internormen
technology

World Wide Competence

filter technology
fluid management *electronics*
system technology *contamination monitoring*
software solutions *process technology*

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Competence through **experience**

35

INTERNORMEN is a company with worldwide recognition. It is synonymous with technical craftsmanship, entrepreneurial continuity and innovative strength. The name stands for an entire range of products in the field of filter technology including modern software, measuring equipment and analysis systems.

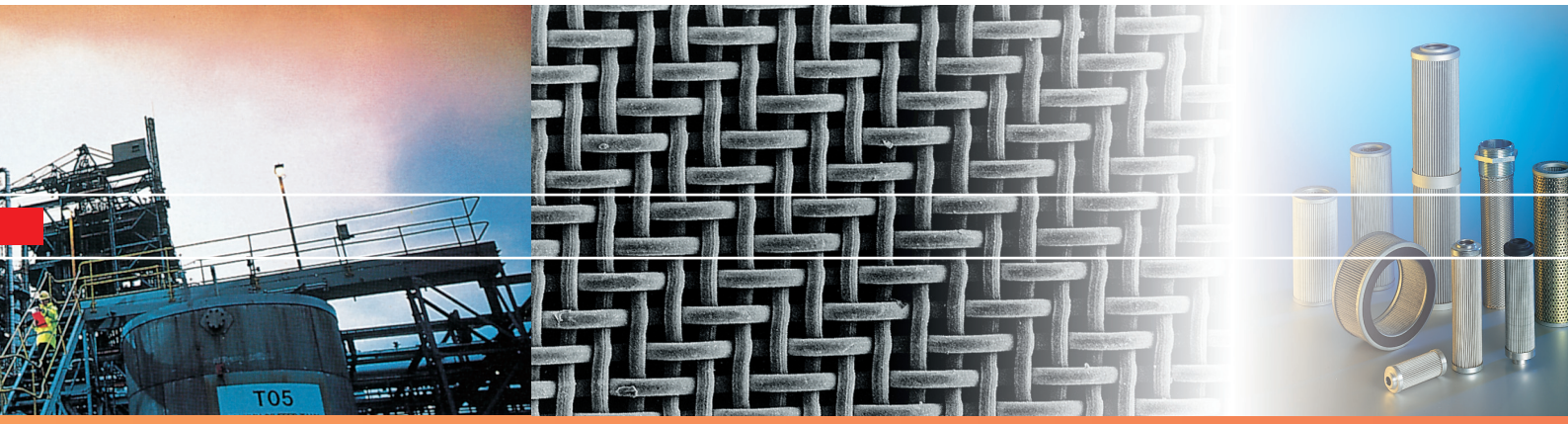
INTERNORMEN Technology has its origin in 1972 when Helmut Franger, along with a few employees, founded *INTERNORMEN-Filter GmbH* in Mannheim. Helmut Franger targeted the manufacturing and distribution of hydraulic and lubrication filters, demanding the highest quality to set a standard on the international market.
The competence of *INTERNORMEN* is based on more than thirty-five years of experience.

Started as a manufacturer of filter elements and housings, *INTERNORMEN* became an international technology company which accompanies its customers into the future as a technologicaly professional partner.

Driving forces in this process are:

- Our wide-range knowledge.
- Our ability to expeditiously implement new technologies.
- The consistent orientation towards our customers' needs.

World Wide Competence



For more than thirty-five years our headquarters have been located in Altlussheim, alongside of the Rhine River. This is where, in an area of about 22.000 square meters (236.806 square feet), our products are being developed and manufactured. The R&D department, administration and central store are also located in this facility. *INTERNORMEN* has 350 highly qualified employees worldwide maintaining a special commitment to the company impartial of a subsidiary's size.

INTERNORMEN's management is already in its second generation, upholding tradition and looking towards the future global market expansion, at the same time.
This management ensures that in future the name *INTERNORMEN* will still stand for a brand of quality, and remain a standard for technical competence and partnership.

Continuous development

Today *INTERNORMEN Technology* masters important key technologies, going far beyond traditional Filter Technology:

Filter Technology
Fluid Management
Electronics
System Technology
Contamination Monitoring
Software Solutions
Process Technology

This enables us to further strengthen our technology- and market position and extend our global leadership in the field of technology.

Master the future through experience - this is what counts.

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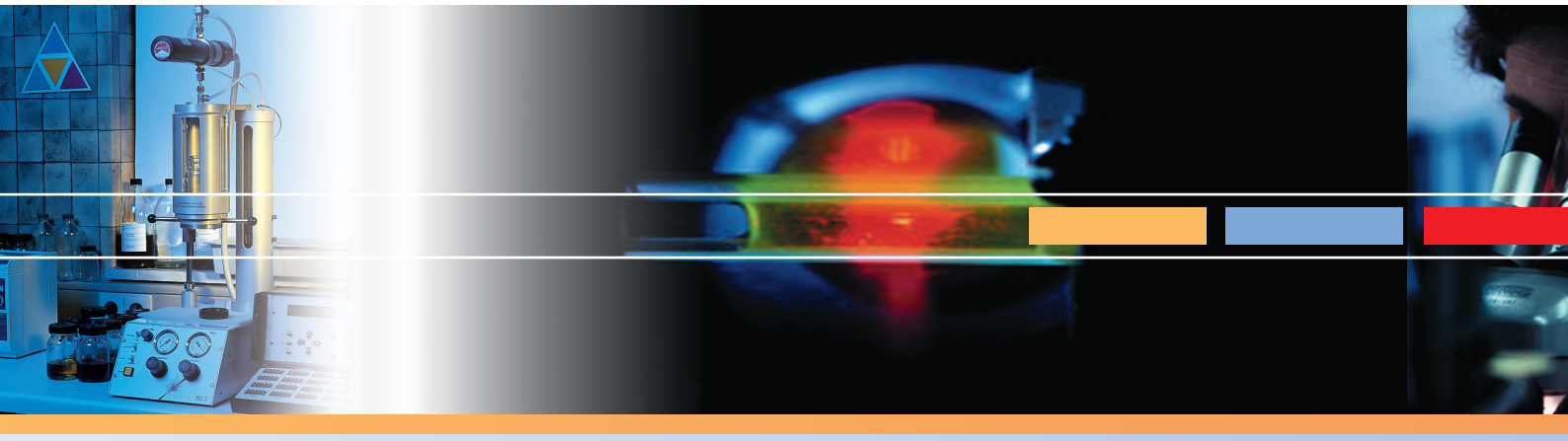

Competence through **research**

Altlussheim is approx. 20 min. away from Mannheim, right on the "Asparagus Route" in Baden ("Badische Spargel-strasse") near Speyer, noted for its famous cathedral.

Our physicists, chemists, engineers and technicians are concentrated in a kind of "think-tank" always searching for the perfect solution. This is also the home of our important research and development center.

Craftsmanship in series production

For *INTERNORMEN*, the reliability and quality of its products is the first priority. Therefore, quality, as a common hallmark of all products and services, is a fundamental element of the *INTERNORMEN* corporate strategy. All products are designed and made ready for production in-house.

INTERNORMEN invests far more capital in research and development than other companies in this field. The company's objective is to develop products that comply with market requirements, with exemplary usefulness and which are able to offer a highly competitive price-performance ratio. Already in this phase, a "brainstorming department" begins its activity with being in close contact with the customer, in order to guarantee from the beginning that the later product will satisfy all practical requirements.

Constructive ideas on the test stand

All great ideas, produced by *INTERNORMEN* research and development and design teams, are then being tested in the extensive testing facility in our separate technology center.

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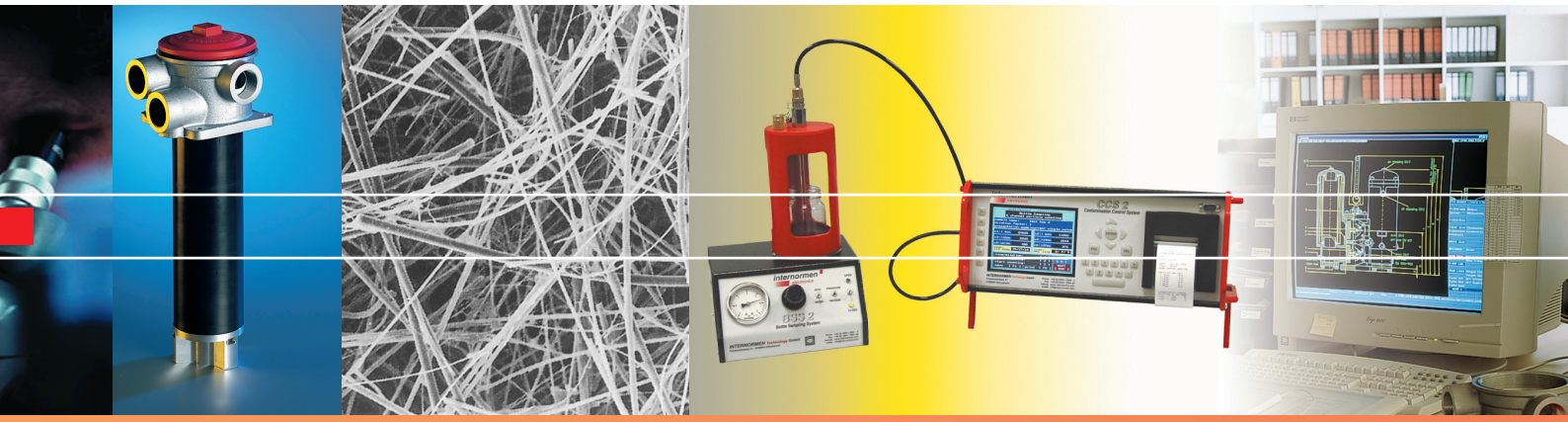

and development

For oil analysis, modern spectral analysis units/atomic emission spectrometers, laser particle counters and porometers are being used.
All data from those tests are being set as standards for the physical construction of the filter and as an improvement of existing standards.

Success through consistency

Today, in the world of bits and bytes, developments from the previous year often become obsolete. However, this cannot be applied to the world of filter technology, which has a totally different time horizon.
Here, innovations are made in the area of high quality fine finishing and by continuous improvement of applied and tested products and technologies. This is precisely the path *INTERNORMEN* has taken.
On one hand, thinking with technical fantasy in long-term developments, but also carrying out patiently long-term detailed research, until a quality breakthrough is achieved.

Our name is quality

The certification according to ISO 9001:2000 is a result of our high quality standards. All of our subsidiaries are working in accordance with this standard.

Certified Quality Management ISO 9001:2000

Also, due to the successfull certification of our filter series by the American Society of Mechanical Engineers, *INTERNORMEN* gained the “Certificate of Authorization” according to ASME Section VIII, Division 1.

The ASME Code regulates requirements in regard to manufacturer certification, quality assurance, construction, material selection, production, testing, trial, inspection and certification of steam and heating boilers, pipeworks, pressure tanks and nuclear components.

CERTIFICATE OF AUTHORIZATION

The American Society of Mechanical Engineers

This certificate accredits the named company as authorized to use the indicated symbol of the American Society of Mechanical Engineers (ASME) for the scope of activity shown below in accordance with the applicable rules of the ASME Boiler and Pressure Vessel Code. The use of the Code symbol and the authority granted by this Certificate of Authorization are subject to the provisions of the agreement set forth in the application. Any construction stamped with this symbol shall have been built strictly in accordance with the provisions of the ASME Boiler and Pressure Vessel Code.

COMPANY:
Internormen Technology GmbH
Friedensstrasse 41
68804 Altlussheim
Baden-Württemberg
Germany

SCOPE:
Manufacture of pressure vessels at the above location only (this authorization does not cover welding or brazing)

AUTHORIZED: January 9, 2006
EXPIRES: January 9, 2009
CERTIFICATE NUMBER: 35,557

Chairman of The Boiler And Pressure Vessel Committee

Director, Accreditation and Certification

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Competence through **competent**

People from *INTERNORMEN* are by your side when you need them

People from *INTERNORMEN* are the decisive factor of our competitiveness. This is why at *INTERNORMEN* - on every level - our employees are very well trained, highly flexible and thinking on a global scale. They listen to their customers, understand their problems and needs, advise them with professional competence, and accompany them in their work - in about 20 different languages.

It is their pleasure to communicate with people from various cultures, to perceive market changes quickly and take appropriate actions, and to work and strive in multicultural teams towards mutual success.

Product optimization and good customer support, are always the worldwide objectives of our experts from different sales departments. At international exhibitions, our experts are also responsible for the presentation of our products and services.

In the meantime, back home, our technical specialists take care of on-time deliveries and quality production.

The most modern ERP technology, with an open interface architecture, facilitates, trouble free and direct, data exchange within the whole group and other external systems.

World Wide Competence

people on every level

Everyday, competent people at all levels are accepting new challenges, and are pleased when problems are resolved in a concise, creative and reliable manner.

One of the most important features of the entire company is the trust, human cooperation within the company, on one hand, and the understanding of customers' problems and tasks, on the other hand.

Why don't you meet people from *INTERNORMEN* ? You are very welcome.

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Competence through **variety**

Ideas coming from research, development and design, are implemented in the manufacturing process. The result are products, which comply with all demands of a final user.

An example is the range wideness of our products. In the field of hydraulic and lubrication filters, *INTERNORMEN* currently offers a product selection with more than 4000 different filter elements, including corresponding filter housings.

Wide range of standard products

Our standard range in the filter technology division includes:

Low, medium and high-pressure filters, return-line filters and suction filters.
All of them are available in single or duplex, and in other various mounting types.

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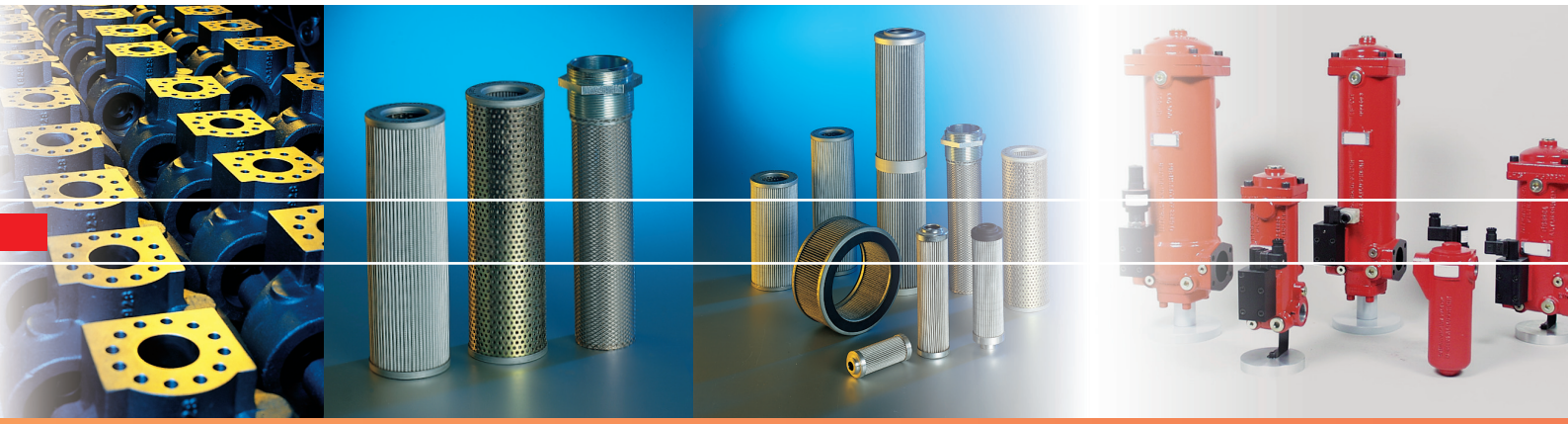

Individual special solutions

Considering of individual customers needs and prompt deliveries are two more advantages *INTERNORMEN* can offer:
special solutions for all kinds of different business areas, from mobile hydraulic technology, and steel industry to the off-shore area.

INTERNORMEN is able to find economical solutions for even difficult types of problems. This success is based on the interdisciplinary combination of development, design and manufacturing, as well as practical engineering and maintaining constant communication with the customers.

The rich and wide range experience gained by providing optimum solutions for various problems, is a solid basis for successfully meeting challenges in nearly every area of application.

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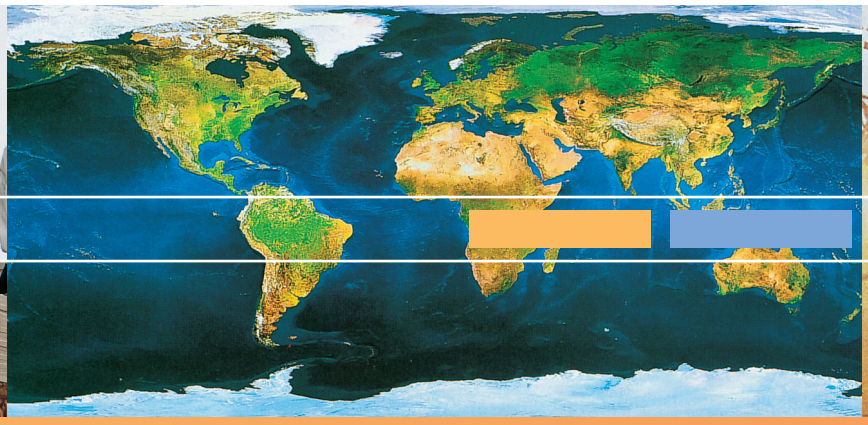

Competence through **internatio**

The company *INTERNORMEN Technology GmbH,* in Altlussheim, is the head office for a group of internationally active companies. A cosmopolitan strategy ensures an optimum care for our customers, as well as our expansion into new markets. Problems we have been asked to solve are as numerous and diverse as the countries and continents in which we are represented. Due to these circumstances, our knowledge and experience is very broad, enabling us to be flexible and versatile.

At home all over the world

Today, *INTERNORMEN Technology* is represented in more than eighty countries, with fourteen independent subsidiaries and six company owned engineering & distribution centres. Installation and service work are carried out on location by systematically trained staff. Well-coordinated logistics guarantee on-time delivery.

In Germany, China, India and the United States, *INTERNORMEN* runs production facilities in order to develop and manufacture special product versions for supplying the regional market.

World Wide Competence

nal cooperation

As one example for the international presence of *INTERNORMEN* we would like to describe our branch in Zanesville Ohio, based in North America.
Built on an area of 22,000 square meters, *INTERNORMEN Technology Inc.* holds a large inventory of products, and produces, among other things, special filters for users and OEM's for all relevant industrial sectors. A team of local experts is on hand for professional advice, sales and services.

Here, as in all other worldwide *INTERNORMEN* subsidiaries, the harmonious cooperation of individual strengths, from headquarters and branches, has proven itself and is the reason for the power and efficiency of the organization as a whole.

This cooperation is the breeding ground for innovative power needed in an ambitious process of development, and focuses that power where *INTERNORMEN*-products and services are specifically needed.

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Filtration solutions for Mobile Hydraulics

internormen
filter technology

INTER NORMEN

Solutions for Mobile Hydraulics

INTERNORMEN Technology
is a leading global manufacturer of high quality hydraulic and lubrication filters, oil service equipment and measurement, diagnostic and analysis products which are divided into different product lines: ***filter technology, fluid management, electronics, process technology, system technology, contamination monitoring, software solutions***

In the field of hydraulic and lubrication filters, ***INTERNORMEN*** currently offers a product selection with more than 4000 different filter elements, including corresponding filter housings.

Specifically for mobile applications, ***INTERNORMEN Technology*** can offer a wide range of products that have been industry standard for many years and have provided our customers with a different kind of filtration - from tank mounted return line filters, in-line or flange mounted high pressure filters, manifold side mounted or manifold bottom mounted pressure filters, to air breathers and suction strainers.

INTERNORMEN's product lines include a wide variety of filter related products like:

- Mobile and stationary off-line filter units ***(Fluid Management)***
- Sensors for metal particle detection, water contamination and oil condition sensors ***(Electronics)***
- In-line measuring systems ***(Electronics)***
- On-line and off-line measuring systems, like e.g. Bottle (BSS 2), Contamination Control System (CCS 4) or the multi-analysis system OCM 01 ***(Electronics)***
- Laboratory analysis and measurement systems ***(Electronics*** and ***Contamination Monitoring)***
- Clogging indicators and sensors: optical, electrical, optical-electrical and electronic ***(Filter Technology)***
- The Filter Expert System CD: software for selection and performance simulation of filters ***(Software Solutions)***

Brands we interchange with:
- Hydac
- EPE
- Mahle
- Pall ...and many others

Our advantages:
- Superior dirt holding capacity
- Highest Δp capability
- Best filtration efficiency
- Customized solutions

In-Tank Filters

TEF
Pressures up to 10 bar
Flow Rates up to 8000 l/min

In-Tank Return Line TEF series

Applications:
Tank mounted return-line filters
Element options:
Paper, interpor fleece, stainless steel wire mesh
User Benefits: Lightweighted, tank mounted return-line filters, model TEF 41-7201 are easy to change and reduce the possibility of oil spillage during element change (environmental concern). Filters have a removable bowl which prevents contamination from entering reservoir during filter element change. Multiple inlet ports are possible.

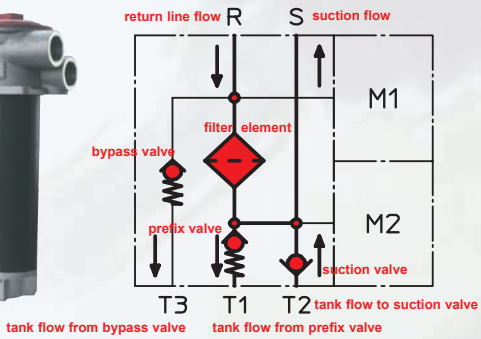
TEFB
Pressures up to 10 bar
Flow Rates up to 300 l/min

In-Tank Return Line with additional airbreather TEFB series

Applications:
Tank mounted return-line filters with additional breather filter
Element options:
Paper, interpor fleece, stainless steel wire mesh
User Benefits: Lightweighted, tank mounted return-line filters, model TEFB 41-310 are easy to change and reduce the possibility of oil spillage during element change (environmental concern). No additional breather port in the tank needed.

TRS/TNRS
Pressures up to 10 bar
Flow Rates up to 450 l/min

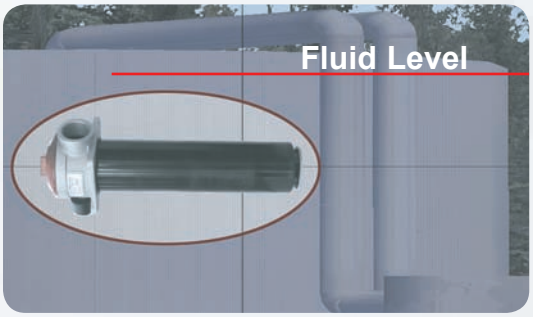
Return- / Suction Combination Filters TRS/TNRS series



Applications:
Tank mounted return-line filters with suction connection for mobile hydraulic applications with minimum 2 independent hydraulic circuits
Element options:
Paper, interpor fleece, stainless steel wire mesh
User Benefits:
Tank-top mounted in-line filters supply clean suction flow and prevent cavitation. Custom designs possible.

TRW
Pressures up to 10 bar
Flow Rates up to 300 l/min

Return Filters under the fluid level TRW series



Applications:
Horizontal tank mounted return-line filters
Element options:
Paper, interpor fleece, stainless steel wire mesh
User Benefits:
Space-saving mounting under the fluid level (does not need an additional check valve)

Learn more at ***http://www.internormen.com/cms/en/products/filtertechnology***

Pressure Filters

MNL/ML
Pressures up to 160 bar
Flow Rates up to 450 l/min

MNL/ML series Medium Pressure Filters

Applications:
In-line mounted pressure filters (partial aluminum construction)
Element options:
Interpor fleece, stainless steel wire mesh
User Benefits:
Economical, lightweighted filter range for low to medium pressure applications. Requires only minimal clearance during element change and therefore saves valuable space.

HP
Pressures up to 420 bar
Flow Rates up to 1350 l/min

HP series High Pressure Filters

Applications:
In-line or flange mounted high pressure filters
Element options:
Interpor fleece, stainless steel wire mesh
User Benefits:
In-line or flange mounting possible with various different port and Δp indicator options. Very high flow rates with a single housing possible.

MDV
Pressures up to 200 bar
Flow Rates up to 150 l/min

HPV
Pressures up to 420 bar
Flow Rates up to 450 l/min

MDV/HPV series Pressure Filters with Cold Start Valve

Applications:
In-line pressure filters with differential pressure (cold start) valve
Element options:
Interpor fleece, stainless steel wire mesh
User Benefits:
Permanent supply of clean oil guaranteed.
If the element is clogged, change is forced, this means no damage is possible to the downstream components.
Forced (third port) return to the reservoir.

Learn more at ***http://www.internormen.com/cms/en/products/filtertechnology***

Special Filters

Return In-Line Filters RF series

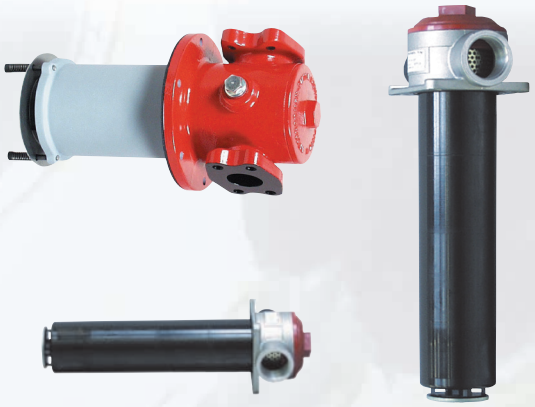
RF
Pressures up to 10 bar
Flow Rates up to 320 l/min

Applications:
Return-line filters for connection in return lines
Element options:
Paper, interpor fleece, stainless steel wire mesh
User Benefits:
Economical line mounted return filters.
Light-weighted aluminum design.
Several and multiple ports available.
Hose connections possible.

In-Tank Suction Filters AS/TS/TSW series

AS - Flow Rates up to 630 l/min
TS - Flow Rates up to 700 l/min
TSW - Flow Rates up to 120 l/min

Applications:
Suction filters, directly mounted to the reservoir vertically (TS-series) or horizontally (TSW-series)
Element options:
Paper, interpor fleece, stainless steel wire mesh
User Benefits:
Suction filters which can be serviced from the outside of the reservoir with no additional check valve needed.



Manifold Mounted Filters FHP/HPP/HPF series

FHP
Pressures up to 250 bar
Flow Rates up to 150 l/min

HPP/HPF
Pressures up to 315 bar
Flow Rates up to 1350 l/min

Applications:
FHP/ HPF - Pressure filters, manifold side mounted
HPP - Pressure filters, manifold bottom mounted
Element options:
Interpor fleece, stainless steel wire mesh
User Benefits:
Simplified mounting, which saves valuable space.
Provides filtration directly at the needed point. Prevents dirty fluid from passing downstream during element change.

Spin-on Filters

WPL
Pressures up to 10 bar
Flow Rates up to 450 l/min

WPL series Spin-on Filters

Applications:
In-line filter series, mounted into pressure and return lines for all hydraulic systems.
Element options:
Interpor fleece, paper
User Benefits:
Easy maintenance.
Die-cast aluminum construction saves overall weight.
Can be used as suction or return filter.

Accessories

ASF 25 - ASF 275
Flow Rates up to 400 l/min

SUCTION STRAINERS

Applications:
Suction Strainers are used in the tank to protect the hydraulic pump from large contaminants.
Element options:
Stainless steel wire mesh with by-pass options
User Benefits:
Protect pumps from large particles
Ensure long service life
Reduce maintenance and replacement costs
Available in BSPP up to 3”

Flow Rates up to 3500 l/min

FILLER / AIR BREATHERS

Application:
Air breathers assure that no contamination reaches the tank through air exchange and condesation of water in reservoirs.
Element options:
NBF Interpor fleece, Paper EBF Paper
TBF Paper BF-WP Interpor fleece, Paper
BFD-series Silicagel, Interpor fleece
User Benefits:
Protect systems from airborne debris and / or moisture

CLOGGING INDICATORS

Application:
Clogging indicators are warning devices that should be used on all filter applications to ensure in time change of elements, allowing maximum element service life.
User Benefits:
Wide variety available in differential pressure indicators, electronic indicators and suction indicators
Prevent system downtimes
Prevent premature element change

Other products offered by internormen technology

internormen fluid management

Mobile and stationary off-line filtration units with options like heat exchanger and watersorp elements, and vacuum dehydration systems (Fluid Purifier Systems)

http://www.internormen.com/cms/en/products/fluidmanagement




internormen electronics

Contamination Control Systems (Laser Particle Counters) with options like Bottle Sampling System as well as mobile and stationary water sensors and electronic sensor systems.

http://www.internormen.com/cms/en/products/electronics



internormen contamination monitoring

Mobile sampling and oil analysis sets as well as in-house laboratory services including oil analysis and element checks, performing of optical emission spectrum and infrared spectroscopy analyses.

http://www.internormen.com/cms/en/products/contaminationmonitoring

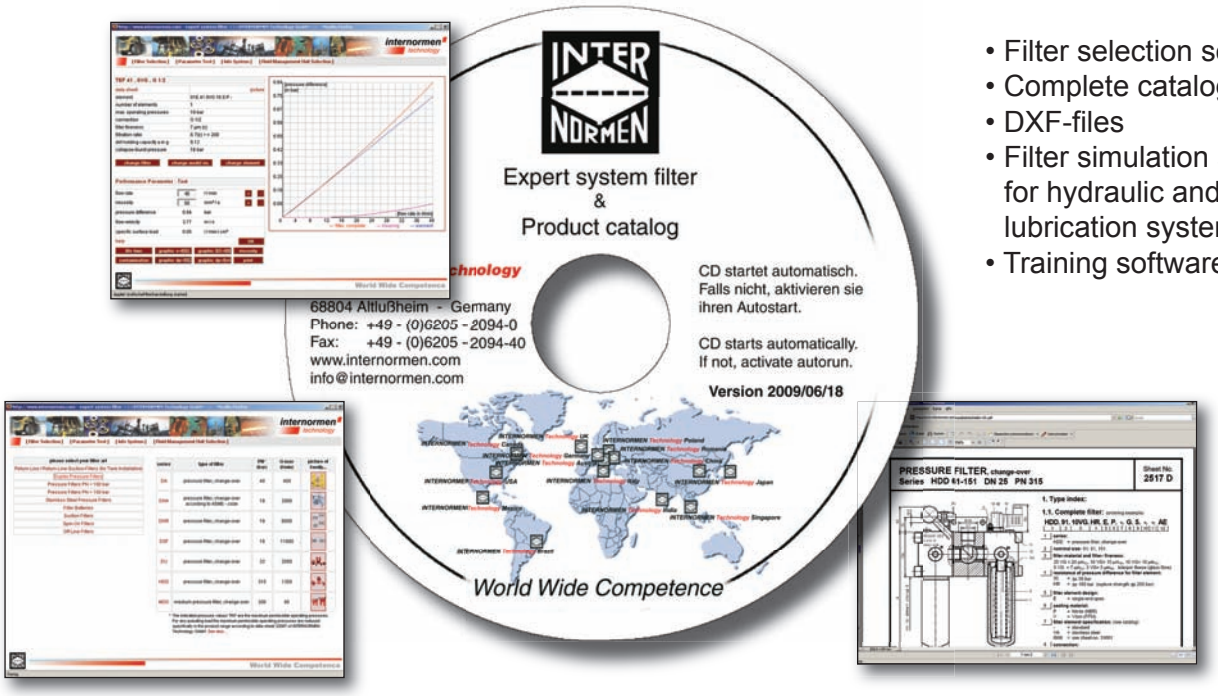


Become a filtration expert!

Design and explore the filter you need using our CD-ROM

Including:

- Filter selection software
- Complete catalogue
- DXF-files
- Filter simulation software for hydraulic and lubrication systems
- Training software



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GB-05/2010
326035

Contamination Monitoring

Measurement, diagnostic and analysis technology

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INTER NORMEN

Particulate contamination

Particulate contamination is the most common reason for failure and downtime of hydraulic and lubricating systems.

Therefore, knowing the precise level of contamination can be essential for the efficiency and functionality of a system.

This knowledge enables the operator to influence the situation with appropriate counteractive measures. By doing so the best possible equipment availability can be ensured.

Effects of particulate contamination

- Accelerated oil ageing
- Shortened fluid lifetime
- Failure of additives
- Corrosion, cavitation, abrasion, erosion
- Increased wear

Particle

Contact us to learn more about the wide range of our filtration products!

Applications of *INTERNORMEN* Contamination Monitoring Systems

- Immediate and precise diagnosis of a hydraulic system's condition
- Monitoring of filter performance with respect to the standards required by certain system components
- Accurate determination of the optimal time for performing filter element changes
- Reliable monitoring of running-in time of new systems
- Diagnosis of hydraulic components, such as pumps, bearings or sealings
- Defining the condition of new fluids during start up of a system
- Verification of effective off-line filtration
- Proof of how changed external conditions influence the particle level in a hydraulic system

Element Spectral Analysis - Potential Sources of Metals in Oil

Element	Potential Sources
Aluminium	abrasives, aluminium mill, bauxite, bearing metal, catalyst, coal contaminat, fly ash, foundry dust, granite, paint
Antimony	journal bearings, solder
Arsenic	antioxidans, bactericide, mineral oil
Barium	engine additive, grease
Berylium	aircraft construction, bearings, mineral oil
Bismuth	journal bearings
Boron	EP-additives, coolant inhibitor
Cadmium	journal bearings, platings
Calcium	cement dust, detergent, fuller´s earth, grease, gypson, hard water, lignite, limestone, mining dust, oil additive, road dust, rubber salt water, slag
Carbon	abrasives, carbides, carbon steel, graphite, hard metal, mineral oil, soot, synthetic material
Chromium	chrome plating, hardcoat, paint, ring plating, stainless steel, tooling steels
Cobalt	additives, hard metal, tooling steels
Hafnium	reactor technique
Iron	asbestos, cast iron, catalyst, cleaning detergent, fly ash, mill scale ore dust, paint, rust, talc, zeolit
Lead	babbit, bearing overlay, gasoline additive, solder, paint
Lithium	dust, grease, salt water
Magnesium	alloy of aluminium, engine additives, fuller´s earth, hard water road dust, salt water, turbine
Mercury	bactericide, batteries
Molybdenum	alloying metal, EP-additives, MoS_2, rings
Nickel	hard stell, plating, stainless steel, stellite
Niobum	turbine blades
Phosphorus	AW / EP-additives, cleaning detergents, oil additives, surface finish
Platinum	catalyst, mineral oil
Potassium	additives, coolant inhibitor, fly ash, granite, paper mill dust, vertilizer
Scandium	ICP-reference
Silicium	antifoam additives, asbestos, cement dust, coolant additives, fly ash foundry dust, glass, granite, limestone, mica, road dust, slag steel, synthetic lubricant, talc, wet clutch
Silver	bearing overlay, needle bearings, solder
Sodium	additives, base stocks, coolant inhibitor, dirt, fly ash, grease, paper mill dust, road dust, salt, salt water
Sulphur	gypsum, mineral oil, MoS_2, rubber
Tantal	hard metal, toolings steel
Tellur	mineral oil
Titanium	hard metals, paints, turbine bearings, turbine bleads
Tungsten	hard metal, toolings steel
Uranium	ore dust, road dust (some)
Vanadium	mineral oil, turbine blades, valves
Yttrium	ICP-reference
Zinc	AW additives, brass, galvanzing, grease, oil additives, plating, solder
Zirkon	abrasives, hard steel, reaktor technique

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Guidelines for Determining, Achieving, and Maintaining Target Cleanliness Levels with High Performance Filtration (Beta Ratio ≥ 200)

Most Sensitive System Component	Low Pressure Under 140 Bar (moderate conditions)		Medium Pressure 140-210 Bar (or low pressure plus severe conditions) (1		High Pressure 210 Bar and Over (or medium pressure plus severe conditions) (1	
	ISO Target Levels	Filter Micron Ratings (2	ISO Target Levels	Filter Micron Ratings (2	ISO Target Levels	Filter Micron Ratings (2
PUMPS						
Fixed External Gear	22/18/14	25VG	20/16/13	10VG	20/16/13	10VG
Vane	22/18/14	25VG	20/16/13	10VG	20/16/13	6VG
Fixed Piston	20/16/13	10VG	20/16/13	6VG	19/15/11	3VG
Variable Piston	20/16/13	6VG	19/15/11	3VG	18/14/10	3VG
VALVES						
Check Valve	22/18/14	25VG	20/16/13	10VG	20/16/13	10VG
Directional (solenoid)	22/18/14	25VG	20/16/13	10VG	20/16/13	10VG
Standard Flow Control	22/18/14	25VG	20/16/13	10VG	20/16/13	10VG
Cartridge Valve	20/16/13	10VG	20/16/13	6VG	19/15/11	3VG
Proportional Valve	19/15/11	3VG	18/14/10	3VG	17/13/9	3VG
Servo Valve	18/14/10	3VG	17/13/9	3VG	16/12/8	3VG
ACTUATORS						
Cylinders, Vane Motors, Gear Motors	23/19/15	25VG	22/18/14	16VG	20/16/13	6VG
Piston Motors, Swash Plate Motors	20/16/13	10VG	20/16/13	6VG	19/15/11	6VG
Hydrostatic Drives	19/15/11	6VG	18/14/10	3VG	17/13/9	3VG
TEST STANDS	15/11/7	1VG	15/11/7	1VG	15/11/7	1VG
LUBRICATING OILS						
Paper Machine Oils	20/16/13	10VG	not applicable	not applicable	not applicable	not applicable
Steam Turbine Oils	19/15/11	6VG	not applicable	not applicable	not applicable	not applicable
Diesel Engine	20/16/13	10VG	not applicable	not applicable	not applicable	not applicable
Mobile Gear Box	20/16/13	10VG	not applicable	not applicable	not applicable	not applicable
Industrial Gear Box	19/15/11	6VG	not applicable	not applicable	not applicable	not applicable
Journal Bearing	19/15/11	6VG	not applicable	not applicable	not applicable	not applicable
Roller Bearing	18/14/10	3VG	not applicable	not applicable	not applicable	not applicable
Ball Bearing	17/13/9	3VG	not applicable	not applicable	not applicable	not applicable

Notes: (1 Severe conditions may include high flow surges, pressure spikes, frequent cold starts, extremely heavy duty use or the presence of water.

(2 Two or more systems filters of the recommended rating may be required to achieve and maintain the desired Target Cleanliness Level, for more details and accuracy use our filter simulation software.

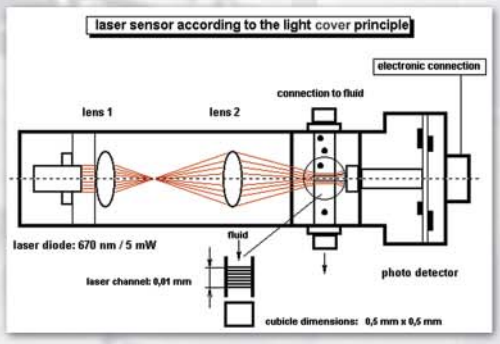
INTERNORMEN monitoring systems provide the opportunity of mobile and stationary fluid monitoring and particle counting. All diagnoses are made immediately and accurately according to available and valid standards.

Benefit from the advantages of immediate diagnosis opposite to external lab analysis

Our numerous products for particulate contamination measurement are an essential part of any broad maintenance concept. The systems are meant for in-line and off-line operation as well as for various on-line applications.

All of our systems can be connected to an external computer in order to control operations and manage measurement data using a MS-Excel based Data-Manager.

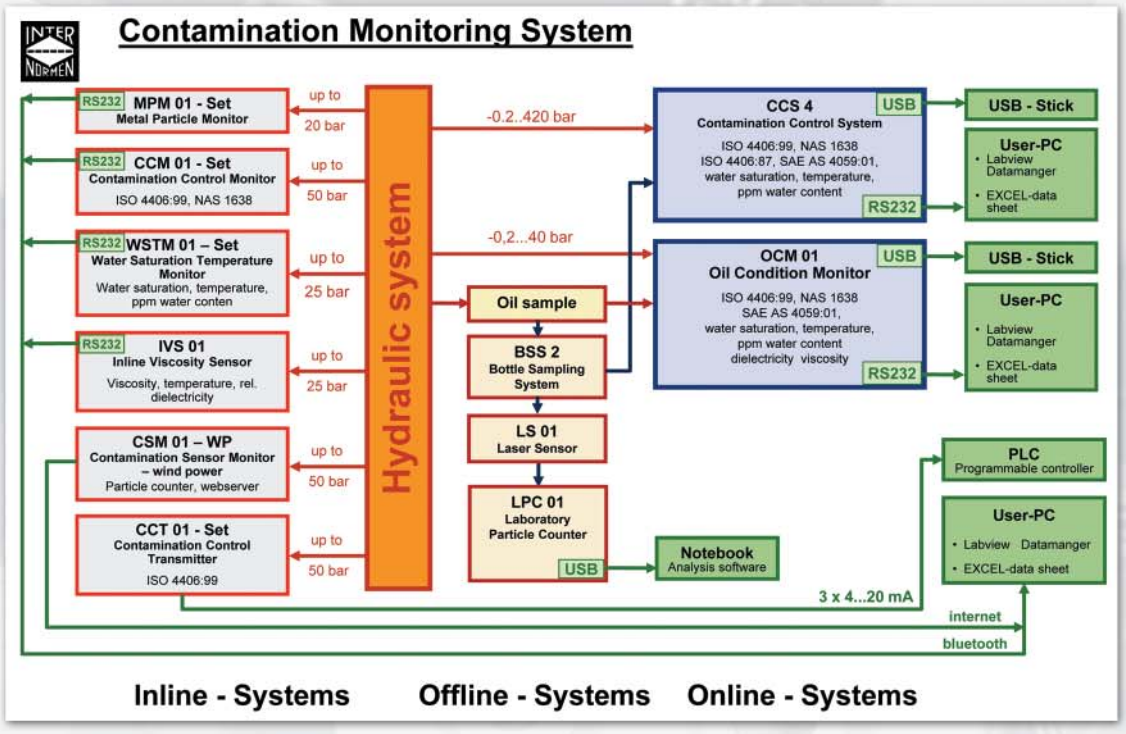
The CCM 01-Set and CCT 01-Set are inexpensive in-line monitoring systems for permanent and stationary operations based on the successful CCS 2 (now CCS 4) technology.



Technology

The *INTERNORMEN* particle counters operate with different sensors. The CCS 4, the CCM 01-Set and the CCT 01-Set are equipped with a laser sensor, which, based on the light blockade principle, detects particles in a fluid. For example, the sensor integrated in the CCS 4 determines the current particulate level of the pressure or lubricating fluid in combination with an integrated dosing system which automatically adapts the pressure of the connected system. On the other hand, both, the CCM 01-Set and the CCT 01-Set, generate results by an additional measurement of the volume flow rate. The MPS sensors detect coarse metal particles by using an inductive measuring technique.

Contact us to learn more about our water-in-oil monitoring solutions!



Oil Contamination Monitoring Systems

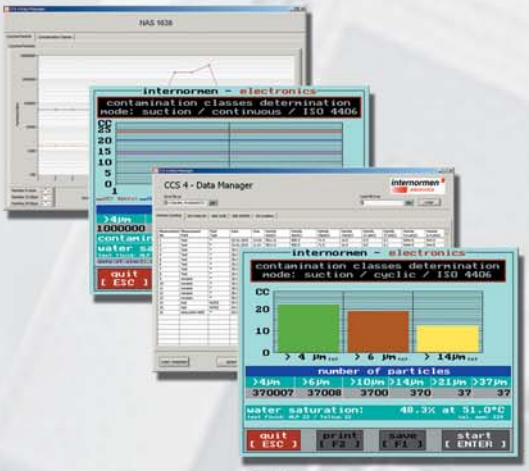
Lab quality results

CCS 4 - Contamination Control System

- The CCS 4 is a mobile measuring system meant for exact determination of the particle size distribution of the contamination, water saturation and fluid temperature
- Measurement results obtained by the CCS 4 are meant to be a base for evaluating the wear condition of hydraulic components, adherence to norms and early detection of damages
- Can be handled in on-line pressurized operating modes as well as for depressurized samplings (e.g. tank sampling)

Features:

- Optical particle counting performed by a laser sensor
- Counting system: > 4 µm(c), > 4,6 µm(c), > 6,0 µm(c), > 6,4 µm(c), > 10 µm(c), >14 µm(c), > 21 µm(c), > 38 µm(c)
- Exact evaluation of contamination classes according to ISO 4406:99, ISO 4406:87, NAS 1638 and SAE AS 4059
- Measurements are being displayed as particle numbers according to the above mentioned contamination classes, water saturation and temperature, theoretical water content in ppm
- Measuring programmes: special automatic measuring and conditioning operations, such as single, continuous, cyclic and off-line measurements
- Lithium-polymer rechargeable battery
- Internal storage of measurements (storage capacity of 4 x 100 measurements)
- Output of current and saved measurement values by a RS232-interface
- Output of saved measurements by an USB-interface on an USB flash drive (TXT file)
- Data management using an external computer (export in MS EXCEL)
- Output of saved measurement data by a RS232-interface.
- Data management using an external computer and the LabVIEW Data Manager Software (export in MS EXCEL)



Software

Since external factors have a huge and extensive influence on the lubricant during operation, knowing the above mentioned important parameters enables the user to evaluate the precise condition of a system. Having this information will help to promptly initiate actions and cost-saving measures before any failures can occur.

Technical data

Power supply	12 V DC
External power supply unit	100...240 V AC/ + 15 V DC/ 3,5 A, 50-60 Hz
Protection class	IP 67 (with closed cover)
Suction operating range	-0,2…0,2 bar
Pressure operating range	1,5…420 bar
Viscosity range	10…400 mm²/s
Fluid temperature range	0…70°C
Ambient temperature range	0…50°C
Calibration laser sensor	ISO MTD in oil (ISO 11171:2000)
Flow rate	50 ml / min
Water saturation range	0 – 100 %
Temperature range	-30... 70°C

Wide range of accessories

RS 232 and USB interface

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Oil Condition Monitoring Systems

IVS 01 - In-line Multifunction Oil Condition Sensor

- In-line multifunction sensor meant for oil condition monitoring in hydraulic and lubrication systems
- Able to determine the ageing condition of oil and detect various mixtures by measuring and detecting changes of viscosity, temperature and relative dielectricity before system failures can occur
- Enables the user to programme an automatic oil condition monitoring function, make a precise assessment of the condition of a system and perform maintenance accurately timed
- Simple screw-in assembling G 3/4

Technical data

Measurement range of the sensor:	
Dynamic viscosity	5...1000 mPas
Temperature	-40...+130°C
Rel. dielectricity	1...10
	IP 65
Operating parameters:	
Max. admissible pressure	25 bar
Ambient temperature of the evaluation electronics	0...70°C
Connection thread	G ¾
Protection class	IP 67
Power supply	24 V DC
Output data	4 x 4...20 mA (dyn. viscosity, temperature, rel. dielectric constant, oil condition) or CANopen

OCM 01 - Oil Condition Monitor

- Mobile diagnostic system able to determine the ageing condition of oil in hydraulic and lubrication systems by measuring solid contamination, water saturation, temperature, viscosity and relative dielectricity
- Theoretical water content in ppm
- Applicable for both pressure and suction lines (can as well be used when working with foamed oils in gears)
- Enables the user to make a precise assessment of the condition of a system and perform a cost-effective maintenance on time

Technical data

Operating parameters:	
Voltage supply	90...230 V, 50/60 Hz
Pressure operating range	-0,2…40 bar
Viscosity range	22...780 mm²/s
Max. permitted oil temperature	0...70°C
Ambient temperature	0...50°C
Protection class	IP 67 (with cover closed)
Measurement parameters:	
Particle counting according to ISO 4406:99, NAS 1638, SAE AS 4059	
Automatic particle counting in 8-channels	4,0 $\mu m_{(c)}$, 4,6 $\mu m_{(c)}$, 6,0 $\mu m_{(c)}$, 6,4 $\mu m_{(c)}$, 10 $\mu m_{(c)}$, 14 $\mu m_{(c)}$, 21 $\mu m_{(c)}$, 37 $\mu m_{(c)}$
Coincidence barrier	10.000 particles / ml
Calibration	ISO MTD in oil (ISO 11171:2000)
Measuring accuracy	± 1 (contamination class)
Water saturation	0…100%
Dynamic viscosity	0,8…700 mPas
Temperature	0...70°C
Relative dielectricity constant	1…10

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In-line Monitoring Solutions

MPM 01-Set - Metal Particle Monitor System

- Consists of a metal particle sensor MPS, based on an inductive measurement technique, and the control and display unit MPM 01 for direct measurement survey
- The MPM 01-Set can be delivered with the MPS 01.2 sensor or the MPS 03.1 sensor
- Detection and counting of metal particles >200µm
- Designed as an inexpensive in-line monitoring solution for stationary and permanent operation
- Suitable for installation in new or existing systems
- Internal storage of measurements
- Automatic monitoring function with control signal output if set thresholds are exceeded
- RS 232 interface
- Data-transfer to an external PC
- Data management using a MS-Excel based LabVIEW Data-Manager software
- Comfortable and user-friendly software
- Numeric 4-line display
- Robust case

MPS 01.2 - Metal Particle Sensor

- Metal particle sensor based on an inductive measurement technique for hydraulic and lubricating fluids
- Detects metal particles >200µm
- Designed as an inexpensive in-line monitoring solution for stationary and permanent operations
- Suitable for installation in new or existing systems
- Two output signals; counting impulses (24V, 7ms) as well as a diagnostic signal
- The MPS 01.2 can be used with or without the MPM 01 display unit

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CERTIFIED!

Technical data

Fluid compatibility	Hydraulic and lubricating fluids, as well as synthetic esters
Measuring	Inductive method
Metal particles	>200µm
Detection rate	max. 100 particles/sec
Pressure	up to 20 bar
Temperature range	-40...80°C
Flow velocity	50 l/min
Connections	Hose or flange
Electronic	M12, 4 poles
Power supply	24 V DC

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In-line Monitoring Solutions

MPS 03.1 - Metal Particle Sensor

- Inexpensive metal particle sensor for monitoring of large-scale gear boxes and detecting incipient heavy wear by indentifying an increasing number of particles within a time unit
- Also applicable for component cleanliness monitoring e.g. on flushing test stands
- Detects metal particles in moving hydraulic and lubricating fluids, independent of the metal type and the accurate particle size. *The minimum particle size which can be detected is defined as an iron ball with a diameter of 350 µm at a volume flow (through the channel) of 60 l/min*
- The sensor has to be permanently installed into the hydraulic or lubricating circuit, so that the fluid, which is being monitored, permanently flows through the measuring channel of the sensor. When passing through the channel, the metal particle is being detected which is indicated by a standardise

Technical data

Detection limit	> 350 µm Fe
Measurement limit	max. 100 particles/s
Operating pressure	≤ 20 bar
Ambient temperature	-40°C…70°C
Fluid temperature range	-30°C**…85°C
Survival temperature range	-40°C…85°C
Max. volume flow	320 l/min
Min. volume flow	60 l/min
Power supply	+24 V DC
Electrical power consumption	max. 5W
Outputs	1x signal (24 V impulses ~ 7ms) 1x diagnostic output (24 V, if free from defects)
Max. electric current at the output	10mA
Connection size	SAE flange 1 ½" 3000 PSI
Mass	2 kg

***The minimum of the flow rate has to be ensured!*

Note:

The working temperature range of the MPS 03.1 depends also on the VT – behaviour of the fluid. For applications with very high viscous fluids a regular operation of the sensor is only possible within a temperature range in which a sufficient oil flow (>60 l/min) can be ensured!

Today wind power is considered to be one of the most important energy sources and today's wind turbines a cost effective solution for constantly growing global energy needs.

INTERNORMEN ***Windpower Products*** have been proven to be the key to preventive maintenance which maximizes efficient power generation and prevention of major breakdowns on critical turbine components.
In addition to the **Metal Particle Sensors** and **MPM 01-Set** we are a supplier of filtration and lubrication systems for gears and for main bearings of wind turbine gears, contamination and condition monitoring systems, heating and cooling systems, maintenance and filtration units.

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In-line Monitoring Solutions

CCM 01-Set - Contamination Control Monitor System

- Particle counter, with a laser sensor for hydraulic and lubricating fluids (PFS 01) and a monitoring and display unit CCM 01
- Designed as an inexpensive in-line monitoring solution for stationary and permanent operations
- Reliable determination of contamination classes according to ISO 4406:99 or NAS 1638 (switchable)
- CAN-interface acc. to ISO 11898, CAN 2.0A, CANopen compatible
- Suitable for installation in new or existing systems
- Results displayed immediately
- Internal storage of measurements
- Automatic monitoring function with control signal output if set thresholds are exceeded
- RS 232 interface
- Data transfer to an external PC
- Data management using a MS-Excel based LabVIEW Data-Manager software
- Comfortable and user-friendly software
- Numeric 4-line display
- Robust case

CCM 01 display unit

PFS 01 laser sensor

Technical data

Fluid compatibility	Hydraulic and lubricating fluids as well as synthetic esters
Laser	650 nm
Counting channels	4; sizes (switchable): $\geq 4\mu m_{(c)}$, $\geq 6\mu m_{(c)}$, $\geq 14\mu m_{(c)}$, $\geq 21\mu m_{(c)}$ **or** $\geq 6.4\mu m_{(c)}$, $\geq 14\mu m_{(c)}$, $\geq 21\mu m_{(c)}$, $\geq 37\mu m_{(c)}$
Pressure	up to 50 bar
Temperature range	0...70°C
Calibration	ISO MTD in oil
Connection	1" or 3/4" pipes
Power supply	24 V DC

PFS 01 - Laser Sensor

- Consists of two sensor elements, a laser sensor for particle counting and a flow sensor for volume flow measurements
- Advantages of the thermal volume flow sensor: no mobile component parts, no abrasion, simple electronic evaluation procedures, the sensor is insensitive to contamination
- The laser sensor integrated in the PFS operates based on the light blockade principle
- Advantages over precision sensors: compact construction, lower costs, applicable for perma nent and spontaneous monitoring
- Calibrated according to ISO 11171:99
- Suitable for installation in new or existing systems
- The PFS 01 sensor cannot be used without a display unit (CCM 01 or CCT 01)

Technical data

Calibration of the particle size	ISO MTD in oil (ISO 11171:2000)
Max. acceptable operating pressure	≤ 50 bar
Max. oil temperature (short term)	70 °C
Viscosity range	10...400 mm²/s
Ambient temperature	0...45° C
Max. acceptable volume flow	50 l/min
Connections	Pipes, 1“ or ¾“
Protection class	IP 65
Weight	1,5 kg

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In-line Monitoring Solutions

CCT 01-Set - Contamination Control Transmitter System

- Particle counter with the PFS 01 laser sensor for hydraulic and lubricating fluids
- Contamination monitoring at different test stands, for hydraulic components, filter service devices, wind energy plants, mobile and stationary hydraulic systems in general
- Inexpensive and reliable in-line system for contamination class control
- Consists of the contamination class transmitter CCT 01 with an integrated three-channel particle counter combined with the particle flow sensor PFS 01
- CAN-interface acc. ISO 11898, CAN 2.0A, CANopen compatible
- When used as a contamination class transmitter, the CCT 01 transforms measurement signals, received from the laser sensor, into contamination classes which are being displayed as analogue outputs (4...20mA)
- The emitted signals are consistent with the contamination classes based on ISO 4406:99 (≥ 4 $\mu m_{(c)}$, ≥ 6 $\mu m_{(c)}$, ≥ 14 $\mu m_{(c)}$)
- Measurements can be saved in user-defined intervals (up to 1000 measurements)
- By using an USB-interface the CCT 01 can be PC-configured, calibration values can be set and current or saved particle numbers can be transmitted to a PC

Technical data

Interface	USB (for configuration) M 12 - connector, CAN - option
Dimensions	201 x 85 x 35 mm x mm x mm
Mass	380 g
Output signals	3 x 4...20 mA

A complex interaction of market and technological innovations, brought up outstanding solutions - accurate, immediate, mobile and stationary fluid monitoring and particle counting according to ISO, NAS and SAE standards.

.... making your systems operate at their maximum capacity.

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Laboratory Analysis and Measurement Systems

LPC 01–Set - Laboratory Particle Counter

- The LPC 01–Set is meant for counting of solid contaminants and precise determination of contamination classes in hydraulic and lubrication oils
- The Set consists of the laboratory particle counter LPC 01, the laser sensor LS 01 and the Bottle Sampling System BSS 2
- The Set can easily be handled, with selectable counting channels and 4096 available channels for determining the grit size progression
- An integrated evaluation software enables the user to get data analysis and graphic diagrams of performed measurements, which can simply be transferred to MS Excel.

Technical data LS 01

Measuring principle	Particle determination according to the light blockade principle
Pressure	0 …4 bar
Viscosity range	10…400 mm²/s (pressure 4 bar)
Limit of coincidence	24000 particles / ml
Calibration	ISO MTD in oil (ISO 11171:2000)

Technical data LPC 01

Measurement display	Particle numbers; Contamination classes according to ISO 4406:99, NAS 1638 and SAE AS 4059
Counting System	Theoretical 4096 channels, 12 Bit
Pressure range	0…4 bar
Viscosity range	10…400 mm²/s (pressure 4 bar)
Volume of measurement	20 ml
Measurement connection	1 x mini measuring screwed joint M 16 x 2 1 x Plug-in coupling for hose DN 6
Power supply	External adaptor 100…250 VAC 50-60 Hz / 12 V DC
Interface	USB
Weight	approx. 3,4 kg
Dimensions	172,5 mm x 275,2 mm x 76 mm

INTERNORMEN **Laboratory and Analysis Measurement Systems** are mobile sampling and oil analysis sets meant for professional vendor inspection, condition and contamination control of operating fluids.
In addition to the **particle counter** LPC 01 we are offering **oil analysis systems** (PAS 01, Microscope-Set, Drop ball viscosimeter) and **water analysis systems** (WAS 01).

Additional service: in-house laboratory service being carried out by experts using latest measuring and testing equipment (e.g. oil analysis and filter element checks, performing optical of emission spectrum and infrared spectroscopy analyses).

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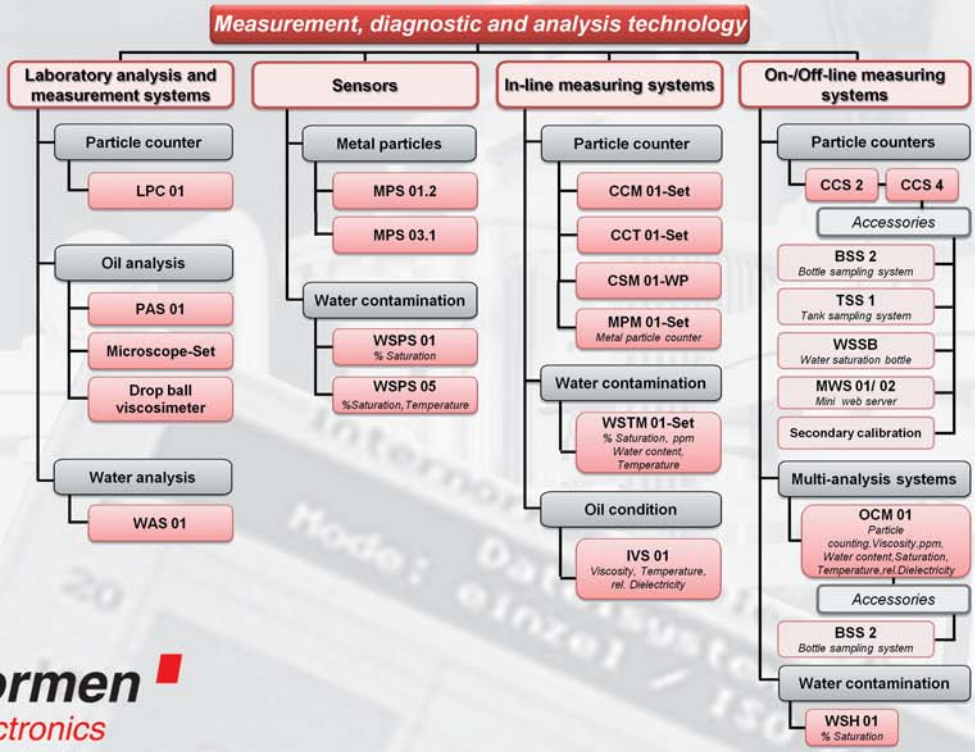
Monitoring and diagnostic systems overview



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Advanced Fluid Management

UMFC 41/81 - Mobile Oil Service with Fluid Control Function

- Mobile off-line filter unit with a Fluid Control Function
- Simplifies off-line filtration and filling of reservoirs
- Selectively equipped with the ***Interporvlies*** filter elements or well proven ***Watersorp*** filter elements
- A continuous measurement of contamination classes and the saturation of oil with water is provided between the pump and filter unit by the PFS 01 laser sensor and the contamination class transmitter CCT 01
- The output is displayed in contamination classes according to ISO 4406:99 and in percent (%) of saturation of oil with water
- Data can be read-out and transferred to a standard PC via RS232 interface
- The unit is equipped with 4 separate operating modes and a temperature control function meant to protect the particle sensor
- By entering the desired contamination class and/or water saturation an automated shutdown of the UMFC is effected when thresholds for contamination classes, water saturation or contamination classes and water saturation are reached

	Technical Data **UMFC 41** single phase AC motor	Technical Data **UMFC 81** three phase AC motor / pole changing	
Volume flow	35,5 l/min	35,5 l/min	71 l/min
Max. working pressure	6 bar	10 bar	
Viscosity	10 - 400 mm²/s	10 - 800 mm²/s	10-400 mm²/s
Electrical connection	230 V - 50 Hz (1 phase)	230/400 V - 50 Hz (3 phase)	230/400 V - 50 Hz (3 phase)
Max. oil temperature	0...70°C particle measuring possible up to 50°C	0...70°C particle measuring possible up to 50°C	

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Contamination Monitoring Accessories

BSS 2 - Bottle Sampling System

- This optional auxiliary unit for the CCS 4 measuring system ensures optimal bottle sampling processing and sample preparation and therefore lab quality results
- Essential degasification is being performed by generating a vacuum
- A variable adjustable pressure can be applied to feed the fluid to the CCS 4 system

Optionally available with a compressor

Technical data

Pressure range	0...4 bar
Vacuum range	0...-0.95 bar (-95 kPa)
External supply pressure	min 5 bar, max. 10 bar Air volume Q_{min}=40l/min
Supply pressure connection	Quick coupling NW 7.2
Hose connection	Miniature measuring connection with screw coupling M16x2
Power supply	110...230 V AC, 12 V DC

Secondary Calibration CALSUS 01 + CALSOFT 01

- This set allows - in combination with the BSS 2 - a secondary calibration of the CCS 4 laser sensor according to ISO 11171:99
- All necessary solutions and certificates are included
- By using the software CALSOFT 01 this secondary calibration can be performed automatically

http://www.internormen.com/cms/en/products/softwaresolutions/calibration-software

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GB-02/2011
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Water-in-Oil Monitoring Solutions

Electronic sensor systems for in-line and off-line applications

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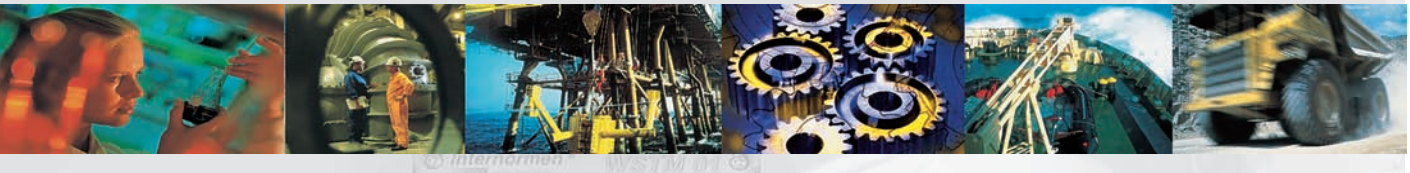
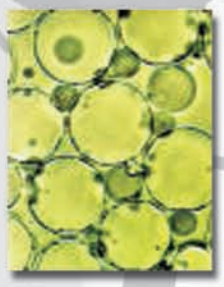


Water in hydraulic fluids

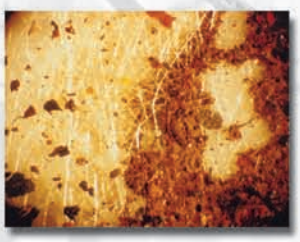
After particulate contamination, water is the second most common reason for breakdowns and failures of hydraulic and lubrication systems.



Microscopic photo of water in oil

How can water get in a system?

By inappropriate storage, as a cleaning residue, as a result of humidity/condensation, through bearings or permeable spots (hairline cracks, caps, defective sealings etc.)



Filtered rust particles

Types of water

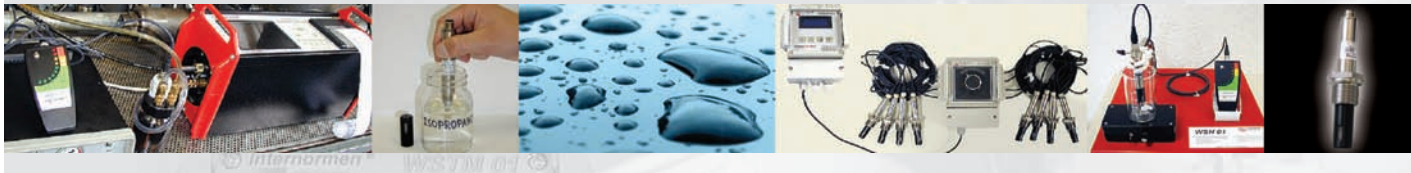
Water can be present as:
Dissolved (up to the saturation limit of a fluid)
Emulsified and free water (above the saturation limit of a fluid)

Oil sample with 100 ppm

Oil sample with 600 ppm

Effects and consequences of water in hydraulic fluids

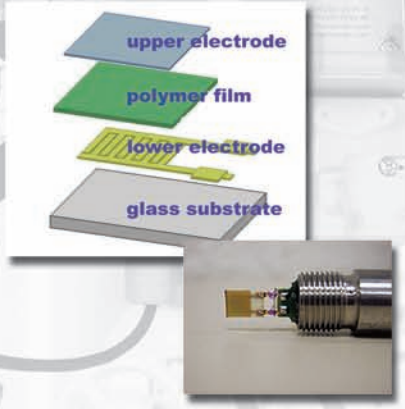
- Accelerated oil ageing
- Shortened fluid life
- Worsened lubricating performance
- Worsened control characteristics
- Worsened filterability
- Increased wear
- Noise
- Failure of polarizing additives
- Increased acid numbers
- Rust
- Higher contamination levels



Principle of function

Measuring principle

The WSPS sensors are capacitive sensors and utilize a polymer foil as dielectric between two electrodes. This foil is capable of absorbing water molecules due to its microporous structure. The absorption causes the capacity of the sensor element to change, which changes the frequency of the resonant circuit and is detected and converted into an output.

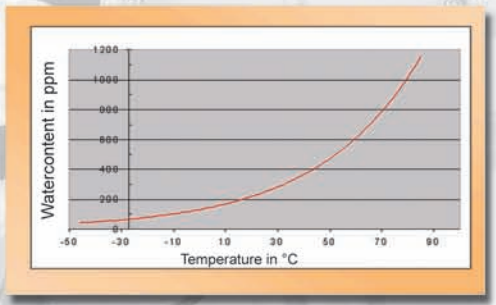


What is being measured?

These sensors measure the relative humidity of a fluid, unlike the water content determination using the Karl-Fischer-Method (total amount of the free and the dissolved water in the fluid). The result of a measurement is the saturation level of the fluid with water in percent.

0 - 60 %	no free water
60 - 80 %	small amounts of free water
80 - 100 %	free water

The indication of **100%** means the *total saturation of a fluid and presence of dangerous free water in the fluid.*
A theoretic relation to the ppm (mg/kg) water content (determined by the Karl-Fischer method) can be made for values between 0% and 100%. In order to do so it is necessary to know the characteristic curve of the saturation level and the temperature of the fluid.



Characteristic curves for different fluids are pre-programmed in the WSTM 01 display unit. Operating with the WSPS 05, results can be displayed in ppm.

Monitoring and Diagnostic Solutions

WSPS 01 Sensor

- The WSPS 01 is a monitoring and diagnostic sensor, to be used for hydraulic and lubricating fluids. It is meant for quick and reliable off-line measurements of saturated water in oil (analogue output of water saturation in volt). Simply and easily cleaned.

Technical Data

Measuring range	0%...100 %
Accuracy	+/- 2%
Ambient temperature	-40°C...+80°C
Flow velocity	maximum 2 m/s
Power supply	6 V...30 V DC
Analogue output	0 V...1 V
Cable length	1,5 m
Protection class sensor	IP 67

Recommended display unit
WSH 01
coloured LED display
for mobile off-line applications

WSPS 05 Sensor

- The WSPS 05 is an effective diagnostic system able to determine the saturation level of water in oil. The sensor detects the presence of free or emulsified water in hydraulic or lubrication systems, thereby enabling the user to prevent accelerated oil ageing, increased wear, malfunctions and failure of components.
- The saturation of the fluid with water is shown in percent. The indication 100 % means that the fluid is completely saturated.
- Additionally the WSPS 05 has an integrated temperature sensor which determines the exact temperature of the fluid during a measurement (saturation values depend on the temperature of the fluid).

Technical Data

Measuring range	
Saturation level	0 - 100 %
Temperature	-25°C...+100°C
Accuracy	
Saturation level	± 2 %
Temperature	± 0,4 %
Operating pressure	0...25 bar
Flow velocity	≤ 2m/s
Ambient temperature	-25°C...+85°C
Temperature range of fluid	-40°C...+90°C (temporary 100°C)
Power supply	12...30VDC
Analogue outputs	2 x 4...20 mA
Protection class	IP 65
Screw thread	G ¾

Recommended display unit
WSTM 01
numeric 4-row display
for stationary in-line applications
results ca be desplayed in ppm
for certain fluids

WSH 01 - Set

- The WSH 01 is a comfortable handheld measuring device, consisting of a WSPS 01 sensor and a WSH 01 display unit with a coloured LED display.
- It is meant for quick, simple and reliable mobile off-line measurements of saturated water in oil.
- Battery powered and simple to be cleaned.

WSTM 01 - Set

- The WSTM 01-Set is meant for reliable, stationary in-line measurements of saturated water in oil and temperature as well.
- The set consists of a WSPS 05 sensor and a WSTM 01 display unit (4-row numeric display, simple menu), displaying results in either saturation level or theoretical ppm.
- Serial interface (RS 232), CAN-bus interface acc. to ISO 11898, CAN 2.0A, CANopen compatible

MSS 01

Enables the operation of up to 8 separate WSPS sensors with only one WSTM 01 display unit

WSSB

Water sensor sample bottle, for direct measurements when using the CCS (Contamination Control System)

Fluid compatibility

Mineral oil based fluids as well as synthetic fluids such as hydraulic oils, lubricating oils, transformer oils, and ester based synthetic oils.

Tested and for the WSTM 01 pre-programmed fluids

- ✓ HLP 22 (Shell)
- ✓ HLP 46 (Shell)
- ✓ HLP 68 (Shell)
- ✓ MIL-H 5606 (Shell)
- ✓ CLP 220 (Shell)
- ✓ HEES 46 (Fuchs)
- ✓ ...

Additional fluids are being tested constantly and added to the programme. Research on special fluids is available (upon request).

Additional products

from our product range, which - if you have problems with water - might be of great interest

internormen
fluid management

IFPM/IFPS Fluid Purifier Systems

- Remove free, dissolved and emulsified water from operating fluids
- Remove free and dissolved gases
- Remove particulate contamination down to 1 micron
- Extend fluid life and prevent oil ageing
- Improve reliability and productivity of your systems
- Reduce downtime of machinery
- Extend life of system components

internormen
filter technology

Watersorp - water-absorbing filter elements

- Absorb free and emulsified water from oil
- Particulate contamination is also being filtered
- Reduce oil ageing and deadditivation of fluids

BFD - Desiccant breather filters

- Reduce the influence of humidity
- Remove particulate contamination and prevent that humidity out of air enters a system or a tank
- Extend fluid life
- Reduce downtime of machinery
- Reduce system component repairs and replacements

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Probenentnahme und Ölanalyse-Set

Sampling and Oil Analysis Set

internormen
contamination
monitoring

INTER
NORMEN

Probenentnahme- und Ölanalysekoffer
Sampling and oil analysis kit

Best.-Nr.
306594
Order-No.
306594

PAS 01

Dynamische Probenentnahme
Dynamic sampling

Minimessanschlüsse und Schläuche zur dynamischen Probenentnahme aus Druckleitungen
Best.-Nr. 313624

Mini-measuring connections and tubes for dynamic sampling out of pressure pipes
Order-No. 313624

Statische Probenentnahme
Static sampling

Vakuumpumpe, Schläuche und Teleskopstab zur statischen Probenentnahme aus Tanks oder Gebinden
Best.-Nr. 313625

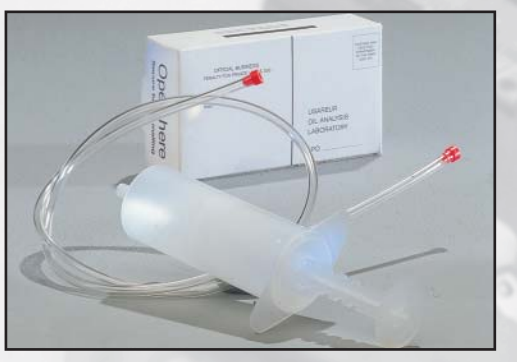
Vacuum pump, tubes and telescopic stick for static sampling out of tanks or packing drums
Order-No. 313625

Vakuum-Filtrationsset
Vacuum filtration set

Vakuum-Filtrationsset mit elektrischer Vakuumpumpe für die Erstellung von Membranproben zur:
- Mikroskopischen Partikelzählung mittels beiliegender Mikrolupe
- Analyse der Verschmutzungsart
- Gravimetrischen Analyse

Vacuum filtration set with an electrical vacuum pump to prepare membrane samples for:
- *microscopical particle counting with the attached micro pocket lens*
- *analysis of the kind of contamination*
- *gravimetric analysis*

Einweg-Saugheber
One-way pipette



Einwegsaugheber zur statischen Probenentnahme bei stark verschmutzten Flüssigkeiten.
Best.-Nr. 312950

One-way pipette for static sampling used in heavy contaminated fluids
Order-No. 312950

Eingangskontrolle und Zustandsüberwachung der Betriebsflüssigkeit vor Ort
On site vendor inspection and condition control of the operating fluid

Ergänzungssets zur Ölanalyse
Supplementary sets for oil analysis

WAS 01

Wasseranalysekoffer WAS 01 zur Bestimmung des Wassergehaltes in Mineralölen nach der Calciumhydrid-Methode.
Best.-Nr. 311077

Water test kit WAS 01 for determining the content of water in mineral oils according to the calciumhydride-method.
Order-No. 311077

Probenflaschen-Set
Bottle sampling set

2 Stück hochreine Glasflaschen á 250 ml mit Selbstklebeetiketten und Versandkarton.
Best.-Nr. 313427
12 Stück: Best.-Nr. 314781

2 high purity glass bottles (250 ml) with self adhesive labels and a shipping box.
Order-No. 313427
12 pieces: Order-No. 314781

Kugelfall-Viskosimeter
Drop ball viscosimeter

Messrohr mit eingebautem Thermometer, 3 Messkugeln, Spiegel und elektronischer Stoppuhr.
Best.-Nr. 313347

Graduated tube with integrated thermometer, 3 measuring balls, mirror and electronical stop-watch.
Order-No. 313347

Mikroskop
Microscope

Mikroskop mit Okularmikrometer, 3 Objektiven (40, 100, 400 x Vergrößerung), Durchlichteinrichtung und Kreuztisch zur mikroskopischen Partikelzählung.
Best.-Nr. 313322

Microscope with eyepiece micrometer, 3 lenses (40, 100, 400 x magnification) transmitted light equiped and compound table for the microscopical particle counting.
Order-No. 313322

Verbrauchsmaterialien und Reagenzien
Consumables and reagents

Verbrauchsmaterialien und Reagenzien:
Consumables and reagents:

Best.-Nr.	*Order-No.*
Membran-Filter	*membrane filters*
0,45 µm	313326
5 µm	313327
gewichtsgleich	*of equal weight*
	313321
Transparent-Fluid	*transparent fluid*
	313328
Petri slides	313329

Für WAS 01	***For* WAS 01**
Reagenz A und B	*reagent A and B*
	313235
Reinigungsspray	*cleaning spray*
	313346

Laborservice

- Modernste Mess- und Prüfeinrichtungen
- Qualifiziertes Fachpersonal
- Reinheitsklassenbestimmung
- Verschmutzungsanalyse
- Ölzustandsanalyse

Laboratory service

- *Being carried out by experts*
- *Using latest measuring and testing equipment*
- *Determination of contamination classes*
- *Contamination analysis*
- *Oil condition analysis*

http://www.internormen.com/cms/en/service/laboratory-analysis

Kalibrierungsservice

- Funktionstests
- Sekundärkalibrierung
- Austausch mechanischer Verschleißteile
- Druckpapier- und Farbbandwechsel
- Gerätereinigung
- Software update
- 24-Stunden Testlauf
- Kalibrierzertifikat

Calibration service

- *Performance tests*
- *Secondary calibration*
- *Exchange of mechanical wear parts*
- *Print paper and ink ribbon exchange*
- *Equipment cleaning*
- *Software update*
- *24-hours test run*
- *Calibration certificate*

http://www.internormen.com/cms/en/service/calibration

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internormen technology

In addition to our standard program of hydraulic and lubrication filters in the range of ***INTERNORMEN filter technology*** following ***INTERNORMEN*** product groups were developed:

fluid management

electronics

system technology

contamination monitoring

software solutions

process technology

For our “Fluid-Service-Centers”, which are established for certain territories ***INTERNORMEN*** offers a comprehensive Service Consulting - including appropriate products - which requires the following basic procedure:

INTERNORMEN`s Fluid

Solutions contain:

- ***Setting targets for contamination classes regarding particle and moisture contamination***
- ***Fixing critical values and defining thresholds***

- ***Preparation of complete interpretations of analyses:***

internormen filter technology

Guidelines for Determining, Achieving, and Maintaining Target Cleanliness Levels with High Performance Filtration (Beta Ratio ≥ 200)

Most Sensitive System Component	Low Pressure Under 140 Bar (moderate conditions)		Medium Pressure 140-210 Bar (or low pressure plus severe conditions) (1)		High Pressure 210 Bar and Over (or medium pressure plus severe conditions) (1)	
	ISO Target Levels	Filter Micron Ratings (2)	ISO Target Levels	Filter Micron Ratings (2)	ISO Target Levels	Filter Micron Ratings (2)
PUMPS						
Fixed External Gear	22/18/14	25VG	20/16/13	10VG	20/16/13	10VG
Vane	22/18/14	25VG	20/16/13	10VG	20/16/13	6VG
Fixed Piston	20/16/13	10VG	20/16/13	6VG	19/15/11	3VG
Variable Piston	20/16/13	6VG	19/15/11	3VG	18/14/10	3VG
VALVES						
Check Valve	22/18/14	25VG	20/16/13	10VG	20/16/13	10VG
Directional (solenoid)	22/18/14	25VG	20/16/13	10VG	20/16/13	10VG
Standard Flow Control	22/18/14	10VG	20/16/13	10VG	20/16/13	10VG
Cartridge Valve	20/18/13	3VG	18/14/10	6VG	19/15/11	3VG
Proportional Valve	19/15/11	3VG	17/13/9	3VG	17/13/9	3VG
Servo Valve	18/14/10				16/12/8	
ACTUATORS						
Cylinders, Vane Motors, Gear Motors	23/19/15	25VG	22/18/14	16VG	20/16/13	6VG
Piston Motors, Swash Plate Motors	20/18/13	10VG	20/16/13	6VG	19/15/11	6VG
Hydrostatic Drives	19/15/11	6VG	18/14/10	3VG	17/13/9	3VG
TEST STANDS	15/11/7	1VG	15/11/7	1VG	15/11/7	1VG
LUBRICATING OILS						
Paper Machine Oils	20/16/13	10VG	not applicable	not applicable	not applicable	not applicable
Steam Turbine Oils	19/15/11	6VG	not applicable	not applicable	not applicable	not applicable
Diesel Engine	20/16/13	10VG	not applicable	not applicable	not applicable	not applicable
Mobile Gear Box	20/16/13	10VG	not applicable	not applicable	not applicable	not applicable
Industrial Gear Box	19/15/11	6VG	not applicable	not applicable	not applicable	not applicable
Journal Bearing	19/15/11	6VG	not applicable	not applicable	not applicable	not applicable
Roller Bearing	18/14/10	3VG	not applicable	not applicable	not applicable	not applicable
Ball Bearing	17/13/9	3VG	not applicable	not applicable	not applicable	not applicable

Notes: (1 Severe conditions may include high flow surges, pressure spikes, frequent starts, extremely heavy duty use or the presence of water.

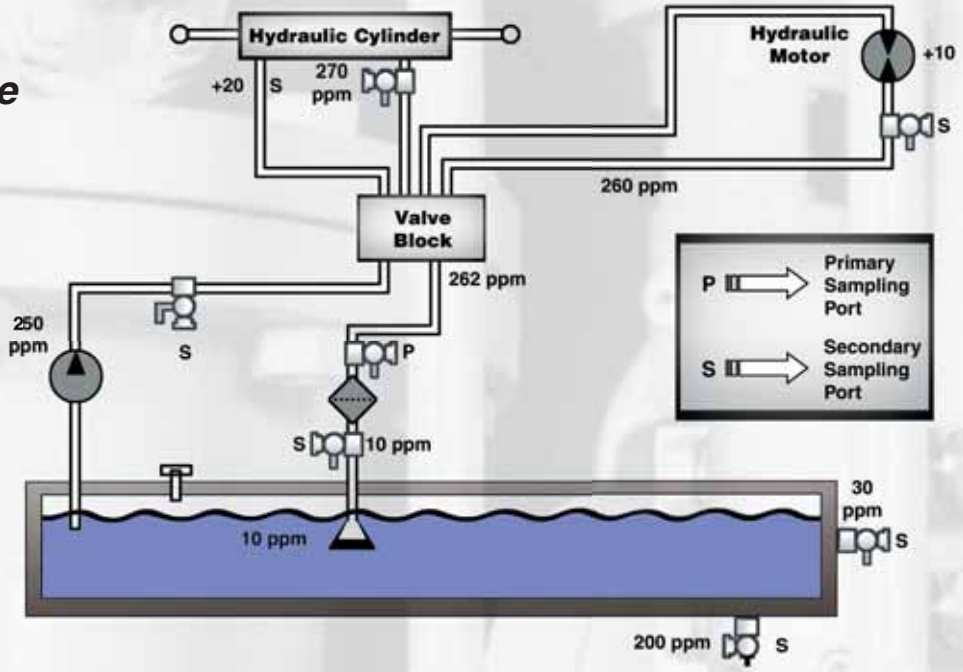
(2 Two or more systems filters of the recommended rating may be required to achieve and maintain the desired Target Cleanliness Level, for more detailed accuracy use our filter simulation software.

Element Spectral Analysis - Potential Sources of Metals in Oil

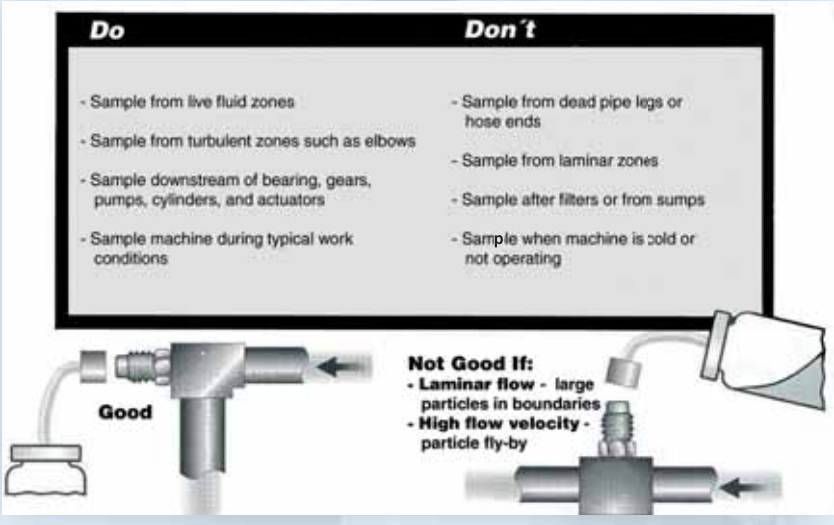
Element	
Aluminium	abrasives, aluminium mill, bauxite, bearing metal, catalyst, coal contaminat, fly ash, foundry dust, granite, paint
Antimony	journal bearings, solder
Arsenic	antioxidans, bactericide, mineral oil
Barium	engine additive, grease
Beryllium	aircraft construction, bearings, mineral oil
Bismuth	journal bearings
Boron	EP-additives, coolant inhibitor
Cadmium	journal bearings, platings
Calcium	cement dust, detergent, fuller`s earth, grease, gypsom, hard water, lignite, limestone, mining dust, oil additive, road dust, rubber salt water, slag
Carbon	abrasives, carbides, carbon steel, graphite, hard metal, mineral oil, soot, synthetic material
Chromium	chrome plating, hardcoat, paint, ring plating, stainless steel, tooling steels
Cobalt	additives, hard metal, tooling steels
Hafnium	reactor technique
Iron	asbestos, cast iron, catalyst, cleaning detergent, fly ash, mill scale ore dust, paint, rust, talc, zeolit
Lead	babbit, bearing overlay, gasoline additive, solder, paint
Lithium	dust, grease, salt water
Magnesium	alloy of aluminium, engine additives, fuller`s earth, hard water road dust, salt water, turbine
Mercury	bactericide, batteries
Molybdenum	alloying metal, EP-additives, MoS_2, rings
Nickel	hard steel, plating, stainless steel, stellite
Niobium	turbine blades
Phosphorus	AW / EP-additives, cleaning detergents, oil additives, surface finish
Platinum	catalyst, mineral oil
Potassium	additives, coolant inhibitor, fly ash, granite, paper mill dust, vertilizer
Scandium	ICP-reference
Silicium	antifoam additives, asbestos, cement dust, coolant additives, fly ash foundry dust, glass, granite, limestone, mica, road dust, slag steel, synthetic lubricant, talc, wet clutch
Silver	bearing overlay, needle bearings, solder
Sodium	additives, base stocks, coolant inhibitor, dirt, fly ash, grease, paper mill dust, road dust, salt, salt water
Sulphur	gypsum, mineral oil, MoS_2, rubber
Tantal	hard metal, toolings steel
Tellur	mineral oil
Titanium	hard metals, paints, turbine bearings, turbine bleads
Tungsten	hard metal, toolings steel
Uranium	ore dust, road dust (some)
Vanadium	mineral oil, turbine blades, valves
Ytrium	ICP-reference
Zinc	AW additives, brass, galvanizing, grease, oil additives, plating, solder
Zirkon	abrasives, hard steel, reaktor technique

Service Concept

Selection of possible measuring points in the system



Installation of possible measuring valves and access points



Supply of corrective customer specific solutions

INTERNORMEN **offers service devices for sale, leasing or rent**

internormen technology

INTERNORMEN service devices - application and benefits:

CCS 2 + BSS 2 / Particle Counter and Bottle Sampling System

- On-line determination of contamination classes according to ISO 4406:1999, ISO 4406:1987, NAS 1638 and SAE AS 4059
- Verifies the filter performance
- Permits "on the spot" laboratory oil analysis
- Improved maintenance
- Verifies pump condition
- Determines the cleanliness of stored hydraulic and lubrication fluids
- Identifies changing atmospheric conditions
- Troubleshoots and isolates problems and problematic components
- Identifies the necessity of spectral analysis
- Determines the benefit of off-line filter units
- Determines the optimal time/frequency for the change of elements
- Identifies filter failures
- Verifies centrifuge performance
- Detects high corrosive wear
- Monitors new system start-up time
- Verifies bearing condition
- Confirms that target contamination classes are achieved
- Verifies breather condition
- Verifies the effectiveness of selected filters
- Identifies abnormal gear wear
- Determines cleanliness of new oil

BSS 2 - Bottle Sampling System

- Serves as bottle sampling device for the CCS 2
- Deaerates the processed oil sample before feeding it into the CCS 2
- Serves as calibration device for the CCS 2, using ***INTERNORMEN's*** software CALSOFT 01 and ***INTERNORMEN's*** certified test fluid CALSUS 01

TSS 1 - Tank Sampling System

- Serves as a device for feeding oil samples from reservoirs to the CCS 2
- Also serves as a bottle sampling device from reservoirs

INTERNORMEN`s Fluid

WAS 01 - Water-in-Oil Analysis Set

- Determines water content in oils
- Determines condensation in the reservoir
- Identifies damages/leaks of watercooled heat exchangers
- Determines the saturation of water absorbing breather filters
- Demonstrates the effectiveness of water extracting devices
- Identifies the effectiveness of cylinder wiper seals

PAS 01 - Sampling and Oil Analysis Set

- Inspection of hydraulic and lubrication fluids
- Includes mini-measuring connections for simple sampling
- Determines the condition of operating fluids on site
- Identifies the type of contamination
- Visual evaluation of fluids and their contamination level
- Static or dynamic bottle sampling
- Particle analysis by means of membrane sample
- Optical particle counting by means of membrane sample under a microscope
- Gravimetric analysis of solid contamination

UM/US - Mobile and Stationary Off-line Filter Units

- Improvement of contamination classes in fluid systems
- Extend the service life of system components
- Reduce downtimes of machines
- Usable for filling of reservoirs and sumps with a new fluid
- Flushing of fluid systems after machine repairs and maintenance
- Extend the service life of „In-Line“-Filters
- Improve the general cleanliness classes of fluid systems
- Extend the service life of oil, respectively change intervals
- Reduce fine contamination / polish the fluid
- Reduce oil ageing and extend oil service life
- Serve as flushing units for new systems and machine break-ins

Service Concept

internormen technology

USP - Off-Line Filter with additional Heat Exchanger

- Filtration and cooling of fluids
- Improves oil service life
- Increases lubricating properties of operation fluids

Watersorp - Water Absorbing Filter Elements

- Absorption of free, emulsified and dissolved water from oils
- Additionally reduce solid contamination
- Reduce oil ageing and deadditivation of fluids

IFPM/IFPS - Fluid Purifier Systems

- Remove free, dissolved and emulsified water from operation fluids
- Remove free and dissolved gases
- Remove particle contamination down to 1 µm
- Extend oil service times and prevent oil ageing
- Improve the reliability and productivity of plants
- Reduce downtimes of machine equipment / systems
- Extend service life of system components

WSH 01 - Water Analysis Sensor

- Measures the water saturation level of fluids in percent
- Determines proactive a water problem, before water turns into an emulsified or even free state
- Avoidance of deadditivation, corrosion, loss of dielectric strength in transformer oils and reduction of lubrication film thickness

BFD - Desiccant Breather Filter

- Reduces the coefficient of high ambient humidity
- Removes particle and moisture contamination from the ambient air before tank inlet
- Extends oil service life
- Reduces machine downtimes, repairs and replacement of system components

INTERNORMEN's „In-house Laboratory Services"

has the most modern equipment and special expert knowledge to immediately analyse problems and present solutions in teaming up with the Fluid Management Experts.










***INTERNORMEN's* equipment in the oil analysis laboratory (abstract):**

Atomic Emission Spectroscopy

The ICP-OES (Inductive couplet plasma-optical emission spectrum) serves for analysis of chemical elements. In the range of hydraulic- and lubrication filters the OES analysis is mainly applied for determination of wear, respectively of contamination. The ICP technology enables a determination of up to 72 chemical elements relating to quality and quantity.

Infrared Spectroscopy

The FTIR-method (Fourier-Transformation-Infrared spectroscopy) is the most advanced method of infrared spectroscopy and provides a current analysis over the wide range of the electromagnetic spectrum (7500-370 cm^{-1}). The infrared spectroscopy serves for determination of chemical compounds (molecules) and indicates chemical changes, polymerisation and impurities in comparison with known samples.




Wet chemical method of analysis

1. **Testing of minerals and hydrocarbons; determination of water content according to Karl Fischer, ASTM.D 1744-64**

   The determination of the water content is based on the oxidation of sulphur dioxide through iodine, in the presence of water, as described by Bunsen.
   The water content is determined by end point titration.

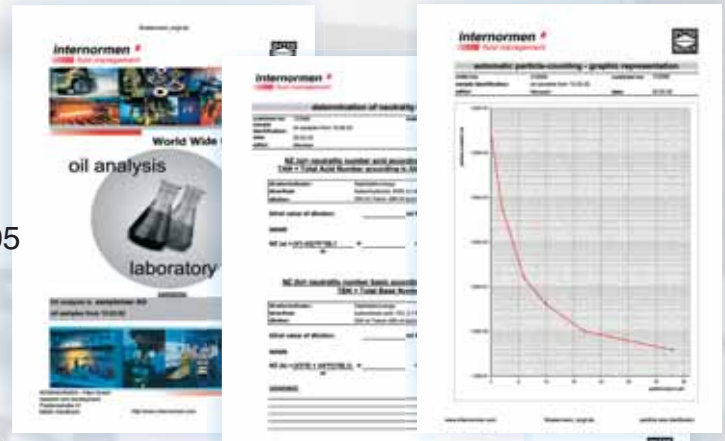
2. **Determination of total base or strong acid number (TAN/TBN)**

   The acid number indicates the amount of acid or base in mg that has to be added until the colour changes. The TAN (Total Acid Number), respectively the TBN (Total Base Number) indicates the ageing state of oils.
   A practical assessment is only possible by a comparison with new oil.

internormen
technology

Oil Sample Analysis

Contamination analysis according to NAS 1638 and ISO 4406:1999
Microscopic particle counting according to ISO 4407
Gravimetric analysis according to ISO 4405
Microscopic contamination analysis
Center viscosity (+40°C)
Viscosity - temperature diagram
pH-value measurement (only aqueous fluids)



Examination of Filter Elements

Bubble Point Test according to ISO 2942
Collapse pressure resistance according to ISO 2941
Multi Pass test according to ISO 16889 (new element)
p/Q-characteristic curve according to ISO 3968 (n.e.)
Compatibility with hydraulic fluids according to ISO 2943
Analysis of the element structure
Pore size + spectrum of the filter material
Type of contamination, microscopic analysis
Determination of contamination, manometric

The way you benefit from our "Fluid-Service-Center":

INTERNORMEN Fluid Management has invested in highly talented and well-trained people, highest product technology, research and development equipment as well as a „top-of-the-line“ laboratory for oil analysis, in order to get the best for our customers. We are proud of being able to lead our customers and partners to the next level in the domain of Fluid Management. You may rely on our team of specialists to:

- Optimise your oil analysis program
- Obtain analysis and solutions for achieving your goals from one supplier
- Get the newest products in the range of oil analysis and filter technology and get trained how to benefit from them
- Reduce unscheduled downtimes of your systems, machinery and equipment
- Increase the reliability of your systems and thus improve your product quality
- Minimize the chance of failures
- Reduce the number of fluid changes, lubricant consumption cost and save substantial costs for their disposal
- Reduce environmental impact by minimizing lubricant consumption (integral part of ISO 14001)
- On base of our training material, which is always updated and readapted, you and your personnel are regularly trained to get a know-how which enables you to achieve an active cost-saving maintenance. These training sessions can take place either in our Training Center in Altlussheim or world-wide at any requested site and in different languages.

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World Wide Competence

GB-10/2008
325165

Mobile Oil Service Units UMFC 41/81

Equipped with the Particle Counter CCT 01-Set
and Water sensor WSPS 05

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Features

The UMFC is a mobile off-line filter unit with a "Fluid-Control" function, simplifying off-line filtration and filling of reservoirs, selectively equipped with the *Interporvlies* filter elements or with our well proven *Watersorp* filter elements.For a representative conclusion about the prevailing condition of a fluid, a continuous measurement of the contamination classes and the saturation of the oil with water is provided between the pump and filter unit.

The output is displayed in contamination classes according to ISO 4406:99 and in percent (%) of saturation of the oil with water, additionally data may be read out and transfered to a standard PC via serial interface RS232.

The unit UMFC is equipped with 4 separate operating modes. By entering the desired contamination classes and/or desired water saturation an automated shutdown of the UMFC is effected when reaching threshold for contamination classes, for water saturation or for contamination classes and water saturation.

As for protection of the particle sensor, the unit is equipped with a temperature control function. For avoiding any damages, the sensor of the particle counter set CCT 01 is switched off, when reaching an oil temperature of over 50°C. The maximum allowable oil temperature of the system is up to 70°C, reaching this value causes an automated shutdown. All conditions are displayed via pilot lamps on the LCD-monitor.

Functional principle

MODE 1

Manual stop

Manual stop of the motor through the motor switch (possible for all modes)

MODE 2

Auto-stop contamination classes

Automated stop of the motor when all of the entered contamination classes are underneath the set values

MODE 3

Auto-stop water saturation

Automated stop of the motor when the entered maximum water saturation is underneath the set value

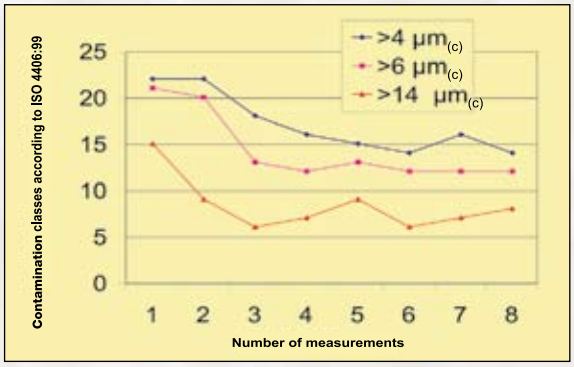
MODE 4

Auto-stop contamination classes and water saturation

Automated stop of the motor when all of the entered contamination classes and the entered maximum water saturation are underneath the set values

High-value measuring technique

Specifically developed for a continuous monitoring, the CCT 01-Set detects particles > 4µm$_{(c)}$, > 6µm$_{(c)}$ and > 14 µm$_{(c)}$ and classifies them according to ISO 4406:99. The sensor WSPS 05 determines the water saturation and offers a reliable conclusion about danger of free water in the fluid. The control unit examines the oil temperature and if necessary, prevents overheating of the unit by switching it off automatically.



Economic efficiency

The investment for an *INTERNORMEN* system pays off in a short time through extended service intervals and higher machine or system availibility.

Easy and comfortable handling

The filter element can be changed through anti-clockwise rotation of the handlebar and lifting of the tube cover. So there are no tools needed to change the filter element.

Quality in detail

According to customer requirements and the field of application, the units UMFC 41/81 may be equipped with *Interporvlies* filter elements as well as with *Watersorp* filter elements. Highest separation rates and exceptional dirt holding capacity ensure accurately defined contamination classes and more favourable service ranges.

	Technical data **UMFC 41** single phase AC motor	Technical data **UMFC 81** three phase AC motor / pole changing	
Volume flow	35,5 l/min	35,5 l/min	71 l/min
Max. working pressure	6 bar	10 bar	
Viscosity	10 - 400 mm^2/s	10 - 800 mm^2/s	10 - 400 mm^2/s
Electrical connection	230 V - 50 Hz (1 phase)	230/400 V - 50 Hz (3 phase)	230/400 V - 50 Hz (3 phase)
Max. oil temperature	0...70°C **particle measuring possible up to 50°C**	0...70°C **particle measuring possible up to 50°C**	

Other products offered by internormen technology

internormen fluid management

Off-line filtration units, stationary and mobile versions, with options like heat exchanger and watersorp elements, and vacuum dehydration systems.




internormen electronics

Contamination Control Systems (laser particle counters) with options like Bottle Sampling System and Tank Sampling System as well as mobile and stationary water sensors and electronic sensor systems.



internormen contamination monitoring

Mobile sampling- and oil analysis sets as well as in-house laboratory services including oil analysis and element checks performing optical emission spectrum and infrared spectroscopy analysis.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GB-02/2011
328412

INTERNORMEN

MOBILE OIL SERVICE

UMCC - available in 40 and 80 l/min

The new standard
for modern
fluid management,
flushing service &
contamination control

Always equipped with
Particle Counter System
CCS 2

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fluid management

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Easy and service friendly handling

Element can be changed through anti-clockwise rotation of the handlebar and lifting of the tube cover. So there are no tools needed to change the filter element.

Fluid Management

In combination with the ultimate CCS 2 particle counter system, contamination classes can be determined online or via bottle samples with our optional BSS 2 system according to the standards ISO 4406:99 and NAS 1638. This way, controlled flushing can be achieved with the integrated software and relais output.

Y-strainer

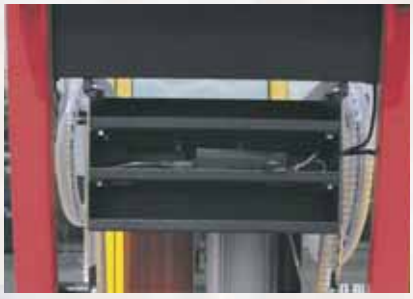
protects and prolongs the service life of the integrated low noise pump. This guarantees, that the unit can be used for tough and dirty cleaning jobs. In addition it is protecting the laser sensor of the particle counter from particles larger than 200 µm.

Continuous Δp monitoring

of the filter element gives the user the true state of the contamination in the element. Because of the large filtration area element, the user can realize cost savings over time through less element changes.

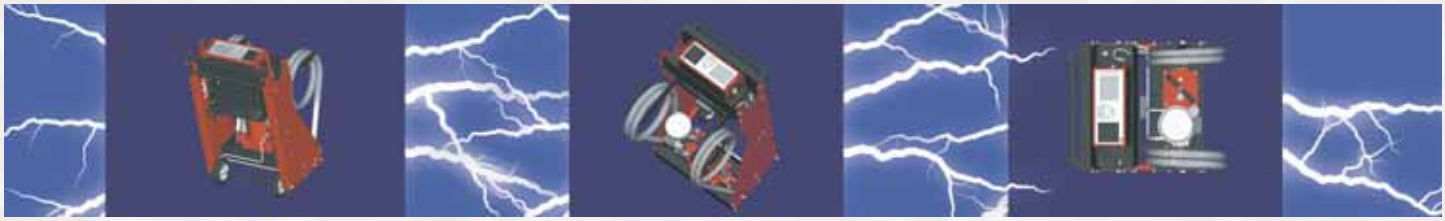
Storage facilities

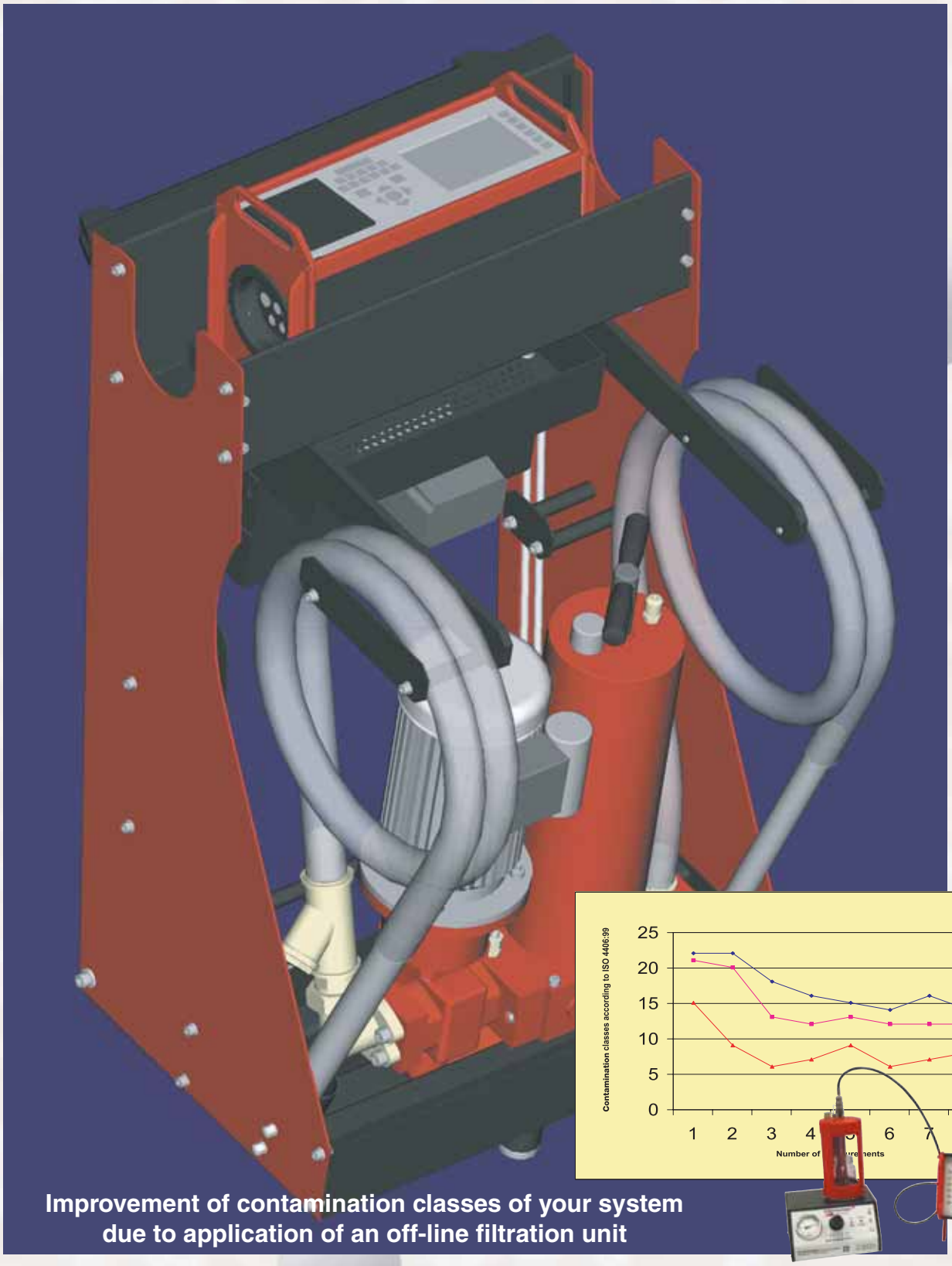
Integrated storage departments for all necessary tools and accessories the user might need.

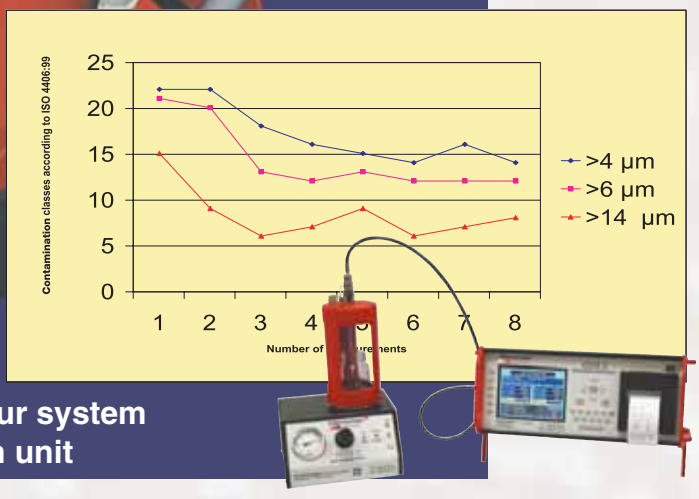


Particle counting system CCS 2

can also be used separate from the flushing system with this handy, lightweighted carrying case, which is included in this package as well as our user-friendly data manager software.







Improvement of contamination classes of your system due to application of an off-line filtration unit

Other products offered by internormen technology

internormen fluid management

Off-line filtration units in stationary and mobile versions, with options like heat exchanger and watersorp elements as well as vacuum dehydration systems.

internormen electronics

Contamination Control Systems (Laser Particle Counters) with options like Bottle Sampling System and Tank Sampling System as well as mobile and stationary water sensors and electronic sensor systems.

internormen contamination monitoring

Mobile Sampling- and Oil Analysis Sets as well as in-house laboratory services including oil analysis and element checks performing optical emission spectrum and infrared spectroscopy analysis.

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GB-10/2008
326038

INTERNORMEN
Fluid Purifier Systems

NEW *EXPLOSION-PROOF VERSION*

INTERNORMEN - IFPM/IFPS

Fluid Purifier Systems are self-contained systems, able to:

- **remove free, emulsified and dissolved water**
- **remove free and dissolved gases**
- **remove particulate contamination down to 1 µm**

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fluid management

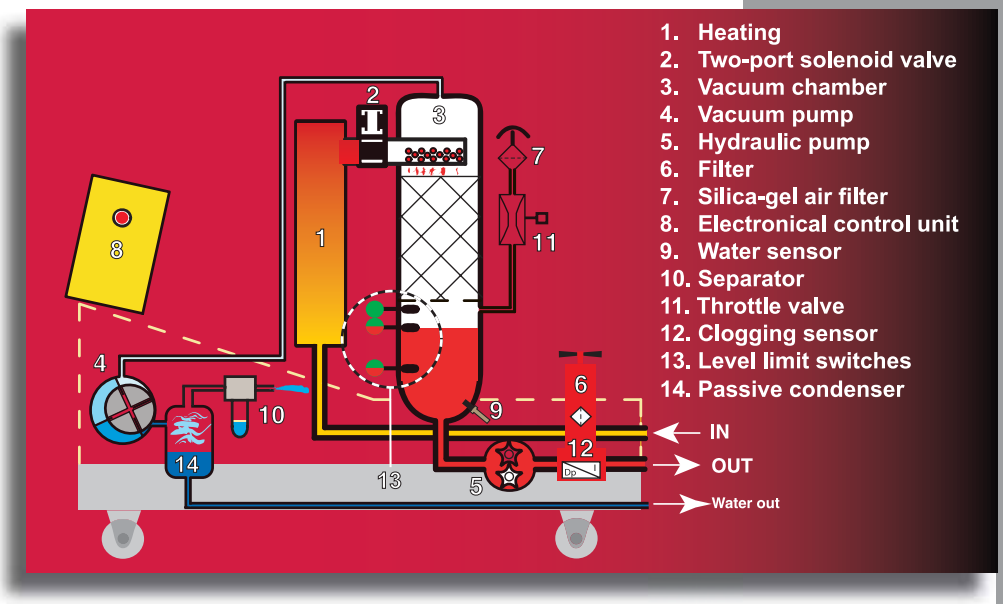
Effects of water contamination

Water is ranked as one of the most frequently occurring kind of contamination and as a destructive foreign matter in second place, right after particulate contamination. Some of the problems and damages, water contamination can cause, are:

- Fluid destruction
- Exhaustion of additives
- Reduction of lubrication characteristics of the liquid
- Oil oxidation
- Internal corrosion
- Increased conductivity

Operating principle

The deployed procedure of vacuum evaporation with inert gas is the most effective method of dehydration principles for this application. This method combines high water separating rates with efficient energy use for a large variety of application possibilities. Using dry air as inert gas, enables the dehydration process to achieve water levels underneath the saturation level of the processed fluid at any given operating temperature. In contrast to the standard vacuum evaporation process, which can only reach equilibrium between the fluid and the surrounding water vapor.

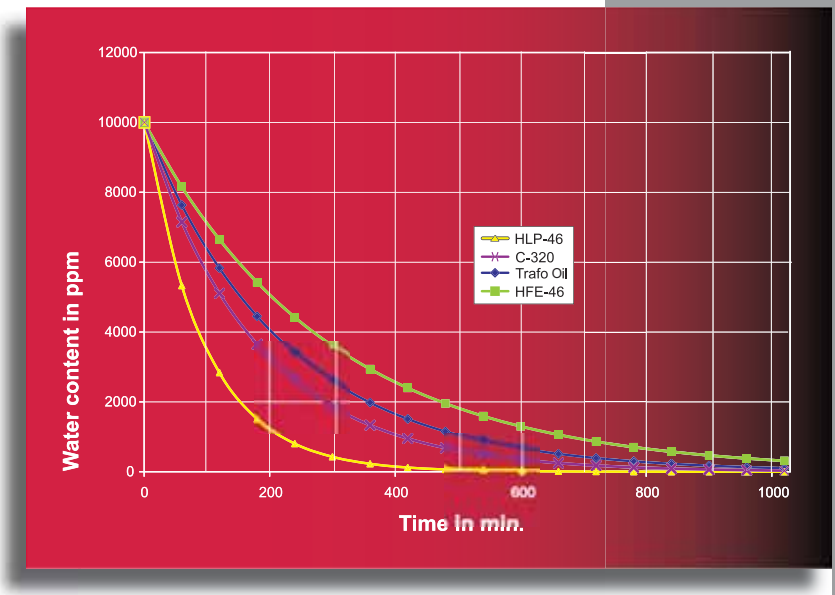


Structure of the IFPM/IFPS systems

The fluid to be purified is drawn out of a reservoir by a vacuum generated by the vacuum pump. It then enters a tank with a heater and is being heated up to the temperature set in the operation unit. A certain amount of fluid is drawn through a two-port solenoid valve into the vacuum chamber, where it diffuses over dispersal material, which enlarges the surface of the fluid. Free and dissolved water vaporises in the chamber due to the lower evaporation point caused by the vacuum. Air from the surrounding area is led into the vacuum chamber through an air filter and a throttle valve. The air which enters approximately in the middle of the chamber, moves upward to the flow of the fluid. Water and gas join the upward airflow and enter the vacuum pump after having left the vacuum chamber. At this point, the air and the water vapour are either condensed and emitted to the atmosphere or emitted immediately.

Technology of *INTERNORMEN* Purifier Systems

The compact IFPM/IFPS systems have been constructed as fully automated, PLC controlled units applicable even in tight areas. The implemented water sensor WSPS 03, in connection with the display unit WFD 01, allows a permanent monitoring of the water level in the purified fluid, and the electronic Δp sensor VS1 provides the optimal use and maintenance scheduling of the included particle removal filter element. The desiccant air breather dries up the inert gas and increases therefore the efficiency of the purifier even in high humidity environments.



Water content - timing diagram for different fluids

Factors influencing the Purifier efficiency

The processing time to reach the desired level of water in the operating fluid mainly depends on the type of fluid used. Other factors, influencing the speed of the dehydration process are:

		Water extraction rate
Temperature	↑	strongly increased
Vacuum	↑	increased
Initial content of water	↑	increased
Additive	↑	reduced
Flow rate of the IFPM / IFPS systems	↑	increased

All types also available in explosion-proof version

	IFPM 21	IFPM 31	IFPM 71	IFPS 71	IFPS 101
Data sheet no.	4035	4036	4045	4046	4043
Dry weight	315 kg	325 kg	590 kg	590 kg	790 kg
Dimensions in mm:					
Lenght					
ball valve closed	1202	1202	1575	1575	1655
ball valve opened	1226	1226	1676	1676	1797
Width	703	703	900	900	1265
Height	1546	1546	1805	1570	1585
Inlet connection	1 1/2" SAE flange	1 1/2" SAE flange	2 1/2" SAE flange	2 1/2" SAE flange	3" SAE flange
Outlet connection	1 1/4" SAE flange	1 1/4" SAE flange	2" SAE flange	2" SAE flange	2 1/2" SAE flange
Flow rate *	20 l/min	30 l/min	70 l/min	70 l/min	100 l/min
Operating pressure	10 bar	10 bar	10 bar	10 bar	10 bar
Operating vacuum **	-60 up to -90 kPa	-60 up to -90 kPa	-60 up to -90 kPa	-60 up to -90 kPa	-60 up to -90 kPa
Total motor power	1.1 KW	1.3 KW	2.8 KW	2.8 KW	4.0 KW
Heater capacity	3000 W	3000 W	4000 W (3 phase)	4000 W (3 phase)	8000 W (3 phase)
Filter type	1 x NF.631	1 x NF.631	1 x NF.1000	1 x NF.1000	2 x NF.1000
Filter element	01.NR 630	01.NR 630	01.NR 1000	01.NR 1000	2 x 01.NR 1000
Sealing material	Viton	Viton	Viton	Viton	Viton
Max. viscosity	700 mm^2/s	700 mm^2/s	700 mm^2/s	700 mm^2/s	700 mm^2/s
Water extraction rate ***	75 l/day	105 l/day	315 l/day	315 l/day	450 l/day

* At liquid viscosity of 32 mm^2/s
** Operating vacuum adapted to specific applications
*** Water content 6% at 40°C and 32 mm^2/s

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GB-09/2008
323789

Mobile Service Unit MKS 601

for coolant and lubricant systems

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Features

This system simplifies the draining of CNC-machine tanks containing coolant and/or lubricant and removes contamination of the emulsion originated by machining. An air pressure operated membrane pump feeds the equipment, for a mechanical cleaning of the emulsion the medium is led through a filter unit to a reservoir of 600 l capacity. In this reservoir, followed by an adequate span of time, the incorporated oil is separated from the emulsion and is removed by systematic use of “Skimmer-Technology” and oil separation mechanisms.

The System MKS 601 may also be applied as an off-line filtration circuit, therefore the fluid is conducted out of the machine tank through the mentioned filter unit, freed from finest particles and led back to the machine circuit by a return line. The control block, located upstream in the pressure line provides several intelligent possibilities, how to run the system as for example the flow may be directed to the exit line without passing the filter element. This is usefull and timesaving in the case of a coolant/lubricant change. Another function is the activation of the low pressure cleaning gun intended for a cautious and effective cleaning of the system. In this case the cleanig gun is supplied from the machinery tank. The single components of the system MKS 601 are easily and quickly to be dismounted.

Details




Filter unit

The return-line filter TEF 952 is mounted directly on the top of the tank and connected to the pressure line. The used filter element Interporvlies “VG” is characterised by deep filtration at low pressure difference and highest dirt holding capacity.

Control block

Following to the suction of the fluid by the membrane pump the control block may route to the filter unit, to the exit line or to the low pressure cleaning gun. Additionally there is an extension port for retrofitting components.

Air pressure operated membrane pump

This type of self-priming pump is air driven and designed especially for a conveyance of chemical fluids. Low service efforts, dry run resistance and easy handling are the main advantages of this pump.

Oil separation mechanism

Floating oil separator with adjustable oil supply. This garantees highest separation performance even at a changing level of the fluid.

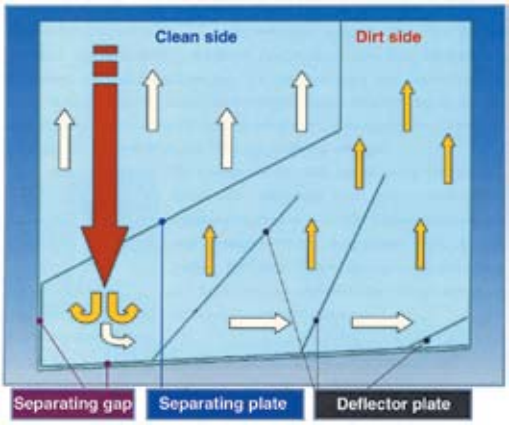
Economic advantages

The application of a service system for coolant/lubricant fluids shows up outstanding possibilities regarding less change, less consumption and less disposal as well as to an increasing technical demand on the coolant/lubricant itself. The consumption of concentrate may decrease over 15% and the service time can be reduced about 2h per change in comparison to a conventional service on machinery systems. As a matter of fact, the clearance between changes is extended considerably.

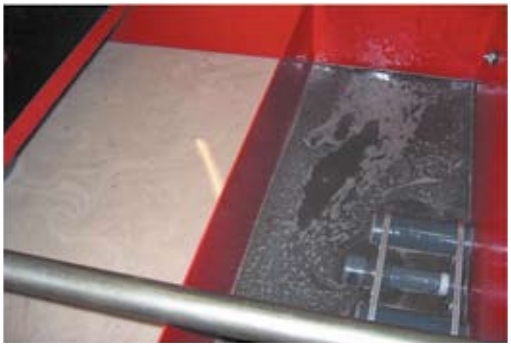
Additional aspects like environmental protection and the exposure of co-workers, caused by contaminated coolant require new, intelligent solutions.

These requirements, economical nose and ergonomical enhancement combined with an easy operation and the multifaceted functions are fully covered by the system MKS 601.

Function of the separation tank



Clean phase | Dirt phase



Technical data

Function	MKS 601
Net weight	approx. 270 kg
Dimensions	1440 x 1116 x 1200 mm
Operation	by air pressure
Reservoir volume	600 l
Extraction of other fluids	Yes
Extraction of chips	max. grain size 6 mm pilot filter suggested
Separation of other fluids	separation tank
Solid particle separation	filter fineness from 1 µm to 25 µm
Cleaning of the machine	hand cleaning gun up to 6 bar

Other products offered by internormen technology

internormen filter technology

Filters for hydraulic and lubrication purposes as well as for process filtration in single or duplex versions up to 20.000 l/min. and pressure up to 1400 bar, equipped with filter elements in glass fibre, paper and stainless steel wire mesh, with highest dirt-holding capacities and highest pressure difference resistance.

internormen fluid management

Off-line filtration units, stationary and mobile versions, with options like heat exchanger and watersorp elements and vacuum dehydration systems.

internormen electronics

Contamination Control Systems (Laser Particle Counters) with options like Bottle Sampling System and Tank Sampling System as well as mobile and stationary water sensors and electronic sensor systems.

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Oil Service Equipment

Off-line filtration, oil change and filling

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Oil service equipment for hydraulic and lubrication systems

Effective oil service for hydraulic and lubrication systems requires, beside using an operating filter, the application of a filter unit for off-line filtration, oil change and filling.
Before the initial start-up in production facilities and lubrication systems, as well as in mobile and stationary hydraulics, a flushing should be performed, which often isn't the case. Unfiltered oil gets into the tank and causes sludge accumulation.
In order to prevent the above mentioned contamination process, the fluid should be filled in via a fine filter of an off-line filtration unit.

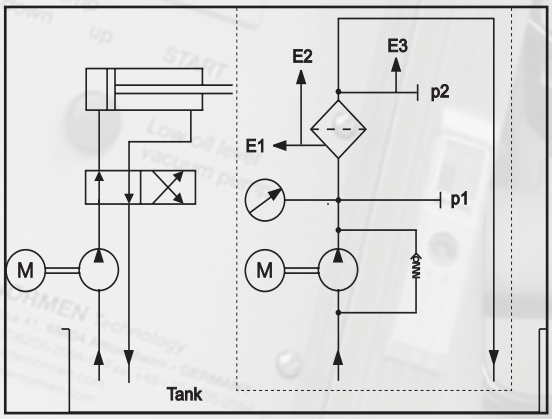
An off-line filtration unit with an electric motor, improves the cleanness and quality of the operating fluid and prolongs its durability, thereby preventing early wear and tear of system components.

UM

UMFC

Off-line filtration

During off-line filtration the filter is located in a circuit which is separated from the main stream. By separating the streams, off-line filtration can be performed as long as it takes for the operating fluid to reach the wanted cleanliness class, regardless of the system's running time.



Off-line filtration

Stationary filter units – US series

The **stationary filter units - US series** are meant for fine filtration, filling or flushing of hydraulic systems. Equipped with a gear pump driven by an electric motor, the US filter units are designed in different sizes, for different volume flows and with various filter elements depending on the needed filtration fineness.

The **stationary filter units with plate heat exchanger - USP series** are an ideal tool for maintenance and service personnel to cool and clean the hydraulic and/or the lubricating oil. Tests showed that 10 °C lower temperature is doubling the life time of the operating hydraulic oil, and preventing additional side effects of thermal degradation, seal failure, loss of film strength on the surface of the hydraulic components (like valves, cylinders etc.) which might lead to severe damages and unscheduled downtime of the systems.

Mobile filter units – UM series

The **mobile filter units - UM series** were as well developed for oil maintenance on hydraulic and lubrication systems, being the mobile version of the US filter series.
The main aim of the **mobile oil service units for fluid controlling - UMFC series** is to simplify off-line filtration and filling of reservoirs, and to monitor ISO cleanliness levels at the same time. Instead of having to replace oil prematurely, it can be filtered and used again, saving costs for oil disposal or for buying new oil – not to mention the effects on the environment.
The UMFC units include a fluid control function, performed by the particle counter *CCT 01-Set* and the water sensor *WSPS 05.*

US

IFPS

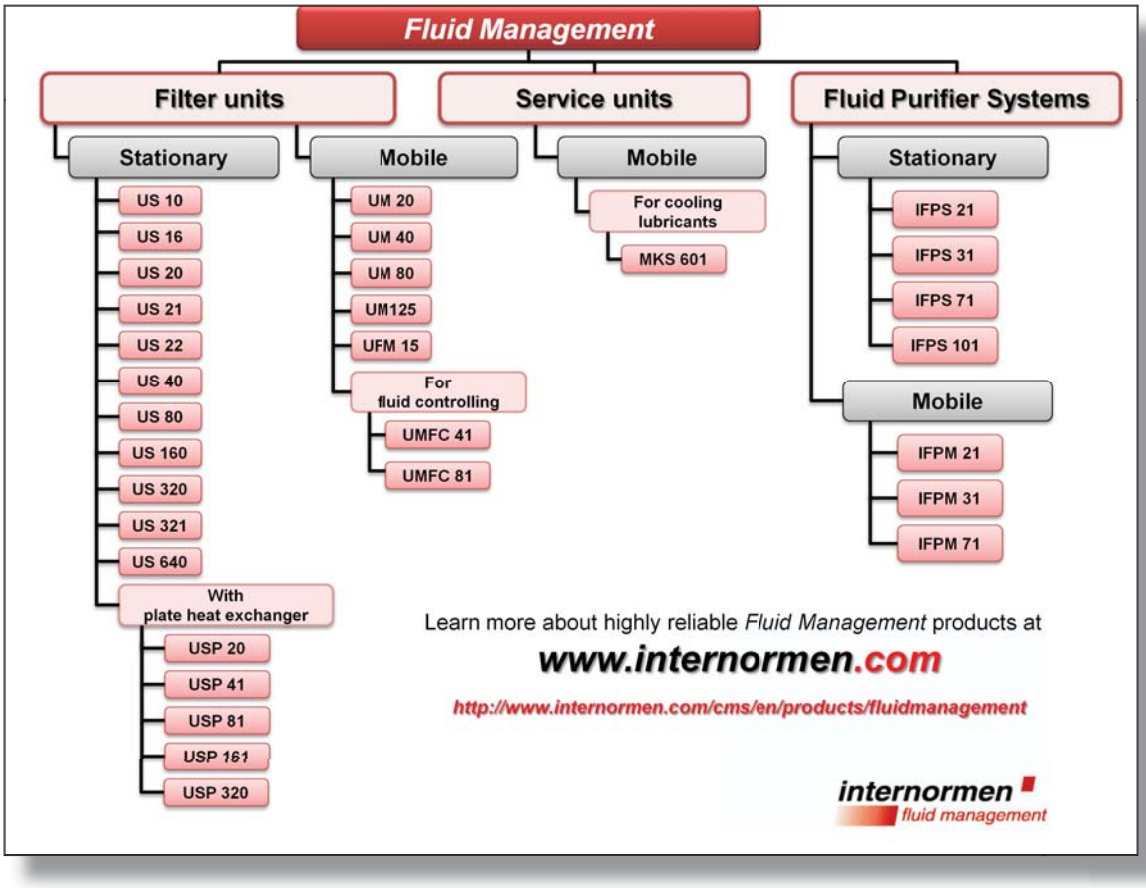
Advanced Fluid Management: Fluid Purifier Systems IFPM/IFPS

The **IFPM/IFPS Fluid Purifier Systems** are designed for viscosity ranges from transformer oils to heavy gear lube oils (ISO 460), able to remove free, emulsified and dissolved water, free and dissolved gases and particulate contamination down to 1µm. The fineness of the filter - ranging from very fine to coarse - is selected according to the kind of contamination. The IFPM/IFPS systems are available in four different standard sizes from 20 to 100 l/min, mobile (IFPM) or stationary (IFPS), and as explosion-proof as well.

Due to the reduction of fluid ageing, the maintenance of lubricity and the decrease of the air and water content, the equipment reliability of the whole system and the durability of the used fluids, are being significantly improved.

Main characteristics of the off-line filter units

Reliable off-line filtration	Low overall size/volume
Off-line filtration in addition to the already existing operating filter	High quality filter elements (high dirt holding capacities)
Different performance possibilities within one type series	Filter element change without tools - without system downtime
Improvement of cleanliness classes	Compact structural design
Visual clogging indicator included as standard equipment	Safety valves make an unattended operation of the units possible
Extension of the service life of system components and the service life of the operating fluid	Filtration during tank filling



INTERNORMEN condition monitoring systems provide the opportunity of accurate, immediate, mobile and stationary fluid monitoring and particle counting according to ISO, NAS and SAE standards, being an essential part of any broad maintenance concept.

Measurement, diagnostic and analysis technology for monitoring and control of your systems at ***http://www.internormen.com/cms/en/products/electronics***

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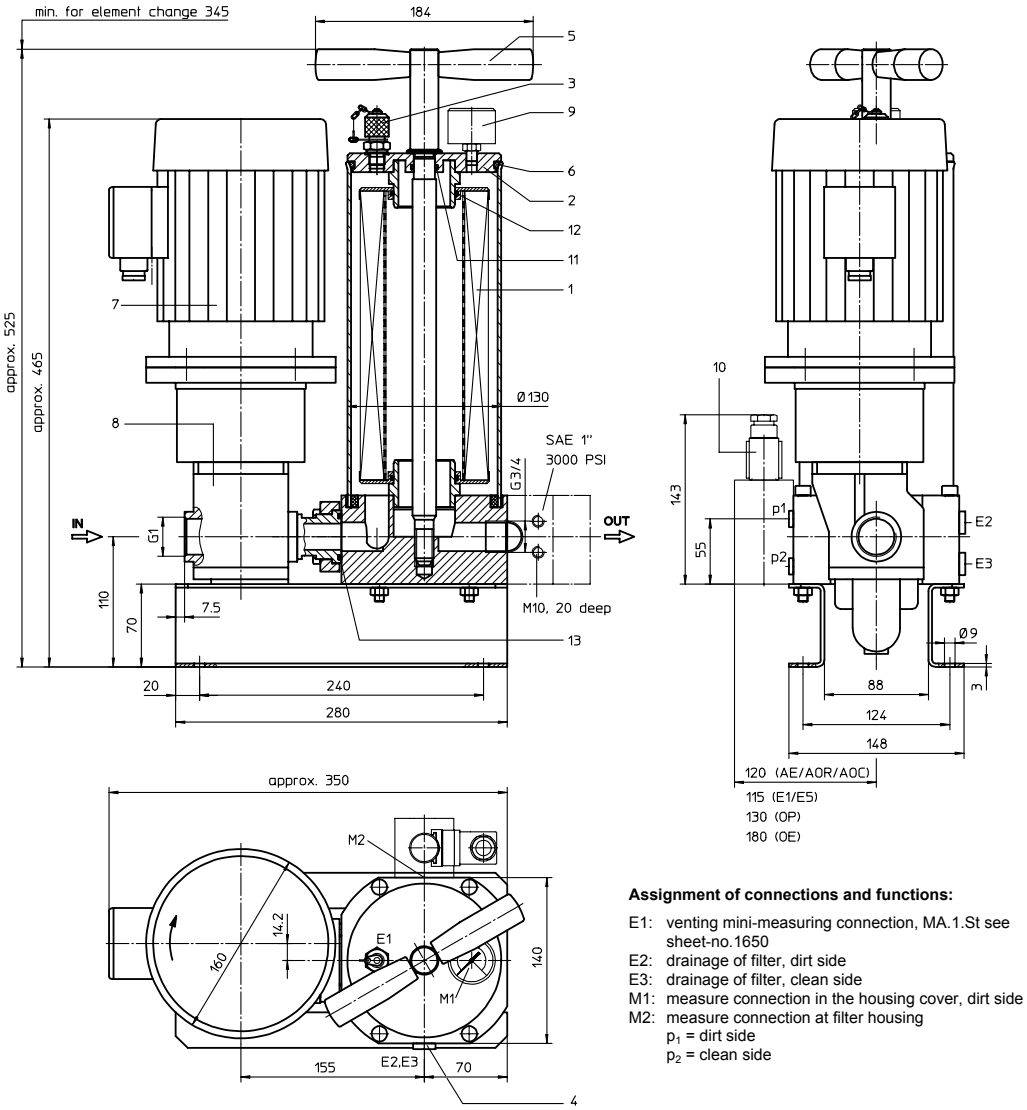
GB-01/2011
316040

FILTER UNIT, stationary
Series US 20

Sheet No. **4008.1 G**
Sheet 1/3

- preference version -



Assignment of connections and functions:

E1: venting mini-measuring connection, MA.1.St see sheet-no.1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the housing cover, dirt side
M2: measure connection at filter housing
p_1 = dirt side
p_2 = clean side

Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

1. Type index:

1.1. Filter unit: (ordering example)

US. 20. 6VG. 10. B. P. -. P01. D03. O. AE

1	2	3	4	5	6	7	8	9	10	11

1 **series:**
US = filter unit, stationary

2 **nominal size:** 20

3 **filter-material and filter-fineness:**
10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$, 1 VG = 4 $\mu m_{(c)}$ Interpor fleece (glass fibre)
10 WVG = 10 $\mu m_{(c)}$, 3 WVG = 5 $\mu m_{(c)}$ Watersorp-filter element

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM), by agreement

7 **filter element specification:**
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **pump unit:**
P01 = pump unit 01, NG 20.16 (standard-pump unit / setting range 1-15 bar)

9 **motor:** (D = rotary current motor / W = alternating current motor)

motor	electrical connection		volume flow	max. viscosity	max. pressure	on/off switch	cable	doc.-no.
D03 [1)]	230/400V	50Hz	22,7 l/min	10-400 mm²/s	4 bar	-	-	42742-4
D03 [1)]	265/460V	60Hz	27,2 l/min	10-400 mm²/s	4 bar	-	-	42742-4
D34	230/400V	50Hz	22,7 l/min	10-400 mm²/s	4 bar	S	K	
D34	265/460V	60Hz	27,2 l/min	10-400 mm²/s	4 bar	S	K	
W01 [1)]	110V	60Hz	27,2 l/min	10-400 mm²/s	4 bar	-	-	43066-4
W03	230V	50Hz	22,7 l/min	10-400 mm²/s	4 bar	S	K	43044-4
W07	110V	60Hz	27,2 l/min	10-400 mm²/s	4 bar	S	K	43045-4

[1)] standard motor

10 **clogging indicator at M1:**
- = without
O = visual, 2,5 bar

11 **clogging indicator at M2:**
- = without
AOR = AOR.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1606,
AOC = AOC.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1606,
AE = AE30.2,5... electrical at p_1 and p_2, 2,5 bar, see sheet-no. 1609
OP = OP.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1628
OE = OE.2,5..., visual-electrical, at p_1 and p_2, 2,5 bar, see sheet-no. 1628
E1 = E1.2,5 electrical at p_1, 2,5 bar, see sheet-no. 1616
E5 = E5.2,5 electrical at p_1, 2,5 bar, see sheet-no. 1616

1.2. Filter element: (ordering example)

01NR. 250. 6VG. 10. B. P. -

1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 250

3 - 7 see type index-filter unit

Changes of measures and design are subject to alteration!

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2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 250	
2	housing cover	1	30615-3	315437
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	G ¼	305003
5	straining screw	1	30631-4	316404
6	O-ring	1	115 x 5	306640 (NBR)
7	electric motor	1	according to type index	
8	pump unit P01	1	NG 20.16	316270
9	clogging indicator (series)	1	visual ∅ 40	315452
10	clogging indicator	1	according to type index	
11	O-ring	1	18 x 3	304359 (NBR)
12	O-ring	2	52 x 3	314206 (NBR)
13	O-ring	1	32 x 3,5	304378 (NBR)

3. Description:

The stationary filter unit is intended for oil maintenance on hydraulic systems.
The area of application comprises:
- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to bypass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability.
The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 250.
Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 $\mu m_{(c)}$. The contamination level of the filter element can be read off from a pressure display in the cover of the filter.
At a pressure >2,5 bar (red area of the scale field), the filter element is contaminated and it must be replaced with a new filter element.
The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.
To protect against overpressure, the filter unit is fitted with a safety valve. The initial response pressure difference valve is set according to pressure stated in the table on the type plate under item 9. If a different pressure setting is requested, please state the initial response presse with respect to the set pressure range of the pump unit in the plain text when ordering.
Stationary filter units with motors without combined protective motor switch and ON/OFF switch and without any cable with plug (see switch „-", cable „-" under item 9 of the type plate) can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected E-motor and if the switch-off function of the E-motor of the electrical clogging indicator is dise ngaged at 2,5 bar.
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium..

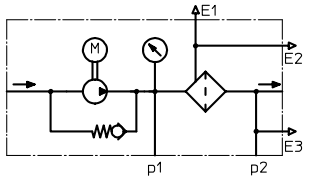
4. Technical data:

filter-fineness:	4, 5, 7 or 10 $\mu m_{(c)}$
weight:	approx. 28 kg
operating medium:	hydraulic oil based on mineral oil from 10 mm²/s, other media on request

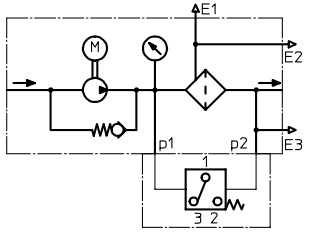
Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:

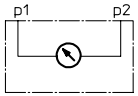
Filter unit without clogging indicator



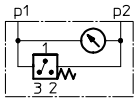
Filter unit with electrical clogging indicator AE30



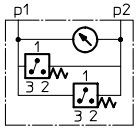
Filter unit with visual clogging indicator AOR, AOC, OP



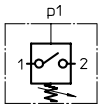
Filter unit with visual-electrical clogging indicator OE1



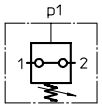
Filter unit with visual-electrical clogging indicator OE2



Filter unit with electrical clogging indicator contact maker E1



Filter unit with electrical clogging indicator contact breaker E5



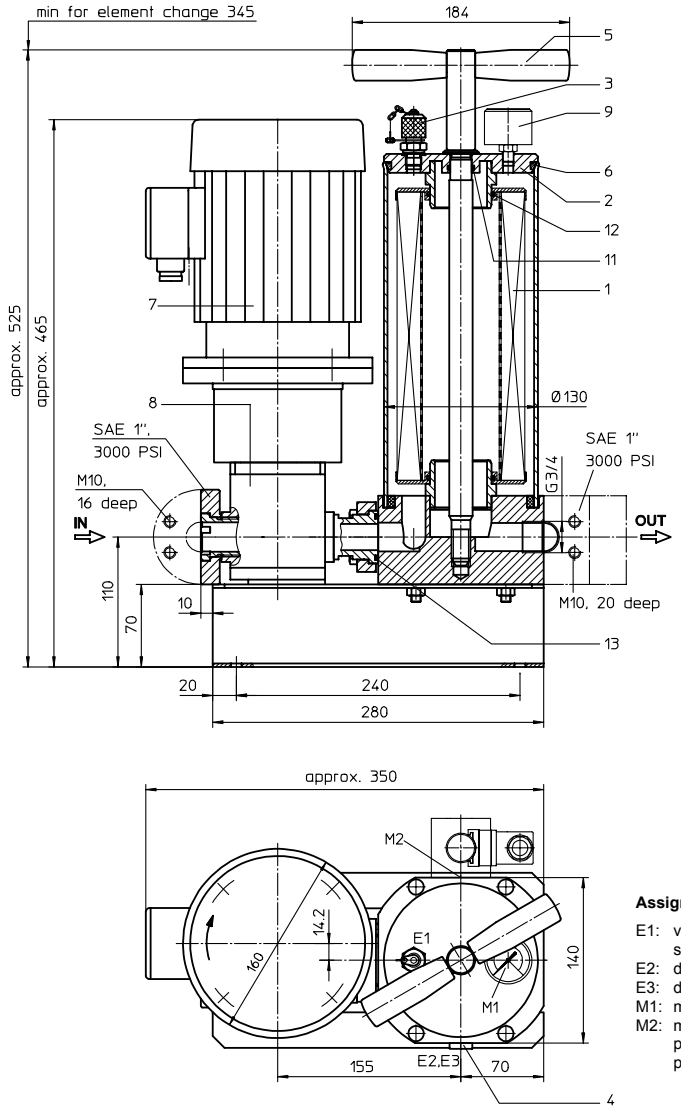
6. Test methods:

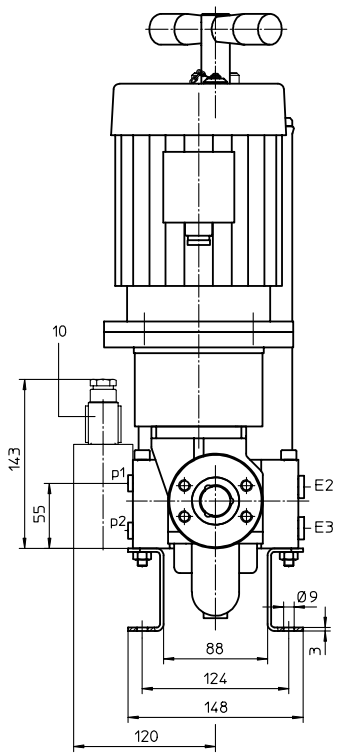
Filter elements are tested according to the following ISO sta ndards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

FILTER UNIT, stationary
Series US 21

- preference version -





Assignment of connections and functions:

E1: venting mini-measuring connection, MA.1.St see sheet-no.1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the housing cover, dirt side
M2: measure connection at filter housing
p_1 = dirt side
p_2 = clean side

Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

EDV 08/06

1. Type index:

1.1. Filter unit: (ordering example)

US. 21. 6VG. 10. B. P. -. P08. D03. O. AE

1	2	3	4	5	6	7	8	9	10	11

1 **series:**
US = filter unit, stationary

2 **nominal size:** 21

3 **filter-material and filter-fineness:**
10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$, 1 VG = 4 $\mu m_{(c)}$ Interpor fleece (glass fibre)
10 WVG = 10 $\mu m_{(c)}$, 3 WVG = 5 $\mu m_{(c)}$ Watersorp-filter element

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM), by agreement

7 **filter element specification:**
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **pump unit:**
P08 = pump unit 08, NG 20.16 (standard-pump unit / setting range 1-15 bar)

9 **motor:** (D = rotary current motor / W = alternating current motor)

motor	electrical connection		volume flow	max. viscosity	max. pressure	on/off switch	cable	doc.-no.
D03 [1]	230/400V	50Hz	22,7 l/min	10-400 mm²/s	4 bar	-	-	42742-4
D03 [1]	265/460V	60Hz	27,2 l/min	10-400 mm²/s	4 bar	-	-	42742-4
D34	230/400V	50Hz	22,7 l/min	10-400 mm²/s	4 bar	S	K	
D34	265/460V	60Hz	27,2 l/min	10-400 mm²/s	4 bar	S	K	
W01 [1]	110V	60Hz	27,2 l/min	10-400 mm²/s	4 bar	-	-	43066-4
W03	230V	50Hz	22,7 l/min	10-400 mm²/s	4 bar	S	K	43044-4
W07	110V	60Hz	27,2 l/min	10-400 mm²/s	4 bar	S	K	43045-4

[1] standard motor

10 **clogging indicator at M1:**
- = without
O = visual, 2,5 bar

11 **clogging indicator at M2:**
- = without
AOR = AOR.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1606,
AOC = AOC.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1606,
AE = AE30.2,5... electrical at p_1 and p_2, 2,5 bar, see sheet-no. 1609
OP = OP.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1628
OE = OE.2,5..., visual-electrical, at p_1 and p_2, 2,5 bar, see sheet-no. 1628
E1 = E1.2,5 electrical at p_1, 2,5 bar, see sheet-no. 1616
E5 = E5.2,5 electrical at p_1, 2,5 bar, see sheet-no. 1616

1.2. Filter element: (ordering example)

01NR. 250. 6VG. 10. B. P. -

1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 250

3 - 7 see type index-filter unit

Changes of measures and design are subject to alteration!

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2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 250	
2	housing cover	1	30615-3	315437
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	G ¼	305003
5	straining screw	1	30631-4	316404
6	O-ring	1	115 x 5	306640 (NBR)
7	electric motor	1	according to type index	
8	pump unit P08	1	NG 20.16	317378
9	clogging indicator (series)	1	visual ∅ 40	315452
10	clogging indicator	1	according to type index	
11	O-ring	1	18 x 3	304359 (NBR)
12	O-ring	2	52 x 3	314206 (NBR)
13	O-ring	1	32 x 3,5	304378 (NBR)

3. Description:

The stationary filter unit is intended for oil maintenance on hydraulic systems.
The area of application comprises:
- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to bypass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability.
The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 250.
Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 $\mu m_{(c)}$. The contamination level of the filter element can be read off from a pressure display in the cover of the filter.
At a pressure >2,5 bar (red area of the scale field), the filter element is contaminated and it must be replaced with a new filter element.
The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.
To protect against overpressure, the filter unit is fitted with a safety valve. The initial response pressure difference valve is set according to pressure stated in the table on the type plate under item 9. If a different pressure setting is requested, please state the initial response presse with respect to the set pressure range of the pump unit in the plain text when ordering.
Stationary filter units with motors without combined protective motor switch and ON/OFF switch and without any cable with plug (see switch „-", cable „-" under item 9 of the type plate) can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected E-motor and if the switch-off function of the E-motor of the electrical clogging indicator is dise ngaged at 2,5 bar.
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium..

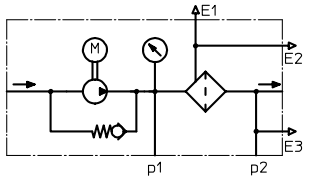
4. Technical data:

filter-fineness:	4, 5, 7 or 10 $\mu m_{(c)}$
weight:	approx. 28 kg
operating medium:	hydraulic oil based on mineral oil from 10 mm²/s, other media on request

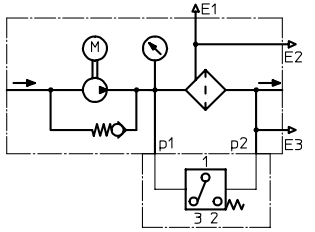
Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:

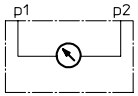
Filter unit without clogging indicator



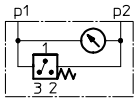
Filter unit with electrical clogging indicator AE30



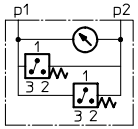
Filter unit with visual clogging indicator AOR, AOC, OP



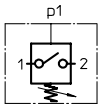
Filter unit with visual-electrical clogging indicator OE1



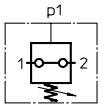
Filter unit with visual-electrical clogging indicator OE2



Filter unit with electrical clogging indicator contact maker E1



Filter unit with electrical clogging indicator contact breaker E5



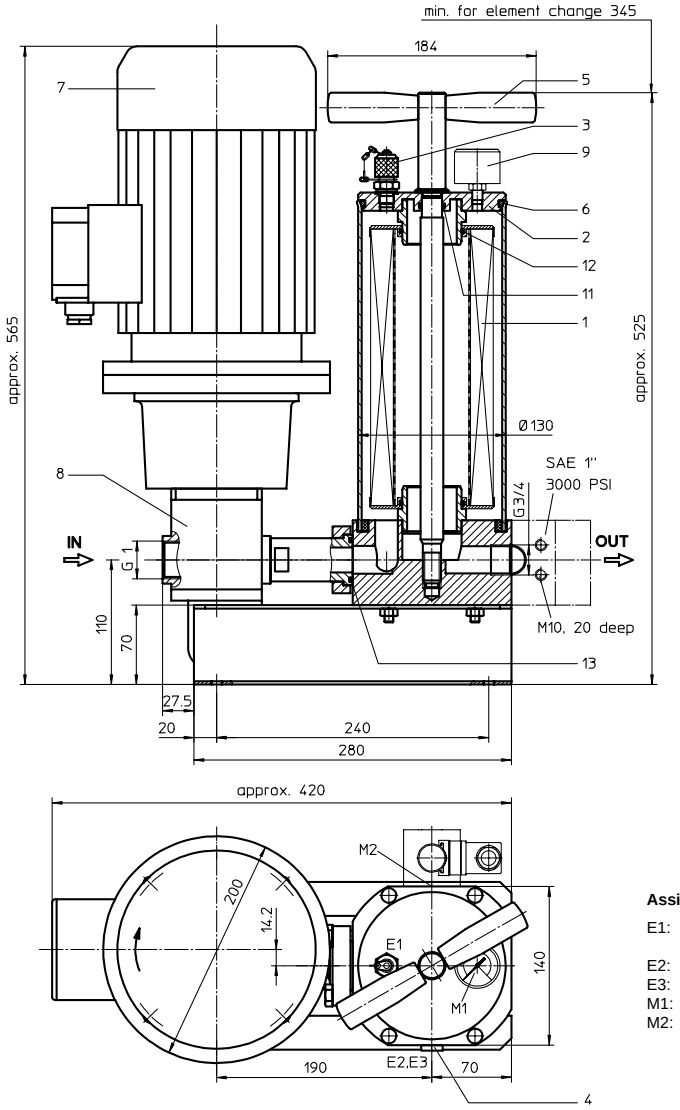
6. Test methods:

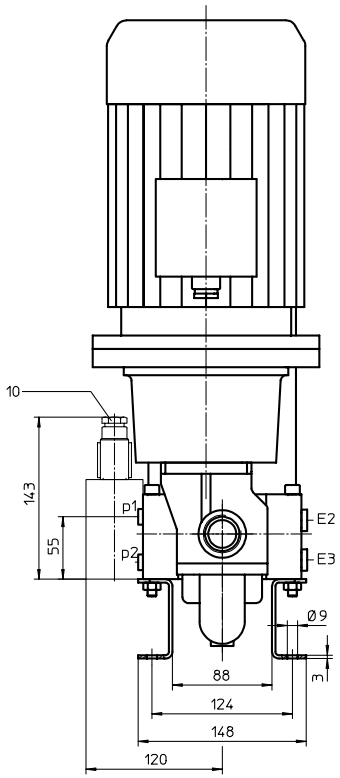
Filter elements are tested according to the following ISO sta ndards:

ISO 2941	Verification of colla pse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow character istics
ISO 16889	Multi-pass method for evaluating filtration performance

FILTER UNIT, stationary
Series US 22

- preference version -





Assignment of connections and functions:

E1: venting mini-measuring connection, MA.1.St see sheet-no.1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the housing cover, dirt side
M2: measure connection at filter housing
p_1 = dirt side
p_2 = clean side

Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

EDV 11/07

1. Type index:

1.1. Filter unit: (ordering example)

US.	22.	6VG.	10.	B.	P.	-.	P14.	D13.	O.	AE
1	2	3	4	5	6	7	8	9	10	11

1 **series:**
US = filter unit, stationary

2 **nominal size:** 22

3 **filter-material and filter-fineness:**
10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$, 1 VG = 4 $\mu m_{(c)}$ Interpor fleece (glass fibre)
10 WVG = 10 $\mu m_{(c)}$, 3 WVG = 5 $\mu m_{(c)}$ Watersorp-filter element

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM), by agreement

7 **filter element specification:**
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **pump unit:**
P14 = pump unit 14, NG 20.16 (standard-pump unit / setting range 1-15 bar)

9 **motor:** (D = rotary current motor)

motor	electrical connection		volume flow	max. viscosity	max. pressure	on/off switch	cable	doc.-no.
D12	230/400V	50Hz	11,4 l/min	10-1200 mm²/s	15 bar	S	K	42743-4
D12	265/460V	60Hz	13,6 l/min	10-1000 mm²/s	15 bar	S	K	42743-4
D13[1)]	230/400V	50Hz	11,4 l/min	10-3000 mm²/s	7 bar	-	-	43656-4
D13[1)]	265/460V	60Hz	13,6 l/min	10-2500 mm²/s	7 bar	-	-	43656-4
D26	400/690V	50Hz	11,4 l/min	10-1200 mm²/s	7 bar	-	-	44908-4
D26	460/790V	60Hz	13,6 l/min	10-1000 mm²/s	7 bar	-	-	44908-4

[1)] standard motor

10 **clogging indicator at M1:**
- = without
O = visual, 2,5 bar

11 **clogging indicator at M2:**
- = without
AOR = AOR.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1606,
AOC = AOC.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1606,
AE = AE30.2,5... electrical at p_1 and p_2, 2,5 bar, see sheet-no. 1609
OP = OP.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1628
OE = OE.2,5..., visual-electrical, at p_1 and p_2, 2,5 bar, see sheet-no. 1628
E1 = E1.2,5 electrical at p_1 , 2,5 bar, see sheet-no. 1616
E5 = E5.2,5 electrical at p_1 , 2,5 bar, see sheet-no. 1616

1.2. Filter element: (ordering example)

01NR.	250.	6VG.	10.	B.	P.	-
1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 250

3 - 7 see type index-filter unit

Changes of measures and design are subject to alteration!

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fax +49 - (0)6205 - 2094-40 url www.internormen.com

2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 250	
2	housing cover	1	30615-3	315437
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	G ¼	305003
5	straining screw	1	30631-4	316404
6	O-ring	1	115 x 5	306640 (NBR)
7	electric motor	1	according to type index	
8	pump unit P14	1	NG 20.16	319735
9	clogging indicator (series)	1	visual ∅ 40	315452
10	clogging indicator	1	according to type index	
11	O-ring	1	18 x 3	304359 (NBR)
12	O-ring	2	52 x 3	314206 (NBR)
13	O-ring	1	32 x 3,5	304378 (NBR)

3. Description:

The stationary filter unit is intended for oil maintenance on hydraulic systems.
The area of application comprises:
- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to bypass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability.
The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 250.
Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 $\mu m_{(c)}$. The contamination level of the filter element can be read off from a pressure display in the cover of the filter.
At a pressure >2,5 bar (red area of the scale field), the filter element is contaminated and it must be replaced with a new filter element.
The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.
To protect against overpressure, the filter unit is fitted with a safety valve. The initial response pressure difference valve is set according to pressure stated in the table on the type plate under item 9. If a different pressure setting is requested, please state the initial response presse with respect to the set pressure range of the pump unit in the plain text when ordering.
Stationary filter units with motors without combined protective motor switch and ON/OFF switch and without any cable with plug (see switch „-", cable „-" under item 9 of the type plate) can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected E-motor and if the switch-off function of the E-motor of the electrical clogging indicator is dise ngaged at 2,5 bar.
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium..

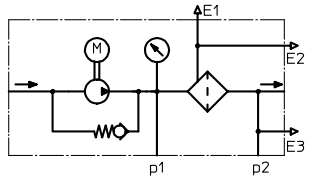
4. Technical data:

filter-fineness:	4, 5, 7 or 10 $\mu m_{(c)}$
weight:	approx. 35 kg
operating medium:	hydraulic oil based on mineral oil from 10 mm²/s, other media on request

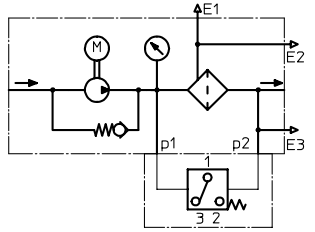
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:

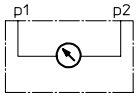
Filter unit without clogging indicator



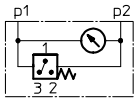
Filter unit with electrical clogging indicator AE30



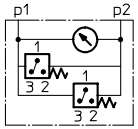
Filter unit with visual clogging indicator AOR, AOC, OP



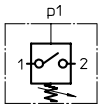
Filter unit with visual-electrical clogging indicator OE1



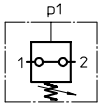
Filter unit with visual-electrical clogging indicator OE2



Filter unit with electrical clogging indicator contact maker E1



Filter unit with electrical clogging indicator contact breaker E5

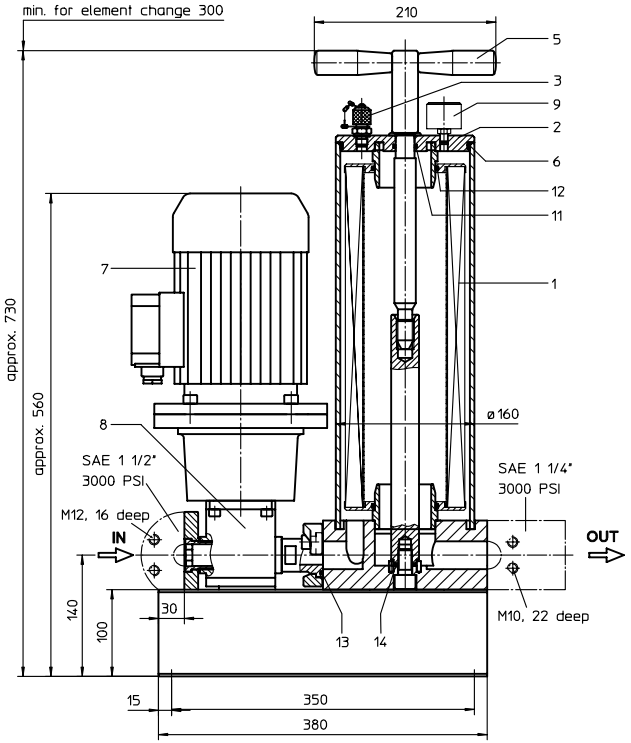


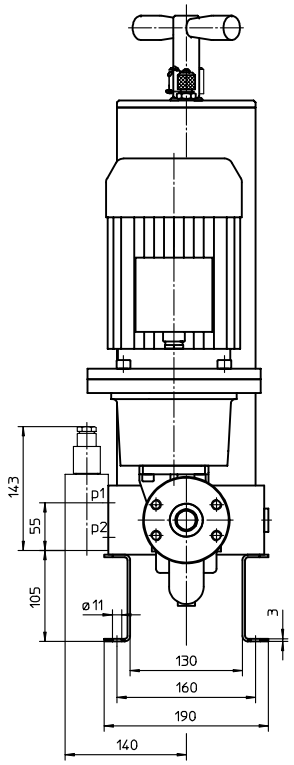
6. Test methods:

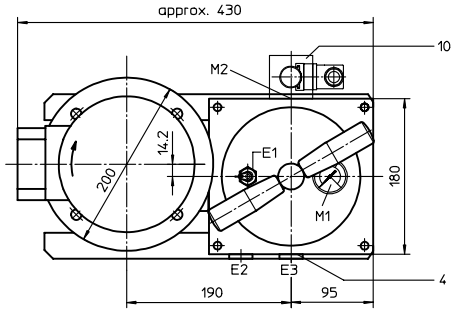
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

- preference version -







Assignment of connections and functions:

E1: venting mini-measuring connection, MA.1.St see sheet-no.1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the housing cover, dirt side
M2: measure connection at filter housing
p_1 = dirt side
p_2 = clean side

Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

EDV 08/06

FILTER UNIT, stationary
Series US 40

Sheet No. **4011.1 F**
Sheet 1/2

1. Type index:

1.1. Filter unit: (ordering example)

US. 40. 6VG. 10. B. P. -. P05. D05. O. AE

1	2	3	4	5	6	7	8	9	10	11

1 **series:**
US = filter unit, stationary

2 **nominal size:** 40

3 **filter-material and filter-fineness:**
10 VG = 10 µm(c), 6 VG = 7 µm(c), 3 VG = 5 µm(c), 1 VG = 4 µm(c) Interpor fleece (glass fibre)
10 WVG = 10 µm(c), 3 WVG = 5 µm(c) Watersorp-filter element

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM), by agreement

7 **filter element specification:**
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **pump unit:**
P05 = pump unit 05, NG 40.25 (standard-pump unit / setting range 1-15 bar)

9 **motor:** (D = rotary current motor / W = alternating current motor)

motor	electrical connection		volume flow	max. viscosity	max. pressure	on/off switch	cable	doc.-no.
D05 [1]	230/400V	50Hz	35,5 l/min	10-400 mm²/s	6 bar	-	-	42549-4
D05 [1]	265/460V	60Hz	42,5 l/min	10-400 mm²/s	6 bar	-	-	42549-4
W10	230V	50Hz	35,5 l/min	10-400 mm²/s	6 bar	S	K	42754-4
W11	110V	60Hz	42,5 l/min	10-400 mm²/s	6 bar	S	K	42877-4

[1] standard motor

10 **clogging indicator at M1:**
- = without
O = visual, 2,5 bar

11 **clogging indicator at M2:**
- = without
AOR = AOR.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1606,
AOC = AOC.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1606,
AE = AE30.2,5... electrical at p_1 and p_2, 2,5 bar, see sheet-no. 1609
OP = OP.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1628
OE = OE.2,5..., visual-electrical, at p_1 and p_2, 2,5 bar, see sheet-no. 1628
E1 = E1.2,5 electrical at p_1, 2,5 bar, see sheet-no. 1616
E5 = E5.2,5 electrical at p_1, 2,5 bar, see sheet-no. 1616

1.2. Filter element: (ordering example)

01NR. 630. 6VG. 10. B. P. -

1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 630

3 - 7 see type index-filter unit

Changes of measures and design are subject to alteration!

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2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 630	
2	housing cover	1	30600-3	315492
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	G ½	304678
5	straining screw	1	30595-3	316312
6	O-ring	1	140 x 6	315392 (NBR)
7	electric motor	1	according to type index	
8	pump unit P05	1	NG 40.25	316292
9	clogging indicator (series)	1	visual ∅ 40	315452
10	clogging indicator	1	according to type index	
11	O-ring	1	22 x 3	304387 (NBR)
12	O-ring	2	70 x 4	306253 (NBR)
13	O-ring	1	37,69 x 3,53	304353 (NBR)
14	O-ring	1	18 x 3	304359 (NBR)

3. Description:

The stationary filter unit is intended for oil maintenance on hydraulic systems.
The area of application comprises:
- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability.
The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 630.
Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 $\mu m_{(c)}$. The contamination level of the filter element can be read off from a pressure display in the cover of the filter.
At a pressure >2,5 bar (red area of the scale field), the filter element is contaminated and it must be replaced with a new filter element.
The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.
To protect against overpressure, the filter unit is fitted with a safety valve. The initial response pressure difference valve is set according to pressure stated in the table on the type plate under item 9. If a different pressure setting is requested, please state the initial response presse with respect to the set pressure range of the pump unit in the plain text when ordering.
Stationary filter units with motors without combined protective motor switch and ON/OFF switch and without any cable with plug (see switch „-“, cable „-“ under item 9 of the type plate) can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected E-motor and if the switch-off function of the E-motor of the electrical clogging indicator is dise ngaged at 2,5 bar.
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium.

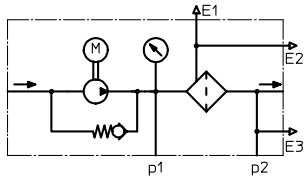
4. Technical data:

filter-fineness:	4, 5, 7 or 10 $\mu m_{(c)}$
weight:	approx. 38 kg
operating medium:	hydraulic oil based on mineral oil from 10 mm²/s, other media on request

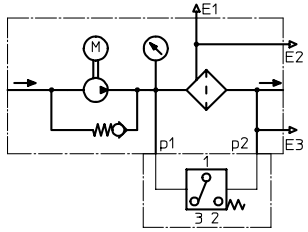
Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:

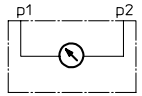
Filter unit without clogging indicator



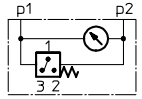
Filter unit with electrical clogging indicator AE30



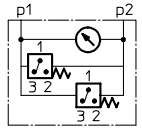
Filter unit with visual clogging indicator AOR, AOC, OP



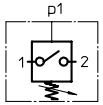
Filter unit with visual-electrical clogging indicator OE1



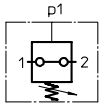
Filter unit with visual-electrical clogging indicator OE2



Filter unit with electrical clogging indicator contact maker E1



Filter unit with electrical clogging indicator contact breaker E5



6. Test methods:

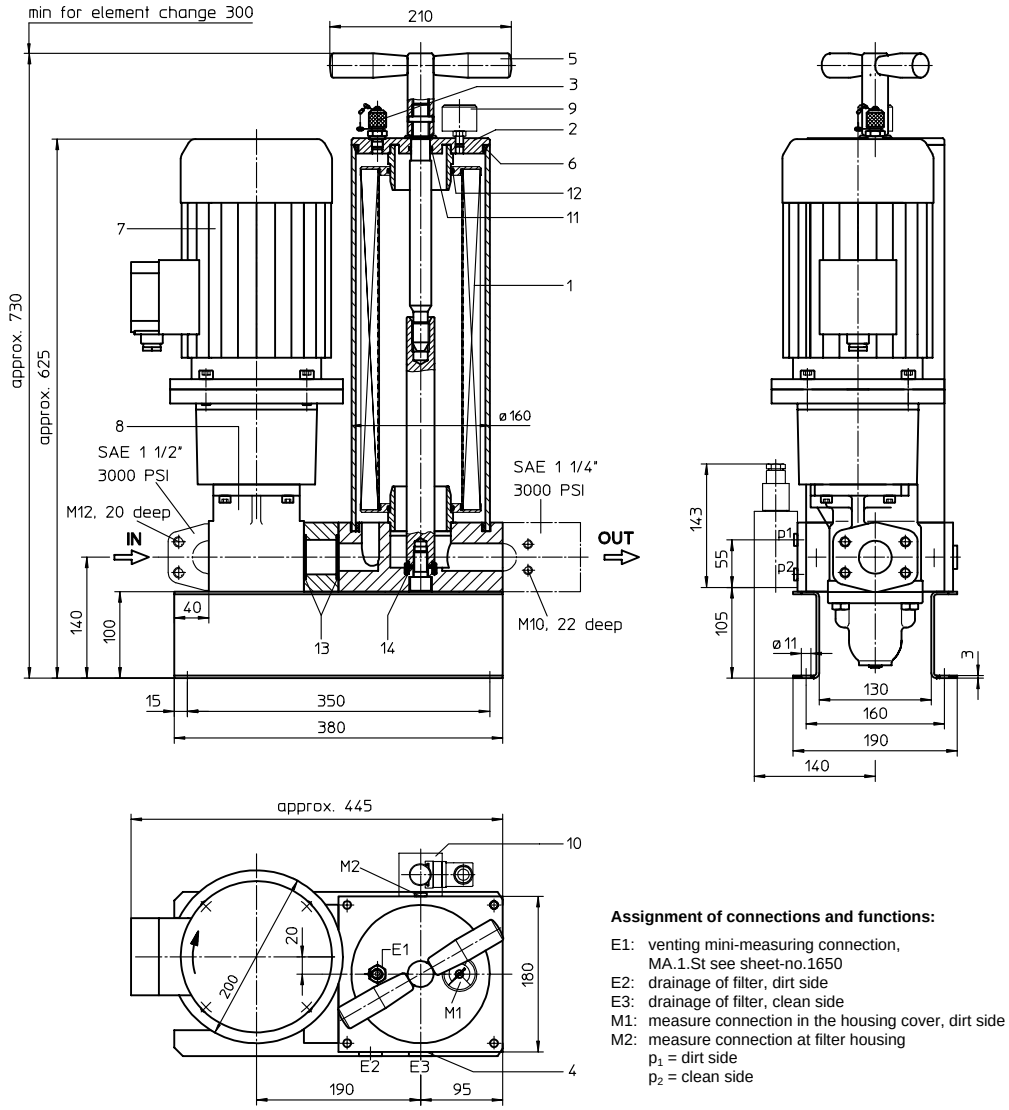
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

FILTER UNIT, stationary
Series US 80

Sheet No.
4009.1 E
Sheet 1/2

- preference version -



Assignment of connections and functions:

E1: venting mini-measuring connection, MA.1.St see sheet-no.1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the housing cover, dirt side
M2: measure connection at filter housing
p_1 = dirt side
p_2 = clean side

Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

EDV 08/06

1. Type index:

1.1. Filter unit: (ordering example)

US. 80. 6VG. 10. B. P. -. P04. D01. O. AE

1	2	3	4	5	6	7	8	9	10	11

1 **series:**
US = filter unit, stationary

2 **nominal size:** 80

3 **filter-material and filter-fineness:**
10 VG = 10 µm$_{(c)}$, 6 VG = 7 µm$_{(c)}$, 3 VG = 5 µm$_{(c)}$, 1 VG = 4 µm$_{(c)}$ Interpor fleece (glass fibre)
10 WVG = 10 µm$_{(c)}$, 3 WVG = 5 µm$_{(c)}$ Watersorp-filter element

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR), V = Viton (FPM), by agreement

7 **filter element specification:**
- = standard, VA = stainless steel, IS06 = see sheet-no. 31601

8 **pump unit:**
P04 = pump unit 04, NG 80.50 (standard-pump unit / setting range 1-15 bar)

9 **motor:** (D = rotary current motor / W = alternating current motor)

motor	electrical connection		volume flow	max. viscosity	max. pressure	on/off switch	cable	doc.-no.
D01 [1)]	230/400V	50Hz	71,0 l/min	10-400 mm²/s	5 bar	-	-	41969-4
D01 [1)]	265/460V	60Hz	85,0 l/min	10-400 mm²/s	5 bar	-	-	41969-4
D17	230/400V	50Hz	71,0 l/min	10-400 mm²/s	9 bar	S	K	
D17	265/460V	60Hz	85,0 l/min	10-400 mm²/s	8 bar	S	K	
D18	230/400V	50Hz	47,5 l/min	10-800 mm²/s	4 bar	-	-	
D18	265/460V	60Hz	57,0 l/min	10-650 mm²/s	4 bar	-	-	
D31	230/400V	50Hz	71,0 l/min	10-400 mm²/s	15 bar	-	-	
D31	265/460V	60Hz	85,0 l/min	10-400 mm²/s	15 bar	-	-	
W06	230V	50Hz	71,0 l/min	10-400 mm²/s	5 bar	S	K	43056-4
W09	110V	60Hz	85,0 l/min	10-400 mm²/s	4 bar	S	K	43057-4
W12 [1)]	110V	60Hz	85,0 l/min	10-400 mm²/s	4 bar	-	-	43067-4
W18	230V	50Hz	71,0 l/min	10-400 mm²/s	9 bar	S	K	43060-4

[1)] standard motor

10 **clogging indicator at M1:**
- = without
O = visual, 2,5 bar

11 **clogging indicator at M2:**
- = without
AOR = AOR.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1606,
AOC = AOC.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1606,
AE = AE30.2,5... electrical at p_1 and p_2, 2,5 bar, see sheet-no. 1609
OP = OP.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1628
OE = OE.2,5..., visual-electrical, at p_1 and p_2, 2,5 bar, see sheet-no. 1628
E1 = E1.2,5 electrical at p_1, 2,5 bar, see sheet-no. 1616
E5 = E5.2,5 electrical at p_1, 2,5 bar, see sheet-no. 1616

1.2. Filter element: (ordering example)

01NR. 630. 6VG. 10. B. P. -

1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 630

3 - 7 see type index-filter unit

Changes of measures and design are subject to alter ation!

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fax +49 - (0)6205 - 2094-40 url www.internormen.com

2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 630	
2	housing cover	1	30600-3	315492
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	G ½	304678
5	straining screw	1	30595-3	316312
6	O-ring	1	140 x 6	315392 (NBR)
7	electric motor	1	according to type index	
8	pump unit P04	1	NG 80.50	317139
9	clogging indicator (series)	1	visual ∅ 40	315452
10	clogging indicator	1	according to type index	
11	O-ring	1	22 x 3	304387 (NBR)
12	O-ring	2	70 x 4	306253 (NBR)
13	O-ring	2	45 x 3	304991 (NBR)
14	O-ring	1	18 x 3	304359 (NBR)

3. Description:

The stationary filter unit is intended for oil maintenance on hydraulic systems.
The area of application comprises:
- secondary flow filtration in addition to the existing operatin g filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability.
The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 630.
Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 $\mu m_{(c)}$. The contamination level of the filter element can be read off from a pressure display in the cover of the filter.
At a pressure >2,5 bar (red area of the scale field), the filter element is contaminated and it must be replaced with a new filter element.
The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.
To protect against overpressure, the filter unit is fitted with a safety valve. The initial response pressure difference valve is set according to pressure stated in the table on the type plate under item 9. If a different pressure setting is requested, please state the initial response presse with respect to the set pressure range of the pump unit in the plain text when ordering.
Stationary filter units with motors without combined protective motor switch and ON/OFF switch and without any cable with plug (see switch „-“, cable „-“ under item 9 of the type plate) can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected E-motor and if the switch-off function of the E-motor of the electrical clogging indicator is dise ngaged at 2,5 bar.
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium.

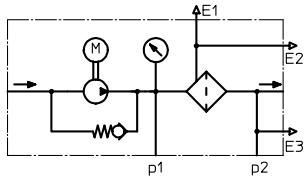
4. Technical data:

filter-fineness:	4, 5, 7 or 10 $\mu m_{(c)}$
weight:	approx. 59 kg
operating medium:	hydraulic oil based on mineral oil from 10 mm²/s, other media on request

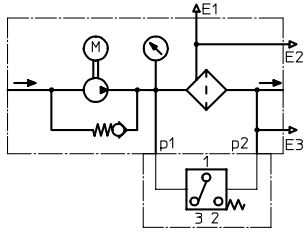
Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:

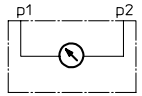
Filter unit without clogging indicator



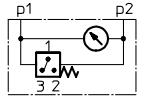
Filter unit with electrical clogging indicator AE30



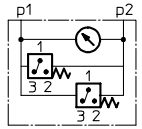
Filter unit with visual clogging indicator AOR, AOC, OP



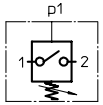
Filter unit with visual-electrical clogging indicator OE1



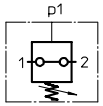
Filter unit with visual-electrical clogging indicator OE2



Filter unit with electrical clogging indicator contact maker E1



Filter unit with electrical clogging indicator contact breaker E5

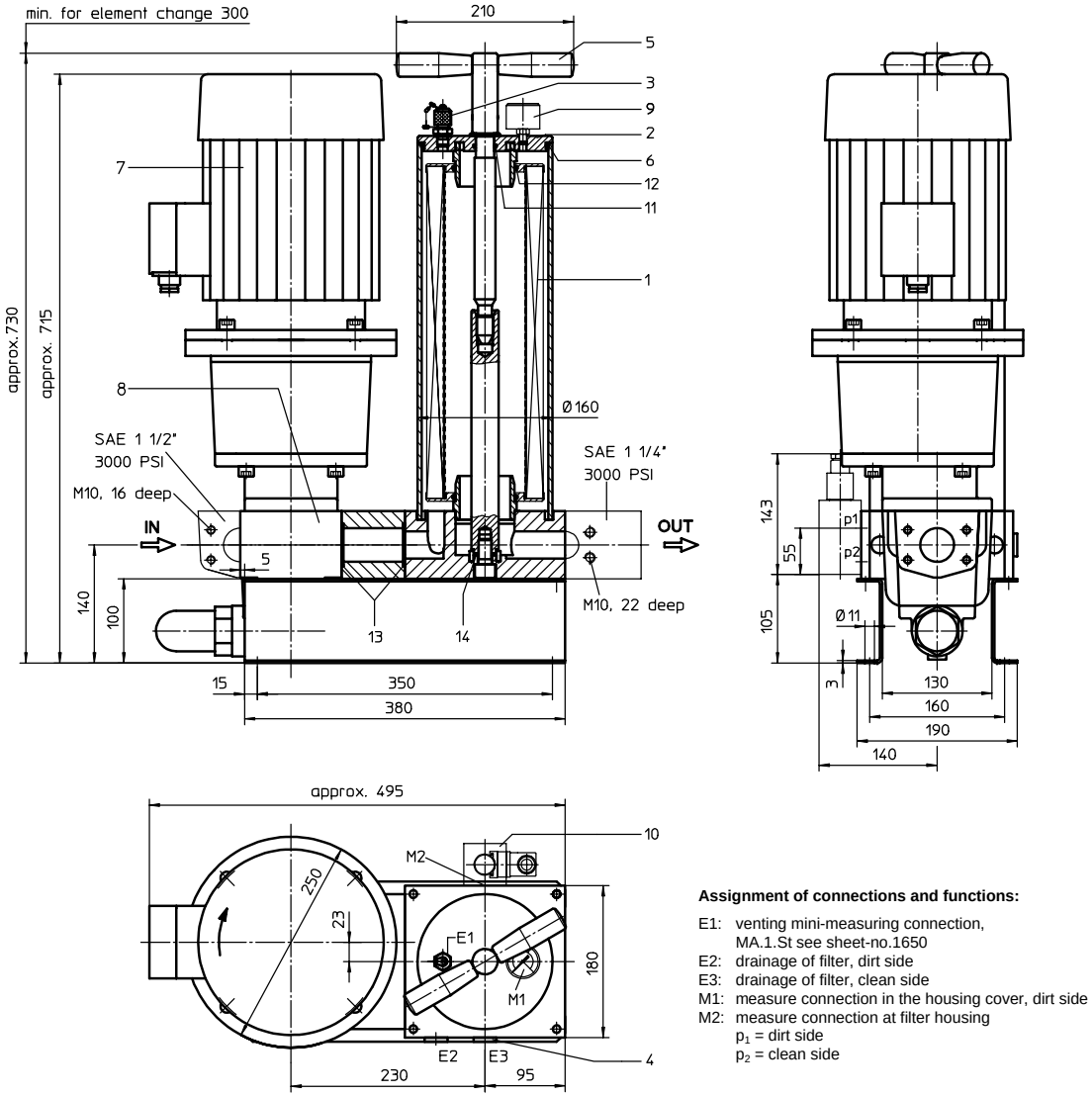


6. Test methods:

Filter elements are tested according to the following ISO sta ndards:

ISO 2941	Verification of colla pse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow character istics
ISO 16889	Multi-pass method for evaluating filtration performance

- preference version -



Assignment of connections and functions:

E1: venting mini-measuring connection, MA.1.St see sheet-no.1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the housing cover, dirt side
M2: measure connection at filter housing
p_1 = dirt side
p_2 = clean side

Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

EDV 02/08

FILTER UNIT, stationary
Series US 160

Sheet No. **4010.1 G**
Sheet 1/3

1. Type index:

1.1. Filter unit: (ordering example)

US.	160.	6VG.	10.	B.	P.	-.	P03.	D04.	O.	AE
1	2	3	4	5	6	7	8	9	10	11

1 **series:**
US = filter unit, stationary

2 **nominal size:** 160

3 **filter-material and filter-fineness:**
10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$, 1 VG = 4 $\mu m_{(c)}$ Interpor fleece (glass fibre)
10 WVG = 10 $\mu m_{(c)}$, 3 WVG = 5 $\mu m_{(c)}$ Watersorp-filter element

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR), V = Viton (FPM), by agreement

7 **filter element specification:**
- = standard
IS06 = see sheet-no. 31601
VA = stainless steel

8 **pump unit:**
P03 = pump unit 03, NG 160.100 (standard-pump unit / setting range 4-8 bar)

9 **motor:** (D = rotary current motor)

motor	electrical connection		volume flow	max. viscosity	max. pressure	on/off switch	cable	doc.-no.
D04 [1)]	230/400V	50Hz	142,0 l/min	10-400 mm²/s	4 bar	-	-	42485-4
D04 [1)]	265/460V	60Hz	170,0 l/min	10-400 mm²/s	4 bar	-	-	42485-4
D06	110/190V	50Hz	142,0 l/min	10-400 mm²/s	4 bar	-	-	
D08	400/690V	50Hz	142,0 l/min	10-400 mm²/s	8 bar	-	-	42744.4
D08	460/790V	60Hz	170,0 l/min	10-400 mm²/s	8 bar	-	-	42744-4
D19	400/690V	50Hz	95,0 l/min	10-600 mm²/s	4 bar	-	-	34374-4
D19	460/790V	60Hz	114,0 l/min	10-600 mm²/s	4 bar	-	-	34374-4
D24	400/690V	50Hz	142,0 l/min	10-400 mm²/s	8 bar	-	-	48816-4
D24	460/790V	60Hz	170,0 l/min	10-400 mm²/s	8 bar	-	-	48816-4

[1)] standard motor

10 **clogging indicator at M1:**
- = without
O = visual, 2,5 bar

11 **clogging indicator at M2:**
- = without
AOR = AOR.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1606,
AOC = AOC.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1606,
AE = AE30.2,5... electrical at p_1 and p_2, 2,5 bar, see sheet-no. 1609
OP = OP.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1628
OE = OE.2,5..., visual-electrical, at p_1 and p_2, 2,5 bar, see sheet-no. 1628
E1 = E1.2,5 electrical at p_1, 2,5 bar, see sheet-no. 1616
E5 = E5.2,5 electrical at p_1, 2,5 bar, see sheet-no. 1616

1.2. Filter element: (ordering example)

01NR.	630.	6VG.	10.	B.	P.	-
1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 630

3 - 7 see type index-filter unit

Changes of measures and design are subject to alter ation!

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2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 630	
2	housing cover	1	30600-3	315492
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	G ½	304678
5	straining screw	1	30595-3	316312
6	O-ring	1	140 x 6	315392 (NBR)
7	electric motor	1	according to type index	
8	pump unit P03	1	NG 160.100	316275
9	clogging indicator (series)	1	visual ∅ 40	315452
10	clogging indicator	1	according to type index	
11	O-ring	1	22 x 3	304387 (NBR)
12	O-ring	2	70 x 4	306253 (NBR)
13	O-ring	2	45 x 3	304991 (NBR)
14	O-ring	1	18 x 3	304359 (NBR)

3. Description:

The stationary filter unit is intended for oil maintenance on hydraulic systems.
The area of application comprises:
- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability.
The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 630.
Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 $\mu m_{(c)}$. The contamination level of the filter element can be read off from a pressure display in the cover of the filter.
At a pressure >2,5 bar (red area of the scale field), the filter element is contaminated and it must be replaced with a new filter element.
The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.
To protect against overpressure, the filter unit is fitted with a safety valve. The initial response pressure difference valve is set according to pressure stated in the table on the type plate under item 9. If a different pressure setting is requested, please state the initial response presse with respect to the set pressure range of the pump unit in the plain text when ordering.
Stationary filter units with motors without combined protective motor switch and ON/OFF switch and without any cable with plug (see switch „-", cable „-" under item 9 of the type plate) can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected E-motor and if the switch-off function of the E-motor of the electrical clogging indicator is dise ngaged at 2,5 bar.
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium.

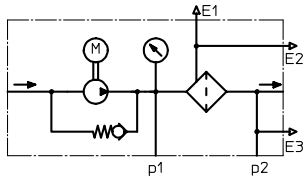
4. Technical data:

filter-fineness:	4, 5, 7 or 10 $\mu m_{(c)}$
weight:	approx. 95 kg
operating medium:	hydraulic oil based on mineral oil from 10 mm²/s, other media on request

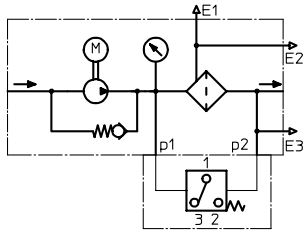
Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:

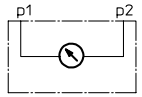
Filter unit without clogging indicator



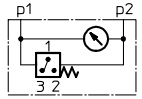
Filter unit with electrical clogging indicator AE30



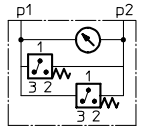
Filter unit with visual clogging indicator AOR, AOC, OP



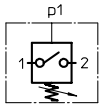
Filter unit with visual-electrical clogging indicator OE1



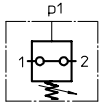
Filter unit with visual-electrical clogging indicator OE2



Filter unit with electrical clogging indicator contact maker E1



Filter unit with electrical clogging indicator contact breaker E5



6. Test methods:

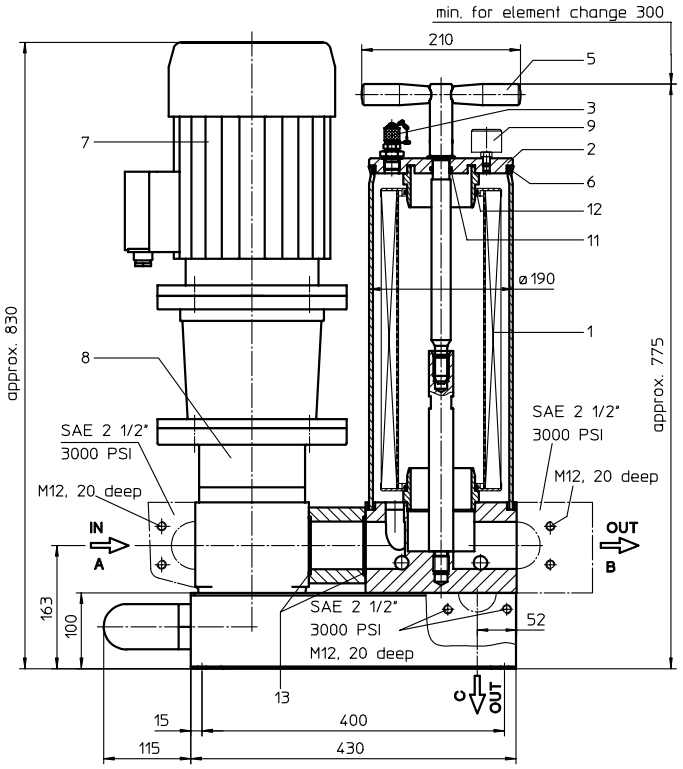
Filter elements are tested according to the following ISO standards:

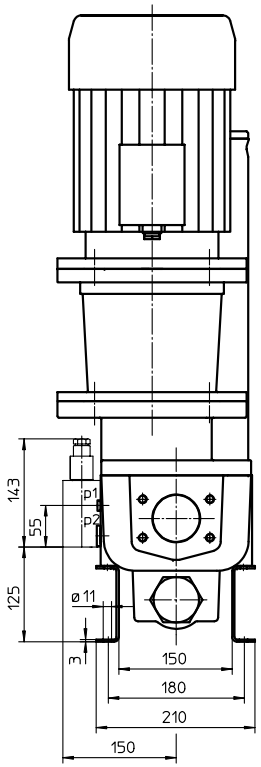
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

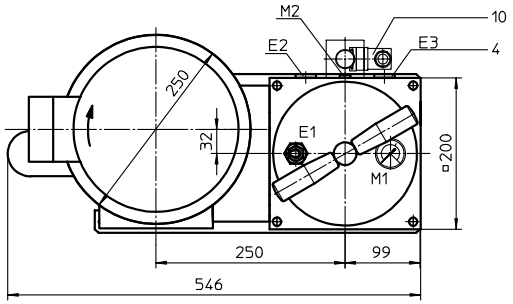
FILTER UNIT, stationary
Series US 320

Sheet No. **4012.1 E**
Sheet 1/2

- preference version -







Assignment of connections and functions:

E1: venting mini-measuring connection, MA.1.St see sheet-no.1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the housing cover, dirt side
M2: measure connection at filter housing
p_1 = dirt side
p_2 = clean side

Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

1. Type index:

1.1. Filter unit: (ordering example)

US.	320.	6VG.	10.	B.	P.	-.	P06.	D08.	3.	O.	AE
1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
US = filter unit, stationary

2 **nominal size:** 320

3 **filter-material and filter-fineness:**
10 VG = 10 µm$_{(c)}$, 6 VG = 7 µm$_{(c)}$, 3 VG = 5 µm$_{(c)}$, 1 VG = 4 µm$_{(c)}$ Interpor fleece (glass fibre)
10 WVG = 10 µm$_{(c)}$, 3 WVG = 5 µm$_{(c)}$ Watersorp-filter element

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR), V = Viton (FPM) , by agreement

7 **filter element specification:**
- = standard, VA = stainless steel, IS06 = see sheet-no. 31601

8 **pump unit:**
P06 = pump unit 06, NG 320.200 (standard-pump-unit / setting range 4-8 bar)

9 **motor:** (D = rotary current motor)

motor	electrical connection		volume flow	max. viscosity	max. pressure	on/off switch	cable	doc.-no.
D08[1)]	400/690V	50Hz	284,0 l/min	10-100 mm²/s	4 bar	-	-	42744-4
D08[1)]	460/790V	60Hz	340,0 l/min	10-100 mm²/s	4 bar	-	-	42744-4
D24	400/690V	50Hz	284,0 l/min	10-100 mm²/s	4 bar	-	-	48816-4
D24	460/790V	60Hz	340,0 l/min	10-100 mm²/s	4 bar	-	-	48816-4

[1)] standard motor

10 **connection variant:**

variant	connection A		connection B		connection C	
	type	size	type	size	type	size
3	FS	9	FS	9	-	-
4	FS	9	FS	9	FS	9

type: FS = flange SAE 3000 PSI
size: 9 = 2 ½"
- = no connection

11 **clogging indicator at M1:**
- = without, O = visual, 2,5 bar

12 **clogging indicator at M2:**
- = without
AOR = AOR.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1606,
AOC = AOC.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1606,
AE = AE30.2,5... electrical at p_1 and p_2, 2,5 bar, see sheet-no. 1609
OP = OP.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1628
OE = OE.2,5..., visual-electrical, at p_1 and p_2, 2,5 bar, see sheet-no. 1628
E1 = E1.2,5 electrical at p_1 , 2,5 bar, see sheet-no. 1616
E5 = E5.2,5 electrical at p_1 , 2,5 bar, see sheet-no. 1616

1.2. Filter element: (ordering example)

01NR.	1000.	6VG.	10.	B.	P.	-
1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 1000

3 - 7 see type index-filter unit

Changes of measures and design are subject to alter ation!

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2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 1000	
2	housing cover	1	22496-3	313837
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	G ½	304678
5	straining screw	1	31067-3	316893
6	O-ring	1	170 x 6	304799 (NBR)
7	electric motor	1	according to type index	
8	pump unit P06	1	NG 320.200	316838
9	clogging indicator (series)	1	visual ∅ 40	315452
10	clogging indicator	1	according to type index	
11	O-ring	1	22 x 3	304387 (NBR)
12	O-ring	2	90 x 4	306941 (NBR)
13	O-ring	2	69,45 x 3,53	305868 (NBR)

3. Description:

The stationary filter unit is intended for oil maintenance on hydraulic systems.
The area of application comprises:
- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability.
The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 1000.
Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 $\mu m_{(c)}$. The contamination level of the filter element can be read off from a pressure display in the cover of the filter.
At a pressure >2,5 bar (red area of the scale field), the filter element is contaminated and it must be replaced with a new filter element.
The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.
To protect against overpressure, the filter unit is fitted with a safety valve. The initial response pressure difference valve is set according to pressure stated in the table on the type plate under item 9. If a different pressure setting is requested, please state the initial response presse with respect to the set pressure range of the pump unit in the plain text when ordering.
Stationary filter units with motors without combined protective motor switch and ON/OFF switch and without any cable with plug (see switch „-“, cable „-“ under item 9 of the type plate) can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected E-motor and if the switch-off function of the E-motor of the electrical clogging indicator is dise ngaged at 2,5 bar.
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium.

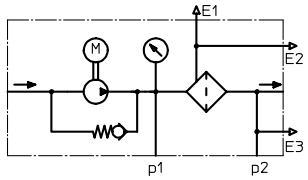
4. Technical data:

filter-fineness:	4, 5, 7 or 10 $\mu m_{(c)}$
weight:	approx. 110 kg
operating medium:	hydraulic oil based on mineral oil from 10 mm²/s, other media on request

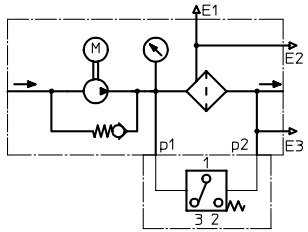
Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:

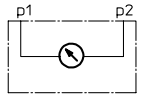
Filter unit without clogging indicator



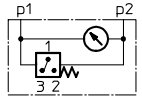
Filter unit with electrical clogging indicator AE30



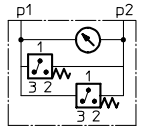
Filter unit with visual clogging indicator AOR, AOC, OP



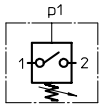
Filter unit with visual-electrical clogging indicator OE1



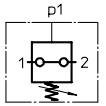
Filter unit with visual-electrical clogging indicator OE2



Filter unit with electrical clogging indicator contact maker E1



Filter unit with electrical clogging indicator contact breaker E5



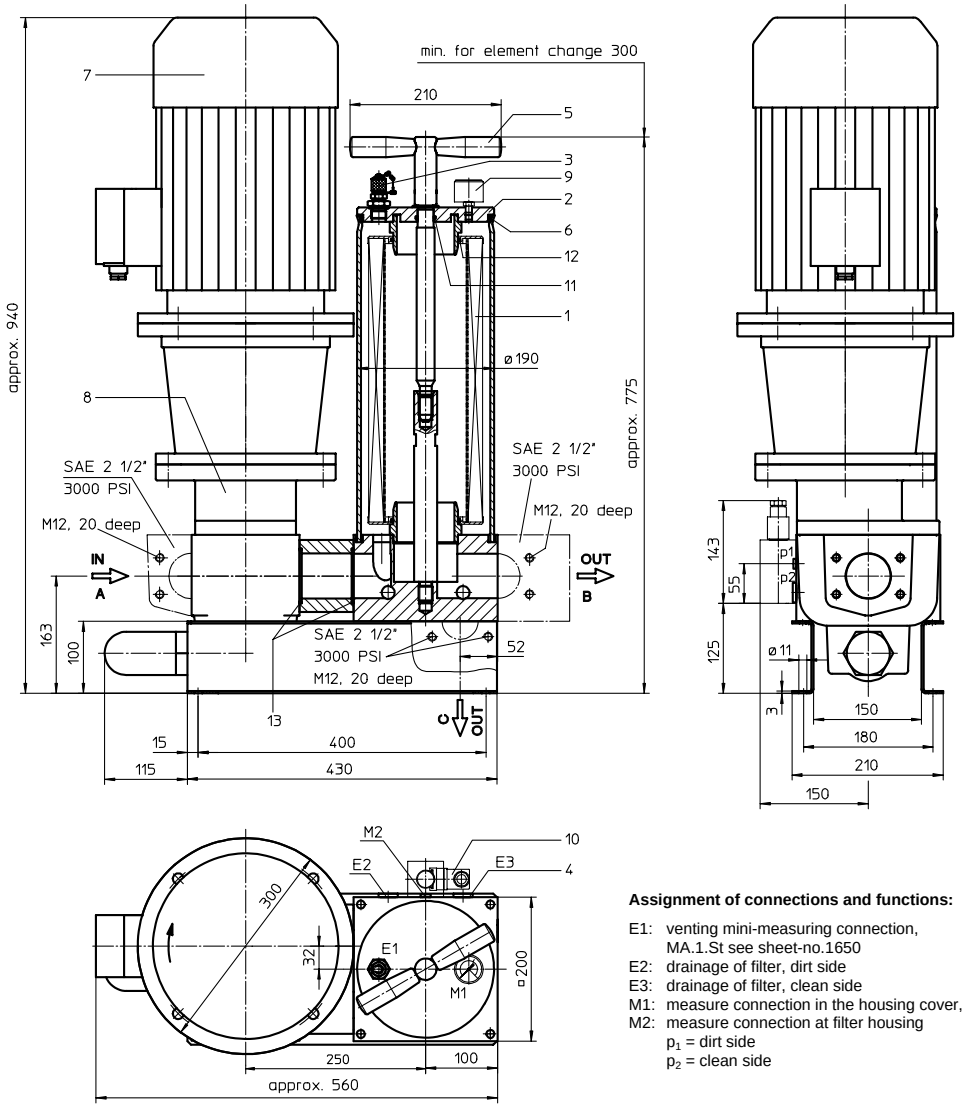
6. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

FILTER UNIT, stationary
Series US 321

- preference version -



Assignment of connections and functions:

E1: venting mini-measuring connection, MA.1.St see sheet-no.1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the housing cover, dirt side
M2: measure connection at filter housing
p_1 = dirt side
p_2 = clean side

Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

1. Type index:

1.1. Filter unit: (ordering example)

US.	321.	6VG.	10.	B.	P.	-.	P07.	D07.	3.	O.	AE
1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
US = filter unit, stationary

2 **nominal size:** 321

3 **filter-material and filter-fineness:**
10 VG = 10 µm(c), 6 VG = 7 µm(c), 3 VG = 5 µm(c), 1 VG = 4 µm(c) Interpor fleece (glass fibre)
10 WVG = 10 µm(c), 3 WVG = 5 µm(c) Watersorp-filter element

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR), V = Viton (FPM) , by agreement

7 **filter element specification:**
- = standard, VA = stainless steel, IS06 = see sheet-no. 31601

8 **pump unit:**
P07 = pump unit 07, NG 320.200 (standard-pump-unit / setting range 4-8 bar)

9 **motor:** (D = rotary current motor)

motor	electrical connection		volume flow	max. viscosity	max. pressure	on/off switch	cable	doc.-no.
D07 [1]	400/690V	50Hz	284,0 l/min	10-400 mm²/s	4 bar	-	-	34378-4
D07 [1]	460/790V	60Hz	340,0 l/min	10-400 mm²/s	4 bar	-	-	34378-4
D22	400/690V	50Hz	190,0 l/min	10-800 mm²/s	6 bar	-	-	34486-4
D22	460/790V	60Hz	228,0 l/min	10-800 mm²/s	6 bar	-	-	34486-4

[1] standard motor

10 **connection variant:**

variant	connection A		connection B		connection C	
	type	size	type	size	type	size
3	FS	9	FS	9	-	-
4	FS	9	FS	9	FS	9

type: FS = flange SAE 3000 PSI
size: 9 = 2 ½"
- = no connection

11 **clogging indicator at M1:**
- = without
O = visual, 2,5 bar

12 **clogging indicator at M2:**
- = without
AOR = AOR.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1606,
AOC = AOC.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1606,
AE = AE30.2,5... electrical at p_1 and p_2, 2,5 bar, see sheet-no. 1609
OP = OP.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1628
OE = OE.2,5..., visual-electrical, at p_1 and p_2, 2,5 bar, see sheet-no. 1628
E1 = E1.2,5 electrical at p_1 , 2,5 bar, see sheet-no. 1616
E5 = E5.2,5 electrical at p_1 , 2,5 bar, see sheet-no. 1616

1.2. Filter element: (ordering example)

01NR.	1000.	6VG.	10.	B.	P.	-
1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 1000

3 - 7 see type index-filter unit

Changes of measures and design are subject to alter ation!

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2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 1000	
2	housing cover	1	22496-3	313837
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	G ½	304678
5	straining screw	1	31067-3	316893
6	O-ring	1	170 x 6	304799 (NBR)
7	electric motor	1	according to type index	
8	pump unit P07	1	NG 320.200	316908
9	clogging indicator (series)	1	visual ∅ 40	315452
10	clogging indicator	1	according to type index	
11	O-ring	1	22 x 3	304387 (NBR)
12	O-ring	2	90 x 4	306941 (NBR)
13	O-ring	2	69,45 x 3,53	305868 (NBR)

3. Description:

The stationary filter unit is intended for oil maintenance on hydraulic systems.
The area of application comprises:
- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability.
The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 1000.
Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 $\mu m_{(c)}$. The contamination level of the filter element can be read off from a pressure display in the cover of the filter.
At a pressure >2,5 bar (red area of the scale field), the filter element is contaminated and it must be replaced with a new filter element.
The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.
To protect against overpressure, the filter unit is fitted with a safety valve. The initial response pressure difference valve is set according to pressure stated in the table on the type plate under item 9. If a different pressure setting is requested, please state the initial response presse with respect to the set pressure range of the pump unit in the plain text when ordering.
Stationary filter units with motors without combined protective motor switch and ON/OFF switch and without any cable with plug (see switch „-", cable „-" under item 9 of the type plate) can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected E-motor and if the switch-off function of the E-motor of the electrical clogging indicator is dise ngaged at 2,5 bar.
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium.

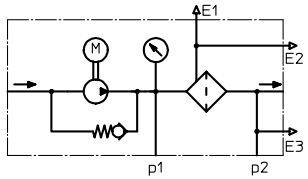
4. Technical data:

filter-fineness:	4, 5, 7 or 10 $\mu m_{(c)}$
weight:	approx. 125 kg
operating medium:	hydraulic oil based on mineral oil from 10 mm²/s, other media on request

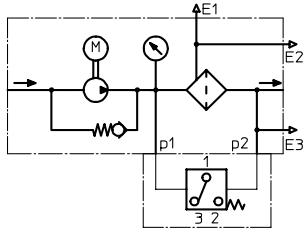
Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:

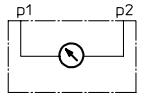
Filter unit without clogging indicator



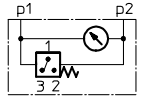
Filter unit with electrical clogging indicator AE30



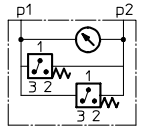
Filter unit with visual clogging indicator AOR, AOC, OP



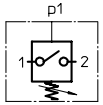
Filter unit with visual-electrical clogging indicator OE1



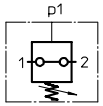
Filter unit with visual-electrical clogging indicator OE2



Filter unit with electrical clogging indicator contact maker E1



Filter unit with electrical clogging indicator contact breaker E5



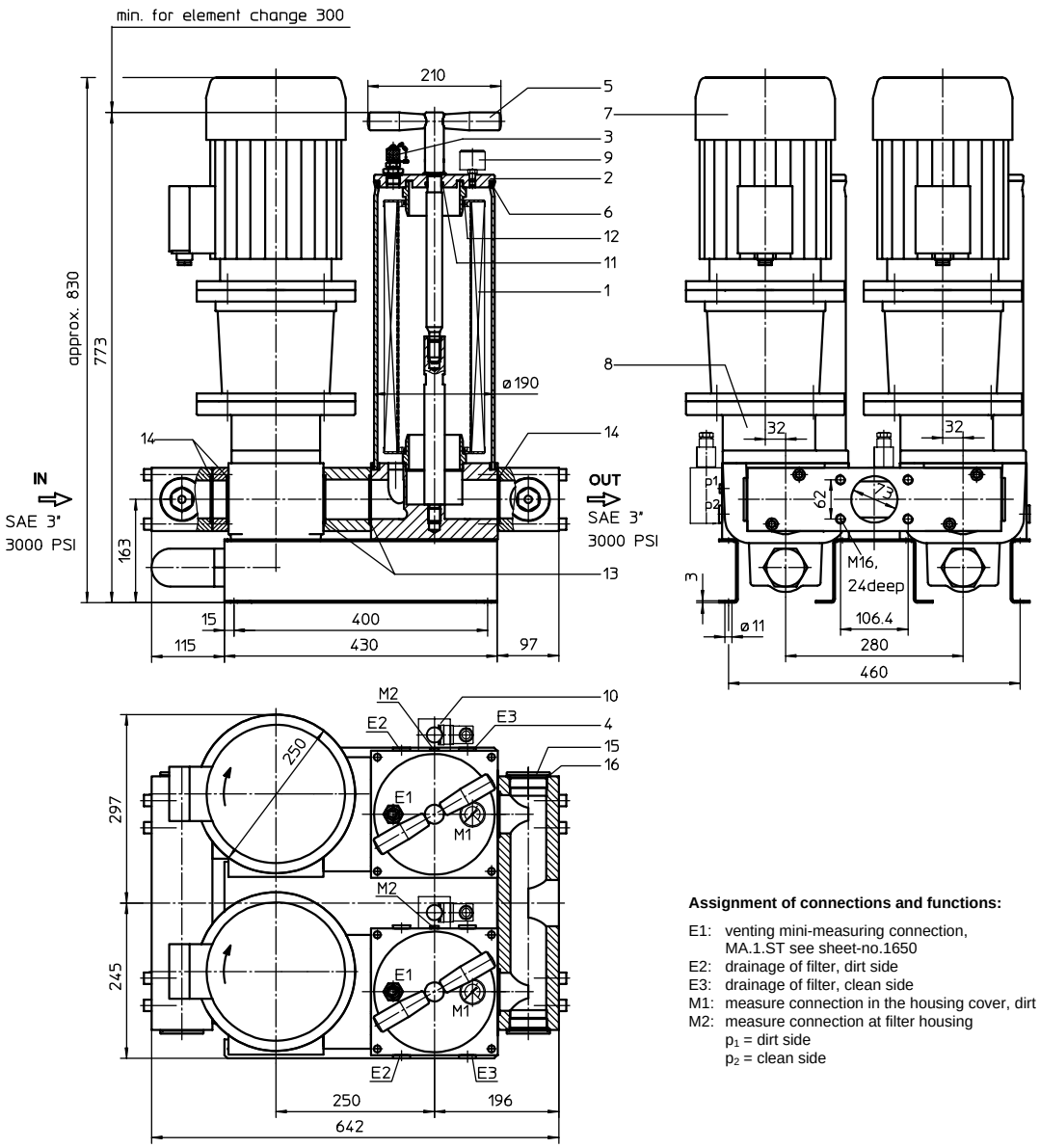
6. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

FILTER UNIT, stationary
Series US 640

Sheet No. **4062 B**



Assignment of connections and functions:

E1: venting mini-measuring connection, MA.1.ST see sheet-no.1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the housing cover, dirt side
M2: measure connection at filter housing
p_1 = dirt side
p_2 = clean side

1. Type index:

1.1. Filter unit: (ordering example)

US.	640.	6VG.	10.	B.	P.	-.	P06.	D08.	O.	AE
1	2	3	4	5	6	7	8	9	10	11

1 **series:**
US = filter unit, stationary

2 **nominal size:** 640

3 **filter-material and filter-fineness:**
10 VG = 10 µm$_{(c)}$, 6 VG = 7 µm$_{(c)}$, 3 VG = 5 µm$_{(c)}$, 1 VG = 4 µm$_{(c)}$ Interpor fleece (glass fibre)
10 WVG = 10 µm$_{(c)}$, 3 WVG = 5 µm$_{(c)}$ Watersorp-filter element

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM) , by agreement

7 **filter element specification:**
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **pump unit:**
P06 = pump unit 06, NG 320.200 (standard-pump-unit / setting range 4-8 bar)

9 **motor:** (D = rotary current motor)

motor	electrical connection		volume flow	max. viscosity	max. pressure	on/off switch	cable	doc.-no.
D08[1)]	400/690V	50Hz	2x 284,0 l/min	10-100 mm²/s	4 bar	-	-	42744-4
D08[1)]	460/790V	60Hz	2x 340,0 l/min	10-100 mm²/s	4 bar	-	-	42744-4
D24	400/690V	50Hz	2x 284,0 l/min	10-100 mm²/s	4 bar	-	-	48816-4
D24	460/790V	60Hz	2x 340,0 l/min	10-100 mm²/s	4 bar	-	-	48816-4

[1)] standard motor

10 **clogging indicator at M1:**
- = without
O = visual, 2,5 bar

11 **clogging indicator at M2:**
- = without
AOR = AOR.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1606,
AOC = AOC.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1606,
AE = AE30.2,5... electrical at p_1 and p_2, 2,5 bar, see sheet-no. 1609
OP = OP.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1628
OE = OE.2,5..., visual-electrical, at p_1 and p_2, 2,5 bar, see sheet-no. 1628
E1 = E1.2,5 electrical at p_1, 2,5 bar, see sheet-no. 1616
E5 = E5.2,5 electrical at p_1, 2,5 bar, see sheet-no. 1616

1.2. Filter element: (ordering example)

01NR.	1000.	6VG.	10.	B.	P.	-
1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 1000

3 - 7 see type index-filter unit!

Changes of measures and design are subject to alteration!

Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

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2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	2	01NR. 1000	
2	housing cover	2	22496-3	313837
3	mini-measuring connection	2	MA.1.ST	305453
4	screw plug	4	G ½	304678
5	straining screw	2	31067-3	316893
6	O-ring	2	170 x 6	304799 (NBR)
7	electric motor	2	according to type index	
8	pump unit P06	2	NG 320.200	316838
9	clogging indicator (series)	2	visual ∅ 40	315452
10	clogging indicator	2	according to type index	
11	O-ring	2	22 x 3	304387 (NBR)
12	O-ring	4	90 x 4	306941 (NBR)
13	O-ring	4	69,45 x 3,53	305868 (NBR)
14	O-ring	6	65,09 x 3,53	317621 (NBR)
15	screw plug	4	G 2	310958
16	gasket	4	A 60 x 68	310959

3. Description:

The stationary filter unit is intended for oil maintenance on hydraulic systems.
The area of application comprises:
- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability.
The device is equipped with two gear pumps driven by two electric-motors. The flow conveyed by the gear pumps is fed over two filter elements according to DIN 24550, T4, nominal size 1000.
Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 $\mu m_{(c)}$. The contamination level of the filter element can be read off from a pressure display in the cover of the filter.
At a pressure >2,5 bar (red area of the scale field), the filter element is contaminated and it must be replaced with a new filter element.
The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.
To protect against overpressure, the filter unit is fitted with a safety valve. The initial response pressure difference valve is set according to pressure stated in the table on the type plate under item 9. If a different pressure setting is requested, please state the initial response presse with respect to the set pressure range of the pumps unit in the plain text when ordering.
Stationary filter units with motors without combined protective motor switch and ON/OFF switch and without any cable with plug (see switch „-", cable „-" under item 9 of the type plate) can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected electric-motor and if the switch-off function of the electric-motor of the electrical clogging indicator is dise ngaged at 2,5 bar.
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium.

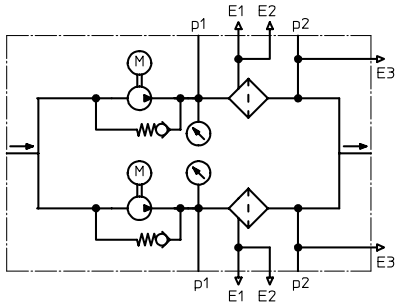
4. Technical data:

filter-fineness:	4, 5, 7 or 10 $\mu m_{(c)}$
weight:	approx. 230 kg
operating medium:	hydraulic oil based on mineral oil from 10 mm²/s, other media on request

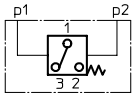
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:

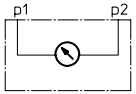
Filter unit without clogging indicator



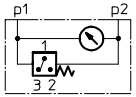
Filter unit with electrical clogging indicator AE30



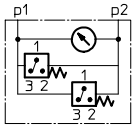
Filter unit with visual clogging indicator AOR, AOC, OP



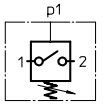
Filter unit with visual-electrical clogging indicator OE1



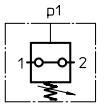
Filter unit with visual-electrical clogging indicator OE2



Filter unit with electrical clogging indicator contact maker E1



Filter unit with electrical clogging indicator contact breaker E5



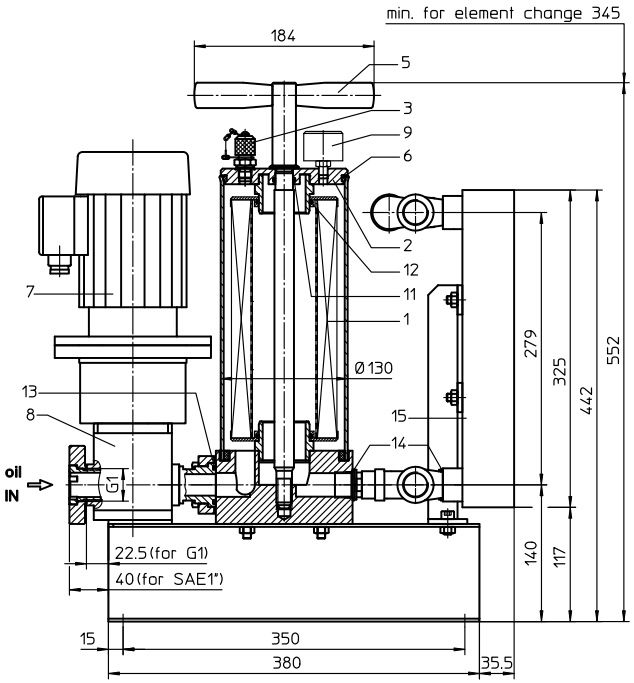
6. Test methods:

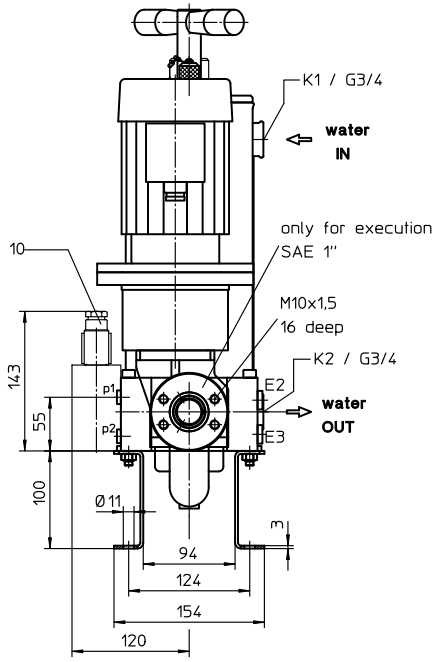
Filter elements are tested according to the following ISO standards:

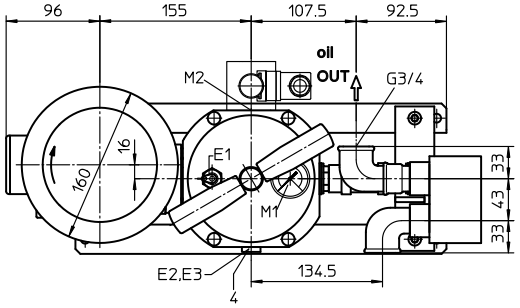
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

FILTER UNIT, stationary with plate-exchanger
Series USP 20 PN 6

Sheet No. **4020 C**







Assignment of connections and functions

E1: venting mini-measuring connection, MA.1.St see sheet-no.1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the housing cover, dirt side manometer 0-16 bar
M2: measure connection at filter housing
p_1 = dirt side
p_2 = clean side
K1: cooling water IN
K2: cooling water OUT

1. Type index:

1.1. Filter unit: (ordering example)

USP. 20. 6VG. 10. B. P. -. P01. D03. CP12. AE

1	2	3	4	5	6	7	8	9	10	11

1 **series:**
USP = filter unit, stationary with plate-exchanger

2 **nominal size:** 20

3 **filter-material and filter-fineness:**
10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$, 1 VG = 4 $\mu m_{(c)}$ Interpor fleece (glass fibre)
10 WVG = 10 $\mu m_{(c)}$, 3 WVG = 5 $\mu m_{(c)}$ Watersorp-filter element

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM), by agreement

7 **filter element specification:**
- = standard
VA = stainless steel

8 **pump unit:**
P01 = pump unit 01, NG 20.16, G.5 with suction connection G1
P08 = pump unit 08, NG 20.16, FS.5 with connection SAE1"

9 **motor:**
D03 = B5/71/4.0,37.1500.230/400.D.50.1.-.-.-
rotay current motor 230/400 V, 50 Hz, approx. 1420 rpm, 0,37 kW, type of protection IP 54

10 **plate-exchanger unit:**
CP12 = plate-exchanger unit CP12

11 **clogging indicator at M2:**
- = without
AE = AE30.2,5.P.-.B electrical at p_1 and p_2, 2,5 bar, see sheet-no. 1609
AOR = AOR.2,5.P.- visual, 2,5 bar, see sheet-no. 1606
AOC = AOC.2,5.P.- visual, 2,5 bar, see sheet-no. 1606

1.2. Filter element: (ordering example)

01NR. 250. 6VG. 10. B. P. -

1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 250

3 - 7 see type index-filter unit

Changes of measures and design are subject to alteration!

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2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 250	
2	housing cover	1	30615-3	315437
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	G ¼	305003
5	straining screw	1	30631-4	316404
6	Oring	1	115 x 5	306640 (NBR)
7	E-motor D03	1	0,37 kW, 230/400 V	311537
8	pump unit P01	1	NG 20.16, G.5	316270
	pump unit P08	1	NG 20.16, FS.5	317378
9	manometer (series)	1	⌀ 40	
10	clogging indicator	1	according to type index	
11	O-ring	1	18 x 3	304359 (NBR)
12	O-ring	2	52 x 3	314206 (NBR)
13	O-ring	1	32 x 3,5	304378 (NBR)
14	gasket	2	A 27 x 32	308536
15	plate-exchanger unit	1	CP12	

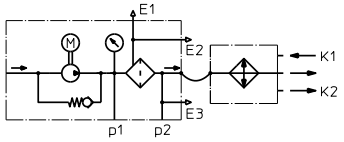
3. Description:

The stationary filter unit with plate-exchanger is intended for oil maintenance and for oil cooling on hydraulic systems.
The area of application comprises:
- secondary flow filtration in addition to the existing operating filter and the oil cooling
- secondary flow filtration without the action of the operating filter and the oil cooling
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design with plate interlacing without pipe satisfies the prerequisites for small dimensions and high reliability.
The device is equipped with a gear pump driven by an e-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 250 and is led afterwards over a plate cooler.
Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 $\mu m_{(c)}$.
At the measuring point M1, the working pressure before the element is shown. The pollution of the element is indicated with the clogging indicator at the measuring point M2.
At a pressure difference > 2,5 bar , the element is polluted and has to be removed with a new element.
The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.
To protect against overpressure, the filter unit is fitted with a safety valve, pressure setting approx. 6 bar.
The cooling capacity is shown at the cooling capacity graph for the chosen field of application, depending on the input temperature, the streams of the medium and the type of medium. The cooling capacity graph is intended for the choice of application of the suitable filter unit with cooler. For the fields of application which are not shown in the cooling capacity graph, the capacity data have to be asked for at the manufacturer.
Stationary filter units can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected e-motor and the switch-off function of the e-motor of the electrical clogging indicator will disengaged at 2,5 bar.
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium.

4. Symbols:

Filter unit with cooler
without clogging indicator

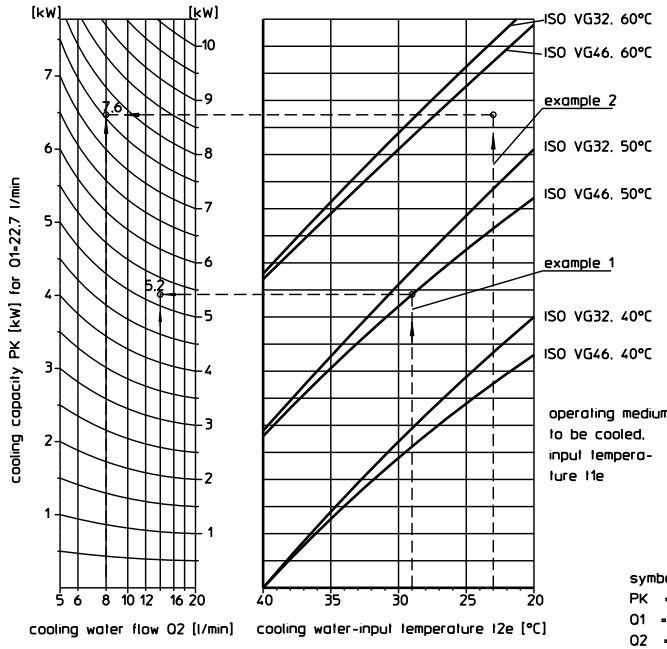


with electrical
clogging indicator AE30

with visual
clogging indicator
AOR, AOC

E 4020 C

5. Cooling capacity graph:



example 1. operating medium ISO VG46

t1e = 50 °C. t2e = 29 °C.
Q1 = 22.7 l/min. Q2 = 14 l/min

cooling capacity PK from the graph = 5.2 kW

$t1a = 50 - \frac{5.2 \cdot 35}{22.7} = 42\ °C$

$t2a = 29 + \frac{5.2 \cdot 14.4}{14} = 34.3\ °C$

example 2. operating medium ISO VG32

t1e = 55 °C. t2e = 23 °C.
Q1 = 22.7 l/min. Q2 = 8.0 l/min

cooling cpacity PK from the graph = 7.6 kW
(data linear interpolated)

$t1a = 55 - \frac{7.6 \cdot 35}{22.7} = 43.3\ °C$

$t2a = 23 + \frac{7.6 \cdot 14.4}{8} = 36.7\ °C$

operating medium-output temperature t1a [°C] $t1a = t1e - \frac{PK \cdot 35}{Q1}$

cooling water-output temperature t2a [°C] $t2a = t2e + \frac{PK \cdot 14.4}{Q2}$

symbol		units
PK	= cooling capacity	kW
Q1	= volume flow-operating medium	l/min
Q2	= volume flow-cooling water	l/min
t1e	= operating medium-input temperature	°C
t1a	= operating medium-output temperature	°C
t2e	= cooling water-input temperature	°C
t2a	= cooling water-output temperature	°C

6. Technical data:

pump-volume flow :	22,7 l/min at 1420 rpm
E-motor:	0,37 kW, approx. 1420 rpm
rotary current:	230/400 V, 50 Hz
operating pressure:	max. 6 bar
filter-fineness:	4, 5, 7 or 10 $\mu m_{(c)}$
weight:	approx. 35 kg
operating medium:	hydraulic oil based on mineral oil from 10 to 100 mm²/s, other media on request

Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

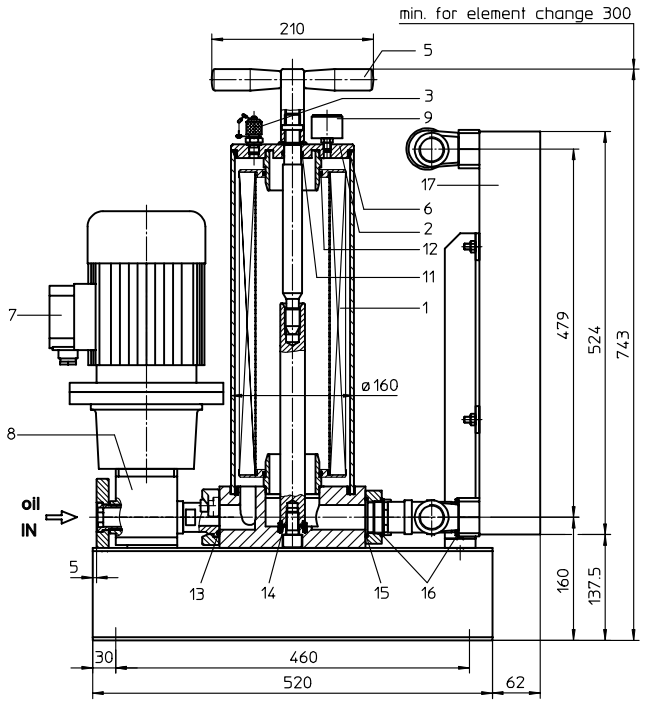
7. Test methods:

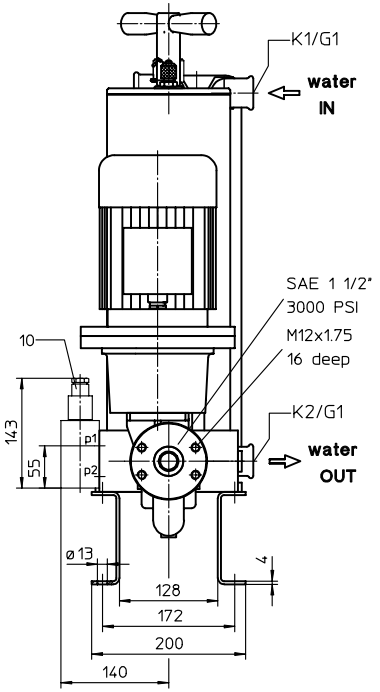
Filter elements are tested according to the following ISO standards:

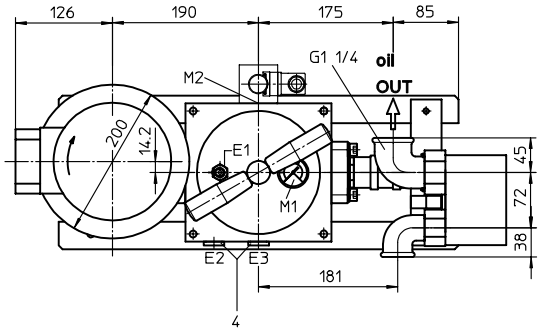
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

FILTER UNIT, stationary with plate-exchanger
Series USP 41 PN 6

Sheet No. **4021 E**







Assignment of connections and functions

E1: venting mini-measuring connection, MA.1.St see sheet-no.1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the housing cover, dirt side manometer 0-16 bar
M2: measure connection at filter housing
p_1 = dirt side
p_2 = clean side
K1: cooling water IN
K2: cooling water OUT

1. Type index:

1.1. Filter unit: (ordering example)

USP. 41. 6VG. 10. B. P. -. P05. D05. CP16. AE

1	2	3	4	5	6	7	8	9	10	11

1 **series**:
USP = filter unit, stationary with plate-exchanger
2 **nominal size:** 41
3 **filter-material and filter-fineness:**
10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$, 1 VG = 4 $\mu m_{(c)}$ Interpor fleece (glass fibre)
10 WVG = 10 $\mu m_{(c)}$, 3 WVG = 5 $\mu m_{(c)}$ Watersorp-filter element
4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar
5 **filter element design:**
B = both sides open
6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM), by agreement
7 **filter element specification:**
- = standard
VA = stainless steel
8 **pump unit:**
P05 = pump unit 05, NG 40.25
9 **motor:**
D05 = B5/80/4.0,75.1500.230/400.D.50.1.-.-.-
rotay current motor 230/400 V, 50 Hz, approx. 1420 rpm, 0,75 kW, type of protection IP 54
10 **plate-exchanger unit:**
CP16 = plate-exchanger unit CP16
11 **clogging indicator at M2:**
- = without
AE = AE30.2,5.P.-.B electrical at p_1 and p_2, 2,5 bar, see sheet-no. 1609
AOR = AOR.2,5.P.- visual, 2,5 bar, see sheet-no. 1606
AOC = AOC.2,5.P.- visual, 2,5 bar, see sheet-no. 1606

1.2. Filter element: (ordering example)

01NR. 630. 6VG. 10. B. P. -

1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4
2 **nominal size:** 630
3 - 7 see type index-filter unit

Changes of measures and design are subject to alteration!

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2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 630	
2	housing cover	1	30600-3	315492
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	G ½	304678
5	straining screw	1	30595-3	316312
6	Oring	1	140 x 6	315392 (NBR)
7	E-motor D05	1	0,75 kW, 230/400 V	311537
8	pump unit P05	1	NG 40.25	316292
9	manometer (series)	1	∅ 40	
10	clogging indicator	1	according to type index	
11	O-ring	1	22 x 3	304387 (NBR)
12	O-ring	2	70 x 4	306253 (NBR)
13	O-ring	1	37,69 x 3,53	304353 (NBR)
14	O-ring	1	18 x 3	304359 (NBR)
15	O-ring	1	44,45 x 3,53	317607 (NBR)
16	gasket	2	A 42 x 49	308541
17	plate-exchanger unit	1	CP16	

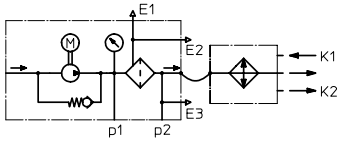
3. Description:

The stationary filter unit with plate-exchanger is intended for oil maintenance and for oil cooling on hydraulic systems.
The area of application comprises:
- secondary flow filtration in addition to the existing operating filter and the oil cooling
- secondary flow filtration without the action of the operating filter and the oil co oling
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design with plate interlacing without pipe satisfies the prerequisites for small dimensions and high reliability.
The device is equipped with a gear pump driven by an e-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 630 and is led afterwards over a plate cooler.
Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 µm $_{(c)}$.
At the measuring point M1, the working pressure before the element is shown. The pollution of the element is indicated with the clogging indicator at the measuring point M2.
At a pressure difference > 2,5 bar , the element is polluted and has to be removed with a new element.
The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.
To protect against overpressure, the filter unit is fitted with a safety valve, pressure setting approx. 6 bar.
The cooling capacity is shown at the cooling capacity graph for the chosen field of application, depending on the input temperature, the streams of the medium and the type of medium. The cooling capacity graph is intended for the choice of application of the suitable filter unit with cooler. For the fields of application which are not shown in the cooling capacity graph, the capacity data have to be asked for at the manufacturer.
Stationary filter units can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected e-motor and the switch-off function of the e-motor of the electrical clogging indicator will disengaged at 2,5 bar.
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium.

4. Symbols:

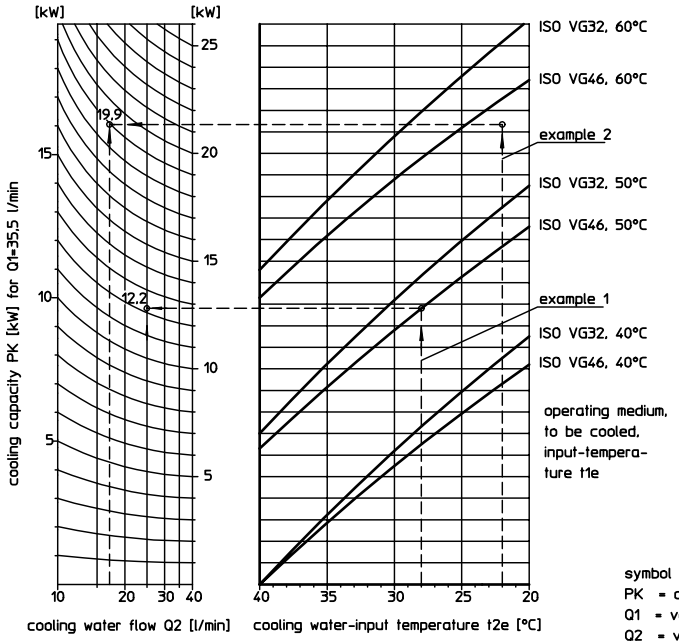
Filter unit with cooler
without clogging indicator



with electrical
clogging indicator AE30

with visual
clogging indicator
AOR, AOC

5. Cooling capacity graph:



example 1, operating medium ISO VG46

t1e = 50 °C, t2e = 28 °C,
Q1 = 35,5 l/min, Q2 = 25 l/min

cooling capacity PK from the graph = 12,2 kW

$t1a = 50 - \frac{12{,}2 * 35}{35{,}5} = 38\ °C$

$t2a = 28 + \frac{12{,}2 * 14{,}4}{25} = 35\ °C$

example 2, operating medium ISO VG32

t1e = 55 °C, t2e = 22 °C,
Q1 = 35,5 l/min, Q2 = 17 l/min

cooling capacity PK from the graph= 19,9 kW
(data linear interpolated)

$t1a = 55 - \frac{19{,}9 * 35}{35{,}5} = 35{,}4\ °C$

$t2a = 22 + \frac{19{,}9 * 14{,}4}{17} = 38{,}9\ °C$

operating medium-output temperature t1a [°C] $t1a = t1e - \frac{PK * 35}{Q1}$

cooling water-output temperature t2a [°C] $t2a = t2e + \frac{PK * 14{,}4}{Q2}$

symbol		units
PK	= cooling capacity	kW
Q1	= volume flow-operating medium	l/min
Q2	= volume flow-cooling water	l/min
t1e	= operating medium-input temperature	°C
t1a	= operating medium-output temperature	°C
t2e	= cooling water-input temperature	°C
t2a	= cooling water-output temperature	°C

6. Technical data:

pump-volume flow :	35,5 l/min at 1420 rpm
E-motor:	0,75 kW, approx. 1420 rpm
rotary current:	230/400 V, 50 Hz
operating pressure:	max. 6 bar
filter-fineness:	4, 5, 7 or 10 $\mu m_{(c)}$
weight:	approx. 58 kg
operating medium:	hydraulic oil based on mineral oil from 10 to 100 mm²/s, other media on request

Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

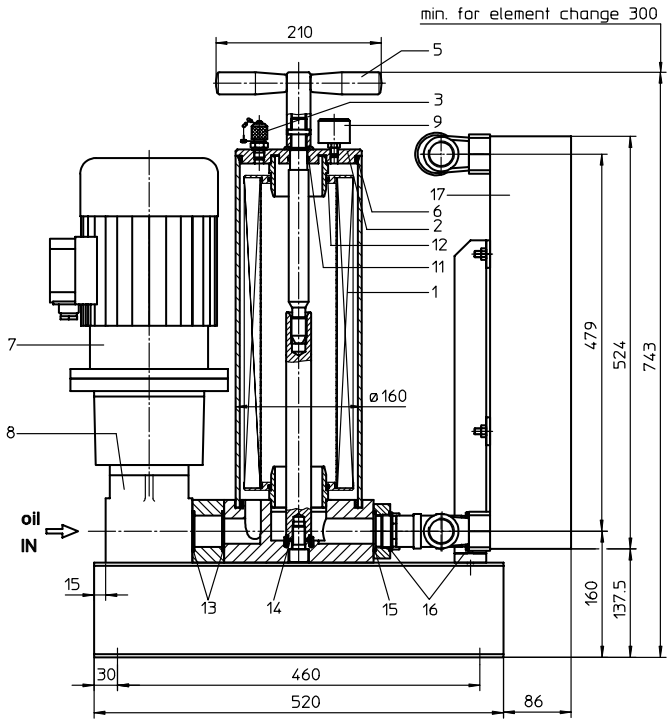
7. Test methods:

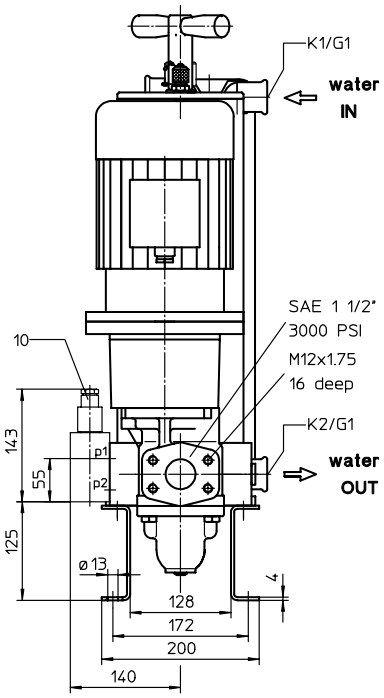
Filter elements are tested according to the following ISO sta ndards:

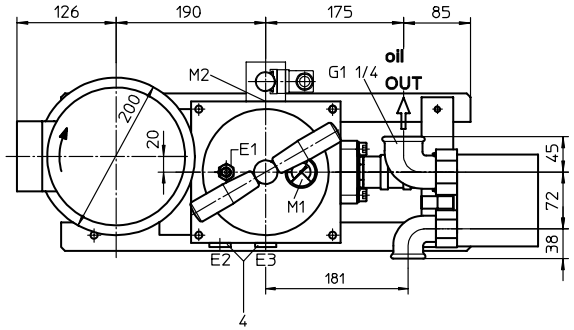
ISO 2941	Verification of colla pse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow character istics
ISO 16889	Multi-pass method for evaluating filtration performance

FILTER UNIT, stationary with plate-exchanger
Series USP 81 PN 6

Sheet No. **4022 E**







Assignment of connections and functions

E1: venting mini-measuring connection, MA.1.St see sheet-no.1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the housing cover, dirt side manometer 0-16 bar
M2: measure connection at filter housing
p_1 = dirt side
p_2 = clean side
K1: cooling water IN
K2: cooling water OUT

1. Type index:

1.1. Filter unit: (ordering example)

USP. 81. 6VG. 10. B. P. -. P04. D01. CP18. AE

1	2	3	4	5	6	7	8	9	10	11

1 **series:**
USP = filter unit, stationary with plate-exchanger

2 **nominal size:** 81

3 **filter-material and filter-fineness:**
10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$, 1 VG = 4 $\mu m_{(c)}$ Interpor fleece (glass fibre)
10 WVG = 10 $\mu m_{(c)}$, 3 WVG = 5 $\mu m_{(c)}$ Watersorp-filter element

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM), by agreement

7 **filter element specification:**
- = standard
VA = stainless steel

8 **pump unit:**
P04 = pump unit 04, NG 80.50

9 **motor:**
D01 = B5/90L/4.1,5.1500.230/400.D.50.1.-.-.-
rotay current motor 230/400 V, 50 Hz, approx. 1420 rpm, 1,5 kW, type of protection IP 54

10 **plate-exchanger unit:**
CP18 = plate-exchanger unit CP18

11 **clogging indicator at M2:**
- = without
AE = AE30.2,5.P.-.B electrical at p_1 and p_2, 2,5 bar, see sheet-no. 1609
AOR = AOR.2,5.P.- visual, 2,5 bar, see sheet-no. 1606
AOC = AOC.2,5.P.- visual, 2,5 bar, see sheet-no. 1606

1.2. Filter element: (ordering example)

01NR. 630. 6VG. 10. B. P. -

1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 630

3 - 7 see type index-filter unit

Changes of measures and design are subject to alteration!

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2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 630	
2	housing cover	1	30600-3	315492
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	G ½	304678
5	straining screw	1	30595-3	316312
6	Oring	1	140 x 6	315392 (NBR)
7	E-motor D01	1	1,5 kW, 230/400 V	313465
8	pump unit P04	1	NG 80.50	317139
9	manometer (series)	1	∅ 40	
10	clogging indicator	1	according to type index	
11	O-ring	1	22 x 3	304387 (NBR)
12	O-ring	2	70 x 4	306253 (NBR)
13	O-ring	2	45 x 3	304991 (NBR)
14	O-ring	1	18 x 3	304359 (NBR)
15	O-ring	1	44,45 x 3,53	317607 (NBR)
16	gasket	2	A 42 x 49	308541
17	plate-exchanger unit	1	CP18	

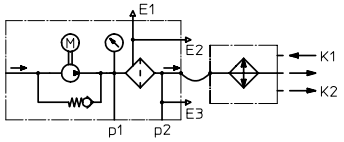
3. Description:

The stationary filter unit with plate-exchanger is intended for oil maintenance and for oil cooling on hydraulic systems.
The area of application comprises:
- secondary flow filtration in addition to the existing operating filter and the oil cooling
- secondary flow filtration without the action of the operating filter and the oil co oling
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design with plate interlacing without pipe satisfies the prerequisites for small dimensions and high reliability.
The device is equipped with a gear pump driven by an e-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 630 and is led afterwards over a plate cooler.
Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 µm $_{(c)}$.
At the measuring point M1, the working pressure before the element is shown. The pollution of the element is indicated with the clogging indicator at the measuring point M2.
At a pressure difference > 2,5 bar , the element is polluted and has to be removed with a new element.
The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.
To protect against overpressure, the filter unit is fitted with a safety valve, pressure setting approx. 6 bar.
The cooling capacity is shown at the cooling capacity graph for the chosen field of application, depending on the input temperature, the streams of the medium and the type of medium. The cooling capacity graph is intended for the choice of application of the suitable filter unit with cooler. For the fields of application which are not shown in the cooling capacity graph, the capacity data have to be asked for at the manufacturer.
Stationary filter units can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected e-motor and the switch-off function of the e-motor of the electrical clogging indicator will disengaged at 2,5 bar.
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium.

4. Symbols:

Filter unit with cooler
without clogging indicator

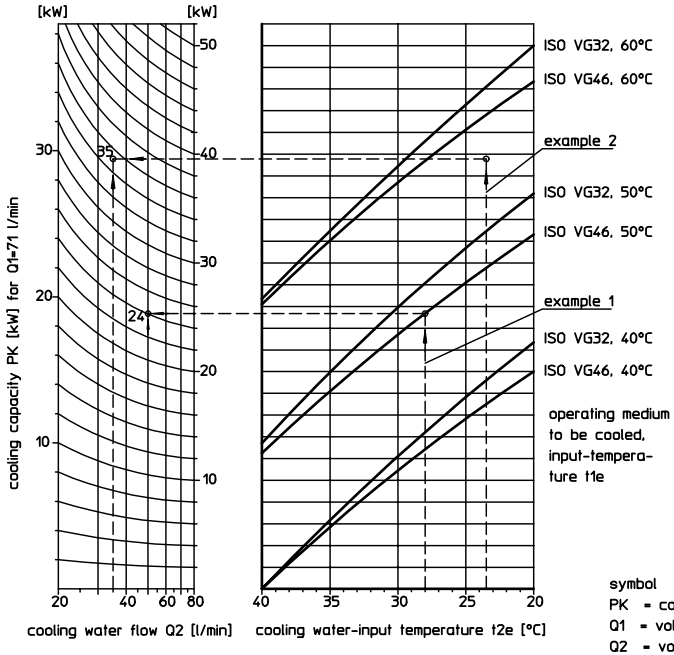


with electrical
clogging indicator AE30

with visual
clogging indicator
AOR, AOC

E 4022 E

5. Cooling capacity graph:



operating medium-output temperature t1a [°C] $t1a = t1e - \frac{PK * 35}{Q1}$

cooling water-output temperature t2a [°C] $t2a = t2e + \frac{PK * 14,4}{Q2}$

example 1, operating medium ISO VG46

t1e = 50 °C, t2e = 28 °C,
Q1 = 71 l/min, Q2 = 50 l/min

cooling capacity PK from the graph = 24 kW

$t1a = 50 - \frac{24 * 35}{71} = 38,2$ °C

$t2a = 28 + \frac{24 * 14,4}{50} = 34,9$ °C

example 2, operating medium ISO VG32

t1e = 55 °C, t2e = 23,5 °C,
Q1 = 71 l/min, Q2 = 35 l/min

cooling capacity PK from the graph = 35 kW
(data linear interpolated)

$t1a = 55 - \frac{35 * 35}{71} = 37,7$ °C

$t2a = 23,5 + \frac{35 * 14,4}{35} = 37,9$ °C

symbol		units
PK	= cooling capacity	kW
Q1	= volume flow-operating medium	l/min
Q2	= volume flow-cooling water	l/min
t1e	= operating medium-input temperature	°C
t1a	= operating medium-output temperature	°C
t2e	= cooling water-input temperature	°C
t2a	= cooling water-output temperature	°C

6. Technical data:

pump-volume flow :	71 l/min at 1420 rpm
E-motor:	1,5 kW, approx. 1420 rpm
rotary current:	230/400 V, 50 Hz
operating pressure:	max. 6 bar
filter-fineness:	4, 5, 7 or 10 $\mu m_{(c)}$
weight:	approx. 80 kg
operating medium:	hydraulic oil based on mineral oil from 10 to 100 mm²/s, other media on request

Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

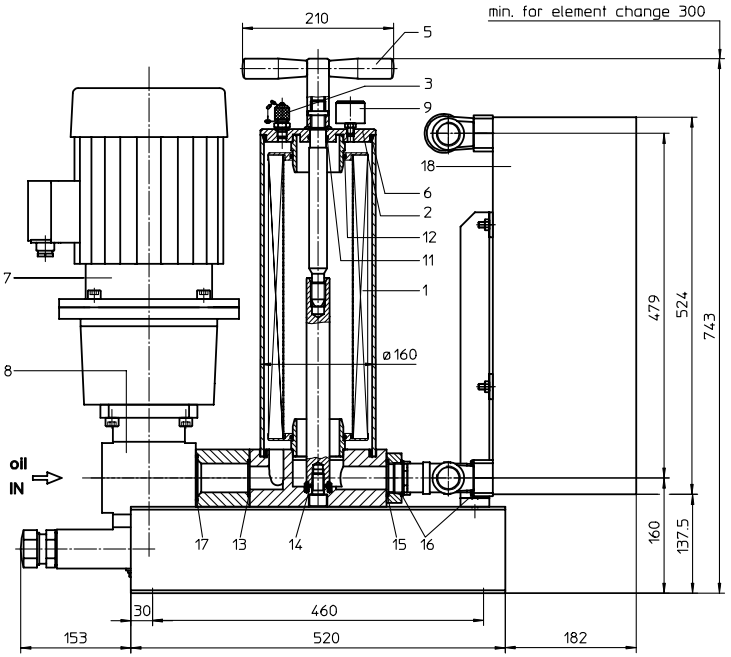
7. Test methods:

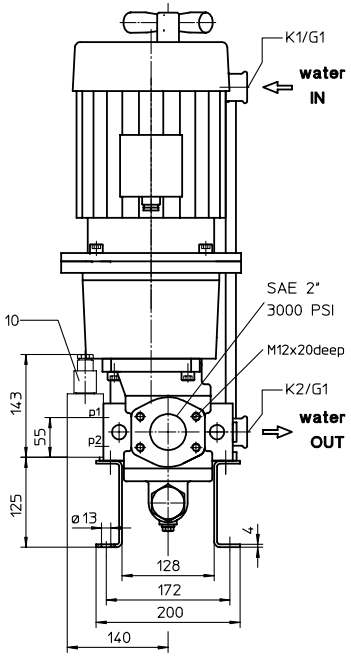
Filter elements are tested according to the following ISO sta ndards:

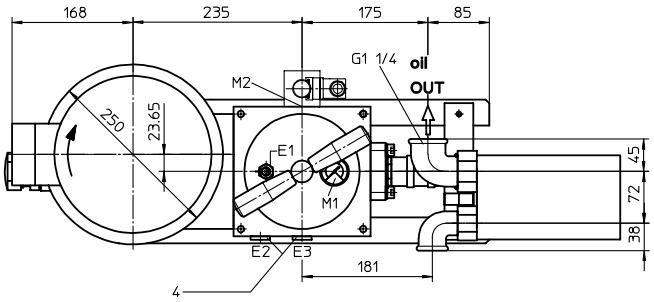
ISO 2941	Verification of colla pse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow character istics
ISO 16889	Multi-pass method for evaluating filtration performance

FILTER UNIT, stationary with plate-exchanger
Series USP 161 PN 8

Sheet No. **4023 E**







Assignment of connections and functions

E1: venting mini-measuring connection, MA.1.St see sheet-no.1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the housing cover, dirt side manometer 0-16 bar
M2: measure connection at filter housing
p_1 = dirt side
p_2 = clean side
K1: cooling water IN
K2: cooling water OUT

1. Type index:

1.1. Filter unit: (ordering example)

USP. 161. 6VG. 10. B. P. -. P18. D11. CP20. AE

1	2	3	4	5	6	7	8	9	10	11

1 **series:**
USP = filter unit, stationary with plate-exchanger

2 **nominal size:** 161

3 **filter-material and filter-fineness:**
10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$, 1 VG = 4 $\mu m_{(c)}$ Interpor fleece (glass fibre)
10 WVG = 10 $\mu m_{(c)}$, 3 WVG = 5 $\mu m_{(c)}$ Watersorp-filter element

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM), by agreement

7 **filter element specification:**
- = standard
VA = stainless steel

8 **pump unit:**
P18 = pump unit 18, NG 160.100.6, adjustable pressure 6 bar
pump unit 18, NG 160.100.8, adjustable pressure 8 bar

9 **motor:**
D11 = B5/100LB/4.3,0.1500. 400/690.D.50.1.-.-.- rotay current motor 400/690V, 50 Hz, approx. 1420 rpm, 3,0 kW, type of protect ion IP 54 — $\nu \leq 100$ mm²/s
D08 = B5/112M/4.4,0.1500.400/690.D.50.1.-.-.- rotay current motor 400/690V, 50 Hz, approx. 1420 rpm, 4,0 kW, type of protection IP 54 — $\nu > 100$ mm²/s, $\nu \leq 150$ mm²/s

10 **plate-exchanger unit:**
CP20 = plate-exchanger unit CP20

11 **clogging indicator at M2:**
- = without
AE = AE30.2,5.P.-.B electrical at p_1 and p_2, 2,5 bar, see sheet-no. 1609
AOR = AOR.2,5.P.- visual, 2,5 bar, see sheet-no. 1606
AOC = AOC.2,5.P.- visual, 2,5 bar,see sheet-no. 1606

1.2. Filter element: (ordering example)

01NR. 630. 6VG. 10. B. P. -

1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 630

3 - 7 see type index-filter unit

Changes of measures and design are subject to alteration!

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2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 630	
2	housing cover	1	30600-3	315492
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	G ½	304678
5	straining screw	1	30595-3	316312
6	Oring	1	140 x 6	315392 (NBR)
7	E-motor D08	1	according to type index	
	E-motor D11	1	according to type index	
8	pump unit P18	1	NG 160.100	321710
9	manometer (series)	1	∅ 40	
10	clogging indicator	1	according to type index	
11	O-ring	1	22 x 3	304387 (NBR)
12	O-ring	2	70 x 4	306253 (NBR)
13	O-ring	2	45 x 3	304991 (NBR)
14	O-ring	1	18 x 3	304359 (NBR)
15	O-ring	1	44,45 x 3,53	317607 (NBR)
16	gasket	2	A 42 x 49	308541
17	O-ring	1	56,75 x 3,53	306035 (NBR)
18	plate-exchanger unit	1	CP20	

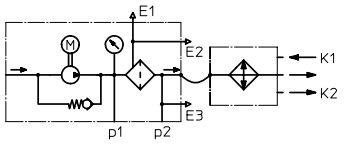
3. Description:

The stationary filter unit with plate-exchanger is intended for oil maintenance and for oil cooling on hydraulic systems.
The area of application comprises:
- secondary flow filtration in addition to the existing operatin g filter and the oil cooling
- secondary flow filtration without the action of the operating filter and the oil co oling
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design with plate interlacing without pipe satisfies the prerequisites for small dimensions and high reliability.
The device is equipped with a gear pump driven by an e-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 630 and is led afterwards over a plate cooler.
Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 µm $_{(c)}$.
At the measuring point M1, the working pressure before the element is shown. The pollution of the element is indicated with the clogging indicator at the measuring point M2.
At a pressure difference > 2,5 bar , the element is polluted and has to be removed with a new element.
The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.
To protect against overpressure, the filter unit is fitted with a safety valve, pressure setting approx. 6 resp. 8 bar.
The cooling capacity is shown at the cooling capacity graph for the chosen field of application, depending on the input temperature, the streams of the medium and the type of medium. The cooling capacity graph is intended for the choice of application of the suitable filter unit with cooler. For the fields of application which are not shown in the cooling capacity graph, the capacity data have to be asked for at the manufacturer.
Stationary filter units can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected e-motor and the switch-off function of the e-motor of the electrical clogging indicator will disengaged at 2,5 bar.
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium.

4. Symbols:

Filter unit with cooler
without clogging indicator

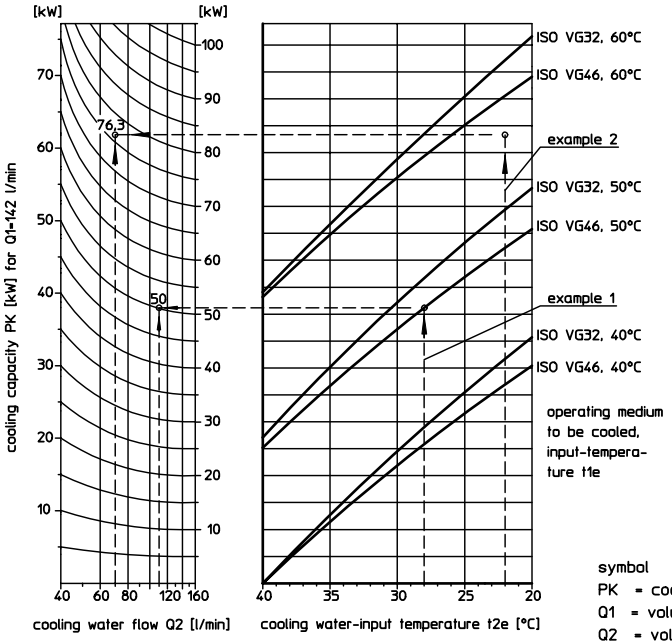


with electrical
clogging indicator AE30

with visual
clogging indicator
AOR, AOC

E 4023 E

5. Cooling capacity graph:



example 1, operating medium ISO VG46

t1e = 50 °C, t2e = 28 °C,
Q1 = 142 l/min, Q2 = 110 l/min

cooling capacity PK from the graph = 50 kW

$t1a = 50 - \frac{50 * 35}{142} = 37{,}7$ °C

$t2a = 28 + \frac{50 * 14{,}4}{110} = 34{,}5$ °C

example 2, operating medium ISO VG32

t1e = 55 °C, t2e = 22 °C,
Q1 = 142 l/min, Q2 = 70 l/min

cooling capacity PK from the graph = 76,3 kW
(data linear interpolated)

$t1a = 55 - \frac{76{,}3 * 35}{142} = 36{,}2$ °C

$t2a = 22 + \frac{76{,}3 * 14{,}4}{70} = 37{,}7$ °C

operating medium-output temperature t1a [°C] $t1a = t1e - \frac{PK * 35}{Q1}$

cooling water-output temperature t2a [°C] $t2a = t2e + \frac{PK * 14{,}4}{Q2}$

symbol		units
PK	= cooling capacity	kW
Q1	= volume flow-operating medium	l/min
Q2	= volume flow-cooling water	l/min
t1e	= operating medium-input temperature	°C
t1a	= operating medium-output temperature	°C
t2e	= cooling water-input temperature	°C
t2a	= cooling water-output temperature	°C

6. Technical data:

pump-volume flow :	142 l/min at 1420 rpm
filter-fineness:	4, 5, 7 or 10 µm$_{(c)}$
weight:	approx. 120 kg
operating medium:	hydraulic oil based on mineral oil from 10 to 150 mm²/s, other media on request
cooling capacity:	according to cooling capacity graph

operating pressure max.	6 bar	8 bar
oil-viscosity	10-100 mm²/s	>100-150 mm²/s
E-motor	3,0 kW, 400/690 V, 50 Hz, approx. 1420 rpm	4,0 kW, 400/690 V, 50 Hz, approx. 1420 rpm

Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

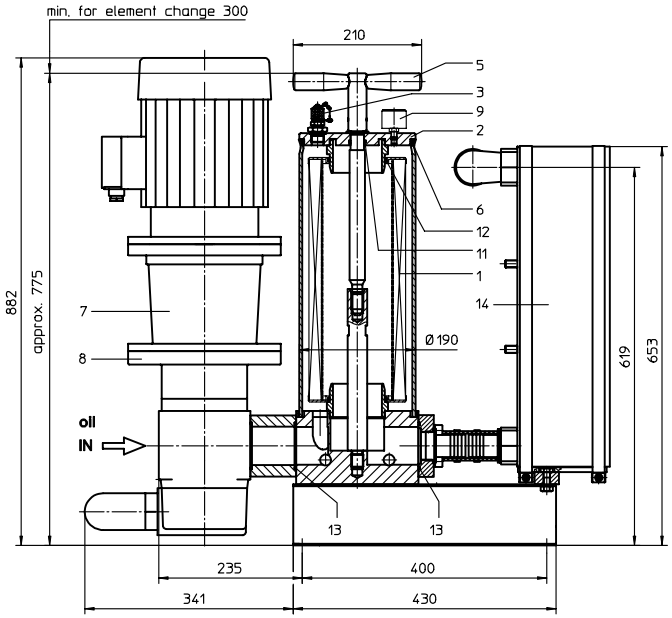
7. Test methods:

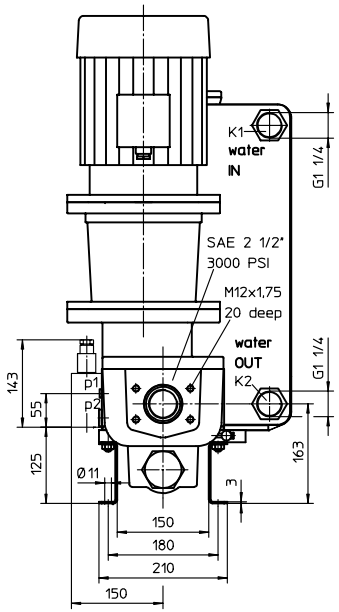
Filter elements are tested according to the following ISO standards:

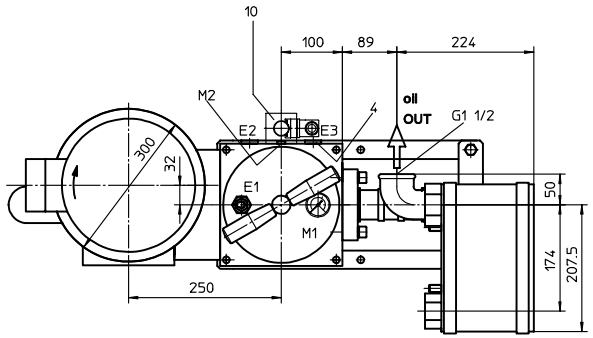
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

FILTER UNIT, stationary with plate-exchanger
Series USP 320 PN 6

Sheet No. **4024 B**







Assignment of connections and functions

E1: venting mini-measuring connection, MA.1.St see sheet-no.1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the housing cover, dirt side manometer 0-16 bar
M2: measure connection at filter housing
p_1 = dirt side
p_2 = clean side
K1: cooling water IN
K2: cooling water OUT

1. Type index:

1.1. Filter unit: (ordering example)

USP. 320. 6VG. 10. B. P. -. P07. D07. CP30. AE

1	2	3	4	5	6	7	8	9	10	11

1 **series:**
USP = filter unit, stationary with plate-exchanger

2 **nominal size:** 320

3 **filter-material and filter-fineness:**
10 VG = 10 µm$_{(c)}$, 6 VG = 7 µm$_{(c)}$, 3 VG = 5 µm$_{(c)}$, 1 VG = 4 µm$_{(c)}$ Interpor fleece (glass fibre)
10 WVG = 10 µm$_{(c)}$, 3 WVG = 5 µm$_{(c)}$ Watersorp-filter element

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM), by agreement

7 **filter element specification:**
- = standard
VA = stainless steel

8 **pump unit:**
P07 = pump unit 07, NG 320.200

9 **motor:**
D07 = B5/132S/4.5,5.1500.400/690.D.50.1.-.-.-
rotay current motor 400/690V, 50 Hz, approx. 1420 rpm, 5,5 kW, type of protection IP 54

10 **plate-exchanger unit:**
CP30 = plate-exchanger unit CP30

11 **clogging indicator at M2:**
- = without
AE = AE30.2,5.P.-.B electrical at p_1 and p_2, 2,5 bar, see sheet-no. 1609
AOR = AOR.2,5.P.- visual, 2,5 bar, see sheet-no. 1606
AOC = AOC.2,5.P.- visual, 2,5 bar, see sheet-no. 1606

1.2. Filter element: (ordering example)

01NR. 1000. 6VG. 10. B. P. -

1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 1000

3 - 7 see type index-filter unit

Changes of measures and design are subject to alteration!

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2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 1000	
2	housing cover	1	22694-3	313837
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	G ½	304678
5	straining screw	1	31067-3	316893
6	Oring	1	170 x 6	304799 (NBR)
7	E-motor D07	1	5,5 kW, 400/690 V	316821
8	pump unit P07	1	NG 320.200	316908
9	manometer (series)	1	∅ 40	
10	clogging indicator	1	according to type index	
11	O-ring	1	22 x 3	304387 (NBR)
12	O-ring	2	90 x 4	306941 (NBR)
13	O-ring	3	69,45 x 3,53	305868 (NBR)
14	plate-exchanger unit	1	CP30	

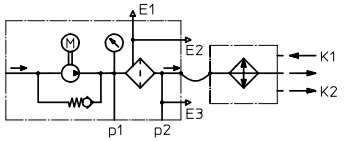
3. Description:

The stationary filter unit with plate-exchanger is intended for oil maintenance and for oil cooling on hydraulic systems.
The area of application comprises:
- secondary flow filtration in addition to the existing operating filter and the oil cooling
- secondary flow filtration without the action of the operating filter and the oil co oling
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design with plate interlacing without pipe satisfies the prerequisites for small dimensions and high reliability.
The device is equipped with a gear pump driven by an e-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 1000 and is led afterwards over a plate cooler.
Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 µm $_{(c)}$.
At the measuring point M1, the working pressure before the element is shown. The pollution of the element is indicated with the clogging indicator at the measuring point M2.
At a pressure difference > 2,5 bar , the element is polluted and has to be removed with a new element.
The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.
To protect against overpressure, the filter unit is fitted with a safety valve, pressure setting approx. 6 bar.
The cooling capacity is shown at the cooling capacity graph for the chosen field of application, depending on the input temperature, the streams of the medium and the type of medium. The cooling capacity graph is intended for the choice of application of the suitable filter unit with cooler. For the fields of application which are not shown in the cooling capacity graph, the capacity data have to be asked for at the manufacturer.
Stationary filter units can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected e-motor and the switch-off function of the e-motor of the electrical clogging indicator will disengaged at 2,5 bar.
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium.

4. Symbols:

Filter unit with cooler
without clogging indicator

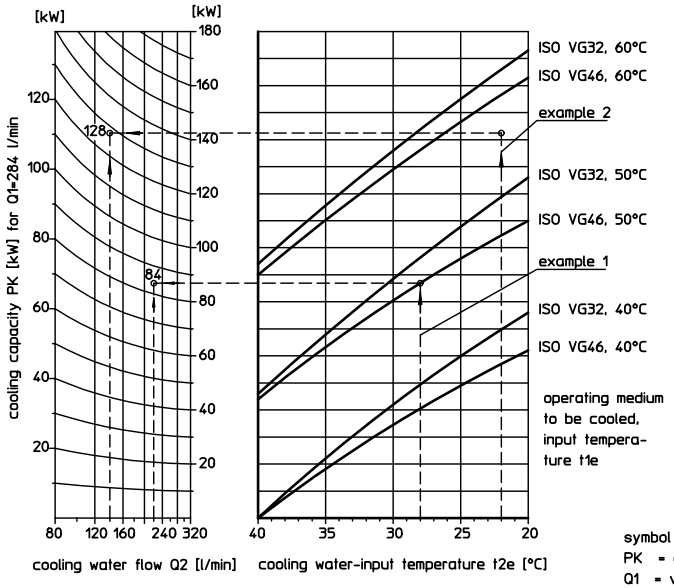


with electrical
clogging indicator AE30

with visual
clogging indicator
AOR, AOC

E 4024 B

5. Cooling capacity graph:



example 1, operating medium ISO VG46

t1e = 50 °C, t2e = 28 °C,
Q1 = 284 l/min, Q2 = 220 l/min

cooling capacity PK from the graph = 84 kW

$t1a = 50 - \frac{84 * 35}{284} = 39{,}6\ °C$

$t2a = 28 + \frac{84 * 14{,}4}{220} = 33{,}5\ °C$

example 2, operating medium ISO VG32

t1e = 55 °C, t2e = 22 °C,
Q1 = 284 l/min, Q2 = 140 l/min

cooling capacity PK from the graph = 128 kW
(data linear interpolated)

$t1a = 55 - \frac{128 * 35}{284} = 39{,}2\ °C$

$t2a = 22 + \frac{128 * 14{,}4}{140} = 35{,}2\ °C$

operating medium-output temperature t1a [°C] $t1a = t1e - \frac{PK * 35}{Q1}$

cooling water-output temperature t2a [°C] $t2a = t2e + \frac{PK * 14{,}4}{Q2}$

symbol		units
PK	= cooling capacity	kW
Q1	= volume flow-operating medium	l/min
Q2	= volume flow-cooling water	l/min
t1e	= operating medium-input temperature	°C
t1a	= operating medium-output temperature	°C
t2e	= cooling water-input temperature	°C
t2a	= cooling water-output temperature	°C

6. Technical data:

pump-volume flow :	284 l/min at 1420 rpm
E-motor:	5,5 kW, approx. 1420 rpm
rotary current:	4000/690 V, 50 Hz
operating pressure:	max. 6 bar
filter-fineness:	4, 5, 7 or 10 µm$_{(c)}$.
weight:	approx. 155 kg
operating medium:	hydraulic oil based on mineral oil from 10 to 100 mm²/s, other media on request

Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

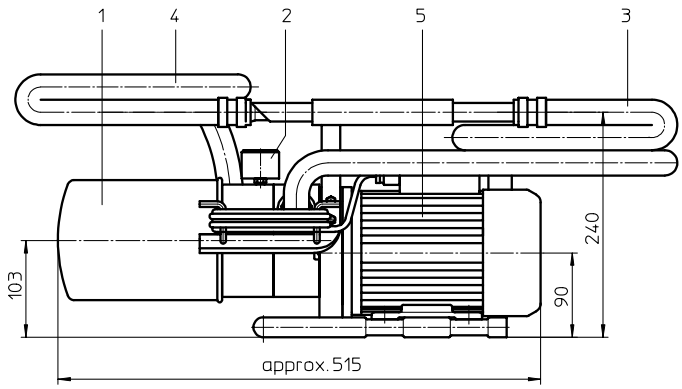
7. Test methods:

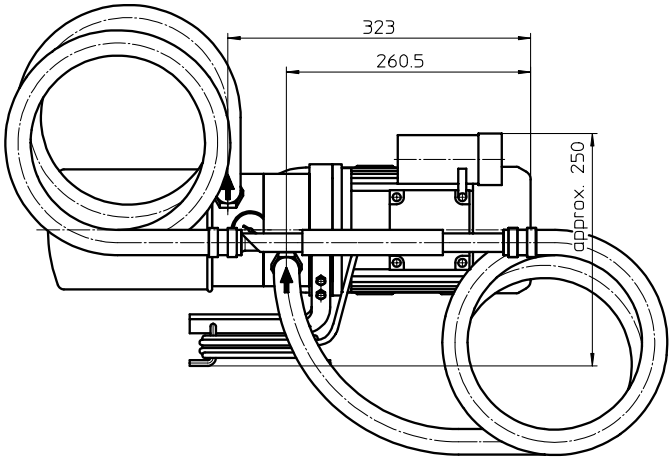
Filter elements are tested according to the following ISO sta ndards:

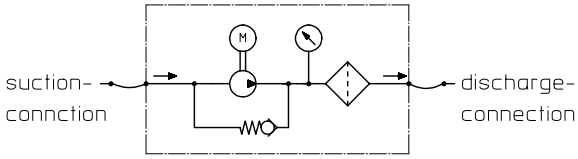
ISO 2941	Verification of colla pse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow character istics
ISO 16889	Multi-pass method for evaluating filtration performance

FILTER UNIT, mobile
Series UFM 15

Sheet No.
4007







1. Type index:

1.1. Filter unit: (ordering example)

UFM.	15.	10VG.	E.	P.	W16
1	2	3	4	5	6

1 **series:**
UFM = filter unit, mobile

2 **nominal size:** 15

3 **filter-material and filter-fineness:**
10 VG = 10 µm$_{(c)}$ Interpor fleece (glass fibre)
10 P = 10 µm paper

4 **filter element design:**
E = single-end open

5 **sealing material:**
P = Nitrile (NBR)

6 **motor:**
W16 = B3-B14/71/4.0,25.1500.230.W.50.1.R.S.K
alternating current motor 230V, 50Hz,
approx. 1500 rpm, 0,25KW,
type of protection IP 54

1.2. Filter element: (ordering example)

01WP.	90.	10VG.	E.	P
1	2	3	4	5

1 **series:**
01WP = spin-on cartridge

2 **nominal size:** 90

3 - 5 see type index-filter unit

2. Technical data:

pump capacity:	15 l/min at 1500 rpm
electric motor:	0,25 KW, 1500 rpm,
alternating current:	230 V, 50 Hz
pressure load capacity:	max. 5 bar
filter-fineness:	10 µm$_{(c)}$
weight:	approx. 12 kg
operating medium:	hydraulic oil based on mineral oil 10 to 400 mm^2/s other media on request

3. Spare parts:

item	qty.	designation	dimension	article-no.
1	1	spin-on cartridge	01WP.90...	
2	1	clogging indicator	visual	315452
3	1	suction hose ¾"	21938-3	
4	1	discharge hose ¾"	21946-3	
5	1	electric motor W16	0,25 KW, 230V	312053

4. Description:

The mobile filter unit is intended for oil maintenance on hydraulic systems.
The area of application comprises:
- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design satisfies the prerequisites for small dimensions and high reliabi lity.
As the filtration unit is portable and small, there is easy accers even to difficult accessible points. Leaking oil from the suction respectively discharge hose is prevented by lances connected with the carrying handle.
The suction hose ¾" and the discharge hose DN 20 are approximately 1500 mm long inclusive of the lance.
The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a spin-on cartridge.
The filter fineness is 10 µm$_{(c)}$. The contamination level of the filter element can be read off from a pressure display.
To protect against overpressure, the filter unit is fitted with a safety valve. Pressure setting about 5 bar.
The filter unit can be operated without supervision, since the unit switches off automatically after about 5 minutes when an operating pressure of > 6 bar is reached. This pressure range is marked in red on the scale field of the pressure display.
The filter element can be changed without tools.
The filter elements are supplied including seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.

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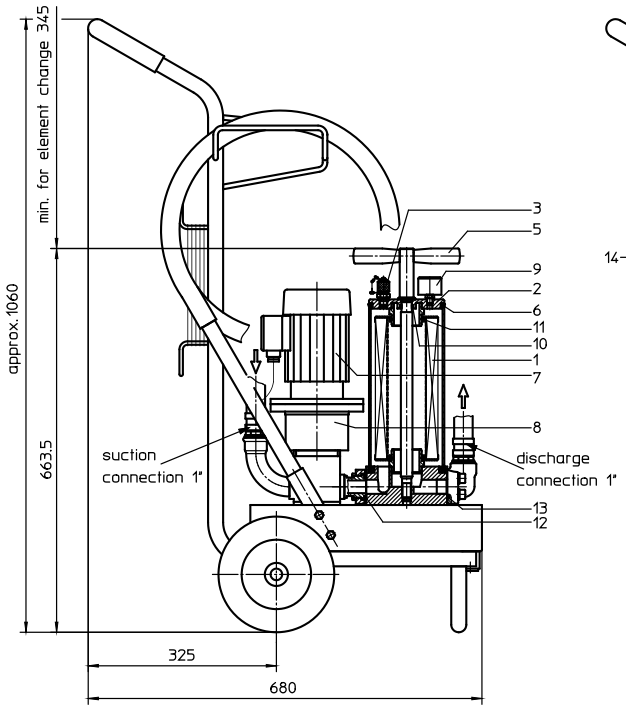
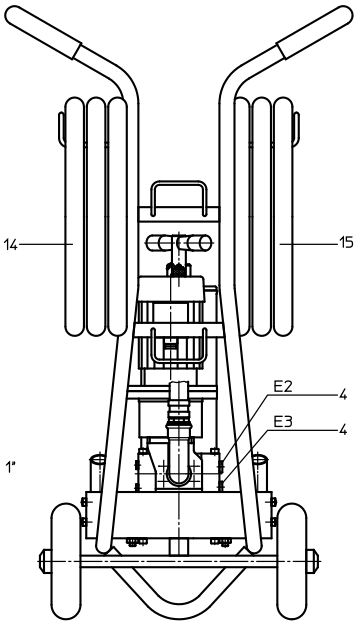
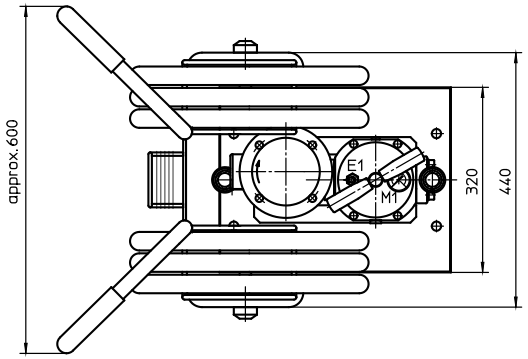
FILTER UNIT, mobile
Series UM 20 PN 4

Sheet No. **4013 G**







Assignment of connections and functions:

E1: venting mini-measuring connection MA.1.ST, see sheet-no.1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the housing cover, dirt side

1. Type index:

1.1. Filter unit: (ordering example)

UM.	20.	6VG.	10.	B.	P.	-.	P01.	W03.	L07.	L11.	O
1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
UM = filter unit, mobile

2 **nominal size:** 20

3 **filter-material and filter-fineness:**
10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$, 1 VG = 4$\mu m_{(c)}$ Interpor fleece (glass fibre)
10 WVG = 10 $\mu m_{(c)}$, 3 WVG = 5 $\mu m_{(c)}$ Watersorp-filter element

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM), by agreement

7 **filter element specification:**
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **pump unit:**
P01 = pump unit 01, NG 20.16 (standard-pump unit)
P14 = pump unit 14, NG 20.16 (standard-pump unit)

9 **motor:** (W = alternating current motor)

motor	electrical connection		volume flow	max. capacity	doc.-no.
W03 [1)]	230V	50Hz	22,7 l/min	10-400 mm²/s	43044-4
W07 [1)]	110V	60Hz	27,2 l/min	10-400 mm²/s	43045-4
W06 [1)]	230V	50Hz	22,7 l/min	10-400 mm²/s	43056-4

[1)] standard-motor

10 **suction connection 1" :** (see sheet-no. 31992-4)
L07 = hose-lance
L08 = hose-fitting-lance
L09 = hose-lance-protective filter
L10 = hose- fitting-lance-protective filter

11 **discharge connection 1" :** (see sheet-no. 31992-4)
L11 = hose-lance
L12 = hose-fitting-lance

12 **clogging indicator at M1:**
- = without
O = visual, 2,5 bar

1.2. Filter element: (ordering example)

01NR.	250.	6VG.	10.	B.	P.	-
1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 250

3 - 7 see type index-filter unit

Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

Changes of measures and design are subject to alteration!

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2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 250	
2	housing cover	1	30615-3	315437
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	G ¼	305003
5	straining screw	1	30631-4	316404
6	O-ring	1	115 x 5	306640 (NBR)
7	electric motor	1	according to type index	
8	pump unit P01	1	NG 20.16	316270
	pump unit P14	1	NG 20.16	319735
9	clogging indicator (series)	1	visual ∅ 40	315452
10	O-ring	1	18 x 3	304359 (NBR)
11	O-ring	2	52 x 3	314206 (NBR)
12	O-ring	1	32 x 3,5	304378 (NBR)
13	O-ring	1	32,9 x 3,53	318850 (NBR)
14	suction hose 1“	1	according to type index	
15	discharge hose 1“	1	according to type index	

3. Designation:

The mobile filter unit is intended for oil maintenance on hydraulic systems.
The area of application comprises:
- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to bypass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability.The transporting trolley makes it possible to move close up to confined locations with difficult access, and to fix the accessories (such as hoses and the connection cable) in a safe and reliable manner.
Oil flowing out of the suction and/or discharge hose or the outflow openings is collected by the filter unit's oil trough, without causing any environmental damage. The suction hose DN 25 and the discharge hose DN 25 are approximately 2700 mm long inclusive of the lance.
The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 250.
Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 $\mu m_{(c)}$. The contamination level of the filter element can be read off from a pressure display in the cover of the filter.
At a pressure >2,5 bar (red area of the scale field), the filter element is contaminated and it must be replaced with a new filter element.
The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.
To protect against overpressure, the filter unit is fitted with a safety valve. Pressure setting about 4 bar.
The E-motor is made safe with a motor-protection-switch against overloading. At a working pressure > 4 bar, the motor-protection-switch cuts the E-motor out.
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when changing the fluid medium.

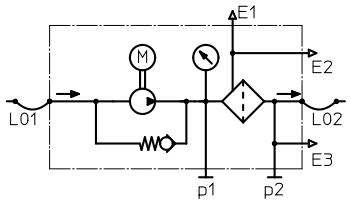
4. Technical data:

filter-fineness:	4, 5, 7 or 10 $\mu m_{(c)}$
oil temeprature:	-5°C to +60°C
weight:	approx. 42 kg
operating medium:	hydraulic oil based on mineral oil from 10 mm²/s, other media on request

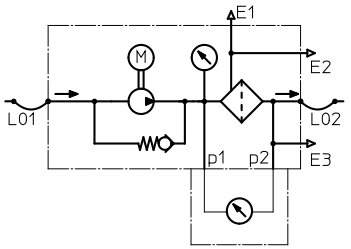
Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:

filter unit without clogging indicator



filter unit with visual clogging indicator



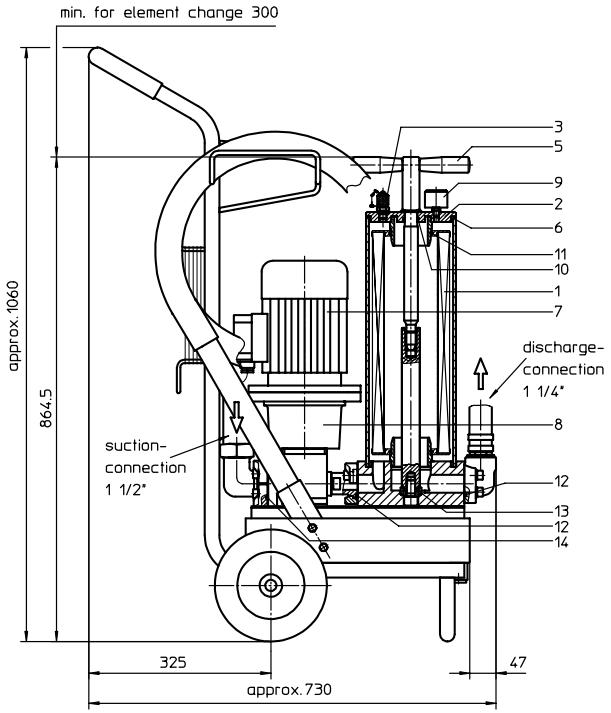
6. Test methods:

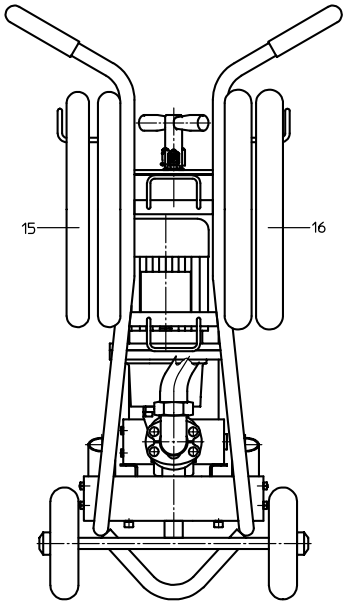
Filter elements are tested according to the following ISO standards:

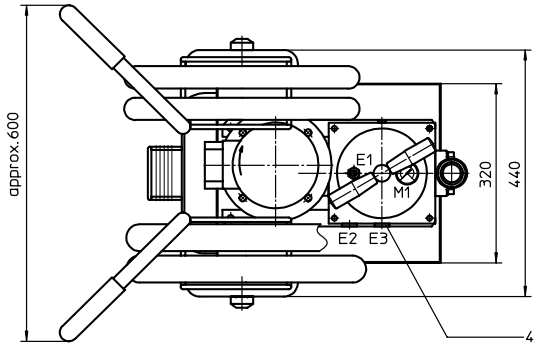
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

FILTER UNIT, mobile
Series UM 40 PN 4

Sheet No. **4014 E**







Assignment of connections and functions:

E1: venting mini-measuring connection, MA.1.St see sheet-no.1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the housing cover, dirt side

1. Type index:

1.1. Filter unit: (ordering example)

UM.	40.	6VG.	10.	B.	P.	-.	P05.	W10.	L01.	L05.	O
1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
UM = filter unit, mobile

2 **nominal size:** 40

3 **filter-material and filter-fineness:**
10 VG = 10 µm$_{(c)}$, 6 VG = 7 µm$_{(c)}$, 3 VG = 5 µm$_{(c)}$, 1 VG = 4µm$_{(c)}$ Interpor fleece (glass fibre)
10 WVG = 10 µm$_{(c)}$, 3 WVG = 5 µm$_{(c)}$ Watersorp-filter element

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM), by agreement

7 **filter element specification:**
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **pump unit:**
P05 = pump unit 05, NG 40.25 (standard-pump unit)

9 **motor:** (W = alternating current motor)

motor	electrical connection		volume flow	max. viscosity	doc.-no.
W10 [1)]	230V	50Hz	35,5 l/min	10-400 mm²/s	42754-4
W11 [1)]	110V	60Hz	42,5 l/min	10-400 mm²/s	42877-4

[1)] standard-motor

10 **suction connection 1 ½ " :** (see sheet-no. 31961-4)
L01 = hose-lance
L02 = hose-fitting-lance
L03 = hose-lance-protective filter
L04 = hose- fitting-lance-protective filter
L22 = hose- fitting

11 **discharge connection 1 ¼ " :** (see sheet-no. 31961-4)
L05 = hose-lance
L06 = hose-fitting-lance
L21 = hose-fitting

12 **clogging indicator at M1:**
- = without
O = visual, 2,5 bar

1.2. Filter element: (ordering example)

01NR.	630.	6VG.	10.	B.	P.	-
1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 630

3 - 7 see type index-filter unit

Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

Changes of measures and design are subject to alteration!

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2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 630	
2	housing cover	1	30600-3	315492
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	G ½	304678
5	straining screw	1	30595-3	316312
6	O-ring	1	140 x 6	315392 (NBR)
7	electric motor	1	according to type index	
8	pump unit P05	1	NG 40.25	316292
9	clogging indicator (series)	1	visual ∅ 40	315452
10	O-ring	1	22 x 3	304387 (NBR)
11	O-ring	2	70 x 4	306253 (NBR)
12	O-ring	2	37,69 x 3,53	304353 (NBR)
13	O-ring	1	18 x 3	304359 (NBR)
14	O-ring	1	47,22 x 3,53	305078 (NBR)
15	suction hose 1 ½ "	1	according to type index	
16	discharge hose 1 ¼ "	1	according to type index	

3. Designation:

The mobile filter unit is intended for oil maintenance on hydraulic systems.
The area of application comprises:
- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to bypass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability.The transporting trolley makes it possible to move close up to confined locations with difficult access, and to fix the accessories (such as hoses and the connection cable) in a safe and r eliable manner.
Oil flowing out of the suction and/or discharge hose or the outflow openings is collected by the filter unit's oil trough, without causing any environmental damage. The suction hose DN 40 and the discharge hose DN 32 are approximately 2700 mm long inclusive of the lance.
The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 630.
Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 $\mu m_{(c)}$. The contamination level of the filter element can be read off from a pressure display in the cover of the filter.
At a pressure >2,5 bar (red area of the scale field), the filter element is contaminated and it must be replaced with a new filter element.
The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.
To protect against overpressure, the filter unit is fitted with a safety valve. Pressure setting about 4 bar.
The E-motor is made safe with a motor-protection-switch against overloading. At a working pressure > 4 bar, the motor-protection-switch cuts the E-motor out.
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when changing the fluid m edium.

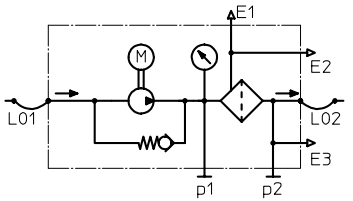
4. Technical data:

filter-fineness:	4, 5, 7 or 10 $\mu m_{(c)}$
oil temperature:	-5 bis +60°C
weight:	approx. 52 kg
operating medium:	hydraulic oil based on mineral oil from 10 mm²/s, other media on request

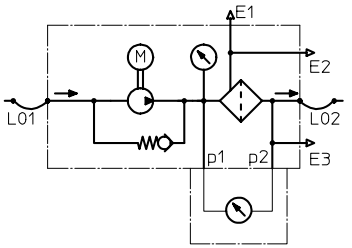
Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:

filter unit without clogging indicator



filter unit with visual clogging indic ator



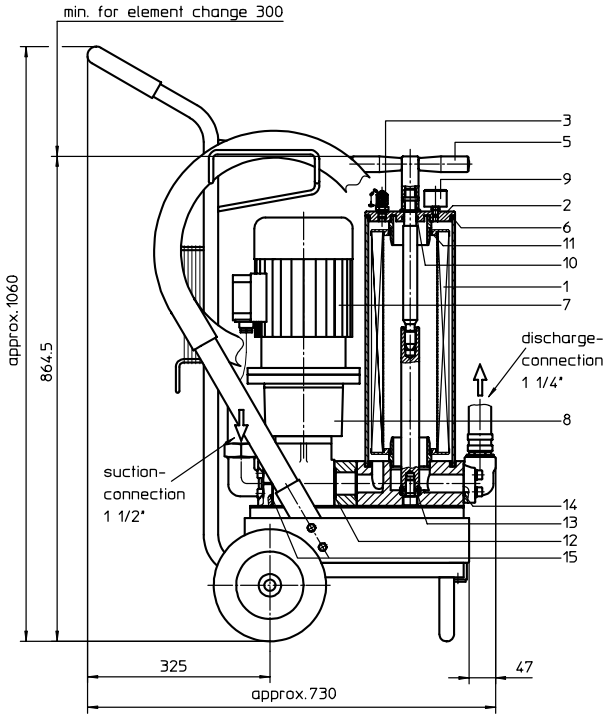
6. Test methods:

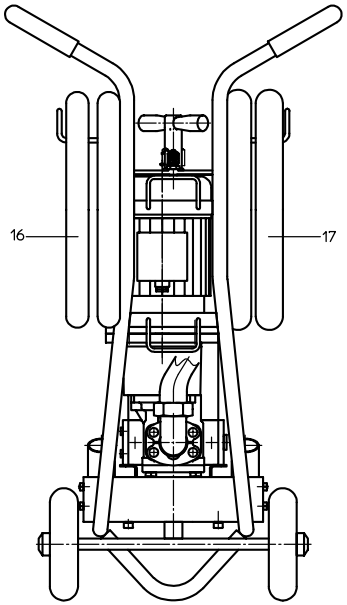
Filter elements are tested according to the following ISO sta ndards:

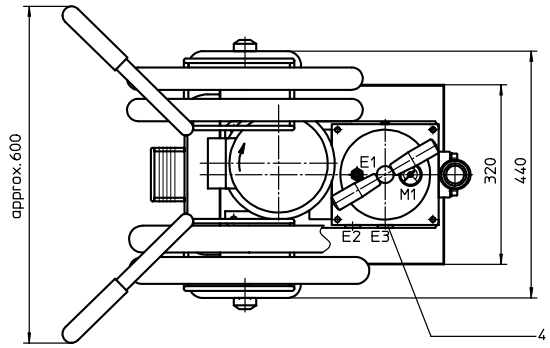
ISO 2941	Verification of colla pse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow character istics
ISO 16889	Multi-pass method for evaluating filtration performance

FILTER UNIT, mobile
Series UM 80 PN 4

Sheet No. **4015 F**







Assignment of connections and functions:

E1: venting mini-measuring connection, MA.1.St see sheet-no.1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the housing cover, dirt side

1. Type index:

1.1. Filter unit: (ordering example)

UM.	80.	6VG.	10.	B.	P.	-.	P04.	W06.	L01.	L05.	O
1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
UM = filter unit, mobile

2 **nominal size:** 80

3 **filter-material and filter-fineness:**
10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$, 1 VG = 4$\mu m_{(c)}$ Interpor fleece (glass fibre)
10 WVG = 10 $\mu m_{(c)}$, 3 WVG = 5 $\mu m_{(c)}$ Watersorp-filter element

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM), by agreement

7 **filter element specification:**
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **pump unit:**
P04 = pump unit 04, NG 80.50 (standard-pump unit)

9 **motor:** (W = alternating current motor)

motor	electrical connection		volume flow	max. viscosity	doc.-no.
W06 [1)]	230V	50Hz	71,0 l/min	10-400 mm²/s	43056-4
W06 [1)]	230V	60Hz	85,0 l/min	10-400 mm²/s	43056-4
W09 [1)]	110V	60Hz	85,0 l/min	10-400 mm²/s	43057-4

[1)] standard-motor

10 **suction connection 1 ½ " :** (see sheet-no. 31961-4)
L01 = hose-lance
L02 = hose-fitting-lance
L03 = hose-lance-protective filter
L04 = hose- fitting-lance-protective filter

11 **discharge connection 1 ¼ " :** (see sheet-no. 31961-4)
L05 = hose-lance
L06 = hose-fitting-lance

12 **clogging indicator at M1:**
- = without
O = visual, 2,5 bar

1.2. Filter element: (ordering example)

01NR.	630.	6VG.	10.	B.	P.	-
1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 630

3 - 7 see type index-filter unit

Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

Changes of measures and design are subject to alteration!

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2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 630	
2	housing cover	1	30600-3	315492
3	mini-measuring connection	1	MA.1.ST	305453
4	screw plug	2	G ½	304678
5	straining screw	1	30595-3	316312
6	O-ring	1	140 x 6	315392 (NBR)
7	electric motor	1	according to type index	
8	pump unit P04	1	NG 80.50	317139
9	clogging indicator (series)	1	visual ∅ 40	315452
10	O-ring	1	22 x 3	304387 (NBR)
11	O-ring	2	70 x 4	306253 (NBR)
12	O-ring	2	45 x 3	304991 (NBR)
13	O-ring	1	18 x 3	304359 (NBR)
14	O-ring	1	37,69 x 3,53	304353 (NBR)
15	O-ring	1	47,22 x 3,53	305078 (NBR)
16	suction hose 1 ½ “	1	according to type index	
17	discharge hose 1 ¼ “	1	according to type index	

3. Designation:

The mobile filter unit is intended for oil maintenance on hydraulic systems.
The area of application comprises:
- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability.The transporting trolley makes it possible to move close up to confined locations with difficult access, and to fix the accessories (such as hoses and the connection cable) in a safe and r eliable manner.
Oil flowing out of the suction and/or discharge hose or the outflow openings is collected by the filter unit’s oil trough, without causing any environmental damage. The suction hose DN 40 and the discharge hose DN 32 are approximately 2700 mm long inclusive of the lance.
The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 630.
Depending on the customer’s wishes, the filter fineness is either 4, 5, 7 or 10 $\mu m_{(c)}$. The contamination level of the filter element can be read off from a pressure display in the cover of the filter.
At a pressure >2,5 bar (red area of the scale field), the filter element is contaminated and it must be replaced with a new filter element.
The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.
To protect against overpressure, the filter unit is fitted with a safety valve. Pressure setting about 4 bar.
The E-motor is made safe with a motor-protection-switch against overloading. At a working pressure > 4 bar, the motor-protection-switch cuts the E-motor out.
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when changing the fluid m edium.

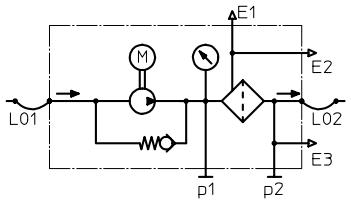
4. Technical data:

filter-fineness:	4, 5, 7 or 10 $\mu m_{(c)}$
oil temperature:	-5 bis +60°C
weight:	approx. 73 kg
operating medium:	hydraulic oil based on mineral oil from 10 mm²/s, other media on request

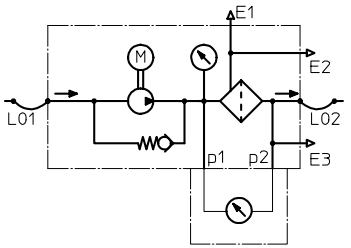
Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:

filter unit without clogging indic ator



filter unit with visual clogging indic ator



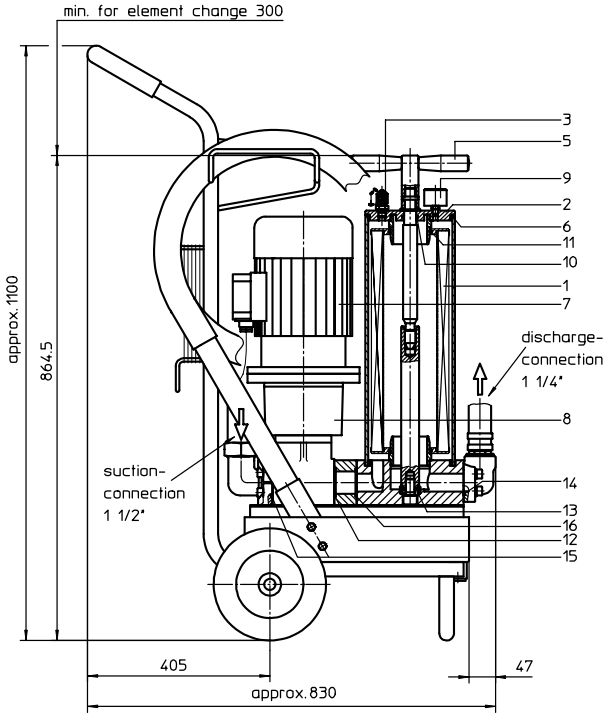
6. Test methods:

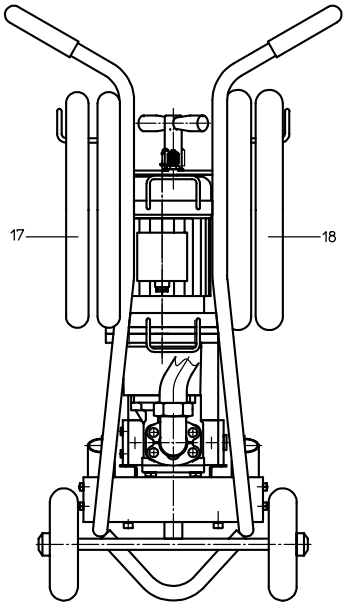
Filter elements are tested according to the following ISO sta ndards:

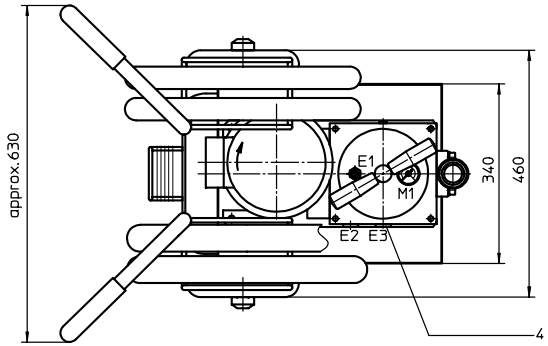
ISO 2941	Verification of colla pse/burst resistance
ISO 2942	Verification of fabrication integ rity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow character istics
ISO 16889	Multi-pass method for evaluating filtration performance

FILTER UNIT, mobile
Series UM 125 PN 4

Sheet No. **4026**







Assignment of connections and functions:

E1: venting mini-measuring connection, MA.1.St see sheet-no.1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the housing cover, dirt side

1. Type index:

1.1. Filter unit: (ordering example)

UM.	125.	6VG.	10.	B.	P.	-.	P79.	D08	L01.	L05.	O
1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
UM = filter unit, mobile

2 **nominal size:** 125

3 **filter-material and filter-fineness:**
10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$, 1 VG = 4$\mu m_{(c)}$ Interpor fleece (glass fibre)
10 WVG = 10 $\mu m_{(c)}$, 3 WVG = 5 $\mu m_{(c)}$ Watersorp-filter element

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM), by agreement

7 **filter element specification:**
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **pump unit:**
P79 = pump unit 79, NG 125.80 (standard-pump unit)

9 **motor:** (D = rotary current motor)

motor	electrical connection		volume flow	max. viscosity	doc.-no.
D08 [1)]	400/690V	50Hz	115,0 l/min	10-2000 mm²/s	42744-4
D08 [1)]	460/790V	60Hz	135,0 l/min	10-2000 mm²/s	42744-4

[1)] standard-motor

10 **suction connection 1 ½ " :** (see sheet-no. 31961-4)
L01 = hose-lance
L02 = hose-fitting-lance
L03 = hose-lance-protective filter
L04 = hose- fitting-lance-protective filter

11 **discharge connection 1 ¼ " :** (see sheet-no. 31961-4)
L05 = hose-lance
L06 = hose-fitting-lance

12 **clogging indicator at M1:**
- = without
O = visual, 2,5 bar

1.2. Filter element: (ordering example)

01NR.	630.	6VG.	10.	B.	P.	-
1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 630

3 - 7 see type index-filter unit

Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

Changes of measures and design are subject to alteration!

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2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 630	
2	housing cover	1	30600-3	315492
3	mini-measuring connection	1	MA.1.ST	305453
4	screw plug	2	G ½	304678
5	straining screw	1	30595-3	316312
6	O-ring	1	140 x 6	315392 (NBR)
7	electric motor	1	according to type index	
8	pump unit P79	1	NG 125.80	337423
9	clogging indicator (series)	1	optisch ∅ 40	315452
10	O-ring	1	22 x 3	304387 (NBR)
11	O-ring	2	70 x 4	306253 (NBR)
12	O-ring	2	56,75 x 3,53	306035 (NBR)
13	O-ring	1	18 x 3	304359 (NBR)
14	O-ring	1	37,69 x 3,53	304353 (NBR)
15	O-ring	1	56,75 x 3,53	306035 (NBR)
16	O-ring	1	45 x 3	304991 (NBR)
16	suction hose 1 ½ "	1	according to type index	
17	discharge hose 1 ¼ "	1	according to type index	

3. Designation:

The mobile filter unit is intended for oil maintenance on hydraulic systems.
The area of application comprises:
- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability.The transporting trolley makes it possible to move close up to confined locations with difficult access, and to fix the accessories (such as hoses and the connection cable) in a safe and r eliable manner.
Oil flowing out of the suction and/or discharge hose or the outflow openings is collected by the filter unit's oil trough, without causing any environmental damage. The suction hose DN 40 and the discharge hose DN 32 are approximately 2700 mm long inclusive of the lance.
The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 630.
Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 $\mu m_{(c)}$. The contamination level of the filter element can be read off from a pressure display in the cover of the filter.
At a pressure >2,5 bar (red area of the scale field), the filter element is contaminated and it must be replaced with a new filter element.
The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.
To protect against overpressure, the filter unit is fitted with a safety valve. Pressure setting about 4 bar.
The E-motor is made safe with a motor-protection-switch against overloading. At a working pressure > 4 bar, the motor-protection-switch cuts the E-motor out.
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when changing the fluid m edium.

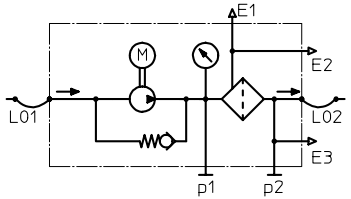
4. Technical data:

filter-fineness:	4, 5, 7 or 10 $\mu m_{(c)}$
oil temperature:	-5 bis +60°C
weight:	approx. 85 kg
operating medium:	hydraulic oil based on mineral oil from 10 mm²/s, other media on request

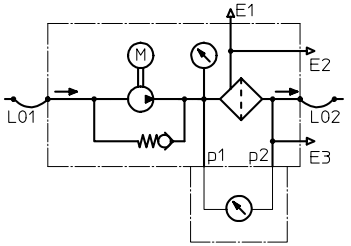
Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:

filter unit without clogging indic ator



filter unit with visual clogging indic ator



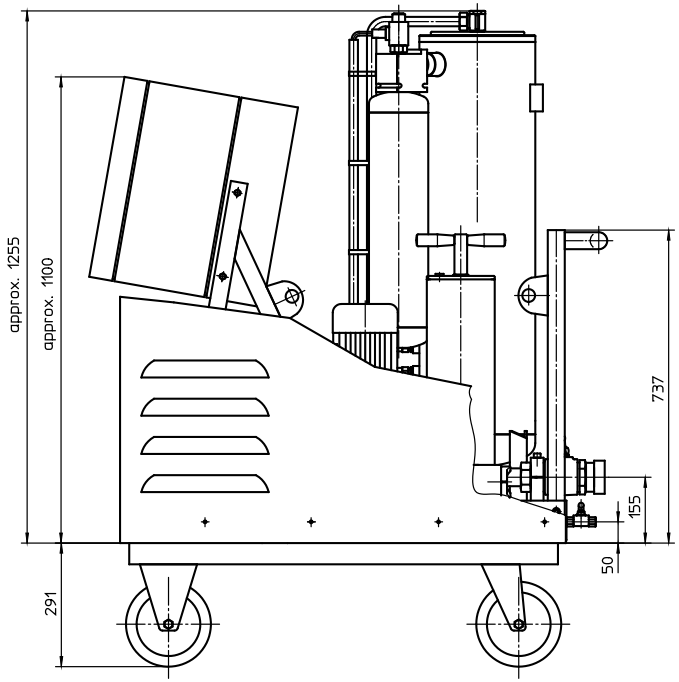
6. Test methods:

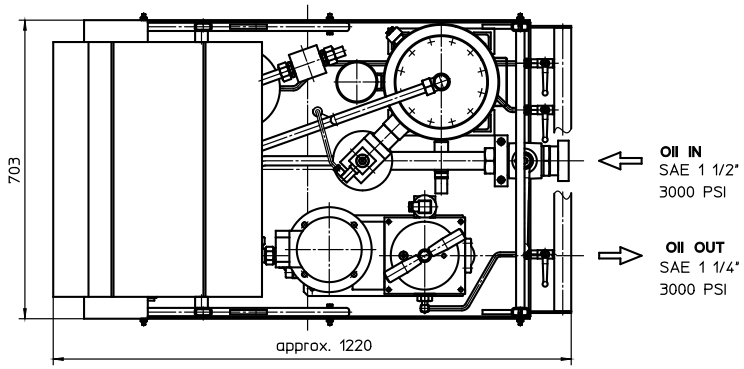
Filter elements are tested according to the following ISO sta ndards:

ISO 2941	Verification of colla pse/burst resistance
ISO 2942	Verification of fab rication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow character istics
ISO 16889	Multi-pass method for evaluating filtration performance

FLUID PURIFIER SYSTEMS, mobile
Series IFPM 21

Sheet No. **4035 F**





1. Type index:

1.1. Fluid Purifier Systems: (ordering example)

IFPM.	21.	6VG.	10.	B.	V.	-.	P21.	D23.	VP01.	VS1.	A
1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
IFPM = INTERNORMEN-Fluid Purifier Systems, mobile

2 **nominal size:** 21

3 **filter-material and filter-fineness:**
10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$, 1 VG = 4 $\mu m_{(c)}$ Interpor fleece (glass fibre)

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
V = Viton (FPM)

7 **filter element specification:**
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **pump unit:**
P21 = pump unit 21, NG 20.16

9 **motor:**
D23 = B5/80/6.0,55.1000.230/400.D.50.1.-.-.-
rotary current motor 230/400 V, 50 Hz, approx. 950 rpm, 0,55 KW, protection IP 55

10 **vacuum pump:**
VP01 = vacuum pump 01, 230/400 V, 3-Phase, 50 Hz, 0,55 KW, protection IP 55

11 **clogging sensor:**
VS1 = VS1.1,5.V.-.GS.B.E electronical, at p_1 and p_2, 1,5 bar, see sheet-no. 1607

12 **supply voltage:**
A = 400V, 3-phase (delivery with CEE plug for alternating current)
B = 480V, 3- phase
C = 208V, 3- phase
D = customised

1.2. Filter element: (ordering example)

01NR.	630.	6VG.	10.	B.	V.	-
1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 630

3 - 7 see type index- INTERNORMEN-Fluid Purifier Systems

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2. Description:

2.1. Effects of Water Contamination:

Water is one of the most common contaminants and the second most destructive besides particulate contamination. Some of the most damaging problems water contamination can cause are:

- Fluid breakdown
  - Additive depletion
  - Reduction of the lubrication properties of the fluid
  - Oil oxidation
- Internal corrosion
- Abrasive wear in system components
- Reduced dielectric strength

2.2. Principle of Operation:

Contaminated fluid is drawn into the Internormen Fluid Purifier System by a vacuum of -0,6 to -0,9 bars.
The fluid is passing a heater which is raising the temperature in order to increase the filtration speed.
The fluid then enters through a vacuum actuated inlet valve into the vacuum chamber, where it is then allowed to cascade over the dispersal elements to break it into droplets in the tower. This increases the exposed surface area of the fluid and converts the water into vapour form, which is drawn out of the tower with a vacuum pump through the condenser to the drainage reservoir for drain off. The water-free fluid is drawn out of the tower by a hydraulic pump and sent through a high efficiency particulate removal filter back to the system.
The installed water sensor allows a permanent control of the saturation of the fluid.

3. Technical data:

Inlet connection:	1 ½“ SAE-flange 3000 PSI
Outlet connection:	1 ¼ “ SAE-flange 3000 PSI
Circulation flow rate:*	20 l/min
Operating vacuum:**	-0,6 to -0,9 bars
E-motor hydraulic pump:	0,55 KW, 3-phase 230/400V, 50 Hz
E-motor vacuum pump:	0,55 KW, 3-phase 230/400V, 50 Hz
Heater capacity:	3000 Watt
Filter type:	NF 631
Seal material:	Viton (FPM)
Maximum viscosity:	700 mm²/s
Water extraction rate:***	75 l/Day
Ambient temperature:	0°C to +40°C
Fluid temperature:	10°C to +80°C
weight:	approx. 315 kg

* Viscosity of the liquid of 32 mm²/s
** Operating vacuum adapted to the specific application
*** Initial rate purifying mineral oil at 32 mm²/s, 40°C and with 6% water content

4. Test methods:

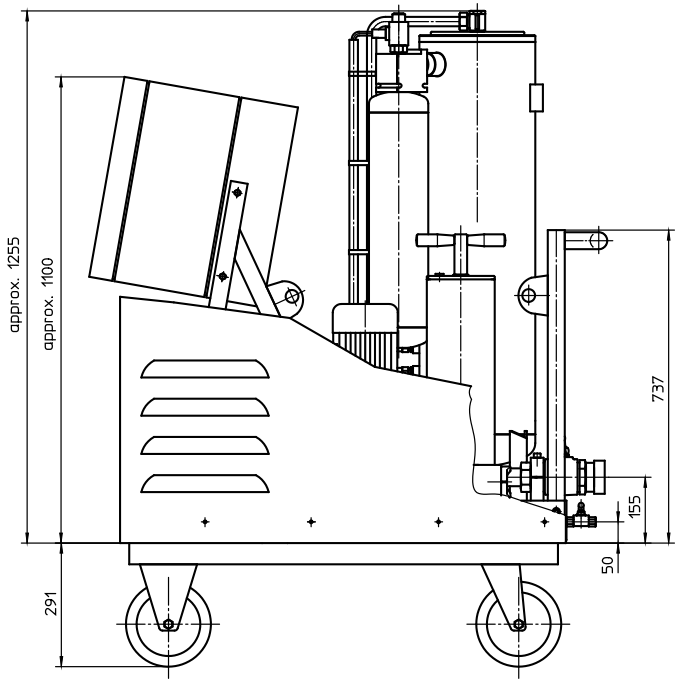
Filter elements are tested according to the following ISO standards:

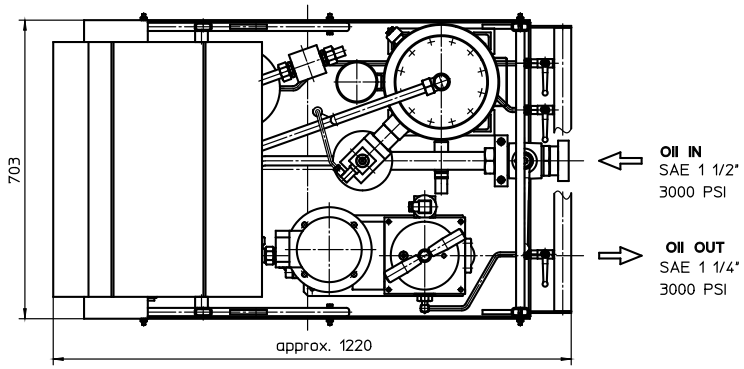
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

Note: Spare parts see manual and maintenance instruction „Purifier“.

FLUID PURIFIER SYSTEMS, mobile
Series IFPM 31

Sheet No.
4036 E





1. Type index:

1.1. Fluid Purifier Systems: (ordering example)

IFPM.	31.	6VG.	10.	B.	V.	-.	P22.	D27.	VP01.	VS1.	A
1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
IFPM = INTERNORMEN-Fluid Purifier Systems, mobile

2 **nominal size:** 31

3 **filter-material and filter-fineness:**
10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$, 1 VG = 4 $\mu m_{(c)}$ Interpor fleece (glass fibre)

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
V = Viton (FPM)

7 **filter element specification:**
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **pump unit:**
P22 = pump unit 22, NG 60.40

9 **motor:**
D27 = B5/100/8.0,75.750.230/400.D.50.1.-.-.-
rotary current motor 230/400 V, 50 Hz, approx. 710 rpm, 0,75 KW, protection IP 55

10 **vacuum pump:**
VP01 = vacuum pump 01, 230/400 V, 3- phase, 50 Hz, 0,55 KW, protection IP 55

11 **clogging sensor:**
VS1 = VS1.1,5.V.-.GS.B.E electronical, at p_1 and p_2, 1,5 bar, see sheet-no. 1607

12 **supply voltage:**
A = 400V, 3-phase (delivery with CEE plug for alternating current)
B = 480V, 3- phase
C = 208V, 3- phase
D = customised

1.2. Filter element: (ordering example)

01NR.	630.	6VG.	10.	B.	V.	-
1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 630

3 - 7 see type index- INTERNORMEN-Fluid Purifier Systems

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2. Description:

2.1. Effects of Water Contamination:

Water is one of the most common contaminants and the second most destructive besides particulate contamination. Some of the most damaging problems water contamination can cause are:

- Fluid breakdown
  - Additive depletion
  - Reduction of the lubrication properties of the fluid
  - Oil oxidation
- Internal corrosion
- Abrasive wear in system components
- Reduced dielectric strength

2.2. Principle of Operation:

Contaminated fluid is drawn into the Internormen Fluid Purifier System by a vacuum of -0,6 to -0,9 bars.
The fluid is passing a heater which is raising the temperature in order to increase the filtration speed.
The fluid then enters through a vacuum actuated inlet valve into the vacuum chamber, where it is then allowed to cascade over the dispersal elements to break it into droplets in the tower. This increases the exposed surface area of the fluid and converts the water into vapour form, which is drawn out of the tower with a vacuum pump through the condenser to the drainage reservoir for drain off. The water-free fluid is drawn out of the tower by a hydraulic pump and sent through a high efficiency particulate removal filter back to the system.
The installed water sensor allows a permanent control of the saturation of the fluid.

3. Technical data:

Inlet connection:	1 ½“ SAE-flange 3000 PSI
Outlet connection:	1 ¼ “ SAE-flange 3000 PSI
Circulation flow rate:*	30 l/min
Operating vacuum:**	-0,6 to -0,9 bars
E-motor hydraulic pump:	0,75 KW, 3-phase 230/400V, 50 Hz
E-motor vacuum pump:	0,55 KW, 3-phase 230/400V, 50 Hz
Heater capacity:	3000 Watt
Filter type:	NF 631
Seal material:	Viton (FPM)
Maximum viscosity:	700 mm²/s
Water extraction rate:***	105 l/Day
Ambient temperature:	0°C to +40°C
Fluid temperature:	10°C to +80°C
weight:	approx. 325 kg

* Viscosity of the liquid of 32 mm²/s
** Operating vacuum adapted to the specific application
*** Initial rate purifying mineral oil at 32 mm²/s, 40°C and with 6% water content

4. Test methods:

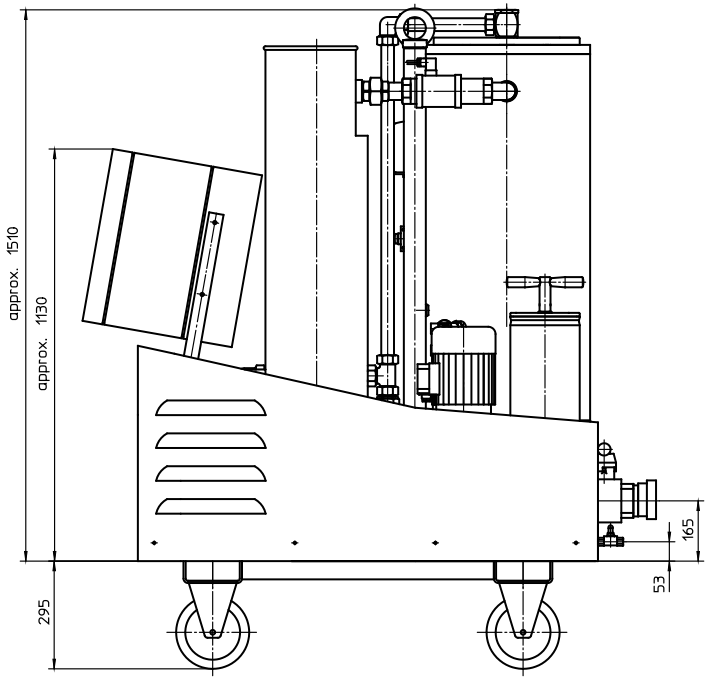
Filter elements are tested according to the following ISO standards:

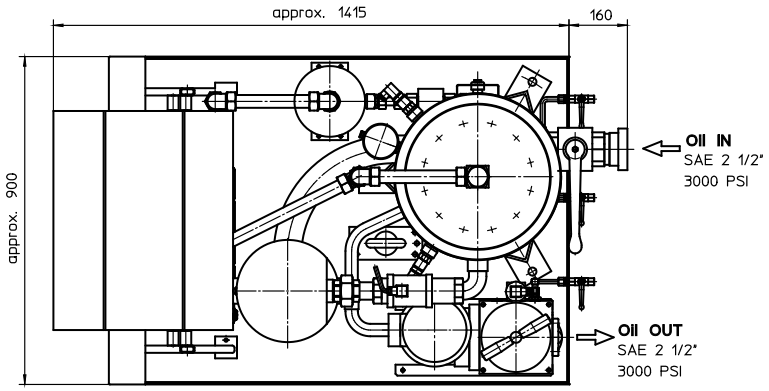
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

Note: Spare parts see manual and maintenance instruction „Purifier“.

FLUID PURIFIER SYSTEMS, mobile
Series IFPM 71

Sheet No. **4046 D**





1. Type index:

1.1. Fluid Purifier Systems: (ordering example)

IFPM.	71.	6VG.	10.	B.	V.	-.	P23.	D01.	VP07.	VS1.	A
1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
IFPM = INTERNORMEN-Fluid Purifier Systems, mobile

2 **nominal size:** 71

3 **filter-material and filter-fineness:**
10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$, 1 VG = 4 $\mu m_{(c)}$ Interpor fleece (glass fibre)

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
V = Viton (FPM)

7 **filter element specification:**
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **pump unit:**
P23 = pump unit 23, NG 80.50

9 **motor:**
D01 = B5/90L/4.1,5.1500.230/400.D.50.1.-.-.-
rotary current motor 230/400 V, 50 Hz, approx. 1450 rpm, 1,5 KW, protection IP 55

10 **vacuum pump:**
VP07 = vacuum pump 07, 230/400 V, 3-phase, 50 Hz, 1,25 KW, protection IP 55

11 **clogging sensor:**
VS1 = VS1.1,5.V.-.GS.B.E electronical, at p_1 and p_2, 1,5 bar, see sheet-no. 1607

12 **supply voltage:**
A = 400V, 3-phase (delivery with CEE plug for alternating current)
B = 480V, 3-phase
C = 208V, 3-phase
D = customised

1.2. Filter element: (ordering example)

01NR.	1000.	6VG.	10.	B.	V.	-
1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 1000

3 - 7 see type index- INTERNORMEN-Fluid Purifier Systems

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2. Description:

2.1. Effects of Water Contamination:

Water is one of the most common contaminants and the second most destructive besides particulate contamination. Some of the most damaging problems water contamination can cause are:

- Fluid breakdown
  - Additive depletion
  - Reduction of the lubrication properties of the fluid
  - Oil oxidation
- Internal corrosion
- Abrasive wear in system components
- Reduced dielectric strength

2.2. Principle of Operation:

Contaminated fluid is drawn into the Internormen Fluid Purifier System by a vacuum of -0,6 to -0,9 bars.
The fluid is passing a heater which is raising the temperature in order to increase the filtration speed.
The fluid then enters through a vacuum actuated inlet valve into the vacuum chamber, where it is then allowed to cascade over the dispersal elements to break it into droplets in the tower. This increases the exposed surface area of the fluid and converts the water into vapour form, which is drawn out of the tower with a vacuum pump through the condenser to the drainage reservoir for drain off. The water-free fluid is drawn out of the tower by a hydraulic pump and sent through a high efficiency particulate removal filter back to the system.
The installed water sensor allows a permanent control of the saturation of the fluid.

3. Technical data:

Inlet connection:	2 ½“ SAE-flange 3000 PSI
Outlet connection:	2 ½“ SAE-flange 3000 PSI
Circulation flow rate:*	70 l/min
Operating vacuum:**	-0,6 to -0,9 bars
E-motor hydraulic pump:	1,50 KW, 3-phase 230/400V, 50 Hz
E-motor vacuum pump:	1,25 KW, 3-phase 230/400V, 50 Hz
Heater capacity:	4000 Watt
Filter type:	NF 1000
Seal material:	Viton (FPM)
Maximum viscosity:	700 mm²/s
Water extraction rate:***	315 l/Day
Ambient temperature:	0°C to +40°C
Fluid temperature:	10°C to +80°C
weight:	approx. 590 kg

* Viscosity of the liquid of 32 mm²/s
** Operating vacuum adapted to the specific application
*** Initial rate purifying mineral oil at 32 mm²/s, 40°C and with 6% water content

4. Test methods:

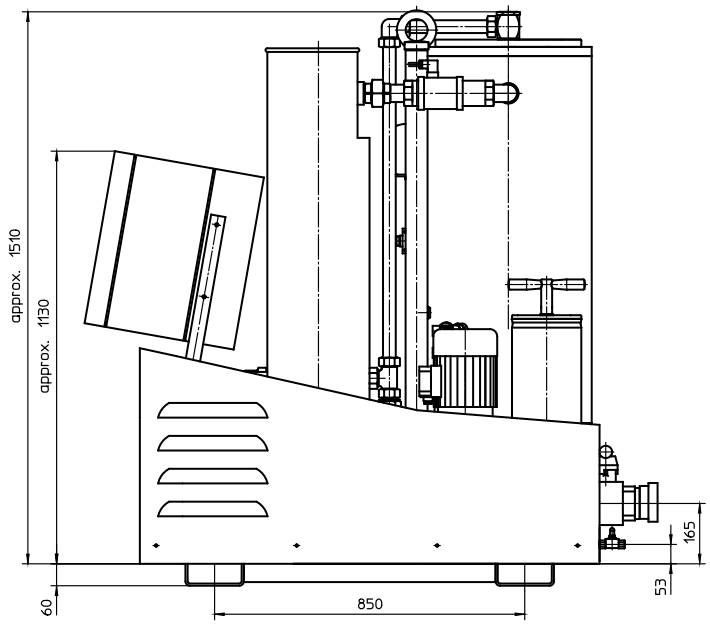
Filter elements are tested according to the following ISO standards:

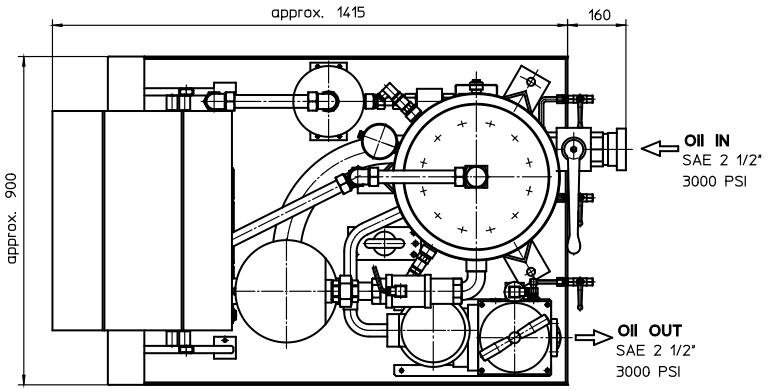
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

Note: Spare parts see manual and maintenance instruction „Purifier“.

FLUID PURIFIER SYSTEMS, stationary
Series IFPS 71

Sheet No. **4045 E**





1. Type index:

1.1. Fluid Purifier Systems: (ordering example)

IFPS.	71.	6VG.	10.	B.	V.	-.	P23.	D01.	VP07.	VS1.	A
1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
IFPS = INTERNORMEN-Fluid Purifier Systems, stationary

2 **nominal size:** 71

3 **filter-material and filter-fineness:**
10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$, 1 VG = 4 $\mu m_{(c)}$ Interpor fleece (glass fibre)

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
V = Viton (FPM)

7 **filter element specification:**
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **pump unit:**
P23 = pump unit 23, NG 80.50

9 **motor:**
D01 = B5/90L/4.1,5.1500.230/400.D.50.1.-.-.-
rotary current motor 230/400 V, 50 Hz, approx. 1450 rpm, 1,5 KW, protection IP 55

10 **vacuum pump:**
VP07 = vacuum pump 07, 230/400 V, 3-phase, 50 Hz, 1,25 KW, protection IP 55

11 **clogging sensor:**
VS1 = VS1.1,5.V.-.GS.B.E electronical, at p_1 and p_2, 1,5 bar, see sheet-no. 1607

12 **supply voltage:**
A = 400V, 3-phase (delivery with CEE plug for alternating current)
B = 480V, 3-phase
C = 208V, 3-phase
D = customised

1.2. Filter element: (ordering example)

01NR.	1000.	6VG.	10.	B.	V.	-
1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 1000

3 - 7 see type index- INTERNORMEN-Fluid Purifier Systems

Changes of measures and design are subject to alteration!

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2. Description:

2.1. Effects of Water Contamination:

Water is one of the most common contaminants and the second most destructive besides particulate contamination. Some of the most damaging problems water contamination can cause are:

- Fluid breakdown
  - Additive depletion
  - Reduction of the lubrication properties of the fluid
  - Oil oxidation
- Internal corrosion
- Abrasive wear in system components
- Reduced dielectric strength

2.2. Principle of Operation:

Contaminated fluid is drawn into the Internormen Fluid Purifier System by a vacuum of -0,6 to -0,9 bars.
The fluid is passing a heater which is raising the temperature in order to increase the filtration speed.
The fluid then enters through a vacuum actuated inlet valve into the vacuum chamber, where it is then allowed to cascade over the dispersal elements to break it into droplets in the tower. This increases the exposed surface area of the fluid and converts the water into vapour form, which is drawn out of the tower with a vacuum pump through the condenser to the drainage reservoir for drain off. The water-free fluid is drawn out of the tower by a hydraulic pump and sent through a high efficiency particulate removal filter back to the system.
The installed water sensor allows a permanent control of the saturation of the fluid.

3. Technical data:

Inlet connection:	2 ½“ SAE-flange 3000 PSI
Outlet connection:	2 ½“ SAE-flange 3000 PSI
Circulation flow rate:*	70 l/min
Operating vacuum:**	-0,6 to -0,9 bars
E-motor hydraulic pump:	1,50 KW, 3-phase 230/400V, 50 Hz
E-motor vacuum pump:	1,25 KW, 3-phase 230/400V, 50 Hz
Heater capacity:	4000 Watt
Filter type:	NF 1000
Seal material:	Viton (FPM)
Maximum viscosity:	700 mm²/s
Water extraction rate:***	315 l/Day
Ambient temperature:	0°C to +40°C
Fluid temperature:	10°C to +80°C
weight:	approx. 590 kg

* Viscosity of the liquid of 32 mm²/s
** Operating vacuum adapted to the specific application
*** Initial rate purifying mineral oil at 32 mm²/s, 40°C and with 6% water content

4. Test methods:

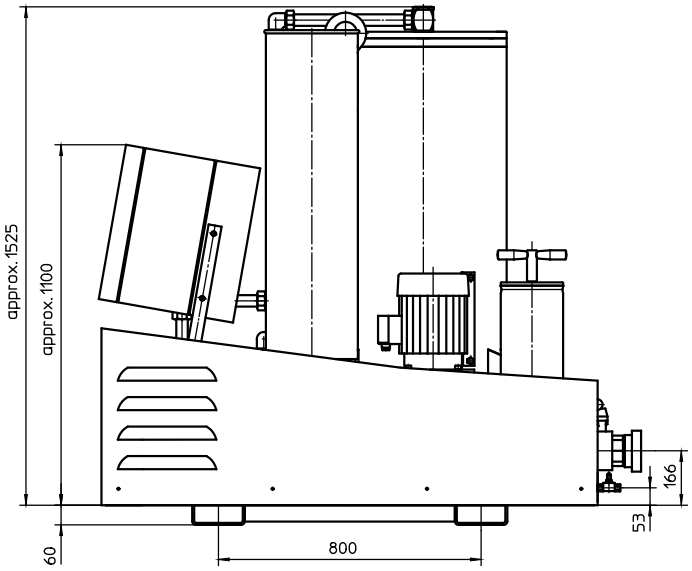
Filter elements are tested according to the following ISO standards:

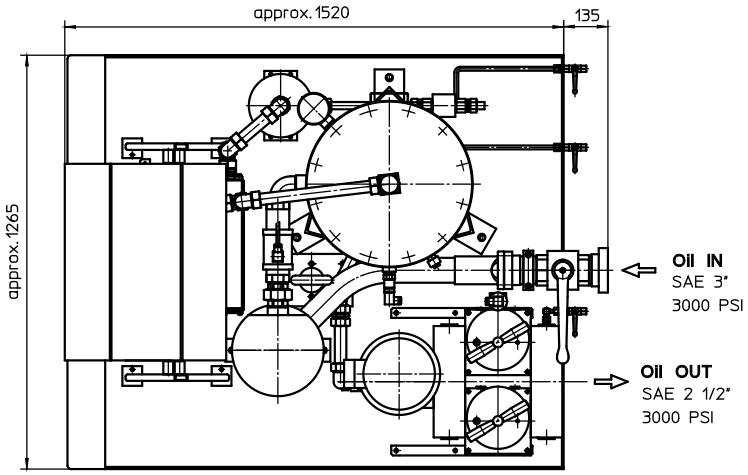
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

Note: Spare parts see manual and maintenance instruction „Purifier“.

FLUID PURIFIER SYSTEMS, stationary
Series IFPS 101

Sheet No. **4043 E**





1. Type index:

1.1. Fluid Purifier Systems: (ordering example)

IFPS.	101.	6VG.	10.	B.	V.	-.	P69.	D04.	VP04.	VS1.	A
1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
IFPS = INTERNORMEN-Fluid Purifier Systems, stationary

2 **nominal size:** 101

3 **filter-material and filter-fineness:**
10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$, 1 VG = 4 $\mu m_{(c)}$ Interpor fleece (glass fibre)

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
V = Viton (FPM)

7 **filter element specification:**
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **pump unit:**
P69 = pump unit 69, NG 125.80

9 **motor:**
D04 = B5/100L/4.2,2.1500.230/400.D.50.1.-.-.-
rotary current motor 230/400 V, 50 Hz, approx. 1420 rpm, 2,2 KW, protection IP 54

10 **vacuum pump:**
VP04 = vacuum pump 04, 230/400 V, 3-phase, 50 Hz, 1,8 KW, protection IP 54

11 **clogging sensor:**
VS1 = VS1.1,5.V.-.GS.B.E electronical, at p_1 and p_2, 1,5 bar, see sheet-no. 1607

12 **supply voltage:**
A = 400V, 3-phase (delivery with CEE plug for alternating current)
B = 480V, 3-phase
C = 208V, 3-phase
D = customised

1.2. Filter element: (ordering example)

01NR.	1000.	6VG.	10.	B.	V.	-
1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 1000

3 - 7 see type index- INTERNORMEN-Fluid Purifier Systems

Changes of measures and design are subject to alteration!

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2. Description:

2.1. Effects of Water Contamination:

Water is one of the most common contaminants and the second most destructive besides particulate contamination. Some of the most damaging problems water contamination can cause are:

- Fluid breakdown
  - Additive depletion
  - Reduction of the lubrication properties of the fluid
  - Oil oxidation
- Internal corrosion
- Abrasive wear in system components
- Reduced dielectric strength

2.2. Principle of Operation:

Contaminated fluid is drawn into the Internormen Fluid Purifier System by a vacuum of -0,6 to -0,9 bars.
The fluid is passing a heater which is raising the temperature in order to increase the filtration speed.
The fluid then enters through a vacuum actuated inlet valve into the vacuum chamber, where it is then allowed to cascade over the dispersal elements to break it into droplets in the tower. This increases the exposed surface area of the fluid and converts the water into vapour form, which is drawn out of the tower with a vacuum pump through the condenser to the drainage reservoir for drain off. The water-free fluid is drawn out of the tower by a hydraulic pump and sent through a high efficiency particulate removal filter back to the system.
The installed water sensor allows a permanent control of the saturation of the fluid.

3. Technical data:

Inlet connection:	3“ SAE-flange 3000 PSI
Outlet connection:	2 1/2“ SAE-flange 3000 PSI
Circulation flow rate:	100 l/min
Operating vacuum:*	-0,6 to -0,9 bars.
E-motor hydraulic pump:	2,2 KW, 3-phase 230/400V, 50 Hz
E-motor vacuum pump:	1,8 KW, 3-phase 230/400V, 50 Hz
Heater capacity:	8000 Watt
Filter type:	2x NF 1000
Seal material:	Viton (FPM)
Maximum viscosity:	700 mm²/s
Water extraction rate:**	450 l/Day
Ambient temperature:	0°C to +40°C
Fluid temperature:	10°C to +80°C
Weight:	approx. 790 kg

* Viscosity of the liquid of 32 mm²/s
** Operating vacuum adapted to the specific application
*** Initial rate purifying mineral oil at 32 mm²/s, 40°C and with 6% water content

4. Test methods:

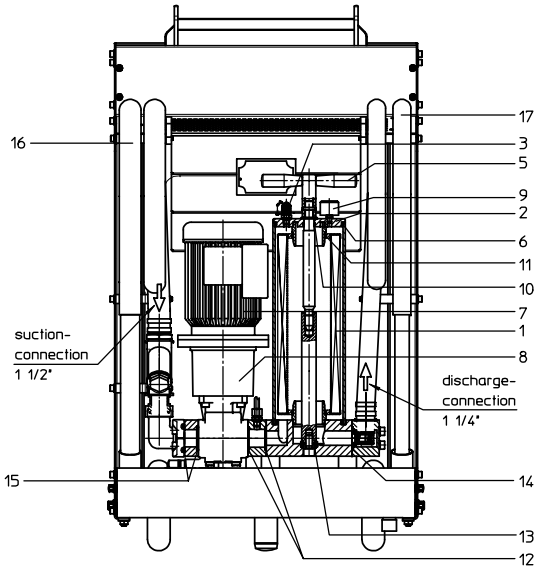
Filter elements are tested according to the following ISO standards:

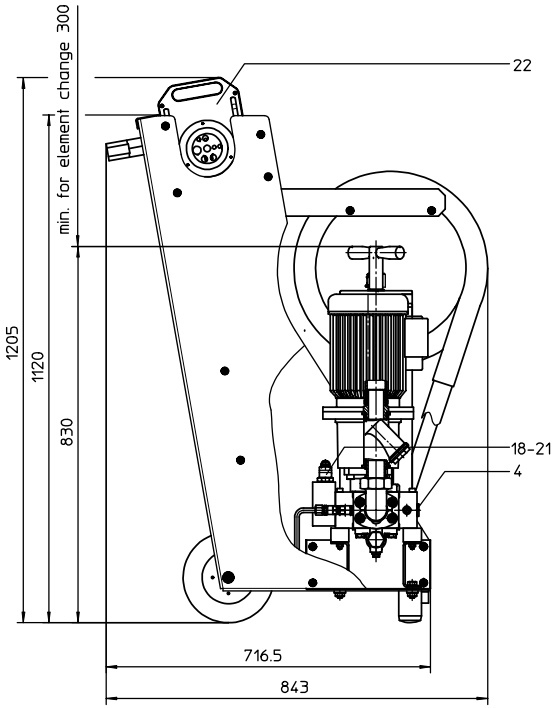
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

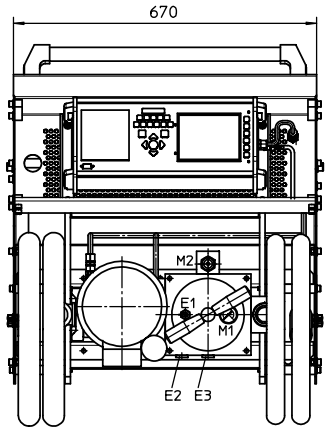
Note: Spare parts see manual and maintenance instruction „Purifier“.

FILTER UNIT, mobile for contamination control
Series UMCC 40 PN 8

Sheet No. **4033**







Assignment of connections and functions:

E1: venting mini-measuring connection, MA.1.St see sheet-no.1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the housing cover, dirt side
manometer 0-16 bar
M2: measure connection at filter housing, dirt side
p_1 = dirt side
p_2 = clean side

1. Type index:

1.1. Filter unit: (ordering example)

UMCC.	40.	6VG.	10.	B.	P.	-.	P30.	W06.	L03.	L28.	AOR.	CCS2
1	2	3	4	5	6	7	8	9	10	11	12	13

1 **series:**
UMCC = filter unit, mobile for contamination control

2 **nominal size:** 40

3 **filter-material and filter- fineness:**
10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$, 1 VG = 4 $\mu m_{(c)}$ Interpor fleece (glass fibre)
10 WVG = 10 $\mu m_{(c)}$, 3 WVG = 5 $\mu m_{(c)}$ Watersorp-filter element

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM), by agreement

7 **filter element specification:**
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **pump unit:**
P30 = pump unit 30, NG 40.25 (standard-pump unit)

9 **motor:** (W = alternating current motor)

motor	electrical connection		volume flow	max. viscosity	doc.-no.
W06 [1]	230V	50Hz	35,5 l/min	400 mm²/s	43056-4
W09 [1]	110V	60Hz	42,5 l/min	400 mm²/s	43057-4

[1] standard-motor

10 **suction connection 1 $^1/_2$" :** (see sheet-no. 31961-4)
L03 = hose-lance-protective filter
L04 = hose-fitting-lance-protective filter

11 **discharge connection 1 $^1/_4$" :** (see sheet-no. 40572-4)
L28 = hose-lance
L29 = hose-fitting-lance

12 **clogging indicator at M2:**
AOR = visual, Δp 2,5 bar, see sheet-no. 1606
AOC = visual, Δp 2,5 bar, see sheet-no. 1606

13 **contamination control system:**
- = without
CCS2 = with contamination control system CCS2

1.2. Filter element: (ordering example)

01NR.	630.	6VG.	10.	B.	P.	-
1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 630

3 - 7 see type index-filter unit

Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

Changes of measures and design are subject to alteration!

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2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 630	
2	housing cover	1	30600-3	315492
3	mini-measuring connection	1	MA.1.ST	305453
4	screw plug	2	G ½	304678
5	straining screw	1	30595-3	316312
6	Oring	1	140 x 6	315392 (NBR)
7	electric motor	1	according to type index	
8	pump unit P30	1	NG 40.25	326584
9	manometer	1	visual ∅ 40	317847
10	O-ring	1	22 x 3	304387 (NBR)
11	O-ring	2	70 x 4	306253 (NBR)
12	O-ring	2	45 x 3	304991 (NBR)
13	O-ring	1	18 x 3	304359 (NBR)
14	O-ring	1	45 x 3	304991 (NBR)
15	O-ring	2	47,22 x 3,53	305078 (NBR)
16	suction hose 1 ½"	1	according to type index	
17	discharge hose 1 ¼"	1	according to type index	
18	clogging indicator, visual	1	AOR or AOC	see sheet-no. 1606
19	O-ring	1	15 x 1,5	315357 (NBR)
20	O-ring	1	22 x 2	304708 (NBR)
21	O-ring	2	14 x 2	304342 (NBR)
22	contamination control system	1	CCS2	320595

3. Designation:

The mobile filter unit is intended for oil maintenance on hydraulic systems.
The area of application comprises:
- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

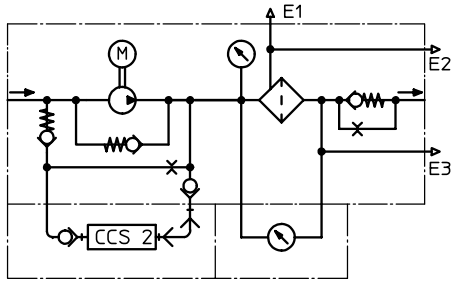
The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability.The transporting trolley makes it possible to move close up to confined locations with difficult access, and to fix the accessories (such as hoses and the connection cable) in a safe and r eliable manner.
Oil flowing out of the suction and/or discharge hose or the outflow openings is collected by the filter unit's oil trough, without cauing any environmental damage.
The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 630.
Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 µm $_{(c)}$.
At a pressure difference > 2,5 bar , the element is polluted and has to be removed with a new element .
The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.
To protect against overpressure, the filter unit is fitted with a safety valve. Pressure setting about 8 bar.
The E-motor is made safe with a motor-protection-switch against overloading. At a working pressure > 8 bar, the motor-protection-switch cuts the E-motor out.
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when changing the fluid m edium.
In order to measure the contamination class of the oil taken in, there is a connection for the electronic particle counter CCS 2 ahead the filter. The CCS 2 is supplied complete with case and extra connection hoses and can also be used separately. When measuring at the mobile filter unit please consider that a change of the measured contamination classes is shown after an adequate operation time only, depending on the total oil volume and its mixing with the filtered oil.
To protect the pump a cleanable coarse filter made of metal wire mesh with mesh size 250 µm is being placed in the suction h ose.

4. Technical data:

filter-fineness:	4, 5, 7 or 10 µm$_{(c)}$
oil temperature:	-5°C to +60°C
weight:	approx. 113 kg
operating medium:	hydraulic oil based on mineral oil from 10 mm²/s, other media on request

Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbol:



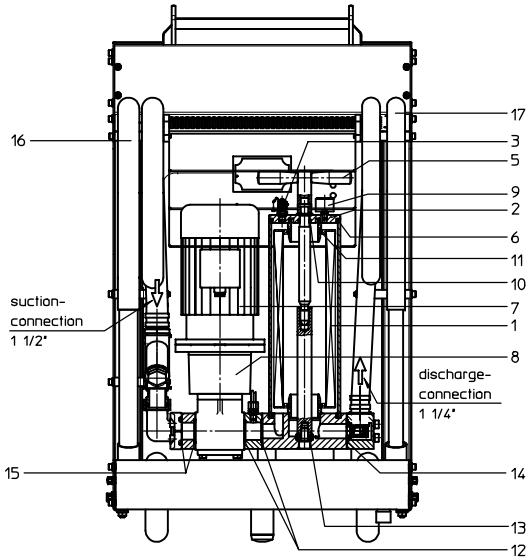
6. Test methods:

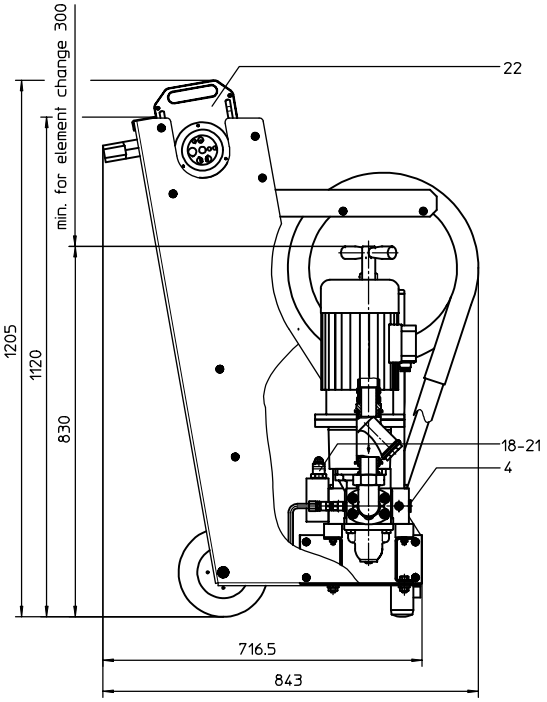
Filter elements are tested according to the following ISO sta ndards:

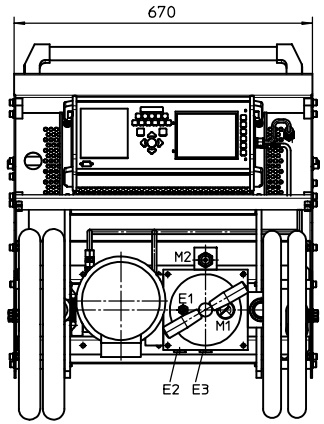
ISO 2941	Verification of colla pse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow character istics
ISO 16889	Multi-pass method for evaluating filtration performance

FILTER UNIT, mobile for contamination control
Series UMCC 80 PN 8

Sheet No. **4032 B**







Assignment of connections and functions:

E1: venting mini-measuring connection, MA.1.St see sheet-no.1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the housing cover, dirt side manometer 0-16 bar
M2: measure connection at filter housing, dirt side
p_1 = dirt side
p_2 = clean side

1. Type index:

1.1. Filter unit: (ordering example)

UMCC.	80.	6VG.	10.	B.	P.	-.	P28.	W18.	L03.	L28.	AOR.	CCS2
1	2	3	4	5	6	7	8	9	10	11	12	13

1 **series:**
UMCC = filter unit, mobile for contamination control

2 **nominal size:** 80

3 **filter-material and filter- fineness:**
10 VG = 10 µm$_{(c)}$, 6 VG = 7 µm$_{(c)}$, 3 VG = 5 µm$_{(c)}$, 1 VG = 4 µm$_{(c)}$ Interpor fleece (glass fibre)
10 WVG = 10 µm$_{(c)}$, 3 WVG = 5 µm$_{(c)}$ Watersorp-filter element

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM), by agreement

7 **filter element specification:**
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **pump unit:**
P28 = pump unit 28, NG 80.50 (standard-pump unit)

9 **motor:** (W = alternating current motor)

motor	electrical connection		volume flow	max. viscosity	doc.-no.
W18 [1)]	230V	50Hz	71,0 l/min	400 mm²/s	43060-4
W06	230V	50Hz	71,0 l/min	100 mm²/s	43056-4

[1)] standard-motor

10 **suction connection 1 $^1/_2$" :** (see sheet-no. 31961-4)
L03 = hose-lance-protective filter
L04 = hose-fitting-lance-protective filter

11 **discharge connection 1 $^1/_4$" :** (see sheet-no. 40572-4)
L28 = hose-lance
L29 = hose-fitting-lance

12 **clogging indicator at M2:**
AOR = visual, Δp 2,5 bar, see sheet-no. 1606
AOC = visual, Δp 2,5 bar, see sheet-no. 1606

13 **contamination control system:**
- = without
CCS2 = with contamination control system CCS2

1.2. Filter element: (ordering example)

01NR.	630.	6VG.	10.	B.	P.	-
1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 630

3 - 7 see type index-filter unit

Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

Changes of measures and design are subject to alteration!

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2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 630	
2	housing cover	1	30600-3	315492
3	mini-measuring connection	1	MA.1.ST	305453
4	screw plug	2	G ½	304678
5	straining screw	1	30595-3	316312
6	Oring	1	140 x 6	315392 (NBR)
7	electric motor	1	according to type index	
8	pump unit P28	1	NG 80.50	325579
9	manometer	1	visual ∅ 40	317847
10	O-ring	1	22 x 3	304387 (NBR)
11	O-ring	2	70 x 4	306253 (NBR)
12	O-ring	2	45 x 3	304991 (NBR)
13	O-ring	1	18 x 3	304359 (NBR)
14	O-ring	1	45 x 3	304991 (NBR)
15	O-ring	2	47,22 x 3,53	305078 (NBR)
16	suction hose 1 ½"	1	according to type index	
17	discharge hose 1 ¼"	1	according to type index	
18	clogging indicator, visual	1	AOR or AOC	see sheet-no. 1606
19	O-ring	1	15 x 1,5	315357 (NBR)
20	O-ring	1	22 x 2	304708 (NBR)
21	O-ring	2	14 x 2	304342 (NBR)
22	contamination control system	1	CCS2	320595

3. Designation:

The mobile filter unit is intended for oil maintenance on hydraulic systems.
The area of application comprises:
- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

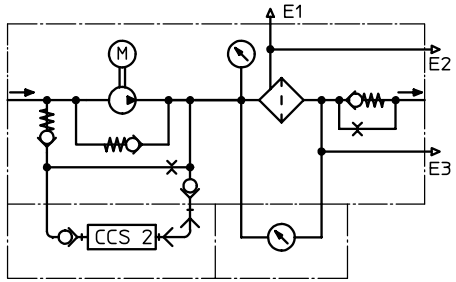
The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability.The transporting trolley makes it possible to move close up to confined locations with difficult access, and to fix the accessories (such as hoses and the connection cable) in a safe and r eliable manner.
Oil flowing out of the suction and/or discharge hose or the outflow openings is collected by the filter unit's oil trough, without cauing any environmental damage.
The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 630.
Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 µm $_{(c)}$.
At a pressure difference > 2,5 bar , the element is polluted and has to be removed with a new element .
The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.
To protect against overpressure, the filter unit is fitted with a safety valve. Pressure setting about 8 bar.
The E-motor is made safe with a motor-protection-switch against overloading. At a working pressure > 8 bar, the motor-protection-switch cuts the E-motor out.
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when changing the fluid m edium.
In order to measure the contamination class of the oil taken in, there is a connection for the electronic particle counter CCS 2 ahead the filter. The CCS 2 is supplied complete with case and extra connection hoses and can also be used separately. When measuring at the mobile filter unit please consider that a change of the measured contamination classes is shown after an adequate operation time only, depending on the total oil volume and its mixing with the filtered oil.
To protect the pump a cleanable coarse filter made of metal wire mesh with mesh size 250 µm is being placed in the suction h ose.

4. Technical data:

filter-fineness:	4, 5, 7 or 10 µm$_{(c)}$
oil temperature:	-5°C to +60°C
weight:	approx. 155 kg
operating medium:	hydraulic oil based on mineral oil from 10 mm²/s, other media on request

Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbol:



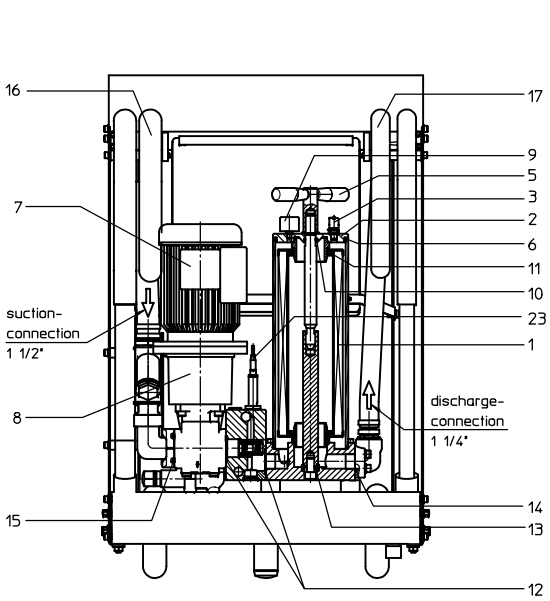
6. Test methods:

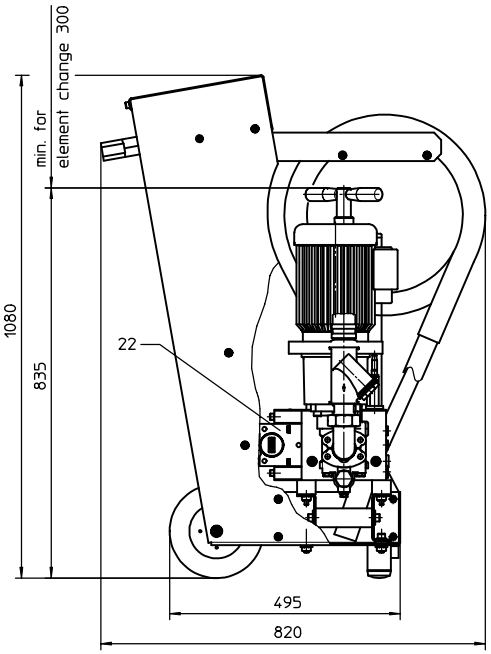
Filter elements are tested according to the following ISO sta ndards:

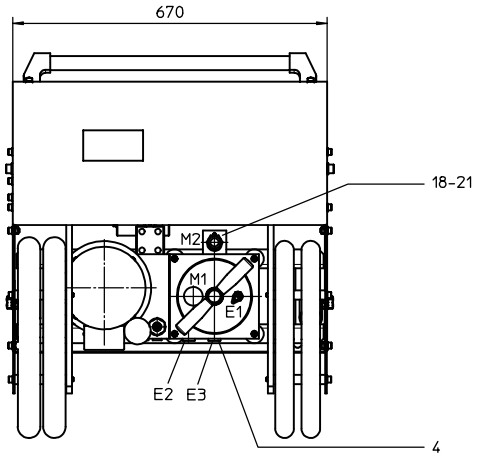
ISO 2941	Verification of colla pse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow character istics
ISO 16889	Multi-pass method for evaluating filtration performance

FILTER UNIT, mobile with fluid control
Series UMFC 41 PN 6

Sheet No. **4052**







Assignment of connections and functions:

E1: venting mini-measuring connection, MA.1.ST
see sheet-no.1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the housing cover, dirt side
M2: measure connection at filter housing, dirt side
p_1 = dirt side
p_2 = clean side

1. Type index:

1.1. Filter unit: (ordering example)

UMFC.	41.	6VG.	10.	B.	P.	-.	P44.	W27.	L03.	L05.	AOR
1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
UMFC = filter unit, mobile with fluid control

2 **nominal size:** 41

3 **filter-material and filter-fineness:**
10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$, 1 VG = 4 $\mu m_{(c)}$ Interpor fleece (glass fiber)
10 WVG = 10 $\mu m_{(c)}$, 3 WVG = 5 $\mu m_{(c)}$ Watersorp-filter element

4 **resistance of presure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM), by agreement

7 **filter element specification:**
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **pump unit:**
P44 = pump unit 44, NG 40.25 (standard-pump unit)

9 **motor:** (W = alternating current motor)

motor	electrical connection		volume flow	max. viscosity	doc.-no.
W27 [1]	230V	50Hz	35,5 l/min	400 mm²/s	43412-4
W04 [1]	110V	60Hz	42,6 l/min	400 mm²/s	43411-4

[1] standard-motor

10 **suction connection 1 $^1/_2$" with protective filter:** (see sheet-no. 31961-4)
L03 = hose-lance-protective filter
L04 = hose-fitting-lance-protective filter

11 **discharge connection 1 $^1/_4$" :** (see sheet-no. 31961-4)
L05 = hose-lance
L06 = hose-fitting-lance
L21 = hose-fitting

12 **clogging indicator at M2:**
- = without
AOR = visual, Δp 2,5 bar, see sheet-no. 1606
AOC = visual, Δp 2,5 bar, see sheet-no. 1606

1.2. Filter element: (ordering example)

01NR.	630.	6VG.	10.	B.	P.	-
1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 630

3 - 7 see type index-filter unit

Notice:
Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

Changes of measures and design are subject to alteration!

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2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 630	
2	housing cover	1	30600-3	315492
3	mini-measuring connection	1	MA.1.ST	305453
4	screw plug	2	G ½	304678
5	straining screw	1	30595-3	316312
6	O-ring	1	140 x 6	315392 (NBR)
7	electric motor	1	according to type index	
8	pump unit P44	1	NG 40.25	327963
9	clogging indicator (series)	1	visual ∅ 40	315452
10	O-ring	1	22 x 3	304387 (NBR)
11	O-ring	2	70 x 4	306253 (NBR)
12	O-ring	2	45 x 3	304991 (NBR)
13	O-ring	1	18 x 3	304359 (NBR)
14	O-ring	1	45 x 3	304991 (NBR)
15	O-ring	1	47,22 x 3,53	305078 (NBR)
16	suction hose 1 ½“	1	according to type index	
17	discharge hose 1 ¼“	1	according to type index	
18	clogging indicator, visual	1	AOR or AOC	see sheet-no. 1606
19	O-ring	1	15 x 1,5	315357 (NBR)
20	O-ring	1	22 x 2	304708 (NBR)
21	O-ring	2	14 x 2	304342 (NBR)
22	contamination control sensor	1	PFS 01	327213
23	water analysis- and temperature sensor	1	WSPS 03	326211

3. Designation:

The mobile filter unit is intended for oil maintenance on hydraulic systems.
The area of application comprises:
- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability.The transporting trolley makes it possible to move close up to confined locations with difficult access, and to fix the accessories (such as hoses and the connection cable) in a safe and r eliable manner.
Oil flowing out of the suction and/or discharge hose or the outflow openings is collected by the filter unit's oil trough, without causing any environmental damage.
The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 630.
Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 µm $_{(c)}$.
At a pressure difference > 2,5 bar , the element is polluted and has to be removed with a new element .
The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.
To protect against overpressure, the filter unit is fitted with a safety valve. Pressure setting about 6 bar.
The E-motor is made safe with a motor-protection-switch against overloading. At a working pressure > 6 bar, the motor-protection-switch cuts the E-motor out.
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when changing the fluid m edium.
In case of the drawn-off oil the contamination classes can be determined in front of the filter with the contamination control sensor PFS01, with help of the water analysis- and temperature sensor WSPS03 the saturation of the water. With choice of the different operating modes the running filter unit can be switched off manually or, after reaching the given limits for the contamination classes and / or through saturation of the water.
For the protection of the pump there is a cleanable coarse filter made of metal with a mesh size of 250 µm in the suction line.
In order to protect the sensors the unit is being automatically stopped at an oil temperature of approx. 70 °C. Measurement of the contamination class with PFS 01 can be done at oil temperatures up to 50 °C only. Otherwise the sensor will be overheated

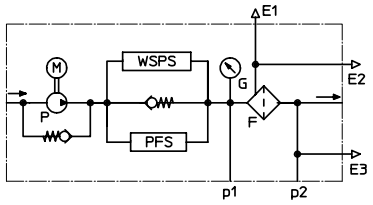
4. Technical data:

filter-fineness:	4, 5, 7 or 10 µm$_{(c)}$
oil temperaure:	0°C to 70°C (50°C)
weight:	approx. 105 kg
operating medium:	hydraulic oil based on mineral oil from 10 mm²/s other media on request

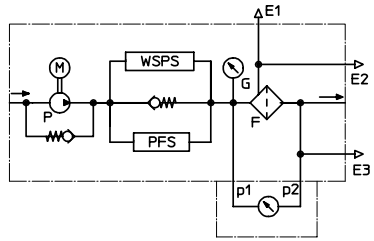
Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbol:

filter unit without clogging indicator



filter unit with clogging indicator
AOR or AOC



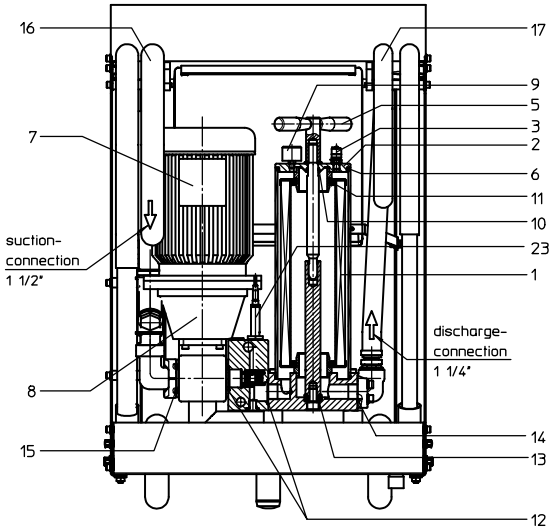
6. Test methods:

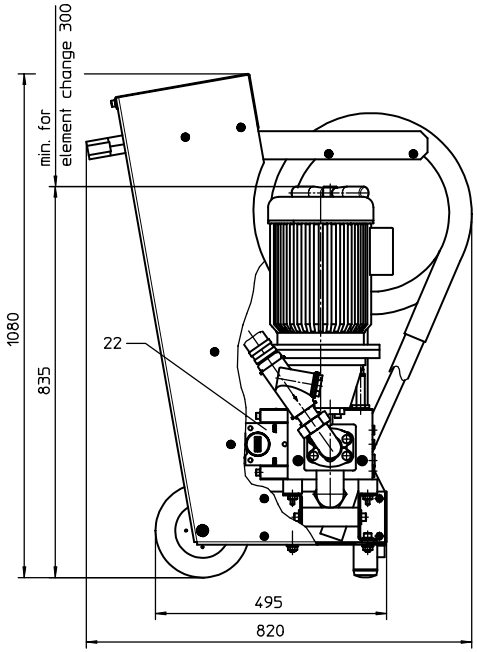
Filter elements are tested according to the following ISO sta ndards:

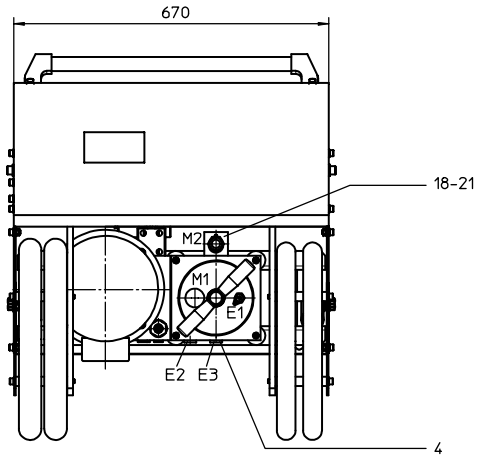
ISO 2941	Verification of colla pse/burst resistance
ISO 2942	Verification of fabrication inte grity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fat igue characteristics
ISO 3968	Evaluation of pressure drop versus flow character istics
ISO 16889	Multi-pass method for evaluating filtration performance

FILTER UNIT, mobile with fluid control
Series UMFC 81 PN 10

Sheet No. **4053**







Assignment of connections and functions:

E1: venting mini-measuring connection, MA.1.ST see sheet-no.1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the housing cover, dirt side
M2: measure connection at filter housing, dirt side
p_1 = dirt side
p_2 = clean side

1. Type index:

1.1. Filter unit: (ordering example)

UMFC. 81. 6VG. 10. B. P. -. P42. D63. L03. L05. AOR

1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
UMFC = filter unit, mobile with fluid control

2 **nominal size:** 81

3 **filter-material and filter-fineness:**
10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$, 1 VG = 4 $\mu m_{(c)}$ Interpor fleece (glass fiber)
10 WVG = 10 $\mu m_{(c)}$, 3 WVG = 5 $\mu m_{(c)}$ Watersorp-filter element

4 **resistance of presure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM), by agreement

7 **filter element specification:**
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **pump unit:**
P42 = pump unit 42, NG 80.50 (standard-pump unit)

9 **motor:** (D = rotary current motor)

motor	electrical connection		volume flow	max. viscosity	doc.-no.
D63 [1]	230/400V	50Hz	35,5 l/min	800 mm²/s	43408-4
	230/400V	50Hz	71,0 l/min	400 mm²/s	
	265/460V	60Hz	42,6 l/min	800 mm²/s	
	265/460V	60Hz	85,2 l/min	400 mm²/s	

[1] standard-motor

10 **suction connection 1 $^1/_2$" with protective filter:** (see sheet-no. 31961-4)
L03 = hose-lance-protective filter
L04 = hose-fitting-lance-protective filter

11 **discharge connection 1 $^1/_4$" :** (see sheet-no. 31961-4)
L05 = hose-lance
L06 = hose-fitting-lance
L21 = hose-fitting

12 **clogging indicator at M2:**
- = without
AOR = visual, Δp 2,5 bar, see sheet-no. 1606
AOC = visual, Δp 2,5 bar, see sheet-no. 1606

1.2. Filter element: (ordering example)

01NR. 630. 6VG. 10. B. P. -

1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 630

3 - 7 see type index-filter unit

Notice:
Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

Changes of measures and design are subject to alteration!

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2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 630	
2	housing cover	1	30600-3	315492
3	mini-measuring connection	1	MA.1.ST	305453
4	screw plug	2	G ½	304678
5	straining screw	1	30595-3	316312
6	O-ring	1	140 x 6	315392 (NBR)
7	electric motor	1	according to type index	
8	pump unit P42	1	NG 80.50	327962
9	clogging indicator (series)	1	visual ∅ 40	315452
10	O-ring	1	22 x 3	304387 (NBR)
11	O-ring	2	70 x 4	306253 (NBR)
12	O-ring	2	45 x 3	304991 (NBR)
13	O-ring	1	18 x 3	304359 (NBR)
14	O-ring	1	45 x 3	304991 (NBR)
15	O-ring	1	47,22 x 3,53	305078 (NBR)
16	suction hose 1 ½“	1	according to type index	
17	discharge hose 1 ¼“	1	according to type index	
18	clogging indicator, visual	1	AOR or AOC	see sheet-no. 1606
19	O-ring	1	15 x 1,5	315357 (NBR)
20	O-ring	1	22 x 2	304708 (NBR)
21	O-ring	2	14 x 2	304342 (NBR)
22	contamination control sensor	1	PFS 01	327213
23	water analysis- and temperature sensor	1	WSPS 03	326211

3. Designation:

The mobile filter unit is intended for oil maintenance on hydraulic systems.
The area of application comprises:
- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability.The transporting trolley makes it possible to move close up to confined locations with difficult access, and to fix the accessories (such as hoses and the connection cable) in a safe and r eliable manner.
Oil flowing out of the suction and/or discharge hose or the outflow openings is collected by the filter unit's oil trough, without causing any environmental damage.
The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 630.
Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 µm $_{(c)}$.
At a pressure difference > 2,5 bar , the element is polluted and has to be removed with a new element .
The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.
To protect against overpressure, the filter unit is fitted with a safety valve. Pressure setting about 10 bar.
The E-motor is made safe with a motor-protection-switch against overloading. At a working pressure > 10 bar, the motor-protection-switch cuts the E-motor out.
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when changing the fluid m edium.
In case of the drawn-off oil the contamination classes can be determined in front of the filter with the contamination control sensor PFS01, with help of the water analysis- and temperature sensor WSPS03 the saturation of the water. With choice of the different operating modes the running filter unit can be switched off manually or, after reaching the given limits for the contamination classes and / or through saturation of the water. With changing over of the pole the motor of the unit can be run eiter with half or full speed, which results in the given working data of item 9 in the order example.
For the protection of the pump there is a cleanable coarse filter made of metal with a mesh size of 250 µm in the suction line.
In order to protect the sensors the unit is being automatically stopped at an oil temperature of approx. 70 °C. Measurement of the contamination class with PFS01 can be done at oil temperatures up to 50 °C only. Otherwise the sensor will be overheated.

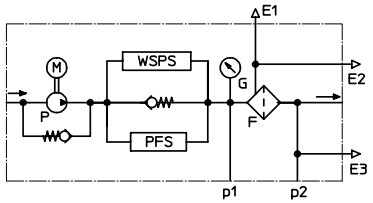
4. Technical data:

filter-fineness:	4, 5, 7 or 10 µm$_{(c)}$
oil temperaure:	0°C to 70°C (50°C)
weight:	approx. 125 kg
operating medium:	hydraulic oil based on mineral oil from 10 mm²/s other media on request

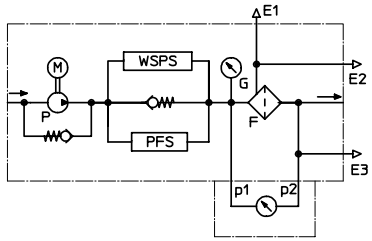
Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbol:

filter unit without clogging indicator



filter unit with clogging indicator
AOR or AOC



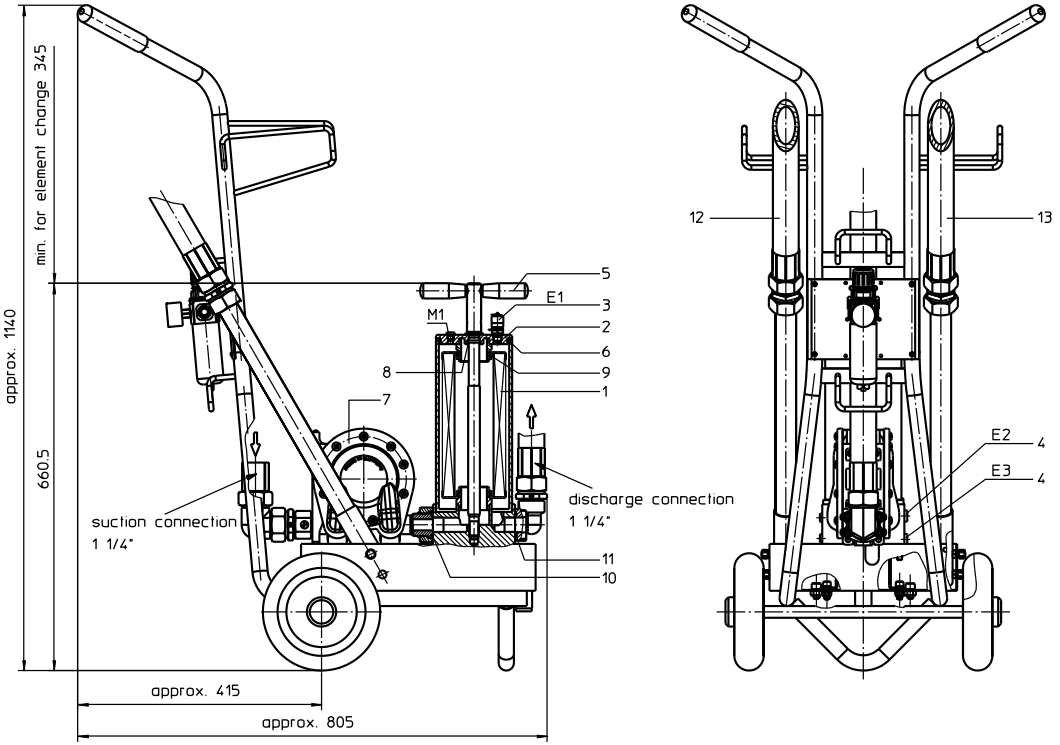
6. Test methods:

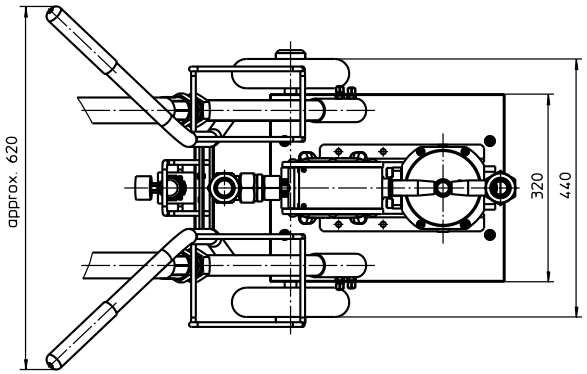
Filter elements are tested according to the following ISO sta ndards:

ISO 2941	Verification of colla pse/burst resistance
ISO 2942	Verification of fabrication inte grity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow character istics
ISO 16889	Multi-pass method for evaluating filtration performance

FILTER UNIT, mobile pneumatical
Series UMP 20 PN 4

Sheet No. **4047**





Assignment of connections and functions:

E1: venting of filter, mini-measuring connection MA.1.ST, see sheet-no.1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the housing cover, dirt side

1. Type index:

1.1. Filter unit: (ordering example)

UMP.	20.	6VG.	10.	B.	P.	-.	P105.	L47.	L48.	-
1	2	3	4	5	6	7	8	9	10	11

1 **series:**
UMP = filter unit, mobile pneumatical

2 **nominal size:** 20

3 **filter-material and filter-fineness:**
10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$, 1 VG = 4$\mu m_{(c)}$ Interpor fleece (glass fibre)
10 WVG = 10 $\mu m_{(c)}$, 3 WVG = 5 $\mu m_{(c)}$ Watersorp-filter element

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM), by agreement

7 **filter element specification:**
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **pump unit:**
P105 = pump unit 105.UMP20 (standard-pump unit)
drive: (P = pneumatical)

pressure air	operating pressure	volume flow	viskosity
filtrated/oiled	0,5 – 8,0 bar	min. 20 l/min [1)]	1 - 1000 mm²/s

[1)] characteristic curves under item 4 technical data

9 **suction connection 1 ¼" :**
L47 = hose-fitting-lance

10 **discharge connection 1 ¼" :**
L48 = hose-fitting-lance

11 **clogging indicator at M1:**
- = without
O = visual, 2,5 bar

1.2. Filter element: (ordering example)

01NR.	250.	6VG.	10.	B.	P.	-
1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 250

3 - 7 see type index-filter unit

Changes of measures and design are subject to alteration!

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2. Spare parts:

item	qty.	designation	dimension	article-no.
1	1	filter element	01NR.250…	
2	1	housing cover	30615-3	315437
3	1	mini-measuring connection	MA.1.ST	305453
4	2	screw plug	G ¼	305003
5	1	straining screw	30631-4	316404
6	1	O-ring	115 x 5	306640 (NBR)
7	1	double membrane pump		341271
8	1	O-ring	18 x 3	304359 (NBR)
9	2	O-ring	52 x 3	314206 (NBR)
10	1	O-ring	32 x 3,5	304378 (NBR)
11	1	O-ring	32,9 x 3,53	318850 (NBR)
12	1	suction hose 1 ¼“		341413
13	1	discharge hose 1 ¼“		341389

3. Designation:

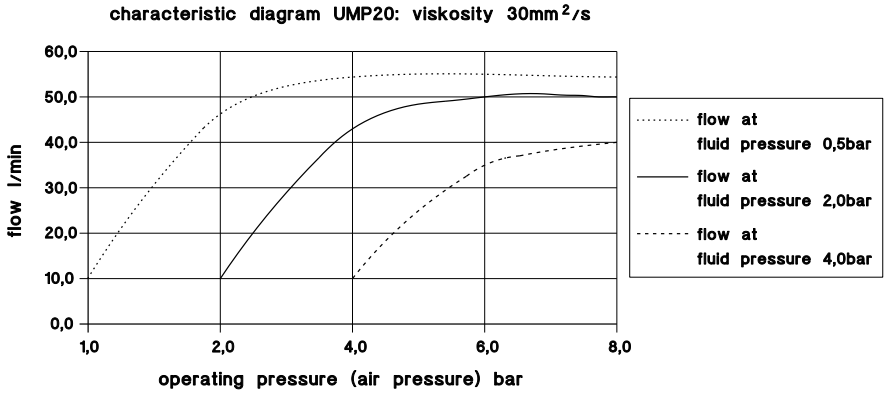
The mobile filter unit is intended for oil maintenance on hydraulic systems.
The area of application comprises:
- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

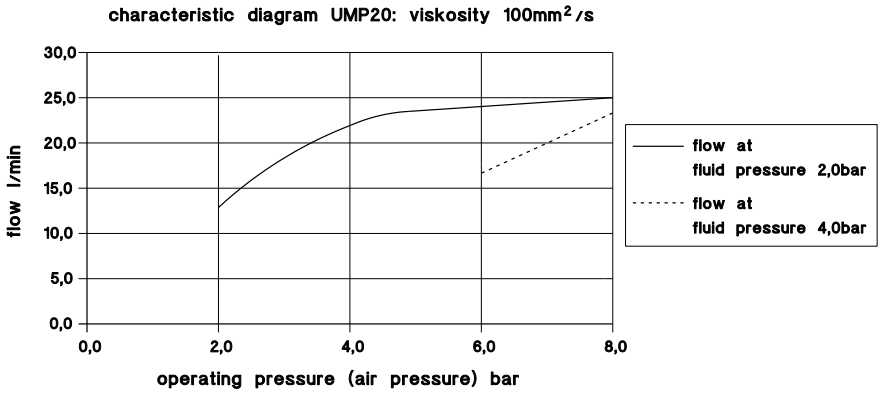
The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability.The transporting trolley makes it possible to move close up to confined locations with difficult access, and to fix the accessories (such as hoses and the connection cable) in a safe and reliable manner.
Oil flowing out of the suction and/or discharge hose or the outflow openings is collected by the filter unit's oil trough, without causing any environmental damage. The suction hose DN 32 and the discharge hose DN 32 are approximately 2700 mm long inclusive of the lance.
The device is equipmed with a double membrane pump. The flow conveyed by the pump is fed over a filter element to DIN 24550, T4, nominal size 250. Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 $\mu m_{(c)}$.
The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when changing the fluid medium.

4. Technical data:

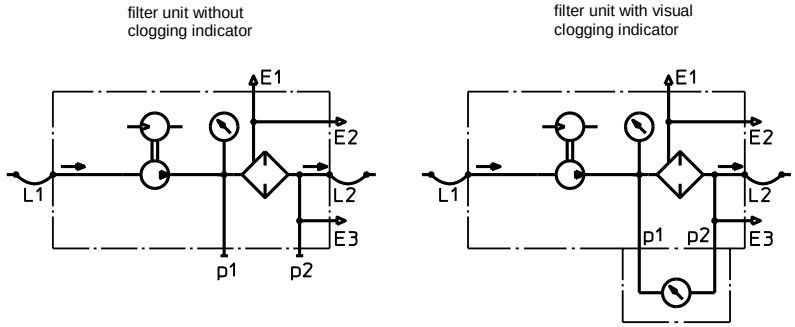
filter-fineness:	4, 5, 7 or 10 $\mu m_{(c)}$
oil temeprature:	-5°C to +60°C
weight:	approx. 45 kg
operating medium:	hydraulic oil based on mineral oil from 10 mm²/s, other media on request
conductivity:	≥ 200 pS/m
fluid sealing/membrane:	Viton / PTFE

Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).





5. Symbols:



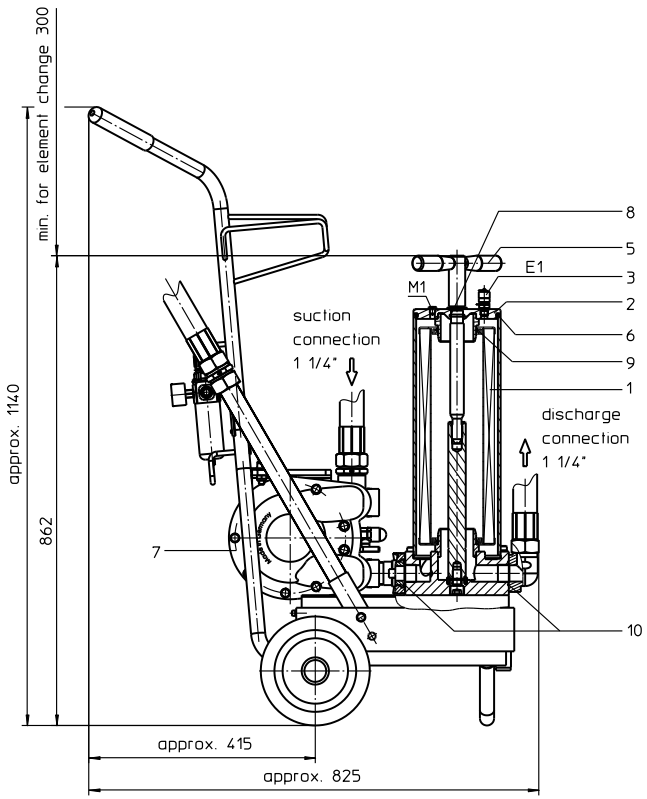
6. Test methods:

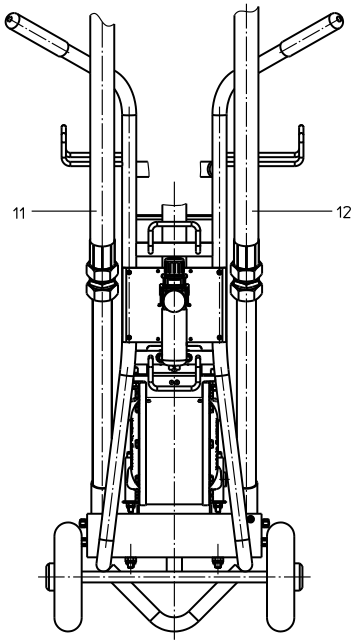
Filter elements are tested according to the following ISO standards:

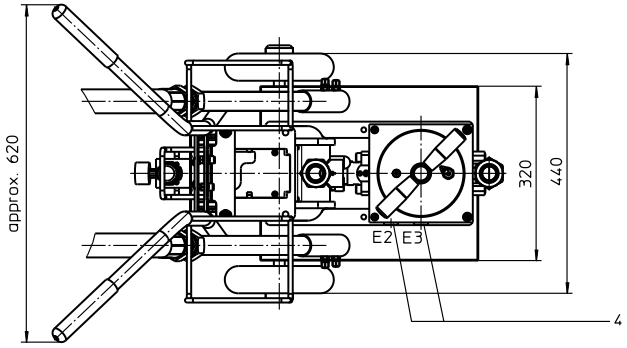
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

FILTER UNIT, mobile pneumatical
Series UMP 40 PN 4

Sheet No. **4048**







Assignment of connections and functions:

E1: venting of filter, mini-measuring connection MA.1.ST, see sheet-no.1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the housing cover, dirt side

1. Type index:

1.1. Filter unit: (ordering example)

UMP.	40.	6VG.	10.	B.	P.	-.	P107.	L49.	L50.	-
1	2	3	4	5	6	7	8	9	10	11

1 **series:**
UMP = filter unit, mobile pneumatical

2 **nominal size:** 40

3 **filter-material and filter-fineness:**
10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$, 1 VG = 4$\mu m_{(c)}$ Interpor fleece (glass fibre)
10 WVG = 10 $\mu m_{(c)}$, 3 WVG = 5 $\mu m_{(c)}$ Watersorp-filter element

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM), by agreement

7 **filter element specification:**
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **pump unit:**
P107 = pump unit 107.UMP40 (standard-pump unit)
drive: (P = pneumatical)

pressure air	operating pressure	volume flow	viskosity
filtrated/oiled	0,5 – 8,0 bar	min. 40 l/min [1)]	1 - 1000 mm²/s

[1)] characteristic curves under item 4 technical data

9 **suction connection 1 ¼" :**
L49 = hose-fitting-lance

10 **discharge connection 1 ¼" :**
L50 = hose-fitting-lance

11 **clogging indicator at M1:**
- = without
O = visual, 2,5 bar

1.2. Filter element: (ordering example)

01NR.	630.	6VG.	10.	B.	P.	-
1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 630

3 - 7 see type index-filter unit

Changes of measures and design are subject to alteration!

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2. Spare parts:

item	qty.	designation	dimension	article-no.
1	1	filter element	01NR. 630…	
2	1	housing cover	30600-3	315492
3	1	mini-measuring connection	MA.1.ST	305453
4	2	screw plug	G ½	304678
5	1	straining screw	30595-3	316312
6	1	O-ring	140 x 6	315392 (NBR)
7	1	double membrane pump		341275
8	1	O-ring	22 x 3	304387 (NBR)
9	2	O-ring	70 x 4	306253 (NBR)
10	1	O-ring	37,69 x 3,53	304353 (NBR)
12	1	suction hose 1 ¼“		341970
13	1	discharge hose 1 ¼“		341971

3. Designation:

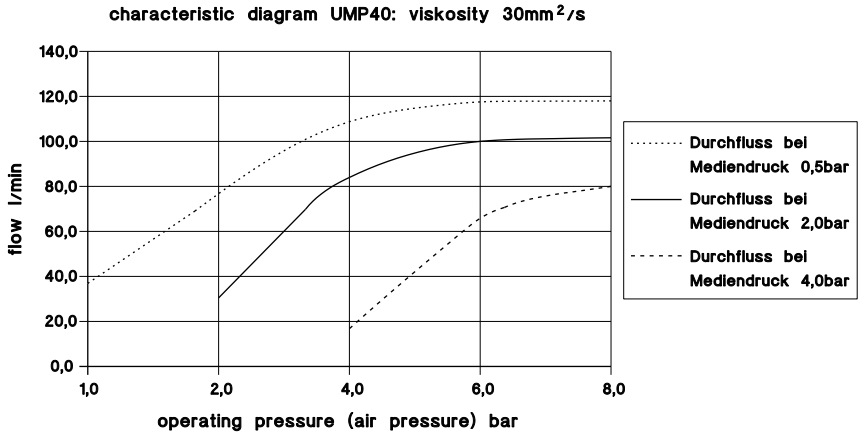
The mobile filter unit is intended for oil maintenance on hydraulic systems.
The area of application comprises:
- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

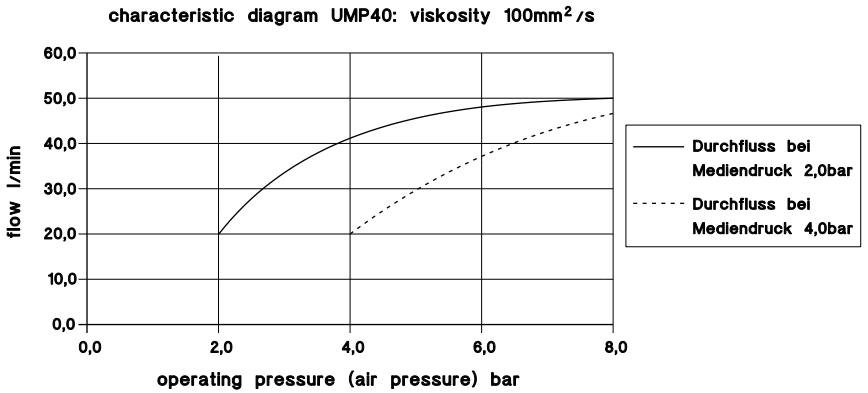
The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability.The transporting trolley makes it possible to move close up to confined locations with difficult access, and to fix the accessories (such as hoses and the connection cable) in a safe and reliable manner.
Oil flowing out of the suction and/or discharge hose or the outflow openings is collected by the filter unit's oil trough, without causing any environmental damage. The suction hose DN 32 and the discharge hose DN 32 are approximately 2700 mm long inclusive of the lance.
The device is equipmed with a double membrane pump. The flow conveyed by the pump is fed over a filter element to DIN 24550, T4, nominal size 250. Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 $\mu m_{(c)}$.
The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when changing the fluid medium.

4. Technical data:

filter-fineness:	4, 5, 7 or 10 $\mu m_{(c)}$
oil temeprature:	-5°C to +60°C
weight:	approx. 48 kg
operating medium:	hydraulic oil based on mineral oil from 10 mm²/s, other media on request
conductivity:	≥ 200 pS/m
fluid sealing/membrane:	Viton / PTFE

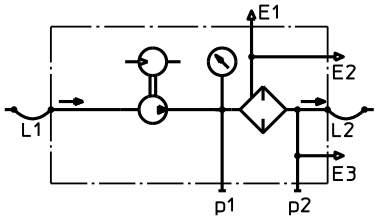
Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).



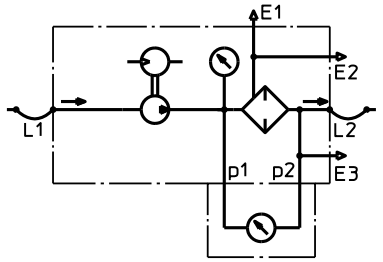


5. Symbols:

filter unit without clogging indicator



filter unit with visual clogging indicator



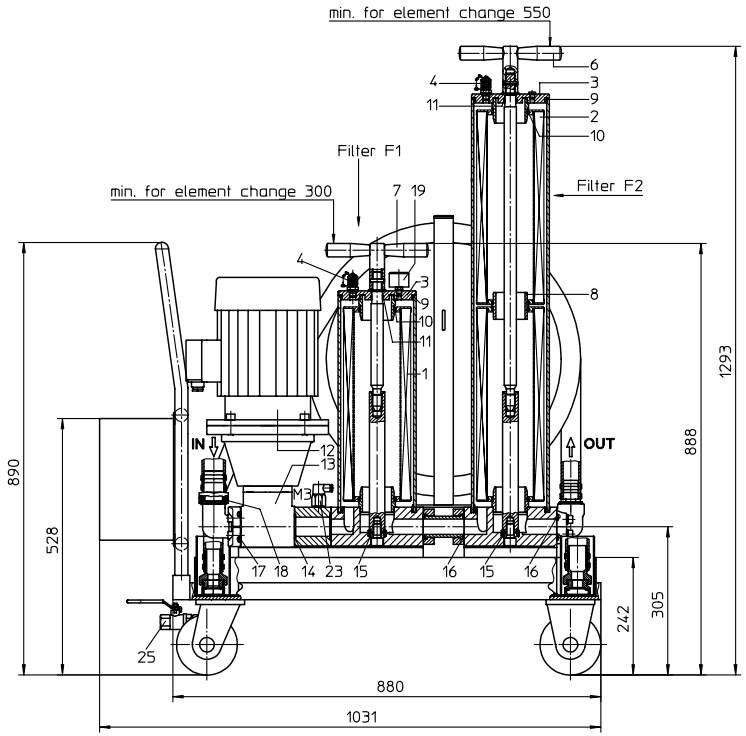
6. Test methods:

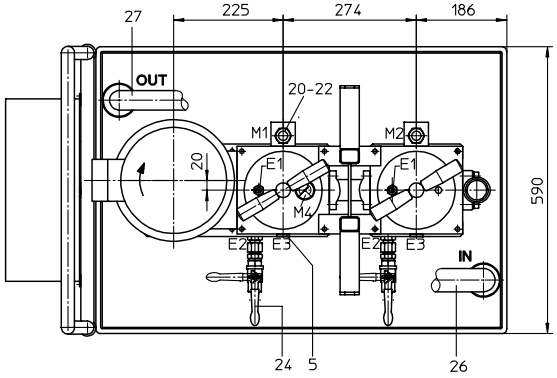
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

FILTER UNIT, mobile with water separator
Series UMW 80 PN 6

Sheet No. **4016 B**





Assignment of connections and functions:

E1: venting mini-measuring connection MA.1.St see sheet-no. 1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1/M2: measure connection at filter housing
M3: measure connection in front of the filters
M4: measure connection in the housing cover, dirt side

1. Type index:

1.1. Filter Unit: (ordering example)

UMW. 80. 1261. P. 1. 2. P09. D04. AOR. AOR. E5. O

1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
UMW = filter unit , mobile with water separator

2 **nominal size filter unit:** 80

3 **nominal size der water separator unit:** 1261

4 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM), by agreement

5 **filter element in the filter 1:**
1 = standard-return-line filter element, see item 1.2.

6 **filter element in the filter 2:**
2 = standard-return-line filter element, see item 1.3.

7 **pump unit:**
P09 = pump unit 09, NG 80.50

8 **motor:**
D04 = B5/100L/4.2,2.1500.230/400.D.50.1.-.-.-
rotary current motor 230/400 V, 50 Hz, approx. 1420 rpm, 2,2 KW, type of protection IP 54

9 **clogging indicator at M1:**
AOR = AOR.2,5.P.- clogging indicator visual, 2,5 bar see sheet-no. 1606

10 **clogging indicator at M2:**
AOR = AOR.2,5.P.- clogging indicator visual, 2,5 bar see sheet-no. 1606

11 **clogging indicator at M3:**
E5 = E5.5 pressure switch, contact breaker, 5 bar see sheet-no. 1616

12 **clogging indicator at M4:**
O = clogging indicator visual, 6,0 bar see sheet-no. 1616

1.2. Filter element: (ordering example)

01NR. 630. 6VG. 10. B. P. -

1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element, DIN 24550, T4

2 **nominal size:** 630

3 **filter-material and filter-fineness:**
10 VG = 10 µm(c), 6 VG = 7 µm(c), 3 VG = 5 µm(c),
1 VG = 4µm(c) Interpor fleece (glass fibre)

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM) , by agreement

7 **filter element specification:**
- = standard
VA = stainless steel

1.3. Filter element: (ordering example)

01NR. 630. 3WVG. 10. B. P. -

1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element, DIN 24550, T4

2 **nominal size:** 630

3 **filter-material and filter-fineness:**
10 WVG = 10 µm(c), 3 WVG = 5 µm(c)
watersorp-filter element

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM) , by agreement

7 **filter element specification:**
- = standard

Changes of measures and design are subject to alteration!

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fax +49 - (0)6205 - 2094-40 url www.internormen.com

2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 630...	
2	watersorp-filter element	2	01NR. 630...	
3	housing cover	2	30600-3	315492
4	mini-measuring connection	2	MA.1.ST	305453
5	screw plug	2	G ½	304678
6	straining screw	1	31078-3	
7	straining screw	1	30595-3	316312
8	connecting pipe	1	20899-4	308842
9	O-ring	2	140 x 6	315392 (NBR)
10	O-ring	2	70 x 4	306253 (NBR)
11	O-ring	2	22 x 3	304387 (NBR)
12	E-motor D 04	1	2,2 KW, 230/400 V	316276
13	pump unit P 09	1	NG 80.50	320268
14	O-ring	2	45 x 3	304991 (NBR)
15	O-ring	2	18 x 3	304359 (NBR)
16	O-ring	3	37,69 x 3,53	304353 (NBR)
17	O-ring	1	47,22 x 3,53	305078 (NBR)
18	O-ring	2	35 x 2,5	308893 (NBR)
19	clogging indicator visual	1	O	304907
20	clogging indicator visual	2	AOR.2,5.P.-	316431
21	O-ring	2	15 x 1,5	315357 (NBR)
22	O-ring	2	22 x 2	304708 (NBR)
23	pressure switch	1	E5.5	306165
24	evacuation connection	2	EE.3.G.ST	310449
25	evacuation connection	1	EE.3.W.ST	310534
26	suction tube 1 ½“	1	31090-4	
27	discharge hose 1 ¼“	1	31108-4	

3. Description:

The mobile filter unit is intended for oil maintenance on hydraulic systems.
The area of application comprises:
- secondary flow filtration and water separation in addition to the existing oper ating filter
- secondary flow filtration and water separation without the action of the operating filter
- filtration and water separation when filling the oil reservoir.

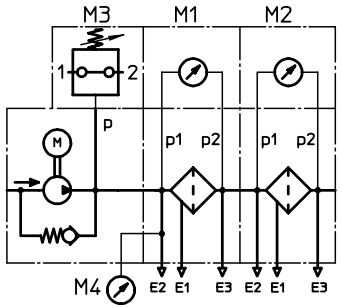
The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability.The transporting trolley makes it possible to move close up to confined locations with difficult access, and to fix the accessories (such as hoses and the connection cable) in a safe and r eliable manner.
Oil flowing out of the suction and/or discharge hose or the outflow openings is collected by the filter unit's oil trough, without causing any environmental damage. The suction tube 1 ½“ and the discharge hose 1 ¼“ are approximately 3000 mm long inclusive of the hose coupling.
The device is equipped with a gear pump driven by an electric motor. The flow conveyed by the geared pump is fed over a filter elements to DIN 24550, T4, nominal size 630.
Oil maintenance takes place in two stages via two in-line filters. The filter element in filter F1 ensures removal of the contamination. Depending on the customer requirements, the filter mesh in filter F1 is either 4, 5, 7 or 10 $\mu m_{(c)}$. Water is separated in filter F2 by means of two parallel-acting water absorption filter elements.
The degree of filter element contamination is indicated on the 4 measurement points M 1 to M4.
If the permissible pressure difference of $\Delta p1 = 2.5$ bar is exceeded, the pressure difference is measured via the filter element in filter F1 and the degree of contamination is displayed at measurement point M1.
If the permissible pressure difference of $\Delta p1 = 2.5$ bar is exceeded, the pressure difference is measured via the filter element in filter F2 and the degree of contamination is displayed at measurement point M2.
The sum resulting from pressures $\Delta p1 + \Delta p2$ + the discharge pressure is measured at points M3 and M4.
The red sector of the gauge fitted to M4 indicates $p \leq 6$ bar and so the opening of the bypass valve between the pressure and suction connection of the gear pump.
The pressure switch on M3 operates the electric control which ensures that, when the operating pressure of $p = 5$ bar is exceeded, the electric motor of the gear pump is switched off.
The filter unit can be operated without supervision, because operational safety is guaranteed by the switching-off function of the pressure switch fitted to M3, the overload protection of the electric motor and the bypass valve in the gear pump. After independent switching off of the filter unit by the pressure switch fitted to M3, the display condition of the pressure switch at M1 and M2 is retained, which indicates that the filter elements must be changed.
After the filter element has been changed, the contamination display at M1 and M2 must be reset manually (see data sheet 1606 for reset function).
The filter element can be changed without tools. After removing the tensioning nut and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare el ements in stock.
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium.

4. Technical data:

pumping capacity:	71 l/min at 1420 rpm
E-motor:	2,2 KW, approx. 1420 rpm
rotary current	230/400 V, 50 Hz
pressure load capacity:	max. 6 bar
filter-fineness:	4, 5, 7 or 10 $\mu m_{(c)}$
weight:	appprox. 125 kg
operating medium:	hydraulic oil based on mineral oil from 10 to 400 mm²/s, other media on request

Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, P ara. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbol:

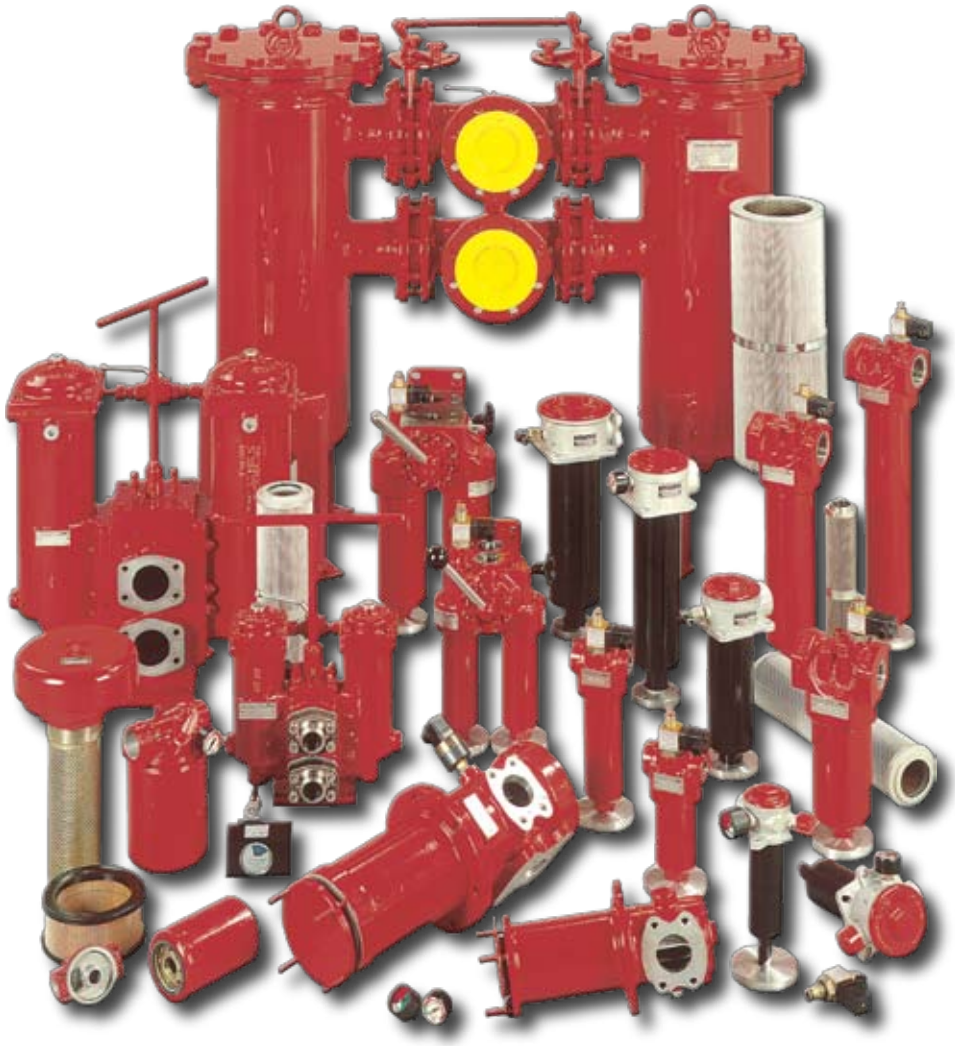


6. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

Hydraulic and Lubrication Filters



internormen
filter technology

INTER NORMEN

The name ***INTERNORMEN*** stands for competence and more than four decades of experience, in developing products and solutions in the fields of filter technology, measurement, diagnostic and analysis technology and modern filtration software.

Following a path of continuous development, we have maintained quality, a common hallmark of all our products and services, as a fundamental element of the *INTERNORMEN* corporate strategy. In the field of hydraulic and lubrication filters, *INTERNORMEN* currently offers a product selection with more than 4000 different filter elements, including corresponding filter housings.

Our wide range knowledge, our ability to expeditiously implement new technologies, the consistent orientation towards our customers' needs – have all resulted in seven product families:

- *filter technology*
- *system technology*
- *fluid management*
- *contamination monitoring*
- *electronics*
- *software solutions*
- *process technology*

WHY FILTRATION ?

What is Hydraulic System Cleanliness?

Cleanliness is a term used to describe the level of solid and liquid contamination found in hydraulic systems. *Contamination* may be defined as any substance that is not part of the hydraulic system's working fluid.

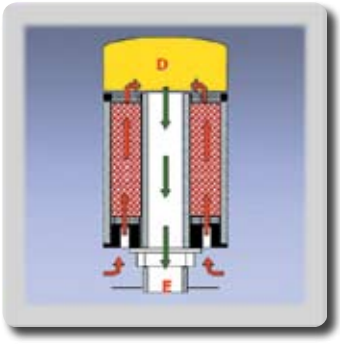
Why is cleanliness important to you?

Efficient production for clean systems provide maximum productivity.
Improved control of spare parts through preventive maintenance and monitoring contamination.
Reduced equipment downtime through scheduled inspections.
Safety hazards minimized through preventing contamination related failure.
Increased life expectancy of system components, essentially increased economies of operation and therefore decreased maintenance charges.
Reduced repair costs due to fewer breakdowns.

How does contamination get in there?

There are three principal means through which contamination can occur in a typical hydraulic system. It can be:

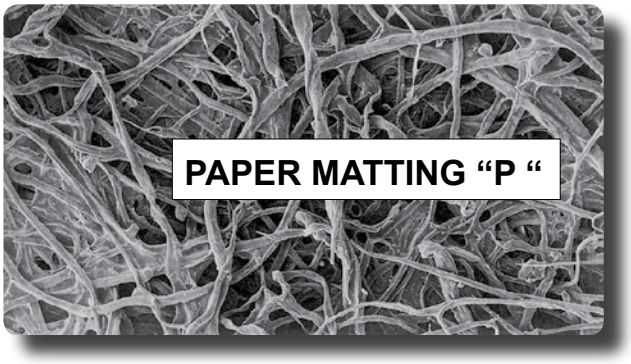
1. Built in during system assembly
2. Generated during system operation
3. Ingested by the system during operation



FILTER MEDIA

Mainly used filter material:

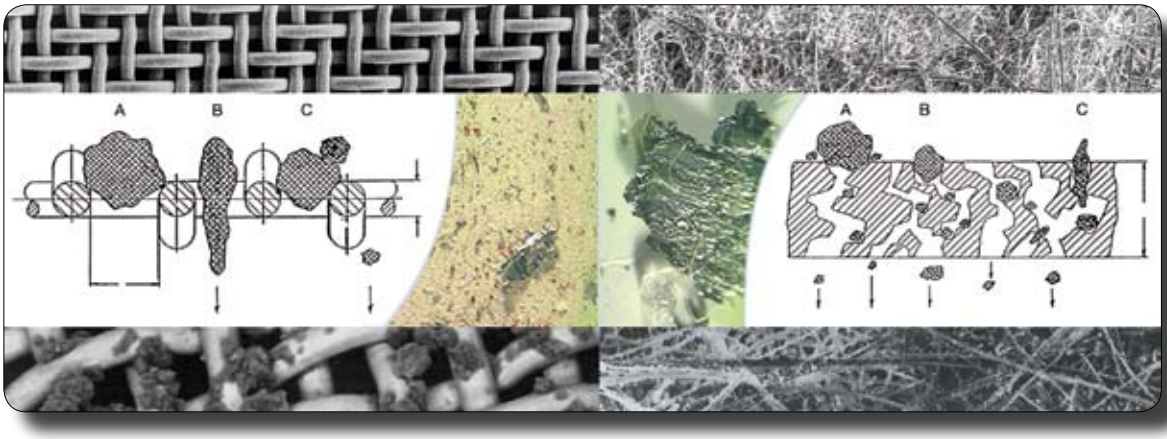
- deep filtration
- high particle-holding capacity
- best micron rating at high delta p
- usable for mineral oils, emulsions and for most synthetic hydraulic fluids and lubrication oils
- filter fineness based on filtration quotient $ß_{x(c)} \geq 200$:
  $4µm_{(c)}$, $5µm_{(c)}$, $7µm_{(c)}$, $10µm_{(c)}$, $15µm_{(c)}$, $20µm_{(c)}$



- deep filtration
- paper matting consisting of paper and polyester fibre
- high material stability and strength
- available in 10 µm and 25 µm

- surface filtration
- a stainless steel wire mesh provides high resistance filter elements (irrespective of the hydraulic fluid being used)
- partially cleanable
- available in 25 µm, 40 µm and 80 µm (other micron ratings on request)

SURFACE FILTRATION (MESH) **BULK FILTRATION (FLEECE)**



TANK MOUNTED RETURN-LINE FILTERS

SERIES TEF - DTEF - TEFB - RF - TRW

Application: Mounting is on the top of the reservoir with the outlet port returning to the reservoir.
Port size: up to G 1 ½, up to SAE 5“, up to DN 200.
Working pressure: 10 bar
Flow rates: up to 7200 l/min, TEFB, TRW up to 300 l/min
Filtration materials: Paper, interpor fleece or stainless steel wire mesh
User benefits: Lightweight, easy to change, reduced possibility of oil spillage during element change (environmental concern)
TEF - filters have a removable bowl which prevents contamination from entering the reservoir during filter element change, multiple inlet ports are possible
TEFB - no additional breather port in the tank needed
TRW - horizontal tank mounted return-line filters

RETURN-LINE FILTERS WITH SUCTION CONNECTION

SERIES TRS - TNRS

Application: Tank mounted return-line filters with suction connection for mobile hydraulic applications with minimum two independent hydraulic circuits
Port size: up to G 1 ¼, up to SAE 2”
Working pressure: 10 bar
Flow rates: up to 450 l/min
Filtration materials: Paper, interpor fleece or stainless steel wire mesh
User benefits: Tank-top mounted in-line filters supply clean suction flow and prevent cavitation, custom designs possible

STAINLESS STEEL PRESSURE FILTERS

SERIES EH

Application: For mounting in pressure lines.
Port size: up to SAE 2”, up to G 1 ½
Working pressure: up to 420 bar

SERIES BEHD

Application: Stainless Steel Filter-Battery, high filter efficiency at high volume flows
Port size: up to Avit 3”
Working pressure: up to 315 bar

SERIES EHD – EDU – EDA – EDSF

Application: Can be mounted in suction, pressure or return lines. The flow path through the filter can be changed to either of the two chambers.
Port size: up to SAE 4”, up to G 1, DN 250
Working pressure: up to 315 bar
User benefits: Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty to the clean filter side without interrupting the operation. The dirty element can be serviced/changed while in the “off” position also without interrupting the operation

EDA-Filters according to ASME

SERIES ELF

Application: For mounting in suction, pressure and return lines
Port size: up to DN 250
Working pressure: 16 bar

PRESSURE FILTERS, CHANGE OVER

SERIES MDD - HDD

Application: Can be mounted in suction, pressure or return lines.
Port size: up to G 1, up to SAE 2” Avit 2”
Working pressure: up to 315 bar
Flow rates: MDD up to 95 l/min, HDD up to 1350 l/min
Filtration materials: Paper, interpor fleece or stainless steel wire mesh.
User benefits: Duplex filters can be maintained without interruption of the operation.
The upper part has a three-way-change-over valve which allows to change-over the flow from the dirty filter side to the clean filter side without interruption.

SERIES DU - DUV

Application: The flow path through the filter can be changed to either of the two chambers.
For mounting in suction, pressure or return lines.
Port size: up to G ¾, up to SAE 5”
Working pressure: 32 bar
Flow rates: DU up to 4000 l/min, DUV up to 2000 l/min
Filtration materials: Paper, interpor fleece or stainless steel wire mesh
User benefits: Rotary slide- or ball valve, which is integrated in the middle of the housing, makes it possible to switch from the dirty filter side to the clean filter side without interrupting the operation. The dirty element can be serviced or changed while in the “off” position.

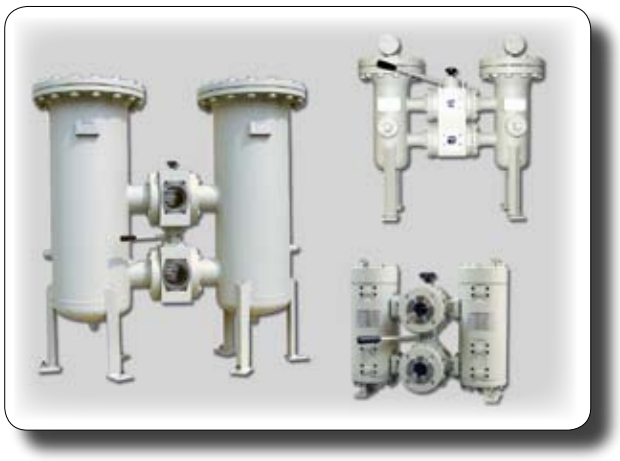
SERIES DSF - DNR

Application: The flow path through the filter can be changed to either of the two chambers.
For mounting in suction, pressure or return lines.
Port size: in DIN or ANSI flanges up to 10”
Working pressure: 25 bar, 16 bar
Flow rates: DSF up to 10 000 l/min, DNR up to 8000 l/min
Filtration materials: Paper, interpor fleece or stainless steel wire mesh
User benefits: A three-way change-over valve which is integrated in the middle of the housing makes it possible to switch from the dirty filter side to the clean filter side without interrupting the operation

SERIES DA - DNA

Filters according to ASME

Application: The flow path through the filter can be changed to either of the two chambers.
For mounting in suction, pressure or return lines.
Port size: up to flange DN 250, up to SAE 2”, up to ANSI 4”
Working pressure: 16 bar, 40 bar
Flow rates: DA up to 1000 l/min, DNA up to 2050 l/min
Filtration materials: Paper, interpor fleece or stainless steel wire mesh
User benefits: Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter side to the clean filter side without interrupting the operation



Learn more about our different filter series at:
http://www.internormen.com/cms/en/products/filtertechnology

PRESSURE FILTERS

SERIES LF - RF

Application: For mounting in suction, pressure and return lines.
Port size: from G ¾ up to DIN/ANSI flange 10”
Working pressure: 10 bar, 16 bar, 25 bar, 32 bar
Flow rates: up to 10 000 l/min
Filtration materials: Paper, interpor fleece or stainless steel wire mesh
User benefits: The filter is mounted in such a way that the inlet and the outlet are on the same level. It can be used as a suction filter, pressure filter and return-line filter. RF-filter series have inlets on the side and outlets to the bottom.

PRESSURE FILTERS, PN > 100 bar

SERIES ML - MNL

Application: Mounting in pressure lines with threaded design.
Port size: up to G 1
Working pressure: up to 160 bar
Flow rates: up to 450 l/min
Filtration materials: Interpor fleece or stainless steel wire mesh.
User benefits: Economical, lightweighted filter range for low to medium pressure applications. Requires only minimal clearance during element change and therefore saves valuable space.

SERIES HP 31 - 450

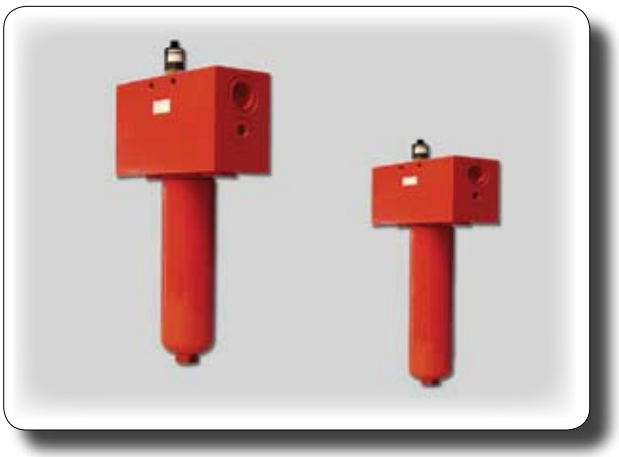
Application: Mounting in pressure lines with threaded design.
Port size: up to G 1 ½ , up to SAE 2”
Working pressure: up to 420 bar
Flow rates: up to 1350 l/min
Filtration materials: Paper, interpor fleece or stainless steel wire mesh.
User benefits: In-line or flange mounting possible with various different port and Δp indicator options. Very high flow rates with a single housing possible.

SERIES HP 170 - 1351

Application: Mounting in pressure lines with flange mounting.
Port size: up to SAE 1 ½"
Working pressure: up to 420 bar
Flow rates: up to 1350 l/min
Filtration materials: Paper, interpor fleece or stainless steel wire mesh.
User benefits: In-line or flange mounting possible with various different port and Δp indicator options. Very high flow rates with a single housing possible.

SERIES HPW

Application: Pressure filters for reversible filtration, mounting in pressure lines with flange or threaded mounting.
Port size: up to G 1 ½, up to flange DN 50, up to G 2
Working pressure: up to 315 bar
Flow rates: up to 400 l/min
Filtration materials: Paper, interpor fleece or stainless steel wire mesh.
User benefits: HPW filters are to be applied where the medium that should be filtered flows through the filter in two directions, and the filter effect for both directions of the flow exists.



SERIES HPV - MDV

Application: In-line pressure filters with differential pressure (cold start) valve.
Port size: HPV - up to G 1 ½, MDV - up to G ¾
Working pressure: HPV - 420 bar, MDV - 200 bar
Flow rates: HPV up to 450 l/min, MDV up to 150 l/min
Filtration materials: Paper, interpor fleece or stainless steel wire mesh.
User benefits: Permanent supply of clean oil is guaranteed. If the element is clogged, change is forced, which means that no damage is possible to the downstream components.
Forced (third port) return to the reservoir.

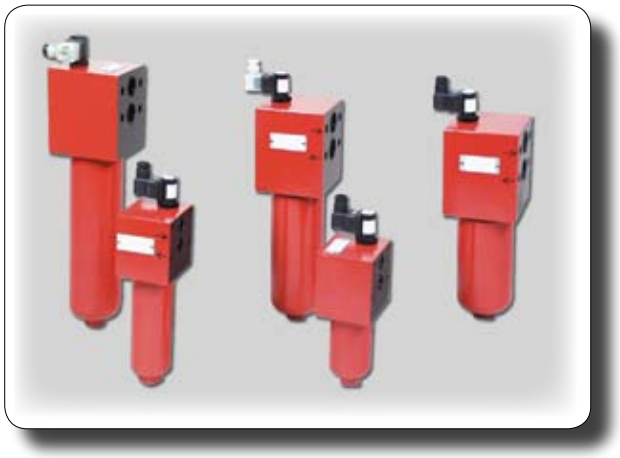
PRESSURE FILTERS, MANIFOLD MOUNTED, PN > 100 bar

SERIES MNU - HNU - HPU - HPP

Application: Mounting in pressure lines with flange or manifold mounting.
Port size: DN 32
Working pressure: 160 bar, 315 bar
Flow rates: HPP - up to 1350 l/min
Filtration materials: Paper, interpor fleece or stainless steel wire mesh.
User benefits: Simplified mounting, which saves valuable space. Provides filtration directly at the point needed. Prevents dirty fluid from passing downstream during the element change.

SERIES HPF - HPX - HPY

Application: Mounting in pressure lines with manifold mounting.
Port size: up to DN 36
Working pressure: up to 315 bar
Flow rates: HPF - up to 1350 l/min
Filtration materials: Paper, interpor fleece or stainless steel wire mesh.
User benefits: Simplified mounting, which saves valuable space. Provides filtration directly at the point needed. Prevents dirty fluid from passing downstream during the element change.



TANK MOUNTED SUCTION FILTERS

SERIES AS - TS - TSW - ASF

Application: Mount into the side of the reservoir below oil levels, directly mounted to the reservoir vertically (TS-series) or horizontally (TSW-series).
Suction side is in the reservoir with a check valve to stop oil draining from the reservoir when being serviced.
Port size: up to SAE 3 ½", up to G 1 ½
Flow rates: up to 700 l/min
Filtration materials: Paper, interpor fleece or stainless steel wire mesh.
User benefits: Suction filters which can be serviced from the outside of the reservoir with no additional check valve needed.

OFF-LINE FILTERS

SERIES NF

Application: The partial flow filter NF is foreseen for fine filtration of hydraulic and lubrication circuits additionally to the main filter.
Port size: up to SAE 2 ½"
Working pressure: 16 bar
Flow rates: up to 1000 l/min
Filtration materials: Paper, interpor fleece or stainless steel wire mesh. NF-filters can be provided with filter elements for water absorption.
User benefits: The large filtration area in comparison to the nominal size is the premise for a high dirt-retaining capacity even in a case of small filter fineness. Element change without tools is possible. After release of the straining screw and removal of the cover, the elements are accessible and can be changed.

Please request separate data sheets for our FILTER SERIES

TANK BREATHERS

SERIES NBF - EBF - BFD - BF

Application: Air breathers assure no contamination reaches the tank through air exchange and condensation of water in reservoirs.
Port size: up to G 3
Flow rates: up to 3500 l/min
Filtration materials: NBF - Interpor fleece, paper
EBF - Paper
TBF - Paper
BF - WP - Interpor fleece, paper
BFD - Silica gel, interpor fleece
User benefits: Protect systems from airborne debris and / or moisture.

SPIN ON FILTERS

SERIES WPL

Application: In-line filter series, mounted into pressure and return lines for all hydraulic systems.
Port size: up to G 1 ½
Flow rates: up to 260 l/min
Filtration materials: Paper or interpor fleece
User benefits: Easy maintenance. Die-cast aluminum construction saves overall weight. Can be used as suction or return filters.

CLOGGING INDICATORS

SERIES AE - OE - O - E - VS

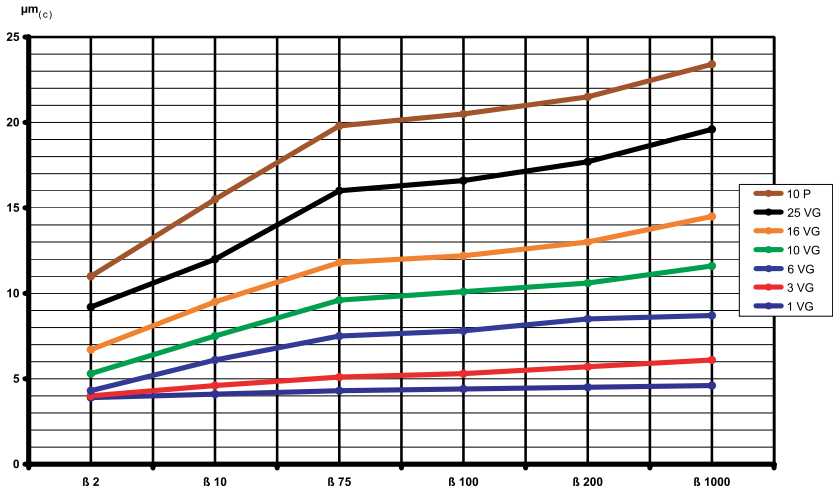
Application: Wide range of clogging indicators for hydraulic and lubricating systems.
User benefits: Easy integration into automatic control systems, continuous contamination control, continuous pressure difference measuring, early identification of increased contamination, optimal utilization of filter elements.
Types: optical, electrical, optical-electrical, electronical, available in the following variations - block execution, explosion-proof, thread execution, with reset function, with control function.

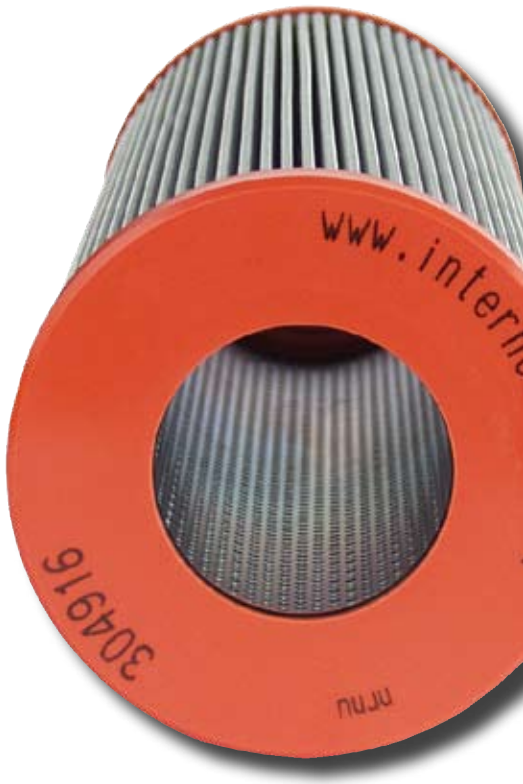
or download them from our website www.internormen.com

FILTER EFFICIENCY DATA

MULTI-PASS PERFORMANCE ACCORDING TO ISO 16889

FILTRATION QUOTIENT ß$_{x(c)}$ INTERPOR GLASS FIBRE





Calculation of the filtration quotient ß$_{x(c)}$

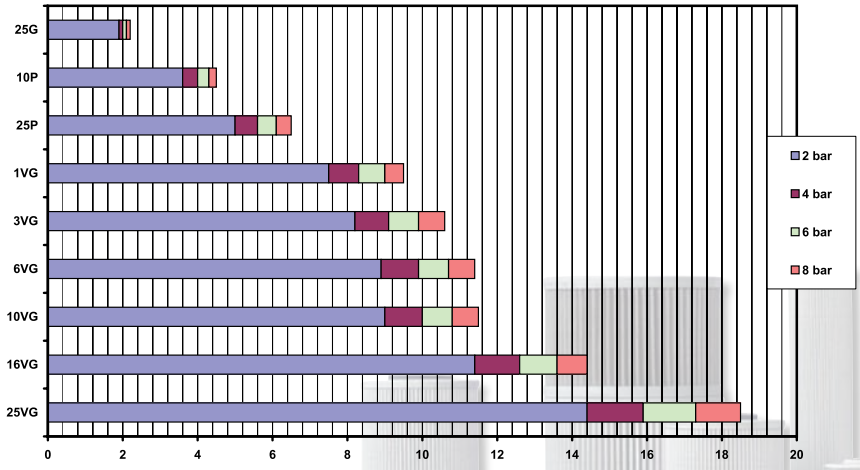
$$ß_{x(c)} = \frac{\text{amount of particles of the size} \geq x\ µm_{(c)} \text{ before the filter}}{\text{amount of particles of the size} \geq x\ µm_{(c)} \text{ after the filter}}$$

Conversion of filtration quotient ß$_{x(c)}$ into filtration efficiency in %

$$\frac{\text{filtration quotient} - 1}{\text{filtration quotient}} \times 100 = \%$$

e.g. $ß_{10(c)} = 200 \longrightarrow \frac{(200-1)}{200} \times 100 = 99{,}5\%$

DIRT HOLDING CAPACITY ACCORDING TO ISO 16889



Dirt holding capacity according to ISO 16889 (test dust : ISO-MTD) of different filter media and different filtration grades. Dirt holding capacities at 2, 4, 6, 8 bar pressure difference.

NECESSARY CLEANLINESS CLASSES IN DEPENDANCY OF A SYSTEMS SENSITIVITY

The cleanliness of the oil in a hydraulic system is dependent on the micron rating of the element, the specific dirt entry as well as the size distribution of the particles in the fluid. The data in the table are standard values. To ascertain the quality of an oil, it has to be analysed.

Kind of system Case of application	Req. class acc. to ISO 4406:99	Req. class acc. to NAS 1638	Recommended ***INTERNORMEN*** filter material
Against fine soiling and mud-ding up of sensitive systems	16/12/8	2-3	1 VG
	17/13/9	3-4	3 VG
Heavy-duty servo systems, high pressure systems with long service life	19/15/11	4-6	6 VG
Proportional valves, industrial hydraulics with high operating safety	20/16/13	7-8	10 VG
Mobile hydraulics, common mechanical engineering, medium pressure systems	22/18/14	7-9	16 VG
Heavy industries, low pressure systems, mobile hydraulics	23/19/15	9-11	25 VG

In addition to tests developed by *INTERNORMEN Technology,* testing of our filter elements is done according to the following ISO-Standards:

ISO 2941 Verification of collapse/burst resistance

ISO 2942 Verification of fabrication integrity

ISO 2943 Verification of material compatibility with fluids

ISO 3723 Method for end load testing

ISO 3724 Verification of flow fatigue characteristics

ISO 3968 Evaluation of pressure drop versus flow characteristics

ISO 16889 Multi-Pass method for evaluating filtration performance

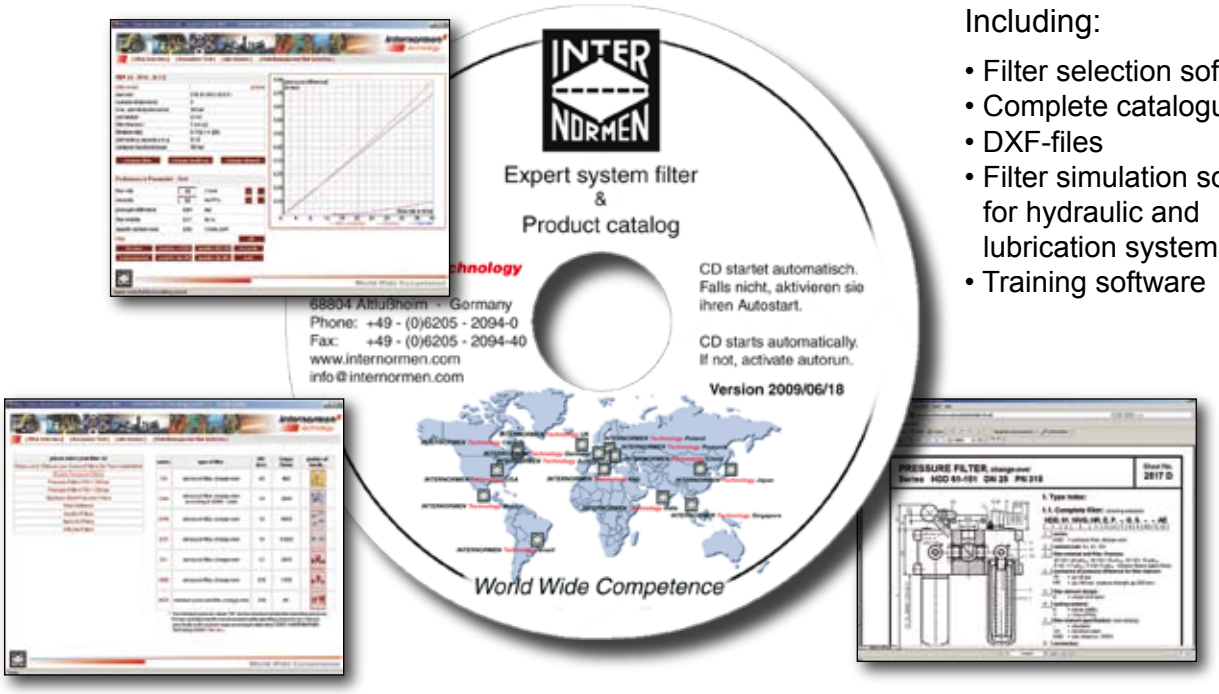
Solution of customer specific filter problems, service in lab and at site are based on the work of our research and development and design teams, supported by computer analysis and measurement methods, and the availability of all necessary test stands according to ISO standards, and continuous production control of filter elements.

The beta ratio of the filter element and its permanent efficiency are guaranteed for high pressure differences. Filter materials, bonding and processing are regularly controlled by means of bubble-point tests, on our test stand, according to ISO 2942.

INTERNORMEN Technology elements can be supplied with 100 % bubble-point tests and corresponding certificates on request.

Become a filtration expert!

Design and explore the filter you need using our CD-ROM



Including:

- Filter selection software
- Complete catalogue
- DXF-files
- Filter simulation software for hydraulic and lubrication systems
- Training software

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GB-02/2011
316047

FULLY AUTOMATIC BACKFLUSHING FILTER TYPE ABF 50 - 1000

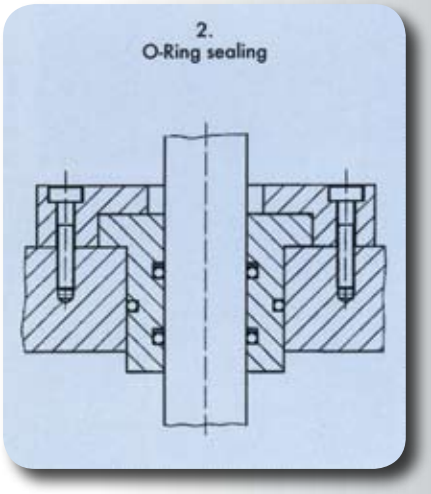
internormen
process technology

INTER NORMEN

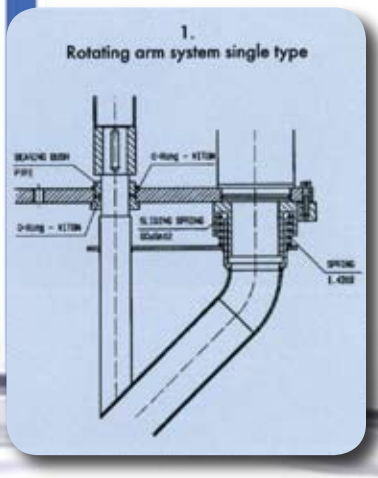
Application

INTERNORMEN - backflushing filters are primarily used for filtration of highly contaminated liquids. They are suitable for filtering fuels, lubrication oils, solvents, machine tool cooling lubrications, chemical process cleaning fluids, water treatment plants in the power industry, in the food sector and for filtration of cooling- and seawater. This filter type is designed to operate trouble free in batch format or continuously. ABF filters may also be used in hazardous areas with all electrical components being designed in accordance with explosion proof classes, for example Eex d2 II CT4.

Construction

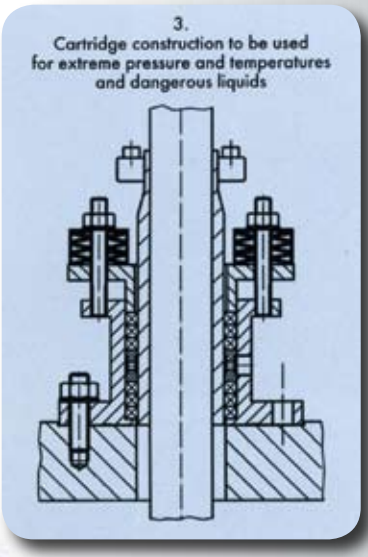


The filter type ABF consists of a filter housing with dished bottom and a flat removable cover. Manufactured in either carbon or specific stainless steels, for example 1.4541 (AISI 321), 1.4571 (AISI 316), 1.4539 (AISI 904L) or other high alloy steels, such as Hastelloy C22, Alloy 624, Inconel, CuNi 90/10 The housing cover sealing is being selected, depending on existing operational conditions, such as pressure, temperature and fluid to be filtered. Two different kinds of sealings are available, according to Pos. 2: O-Ring sealing, or according to Pos.3: as an special cartridge construction suitable for high pressure and high temperatures, as well as for dangerous liquids. The product inlet is located at the lower portion of the filter housing and the product outlet at the top, complete with connecting flanges according to DIN/ANSI as standard. The contaminant discharge point is installed at the lowest point of the filter and equipped with a shut-off valve and flange connection to DIN/ANSI as standard. The vent connection is located at the highest point of the housing.



The filter unit can be equipped with:

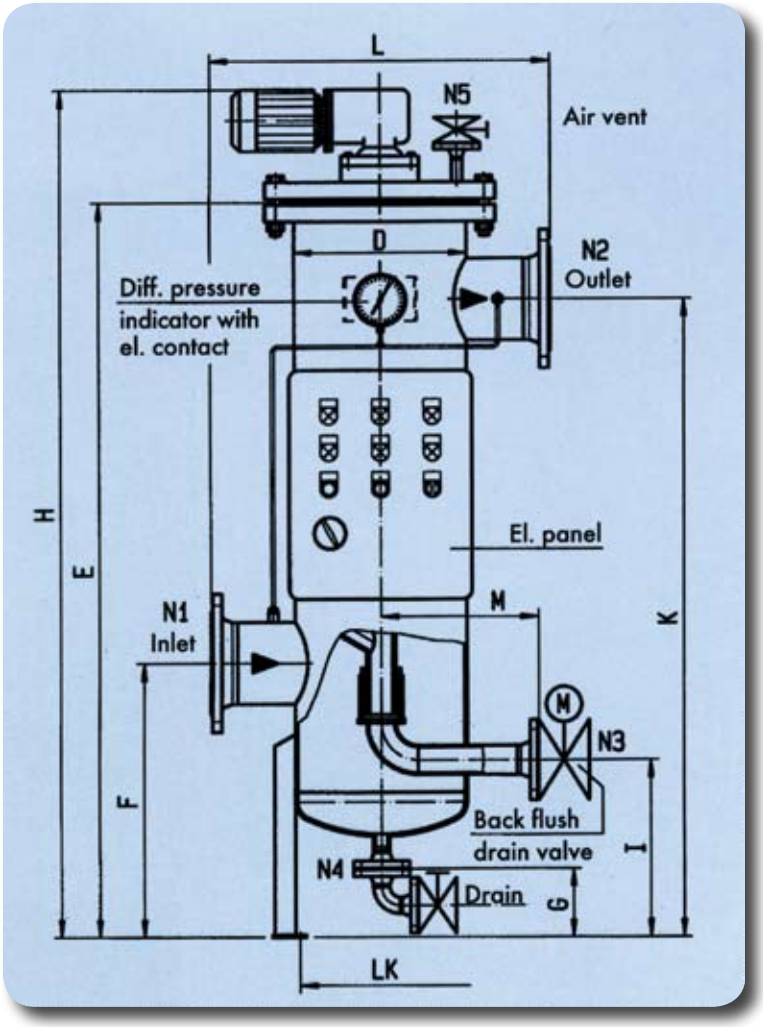
1 differential pressure gauge with output signals 0 to 20 mA
1 electrical gear motor
1 shut-off drain valve under electrical or pneumatic operation (optional)
1 electric control panel



Fully automatic backflushing filter
Type ABF 50 - 1000

Housing material:
Carbon steel
Stainless steel SS304, SS316, SS347 or CuNi 90/10

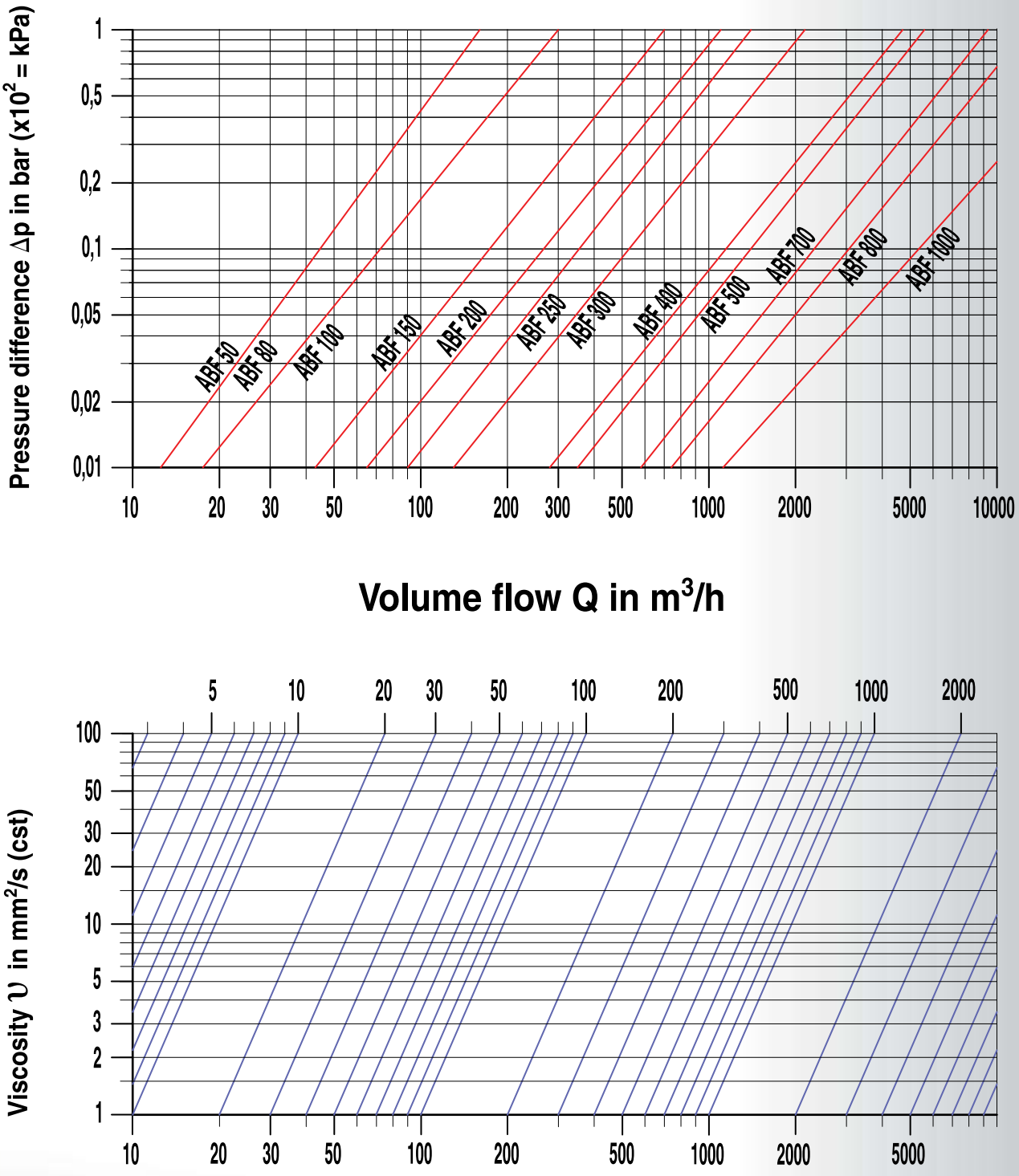
Filter element wedge wire type:
Stainless steel SS304, SS316, Monel or CuNi 90/10



Filter type	Connection max. N1/N2	Connection N3	Connection N4	Filter area m^2	Contents dm^3	Dimensions in mm									
						D	E	F	G	H	I	K	L	M	LK
ABF 50	DN50 /2”	DN25	DN15	0.70	50	219.1	1800	480	200	2050	450	1600	500	230	220
ABF 80	DN80 /3”	DN25	DN15	0.70	50	219.1	1800	480	200	2050	450	1600	500	230	220
ABF 100	DN100 /4”	DN40	DN15	0.90	80	273	1800	510	200	2050	470	1550	600	270	275
ABF 150	DN150 /6”	DN50	DN25	1.70	140	355	1850	550	200	2100	500	1550	700	310	355
ABF 200	DN200 /8”	DN50	DN25	2.15	240	457	1900	600	200	2200	520	1550	850	360	457
ABF 250	DN250 /10”	DN65	DN25	3.15	430	600	1950	660	200	2250	560	1600	1000	430	600
ABF 300	DN300 /12”	DN65	DN25	4.90	580	700	2000	710	200	2300	580	1600	1150	480	700
ABF 400	DN400 /16”	DN100	DN50	7.15	1080	900	2200	860	250	2500	700	1750	1350	590	900
ABF 500	DN500 /20”	DN100	DN50	8.50	1630	1000	2600	910	250	3000	720	2150	1500	640	1000
ABF 700	DN700 /28”	DN125	DN50	14.3	4060	1400	3200	1120	250	3600	820	2600	1850	850	1400
ABF 800	DN800 /32”	DN150	DN50	17.2	5000	1500	3400	1200	250	3800	860	2750	2000	900	1500
ABF 1000	DN1000/40”	DN150	DN50	22.8	8200	1800	3800	1350	250	4200	910	3000	2300	1050	1800

Pressure Drop Diagram:
Fully automatic backflushing filter
Type ABF 50 - 1000
Degree of filtration: 0,2 mm
Density = 1000 kg/m³

The flow versus pressure drop diagram shows the pressure drop of a particular filter size in clean condition, taking into account the volume flow (m³/h) and the viscosity (mm²/s).



For your specific requirements and further information please contact INTERNORMEN'S technical representatives

Installation and start-up

ABF-backflushing filters are being installed vertically in an existing pipeline. Product inlet and outlet are equipped with appropriate valves and fittings, and connected to the existing pipework. Individual motors are internally wired and connected to the control box. Cable connection between the control box and mains is to be carried out on site. Care must be taken during the start-up that all flange connections are tightened via a torque wrench, thus ensuring a tight seal. Check if the discharge fitting is closed. Product inlet and outlet are then opened, and the filter housing must be vented until the product is discharged. The vent fitting must be closed then.

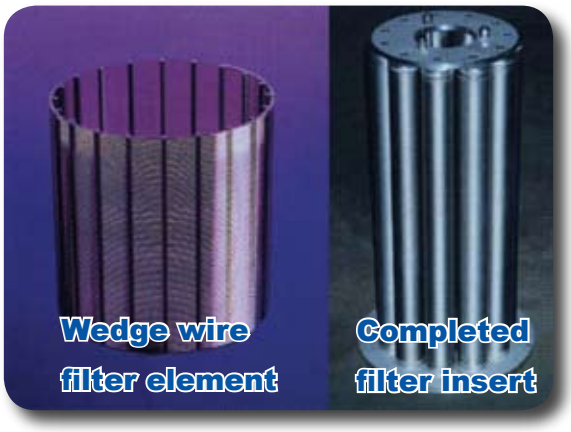
Press the start push button on the control box and the filter is now ready to operate.

Maintenance and spare parts

The maintenance of backflushing filters is simple. It is limited to checking electrical components such as the differential pressure gauge, the gear motor, the shut-off valve and the control panel. The seats of the filter element, housing cover and shut-off fitting must be checked for leakage from time to time, and if necessary seals should be replaced and flange connections retightened.

Possible spare parts:
Filter elements, seals, bolts, nuts and washers, electrical components.

Spare parts should be ordered stating, if possible, the filter type and serial number, together with the spare part name and serial number.



Filter insert

Insert consists of a V-profile wire filter element, wound in various diameters and lengths. They are located in parallel, and loaded from inside to outside, while backflushing is made from outside to inside with a cleaned liquid. The filter elements are available in the following materials:

Stainless steel AISI 304, AISI 347, AISI 316L, AISI 321, Monel, Hastelloy C22, Inconel, CuNi 90/10

The minimum operating pressure has to be 2,0 bar.

Automatically with geared motor, available in various configurations and voltages of 230-690 volts, 50 or 60 Hz, and protection classes from IP54 to IP65. Additionally hazardous protection to Eex d2 CT4 with PLC controling system may be supplied.

Control panels are available either for direct mounting on the filter housing or on a separate location (see photo - right). IP54 and IP65 protection classes are available for the control unit. Additionally hazardous protection Eex d2 CT4 with PLC controling system may be supplied.

World Wide Presence

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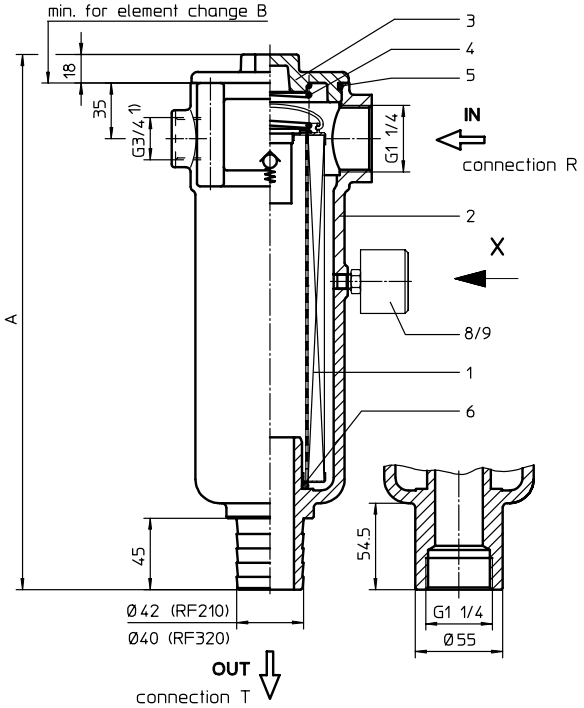
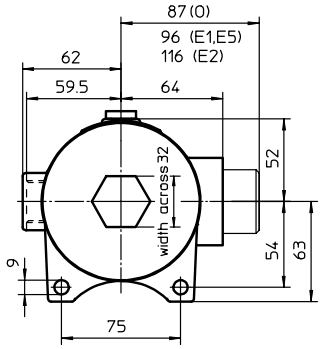
INTER NORMEN

GB-01/2010
329051

RETURN LINE FILTER
Series RF 210-320 DN 32 PN 10

Sheet No.
1102 G





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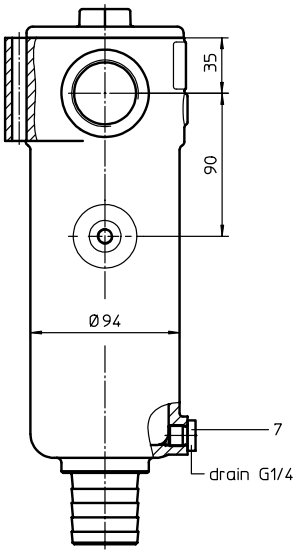

1. Type index:

1.1. Complete filter: (ordering example)

RF.	210.	10VG.	16.	S.	P.	-.	G.	4.	-.	O
1	2	3	4	5	6	7	8	9	10	11

1 **series:**
RF = return-line filter

2 **nominal size:** 210, 320

3 **filter- material and filter- fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$,
6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 P = 25 µm, 10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
16 = Δp 16 bar

5 **filter element design:**
S = with by-pass valve, Δp 2,0 bar
E = without by-pass valve

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
IS07 = see sheet-no. 31602

8 **connection:**
G = thread connection according to DIN 3852, T2

9 **no. of version:**

version		3	4
connection R	**type**	G	G
	size	6	6
connection T	**type**	G	SA
	size	6	42 or 40

type: G = thread
SA = hose nozzle

size: 6 = G 1 ¼
42 = ∅ 42 (RF 210)
40 = ∅ 40 (RF 320)

10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605

11 **clogging indicator:**
- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616

1.2. Filter element: (ordering example)

01E.	210.	10VG.	16.	S.	P.	-.	D
1	2	3	4	5	6	7	8

1 **series:**
01E. = filter element according to INTERNORMEN factory specification

2 **nominal size:** 210, 320

3 - 7 see type index-complete filter

8 **accessories:**
D = with wire strap

2. Dimensions:

type	A	B	weight kg	volume tank
RF 210	337	205	2,7	1,2 l
RF 320	422	290	3,5	1,7 l

[1] additional connection „IN“ max. G ¾, by agreement

Changes of measures and design are subject to alteration!

EDV 04/05

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3. Spare parts:

item	qty.	designation	dimension		article-no.	
			RF 210	RF 320		
1	1	filter element	01E. 210	01E. 320		
2	1	filter housing	NG 210	NG 320		
3	1	screw plug	M90 x 2		301910	
4	1	spring			302144	
5	1	O-ring	82 x 3		305191 (NBR)	305298 (FPM)
6	1	O-ring	40 x 3		304389 (NBR)	304391 (FPM)
7	1	screw plug	G ¼		305003	
8	1	clogging indicator, visual	O		301721	
9	1	pressure switch, electrical	E1, E2 or E5		see sheet-no. 1616	

4. Description:

Return-line filters RF 210-320 are designed for connection in return pipes. The feed pressure at „IN“ connections can be pressurized to 10 bar.
The return pipes at the „OUT“ connection must be < 1m long. The pressure in the return pipe is added to the differential pressure over the filter element and must be considered when consulting the contamination indicator.
The filter element consist of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.
Filter finer than 40 microns should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 microns$_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter can be used with mineral oils, bio-oils, emulsions and most synthetic hydraulic fluids and lubricating oils.
During changing of the filter element care should be taken to ensure that the contaminated side of the filter is emtied before the filter is removed, to ensure that no contaminated liquid enters the discharge pipes. After depressurizing the filter or emptying the contaminated side of the filter and removing the filter cover, the element should be removed by the wire strap and a new element fitted.
Disposal of the contaminated fluid removed from the filter must be carried out in accordance with national regulations.

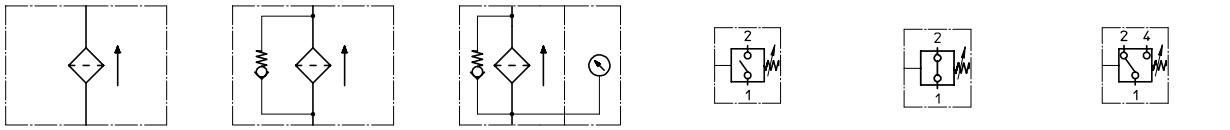
5. Technical data:

temperature range:	-10°C bis +80°C (for a short time +100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	10 bar
opening pressure by-pass valve:	2,0 bar
connection system:	thread connection according to DIN 3852, T2
output:	hose nozzle or thread connection
housing material:	Al-cast; glass fiber reinforced polyamide (filter cover)
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:

without accessories | with by-pass valve | visual O | electrical contact maker E1 | electrical contact breaker E5 | electrical contact maker/breaker E2



7. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’, respectively Δp-curves ; depending on filter fineness and viscosity.

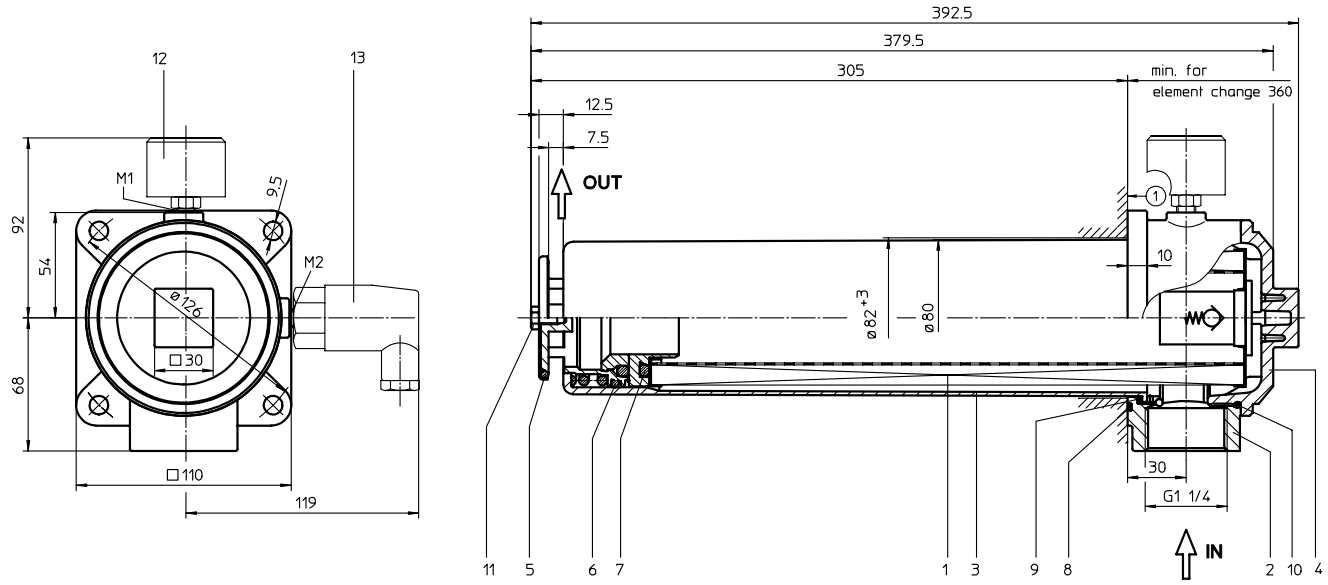
8. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

RETURN LINE FILTER, for horizontal tank-mounting
Series TRW 310 DN 32 PN 10

Sheet No.
1068 C



1. Type index:

1.1. Complete filter: (ordering example)

TRW. 310. 10VG. 16. S. P. -. G. 6. -. O. E2

1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
TRW = return-line-filter for horizontal tank-mounting

2 **nominal size**: 310

3 **filter-material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm,
25 G = 25µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$,
6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 P = 25 µm, 10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
16 = Δp 16 bar

5 **filter element design:**
E = without by-pass valve
S = with by-pass valve, Δp 2,0 bar

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:**
- = standard
VA = stainless steel

8 **connection:**
G = thread connection according to DIN 3852, T2

9 **connection size:**
6 = G 1 ¼

10 **filter housing specification:**
- = standard

11 **clogging indicator at M1:**
- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616

12 **clogging indicator at M2:**
possible indicators see position 12 of the type index

1.2. Filter element: (ordering example)

01E. 320. 10VG. 16. S. P. -

1	2	3	4	5	6	7

1 **series:**
01E. = filter element according to INTERNORMEN factory specification

2 **nominal size:** 320

3 - 7 see type index-complete filter

mounting surface ①

surface quality 3,2

flatness tolerance ⏥ 0,2

weight: approx. 2,8 kg

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Changes of measures and design are subject to alteration!

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2. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01.E 320		
2	1	filter head	NG 210-310	304423	
3	1	filter bowl	NG 310		
4	1	screw plug	M 90 x 2	316637	
5	1	O-ring	53 x 4	309143 (NBR)	- (FPM)
6	1	O-ring	62 x 4	308045 (NBR)	311472 (FPM)
7	2	O-ring	44 x 6	302222 (NBR)	304384 (FPM)
8	1	O-ring	88 x 3	304417 (NBR)	310266 (FPM)
9	1	O-ring	75 x 3	302215 (NBR)	304729 (FPM)
10	1	O-ring	82 x 3	305191 (NBR)	305298 (FPM)
11	1	sheet metal screw	DIN 7976-F 6,3x13	316641	
12	1	clogging indicator, visual	O	301721	
13	1	pressure switch, electrical	E1, E2 or E5	see sheet-no. 1616	

3. Description:

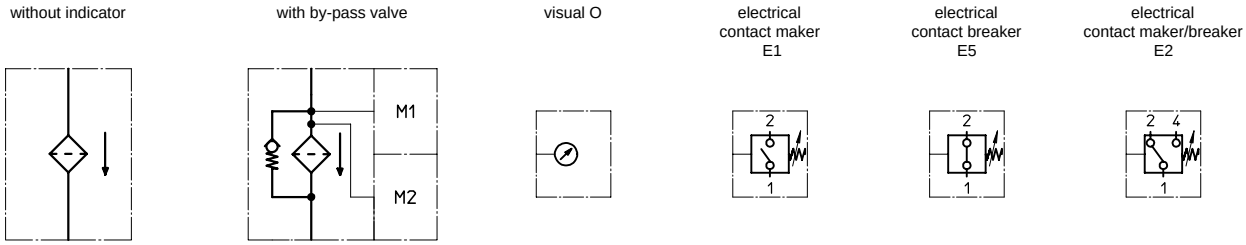
Return-line filters in the TRW series are suitable for a working pressure up to 10 bar.
Pressure peaks will be absorbed by a sufficient margin of safety.
The TRW-filters are directly mounted to the reservoir and connected to the return-line. The return-area „IN“ must be below the oil level.
The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from outside to inside. Filters finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filters can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.
INTERNORMEN-Filters elements are known as stable elements which have excellent filtration capabilities and a high dirt retaining capacity, therefore having a long service life. Due to its practical design, the return-line filter is easy to service.
When changing the filter element a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

4. Technical data:

temperature range:	-10°C to +80°C (for a short time +100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	10 bar
opening pressure by-pass valve:	2,0 bar
connection system:	thread connection according to DIN 3852, T2
housing material:	Al-cast, glass fiber reinforced polyamide
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	1,5 l

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:



6. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’, respectively Δp-curves; depending on filter fineness and viscosity.

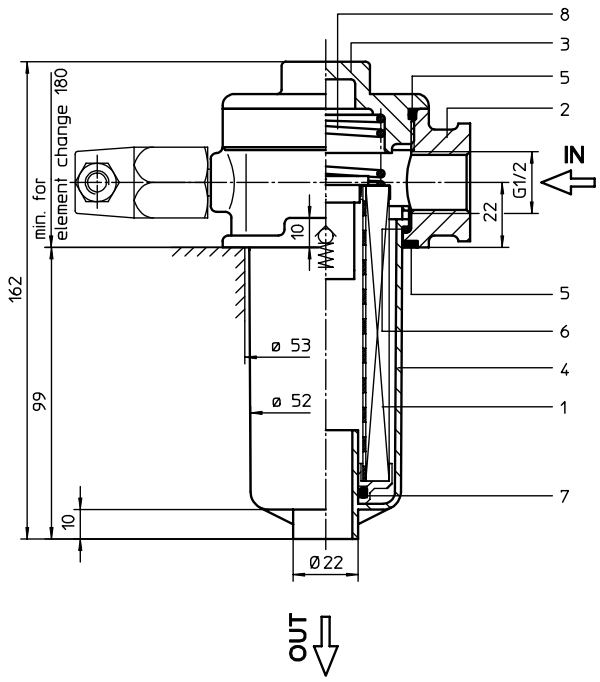
7. Test methods:

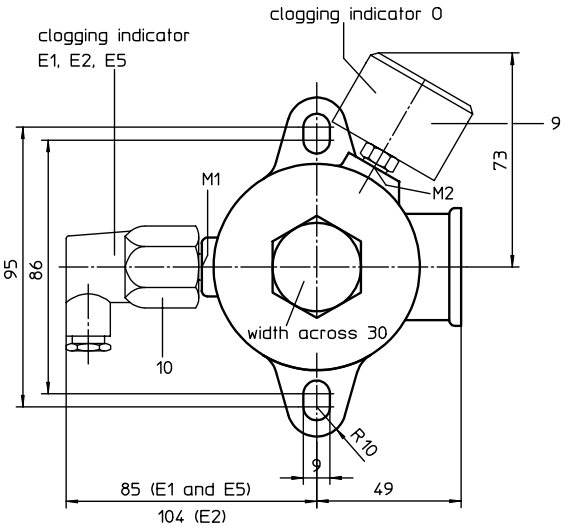
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

RETURN LINE FILTER
Series TEF 41 DN 16 PN 10

Sheet No.
1040 D





When equiped with one clogging indicator use preferably connection M1.

1. Type index:

1.1. Complete filter: (ordering example)

TEF. 41. 10VG. 16. S. P. -. G. 3. -. E1. O (filter with by-pass valve)

1	2	3	4	5	6	7	8	9	10	11	12

TEF. 41. 10VG. 30. E. P. -. G. 3. -. E1. O (filter without by-pass valve)

1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
TEF = tank-mounted return-line-filter

2 **nominal size:** 41

3 **filter-material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25µm
stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$,
3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 P = 25 µm, 10 P = 10 µm paper only with 01E.41

4 **resistance of pressure difference for filter element:**
16 = 01E.41 for Δp 16 bar (standard with by-pass valve)
30 = 01E.60 for Δp 30 bar (standard without by-pass valve)

5 **filter element design:**
E = without by-pass valve (01E.60)
S = with by-pass valve (01E.41) Δp 2,0 bar

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **connection:**
G = thread connection according to DIN 3852, T2

9 **connection size:**
3 = G ½

10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605

11 **clogging indicator at M1:**
- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616

12 **clogging indicator at M2:**
possible indicators see position 11 of the type index

1.2. Filter element: (ordering example)

01E. 41. 10VG. 16. S. P. -

1	2	3	4	5	6	7

(with by-pass valve)

01E. 60. 10VG. 30. E. P. -

1	2	3	4	5	6	7

(without by-pass valve)

1 **series:**
01E. = filter element according to INTERNORMEN factory specification

2 **nominal size**: 41, 60

3 - 7 see type index-complete filter

weight: 0,8 kg

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Changes of measures and design are subject to alteration!

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2. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element with by-pass	01.E 41		
	1	filter element without by-pass	01.E 60		
2	1	filter head	TEF 41 - 55	305458	
3	1	filter cover	M 60 x 2	303621	
4	1	filter bowl	TEF 41	306673	
5	2	O-ring	56 x 3	305072 (NBR)	305322 (FPM)
6	1	O-ring	50 x 2,5	305239 (NBR)	305321 (FPM)
7	1	O-ring	22 x 3,5	304341 (NBR)	304392 (FPM)
8	1	spring	DA = 40	304982	
9	1	clogging indicator visual	O	301721	
10	1	clogging indicator electrical	E1, E2 or E5	see sheet-no. 1616	

3. Description:

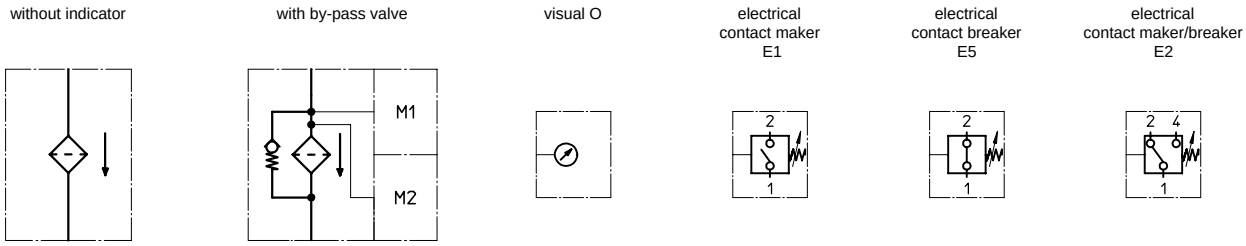
Return-line filters in the TEF series are suitable for a working pressure up to 10 bar.
Pressure peaks will be absorbed by a sufficient margin of safety.
The TEF-filters are directly mounted to the reservoir and connected to the return-line.
The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from outside to inside. Filters finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ microns are available; finer filter elements on request.
INTERNORMEN-Filters can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.
INTERNORMEN-Filters elements are known as stable elements which have excellent filtration capabilities and a high dirt retaining capacity, therefore having a long service life. Due to its practical design, the return-line filter is easy to service.
When changing the filter element a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

4. Technical data:

temperature range:	-10°C to +80°C (for a short time +100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	10 bar
opening pressure by-pass valve:	2,0 bar
connection system:	thread connection according to DIN 3852, T2
housing material:	Al-cast, glass fiber reinforced polyamide
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	0,2 l

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:



6. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

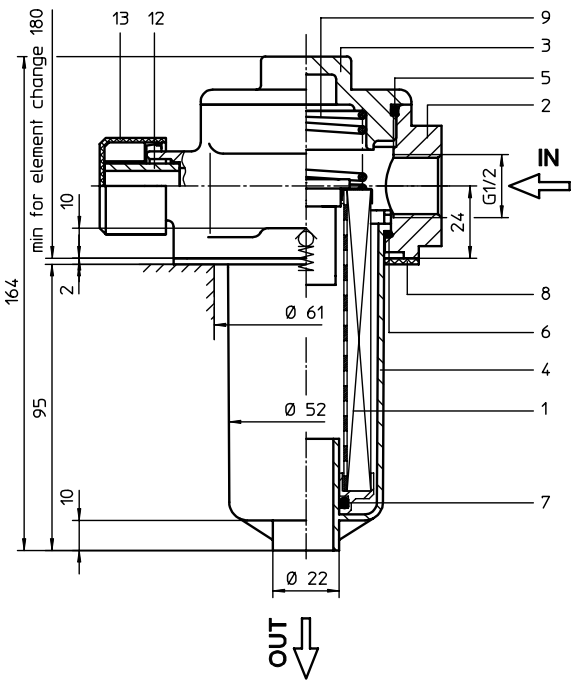
7. Test methods:

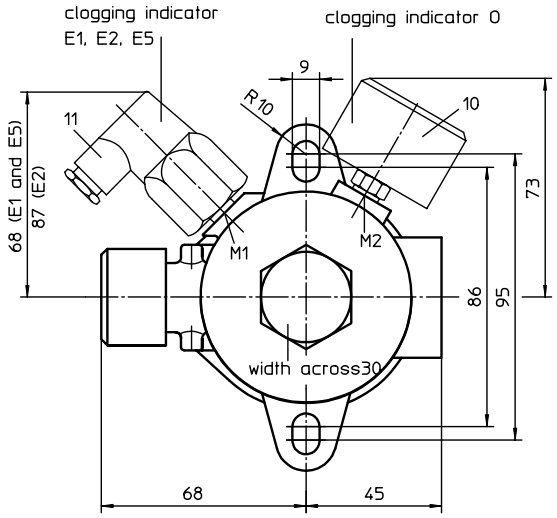
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

RETURN LINE FILTER with breather filter
Series TEFB 41 DN 16 PN 10

Sheet No.
1041 E





When equiped with one clogging indicator use preferably connection M2.

1. Type index:

1.1. Complete filter: (ordering example)

TEFB. 41. 10VG. 16. S. P. -. G. 3. -. E1. O (filter with by-pass valve)

1	2	3	4	5	6	7	8	9	10	11	12

TEFB. 41. 10VG. 30. E. P. -. G. 3. -. E1. O (filter without by-pass valve)

1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
TEFB = tank-mounted return-line-filter with breather filter

2 **nominal size:** 41

3 **filter-material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25µm
stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$,
3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 P = 25 µm, 10 P = 10 µm paper only with 01E.41

4 **resistance of pressure difference for filter element:**
16 = 01E.41 for Δp 16 bar (standard with by-pass valve)
30 = 01E.60 for Δp 30 bar (standard without by-pass valve)

5 **filter element design:**
E = without by-pass valve (01E.60)
S = with by-pass valve (01E.41) Δp 2,0 bar

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **connection:**
G = thread connection according to DIN 3852, T2

9 **connection size:**
3 = G ½

10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605

11 **clogging indicator at M1:**
- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616

12 **clogging indicator at M2:**
possible indicators see position 11 of the type index

1.2. Filter element: (ordering example)

01E. 41. 10VG. 16. S. P. - (with by-pass valve)

1	2	3	4	5	6	7

01E. 60. 10VG. 30. E. P. - (without by-pass valve)

1	2	3	4	5	6	7

1 **series:**
01E. = filter element according to INTERNORMEN factory specification

2 **nominal size**: 41, 60

3 - 7 see type index-complete filter

weight: 0,9 kg

EDV 08/03

Changes of measures and design are subject to alteration!

internormen technology

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2. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element with by-pass	01.E 41		
	1	filter element without by-pass	01.E 60		
2	1	filter head	TEFB 41 - 55	305314	
3	1	filter cover	M 60 x 2	303621	
4	1	filter bowl	TEF 41	306673	
5	1	O-ring	56 x 3	305072 (NBR)	305322 (FPM)
6	1	O-ring	50 x 2,5	305239 (NBR)	305321 (FPM)
7	1	O-ring	22 x 3,5	304341 (NBR)	304392 (FPM)
8	1	gasket	2 thick	303039	
9	1	spring	DA = 40	304982	
10	1	clogging indicator visual	O	301721	
11	1	clogging indicator electrical	E1, E2 or E5	see sheet-no. 1616	
12	1	filter element breather	01BFE.70	301865	
13	1	protection cap		305312	

3. Description:

Return-line filters in the TEFB series are suitable for a working pressure up to 10 bar.
Pressure peaks will be absorbed by a sufficient margin of safety. The TEFB-filters are directly mounted to the reservoir and connected to the return-line. No connection is needed for the build-in air filter. The air filter has a 10 µm throw-away element.
The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from outside to inside. Filters finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filters can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.
INTERNORMEN-Filters elements are known as stable elements which have excellent filtration capabilities and a high dirt retaining capacity, therefore having a long service life. Due to its practical design, the return-line filter is easy to service.
When changing the filter element a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

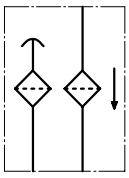
4. Technical data:

temperature range:	-10°C to +80°C (for a short time +100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	10 bar
opening pressure by-pass valve:	2,0 bar
connection system:	thread connection according to DIN 3852, T2
housing material:	Al cast; glass fiber reinforced polyamide
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	0,2 l

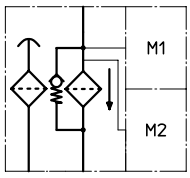
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:

without indicator



with by-pass valve



visual O

electrical
contact maker
E1

electrical
contact breaker
E5

electrical
contact maker/breaker
E2

6. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

7. Test methods:

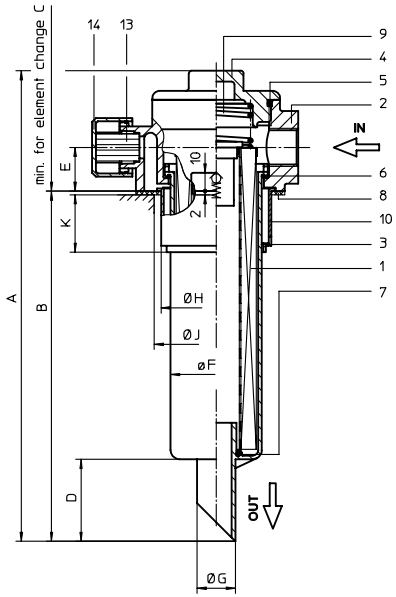
Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

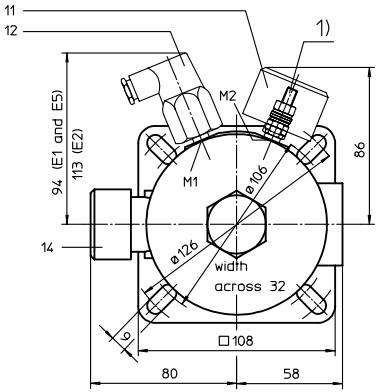
RETURN LINE FILTER, with breather filter
Series TEFB 55-120 DN 16-25 PN 10

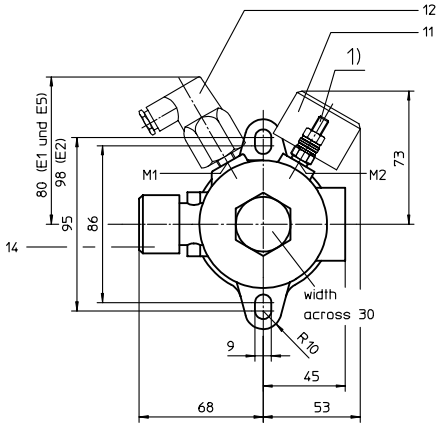
Sheet No. **1061 K**

views TEFB 55, 70



view TEFB 120





1) connection for the potential equalisation, only for application in the explosive area

When equiped with one clogging indicator use preferably connection M2.

2. Dimensions:

type	connection	A	B	C	D	E	F	G	H	J	K	weight kg	volume tank
TEFB 55	G ½	258	192	270	45	24	52	21	60,5	61	31,5	1	0,3 l
TEFB 70	G ¾	258	192	270	45	24	52	21	60,5	61	31,5	1	0,3 l
TEFB 120	G1	284	208	300	65	30	70	24	78,5	79	42	1,5	0,6 l

1. Type index:

1.1. Complete filter: (ordering example)

TEFB. 120. 10VG. 16. S. P. -. G. 5. -. E1. O. 1

1	2	3	4	5	6	7	8	9	10	11	12	13

1 **series:**
TEFB = tank-mounted return-line filter with breather filter

2 **nominal size:** 55, 70, 120

3 **filter-material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm stainless steel wire mesh,
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 P = 25 µm, 10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
16 = Δp 16 bar

5 **filter element design:**
E = without by-pass valve
S = with by-pass valve Δp2,0 bar

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **connection:**
G = thread connection according to DIN 3852, T2

9 **connection size:**
3 = G ½ TEFB 55
4 = G ¾ TEFB 70
5 = G1 TEFB 120

10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605
IS11 = see sheet-no. 40530

11 **clogging indicator at M1:**
- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616
PA = potential equalisation

12 **clogging indicator at M2:**
possible indicators see position 11 of the type index

13 **oil separator:**
- = without
1 = with oil separator

1.2. Filter element: (ordering example)

01E. 120. 10VG. 16. S. P. -

1	2	3	4	5	6	7

1 **series:**
01E. = filter element according to INTERNORMEN factory specification

2 **nominal size:** 70, 120

3 - 7 see type index-complete filter

Changes of measures and design are subject to alteration!

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3. Spare parts:

item	qty.	designation	dimension and article-no.		
			TEFB 55	TEFB 70	TEFB 120
1	1	filter element	01E. 70		01E. 120
2	1	filter head	305314	305315	304743
3	1	filter bowl	304595		303041
4	1	screw plug	M 60 x 2		M 82 x 2
5	1	O-ring	56 x 3 305072 /NBR) 305322 (FPM)		75 x 3 302215 (NBR) 304729 (FPM)
6	1	O-ring	50 x 2,5 305239 (NBR) 305321 (FPM)		68 x 4 303037 (NBR) 313046 (FPM)
7	1	O-ring	22 x 3 304387 (NBR) 304931 (FPM)		24 x 3 303038 (NBR) 304397 (FPM)
8	1	gasket (filter without oil separator)	2 thick 307706		3 thick 303039
	1	gasket (filter with oil separator)	2 thick 306786		3 thick 303039
9	1	spring	DA = 40 304982		DA = 52 302144
10	1	oil separator	304544		310261
11	1	clogging indicator, visual	O 301721		
12	1	pressure switch, electrical	E1, E2 or E5 see sheet-no. 1616		
13	1	filter element breather	01BFE. 70		01BFE. 120
14	1	protection cap	305312		303048

4. Description:

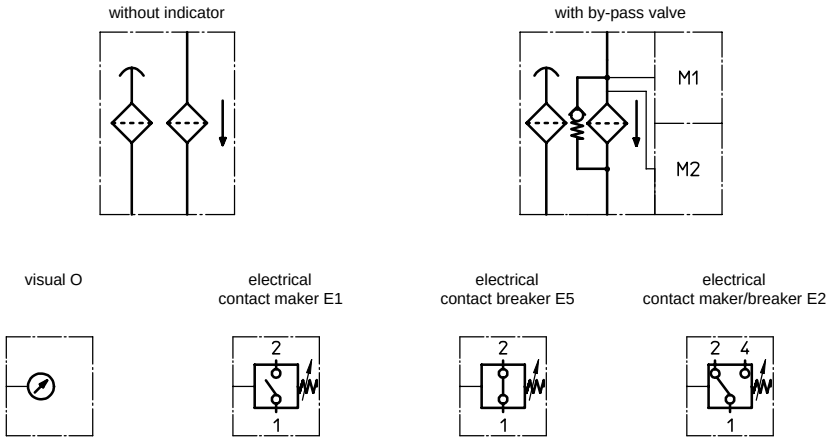
Return-line filters in the TEFB series are suitable for a working pressure up to 10 bar.
Pressure peaks will be absorbed by a sufficient margin of safety. The TEFB-filters are directly mounted to the reservoir and connected to the return-line. No connection is needed for the build-in air filter. The air filter has a 10 µm throw-away element.
The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from outside to inside. Filters finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 µm $_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filters can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.
INTERNORMEN-Filters elements are known as stable elements which have excellent filtration capabilities and a high dirt retaining capacity, therefore having a long service life. Due to its practical design, the return-line filter is easy to service.
When changing the filter element a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

5. Technical data:

temperature range:	- 10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	10 bar
opening pressure by-pass valve:	2,0 bar
line adapter:	thread connection according to DIN 3852, T2
housing material standard:	filter head AL , filter cover / filter bowl glass fibre reinforced polyamide
housing material IS11, category M2:	filter head GG, filter cover steel, filter bowl carbon fibre reinforced polyamide
housing material IS11, category 2:	filter head AL, filter cover / filter bowl carbon fibre reinforced polyamide
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp- curves; depending on filter fineness and viscosity.

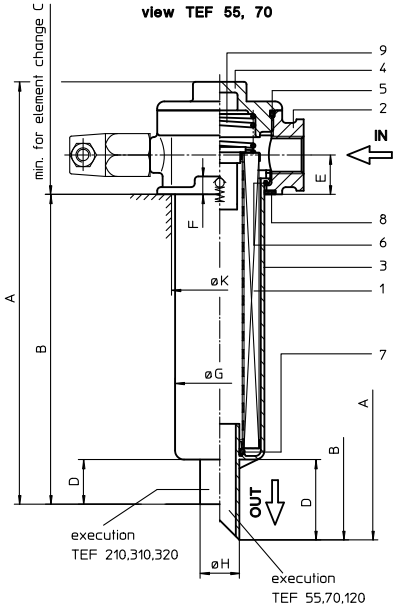
8. Test methods:

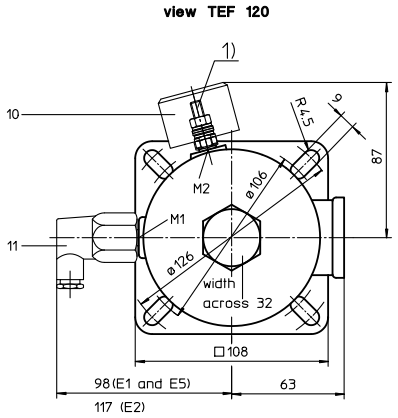
Filter elements are tested according to the following ISO standards:

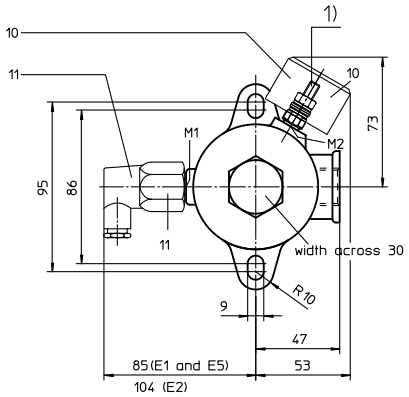
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

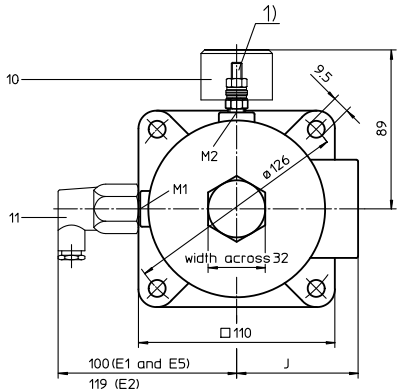
RETURN LINE FILTER
Series TEF 55-320 DN 16-40 PN 10

Sheet No. **1002 U**









When equiped with one clogging indicator use preferably connection M1.

[1] connection for the potential equalisation, only for application in the explosive area

2. Dimensions:

type	connection	A	B	C	D	E	F	G	H	J	K	weight kg	volume tank
TEF 55	G ½	257	194	270	45	22	10	52	21	-	53	0,9	0,3 l
TEF 70	G ¾	257	194	270	45	22	10	52	21	-	53	0,9	0,3 l
TEF 120	G1	285	211	300	65	27	10	70	24	-	72^{+10}	1,5	0,6 l
TEF 210	G 1 ¼	302	227	350	25	30	10	80	38	68	82^{+3}	2,1	1,1 l
TEF 310	G 1 ¼	387	312	405	25	30	10	80	38	68	82^{+3}	2,5	1,4 l
TEF 320	G 1 ½	418	327	465	40	36	10	85	44	71	86^{+6}	2,8	1,7 l

1. Type index:

1.1. Complete filter: (ordering example)

TEF. 70. 10VG. 16. S. P. -. G. 4. -. E1. O. -

1	2	3	4	5	6	7	8	9	10	11	12	13

1 **series:**
TEF = tank-mounted return-line filter

2 **nominal size:** 55, 70, 120, 210, 310, 320

3 **filter-material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm stainless steel wire mesh,
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
16 = Δp 16 bar

5 **filter element design:**
E = without by-pass valve
S = with by-pass valve Δp 2,0 bar
S1 = with by-pass valve Δp 3,5 bar

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **connection:**
G = thread connection according to DIN 3852, T2

9 **connection size:**
3 = G ½ TEF 55
4 = G ¾ TEF 70
5 = G1 TEF 120
6 = G1 ¼ TEF 210/310
7 = G 1 ½ TEF 320

10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605
IS11 = see sheet-no. 40530

11 **measure connection at M1:**
- = without clogging indicator
O = visual see, sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616
PA = potential equalisation

12 **mesure connection at M2:**
possible indicators see position 11 of the type index

13 **permanent magnet:**
- = without
M = with permanent magnet

1.2. Filter element: (ordering example)

01E. 70. 10VG. 16. S. P. -

1	2	3	4	5	6	7

1 **series:**
01E. = filter element according to INTERNORMEN factory specification

2 **nominal size:** 70 (TEF55/70), 120 (TEF120), 210 (TEF210), 320 (TEF310/320)

3 - 7 see type index-complete filter

Changes of measures and design are subject to alteration!

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3. Spare parts:

item	qty.	designation	dimension and article-no.					
			TEF 55	TEF 70	TEF 120	TEF 210	TEF 310	TEF 320
1	1	filter element	01E. 70		01E. 120	01E. 210	01E.320	01E. 320
2	1	filter head						
3	1	filter bowl						
4	1	filter cover	M 60 x 2		M 82 x 2	M 90 x 2		M 100 x 2
5	1	O-ring	56 x 3 305072 /NBR) 305322 (FPM)		75 x 3 302215 (NBR) 304729 (FPM)	82 x 3 305191 (NBR) 305298 (FPM)		96 x 3 305292 (NBR) 305297 (FPM)
6	1	O-ring	50 x 2,5 305239 (NBR) 305321 (FPM)		68 x 4 303037 (NBR) 313046 (FPM)	75 x 3 302215 (NBR) 304729 (FPM)		82 x 3 305191 (NBR) 305298 (FPM)
7	1	O-ring	22 x 3 304387 (NBR) 304931 (FPM)		24 x 3 303038 (NBR) 304397 (FPM)	40 x 3 304389 (NBR) 304391 (FPM)		40 x 3 304389 (NBR) 304391 (FPM)
8	1	O-ring	56 x 3 305072 /NBR) 305322 (FPM)		86 x 3 305470 (NBR) 313047 (FPM)	88 x 3 304417 (NBR) 310266 (FPM)		96 x 3 305292 (NBR) 305297 (FPM)
9	1	spring	DA = 40 304982		DA = 52 302144	DA = 52 302144		DA = 52 305053
10	1	clogging indicator, visual	O 301721					
11	1	pressure switch, electrical	E1, E2 or E5 see sheet-no. 1616					

4. Description:

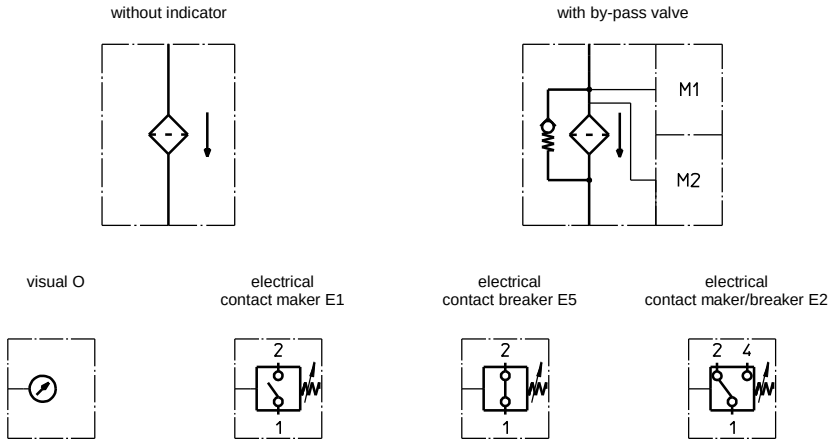
Return-line filters in the TEF series are suitable for a working pressure up to 10 bar. Pressure peaks will be absorbed by a sufficient margin of safety. The TEF-filters are directly mounted to the reservoir and connected to the return-line.
The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from outside to inside. Filters finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filters can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.
INTERNORMEN-Filters elements are known as stable elements which have excellent filtration capabilities and a high dirt retaining capacity, therefore having a long service life. Due to its practical design, the return-line filter is easy to service.
When changing the filter element a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

5. Technical data:

temperature range:	- 10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	10 bar
opening pressure by-pass valve:	2,0 bar, 3,5 bar
line adapter:	thread connection according to DIN 3852, T2
housing material standard:	filter head AL , filter cover / filter bowl glass fibre reinforced polyamide
housing material IS11, category M2:	filter head GG, filter cover steel, filter bowl carbon fibre reinforced polyamide
housing material IS11, category 2:	filter head AL, filter cover / filter bowl carbon fibre reinforced polyamide
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp- curves; depending on filter fineness and viscosity.

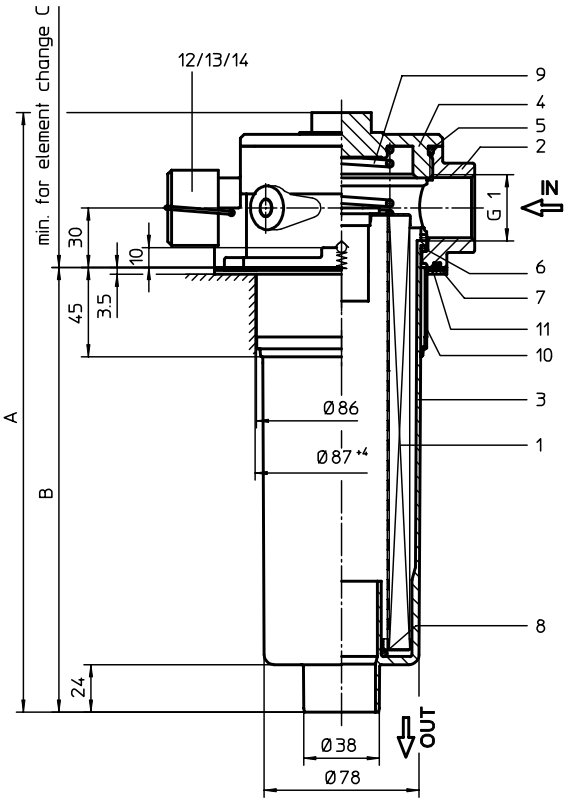
8. Test methods:

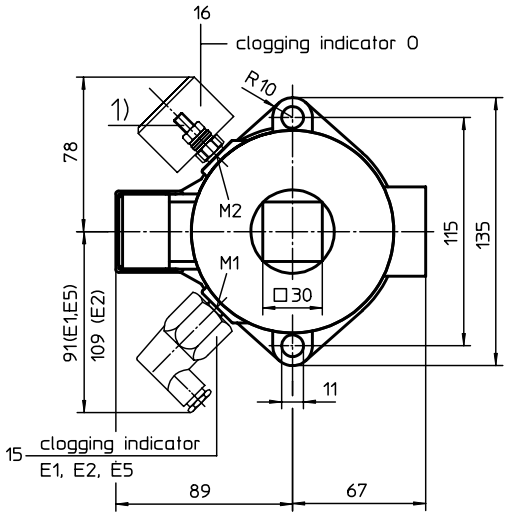
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

RETURN LINE FILTER
Series TEFB 210-310 DN 25 PN 10

Sheet No.
1062 F





[1] connection for the potential equalisation, only for application in the explosive area

When equiped with one clogging indicator use preferably connection M2.

1. Type index:

1.1. Complete filter: (ordering example)

TEFB.	210.	10VG.	16.	S.	P.	-.	G.	5.	-.	E1.	O.	1
1	2	3	4	5	6	7	8	9	10	11	12	13

1 series:
TEFB = tank-mounted return-line-filter with breather filter

2 nominal size: 210, 310

3 filter-material and filter-fineness:
80 G = 80 µm, 40 G = 40 µm, 25 G = 25µm
stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$,
6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 P = 25 µm, 10 P = 10 µm paper

4 resistance of pressure difference for filter element:
16 = Δp 16 bar

5 filter element design:
E = without by-pass valve
S = with by-pass valve Δp 2,0 bar

6 sealing material:
P = Nitrile (NBR)
V = Viton (FPM)

7 filter element specification: (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 connection:
G = thread connection according to DIN 3852, T2

9 connection size:
5 = G 1

10 filter housing specification: (see catalog)
- = standard
IS06 = see sheet-no. 31605
IS11 = see sheet-no. 40530

11 clogging indicator at M1:
- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616
PA = potential equalisation

12 clogging indicator at M2:
possible indicators see position 11 of the type index

13 oil separator:
- = without
1 = with oil separator

1.2. Filter element: (ordering example)

01E.	210.	10VG.	16.	S.	P.	-
1	2	3	4	5	6	7

1 series:
01E. = filter element according to INTERNORMEN factory specification

2 nominal size: 210, 320

3 - 7 see type index complete filter

2. Dimensions:

type	A	B	C	weight kg	volume tank
TEFB 210	302	224	350	2,1	1,0 l
TEFB 310	387	309	435	2,3	1,4 l

EDV 07/10

Changes of measures and design are subject to alteration!

internormen technology

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3. Spare parts:

item	qty.	designation	dimension		article-no.	
			TEFB 210	TEFB 310		
1	1	filter element	01.E 210	01E. 320		
2	1	filter head	TNR 100		313952	
3	1	filter bowl	NG 210	NG 310	304518	305471
4	1	filter cover	M 92 x 3		317014	
5	1	O-ring	82 x 3,5		304403 (NBR)	308745 (FPM)
6	1	O-ring	75 x 3		302215 (NBR)	304729 (FPM)
7	1	O-ring	95 x 3		305808 (NBR)	304828 (FPM)
8	1	O-ring	40 x 3		304991 (NBR)	304997 (FPM)
9	1	spring	DA = 52		305053	
10	1	oil separator				
11	1	gasket (with execution oil separator)	2 thick		325389	
12	1	filter element breather	01BFE. 120		301866	
13	1	protection cap			303048	
14	1	clip			303046	
15	1	clogging indicator electrical	E1, E2 or E5		see sheet-no. 1616	
16	1	clogging indicator visual	O		301721	

4. Description:

Return-line filters in the TEFB series are suitable for a working pressure up to 10 bar.
Pressure peaks will be absorbed by a sufficient margin of safety. The TEFB-filters are directly mounted to the reservoir and connected to the return-line. No connection is needed for the build-in air filter. The air filter has a 10 µm throw-away element.
The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from outside to inside. Filters finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filters can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.
INTERNORMEN-Filters elements are known as stable elements which have excellent filtration capabilities and a high dirt retaining capacity, therefore having a long service life. Due to its practical design, the return-line filter is easy to service.
When changing the filter element a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

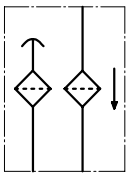
5. Technical data:

temperature range:	-10°C to +80°C (for a short time +100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	10 bar
opening pressure by-pass valve:	2,0 bar
connection system:	thread connection according to DIN 3852, T2
housing material standard:	filter head AL , filter cover / filter bowl glass fibre reinforced polyamide
housing material IS11, category M2:	filter head GG, filter cover steel, filter bowl carbon fibre reinforced polyamide
housing material IS11, category 2	filter head AL, filter cover / filter bowl carbon fibre reinforced polyamide
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

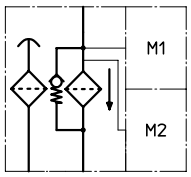
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:

without indicator



with by-pass valve



visual O

electrical contact maker E1

electrical contact breaker E5

electrical contact maker/breaker E2

7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

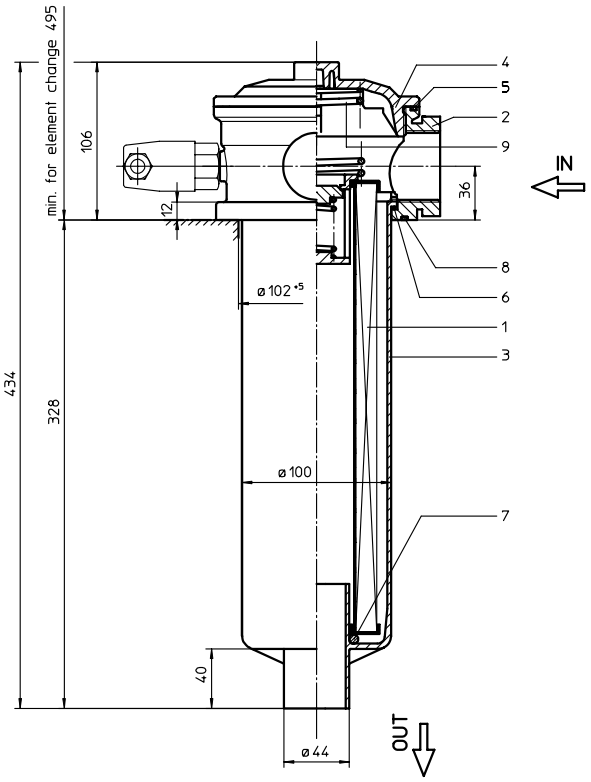
8. Test methods:

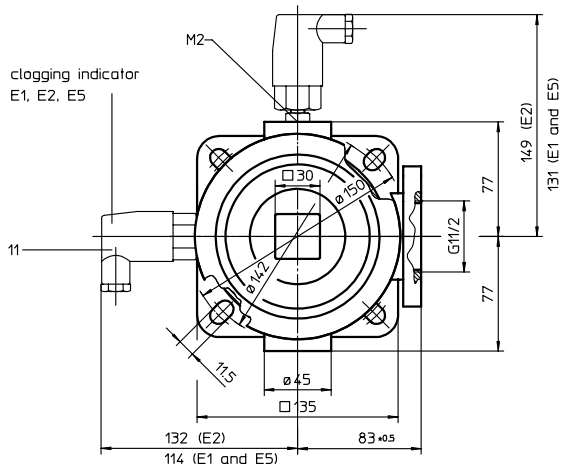
Filter elements are tested according to the following ISO standards:

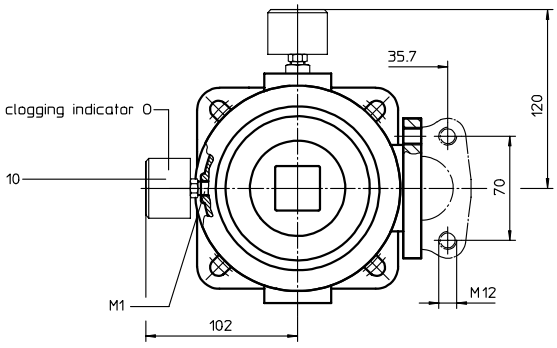
ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

RETURN LINE FILTER
Series TEF 426 DN 40 PN 10

Sheet No.
1043 F







When equiped with one clogging indicator use preferably connection M1.

1. Type index:

1.1. Complete filter: (ordering example)

TEF.	426.	10VG.	16.	S.	P.	-.	G.	7.	-.	O.	E1
1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
TEF = tank-mounted return-line-filter

2 **nominal size:** 426

3 **filter-material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25µm
stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$,
6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 P = 25 µm, 10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
16 = Δp 16 bar

5 **filter element design:**
E = without by-pass valve
S = with by-pass valve Δp 2,0 bar

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **connection:**
G = thread connection according to DIN 3852, T2
FS = SAE-flange connection 3000 PSI

9 **connection size:**
7 = G 1 ½ or 1 ½“ SAE

10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605

11 **clogging indicator at M1:**
- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616

12 **clogging indicator at M2:**
possible indicators see position 11 of the type index

1.2. Filter element: (ordering example)

01E.	425.	10VG.	16.	S.	P.	-
1	2	3	4	5	6	7

1 **series:**
01E. = filter element according to INTERNORMEN factory specification

2 **nominal size:** 425

3 - 7 see type index-complete filter

weight: 2,6 kg

EDV 05/05

Changes of measures and design are subject to alteration!

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2. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01E. 425...	-	
2	1	filter head	nominal size 426	313571	
3	1	filter bowl	nominal size 425	303732	
4	1	screw plug	M 120 x 3	313649	
5	1	O-ring	128 x 3	304602 (NBR)	308140 (FPM)
6	1	O-ring	98 x 4	301914 (NBR)	304765 (FPM)
7	1	O-ring	44 x 6	302222 (NBR)	304384 (FPM)
8	1	O-ring	115 x 3	303963 (NBR)	307762 (FPM)
9	1	spring	DA = 63,5	304983	
10	1	clogging indicator visual	O	see sheet-no. 1616	
11	1	clogging indicator electrical	alternatively E1, E2 or E5	see sheet-no. 1616	

3. Description:

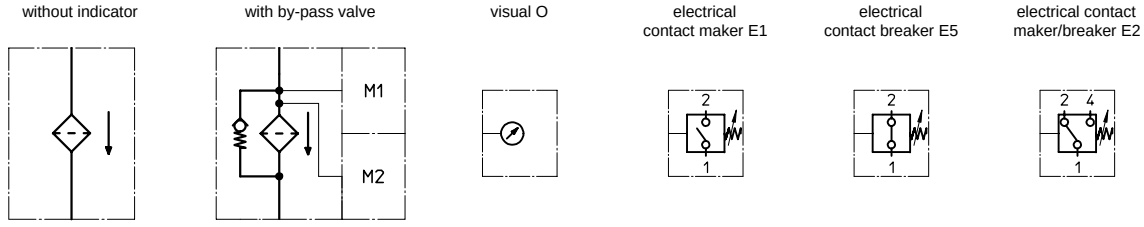
Return-line filters in the TEF series are suitable for a working pressure up to 10 bar.
Pressure peaks will be absorbed by a sufficient margin of safety.
The TEF-filters are directly mounted to the reservoir and connected to the return-line.
The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from outside to inside. Filters finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filters can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.
INTERNORMEN-Filters elements are known as stable elements which have excellent filtration capabilities and a high dirt retaining capacity, therefore having a long service life. Due to its practical design, the return-line filter is easy to service.
When changing the filter element a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

4. Technical data:

temperature range:	-10°C to +80°C (for a short time +100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	10 bar
opening pressure by-pass valve:	2,0 bar
connection system:	thread connection or SAE-flange connection 3000 PSI
housing material:	AL-casting; glass fibre reinforced polyamide
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	2,5 l

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:



6. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter' respectively Δp-curves ; depending on filter fineness and viscosity.

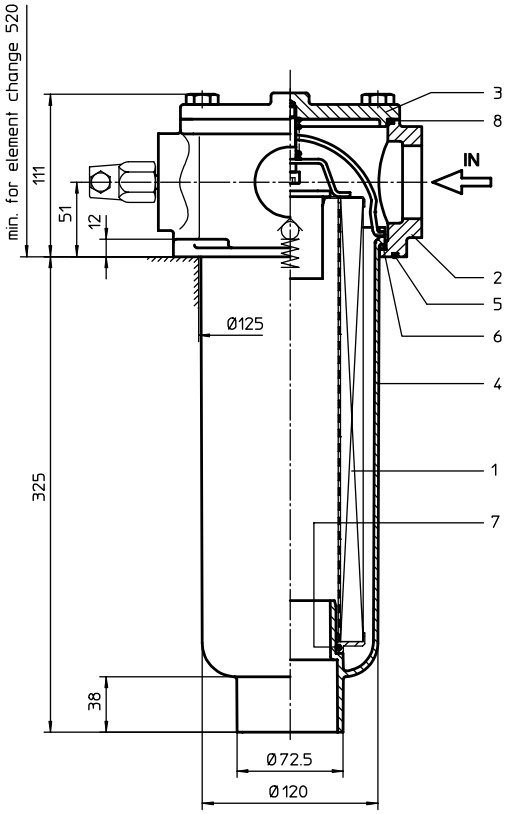
7. Test methods:

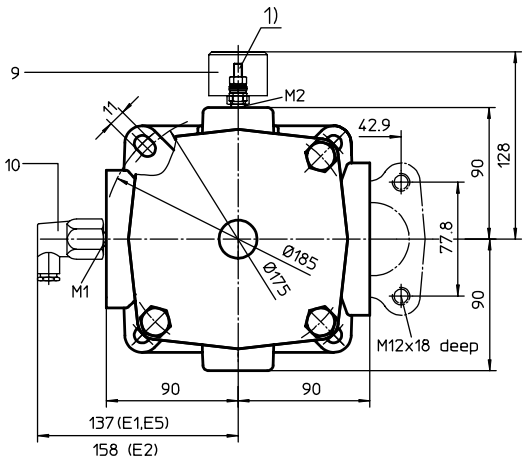
Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

RETURN LINE FILTER
Series TEF 625 DN 50 PN 10

Sheet No.
1042 F





When equiped with one clogging indicator use preferably connection M1.

[1)] connection for the potential equalisation, only for application in the explosive area

1. Type index:

1.1. Complete filter: (ordering example)

TEF. 625. 10VG. 16. S. P. -. FS. 8. -. E1. O

1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
TEF = tank-mounted return-line-filter

2 **nominal size:** 625

3 **filter-material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25µm
stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$,
6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 P = 25 µm, 10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
16 = Δp 16 bar

5 **filter element design:**
E = without by-pass valve
S = with by-pass valve Δp 2,0 bar

6 **sealing material**:
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **connection:**
FS = SAE-flange connection 3000 PSI

9 **connection size:**
8 = 2“

10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605
IS11 = see sheet-no. 40530

11 **measuring connection at M1:**
- = without clogging indicator
O = clogging indicator visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616
PA = potential equalisation

12 **measuring connection at M2:**
possible indicators see position 11 of the type index

1.2. Filter element: (ordering example)

01E. 631. 10VG. 16. S. P. -

1	2	3	4	5	6	7

1 **series:**
01E. = filter element according to INTERNORMEN factory specification

2 **nominal size:** 631

3 - 7 see type index complete filter

2. Accessories:

- Counter flange, see sheet-no. 1652

weight: 4,5 kg

EDV 06/07

Changes of measures and design are subject to alteration!

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3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01E. 631		
2	1	filter head	NG 625		
3	1	filter cover			
4	1	filter bowl	NG 625		
5	1	O-ring	140 x 3	304604 (NBR)	307514 (FPM)
6	1	O-ring	120 x 4	305300 (NBR)	307991 (FPM)
7	1	O-ring	63 x 3,5	311189 (NBR)	311592 (FPM)
8	1	O-ring	135 x 3,5	318386 (NBR)	318387 (FPM)
9	1	clogging indicator, visual	O	301721	
10	1	clogging indicator, electrical	alternatively E1 , E2 or E5	see sheet-no. 1616	

4. Description:

Return-line filters in the TEF series are suitable for a working pressure up to 10 bar.
Pressure peaks will be absorbed by a sufficient margin of safety.
The TEF-filters are directly mounted to the reservoir and connected to the return-line.
The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from outside to inside. Filters finer than 40 µm should use throw-away elements made of paper or Interpor fleece. Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filters can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.
INTERNORMEN-Filters elements are known as stable elements which have excellent filtration capabilities and a high dirt retaining capacity, therefore having a long service life. Due to its practical design, the return-line filter is easy to service.
When changing the filter element a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

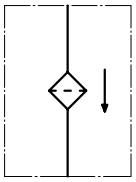
5. Technical data:

temperature range:	-10°C to +80°C (for a short time +100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	10 bar
opening pressure by-pass valve:	2,0 bar
connection system:	SAE-flange connection 3000 PSI
housing material:	filter head / filter cover AL; filter bowl glass fibre reinforced polyamide (standard) filter head / filter cover GG; filter bowl carbon fibre reinforced polyamide (according to IS11)
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	3,7 l

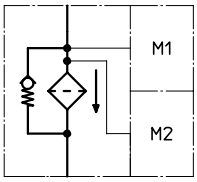
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:

without indicator



with by-pass valve



visual O

electrical
contact maker E1

electrical
contact breaker E5

electrical
contact maker/breaker E2

7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter' respectively Δp-curves ; depending on filter fineness and viscosity.

8. Test methods:

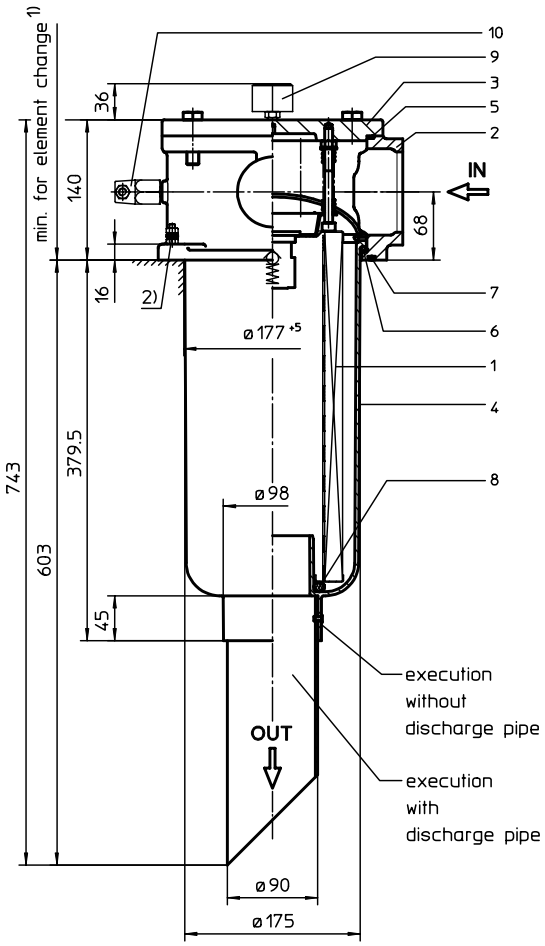
Filter elements are tested according to the following ISO standards:

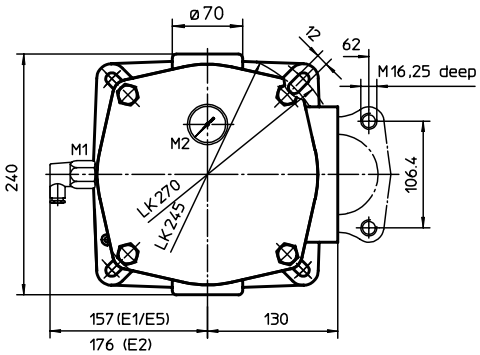
ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

RETURN LINE FILTER
Series TEF 952 DN 80 PN 10

Sheet No.
1060 E

1) min. for element change without discharge pipe 556
min. for element change witht discharge pipe 780





When equiped with one clogging indicator use preferably connection M1.

2) Connection for the potential equalisation, only for application on the explosive area.

1. Type index:

1.1. Complete filter: (ordering example)

TEF.	952.	10VG.	10.	S.	P.	-.	FS.	A.	-.	E1.	O.	-
1	2	3	4	5	6	7	8	9	10	11	12	13

1 series:
TEF = tank-mounted return-line-filter

2 nominal size: 952

3 filter-material and filter-fineness:
80 G = 80 µm, 40 G = 40 µm, 25 G = 25µm
stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$,
6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 P = 25 µm, 10 P = 10 µm paper

4 resistance of pressure difference for filter element:
10 = Δp 10 bar

5 filter element design:
E = without by-pass valve
S = with by-pass valve Δp 2,0 bar
S1 = with by-pass valve Δp 3,5 bar

6 sealing material:
P = Nitrile (NBR)
V = Viton (FPM)

7 filter element specification: (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 connection:
FS = SAE-flange connection 3000 PSI

9 connection size:
A = 3“

10 filter housing specification: (see catalog)
- = standard
IS06 = see sheet-no. 31605
IS11 = see sheet-no. 40530

11 clogging indicator at M1:
- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616

12 clogging indicator at M2:
possible indicators see position 11 of the type index

13 discharge pipe:
- = without
1 = with discharge pipe

1.2. Filter element: (ordering example)

01E.	950.	10VG.	10.	S.	P.	-
1	2	3	4	5	6	7

1 series:
01E. = filter element according to INTERNORMEN factory specification

2 nominal size: 950

3 - **7** see type index-complete filter

2. Accessories:

- Counter flange see sheet-no. 1652

weight: approx.18 kg

EDV 11/10

Changes of measures and design are subject to alteration!

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fax +49 - (0)6205 - 2094-40 url www.internormen.com

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01.E950		
2	1	filter head			
3	1	filter cover			
4	1	filter bowl without discharge pipe			
	1	filter bowl with discharge pipe			
5	1	O-ring	195 x 3,5	301831 (NBR)	306528 (FPM)
6	1	O-ring	170 x 6	304799 (NBR)	306529 (FPM)
7	1	O-ring	190 x 5	305432 (NBR)	310283 (FPM)
8	1	O-ring	78 x 10	305017 (NBR)	305552 (FPM)
9	1	clogging indicator visual	O	301721	
10	1	clogging indicator electrical	alternatively E1, E2 or E5	see sheet-no. 1616	

4. Description:

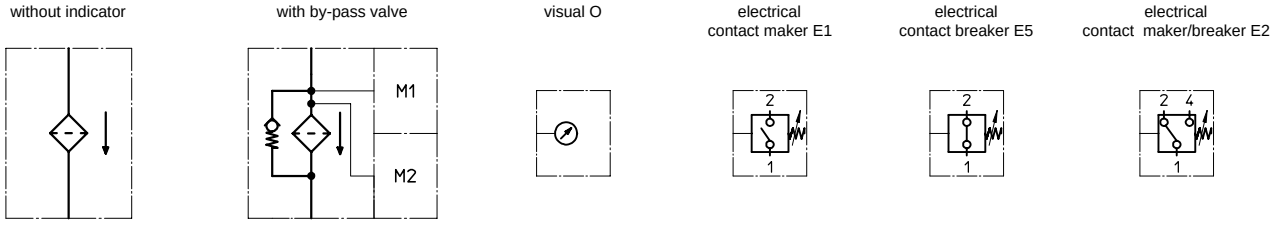
Return-line filters in the TEF series are suitable for a working pressure up to 10 bar.
Pressure peaks will be absorbed by a sufficient margin of safety.
The TEF-filters are directly mounted to the reservoir and connected to the return-line.
The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from outside to inside. Filters finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filters can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.
INTERNORMEN-Filters elements are known as stable elements which have excellent filtration capabilities and a high dirt retaining capacity, therefore having a long service life. Due to its practical design, the return-line filter is easy to service.
When changing the filter element a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

5. Technical data:

temperature range:	-10°C to +80°C (for a short time +100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	10 bar
opening pressure by-pass valve:	2,0 bar, 3,5 bar
connection system:	SAE-flange connection 3000 PSI
housing material:	filter head / filter cover AL, filter bowl glass fibre reinforced polyamide (standard)
	filter head / filter cover GG, filter bowl carbon fibre reinforced polyamide (IS11)
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	10,0 l

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter' respectively Δp-curves ; depending on filter fineness and viscosity.

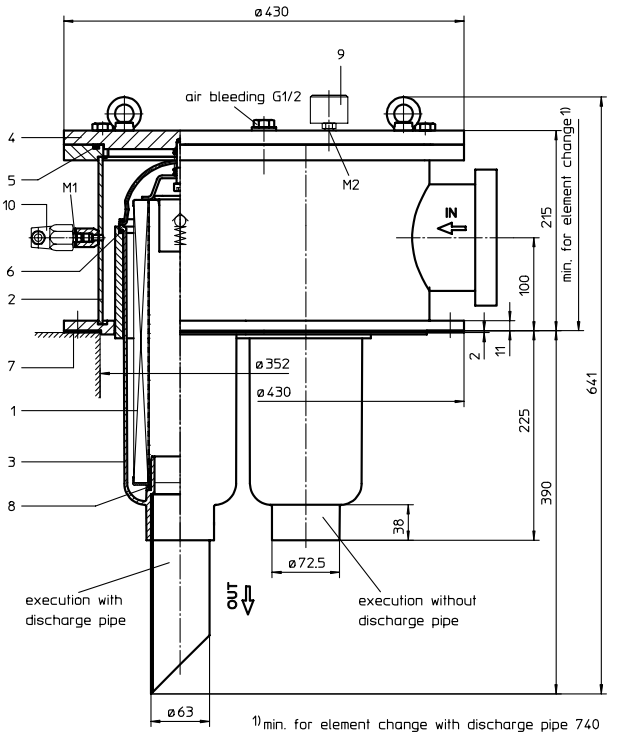
8. Test methods:

Filter elements are tested according to the following ISO standards:

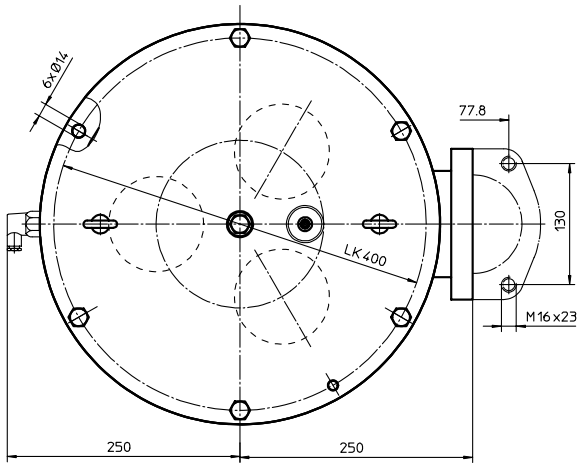
ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristi
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

RETURN LINE FILTER
Series TEF 1652 DN 100 PN 10

Sheet No.
1056 D



1) min. for element change with discharge pipe 740
min. for element change without discharge pipe 575



When equiped with one clogging indicator use preferably connection M1.

1. Type index:

1.1. Complete filter: (ordering example)

TEF. 1652. 10VG. 16. S. P. - FS. B. - E1. O. -

1	2	3	4	5	6	7	8	9	10	11	12	13

1 series:
TEF = tank-mounted return-line-filter

2 nominal size: 1652

3 filter-material and filter-fineness:
80 G = 80 µm, 40 G = 40 µm, 25 G = 25µm
stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$,
6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 P = 25 µm, 10 P = 10 µm paper

4 resistance of pressure difference for filter element:
16 = Δp 16 bar

5 filter element design:
E = without by-pass valve
S = with by-pass valve Δp 2,0 bar

6 sealing material:
P = Nitrile (NBR)
V = Viton (FPM)

7 filter element specification: (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 connection:
FS = SAE-flange connection 3000 PSI

9 connection size:
B = 4“

10 filter housing specification: (see catalog)
- = standard
IS06 = see sheet-no. 31605

11 clogging indicator at M1:
- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616

12 clogging indicator at M2:
possible indicators see position 11 of the type index

13 discharge pipe:
- = without
1 = with discharge pipe

1.2. Filter element: (ordering example)

01E. 631. 10VG. 16. S. P. -

1	2	3	4	5	6	7

1 series:
01E. = filter element according to INTERNORMEN factory specification

2 nominal size: 631

3 - **7** see type index-complete filter

2. Accessories:
- Counter flange see sheet-no. 1652

weight: approx. 55 kg

Changes of measures and design are subject to alteration!

EDV 08/03

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3. Spare parts:

item	qty.	designation	dimension	article-no..	
1	3	filter element	01E.631		
2	1	filter head [1)]			
3	3	filter bowl with discharge pipe [1)]			
	3	filter bowl without discharge pipe [1)]			
4	1	filter cover [1)]			
5	1	O-ring	355 x 5	314740 (NBR)	314739 (FPM)
6	3	O-ring	120 x 4	305300 (NBR)	307991 (FPM)
7	1	gasket	430 x 350 x 2	313271 (NBR)	316659 (FPM)
8	3	O-ring	63 x 3,5	311189 (NBR)	311592 (FPM)
9	1	clogging indicator, visual	O	301721	
10	1	clogging indicator, electrical	E1, E2 or E5	see sheet-no. 1616	

[1)] In case of ordering these spare parts use the complete type index

4. Description:

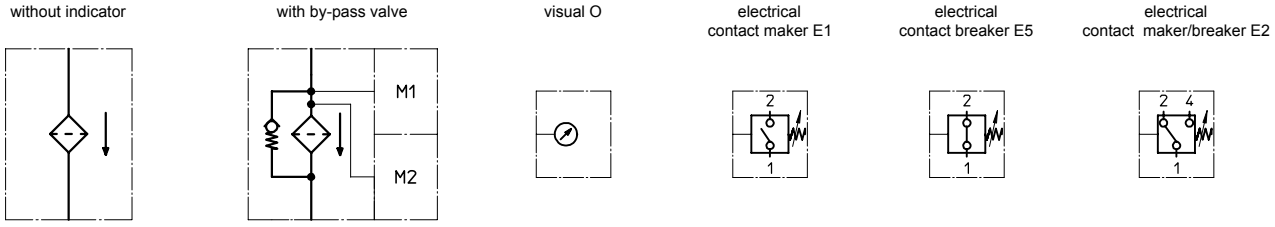
Return-line filters in the TEF series are suitable for a working pressure up to 10 bar.
Pressure peaks will be absorbed by a sufficient margin of safety.
The TEF-filters are directly mounted to the reservoir and connected to the return-line.
The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from outside to inside. Filters finer than 40 µm should use throw-away elements made of paper or Interpor fleece. Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filters can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.
INTERNORMEN-Filters elements are known as stable elements which have excellent filtration capabilities and a high dirt retaining capacity, therefore having a long service life. Due to its practical design, the return-line filter is easy to service.
When changing the filter element a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

5. Technical data:

temperature range:	-10°C to +80°C (for a short time +100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	10 bar
opening pressure by-pass valve:	2,0 bar
connection system:	SAE-flange connection 3000 PSI
housing material:	C-steel; glass fibre reinforced polyamide
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	22,0 l

Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter' respectively Δp-curves ; depending on filter fineness and viscosity.

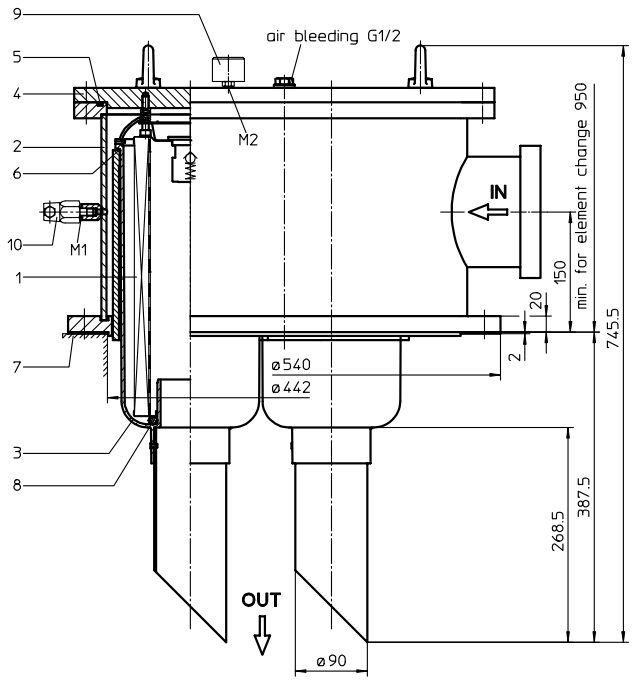
8. Test methods:

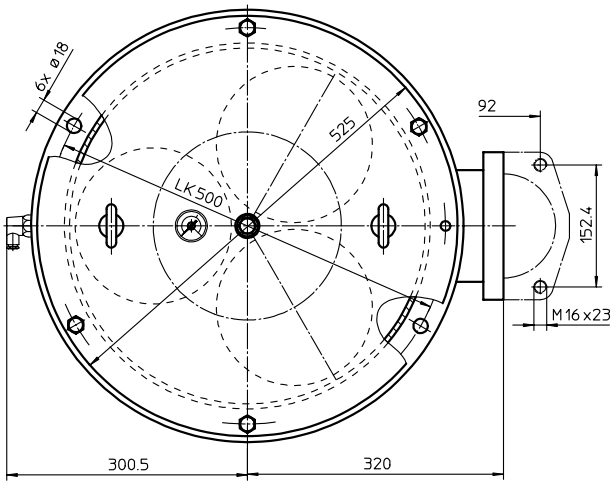
Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

RETURN LINE FILTER
Series TEF 2551 DN 125 PN 10

Sheet No.
1015 O





When equiped with one clogging indicator use preferably connection M1.

1. Type index:

1.1. Complete filter: (ordering example)

TEF. 2551. 10VG. 10. S. P. -. FS. C. -. E1. O

1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
TEF = tank-mounted return-line-filter

2 **nominal size:** 2551

3 **filter-material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25µm
stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$,
6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 P = 25 µm, 10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
E = without by-pass valve
S = with by-pass valve Δp 2,0 bar

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **connection:**
FS = SAE-flange connection 3000 PSI

9 **connection size:**
C = 5“

10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605

11 **clogging indicator at M1:**
- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616

12 **clogging indicator at M2:**
possible indicators see position 11 of the type index

1.2. Filter element: (ordering example)

01E. 950. 10VG. 10. S. P. -

1	2	3	4	5	6	7

1 **series:**
01E. = filter element according to INTERNORMEN factory specification

2 **nominal size:** 950

3 - 7 see type index-complete filter

2. Accessories:

- Counter flange, see sheet-no. 1652

weight: approx. 125 kg

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Changes of measures and design are subject to alteration!

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3. Spare parts:

item	qty.	designation	dimension	article-no..	
1	3	filter element	01E.950		
2	1	filter head [1)]		313295	
3	3	filter bowl [1)]		327461	
4	1	filter cover [1)]			
5	1	O-ring	455 x 5	314742 (NBR)	314741 (FPM)
6	3	O-ring	170 x 6	304799 (NBR)	306529 (FPM)
7	1	gasket	540 x 441 x 2	313293	
8	3	O-ring	78 x 10	305017 (NBR)	305552 (FPM)
9	1	clogging indicator, visual	O	301721	
10	1	clogging indicator, electrical	E1, E2 or E5	see sheet-no. 1616	

[1)] In case of ordering these spare parts use the complete type index

4. Description:

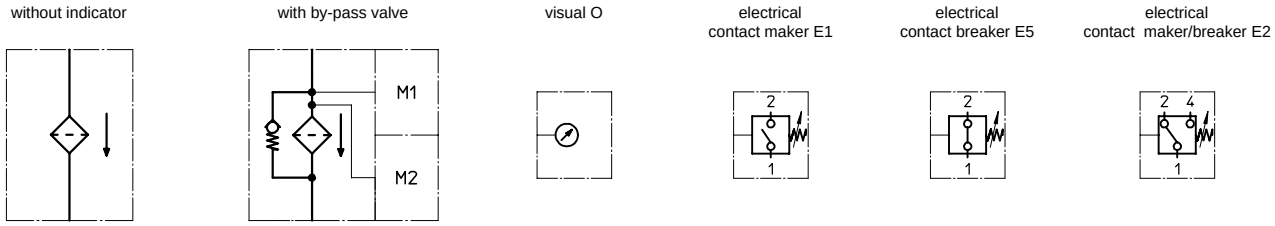
Return-line filters in the TEF series are suitable for a working pressure up to 10 bar.
Pressure peaks will be absorbed by a sufficient margin of safety.
The TEF-filters are directly mounted to the reservoir and connected to the return-line.
The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from outside to inside. Filters finer than 40 µm should use throw-away elements made of paper or Interpor fleece. Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filters can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.
INTERNORMEN-Filters elements are known as stable elements which have excellent filtration capabilities and a high dirt retaining capacity, therefore having a long service life. Due to its practical design, the return-line filter is easy to service.
When changing the filter element a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

5. Technical data:

temperature range:	-10°C to +80°C (for a short time +100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	10 bar
opening pressure by-pass valve:	2,0 bar
connection system:	SAE-flange connection 3000 PSI
housing material:	C-steel. glass fiber reinforced polyamide (filter bowl)
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	47,0 l

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter' respectively Δp-curves ; depending on filter fineness and viscosity.

8. Test methods:

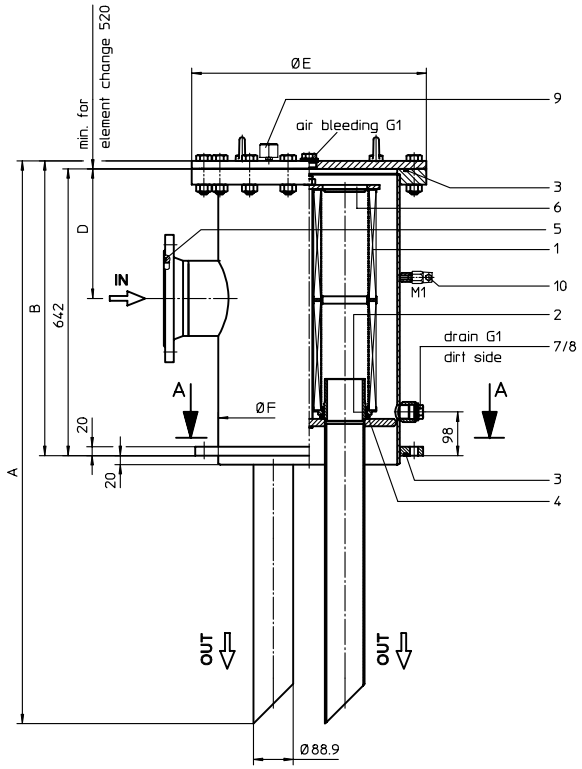
Filter elements are tested according to the following ISO standards:

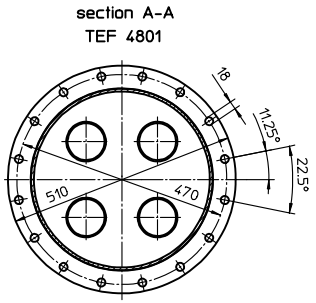
ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

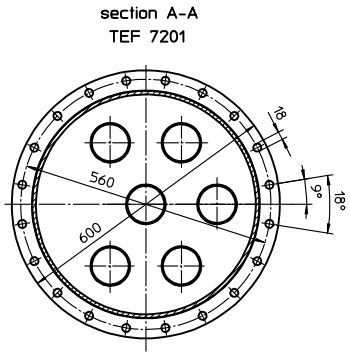
RETURN LINE FILTER

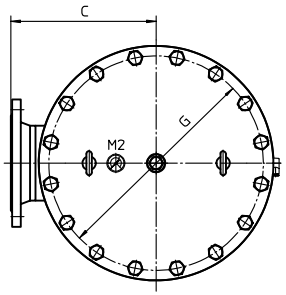
Series TEF 4801-7201 DN 150-200 PN 10

Sheet No. **1058 D**









When equiped with one clogging indicator use preferably connection M1.

2. Dimensions:

type	connection	A	B	C	D	E	F	G	weight	volume tank
TEF 4801	DN 150	1260	660	325	290	525	406	480	193	75,0 l
TEF 7201	DN 200	1264	664	400	280	615	508	570	252	117,0 l

1. Type index:

1.1. Complete filter: (ordering example)

TEF. 4801. 10VG. 10. S. P. -. FD3. D. -. E1. O

1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
TEF = tank-mounted return-line filter

2 **nominal size:** 4801, 7201

3 **filter-material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm stainless steel wire mesh,
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 P = 25 µm, 10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
E = without
S = with by-pass valve Δp 2,0 bar

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **connection:**
FD3 = flange DIN 2633 with O-ring groove (TEF 4801)
FD13 = flange DIN 2632 with O-ring groove (TEF 7201)

9 **connection size:**
D = DN 150 (TEF 4801)
E = DN 200 (TEF 7201)

10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605

11 **clogging indicator at M1:**
- = without
O = visual see, sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616

12 **clogging indicator at M2:**
possible indicators see position 11 of the type index

1.2. Filter element: (ordering example)

01E. 1201. 10VG. 10. S. P. -

1	2	3	4	5	6	7

1 **series:**
01E. = filter element according to INTERNORMEN factory specification

2 **nominal size:** 1201

3 - 7 see type index-complete filter

Changes of measures and design are subject to alteration!

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EDV 08/05

3. Spare parts:

item	designation	qty.	dimension and article-no. TEF 4801	qty.	dimension and article-no. TEF 7201
1	filter element	4	01E. 1201	6	01E. 1201
2	O-ring	4	93 x 5 307588 (NBR) 307589 (FPM)	6	93 x 5 307588 (NBR) 307589 (FPM)
3	O-ring	2	429 x 6 308659 (NBR) 310273 (FPM)	2	516 x 6 301962 (NBR) 311474 (FPM)
4	O-ring	4	85 x 10 304386 (NBR) 304541 (FPM)	6	85 x 10 304386 (NBR) 304541 (FPM)
5	O-ring	1	170 x 4 306875 (NBR) 307987 (FPM)	1	225 x5 308652 (NBR) 311473 (FPM)
6	pressure plate	1	319677	1	327718
7	screw plug	2	G 1 309732		
8	gasket	2	A 33 x 39 308257		
9	clogging indicator, visual	1	O see sheet-no. 1616		
10	pressure switch, electrical	1	E1, E2 oder E5 see sheet-no. 1616		

4. Description:

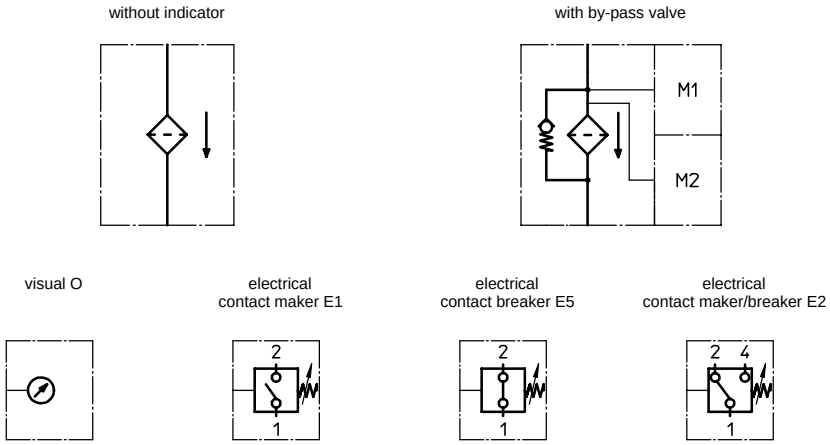
Return-line filters in the TEF series are suitable for a working pressure up to 10 bar. Pressure peaks will be absorbed by a sufficient margin of safety. The TEF-filters are directly mounted to the reservoir and connected to the return-line.
The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from outside to inside. Filters finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 µm $_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filters can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.
INTERNORMEN-Filters elements are known as stable elements which have excellent filtration capabilities and a high dirt retaining capacity, therefore having a long service life. Due to its practical design, the return-line filter is easy to service.
When changing the filter element a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

5. Technical data:

temperature range:	- 10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	10 bar
opening pressure by-pass valve:	2,0 bar
line adapter:	flange connection according to DIN 2633 and DIN 2632
housing material:	c-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp- curves; depending on filter fineness and viscosity.

8. Test methods:

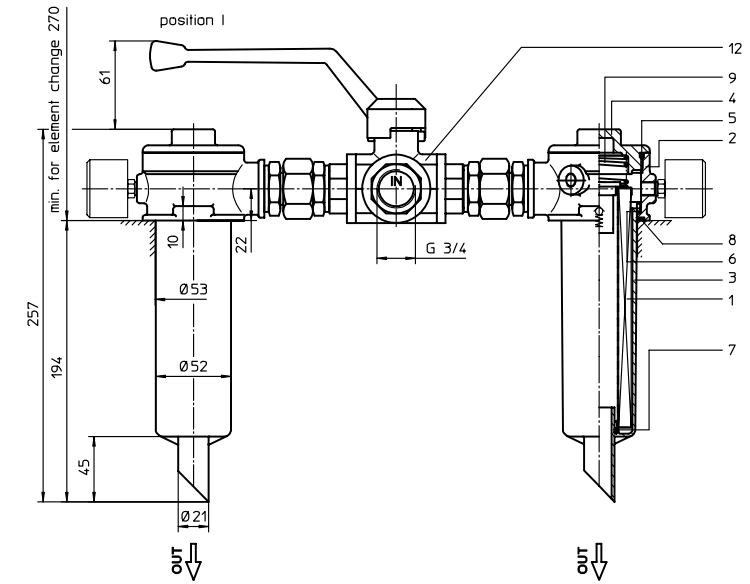
Filter elements are tested according to the following ISO standards:

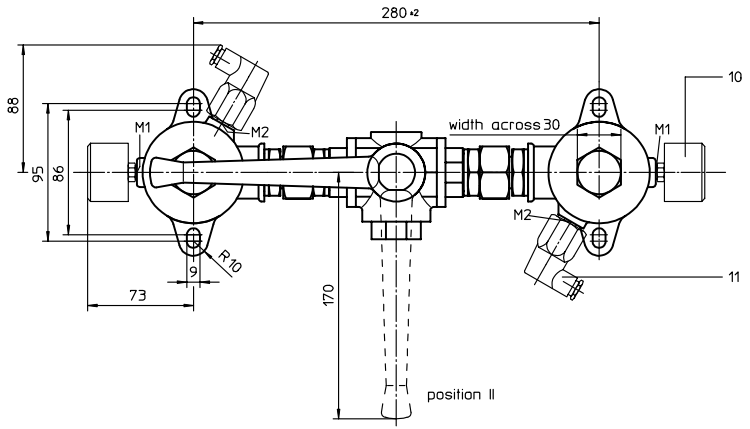
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

RETURN LINE FILTER, change-over

Series DTEF 70 DN 20 PN 10

Sheet No. **1021 E**





Position I: left filter-side in operation
Position II: right filter-side in operation

1. Type index:

1.1. Complete filter: (ordering example)

DTEF. 70. 10VG. 16. S. P. -. G. 4. -. O. E5

1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
DTEF = tank-mounted return-line filter, change-over

2 **nominal size:** 70

3 **filter-material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm stainless steel wire mesh,
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 P = 25 µm, 10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
16 = Δp 16 bar

5 **filter element design:**
E = without by-pass
S = with by-pass, Δp 2,0 bar

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **connection:**
G = thread connection according to DIN 3852, T2

9 **connection size:**
4 = G ¾

10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605

11 **clogging indicator at M1:**
- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616

12 **clogging indicator at M2:**
possible indicators see position 11 of the type index

1.2. Filter element: (ordering example)

01E. 70. 10VG. 16. S. P. -

1	2	3	4	5	6	7

1 **series:**
01E. = filter element according to INTERNORMEN factory specification

2 **nominal size:** 70

3 - 7 see Type index-complete filter

weight: approx. 3,7 kg

Changes of measures and design are subject to alteration!

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2. Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01.E 70	-	
2	2	filter head		305459	
3	2	filter bowl		304595	
4	2	screw plug	M 60 x 2	303621	
5	2	O-ring	56 x 3	305072 (NBR)	305322 (FPM)
6	2	O-ring	50 x 2,5	305239 (NBR)	305321 (FPM)
7	2	O-ring	22 x 3	304387 (NBR)	304931 (FPM)
8	4	O-ring	56 x 3	305072 (NBR)	305322 (FPM)
9	2	spring	DA = 40	304982	
10	2	clogging indicator, visual	O	see sheet-no. 1616	
11	2	pressure switch, electrical	E1, E2 or E5	see sheet-no. 1616	
12	1	three-way-change-over valve		308115	

3. Description:

Return-line filters change-over in the DTEF series are suitable for a working pressure up to 10 bar. Pressure peaks will be absorbed by a sufficient margin of safety. The DTEF-filters are directly mounted to the reservoir and connected to the return-line.
A three-way-change-over valve which is integrated in the middle of the housing makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.
The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from outside to inside. Filters finer than 40 µm should use throuw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 µm $_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filters can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.
INTERNORMEN-Filters elements are known as stable elements which have excellent filtration capabilities and a high dirt retaining capacity, therefore having a long service life. Due to its practical design, the return-line filter is easy to service.
When changing the filter element a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

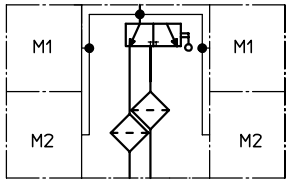
4. Technical data:

temperature range:	- 10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	10 bar
opening pressure by-pass valve:	2,0 bar
connection system:	thread connection according to DIN 3852, T2
housing material:	Al-casting; glass fiber reinforced polyamide
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	2x 0,3 l

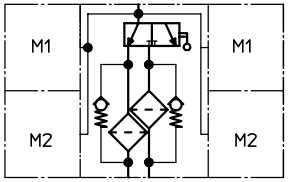
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:

without by-pass valve

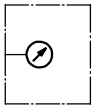


with by-pass valve

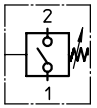


clogging indicator at M1, M2

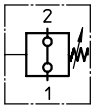
visual O



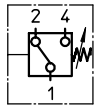
electrical
contact maker E1



electrical
contact breaker E5



electrical
contact maker/breaker E2



6. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp- curves; depending on filter fineness and viscosity.

7. Test methods:

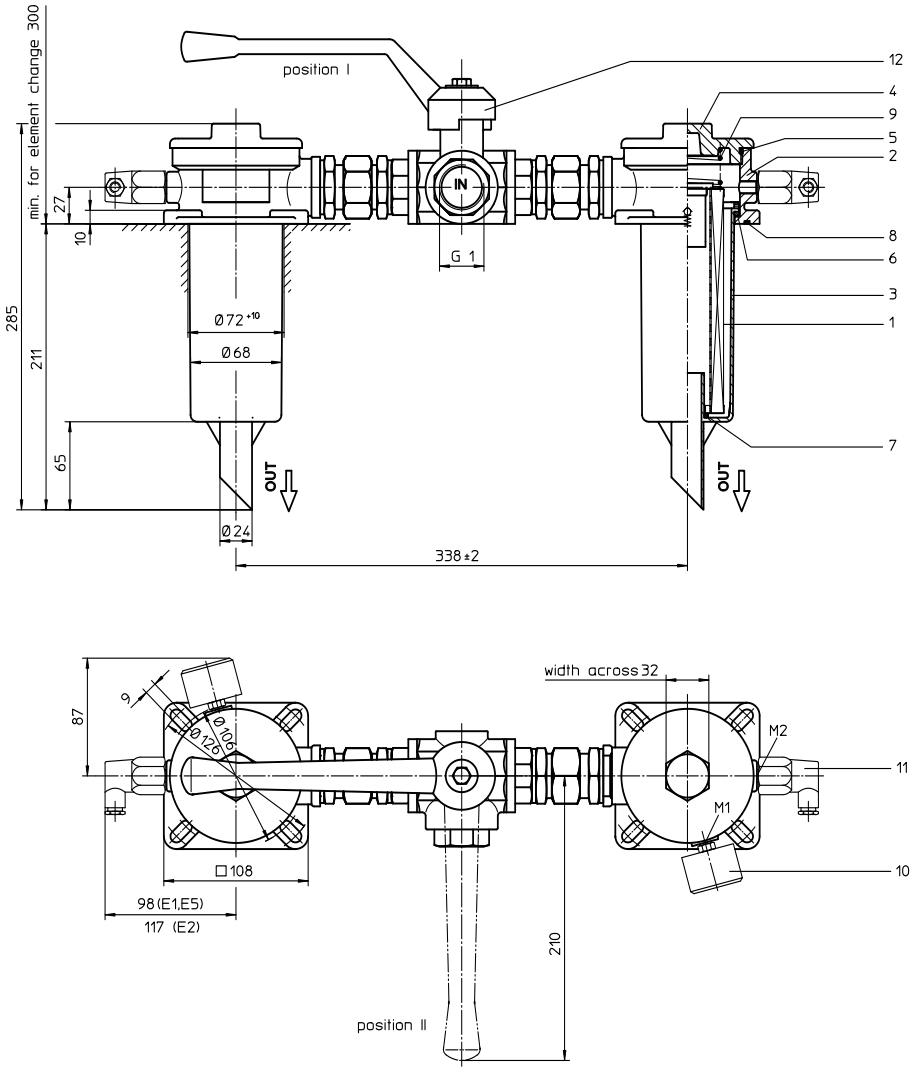
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

RETURN LINE FILTER, change-over

Series DTEF 120 DN 25 PN 10

Sheet No. **1022 F**



Position I: left filter-side in operation
Position II: right filter-side in operation

1. Type index:

1.1. Complete filter: (ordering example)

DTEF. 120. 10VG. 16. S. P. -. G. 5. -. O. E1

1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
DTEF = tank-mounted return-line filter, change-over

2 **nominal size:** 120

3 **filter-material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm stainless steel wire mesh,
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
16 = Δp 16 bar

5 **filter element design:**
E = without by-pass
S = with by-pass, Δp 2,0 bar

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **connection:**
G = thread connection according to DIN 3852, T2

9 **connection size:**
5 = G 1

10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605

11 **clogging indicator at M1:**
- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616

12 **clogging indicator at M2:**
possible indicators see position 11 of the type index

1.2. Filter element: (ordering example)

01E. 120. 10VG. 16. S. P. -

1	2	3	4	5	6	7

1 **series:**
01E. = filter element according to INTERNORMEN factory specification

2 **nominal size:** 120

3 - 7 see Type index-complete filter

weight: approx. 6,0 kg

Changes of measures and design are subject to alteration!

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2. Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01.E 120	-	
2	2	filter head	NG 120	305467	
3	2	filter bowl	NG 120	303041	
4	2	screw plug	M 82 x 2	302069	
5	2	O-ring	75 x 3	302215 (NBR)	304729 (FPM)
6	2	O-ring	68 x 4	303037 (NBR)	313046 (FPM)
7	2	O-ring	24 x 3	303038 (NBR)	304397 (FPM)
8	4	O-ring	86 x 3	305470 (NBR)	313047 (FPM)
9	2	spring	DA = 52	302144	
10	2	clogging indicator, visual	O	see sheet-no. 1616	
11	2	pressure switch, electrical	E1, E2 or E5	see sheet-no. 1616	
12	1	three-way-change-over valve		302123	

3. Description:

Return-line filters change-over in the DTEF series are suitable for a working pressure up to 10 bar. Pressure peaks will be absorbed by a sufficient margin of safety. The DTEF-filters are directly mounted to the reservoir and connected to the return-line.
A three-way-change-over valve which is integrated in the middle of the housing makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.
The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from outside to inside. Filters finer than 40 µm should use throuw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filters can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.
INTERNORMEN-Filters elements are known as stable elements which have excellent filtration capabilities and a high dirt retaining capacity, therefore having a long service life. Due to its practical design, the return-line filter is easy to service.
When changing the filter element a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

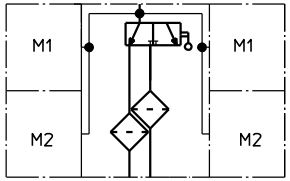
4. Technical data:

temperature range:	- 10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	10 bar
opening pressure by-pass valve:	2,0 bar
connection system:	thread connection according to DIN 3852, T2
housing material:	Al-casting; glass fiber reinforced polyamide
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	2x 0,6 l

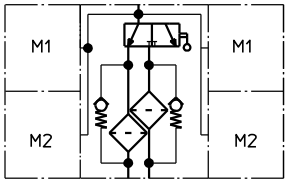
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:

without by-pass valve

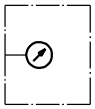


with by-pass valve

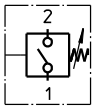


clogging indicator at M1, M2

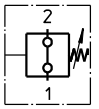
visual O



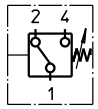
electrical
contact maker E1



electrical
contact breaker E5



electrical
contact maker/breaker E2



6. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp- curves; depending on filter fineness and viscosity.

7. Test methods:

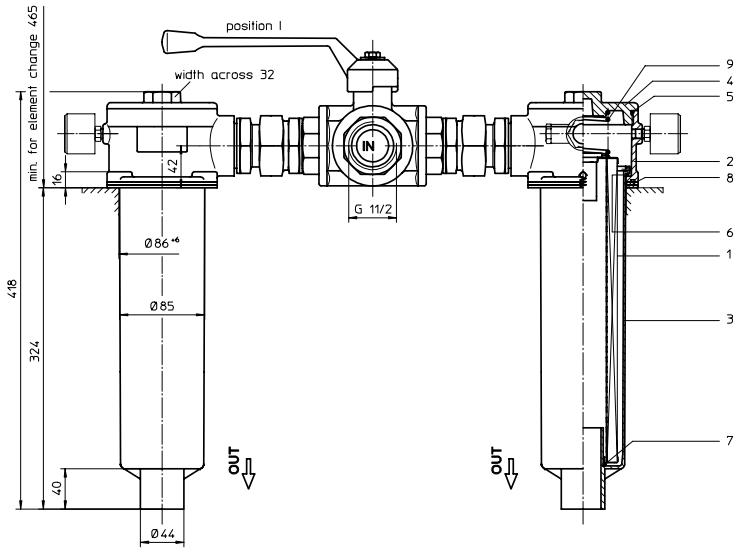
Filter elements are tested according to the following ISO standards:

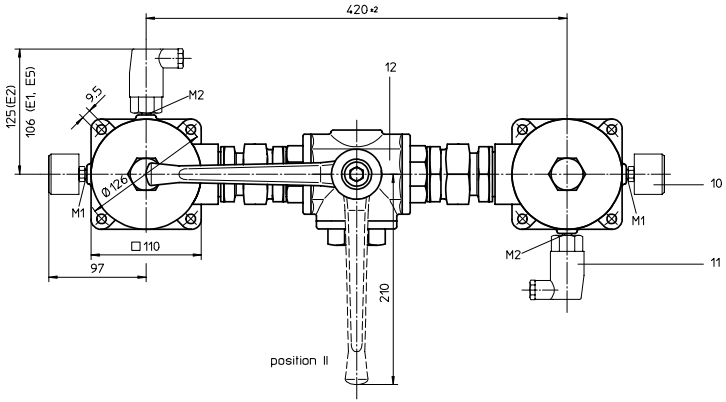
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

RETURN LINE FILTER, change-over

Series DTEF 320 DN 40 PN 10

Sheet No. **1023 L**





Position I: left filter-side in operation
Position II: right filter-side in operation

1. Type index:

1.1. Complete filter: (ordering example)

DTEF. 320. 10VG. 16. S. P. -. G. 7. -. O. E1

1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
DTEF = tank-mounted return-line filter, change-over

2 **nominal size:** 320

3 **filter-material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm stainless steel wire mesh,
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 P = 25 µm, 10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
16 = Δp 16 bar

5 **filter element design:**
E = without by-pass
S = with by-pass, Δp 2,0 bar

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **connection:**
G = thread connection according to DIN 3852, T2

9 **connection size:**
7 = G 1 ½

10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605

11 **clogging indicator at M1:**
- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616

12 **clogging indicator at M2:**
possible indicators see position 11 of the type index

1.2. Filter element: (ordering example)

01E. 320. 10VG. 16. S. P. -

1	2	3	4	5	6	7

1 **series:**
01E. = filter element according to INTERNORMEN factory specification

2 **nominal size:** 320

3 - 7 see Type index-complete filter

weight: approx. 10 kg

Changes of measures and design are subject to alteration!

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2. Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01.E 320	-	
2	2	filter head	NG 320	305475	
3	2	filter bowl	NG 320	302145	
4	2	screw plug	M 100 x 2	302338	
5	2	O-ring	96 x 3	305292 (NBR)	305297 (FPM)
6	2	O-ring	82 x 3	305191 (NBR)	305298 (FPM)
7	2	O-ring	40 x 3	304389 (NBR)	304391 (FPM)
8	4	gasket	110 x 110 x 3	304456 (NBR)	314138 (FPM)
9	2	spring	DA = 52	305053	
10	2	clogging indicator, visual	O	see sheet-no. 1616	
11	2	pressure switch, electrical	E1, E2 or E5	see sheet-no. 1616	
12	1	three-way-change-over valve		308128	

3. Description:

Return-line filters change-over in the DTEF series are suitable for a working pressure up to 10 bar. Pressure peaks will be absorbed by a sufficient margin of safety. The DTEF-filters are directly mounted to the reservoir and connected to the return-line.
A three-way-change-over valve which is integrated in the middle of the housing makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.
The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from outside to inside. Filters finer than 40 µm should use throuw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 µm $_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filters can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.
INTERNORMEN-Filters elements are known as stable elements which have excellent filtration capabilities and a high dirt retaining capacity, therefore having a long service life. Due to its practical design, the return-line filter is easy to service.
When changing the filter element a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

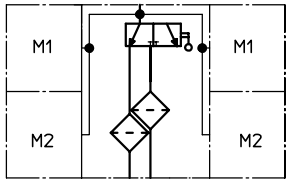
4. Technical data:

temperature range:	- 10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	10 bar
opening pressure by-pass valve:	2,0 bar
connection system:	thread connection according to DIN 3852, T2
housing material:	Al-casting; glass fiber reinforced polyamide
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	2x 1,8 l

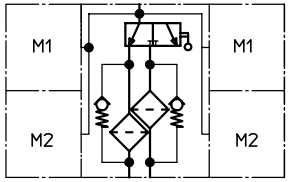
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:

without by-pass valve

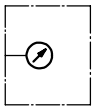


with by-pass valve

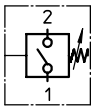


clogging indicator at M1, M2

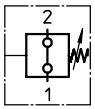
visual O



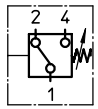
electrical
contact maker E1



electrical
contact breaker E5



electrical
contact maker/breaker E2



6. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp- curves; depending on filter fineness and viscosity.

7. Test methods:

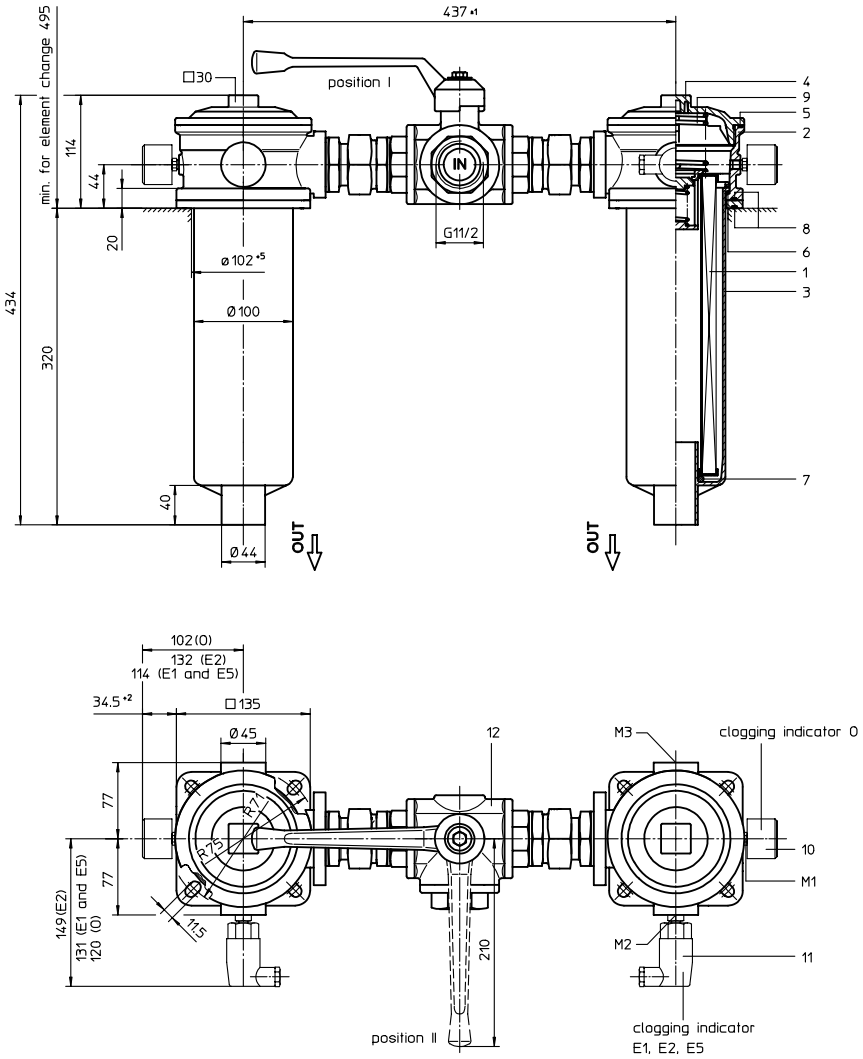
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

RETURN LINE FILTER, change-over

Series DTEF 426 DN 40 PN 10

Sheet No. **1035 D**



Position I: left filter-side in operation
Position II: right filter-side in operation

1. Type index:

1.1. Complete filter: (ordering example)

DTEF. 426. 10VG. 16. S. P. -. G. 7. -. O. E1. -

1	2	3	4	5	6	7	8	9	10	11	12	13

1 **series:**
DTEF = tank-mounted return-line filter, change-over

2 **nominal size:** 426

3 **filter-material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm stainless steel wire mesh,
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 P = 25 µm, 10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
16 = Δp 16 bar

5 **filter element design:**
E = without by-pass
S = with by-pass, Δp 2,0 bar

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **connection:**
G = thread connection according to DIN 3852, T2

9 **connection size:**
7 = G 1 ½

10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605

11 **clogging indicator at M1:**
- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616

12 **clogging indicator at M2:**
possible indicators see position 11 of the type index

13 **clogging indicator at M3:**
possible indicators see position 11 of the type index

1.2. Filter element: (ordering example)

01E. 425. 10VG. 16. S. P. -

1	2	3	4	5	6	7

1 **series:**
01E. = filter element according to INTERNORMEN factory specification

2 **nominal size:** 425

3 - 7 see Type index-complete filter

weight: approx. 12,5 kg

Changes of measures and design are subject to alteration!

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fax +49 - (0)6205 - 2094-40 url www.internormen.com

2. Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01.E 425	-	
2	2	filter head	NG 426	313571	
3	2	filter bowl	NG 425	303732	
4	2	screw plug	M 120 x 3	313649	
5	2	O-ring	128 x 3	304602 (NBR)	308140 (FPM)
6	2	O-ring	98 x 4	301914 (NBR)	304765 (FPM)
7	2	O-ring	44 x 6	302222 (NBR)	304384 (FPM)
8	4	O-ring	115 x 3	303963 (NBR)	307762 (FPM)
9	2	spring	DA = 63,5	304983	
10	2	clogging indicator, visual	O	see sheet-no. 1616	
11	2	pressure switch, electrical	E1, E2 or E5	see sheet-no. 1616	
12	1	three-way-change-over valve		308128	

3. Description:

Return-line filters change-over in the DTEF series are suitable for a working pressure up to 10 bar. Pressure peaks will be absorbed by a sufficient margin of safety. The DTEF-filters are directly mounted to the reservoir and connected to the return-line.
A three-way-change-over valve which is integrated in the middle of the housing makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operat ion.
The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from outside to inside. Filters finer than 40 µm should use throuw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 µm $_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filters can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.
INTERNORMEN-Filters elements are known as stable elements which have excellent filtration capabilities and a high dirt retaining capacity, therefore having a long service life. Due to its practical design, the return-line filter is easy to service.
When changing the filter element a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

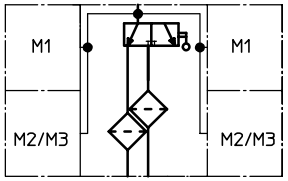
4. Technical data:

temperature range:	- 10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	10 bar
opening pressure by-pass valve:	2,0 bar
connection system:	thread connection according to DIN 3852, T2
housing material:	Al-casting; glass fiber reinforced polyamide
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	2x 2,6 l

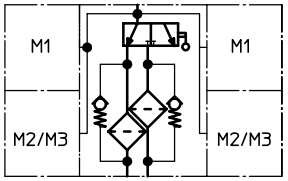
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:

without by-pass valve

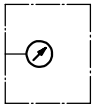


with by-pass valve

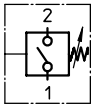


clogging indicator at M1, M2, M3

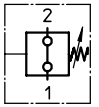
visual O



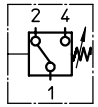
electrical
contact maker E1



electrical
contact breaker E5



electrical
contact maker/breaker E2



6. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp- curves; depending on filter fin eness and viscosity.

7. Test methods:

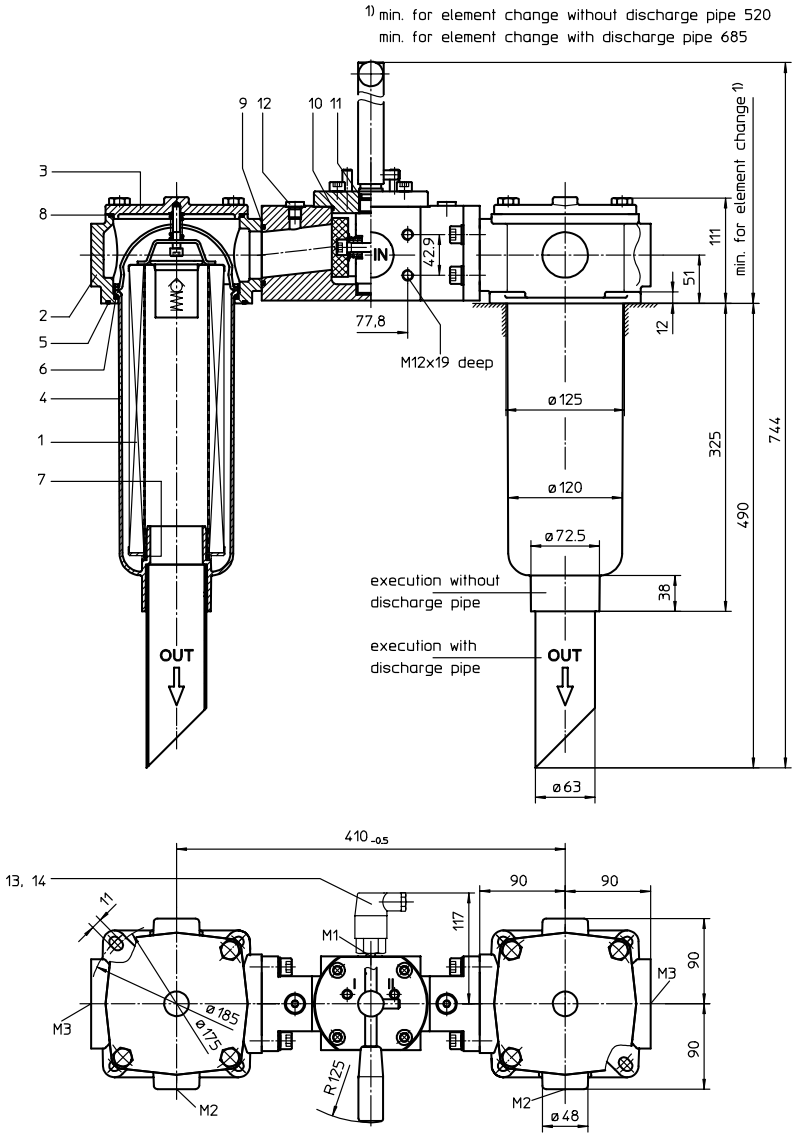
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow charact eristics
ISO 16889	Multi-pass method for evaluating filtration perfo rmance

RETURN LINE FILTER, change-over

Series DTEF 625 DN 50 PN 10

Sheet No. **1074 B**



Position I: left filter-side in operation
Position II: right filter-side in operation

1. Type index:

1.1. Complete filter: (ordering example)

DTEF. 625. 10VG. 16. S. P. -. FS. 8. -. E2. -. -. -

1	2	3	4	5	6	7	8	9	10	11	12	13	14

1 **series:**
DTEF = tank-mounted return-line filter, change-over

2 **nominal size:** 625

3 **filter-material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm stainless steel wire mesh,
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fiber)
25 P = 25 µm, 10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
16 = Δp 16 bar

5 **filter element design:**
E = without by-pass
S = with by-pass, Δp 2,0 bar

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **connection:**
FS = SAE-flange connection 3000 PSI

9 **connection size:**
8 = 2“

10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605

11 **clogging indicator at M1:**
- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616

12 **clogging indicator at M2:**
possible indicators see position 11 of the type index

13 **clogging indicator at M3:**
possible indicators see position 11 of the type index

14 **discharge pipe:**
- = without
1 = with discharge pipe

1.2. Filter element: (ordering example)

01E. 631. 10VG. 16. S. P. -

1	2	3	4	5	6	7

1 **series:**
01E. = filter element according to INTERNORMEN factory specification

2 **nominal size:** 631

3 - 7 see Type index-complete filter

weight: approx. 15 kg

Changes of measures and design are subject to alteration!

internormen technology

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fax +49 - (0)6205 - 2094-40 url www.internormen.com

2. Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01.E 631	-	
2	2	filter head	TEF 625	316414	
3	2	filter cover	32571-4	311662	
4	2	filter bowl without discharge pipe		316416	
	2	filter bowl with discharge pipe			
5	2	O-ring	140 x 3	304604 (NBR)	307514 (FPM)
6	2	O-ring	120 x 4	305300 (NBR)	307991 (FPM)
7	2	O-ring	63 x 3,5	311189 (NBR)	311592 (FPM)
8	2	O-ring	135 x 3,5	318386 (NBR)	318387 (FPM)
9	1	O-ring	56,75 x 3,53	306035 (NBR)	310264 (FPM)
10	1	O-ring	75 x 3	302215 (NBR)	304729 (FPM)
11	2	O-ring	18 x 3	304359 (NBR)	304399 (FPM)
12	2	screw plug	G ¼	305003	
13	1	pressure switch, electrical	E1, E2 or E5	see sheet-no. 1616	
14	1	clogging indicator, visual	O	see sheet-no. 1616	

3. Description:

Return-line filters change-over in the DTEF series are suitable for a working pressure up to 10 bar. Pressure peaks will be absorbed by a sufficient margin of safety. The DTEF-filters are directly mounted to the reservoir and connected to the return-line.
A rotary slide valve which is integrated in the middle of the housing makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.
The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from outside to inside. Filters finer than 40 µm should use throuw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 µm $_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filters can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.
INTERNORMEN-Filters elements are known as stable elements which have excellent filtration capabilities and a high dirt retaining capacity, therefore having a long service life. Due to its practical design, the return-line filter is easy to service.
When changing the filter element a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

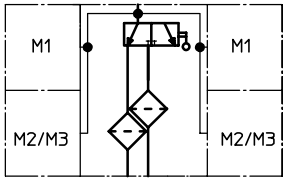
4. Technical data:

temperature range:	- 10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	10 bar
opening pressure by-pass valve:	2,0 bar
connection system:	SAE-flange connection 3000 PSI
housing material:	Al-casting; glass fiber reinforced polyamide
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	2x 3,9 l

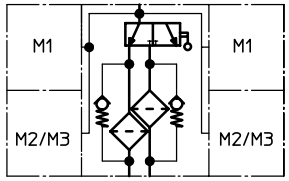
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:

without by-pass valve

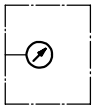


with by-pass valve

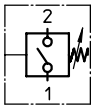


clogging indicator at M1, M2, M3

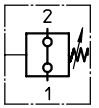
visual O



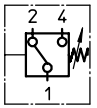
electrical
contact maker E1



electrical
contact breaker E5



electrical
contact maker/breaker E2



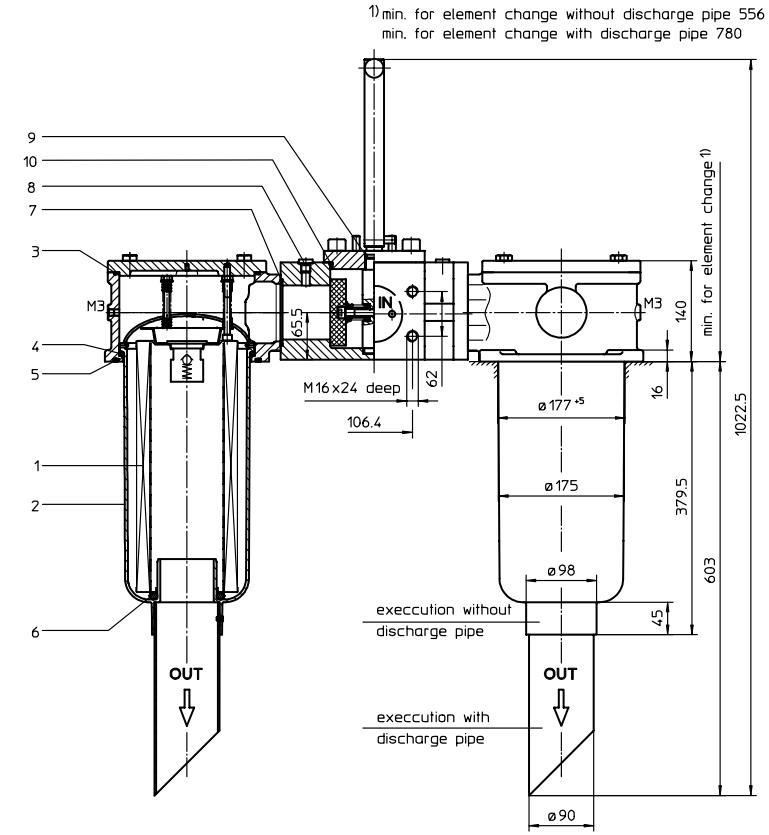
6. Pressure drop flow curves:

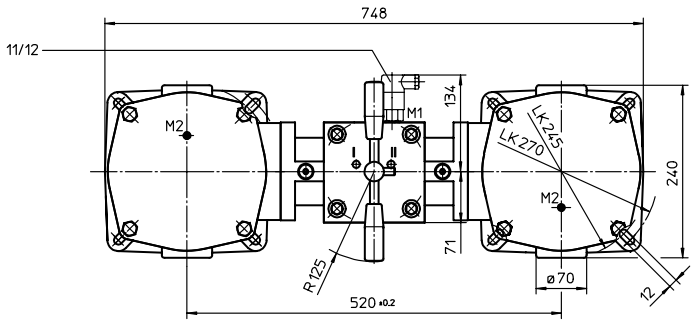
Precise flow rates see 'INT-Expert-System Filter', respectively Δp- curves; depending on filter fineness and viscosity.

7. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance





Position I: left filter-side in operation
Position II: right filter-side in operation

EDV 03/06

RETURN LINE FILTER, change-over

Series DTEF 952 DN 80 PN 10

Sheet No. **1075 B**

1. Type index:

1.1. Complete filter: (ordering example)

DTEF. 952. 10VG. 10. S. P. -. FS. A. -. E2. -. -. -

1	2	3	4	5	6	7	8	9	10	11	12	13	14

1 **series:**
DTEF = tank-mounted return-line filter, change-over

2 **nominal size:** 952

3 **filter-material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm stainless steel wire mesh,
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 P = 25 µm, 10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
E = without by-pass
S = with by-pass, Δp 2,0 bar

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **connection:**
FS = SAE-flange connection 3000 PSI

9 **connection size:**
A = 3“

10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605

11 **clogging indicator at M1:**
- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616

12 **clogging indicator at M2:**
possible indicators see position 11 of the type index

13 **clogging indicator at M3:**
possible indicators see position 11 of the type index

14 **discharge pipe:**
- = without
1 = with discharge pipe

1.2. Filter element: (ordering example)

01E. 950. 10VG. 10. S. P. -

1	2	3	4	5	6	7

1 **series:**
01E. = filter element according to INTERNORMEN factory specification

2 **nominal size:** 950

3 - 7 see Type index-complete filter

2. Accessories:

- counter flange, see sheet-no.1652

weight: approx. 54 kg

Changes of measures and design are subject to alteration!

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fax +49 - (0)6205 - 2094-40 url www.internormen.com

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01.E 950		
2	2	filter bowl without discharge pipe		327460	
	2	filter bowl with discharge pipe		327461	
3	2	O-ring	195 x 3,5	301831(NBR)	306528 (FPM)
4	2	O-ring	170 x 6	304799 (NBR)	306529 (FPM)
5	2	O-ring	190 x 5	305432 (NBR)	310283 (FPM)
6	2	O-ring	78 x 10	305017 (NBR)	305552 (FPM)
7	2	O-ring	85,32 x 3,53	305590 (NBR)	306308 (FPM)
8	2	screw plug	G ¼	305003	
9	1	O-ring	18 x 3	304359 (NBR)	304399 (FPM)
10	1	O-ring	105 x 5	310003 (NBR)	323080 (FPM)
11	1	pressure switch, electrical	E1, E2 or E5	see sheet-no. 1616	
12	1	clogging indicator, visual	O	see sheet-no. 1616	

4. Description:

Return-line filters change-over in the DTEF series are suitable for a working pressure up to 10 bar. Pressure peaks will be absorbed by a sufficient margin of safety. The DTEF-filters are directly mounted to the reservoir and connected to the return-line.
A rotary slide valve which is integrated in the middle of the housing makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.
The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from outside to inside. Filters finer than 40 µm should use throuw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 µm $_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filters can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.
INTERNORMEN-Filters elements are known as stable elements which have excellent filtration capabilities and a high dirt retaining capacity, therefore having a long service life. Due to its practical design, the return-line filter is easy to service.
When changing the filter element a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

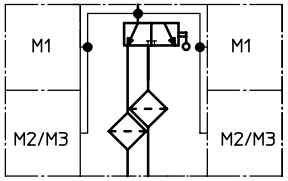
5. Technical data:

temperature range:	- 10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	10 bar
opening pressure by-pass valve:	2,0 bar
connection system:	SAE-flange connection 3000 PSI
housing material:	AL; glass fibre reinforced polyamide
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	2x 10,0 l

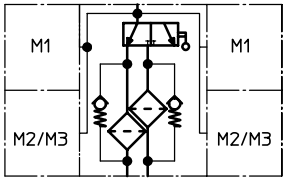
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:

without by-pass valve

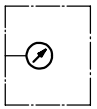


with by-pass valve

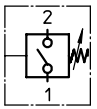


clogging indicator at M1, M2, M3

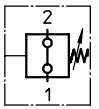
visual O



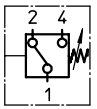
electrical
contact maker E1



electrical
contact breaker E5



electrical
contact maker/breaker E2



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp- curves; depending on filter fineness and viscosity.

8. Test methods:

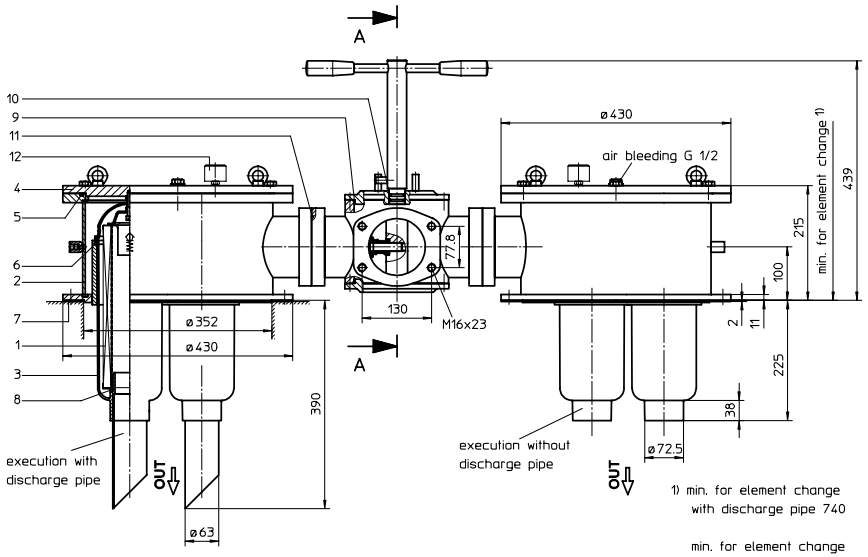
Filter elements are tested according to the following ISO standards:

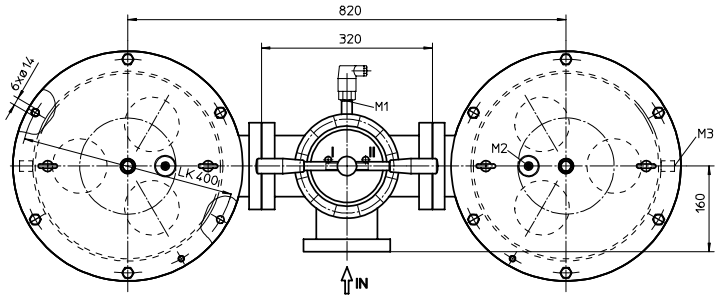
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

RETURN LINE FILTER, change-over

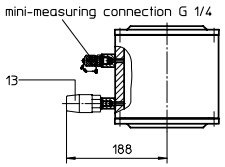
Series DTEF 1652 DN 100 PN 10

Sheet No. **1038 D**





partial section A-A



Position I: left filter-side in operation
Position II: right filter-side in operation

1. Type index:

1.1. Complete filter: (ordering example)

DTEF. 1652. 10VG. 16. S. P. -. FS. B. -. E1. O. -. -

1	2	3	4	5	6	7	8	9	10	11	12	13	14

1 **series:**
DTEF = tank-mounted return-line filter, change-over

2 **nominal size:** 1652

3 **filter-material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm stainless steel wire mesh,
25 VG = 20 µm(c), 16 VG = 15 µm(c), 10 VG = 10 µm(c), 6 VG = 7 µm(c), 3 VG = 5 µm(c) Interpor fleece (glass fiber)
25 P = 25 µm, 10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
16 = Δp 16 bar

5 **filter element design:**
E = without by-pass; S = with by-pass, Δp 2,0 bar

6 **sealing material:**
P = Nitrile (NBR); V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **connection:**
FS = SAE-flange connection 3000 PSI

9 **connection size:**
B = 4“

10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605

11 **clogging indicator at M1:**
- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616

12 **clogging indicator at M2:**
possible indicators see position 11 of the type index

13 **clogging indicator at M3:**
possible indicators see position 11 of the type index

14 **discharge pipe:**
- = without
1 = with discharge pipe

1.2. Filter element: (ordering example)

01E. 631. 10VG. 16. S. P. -

1	2	3	4	5	6	7

1 **series:**
01E. = filter element according to INTERNORMEN factory specification

2 **nominal size:** 631

3 - 7 see Type index-complete filter

2. Accessories:

- measure- and bleeder connections, see sheet-no. 1650
- evacuations- or bleeder connections, see sheet-no. 1651
- counter flange, see sheet-no.1652

weight: approx. 124 kg

Changes of measures and design are subject to alteration!

internormen technology

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3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	6	filter element	01.E 631	-	
2	2	filter head [1)]			
3	6	filter bowl with discharge pipe [1)]			
	6	filter bowl without discharge pipe [1)]			
4	2	filter cover [1)]			
5	2	O-ring	355 x 5	314740 (NBR)	314739 (FPM)
6	6	O-ring	120 x 4	305300 (NBR)	307991 (FPM)
7	2	gasket	430 x 350 x 2	317271 (NBR)	316659 (FPM)
8	2	O-ring	63 x 3,5	311189 (NBR)	311592 (FPM)
9	2	O-ring	150 x 4	313278 (NBR)	- (FPM)
10	2	O-ring	24 x 3	303038 (NBR)	304397 (FPM)
11	2	O-ring	110,72 x 3,53	316355 (NBR)	316356 (FPM)
12	1	clogging indicator, visual	O	see sheet-no. 1616	
13	1	pressure switch, electrical	E1, E2 or E5	see sheet-no. 1616	

[1)] in case of ordering these spare parts use the complete type index

4. Description:

Return-line filters change-over in the DTEF series are suitable for a working pressure up to 10 bar. Pressure peaks will be absorbed by a sufficient margin of safety. The DTEF-filters are directly mounted to the reservoir and connected to the return-line.
A rotary slide valve which is integrated in the middle of the housing makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.
The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from outside to inside. Filters finer than 40 µm should use throuw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 µm $_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filters can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.
INTERNORMEN-Filters elements are known as stable elements which have excellent filtration capabilities and a high dirt retaining capacity, therefore having a long service life. Due to its practical design, the return-line filter is easy to service.
When changing the filter element a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

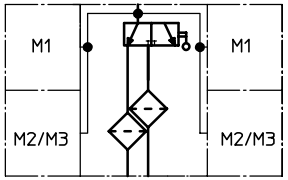
5. Technical data:

temperature range:	- 10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	10 bar
opening pressure by-pass valve:	2,0 bar
connection system:	SAE-flange connection 3000 PSI
housing material:	C-steel; glass fibre reinforced polyamide
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	2x 22,0 l

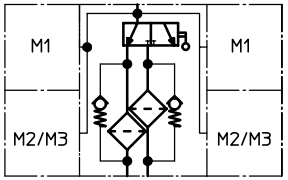
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:

without by-pass valve

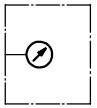


with by-pass valve

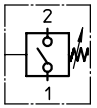


clogging indicator at M1, M2, M3

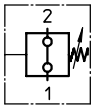
visual O



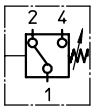
electrical
contact maker E1



electrical
contact breaker E5



electrical
contact maker/breaker E2



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp- curves; depending on filter fineness and viscosity.

8. Test methods:

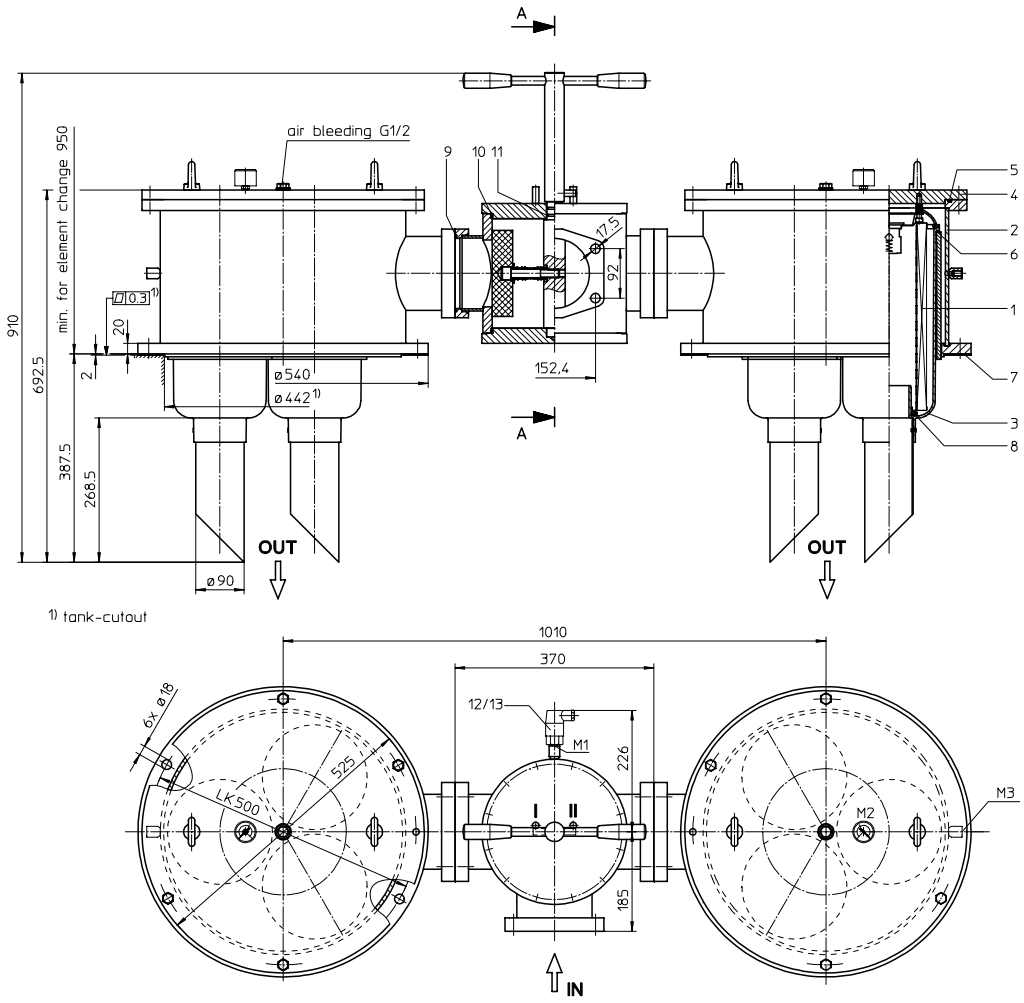
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration perfo rmance

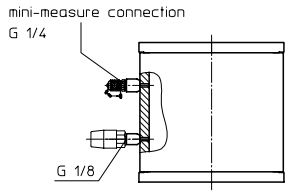
RETURN LINE FILTER, change-over

Series DTEF 2551 DN 125 PN 10

Sheet No. **1029 K**



particial section A-A



Position I: left filter-side in operation
Position II: right filter-side in operation

1. Type index:

1.1. Complete filter: (ordering example)

DTEF. 2551. 10VG. 10. S. P. -. FS. C. -. E2. O. -

1	2	3	4	5	6	7	8	9	10	11	12	13

1 **series:**
DTEF = tank-mounted return-line filter, change-over

2 **nominal size:** 2551

3 **filter-material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm stainless steel wire mesh,
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 P = 25 µm, 10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
E = without by-pass
S = with by-pass, Δp 2,0 bar

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **connection:**
FS = SAE-flange connection 3000 PSI

9 **connection size:**
C = 5“

10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605

11 **clogging indicator at M1:**
- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616

12 **clogging indicator at M2:**
possible indicators see position 11 of the type index

13 **clogging indicator at M3:**
possible indicators see position 11 of the type index

1.2. Filter element: (ordering example)

01E. 950. 10VG. 10. S. P. -

1	2	3	4	5	6	7

1 **series:**
01E. = filter element according to INTERNORMEN factory specification

2 **nominal size:** 950

3 - 7 see Type index-complete filter

2. Accessories:

- measure- and bleeder connections, see sheet-no. 1650
- evacuations- or bleeder connections, see sheet-no. 1651
- counter flange, see sheet-no.1652

weight: approx. 275 kg

Changes of measures and design are subject to alteration!

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EDV 08/06

3. Spare parts:

item	qty.	designation	dimension	article-no	
1	6	filter element	01E.950		
2	2	filter head [1]		313295	
3	6	filter bowl [1]		327461	
4	2	filter cover [1]			
5	2	O-ring	455 x 5	314742 (NBR)	314741 (FPM)
6	6	O-ring	170 x 6	304799 (NBR)	306529 (FPM)
7	2	gasket	540 x 441 x 2	313293 (NBR)	317461 (FPM)
8	6	O-ring	78 x 10	305017 (NBR)	305552 (FPM)
9	2	O-ring	136,12 x 3,53	320162 (NBR)	320163 (FPM)
10	2	O-ring	225 x 5	308652 (NBR)	311473 (FPM)
11	2	O-ring	24 x 3	303038 (NBR)	304397 (FPM)
12	1	pressure switch, electrical	E1, E2 or E5	see sheet-no. 1616	
13	1	clogging indicator, visual	O	301721	

[1] in case of ordering these spare parts use the complete type index

4. Description:

Return-line filters change-over in the DTEF series are suitable for a working pressure up to 10 bar. Pressure peaks will be absorbed by a sufficient margin of safety. The DTEF-filters are directly mounted to the reservoir and connected to the return-line.
A rotary slide valve which is integrated in the middle of the housing makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.
The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from outside to inside. Filters finer than 40 µm should use throuw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 µm $_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filters can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.
INTERNORMEN-Filters elements are known as stable elements which have excellent filtration capabilities and a high dirt retaining capacity, therefore having a long service life. Due to its practical design, the return-line filter is easy to service.
When changing the filter element a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

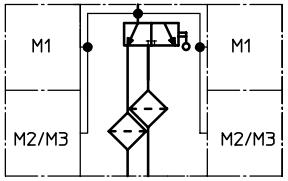
5. Technical data:

temperature range:	- 10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	10 bar
opening pressure by-pass valve:	2,0 bar
connection system:	SAE-flange connection 3000 PSI
housing material:	C-steel, glass fibre reinforced polyamide (filter bowl)
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	2x 47,0 l

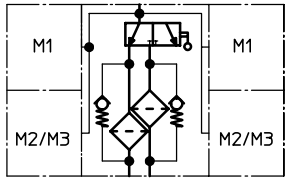
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:

without by-pass valve

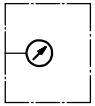


with by-pass valve

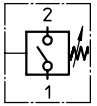


clogging indicator at M1, M2, M3

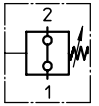
visual O



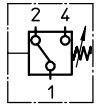
electrical
contact maker E1



electrical
contact breaker E5



electrical
contact maker/breaker E2



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp- curves; depending on filter fineness and viscosity.

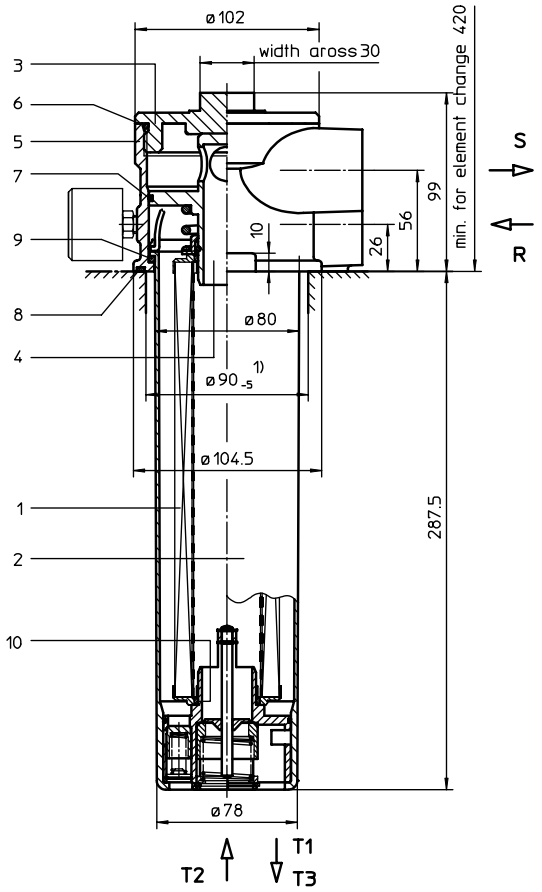
8. Test methods:

Filter elements are tested according to the following ISO standards:

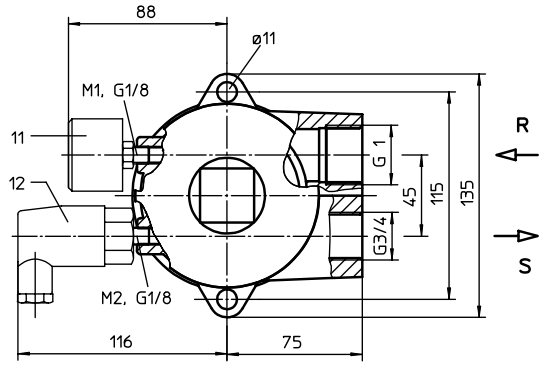
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

RETURN LINE FILTER, with suction connection
Series TNRS 101 DN 25 PN 10

Sheet No.
1070 F



1) tank cutout according to DIN 24550, T5



1. Type index:

1.1. Complete filter: (ordering example)

TNRS.	101.	10VG.	10.	B.	P.	-.	G.	5.	-.	S2,5.	Z.	O.	E2
1	2	3	4	5	6	7	8	9	10	11	12	13	14

1 | series:
TNRS = tank-mounted return-line filter according to DIN 24550, T5 with suction connection

2 | nominal size: 101

3 | filter-material and filter-fineness:
80 G = 80 µm, 40 G = 40 µm, 25 G = 25µm
stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$,
6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 P = 25 µm, 10 P = 10 µm paper

4 | resistance of pressure difference for filter element:
10 = Δp 10 bar

5 | filter element design:
B = both sides open

6 | sealing material:
P = Nitrile (NBR)
V = Viton (FPM)

7 | filter element specification:
- = standard
VA = stainless steel

8 | connection:
G = thread connection according to DIN 3852, T2

9 | connection size:
5 = G1

10 | filter housing specification:
- = standard

11 | internal valve:
S2,5 = with by-pass valve Δp 2,5 bar

12 | suction valve:
Z = with suction valve

13 | clogging indicator at M1:
- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616

14 | preload pressure indicator at M2:
- = without
E2 = pressure switch, see sheet-no. 1616

1.2. Filter element: (ordering example)

01NR.	100.	10VG.	10.	B.	P.	-
1	2	3	4	5	6	7

1 | series:
01NR. = standard-return-line filter element according to DIN 24550, T4

2 | nominal size: 100

3 | - | 7 | see type index-complete filter

weight: approx. 2,1 kg

EDV 01/10

Changes of measures and design are subject to alteration!

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2. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01.NR 100		
2	1	filter bowl with valve combination	TNRS 101		
3	1	screw plug	M 92 x 3	317014	
4	1	centering pivot	TNRS 63-100		
5	1	filter head	TNRS 101		
6	1	O-ring	82 x 4	331337 (NBR)	337365 (FPM)
7	1	O-ring	80 x 2,5	313179 (NBR)	314148 (FPM)
8	1	O-ring	92 x 3	325584 (NBR)	325585 (FPM)
9	1	O-ring	75 x 3	302215 (NBR)	304729 (FPM)
10	2	O-ring	32 x 3,5	304378 (NBR)	304401 (FPM)
11	1	clogging indicator at M1	O, E1, E5 or E2	see sheet-no. 1616	
12	1	clogging indicator at M2	E2	see sheet-no. 1616	

3. Description:

The filters of the series TNRS are tank-top mounted in-line filters. In addition to the return-line connection they have a suction connection on the clean-side. This suction connection has a preload pressure (fitting pressure) of ≥ 0,5 bar.
This combination, return-line and suction filter, is foreseen for hydraulic circuits which are equiped with minimum 2 feed pumps (2 hydraulic circuits). The preload suction connection is for the full volume flow filtration for the pump with the smaller volume flow.
The operating status in general wherein the preload pressure and the full stream filtration are effecting the Q_R (return-line flow) > Q_S (suction flow). When the operating status is $Q_R = Q_S$ no preload pressure is effective.
During the operating status $Q_R < Q_S$ the suction valve is effective operates at the connection T2, what makes a feeding out of the receptable possible without preload pressure and without filter efficiency.
Return-line filters in the TNRS series are suitable for a working pressure up to 10 bar. Pressure peaks will be absorbed by a sufficient margin of safety.
The filter element according to DIN 24550, T4 consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from outside to inside. Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filters can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.
INTERNORMEN-Filters elements are known as stable elements which have excellent filtration capabilities and a high dirt retaining capacity, therefore having a long service life. Due to its practical design, the return-line filter is easy to service.
When changing the filter element a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

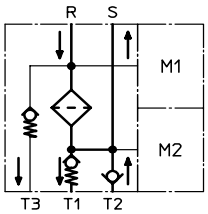
4. Technical data:

temperature range:	- 10 °C to + 80 °C (for a short time + 100 °C)
operating medium:	mineral oil, other media on request
max. operating pressure:	10 bar
opening pressure by-pass valve:	2,5 bar
opening pressure preload valve:	0,5 bar
opening pressure suction valve:	0,05 bar
line adapter:	G 1 and G ¾ according to DIN 3852, T2
housing material:	Al-casting, polyamide 6
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	1,3 l

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:

clogging indicator at M1 — preload pressure indicator at M2

filter with suction valve and by-pass valve	visual O	electrical contact maker E1	electrical contact breaker E5	electrical contact maker/breaker E2	electrical contact maker/breaker E2
					

6. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter' respectively Δp-curves ; depending on filter fineness and viscosity.

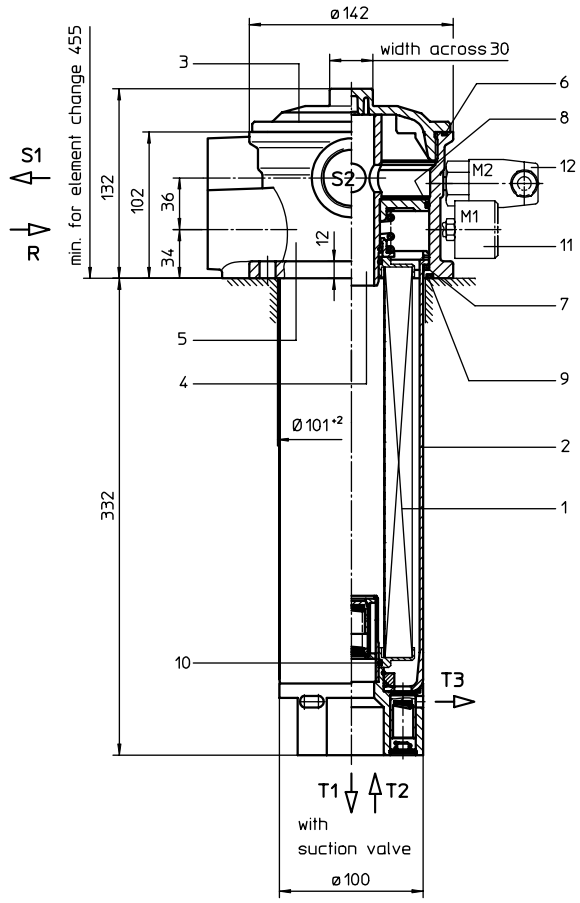
7. Test methods:

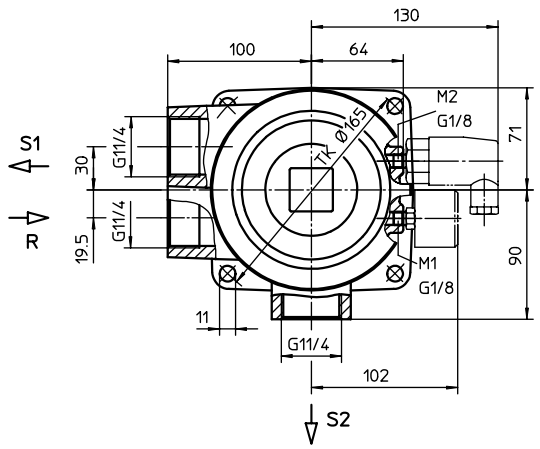
Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristi
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

RETURN LINE FILTER, with suction connection
Series TRS 226 DN 32 PN 10

Sheet No.
1065 C





1. Type index:

1.1. Complete filter: (ordering example)

TRS.	226.	10VG.	10.	B.	P.	-.	G.	6.	-.	S2,5.	Z.	O.	E2
1	2	3	4	5	6	7	8	9	10	11	12	13	14

1 **series:**
TRS = tank-mounted return-line filter with suction connection

2 **nominal size:** 226

3 **filter-material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25µm
stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$,
6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 P = 25 µm, 10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:**
- = standard
VA = stainless steel

8 **connection:**
G = thread connection according to DIN 3852, T2

9 **connection size:**
6 = G 1 ¼

10 **filter housing specification:**
- = standard

11 **internal valve:**
S2,5 = with by-pass valve Δp 2,5 bar

12 **suction valve:**
Z = with suction valve

13 **clogging indicator at M1:**
- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616

14 **preload pressure indicator at M2:**
- = without
O1 = visual, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616

1.2. Filter element: (ordering example)

01RS.	225.	10VG.	10.	B.	P.	-
1	2	3	4	5	6	7

1 **series:**
01RS. = return-line suction filter element

2 **nominal size:** 225

3 - 7 see type index-complete filter

weight: approx. 3,2 kg

Changes of measures and design are subject to alteration!

EDV 01/05

internormen technology

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2. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01.RS 225		
2	1	filter bowl with suction valve and by-pass valve	TRS 226		
3	1	screw plug	M 120 x 3	313649	
4	1	centering pivot	TRS 175-225		
5	1	filter head	TRS 175-225		
6	1	O-ring	128 x 3	304602 (NBR)	308140 (FPM)
7	1	O-ring	98 x 4	301914 (NBR)	304765 (FPM)
8	1	O-ring	96 x 3	305292 (NBR)	305297 (FPM)
9	1	O-ring	104,37 x 3,53	304339 (NBR)	304390 (FPM)
10	2	O-ring	38 x 3	304340 (NBR)	317013 (FPM)
11	1	clogging indicator at M1	O, E1, E5 or E2	see sheet-no. 1616	
12	1	clogging indicator at M2	O1 or E2	see sheet-no. 1616	

3. Description:

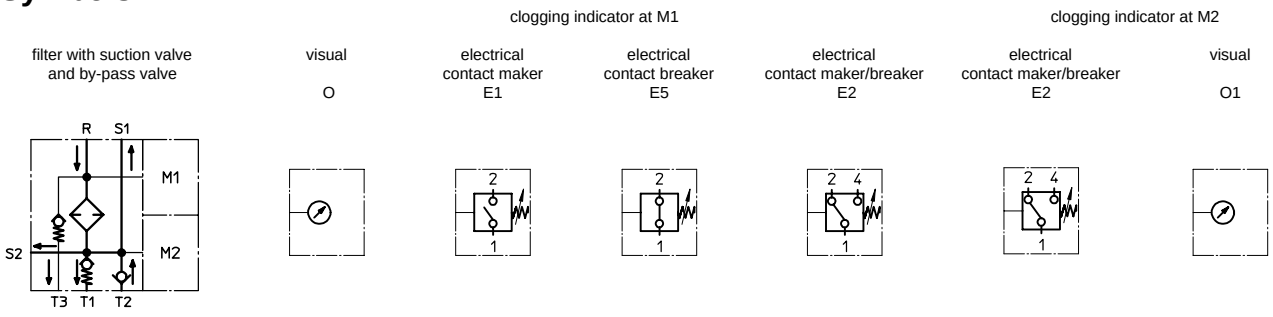
The filters of the series TRS are tank-top mounted in-line filters. In addition to the return-line connection they have a suction connection on the clean-side. This suction connection has a preload pressure (fitting pressure) of ≥ 0,5 bar.
This combination, return-line and suction filter, is foreseen for hydraulic circuits which are equiped with minimum 2 feed pumps (2 hydraulic circuits). The preload suction connection is for the full volume flow filtration for the pump with the smaller volume flow.
The operating status in general wherein the preload pressure and the full stream filtration are effecting the Q_R (return-line flow) > Q_S (sum of the suction flows at S1 and S2). When the operating status is $Q_R = Q_S$ no preload pressure is effective. For circuits wherein the operating status $Q_R < Q_S$ appears for a short time, the suction valve operates and as a result a feeding out of the vessel is possible without preload pressure and without filter effect.
Return-line filters in the TRS series are suitable for a working pressure up to 10 bar. Pressure peaks will be absorbed by a sufficient margin of safety.
The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from outside to inside. Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filters can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.
INTERNORMEN-Filters elements are known as stable elements which have excellent filtration capabilities and a high dirt retaining capacity, therefore having a long service life. Due to its practical design, the return-line filter is easy to service.
When changing the filter element a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

4. Technical data:

temperature range:	- 10 °C to + 80 °C (for a short time + 100 °C)
operating medium:	mineral oil, other media on request
max. operating pressure:	10 bar
opening pressure by-pass valve:	2,5 bar
opening pressure preload valve:	0,5 bar
opening pressure suction valve:	0,05 bar
line adapter:	G 1 ¼ according to DIN 3852, T2
housing material:	Al-casting, polyamide 6
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	2,8 l

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:



6. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter' respectively Δp-curves ; depending on filter fineness and viscosity.

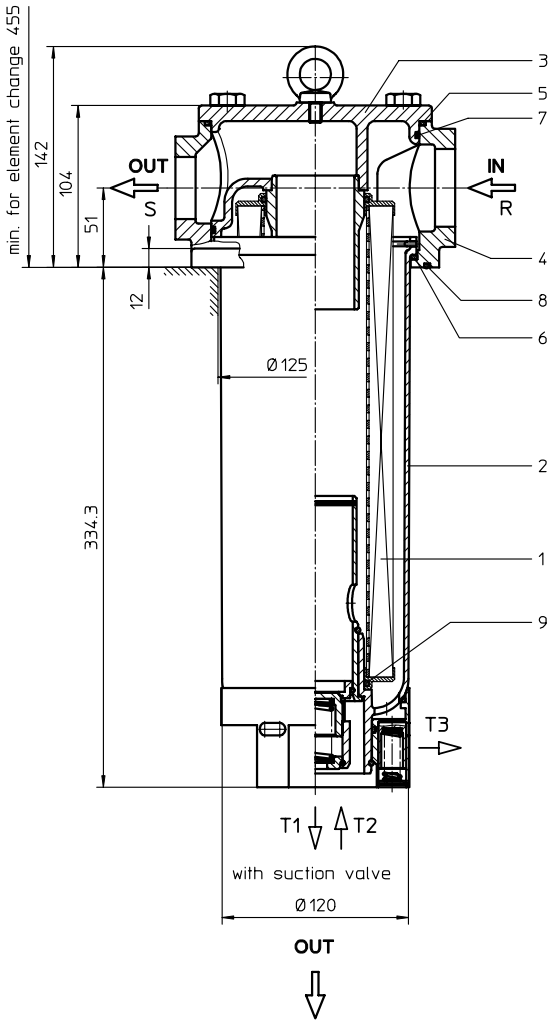
7. Test methods:

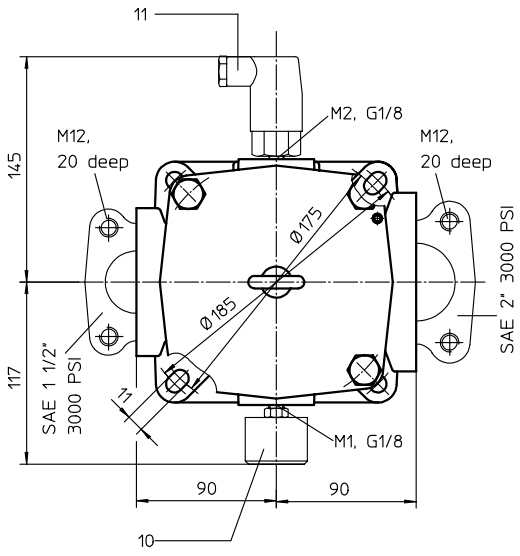
Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristi
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

RETURN LINE FILTER, with suction connection
Series TRS 625 DN 50 PN 10

Sheet No.
1066 C





1. Type index:

1.1. Complete filter: (ordering example)

TRS.	625.	10VG.	10.	B.	P.	-.	FS.	8.	-.	S2,5.	Z.	O.	E2
1	2	3	4	5	6	7	8	9	10	11	12	13	14

1 **series:**
TRS = tank-mounted return-line filter with suction connection

2 **nominal size:** 625

3 **filter-material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25µm
stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$,
6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 P = 25 µm, 10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:**
- = standard
VA = stainless steel

8 **connection:**
FS = SAE-flange connection 3000 PSI

9 **connection size:**
8 = 2“

10 **filter housing specification:**
- = standard

11 **internal valve:**
S2,5 = with by-pass valve Δp 2,5 bar

12 **suction valve:**
Z = with suction valve

13 **clogging indicator at M1:**
- = without
O = visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616

14 **preload pressure indicator at M2:**
- = without
E2 = pressure switch, see sheet-no. 1616

1.2. Filter element: (ordering example)

01E.	625.	10VG.	10.	B.	P.	-
1	2	3	4	5	6	7

1 **series:**
01E. = filter element according to INTERNORMEN factory specicfication

2 **nominal size:** 625

3 - 7 see type index-complete filter

weight: approx. 6,0 kg

EDV 08/03

Changes of measures and design are subject to alteration!

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2. Spare parts:

item	qty.	designation	Abmessung	article-no.	
1	1	filter element	01.E 625		
2	1	filter bowl with suction valve and by-pass valve	TRS 625		
3	1	filter cover	TRS 625		
4	1	filter head	TRS 625		
5	1	O-ring	135 x 3,5	318386 (NBR)	318387 (FPM)
6	1	O-ring	120 x 4	305300 (NBR)	307991 (FPM)
7	1	O-ring	128 x 3	304602 (NBR)	308140 (FPM)
8	1	O-ring	140 x 3	304604 (NBR)	307514 (FPM)
9	2	O-ring	63 x 3,5	311189 (NBR)	311592 (FPM)
10	1	clogging indicator at M1	O, E1, E5 or E2	see sheet-no. 1616	
11	1	clogging indicator at M2	E2	see sheet-no. 1616	

3. Description:

The filters of the series TRS are tank-top mounted in-line filters. In addition to the return-line connection they have a suction connection on the clean-side. This suction connection has a preload pressure (fitting pressure) of ≥ 0,5 bar.
This combination, return-line and suction filter, is foreseen for hydraulic circuits which are equiped with minimum 2 feed pumps (2 hydraulic circuits). The preload suction connection is for the full volume flow filtration for the pump with the smaller volume flow.
The operating status in general wherein the preload pressure and the full stream filtration are effecting the Q_R (return-line flow) > Q_S (suction flow). When the operating status is $Q_R = Q_S$ no preload pressure is effective. For circuits wherein the operating status $Q_R < Q_S$ appears for a short time, the suction valve operates and as a result a feeding out of the vessel is possible without preload pressure and without filter effect.
Return-line filters in the TRS series are suitable for a working pressure up to 10 bar. Pressure peaks will be absorbed by a sufficient margin of safety.
The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from outside to inside. Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filters can be used for petroleum-based fluids, HW emulsions, water glycols, most synthetic fluids and lubrication fluids. Consult factory for specific fluid applications.
INTERNORMEN-Filters elements are known as stable elements which have excellent filtration capabilities and a high dirt retaining capacity, therefore having a long service life. Due to its practical design, the return-line filter is easy to service.
When changing the filter element a detachable connection between the filter head and the filter bowl prevents a flow back of dirty oil into the tank.

4. Technical data:

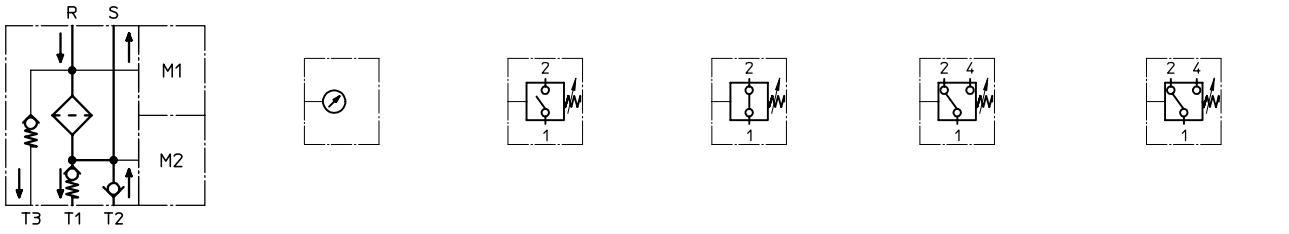
temperature range:	- 10 °C to + 80 °C (for a short time + 100 °C)
operating medium:	mineral oil, other media on request
max. operating pressure:	10 bar
opening pressure by-pass valve:	2,5 bar
opening pressure preload valve:	0,5 bar
opening pressure suction valve:	0,05 bar
line adapter:	SAE 2“ and SAE 1 ½“
housing material:	Al-casting, polyamide 6
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	3,7 l

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:

clogging indicator at M1 | preload pressure indicator at M2

filter with suction valve and by-pass valve | visual O | electrical contact maker E1 | electrical contact breaker E5 | electrical contact maker/breaker E2 | electrical contact maker/breaker E2



6. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’ respectively Δp-curves ; depending on filter fineness and viscosity.

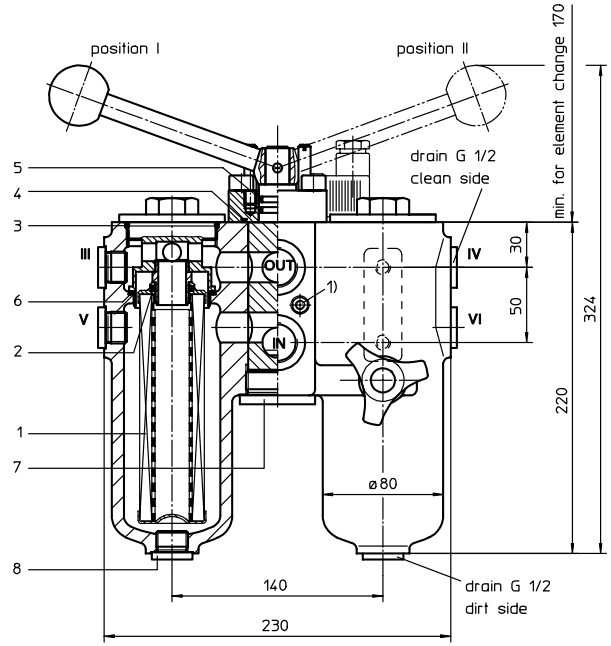
7. Test methods:

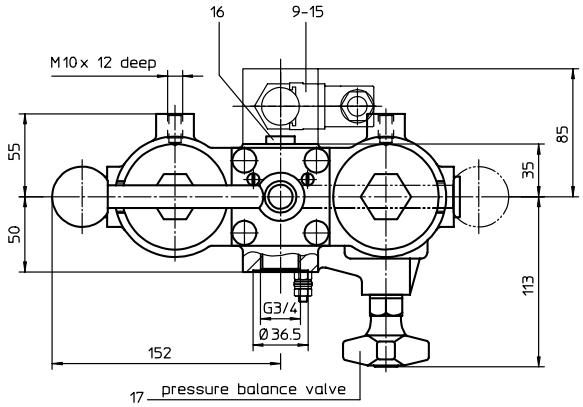
Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristi
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

PRESSURE FILTER, change-over
Series DU 63 DN 20 PN 32

Sheet No. **2121 K**





1) connection for the potential equalisation,
only for application in the explosive area

Pos. I: left filter-side in operation
Pos. II: right filter-side in operation

measure connection III, IV: air bleeding, pressure relief G ½ - clean side
measure connection V, VI: air bleeding, pressure relief G ½ - dirt side

1. Type index:

1.1. Complete filter: (ordering example)

DU. 63. 10VG. 30. E. P. -. G. 4. -. -. AE

1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
DU = pressure filter, change-over

2 **nominal size:** 63

3 **filter-fineness and filter-material:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm stainless steel wire mesh,
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 P = 25 µm, 10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
30 = Δp 30 bar

5 **filter element design:**
E = single-end open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:**
- = standard
VA = stainless steel

8 **connection:**
G = thread connection according to ISO 228

9 **connection size:**
4 = G ¾

10 **filter housing specification:**
- = standard

11 **internal valve:**
- = without
S1 = with by-pass valve Δp 3,5 bar

12 **clogging indicator or clogging sensor:**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01NL. 63. 10VG. 30. E. P. -

1	2	3	4	5	6	7

1 **series:**
01NL. = standard filter element according to DIN 24550, T3

2 **nominal size:** 63

3 - 7 see type index-complete filter

2. Accessories:

- measure- and bleeder-connections, see sheet-no. 1650
- evacuation- and bleeder-connections, see sheet-no. 1651

weight: 15 kg

Changes of measures and design are subject to alt eration!

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3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01NL. 63		
2	2	O-ring	22 x 3,5	304341 (NBR)	304392 (FPM)
3	2	O-ring	56 x 3	305072 (NBR)	305322 (FPM)
4	1	O-ring	42,52 x 2,62	304352 (NBR)	304393 (FPM)
5	2	O-ring	18 x 3	304359 (NBR)	304399 (FPM)
6	2	O-ring	48 x 3	304357 (NBR)	304404 (FPM)
7	1	screw plug	G 1 ¼	308530	
8	6	screw plug	G ½	304678	
9	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
10	1	clogging indicator, visual-electrical	AE	see sheet-no. 1615	
11	1	clogging sensor, electronical	VS1	see sheet-no. 1617	
12	1	clogging sensor, electronical	VS2	see sheet-no. 1618	
13	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
14	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
15	3	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
16	2	screw plug	G ¼	305003	
17	1	pressure balance valve			

item 16 execution only without clogging indicator or clogging sensor

4. Description:

Pressure filter of the series DU 63 are suitable for a working pressure up to 32 bar.
The pressure peaks are absorbed by a sufficient margin of safety.
Rotary slide valve which is integrated in the middle of the housing makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation. These filters can be installed as suction-filters.
The filter element consist of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.
Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre).
Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
Approvals according to TÜV, and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible.
The internal valve is integrated in the filter cover. After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter.

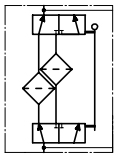
5. Technical data:

temperature range:	- 10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	32 bar
test pressure:	64 bar
connection system:	thread connection according to ISO 228
housing material:	EN-GJS-400-18-LT
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
mini-measuring connections:	G ½
evacuation-or bleeder connections:	G ½
volume tank:	2x 0,65 l

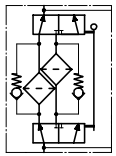
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:

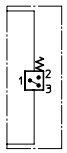
without indicator



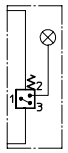
with by-pass valve



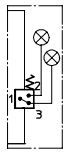
with electrical indicator AE 30 and AE 40



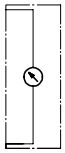
with visual-electrical indicator AE 50 and AE 62



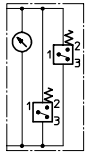
with visual-electrical indicator AE 70 and AE 80



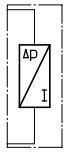
with visual indicator OP



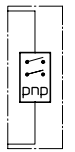
with visual-electrical indicator OE



with electronical clogging sensor VS1



with electronical clogging sensor VS2



7. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’, respectively Δp- curves; depending on filter fineness and viscosity.

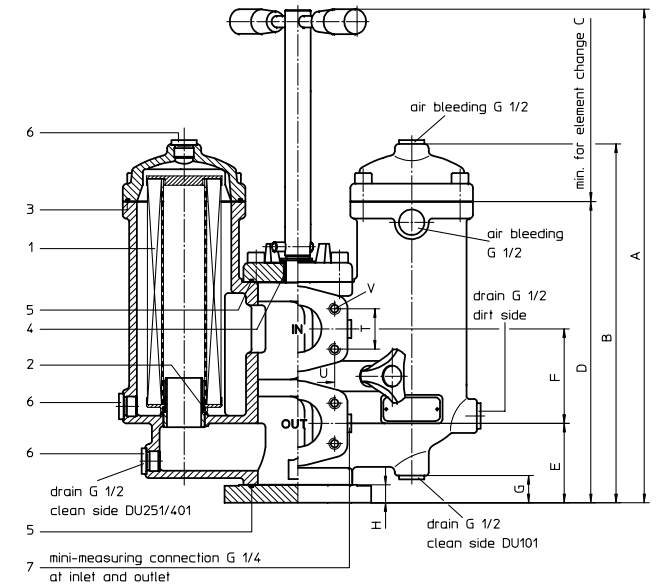
8. Test methods:

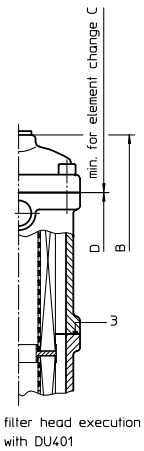
Filter elements are tested according to the following ISO standards:

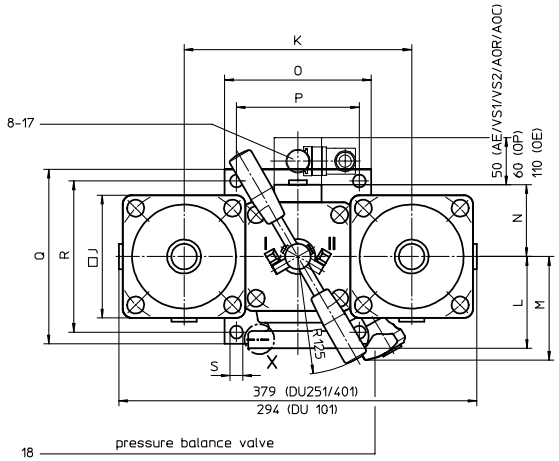
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

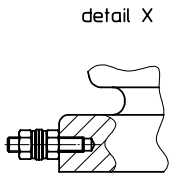
PRESSURE FILTER, change-over
Series DU 101-401 DN 32-50 PN 32

Sheet No. **2117 N**









connection for the potential equalisation
at outlet, only for application
in the explosive area

Pos I: left filter-side in operation
Pos II: right filter-side in operation

1. Type index:

1.1. Complete filter: (ordering example)

DU. 251. 10VG. 30. E. P. -. FS. 8. -. -. AE

1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
DU = pressure filter, change-over

2 **nominal size:** 101, 251, 401

3 **filter-material and filter- fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm stainless steel wire mesh,
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 P = 25 µm, 10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
16 = Δp 16 bar, (01.N 100), 30 = Δp 30 bar, (01NL. 250, 400)

5 **filter element design:**
E = single-end open
S = with by-pass valve Δp 2,0 bar
S1 = with by-pass valve Δp 3,5 bar

6 **sealing material:**
P = Nitrile (NBR), V = Viton (FPM)

7 **filter element specification:**
- = standard, VA = stainless steel, IS06 = see sheet-no. 31601

8 **connection:**
FS = SAE-flange connection 3000 PSI

9 **connection size**:
6 = 1 ¼ " (DU 101), 8 = 2" (DU 251/401)

10 **filter housing specification:**
- = standard, IS12 = see sheet-no. 41028

11 **internal valve:**
- = without

12 **clogging indicator or clogging sensor:**
- = without, OP = visual, see sheet-no. 1628
AOR = visual, see sheet-no. 1606, OE = visual-electrical, see sheet-no. 1628
AOC = visual, see sheet-no. 1606, VS1 = electronical, see sheet-no. 1607
AE = visual-electrical, see sheet-no. 1609, VS2 = electronical, see sheet-no. 1608

1.2. Filter element: (ordering example)

01NL. 250. 10VG. 30. E. P. -

1	2	3	4	5	6	7

1 **series:**
01N. = standard filter element according to INTERNORMEN factory specification
01NL. = standard filter element according to DIN 24550, T3

2 **nominal size:** 100 (01N.); 250, 400 (01NL.)

3 - 7 see type index-complete filter

2. Accessories:

- measure- and bleeder connections, see sheet-no. 1650
- evacuation and bleeder-conections, see sheet-no. 1651
- counter flanges, see sheet-no. 1652
- shut-off valve, see sheet-no. 1655

3. Dimensions:

type	connection	SAE-connection size	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	T	U	V	weight kg
DU 101	DN 25[1]	SAE 1 ¼"	463	310	210	265	55	80	22	16	95	180	60	100	50	140	115	140	115	12	30,2	58,7	M10, 19 deep	23
DU 101	DN 32	SAE 1 ¼"																						
DU 251	DN 40[2]	SAE 2"	522	380	260	319	84	100	-	19	130	241	97	110	76	155	130	185	160	13,5	42,9	77,8	M12, 18 deep	40
DU 251	DN 50	SAE 2"																						
DU 401	DN 50	SAE 2"	632	530	410	469	84	100	-	19	130	241	97	110	76	155	130	185	160	13,5	42,9	77,8	M12, 18 deep	50

Changes of measures and design are subject to alteration!

[1] by counter flange BFS.6.A.33,7x2,6.St.P.3000
[2] by counter flange BFS.8.A.48,3x3,7.St.P.3000

Instaed of P (Nitrile) also V (Viton) can be chosen.

EDV 01/11

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4. Spare parts:

item	designation	qty.	dimension/article no. DU 101	qty.	dimension/article no. DU 251	qty.	dimension/article no. DU 401
1	filter element	2	01N. 100	2	01NL. 250	2	01NL. 400
2	O-ring	2	32 x 3,5 304378 (NBR) 304401 (FPM)	2	40 x 3 304389 (NBR) 304391 (FPM)	2	40 x 3 304389 (NBR) 304391 (FPM)
3	O-ring	2	76 x 4 305599 (NBR) 310291 (FPM)	2	115 x 3 303963 (NBR) 307762 (FPM)	4	115 x 3 303963 (NBR) 307762 (FPM)
4	O-ring	1	24 x 3 303038 (NBR) 304397 (FPM)	1	24 x 3 303038 (NBR) 304397 (FPM)	1	24 x 3 303038 (NBR) 304397 (FPM)
5	O-ring	2	60 x 2,5 305601 (NBR) 310267 (FPM)	2	95 x 3 305808 (NBR) 304828 (FPM)	2	95 x 3 305808 (NBR) 304828 (FPM)
6	screw plug	8	G ½ 304678				
7	screw plug	2	G ¼ 305003				
8	clogging indicator, visual	1	AOR or AOC see sheet-no. 1606				
9	clogging indicator, visual	1	OP see sheet-no. 1628				
10	clogging indicator, visual-electrical	1	OE see sheet-no. 1628				
11	clogging indicator, visual-electrical	1	AE see sheet-no. 1609				
12	clogging sensor, electronical	1	VS1 see sheet-no. 1607				
13	clogging sensor, electronical	1	VS2 see sheet-no. 1608				
14	O-ring	1	15 x 1,5 315357 (NBR) 315427 (FPM)				
15	O-ring	1	22 x 2 304708 (NBR) 304721 (FPM)				
16	O-ring	2	14 x 2 304342 (NBR) 304722 (FPM)				
17	screw plug	2	G ¼ 305003				
18	pressure balance valve	1					

item 17 execution only without clogging indicator or clogging sensor

5. Description:

Pressure filters, change-over series DU 101-401 are suitable for operating pressure up to 32 bar.
Pressure peaks can be absorbed with a sufficient margin o safety.
A three-way-change-over valve which is integrated in the middle of the housing makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.
The filter element consist of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.
These filters can be installed as suction filters.
Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
Approvals according to TÜV, and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible.

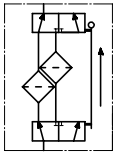
6. Technical data:

temperature range:	- 10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	32 bar
test pressure:	64 bar
connection system:	SAE-flange connection 3000 PSI
housing material:	EN-GJS-400-18-LT
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
mini-measuring connections:	G ¼
evacuation-or bleeder connections:	G ½
volume tank DU 101:	2x 0,9 l
DU 251:	2x 2,5 l
DU 401:	2x 3,7 l

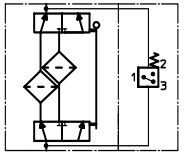
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

7. Symbols:

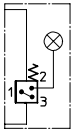
without indicator



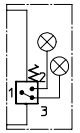
with electrical indicator AE 30 and AE 40



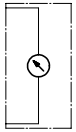
with visual - electrical indicator AE 50 and AE 62



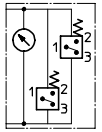
with visual - electrical indicator AE 70 and AE 80



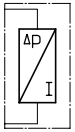
with visual indicator AOR/AOC/OP



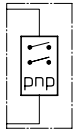
with visual - electrical indicator OE



with electronical clogging sensor VS1



with electronical clogging sensor VS2



8. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’, respectively Δp- curves; depending on filter fineness and viscosity.

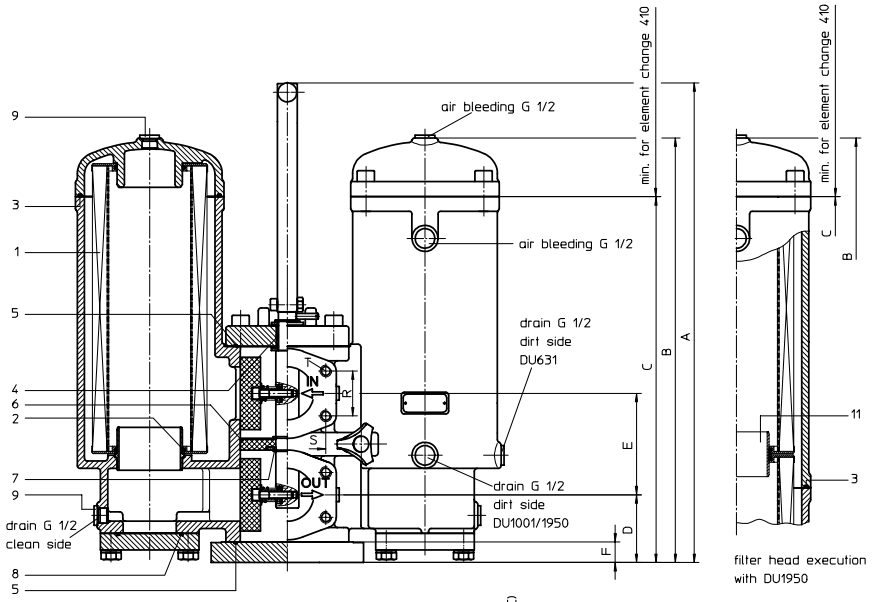
9. Test methods:

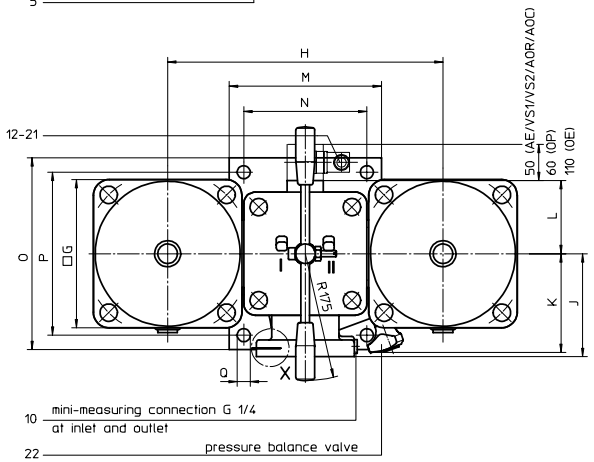
Filter elements are tested according to the following ISO standards:

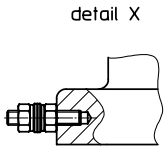
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER, change-over
Series DU 631-1950 DN 65-80 PN 32

Sheet No. **2118 G**







connection for the potential equalisation at outlet, only for application in the explosive area

Pos. I: left filter-side in operation
Pos. II: lright filter-side in operation

1. Type index:

1.1. Complete filter: (ordering example)

DU. 631. 10VG. 30. E. P. -. FS. 9. -. -. AE

1	2	3	4	5	6	7	8	9	10	11	12

1 series:
DU = pressure filter, change-over

2 nominal size: 631, 1001, 1950

3 filter-material and filter- fineness:
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm stainless steel wire mesh,
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 P = 25 µm, 10 P = 10 µm paper

4 resistance of pressure difference for filter element:
30 = Δp 30 bar (01NL. 630) 10 = Δp 10 bar (01NR. 1000);

5 filter element design:
E = single-end open (DU 631) B = both sides open (DU 1001/1950)
S = with by-pass valve Δp 2,0 bar (DU 631) S1 = with by-pass valve Δp 3,5 bar (DU 631)

6 sealing material:
P = Nitrile (NBR) V = Viton (FPM)

7 filter element specification: (see catalog)
- = standard VA = stainless steel IS06 = see sheet-no. 31601 IS07 = see sheet-no. 31602

8 connection:
FS = SAE-flange connection 3000 PSI

9 connection size:
9 = 2 ½ " (DU 631) A = 3" (DU 1001/1950)

10 filter housing specification: (see catalog)
- = standard IS06 = see sheet-no. 31605 IS12 = see sheet-no. 41028

11 internal valve:
- = without
S = with by-pass valve Δp 2,0 bar (DU 1001/1950)
S1 = with by-pass valve Δp 3,5 bar (DU 1001/1950)

12 clogging indicator or clogging sensor:
- = without, OP = visual, see sheet-no. 1628
AOR = visual, see sheet-no. 1606, OE = visual-electrical, see sheet-no. 1628
AOC = visual, see sheet-no. 1606, VS1 = electronical, see sheet-no. 1607
AE = visual-electrical, see sheet-no. 1609, VS2 = electronical, see sheet-no. 1608

1.2. Filter element: (ordering example)

01NL. 630. 10VG. 30. E. P. -

1	2	3	4	5	6	7

1 series:
01NL. = standard filter element according to DIN 24550, T3
01NR. = standard-return-line filter element according to DIN 24550, T4

2 nominal size: 630 (01NL.), 1000 (01NR.)

3 - **7** see type index-complete filter

2. Accessories:

- measure- and bleeder connections, see sheet-no. 1650
- evacuation and bleeder-conections, see sheet-no. 1651
- counter flanges, see sheet-no. 1652
- shut-off valve, see sheet-no. 1655

3. Dimensions:

type	connection	SAE-connection size	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	T	weight kg
DU 631	DN 65	SAE 2 ½"	693	568	497	110	115	24	160	284	120	121	83	140	115	210	185	13,5	50,8	89	M12, 18 deep	90
DU 1001	DN 80	SAE 3"	717	586	505	93,5	140	28,5	205	380	142	137	101	210	170	265	225	18	62	106,4	M16, 23 deep	116
DU 1950	DN 80	SAE 3"	1119	988	907	93,5	140	28,5	205	380	142	137	101	210	170	265	225	18	62	106,4	M16, 23 deep	170

Changes of measures and design are subject to alteration!

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4. Spare parts:

item	designation	qty.	dimension and article-no. DU 631	qty.	dimension and article-no. DU 1001	qty.	dimension and article-no. DU 1950
1	filter element	2	01NL. 630	2	01NR. 1000	4	01NR. 1000
2	O-ring	2	60 x 3,5 304377 (NBR) 304398 (FPM)	4	90 x 4 306941 (NBR) 307031 (FPM)	8	90 x 4 306941 (NBR) 307031 (FPM)
3	O-ring	2	125 x 3 306025 (NBR) 307358 (FPM)	2	185 x 4 305593 (NBR) 306309 (FPM)	4	185 x 4 305593 (NBR) 306309 (FPM)
4	O-ring	1	24 x 3 303038 (NBR) 304397 (FPM)	24 x 3 303038 (FPM) 304397 (FPM)			
5	O-ring	2	115 x 3 303963 (NBR) 307762 (FPM)	140 x 3 304604 (NBR) 307541 (FPM)			
6	O-ring	1	96 x 4 305190 (NBR) 308148 (FPM)	120 x 4 305300 (NBR) 307991 (FPM)			
7	O-ring	1	32 x 2,5 306843 (NBR) 308268 (FPM)	32 x 2,5 306843 (NBR) 308268 (FPM)			
8	O-ring	2	69,45 x 3,53 305868 (NBR) 307357 (FPM)	85,32 x 3,53 305590 (NBR) 306308 (FPM)			
9	screw plug	8	G ½ 304678	8	G ½ 304678	10	G ½ 304678
10	screw plug	2	G ¼ 305003				
11	connecting pipe	2	-				∅ 90 313233
12	clogging indicator, visual	1	AOR or AOC see sheet-no. 1606				
13	clogging indicator, visual	1	OP see sheet-no. 1628				
14	clogging indicator, visual-electrical	1	OE see sheet-no. 1628				
15	clogging indicator, visual-electrical	1	AE see sheet-no. 1609				
16	clogging sensor, electronical	1	VS1 see sheet-no. 1607				
17	clogging sensor, electronical	1	VS2 see sheet-no. 1608				
18	O-ring	1	15 x 1,5 315357 (NBR) 315427 (FPM)				
19	O-ring	1	22 x 2 304708 (NBR) 304721 (FPM)				
20	O-ring	2	14 x 2 304342 (NBR) 304722 (FPM)				
21	screw plug	2	G ¼ 305003				
22	pressure balance valve	1					

item 21 execution only without clogging indicator or clogging sensor

E 2118 G

5. Description:

Pressure filters, change-over series DU 631-1950 are suitable for operating pressure up to 32 bar.
Pressure peaks can be absorbed with a sufficient margin of safety.
A three-way-change-over valve which is, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.
These filters can be installed as suction filters, pressure filters or return-line filters.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.
Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
Approvals according to TÜV, and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible.
The internal valve is integrated in the filter cover. After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter.

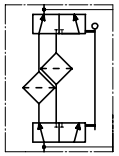
6. Technical data:

temperature range:	- 10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	32 bar
test pressure:	64 bar
connection system:	SAE-flange connection 3000 PSI
housing material:	EN-GJS-400-18-LT
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
mini-measuring connections:	G ¼
evacuation-or bleeder connections:	G ½
volume tank DU 631:	2x 5,7 l
DU 1001:	2x 13,0 l
DU 1950:	2x 23,3 l

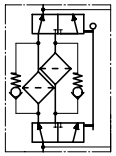
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

7. Symbols:

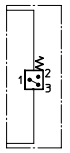
without indicator



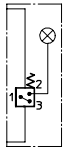
with by-pass valve



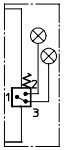
with electrical indicator AE 30 and AE 40



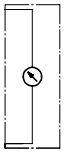
with visual-electrical indicator AE 50 and AE 62



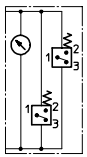
with visual-electrical indicator AE 70 and AE 80



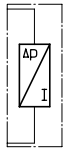
with visual indicator AOR/AOC/OP



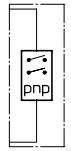
with visual-electrical indicator OE



with electronical clogging sensor VS1



with electronical clogging sensor VS2



8. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’, respectively Δp- curves; depending on filter fineness and viscosity.

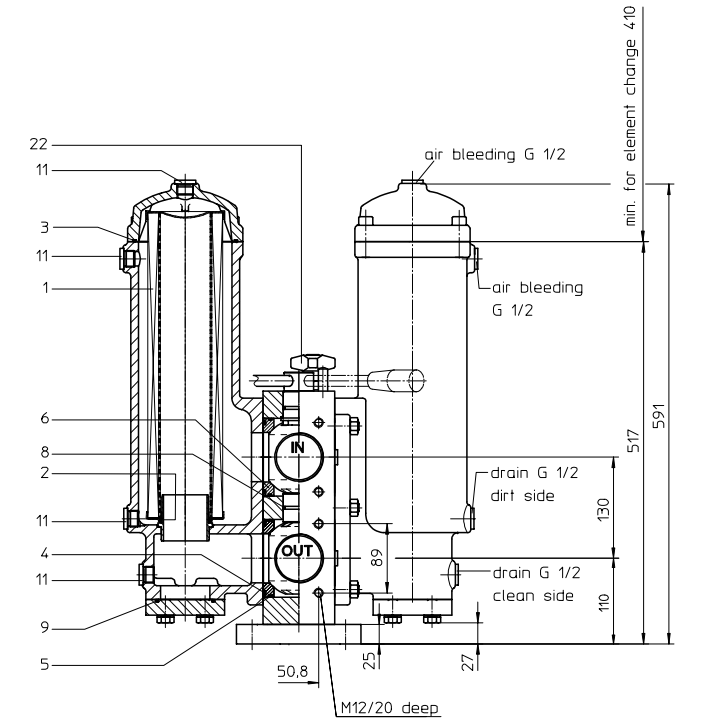
9. Test methods:

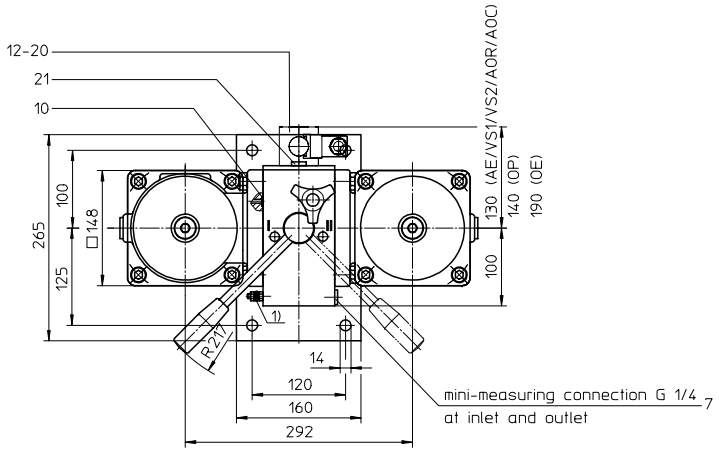
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER, change-over ball valve
Series DU 635 DN 65 PN 32

Sheet No. **2128 E**





1) connection for the potential equilisation, at outlet, only for application in the explosive area

Pos. I: left filter-side in operation
Pos. II: lright filter-side in operation

1. Type index:

1.1. Complete filter: (ordering example)

DU. 635. 10VG. 30. E. P. -. FS. 9. -. -. AE

1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
DU = pressure filter, change-over

2 **nominal size:** 635

3 **filter-material and filter- fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm stainless steel wire mesh,
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 P = 25 µm, 10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
30 = Δp 30 bar

5 **filter element design:**
E = single-end open
S = with by-pass valve Δp 2,0 bar
S1 = with by-pass valve Δp 3,5 bar

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
IS07 = see sheet-no. 31602

8 **connection:**
FS = SAE-flange connection 3000 PSI

9 **connection size:**
9 = 2 ½ “

10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605 IS12 = see sheet-no. 41028

11 **internal valve:**
- = without

12 **clogging indicator or clogging sensor:**
- = without,
AOR = visual, see sheet-no. 1606,
AOC = visual, see sheet-no. 1606,
AE = visual-electrical, see sheet-no. 1609,
OP = visual, see sheet-no. 1628
OE = visual-electrical, see sheet-no. 1628
VS1 = electronical, see sheet-no. 1607
VS2 = electronical, see sheet-no. 1608

1.2. Filter element: (ordering example)

01NL. 630. 10VG. 30. E. P. -

1	2	3	4	5	6	7

1 **series:**
01NL. = standard filter element according to DIN 24550, T3

2 **nominal size:** 630

3 - 7 see type index-complete filter

2. Accessories:

- measure- and bleeder connections, see sheet-no. 1650
- evacuation and bleeder-conections, see sheet-no. 1651
- counter flanges, see sheet-no. 1652
- shut-off valve, see sheet-no. 1655

weight: approx. 90 kg

Changes of measures and design are subject to alteration!

EDV 11/07

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3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01NL. 630		
2	2	O-ring	60 x 3,5	304377 (NBR)	304398 (FPM)
3	2	O-ring	125 x 3	306025 (NBR)	307358 (FPM)
4	4	O-ring	85 x 4	305685 (NBR)	310285 (FPM)
5	4	O-ring	95 x 3	305808 (NBR)	304828 (FPM)
6	4	gasket		317651	
7	2	screw plug	G ¼	305003	
8	2	O-ring	32 x 3	304368 (NBR)	311020 (FPM)
9	2	O-ring	69,45 x 3,53	305868 (NBR)	307357 (FPM)
10	4	O-ring	8 x 2	310004 (NBR)	316530 (FPM)
11	8	screw plug	G ½	304678	
12	1	clogging indicator, visual	AOR oder AOC	see sheet no. 1606	
13	1	clogging indicator, visual	OP	see sheet no. 1628	
14	1	clogging indicator, visual-electrical	OE	see sheet no. 1628	
15	1	clogging indicator, visual-electrical	AE	see sheet no. 1609	
16	1	clogging sensor, electronical	VS1	see sheet no. 1607	
17	1	clogging sensor, electronical	VS2	see sheet no. 1608	
18	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
19	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
20	2	O-ring	14 x2	304342 (NBR)	304722 (FPM)
21	2	screw plug	G ¼	305003	
22	1	pressure balance valve			

item 21 execution only without clogging indicator or clogging sensor

4. Description:

Pressure filters, change-over series DU 635 are suitable for operating pressure up to 32 bar. Pressure peaks can be absorbed with a sufficient margin of safety.
Change-over ball valve between the two filter housings makes it possible to switch from the dirty filter-side to the clean filter-side without interruting operation.
The filter element consist of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. These filters can be installed as suct ion filters.
For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fibre element remove the cover and take out the element.
Filter finer than 40 mµ should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
Approvals according to TÜV, and the major „Shipyard Classification Societies" D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible.

5. Technical data:

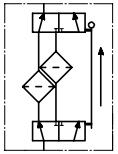
temperature range:	- 10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	32 bar
test pressure:	64 bar
connection system:	SAE-flange connection 3000 PSI
housing material:	EN-GJS-400-18-LT
switching housing-material:	S355J2G3
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
mini-measuring connections:	G ¼
evacuation-or bleeder connections:	G ½
volume tank:	2x 5,7 l

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

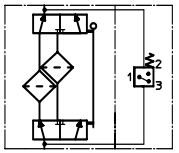
E 2128 E

6. Symbols:

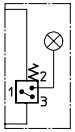
without indicator



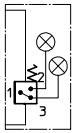
with electrical indicator
AE 30 and AE 40



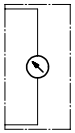
with visual-electrical indicator
AE 50 and AE 62



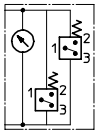
with visual-electrical indicator
AE 70 and AE 80



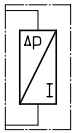
with visual indicator
AOR/AOC/OP



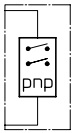
with visual-electrical indicator
OE



with electronical clogging sensor
VS1



with electronical clogging sensor
VS2



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

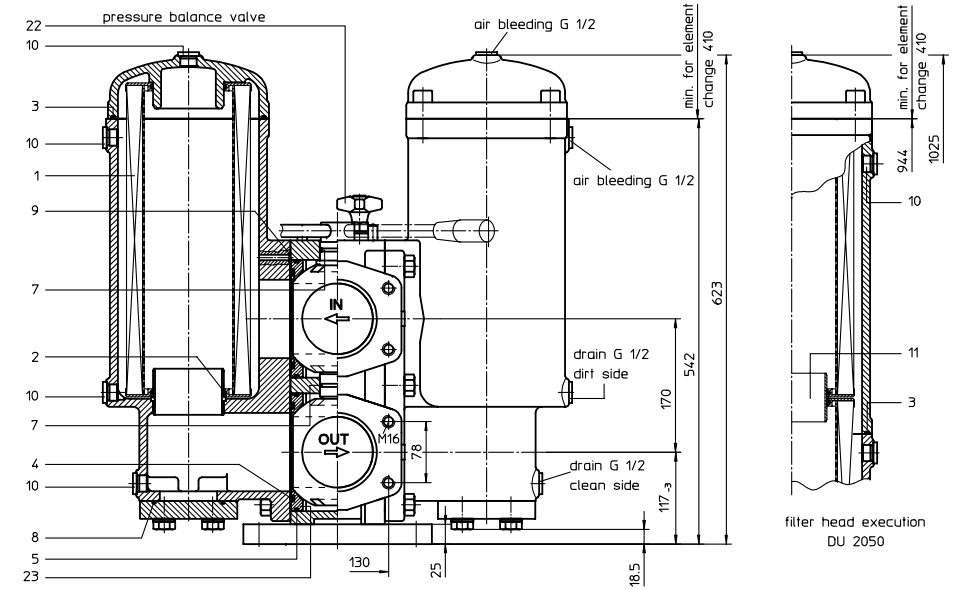
8. Test methods:

Filter elements are tested according to the following ISO standards:

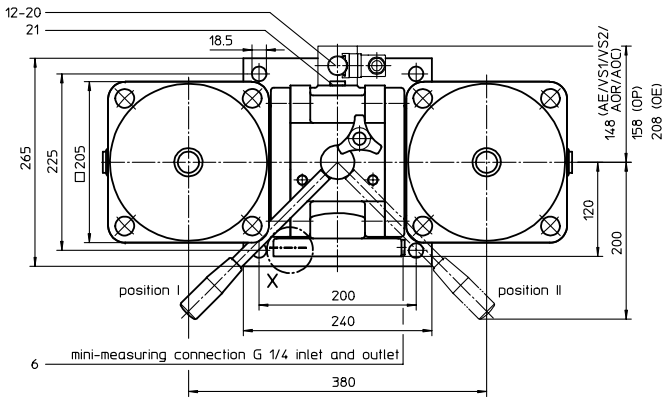
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER, change-over ball valve
Series DU 1050-2050 DN 80-100 PN 32

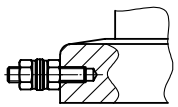
Sheet No. **2119 K**



filter head execution DU 2050



detail X



connection for the potential equalisation at outlet, only for application in the explosive area

Pos. I: left filter-side in operation
Pos. II: right filter-side in operation

1. Type index:

1.1. Complete filter: (ordering example)

DU. 1050. 10VG. 10. B. P. -. FS. B. -. -. AE

1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
DU = pressure filter, change-over

2 **nominal size:** 1050, 2050

3 **filter-material and filter- fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 P = 25 µm, 10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
IS07 = see sheet-no. 31602

8 **connection:**
FS = SAE-flange connection 3000 PSI

9 **connection size:**
B = 4“

10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605
IS12 = see sheet-no. 41028

11 **internal valve:**
- = without
S = with by-pass valve Δp 2 bar
S1 = with by-pass valve Δp 3,5 bar

12 **clogging indicator or clogging sensor:**
- = without,
AOR = visual, see sheet-no. 1606,
AOC = visual, see sheet-no. 1606,
AE = visual-electrical, see sheet-no. 1609,
OP = visual, see sheet-no. 1628
OE = visual-electrical, see sheet-no. 1628
VS1 = electronical, see sheet-no. 1607
VS2 = electronical, see sheet-no. 1608

1.2. Filter element: (ordering example)

01NR. 1000. 10VG. 10. B. P. -

1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 1000

3 - 7 see type index complete filter

2. Accessories:

- measure-and bleeder -connection, see sheet-no. 1650
- evacuation- and bleeder-connection, see sheet-no. 1651
- counter flange, see sheet-no. 1652
- shut-off valve, see sheet-no. 1655

3. Dimensions:

type	connection	SAE-connection size	weight kg
DU 1050	DN 80[1)]	SAE 4“	150
DU 1050	DN 100	SAE 4“	150
DU 2050	DN 80[1)]	SAE 4“	200
DU 2050	DN 100	SAE 4“	200

[1)] by counter flange BFS.B.E.88,9x3,2.St.P.3000
Instead of P (Nitrile) also V (Viton) can be chosen.

Changes of measures and design are subject to alteration!

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4. Spare parts:

item	designation	qty.	dimension and article-no. DU 1050	qty.	dimension and article-no. DU 2050
1	filter element	2	01NR. 1000	4	01NR. 1000
2	O-ring	4	90 x 4 306941 (NBR) 307031 (FPM)	8	90 x 4 306941 (NBR) 307031 (FPM)
3	O-ring	2	185 x 4 305593 (NBR) 306309 (FPM)	4	185 x 4 305593 (NBR) 306309 (FPM)
4	O-ring	4	114 x 6 314419 (NBR) 316531 (FPM)	4	114 x 6 314419 (NBR) 316531 (FPM)
5	O-ring	4	140 x 4 305145 (NBR) 305201 (FPM)	4	140 x 4 305145 (NBR) 305201 (FPM)
6	screw plug	2	G ¼ 305003	2	G ¼ 305003
7	O-ring	2	38 x 3 304340 (NBR) 317013 (FPM)	2	38 x 3 304340 (NBR) 317013 (FPM)
8	O-ring	2	85,32 x 3,53 305590 (NBR) 306308 (FPM)	2	85,32 x 3,53 305590 (NBR) 306308 (FPM)
9	O-ring	4	8 x 2 310004 (NBR) 316530 (FPM)	4	8 x 2 310004 (NBR) 316530 (FPM)
10	screw plug	8	G ½ 304678	10	G ½ 304678
11	slip coupling	-	-	2	∅90 313233
12	clogging indicator visual	1	AOR or AOC	see sheet-no. 1606	
13	clogging indicator visual	1	OP	see sheet-no. 1628	
14	clogging indicator visual-electrical	1	OE	see sheet-no. 1628	
15	clogging indicator visual-electrical	1	AE	see sheet-no. 1609	
16	clogging sensor electronical	1	VS1	see sheet-no. 1607	
17	clogging sensor electronical	1	VS2	see sheet-no. 1608	
18	O-ring	1	15 x 1,5	315357 (NBR) 315427 (FPM)	
19	O-ring	1	22 x 2	304708 (NBR) 304721 (FPM)	
20	O-ring	2	14 x2	304342 (NBR) 304722 (FPM)	
21	screw plug	2	G ¼	305003	
22	pressure balance valve	1			
23	gasket	4	DN 90	312275	

item 21 execution only without clogging indicator or clogging sensor

5. Description:

Pressure filters, change-over series DU 1050-2050 are suitable for operating pressure up to 32 bar.
Pressure peaks can be absorbed with a sufficient margin o safety.
Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outs ide to the inside.
These filters can be installed as suction filters.
For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fibre element remove the cover and take out the element.
Filter finer than 40 mµ should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
Approvals according to TÜV, and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible.
The internal valve is integrated in the filter cover. After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter.

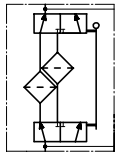
6. Technical data:

temperature range:	- 10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	32 bar
test pressure:	64 bar
connection system:	SAE-flange connection 3000 PSI
housing material:	EN-GJS-400-18-LT
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
mini-measuring connections:	G ¼
evacuation-or bleeder connections:	G ½
volume tank DU 1050:	2x 13,7 l
DU 2050:	2x 23,9 l

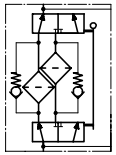
Classification according to the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2) -article 3, paragraph 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

7. Symbols:

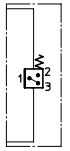
without indicator



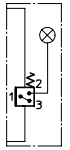
with by-pass valve



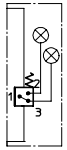
with electrical indicator AE 30 and AE 40



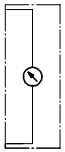
with visual-electrical indicator AE 50 and AE 62



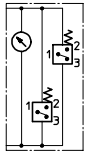
with visual-electrical indicator AE 70 and AE 80



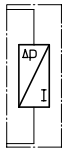
with visual indicator AOR/AOC/OP



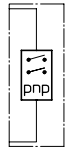
with visual-electrical indicator OE



with electronical clogging sensor VS1



with electronical clogging sensor VS2



8. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fin eness and viscosity.

9. Test methods:

Filter elements are tested according to the following ISO standards:

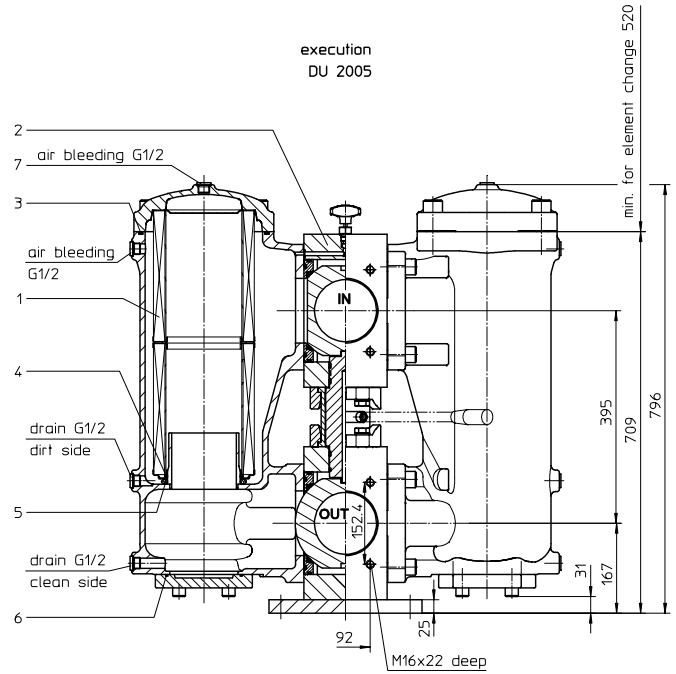
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER, change over ball valve

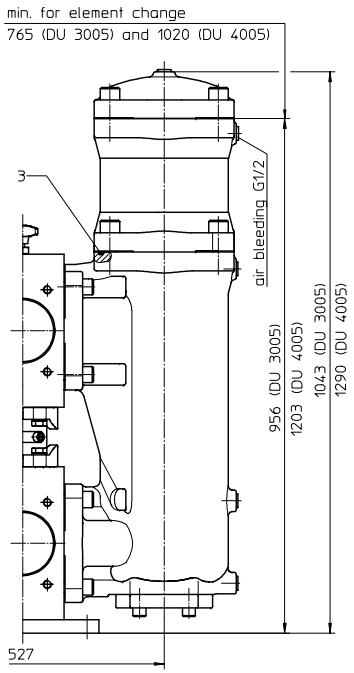
Series DU 2005-4005 DN 125 PN 32

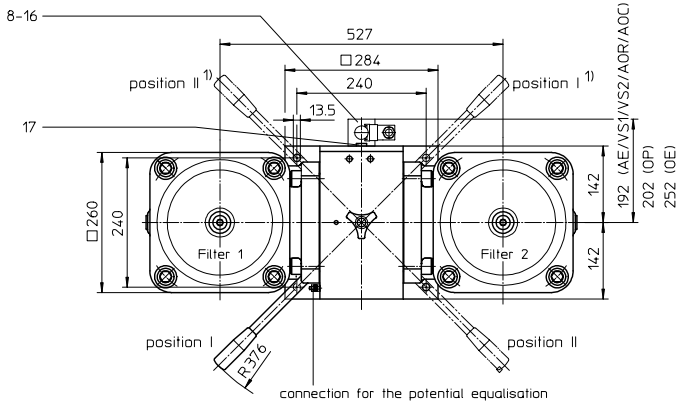
Sheet No. **2153 A**

execution
DU 2005



execution
DU 3005/DU 4005





1) On request: Switch lever backside opposite to inlet and outlet.

Please specify on order !

Pos. I: filter 1 in operation
Pos. II: filter 2 in operation

filter	weight kg
DU 2005	340
DU 3005	402
DU 4005	436

1. Type index:

1.1. Complete filter: (ordering example)

DU. 2005. 10VG. 10. E. P. -. FS. C. -. AE

1	2	3	4	5	6	7	8	9	10	11

1 **series:**
DU = pressure filter, change-over

2 **nominal size:** 2005, 3005, 4005

3 **filter-material and filter- fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 P = 25 µm, 10 P = 10µm paper

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
E = without by-pass valve
S = with by-pass valve Δp 2,0 bar
S1 = with by-pass valve Δp 3,5 bar

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **connection:**
FS = SAE-flange connection 3000 PSI

9 **connection size:**
C = 5"

10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605
IS12 see sheet-no. 41028

11 **clogging indicator or clogging sensor:**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1609
OP = visual, see sheet-no. 1628
OE = visual-electrical, see sheet-no. 1628
VS1 = electronical, see sheet-no. 1607
VS2 = electronical, see sheet-no. 1608

1.2. Filter element: (ordering example)

01E. 2001. 10VG. 10. E. P. -

1	2	3	4	5	6	7

1 **series:**
01E. = filter element according to INTERNORMEN factory specification

2 **nominal size:** 2001, 3001, 4001

3 - 7 see type index complete filter

2. Accessories:

- measure-and bleeder -connection, see sheet-no. 1650
- evacuation- and bleeder-connection, see sheet-no. 1651
- counter flange, see sheet-no. 1652
- shut-off valve, see sheet-no. 1655

Changes of measures and design are subject to alteration!

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3. Spare parts:

item	designation	qty.	dimension and article-no. DU 2005	dimension and article-no. DU 3005	dimension and article-no. DU 4005
1	filter element	2	01E. 2001	01E. 3001	01E. 4001
2	change over	1	DN 125		
3	O-ring (DU 2005)	2	240 x 5	307592 (NBR)	
	O-ring (DU 3005/4005)	4		328793 (FPM)	
4	O-ring	2	135 x 10	306016 (NBR) 307045 (FPM)	
5	O-ring	2	125 x 10	304388 (NBR) 306006 (FPM)	
6	O-ring	2	136,12 x 3,53	320162 (NBR) 320163 (FPM)	
7	screw plug (DU 2005)	8	G ½	304678	
	screw plug (DU 3005/4005)	10			
8	clogging indicator visual	1	AOR or AOC	see seet-no. 1606	
9	clogging indicator visual-electrical	1	OE	see seet-no. 1628	
10	clogging indicator visual	1	OP	see seet-no. 1628	
11	clogging indicator visual-electrical	1	AE	see seet-no. 1609	
12	clogging sensor electronical	1	VS1	see seet-no. 1607	
13	clogging sensor electronical	1	VS2	see seet-no. 1608	
14	O-ring	1	15 x 1,5	315357 (NBR) 315427 (FPM)	
15	O-ring	1	22 x 2	304708 (NBR) 304721 (FPM)	
16	O-ring	2	14 x 2	304342 (NBR) 304722 (FPM)	
17	screw plug	2	G ¼	305003	

item 17 execution only without clogging indicator or clogging sensor

4. Description:

Pressure filters, change-over series DU 2005-4005 are suitable for operating pressure up to 32 bar.
Pressure peaks can be absorbed with a sufficient margin o safety.
Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation. These filters can be installed as suction filters.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outs ide to the inside.
For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fibre element remove the cover and take out the element.
Filter finer than 40 mµ should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
Approvals according to TÜV, and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible.

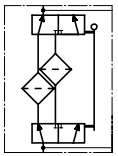
5. Technical data:

temperature range:	- 10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	32 bar
test pressure:	64 bar
connection system:	SAE-flange connection 3000 PSI
housing material:	EN-GJS-400-18-LT
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
measuring connections:	G ¼
evacuation-or bleeder connections:	G ½
volume tank DU 2005:	2x 29 l
DU 3005:	2x 38 l
DU 4005:	2x 47 l

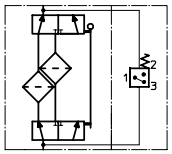
Classification according to the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2) -article 3, paragraph 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:

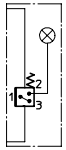
without indicator



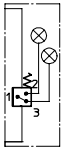
with electrical indicator AE 30 and AE 40



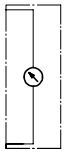
with visual-electrical indicator AE 50 and AE 62



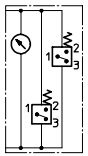
with visual-electrical indicator AE 70 and AE 80



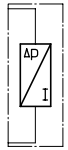
with visual indicator AOR/AOC/OP



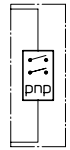
with visual-electrical indicator OE



with electronical clogging sensor VS1



with electronical clogging sensor VS2



7. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’, respectively Δp-curves; depending on filter fin eness and viscosity.

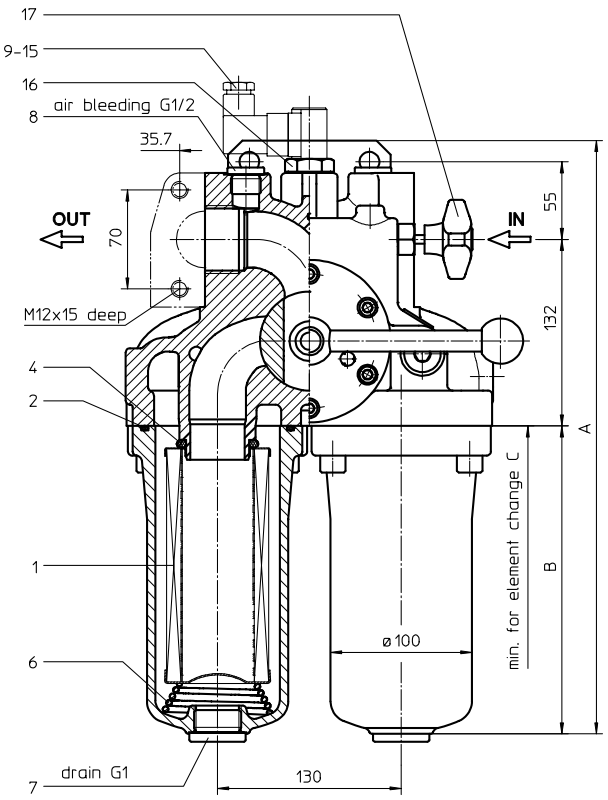
8. Test methods:

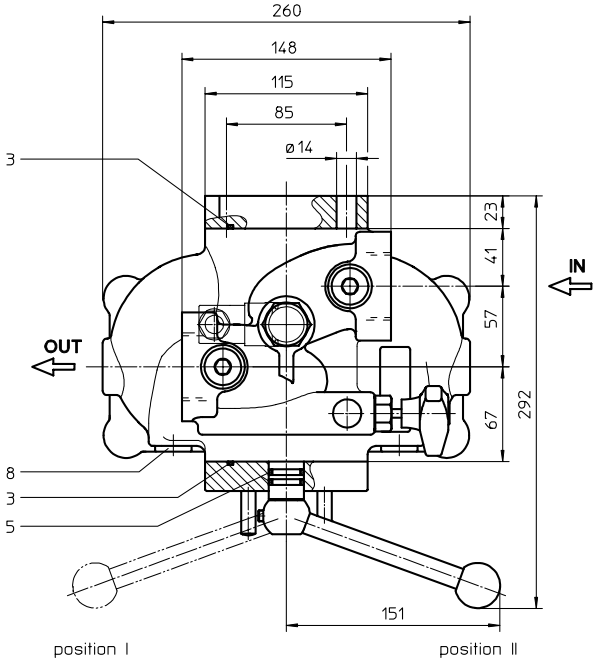
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER, change-over
Series DSF 176 - 331 DN 40 PN 25

Sheet No.
2148 A





Pos. I: left filter-side in operation
Pos. II: right filter-side in operation

Information:
Execution IN left/OUT right
see data sheet-no. 2149 !

1. Type index:

1.1. Complete filter: (ordering example)

DSF.	176.	10VG.	16.	E.	P.	-.	FS.	7.	-.	-.	AE
1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
DSF = duplex filter, change-over

2 **nominal size**: 176, 331

3 **filter-material and filter- fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25µm
stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$,
6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 P = 25 µm, 10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
16 = Δp 16 bar

5 **filter element design:**
E = without by-pass valve

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:**
- = standard
VA = stainless steel

8 **connection:**
FS = SAE-flange connection 3000 PSI
G = thread connection according to DIN 3852, T2

9 **connection size:**
7 = 1 ½“

10 **filter housing specification:**
- = standard

11 **internal valve:**
- = without
S1 = with by-pass valve Δp 3,5 bar
S2 = with by-pass valve Δp 7,0 bar

12 **clogging indicator or clogging sensor** :
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E.	175.	10VG.	16.	E.	P.	-
1	2	3	4	5	6	7

1 **series:**
01E. = filter element according to INTERNORMEN factory specification

2 **nominal size:** 175, 330

3 - 7 see type index complete filter

2. Accessories:

- counter flange see sheet-no. 1652

3. Dimensions:

type	A	B	C	weight kg	volume tank
DSF 176	420	218	250	36	2x 1,2 l
DSF 331	555	353	390	38	2x 2,0 l

Changes of measures and design are subject to alteration!

EDV 04/09

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4. Spare parts:

item	qty.	designation	dimension DSF 176	dimension DSF 331	article-no.	
1	2	filter element	01E. 175	01E. 330		
2	2	O-ring	98 x 4		301914 (NBR)	304765 (FPM)
3	2	O-ring	75 x 3		302215 (NBR)	304729 (FPM)
4	2	O-ring	44 x 6		302222 (NBR)	304384 (FPM)
5	2	O-ring	18 x 3		304359 (NBR)	304399 (FPM)
6	2	spring	Da = 52		304989	
7	2	screw plug	G 1		305303	
8	4	screw plug	G ½		304678	
9	1	clogging indicator, visual	AOR or AOC		see sheet-no.1606	
10	1	clogging indicator, visual-electrical	AE		see sheet-no.1615	
11	1	clogging sensor, electronical	VS1		see sheet-no.1617	
12	1	clogging sensor, electronical	VS2		see sheet-no.1618	
13	1	O-ring	15 x 1,5		315357 (NBR)	315427 (FPM)
14	1	O-ring	22 x 2		304708 (NBR)	304721 (FPM)
15	1	O-ring	14 x 2		304342 (NBR)	304722 (FPM)
16	1	screw plug	20913-4		309817	
17	1	pressure balance valve				

item 16 execution only without clogging indicator or clogging sensor

5. Description:

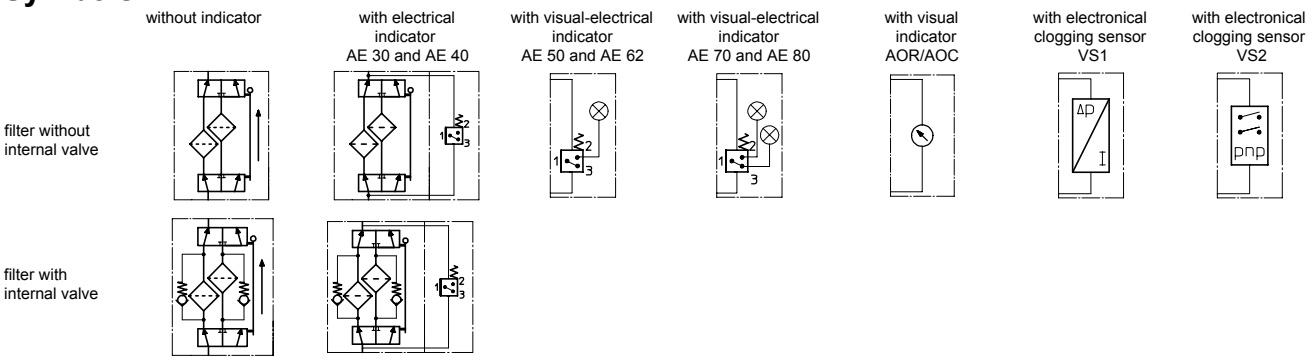
Duplex filters of the series DSF 176-331 are suitable for a working pressure up to 25 bar.
Pressure peaks can be absorbed with a sufficient margin of safety.
A three-way-change-over valve which is integrated in the middle of the housing makes it possible to switch from the dirty filter-side to the clean filter-side without interruting operation.
The filters can be installed as suction filter, pressure filter or return-line filter.
The filter element consist of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
Approvals according to TÜV, and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S.; P.R.S.;USS.R.S. and others are possible.
The internal valve is integrated in the filter. After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter.

6. Technical data:

temperature range:	-10°C to +80°C (for a short time +100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	25 bar
test pressure:	50 bar
connection system:	SAE-flange 3000 PSI or thread according to DIN 3852, T2
housing material:	EN-GJS-400-18-LT
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

7. Symbols:



8. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’ respectively Δp-curves ; depending on filter fineness and viscosity.

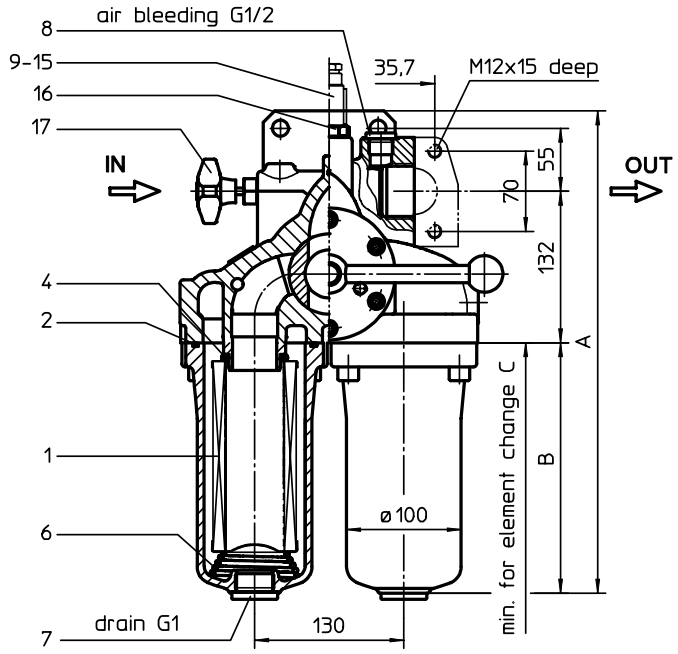
9. Test methods:

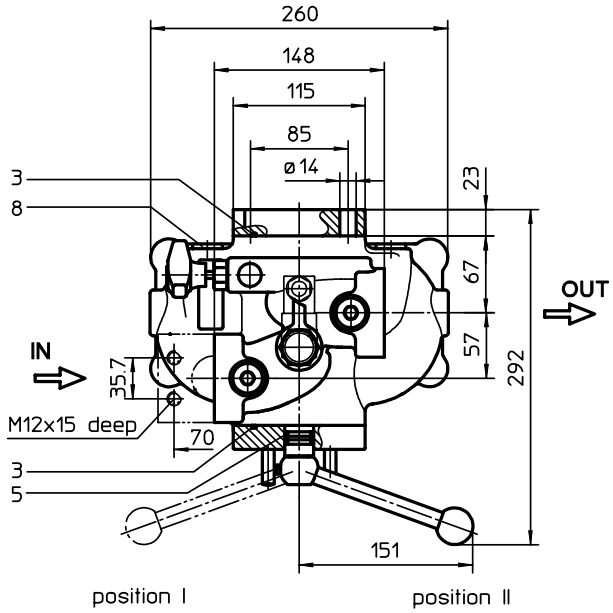
Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

PRESSURE FILTER, change-over
Series DSF 180-340 DN 40 PN 25

Sheet No. **2149**





Pos. I: left filter-side in operation
Pos. II: right filter-side in operation

Information:
Execution IN right/OUT left
see data sheet-no. 2148 !

1. Type index:

1.1. Complete filter: (ordering example)

DSF. 180. 10VG. 16. E. P. -. FS. 7. -. -. AE

1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
DSF = duplex filter, change-over

2 **nominal size**: 180, 340

3 **filter-material and filter- fineness:**
80 G = 80 µm, 40 G = 40 µm,
25 G = 25µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$,
6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 P = 25 µm, 10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
16 = Δp 16 bar

5 **filter element design:**
E = without by-pass valve

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:**
- = standard
VA = stainless steel

8 **connection:**
FS = SAE-flange connection 3000 PSI
G = thread connection according to DIN 3852, T2

9 **connection size:**
7 = 1 ½“

10 **filter housing specification:**
- = standard

11 **internal valve:**
- = without
S1 = with by-pass valve Δp 3,5 bar
S2 = with by-pass valve Δp 7,0 bar

12 **clogging indicator or clogging sensor** :
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E. 175. 10VG. 16. E. P. -

1	2	3	4	5	6	7

1 **series:**
01E. = filter element according to INTERNORMEN factory specification

2 **nominal size:** 175, 330

3 - 7 see type index complete filter

2. Accessories:

- counter flange see sheet-no. 1652

3. Dimensions:

type	A	B	C	weight kg	volume tank
DSF 180	420	218	250	36	2x 1,2 l
DSF 340	555	353	390	38	2x 2,0 l

Changes of measures and design are subject to alteration!

EDV 04/09

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fax +49 - (0)6205 - 2094-40 url www.internormen.com

4. Spare parts:

item	qty.	designation	dimension DSF 180	dimension DSF 340	article-no.	
1	2	filter element	01E. 175	01E. 330		
2	2	O-ring	98 x 4		301914 (NBR)	304765 (FPM)
3	2	O-ring	75 x 3		302215 (NBR)	304729 (FPM)
4	2	O-ring	44 x 6		302222 (NBR)	304384 (FPM)
5	2	O-ring	18 x 3		304359 (NBR)	304399 (FPM)
6	2	spring	Da = 52		304989	
7	2	screw plug	G 1		305303	
8	4	screw plug	G ½		304678	
9	1	clogging indicator, visual	AOR or AOC		see sheet-no.1606	
10	1	clogging indicator, visual-electrical	AE		see sheet-no.1615	
11	1	clogging sensor, electronical	VS1		see sheet-no.1617	
12	1	clogging sensor, electronical	VS2		see sheet-no.1618	
13	1	O-ring	15 x 1,5		315357 (NBR)	315427 (FPM)
14	1	O-ring	22 x 2		304708 (NBR)	304721 (FPM)
15	1	O-ring	14 x 2		304342 (NBR)	304722 (FPM)
16	1	screw plug	20913-4		309817	
17	1	pressure balance valve				

item 16 execution only without clogging indicator or clogging sensor

5. Description:

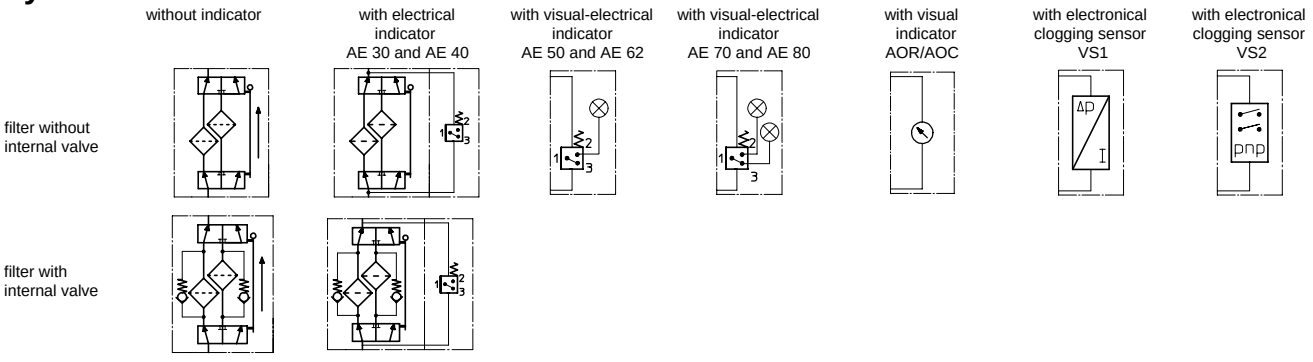
Duplex filters of the series DSF 180-340 are suitable for a working pressure up to 25 bar.
Pressure peaks can be absorbed with a sufficient margin of safety.
A three-way-change-over valve which is integrated in the middle of the housing makes it possible to switch from the dirty filter-side to the clean filter-side without interruting operation.
The filters can be installed as suction filter, pressure filter or return-line filter.
The filter element consist of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
Approvals according to TÜV, and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S.; P.R.S.;USS.R.S. and others are possible.
The internal valve is integrated in the filter. After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter.

6. Technical data:

temperature range:	-10°C to +80°C (for a short time +100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	25 bar
test pressure:	50 bar
connection system:	SAE-flange 3000 PSI or thread according to DIN 3852, T2
housing material:	EN-GJS-400-18-LT
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

7. Symbols:



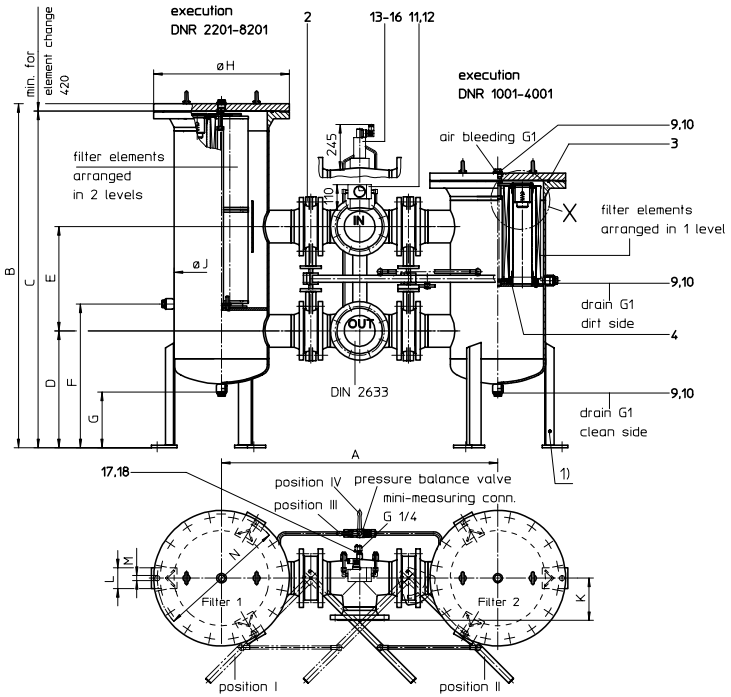
8. Pressure drop flow curves:

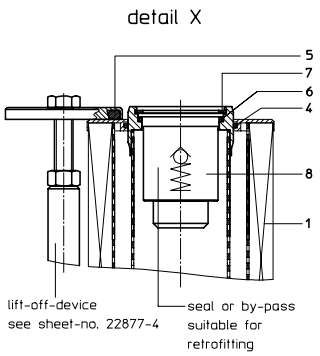
Precise flow rates see ‘INT-Expert-System Filter’ respectively Δp-curves ; depending on filter fineness and viscosity.

9. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance





Pos. I: filter 1 in operation
Pos II: filter 2 in operation

with pressure balance valve:
Pos III: valve open
Pos IV: valve closed

Connection standard as in drawing.
On request: inlet- on top and backside
outlet - bottom and backside

Please specify on order!

1) connection for the potential equalisation, only for application in the explosive area

3. Dimensions:

type	connection DN	A	B	C	D	E	F	G	H	J	K	L	M	N	weight kg	volume tank
DNR 1001	50	796	915	890	395	330	465	190	340	219	111	70	18	330	170	2x 22,5 l
	65	822	915	890	395	347	465				123					2x 22,5 l
	80	862	965	940	395	400	515				138					2x 24,0 l
	100	914	995	970	395	421	545				159					2x 25,0 l
DNR 2001	80	1092	1105	1070	500	400	645	250	580	406	138	90	22	550	530	2x 94,0 l
	100	1144	1135	1100	500	421	675				159					2x 98,0 l
	125	1182	1175	1140	500	446	715				181					2x 103,0 l
	150	1212	1235	1200	500	492	775				200					2x 109,0 l
DNR 3001	100	1144	1135	1100	500	421	675	250	580	406	159	90	22	550	540	2x 98,0 l
	125	1182	1175	1140	500	446	715				181					2x 103,0 l
	150	1212	1235	1200	500	492	775				200					2x 109,0 l
	200	1330	1345	1310	530	543	885				242					2x 121,0 l
DNR 4001	100	1274	1165	1130	520	421	705	240	715	508	159	90	22	650	550	2x 152,0 l
	125	1322	1205	1170	520	446	745				181					2x 165,0 l
	150	1352	1275	1240	530	492	815				200					2x 178,0 l
	200	1440	1375	1340	560	543	915				242					2x 195,0 l
DNR 2201	80	862	1365	1340	395	400	515	190	340	219	138	70	18	330	240	2x 38,0 l
	100	914	1395	1370	395	421	545				159					2x 39,0 l
	125	1000	1395	1370	410	446	545				181					2x 39,0 l
	150	1060	1395	1370	420	492	545				200					2x 39,0 l
DNR 4201	80	1092	1475	1440	500	400	615	250	580	406	138	90	22	550	960	2x 137,0 l
	100	1144	1475	1440	500	421	615				159					2x 137,0 l
	125	1182	1475	1440	500	446	615				181					2x 137,0 l
	150	1212	1475	1440	500	492	615				200					2x 137,0 l
	200	1330	1575	1540	550	543	675				242					2x 149,0 l
DNR 6201	100	1144	1475	1440	500	421	615	240	580	406	159	90	22	550	570	2x 137,0 l
	125	1182	1475	1440	500	446	615				181					2x 137,0 l
	150	1212	1475	1440	500	492	615				200					2x 137,0 l
	200	1330	1535	1500	530	543	675				242					2x 145,0 l
	250	1450	1595	1560	560	618	735				288					2x 151,0 l
DNR 8201	100	1274	1495	1460	520	421	635	240	715	508	159	90	22	650	830	2x 218,0 l
	125	1322	1495	1460	520	446	635				181					2x 218,0 l
	150	1352	1515	1480	530	492	655				200					2x 222,0 l
	200	1440	1575	1540	560	543	715				242					2x 233,0 l

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PRESSURE FILTER, change -over

Series DNR 1001-8201 DN 50-250 PN 16

Sheet No. **2135 J**

1. Type index:

1.1. Complete filter: (ordering example)

DNR.	3001.	10VG.	10.	B.	P.	-.	FD1.	D.	-.	-.	AE
1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
DNR = duplex filter with standard-return-line filter elements

2 **nominal size:** 1001, 2001, 3001, 4001 (1 level)
2201, 4201, 6201, 8201 (2 levels)

3 **filter-material and filter- fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm stainless steel wire mesh,
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:**
- = standard ; VA = stainless steel ; IS06 = see sheet-no. 31601 ; IS07 = see sheet-no. 31602

8 **connection:**
FD1 = flange DIN 2633, design C DIN 2526
FD2 = flange DIN 2633, design E DIN 2526

9 **connection size:**

filter nominal size	DNR 1001	DNR 2001	DNR 3001	DNR 4001
connection size	8-9-A-B	A-B-C-D	B-C-D-E	B-C-D-E
filter nominal size	DNR 2201	DNR 4201	DNR 6201	DNR 8201
connection size	A-B-C-D	A-B-C-D-E	B-C-D-E-F	B-C-D-E

8 = DN 50 ; 9 = DN 65 ; A = DN 80 ; B = DN 100 ; C = DN 125 ; D = DN 150 ; E = DN 200 ; F = DN 250

10 **filter housing specification:**
- = standard
IS06 = see sheet-no. 31605

11 **internal valve:**
- = without ; S1 = with by-pass valve 3,5 bar

12 **clogging indicator or clogging sensor:**
- = without
AE = visual-electrical, see sheet-no.1609
OP = visual, see sheet-no.1614 ; VS1 = electronical, see sheet-no.1607
OE = visual-electrical, see sheet-no 1614 ; VS2 = electronical, see sheet-no.1608

1.2. Filter element: (ordering example)

01NR.	1000.	10VG.	10.	B.	P.	-
1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 1000

3 - 7 see type index-complete filter

2. Accessories:

- measure-and bleeder -connection, see sheet-no. 1650
- evacuation- and bleeder-connection, see sheet-no. 1651
- counter flange, see sheet-no. 1653
- shut-off valve, see sheet-no. 1655
- lifting mechanism, see sheet-no. 1661

Changes of measures and design are subject to alteration!

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fax +49 - (0)6205 - 2094-40 url www.internormen.com

4. Spare parts:

4.1. Depending on different series:

item	designation	qty.	dimension and article-no. DNR 1001	qty.	dimension and article-no. DNR 2001	qty.	dimension and article-no. DNR 3001	qty.	dimension and article-no. DNR 4001	qty.	dimension and article-no. DNR 2201	qty.	dimension and article-no. DNR 4201	qty.	dimension and article-no. DNR 6201	qty.	dimension and article-no. DNR 8201
1	filter element	2	01NR. 1000	4	01NR. 1000	6	01NR. 1000	8	01NR. 1000	4	01NR. 1000	8	01NR. 1000	12	01NR. 1000	16	01NR. 1000
2	stop flap [1]	4	DN 50-100	4	DN 80-150	4	DN 100-200	4	DN 100-200	4	DN 100-150	4	DN 80-200	4	DN 100-250	4	DN 100-200
3	O-ring	2	225 x 5 308652 (NBR) 311473 (FPM)	2	429 x 6 308659 (NBR) 310273 (FPM)	2	429 x 6 308659 (NBR) 310273 (FPM)	2	516 x 6 301962 (NBR) 311474 (FPM)	2	225 x 5 308652 (NBR) 311473 (FPM)	2	429 x 6 308659 (NBR) 310273 (FPM)	2	429 x 6 308659 (NBR) 310273 (FPM)	2	516 x 6 301962 (NBR) 311474 (FPM)
4	O-ring	6	90 x 4 306941 (NBR) 307031 (FPM)	12	90 x 4 306941 (NBR) 307031 (FPM)	18	90 x 4 306941 (NBR) 307031 (FPM)	24	90 x 4 306941 (NBR) 307031 (FPM)	10	90 x 4 306941 (NBR) 307031 (FPM)	20	90 x 4 306941 (NBR) 307031 (FPM)	30	90 x 4 306941 (NBR) 307031 (FPM)	40	90 x 4 306941 (NBR) 307031 (FPM)
5	O-ring	2	78 x 10 305017 (NBR) 305552 (FPM	2	78 x 10 305017 (NBR) 305552 (FPM	2	78 x 10 305017 (NBR) 305552 (FPM	2	78 x 10 305017 (NBR) 305552 (FPM	2	78 x 10 305017 (NBR) 305552 (FPM	2	78 x 10 305017 (NBR) 305552 (FPM	2	78 x 10 305017 (NBR) 305552 (FPM	2	170 x 10 308662 (NBR) 317149 (FPM
6	O-ring	2	62 x 4 308045 (NBR) 311472 (FPM)	4	62 x 4 308045 (NBR) 311472 (FPM)	6	62 x 4 308045 (NBR) 311472 (FPM)	8	62 x 4 308045 (NBR) 311472 (FPM)	2	62 x 4 308045 (NBR) 311472 (FPM)	4	62 x 4 308045 (NBR) 311472 (FPM)	6	62 x 4 308045 (NBR) 311472 (FPM)	8	62 x 4 308045 (NBR) 311472 (FPM)
7	circlip	2	DIN 472-75x2,5 311471	4	DIN 472-75x2,5 311471	6	DIN 472-75x2,5 311471	8	DIN 472-75x2,5 311471	2	DIN 472-75x2,5 311471	4	DIN 472-75x2,5 311471	6	DIN 472-75x2,5 311471	8	DIN 472-75x2,5 311471
8	by-pass valve	2	DN 50 311974	4	DN 50 311974	6	DN 50 311974	8	DN 50 311974	2	DN 50 311974	4	DN 50 311974	6	DN 50 311974	8	DN 50 311974
9	screw plug	6	G1 309732														
10	gasket	6	A 33 x 39 308257														

[1] dimension of stop flap = connection size

4.2. Independing on the series:

item	qty.	designation	dimension	article-no.	
11	1	clogging indicator, visual	OP	see sheet-no. 1614	
12	1	clogging indicator, visual-electrical	OE	see sheet-no. 1614	
13	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
14	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
15	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
16	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
17	2	gasket	A 14 x 18	306330	
18	2	screw plug	G ¼	309734	

5. Description:

Duplex filters of the series DNR 1001-8201 are suitable for a working pressure up to 16 bar.
Pressure peaks can be absorbed with a sufficient margin of safety.
Four mechanically connected change-over flaps enabling the change-over without service-interruption from the clean to the dirty filter-side.
The filters can be installed as suction filter, pressure filter or return-line filter.
The filter element consist of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter finer than 40 µm should use throuw-away elements made of Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
Approvals according to TÜV, and the mayor „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S.; P.R.S.;USS.R.S. and others are possible.

6. Technical data:

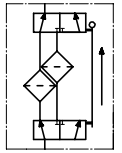
temperature range:	- 10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	16 bar
test pressure:	23 bar
connection system:	flange DIN 2633, 16 bar
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
mini-measuring connection:	G ¼ for screw coupling (mini-measuring)

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

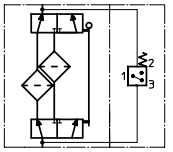
E 2135 J

7. Symbols:

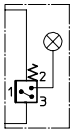
without indicator



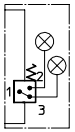
with electrical indicator AE 30 and AE 40



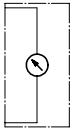
with visual - electrical indicator AE 50 and AE 62



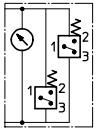
with visual - electrical indicator AE 70 and AE 80



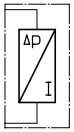
with visual indicator OP



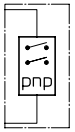
with visual - electrical indicator OE



with electronical clogging sensor VS1



with electronical clogging sensor VS2



8. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’, respectively Δp-curves; depending on filter fineness and viscosity.

9. Test methods:

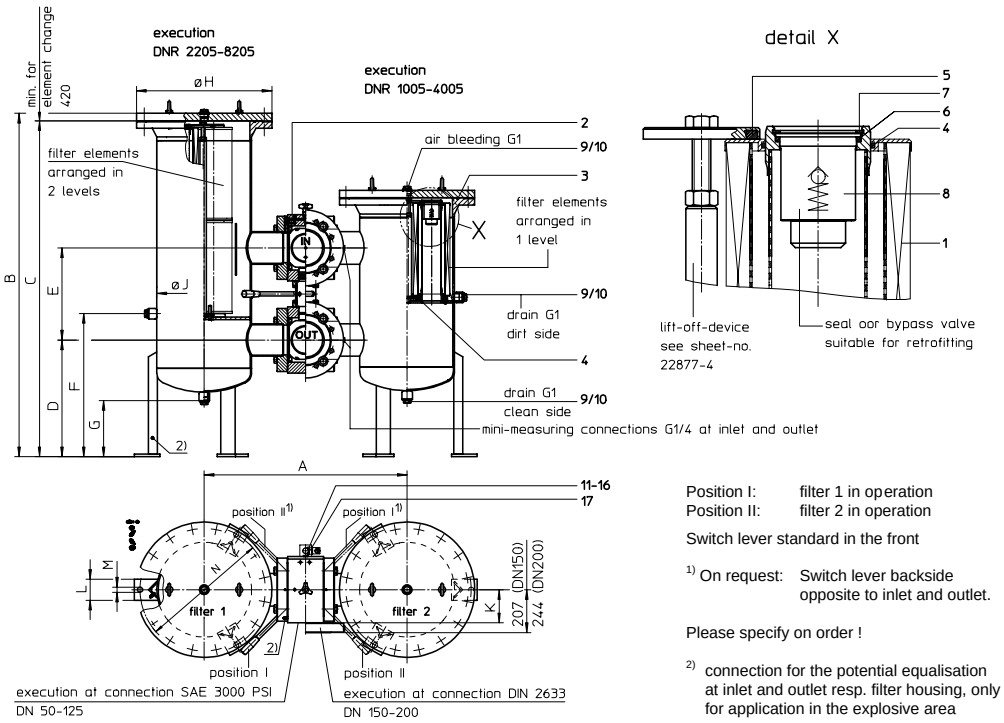
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER, change-over

Series DNR 1005-8205 DN 50-200 PN 16

Sheet No. **2141 F**



Position I: filter 1 in operation
Position II: filter 2 in operation

Switch lever standard in the front

1) On request: Switch lever backside opposite to inlet and outlet.

Please specify on order !

2) connection for the potential equalisation at inlet and outlet resp. filter housing, only for application in the explosive area

3. Dimensions:

type	DN	A	B	C	D	E	F	G	H	J	K	L	M	N	weight kg	volume tank
DNR 1005	50	610	915	890	365	175	463	180	340	219	74	70	18	330	180	2x 22,5 l
	65	560	915	890	365	270	463				90				200	2x 22,5 l
	80	585	925	900	375	290	473				100				210	2x 23,0 l
	100	620	955	930	390	365	503				127				230	2x 24,0 l
DNR 2005	80	780	1105	1070	500	290	643	240	580	406	100	90	22	550	510	2x 94,0 l
	100	810	1105	1070	500	365	643				127				520	2x 94,0 l
	125	870	1145	1110	500	395	683				142				540	2x 99,0 l
	150	900	1195	1160	500	440	733				-				560	2x 105,0 l
DNR 3005	100	810	1105	1070	500	365	643	240	580	406	127	90	22	550	520	2x 94,0 l
	125	870	1145	1110	500	395	683				142				540	2x 99,0 l
	150	900	1195	1160	500	440	733				-				560	2x 105,0 l
	200	990	1345	1310	535	520	883				-				590	2x 121,0 l
DNR 4005	100	910	1165	1130	520	365	703	240	715	508	127	90	22	650	540	2x 152,0 l
	125	970	1165	1130	520	395	703				142				560	2x 152,0 l
	150	1040	1235	1200	530	440	773				-				1020	2x 167,0 l
	200	1090	1375	1340	560	520	913				-				1290	2x 193,0 l
DNR 2205	80	585	1325	1300	375	290	473	180	340	219	100	70	18	330	250	2x 36,0 l
	100	620	1355	1330	390	365	503				127				270	2x 37,0 l
	125	680	1375	1350	400	395	523				142				280	2x 38,0 l
	150	710	1405	1380	415	440	553				-				300	2x 40,0 l
DNR 4205	80	780	1475	1440	500	290	613	240	580	406	100	90	22	550	540	2x 137,0 l
	100	810	1475	1440	500	365	613				127				550	2x 137,0 l
	125	870	1475	1440	500	395	613				142				570	2x 137,0 l
	150	900	1505	1470	510	440	643				-				590	2x 141,0 l
	200	990	1535	1500	530	520	673				-				620	2x 145,0 l
DNR 6205	100	810	1475	1440	500	365	613	240	580	406	127	90	22	550	580	2x 137,0 l
	125	870	1475	1440	500	395	613				142				600	2x 137,0 l
	150	900	1475	1440	500	440	613				-				620	2x 137,0 l
	200	990	1535	1500	530	520	673				-				650	2x 145,0 l
DNR 8205	100	910	1495	1460	520	365	633	240	715	508	127	90	22	650	830	2x 218,0 l
	125	970	1495	1460	520	395	633				142				850	2x 218,0 l
	150	1040	1515	1480	530	440	653				-				870	2x 222,0 l
	200	1090	1575	1540	560	520	713				-				900	2x 233,0 l

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1. Type index:

1.1. Complete filter: (oedering example)

DNR. 3005. 10VG. 10. B. P. -. FS. B. -. -. AE

1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
DNR = duplex filter with standard-return-line filter elements

2 **nominal size:** 1005, 2005, 3005, 4005 (1 level)
2205, 4205, 6205, 8205 (2 levels)

3 **filter-material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm stainless steel wire mesh,
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 P = 25 µm, 10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR) ; V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard ; VA = stainless steel ; IS06 = see sheet-no. 31601 ; IS07 = see sheet-no. 31602

8 **connection:**
FS = flange connection SAE 3000 PSI , only for DN 50-125
FD1 = flange connection DIN 2633, design C DIN 2526, only for DN 150-200
FD2 = flange connection DIN 2633, design E DIN 2526, only for DN 150-200

9 **connection size:**

filter-nominal size	DNR 1005	DNR 2005	DNR 3005	DNR 4005	DNR 2205	DNR 4205	DNR 6205	DNR 8205
connection size	8-9-A-B	A-B-C-D	B-C-D-E	B-C-D-E	A-B-C-D	A-B-C-D-E	B-C-D-E	B-C-D-E

8 = DN 50 ; 9 = DN 65 ; A = DN 80 ; B = DN 100 ; C = DN 125 ; D = DN 150 ; E = DN 200

10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605

11 **internal valve:**
- = without
S1 = with by-pass valve 3,5 bar

12 **clogging indicator or clogging sensor:**
- = without; AE = visual-electrical, see sheet-no. 1609
OP = visual, see sheet-no. 1628; VS1 = electronical, see sheet-no. 1607
OE = visual-electrical, see sheet-no. 1628; VS2 = electronical, see sheet-no. 1608

1.2. Filter element: (ordering example)

01NR. 1000. 10VG. 10. B. P. -

1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter ele ment according to DIN 24550, T4

2 **Nenngröße:** 1000

3 - 7 see type index-complete filter

2. Accessories:

- measure -and bleeder-connections, see sheet-no. 1650
- evacuation- and bleeder-connections, see sheet-no. 1651
- shut-off valve, see sheet-no. 1655
- couner flange, see sheet-no. 1652
- adaptor for flange DIN 2633 (DN 50-125) see sheet-no. 1657
- lifting mechanism, see sheet-no. 1661

Changes of measures and design are subject to alteration!

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4. Spare parts:

4.1. Depending on different series:

item	designation	qty.	dimension and article-no. DNR 1005	qty.	dimension and article-no. DNR 2005	qty.	dimension and article-no. DNR 3005	qty.	dimension and article-no. DNR 4005	qty.	dimension and article-no. DNR 2205	qty.	dimension and article-no. DNR 4205	qty.	dimension and article-no. DNR 6205	qty.	dimension and article-no. DNR 8205
1	filter element	2	01NR. 1000	4	01NR. 1000	6	01NR. 1000	8	01NR. 1000	4	01NR. 1000	8	01NR. 1000	12	01NR. 1000	16	01NR. 1000
2	change over UKK	1	DN 50-100	1	DN 80-150	1	DN 100-200	1	DN 100-200	1	DN 80-150	1	DN 80-200	1	DN 100-200	1	DN 100-200
3	O-ring	2	225 x 5 308652 (NBR) 311473 (FPM)	2	429 x 6 308659 (NBR) 310273 (FPM)	2	429 x 6 308659 (NBR) 310273 (FPM)	2	516 x 6 301962 (NBR) 311474 (FPM)	2	225 x 5 308652 (NBR) 311473 (FPM)	2	429 x 6 308659 (NBR) 310273 (FPM)	2	429 x 6 308659 (NBR) 310273 (FPM)	2	516 x 6 301962 (NBR) 311474 (FPM)
4	O-ring	6	90 x 4 306941 (NBR) 307031 (FPM)	12	90 x 4 306941 (NBR) 307031 (FPM)	18	90 x 4 306941 (NBR) 307031 (FPM)	24	90 x 4 306941 (NBR) 307031 (FPM)	10	90 x 4 306941 (NBR) 307031 (FPM)	20	90 x 4 306941 (NBR) 307031 (FPM)	30	90 x 4 306941 (NBR) 307031 (FPM)	40	90 x 4 306941 (NBR) 307031 (FPM)
5	O-ring	-	-	2	78 x 10 305017 (NBR) 305552 (FPM)	2	78 x 10 305017 (NBR) 305552 (FPM)	2	78 x 10 305017 (NBR) 305552 (FPM)	2	78 x 10 305017 (NBR) 305552 (FPM)	2	78 x 10 305017 (NBR) 305552 (FPM)	2	78 x 10 305017 (NBR) 305552 (FPM)	2	170 x 10 308662 (NBR) 317149 (FPM)
6	O-ring	2	62 x 4 308045 (NBR) 311472 (FPM)	4	62 x 4 308045 (NBR) 311472 (FPM)	6	62 x 4 308045 (NBR) 311472 (FPM)	8	62 x 4 308045 (NBR) 311472 (FPM)	2	62 x 4 308045 (NBR) 311472 (FPM)	4	62 x 4 308045 (NBR) 311472 (FPM)	6	62 x 4 308045 (NBR) 311472 (FPM)	8	62 x 4 308045 (NBR) 311472 (FPM)
7	circlip	2	DIN 472-75x2,5 311471	4	DIN 472-75x2,5 311471	6	DIN 472-75x2,5 311471	8	DIN 472-75x2,5 311471	2	DIN 472-75x2,5 311471	4	DIN 472-75x2,5 311471	6	DIN 472-75x2,5 311471	8	DIN 472-75x2,5 311471
8	bypass valve	2	DN 50 311974	4	DN 50 311974	6	DN 50 311974	8	DN 50 311974	2	DN 50 311974	4	DN 50 311974	6	DN 50 311974	8	DN 50 311974
9	screw plug	6	G1 309732														
10	gasket	6	A 33 x 39 308257														

4.2. Independing on the series:

item	qty.	designation	dimension	article-no.	
11	1	clogging indicator, visual	OP	see sheet-no. 1628	
12	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628	
13	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
14	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
15	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
16	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
17	2	screw plug	G ¼	305003	

5. Description:

Duplex filters of the series DNR 1005-8205 are suitable for a working pressure up to 16 bar.
Pressure peaks can be absorbed with a sufficient margin of safety.
Change-over ball valve between the two filter housings makes it possible to switch from the dirty filter-side to the clean filter-side without interruting operat ion.
The filters can be installed as suction filter, pressure filter or return-line filter.
The filter element consist of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter finer than 40 microns should use throw-away elements made of Interpor fleece (glass fibre). Filter elements as fine as 5 microns $_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
Approvals according to TÜV, and the mayor „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S.; P.R.S.;USS.R.S. and others are possible.

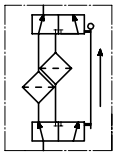
6. Technical data:

temperature range:	- 10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	16 bar
test pressure:	23 bar
connection system:	SAE-flange connection 3000 PSI or flange connection DIN 2633, 16 bar
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
mini-measuring connection:	G ¼

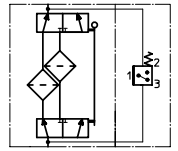
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

7. Symbols:

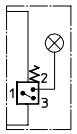
without indicator



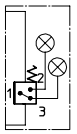
with electrical indicator
AE 30 and AE 40



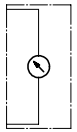
with visual - electrical indicator
AE 50 and AE 62



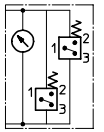
with visual - electrical indicator
AE 70 and AE 80



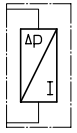
with visual indicator
OP



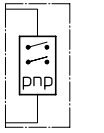
with visual - electrical indicator
OE



with electronical clogging sensor
VS1



with electronical clogging sensor
VS2



8. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’, respectively Δp-curves; depending on filter fin eness and viscosity.

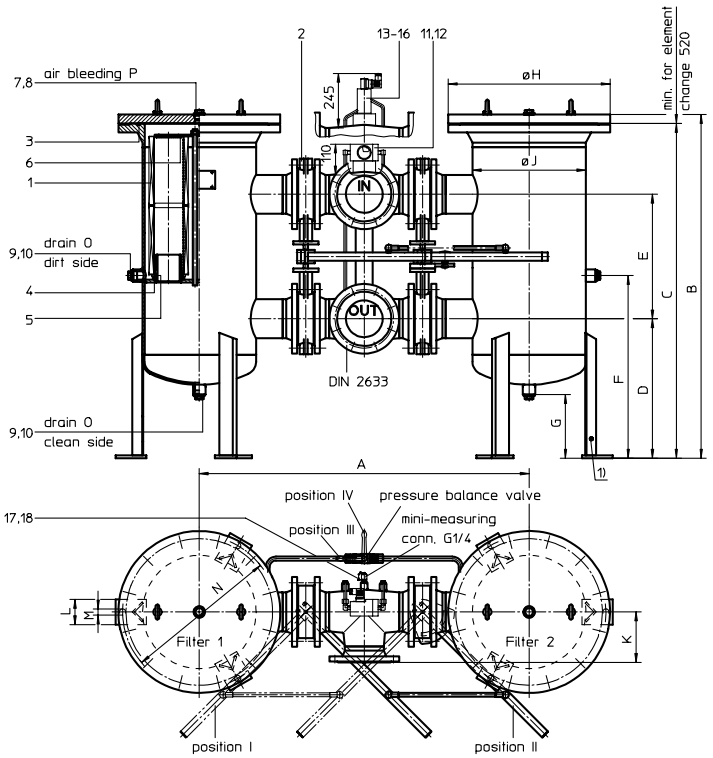
9. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER, change-over
Series DSF 1201-10001 DN 50-250 PN 16

Sheet No. **2133 M**



Pos. I: filter 1 in operation
Pos II: filter 2 in operation

with pressure balance valve:
Pos III: valve open
Pos IV: valve closed

Connection standard as in drawing.
On request: inlet- on top and backside
outlet - bottom and backside

Please specify on order!

1) connection for the potential equalisation, only for application in the explosive area

3. Dimensions:

Typ	connection DN	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	weight kg	volume tank
DSF 1201	50	796	1035	1015	395	330	490	183	340	219	111	70	18	330	G1	G ½	200	2x 26,0 l
	65	822				347					123							
	80	862				400					138							
	100	914				421					159							
DSF 2001	65	902	1100	1075	425	347	550	186	405	273	123	70	18	380	G1	G1	280	2x 44,0 l
	80	942				400					138							
	100	984				421					159							
	125	1032				446					181							
DSF 2401	65	952	1115	1085	425	347	540	183	460	324	123	70	18	450	G1	G1	355	2x 63,0 l
	80	982				400					138							
	100	1034				421					159							
	125	1082				446					181							
	150	1150	1185	1155	445	492	610				200							2x 67,0 l
DSF 3601	80	1092	1235	1200	500	400	655	238	580	406	138	90	22	550	G1	G1	580	2x 109,0 l
	100	1144				421					159							
	125	1182				446					181							
	150	1212				492					200							
DSF 4001	65	902	1596	1570	425	347	550	186	405	273	123	70	18	380	G1	G1	340	2x 70,0 l
	80	942				400					138							
	100	984				421					159							
	125	1032				446					181							
DSF 4801 DSF 6001	100	1274	1240	1200	520	421	655	232	715	508	159	90	22	650	G1	G1	800	2x 171,0 l
	125	1322				446					181							2x 171,0 l
	150	1352	1290	1250	530	492	705				200							2x 180,0 l
	200	1440	1390	1350	560	543	765				242							2x 199,0 l
DSF 10001	125	1592	1340	1300	620	446	755	283	910	711	181	120	22	900	G1 ½	G1 ½	950	2x 355,0 l
	150	1632	1390	1350	630	492	805				200							2x 374,0 l
	200	1700	1490	1450	650	543	870				242							2x 411,0 l
	250	1800	1620	1580	680	618	1000				288							2x 460,0 l

EDV 11/07

1. Type index:

1.1. Complete filter: (ordering example)

DSF. 3601. 10VG. 10. E. P. -. FD1. B. -. AE

1	2	3	4	5	6	7	8	9	10	11

1 **series:**
DSF = duplex filter

2 **nominal size:** 1201, 2001, 2401, 3601, 4001, 4801, 6001, 10001

3 **filter material and filter fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm stainless steel wire mesh,
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 P = 25 µm, 10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
E = without by-pass valve; S = with by-pass valve Δp 2,0 bar

6 **sealing material:**
P = Nitrile (NBR); V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **connection:**
FD1 = flange connection DIN 2633, design C DIN 2526; FD2 = flange connection DIN 2633, design E DIN 2526

9 **connection size:**

DN	filter nominal size							
8 = 50	1201							
9 = 65	1201	2001	2401		4001			
A = 80	1201	2001	2401	3601	4001			
B = 100	1201	2001	2401	3601	4001	4801	6001	
C = 125		2001	2401	3601	4001	4801	6001	10001
D = 150			2401	3601		4801	6001	10001
E = 200						4801	6001	10001
F = 250								10001

10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605

11 **clogging indicator or clogging sensor:**
- = without
OP = visual, see sheet-no.1614
AE = visual-electrical, see sheet-no.1609; VS1 = electronical, see sheet-no.1607
OE = visual-electrical, see sheet-no 1614; VS2 = electronical, see sheet-no.1608

1.2. Filter element: (ordering example)

01E. 1201. 10VG. 10. E. P. -

1	2	3	4	5	6	7

1 **series:**
01E. = filter element according to INTERNORMEN factory specification

2 **nominal size:** 1201, 2001, 4001

3 - 7 see type index-complete filter

2. Accessories:

- measure-and bleeder -connections, see sheet-no. 1650
- evacuation- and bleeder-connections, see sheet-no. 1651
- counter flanges, see sheet-no. 1653
- shut-off valve, see sheet-no. 1655
- lifting mechanism, see sheet-no. 1661

Changes of measures and design are subject to alteration!

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fax +49 - (0)6205 - 2094-40 url www.internormen.com

4. Spare parts:

4.1. Depending on different series:

item	designation	qty.	dimension and article-no. DSF 1201	dimension and article-no. DSF 2001	qty.	dimension and article-no. DSF 2401	qty.	dimension and article-no. DSF 3601	qty.	dimension and article-no. DSF 4001	qty.	dimension and article-no. DSF 4801	qty.	dimension and article-no. DSF 6001	qty.	dimension and article-no. DSF 10001
1	filter element	2	01E.1201	01E.2001	4	01E.1201	6	01E.1201	2	01E.4001	8	01E.1201	6	01E.2001	10	01E.2001
2	stop flap [1)]	4	DN 50-100	DN 65-125	4	DN 65-150	4	DN 80-150	4	DN 65-125	4	DN 100-200	4	DN 100-200	4	DN 125-250
3	O-ring	2	225 x 5 308652 (NBR) 311473 (FPM)	275 x 5 307414 (NBR) 310288 (FPM)	2	330 x 5 303080 (NBR) 310275 (FPM)	2	429 x 6 308659 (NBR) 310273 (FPM)	2	275 x 5 307414 (NBR) 310288 (FPM)	2	516 x 6 301962 (NBR) 311474 (FPM)	2	516 x 6 301962 (NBR) 311474 (FPM)	2	722 x 8 308145 (NBR) 311805 (FPM)
4	O-ring	2	85 x 10 304386 (NBR) 304541 (FPM)	125 x 10 304388 (NBR) 306006 (FPM)	4	85 x 10 304386 (NBR) 304541 (FPM)	6	85 x 10 304386 (NBR) 304541 (FPM)	2	125 x 10 304388 (NBR) 306006 (FPM)	8	85 x 10 304386 (NBR) 304541 (FPM)	6	125 x 10 304388 (NBR) 306006 (FPM)	10	125 x 10 304388 (NBR) 306006 (FPM)
5	O-ring	2	93 x 5 307588 (NBR) 307589 (FPM)	135 x 5 306016 (NBR) 307045 (FPM)	4	93 x 5 307588 (NBR) 307589 (FPM)	6	93 x 5 307588 (NBR) 307589 (FPM)	2	135 x 5 306016 (NBR) 307045 (FPM)	8	93 x 5 307588 (NBR) 307589 (FPM)	6	135 x 5 306016 (NBR) 307045 (FPM)	10	135 x 5 306016 (NBR) 307045 (FPM)
6	spring	2	Da = 95 304414		2	pressure plate			2	Da = 95 304414	2	pressure plate				
7	screw plug	2	G ½ 309730	G 1 309732	2	G1 309732									2	G 1 ½ 318556
8	gasket	2	A 22 x 27 305564	A 33 x 39 308257	2	A 33 x 39 308257									2	A 48 x 55 309764
9	screw plug	4	G1 309732	G1 309732	4	G1 309732									4	G 1 ½ 318556
10	gasket	4	A 33 x 39 308257	A 33 x 39 308257	4	A 33 x 39 308257									4	A 48 x 55 309764

[1)] dimension of stop flap = connection size

4.2. Independing on the series:

item	qty.	designation	dimension	article-no.	
11	1	clogging indicator, visual	OP	see sheet-no. 1614	
12	1	clogging indicator, visual-electrical	OE	see sheet-no. 1614	
13	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
14	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
15	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
16	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
17	2	gasket	A 14 x 18	306330	
18	2	screw plug	G ¼	309734	

5. Description:

Duplex filters of the series DSF 1201 - 10001 are suitable for a working pressure up to 16 bar.
Pressure peaks can be absorbed with a sufficient margin of safety.
Four mechanically connected change-over flaps enabling the change-over without service-interruption from the clean to the dirty filter-side.
The filters can be installed as suction filter, pressure filter or return-line filter.
The filter element consist of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 µm $_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
Approvals according to TÜV, and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S.; P.R.S.;USS.R.S. and others are possible.

6. Technical data:

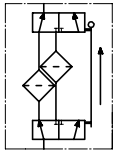
temperature range:	- 10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	16 bar
test pressure:	23 bar
connection system:	flange connection DIN 2633, 16 bar
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
mini-measuring connection:	G ¼

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

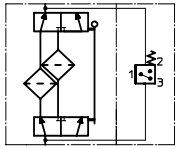
E 2133 M

7. Symbols:

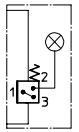
without indicator



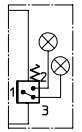
with electrical indicator AE 30 and AE 40



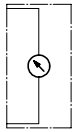
with visual - electrical indicator AE 50 and AE 62



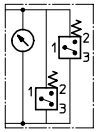
with visual - electrical indicator AE 70 and AE 80



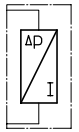
with visual indicator OP



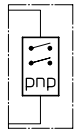
with visual - electrical indicator OE



with electronical clogging sensor VS1



with electronical clogging sensor VS2



8. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’, respectively Δp-curves; depending on filter fineness and viscosity.

9. Test methods:

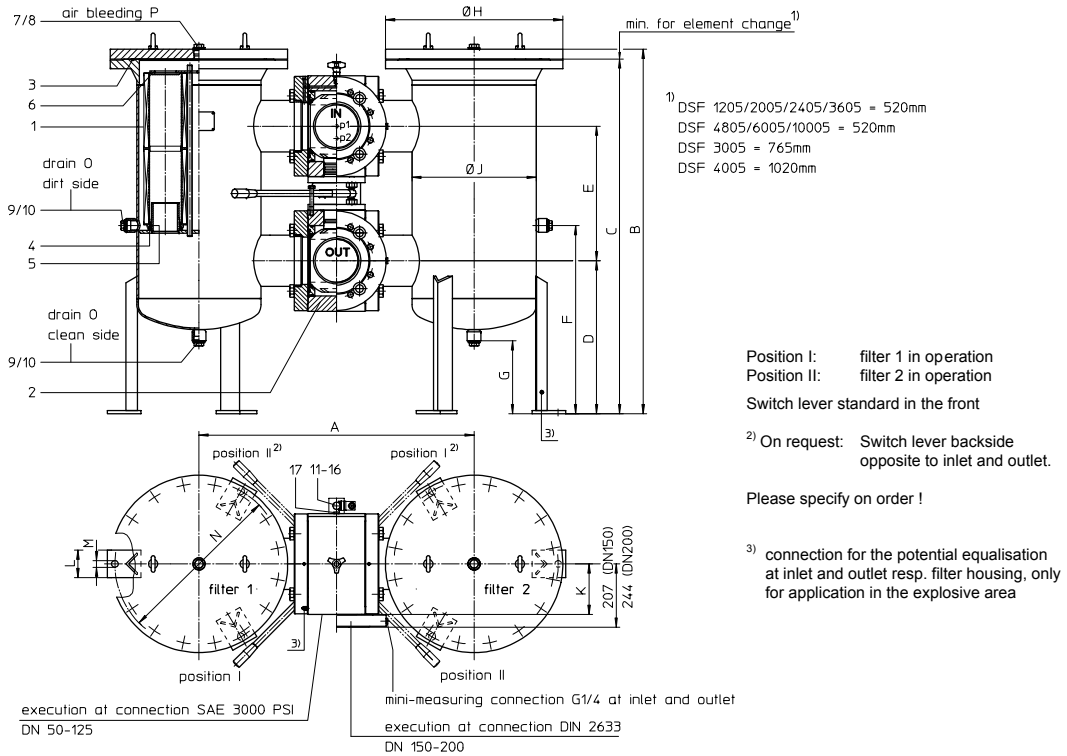
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER, change-over ball valve

Series DSF 1205-10005 DN 50-200 PN 16

Sheet No. **2134 G**



1) DSF 1205/2005/2405/3605 = 520mm
DSF 4805/6005/10005 = 520mm
DSF 3005 = 765mm
DSF 4005 = 1020mm

Position I: filter 1 in operation
Position II: filter 2 in operation

Switch lever standard in the front

2) On request: Switch lever backside opposite to inlet and outlet.

Please specify on order !

3) connection for the potential equalisation at inlet and outlet resp. filter housing, only for application in the explosive area

3. Dimensions:

type	DN	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	weight kg	volume tank
DSF 1205	50	610	1009	985	365	175	460	185	340	219	74	70	18	330	G1	G ½	200	2x 26 l
	65	560	1009	985	365	270	460				90							2x 26 l
	80	585	1009	985	375	290	460				100							2x 26 l
	100	620	1024	1000	390	365	475				127							2x 26 l
DSF 2005	65	630	1011	985	380	270	460	185	405	273	90	70	18	380	G1	G1	280	2x 39 l
	80	640	1011	985	380	290	460				100							2x 39 l
	100	670	1046	1020	400	365	495				127							2x 41 l
	125	730	1086	1060	420	395	535				142							2x 43 l
DSF 2405	65	680	1053	1025	390	270	480	185	460	324	90	70	18	450	G1	G1	355	2x 58 l
	80	700	1053	1025	400	290	480				100							2x 58 l
	100	730	1078	1050	410	365	505				127							2x 60 l
	125	770	1113	1085	425	395	540				142							2x 63 l
DSF 3005	65	630	1258	1232	380	270	460	185	405	273	90	70	18	380	G1	G ½	310	2x 52 l
	80	640	1258	1232	380	290	460				100							2x 52 l
	100	670	1293	1267	400	365	495				127							2x 54 l
	125	730	1333	1307	420	395	535				142							2x 56 l
	150	760	1333	1307	420	440	535	175			-							2x 57 l
DSF 3605	80	780	1152	1120	480	290	575	235	580	406	100	90	22	550	G1	G1	580	2x 97 l
	100	810	1152	1120	480	365	575				127							2x 97 l
	125	870	1192	1160	500	395	615				142							2x 103 l
	150	900	1192	1160	500	440	615				-							2x 103 l
DSF 4005	65	630	1506	1480	380	270	460	185	405	273	90	70	18	380	G1	G1	340	2x 65 l
	80	640	1506	1480	380	290	460				100							2x 65 l
	100	670	1541	1515	400	365	495				127							2x 67 l
	125	730	1581	1555	420	395	535				142							2x 69 l
DSF 4805 DSF 6005	100	910	1216	1180	520	365	635	235	715	508	127	90	22	650	G1	G1	800	2x 165 l
	125	970	1216	1180	520	395	635				142							2x 165 l
	150	1040	1236	1200	530	440	655				-							2x 171 l
	200	1090	1376	1340	560	520	795				-							2x 197 l
DSF 10005	125	1170	1350	1310	630	395	765	285	910	711	142	120	22	900	G1 ½	G1 ½	950	2x 358 l
	150	1250	1350	1310	630	440	765				-							2x 358 l
	200	1290	1490	1450	660	520	905				-							2x 408 l

EDV 04/09

1. Type index:

1.1. Complete filter: (oedering example)

DSF. 3605. 10VG. 10. E. P. -. FS. B. -. AE

1	2	3	4	5	6	7	8	9	10	11

1 **series:**
DSF = duplex filter

2 **nominal size:** 1205, 2005, 2405, 3005, 3605, 4005, 4805, 6005, 10005

3 **filter-material and filter- fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm, 10 G = 10 µm stainless steel wire mesh,
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 P = 25 µm, 10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
E = without by-pass valve S = with by-pass valve Δp 2,0 bar

6 **sealing material:**
P = Nitrile (NBR) V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **connection:**
FS = flange connection SAE 3000 PSI , only for DN 50-125
FD1 = flange connection DIN 2633, design C DIN 2526, only for DN 150-200
FD2 = flange connection DIN 2633, design E DIN 2526, only for DN 150-200

9 **connection size:**

filter-nominal size	DSF 1205	DSF 2005	DSF 2405	DSF 3005	DSF 3605
connection size	8-9-A-B	9-A-B-C	9-A-B-C	9-A-B-C-D	A-B-C-D
filter-nominal size	DSF 4005	DSF 4805	DSF 6005	DSF 10005	
connection size	9-A-B-C	B-C-D-E	B-C-D-E	C-D-E	

8 = DN 50 9 = DN 65 A = DN 80 B = DN 100 C = DN 125 D = DN 150 E = DN 200

10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605

11 **clogging indicator or clogging sensor:**
- = without
OP = visual, see sheet-no. 1628
OE = visual-electrical, see sheet-no. 1628
AE = visual-electrical, see sheet-no. 1609
VS1 = electronical, see sheet-no. 1607
VS2 = electronical, see sheet-no. 1608

1.2. Filter element: (ordering example)

01E. 1201. 10VG. 10. E. P. -

1	2	3	4	5	6	7

1 **series:**
01E. = filter element according to INTERNORMEN factory specification

2 **Nenngröße:** 1201, 2001, 3001, 4001

3 - 7 see type index-complete filter

2. Accessories:

- measure -and bleeder-connections, see sheet-no. 1650
- evacuation- and bleeder-connections, see sheet-no. 1651
- shut-off valve, see sheet-no. 1655
- SAE-counter flanges, see sheet-no. 1652
- adaptor for flange DIN 2633 (DN 50-125), see sheet-no. 1657
- lifting mechanism, see sheet-no. 1661

Changes of measures and design are subject to alteration!

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4. Spare parts:

4.1. Depending on different series:

item	designation	qty.	dimension and article-no. DSF 1205	dimension and article-no. DSF 2005	qty.	dimension and article-no. DSF 2405	qty.	dimension and article-no. DSF 3005	qty.	dimension and article-no. DSF 3605	qty.	dimension and article-no. DSF 4005	qty.	dimension and article-no. DSF 4805	qty.	dimension and article-no. DSF 6005	qty.	dimension and article-no. DSF 10005
1	filter element	2	01E.1201	01E.2001	4	01E.1201	2	01E.3001	6	01E.1201	2	01E.4001	8	01E.1201	6	01E.2001	10	01E.2001
2	change over UKK	1	DN 50-100	DN 65-125	1	DN 65-125	1	DN 65-150	1	DN 80-150	1	DN 65-125	1	DN 100-200	1	DN 100-200	1	DN 125-200
3	O-ring	2	225 x 5 308652 (NBR) 311473 (FPM)	275 x 5 307414 (NBR) 310288 (FPM)	2	330 x 5 303080 (NBR) 310275 (FPM)	2	275 x 5 307414 (NBR) 310288 (FPM)	2	429 x 6 308659 (NBR) 310273 (FPM)	2	275 x 5 307414 (NBR) 310288 (FPM)	2	516 x 6 301962 (NBR) 311474 (FPM)	2	516 x 6 301962 (NBR) 311474 (FPM)	2	722 x 8 308145 (NBR) 311805 (FPM)
4	O-ring	2	85 x 10 304386 (NBR) 304541 (FPM)	125 x 10 304388 (NBR) 306006 (FPM)	4	85 x 10 304386 (NBR) 304541 (FPM)	2	125 x 10 304388 (NBR) 306006 (FPM)	6	85 x 10 304386 (NBR) 304541 (FPM)	2	125 x 10 304388 (NBR) 306006 (FPM)	8	85 x 10 304386 (NBR) 304541 (FPM)	6	125 x 10 304388 (NBR) 306006 (FPM)	10	125 x 10 304388 (NBR) 306006 (FPM)
5	O-ring	2	93 x 5 307588 (NBR) 307589 (FPM)	135 x 5 306016 (NBR) 307045 (FPM)	4	93 x 5 307588 (NBR) 307589 (FPM)	2	135 x 5 306016 (NBR) 307045 (FPM)	6	93 x 5 307588 (NBR) 307589 (FPM)	2	135 x 5 306016 (NBR) 307045 (FPM)	8	93 x 5 307588 (NBR) 307589 (FPM)	6	135 x 5 306016 (NBR) 307045 (FPM)	10	135 x 5 306016 (NBR) 307045 (FPM)
6	spring	2	Da = 95 304414	Da = 95 304414	2	pressure plate	2	Da = 95 304414	2	pressure plate	2	Da = 95 304414	2	pressure plate	2	pressure plate	2	pressure plate
7	screw plug	2	G ½ 309730	G 1 309732	2	G1 309732											2	G 1 ½ 318556
8	gasket	2	A 22 x 27 305564	A 33 x 39 308257	2	A 33 x 39 308257											2	A 48 x 55 309764
9	screw plug	4	G1 309732	G1 309732	4	G1 309732											4	G 1 ½ 318556
10	gasket	4	A 33 x 39 308257	A 33 x 39 308257	4	A 33 x 39 308257											4	A 48 x 55 309764

4.2. Independing on the series:

item	qty.	designation	dimension	article-no.	
11	1	clogging indicator, visual	OP	see sheet-no. 1628	
12	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628	
13	1	clogging indicator, visual-electrical	AE	see sheet-no.. 1609	
14	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
15	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
16	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
17	2	screw plug	G ¼	305003	

item 17 execution only without clogging indicator or clogging sensor

5. Description:

Duplex filters of the series DSF 1205 - 10005 are suitable for a working pressure up to 16 bar.
Pressure peaks can be absorbed with a sufficient margin of safety.
Change-over ball valve between the two filter housings makes it possible to switch from the dirty filter-side to the clean filter-side without interruting oper ation.
The filters can be installed as suction filter, pressure filter or return-line filter.
The filter element consist of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.
For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fibre element remove the cover and take out the element.
Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
Approvals according to TÜV, and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S.; P.R.S.;USS.R.S. and others are possible.

6. Technical data:

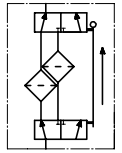
temperature range:	- 10°C to + 80°C (for a short time + 100°C
operating medium:	mineral oil, other media on request
max. operating pressure:	16 bar
test pressure:	23 bar
connection system:	SAE-flange connection 3000 PSI or flange connection DIN 2633, 16 bar
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
mini-measuring connection:	G ¼

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

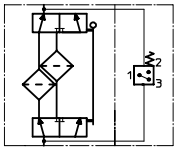
E 2134 G

7. Symbols:

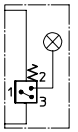
without indicator



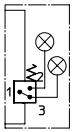
with electrical indicator AE 30 and AE 40



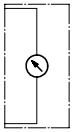
with visual - electrical indicator AE 50 and AE 62



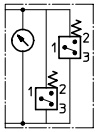
with visual - electrical indicator AE 70 and AE 80



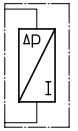
with visual indicator OP



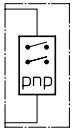
with visual - electrical indicator OE



with electron ical clogging sensor VS1



with electronical clogging sensor VS2



8. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’, respectively Δp-curves; depending on filter fin eness and viscosity.

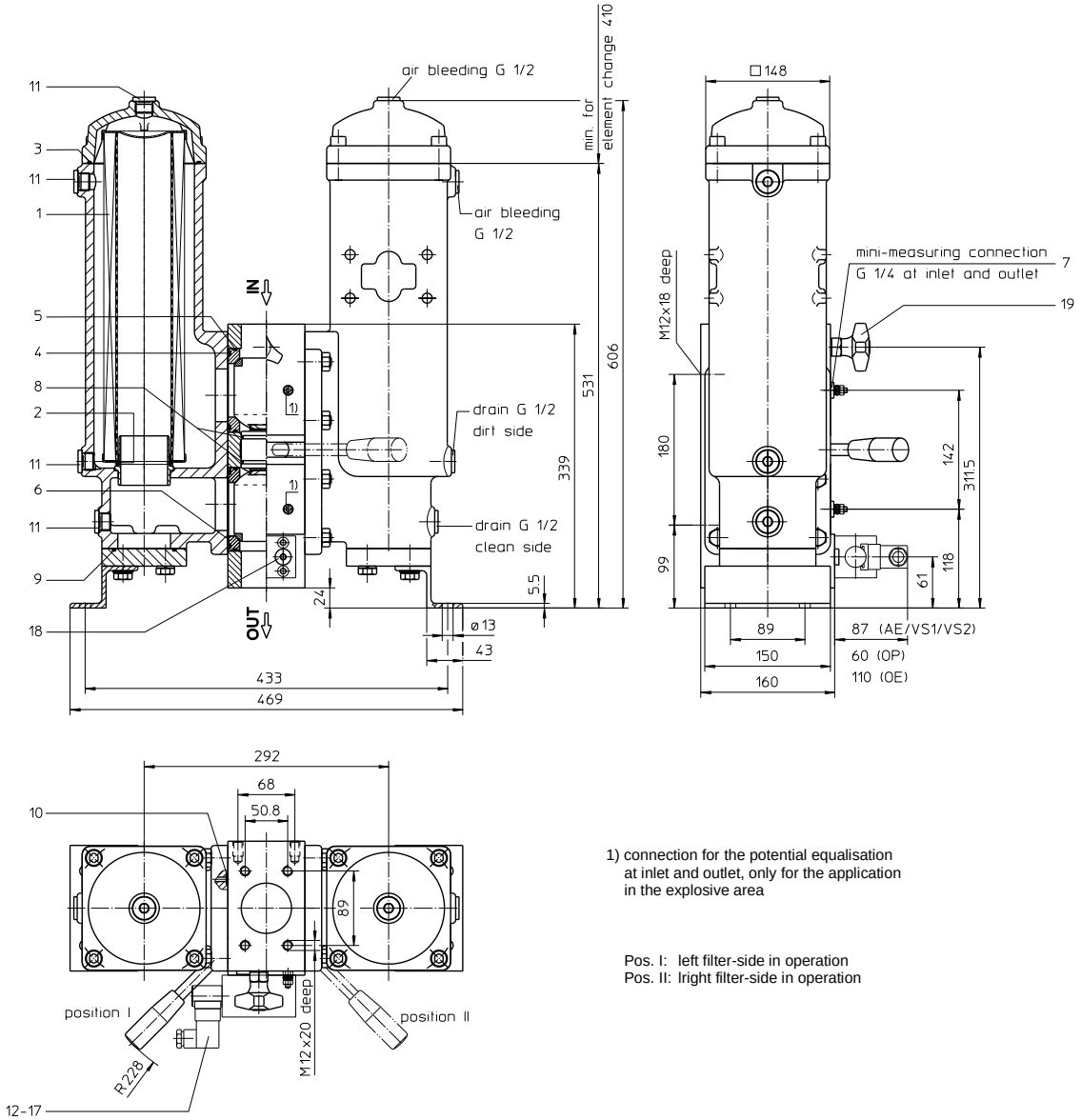
9. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration pe rformance

PRESSURE FILTER, change-over ball valve
Series DUV 635 DN 65 PN 32

Sheet No. **2146 D**



1) connection for the potential equalisation at inlet and outlet, only for the application in the explosive area

Pos. I: left filter-side in operation
Pos. II: lright filter-side in operation

1. Type index:

1.1. Complete filter: (ordering example)

DUV. 635. 10VG. 30. E. P. -. FS. 9. -. -. AE

1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
DUV = pressure filter, change-over with vertical connecting line

2 **nominal size:** 635

3 **filter-material and filter- fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm 10 G = 10 µm stainless steel wire mesh,
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 API = 20 µm, 10 API = 10 µm Interpor fleece (glass fibre) according to API
10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
30 = Δp 30 bar,
S = with by-pass Δp 2,0 bar, S1 = with by-pass Δp 3,5 bar

5 **filter element design:**
E = single-end open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
IS07 = see sheet-no. 31602

8 **connection:**
FS = SAE-flange connection 3000 PSI

9 **connection size:**
9 = 2 ½ “

10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605, IS12 = see sheet-no. 41028

11 **internal valve:**
- = without

12 **clogging indicator or clogging sensor:**
- = without
AE = visual-electrical, see sheet-no. 1609
OP = visual, see sheet-no. 1628
OE = visual-electrical, see sheet-no. 1628
VS1 = electronical, see sheet-no. 1607
VS2 = electronical, see sheet-no. 1608

1.2. Filter element: (ordering example)

01NL. 630. 10VG. 30. E. P. -

1	2	3	4	5	6	7

1 **series:**
01NL. = standard filter element according to DIN 24550, T3

2 **nominal size:** 630

3 - 7 see type index-complete filter

2. Accessories:

- measure- and bleeder connections, see sheet-no. 1650
- evacuation and bleeder-conections, see sheet-no. 1651
- counter flanges, see sheet-no. 1652
- shut-off valve, see sheet-no. 1655

weight: approx. 90 kg

Changes of measures and design are subject to alteration!

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EDV 02/12

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01NL. 630		
2	2	O-ring	60 x 3,5	304377 (NBR)	304398 (FPM)
3	2	O-ring	125 x 3	306025 (NBR)	307358 (FPM)
4	4	O-ring	85 x 4	305685 (NBR)	310285 (FPM)
5	4	O-ring	95 x 3	305808 (NBR)	304828 (FPM)
6	4	gasket		317651	
7	2	screw plug	G ¼	305003	
8	2	O-ring	54 x 3	304657 (NBR)	304720 (FPM)
9	2	O-ring	69,45 x 3,53	305868 (NBR)	307357 (FPM)
10	4	O-ring	8 x 2	310004 (NBR)	316530 (FPM)
11	8	screw plug	G ½	304678	
12	1	clogging indicator, visual	OP	see sheet no. 1628	
13	1	clogging indicator, visual-electrical	OE	see sheet no. 1628	
14	1	clogging indicator, visual-electrical	AE	see sheet no. 1609	
15	1	clogging sensor, electronical	VS1	see sheet no. 1607	
16	1	clogging sensor, electronical	VS2	see sheet no. 1608	
17	2	O-ring	14 x2	304342 (NBR)	304722 (FPM)
18	2	screw plug	G ¼	305003	
19	1	pressure balance valve			

item 18 execution only without clogging indicator or clogging sensor

4. Description:

Pressure filters, change-over series DUV 635 are suitable for operating pressure up to 32 bar. Pressure peaks can be absorbed with a sufficient margin of safety.
Change-over ball valve between the two filter housings makes it possible to switch from the dirty filter-side to the clean filter-side without interruting operation.
The filter element consist of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. These filters can be installed as suction filters.
For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fibre element remove the cover and take out the element.
Filter finer than 40 mµ should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
Approvals according to TÜV, and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible.

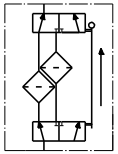
5. Technical data:

temperature range:	- 10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	32 bar
test pressure:	64 bar
connection system:	SAE-flange connection 3000 PSI
housing material:	EN-GJS-400-18-LT3
switching housing-material:	S355J2G3
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
mini-measuring connections:	G ¼
evacuation-or bleeder connections:	G ½
volume tank:	2x 5,7 l

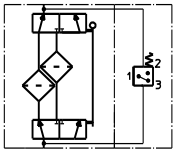
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

6. Symbols:

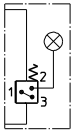
without indicator



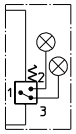
with electrical indicator
AE 30 and AE 40



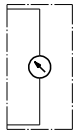
with visual-electrical indicator
AE 50 and AE 62



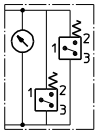
with visual-electrical indicator
AE 70 and AE 80



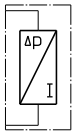
with visual indicator
OP



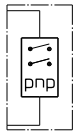
with visual-electrical indicator
OE



with electronical clogging sensor
VS1



with electronical clogging sensor
VS2



7. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’, respectively Δp-curves; depending on filter fineness and viscosity.

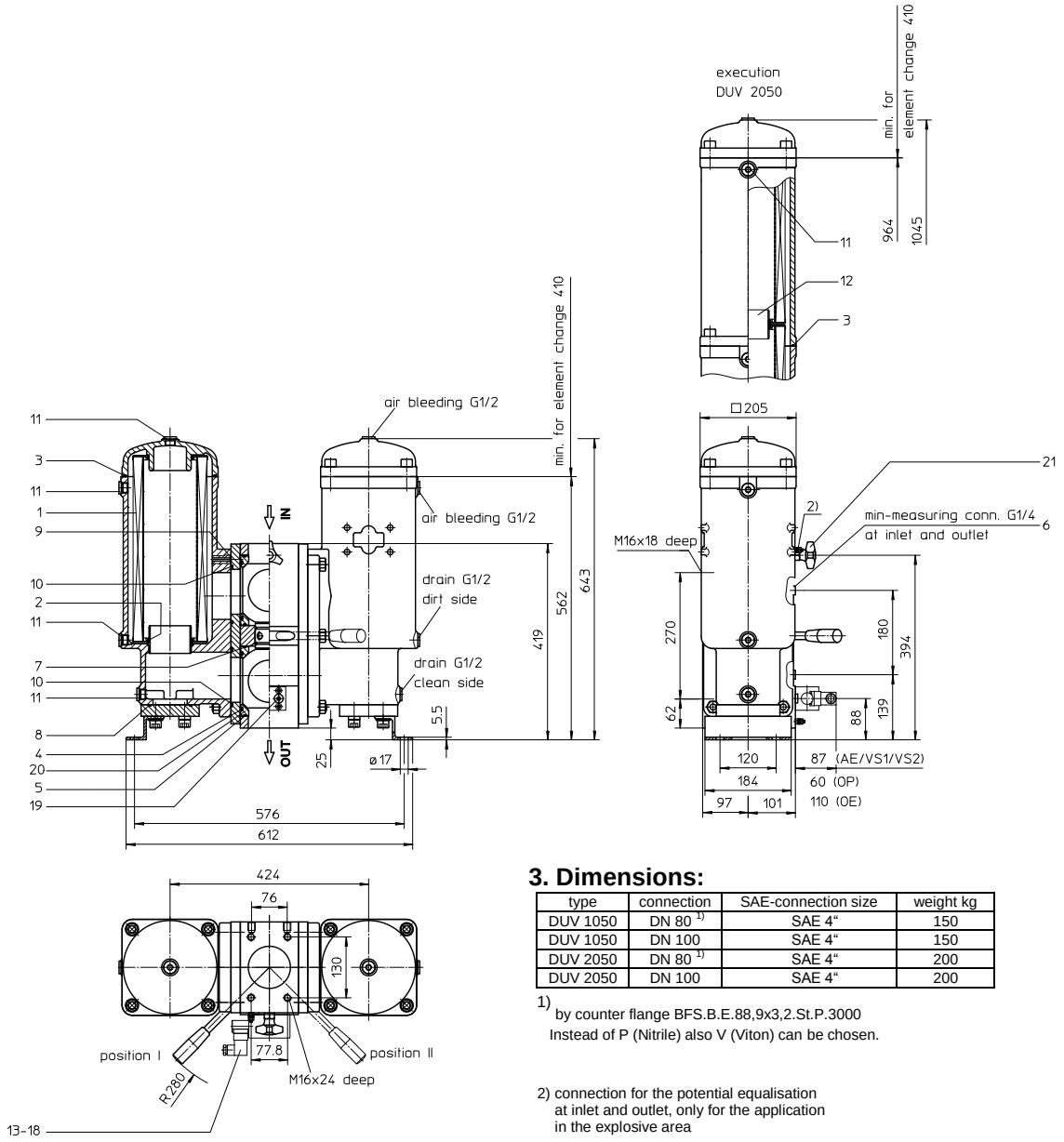
8. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER, change-over ball valve
Series DUV 1050-2050 DN 80-100 PN 32

Sheet No.
2147 D



3. Dimensions:

type	connection	SAE-connection size	weight kg
DUV 1050	DN 80 1)	SAE 4“	150
DUV 1050	DN 100	SAE 4“	150
DUV 2050	DN 80 1)	SAE 4“	200
DUV 2050	DN 100	SAE 4“	200

1) by counter flange BFS.B.E.88,9x3,2.St.P.3000
Instead of P (Nitrile) also V (Viton) can be chosen.

2) connection for the potential equalisation at inlet and outlet, only for the application in the explosive area

Pos. I: left filter-side in operation
Pos. II: lright filter-side in operation

1. Type index:

1.1. Complete filter: (ordering example)

DUV. 1050. 10VG. 10. B. P. -. FS. B. -. -. AE

1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
DUV = pressure filter, change-over with vertical connecting line

2 **nominal size:** 1050, 2050

3 **filter-material and filter- fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm, 10 G = 10 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 API = 20 µm, 10 API = 10 µm Interpor fleece (glass fibre) according to API
10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
IS07 = see sheet-no. 31602

8 **connection:**
FS = SAE-flange connection 3000 PSI

9 **connection size:**
B = 4“

10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605
IS12 = see sheet-no. 41028

11 **internal valve:**
- = without
S = with by-pass valve Δp 2 bar
S1 = with by-pass valve Δp 3,5 bar

12 **clogging indicator or clogging sensor:**
- = without
AE = visual-electrical, see sheet-no. 1609
OP = visual, see sheet-no. 1628
OE = visual-electrical, see sheet-no. 1628
VS1 = electronical, see sheet-no. 1607
VS2 = electronical, see sheet-no. 1608

1.2. Filter element: (ordering example)

01NR. 1000. 10VG. 10. B. P. -

1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 1000

3 - 7 see type index complete filter

2. Accessories:

- measure-and bleeder -connection, see sheet-no. 1650
- evacuation- and bleeder-connection, see sheet-no. 1651
- counter flange, see sheet-no. 1652
- shut-off valve, see sheet-no. 1655

Changes of measures and design are subject to alteration!

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4. Spare parts:

item	designation	qty.	dimension and article-no. DUV 1050	qty.	dimension and article-no. DUV 2050
1	filter element	2	01NR. 1000	4	01NR. 1000
2	O-ring	4	90 x 4 306941 (NBR) 307031 (FPM)	8	90 x 4 306941 (NBR) 307031 (FPM)
3	O-ring	2	185 x 4 305593 (NBR) 306309 (FPM)	4	185 x 4 305593 (NBR) 306309 (FPM)
4	O-ring	4	114 x 6 314419 (NBR) 316531 (FPM)	4	114 x 6 314419 (NBR) 316531 (FPM)
5	O-ring	4	140 x 4 305145 (NBR) 305201 (FPM)	4	140 x 4 305145 (NBR) 305201 (FPM)
6	screw plug	2	G ¼ 305003	2	G ¼ 305003
7	O-ring	2	54 x 3 304657 (NBR) 304720 (FPM)	2	54 x 3 304657 (NBR) 304720 (FPM)
8	O-ring	2	85,32 x 3,53 305590 (NBR) 306308 (FPM)	2	85,32 x 3,53 305590 (NBR) 306308 (FPM)
9	O-ring	8	8 x 2 310004 (NBR) 316530 (FPM)	8	8 x 2 310004 (NBR) 316530 (FPM)
10	O-ring	4	115 x 5 306640 (NBR) 310287 (FPM)	4	115 x 5 306640 (NBR) 310287 (FPM)
11	screw plug	8	G ½ 304678	10	G ½ 304678
12	slip coupling	-	-	2	∅90 313233
13	clogging indicator visual	1	OP	see sheet-no. 1628	
14	clogging indicator visual-electrical	1	OE	see sheet-no. 1628	
15	clogging indicator visual-electrical	1	AE	see sheet-no. 1609	
16	clogging sensor electronical	1	VS1	see sheet-no. 1607	
17	clogging sensor electronical	1	VS2	see sheet-no. 1608	
18	O-ring	2	14 x2	304342 (NBR) 304722 (FPM)	
19	screw plug	2	G ¼	305003	
20	gasket	4	DN 90	312275	
21	pressure balance valve	1			

item 19 execution only without clogging indicator or clogging sensor

5. Description:

Pressure filters, change-over series DUV 1050-2050 are suitable for operating pressure up to 32 bar.
Pressure peaks can be absorbed with a sufficient margin o safety.
Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. These filters can be installed as suction filters.
For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fibre element remove the cover and take out the element.
Filter finer than 40 mµ should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
Approvals according to TÜV, and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible.
The internal valve is integrated in the filter cover. After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter.

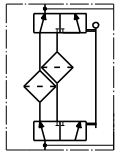
6. Technical data:

temperature range:	- 10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	32 bar
test pressure:	64 bar
connection system:	SAE-flange connection 3000 PSI
housing material:	EN-GJS-400-18-LT
switching housing-material:	S355J2G3
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
mini-measuring connections:	G ¼
evacuation-or bleeder connections:	G ½
volume tank DUV 1050:	2x 13,7 l
DUV 2050:	2x 23,9 l

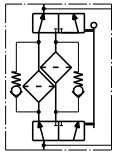
Classification according to the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2) -article 3, paragraph 3
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

7. Symbols:

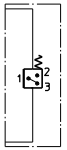
without indicator



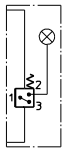
with by-pass valve



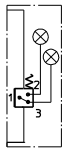
with electrical indicator AE 30 and AE 40



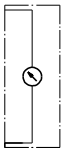
with visual-electrical indicator AE 50 and AE 62



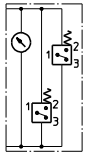
with visual-electrical indicator AE 70 and AE 80



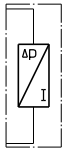
with visual indicator OP



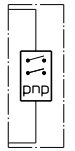
with visual-electrical indicator OE



with electronical clogging sensor VS1



with electronical clogging sensor VS2



8. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’, respectively Δp-curves; depending on filter fineness and viscosity.

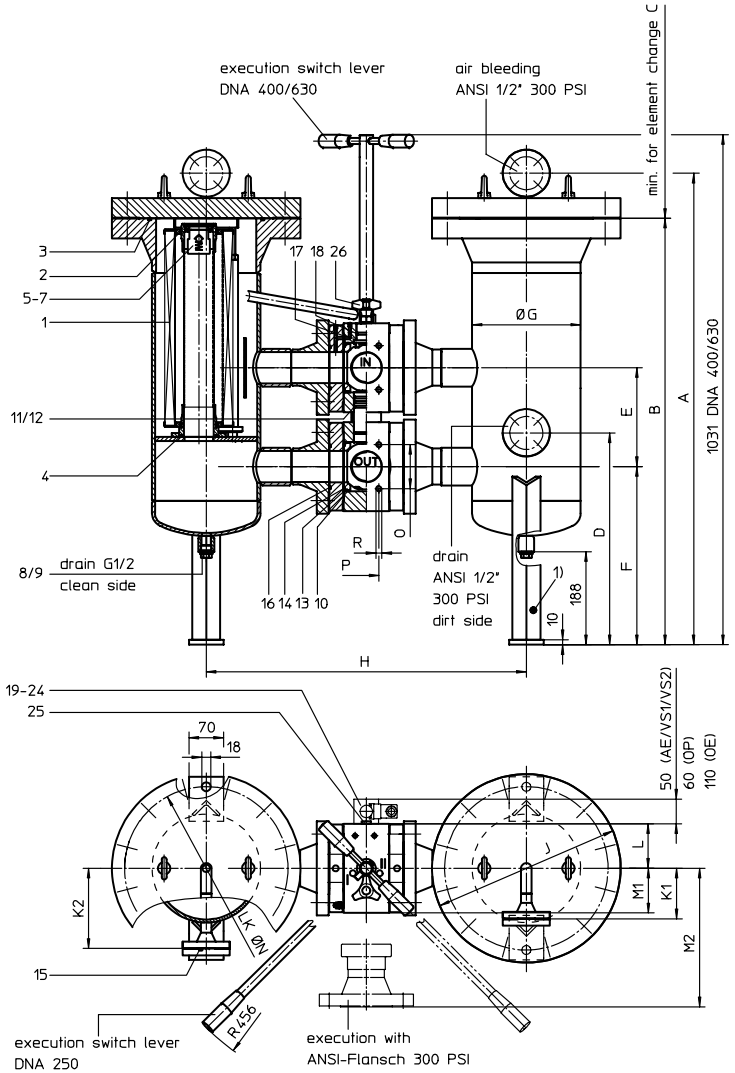
9. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER, change-over
Series DNA 250-630 DN 50-65 PN 16

Sheet No. **2137 H**



Pos. I: left filter-side in operation
Pos. II: right filter-side in operation

1) connection for the potential equalisation at inlet and outlet resp. filter housing, only for application in the explosive area

1. Type index:

1.1. Complete filter: (ordering example)

DNA. 630. 10VG. 10. B. P. -. FS. 9. -. -. AE

1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
DNA = pressure filter, change-over according to ASME-code

2 **nominal size:** 250, 400, 630

3 **filter-material and filter- fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design**:
B = both sides open

6 **sealing material:**
P = Nitrile (NBR) V = Viton (FPM)

7 **filter element specification:**
- = standard VA = stainless steel

8 **connection:**
FS = SAE-flange connection 3000 PSI
FA = ANSI-flange connection 300 PSI

9 **connection size:**
8 = 2" (DNA 250)
9 = 2 ½" (DNA 400/630)

10 **filter housing specification:**
- = standard

11 **internal valve:**
- = without
S1 = with by-pass valve Δp 3,5 bar S2 = with by-pass valve Δp 7,0 bar

12 **clogging indicator or clogging sensor:**
- = without
AE = visual-electrical, see sheet-no. 1609
OP = visual, see sheet-no. 1628 VS1 = electronical, see sheet-no. 1607
OE = visual-electrical, see sheet-no. 1628 VS2 = electronical, see sheet-no. 1608

1.2. Filter element: (ordering example)

01NR. 630. 10VG. 10. B. P. -

1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 250, 400, 630

3 - 7 see type index-complete filter

2. Accessories:

- shut-off valve see sheet-no. 1655
- SAE-counter-flange see sheet-no. 1652
- adaptor for ANSI-flange 300 PSI see sheet-no. 1658

3. Dimensions:

type	connection	A	B	C	D	E	F	G	H	J	K1	K2	L	M1	M2	N	O	P	R	weight kg	volume tank
DNA 250	DN 50	821	715	270	433	175	365	168,3	603	317,5	82	136,5	74	74	191	278	42,9	77,8	M12x20 tief	223	2x 9 l
DNA 400	DN 65	847	756	270	472	200	360	219,1	647	381	102	162	90	90	218	330	52,8	89	M12x22 tief	264	2x 17 l
DNA 630	DN 65	953	862	420	428	200	360	219,1	647	381	102	162	90	90	218	330	52,8	89	M12x22 tief	272	2x 21 l

Changes of measures and design are subject to alteration!

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4. Spare parts:

item	designation	qty.	dimension and article-no. DNA 250	dimension and article-no. DNA 400	dimension and article-no. DNA 630
1	filter element	2	01NR. 250	01NR. 400	01NR. 630
2	O-ring	4	52 x 3 314206 (NBR) 316698 (FPM)	70 x 4 306253 (NBR) 310280 (FPM)	
3	O-ring	2	170 x 6 304799 (NBR) 306529 (FPM)	225 x 5 308652 (NBR) 311473 (FPM)	
4	O-ring	2	47,22 x 3,53 305078 (NBR) 310269 (FPM)	68 x 5 304376 (NBR) 304394 (FPM)	
5	by-pass valve	2	DN 20	DN 32	
6	O-ring	2	28 x 3 316778 (NBR) 318366 (FPM)	45 x 3 304991 (NBR) 304997 (FPM)	
7	circlip	1	DIN 472-38x1,5 311921	DIN 472-57x5 317668	
8	screw plug	2	G ½ 309730	G ½ 309730	
9	gasket	2	A 22 x 27 305564	A 22 x 27 305564	
10	O-ring	4	76 x 4 305599 (NBR) 310291 (FPM)	95 x 3 305808 (NBR) 304828 (FPM)	
11	O-ring	3	98 x 4 301914 (NBR) 304765 (FPM)	45 x 3 304991 (NBR) 304997 (FPM)	
12	support ring	3	103,4 x 97 x 5 318551	-	
13	gasket	4	DN 50 318549	DN 65 317651	
14	O-ring	4	56 x 3 305072 (NBR) 305322 (FPM)	85 x 4 305685 (NBR) 310285 (FPM)	
15	O-ring	4	22 x 3 304387 (NBR) 304931 (FPM)	22 x 3 304387 (NBR) 304931 (FPM)	
16	O-ring	4	63 x 3,5 311189 (NBR) 311592 (FPM)	82 x 3,5 304403 (NBR) 308745 (FPM)	
17	O-ring	4	-	8 x 2 310004 (NBR) 316530 (FPM)	
18	O-ring	4	-	34 x 3,5 304338 (NBR) 304730 (FPM)	
19	clogging indicator, visual-electrical	1	OE see sheet-no. 1628		
20	clogging indicator, visual	1	OP see sheet-no. 1628		
21	clogging indicator, visual-electrical	1	AE see sheet-no. 1609		
22	clogging sensor, electronical	1	VS1 see sheet-no. 1607		
23	clogging sensor, electronical	1	VS2 see sheet-no. 1608		
24	O-ring	2	14 x 2 304342 (NBR) 304722 (FPM)		
25	screw plug	2	G ¼ 305003		
26	pressure balance valve	1			

Item 25 execution only without clogging indicator or clogging sensor

5. Description:

Pressure filters, change-over series DNA 250-630 are suitable for operating pressure up to 16 bar. Pressure peaks can be absorbed with a sufficient margin of safety.
Change-over ball valve which integrated in the middle of the housing makes it possible to switch from the dirty filter-side to the clean filter-side without interr uting operation.
The filter element consist of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. These filters can be installed as suction filters.
Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
Approvals according to TÜV, and the major „Shipyard Classification Societies" D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible.
The internal valve is integrated in the filter. After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter.

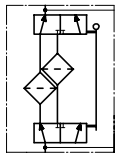
6. Technical data:

temperature range:	- 10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	16 bar
test pressure:	24 bar
connection system:	SAE-flange 3000 PSI or ANSI-flange 300 PSI
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
calculation according to:	ASME-code, sec. VIII / div.1 - 1998; add.98

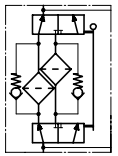
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

7. Symbols:

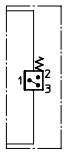
without indicator



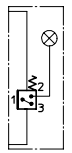
with by-pass valve



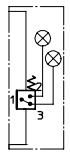
with electrical indicator AE 30 and AE 40



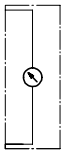
with visual-electrical indicator AE 50 and AE 62



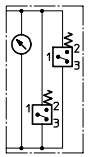
with visual-electrical indicator AE 70 and AE 80



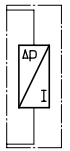
with visual indicator OP



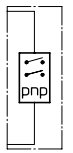
with visual-electrical indicator OE



with electronical clogging sensor VS1



with electronical clogging sensor VS2



8. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

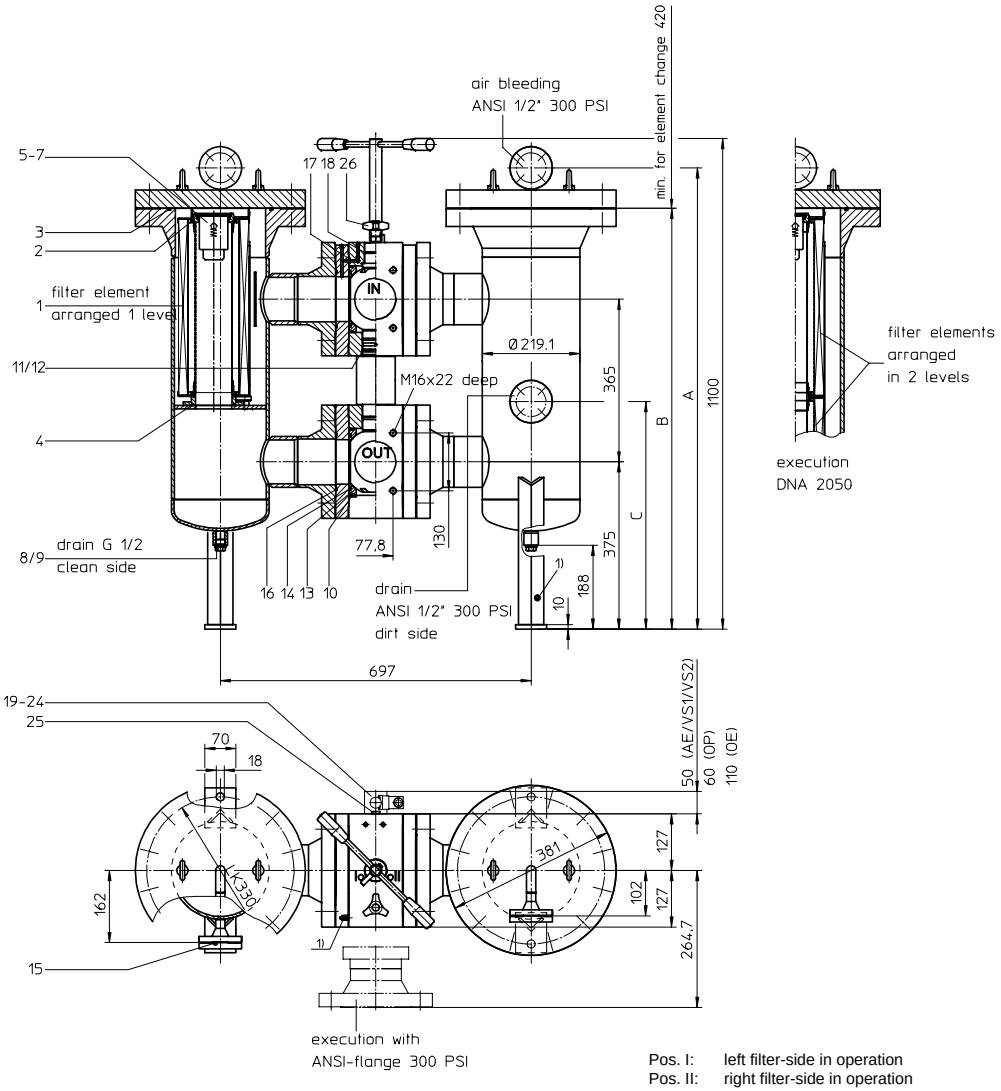
9. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER, change-over
Series DNA 1050-2050 DN 100 PN 16

Sheet No. **2138 H**



Pos. I: left filter-side in operation
Pos. II: right filter-side in operation

[1] connection for the potential equalisation at inlet and outlet resp. filter housing, only for application in the explosive area

3. Dimensions:

type	connection	A	B	C	weight kg	volume tank
DNA 1050	DN 100	1035	944	510	446	2x 24 l
DNA 2050	DN 100	1391	1300	467	476	2x 35 l

1. Type index:

1.1. Complete filter: (ordering example)

DNA. 1050. 10VG. 10. B. P. -. FS. B. -. -. AE

1	2	3	4	6	6	7	8	9	10	11	12

1 **series:**
DNA = pressure filter, change-over according to ASME-code

2 **nominal size:** 1050, 2050

3 **filter-material and filter- fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:**
- = standard
VA = stainless steel

8 **connection:**
FS = SAE-flange connection 3000 PSI
FA = ANSI-flange connection 300 PSI

9 **connection size:**
B = 4"

10 **filter housing specification:**
- = standard

11 **internal valve:**
- = without
S1 = with by-pass valve Δp 3,5 bar
S2 = with by-pass valve Δp 7,0 bar

12 **clogging indicator or clogging sensor:**
- = without
AE = visual-electrical, see sheet-no. 1609
OP = visual, see sheet-no. 1628
OE = visual-electrical, see sheet-no. 1628
VS1 = electronical, see sheet-no. 1607
VS2 = electronical, see sheet-no. 1608

1.2. Filter element: (ordering example)

01NR. 1000. 10VG. 10. B. P. -

1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 1000

3 - 7 see type index-complete filter

2. Accessories:

- shut-off valve, see sheet-no. 1655
- SAE-counter-flange see sheet-no. 1652
- adaptor for ANSI-flange 300 PSI, see sheet-no. 1658

Changes of measures and design are subject to alteration!

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4. Spare parts:

item	designation	qty.	dimension and article-no. DNA 1050	qty.	dimension and article-no. DNA 2050
1	filter element	2	01NR. 1000	4	01NR. 1000
2	O-ring	4	90 x 4 306941 (NBR) 307031 (FPM)	8	90 x 4 306941 (NBR) 307031 (FPM)
3	O-ring	2	225 x 5		308652 (NBR) 311473 (FPM)
4	O-ring	2	90 x 4		306941 (NBR) 307031 (FPM)
5	by-pass valve	2	DN 50		311470
6	O-ring	2	62 x 4		308045 (NBR) 311472 (FPM)
7	circlip	2	DIN 472-75x2,5		311471
8	screw plug	2	G ½		309730
9	gasket	2	A 22 x 27		310476
10	O-ring	4	140 x 4		305145 (NBR) 305201 (FPM)
11	O-ring	3	54 x 3		304657 (NBR) 304720 (FPM)
12	sliding ring	2	087 x 060 x 1,5		318100
13	gasket	4	DN 90		312275
14	O-ring	4	114 x 6		314419 (NBR) 316531 (FPM)
15	O-ring	4	22 x 3		304387 (NBR) 304931 (FPM)
16	O-ring	4	120 x 4		305300 (NBR) 307991 (FPM)
17	O-ring	2	8 x 2		310004 (NBR) 316530 (FPM)
18	O-ring	1	45 x 3		304991 (NBR) 304997 (FPM)
19	clogging indicator visual-electrical	1	OE		see sheet-no. 1628
20	clogging indicator visual	1	OP		see sheet-no. 1628
21	clogging indicator visual-electrical	1	AE		see sheet-no. 1609
22	clogging sensor electronical	1	VS1		see sheet-no. 1607
23	clogging sensor electronical	1	VS2		see sheet-no. 1608
24	O-ring	2	14 x 2		304342 (NBR) 304722 (FPM)
25	screw plug	2	G ¼		305003
26	pressure balance valve	1			

Item 25 execution only without clogging indicator or clogging sensor

5. Description:

Pressure filters, change-over series DNA 1050-2050 are suitable for operating pressure up to 16 bar. Pressure peaks can be absorbed with a sufficient margin o safety.
Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outs ide to the inside. These filters can be installed as suction filters.
Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
Approvals according to TÜV, and the major „Shipyard Classification Societies" D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible.
The internal valve is integrated into the filter. After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter.

E 2138 H

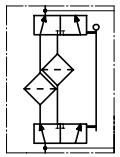
6. Technical data:

temperature range:	- 10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	16 bar
test pressure:	24 bar
connection system:	SAE-flange 3000 PSI or ANSI-flange 300 PSI
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on requ est
installation position:	vertical
calculation according to:	ASME-code, sec. VIII / div.1 - 1998; add.98

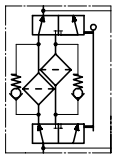
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

7. Symbols:

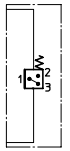
without indicator



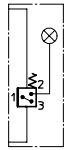
with by-pass valve



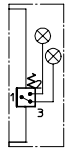
with electrical indicator AE 30 and AE 40



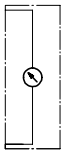
with visual-electrical indicator AE 50 and AE 62



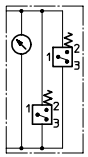
with visual-electrical indicator AE 70 and AE 80



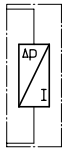
with visual indicator OP



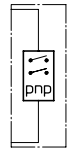
with visual-electrical indicator OE



with electronical clogging sensor VS1



with electronical clogging sensor VS2



8. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fin eness and viscosity.

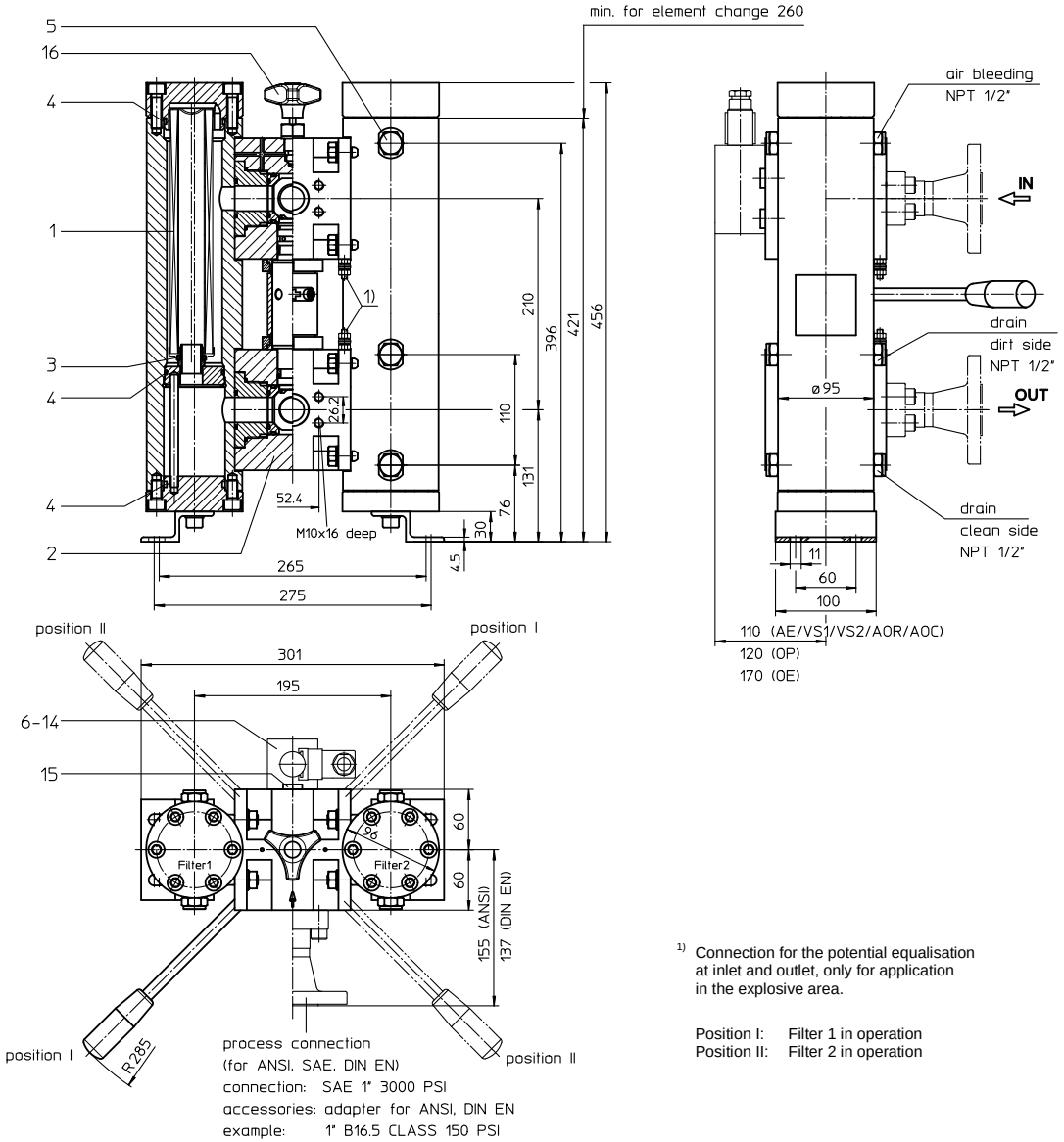
9. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER, change-over
Series DA 101 NPS 1“ CLASS 150 PSI

Sheet No. **2163 C**



1) Connection for the potential equalisation at inlet and outlet, only for application in the explosive area.

Position I: Filter 1 in operation
Position II: Filter 2 in operation

1. Type index:

1.1. Complete filter: (ordering example)

DA.	101.	10VG.	30.	E.	P.	-.	FS.	5.	-.	-.	AE.	AV.	IS21.	F.	F
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

1 **series:**
DA = pressure filter change-over, according to ASME-code

2 **nominal size:** 101

3 **filter-material and filter- fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm, 10 G = 10 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 API = 20 µm, 10 API = 10 µm Interpor fleece (glass fibre) according to API
10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
30 = Δp 30 bar

5 **filter element design:**
E = single-end open, S = with by-pass valve Δp 2,0 bar, S1 = with by-pass valve Δp 3,5 bar

6 **sealing material:**
P = Nitrile (NBR), V = Viton (FPM)

7 **filter element specification:**
- = standard, VA = stainless steel

8 **process connection:**
FS = SAE-flange connection 3000 PSI
FA11 = ANSI-flange connection CLASS 150 PSI, sealing surface R_z = 160 µm (not finer than 40 µm)
FA12 = ANSI-flange connection CLASS 150 PSI, sealing surface R_z = 16 µm
FD1 = flange connection DIN EN 1092-1, design B1
FD2 = flange connection DIN EN 1092-1, design B2

9 **process connection size:**
5 = 1“

10 **filter housing specification:**
- = standard
IS12 = internal parts of change-over armature stainless steel, see sheet-no. 41028

11 **internal valve:**
- = without

12 **clogging indicator or clogging sensor:**
- = without, OP = visual, see sheet-no. 1628
AOR = visual, see sheet-no. 1606, OE = visual-electrical, see sheet-no. 1628
AOC = visual, see sheet-no. 1606, VS1 = electronical, see sheet-no. 1607
AE = visual-electrical, see sheet-no. 1609, VS2 = electronical, see sheet-no. 1608

13 **shut-off valve:**
- = without, AV = shut-off valve, see sheet-no. 1655

14 **specification pressure vessel:**
- = standard (PED 97/23/EC)
IS20 = ASME VIII Div.1 with ASME equivalent material, see sheet-no. 55217
IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415
IS23 = ASME VIII Div.1 without U-stamp, see sheet-no. 55218

15 **switch lever:**
F = toward IN/OUT, B = opposite IN/OUT

16 **air bleeding/drain:**
F = toward IN/OUT, B = opposite IN/OUT

1.2. Filter element: (ordering example)

01NL.	100.	10VG.	30.	E.	P.	-
1	2	3	4	5	6	7

1 **series:**
01NL. = standard filter element according to DIN 24550, T3

2 **nominal size:** 100

3 - 7 see type index complete filter

weight: approx. 60 kg

Changes of measures and design are subject to alteration!

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2. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for connection acc. to EN1092-1, see sheet-no. 1657
- adapter for ANSI-connection B16.5 CLASS 150 PSI, see sheet-no. 1658
- measure- and bleeder-connections, see sheet-no. 1650
- drain- and bleeder connection, see sheet-no. 1659

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01NL.100…		
2	1	change over UKK	DN 25		
3	2	O-ring	22 x 3,5	304341 (NBR)	304392 (FPM)
4	6	O-ring	54 x 3	304657 (NBR)	304720 (FPM)
5	12	screw plug	NPT ½	307766	
6	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
7	1	clogging indicator, visual-electrical	OP	see sheet-no. 1628	
8	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628	
9	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
10	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
11	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
12	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
13	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
14	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
15	2	screw plug	G ¼	305003	
16	1	pressure balance valve	DN 10	305000	

item 15 execution only with clogging indicator or clogging sensor

4. Description:

Pressure filters, change-over series DA 101 are suitable for operating pressure up to 40 bar.
Pressure peaks can be absorbed with a sufficient margin o safety.
Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.
These filters can be installed as suction filters.
For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fibre element remove the cover and take out the element.
Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

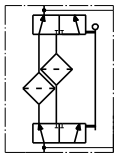
5. Technical data:

temperature ranges	
- calculation temperature (pressure vessel):	- 10°C to +100°C
- medium temperature:	- 10°C to +80°C
- ambient temperature:	- 40°C to +60°C
- survival temperature:	- 40°C to +100°C (short-time)
operating medium:	mineral oil, other media on request
max. operating pressure housing:	40 bar
test pressure acc. to PED 97/23/EC:	1,43 x operating pressure = 57 bar
test pressure acc. to ASME VIII Div. 1:	1,3 x operating pressure = 52 bar
test pressure acc. to API 614, Chapter 1:	1,5 x operating pressure = 60 bar
connection system:	SAE-flange connection 3000 PSI
housing material:	steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
bleeder connection :	NPT ½“
drain connection dirt side :	NPT ½“
drain connection clean side :	NPT ½“
volume tank :	2x 0,9 l
operating pressure adapter flanges:	according to B16.5 CLASS 150 PSI / DIN EN 1092-1

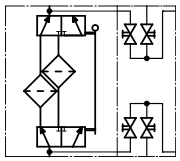
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

6. Symbols:

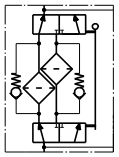
without indicator



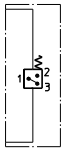
with shut-off valve



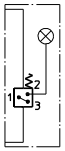
with by-pass valve



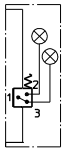
with electrical indicator
AE 30 and AE 40



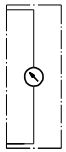
with visual-electrical indicator
AE 50 and AE 62



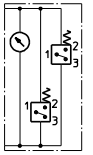
with visual-electrical indicator
AE 70 and AE 80



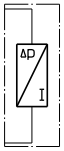
with visual indicator
AOR/AOC/OP



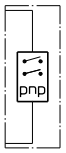
with visual-electrical indicator
OE



with electronical sensor
VS1



with electronical sensor
VS2



7. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’, respectively Δp- curves; depending on filter fineness and viscosity.

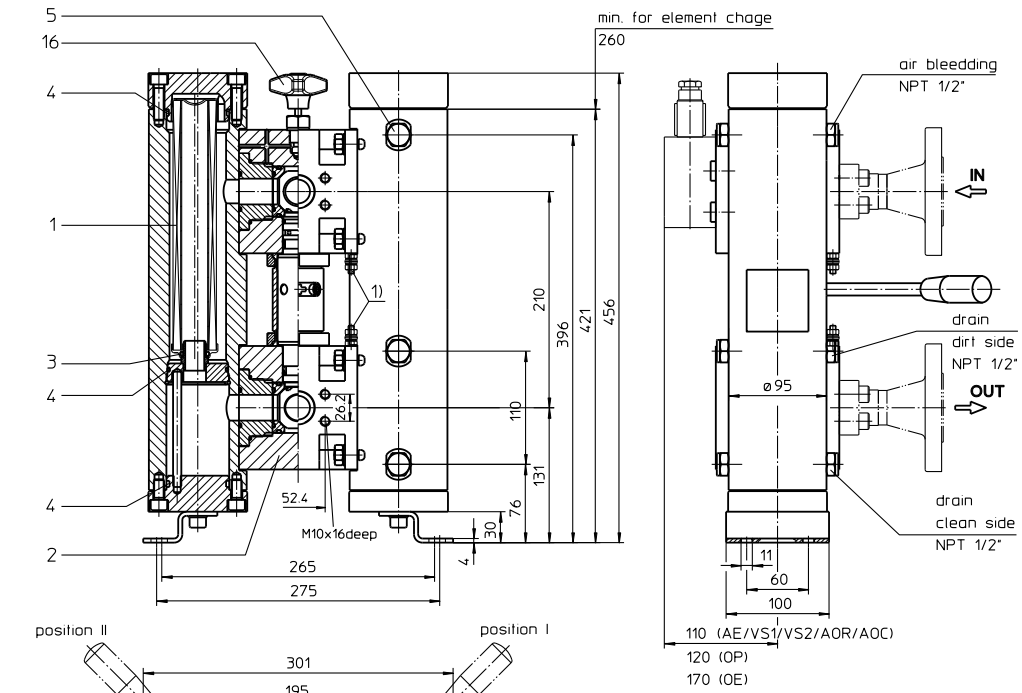
8. Test methods:

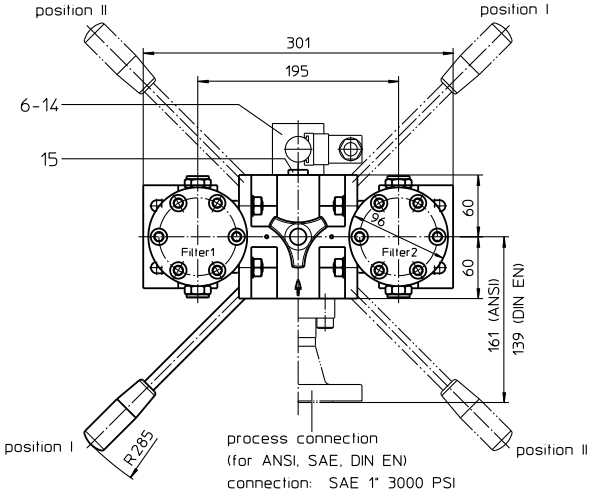
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER, change-over
Series DA 100 NPS 1“ CLASS 300 PSI

Sheet No. **2152 D**





1) Connection for the potential equalisation at inlet and outlet, only for application in the explosive area.

Position I: Filter 1 in operation
Position II: Filter 2 in operation

1. Type index:

1.1. Complete filter: (ordering example)

DA.	100.	10VG.	30.	E.	P.	-.	FS.	5.	-.	-.	AE.	AV.	IS21.	F.	F
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

1 **series:**
DA = pressure filter change-over, according to ASME-code

2 **nominal size:** 100

3 **filter-material and filter- fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm, 10 G = 10 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 API = 20 µm, 10 API = 10 µm Interpor fleece (glass fibre) according to API
10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
30 = Δp 30 bar

5 **filter element design:**
E = single-end open, S = with by-pass valve Δp 2,0 bar, S1 = with by-pass valve Δp 3,5 bar

6 **sealing material:**
P = Nitrile (NBR), V = Viton (FPM)

7 **filter element specification:**
- = standard, VA = stainless steel

8 **process connection:**
FS = SAE-flange connection 3000 PSI
FA1 = ANSI-flange connection CLASS 300 PSI, sealing surface R_z = 160 µm (not finer than 40 µm)
FA2 = ANSI-flange connection CLASS 300 PSI, sealing surface R_z = 16 µm
FD41 = flange connection DIN EN 1092-1, design B1
FD42 = flange connection DIN EN 1092-1, design B2

9 **process connection size:**
5 = 1“

10 **filter housing specification:**
- = standard
IS12 = internal parts of change-over armature stainless steel, see sheet-no. 41028

11 **internal valve:**
- = without

12 **clogging indicator or clogging sensor:**
- = without, OP = visual, see sheet-no. 1628
AOR = visual, see sheet-no. 1606, OE = visual-electrical, see sheet-no. 1628
AOC = visual, see sheet-no. 1606, VS1 = electronical, see sheet-no. 1607
AE = visual-electrical, see sheet-no. 1609, VS2 = electronical, see sheet-no. 1608

13 **shut-off valve:**
- = without, AV = shut-off valve, see sheet-no. 1655

14 **specification pressure vessel:**
- = standard (PED 97/23/EC)
IS20 = ASME VIII Div.1 with ASME equivalent material, see sheet-no. 55217
IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415
IS23 = ASME VIII Div.1 without U-stamp, see sheet-no. 55218

15 **switch lever:**
F = toward IN/OUT, B = opposite IN/OUT

16 **air bleeding/drain:**
F = toward IN/OUT, B = opposite IN/OUT

1.2. Filter element: (ordering example)

01NL.	100.	10VG.	30.	E.	P.	-
1	2	3	4	5	6	7

1 **series:**
01NL. = standard filter element according to DIN 24550, T3

2 **nominal size:** 100

3 - 7 see type index complete filter

weight: approx. 60 kg

Changes of measures and design are subject to alteration!

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2. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for connection acc. to EN1092-1, see sheet-no. 1657
- adapter for ANSI-connection B16.5 CLASS 300 PSI, see sheet-no. 1658
- measure- and bleeder-connections, see sheet-no. 1650
- drain- and bleeder connection, see sheet-no. 1659

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01NL.100...		
2	1	change over UKK	DN 25		
3	2	O-ring	22 x 3,5	304341 (NBR)	304392 (FPM)
4	6	O-ring	54 x 3	304657 (NBR)	304720 (FPM)
5	12	screw plug	NPT ½	307766	
6	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
7	1	clogging indicator, visual-electrical	OP	see sheet-no. 1628	
8	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628	
9	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
10	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
11	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
12	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
13	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
14	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
15	2	screw plug	G ¼	305003	
16	1	pressure balance valve	DN 10	305000	

item 15 execution only with clogging indicator or clogging sensor

4. Description:

Pressure filters, change-over series DA 100 are suitable for operating pressure up to 40 bar.
Pressure peaks can be absorbed with a sufficient margin o safety.
Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.
These filters can be installed as suction filters.
For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fibre element remove the cover and take out the element.
Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

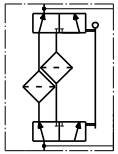
5. Technical data:

temperature ranges	
- calculation temperature (pressure vessel):	- 10°C to +100°C
- medium temperature:	- 10°C to +80°C
- ambient temperature:	- 40°C to +60°C
- survival temperature:	- 40°C to +100°C (short-time)
operating medium:	mineral oil, other media on request
max. operating pressure housing:	40 bar
test pressure acc. to PED 97/23/EC:	1,43 x operating pressure = 57 bar
test pressure acc. to ASME VIII Div. 1:	1,3 x operating pressure = 52 bar
test pressure acc. to API 614, Chapter 1:	1,5 x operating pressure = 60 bar
connection system:	SAE-flange connection 3000 PSI
housing material:	steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
bleeder connection :	NPT ½“
drain connection dirt side :	NPT ½“
drain connection clean side :	NPT ½“
volume tank :	2x 0,9 l
operating pressure adapter flanges:	according to B16.5 CLASS 300 PSI / DIN EN 1092-1

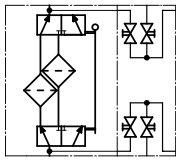
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

6. Symbols:

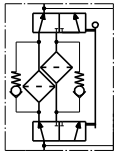
without indicator



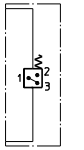
with shut-off valve



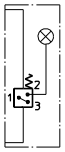
with by-pass valve



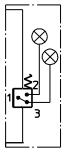
with electrical indicator
AE 30 and AE 40



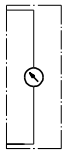
with visual-electrical indicator
AE 50 and AE 62



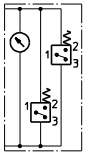
with visual-electrical indicator
AE 70 and AE 80



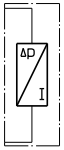
with visual indicator
AOR/AOC/OP



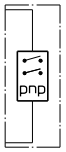
with visual-electrical indicator
OE



with electronical sensor
VS1



with electronical sensor
VS2



7. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’, respectively Δp- curves; depending on filter fineness and viscosity.

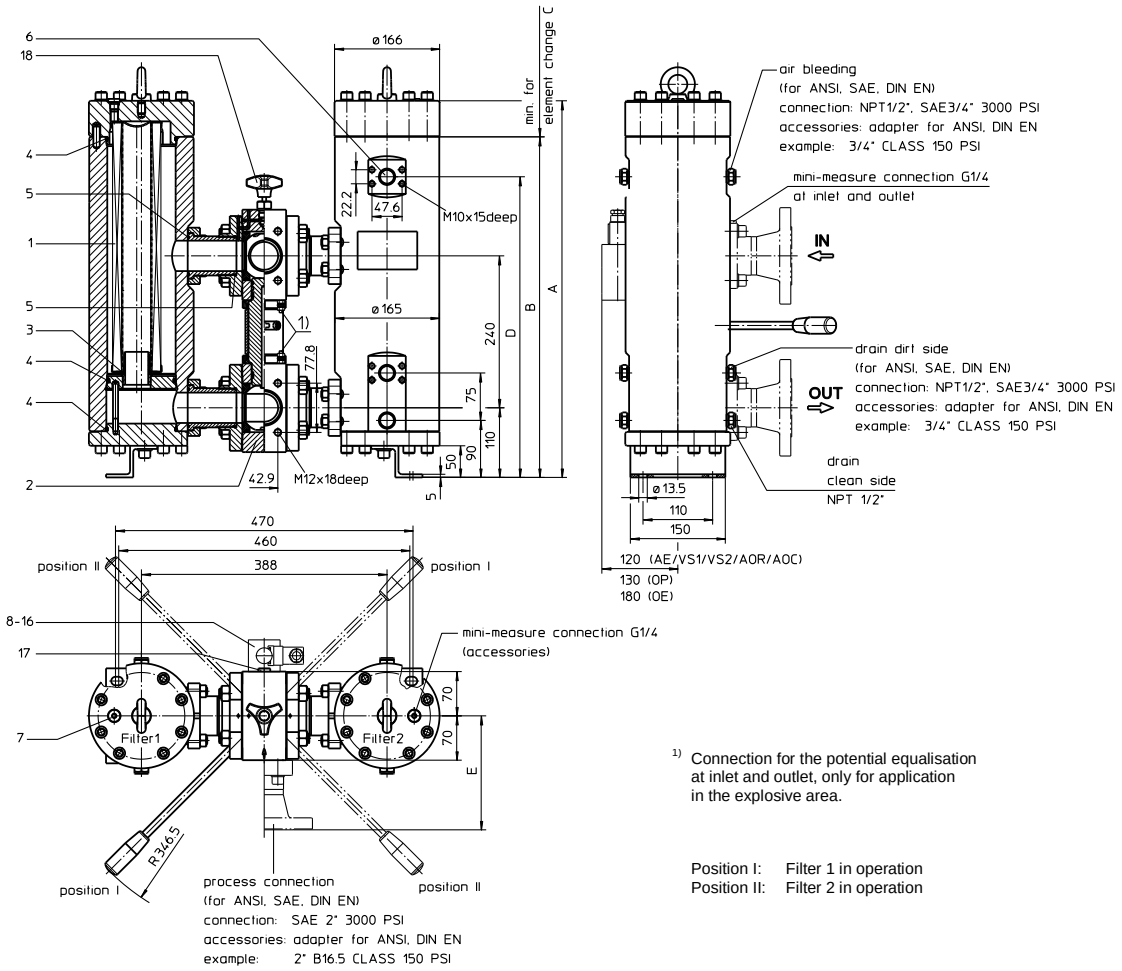
8. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER, change-over
Series DA 251-401 NPS 2“ CLASS 150 PSI

Sheet No. **2164 C**



1) Connection for the potential equalisation at inlet and outlet, only for application in the explosive area.

Position I: Filter 1 in operation
Position II: Filter 2 in operation

2. Dimensions:

type	connection	A	B	C	D	E	weight kg
DA 251	SAE 2“	455	398	260	365	-	ca. 130
	ANSI 2“					180	
	DIN EN 2“					162	
	ANSI 1 ½“					179	
	DIN EN 1 ½“					159	
DA 401	SAE 2“	595	538	410	475	-	ca. 160
	ANSI 2“					180	
	DIN EN 2“					162	
	ANSI 1 ½“					179	
	DIN EN 1 ½“					159	

1. Type index:

1.1. Complete filter: (ordering example)

DA. 401. 10VG. 30. E. P. -. FS. 8. -. -. AE. AV. IS21. F. F

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

1 **series:**
DA = pressure filter change-over, according to ASME-code

2 **nominal size:** 251, 401

3 **filter-material and filter- fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm, 10 G = 10 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 API = 20 µm, 10 API = 10 µm Interpor fleece (glass fibre) according to API
10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
30 = Δp 30 bar

5 **filter element design:**
E = single-end open, S = with by-pass valve Δp 2,0 bar, S1 = with by-pass valve Δp 3,5 bar

6 **sealing material:**
P = Nitrile (NBR), V = Viton (FPM)

7 **filter element specification:**
- = standard, VA = stainless steel

8 **process connection:**
FS = SAE-flange connection 3000 PSI
FA11 = ANSI-flange connection CLASS 150 PSI, sealing surface R_z = 160 µm (not finer than 40 µm)
FA12 = ANSI-flange connection CLASS 150 PSI, sealing surface R_z = 16 µm
FD1 = flange connection DIN EN 1092-1, design B1
FD2 = flange connection DIN EN 1092-1, design B2

9 **process connection size:**
7 = 1 ½“ (only with adapter), 8 = 2“

10 **filter housing specification:**
- = standard
IS12 = internal parts of change-over armature stainless steel, see sheet-no. 41028

11 **internal valve:**
- = without

12 **clogging indicator or clogging sensor:**
- = without, OP = visual, see sheet-no. 1628
AOR = visual, see sheet-no. 1606, OE = visual-electrical, see sheet-no. 1628
AOC = visual, see sheet-no. 1606, VS1 = electronical, see sheet-no. 1607
AE = visual-electrical, see sheet-no. 1609, VS2 = electronical, see sheet-no. 1608

13 **shut-off valve:**
- = without, AV = shut-off valve, see sheet-no. 1655

14 **specification pressure vessel:**
- = standard (PED 97/23/EC)
IS20 = ASME VIII Div.1 with ASME equivalent material, see sheet-no. 55217
IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415
IS23 = ASME VIII Div.1 without U-stamp, see sheet-no. 55218

15 **switch lever:**
F = toward IN/OUT, B = opposite IN/OUT

16 **air bleeding/drain:**
F = toward IN/OUT, B = opposite IN/OUT

1.2. Filter element: (ordering example)

01NL. 400. 10VG. 30. E. P. -

1	2	3	4	5	6	7

1 **series:**
01NL. = standard filter element according to DIN 24550, T3

2 **nominal size:** 250, 400

3 - 7 see type index complete filter

Changes of measures and design are subject to alteration!

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3. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for connection acc. to EN1092-1, see sheet-no. 1657
- adapter for ANSI-connection B16.5 CLASS 150 PSI, see sheet-no. 1658
- measure- and bleeder-connections, see sheet-no. 1650
- drain- and bleeder connection, see sheet-no. 1659

4. Spare parts:

item	qty.	designation	dimension DA 251	dimension DA 401	article-no.	
1	2	filter element	01NL. 250...	01NL. 400...		
2	1	change over UKK	DN 50			
3	2	O-ring	40 x 3		304389NBR)	305482FPM)
4	6	O-ring	100 x 5		327063 (NBR)	327064 (FPM)
5	8	O-ring	56 x 3		305072 (NBR)	305322 (FPM)
6	12	screw plug	NPT ½		307766	
7	2	screw plug	G ¼		305003	
8	1	clogging indicator, visual	AOR or AOC		see sheet-no. 1606	
9	1	clogging indicator, visual-electrical	OP		see sheet-no. 1628	
10	1	clogging indicator, visual-electrical	OE		see sheet-no. 1628	
11	1	clogging indicator, visual-electrical	AE		see sheet-no. 1609	
12	1	clogging sensor, electronical	VS1		see sheet-no. 1607	
13	1	clogging sensor, electronical	VS2		see sheet-no. 1608	
14	1	O-ring	15 x 1,5		315357 (NBR)	315427 (FPM)
15	1	O-ring	22 x 2		304708 (NBR)	304721 (FPM)
16	2	O-ring	14 x 2		304342 (NBR)	304722 (FPM)
17	2	screw plug	G ¼		305003	
18	1	pressure balance valve	DN 10		305000	

item 17 execution only with clogging indicator or clogging sensor

5. Description:

Pressure filters, change-over series DA 251-401 are suitable for operating pressure up to 40 bar.
Pressure peaks can be absorbed with a sufficient margin o safety.
Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.
These filters can be installed as suction filters.
For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fibre element remove the cover and take out the element.
Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

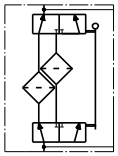
6. Technical data:

temperature ranges	
- calculation temperature (pressure vessel):	- 10°C to +100°C
- medium temperature:	- 10°C to +80°C
- ambient temperature:	- 40°C to +60°C
- survival temperature:	- 40°C to +100°C (short-time)
operating medium:	mineral oil, other media on request
max. operating pressure housing:	40 bar
test pressure acc. to PED 97/23/EC:	1,43 x operating pressure = 57 bar
test pressure acc. to ASME VIII Div. 1:	1,3 x operating pressure = 52 bar
test pressure acc. to API 614, Chapter 1:	1,5 x operating pressure = 60 bar
connection system:	SAE-flange connection 3000 PSI
housing material:	steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
bleeder connection :	NPT ½“ and SAE ¾“ 3000 PSI
drain connection dirt side :	NPT ½“ and SAE ¾“ 3000 PSI
drain connection clean side :	NPT ½“
volume tank DA 251:	2x 3,0 l
DA 401:	2x 4,3 l
operating pressure adapter flanges:	according to B16.5 CLASS 150 PSI / DIN EN 1092-1

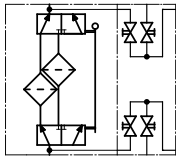
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

7. Symbols:

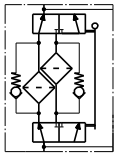
without indicator



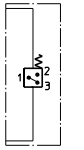
with shut-off valve



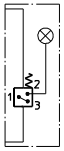
with by-pass valve



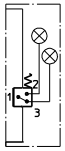
with electrical indicator
AE 30 and AE 40



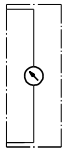
with visual-electrical indicator
AE 50 and AE 62



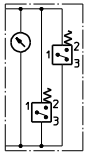
with visual-electrical indicator
AE 70 and AE 80



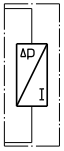
with visual indicator
AOR/AOC/OP



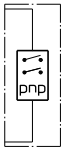
with visual-electrical indicator
OE



with electronical sensor
VS1



with electronical sensor
VS2



8. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’, respectively Δp- curves; depending on filter fineness and viscosity.

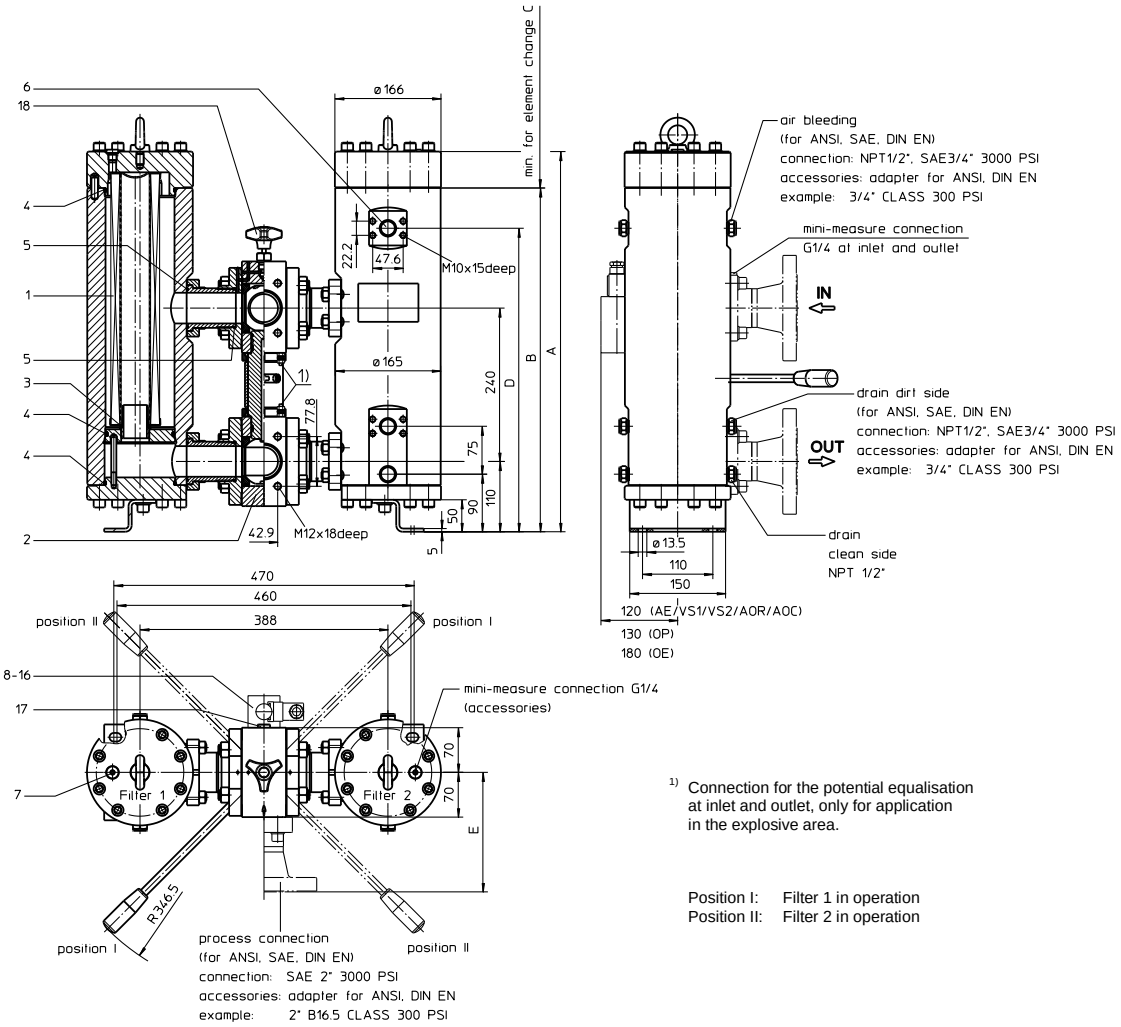
9. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER, change-over
Series DA 250-400 NPS 2“ CLASS 300 PSI

Sheet No. **2155 H**



1) Connection for the potential equalisation at inlet and outlet, only for application in the explosive area.

Position I: Filter 1 in operation
Position II: Filter 2 in operation

2. Dimensions:

type	connection	A	B	C	D	E	weight kg
DA 250	SAE 2“	455	398	260	365	-	ca. 130
	ANSI 2“					187	
	DIN EN 2“					165	
	ANSI 1 ½“					185	
	DIN EN 1 ½“					162	
DA 400	SAE 2“	595	538	410	475	-	ca. 160
	ANSI 2“					187	
	DIN EN 2“					165	
	ANSI 1 ½“					185	
	DIN EN 1 ½“					162	

1. Type index:

1.1. Complete filter: (ordering example)

DA.	400.	10VG.	30.	E.	P.	-.	FS.	8.	-.	-.	AE.	AV.	IS21.	F.	F
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

1 **series:**
DA = pressure filter change-over, according to ASME-code

2 **nominal size:** 250, 400

3 **filter-material and filter- fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm, 10 G = 10 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 API = 20 µm, 10 API = 10 µm Interpor fleece (glass fibre) according to API
10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
30 = Δp 30 bar

5 **filter element design:**
E = single-end open, S = with by-pass valve Δp 2,0 bar, S1 = with by-pass valve Δp 3,5 bar

6 **sealing material:**
P = Nitrile (NBR), V = Viton (FPM)

7 **filter element specification:**
- = standard, VA = stainless steel

8 **process connection:**
FS = SAE-flange connection 3000 PSI
FA1 = ANSI-flange connection CLASS 300 PSI, sealing surface R_z = 160 µm (not finer than 40 µm)
FA2 = ANSI-flange connection CLASS 300 PSI, sealing surface R_z = 16 µm
FD41 = flange connection DIN EN 1092-1, design B1
FD42 = flange connection DIN EN 1092-1, design B2

9 **process connection size:**
7 = 1 ½“ (only with adapter), 8 = 2“

10 **filter housing specification:**
- = standard
IS12 = internal parts of change-over armature stainless steel, see sheet-no. 41028

11 **internal valve:**
- = without

12 **clogging indicator or clogging sensor:**
- = without, OP = visual, see sheet-no. 1628
AOR = visual, see sheet-no. 1606, OE = visual-electrical, see sheet-no. 1628
AOC = visual, see sheet-no. 1606, VS1 = electronical, see sheet-no. 1607
AE = visual-electrical, see sheet-no. 1609, VS2 = electronical, see sheet-no. 1608

13 **shut-off valve:**
- = without, AV = shut-off valve, see sheet-no. 1655

14 **specification pressure vessel:**
- = standard (PED 97/23/EC)
IS20 = ASME VIII Div.1 with ASME equivalent material, see sheet-no. 55217
IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415
IS23 = ASME VIII Div.1 without U-stamp, see sheet-no. 55218

15 **switch lever:**
F = toward IN/OUT, B = opposite IN/OUT

16 **air bleeding/drain:**
F = toward IN/OUT, B = opposite IN/OUT

1.2. Filter element: (ordering example)

01NL.	400.	10VG.	30.	E.	P.	-
1	2	3	4	5	6	7

1 **series:**
01NL. = standard filter element according to DIN 24550, T3

2 **nominal size:** 250, 400

3 - 7 see type index complete filter

Changes of measures and design are subject to alteration!

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3. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for connection acc. to EN1092-1, see sheet-no. 1657
- adapter for ANSI-connection B16.5 CLASS 300 PSI, see sheet-no. 1658
- measure- and bleeder-connections, see sheet-no. 1650
- drain- and bleeder connection, see sheet-no. 1659

4. Spare parts:

item	qty.	designation	dimension DA 250	dimension DA 400	article-no.	
1	2	filter element	01NL. 250...	01NL. 400...		
2	1	change over UKK	DN 50			
3	2	O-ring	40 x 3		304389NBR)	305482FPM)
4	6	O-ring	100 x 5		327063 (NBR)	327064 (FPM)
5	8	O-ring	56 x 3		305072 (NBR)	305322 (FPM)
6	12	screw plug	NPT ½		307766	
7	2	screw plug	G ¼		305003	
8	1	clogging indicator, visual	AOR or AOC		see sheet-no. 1606	
9	1	clogging indicator, visual-electrical	OP		see sheet-no. 1628	
10	1	clogging indicator, visual-electrical	OE		see sheet-no. 1628	
11	1	clogging indicator, visual-electrical	AE		see sheet-no. 1609	
12	1	clogging sensor, electronical	VS1		see sheet-no. 1607	
13	1	clogging sensor, electronical	VS2		see sheet-no. 1608	
14	1	O-ring	15 x 1,5		315357 (NBR)	315427 (FPM)
15	1	O-ring	22 x 2		304708 (NBR)	304721 (FPM)
16	2	O-ring	14 x 2		304342 (NBR)	304722 (FPM)
17	2	screw plug	G ¼		305003	
18	1	pressure balance valve	DN 10		305000	

item 17 execution only with clogging indicator or clogging sensor

5. Description:

Pressure filters, change-over series DA 250-400 are suitable for operating pressure up to 40 bar.
Pressure peaks can be absorbed with a sufficient margin o safety.
Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.
These filters can be installed as suction filters.
For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fibre element remove the cover and take out the element.
Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

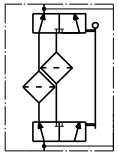
6. Technical data:

temperature ranges	
- calculation temperature (pressure vessel):	- 10°C to +100°C
- medium temperature:	- 10°C to +80°C
- ambient temperature:	- 40°C to +60°C
- survival temperature:	- 40°C to +100°C (short-time)
operating medium:	mineral oil, other media on request
max. operating pressure housing:	40 bar
test pressure acc. to PED 97/23/EC:	1,43 x operating pressure = 57 bar
test pressure acc. to ASME VIII Div. 1:	1,3 x operating pressure = 52 bar
test pressure acc. to API 614, Chapter 1:	1,5 x operating pressure = 60 bar
connection system:	SAE-flange connection 3000 PSI
housing material:	steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
bleeder connection :	NPT ½“ and SAE ¾“ 3000 PSI
drain connection dirt side :	NPT ½“ and SAE ¾“ 3000 PSI
drain connection clean side :	NPT ½“
volume tank DA 251:	2x 3,0 l
DA 401:	2x 4,3 l
operating pressure adapter flanges:	according to B16.5 CLASS 300 PSI / DIN EN 1092-1

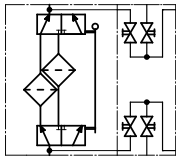
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

7. Symbols:

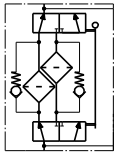
without indicator



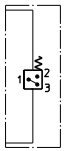
with shut-off valve



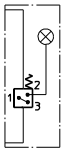
with by-pass valve



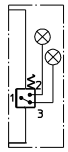
with electrical indicator AE 30 and AE 40



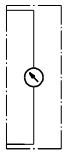
with visual-electrical indicator AE 50 and AE 62



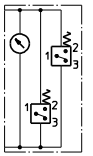
with visual-electrical indicator AE 70 and AE 80



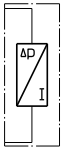
with visual indicator AOR/AOC/OP



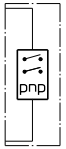
with visual-electrical indicator OE



with electronical sensor VS1



with electronical sensor VS2



8. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’, respectively Δp- curves; depending on filter fineness and viscosity.

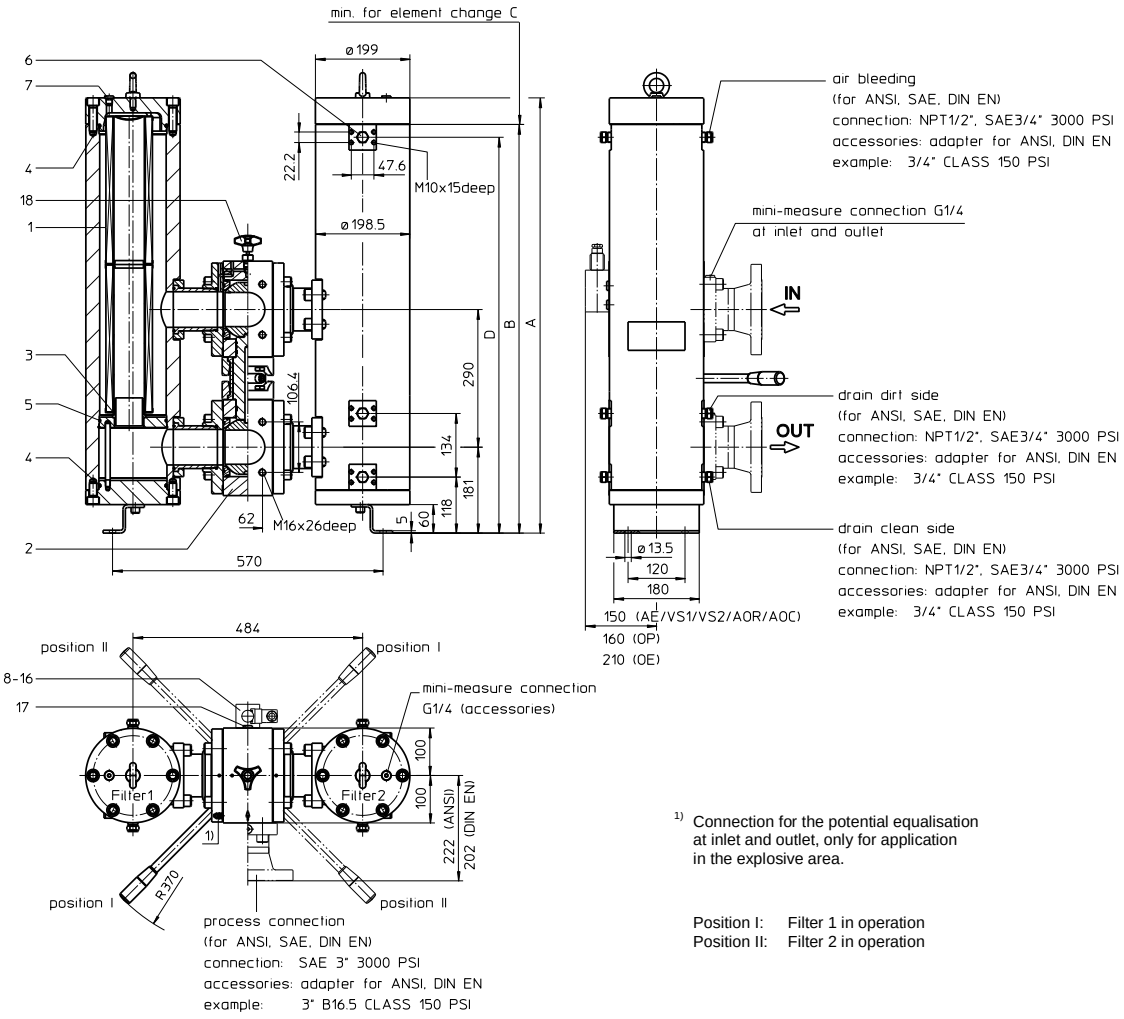
9. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER, change-over
Series DA 631-1001 NPS 3“ CLASS 150 PSI

Sheet No. **2165 C**



[1] Connection for the potential equalisation at inlet and outlet, only for application in the explosive area.

Position I: Filter 1 in operation
Position II: Filter 2 in operation

2. Dimensions:

type	connection	A	B	C	D	weight kg
DA 631	SAE 3“	687	631	410	604	approx. 290
DA 1001	SAE 3“	917	861	640	834	approx. 350

1. Type index:

1.1. Complete filter: (ordering example)

DA.	1001.	10VG.	30.	E.	P.	-.	FS.	A.	-.	-.	AE.	AV.	IS21.	F.	F
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

1 **series:**
DA = pressure filter change-over, according to ASME-code

2 **nominal size:** 631, 1001

3 **filter-material and filter- fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm, 10 G = 10 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 API = 20 µm, 10 API = 10 µm Interpor fleece (glass fibre) according to API
10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
30 = Δp 30 bar

5 **filter element design:**
E = single-end open, S = with by-pass valve Δp 2,0 bar, S1 = with by-pass valve Δp 3,5 bar

6 **sealing material:**
P = Nitrile (NBR), V = Viton (FPM)

7 **filter element specification:**
- = standard, VA = stainless steel

8 **process connection:**
FS = SAE-flange connection 3000 PSI
FA11 = ANSI-flange connection CLASS 150 PSI, sealing surface R_z = 160 µm (not finer than 40 µm)
FA12 = ANSI-flange connection CLASS 150 PSI, sealing surface R_z = 16 µm
FD1 = flange connection DIN EN 1092-1, design B1
FD2 = flange connection DIN EN 1092-1, design B2

9 **process connection size:**
A = 3“

10 **filter housing specification:**
- = standard
IS12 = internal parts of change-over armature stainless steel, see sheet-no. 41028

11 **internal valve:**
- = without

12 **clogging indicator or clogging sensor:**
- = without, OP = visual, see sheet-no. 1628
AOR = visual, see sheet-no. 1606, OE = visual-electrical, see sheet-no. 1628
AOC = visual, see sheet-no. 1606, VS1 = electronical, see sheet-no. 1607
AE = visual-electrical, see sheet-no. 1609, VS2 = electronical, see sheet-no. 1608

13 **shut-off valve:**
- = without, AV = shut-off valve, see sheet-no. 1655

14 **specification pressure vessel:**
- = standard (PED 97/23/EC)
IS20 = ASME VIII Div.1 with ASME equivalent material, see sheet-no. 55217
IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415
IS23 = ASME VIII Div.1 without U-stamp, see sheet-no. 55218

15 **switch lever:**
F = toward IN/OUT, B = opposite IN/OUT

16 **air bleeding/drain:**
F = toward IN/OUT, B = opposite IN/OUT

1.2. Filter element: (ordering example)

01NL.	1000.	10VG.	30.	E.	P.	-
1	2	3	4	5	6	7

1 **series:**
01NL. = standard filter element according to DIN 24550, T3

2 **nominal size:** 630, 1000

3 - 7 see type index complete filter

Changes of measures and design are subject to alteration!

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3. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for connection acc. to EN1092-1, see sheet-no. 1657
- adapter for ANSI-connection B16.5 CLASS 150 PSI, see sheet-no. 1658
- measure- and bleeder-connections, see sheet-no. 1650
- drain- and bleeder connection, see sheet-no. 1659

4. Spare parts:

item	qty.	designation	dimension DA 631	dimension DA 1001	article-no.	
1	2	filter element	01NL.630	01NL.1000		
2	1	change over UKK	DN 80			
3	2	O-ring	60 x 3,5		304377 (NBR)	304398 (FPM)
4	4	O-ring	135 x 4,75		326348 (NBR)	326349 (FPM)
5	2	O-ring	136,12 x 3,53		320162 (NBR)	320163 (FPM)
6	12	screw plug	NPT ½		307766	
7	2	screw plug	G ¼		305003	
8	1	clogging indicator, visual	AOR or AOC		see sheet-no. 1606	
9	1	clogging indicator, visual-electrical	OP		see sheet-no. 1628	
10	1	clogging indicator, visual-electrical	OE		see sheet-no. 1628	
11	1	clogging indicator, visual-electrical	AE		see sheet-no. 1609	
12	1	clogging sensor, electronical	VS1		see sheet-no. 1607	
13	1	clogging sensor, electronical	VS2		see sheet-no. 1608	
14	1	O-ring	15 x 1,5		315357 (NBR)	315427 (FPM)
15	1	O-ring	22 x 2		304708 (NBR)	304721 (FPM)
16	2	O-ring	14 x 2		304342 (NBR)	304722 (FPM)
17	2	screw plug	G ¼		305003	
18	1	pressure balance valve	DN 10		305000	

item 17 execution only with clogging indicator or clogging sensor

5. Description:

Pressure filters, change-over series DA 631-1001 are suitable for operating pressure up to 40 bar.
Pressure peaks can be absorbed with a sufficient margin o safety.
Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.
These filters can be installed as suction filters.
For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fibre element remove the cover and take out the element.
Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

6. Technical data:

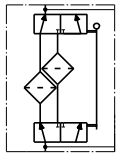
temperature ranges	
- calculation temperature (pressure vessel):	- 10°C to +100°C
- medium temperature:	- 10°C to +80°C
- ambient temperature:	- 40°C to +60°C
- survival temperature:	- 40°C to +100°C (short-time)
operating medium:	mineral oil, other media on request
max. operating pressure housing:	40 bar
test pressure acc. to PED 97/23/EC:	1,43 x operating pressure = 57 bar
test pressure acc. to ASME VIII Div. 1:	1,3 x operating pressure = 52 bar
test pressure acc. to API 614, Chapter 1:	1,5 x operating pressure = 60 bar
connection system:	SAE-flange connection 3000 PSI
housing material:	steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
bleeder connection :	NPT ½“ and SAE ¾“ 3000 PSI
drain connection dirt side :	NPT ½“ and SAE ¾“ 3000 PSI
drain connection clean side :	NPT ½“ and SAE ¾“ 3000 PSI
volume tank DA 631:	2x 8,3 l
DA 1001:	2x 11,8 l
operating pressure adapter flanges:	according to B16.5 CLASS 150 PSI / DIN EN 1092-1

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

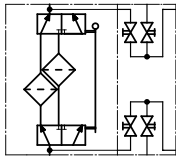
E 2165 C

7. Symbols:

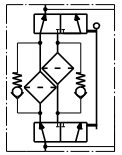
without indicator



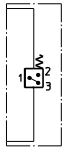
with shut-off valve



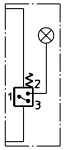
with by-pass valve



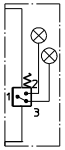
with electrical indicator
AE 30 and AE 40



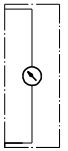
with visual-electrical indicator
AE 50 and AE 62



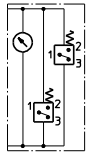
with visual-electrical indicator
AE 70 and AE 80



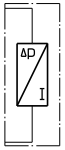
with visual indicator
AOR/AOC/OP



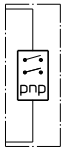
with visual-electrical indicator
OE



with electronical sensor
VS1



with electronical sensor
VS2



8. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’, respectively Δp- curves; depending on filter fineness and viscosity.

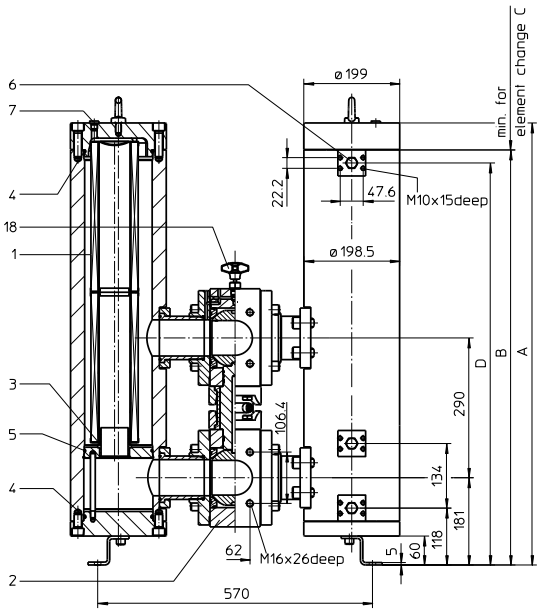
9. Test methods:

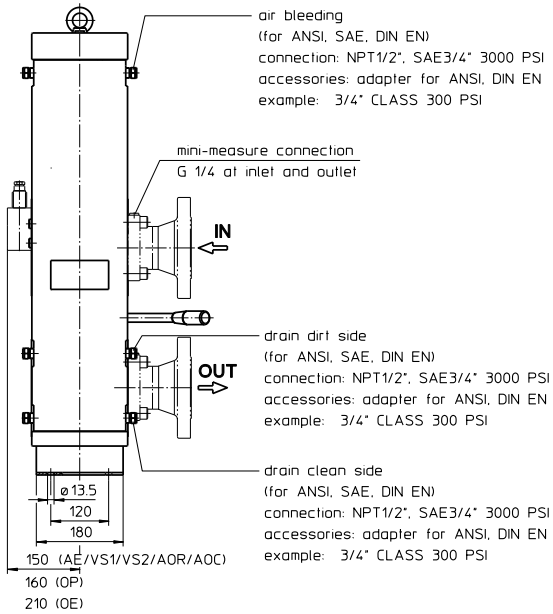
Filter elements are tested according to the following ISO standards:

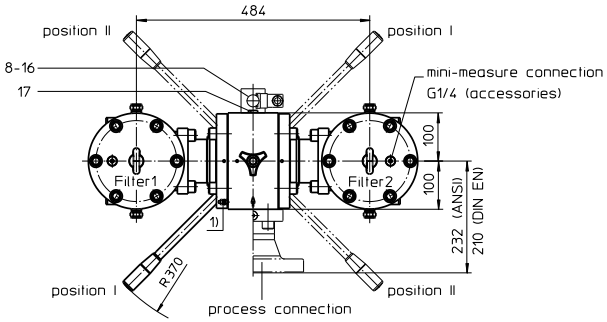
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER, change-over
Series DA 630-1000 NPS 3“ CLASS 300 PSI

Sheet No. **2156 D**







1) Connection for the potential equalisation at inlet and outlet, only for application in the explosive area.

Position I: Filter 1 in operation
Position II: Filter 2 in operation

2. Dimensions:

type	connection	A	B	C	D	weight kg
DA 630	SAE 3“	687	631	410	604	approx. 290
DA 1000	SAE 3“	917	861	640	834	approx. 350

1. Type index:

1.1. Complete filter: (ordering example)

DA.	1000.	10VG.	30.	E.	P.	-.	FS.	A.	-.	-.	AE.	AV.	IS21.	F.	F
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

1 **series:**
DA = pressure filter change-over, according to ASME-code

2 **nominal size:** 630, 1000

3 **filter-material and filter- fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm, 10 G = 10 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 API = 20 µm, 10 API = 10 µm Interpor fleece (glass fibre) according to API
10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
30 = Δp 30 bar

5 **filter element design:**
E = single-end open, S = with by-pass valve Δp 2,0 bar, S1 = with by-pass valve Δp 3,5 bar

6 **sealing material:**
P = Nitrile (NBR), V = Viton (FPM)

7 **filter element specification:**
- = standard, VA = stainless steel

8 **process connection:**
FS = SAE-flange connection 3000 PSI
FA1 = ANSI-flange connection CLASS 300 PSI, sealing surface R_z = 160 µm (not finer than 40 µm)
FA2 = ANSI-flange connection CLASS 300 PSI, sealing surface R_z = 16 µm
FD41 = flange connection DIN EN 1092-1, design B1
FD42 = flange connection DIN EN 1092-1, design B2

9 **process connection size:**
A = 3“

10 **filter housing specification:**
- = standard
IS12 = internal parts of change-over armature stainless steel, see sheet-no. 41028

11 **internal valve:**
- = without

12 **clogging indicator or clogging sensor:**
- = without, OP = visual, see sheet-no. 1628
AOR = visual, see sheet-no. 1606, OE = visual-electrical, see sheet-no. 1628
AOC = visual, see sheet-no. 1606, VS1 = electronical, see sheet-no. 1607
AE = visual-electrical, see sheet-no. 1609, VS2 = electronical, see sheet-no. 1608

13 **shut-off valve:**
- = without, AV = shut-off valve, see sheet-no. 1655

14 **specification pressure vessel:**
- = standard (PED 97/23/EC)
IS20 = ASME VIII Div.1 with ASME equivalent material, see sheet-no. 55217
IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415
IS23 = ASME VIII Div.1 without U-stamp, see sheet-no. 55218

15 **switch lever:**
F = toward IN/OUT, B = opposite IN/OUT

16 **air bleeding/drain:**
F = toward IN/OUT, B = opposite IN/OUT

1.2. Filter element: (ordering example)

01NL.	1000.	10VG.	30.	E.	P.	-
1	2	3	4	5	6	7

1 **series:**
01NL. = standard filter element according to DIN 24550, T3

2 **nominal size:** 630, 1000

3 - 7 see type index complete filter

Changes of measures and design are subject to alteration!

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3. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for connection acc. to EN1092-1, see sheet-no. 1657
- adapter for ANSI-connection B16.5 CLASS 300 PSI, see sheet-no. 1658
- measure- and bleeder-connections, see sheet-no. 1650
- drain- and bleeder connection, see sheet-no. 1659

4. Spare parts:

item	qty.	designation	dimension DA 630	dimension DA 1000	article-no.	
1	2	filter element	01NL.630…	01NL.1000…		
2	1	change over UKK	DN 80			
3	2	O-ring	60 x 3,5		304377 (NBR)	304398 (FPM)
4	4	O-ring	135 x 4,75		326348 (NBR)	326349 (FPM)
5	2	O-ring	136,12 x 3,53		320162 (NBR)	320163 (FPM)
6	12	screw plug	NPT ½		307766	
7	2	screw plug	G ¼		305003	
8	1	clogging indicator, visual	AOR or AOC		see sheet-no. 1606	
9	1	clogging indicator, visual-electrical	OP		see sheet-no. 1628	
10	1	clogging indicator, visual-electrical	OE		see sheet-no. 1628	
11	1	clogging indicator, visual-electrical	AE		see sheet-no. 1609	
12	1	clogging sensor, electronical	VS1		see sheet-no. 1607	
13	1	clogging sensor, electronical	VS2		see sheet-no. 1608	
14	1	O-ring	15 x 1,5		315357 (NBR)	315427 (FPM)
15	1	O-ring	22 x 2		304708 (NBR)	304721 (FPM)
16	2	O-ring	14 x 2		304342 (NBR)	304722 (FPM)
17	2	screw plug	G ¼		305003	
18	1	pressure balance valve	DN 10		305000	

item 17 execution only with clogging indicator or clogging sensor

5. Description:

Pressure filters, change-over series DA 630-1000 are suitable for operating pressure up to 40 bar.
Pressure peaks can be absorbed with a sufficient margin o safety.
Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.
These filters can be installed as suction filters.
For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fibre element remove the cover and take out the element.
Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

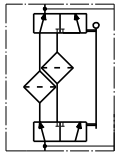
6. Technical data:

temperature ranges	
- calculation temperature (pressure vessel):	- 10°C to +100°C
- medium temperature:	- 10°C to +80°C
- ambient temperature:	- 40°C to +60°C
- survival temperature:	- 40°C to +100°C (short-time)
operating medium:	mineral oil, other media on request
max. operating pressure housing:	40 bar
test pressure acc. to PED 97/23/EC:	1,43 x operating pressure = 57 bar
test pressure acc. to ASME VIII Div. 1:	1,3 x operating pressure = 52 bar
test pressure acc. to API 614, Chapter 1:	1,5 x operating pressure = 60 bar
connection system:	SAE-flange connection 3000 PSI
housing material:	steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
bleeder connection :	NPT ½“ and SAE ¾“ 3000 PSI
drain connection dirt side :	NPT ½“ and SAE ¾“ 3000 PSI
drain connection clean side :	NPT ½“ and SAE ¾“ 3000 PSI
volume tank DA 630:	2x 8,3 l
DA 1000:	2x 11,8 l
operating pressure adapter flanges:	according to B16.5 CLASS 300 PSI / DIN EN 1092-1

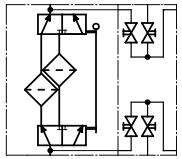
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

7. Symbols:

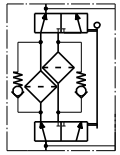
without indicator



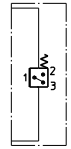
with shut-off valve



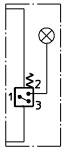
with by-pass valve



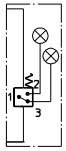
with electrical indicator AE 30 and AE 40



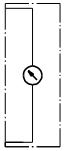
with visual-electrical indicator AE 50 and AE 62



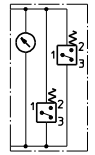
with visual-electrical indicator AE 70 and AE 80



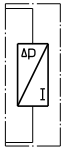
with visual indicator AOR/AOC/OP



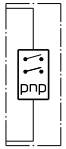
with visual-electrical indicator OE



with electronical sensor VS1



with electronical sensor VS2



8. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’, respectively Δp- curves; depending on filter fineness and viscosity.

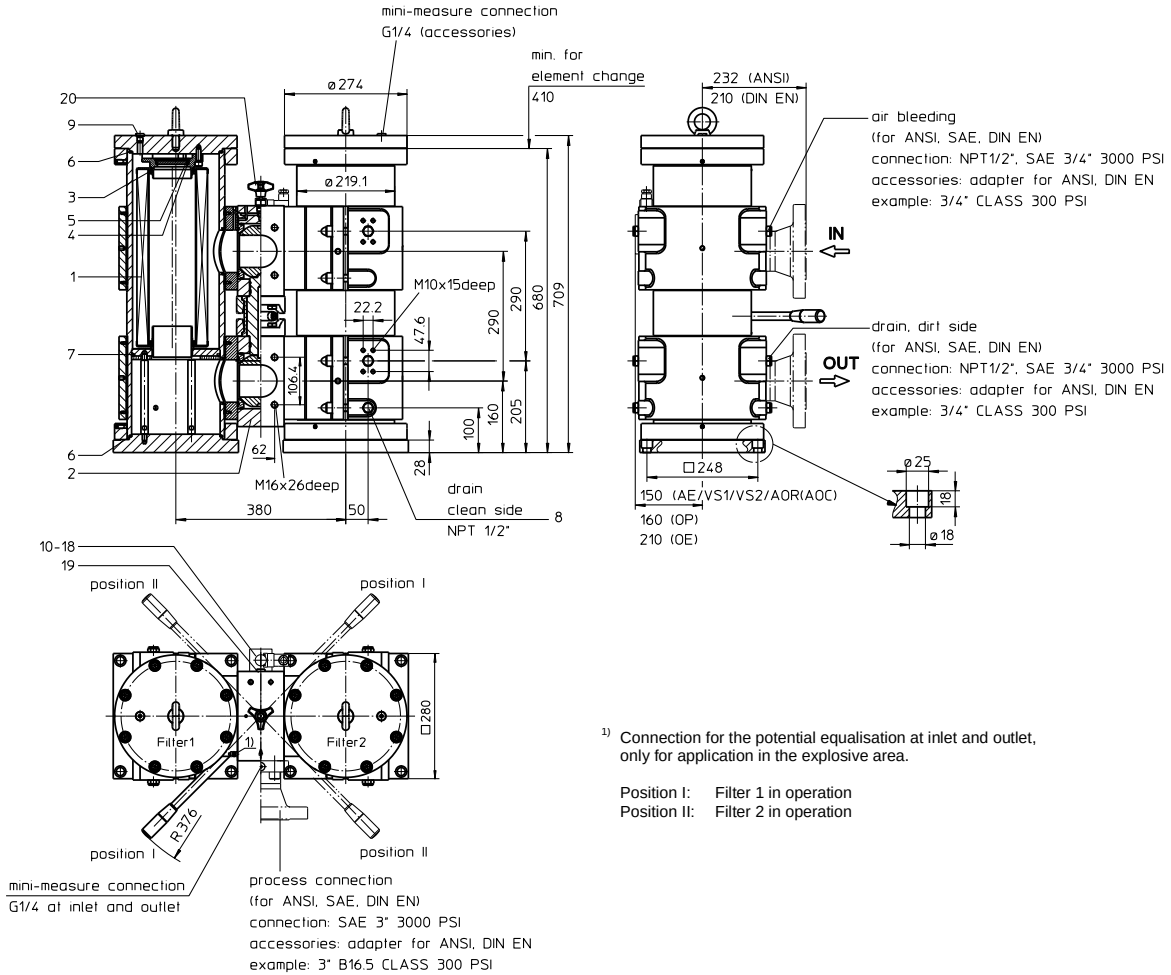
9. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER, change-over
Series DA 1004 NPS 3“ CLASS 300 PSI

Sheet No. **2185 B**



1) Connection for the potential equalisation at inlet and outlet, only for application in the explosive area.

Position I: Filter 1 in operation
Position II: Filter 2 in operation

1. Type index:

1.1. Complete filter: (ordering example)

DA.	1004.	10VG.	10.	B.	P.	-.	FS.	A.	-.	-.	AE.	AV.	IS21.	F.	F
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

1 **series:**
DA = pressure filter change-over, according to ASME-code

2 **nominal size:** 1004

3 **filter-material and filter- fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm, 10 G = 10 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 API = 20 µm, 10 API = 10 µm Interpor fleece (glass fibre) according to API
10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR), V = Viton (FPM)

7 **filter element specification:**
- = standard, VA = stainless steel

8 **process connection:**
FS = SAE-flange connection 3000 PSI
FA1 = ANSI-flange connection CLASS 300 PSI, sealing surface R_z = 160 µm (not finer than 40 µm)
FA2 = ANSI-flange connection CLASS 300 PSI, sealing surface R_z = 16 µm
FD41 = flange connection DIN EN 1092-1, design B1
FD42 = flange connection DIN EN 1092-1, design B2

9 **process connection size:**
A = 3“

10 **filter housing specification:**
- = standard
IS12 = internal parts of change-over armature stainless steel, see sheet-no. 41028

11 **internal valve:**
- = without, S1 = with by-pass valve Δp 3,5 bar

12 **clogging indicator or clogging sensor:**
- = without, OP = visual, see sheet-no. 1628
AOR = visual, see sheet-no. 1606, OE = visual-electrical, see sheet-no. 1628
AOC = visual, see sheet-no. 1606, VS1 = electronical, see sheet-no. 1607
AE = visual-electrical, see sheet-no. 1609, VS2 = electronical, see sheet-no. 1608

13 **shut-off valve:**
- = without, AV = shut-off valve, see sheet-no. 1655

14 **specification pressure vessel:**
- = standard (PED 97/23/EC)
IS20 = ASME VIII Div.1 with ASME equivalent material, see sheet-no. 55217
IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415
IS23 = ASME VIII Div.1 without U-stamp, see sheet-no. 55218

15 **switch lever:**
F = toward IN/OUT, B = opposite IN/OUT

16 **air bleeding/drain:**
F = toward IN/OUT, B = opposite IN/OUT

1.2. Filter element: (ordering example)

01NR.	1000.	10VG.	10.	B.	P.	-
1	2	3	4	5	6	7

1 **series:**
01NR = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 1000

3 - 7 see type index complete filter

weight: approx. 370 kg

Changes of measures and design are subject to alteration!

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2. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for connection acc. to EN1092-1, see sheet-no. 1657
- adapter for ANSI-connection B16.5 CLASS 300 PSI, see sheet-no. 1658
- measure- and bleeder-connections, see sheet-no. 1650
- drain- and bleeder connection, see sheet-no. 1659

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01NR.1000 ...		
2	1	change over UKK	DN 80		
3	4	O-ring	90 x 4	306941 (NBR)	307031 (FPM)
4	2	O-ring	62 x 4	308045 (NBR)	311472 (FPM)
5	2	circlip	DIN472-75x2,5-ST	311471	
6	4	O-ring	200 x 4	334555 (NBR)	334554 (FPM)
7	2	O-ring	185 x 6	335381 (NBR)	335306 (FPM)
8	12	screw plug	NPT ½	307766	
9	2	screw plug	G ¼	305003	
10	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
11	1	clogging indicator, visual-electrical	OP	see sheet-no. 1628	
12	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628	
13	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
14	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
15	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
16	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
17	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
18	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
19	2	screw plug	G ¼	305003	
20	1	pressure balance valve	DN 10	305000	

item 19 execution only with clogging indicator or clogging sensor

4. Description:

Pressure filters, change-over series DA 1004 are suitable for operating pressure up to 40 bar.
Pressure peaks can be absorbed with a sufficient margin o safety.
Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.
These filters can be installed as suction filters.
For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fibre element remove the cover and take out the element.
Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

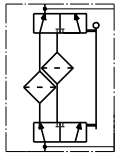
5. Technical data:

temperature ranges	
- calculation temperature (pressure vessel):	- 10°C to +100°C
- medium temperature:	- 10°C to +80°C
- ambient temperature:	- 40°C to +60°C
- survival temperature:	- 40°C to +100°C (short-time)
operating medium:	mineral oil, other media on request
max. operating pressure housing:	40 bar
test pressure acc. to PED 97/23/EC:	1,43 x operating pressure = 57 bar
test pressure acc. to ASME VIII Div. 1:	1,3 x operating pressure = 52 bar
test pressure acc. to API 614, Chapter 1:	1,5 x operating pressure = 60 bar
connection system:	SAE-flange connection 3000 PSI
housing material:	steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
bleeder connection :	NPT ½“ and SAE ¾“ 3000 PSI
drain connection dirt side :	NPT ½“ and SAE ¾“ 3000 PSI
drain connection clean side :	NPT ½“
volume tank :	2x 19 l
operating pressure adapter flanges:	according to B16.5 CLASS 300 PSI / DIN EN 1092-1

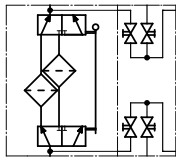
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

6. Symbols:

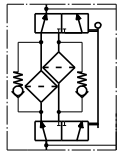
without indicator



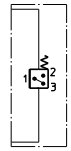
with shut-off valve



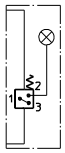
with by-pass valve



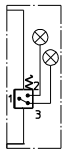
with electrical indicator AE 30 and AE 40



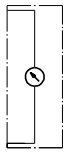
with visual-electrical indicator AE 50 and AE 62



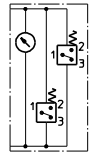
with visual-electrical indicator AE 70 and AE 80



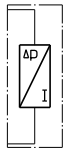
with visual indicator AOR/AOC/OP



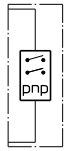
with visual-electrical indicator OE



with electronical sensor VS1



with electronical sensor VS2



7. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’, respectively Δp- curves; depending on filter fineness and viscosity.

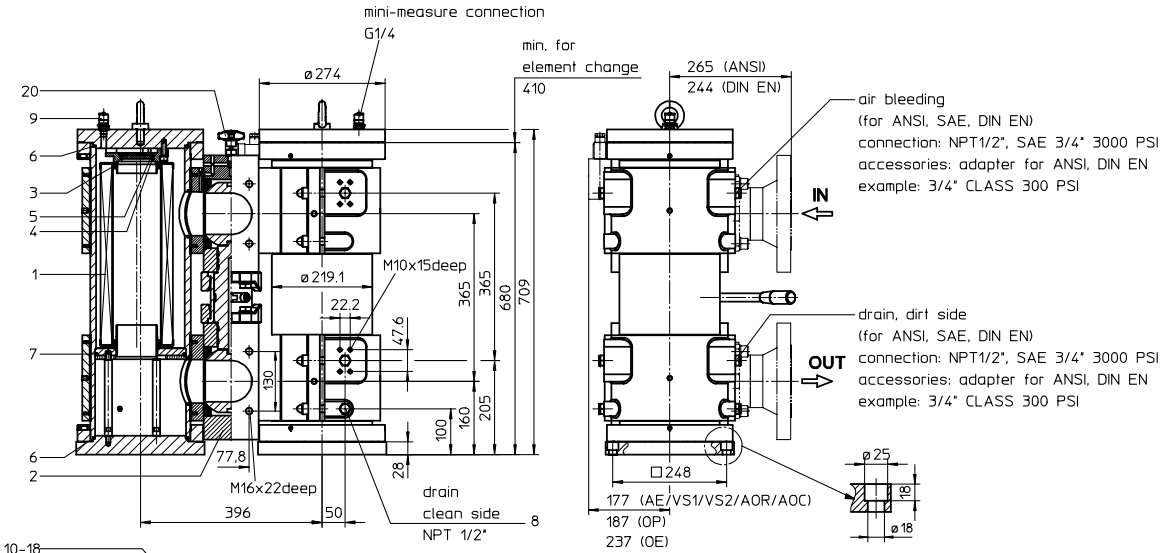
8. Test methods:

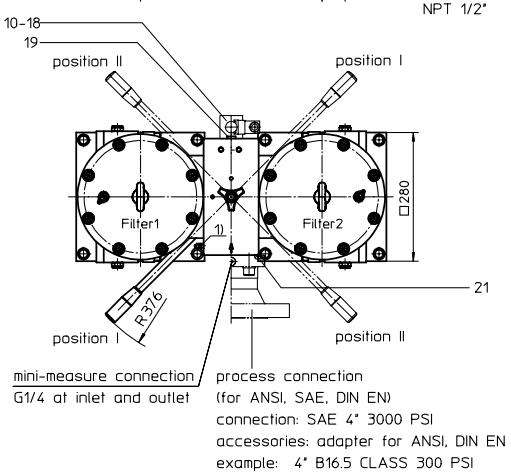
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER, change-over
Series DA 1005 NPS 4“ CLASS 300 PSI

Sheet No. **2186 A**





1) Connection for the potential equalisation at inlet and outlet, only for application in the explosive area.

Position I: Filter 1 in operation
Position II: Filter 2 in operation

1. Type index:

1.1. Complete filter: (ordering example)

DA.	1005.	10VG.	10.	B.	P.	-.	FS.	B.	-.	-.	AE.	AV.	IS21.	F.	F
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

1 **series:**
DA = pressure filter change-over, according to ASME-code

2 **nominal size:** 1005

3 **filter-material and filter- fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm, 10 G = 10 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 API = 20 µm, 10 API = 10 µm Interpor fleece (glass fibre) according to API
25 P = 25 µm, 10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR), V = Viton (FPM)

7 **filter element specification:**
- = standard, VA = stainless steel

8 **process connection:**
FS = SAE-flange connection 3000 PSI
FA1 = ANSI-flange connection CLASS 300 PSI, sealing surface R_z = 160 µm (not finer than 40 µm)
FA2 = ANSI-flange connection CLASS 300 PSI, sealing surface R_z = 16 µm
FD41 = flange connection DIN EN 1092-1, design B1
FD42 = flange connection DIN EN 1092-1, design B2

9 **process connection size:**
B = 4“

10 **filter housing specification:**
- = standard
IS12 = internal parts of change-over armature stainless steel, see sheet-no. 41028

11 **internal valve:**
- = without, S1 = with by-pass valve Δp 3,5 bar

12 **clogging indicator or clogging sensor:**
- = without, OP = visual, see sheet-no. 1628
AOR = visual, see sheet-no. 1606, OE = visual-electrical, see sheet-no. 1628
AOC = visual, see sheet-no. 1606, VS1 = electronical, see sheet-no. 1607
AE = visual-electrical, see sheet-no. 1609, VS2 = electronical, see sheet-no. 1608

13 **shut-off valve:**
- = without, AV = shut-off valve, see sheet-no. 1655

14 **specification pressure vessel:**
- = standard (PED 97/23/EC)
IS20 = ASME VIII Div.1 with ASME equivalent material, see sheet-no. 55217
IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415
IS23 = ASME VIII Div.1 without U-stamp, see sheet-no. 55218

15 **switch lever:**
F = toward IN/OUT, B = opposite IN/OUT

16 **air bleeding/drain:**
F = toward IN/OUT, B = opposite IN/OUT

1.2. Filter element: (ordering example)

01NR.	1000.	10VG.	10.	B.	P.	-
1	2	3	4	5	6	7

1 **series:**
01NL. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 1000

3 - 7 see type index complete filter

weight: approx. 415 kg

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2. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for connection acc. to EN1092-1, see sheet-no. 1657
- adapter for ANSI-connection B16.5 CLASS 300 PSI, see sheet-no. 1658
- drain- and bleeder connection, see sheet-no. 1659

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01NR.1000 ...		
2	1	change over UKK	DN 100		
3	4	O-ring	90 x 4	306941 (NBR)	307031 (FPM)
4	2	O-ring	62 x 4	308045 (NBR)	311472 (FPM)
5	2	circlip	DIN472-75x2,5-ST	311471	
6	4	O-ring	200 x 4	334555 (NBR)	334554 (FPM)
7	2	O-ring	185 x 6	335381 (NBR)	335306 (FPM)
8	12	screw plug	NPT ½	307766	
9	2	mini-measuring connection	MA.1.ST	305453	
10	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
11	1	clogging indicator, visual-electrical	OP	see sheet-no. 1628	
12	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628	
13	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
14	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
15	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
16	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
17	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
18	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
19	2	screw plug	G ¼	305003	
20	1	pressure balance valve	DN 10	305000	
21	2	O-ring (only for execution with ANSI/DIN-flange)	110,72 x 3,53	316355 (NBR)	316356 (FPM)

item 19 execution only with clogging indicator or clogging sensor

4. Description:

Pressure filters, change-over series DA 1005 are suitable for operating pressure up to 40 bar.
Pressure peaks can be absorbed with a sufficient margin o safety.
Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outs ide to the inside.
These filters can be installed as suction filters.
For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fibre element remove the cover and take out the element.
Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

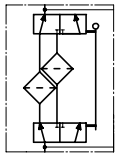
5. Technical data:

temperature ranges	
- calculation temperature (pressure vessel):	- 10°C to +100°C
- medium temperature:	- 10°C to +80°C
- ambient temperature:	- 40°C to +60°C
- survival temperature:	- 40°C to +100°C (short-time)
operating medium:	mineral oil, other media on request
max. operating pressure:	40 bar
test pressure acc. to PED 97/23/EC:	1,43 x operating pressure = 57 bar
test pressure acc. to ASME VIII Div. 1:	1,3 x operating pressure = 52 bar
test pressure acc. to API 614, Chapter 1:	1,5 x operating pressure = 60 bar
connection system:	SAE-flange connection 3000 PSI
housing material:	steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
bleeder connection :	NPT ½“ and SAE ¾“ 3000 PSI
drain connection dirt side :	NPT ½“ and SAE ¾“ 3000 PSI
drain connection clean side :	NPT ½“
volume tank :	2x 19 l
operating pressure adapter flanges:	according to B16.5 CLASS 300 PSI / DIN EN 1092-1

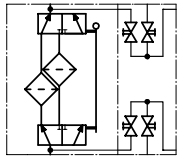
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

6. Symbols:

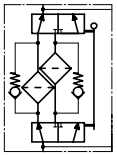
without indicator



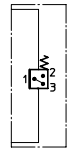
with shut-off valve



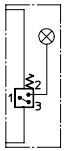
with by-pass valve



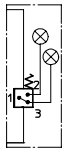
with electrical indicator
AE 30 and AE 40



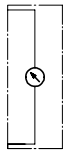
with visual-electrical indicator
AE 50 and AE 62



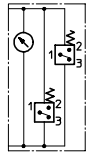
with visual-electrical indicator
AE 70 and AE 80



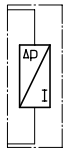
with visual indicator
AOR/AOC/OP



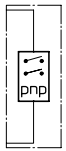
with visual-electrical indicator
OE



with electronical sensor
VS1



with electronical sensor
VS2



7. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’, respectively Δp- curves; depending on filter fin eness and viscosity.

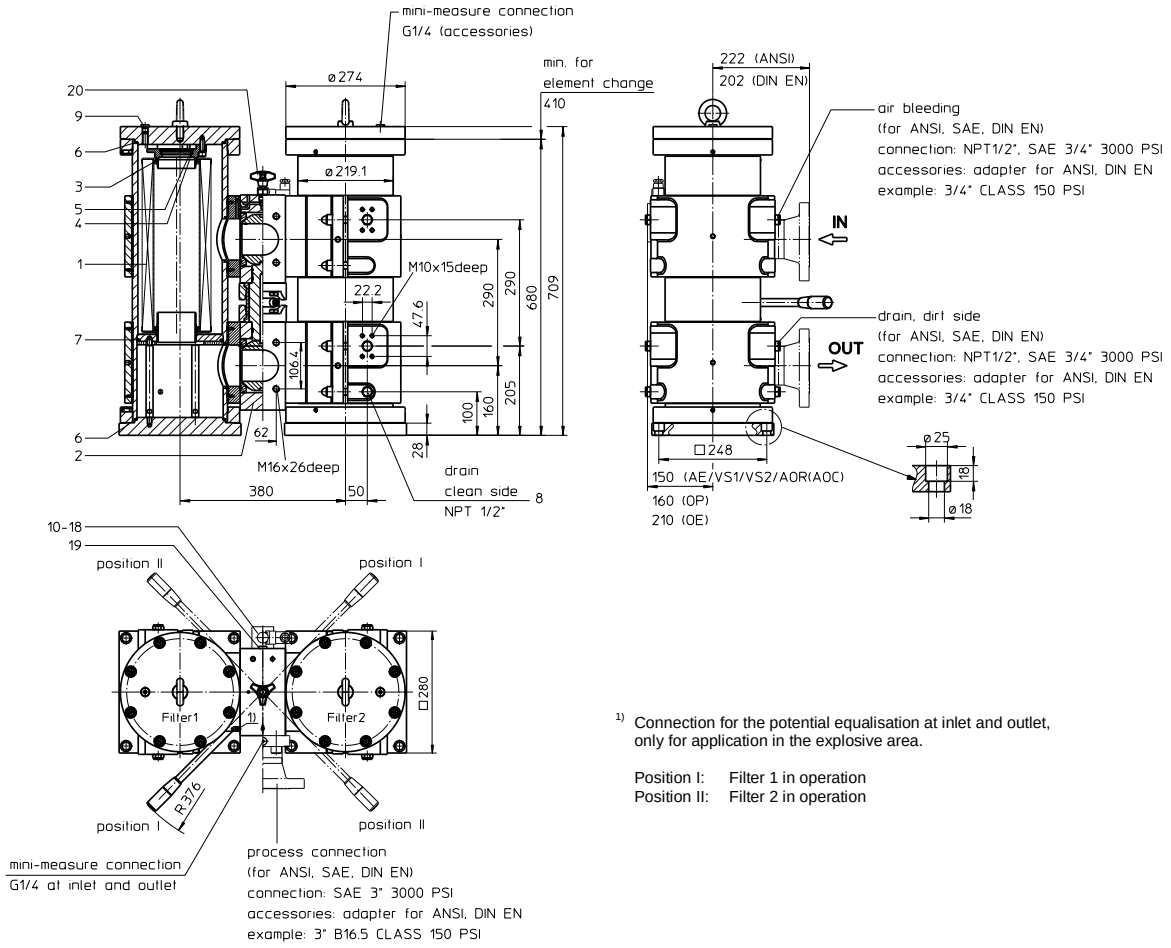
8. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration perfo rmance

PRESSURE FILTER, change-over
Series DA 1014 NPS 3“ CLASS 150 PSI

Sheet No. **2180 B**



1) Connection for the potential equalisation at inlet and outlet, only for application in the explosive area.

Position I: Filter 1 in operation
Position II: Filter 2 in operation

1. Type index:

1.1. Complete filter: (ordering example)

DA.	1014.	10VG.	10.	B.	P.	-.	FS.	A.	-.	-.	AE.	AV.	IS21.	F.	F
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

1 series:
DA = pressure filter change-over, according to ASME-code

2 nominal size: 1014

3 filter-material and filter- fineness:
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm, 10 G = 10 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 API = 20 µm, 10 API = 10 µm Interpor fleece (glass fibre) according to API
10 P = 10 µm paper

4 resistance of pressure difference for filter element:
10 = Δp 10 bar

5 filter element design:
B = both sides open

6 sealing material:
P = Nitrile (NBR), V = Viton (FPM)

7 filter element specification:
- = standard, VA = stainless steel

8 process connection:
FS = SAE-flange connection 3000 PSI
FA11 = ANSI-flange connection CLASS 150 PSI, sealing surface R_z = 160 µm (not finer than 40 µm)
FA12 = ANSI-flange connection CLASS 150 PSI, sealing surface R_z = 16 µm
FD1 = flange connection DIN EN 1092-1, design B1
FD2 = flange connection DIN EN 1092-1, design B2

9 process connection size:
A = 3“

10 filter housing specification:
- = standard
IS12 = internal parts of change-over armature stainless steel, see sheet-no. 41028

11 internal valve:
- = without, S1 = with by-pass valve Δp 3,5 bar

12 clogging indicator or clogging sensor:
- = without, OP = visual, see sheet-no. 1628
AOR = visual, see sheet-no. 1606, OE = visual-electrical, see sheet-no. 1628
AOC = visual, see sheet-no. 1606, VS1 = electronical, see sheet-no. 1607
AE = visual-electrical, see sheet-no. 1609, VS2 = electronical, see sheet-no. 1608

13 shut-off valve:
- = without, AV = shut-off valve, see sheet-no. 1655

14 specification pressure vessel:
- = standard (PED 97/23/EC)
IS20 = ASME VIII Div.1 with ASME equivalent material, see sheet-no. 55217
IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415
IS23 = ASME VIII Div.1 without U-stamp, see sheet-no. 55218

15 switch lever:
F = toward IN/OUT, B = opposite IN/OUT

16 air bleeding/drain:
F = toward IN/OUT, B = opposite IN/OUT

1.2. Filter element: (ordering example)

01NR.	1000.	10VG.	10.	B.	P.	-
1	2	3	4	5	6	7

1 series:
01NR = standard-return-line filter element according to DIN 24550, T4

2 nominal size: 1000

3 - **7** see type index complete filter

weight: approx. 370 kg

Changes of measures and design are subject to alteration!

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fax +49 - (0)6205 - 2094-40 url www.internormen.com

2. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for connection acc. to EN1092-1, see sheet-no. 1657
- adapter for ANSI-connection B16.5 CLASS 150 PSI, see sheet-no. 1658
- measure- and bleeder-connections, see sheet-no. 1650
- drain- and bleeder connection, see sheet-no. 1659

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01NR.1000 ...		
2	1	change over UKK	DN 80		
3	4	O-ring	90 x 4	306941 (NBR)	307031 (FPM)
4	2	O-ring	62 x 4	308045 (NBR)	311472 (FPM)
5	2	circlip	DIN472-75x2,5-ST	311471	
6	4	O-ring	200 x 4	334555 (NBR)	334554 (FPM)
7	2	O-ring	185 x 6	335381 (NBR)	335306 (FPM)
8	12	screw plug	NPT ½	307766	
9	2	screw plug	G ¼	305003	
10	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
11	1	clogging indicator, visual-electrical	OP	see sheet-no. 1628	
12	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628	
13	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
14	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
15	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
16	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
17	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
18	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
19	2	screw plug	G ¼	305003	
20	1	pressure balance valve	DN 10	305000	

item 19 execution only with clogging indicator or clogging sensor

4. Description:

Pressure filters, change-over series DA 1014 are suitable for operating pressure up to 40 bar.
Pressure peaks can be absorbed with a sufficient margin o safety.
Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.
These filters can be installed as suction filters.
For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fibre element remove the cover and take out the element.
Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

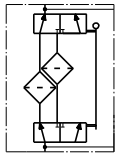
5. Technical data:

temperature ranges	
- calculation temperature (pressure vessel):	- 10°C to +100°C
- medium temperature:	- 10°C to +80°C
- ambient temperature:	- 40°C to +60°C
- survival temperature:	- 40°C to +100°C (short-time)
operating medium:	mineral oil, other media on request
max. operating pressure housing:	40 bar
test pressure acc. to PED 97/23/EC:	1,43 x operating pressure = 57 bar
test pressure acc. to ASME VIII Div. 1:	1,3 x operating pressure = 52 bar
test pressure acc. to API 614, Chapter 1:	1,5 x operating pressure = 60 bar
connection system:	SAE-flange connection 3000 PSI
housing material:	steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
bleeder connection :	NPT ½“ and SAE ¾“ 3000 PSI
drain connection dirt side :	NPT ½“ and SAE ¾“ 3000 PSI
drain connection clean side :	NPT ½“
volume tank :	2x 19 l
operating pressure adapter flanges:	according to B16.5 CLASS 150 PSI / DIN EN 1092-1

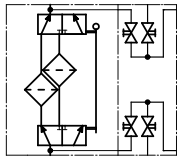
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

6. Symbols:

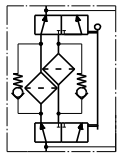
without indicator



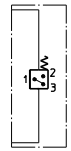
with shut-off valve



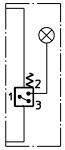
with by-pass valve



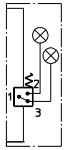
with electrical indicator
AE 30 and AE 40



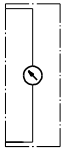
with visual-electrical indicator
AE 50 and AE 62



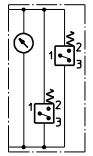
with visual-electrical indicator
AE 70 and AE 80



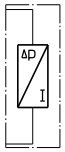
with visual indicator
AOR/AOC/OP



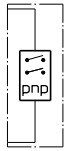
with visual-electrical indicator
OE



with electronical sensor
VS1



with electronical sensor
VS2



7. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’, respectively Δp- curves; depending on filter fineness and viscosity.

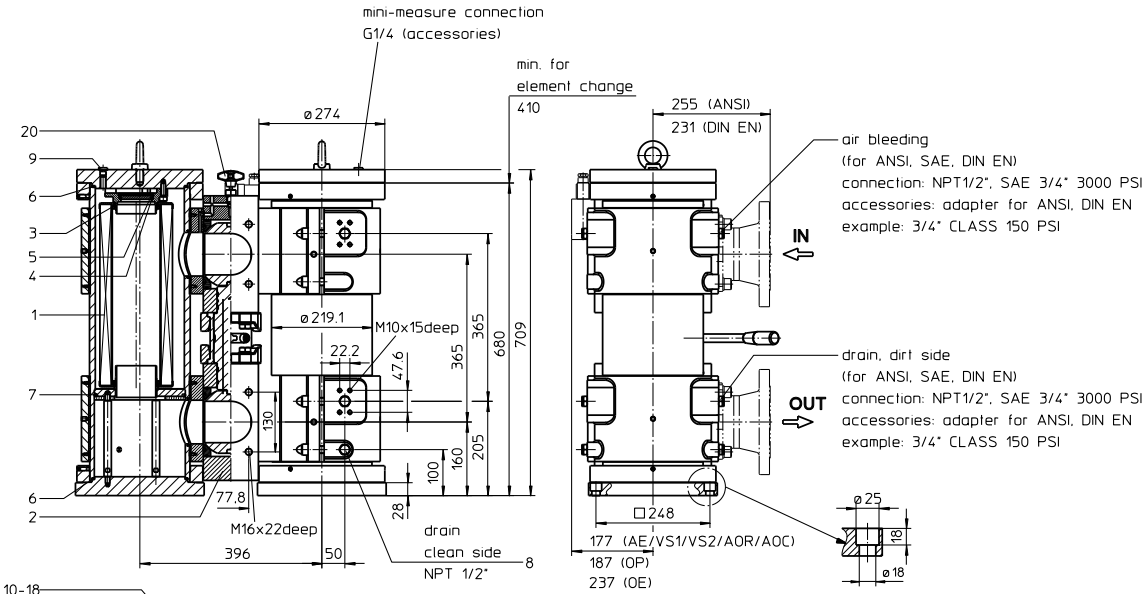
8. Test methods:

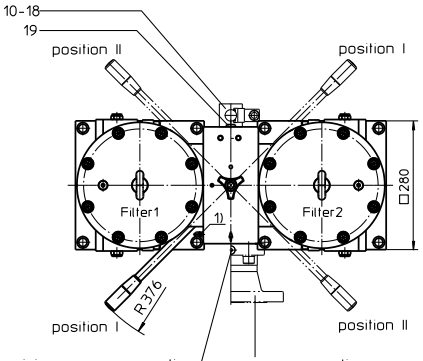
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER, change-over
Series DA 1015 NPS 4“ CLASS 150 PSI

Sheet No. **2181 B**





1) Connection for the potential equalisation at inlet and outlet, only for application in the explosive area.

Position I: Filter 1 in operation
Position II: Filter 2 in operation

1. Type index:

1.1. Complete filter: (ordering example)

DA.	1015.	10VG.	10.	B.	P.	-.	FS.	B.	-.	-.	AE.	AV.	IS21.	F.	F
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

1 **series:**
DA = pressure filter change-over, according to ASME-code

2 **nominal size:** 1015

3 **filter-material and filter- fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm, 10 G = 10 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 API = 20 µm, 10 API = 10 µm Interpor fleece (glass fibre) according to API
10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR), V = Viton (FPM)

7 **filter element specification:**
- = standard, VA = stainless steel

8 **process connection:**
FS = SAE-flange connection 3000 PSI
FA11 = ANSI-flange connection CLASS 150 PSI, sealing surface R_z = 160 µm (not finer than 40 µm)
FA12 = ANSI-flange connection CLASS 150 PSI, sealing surface R_z = 16 µm
FD1 = flange connection DIN EN 1092-1, design B1
FD2 = flange connection DIN EN 1092-1, design B2

9 **process connection size:**
B = 4“

10 **filter housing specification:**
- = standard
IS12 = internal parts of change-over armature stainless steel, see sheet-no. 41028

11 **internal valve:**
- = without, S1 = with by-pass valve Δp 3,5 bar

12 **clogging indicator or clogging sensor:**
- = without, OP = visual, see sheet-no. 1628
AOR = visual, see sheet-no. 1606, OE = visual-electrical, see sheet-no. 1628
AOC = visual, see sheet-no. 1606, VS1 = electronical, see sheet-no. 1607
AE = visual-electrical, see sheet-no. 1609, VS2 = electronical, see sheet-no. 1608

13 **shut-off valve:**
- = without, AV = shut-off valve, see sheet-no. 1655

14 **specification pressure vessel:**
- = standard (PED 97/23/EC)
IS20 = ASME VIII Div.1 with ASME equivalent material, see sheet-no. 55217
IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415
IS23 = ASME VIII Div.1 without U-stamp, see sheet-no. 55218

15 **switch lever:**
F = toward IN/OUT, B = opposite IN/OUT

16 **air bleeding/drain:**
F = toward IN/OUT, B = opposite IN/OUT

1.2. Filter element: (ordering example)

01NR.	1000.	10VG.	10.	B.	P.	-
1	2	3	4	5	6	7

1 **series:**
01NR = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 1000

3 - 7 see type index complete filter

weight: approx. 415 kg

Changes of measures and design are subject to alteration!

internormen technology
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phone +49 - (0)6205 - 2094-0 e-mail sales@internormen.com
fax +49 - (0)6205 - 2094-40 url www.internormen.com

2. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for connection acc. to EN1092-1, see sheet-no. 1657
- adapter for ANSI-connection B16.5 CLASS 150 PSI, see sheet-no. 1658
- measure- and bleeder-connections, see sheet-no. 1650
- drain- and bleeder connection, see sheet-no. 1659

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01NR.1000 ...		
2	1	change over UKK	DN 100		
3	4	O-ring	90 x 4	306941 (NBR)	307031 (FPM)
4	2	O-ring	62 x 4	308045 (NBR)	311472 (FPM)
5	2	circlip	DIN472-75x2,5-ST	311471	
6	4	O-ring	200 x 4	334555 (NBR)	334554 (FPM)
7	2	O-ring	185 x 6	335381 (NBR)	335306 (FPM)
8	12	screw plug	NPT ½	307766	
9	2	screw plug	G ¼	305003	
10	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
11	1	clogging indicator, visual-electrical	OP	see sheet-no. 1628	
12	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628	
13	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
14	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
15	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
16	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
17	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
18	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
19	2	screw plug	G ¼	305003	
20	1	pressure balance valve	DN 10	305000	

item 19 execution only with clogging indicator or clogging sensor

4. Description:

Pressure filters, change-over series DA 1015 are suitable for operating pressure up to 40 bar.
Pressure peaks can be absorbed with a sufficient margin o safety.
Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.
These filters can be installed as suction filters.
For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fibre element remove the cover and take out the element.
Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

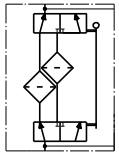
5. Technical data:

temperature ranges	
- calculation temperature (pressure vessel):	- 10°C to +100°C
- medium temperature:	- 10°C to +80°C
- ambient temperature:	- 40°C to +60°C
- survival temperature:	- 40°C to +100°C (short-time)
operating medium:	mineral oil, other media on request
max. operating pressure housing:	40 bar
test pressure acc. to PED 97/23/EC:	1,43 x operating pressure = 57 bar
test pressure acc. to ASME VIII Div. 1:	1,3 x operating pressure = 52 bar
test pressure acc. to API 614, Chapter 1:	1,5 x operating pressure = 60 bar
connection system:	SAE-flange connection 3000 PSI
housing material:	steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
bleeder connection :	NPT ½“ and SAE ¾“ 3000 PSI
drain connection dirt side :	NPT ½“ and SAE ¾“ 3000 PSI
drain connection clean side :	NPT ½“
volume tank :	2x 19 l
operating pressure adapter flanges:	according to B16.5 CLASS 150 PSI / DIN EN 1092-1

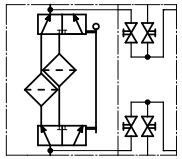
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

6. Symbols:

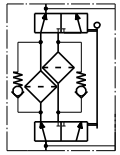
without indicator



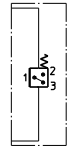
with shut-off valve



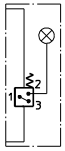
with by-pass valve



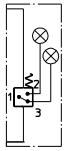
with electrical indicator
AE 30 and AE 40



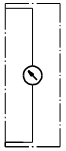
with visual-electrical indicator
AE 50 and AE 62



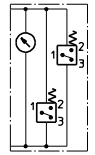
with visual-electrical indicator
AE 70 and AE 80



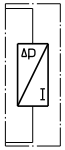
with visual indicator
AOR/AOC/OP



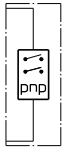
with visual-electrical indicator
OE



with electronical sensor
VS1



with electronical sensor
VS2



7. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’, respectively Δp- curves; depending on filter fineness and viscosity.

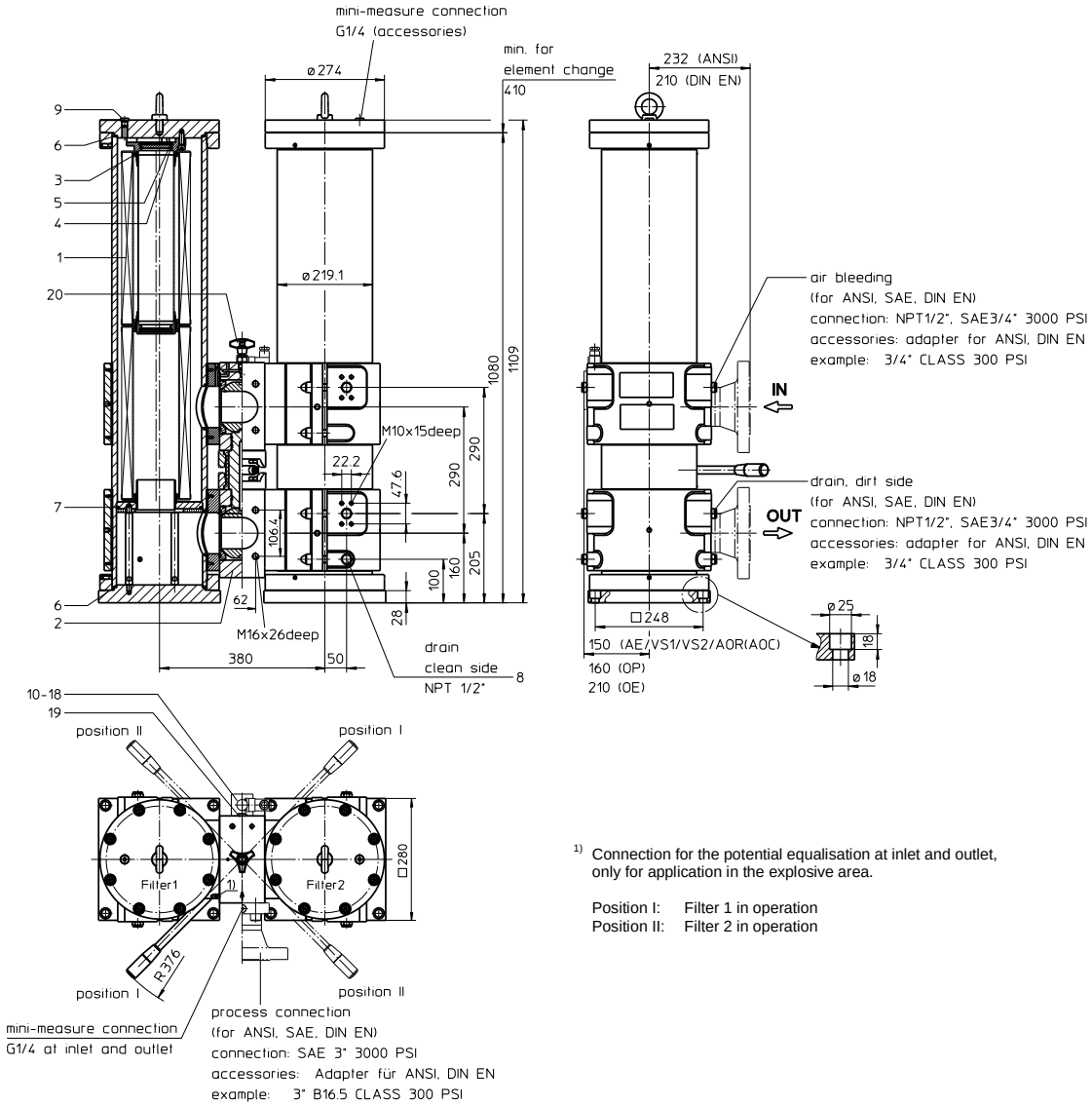
8. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER, change-over
Series DA 2204 NPS 3“ CLASS 300 PSI

Sheet No. **2188 B**



1) Connection for the potential equalisation at inlet and outlet, only for application in the explosive area.

Position I: Filter 1 in operation
Position II: Filter 2 in operation

1. Type index:

1.1. Complete filter: (ordering example)

DA.	2204.	10VG.	10.	B.	P.	-.	FS.	A.	-.	-.	AE.	AV.	IS21.	F.	F
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

1 **series:**
DA = pressure filter change-over, according to ASME-code

2 **nominal size:** 2204

3 **filter-material and filter- fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm, 10 G = 10 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 API = 20 µm, 10 API = 10 µm Interpor fleece (glass fibre) according to API
10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR), V = Viton (FPM)

7 **filter element specification:**
- = standard, VA = stainless steel

8 **process connection:**
FS = SAE-flange connection 3000 PSI
FA1 = ANSI-flange connection CLASS 300 PSI, sealing surface R_z = 160 µm (not finer than 40 µm)
FA2 = ANSI-flange connection CLASS 300 PSI, sealing surface R_z = 16 µm
FD41 = flange connection DIN EN 1092-1, design B1
FD42 = flange connection DIN EN 1092-1, design B2

9 **process connection size:**
A = 3“

10 **filter housing specification:**
- = standard
IS12 = internal parts of change-over armature stainless steel, see sheet-no. 41028

11 **internal valve:**
- = without, S1 = with by-pass valve Δp 3,5 bar

12 **clogging indicator or clogging sensor:**
- = without, OP = visual, see sheet-no. 1628
AOR = visual, see sheet-no. 1606, OE = visual-electrical, see sheet-no. 1628
AOC = visual, see sheet-no. 1606, VS1 = electronical, see sheet-no. 1607
AE = visual-electrical, see sheet-no. 1609, VS2 = electronical, see sheet-no. 1608

13 **shut-off valve:**
- = without, AV = shut-off valve, see sheet-no. 1655

14 **specification pressure vessel:**
- = standard (PED 97/23/EC)
IS20 = ASME VIII Div.1 with ASME equivalent material, see sheet-no. 55217
IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415
IS23 = ASME VIII Div.1 without U-stamp, see sheet-no. 55218

15 **switch lever:**
F = toward IN/OUT, B = opposite IN/OUT

16 **air bleeding/drain:**
F = toward IN/OUT, B = opposite IN/OUT

1.2. Filter element: (ordering example)

01NR.	1000.	10VG.	10.	B.	P.	-
1	2	3	4	5	6	7

1 **series:**
01NR = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 1000

3 - 7 see type index complete filter

weight: approx. 490 kg

Changes of measures and design are subject to alteration!

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2. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for connection acc. to EN1092-1, see sheet-no. 1657
- adapter for ANSI-connection B16.5 CLASS 300 PSI, see sheet-no. 1658
- measure- and bleeder-connections, see sheet-no. 1650
- drain- and bleeder connection, see sheet-no. 1659

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	4	filter element	01NR.1000 ...		
2	1	change over UKK	DN 80		
3	8	O-ring	90 x 4	306941 (NBR)	307031 (FPM)
4	2	O-ring	62 x 4	308045 (NBR)	311472 (FPM)
5	2	circlip	DIN472-75x2,5-ST	311471	
6	4	O-ring	200 x 4	334555 (NBR)	334554 (FPM)
7	2	O-ring	185 x 6	335381 (NBR)	335306 (FPM)
8	12	screw plug	NPT ½	307766	
9	2	screw plug	G ¼	305003	
10	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
11	1	clogging indicator, visual-electrical	OP	see sheet-no. 1628	
12	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628	
13	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
14	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
15	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
16	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
17	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
18	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
19	2	screw plug	G ¼	305003	
20	1	pressure balance valve	DN 10	305000	

item 19 execution only with clogging indicator or clogging sensor

4. Description:

Pressure filters, change-over series DA 2204 are suitable for operating pressure up to 40 bar.
Pressure peaks can be absorbed with a sufficient margin o safety.
Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.
These filters can be installed as suction filters.
For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fibre element remove the cover and take out the element.
Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

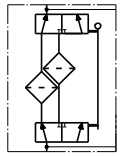
5. Technical data:

temperature ranges	
- calculation temperature (pressure vessel):	- 10°C to +100°C
- medium temperature:	- 10°C to +80°C
- ambient temperature:	- 40°C to +60°C
- survival temperature:	- 40°C to +100°C (short-time)
operating medium:	mineral oil, other media on request
max. operating pressure housing:	40 bar
test pressure acc. to PED 97/23/EC:	1,43 x operating pressure = 57 bar
test pressure acc. to ASME VIII Div. 1:	1,3 x operating pressure = 52 bar
test pressure acc. to API 614, Chapter 1:	1,5 x operating pressure = 60 bar
connection system:	SAE-flange connection 3000 PSI
housing material:	steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
bleeder connection :	NPT ½“ and SAE ¾“ 3000 PSI
drain connection dirt side :	NPT ½“ and SAE ¾“ 3000 PSI
drain connection clean side :	NPT ½“
volume tank :	2x 30 l
operating pressure adapter flanges:	according to B16.5 CLASS 300 PSI / DIN EN 1092-1

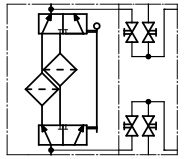
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

6. Symbols:

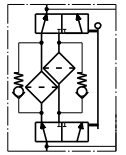
without indicator



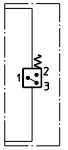
with shut-off valve



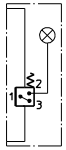
with by-pass valve



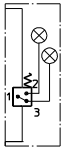
with electrical indicator AE 30 and AE 40



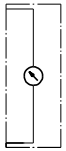
with visual-electrical indicator AE 50 and AE 62



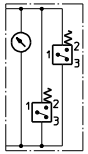
with visual-electrical indicator AE 70 and AE 80



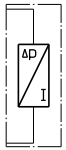
with visual indicator AOR/AOC/OP



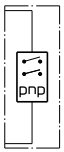
with visual-electrical indicator OE



with electronical sensor VS1



with electronical sensor VS2



7. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’, respectively Δp- curves; depending on filter fineness and viscosity.

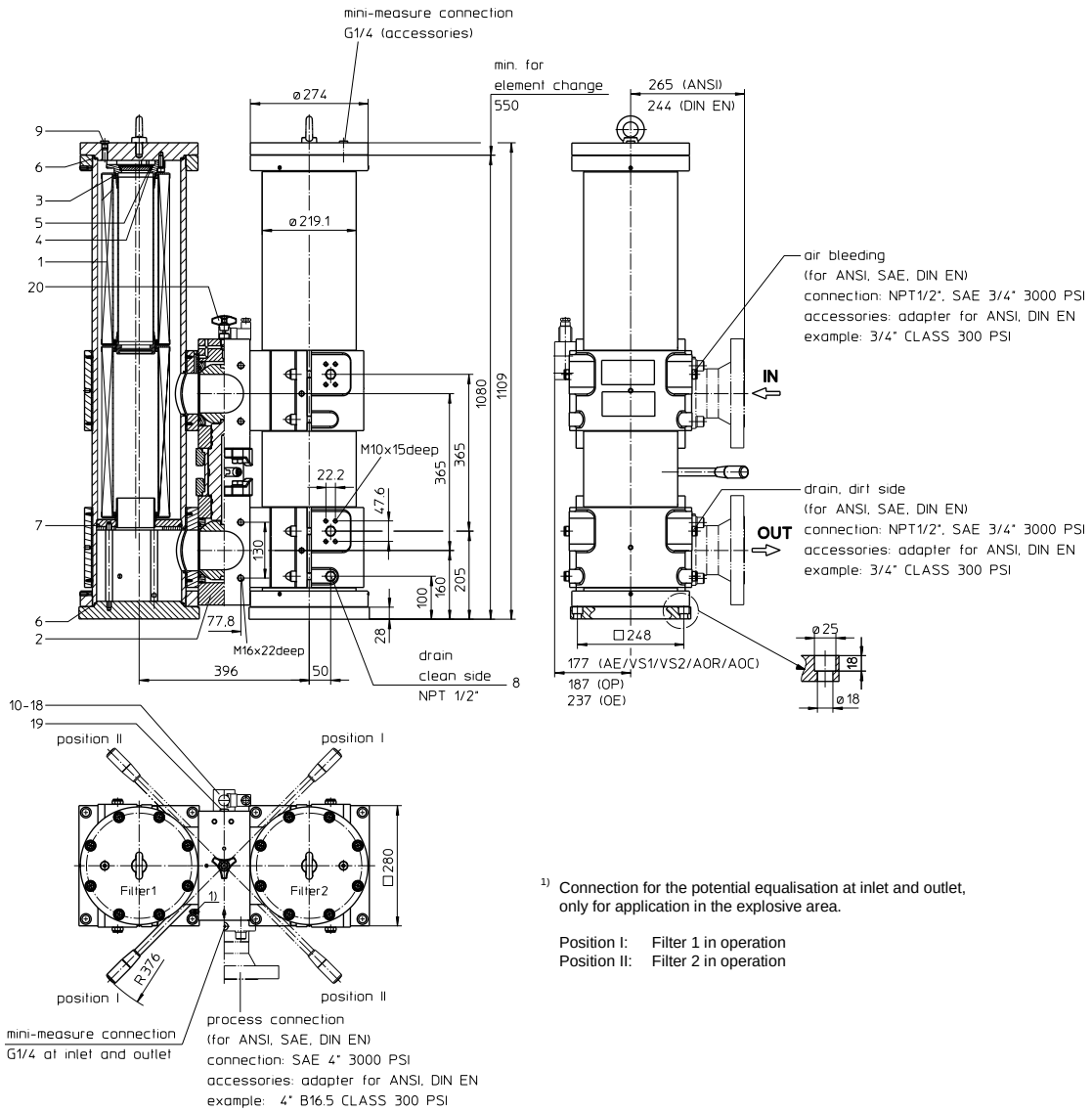
8. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER, change-over
Series DA 2205 NPS 4“ CLASS 300 PSI

Sheet No. **2187 B**



1) Connection for the potential equalisation at inlet and outlet, only for application in the explosive area.

Position I: Filter 1 in operation
Position II: Filter 2 in operation

1. Type index:

1.1. Complete filter: (ordering example)

DA.	2205.	10VG.	10.	B.	P.	-.	FS.	B.	-.	-.	AE.	AV.	IS21.	F.	F
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

1 **series:**
DA = pressure filter change-over, according to ASME-code

2 **nominal size:** 2205

3 **filter-material and filter- fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm, 10 G = 10 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 API = 20 µm, 10 API = 10 µm Interpor fleece (glass fibre) according to API
10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR), V = Viton (FPM)

7 **filter element specification:**
- = standard, VA = stainless steel

8 **process connection:**
FS = SAE-flange connection 3000 PSI
FA1 = ANSI-flange connection CLASS 300 PSI, sealing surface R_z = 160 µm (not finer than 40 µm)
FA2 = ANSI-flange connection CLASS 300 PSI, sealing surface R_z = 16 µm
FD41 = flange connection DIN EN 1092-1, design B1
FD42 = flange connection DIN EN 1092-1, design B2

9 **process connection size:**
B = 4“

10 **filter housing specification:**
- = standard
IS12 = internal parts of change-over armature stainless steel, see sheet-no. 41028

11 **internal valve:**
- = without, S1 = with by-pass valve Δp 3,5 bar

12 **clogging indicator or clogging sensor:**
- = without, OP = visual, see sheet-no. 1628
AOR = visual, see sheet-no. 1606, OE = visual-electrical, see sheet-no. 1628
AOC = visual, see sheet-no. 1606, VS1 = electronical, see sheet-no. 1607
AE = visual-electrical, see sheet-no. 1609, VS2 = electronical, see sheet-no. 1608

13 **shut-off valve:**
- = without, AV = shut-off valve, see sheet-no. 1655

14 **specification pressure vessel:**
- = standard (PED 97/23/EC)
IS20 = ASME VIII Div.1 with ASME equivalent material, see sheet-no. 55217
IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415
IS23 = ASME VIII Div.1 without U-stamp, see sheet-no. 55218

15 **switch lever:**
F = toward IN/OUT, B = opposite IN/OUT

16 **air bleeding/drain:**
F = toward IN/OUT, B = opposite IN/OUT

1.2. Filter element: (ordering example)

01NR.	1000.	10VG.	10.	B.	P.	-
1	2	3	4	5	6	7

1 **series:**
01NR = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 1000

3 - 7 see type index complete filter

weight: approx. 500 kg

Changes of measures and design are subject to alteration!

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2. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for connection acc. to EN1092-1, see sheet-no. 1657
- adapter for ANSI-connection B16.5 CLASS 300 PSI, see sheet-no. 1658
- measure- and bleeder-connections, see sheet-no. 1650
- drain- and bleeder connection, see sheet-no. 1659

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	4	filter element	01NR.1000 ...		
2	1	change over UKK	DN 100		
3	8	O-ring	90 x 4	306941 (NBR)	307031 (FPM)
4	2	O-ring	62 x 4	308045 (NBR)	311472 (FPM)
5	2	circlip	DIN472-75x2,5-ST	311471	
6	4	O-ring	200 x 4	334555 (NBR)	334554 (FPM)
7	2	O-ring	185 x 6	335381 (NBR)	335306 (FPM)
8	12	screw plug	NPT ½	307766	
9	2	screw plug	G ¼	305003	
10	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
11	1	clogging indicator, visual-electrical	OP	see sheet-no. 1628	
12	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628	
13	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
14	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
15	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
16	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
17	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
18	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
19	2	screw plug	G ¼	305003	
20	1	pressure balance valve	DN 10	305000	

item 19 execution only with clogging indicator or clogging sensor

4. Description:

Pressure filters, change-over series DA 2205 are suitable for operating pressure up to 40 bar.
Pressure peaks can be absorbed with a sufficient margin o safety.
Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.
These filters can be installed as suction filters.
For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fibre element remove the cover and take out the element.
Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

5. Technical data:

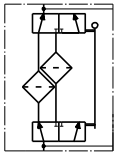
temperature ranges

- calculation temperature (pressure vessel):	- 10°C to +100°C
- medium temperature:	- 10°C to +80°C
- ambient temperature:	- 40°C to +60°C
- survival temperature:	- 40°C to +100°C (short-time)
operating medium:	mineral oil, other media on request
max. operating pressure housing:	40 bar
test pressure acc. to PED 97/23/EC:	1,43 x operating pressure = 57 bar
test pressure acc. to ASME VIII Div. 1:	1,3 x operating pressure = 52 bar
test pressure acc. to API 614, Chapter 1:	1,5 x operating pressure = 60 bar
connection system:	SAE-flange connection 3000 PSI
housing material:	steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
bleeder connection :	NPT ½“ and SAE ¾“ 3000 PSI
drain connection dirt side :	NPT ½“ and SAE ¾“ 3000 PSI
drain connection clean side :	NPT ½“
volume tank :	2x 30 l
operating pressure adapter flanges:	according to B16.5 CLASS 300 PSI / DIN EN 1092-1

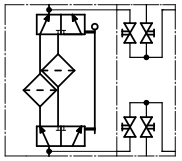
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

6. Symbols:

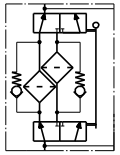
without indicator



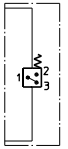
with shut-off valve



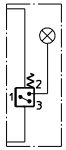
with by-pass valve



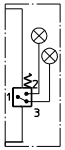
with electrical indicator
AE 30 and AE 40



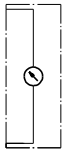
with visual-electrical indicator
AE 50 and AE 62



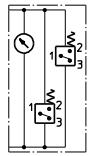
with visual-electrical indicator
AE 70 and AE 80



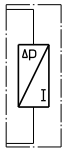
with visual indicator
AOR/AOC/OP



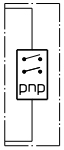
with visual-electrical indicator
OE



with electronical sensor
VS1



with electronical sensor
VS2



7. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’, respectively Δp- curves; depending on filter fineness and viscosity.

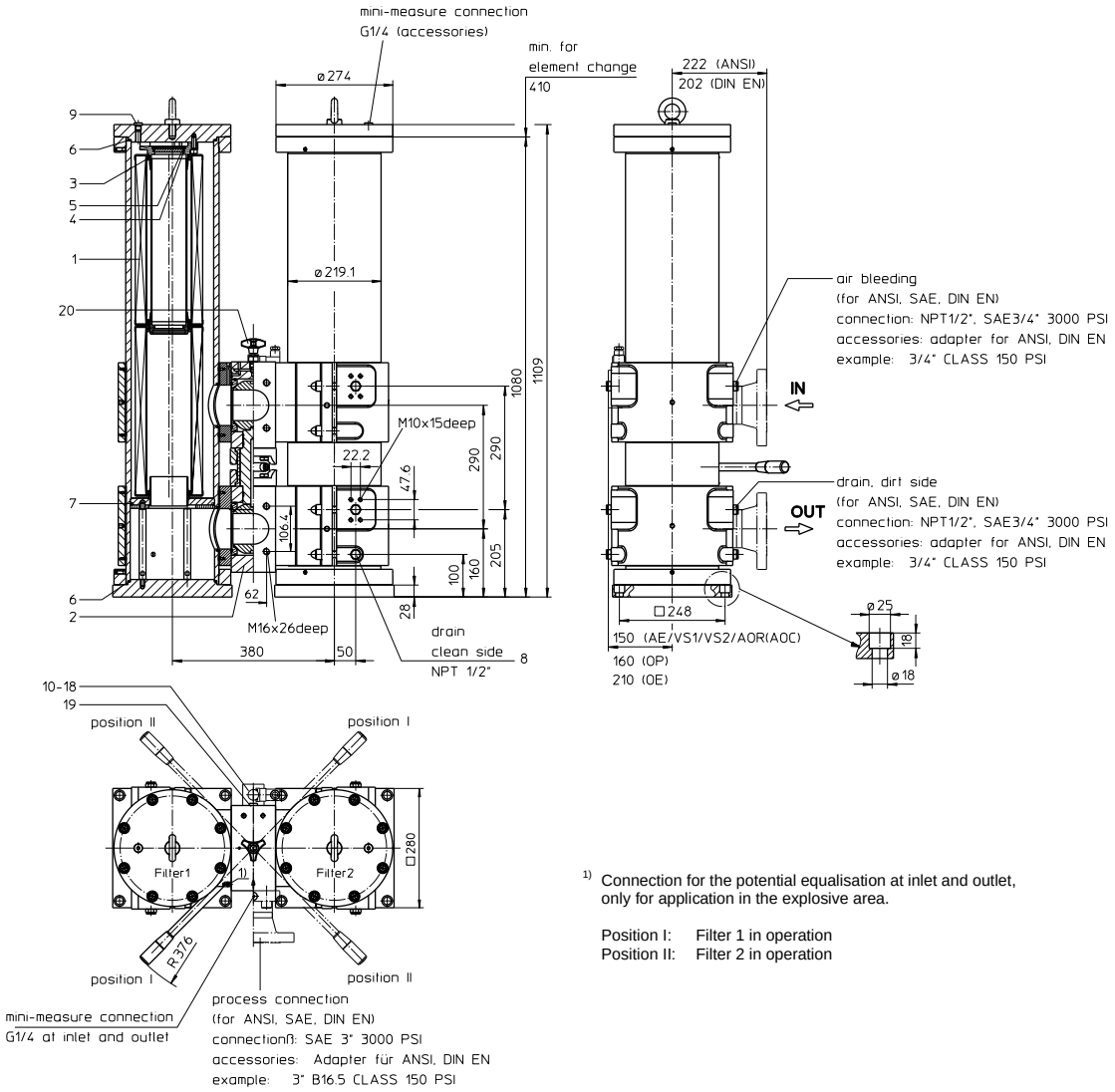
8. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER, change-over
Series DA 2214 NPS 3“ CLASS 150 PSI

Sheet No. **2183 B**



1) Connection for the potential equalisation at inlet and outlet, only for application in the explosive area.

Position I: Filter 1 in operation
Position II: Filter 2 in operation

1. Type index:

1.1. Complete filter: (ordering example)

DA.	2214.	10VG.	10.	B.	P.	-.	FS.	A.	-.	-.	AE.	AV.	IS21.	F.	F
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

1 **series:**
DA = pressure filter change-over, according to ASME-code

2 **nominal size:** 2214

3 **filter-material and filter- fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm, 10 G = 10 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 API = 20 µm, 10 API = 10 µm Interpor fleece (glass fibre) according to API
10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR), V = Viton (FPM)

7 **filter element specification:**
- = standard, VA = stainless steel

8 **process connection:**
FS = SAE-flange connection 3000 PSI
FA11 = ANSI-flange connection CLASS 150 PSI, sealing surface R_z = 160 µm (not finer than 40 µm)
FA12 = ANSI-flange connection CLASS 150 PSI, sealing surface R_z = 16 µm
FD1 = flange connection DIN EN 1092-1, design B1
FD2 = flange connection DIN EN 1092-1, design B2

9 **process connection size:**
A = 3“

10 **filter housing specification:**
- = standard
IS12 = internal parts of change-over armature stainless steel, see sheet-no. 41028

11 **internal valve:**
- = without, S1 = with by-pass valve Δp 3,5 bar

12 **clogging indicator or clogging sensor:**
- = without, OP = visual, see sheet-no. 1628
AOR = visual, see sheet-no. 1606, OE = visual-electrical, see sheet-no. 1628
AOC = visual, see sheet-no. 1606, VS1 = electronical, see sheet-no. 1607
AE = visual-electrical, see sheet-no. 1609, VS2 = electronical, see sheet-no. 1608

13 **shut-off valve:**
- = without, AV = shut-off valve, see sheet-no. 1655

14 **specification pressure vessel:**
- = standard (PED 97/23/EC)
IS20 = ASME VIII Div.1 with ASME equivalent material, see sheet-no. 55217
IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415
IS23 = ASME VIII Div.1 without U-stamp, see sheet-no. 55218

15 **switch lever:**
F = toward IN/OUT, B = opposite IN/OUT

16 **air bleeding/drain:**
F = toward IN/OUT, B = opposite IN/OUT

1.2. Filter element: (ordering example)

01NR.	1000.	10VG.	10.	B.	P.	-
1	2	3	4	5	6	7

1 **series:**
01NR = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 1000

3 - 7 see type index complete filter

weight: approx. 490 kg

Changes of measures and design are subject to alteration!

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2. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for connection acc. to EN1092-1, see sheet-no. 1657
- adapter for ANSI-connection B16.5 CLASS 150 PSI, see sheet-no. 1658
- measure- and bleeder-connections, see sheet-no. 1650
- drain- and bleeder connection, see sheet-no. 1659

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	4	filter element	01NR.1000 ...		
2	1	change over UKK	DN 80		
3	8	O-ring	90 x 4	306941 (NBR)	307031 (FPM)
4	2	O-ring	62 x 4	308045 (NBR)	311472 (FPM)
5	2	circlip	DIN472-75x2,5-ST	311471	
6	4	O-ring	200 x 4	334555 (NBR)	334554 (FPM)
7	2	O-ring	185 x 6	335381 (NBR)	335306 (FPM)
8	12	screw plug	NPT ½	307766	
9	2	screw plug	G ¼	305003	
10	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
11	1	clogging indicator, visual-electrical	OP	see sheet-no. 1628	
12	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628	
13	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
14	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
15	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
16	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
17	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
18	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
19	2	screw plug	G ¼	305003	
20	1	pressure balance valve	DN 10	305000	

item 19 execution only with clogging indicator or clogging sensor

4. Description:

Pressure filters, change-over series DA 2214 are suitable for operating pressure up to 40 bar.
Pressure peaks can be absorbed with a sufficient margin o safety.
Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.
These filters can be installed as suction filters.
For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fibre element remove the cover and take out the element.
Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

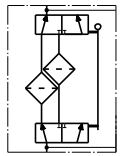
5. Technical data:

temperature ranges	
- calculation temperature (pressure vessel):	- 10°C to +100°C
- medium temperature:	- 10°C to +80°C
- ambient temperature:	- 40°C to +60°C
- survival temperature:	- 40°C to +100°C (short-time)
operating medium:	mineral oil, other media on request
max. operating pressure housing:	40 bar
test pressure acc. to PED 97/23/EC:	1,43 x operating pressure = 57 bar
test pressure acc. to ASME VIII Div. 1:	1,3 x operating pressure = 52 bar
test pressure acc. to API 614, Chapter 1:	1,5 x operating pressure = 60 bar
connection system:	SAE-flange connection 3000 PSI
housing material:	steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
bleeder connection :	NPT ½“ and SAE ¾“ 3000 PSI
drain connection dirt side :	NPT ½“ and SAE ¾“ 3000 PSI
drain connection clean side :	NPT ½“
volume tank :	2x 30 l
operating pressure adapter flanges:	according to B16.5 CLASS 150 PSI / DIN EN 1092-1

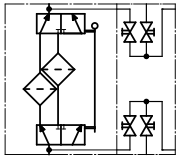
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

6. Symbols:

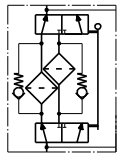
without indicator



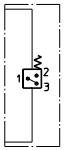
with shut-off valve



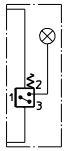
with by-pass valve



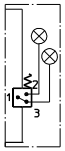
with electrical indicator
AE 30 and AE 40



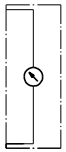
with visual-electrical indicator
AE 50 and AE 62



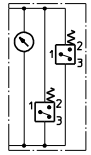
with visual-electrical indicator
AE 70 and AE 80



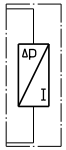
with visual indicator
AOR/AOC/OP



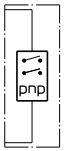
with visual-electrical indicator
OE



with electronical sensor
VS1



with electronical sensor
VS2



7. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’, respectively Δp- curves; depending on filter fineness and viscosity.

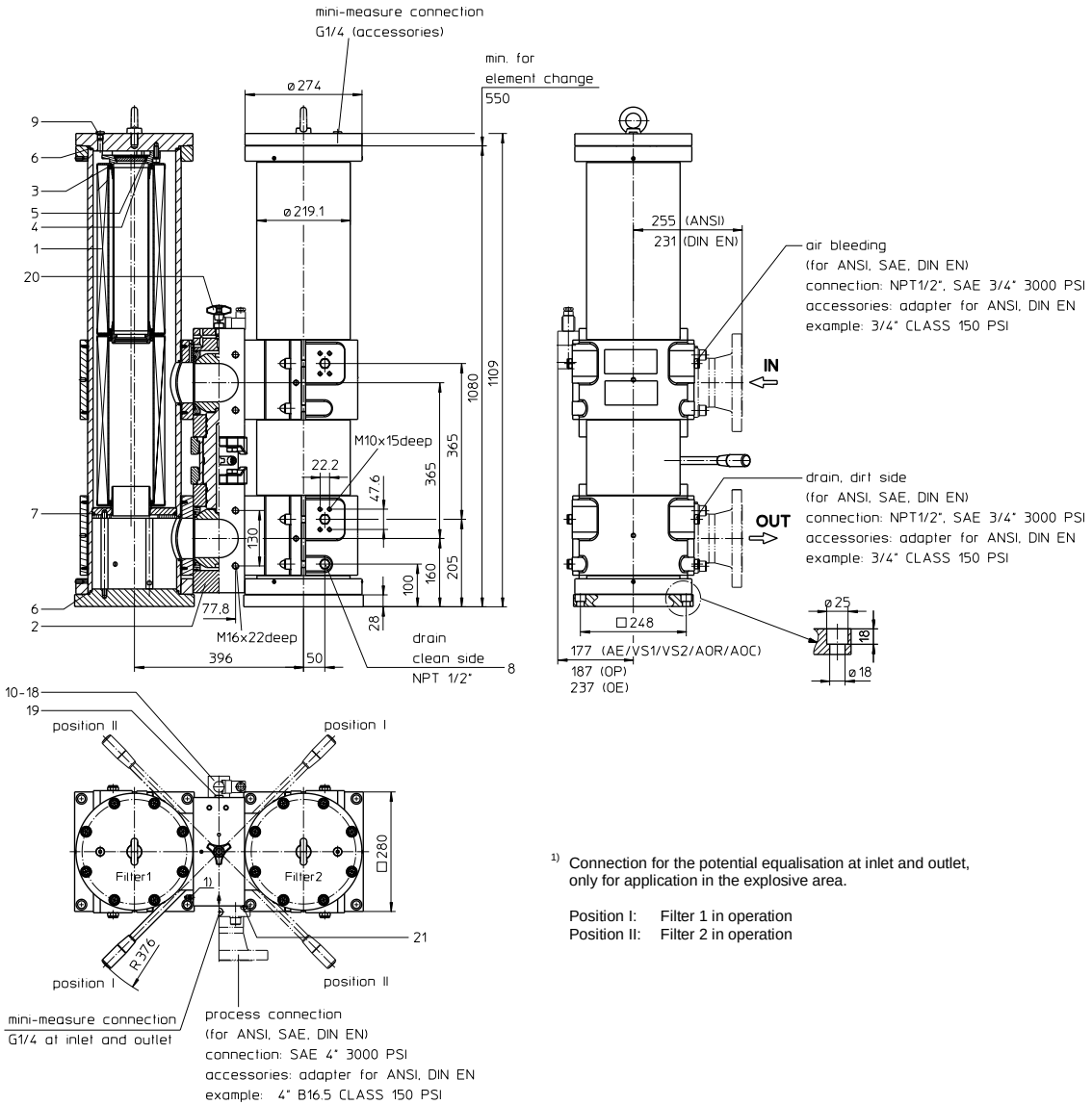
8. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER, change-over
Series DA 2215 NPS 4“ CLASS 150 PSI

Sheet No. **2182 B**



1) Connection for the potential equalisation at inlet and outlet, only for application in the explosive area.

Position I: Filter 1 in operation
Position II: Filter 2 in operation

1. Type index:

1.1. Complete filter: (ordering example)

DA.	2215.	10VG.	10.	B.	P.	-.	FS.	B.	-.	-.	AE.	AV.	IS21.	F.	F
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

1 **series:**
DA = pressure filter change-over, according to ASME-code

2 **nominal size:** 2215

3 **filter-material and filter- fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm, 10 G = 10 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 API = 20 µm, 10 API = 10 µm Interpor fleece (glass fibre) according to API
10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR), V = Viton (FPM)

7 **filter element specification:**
- = standard, VA = stainless steel

8 **process connection:**
FS = SAE-flange connection 3000 PSI
FA11 = ANSI-flange connection CLASS 150 PSI, sealing surface R_z = 160 µm (not finer than 40 µm)
FA12 = ANSI-flange connection CLASS 150 PSI, sealing surface R_z = 16 µm
FD1 = flange connection DIN EN 1092-1, design B1
FD2 = flange connection DIN EN 1092-1, design B2

9 **process connection size:**
B = 4“

10 **filter housing specification:**
- = standard
IS12 = internal parts of change-over armature stainless steel, see sheet-no. 41028

11 **internal valve:**
- = without, S1 = with by-pass valve Δp 3,5 bar

12 **clogging indicator or clogging sensor:**
- = without, OP = visual, see sheet-no. 1628
AOR = visual, see sheet-no. 1606, OE = visual-electrical, see sheet-no. 1628
AOC = visual, see sheet-no. 1606, VS1 = electronical, see sheet-no. 1607
AE = visual-electrical, see sheet-no. 1609, VS2 = electronical, see sheet-no. 1608

13 **shut-off valve:**
- = without, AV = shut-off valve, see sheet-no. 1655

14 **specification pressure vessel:**
- = standard (PED 97/23/EC)
IS20 = ASME VIII Div.1 with ASME equivalent material, see sheet-no. 55217
IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415
IS23 = ASME VIII Div.1 without U-stamp, see sheet-no. 55218

15 **switch lever:**
F = toward IN/OUT, B = opposite IN/OUT

16 **air bleeding/drain:**
F = toward IN/OUT, B = opposite IN/OUT

1.2. Filter element: (ordering example)

01NR.	1000.	10VG.	10.	B.	P.	-
1	2	3	4	5	6	7

1 **series:**
01NR = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 1000

3 - 7 see type index complete filter

weight: approx. 500 kg

Changes of measures and design are subject to alteration!

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fax +49 - (0)6205 - 2094-40 url www.internormen.com

2. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for connection acc. to EN1092-1, see sheet-no. 1657
- adapter for ANSI-connection B16.5 CLASS 150 PSI, see sheet-no. 1658
- measure- and bleeder-connections, see sheet-no. 1650
- drain- and bleeder connection, see sheet-no. 1659

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	4	filter element	01NR.1000 ...		
2	1	change over UKK	DN 100		
3	8	O-ring	90 x 4	306941 (NBR)	307031 (FPM)
4	2	O-ring	62 x 4	308045 (NBR)	311472 (FPM)
5	2	circlip	DIN472-75x2,5-ST	311471	
6	4	O-ring	200 x 4	334555 (NBR)	334554 (FPM)
7	2	O-ring	185 x 6	335381 (NBR)	335306 (FPM)
8	12	screw plug	NPT ½	307766	
9	2	screw plug	G ¼	305003	
10	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
11	1	clogging indicator, visual-electrical	OP	see sheet-no. 1628	
12	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628	
13	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
14	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
15	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
16	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
17	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
18	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
19	2	screw plug	G ¼	305003	
20	1	pressure balance valve	DN 10	305000	

item 19 execution only with clogging indicator or clogging sensor

4. Description:

Pressure filters, change-over series DA 2215 are suitable for operating pressure up to 40 bar.
Pressure peaks can be absorbed with a sufficient margin o safety.
Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.
These filters can be installed as suction filters.
For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fibre element remove the cover and take out the element.
Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

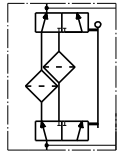
5. Technical data:

temperature ranges	
- calculation temperature (pressure vessel):	- 10°C to +100°C
- medium temperature:	- 10°C to +80°C
- ambient temperature:	- 40°C to +60°C
- survival temperature:	- 40°C to +100°C (short-time)
operating medium:	mineral oil, other media on request
max. operating pressure housing:	40 bar
test pressure acc. to PED 97/23/EC:	1,43 x operating pressure = 57 bar
test pressure acc. to ASME VIII Div. 1:	1,3 x operating pressure = 52 bar
test pressure acc. to API 614, Chapter 1:	1,5 x operating pressure = 60 bar
connection system:	SAE-flange connection 3000 PSI
housing material:	steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
bleeder connection :	NPT ½“ and SAE ¾“ 3000 PSI
drain connection dirt side :	NPT ½“ and SAE ¾“ 3000 PSI
drain connection clean side :	NPT ½“
volume tank :	2x 30 l
operating pressure adapter flanges:	according to B16.5 CLASS 150 PSI / DIN EN 1092-1

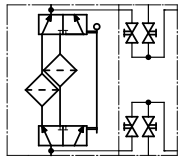
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

6. Symbols:

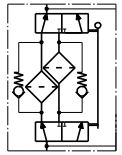
without indicator



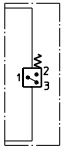
with shut-off valve



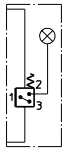
with by-pass valve



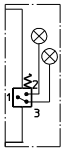
with electrical indicator AE 30 and AE 40



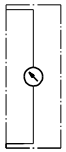
with visual-electrical indicator AE 50 and AE 62



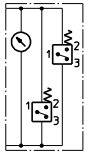
with visual-electrical indicator AE 70 and AE 80



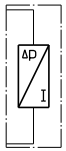
with visual indicator AOR/AOC/OP



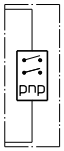
with visual-electrical indicator OE



with electronical sensor VS1



with electronical sensor VS2



7. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’, respectively Δp- curves; depending on filter fineness and viscosity.

8. Test methods:

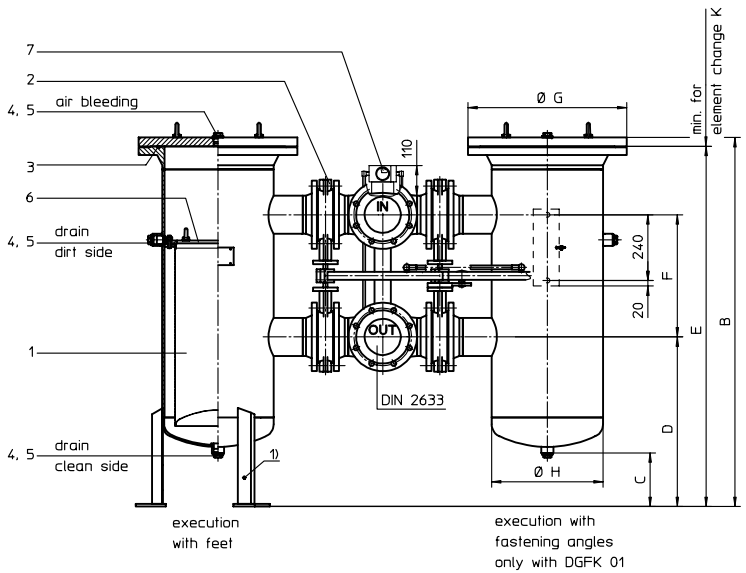
Filter elements are tested according to the following ISO standards:

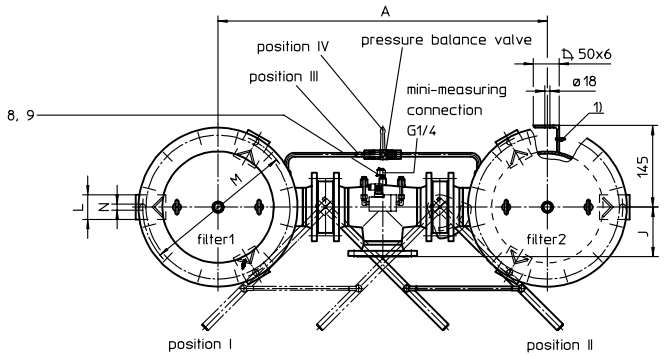
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

DUPLEX COARSE FILTER, change-over

Series DGFK 01-07 DN 50-300 PN 16

Sheet No. **3109 E**





Pos. I: filter 1 in operation
Pos II: filter 2 in operation

with pressure balance valve:
Pos III: valve open
Pos IV: valve closed

Connection standard as in drawing.
On request: inlet- on top or backside
outlet - bottom or backside

Please specify on order!

1) connection for the potential equalisation, only for applicatrion in the explosive area

2. Dimensions:

type	connection DN	Q = m³/h	A	B	C	D	E	F	G	H	J	K	L	M	N	weight kg	volume tank
DGFK 01	50	25	796	740	120	305	720	330	280	194	111	420	70	300	18	150	2x 14,0 l
	65	35	822			273		347			123						2x 14,5 l
	80	55	862	805		285	785	400			138						2x 16,0 l
DGFK 02	50	25	876	1020	170	515	995	330	405	273	111	550	70	380	18	170	2x 41,0 l
	65	35	902			498		347			123						
	80	55	942			445		400			138						
	100	90	984	1045		424	1020	421			159						2x 42,0 l
	125	110	1032			399		446			181						
DGFK 04	80	55	942	1555	170	938	1530	400	405	273	138	1050	70	380	18	220	2x 70,0 l
	100	90	984			917		421			159						
	125	110	1032			892		446			181						
	150	192	1082			846		492			200						
DGFK 06	125	110	1202	1350	180	619	1315	446	580	406	181	720	90	550	22	400	2x 127,0 l
	150	192	1232			573		492			200						
	200	288	1350	1370		542	1335	543			242						2x 130,0 l
	250	440	1460	1450		517	1415	618			288						2x 138,0 l
DGFK 07	300	630	1760	1805	167	664	1775	811	715	508	334	1050	90	650	22	965	2x 289,0 l

EDV 06/10

1. Type index:

1.1. Complete filter: (ordering example)

DGFK. 04. ST. 0,50G. P. FD1. B. -. OE

1	2	3	4	5	6	7	8	9

1 **series:**
DGFK = duplex coarse filter with strainer basket

2 **nominal size:** 01, 02, 04, 06, 07

3 **housing material:**
ST = of steel
VA = of stainless steel

4 **filter-material and filter-fineness:**
0,25 G = 0,25 mm, 0,50 G = 0,50 mm, 0,75 G = 0,75 mm,
1,00 G = 1,00 mm, 1,50 G = 1,50 mm stainless steel wire mesh

5 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

6 **connection:**
FD1 = flange EN 1092-1, design B1
FD2 = flange EN 1092-1, design B2

7 **connection size:**

DN	filter nominal-size				
8 = 50	01	02			
9 = 65	01	02			
A = 80	01	02	04		
B = 100		02	04		
C = 125		02	04	06	
D = 150			04	06	
E = 200				06	
F = 250				06	
G = 300					07

8 **manner of fastening:**
- = execution with feet
B = fastening angle (only with DGFK 01)

9 **clogging indicator :**
- = without clogging indicator
OE = clogging indicator, visual-electrical see sheet-no. 1614
DM = differential pressure gauge
DKM = differential pressure gauge with contact

1.2. Strainer basket: (ordering example)

Gr04. 0.50G. VA

1	2	3

1 **size of strainer basket:** Gr 01, Gr 02, Gr 04, Gr 06, Gr 07

2 **filter-material and filter-fineness:**
0,25 G = 0,25 mm, 0,50 G = 0,50 mm, 0,75 G = 0,75 mm,
1,00 G = 1,00 mm, 1,50 G = 1,50 mm stainless steel wire mesh

3 **strainer basket material:**
VA = stainless steel

Changes of measures and design are subject to alteration!

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3. Spare parts:

item	qty.	designation	dimension and article-no.				
			DGFK 01	DGFK 02	DGFK 04	DGFK 06	DGFK 07
1	2	strainer basket	Gr 01	Gr 02	Gr 04	Gr 06	Gr 07
2	4	stop flap [1)]	DN 50-80	DN 50-125	DN80-150	DN 125-250	DN 300
3	2	O-ring	190 x 5 305432 (NBR) 310283 (FPM)	275 x 5 307414 (NBR) 310288 (FPM)		429 x 6 308659 (NBR) 310273 (FPM)	516 x 6 301962 (NBR) 311474 (FPM)
4	6	screw plug	G ½ 309730	G 1 309732			
5	6	gasket	A 22 x 27 305564	A 33 x 39 308257			
6	2	spring	Da = 95 304414	pressure plate			
7	1	clogging indicator	OE, DM or DKM				
8	2	screw plug	G ¼ 309734				
9	2	gasket	A 14 x 18 306330				

[1)] dimension of stop flap = connection size

4. Description:

Duplex filters of the series DGFK 01-07 are suitable for a working pressure up to 16 bar.
Pressure peaks can be absorbed with a sufficient margin of safety.
Four mechanically connected change-over flaps enabling the change-over without service-interruption from the clean to the dirty filter-side.
The filters can be installed as suction filter, pressure filter or return-line filter.
The filter elements are filter baskets with steel wire mesh as filter material. The perforated centre tube is layed out with steel wire mesh. The flow direction is from outside to the inside.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
Approvals according to TÜV, and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S.; P.R.S.;USS.R.S. and others are possible.

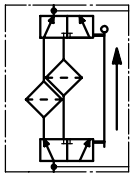
5. Technical data:

temperature range:	- 10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	16 bar
test pressure:	23 bar
connection system:	flange EN 1092-1, PN16
housing material:	C-steel or stainless steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
mini-measuring connection:	G ¼

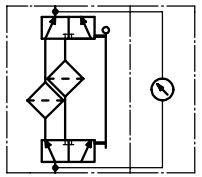
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:

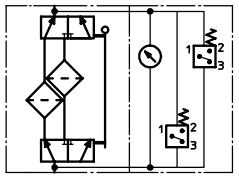
without indicator



with visual indicator



with visual-electrical indicator OE

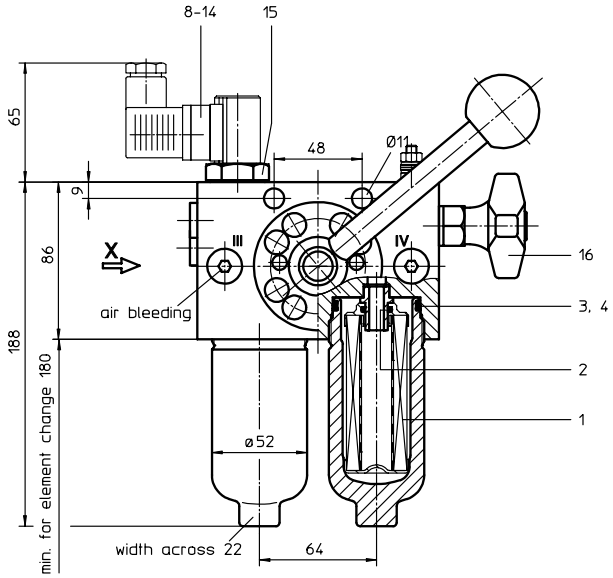


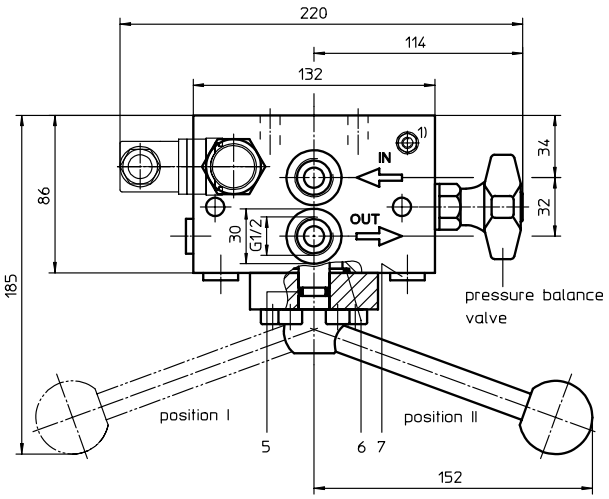
7. Pressure drop flow curves:

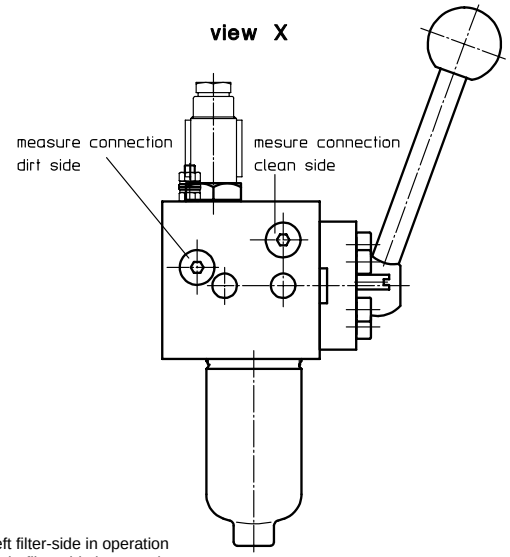
Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

PRESSURE FILTER, change-over
Series HDD 30 DN 15 PN 315

Sheet No.
2510 G







Pos. I: left filter-side in operation
Pos. II: right filter-side in operation

Connection III and IV to be used to bleed filter or to relieve pressure

1) connection for the potential equalisation, only for the application in the explosive area.

1. Type index:

1.1. Complete filter: (ordering example)

HDD.	30.	10VG.	HR.	E.	P.	-.	G.	3.	-.	AE
1	2	3	4	5	6	7	8	9	10	11

1 **series:**
HDD = pressure filter, change-over

2 **nominal size**: 30

3 **filter-material and filter- fineness:**
25 VG = 20 µm$_{(c)}$, 16 VG= 15 µm$_{(c)}$, 10 VG= 10 µm$_{(c)}$,
6 VG = 7 µm$_{(c)}$, 3 VG = 5 µm$_{(c)}$ Interpor fleece (glass fibre)

4 **resistance of pressure difference for filter element:**
30 = Δp 30 bar
HR = Δp 160 bar (rupture strength Δp 250 bar)

5 **filter element design:**
E = single-end open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:**
- = standard
VA = stainless steel

8 **connection:**
G = thread connection according to ISO 228

9 **connection size:**
3 = G ½

10 **filter housing specification:**
- = standard

11 **clogging indicator or clogging sensor :**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E.	30.	10VG.	HR.	E.	P.	-
1	2	3	4	5	6	7

1 **series:**
01E. = filter element according to INTERNORMEN factory specification

2 **nominal size:** 30

3 - 7 see type index-complete filter

2. Accessories:
- measure- and bleeder connection, see sheet-no. 1650

weight: 8 kg

EDV 11/07

Changes of measures and design are subject to alteration!

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3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01E. 30		
2	2	O-ring	12,37 x 2,62	304356 (NBR)	304396 (FPM)
3	2	O-ring	40 x 3	304389 (NBR)	304391 (FPM)
4	2	support ring	48 x 2,6 x 1	305391	
5	1	O-ring	10 x 3	307285 (NBR)	311019 (FPM)
6	1	O-ring	32 x 3	304368 (NBR)	- (FPM)
7	4	screw plug	G ¼	305003	
8	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
9	1	clogging indicator, visual-electrical	AE	see sheet-no. 1615	
10	1	clogging sensor, electronical	VS1	see sheet-no. 1617	
11	1	clogging sensor, electronical	VS2	see sheet-no. 1618	
12	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
13	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
14	1	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
15	1	screw plug	20913-4	309817	
16	1	pressure balance valve			

item 15 execution only without clogging indicator or clogging sensor

4. Description:

Duplex pressure filters with change-over valve type HDD are suitable for a working pressure up to 315 bar.
The pressure peaks are absorbed by a sufficient margin of safety. Duplex filters can be serviced without interruption of operation. The upper part has a three-way-change-over valve which allows to change-over the flow from the dirty filter-side to the clean filter-side without interrupting the operation. The change-over procedure does not lead to a cross sectional contraction. Prior to the change-over procedure a built-in pressure balance valve equalizes the housing pressure. After change-over the pressure balance valve is to be closed again. The closed filter-side has to be air-bled by vent III respectively by vent IV. Then change filter element. After screw in the filter bowl the pressure balance has to be opened shortly and the just serviced filter-side has to be air-bled. Filter elements are available down to a filter fineness of $4\mu m_{(c)}$.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
INTERNORMEN-Filter elements are available with a pressure difference resistance up to Δp 160 bar and a rupture strength up to Δp 250 bar.

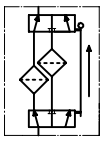
5. Technical data:

temperature range:	-10°C to +80°C (for a short time +100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	315 bar
test pressure:	410 bar
connection system:	thread connection according to ISO 228
housing material:	EN-GJS-400-18-LT; C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
air bleeding and mini-measuring connection:	G ¼
volume tank:	2x 0,11 l

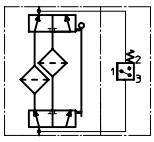
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:

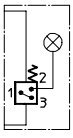
without indicator



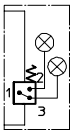
with electrical indicator AE 30 and AE 40



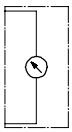
with visual-electrical indicator AE 50 and AE 62



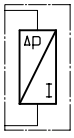
with visual-electrical indicator AE 70 and AE 80



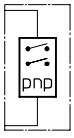
with visual indicator AOR/AOC



with electronical clogging sensor VS1



with electronical clogging sensor VS2



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter' respectively Δp-curves ; depending on filter fineness and viscosity.

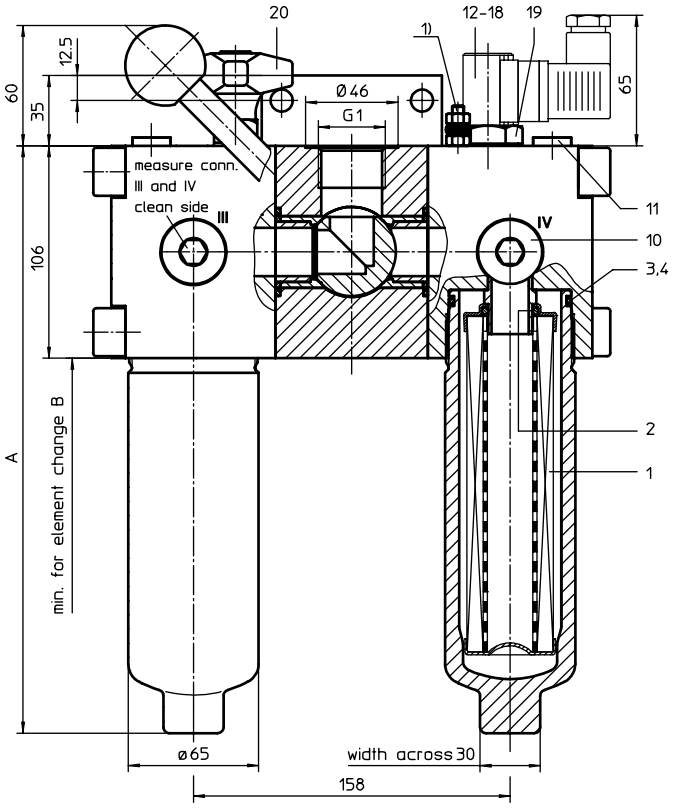
8. Test methods:

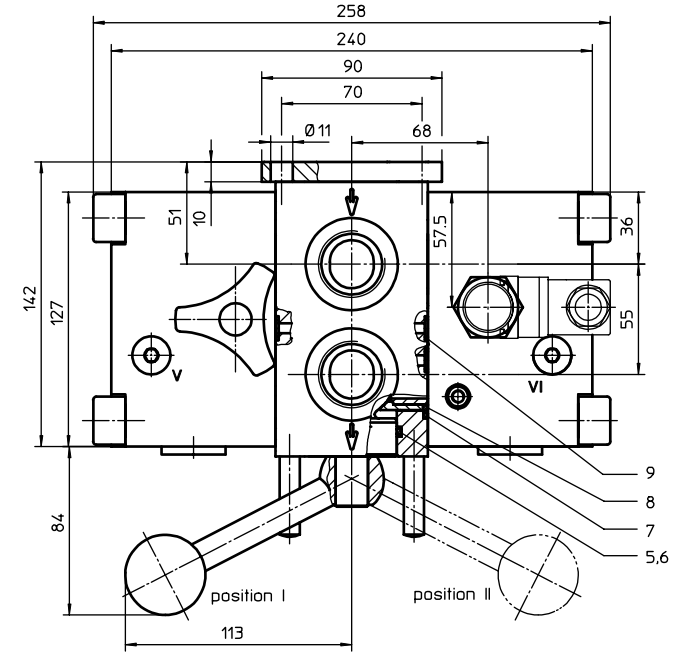
Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

PRESSURE FILTER, change-over
Series HDD 61-151 DN 25 PN 315

Sheet No.
2517 D





Pos. I: left filter-side in operation
Pos. II: right filter-side in operation

Connection V and VI to be used to bleed filter or to relieve pressure

1) connection for the potential equalisation, only for the application in the explosive area.

1. Type index:

1.1. Complete filter: (ordering example)

HDD.	91.	10VG.	HR.	E.	P.	-.	G.	5.	-.	-.	AE
1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
HDD = pressure filter, change-over

2 **nominal size:** 61, 91, 151

3 **filter-material and filter- fineness:**
25 VG = 20 µm(c), 16 VG= 15 µm(c), 10 VG= 10 µm(c),
6 VG = 7 µm(c), 3 VG= 5 µm(c) Interpor fleece (glass fibre)

4 **resistance of pressure difference for filter element:**
30 = Δp 30 bar
HR = Δp 160 bar (rupture strength Δp 250 bar)

5 **filter element design:**
E = single-end open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **connection:**
G = thread connection according to ISO 228

9 **connection size:**
5 = G 1

10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605

11 **internal valve:**
- = without valve
S1 = with by-pass valve Δp 3,5 bar
S2 = with by-pass valve Δp 7,0 bar
R = reversing valve, Q ≤ 70,06 l/min

12 **clogging indicator or clogging sensor:**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E.	90.	10VG.	HR.	E.	P.	-
1	2	3	4	5	6	7

1 **series:**
01E. = filter element according to INTERNORMEN factory specification

2 **nominal size:** 60, 90, 150

3 - 7 see type index-complete filter

2. Accessories:

- measure- and bleeder connection, see sheet-no. 1650

3. Dimensions:

type	connection	A	B	weight kg	volume tank
HDD 61	G1	228	275	24	2x 0,3 l
HDD 91		293	340	25	2x 0,4 l
HDD 151		402	450	27	2x 0,6 l

EDV 11/07

Changes of measures and design are subject to alteration!

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4. Spare parts:

item	qty.	designation	dimension HDD 61	dimension HDD 91	dimension HDD 151	article-no.	
1	2	filter element	01E.60	01E.90	01E.150		
2	2	O-ring	22 x 3,5			304341 (NBR)	304392 (FPM)
3	2	O-ring	54 x 3			304657 (NBR)	304720 (FPM)
4	2	support ring	61 x 2,6 x 1			304660	
5	3	O-ring	45 x 3			304991 (NBR)	304997 (FPM)
6	2	support ring	49,7 x 2,4 x 1			317709	
7	4	O-ring	38 x 3			304340 (NBR)	317013 (FPM)
8	4	O-ring	28 x 3			316778 (NBR)	- (FPM)
9	4	O-ring	8 x 2			310004 (NBR)	316530 (FPM)
10	2	screw plug	G ¾			308529	
11	2	screw plug	G ¼			305003	
12	1	clogging indicator, visual	AOR or AOC			see sheet-no. 1606	
13	1	clogging indicator, visual-electrical	AE			see sheet-no. 1615	
14	1	clogging sensor, electronical	VS1			see sheet-no. 1617	
15	1	clogging sensor, electronical	VS2			see sheet-no. 1618	
16	1	O-ring	15 x 1,5			315357 (NBR)	315427 (FPM)
17	1	O-ring	22 x 2			304708 (NBR)	304721 (FPM)
18	1	O-ring	14 x 2			304342 (NBR)	304722 (FPM)
19	1	screw plug	20913-4			309817	
20	1	pressure balance valve					

item 19 execution only without clogging indicator or clogging sensor

5. Description:

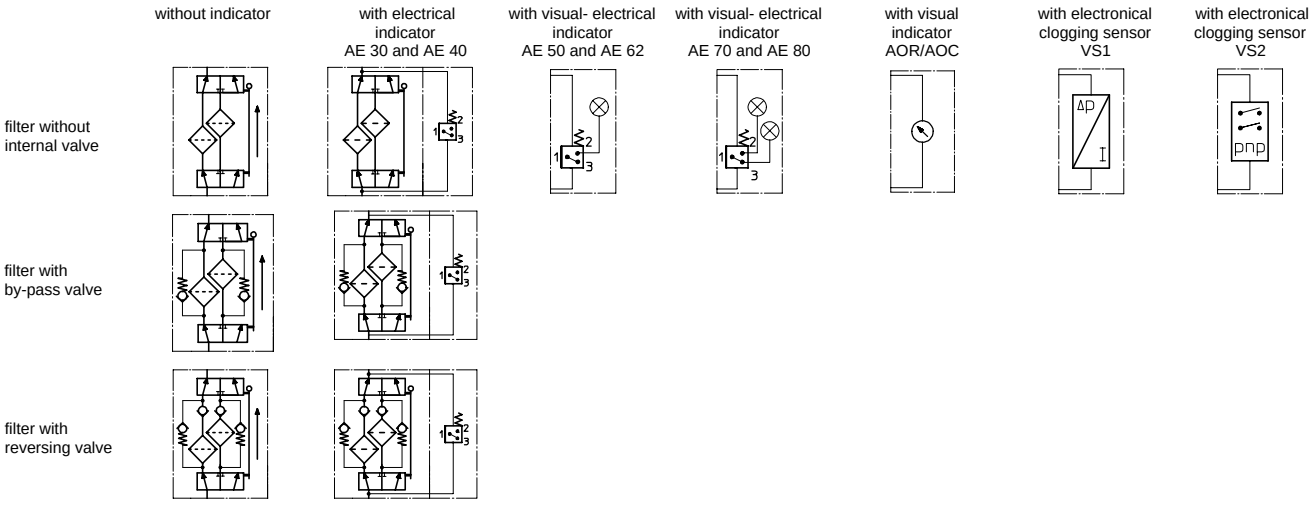
Duplex pressure filters with change-over valve type HDD are suitable for a working pressure up to 315 bar.
The pressure peaks are absorbed by a sufficient margin of safety. Duplex filters can be serviced without interruption of operation. The upper part has a three-way-change-over valve which allows to change-over the flow from the dirty filter-side to the clean filter-side without interrupting the operation. The change-over procedure does not lead to a cross sectional contraction. Prior to the change-over procedure a built-in pressure balance valve equalizes the housing pressure. After change-over the pressure balance valve is to be closed again. The closed filter-side has to be air-bled by vent V respectively by vent VI. Then change filter element. After screw in the filter bowl the pressure balance has to be opened shortly and the just serviced filter-side has to be air-bled. Filter elements are available down to a filter fineness of 4 $\mu m_{(c)}$.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
INTERNORMEN-Filter elements are available with a pressure difference resistance up to Δp 160 bar and a rupture strength up to Δp 250 bar.
The internal valves are integrated into the centering pivot for the filter element. After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

6. Technical data:

temperature range:	-10°C to +80°C (for a short time +100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	315 bar
test pressure:	410 bar
connection system:	thread connection according to ISO 228
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
air bleeding and mini-measuring connections dirt side:	G ¼
measuring connections clean side:	G ¾

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

7. Symbols:



8. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter' respectively Δp-curves ; depending on filter fineness and viscosity.

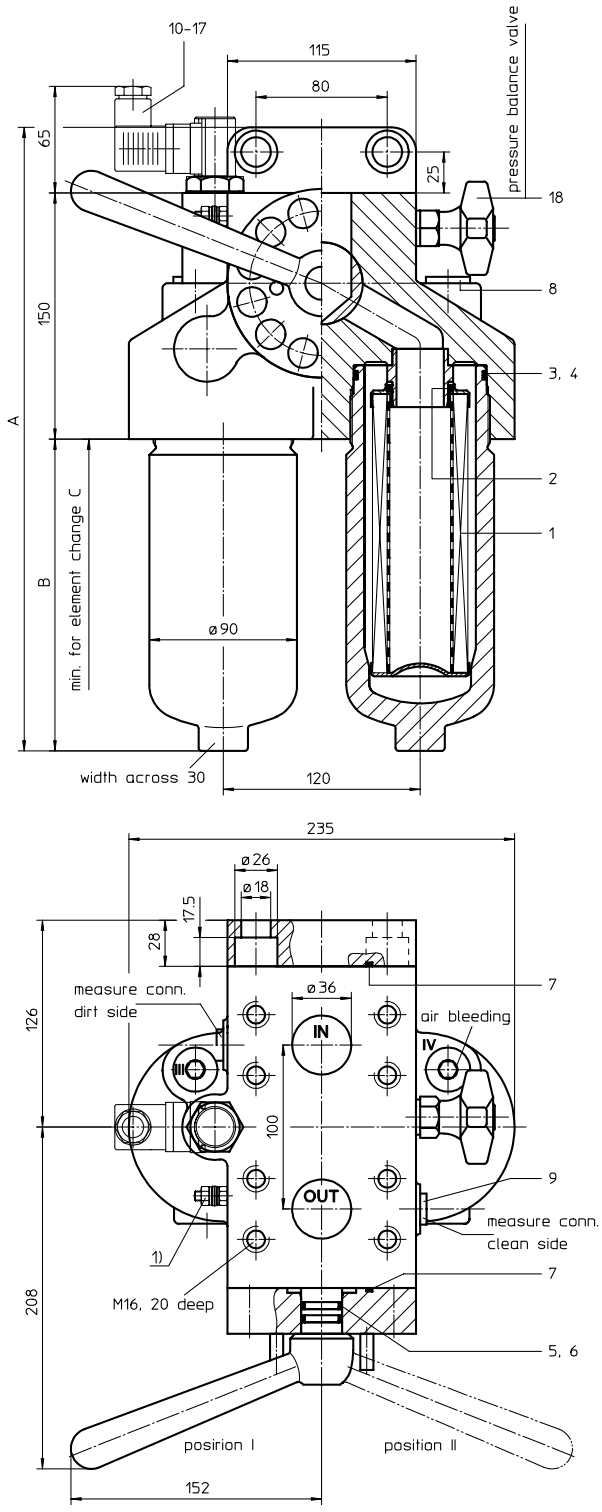
9. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER, change-over
Series HDD 170 - 450 DN 40 PN 315

Sheet No.
2514 N



Pos. I: left filter-side in operation
Pos. II: right filter-side in operation

Connection III and IV to be used to bleed filter or to relieve pressure

1) connection for the potential equalisation, only for the application in the explosive area

1. Type index:

1.1. Complete filter: (ordering example)

HDD.	170.	10VG.	HR.	E.	P.	-.	FS.	7.	-.	-.	AE
1	2	3	4	5	6	7	8	9	10	11	12

1 series:
HDD = pressure filter, change-over

2 nominal size: 170, 240, 360, 450

3 filter-material and filter- fineness:
25 VG = 20 µm(C), 16 VG = 15 µm(C), 10 VG = 10 µm(C), 6 VG = 7 µm(C), 3 VG = 5 µm(C) Interpor fleece (glass fibre)

4 resistance of pressure difference for filter element:
30 = Δp 30 bar
HR = Δp 160 bar (rupture strength Δp 250 bar)

5 filter element design:
E = single-end open

6 sealing material:
P = Nitrile (NBR)
V = Viton (FPM)

7 filter element specification:
- = standard
VA = stainless steel

8 connection:
FS = SAE-flange connection 6000 PSI

9 connection size:
7 = 1 ½''

10 filter housing specification:
- = standard

11 internal valve:
- = without
S1 = with by-pass valve Δp 3,5 bar
S2 = with by-pass valve Δp 7,0 bar
R = reversing valve, Q ≤ 211,008 l/min

12 clogging indicator or clogging sensor:
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E.	170.	10VG.	HR.	E.	P.	-
1	2	3	4	5	6	7

1 series:
01E. = filter element according to INTERNORMEN factory specification

2 nominal size: 170, 240, 360, 450

3 - **7** see type index-complete filter

2. Accessories:
- measure- and bleeder connection, see sheet-no. 1650

3. Dimensions:

type	connection	A	B	C	weight kg	volume tank
HDD 170	SAE 1 ½"	380	190	350	39	2x 0,7 l
HDD 240		430	240	400	41	2x 0,9 l
HDD 360		510	320	480	45	2x 1,2 l
HDD 450		615	425	585	50	2x 1,6 l

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Changes of measures and design are subject to alteration!

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4. Spare parts:

item	qty.	designation	dimension				article-no.	
			HDD 170	HDD 240	HDD 360	HDD 450		
1	2	filter element	01E.170	01E.240	01E.360	01E. 450		
2	2	O-ring	34 x 3,5				304338 (NBR)	304730 (FPM)
3	2	O-ring	75 x 3				302215 (NBR)	304729 (FPM)
4	2	support ring	81 x 2,6 x 1				304581	
5	2	O-ring	18 x 3				304359 (NBR)	304399 (FPM)
6	2	support ring	25 x 2,5 x 0,5				311311	
7	2	O-ring	56 x 3				305072 (NBR)	305322 (FPM)
8	2	screw plug	G ½				304678	
9	2	screw plug	G ¼				305003	
10	1	clogging indicator, visual	AOR or AOC				see sheet-no. 1606	
11	1	clogging indicator, visual-electrical	AE				see sheet-no. 1615	
12	1	clogging sensor, electronical	VS1				see sheet-no. 1617	
13	1	clogging sensor, electronical	VS2				see sheet-no. 1618	
14	1	O-ring	15 x 1,5				315357 (NBR)	315427 (FPM)
15	1	O-ring	22 x 2				304708 (NBR)	304721 (FPM)
16	1	O-ring	14 x 2				304342 (NBR)	304722 (FPM)
17	1	screw plug	20913-4				309817	
18	1	pressure balance valve						

item 17 execution only without clogging indicator or clogging sensor

5. Description:

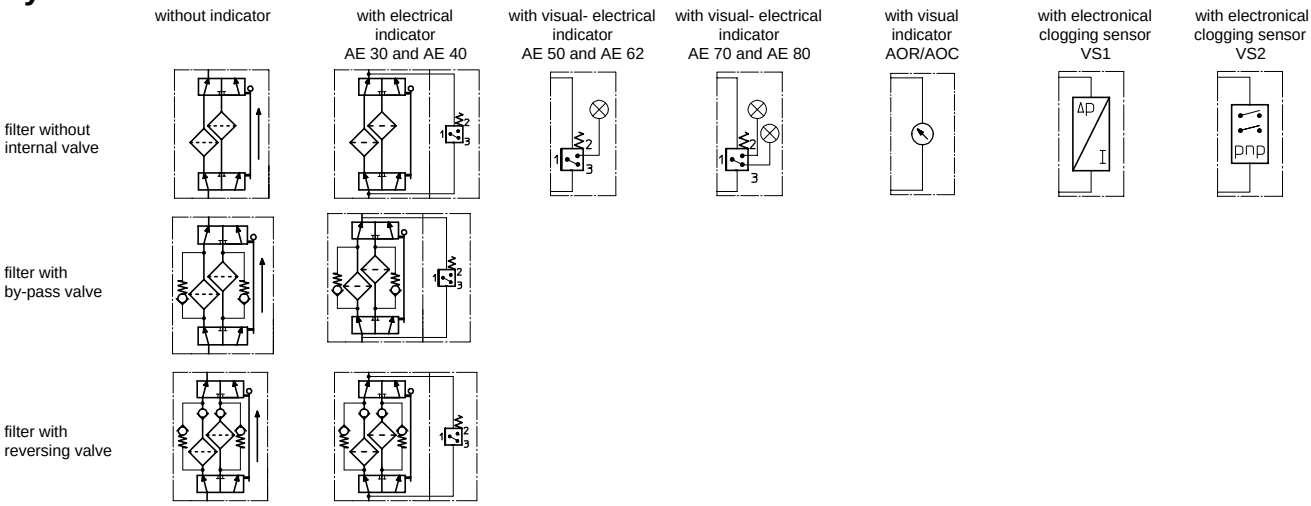
Duplex pressure filters with change-over valve type HDD are suitable for a working pressure up to 315 bar.
The pressure peaks are absorbed by a sufficient margin of safety. Duplex filters can be serviced without interruption of operation. The upper part has a three-way-change-over valve which allows to change-over the flow from the dirty filter-side to the clean filter-side without interrupting the operation. The change-over procedure does not lead to a cross sectional contraction. Prior to the change-over procedure a built-in pressure balance valve equalizes the housing pressure. After change-over the pressure balance valve is to be closed again. The closed filter-side has to be air-bled by vent III respectively by vent IV. Then change filter element. After screw in the filter bowl the pressure balance has to be opened shortly and the just serviced filter-side has to be air-bled. Filter elements are available down to a filter fineness of 4 $\mu m_{(c)}$.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
INTERNORMEN-Filter elements are available with a pressure difference resistance up to Δp 160 bar and a rupture strength up to Δp 250 bar.
The internal valves are integrated into the centering pivot for the filter element. After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

6. Technical data:

temperature range:	-10°C to +80°C (for a short time +100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	315 bar
test pressure:	410 bar
connection system:	SAE-flange connection 6000 PSI
housing material:	EN-GJS-400-18-LT; C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
mini-measuring connections:	G ¼
air bleeding connections:	G ½

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

7. Symbols:



8. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter' respectively Δp-curves ; depending on filter fineness and viscosity.

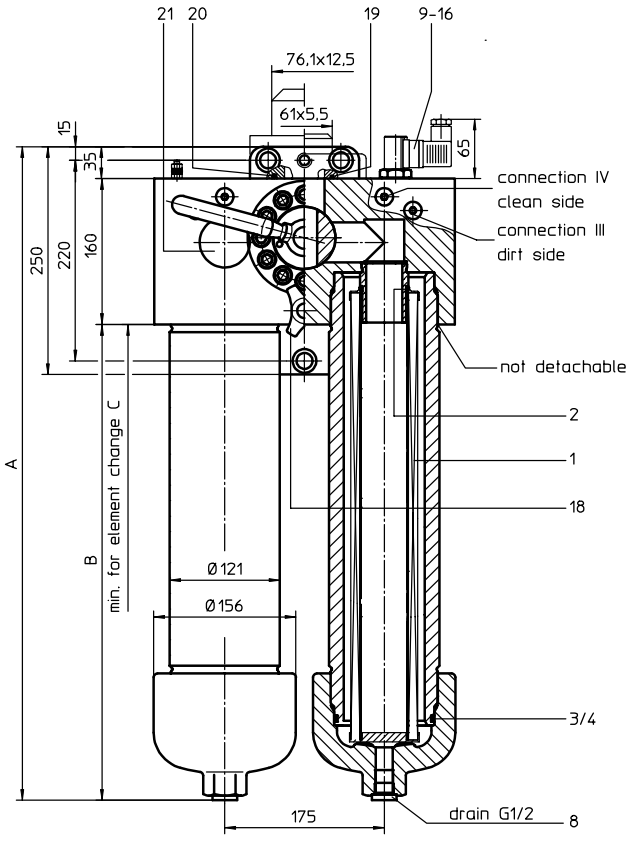
9. Test methods:

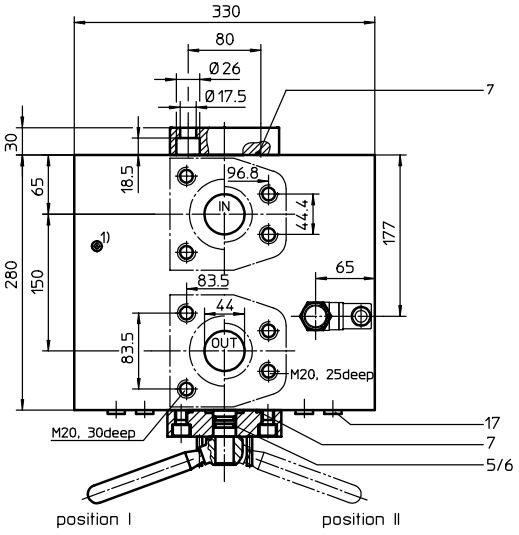
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER, change-over
Series HDD 601- 1351 DN 50 PN 315

Sheet No.
2525 K





Pos. I: left filter-side in operation
Pos. II: right filter-side in operation

Connection III and IV to be used to bleed filter or to relieve pressure

1) connection for the potential equalisation, only for the application in the explosive area.

1. Type index:

1.1. Complete filter: (ordering example)

HDD. 901. 10VG. HR. E. P. -. FS. 8. -. -. AE

1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
HDD = pressure filter, change-over

2 **nominal size**: 601, 901,1351

3 **filter-material and filter- fineness:**
25 VG = 20 µm(c), 16 VG = 15 µm(c), 10 VG = 10 µm(c), 6 VG = 7 µm(c), 3 VG = 5 µm(c) Interpor fleece (glass fibre)

4 **resistance of pressure difference for filter element:**
30 = Δp 30 bar
HR = Δp 160 bar (rupture strength Δp 250 bar)

5 **filter element design:**
E = single-end open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:**
- = standard
VA = stainless steel

8 **connection:**
FS = SAE-flange connection 6000 PSI (standard)
FV = AVIT-flange connection 320 bar (special design)

9 **connection size:**
8 = 2“

10 **filter housing specification:**
- = standard

11 **internal valve:**
- = without
S1 = with by-pass valve Δp 3,5 bar
S2 = with by-pass valve Δp 7,0 bar
R = reversing valve, Q ≤ 465,348 l/min

12 **clogging indicator or clogging sensor:**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E. 900. 10VG. HR. E. P. -

1	2	3	4	5	6	7

1 **series:**
01E. = filter element according to INTERNORMEN factory specification

2 **nominal size:** 600, 900, 1350

3 - 7 see type index-complete filter

2. Accessories:

- measure- and bleeder connection, see sheet-no. 1650
- SAE-counter flange, see sheet-no. 1652
- AVIT-counter flange, see sheet-no. 1654

3. Dimensions:

type	connection	A	B	C	weight kg	volume tank
HDD 601	2“	567	372	790	143	2x 2,1 l
HDD 901	2“	717	522	940	150	2x 3,1 l
HDD 1351	2“	965	770	1440	162	2x 4,6 l

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4. Spare parts:

item	qty.	designation	dimension HDD 601	HDD 901	HDD 1351	article-no.	
1	2	filter element	01E.600	01E.900	01E.1350		
2	2	O-ring	48 x 3			304357(NBR)	304404(FPM)
3	2	O-ring	98 x 4			301914(NBR)	304765(FPM)
4	2	support ring	110 x 3,5 x 2			304802	
5	2	O-ring	18 x 3			304359(NBR)	304399(FPM)
6	2	support ring	25 x 2,5 x 0,5			311311	
7	2	O-ring	71 x 3			306451(NBR)	306897(FPM)
8	2	screw plug	G ½			304678	
9	1	clogging indicator, visual	AOR or AOC			see sheet no. 1606	
10	1	clogging indicator, visual-electrical	AE			see sheet no. 1615	
11	1	clogging sensor, electronical	VS1			see sheet no. 1617	
12	1	clogging sensor, electronical	VS2			see sheet no. 1618	
13	1	O-ring	15 x 1,5			315457(NBR)	315427(FPM)
14	1	O-ring	22 x 2			304708(NBR)	304721(FPM)
15	1	O-ring	14 x 2			304342(NBR)	304722(FPM)
16	1	screw plug	20913-4			309817	
17	4	screw plug	G ¼			305003	
18	1	pressure balance valve	nominal size 10			305000	
19	1	O-ring (only with counter flange SAE)	56,75 x 3,53			306035(NBR)	310264(FPM)
20	1	O-ring (only with counter flange AVIT)	61 x 5				
21	8	screw plug	G 1½			311475	

item 16 execution only without clogging indicator or clogging sensor

5. Description:

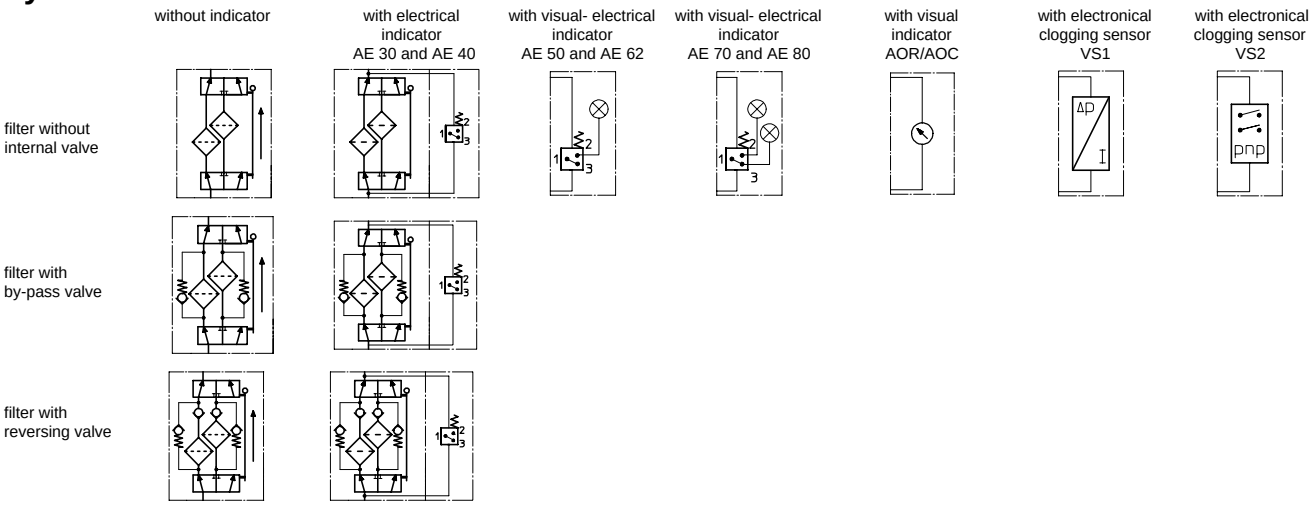
Duplex pressure filters with change-over valve type HDD are suitable for a working pressure up to 315 bar.
Pressure peaks can be absorbed with a sufficient margin of safety.
Duplex filters can be maintained without interruption. The upper part has a three-way-change-over valve which allows to change-over the flow from the dirty filter-side to the clean filter-side without interrupting the operation. The change-over procedure does not lead to a reduction of area.
The change-over can be done easily by opening of the change-over valve.
The mini-measuring connections on each filter-side allow the measuring of the pressure drop through the filter element, as well as at the pressure discharge of the tube plug during the maintenance.
Filter elements are available down to a filter fineness of 4 $\mu m_{(c)}$.
INTERNORMEN-Filter elements consist of filter materials with a high intrinsic stability, an excellent particle retention, respectively a high dirt holding capacity and provide a long service life.
INTERNORMEN-Filters can be used for mineral oil based fluids, HW-emulsions, water glycols, most synthetic hydraulic fluids and lubrication fluids.
The internal valves are integrated into the centering pivot for the filter element.
After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

6. Technical data:

temperature range:	-10°C to +80°C (for a short time +100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	315 bar
test pressure:	410 bar
connection system:	SAE-flange 6000 PSI (standard) AVIT-flange 320 bar (special design)
housing material:	EN-GJS-400-18-LT; C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
air bleeding and mini-measuring connection:	G ¼

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

7. Symbols:



8. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter' respectively Δp-curves ; depending on filter fineness and viscosity.

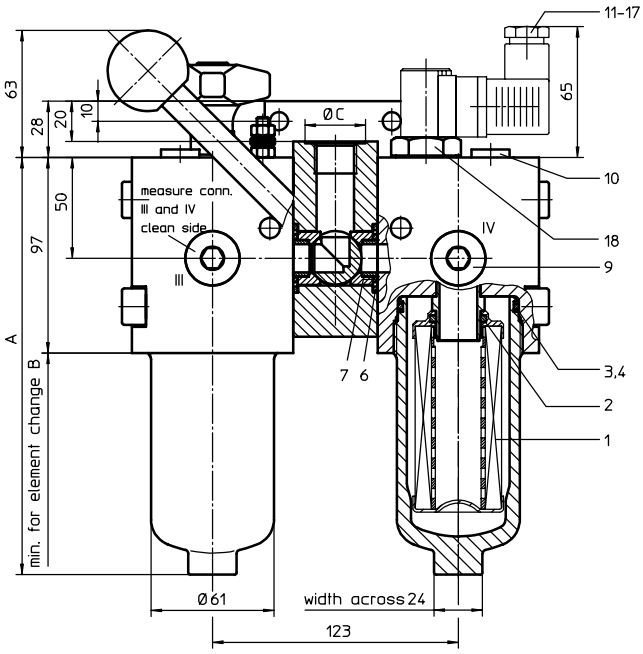
9. Test methods:

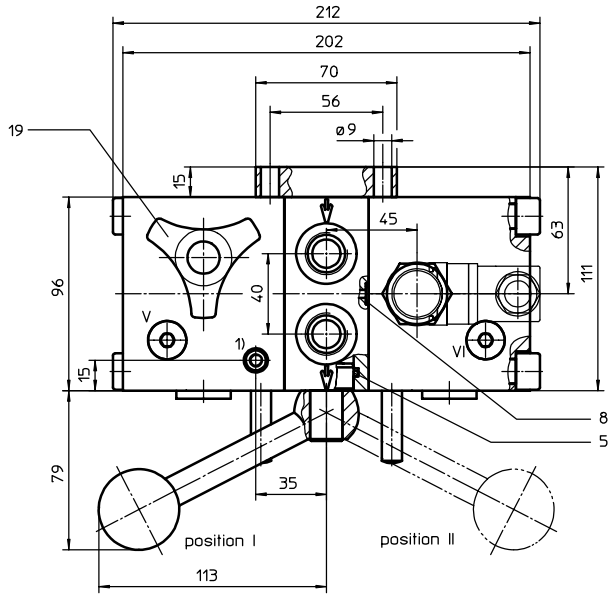
Filter elements are tested according to the following ISO standards:

ISO 2942 Verification of fabrication integrity
ISO 2941 Verification of collapse/burst resistance
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

PRESSURE FILTER, change-over
Series MDD 40-63 DN 15-20 PN 200

Sheet No.
2516 D





1) connection for the potential equalisation, only for application in the explosive area.

Pos. I: left filter-side in operation
Pos. II: right filter-side in operation

Connection V and VI to be used to bleed filter or to relieve pressure

1. Type index:

1.1. Complete filter: (ordering example)

MDD.	40.	10VG.	HR.	E.	P.	-.	G.	3.	-.	-.	AE
1	2	3	4	5	6	7	8	9	10	11	12

1 series:
MDD = medium pressure filter, change-over

2 nominal size: 40, 63

3 filter-material and filter- fineness:
25 VG = 20 µm(c), 16 VG = 15 µm(c), 10 VG= 10 µm(c),
6 VG = 7 µm(c), 3 VG = 5 µm(c) Interpor fleece (glass fibre)

4 resistance of pressure difference for filter element:
30 = Δp 30 bar
HR = Δp 160 bar (rupture strength Δp 250 bar)

5 filter element design:
E = single-end open

6 sealing material:
P = Nitrile (NBR)
V = Viton (FPM)

7 filter element specification: (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 connection:
G = thread connection according to ISO 228

9 connection size:
3 = G ½ (MDD 40)
4 = G ¾ (MDD 63)

10 filter housing specification: (see catalog)
- = standard
IS06 = see sheet-no. 31605
IS12 = see sheet-no. 41028

11 internal valve:
- = without
S1 = with by-pass valve Δp 3,5 bar
S2 = with by-pass valve Δp 7,0 bar
R = reversing valve, Q ≤ 70,06 l/min

12 clogging indicator or clogging sensor :
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01NL.	40.	10VG.	HR.	E.	P.	-
1	2	3	4	5	6	7

1 series:
01NL. = standard filter element according toDIN 24550, T3

2 nominal size: 40, 63

3 - 7 see type index-complete filter

2. Accessories:

- measure- and bleeder connection, see sheet-no. 1650

3. Dimensions:

type	connection	A	B	C	weight kg	volume tank
MDD 40	G ½	207	285	30	15,5	2x 0,25 l
MDD 63	G ¾	267	345	36,5	16,5	2x 0,35 l

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Changes of measures and design are subject to alteration!

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4. Spare parts:

item	qty.	designation	dimension		article-no.	
			MDD 40	MDD 63		
1	2	filter element	01NL.40	01NL.63		
2	2	O-ring	22 x 3,5		304341 (NBR)	304392 (FPM)
3	2	O-ring	54 x 3		304657 (NBR)	304720 (FPM)
4	2	support ring	60 x 2,6 x 1		311779	
5	3	O-ring	26 x 3		304379 (NBR)	318576 (FPM)
6	4	O-ring	28 x 3		316778 (NBR)	318366 (FPM)
7	4	O-ring	18 x 3		304359 (NBR)	304399 (FPM)
8	4	O-ring	6,5 x 2		313553 (NBR)	318577 (FPM)
9	2	screw plug	G ½		304678	
10	2	screw plug	G ¼		305003	
11	1	clogging indicator, visual	AOR or AOC		see sheet-no. 1606	
12	1	clogging indicator, visual-electrical	AE		see sheet-no. 1615	
13	1	clogging sensor, electronical	VS1		see sheet-no. 1617	
14	1	clogging sensor, electronical	VS2		see sheet-no. 1618	
15	1	O-ring	15 x 1,5		315357 (NBR)	315427 (FPM)
16	1	O-ring	22 x 2		304708 (NBR)	304721 (FPM)
17	1	O-ring	14 x 2		304342 (NBR)	304722 (FPM)
18	1	screw plug	20913-4		309817	
19	1	pressure balance valve				

item 18 execution only without clogging indicator or clogging sensor

5. Description:

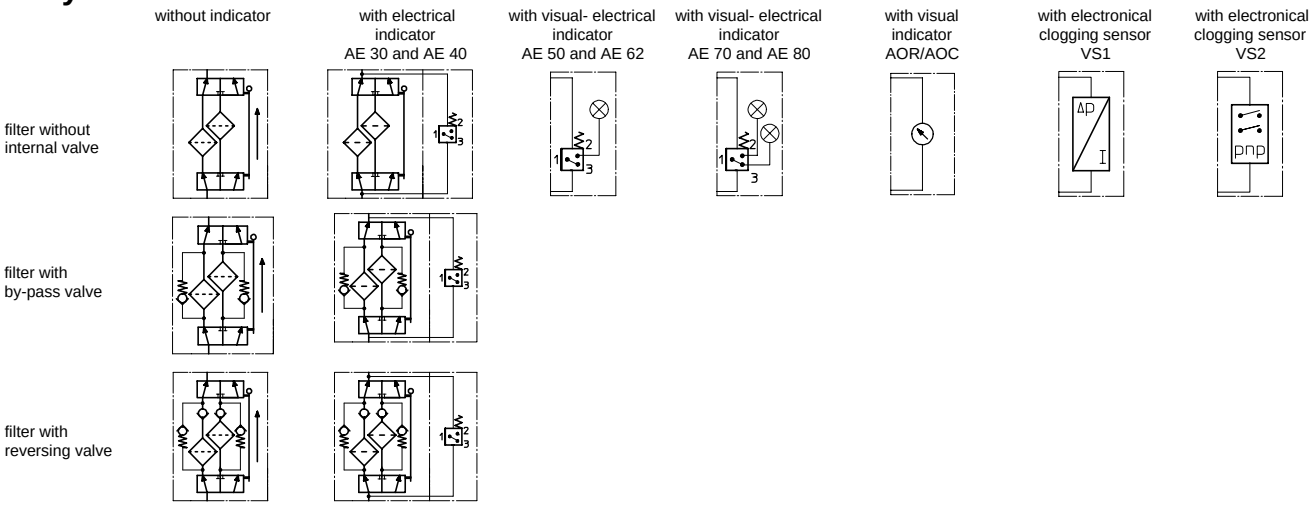
Duplex pressure filters with change-over valve type MDD are suitable for a working pressure up to 200 bar.
The pressure peaks are absorbed by a sufficient margin of safety. Duplex filters can be serviced without interruption of operation. The upper part has a three-way-change-over valve which allows to change-over the flow from the dirty filter-side to the clean filter-side without interrupting the operation. The change-over procedure does not lead to a cross sectional contraction. Prior to the change-over procedure a built-in pressure balance valve equalizes the housing pressure. After change-over the pressure balance valve is to be closed again. The closed filter-side has to be air-bled by vent V respectively by vent VI. Then change filter element. After screw in the filter bowl the pressure balance has to be opened shortly and the just serviced filter-side has to be air-bled. Filter elements are available down to a filter fineness of 4 $\mu m_{(c)}$.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
INTERNORMEN-Filter elements are available with a pressure difference resistance up to Δp 160 bar and a rupture strength up to Δp 250 bar.
The internal valves are integrated into the centering pivot for the filter element. After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

6. Technical data:

temperature range:	-10°C to +80°C (for a short time +100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	200 bar
test pressure:	260 bar
connection system:	thread connection according to ISO 228
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
air bleeding and mini-measuring connections dirt side:	G ¼
measuring connections clean side:	G ½

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

7. Symbols:



8. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter' respectively Δp-curves ; depending on filter fineness and viscosity.

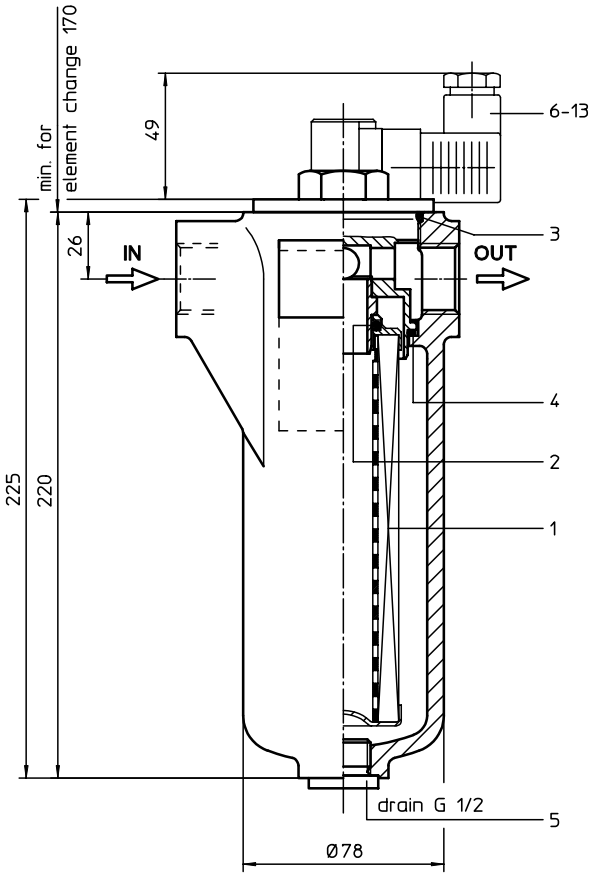
9. Test methods:

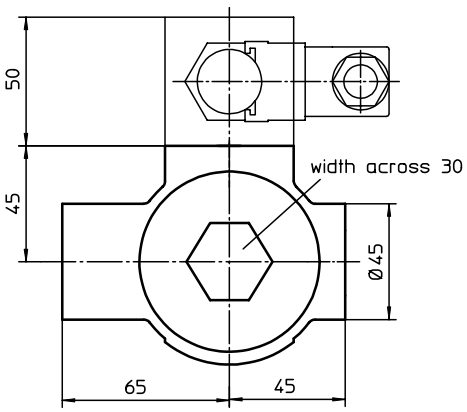
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER
Series LF 63 DN 20 PN 25

Sheet No.
1109 G





1. Type index:

1.1. Complete filter: (ordering example)

LF.	63.	10VG.	30.	E.	P.	-.	G.	4.	-.	-.	AE
1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
LF = in-line filter

2 **nominal size:** 63

3 **filter-material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25µm
stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$,
6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)

4 **resistance of pressure difference for filter element:**
30 = Δp 30 bar

5 **filter element design:**
E = single-end open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
IS07 = see sheet-no. 31602

8 **connection:**
G = thread connection according to DIN 3852, T2

9 **connection size:**
4 = G ¾

10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605

11 **internal valve**
- = without
S1 = with by-pass valve Δp 3,5 bar

12 **clogging indicator or clogging sensor :**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01NL.	63.	10VG.	30.	E.	P.	-
1	2	3	4	5	6	7

1 **series:**
01NL. = standard filter element according to DIN 24550, T3

2 **nominal size:** 63

3 - 7 see type index-complete filter

weight: 2,0 kg

Changes of measures and design are subject to alteration!

EDV 11/07

internormen technology

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2. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01NL. 63		
2	1	O-ring	22 x 3,5	304341 (NBR)	304392 (FPM)
3	1	O-ring	56 x 3	305072 (NBR)	305322 (FPM)
4	1	O-ring	48 x 3	304357 (NBR)	304404 (FPM)
5	1	screw plug	G ½	304678	
6	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
7	1	clogging indicator, visual-electrical	AE	see sheet-no. 1615	
8	1	clogging sensor, electronical	VS1	see sheet-no. 1617	
9	1	clogging sensor, electronical	VS2	see sheet-no. 1618	
10	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
11	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
12	1	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
13	2	screw plug	G $^{1}/_{8}$	305496	

item 13 execution only without clogging indicator or clogging sensor

3. Description:

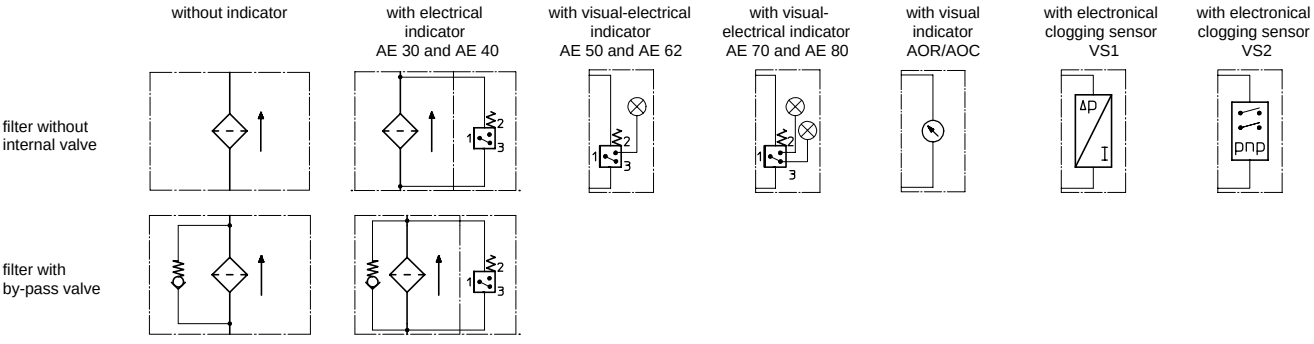
In-line filters of the type LF 63 are suitable for a working pressure up to 25 bar.
Pressure peaks are absorbed with a sufficient margin of safety.
The filter is mounted in such a way that inlet and outlet are on the same level. It can be used as suction filter, pressure filter and return-line filter. The filter element consist of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.
The particles are hold back on the outside. For cleaning (see special leaflet 21070-4) the mesh element respectively to change the glass fiber element remove the cover and take out the element.
Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils
Approvals according to TÜV, and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible.
The internal valve is integrated in the filter cover.
After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter.

4. Technical data:

temperature range:	-10°C bis +80°C (for a short time +100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	25 bar
test pressure:	33 bar
connection system:	thread connection according to DIN 3852, T2
housing material:	aluminium-cast
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
mini-measuring connection:	G ¼
evacuation-or bleeder-connection:	G ½
volume tank:	0,7 l

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:



6. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’, respectively Δp-curves ; depending on filter fineness and viscosity.

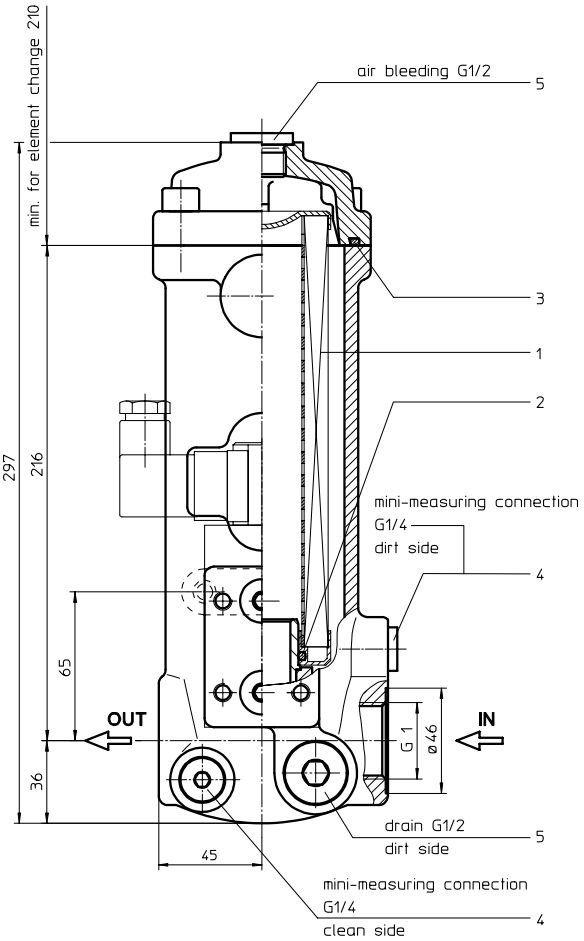
7. Test methods:

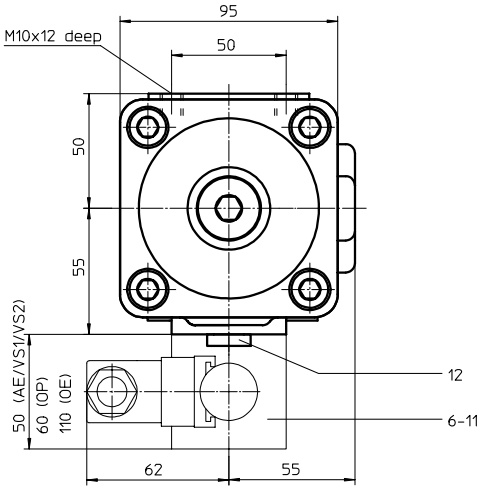
Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

PRESSURE FILTER
Series LF 101 DN 25 PN 32

Sheet No.
1125 B





1. Type index:

1.1. Complete filter: (ordering example)

LF.	101.	10VG.	16.	E.	P.	-.	G.	5.	-.	AE
1	2	3	4	5	6	7	8	9	10	11

1 **series:**
LF = in-line filter

2 **nominal size:** 101

3 **filter-material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25µm
stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$,
6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)

4 **resistance of pressure difference for filter element:**
16 = Δp 16 bar

5 **filter element design:**
E = single-end open
S = with by-pass valve Δp 2,0 bar
S1 = with by-pass valve Δp 3,5 bar

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
IS07 = see sheet-no. 31602

8 **connection:**
G = thread connection according to ISO 228

9 **connection size:**
5 = G 1

10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605

11 **clogging indicator or clogging sensor :**
- = without
AE = visual-electrical, see sheet-no. 1609
OP = visual, see sheet-no. 1628
OE = visual-electrical, see sheet-no. 1628
VS1 = electronical, see sheet-no. 1607
VS2 = electronical, see sheet-no. 1608

1.2. Filter element: (ordering example)

01N.	100.	10VG.	16.	E.	P.	-
1	2	3	4	5	6	7

1 **series:**
01N. = filter element according to INTERNORMEN factory specification

2 **nominal size:** 100

3 - 7 see type index-complete filter

weight: 3,5 kg

EDV 11/06

Changes of measures and design are subject to alteration!

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2. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01N. 100		
2	1	O-ring	32 x 3,5	304378 (NBR)	304401 (FPM)
3	1	O-ring	76 x 4	305599 (NBR)	310291 (FPM)
4	2	screw plug	G ¼	305003	
5	2	screw plug	G ½	304678	
6	1	clogging indicator, visual	OP	see sheet-no. 1628	
7	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628	
8	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
9	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
10	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
11	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
12	2	screw plug	G ¼	305003	

item 12 execution only without clogging indicator or clogging sensor

3. Description:

In-line filters of the type LF 101 are suitable for a working pressure up to 32 bar.
Pressure peaks are absorbed with a sufficient margin of safety.
The filter is mounted in such a way that inlet and outlet are on the same level. It can be used as suction filter, pressure filter and return-line filter. The filter element consist of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.
To clean (see special leaflets 21070-4 and 34448-4) and change respectively the filter element, the filter cover will be removed and the filter element can be taken out.
Filter finer than 40 µm should use throw-away elements made of Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils
Approvals according to TÜV, and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible.

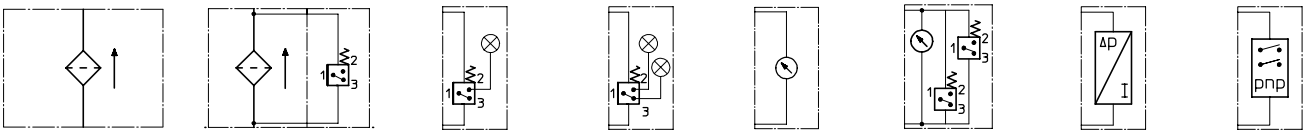
4. Technical data:

temperature range:	-10°C to +80°C (for a short time +100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	32 bar
test pressure:	64 bar
connection system:	thread connection according to ISO 228
housing material:	aluminium-cast
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
mini-measuring connection:	G ¼
evacuation-or bleeder-connection:	G ½
volume tank:	1,0 l

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:

without indicator | with electrical indicator AE 30 and AE 40 | with visual-electrical indicator AE 50 and AE 62 | with visual-electrical indicator AE 70 and AE 80 | with visual indicator OP | with visual-electrical indicator OE | with electronical clogging sensor VS1 | with electronical clogging sensor VS2



6. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’, respectively Δp-curves ; depending on filter fineness and viscosity.

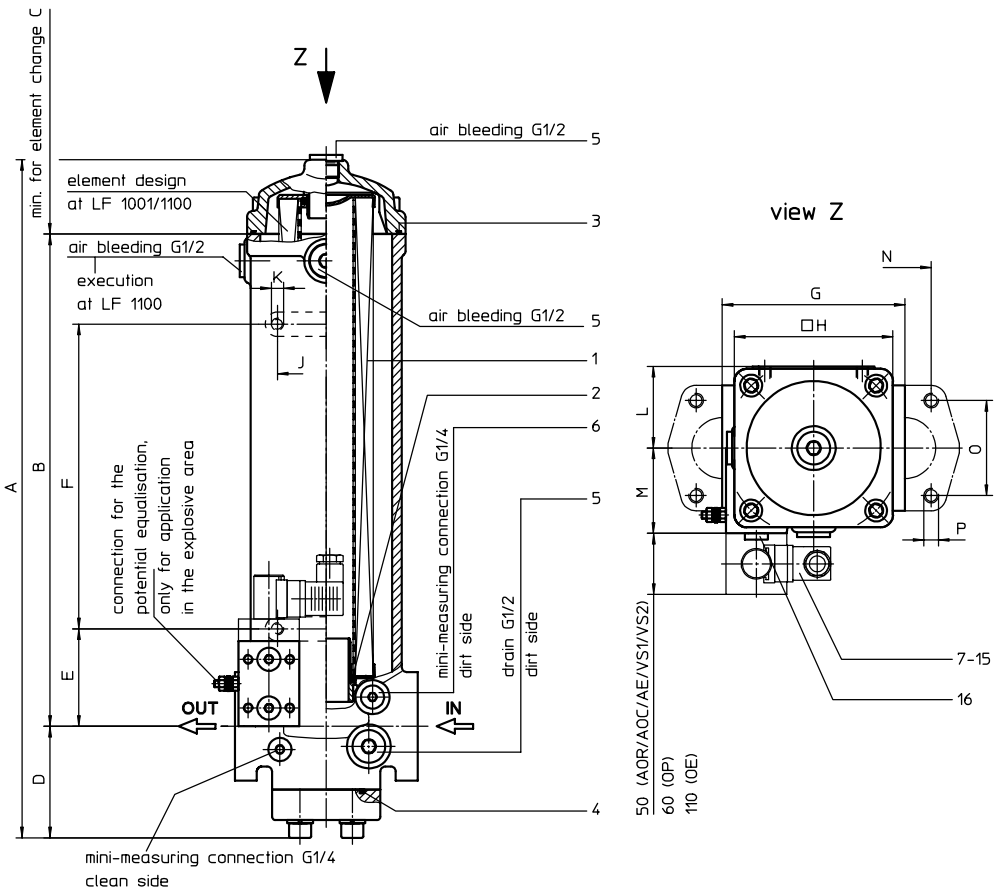
7. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

PRESSURE FILTER
Series LF 251-1100 DN 40-125 PN 32

Sheet No. **1117 L**



1. Type index:

1.1. Complete filter: (ordering example)

LF. 401. 10VG. 30. E. P. -. FS. 8. -. -. AE

1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
LF = in-line filter

2 **nominal size:** 251, 401, 631, 1001, 1100

3 **filter material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm stainless steel wire mesh,
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar (01NR.) 30 = Δp 30 bar (01NL.)

5 **filter element design:**
E = single-end open S = with by-pass valve Δp 2,0 bar
B = both sides open (LF 1001/1100) S1 = with by-pass valve Δp 3,5 bar

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard VA = stainless steel IS06 = see sheet-no. 31601 IS07 = see sheet-no. 31602

8 **connection:**
FS = SAE-flange connection 3000 PSI (LF 251-1100)

9 **connection size:**
7 = 1 ½" (LF 251) 9 = 2 ½" (LF 631) C = 5" (LF 1100)
8 = 2" (LF 401) A = 3" (LF 1001)

10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605

11 **internal valve:**
- = without
S = with by-pass valve Δp 2,0 bar (LF 1001/1100)
S1 = with by-pass valve Δp 3,5 bar (LF 1001/1100)

12 **clogging indicator or clogging sensor:**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1609
OP = visual, see sheet-no. 1628
OE = visual-electrical, see sheet-no. 1628
VS1 = electronical, see sheet-no. 1607
VS2 = electronical, see sheet-no. 1608

1.2. Filter element: (ordering example)

01NL. 400. 10VG. 30. E. P. -

1	2	3	4	5	6	7

1 **series:**
01NL. = standard filter element according to DIN 24550, T3
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 250, 400, 630 (01NL.), 1000 (01NR.)

3 - 7 see type index-complete filter

2. Accessories:

- measure- and bleeder connection, see sheet-no. 1650
- evacuation- and bleeder connection, see sheet-no. 1651
- counter flange, see sheet-no. 1652

3. Dimensions:

type	LF 251	LF 401	LF 631	LF 1001	LF 1100
connection	SAE 1 ½"	SAE 2"	SAE 2 ½"	SAE 3"	SAE 5"
A	354	550	561	583	641
B	254	404	406	404	430
C	260	410	410	410	410
D	39	85	86	100	130
E	80	80	80	90	116
F	-	250	250	250	250
G	140	150	170	220	220
H	130	130	160	205	205
J	80	80	80	116	116
K	M10x12 deep	M10x12 deep	M12x18 deep	M12x18 deep	M12x18 deep
L	67	67	82	106	106
M	72	70	86	106	106
N	35,7	42,9	50,8	62	92
O	70	77,8	89	106,4	152,4
P	M12x19 deep	M12x19 deep	M12x19 deep	M16x24 deep	M16x24 deep
weight kg	16	25	35	45	51
volume tank	2,4 l	3,6 l	5,3 l	11,5 l	11,5 l

Changes of measures and design are subject to alteration!

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4. Spare parts:

item	designation	qty.	dimension and article-no. LF 251	qty.	dimension and article-no. LF 401	qty.	dimension and article-no. LF 631	qty.	dimension and article-no. LF 1001/1100
1	filter element	1	01NL. 250	1	01NL. 400	1	01NL. 630	1	01NR. 1000
2	O-ring	1	40 x 3 304389 (NBR) 304391 (FPM)	1	40 x 3 304389 (NBR) 304391 (FPM)	1	60 x 3,5 304377 (NBR) 304398 (FPM)	1	90 x 4 306941 (NBR) 307031 (FPM)
3	O-ring	1	115 x 3 303963 (NBR) 307762 (FPM)	1	115 x 3 303963 (NBR) 307762 (FPM)	1	125 x 3 306025 (NBR) 307358 (FPM)	1	185 x 4 305593 (NBR) 306309 (FPM)
4	O-ring (LF 401-1001)	-	-	1	56,75 x 3,53 306035 (NBR) 310264 (FPM)	1	69,45 x 3,53 305868 (NBR) 307357 (FPM)	1	85,32 x 3,53 305590 (NBR) 306308 (FPM)
	O-ring (LF 1100)	-	-	-	-	-	-	1	136,12 x 3,53 320162 (NBR) 320163 (FPM)
5	screw plug	3	G ½ 304678	3	G ½ 304678	3	G ½ 304678	3	G ½ 304678
6	screw plug	2	G ¼ 305003						
7	clogging indicator, visual	1	AOR or AOC see sheet-no. 1606						
8	clogging indicator, visual	1	OP see sheet-no. 1628						
9	clogging indicator, visual-electrical	1	OE see sheet-no. 1628						
10	clogging indicator, visual-electrical	1	AE see sheet-no. 1609						
11	clogging sensor, electronical	1	VS1 see sheet-no. 1607						
12	clogging sensor, electronical	1	VS2 see sheet-no. 1608						
13	O-ring	1	15 x 1,5 315357 (NBR) 315427 (FPM)						
14	O-ring	1	22 x 2 304708 (NBR) 304721 (FPM)						
15	O-ring	2	14 x 2 304342 (NBR) 304722 (FPM)						
16	screw plug	2	G ¼ 305003						

item 16 execution only without clogging indicator or clogging sensor

5. Description:

In-line filters of the type LF 251-1100 are suitable for a working pressure up to 32 bar. Pressure peaks are absorbed with a sufficient margin of safety.
The filter is mounted in such a way that inlet and outlet are on the same level. It can be used as suction filter, pressure filter and return-line filter. The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside.
For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fibre element remove the cover and take out the element.
Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as
5 $\mu m_{(c)}$ microns are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils
Approvals according to TÜV, and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible.

The internal valve is integrated in the filter cover. After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter.

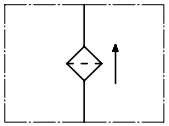
6. Technical data:

temperature range:	-10°C to +80°C (for a short time +100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	32 bar
test pressure:	64 bar
connection system:	SAE-flange connection 3000 PSI
housing material:	EN-GJS-400-18-LT
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
mini-measuring connection:	G ¼
evacuation-or bleeder-connection:	G ½

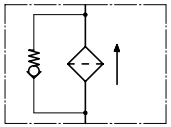
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

7. Symbols:

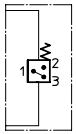
filter without internal valve



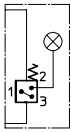
filter with by-pass valve



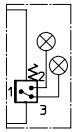
with electrical indicator AE 30 and AE 40



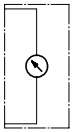
with visual - electrical indicator AE 50 and AE 62



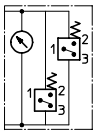
with visual - electrical indicator AE 70 and AE 80



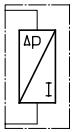
with visual indicator AOR/AOC/OP



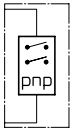
with visual - electrical indicator OE



with electronical clogging sensor VS1



with electronical clogging sensor VS2



8. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively
Δp- curves; depending on filter fineness and viscosity.

9. Test methods:

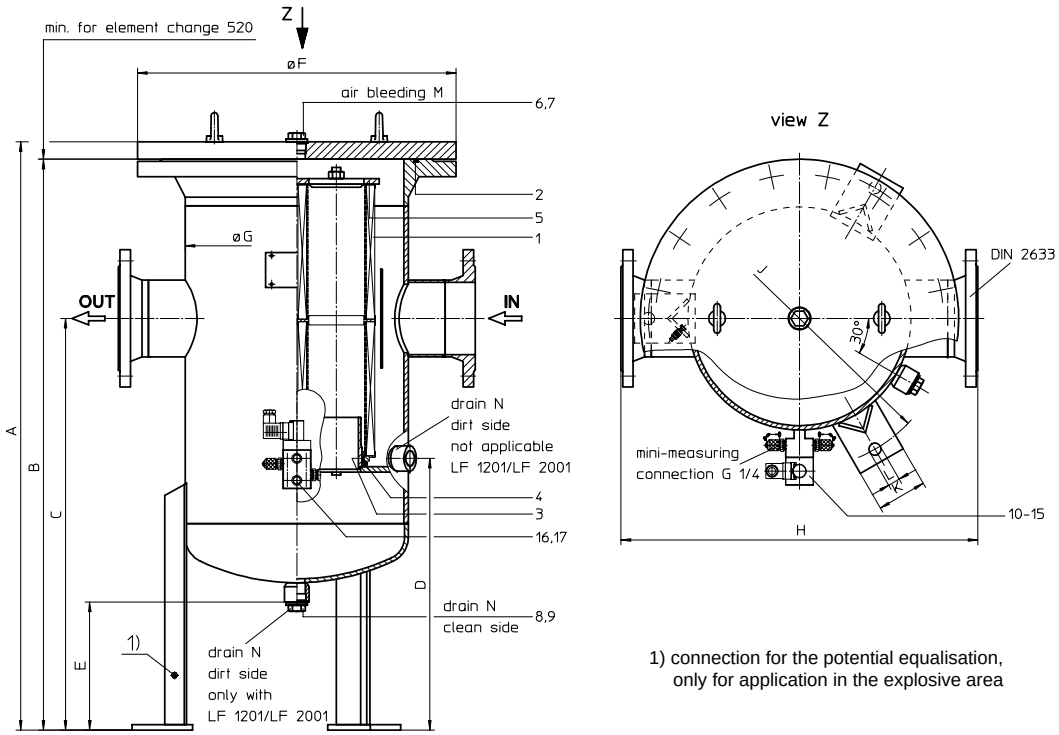
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 293	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER

Series LF 1201-10001 DN 50-250 PN 16

Sheet No. **1118 J**



1) connection for the potential equalisation, only for application in the explosive area

3. Dimensions:

type	connection DN	A	B	C	D	E	F	G	H	J	K	L	M	N	weight kg	volume tank
LF 1201	50	1052	1028	400	-	188	340	219	412	330	70	18	G ½	G1	60	26,0 l
	65	1071	1047													27,0 l
	80	1052	1028													26,0 l
	100	1128	1104													29,0 l
LF 2001	65	1093	1067	425	-	186	405	273	494	380	70	18	G1	G1	110	43,5 l
	80	1112	1086													44,5 l
	100	1100	1074													43,5 l
	125	1188	1162													48,0 l
LF 2401	65	1018	990	700	445	183	460	324	600	450	70	18	G1	G1	130	55,0 l
	80															
	100															
	125															
LF 3601	80	1072	1040	750	495	238	580	406	650	550	90	22	G1	G1	260	90,0 l
	100															
	125															
	150															
LF 4801 LF 6001	100	1116	1080	800	535	232	715	508	800	650	90	22	G1	G1	310	145,0 l
	125															
	150															
	200															
LF 10001	125	1150	1110	800	570	283	910	711	1000	900	120	22	G1 ½	G1 ½	560	283,0 l
	150															
	200															
	250															

EDV 11/07

1. Type index:

1.1. Complete filter: (ordering example)

LF. 2001. 10VG. 10. E. P. -. FD1. 9. -. AE

1	2	3	4	5	6	7	8	9	10	11

1 **series:**
LF = in-line filter

2 **nominal size:** 1201, 2001, 2401, 3601, 4801, 6001, 10001

3 **filter material and filter fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm stainless steel wire mesh,
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
E = without by-pass valve
S = with by-pass valve Δp 2,0 bar

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **connection:**
FD1 = flange connection DIN 2633, design C DIN 2526; FD2 = flange connection DIN 2633, design E DIN 2526

9 **connection size:**

DN	filter nominal size						
8 = 50	1201						
9 = 65	1201	2001	2401				
A = 80	1201	2001	2401	3601			
B = 100	1201	2001	2401	3601	4801	6001	
C = 125		2001	2401	3601	4801	6001	10001
D = 150				3601	4801	6001	10001
E = 200					4801	6001	10001
F = 250							10001

10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605

11 **clogging indicator or clogging sensor:**
- = without
AE = visual-electrical, see sheet-no.1609
OP = visual, see sheet-no.1628; VS1 = electronical, see sheet-no.1607
OE = visual-electrical, see sheet-no 1628; VS2 = electronical, see sheet-no.1608

1.2. Filter element: (ordering example)

01E. 2001. 10VG. 10. E. P. -

1	2	3	4	5	6	7

1 **series:**
01E. = filter element according to INTERNORMEN factory specification

2 **nominal size:** 1201, 2001

3 - 7 see type index-complete filter

2. Accessories:

- measure-and bleeder -connection see sheet-no. 1650
- evacuation- and bleeder-connection see sheet-no. 1651
- counter flange see sheet-no. 1653
- lifting mechanism see sheet-no. 1661

Changes of measures and design are subject to alt eration!

internormen technology

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4. Spare parts:

4.1. Depending on different series:

item	designation	qty.	dimension and article-no. LF 1201	dimension and article-no. LF 2001	qty.	dimension and article-no. LF 2401	qty.	dimension and article-no. LF 3601	qty.	dimension and article-no. LF 4801	qty.	dimension and article-no. LF 6001	qty.	dimension and article-no. LF 10001
1	filter element	1	01E.1201	01E.2001	2	01E.1201	3	01E.1201	4	01E.1201	3	01E.2001	5	01E.2001
2	O-ring	1	225 x 5 308652 (NBR) 311473 (FPM)	275 x 5 307414 (NBR) 310288 (FPM)	1	330 x 5 303080 (NBR) 310275 (FPM)	1	429 x 6 308659 (NBR) 310273 (FPM)	1	516 x 6 301962 (NBR) 311474 (FPM)	1	516 x 6 301962 (NBR) 311474 (FPM)	1	722 x 8 308145 (NBR) 311805 (FPM)
3	O-ring	1	93 x 5 307588 (NBR) 307589 (FPM)	135 x 5 306016 (NBR) 307045 (FPM)	2	93 x 5 307588 (NBR) 307589 (FPM)	3	93 x 5 307588 (NBR) 307589 (FPM)	4	93 x 5 307588 (NBR) 307589 (FPM)	3	135 x 5 306016 (NBR) 307045 (FPM)	5	135 x 5 306016 (NBR) 307045 (FPM)
4	O-ring	1	85 x 10 304386 (NBR) 304541 (FPM)	125 x 10 304388 (NBR) 306006 (FPM)	2	85 x 10 304386 (NBR) 304541 (FPM)	3	85 x 10 304386 (NBR) 304541 (FPM)	4	85 x 10 304386 (NBR) 304541 (FPM)	3	125 x 10 304388 (NBR) 306006 (FPM)	5	125 x 10 304388 (NBR) 306006 (FPM)
5	spring	1	304414		-	-	-	-	-	-	-	-	-	-
	pressure plate	-	-		1	309851	1	313116	1	314718	1	313335	1	313062
6	screw plug	1	G ½ 309730	G 1 309732	1	G1 309732							1	G 1 ½ 318556
7	gasket	1	A 22 x 27 305564	A 33 x 39 308257	1	A 33 x 39 308257							1	A 48 x 55 309764
8	screw plug	1	G1 309732	G1 309732	2	G1 309732							2	G 1 ½ 318556
9	gasket	1	A 33 x 39 308257	A 33 x 39 308257	2	A 33 x 39 308257							2	A 48 x 55 309764

4.2. Independing on the series:

item	qty.	designation	dimension	article-no.	
10	1	clogging indicator, visual	OP	see sheet-no. 1628	
11	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628	
12	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
13	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
14	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
15	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
16	2	screw plug	G ¼	309734	
17	2	gasket	A 14 x 18	306330	

5. Description:

In-line filters of the series LF 1201-10001 are suitable for a working pressure up to 16 bar. Pressure peaks can be absorbed with a sufficient margin of safety.
The filter is in-line mounted. Inlet and outlet are on the same level. The filters can be installed as suction-filter, pressure-filter or return-line filter.
The filter element consist of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. The particles are hold back on the outside. For cleaning (see special leaflet 21070-4 resp. 39448-4) the mesh element respectively to change the glass fibre element remove the cover and take out the element.
Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubric ation oils.
Approvals according to TÜV, and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S.; P.R.S.;USS.R.S. and others are possible.

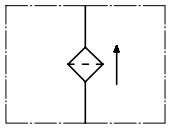
6. Technical data:

temperature range:	- 10°C to +80°C (for a short time +100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	16 bar
test pressure:	23 bar
connection system:	flange connection DIN 2633, 16 bar
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
mini-measuring connection:	G ¼

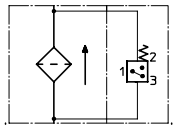
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

7. Symbols:

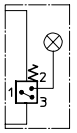
without indicator



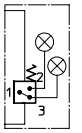
with electrical indicator
AE 30 and AE 40



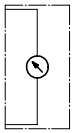
with visual - electrical indicator
AE 50 and AE 62



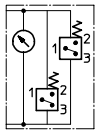
with visual - electrical indicator
AE 70 and AE 80



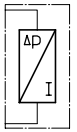
with visual indicator
OP



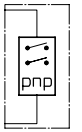
with visual - electrical indicator
OE



with electronical clogging sensor
VS1



with electronical clogging sensor
VS2



8. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’, respectively Δp-curves; depending on filter fin eness and viscosity.

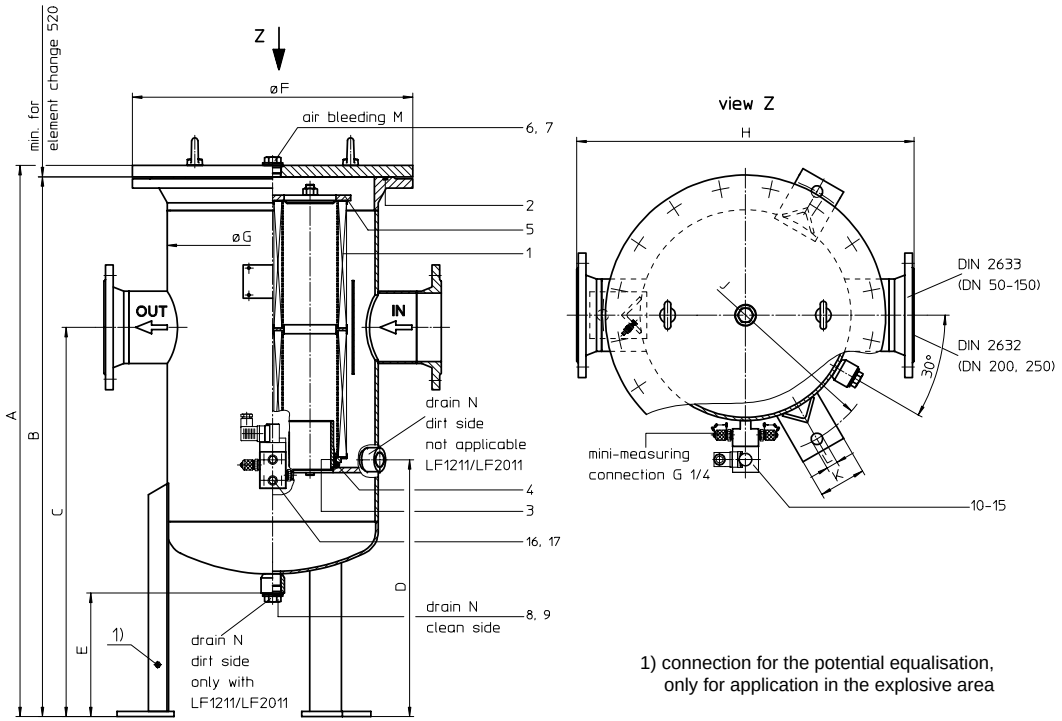
9. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER
Series LF 1211-10011 DN 50-250 PN 10

Sheet No. **1127 B1**



1) connection for the potential equalisation, only for application in the explosive area

1. Type index:

1.1. Complete filter: (ordering example)

LF. 2011. 10VG. 10. E. P. -. FD1. 9. -. AE

1	2	3	4	5	6	7	8	9	10	11

1 **series:**
LF = in-line filter

2 **nominal size:** 1211, 2011, 2411, 3611, 4811, 6011, 10011

3 **filter material and filter fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm stainless steel wire mesh,
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
E = without by-pass valve; S = with by-pass valve Δp 2,0 bar

6 **sealing material:**
P = Nitrile (NBR) ; V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **connection:**
FD11 = flange DIN 2632, design C DIN 2526; FD12 = flange DIN 2632, design E DIN 2526 (DN 200, 250)
FD1 = flange DIN 2633, design C DIN 2526; FD2 = flange DIN 2633, design E DIN 2526 (DN 50-150)

9 **connection size:**

DN	filter nominal size						
8 = 50	1211						
9 = 65	1211	2011	2411				
A = 80	1211	2011	2411	3611			
B = 100	1211	2011	2411	3611	4811	6011	
C = 125		2011	2411	3611	4811	6011	10011
D = 150				3611	4811	6011	10011
E = 200					4811	6011	10011
F = 250							10011

10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605

11 **clogging indicator or clogging sensor:**
- = without
AE = visual-electrical, see sheet-no.1609
OP = visual, see sheet-no.1628; VS1 = electronical, see sheet-no.1607
OE = visual-electrical, see sheet-no 1628 VS2 = electronical, see sheet-no.1608

1.2. Filter element: (ordering example)

01E. 2001. 10VG. 10. E. P. -

1	2	3	4	5	6	7

1 **series:**
01E. = filter element according to INTERNORMEN factory specification

2 **nominal size:** 1201, 2001

3 - 7 see type index-complete filter

2. Accessories:

- measure-and bleeder -connections, see sheet-no. 1650
- evacuation- and bleeder-connections, see sheet-no. 1651
- counter flanges, see sheet-no. 1653
- lifting mechanism, see sheet-no. 1661

Changes of measures and design are subject to alteration!

3. Dimensions:

type	connection DN	A	B	C	D	E	F	G	H	J	K	L	M	N	weight kg	volume tank
LF 1211	50	1052	1028	400	-	188	340	219	412	330	70	18	G ½	G1	60	26,0 l
	65	1071	1047													27,0 l
	80	1052	1028													26,0 l
	100	1128	1104													29,0 l
LF 2011	65	1093	1067	425	-	186	395	273	494	380	70	18	G1	G1	110	43,5 l
	80	1112	1086													44,5 l
	100	1100	1074													43,5 l
	125	1188	1162													48,0 l
LF 2411	65	1016	990	700	445	183	445	324	600	450	70	18	G1	G1	130	55,0 l
	80															
	100															
	125															
LF 3611	80	1066	1040	750	495	238	565	406	650	550	90	22	G1	G1	260	90,0 l
	100															
	125															
	150															
LF 4811 LF 6011	100	1108	1080	800	535	232	670	508	800	650	90	22	G1	G1	310	145,0 l
	125															
	150															
	200															
LF 10011	125	1148	1110	800	570	288	895	711	1000	900	120	22	G1 ½	G1 ½	560	283,0 l
	150															
	200															
	250															

EDV 11/07

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4. Spare parts:

4.1. Depending on different series:

item	designation	qty.	dimension and article-no. LF 1211	dimension and article-no. LF 2011	qty.	dimension and article-no. LF 2411	qty.	dimension and article-no. LF 3611	qty.	dimension and article-no. LF 4811	qty.	dimension and article-no. LF 6011	qty.	dimension and article-no. LF 10011
1	filter element	1	01E.1201	01E.2001	2	01E.1201	3	01E.1201	4	01E.1201	3	01E.2001	5	01E.2001
2	O-ring	1	225 x 5 308652 (NBR) 311473 (FPM)	275 x 5 307414 (NBR) 310288 (FPM)	1	330 x 5 303080 (NBR) 310275 (FPM)	1	429 x 6 308659 (NBR) 310273 (FPM)	1	516 x 6 301962 (NBR) 311474 (FPM)	1	516 x 6 301962 (NBR) 311474 (FPM)	1	722 x 8 308145 (NBR) 311805 (FPM)
3	O-ring	1	93 x 5 307588 (NBR) 307589 (FPM)	135 x 5 306016 (NBR) 307045 (FPM)	2	93 x 5 307588 (NBR) 307589 (FPM)	3	93 x 5 307588 (NBR) 307589 (FPM)	4	93 x 5 307588 (NBR) 307589 (FPM)	3	135 x 5 306016 (NBR) 307045 (FPM)	5	135 x 5 306016 (NBR) 307045 (FPM)
4	O-ring	1	85 x 10 304386 (NBR) 304541 (FPM)	125 x 10 304388 (NBR) 306006 (FPM)	2	85 x 10 304386 (NBR) 304541 (FPM)	3	85 x 10 304386 (NBR) 304541 (FPM)	4	85 x 10 304386 (NBR) 304541 (FPM)	3	125 x 10 304388 (NBR) 306006 (FPM)	5	125 x 10 304388 (NBR) 306006 (FPM)
5	spring	1	304414		-	-	-	-	-	-	-	-	-	-
	pressure plate	-	-		1	309851	1	313116	1	314718	1	313335	1	313062
6	screw plug	1	G ½ 309730	G 1 309732	1	G1 309732							1	G 1 ½ 318556
7	gasket	1	A 22 x 27 305564	A 33 x 39 308257	1	A 33 x 39 308257							1	A 48 x 55 309764
8	screw plug	1	G1 309732	G1 309732	2	G1 309732							2	G 1 ½ 318556
9	gasket	1	A 33 x 39 308257	A 33 x 39 308257	2	A 33 x 39 308257							2	A 48 x 55 309764

4.2. Independing on the series:

item	qty.	designation	dimension	article-no.	
10	1	clogging indicator, visual	OP	see sheet-no. 1628	
11	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628	
12	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
13	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
14	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
15	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
16	2	screw plug	G ¼	309734	
17	2	gasket	A 14 x 18	306330	

5. Description:

In-line filters of the series LF 1211-10011 are suitable for a working pressure up to 10 bar. Pressure peaks can be absorbed with a sufficient margin of safety.
The filter is in-line mounted. Inlet and outlet are on the same level. The filters can be installed as suction-filter, pressure-filter or return-line filter.
The filter element consist of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. The particles are hold back on the outside. For cleaning (see special leaflet 21070-4 resp. 39448-4) the mesh element respectively to change the glass fibre element remove the cover and take out the element.
Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubric ation oils.
Approvals according to TÜV, and the mayor „Shipyard Classification Societies" D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S.; P.R.S.;USS.R.S. and others are possible.

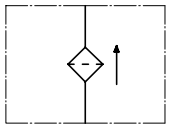
6. Technical data:

temperature range:	- 10°C to +80°C (for a short time +100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	10 bar
test pressure:	14,3 bar
connection system:	flange connection DIN 2633, 16 bar (DN 50-150) flange connection DIN 2632, 10 bar (DN 200, 250)
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
mini-measuring connection:	G ¼ for screw coupling (mini-measuring)

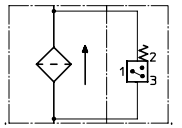
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

7. Symbols:

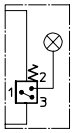
without indicator



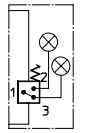
with electrical indicator AE 30 and AE 40



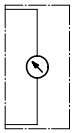
with visual - electrical indicator AE 50 and AE 62



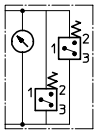
with visual - electrical indicator AE 70 and AE 80



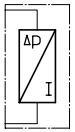
with visual indicator OP



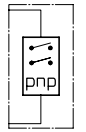
with visual - electrical indicator OE



with electronical clogging sensor VS1



with electronical clogging sensor VS2



8. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fin eness and viscosity.

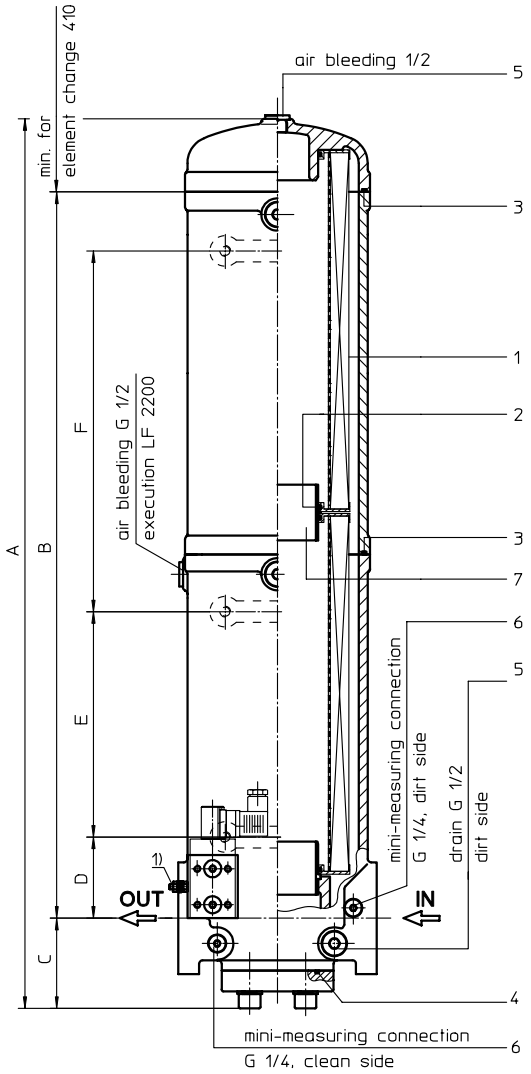
9. Test methods:

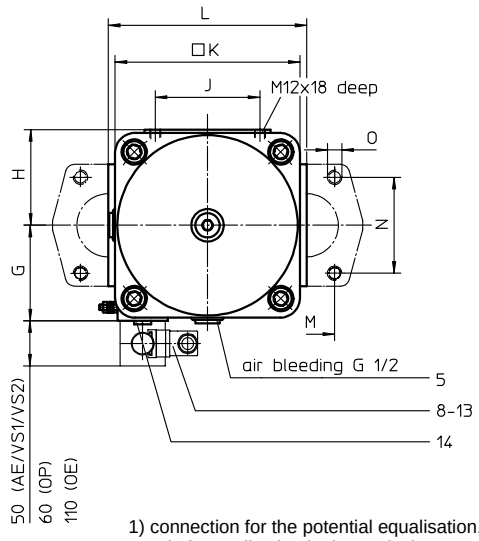
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER
Series LF 1950-2200 DN 80-125 PN 32

Sheet No.
1119 K





1) connection for the potential equalisation, only for application in the explosive area

1. Type index:

1.1. Complete filter: (ordering example)

LF.	1950.	10VG.	10.	B.	P.	-.	FS.	A.	-.	-.	AE
1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
LF = in-line filter

2 **nominal size:** 1950, 2200

3 **filter-material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25µm
stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$,
6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fiber)

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
IS07 = see sheet-no. 31602

8 **connection:**
FS = SAE-flange connection 3000 PSI

9 **connection size:**
A = 3“ (LF 1950)
C = 5“ (LF 2200)

10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605

11 **internal valve:**
- = without
S = with by-pass valve Δp 2,0 bar
S1 = with by-pass valve Δp 3,5 bar

12 **clogging indicator or clogging sensor :**
- = without
OP = visual, see sheet-no. 1628
OE = visual-electrical, see sheet-no. 1628
AE = visual-electrical, see sheet-no. 1609
VS1 = electronical, see sheet-no. 1607
VS2 = electronical, see sheet-no. 1608

1.2. Filter element: (ordering example)

01NR.	1000.	10VG.	10.	B.	P.	-
1	2	3	4	5	6	7

1 **series**:
01NR. = standard filter element according to DIN 24550, T4

2 **nominal size:** 1000

3 - 7 see type index-complete filter

2. Accessories:

- measure- and bleeder-connection, se sheet-no. 1650
- evacuation- and bleeder-connection, see shet-no. 1651
- counter flange, see sheet-no. 1652

3. Dimensions:

type	connection	A	B	C	D	E	F	G	H	J	K	L	M	N	O	weight kg
LF 1950	SAE 3“	987	806	100	90	250	400	106	106	116	205	220	62	106,4	M16 x 24 deep	68
LF 2200	SAE 5“	1043	832	130	116	250	400	106	106	116	205	220	92	152,4	M16 x 24 deep	74

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Changes of measures and design are subject to alteration!

internormen technology

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4. Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01NR. 1000		
2	4	O-ring	90 x 4	306941 (NBR)	307031 (FPM)
3	2	O-ring	185 x 4	305593 (NBR)	306309 (FPM)
4	1	O-ring LF 1950	85,32 x 3,53	305590 (NBR)	306308 (FPM)
	1	O-ring LF 2200	136,12 x 3,53	320162 (NBR)	320163 (FPM)
5	4	screw plug	G ½	304678	
6	2	screw plug	G ¼	305003	
7	1	connecting pipe	21689-4	313233	
8	1	clogging indicator, visual	OP	see sheet-no. 1628	
9	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628	
10	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
11	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
12	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
13	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
14	2	screw plug	G ¼	305003	

item 14 execution only without clogging indicator or clogging sensor

5. Description:

In-line filters of the type LF 1950-2200 are suitable for a working pressure up to 32 bar.
Pressure peaks are absorbed with a sufficient margin of safety.
The filter is mounted in such a way that inlet and outlet are on the same level. It can be used as suction filter, pressure filter and return-line filter. The filter element consist of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.
For cleaning (see special leaflet 21070-4 resp. 39448-4) the mesh element respectively to change the glass fiber element remove the cover and take out the element.
Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fiber). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils
Approvals according to TÜV, and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible.
The internal valve is integrated in the filter cover. After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter.

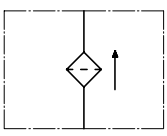
6. Technical data:

temperature range:	-10°C to +80°C (for a short time +100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	32 bar
test pressure:	64 bar
connection system:	SAE-flange connection 3000 PSI
housing material:	GGG 40.3
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
mini-measuring connection:	G ¼
evacuation-or bleeder-connection:	G ½
volume tank LF 1950:	21,7 l
LF 2200:	22,0 l

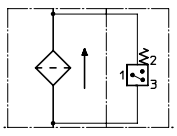
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

7. Symbols:

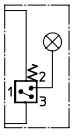
filter without indicator and without internal valve



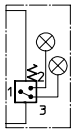
with electrical indicator AE 30 and AE 40



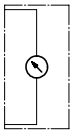
with visual-electrical indicator AE 50 and AE 62



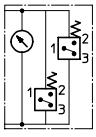
with visual-electrical indicator AE 70 and AE 80



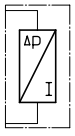
with visual indicator OP



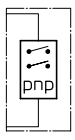
with visual-electrical indicator OE



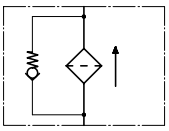
with electronical clogging sensor VS1

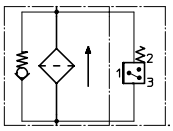


with electronical clogging sensor VS1



filter with by-pass valve





8. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’ respectively Δp-curves ; depending on filter fineness and viscosity.

9. Test methods:

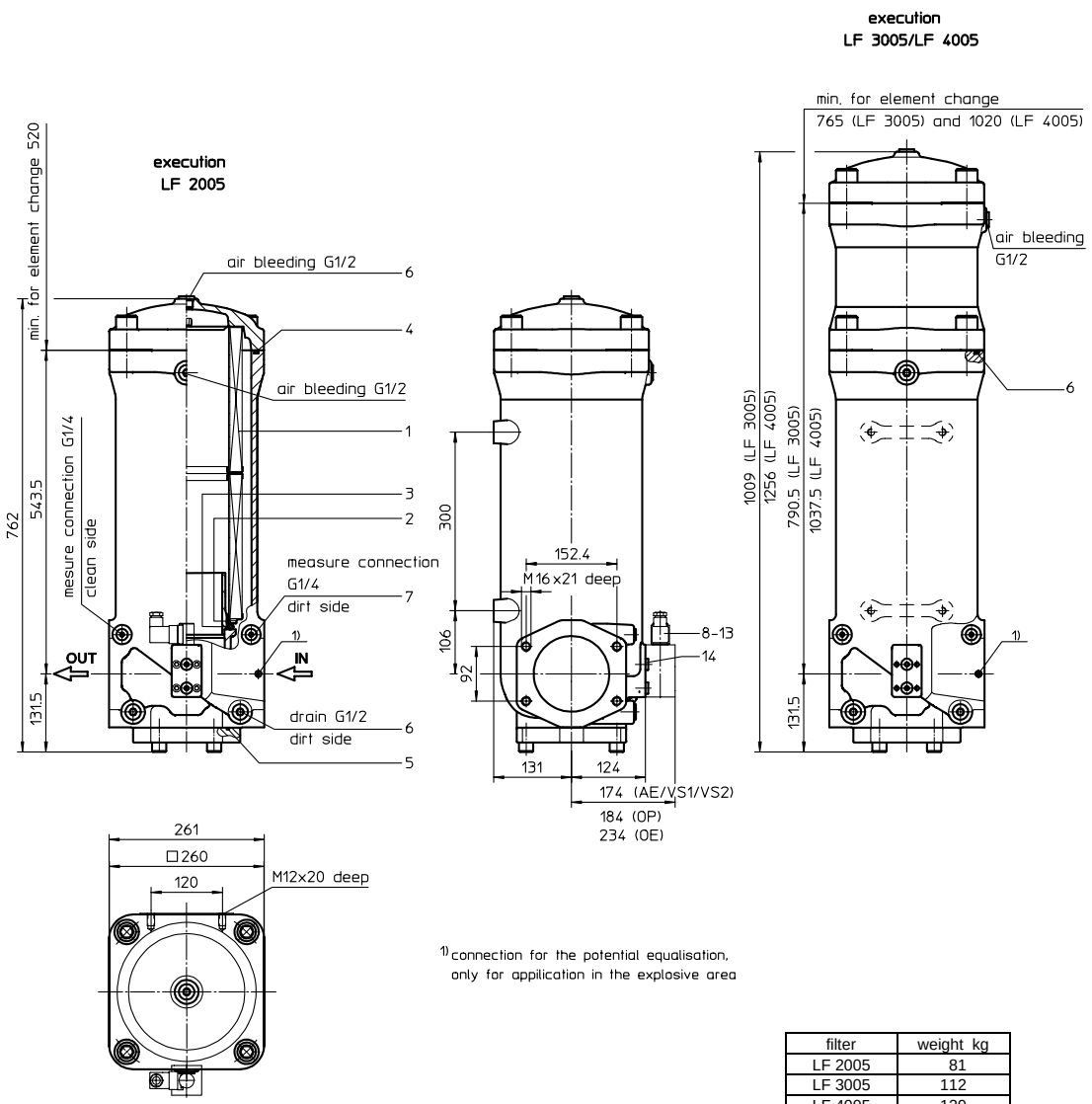
Filter elements are tested according to the following ISO specification:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

PRESSURE FILTER

Series LF 2005-4005 DN 125 PN 32

Sheet No. **1128**



1) connection for the potential equalisation, only for appilication in the explosive area

filter	weight kg
LF 2005	81
LF 3005	112
LF 4005	129

1. Type index:

1.1. Complete filter: (ordering example)

LF. 2005. 10VG. 10. E. P. -. FS. C. -. AE

1	2	3	4	5	6	7	8	9	10	11

1 **series:**
LF = in-line filter

2 **nominal size:** 2005, 3005, 4005

3 **filter-material and filter- fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
E = without by-pass valve
S = with by-pass valve Δp 2,0 bar

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **connection:**
FS = SAE-flange connection 3000 PSI

9 **connection size:**
C = 5"

10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605

11 **clogging indicator or clogging sensor:**
- = without
AE = visual-electrical, see sheet-no. 1609
OP = visual, see sheet-no. 1628
OE = visual-electrical, see sheet-no. 1628
VS1 = electronical, see sheet-no. 1607
VS2 = electronical, see sheet-no. 1608

1.2. Filter element: (ordering example)

01E. 2001. 10VG. 10. E. P. -

1	2	3	4	5	6	7

1 **series:**
01E. = filter element according to INTERNORMEN factory specification

2 **nominal size:** 2001, 3001, 4001

3 - 7 see type index complete filter

2. Accessories:

- measure-and bleeder -connection, see sheet-no. 1650
- evacuation- and bleeder-connection, see sheet-no. 1651
- counter flange, see sheet-no. 1652

Changes of measures and design are subject to alteration!

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3. Spare parts:

item	designation	qty.	dimension and article-no. LF 2005	dimension and article-no. LF 3005	dimension and article-no. LF 4005
1	filter element	1	01E. 2001	01E. 3001	01E. 4001
2	O-ring	1	135 x 10	306016 (NBR) 307045 (FPM)	
3	O-ring	1	125 x 10	304388 (NBR) 306006 (FPM)	
4	O-ring (LF 2005)	1	240 x 5	307592 (NBR)	
	O-ring (LF 3005/4005)	2		328793 (FPM)	
5	O-ring	1	136,12 x 3,53	320162 (NBR) 320163 (FPM)	
6	screw plug (LF 2005)	4	G ½	304678	
	screw plug (LF 3005/4005)	5			
7	screw plug	2	G ¼	305003	
8	clogging indicator visual-electrical	1	OE	see seet-no. 1628	
9	clogging indicator visual	1	OP	see seet-no. 1628	
10	clogging indicator visual-electrical	1	AE	see seet-no. 1609	
11	clogging sensor electronical	1	VS1	see seet-no. 1607	
12	clogging sensor electronical	1	VS2	see seet-no. 1608	
13	O-ring	2	14 x 2	304342 (NBR) 304722 (FPM)	
14	screw plug	2	G ¼	305003	

item 14 execution only without clogging indicator or clogging sensor

4. Description:

In-line filters of the type LF 2005-4005 are suitable for a working pressure up to 32 bar. Pressure peaks are absorbed with a sufficient margin of safety.
The filter is mounted in such a way that inlet and outlet are on the same level. It can be used as suction filter, pressure filter and return-line filter. The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside.
For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fibre element remove the cover and take out the element.
Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ microns are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils
Approvals according to TÜV, and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible.

5. Technical data:

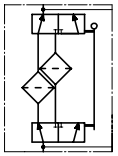
temperature range:		- 10°C to + 80°C (for a short time + 100°C)
operating medium:		mineral oil, other media on request
max. operating pressure:		32 bar
test pressure:		64 bar
connection system:		SAE-flange connection 3000 PSI
housing material:		EN-GJS-400-18-LT
sealing material:		Nitrile (NBR) or Viton (FPM), other materials on request
installation position:		vertical
measuring connections:		G ¼
evacuation-or bleeder connections:		G ½
volume tank	LF 2005:	23 l
	LF 3005:	32 l
	LF 4005:	40 l

Classification according to the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2) -article 3, paragraph 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

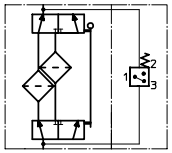
E 1128

6. Symbols:

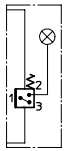
without indicator



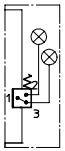
with electrical indicator AE 30 and AE 40



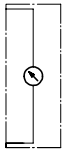
with visual-electrical indicator AE 50 and AE 62



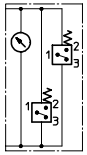
with visual-electrical indicator AE 70 and AE 80



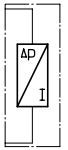
with visual indicator AOR/AOC/OP



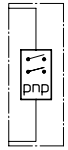
with visual-electrical indicator OE



with electronical clogging sensor VS1



with electronical clogging sensor VS2



7. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’, respectively Δp-curves; depending on filter fineness and viscosity.

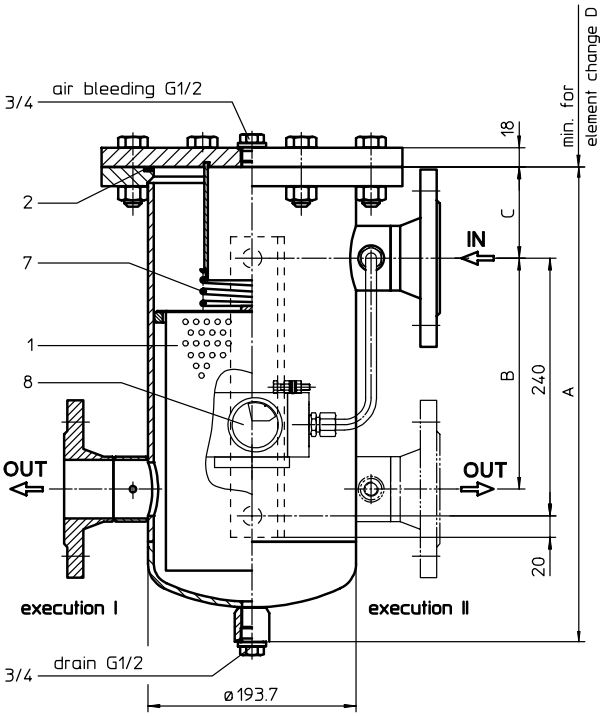
8. Test methods:

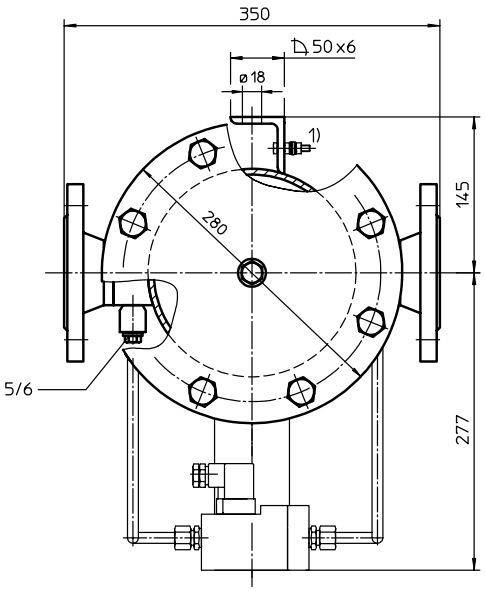
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

COARSE FILTER
Series GFK 50-80 DN 50-80 PN 16

Sheet No.
3005 C





1) connection for the potential equalisation, only for application in the explosive area

1. Type index:

1.1. Complete filter: (ordering example)

GFK.	50.	I.	ST.	0,50G.	P.	FD1.	8.	OE
1	2	3	4	5	6	7	8	9

1 **series:**
GFK = coarse filter with strainer basket

2 **nominal size:** 50, 65, 80

3 **execution:**
I = filter outlet according to I
II = filter outlet according to II

4 **housing material:**
ST = housing of steel
VA = housing of stainless steel

5 **filter-material and filter-fineness:**
0,25 G = 0,25 mm, 0,50 G = 0,50 mm, 0,75 G = 0,75 mm,
1,00 G = 1,00 mm, 1,50 G = 1,50 mm stainless steel wire mesh

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **connection:**
FD1 = flange DIN 2633, form C DIN 2526
FD2 = flange DIN 2633, form E DIN 2526

8 **connection size:**
8 = DN 50 (GFK50)
9 = DN 65 (GFK65)
A = DN 80 (GFK80)

9 **clogging indicator:**
- = without
OE = clogging indicator, visual-electrical, see sheet-no. 1614
DM = pressure difference gauge
DKM = pressure difference gauge with contact

1.2. Strainer basket: (ordering example)

Gr.00.	0,50.	ST
1	2	3

1 **size of strainer basket :** Gr. 00, Gr. 01

2 **filter-material and filter-fineness:**
0,25 G = 0,25 mm, 0,50 G = 0,50 mm, 0,75 G = 0,75 mm,
1,00 G = 1,00 mm, 1,50 G = 1,50 mm stainless steel wire mesh

3 **material of strainer basket:**
ST = strainer basket of steel, wire mesh of stainless steel
VA = strainer basket and wire mesh of stainless steel

2. Dimensions:

type	GFK 50	GFK 65	GFK 80
connection	DN 50	DN 65	DN 80
size of strainer basket	Gr. 00	Gr. 01	Gr. 01
Q = m³/h	25	35	55
filter surface m²	0,12	0,18	0,18
A	442	587	587
B	215	340	340
C	85	100	100
D	300	420	420
weight kg	40	44	45
volume tank	10 l	14 l	14 l

Changes of measures and design are subject to alteration !

EDV 11/07

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3. Spare parts:

item	qty.	designation	dimension and article-no.		
			GFK 50	GFK 65	GFK 80
1	1	strainer basket	Gr. 00	Gr. 01	Gr. 01
2	1	O-ring	190 x 5 305432 (NBR) 310283 (FPM)		
3	2	screw plug	G ½ 309730		
4	2	gasket	A 22 x 27 305564		
5	2	screw plug	G ¼ 309734		
6	2	gasket	A 14 x 18 306330		
7	1	spring	Da = 95 304414		
8	1	clogging indiactor	OE, DM or DKM		

4. Description:

Coarse filters of the series GFK 50-80 are suitable for a working pressure up to 16 bar.
Pressure peaks can be absorbed with a sufficient margin of safety. The filters can be installed as suction filter, pressure filter or return-line filter.
The filter elements are filter baskets with steel wire mesh as filter material. The perforated centre tube is layed out with steel wire mesh. The flow direction is from inside to the outside.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
Approvals according to TÜV, and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S.; P.R.S.;USS.R.S. and others are possible.

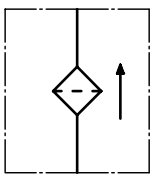
5. Technical data:

temperature range:	- 10 °C to + 80 °C (for a short time + 100 °C)
operating medium:	mineral oil, other media on request
max. operating pressure:	16 bar
test pressure:	23 bar
connection system:	SAE-flange 3000 PSI
housing material:	C-steel or stainless steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

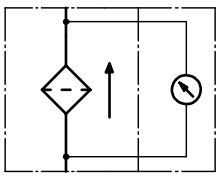
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:

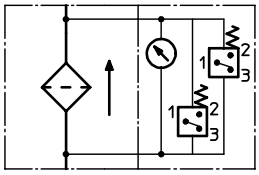
without indicator



with visual indicator



with visual-electrical indicator OE

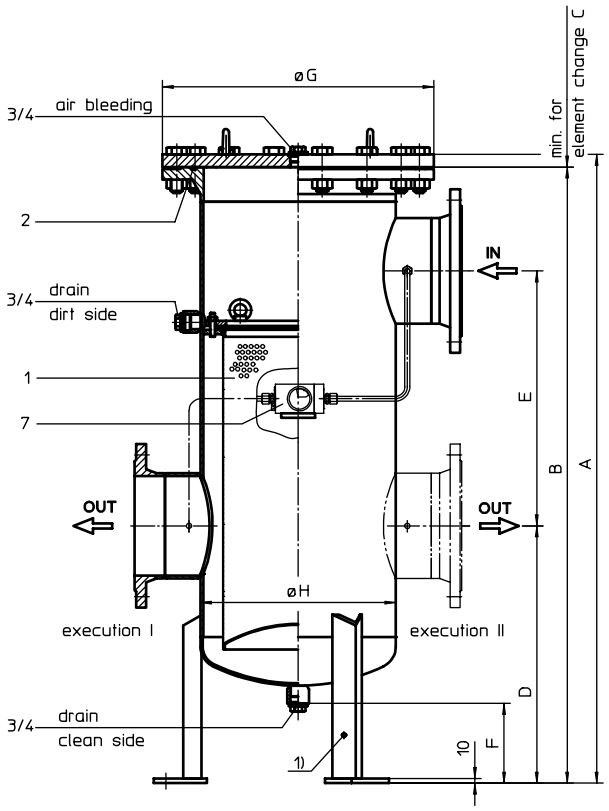


7. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’, respectively Δp-curves; depending on filter fineness and viscosity.

COARSE FILTER
Series GFK 100-500 DN 100-500 PN 10

Sheet No.
3006 F



1) connection for the potential equalisation, only for application in the explosive area

1. Type index:

1.1. Complete filter: (ordering example)

GFK. 200. I. ST. 0,50G. P. FD11. E. OE

1	2	3	4	5	6	7	8	9

1 series:
GFK = coarse filter with strainer basket

2 nominal size: 100, 125, 150, 200, 250, 300, 350, 400, 500

3 execution:
I = filter outlet according to I
II = filter outlet according to II

4 housing material:
ST = housing of steel
VA = housing of stainless steel

5 filter-material and filter-fineness:
0,25 G = 0,25 mm, 0,50 G = 0,50 mm, 0,75 G = 0,75 mm, 1,00 G = 1,00 mm, 1,50 G = 1,50 mm stainless steel wire mesh

6 sealing material:
P = Nitrile (NBR)
V = Viton (FPM)

7 connection:
FD1 = flange DIN 2633, form C DIN 2526 (DN100-150)
FD2 = flange DIN 2633, form E DIN 2526 (DN100-150)
FD11 = flange DIN 2632, form C DIN 2526 (DN200-500)
FD12 = flange DIN 2632, form E DIN 2526 (DN200-500)

8 connection size:
B = DN 100 (GFK100)
C = DN 125 (GFK125)
D = DN 150 (GFK150)
E = DN 200 (GFK200)
F = DN 250 (GFK250)
G = DN 300 (GFK300)
H = DN 350 (GFK350)
I = DN 400 (GFK400)
K = DN 500 (GFK500)

9 clogging indicator:
- = without
OE = clogging indicator, visual-electrical, see sheet-no. 1614
DM = pressure difference gauge
DKM = pressure difference gauge with contact

1.2. Strainer basket: (ordering example)

Gr.06. 0,50. ST

1	2	3

1 size of strainer basket : Gr. 02, Gr. 04, Gr. 06, Gr. 07

2 filter-material and filter-fineness:
0,25 G = 0,25 mm, 0,50 G = 0,50 mm, 0,75 G = 0,75 mm, 1,00 G = 1,00 mm, 1,50 G = 1,50 mm stainless steel wire mesh

3 material of strainer basket:
ST = strainer basket of steel, wire mesh of stainless steel
VA = strainer basket and wire mesh of stainless steel

2. Dimensions:

type	GFK 100	GFK 125	GFK 150	GFK 200	GFK 250	GFK 300	GFK 350	GFK 400	GFK 500
connection	DN 100	DN 125	DN 150	DN 200	DN 250	DN 300	DN 350	DN 400	DN 500
size of strainer basket	Gr. 02	Gr. 02	Gr. 04	Gr. 06	Gr. 06	Gr. 07	Gr. 04	Gr. 07	Gr. 04
Q = m³/h	90	110	192	288	440	630	650	850	1350
filter surface m²	0,25	0,25	0,5	0,6	0,6	1,0	2,0	3,0	6,0
A	1021	1021	1556	1306	1366	1788	1865	2000	2100
B	995	995	1530	1280	1340	1760	1835	1960	2060
C	550	550	1050	700	700	1050	800	1130	1130
D	370	385	420	535	550	575	1005	1030	940
E	435	410	870	530	550	900	540	600	740
F	170	170	170	165	165	180	200	200	200
G	405	405	405	565	565	670	780	1115	1115
H	273	273	273	406	406	508	610	914	914
J	480	480	480	680	680	750	950	1300	1300
K	380	380	380	550	550	650	800	1130	1130
L	70	70	70	90	90	90	100	100	100
M	18	18	18	22	22	22	27	35	35
N	320	320	320	385	385	435	485	640	640
weight kg	95	97	130	200	210	320	630	1015	1350
volume tank	41 l	41 l	70 l	127 l	130 l	217 l	448 l	1097 l	1160 l

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3. Spare parts:

item	qty.	designation	dimension and article-no.								
			GFK 100	GFK 125	GFK 150	GFK 200	GFK 250	GFK 300	GFK 350	GFK 400	GFK 500
1	-	strainer basket	1x Gr.02		1x Gr.04	1x Gr.06		1x Gr.07	4x Gr.04	3x Gr.07	12x Gr.04
2	1	O-ring	275 x 5 307414 (NBR) 310288 (FPM)			429 x 6 308659 (NBR) 310273 (FPM)		516 x 6 301962 (NBR) 311474 (FPM)	620 x 6 328918 (NBR) 328919 (FPM)	920 x 10 328920 (NBR) 328921 (FPM)	
3	3	screw plug	G 1 309732						G 1 ½ 309749		
4	3	gasket	A 33 x 39 308257						A 48 x 55 309764		
5	2	screw plug	G ¼ 309734								
6	2	gasket	A 14 x 18 306330								
7	1	clogging indicator	OE, DM or DKM								

4. Description:

Coarse filters of the series GFK 100-500 are suitable for a working pressure up to 10 bar.
Pressure peaks can be absorbed with a sufficient margin of safety. The filters can be installed as suction filter, pressure filter or return-line filter.
The filter elements are filter baskets with steel wire mesh as filter material. The perforated centre tube is layed out with steel wire mesh. The flow direction is from inside to the outside.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
Approvals according to TÜV, and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S.; P.R.S.;USS.R.S. and others are possible.

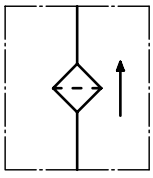
5. Technical data:

temperature range:	- 10 °C bis + 80 °C (kurzzeitig + 100 °C)
operating medium:	mineral oil, other media on request
max. operating pressure:	10 bar
test pressure:	14,3 bar
connection system:	flange DIN 2633, 16 bar (DN100-150) flange DIN 2632, 10 bar (DN200-500)
housing material:	C-steel or stainless steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

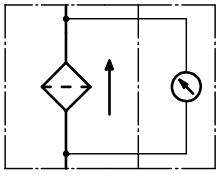
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:

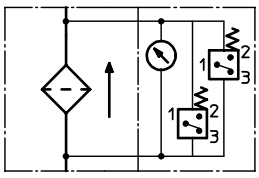
without indicator



with visual indicator



with visual-electrical indicator OE



7. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’, respectively Δp-curves; depending on filter fineness and viscosity

Bei pulsierender Belastung wie z.B. bei Kunststoffspritzmaschinen, Druckgussmaschinen, Schmiedepressen ect. reduzieren sich die max. zulässigen Betriebsdrücke je nach Filterbaureihe auf folgende Daten:

(Ermüdungsfestigkeit ca. 1 Mio. Lastwechsel)

Bei der Filterbaureihe bis 160 bar z.B. MNL, ML
(Filtergehäusematerial Al-Speziallegierung / C-Stahl) reduziert sich der zulässige Betriebsdruck auf 120 bar
Berstdruck: 480 bar

bei der Filterbaureihe bis 315 bar HDD, HPF, HPP
(Filtergehäusematerial GGG40.3 / C-Stahl) reduziert sich der zulässige Betriebsdruck auf 250 bar
Berstdruck: 945 bar

bei der Filterbaureihe bis 420 bar HP, HPV
(Filtergehäusematerial GGG40.3 / C-Stahl) reduziert sich der zulässige Betriebsdruck auf 340 bar
Berstdruck: 1344 bar

At pulsating loading like by injection moulding machines, diecasting machines, forging pressure etc. the max. admissible accumulator pressures reduce according to the line of filters to following facts:

(fatigue resistance appr. 1 million change of load)

At the line of filters up to 160 bar e.g. MNL, ML
(filter housing material Al-special alloy / C-steel) the admissible accumulator pressure reduces to 120 bar
burst pressure: 480 bar

At the line of filters up to 315 bar e.g. HDD, HPF, HPP
(filter housing material GGG 40.3 / C-steel) the admissible accumulator pressure reduces to 250 bar
burst pressure: 945 bar

At the line of filters up to 420 bar e.g. HP, HPV
(filter housing material GGG 40.3 / C-steel) the admissible accumulator pressure reduces to 340 bar
burst pressure: 1344 bar

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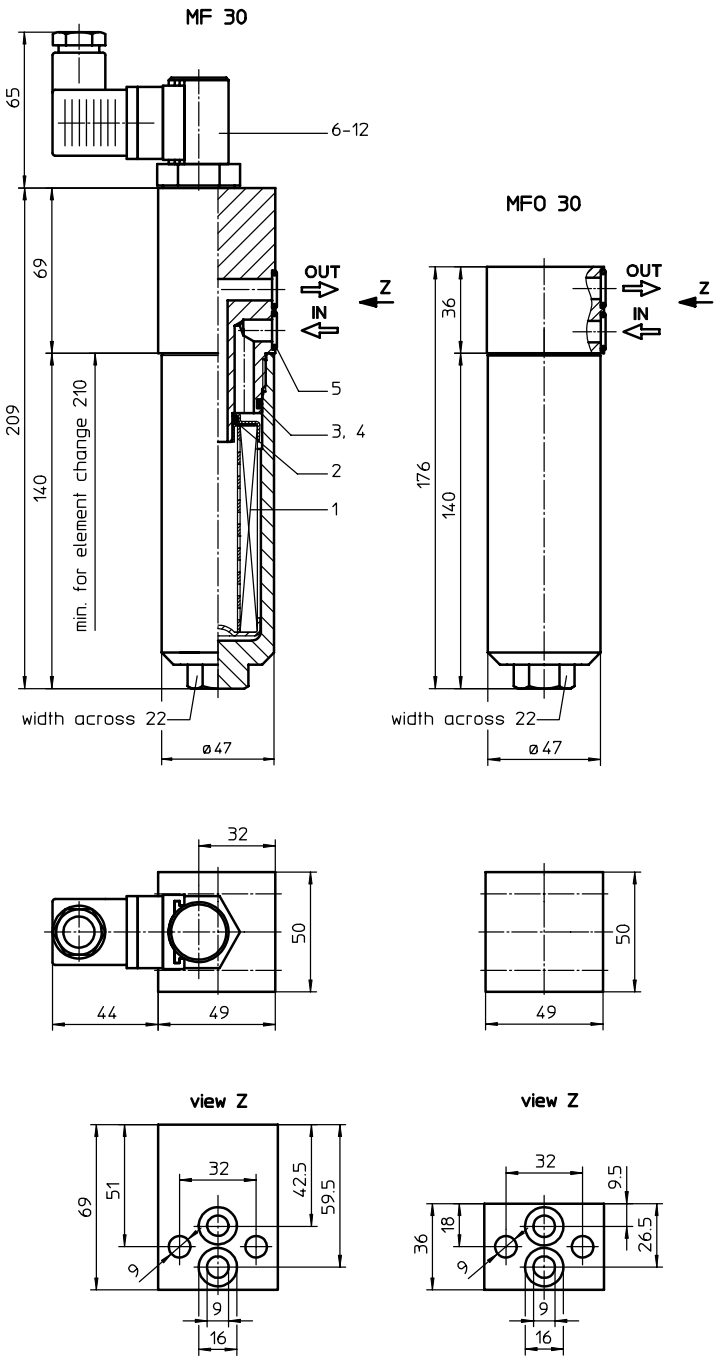
PRESSURE FILTER, manifold mounted
Series MF 30, MFO 30 DN 10 PN 160

Sheet No.
1416 E



1. Type index:

1.1. Complete filter: (ordering example)

MF.	30.	10VG.	HR.	E.	P.	-.	F.	2.	-.	AE
1	2	3	4	5	6	7	8	9	10	11

1 **series:**
- MF = medium pressure filter, manifold mounted with indicator
- MFO = medium pressure filter, manifold mounted without indicator

2 **nominal size:** 30

3 **filter-material and filter-fineness:**
25 VG= 20 µm$_{(c)}$, 16 VG= 15 µm$_{(c)}$, 10 VG= 10 µm$_{(c)}$,
6 VG = 7 µm$_{(c)}$, 3 VG = 5 µm$_{(c)}$ Interpor fleece (glass fibre)

4 **resistance of pressure difference for filter element:**
- 30 = Δp 30 bar
- HR = Δp 160 bar (rupture strenght Δp 250 bar)

5 **filter element design:**
- E = single-end open

6 **sealing material:**
- P = Nitrile (NBR)
- V = Viton (FPM)

7 **filter element specification:** (see catalog)
- - = standard
- VA = stainless steel
- IS06 = see sheet-no. 31601

8 **connection:**
- F = manifold mounted

9 **connection size:**
- 2 = DN 10

10 **filter housing specification:** (see catalog)
- - = standard
- IS06 = see sheet-no. 31605

11 **clogging indicator or clogging sensor:**
series MFO:
- - = without

series MF:
- AOR = visual, see sheet-no. 1606
- AOC = visual, see sheet-no. 1606
- AE = visual-electrical, see sheet-no. 1615
- VS1 = electronical, see sheet-no. 1617
- VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E.	30.	10VG.	HR.	E.	P.	-
1	2	3	4	5	6	7

1 **series:**
- 01E. = filter element according to INTERNORMEN factory specification

2 **nominal size:** 30

3 - 7 see type index-complete filter

weight without indicator: approx. 1,2 kg
weight with indicator : approx. 1,4 kg

Changes of measures and design are subject to alteration!

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2. Spare parts:

item	qty.	designation	dimensions	article-no.	
1	1	filter element	01E. 30		
2	1	O-ring	11 x 3	312603 (NBR)	312727 (FPM)
3	1	O-ring	32 x 2,5	306843 (NBR)	308268 (FPM)
4	1	support ring	37 x 2,1 x 1	305466	
5	2	O-ring	12 x 2	311014 (NBR)	310271 (FPM)
6	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
7	1	clogging indicator, visual-electrical	AE	see sheet-no. 1615	
8	1	clogging sensor, electronical	VS1	see sheet-no. 1617	
9	1	clogging sensor, electronical	VS2	see sheet-no. 1618	
10	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
11	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
12	1	O-ring	14 x 2	304342 (NBR)	304722 (FPM)

3. Description:

Pressure filter of the series MF 30 and MFO 30 are suitable for a working pressure up to 160 bar.
The pressure peaks are absorbed by a sufficient margin of safety. The filters are flange mounted to the hydraulic system.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside.
Filter elements are available down to 4 $\mu m_{(c)}$.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 160 bar and a rupture strength of Δp 250 bar.

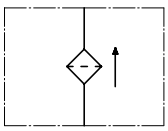
4. Technical data:

temperature range:	-10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	160 bar
test pressure:	208 bar
connection system:	manifold mounted
housing material:	Al; C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	0,1 l

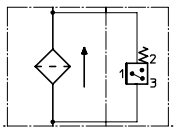
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:

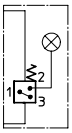
without indicator



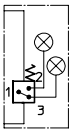
with electrical indicator AE 30 and AE 40



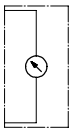
with visual-electrical indicator AE 50 and AE 62



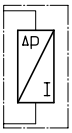
with visual-electrical indicator AE 70 and AE 80



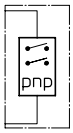
with visual indicator AOR/AOC



with electronical clogging sensor VS1



with electronical clogging sensor VS2



6. Pressure drop flow curves:

Precise flow rates see INT-Expert-System Filter respectively Δp-curves - depending on filter fineness and viscosity.

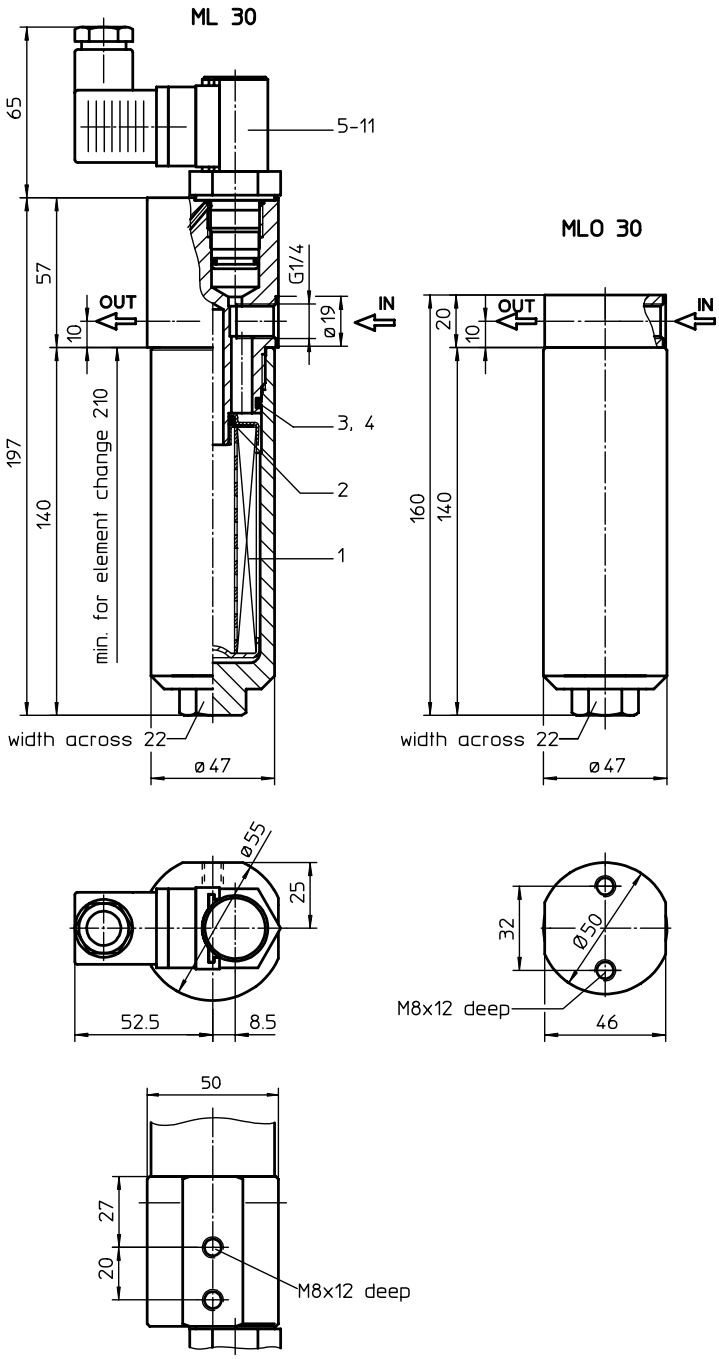
7. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

PRESSURE FILTER
Series ML 30, MLO 30 DN 6 PN 160

Sheet No.
1417 E



1. Type index:

1.1. Complete filter: (ordering example)

ML.	30.	10VG.	HR.	E.	P.	-.	G.	1.	-.	AE
1	2	3	4	5	6	7	8	9	10	11

1 **series:**
- ML = in-line filter-medium pressure range with indicator
- MLO = in-line filter-medium pressure range without indicator

2 **nominal size:** 30

3 **filter-material and filter-fineness:**
25 VG= 20 µm$_{(c)}$, 16 VG= 15 µm$_{(c)}$, 10 VG= 10 µm$_{(c)}$,
6 VG = 7 µm$_{(c)}$, 3 VG = 5 µm$_{(c)}$ Interpor fleece (glass fibre)

4 **resistance of pressure difference for filter element:**
- 30 = Δp 30 bar
- HR = Δp 160 bar (rupture strenght Δp 250 bar)

5 **filter element design:**
- E = single-end open

6 **sealing material:**
- P = Nitrile (NBR)
- V = Viton (FPM)

7 **filter element specification:** (see catalog)
- - = standard
- VA = stainless steel
- IS06 = see sheet-no. 31601

8 **connection:**
- G = thread connection according to ISO 228

9 **connection size:**
- 1 = G ¼

10 **filter housing specification:** (see catalog)
- - = standard
- IS06 = see sheet-no. 31605

11 **clogging indicator or clogging sensor:**
series MLO:
- - = without

series ML:
- AOR = visual, see sheet-no. 1606
- AOC = visual, see sheet-no. 1606
- AE = visual-electrical, see sheet-no. 1615
- VS1 = electronical, see sheet-no. 1617
- VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E.	30.	10VG.	HR.	E.	P.	-
1	2	3	4	5	6	7

1 **series:**
- 01E. = filter element according to INTERNORMEN factory specification

2 **nominal size:** 30

3 - 7 see type index-complete filter

weight without indicator: approx. 1,1 kg
weight with indicator : approx. 1,3 kg

Changes of measures and design are subject to alteration!

EDV 11/07

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2. Spare parts:

item	qty.	designation	dimensions	article-no.	
1	1	filter element	01E.30		
2	1	O-ring	11 x 3	312603 (NBR)	312727 (FPM)
3	1	O-ring	32 x 2,5	306843 (NBR)	308268 (FPM)
4	1	support ring	37 x 2,1 x 1	305466	
5	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
6	1	clogging indicator, visual-electrical	AE	see sheet-no. 1615	
7	1	clogging sensor, electronical	VS1	see sheet-no. 1617	
8	1	clogging sensor, electronical	VS2	see sheet-no. 1618	
9	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
10	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
11	1	O-ring	14 x 2	304342 (NBR)	304722 (FPM)

3. Description:

Pressure filter of the series ML 30 and MLO 30 are suitable for a working pressure up to 160 bar.
The pressure peaks are absorbed by a sufficient margin of safety. The filter is in-line mounted.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside.
Filter elements are available down to 4 $\mu m_{(c)}$.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 160 bar and a rupture strength of Δp 250 bar.

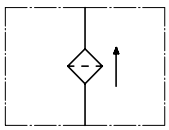
4. Technical data:

temperature range:	-10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	160 bar
test pressure:	208 bar
connection system:	thread connection according to ISO 228
housing material:	Al; C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	0,1 l

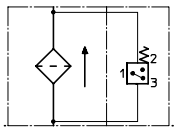
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:

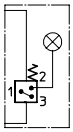
without indicator



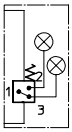
with electrical indicator AE 30 and AE 40



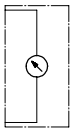
with visual-electrical indicator AE 50 and AE 62



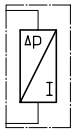
with visual-electrical indicator AE 70 and AE 80



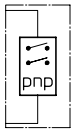
with visual indicator AOR/AOC



with electronical clogging sensor VS1



with electronical clogging sensor VS2



6. Pressure drop flow curves:

Precise flow rates see INT-Expert-System Filter respectively Δp-curves - depending on filter fineness and viscosity.

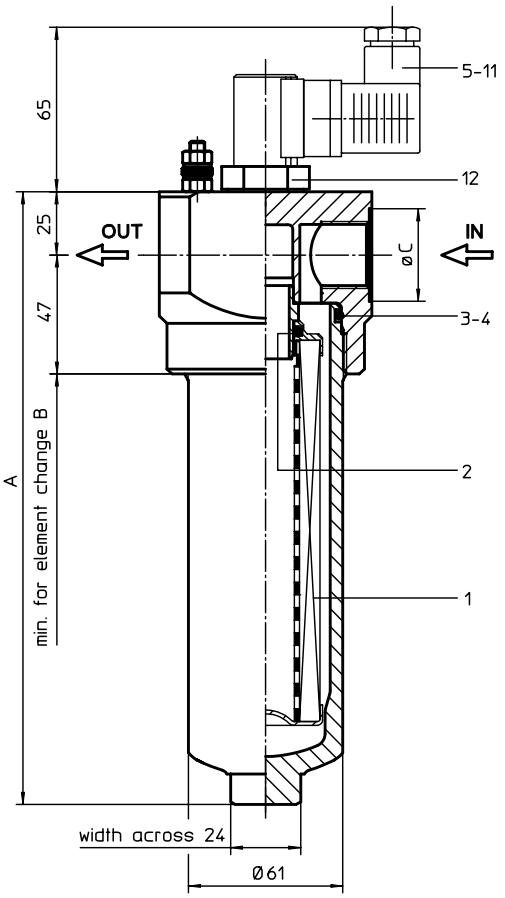
7. Test methods:

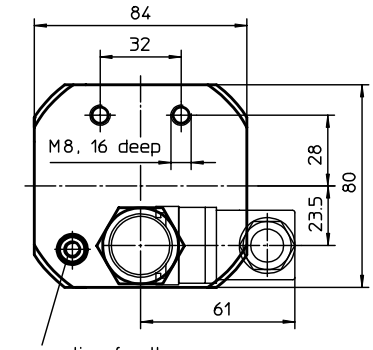
Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

PRESSURE FILTER
Series MNL 40 - 100 DN 15 - 25 PN 160

Sheet No.
1427 E





connection for the potential equalisation only for application in the explosive area.

1. Type index:

1.1. Complete filter: (ordering example)

MNL.	63.	10VG.	HR.	E.	P.	-.	G.	4.	-.	-.	AE
1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
MNL = standard in-line filter-medium pressure range according to DIN 24550 T1, T2

2 **nominal size:** 40, 63, 100

3 **filter-material and filter-fineness:**
25 VG = 20 µm$_{(c)}$, 16 VG = 15 µm$_{(c)}$, 10 VG = 10 µm$_{(c)}$,
6 VG = 7 µm$_{(c)}$, 3 VG = 5 µm$_{(c)}$ Interpor fleece (glass fibre)

4 **resistance of pressure difference for filter element:**
30 = Δp 30 bar
HR = Δp 160 bar (rupture strength Δp 250 bar)

5 **filter element design:**
E = single-end open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **connection:**
G = thread connection according to ISO 228

9 **connection size:**
3 = G ½
4 = G ¾
5 = G 1

10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605

11 **internal valve:**
- = without
S1 = with by-pass valve Δp 3,5 bar
S2 = with by-pass valve Δp 7,0 bar
R = reversing valve, Q ≤ 70,06 l/min

12 **clogging indicator or clogging sensor:**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01NL.	63.	10VG.	HR.	E.	P.	-
1	2	3	4	5	6	7

1 **series:**
01NL. = standard filter element according to DIN 24550, T3

2 **nominal size:** 40, 63, 100

3 - 7 see type index-complete filter

2. Dimensions:

type	MNL 40	MNL 63	MNL100
connection	G ½	G ¾	G 1
A	182	242	332
B	210	270	360
C	30	36,5	46
weight kg	2,0	2,5	3,3
volume tank	0,25 l	0,35 l	0,55 l

Connection assignments as shown in the table are standard according to DIN 24 550 T1. Are the connection assignments against DIN 24 550 T1, see item 9 of the type code.

Changes of measures and design are subject to alteration!

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3. Spare parts:

item	qty.	designation	dimension MNL 40	MNL 63	MNL 100	article-no.	
1	1	filter element	01NL.40	01NL.63	01NL.100		
2	1	O-ring	22 x 3,5			304341 (NBR)	304392 (FPM)
3	1	O-ring	54 x 3			304657 (NBR)	304720 (FPM)
4	1	support ring	60 x 2,6 x 1			311779	
5	1	clogging indicator visual	AOR or AOC			see sheet-no. 1606	
6	1	clogging indicator visual-electrical	AE			see sheet-no. 1615	
7	1	clogging sensor electronical	VS1			see sheet-no. 1617	
8	1	clogging sensor electronical	VS2			see sheet-no. 1618	
9	1	O-ring	15 x 1,5			315357 (NBR)	315427 (FPM)
10	1	O-ring	22 x 2			304708 (NBR)	304721 (FPM)
11	1	O-ring	14 x 2			304342 (NBR)	304722 (FPM)
12	1	screw plug	20913-4			309817	

item 12 execution only without clogging indicator or clogging sensor

4. Description:

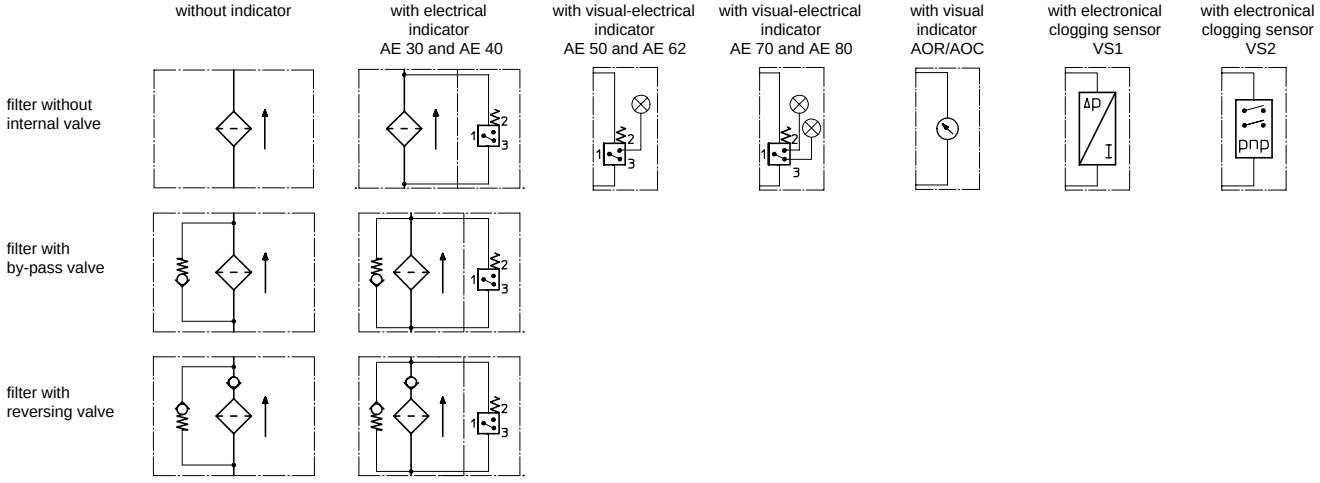
The pressure filters of the series MNL 40-100 are suitable for a working pressure up to 160 bar and equiped with elements according to DIN 24 550 T3.
The pressure peaks are absorbed by a sufficient margin of safety. The MNL-filter is in-line mounted.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter elements are available down to $4\mu m_{(c)}$.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 160 bar and a rupture strength of Δp 250 bar.
The internal valves are integrated into the centering pivot for the filter element.
After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

5. Technical data:

temperature range:	-10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	160 bar
test pressure:	208 bar
connection system:	thread connection according to ISO 228
housing material:	aluminium forging alloy; C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter' respectively Δp-curves ; depending on filter fineness and viscosity.

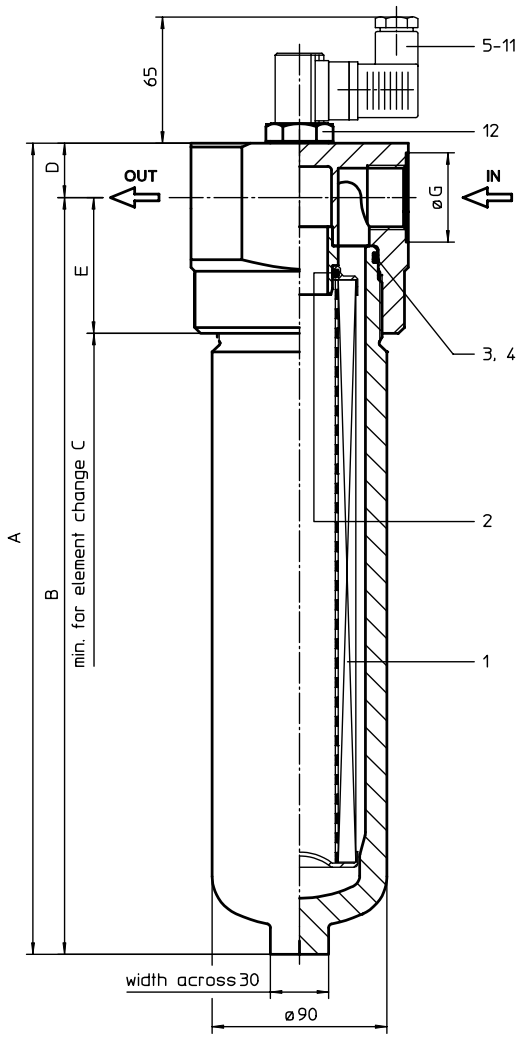
8. Test methods:

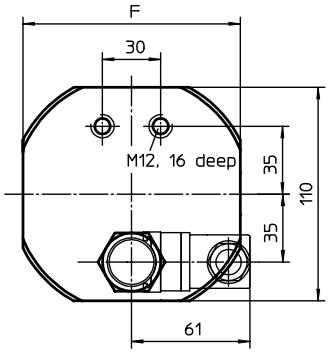
Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

PRESSURE FILTER
Series ML 170 - 450 DN 25 - 40 PN 160

Sheet No.
1429 E





2. Dimensions:

type	ML 170		ML 240		ML 360		ML 450	
connection	G1	G1 ½	G1	G1 ½	G1	G1 ½	G1	G1 ½
A	288	300	338	350	418	430	523	535
B	260	265	310	315	390	395	495	500
C	350	350	400	400	480	480	585	585
D	28	35	28	35	28	35	28	35
E	70	75	70	75	70	75	70	75
F	112	116	112	116	112	116	112	116
G	46	63,5	46	63,5	46	63,5	46	63,5
weight kg	7.5	7.9	8.5	8.9	10.1	10.5	13.1	13.5
volume tank	0,7 l	0,7 l	0,9 l	0,9 l	1,2 l	1,2 l	1,6 l	1,6 l

1. Type index:

1.1. Complete filter: (ordering example)

ML	.	360	.	10VG	.	HR	.	E	.	P	.	-.	G	.	5	.	-.	-.	AE
1		2		3		4		5		6		7	8		9		10	11	12

1 **series:**
ML = in-line filter-medium pressure range

2 **nominal size:** 170, 240, 360, 450

3 **filter-material and filter-fineness:**
25 VG = 20 µm(c), 16 VG = 15 µm(c), 10 VG = 10 µm(c),
6 VG = 7 µm(c), 3 VG = 5 µm(c) Interpor fleece (glass fibre)

4 **resistance of pressure difference for filter element:**
30 = Δp 30 bar
HR = Δp 160 bar (rupture strength Δp 250 bar)

5 **filter element design:**
E = single-end open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **connection:**
G = thread connection according to ISO 228

9 **connection size:**
5 = G 1
7 = G 1 ½

10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605

11 **internal valve:**
- = without
S1 = with by-pass valve Δp 3,5 bar
S2 = with by-pass valve Δp 7,0 bar
R = reversing valve, Q ≤ 211,008 l/min

12 **clogging indicator or clogging sensor:**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E	.	360	.	10VG	.	HR	.	E	.	P	.	-
1		2		3		4		5		6		7

1 **series:**
01E. = filter element according to INTERNORMEN factory specification

2 **nominal size:** 170, 240, 360, 450

3 - 7 see type index-complete filter

Changes of measures and design are subject to alteration!

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3. Spare parts:

item	qty.	designation	dimension				article-no.	
			ML 170	ML 240	ML 360	ML 450		
1	1	filter element	01E. 170	01E. 240	01E. 360	01E. 450		
2	1	O-ring	34 x 3,5				304338 (NBR)	304730 (FPM)
3	1	O-ring	75 x 3				302215 (NBR)	304729 (FPM)
4	1	support ring	81 x 2,6 x 1				304581	
5	1	clogging indicator visual	AOR or AOC				see sheet-no. 1606	
6	1	clogging indicator visual-electrical	AE				see sheet-no. 1615	
7	1	clogging sensor electronical	VS1				see sheet-no. 1617	
8	1	clogging sensor electronical	VS2				see sheet-no. 1618	
9	1	O-ring	15 x 1,5				315357 (NBR)	315427 (FPM)
10	1	O-ring	22 x 2				304708 (NBR)	304721 (FPM)
11	1	O-ring	14 x 2				304342 (NBR)	304722 (FPM)
12	1	screw plug	20913-4				309817	

item 12 execution only without clogging indicator or clogging sensor

4. Description:

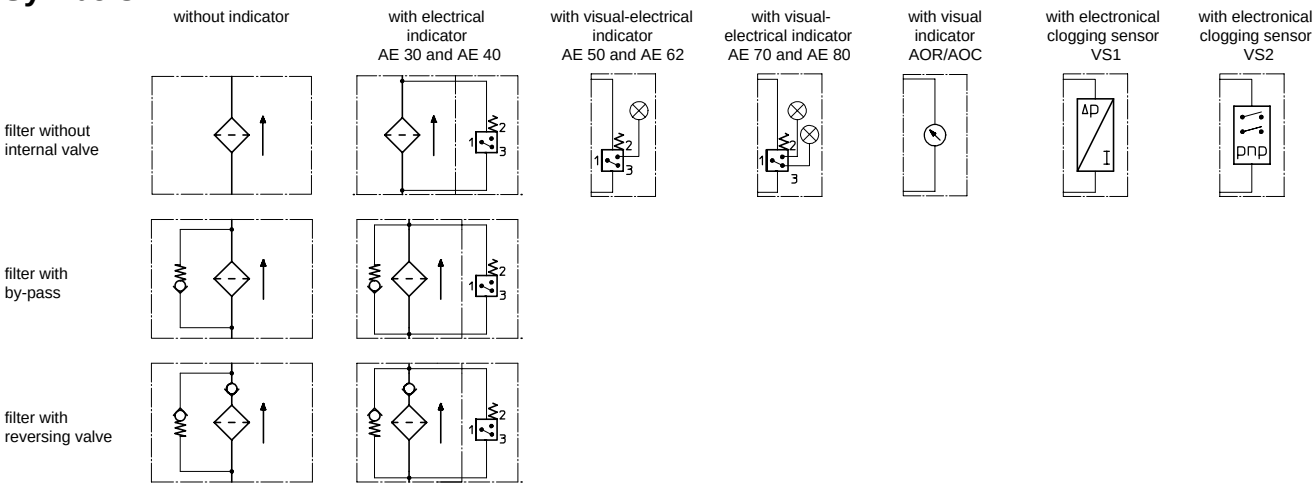
The pressure filters of the series ML 170-450 are suitable for a working pressure up to 160 bar.
The pressure peaks are absorbed by a sufficient margin of safety. The ML-filter is in-line mounted.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter elements are available down to $4\mu m_{(c)}$.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 160 bar and a rupture strength of Δp 250 bar.
The internal valves are integrated into the centering pivot for the filter element.
After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

5. Technical data:

temperature range:	-10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	160 bar
test pressure:	208 bar
connection system:	thread according to ISO 228
housing material:	Al; C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter' respectively Δp-curves ; depending on filter fineness and viscosity.

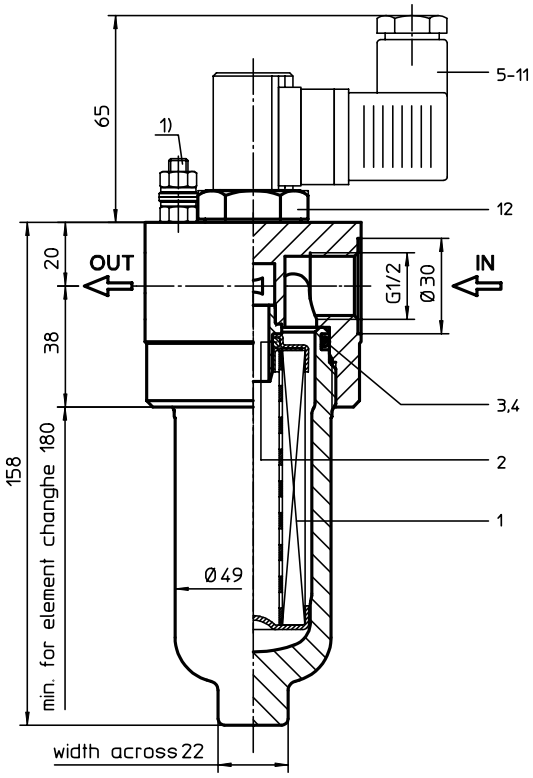
8. Test methods:

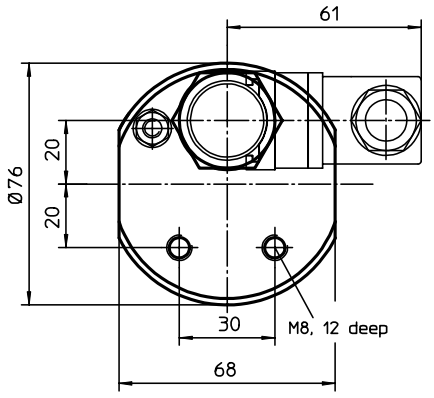
Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

PRESSURE FILTER
Series HP 31 DN 15 PN 420

Sheet No.
1459 D





1) connection for the potential equalisation, only for application in the explosive area

1. Type index:

1.1. Complete filter: (ordering example)

HP .	31.	10VG.	HR.	E.	P.	-.	G.	3.	-.	-.	AE
1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
HP = pressure filter

2 **nominal size:** 31

3 **filter-material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25µm
stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$,
6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)

4 **resistance of pressure difference for filter element:**
30 = Δp 30 bar
HR = Δp 160 bar (rupture strength Δp 250 bar)

5 **filter element design:**
E = single-end open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **connection:**
G = thread connection according to ISO 228

9 **connection size:**
3 = G ½

10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605

11 **internal valve:**
- = without
S1 = with by-pass valve Δp 3,5 bar
S2 = with by-pass valve Δp 7,0 bar

12 **clogging indicator or clogging sensor:**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E.	30.	10VG.	HR.	E.	P.	-
1	2	3	4	5	6	7

1 **series:**
01E. = filter element according to INTERNORMEN factory specification

2 **nominal size:** 30

3 - 7 see type index-complete filter

weight: approx. 3,0 kg

EDV 11/09

Changes of measures and design are subject to alteration!

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2. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01E. 30		
2	1	O-ring	11 x 3	312603 (NBR)	312727 (FPM)
3	1	O-ring	40 x 3	304389 (NBR)	304391 (FPM)
4	1	support ring	48 x 2,6 x 1	305391	
5	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
6	1	clogging indicator, visual-electrical	AE	see sheet-no. 1615	
7	1	clogging sensor, electronical	VS1	see sheet-no. 1617	
8	1	clogging sensor, electronical	VS2	see sheet-no. 1618	
9	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
10	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
11	1	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
12	1	screw plug	20913-4	309817	

item 12 execution only without clogging indicator or clogging sensor

3. Description:

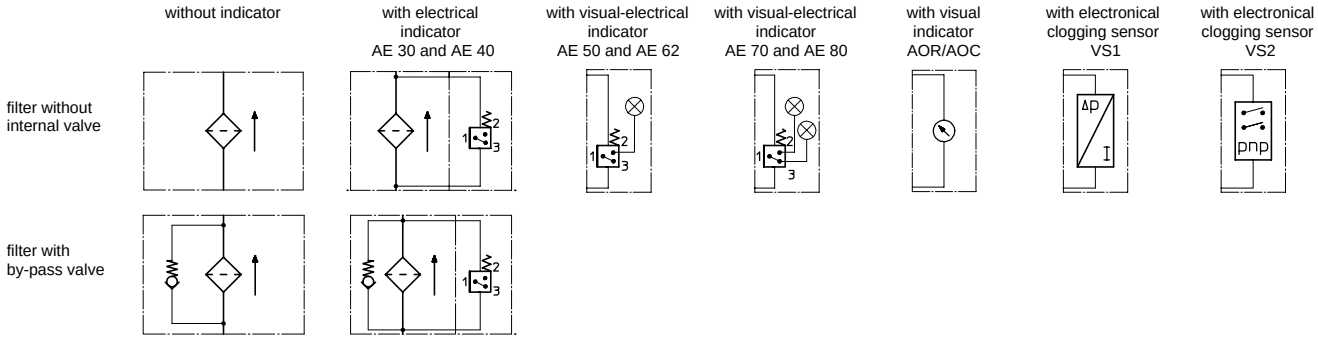
The pressure filters of the series HP 31 are suitable for a working pressure up to 420 bar.
The pressure peaks are absorbed by a sufficient margin of safety. The HP-filter is in-line mounted.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter elements are available down to 4 $\mu m_{(c)}$.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 160 bar and a rupture strength of Δp 250 bar.
The internal valves are integrated into the centering pivot for the filter element.
After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter.

4. Technical data:

temperature range:	-10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	420 bar
test pressure:	600 bar
connection system:	thread connection according to ISO 228
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	0,1 l

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:



6. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

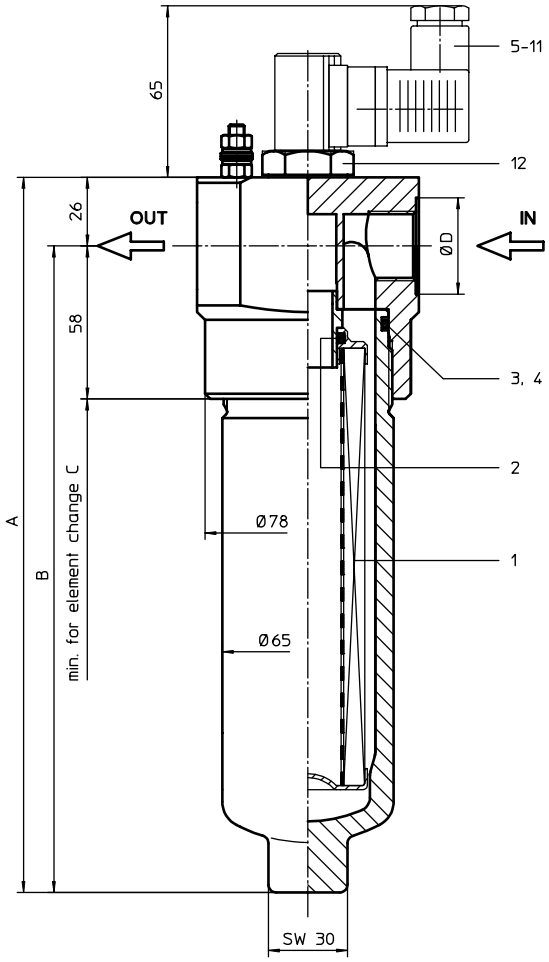
7. Test methods:

Filter elements are tested according to the following ISO standards:

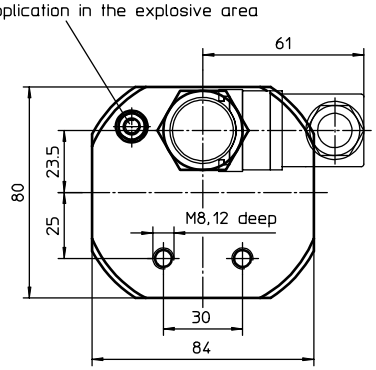
ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

PRESSURE FILTER
Series HP 61-151 DN 15 - 25 PN 420

Sheet No.
1477 F



connection for the potential equalisation, only for application in the explosive area



2. Dimensions:

type	HP 61	HP 91	HP 151
connection	G ½	G ¾	G 1
A	206	271	380
B	180	245	354
C	270	335	445
D	30	36,5	46
weight kg	4	4,5	5,5
volume tank	0,3 l	0,4 l	0,6 l

Connection assignments as shown in the table are standard. To exchange connections see item 9 in type index.

1. Type index:

1.1. Complete filter: (ordering example)

HP .	91.	10VG.	HR.	E.	P.	-.	G.	4.	-.	-.	AE
1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
HP = pressure filter

2 **nominal size:** 61, 91, 151

3 **filter-material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25µm
stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$,
6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)

4 **resistance of pressure difference for filter element:**
30 = Δp 30 bar
HR = Δp 160 bar (rupture strength Δp 250 bar)

5 **filter element design:**
E = single-end open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **connection:**
G = thread connection according to ISO 228

9 **connection size:**
3 = G ½
4 = G ¾
5 = G 1

10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605

11 **internal valve:**
- = without
S1 = with by-pass valve Δp 3,5 bar
S2 = with by-pass valve Δp 7,0 bar
R = reversing valve, Q ≤ 70,06 l/min

12 **clogging indicator or clogging sensor:**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E.	90.	10VG.	HR.	E.	P.	-
1	2	3	4	5	6	7

1 **series:**
01E. = filter element according to INTERNORMEN factory specification

2 **nominal size:** 60, 90, 150

3 - 7 see type index-complete filter

EDV 10/09

Changes of measures and design are subject to alteration!

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3. Spare parts:

item	qty.	designation	dimension			article-no.	
			HP 61	HP 91	HP 151		
1	1	filter element	01E. 60	01E. 90	01E. 150		
2	1	O-ring	22 x 3,5			304341 (NBR)	304392 (FPM)
3	1	O-ring	54 x 3			304657 (NBR)	304720 (FPM)
4	1	support ring	61 x 2,6 x 1			304660	
5	1	clogging indicator, visual	AOR or AOC			see sheet-no. 1606	
6	1	clogging indicator, visual-electrical	AE			see sheet-no. 1615	
7	1	clogging sensor, electronical	VS1			see sheet-no. 1617	
8	1	clogging sensor, electronical	VS2			see sheet-no. 1618	
9	1	O-ring	15 x 1,5			315357 (NBR)	315427 (FPM)
10	1	O-ring	22 x 2			304708 (NBR)	304721 (FPM)
11	1	O-ring	14 x 2			304342 (NBR)	304722 (FPM)
12	1	screw plug	20913-4			309817	

item 12 execution only without clogging indicator or clogging sensor

4. Description:

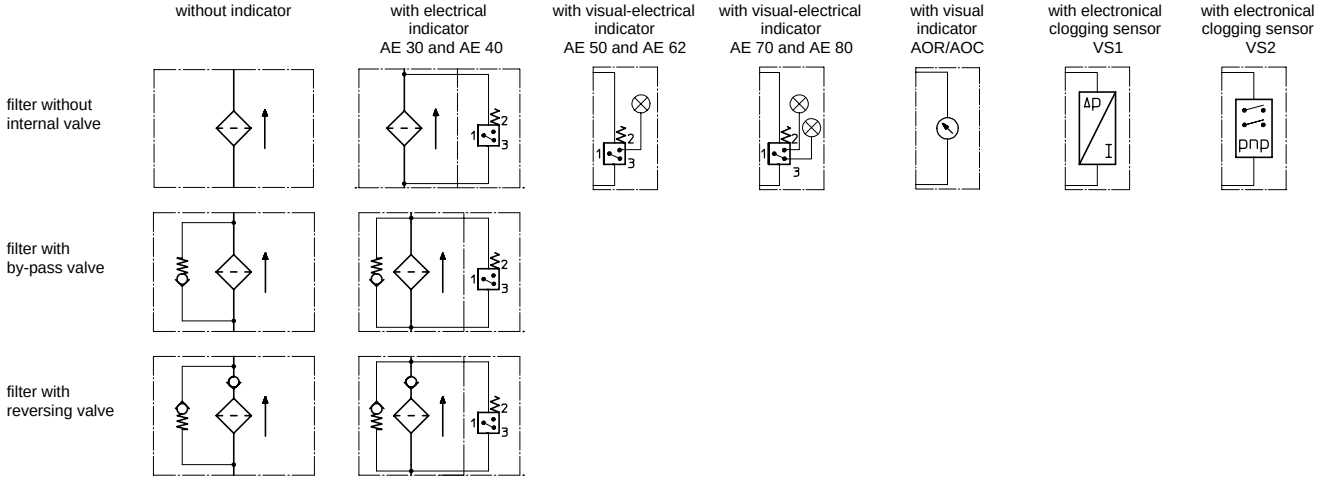
The pressure filters of the series HP 61-151 are suitable for a working pressure up to 420 bar.
The pressure peaks are absorbed by a sufficient margin of safety. The HP-filter is in-line mounted.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter elements are available down to 4 $\mu m_{(c)}$.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 160 bar and a rupture strength of Δp 250 bar.
The internal valves are integrated into the centering pivot for the filter element.
After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

5. Technical data:

temperature range:	-10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	420 bar
test pressure:	600 bar
connection system:	thread connection according to ISO 228
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

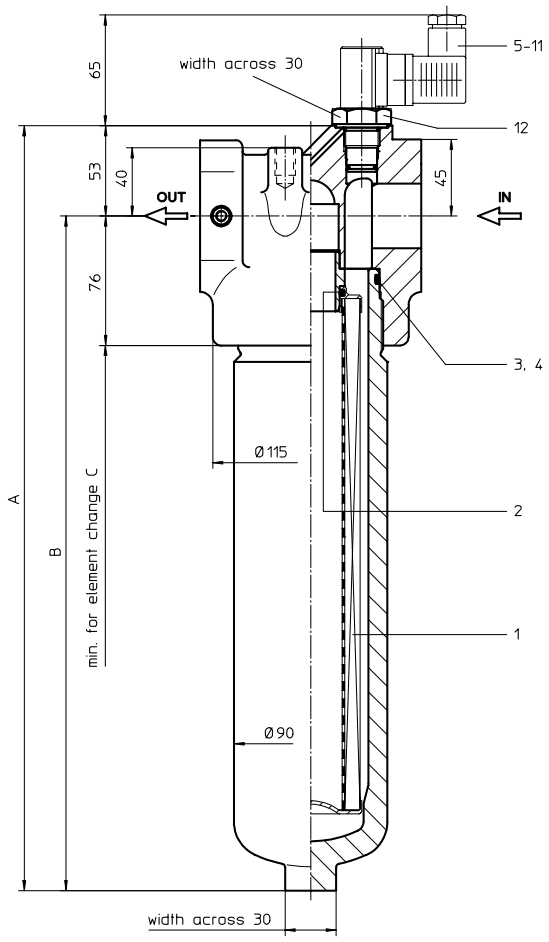
8. Test methods:

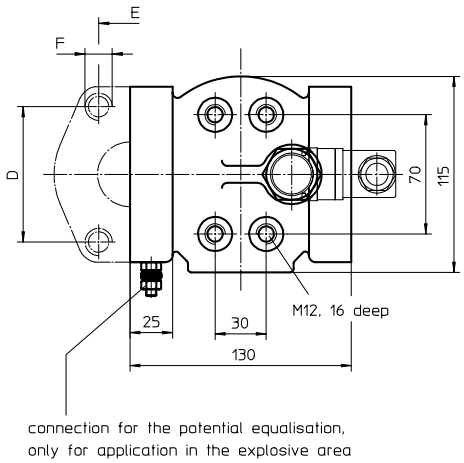
Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

PRESSURE FILTER
Series HP 170 - 450 DN 40 PN 420

Sheet No.
1462 O





connection for the potential equalisation,
only for application in the explosive area

1. Type index:

1.1. Complete filter: (ordering example)

HP	.	170	.	10VG	.	HR	.	E	.	P	.	-	.	FS	.	7	.	-	.	-	.	AE
1		2		3		4		5		6		7		8		9		10		11		12

1 **series:**
HP = pressure filter

2 **nominal size:** 170, 240, 360, 450

3 **filter-material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25µm
stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$,
6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)

4 **resistance of pressure difference for filter element:**
30 = Δp 30 bar
HR = Δp 160 bar (rupture strength Δp 250 bar)

5 **filter element design:**
E = single-end open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **connection:**
FS = SAE-flange connection 6000 PSI

9 **connection size:**
7 = 1 ½“

10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605

11 **internal valve:**
- = without
S1 = with by-pass valve Δp 3,5 bar
S2 = with by-pass valve Δp 7,0 bar
R = reversing valve, Q ≤ 211,008 l/min

12 **clogging indicator or clogging sensor:**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E.	170	.	10VG	.	HR	.	E	.	P	.	-
1	2		3		4		5		6		7

1 **series:**
01E. = filter element according to INTERNORMEN factory specification

2 **nominal size:** 170, 240, 360, 450

3 - 7 see type index-complete filter

2. Dimensions:

type	HP 170	HP 240	HP 360	HP 450
connection	SAE 1 ½“			
A	319	368	449	554
B	266	316	396	501
C	350	400	480	585
D	79,4			
E	36,7			
F	M16, 20 deep			
weight kg	13	14	16	19
volume tank	0,7 l	0,9 l	1,2 l	1,6 l

Changes of measures and design are subject to alteration!

EDV 11/09

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3. Spare parts:

item	qty.	designation	dimension				article-no.	
			HP 170	HP 240	HP 360	HP 450		
1	1	filter element	01E. 170	01E. 240	01E. 360	01E. 450		
2	1	O-ring	34 x 3,5				304338 (NBR)	304730 (FPM)
3	1	O-ring	75 x 3				302215 (NBR)	304729 (FPM)
4	1	support ring	81 x 2,6 x 1				304581	
5	1	clogging indicator visual	AOR or AOC				see sheet-no. 1606	
6	1	clogging indicator visual-electrical	AE				see sheet-no. 1615	
7	1	clogging sensor electronical	VS1				see sheet-no. 1617	
8	1	clogging sensor electronical	VS2				see sheet-no. 1618	
9	1	O-ring	15 x 1,5				315357 (NBR)	315427 (FPM)
10	1	O-ring	22 x 2				304708 (NBR)	304721 (FPM)
11	1	O-ring	14 x 2				304342 (NBR)	304722 (FPM)
12	1	screw plug	20913-4				309817	

item 12 execution only without clogging indicator or clogging sensor

4. Description:

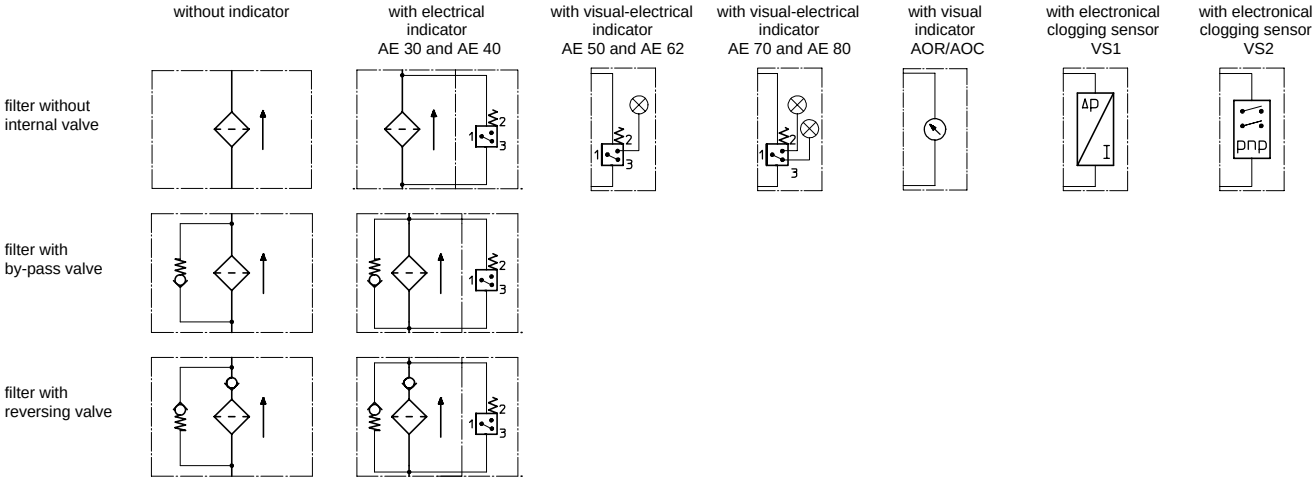
The pressure filters of the series HP 170-450 are suitable for a working pressure up to 420 bar.
The pressure peaks are absorbed by a sufficient margin of safety. The HP-filters are flange mounted to the hydraulic system.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter elements are available down to 4 $\mu m_{(c)}$.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 160 bar and a rupture strength of Δp 250 bar.
The internal valves are integrated into the centering pivot for the filter element.
After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

5. Technical data:

temperature range:	-10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	420 bar
test pressure:	600 bar
connection system:	SAE-flange connection 6000 PSI
housing material:	EN-GJS-400-18-LT; C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter' respectively Δp-curves ; depending on filter fineness and viscosity.

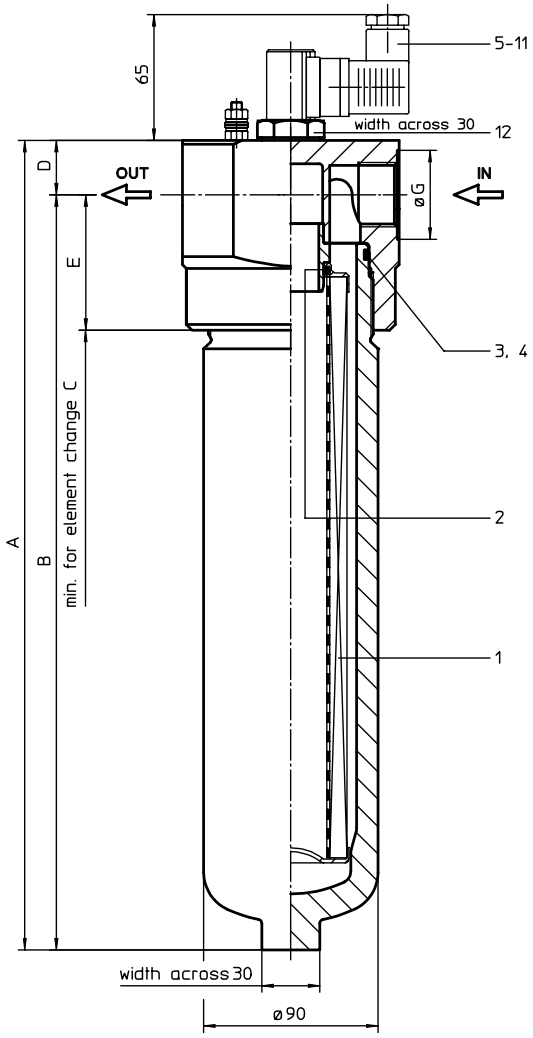
8. Test methods:

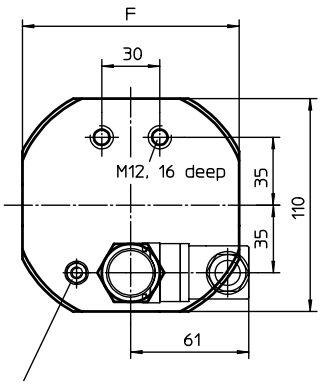
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PRESSURE FILTER
Series HP 171 - 451 DN 25 - 40 PN 420

Sheet No.
1468 E





connection for the potential equalisation, only for application in the explosive area

1. Type index:

1.1. Complete filter: (ordering example)

HP .	361.	10VG.	HR.	E.	P.	-.	G.	5.	-.	-.	AE
1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
HP = pressure filter

2 **nominal size:** 171, 241, 361, 451

3 **filter-material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25µm
stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$,
6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)

4 **resistance of pressure difference for filter element:**
30 = Δp 30 bar
HR = Δp 160 bar (rupture strength Δp 250 bar)

5 **filter element design:**
E = single-end open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **connection:**
G = thread connection according to ISO 228

9 **connection size:**
5 = G 1
6 = G 1 ¼
7 = G 1 ½

10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605

11 **internal valve:**
- = without
S1 = with by-pass valve Δp 3,5 bar
S2 = with by-pass valve Δp 7,0 bar
R = reversing valve, Q ≤ 211,008 l/min

12 **clogging indicator or clogging sensor:**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E.	360.	10VG.	HR.	E.	P.	-
1	2	3	4	5	6	7

1 **series:**
01E. = filter element according to INTERNORMEN factory specification

2 **nominal size:** 170, 240, 360, 450

3 - 7 see type index-complete filter

2. Dimensions:

type	HP 171			HP 241			HP 361			HP 451		
connection	G 1	G 1 ¼	G 1 ½	G 1	G 1 ¼	G 1 ½	G 1	G 1 ¼	G 1 ½	G 1	G 1 ¼	G 1 ½
A	288	295	300	338	345	350	418	425	430	523	530	535
B	260	263	265	310	313	315	390	393	395	495	498	500
C	350	350	350	400	400	400	480	480	480	585	585	585
D	28	32	35	28	32	35	28	32	35	28	32	35
E	70	73	75	70	73	75	70	73	75	70	73	75
F	112	116	116	112	116	116	112	116	116	112	116	116
G	46	57	63,5	46	57	63,5	46	57	63,5	46	57	63,5
weight kg	10,8	11,4	11,8	12,1	12,7	13,1	14	14,6	15	16,5	17,1	17,5
volume tank	0,7 l			0,9 l			1,2 l			1,6 l		

Connection assignments as shown in the table are standard. To exchange connections see item 9 in type index.

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Changes of measures and design are subject to alteration!

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url www.internormen.com

3. Spare parts:

item	qty.	designation	dimension				article-no.	
			HP 171	HP 241	HP 361	HP 451		
1	1	filter element	01E. 170	01E. 240	01E. 360	01E. 450		
2	1	O-ring	34 x 3,5				304338 (NBR)	304730 (FPM)
3	1	O-ring	75 x 3				302215 (NBR)	304729 (FPM)
4	1	support ring	81 x 2,6 x 1				304581	
5	1	clogging indicator visual	AOR or AOC				see sheet-no. 1606	
6	1	clogging indicator visual-electrical	AE				see sheet-no. 1615	
7	1	clogging sensor electronical	VS1				see sheet-no. 1617	
8	1	clogging sensor electronical	VS2				see sheet-no. 1618	
9	1	O-ring	15 x 1,5				315357 (NBR)	315427 (FPM)
10	1	O-ring	22 x 2				304708 (NBR)	304721 (FPM)
11	1	O-ring	14 x 2				304342 (NBR)	304722 (FPM)
12	1	screw plug	20913-4				309817	

item 12 execution only without clogging indicator or clogging sensor

4. Description:

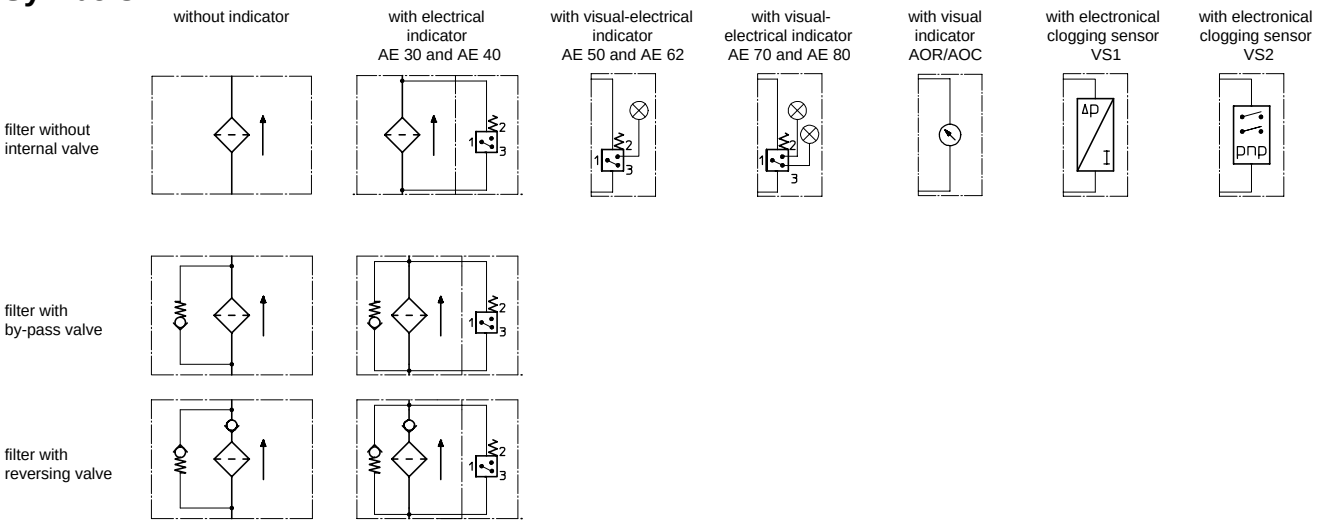
The pressure filters of the series HP 171-451 are suitable for a working pressure up to 420 bar.
The pressure peaks are absorbed by a sufficient margin of safety. The HP-filter is in-line mounted.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter elements are available down to 4 $\mu m_{(c)}$.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 160 bar and a rupture strength of Δp 250 bar.
The internal valves are integrated into the centering pivot for the filter element.
After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

5. Technical data:

temperature range:	-10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	420 bar
test pressure:	600 bar
connection system:	thread connection according to ISO 228
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter' respectively Δp-curves ; depending on filter fineness and viscosity.

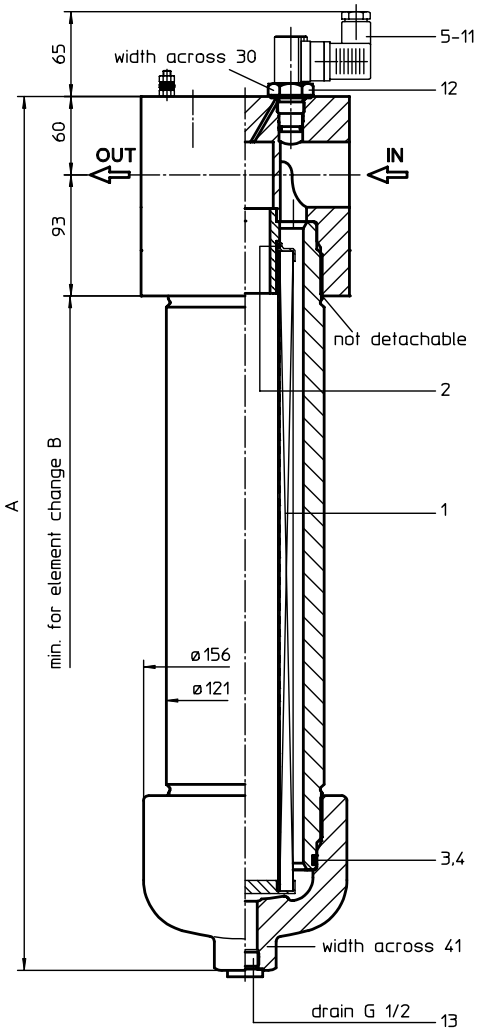
8. Test methods:

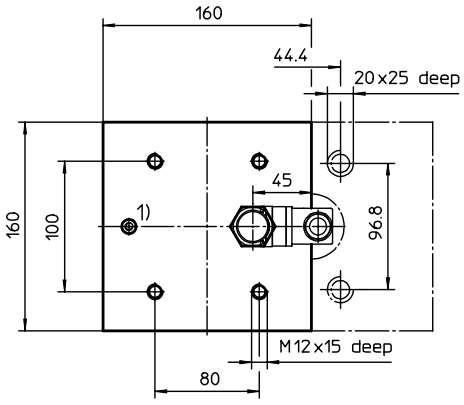
Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

PRESSURE FILTER
Series HP 601-1351 DN 50 PN 420

Sheet No.
1465 K





1) connection for the potential equalisation, only for the application in the explosive area.

1. Type index:

1.1. Complete filter: (ordering example)

HP .	901.	10VG.	HR.	E.	P.	-.	FS.	8.	-.	-.	AE
1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
HP = pressure filter

2 **nominal size:** 601, 901, 1351

3 **filter-material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$,
6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)

4 **resistance of pressure difference for filter element:**
30 = Δp 30 bar
HR = Δp 160 bar (rupture strength Δp 250 bar)

5 **filter element design:**
E = single-end open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **connection:**
FS = SAE-flange connection 6000 PSI

9 **connection size:**
8 = 2“

10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605

11 **internal valve:**
- = without
S1 = with by-pass valve Δp 3,5 bar
S2 = with by-pass valve Δp 7,0 bar
R = reversing valve, Q ≤ 465,348 l/min

12 **clogging indicator or clogging sensor:**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E.	900.	10VG.	HR.	E.	P.	-
1	2	3	4	5	6	7

1 **series:**
01E. = filter element according to INTERNORMEN factory specification

2 **nominal size:** 600, 900, 1350

3 - 7 see type index-complete filter

2. Dimensions:

type	HP 601	HP 901	HP 1351
connection	SAE 2“		
A	520	670	918
B	790	940	1440
weight kg	49	56	68
volume tank	2,1 l	3,1 l	4,6 l

EDV 11/09

Changes of measures and design are subject to alteration!

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3. Spare parts:

item	qty.	designation	dimension			article-no.	
			HP 601	HP 901	HP 1351		
1	1	filer element	01E. 600	01E. 900	01E. 1350		
2	1	O-ring	48 x 3			304357 (NBR)	304404 (FPM)
3	1	O-ring	98 x 4			301914 (NBR)	304765 (FPM)
4	1	support ring	110 x 3,5 x 2			304802	
5	1	clogging indicator, visual	AOR or AOC			see sheet no. 1606	
6	1	clogging indicator, visual-electrical	AE			see sheet no. 1615	
7	1	clogging sensor, electronical	VS1			see sheet no. 1617	
8	1	clogging sensor, electronical	VS2			see sheet no. 1618	
9	1	O-ring	15 x 1,5			315357 (NBR)	315427 (FPM)
10	1	O-ring	22 x 2			304708 (NBR)	304721 (FPM)
11	1	O-ring	14 x 2			304342 (NBR)	304722 (FPM)
12	1	screw plug	20913-4			309817	
13	1	screw plug	G ½			304678	

item 12 execution only without clogging indicator or clogging sensor

4. Description:

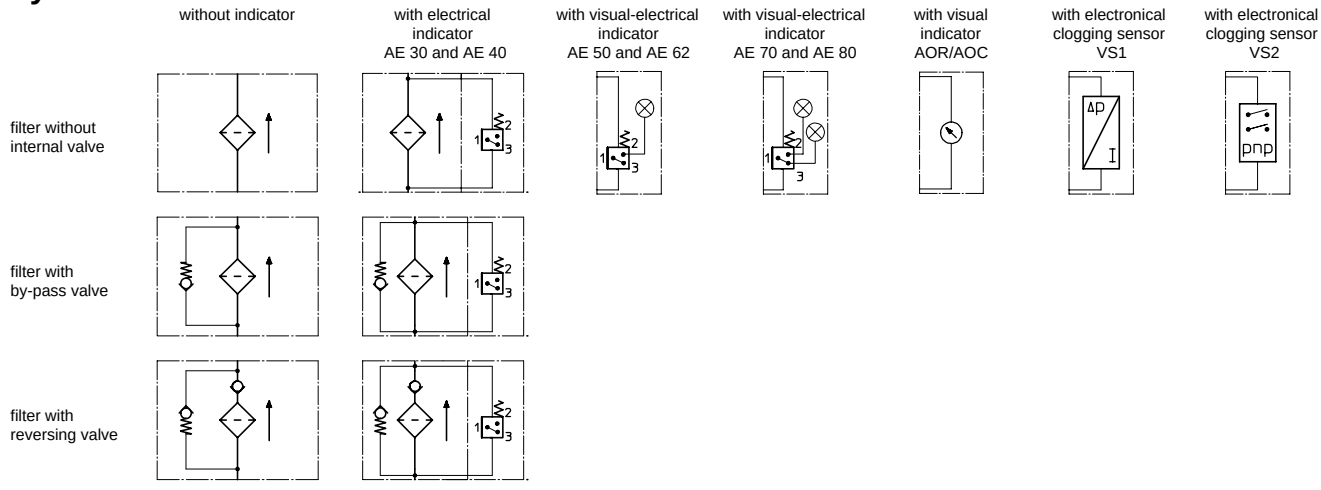
The pressure filters of the series HP 601-1351 are suitable for a working pressure up to 420 bar.
The pressure peaks are absorbed by a sufficient margin of safety. The HP-filters are flange mounted to the hydraulic system.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter elements are available down to 4 $\mu m_{(c)}$.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 160 bar and a rupture strength of Δp 250 bar.
The internal valves are integrated into the centering pivot for the filter element.
After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

5. Technical data:

temperature range:	-10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	420 bar
test pressure:	600 bar
connection system:	SAE-flange connection 6000 PSI
housing material:	EN-GJS-400-18-LT; C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

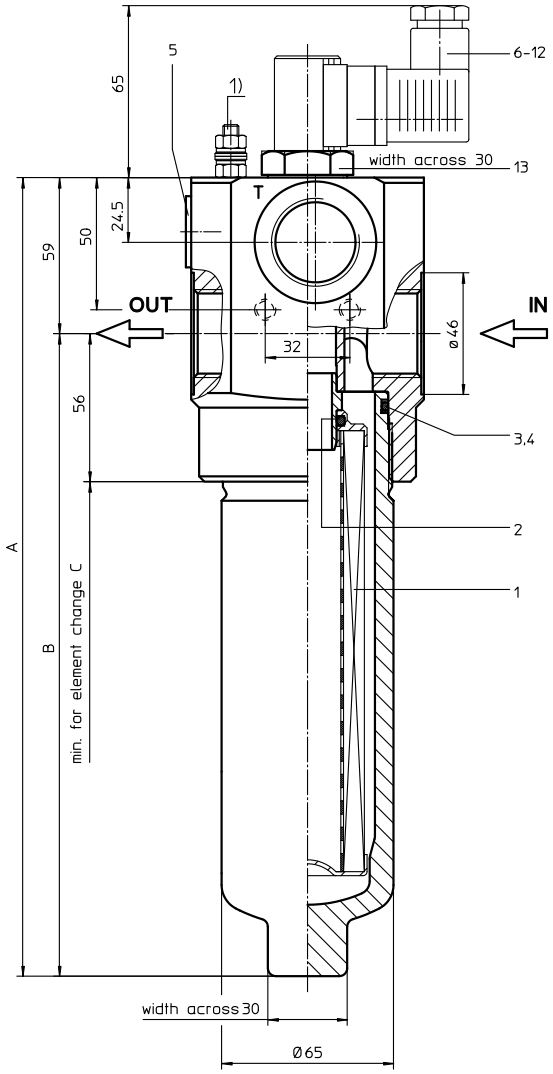
8. Test methods:

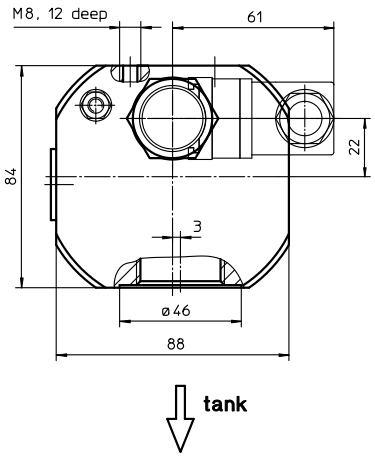
Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

PRESSURE FILTER
Series HPV 60-150 DN 25 PN 420

Sheet No.
1478 E





[1] connection for the potential equalisation, only for application in the explosive area

1. Type index:

1.1. Complete filter: (ordering example)

HPV.	90.	10VG.	HR.	E.	P.	-.	G.	5.	-.	D2.	AE
1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
HPV = pressure filter with differential pressure-valve

2 **nominal size:** 60, 90, 150

3 **filter-material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25µm
stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$,
6 VG = 7$\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)

4 **resistance of pressure difference for filter element:**
30 = Δp 30 bar
HR = Δp 160 bar (rupture strength Δp 250 bar)

5 **filter element design:**
E = single-end open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:**
- = standard
VA = stainless steel

8 **connection:**
G = thread connection according to ISO 228

9 **connection size:**
5 = G 1

10 **filter housing specification:**
- = standard

11 **internal valve:**
D1 = differential pressure-valve Δp 3,5 bar
D2 = differential pressure-valve Δp 7,0 bar

12 **clogging indicator or clogging sensor:**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E.	90.	10VG.	HR.	E.	P.	-
1	2	3	4	5	6	7

1 **series:**
01E. = filter element according to INTERNORMEN specification

2 **nominal size:** 60, 90, 150

3 - 7 see type index-complete filter

2. Dimensions:

type	HPV 60	HPV 90	HPV 150
connection		G 1	
A	237	302	411
B	178	243	352
C	270	335	445
weight kg	6,5	7	8
volume tank	0,3 l	0,4 l	0,6 l

EDV 04/11

Changes of measures and design are subject to alteration!

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3. Spare parts:

item	qty.	designation	dimension HPV 60 -150	article-no.	
1	1	filter element	01E. 60-150		
2	1	O-ring	22 x 3,5	304341 (NBR)	304392 (FPM)
3	1	O-ring	54 x 3	304657 (NBR)	304720 (FPM)
4	1	support ring	61 x 2,6 x 1	304660	
5	1	screw plug	G ½	304678	
6	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
7	1	clogging indicator, visual-electrical	AE	see sheet-no. 1615	
8	1	clogging sensor, electronical	VS1	see sheet-no. 1617	
9	1	clogging sensor, electronical	VS2	see sheet-no. 1618	
10	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
11		O-ring	22 x 2	304708 (NBR)	304721 (FPM)
12	1	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
13	1	screw plug	20913-4	309817	

item 13 execution only without clogging indicator or clogging sensor

4. Description:

The pressure filters of the series HPV 60-150 are suitable for a working pressure up to 420 bar.
The pressure peaks are absorbed by a sufficient margin of safety. The HPV-filter is in-line mounted.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter elements are available down to $4\mu m_{(c)}$.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 160 bar and a rupture strength of Δp 250 bar.
The differential pressure-valve opens independently of the operating pressure at a chosen differential pressure-valve between IN and OUT and leaves an unfiltered partial-flow flowing from „IN“ to the tank.

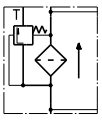
5. Technical data:

temperature range:	- 10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	420 bar
test pressure:	600 bar
connection system:	thread connection according to ISO 228
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

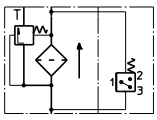
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:

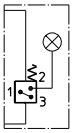
without indicator



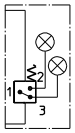
with electrical indicator AE 30 and AE 40



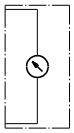
with visual-electrical indicator AE 50 and AE 62



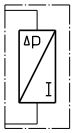
with visual-electrical indicator AE 70 and AE 80



with visual indicator AOR/AOC



with electronical clogging sensor VS1



with electronical clogging sensor VS2

7. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’ respectively Δp-curves ; depending on filter fineness and viscosity.

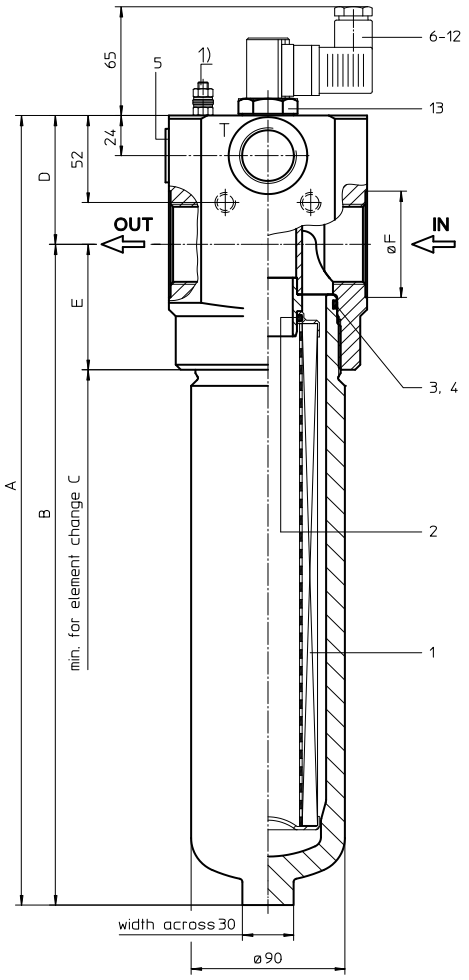
8. Test methods:

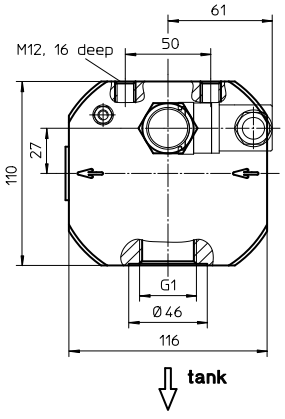
Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

PRESSURE FILTER
Series HPV 170-450 DN 25-40 PN 420

Sheet No.
1479 D





1) connection for the potential equalisation, only for application in the explosive area

1. Type index:

1.1. Complete filter: (ordering example)

HPV.	360.	10VG.	HR.	E.	P.	-.	G.	7.	-.	D2.	AE
1	2	3	4	5	6	7	8	9	10	11	12

1 series:
HPV = pressure filter with differential pressure-valve

2 nominal size: 170, 240, 360, 450

3 filter-material and filter-fineness:
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$,
6 VG = 7$\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)

4 resistance of pressure difference for filter element:
30 = Δp 30 bar
HR = Δp 160 bar (rupture strength Δp 250 bar)

5 filter element design:
E = single-end open

6 sealing material:
P = Nitrile (NBR)
V = Viton (FPM)

7 filter element specification:
- = standard
VA = stainless steel

8 connection:
G = thread according to ISO 228

9 connection size:
5 = G 1
6 = G 1 ¼
7 = G 1 ½

10 filter housing specification:
- = standard

11 internal valve:
D1 = differential pressure-valve Δp 3,5 bar
D2 = differential pressure-valve Δp 7,0 bar

12 clogging indicator or clogging sensor:
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E.	360.	10VG.	HR.	E.	P.	-
1	2	3	4	5	6	7

1 series:
01E. = filter element according to INTERNORMEN specification

2 nominal size: 170, 240, 360, 450

3 - 7 see type index-complete filter

2. Dimensions:

type	HPV 170			HPV 240			HPV 360			HPV 450		
connection	G 1	G 1 ¼	G 1 ½	G 1	G 1 ¼	G 1 ½	G 1	G 1 ¼	G 1 ½	G 1	G 1 ¼	G 1 ½
A	337	337	342	387	387	392	467	467	472	572	572	577
B	263	263	265	313	313	315	393	393	395	498	498	500
C	350	350	350	400	400	400	480	480	480	585	585	585
D	74	74	77	74	74	77	74	74	77	74	74	77
E	73	73	75	73	73	75	73	73	75	73	73	75
F	46	57	63,5	46	57	63,5	46	57	63,5	46	57	63,5
weight kg	13,5	14,5	14,9	14,8	15,8	16,2	16,7	17,7	18,1	19,2	20,2	20,6
volume tank	0,7 l			0,9 l			1,2 l			1,6 l		

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Changes of measures and design are subject to alteration!

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fax +49 - (0)6205 - 2094-40 url www.internormen.com

3. Spare parts:

item	qty.	designation	dimension HPV 170-450	article-no.	
1	1	filter element	01E. 170-450		
2	1	O-ring	34 x 3,5	304338 (NBR)	304730 (FPM)
3	1	O-ring	75 x 3	302215 (NBR)	304729 (FPM)
4	1	support ring	81 x 2,6 x 1	304581	
5	1	screw plug	G ¾	308529	
6	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
7	1	clogging indicator, visual-electrical	AE	see sheet-no. 1615	
8	1	clogging sensor, electronical	VS1	see sheet-no. 1617	
9	1	clogging sensor, electronical	VS2	see sheet-no. 1618	
10	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
11		O-ring	22 x 2	304708 (NBR)	304721 (FPM)
12	1	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
13	1	screw plug	20913-4	309817	

item 13 execution only without clogging indicator or clogging sensor

4. Description:

The pressure filters of the series HPV 170-450 are suitable for a working pressure up to 420 bar.
The pressure peaks are absorbed by a sufficient margin of safety. The HPV-filter is in-line mounted.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter elements are available down to 4µm$_{(c)}$.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 160 bar and a rupture strength of Δp 250 bar.
The differential pressure-valve opens independently of the operating pressure at a chosen differential pressure-valve between IN and OUT and leaves an unfiltered partial-flow flowing from „IN“ to the tank.

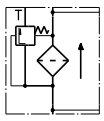
5. Technical data:

temperature range:	- 10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	420 bar
test pressure:	600 bar
connection system:	thread according to ISO 228
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

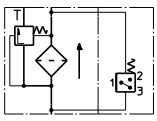
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:

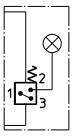
without indicator



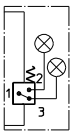
with electrical indicator AE 30 and AE 40



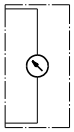
with visual-electrical indicator AE 50 and AE 62



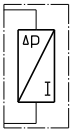
with visual-electrical indicator AE 70 and AE 80



with visual indicator AOR/AOC



with electronical clogging sensor VS1



with electronical clogging sensor VS2

7. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’ respectively Δp-curves ; depending on filter fineness and viscosity.

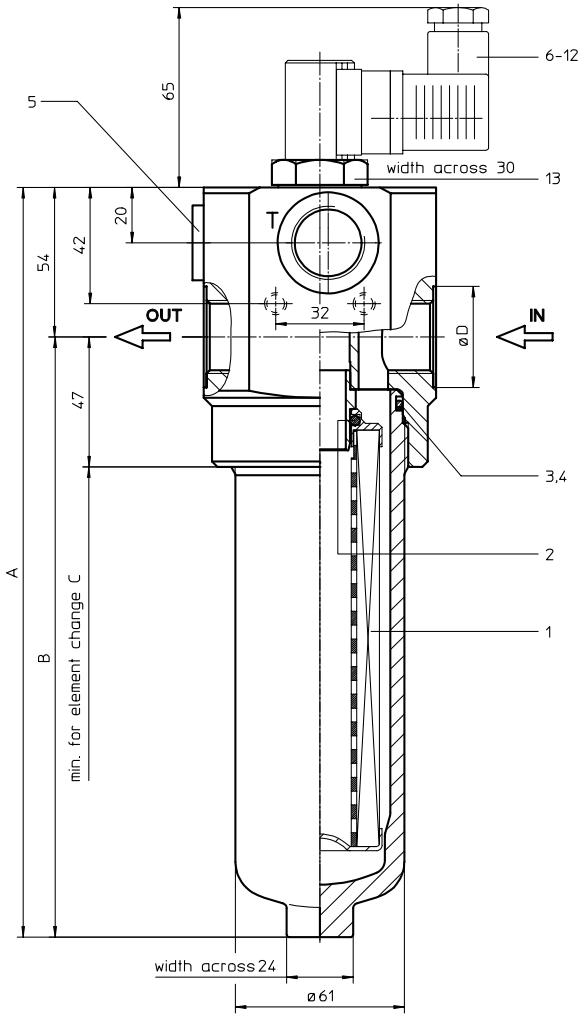
8. Test methods:

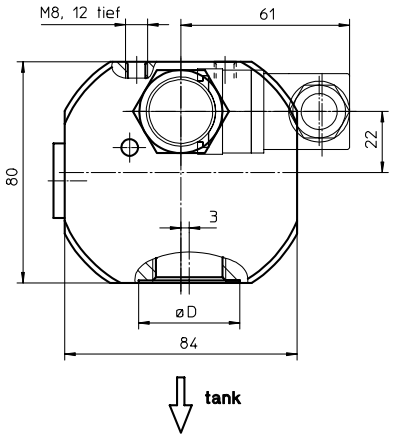
Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

PRESSURE FILTER
Series MDV 40-63 DN 15 - 20 PN 200

Sheet No.
1419 C





1. Type index:

1.1. Complete filter: (ordering example)

MDV.	40.	10VG.	HR.	E.	P.	-.	G.	3.	-.	D2.	AE
1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
MDV = medium pressure filter with differential pressure-valve

2 **nominal size:** 40, 63

3 **filter-material and filter-fineness:**
25 VG = 20 µm$_{(c)}$, 16 VG = 15 µm$_{(c)}$, 10 VG = 10 µm$_{(c)}$,
6 VG = 7 µm$_{(c)}$, 3 VG = 5 µm$_{(c)}$ Interpor fleece (glass fibre)

4 **resistance of pressure difference for filter element:**
30 = Δp 30 bar
HR = Δp 160 bar (rupture strength Δp 250 bar)

5 **filter element design:**
E = single-end open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:**
- = standard
VA = stainless steel

8 **connection:**
G = thread connection according to ISO 228

9 **connection size:**
3 = G ½
4 = G ¾

10 **filter housing specification:**
- = standard

11 **internal valve:**
D1 = differential pressure-valve Δp 3,5 bar
D2 = differential pressure-valve Δp 7,0 bar

12 **clogging indicator or clogging sensor:**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01NL.	40.	10VG.	HR.	E.	P.	-
1	2	3	4	5	6	7

1 **series:**
01NL. = standard filter element according to DIN 24550, T3

2 **nominal size:** 40, 63

3 - 7 see type index-complete filter

2. Dimensions:

type	connection	A	B	C	D	weight kg	volume tank
MDV 40	G ½	211	157	265	30	2,7	0,25 l
MDV 63	G ¾	271	217	325	36,5	3,2	0,35 l

Connection assignments as shown in the table are standard according to DIN 24 550 T1.
Are the connection assignments against DIN 24 550 T1, see item 9 of the type code.

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3. Spare parts:

item	qty.	designation	dimension		article-no.	
			MDV 40	MDV 63		
1	1	filter element	01NL.40	01NL.63		
2	1	O-ring	22 x 3,5		304341 (NBR)	304392 (FPM)
3	1	O-ring	54 x 3		304657 (NBR)	304720 (FPM)
4	1	support ring	60 x 2,6 x 1		311779	
5	1	screw plug	G ½		304678	
6	1	clogging indicator visual	AOR or AOC		see sheet-no. 1606	
7	1	clogging indicator visual-electrical	AE		see sheet-no. 1615	
8	1	clogging sensor electronical	VS1		see sheet-no. 1617	
9	1	clogging sensor electronical	VS2		see sheet-no. 1618	
10	1	O-ring	15 x 1,5		315357 (NBR)	315427 (FPM)
11	1	O-ring	22 x 2		304708 (NBR)	304721 (FPM)
12	1	O-ring	14 x 2		304342 (NBR)	304722 (FPM)
13	1	screw plug	20913-4		309817	

item 13 execution only without clogging indicator or clogging sensor

4. Description:

The pressure filters of the series MDV are suitable for a working pressure up to 200 bar and equiped with elements according to DIN 24 550 T3.
The pressure peaks are absorbed by a sufficient margin of safety. The MDV-filter is in-line mounted.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter elements are available down to 4µm$_{(c)}$.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 160 bar and a rupture strength of Δp 250 bar.
The differential pressure-valve opens independently of the operating pressure at a chosen differential pressure-valve between IN and OUT and leaves an unfiltered partial-flow flowing from „IN“ to the tank.

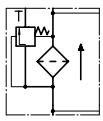
5. Technical data:

temperature range:	- 10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	200 bar
test pressure:	260 bar
connection system:	thread connection according to ISO 228
housing material:	aluminium forging alloy; C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

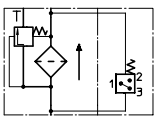
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:

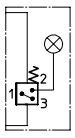
without indicator



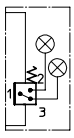
with electrical indicator AE 30 and AE 40



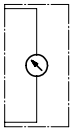
with visual-electrical indicator AE 50 and AE 62



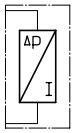
with visual-electrical indicator AE 70 and AE 80



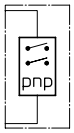
with visual indicator AOR/AOC



with electronical clogging sensor VS1



with electronical clogging sensor VS2



7. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’ respectively Δp-curves ; depending on filter fineness and viscosity.

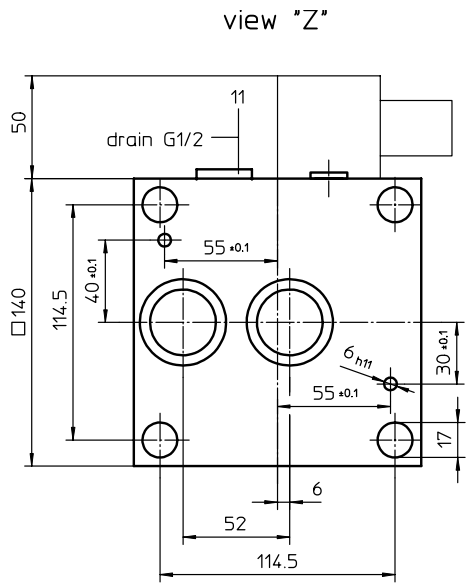
8. Test methods:

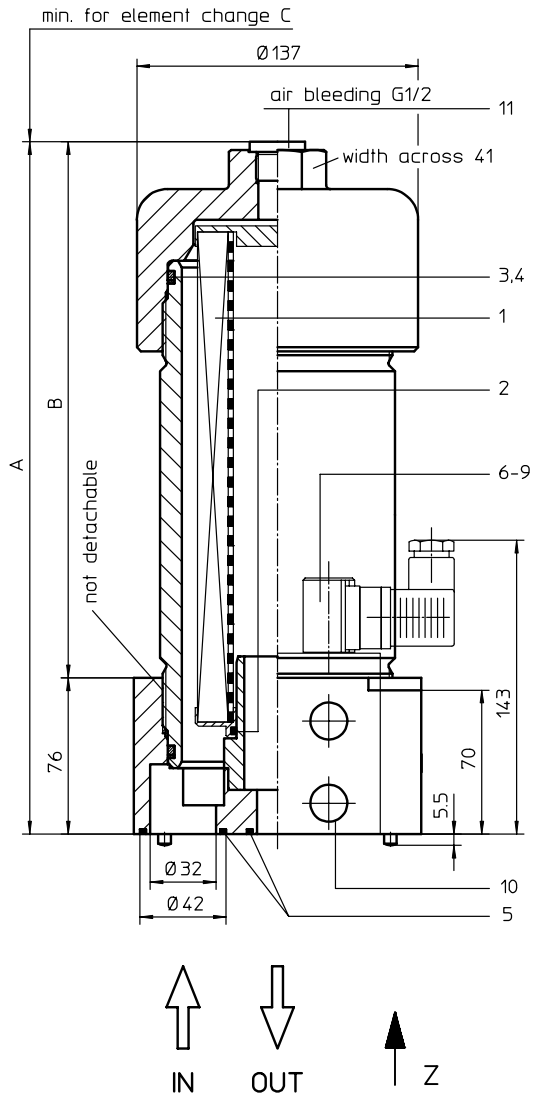
Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

PRESSURE FILTER, manifold mounted
Series MNU 250 - 400 DN 32 PN 250

Sheet No.
1428 J





1. Type index:

1.1. Complete filter: (ordering example)

MNU.	250.	10VG.	30.	E.	P.	-.	P.	6.	-.	-.	AE
1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
MNU = medium pressure standard filter for manifold mounted

2 **nominal size:** 250, 400

3 **filter-material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$,
6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)

4 **resistance of pressure difference:**
30 = filter element for Δp 30 bar
HR = filter element for Δp 160 bar (rupture strength Δp 250 bar)

5 **filter element design:**
E = single-end open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:**
- = standard
VA = stainless steel

8 **connection:**
P = manifold mounted

9 **connection size:**
6 = DN 32

10 **filter housing specification:**
- = standard

11 **internal valve:**
- = without
S1 = with by-pass valve Δp 3,5 bar
S2 = with by-pass valve Δp 7,0 bar

12 **clogging indicator or clogging sensor:**
- = without
AE = visual-electrical, see sheet-no. 1609
VS1 = electronical, see sheet-no. 1607
VS2 = electronical, see sheet-no. 1608

1.2. Filter element: (ordering example)

01NL.	250.	10VG.	30.	E.	P.	-
1	2	3	4	5	6	7

1 **series:**
01NL. = standard filter element according to DIN 24 550, T3

2 **nominal size:** 250, 400

3 - 7 see type index-complete filter

2. Dimensions:

type	connection	A	B	C	weight kg	volume tank
MNU 250	DN 32	337	261	210	20	1,6 l
MNU 400	DN 32	487	411	360	24	2,6 l

EDV 09/09

Changes of measures and design are subject to alteration!

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3. Spare parts:

item	qty.	designation	dimension		article-no.	
			MNU 250	MNU 400		
1	1	filter element	01NL. 250	01NL. 400		
2	1	O-ring	40 x 3		304389 (NBR)	304391 (FPM)
3	1	O-ring	98 x 4		301914 (NBR)	304765 (FPM)
4	1	support ring	107 x 3,5 x 1,5		317663	
5	2	O-ring	36 x 3		304358 (NBR)	313900(FPM)
6	1	clogging indicator,visual-electrical	AE		see sheet-no. 1609	
7	1	clogging sensor,electronical	VS1		see sheet-no. 1607	
8	1	clogging sensor,electronical	VS2		see sheet-no. 1608	
9	2	O-ring	14 x 2		304342 (NBR)	304722 (FPM)
10	2	screw plug	G $^1/_8$		304791	
11	2	screw plug	G ½		304678	

item 10 execution only without clogging indicator or clogging sensor

4. Description:

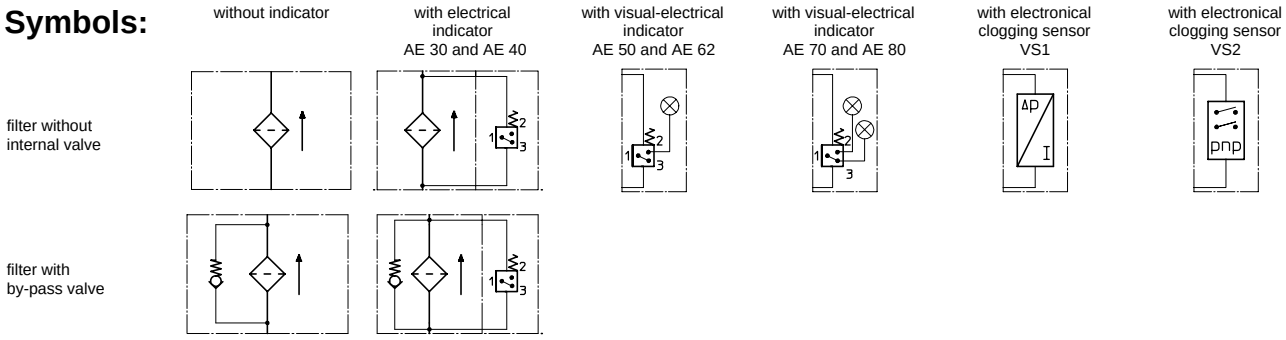
Pressure filters of the series MNU are suitable for a working pressure up to 250 bar and equiped with filter elements according to DIN 24550, T3. The pressure peaks are absorbed by a sufficient margin of safety.The MNU-filters are flange-mounted to the hydraulic system.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive.
The flow direction is from outside to the inside. Filter elements are available down to 4 $\mu m_{(c)}$.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 160 bar and a rupture strength of Δp 250 bar.
The internal valves are integrated into the centering pivot for the filter element.
After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter.

5. Technical data:

temperature range:	-10°C to +80°C (for a short time +100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	250 bar
test pressure:	358 bar
connection system:	manifold mounted
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter' respectively Δp-curves ; depending on filter fineness and viscosity.

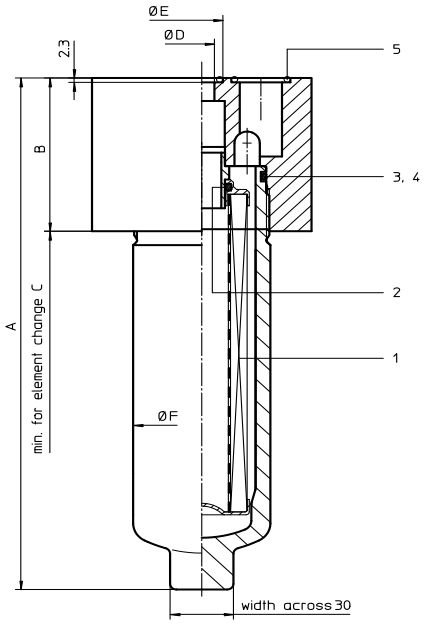
8. Test methods:

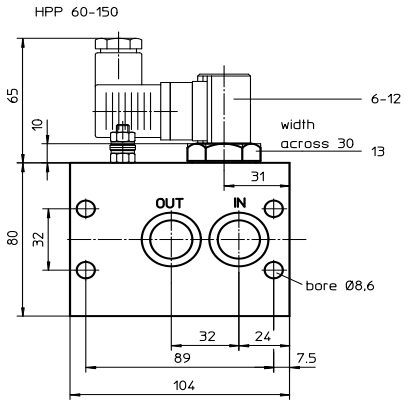
Filter elements are tested according to the following ISO standards:

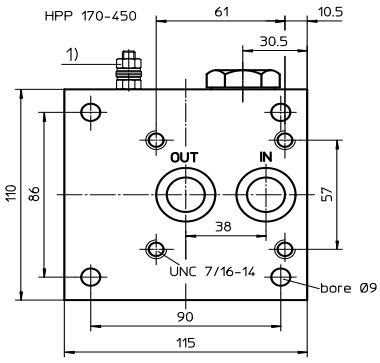
ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

PRESSURE FILTER, manifold mounted
Series HPP 60 - 450 DN 20-22 PN 315

Sheet No.
1471 P







1) connection for the potential equalisation, only for application in the explosive area

1. Type index:

1.1. Complete filter: (ordering example)

HPP.	90.	10VG.	HR.	E.	P.	-.	P.	4.	-.	-.	AE
1	2	3	4	5	6	7	8	9	10	11	12

1 series:
HPP = pressure filter, manifold mounted

2 nominal size: 60, 90, 150, 170, 240, 360, 450

3 filter-material and filter-fineness:
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$,
6 VG= 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)

4 resistance of pressure difference for filter element:
30 = Δp 30 bar
HR = Δp 160 bar (rupture strength Δp 250 bar)

5 filter element design:
E = single-end open

6 sealing material:
P = Nitrile (NBR)
V = Viton (FPM)

7 filter element specification: (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 connection:
P = manifold mounted

9 connection size:
4 = DN 20 (HPP 60-150)
5 = DN 22 (HPP 170-450)

10 filter housing specification: (see catalog)
- = standard
IS06 = see sheet-no. 31605

11 internal valve:
- = without
S1 = with by-pass valve Δp 3,5 bar
S2 = with by-pass valve Δp 7,0 bar
R = reversing valve, Q ≤ 70,06 l/min (HPP 60-150)
Q ≤ 211,008 l/min (HPP 170-450)

12 clogging indicator or clogging sensor:
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E.	90.	10VG.	HR.	E.	P.	-
1	2	3	4	5	6	7

1 series:
01E. = filter element according to INTERNORMEN factory specification

2 nominal size: 60, 90, 150, 170, 240, 360, 450

3 - 7 see type index-complete filter

2. Dimensions:

type	HPP 60	HPP 90	HPP 150	HPP 170	HPP 240	HPP 360	HPP 450
connection	DN 20			DN 22			
A	202	267	376	285	335	415	522
B	80	80	80	95	95	95	95
C	270	335	445	350	400	480	585
D	20	20	20	22	22	22	22
E	28	28	28	30	30	30	30
F	65	65	65	90	90	90	90
weight kg	5	5,5	6,5	15	16	18	20
volume tank	0,3 l	0,4 l	0,6 l	0,7 l	0,9 l	1,2 l	1,6 l

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3. Spare parts:

item	qty.	designation	dimension and article-no. HPP 60-150	HPP 170-450
1	1	filter element	01E. 60 - 01E. 150	01E. 170 - 01E.450
2	1	O-ring	22 x 3,5 304341 (NBR) 304392 (FPM)	34 x 3,5 304338 (NBR) 304730 (FPM)
3	1	O-ring	54 x 3 304657 (NBR) 304720 (FPM)	75 x 3 302215 (NBR) 304729 (FPM)
4	1	support ring	61 x 2,6 x 1 304660	81 x 2,6 x 1 304581
5	2	O-ring	22 x 3 304387 (NBR) 304931 (FPM)	24 x 3 303038 (NBR) 304397 (FPM)
6	1	clogging indicator,visual	AOR or AOC see sheet-no. 1606	
7	1	clogging indicator,visual-electrical	AE see sheet-no. 1615	
8	1	clogging sensor, electronical	VS1 see sheet-no. 1617	
9	1	clogging sensor, electronical	VS2 see sheet-no. 1618	
10	1	O-ring	15 x 1,5 315357 (NBR) 315427 (FPM)	
11	1	O-ring	22 x 2 304708 (NBR) 304721 (FPM)	
12	1	O-ring	14 x 2 304342 (NBR) 304722 (FPM)	
13	1	screw plug	20913-4 309817	

item 13 execution only without clogging indicator or clogging sensor

4. Description:

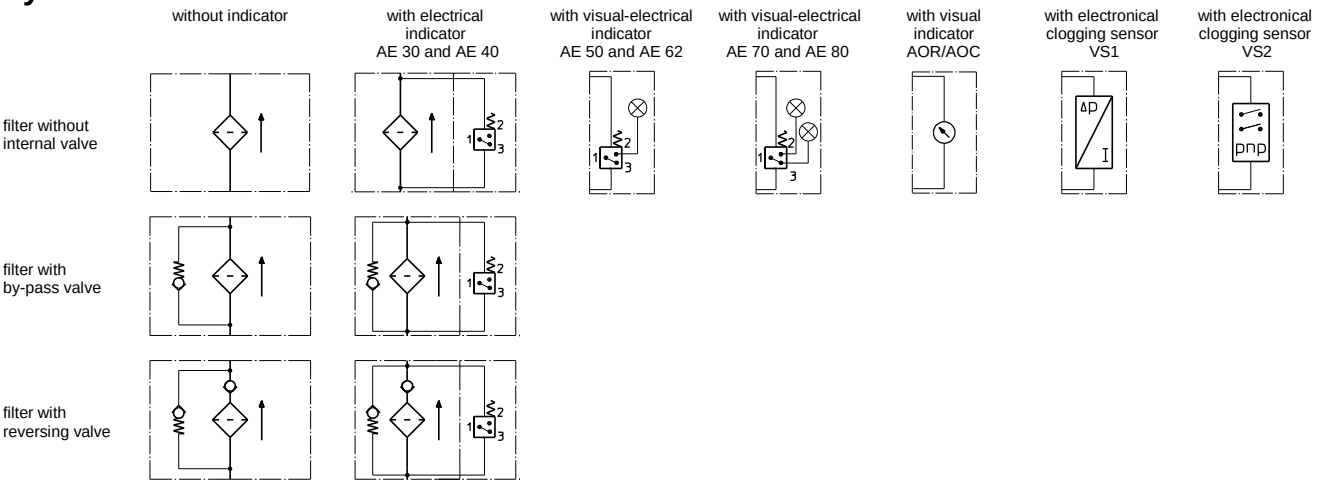
Pressure filter of the series HPP 60-450 are suitable for a working pressure up to 315 bar.
The pressure peaks are absorbed by a sufficient margin of safety. The HPP-filters are flanged to the mounting-surface.
The filter element consist of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.
Filter elements are available down to 4 $\mu m_{(c)}$.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 160 bar and a rupture strength of Δp 250 bar.
The internal valves are integrated into the centering pivot for the filter element.
After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

5. Technical data:

temperature range:	-10°C to +80°C (for a short time +100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	315 bar
test pressure:	450 bar
connection system:	manifold mounted
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

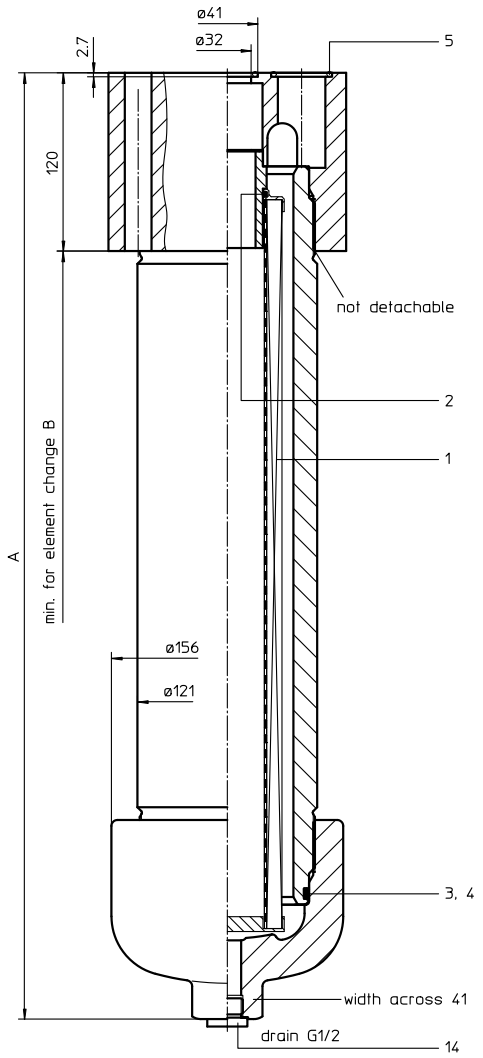
8. Test methods:

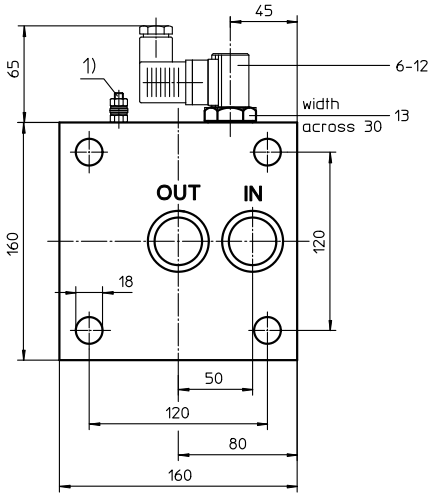
Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

PRESSURE FILTER, manifold mounted
Series HPP 601-1351 DN 32 PN 315

Sheet No.
1470 K





1) connection for the potential equalisation, only for application in the explosive area

1. Type index:

1.1. Complete filter: (ordering example)

HPP.	901.	10VG.	HR.	E.	P.	-.	P.	6.	-.	-.	AE
1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
HPP = pressure filter, manifold mounted

2 **nominal size:** 601, 901, 1351

3 **filter-material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$,
6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)

4 **resistance of pressure difference for filter element:**
30 = Δp 30 bar
HR = Δp 160 bar (rupture strength Δp 250 bar)

5 **filter element design:**
E = single-end open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **connection:**
P = manifold mounted

9 **connection size:**
6 = DN 32

10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605

11 **internal valve:**
- = without
S1 = with by-pass valve Δp 3,5 bar
S2 = with by-pass valve Δp 7,0 bar
R = reversing valve, Q ≤ 465,348 l/min

12 **clogging indicator or clogging sensor:**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E.	900.	10VG.	HR.	E.	P.	-
1	2	3	4	5	6	7

1 **series:**
01E. = filter element according to INTERNORMEN factory specification

2 **nominal size:** 600, 900, 1350

3 - 7 see type index-complete filter

2. Dimensions:

type	HPP 601	HPP 901	HPP 1351
connection	DN 32	DN 32	DN 32
A	487	637	885
B	790	940	1440
weight kg	39	46	58
volume tank	2,1 l	3,1 l	4,6 l

Changes of measures and design are subject to alteration!

EDV 04/11

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3. Spare parts:

item	qty.	designation	dimension			article-no.	
			HPP 601	HPP 901	HPP 1351		
1	1	filer element	01E.600	01E.900	01E.1350		
2	1	O-ring	48 x 3			304357 (NBR)	304404 (FPM)
3	1	O-ring	98 x 4			301914 (NBR)	304765 (FPM)
4	1	support ring	110 x 3,5 x 2			304802	
5	2	O-ring	34 x 3,5			304338 (NBR)	304730 (FPM)
6	1	clogging indicator, visual	AOR or AOC			see sheet no. 1606	
7	1	clogging indicator, visual-electrical	AE			see sheet no. 1615	
8	1	clogging sensor, electronical	VS1			see sheet no. 1617	
9	1	clogging sensor, electronical	VS2			see sheet no. 1618	
10	1	O-ring	15 x 1,5			315357 (NBR)	315427 (FPM)
11	1	O-ring	22 x 2			304708 (NBR)	304721 (FPM)
12	1	O-ring	14 x 2			304342 (NBR)	304722 (FPM)
13	1	screw plug	20913-4			309817	
14	1	screw plug	G ½			304678	

item 13 execution only without clogging indicator or clogging sensor

4. Description:

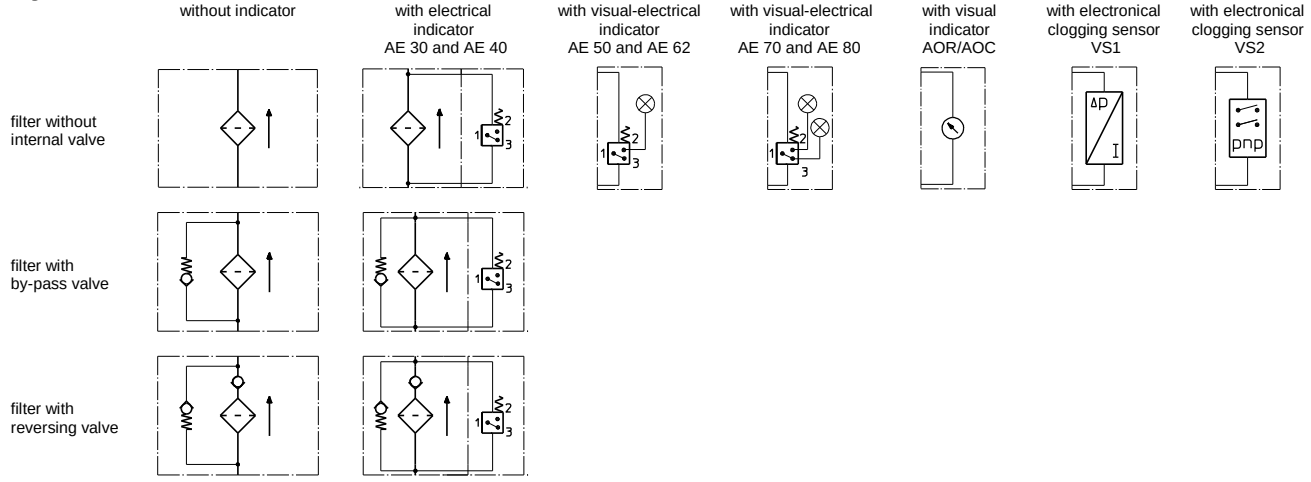
The pressure filters of the series HPP 601-1351 are suitable for a working pressure up to 315 bar.
The pressure peaks are absorbed by a sufficient margin of safety. The HPP-filters are flange mounted to the hydraulic system.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter elements are available down to 4 $\mu m_{(c)}$.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 160 bar and a rupture strength of Δp 250 bar.
The internal valves are integrated into the centering pivot for the filter element.
After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

5. Technical data:

temperature range:	-10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	315 bar
test pressure:	450 bar
connection system:	manifold mounted
housing material:	C-steel; EN-GJS-400-18-LT
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

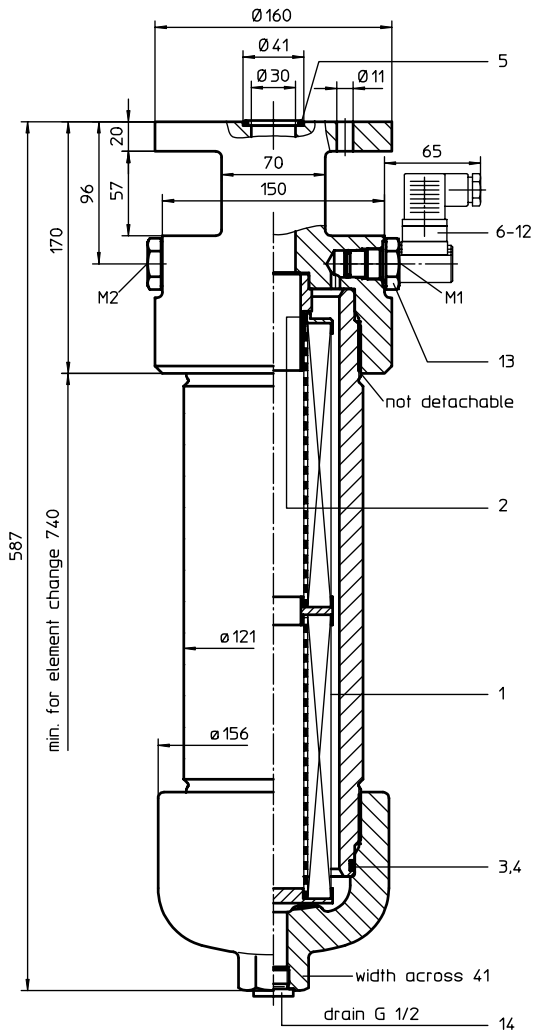
8. Test methods:

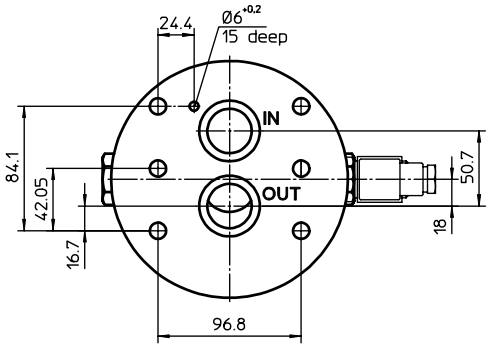
Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

PRESSURE FILTER, manifold mounted
Series HNU 401 DN 32 PN 315

Sheet No.
1476 E





1. Type index:

1.1. Complete filter: (ordering example)

HNU.	401.	10VG.	HR.	E.	P.	-.	P.	6.	-.	-.	AE.	-
1	2	3	4	5	6	7	8	9	10	11	12	13

1 **series:**
HNU = pressure filter, manifold mounted

2 **nominal size:** 401

3 **filter-material and filter-fineness:**
25 VG = 20 µm$_{(c)}$, 16 VG = 15 µm$_{(c)}$, 10 VG = 10 µm$_{(c)}$,
6 VG = 7 µm$_{(c)}$, 3 VG = 5 µm$_{(c)}$ Interpor fleece (glass fibre)

4 **resistance of pressure difference for filter element:**
30 = Δp 30 bar
HR = Δp 160 bar (rupture strength Δp 250 bar)

5 **filter element design:**
E = single-end open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **connection:**
P = manifold mounted

9 **connection size:**
6 = DN 32

10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605

11 **internal valve:**
- = without
S1 = with by-pass valve Δp 3,5 bar
S2 = with by-pass valve Δp 7,0 bar

12 **clogging indicator at M1:**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

13 **clogging indicator at M2:**
possible indicators see position 12 of the type index

1.2. Filter element: (ordering example)

01NL.	400.	10VG.	HR.	E.	P.	-
1	2	3	4	5	6	7

1 **series:**
01NL. = standard filter element according to DIN 24550, T3

2 **nominal size:** 400

3 - 7 see type index-complete filter

weight: approx. 40 kg

Changes of measures and design are subject to alteration!

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2. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01NL. 400		
2	1	O-ring	48 x 3	304357 (NBR)	304404 (FPM)
3	1	O-ring	98 x 4	301914 (NBR)	304765 (FPM)
4	1	support ring	110 x 3,5 x 2	304802	
5	2	O-ring	34 x 3,5	304338 (NBR)	304730 (FPM)
6	1	clogging indicator, visual	AOR or AOC	see sheet no. 1606	
7	1	clogging indicator, visual-electrical	AE	see sheet no. 1615	
8	1	clogging sensor, electronical	VS1	see sheet no. 1617	
9	1	clogging sensor, electronical	VS2	see sheet no. 1618	
10	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
11	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
12	1	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
13	2	screw plug	20913-4	309817	
14	1	screw plug	G ½	304678	

item 13 execution only without clogging indicator or clogging sensor

3. Description:

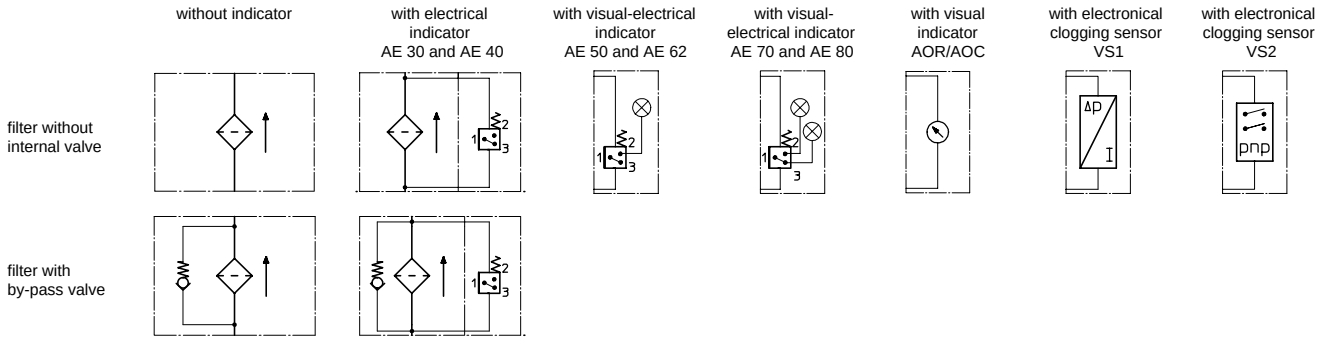
The pressure filters of the series HNU 401 are suitable for a working pressure up to 315 bar.
The pressure peaks are absorbed by a sufficient margin of safety. The HNU-filters are flange mounted to the hydraulic system.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter elements are available down to 4 $\mu m_{(c)}$.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 160 bar and a rupture strength of Δp 250 bar.
The internal valves are integrated into the centering pivot for the filter element.
After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter.

4. Technical data:

temperature range:	-10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	315 bar
test pressure:	410 bar
connection system:	manifold mounted
housing material:	EN-GJS-400-18-LT; C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	2,5 l

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:



6. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

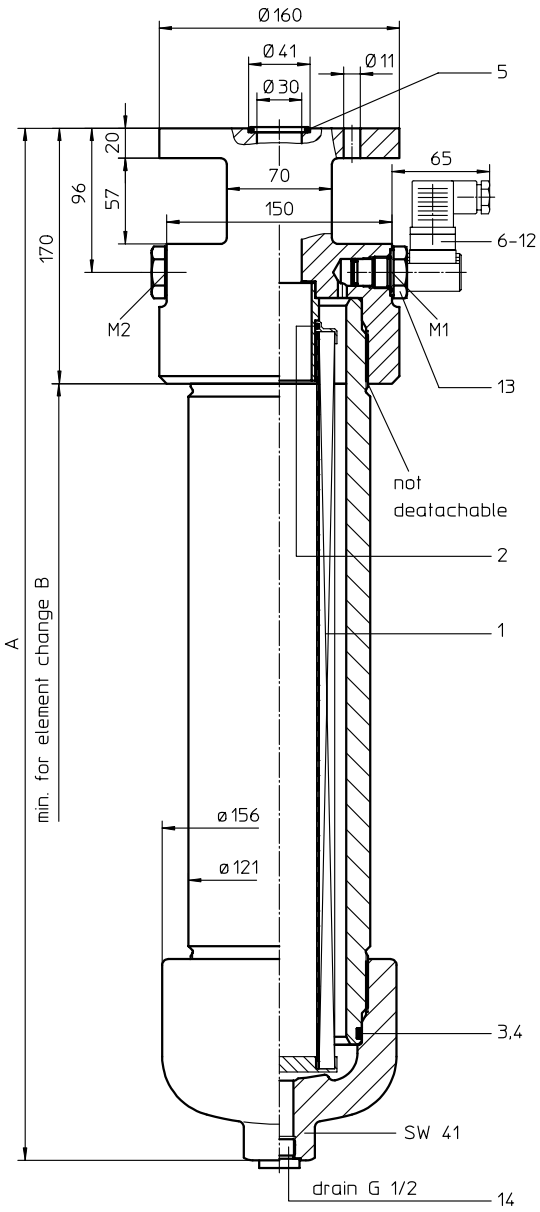
7. Test methods:

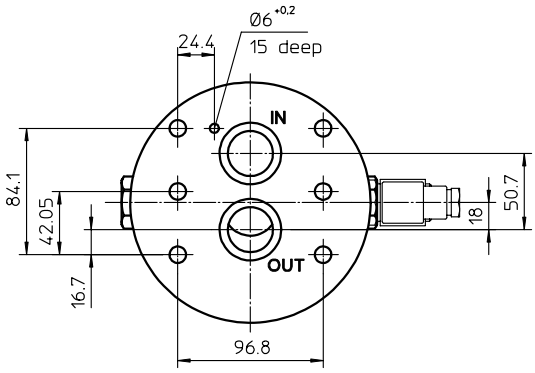
Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

PRESSURE FILTER, manifold mounted
Series HPU 601-1351 DN 32 PN 315

Sheet No.
1480 D





1. Type index:

1.1. Complete filter: (ordering example)

HPU.	901.	10VG.	HR.	E.	P.	-.	P.	6.	-.	-.	AE.	-
1	2	3	4	5	6	7	8	9	10	11	12	13

1 series:
HPU = pressure filter, manifold mounted

2 nominal size: 601, 901, 1351

3 filter-material and filter-fineness:
25 VG = 20 µm(c), 16 VG = 15 µm(c), 10 VG = 10 µm(c),
6 VG = 7 µm(c), 3 VG = 5 µm(c) Interpor fleece (glass fibre)

4 resistance of pressure difference for filter element:
30 = Δp 30 bar
HR = Δp 160 bar (rupture strength Δp 250 bar)

5 filter element design:
E = single-end open

6 sealing material:
P = Nitrile (NBR)
V = Viton (FPM)

7 filter element specification: (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 connection:
P = manifold mounted

9 connection size:
6 = DN 32

10 filter housing specification: (see catalog)
- = standard
IS06 = see sheet-no. 31605

11 internal valve:
- = without
S1 = with by-pass valve Δp 3,5 bar
S2 = with by-pass valve Δp 7,0 bar
R = reversing valve, Q ≤ 465,348 l/min

12 clogging indicator at M1:
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

13 clogging indicator at M2:
possible indicators see position 12 of the type index

1.2. Filter element: (ordering example)

01E.	900.	10VG.	HR.	E.	P.	-
1	2	3	4	5	6	7

1 series:
01E. = filter element according to INTERNORMEN-factory specification

2 nominal size: 600, 900, 1350

3 - 7 see type index-complete filter

2. Dimensions:

type	HPU 601	HPU 901	HPU 1351
connection	DN 32		
A	537	687	935
B	790	940	1440
weight kg	37,5	46	59
volume tank	2,1 l	3,1 l	4,6 l

EDV 11/07

Changes of measures and design are subject to alteration!

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3. Spare parts:

item	qty.	designation	dimension			article-no.	
			HPU 601	HPU 901	HPU 1351		
1	1	filter element	01E. 600	01E. 900	01E. 1350		
2	1	O-ring	48 x 3			304357 (NBR)	304404 (FPM)
3	1	O-ring	98 x 4			301914 (NBR)	304765 (FPM)
4	1	support ring	110 x 3,5 x 2			304802	
5	2	O-ring	34 x 3,5			304338 (NBR)	304730 (FPM)
6	1	clogging indicator, visual	AOR or AOC			see sheet no. 1606	
7	1	clogging indicator, visual-electrical	AE			see sheet no. 1615	
8	1	clogging sensor, electronical	VS1			see sheet no. 1617	
9	1	clogging sensor, electronical	VS2			see sheet no. 1618	
10	1	O-ring	15 x 1,5			315357 (NBR)	315427 (FPM)
11	1	O-ring	22 x 2			304708 (NBR)	304721 (FPM)
12	1	O-ring	14 x 2			304342 (NBR)	304722 (FPM)
13	2	screw plug	20913-4			309817	
14	1	screw plug	½ BSPP			304678	

item 13 execution only without clogging indicator or clogging sensor

4. Description:

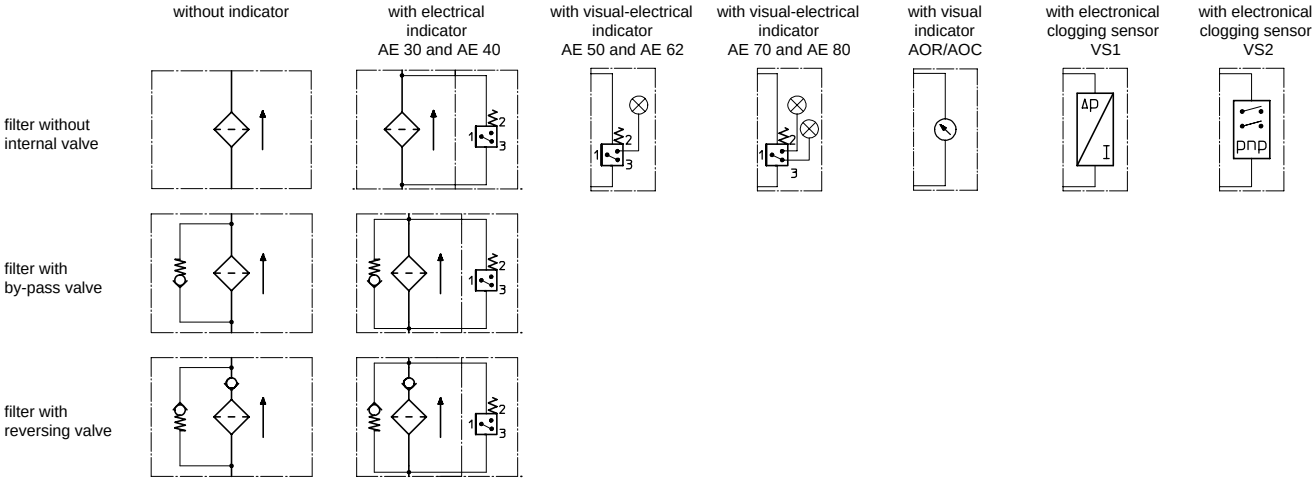
The pressure filters of the series HPU 601-1351 are suitable for a working pressure up to 315 bar.
The pressure peaks are absorbed by a sufficient margin of safety. The HPU-filters are flange mounted to the hydraulic system.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter elements are available down to 4 $\mu m_{(c)}$.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 160 bar and a rupture strength of Δp 250 bar.
The internal valves are integrated into the centering pivot for the filter element.
After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

5. Technical data:

temperature range:	-10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	315 bar
test pressure:	410 bar
connection system:	manifold mounted
housing material:	EN-GJS-400-18-LT; C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

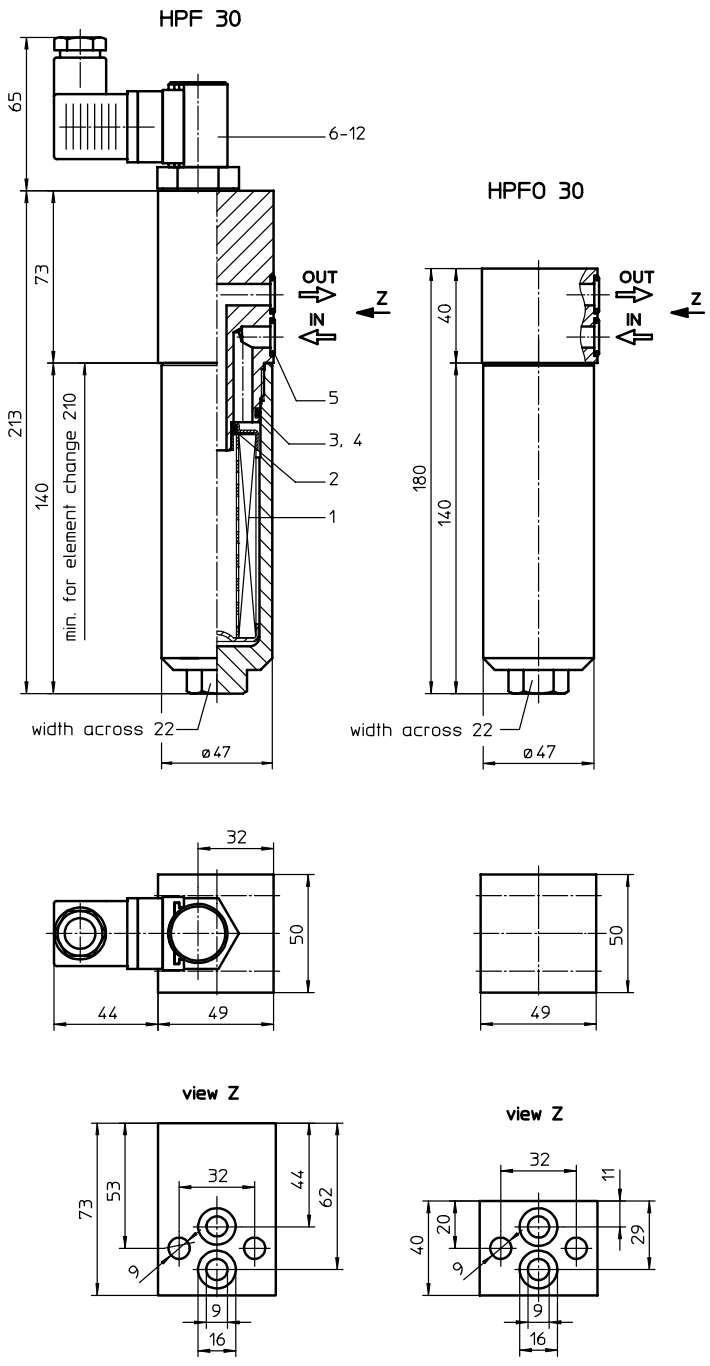
8. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

PRESSURE FILTER, manifold mounted
Series HPF 30, HPFO 30 DN 10 PN 315

Sheet No.
1495 A



1. Type index:

1.1. Complete filter: (ordering example)

HPF.	30.	10VG.	HR.	E.	P.	-.	F.	2.	-.	AE
1	2	3	4	5	6	7	8	9	10	11

1 **series:**
- HPF = medium pressure filter, manifold mounted with indicator
- HPFO = medium pressure filter, manifold mounted without indicator

2 **nominal size:** 30

3 **filter-material and filter-fineness:**
25 VG= 20 µm$_{(c)}$, 16 VG= 15 µm$_{(c)}$, 10 VG= 10 µm$_{(c)}$,
6 VG = 7 µm$_{(c)}$, 3 VG = 5 µm$_{(c)}$ Interpor fleece (glass fibre)

4 **resistance of pressure difference for filter element:**
- 30 = Δp 30 bar
- HR = Δp 160 bar (rupture strenght Δp 250 bar)

5 **filter element design:**
- E = single-end open

6 **sealing material:**
- P = Nitrile (NBR)
- V = Viton (FPM)

7 **filter element specification:** (see catalog)
- - = standard
- VA = stainless steel
- IS06 = see sheet-no. 31601

8 **connection:**
- F = manifold mounted

9 **connection size:**
- 2 = DN 10

10 **filter housing specification:** (see catalog)
- - = standard
- IS06 = see sheet-no. 31605

11 **clogging indicator or clogging sensor:**
series HPFO:
- - = without

series HPF:
- AOR = visual, see sheet-no. 1606
- AOC = visual, see sheet-no. 1606
- AE = visual-electrical, see sheet-no. 1615
- VS1 = electronical, see sheet-no. 1617
- VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E.	30.	10VG.	HR.	E.	P.	-
1	2	3	4	5	6	7

1 **series:**
- 01E. = filter element according to INTERNORMEN factory specification

2 **nominal size:** 30

3 - 7 see type index-complete filter

weight without indicator: approx. 1,8 kg
weight with indicator : approx. 2,4 kg

Changes of measures and design are subject to alteration!

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2. Spare parts:

item	qty.	designation	dimensions	article-no.	
1	1	filter element	01E. 30		
2	1	O-ring	11 x 3	312603 (NBR)	312727 (FPM)
3	1	O-ring	32 x 2,5	306843 (NBR)	308268 (FPM)
4	1	support ring	37 x 2,1 x 1	305466	
5	2	O-ring	12 x 2	311014 (NBR)	310271 (FPM)
6	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
7	1	clogging indicator, visual-electrical	AE	see sheet-no. 1615	
8	1	clogging sensor, electronical	VS1	see sheet-no. 1617	
9	1	clogging sensor, electronical	VS2	see sheet-no. 1618	
10	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
11	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
12	1	O-ring	14 x 2	304342 (NBR)	304722 (FPM)

3. Description:

Pressure filter of the series HPF 30 and HPFO 30 are suitable for a working pressure up to 315 bar.
The pressure peaks are absorbed by a sufficient margin of safety. The filters are flange mounted to the hydraulic system.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside.
Filter elements are available down to 4 $\mu m_{(c)}$.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 160 bar and a rupture strength of Δp 250 bar.

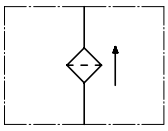
4. Technical data:

temperature range:	-10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	315 bar
test pressure:	410 bar
connection system:	manifold mounted
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	0,1 l

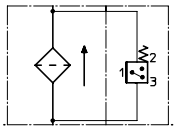
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:

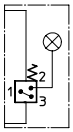
without indicator



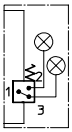
with electrical indicator AE 30 and AE 40



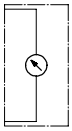
with visual-electrical indicator AE 50 and AE 62



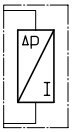
with visual-electrical indicator AE 70 and AE 80



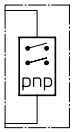
with visual indicator AOR/AOC



with electronical clogging sensor VS1



with electronical clogging sensor VS2



6. Pressure drop flow curves:

Precise flow rates see INT-Expert-System Filter respectively Δp-curves - depending on filter fineness and viscosity.

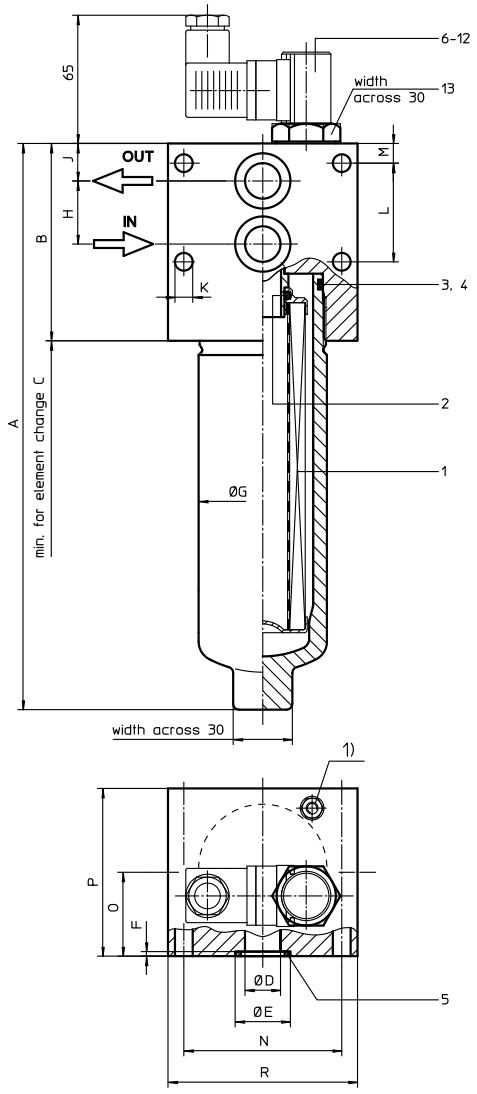
7. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

PRESSURE FILTER, manifold mounted
Series HPF 60 - 450 DN 18 - 28 PN 315

Sheet No.
1473 P



1) connection for the potential equalisation, only for application in the explosive area

1. Type index:

1.1. Complete filter: (ordering example)

HPF.	90.	10VG.	HR.	E.	P.	-.	F.	4.	-.	-.	AE
1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
HPF = pressure filter, manifold mounted

2 **nominal size:** 60, 90, 150, 170, 240, 360, 450

3 **filter-material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$,
6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)

4 **resistance of pressure difference for filter element:**
30 = Δp 30 bar
HR = Δp 160 bar (rupture strength Δp 250 bar)

5 **filter element design:**
E = single-end open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **connection:**
F = manifold mounted

9 **connection size:**
4 = DN 18 (HPF 60-150)
5 = DN 28 (HPF 170-450)

10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605

11 **internal valve:**
- = without
S1 = with by-pass valve Δp 3,5 bar
S2 = with by-pass valve Δp 7,0 bar
R = reversing valve, Q ≤ 70,06 l/min (HPF 60-150)
Q ≤ 211,008 l/min (HPF 170-450)

12 **clogging indicator or clogging sensor:**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

2. Dimensions:

type	HPF 60	HPF 90	HPF 150	HPF 170	HPF 240	HPF 360	HPF 450
connection	DN18	DN18	DN18	DN28	DN28	DN28	DN28
A	218	283	392	330	380	460	565
B	96	96	96	140	140	140	140
C	270	335	445	350	400	480	585
D	18	18	18	28	28	28	28
E	28	28	28	38	38	38	38
F	2,3	2,3	2,3	1,8	1,8	1,8	1,8
G	65	65	65	90	90	90	90
H	32	32	32	44	44	44	44
J	19	19	19	28	28	28	28
K	9	9	9	14	14	14	14
L	50	50	50	44	44	44	44
M	10	10	10	28	28	28	28
N	80	80	80	80	80	80	80
O	42,5	42,5	42,5	57,5	57,5	57,5	57,5
P	85	85	85	115	115	115	115
R	96	96	96	115	115	115	115
weight kg	5,5	6	7	17	18	20	23
volume tank	0,3 l	0,4 l	0,6 l	0,7 l	0,9 l	1,2 l	1,6 l

1.2. Filter element: (ordering example)

01E.	90.	10VG.	HR.	E.	P.	-
1	2	3	4	5	6	7

1 **series:**
01E. = filter element according to INTERNORMEN factory specification

2 **nominal size:** 60, 90, 150, 170, 240, 360, 450

3 - 7 see type index-complete filter

Changes of measures and design are subject to alteration!

EDV 04/11

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3. Spare parts:

item	qty.	designation	dimension and article-no. HPF 60-150	HPF 170-450
1	1	filter element	01E. 60 - 01E. 150	01E. 170 - 01E.450
2	1	O-ring	22 x 3,5 304341 (NBR) 304392 (FPM)	34 x 3,5 304338 (NBR) 304730 (FPM)
3	1	O-ring	54 x 3 304657 (NBR) 304720 (FPM)	75 x 3 302215 (NBR) 304729 (FPM)
4	1	support ring	61 x 2,6 x 1 304660	81 x 2,6 x 1 304581
5	2	O-ring	22 x 3 304387 (NBR) 304931 (FPM)	33,3 x 2,4 304380 (NBR) 314706 (FPM)
6	1	clogging indicator, visual	AOR or AOC see sheet-no. 1606	
7	1	clogging indicator, visual-electrical	AE see sheet-no. 1615	
8	1	clogging sensor, electronical	VS1 see sheet-no. 1617	
9	1	clogging sensor, electronical	VS2 see sheet-no. 1618	
10	1	O-ring	15 x 1,5 315357 (NBR) 315427 (FPM)	
11	1	O-ring	22 x 2 304708 (NBR) 304721 (FPM)	
12	1	O-ring	14 x 2 304342 (NBR) 304722 (FPM)	
13	1	screw plug	20913-4 309817	

item 13 execution only without clogging indicator or clogging sensor

4. Description:

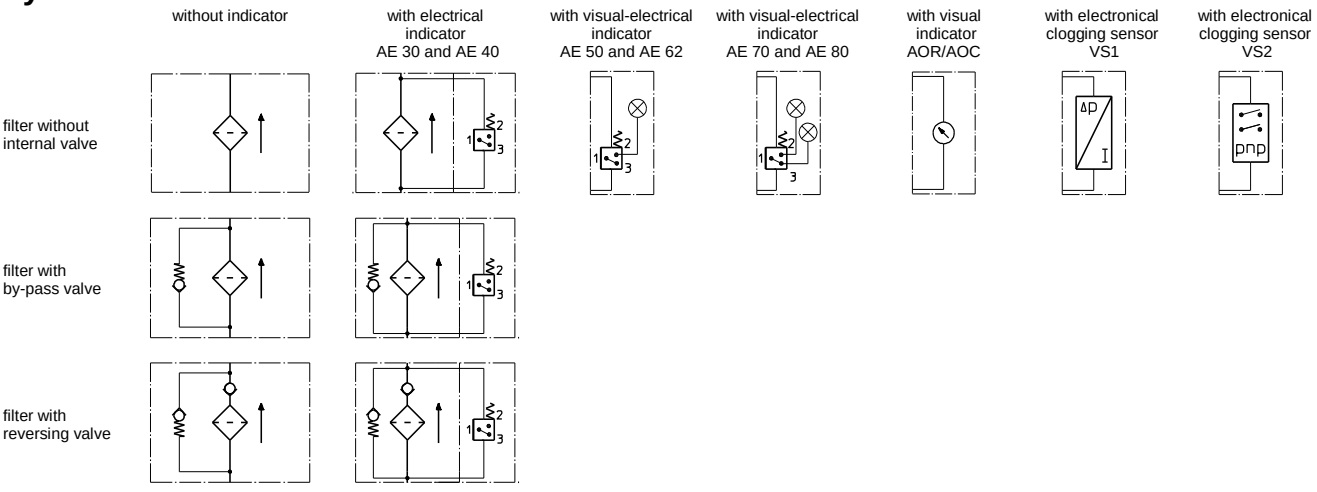
Pressure filter of the series HPF are suitable for a working pressure up to 315 bar.
The pressure peaks are absorbed by a sufficient margin of safety. The HPF-filters are flanged to the mounting-surface.
The filter element consist of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.
Filter elements are available down to 4 $\mu m_{(c)}$.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 160 bar and a rupture strength of Δp 250 bar.
The internal valves are integrated into the centering pivot for the filter element.
After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

5. Technical data:

temperature range:	-10°C to +80°C (for a short time +100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	315 bar
test pressure:	450 bar
connection system:	manifold mounted
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter' respectively Δp-curves ; depending on filter fineness and viscosity.

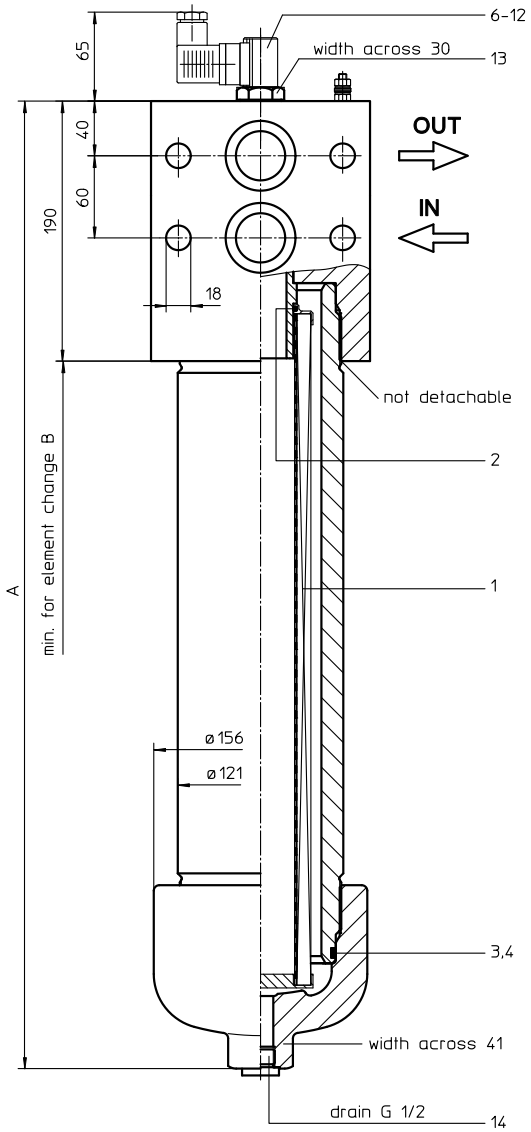
8. Test methods:

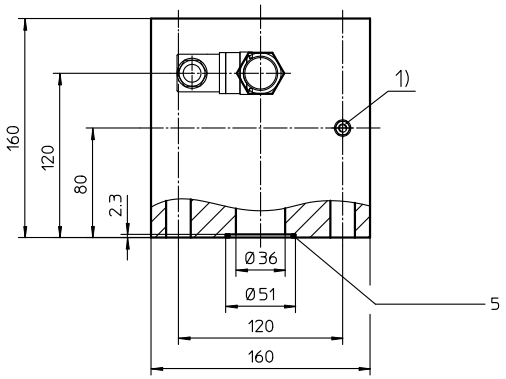
Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

PRESSURE FILTER, manifold mounted
Series HPF 601-1351 DN 36 PN 315

Sheet No.
1472 J





[1] connection for the potential equalisation, only for application in the explosive area

1. Type index:

1.1. Complete filter: (ordering example)

HPF.	901.	10VG.	HR.	E.	P.	-.	F.	6.	-.	-.	AE
1	2	3	4	5	6	7	8	9	10	11	12

1 series:
HPF = pressure filter, manifold mounted

2 nominal size: 601, 901, 1351

3 filter-material and filter-fineness:
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$,
6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)

4 resistance of pressure difference for filter element:
30 = Δp 30 bar
HR = Δp 160 bar (rupture strength Δp 250 bar)

5 filter element design:
E = single-end open

6 sealing material:
P = Nitrile (NBR)
V = Viton (FPM)

7 filter element specification: (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 connection:
F = manifold mounted

9 connection size:
6 = DN 36

10 filter housing specification: (see catalog)
- = standard
IS06 = see sheet-no. 31605

11 internal valve:
- = without
S1 = with by-pass valve Δp 3,5 bar
S2 = with by-pass valve Δp 7,0 bar
R = reversing valve, Q ≤ 465,348 l/min

12 clogging indicator or clogging sensor:
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E.	900.	10VG.	HR.	E.	P.	-
1	2	3	4	5	6	7

1 series:
01E. = filter element according to INTERNORMEN factory specification

2 nominal size: 600, 900, 1350

3 - **7** see type index-complete filter

2. Dimensions:

type	HPF 601	HPF 901	HPF 1351
connection	DN 36	DN 36	DN 36
A	557	707	955
B	790	940	1440
weight kg	47	54	66
volume tank	2,1 l	3,1 l	4,6 l

Changes of measures and design are subject to alteration!

EDV 04/11

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3. Spare parts:

item	qty.	designation	dimension			article-no.	
			HPF 601	HPF 901	HPF 1351		
1	1	filer element	01E.600	01E.900	01E.1350		
2	1	O-ring	48 x 3			304357 (NBR)	304404 (FPM)
3	1	O-ring	98 x 4			301914 (NBR)	304765 (FPM)
4	1	support ring	110 x 3,5 x 2			304802	
5	1	O-ring	45 x 3			304991 (NBR)	304997 (FPM)
6	1	clogging indicator, visual	AOR or AOC			see sheet -no. 1606	
7	1	clogging indicator, visual-electrical	AE			see sheet -no. 1615	
8	1	clogging sensor, electronical	VS1			see sheet -no. 1617	
9	1	clogging sensor, electronical	VS2			see sheet -no. 1618	
10	1	O-ring	15 x 1,5			315357 (NBR)	315427 (FPM)
11	1	O-ring	22 x 2			304708 (NBR)	304721 (FPM)
12	1	O-ring	14 x 2			304342 (NBR)	304722 (FPM)
13	1	screw plug	20913-4			309817	
14	1	screw plug	G ½			304678	

item 13 execution only without clogging indicator or clogging sensor

4. Description:

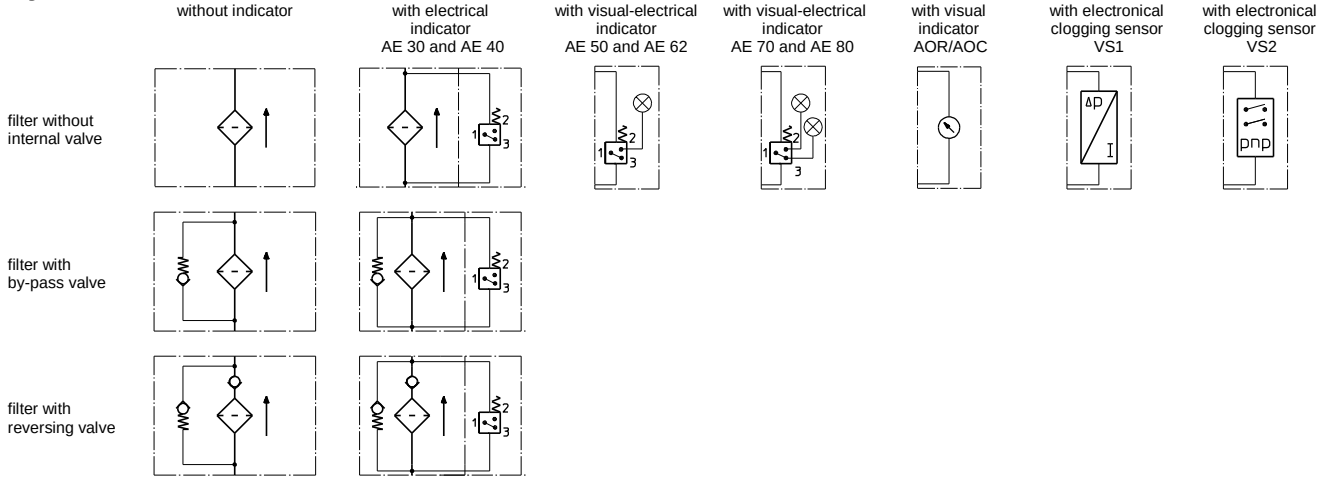
The pressure filters of the series HPF 601-1351 are suitable for a working pressure up to 315 bar.
The pressure peaks are absorbed by a sufficient margin of safety. The HPF-filters are flange mounted to the hydraulic system.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter elements are available down to 4 $\mu m_{(c)}$.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 160 bar and a rupture strength of Δp 250 bar.
The internal valves are integrated into the centering pivot for the filter element.
After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

5. Technical data:

temperature range:	-10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	315 bar
test pressure:	450 bar
connection system:	manifold mounted
housing material:	C-steel; EN-GJS-400-18-LT
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

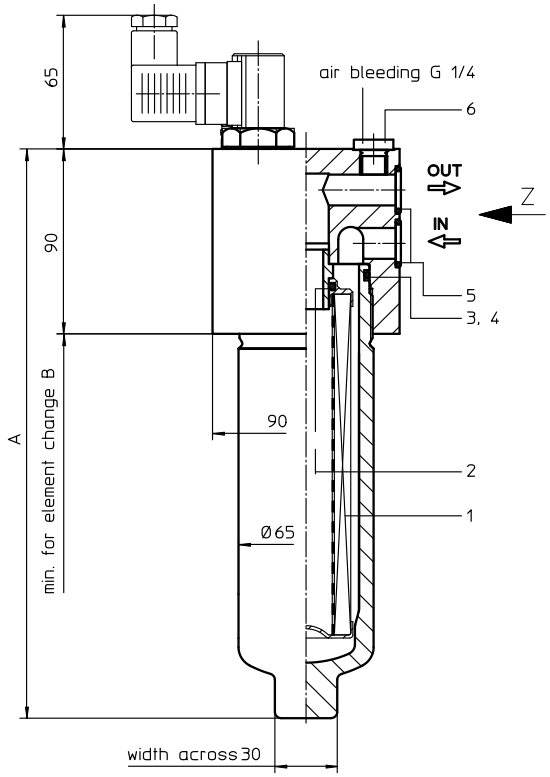
8. Test methods:

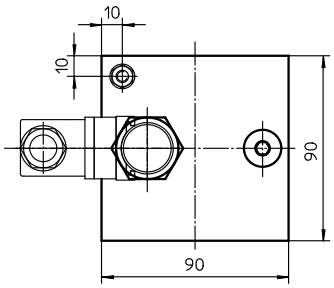
Filter elements are tested according to the following ISO standards:

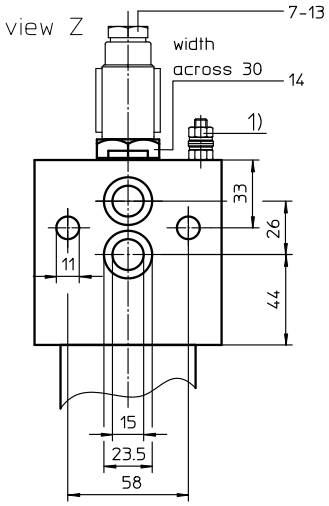
ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

PRESSURE FILTER, manifold mounted
Series FHP 60 - 150 DN 15 PN 250

Sheet No.
1474 H







1) connection for the potential equalisation, only for application in the explosive area

1. Type index:

1.1. Complete filter: (ordering example)

FHP.	90.	10VG.	HR.	E.	P.	-.	F.	4.	-.	-.	AE
1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
FHP = pressure filter, manifold mounted

2 **nominal size:** 60, 90, 150

3 **filter-material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm
stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$,
6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)

4 **resistance of pressure difference for filter element:**
30 = Δp 30 bar
HR = Δp 160 bar (rupture strength Δp 250 bar)

5 **filter element design:**
E = single-end open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **connection:**
F = manifold mounted

9 **connection size:**
4 = DN 15

10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605

11 **internal valve:**
- = without
S1 = with by-pass valve Δp 3,5 bar
S2 = with by-pass valve Δp 7,0 bar
R = reversing valve, Q ≤ 70,06 l/min

12 **clogging indicator or clogging sensor:**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E.	90.	10VG.	HR.	E.	P.	-
1	2	3	4	5	6	7

1 **series:**
01E. = filter element according to INTERNORMEN factory specification

2 **nominal size:** 60, 90, 150

3 - 7 see type index-complete filter

2. Dimensions:

type	FHP 60	FHP 90	FHP 150
connection		DN 15	
A	212	277	386
B	270	335	445
weight kg	5	5,5	6,5
volume tank	0,3 l	0,4 l	0,6 l

Changes of measures and design are subject to alteration!

EDV 04/11

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3. Spare parts:

item	qty.	designation	dimensions			article-no.	
			FHP 60	FHP 90	FHP 150		
1	1	filter element	01E. 60	01E. 90	01E. 150		
2	1	O-ring	22 x 3,5			304341 (NBR)	304392 (FPM)
3	1	O-ring	54 x 3			304657 (NBR)	304720 (FPM)
4	1	support ring	61 x 2,6 x 1			304660	
5	2	O-ring	18 x 2,5			304371 (NBR)	
6	1	screw plug	G ¼			305003	
7	1	clogging indicator, visual	AOR or AOC			see sheet-no. 1606	
8	1	clogigng indicator, visual-electrical	AE			see sheet-no. 1615	
9	1	clogging sensor, electronical	VS1			see sheet-no. 1617	
10	1	clogging sensor, electronical	VS2			see sheet-no. 1618	
11	1	O-ring	15 x 1,5			315357 (NBR)	315427 (FPM)
12	1	O-ring	22 x 2			304708 (NBR)	304721 (FPM)
13	1	O-ring	14 x 2			304342 (NBR)	304722 (FPM)
14	1	screw plug	20913-4			309817	

item 14 execution only without clogging indicator or clogging sensor

4. Description:

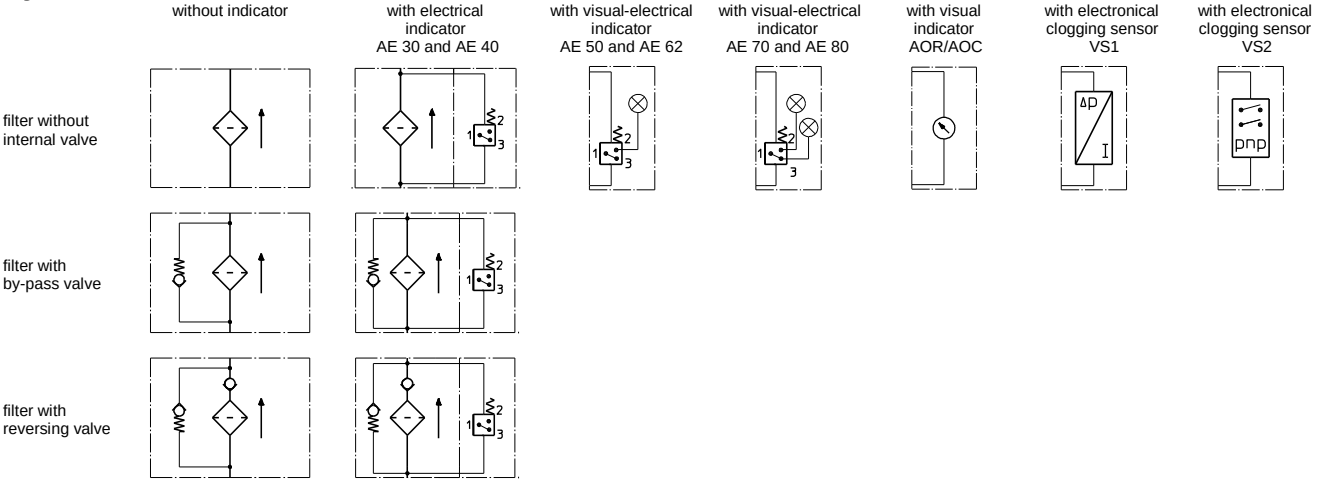
Pressure filter of the series FHP are suitable for a working pressure up to 250 bar.
The pressure peaks are absorbed by a sufficient margin of safety. The FHP-filters are flange mounted to the hydraulic system.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside.
Filter elements are available down to 4 $\mu m_{(c)}$.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 160 bar and a rupture strength of Δp 250 bar.
The internal valves are integrated into the centering pivot for the filter element.
After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

5. Technical data:

temperature range:	-10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	250 bar
test pressure:	358 bar
connection system:	manifold mounted
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see INT-Expert-System Filter respectively Δp-curves - depending on filter fineness and viscosity.

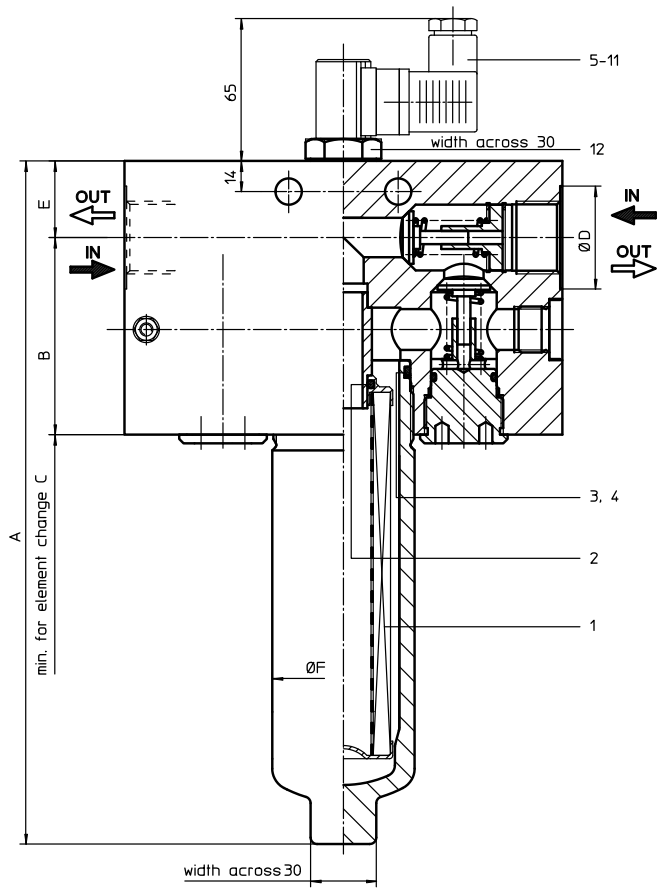
8. Test methods:

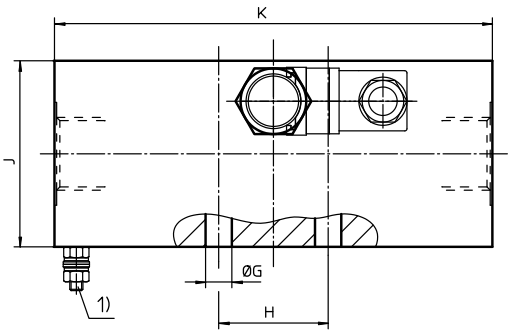
Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

PRESSURE FILTER for reversable filtration
Series HPW 60 - 450 DN 25 - 40 PN 315

Sheet No.
1481 L





[1] connection for the potential equalisation, only for application in the explosive area

1. Type index:

1.1. Complete filter: (ordering example)

HPW. 170. 10VG. HR. E. P. -. G. 7. -. -. AE

1	2	3	4	5	6	7	8	9	10	11	12

1 series:
HPW = pressure filter for reversable filtration

2 nominal size: 60, 90, 150, 170, 240, 360, 450

3 filter-material and filter-fineness:
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)

4 resistance of pressure difference for filter element:
30 = Δp 30 bar
HR = Δp 160 bar (rupture strength Δp 250 bar)

5 filter element design:
E = single-end open

6 sealing material:
P = Nitrile (NBR)
V = Viton (FPM)

7 filter element specification:
- = standard
VA = stainless steel

8 connection:
G = thread connection according to DIN 3852, T2

9 connection size:
5 = G 1 HPW 60-150
7 = G 1 ½ HPW 170-450

10 filter housing specification:
- = standard

11 internal valve:
- = without
S1 = with by-pass valve Δp 3,5 bar
S2 = with by-pass valve Δp 7,0 bar

12 clogging indicator or clogging sensor:
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E. 170. 10VG. HR. E. P. -

1	2	3	4	5	6	7

1 series:
01E. = filter element according to INTERNORMEN factory specification

2 nominal size: 60, 90, 150, 170, 240, 360, 450

3 - 7 see type index-complete filter

2. Dimensions:

type	HPW 60	HPW 90	HPW 150	HPW 170	HPW 240	HPW 360	HPW 450
connection	G 1			G 1 ½			
A	247	312	421	350	400	480	585
B	90	90	90	120	120	120	120
C	270	335	445	350	400	480	585
D	47	47	47	61	61	61	61
E	35	35	35	40	40	40	40
F	65	65	65	90	90	90	90
G	12	12	12	14	14	14	14
H	50	50	50	60	60	60	60
J	85	85	85	115	115	115	115
K	200	200	200	270	270	270	270
weight kg	16,0	16,5	17,0	39,0	40,0	42,0	44,0
volume tank	0,3 l	0,4 l	0,6 l	0,7 l	0,9 l	1,2 l	1,6 l

Changes of measures and design are subject to alteration!

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3. Spare parts:

item	qty.	designation	dimension and article-no. HPW 60-150	HPW 170-450
1	1	filter element	01E. 60 - 01E. 150	01E. 170 - 01E.450
2	1	O-ring	22 x 3,5 304341 (NBR) 304392 (FPM)	34 x 3,5 304338 (NBR) 304730 (FPM)
3	1	O-ring	54 x 3 304657 (NBR) 304720 (FPM)	75 x 3 302215 (NBR) 304729 (FPM)
4	1	support ring	61 x 2,6 x 1 304660	81 x 2,6 x 1 304581
5	1	clogging indicator visual	AOR or AOC	see sheet-no. 1606
6	1	clogging indicator visual-electrical	AE	see sheet-no. 1615
7	1	clogging sensor electronical	VS1	see sheet-no. 1617
8	1	clogging sensor electronical	VS2	see sheet-no. 1618
9	1	O-ring	15 x 1,5	315357 (NBR) 315427 (FPM)
10	1	O-ring	22 x 2	304708 (NBR) 304721 (FPM)
11	1	O-ring	14 x 2	304342 (NBR) 304722 (FPM)
12	1	screw plug	20913-4	309817

item 12 execution only without clogging indicator or clogging sensor

4. Description:

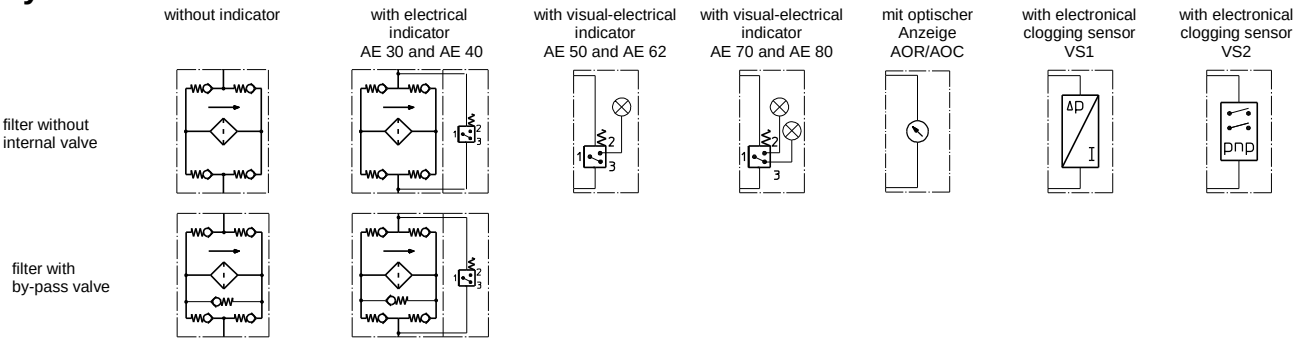
Pressure filter of the series HPW 60 - 450 are intended for fields of application, where the medium that should be filtered flows through the filter in two directions and the filter effect for both directions of flow exists.
Four check valves fitted in Graetz-position (see switching symbol) quarantee the function, that the flow against to the filter-element will be always from the same side even with changing flow direction. The HPW-filter is in-line mounted.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter elements are available down to 4 $\mu m_{(c)}$.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 160 bar and a rupture strength of Δp 250 bar.
The internal valves are integrated into the centering pivot for the filter element. After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter.

5. Technical data:

temperature range:	-10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	315 bar
test pressure:	450 bar
connection system:	thread according to DIN 3852, T2
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter' respectively Δp-curves ; depending on filter fineness and viscosity.

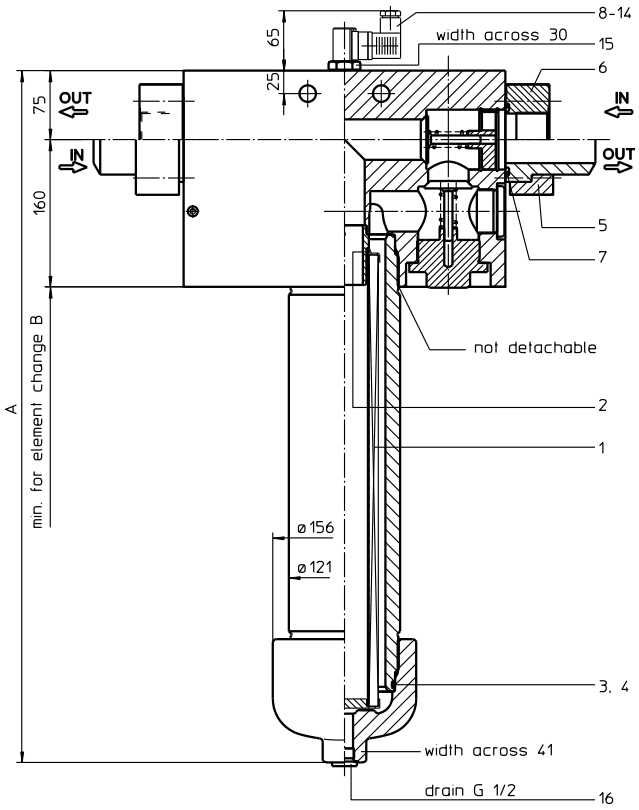
8. Test methods:

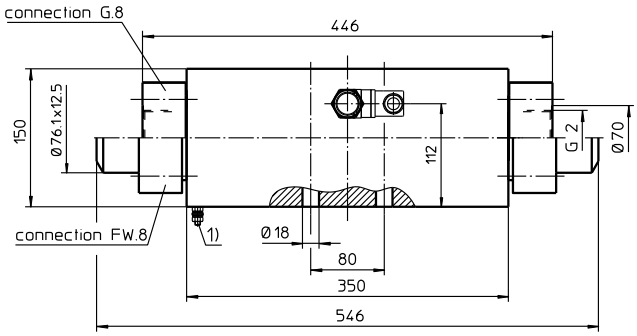
Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

PRESSURE FILTER for reversable filtration
Series HPW 601-1351 DN 50 PN 315

Sheet No.
1482 H





1) connection for the potential equalisation, only for application in the explosive area

1. Type index:

1.1. Complete filter: (ordering example)

HPW. 901. 10VG. HR. E. P. -. FW. 8. -. -. AE

1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
HPW = pressure filter for reversable filtration

2 **nominal size:** 601, 901, 1351

3 **filter-material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm
stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$,
6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)

4 **resistance of pressure difference for filter element:**
30 = Δp 30 bar
HR = Δp 160 bar (rupture strength Δp 250 bar)

5 **filter element design:**
E = single-end open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:**
- = standard
VA = stainless steel

8 **connection:**
FW = flange connection factory specification
G = thread connection according to ISO 228

9 **connection size:**
8 = 2“

10 **filter housing specification:**
- = standard

11 **internal valve:**
- = without
S1 = with by-pass valve Δp 3,5 bar
S2 = with by-pass valve Δp 7,0 bar

12 **clogging indicator or clogging sensor:**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E. 900. 10VG. HR. E. P. -

1	2	3	4	5	6	7

1 **series:**
01E. = filter element according to INTERNORMEN factory specification

2 **nominal size:** 600, 900, 1350

3 - 7 see type index-complete filter

2. Accessories:
- counter flange, see sheet-no. 1654

3. Dimensions:

type	HPW 601	HPW 901	HPW 1351
connection	2“	2“	2“
A	602	752	1000
B	790	940	1440
weight kg	115	122	134
volume tank	2,1 l	3,1 l	4,6 l

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Changes of measures and design are subject to alteration!

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4. Spare parts:

item	qty.	designation	dimension			article-no..	
			HPW 601	HPW 901	HPW 1351		
1	1	filter element	01E.600	01E.900	01E.1350		
2	1	O-ring	48 x 3			304357 (NBR)	304404 (FPM)
3	1	O-ring	98 x 4			301914 (NBR)	304765 (FPM)
4	1	support ring	110 x 3,5 x 2			304802	
5	2	counter flange	FW 50-4-76,1x12,5			303717.1	
6	2	adapter	FW.8.G.8			320554	
7	2	O-ring	68 x 5			304376 (NBR)	304394 (FPM)
8	1	clogging indicator visual	AOR or AOC			see sheet-no. 1606	
9	1	clogging indicator visual-electrical	AE			see sheet-no. 1615	
10	1	clogging sensor electronical	VS1			see sheet-no. 1617	
11	1	clogging sensor electronical	VS2			see sheet-no. 1618	
12	1	O-ring	15 x 1,5			315357 (NBR)	315427 (FPM)
13	1	O-ring	22 x 2			304708 (NBR)	304721 (FPM)
14	1	O-ring	14 x 2			304342 (NBR)	304722 (FPM)
15	1	screw plug	20913-4			309817	
16	1	screw plug	G ½			304678	

item 15 execution only without clogging indicator or clogging sensor

5. Description:

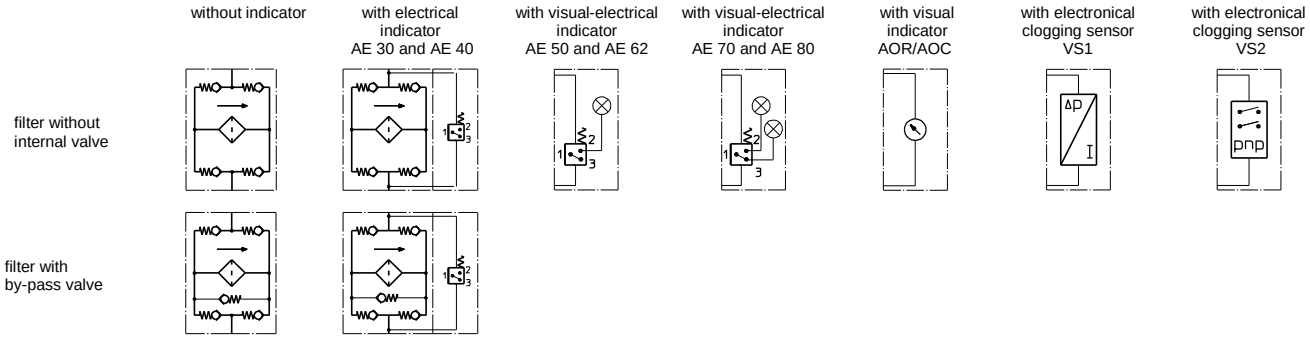
Pressure filter of the series HPW 601-1351 are intended for fields of application, where the medium that should be filtered flows through the filter in two directions and the filter effect for both directions of flow exists.
Four check valves fitted in Graetz-position (see switching symbol) quarantee the function, that the flow against to the filter-element will be always from the same side even with changing flow direction. The HPW-filters are flange mounted to the hydraulic system.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter elements are available down to 4 $\mu m_{(c)}$.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 160 bar and a rupture strength of Δp 250 bar.
The internal valves are integrated into the centering pivot for the filter element. After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter.

6. Technical data:

temperature range:	-10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	315 bar
test pressure:	450 bar
connection system:	flange connection factory specification or thread connection according to ISO 228
housing material:	C-steel; EN-GJS-400-18-LT
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

7. Symbols:



8. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter' respectively Δp-curves ; depending on filter fineness and viscosity.

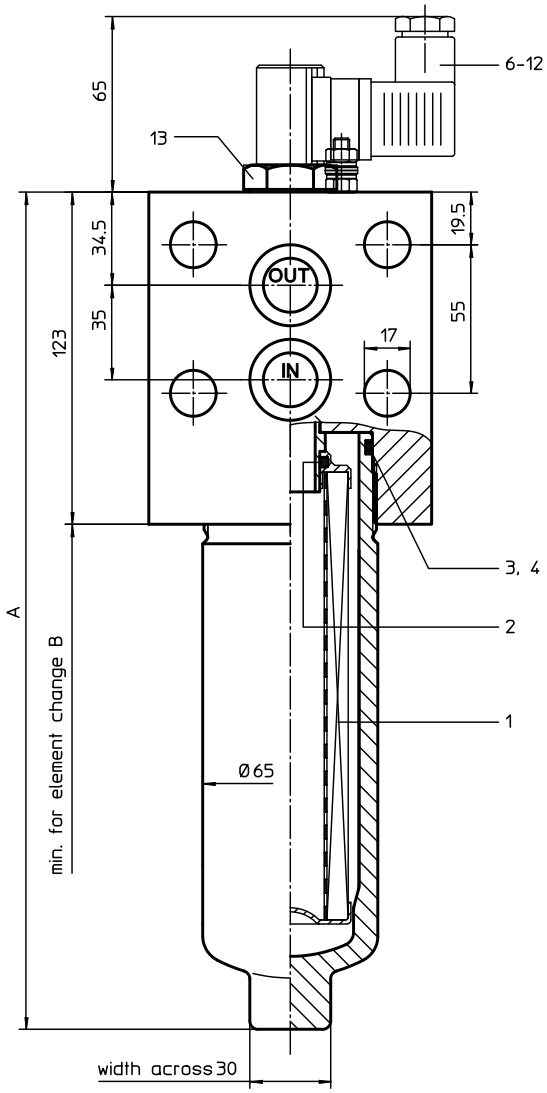
9. Test methods:

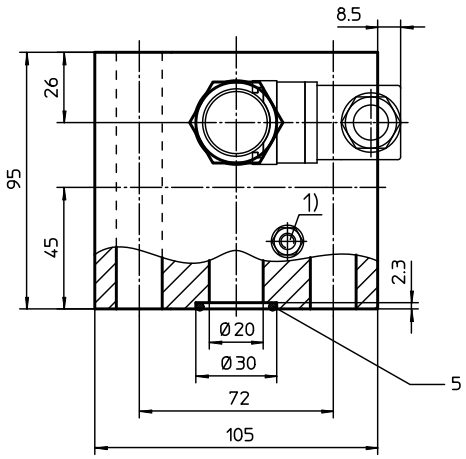
Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

PRESSURE FILTER, manifold mounted
Series HPX 60-150 DN 20 PN 315

Sheet No.
1483 D





[1] connection for the potential equalisation, only for application in the explosive area

1. Type index:

1.1. Complete filter: (ordering example)

HPX .	90.	10VG.	HR.	E.	P.	-.	F.	4.	-.	-.	AE
1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
HPX = pressure filter, manifold mounted

2 **nominal size:** 60, 90, 150

3 **filter-material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$,
6 VG= 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)

4 **resistance of pressure difference for filter element:**
30 = Δp 30 bar
HR = Δp 160 bar (rupture strength Δp 250 bar)

5 **filter element design:**
E = single-end open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **connection:**
F = manifold mounted

9 **connection size:**
4 = DN 20

10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605

11 **internal valve:**
- = without
S1 = with by-pass valve Δp 3,5 bar
S2 = with by-pass valve Δp 7,0 bar
R = reversing valve, Q ≤ 70,06 l/min

12 **clogging indicator or clogging sensor:**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E.	90.	10VG.	HR.	E.	P.	-
1	2	3	4	5	6	7

1 **series:**
01E. = filter element according to INTERNORMEN factory specification

2 **nominal size:** 60, 90, 150

3 - 7 see type index-complete filter

2. Dimensions:

Type	HPX 60	HPX 90	HPX 150
connection	DN 20		
A	245	310	419
B	270	335	445
weight kg	9	9,5	10,5
volume tank	0,3 l	0,4 l	0,6 l

Changes of measures and design are subject to alteration!

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3. Spare parts:

item	qty.	designation	dimension HPX 60	dimension HPX 90	dimension HPX 150	article-no.	
1	1	filter element	01E.60	01E.90	01E.150		
2	1	O-ring	22 x 3,5			304341 (NBR)	304392 (FPM)
3	1	O-ring	54 x 3			304657 (NBR)	304720 (FPM)
4	1	support ring	61 x 2,6 x 1			304660	
5	2	O-ring	24 x 3			303038 (NBR)	304397 (FPM)
6	1	clogging indicator, visual	AOR or AOC			see sheet-no. 1606	
7	1	clogging indicator, visual-electrical	AE			see sheet-no. 1615	
8	1	clogging sensor, electronical	VS1			see sheet-no. 1617	
9	1	clogging sensor, electronical	VS2			see sheet-no. 1618	
10	1	O-ring	15 x 1,5			315357 (NBR)	315427 (FPM)
11	1	O-ring	22 x 2			304708 (NBR)	304721 (FPM)
12	1	O-ring	14 x 2			304342 (NBR)	304722 (FPM)
13	1	screw plug	20913-4			309817	

item 13 execution only without clogging indicator or clogging sensor

4. Description:

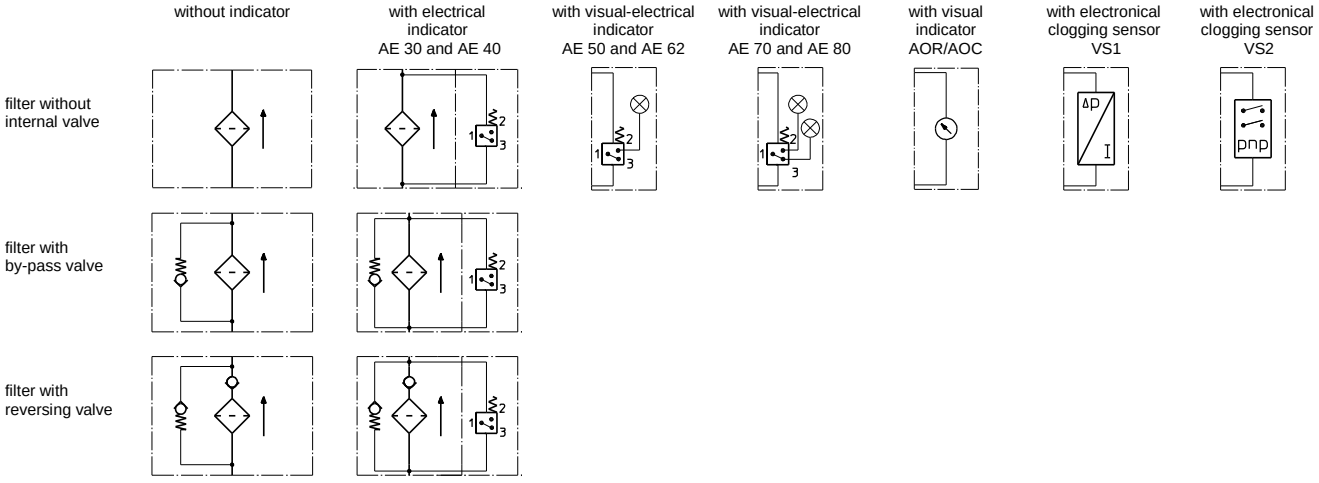
The pressure filters of the series HPX 60-150 are suitable for a working pressure up to 315 bar.
The pressure peaks are absorbed by a sufficient margin of safety. The HPX-filter are flanged to the mounting face.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter elements are available down to 4 $\mu m_{(c)}$.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 160 bar and a rupture strength of Δp 250 bar.
The internal valves are integrated into the centering pivot for the filter element.
After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

5. Technical data:

temperature range:	-10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	315 bar
test pressure:	450 bar
connection system:	manifold mounted
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

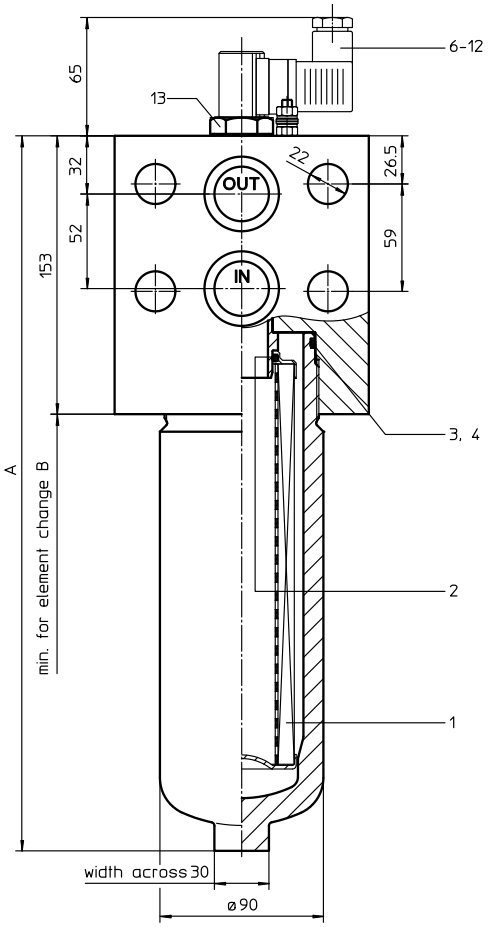
8. Test methods:

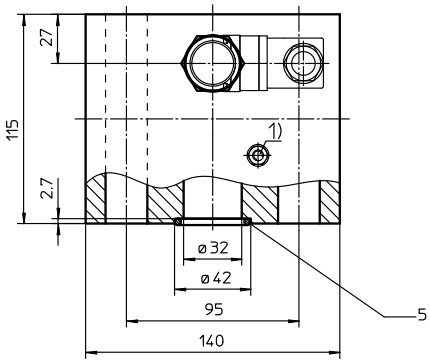
Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

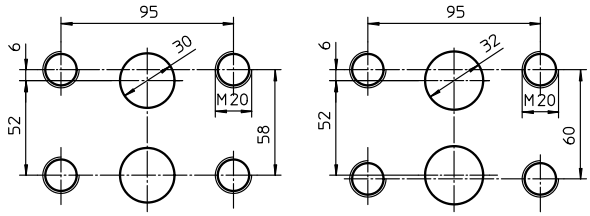
PRESSURE FILTER, manifold mounted
Series HPX 170-450 DN 32 PN 315

Sheet No.
1485 D





possible connection masses



[1] connection for the potential equalisation, only for application in the explosive area

1. Type index:

1.1. Complete filter: (ordering example)

HPX	. 360.	10VG.	HR.	E.	P.	-.	F.	6.	-.	-.	AE
1	2	3	4	5	6	7	8	9	10	11	12

1 series:
HPX = pressure filter, manifold mounted

2 nominal size: 170, 240, 360, 450

3 filter-material and filter-fineness:
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$,
6 VG = 7$\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)

4 resistance of pressure difference for filter element:
30 = Δp 30 bar
HR = Δp 160 bar (rupture strength Δp 250 bar)

5 filter element design:
E = single-end open

6 sealing material:
P = Nitrile (NBR)
V = Viton (FPM)

7 filter element specification: (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 connection:
F = manifold mounted

9 connection size:
6 = DN 32

10 filter housing specification: (see catalog)
- = standard
IS06 = see sheet-no. 31605

11 internal valve:
- = without
S1 = with by-pass valve Δp 3,5 bar
S2 = with by-pass valve Δp 7,0 bar
R = reversing valve, Q ≤ 211,008 l/min

12 clogging indicator or clogging sensor:
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E.	360.	10VG.	HR.	E.	P.	-
1	2	3	4	5	6	7

1 series:
01E. = filter element according to INTERNORMEN factory specification

2 nominal size: 170, 240, 360, 450

3 - 7 see type index-complete filter

2. Dimensions:

type	HPX 170	HPX 240	HPX 360	HPX 450
connection	DN 32			
A	343	393	473	580
B	350	400	480	585
weight kg	21	22,3	24	27,7
volume tank	0,7 l	0,9 l	1,2 l	1,6 l

Changes of measures and design are subject to alteration!

EDV 04/11

internormen technology

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3. Spare parts:

item	qty.	designation	dimension				article-no.	
			HPX 170	HPX 240	HPX 360	HPX 450		
1	1	filter element	01E.170	01E.240	01E.360	01E.450		
2	1	O-ring	34 x 3,5				304338 (NBR)	304730 (FPM)
3	1	O-ring	75 x 3				302215 (NBR)	304729 (FPM)
4	1	support ring	81 x 2,6 x 1				304581	
5	2	O-ring	36 x 3				304358 (NBR)	313900 (FPM)
6	1	clogging indicator, visual	AOR or AOC				see sheet-no. 1606	
7	1	clogging indicator, visual-electrical	AE				see sheet-no. 1615	
8	1	clogging sensor, electronical	VS1				see sheet-no. 1617	
9	1	clogging sensor, electronical	VS2				see sheet-no. 1618	
10	1	O-ring	15 x 1,5				315357 (NBR)	315427 (FPM)
11	1	O-ring	22 x 2				304708 (NBR)	304721 (FPM)
12	1	O-ring	14 x 2				304342 (NBR)	304722 (FPM)
13	1	screw plug	20913-4				309817	

item 13 execution only without clogging indicator or clogging sensor

4. Description:

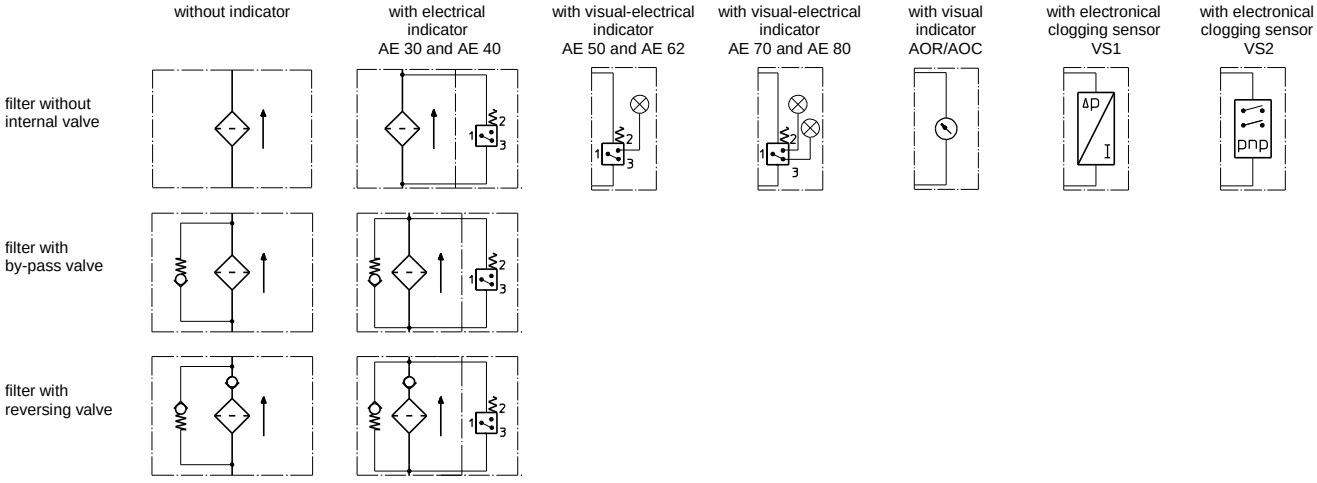
The pressure filters of the series HPX 170-450 are suitable for a working pressure up to 315 bar.
The pressure peaks are absorbed by a sufficient margin of safety. The HPX-filter are flanged to the mounting face.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter elements are available down to 4 $\mu m_{(c)}$.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 160 bar and a rupture strength of Δp 250 bar.
The internal valves are integrated into the centering pivot for the filter element.
After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

5. Technical data:

temperature range:	-10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	315 bar
test pressure:	450 bar
connection system:	manifold mounted
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

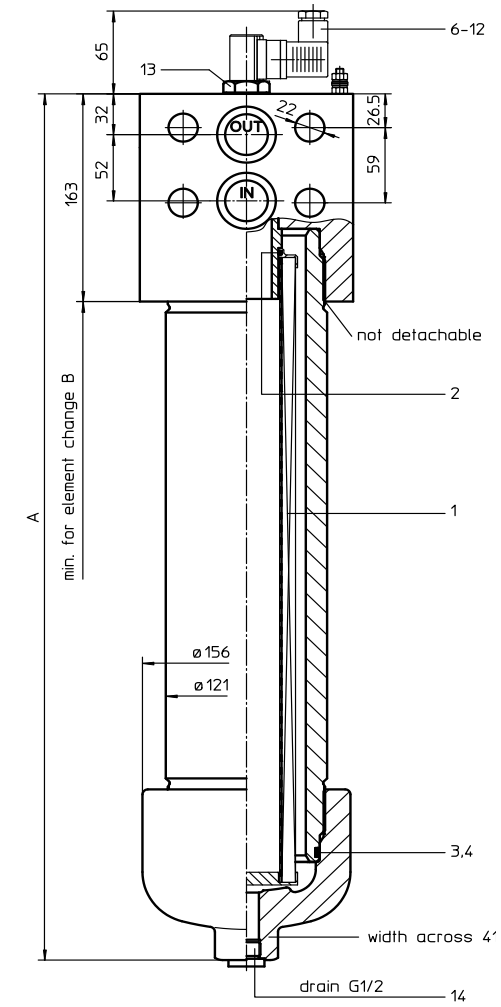
8. Test methods:

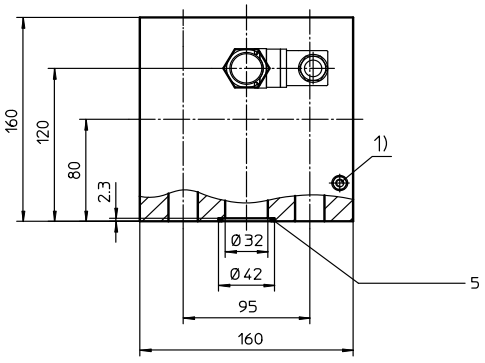
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

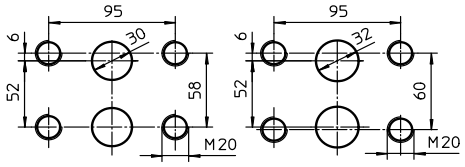
PRESSURE FILTER, manifold mounted
Series HPX 601-1351 DN 32 PN 315

Sheet No.
1487 B





possible connection masses



1) connection for the potential equalisation, only for application in the explosive area

1. Type index:

1.1. Complete filter: (ordering example)

HPX	. 901.	10VG.	HR.	E.	P.	-.	F.	6.	-.	-.	AE
1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
HPX = pressure filter, manifold mounted

2 **nominal size:** 601, 901, 1351

3 **filter-material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$,
6 VG = 7$\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)

4 **resistance of pressure difference for filter element:**
30 = Δp 30 bar
HR = Δp 160 bar (rupture strength Δp 250 bar)

5 **filter element design:**
E = single-end open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **connection:**
F = manifold mounted

9 **connection size:**
6 = DN 32

10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605

11 **internal valve:**
- = without
S1 = with by-pass valve Δp 3,5 bar
S2 = with by-pass valve Δp 7,0 bar
R = reversing valve, Q ≤ 211,008 l/min

12 **clogging indicator or clogging sensor:**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E.	900.	10VG.	HR.	E.	P.	-
1	2	3	4	5	6	7

1 **series:**
01E. = filter element according to INTERNORMEN factory specification

2 **nominal size:** 600, 900, 1350

3 - 7 see type index-complete filter

2. Dimensions:

type	HPX 601	HPX 901	HPX 1351
connection	DN 32		
A	530	680	928
B	790	940	1440
weight kg	55	62	74
volume tank	2,1 l	3,1 l	4,6 l

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Changes of measures and design are subject to alteration!

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3. Spare parts:

item	qty.	designation	dimension			article-no.	
			HPX 601	HPX 901	HPX 1351		
1	1	filter element	01E.600	01E.900	01E.1350		
2	1	O-ring	48 x 3			304357 (NBR)	304404 (FPM)
3	1	O-ring	98 x 4			301914 (NBR)	304765 (FPM)
4	1	support ring	110 x 3,5 x 2			304802	
5	2	O-ring	36 x 3			304358 (NBR)	313900 (FPM)
6	1	clogging indicator, visual	AOR or AOC			see sheet-no. 1606	
7	1	clogging indicator, visual-electrical	AE			see sheet-no. 1615	
8	1	clogging sensor, electronical	VS1			see sheet-no. 1617	
9	1	clogging sensor, electronical	VS2			see sheet-no. 1618	
10	1	O-ring	15 x 1,5			315357 (NBR)	315427 (FPM)
11	1	O-ring	22 x 2			304708 (NBR)	304721 (FPM)
12	1	O-ring	14 x 2			304342 (NBR)	304722 (FPM)
13	1	screw plug	20913-4			309817	
14	1	screw plug	G ½			304678	

item 13 execution only without clogging indicator or clogging sensor

4. Description:

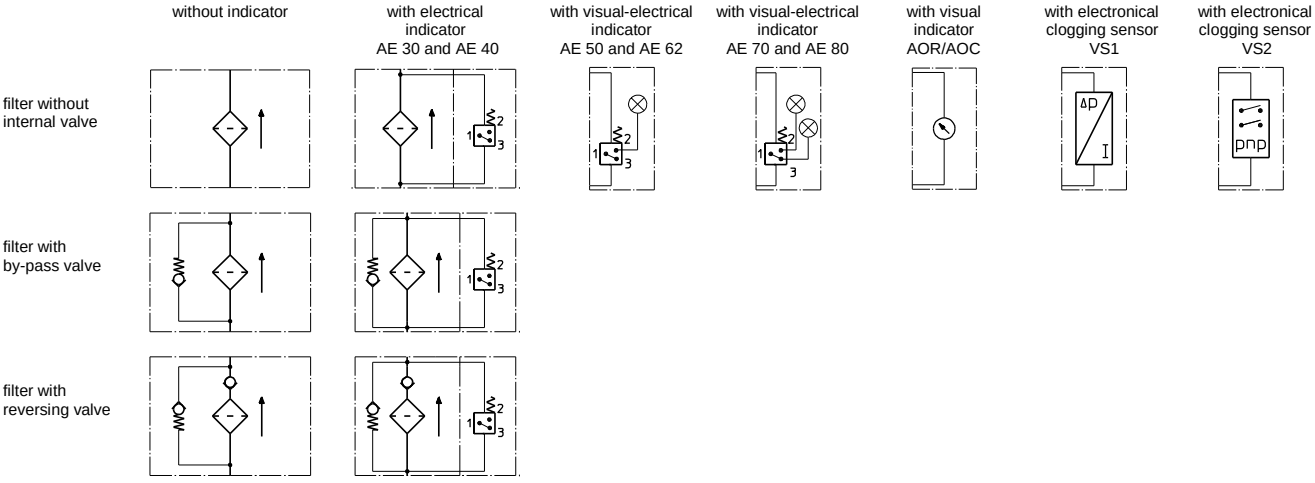
The pressure filters of the series HPX 601-1351 are suitable for a working pressure up to 315 bar.
The pressure peaks are absorbed by a sufficient margin of safety. The HPX-filter are flanged to the mounting face.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter elements are available down to 4 $\mu m_{(c)}$.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 160 bar and a rupture strength of Δp 250 bar.
The internal valves are integrated into the centering pivot for the filter element.
After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

5. Technical data:

temperature range:	-10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	315 bar
test pressure:	450 bar
connection system:	manifold mounted
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

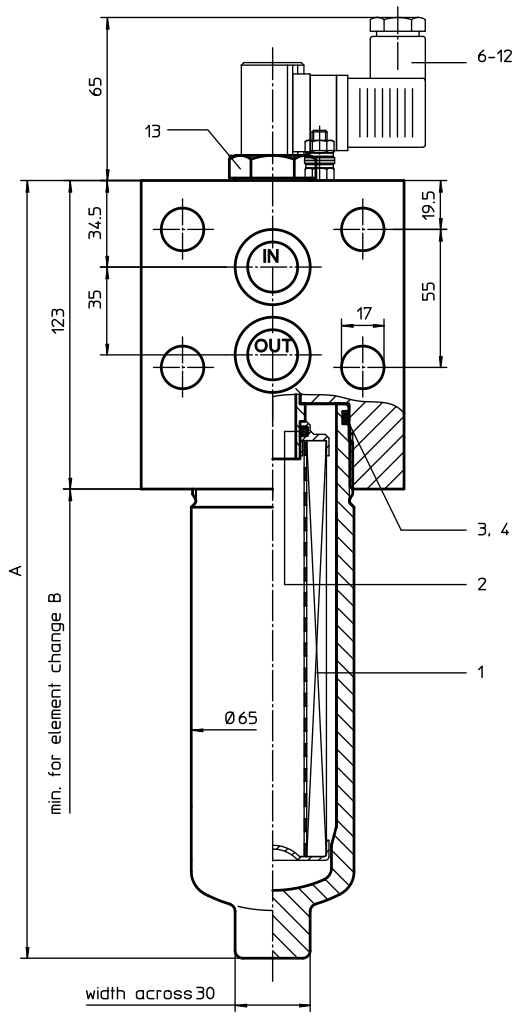
8. Test methods:

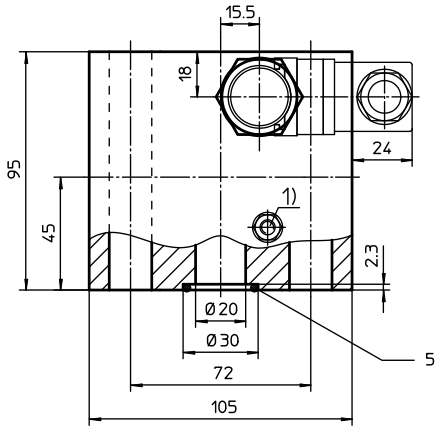
Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

PRESSURE FILTER, manifold mounted
Series HPY 60-150 DN 20 PN 315

Sheet No.
1484 D





[1] connection for the potential equalisation, only for application in the explosive area

1. Type index:

1.1. Complete filter: (ordering example)

HPY .	90.	10VG.	HR.	E.	P.	-.	F.	4.	-.	-.	AE
1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
HPY = pressure filter, manifold mounted

2 **nominal size:** 60, 90, 150

3 **filter-material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$,
6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)

4 **resistance of pressure difference for filter element:**
30 = Δp 30 bar
HR = Δp 160 bar (rupture strength Δp 250 bar)

5 **filter element design:**
E = single-end open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **connection:**
F = manifold mounted

9 **connection size:**
4 = DN 20

10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605

11 **internal valve:**
- = without
S1 = with by-pass valve Δp 3,5 bar
S2 = with by-pass valve Δp 7,0 bar
R = reversing valve, Q ≤ 70,06 l/min

12 **clogging indicator or clogging sensor:**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E.	90.	10VG.	HR.	E.	P.	-
1	2	3	4	5	6	7

1 **series:**
01E. = filter element according to INTERNORMEN factory specification

2 **nominal size:** 60, 90, 150

3 - 7 see type index-complete filter

2. Dimensions:

type	HPY 60	HPY 90	HPY 150
connection		DN 20	
A	245	310	419
B	270	335	445
weight kg	9	9,5	10,5
volume tank	0,3 l	0,4 l	0,6 l

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Changes of measures and design are subject to alteration!

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3. Spare parts:

item	qty.	designation	dimension HPY 60	dimension HPY 90	dimension HPY 150	article-no.	
1	1	filter element	01E.60	01E.90	01E.150		
2	1	O-ring	22 x 3,5			304341 (NBR)	304392 (FPM)
3	1	O-ring	54 x 3			304657 (NBR)	304720 (FPM)
4	1	support ring	61 x 2,6 x 1			304660	
5	2	O-ring	24 x 3			303038 (NBR)	304397 (FPM)
6	1	clogging indicator, visual	AOR or AOC			see sheet-no. 1606	
7	1	clogging indicator, visual-electrical	AE			see sheet-no. 1615	
8	1	clogging sensor, electronical	VS1			see sheet-no. 1617	
9	1	clogging sensor, electronical	VS2			see sheet-no. 1618	
10	1	O-ring	15 x 1,5			315357 (NBR)	315427 (FPM)
11	1	O-ring	22 x 2			304708 (NBR)	304721 (FPM)
12	1	O-ring	14 x 2			304342 (NBR)	304722 (FPM)
13	1	screw plug	20913-4			309817	

item 13 execution only without clogging indicator or clogging sensor

4. Description:

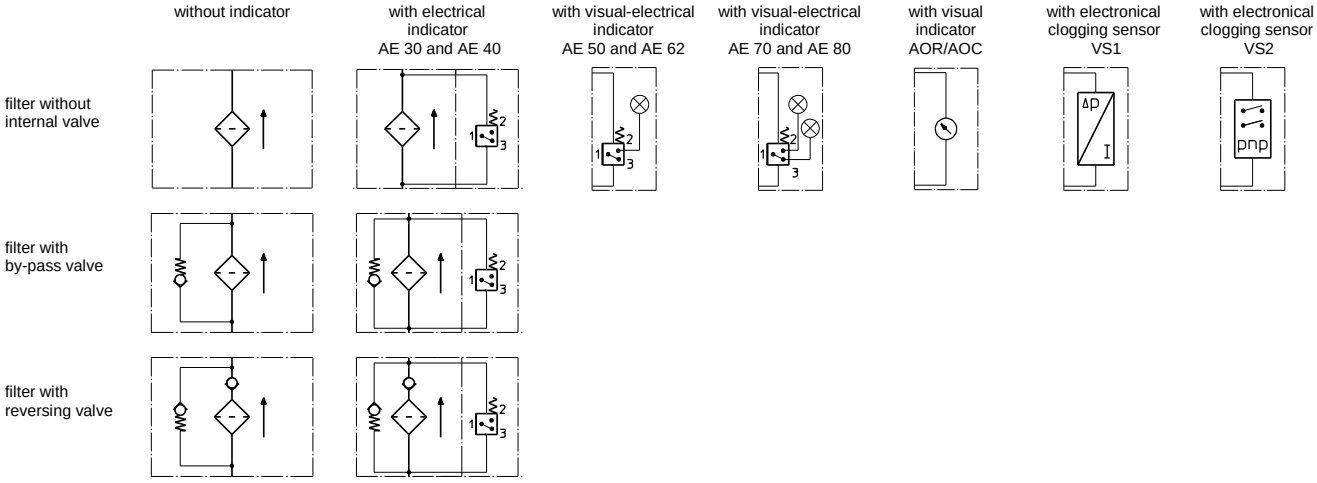
The pressure filters of the series HPY 60-150 are suitable for a working pressure up to 315 bar.
The pressure peaks are absorbed by a sufficient margin of safety. The HPY-filter are flanged to the mounting face.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter elements are available down to 4 $\mu m_{(c)}$.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 160 bar and a rupture strength of Δp 250 bar.
The internal valves are integrated into the centering pivot for the filter element.
After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

5. Technical data:

temperature range:	-10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	315 bar
test pressure:	450 bar
connection system:	manifold mounted
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

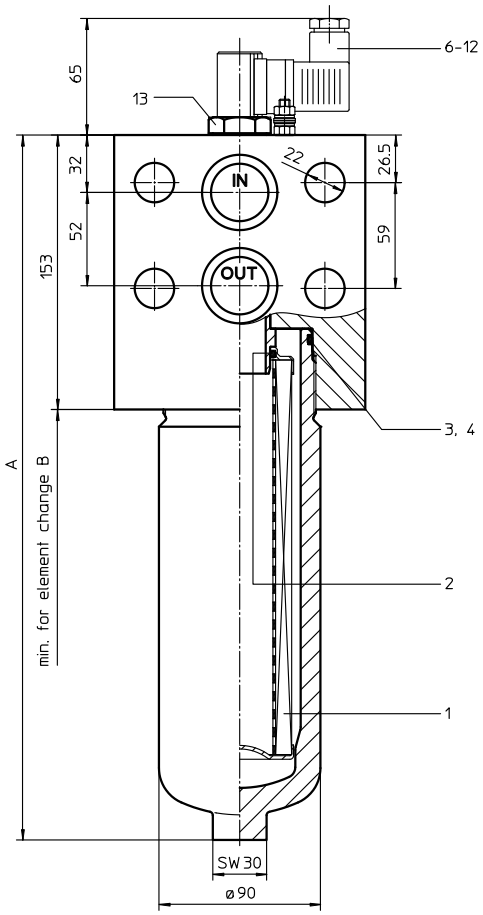
8. Test methods:

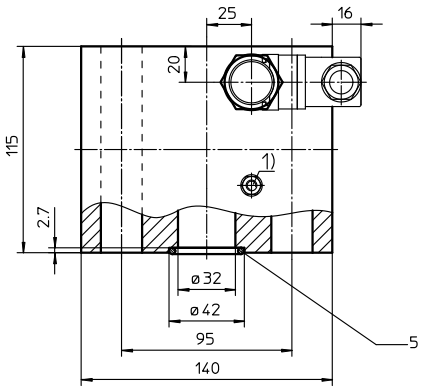
Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

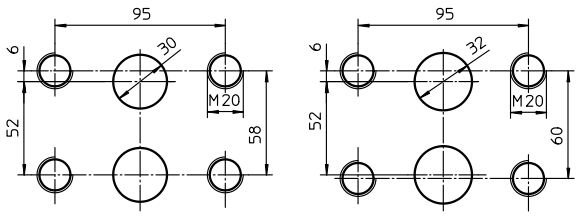
PRESSURE FILTER, manifold mounted
Series HPY 170-450 DN 32 PN 315

Sheet No.
1486 D





possible connection masses



[1] connection for the potential equalisation, only for application in the explosive area

1. Type index:

1.1. Complete filter: (ordering example)

HPY	.	360.	10VG.	HR.	E.	P.	-.	F.	6.	-.	-.	AE
1		2	3	4	5	6	7	8	9	10	11	12

1 series:
HPY = pressure filter, manifold mounted

2 nominal size: 170, 240, 360, 450

3 filter-material and filter-fineness:
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm
stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$,
6 VG = 7$\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)

4 resistance of pressure difference for filter element:
30 = Δp 30 bar
HR = Δp 160 bar (rupture strength Δp 250 bar)

5 filter element design:
E = single-end open

6 sealing material:
P = Nitrile (NBR)
V = Viton (FPM)

7 filter element specification: (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 connection:
F = manifold mounted

9 connection size:
6 = DN 32

10 filter housing specification: (see catalog)
- = standard
IS06 = see sheet-no. 31605

11 internal valve:
- = without
S1 = with by-pass valve Δp 3,5 bar
S2 = with by-pass valve Δp 7,0 bar
R = reversing valve, Q ≤ 211,008 l/min

12 clogging indicator or clogging sensor:
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E.	360.	10VG.	HR.	E.	P.	-
1	2	3	4	5	6	7

1 series:
01E. = filter element according to INTERNORMEN factory specification

2 nominal size: 170, 240, 360, 450

3 - 7 see type index-complete filter

2. Dimensions:

type	HPY 170	HPY 240	HPY 360	HPY 450
connection	DN 32			
A	343	393	473	580
B	350	400	480	585
weight kg	21	22,3	24	27,7
volume tank	0,7 l	0,9 l	1,2 l	1,6 l

Changes of measures and design are subject to alteration!

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3. Spare parts:

item	qty.	designation	dimension				article-no.	
			HPY 170	HPY 240	HPY 360	HPY 450		
1	1	filter element	01E.170	01E.240	01E.360	01E.450		
2	1	O-ring	34 x 3,5				304338 (NBR)	304730 (FPM)
3	1	O-ring	75 x 3				302215 (NBR)	304729 (FPM)
4	1	support ring	81 x 2,6 x 1				304581	
5	2	O-ring	36 x 3				304358 (NBR)	313900 (FPM)
6	1	clogging indicator, visual	AOR or AOC				see sheet-no. 1606	
7	1	clogging indicator, visual-electrical	AE				see sheet-no. 1615	
8	1	clogging sensor, electronical	VS1				see sheet-no. 1617	
9	1	clogging sensor, electronical	VS2				see sheet-no. 1618	
10	1	O-ring	15 x 1,5				315357 (NBR)	315427 (FPM)
11	1	O-ring	22 x 2				304708 (NBR)	304721 (FPM)
12	1	O-ring	14 x 2				304342 (NBR)	304722 (FPM)
13	1	screw plug	20913-4				309817	

item 13 execution only without clogging indicator or clogging sensor

4. Description:

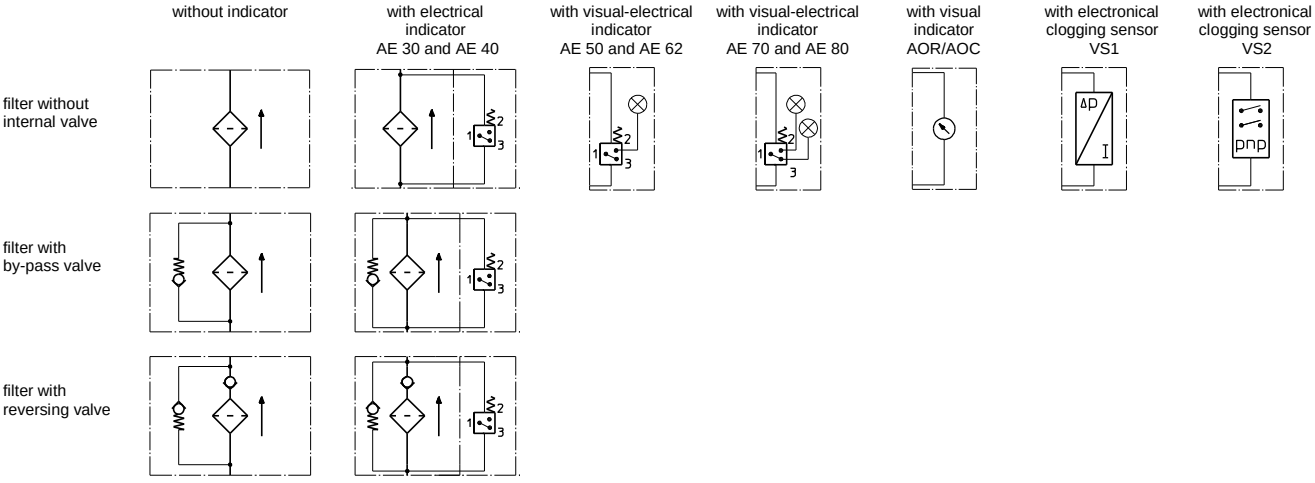
The pressure filters of the series HPY 170-450 are suitable for a working pressure up to 315 bar.
The pressure peaks are absorbed by a sufficient margin of safety. The HPY-filter are flanged to the mounting face.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter elements are available down to 4 $\mu m_{(c)}$.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 160 bar and a rupture strength of Δp 250 bar.
The internal valves are integrated into the centering pivot for the filter element.
After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

5. Technical data:

temperature range:	-10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	315 bar
test pressure:	450 bar
connection system:	manifold mounted
housing material:	C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

8. Test methods:

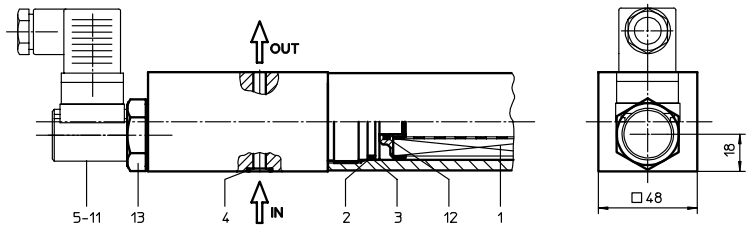
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

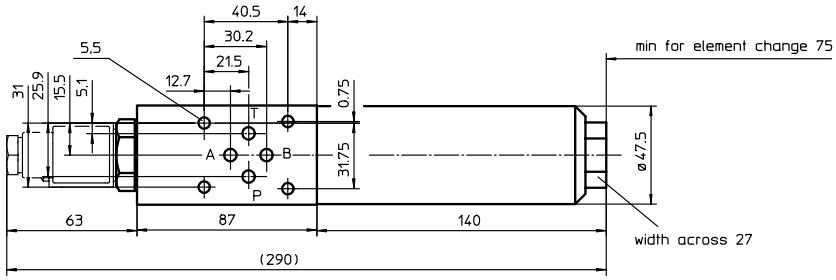
PRESSURE FILTER, for sandwich stacking
Series HPZ 32 DN 6 PN 350

Sheet No.
1491 P

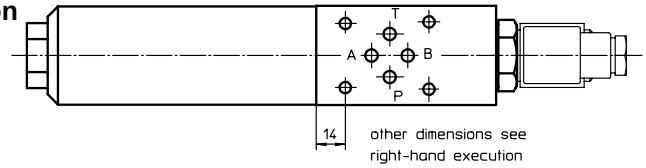
right-hand execution



right-hand execution



left-hand execution



1. Type index:

1.1. Complete filter: (ordering example)

HPZ.	32.	10VG.	HR.	E.	P.	-.	Z.	1.	-.	R.	AE
1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
HPZ = pressure filter for sandwich stacking

2 **nominal size:** 32

3 **filter-material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm
stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$,
6VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)

4 **resistance of pressure difference for filter element:**
30 = Δp 30 bar
HR = Δp 160 bar (rupture strength Δp 250 bar)

5 **filter element design:**
E = single-end open

6 **sealing material:**
P = Nitrile (NBR) V = Viton (FPM)

7 **filter element specification:**
- = standard
VA = stainless steel

8 **connection:**
Z = sandwich stacking according to DIN 24340, T2

9 **connection size:**
1 = A 6 according to DIN 24340, T2

10 **filter housing specification:**
- = standard

11 **head design:**
R = right-hand execution L = left-hand execution

12 **clogging indicator or clogging sensor:**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617

1.2. Filter element: (ordering example)

01E.	30.	10VG.	HR.	E.	P.	-
1	2	3	4	5	6	7

1 **series:**
01E. = filter element according to INTERNORMEN factory specification

2 **nominal size**: 30

3 - 7 see type index-complete filter

weight: 3,5 kg

Changes of measures and design are subject to alteration!

EDV 11/09

internormen technology

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2. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filer element	01E. 30		
2	1	O-ring	SRA 27 x 2,1 x 1	305466	
3	1	O-ring	32 x 2,5	306843 (NBR)	308268 (FPM)
4	1	support ring	9,25 x 1,78	304354 (NBR)	310268 (FPM)
5	1	clogging indicator, visual	AOR or AOC	see sheet no. 1606	
6	1	clogging indicator, visual-electrical	AE	see sheet no. 1615	
7	1	clogging sensor, electronical	VS1	see sheet no. 1617	
8	1	clogging sensor, electronical	VS2	see sheet no. 1618	
9	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
10	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
11	1	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
12	1	O-ring	11 x 3	312603 (NBR)	312727 (FPM)
13	1	screw plug	20913-4	309817	

item 13 execution only without clogging indicator or clogging sensor

3. Description:

Pressure filters for sandwich stacking with master gauge for holes according to DIN 24340-A6 are designed for vertical interlink mounting. The filters are placed in the pressure feed channel in front of the hydro valve that is to be protected.
The filters are available in right-hand and left-hand execution - with or without clogging indicator - thus, the filters can be installed according to the corresponding mounting and service applications.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter elements are available down to 4 $\mu m_{(c)}$.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 160bar and a rupture strength of Δp 250bar.

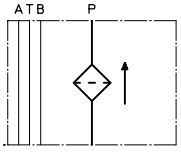
4. Technical data:

temperature range:	- 10 °C to + 80 °C (for a short time + 100 °C)
operating medium:	mineral oil, other media on request
max. operating pressure:	350 bar
test pressure:	500 bar
connection system:	(master gauge for holes) DIN 24340 - A6
housing material:	EN-GJS-400-18-LT; C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical (preferably) horizontal
volume tank:	0,1 l

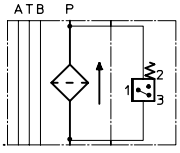
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:

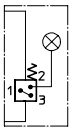
without indicator



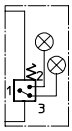
with electrical indicator AE 30 and AE 40



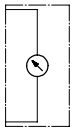
with visual-electrical indicator AE 50 and AE 62



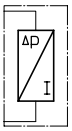
with visual-electrical indicator AE 70 and AE 80



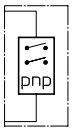
with visual indicator AOR/AOC



with electronical clogging sensor VS1



with electronical clogging sensor VS2



6. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

7. Test methods:

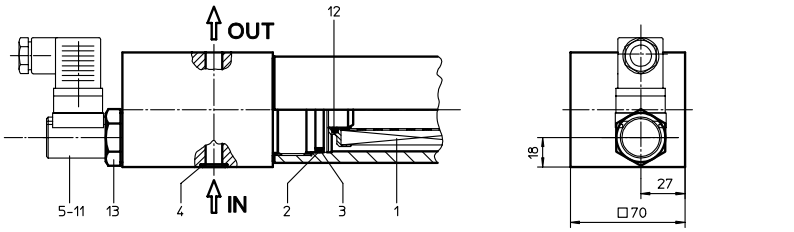
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

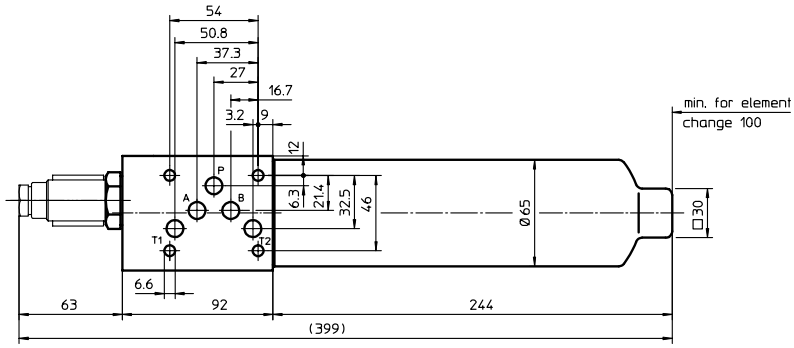
PRESSURE FILTER, for sandwich stacking
Series HPZ 90 DN 10 PN 350

Sheet No.
1493 G

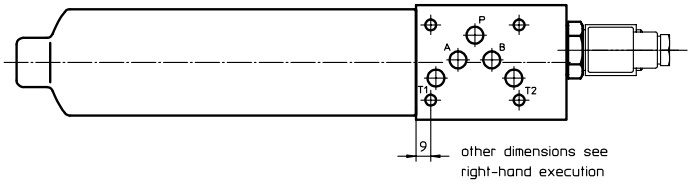
right-hand execution



right-hand execution



left-hand execution



1. Type index:

1.1. Complete filter: (ordering example)

HPZ.	90.	10VG.	HR.	E.	P.	-.	Z.	2.	-.	R.	AE
1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
HPZ = pressure filter for sandwich stacking

2 **nominal size:** 90

3 **filter-material and filter-fineness:**
25 VG = 20 µm(c), 16 VG = 15 µm(c), 10 VG = 10 µm(c),
6 VG = 7 µm(c),3 VG = 5 µm(c) Interpor fleece (glass fibre)

4 **resistance of pressure difference for filter element:**
30 = Δp 30 bar
HR = Δp 160 bar (rupture strength Δp 250 bar)

5 **filter element design:**
E = single-end open

6 **sealing material:**
P = Nitrile (NBR) V = Viton (FPM)

7 **filter element specification:**
- = standard
VA = stainless steel

8 **connection:**
Z = sandwich stacking according to DIN 24340, T2

9 **connection size:**
2 = A 10 according to DIN 24340, T2

10 **filter housing specification:**
- = standard

11 **head design:**
R = right-hand execution L = left-hand execution

12 **clogging indicator or clogging sensor:**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E.	90.	10VG.	HR.	E.	P.	-
1	2	3	4	5	6	7

1 **series:**
01E. = filter element according to INTERNORMEN factory specification

2 **nominal size**: 90

3 - 7 see type index-complete filter

weight: 6,5 kg

EDV 08/03

Changes of measures and design are subject to alteration!

internormen technology

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url www.internormen.com

2. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filer element	01E.90		
2	1	support ring	SRA 52 x 2,6 x 1	311013	
3	1	O-ring	45 x 3	304991 (NBR)	304997 (FPM)
4	1	O-ring	12 x 2	311014 (NBR)	310271 (FPM)
5	1	clogging indicator, visual	AOR or AOC	see sheet no. 1606	
6	1	clogging indicator, visual-electrical	AE	see sheet no. 1615	
7	1	clogging sensor, electronical	VS1	see sheet no. 1617	
8	1	clogging sensor, electronical	VS2	see sheet no. 1618	
9	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
10	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
11	1	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
12	1	O-ring	22 x 3,5	304341 (NBR)	304392 (FPM)
13	1	screw plug	20913-4	309817	

item 13 execution only without clogging indicator or clogging sensor

3. Description:

Pressure filters for sandwich stacking with master gauge for holes according to DIN 24340-A10 are designed for vertical interlink mounting. The filters are placed in the pressure feed channel in front of the hydro valve that is to be protected.
The filters are available in right-hand and left-hand execution - with or without clogging indicator - thus, the filters can be installed according to the corresponding mounting and service applications.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter elements are available down to 4 $\mu m_{(c)}$.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 160 bar and a rupture strength of Δp 250 bar.

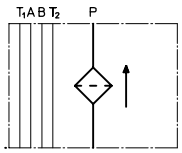
4. Technical data:

temperature range:	- 10 °C to + 80 °C (for a short time + 100 °C)
operating medium:	mineral oil, other media on request
max. operating pressure:	350 bar
test pressure:	455 bar
connection system:	(master gauge for holes) DIN 24340 - A10
housing material:	GGG 40.3; C-steel
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical (preferably) horizontal
volume tank:	0,4 l

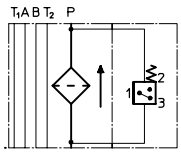
Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:

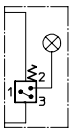
without indicator



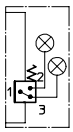
with electrical indicator AE 30 and AE 40



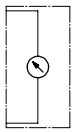
with visual-electrical indicator AE 50 and AE 60



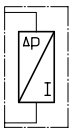
with visual-electrical indicator AE 70 and AE 80



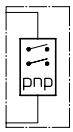
with visual indicator AOR/AOC



with electronical clogging sensor VS1



with electronical clogging sensor VS2



6. Pressure drop flow curves:

Precise flow rates see 'INF-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

7. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

INTERNORMEN

Edelstahlfilter

Stainless Steel Filters

Wir schaffen Reinheit in Ihrem System

- **Optimierte Baureihen**
- **Modulare Bauweise**
- **Komfortable Bedienung und einfache Wartung**
- **Qualitativ hochwertige Elemente**

We generate cleanliness in your system

- ***Optimised efficiency ranges***
- ***Modular construction***
- ***Comfortable operation and easy service***
- ***High-quality elements***

internormen

filter technology

INTER NORMEN

Filterbaureihen
Filter Types

Beschreibung

Edelstahl-Filter von ***INTERNORMEN Technology*** sind geeignet für den Einsatz der Medien Wasser und Emulsionen in der Offshore-Technik, der Chemieindustrie, der Lebensmittelindustrie und in Fällen extremer Außen- und Umweltbedingungen.

Description

*Stainless steel filters from **INTERNORMEN Technology** are applicable for water and emulsions in the offshore technology, chemical industry, the food industry and in cases of extreme outdoor and environmental conditions.*

Edelstahlfilter zum Einbau in die Druckleitung
Stainless steel filters for mounting in pressure lines

Baugröße	Anschluß	Nenndruck in bar	Filterfläche in cm²		Maßblatt-Nr.
			Edelstahl-Gewebe	Glasfaser	
model No.	*port size*	*working pressure*	*filtration area cm²*		*data sheet No.*
		bar	*stainless steel wire mesh*	*glass fibre*	
EH 31	G 1/2	420	410	490	1435
EH 60	G 1/2	420	520	800	1430
EH 90	G 3/4	420	860	1330	1430
EH 150	G 1	420	1440	2229	1430
EH 240	G 1 1/2, SAE 1 1/2"	420	1600	2581	1431
EH 450	G 1 1/2, SAE 1 1/2"	420	2980	4795	1431
EH 601	SAE 2"	315	3440	5606	1434
EH 901	SAE 2"	315	4980	8079	1434
EH 1351	SAE 2"	315	7410	12939	1434

EH-Gruppe / *EH group*

Edelstahlfilter, umschaltbar

Bestehend aus 2 Kammern, von denen sich eine Kammer in Funktion befindet, während die andere abgeschaltet ist. Dadurch kann das verschmutzte Filterelement ohne Betriebsunterbrechung ausgetauscht werden. Der Einbau kann in eine Saug-, Druck- oder Rücklaufleitung erfolgen.

Stainless steel filter, change-over

Flow path through the filter can be changed to either of the two chambers. The dirty element can be serviced/changed while in the "off" position without interrupting the operation. Can be mounted in suction, pressure or return lines.

Baugröße	Anschluß	Nenndruck in bar	Filterfläche * in cm²		Maßblatt-Nr.
			Edelstahl-Gewebe	Glasfaser	
model No.	*port size*	*working pressure*	*filtration area cm²*		*data sheet No.*
		bar	*stainless steel wire mesh*	*glass fibre*	
EHD 91	G 1	315	860	1330	2530
EHD 151	G 1	315	1440	2229	2530
EHD 241	SAE 1 1/2"	315	1600	2581	2533
EHD 451	SAE 1 1/2"	315	2980	4795	2533

* **Filterfläche: je Filterseite**
filtration area: per each filter side

EHD 241

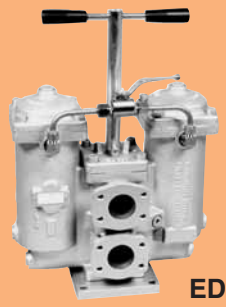
Filterprüfung und Qualitätskontrolle nach ISO

Filter testing and quality control according to ISO standards.

Titelseite: "Werksfoto Lurgi"
title page: "photo Lurgi"

Edelstahlfilter, umschaltbar
Stainless steel filter, change-over

Baugröße	Anschluß	Nenndruck in bar	Filterfläche * in cm²		Maßblatt-Nr.
			Edelstahl-Gewebe	Glasfaser	
model No.	*port size*	*working pressure*	*filtration area cm²*		*data sheet No.*
		bar	*stainless steel wire mesh*	*glass fibre*	
EDU 251	SAE 2”	25	3070	4672	2124
EDU 401	SAE 2”	25	5020	7612	2124
EDU 635	SAE 2 1/2”	25	6000	9978	2150
EDA 100/101	SAE 1”, ANSI 1”	40/20	1490	2920	2159/2168
EDA 250/251	SAE 2”, ANSI 2”	40/20	3070	4672	2157/2169
EDA 400/401	SAE 2”, ANSI 2”	40/20	5020	7612	2157/2169
EDA 630/631	SAE 3”, ANSI 3”	40/20	6000	9978	2158/2170
EDA 1000/1001	SAE 3”, ANSI 3”	40/20	8050	15760	2158/2170
EDSF 1201	DN 50, 65, 80, 100	16	11160	18018	2161
EDSF 2001	DN 65, 80, 100, 125	16	17570	29630	
EDSF 2401	DN 65, 80, 100, 125, 150	16	22320	36036	
EDSF 3601	DN 80, 100, 125, 150	16	33480	54054	
EDSF 4001	DN 65, 80, 100, 125	16	35140	59262	
EDSF 4801	DN 100, 125, 150, 200	16	44640	72072	
EDSF 6001	DN 100, 125, 150, 200	16	52710	88890	
EDSF 10001	DN 125, 150, 200, 250	16	87850	148150	



EDU 251

EDU 635

Edelstahl-Filterbatterie
Hohe Filterleistung bei großen Volumenströmen

Stainless steel filter battery
High filter efficiency at high volume flows

Baugröße	Anschluß	Nenndruck in bar	Filterfläche * in cm²		Maßblatt-Nr.
			Edelstahl-Gewebe	Glasfaser	
model No.	*port size*	*working pressure*	*filtration area cm²*		*data sheet No.*
		bar	*stainless steel wire mesh*	*glass fibre*	
EBHDD 2 x 901	AVIT 2”	315	2 x 4980	2 x 8079	2526
EBHDD 3 x 901	AVIT 2 1/2”	315	3 x 4980	3 x 8079	
EBHDD 4 x 901	AVIT 3”	315	4 x 4980	4 x 8079	

Filterbatterie
Filter battery
BEHD 4 x 901

* Filterfläche: je Filterseite
filtration area: per each filter side

Weitere Baureihen auf Anfrage
Other ranges on request!

Edelstahlfilter
Zum Einbau in die Saug-, Druck- und Rücklaufleitung

Stainless Steel Filter
For mounting in suction, pressure and return lines

Baugröße	Anschluß	Nenndruck in bar	Filterfläche in cm²		Maßblatt-Nr.
			Edelstahl-Gewebe	Glasfaser	
model No.	*port size*	*working pressure*	*filtration area cm²*		*data sheet No.*
		bar	*stainless steel wire mesh*	*glass fibre*	
ELF 1201	DN 50, 65, 80, 100	16	11160	18018	1130
ELF 2001	DN 65, 80, 100, 125	16	17570	29630	
ELF 2401	DN 65, 80, 100, 125	16	22320	36036	
ELF 3601	DN 80, 100, 125, 150	16	33480	54054	
ELF 4801	DN 100, 125, 150, 200	16	44640	72072	
ELF 6001	DN 100, 125, 150, 200	16	52710	88890	
ELF 10001	DN 125, 150, 200, 250	16	87850	148150	

ELF 2001

Vertrauen ist gut, Kontrolle ist besser!
Reinheitsklassenermittlung mit unserem CCS 2.

Reliance is good, control is better!
Contamination determination with our CCS 2.

Edelstahlfilter im Einsatz für Wasserhydraulik

Stainless steel filters in use in water hydraulics

INTERNORMEN Technology GmbH

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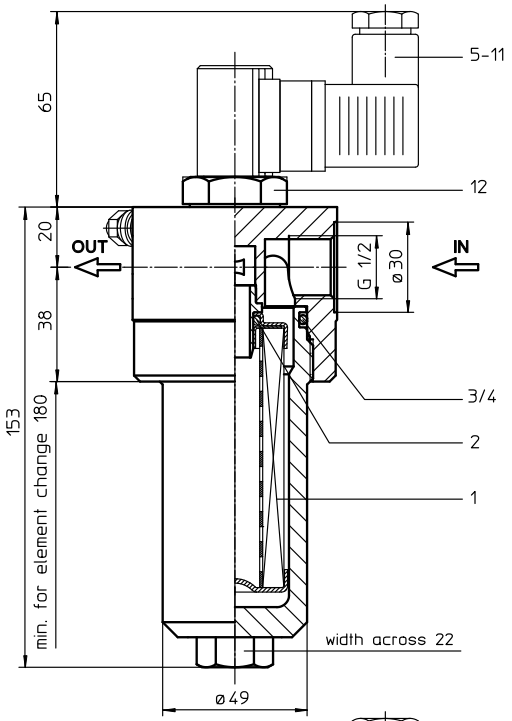
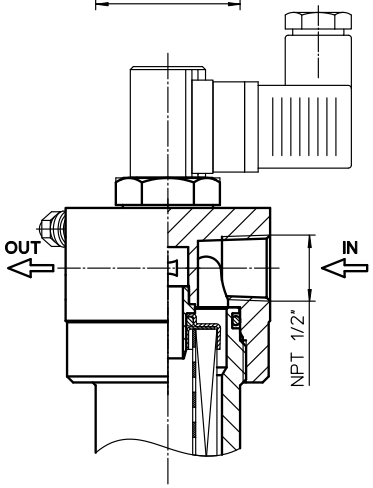
Internet: www.internormen.com • e-mail: info@internormen.com

D/GB-01/2009
316026

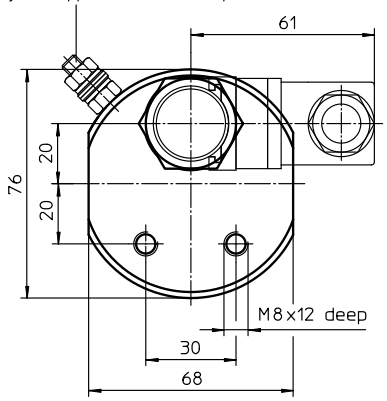
STAINLESS STEEL-PRESSURE FILTER
Series EH 31 DN 15 PN 420

Sheet No.
1435 D





connection for the potential equalisation,
only for application in the explosive area



1. Type index:

1.1. Complete filter: (ordering example)

EH .	31.	10VG.	HR.	E.	P.	VA.	G.	3.	VA.	-.	AE
1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
EH = stainless steel-pressure filter

2 **nominal size:** 31

3 **filter-material and filter-fineness:**
80G = 80 µm, 40G = 40 µm, 25G = 25 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$,
6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)

4 **resistance of pressure difference for filter element:**
30 = Δp 30 bar
HR = Δp 160 bar (rupture strength Δp 250 bar)

5 **filter element design:**
E = single-end open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **connection:**
G = thread connection according to ISO 228
NPT = thread connection

9 **connection size:**
3 = ½“

10 **filter housing specification:**
VA = stainless steel

11 **internal valve:**
- = without
S1 = with by-pass valve Δp 3,5 bar
S2 = with by-pass valve Δp 7,0 bar

12 **clogging indicator or clogging sensor:**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E.	30.	10VG.	HR.	E.	P.	VA
1	2	3	4	5	6	7

1 **series:**
01E. = filter element according to INTERNORMEN factory specification

2 **nominal size:** 30

3 - 7 see type index-complete filter

weight: approx. 3,0 kg

EDV 10/11

Changes of measures and design are subject to alteration!

internormen technology

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2. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01E. 30		
2	1	O-ring	11 x 3	312603 (NBR)	312727 (FPM)
3	1	O-ring	40 x 3	304389 (NBR)	304391 (FPM)
4	1	support ring	48 x 2,6 x 1	305391	
5	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
6	1	clogging indicator, visual-electrical	AE	see sheet-no. 1615	
7	1	clogging sensor, electronical	VS1	see sheet-no. 1617	
8	1	clogging sensor, electronical	VS2	see sheet-no. 1618	
9	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
10	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
11	1	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
12	1	screw plug	20913-4	314442	

item 12 execution only without clogging indicator or clogging sensor

3. Description:

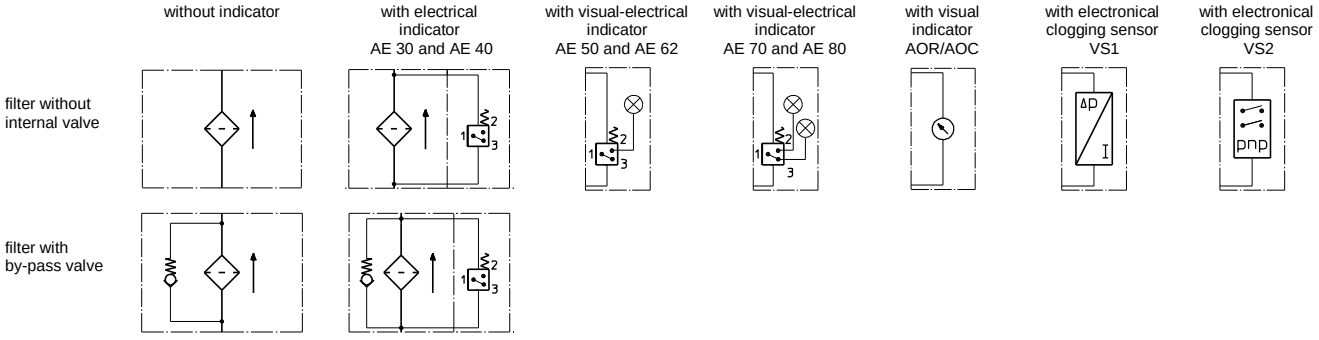
The pressure filters of the series EH 31 are suitable for a working pressure up to 420 bar.
The pressure peaks are absorbed by a sufficient margin of safety. The EH-filter is in-line mounted.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter elements are available down to 4 $\mu m_{(c)}$.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 160 bar and a rupture strength of Δp 250 bar.
The internal valves are integrated into the centering pivot for the filter element.
After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter.

4. Technical data:

temperature range:	-10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	420 bar
test pressure:	600 bar
connection system:	thread connection
housing material:	DIN 17440 - 1.4571 (320 S 18, 320 S 31 according to B.S.)
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	0,12 l

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:



6. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

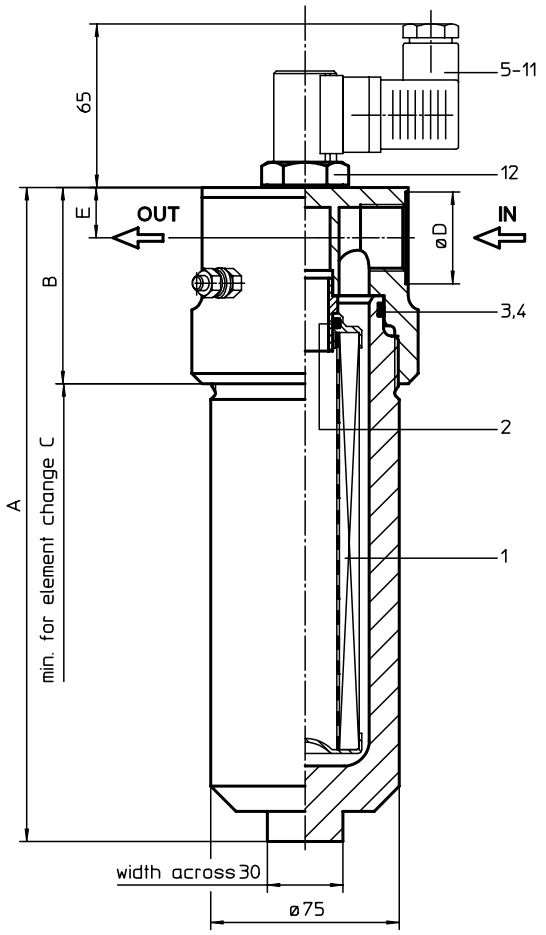
7. Test methods:

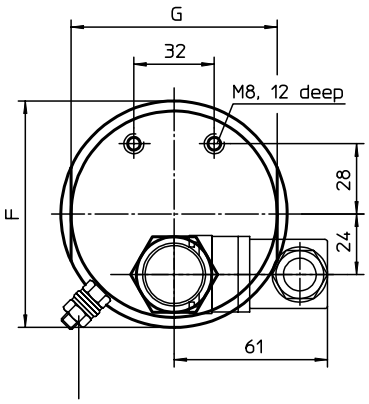
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

STAINLESS STEEL- PRESSURE FILTER
Series EH 60-150 DN 15-25 PN 420

Sheet No.
1430 L





connection for the potential equalisation, only for application in the explosive area

1. Type index:

1.1. Complete filter: (ordering example)

EH. 90. 10VG. HR. E. P. VA. G. 4. VA. -. AE

1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
EH = stainless steel-pressure filter

2 **nominal size:** 60, 90, 150

3 **filter-material and filter-fineness:**
80G = 80 µm, 40G = 40 µm,
25G = 25 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$,
6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)

4 **resistance of pressure difference for filter element:**
30 = Δp 30 bar
HR = Δp 160 bar (rupture strength Δp 250 bar)

5 **filter element design:**
E = single-end open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 see sheet-no. 31601

8 **connection:**
G = thread connection according to ISO 228
NPT = thread connection according to ANSI B1.20.1

9 **connection size:**
3 = ½“
4 = ¾“
5 = 1“

10 **filter housing specification:**
VA = stainless steel

11 **internal valve:**
- = without
S1 = with by-pass valve Δp 3,5 bar
S2 = with by-pass valve Δp 7,0 bar
R = reversing valve, Q ≤ 70,06 l/min

12 **clogging indicator or clogging sensor :**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E. 90. 10VG. HR. E. P. VA

1	2	3	4	5	6	7

1 **series:**
01E. = filter element according to INTERNORMEN factory specification

2 **nominal size:** 60, 90, 150

3 - 7 see type index-complete filter

2. Dimensions:

type	connection	A	B	C	D [1)]	E	F	G	weight kg	volume tank
EH 60	½“	195	78	215	30	20	90	82	8,5	0,3 l
EH 90	¾“	260	78	280	36,5	20	90	82	9,5	0,4 l
EH 150	1“	370	84	390	40	23	95	84	12,5	0,6 l

Connection assignments as showwn in the table are standard. To exchange connections see item 9 in type index.

[1)] dimension only with execution according to ISO 228

EDV 12/10

Changes of measures and design are subject to alteration!

internormen technology

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3. Spare parts:

item	qty.	designation	dimension			article-no.	
			EH 60	EH 90	EH 150		
1	1	filer element	01E.60	01E.90	01E.150		
2	1	O-ring	22 x 3,5			304341 (NBR)	304392 (FPM)
3	1	O-ring	56 x 3			305072 (NBR)	305322 (FPM)
4	1	support ring	63 x 2,6 x 1			312309	
5	1	clogging indicator, visual	AOR or AOC			see sheet no. 1606	
6	1	clogging indicator, visual-electrical	AE			see sheet no. 1615	
7	1	clogging sensor, electronical	VS1			see sheet no. 1617	
8	1	clogging sensor, electronical	VS2			see sheet no. 1618	
9	1	O-ring	15 x 1,5			315357 (NBR)	315427 (FPM)
10	1	O-ring	22 x 2			304708 (NBR)	304721 (FPM)
11	1	O-ring	14 x 2			304342 (NBR)	304722 (FPM)
12	1	screw plug	20913-4			314442	

item 12 execution only without clogging indicator or clogging sensor

4. Description:

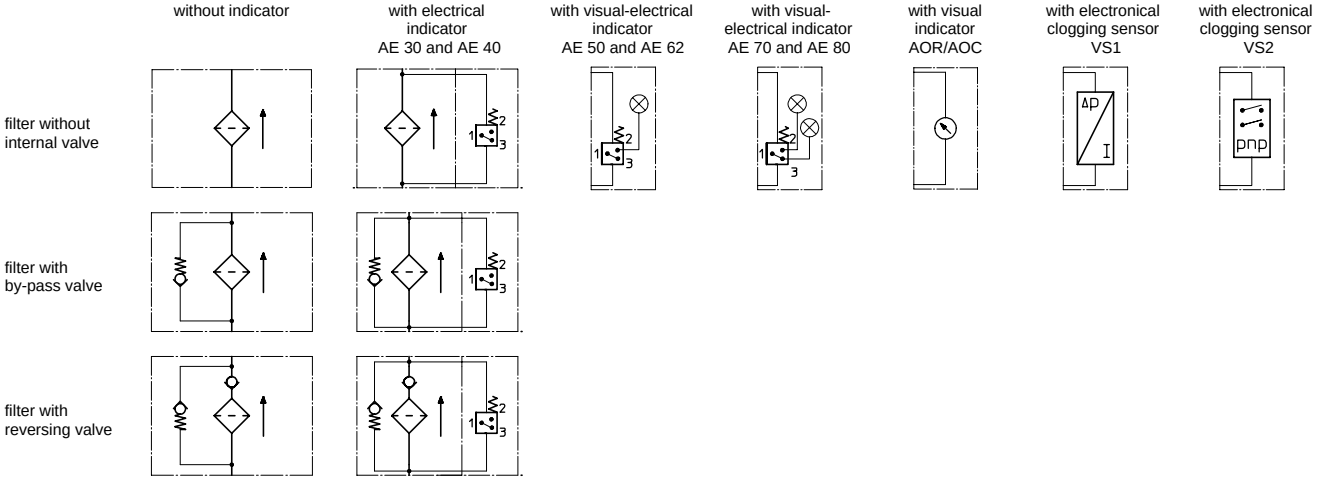
The pressure filters of the series EH are suitable for a working pressure up to 420 bar.
The pressure peaks are absorbed by a sufficient margin of safety. The EH-filter is in-line mounted.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to a filter fineness of $4\mu m_{(c)}$.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 160 bar and a rupture strength of Δp 250 bar.
The internal valves are integrated into the centering pivot for the filter element.
After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

5. Technical data:

temperature range:	- 10°C to +80°C (for a short time +100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	420 bar
test pressure:	546 bar
connection system:	thread connection according to ISO 228 or ANSI B1.20.1
housing material:	DIN 17440 - 1.4571 (320 S 18, 320 S 31 according to B.S.)
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

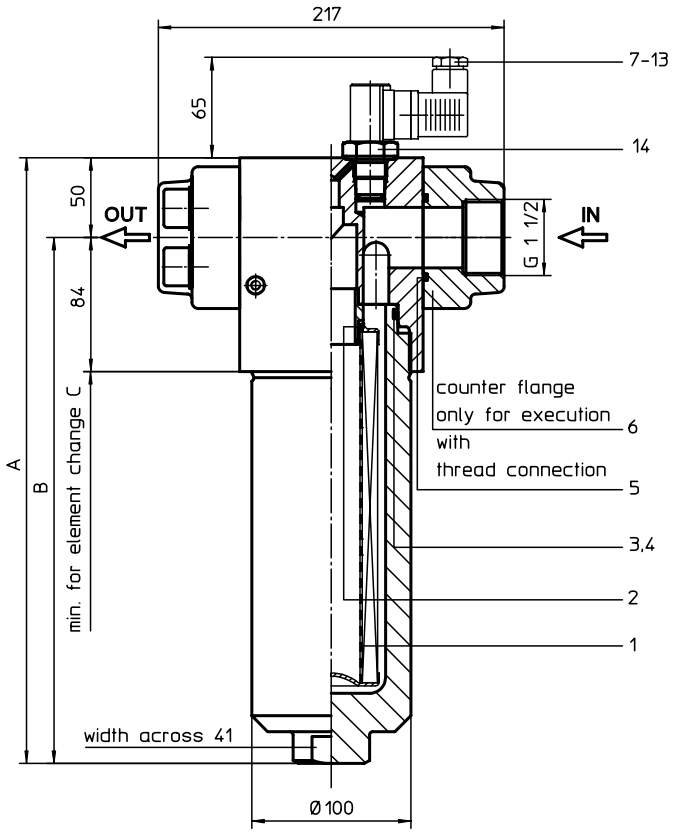
8. Test methods:

Filter elements are tested according to the following ISO standards:

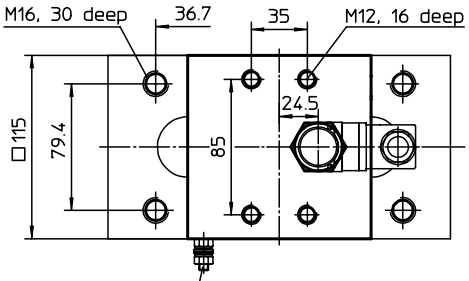
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

STAINLESS STEEL- PRESSURE FILTER
Series EH 240 - 450 DN 40 PN 420

Sheet No.
1431 H



delineation without counter flange



connection for the potential equalisation,
only for application in the explosive area

1. Type index:

1.1. Complete filter: (ordering example)

EH. 240. 10VG. HR. E. P. VA. FS. 7. VA. -. AE

1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
EH = stainless steel-pressure filter

2 **nominal size:** 240, 450

3 **filter-material and filter-fineness:**
80G = 80 µm, 40G = 40 µm,
25G = 25 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$,
6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)

4 **resistance of pressure difference for filter element:**
30 = Δp 30 bar
HR = Δp 160 bar (rupture strength Δp 250 bar)

5 **filter element design:**
E = single-end open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 see sheet-no. 31601

8 **connection:**
G = thread connection (only with counter flange)
FS = SAE-flange connection 6000 PSI

9 **connection size:**
7 = 1 ½“

10 **filter housing specification:**
VA = stainless steel

11 **internal valve:**
- = without
S1 = with by-pass valve Δp 3,5 bar
S2 = with by-pass valve Δp 7,0 bar
R = reversing valve, Q ≤ 211,008 l/min

12 **clogging indicator or clogging sensor :**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E. 240. 10VG. HR. E. P. VA

1	2	3	4	5	6	7

1 **series:**
01E. = filter element according to INTERNORMEN factory specification

2 **nominal size:** 240, 450

3 - 7 see type index-complete filter

2. Dimensions:

type	connection	A	B	C	weight kg	volume tank
EH 240	G1 ½ or	380	330	320	22	0,85 l
EH 450	SAE 1 ½“	565	515	500	30	1,55 l

EDV 11/07

Changes of measures and design are subject to alteration!

internormen technology

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3. Spare parts:

item	qty.	designation	dimension EH 240	dimension EH 450	article-no.	
1	1	filter element	01E. 240	01E. 450		
2	1	O-ring	34 x 3,5		304341 (NBR)	304392 (FPM)
3	1	O-ring	76 x 4		305072 (NBR)	305322 (FPM)
4	1	support ring	84 x 3,2 x 1,5		312309	
5	1	O-ring (only with counter flange)	47,22 x 3,53		305078 (NBR)	310269 (FPM)
6	1	counter flange 6000 PSI	SAE 1 ½"		312406	
7	1	clogging indicator, visual	AOR or AOC		see sheet no. 1606	
8	1	clogging indicator, visual-electrical	AE		see sheet no. 1615	
9	1	clogging sensor, electronical	VS1		see sheet no. 1617	
10	1	clogging sensor, electronical	VS2		see sheet no. 1618	
11	1	O-ring	15 x 1,5		315357 (NBR)	315427 (FPM)
12	1	O-ring	22 x 2		304708 (NBR)	304721 (FPM)
13	1	O-ring	14 x 2		304342 (NBR)	304722 (FPM)
14	1	screw plug	20913-4		314442	

item 14 execution only without clogging indicator or clogging sensor

4. Description:

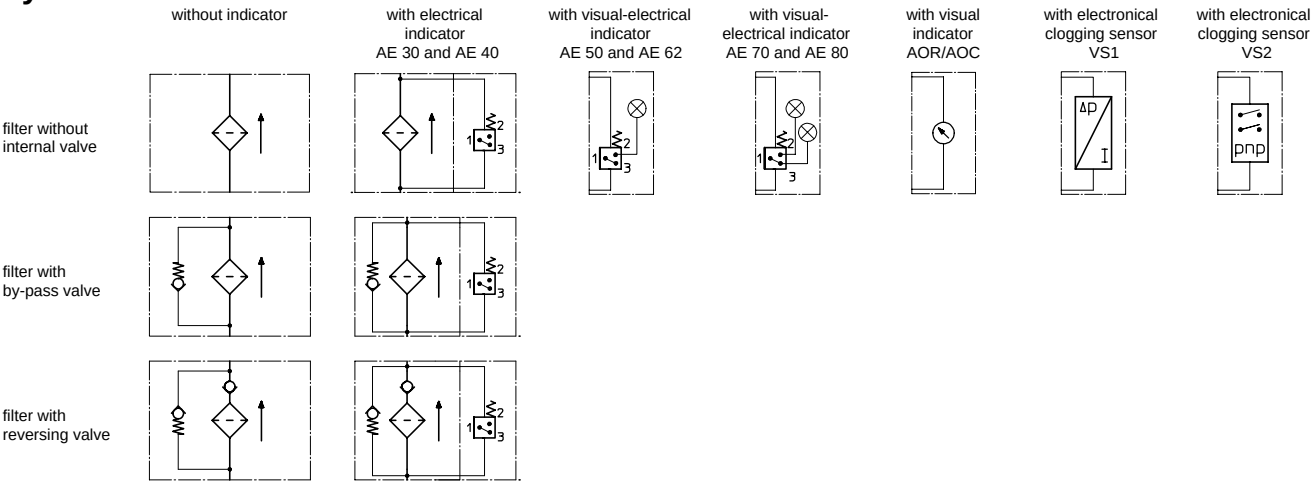
The pressure filters of the series EH are suitable for a working pressure up to 420 bar.
The pressure peaks are absorbed by a sufficient margin of safety. The EH-filters are flange mounted to the hydraulic system.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to a filter fineness of 4µm$_{(c)}$.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 160 bar and a rupture strength of Δp 250 bar.
The internal valves are integrated into the centering pivot for the filter element.
After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

5. Technical data:

temperature range:	-10°C to +80°C (for a short time +100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	420 bar
test pressure:	546 bar
connection system:	thread connection or SAE-flange connection 6000 PSI
housing material:	DIN 17440 - 1.4571 (320 S 18, 320 S 31 according to B.S.)
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

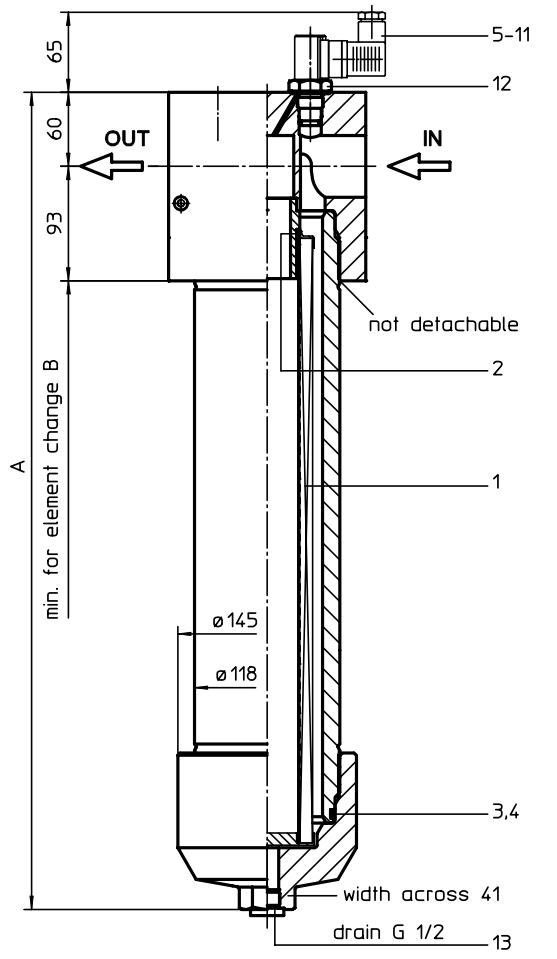
8. Test methods:

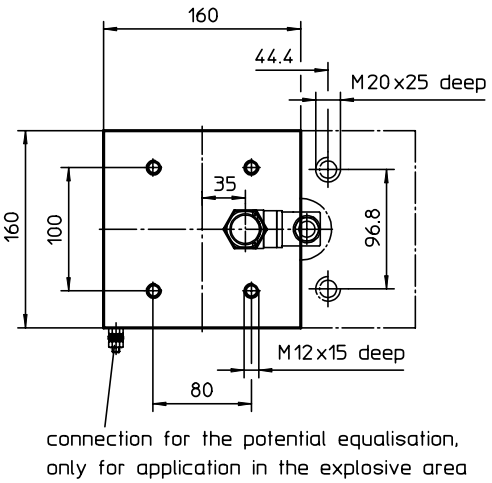
Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

STAINLESS STEEL- PRESSURE FILTER
Series EH 601-1351 DN 50 PN 315

Sheet No.
1434 F





1. Type index:

1.1. Complete filter: (ordering example)

EH.	901.	10VG.	HR.	E.	P.	VA.	FS.	8.	VA.	-.	AE
1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
EH = stainless steel-pressure filter

2 **nominal size:** 601, 901, 1351

3 **filter-material and filter-fineness:**
80G = 80 µm, 40G = 40 µm,
25G = 25 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$,
6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)

4 **resistance of pressure difference for filter element:**
30 = Δp 30 bar
HR = Δp 160 bar (rupture strength Δp 250 bar)

5 **filter element design:**
E = single-end open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 see sheet-no. 31601

8 **connection:**
FS = SAE-flange connection 6000 PSI

9 **connection size:**
8 = 2“

10 **filter housing specification:**
VA = stainless steel

11 **internal valve:**
- = without
S1 = with by-pass valve Δp 3,5 bar
S2 = with by-pass valve Δp 7,0 bar
R = reversing valve, Q ≤ 465,348 l/min

12 **clogging indicator or clogging sensor :**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E.	900.	10VG.	HR.	E.	P.	VA
1	2	3	4	5	6	7

1 **series:**
01E. = filter element according to INTERNORMEN factory specification

2 **nominal size:** 600, 900, 1350

3 - 7 see type index-complete filter

2. Dimensions:

type	EH 601	EH 901	EH 1351
connection	SAE 2“	SAE 2“	SAE 2“
A	520	670	918
B	790	940	1440
weight kg	49	56	68
volume tank	2,1 l	3,1 l	4,6 l

EDV 11/07

Changes of measures and design are subject to alteration!

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3. Spare parts:

item	qty.	designation	dimension			article-no.	
			EH 601	EH 901	EH 1351		
1	1	filer element	01E.600	01E.900	01E.1350		
2	1	O-ring	48 x 3			304357 (NBR)	304404 (FPM)
3	1	O-ring	98 x 4			301914 (NBR)	304765 (FPM)
4	1	support ring	110 x 3,5 x 2			304802	
5	1	clogging indicator, visual	AOR or AOC			see sheet no. 1606	
6	1	clogging indicator, visual-electrical	AE			see sheet no. 1615	
7	1	clogging sensor, electronical	VS1			see sheet no. 1617	
8	1	clogging sensor, electronical	VS2			see sheet no. 1618	
9	1	O-ring	15 x 1,5			315357 (NBR)	315427 (FPM)
10	1	O-ring	22 x 2			304708 (NBR)	304721 (FPM)
11	1	O-ring	14 x 2			304342 (NBR)	304722 (FPM)
12	1	screw plug	20913-4			314442	
13	1	screw plug	G ½			306966	

item 12 execution only without clogging indicator or clogging sensor

4. Description:

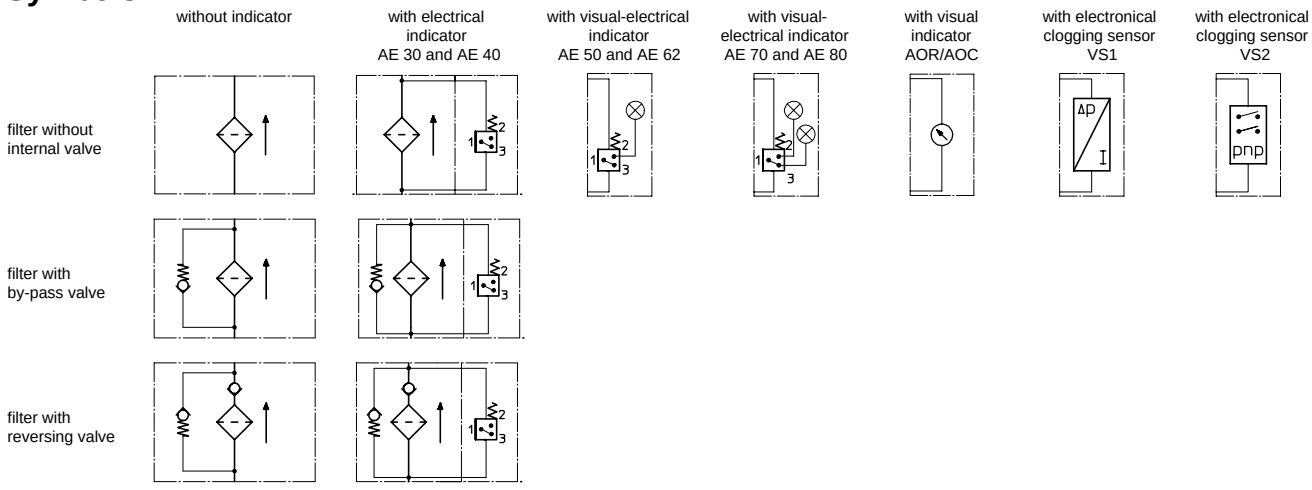
The pressure filters of the series EH are suitable for a working pressure up to 315 bar.
The pressure peaks are absorbed by a sufficient margin of safety. The EH-filters are flange mounted to the hydraulic system.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. Filter elements are available down to 4 $\mu m_{(c)}$.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 160 bar and a rupture strength of Δp 250 bar.
The internal valves are integrated into the centering pivot for the filter element.
After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

5. Technical data:

temperature range:	-10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	315 bar
test pressure:	410 bar
connection system:	SAE-flange connection 6000 PSI
housing material:	DIN 17440 - 1.4571 (320 S 18, 320 S 31 according to B.S.)
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

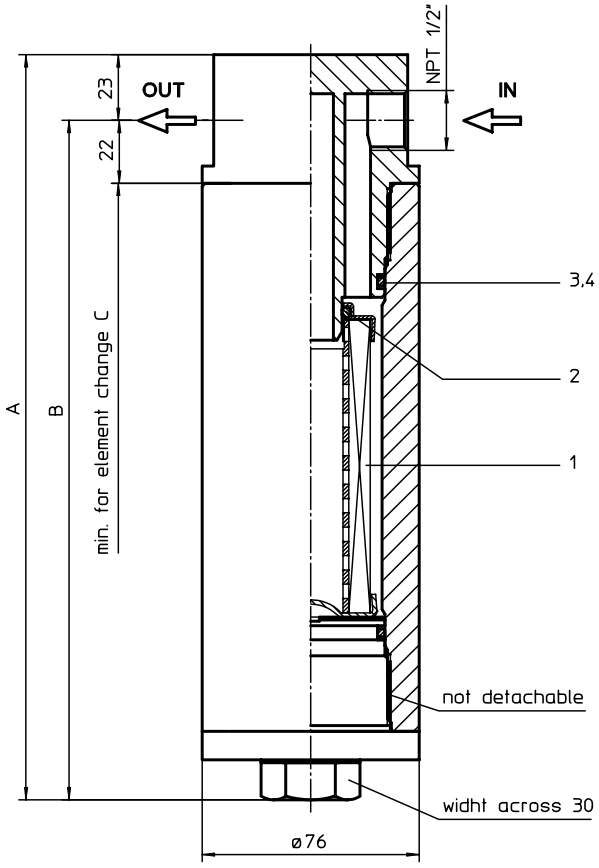
8. Test methods:

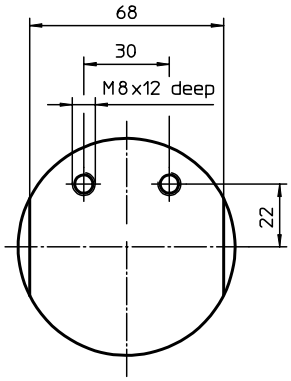
Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

STAINLESS STEEL- PRESSURE FILTER
Series EHP 60-90 DN 15 PN 700/1400

Sheet No.
1436 B





1. Type index:

1.1. Complete filter: (ordering example)

EHP.	90.	10VG.	HR.	E.	P.	VA.	NPT.	3.	VA.	700
1	2	3	4	5	6	7	8	9	10	11

1 **series:**
EHP = stainless steel-pressure filter

2 **nominal size:** 60, 90

3 **filter-material and filter-fineness:**
80G = 80 µm, 40G = 40 µm,
25G = 25 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$,
6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)

4 **resistance of pressure difference for filter element:**
30 = Δp 30 bar
HR = Δp 160 bar (rupture strength Δp 250 bar)

5 **filter element design:**
E = single-end open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 see sheet-no. 31601

8 **connection:**
NPT = thread connection

9 **connection size:**
3 = NPT ½

10 **filter housing specification:**
VA = stainless steel

11 **pressure level:**
700 = max. operating pressure 700 bar
1400 = max. operating pressure 1400 bar

1.2. Filter element: (ordering example)

01E.	90.	10VG.	HR.	E.	P.	VA
1	2	3	4	5	6	7

1 **series:**
01E. = filter element according to INTERNORMEN factory specification

2 **nominal size:** 60, 90

3 - 7 see type index-complete filter

2. Dimensions:

type	EHP 60	EHP 90
A	261	326
B	238	303
C	360	425
weight kg	8,5	9,7
volume tank	0,3 l	0,4 l

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3. Spare parts:

item	qty.	designation	dimension		article-no.	
			EHP 60	EHP 90		
1	1	filer element	01E.60	01E.90		
2	1	O-ring	22 x 3,5		304341 (NBR)	304392 (FPM)
3	1	O-ring	45 x 3		304991 (NBR)	304997 (FPM)
4	1	support ring	52 x 2,6 x 1		311013	

4. Description:

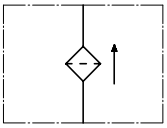
The pressure filters of the series EHP are suitable for a working pressure up to 700 respectively 1400 bar.
The pressure peaks are absorbed by a sufficient margin of safety. The EHP-filter is in-line mounted.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to a filter fineness of $4\mu m_{(c)}$.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 160 bar and a rupture strength of Δp 250 bar.

5. Technical data:

temperature range:	- 10°C to +80°C (for a short time +100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	700 bar / 1400 bar
test pressure:	1000 bar / 2000 bar
connection system:	thread connection
housing material:	EN10088-3 - 1.4418 + QT900
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Pressure stage 700: Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para 3.
Pressure stage 1400: Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para 1.1.b) Category I (Modul A)
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbol:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

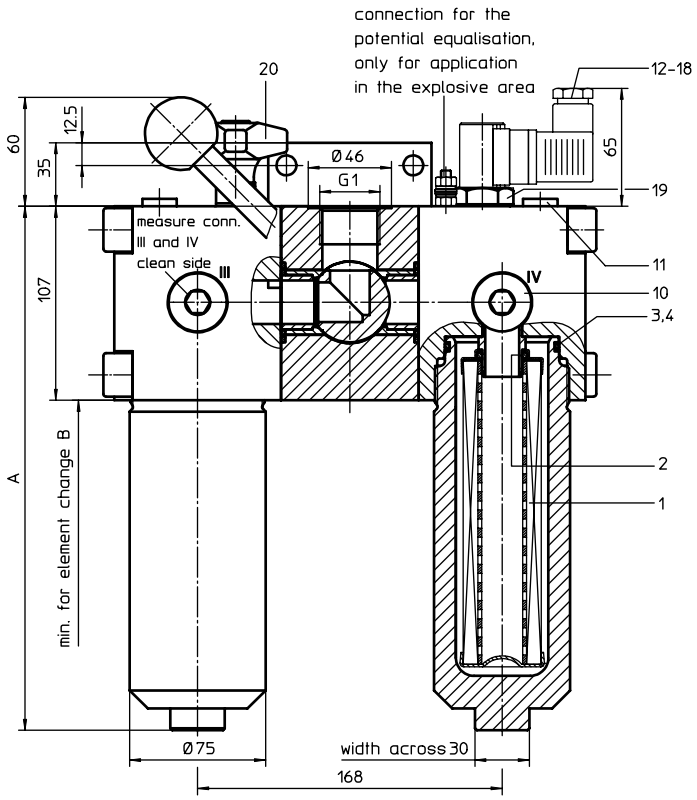
8. Test methods:

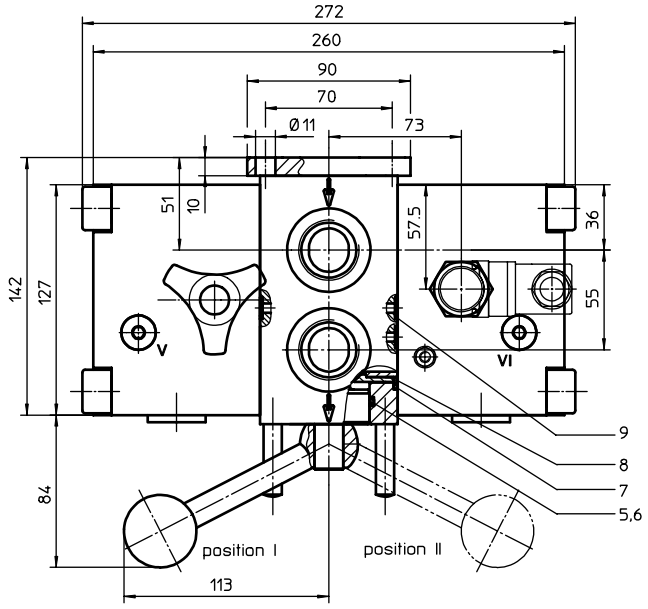
Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

STAINLESS STEEL-PRESSURE FILTER, change-over
Series EHD 61-151 DN 25 PN 315

Sheet No.
2530 E





Pos. I: left filter-side in operation
Pos. II: right filter-side in operation

Connection V and VI to be used to bleed filter or to relieve pressure

1. Type index:

1.1. Complete filter: (ordering example)

EHD. 91. 10VG. HR. E. P. VA. G. 5. VA. -. AE

1	2	3	4	5	6	7	8	9	10	11	12

1 series:
EHD = stainless steel-pressure filter, change-over

2 nominal size: 61, 91, 151

3 filter-material and filter-fineness:
80G = 80 µm, 40G = 40 µm,
25G = 25 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$,
6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)

4 resistance of pressure difference for filter element:
30 = Δp 30 bar
HR = Δp 160 bar (rupture strength Δp 250 bar)

5 filter element design:
E = single-end open

6 sealing material:
P = Nitrile (NBR)
V = Viton (FPM)

7 filter element specification: (see catalog)
- = standard
VA = stainless steel
IS06 see sheet-no. 31601

8 connection:
G = thread connection according to ISO 228

9 connection size:
5 = G 1

10 filter housing specification:
VA = stainless steel

11 internal valve:
- = without
S1 = with by-pass valve Δp 3,5 bar
S2 = with by-pass valve Δp 7,0 bar
R = reversing valve, Q ≤ 70,06 l/min

12 clogging indicator or clogging sensor :
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E. 90. 10VG. HR. E. P. VA

1	2	3	4	5	6	7

1 series:
01E. = filter element according to INTERNORMEN factory specification

2 nominal size: 60, 90, 150

3 - 7 see type index-complete filter

2. Accessories:
- measure- and bleeder connection, see sheet-no. 1650

3. Dimensions:

type	connection	A	B	weight kg	volume tank
EHD 61	G1	224	210	30	2x 0,25 l
EHD 91		289	340	32	2x 0,4 l
EHD 151		399	450	35	2x 0,6 l

EDV 04/08

Changes of measures and design are subject to alteration!

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4. Spare parts:

item	qty.	designation	dimension EHD 61	dimension EHD 91	dimension EHD 151	article-no.	
1	2	filter element	01E.60	01E.90	01E.150		
2	2	O-ring	22 x 3,5			304341 (NBR)	304392 (FPM)
3	2	O-ring	56 x 3			305072 (NBR)	305322 (FPM)
4	2	support ring	63 x 2,6 x 1			312309	
5	3	O-ring	45 x 3			304991 (NBR)	304997 (FPM)
6	2	support ring	49,7 x 2,4 x 1			317709	
7	4	O-ring	38 x 3			304340 (NBR)	317013 (FPM)
8	4	O-ring	28 x 3			316778 (NBR)	318366 (FPM)
9	4	O-ring	8 x 2			310004 (NBR)	316530 (FPM)
10	2	screw plug	G ¾			313815	
11	2	screw plug	G ¼			306968	
12	1	clogging indicator, visual	AOR or AOC			see sheet-no. 1606	
13	1	clogging indicator, visual-electrical	AE			see sheet-no. 1615	
14	1	clogging sensor, electronical	VS1			see sheet-no. 1617	
15	1	clogging sensor, electronical	VS2			see sheet-no. 1618	
16	1	O-ring	15 x 1,5			315357 (NBR)	315427 (FPM)
17	1	O-ring	22 x 2			304708 (NBR)	304721 (FPM)
18	1	O-ring	14 x 2			304342 (NBR)	304722 (FPM)
19	1	screw plug	20913-4			314442	
20	1	pressure balance valve					

item 19 execution only without clogging indicator or clogging sensor

5. Description:

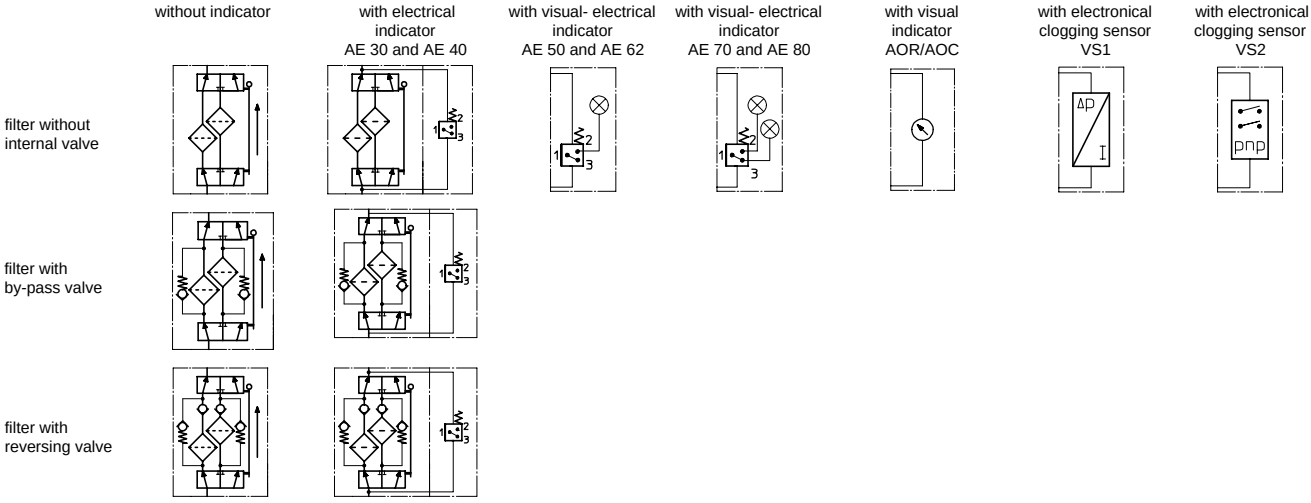
Duplex pressure filters with change-over valve type EHD are suitable for a working pressure up to 315 bar.
The pressure peaks are absorbed by a sufficient margin of safety. Duplex filters can be serviced without interruption of operation. The upper part has a three-way-change-over valve which allows to change-over the flow from the dirty filter-side to the clean filter-side without interrupting the operation. The change-over procedure does not lead to a cross sectional contraction. Prior to the change-over procedure a built-in pressure balance valve equalizes the housing pressure. After change-over the pressure balance valve is to be closed again. The closed filter-side has to be air-bled by vent V respectively by vent VI. Then change filter element. After screw in the filter bowl the pressure balance has to be opened shortly and the just serviced filter-side has to be air-bled. Filter elements are available down to a filter fineness of 4 $\mu m_{(c)}$.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
INTERNORMEN-Filter elements are available with a pressure difference resistance up to Δp 160 bar and a rupture strength up to Δp 250 bar.
The internal valves are integrated into the centering pivot for the filter element. After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

6. Technical data:

temperature range:	-10°C to +80°C (for a short time +100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	315 bar
test pressure:	410 bar
connection system:	thread connection according to ISO 228
housing material:	DIN 17440 - 1.4571 (320 S 18, 320 S 31 according to B.S.)
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
air bleeding and mini-measuring connections dirt side:	G ¼
measuring connections clean side:	G ¾

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

7. Symbols:



8. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter' respectively Δp-curves ; depending on filter fineness and viscosity.

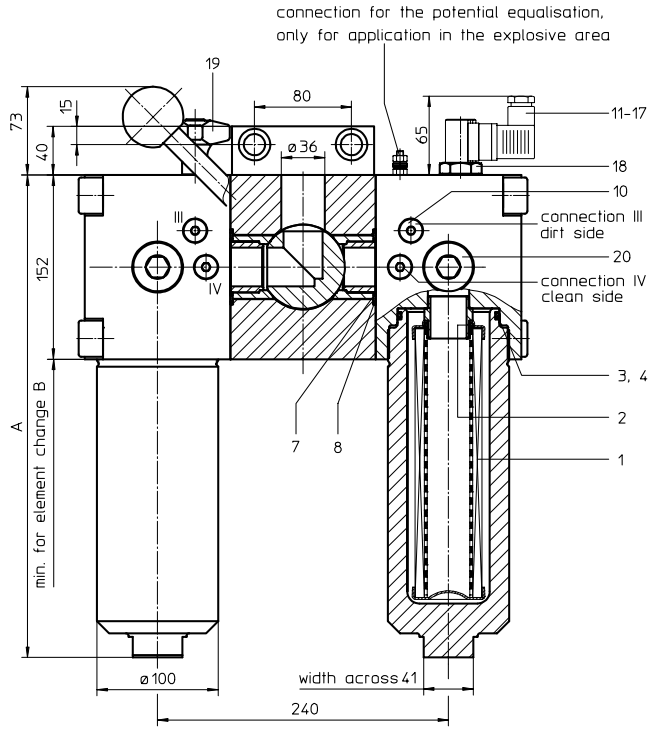
9. Test methods:

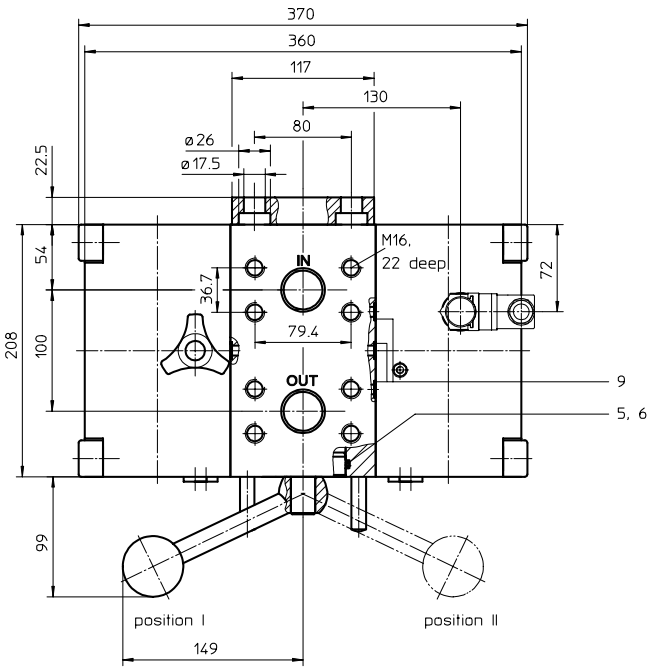
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

STAINLESS STEEL- PRESSURE FILTER, change-over
Series EHD 241 - 451 DN 40 PN 315

Sheet No.
2533 D





Pos. I: left filter-side in operation
Pos. II: right filter-side in operation

Connection III and IV to be used to bleed filter or to relieve pressure.

1. Type index:

1.1. Complete filter: (ordering example)

EHD. 241. 10VG. HR. E. P. VA. FS. 7. VA. -. AE

1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
EHD = stainless steel-pressure filter, change-over

2 **nominal size:** 241, 451

3 **filter-material and filter-fineness:**
80G = 80 µm, 40G = 40 µm,
25G = 25 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$,
6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)

4 **resistance of pressure difference for filter element:**
30 = Δp 30 bar
HR = Δp 160 bar (rupture strength Δp 250 bar)

5 **filter element design:**
E = single-end open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **connection:**
FS = SAE-flange connection 6000 PSI

9 **connection size:**
7 = 1 ½"

10 **filter housing specification:**
VA = stainless steel

11 **internal valve:**
- = without
S1 = with by-pass valve Δp 3,5 bar
S2 = with by-pass valve Δp 7,0 bar
R = reversing valve, Q ≤ 211,008 l/min

12 **clogging indicator or clogging sensor :**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E. 240. 10VG. HR. E. P. VA

1	2	3	4	5	6	7

1 **series:**
01E. = filter element according to INTERNORMEN factory specification

2 **nominal size:** 240, 450

3 - 7 see type index-complete filter

2. Accessories:

- measure- and bleeder connection, see sheet-no. 1650

3. Dimensions:

type	connection	A	B	weight kg	volume tank
EHD 241	SAE	398	340	102	2x 0,85 l
EHD 451	1 ½"	583	525	116	2x 1,55 l

Changes of measures and design are subject to alteration!

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4. Spare parts:

item	qty.	designation	dimension EHD 241	dimension EHD 451	article-no.	
1	2	filter element	01E. 240	01E. 450		
2	2	O-ring	34 x 3,5		304338 (NBR)	304730 (FPM)
3	2	O-ring	76 x 4		305599 (NBR)	310291 (FPM)
4	2	support ring	84 x 3,2 x 1,5		312307	
5	3	O-ring	70 x 4		306253 (NBR)	310280 (FPM)
6	2	sliding ring	076 x70 x 45°		318070	
7	4	O-ring	56 x 3		305072 (NBR)	305322 (FPM)
8	4	O-ring	42,52 x 2,62		304352 (NBR)	304393 (FPM)
9	4	O-ring	10 x 2		309998 (NBR)	310272 (FPM)
10	4	screw plug	G ¼		306968	
11	1	clogging indicator visual	AOR or AOC		see sheet-no. 1606	
12	1	clogging indicator visual-electrical	AE		see sheet-no. 1615	
13	1	clogging sensor electronical	VS1		see sheet-no. 1617	
14	1	clogging sensor electronical	VS2		see sheet-no. 1618	
15	1	O-ring	15 x 1,5		315357 (NBR)	315427 (FPM)
16	1	O-ring	22 x 2		304708 (NBR)	304721 (FPM)
17	1	O-ring	14 x 2		304342 (NBR)	304722 (FPM)
18	1	screw plug	20913-4		314442	
19	1	pressure balance valve	nominal size 10		310316	
20	4	screw plug	G1		308498	

item 18 execution only without clogging indicator or clogging sensor

5. Description:

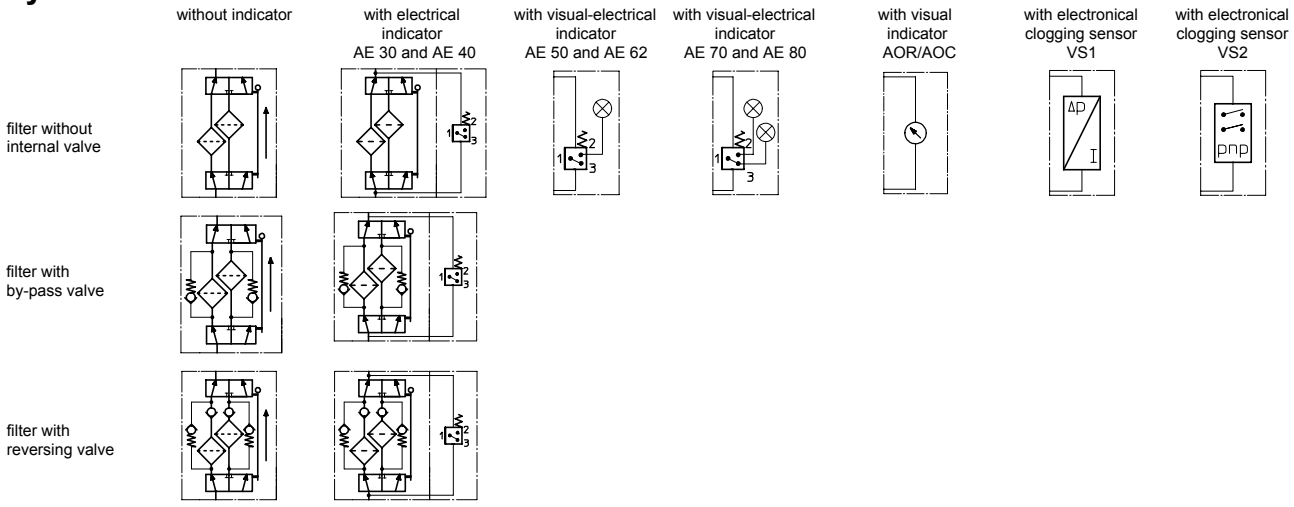
Duplex pressure filters with change-over valve type EHD are suitable for a working pressure up to 315 bar.
The pressure peaks are absorbed by a sufficient margin of safety. Duplex filters can be serviced without interruption of operation. The upper part has a three-way-change-over valve which allows to change-over the flow from the dirty filter-side to the clean filter-side without interrupting the operation. The change-over procedure does not lead to a cross sectional contraction. Prior to the change-over procedure a built-in pressure balance valve equalizes the housing pressure. After change-over the pressure balance valve has to to be closed again. The closed filter-side has to be air-bled by vent III respectively by vent IV. Then change filter element. After screw in the filter bowl the pressure balance has to be opened shortly and the just serviced filter-side has to be air-bled.
Filter elements are available down to a filter fineness of 4 $\mu m_{(c)}$. INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
INTERNORMEN-Filter elements are available with a pressure difference resistance up to Δp 160 bar and a rupture strength up to Δp 250 bar.
The internal valves are integrated into the centering pivot for the filter element. After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

6. Technical data:

temperature range:	-10°C to +80°C (for a short time +100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	315 bar
test pressure:	450 bar
connection system:	SAE-flange connection 6000 PSI
housing material:	EN10088 - 1.4571 (320 S 18, 320 S 31 according to B.S.)
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
air bleeding and mini-measuring connection:	G ¼

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

7. Symbols:



8. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

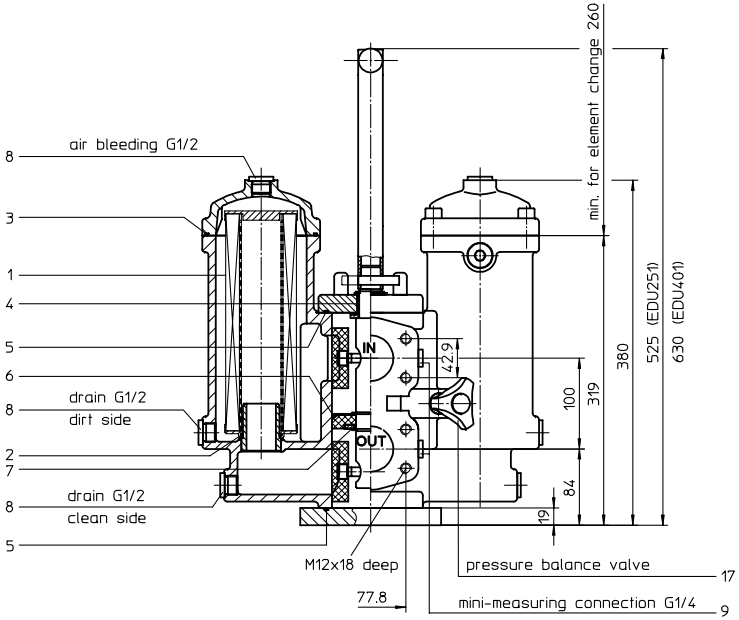
9. Test methods:

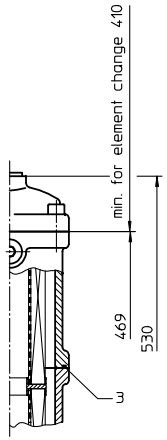
Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

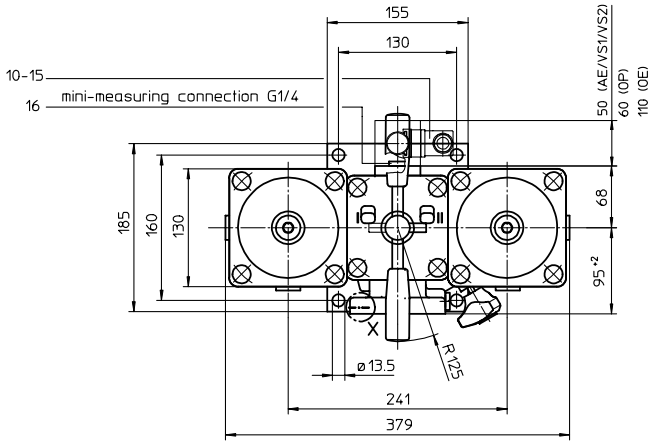
STAINLESS STEEL-PRESSURE FILTER, change-over
Series EDU 251-401 DN 50 PN 25

Sheet No. **2124 H**

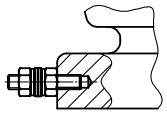




filter head execution
with EDU 401



detail X



connection for the potential equalisation
at outlet, only for application
in the explosive area

Pos. I: left filter-side in operation
Pos. II: right filter-side in operation

1. Type index:

1.1. Complete filter: (ordering example)

EDU. 251. 10VG. 30. E. P. VA. FS. 8. VA. AE

1	2	3	4	5	6	7	8	9	10	11

1 **series:**
EDU = stainless steel-pressure filter, change-over

2 **nominal size:** 251, 401

3 **filter-material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm stainless steel wire mesh,
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)

4 **resistance of pressure difference for filter element:**
30 = Δp 30 bar

5 **filter element design:**
E = single-end open
S = with by-pass valve Δp 2,0 bar
S1 = with by-pass valve Δp 3,5 bar

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no.31601

8 **connection:**
FS = SAE-flange connection 3000 PSI

9 **connection size:**
8 = 2 ‘‘

10 **filter housing specification:**
VA = stainless steel

11 **clogging indicator or clogging sensor:**
- = without
AE = visual-electrical, see sheet-no. 1609
OP = visual, see sheet-no. 1628
OE = visual-electrical, see sheet-no. 1628
VS1 = electronical, see sheet-no. 1607
VS2 = electronical, see sheet-no. 1608

1.2. Filter element: (ordering example)

01NL. 250. 10VG. 30. E. P. VA

1	2	3	4	5	6	7

1 **series:**
01NL. = standard filter element according to DIN 24550, T3

2 **nominal size:** 250, 400

3 - 7 see type index-complete filter

2. Accessories:

- measure- and bleeder-connections, see sheet-no. 1650
- evacuation- and bleeder-connections, see sheet-no. 1651
- counter flange, see sheet-no. 1652
- shut-off valve, see sheet-no. 1655

weight EDU 251: approx. 40 kg
weight EDU 401: approx. 50 kg

Changes of measures and design are subject to alteration!

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fax +49 - (0)6205 - 2094-40 url www.internormen.com

3. Spare parts:

item	designation	qty.	dimension EDU 251	qty.	dimension EDU 401	article-no.	
1	filter element	2	01NL. 250...VA	2	01NL. 400...VA		
2	O-ring	2	40 x 3			304389 (NBR)	304391 (FPM)
3	O-ring	2	115 x 3	4	115 x 3	303963 (NBR)	307762 (FPM)
4	O-ring	1	24 x 3			303038 (NBR)	304397 (FPM)
5	O-ring	2	95 x 3			305808 (NBR)	304828 (FPM)
6	O-ring	1	76 x 4			305599 (NBR)	310291 (FPM)
7	O-ring	1	32 x 2,5			306843 (NBR)	308268 (FPM)
8	screw plug	8	G ½	10	G ½	306966	
9	screw plug	2	G ¼			306968	
10	clogging indicator, visual	1	OP			see sheet-no. 1628	
11	clogging indicator, visual-electrical	1	OE			see sheet-no. 1628	
12	clogging indicator, visual-electrical	1	AE			see sheet-no. 1609	
13	clogging sensor, electronical	1	VS1			see sheet-no. 1607	
14	clogging sensor, electronical	1	VS2			see sheet-no. 1608	
15	O-ring	2	14 x 2			304342 (NBR)	304722 (FPM)
16	screw plug	2	G ¼			306968	
17	pressure balance valve	1					

item 16 execution only without clogging indicator or clogging sensor

4. Description:

Stainless steel-pressure filter of the series EDU 251-401 are suitable for a working pressure up to 25 bar.
The pressure peaks are absorbed by a sufficient margin of safety.
Rotary slide valve which is integrated in the middle of the housing makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation. These filters can be installed as suction-filters.
The filter element consist of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.
Filter finer than 40 µm should use throw-away elements made of Interpor fleece (glass fibre).

Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.

INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
Approvals according to TÜV, and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible.

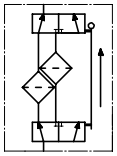
5. Technical data:

temperature range:	- 10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	25 bar
test pressure:	32,5 bar
connection system:	SAE-flange connection 3000 PSI
housing material:	DIN 17445 -1.4581 (318 C 17, ANC 4 C according to B.S.)
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
mini-measuring connections:	G ¼
evacuation-or bleeder connections:	G ½
volume tank EDU 251:	2x 2,5 l
EDU 401:	2x 3,7 l

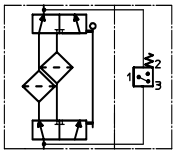
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:

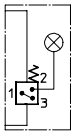
without indicator



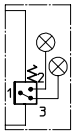
with electrical indicator
AE 30 and AE 40



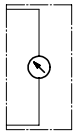
with visual-electrical indicator
AE 50 and AE 62



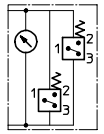
with visual-electrical indicator
AE 70 and AE 80



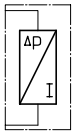
with visual indicator
OP



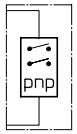
with visual-electrical indicator
OE



with electronical clogging sensor
VS1



with electronical clogging sensor
VS2



7. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’, respectively Δp- curves; depending on filter fin eness and viscosity.

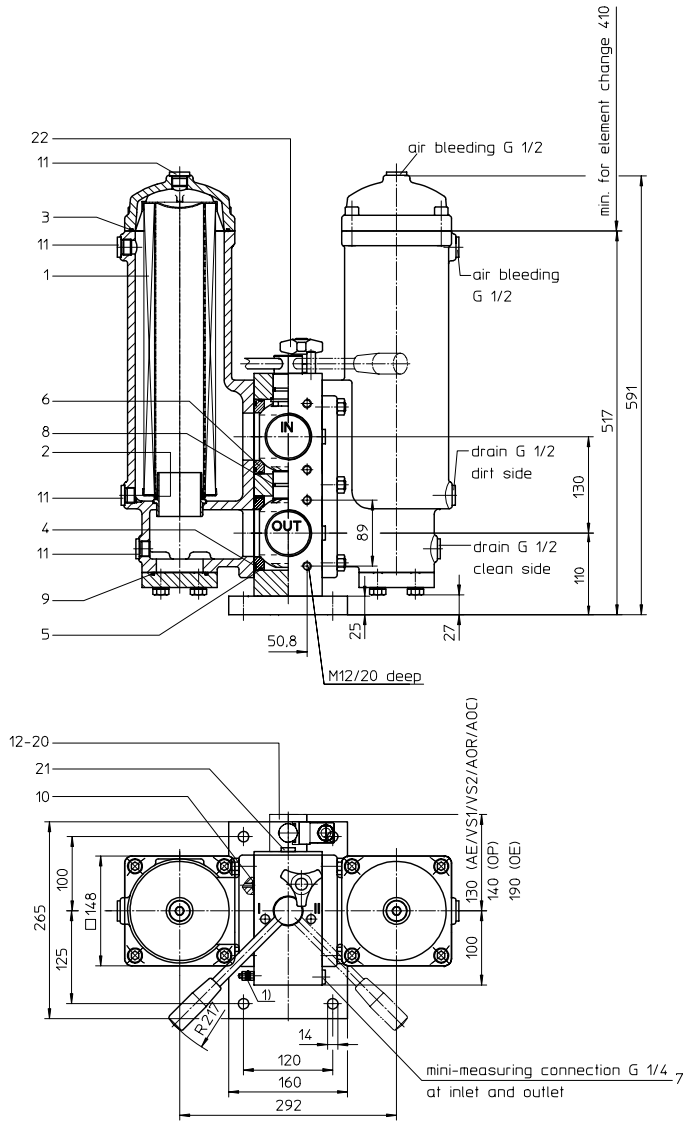
8. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow charact eristics
ISO 16889	Multi-pass method for evaluating filtration perfo rmance

STAINLESS STEEL-PRESSURE FILTER, change-over
Series EDU 635 DN 65 PN 25

Sheet No. **2150 A**



1) connection for the potential equilisation, at outlet, only for application in the explosive area

Pos. I: left filter-side in operation
Pos. II: lright filter-side in operation

1. Type index:

1.1. Complete filter: (ordering example)

EDU. 635. 10VG. 30. E. P. VA. FS. 9. VA. -. AE

1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
EDU = stainless steel-pressure filter, cha nge-over

2 **nominal size:** 635

3 **filter-material and filter- fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm stainless steel wire mesh,
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 P = 25 µm, 10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
30 = Δp 30 bar

5 **filter element design:**
E = single-end open
S = with by-pass valve Δp 2,0 bar
S1 = with by-pass valve Δp 3,5 bar

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601
IS07 = see sheet-no. 31602

8 **connection:**
FS = SAE-flange connection 3000 PSI

9 **connection size:**
9 = 2 ½ "

10 **filter housing specification:**
VA = stainless steel

11 **internal valve:**
- = without

12 **clogging indicator or clogging sensor:**
- = without,
AOR = visual, see sheet-no. 1606,
AOC = visual, see sheet-no. 1606,
AE = visual-electrical, see sheet-no. 1609,
OP = visual, see sheet-no. 1628
OE = visual-electrical, see sheet-no. 1628
VS1 = electronical, see sheet-no. 1607
VS2 = electronical, see sheet-no. 1608

1.2. Filter element: (ordering example)

01NL. 630. 10VG. 30. E. P. VA

1	2	3	4	5	6	7

1 **series:**
01NL. = standard filter element according to DIN 24550, T3

2 **nominal size:** 630

3 - 7 see type index-complete filter

2. Accessories:

- measure- and bleeder connections, see sheet-no. 1650
- evacuation and bleeder-conections, see sheet-no. 1651
- counter flanges, see sheet-no. 1652
- shut-off valve, see sheet-no. 1655

weight: approx. 90 kg

Changes of measures and design are subject to alteration!

internormen technology

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fax +49 - (0)6205 - 2094-40 url www.internormen.com

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01NL. 630...VA		
2	2	O-ring	60 x 3,5	304377 (NBR)	304398 (FPM)
3	2	O-ring	125 x 3	306025 (NBR)	307358 (FPM)
4	4	O-ring	85 x 4	305685 (NBR)	310285 (FPM)
5	4	O-ring	95 x 3	305808 (NBR)	304828 (FPM)
6	4	gasket		317651	
7	2	screw plug	G ¼	306968	
8	2	O-ring	32 x 3	304368 (NBR)	311020 (FPM)
9	2	O-ring	69,45 x 3,53	305868 (NBR)	307357 (FPM)
10	4	O-ring	8 x 2	310004 (NBR)	316530 (FPM)
11	8	screw plug	G ½	306966	
12	1	clogging indicator, visual	AOR oder AOC	see sheet no. 1606	
13	1	clogging indicator, visual	OP	see sheet no. 1628	
14	1	clogging indicator, visual-electrical	OE	see sheet no. 1628	
15	1	clogging indicator, visual-electrical	AE	see sheet no. 1609	
16	1	clogging sensor, electronical	VS1	see sheet no. 1607	
17	1	clogging sensor, electronical	VS2	see sheet no. 1608	
18	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
19	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
20	2	O-ring	14 x2	304342 (NBR)	304722 (FPM)
21	2	screw plug	G ¼	306968	
22	1	pressure balance valve			

item 21 execution only without clogging indicator or clogging sensor

4. Description:

Stainless steel-pressure filters, change-over series EDU 635 are suitable for operating pressure up to 25 bar. Pressure peaks can be absorbed with a sufficient margin of safety.
Change-over ball valve between the two filter housings makes it possible to switch from the dirty filter-side to the clean filter-side without interruting operation.
The filter element consist of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside. These filters can be installed as suct ion filters.
For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fibre element remove the cover and take out the element.
Filter finer than 40 mµ should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
Approvals according to TÜV, and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible.

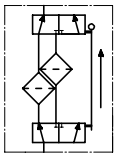
5. Technical data:

temperature range:	- 10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	25 bar
test pressure:	32,5 bar
connection system:	SAE-flange connection 3000 PSI
housing material:	DIN17445 - 1.4581(318 C 17, ANC 4 C according to B.S.)
switching housing-material:	DIN17440 - 1.4541(320 S18, 320 S31 according to B.S.)
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
mini-measuring connections:	G ¼
evacuation-or bleeder connections:	G ½
volume tank:	2x 5,7 l

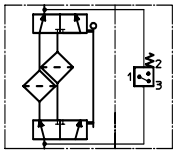
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:

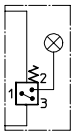
without indicator



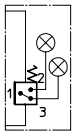
with electrical indicator
AE 30 and AE 40



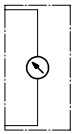
with visual-electrical indicator
AE 50 and AE 62



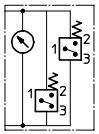
with visual-electrical indicator
AE 70 and AE 80



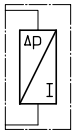
with visual indicator
AOR/AOC/OP



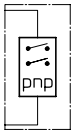
with visual-electrical indicator
OE



with electronical clogging sensor
VS1



with electronical clogging sensor
VS2



7. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’, respectively Δp-curves; depending on filter fin eness and viscosity.

8. Test methods:

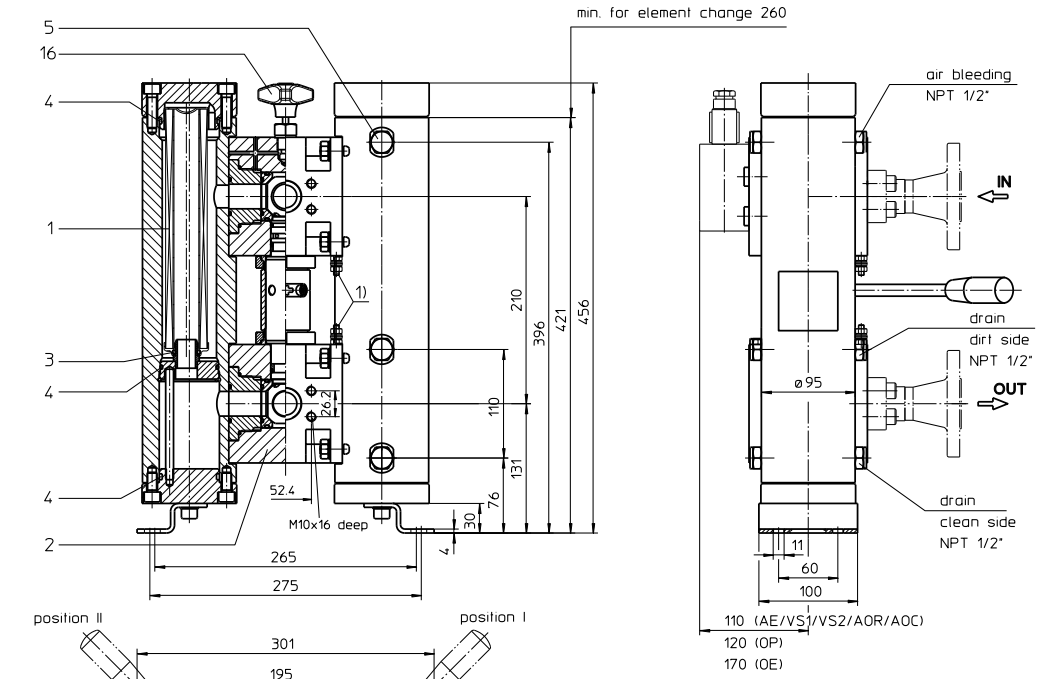
Filter elements are tested according to the following ISO standards:

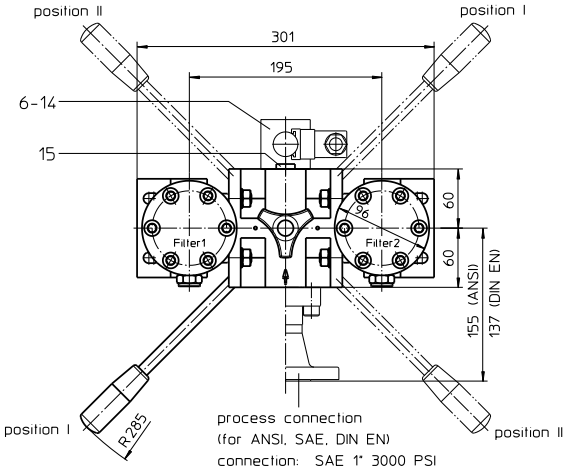
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrit y
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

STAINLESS STEEL-PRESSURE FILTER, change-over

Series EDA 101 NPS 1“ CLASS 150 PSI

Sheet No. **2168 C**





[1] Connection for the potential equalisation at inlet and outlet, only for application in the explosive area.

Position I: Filter 1 in operation
Position II: Filter 2 in operation

1. Type index:

1.1. Complete filter: (ordering example)

EDA.	101.	10VG.	30.	E.	P.	VA.	FS.	5.	-.	-.	AE.	AV.	IS21.	F.	F
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

1 **series:**
EDA = stainless steel-pressure filter change-over, according to ASME-code

2 **nominal size:** 101

3 **filter-material and filter- fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm, 10 G = 10 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 API = 20 µm, 10 API = 10 µm Interpor fleece (glass fibre) according to API
10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
30 = Δp 30 bar

5 **filter element design:**
E = single-end open, S = with by-pass valve Δp 2,0 bar, S1 = with by-pass valve Δp 3,5 bar

6 **sealing material:**
P = Nitrile (NBR), V = Viton (FPM)

7 **filter element specification:**
- = standard, VA = stainless steel

8 **process connection:**
FS = SAE-flange connection 3000 PSI
FA11 = ANSI-flange connection CLASS 150 PSI, sealing surface R_z = 160 µm (not finer than 40 µm)
FA12 = ANSI-flange connection CLASS 150 PSI, sealing surface R_z = 16 µm
FD1 = flange connection DIN EN 1092-1, design B1
FD2 = flange connection DIN EN 1092-1, design B2

9 **process connection size:**
5 = 1“

10 **filter housing specification:** (material) see sheet-no. 55050
- = standard, per according to specification pressure vessel DGRL (1.4571) / ASME type 316L

11 **internal valve:**
- = without

12 **clogging indicator or clogging sensor:**
- = without, OP = visual, see sheet-no. 1628
AOR = visual, see sheet-no. 1606, OE = visual-electrical, see sheet-no. 1628
AOC = visual, see sheet-no. 1606, VS1 = electronical, see sheet-no. 1607
AE = visual-electrical, see sheet-no. 1609, VS2 = electronical, see sheet-no. 1608

13 **shut-off valve:**
- = without, AV = shut-off valve, see sheet-no. 1655

14 **specification pressure vessel:**
- = standard (PED 97/23/EC)
IS20 = ASME VIII Div.1 with ASME equivalent material, see sheet-no. 55217
IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415
IS23 = ASME VIII Div.1 without U-stamp, see sheet-no. 55218

15 **switch lever:**
F = toward IN/OUT, B = opposite IN/OUT

16 **air bleeding/drain:**
F = toward IN/OUT, B = opposite IN/OUT

1.2. Filter element: (ordering example)

01NL.	100.	10VG.	30.	E.	P.	VA
1	2	3	4	5	6	7

1 **series:**
01NL. = standard filter element according to DIN 24550, T3

2 **nominal size:** 100

3 - 7 see type index complete filter

weight: approx. 60 kg

Changes of measures and design are subject to alteration!

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2. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for connection acc. to EN1092-1, see sheet-no. 1657
- adapter for ANSI-connection B16.5 CLASS 150 PSI, see sheet-no. 1658
- measure- and bleeder-connections, see sheet-no. 1650
- drain- and bleeder connection, see sheet-no. 1659

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01NL.100...		
2	1	change over UKK	DN 25		
3	2	O-ring	22 x 3,5	304341 (NBR)	304392 (FPM)
4	6	O-ring	54 x 3	304657 (NBR)	304720 (FPM)
5	12	screw plug	NPT ½	307766	
6	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
7	1	clogging indicator, visual-electrical	OP	see sheet-no. 1628	
8	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628	
9	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
10	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
11	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
12	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
13	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
14	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
15	2	screw plug	G ¼	306968	
16	1	pressure balance valve	DN 10	310316	
17	2	O-ring (only for execution with ANSI/DIN-flange)	32,9 x 3,53	318850 (NBR)	338231(FPM)

item 15 execution only with clogging indicator or clogging sensor

4. Description:

Stainless steel-pressure filters, change-over series EDA 101 are suitable for operating pressure up to 40 bar.
Pressure peaks can be absorbed with a sufficient margin o safety.
Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.
These filters can be installed as suction filters.
For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fibre element remove the cover and take out the element.
Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

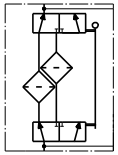
5. Technical data:

temperature ranges	
- calculation temperature (pressure vessel):	- 10°C to +100°C
- medium temperature:	- 10°C to +80°C
- ambient temperature:	- 40°C to +60°C
- survival temperature:	- 40°C to +100°C (short-time)
operating medium:	mineral oil, other media on request
max. operating pressure housing:	40 bar
test pressure acc. to PED 97/23/EC:	1,43 x operating pressure = 57 bar
test pressure acc. to ASME VIII Div. 1:	1,3 x operating pressure = 52 bar
test pressure acc. to API 614, Chapter 1:	1,5 x operating pressure = 60 bar
connection system:	SAE-flange connection 3000 PSI
housing material:	stainless steel, see sheet-no. 55050
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
bleeder connection :	NPT ½“
drain connection dirt side :	NPT ½“
drain connection clean side :	NPT ½“
volume tank :	2x 0,9 l
operating pressure adapter flanges:	according to B16.5 CLASS 150 PSI / DIN EN 1092-1

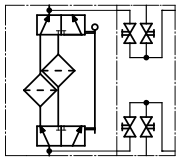
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

6. Symbols:

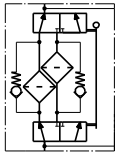
without indicator



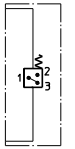
with shut-off valve



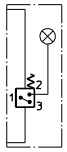
with by-pass valve



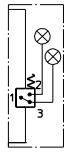
with electrical indicator
AE 30 and AE 40



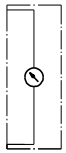
with visual-electrical indicator
AE 50 and AE 62



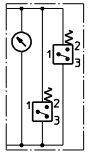
with visual-electrical indicator
AE 70 and AE 80



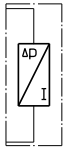
with visual indicator
AOR/AOC/OP



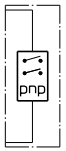
with visual-electrical indicator
OE



with electronical sensor
VS1



with electronical sensor
VS2



7. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’, respectively Δp- curves; depending on filter fineness and viscosity.

8. Test methods:

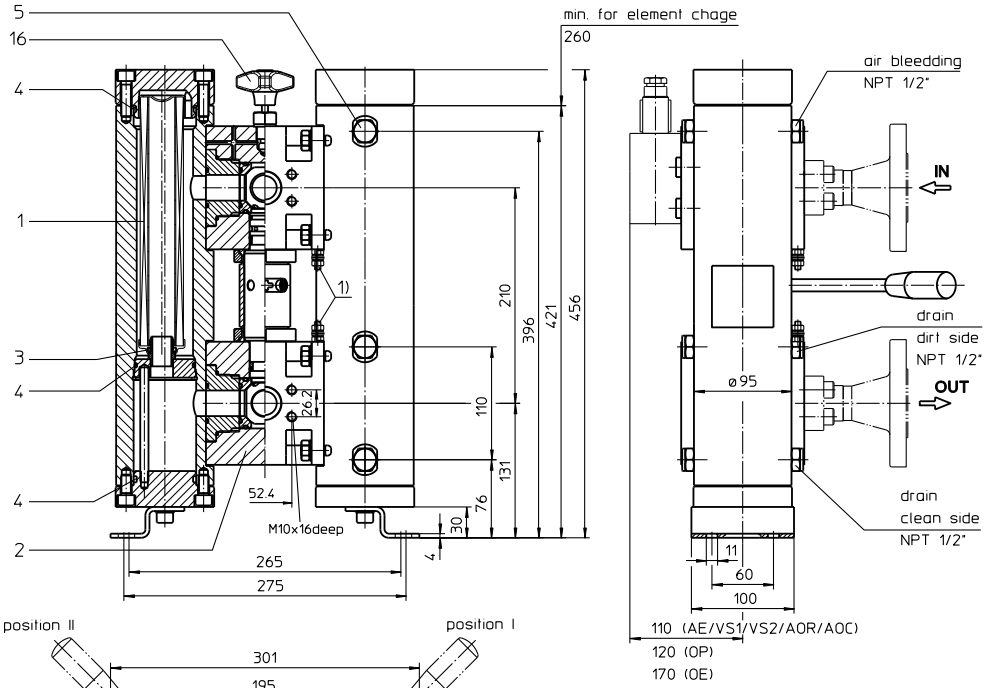
Filter elements are tested according to the following ISO standards:

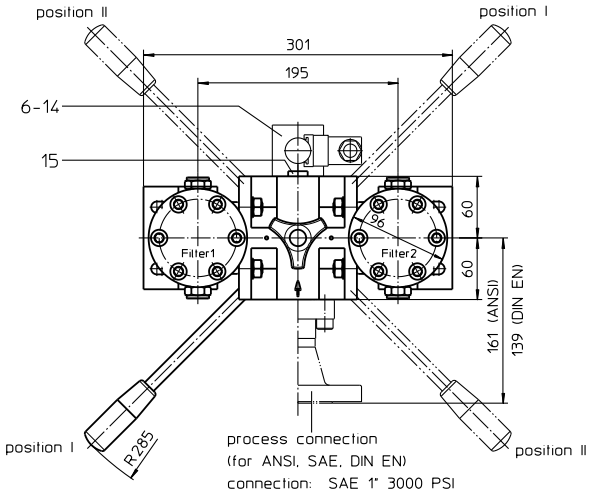
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

STAINLESS STEEL-PRESSURE FILTER, change-over

Series EDA 100 NPS 1“ CLASS 300 PSI

Sheet No. **2159 D**





1) Connection for the potential equalisation at inlet and outlet, only for application in the explosive area.

Position I: Filter 1 in operation
Position II: Filter 2 in operation

1. Type index:

1.1. Complete filter: (ordering example)

EDA.	100.	10VG.	30.	E.	P.	VA.	FS.	5.	-.	-.	AE.	AV.	IS21.	F.	F
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

1 **series:**
EDA = stainless steel-pressure filter change-over, according to ASME-code

2 **nominal size:** 100

3 **filter-material and filter- fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm, 10 G = 10 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 API = 20 µm, 10 API = 10 µm Interpor fleece (glass fibre) according to API
10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
30 = Δp 30 bar

5 **filter element design:**
E = single-end open, S = with by-pass valve Δp 2,0 bar, S1 = with by-pass valve Δp 3,5 bar

6 **sealing material:**
P = Nitrile (NBR), V = Viton (FPM)

7 **filter element specification:**
- = standard, VA = stainless steel

8 **process connection:**
FS = SAE-flange connection 3000 PSI
FA1 = ANSI-flange connection CLASS 300 PSI, sealing surface R_z = 160 µm (not finer than 40 µm)
FA2 = ANSI-flange connection CLASS 300 PSI, sealing surface R_z = 16 µm
FD41 = flange connection DIN EN 1092-1, design B1
FD42 = flange connection DIN EN 1092-1, design B2

9 **process connection size:**
5 = 1“

10 **filter housing specification:** (material) see sheet-no. 55050
- = standard, per according to specification pressure vessel DGRL (1.4571) / ASME type 316L

11 **internal valve:**
- = without

12 **clogging indicator or clogging sensor:**
- = without, OP = visual, see sheet-no. 1628
AOR = visual, see sheet-no. 1606, OE = visual-electrical, see sheet-no. 1628
AOC = visual, see sheet-no. 1606, VS1 = electronical, see sheet-no. 1607
AE = visual-electrical, see sheet-no. 1609, VS2 = electronical, see sheet-no. 1608

13 **shut-off valve:**
- = without, AV = shut-off valve, see sheet-no. 1655

14 **specification pressure vessel:**
- = standard (PED 97/23/EC)
IS20 = ASME VIII Div.1 with ASME equivalent material, see sheet-no. 55217
IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415
IS23 = ASME VIII Div.1 without U-stamp, see sheet-no. 55218

15 **switch lever:**
F = toward IN/OUT, B = opposite IN/OUT

16 **air bleeding/drain:**
F = toward IN/OUT, B = opposite IN/OUT

1.2. Filter element: (ordering example)

01NL.	100.	10VG.	30.	E.	P.	VA
1	2	3	4	5	6	7

1 **series:**
01NL. = standard filter element according to DIN 24550, T3

2 **nominal size:** 100

3 - 7 see type index complete filter

weight: approx. 60 kg

Changes of measures and design are subject to alteration!

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2. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for connection acc. to EN1092-1, see sheet-no. 1657
- adapter for ANSI-connection B16.5 CLASS 300 PSI, see sheet-no. 1658
- measure- and bleeder-connections, see sheet-no. 1650
- drain- and bleeder connection, see sheet-no. 1659

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01NL.100...		
2	1	change over UKK	DN 25		
3	2	O-ring	22 x 3,5	304341 (NBR)	304392 (FPM)
4	6	O-ring	54 x 3	304657 (NBR)	304720 (FPM)
5	6	screw plug	NPT ½	307766	
6	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
7	1	clogging indicator, visual-electrical	OP	see sheet-no. 1628	
8	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628	
9	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
10	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
11	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
12	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
13	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
14	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
15	2	screw plug	G ¼	306968	
16	1	pressure balance valve	DN 10	310316	

item 15 execution only with clogging indicator or clogging sensor

4. Description:

Stainless steel-pressure filters, change-over series EDA 100 are suitable for operating pressure up to 40 bar.
Pressure peaks can be absorbed with a sufficient margin o safety.
Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.
These filters can be installed as suction filters.
For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fibre element remove the cover and take out the element.
Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

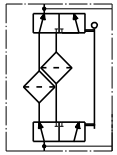
5. Technical data:

temperature ranges	
- calculation temperature (pressure vessel):	- 10°C to +100°C
- medium temperature:	- 10°C to +80°C
- ambient temperature:	- 40°C to +60°C
- survival temperature:	- 40°C to +100°C (short-time)
operating medium:	mineral oil, other media on request
max. operating pressure housing:	40 bar
test pressure acc. to PED 97/23/EC:	1,43 x operating pressure = 57 bar
test pressure acc. to ASME VIII Div. 1:	1,3 x operating pressure = 52 bar
test pressure acc. to API 614, Chapter 1:	1,5 x operating pressure = 60 bar
connection system:	SAE-flange connection 3000 PSI
housing material:	stainless steel, see sheet-no. 55050
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
bleeder connection :	NPT ¼“
drain connection dirt side :	NPT ½“
drain connection clean side :	NPT ½“
volume tank :	2x 0,9 l
operating pressure adapter flanges:	according to B16.5 CLASS 300 PSI / DIN EN 1092-1

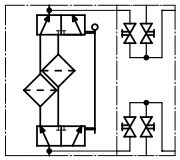
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

6. Symbols:

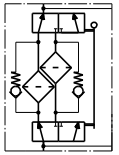
without indicator



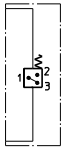
with shut-off valve



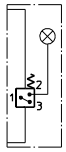
with by-pass valve



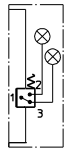
with electrical indicator
AE 30 and AE 40



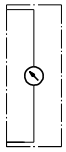
with visual-electrical indicator
AE 50 and AE 62



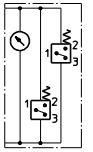
with visual-electrical indicator
AE 70 and AE 80



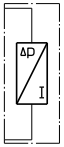
with visual indicator
AOR/AOC/OP



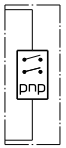
with visual-electrical indicator
OE



with electronical sensor
VS1



with electronical sensor
VS2



7. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’, respectively Δp- curves; depending on filter fineness and viscosity.

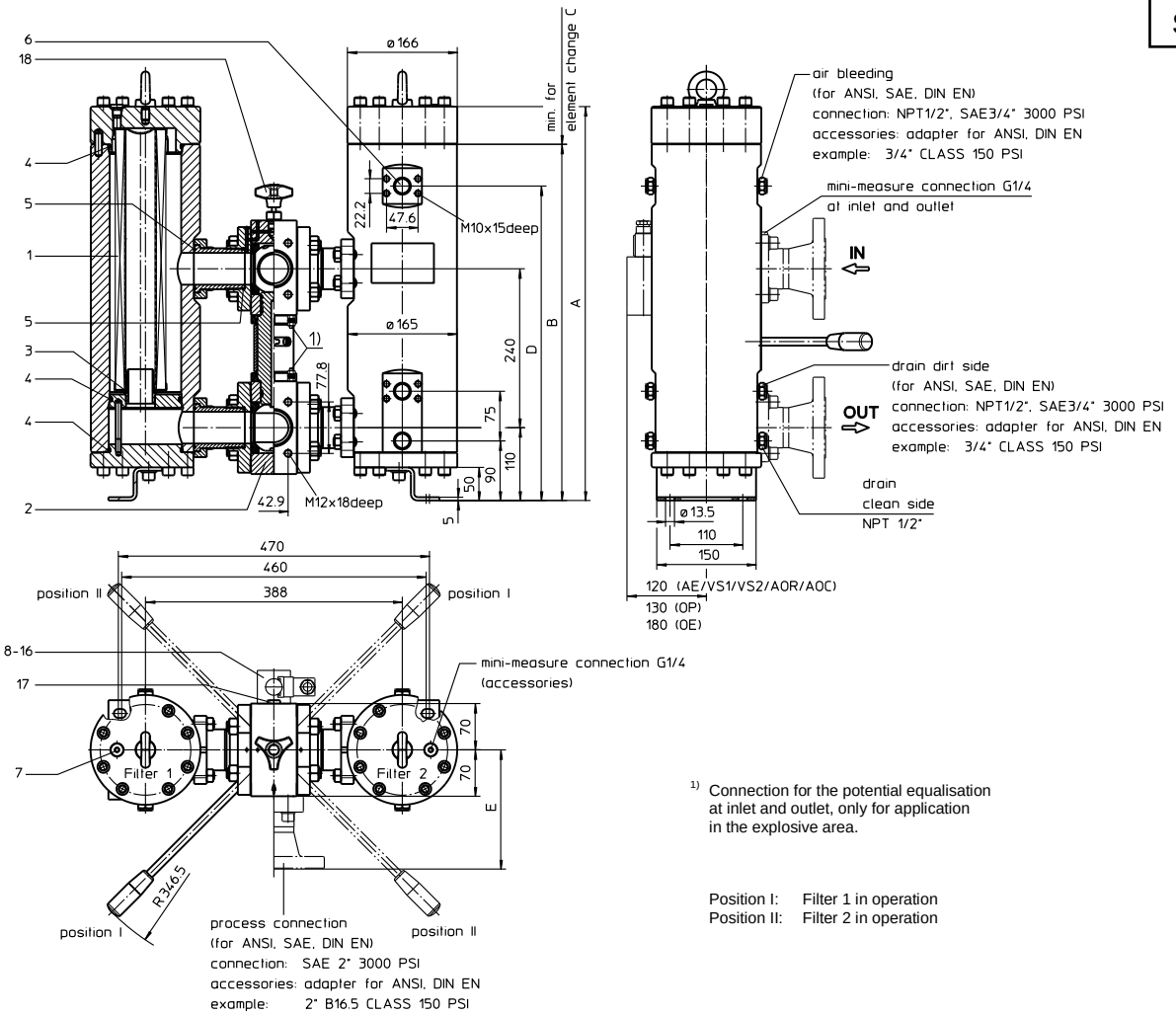
8. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

STAINLESS STEEL-PRESSURE FILTER, change-over
Series EDA 251-401 NPS 2“ CLASS 150 PSI

Sheet No. **2169 C**



1) Connection for the potential equalisation at inlet and outlet, only for application in the explosive area.

Position I: Filter 1 in operation
Position II: Filter 2 in operation

2. Dimensions:

type	connection	A	B	C	D	E	weight kg
EDA 251	SAE 2“	455	398	260	365	-	ca. 130
	ANSI 2“					180	
	DIN EN 2“					162	
	ANSI 1 ½“					179	
	DIN EN 1 ½“					159	
EDA 401	SAE 2“	595	538	410	475	-	ca. 160
	ANSI 2“					180	
	DIN EN 2“					162	
	ANSI 1 ½“					179	
	DIN EN 1 ½“					159	

1. Type index:

1.1. Complete filter: (ordering example)

EDA. 401. 10VG. 30. E. P. VA. FS. 8. -. -. AE. AV. IS21. F. F

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

1 **series:**
EDA = stainless steel-pressure filter change-over, according to ASME-code

2 **nominal size:** 251, 401

3 **filter-material and filter- fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm, 10 G = 10 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 API = 20 µm, 10 API = 10 µm Interpor fleece (glass fibre) according to API
10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
30 = Δp 30 bar

5 **filter element design:**
E = single-end open, S = with by-pass valve Δp 2,0 bar, S1 = with by-pass valve Δp 3,5 bar

6 **sealing material:**
P = Nitrile (NBR), V = Viton (FPM)

7 **filter element specification:**
- = standard, VA = stainless steel

8 **process connection:**
FS = SAE-flange connection 3000 PSI
FA11 = ANSI-flange connection CLASS 150 PSI, sealing surface R_z = 160 µm (not finer than 40 µm)
FA12 = ANSI-flange connection CLASS 150 PSI, sealing surface R_z = 16 µm
FD1 = flange connection DIN EN 1092-1, design B1
FD2 = flange connection DIN EN 1092-1, design B2

9 **process connection size:**
7 = 1 ½“ (only with adapter), 8 = 2“

10 **filter housing specification:** (material) see sheet-no. 55050
- = standard, per according to specification pressure vessel DGRL (1.4571) / ASME type 316L

11 **internal valve:**
- = without

12 **clogging indicator or clogging sensor:**
- = without, OP = visual, see sheet-no. 1628
AOR = visual, see sheet-no. 1606, OE = visual-electrical, see sheet-no. 1628
AOC = visual, see sheet-no. 1606, VS1 = electronical, see sheet-no. 1607
AE = visual-electrical, see sheet-no. 1609, VS2 = electronical, see sheet-no. 1608

13 **shut-off valve:**
- = without, AV = shut-off valve, see sheet-no. 1655

14 **specification pressure vessel:**
- = standard (PED 97/23/EC)
IS20 = ASME VIII Div.1 with ASME equivalent material, see sheet-no. 55217
IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415
IS23 = ASME VIII Div.1 without U-stamp, see sheet-no. 55218

15 **switch lever:**
F = toward IN/OUT, B = opposite IN/OUT

16 **air bleeding/drain:**
F = toward IN/OUT, B = opposite IN/OUT

1.2. Filter element: (ordering example)

01NL. 400. 10VG. 30. E. P. VA

1	2	3	4	5	6	7

1 **series:**
01NL. = standard filter element according to DIN 24550, T3

2 **nominal size:** 250, 400

3 - 7 see type index complete filter

Changes of measures and design are subject to alteration!

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3. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for connection acc. to EN1092-1, see sheet-no. 1657
- adapter for ANSI-connection B16.5 CLASS 150 PSI, see sheet-no. 1658
- measure- and bleeder-connections, see sheet-no. 1650
- drain- and bleeder connection, see sheet-no. 1659

4. Spare parts:

item	qty.	designation	dimension		article-no.	
			EDA 251	EDA 401		
1	2	filter element	01NL. 250...	01NL. 400...		
2	1	change over UKK	DN 50			
3	2	O-ring	40 x 3		304389NBR)	305482FPM)
4	6	O-ring	100 x 5		327063 (NBR)	327064 (FPM)
5	8	O-ring	56 x 3		305072 (NBR)	305322 (FPM)
6	12	screw plug	NPT ½		307766	
7	2	screw plug	G ¼		306968	
8	1	clogging indicator, visual	AOR or AOC		see sheet-no. 1606	
9	1	clogging indicator, visual-electrical	OP		see sheet-no. 1628	
10	1	clogging indicator, visual-electrical	OE		see sheet-no. 1628	
11	1	clogging indicator, visual-electrical	AE		see sheet-no. 1609	
12	1	clogging sensor, electronical	VS1		see sheet-no. 1607	
13	1	clogging sensor, electronical	VS2		see sheet-no. 1608	
14	1	O-ring	15 x 1,5		315357 (NBR)	315427 (FPM)
15	1	O-ring	22 x 2		304708 (NBR)	304721 (FPM)
16	2	O-ring	14 x 2		304342 (NBR)	304722 (FPM)
17	2	screw plug	G ¼		306968	
18	1	pressure balance valve	DN 10		310316	

item 17 execution only with clogging indicator or clogging sensor

5. Description:

Stainless steel-pressure filters, change-over series EDA 251-401 are suitable for operating pressure up to 40 bar.
Pressure peaks can be absorbed with a sufficient margin o safety.
Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.
These filters can be installed as suction filters.
For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fibre element remove the cover and take out the element.
Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

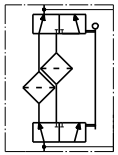
6. Technical data:

temperature ranges	
- calculation temperature (pressure vessel):	- 10°C to +100°C
- medium temperature:	- 10°C to +80°C
- ambient temperature:	- 40°C to +60°C
- survival temperature:	- 40°C to +100°C (short-time)
operating medium:	mineral oil, other media on request
max. operating pressure housing:	40 bar
test pressure acc. to PED 97/23/EC:	1,43 x operating pressure = 57 bar
test pressure acc. to ASME VIII Div. 1:	1,3 x operating pressure = 52 bar
test pressure acc. to API 614, Chapter 1:	1,5 x operating pressure = 60 bar
connection system:	SAE-flange connection 3000 PSI
housing material:	stainless steel, see sheet-no. 55050
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
bleeder connection :	NPT ½“ and SAE ¾“ 3000 PSI
drain connection dirt side :	NPT ½“ and SAE ¾“ 3000 PSI
drain connection clean side :	NPT ½“
volume tank EDA 251:	2x 3,0 l
EDA 401:	2x 4,3 l
operating pressure adapter flanges:	according to B16.5 CLASS 150 PSI / DIN EN 1092-1

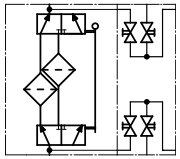
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

7. Symbols:

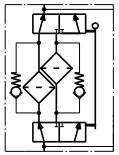
without indicator



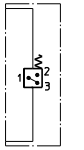
with shut-off valve



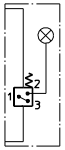
with by-pass valve



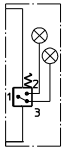
with electrical indicator
AE 30 and AE 40



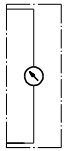
with visual-electrical indicator
AE 50 and AE 62



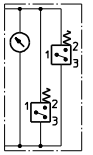
with visual-electrical indicator
AE 70 and AE 80



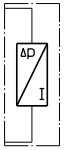
with visual indicator
AOR/AOC/OP



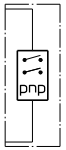
with visual-electrical indicator
OE



with electronical sensor
VS1



with electronical sensor
VS2



8. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’, respectively ∆p- curves; depending on filter fineness and viscosity.

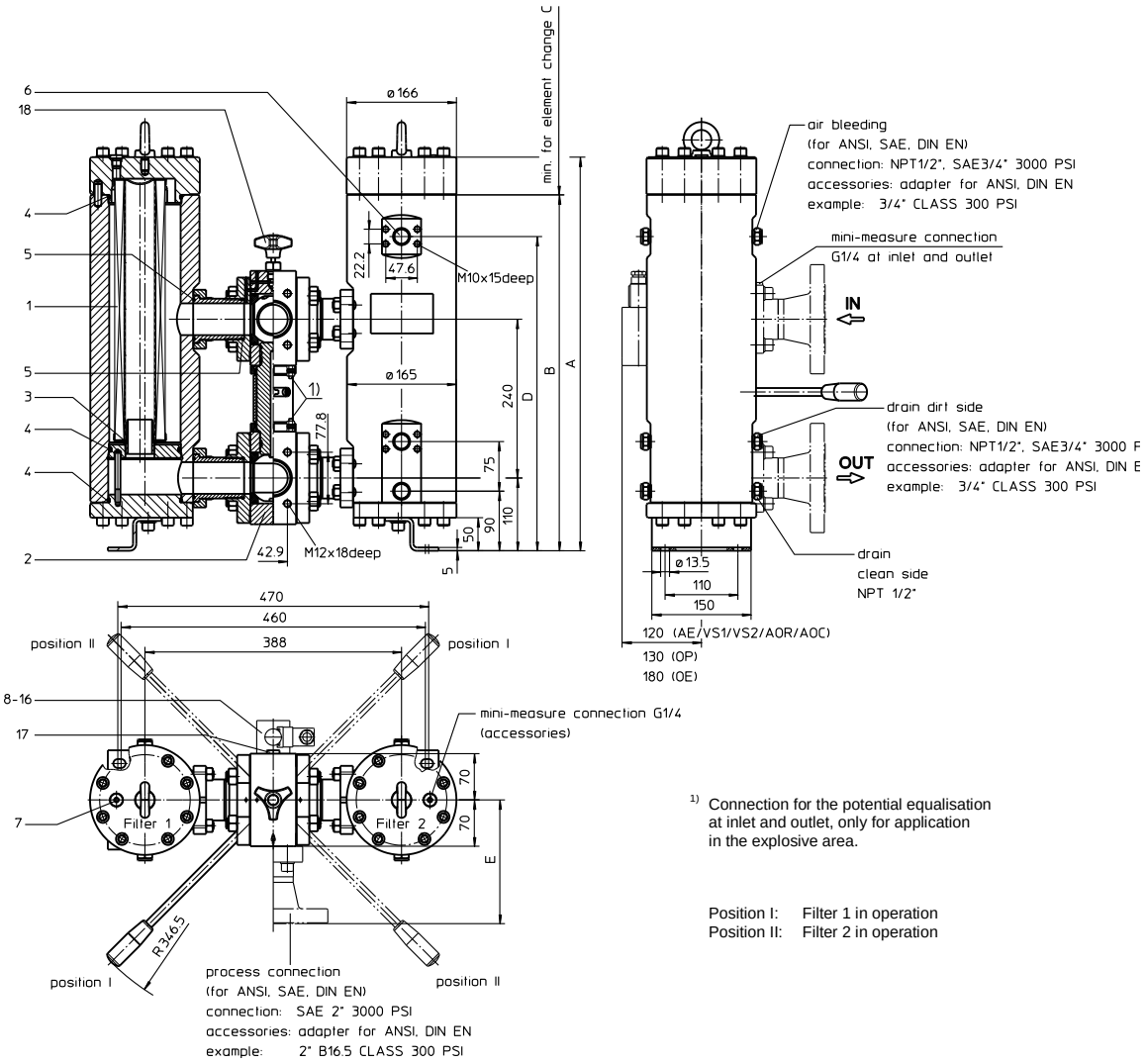
9. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

STAINLESS STEEL-PRESSURE FILTER, change-over
Series EDA 250-400 NPS 2“ CLASS 300 PSI

Sheet No. **2157 D**



1) Connection for the potential equalisation at inlet and outlet, only for application in the explosive area.

Position I: Filter 1 in operation
Position II: Filter 2 in operation

2. Dimensions:

type	connection	A	B	C	D	E	weight kg
EDA 250	SAE 2“	455	398	260	365	-	ca. 130
	ANSI 2“					187	
	DIN EN 2“					165	
	ANSI 1 ½“					185	
	DIN EN 1 ½“					162	
EDA 400	SAE 2“	595	538	410	475	-	ca. 160
	ANSI 2“					187	
	DIN EN 2“					165	
	ANSI 1 ½“					185	
	DIN EN 1 ½“					162	

1. Type index:

1.1. Complete filter: (ordering example)

EDA. 400. 10VG. 30. E. P. VA. FS. 8. -. -. AE. AV. IS21. F. F

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

1 **series:**
EDA = stainless steel-pressure filter change-over, according to ASME-code

2 **nominal size:** 250, 400

3 **filter-material and filter- fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm, 10 G = 10 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 API = 20 µm, 10 API = 10 µm Interpor fleece (glass fibre) according to API
10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
30 = Δp 30 bar

5 **filter element design:**
E = single-end open, S = with by-pass valve Δp 2,0 bar, S1 = with by-pass valve Δp 3,5 bar

6 **sealing material:**
P = Nitrile (NBR), V = Viton (FPM)

7 **filter element specification:**
- = standard, VA = stainless steel

8 **process connection:**
FS = SAE-flange connection 3000 PSI
FA1 = ANSI-flange connection CLASS 300 PSI, sealing surface R_z = 160 µm (not finer than 40 µm)
FA2 = ANSI-flange connection CLASS 300 PSI, sealing surface R_z = 16 µm
FD41 = flange connection DIN EN 1092-1, design B1
FD42 = flange connection DIN EN 1092-1, design B2

9 **process connection size:**
7 = 1 ½“ (only with adapter), 8 = 2“

10 **filter housing specification:** (material) see sheet-no. 55050
- = standard, per according to specification pressure vessel DGRL (1.4571) / ASME type 316L

11 **internal valve:**
- = without

12 **clogging indicator or clogging sensor:**
- = without, OP = visual, see sheet-no. 1628
AOR = visual, see sheet-no. 1606, OE = visual-electrical, see sheet-no. 1628
AOC = visual, see sheet-no. 1606, VS1 = electronical, see sheet-no. 1607
AE = visual-electrical, see sheet-no. 1609, VS2 = electronical, see sheet-no. 1608

13 **shut-off valve:**
- = without, AV = shut-off valve, see sheet-no. 1655

14 **specification pressure vessel:**
- = standard (PED 97/23/EC)
IS20 = ASME VIII Div.1 with ASME equivalent material, see sheet-no. 55217
IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415
IS23 = ASME VIII Div.1 without U-stamp, see sheet-no. 55218

15 **switch lever:**
F = toward IN/OUT, B = opposite IN/OUT

16 **air bleeding/drain:**
F = toward IN/OUT, B = opposite IN/OUT

1.2. Filter element: (ordering example)

01NL. 400. 10VG. 30. E. P. VA

1	2	3	4	5	6	7

1 **series:**
01NL. = standard filter element according to DIN 24550, T3

2 **nominal size:** 250, 400

3 - 7 see type index complete filter

Changes of measures and design are subject to alteration!

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3. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for connection acc. to EN1092-1, see sheet-no. 1657
- adapter for ANSI-connection B16.5 CLASS 300 PSI, see sheet-no. 1658
- measure- and bleeder-connections, see sheet-no. 1650
- drain- and bleeder connection, see sheet-no. 1659

4. Spare parts:

item	qty.	designation	dimension		article-no.	
			EDA 250	EDA 400		
1	2	filter element	01NL. 250...	01NL. 400...		
2	1	change over UKK	DN 50			
3	2	O-ring	40 x 3		304389NBR)	305482FPM)
4	6	O-ring	100 x 5		327063 (NBR)	327064 (FPM)
5	8	O-ring	56 x 3		305072 (NBR)	305322 (FPM)
6	12	screw plug	NPT ½		307766	
7	2	screw plug	G ¼		306968	
8	1	clogging indicator, visual	AOR or AOC		see sheet-no. 1606	
9	1	clogging indicator, visual-electrical	OP		see sheet-no. 1628	
10	1	clogging indicator, visual-electrical	OE		see sheet-no. 1628	
11	1	clogging indicator, visual-electrical	AE		see sheet-no. 1609	
12	1	clogging sensor, electronical	VS1		see sheet-no. 1607	
13	1	clogging sensor, electronical	VS2		see sheet-no. 1608	
14	1	O-ring	15 x 1,5		315357 (NBR)	315427 (FPM)
15	1	O-ring	22 x 2		304708 (NBR)	304721 (FPM)
16	2	O-ring	14 x 2		304342 (NBR)	304722 (FPM)
17	2	screw plug	G ¼		306968	
18	1	pressure balance valve	DN 10		310316	

item 17 execution only with clogging indicator or clogging sensor

5. Description:

Stainless steel-pressure filters, change-over series EDA 250-400 are suitable for operating pressure up to 40 bar.
Pressure peaks can be absorbed with a sufficient margin o safety.
Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.
These filters can be installed as suction filters.
For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fibre element remove the cover and take out the element.
Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

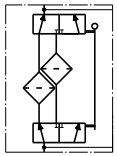
6. Technical data:

temperature ranges	
- calculation temperature (pressure vessel):	- 10°C to +100°C
- medium temperature:	- 10°C to +80°C
- ambient temperature:	- 40°C to +60°C
- survival temperature:	- 40°C to +100°C (short-time)
operating medium:	mineral oil, other media on request
max. operating pressure housing:	40 bar
test pressure acc. to PED 97/23/EC:	1,43 x operating pressure = 57 bar
test pressure acc. to ASME VIII Div. 1:	1,3 x operating pressure = 52 bar
test pressure acc. to API 614, Chapter 1:	1,5 x operating pressure = 60 bar
connection system:	SAE-flange connection 3000 PSI
housing material:	stainless steel, see sheet-no. 55050
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
bleeder connection :	NPT ½“ and SAE ¾“ 3000 PSI
drain connection dirt side :	NPT ½“ and SAE ¾“ 3000 PSI
drain connection clean side :	NPT ½“
volume tank EDA 251:	2x 3,0 l
EDA 401:	2x 4,3 l
operating pressure adapter flanges:	according to B16.5 CLASS 300 PSI / DIN EN 1092-1

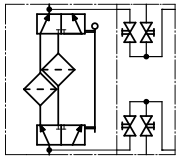
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

7. Symbols:

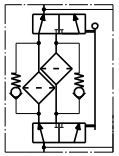
without indicator



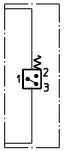
with shut-off valve



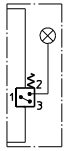
with by-pass valve



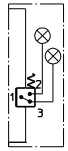
with electrical indicator
AE 30 and AE 40



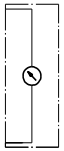
with visual-electrical indicator
AE 50 and AE 62



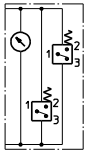
with visual-electrical indicator
AE 70 and AE 80



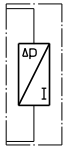
with visual indicator
AOR/AOC/OP



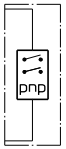
with visual-electrical indicator
OE



with electronical sensor
VS1



with electronical sensor
VS2



8. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’, respectively ∆p- curves; depending on filter fineness and viscosity.

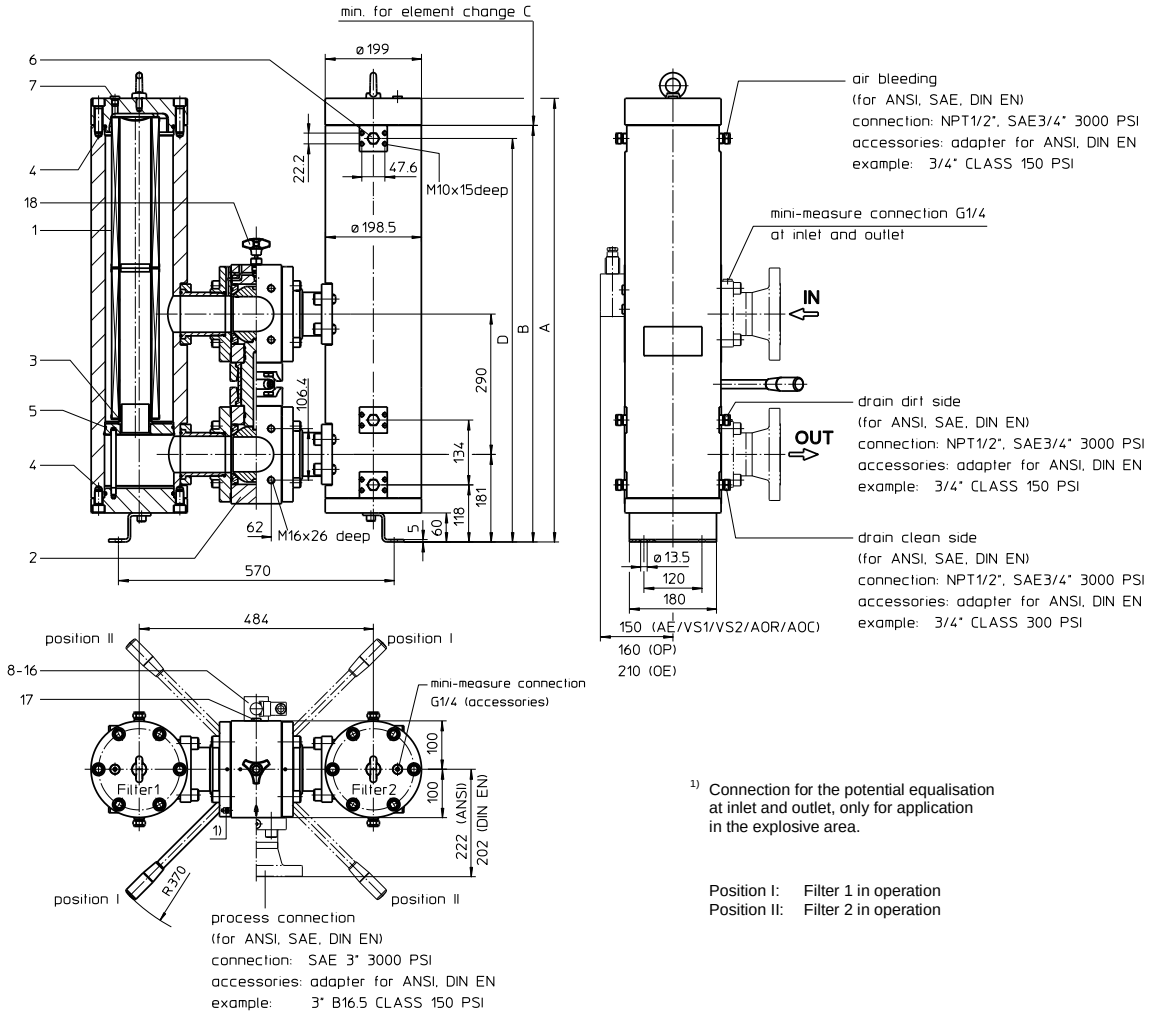
9. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

STAINLESS STEEL-PRESSURE FILTER, change-over
Series EDA 631-1001 NPS 3“ CLASS 150 PSI

Sheet No. **2170 C**



1) Connection for the potential equalisation at inlet and outlet, only for application in the explosive area.

Position I: Filter 1 in operation
Position II: Filter 2 in operation

2. Dimensions:

type	connection	A	B	C	D	weight kg
EDA 631	SAE 3“	687	631	410	604	approx. 290
EDA 1001	SAE 3“	917	861	640	834	approx. 350

1. Type index:

1.1. Complete filter: (ordering example)

EDA. 1001. 10VG. 30. E. P. VA. FS. A. -. -. AE. AV. IS21. F. F

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

1 **series:**
EDA = stainless steel-pressure filter change-over, according to ASME-code

2 **nominal size:** 631, 1001

3 **filter-material and filter- fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm, 10 G = 10 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 API = 20 µm, 10 API = 10 µm Interpor fleece (glass fibre) according to API
10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
30 = Δp 30 bar

5 **filter element design:**
E = single-end open, S = with by-pass valve Δp 2,0 bar, S1 = with by-pass valve Δp 3,5 bar

6 **sealing material:**
P = Nitrile (NBR), V = Viton (FPM)

7 **filter element specification:**
- = standard, VA = stainless steel

8 **process connection:**
FS = SAE-flange connection 3000 PSI
FA11 = ANSI-flange connection CLASS 150 PSI, sealing surface R_z = 160 µm (not finer than 40 µm)
FA12 = ANSI-flange connection CLASS 150 PSI, sealing surface R_z = 16 µm
FD1 = flange connection DIN EN 1092-1, design B1
FD2 = flange connection DIN EN 1092-1, design B2

9 **process connection size:**
A = 3“

10 **filter housing specification:** (material) see sheet-no. 55050
- = standard, per according to specification pressure vessel DGRL (1.4571) / ASME type 316L

11 **internal valve:**
- = without

12 **clogging indicator or clogging sensor:**
- = without, OP = visual, see sheet-no. 1628
AOR = visual, see sheet-no. 1606, OE = visual-electrical, see sheet-no. 1628
AOC = visual, see sheet-no. 1606, VS1 = electronical, see sheet-no. 1607
AE = visual-electrical, see sheet-no. 1609, VS2 = electronical, see sheet-no. 1608

13 **shut-off valve:**
- = without, AV = shut-off valve, see sheet-no. 1655

14 **specification pressure vessel:**
- = standard (PED 97/23/EC)
IS20 = ASME VIII Div.1 with ASME equivalent , see sheet-no. 55217
IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415
IS23 = ASME VIII Div.1 without U-stamp, see sheet-no. 55218

15 **switch lever:**
F = toward IN/OUT, B = opposite IN/OUT

16 **air bleeding/drain:**
F = toward IN/OUT, B = opposite IN/OUT

1.2. Filter element: (ordering example)

01NL. 1000. 10VG. 30. E. P. VA

1	2	3	4	5	6	7

1 **series:**
01NL. = standard filter element according to DIN 24550, T3

2 **nominal size:** 630, 1000

3 - 7 see type index complete filter

Changes of measures and design are subject to alteration!

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3. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for connection acc. to EN1092-1, see sheet-no. 1657
- adapter for ANSI-connection B16.5 CLASS 150 PSI, see sheet-no. 1658
- measure- and bleeder-connections, see sheet-no. 1650
- drain- and bleeder connection, see sheet-no. 1659

4. Spare parts:

item	qty.	designation	dimension		article-no.	
			EDA 631	EDA 1001		
1	2	filter element	01NL.630…	01NL.1000…		
2	1	change over UKK	DN 80			
3	2	O-ring	60 x 3,5		304377 (NBR)	304398 (FPM)
4	4	O-ring	135 x 4,75		326348 (NBR)	326349 (FPM)
5	2	O-ring	136,12 x 3,53		320162 (NBR)	320163 (FPM)
6	12	screw plug	NPT ½		307766	
7	2	screw plug	G ¼		306968	
8	1	clogging indicator, visual	AOR or AOC		see sheet-no. 1606	
9	1	clogging indicator, visual-electrical	OP		see sheet-no. 1628	
10	1	clogging indicator, visual-electrical	OE		see sheet-no. 1628	
11	1	clogging indicator, visual-electrical	AE		see sheet-no. 1609	
12	1	clogging sensor, electronical	VS1		see sheet-no. 1607	
13	1	clogging sensor, electronical	VS2		see sheet-no. 1608	
14	1	O-ring	15 x 1,5		315357 (NBR)	315427 (FPM)
15	1	O-ring	22 x 2		304708 (NBR)	304721 (FPM)
16	2	O-ring	14 x 2		304342 (NBR)	304722 (FPM)
17	2	screw plug	G ¼		306968	
18	1	pressure balance valve	DN 10		310316	

item 17 execution only with clogging indicator or clogging sensor

5. Description:

Stainless steel-pressure filters, change-over series EDA 631-1001 are suitable for operating pressure up to 40 bar.
Pressure peaks can be absorbed with a sufficient margin o safety.
Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.
These filters can be installed as suction filters.
For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fibre element remove the cover and take out the element.
Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

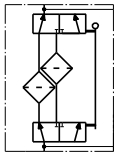
6. Technical data:

temperature ranges	
- calculation temperature (pressure vessel):	- 10°C to +100°C
- medium temperature:	- 10°C to +80°C
- ambient temperature:	- 40°C to +60°C
- survival temperature:	- 40°C to +100°C (short-time)
operating medium:	mineral oil, other media on request
max. operating pressure housing:	40 bar
test pressure acc. to PED 97/23/EC:	1,43 x operating pressure = 57 bar
test pressure acc. to ASME VIII Div. 1:	1,3 x operating pressure = 52 bar
test pressure acc. to API 614, Chapter 1:	1,5 x operating pressure = 60 bar
connection system:	SAE-flange connection 3000 PSI
housing material:	stainless steel, see sheet-no. 55050
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
bleeder connection :	NPT ½“ and SAE ¾“ 3000 PSI
drain connection dirt side :	NPT ½“ and SAE ¾“ 3000 PSI
drain connection clean side :	NPT ½“ and SAE ¾“ 3000 PSI
volume tank EDA 631:	2x 8,3 l
EDA 1001:	2x 11,8 l
operating pressure adapter flanges:	according to B16.5 CLASS 150 PSI / DIN EN 1092-1

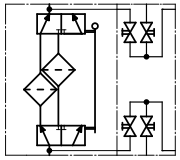
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

7. Symbols:

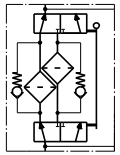
without indicator



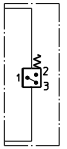
with shut-off valve



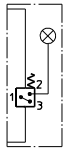
with by-pass valve



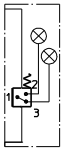
with electrical indicator
AE 30 and AE 40



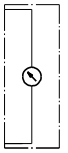
with visual-electrical indicator
AE 50 and AE 62



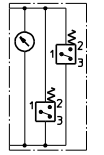
with visual-electrical indicator
AE 70 and AE 80



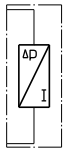
with visual indicator
AOR/AOC/OP



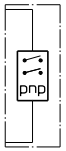
with visual-electrical indicator
OE



with electronical sensor
VS1



with electronical sensor
VS2



8. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’, respectively Δp- curves; depending on filter fineness and viscosity.

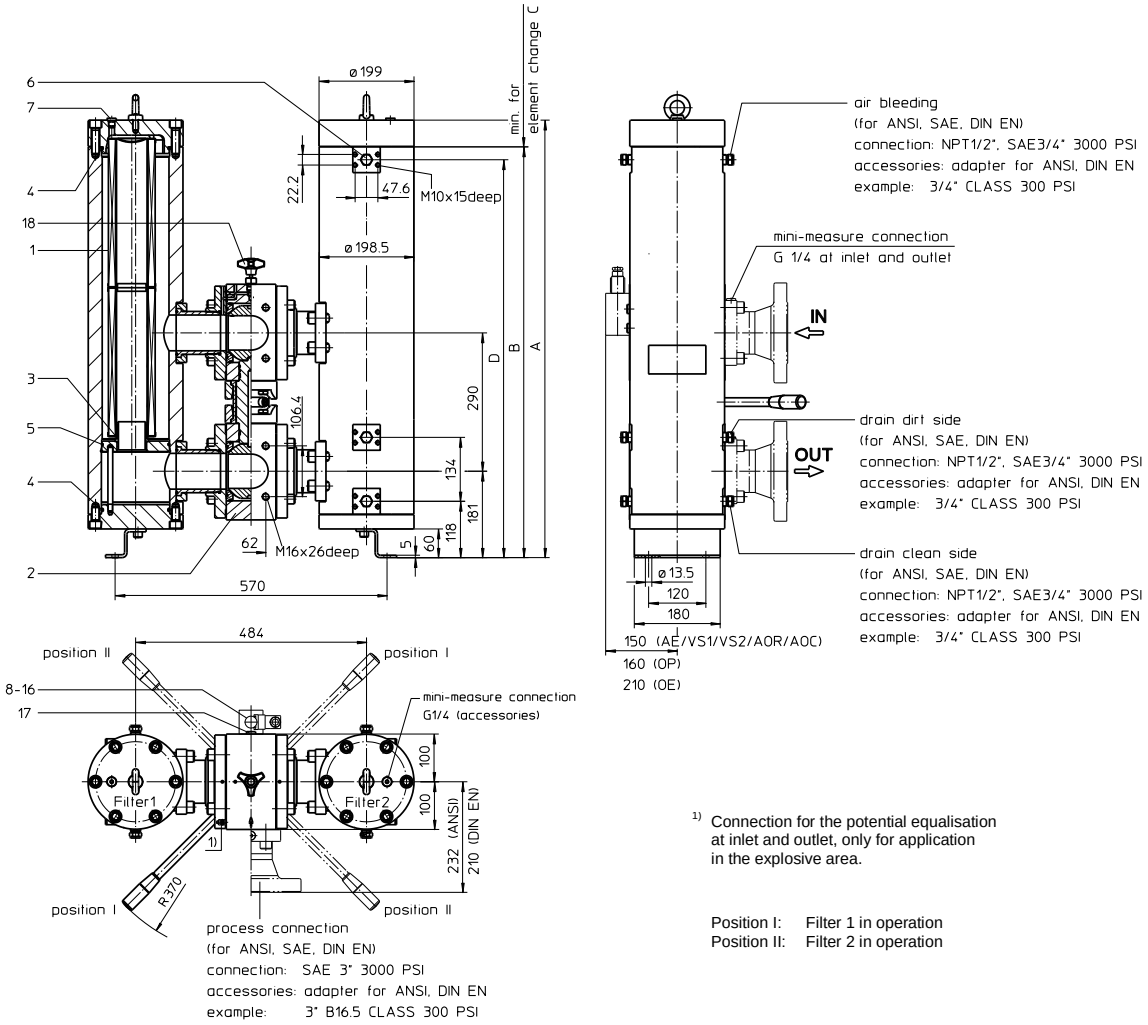
9. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

STAINLESS STEEL-PRESSURE FILTER, change-over
Series EDA 630-1000 NPS 3“ CLASS 300 PSI

Sheet No. **2158 D**



1) Connection for the potential equalisation at inlet and outlet, only for application in the explosive area.

Position I: Filter 1 in operation
Position II: Filter 2 in operation

1. Type index:

1.1. Complete filter: (ordering example)

EDA. 1000. 10VG. 30. E. P. VA. FS. A. -. -. AE. AV. IS21. F. F

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

1 **series:**
EDA = stainless steel-pressure filter change-over, according to ASME-code

2 **nominal size:** 630, 1000

3 **filter-material and filter- fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm, 10 G = 10 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 API = 20 µm, 10 API = 10 µm Interpor fleece (glass fibre) according to API
10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
30 = Δp 30 bar

5 **filter element design:**
E = single-end open, S = with by-pass valve Δp 2,0 bar, S1 = with by-pass valve Δp 3,5 bar

6 **sealing material:**
P = Nitrile (NBR), V = Viton (FPM)

7 **filter element specification:**
- = standard, VA = stainless steel

8 **process connection:**
FS = SAE-flange connection 3000 PSI
FA1 = ANSI-flange connection CLASS 300 PSI, sealing surface R_z = 160 µm (not finer than 40 µm)
FA2 = ANSI-flange connection CLASS 300 PSI, sealing surface R_z = 16 µm
FD41 = flange connection DIN EN 1092-1, design B1
FD42 = flange connection DIN EN 1092-1, design B2

9 **process connection size:**
A = 3“

10 **filter housing specification:** (material) see sheet-no. 55050
- = standard, per according to specification pressure vessel DGRL (1.4571) / ASME type 316L

11 **internal valve:**
- = without

12 **clogging indicator or clogging sensor:**
- = without, OP = visual, see sheet-no. 1628
AOR = visual, see sheet-no. 1606, OE = visual-electrical, see sheet-no. 1628
AOC = visual, see sheet-no. 1606, VS1 = electronical, see sheet-no. 1607
AE = visual-electrical, see sheet-no. 1609, VS2 = electronical, see sheet-no. 1608

13 **shut-off valve:**
- = without, AV = shut-off valve, see sheet-no. 1655

14 **specification pressure vessel:**
- = standard (PED 97/23/EC)
IS20 = ASME VIII Div.1 with ASME equivalent material, see sheet-no. 55217
IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415
IS23 = ASME VIII Div.1 without U-stamp, see sheet-no. 55218

15 **switch lever:**
F = toward IN/OUT, B = opposite IN/OUT

16 **air bleeding/drain:**
F = toward IN/OUT, B = opposite IN/OUT

1.2. Filter element: (ordering example)

01NL. 1000. 10VG. 30. E. P. VA

1	2	3	4	5	6	7

1 **series:**
01NL. = standard filter element according to DIN 24550, T3

2 **nominal size:** 630, 1000

3 - 7 see type index complete filter

2. Dimensions:

type	connection	A	B	C	D	weight kg
EDA 630	SAE 3“	687	631	410	604	approx. 290
EDA 1000	SAE 3“	917	861	640	834	approx. 350

Changes of measures and design are subject to alteration!

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3. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for connection acc. to EN1092-1, see sheet-no. 1657
- adapter for ANSI-connection B16.5 CLASS 300 PSI, see sheet-no. 1658
- measure- and bleeder-connections, see sheet-no. 1650
- drain- and bleeder connection, see sheet-no. 1659

4. Spare parts:

item	qty.	designation	dimension EDA 630	dimension EDA 1000	article-no.	
1	2	filter element	01NL.630…	01NL.1000…		
2	1	change over UKK	DN 80			
3	2	O-ring	60 x 3,5		304377 (NBR)	304398 (FPM)
4	4	O-ring	135 x 4,75		326348 (NBR)	326349 (FPM)
5	2	O-ring	136,12 x 3,53		320162 (NBR)	320163 (FPM)
6	12	screw plug	NPT ½		307766	
7	2	screw plug	G ¼		306968	
8	1	clogging indicator, visual	AOR or AOC		see sheet-no. 1606	
9	1	clogging indicator, visual-electrical	OP		see sheet-no. 1628	
10	1	clogging indicator, visual-electrical	OE		see sheet-no. 1628	
11	1	clogging indicator, visual-electrical	AE		see sheet-no. 1609	
12	1	clogging sensor, electronical	VS1		see sheet-no. 1607	
13	1	clogging sensor, electronical	VS2		see sheet-no. 1608	
14	1	O-ring	15 x 1,5		315357 (NBR)	315427 (FPM)
15	1	O-ring	22 x 2		304708 (NBR)	304721 (FPM)
16	2	O-ring	14 x 2		304342 (NBR)	304722 (FPM)
17	2	screw plug	G ¼		306968	
18	1	pressure balance valve	DN 10		310316	

item 17 execution only with clogging indicator or clogging sensor

5. Description:

Stainless steel-pressure filters, change-over series EDA 630-1000 are suitable for operating pressure up to 40 bar.
Pressure peaks can be absorbed with a sufficient margin o safety.
Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.
These filters can be installed as suction filters.
For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fibre element remove the cover and take out the element.
Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyard Classification Societies" D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

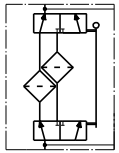
6. Technical data:

temperature ranges	
- calculation temperature (pressure vessel):	- 10°C to +100°C
- medium temperature:	- 10°C to +80°C
- ambient temperature:	- 40°C to +60°C
- survival temperature:	- 40°C to +100°C (short-time)
operating medium:	mineral oil, other media on request
max. operating pressure housing:	40 bar
test pressure acc. to PED 97/23/EC:	1,43 x operating pressure = 57 bar
test pressure acc. to ASME VIII Div. 1:	1,3 x operating pressure = 52 bar
test pressure acc. to API 614, Chapter 1:	1,5 x operating pressure = 60 bar
connection system:	SAE-flange connection 3000 PSI
housing material:	stainless steel, see sheet-no. 55050
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
bleeder connection :	NPT ½" and SAE ¾" 3000 PSI
drain connection dirt side :	NPT ½" and SAE ¾" 3000 PSI
drain connection clean side :	NPT ½" and SAE ¾" 3000 PSI
volume tank EDA 630:	2x 8,3 l
EDA 1000:	2x 11,8 l
operating pressure adapter flanges:	according to B16.5 CLASS 300 PSI / DIN EN 1092-1

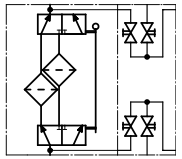
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

7. Symbols:

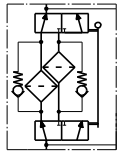
without indicator



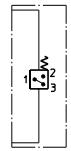
with shut-off valve



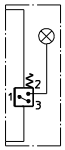
with by-pass valve



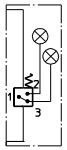
with electrical indicator AE 30 and AE 40



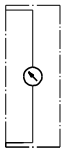
with visual-electrical indicator AE 50 and AE 62



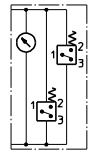
with visual-electrical indicator AE 70 and AE 80



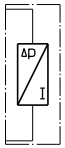
with visual indicator AOR/AOC/OP



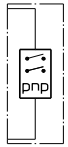
with visual-electrical indicator OE



with electronical sensor VS1



with electronical sensor VS2



8. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp- curves; depending on filter fineness and viscosity.

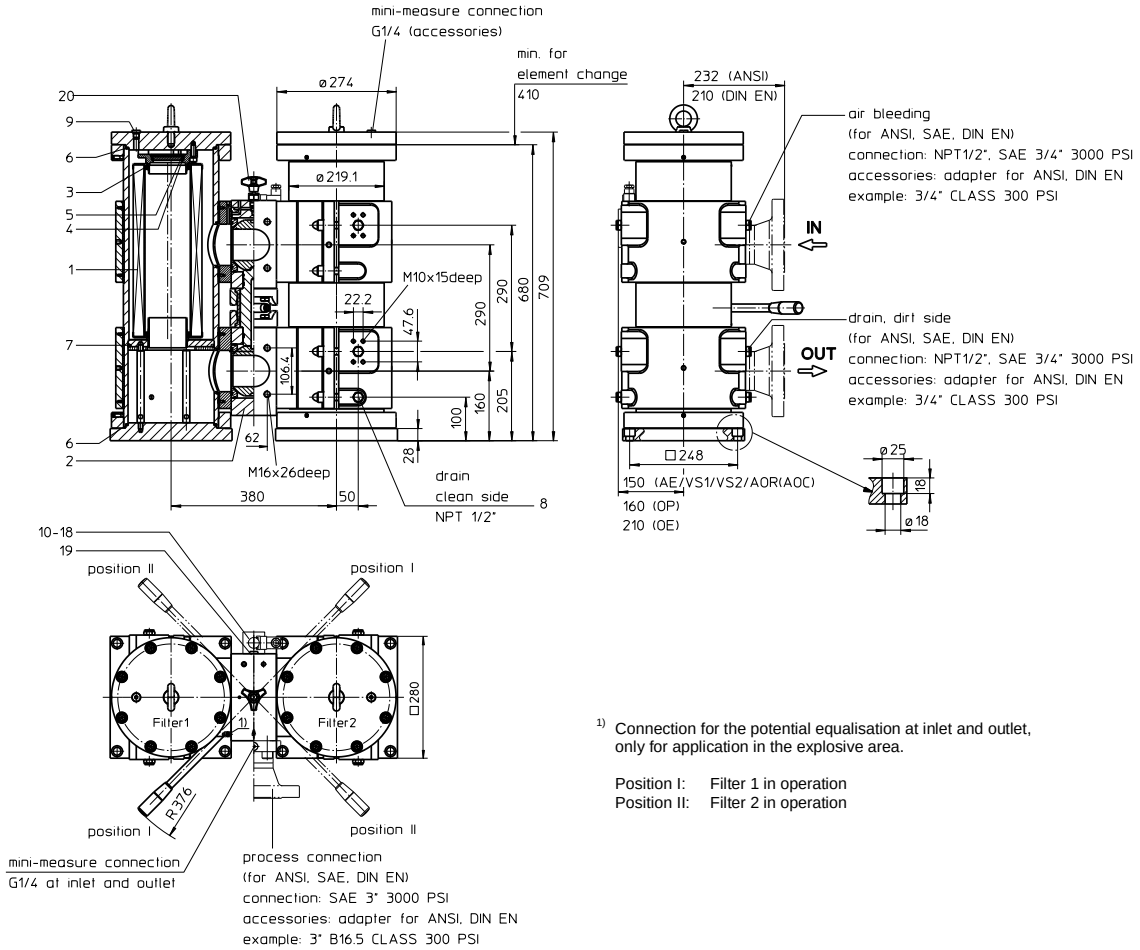
9. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

STAINLESS STEEL-PRESSURE FILTER, change-over
Series EDA 1004 NPS 3“ CLASS 300 PSI

Sheet No. **2176 B**



1) Connection for the potential equalisation at inlet and outlet, only for application in the explosive area.

Position I: Filter 1 in operation
Position II: Filter 2 in operation

1. Type index:

1.1. Complete filter: (ordering example)

EDA. 1004. 10VG. 10. B. P. VA. FS. A. -. -. AE. AV. IS21. F. F

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

1 **series:**
EDA = stainless steel-pressure filter change-over, according to ASME-code

2 **nominal size:** 1004

3 **filter-material and filter- fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm, 10 G = 10 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 API = 20 µm, 10 API = 10 µm Interpor fleece (glass fibre) according to API
10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR), V = Viton (FPM)

7 **filter element specification:**
- = standard, VA = stainless steel

8 **process connection:**
FS = SAE-flange connection 3000 PSI
FA1 = ANSI-flange connection CLASS 300 PSI, sealing surface R_z = 160 µm (not finer than 40 µm)
FA2 = ANSI-flange connection CLASS 300 PSI, sealing surface R_z = 16 µm
FD41 = flange connection DIN EN 1092-1, design B1
FD42 = flange connection DIN EN 1092-1, design B2

9 **process connection size:**
A = 3“

10 **filter housing specification:** (material) see sheet-no. 55050
- = standard, per according to specification pressure vessel DGRL (1.4571) / ASME type 316L

11 **internal valve:**
- = without, S1 = with by-pass valve Δp 3,5 bar

12 **clogging indicator or clogging sensor:**
- = without, OP = visual, see sheet-no. 1628
AOR = visual, see sheet-no. 1606, OE = visual-electrical, see sheet-no. 1628
AOC = visual, see sheet-no. 1606, VS1 = electronical, see sheet-no. 1607
AE = visual-electrical, see sheet-no. 1609, VS2 = electronical, see sheet-no. 1608

13 **shut-off valve:**
- = without, AV = shut-off valve, see sheet-no. 1655

14 **specification pressure vessel:**
- = standard (PED 97/23/EC)
IS20 = ASME VIII Div.1 with ASME equivalent material, see sheet-no. 55217
IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415
IS23 = ASME VIII Div.1 without U-stamp, see sheet-no. 55218

15 **switch lever:**
F = toward IN/OUT, B = opposite IN/OUT

16 **air bleeding/drain:**
F = toward IN/OUT, B = opposite IN/OUT

1.2. Filter element: (ordering example)

01NR. 1000. 10VG. 10. B. P. VA

1	2	3	4	5	6	7

1 **series:**
01NR = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 1000

3 - 7 see type index complete filter

weight: approx. 370 kg

Changes of measures and design are subject to alteration!

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2. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for connection acc. to EN1092-1, see sheet-no. 1657
- adapter for ANSI-connection B16.5 CLASS 300 PSI, see sheet-no. 1658
- measure- and bleeder-connections, see sheet-no. 1650
- drain- and bleeder connection, see sheet-no. 1659

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01NR.1000 ...		
2	1	change over UKK	DN 80		
3	4	O-ring	90 x 4	306941 (NBR)	307031 (FPM)
4	2	O-ring	62 x 4	308045 (NBR)	311472 (FPM)
5	2	circlip	DIN472-75x2,5-1.4310	318481	
6	4	O-ring	200 x 4	334555 (NBR)	334554 (FPM)
7	2	O-ring	185 x 6	335381 (NBR)	335306 (FPM)
8	12	screw plug	NPT ½	307766	
9	2	screw plug	G ¼	306968	
10	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
11	1	clogging indicator, visual-electrical	OP	see sheet-no. 1628	
12	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628	
13	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
14	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
15	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
16	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
17	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
18	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
19	2	screw plug	G ¼	306968	
20	1	pressure balance valve	DN 10	310316	

item 19 execution only with clogging indicator or clogging sensor

4. Description:

Stainless steel-pressure filters, change-over series EDA 1004 are suitable for operating pressure up to 40 bar.
Pressure peaks can be absorbed with a sufficient margin o safety.
Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.
These filters can be installed as suction filters.
For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fibre element remove the cover and take out the element.
Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

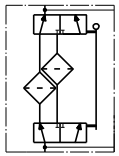
5. Technical data:

temperature ranges	
- calculation temperature (pressure vessel):	- 10°C to +100°C
- medium temperature:	- 10°C to +80°C
- ambient temperature:	- 40°C to +60°C
- survival temperature:	- 40°C to +100°C (short-time)
operating medium:	mineral oil, other media on request
max. operating pressure housing:	40 bar
test pressure acc. to PED 97/23/EC:	1,43 x operating pressure = 57 bar
test pressure acc. to ASME VIII Div. 1:	1,3 x operating pressure = 52 bar
test pressure acc. to API 614, Chapter 1:	1,5 x operating pressure = 60 bar
connection system:	SAE-flange connection 3000 PSI
housing material:	stainless steel, see sheet-no. 55050
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
bleeder connection :	NPT ½“ and SAE ¾“ 3000 PSI
drain connection dirt side :	NPT ½“ and SAE ¾“ 3000 PSI
drain connection clean side :	NPT ½“
volume tank :	2x 19 l
operating pressure adapter flanges:	according to B16.5 CLASS 300 PSI / DIN EN 1092-1

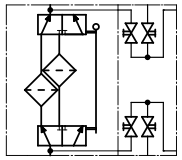
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

6. Symbols:

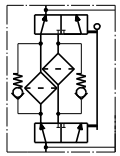
without indicator



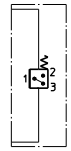
with shut-off valve



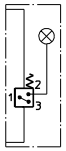
with by-pass valve



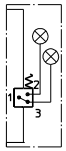
with electrical indicator AE 30 and AE 40



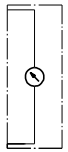
with visual-electrical indicator AE 50 and AE 62



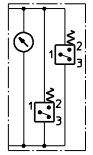
with visual-electrical indicator AE 70 and AE 80



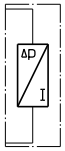
with visual indicator AOR/AOC/OP



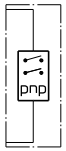
with visual-electrical indicator OE



with electronical sensor VS1



with electronical sensor VS2



7. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’, respectively Δp- curves; depending on filter fineness and viscosity.

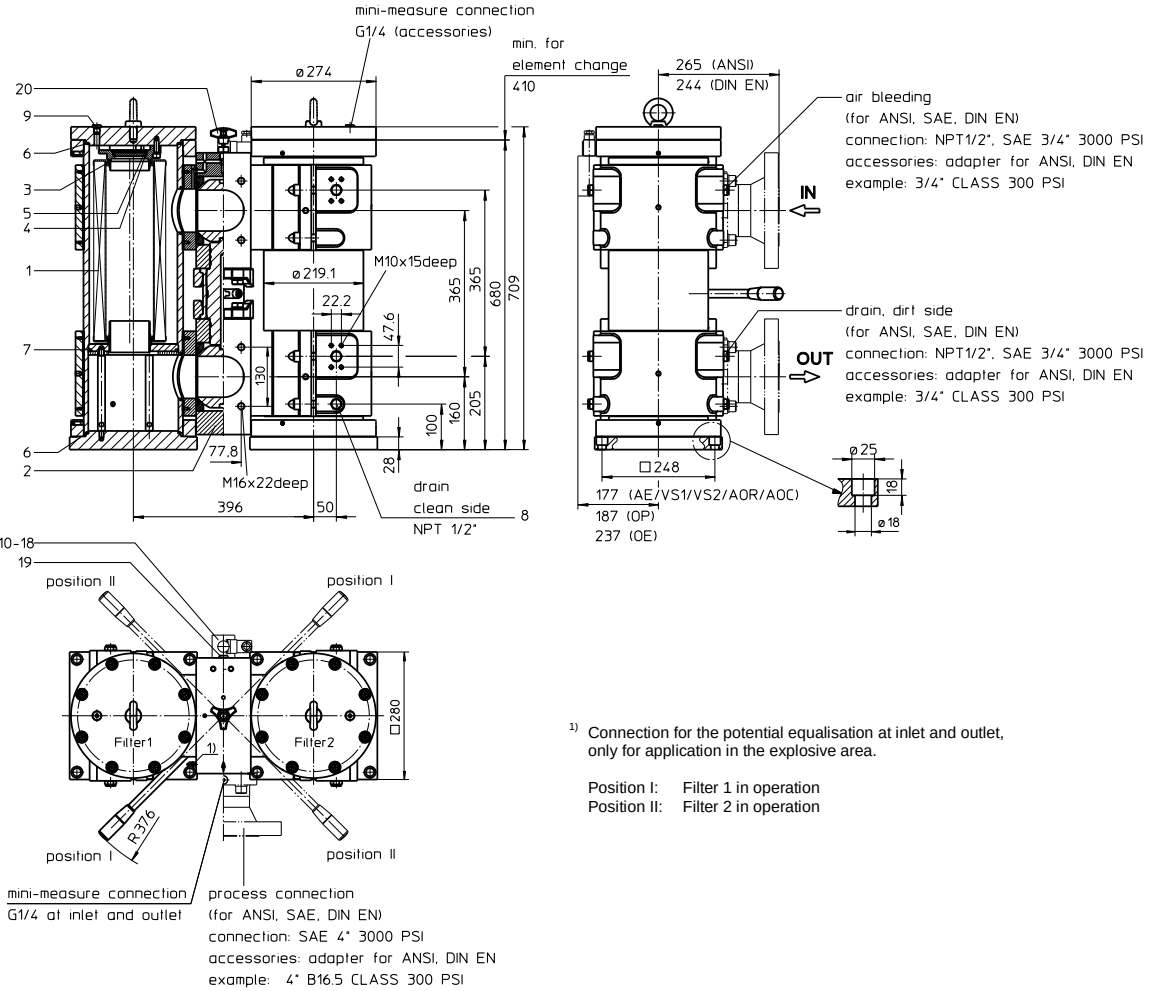
8. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

STAINLESS STEEL-PRESSURE FILTER, change-over
Series EDA 1005 NPS 4“ CLASS 300 PSI

Sheet No. **2177 B**



[1] Connection for the potential equalisation at inlet and outlet, only for application in the explosive area.

Position I: Filter 1 in operation
Position II: Filter 2 in operation

1. Type index:

1.1. Complete filter: (ordering example)

EDA. 1005. 10VG. 10. B. P. VA. FS. B. -. -. AE. AV. IS21. F. F

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

1 **series:**
EDA = stainless steel-pressure filter change-over, according to ASME-code

2 **nominal size:** 1005

3 **filter-material and filter- fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm, 10 G = 10 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 API = 20 µm, 10 API = 10 µm Interpor fleece (glass fibre) according to API
10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR), V = Viton (FPM)

7 **filter element specification:**
- = standard, VA = stainless steel

8 **process connection:**
FS = SAE-flange connection 3000 PSI
FA1 = ANSI-flange connection CLASS 300 PSI, sealing surface R_z = 160 µm (not finer than 40 µm)
FA2 = ANSI-flange connection CLASS 300 PSI, sealing surface R_z = 16 µm
FD41 = flange connection DIN EN 1092-1, design B1
FD42 = flange connection DIN EN 1092-1, design B2

9 **process connection size:**
B = 4“

10 **filter housing specification:** (material) see sheet-no. 55050
- = standard, per according to specification pressure vessel DGRL (1.4571) / ASME type 316L

11 **internal valve:**
- = without, S1 = with by-pass valve Δp 3,5 bar

12 **clogging indicator or clogging sensor:**
- = without, OP = visual, see sheet-no. 1628
AOR = visual, see sheet-no. 1606, OE = visual-electrical, see sheet-no. 1628
AOC = visual, see sheet-no. 1606, VS1 = electronical, see sheet-no. 1607
AE = visual-electrical, see sheet-no. 1609, VS2 = electronical, see sheet-no. 1608

13 **shut-off valve:**
- = without, AV = shut-off valve, see sheet-no. 1655

14 **specification pressure vessel:**
- = standard (PED 97/23/EC)
IS20 = ASME VIII Div.1 with ASME equivalent material, see sheet-no. 55217
IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415
IS23 = ASME VIII Div.1 without U-stamp, see sheet-no. 55218

15 **switch lever:**
F = toward IN/OUT, B = opposite IN/OUT

16 **air bleeding/drain:**
F = toward IN/OUT, B = opposite IN/OUT

1.2. Filter element: (ordering example)

01NR. 1000. 10VG. 10. B. P. VA

1	2	3	4	5	6	7

1 **series:**
01NR = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 1000

3 - 7 see type index complete filter

weight: approx. 415 kg

Changes of measures and design are subject to alteration!

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fax +49 - (0)6205 - 2094-40 url www.internormen.com

2. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for connection acc. to EN1092-1, see sheet-no. 1657
- adapter for ANSI-connection B16.5 CLASS 300 PSI, see sheet-no. 1658
- measure- and bleeder-connections, see sheet-no. 1650
- drain- and bleeder connection, see sheet-no. 1659

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01NR.1000 ...		
2	1	change over UKK	DN 100		
3	4	O-ring	90 x 4	306941 (NBR)	307031 (FPM)
4	2	O-ring	62 x 4	308045 (NBR)	311472 (FPM)
5	2	circlip	DIN472-75x2,5-1.4310	318481	
6	4	O-ring	200 x 4	334555 (NBR)	334554 (FPM)
7	2	O-ring	185 x 6	335381 (NBR)	335306 (FPM)
8	12	screw plug	NPT ½	307766	
9	2	screw plug	G ¼	306968	
10	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
11	1	clogging indicator, visual-electrical	OP	see sheet-no. 1628	
12	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628	
13	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
14	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
15	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
16	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
17	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
18	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
19	2	screw plug	G ¼	306968	
20	1	pressure balance valve	DN 10	310316	

item 19 execution only with clogging indicator or clogging sensor

4. Description:

Stainless steel-pressure filters, change-over series EDA 1005 are suitable for operating pressure up to 40 bar.
Pressure peaks can be absorbed with a sufficient margin o safety.
Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.
These filters can be installed as suction filters.
For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fibre element remove the cover and take out the element.
Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

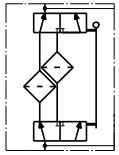
5. Technical data:

temperature ranges	
- calculation temperature (pressure vessel):	- 10°C to +100°C
- medium temperature:	- 10°C to +80°C
- ambient temperature:	- 40°C to +60°C
- survival temperature:	- 40°C to +100°C (short-time)
operating medium:	mineral oil, other media on request
max. operating pressure housing:	40 bar
test pressure acc. to PED 97/23/EC:	1,43 x operating pressure = 57 bar
test pressure acc. to ASME VIII Div. 1:	1,3 x operating pressure = 52 bar
test pressure acc. to API 614, Chapter 1:	1,5 x operating pressure = 60 bar
connection system:	SAE-flange connection 3000 PSI
housing material:	stainless steel, see sheet-no. 55050
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
bleeder connection :	NPT ½“ and SAE ¾“ 3000 PSI
drain connection dirt side :	NPT ½“ and SAE ¾“ 3000 PSI
drain connection clean side :	NPT ½“
volume tank :	2x 19 l
operating pressure adapter flanges:	according to B16.5 CLASS 300 PSI / DIN EN 1092-1

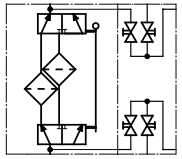
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

6. Symbols:

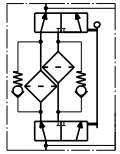
without indicator



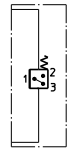
with shut-off valve



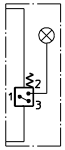
with by-pass valve



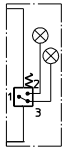
with electrical indicator
AE 30 and AE 40



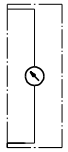
with visual-electrical indicator
AE 50 and AE 62



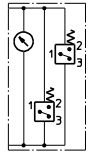
with visual-electrical indicator
AE 70 and AE 80



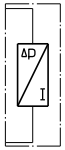
with visual indicator
AOR/AOC/OP



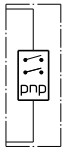
with visual-electrical indicator
OE



with electronical sensor
VS1



with electronical sensor
VS2



7. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’, respectively Δp- curves; depending on filter fineness and viscosity.

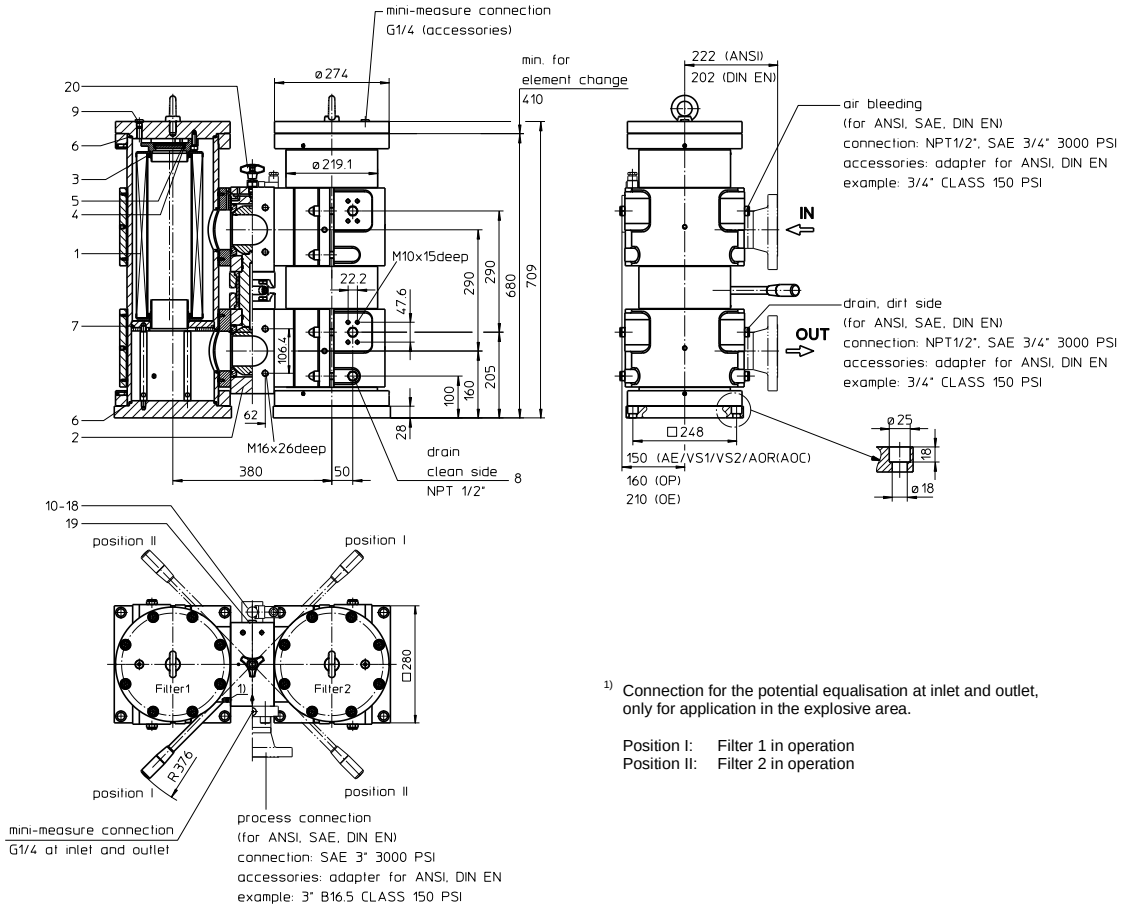
8. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

STAINLESS STEEL-PRESSURE FILTER, change-over
Series EDA 1014 NPS 3“ CLASS 150 PSI

Sheet No. **2175 B**



1) Connection for the potential equalisation at inlet and outlet, only for application in the explosive area.

Position I: Filter 1 in operation
Position II: Filter 2 in operation

1. Type index:

1.1. Complete filter: (ordering example)

EDA. 1014. 10VG. 10. B. P. VA. FS. A. -. -. AE. AV. IS21. F. F

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

1 **series:**
EDA = stainless steel-pressure filter change-over, according to ASME-code

2 **nominal size:** 1014

3 **filter-material and filter- fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm, 10 G = 10 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 API = 20 µm, 10 API = 10 µm Interpor fleece (glass fibre) according to API
10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR), V = Viton (FPM)

7 **filter element specification:**
- = standard, VA = stainless steel

8 **process connection:**
FS = SAE-flange connection 3000 PSI
FA11 = ANSI-flange connection CLASS 150 PSI, sealing surface R_z = 160 µm (not finer than 40 µm)
FA12 = ANSI-flange connection CLASS 150 PSI, sealing surface R_z = 16 µm
FD1 = flange connection DIN EN 1092-1, design B1
FD2 = flange connection DIN EN 1092-1, design B2

9 **process connection size:**
A = 3“

10 **filter housing specification:** (material) see sheet-no. 55050
- = standard, per according to specification pressure vessel DGRL (1.4571) / ASME type 316L

11 **internal valve:**
- = without, S1 = with by-pass valve Δp 3,5 bar

12 **clogging indicator or clogging sensor:**
- = without, OP = visual, see sheet-no. 1628
AOR = visual, see sheet-no. 1606, OE = visual-electrical, see sheet-no. 1628
AOC = visual, see sheet-no. 1606, VS1 = electronical, see sheet-no. 1607
AE = visual-electrical, see sheet-no. 1609, VS2 = electronical, see sheet-no. 1608

13 **shut-off valve:**
- = without, AV = shut-off valve, see sheet-no. 1655

14 **specification pressure vessel:**
- = standard (PED 97/23/EC)
IS20 = ASME VIII Div.1 with ASME equivalent material, see sheet-no. 55217
IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415
IS23 = ASME VIII Div.1 without U-stamp, see sheet-no. 55218

15 **switch lever:**
F = toward IN/OUT, B = opposite IN/OUT

16 **air bleeding/drain:**
F = toward IN/OUT, B = opposite IN/OUT

1.2. Filter element: (ordering example)

01NR. 1000. 10VG. 10. B. P. VA

1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 1000

3 - 7 see type index complete filter

weight: approx. 370 kg

Changes of measures and design are subject to alteration!

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2. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for connection acc. to EN1092-1, see sheet-no. 1657
- adapter for ANSI-connection B16.5 CLASS 150 PSI, see sheet-no. 1658
- measure- and bleeder-connections, see sheet-no. 1650
- drain- and bleeder connection, see sheet-no. 1659

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01NR.1000 ...		
2	1	change over UKK	DN 80		
3	4	O-ring	90 x 4	306941 (NBR)	307031 (FPM)
4	2	O-ring	62 x 4	308045 (NBR)	311472 (FPM)
5	2	circlip	DIN472-75x2,5-1.4310	318481	
6	4	O-ring	200 x 4	334555 (NBR)	334554 (FPM)
7	2	O-ring	185 x 6	335381 (NBR)	335306 (FPM)
8	12	screw plug	NPT ½	307766	
9	2	screw plug	G ¼	306968	
10	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
11	1	clogging indicator, visual-electrical	OP	see sheet-no. 1628	
12	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628	
13	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
14	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
15	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
16	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
17	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
18	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
19	2	screw plug	G ¼	306968	
20	1	pressure balance valve	DN 10	310316	

item 19 execution only with clogging indicator or clogging sensor

4. Description:

Stainless steel-pressure filters, change-over series EDA 1014 are suitable for operating pressure up to 40 bar.
Pressure peaks can be absorbed with a sufficient margin o safety.
Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.
These filters can be installed as suction filters.
For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fibre element remove the cover and take out the element.
Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

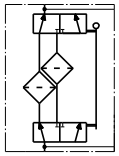
5. Technical data:

temperature ranges	
- calculation temperature (pressure vessel):	- 10°C to +100°C
- medium temperature:	- 10°C to +80°C
- ambient temperature:	- 40°C to +60°C
- survival temperature:	- 40°C to +100°C (short-time)
operating medium:	mineral oil, other media on request
max. operating pressure housing:	40 bar
test pressure acc. to PED 97/23/EC:	1,43 x operating pressure = 57 bar
test pressure acc. to ASME VIII Div. 1:	1,3 x operating pressure = 52 bar
test pressure acc. to API 614, Chapter 1:	1,5 x operating pressure = 60 bar
connection system:	SAE-flange connection 3000 PSI
housing material:	stainless steel, see sheet-no. 55050
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
bleeder connection :	NPT ½“ and SAE ¾“ 3000 PSI
drain connection dirt side :	NPT ½“ and SAE ¾“ 3000 PSI
drain connection clean side :	NPT ½“
volume tank :	2x 19 l
operating pressure adapter flanges:	according to B16.5 CLASS 150 PSI / DIN EN 1092-1

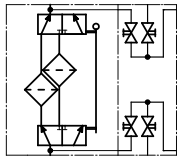
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

6. Symbols:

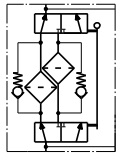
without indicator



with shut-off valve

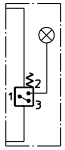


with by-pass valve

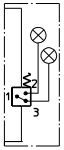


with electrical indicator
AE 30 and AE 40

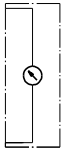
with visual-electrical indicator
AE 50 and AE 62



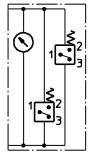
with visual-electrical indicator
AE 70 and AE 80



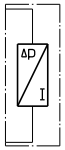
with visual indicator
AOR/AOC/OP



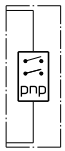
with visual-electrical indicator
OE



with electronical sensor
VS1



with electronical sensor
VS2



7. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’, respectively Δp- curves; depending on filter fineness and viscosity.

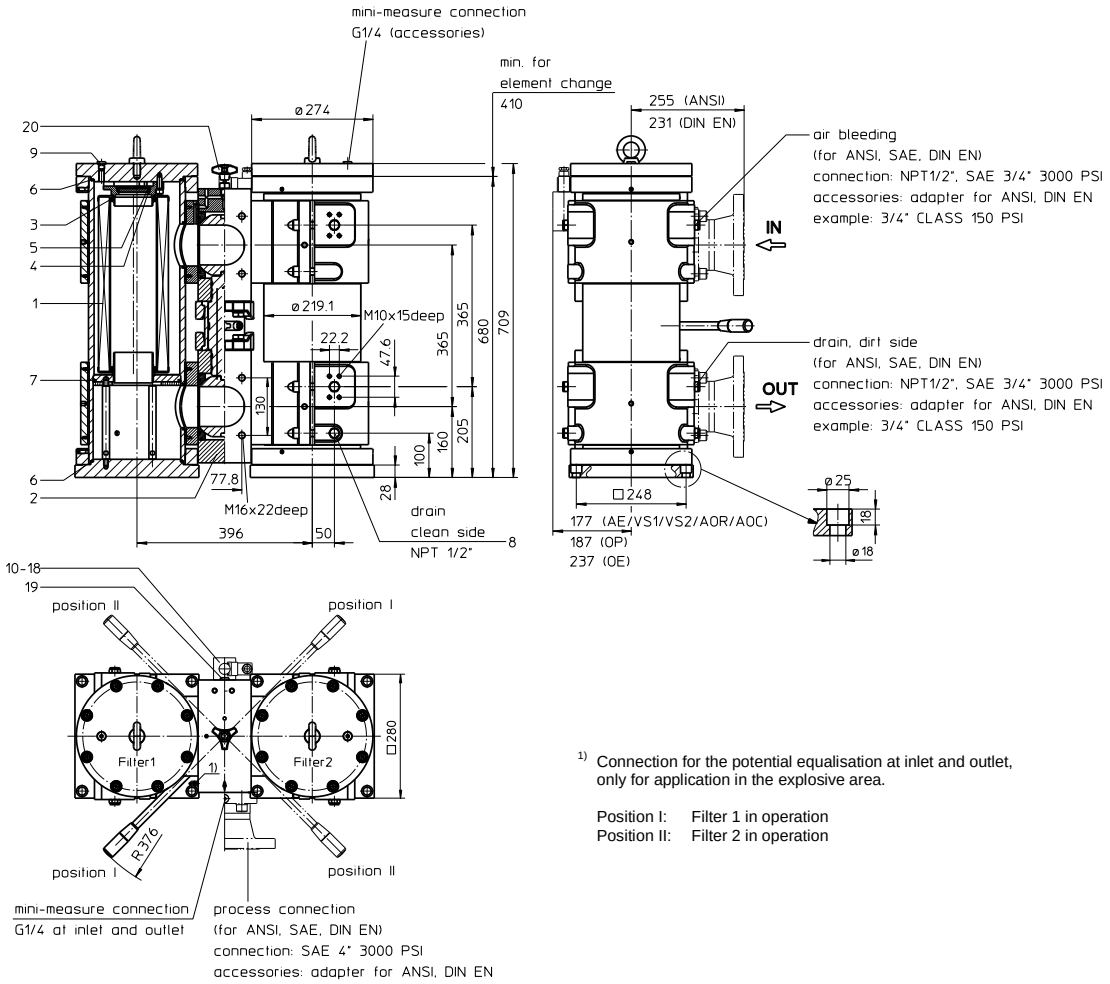
8. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

STAINLESS STEEL-PRESSURE FILTER, change-over
Series EDA 1015 NPS 4“ CLASS 150 PSI

Sheet No. **2171 B**



[1] Connection for the potential equalisation at inlet and outlet, only for application in the explosive area.

Position I: Filter 1 in operation
Position II: Filter 2 in operation

1. Type index:

1.1. Complete filter: (ordering example)

EDA.	1015.	10VG.	10.	B.	P.	VA.	FS.	B.	-.	-.	AE.	AV.	IS21.	F.	F
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

1 **series:**
EDA = stainless steel-pressure filter change-over, according to ASME-code

2 **nominal size:** 1015

3 **filter-material and filter- fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm, 10 G = 10 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 API = 20 µm, 10 API = 10 µm Interpor fleece (glass fibre) according to API
10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR), V = Viton (FPM)

7 **filter element specification:**
- = standard, VA = stainless steel

8 **process connection:**
FS = SAE-flange connection 3000 PSI
FA11 = ANSI-flange connection CLASS 150 PSI, sealing surface R_z = 160 µm (not finer than 40 µm)
FA12 = ANSI-flange connection CLASS 150 PSI, sealing surface R_z = 16 µm
FD1 = flange connection DIN EN 1092-1, design B1
FD2 = flange connection DIN EN 1092-1, design B2

9 **process connection size:**
B = 4“

10 **filter housing specification:** (material) see sheet-no. 55050
- = standard, per according to specification pressure vessel DGRL (1.4571) / ASME type 316L

11 **internal valve:**
- = without, S1 = with by-pass valve Δp 3,5 bar

12 **clogging indicator or clogging sensor:**
- = without, OP = visual, see sheet-no. 1628
AOR = visual, see sheet-no. 1606, OE = visual-electrical, see sheet-no. 1628
AOC = visual, see sheet-no. 1606, VS1 = electronical, see sheet-no. 1607
AE = visual-electrical, see sheet-no. 1609, VS2 = electronical, see sheet-no. 1608

13 **shut-off valve:**
- = without, AV = shut-off valve, see sheet-no. 1655

14 **specification pressure vessel:**
- = standard (PED 97/23/EC)
IS20 = ASME VIII Div.1 with ASME equivalent material, see sheet-no. 55217
IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415
IS23 = ASME VIII Div.1 without U-stamp, see sheet-no. 55218

15 **switch lever:**
F = toward IN/OUT, B = opposite IN/OUT

16 **air bleeding/drain:**
F = toward IN/OUT, B = opposite IN/OUT

1.2. Filter element: (ordering example)

01NR.	1000.	10VG.	10.	B.	P.	VA
1	2	3	4	5	6	7

1 **series:**
01NR = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 1000

3 - 7 see type index complete filter

weight: approx. 415 kg

Changes of measures and design are subject to alteration!

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2. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for connection acc. to EN1092-1, see sheet-no. 1657
- adapter for ANSI-connection B16.5 CLASS 150 PSI, see sheet-no. 1658
- measure- and bleeder-connections, see sheet-no. 1650
- drain- and bleeder connection, see sheet-no. 1659

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	filter element	01NR.1000 ...		
2	1	change over UKK	DN 100		
3	4	O-ring	90 x 4	306941 (NBR)	307031 (FPM)
4	2	O-ring	62 x 4	308045 (NBR)	311472 (FPM)
5	2	circlip	DIN472-75x2,5-1.4310	318481	
6	4	O-ring	200 x 4	334555 (NBR)	334554 (FPM)
7	2	O-ring	185 x 6	335381 (NBR)	335306 (FPM)
8	12	screw plug	NPT ½	307766	
9	2	screw plug	G ¼	306968	
10	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
11	1	clogging indicator, visual-electrical	OP	see sheet-no. 1628	
12	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628	
13	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
14	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
15	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
16	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
17	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
18	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
19	2	screw plug	G ¼	306968	
20	1	pressure balance valve	DN 10	310316	

item 19 execution only with clogging indicator or clogging sensor

4. Description:

Stainless steel-pressure filters, change-over series EDA 1015 are suitable for operating pressure up to 40 bar.
Pressure peaks can be absorbed with a sufficient margin o safety.
Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.
These filters can be installed as suction filters.
For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fibre element remove the cover and take out the element.
Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

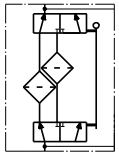
5. Technical data:

temperature ranges	
- calculation temperature (pressure vessel):	- 10°C to +100°C
- medium temperature:	- 10°C to +80°C
- ambient temperature:	- 40°C to +60°C
- survival temperature:	- 40°C to +100°C (short-time)
operating medium:	mineral oil, other media on request
max. operating pressure housing:	40 bar
test pressure acc. to PED 97/23/EC:	1,43 x operating pressure = 57 bar
test pressure acc. to ASME VIII Div. 1:	1,3 x operating pressure = 52 bar
test pressure acc. to API 614, Chapter 1:	1,5 x operating pressure = 60 bar
connection system:	SAE-flange connection 3000 PSI
housing material:	stainless steel, see sheet-no. 55050
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
bleeder connection :	NPT ½“ and SAE ¾“ 3000 PSI
drain connection dirt side :	NPT ½“ and SAE ¾“ 3000 PSI
drain connection clean side :	NPT ½“
volume tank :	2x 19 l
operating pressure adapter flanges:	according to B16.5 CLASS 150 PSI / DIN EN 1092-1

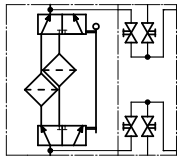
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

6. Symbols:

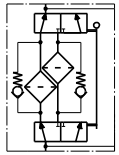
without indicator



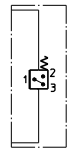
with shut-off valve



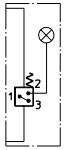
with by-pass valve



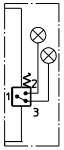
with electrical indicator AE 30 and AE 40



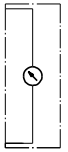
with visual-electrical indicator AE 50 and AE 62



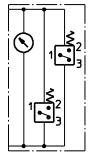
with visual-electrical indicator AE 70 and AE 80



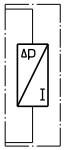
with visual indicator AOR/AOC/OP



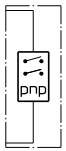
with visual-electrical indicator OE



with electronical sensor VS1



with electronical sensor VS2



7. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’, respectively Δp- curves; depending on filter fineness and viscosity.

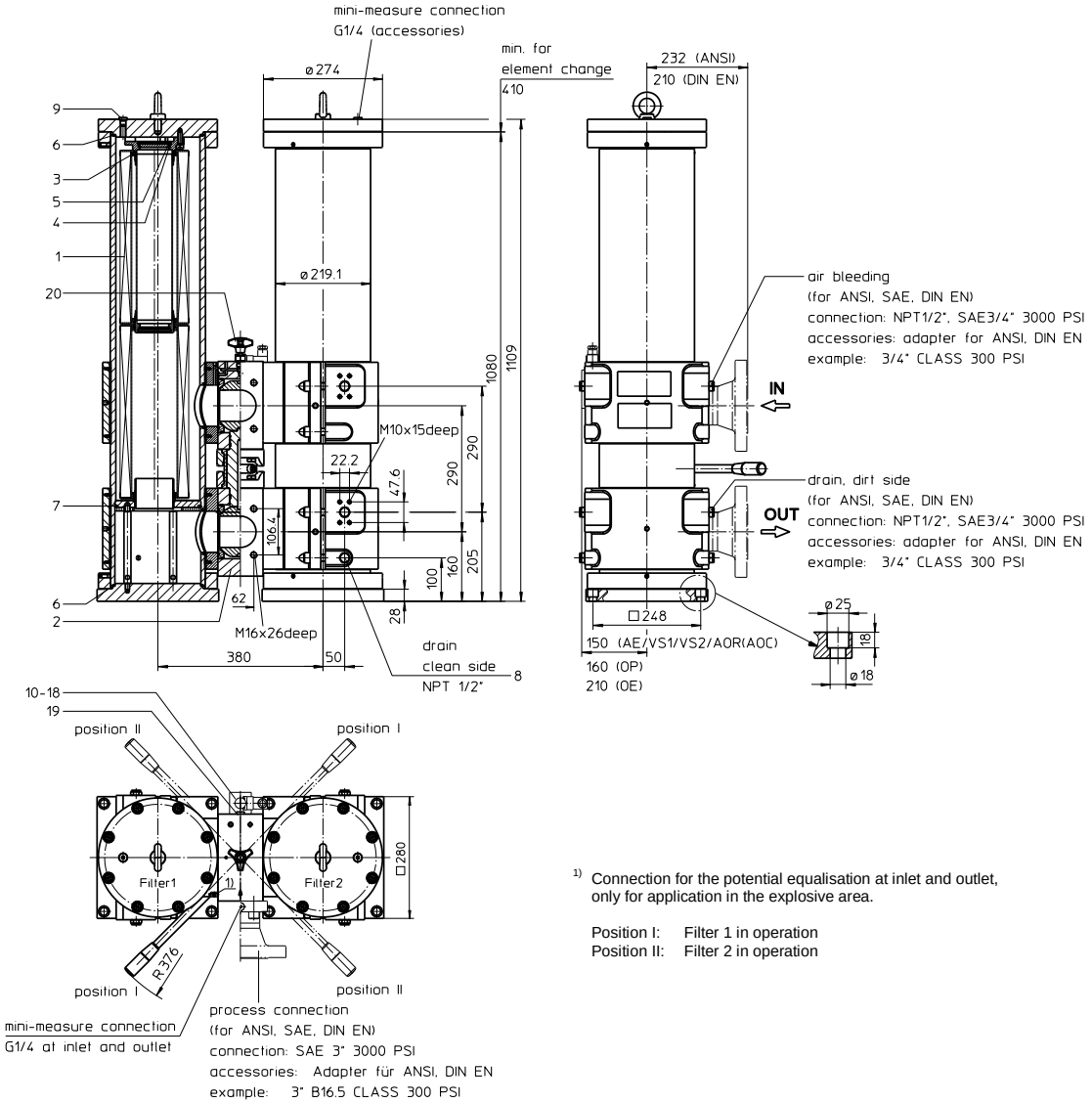
8. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

STAINLESS STEEL-PRESSURE FILTER, change-over
Series EDA 2204 NPS 3“ CLASS 300 PSI

Sheet No. **2179 A**



1) Connection for the potential equalisation at inlet and outlet, only for application in the explosive area.

Position I: Filter 1 in operation
Position II: Filter 2 in operation

1. Type index:

1.1. Complete filter: (ordering example)

EDA. 2204. 10VG. 10. B. P. VA. FS. A. -. -. AE. AV. IS21. F. F

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

1 **series:**
EDA = stainless steel-pressure filter change-over, according to ASME-code

2 **nominal size:** 2204

3 **filter-material and filter- fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm, 10 G = 10 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 API = 20 µm, 10 API = 10 µm Interpor fleece (glass fibre) according to API
10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR), V = Viton (FPM)

7 **filter element specification:**
- = standard, VA = stainless steel

8 **process connection:**
FS = SAE-flange connection 3000 PSI
FA1 = ANSI-flange connection CLASS 300 PSI, sealing surface R_z = 160 µm (not finer than 40 µm)
FA2 = ANSI-flange connection CLASS 300 PSI, sealing surface R_z = 16 µm
FD41 = flange connection DIN EN 1092-1, design B1
FD42 = flange connection DIN EN 1092-1, design B2

9 **process connection size:**
A = 3“

10 **filter housing specification:** (material) see sheet-no. 55050
- = standard, per according to specification pressure vessel DGRL (1.4571) / ASME type 316L

11 **internal valve:**
- = without, S1 = with by-pass valve Δp 3,5 bar

12 **clogging indicator or clogging sensor:**
- = without, OP = visual, see sheet-no. 1628
AOR = visual, see sheet-no. 1606, OE = visual-electrical, see sheet-no. 1628
AOC = visual, see sheet-no. 1606, VS1 = electronical, see sheet-no. 1607
AE = visual-electrical, see sheet-no. 1609, VS2 = electronical, see sheet-no. 1608

13 **shut-off valve:**
- = without, AV = shut-off valve, see sheet-no. 1655

14 **specification pressure vessel:**
- = standard (PED 97/23/EC)
IS20 = ASME VIII Div.1 with ASME equivalent material, see sheet-no. 55217
IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415
IS23 = ASME VIII Div.1 without U-stamp, see sheet-no. 55218

15 **switch lever:**
F = toward IN/OUT, B = opposite IN/OUT

16 **air bleeding/drain:**
F = toward IN/OUT, B = opposite IN/OUT

1.2. Filter element: (ordering example)

01NR. 1000. 10VG. 10. B. P. VA

1	2	3	4	5	6	7

1 **series:**
01NR = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 1000

3 - 7 see type index complete filter

weight: approx. 490 kg

Changes of measures and design are subject to alteration!

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2. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for connection acc. to EN1092-1, see sheet-no. 1657
- adapter for ANSI-connection B16.5 CLASS 300 PSI, see sheet-no. 1658
- measure- and bleeder-connections, see sheet-no. 1650
- drain- and bleeder connection, see sheet-no. 1659

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	4	filter element	01NR.1000 ...		
2	1	change over UKK	DN 80		
3	8	O-ring	90 x 4	306941 (NBR)	307031 (FPM)
4	2	O-ring	62 x 4	308045 (NBR)	311472 (FPM)
5	2	circlip	DIN472-75x2,5-1.4310	318481	
6	4	O-ring	200 x 4	334555 (NBR)	334554 (FPM)
7	2	O-ring	185 x 6	335381 (NBR)	335306 (FPM)
8	12	screw plug	NPT ½	307766	
9	2	screw plug	G ¼	306968	
10	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
11	1	clogging indicator, visual-electrical	OP	see sheet-no. 1628	
12	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628	
13	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
14	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
15	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
16	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
17	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
18	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
19	2	screw plug	G ¼	306968	
20	1	pressure balance valve	DN 10	310316	

item 19 execution only with clogging indicator or clogging sensor

4. Description:

Stainless steel-pressure filters, change-over series EDA 2204 are suitable for operating pressure up to 40 bar.
Pressure peaks can be absorbed with a sufficient margin o safety.
Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.
These filters can be installed as suction filters.
For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fibre element remove the cover and take out the element.
Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

5. Technical data:

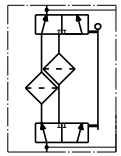
temperature ranges	
- calculation temperature (pressure vessel):	- 10°C to +100°C
- medium temperature:	- 10°C to +80°C
- ambient temperature:	- 40°C to +60°C
- survival temperature:	- 40°C to +100°C (short-time)
operating medium:	mineral oil, other media on request
max. operating pressure housing:	40 bar
test pressure acc. to PED 97/23/EC:	1,43 x operating pressure = 57 bar
test pressure acc. to ASME VIII Div. 1:	1,3 x operating pressure = 52 bar
test pressure acc. to API 614, Chapter 1:	1,5 x operating pressure = 60 bar
connection system:	SAE-flange connection 3000 PSI
housing material:	stainless steel, see sheet-no. 55050
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
bleeder connection :	NPT ½“ and SAE ¾“ 3000 PSI
drain connection dirt side :	NPT ½“ and SAE ¾“ 3000 PSI
drain connection clean side :	NPT ½“
volume tank :	2x 30 l
operating pressure adapter flanges:	according to B16.5 CLASS 300 PSI / DIN EN 1092-1

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

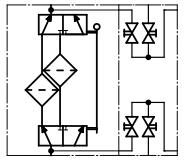
E 2179 A

6. Symbols:

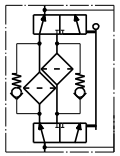
without indicator



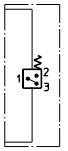
with shut-off valve



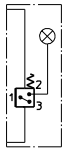
with by-pass valve



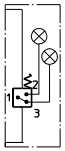
with electrical indicator
AE 30 and AE 40



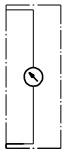
with visual-electrical indicator
AE 50 and AE 62



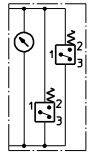
with visual-electrical indicator
AE 70 and AE 80



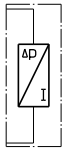
with visual indicator
AOR/AOC/OP



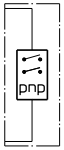
with visual-electrical indicator
OE



with electronical sensor
VS1



with electronical sensor
VS2



7. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’, respectively Δp- curves; depending on filter fineness and viscosity.

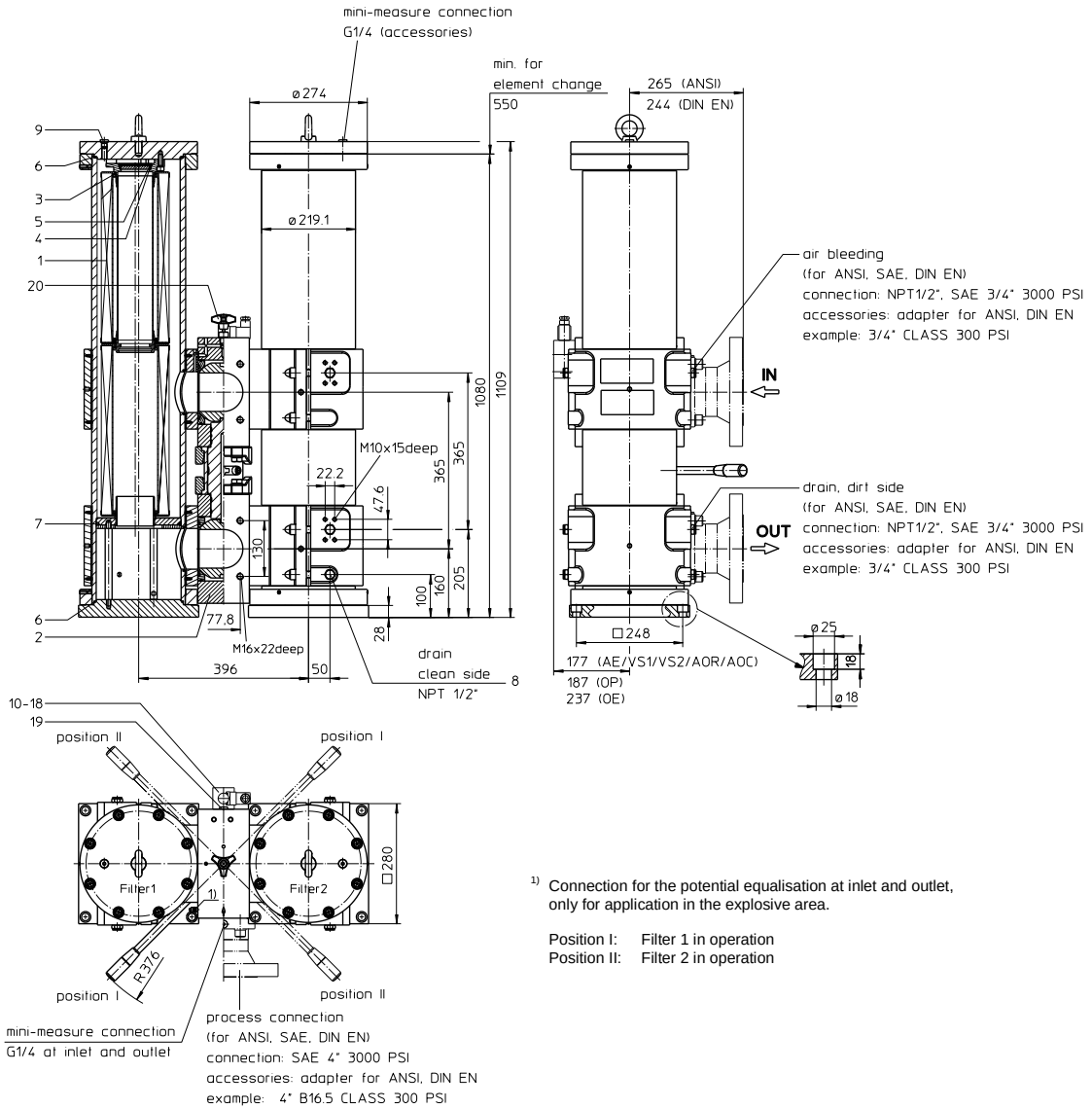
8. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

STAINLESS STEEL-PRESSURE FILTER, change-over
Series EDA 2205 NPS 4“ CLASS 300 PSI

Sheet No. **2178 A**



1) Connection for the potential equalisation at inlet and outlet, only for application in the explosive area.

Position I: Filter 1 in operation
Position II: Filter 2 in operation

1. Type index:

1.1. Complete filter: (ordering example)

EDA.	2205.	10VG.	10.	B.	P.	VA.	FS.	B.	-.	-.	AE.	AV.	IS21.	F.	F
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

1 **series:**
EDA = stainless steel-pressure filter change-over, according to ASME-code

2 **nominal size:** 2205

3 **filter-material and filter- fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm, 10 G = 10 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 API = 20 µm, 10 API = 10 µm Interpor fleece (glass fibre) according to API
10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR), V = Viton (FPM)

7 **filter element specification:**
- = standard, VA = stainless steel

8 **process connection:**
FS = SAE-flange connection 3000 PSI
FA1 = ANSI-flange connection CLASS 300 PSI, sealing surface R_z = 160 µm (not finer than 40 µm)
FA2 = ANSI-flange connection CLASS 300 PSI, sealing surface R_z = 16 µm
FD41 = flange connection DIN EN 1092-1, design B1
FD42 = flange connection DIN EN 1092-1, design B2

9 **process connection size:**
B = 4“

10 **filter housing specification:** (material) see sheet-no. 55050
- = standard, per according to specification pressure vessel DGRL (1.4571) / ASME type 316L

11 **internal valve:**
- = without, S1 = with by-pass valve Δp 3,5 bar

12 **clogging indicator or clogging sensor:**
- = without, OP = visual, see sheet-no. 1628
AOR = visual, see sheet-no. 1606, OE = visual-electrical, see sheet-no. 1628
AOC = visual, see sheet-no. 1606, VS1 = electronical, see sheet-no. 1607
AE = visual-electrical, see sheet-no. 1609, VS2 = electronical, see sheet-no. 1608

13 **shut-off valve:**
- = without, AV = shut-off valve, see sheet-no. 1655

14 **specification pressure vessel:**
- = standard (PED 97/23/EC)
IS20 = ASME VIII Div.1 with ASME equivalent material, see sheet-no. 55217
IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415
IS23 = ASME VIII Div.1 without U-stamp, see sheet-no. 55218

15 **switch lever:**
F = toward IN/OUT, B = opposite IN/OUT

16 **air bleeding/drain:**
F = toward IN/OUT, B = opposite IN/OUT

1.2. Filter element: (ordering example)

01NR.	1000.	10VG.	10.	B.	P.	VA
1	2	3	4	5	6	7

1 **series:**
01NR = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 1000

3 - 7 see type index complete filter

weight: approx. 500 kg

Changes of measures and design are subject to alteration!

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2. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for connection acc. to EN1092-1, see sheet-no. 1657
- adapter for ANSI-connection B16.5 CLASS 300 PSI, see sheet-no. 1658
- measure- and bleeder-connections, see sheet-no. 1650
- drain- and bleeder connection, see sheet-no. 1659

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	4	filter element	01NR.1000 ...		
2	1	change over UKK	DN 100		
3	8	O-ring	90 x 4	306941 (NBR)	307031 (FPM)
4	2	O-ring	62 x 4	308045 (NBR)	311472 (FPM)
5	2	circlip	DIN472-75x2,5-1.4310	318481	
6	4	O-ring	200 x 4	334555 (NBR)	334554 (FPM)
7	2	O-ring	185 x 6	335381 (NBR)	335306 (FPM)
8	12	screw plug	NPT ½	307766	
9	2	screw plug	G ¼	306968	
10	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
11	1	clogging indicator, visual-electrical	OP	see sheet-no. 1628	
12	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628	
13	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
14	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
15	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
16	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
17	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
18	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
19	2	screw plug	G ¼	306968	
20	1	pressure balance valve	DN 10	310316	

item 19 execution only with clogging indicator or clogging sensor

4. Description:

Stainless steel-pressure filters, change-over series EDA 2205 are suitable for operating pressure up to 40 bar.
Pressure peaks can be absorbed with a sufficient margin o safety.
Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.
These filters can be installed as suction filters.
For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fibre element remove the cover and take out the element.
Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

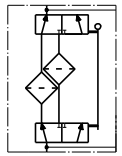
5. Technical data:

temperature ranges	
- calculation temperature (pressure vessel):	- 10°C to +100°C
- medium temperature:	- 10°C to +80°C
- ambient temperature:	- 40°C to +60°C
- survival temperature:	- 40°C to +100°C (short-time)
operating medium:	mineral oil, other media on request
max. operating pressure housing:	40 bar
test pressure acc. to PED 97/23/EC:	1,43 x operating pressure = 57 bar
test pressure acc. to ASME VIII Div. 1:	1,3 x operating pressure = 52 bar
test pressure acc. to API 614, Chapter 1:	1,5 x operating pressure = 60 bar
connection system:	SAE-flange connection 3000 PSI
housing material:	stainless steel, see sheet-no. 55050
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
bleeder connection :	NPT ½“ and SAE ¾“ 3000 PSI
drain connection dirt side :	NPT ½“ and SAE ¾“ 3000 PSI
drain connection clean side :	NPT ½“
volume tank :	2x 30 l
operating pressure adapter flanges:	according to B16.5 CLASS 300 PSI / DIN EN 1092-1

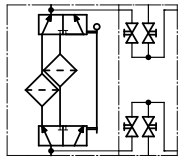
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

6. Symbols:

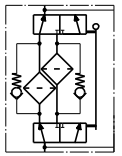
without indicator



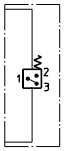
with shut-off valve



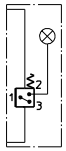
with by-pass valve



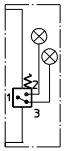
with electrical indicator
AE 30 and AE 40



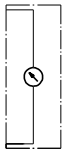
with visual-electrical indicator
AE 50 and AE 62



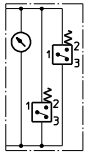
with visual-electrical indicator
AE 70 and AE 80



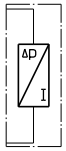
with visual indicator
AOR/AOC/OP



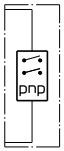
with visual-electrical indicator
OE



with electronical sensor
VS1



with electronical sensor
VS2



7. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’, respectively Δp- curves; depending on filter fineness and viscosity.

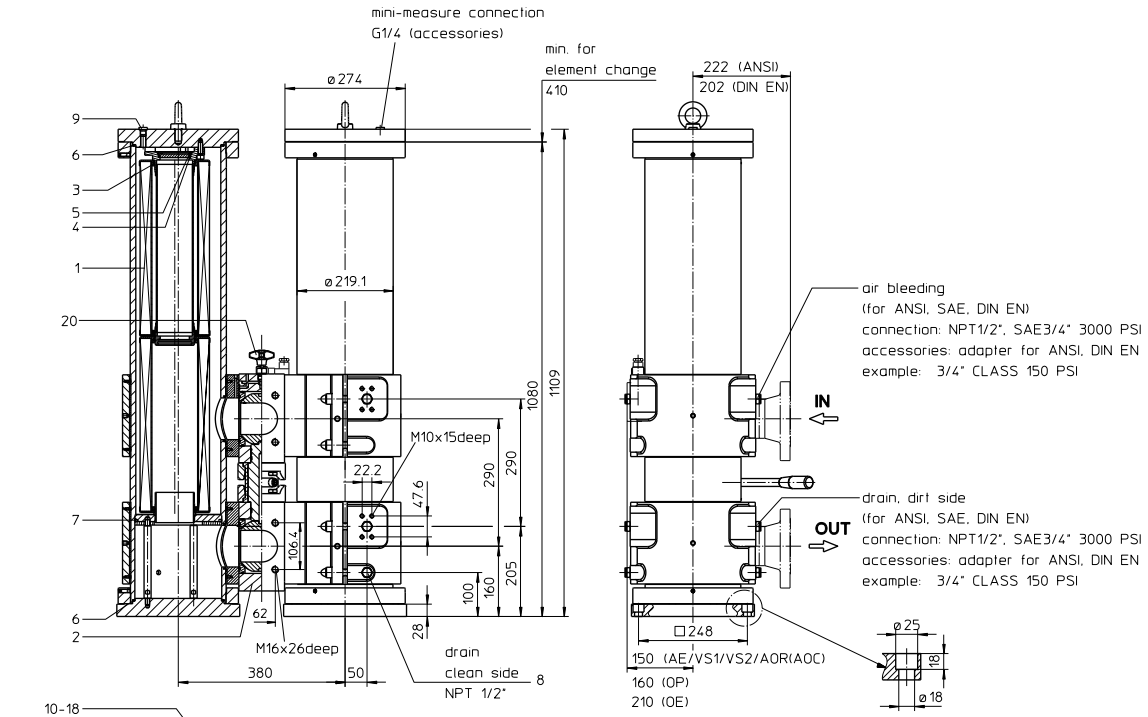
8. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

STAINLESS STEEL-PRESSURE FILTER, change-over
Series EDA 2214 NPS 3“ CLASS 150 PSI

Sheet No. **2167 A**



1) Connection for the potential equalisation at inlet and outlet, only for application in the explosive area.

Position I: Filter 1 in operation
Position II: Filter 2 in operation

1. Type index:

1.1. Complete filter: (ordering example)

EDA.	2214.	10VG.	10.	B.	P.	VA.	FS.	A.	-.	-.	AE.	AV.	IS21.	F.	F
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

1 **series:**
EDA = stainless steel-pressure filter change-over, according to ASME-code

2 **nominal size:** 2214

3 **filter-material and filter- fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm, 10 G = 10 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 API = 20 µm, 10 API = 10 µm Interpor fleece (glass fibre) according to API
10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR), V = Viton (FPM)

7 **filter element specification:**
- = standard, VA = stainless steel

8 **process connection:**
FS = SAE-flange connection 3000 PSI
FA11 = ANSI-flange connection CLASS 150 PSI, sealing surface R_z = 160 µm (not finer than 40 µm)
FA12 = ANSI-flange connection CLASS 150 PSI, sealing surface R_z = 16 µm
FD1 = flange connection DIN EN 1092-1, design B1
FD2 = flange connection DIN EN 1092-1, design B2

9 **process connection size:**
A = 3“

10 **filter housing specification:** (material) see sheet-no. 55050
- = standard, per according to specification pressure vessel DGRL (1.4571) / ASME type 316L

11 **internal valve:**
- = without, S1 = with by-pass valve Δp 3,5 bar

12 **clogging indicator or clogging sensor:**
- = without, OP = visual, see sheet-no. 1628
AOR = visual, see sheet-no. 1606, OE = visual-electrical, see sheet-no. 1628
AOC = visual, see sheet-no. 1606, VS1 = electronical, see sheet-no. 1607
AE = visual-electrical, see sheet-no. 1609, VS2 = electronical, see sheet-no. 1608

13 **shut-off valve:**
- = without, AV = shut-off valve, see sheet-no. 1655

14 **specification pressure vessel:**
- = standard (PED 97/23/EC)
IS20 = ASME VIII Div.1 with ASME equivalent material, see sheet-no. 55217
IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415
IS23 = ASME VIII Div.1 without U-stamp, see sheet-no. 55218

15 **switch lever:**
F = toward IN/OUT, B = opposite IN/OUT

16 **air bleeding/drain:**
F = toward IN/OUT, B = opposite IN/OUT

1.2. Filter element: (ordering example)

01NR.	1000.	10VG.	10.	B.	P.	VA
1	2	3	4	5	6	7

1 **series:**
01NR = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 1000

3 - 7 see type index complete filter

weight: approx. 490 kg

Changes of measures and design are subject to alteration!

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2. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for connection acc. to EN1092-1, see sheet-no. 1657
- adapter for ANSI-connection B16.5 CLASS 150 PSI, see sheet-no. 1658
- measure- and bleeder-connections, see sheet-no. 1650
- drain- and bleeder connection, see sheet-no. 1659

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	4	filter element	01NR.1000 ...		
2	1	change over UKK	DN 80		
3	8	O-ring	90 x 4	306941 (NBR)	307031 (FPM)
4	2	O-ring	62 x 4	308045 (NBR)	311472 (FPM)
5	2	circlip	DIN472-75x2,5-1.4310	318481	
6	4	O-ring	200 x 4	334555 (NBR)	334554 (FPM)
7	2	O-ring	185 x 6	335381 (NBR)	335306 (FPM)
8	12	screw plug	NPT ½	307766	
9	2	screw plug	G ¼	306968	
10	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
11	1	clogging indicator, visual-electrical	OP	see sheet-no. 1628	
12	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628	
13	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
14	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
15	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
16	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
17	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
18	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
19	2	screw plug	G ¼	306968	
20	1	pressure balance valve	DN 10	310316	

item 19 execution only with clogging indicator or clogging sensor

4. Description:

Stainless steel-pressure filters, change-over series EDA 2214 are suitable for operating pressure up to 40 bar.
Pressure peaks can be absorbed with a sufficient margin o safety.
Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.
These filters can be installed as suction filters.
For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fibre element remove the cover and take out the element.
Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

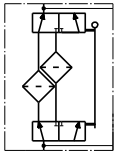
5. Technical data:

temperature ranges	
- calculation temperature (pressure vessel):	- 10°C to +100°C
- medium temperature:	- 10°C to +80°C
- ambient temperature:	- 40°C to +60°C
- survival temperature:	- 40°C to +100°C (short-time)
operating medium:	mineral oil, other media on request
max. operating pressure housing:	40 bar
test pressure acc. to PED 97/23/EC:	1,43 x operating pressure = 57 bar
test pressure acc. to ASME VIII Div. 1:	1,3 x operating pressure = 52 bar
test pressure acc. to API 614, Chapter 1:	1,5 x operating pressure = 60 bar
connection system:	SAE-flange connection 3000 PSI
housing material:	stainless steel, see sheet-no. 55050
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
bleeder connection :	NPT ½“ and SAE ¾“ 3000 PSI
drain connection dirt side :	NPT ½“ and SAE ¾“ 3000 PSI
drain connection clean side :	NPT ½“
volume tank :	2x 30 l
operating pressure adapter flanges:	according to B16.5 CLASS 150 PSI / DIN EN 1092-1

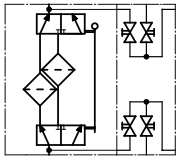
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

6. Symbols:

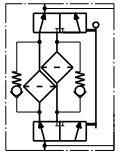
without indicator



with shut-off valve

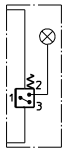


with by-pass valve

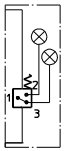


with electrical indicator
AE 30 and AE 40

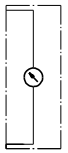
with visual-electrical indicator
AE 50 and AE 62



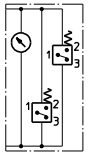
with visual-electrical indicator
AE 70 and AE 80



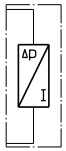
with visual indicator
AOR/AOC/OP



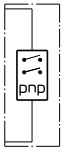
with visual-electrical indicator
OE



with electronical sensor
VS1



with electronical sensor
VS2



7. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’, respectively
∆p- curves; depending on filter fineness and viscosity.

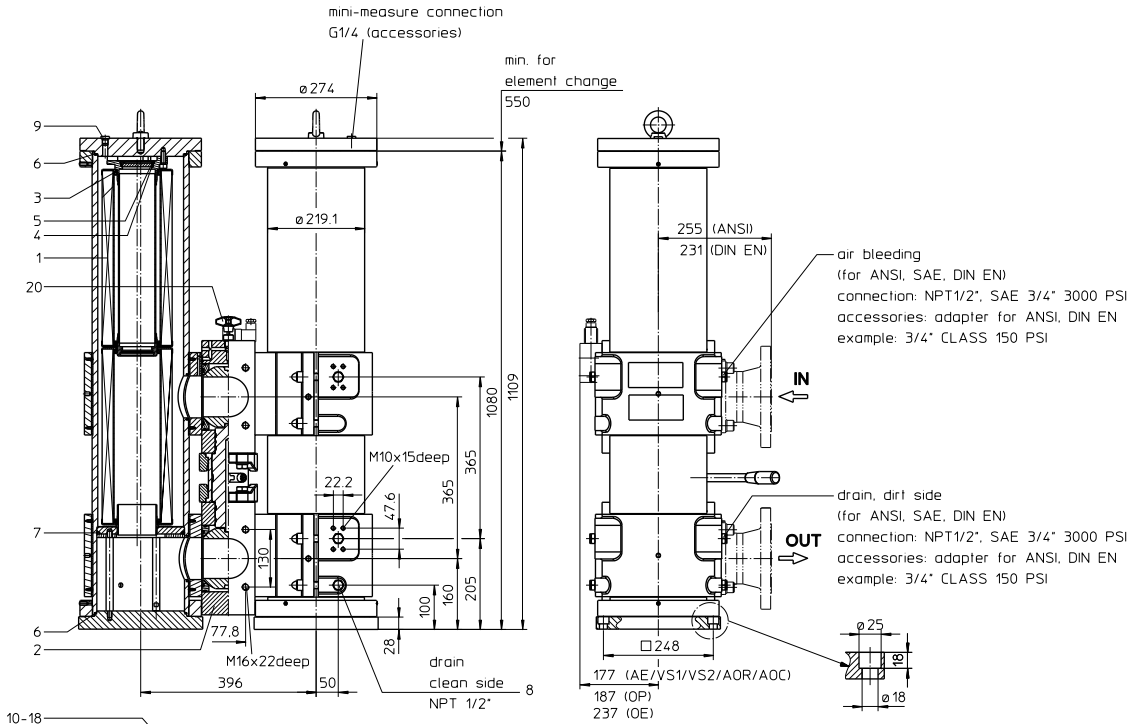
8. Test methods:

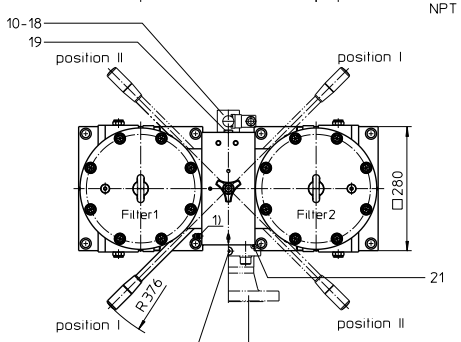
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

STAINLESS STEEL-PRESSURE FILTER, change-over
Series EDA 2215 NPS 4“ CLASS 150 PSI

Sheet No. **2172 C**





1) Connection for the potential equalisation at inlet and outlet, only for application in the explosive area.

Position I: Filter 1 in operation
Position II: Filter 2 in operation

1. Type index:

1.1. Complete filter: (ordering example)

EDA. 2215. 10VG. 10. B. P. VA. FS. B. -. -. AE. AV. IS21. F. F

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

1 **series:**
EDA = stainless steel-pressure filter change-over, according to ASME-code

2 **nominal size:** 2215

3 **filter-material and filter- fineness:**
80 G = 80 µm, 40 G = 40 µm, 25 G = 25 µm, 10 G = 10 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 API = 20 µm, 10 API = 10 µm Interpor fleece (glass fibre) according to API
10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR), V = Viton (FPM)

7 **filter element specification:**
- = standard, VA = stainless steel

8 **process connection:**
FS = SAE-flange connection 3000 PSI
FA11 = ANSI-flange connection CLASS 150 PSI, sealing surface R_z = 160 µm (not finer than 40 µm)
FA12 = ANSI-flange connection CLASS 150 PSI, sealing surface R_z = 16 µm
FD1 = flange connection DIN EN 1092-1, design B1
FD2 = flange connection DIN EN 1092-1, design B2

9 **process connection size:**
B = 4“

10 **filter housing specification:** (material) see sheet-no. 55050
- = standard, per according to specification pressure vessel DGRL (1.4571) / ASME type 316L

11 **internal valve:**
- = without, S1 = with by-pass valve Δp 3,5 bar

12 **clogging indicator or clogging sensor:**
- = without, OP = visual, see sheet-no. 1628
AOR = visual, see sheet-no. 1606, OE = visual-electrical, see sheet-no. 1628
AOC = visual, see sheet-no. 1606, VS1 = electronical, see sheet-no. 1607
AE = visual-electrical, see sheet-no. 1609, VS2 = electronical, see sheet-no. 1608

13 **shut-off valve:**
- = without, AV = shut-off valve, see sheet-no. 1655

14 **specification pressure vessel:**
- = standard (PED 97/23/EC)
IS20 = ASME VIII Div.1 with ASME equivalent material, see sheet-no. 55217
IS21 = ASME VIII Div.1 with U-stamp, see sheet-no. 43415
IS23 = ASME VIII Div.1 without U-stamp, see sheet-no. 55218

15 **switch lever:**
F = toward IN/OUT, B = opposite IN/OUT

16 **air bleeding/drain:**
F = toward IN/OUT, B = opposite IN/OUT

1.2. Filter element: (ordering example)

01NR. 1000. 10VG. 10. B. P. VA

1	2	3	4	5	6	7

1 **series:**
01NR = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 1000

3 - 7 see type index complete filter

weight: approx. 500 kg

Changes of measures and design are subject to alteration!

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2. Accessories:

- SAE-counter flanges, see sheet-no. 1652
- adapter for connection acc. to EN1092-1, see sheet-no. 1657
- adapter for ANSI-connection B16.5 CLASS 150 PSI, see sheet-no. 1658
- measure- and bleeder-connections, see sheet-no. 1650
- drain- and bleeder connection, see sheet-no. 1659

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	4	filter element	01NR.1000 ...		
2	1	change over UKK	DN 100		
3	8	O-ring	90 x 4	306941 (NBR)	307031 (FPM)
4	2	O-ring	62 x 4	308045 (NBR)	311472 (FPM)
5	2	circlip	DIN472-75x2,5-1.4310	318481	
6	4	O-ring	200 x 4	334555 (NBR)	334554 (FPM)
7	2	O-ring	185 x 6	335381 (NBR)	335306 (FPM)
8	12	screw plug	NPT ½	307766	
9	2	screw plug	G ¼	306968	
10	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
11	1	clogging indicator, visual-electrical	OP	see sheet-no. 1628	
12	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628	
13	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
14	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
15	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
16	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
17	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
18	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
19	2	screw plug	G ¼	306968	
20	1	pressure balance valve	DN 10	310316	

item 19 execution only with clogging indicator or clogging sensor

4. Description:

Stainless steel-pressure filters, change-over series EDA 2215 are suitable for operating pressure up to 40 bar.
Pressure peaks can be absorbed with a sufficient margin o safety.
Change-over ball valve which, integrated in the middle of the housing, makes it possible to switch from the dirty filter-side to the clean filter-side without interrupting operation.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to the inside.
These filters can be installed as suction filters.
For cleaning (see special leaflet 21070-4 and 34448-4) the mesh element respectively to change the glass fibre element remove the cover and take out the element.
Filter finer than 40 µm should use throw-away elements made of paper or Interpor fleece (glass fibre). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
The inspection according to TÜV, according to ASME VIII Div.1 and the major „Shipyard Classification Societies“ D.N.V.; B.V.; G.L.; L.R.S.; R.I.N.A.; A.B.S. and others are possible. If inspection is required please indicate in your order.

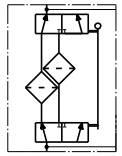
5. Technical data:

temperature ranges	
- calculation temperature (pressure vessel):	- 10°C to +100°C
- medium temperature:	- 10°C to +80°C
- ambient temperature:	- 40°C to +60°C
- survival temperature:	- 40°C to +100°C (short-time)
operating medium:	mineral oil, other media on request
max. operating pressure housing:	40 bar
test pressure acc. to PED 97/23/EC:	1,43 x operating pressure = 57 bar
test pressure acc. to ASME VIII Div. 1:	1,3 x operating pressure = 52 bar
test pressure acc. to API 614, Chapter 1:	1,5 x operating pressure = 60 bar
connection system:	SAE-flange connection 3000 PSI
housing material:	stainless steel, see sheet-no. 55050
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
bleeder connection :	NPT ½“ and SAE ¾“ 3000 PSI
drain connection dirt side :	NPT ½“ and SAE ¾“ 3000 PSI
drain connection clean side :	NPT ½“
volume tank :	2x 30 l
operating pressure adapter flanges:	according to B16.5 CLASS 150 PSI / DIN EN 1092-1

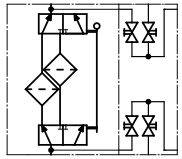
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4)

6. Symbols:

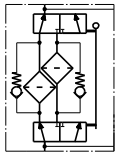
without indicator



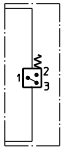
with shut-off valve



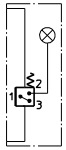
with by-pass valve



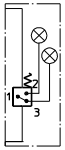
with electrical indicator
AE 30 and AE 40



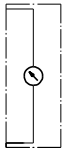
with visual-electrical indicator
AE 50 and AE 62



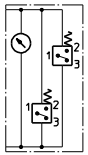
with visual-electrical indicator
AE 70 and AE 80



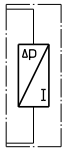
with visual indicator
AOR/AOC/OP



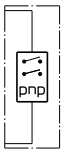
with visual-electrical indicator
OE



with electronical sensor
VS1



with electronical sensor
VS2



7. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’, respectively Δp- curves; depending on filter fineness and viscosity.

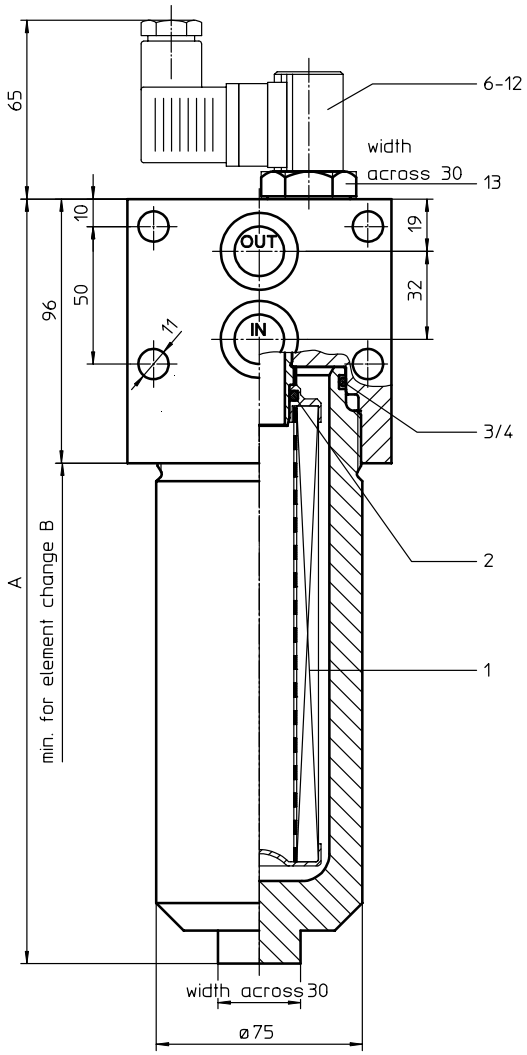
8. Test methods:

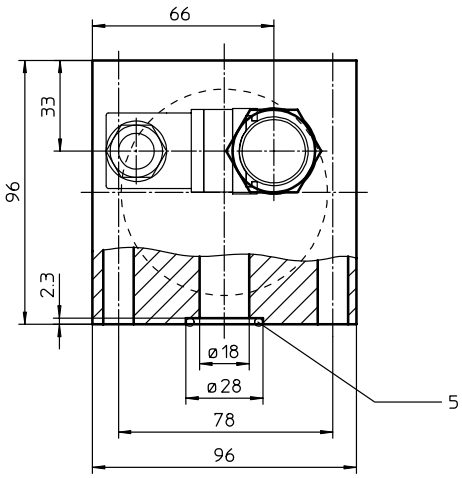
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

STAINLESS STEEL- PRESSURE FILTER
Series EHPF 60-150 DN 18 PN 315

Sheet No.
1440





1. Type index:

1.1. Complete filter: (ordering example)

EHPF. 90. 10VG. HR. E. P. VA. F. 4. VA. -. AE

1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
EHPF = stainless steel-pressure filter, manifold mounted

2 **nominal size:** 60, 90, 150

3 **filter-material and filter-fineness:**
80G = 80 µm, 40G = 40 µm,
25G = 25 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$,
6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)

4 **resistance of pressure difference for filter element:**
30 = Δp 30 bar
HR = Δp 160 bar (rupture strength Δp 250 bar)

5 **filter element design:**
E = single-end open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 see sheet-no. 31601

8 **connection:**
F = manifold mounted

9 **connection size:**
4 = DN 18

10 **filter housing specification:**
VA = stainless steel

11 **internal valve:**
- = without
S1 = with by-pass valve Δp 3,5 bar
S2 = with by-pass valve Δp 7,0 bar
R = reversing valve, Q ≤ 70,06 l/min

12 **clogging indicator or clogging sensor :**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E. 90. 10VG. HR. E. P. VA

1	2	3	4	5	6	7

1 **series:**
01E. = filter element according to INTERNORMEN factory specification

2 **nominal size:** 60, 90, 150

3 - 7 see type index-complete filter

2. Dimensions:

type	connection	A	B	weight kg	volume tank
EHPF 60	DN 18	213	215	10	0,3 l
EHPF 90		278	280	11	0,4 l
EHPF 150		388	390	13	0,6 l

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3. Spare parts:

item	qty.	designation	dimension			article-no.	
			EHPF60	EHPF 90	EHPF 150		
1	1	filer element	01E.60	01E.90	01E.150		
2	1	O-ring	22 x 3,5			304341 (NBR)	304392 (FPM)
3	1	O-ring	56 x 3			305072 (NBR)	305322 (FPM)
4	1	support ring	63 x 2,6 x 1			312309	
5	2	O-ring	22 x 3			304387 (NBR)	304931 (FPM)
6	1	clogging indicator, visual	AOR or AOC			see sheet no. 1606	
7	1	clogging indicator, visual-electrical	AE			see sheet no. 1615	
8	1	clogging sensor, electronical	VS1			see sheet no. 1617	
9	1	clogging sensor, electronical	VS2			see sheet no. 1618	
10	1	O-ring	15 x 1,5			315357 (NBR)	315427 (FPM)
11	1	O-ring	22 x 2			304708 (NBR)	304721 (FPM)
12	1	O-ring	14 x 2			304342 (NBR)	304722 (FPM)
13	1	screw plug	40171-4			314442	

item 13 execution only without clogging indicator or clogging sensor

4. Description:

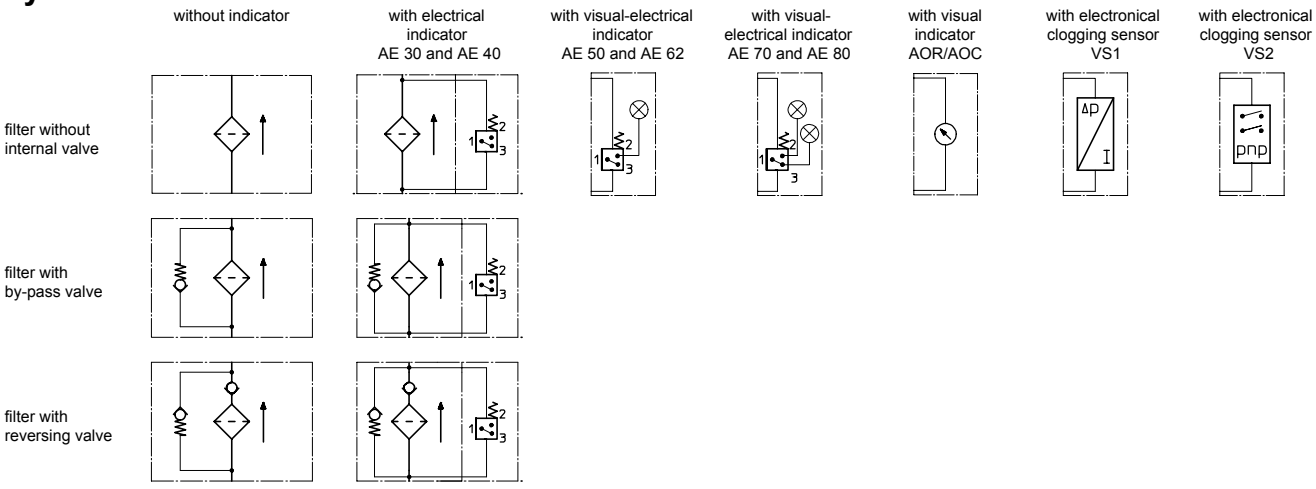
The stainless steel pressure filters of the series EHPF are suitable for a working pressure up to 315 bar.
The pressure peaks are absorbed by a sufficient margin of safety. The EHPF-filters are flanged to the mounting-surface.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to a filter fineness of 4µm$_{(c)}$.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 160 bar and a rupture strength of Δp 250 bar.
The internal valves are integrated into the centering pivot for the filter element.
After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

5. Technical data:

temperature range:	- 10°C to +80°C (for a short time +100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	315 bar
test pressure:	450 bar
connection system:	manifold mounted
housing material:	EN10088 - 1.4571 (320 S 18, 320 S 31 according to B.S.)
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

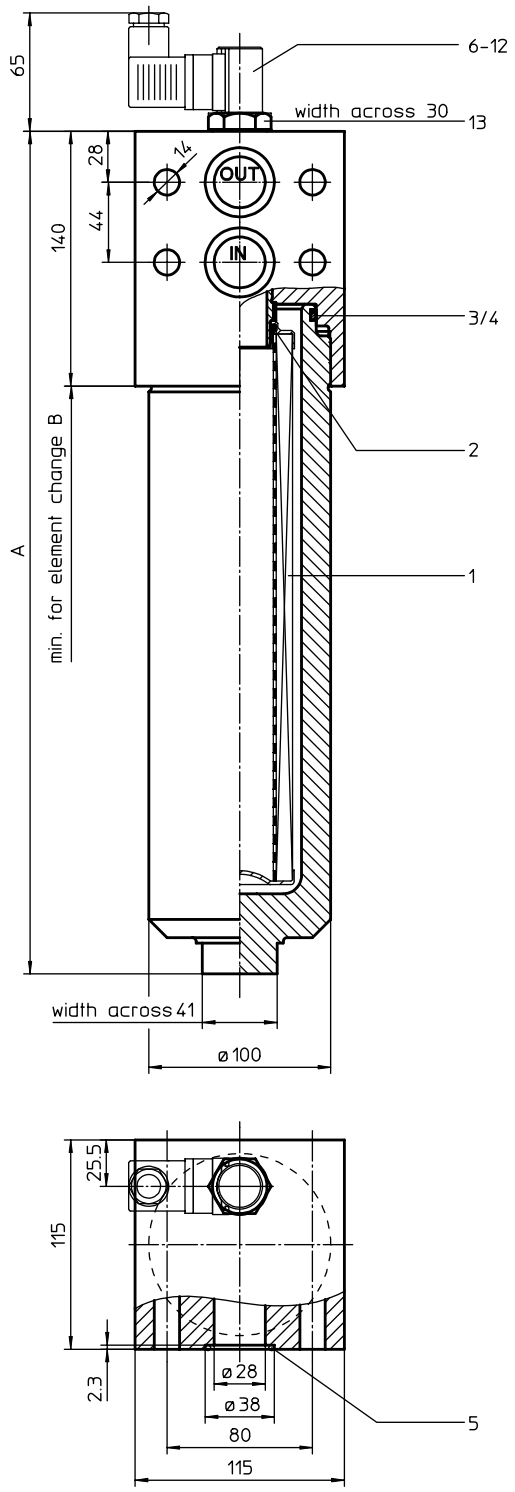
8. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

STAINLESS STEEL- PRESSURE FILTER
Series EHPF 170 - 450 DN 28 PN 315

Sheet No.
1441



1. Type index:

1.1. Complete filter: (ordering example)

EHPF. 360. 10VG. HR. E. P. VA. F. 5. VA. -. AE

1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
EHPF = stainless steel-pressure filter, manifold mouted

2 **nominal size:** 170, 240, 360, 450

3 **filter-material and filter-fineness:**
80G = 80 µm, 40G = 40 µm,
25G = 25 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$,
6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)

4 **resistance of pressure difference for filter element:**
30 = Δp 30 bar
HR = Δp 160 bar (rupture strength Δp 250 bar)

5 **filter element design:**
E = single-end open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 see sheet-no. 31601

8 **connection:**
F = manifold mounted

9 **connection size:**
5 = DN 28

10 **filter housing specification:**
VA = stainless steel

11 **internal valve:**
- = without
S1 = with by-pass valve Δp 3,5 bar
S2 = with by-pass valve Δp 7,0 bar
R = reversing valve, Q ≤ 211,008 l/min

12 **clogging indicator or clogging sensor :**
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

1.2. Filter element: (ordering example)

01E. 360. 10VG. HR. E. P. VA

1	2	3	4	5	6	7

1 **series:**
01E. = filter element according to INTERNORMEN factory specification

2 **nominal size:** 170, 240, 360, 450

3 - 7 see type index-complete filter

2. Dimensions:

type	connection	A	B	weight kg	volume tank
EHPF 170	DN 28	333	330	22	0,7 l
EHPF 240		383	380	24	0,9 l
EHPF 360		463	460	26	1,2 l
EHPF 450		568	565	30	1,6 l

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fax +49 - (0)6205 - 2094-40 url www.internormen.com

3. Spare parts:

item	qty.	designation	dimensions				article-no.	
			EHPF 170	EHPF 240	EHPF 360	EHPF 450		
1	1	filter element	01E.170	01E.240	01E.360	01E.450		
2	1	O-ring	34 x 3,5				304338 (NBR)	304730 (FPM)
3	1	O-ring	76 x 4				305599 (NBR)	310291 (FPM)
4	1	support ring	84 x 3,2 x 1,5				312307	
5	2	O-ring	32 x 3				304368 (NBR)	311020 (FPM)
6	1	clogging indicator, visual	AOR or AOC				see sheet-no. 1606	
7	1	clogging indicator, visual-electrical	AE				see sheet-no. 1615	
8	1	clogging sensor, electronical	VS1				see sheet-no. 1617	
9	1	clogging sensor, electronical	VS2				see sheet-no. 1618	
10	1	O-ring	15 x 1,5				315357 (NBR)	315427 (FPM)
11	1	O-ring	22 x 2				304708 (NBR)	304721 (FPM)
12	1	O-ring	14 x 2				304342 (NBR)	304722 (FPM)
13	1	screw plug	40171-4				314442	

item 13 execution only without clogging indicator or clogging sensor

4. Description:

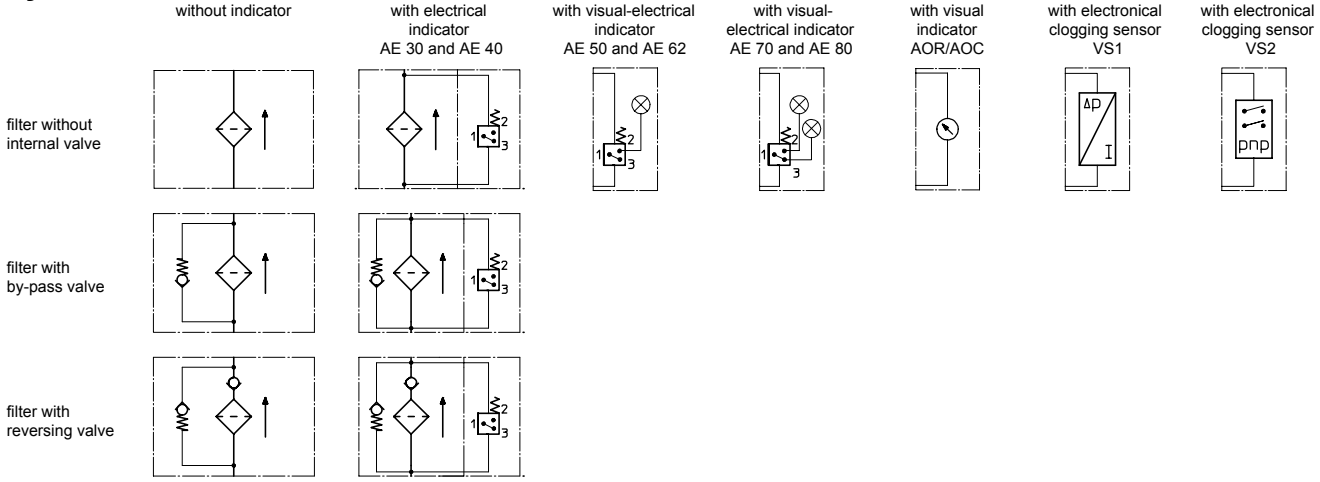
The stainless steel-pressure filters of the series EHPF are suitable for a working pressure up to 315 bar.
The pressure peaks are absorbed by a sufficient margin of safety. The EHPF-filters are flanged to the mounting-surface.
The filter element consists of star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow direction is from outside to inside. Filter elements are available down to a filter fineness of $4\mu m_{(c)}$.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
INTERNORMEN-Filter elements are available up to a pressure difference resistance of Δp 160 bar and a rupture strength of Δp 250 bar.
The internal valves are integrated into the centering pivot for the filter element.
After reaching the opening pressure the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

5. Technical data:

temperature range:	-10°C to +80°C (for a short time +100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	315 bar
test pressure:	450 bar
connection system:	manifold mounted
housing material:	EN10088-1.4571 (320 S 18, 320 S 31 according to B.S.)
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

8. Test methods:

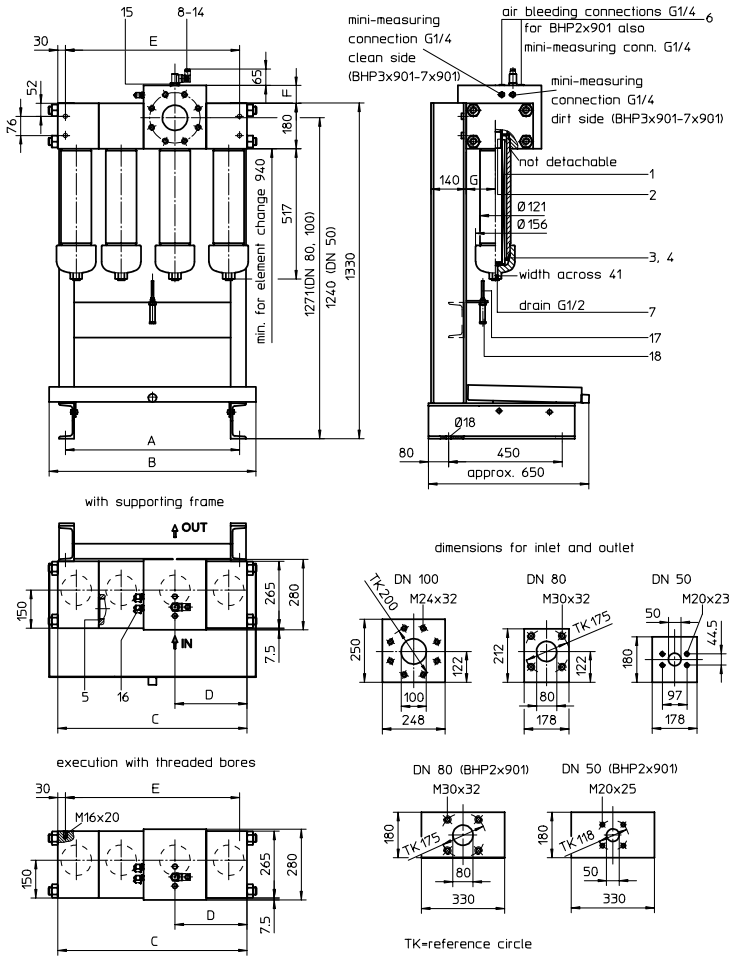
Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

FILTER-BATTERY

Series BHP 2x901-7x901 DN 50-100 PN 315

Sheet No. **1467 E**



1. Type index:

1.1. Complete filter: (ordering example)

BHP. 4x901. 10VG. HR. E. P. -. FV. A. -. -. AE. T

1	2	3	4	5	6	7	8	9	10	11	12	13

1 series:
BHP = battery-pressure filter

2 nominal size:
2x901; 5x901
3x901; 6x901
4x901; 7x901

3 filter-material and filter-fineness:
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)

4 resistance of pressure difference for filter element:
30 = Δp 30 bar
HR = Δp 160 bar (rupture strength Δp 250 bar)

5 filter element design:
E = single-end open

6 sealing material:
P = Nitrile (NBR); V = Viton (FPM)

7 filter element specification:
- = standard; VA = stainless steel

8 connection:
FS = SAE-flange connection 6000 PSI
FV = AVIT-flange connection 320 bar

9 connection size:
8 = DN 50 with FS (up to BHP 3x901 preferably)
= or with FV (only BHP 2x901)
A = DN 80 with FV (up to BHP 5x901 preferably)
B = DN 100 with FV (BHP 3x901 up to 7x901 preferably)

10 filter housing specification:
- = standard

11 internal valve:
- = without
S1 = with by-pass valve, Δp 3,5 bar
S2 = with by-pass valve, Δp 7,0 bar
R = reversing valve, Q ≤ 465,348 l/min

12 clogging indicator or clogging sensor:
- = without
AOR = visual, see sheet-no. 1606
AOC = visual, see sheet-no. 1606
AE = visual-electrical, see sheet-no. 1615
VS1 = electronical, see sheet-no. 1617
VS2 = electronical, see sheet-no. 1618

13 fixing:
- = without supporting frame with fastening bores
T = with supporting frame

1.2. Filter element: (ordering example)

01E. 900. 10VG. HR. E. P. -

1	2	3	4	5	6	7

1 series:
01E. = filter element according to INTERNORMEN factory specification

2 nominal size: 900

3 - 7 see type index-complete filter

2. Dimensions:

filter-battery	connection DN	A	B	C	D	E	F	G	weight kg without supporting frame	weight kg with supporting frame
BHP2x901	80	270	400	330	165	270	32	98	170	210
	50	270	400	330	165	270	-	98	170	210
BHP3x901	100	512	642	572	286	512	70	115	282	347
	80, 50	442	572	502	251	442	32	115	243	308
BHP4x901	100	690	820	750	286	690	70	115	360	428
	80, 50	620	750	680	251	620	32	115	321	389
BHP5x901	100	868	998	928	464	868	70	115	439	510
	80, 50	798	928	858	429	798	32	115	400	471
BHP6x901	100	1046	1176	1106	464	1046	70	115	517	591
	80, 50	976	1106	1036	429	976	32	115	478	552
BHP7x901	100	1224	1354	1284	642	1224	70	115	595	671
	80, 50	1154	1284	1214	607	1154	32	115	556	632

EDV 11/07

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3. Accessories:

- counter flange see sheet-no. 1654

4. Spare parts:

item	qty. BHP2x901	qty. BHP3x901	qty. BHP4x901	qty. BHP5x901	qty. BHP6x901	qty. BHP7x901	designation	dimension	article-no.	
1	2	3	4	5	6	7	filter element	01E.900		
2	2	3	4	5	6	7	O-ring	48 x 3	304357 (NBR)	304404 (FPM)
3	2	3	4	5	6	7	O-ring	98 x 4	301914 (NBR)	304754 (FPM)
4	2	3	4	5	6	7	support ring	110 x 3,5 x 2	304802	
5	-	4	6	8	10	12	O-ring	85 x 3,5	311309 (NBR)	317033 (FPM)
6	2	2	2	2	2	2	screw plug	G ¼	305003	
7	2	3	4	5	6	7	screw plug	G ½	304678	
8	1	1	1	1	1	1	clogging indicator, visual	AOR or AOC	see sheet-no. 1606	
9	1	1	1	1	1	1	clogging indicator, visual-electrical	AE	see sheet-no. 1615	
10	1	1	1	1	1	1	clogging sensor, electronical	VS1	see sheet-no. 1617	
11	1	1	1	1	1	1	clogging sensor, electronical	VS2	see sheet-no. 1618	
12	1	1	1	1	1	1	O-ring	15 x 1,5	315357 (NBR)	315427 (FPM)
13	1	1	1	1	1	1	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
14	1	1	1	1	1	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
15	1	1	1	1	1	1	screw plug	20913-4	314442	
16	2	2	2	2	2	2	mini-measuring connection	MA.1.St	305453	
17	1	1	1	1	1	1	high pressure hose	M16.2000	see sheet-no. 1650	
18	1	1	1	1	1	1	spray protection	M16	see sheet-no. 1650	

5. Description:

The filter-batteries of the series BHP are suitable for the filtration of large flow volumes up to a working pressure of 315 bar and are stressing a high filter efficiency.
The filters of the filter-battery consist of spheroidal graphite cast iron (EN-GJS-400-18-LT) respectively of C-steel.
For changing the filter elements the filter tubes have to be opened at the tube plug (bottom part of the filter). Filter elements are available down to a filter fineness of $4\mu m_{(c)}$.
INTERNORMEN-Filter elements consist of filter materials with a high intrinsic stability, an excellent particle retention, respectively a high dirt holding capacity and provide a long service life.
INTERNORMEN-Filters can be used for mineral oil based fluids, HW-emulsions, water glycols, most synthetic hydraulic fluids and lubrication fluids.
INTERNORMEN-Filter elements are available with a pressure difference resistance up to Δp 160 bar and a rupture strength up to Δp 250 bar.
The internal valves are integrated into the centering pivot for the filter element. After reaching the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

6. Technical data:

temperature range:	- 10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	315 bar
test pressure:	410 bar
connection system:	SAE-flange connection 6000 PSI, AVIT-flange connection 320 bar
air bleeding and mini-measuring connection:	G ¼
contents:	BHP 2x901 = 8 l BHP 3x901 = 18 l BHP 4x901 = 24 l BHP 5x901 = 30 l BHP 6x901 = 36 l BHP 7x901 = 42 l

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

7. Pressure drop flow rates:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

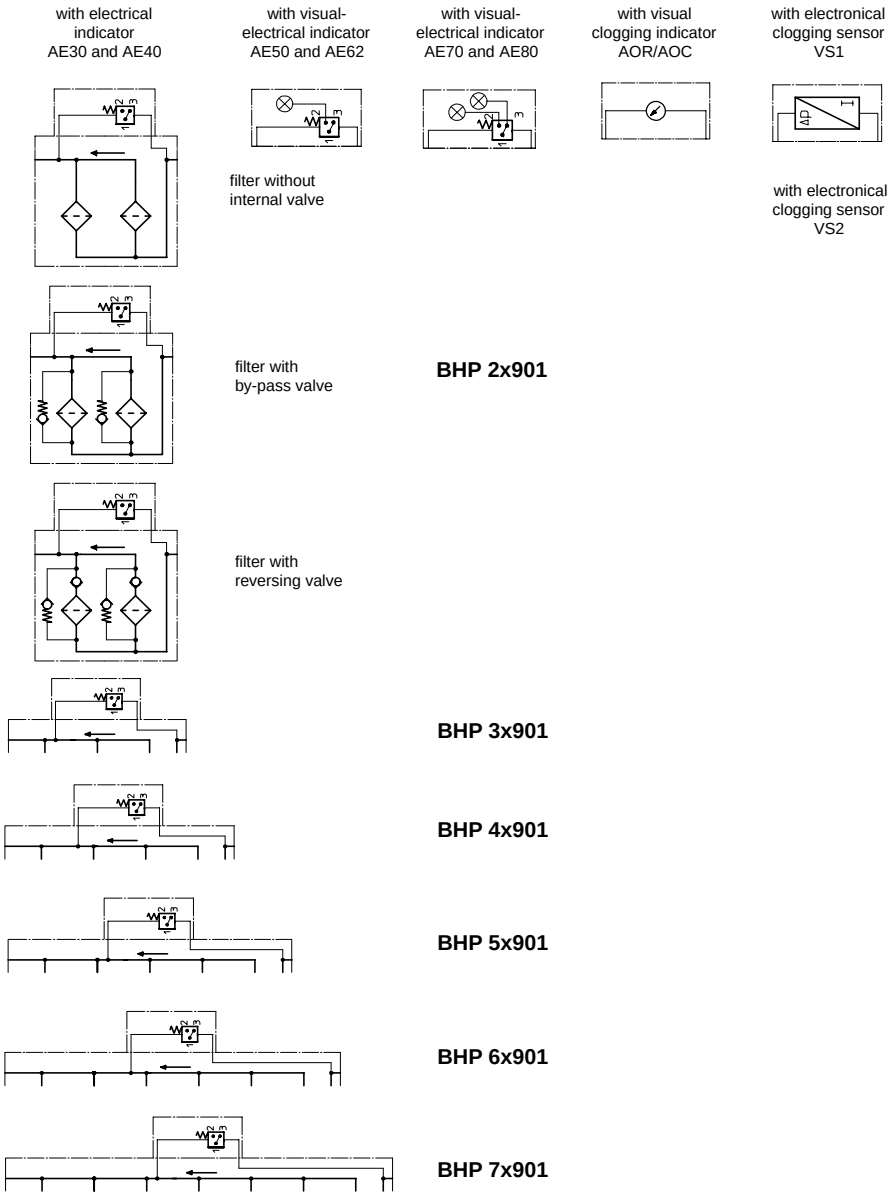
8. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

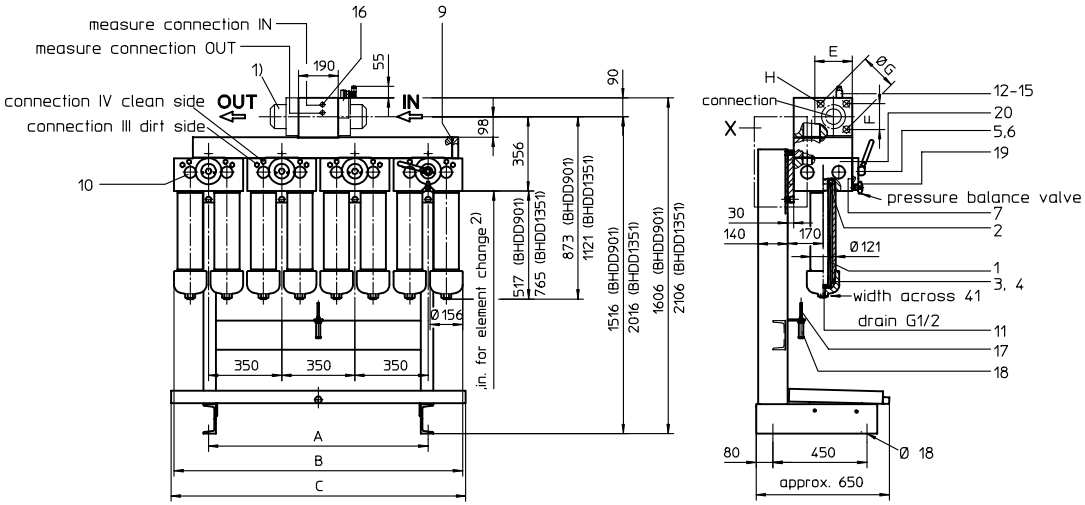
E 1467 E

9. Symbols:

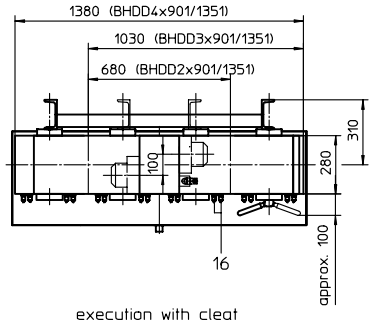


FILTER-BATTERY, change-over
Series BHDD 2x901/1351- 4x901/1351 DN 50-80 PN 315

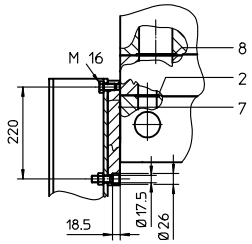
Sheet No. **2526 J**



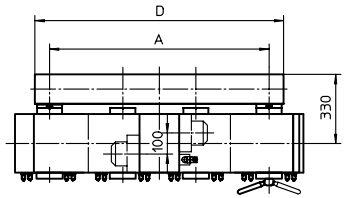
execution with supporting frame



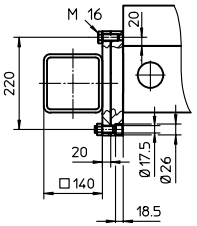
single unit X
with supporting frame



execution with cleat



single unit X
with cleat



Measuring connections III and IV to be used to bleed filter or to relieve pressure.

1) Flanges are not part of the connecting block. If required they have to be ordered separately.

filter-battery	A	B	C	D
BHDD 2x901/1351	350	680	710	490
BHDD 3x901/1351	700	1030	1060	840
BHDD 4x901/1351	1050	1380	1410	1190

2) min. for element change: 940 (BHDD901)
1440 (BHDD1351)

connection	E	F	G	H
2“	120	83,4	118	M20 x 25 deep
2 ½“	150	102,5	145	M24 x 30 deep
3“	180	123,7	175	M30 x 32 deep

EDV 01/08

1. Type index:

1.1. Complete filter: (ordering example)

BHDD. 4x901. 10VG. HR. E. P. -. FV. A. -. -. AE. T

1	2	3	4	5	6	7	8	9	10	11	12	13

1 series:
BHDD = battery-pressure filter, change-over

2 nominal size:
2x901, 2x1351
3x901, 3x1351
4x901, 4x1351

3 filter-material and filter-fineness:
25 VG = 20 µm(c), 16 VG = 15 µm(c), 10 VG = 10 µm(c), 6 VG = 7 µm(c), 3 VG = 5 µm(c) Interpor fleece (glass fibre)

4 resistance of pressure difference for filter element:
30 = Δp 30 bar
HR = Δp 160 bar (rupture strength Δp 250 bar)

5 filter element design:
E = single-end open

6 sealing material:
P = Nitrile (NBR)
V = Viton (FPM)

7 filter element specification:
- = standard
VA = stainless steel

8 connection:
FV = AVIT-flange connection 320 bar

9 connection size:
8 = 2“
9 = 2 ½“
A = 3“

10 filter housing specification:
- = standard

11 internal valve:
- = without
S1 = with by-pass valve, Δp 3,5 bar
S2 = with by-pass valve, Δp 7,0 bar
R = reversing valve, Q ≤ 465,348 l/min

12 clogging indicator or clogging sensor:
- = without
AE = visual-electrical, see sheet-no. 1609
VS1 = electronical, see sheet-no. 1607
VS2 = electronical, see sheet-no. 1608

13 fixing:
- = without supporting frame with fastening bores
B = with cleat
T = with supporting frame

1.2. Filter element: (ordering example)

01E. 900. 10VG. HR. E. P. -

1	2	3	4	5	6	7

1 series:
01E. = filter element according to INTERNORMEN factory specification

2 nominal size: 900, 1350

3 - **7** see type index-complete filter

Changes of measures and design are subject to alterat ion!

internormen technology
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2. Accessories:

- counter-flange see sheet-no. 1654

3. Spare parts:

item	qty. BHDD 2x901/1351	qty. BHDD 3x901/1351	qty. BHDD 4x901/1351	designation	dimension	article-no.	
1	4	6	8	filter element (BHDD 2-4x901)	01E.900		
				filter element (BHDD 2-4x1351)	01E.1350		
2	8	12	16	O-ring	48 x 3	304357 (NBR)	304404 (FPM)
3	4	6	8	O-ring	98 x 4	301914 (NBR)	304754 (FPM)
4	4	6	8	support ring	110 x 3,5 x 2	304802	
5	4	6	8	O-ring	18 x 3	304359 (NBR)	304399 (FPM)
6	4	6	8	support ring	25 x 2,5 x 0,5	311311	
7	4	6	8	O-ring	71 x 3	306451 (NBR)	306897 (FPM)
8	2	2	2	O-ring	85 x 3,5	310785 (NBR)	
9	2	2	2	O-ring	69,45 x 3,53	305868 (NBR)	307357 (FPM)
10	16	24	32	screw plug	G 1 ½	311475	
11	4	6	8	screw plug	G ½	304678	
12	1	1	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
13	1	1	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
14	1	1	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
15	2	2	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
16	10	14	18	mini-measuring connection	MA.1.St	305453	
17	1	1	1	high pressure hose	M16.2000	see sheet-no. 1650	
18	1	1	1	spray protection	M16	see sheet-no. 1650	
19	2	3	4	pressure balance valve	NG 10	305000	
20	2	3	4	pressure filter, change-over	HDD901 resp. HDD1351	see sheet-no. 2524	

4. Description:

The filter-batteries of the series BHDD are suitable for the filtration of large flow volumes up to a working pressure of 315 bar and are stressing a high filter efficiency. The duplex pressure filters, of the filter-batteries consist of high quality spheroidal graphite cast iron (EN-GJS-400-18-LT) resp. c-steel. The intrinsic joint plate is made out of high-tensile aluminium alloy.
Duplex filters can be maintained without interruption of operation, as the change-over device allows to change-over the flow from the dirt filter-side to the clean filter-side after opening of pressure balance valve. For changing the filter elements the filter tubes have to be opened at the tube plug (bottom part of the filter). Filter elements are available down to a filter fineness of 4µm $_{(c)}$.
INTERNORMEN-Filter elements consist of filter materials with a high intrinsic stability, an excellent particle retention, respectively a high dirt holding capacity and provide a long service life.
INTERNORMEN-Filters can be used for mineral oil based fluids, HW-emulsions, water glycols, most synthetic hydraulic fluids and lubrication fluids.
INTERNORMEN-Filter elements are available with a pressure difference resistance up to Δp 160 bar and a rupture strength up to Δp 250 bar.
The internal valves are integrated into the centering pivot for the filter element. After reaching the by-pass valve causes that an unfiltered partial flow passes the filter. With the reverse valve a protection of the filter element is given when having a reverse flow inside the filter. The reverse flow will not be filtered.

5. Technical data:

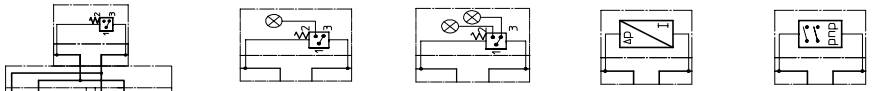
temperature range:	- 10°C to + 80°C (for a short time + 100°C)	
operating medium:	mineral oil, other media on request	
max. operating pressure:	315 bar	
test pressure:	410 bar	
connection system:	AVIT-flange connection 320 bar	
air bleeding and mini-measuring connection:	G ¼	
contents:	BHDD 2x901 = 25 l	BHDD 2x1351 = 34 l
	BHDD 3x901 = 36 l	BHDD 3x1351 = 50 l
	BHDD 4x901 = 48 l	BHDD 4x1351 = 66 l
weight:	BHDD 2x901 = 465 kg	BHDD 2x1351 = 478 kg
	BHDD 3x901 = 665 kg	BHDD 3x1351 = 696 kg
	BHDD 4x901 = 865 kg	BHDD 4x1351 = 905 kg

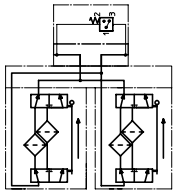
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

E 2526 J

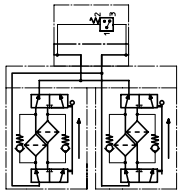
6. Symbols:

with electrical indicator AE30 and AE40 | with visual-electrical indicator AE50 and AE62 | with visual-electrical indicator AE70 and AE80 | with electronical clogging sensor VS1 | with electronical clogging sensor VS2



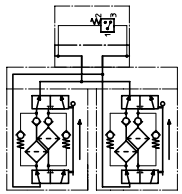


filter without internal valve

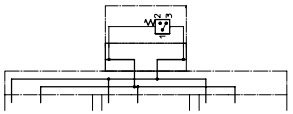


filter with by-pass valve

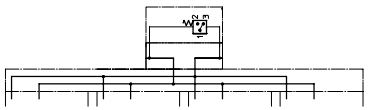
BHDD 2x901 / 1351



filter with reversing valve



BHDD 3x901 / 1351



BHDD 4x901 / 1351

7. Pressure drop flow rates:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

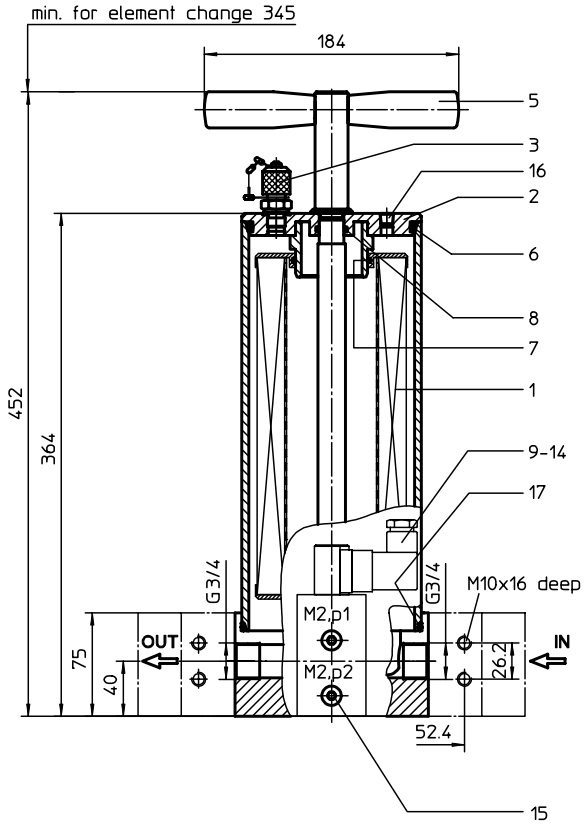
8. Test methods:

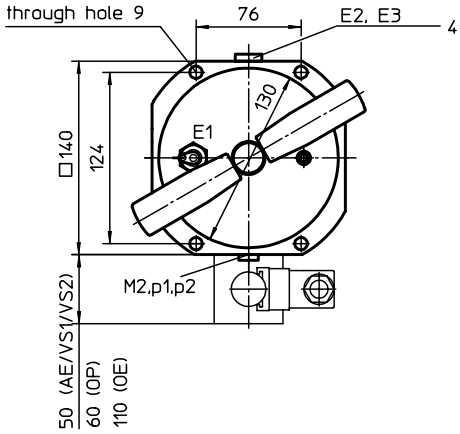
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

PARTIAL FLOW FILTER
Series NF 250 DN 25 PN 16

Sheet No.
1100 D





M2,p1 = measure connection dirt-side
M2,p2 = measure connection clean-side
E1 = air bleeding dirt-side
E2 = drain dirt-side
E3 = drain clean-side

1. Type index:

1.1. Complete filter: (ordering example)

NF.	250.	10VG.	10.	B.	P.	-.	FS.	5.	-.	AE
1	2	3	4	5	6	7	8	9	10	11

1 **series:**
NF = partial flow filter

2 **nominal size:** 250

3 **filter-material and filter-fineness:**
25 VG= 20 µm$_{(c)}$, 16 VG = 15 µm$_{(c)}$,10 VG = 10 µm$_{(c)}$,
6 VG = 7 µm$_{(c)}$, 3 VG = 5 µm$_{(c)}$ Interpor fleece (glass fibre)
10 WVG = 10 µm$_{(c)}$, 3 WVG = 5 µm$_{(c)}$ Watersorp-filter element

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **connection:**
FS = SAE-flange connection 3000 PSI [1)]

9 **connection size:**
5 = 1“ [1)]

10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605

11 **clogging indicator or clogging sensor :**
- = without
OP = visual, see sheet-no. 1628
OE = visual-electrical, see sheet-no. 1628
AE = visual-electrical, see sheet-no. 1609
VS1 = electrical, see sheet-no. 1607
VS2 = electrical, see sheet-no. 1608

[1)] in addition available
thread G ¾ according to DIN 3852 T2, design Z

1.2. Filter element: (ordering example)

01NR.	250.	10VG.	10.	B.	P.	-
1	2	3	4	5	6	7

1 **series:**
01NR. = standard return line filter element according to DIN 24550, T4

2 **nominal size: 250**

3 - 7 see type index-complete filter

2. Accessories:
- measure- and bleeder connection, see sheet-no. 1650
- evacuation- and bleeder-connections, see sheet-no. 1651

weight : approx. 7 kg

EDV 10/09

Changes of measures and design are subject to alteration!

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fax +49 - (0)6205 - 2094-40 url www.internormen.com

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01NR. 250		
2	1	filter cover	30615-3	315437	
3	1	mini-measuring connection	MA.1.St	305453	
4	2	screw plug	G ¼	305003	
5	1	straining screw	30631-3	316404	
6	1	O-ring	110 x 6	337001 (NBR)	337002 (FPM)
7	2	O-ring	52 x 3	314206 (NBR)	316698 (FPM)
8	1	O-ring	18 x 3	304359 (NBR)	304399 (FPM)
9	1	clogging indicator, visual	OP	see sheet-no. 1628	
10	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628	
11	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
12	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
13	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
14	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
15	2	screw plug	G 1/8	304791	
16	1	screw plug	G 1/8	305496	
17	1	O-ring	123 x 4	337003 (NBR)	337004 (FPM)

item 15 execution only without clogging indicator or clogging sensor

4. Description:

The partial flow filter NF is foreseen for the fine filtration of hydraulic and lubrication circuits additionally to the main filter. The big filtration area in comparison to the nominal size is the premise for a high dirt-retaining capacity even in case of small filter-fineness. The filter NF is flanged mounted to the line.
Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request. Element change without tools is possible. After release of the straining screw and removal of the cover the elements are accessible and could be changed. The filter elements were delivered completely inclusive seals. Cleaning of the elements not possible therefore the user should have enough spare elements on stock.

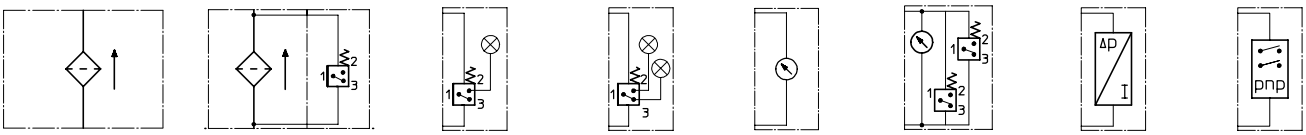
5. Technical data:

temperature range:	-10°C to +80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	16 bar
test pressure:	23 bar
connection:	SAE-flange connection 3000 PSI
housing material:	aluminium forging alloy
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation-position:	vertical
measure connection:	G 1/8
evacuation- or bleeder connections:	G 1/4
volume tank:	3,3 l

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:

without indicator | with electrical indicator AE 30 and AE 40 | with visual-electrical indicator AE 50 and AE 62 | with visual-electrical indicator AE 70 and AE 80 | with visual indicator OP | with visual-electrical indicator OE | with electronical clogging sensor VS1 | with electronical clogging sensor VS2



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

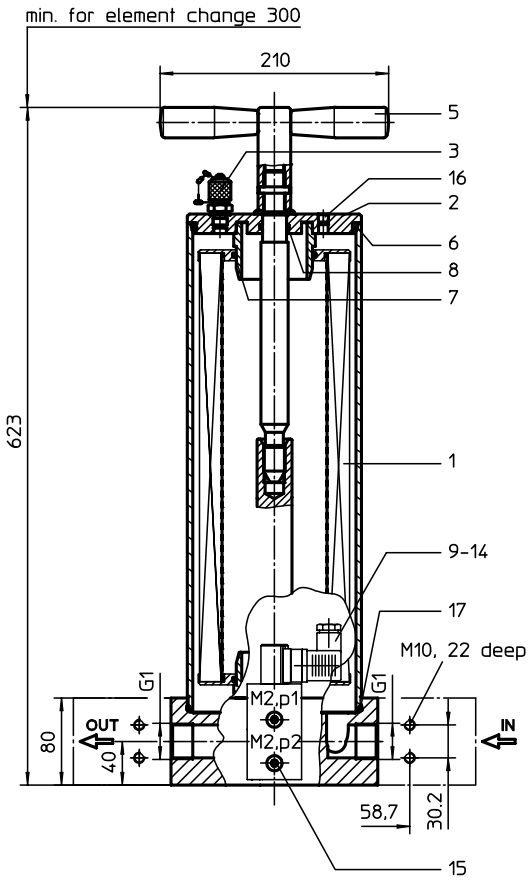
8. Test methods:

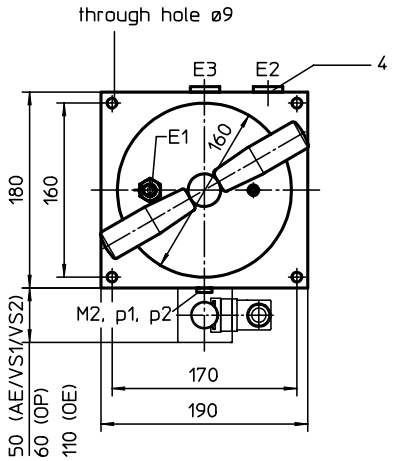
Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

PARTIAL FLOW FILTER
Series NF 631 DN 32 PN 16

Sheet No.
1115 J





M2,p1 = measure connection dirt-side
M2,p2 = measure connection clean-side
E1 = air bleeding dirt-side
E2 = drain dirt-side
E3 = drain clean-side

1. Type index:

1.1. Complete filter: (ordering example)

NF.	631.	10VG.	10.	B.	P.	-.	FS.	6.	-.	AE
1	2	3	4	5	6	7	8	9	10	11

1 **series:**
NF = partial flow filter

2 **nominal size:** 631

3 **filter-material and filter-fineness:**
25 VG= 20 µm$_{(c)}$, 16 VG = 15 µm$_{(c)}$, 10 VG = 10 µm$_{(c)}$,
6 VG = 7 µm$_{(c)}$, 3 VG = 5 µm$_{(c)}$ Interpor fleece (glass fibre)
10 WVG = 10 µm$_{(c)}$, 3 WVG = 5 µm$_{(c)}$ Watersorp-filter element

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **connection:**
FS = SAE-flange connection 3000 PSI [1)]

9 **connection size:**
6 = 1 ¼“ [1)]

10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605

11 **clogging indicator or clogging sensor :**
- = without
OP = visual, see sheet-no. 1628
OE = visual-electrical, see sheet-no. 1628
AE = visual-electrical, see sheet-no. 1609
VS1 = electrical, see sheet-no. 1607
VS2 = electrical, see sheet-no. 1608

[1)] in addition available
thread G1 according to DIN 3852 T2, design Z

1.2. Filter element: (ordering example)

01NR.	630.	10VG.	10.	B.	P.	-
1	2	3	4	5	6	7

1 **series:**
01NR. = standard return line filter element according to DIN 24550, T4

2 **nominal size:** 630

3 - 7 see type index-complete filter

2. Accessories:
- measure- and bleeder connection, see sheet-no. 1650
- evacuation- and bleeder-connections, see sheet-no. 1651
- counter flange, see sheet-no. 1652

weight : approx. 17 kg

Changes of measures and design are subject to alteration!

EDV 10/09

internormen technology
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phone +49 - (0)6205 - 2094-0 e-mail sales@internormen.com
fax +49 - (0)6205 - 2094-40 url www.internormen.com

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01NR. 630		
2	1	filter cover	30600-3	315492	
3	1	mini-measuring connection	MA.1.St	305453	
4	2	screw plug	G ½	304678	
5	1	straining screw	30595-3	316312	
6	1	O-ring	140 x 6	315392 (NBR)	316322 (FPM)
7	2	O-ring	70 x 4	306253 (NBR)	310280 (FPM)
8	1	O-ring	22 x 3	304387 (NBR)	304931 (FPM)
9	1	clogging indicator, visual	OP	see sheet-no. 1628	
10	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628	
11	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
12	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
13	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
14	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
15	2	screw plug	G 1/8	304791	
16	1	screw plug	G 1/8	305496	
17	1	O-ring	153 x 4	320763 (NBR)	322368 (FPM)

item 15 execution only without clogging indicator or clogging sensor

4. Description:

The partial flow filter NF is foreseen for the fine filtration of hydraulic and lubrication circuits additionally to the main filter. The big filtration area in comparison to the nominal size is the premise for a high dirt-retaining capacity even in case of small filter-fineness. The filter NF is flanged mounted to the line.
Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request. Element change without tools is possible. After release of the straining screw and removal of the cover the elements are accessible and could be changed. The filter elements were delivered completely inclusive seals. Cleaning of the elements not possible therefore the user should have enough spare elements on stock.

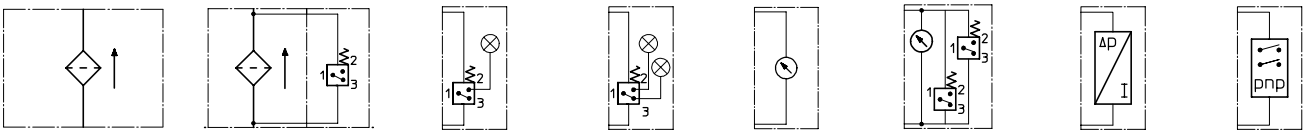
5. Technical data:

temperature range:	-10°C to +80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
max. operating pressure:	16 bar
test pressure:	23 bar
connection:	SAE-flange connection 3000 PSI
housing material:	aluminium forging alloy
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation-position:	vertical
measure connection:	G ¼
evacuation- or bleeder connections:	G ½
volume tank:	7,3 l

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:

without indicator | with electrical indicator AE 30 and AE 40 | with visual-electrical indicator AE 50 and AE 62 | with visual-electrical indicator AE 70 and AE 80 | with visual indicator OP | with visual-electrical indicator OE | with electronical clogging sensor VS1 | with electronical clogging sensor VS2



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

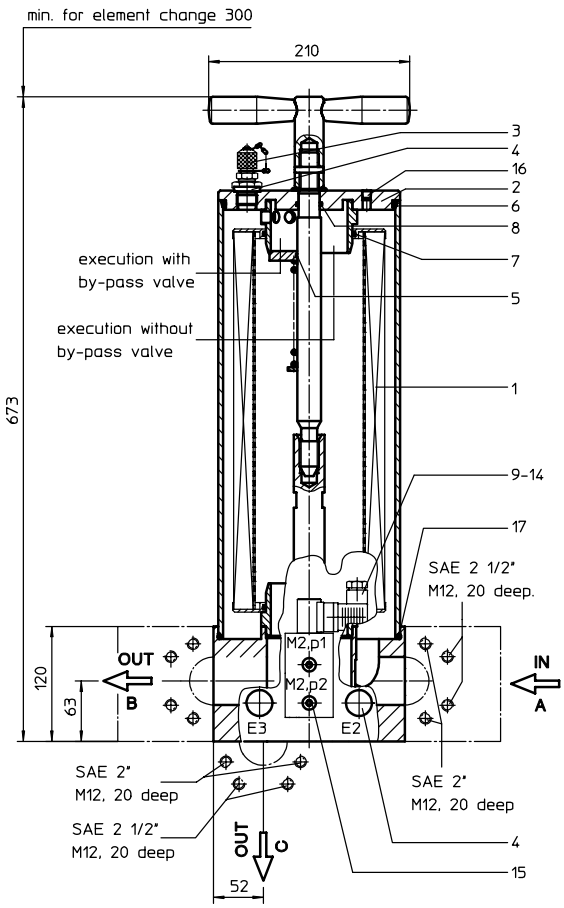
8. Test methods:

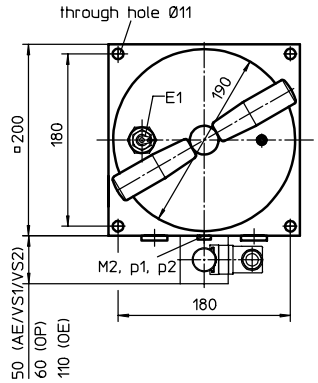
Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

PARTIAL FLOW FILTER
Series NF 1000 DN 50-65 PN 16

Sheet No.
1116 J





M2, p1 = measure connection dirt side
M2, p2 = measure connection clean side
E1 = aie bleeding dirt side
E2 = drain dirt side
E3 = drain clean side

1. Type index:

1.1. Complete filter: (ordering example)

NF.	1000.	10VG.	10.	B.	P.	-.	FS.	3.	-.	-.	AE
1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
NF = partial flow filter

2 **nominal size:** 1000

3 **filter-material and filter-fineness:**
25 VG= 20 µm$_{(c)}$, 16 VG = 15 µm$_{(c)}$, 10 VG = 10 µm$_{(c)}$,
6 VG = 7 µm$_{(c)}$, 3 VG = 5 µm$_{(c)}$ Interpor fleece (glass fibre)
10 WVG = 10 µm$_{(c)}$, 3 WVG = 5 µm$_{(c)}$ Watersorp-filter element

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:** (see catalog)
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **connection:**
FS = SAE-flange connection 3000 PSI

9 **no. of version:**

version	connection A connection size	connection B connection size	connection C connection size
1	8	8	-
2	8	8	8
3	9	9	-
4	9	9	9

connection size: 8 = 2“
9 = 2 ½“
- = without connection

10 **filter housing specification:** (see catalog)
- = standard
IS06 = see sheet-no. 31605

11 **internal valve:**
- = without
S1 = with by-pass valve Δp 3,5 bar

12 **clogging indicator or clogging sensor :**
- = without
OP = visual, see sheet-no. 1628
OE = visual-electrical, see sheet-no. 1628
AE = visual-electrical, see sheet-no. 1609
VS1 = electrical, see sheet-no. 1607
VS2 = electrical, see sheet-no. 1608

1.2. Filter element: (ordering example)

01NR.	1000.	10VG.	10.	B.	P.	-
1	2	3	4	5	6	7

1 **series:**
01NR. = standard return line filter element according to DIN 24550, T4

2 **nominal size:** 1000

3 - 7 see type index-complete filter

2. Accessories:

- measure- and bleeder connection, see sheet-no. 1650
- evacuation- and bleeder-connections, see sheet-no. 1651
- counter flange, see sheet-no. 1652

weight : approx. 23 kg

EDV 10/09

Changes of measures and design are subject to alteration!

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fax +49 - (0)6205 - 2094-40 url www.internormen.com

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01NR. 1000		
2	1	filter cover without by-pass valve	31065-3		
	1	filter cover with by-pass valve S1	31461-3		
3	1	mini-measuring connection	MA.3.St	308630	
4	3	screw plug	G ½	304678	
5	1	O-ring (only with by-pass valve)	22 x 3	304387 (NBR)	304931 (FPM)
6	1	O-ring	170 x 6	304799 (NBR)	306529 (FPM)
7	2	O-ring	90 x 4	306941(NBR)	307031(FPM)
8	1	O-ring	22 x 3	304387(NBR)	304931(FPM)
9	1	clogging indicator, visual	OP	see sheet-no. 1628	
10	1	clogging indicator, visual-electrical	OE	see sheet-no. 1628	
11	1	clogging indicator, visual-electrical	AE	see sheet-no. 1609	
12	1	clogging sensor, electronical	VS1	see sheet-no. 1607	
13	1	clogging sensor, electronical	VS2	see sheet-no. 1608	
14	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
15	2	screw plug	G 1/8	304791	
16	1	screw plug	G 1/8	305496	
17	1	O-ring	183 x 4	337005 (NBR)	337006 (FPM)

item 15 execution only without clogging indicator or clogging sensor

4. Description:

The partial flow filter NF is foreseen for the fine filtration of hydraulic and lubrication circuits additionally to the main filter.
The big filtration area in comparison to the nominal size is the premise for a high dirt-retaining capacity even in case of small filter-fineness.
Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
To protect the filter elements and the filter housing equipment with by-pass valves is foreseen. Element change without tools is possible. After release of the straining screw and removal of the cover the elements are accessible and could be changed. The filter elements were delivered completely inclusive seals. Cleaning of the elements not possible therefore the user should have enough spare elements on stock.

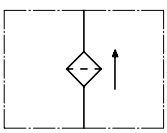
5. Technical data:

temperature range:	- 10°C to + 80°C (for a short time + 100 °C)
operating medium:	mineral oil, other media on request
max. operating pressure:	16 bar
test pressure:	23 bar
connection:	SAE-flange connection 3000 PSI
housing material:	aluminium forging alloy
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation-position:	vertical
measure connection:	G ¼
evacuation -or bleeder connection:	G ½
volume tank:	11,4 l

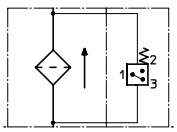
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:

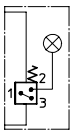
filter without indicator and without internal valve



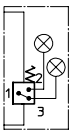
with electrical indicator AE 30 and AE 40



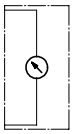
with visual-electrical indicator AE 50 and AE 62



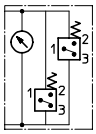
with visual-electrical indicator AE 70 and AE 80



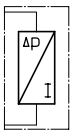
with visual indicator OP



with visual-electrical indicator OE

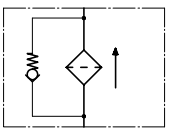


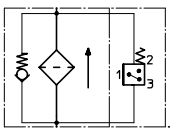
with electronical clogging sensor VS1



with electronical clogging sensor VS1

filter with by-pass valve





7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

8. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

Watersorp

Wasserabsorbierung / Waterabsorption

internormen
filter technology

INTER
NORMEN

Watersorp

Filterelemente für Wasserabsorption und Partikelretention
- Dienen zur Absorbierung von freiem und emulgiertem Wasser aus Ölen
- Scheiden zusätzlich auch Feststoffverschmutzung ab
- Reduzieren die Ölalterung und Deadditivierung von Flüssigkeiten

Filter elements for water absorption and particle retention
- Absorb free and emulsified water from oil
- Particulate contamination is also being filtered
- Reduce oil ageing and deadditivation of fluids

NF 1000

Anwendungsgebiete
- Hydrauliköl
- Schmieröl
- Esteröl
- Polyalphaolefine
- Rapsöl
- Diesel

Application Range
- Hydraulic oil
- Lubrication oil
- Ester oil
- Poly alpha olefines
- Vegetable oil
- Diesel oil

Watersorp Elemente sind in Nebenstromfiltern (NF), stationären Umlauffiltereinheiten (US) stationären Umlauffiltereinheiten mit Plattenwärmetauscher (USP) und mobilen Umlauffiltereinheiten (UM) einsetzbar.

Watersorp elements can be used in off-line filters (NF), stationary filter units (US), stationary filter units with plate heat exchanger (USP) and in mobile filter units (UM).

US 40

Nenngrösse / *Nominal size*	**Elementgrösse / *Element size***
NF 250	1x 01.WSNR.250
NF 631	1x 01.WSNR.630
NF 1000	1x 01.WSNR.1000
US 20/ UM 20/ USP 20	1x 01.WSNR.250
US 40/ UM 40/ USP 41	1x 01.WSNR.630
US 80/ UM 80/ USP 81	1x 01.WSNR.630
US 160/ USP 161	1x 01.WSNR.630
US 320/ USP 320	1x 01.WSNR.1000

Unsere Empfehlung ist es die Watersorp Elemente nur im Nebenstrom einzusetzen – somit ist die höchstmögliche Effizienz garantiert.

We recommend that you use the Watersorp elements only off-line – that is how the highest possible efficiency is guaranteed.

UM 40

Berechnung der benötigten Anzahl Watersorp-Elemente (bei 30 mm^2/s):

$$\frac{\frac{\text{Systeminhalt (Liter)}}{100\%} \times H_2O\ \%}{\text{Wasseraufnahmekapazität (Liter)}} = \text{Anzahl Elemente}$$

Calculation of the necessary amount of watersorp elements (at 30 mm^2/s):

$$\frac{\frac{\text{system volume (liter)}}{100\%} \times H_2O\ \%}{\text{water absorption capacity (liter)}} = \text{number of elements}$$

Filtermaterial WVG
WVG ist eine Kombination von Glasfasermedien mit einem speziellen Wasserabsorptionsvlies:
- WVG hat einen sechslagigen Faltenbalg
- garantierte Rückhalteraten nach ISO 16889
- garantierte Wasserrückhalterate
- garantierte Wasser- und Schmutzaufnahmekapazität
- garantierte Kollaps/ Berstdruckfestigkeit

WVG Filter media
WVG is a combination of fine filter glass fibre media with a special water absorption fleece media:
- with a six layer fold bellow
- guaranteeing retention rates acc. to ISO 16889
- guaranteeing water retention
- guaranteed water and dirt holding capacity
- guaranteed collapse pressure resistance

UM 80

Technische Daten / *Technical data*

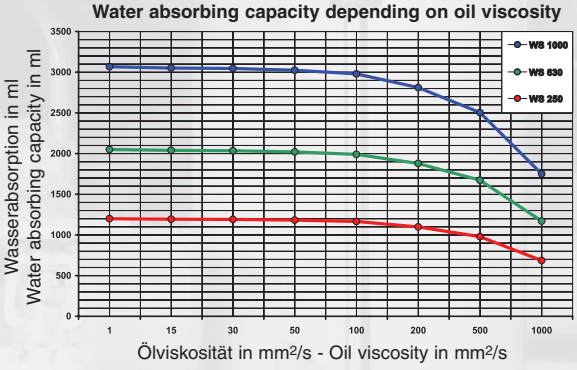
	01.WSNR250	01.WSNR630	01.WSNR1000
Filerfläche:	7350 cm²	12560 cm²	18800 cm²
Wasseraufnahmekapazität:	0,162 ml/cm² bei Δp = 6 bar		
Rückhalterate nach ISO 16889:	WVG 3, ß5(c) > 200; WVG 10, ß10(c) > 200		
Schmutzaufnahmekapazität nach ISO 16889, bei Δp_{end} = 6 bar:	WVG3 = 7 mg/cm²; WVG10 = 8,6 mg/cm²		
Kollopsdruckbeständigkeit nach ISO 2941:	Δp max. = 10 bar		
Max. Betriebsdruckdifferenz:	Δp max. = 6 bar		

	01.WSNR250	01.WSNR630	01.WSNR1000
Filter surface:	7350 cm²	12560 cm²	18800 cm²
Water absorbing capacity:	0,162 ml/cm² at Δp = 6 bar		
Rentention rate acc. to ISO 16889:	WVG 3, ß5(c) > 200; WVG 10, ß10(c) > 200		
Dirt holding capacity acc. to ISO 16889, Δp_{end} = 6 bar:	WVG3 = 7 mg/cm²; WVG10 = 8,6 mg/cm²		
Collapse pressure resistance acc. to ISO 2941:	Δp max. = 10 bar		

Spez. Wasseraufnahmekapazität in ml
Spec. water absorbing capacity in ml

	01.WS250	01.WS630	01.WS1000
bei / at Δp = 2 bar	617	1055	1579
bei / at Δp = 4 bar	926	1583	2369
bei / at Δp = 6 bar	1191	2035	3046

Wasserabsorption in Abhängigkeit der Ölviskosität
Water absorbing capacity depending on oil viscosity



Spez. Schmutzaufnahmekapazität / *Spec. dirt holding capacity*
Teststaub ISO-MTD in mg / *Test dust ISO-MTD in mg*

	WVG3			WVG10		
bei / at Δp = 2 bar	34315	58643	87777	42161	72047	107841
bei / at Δp = 4 bar	43312	74117	110939	53286	91057	136296
bei / at Δp = 6 bar	51450	87920	131600	63210	108016	161680

INTERNORMEN Fluid Purifier Systeme / *Systems*

Fortgeschrittenes Fluid Management: Fluid Purifier Systeme IFPM/IFPS

Die IFPM/IFPS Fluid Purifier Systeme, konstruiert für Viskositätsbereiche von Transformatorölen bis zu schweren Getriebeschmierölen (ISO 460), entfernen freies, emulgiertes und gelöstes Wasser, freie und gelöste Gase und mechanische Verschmutzungen bis zu 1µm. Die Feinheit des Filters - von sehr fein bis zu grob - wird entsprechend der Art der Verschmutzung ausgewählt. Die IFPM/IFPS Systeme sind in vier verschiedenen Standardgrößen verfügbar von 20 bis 100 l/min, mobil (IFPM) oder stationär (IFPS) und als explosionsgeschützt ebenfalls.

Advanced Fluid Management: Fluid Purifier Systems IFPM/IFPS

The IFPM/IFPS Fluid Purifier Systems are designed for viscosity ranges from transformer oils to heavy gear lube oils (ISO 460), able to remove free, emulsified and dissolved water, free and dissolved gases and particulate contamination down to 1µm. The fineness of the filter - ranging from very fine to coarse - is selected according to the kind of contamination. The IFPM/IFPS systems are available in four different standard sizes from 20 to 100 l/min, mobile (IFPM) or stationary (IFPS), and as explosion-proof as well.

Weitere Produkte / Additional products

aus unserem Produktprogramm, die für Sie bei Wasserproblemen von Interesse sein könnten:

from our product range, which - if you have problems with water - might be of great interest:

Wasser-in-Öl Diagnose Systeme
Mobile und stationäre *INTERNORMEN* Wassersensoren WSPS 01/05, WSH 01 und WSTM 01 ermöglichen:

- Monitoring und Diagnose von Hydraulik- und Schmierölflüssigkeiten
- Die Ermittlung des Sättigungszustands von Öl mit Wasser
- Eine genaue Temperaturbestimmung des Fluides während der Messung
- Zyklische oder kontinuierliche, inline und offline Messungen

Water-in-oil Monitoring Solutions
INTERNORMEN mobile and stationary water sensor units WSPS 01/05, WSH 01 and WSTM 01 enable you to perform:

- Monitoring and diagnostics of hydraulic and lubrication fluids
- Measurements of saturated water in oil
- Temperature measurements
- Periodic or continuous, in-line and off-line measurements

http://www.internormen.com/cms/en/products/electronics

BFD Silicagel – Belüftungsfilter

- Reduzieren den Einfluß von hohen Umgebungsfeuchten
- Entfernen Partikel- und Feuchtigkeitsverschmutzung aus der Umluft vor dem Tankeintritt
- Verlängern Ölstandzeiten
- Reduzieren Maschinenausfallzeiten
- Reduzieren Reparaturen und Ersatz von Systemkomponenten

BFD - Desiccant breather filters

- Reduce the influence of humidity
- Remove particulate contamination and prevent that humidity out of air enters a system or a tank
- Extend fluid life
- Reduce downtime of machinery
- Reduce system component repairs and replacements

http://www.internormen.com/cms/en/products/filtertechnology/breather-filters

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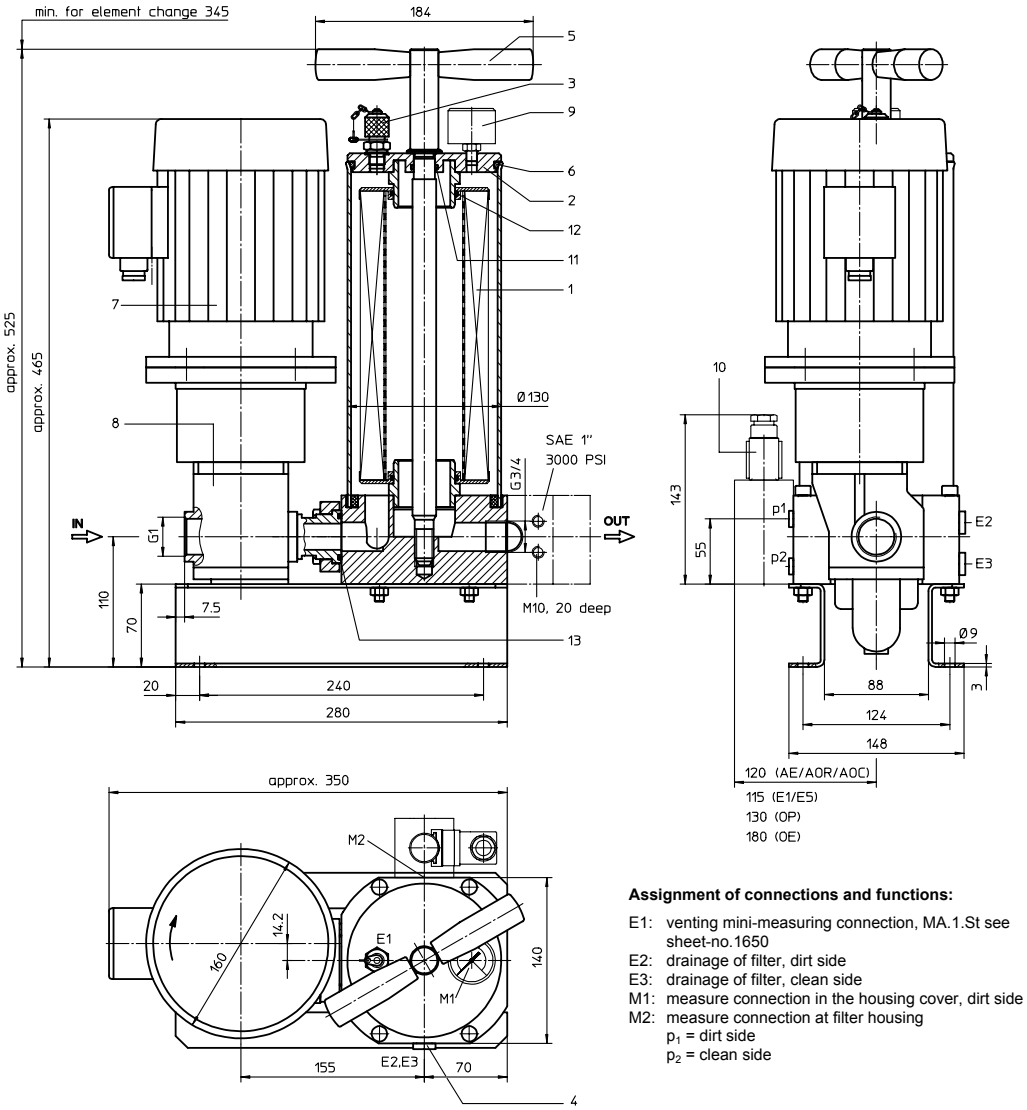
Internet: www.internormen.com • e-mail: info@internormen.com

GB-06/2011
316202

FILTER UNIT, stationary
Series US 20

Sheet No. **4008.1 G**
Sheet 1/3

- preference version -



Assignment of connections and functions:

E1: venting mini-measuring connection, MA.1.St see sheet-no.1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the housing cover, dirt side
M2: measure connection at filter housing
p_1 = dirt side
p_2 = clean side

Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

1. Type index:

1.1. Filter unit: (ordering example)

US. 20. 6VG. 10. B. P. -. P01. D03. O. AE

1	2	3	4	5	6	7	8	9	10	11

1 **series:**
US = filter unit, stationary

2 **nominal size:** 20

3 **filter-material and filter-fineness:**
10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$, 1 VG = 4 $\mu m_{(c)}$ Interpor fleece (glass fibre)
10 WVG = 10 $\mu m_{(c)}$, 3 WVG = 5 $\mu m_{(c)}$ Watersorp-filter element

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM), by agreement

7 **filter element specification:**
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **pump unit:**
P01 = pump unit 01, NG 20.16 (standard-pump unit / setting range 1-15 bar)

9 **motor:** (D = rotary current motor / W = alternating current motor)

motor	electrical connection		volume flow	max. viscosity	max. pressure	on/off switch	cable	doc.-no.
D03 [1)]	230/400V	50Hz	22,7 l/min	10-400 mm²/s	4 bar	-	-	42742-4
D03 [1)]	265/460V	60Hz	27,2 l/min	10-400 mm²/s	4 bar	-	-	42742-4
D34	230/400V	50Hz	22,7 l/min	10-400 mm²/s	4 bar	S	K	
D34	265/460V	60Hz	27,2 l/min	10-400 mm²/s	4 bar	S	K	
W01 [1)]	110V	60Hz	27,2 l/min	10-400 mm²/s	4 bar	-	-	43066-4
W03	230V	50Hz	22,7 l/min	10-400 mm²/s	4 bar	S	K	43044-4
W07	110V	60Hz	27,2 l/min	10-400 mm²/s	4 bar	S	K	43045-4

[1)] standard motor

10 **clogging indicator at M1:**
- = without
O = visual, 2,5 bar

11 **clogging indicator at M2:**
- = without
AOR = AOR.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1606,
AOC = AOC.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1606,
AE = AE30.2,5... electrical at p_1 and p_2, 2,5 bar, see sheet-no. 1609
OP = OP.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1628
OE = OE.2,5..., visual-electrical, at p_1 and p_2, 2,5 bar, see sheet-no. 1628
E1 = E1.2,5 electrical at p_1, 2,5 bar, see sheet-no. 1616
E5 = E5.2,5 electrical at p_1, 2,5 bar, see sheet-no. 1616

1.2. Filter element: (ordering example)

01NR. 250. 6VG. 10. B. P. -

1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 250

3 - 7 see type index-filter unit

Changes of measures and design are subject to alteration!

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2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 250	
2	housing cover	1	30615-3	315437
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	G ¼	305003
5	straining screw	1	30631-4	316404
6	O-ring	1	115 x 5	306640 (NBR)
7	electric motor	1	according to type index	
8	pump unit P01	1	NG 20.16	316270
9	clogging indicator (series)	1	visual ∅ 40	315452
10	clogging indicator	1	according to type index	
11	O-ring	1	18 x 3	304359 (NBR)
12	O-ring	2	52 x 3	314206 (NBR)
13	O-ring	1	32 x 3,5	304378 (NBR)

3. Description:

The stationary filter unit is intended for oil maintenance on hydraulic systems.
The area of application comprises:
- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to bypass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability.
The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 250.
Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 $\mu m_{(c)}$. The contamination level of the filter element can be read off from a pressure display in the cover of the filter.
At a pressure >2,5 bar (red area of the scale field), the filter element is contaminated and it must be replaced with a new filter element.
The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.
To protect against overpressure, the filter unit is fitted with a safety valve. The initial response pressure difference valve is set according to pressure stated in the table on the type plate under item 9. If a different pressure setting is requested, please state the initial response presse with respect to the set pressure range of the pump unit in the plain text when ordering.
Stationary filter units with motors without combined protective motor switch and ON/OFF switch and without any cable with plug (see switch „-", cable „-" under item 9 of the type plate) can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected E-motor and if the switch-off function of the E-motor of the electrical clogging indicator is dise ngaged at 2,5 bar.
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium..

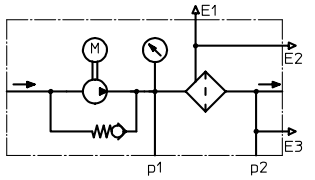
4. Technical data:

filter-fineness:	4, 5, 7 or 10 $\mu m_{(c)}$
weight:	approx. 28 kg
operating medium:	hydraulic oil based on mineral oil from 10 mm²/s, other media on request

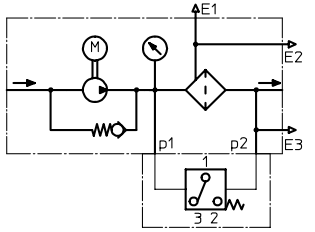
Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:

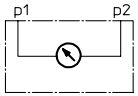
Filter unit without clogging indicator



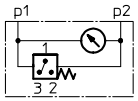
Filter unit with electrical clogging indicator AE30



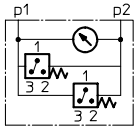
Filter unit with visual clogging indicator AOR, AOC, OP



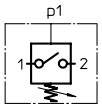
Filter unit with visual-electrical clogging indicator OE1



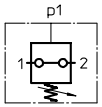
Filter unit with visual-electrical clogging indicator OE2



Filter unit with electrical clogging indicator contact maker E1



Filter unit with electrical clogging indicator contact breaker E5



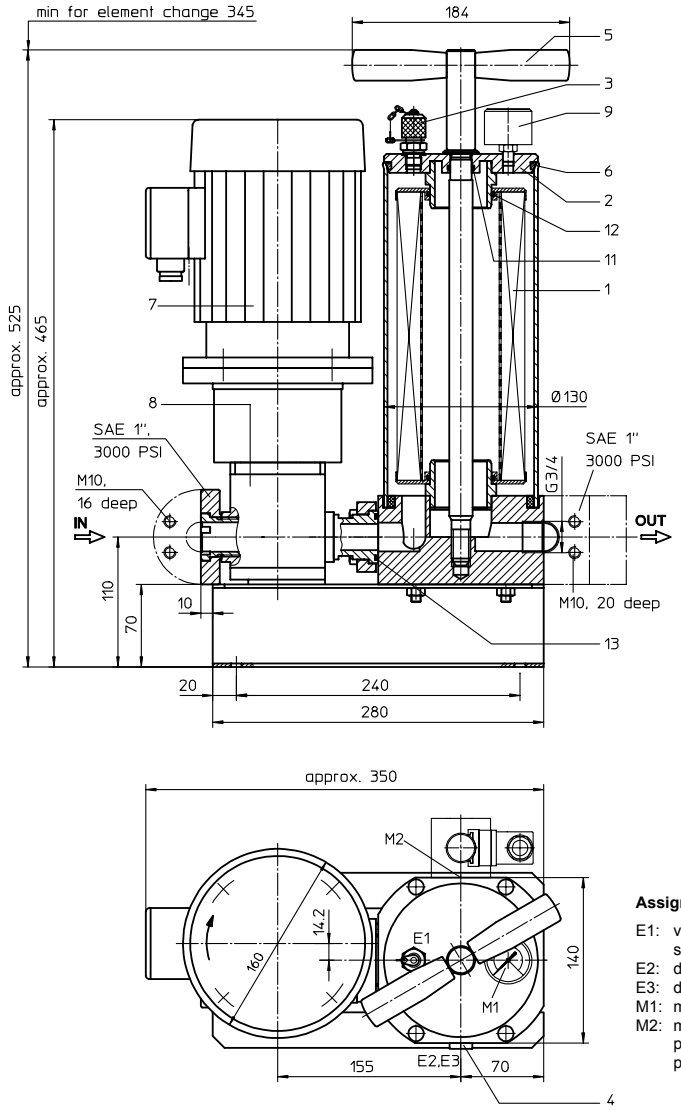
6. Test methods:

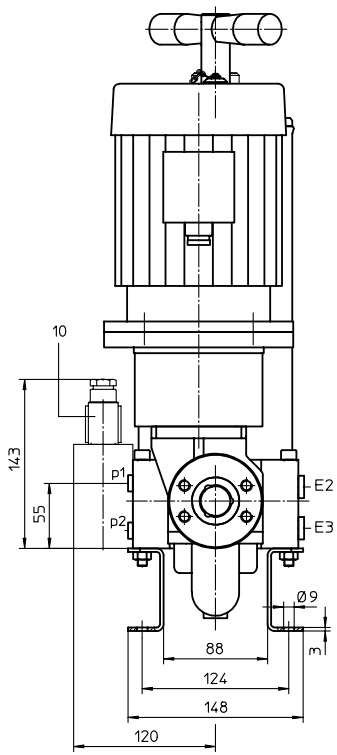
Filter elements are tested according to the following ISO sta ndards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

FILTER UNIT, stationary
Series US 21

- preference version -





Assignment of connections and functions:

E1: venting mini-measuring connection, MA.1.St see sheet-no.1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the housing cover, dirt side
M2: measure connection at filter housing
p_1 = dirt side
p_2 = clean side

Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

EDV 08/06

1. Type index:

1.1. Filter unit: (ordering example)

US. 21. 6VG. 10. B. P. -. P08. D03. O. AE

1	2	3	4	5	6	7	8	9	10	11

1 **series:**
US = filter unit, stationary

2 **nominal size:** 21

3 **filter-material and filter-fineness:**
10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$, 1 VG = 4 $\mu m_{(c)}$ Interpor fleece (glass fibre)
10 WVG = 10 $\mu m_{(c)}$, 3 WVG = 5 $\mu m_{(c)}$ Watersorp-filter element

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM), by agreement

7 **filter element specification:**
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **pump unit:**
P08 = pump unit 08, NG 20.16 (standard-pump unit / setting range 1-15 bar)

9 **motor:** (D = rotary current motor / W = alternating current motor)

motor	electrical connection		volume flow	max. viscosity	max. pressure	on/off switch	cable	doc.-no.
D03 [1]	230/400V	50Hz	22,7 l/min	10-400 mm²/s	4 bar	-	-	42742-4
D03 [1]	265/460V	60Hz	27,2 l/min	10-400 mm²/s	4 bar	-	-	42742-4
D34	230/400V	50Hz	22,7 l/min	10-400 mm²/s	4 bar	S	K	
D34	265/460V	60Hz	27,2 l/min	10-400 mm²/s	4 bar	S	K	
W01 [1]	110V	60Hz	27,2 l/min	10-400 mm²/s	4 bar	-	-	43066-4
W03	230V	50Hz	22,7 l/min	10-400 mm²/s	4 bar	S	K	43044-4
W07	110V	60Hz	27,2 l/min	10-400 mm²/s	4 bar	S	K	43045-4

[1] standard motor

10 **clogging indicator at M1:**
- = without
O = visual, 2,5 bar

11 **clogging indicator at M2:**
- = without
AOR = AOR.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1606,
AOC = AOC.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1606,
AE = AE30.2,5... electrical at p_1 and p_2, 2,5 bar, see sheet-no. 1609
OP = OP.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1628
OE = OE.2,5..., visual-electrical, at p_1 and p_2, 2,5 bar, see sheet-no. 1628
E1 = E1.2,5 electrical at p_1, 2,5 bar, see sheet-no. 1616
E5 = E5.2,5 electrical at p_1, 2,5 bar, see sheet-no. 1616

1.2. Filter element: (ordering example)

01NR. 250. 6VG. 10. B. P. -

1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 250

3 - 7 see type index-filter unit

Changes of measures and design are subject to alteration!

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2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 250	
2	housing cover	1	30615-3	315437
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	G ¼	305003
5	straining screw	1	30631-4	316404
6	O-ring	1	115 x 5	306640 (NBR)
7	electric motor	1	according to type index	
8	pump unit P08	1	NG 20.16	317378
9	clogging indicator (series)	1	visual ∅ 40	315452
10	clogging indicator	1	according to type index	
11	O-ring	1	18 x 3	304359 (NBR)
12	O-ring	2	52 x 3	314206 (NBR)
13	O-ring	1	32 x 3,5	304378 (NBR)

3. Description:

The stationary filter unit is intended for oil maintenance on hydraulic systems.
The area of application comprises:
- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to bypass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability.
The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 250.
Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 $\mu m_{(c)}$. The contamination level of the filter element can be read off from a pressure display in the cover of the filter.
At a pressure >2,5 bar (red area of the scale field), the filter element is contaminated and it must be replaced with a new filter element.
The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.
To protect against overpressure, the filter unit is fitted with a safety valve. The initial response pressure difference valve is set according to pressure stated in the table on the type plate under item 9. If a different pressure setting is requested, please state the initial response presse with respect to the set pressure range of the pump unit in the plain text when ordering.
Stationary filter units with motors without combined protective motor switch and ON/OFF switch and without any cable with plug (see switch „-", cable „-" under item 9 of the type plate) can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected E-motor and if the switch-off function of the E-motor of the electrical clogging indicator is dise ngaged at 2,5 bar.
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium..

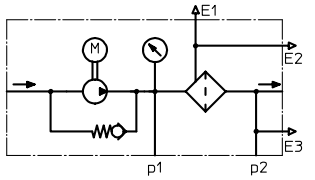
4. Technical data:

filter-fineness:	4, 5, 7 or 10 $\mu m_{(c)}$
weight:	approx. 28 kg
operating medium:	hydraulic oil based on mineral oil from 10 mm²/s, other media on request

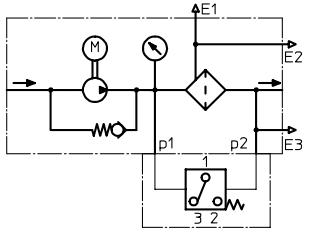
Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:

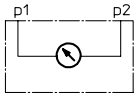
Filter unit without clogging indicator



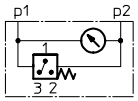
Filter unit with electrical clogging indicator AE30



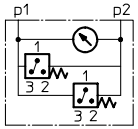
Filter unit with visual clogging indicator AOR, AOC, OP



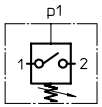
Filter unit with visual-electrical clogging indicator OE1



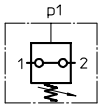
Filter unit with visual-electrical clogging indicator OE2



Filter unit with electrical clogging indicator contact maker E1



Filter unit with electrical clogging indicator contact breaker E5



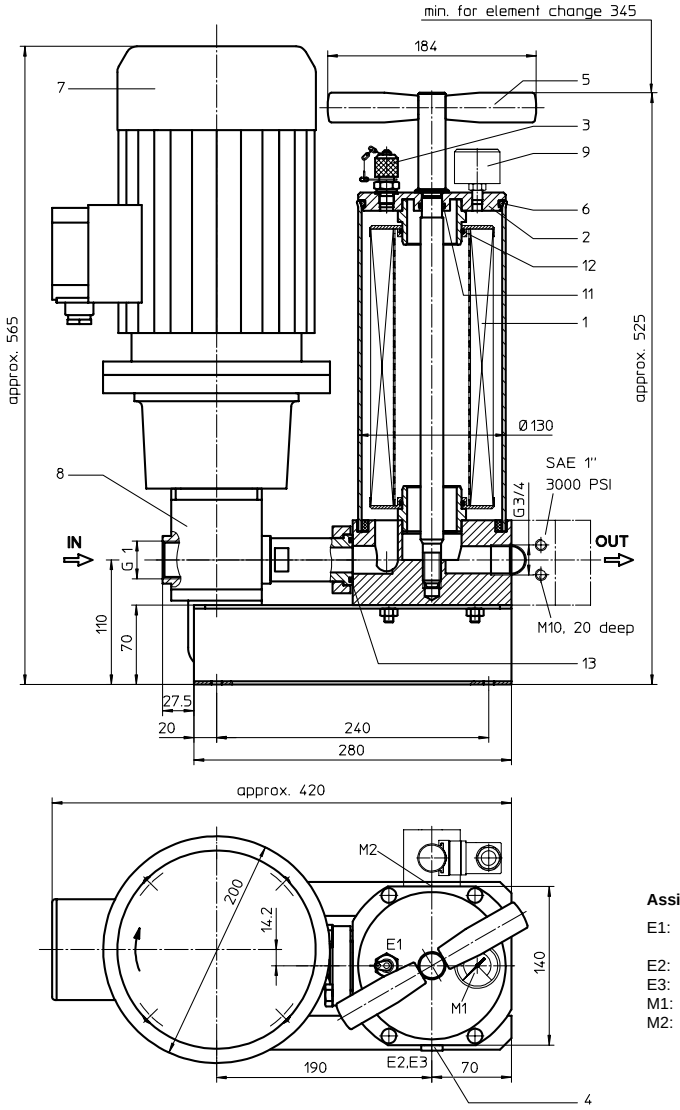
6. Test methods:

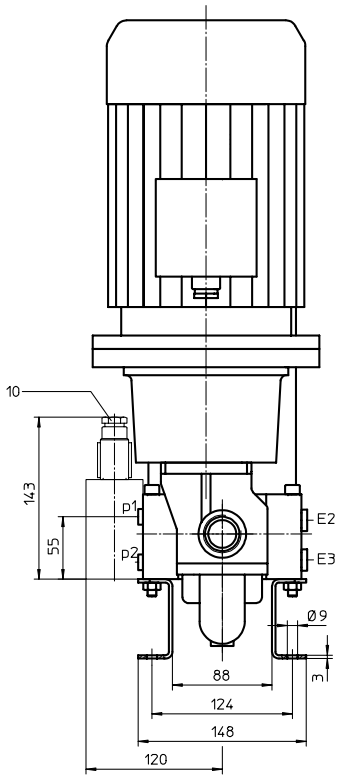
Filter elements are tested according to the following ISO sta ndards:

ISO 2941	Verification of colla pse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow character istics
ISO 16889	Multi-pass method for evaluating filtration performance

FILTER UNIT, stationary
Series US 22

- preference version -





Assignment of connections and functions:

E1: venting mini-measuring connection, MA.1.St see sheet-no.1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the housing cover, dirt side
M2: measure connection at filter housing
p_1 = dirt side
p_2 = clean side

Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

EDV 11/07

1. Type index:

1.1. Filter unit: (ordering example)

US.	22.	6VG.	10.	B.	P.	-.	P14.	D13.	O.	AE
1	2	3	4	5	6	7	8	9	10	11

1 **series:**
US = filter unit, stationary

2 **nominal size:** 22

3 **filter-material and filter-fineness:**
10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$, 1 VG = 4 $\mu m_{(c)}$ Interpor fleece (glass fibre)
10 WVG = 10 $\mu m_{(c)}$, 3 WVG = 5 $\mu m_{(c)}$ Watersorp-filter element

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM), by agreement

7 **filter element specification:**
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **pump unit:**
P14 = pump unit 14, NG 20.16 (standard-pump unit / setting range 1-15 bar)

9 **motor:** (D = rotary current motor)

motor	electrical connection		volume flow	max. viscosity	max. pressure	on/off switch	cable	doc.-no.
D12	230/400V	50Hz	11,4 l/min	10-1200 mm²/s	15 bar	S	K	42743-4
D12	265/460V	60Hz	13,6 l/min	10-1000 mm²/s	15 bar	S	K	42743-4
D13[1)]	230/400V	50Hz	11,4 l/min	10-3000 mm²/s	7 bar	-	-	43656-4
D13[1)]	265/460V	60Hz	13,6 l/min	10-2500 mm²/s	7 bar	-	-	43656-4
D26	400/690V	50Hz	11,4 l/min	10-1200 mm²/s	7 bar	-	-	44908-4
D26	460/790V	60Hz	13,6 l/min	10-1000 mm²/s	7 bar	-	-	44908-4

[1)] standard motor

10 **clogging indicator at M1:**
- = without
O = visual, 2,5 bar

11 **clogging indicator at M2:**
- = without
AOR = AOR.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1606,
AOC = AOC.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1606,
AE = AE30.2,5... electrical at p_1 and p_2, 2,5 bar, see sheet-no. 1609
OP = OP.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1628
OE = OE.2,5..., visual-electrical, at p_1 and p_2, 2,5 bar, see sheet-no. 1628
E1 = E1.2,5 electrical at p_1 , 2,5 bar, see sheet-no. 1616
E5 = E5.2,5 electrical at p_1 , 2,5 bar, see sheet-no. 1616

1.2. Filter element: (ordering example)

01NR.	250.	6VG.	10.	B.	P.	-
1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 250

3 - 7 see type index-filter unit

Changes of measures and design are subject to alteration!

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2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 250	
2	housing cover	1	30615-3	315437
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	G ¼	305003
5	straining screw	1	30631-4	316404
6	O-ring	1	115 x 5	306640 (NBR)
7	electric motor	1	according to type index	
8	pump unit P14	1	NG 20.16	319735
9	clogging indicator (series)	1	visual ∅ 40	315452
10	clogging indicator	1	according to type index	
11	O-ring	1	18 x 3	304359 (NBR)
12	O-ring	2	52 x 3	314206 (NBR)
13	O-ring	1	32 x 3,5	304378 (NBR)

3. Description:

The stationary filter unit is intended for oil maintenance on hydraulic systems.
The area of application comprises:
- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to bypass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability.
The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 250.
Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 $\mu m_{(c)}$. The contamination level of the filter element can be read off from a pressure display in the cover of the filter.
At a pressure >2,5 bar (red area of the scale field), the filter element is contaminated and it must be replaced with a new filter element.
The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.
To protect against overpressure, the filter unit is fitted with a safety valve. The initial response pressure difference valve is set according to pressure stated in the table on the type plate under item 9. If a different pressure setting is requested, please state the initial response presse with respect to the set pressure range of the pump unit in the plain text when ordering.
Stationary filter units with motors without combined protective motor switch and ON/OFF switch and without any cable with plug (see switch „-", cable „-" under item 9 of the type plate) can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected E-motor and if the switch-off function of the E-motor of the electrical clogging indicator is dise ngaged at 2,5 bar.
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium..

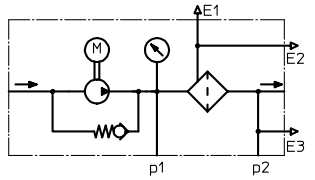
4. Technical data:

filter-fineness:	4, 5, 7 or 10 $\mu m_{(c)}$
weight:	approx. 35 kg
operating medium:	hydraulic oil based on mineral oil from 10 mm²/s, other media on request

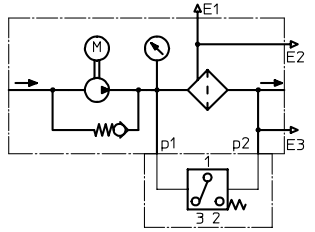
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:

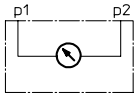
Filter unit without clogging indicator



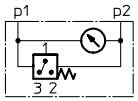
Filter unit with electrical clogging indicator AE30



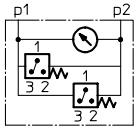
Filter unit with visual clogging indicator AOR, AOC, OP



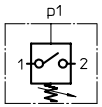
Filter unit with visual-electrical clogging indicator OE1



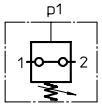
Filter unit with visual-electrical clogging indicator OE2



Filter unit with electrical clogging indicator contact maker E1



Filter unit with electrical clogging indicator contact breaker E5

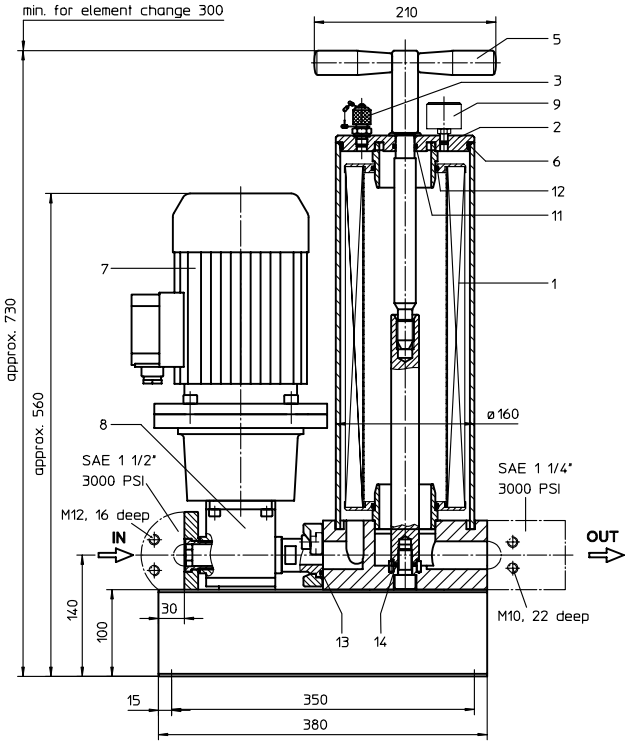


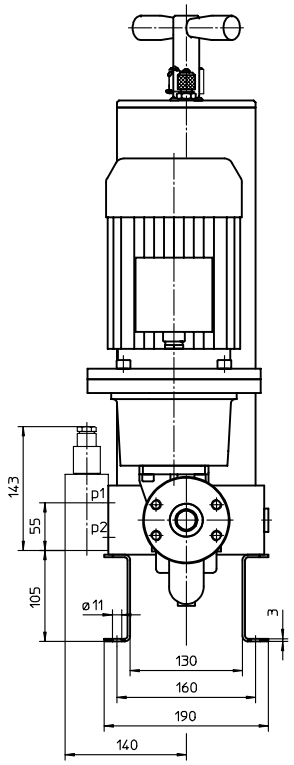
6. Test methods:

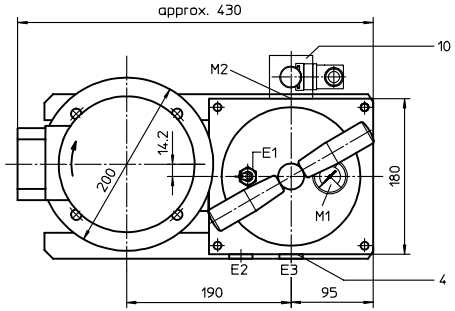
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

- preference version -







Assignment of connections and functions:

E1: venting mini-measuring connection, MA.1.St see sheet-no.1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the housing cover, dirt side
M2: measure connection at filter housing
p_1 = dirt side
p_2 = clean side

Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

EDV 08/06

FILTER UNIT, stationary
Series US 40

Sheet No. **4011.1 F**
Sheet 1/2

1. Type index:

1.1. Filter unit: (ordering example)

US. 40. 6VG. 10. B. P. -. P05. D05. O. AE

1	2	3	4	5	6	7	8	9	10	11

1 **series:**
US = filter unit, stationary

2 **nominal size:** 40

3 **filter-material and filter-fineness:**
10 VG = 10 µm(c), 6 VG = 7 µm(c), 3 VG = 5 µm(c), 1 VG = 4 µm(c) Interpor fleece (glass fibre)
10 WVG = 10 µm(c), 3 WVG = 5 µm(c) Watersorp-filter element

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM), by agreement

7 **filter element specification:**
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **pump unit:**
P05 = pump unit 05, NG 40.25 (standard-pump unit / setting range 1-15 bar)

9 **motor:** (D = rotary current motor / W = alternating current motor)

motor	electrical connection		volume flow	max. viscosity	max. pressure	on/off switch	cable	doc.-no.
D05 [1]	230/400V	50Hz	35,5 l/min	10-400 mm²/s	6 bar	-	-	42549-4
D05 [1]	265/460V	60Hz	42,5 l/min	10-400 mm²/s	6 bar	-	-	42549-4
W10	230V	50Hz	35,5 l/min	10-400 mm²/s	6 bar	S	K	42754-4
W11	110V	60Hz	42,5 l/min	10-400 mm²/s	6 bar	S	K	42877-4

[1] standard motor

10 **clogging indicator at M1:**
- = without
O = visual, 2,5 bar

11 **clogging indicator at M2:**
- = without
AOR = AOR.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1606,
AOC = AOC.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1606,
AE = AE30.2,5... electrical at p_1 and p_2, 2,5 bar, see sheet-no. 1609
OP = OP.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1628
OE = OE.2,5..., visual-electrical, at p_1 and p_2, 2,5 bar, see sheet-no. 1628
E1 = E1.2,5 electrical at p_1, 2,5 bar, see sheet-no. 1616
E5 = E5.2,5 electrical at p_1, 2,5 bar, see sheet-no. 1616

1.2. Filter element: (ordering example)

01NR. 630. 6VG. 10. B. P. -

1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 630

3 - 7 see type index-filter unit

Changes of measures and design are subject to alteration!

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2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 630	
2	housing cover	1	30600-3	315492
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	G ½	304678
5	straining screw	1	30595-3	316312
6	O-ring	1	140 x 6	315392 (NBR)
7	electric motor	1	according to type index	
8	pump unit P05	1	NG 40.25	316292
9	clogging indicator (series)	1	visual ∅ 40	315452
10	clogging indicator	1	according to type index	
11	O-ring	1	22 x 3	304387 (NBR)
12	O-ring	2	70 x 4	306253 (NBR)
13	O-ring	1	37,69 x 3,53	304353 (NBR)
14	O-ring	1	18 x 3	304359 (NBR)

3. Description:

The stationary filter unit is intended for oil maintenance on hydraulic systems.
The area of application comprises:
- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability.
The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 630.
Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 $\mu m_{(c)}$. The contamination level of the filter element can be read off from a pressure display in the cover of the filter.
At a pressure >2,5 bar (red area of the scale field), the filter element is contaminated and it must be replaced with a new filter element.
The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.
To protect against overpressure, the filter unit is fitted with a safety valve. The initial response pressure difference valve is set according to pressure stated in the table on the type plate under item 9. If a different pressure setting is requested, please state the initial response presse with respect to the set pressure range of the pump unit in the plain text when ordering.
Stationary filter units with motors without combined protective motor switch and ON/OFF switch and without any cable with plug (see switch „-“, cable „-“ under item 9 of the type plate) can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected E-motor and if the switch-off function of the E-motor of the electrical clogging indicator is dise ngaged at 2,5 bar.
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium.

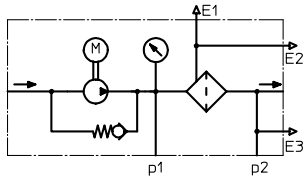
4. Technical data:

filter-fineness:	4, 5, 7 or 10 $\mu m_{(c)}$
weight:	approx. 38 kg
operating medium:	hydraulic oil based on mineral oil from 10 mm²/s, other media on request

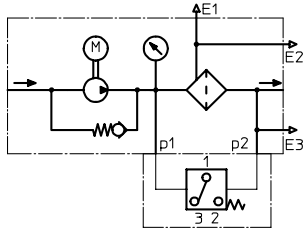
Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:

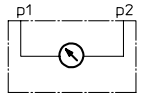
Filter unit without clogging indicator



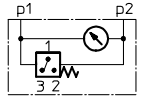
Filter unit with electrical clogging indicator AE30



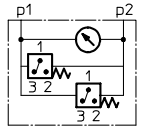
Filter unit with visual clogging indicator AOR, AOC, OP



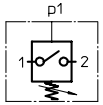
Filter unit with visual-electrical clogging indicator OE1



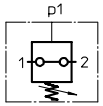
Filter unit with visual-electrical clogging indicator OE2



Filter unit with electrical clogging indicator contact maker E1



Filter unit with electrical clogging indicator contact breaker E5



6. Test methods:

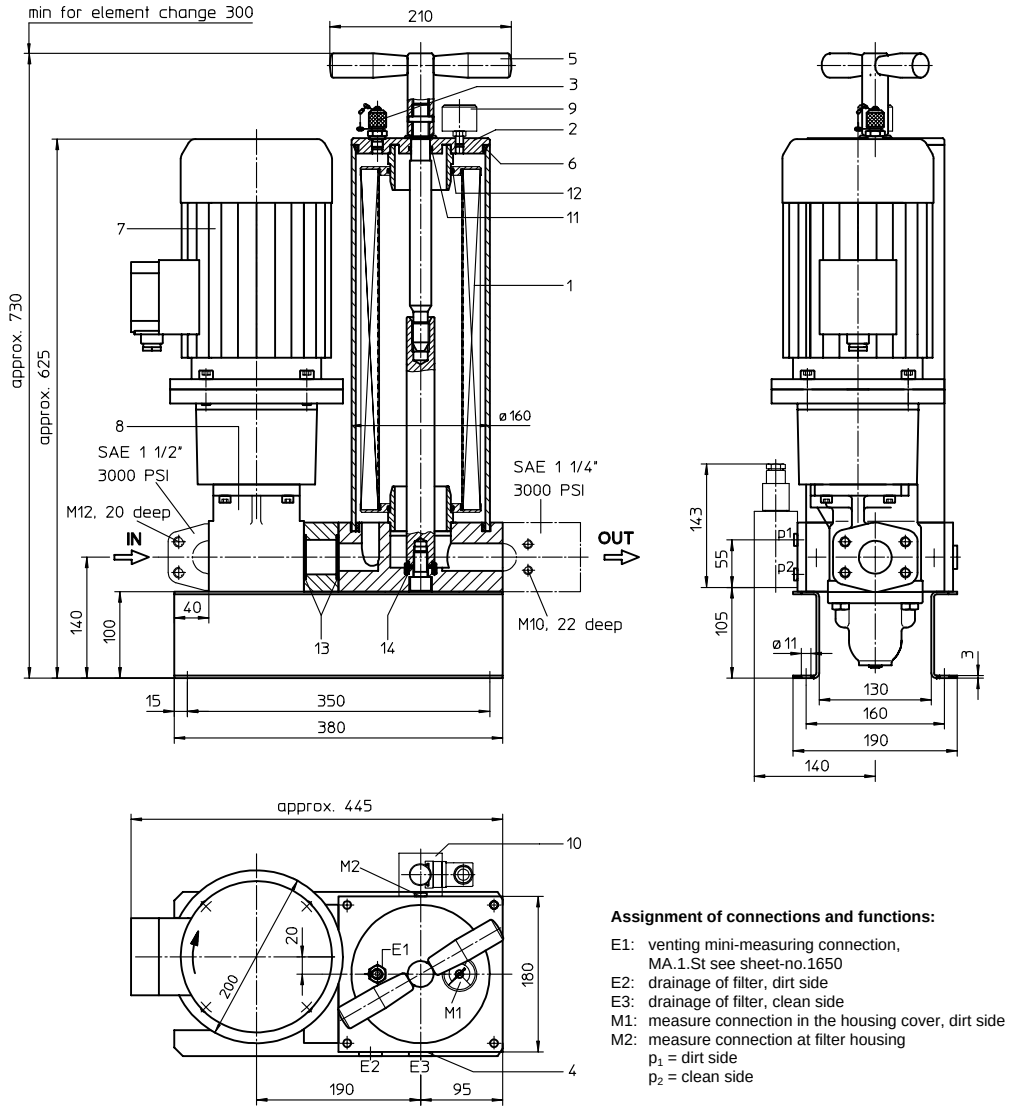
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

FILTER UNIT, stationary
Series US 80

Sheet No.
4009.1 E
Sheet 1/2

- preference version -



Assignment of connections and functions:

E1: venting mini-measuring connection, MA.1.St see sheet-no.1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the housing cover, dirt side
M2: measure connection at filter housing
p_1 = dirt side
p_2 = clean side

Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

EDV 08/06

1. Type index:

1.1. Filter unit: (ordering example)

US. 80. 6VG. 10. B. P. -. P04. D01. O. AE

1	2	3	4	5	6	7	8	9	10	11

1 **series:**
US = filter unit, stationary

2 **nominal size:** 80

3 **filter-material and filter-fineness:**
10 VG = 10 µm$_{(c)}$, 6 VG = 7 µm$_{(c)}$, 3 VG = 5 µm$_{(c)}$, 1 VG = 4 µm$_{(c)}$ Interpor fleece (glass fibre)
10 WVG = 10 µm$_{(c)}$, 3 WVG = 5 µm$_{(c)}$ Watersorp-filter element

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR), V = Viton (FPM), by agreement

7 **filter element specification:**
- = standard, VA = stainless steel, IS06 = see sheet-no. 31601

8 **pump unit:**
P04 = pump unit 04, NG 80.50 (standard-pump unit / setting range 1-15 bar)

9 **motor:** (D = rotary current motor / W = alternating current motor)

motor	electrical connection		volume flow	max. viscosity	max. pressure	on/off switch	cable	doc.-no.
D01 [1)]	230/400V	50Hz	71,0 l/min	10-400 mm²/s	5 bar	-	-	41969-4
D01 [1)]	265/460V	60Hz	85,0 l/min	10-400 mm²/s	5 bar	-	-	41969-4
D17	230/400V	50Hz	71,0 l/min	10-400 mm²/s	9 bar	S	K	
D17	265/460V	60Hz	85,0 l/min	10-400 mm²/s	8 bar	S	K	
D18	230/400V	50Hz	47,5 l/min	10-800 mm²/s	4 bar	-	-	
D18	265/460V	60Hz	57,0 l/min	10-650 mm²/s	4 bar	-	-	
D31	230/400V	50Hz	71,0 l/min	10-400 mm²/s	15 bar	-	-	
D31	265/460V	60Hz	85,0 l/min	10-400 mm²/s	15 bar	-	-	
W06	230V	50Hz	71,0 l/min	10-400 mm²/s	5 bar	S	K	43056-4
W09	110V	60Hz	85,0 l/min	10-400 mm²/s	4 bar	S	K	43057-4
W12 [1)]	110V	60Hz	85,0 l/min	10-400 mm²/s	4 bar	-	-	43067-4
W18	230V	50Hz	71,0 l/min	10-400 mm²/s	9 bar	S	K	43060-4

[1)] standard motor

10 **clogging indicator at M1:**
- = without
O = visual, 2,5 bar

11 **clogging indicator at M2:**
- = without
AOR = AOR.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1606,
AOC = AOC.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1606,
AE = AE30.2,5... electrical at p_1 and p_2, 2,5 bar, see sheet-no. 1609
OP = OP.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1628
OE = OE.2,5..., visual-electrical, at p_1 and p_2, 2,5 bar, see sheet-no. 1628
E1 = E1.2,5 electrical at p_1, 2,5 bar, see sheet-no. 1616
E5 = E5.2,5 electrical at p_1, 2,5 bar, see sheet-no. 1616

1.2. Filter element: (ordering example)

01NR. 630. 6VG. 10. B. P. -

1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 630

3 - 7 see type index-filter unit

Changes of measures and design are subject to alter ation!

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2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 630	
2	housing cover	1	30600-3	315492
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	G ½	304678
5	straining screw	1	30595-3	316312
6	O-ring	1	140 x 6	315392 (NBR)
7	electric motor	1	according to type index	
8	pump unit P04	1	NG 80.50	317139
9	clogging indicator (series)	1	visual ∅ 40	315452
10	clogging indicator	1	according to type index	
11	O-ring	1	22 x 3	304387 (NBR)
12	O-ring	2	70 x 4	306253 (NBR)
13	O-ring	2	45 x 3	304991 (NBR)
14	O-ring	1	18 x 3	304359 (NBR)

3. Description:

The stationary filter unit is intended for oil maintenance on hydraulic systems.
The area of application comprises:
- secondary flow filtration in addition to the existing operatin g filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability.
The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 630.
Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 $\mu m_{(c)}$. The contamination level of the filter element can be read off from a pressure display in the cover of the filter.
At a pressure >2,5 bar (red area of the scale field), the filter element is contaminated and it must be replaced with a new filter element.
The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.
To protect against overpressure, the filter unit is fitted with a safety valve. The initial response pressure difference valve is set according to pressure stated in the table on the type plate under item 9. If a different pressure setting is requested, please state the initial response presse with respect to the set pressure range of the pump unit in the plain text when ordering.
Stationary filter units with motors without combined protective motor switch and ON/OFF switch and without any cable with plug (see switch „-“, cable „-“ under item 9 of the type plate) can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected E-motor and if the switch-off function of the E-motor of the electrical clogging indicator is dise ngaged at 2,5 bar.
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium.

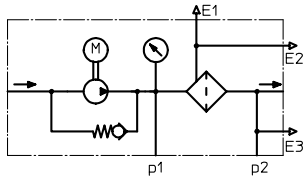
4. Technical data:

filter-fineness:	4, 5, 7 or 10 $\mu m_{(c)}$
weight:	approx. 59 kg
operating medium:	hydraulic oil based on mineral oil from 10 mm²/s, other media on request

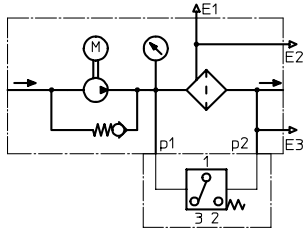
Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:

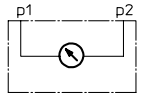
Filter unit without clogging indicator



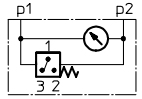
Filter unit with electrical clogging indicator AE30



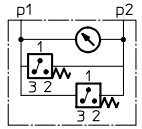
Filter unit with visual clogging indicator AOR, AOC, OP



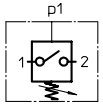
Filter unit with visual-electrical clogging indicator OE1



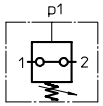
Filter unit with visual-electrical clogging indicator OE2



Filter unit with electrical clogging indicator contact maker E1



Filter unit with electrical clogging indicator contact breaker E5

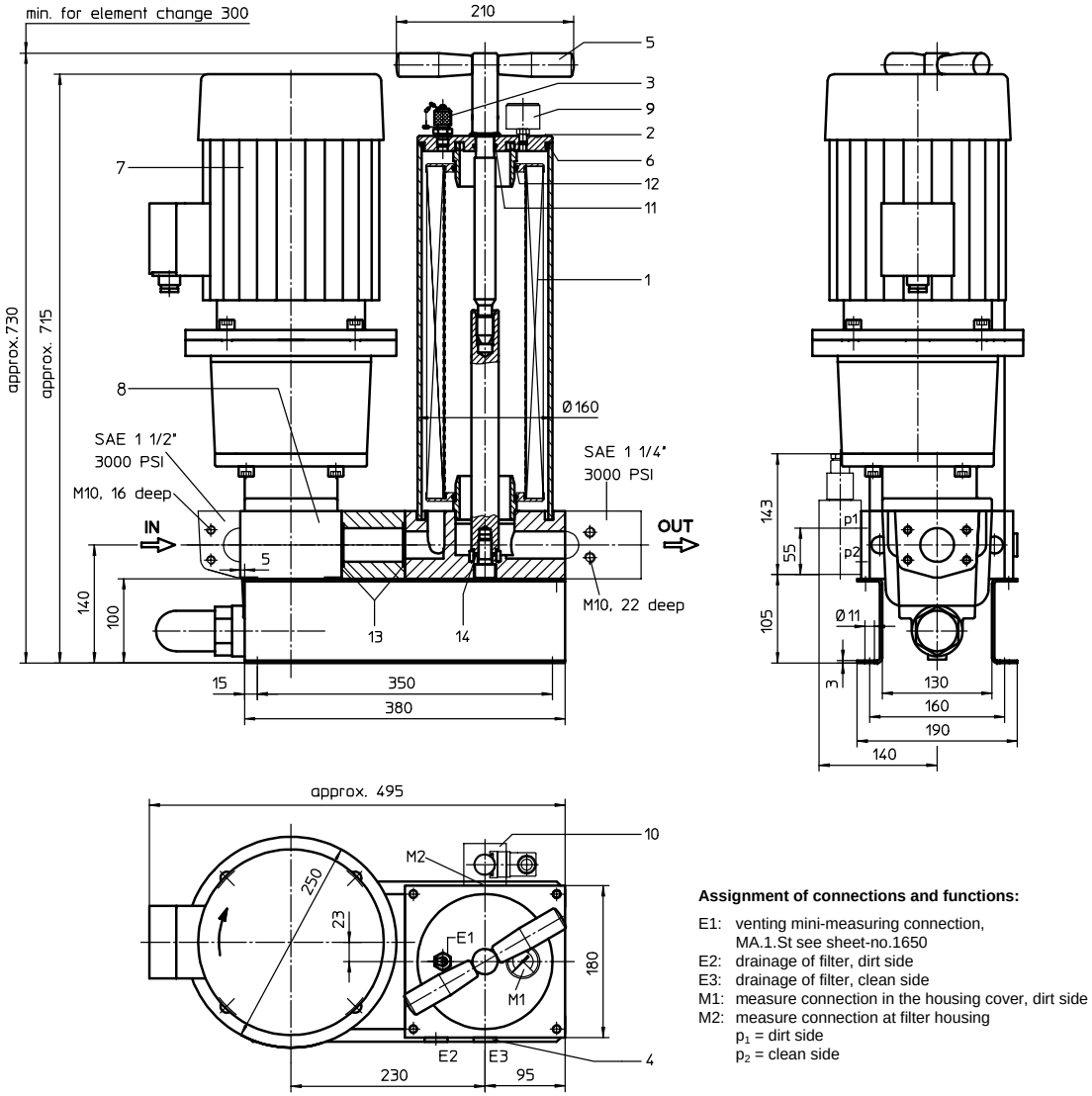


6. Test methods:

Filter elements are tested according to the following ISO sta ndards:

ISO 2941	Verification of colla pse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow character istics
ISO 16889	Multi-pass method for evaluating filtration performance

- preference version -



Assignment of connections and functions:

E1: venting mini-measuring connection, MA.1.St see sheet-no.1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the housing cover, dirt side
M2: measure connection at filter housing
p_1 = dirt side
p_2 = clean side

Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

EDV 02/08

FILTER UNIT, stationary
Series US 160

Sheet No. **4010.1 G**
Sheet 1/3

1. Type index:

1.1. Filter unit: (ordering example)

US.	160.	6VG.	10.	B.	P.	-.	P03.	D04.	O.	AE
1	2	3	4	5	6	7	8	9	10	11

1 **series:**
US = filter unit, stationary

2 **nominal size:** 160

3 **filter-material and filter-fineness:**
10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$, 1 VG = 4 $\mu m_{(c)}$ Interpor fleece (glass fibre)
10 WVG = 10 $\mu m_{(c)}$, 3 WVG = 5 $\mu m_{(c)}$ Watersorp-filter element

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR), V = Viton (FPM), by agreement

7 **filter element specification:**
- = standard
IS06 = see sheet-no. 31601
VA = stainless steel

8 **pump unit:**
P03 = pump unit 03, NG 160.100 (standard-pump unit / setting range 4-8 bar)

9 **motor:** (D = rotary current motor)

motor	electrical connection		volume flow	max. viscosity	max. pressure	on/off switch	cable	doc.-no.
D04 [1)]	230/400V	50Hz	142,0 l/min	10-400 mm²/s	4 bar	-	-	42485-4
D04 [1)]	265/460V	60Hz	170,0 l/min	10-400 mm²/s	4 bar	-	-	42485-4
D06	110/190V	50Hz	142,0 l/min	10-400 mm²/s	4 bar	-	-	
D08	400/690V	50Hz	142,0 l/min	10-400 mm²/s	8 bar	-	-	42744.4
D08	460/790V	60Hz	170,0 l/min	10-400 mm²/s	8 bar	-	-	42744-4
D19	400/690V	50Hz	95,0 l/min	10-600 mm²/s	4 bar	-	-	34374-4
D19	460/790V	60Hz	114,0 l/min	10-600 mm²/s	4 bar	-	-	34374-4
D24	400/690V	50Hz	142,0 l/min	10-400 mm²/s	8 bar	-	-	48816-4
D24	460/790V	60Hz	170,0 l/min	10-400 mm²/s	8 bar	-	-	48816-4

[1)] standard motor

10 **clogging indicator at M1:**
- = without
O = visual, 2,5 bar

11 **clogging indicator at M2:**
- = without
AOR = AOR.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1606,
AOC = AOC.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1606,
AE = AE30.2,5... electrical at p_1 and p_2, 2,5 bar, see sheet-no. 1609
OP = OP.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1628
OE = OE.2,5..., visual-electrical, at p_1 and p_2, 2,5 bar, see sheet-no. 1628
E1 = E1.2,5 electrical at p_1, 2,5 bar, see sheet-no. 1616
E5 = E5.2,5 electrical at p_1, 2,5 bar, see sheet-no. 1616

1.2. Filter element: (ordering example)

01NR.	630.	6VG.	10.	B.	P.	-
1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 630

3 - 7 see type index-filter unit

Changes of measures and design are subject to alter ation!

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2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 630	
2	housing cover	1	30600-3	315492
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	G ½	304678
5	straining screw	1	30595-3	316312
6	O-ring	1	140 x 6	315392 (NBR)
7	electric motor	1	according to type index	
8	pump unit P03	1	NG 160.100	316275
9	clogging indicator (series)	1	visual ∅ 40	315452
10	clogging indicator	1	according to type index	
11	O-ring	1	22 x 3	304387 (NBR)
12	O-ring	2	70 x 4	306253 (NBR)
13	O-ring	2	45 x 3	304991 (NBR)
14	O-ring	1	18 x 3	304359 (NBR)

3. Description:

The stationary filter unit is intended for oil maintenance on hydraulic systems.
The area of application comprises:
- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability.
The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 630.
Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 $\mu m_{(c)}$. The contamination level of the filter element can be read off from a pressure display in the cover of the filter.
At a pressure >2,5 bar (red area of the scale field), the filter element is contaminated and it must be replaced with a new filter element.
The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.
To protect against overpressure, the filter unit is fitted with a safety valve. The initial response pressure difference valve is set according to pressure stated in the table on the type plate under item 9. If a different pressure setting is requested, please state the initial response presse with respect to the set pressure range of the pump unit in the plain text when ordering.
Stationary filter units with motors without combined protective motor switch and ON/OFF switch and without any cable with plug (see switch „-", cable „-" under item 9 of the type plate) can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected E-motor and if the switch-off function of the E-motor of the electrical clogging indicator is dise ngaged at 2,5 bar.
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium.

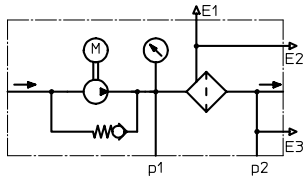
4. Technical data:

filter-fineness:	4, 5, 7 or 10 $\mu m_{(c)}$
weight:	approx. 95 kg
operating medium:	hydraulic oil based on mineral oil from 10 mm²/s, other media on request

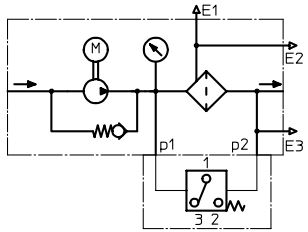
Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:

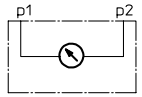
Filter unit without clogging indicator



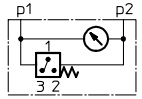
Filter unit with electrical clogging indicator AE30



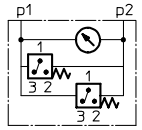
Filter unit with visual clogging indicator AOR, AOC, OP



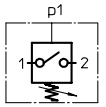
Filter unit with visual-electrical clogging indicator OE1



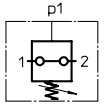
Filter unit with visual-electrical clogging indicator OE2



Filter unit with electrical clogging indicator contact maker E1



Filter unit with electrical clogging indicator contact breaker E5



6. Test methods:

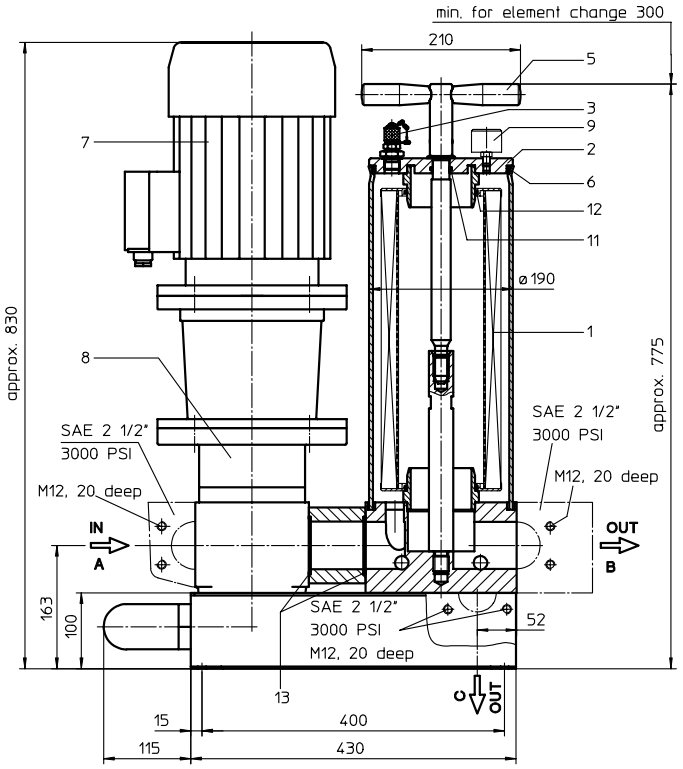
Filter elements are tested according to the following ISO standards:

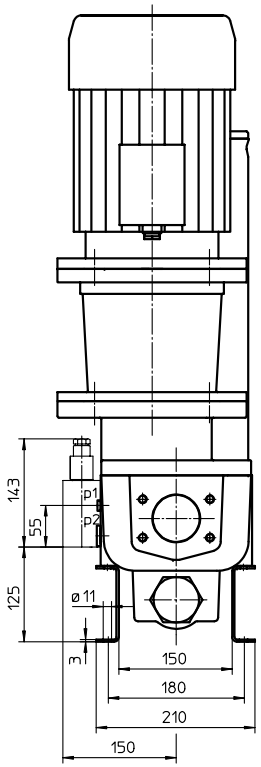
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

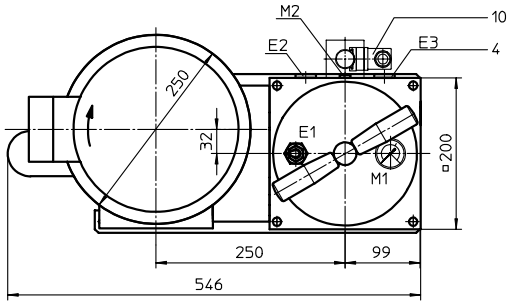
FILTER UNIT, stationary
Series US 320

Sheet No. **4012.1 E**
Sheet 1/2

- preference version -







Assignment of connections and functions:

E1: venting mini-measuring connection, MA.1.St see sheet-no.1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the housing cover, dirt side
M2: measure connection at filter housing
p_1 = dirt side
p_2 = clean side

Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

1. Type index:

1.1. Filter unit: (ordering example)

US.	320.	6VG.	10.	B.	P.	-.	P06.	D08.	3.	O.	AE
1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
US = filter unit, stationary

2 **nominal size:** 320

3 **filter-material and filter-fineness:**
10 VG = 10 µm$_{(c)}$, 6 VG = 7 µm$_{(c)}$, 3 VG = 5 µm$_{(c)}$, 1 VG = 4 µm$_{(c)}$ Interpor fleece (glass fibre)
10 WVG = 10 µm$_{(c)}$, 3 WVG = 5 µm$_{(c)}$ Watersorp-filter element

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR), V = Viton (FPM) , by agreement

7 **filter element specification:**
- = standard, VA = stainless steel, IS06 = see sheet-no. 31601

8 **pump unit:**
P06 = pump unit 06, NG 320.200 (standard-pump-unit / setting range 4-8 bar)

9 **motor:** (D = rotary current motor)

motor	electrical connection		volume flow	max. viscosity	max. pressure	on/off switch	cable	doc.-no.
D08[1)]	400/690V	50Hz	284,0 l/min	10-100 mm²/s	4 bar	-	-	42744-4
D08[1)]	460/790V	60Hz	340,0 l/min	10-100 mm²/s	4 bar	-	-	42744-4
D24	400/690V	50Hz	284,0 l/min	10-100 mm²/s	4 bar	-	-	48816-4
D24	460/790V	60Hz	340,0 l/min	10-100 mm²/s	4 bar	-	-	48816-4

[1)] standard motor

10 **connection variant:**

variant	connection A		connection B		connection C	
	type	size	type	size	type	size
3	FS	9	FS	9	-	-
4	FS	9	FS	9	FS	9

type: FS = flange SAE 3000 PSI
size: 9 = 2 ½"
- = no connection

11 **clogging indicator at M1:**
- = without, O = visual, 2,5 bar

12 **clogging indicator at M2:**
- = without
AOR = AOR.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1606,
AOC = AOC.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1606,
AE = AE30.2,5... electrical at p_1 and p_2, 2,5 bar, see sheet-no. 1609
OP = OP.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1628
OE = OE.2,5..., visual-electrical, at p_1 and p_2, 2,5 bar, see sheet-no. 1628
E1 = E1.2,5 electrical at p_1 , 2,5 bar, see sheet-no. 1616
E5 = E5.2,5 electrical at p_1 , 2,5 bar, see sheet-no. 1616

1.2. Filter element: (ordering example)

01NR.	1000.	6VG.	10.	B.	P.	-
1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 1000

3 - 7 see type index-filter unit

Changes of measures and design are subject to alter ation!

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2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 1000	
2	housing cover	1	22496-3	313837
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	G ½	304678
5	straining screw	1	31067-3	316893
6	O-ring	1	170 x 6	304799 (NBR)
7	electric motor	1	according to type index	
8	pump unit P06	1	NG 320.200	316838
9	clogging indicator (series)	1	visual ∅ 40	315452
10	clogging indicator	1	according to type index	
11	O-ring	1	22 x 3	304387 (NBR)
12	O-ring	2	90 x 4	306941 (NBR)
13	O-ring	2	69,45 x 3,53	305868 (NBR)

3. Description:

The stationary filter unit is intended for oil maintenance on hydraulic systems.
The area of application comprises:
- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability.
The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 1000.
Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 $\mu m_{(c)}$. The contamination level of the filter element can be read off from a pressure display in the cover of the filter.
At a pressure >2,5 bar (red area of the scale field), the filter element is contaminated and it must be replaced with a new filter element.
The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.
To protect against overpressure, the filter unit is fitted with a safety valve. The initial response pressure difference valve is set according to pressure stated in the table on the type plate under item 9. If a different pressure setting is requested, please state the initial response presse with respect to the set pressure range of the pump unit in the plain text when ordering.
Stationary filter units with motors without combined protective motor switch and ON/OFF switch and without any cable with plug (see switch „-“, cable „-“ under item 9 of the type plate) can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected E-motor and if the switch-off function of the E-motor of the electrical clogging indicator is dise ngaged at 2,5 bar.
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium.

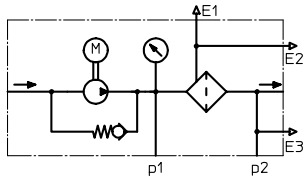
4. Technical data:

filter-fineness:	4, 5, 7 or 10 $\mu m_{(c)}$
weight:	approx. 110 kg
operating medium:	hydraulic oil based on mineral oil from 10 mm²/s, other media on request

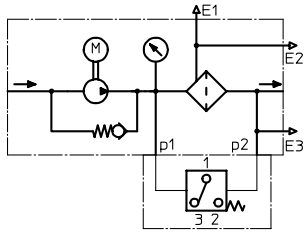
Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:

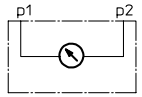
Filter unit without clogging indicator



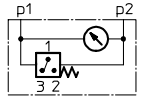
Filter unit with electrical clogging indicator AE30



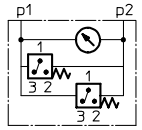
Filter unit with visual clogging indicator AOR, AOC, OP



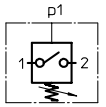
Filter unit with visual-electrical clogging indicator OE1



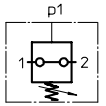
Filter unit with visual-electrical clogging indicator OE2



Filter unit with electrical clogging indicator contact maker E1



Filter unit with electrical clogging indicator contact breaker E5



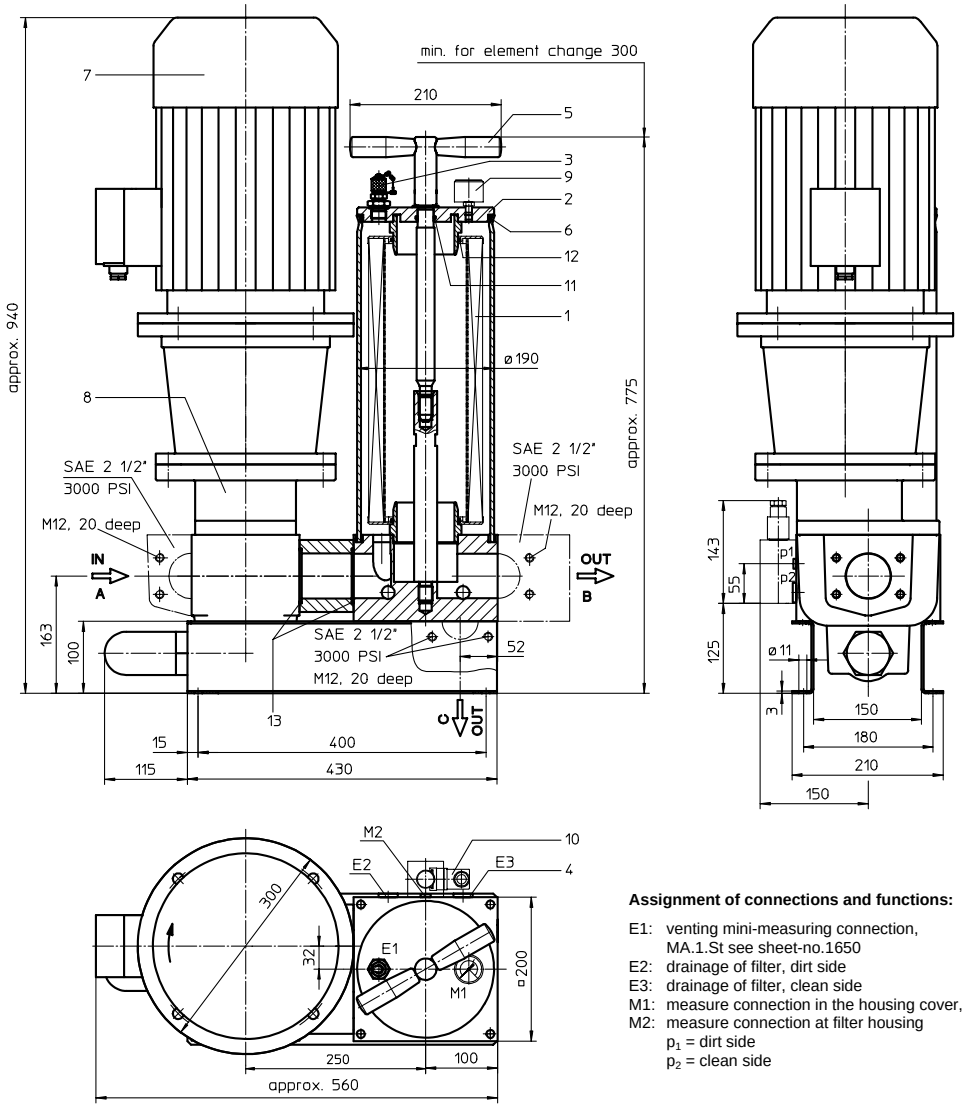
6. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

FILTER UNIT, stationary
Series US 321

- preference version -



Assignment of connections and functions:

E1: venting mini-measuring connection, MA.1.St see sheet-no.1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the housing cover, dirt side
M2: measure connection at filter housing
p_1 = dirt side
p_2 = clean side

Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

1. Type index:

1.1. Filter unit: (ordering example)

US.	321.	6VG.	10.	B.	P.	-.	P07.	D07.	3.	O.	AE
1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
US = filter unit, stationary

2 **nominal size:** 321

3 **filter-material and filter-fineness:**
10 VG = 10 µm(c), 6 VG = 7 µm(c), 3 VG = 5 µm(c), 1 VG = 4 µm(c) Interpor fleece (glass fibre)
10 WVG = 10 µm(c), 3 WVG = 5 µm(c) Watersorp-filter element

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR), V = Viton (FPM) , by agreement

7 **filter element specification:**
- = standard, VA = stainless steel, IS06 = see sheet-no. 31601

8 **pump unit:**
P07 = pump unit 07, NG 320.200 (standard-pump-unit / setting range 4-8 bar)

9 **motor:** (D = rotary current motor)

motor	electrical connection		volume flow	max. viscosity	max. pressure	on/off switch	cable	doc.-no.
D07 [1]	400/690V	50Hz	284,0 l/min	10-400 mm²/s	4 bar	-	-	34378-4
D07 [1]	460/790V	60Hz	340,0 l/min	10-400 mm²/s	4 bar	-	-	34378-4
D22	400/690V	50Hz	190,0 l/min	10-800 mm²/s	6 bar	-	-	34486-4
D22	460/790V	60Hz	228,0 l/min	10-800 mm²/s	6 bar	-	-	34486-4

[1] standard motor

10 **connection variant:**

variant	connection A		connection B		connection C	
	type	size	type	size	type	size
3	FS	9	FS	9	-	-
4	FS	9	FS	9	FS	9

type: FS = flange SAE 3000 PSI
size: 9 = 2 ½"
- = no connection

11 **clogging indicator at M1:**
- = without
O = visual, 2,5 bar

12 **clogging indicator at M2:**
- = without
AOR = AOR.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1606,
AOC = AOC.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1606,
AE = AE30.2,5... electrical at p_1 and p_2, 2,5 bar, see sheet-no. 1609
OP = OP.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1628
OE = OE.2,5..., visual-electrical, at p_1 and p_2, 2,5 bar, see sheet-no. 1628
E1 = E1.2,5 electrical at p_1 , 2,5 bar, see sheet-no. 1616
E5 = E5.2,5 electrical at p_1 , 2,5 bar, see sheet-no. 1616

1.2. Filter element: (ordering example)

01NR.	1000.	6VG.	10.	B.	P.	-
1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 1000

3 - 7 see type index-filter unit

Changes of measures and design are subject to alter ation!

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2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 1000	
2	housing cover	1	22496-3	313837
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	G ½	304678
5	straining screw	1	31067-3	316893
6	O-ring	1	170 x 6	304799 (NBR)
7	electric motor	1	according to type index	
8	pump unit P07	1	NG 320.200	316908
9	clogging indicator (series)	1	visual ∅ 40	315452
10	clogging indicator	1	according to type index	
11	O-ring	1	22 x 3	304387 (NBR)
12	O-ring	2	90 x 4	306941 (NBR)
13	O-ring	2	69,45 x 3,53	305868 (NBR)

3. Description:

The stationary filter unit is intended for oil maintenance on hydraulic systems.
The area of application comprises:
- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability.
The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 1000.
Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 $\mu m_{(c)}$. The contamination level of the filter element can be read off from a pressure display in the cover of the filter.
At a pressure >2,5 bar (red area of the scale field), the filter element is contaminated and it must be replaced with a new filter element.
The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.
To protect against overpressure, the filter unit is fitted with a safety valve. The initial response pressure difference valve is set according to pressure stated in the table on the type plate under item 9. If a different pressure setting is requested, please state the initial response presse with respect to the set pressure range of the pump unit in the plain text when ordering.
Stationary filter units with motors without combined protective motor switch and ON/OFF switch and without any cable with plug (see switch „-", cable „-" under item 9 of the type plate) can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected E-motor and if the switch-off function of the E-motor of the electrical clogging indicator is dise ngaged at 2,5 bar.
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium.

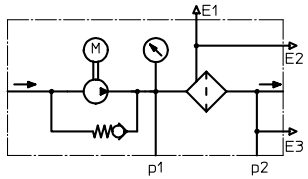
4. Technical data:

filter-fineness:	4, 5, 7 or 10 $\mu m_{(c)}$
weight:	approx. 125 kg
operating medium:	hydraulic oil based on mineral oil from 10 mm²/s, other media on request

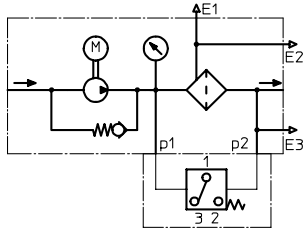
Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:

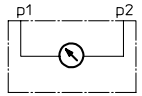
Filter unit without clogging indicator



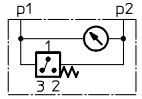
Filter unit with electrical clogging indicator AE30



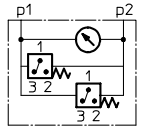
Filter unit with visual clogging indicator AOR, AOC, OP



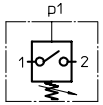
Filter unit with visual-electrical clogging indicator OE1



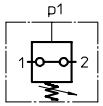
Filter unit with visual-electrical clogging indicator OE2



Filter unit with electrical clogging indicator contact maker E1



Filter unit with electrical clogging indicator contact breaker E5



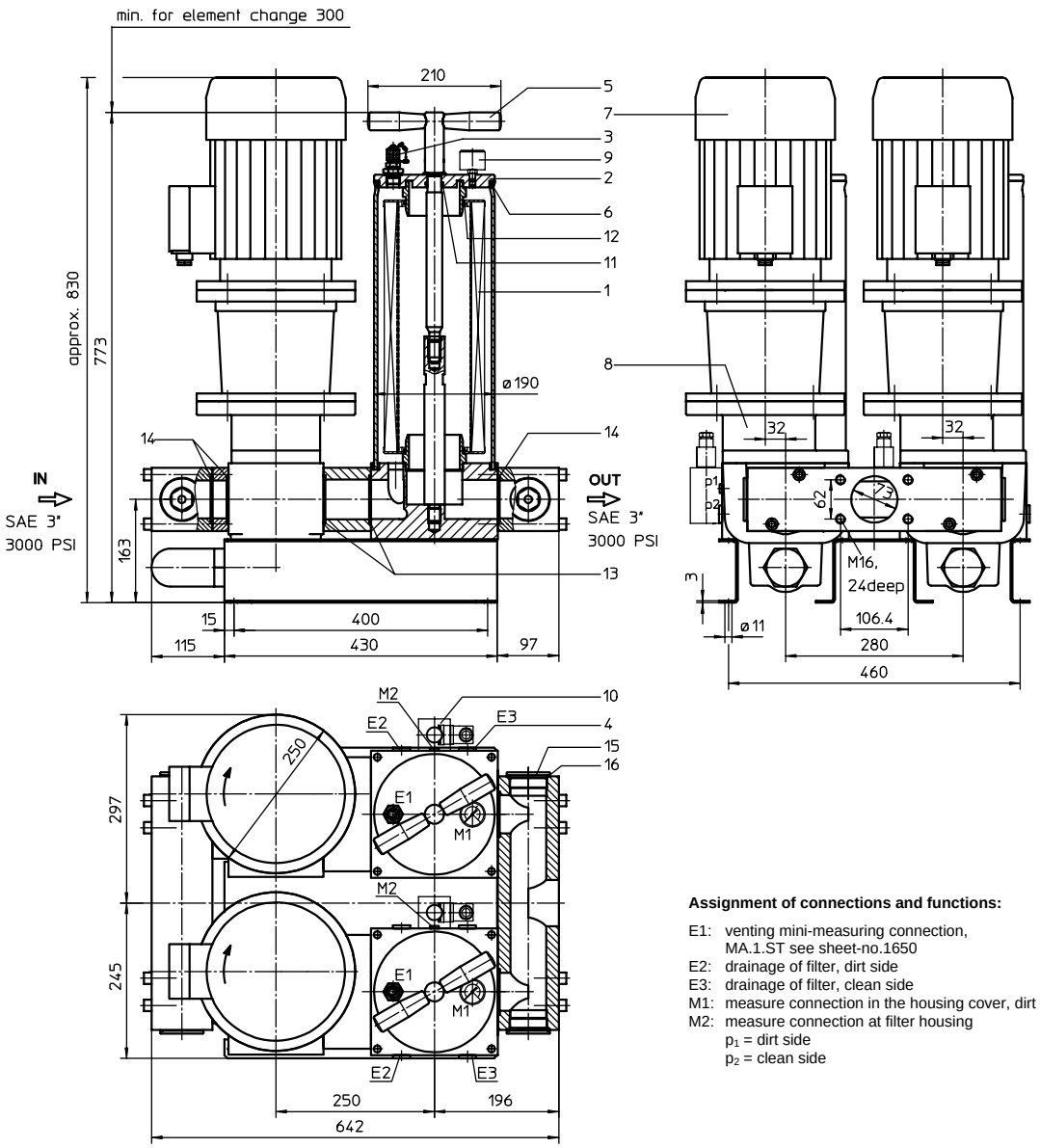
6. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

FILTER UNIT, stationary
Series US 640

Sheet No. **4062 B**



Assignment of connections and functions:

E1: venting mini-measuring connection, MA.1.ST see sheet-no.1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the housing cover, dirt side
M2: measure connection at filter housing
p_1 = dirt side
p_2 = clean side

1. Type index:

1.1. Filter unit: (ordering example)

US.	640.	6VG.	10.	B.	P.	-.	P06.	D08.	O.	AE
1	2	3	4	5	6	7	8	9	10	11

1 **series:**
US = filter unit, stationary

2 **nominal size:** 640

3 **filter-material and filter-fineness:**
10 VG = 10 µm$_{(c)}$, 6 VG = 7 µm$_{(c)}$, 3 VG = 5 µm$_{(c)}$, 1 VG = 4 µm$_{(c)}$ Interpor fleece (glass fibre)
10 WVG = 10 µm$_{(c)}$, 3 WVG = 5 µm$_{(c)}$ Watersorp-filter element

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM) , by agreement

7 **filter element specification:**
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **pump unit:**
P06 = pump unit 06, NG 320.200 (standard-pump-unit / setting range 4-8 bar)

9 **motor:** (D = rotary current motor)

motor	electrical connection		volume flow	max. viscosity	max. pressure	on/off switch	cable	doc.-no.
D08[1)]	400/690V	50Hz	2x 284,0 l/min	10-100 mm²/s	4 bar	-	-	42744-4
D08[1)]	460/790V	60Hz	2x 340,0 l/min	10-100 mm²/s	4 bar	-	-	42744-4
D24	400/690V	50Hz	2x 284,0 l/min	10-100 mm²/s	4 bar	-	-	48816-4
D24	460/790V	60Hz	2x 340,0 l/min	10-100 mm²/s	4 bar	-	-	48816-4

[1)] standard motor

10 **clogging indicator at M1:**
- = without
O = visual, 2,5 bar

11 **clogging indicator at M2:**
- = without
AOR = AOR.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1606,
AOC = AOC.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1606,
AE = AE30.2,5... electrical at p_1 and p_2, 2,5 bar, see sheet-no. 1609
OP = OP.2,5..., visual, at p_1 and p_2, 2,5 bar, see sheet-no. 1628
OE = OE.2,5..., visual-electrical, at p_1 and p_2, 2,5 bar, see sheet-no. 1628
E1 = E1.2,5 electrical at p_1, 2,5 bar, see sheet-no. 1616
E5 = E5.2,5 electrical at p_1, 2,5 bar, see sheet-no. 1616

1.2. Filter element: (ordering example)

01NR.	1000.	6VG.	10.	B.	P.	-
1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 1000

3 - 7 see type index-filter unit!

Changes of measures and design are subject to alteration!

Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

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2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	2	01NR. 1000	
2	housing cover	2	22496-3	313837
3	mini-measuring connection	2	MA.1.ST	305453
4	screw plug	4	G ½	304678
5	straining screw	2	31067-3	316893
6	O-ring	2	170 x 6	304799 (NBR)
7	electric motor	2	according to type index	
8	pump unit P06	2	NG 320.200	316838
9	clogging indicator (series)	2	visual ∅ 40	315452
10	clogging indicator	2	according to type index	
11	O-ring	2	22 x 3	304387 (NBR)
12	O-ring	4	90 x 4	306941 (NBR)
13	O-ring	4	69,45 x 3,53	305868 (NBR)
14	O-ring	6	65,09 x 3,53	317621 (NBR)
15	screw plug	4	G 2	310958
16	gasket	4	A 60 x 68	310959

3. Description:

The stationary filter unit is intended for oil maintenance on hydraulic systems.
The area of application comprises:
- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability.
The device is equipped with two gear pumps driven by two electric-motors. The flow conveyed by the gear pumps is fed over two filter elements according to DIN 24550, T4, nominal size 1000.
Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 $\mu m_{(c)}$. The contamination level of the filter element can be read off from a pressure display in the cover of the filter.
At a pressure >2,5 bar (red area of the scale field), the filter element is contaminated and it must be replaced with a new filter element.
The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.
To protect against overpressure, the filter unit is fitted with a safety valve. The initial response pressure difference valve is set according to pressure stated in the table on the type plate under item 9. If a different pressure setting is requested, please state the initial response presse with respect to the set pressure range of the pumps unit in the plain text when ordering.
Stationary filter units with motors without combined protective motor switch and ON/OFF switch and without any cable with plug (see switch „-", cable „-" under item 9 of the type plate) can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected electric-motor and if the switch-off function of the electric-motor of the electrical clogging indicator is dise ngaged at 2,5 bar.
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium.

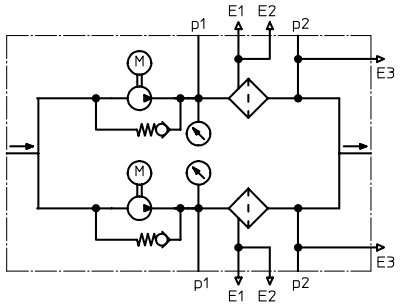
4. Technical data:

filter-fineness:	4, 5, 7 or 10 $\mu m_{(c)}$
weight:	approx. 230 kg
operating medium:	hydraulic oil based on mineral oil from 10 mm²/s, other media on request

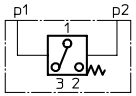
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:

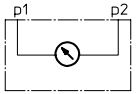
Filter unit without clogging indicator



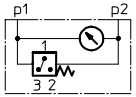
Filter unit with electrical clogging indicator AE30



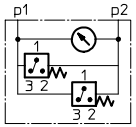
Filter unit with visual clogging indicator AOR, AOC, OP



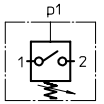
Filter unit with visual-electrical clogging indicator OE1



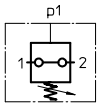
Filter unit with visual-electrical clogging indicator OE2



Filter unit with electrical clogging indicator contact maker E1



Filter unit with electrical clogging indicator contact breaker E5



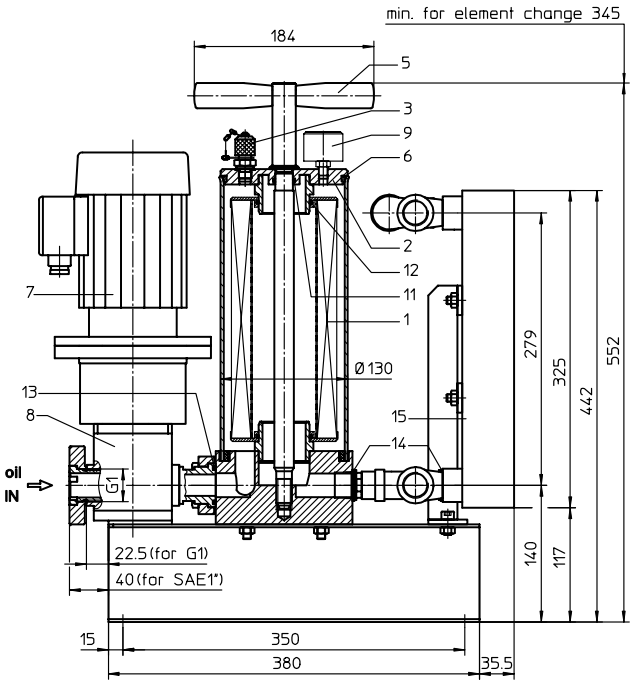
6. Test methods:

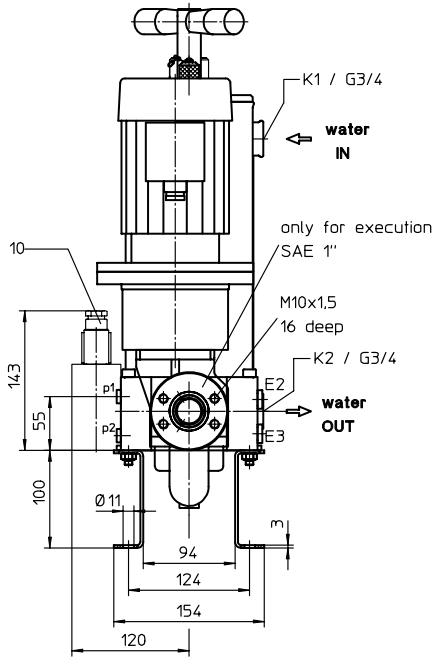
Filter elements are tested according to the following ISO standards:

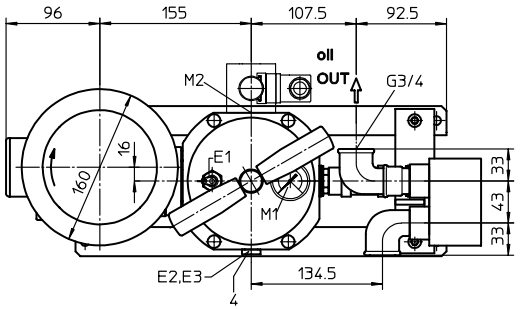
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

FILTER UNIT, stationary with plate-exchanger
Series USP 20 PN 6

Sheet No. **4020 C**







Assignment of connections and functions

E1: venting mini-measuring connection, MA.1.St see sheet-no.1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the housing cover, dirt side manometer 0-16 bar
M2: measure connection at filter housing
p_1 = dirt side
p_2 = clean side
K1: cooling water IN
K2: cooling water OUT

1. Type index:

1.1. Filter unit: (ordering example)

USP. 20. 6VG. 10. B. P. -. P01. D03. CP12. AE

1	2	3	4	5	6	7	8	9	10	11

1 **series:**
USP = filter unit, stationary with plate-exchanger
2 **nominal size:** 20
3 **filter-material and filter-fineness:**
10 VG = 10 µm$_{(c)}$, 6 VG = 7 µm$_{(c)}$, 3 VG = 5 µm$_{(c)}$, 1 VG = 4 µm$_{(c)}$ Interpor fleece (glass fibre)
10 WVG = 10 µm$_{(c)}$, 3 WVG = 5 µm$_{(c)}$ Watersorp-filter element
4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar
5 **filter element design:**
B = both sides open
6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM), by agreement
7 **filter element specification:**
- = standard
VA = stainless steel
8 **pump unit:**
P01 = pump unit 01, NG 20.16, G.5 with suction connection G1
P08 = pump unit 08, NG 20.16, FS.5 with connection SAE1"
9 **motor:**
D03 = B5/71/4.0,37.1500.230/400.D.50.1.-.-.-
rotay current motor 230/400 V, 50 Hz, approx. 1420 rpm, 0,37 kW, type of protection IP 54
10 **plate-exchanger unit:**
CP12 = plate-exchanger unit CP12
11 **clogging indicator at M2:**
- = without
AE = AE30.2,5.P.-.B electrical at p_1 and p_2, 2,5 bar, see sheet-no. 1609
AOR = AOR.2,5.P.- visual, 2,5 bar, see sheet-no. 1606
AOC = AOC.2,5.P.- visual, 2,5 bar, see sheet-no. 1606

1.2. Filter element: (ordering example)

01NR. 250. 6VG. 10. B. P. -

1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4
2 **nominal size:** 250
3 - 7 see type index-filter unit

Changes of measures and design are subject to alteration!

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2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 250	
2	housing cover	1	30615-3	315437
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	G ¼	305003
5	straining screw	1	30631-4	316404
6	Oring	1	115 x 5	306640 (NBR)
7	E-motor D03	1	0,37 kW, 230/400 V	311537
8	pump unit P01	1	NG 20.16, G.5	316270
	pump unit P08	1	NG 20.16, FS.5	317378
9	manometer (series)	1	∅ 40	
10	clogging indicator	1	according to type index	
11	O-ring	1	18 x 3	304359 (NBR)
12	O-ring	2	52 x 3	314206 (NBR)
13	O-ring	1	32 x 3,5	304378 (NBR)
14	gasket	2	A 27 x 32	308536
15	plate-exchanger unit	1	CP10	

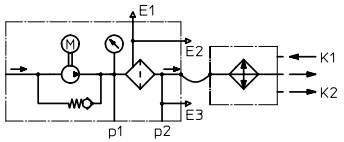
3. Description:

The stationary filter unit with plate-exchanger is intended for oil maintenance and for oil cooling on hydraulic systems.
The area of application comprises:
- secondary flow filtration in addition to the existing operating filter and the oil cooling
- secondary flow filtration without the action of the operating filter and the oil co oling
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design with plate interlacing without pipe satisfies the prerequisites for small dimensions and high reliability.
The device is equipped with a gear pump driven by an e-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 250 and is led afterwards over a plate cooler.
Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 µm $_{(c)}$.
At the measuring point M1, the working pressure before the element is shown. The pollution of the element is indicated with the clogging indicator at the measuring point M2.
At a pressure difference > 2,5 bar , the element is polluted and has to be removed with a new element.
The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.
To protect against overpressure, the filter unit is fitted with a safety valve, pressure setting approx. 6 bar.
The cooling capacity is shown at the cooling capacity graph for the chosen field of application, depending on the input temperature, the streams of the medium and the type of medium. The cooling capacity graph is intended for the choice of application of the suitable filter unit with cooler. For the fields of application which are not shown in the cooling capacity graph, the capacity data have to be asked for at the manufacturer.
Stationary filter units can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected e-motor and the switch-off function of the e-motor of the electrical clogging indicator will disengaged at 2,5 bar.
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium.

4. Symbols:

Filter unit with cooler
without clogging indicator

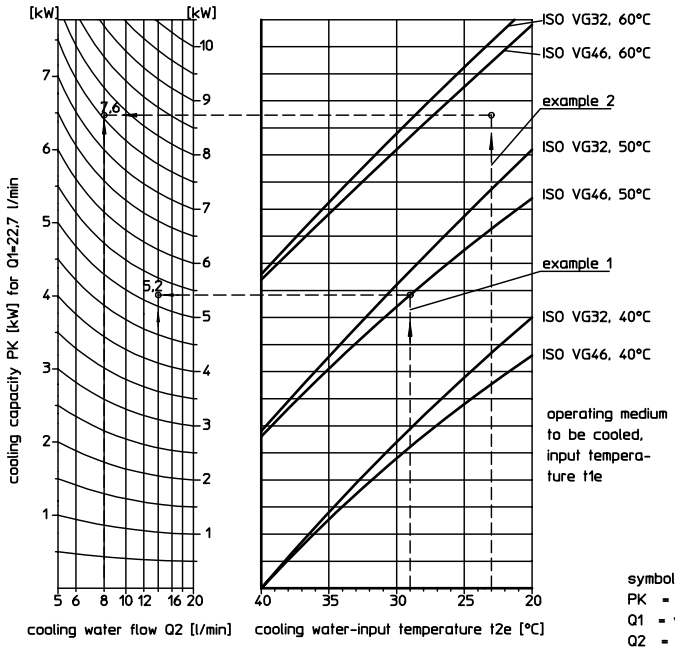


with electrical
clogging indicator AE30

with visual
clogging indicator
AOR, AOC

E 4020 C

5. Cooling capacity graph:



example 1, operating medium ISO VG46

t1e = 50 °C, t2e = 29 °C,
Q1 = 22,7 l/min, Q2 = 14 l/min

cooling capacity PK from the graph = 5,2 kW

$t1a = 50 - \frac{5{,}2 * 35}{22{,}7} = 42\ °C$

$t2a = 29 + \frac{5{,}2 * 14{,}4}{14} = 34{,}3\ °C$

example 2, operating medium ISO VG32

t1e = 55 °C, t2e = 23 °C,
Q1 = 22,7 l/min, Q2 = 8,0 l/min

cooling cpacity PK from the graph = 7,6 kW
(data linear interpolated)

$t1a = 55 - \frac{7{,}6 * 35}{22{,}7} = 43{,}3\ °C$

$t2a = 23 + \frac{7{,}6 * 14{,}4}{8} = 36{,}7\ °C$

operating medium-output temperature t1a [°C] $t1a = t1e - \frac{PK * 35}{Q1}$

cooling water-output temperature t2a [°C] $t2a = t2e + \frac{PK * 14{,}4}{Q2}$

symbol	units
PK = cooling capacity	kW
Q1 = volume flow-operating medium	l/min
Q2 = volume flow-cooling water	l/min
t1e = operating medium-input temperature	°C
t1a = operating medium-output temperature	°C
t2e = cooling water-input temperature	°C
t2a = cooling water-output temperature	°C

6. Technical data:

pump-volume flow :	22,7 l/min at 1420 rpm
E-motor:	0,37 kW, approx. 1420 rpm
rotary current:	230/400 V, 50 Hz
operating pressure:	max. 6 bar
filter-fineness:	4, 5, 7 or 10 $\mu m_{(c)}$
weight:	approx. 35 kg
operating medium:	hydraulic oil based on mineral oil from 10 to 100 mm²/s, other media on request

Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

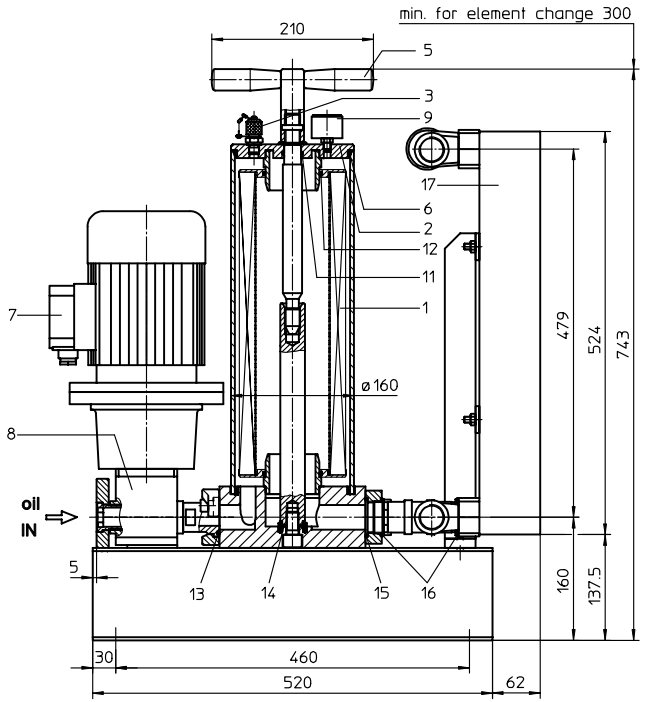
7. Test methods:

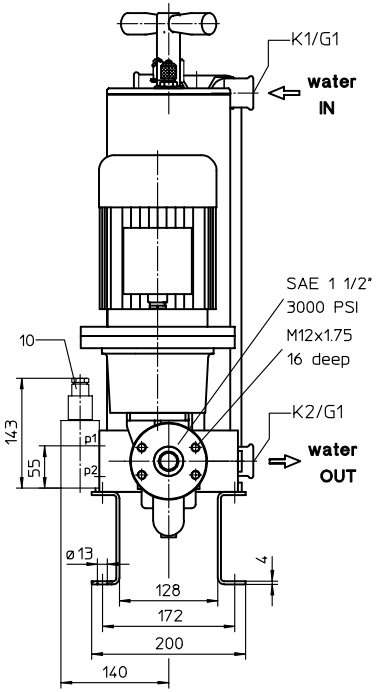
Filter elements are tested according to the following ISO sta ndards:

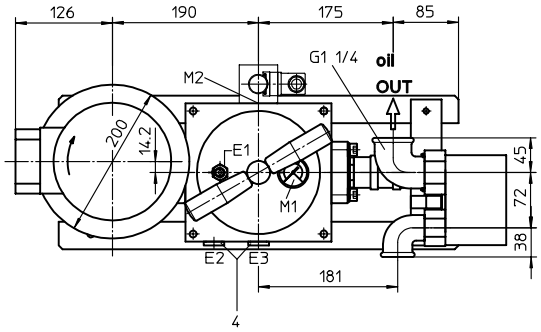
ISO 2941	Verification of colla pse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow character istics
ISO 16889	Multi-pass method for evaluating filtration performance

FILTER UNIT, stationary with plate-exchanger
Series USP 41 PN 6

Sheet No. **4021 E**







Assignment of connections and functions

E1: venting mini-measuring connection, MA.1.St see sheet-no.1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the housing cover, dirt side manometer 0-16 bar
M2: measure connection at filter housing
p_1 = dirt side
p_2 = clean side
K1: cooling water IN
K2: cooling water OUT

1. Type index:

1.1. Filter unit: (ordering example)

USP. 41. 6VG. 10. B. P. -. P05. D05. CP16. AE

1	2	3	4	5	6	7	8	9	10	11

1 **series**:
USP = filter unit, stationary with plate-exchanger
2 **nominal size:** 41
3 **filter-material and filter-fineness:**
10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$, 1 VG = 4 $\mu m_{(c)}$ Interpor fleece (glass fibre)
10 WVG = 10 $\mu m_{(c)}$, 3 WVG = 5 $\mu m_{(c)}$ Watersorp-filter element
4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar
5 **filter element design:**
B = both sides open
6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM), by agreement
7 **filter element specification:**
- = standard
VA = stainless steel
8 **pump unit:**
P05 = pump unit 05, NG 40.25
9 **motor:**
D05 = B5/80/4.0,75.1500.230/400.D.50.1.-.-.-
rotay current motor 230/400 V, 50 Hz, approx. 1420 rpm, 0,75 kW, type of protection IP 54
10 **plate-exchanger unit:**
CP16 = plate-exchanger unit CP16
11 **clogging indicator at M2:**
- = without
AE = AE30.2,5.P.-.B electrical at p_1 and p_2, 2,5 bar, see sheet-no. 1609
AOR = AOR.2,5.P.- visual, 2,5 bar, see sheet-no. 1606
AOC = AOC.2,5.P.- visual, 2,5 bar, see sheet-no. 1606

1.2. Filter element: (ordering example)

01NR. 630. 6VG. 10. B. P. -

1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4
2 **nominal size:** 630
3 - 7 see type index-filter unit

Changes of measures and design are subject to alteration!

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2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 630	
2	housing cover	1	30600-3	315492
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	G ½	304678
5	straining screw	1	30595-3	316312
6	Oring	1	140 x 6	315392 (NBR)
7	E-motor D05	1	0,75 kW, 230/400 V	311537
8	pump unit P05	1	NG 40.25	316292
9	manometer (series)	1	∅ 40	
10	clogging indicator	1	according to type index	
11	O-ring	1	22 x 3	304387 (NBR)
12	O-ring	2	70 x 4	306253 (NBR)
13	O-ring	1	37,69 x 3,53	304353 (NBR)
14	O-ring	1	18 x 3	304359 (NBR)
15	O-ring	1	44,45 x 3,53	317607 (NBR)
16	gasket	2	A 42 x 49	308541
17	plate-exchanger unit	1	CP16	

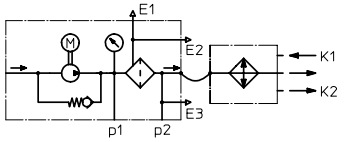
3. Description:

The stationary filter unit with plate-exchanger is intended for oil maintenance and for oil cooling on hydraulic systems.
The area of application comprises:
- secondary flow filtration in addition to the existing operating filter and the oil cooling
- secondary flow filtration without the action of the operating filter and the oil co oling
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design with plate interlacing without pipe satisfies the prerequisites for small dimensions and high reliability.
The device is equipped with a gear pump driven by an e-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 630 and is led afterwards over a plate cooler.
Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 µm $_{(c)}$.
At the measuring point M1, the working pressure before the element is shown. The pollution of the element is indicated with the clogging indicator at the measuring point M2.
At a pressure difference > 2,5 bar , the element is polluted and has to be removed with a new element.
The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.
To protect against overpressure, the filter unit is fitted with a safety valve, pressure setting approx. 6 bar.
The cooling capacity is shown at the cooling capacity graph for the chosen field of application, depending on the input temperature, the streams of the medium and the type of medium. The cooling capacity graph is intended for the choice of application of the suitable filter unit with cooler. For the fields of application which are not shown in the cooling capacity graph, the capacity data have to be asked for at the manufacturer.
Stationary filter units can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected e-motor and the switch-off function of the e-motor of the electrical clogging indicator will disengaged at 2,5 bar.
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium.

4. Symbols:

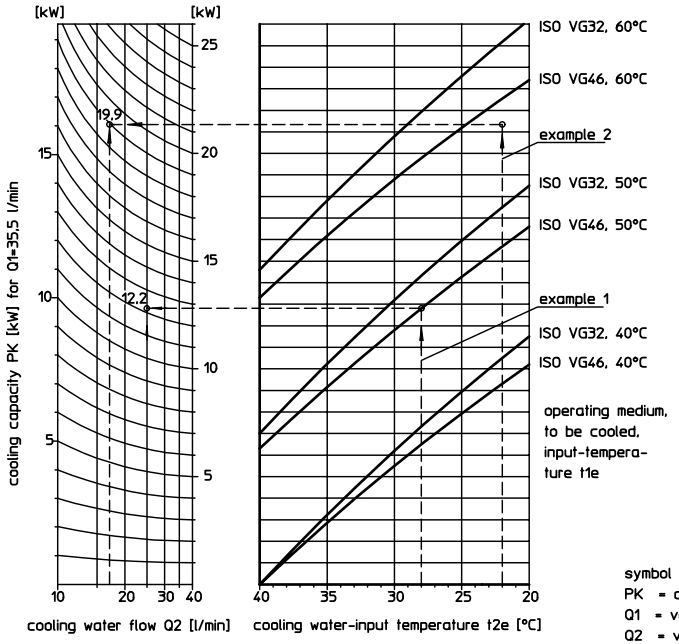
Filter unit with cooler
without clogging indicator



with electrical
clogging indicator AE30

with visual
clogging indicator
AOR, AOC

5. Cooling capacity graph:



example 1, operating medium ISO VG46

t1e = 50 °C, t2e = 28 °C,
Q1 = 35,5 l/min, Q2 = 25 l/min

cooling capacity PK from the graph = 12,2 kW

$t1a = 50 - \frac{12{,}2 * 35}{35{,}5} = 38\ °C$

$t2a = 28 + \frac{12{,}2 * 14{,}4}{25} = 35\ °C$

example 2, operating medium ISO VG32

t1e = 55 °C, t2e = 22 °C,
Q1 = 35,5 l/min, Q2 = 17 l/min

cooling capacity PK from the graph= 19,9 kW
(data linear interpolated)

$t1a = 55 - \frac{19{,}9 * 35}{35{,}5} = 35{,}4\ °C$

$t2a = 22 + \frac{19{,}9 * 14{,}4}{17} = 38{,}9\ °C$

operating medium-output temperature t1a [°C] $t1a = t1e - \frac{PK * 35}{Q1}$

cooling water-output temperature t2a [°C] $t2a = t2e + \frac{PK * 14{,}4}{Q2}$

symbol		units
PK	= cooling capacity	kW
Q1	= volume flow-operating medium	l/min
Q2	= volume flow-cooling water	l/min
t1e	= operating medium-input temperature	°C
t1a	= operating medium-output temperature	°C
t2e	= cooling water-input temperature	°C
t2a	= cooling water-output temperature	°C

6. Technical data:

pump-volume flow :	35,5 l/min at 1420 rpm
E-motor:	0,75 kW, approx. 1420 rpm
rotary current:	230/400 V, 50 Hz
operating pressure:	max. 6 bar
filter-fineness:	4, 5, 7 or 10 $\mu m_{(c)}$
weight:	approx. 58 kg
operating medium:	hydraulic oil based on mineral oil from 10 to 100 mm²/s, other media on request

Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

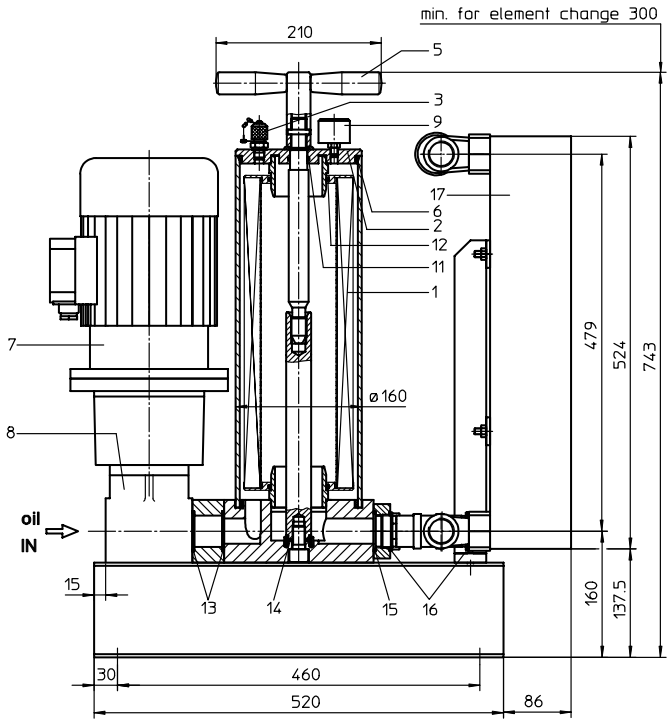
7. Test methods:

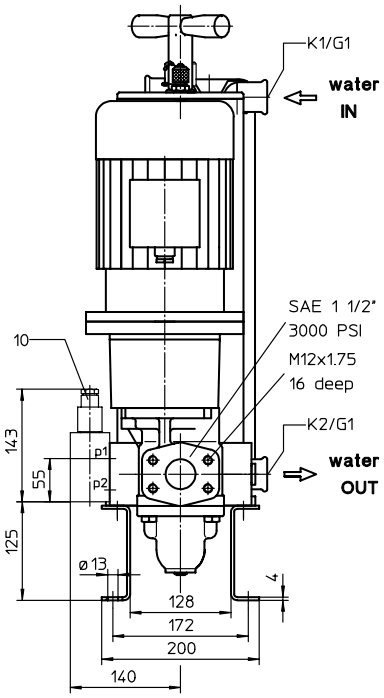
Filter elements are tested according to the following ISO sta ndards:

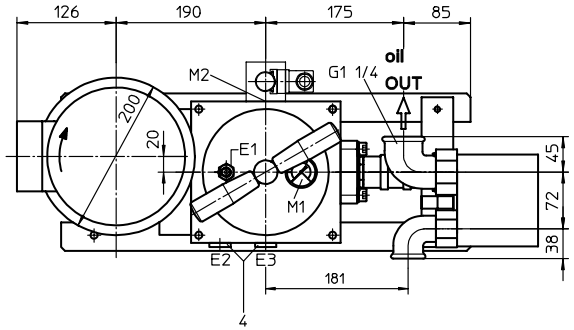
ISO 2941	Verification of colla pse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow character istics
ISO 16889	Multi-pass method for evaluating filtration performance

FILTER UNIT, stationary with plate-exchanger
Series USP 81 PN 6

Sheet No. **4022 E**







Assignment of connections and functions

E1: venting mini-measuring connection, MA.1.St see sheet-no.1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the housing cover, dirt side manometer 0-16 bar
M2: measure connection at filter housing
p_1 = dirt side
p_2 = clean side
K1: cooling water IN
K2: cooling water OUT

1. Type index:

1.1. Filter unit: (ordering example)

USP. 81. 6VG. 10. B. P. -. P04. D01. CP18. AE

1	2	3	4	5	6	7	8	9	10	11

1 **series:**
USP = filter unit, stationary with plate-exchanger

2 **nominal size:** 81

3 **filter-material and filter-fineness:**
10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$, 1 VG = 4 $\mu m_{(c)}$ Interpor fleece (glass fibre)
10 WVG = 10 $\mu m_{(c)}$, 3 WVG = 5 $\mu m_{(c)}$ Watersorp-filter element

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM), by agreement

7 **filter element specification:**
- = standard
VA = stainless steel

8 **pump unit:**
P04 = pump unit 04, NG 80.50

9 **motor:**
D01 = B5/90L/4.1,5.1500.230/400.D.50.1.-.-.-
rotay current motor 230/400 V, 50 Hz, approx. 1420 rpm, 1,5 kW, type of protection IP 54

10 **plate-exchanger unit:**
CP18 = plate-exchanger unit CP18

11 **clogging indicator at M2:**
- = without
AE = AE30.2,5.P.-.B electrical at p_1 and p_2, 2,5 bar, see sheet-no. 1609
AOR = AOR.2,5.P.- visual, 2,5 bar, see sheet-no. 1606
AOC = AOC.2,5.P.- visual, 2,5 bar, see sheet-no. 1606

1.2. Filter element: (ordering example)

01NR. 630. 6VG. 10. B. P. -

1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 630

3 - 7 see type index-filter unit

Changes of measures and design are subject to alteration!

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2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 630	
2	housing cover	1	30600-3	315492
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	G ½	304678
5	straining screw	1	30595-3	316312
6	Oring	1	140 x 6	315392 (NBR)
7	E-motor D01	1	1,5 kW, 230/400 V	313465
8	pump unit P04	1	NG 80.50	317139
9	manometer (series)	1	∅ 40	
10	clogging indicator	1	according to type index	
11	O-ring	1	22 x 3	304387 (NBR)
12	O-ring	2	70 x 4	306253 (NBR)
13	O-ring	2	45 x 3	304991 (NBR)
14	O-ring	1	18 x 3	304359 (NBR)
15	O-ring	1	44,45 x 3,53	317607 (NBR)
16	gasket	2	A 42 x 49	308541
17	plate-exchanger unit	1	CP18	

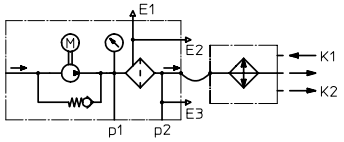
3. Description:

The stationary filter unit with plate-exchanger is intended for oil maintenance and for oil cooling on hydraulic systems.
The area of application comprises:
- secondary flow filtration in addition to the existing operating filter and the oil cooling
- secondary flow filtration without the action of the operating filter and the oil co oling
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design with plate interlacing without pipe satisfies the prerequisites for small dimensions and high reliability.
The device is equipped with a gear pump driven by an e-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 630 and is led afterwards over a plate cooler.
Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 µm $_{(c)}$.
At the measuring point M1, the working pressure before the element is shown. The pollution of the element is indicated with the clogging indicator at the measuring point M2.
At a pressure difference > 2,5 bar , the element is polluted and has to be removed with a new element.
The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.
To protect against overpressure, the filter unit is fitted with a safety valve, pressure setting approx. 6 bar.
The cooling capacity is shown at the cooling capacity graph for the chosen field of application, depending on the input temperature, the streams of the medium and the type of medium. The cooling capacity graph is intended for the choice of application of the suitable filter unit with cooler. For the fields of application which are not shown in the cooling capacity graph, the capacity data have to be asked for at the manufacturer.
Stationary filter units can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected e-motor and the switch-off function of the e-motor of the electrical clogging indicator will disengaged at 2,5 bar.
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium.

4. Symbols:

Filter unit with cooler
without clogging indicator

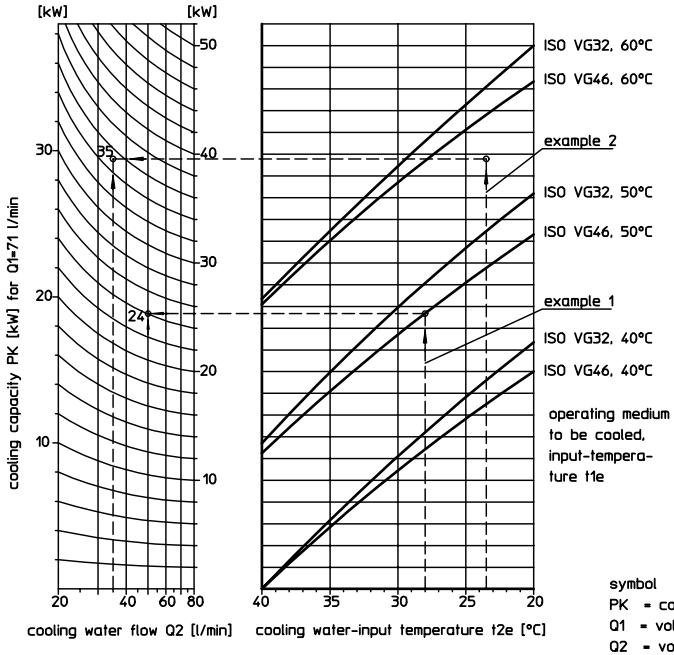


with electrical
clogging indicator AE30

with visual
clogging indicator
AOR, AOC

E 4022 E

5. Cooling capacity graph:



operating medium-output temperature t1a [°C] $t1a = t1e - \frac{PK * 35}{Q1}$

cooling water-output temperature t2a [°C] $t2a = t2e + \frac{PK * 14,4}{Q2}$

example 1, operating medium ISO VG46

t1e = 50 °C, t2e = 28 °C,
Q1 = 71 l/min, Q2 = 50 l/min

cooling capacity PK from the graph = 24 kW

$t1a = 50 - \frac{24 * 35}{71} = 38,2$ °C

$t2a = 28 + \frac{24 * 14,4}{50} = 34,9$ °C

example 2, operating medium ISO VG32

t1e = 55 °C, t2e = 23,5 °C,
Q1 = 71 l/min, Q2 = 35 l/min

cooling capacity PK from the graph = 35 kW
(data linear interpolated)

$t1a = 55 - \frac{35 * 35}{71} = 37,7$ °C

$t2a = 23,5 + \frac{35 * 14,4}{35} = 37,9$ °C

symbol		units
PK	= cooling capacity	kW
Q1	= volume flow-operating medium	l/min
Q2	= volume flow-cooling water	l/min
t1e	= operating medium-input temperature	°C
t1a	= operating medium-output temperature	°C
t2e	= cooling water-input temperature	°C
t2a	= cooling water-output temperature	°C

6. Technical data:

pump-volume flow :	71 l/min at 1420 rpm
E-motor:	1,5 kW, approx. 1420 rpm
rotary current:	230/400 V, 50 Hz
operating pressure:	max. 6 bar
filter-fineness:	4, 5, 7 or 10 $\mu m_{(c)}$
weight:	approx. 80 kg
operating medium:	hydraulic oil based on mineral oil from 10 to 100 mm²/s, other media on request

Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

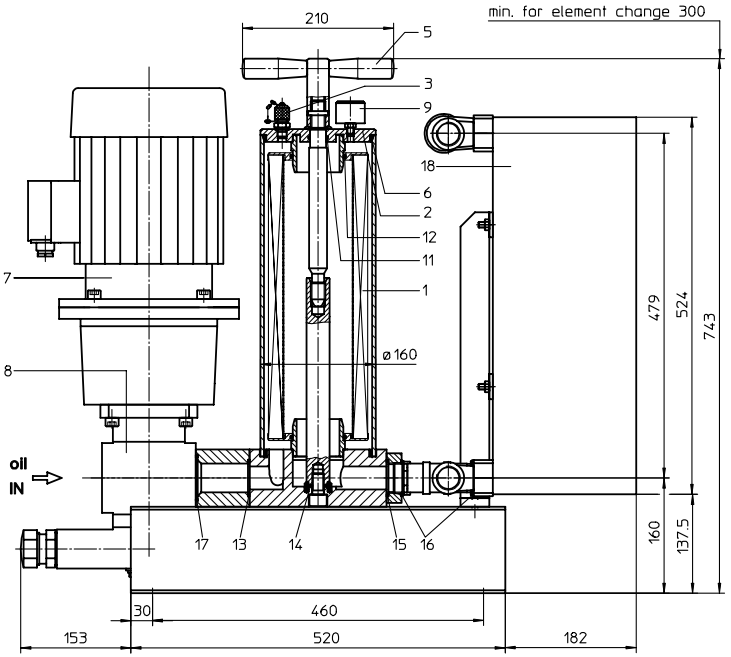
7. Test methods:

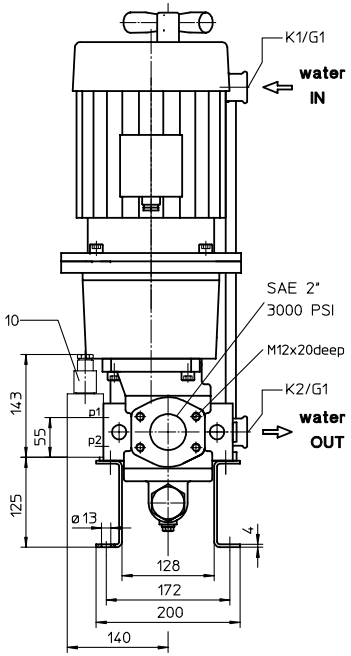
Filter elements are tested according to the following ISO sta ndards:

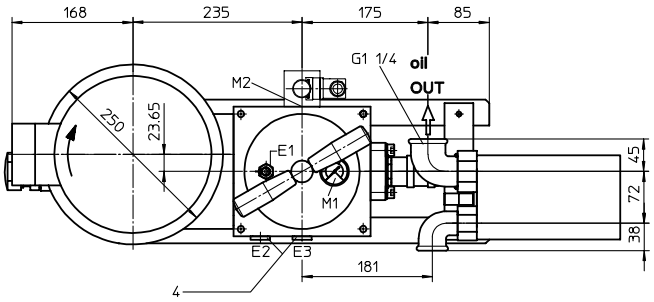
ISO 2941	Verification of colla pse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow character istics
ISO 16889	Multi-pass method for evaluating filtration performance

FILTER UNIT, stationary with plate-exchanger
Series USP 161 PN 8

Sheet No. **4023 E**







Assignment of connections and functions

E1: venting mini-measuring connection, MA.1.St see sheet-no.1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the housing cover, dirt side manometer 0-16 bar
M2: measure connection at filter housing
p_1 = dirt side
p_2 = clean side
K1: cooling water IN
K2: cooling water OUT

1. Type index:

1.1. Filter unit: (ordering example)

USP. 161. 6VG. 10. B. P. -. P18. D11. CP20. AE

1	2	3	4	5	6	7	8	9	10	11

1 **series:**
USP = filter unit, stationary with plate-exchanger

2 **nominal size:** 161

3 **filter-material and filter-fineness:**
10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$, 1 VG = 4 $\mu m_{(c)}$ Interpor fleece (glass fibre)
10 WVG = 10 $\mu m_{(c)}$, 3 WVG = 5 $\mu m_{(c)}$ Watersorp-filter element

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM), by agreement

7 **filter element specification:**
- = standard
VA = stainless steel

8 **pump unit:**
P18 = pump unit 18, NG 160.100.6, adjustable pressure 6 bar
pump unit 18, NG 160.100.8, adjustable pressure 8 bar

9 **motor:**
D11 = B5/100LB/4.3,0.1500. 400/690.D.50.1.-.-.- rotay current motor 400/690V, 50 Hz, approx. 1420 rpm, 3,0 kW, type of protect ion IP 54 — $\nu \leq 100$ mm²/s
D08 = B5/112M/4.4,0.1500.400/690.D.50.1.-.-.- rotay current motor 400/690V, 50 Hz, approx. 1420 rpm, 4,0 kW, type of protection IP 54 — $\nu > 100$ mm²/s, $\nu \leq 150$ mm²/s

10 **plate-exchanger unit:**
CP20 = plate-exchanger unit CP20

11 **clogging indicator at M2:**
- = without
AE = AE30.2,5.P.-.B electrical at p_1 and p_2, 2,5 bar, see sheet-no. 1609
AOR = AOR.2,5.P.- visual, 2,5 bar, see sheet-no. 1606
AOC = AOC.2,5.P.- visual, 2,5 bar,see sheet-no. 1606

1.2. Filter element: (ordering example)

01NR. 630. 6VG. 10. B. P. -

1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 630

3 - 7 see type index-filter unit

Changes of measures and design are subject to alteration!

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2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 630	
2	housing cover	1	30600-3	315492
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	G ½	304678
5	straining screw	1	30595-3	316312
6	Oring	1	140 x 6	315392 (NBR)
7	E-motor D08	1	according to type index	
	E-motor D11	1	according to type index	
8	pump unit P18	1	NG 160.100	321710
9	manometer (series)	1	∅ 40	
10	clogging indicator	1	according to type index	
11	O-ring	1	22 x 3	304387 (NBR)
12	O-ring	2	70 x 4	306253 (NBR)
13	O-ring	2	45 x 3	304991 (NBR)
14	O-ring	1	18 x 3	304359 (NBR)
15	O-ring	1	44,45 x 3,53	317607 (NBR)
16	gasket	2	A 42 x 49	308541
17	O-ring	1	56,75 x 3,53	306035 (NBR)
18	plate-exchanger unit	1	CP20	

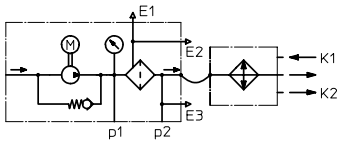
3. Description:

The stationary filter unit with plate-exchanger is intended for oil maintenance and for oil cooling on hydraulic systems.
The area of application comprises:
- secondary flow filtration in addition to the existing operatin g filter and the oil cooling
- secondary flow filtration without the action of the operating filter and the oil co oling
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design with plate interlacing without pipe satisfies the prerequisites for small dimensions and high reliability.
The device is equipped with a gear pump driven by an e-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 630 and is led afterwards over a plate cooler.
Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 µm $_{(c)}$.
At the measuring point M1, the working pressure before the element is shown. The pollution of the element is indicated with the clogging indicator at the measuring point M2.
At a pressure difference > 2,5 bar , the element is polluted and has to be removed with a new element.
The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.
To protect against overpressure, the filter unit is fitted with a safety valve, pressure setting approx. 6 resp. 8 bar.
The cooling capacity is shown at the cooling capacity graph for the chosen field of application, depending on the input temperature, the streams of the medium and the type of medium. The cooling capacity graph is intended for the choice of application of the suitable filter unit with cooler. For the fields of application which are not shown in the cooling capacity graph, the capacity data have to be asked for at the manufacturer.
Stationary filter units can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected e-motor and the switch-off function of the e-motor of the electrical clogging indicator will disengaged at 2,5 bar.
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium.

4. Symbols:

Filter unit with cooler
without clogging indicator

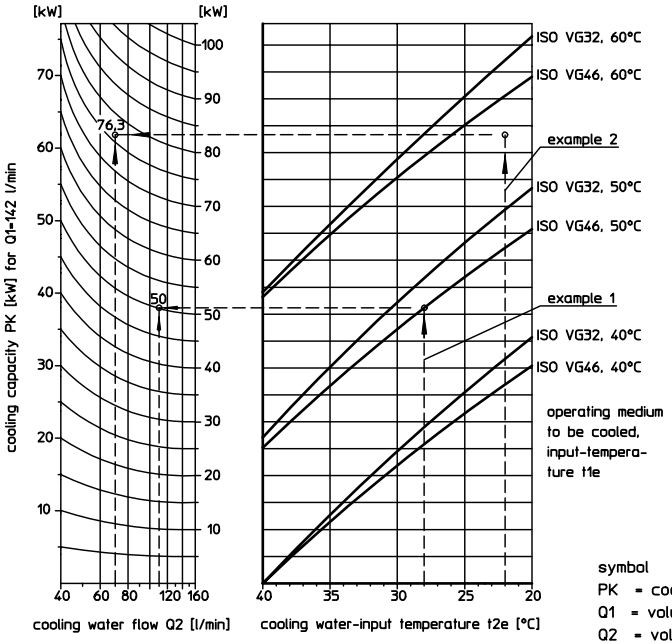


with electrical
clogging indicator AE30

with visual
clogging indicator
AOR, AOC

E 4023 E

5. Cooling capacity graph:



example 1, operating medium ISO VG46

t1e = 50 °C, t2e = 28 °C,
Q1 = 142 l/min, Q2 = 110 l/min

cooling capacity PK from the graph = 50 kW

$t1a = 50 - \frac{50 * 35}{142} = 37{,}7$ °C

$t2a = 28 + \frac{50 * 14{,}4}{110} = 34{,}5$ °C

example 2, operating medium ISO VG32

t1e = 55 °C, t2e = 22 °C,
Q1 = 142 l/min, Q2 = 70 l/min

cooling capacity PK from the graph = 76,3 kW
(data linear interpolated)

$t1a = 55 - \frac{76{,}3 * 35}{142} = 36{,}2$ °C

$t2a = 22 + \frac{76{,}3 * 14{,}4}{70} = 37{,}7$ °C

operating medium-output temperature t1a [°C] $t1a = t1e - \frac{PK * 35}{Q1}$

cooling water-output temperature t2a [°C] $t2a = t2e + \frac{PK * 14{,}4}{Q2}$

symbol		units
PK	= cooling capacity	kW
Q1	= volume flow-operating medium	l/min
Q2	= volume flow-cooling water	l/min
t1e	= operating medium-input temperature	°C
t1a	= operating medium-output temperature	°C
t2e	= cooling water-input temperature	°C
t2a	= cooling water-output temperature	°C

6. Technical data:

pump-volume flow :	142 l/min at 1420 rpm
filter-fineness:	4, 5, 7 or 10 µm$_{(c)}$
weight:	approx. 120 kg
operating medium:	hydraulic oil based on mineral oil from 10 to 150 mm²/s, other media on request
cooling capacity:	according to cooling capacity graph

operating pressure max.	6 bar	8 bar
oil-viscosity	10-100 mm²/s	>100-150 mm²/s
E-motor	3,0 kW, 400/690 V, 50 Hz, approx. 1420 rpm	4,0 kW, 400/690 V, 50 Hz, approx. 1420 rpm

Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

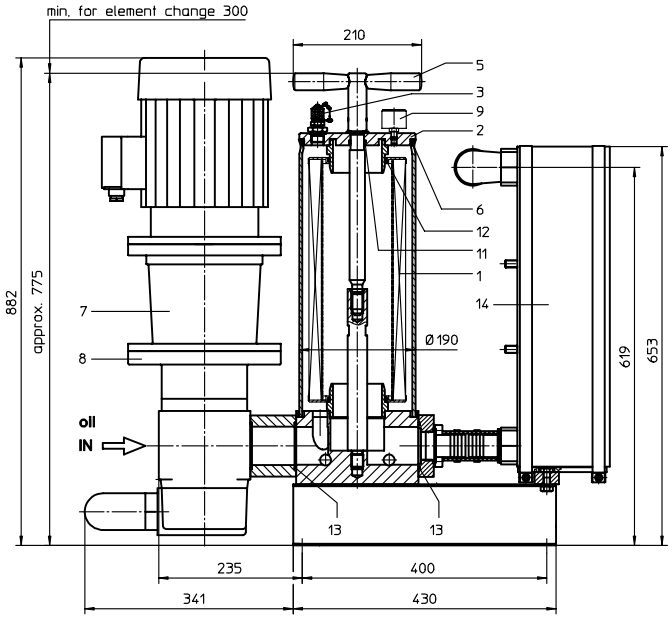
7. Test methods:

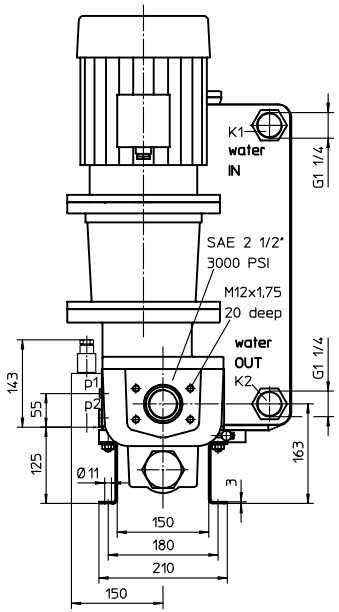
Filter elements are tested according to the following ISO standards:

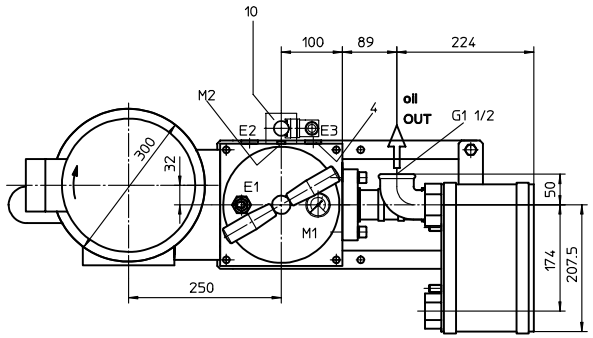
ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

FILTER UNIT, stationary with plate-exchanger
Series USP 320 PN 6

Sheet No. **4024 B**







Assignment of connections and functions

E1: venting mini-measuring connection, MA.1.St see sheet-no.1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the housing cover, dirt side manometer 0-16 bar
M2: measure connection at filter housing
p_1 = dirt side
p_2 = clean side
K1: cooling water IN
K2: cooling water OUT

1. Type index:

1.1. Filter unit: (ordering example)

USP. 320. 6VG. 10. B. P. -. P07. D07. CP30. AE

1	2	3	4	5	6	7	8	9	10	11

1 **series:**
USP = filter unit, stationary with plate-exchanger

2 **nominal size:** 320

3 **filter-material and filter-fineness:**
10 VG = 10 µm$_{(c)}$, 6 VG = 7 µm$_{(c)}$, 3 VG = 5 µm$_{(c)}$, 1 VG = 4 µm$_{(c)}$ Interpor fleece (glass fibre)
10 WVG = 10 µm$_{(c)}$, 3 WVG = 5 µm$_{(c)}$ Watersorp-filter element

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM), by agreement

7 **filter element specification:**
- = standard
VA = stainless steel

8 **pump unit:**
P07 = pump unit 07, NG 320.200

9 **motor:**
D07 = B5/132S/4.5,5.1500.400/690.D.50.1.-.-.-
rotay current motor 400/690V, 50 Hz, approx. 1420 rpm, 5,5 kW, type of protection IP 54

10 **plate-exchanger unit:**
CP30 = plate-exchanger unit CP30

11 **clogging indicator at M2:**
- = without
AE = AE30.2,5.P.-.B electrical at p_1 and p_2, 2,5 bar, see sheet-no. 1609
AOR = AOR.2,5.P.- visual, 2,5 bar, see sheet-no. 1606
AOC = AOC.2,5.P.- visual, 2,5 bar, see sheet-no. 1606

1.2. Filter element: (ordering example)

01NR. 1000. 6VG. 10. B. P. -

1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 1000

3 - 7 see type index-filter unit

Changes of measures and design are subject to alteration!

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fax +49 - (0)6205 - 2094-40 url www.internormen.com

2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 1000	
2	housing cover	1	22694-3	313837
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	G ½	304678
5	straining screw	1	31067-3	316893
6	Oring	1	170 x 6	304799 (NBR)
7	E-motor D07	1	5,5 kW, 400/690 V	316821
8	pump unit P07	1	NG 320.200	316908
9	manometer (series)	1	∅ 40	
10	clogging indicator	1	according to type index	
11	O-ring	1	22 x 3	304387 (NBR)
12	O-ring	2	90 x 4	306941 (NBR)
13	O-ring	3	69,45 x 3,53	305868 (NBR)
14	plate-exchanger unit	1	CP30	

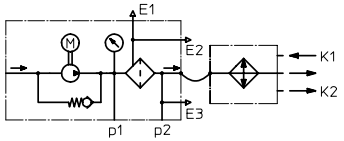
3. Description:

The stationary filter unit with plate-exchanger is intended for oil maintenance and for oil cooling on hydraulic systems.
The area of application comprises:
- secondary flow filtration in addition to the existing operating filter and the oil cooling
- secondary flow filtration without the action of the operating filter and the oil co oling
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design with plate interlacing without pipe satisfies the prerequisites for small dimensions and high reliability.
The device is equipped with a gear pump driven by an e-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 1000 and is led afterwards over a plate cooler.
Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 µm $_{(c)}$.
At the measuring point M1, the working pressure before the element is shown. The pollution of the element is indicated with the clogging indicator at the measuring point M2.
At a pressure difference > 2,5 bar , the element is polluted and has to be removed with a new element.
The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.
To protect against overpressure, the filter unit is fitted with a safety valve, pressure setting approx. 6 bar.
The cooling capacity is shown at the cooling capacity graph for the chosen field of application, depending on the input temperature, the streams of the medium and the type of medium. The cooling capacity graph is intended for the choice of application of the suitable filter unit with cooler. For the fields of application which are not shown in the cooling capacity graph, the capacity data have to be asked for at the manufacturer.
Stationary filter units can be operated without supervision if the electrical connection is fitted with an overload protection corresponding to the current consumption of the selected e-motor and the switch-off function of the e-motor of the electrical clogging indicator will disengaged at 2,5 bar.
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium.

4. Symbols:

Filter unit with cooler
without clogging indicator

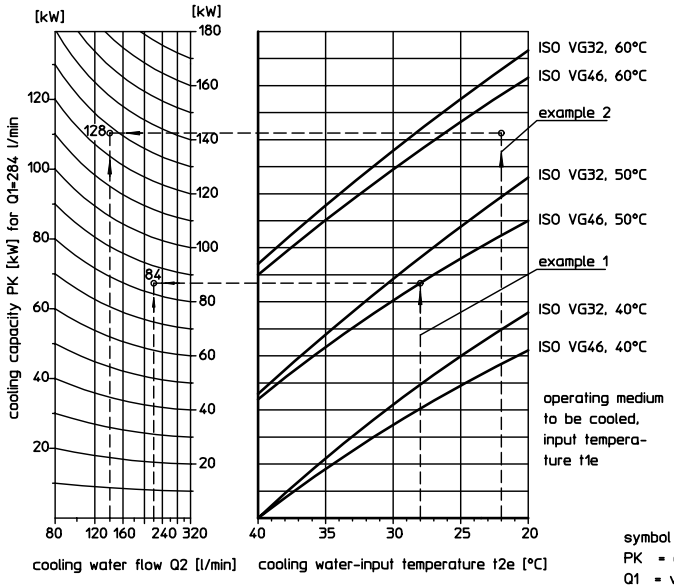


with electrical
clogging indicator AE30

with visual
clogging indicator
AOR, AOC

E 4024 B

5. Cooling capacity graph:



example 1, operating medium ISO VG46

t1e = 50 °C, t2e = 28 °C,
Q1 = 284 l/min, Q2 = 220 l/min

cooling capacity PK from the graph = 84 kW

$t1a = 50 - \frac{84 * 35}{284} = 39{,}6\ °C$

$t2a = 28 + \frac{84 * 14{,}4}{220} = 33{,}5\ °C$

example 2, operating medium ISO VG32

t1e = 55 °C, t2e = 22 °C,
Q1 = 284 l/min, Q2 = 140 l/min

cooling capacity PK from the graph = 128 kW
(data linear interpolated)

$t1a = 55 - \frac{128 * 35}{284} = 39{,}2\ °C$

$t2a = 22 + \frac{128 * 14{,}4}{140} = 35{,}2\ °C$

operating medium-output temperature t1a [°C] $t1a = t1e - \frac{PK * 35}{Q1}$

cooling water-output temperature t2a [°C] $t2a = t2e + \frac{PK * 14{,}4}{Q2}$

symbol		units
PK	= cooling capacity	kW
Q1	= volume flow-operating medium	l/min
Q2	= volume flow-cooling water	l/min
t1e	= operating medium-input temperature	°C
t1a	= operating medium-output temperature	°C
t2e	= cooling water-input temperature	°C
t2a	= cooling water-output temperature	°C

6. Technical data:

pump-volume flow :	284 l/min at 1420 rpm
E-motor:	5,5 kW, approx. 1420 rpm
rotary current:	4000/690 V, 50 Hz
operating pressure:	max. 6 bar
filter-fineness:	4, 5, 7 or 10 µm$_{(c)}$.
weight:	approx. 155 kg
operating medium:	hydraulic oil based on mineral oil from 10 to 100 mm²/s, other media on request

Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

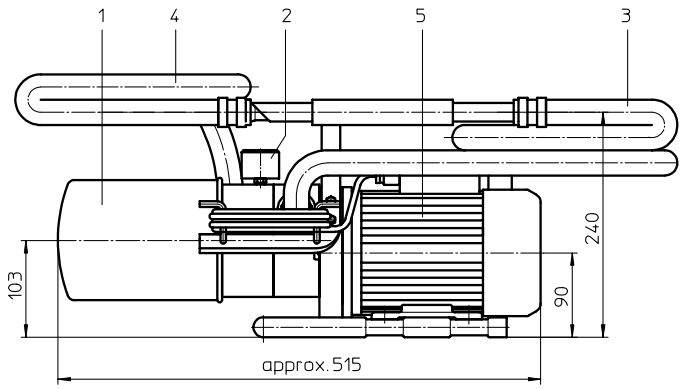
7. Test methods:

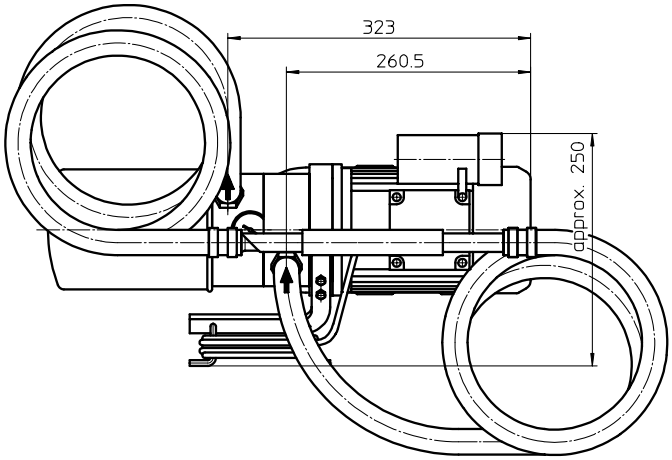
Filter elements are tested according to the following ISO sta ndards:

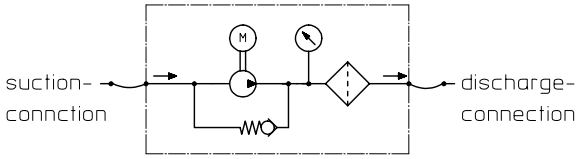
ISO 2941	Verification of colla pse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow character istics
ISO 16889	Multi-pass method for evaluating filtration performance

FILTER UNIT, mobile
Series UFM 15

Sheet No.
4007







1. Type index:

1.1. Filter unit: (ordering example)

UFM.	15.	10VG.	E.	P.	W16
1	2	3	4	5	6

1 **series:**
UFM = filter unit, mobile

2 **nominal size:** 15

3 **filter-material and filter-fineness:**
10 VG = 10 µm$_{(c)}$ Interpor fleece (glass fibre)
10 P = 10 µm paper

4 **filter element design:**
E = single-end open

5 **sealing material:**
P = Nitrile (NBR)

6 **motor:**
W16 = B3-B14/71/4.0,25.1500.230.W.50.1.R.S.K
alternating current motor 230V, 50Hz,
approx. 1500 rpm, 0,25KW,
type of protection IP 54

1.2. Filter element: (ordering example)

01WP.	90.	10VG.	E.	P
1	2	3	4	5

1 **series:**
01WP = spin-on cartridge

2 **nominal size:** 90

3 - 5 see type index-filter unit

2. Technical data:

pump capacity:	15 l/min at 1500 rpm
electric motor:	0,25 KW, 1500 rpm,
alternating current:	230 V, 50 Hz
pressure load capacity:	max. 5 bar
filter-fineness:	10 µm$_{(c)}$
weight:	approx. 12 kg
operating medium:	hydraulic oil based on mineral oil 10 to 400 mm^2/s other media on request

3. Spare parts:

item	qty.	designation	dimension	article-no.
1	1	spin-on cartridge	01WP.90...	
2	1	clogging indicator	visual	315452
3	1	suction hose ¾"	21938-3	
4	1	discharge hose ¾"	21946-3	
5	1	electric motor W16	0,25 KW, 230V	312053

4. Description:

The mobile filter unit is intended for oil maintenance on hydraulic systems.
The area of application comprises:
- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design satisfies the prerequisites for small dimensions and high reliabi lity.
As the filtration unit is portable and small, there is easy accers even to difficult accessible points. Leaking oil from the suction respectively discharge hose is prevented by lances connected with the carrying handle.
The suction hose ¾" and the discharge hose DN 20 are approximately 1500 mm long inclusive of the lance.
The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a spin-on cartridge.
The filter fineness is 10 µm$_{(c)}$. The contamination level of the filter element can be read off from a pressure display.
To protect against overpressure, the filter unit is fitted with a safety valve. Pressure setting about 5 bar.
The filter unit can be operated without supervision, since the unit switches off automatically after about 5 minutes when an operating pressure of > 6 bar is reached. This pressure range is marked in red on the scale field of the pressure display.
The filter element can be changed without tools.
The filter elements are supplied including seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.

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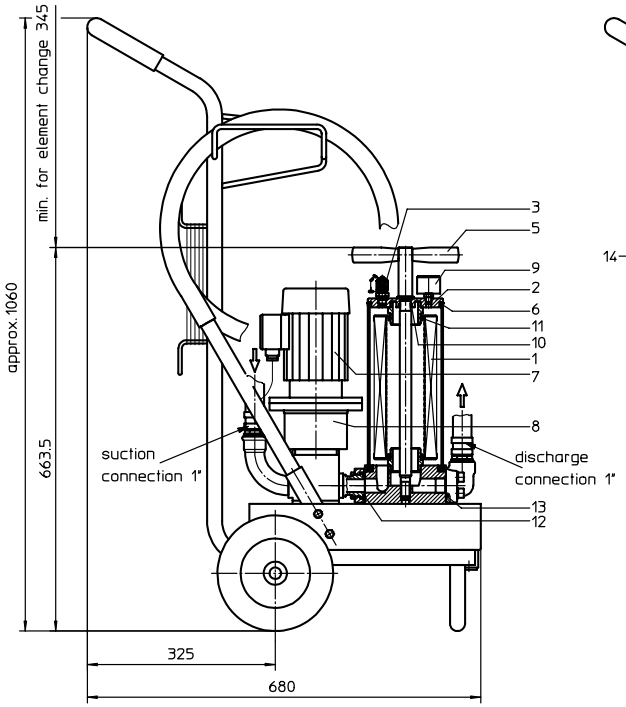
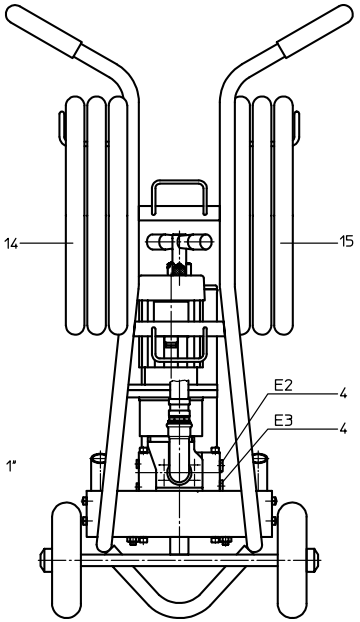
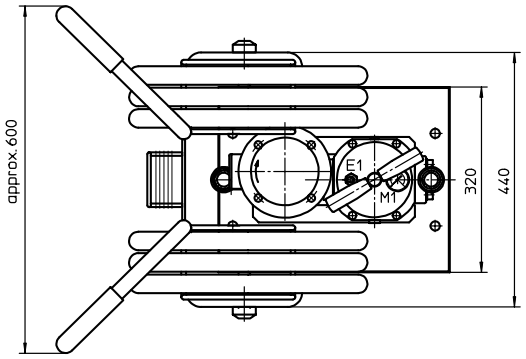
FILTER UNIT, mobile
Series UM 20 PN 4

Sheet No. **4013 F**







Assignment of connections and functions:

E1: venting mini-measuring connection MA.1.ST, see sheet-no.1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the housing cover, dirt side

1. Type index:

1.1. Filter unit: (ordering example)

UM.	20.	6VG.	10.	B.	P.	-.	P01.	W03.	L07.	L11.	O
1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
UM = filter unit, mobile

2 **nominal size:** 20

3 **filter-material and filter-fineness:**
10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$, 1 VG = 4$\mu m_{(c)}$ Interpor fleece (glass fibre)
10 WVG = 10 $\mu m_{(c)}$, 3 WVG = 5 $\mu m_{(c)}$ Watersorp-filter element

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM), by agreement

7 **filter element specification:**
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **pump unit:**
P01 = pump unit 01, NG 20.16 (standard-pump unit)

9 **motor:** (W = alternating current motor)

motor	electrical connection		volume flow	max. capacity	doc.-no.
W03 [1)]	230V	50Hz	22,7 l/min	10-400 mm²/s	43044-4
W07 [1)]	110V	60Hz	27,2 l/min	10-400 mm²/s	43045-4

[1)] standard-motor

10 **suction connection 1" :** (see sheet-no. 31992-4)
L07 = hose-lance
L08 = hose-fitting-lance
L09 = hose-lance-protective filter
L10 = hose- fitting-lance-protective filter

11 **discharge connection 1" :** (see sheet-no. 31992-4)
L11 = hose-lance
L12 = hose-fitting-lance

12 **clogging indicator at M1:**
- = without
O = visual, 2,5 bar

1.2. Filter element: (ordering example)

01NR.	250.	6VG.	10.	B.	P.	-
1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 250

3 - 7 see type index-filter unit

Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

Changes of measures and design are subject to alteration!

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2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 250	
2	housing cover	1	30615-3	315437
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	G ¼	305003
5	straining screw	1	30631-4	316404
6	O-ring	1	115 x 5	306640 (NBR)
7	electric motor	1	according to type index	
8	pump unit P01	1	NG 20.16	316270
9	clogging indicator (series)	1	visual ∅ 40	315452
10	O-ring	1	18 x 3	304359 (NBR)
11	O-ring	2	52 x 3	314206 (NBR)
12	O-ring	1	32 x 3,5	304378 (NBR)
13	O-ring	1	32,9 x 3,53	318850 (NBR)
14	suction hose 1"	1	according to type index	
15	discharge hose 1"	1	according to type index	

3. Designation:

The mobile filter unit is intended for oil maintenance on hydraulic systems.
The area of application comprises:
- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability.The transporting trolley makes it possible to move close up to confined locations with difficult access, and to fix the accessories (such as hoses and the connection cable) in a safe and r eliable manner.
Oil flowing out of the suction and/or discharge hose or the outflow openings is collected by the filter unit's oil trough, without causing any environmental damage. The suction hose DN 25 and the discharge hose DN 25 are approximately 2700 mm long inclusive of the lance.
The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 250.
Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 $\mu m_{(c)}$. The contamination level of the filter element can be read off from a pressure display in the cover of the filter.
At a pressure >2,5 bar (red area of the scale field), the filter element is contaminated and it must be replaced with a new filter element.
The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.
To protect against overpressure, the filter unit is fitted with a safety valve. Pressure setting about 4 bar.
The E-motor is made safe with a motor-protection-switch against overloading. At a working pressure > 4 bar, the motor-protection-switch cuts the E-motor out.
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when changing the fluid m edium.

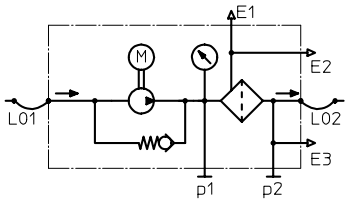
4. Technical data:

filter-fineness:	4, 5, 7 or 10 $\mu m_{(c)}$
oil temeprature:	-5°C to +60°C
weight:	approx. 42 kg
operating medium:	hydraulic oil based on mineral oi l from 10 mm²/s, other media on request

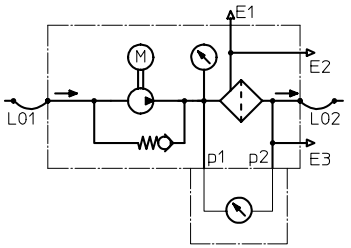
Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:

filter unit without clogging indicator



filter unit with visual clogging indic ator



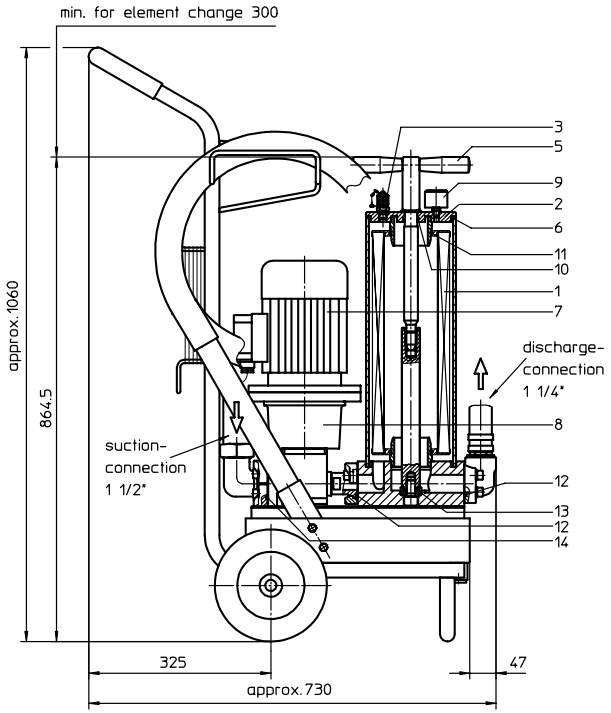
6. Test methods:

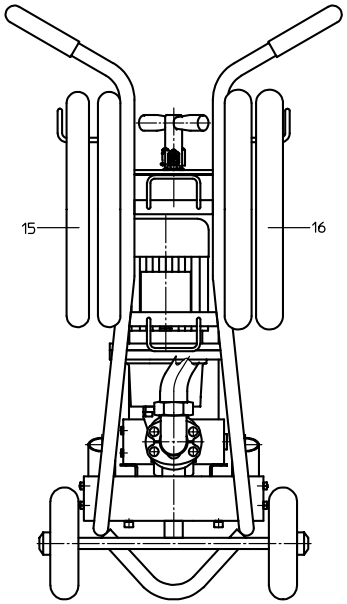
Filter elements are tested according to the following ISO sta ndards:

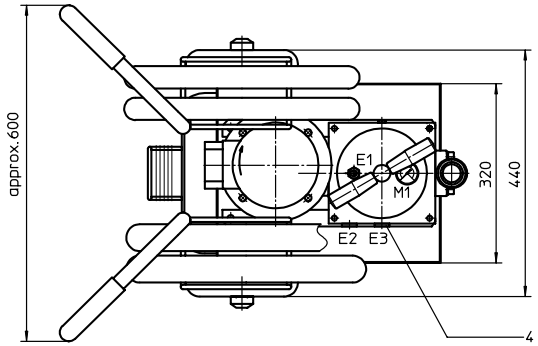
ISO 2941	Verification of colla pse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow character istics
ISO 16889	Multi-pass method for evaluating filtration performance

FILTER UNIT, mobile
Series UM 40 PN 4

Sheet No. **4014 E**







Assignment of connections and functions:

E1: venting mini-measuring connection, MA.1.St see sheet-no.1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the housing cover, dirt side

1. Type index:

1.1. Filter unit: (ordering example)

UM.	40.	6VG.	10.	B.	P.	-.	P05.	W10.	L01.	L05.	O
1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
UM = filter unit, mobile

2 **nominal size:** 40

3 **filter-material and filter-fineness:**
10 VG = 10 µm$_{(c)}$, 6 VG = 7 µm$_{(c)}$, 3 VG = 5 µm$_{(c)}$, 1 VG = 4µm$_{(c)}$ Interpor fleece (glass fibre)
10 WVG = 10 µm$_{(c)}$, 3 WVG = 5 µm$_{(c)}$ Watersorp-filter element

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM), by agreement

7 **filter element specification:**
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **pump unit:**
P05 = pump unit 05, NG 40.25 (standard-pump unit)

9 **motor:** (W = alternating current motor)

motor	electrical connection		volume flow	max. viscosity	doc.-no.
W10 [1)]	230V	50Hz	35,5 l/min	10-400 mm²/s	42754-4
W11 [1)]	110V	60Hz	42,5 l/min	10-400 mm²/s	42877-4

[1)] standard-motor

10 **suction connection 1 ½ " :** (see sheet-no. 31961-4)
L01 = hose-lance
L02 = hose-fitting-lance
L03 = hose-lance-protective filter
L04 = hose- fitting-lance-protective filter
L22 = hose- fitting

11 **discharge connection 1 ¼ " :** (see sheet-no. 31961-4)
L05 = hose-lance
L06 = hose-fitting-lance
L21 = hose-fitting

12 **clogging indicator at M1:**
- = without
O = visual, 2,5 bar

1.2. Filter element: (ordering example)

01NR.	630.	6VG.	10.	B.	P.	-
1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 630

3 - 7 see type index-filter unit

Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

Changes of measures and design are subject to alteration!

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2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 630	
2	housing cover	1	30600-3	315492
3	mini-measuring connection	1	MA.1.St	305453
4	screw plug	2	G ½	304678
5	straining screw	1	30595-3	316312
6	O-ring	1	140 x 6	315392 (NBR)
7	electric motor	1	according to type index	
8	pump unit P05	1	NG 40.25	316292
9	clogging indicator (series)	1	visual ∅ 40	315452
10	O-ring	1	22 x 3	304387 (NBR)
11	O-ring	2	70 x 4	306253 (NBR)
12	O-ring	2	37,69 x 3,53	304353 (NBR)
13	O-ring	1	18 x 3	304359 (NBR)
14	O-ring	1	47,22 x 3,53	305078 (NBR)
15	suction hose 1 ½ "	1	according to type index	
16	discharge hose 1 ¼ "	1	according to type index	

3. Designation:

The mobile filter unit is intended for oil maintenance on hydraulic systems.
The area of application comprises:
- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to bypass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability.The transporting trolley makes it possible to move close up to confined locations with difficult access, and to fix the accessories (such as hoses and the connection cable) in a safe and r eliable manner.
Oil flowing out of the suction and/or discharge hose or the outflow openings is collected by the filter unit's oil trough, without causing any environmental damage. The suction hose DN 40 and the discharge hose DN 32 are approximately 2700 mm long inclusive of the lance.
The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 630.
Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 $\mu m_{(c)}$. The contamination level of the filter element can be read off from a pressure display in the cover of the filter.
At a pressure >2,5 bar (red area of the scale field), the filter element is contaminated and it must be replaced with a new filter element.
The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.
To protect against overpressure, the filter unit is fitted with a safety valve. Pressure setting about 4 bar.
The E-motor is made safe with a motor-protection-switch against overloading. At a working pressure > 4 bar, the motor-protection-switch cuts the E-motor out.
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when changing the fluid m edium.

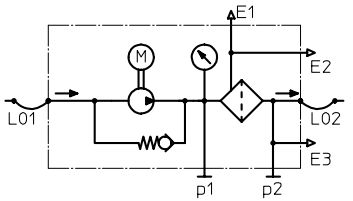
4. Technical data:

filter-fineness:	4, 5, 7 or 10 $\mu m_{(c)}$
oil temperature:	-5 bis +60°C
weight:	approx. 52 kg
operating medium:	hydraulic oil based on mineral oil from 10 mm²/s, other media on request

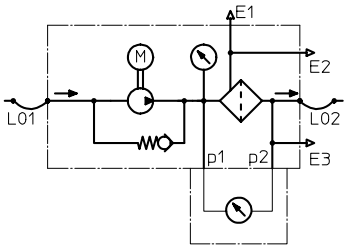
Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:

filter unit without clogging indicator



filter unit with visual clogging indic ator



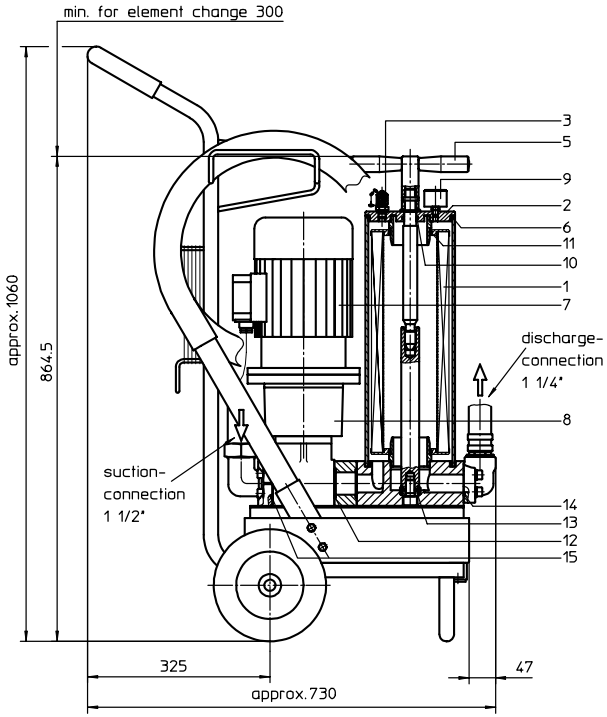
6. Test methods:

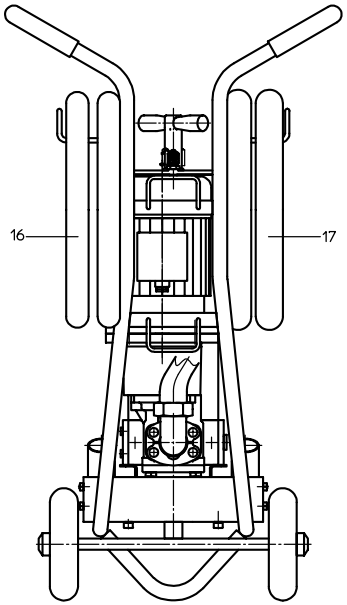
Filter elements are tested according to the following ISO sta ndards:

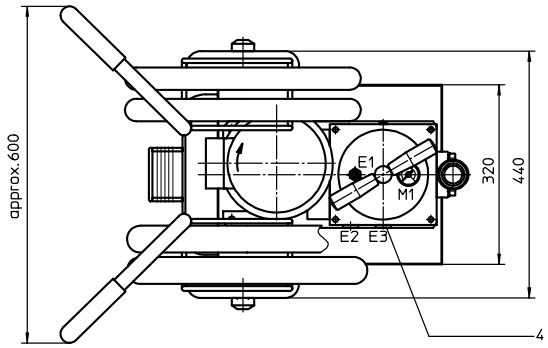
ISO 2941	Verification of colla pse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow character istics
ISO 16889	Multi-pass method for evaluating filtration performance

FILTER UNIT, mobile
Series UM 80 PN 4

Sheet No. **4015 E**







Assignment of connections and functions:

E1: venting mini-measuring connection, MA.1.St see sheet-no.1650
E2: drainage of filter, dirt sid e
E3: drainage of filter, clean side
M1: measure connection in the housing cover, dirt side

1. Type index:

1.1. Filter unit: (ordering example)

UM.	80.	6VG.	10.	B.	P.	-.	P04.	W06.	L01.	L05.	O
1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
UM = filter unit, mobile

2 **nominal size:** 80

3 **filter-material and filter-fineness:**
10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$, 1 VG = 4$\mu m_{(c)}$ Interpor fleece (glass fibre)
10 WVG = 10 $\mu m_{(c)}$, 3 WVG = 5 $\mu m_{(c)}$ Watersorp-filter element

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM), by agreement

7 **filter element specification:**
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **pump unit:**
P04 = pump unit 04, NG 80.50 (standard-pump unit)

9 **motor:** (W = alternating current motor)

motor	electrical connection		volume flow	max. viscosity	doc.-no.
W06 [1]	230V	50Hz	71,0 l/min	10-400 mm²/s	43056-4
W09 [1]	110V	60Hz	85,0 l/min	10-400 mm²/s	43057-4

[1] standard-motor

10 **suction connection 1 ½ " :** (see sheet-no. 31961-4)
L01 = hose-lance
L02 = hose-fitting-lance
L03 = hose-lance-protective filter
L04 = hose- fitting-lance-protective filter

11 **discharge connection 1 ¼ " :** (see sheet-no. 31961-4)
L05 = hose-lance
L06 = hose-fitting-lance

12 **clogging indicator at M1:**
- = without
O = visual, 2,5 bar

1.2. Filter element: (ordering example)

01NR.	630.	6VG.	10.	B.	P.	-
1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 630

3 - 7 see type index-filter unit

Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

Changes of measures and design are subject to alteration!

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2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 630	
2	housing cover	1	30600-3	315492
3	mini-measuring connection	1	MA.1.ST	305453
4	screw plug	2	G ½	304678
5	straining screw	1	30595-3	316312
6	O-ring	1	140 x 6	315392 (NBR)
7	electric motor	1	according to type index	
8	pump unit P04	1	NG 80.50	317139
9	clogging indicator (series)	1	visual ∅ 40	315452
10	O-ring	1	22 x 3	304387 (NBR)
11	O-ring	2	70 x 4	306253 (NBR)
12	O-ring	2	45 x 3	304991 (NBR)
13	O-ring	1	18 x 3	304359 (NBR)
14	O-ring	1	37,69 x 3,53	304353 (NBR)
15	O-ring	1	47,22 x 3,53	305078 (NBR)
16	suction hose 1 ½ “	1	according to type index	
17	discharge hose 1 ¼ “	1	according to type index	

3. Designation:

The mobile filter unit is intended for oil maintenance on hydraulic systems.
The area of application comprises:
- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability.The transporting trolley makes it possible to move close up to confined locations with difficult access, and to fix the accessories (such as hoses and the connection cable) in a safe and r eliable manner.
Oil flowing out of the suction and/or discharge hose or the outflow openings is collected by the filter unit’s oil trough, without causing any environmental damage. The suction hose DN 40 and the discharge hose DN 32 are approximately 2700 mm long inclusive of the lance.
The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 630.
Depending on the customer’s wishes, the filter fineness is either 4, 5, 7 or 10 $\mu m_{(c)}$. The contamination level of the filter element can be read off from a pressure display in the cover of the filter.
At a pressure >2,5 bar (red area of the scale field), the filter element is contaminated and it must be replaced with a new filter element.
The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.
To protect against overpressure, the filter unit is fitted with a safety valve. Pressure setting about 4 bar.
The E-motor is made safe with a motor-protection-switch against overloading. At a working pressure > 4 bar, the motor-protection-switch cuts the E-motor out.
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when changing the fluid m edium.

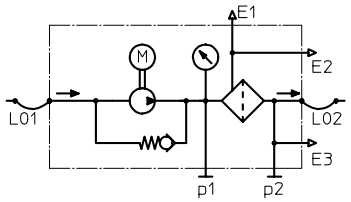
4. Technical data:

filter-fineness:	4, 5, 7 or 10 $\mu m_{(c)}$
oil temperature:	-5 bis +60°C
weight:	approx. 73 kg
operating medium:	hydraulic oil based on mineral oil from 10 mm²/s, other media on request

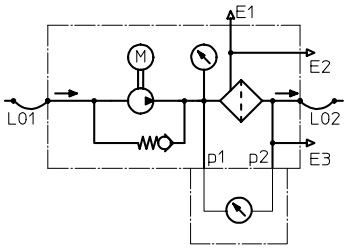
Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:

filter unit without clogging indic ator



filter unit with visual clogging indic ator



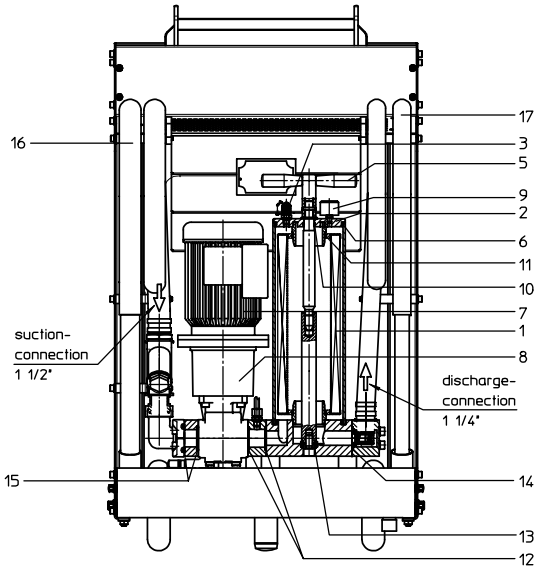
6. Test methods:

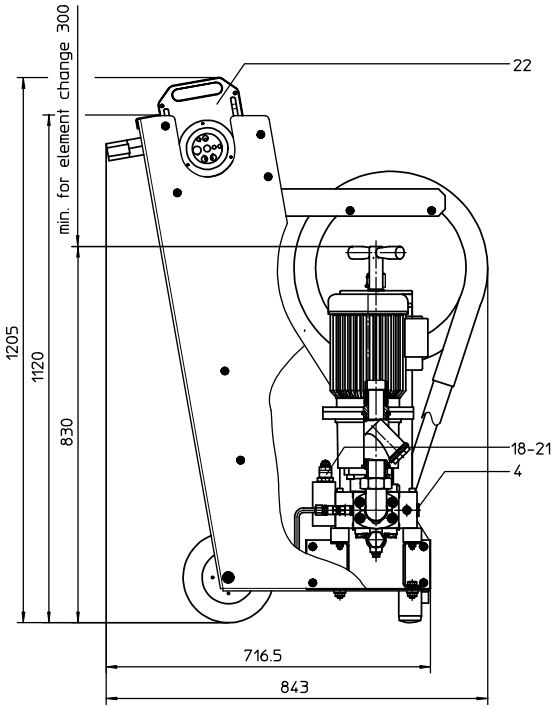
Filter elements are tested according to the following ISO sta ndards:

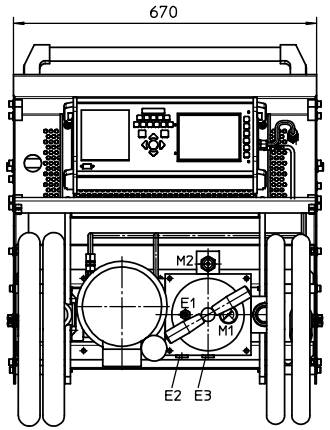
ISO 2941	Verification of colla pse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow character istics
ISO 16889	Multi-pass method for evaluating filtration performance

FILTER UNIT, mobile for contamination control
Series UMCC 40 PN 8

Sheet No. **4033**







Assignment of connections and functions:

E1: venting mini-measuring connection, MA.1.St see sheet-no.1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the housing cover, dirt side
manometer 0-16 bar
M2: measure connection at filter housing, dirt side
p_1 = dirt side
p_2 = clean side

1. Type index:

1.1. Filter unit: (ordering example)

UMCC.	40.	6VG.	10.	B.	P.	-.	P30.	W06.	L03.	L28.	AOR.	CCS2
1	2	3	4	5	6	7	8	9	10	11	12	13

1 **series:**
UMCC = filter unit, mobile for contamination control

2 **nominal size:** 40

3 **filter-material and filter- fineness:**
10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$, 1 VG = 4 $\mu m_{(c)}$ Interpor fleece (glass fibre)
10 WVG = 10 $\mu m_{(c)}$, 3 WVG = 5 $\mu m_{(c)}$ Watersorp-filter element

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM), by agreement

7 **filter element specification:**
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **pump unit:**
P30 = pump unit 30, NG 40.25 (standard-pump unit)

9 **motor:** (W = alternating current motor)

motor	electrical connection		volume flow	max. viscosity	doc.-no.
W06 [1]	230V	50Hz	35,5 l/min	400 mm²/s	43056-4
W09 [1]	110V	60Hz	42,5 l/min	400 mm²/s	43057-4

[1] standard-motor

10 **suction connection 1 $^1/_2$" :** (see sheet-no. 31961-4)
L03 = hose-lance-protective filter
L04 = hose-fitting-lance-protective filter

11 **discharge connection 1 $^1/_4$" :** (see sheet-no. 40572-4)
L28 = hose-lance
L29 = hose-fitting-lance

12 **clogging indicator at M2:**
AOR = visual, Δp 2,5 bar, see sheet-no. 1606
AOC = visual, Δp 2,5 bar, see sheet-no. 1606

13 **contamination control system:**
- = without
CCS2 = with contamination control system CCS2

1.2. Filter element: (ordering example)

01NR.	630.	6VG.	10.	B.	P.	-
1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 630

3 - 7 see type index-filter unit

Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

Changes of measures and design are subject to alteration!

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2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 630	
2	housing cover	1	30600-3	315492
3	mini-measuring connection	1	MA.1.ST	305453
4	screw plug	2	G ½	304678
5	straining screw	1	30595-3	316312
6	Oring	1	140 x 6	315392 (NBR)
7	electric motor	1	according to type index	
8	pump unit P30	1	NG 40.25	326584
9	manometer	1	visual ∅ 40	317847
10	O-ring	1	22 x 3	304387 (NBR)
11	O-ring	2	70 x 4	306253 (NBR)
12	O-ring	2	45 x 3	304991 (NBR)
13	O-ring	1	18 x 3	304359 (NBR)
14	O-ring	1	45 x 3	304991 (NBR)
15	O-ring	2	47,22 x 3,53	305078 (NBR)
16	suction hose 1 ½"	1	according to type index	
17	discharge hose 1 ¼"	1	according to type index	
18	clogging indicator, visual	1	AOR or AOC	see sheet-no. 1606
19	O-ring	1	15 x 1,5	315357 (NBR)
20	O-ring	1	22 x 2	304708 (NBR)
21	O-ring	2	14 x 2	304342 (NBR)
22	contamination control system	1	CCS2	320595

3. Designation:

The mobile filter unit is intended for oil maintenance on hydraulic systems.
The area of application comprises:
- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

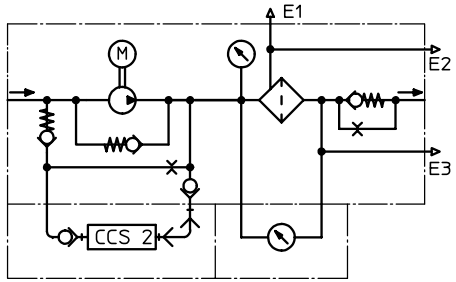
The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability.The transporting trolley makes it possible to move close up to confined locations with difficult access, and to fix the accessories (such as hoses and the connection cable) in a safe and r eliable manner.
Oil flowing out of the suction and/or discharge hose or the outflow openings is collected by the filter unit's oil trough, without cauing any environmental damage.
The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 630.
Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 µm $_{(c)}$.
At a pressure difference > 2,5 bar , the element is polluted and has to be removed with a new element .
The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.
To protect against overpressure, the filter unit is fitted with a safety valve. Pressure setting about 8 bar.
The E-motor is made safe with a motor-protection-switch against overloading. At a working pressure > 8 bar, the motor-protection-switch cuts the E-motor out.
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when changing the fluid m edium.
In order to measure the contamination class of the oil taken in, there is a connection for the electronic particle counter CCS 2 ahead the filter. The CCS 2 is supplied complete with case and extra connection hoses and can also be used separately. When measuring at the mobile filter unit please consider that a change of the measured contamination classes is shown after an adequate operation time only, depending on the total oil volume and its mixing with the filtered oil.
To protect the pump a cleanable coarse filter made of metal wire mesh with mesh size 250 µm is being placed in the suction h ose.

4. Technical data:

filter-fineness:	4, 5, 7 or 10 µm$_{(c)}$
oil temperature:	-5°C to +60°C
weight:	approx. 113 kg
operating medium:	hydraulic oil based on mineral oil from 10 mm²/s, other media on request

Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbol:



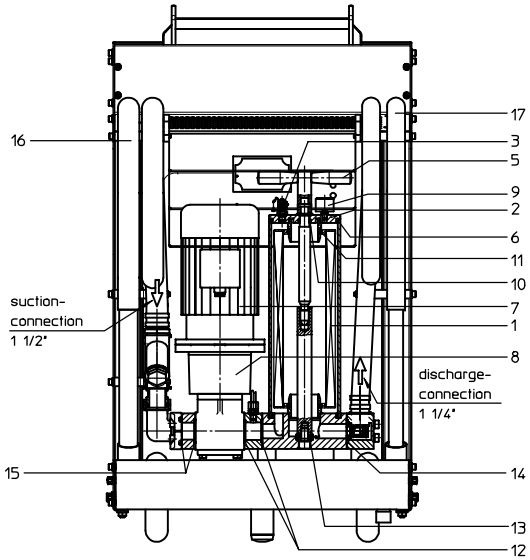
6. Test methods:

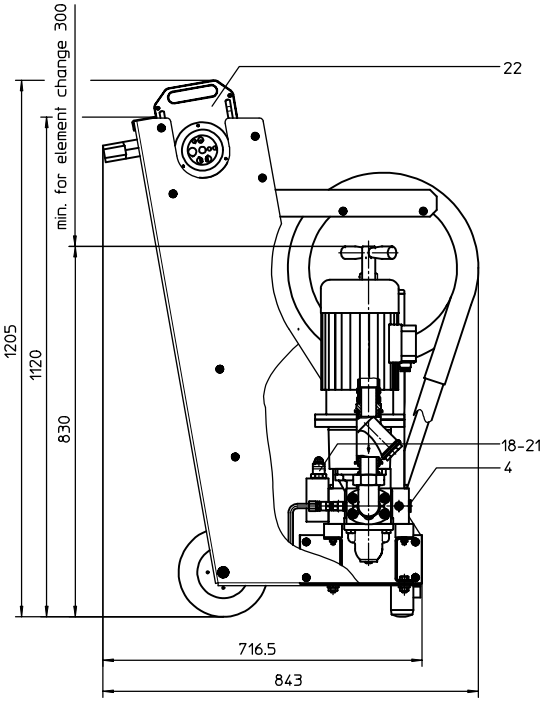
Filter elements are tested according to the following ISO sta ndards:

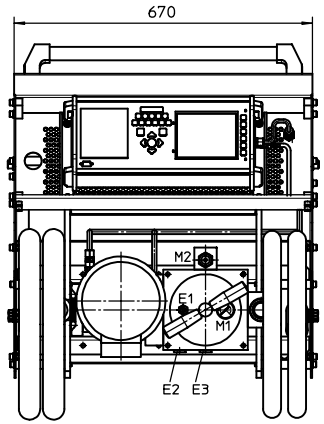
ISO 2941	Verification of colla pse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow character istics
ISO 16889	Multi-pass method for evaluating filtration performance

FILTER UNIT, mobile for contamination control
Series UMCC 80 PN 8

Sheet No. **4032 B**







Assignment of connections and functions:

E1: venting mini-measuring connection, MA.1.St see sheet-no.1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the housing cover, dirt side manometer 0-16 bar
M2: measure connection at filter housing, dirt side
p_1 = dirt side
p_2 = clean side

1. Type index:

1.1. Filter unit: (ordering example)

UMCC.	80.	6VG.	10.	B.	P.	-.	P28.	W18.	L03.	L28.	AOR.	CCS2
1	2	3	4	5	6	7	8	9	10	11	12	13

1 **series:**
UMCC = filter unit, mobile for contamination control

2 **nominal size:** 80

3 **filter-material and filter- fineness:**
10 VG = 10 µm$_{(c)}$, 6 VG = 7 µm$_{(c)}$, 3 VG = 5 µm$_{(c)}$, 1 VG = 4 µm$_{(c)}$ Interpor fleece (glass fibre)
10 WVG = 10 µm$_{(c)}$, 3 WVG = 5 µm$_{(c)}$ Watersorp-filter element

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM), by agreement

7 **filter element specification:**
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **pump unit:**
P28 = pump unit 28, NG 80.50 (standard-pump unit)

9 **motor:** (W = alternating current motor)

motor	electrical connection		volume flow	max. viscosity	doc.-no.
W18 [1)]	230V	50Hz	71,0 l/min	400 mm²/s	43060-4
W06	230V	50Hz	71,0 l/min	100 mm²/s	43056-4

[1)] standard-motor

10 **suction connection 1 $^1/_2$" :** (see sheet-no. 31961-4)
L03 = hose-lance-protective filter
L04 = hose-fitting-lance-protective filter

11 **discharge connection 1 $^1/_4$" :** (see sheet-no. 40572-4)
L28 = hose-lance
L29 = hose-fitting-lance

12 **clogging indicator at M2:**
AOR = visual, Δp 2,5 bar, see sheet-no. 1606
AOC = visual, Δp 2,5 bar, see sheet-no. 1606

13 **contamination control system:**
- = without
CCS2 = with contamination control system CCS2

1.2. Filter element: (ordering example)

01NR.	630.	6VG.	10.	B.	P.	-
1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 630

3 - 7 see type index-filter unit

Notice:

Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

Changes of measures and design are subject to alteration!

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2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 630	
2	housing cover	1	30600-3	315492
3	mini-measuring connection	1	MA.1.ST	305453
4	screw plug	2	G ½	304678
5	straining screw	1	30595-3	316312
6	Oring	1	140 x 6	315392 (NBR)
7	electric motor	1	according to type index	
8	pump unit P28	1	NG 80.50	325579
9	manometer	1	visual ∅ 40	317847
10	O-ring	1	22 x 3	304387 (NBR)
11	O-ring	2	70 x 4	306253 (NBR)
12	O-ring	2	45 x 3	304991 (NBR)
13	O-ring	1	18 x 3	304359 (NBR)
14	O-ring	1	45 x 3	304991 (NBR)
15	O-ring	2	47,22 x 3,53	305078 (NBR)
16	suction hose 1 ½"	1	according to type index	
17	discharge hose 1 ¼"	1	according to type index	
18	clogging indicator, visual	1	AOR or AOC	see sheet-no. 1606
19	O-ring	1	15 x 1,5	315357 (NBR)
20	O-ring	1	22 x 2	304708 (NBR)
21	O-ring	2	14 x 2	304342 (NBR)
22	contamination control system	1	CCS2	320595

3. Designation:

The mobile filter unit is intended for oil maintenance on hydraulic systems.
The area of application comprises:
- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

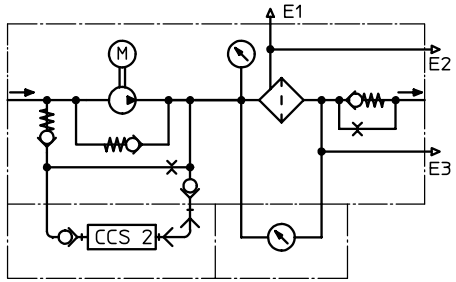
The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability.The transporting trolley makes it possible to move close up to confined locations with difficult access, and to fix the accessories (such as hoses and the connection cable) in a safe and r eliable manner.
Oil flowing out of the suction and/or discharge hose or the outflow openings is collected by the filter unit's oil trough, without cauing any environmental damage.
The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 630.
Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 µm $_{(c)}$.
At a pressure difference > 2,5 bar , the element is polluted and has to be removed with a new element .
The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.
To protect against overpressure, the filter unit is fitted with a safety valve. Pressure setting about 8 bar.
The E-motor is made safe with a motor-protection-switch against overloading. At a working pressure > 8 bar, the motor-protection-switch cuts the E-motor out.
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when changing the fluid m edium.
In order to measure the contamination class of the oil taken in, there is a connection for the electronic particle counter CCS 2 ahead the filter. The CCS 2 is supplied complete with case and extra connection hoses and can also be used separately. When measuring at the mobile filter unit please consider that a change of the measured contamination classes is shown after an adequate operation time only, depending on the total oil volume and its mixing with the filtered oil.
To protect the pump a cleanable coarse filter made of metal wire mesh with mesh size 250 µm is being placed in the suction h ose.

4. Technical data:

filter-fineness:	4, 5, 7 or 10 µm$_{(c)}$
oil temperature:	-5°C to +60°C
weight:	approx. 155 kg
operating medium:	hydraulic oil based on mineral oil from 10 mm²/s, other media on request

Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbol:



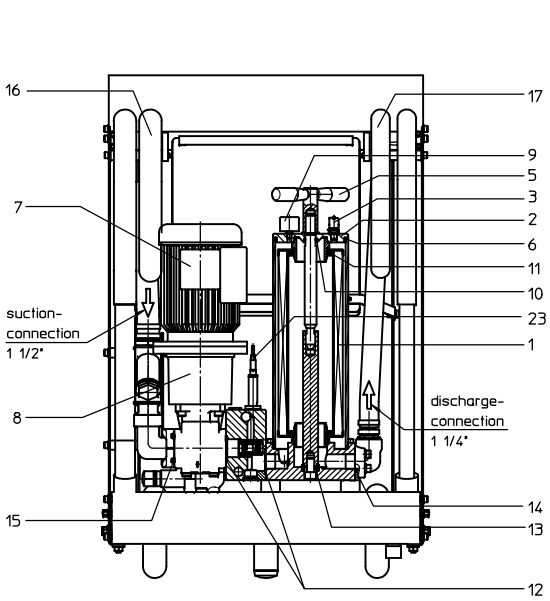
6. Test methods:

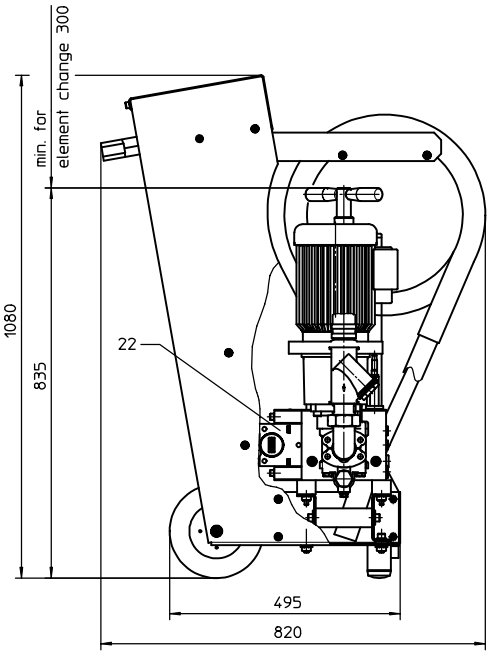
Filter elements are tested according to the following ISO sta ndards:

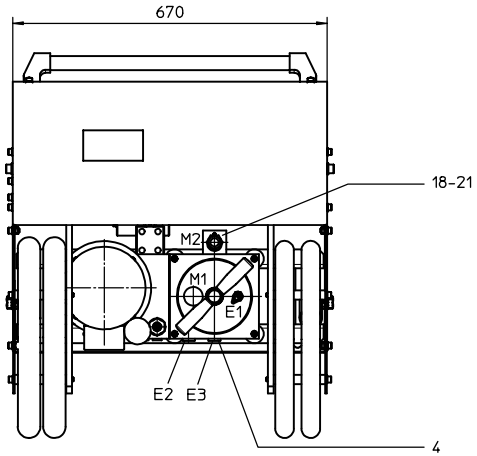
ISO 2941	Verification of colla pse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow character istics
ISO 16889	Multi-pass method for evaluating filtration performance

FILTER UNIT, mobile with fluid control
Series UMFC 41 PN 6

Sheet No. **4052**







Assignment of connections and functions:

E1: venting mini-measuring connection, MA.1.ST
see sheet-no.1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the housing cover, dirt side
M2: measure connection at filter housing, dirt side
p_1 = dirt side
p_2 = clean side

1. Type index:

1.1. Filter unit: (ordering example)

UMFC.	41.	6VG.	10.	B.	P.	-.	P44.	W27.	L03.	L05.	AOR
1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
UMFC = filter unit, mobile with fluid control

2 **nominal size:** 41

3 **filter-material and filter-fineness:**
10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$, 1 VG = 4 $\mu m_{(c)}$ Interpor fleece (glass fiber)
10 WVG = 10 $\mu m_{(c)}$, 3 WVG = 5 $\mu m_{(c)}$ Watersorp-filter element

4 **resistance of presure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM), by agreement

7 **filter element specification:**
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **pump unit:**
P44 = pump unit 44, NG 40.25 (standard-pump unit)

9 **motor:** (W = alternating current motor)

motor	electrical connection		volume flow	max. viscosity	doc.-no.
W27 [1]	230V	50Hz	35,5 l/min	400 mm²/s	43412-4
W04 [1]	110V	60Hz	42,6 l/min	400 mm²/s	43411-4

[1] standard-motor

10 **suction connection 1 $^1/_2$" with protective filter:** (see sheet-no. 31961-4)
L03 = hose-lance-protective filter
L04 = hose-fitting-lance-protective filter

11 **discharge connection 1 $^1/_4$" :** (see sheet-no. 31961-4)
L05 = hose-lance
L06 = hose-fitting-lance
L21 = hose-fitting

12 **clogging indicator at M2:**
- = without
AOR = visual, Δp 2,5 bar, see sheet-no. 1606
AOC = visual, Δp 2,5 bar, see sheet-no. 1606

1.2. Filter element: (ordering example)

01NR.	630.	6VG.	10.	B.	P.	-
1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 630

3 - 7 see type index-filter unit

Notice:
Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

Changes of measures and design are subject to alteration!

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2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 630	
2	housing cover	1	30600-3	315492
3	mini-measuring connection	1	MA.1.ST	305453
4	screw plug	2	G ½	304678
5	straining screw	1	30595-3	316312
6	O-ring	1	140 x 6	315392 (NBR)
7	electric motor	1	according to type index	
8	pump unit P44	1	NG 40.25	327963
9	clogging indicator (series)	1	visual ∅ 40	315452
10	O-ring	1	22 x 3	304387 (NBR)
11	O-ring	2	70 x 4	306253 (NBR)
12	O-ring	2	45 x 3	304991 (NBR)
13	O-ring	1	18 x 3	304359 (NBR)
14	O-ring	1	45 x 3	304991 (NBR)
15	O-ring	1	47,22 x 3,53	305078 (NBR)
16	suction hose 1 ½“	1	according to type index	
17	discharge hose 1 ¼“	1	according to type index	
18	clogging indicator, visual	1	AOR or AOC	see sheet-no. 1606
19	O-ring	1	15 x 1,5	315357 (NBR)
20	O-ring	1	22 x 2	304708 (NBR)
21	O-ring	2	14 x 2	304342 (NBR)
22	contamination control sensor	1	PFS 01	327213
23	water analysis- and temperature sensor	1	WSPS 03	326211

3. Designation:

The mobile filter unit is intended for oil maintenance on hydraulic systems.
The area of application comprises:
- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability.The transporting trolley makes it possible to move close up to confined locations with difficult access, and to fix the accessories (such as hoses and the connection cable) in a safe and r eliable manner.
Oil flowing out of the suction and/or discharge hose or the outflow openings is collected by the filter unit's oil trough, without causing any environmental damage.
The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 630.
Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 µm $_{(c)}$.
At a pressure difference > 2,5 bar , the element is polluted and has to be removed with a new element .
The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.
To protect against overpressure, the filter unit is fitted with a safety valve. Pressure setting about 6 bar.
The E-motor is made safe with a motor-protection-switch against overloading. At a working pressure > 6 bar, the motor-protection-switch cuts the E-motor out.
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when changing the fluid m edium.
In case of the drawn-off oil the contamination classes can be determined in front of the filter with the contamination control sensor PFS01, with help of the water analysis- and temperature sensor WSPS03 the saturation of the water. With choice of the different operating modes the running filter unit can be switched off manually or, after reaching the given limits for the contamination classes and / or through saturation of the water.
For the protection of the pump there is a cleanable coarse filter made of metal with a mesh size of 250 µm in the suction line.
In order to protect the sensors the unit is being automatically stopped at an oil temperature of approx. 70 °C. Measurement of the contamination class with PFS 01 can be done at oil temperatures up to 50 °C only. Otherwise the sensor will be overheated

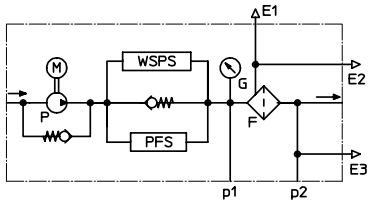
4. Technical data:

filter-fineness:	4, 5, 7 or 10 µm$_{(c)}$
oil temperaure:	0°C to 70°C (50°C)
weight:	approx. 105 kg
operating medium:	hydraulic oil based on mineral oil from 10 mm²/s other media on request

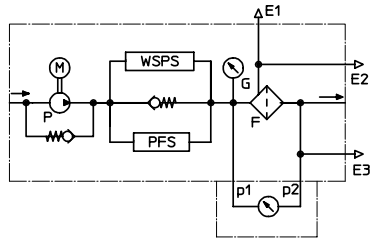
Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbol:

filter unit without clogging indicator



filter unit with clogging indicator
AOR or AOC



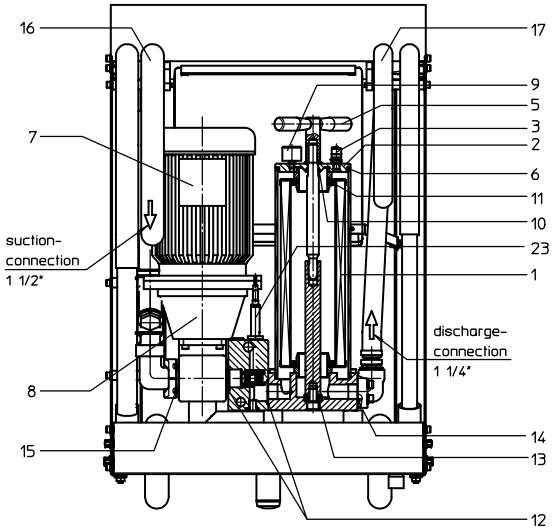
6. Test methods:

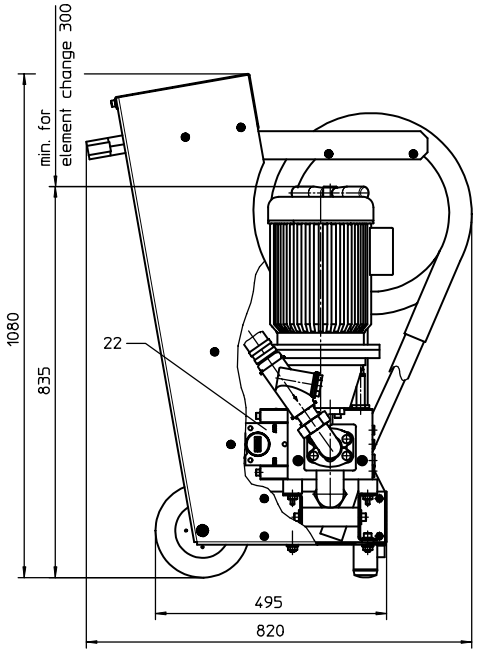
Filter elements are tested according to the following ISO sta ndards:

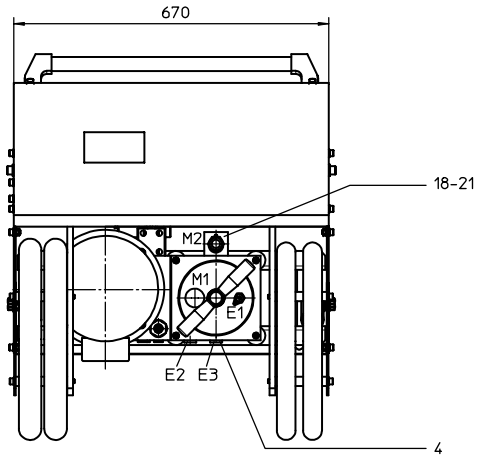
ISO 2941	Verification of colla pse/burst resistance
ISO 2942	Verification of fabrication inte grity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fat igue characteristics
ISO 3968	Evaluation of pressure drop versus flow character istics
ISO 16889	Multi-pass method for evaluating filtration performance

FILTER UNIT, mobile with fluid control
Series UMFC 81 PN 10

Sheet No. **4053**







Assignment of connections and functions:

E1: venting mini-measuring connection, MA.1.ST see sheet-no.1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1: measure connection in the housing cover, dirt side
M2: measure connection at filter housing, dirt side
p_1 = dirt side
p_2 = clean side

1. Type index:

1.1. Filter unit: (ordering example)

UMFC. 81. 6VG. 10. B. P. -. P42. D63. L03. L05. AOR

1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
UMFC = filter unit, mobile with fluid control

2 **nominal size:** 81

3 **filter-material and filter-fineness:**
10 VG = 10 $\mu m_{(c)}$, 6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$, 1 VG = 4 $\mu m_{(c)}$ Interpor fleece (glass fiber)
10 WVG = 10 $\mu m_{(c)}$, 3 WVG = 5 $\mu m_{(c)}$ Watersorp-filter element

4 **resistance of presure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM), by agreement

7 **filter element specification:**
- = standard
VA = stainless steel
IS06 = see sheet-no. 31601

8 **pump unit:**
P42 = pump unit 42, NG 80.50 (standard-pump unit)

9 **motor:** (D = rotary current motor)

motor	electrical connection		volume flow	max. viscosity	doc.-no.
D63 [1]	230/400V	50Hz	35,5 l/min	800 mm²/s	43408-4
	230/400V	50Hz	71,0 l/min	400 mm²/s	
	265/460V	60Hz	42,6 l/min	800 mm²/s	
	265/460V	60Hz	85,2 l/min	400 mm²/s	

[1] standard-motor

10 **suction connection 1 $^1/_2$" with protective filter:** (see sheet-no. 31961-4)
L03 = hose-lance-protective filter
L04 = hose-fitting-lance-protective filter

11 **discharge connection 1 $^1/_4$" :** (see sheet-no. 31961-4)
L05 = hose-lance
L06 = hose-fitting-lance
L21 = hose-fitting

12 **clogging indicator at M2:**
- = without
AOR = visual, Δp 2,5 bar, see sheet-no. 1606
AOC = visual, Δp 2,5 bar, see sheet-no. 1606

1.2. Filter element: (ordering example)

01NR. 630. 6VG. 10. B. P. -

1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element according to DIN 24550, T4

2 **nominal size:** 630

3 - 7 see type index-filter unit

Notice:
Only operate all motors listed on this data sheet in combination with the pump unit specified on the type plate under item 8.

Changes of measures and design are subject to alteration!

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2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 630	
2	housing cover	1	30600-3	315492
3	mini-measuring connection	1	MA.1.ST	305453
4	screw plug	2	G ½	304678
5	straining screw	1	30595-3	316312
6	O-ring	1	140 x 6	315392 (NBR)
7	electric motor	1	according to type index	
8	pump unit P42	1	NG 80.50	327962
9	clogging indicator (series)	1	visual ∅ 40	315452
10	O-ring	1	22 x 3	304387 (NBR)
11	O-ring	2	70 x 4	306253 (NBR)
12	O-ring	2	45 x 3	304991 (NBR)
13	O-ring	1	18 x 3	304359 (NBR)
14	O-ring	1	45 x 3	304991 (NBR)
15	O-ring	1	47,22 x 3,53	305078 (NBR)
16	suction hose 1 ½“	1	according to type index	
17	discharge hose 1 ¼“	1	according to type index	
18	clogging indicator, visual	1	AOR or AOC	see sheet-no. 1606
19	O-ring	1	15 x 1,5	315357 (NBR)
20	O-ring	1	22 x 2	304708 (NBR)
21	O-ring	2	14 x 2	304342 (NBR)
22	contamination control sensor	1	PFS 01	327213
23	water analysis- and temperature sensor	1	WSPS 03	326211

3. Designation:

The mobile filter unit is intended for oil maintenance on hydraulic systems.
The area of application comprises:
- secondary flow filtration in addition to the existing operating filter
- secondary flow filtration without the action of the operating filter
- filtration when filling the oil reservoir.

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability.The transporting trolley makes it possible to move close up to confined locations with difficult access, and to fix the accessories (such as hoses and the connection cable) in a safe and r eliable manner.
Oil flowing out of the suction and/or discharge hose or the outflow openings is collected by the filter unit's oil trough, without causing any environmental damage.
The device is equipped with a gear pump driven by an E-motor. The flow conveyed by the geared pump is fed over a filter element to DIN 24550, T4, nominal size 630.
Depending on the customer's wishes, the filter fineness is either 4, 5, 7 or 10 µm $_{(c)}$.
At a pressure difference > 2,5 bar , the element is polluted and has to be removed with a new element .
The filter element can be changed without tools. After removing the straining screw and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare elements in stock.
To protect against overpressure, the filter unit is fitted with a safety valve. Pressure setting about 10 bar.
The E-motor is made safe with a motor-protection-switch against overloading. At a working pressure > 10 bar, the motor-protection-switch cuts the E-motor out.
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when changing the fluid m edium.
In case of the drawn-off oil the contamination classes can be determined in front of the filter with the contamination control sensor PFS01, with help of the water analysis- and temperature sensor WSPS03 the saturation of the water. With choice of the different operating modes the running filter unit can be switched off manually or, after reaching the given limits for the contamination classes and / or through saturation of the water. With changing over of the pole the motor of the unit can be run eiter with half or full speed, which results in the given working data of item 9 in the order example.
For the protection of the pump there is a cleanable coarse filter made of metal with a mesh size of 250 µm in the suction line.
In order to protect the sensors the unit is being automatically stopped at an oil temperature of approx. 70 °C. Measurement of the contamination class with PFS01 can be done at oil temperatures up to 50 °C only. Otherwise the sensor will be overheated.

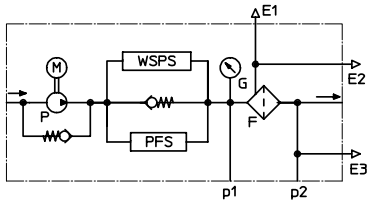
4. Technical data:

filter-fineness:	4, 5, 7 or 10 µm$_{(c)}$
oil temperaure:	0°C to 70°C (50°C)
weight:	approx. 125 kg
operating medium:	hydraulic oil based on mineral oil from 10 mm²/s other media on request

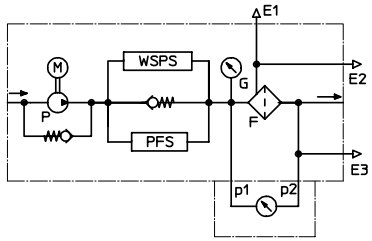
Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbol:

filter unit without clogging indicator



filter unit with clogging indicator
AOR or AOC



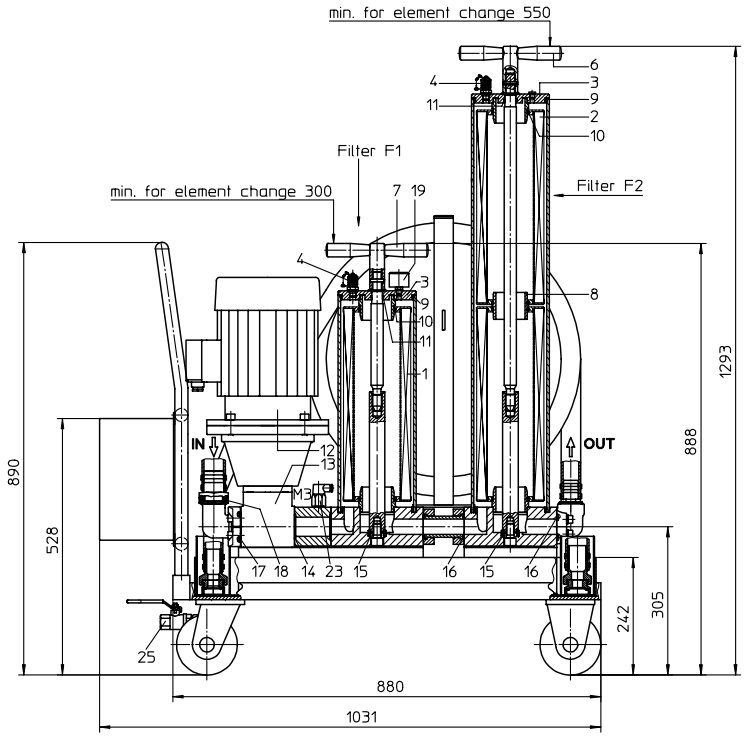
6. Test methods:

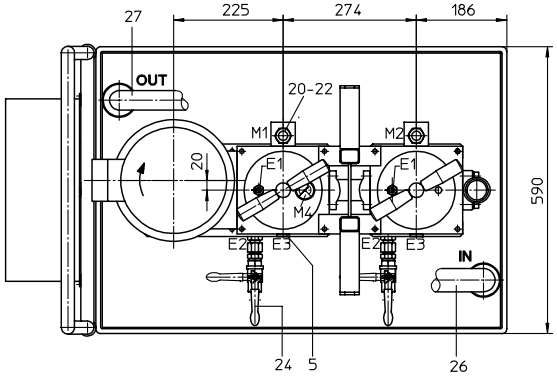
Filter elements are tested according to the following ISO sta ndards:

ISO 2941	Verification of colla pse/burst resistance
ISO 2942	Verification of fabrication inte grity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow character istics
ISO 16889	Multi-pass method for evaluating filtration performance

FILTER UNIT, mobile with water separator
Series UMW 80 PN 6

Sheet No. **4016 B**





Assignment of connections and functions:

E1: venting mini-measuring connection MA.1.St see sheet-no. 1650
E2: drainage of filter, dirt side
E3: drainage of filter, clean side
M1/M2: measure connection at filter housing
M3: measure connection in front of the filters
M4: measure connection in the housing cover, dirt side

1. Type index:

1.1. Filter Unit: (ordering example)

UMW. 80. 1261. P. 1. 2. P09. D04. AOR. AOR. E5. O

1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
UMW = filter unit , mobile with water separator

2 **nominal size filter unit:** 80

3 **nominal size der water separator unit:** 1261

4 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM), by agreement

5 **filter element in the filter 1:**
1 = standard-return-line filter element, see item 1.2.

6 **filter element in the filter 2:**
2 = standard-return-line filter element, see item 1.3.

7 **pump unit:**
P09 = pump unit 09, NG 80.50

8 **motor:**
D04 = B5/100L/4.2,2.1500.230/400.D.50.1.-.-.-
rotary current motor 230/400 V, 50 Hz, approx. 1420 rpm, 2,2 KW, type of protection IP 54

9 **clogging indicator at M1:**
AOR = AOR.2,5.P.- clogging indicator visual, 2,5 bar see sheet-no. 1606

10 **clogging indicator at M2:**
AOR = AOR.2,5.P.- clogging indicator visual, 2,5 bar see sheet-no. 1606

11 **clogging indicator at M3:**
E5 = E5.5 pressure switch, contact breaker, 5 bar see sheet-no. 1616

12 **clogging indicator at M4:**
O = clogging indicator visual, 6,0 bar see sheet-no. 1616

1.2. Filter element: (ordering example)

01NR. 630. 6VG. 10. B. P. -

1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element, DIN 24550, T4

2 **nominal size:** 630

3 **filter-material and filter-fineness:**
10 VG = 10 µm(c), 6 VG = 7 µm(c), 3 VG = 5 µm(c),
1 VG = 4µm(c) Interpor fleece (glass fibre)

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM) , by agreement

7 **filter element specification:**
- = standard
VA = stainless steel

1.3. Filter element: (ordering example)

01NR. 630. 3WVG. 10. B. P. -

1	2	3	4	5	6	7

1 **series:**
01NR. = standard-return-line filter element, DIN 24550, T4

2 **nominal size:** 630

3 **filter-material and filter-fineness:**
10 WVG = 10 µm(c), 3 WVG = 5 µm(c)
watersorp-filter element

4 **resistance of pressure difference for filter element:**
10 = Δp 10 bar

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM) , by agreement

7 **filter element specification:**
- = standard

Changes of measures and design are subject to alteration!

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2. Spare parts:

item	designation	qty.	dimension	article-no.
1	filter element	1	01NR. 630...	
2	watersorp-filter element	2	01NR. 630...	
3	housing cover	2	30600-3	315492
4	mini-measuring connection	2	MA.1.ST	305453
5	screw plug	2	G ½	304678
6	straining screw	1	31078-3	
7	straining screw	1	30595-3	316312
8	connecting pipe	1	20899-4	308842
9	O-ring	2	140 x 6	315392 (NBR)
10	O-ring	2	70 x 4	306253 (NBR)
11	O-ring	2	22 x 3	304387 (NBR)
12	E-motor D 04	1	2,2 KW, 230/400 V	316276
13	pump unit P 09	1	NG 80.50	320268
14	O-ring	2	45 x 3	304991 (NBR)
15	O-ring	2	18 x 3	304359 (NBR)
16	O-ring	3	37,69 x 3,53	304353 (NBR)
17	O-ring	1	47,22 x 3,53	305078 (NBR)
18	O-ring	2	35 x 2,5	308893 (NBR)
19	clogging indicator visual	1	O	304907
20	clogging indicator visual	2	AOR.2,5.P.-	316431
21	O-ring	2	15 x 1,5	315357 (NBR)
22	O-ring	2	22 x 2	304708 (NBR)
23	pressure switch	1	E5.5	306165
24	evacuation connection	2	EE.3.G.ST	310449
25	evacuation connection	1	EE.3.W.ST	310534
26	suction tube 1 ½“	1	31090-4	
27	discharge hose 1 ¼“	1	31108-4	

3. Description:

The mobile filter unit is intended for oil maintenance on hydraulic systems.
The area of application comprises:
- secondary flow filtration and water separation in addition to the existing oper ating filter
- secondary flow filtration and water separation without the action of the operating filter
- filtration and water separation when filling the oil reservoir.

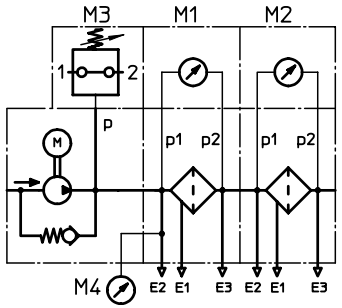
The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. The compact structural design on a base plate without pipe satisfies the prerequisites for small dimensions and high reliability.The transporting trolley makes it possible to move close up to confined locations with difficult access, and to fix the accessories (such as hoses and the connection cable) in a safe and r eliable manner.
Oil flowing out of the suction and/or discharge hose or the outflow openings is collected by the filter unit's oil trough, without causing any environmental damage. The suction tube 1 ½“ and the discharge hose 1 ¼“ are approximately 3000 mm long inclusive of the hose coupling.
The device is equipped with a gear pump driven by an electric motor. The flow conveyed by the geared pump is fed over a filter elements to DIN 24550, T4, nominal size 630.
Oil maintenance takes place in two stages via two in-line filters. The filter element in filter F1 ensures removal of the contamination. Depending on the customer requirements, the filter mesh in filter F1 is either 4, 5, 7 or 10 $\mu m_{(c)}$. Water is separated in filter F2 by means of two parallel-acting water absorption filter elements.
The degree of filter element contamination is indicated on the 4 measurement points M 1 to M4.
If the permissible pressure difference of $\Delta p1 = 2.5$ bar is exceeded, the pressure difference is measured via the filter element in filter F1 and the degree of contamination is displayed at measurement point M1.
If the permissible pressure difference of $\Delta p1 = 2.5$ bar is exceeded, the pressure difference is measured via the filter element in filter F2 and the degree of contamination is displayed at measurement point M2.
The sum resulting from pressures $\Delta p1 + \Delta p2$ + the discharge pressure is measured at points M3 and M4.
The red sector of the gauge fitted to M4 indicates $p \leq 6$ bar and so the opening of the bypass valve between the pressure and suction connection of the gear pump.
The pressure switch on M3 operates the electric control which ensures that, when the operating pressure of $p = 5$ bar is exceeded, the electric motor of the gear pump is switched off.
The filter unit can be operated without supervision, because operational safety is guaranteed by the switching-off function of the pressure switch fitted to M3, the overload protection of the electric motor and the bypass valve in the gear pump. After independent switching off of the filter unit by the pressure switch fitted to M3, the display condition of the pressure switch at M1 and M2 is retained, which indicates that the filter elements must be changed.
After the filter element has been changed, the contamination display at M1 and M2 must be reset manually (see data sheet 1606 for reset function).
The filter element can be changed without tools. After removing the tensioning nut and taking off the housing cover, the filter element is accessible and it can be exchanged. The filter elements are supplied complete with seals. Since it is not possible to clean the elements, the user must always keep an adequate supply of spare el ements in stock.
The line, venting and draining connections are identified according to their function. Drainage is necessary when cleaning the filter unit in connection with the change of filter element, and when setting the medium.

4. Technical data:

pumping capacity:	71 l/min at 1420 rpm
E-motor:	2,2 KW, approx. 1420 rpm
rotary current	230/400 V, 50 Hz
pressure load capacity:	max. 6 bar
filter-fineness:	4, 5, 7 or 10 $\mu m_{(c)}$
weight:	appprox. 125 kg
operating medium:	hydraulic oil based on mineral oil from 10 to 400 mm²/s, other media on request

Classified under the Pressure Vessel Directive 97/23/EC for mineral oil (fluid group 2), Article 3, P ara. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbol:



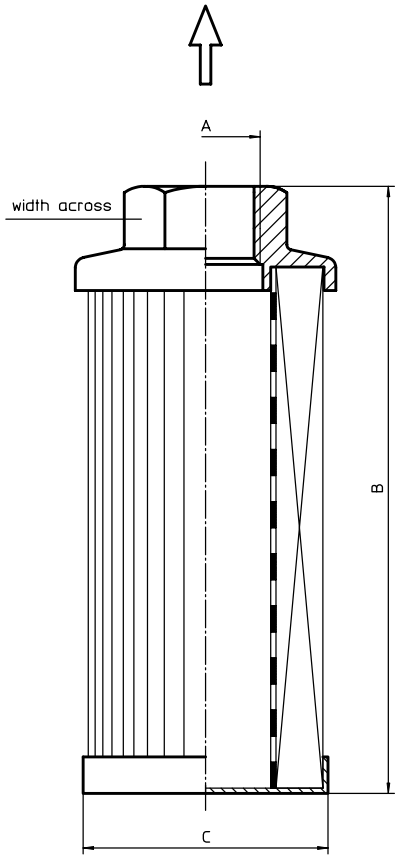
6. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

SUCTION STRAINER
Series ASF 25 - 275 DN 15 - 50

Sheet No.
1701 J



1. Type index:

1.1. Complete filter: (ordering example)

ASF. 165. 25G

1	2	3

1 **series:**
ASF = suction strainer

2 **nominal size:** 25, 40, 60, 90, 165, 275

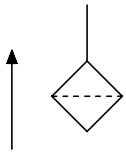
3 **filter-material and filter-fineness:**
25 G = 25 µm, 80 G = 80 µm,
130 G = 130µm stainless steel wire mesh

2. Dimensions:

type	A	B	C	width across	F	weight kg
ASF 25	G ½	117	50	27	250	0,13
ASF 40	G ¾	138	68	36	350	0,24
ASF 60	G 1	195	68	41	750	0,32
ASF 90	G 1 ¼	186	88	50	750	0,40
ASF 165	G 1 ½	199	102	70	1400	0,68
ASF 275	G2	244	102	70	2100	0,75

F = filter surface in cm²

Symbol



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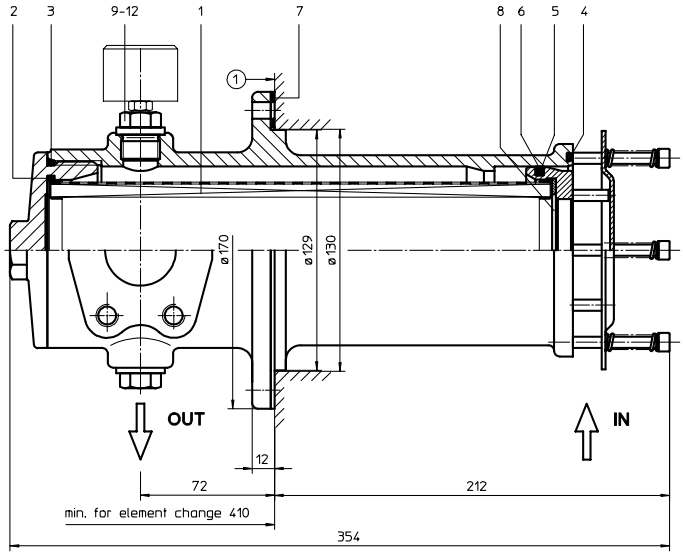
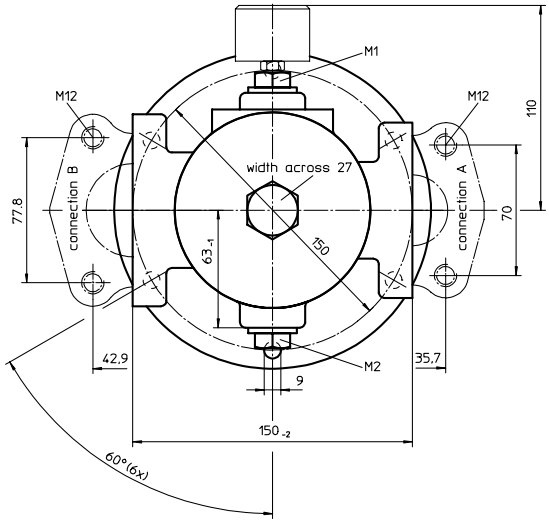
SUCTION FILTER
Series AS 220 DN 40 - 50

Sheet No.
1903 G





1. Type index:

1.1. Complete filter: (ordering example)

AS. 220. 40G. -. B. P. -. FS. 8. -. O1. -

1	2	3	4	5	6	7	8	9	10	11	12

1 **series:**
AS = suction filter

2 **nominal size:** 220

3 **filter-material and filter-fineness:**
80 G= 80 µm, 40 G= 40 µm stainless steel wire mesh, other materials on request

4 **resistance of pressure difference for filter element:**
- = not specified

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:**
- = standard
VA = stainless steel

8 **connection:**
FS = SAE-flange connection 3000 PSI

9 **no. of version:**

version		7	4	8
connection A	**type**	-	FS	FS
	size	-	7	7
connection B	**type**	FS	-	FS
	size	8	-	8

type: FS = SAE-flange 3000 PSI
size: - = no connection
7 = 1 ½ “
8 = 2 “

10 **filter housing specification:**
- = standard

11 **clogging indicator at M1:**
- = without
O1 = visual, see sheet-no. 1616
E4.-0,25 = pressure switch, see sheet-no. 1616

12 **clogging indicator at M2:**
possible indicators see position 11 of the type index

1.2. Filter element: (ordering example)

01AS. 220. 40G. -. B -. -

1	2	3	4	5	6	7

1 **series:**
01AS. = suction filter element according to INTERNORMEN factory specification

2 **nominal size:** 220

3 - 5 , 7 see type index complete-filter

6 **sealing material:**
- = without

2. Accessories:

- counter flange see sheet-no. 1652

mounting area ①

surface quality 3,2

flatness tolerance ⏥ 0,2

weight: approx. 4,5 kg

Changes of measures and design are subject to alteration!

EDV 11/07

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3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01AS.220		
2	1	O-ring	75 x 3	302215 (NBR)	304729 (FPM)
3	1	O-ring	88 x 3	304417 (NBR)	310266 (FPM)
4	1	O-ring	96 x 4	305190 (NBR)	308148 (FPM)
5	1	O-ring	78 x 3,5	311610 (NBR)	314696 (FPM)
6	1	sliding ring	20165-4	305194	
7	1	gasket	2 thick	305135	
8	1	sliding ring	20164-4	305199	
9	2	screw plug	G ½	309730	
10	2	gasket	A 21 x 26	309815	
11	1	clogging indicator, visual	O1	see sheet-no. 1616	
12	1	clogging indicator, electrical	E4.-0,25	see sheet-no. 1616	

4. Description:

The filter housing consists of high quality aluminium material.
The filter element consists of a star-shaped pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
The AS-filters are horizotally or vertically mounted to the reservoir and connected directly to the suction-line.
Due to its practical design the suction filter is easy to service. When releasing the filter lid a plate valve closes the suction-inlet of the filter and prevents the return flow of dirt oil to the reservoir, respectively when mounted horizontally the flow out of the reservoir is prevented.
After the servicing respectively after changing the element the filter is again ready for operation.
According to the operating condition the filter could be equiped with different accessories (clogging indicators, counter flange etc.).

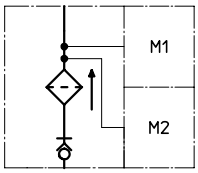
5. Technical data:

temperature range:	-10°C to +80°C (for a short time +100°C)
connection system:	SAE-flange connection 3000 PSI
installation position:	optional
housing material:	G-AlSi10Mgwa DIN 1725 (3.2381.61)
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
usable for following fluids:	petroleum-based fluids, lubrication fluids; HW-emulsions and synthetic hydraulic fluids on request
volume tank:	1,6 l

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:

without indicator



visual , O1

electrical , E4.-0,25

7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

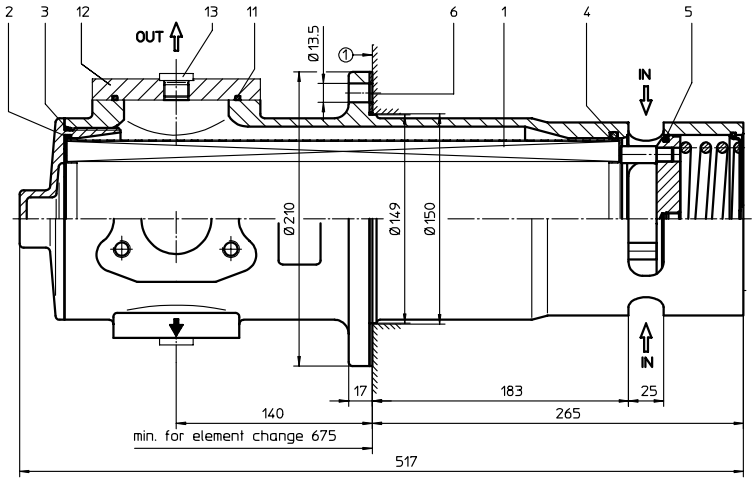
8. Test methods:

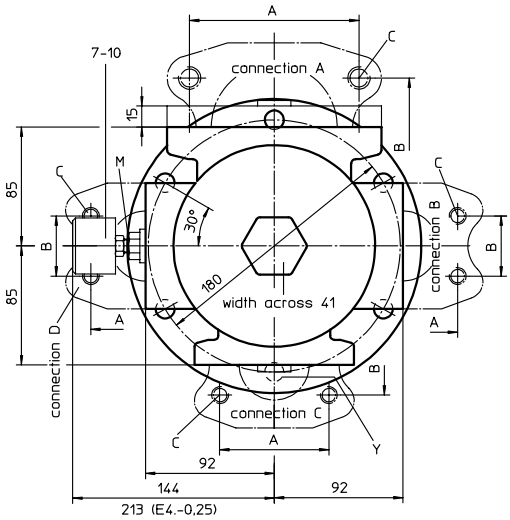
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

SUCTION FILTER
Series AS 632 DN 50 - 90

Sheet No.
1909 F





1. Type index:

1.1. Complete filter: (ordering example)

AS.	632.	40G.	-.	B.	P.	-.	FS.	11.	-.	O1
1	2	3	4	5	6	7	8	9	10	11

1 **series:**
AS = suction filter

2 **nominal size:** 632

3 **filter-material and filter-fineness:**
80 G= 80 µm, 40 G= 40 µm stainless steel wire mesh, other materials on request

4 **resistance of pressure difference for filter element:**
- = not specified

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR); V = Viton (FPM)

7 **filter element specification:**
- = standard; VA = stainless steel

8 **connection:**
FS = SAE-flange connection 3000 PSI

9 **no. of version:**

version		1	5	6	10	11	12	14	21
connection A	**type**	XY	XY	XY	FS	FS	FS	-	FS
	size				A1	A1	A1		A
connection B	**type**	Y	M	M	FS	FS	-	FS	Y
	size				8	9		8	
connection C	**type**	FS	FS	FS	Y	Y	Y	FS	Y
	size	8	9	9				8	
connection D	**type**	FS	FS	-	Y	M	M	FS	FS
	size	8	9					8	8

type: FS = SAE-flange 3000 PSI
M = adapter M18 x 1,5 - R 1/8
Y = drain M18 x 1,5
X = adapter SAE 3“ - M18 x 1,5
- = no connection

size: 8 = 2“
9 = 2 ½“
A = 3“
A1 = 3 ½“

10 **filter housing specification:**
- = standard

11 **clogging indicator:**
- = without
O1 = visual, see sheet-no. 1616
E4.-0,25 = pressure switch, see sheet-no. 1616

1.2. Filter element: (ordering example)

01AS.	631.	40G	-.	B	-.	-
1	2	3	4	5	6	7

1 **series:**
01AS. = suction filter element according to INTERNORMEN factory specification

2 **nominal size:** 631

3 - 5 , 7 see type index-complete filter

6 **sealing material:**
- = without

2. Dimensions:

connection size	2“	2 ½“	3“	3 ½“
dimension A	78	89	106,4	121
dimension B	43	51	62	70
thread C	M12, 18 deep	M12, 18 deep	M16, 22 deep	M16, 22 deep

3. Accessories:

- counter flange, see sheet-no. 1652

mounting area ①

surface quality 3,2

flatness tolerance ⏥ 0,2

weight: approx. 12 kg

Changes of measures and design are subject to alteration!

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4. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01AS.631		
2	1	O-ring	115 x 3	303963 (NBR)	307762 (FPM)
3	1	O-ring	125 x 3	306025 (NBR)	307358 (FPM)
4	1	O-ring	115 x 5	306640 (NBR)	310287 (FPM)
5	1	O-ring	104,37 x 3,53	304339 (NBR)	304390 (FPM)
6	1	gasket	2 thick	305160	
7	1	adapter M18 x 1,5 - R 1/8	30505-4	317114	
8	2	gasket	A18 x 24x1,5	305136	
9	1	clogging indicator, visual	O1	301722	
10	1	clogging indicator, electrical	E4.-0,25	301725	
11	1	O-ring	85,32 x 3,53	305590 (NBR)	306308 (FPM)
12	1	adapter SAE 3“ - M18 x 1,5	30294-3	317048	
13	1	screw plug	M18 x 1,5	305193	

5. Description:

The filter element consists of a star-shaped pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
The AS-filters are horizotally or vertically mounted to the reservoir and connected directly to the suction-line.
Due to its practical design the suction filter is easy to service. When releasing the filter lid a plate valve closes the suction-inlet of the filter and prevents the return flow of dirt oil to the reservoir, respectively when mounted horizontally the flow out of the reservoir is prevented.
After the servicing respectively after changing the element the filter is again ready for operation.
According to the operating condition the filter could be equiped with different accessories (clogging indicators, counter flange etc.).

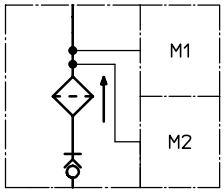
6. Technical data:

temperature range:	-10°C to + 80°C (for a short time + 100°C)
connection system:	SAE-flange connection 3000 PSI
installation position:	optional
housing material:	G-AlSi10Mg wa DIN 1725 (3.2381.61)
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
usable for following fluids:	petroleum-based fluids, lubrication fluids; HW-emulsions and synthetic hydraulic fluids on request
volume tank:	6,3 l

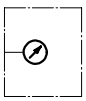
Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

7. Symbols:

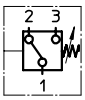
without indicator



visual O1



electrical E4



8. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’, respectively Δp-curves; dependingon filter fineness and viscosity.

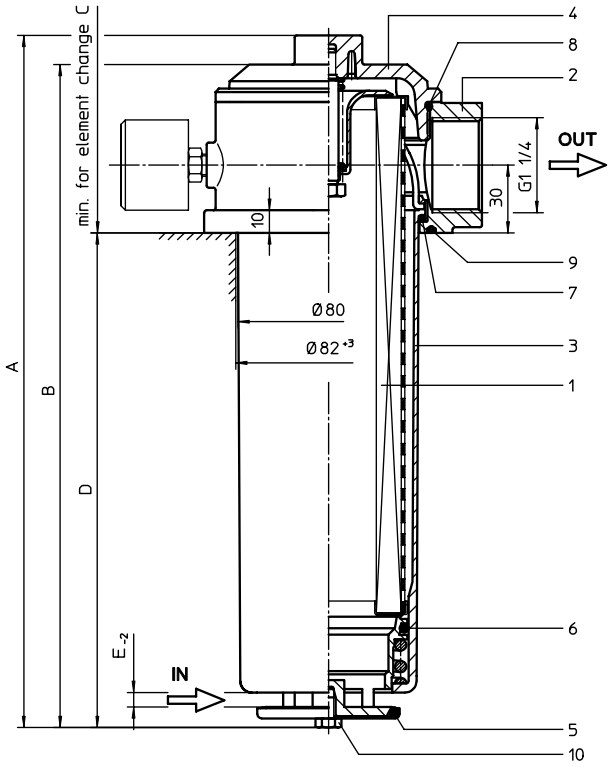
9. Test methods:

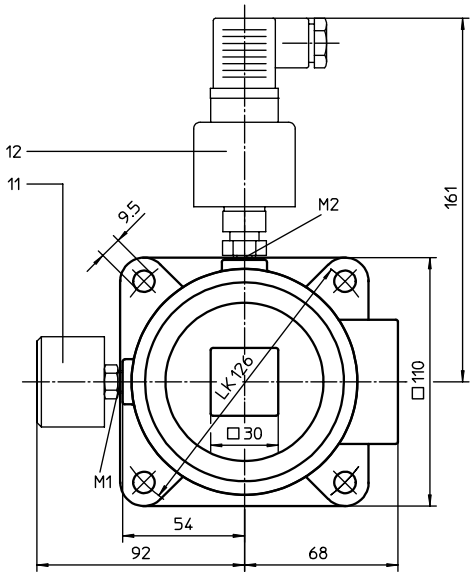
Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

SUCTION FILTER, for vertical tank-mounting
Series TS 210 - 310 DN 32

Sheet No.
1904 H





1. Type index:

1.1. Complete filter: (ordering example)

TS.	210.	10VG.	-.	B.	P.	-.	G.	6.	-.	-.	O1.	E4
1	2	3	4	5	6	7	8	9	10	11	12	13

1 series:
TS = suction filter for vertical tank-mounting

2 nominal size: 210, 310

3 filter-material and filter-fineness:
80 G = 80 µm, 40 G = 40 µm,
25 G = 25µm stainless steel wire mesh
25 VG= 20 $\mu m_{(c)}$, 16 VG = 16 $\mu m_{(c)}$, 10 VG= 10 $\mu m_{(c)}$,
6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 P = 25 µm, 10 P = 10 µm paper

4 resistance of pressure difference for filter element:
- = not specified

5 filter element design:
B = both sides open

6 sealing material:
P = Nitrile (NBR)
V = Viton (FPM)

7 filter element specification:
- = standard
VA = stainless steel

8 connection:
G = thread connection according to DIN 3852, T2

9 connection size:
6 = G 1¼

10 filter housing specification:
- = standard

11 internal valve:
- = without
S = with by-pass valve Δp 0,28 bar

12 clogging indicator at M1:
- = without
O1 = visual, see sheet-no. 1616
E4 = pressure switch, see sheet-no. 1616

13 clogging indicator at M2:
possible indicators see position 12 of the type index

1.2. Filter element: (ordering example)

01TS.	210.	10VG.	-.	B.	-.	-
1	2	3	4	5	6	7

1 series:
01TS. = suction filter element according to INTERNORMEN factory specification

2 nominal size: 210, 310

3 - 5 , 7 see type index-complete filter

6 sealing material:
- = without

2. Dimensions:

type	connection	A	B	C	D	E	weight kg
TS 210	G 1 ¼	307	294	290	219	6,5	2,3
TS 310	G 1 ¼	393	380	375	305	7,5	3,0

Changes of measures and design are subject to alteration!

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3. Spare parts:

item	qty.	designation	dimension		article-no.	
			TS 210	TS 310		
1	1	filter element	01TS. 210	01TS. 310		
2	1	filter head			304423	
3	1	filter bowl			304518.1	
4	1	filter cover	M 90 x 2			
5	1	O-ring	53 x 4		309143 (NBR)	- (FPM)
6	1	O-ring	62 x 4		308045 (NBR)	311472 (FPM)
7	1	O-ring	75 x 3		302215 (NBR)	304729 (FPM)
8	1	O-ring	82 x 3		305191 (NBR)	305298 (FPM)
9	1	O-ring	88 x 3		304417 (NBR)	310266 (FPM)
10	1	sheet metal screw	B 6,3 x 13		316641	
11	1	clogging indicator, visual	O1		301722	
12	1	pressure switch, electrical	E4		311016	

4. Description:

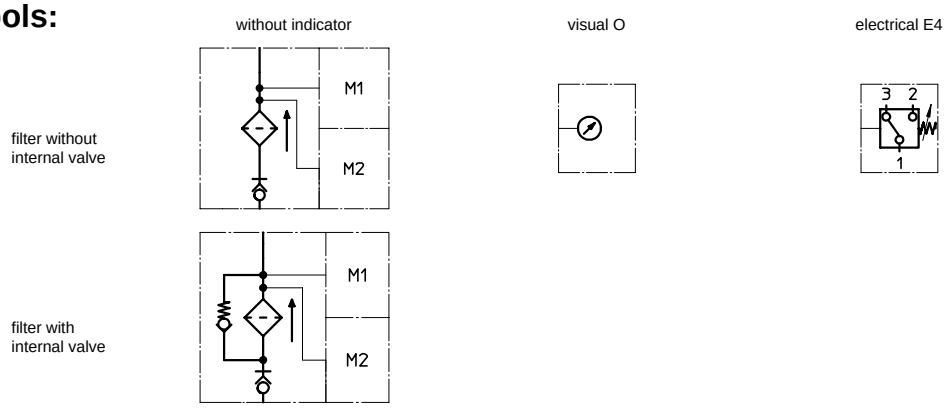
The TS-filters are directly mounted to the reservoir and connected to the suction-line. The suction-area „IN“ must be below the oil level. The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from inside to outside. Filters finer than 40 mµ should use throw-away elements made of paper or Interpor fleece (VG). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
Due to its practical design, the return-line filter is easy to service. When releasing the filter cover a plate-shaped valve closes the suction-inlet of the filter bowl and prevents the return flow of dirt oil into the reservoir. For cleaning, the filter bowl together with the filter element can be taken out of the filter head.

5. Technical data:

temperature range:	-10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
connection system:	thread connection according to DIN 3852, T2
housing material:	Al-casting; glass fibre reinforced polyamide
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank TS 210:	1,1 l
TS 310:	1,5 l

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’ respectively Δp-curves ; depending on filter fineness and viscosity.

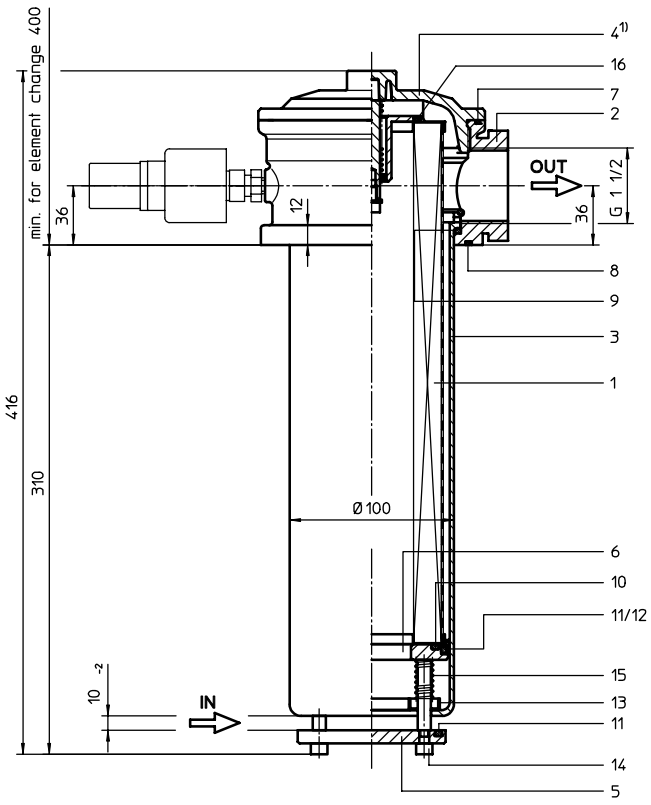
8. Test methods:

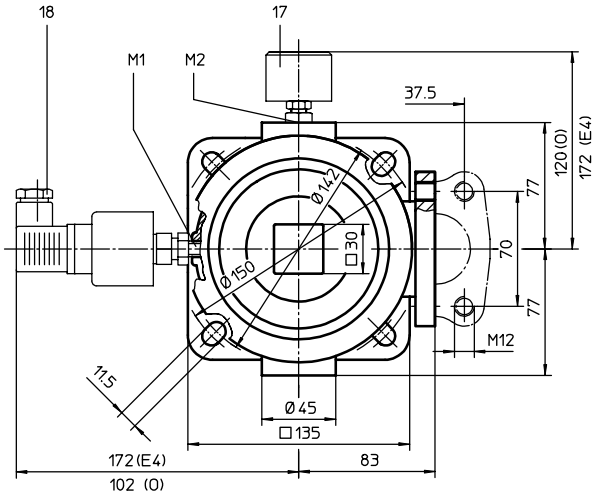
Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

SUCTION FILTER, for vertical tank-mounting
Series TS 426 DN 40

Sheet No.
1908 D





1) The bypass valve is integrated in the screw plug. For the filter without a by-pass valve the opening function is raised up to Δp > 1 bar

1. Type index:

1.1. Complete filter: (ordering example)

TS. 426. 10VG. -. B. P. -. G. 7. -. -. E4. O1

1	2	3	4	5	6	7	8	9	10	11	12	13

1 **series:**
TS = suction filter for vertical tank-mounting

2 **nominal size:** 426

3 **filter-material and filter-fineness**:
80 G = 80 µm, 40 G = 40 µm,
25 G = 25µm stainless steel wire mesh
25 VG= 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$,
6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 P = 25 µm, 10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
- = not specified

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:**
- = standard
VA = stainless steel

8 **connection:**
G = thread connection according to DIN 3852, T2
FS = SAE-flange connection 3000 PSI

9 **connection size:**
7 = G 1 ½ or SAE 1 ½"

10 **filter housing specification:**
- = standard

11 **internal valve:**
- = without
S = with by-pass valve Δp 0,28 bar

12 **clogging indicator at M1:**
- = without
O1 = visual, see sheet-no. 1616
E4 = pressure switch, see sheet-no. 1616

13 **clogging indicator at M2:**
possible indicators see position 12 of the type index

1.2. Filter element: (ordering example)

01TS. 425. 10VG. -. B. -. -

1	2	3	4	5	6	7

1 **series:**
01TS. = suction filter element according to INTERNORMEN factory specification

2 **nominal size:** 425

3 - 5 , 7 see type index-complete filter

6 **sealing material:**
- = without

weight: 5,7 kg

Changes of measures and design are subject to alteration!

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2. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01TS. 425		
2	1	filter head	NG 426		
3	1	filter bowl	NG 426		
4	1	screw plug with by-pass	M 120 x 3		
	1	screw plug without by-pass	M 120 x 3		
5	1	valve disc		311892	
6	1	valve bushing		307548	
7	1	O-ring	128 x 3	304602 (NBR)	308140 (FPM)
8	1	O-ring	115 x 3	303963 (NBR)	307762 (FPM)
9	1	O-ring	98 x 4	301914 (NBR)	304765 (FPM)
10	1	O-ring	70 x 4	306253 (NBR)	310280 (FPM)
11	2	O-ring	76 x 4	305599 (NBR)	310291 (FPM)
12	1	sliding ring		307547	
13	1	pressure ring		307549	
14	1	fillister head cap screw	M 6 x 60	307534	
15	1	spring	1,6 x 10 x 53 x 12.5	311847	
16	1	O-ring	50 x 3	307398 (NBR)	314682 (FPM)
17	1	clogging indicator, visual	O1	301722	
18	1	clogging indicator, electrical	E4	311016	

3. Description:

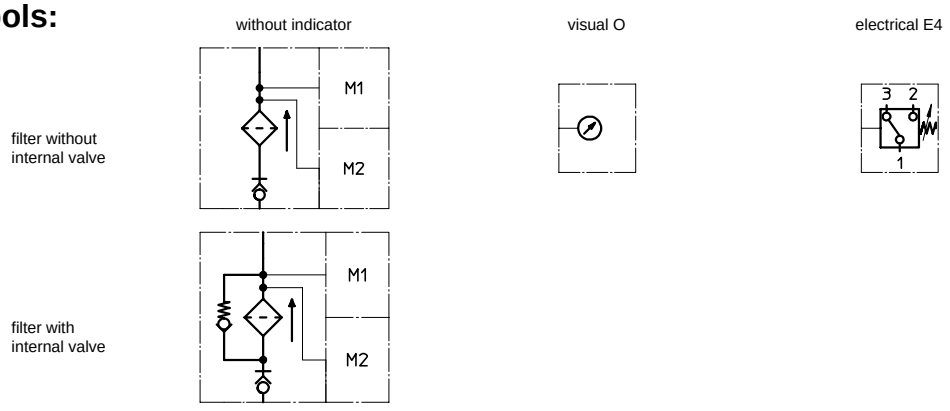
The TS-filters are directly mounted to the reservoir and connected to the suction-line. The suction-area „IN“ must be below the oil level. The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from inside to outside. Filters finer than 40 mµ should use throw-away elements made of paper or Interpor fleece (VG). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
Due to its practical design, the return-line filter is easy to service. When releasing the filter cover a plate-shaped valve closes the suction-inlet of the filter bowl and prevents the return flow of dirt oil into the reservoir. For cleaning, the filter bowl together with the filter element can be taken out of the filter head.

4. Technical data:

temperature range:	-10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
connection system:	thread connection or SAE-flange connection 3000 PSI
housing material:	Al-casting; glass fibre reinforced polyamide
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	2,6 l

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:



6. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’ respectively Δp-curves ; depending on filter fineness and viscosity.

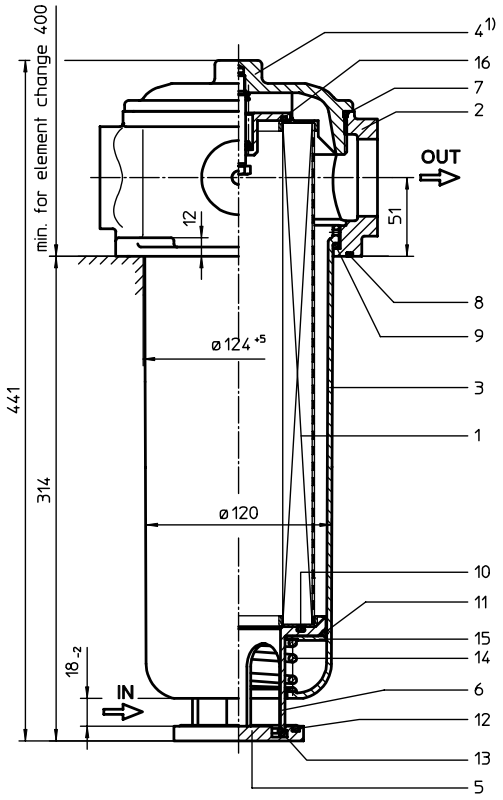
7. Test methods:

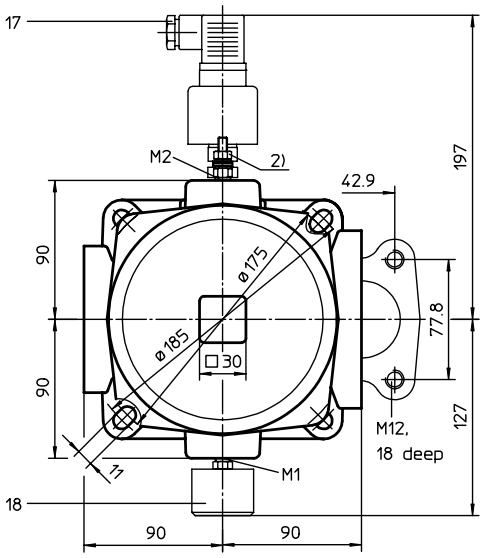
Filter elements are tested according to the following ISO standards:

ISO 2941	Verification of collapse/burst resistance
ISO 2942	Verification of fabrication integrity
ISO 2943	Verification of material compatibility with fluids
ISO 3723	Method for end load test
ISO 3724	Verification of flow fatigue characteristics
ISO 3968	Evaluation of pressure drop versus flow characteristics
ISO 16889	Multi-pass method for evaluating filtration performance

SUCTION FILTER, for vertical tank-mounting
Series TS 625 DN 50

Sheet No.
1910 C





1) The by-pass valve is integrated in the screw plug. For the filter without a bypss-valve the opening function is raised up to Δp > 1 bar.

2) Connection for the potential equalisation, only for application in the explosive area.

1. Type index:

1.1. Complete filter: (ordering example)

TS.	625.	10VG.	-.	B.	P.	-.	FS.	8.	-.	-.	O1.	E4
1	2	3	4	5	6	7	8	9	10	11	12	13

1 **series:**
TS = suction filter for vertical tank-mounting

2 **nominal size:** 625

3 **filter-material and filter-fineness**:
80 G = 80 µm, 40 G = 40 µm,
25 G = 25 µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$,
6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 P = 25 µm, 10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
- = not specified

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:**
- = standard
VA = stainless steel

8 **connection:**
FS = SAE-flange connection 3000 PSI

9 **connection size:**
8 = 2“

10 **filter housing specification:**
- = standard
IS11 = see sheet-no. 40530

11 **internal valve:**
- = without
S = with by-pass valve Δp 0,28 bar

12 **mesure connection at M1:**
- = without
O1 = visual, see sheet-no. 1616
E4 = pressure switch, see sheet-no. 1616
PA = potential equalisation

13 **measure connection at M2:**
possible indicators see position 12 of the type index

1.2. Filter element: (ordering example)

01TS.	625.	10VG.	-.	B.	-.	-
1	2	3	4	5	6	7

1 **series:**
01TS. = suction filter element according to INTERNORMEN factory specification

2 **nominal size:** 625

3 - 5 , 7 see type index-complete filter

6 **sealing material:**
- = without

weight: approx. 5,5 kg

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Changes of measures and design are subject to alteration!

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2. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01TS. 625		
2	1	filter head	NG 625		
3	1	filter bowl	NG 625		
4	1	screw plug with by-pass valve	M 140 x 3		
	1	screw plug without by-pass valve	M 140 x 3		
5	1	valve disc		318740	
6	1	valve bushing		318739	
7	1	O-ring	135 x 3,5	318386 (NBR)	318387 (FPM)
8	1	O-ring	140 x 3	304604 (NBR)	307514 (FPM)
9	1	O-ring	120 x 4	305300 (NBR)	307991 (FPM)
10	1	O-ring	76 x 4	305599 (NBR)	310291 (FPM)
11	1	O-ring	104,37 x 3,53	304339 (NBR)	304390 (FPM)
12	1	O-ring	70 x 4	306253 (NBR)	310280 (FPM)
13	1	snap ring	B 55	311976	
14	1	spring	5,0 x 70 x 117 x 3,5	318742	
15	1	disc		318741	
16	1	O-ring	56 x 3	307398 (NBR)	314682 (FPM)
17	1	clogging indicator, visual	E4	311016	
18	1	clogging indicator, electrical	O1	301722	

3. Description:

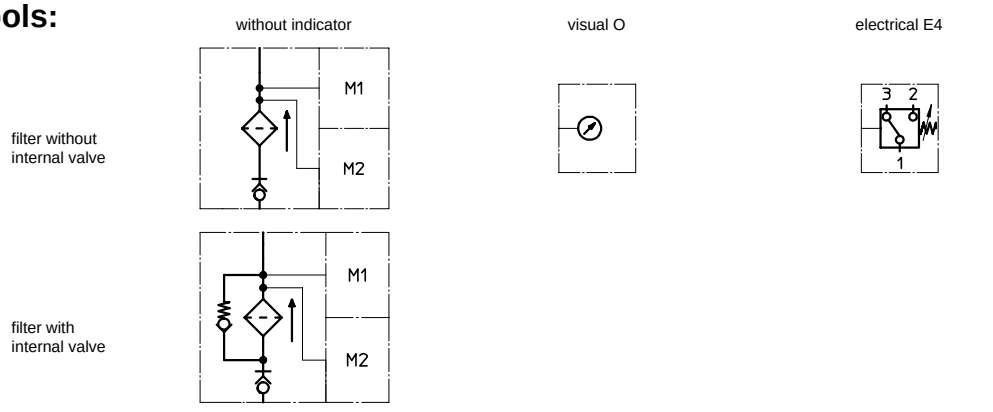
The TS-filters are directly mounted to the reservoir and connected to the suction-line. The suction-area „IN“ must be below the oil level. The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from inside to outside. Filters finer than 40 µm should use throw-away elements made of paper or Interpor fleece (VG). Filter elements as fine as $5\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
Due to its practical design, the return-line filter is easy to service. When releasing the filter cover a plate-shaped valve closes the suction-inlet of the filter bowl and prevents the return flow of dirt oil into the reservoir. For cleaning, the filter bowl together with the filter element can be taken out of the filter head.

4. Technical data:

temperature range:	-10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
connection system:	SAE-flange connection 3000 PSI
housing material:	filter head / screw plug AL, filter bowl glass fibre reinforced polyamide (standard)
	filter head / screw plug GG, filter bowl carbon fibre reinforced polyamide (IS11)
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	vertical
volume tank:	4,0 l

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:



6. Pressure drop flow curves:

Precise flow rates see ‘INT-Expert-System Filter’ respectively Δp-curves ; depending on filter fineness and viscosity.

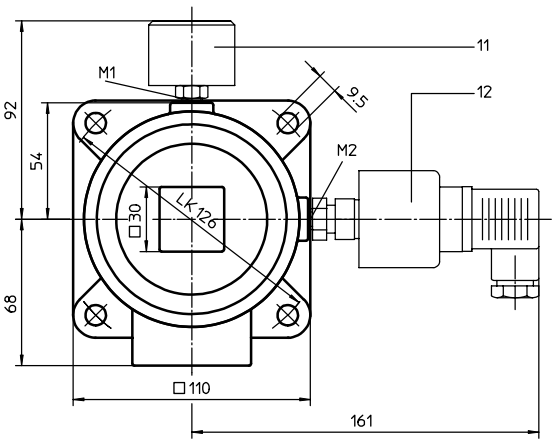
7. Test methods:

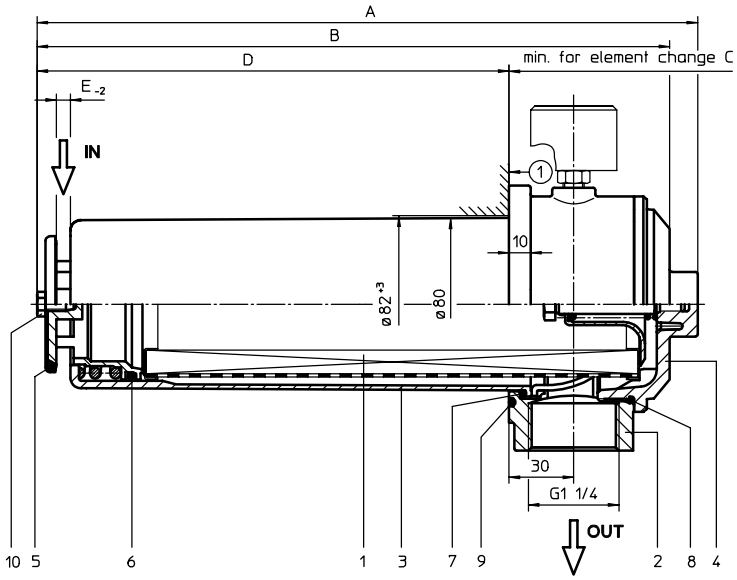
Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

SUCTION FILTER, for horizontal tank-mounting
Series TSW 210-310 DN 32

Sheet No.
1905 G





1. Type index:

1.1. Complete filter: (ordering example)

TSW.	210.	10VG.	-.	B.	P.	-.	G.	6.	-.	-.	O1.	E4
1	2	3	4	5	6	7	8	9	10	11	12	13

1 **series:**
TSW = suction filter for horizontal tank-mounting

2 **nominal size**: 210, 310

3 **filter-material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm,
25 G = 25µm stainless steel wire mesh
25 VG= 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$,
6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 P = 25 µm, 10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
- = not specified

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR) V = Viton (FPM)

7 **filter element specification:**
- = standard VA = stainless steel

8 **connection:**
G = thread connection according to DIN 3852, T2

9 **connection size:**
6 = G 1 ¼

10 **filter housing specification:**
- = standard

11 **internal valve:**
- = without
S = with by-pass valve Δp 0,28 bar

12 **clogging indicator at M1:**
- = without
O1 = visual, see sheet-no. 1616
E4 = pressure switch, see sheet-no. 1616

13 **clogging indicator at M2:**
possible indicators see position 12 of the type index

1.2. Filter element: (ordering example)

01TS.	210.	10VG.	-.	B.	-.	-
1	2	3	4	5	6	7

1 **series:**
01TS. = suction filter element according to INTERNORMEN factory specification

2 **nominal size:** 210, 310

3 - 5 , 7 see type index-complete filter

6 **sealing material:**
- = without

2. Dimensions:

type	connection	A	B	C	D	E	weight kg
TSW 210	G 1 ¼	307	294	290	219	6,5	2,3
TSW 310	G 1 ¼	393	380	375	305	7,5	3,0

mounting surface ①

surface quality 3,2

flatness tolerance ⏥ 0,2

weight: approx. 2,7 kg

Changes of measures and design are subject to alteration!

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3. Spare parts:

item	qty.	designation	dimension		article-no.	
			TSW 210	TSW 310		
1	1	filter element	01TS. 210	01TS. 310		
2	1	filter head			304423	
3	1	filter bowl			304518.1	
4	1	filter cover	M 90 x 2			
5	1	O-ring	53 x 4		309143 (NBR)	- (FPM)
6	1	O-ring	62 x 4		308045 (NBR)	311472 (FPM)
7	1	O-ring	75 x 3		302215 (NBR)	304729 (FPM)
8	1	O-ring	82 x 3		305191 (NBR)	305298 (FPM)
9	1	O-ring	88 x 3		304417 (NBR)	310266 (FPM)
10	1	sheet metal screw	B 6,3 x 13		316641	
11	1	clogging indicator, visual	O1		301722	
12	1	pressure switch, electrical	E4		311016	

4. Description:

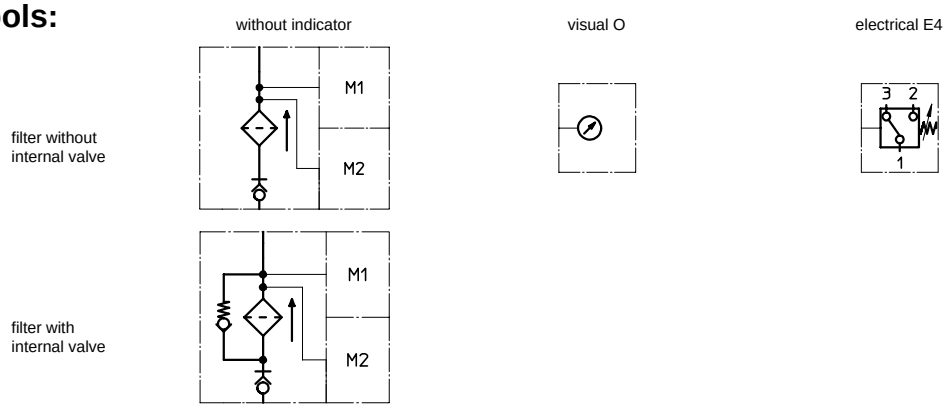
The TSW-filters are directly mounted to the reservoir and connected to the suction-line. The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from inside to outside. Filters finer than 40 mµ should use throw-away elements made of paper or Interpor fleece (VG). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
Due to its practical design, the return-line filter is easy to service. When releasing the filter cover a plate-shaped valve closes the suction-inlet of the filter bowl and prevents leakage of fluid out of the tank. Filter element can removed from filter pot for cleaning purposes.

5. Technical data:

temperature range:	-10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
connection system:	thread connection acording to DIN 3852, T2
housing material:	Al-casting; glass fibre reinforced polyamide
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	horizontal
volume tank TSW 210:	1,1 l
TSW 310:	1,5 l

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

6. Symbols:



7. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter' respectively Δp-curves ; depending on filter fineness and viscosity.

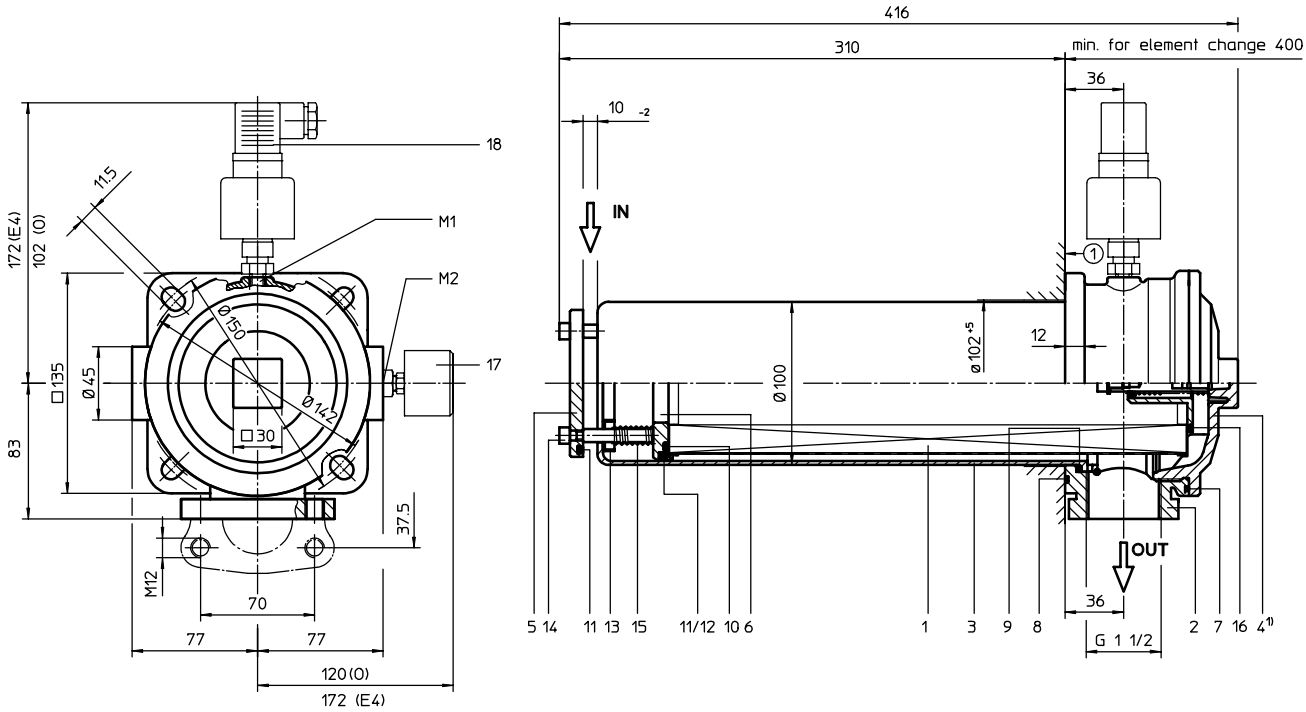
8. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

SUCTION FILTER, for horizontal tank-mounting
Series TSW 426 DN 40

Sheet No.
1906 D



1. Type index:

1.1. Complete filter: (ordering example)

TSW.	426.	10VG.	-.	B.	P.	-.	G.	7.	-.	-.	E4.	O1
1	2	3	4	5	6	7	8	9	10	11	12	13

1 **series:**
TSW = suction filter for horizontal tank-mounting

2 **nominal size:** 426

3 **filter-material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm,
25 G = 25µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$,
6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 P = 25 µm, 10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
- = not specified

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR) V = Viton (FPM)

7 **filter element specification:**
- = standard VA = stainless steel

8 **connection:**
G = thread connection according to DIN 3852, T2
FS = SAE-flange connection 3000 PSI

9 **connection size:**
7 = G 1 ½ or SAE 1 ½"

10 **filter housing specification:**
- = standard

11 **internal valve:**
- = without S = with by-pass valve Δp 0,28 bar

12 **clogging indicator at M1**:
- = without
O1 = visual, see sheet-no. 1616
E4 = pressure switch, see sheet-no. 1616

13 **clogging indicator at M2:**
possible indicators see position 12 of the type index

1.2. Filter element: (ordering example)

01TS.	425.	10VG.	-.	B.	-.	-
1	2	3	4	5	6	7

1 **series:**
01TS. = suction filter element according to INTERNORMEN factory specification

2 **nominal size:** 425

3 - 5 , 7 see type index complete filter

6 **sealing material:**
- = without

mounting surface ①

surface quality 3,2

flatness tolerance ⏥ 0,2

[1] The by-pass valve is integrated in the screw plug. For the filter without a bypss-valve the opening function is raised up to Δp > 1 bar.

weight: 5,7 kg

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Changes of measures and design are subject to alteration!

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2. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01TS. 425		
2	1	filter head	NG 426		
3	1	filter bowl	NG 426	303732	
4	1	screw plug with by-pass	M 120 x 3	313455	
	1	screw plug without by-pass	M 120 x 3	313649	
5	1	valve disc		311892	
6	1	valve bushing		307548	
7	1	O-ring	128 x 3	304602 (NBR)	308140 (FPM)
8	1	O-ring	115 x 3	303963 (NBR)	307762 (FPM)
9	1	O-ring	98 x 4	301914 (NBR)	304765 (FPM)
10	1	O-ring	70 x 4	306253 (NBR)	310280 (FPM)
11	2	O-ring	76 x 4	305599 (NBR)	310291 (FPM)
12	1	sliding ring		307547	
13	1	pressure ring		307549	
14	1	fillister head cap screw	M 6 x 60	307534	
15	1	spring	1,6 x 10 x 53	311847	
16	1	O-ring	50 x 3	307398 (NBR)	314682 (FPM)
17	1	clogging indicator, visual	O1	301722	
18	1	clogging indicator, electrical	E4	311016	

3. Description:

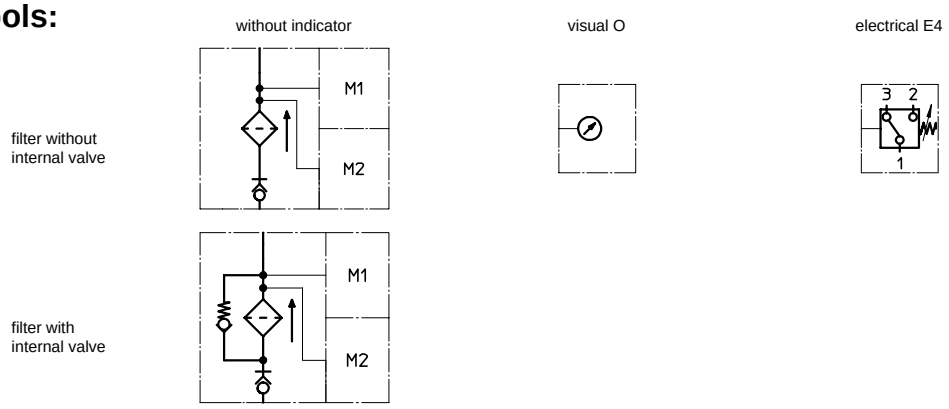
The TSW-filters are directly mounted to the reservoir and connected to the suction-line. The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from inside to outside. Filters finer than 40 µm should use throw-away elements made of paper or Interpor fleece (VG). Filter elements as fine as $5\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
Due to its practical design, the return-line filter is easy to service. When releasing the filter cover a plate-shaped valve closes the suction-inlet of the filter bowl and prevents leakage of fluid out of the tank. Filter element can removed from filter pot for cleaning purposes.

4. Technical data:

temperature range:	-10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
connection system:	thread connection or SAE-flange connection 3000 PSI
housing material:	Al-casting; glass fibre reinforced polyamide
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	horizontal
volume tank:	2,6 l

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:



6. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter' respectively Δp-curves ; depending on filter fineness and viscosity.

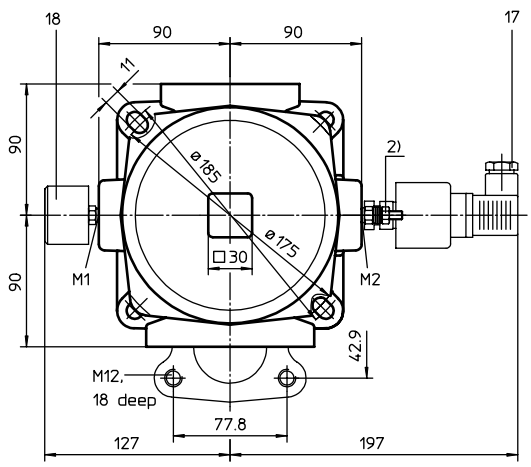
7. Test methods:

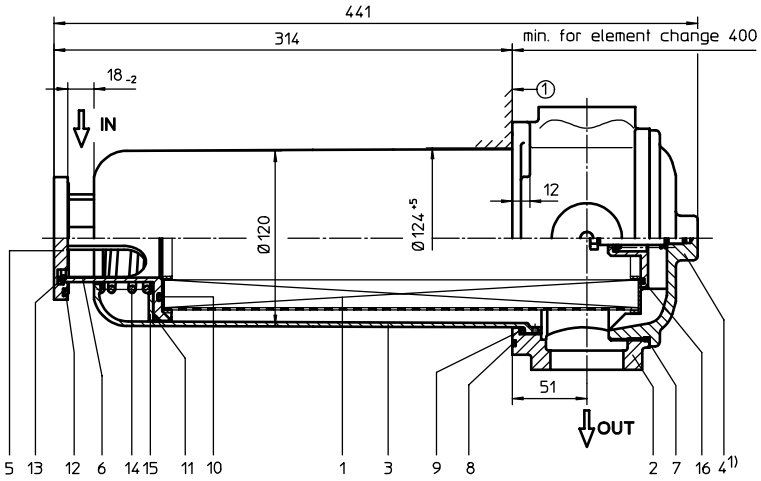
Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

SUCTION FILTER, for horizontal tank-mounting
Series TSW 625 DN 50

Sheet No.
1911 C





1. Type index:

1.1. Complete filter: (ordering example)

TSW.	625.	10VG.	-.	B.	P.	-.	FS.	8.	-.	-.	O1.	E4
1	2	3	4	5	6	7	8	9	10	11	12	13

1 **series:**
TSW = suction filter for horizontal tank-mounting

2 **nominal size:** 625

3 **filter-material and filter-fineness:**
80 G = 80 µm, 40 G = 40 µm,
25 G = 25µm stainless steel wire mesh
25 VG = 20 $\mu m_{(c)}$, 16 VG = 15 $\mu m_{(c)}$, 10 VG = 10 $\mu m_{(c)}$,
6 VG = 7 $\mu m_{(c)}$, 3 VG = 5 $\mu m_{(c)}$ Interpor fleece (glass fibre)
25 P = 25 µm, 10 P = 10 µm paper

4 **resistance of pressure difference for filter element:**
- = not specified

5 **filter element design:**
B = both sides open

6 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

7 **filter element specification:**
- = standard
VA = stainless steel

8 **connection:**
FS = SAE-flange connection 3000 PSI

9 **connection size:**
8 = 2“

10 **filter housing specification:**
- = standard
IS11 = see sheet-no. 40530

11 **internal valve:**
- = without
S = with by-pass valve Δp 0,28 bar

12 **measure connection at M1**:
- = without
O1 = visual, see sheet-no. 1616
E4 = pressure switch, see sheet-no. 1616
PA = potential equalisation

13 **measure connection at M2**:
possible indicators see position 12 of the type index

1.2. Filter element: (ordering example)

01TS.	625.	10VG.	-.	B.	-.	-
1	2	3	4	5	6	7

1 **series:**
01TS. = suction filter element according to INTERNORMEN factory specification

2 **nominal size:** 625

3 - 5 , 7 see type index complete filter

6 **sealing material:**
- = without

mounting surface ①

surface quality 3,2

flatness tolerance ⏥ 0,2

1) The by-pass valve is integrated in the screw plug. For the filter without a bypss-valve the opening function is raised up to Δp > 1 bar.

2) Connection for the potential equalisation, only for application in the explosive area.

weight: approx. 5,5 kg

Changes of measures and design are subject to alteration!

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2. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	filter element	01TS. 625		
2	1	filter head	NG 625		
3	1	filter bowl	NG 625		
4	1	screw plug with by-pass valve	M 140 x 3		
	1	screw plug without by-pass valve	M 140 x 3		
5	1	valve disc		318740	
6	1	valve bushing		318739	
7	1	O-ring	135 x 3,5	318386 (NBR)	318387 (FPM)
8	1	O-ring	140 x 3	304604 (NBR)	307514 (FPM)
9	1	O-ring	120 x 4	305300 (NBR)	307991 (FPM)
10	1	O-ring	76 x 4	305599 (NBR)	310291 (FPM)
11	1	O-ring	104,37 x 3,53	304339 (NBR)	304390 (FPM)
12	1	O-ring	70 x 4	306253 (NBR)	310280 (FPM)
13	1	snap ring	B 55	311976	
14	1	spring	5,0 x 70 x 117 x 3,5	318742	
15	1	disc		318741	
16	1	O-ring	56 x 3	307398 (NBR)	314682 (FPM)
17	1	clogging indicator, visual	E4	311016	
18	1	clogging indicator, electrical	O1	301722	

3. Description:

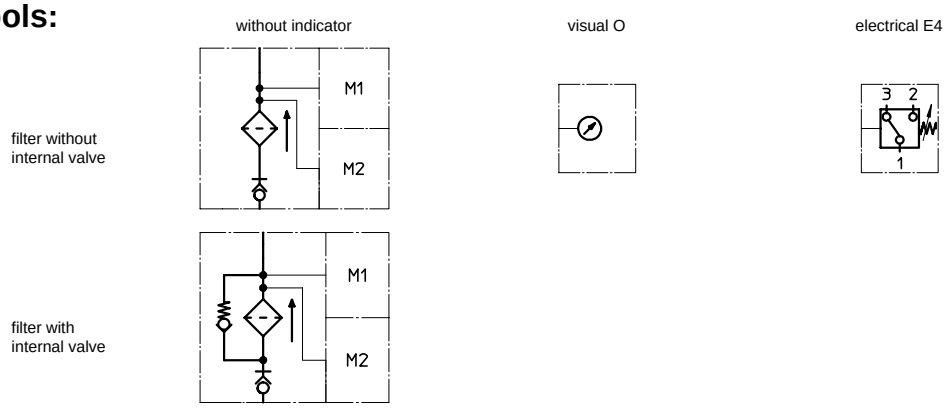
The TSW-filters are directly mounted to the reservoir and connected to the suction-line. The filter element consists of a star-shaped, pleated filter material which is supported on the inside by a perforated core tube and is bonded to the end caps with a high-quality adhesive. The flow is from inside to outside. Filters finer than 40 mµ should use throw-away elements made of paper or Interpor fleece (VG). Filter elements as fine as 5 $\mu m_{(c)}$ are available; finer filter elements on request.
INTERNORMEN-Filter elements are known as elements with a high intrinsic stability and an excellent filtration capability, a high dirt-retaining capacity and a long service life.
INTERNORMEN-Filter are suitable for all petroleum based fluids, HW-emulsions, most synthetic hydraulic fluids and lubrication oils.
Due to its practical design, the return-line filter is easy to service. When releasing the filter cover a plate-shaped valve closes the suction-inlet of the filter bowl and prevents leakage of fluid out of the tank. Filter element can removed from filter pot for cleaning purposes.

4. Technical data:

temperature range:	-10°C to + 80°C (for a short time + 100°C)
operating medium:	mineral oil, other media on request
connection system:	SAE-flange connection 3000 PSI
housing material:	filter head / screw plug AL, filter bowl glass fibre reinforced polyamide (standard)
	filter head / screw plug GG, filter bowl carbon fibre reinforced polyamide (IS11)
sealing material:	Nitrile (NBR) or Viton (FPM), other materials on request
installation position:	horizontal
volume tank:	4,0 l

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

5. Symbols:



6. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter' respectively Δp-curves ; depending on filter fineness and viscosity.

7. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

Desiccant Air Breathers

BFD Series

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filter technology

INTER NORMEN

Features

- Available in 4 sizes
- Refillable with drying agent
- Available with adapter and clogging indicator
- Replacement spin-on air filter separately available
- Seal and plastic plug to prevent moisture entry before installation

Monitoring by colour change

Advantages

Protects expensive equipment, increases operation efficiency and reduces maintenance costs by:

- Preventing corrosion
- Extending the life time of hydraulic, lubrication and process fluids
- Minimizing component wear, downtime and repairs
- Eliminating oil oxidation, additive depletion and freezing of the media
- Extending the oil filter life time

Unique filtration process

Moisture and particulate contamination are the main cause of oil contamination in industrial equipment. If neglected, these contaminants will restrict equipment efficiency, causing machine downtime and significant expenses caused by shortened oil change intervals, higher replacement demand and increased maintenance costs.

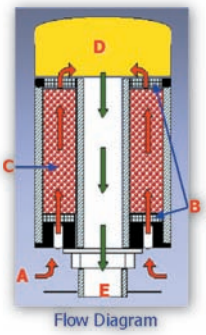
BFD desiccant air breathers prevent water and other contaminants from entering fluid reservoirs everywhere where differential pressures can occur through thermal expansion and contraction of the fluid, or during filling or emptying procedures.

Made up of a hygroscopic agent, compliant with revised European regulations (Council Directive 88/379/EEC), BFD breathers utilize the entire filter area and have the capability of extracting water vapour out of the air as soon as air enters (is drawn into) the unit. Accompanying solid particles are being removed by a 3µm absolute glass filter, allowing only clean, dry air to enter the system.

Technical Data	BFD 95	BFD 100	BFD 125	BFD 130
Max. air flow vol. (m³/min)	0,5	0,5	1,25	1,25
Filter fineness (µm)	3	3	3	3
Weight (g)	1000	1320	2950	4300
Connection thread (BSP)	G ¾	G ¾	G 1 ¼	G 1 ¼
Silicagel filling weight (g)	225	450	750	1500
Max. hygroscopicity (g)	86,5	173	288	576

Application area

- Hydraulic systems
- Bearing lubrication systems
- Mobile earthmoving equipment
- Gearboxes
- Robotics hydraulic systems
- Mobile tank systems
- Diesel fuel storage tanks
- Transformers with oil cooling systems
- Vacuum- and welding chambers
- Agricultural equipment



Flow Diagram

A. Wet Air In
B. Foam Filters
C. Desiccant Crystals
D. Absolute Air Filter
E. Standpipe – Dry Air Out

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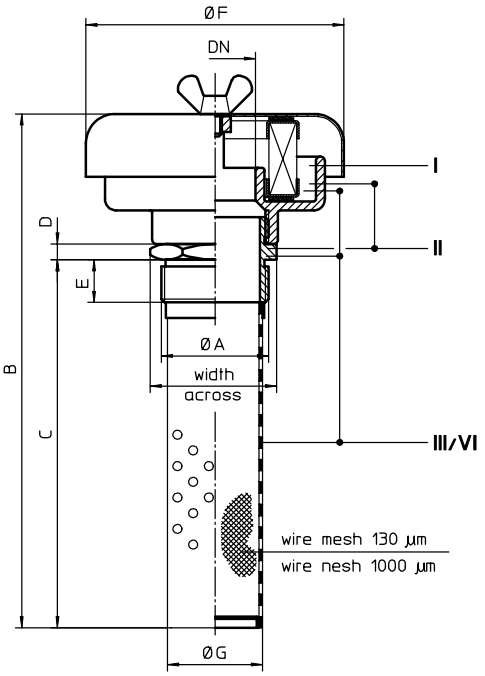
BREATHER FILTER
Series NBF, BF - WP

Sheet No.
6000 P



1. Type index:

1.1. Complete filter: (ordering example)

NBF. 25. 3VL. P. G. 5. III. -

1	2	3	4	5	6	7	8

1 **series:**
NBF = breather filter

2 **nominal size:** 25, 40, 55, 85

3 **filter-material and filter-fineness:**
10 P = 10 µm paper
3 VL = filtration efficiency D 100 = 3

4 **sealing material:**
P = Nitrile (NBR); V = Viton (FPM), only for 3VL

5 **connection:**
G = thread connection

6 **connection size:**
5 = G1; 7 = G 1 ½ ; 8 = G2; A = G3

7 **execution:**
I = only breather cap
II = breather cap and thread double nipple
III = complete as shown with filler filter 130 µm
VI = complete as shown with filler filter 1000 µm

8 **tank weld coupling:**
- = without

1.2. Filter element: (ordering example)

01NBF. 25-40. 3VL. P

1	2	3	4

filter element for NBF 25-40

01NBF. 55-85. 3VL. P

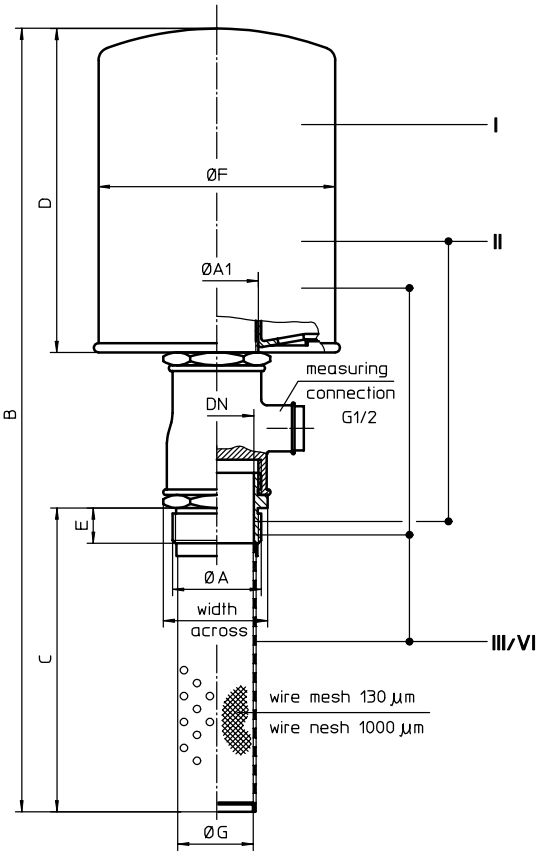
1	2	3	4

filter element for NBF 55-85

2. Dimensions:

type	DN	width across	A	B	C	D	E	F	G	Q in l/min	weight kg
NBF 25	25	41	G 1	186	120	6	18	115	28	450	0,8
NBF 40	40	55	G 1 ½	232	165	7	19	115	42	1150	1,2
NBF 55	50	70	G 2	332	230	7	24	190	54	1800	2,5
NBF 85	80	100	G 3	369	265	9	29	190	82	3500	2,5

Q = flow rate of air l/min, Δp approx. 10 mbar



1. Type index:

1.1. Complete filter: (ordering example)

BF-WP. 90. 10P. P. G. 7. III. -

1	2	3	4	5	6	7	8

1 **series:**
BF-WP = spin on - vent filter

2 **nominal size:** 45, 90

3 **filter-material and filter-fineness:**
10 P = 10 µm paper

4 **sealing material:**
P = Nitrile (NBR)

5 **connection:**
G = thread connection

6 **connection size:**
5 = G1; 7 = G 1 ½

7 **execution:**
I = only breather cap
II = breather cap and thread double nipple
III = complete as shown with a filler filter 130 µm
VI = complete as shown with a filler filter 1000 µm

8 **tank weld coupling:**
- = without

1.2. Filter element: (ordering example)

WP. 90. 10P. P

1	2	3	4

series:
1 WP = spin-on cartridge
2 - 4 see type index-complete filter

2. Dimensions:

type	DN	width across	A	A1	B	C	D	E	F	G	Q in l/min	weight kg
BF-WP 45	25	41	G 1	G ¾	335	120	145	18	92	28	400	0,8
BF-WP 90	40	55	G 1 ½	G 1 ¼	410	165	175	20	128	42	750	1,0

Q = flow rate of air l/min, Δp approx. 10 mbar

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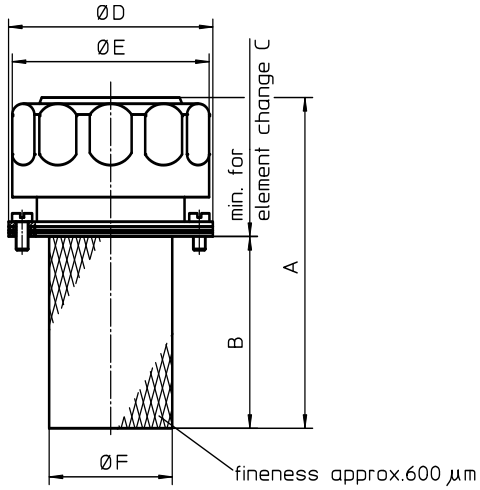
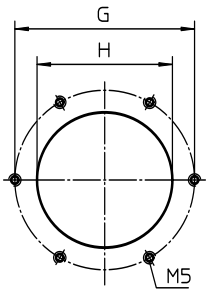
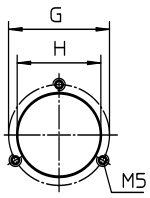
BREATHER FILTER
Series EBF 30 and 50, TBF 3/4, BF

Sheet No.
6002 E





bore draft EBF 50



bore draft EBF 30

1. Type index:

1.1. Complete filter: (ordering example)

EBF. 50. 10P. V1

1	2	3	4

1 **series:**
EBF = breather filter

2 **nominal size:** 30, 50

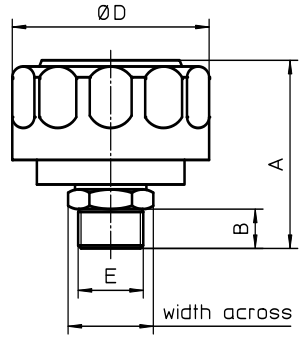
3 **filter-material and filter-fineness:**
10 P = 10 µm paper

4 **internal valve:**
- = without
V 1 = preload valve 0,35 bar ± 10 %, only for nominal size 50 available

2. Dimensions:

type	A	B	C	D	E	F	G	H	Q1	Q2	weight kg
EBF 30	111	63	80	52	46	29	41	34	200	300	0,1
EBF 50	134	78	100	83	80	50	73	55	600	1000	0,3

Q1 = air flow rate l/min, with Δp 0,01 bar
Q2 = air flow rate l/min, with Δp 0,03 bar



1. Type index:

1.1. Complete filter: (ordering example)

TBF. 3/4 . 3P

1	2	3

1 **series:**
TBF = tank breather filter

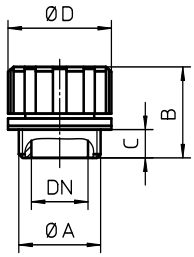
2 **nominal size:** connection G ¾

3 **filter-fineness:**
3P = 3 µm paper

2. Dimensions:

type	A	B	D	E	width across	Q1	Q2	weight kg
TBF ¾	71	16	80	G ¾ A	30	300	600	0,3

Q1 = air flow rate l/min, with Δp 0,01 bar
Q2 = air flow rate l/min, with Δp 0,03 bar



1. Type index:

1.1. Complete filter: (ordering example)

BF. G1

1	2

1 **series:**
BF = breather filter

2 **connection size:** G ¼, G ½, G1

2. Dimensions:

type	DN	A	B	C	D	Q in l/min
BF G ¼	8	G ¼	30	10	30	70
BF G ½	15	G ½	30	8	31	100
BF G 1	25	G 1	37	10	42	400

Q = flow rate of air l/min, filter-fineness 40 µm

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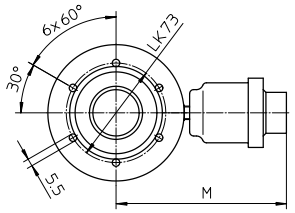
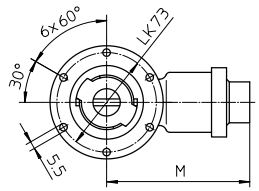
BREATHER FILTER
Series BFD 95-130

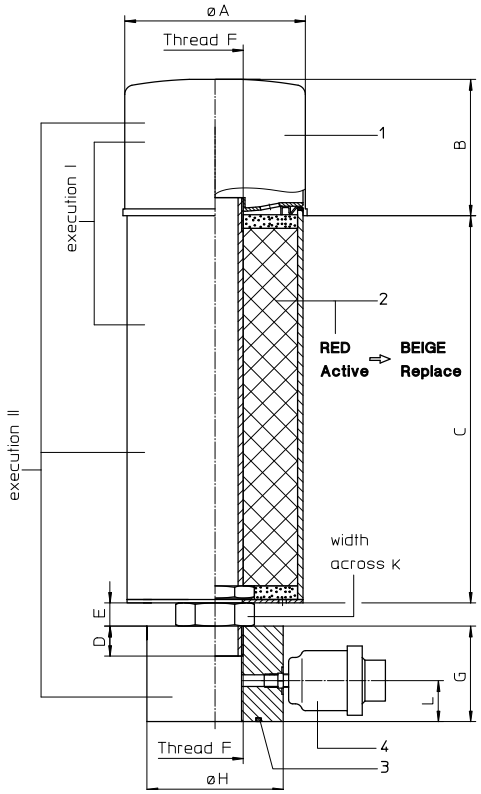
Sheet No. **6003 D**

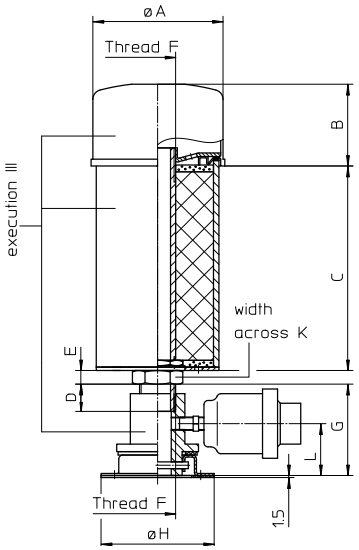
BFD 95, 100, 125, 130 execution II



BFD 95, 100 execution III







1. Type index:

1.1. Complete filter: (ordering example)

BFD. 95. 3VL. P. G. 4. II. FMI

1	2	3	4	5	6	7	8

1 **series:**
BFD = Silicagel Desiccant breather

2 **nominal size:** 95, 100, 125, 130

3 **filter-material and filter-fineness:**
3VL = filtration efficiency D 100 = 3

4 **sealing material:**
P = Nitrile (NBR)

5 **connection:**
G = threaded connection (BSPP)

6 **connection size:**
4 = G ¾ (size 95, 100)
6 = G 1 ¼ (size 125, 130)

7 **execution:**
I = without adapter
II = with adapter AP1 (only for size 95, 100) or with adapter AP2 (only for size 125, 130)
III = with adapter AP3 to retrofit EBF.50 (only for size 95, 100)

8 **clogging indicator:**
- = without
FMI = filter minder (only for execution II and III)

1.2. Filter element: (ordering example)

01WP. 95/100. 3VL. P

1	2	3	4

1 **series:**
01WP = spin-on cartridge

2 **nominal size:** WP 95/100 (for BFD 95, 100)
WP 125/130 (for BFD 125, 130)

3 - 4 see Type index-complete filter

1.3. Replacement Gel: (ordering example)

RG. 95

1	2

1 **series:**
RG = Replacement Gel

2 **nominal size:** 95, 100, 125, 130

2. Dimensions:

Type	execution	A	B	C	D	E	F	G	H	K	L	M	weight (g)
BFD 95	I	98	60	92	20	15	G ¾	-	-	32	-	-	1150
BFD 100	I			152									1400
BFD 125	I	130	100	144	30	10	G 1 ¼	-	-	50	-	-	3400
BFD 130	I			257									4300
BFD 95	II	98	60	92	20	15	G ¾	50	88	32	30	119	1350
BFD 100	II			152									1600
BFD 125	II	130	100	144	30	10	G 1 ¼	70	100	50	30	125	4600
BFD 130	II			257									5500
BFD 95	III	98	60	92	20	15	G ¾	67	83	32	38	105	1450
BFD 100	III			152									1700

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2. Spare parts:

item	designation	qty.	dimension	article-no.
1	spin-on cartridge	1	01WP....	
2	replacement gel	1	RG....	
3	O-ring	1	47,22 x 3,53	305078 (NBR)
4	clogging indicator	1	FMI	

3. Description:

3.1 Condensation in reservoirs:

When the reservoir breathers, air containing water vapor is ingested into the system. Temperature fluctuations will cause the water vapor to condense. This condensed Water will speed up the oxidation of the oil and lead to damage in the machine. The Catalytic action of metal particles present in the contamination process speeds up Both these processes. The air conditioner first dries the air as it passes through the Silica gel granules and the dry air passes through a 3 micron rated synthetic Media element to remove any solid contamination particles.

The expelled air reaches the atmosphere via the same route but in the opposite direction.

Air Driver - As moistore is absorbed, the silica gel granules will gradually change color from a deep red to beige.
When the granules are beige, replace the silica gel.

3.2 Mounting:

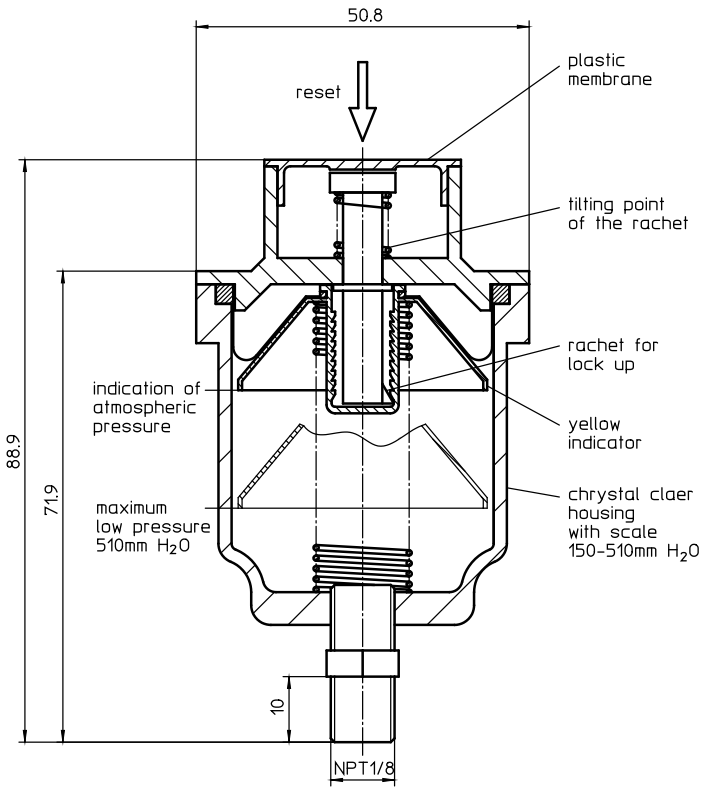
Direct mount onto the reservoir or use an adaptor plate which fits the standard 6-bolt pattern for filler breathers.
Remove protective coverning from silica gel inlet holes before installation.

4. Technical data:

Type	max. Volume flow (m³/min)	max. hygroscapacity (g)	Silica gel filling weight (g)
BFD 95	0,5	86,5	225
BFD 100	0,5	173	450
BFD 125	1,25	288	750
BFD 130	1,25	576	1500

5. Filter minder: (ordering example)

FMI = filter minder



5.1 Description:

Air Filter -The adaptor plate has a connection for the „filter minder". This gives a static indication of the air breather.
The unit can be reset when the element is Changed.

Retrofitting Filter Systems for permanent Off-Line Filtration at Wind Power Gears

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US22

The stationary filter units US22 are intended for oil maintenance in hydraulic systems. Application area:

- **secondary flow filtration in addition to the existing operating filter**
- **secondary flow filtration without the action of the operating filter**
- **filtration when filling the oil reservoir**

The filter unit must not be used to pump contaminated hydraulic fluids and is therefore designed without a switchover fitting to by-pass the filter. Features like high reliability and small dimensions are guaranteed by its compact structural design on a base plate without a pipe. The device is equipped with a gear pump driven by an E-motor. Filter elements are available in different filter finesses and can be replaced without any tools.

Additionally the US 22 can be equipped with the MPS 01.2, Metal Particle Sensor having the following features:

- **Detection of metal particles > 200µm**
- **Designed as an inexpensive inline monitoring solution for stationary and permanent operations**
- **Suitable for installation in new or existing systems**
- **Operating with inductive measuring concept for hydraulic and lubricating fluids**

Technical data:
Filter-fineness: 7 $\mu m_{(c)}$
Weight:approx. 73 kg
Operating medium: hydraulic oil based on mineral oil from 10 mm²/s, other media on request.

US10

The stationary filter units US10 are designed for servicing oil at gears with lubricants of high viscosity. The units perform off-line filtration, and are constructed on a base plate without tube, which guarantees small dimensions and high reliability. The stationary filter unit can be operated unattended. The electric security and switch elements of the filter unit perform the following functions:

- **motor protective switch e1, e-motor turns off, when overloaded**
- **thermostat to switch on the pump depending on the respective gear temperature**
- **pressure switch (clogging indication E5.5) as protection against permanent overload > 5 bar**
- **time lag relay to bridge the cold start of E 5.5**

The conduct, deaeration and diversion connections are marked corresponding to their function. The diversion is necessary for the purification of the filter unit and the appropriate replacement of the filter element as well as the change of the fluid to be filtered.

Technical data:
Flow rate : 11,2 l/min at 700 r/min
E-Motor: 0,37 KW, about 700 r/min
Alternating current : 230/400 V, 50 Hz
Pressure resistance : max. 8 bar
Filter fineness 5 $\mu m_{(c)}$, 7 $\mu m_{(c)}$, 10 $\mu m_{(c)}$, 15 $\mu m_{(c)}$ or 20 $\mu m_{(c)}$
Weight : about 35 kg
Medium : Hydraulic oil on mineral oil base 10 up to 3000 mm²/s

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Twinfil Filter Systems

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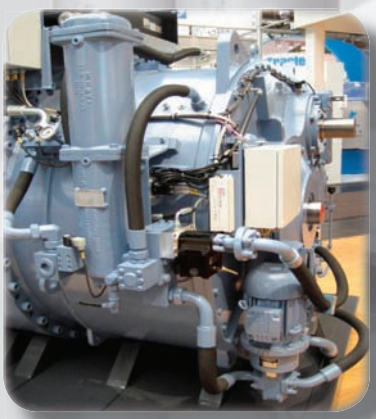
Lubrication and filter systems for wind power gears

It is particularly important that wind turbine lubricants provide an appropriate protection for gearboxes against corrosion, wear and tear. Most of oil system failures are caused by contaminated oil, thus oil quality and cleanliness have a great impact on the lifetime of bearings and the gearbox performance.



Twinfil Filter System

Contaminants, like e.g. solid particles or moisture, can enter the gearbox during manufacturing, assembly and initial run-in process or during maintenance, can be ingested through seals or breathers or internally generated.

Proper oil maintenance, monitoring and filtration are an essential part of preventive and structured maintenance programmes.

Maintenance experts are therefore recommending:

- Additional filtration systems
- Metal particle monitoring systems
- Solid contamination monitoring systems
- Water-in-oil monitoring systems
- Water removal systems
- High quality desiccant breathers

Contamination Sensor Monitor CSM 01

In-line particle counting in oils which are being used in wind turbine gearboxes can quickly become **a challenge**:

High-viscosity oils and variations in outdoor temperatures can significantly affect the measuring systems.

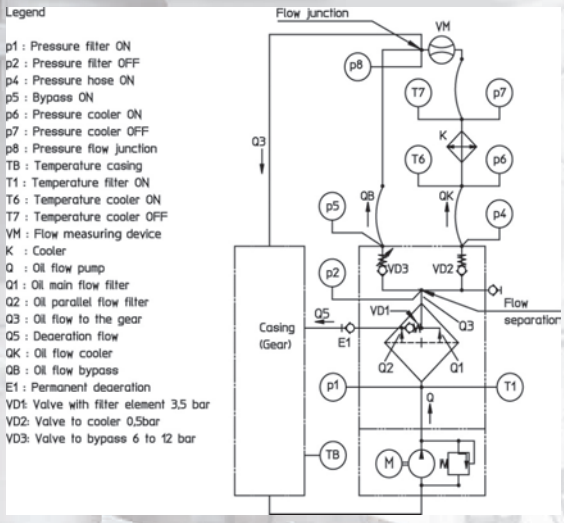
Foamed oils make particle counting in wind power plants additionally difficult.

Operating parameters:	
Voltage supply:	230V / 380V, 50 Hz
Viscosity range:	10…1100 mm2/ s
Max. permitted oil temperature:	70°C
Ambient temperature:	0°C....55°C
Protection class:	IP 54
Measuring parameters:	
Particle counting:	contamination classes acc. to ISO 4406:99
Calibration:	ISO MTD in oil
Water saturation:	0…100%
Temperature:	0°C....70°C
Dynamic viscosity:	0,8…1000mPas
Relative dielectricity constant:	1…10
Weight:	approx. 33 kg

The solution: CSM 01

- Can be used as a stationary or mobile condition monitoring system
- Determines the amount and size of solid contamination in hydraulic and lubrication fluids, working in an off-line capacity, independently of the system in which the measurement is being performed
- It can be upgraded with additional sensor modules for measuring other important fluid parameters
- Enables the user to perform accurate measurements within foamed oils
- An effective measuring device for early detection of fluid cleanliness changes, changes in the oil composition, increase of contamination, during initial operation, quality control and maintenance

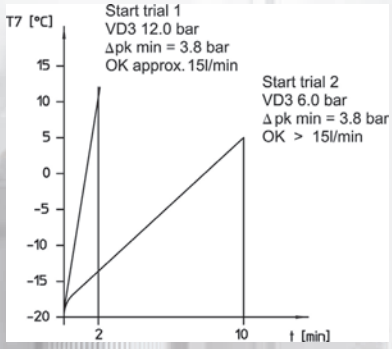
Lubrication system



Twinfil Filter System

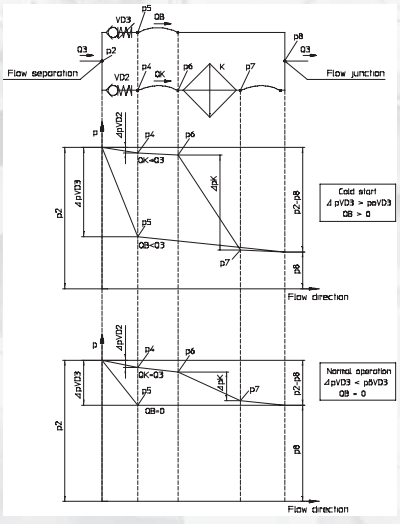
Evaluation of start trials

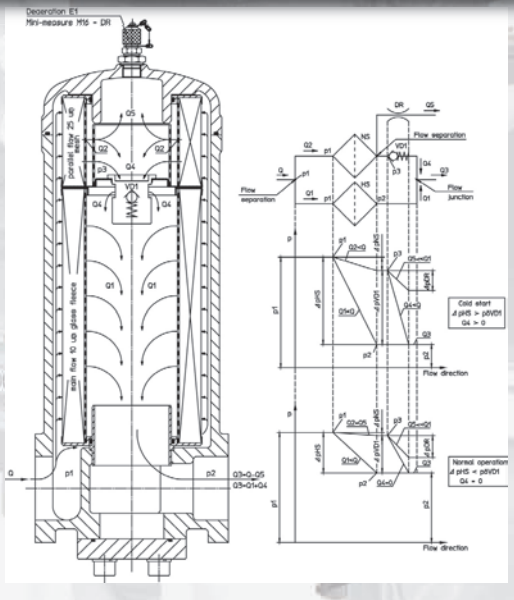
Under simulated cold start conditions (down to -30°C operating and -40°C survival temperature) and with a special gear oil being used:



The oil flow of the air-oil cooler (cooled down to -30°C) could be attained after 2 minutes.
The time until a temperature increase T7 at the cooler outlet was evident - respectively until the oil flow QK (about 20% of the total flow Q), within the range of set pressures from 6 to 12 bar and from 10 to 2 minutes - could have been influenced by an adjustable pressure difference valve VD3.
All system components worked properly from the cold start up to the maximum temperature. At any time the oil flow was filtered 100 %, and the oil flow was, at oil viscosities < 1000 mm²/s, conducted in full extent through the main element (filter fineness 10 µm, fibre glass fleece).

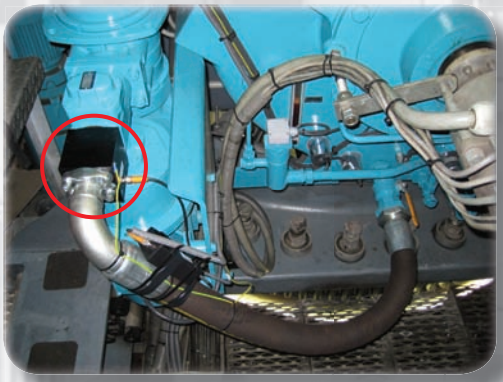
Filter, valve and cooling system functioning from cold start to normal function





Twinfil Filter Systems

- Specially designed lubrication system for gears
- Able to perform reliable supplying of all lubricating points in the gear, filtration and deaeration
- Ensure low noise emission
- Indicate the operating condition of the oil
- Prolong the service life of the lubricant
- Simple to be serviced
- For operations **under cold weather conditions:** with an additional pump-assisted heating system



*Metal Particle Sensor **MPS***

Available options

Condition Monitoring Systems

- Metal particle sensors (MPS)
- Water sensors (WSPS)
- Multifunction oil condition sensor (IVS 01)

Water removal filter elements

- For particle retention and absorption of free and emulsified water from oil
- Reduce oil ageing and deadditivation of fluids

Experimental trials

The functionality of TWF systems has been proven during special experiments conducted by *INTERNORMEN* specialists and in cooperation with customers and partners. Cold start conditions down to -30°C (operating temperature), -40°C (survival temperature) were simulated and special gear oils were used.
All system components, such as the pump, the filter, the valve system of the filters as well as the tube system, worked properly from the cold start up to the maximum temperature of 70°C, without any negative effects on the overall function of the oil supply to the gear.

Maintenance unit WGR 60

- Inexpensive maintenance unit meant for quick and clean filter element change without oil loss
- During the filter element change the oil is being pumped down out of the filter housing into an appropriate barrel and can be pumped back into the system after the filter has been changed
- Especially suitable for and timesaving filter element change in wind power plants

Technical Data

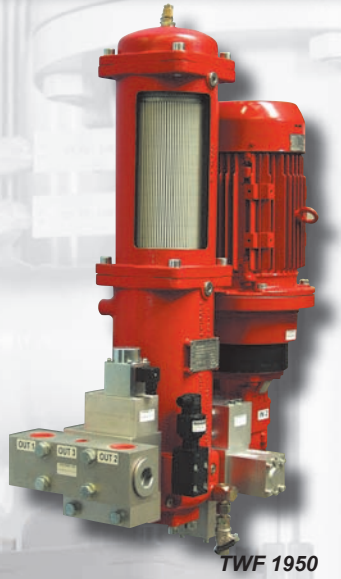
Dimensions:	520 x 355 x 730 mm
Weight:	12 kg
Barrel capacity:	60 l
Flow rates:	5 – 15 l/min
Viscosity:	4000 mm²/s
Suction / pressure hose:	1,5 m
Connection thread:	G 1/2“
Power supply:	230 V

TWF 1950 with WGR 60

TWF 1001

TWF 1001 - Technical Data

Max. operating pressure:	16 bar
Flow rate:	120 l/min
Operating temperature:	min. -30 °C
Survival temperature:	min. -40 °C
E-motor:	
Rotary current motor:	400/690 V, 50Hz/60 Hz
Protection classes:	IP65



TWF 1950

TWF 1950 - Technical Data

Max. operating pressure:	16 bar
Flow rate:	200 l/min
Operating temperature:	min. -30 °C
Survival temperature:	min. -40 °C
E-motor:	
Rotary current motor:	400/690 V, 50Hz/60 Hz
Protection classes:	IP65

TWF 4000

TWF 4000 - Technical Data

Max. operating pressure:	16 bar
Flow rate:	250 l/min
Operating temperature:	min. -30 °C
Survival temperature:	min. -40 °C
E-motor:	
Rotary current motor:	400/690 V, 50Hz/60 Hz
Protection classes:	IP65

TWF 6000

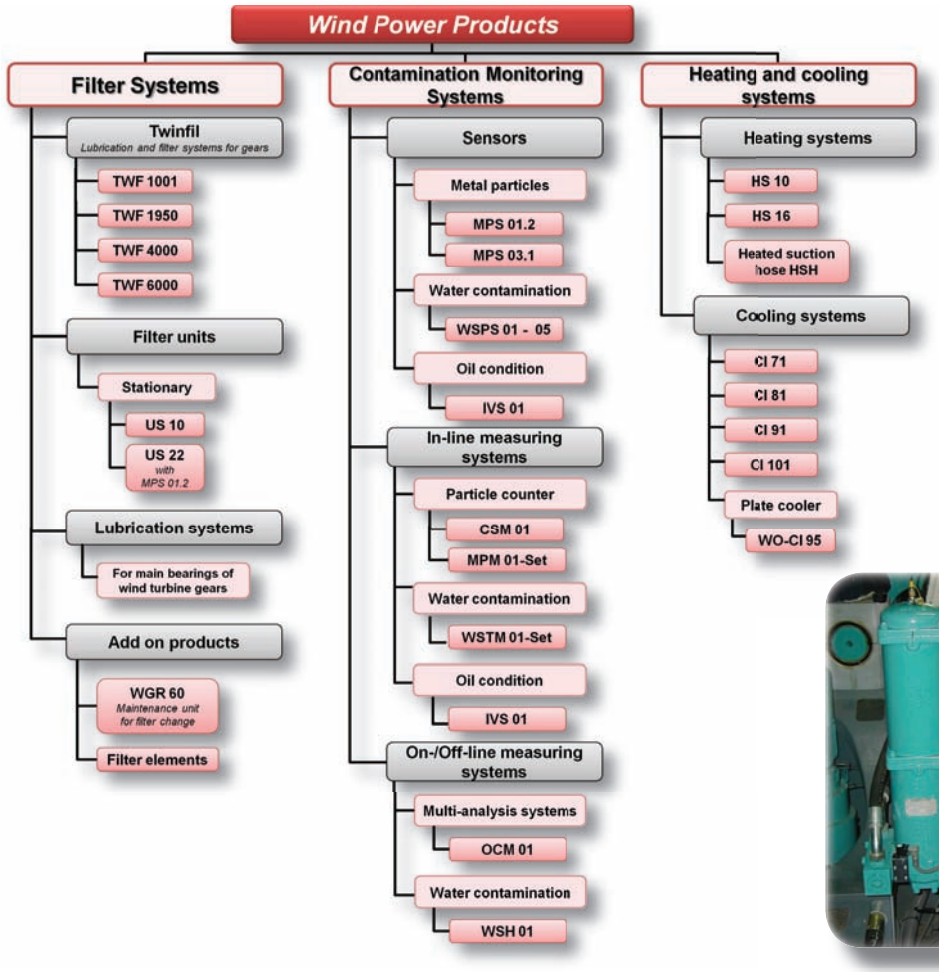
TWF 6000 - Technical Data

Max. operating pressure:	16 bar
Cumulative flow rate:	400 l/min
Operating temperature:	min. -30 °C
Survival temperature:	min. -40 °C
E-motor:	
Rotary current motor:	400/690 V, 50Hz/60 Hz
Protection classes:	IP65

Additional extras:

- Electric, electronic and visual pressure difference indicators, connected with the filter without any tubes, to indicate the operating condition of the filter

Additional Wind Power Products



TWF 1950

http://www.internormen.com/cms/en/products/windpower

Wind Energy in Cold Climates

Minimize downtime and benefit from favourable winter winds: *INTERNORMEN* filtration and lubrication systems for gears and for main bearings of wind turbine gears, heating systems and maintenance and filtration units.

Coolers

Designed to provide optimum cooling of hydraulic and lubricating oils, available in different sizes and on customer request with optional extras; high cooling performance.

INTERNORMEN Technology GmbH

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Wind Power Solutions

Cold Weather Conditions

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system technology

INTER
NORMEN

Wind Energy in Cold Climates

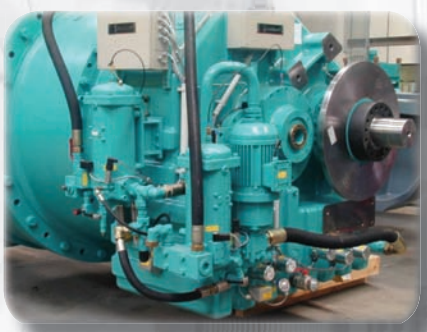
Wind power is not only the fastest growing energy production platform in the world, it is also one of the cleanest renewable power sources on Earth. As turbines are getting larger and offshore turbines more common, the possibility to build wind power plants almost everywhere makes their growth exceed all anticipations.

However, good wind sites are sometimes located in colder regions where harsh winter conditions prevail during a substantial part of the year.

How cold weather effects wind turbines

Cold climate and severe outdoor conditions have different non-desirable effects on wind turbines, primarily affecting the plastics, steel and lubricants.
Due to low temperatures the viscosity of lubricants and hydraulic oils increases, causing the oil to get stiff and unable to perform sufficient lubrication of the gearbox and bearings.

If the oil is too thick to freely circulate and the oil viscosity didn't reach a certain level, damages to the gear will occur almost immediately and an increase in internal friction will cause reduced power transmission capacity of the gearbox.



Service and monitoring under difficult cold weather conditions has to be taken into account as well, because it can result in increased maintenance costs and extended turbine downtime.

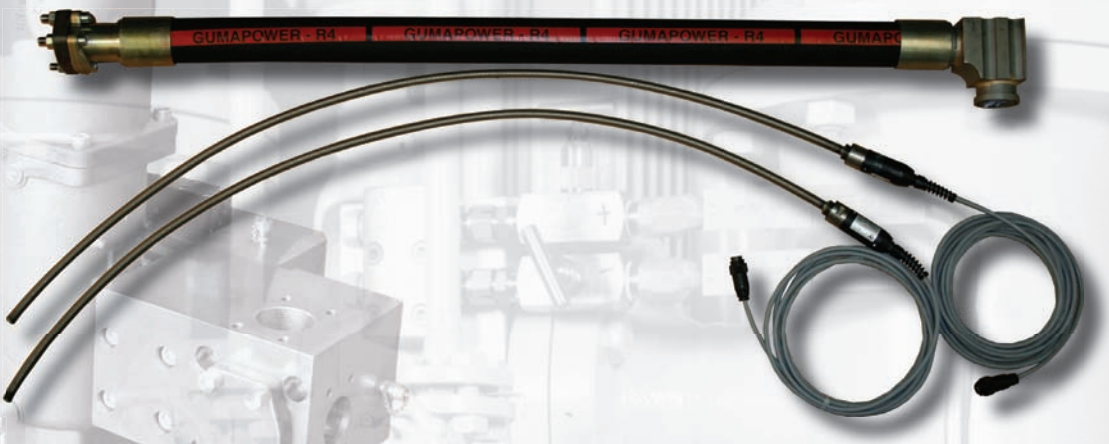
To minimize downtime and benefit from favourable winter winds

In order to significantly improve the dependability and extend the service life of wind turbines under cold, unpredictable winter conditions, *INTERNORMEN* offers a variety of products:

- Filtration and lubrication systems for gears and for main bearings of wind turbine gears
- Contamination and condition monitoring systems
- Heating systems
- Maintenance and filtration units

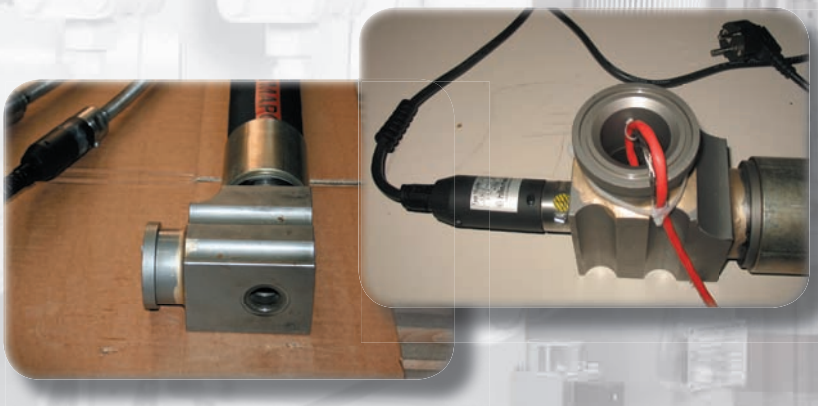
HSH – Oil pre-heater for suction hoses

- Suction hose heater placed within the *INTERNORMEN* suction hose DN 60
- With an additional 1,5 m connection line and inlet for the heater
- Ensures excellent cold start behavior of the gear pump



User benefits:

- High power 350 W/m ensures an exceptionally quick heating-up time, from -30°C up to +5°C in 20 minutes
- Overheat control (no oil combustion)
- Outer sheath made of a stainless steel wave tube, absolutely leak-proof and compatible with different media
- Temperature control at the surface of the stainless steel wave tube (Tmax 60°C)
- Hose to heater sealing without compression glands
- Various hose lengths available (standard: 1,5m)

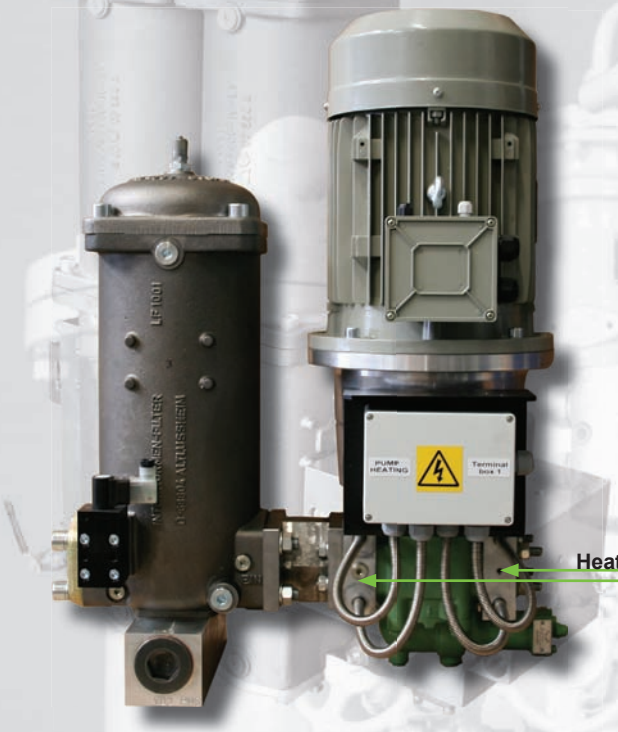


Technical Data

Tube length:	1,5 m (other lengths available on request)
Connections:	2 x SAE 2“ (other connections available on request)
Nominal diameter:	DN 60
Power supply:	230V~ (other supply voltage on request)
Power:	350 W/m
Operating temperature:	min. -30°C
Survival temperature:	min. -40°C

Twinfil Filter Systems

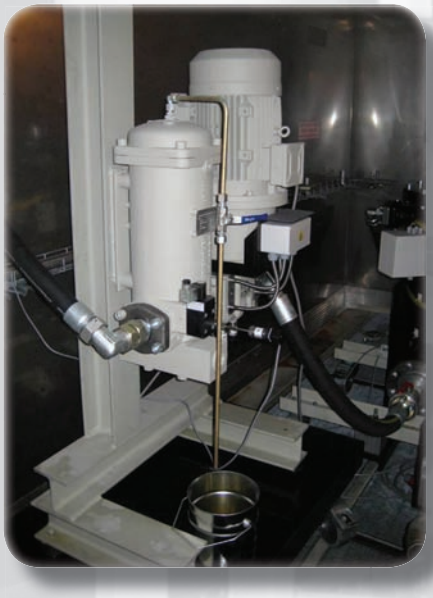
with additional pump-assisted heating system



- Specially designed lubrication system for gears
- With additional heating plates
- Able to perform reliable supplying of all lubricating points in the gear, filtration and deaeration of the system
- Ensures low noise emission
- Indicates the operating condition of the oil
- Prolongs the service life of the lubricant
- Simple to be serviced

Technical Data

Maximum operating pressure:	15 bar
Operating temperature:	min. -30°C
Survival temperature:	min. -40°C
Pump heating:	4 x 100 W, 230 V
E-motor:	customer-specific

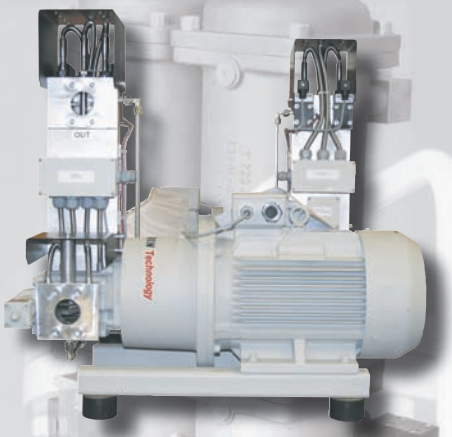


It is particularly important that wind turbine lubricants provide an appropriate protection for gearboxes against corrosion, wear and tear. Most of oil system failures are caused by contaminated oil – that is why proper oil maintenance, monitoring and filtration are an essential part of preventive and structured maintenance programmes.

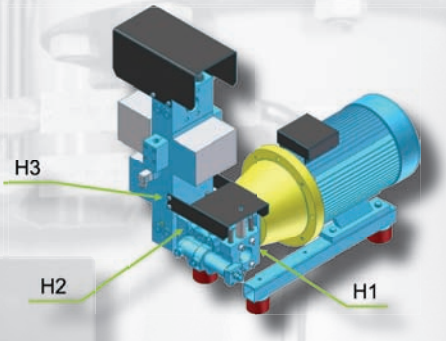
Reduce ingrained contamination and humidity by using a desiccant breather filter!

BFD series

HS – Heating Systems

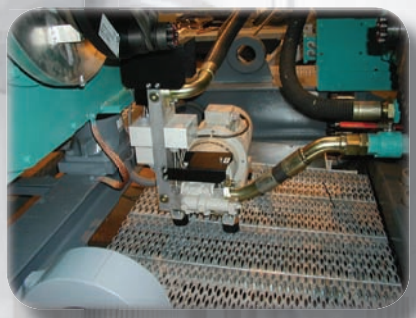


- Provide quick additional heating of oil in the gears, when due to low temperatures and extreme conditions the oil viscosity reaches up to 160 000 cSt (mm²/s)
- Two types are available HS 10 and HS 16, operating at 8 or 12 bars maximum pressure
- Fitted for survival temperatures up to 80°C and down to -40°C
- The HS heating systems are maintenance-free and equipped with a monitoring device which prevents the overheating of oil



HS 10 - Technical Data

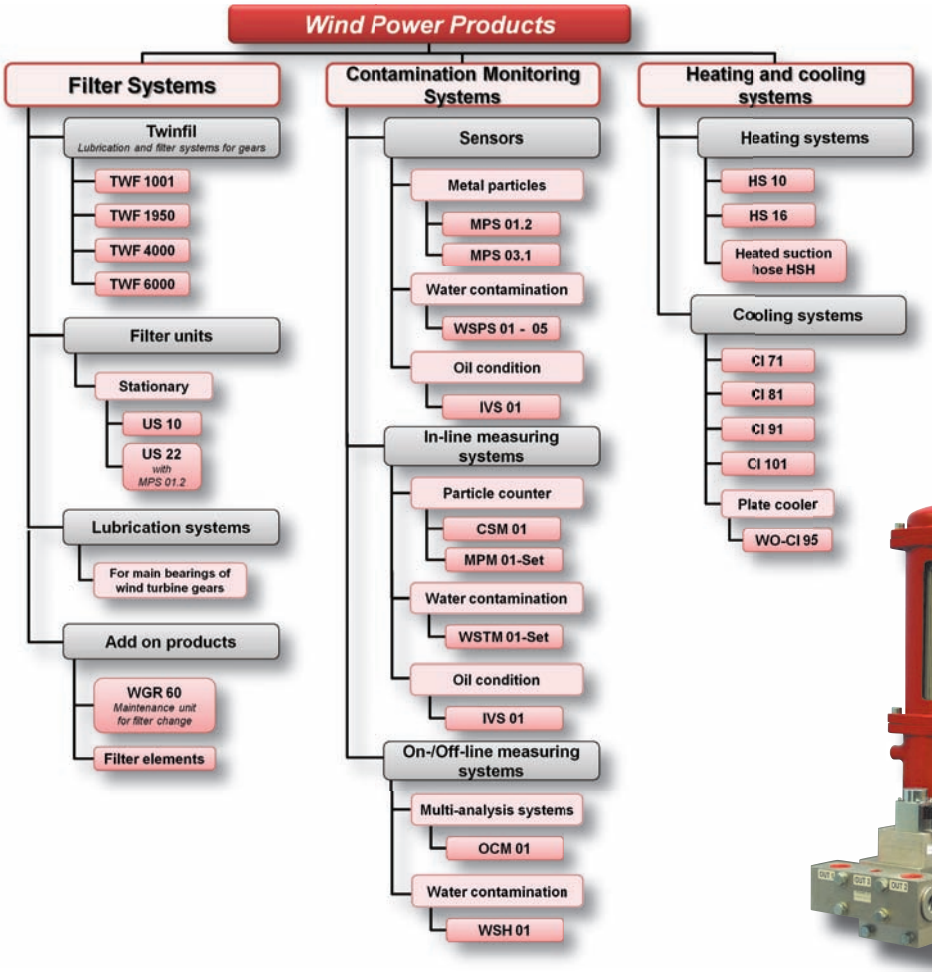
Maximum operating pressure:	8 or 12 bar
Operating fluid:	Poly-alpha-olefin or mineral oil based gear oils
Maximum starting viscosity:	160 000 mm²/s
Operating temperature:	maximum 30°C, minimum -30°C
Survival temperature:	maximum 80°C, minimum -40°C
Operating voltage:	Standart 400/460 V Δ AC other voltage of request
Frequency:	50 / 60 Hz
Hydraulic thermal output:	maximum 1000 W
Electric thermal output:	H1: 2 x 100 W, 230 V AC H2: 2 x 160 W, 230 V AC H3: 3 x 2500 W, 400 V AC
Geared pump:	80 cm³/U, 52 l/min at 750 rpm, 62 l/min at 500 rpm
Electric motor:	3,0 kW

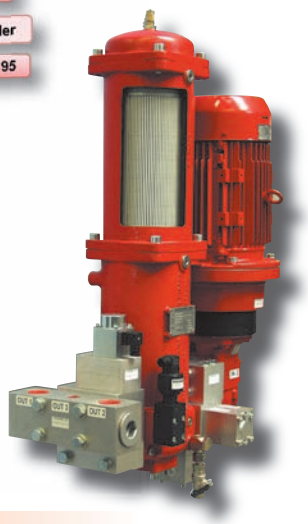


HS 16 - Technical Data

Maximum operating pressure:	8 or 12 bar
Operating fluid:	Poly-alpha-olefin or mineral oil based gear oils
Maximum starting viscosity:	160 000 mm²/s
Operating temperature:	maximum 30°C, minimum -30°C
Survival temperature:	maximum 80°C, minimum -40°C
Operating voltage:	Standart 400/460 V Δ AC other voltage of request
Frequency:	50 / 60 Hz
Hydraulic thermal output:	maximum 1500 W
Electric thermal output:	H1: 2 x 100 W, 400 V AC H2: 2 x 250 W, 400 V AC H3: 6 x 2500 W, 400 V AC
Geared pump:	80 cm³/U, 52 l/min at 750 rpm, 62 l/min at 500 rpm
Electric motor:	3,0 kW

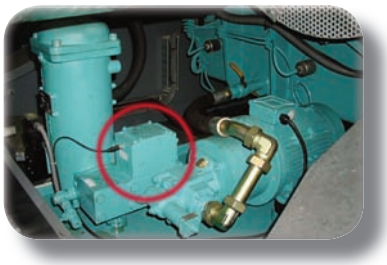
Additional Wind Power Products





The Importance of Oil Cleanliness

Oil quality and cleanliness have a great impact on the lifetime of bearings and the gearbox performance. Contaminants, like e.g. solid particles or moisture, can enter the gearbox during manufacturing or during maintenance, can be ingested through seals or breathers or internally generated. To prevent equipment failures and system downtimes learn more about our Contamination Monitoring Systems which can be installed in new or existing systems:
http://www.internormen.com/cms/en/products/electronics



Coolers

Designed to provide optimum cooling of hydraulic and lubricating oils, available in different sizes and on customer request with optional extras, high cooling performance.

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Cooling Systems

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Wind Power Coolers

High performance oil coolers

High or increased oil temperatures lead to oil deterioration, which again leads to decreased efficiency, wear and tear and reduced service life of equipment and components.
In order to prevent high operating and maintenance costs and prolong the life expectancy of a system, oil has to be cooled and thus enabled to perform trouble-free lubricating, sealing, corrosion protection or cooling.

Designed and dimensioned to suit your needs and requirements

INTERNORMEN offers a wide range of high-quality standard and custom-designed oil coolers, with excellent cooling capacities and designed to withstand hardest operating conditions.
Efficient cooling begins with optimal dimensioning and extensive product testing: considering various factors (like e.g. the application area, environment or cooling medium) we are able to offer exactly the right cooler size or type to suit your specific requirements.

CI 61 - Technical Data

Operating pressure:	20 bar
Weight:	49 kg
Noise level:	82 dB, +/- 3 dB
Working temperature:	-30°C to +55°C
Survival temperature:	-40°C
Motor:	1,1 kW 400 - 690 V, 50 Hz 1450 rpm, 4-pin

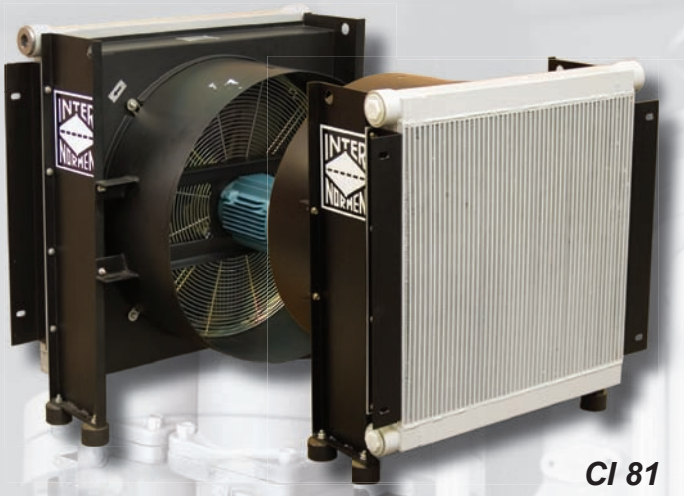
CI 61

CI 71

CI 71 - Technical Data

Operating pressure:	20 bar
Weight:	91 kg
Noise level:	80 dB, +/- 3 dB
Working temperature:	-30°C to +55°C
Survival temperature:	-40°C
Cooling capacity:	45 KW
Motor:	1,1 kW 690 V, 50 Hz 905 rpm, 6-pin

All of the listed cooler types have been flushed acc. to ISO 4406 contamination class 16/14/11, with a low viscosity fluid as a flushing medium



CI 81

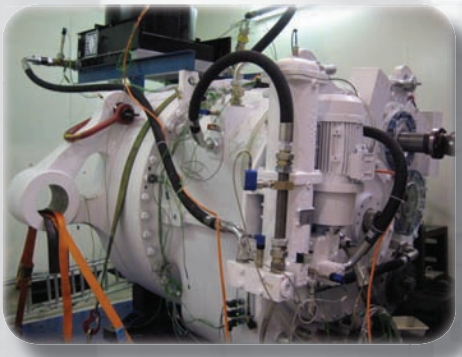
Advantages of *INTERNORMEN* coolers:

- Compact design
- High cooling performance
- Low noise level
  (essential for indoor installations)
- Various sizes
- Various types (e.g. plate coolers)
- Customer-specific solutions
- Different accessories (e.g. adapters)

CI 81 - Technical Data

Operating pressure:	20 bar
Weight:	111 kg
Noise level:	82 dB, +/- 3 dB
Working temperature:	-30°C to +55°C
Survival temperature:	-40°C
Cooling capacity:	51 KW
Motor:	1,1 kW 690 V, 50 Hz 905 rpm, 6-pin

Plate cooler WO-CI 95



CI 91

CI 91 - Technical Data

Operating pressure:	20 bar
Weight:	137 kg
Noise level:	83 dB, +/- 3 dB
Working temperature:	-30°C to +55°C
Survival temperature:	-40°C
Motor:	2,2 kW 690 V, 50 Hz 905 rpm, 6-pin

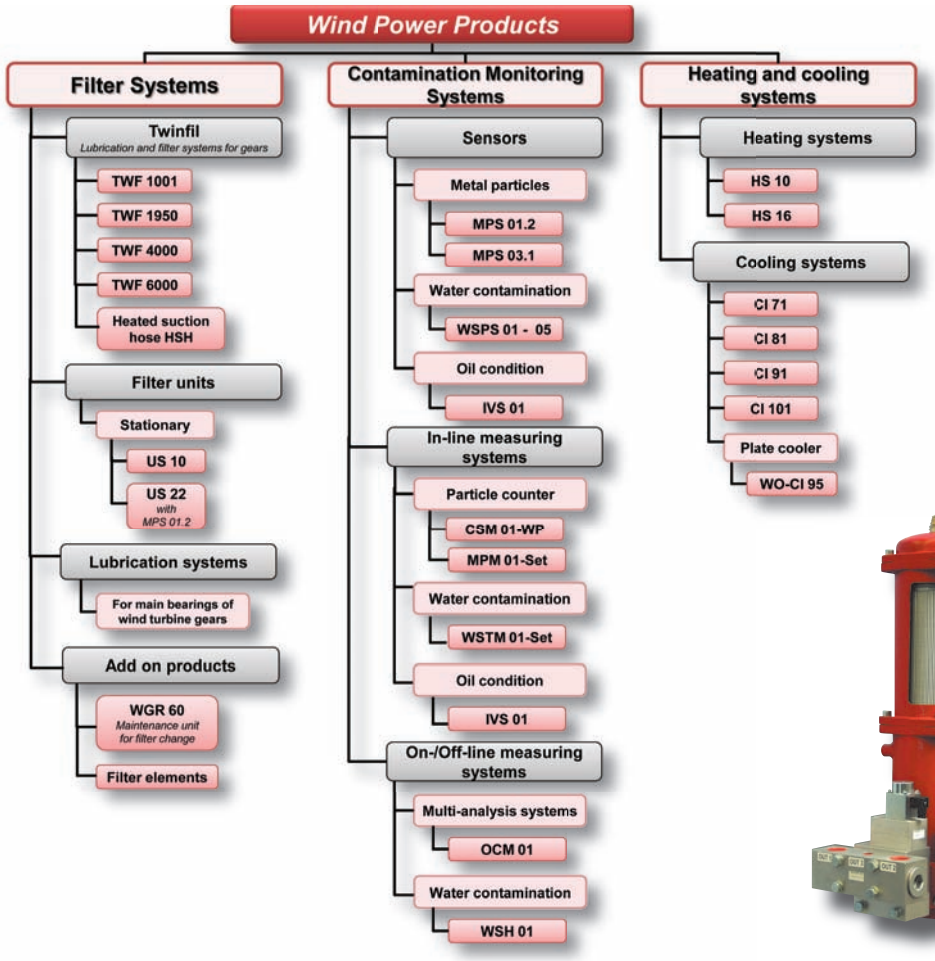
CI 101 - Technical Data

Maximum operating pressure:	20 bar
Test pressure:	30 bar
Weight:	157 kg
Noise level:	83 dB, +/- 3 dB
Cooling capacity:	60 KW
Motor:	2,2 kW 3 x 690 V, 50 Hz 6-pin

CI 101

All of the listed cooler types have been flushed acc. to ISO 4406 contamination class 16/14/11, with a low viscosity fluid as a flushing medium

Additional Wind Power Products



TWF

The Importance of Oil Cleanliness

Oil quality and cleanliness have a great impact on the lifetime of bearings and the gearbox performance. Contaminants, like e.g. solid particles or moisture, can enter the gearbox during manufacturing or during maintenance, can be ingested through seals or breathers or internally generated. Prevent equipment failures and system down-times:
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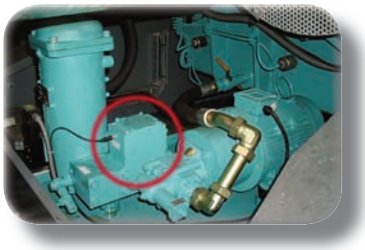

Wind Energy in Cold Climates

Minimize downtime and benefit from favourable winter winds:
INTERNORMEN filtration and lubrication systems for gears and for main bearings of wind turbine gears, heating systems and maintenance and filtration units.
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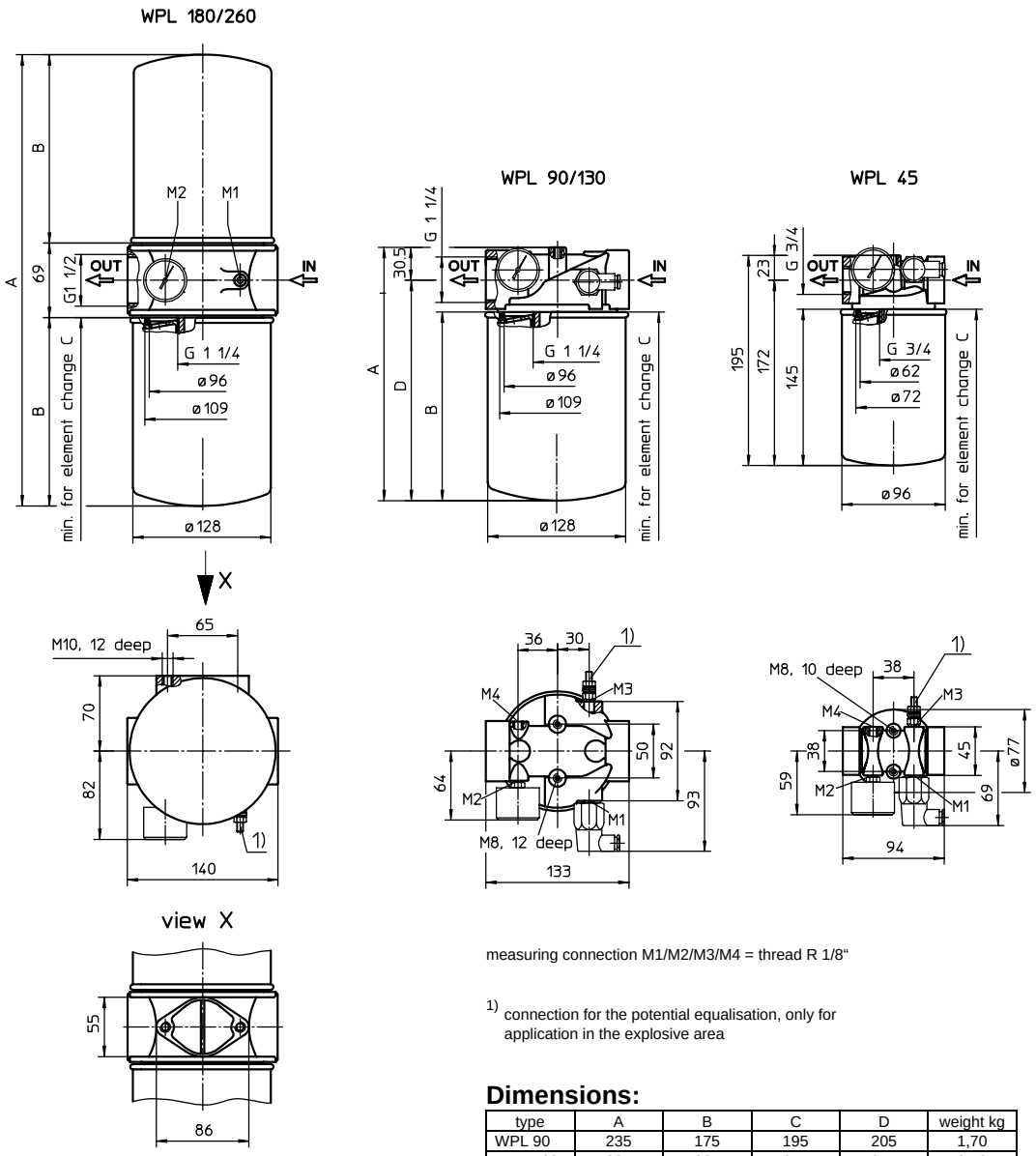
SPIN-ON FILTER

Series WPL 45-260 DN 20-40 PN 10

Sheet No. **9000 N**



measuring connection M1/M2/M3/M4 = thread R 1/8"

1) connection for the potential equalisation, only for application in the explosive area

Dimensions:

type	A	B	C	D	weight kg
WPL 90	235	175	195	205	1,70
WPL 130	285	225	245	255	2,10
WPL 180	419	175	195	-	3,25
WPL 260	519	225	245	-	4,00

1. Type index:

1.1. Complete filter: (ordering example)

WPL. 90. 10P. R. E1. -. -. -

1	2	3	4	5	6	7	8

1 **series:**
WPL = spin-on filter

2 **nominal size:** 45, 90, 130, 180, 260

3 **filter-fineness and filter-material:**
10 P = 10 µm paper
10 VG = 10 µm(c) Interpor fleece (glass fibre) WPL 45/90/180

4 **internal valve:**
- = without (WPL 45/90/130)
S = by-pass valve suction filter Δp 0,28 bar
R = by-pass valve pressure filter Δp 2,0 bar

5 **measuring connection M1:**
- = without clogging indicator
O = clogging indicator visual, see sheet-no. 1616
E1 = pressure switch, see sheet-no. 1616
E2 = pressure switch, see sheet-no. 1616
E5 = pressure switch, see sheet-no. 1616
PA = potential equalisation

6 **measuring connection M2:**
- = without clogging indicator
O1 = clogging indicator visual, see sheet-no. 1616
E4 = pressure switch, see sheet-no. 1616
PA = potential equalisation

7 **measuring connection M3:**
possible indicators see position 5 of the type index (WPL 45/90/130)

8 **measuring connection M4:**
possible indicators see position 6 of the type index (WPL 45/90/130)

1.2. Filter element: (ordering example)

WP. 90. 10P

1	2	3

1 **series:**
WP = spin-on cartridge for in-lin filter

2 **nominal size:** 45, 90, 130
WPL 180 = 2x NG 90
WPL 260 = 2x NG 130

3 **filter-fineness and filter-material:**
10 P = 10 µm paper
10 VG = 10 µm(c) Interpor fleece (glass fibre), WPL 45/90/180

2. Description:

In-line filter series WPL and WP-spin-on-cartridges are suitable for an operating pressure up to 10 bar. They are appointed for mounting into pressure lines and return lines. the spin-on-cartridges, e.g. are directly screwed to hydrostatic drives. These series allow an easy maintaining with short operating interruption. After pollution the complete spin-on-cartridges has to be changed. The WPL-filter can alternatively be equiped with pressure switch and/or pressure gauge. The serie can be used for all mineral oils (hydraulic- and lubrication oils).

3. Technical data:

temperature range	- 10 °C to + 110°C
operating medium:	mineral oil, other media on request
max. operating pressure:	10 bar
test pressure:	13 bar
opening pressure by-pass valve for pressure filter:	Δp 2,0 bar
opening pressure by-pass valve for suction filter:	Δp 0,28 bar
pressure switch:	Δp 1,5 bar see sheet-no. 1616
pressure switch:	Δp 0,25 bar see sheet-no. 1616
gaskets:	Nitrile (NBR)

Classified under the Pressure Equipment Directive 97/23/EC for mineral oil (fluid group 2), Article 3, Para. 3.
Classified under ATEX Directive 94/9/EC according to specific application (see questionnaire sheet-no. 34279-4).

4. Pressure drop flow curves:

Precise flow rates see 'INT-Expert-System Filter', respectively Δp-curves; depending on filter fineness and viscosity.

5. Test methods:

Filter elements are tested according to the following ISO standards:

ISO 2941 Verification of collapse/burst resistance
ISO 2942 Verification of fabrication integrity
ISO 2943 Verification of material compatibility with fluids
ISO 3723 Method for end load test
ISO 3724 Verification of flow fatigue characteristics
ISO 3968 Evaluation of pressure drop versus flow characteristics
ISO 16889 Multi-pass method for evaluating filtration performance

Changes of measures and design are subject to alteration!

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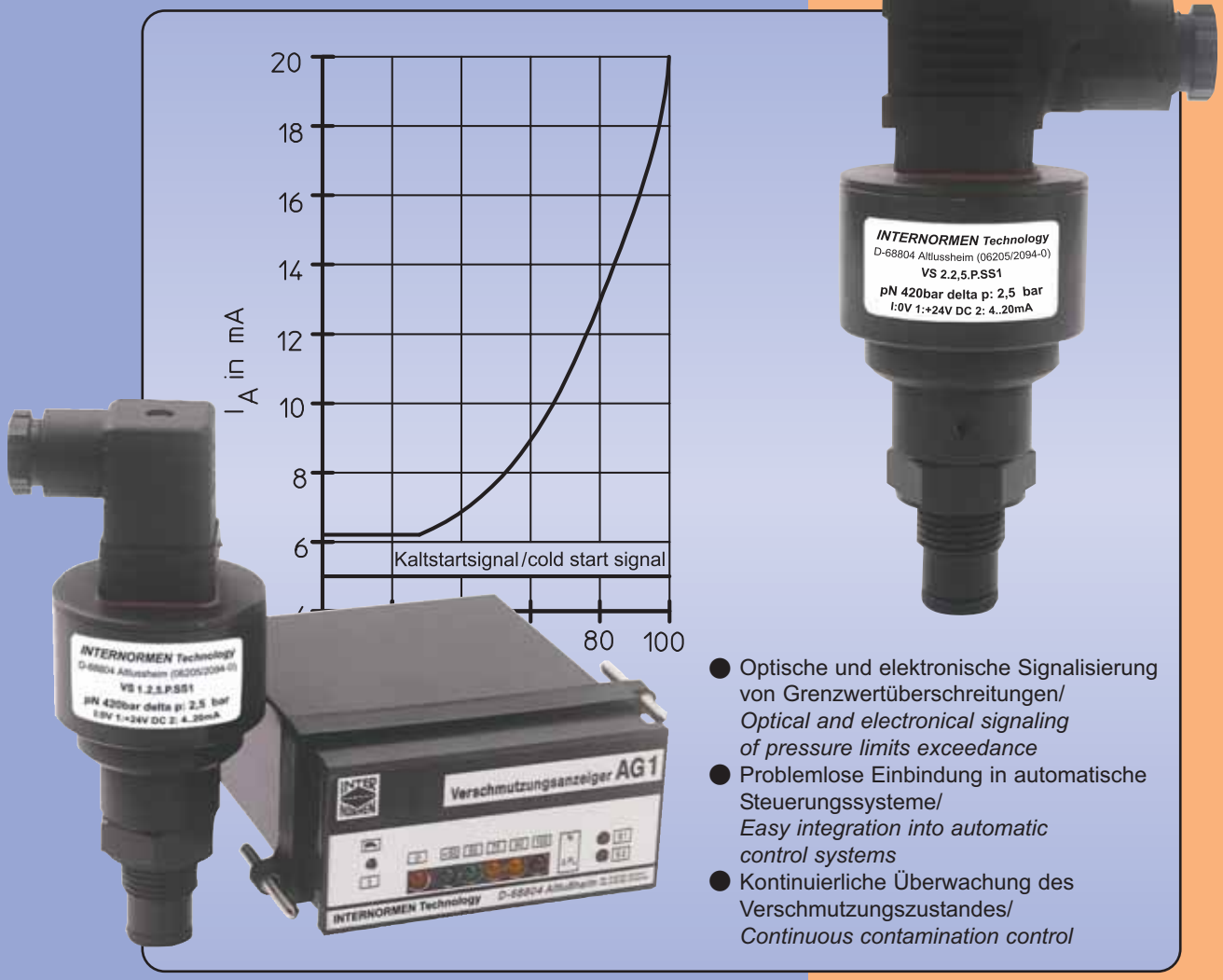
INTERNORMEN

Intelligente Filterüberwachung mit Elektronik

Intelligent Filter Control by Electronics



- Optische und elektronische Signalisierung von Grenzwertüberschreitungen/ *Optical and electronical signaling of pressure limits exceedance*
- Problemlose Einbindung in automatische Steuerungssysteme/ *Easy integration into automatic control systems*
- Kontinuierliche Überwachung des Verschmutzungszustandes/ *Continuous contamination control*

Elektronische Verschmutzungssensoren und Anzeigegeräte für Hydraulik- und Schmierölfilter

Electronical clogging sensors and indicating systems for hydraulic and lubricating oil filters

internormen electronics

INTER NORMEN

Elektronischer Verschmutzungssensor VS 1

- Kontinuierliche Druckdifferenzmessung
- Optimale Ausnutzung der Filterelemente durch hohe Messwertauflösung im Endwertbereich
- Früherkennung von erhöhtem Schmutzaufkommen in der Anlage
- Kaltstartanzeige bis ca. 25°C
- Druckspitzenunterdrückung
- Staub- und spritzwassergeschütztes Aluminium- oder Edelstahlgehäuse
- Störungsfreie Signalübertragung auch über grössere Entfernungen
- Austauschbar mit den Verschmutzungsanzeigen vom Typ AE und AO

Typenschlüssel (gleichzeitig Bestellbeispiel):

VS1.	1,5 .	P .	–.	GS	-.	E
1	2	3	4	5	6	7

1 VS 1 = elektron. Verschmutzungssensor mit analogem 4...20mA Ausgangssignal

2 1,5 = Druckdifferenzbereich
2,5 = Druckdifferenzbereich
5,0 = Druckdifferenzbereich
6,0 = Druckdifferenzbereich
} Δp-Nenn

3 Dichtungsmaterial:
P = Perbunan
V = Viton

4 VA = komplett Edelstahl
– = Standardausführung

5 GS = Leitungsdose DIN 43650-A, 3-polig

6 – = Standard

7 E = 0 Volt erdungsfrei
G = 0 Volt geerdet

Technische Daten:

Maximaler Betriebsdruck:	420 bar
Einschraubgewinde:	G 1/2
Versorgungsspannung:	24V DC ± 20%; Restwelligkeit: < 10%
Temperaturbereich:	-10°C...+100°C (Flüssigkeit) -10°C... +80°C (Elektronik)
Anschlussart:	nach DIN 43650-A 3-polig
Leitungsdose:	GDM 3011
Ausgangssignal:	4...20mA; max. Bürde: 400 Ohm
Messfehler:	± 5% v. EW. (Δp-Nenn)
Schutzart:	IP 65 nach DIN 40050

Electronical Clogging Sensor VS 1

- *Continuous pressure difference measuring*
- *Optimal utilization of filter elements based on high definition of the measure value within the final measure range*
- *Early identification of increased contamination inside the system*
- *Cold start indication up to approx. 25°C*
- *Suppression of pressure peaks*
- *Dust-proof and splash-proof aluminium or stainless steel housing*
- *Interference free signal transmission over longer distances*
- *Interchangeable with clogging indicators type AE and type AO*

Type code *(ordering example):*

VS1.	1,5 .	P .	–.	GS	-.	E
1	2	3	4	5	6	7

1 *VS 1 = electron. clogging sensor with analogous 4...20mA output signal*

2 *1,5 = pressure difference range*
2,5 = pressure difference range
5,0 = pressure difference range
6,0 = pressure difference range
} *Δp-nominal*

3 *Sealing material:*
P = buna N
V = viton

4 *VA = stainless steel*
– = standard version

5 *GS = line adapter DIN 43650-A, three channel plug*

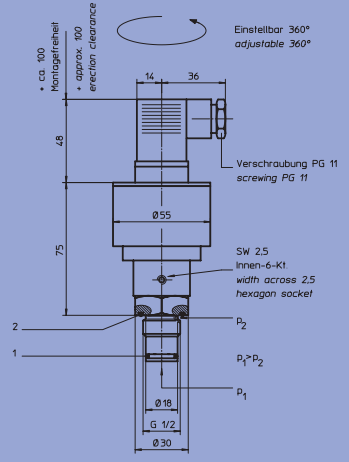
6 *– = standard*

7 *E = 0 volt free of grounding*
G = 0 volt grounded

Technical Data:

max. operating pressure:	*420 bar*
screw thread:	*G 1/2*
distribution voltage:	*24V DC ± 20%; residual ripple: < 10%*
temperature range:	*-10°C...+100°C (fluids) -10°C... +80°C (electronics)*
connection:	*according to DIN 43650-A three-channel plug*
line adapter:	*GDM 3011*
output signal:	*4...20mA; max. load: 400 Ohm*
measurement error:	*± 5% of the final value (Δp-nominal)*
protection system:	*IP 65 according to DIN 40050*

Verschmutzungssensoren/ *Clogging Sensors* VS 1 ... VS 2 ... GS



FILTERPRÜFUNG UND QUALITÄTS-KONTROLLE NACH ISO

FILTER TESTING AND QUALITY CONTROL ACCORDING TO ISO STANDARDS

Anzeigegerät AG 1 (Schalttafeleinbaugerät)

- Auswertegerät für VS 1 - Stromsignale
- Druckdifferenzanzeige mittels LED-Band
- 2 x Relaisschaltkontakte (75% und 100% des Δp-Nennbereiches)
- Schaltstellungsanzeige mittels LED
- Kaltstartanzeige mittels LED
- Einstellbare Druckspitzenunterdrückung

Technische Daten:

Versorgungsspannung:	24V DC± 20%; Restwelligkeit: < 10%
Relaiskontakte:	2 x Schliesser; U_{max}: 240V AC I_{max}: 0,5A P_{max}: 10 Watt
Temperaturbereich:	0...+70°C
Schutzart:	IP 53 (nur Frontseite mit Klarsichtschutzhaube)
Gehäuseabmeesungen:	nach DIN 43700 (siehe Abb.)

Typenschlüssel (gleichzeitig Bestellbeispiel):

AG 1
1

1 AG 1 = elektron. Anzeigegerät für Schalttafeleinbau mit Klarsichtschutzhaube, in Verbindung mit Verschmutzungssensor VS 1

Indicating System AG 1 (control panel set)

- *Evaluation set for current signals emitted by VS 1*
- *Pressure difference indication by LED-band*
- *2 x relay switching contacts (75% und 100% of the Δp-nominal range)*
- *Indication of switching position by LED*
- *Cold start indication by LED*
- *Adjustable pressure peak suppression*

Technical Data:

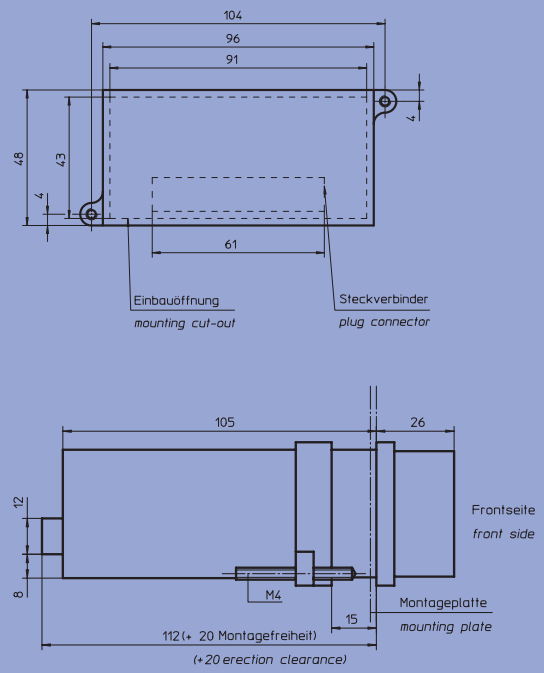
distribution voltage:	*24V DC± 20%; residual ripple*: < 10%
contacts:	*2 x contact maker; U_{max}: 240V AC* *I_{max}: 0,5A* *P_{max}: 10 Watt*
temperature range:	*0...70°C*
protection system:	*IP 53 (only front side with transparent protection cap)*
housing dimensions:	*according to DIN 43700 (see illustration)*

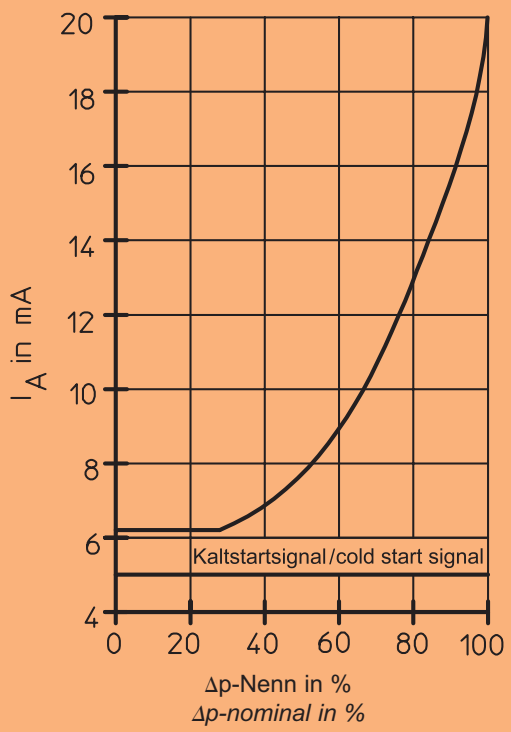
***Type code** (ordering example):*

AG 1
1

1 *AG 1 = electronic indicating system with transparent protection cap connected with clogging sensor VS 1 for mounting into the control panel*

Anzeigegerät AG 1/ *Indicating system AG 1*





Für detaillierte Angaben bitte das Massblatt 1617 für den VS 1/AG 1 und Nr. 1618 für den VS 2/SS 1 anfordern.

Moderne Labor- und Prüfeinrichtungen garantieren hohe Qualität.

Request data sheets no. 1617 for VS 1/AG 1 and no. 1618 for VS 2/SS 1 for further details.

Modern laboratories with up-to-date test equipment guarantee best quality.

Elektronischer Verschmutzungssensor VS 2

- Diskrete Überwachung des Filterverschmutzungszustandes mittels zweier PNP-Schaltausgänge (75% und 100% des Δp-Nennbereiches)
- Schaltstellungsanzeige mittels LED direkt am Sensor in Verbindung mit Signalstecker SS 1
- Kaltstartunterdrückung bis ca. 25°C
- Druckspitzenunterdrückung
- Austauschbar mit den Verschmutzungsanzeigen vom Typ AE und AO

Typenschlüssel (gleichzeitig Bestellbeispiel):

VS2 .	1,5 .	P .	–.	GS	-.	E
1	2	3	4	5	6	7

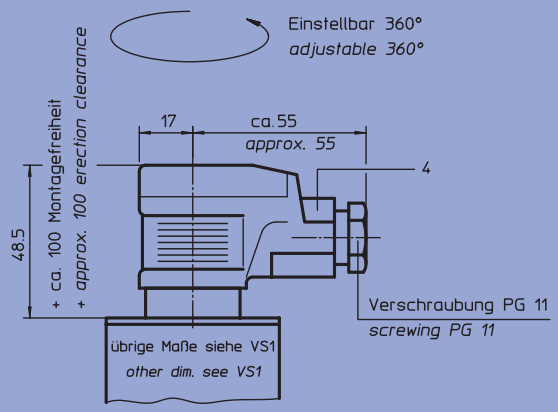
1 VS 2 = elektron. Verschmutzungssensor mit 2 x PNP-Schaltausgängen (75% und 100% des Δp-Nennbereiches)
5 GS = Gerätestecker (Steckertyp: GDM 3011)
SS 1 = Signalstecker zur Anzeige des aktuellen Schaltzustandes am VS 2 mittels 3 LED (Steckertyp: GDME 311)

2; 3; 4; 6; 7 siehe VS 1

Technische Daten:

Maximaler Betriebsdruck:	420 bar
Einschraubgewinde:	G 1/2
Versorgungsspannung:	24V DC± 20%
	Restwelligkeit: < 10%
Temperaturbereich:-	-10°C... +100°C (Flüssigkeit)
	-10°C...+ 80°C (Elektronik)
Anschlussart:	nach DIN 43650-A 3-polig
PNP Schaltkontakte:	Schliesser; $I_{max.}$ = 200mA bei 24V
Schutzart:	IP 65 nach DIN 40050

Signalstecker SS 1/ *Signal Plug SS 1*



Electronical Clogging Sensor VS 2

- *Discrete control of filter contamination by means of two PNP-switching contacts (75% and 100% of the Δp-nominal range)*
- *Indication of switching position by LED immediately at the sensor in connection with the signal plug SS 1*
- *Cold start suppression up to approx. 25°C*
- *Suppression of pressure peaks*
- *Interchangeable with clogging indicators type AE and type AO*

Type code *(ordering example):*

VS2 .	1,5 .	P .	–.	GS	-.	E
1	2	3	4	5	6	7

1 VS 2 = electronic clogging sensor with 2 x PNP-switching contacts (75% and 100% of the Δp-nominal range)
5 GS = connector plug (type of plug: GDM 3011)
SS 1 = signal plug to indicate the actual switching position at the VS 2 by 3 LED (plug type: GDME 311)

2; 3; 4; 6; 7 see VS 1

Technical Data:

max. operating pressure:	*420 bar*
screw thread:	*G 1/2*
distribution voltage:	*24V DC± 20%;*
	residual ripple: < 10%
temperature range:	*-10°C...+100°C (fluids)*
	-10°C...+ 80°C (electronics)
connection:	*according to DIN 43650-A three-channel plug*
PNP-switching contacts:	*contact-maker;*
	$I_{max.}$ *= 200mA with 24 V*
protection system:	*IP 65 according to DIN 40050*

Ersatzteile VS 1, VS 2 *Spare Parts VS 1, VS 2*

Teil item	Stück qty.	Benennung designation	Abmessung dimension	Artikel-Nr. article-no.	
1	1	O-ring	14x2	304342(NBR)	304722(FPM)
2	1	O-ring	22x2	304708(NBR)	304721(FPM)
3	1	Gerätestecker connector plug GS	DIN 43650-A	312492	
4	1	Signalstecker signal plug SS1	DIN 43650-A	310403	

Für detailliertere Angaben bitte das Massblatt-Nr.1617 für den VS 1/AG 1 und Nr.1618 für den VS 2/SS 1 anfordern.

Request data sheets no.1617 for VS 1/AG 1 and no.1618 for VS 2/SS 1 for further details.

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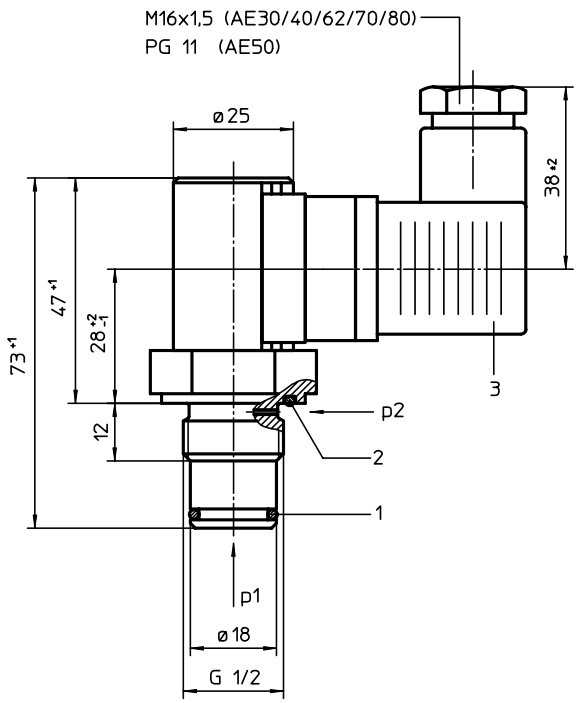
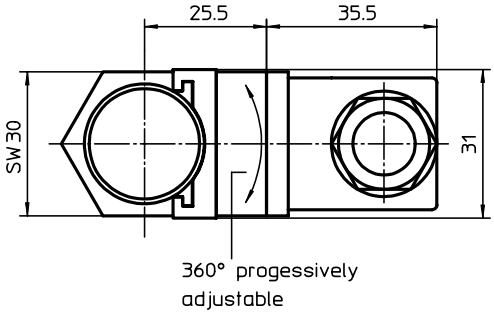
D/GB - 03/2008
316087

CLOGGING INDICATOR
Series AE (electrical / visual-electrical, thread execution)

Sheet No.
1615 J





1. Clogging indicator AE

1.1. Type index: (ordering example)

AE. 30. 1,5. P. -. -. -

1	2	3	4	5	6	7

1 series:
AE = clogging indicator, electrical / visual-electrical

2 version:
30-80 = see table below

3 indicator-pressure difference: Δp-nominal
1,5 = 1,5 bar
2,5 = 2,5 bar
5,0 = 5,0 bar

4 sealing material:
P = Nitrile (NBR)
V = Viton (FPM)

5 material:
- = standard
VA = stainless steel

6 execution:
- = standard

7 damper:
- = standard with hydraulic damper
1 = without hydraulic damper

2. Technical data:

temperature ranges	-10°C to +80°C
- operating temperature:	(for a short time +100°C)
- resistant to compression:	-30°C to +100°C
- survival temperature:	-40°C to +100°C
max. operating pressure:	420 bar
max. pressure difference:	160 bar

Clogging indicator AE with redundant switches, see data sheet-no. 40968-4

version	luminous indication	contact	voltage	max. rupturing capacity (resistive load)	max. switching current (resistive load)	connection protection
30	-	contact maker and contact breaker	..... 175V DC ..... 125V AC	3 VA 3 Watt	0,25 A 0,25 A	line adapter according to DIN 43650-designA/ISO4400
40	-		..... 175V DC ..... 230V AC	20 VA 10 Watt	1,0 A 0,5 A	
50	1x LED [1]		120V AC/DC	3 Watt/VA	0,025 A with 120V AC/DC	IP 65 according to DIN EN 60529
62	1x LED		110....230V AC/DC	20 Watt/VA	0,180 A with 110V AC/DC 0,090 A with 230V AC/DC	
70	2x LED		24V DC	3 VA	0,080 A with 24V DC	
80	2x LED		24V DC	20 VA	0,750 A with 24V DC	

[1] LED = light emitting diode

EDV 02/11

Changes of measures and design are subject to alteration!

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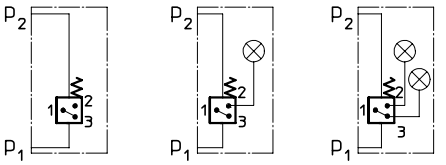
3. Spare parts:

item	qty.	designation	dimension	article-no.	type
1	1	O-ring	14 x 2	304342 (NBR)	versions 30 - 80
				304722 (FPM)	
2	1	O-ring	22 x 2	304708 (NBR)	
				304721 (FPM)	
3	1	line adapter	DIN 43650-designA/ISO4400	312492	versions 30 and 40
	1	line adapter with LED 24V		315012	versions 70 and 80
	1	line adapter with LED 120V		315010	version 50
	1	line adapter with LED 110...230V		332235	version 62

4. Symbols:

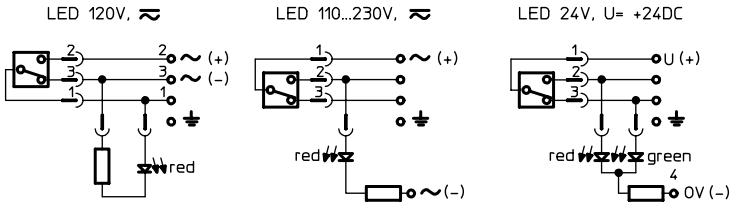
hydraulic-electrical symbol

versions 30 and 40 | versions 50 and 62 | versions 70 and 80



connection configuration for LED

version 50 | version 62 | versions 70 and 80



p_1 = measure connection supply
p_2 = measure connection output

5. Description:

The AE 30 and AE 40 pollution indicators are electrical differential pressure indicators.
The AE 50 to AE 80 pollution indicators are combined optical and electrical differential pressure indicators. These differential pressure indicators can be fitted to all pressure filters $p \leq 420$ bar for which there is a corresponding assignment on the relevant dimension drawing. As the degree of pollution of the filter element rises, so the difference between the entry pressure p_1 and the exit pressure p_2 of the filter increases. Depending on this pressure difference and irrespective of the operating pressure, in the pollution indicators

- AE 30 and AE 40, two electrical signals (contact maker/contact breaker) are triggered
- AE 50 and AE 62, two electrical signals (contact maker/contact breaker) are triggered and one optical signal is formed
- AE 70 and AE 80, two electrical signals (contact maker/contact breaker) are triggered and two optical signals are formed.

A metering piston subjected to the entry and exit pressure moves against a metering spring according to the pressure differential. Depending on the path a permanent magnet integrated in the metering piston activates a reed contact (electromagnetic switch) and triggers the electrical signal. The electrical and optical indication is effected as a digital signal at the given switching pressure. Versions 50 to 80 of the pollution indicator are fitted with additional LED displays. The optical LED signal becomes visible according to the selected version in the translucent cover plate of the line box on the pollution indicator.
In the pollution indicators

- AE 50 and AE 62, the red LED signal that the filter element needs to be changed
- AE 70 and AE 80, the green LED signal the normal operating state (filter element not yet polluted to an unacceptable level), while the red LED signal that the filter element needs to be changed.

6. Operating instructions:

Normally filters are supplied with mounted clogging indicator. When retrofitting - the filter is to be discharged of the operating pressure.

- dismantling the screw plug out of the bare hole which is foreseen for the clogging indicator
- screw in the clogging inidcator into the bare hole (starting torque 125 Nm)

It is necessary to make sure the availability and the right positioning of sealing parts

- O-ring 22 x 2 and
- O-ring 14 x 2

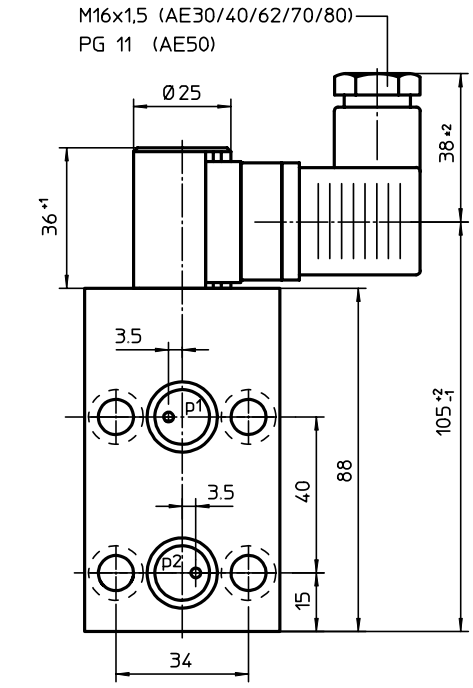
as well as a dirt-free mounting. The electrical contacts are to be connected according to the graphical symbol shown on the type plate of the clogging indicator.

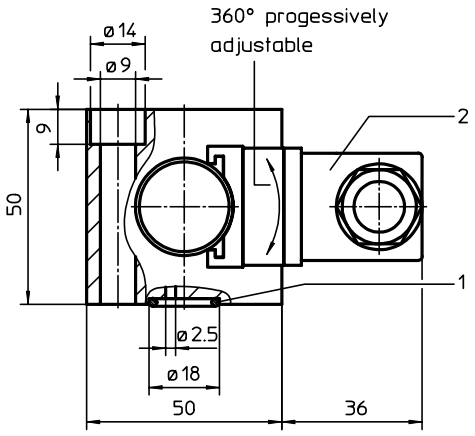
7. Maintenance:

The device is maintenance-free, however, note that no cleaning fluids and solvents get on the transparent cap of the optical indicator.

CLOGGING INDICATOR
Series AE (electrical / visual-electrical, block execution)

Sheet No.
1609 H





1. Clogging indicator AE

1.1. Type index: (ordering example)

AE. 30. 1,5. P. -. B. -

1	2	3	4	5	6	7

1 **series:**
AE = clogging indicator, electrical / visual-electrical

2 **version:**
30-80 = see table below

3 **indicator-pressure difference:** Δp-nominal
1,5 = 1,5 bar (0,15 MPa)
2,5 = 2,5 bar (0,25 MPa)
5,0 = 5,0 bar (0,50 MPa)

4 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

5 **material:** (block)
- = standard
VA = stainless steel

6 **execution**:
B = block execution

7 **damper:**
- = standard with hydraulic damper
1 = without hydraulic damper

2. Technical data:

temperature ranges
- operating temperature: -10°C to +80°C (for a short time +100°C)
- resistant to compression: -30°C to +100°C
- survival temperature: -40°C to +100°C
max. operating pressure: 420 bar (42 MPa)
max. pressure difference: 160 bar (16 MPa)

version	luminous indication	contact	voltage	max. rupturing capacity (resistive load)	max. switching current (resistive load)	connection protection
30	-	contact maker and contact breaker	..... 175V DC ..... 125V AC	3 VA 3 Watt	0,25 A 0,25 A	line adapter according to DIN 43650-designA/ISO4400
40	-		..... 175V DC ..... 230V AC	20 VA 10 Watt	1,0 A 0,5 A	
50	1x LED [1]		120V AC/DC	3 Watt/VA	0,025 A with 120V AC/DC	
62	1x LED		110....230V AC/DC	20 Watt/VA	0,180 A with 110V AC/DC 0,090 A with 230V AC/DC	IP 65 according to DIN EN 60529
70	2x LED		24V DC	3 VA	0,080 A with 24V DC	
80	2x LED		24V DC	20 VA	0,750 A with 24V DC	

[1] LED = light emitting diod

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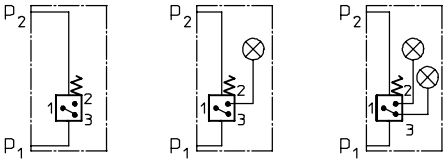
3. Spare parts:

item	qty.	designation	dimension	article-no.	type
1	2	O-ring	14 x 2	304342 (NBR)	AE version 30 - 80
				304722 (FPM)	
2	1	line adapter	DIN 43650-designA/ISO4400	312492	AE version 30 and 40
	1	line adapter with LED 24V		315012	AE version 70 and 80
	1	line adapter with LED 120V		315010	AE version 50
	1	line adapter with LED 110...230V		332235	AE version 62

4. Symbols:

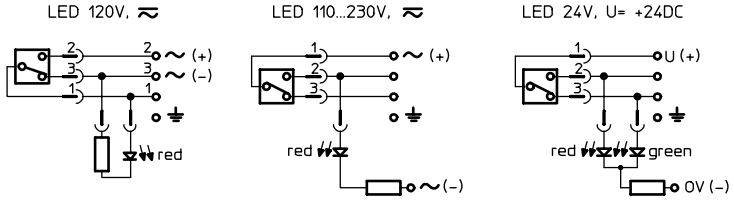
hydraulic-electrical symbol

versions 30 and 40 | versions 50 and 62 | versions 70 and 80



connection configuration for LED

version 50 | version 62 | versions 70 and 80



p_1 = measure connection supply
p_2 = measure connection output

5. Description:

The AE 30 and AE 40 pollution indicators are electrical differential pressure indicators.
The AE 50 to AE 80 pollution indicators are combined optical and electrical differential pressure indicators. These differential pressure indicators can be fitted to all pressure filters $p \leq 420$ bar (42 MPa) for which there is a corresponding assignment on the relevant dimension drawing. As the degree of pollution of the filter element rises, so the difference between the entry pressure p_1 and the exit pressure p_2 of the filter increases. Depending on this pressure difference and irrespective of the operating pressure, in the pollution indicators

- AE 30 and AE 40, two electrical signals (contact maker/contact breaker) are triggered
- AE 50 and AE 62, two electrical signals (contact maker/contact breaker) are triggered and one optical signal is formed
- AE 70 and AE 80, two electrical signals (contact maker/contact breaker) are triggered and two optical signals are formed.

A metering piston subjected to the entry and exit pressure moves against a metering spring according to the pressure differential. Depending on the path a permanent magnet integrated in the metering piston activates a reed contact (electromagnetic switch) and triggers the electrical signal. The electrical and optical indication is effected as a digital signal at the given switching pressure. Versions 50 to 80 of the pollution indicator are fitted with additional LED displays. The optical LED signal becomes visible according to the selected version in the translucent cover plate of the line box on the pollution indicator.
In the pollution indicators

- AE 50 and AE 62, the red LED signals that the filter element needs to be changed
- AE 70 and AE 80, the green LED signals the normal operating state (filter element not yet polluted to an unacceptable level), while the red LED signals that the filter element needs to be changed.

6. Operating instructions:

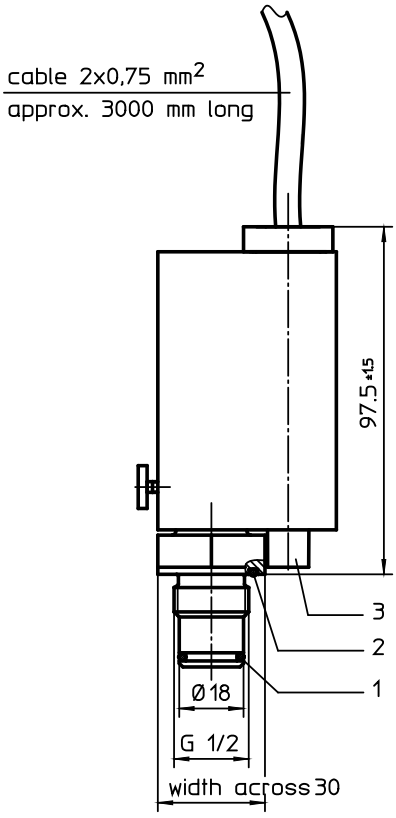
Normally filters are supplied with mounted clogging indicators.
It is necessary to make sure the availability and the right positioning of sealing parts O-ring 14 x 2 as well as a dirt-free mounting.
The electrical contacts are to be connected according to the graphical symbol shown on the type plate of the clogging indicator.

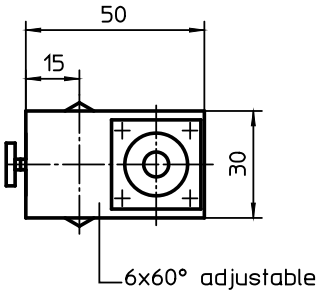
7. Maintenance:

The device is maintenance-free, however, note that no cleaning fluids and solvents get on the transparent cap of the optical indicator.

CLOGGING INDICATOR
Series AE (electrical) explosion-proof

Sheet No.
1625 C





1. Type index: (oredering example)

AE. 10. 1,5. P. VA. Ex

1	2	3	4	5	6

1 **series:**
AE = clogging indicator electrical

2 **contact:**
10 = contact maker

3 **indicator-pressure difference: Δp nominal**
1,5 = 1,5 bar; 2,5 = 2,5 bar; 5,0 = 5,0 bar

4 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

5 **material:**
VA = stainless steel

6 **execution:**
Ex = explosion-proof

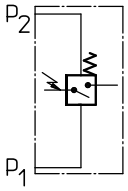
2. Technical data:

permissible fluid temperature:	-40°C to +80°C
permissible ambient temperature:	-40°C to +60°C
max. operating pressure:	420 bar
max. pressure difference:	160 bar

3. Electrical limit facts:

execution:	V DC/V AC 200/250 V, max. 30 Watt
switch contact:	contact maker
protection:	EEx m II T6

4. Symbol:



contact maker

5. Spare parts:

item	qty.	designation	dimension	article-no.
1	1	O-ring	14 x 2	304342 (NBR) 304722 (FPM)
2	1	O-ring	22 x 2	304708 (NBR) 304721 (FPM)
3	1	switch explosion-proof		315461

Changes of measures and design are subject to alteration!

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5. Description:

The AE 10 pollution indicator is an electrical differential pressure indicator.
The differential pressure indicator can be fitted to all pressure filters $p \leq 420$ bar for which there is a corresponding assignment on the relevant dimension drawing. As the degree of pollution of the filter element rises, so the difference between the entry pressure p_1 and the exit pressure p_2 of the filter increases. Depending on this pressure difference and irrespective of the operating pressure, an electrical signal on the AE 10 pollution indicator will be released.
A metering piston subjected to the entry and exit pressure moves against a metering spring according to the pressure differential. Depending on the path a permanent magnet integrated in the metering piston activates a reed contact (electromagnetic switch) and triggers the electrical signal. The electrical indication is effected as a digital signal at the given switching pressure.
At the AE 10 pollution indicator the closed condition signalizes that the change of the filter element is necessary.

6. Operating instructions:

Normally filters are supplied with mounted clogging indicator. When retrofitting - the filter is to be discharged of the operating pressure.
- dismantling the screw plug out of the bare hole which is foreseen for the clogging indicator
- screw in the clogging inidcator into the bare hole (starting torque 125 Nm).

It is necessary to make sure the availability and the right positioning of sealing parts
- O-ring 22 x 2 and
- O-ring 14 x 2

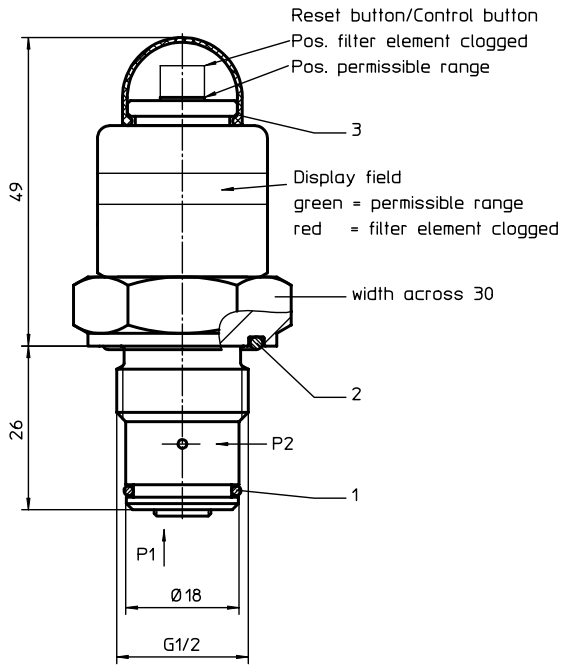
as well as a dirt-free mounting. The electrical contacts are to be connected according to the graphical symbol shown on the type plate of the clogging indicator.

7. Maintenance:

The device is maintenance-free, however, note that no cleaning fluids and solvents get on the housing and the cable of the switch.

CLOGGING INDICATOR
Series AOR, AOC (thread execution)

Sheet No.
1606 B



1. Clogging indicator AOR, AOC

1.1. Type index: (ordering example)

AOR. 1,5. P. -

1	2	3	4

1 **series:**
- AOR = clogging indicator, visual with reset function
- AOC = clogging indicator, visual with control function

2 **indicator-pressure difference:** Δp-nominal
- 1,5 = 1,5 bar
- 2,5 = 2,5 bar
- 5,0 = 5,0 bar

3 **sealing material:**
- P = Nitrile (NBR)
- V = Viton (FPM)

4 **material:**
- \- = standard
- VA = stainless steel

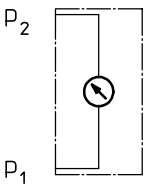
2. Technical data:

temperature ranges	
- operating temperature:	-10°C to +80°C (for a short time +100°C)
- resistant to compression:	-30°C to +100°C
- survival temperature:	-40°C to +100°C
max. operating pressure:	420 bar
max. pressure difference:	160 bar
reset condition:	< 60% Δp-nominal
control condition:	< 80% Δp-nominal
max. display error:	± 10%

3. Spare parts:

item	qty.	designation	dimension	article-no.
1	1	O-ring	15 x 1,5	315357 (NBR) 315427 (FPM)
2	1	O-ring	22 x 2	304708 (NBR) 304721 (FPM)
3	1	cap		315325 (PUR)

4. Symbol:



p_1 = measure connection supply
p_2 = measure connection output

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5. Description:

The clogging indicators with designation AOR and AOC are visual pressure difference indicators with a reset function or control function.
These pressure difference indicators can be built on to all pressure filters where $p \leq 420$ bar, and for which a corresponding allocation is provided on the respective dimension sheet. As the filter element becomes increasingly clogged, the difference between the inflow pressure p_1 and the outflow pressure p_2 of the filter will become larger. The display function is triggered at the switching pressure difference: this depends on the pressure difference just mentioned, and is independent of the operating pressure.
A measuring piston which is subject to the inflow and outflow pressure moves against a measuring spring in a manner which depends on the pressure difference. The tractive force between two magnets in the measuring piston and in the display cylinder changes according to the distance moved. At the switching point, the tractive force between the magnets and the force of the spring on the display cylinder are equally large, and are opposed.
In the range $\pm$ 10% of the set switching pressure, the spring on the display cylinder causes the display cylinder to move suddenly into the „filter element clogged“ display position. This means that the colour in the display field changes from green to red.
In the case of the clogging indicator AOR the display position „filter element clogged“ is fixed, and continues to be maintained even if the pressure difference returns to permissible values, dependent on the viscosity or the rate of flow. The fixed „element clogged“ display position can be canceled by operating the reset button, provided that the reset condition is satisfied.
In the case of the clogging indicator AOC the display position „filter element clogged“ is only fixed in the pressure difference range $\geq 30 \pm 10\%$ of the switching pressure difference. In the range $< 30 \pm 10\%$ of the switching pressure difference occurs a self-instructed shift down to the display position „permissible range“. In the range > 30%,< 80% of the switching pressure difference, the display position „filter element clogged“ can be restored for control functions with the control button.
The reset- or control button is located in a position where it is protected from dirt, underneath the elastic cap, item 3, and should be operated with slight manual pressure < 10N.
Note on functional behaviour:
The „filter element clogged“ display will also be triggered if the pressure difference exceeds the switching pressure difference for only a brief period (> 100ms).
The „filter element clogged“ display is triggered in the event of oscillatory or impulse excitations > 1g at values < 90% of the switching pressure difference.

6. Operating instructions:

Normally filters are supplied with mounted clogging indicator. When retrofitting - the filter is to be discharged of the operating pressure.
- dismantling the screw plug out of the bare hole which is foreseen for the clogging indicator
- screw in the clogging indicator into the bare hole (starting torque 125 Nm)

It is necessary to make sure the availability and the right positioning of sealing parts
- O-ring 22 x 2 and
- O-ring 15 x 1,5

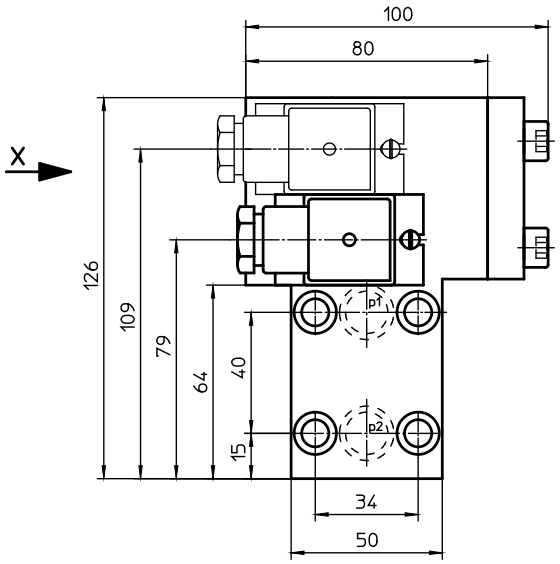
as well as a dirt-free mounting.

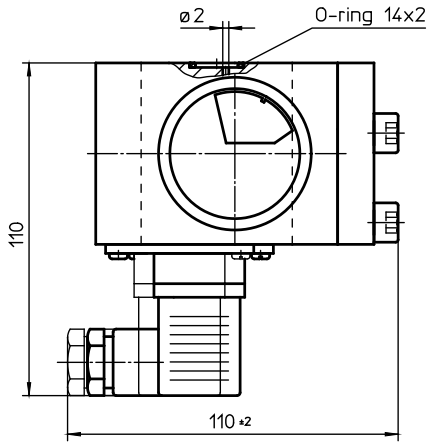
7. Maintenance:

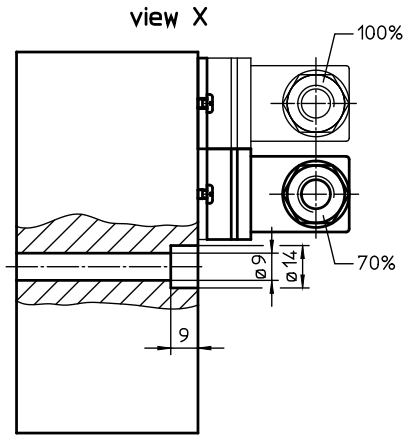
This device is maintenance-free; however, care should be taken to ensure that no cleaning agent or solvents reach the transparent hood and the elastic cap over the reset button or control button.

CLOGGING INDICATOR
Series OP (visual), OE (visual-electrical); block execution

Sheet No.
1628 F







1. Clogging indicator OP-OE

1.1. Type index: (ordering example)

OE1.	1,2.	B.	-.	P.	-.	1
1	2	3	4	5	6	7

1 **series:**
- OE1 = clogging indicator, visual-electrical with 1 contact maker and contact breaker with 70% switching pressure difference
- OE2 = clogging indicator, visual-electrical with 1 contact maker and contact breaker with 70% and 100% switching pressure difference
- OE3 = clogging indicator, visual-electrical with 2 contacts maker and contacts breaker with 70% switching pressure difference
- OP = clogging indicator, visual (according to series OE without switching contacts)

2 **indicator-pressure difference:** Δp-nominal
- 0,3 = 0,3 bar
- 0,8 = 0,8 bar
- 1,2 = 1,2 bar
- 2,5 = 2,5 bar
- 4,5 = 4,5 bar

3 **connection:**
- B = block execution with flange connection

4 **connection size:**
- \- = standard

5 **sealing material:**
- P = Nitrile (NBR)
- V = Viton (FPM)

6 **material:**
- \- = standard
- VA = stainless steel

7 **execution:**
- \- = without switching contacts (OP)
- 1 = execution 1 (electrical limit facts see item 3)
- 2 = execution 2 (electrical limit facts see item 3)

2. Technical data:

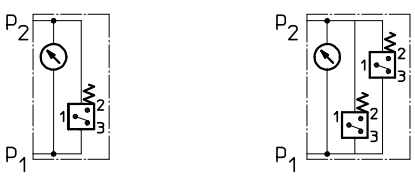
permissible operating pressure:	63 bar
permissible operating temperature:	80°C
permissible pressure difference:	$p_1 - p_2 \leq 16$ bar
indicator-pressure difference Δp:	0,3; 0,8; 1,2; 2,5; 4,5 bar

3. Electrical limit facts:

execution 1:	175V DC, 0,25A, 3 VA 125V AC, 0,25A, 3 Watt
execution 2:	1…150V, 1A, 20 Watt
switch-over contact:	contact maker and contact breaker
protection:	IP 65

4. Symbols:

execution OE1 | execution OE2, OE3



1+2 contact maker
1+3 contact breaker

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5. Functioning:

The clogging indicator OE is a combined visual and electrical pressure difference indicator.
This type of pressure difference indicator can be mounted on all pressure filters with operating pressure ≤ 63 bar, if the corresponding measuring ports on the filter housing are available.
With contamination of the filter element the difference between the supply pressure and the output pressure of the filter is increasing. Depending on this pressure difference but independent of the operating pressure, visual and electrical signals are released.
A pressure difference dependent measuring piston, charged with supply pressure and output pressure, moves towards a measuring spring.
Concerning the OE1 a permanent magnet which is integrated in the measuring piston switches - depending on the gauge length - a Reed-contact (magnetic-switch) and releases electrical control signals upon reaching a pressure difference of 70%.
The OE2 is equiped with two magnetic switches which release electrical control signals in a sequence of 70% and 100% of the switching pressure.
The OE3 is equiped with two magnetic switches triggering electrical control signals at 70% of the switching pressure (redudance of the switches).
The visual control signal is indicated by a blue-red scale which is connected to the magnetic measuring piston.
In the range of low pressure differences - depending on the gauge length of the measuring piston - the blue range of the scale appears first.
The indicated switching pressure difference is reached when the dividing line between the red and the blue range of the scale points to the marking on the display window.

6. Operating instruction:

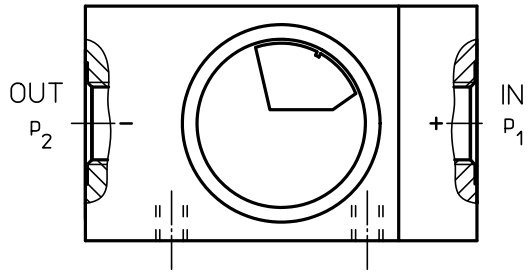
Note: Consider data and connecting conditions mentioned in items 2 to 4**.**

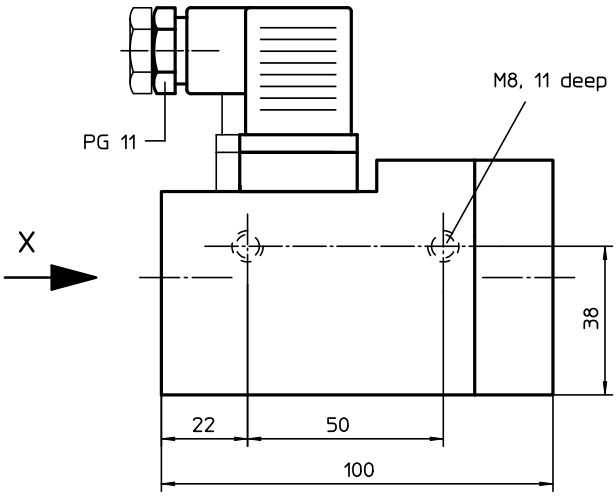
7. Maintenance:

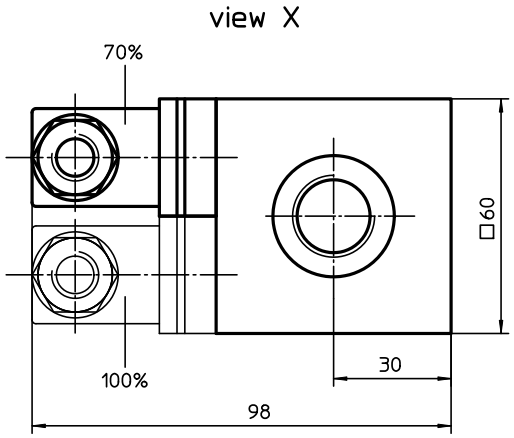
The device is maintenance-free. However, make sure that no solvents get in touch with the display window visual indicator nor with the piston-spring-system of the clogging indicator.

CLOGGING INDICATOR
Series OP (visual), OE (visual-electrical)

Sheet No.
1614 E







1. Clogging indicator OP-OE

1.1. Type index: (ordering example)

OE1.	1,2.	G.	1.	P.	-.	1
1	2	3	4	5	6	7

1 **series:**
- OE1 = clogging indicator, visual-electrical with 1 contact maker and contact breaker with 70% switching pressure difference
- OE2 = clogging indicator, visual-electrical with 1 contact maker and contact breaker with 70% and 100% switching pressure difference
- OP = clogging indicator, visual (according to series OE without switching contacts)

2 **indicator-pressure difference:** Δp-nominal
- 0,8 = 0,8 bar
- 1,2 = 1,2 bar
- 2,5 = 2,5 bar
- 4,5 = 4,5 bar

3 **connection:**
- G = thread connection according to DIN 3852, T2

4 **connection size:**
- 1 = G ¼
- 3 = G ½

5 **sealing material:**
- P = Nitrile (NBR)
- V = Viton (FPM)

6 **material:**
- - = standard
- VA = stainless steel

7 **execution:**
- - = without switching contacts (OP)
- 1 = execution 1 (electrical limit facts see item 3)
- 2 = execution 2 (electrical limit facts see item 3)

2. Technical data:

permissible operating pressure:	63 bar
permissible operating temperature:	80°C
permissible pressure difference:	$p_1 - p_2 \leq 16$ bar
indicator-pressure difference Δp:	0,8; 1,2; 2,5; 4,5 bar

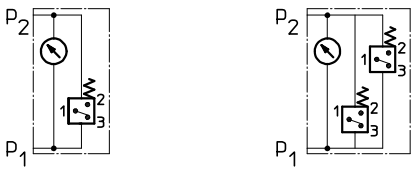
The electrical signal takes place at 70% of the switching pressure difference using the design with two contacts the second signal takes place at 100% of the switching pressure difference.

3. Electrical limit facts:

execution 1:	175V DC, 0,25A, 3 VA 125V AC, 0,25A, 3 Watt
execution 2:	1…150V, 1A, 20 Watt
switch-over contact:	contact maker and contact breaker
protection:	IP 65

4. Symbols:

execution OE1 | execution OE2



1+2 contact maker
1+3 contact breaker

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5. Functioning:

The clogging indicator OE is a combined visual and electrical pressure difference indicator.
This type of pressure difference indicator can be mounted on all pressure filters with operating pressure ≤ 63 bar, if the corresponding measuring ports on the filter housing are available.
With contamination of the filter element the difference between the supply pressure and the output pressure of the filter is increasing. Depending on this pressure difference but independent of the operating pressure, visual and electrical signals are released.
A pressure difference dependent measuring piston, charged with supply pressure and output pressure, moves towards a measuring spring.
Concerning the OE1 a permanent magnet which is integrated in the measuring piston switches - depending on the gauge length - a Reed-contact (magnetic-switch) and releases electrical control signals upon reaching a pressure difference of 70%.
The OE2 is equiped with two magnetic switches which release electrical control signals in a sequence of 70% and 100% of the switching pressure.
The visual control signal is indicated by a blue-red scale which is connected to the magnetic measuring piston.
In the range of low pressure differences - depending on the gauge length of the measuring piston - the blue range of the scale appears first.
The indicated switching pressure difference is reached when the dividing line between the red and the blue range of the scale points to the marking on the display window.

6. Operating instruction:

- Connection

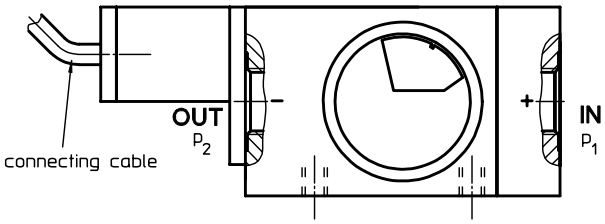
Upon connecting the indicator to the filter make sure that the connection marked „+“ is connected to the dirt oil side (IN) and the connection marked „-“ is connected to the clean oil side (OUT).
Note: Consider data and connecting conditions mentioned in items 2 to 4**.**

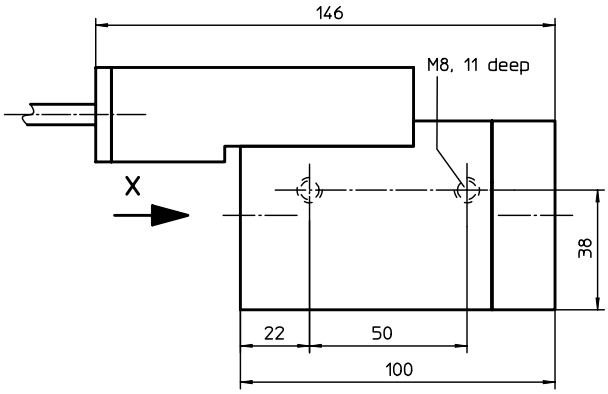
7. Maintenance:

The device is maintenance-free. However, make sure that no solvents get in touch with the display window visual indicator nor with the piston-spring-system of the clogging indicator.

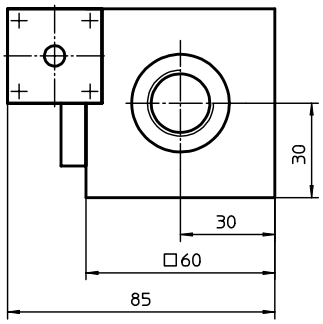
CLOGGING INDICATOR
OE (visual-electrical) explosion-proof

Sheet No.
1624 E





view X



1. Type index: (ordering example)

OE.	1,2.	G.	1.	P.	VA.	Ex
1	2	3	4	5	6	7

1 **series:**
OE = clogging indicator, visual-electrical with 1 contact maker with 70% switching pressure difference

2 **indicator-pressure difference:** Δp-nominal
0,3 = 0,3 bar
0,8 = 0,8 bar
1,2 = 1,2 bar
2,5 = 2,5 bar
4,5 = 4,5 bar

3 **connection:**
G = thread connection according to DIN 3852, T2

4 **connection size:**
1 = G ¼
3 = G ½

5 **sealing material:**
P = Nitile (NBR)
V = Viton (FPM)

6 **material:**
VA = stainless steel

7 **execution:**
Ex = explosion-proof

2. Technical data:

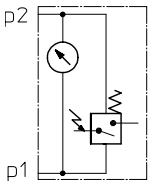
permissible operating pressure:	63 bar
permissible fluid temperature:	-40°C to +80°C
permissible ambient temperature:	-40°C to +60°C
permissible pressure difference:	$p_1 - p_2 \leq 16$ bar
indicator-pressure difference Δp:	0,3; 0,8; 1,2; 2,5; 4,5 bar

The electrical signal takes place at 70% of the switching pressure difference.

3. Electrical data switching contact:

contact design:	reed contact - normally open
max. switching voltage:	200V DC 250V AC peak - peak
max. switching current:	1 A
max. breaking capacity:	30 Watt
type of protection:	Ex II 2 GD EEx m II T6 KEMA 00ATEX 1112 IP 65
certificated	
operating temperature range:	-40°C to +60°C
connecting cable:	H05RN 2x 0,75 mm^2
length connecting cable:	max. 5 m

4. Symbol:



1+2 normally open

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5. Functioning:

The clogging indicator OE is a combined visual and electrical pressure difference indicator.
This type of pressure difference indicator can be mounted on all pressure filters with operating pressure ≤ 63 bar, if the corresponding measuring ports on the filter housing are available.
With contamination of the filter element the difference between the supply pressure and the output pressure of the filter is increasing. Depending on this pressure difference but independent of the operating pressure, visual and electrical signals are released.
The visual control signal is indicated by a blue-red scale which is connected to the magnetic measuring piston.
In the range of low pressure differences - depending on the gauge length of the measuring piston - the blue range of the scale appears first.
The indicated switching pressure difference is reached when the dividing line between the red and the blue range of the scale points to the marking on the display window.

6. Operating instruction:

- Connection

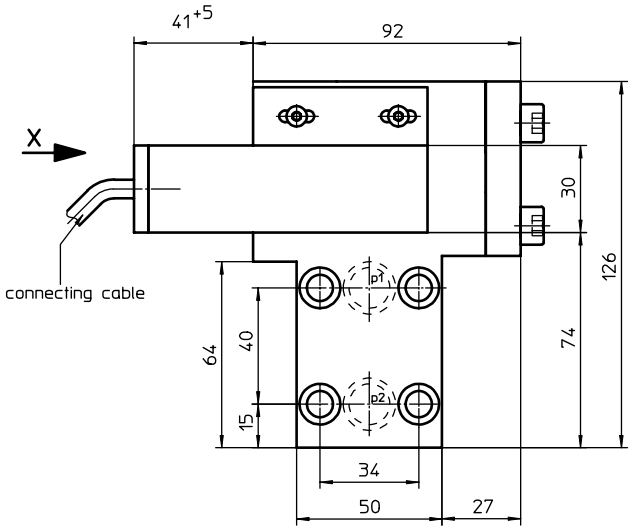
Upon connecting the indicator to the filter make sure that the connection marked „+“ is connected to the dirt oil side (IN) and the connection marked „-“ is connected to the clean oil side (OUT).
Note: Consider data and connecting conditions mentioned in items 2 to 4**.**

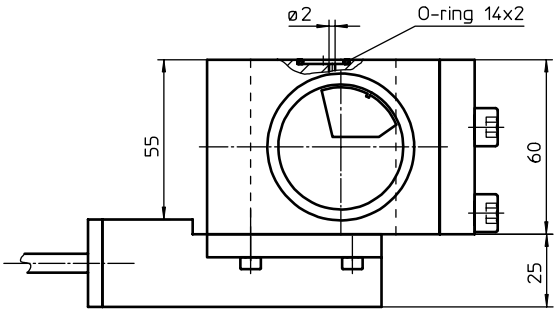
7. Maintenance:

The device is maintenance-free. However, make sure that no solvents get in touch with the display window visual indicator nor with the piston-spring-system of the clogging indicator.

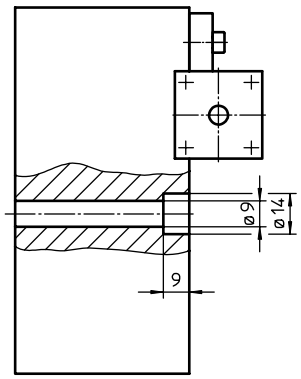
CLOGGING INDICATOR
Series OE (visual-electrical, block execution) explosion-proof

Sheet No.
1629 C





view X



1. Type index: (ordering example)

OE.	1,2.	B.	-.	P.	VA.	Ex
1	2	3	4	5	6	7

1 series:
OE = clogging indicator, visual-electrical with 1 contact maker with 70% switching pressure difference

2 indicator-pressure difference: Δp-nominal
0,8 = 0,8 bar
1,2 = 1,2 bar
2,5 = 2,5 bar
4,5 = 4,5 bar

3 connection:
B = block execution with flange connection

4 connection size:
- = standard

5 sealing material:
P = Nitile (NBR)
V = Viton (FPM)

6 material:
VA = stainless steel

7 execution:
Ex = explosion-proof

2. Technical data:

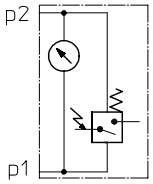
permissible operating pressure:	63 bar
permissible fluid temperature:	-40°C to +80°C
permissible ambient temperature:	-40°C to +60°C
permissible pressure difference:	$p_1 - p_2 \leq 16$ bar
indicator-pressure difference Δp:	0,8; 1,2; 2,5; 4,5 bar

The electrical signal takes place at 70% of the switching pressure difference.

3. Electrical data switching contact:

contact design:	reed contact - normally open
max. switching voltage:	200V DC 250V AC peak - peak
max. switching current:	1 A
max. breaking capacity:	30 Watt
type of protection:	Ex II 2 GD EEx m II T6 KEMA 00ATEX 1112 IP 65
certificated	
operating temperature range:	-40°C to +60°C
connecting cable:	H05RN 2x 0,75 mm^2
length connecting cable:	max. 5 m

4. Symbol:



1+2 normally open

EDV 10/08

Changes of measures and design are subject to alteration!

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5. Functioning:

The clogging indicator OE is a combined visual and electrical pressure difference indicator.
This type of pressure difference indicator can be mounted on all pressure filters with operating pressure ≤ 63 bar, if the corresponding measuring ports on the filter housing are available.
With contamination of the filter element the difference between the supply pressure and the output pressure of the filter is increasing. Depending on this pressure difference but independent of the operating pressure, visual and electrical signals are released.
The visual control signal is indicated by a blue-red scale which is connected to the magnetic measuring piston.
In the range of low pressure differences - depending on the gauge length of the measuring piston - the blue range of the scale appears first.
The indicated switching pressure difference is reached when the dividing line between the red and the blue range of the scale points to the marking on the display window.

6. Operating instruction:

- Connection

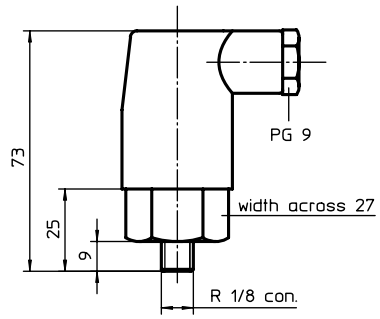
Upon connecting the indicator to the filter make sure that the display window visual indicator shows upwards.
Note: Consider data and connecting conditions mentioned in items 2 to 4.

7. Maintenance:

The device is maintenance-free. However, make sure that no solvents get in touch with the display window visual indicator nor with the piston-spring-system of the clogging indicator.

CLOGGING INDICATOR
Series E (electrical), O (visual)

Sheet No.
1616 J



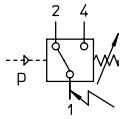
1. Type index: (ordering example)

E2.0,3.P = pressure switch, contact maker and contact breaker, switching pressure 0,3 bar
E2.1,5.P = pressure switch, contact maker and contact breaker, switching pressure 1,5 bar
E2.2,5.P = pressure switch, contact maker and contact breaker, switching pressure 2,5 bar

2. Technical data:

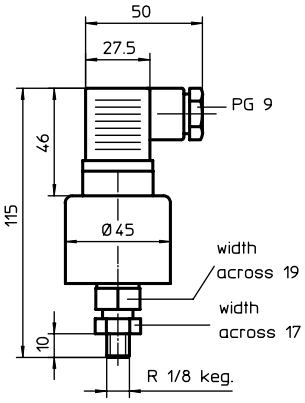
max. pressure to 100 bar	
temperature range:	-20°C to +80°C
max. contact load:	max.250 V ≅ /2A
sealing material:	nitrile (NBR)
protection:	IP 55

3. Symbol:



1 + 2 contact breaker
1 + 4 contact maker

The functions contact making, contact breaking or contact making and breaking refer to the increasing pressure.



1. Type index: (ordering example)

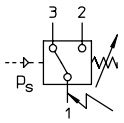
E4.-0,25.P = pressure switch, contact maker and contact breaker, switching pressure -0,25 bar

2. Technical data:

max. pressure to 80 bar	
temperature range:	-20°C to +80°C
max. contact load:	max.250 V ≅ /5A
sealing material:	nitrile (NBR)
protection:	IP 65

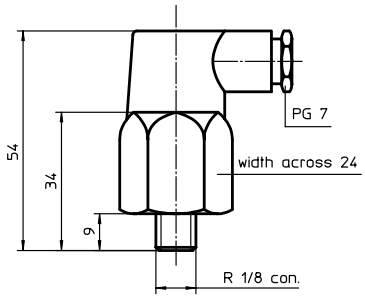
For the electrical connection please use only enclosed utensil socket. Other utensil sockets have a longer fixing screw which can destroy the inside micro switch.
The screw of an available utensil socket should have a max. thread reach of 28 mm. Do not forget the shaped packing by sticking up the utensil and tighten the fixing screw moderately.

3. Symbol:



1 + 2 contact maker
1 + 3 contact breaker

The functions contact making, contact breaking or contact making and breaking refer to the increasing pressure (0 bar → -0,25 bar) .



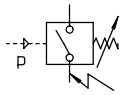
1. Type index: (ordering example)

E1.1,5.P = pressure switch, contact maker, switching pressure 1,5 bar
E1.2,5.P = pressure switch, contact maker, switching pressure 2,5 bar
E5.1,5.P = pressure switch, contact breaker, switching pressure 1,5 bar
E5.2,5.P = pressure switch, contact breaker, switching pressure 2,5 bar
E5.5,0.P = pressure switch, contact breaker, switching pressure 5,0 bar

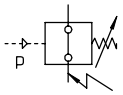
2. Technical data:

max. pressure to 300 bar	
temperature range:	-20°C to +100°C
max. contact load:	max.250 V ≅ /2A
sealing material:	nitrile (NBR)
protection:	IP 55

3. Symbol:

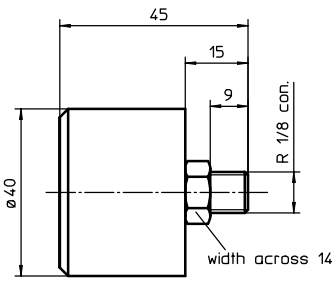


1 + 2 contact maker



1 + 2 contact breaker

The function contact making or contact breaking refer to the increasing pressure.



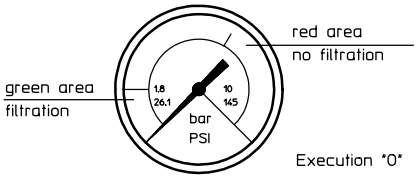
1. Type index: (ordering example)

O = clogging indicator visual, 0 to 10 bar
O1 = clogging indicator visual, + 0,6 bar to -1,0 bar

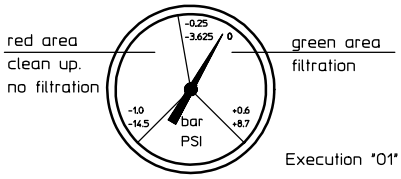
2. Technical data:

temperature range: -20°C to +80°C

3. Symbol:



Execution "0"



Execution "01"

EDV 03/10

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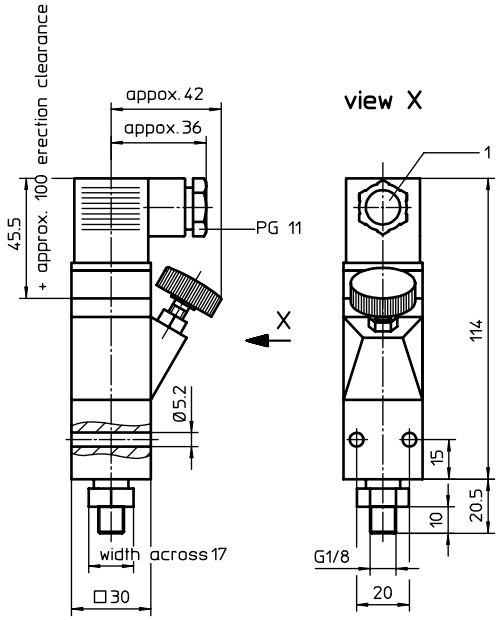
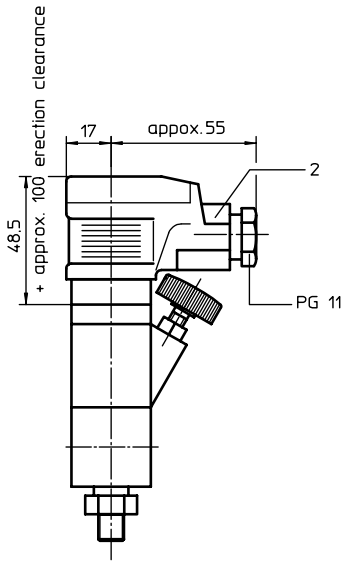
CLOGGING INDICATOR
Series E6

Sheet No.
1600 A

Clogging indicator
E6 ... GS



Clogging indicator
E6 ... SS3



1. Type index: (ordering example)

E 6. 1,5. GS

1	2	3

1 **series:**
E6 = pressure switch, contact maker and contact breaker

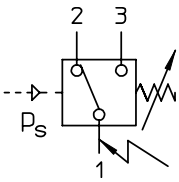
2 **switching pressure:**
1,5 = 1,5 bar
2,5 = 2,5 bar

3 **connection:**
GS = line adapter DIN 43650-A, three-channel plug
SS3 = line adapter DIN 43650-A, three-channel plug with LED indication of switching position

2. Technical data:

max. pressure:	to 100 bar
temperature range:	- 20 °C to + 80 °C
type of protection:	IP 55
connaction of cable:	PG 11
max. contact load with GS-line adapter:	U_{max} = 250 V AC
	I_{max} = 2 A
	P_{max} = 500 VA
distribution voltage with SS3-line adapter:	U_{max} = 24 V DC
max. contact load with SS3-line adapter:	I_{max} = 2 A
	P_{max} = 48 VA

3. Symbol:



1 + 3 contact maker
1 + 2 contact breaker

4. Spare parts:

item	qty.	designation	dimension	article-no.
1	1	GS	DIN 43650-A	312492
2	1	SS3	DIN 43650-A	312478

EDV 01/11

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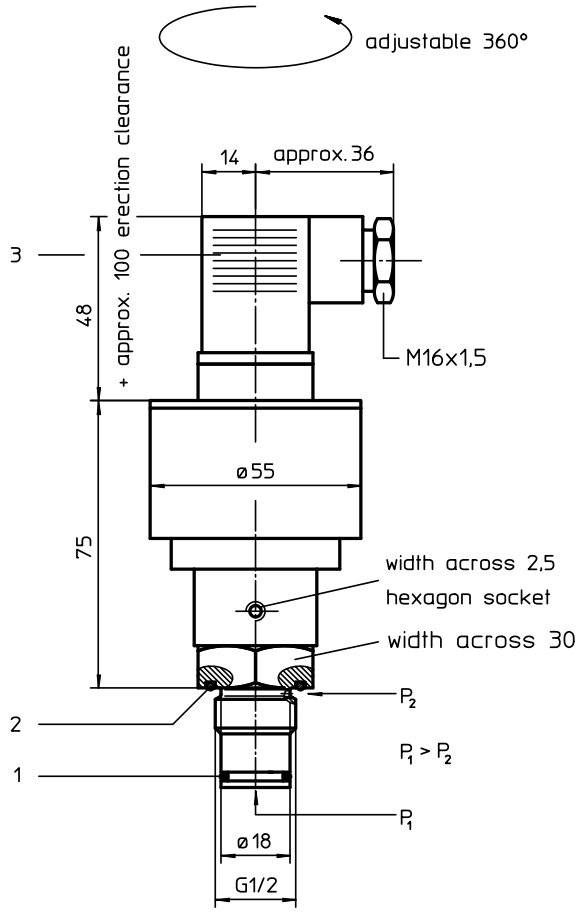
ELECTRONICAL CLOGGING SENSOR
Series VS1.49211 (thread execution)

Sheet No.
49211-4B
replaces sheet-no. 1617



1. Type index: (ordering example)

VS1. 49211. 1,5. P. -. GS. -. E

1	2	3	4	5	6	7	8

1 **series:**
VS1 = electronical clogging sensor with analog 6...20mA output signal

2 **execution** according to sheet-no. 49211

3 **indicator-pressure difference:** Δp-nominal
1,5 = 1,5 bar
2,5 = 2,5 bar
5,0 = 5,0 bar
6,0 = 6,0 bar

4 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

5 **material:**(screw-in-housing)
- = standard
VA = stainless steel

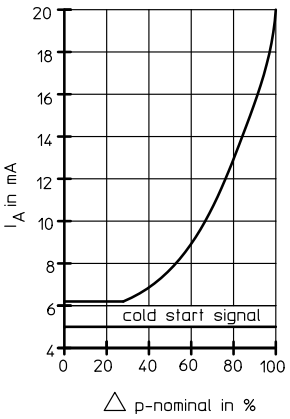
6 **connection:**
GS = line adapter acc. to DIN 43650-designA/ISO4400 three-channel plug

7 **execution:**
- = standard

8 **earthing:**
E = housing not connected with protective earth contact
G = housing connected with protective earth contact

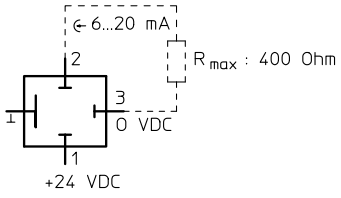
2. Technical data:

max. operating pressure:	420 bar
max. pressure difference:	160 bar
distribution voltage:	24 V DC ± 20% residual ripple: < 10%
temperature range:	- 10 °C to + 100 °C (fluid) - 10 °C to + 80 °C (electronics)
output signal:	6...20mA;
cold start:	5mA
max. load:	400 Ohm three-wire system current source
error of measurement:	± 5% v. Δp-nominal

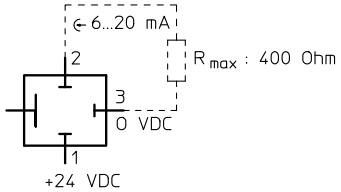


Connection configuration

housing earthed
(with earth screw)



housing
free of earthing



3. Functions:

- Continuous pressure difference measuring
- Cold start indication up to approx. + 25°C
- Suppression of pressure peaks
- Dust-proof and splash-proof aluminium or stainless steel housing
- Interference-free signal transmission over longer distances
- Optimal utilization of the filter elements based on a high definition of the measure value within the final measure range
- Interchangeable with clogging indicator type AE (INT)

4. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
2	1	O-ring	22 x 2	304708 (NBR)	304721 (FPM)
3	1	GS	DIN 43650-BauformA/ISO4400	312492	

EDV 02/11

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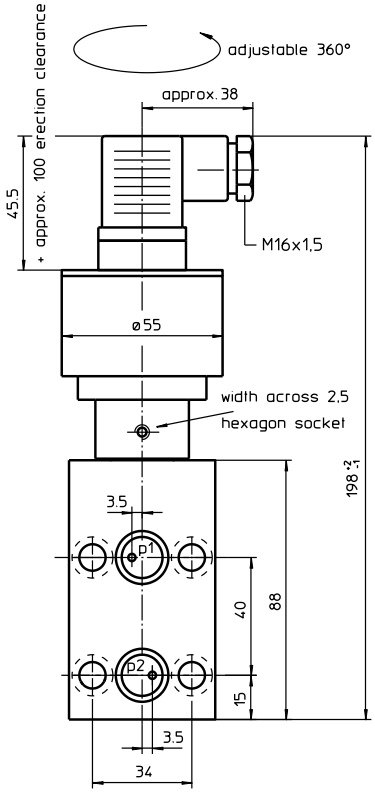
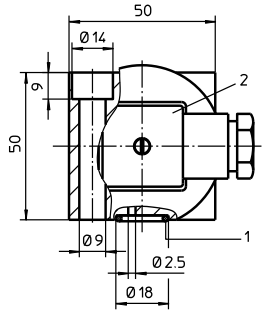
ELECTRONICAL CLOGGING SENSOR
Series VS1.43477 (block execution)

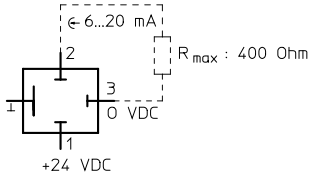
Sheet No.
43477-4C
replaces sheet-no. 1607



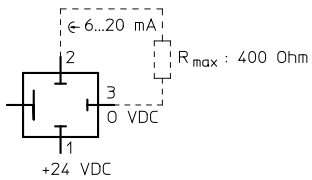


Connection configuration

housing earthed
(with earth screw)



housing
free of earthing



1. Type index: (ordering example)

VS1.	43477.	1,5.	P.	-.	GS.	B.	E
1	2	3	4	5	6	7	8

1 **series:**
VS1 = electronical clogging sensor with analog 6...20mA output signal

2 **execution** according to sheet-no: 43477

3 **indicator-pressure difference:** (Δ p-nominal)
1,5 = 1,5 bar
2,5 = 2,5 bar
5,0 = 5,0 bar
6,0 = 6,0 bar

4 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

5 **material:** (block)
- = Standard
VA = stainless steel

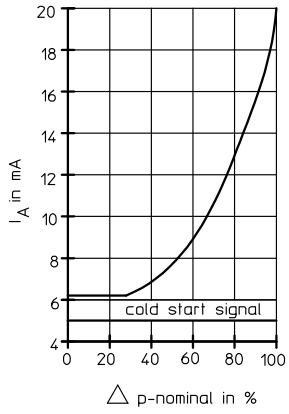
6 **connection:**
GS = line adapter acc. to DIN 43650-designA/ISO4400 three-channel plug

7 **execution:**
B = block execution

8 **earthing:**
E = housing not connected with protective earth contact
G = housing connected with protective earth contact

2. Technical data:

max. operating pressure:	420 bar
max. pressure difference:	160 bar
distribution voltage:	24 V DC ± 20% residual ripple: < 10%
temperature range:	- 10 °C to + 100 °C (fluid) - 10 °C to + 80 °C (electronics)
output signal:	6...20mA
cold start:	5mA
max. load:	400 Ohm three-wire system current source
error of measurement:	± 5% v. Δp-nominal



3. Functions:

- Continuous pressure difference measuring
- Cold start indication up to approx. + 25°C
- Suppression of pressure peaks
- Dust-proof and splash-proof aluminium or stainless steel housing
- Interference-free signal transmission over longer distances
- Optimal utilization of the filter elements based on a high definition of the measure value within the final measure range
- Interchangeable with clogging indicator type AE (INT)

4. Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
2	1	GS	DIN 43650-designA/ISO4400	312492	

Changes of measures and design are subject to alteration!

EDV 02/11

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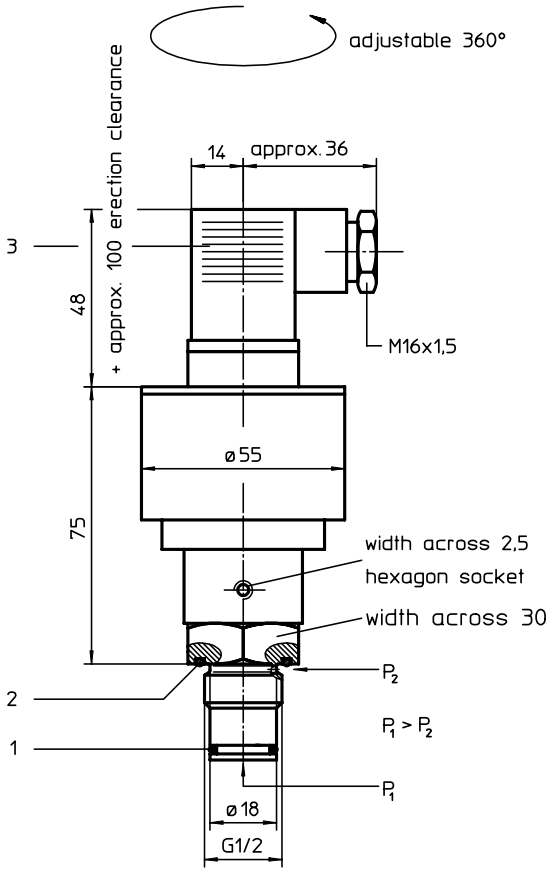
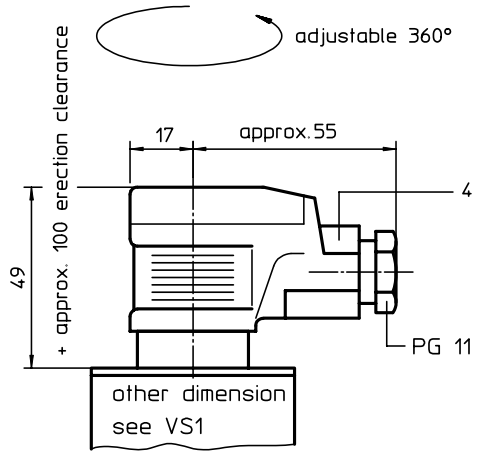
ELECTRONICAL CLOGGING SENSOR
Series VS 2 (thread execution)

Sheet No.
1618 E

Clogging sensor
VS 2 ... GS



Clogging sensor
VS 2 ... SS1



1. Type index: (ordering example)

VS 2.	1,5.	P.	-.	GS.	-.	E
1	2	3	4	5	6	7

1 **series:**
VS2 = electronical clogging sensor with 2x PNP-switching contacts (75% and 100% of the Δp-nominal range)

2 **indicator-pressure difference:** (Δ p-nominal)
1,5 = 1,5 bar
2,5 = 2,5 bar
5,0 = 5,0 bar
6,0 = 6,0 bar

3 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

4 **material:** (screw-in-housing)
- = standard
VA = stainless steel

5 **connection:**
GS = line adapter acc. to DIN 43650-designA/ISO4400, three-channel plug
SS1 = line adapter acc. to DIN 43650-designA/ISO4400, three-channel plug with LED switch-position indicator for VS 2

6 **execution:**
- = standard

7 **earthing:**
E = 0 volt free of earthing
G = 0 volt earthed

2. Technical data:

max. operating pressure:	420 bar
max. pressure difference:	160 bar
distribution voltage:	24 V DC ± 20% residual ripple: < 10%
temperature range:	- 10 °C to + 100 °C (fluid) - 10 °C to + 80 °C (electronics)
PNP-switching contacts:	conatct maker; I_{max} =200 mA with 24V
protection:	IP65 acc. to DIN EN 60529

3. Functions:

- Discrete control of the filter contamination by means of two PNP-switching contacts (75% and 100% of the Δp-nominal range)
- Indication of switching position by LED immediately at the sensor in connection with the signal plug SS1
- Cold start suppression up to approx. 25°C
- Suppression of pressure peaks
- Interchangeable with clogging indicator type AE (INT)

4. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	O-ring	14 ×2	304342 (NBR)	304722 (FPM)
2	1	O-ring	22 × 2	304708 (NBR)	304721 (FPM)
3	1	GS	DIN 43650-designA/ISO4400	312492	
4	1	SS1	DIN 43650-designA/ISO4400	310403	

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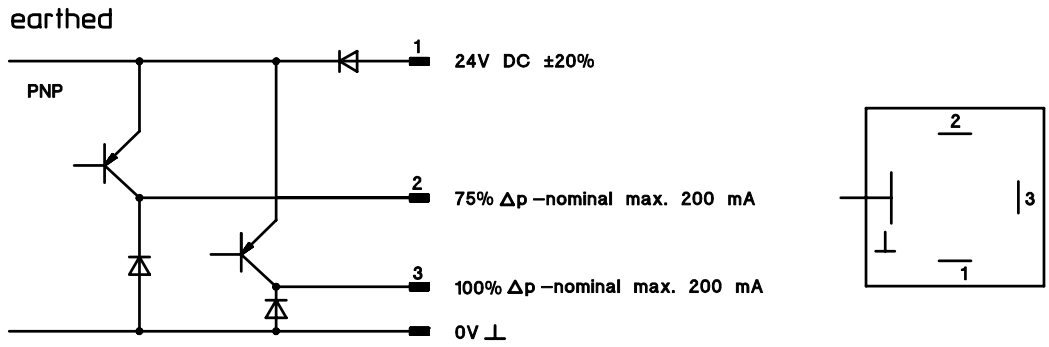
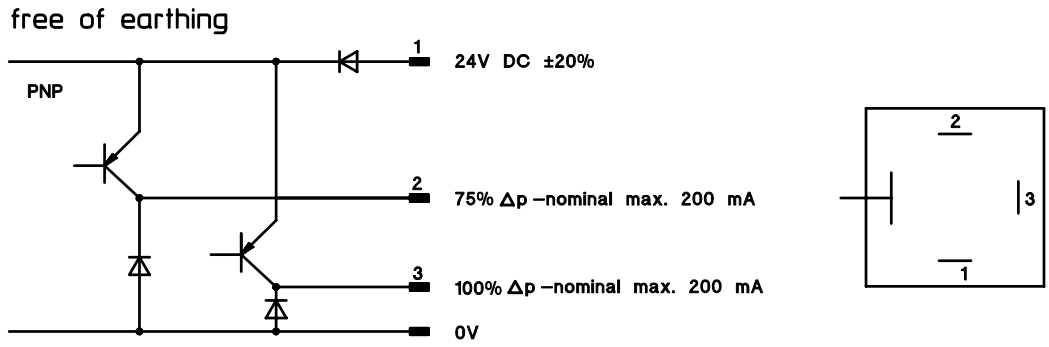
5. Connection configuration :

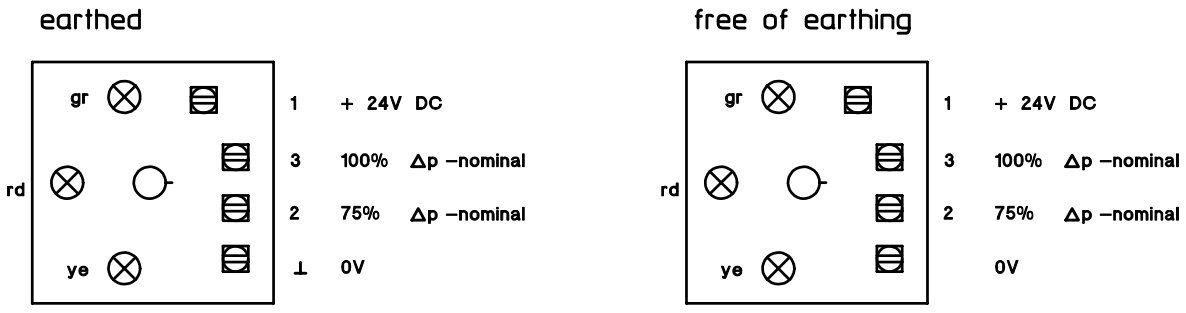
Connection configuration VS 2





Connection configuration SS 1

The signal plug SS1 is used to indicate the actual switching position at the VS2.

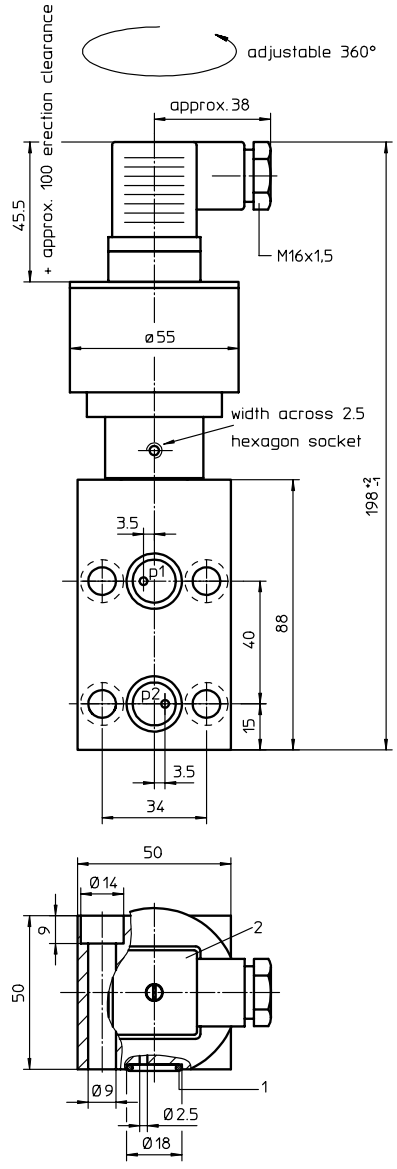


LED - green - on: operating pressure in on-position
LED - yellow - on: switching contact 75% Δp-nominal switched
LED - red - on: switching contact 100% Δp-nominal switched

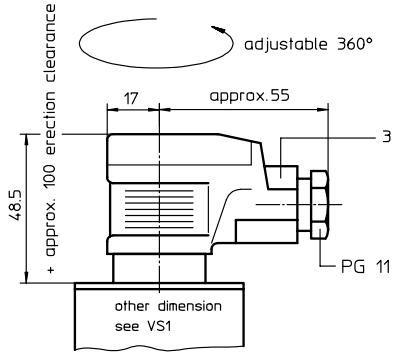
ELECTRONICAL CLOGGING SENSOR
Series VS 2 (block execution)

Sheet No.
1608 C

Clogging sensor VS 2 ... GS



Clogging sensor VS 2 ... SS1



1. Type index: (ordering example)

VS 2.	1,5.	P.	-.	GS.	B.	E
1	2	3	4	5	6	7

1 **series:**
VS2 = electronical clogging sensor with 2x PNP-switching contacts (75% and 100% of the Δp-nominal range)

2 **indicator-pressure difference:** (Δ p-nominal)
1,5 = 1,5 bar
2,5 = 2,5 bar
5,0 = 5,0 bar
6,0 = 6,0 bar

3 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

4 **material:** (block)
- = standard
VA = stainless steel

5 **connection:**
GS = line adapter acc. to DIN 43650-designA/ISO4400, three-channel plug
SS1 = line adapter acc. to DIN 43650-designA/ISO4400, three-channel plug with LED switch-position indicator for VS 2

6 **execution:**
B = block execution

7 **earthing:**
E = 0 volt free of earthing
G = 0 volt earthed

2. Technical data:

max. operating pressure:	420 bar
max. pressure difference:	160 bar
distribution voltage:	24 V DC ± 20% residual ripple: < 10%
temperature range:	- 10 °C to + 100 °C (fluid) - 10 °C to + 80 °C (electronics)
PNP-switching contacts:	contact maker; I_{max} =200 mA with 24V
protection:	IP65 acc. to DIN EN 60529

3. Functions:

- Discrete control of the filter contamination by means of two PNP-switching contacts (75% and 100% of the Δp-nominal range)
- Indication of switching position by LED immediately at the sensor in connection with the signal plug SS1
- Cold start suppression up to approx. 25°C
- Suppression of pressure peaks
- Interchangeable with clogging indicator type AE (INT)

4. Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	O-ring	14×2	304342 (NBR)	304722 (FPM)
2	1	GS	DIN 43650-designA/ISO4400	312492	
3	1	SS1	DIN 43650-designA/ISO4400	310403	

EDV 06/09

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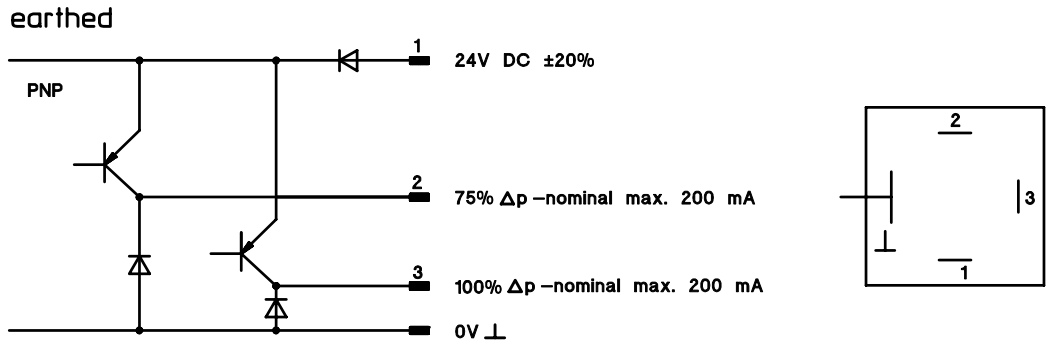
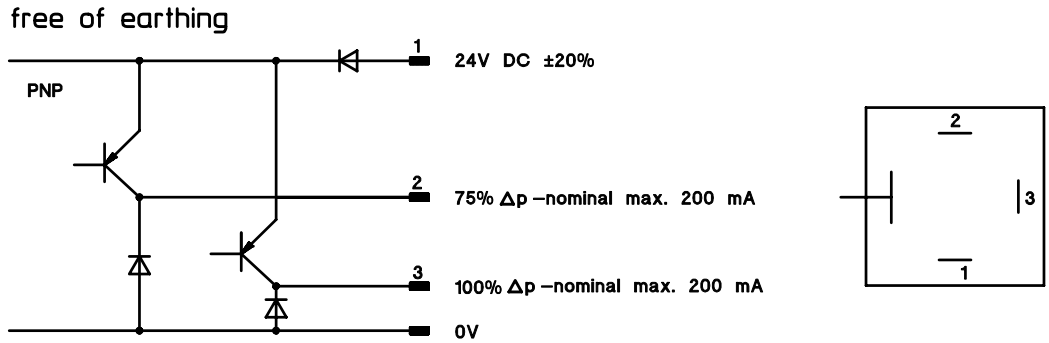
5. Connection configuration :

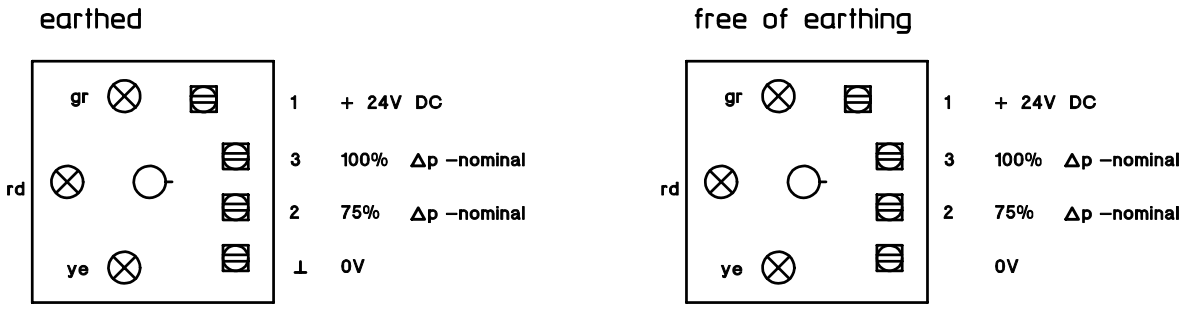
Connection configuration VS 2





Connection configuration SS 1

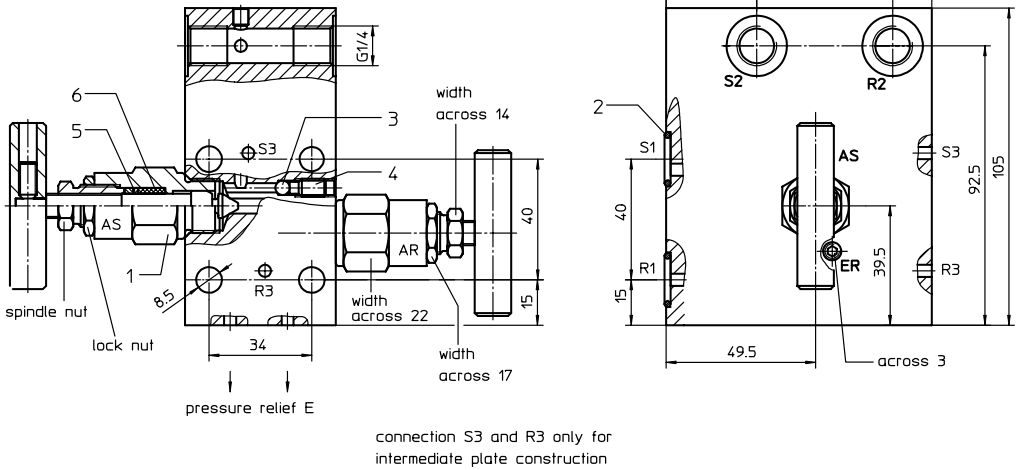
The signal plug SS1 is used to indicate the actual switching position at the VS2.



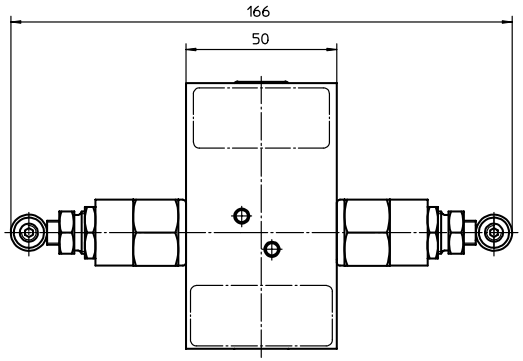
LED - green - on: operating pressure in on-position
LED - yellow - on: switching contact 75% Δp-nominal switched
LED - red - on: switching contact 100% Δp-nominal switched

SHUT-OFF VALVE
Series AV **DN 5** **PN 420 (210)**

Sheet No. **1655 D**



connection S3 and R3 only for intermediate plate construction



1. Type index: (ordering example)

AV. G. 1. -. P. VA

1	2	3	4	5	6

1 **series:**
AV = shut-off valve

2 **connection:**
G = thread according to DIN 3852, T2

3 **connection size:**
1 = G ¼

4 **execution:**
\- = cannot be interlinked (R3 and S3 not present)
Z = intermediate plate interlinking, interlinked with clogging indicators according to sheet-no. 1609, 1628, 1629 or clogging sensors according to sheet-no. 1607, 1608

5 **sealing material:**
P = Nitrile (NBR)
V = Viton (FPM)

6 **housing material:**
\- = standard (Al-design)
VA = stainless steel

2. Technical data:

temperature range:	-10°C to +80°C (for a short time +100°C)
max. operating pressure:	420 bar (cannot be interlinked)
	210 bar (interlinked, execution Z)
max.pressure difference:	160 bar

3. Spare parts:

item	qty.	designation	dimension	article-no.	
1	2	valve	AV.DN5	316344	
2	2	O-ring	14 x 2	304342 (NBR)	304722 (FPM)
3	2	ball	4.762	316377	
4	2	set screw	M6 x 12	316368	
5	2	annular becel		316371	
6	2	packing		316370	

weight: approx. 3,5 kg

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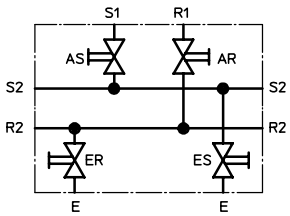
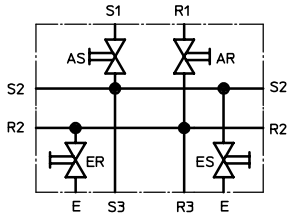
4. Symbols:

hydraulic symbol

cannot be interlinked



intermediate plate interlinking



5. Connection configuration:

description of the connection	equipment connection		pressure
S1	filter connection	dirt side	p_1
R1	filter connection	clean side	p_2
S2	indicator pipe connection	dirt side test connection	p_1
R2	indicator pipe connection	clean side	p_2
S3	indicator intermediate plate connection	dirt side	p_1
R3	indicator intermediate plate connection	clean side	p_2
E	relieving connections		p = 0

6. Description:

The AV shut-off valves, intendend for use in double filters with change-over valve,that can be serviced during operation and are fitted with a contamination indicator.
To check or exchange the contamination indicator, it is necessary to shut off the pressure feed pipes S1 (contaminated side) and R1 (clean side) between the contamination indicator. Valves AS and AR meet this shut-off requirement.
The pressure relief valves ES and ER are used to relieve the pressure of the connected contamination indicator. Pipes to the contamination indicator and external test equipment can be fitted to connections S2 and R2.

7. Operating instructions:

Depending on the order, filters are normally fitted with the shut-off valve before delivery. During retrofitting care must be exercised to ensure that the sealing elements, O-ring 14x2 are there and seated correctly and that there is cleanliness during installation.
Operation depends on the operational condition:

a) Operating condition of the shut-off valve

- Valves AS and AR open, p_1 and p_2 operate the contamination indicator.
- Valves ES and ER closed.

b) Cutting-off operation of the shut-off valve

- Close valves AS and AR, turn the valve spindle clockwise up to the stop, torque approx. 1-2 Nm, p_1 and p_2 remain active on the indicator.

- Open valves ES and ER 1 turn anti-clockwise on the M6x12 stud (tool, 3 mm Allen key), p_1 and p_2 on the indicator go to 0, which means that the existing pressure is released through relief connections E.

- Dismantling or exchange of the connected contamination indicator is possible.

c) Test operation

- Close valves AS and AR (see point 7b)

- Open valves ES and ER (see point 7b)

- Close valve ES (see point 7d)

- Connect external test equipment to S2

- Provide the test pressure to S2 and check the operation of the connected indicator. Test pressure = switching pressure differential.

- Release the test pressure, remove the external test equipment and seal connection S2.

d) Establishing the operating condition

After an exchange or test of the connected contamination indicator the operating condition must be re-established.

- Clock valves ES and ER, turn the M6x12 stud clockwise up to the end stop, tighten to approx. 0,5-1 Nm

- Open valves AS and AR (see point 7b)

Warning!

With valves AS and AR closed and valves ES and/or ER open, the valves AS and AR will not shut off if there is a constant leak at connections E.
The connected contamination indicator or the seal at connection S2 must not be dismantled if it is impossible to establish the closing operation of valves AS and AR.

8. Maintenance:

Maintenance of the shut-off valve should only be undertaken if the valve is de-pressurized.
Maintenance includes:

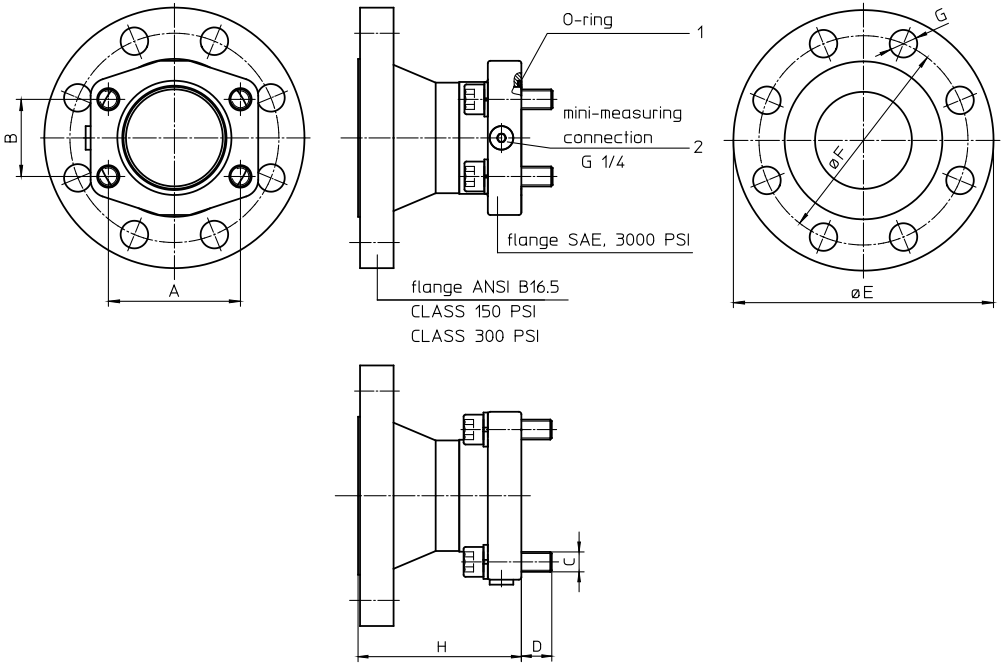
- Exchange of replacement parts, item 1 to 7.
- Tightening of the packing of the valve, item 1
- Exchange of complete shut-off valve

In the case of a leak on the valve spindle of the valve, item 1, first tighten the packing. Only if this does not stop the leak should the packing, item 6, and the annular bezel, item 5, or the whole valve, item 1 be replaced. The following torque pressures must be observed when tightening the packing or exchanging the packing and annular bezel or valve or exchanging the complete shut-off valve.

- Spindle nut	SW 14	10 to 20 Nm
- Lock nut	SW 17	40 Nm
- Valve	SW 22	80 Nm
- Screws	M8-8.8	28 Nm

ADAPTER, SAE to ANSI
Series ASA ¾“ - 5“

Sheet No. **1658 D**



1. Type index: (ordering example)

ASA.	FS.	A.	FA1.	A.	P.	ST
1	2	3	4	5	6	7

1 series:
ASA = adapter SAE to ANSI

2 connection 1:
FS = flange SAE-J518c, 3000 PSI

3 connection size 1:
4 = ¾“
5 = 1“
8 = 2“
9 = 2 ½ “
A = 3“
B = 4“
C = 5“

4 connection 2:
FA11 = ANSI-flange CLASS 150 PSI, sealing surface R_z = 160µm (not finer than 40µm)
FA12 = ANSI-flange CLASS 150 PSI, sealing surface R_z = 16µm
FA1 = ANSI-flange CLASS 300 PSI, sealing surface R_z = 160µm (not finer than 40µm)
FA2 = ANSI-flange CLASS 300 PSI, sealing surface R_z = 16µm

5 connection size 2:
4 = ¾“
5 = 1“
7 = 1 ½“
8 = 2“
9 = 2 ½ “
A = 3“
B = 4“
C = 5“

6 sealing material:
P = Nitrile (NBR)
V = Viton (FPM)

7 flange material:
ST = steel
VA = stainless steel

Dimensions:

connection	nominal pressure	A	B	C	D	O-ring	E	F	G	H
¾“	CLASS 150 PSI	47,6	22,2	M10	16	24,99 x 3,53	98,6	69,9	15,7	90
1“		52,4	26,2	M10	16	32,90 x 3,53	108,0	79,2	15,7	95
1 ½“ [1)]		77,8	42,9	M12	18	56,75 x 3,53	127,0	98,6	15,7	109
2“		77,8	42,9	M12	18	56,75 x 3,53	152,4	120,7	19,1	110
2 ½“		89,0	50,8	M12	18	69,45 x 3,53	177,8	139,7	19,1	122
3“		106,4	62,0	M16	25	85,32 x 3,53	190,5	152,4	19,1	122
4“		130,0	77,8	M16	25	110,72 x 3,53	228,6	190,5	19,1	128
5“		152,4	92,0	M16	25	136,12 x 3,53	254,0	215,9	22,4	141
¾“	CLASS 300 PSI	47,6	22,2	M10	16	24,99 x 3,53	117,3	52,5	19,0	95
1“		52,4	26,2	M10	16	32,90 x 3,53	123,9	88,9	19,0	102
1 ½“ [1)]		77,8	42,9	M12	18	56,75 x 3,53	155,4	114,3	22,3	115
2“		77,8	42,9	M12	18	56,75 x 3,53	165,1	127,0	19,0	117
2 ½“		89,0	50,8	M12	18	69,45 x 3,53	190,5	149,3	22,3	128
3“		106,4	62,0	M16	25	85,32 x 3,53	209,5	168,1	22,3	132
4“		130,0	77,8	M16	25	110,72 x 3,53	254,0	200,1	22,3	138
5“		152,4	92,0	M16	25	136,12 x 3,53	279,4	234,9	22,3	151

[1)] by counter flange SAE 2“ to 1 ½“ 3000 PSI

2. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	O-ring	24,99 x 3,53	304381 (NBR)	305784 (FPM)
	1	O-ring	32,90 x 3,53	318850 (NBR)	338231 (FPM)
	1	O-ring	56,75 x 3,53	306035 (NBR)	310264 (FPM)
	1	O-ring	69,45 x 3,53	305868 (NBR)	307357 (FPM)
	1	O-ring	85,32 x 3,53	305590 (NBR)	306308 (FPM)
	1	O-ring	110,72 x 3,53	316355 (NBR)	316356 (FPM)
	1	O-ring	136,12 x 3,53	320162 (NBR)	320163 (FPM)
2	1	screw plug	G ¼	305003 (ST)	306968 (VA)

Changes of measures and design are subject to alteration!

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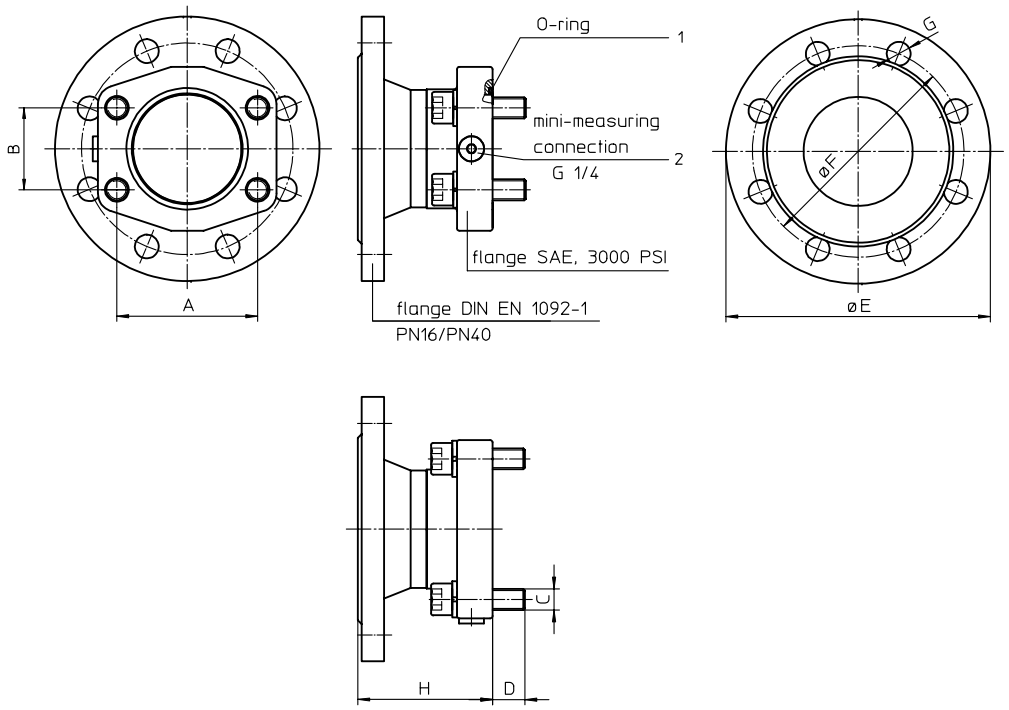
ADAPTER, SAE to DIN EN 1092-1
Series ASD DN 20-125

Sheet No.
1657 A



1. Type index: (ordering example)

ASD.	FS.	A.	FD1.	A.	P.	ST
1	2	3	4	5	6	7

1 series:
ASD = adapter SAE to DIN EN 1092-1

2 connection 1:
FS = flange SAE-J518c, 3000 PSI

3 connection size 1:
4 = ¾“
5 = 1“
8 = 2“
9 = 2 ½ “
A = 3“
B = 4“
C = 5“

4 connection 2:
FD1 = flange DIN EN 1092-1, design B1, PN16
FD2 = flange DIN EN 1092-1, design B2, PN16
FD41 = flange DIN EN 1092-1, design B1, PN40
FD42 = flange DIN EN 1092-1, design B2, PN40

5 connection size 2:
4 = DN 20
5 = DN 25
7 = DN 40
8 = DN 50
9 = DN 65
A = DN 80
B = DN 100
C = DN 125

6 sealing material:
P = Nitrile (NBR)
V = Viton (FPM)

7 flange material:
ST = steel
VA = stainless steel

Dimensions:

connection	nominal pressure	A	B	C	D	O-ring	E	F	G	H
DN 20	PN16	47,6	22,2	M10	16	24,99 x 3,53	105	75	14	77
DN 25		52,4	26,2	M10	16	32,90 x 3,53	115	85	14	78
DN 40 [1)]		77,8	42,9	M12	18	56,75 x 3,53	150	110	18	88
DN 50		77,8	42,9	M12	18	56,75 x 3,53	165	125	18	92
DN 65		89,0	50,8	M12	18	69,45 x 3,53	185	145	18	97
DN 80		106,4	62,0	M16	25	85,32 x 3,53	200	160	18	102
DN 100		130,0	77,8	M16	25	110,72 x 3,53	220	180	18	104
DN 125		152,4	92,0	M16	25	136,12 x 3,53	250	210	18	107
DN 20	PN40	47,6	22,2	M10	16	24,99 x 3,53	105	75	14	78
DN 25		52,4	26,2	M10	16	32,90 x 3,53	115	85	14	80
DN 40 [1)]		77,8	42,9	M12	18	56,75 x 3,53	150	110	18	91
DN 50		77,8	42,9	M12	18	56,75 x 3,53	165	125	18	95
DN 65		89,0	50,8	M12	18	69,45 x 3,53	185	145	18	104
DN 80		106,4	62,0	M16	25	85,32 x 3,53	200	160	18	110
DN 100		130,0	77,8	M16	25	110,72 x 3,53	235	190	22	117
DN 125		152,4	92,0	M16	25	136,12 x 3,53	270	220	26	120

[1)] by counter flange SAE 2“ to 1 ½“ 3000 PSI

2. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	O-ring	24,99 x 3,53	304381 (NBR)	305784 (FPM)
	1	O-ring	32,90 x 3,53	318850 (NBR)	338231 (FPM)
	1	O-ring	56,75 x 3,53	306035 (NBR)	310264 (FPM)
	1	O-ring	69,45 x 3,53	305868 (NBR)	307357 (FPM)
	1	O-ring	85,32 x 3,53	305590 (NBR)	306308 (FPM)
	1	O-ring	110,72 x 3,53	316355 (NBR)	316356 (FPM)
	1	O-ring	136,12 x 3,53	320162 (NBR)	320163 (FPM)
2	1	screw plug	G ¼	305003 (ST)	306968 (VA)

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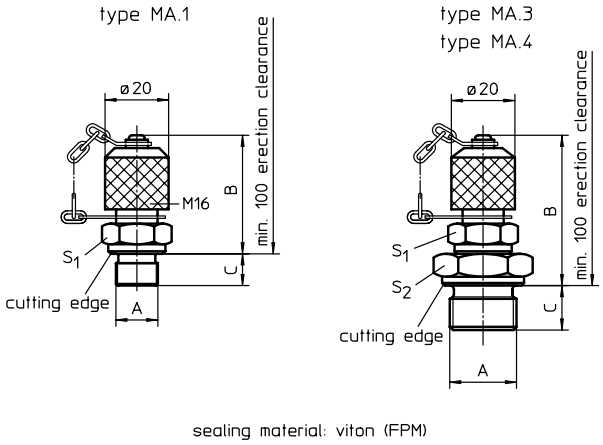
MEASURE- and BLEEDER-CONNECTIONS
DN 2 PN 500

Sheet No.
1650 D



sealing material: viton (FPM)

Mini-measuring connection

1. Type index: (ordering example)

MA. 1. ST

1	2	3

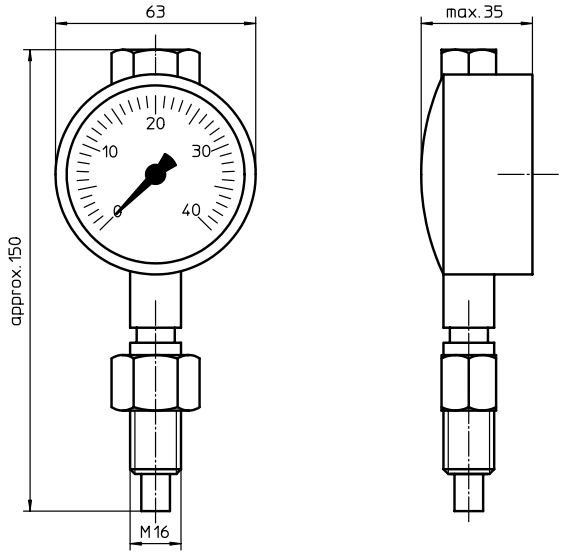
1 **series:**
MA = mini-measuring connection

2 **screwed plug:**
1 = G ¼ DIN 3852 T2, design B
3 = G ½ DIN 3852 T2, design B
4 = G ¾ DIN 3852 T2, design B

3 **material:**
ST = steel
VA = stainless steel

2. Dimensions:

type	A	B	C	S_1	S_2
MA.1	G ¼ A	36	10	19	-
MA.3	G ½ A	46	14	19	27
MA.4	G ¾ A	46	16	19	32



Pressure gauge

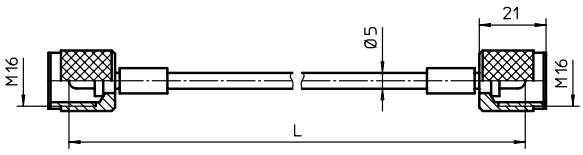
1. Type index: (ordering example)

Pressure gauge. 16

1	2

1 **series:**
pressure gauge

2 **pressure range:**
16 = 0 - 16 bar
40 = 0 - 40 bar
100 = 0 - 100 bar
250 = 0 - 250 bar
600 = 0 - 600 bar



High pressure hose

1. Type index: (ordering example)

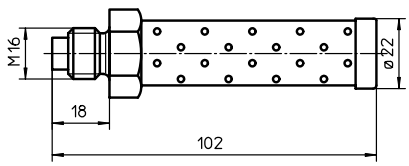
High pressure hose. M 16. 630

1	2	3

1 **series:**
high pressure hose

2 **threaded connection:** M 16

3 **length:**
630 = 630 mm
2000 = 2000 mm



Spray protection M 16

(ordering example)

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EDV 09/99

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Description:

The measuring-connection and spray protection are designed for filters up to PN 500 bar. The measuring-connection has to be mounted tightly to the foresen measure connection- and spray protection spots.
It is possible to conect the pressure gauge by means of high-pressure hose with the screw coupling M16 without interrupting operation.
The high-pressure hose is to be deaerated before the first measuring.
A capillary effect prevents a drain off of the operating fluid.
The spray protection must be used in connection with the high-pressure hose and is designed for filters with a capacity of approx. 10 l.

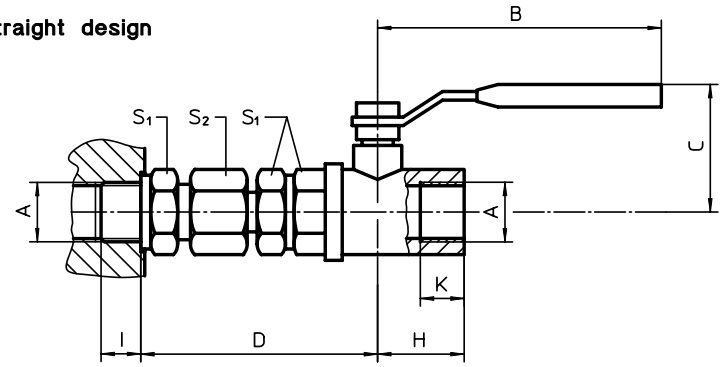
Note!

The deaeration is only to the executed with operating pressure up to max. 32 bar. A flow of approx. 1,2 l/min of operating fluid is given at a pressure of 32 bar and a viscosity of 25 mm²/s. It is inadmissible to connect the high-pressure hose with the measuring-connection without spray protection respectively without connected pressure gauge. (risk of injury)

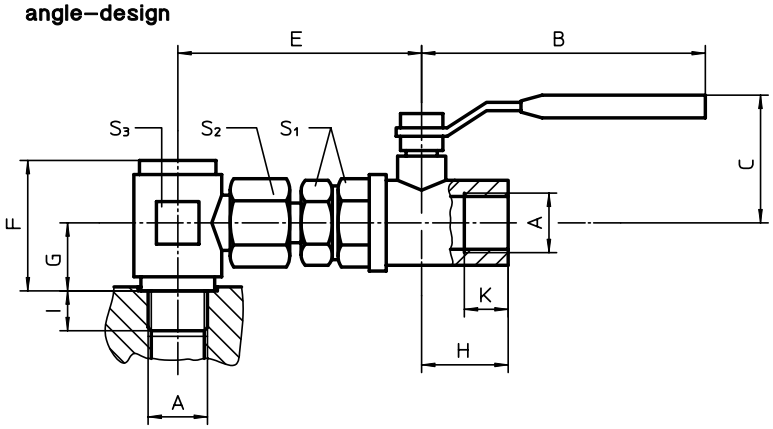
EVACUATION- and BLEEDER-CONNECTIONS
Series EE DN 15 - 40

Sheet No.
1651 C

straight design



angle–design



1. Type index: (ordering example)

EE. 3. W. St.

1	2	3	4

1 **series:**
EE = evacuation- and bleeder-connection

2 **connection size:**
3 = G ½ A
5 = G 1 A
7 = G 1 ½ A

3 **design:**
G = straight design
W = angle design

4 **material:**
St = steel
VA = stainless steel

2. Dimensions:

connection size A	B	C	D	E	F	G	H	I	K	S_1	S_2	S_3
G ½ A	100	45	86	90	42	21	30,5	14	15,5	27	27	32
G 1 A	120	57	98	112	64	32	45,5	18	21,0	41	41	50
G 1 ½ A	160	82	124	145	85	42	58,5	22	24,5	55	60	70

3. Technical data:

temperature range:	-40°C to +80°C (short in time +100°C)
max. operating pressure:	32 bar
installation position:	any
fluid:	mineral oils, lubricating oils, synthetic hydraulic fluids, emulsions

4. Description:

When maintaining and servicing filters the drain-plugs and air-bleed connections are used to drain and to bleed the fluid inside the filter. This applies to filters with a operating pressure of PN ≤ 32 bar. The connection size is to be chosen according to the corresponding connections of the filter housing.
During operation of the filter, the connection has to remain closed.

Changes of measures and design are subject to alteration!

EDV 09/99

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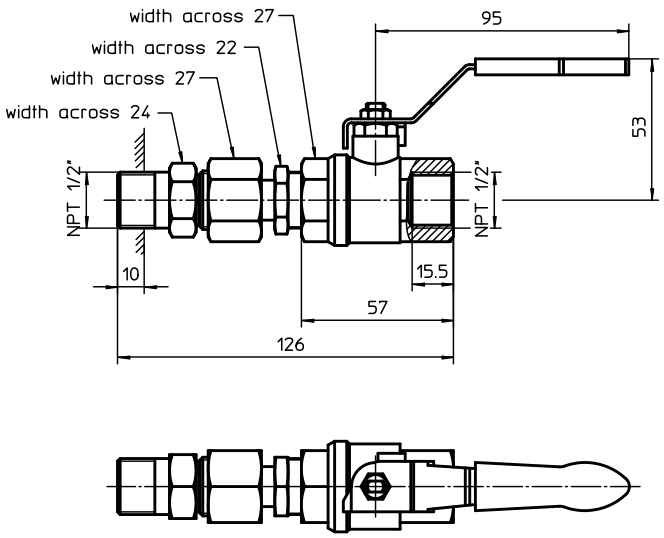
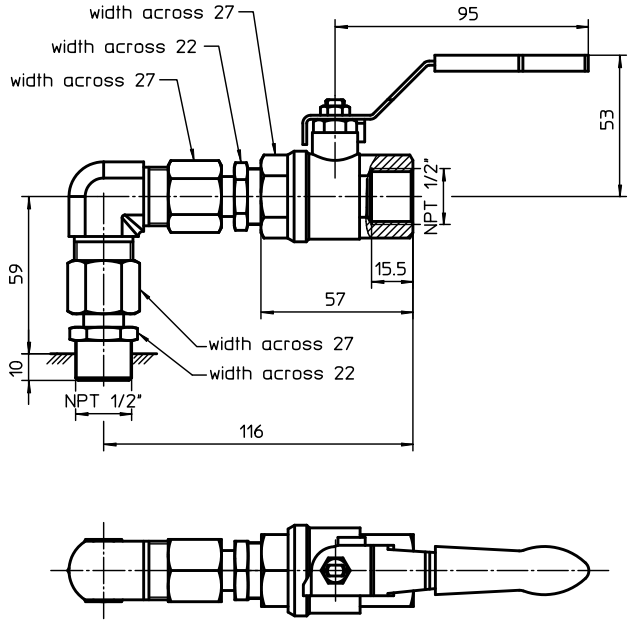
EVACUATION- and BLEEDER-CONNECTIONS
Series EE DN 15 PN 63 for DA/EDA filter

Sheet No.
1659 A

straight design



angle-design



1. Type index: (ordering example

EE. 63. NPT. 3. W. VA

1	2	3	4	5	6

1 **series:**
EE = evacuation- and bleeder-connection

2 **pressure range:**
63 = 63 bar

3 **connection:**
NPT = thread acc. to ANSI B1.20.1

4 **connection size:**
3 = ½“

5 **design:**
G = straight design
W = angle design

6 **material:**
VA = stainless steel

2. Technical data:

temperature range:	-40°C bis +80°C (short in time +100°C)
max. operating pressure:	63 bar
installation position:	any
fluid:	mineral oils, lubricating oils, synthetic hydraulic fluids, emulsions

3. Description:

When maintaining and servicing filters the drain-plugs and air-bleed connections are used to drain and to bleed the fluid inside the filter. This applies to filters with a operating pressure of PN ≤ 63 bar.
During operation of the filter, the connection has to remain closed.

EDV 05/11

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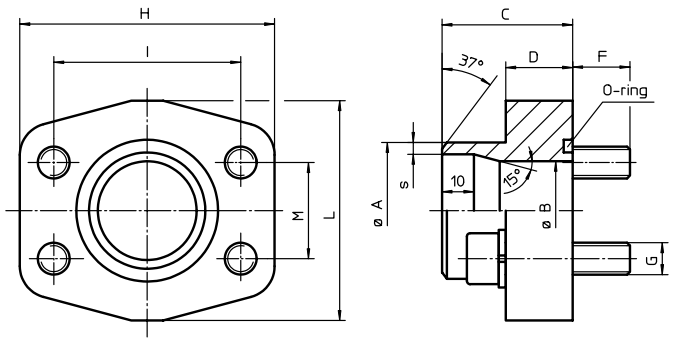
MATING FLANGES
Master Gauge for Holes SAE J 518 c 3000 PSI

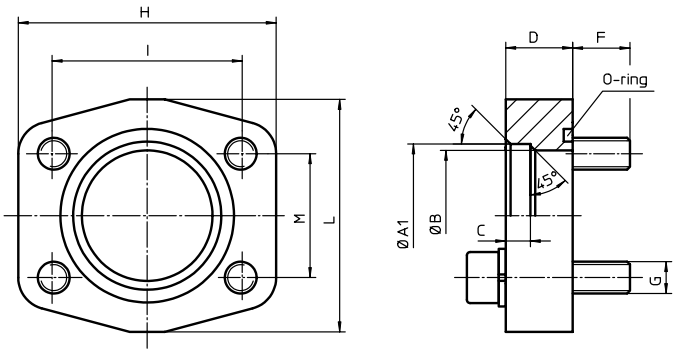
Sheet No.
1652 F

Flanges are offered as complete unit, i. e. including cylinder screws, spring ring and O-ring and are used to connect the filter to the pipe-system.

welded flange socket



welded flange



Type index: (ordering example)

BFS.	8.	A.	60,3 x 2,9.	St.	P.	3000
1	2	3	4	5	6	7

1 series:
BFS = flange with master gauge for holes according to SAE-J518c

2 connection size:
6 = 1 ¼“
7 = 1 ½“
8 = 2“
9 = 2 ½“
A = 3“
A1 = 3 ½“
B = 4“
C = 5“

3 design:
A = welded flange socket
E = welded flange

4 size of connection pipes of the flange:
outside diameter A of pipe x pipe-wall thickness s (see table below)

5 flange material:
St = steel (C 22, St 52-3)
VA = stainless steel (X 5 Cr Ni 1810)

6 sealing material:
P = Nitrile (NBR)
V = Viton (FPM)

7 master gauge for holes according to SAE-
3000 = 3000 PSI

welded flange: design A

SAE-connection 3000 PSI	pipe-dimension A x s	PN	B	C	D	F	G	H	I	L	M	O-ring	sheet-no.
1 ¼“	33,7 x 2,6 42,4 x 2,6	63	25 31	41	21	18	M 10	80	58,7	69	30,2	37,69 x 3,53	21111-3 21111-3
1 ½“	48,3 x 2,6	63	38	44	25	18	M 12	94	70,0	77	35,7	47,22 x 3,53	21112-3
2“	48,3 x 3,7 48,3 x 2,6 60,3 x 2,9	63	38 38 50	45	25	18	M 12	103	77,8	89	42,9	56,75 x 3,53	21113-3 21113-3 21113-3
2 ½“	76,1 x 2,9	40	63	50	25	18	M 12	115	89,0	101	50,8	69,45 x 3,53	21114-3
3“	88,9 x 3,2	40	73	50	27	23	M 16	135	106,4	124	62,0	85,32 x 3,53	21115-3
3 ½“	101,6 x 3,6	40	89	48	27	23	M 16	153	120,7	137	70,0	98,02 x 3,53	22746-3
5“	114,3 x 3,6	40	107	50	27	25	M16	184	152,4	165	92,0	136,12 x 3,53	-
5“	139,7 x 4,0	40	131	50	28	25	M16	184	152,4	165	92,0	136,12 x 3,53	-

welded flange: design E

SAE-connection 3000 PSI	pipe-dimension A x s	PN	A1	B	C	D	F	G	H	I	L	M	O-ring	sheet-no.
4“	76,0 x 3,6 88,9 x 3,2 114,3 x 3,6	40	77 90 115	69 82 100	10	25	25	M 16	162	130	146	77,8	110,72 x 3,53	21123-3
5“	114,3 x 3,6	40	115	100	12	25	19	M16	184	152,4	165	92,0	136,12 x 3,53	32508-3
5“	139,7 x 4,0	40	142	130	12	25	19	M16	184	152,4	165	92,0	136,12 x 3,53	32557-3

pipe-dimension A = outside diameter
s = pipe-wall thickness

Changes of measures and design are subject to alteration!

EDV 10/00

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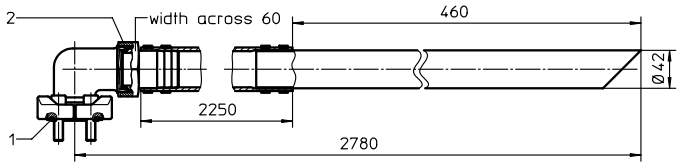
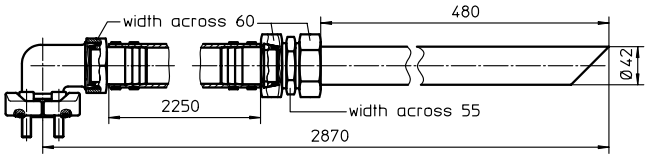
HOSE LINE
Series L01-L22 DN 32-40

Sheet No.
31961-4A

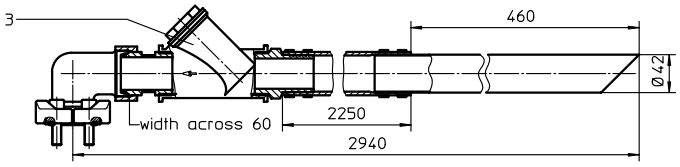
L01
hose-lance



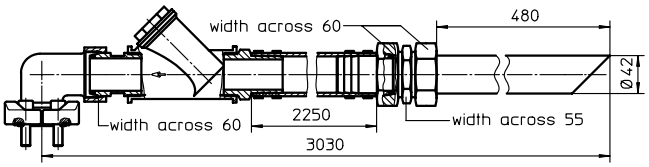
L02
hose-fitting-lance
connection: fitting DIN 20078 T8-N40-60
for counter connection acc. to DIN 3861, M52x2, series L



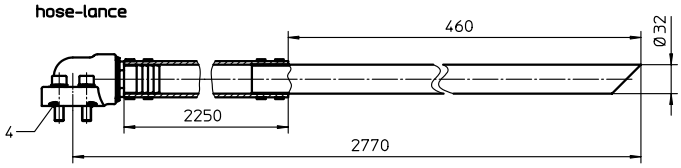
L03
hose-lance-protective filter



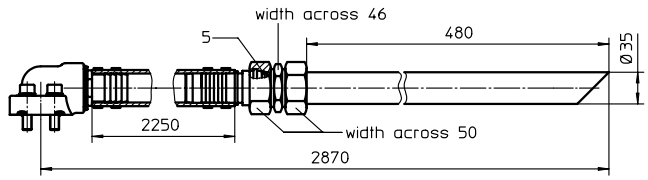
L04
hose-fitting-lance-protective filter
connection: fitting DIN 20078 T8-N40-60
for counter connection acc. to DIN 3861, M52x2, series L



L05
hose-lance



L06
hose-fitting-lance
connection: fitting DIN 20078 T8-N32-50
for counter connection acc. to DIN 3861, M45x2, series L



1. Type index: (ordering example)

Hose line

L01. FS. 7. P
1 | 2 | 3 | 4

1 **series:**
- L01 = hose-lance
- L02 = hose-fitting-lance
- L03 = hose-lance-protective filter
- L04 = hose-fitting-lance-protective filter
- L05 = hose-lance
- L06 = hose-fitting-lance
- L21 = hose-fitting
- L22 = hose-fitting

2 **connection:**
- FS = SAE J518c, 3000 PSI

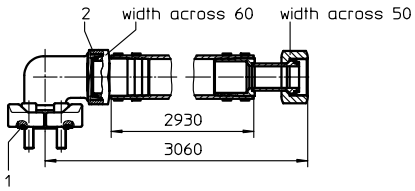
3 **connection size:**
- 6 = 1 ¼“ L05-L06, L21
- 7 = 1 ½“ L01-L04, L22

4 **sealing material:**
- P = Nitrile (NBR)
- V = Viton (FPM)

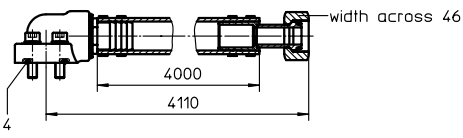
2. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	O-ring	47,22 x 3,53	305078 (NBR)	310269 (FPM)
2	1	O-ring	35 x 2,5	308893 (NBR)	- (FPM)
3	1	strainer insert	SF6.250G	318663	
4	1	O-ring	37,69 x 3,53	305078 (NBR)	310269 (FPM)
5	1	O-ring	32 x 2,5	306843 (NBR)	308268 (FPM)

L22
hose-fitting
connection: fitting DIN 20078 T9-P25-50
for counter connection acc. to DIN 3861, M42x2, series S



L21
hose-fitting
connection: fitting DIN 20078 T9-P20-46
for counter connection acc. to DIN 3861, M36x2, series S



Changes of measures and design are subject to alteration!

EDV 08/00

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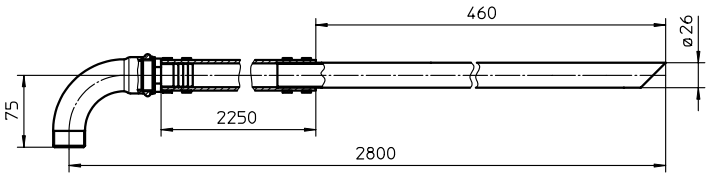
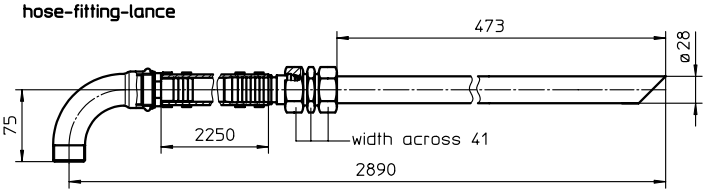
HOSE LINE
Series L07-12 DN 25

Sheet No.
31992-4

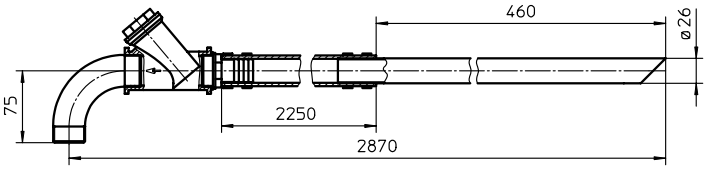
L07
hose-lance



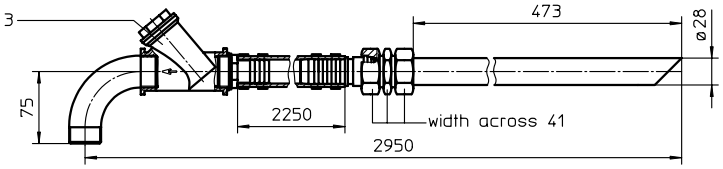
L08
hose-fitting-lance



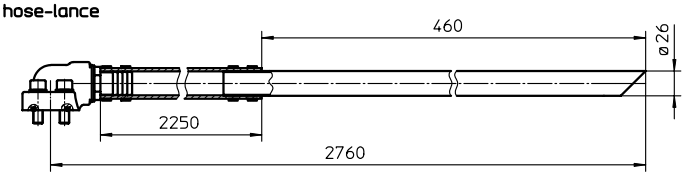
L09
hose-lance-protective filter



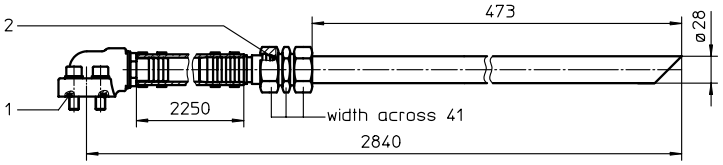
L10
hose-fitting-lance-protective filter



L11
hose-lance



L12
hose-fitting-lance



1. Type index: (ordering example)

Hose line

L07.	G.	5.	P
1	2	3	4

1 series:

L07	= hose-lance	
L08	= hose-fitting-lance	
L09	= hose-lance-protective filter	
L10	= hose-fitting-lance-protective filter	
L11	= hose-lance	
L12	= hose-fitting-lance	

2 connection:

G	= thread	L07-L10
FS	= SAE J518c, 3000 PSI	L11-L12

3 connection size:

5 = G 1 or SAE 1“

4 sealing material:

P	= Nitrile (NBR)
V	= Viton (FPM)

2. Spare parts:

item	qty.	designation	dimension	article-no.	
1	1	O-ring	32,9 x 3,53	318850 (NBR)	- (FPM)
2	1	O-ring	26 x 2	311950 (NBR)	- (FPM)
3	1	strainer insert	SF4.250G	318906	

Changes of measures and design are subject to alteration!

EDV 12/99

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DATA SHEET
Oil sample analysis / Element check

Erstellt von/am:
Abt.QS/27.01.94
Geändert von/am:
QS/Ohlau/26.03.03

Customer : _____ Customer-no : _____ Tank sample : _____

Address : _____ On-line sample : _____

Contact : _____ Other sample : _____

Department : _____ Viscosity : _____

Machine : _____ Temperature : _____

Filter : _____ Operating time : _____

Element : _____ Environment : _____

Fluid : _____ Order-no : _____

nominal	Oil sample analysis	EDV-no.	nominal	Filter element check	EDV-no.
	Particle cleanliness determination acc. to ISO 4406 and NAS 1638	304 969		Bubble point test acc. to ISO 2942	304 973
	Microscopical particel counting according to ISO 4407	314 579		Collaps pressure resistance acc. to ISO 2941	314 563
	Gravimetric analysis according to ISO 4405	314 557		Multi Pass Test acc. to ISO16889 (new element)	314 564
	Microscopical contamination analysis	304 970		Δ p/Q - curve acc. to ISO 3968 (new element)	304 974
	Determination of the water content hydride-method	304 971		Compatibility with hydraulic fluids acc. to ISO 2943	314 565
	Determination of the water content KF-method only for mineral oils	317 688		Analysis of the filter element structure	304 975
	Viscosity - temperature diagram	314 559		Pore size + spectrum - filter material	314 566
	Center viscosity (+ 40° C)	314 558		Kind of contamination, microscopical	314 567
	Aging, chemical (TAN / TBN)	314 560		Determination of the contamination weight, gravimetric	317 691
	Element spectral analysis (ICP)	314 561		Determination of the contamination weight	
	Infrared spectral analysis (FTIR)	317 689		Manometric method - INF element as well as actual	314 568
	PH-value-measurement (only aqueous fluids)	314 562		flow rate needed	
	Others			Determination of the contamination weight	
	Sample - bottles - set 1 (2 pieces) acc. to ISO 3722	313 427		Manometric method - element of other brand	314 569
	Sample - bottles - set 2 (12 pieces) acc. to ISO 3722	314 781		+ housing as well as actual flow rate	
	Hand - pump, with adapter for sample bottles	313 426		Element spectral analysis (ICP) (filter contermination)	317 692
	Spare hose 3.4 ft (1,2 m)	313 323		Infrared spectral analysis (FTIR) (filter contermination)	317 693
	One - way - pipette, complete	312 950			
	Photo documentation for the oil sample analysis	317 690		Photo documentation	304 972

Remarks :

_____

_____

_____

_____

_____ date

_____ responsible engineer

Bei pulsierender Belastung wie z.B. bei Kunststoffspritzmaschinen, Druckgussmaschinen, Schmiedepressen ect. reduzieren sich die max. zulässigen Betriebsdrücke je nach Filterbaureihe auf folgende Daten:

(Ermüdungsfestigkeit ca. 1 Mio. Lastwechsel)

Bei der Filterbaureihe bis 160 bar z.B. MNL, ML
(Filtergehäusematerial Al-Speziallegierung / C-Stahl) reduziert sich der zulässige Betriebsdruck auf 120 bar
Berstdruck: 480 bar

bei der Filterbaureihe bis 315 bar HDD, HPF, HPP
(Filtergehäusematerial GGG40.3 / C-Stahl) reduziert sich der zulässige Betriebsdruck auf 250 bar
Berstdruck: 945 bar

bei der Filterbaureihe bis 420 bar HP, HPV
(Filtergehäusematerial GGG40.3 / C-Stahl) reduziert sich der zulässige Betriebsdruck auf 340 bar
Berstdruck: 1344 bar

At pulsating loading like by injection moulding machines, diecasting machines, forging pressure etc. the max. admissible accumulator pressures reduce according to the line of filters to following facts:

(fatigue resistance appr. 1 million change of load)

At the line of filters up to 160 bar e.g. MNL, ML
(filter housing material Al-special alloy / C-steel) the admissible accumulator pressure reduces to 120 bar
burst pressure: 480 bar

At the line of filters up to 315 bar e.g. HDD, HPF, HPP
(filter housing material GGG 40.3 / C-steel) the admissible accumulator pressure reduces to 250 bar
burst pressure: 945 bar

At the line of filters up to 420 bar e.g. HP, HPV
(filter housing material GGG 40.3 / C-steel) the admissible accumulator pressure reduces to 340 bar
burst pressure: 1344 bar

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ATEX- Directive
Questionnaire to the ATEX-Analyses

Sheet No.
34279-4B

1. General

The ATEX analysis is required when products are intended to be used in, or in connection with, a potentially explosive atmosphere.
Potentially explosive atmospheres within the meaning of Directive 94/9/EC are atmospheres which could become explosive due to local and/or operational conditions.
Products for whose use special regulations apply (e.g. seagoing vessels and their equipment, which are covered by the IMO Convention) are excluded from Directive 94/9/EC.
Standards of explosion safety are classified according to Directive 94/9/EC point 4.4.

2. Classification

The application-specific degree of protection must be indicated by the customer (please mark as applicable).

The type of explosive atmosphere: ☐ G (Gas) ☐ D (Dust)

Equipment group I

Category M1	Category M2

Equipment group II

Category 1	Category 2	Category 3
Zone 0 (G) Zone 20 (D)	Zone 1 (G) Zone 21 (D)	Zone 2 (G) Zone 22 (D)

Temperature class (Maximum permissible surface temperature)

T1	T2	T3	T4	T5	T6
450°C	300°C	200°C	135°C	100°C	85°C

Explanations regarding assignation of applicance groups and categories (zones).

Equipment group I (potentially explosive atmospheres in underground operations)

Degree of protection	Category	Guarantee of protection	Operating conditions [1)]
Very high	M 1	Two independent protective means, or safe even if two faults occur independently of each other.	Equipment remains operational and continues to be operated in the event of a potentially explosive atmosphere.
High	M 2	Suitable for normal operation and difficult operating conditions.	Equipment is disconnected in the event of a potentially explosive atmosphere.

Equipment group II (potentially explosive atmospheres in the other areas)

Degree of protection	Category	Guarantee of protection	Operating conditions [1)]
Very high	1	Two independent protective means, or safe even if two faults occur independently of each other.	Equipment remains operational and continues to be operated in zones 0, 1, 2 (G) and 20, 21, 22 (D).
High	2	Safe in normal operation and if the usual faults occur.	Equipment remains operational and continues to be operated in zones 1, 2 (G) and/or 21, 22 (D).
Normal	3	Safe in normal operation.	Equipment remains operational and continues to be operated in zone 2 (G) and/or 22 (D).

[1)] Note: See also Directive 1999/92/EC on minimum requirements for improving the safety and health protection of workers potentially at risk from explosive atmospheres.

3. Documentation and marking

The documentation on equipment for which Directive 94/9/EC applies is produced according to the specific application and equipment.
The documentation shows the classification of the equipment/combination of equipment according to Directive 94/9/EC in a declaration of conformity.
The rating plate(s) indicate the explosion protection symbol, the equipment group, the equipment category and the potentially explosive atmosphere for which the protective system is suitable.

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ATEX- Directive

Questionnaire to the ATEX- Analysis of electrical clogging indicators

Sheet No.
41767-4

1. General

The ATEX analysis is required when products are intended to be used in, or in connection with, a potentially explosive atmosphere.
Potentially explosive atmospheres within the meaning of Directive 94/9/EC are atmospheres which could become explosive due to local and/or operational conditions.
Products for whose use special regulations apply (e.g. seagoing vessels and their equipment, which are covered by the IMO Convention) are excluded from Directive 94/9/EC.
Standards of explosion safety are classified according to Directive 94/9/EC point 4.4.

2. Classification

The application-specific degree of protection must be indicated by the customer (please mark as applicable).

Type of explosive atmosphere: ☐ G (Gas) ☐ D (Dust)

Equipment group I

Category M1	Category M2

Equipment group II

Category 1	Category 2	Category 3
Zone 0 (G) Zone 20 (D)	Zone 1 (G) Zone 21 (D)	Zone 2 (G) Zone 22 (D)

Temperature class (Maximum permissible surface temperature)

T1	T2	T3	T4	T5	T6
450°C	300°C	200°C	135°C	100°C	85°C

Is the clogging indicator operated in an intrinsically safe circuit: jes ☐ no ☐

If yes: How much cable is approximately needed? _____m

Explanations regarding assignation of applicance groups and categories (zones).

Equipment group I (potentially explosive atmospheres in underground operations)

Degree of protection	Category	Guarantee of protection	Operating conditions [1)]
Very high	M 1	Two independent protective means, or safe even if two faults occur independently of each other.	Equipment remains operational and continues to be operated in the event of a potentially explosive atmosphere.
High	M 2	Suitable for normal operation and difficult operating conditions.	Equipment is disconnected in the event of a potentially explosive atmosphere.

Equipment group II (potentially explosive atmospheres in the other areas)

Degree of protection	Category	Guarantee of protection	Operating conditions [1)]
Very high	1	Two independent protective means, or safe even if two faults occur independently of each other.	Equipment remains operational and continues to be operated in zones 0, 1, 2 (G) and 20, 21, 22 (D).
High	2	Safe in normal operation and if the usual faults occur.	Equipment remains operational and continues to be operated in zones 1, 2 (G) and/or 21, 22 (D).
Normal	3	Safe in normal operation.	Equipment remains operational and continues to be operated in zone 2 (G) and/or 22 (D).

[1)] Note: See also Directive 1999/92/EC on minimum requirements for improving the safety and health protection of workers potentially at risk from explosive atmospheres.

3. Documentation and marking

The documentation on equipment for which Directive 94/9/EC applies is produced according to the specific application and equipment.
The documentation shows the classification of the equipment/combination of equipment according to Directive 94/9/EC in a declaration of conformity.
The rating plate(s) indicate the explosion protection symbol, the equipment group, the equipment category and the potentially explosive atmosphere for which the protective system is suitable.

Subject to alterations!

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SPECIFICATION IS06
for filter elements

Sheet No.
31601-4 A

glue:	standard
by-pass valve:	plastic, stainless steel-spring 1.4310
seal:	P, V (nitrile, viton)
filter-material:	VG, G, M (no P)
plait:	stainless steel-support wire
metal parts:	aluminium anodized, steel tinned

EDV 11/00

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SPECIFICATION IS06
for filter housing and indicator for HFC-use

Sheet No.
31605-4 B

1. aluminium parts:

all aluminium parts are to be anodized

2. steel parts:

standard design

3. cast parts (GGG):

standard design

4. plastic parts:

standard design

5. galvanized parts:

galvanized parts **must not** be used!

6. bowls, deep-drawn pieces:

standard design phosphate treated

7. switching shaft at DU-filters:

surface chemical-nickel, tempered
DU 40: steel, nitrated

8. switching shaft at HDD- filters:

surface chemical-nickel, tempered
HDD 61-151: steel, nitrated

9. by-pass valves:

- plastic: standard design
- metal: standard design

10. clogging indicator:

- return-line filter: standard design aluminium anodized or complete stainless steel 1.4571
- indicator AE: standard design aluminium anodized or complete stainless steel 1.4571
- indicator AOR/AOC: standard design aluminium anodized or complete stainless steel 1.4571
- indicator OP/OE: standard design aluminium anodized or complete stainless steel 1.4571
- indicator VS1/VS2: standard design aluminium anodized

11. seals:

< 70 °C = NBR (Nitrile)
> 70 °C = FPM (Viton)

12. change-over ball valve DU:

standard design, aluminium anodized

13. intertank transfer stations/filter units:

Attention! special design with separate specification

14. applicable centering pivots:

steel: standard design
aluminium: anodized

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SPECIFICATION IS07

for filter elements used with Oil/Ammonia-mixtures (NH_3)
Permanent working temperature ≤ +80°C

Sheet No.
31602-4D

1. Filter element

Adhesive: Article No. 325315

Sealing gaskets: N (Neoprene, CR)

Filtration material: VG, G, M

Bellows: A) VG-Filter elements

1. Protective wire frame
2. Protective fleece PS315, Polypropylen
3. Fiberglas pre-filtration fleece
4. Fiberglas main-filtration fleece
5. Support fleece PS315, Polypropylen
6. Supporting wire frame, steel, zinced
7. Support pipe, steel, zinced

B) G-Filter elements

1. Protective wire frame, steel, zinced**
2. Filtration fabric, stainless steel
3. Supporting wire frame, steel, zinced
4. Support pipe, steel, zinced

** NR630; NR1000; E950; E1201; E2001; E3001; E4001

2. Housing and indicator

For housings and indicators the standard version is used.

Notice:

All butt seam conglutinations are coated by sheet metal bars.
For the respective filter element, the deposited dimensions, cut to size and resp. existing superstructure-specifications are valid.

Caution!

This specification IS07 is intended only for oil/ammonia-mixtures with a maximum gas portion of 10%. This specification is not applicable for 100% ammonia atmospheres as well as watery ammonia.
Because of oil content no EPDM seals may be used.

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SPECIFICATION IS08

for filter elements working at high temperatures ≤ +140°C

Sheet No.
31603-4B

1. Filter element

Adhesive:	Article No. 337085
Sealing gaskets:	V (Viton (FPM))
Filtration material:	VG, G, M, P
Bellow:	Standard
Metal parts:	Standard

2. Housing

Housing:	Article No. 337085
Indicator:	No indication possible!

Caution

It is essential that the category temperature of less than +140°C is complied with. Make sure no Perbunan sealing is used.

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SPECIFICATION IS12

for change-over filter, internal parts of change-over armature VA

Sheet No.
41028-4

1. Filter element:

Standard execution

2. Sealing material:

Standard execution

3. Housing (Filter- and change-over housing):

Standard execution

3.1 Internal parts of the change-over:

3.1.1 Flap change-over :

Change-over flap: VA (1.4301, 1.4571)
Change-over shaft: VA (1.4301, 1.4571)

3.1.2 Shaft change-over:

Change-over shaft: VA (1.4571)
Surface chromed, dressed to fit size

3.1.3 Segment change-over:

Change-over segment: standard execution
Change-over shaft:: VA (1.4571)
Screws: A2, A4
Springs: VA (1.4310)
Distance socket: VA (1.4571)
Retaining ring in steel, chemically nickel-plated 30 µm

3.1.4 Ball change-over:

Sealing ring: standard execution
Support case : VA (1.4571)
Snap ring: VA (1.4310)
Attachment: VA (1.4571)
Ball: VA (1.4571)

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SPECIFICATION IS20

for pressure vessel parts of ASME equivalent material according to the ASME VIII Div. 1 calculation

Sheet No.
55217-4

1. Scope:

This specification concerns all pressure vessel parts affected by ASME VIII Div. 1.

2. Choise of material:

ASME equivalent material according to the PED (pressure equipment directive) may be used for the pressure vessel parts.

3. Design and calculation:

The design and calculation shall be done according to the valid Edition and Addenda of ASME VIII Div. 1.

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SPECIFICATION IS21

for pressure vessel parts according to ASME VIII Div. 1 with U-Stamp

Sheet No.
43415-4A

1. Scope:

This specification concerns all pressure vessel parts affected by ASME VIII Div. 1.
According to IS23.

2. Addition:

According to IS23 but with U-Stamp certification.

EDV 05/10

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SPECIFICATION IS23

for pressure vessel parts according to ASME VIII Div. 1

Sheet No.
55218-4

1. Scope:

This specification concerns all pressure vessel parts affected ASME VIII Div. 1.

2. Choise of material:

Only valid ASME – material shall be used for pressure vessel parts (see ASME VIII Div. 1).

3. Design and calculation:

The design and calculation of pressure vessel parts shall be done according to the valid Edition and Addenda ASME VIII Div. 1.

Subject to modification!

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SPECIFICATION IS30

for stainless steel filter with increasid corrosion resistance

Sheet No.
55219-4

1. Scope:

This specification concerns all pressure vessel parts, housing bolted connections of the filter.

2. Choise of material:

The pressure vessel parts affected by ASME VIII Div. 1 shall be out of SA ... Type/Grade 316, 316L, 316Ti and B8M as faras they are listed in ASME.
Further housing parts and bolted connections shall be in the above mentioned quality or A4 (i. e.: A4-70, 1.4401, 1.4404, 1.4571)

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Inhaltsverzeichnis / list of contents

Die Preise verstehen sich zuzüglich der gesetzlichen MwSt.
Der Mindestauftragswert beträgt 100 EUR.

V.A.T. has to be added to the prices.
Minimum order value: 100 EUR.

Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price

1. Abmessungen/Sizes INTERNORMEN

1.1 Filterelemente/Filter Elements 01.E 30...1350

303061	01.E 30.3VG.30.E.P.-	
303064	01.E 30.3VG.HR.E.P.-	
303062	01.E 30.6VG.30.E.P.-	
300070	01.E 30.6VG.HR.E.P.-	
300064	01.E 30.10VG.30.E.P.-	
300065	01.E 30.10VG.HR.E.P.-	
303063	01.E 30.16VG.30.E.P.-	
305710	01.E 30.16VG.HR.E.P.-	
300067	01.E 30.25VG.30.E.P.-	
300068	01.E 30.25VG.HR.E.P.-	
300596	01.E 30.25G.30.E.P.-	
311829	01.E 30.25G.HR.E.P.-	
300069	01.E 30.40G.30.E.P.-	
300597	01.E 30.40G.HR.E.P.-	
310991	01.E 30.80G.30.E.P.-	
313658	01.E 30.80G.HR.E.P.-	
333359	01.E 30.130G.30.E.P.-	
324139	01.E 30.130G.HR.E.P.-	
	1) 01.E 30 MEHRPREIS VITON DICHTUNG	
	2) 01.E 30 MEHRPREIS AUSF. KPL. EDELSTAHL	
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
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318778	01.E 60.3VG.30.E.P.-	
300072	01.E 60.3VG.HR.E.P.-	
302185	01.E 60.6VG.30.E.P.-	
300084	01.E 60.6VG.HR.E.P.-	
300073	01.E 60.10VG.30.E.P.-	
300074	01.E 60.10VG.HR.E.P.-	
300612	01.E 60.16VG.30.E.P.-	
303099	01.E 60.16VG.HR.E.P.-	
300077	01.E 60.25VG.30.E.P.-	
300078	01.E 60.25VG.HR.E.P.-	
301823	01.E 60.25G.30.E.P.-	
300080	01.E 60.25G.HR.E.P.-	
301994	01.E 60.40G.30.E.P.-	
300082	01.E 60.40G.HR.E.P.-	
301917	01.E 60.80G.30.E.P.-	
300609	01.E 60.80G.HR.E.P.-	
320136	01.E 60.130G.30.E.P.-	
304941	01.E 60.130G.HR.E.P.-	
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1) Surplus price: viton sealing
2) Surplus price: execution complete stainless steel
3) Surplus price: element execution IS 06
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Vergleichsliste Filterelemente
Cross Reference List Filter - Elements

Artikelnr. / Ident.no.	Artikelbezeichnung / Designation	Netto-Preis / Unit-Price
304114	01.E 90.3VG.30.E.P.-	
300103	01.E 90.3VG.HR.E.P.-	
303108	01.E 90.6VG.30.E.P.-	
300117	01.E 90.6VG.HR.E.P.-	
300104	01.E 90.10VG.30.E.P.-	
300106	01.E 90.10VG.HR.E.P.-	
300631	01.E 90.16VG.30.E.P.-	
300118	01.E 90.16VG.HR.E.P.-	
300108	01.E 90.25VG.30.E.P.-	
300110	01.E 90.25VG.HR.E.P.-	
304488	01.E 90.25G.30.E.P.-	
300111	01.E 90.25G.HR.E.P.-	
300114	01.E 90.40G.30.E.P.-	
300115	01.E 90.40G.HR.E.P.-	
300627	01.E 90.80G.30.E.P.-	
300628	01.E 90.80G.HR.E.P.-	
303104	01.E 90.130G.30.E.P.-	
332999	01.E 90.130G.HR.E.P.-	
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316513	01.E 150.3VG.30.E.P.-	
300135	01.E 150.3VG.HR.E.P.-	
303111	01.E 150.6VG.30.E.P.-	
300145	01.E 150.6VG.HR.E.P.-	
300136	01.E 150.10VG.30.E.P.-	
300138	01.E 150.10VG.HR.E.P.-	
300657	01.E 150.16VG.30.E.P.-	
300658	01.E 150.16VG.HR.E.P.-	
300141	01.E 150.25VG.30.E.P.-	
300142	01.E 150.25VG.HR.E.P.-	
303112	01.E 150.25G.30.E.P.-	
300143	01.E 150.25G.HR.E.P.-	
300651	01.E 150.40G.30.E.P.-	
300144	01.E 150.40G.HR.E.P.-	
300653	01.E 150.80G.30.E.P.-	
300655	01.E 150.80G.HR.E.P.-	
302220	01.E 150.130G.30.E.P.-	
303088	01.E 150.130G.HR.E.P.-	
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318583	01.E 170.3VG.30.E.P.-	
300146	01.E 170.3VG.HR.E.P.-	
303070	01.E 170.6VG.30.E.P.-	
300153	01.E 170.6VG.HR.E.P.-	
300147	01.E 170.10VG.30.E.P.-	
300148	01.E 170.10VG.HR.E.P.-	
300662	01.E 170.16VG.30.E.P.-	
303065	01.E 170.16VG.HR.E.P.-	
300150	01.E 170.25VG.30.E.P.-	
300151	01.E 170.25VG.HR.E.P.-	
303068	01.E 170.25G.30.E.P.-	
300660	01.E 170.25G.HR.E.P.-	
303066	01.E 170.40G.30.E.P.-	
303513	01.E 170.40G.HR.E.P.-	
300661	01.E 170.80G.30.E.P.-	
302191	01.E 170.80G.HR.E.P.-	
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313929	01.E 170.130G.HR.E.P.-	
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300186	01.E 240.3VG.HR.E.P.-	
303089	01.E 240.6VG.30.E.P.-	
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300188	01.E 240.10VG.HR.E.P.-	
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300192	01.E 240.25G.HR.E.P.-	
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300685	01.E 240.40G.HR.E.P.-	
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300229	01.E 360.3VG.HR.E.P.-	
301952	01.E 360.6VG.30.E.P.-	
300243	01.E 360.6VG.HR.E.P.-	
300231	01.E 360.10VG.30.E.P.-	
300232	01.E 360.10VG.HR.E.P.-	
300705	01.E 360.16VG.30.E.P.-	
303093	01.E 360.16VG.HR.E.P.-	
300702	01.E 360.25VG.30.E.P.-	
300235	01.E 360.25VG.HR.E.P.-	
300237	01.E 360.25G.30.E.P.-	
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300703	01.E 360.40G.HR.E.P.-	
300704	01.E 360.80G.30.E.P.-	
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305267	01.E 360.130G.HR.E.P.-	
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302093	01.E 450.3VG.HR.E.P.-	
303094	01.E 450.6VG.30.E.P.-	
300263	01.E 450.6VG.HR.E.P.-	
300255	01.E 450.10VG.30.E.P.-	
300256	01.E 450.10VG.HR.E.P.-	
300722	01.E 450.16VG.30.E.P.-	
300264	01.E 450.16VG.HR.E.P.-	
300710	01.E 450.25VG.30.E.P.-	
300258	01.E 450.25VG.HR.E.P.-	
300715	01.E 450.25G.30.E.P.-	
300717	01.E 450.25G.HR.E.P.-	
300719	01.E 450.40G.30.E.P.-	
300261	01.E 450.40G.HR.E.P.-	
300720	01.E 450.80G.30.E.P.-	
300721	01.E 450.80G.HR.E.P.-	
303096	01.E 450.130G.30.E.P.-	
	01.E 450.130G.HR.E.P.-	
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2) Surplus price: execution complete stainless steel
3) Surplus price: element execution IS 06
4) Surplus price: element execution IS 08

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319967	01.E 600.3VG.30.E.P.-	
300723	01.E 600.3VG.HR.E.P.-	
303097	01.E 600.6VG.30.E.P.-	
300730	01.E 600.6VG.HR.E.P.-	
300265	01.E 600.10VG.30.E.P.-	
300266	01.E 600.10VG.HR.E.P.-	
300731	01.E 600.16VG.30.E.P.-	
300732	01.E 600.16VG.HR.E.P.-	
300727	01.E 600.25VG.30.E.P.-	
300728	01.E 600.25VG.HR.E.P.-	
305725	01.E 600.25G.30.E.P.-	
303748	01.E 600.25G.HR.E.P.-	
329443	01.E 600.40G.30.E.P.-	
303747	01.E 600.40G.HR.E.P.-	
300729	01.E 600.80G.30.E.P.-	
	01.E 600.80G.HR.E.P.-	
303098	01.E 600.130G.30.E.P.-	
	01.E 600.130G.HR.E.P.-	
1)	01.E 600 MEHRPREIS VITON DICHTUNG	
2)	01.E 600 MEHRPREIS AUSF. KPL. EDELSTAHL	
3)	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
4)	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%

317518	01.E 900.3VG.30.E.P.-	
300735	01.E 900.3VG.HR.E.P.-	
303150	01.E 900.6VG.30.E.P.-	
300295	01.E 900.6VG.HR.E.P.-	
300736	01.E 900.10VG.30.E.P.-	
300290	01.E 900.10VG.HR.E.P.-	
300739	01.E 900.16VG.30.E.P.-	
303152	01.E 900.16VG.HR.E.P.-	
300737	01.E 900.25VG.30.E.P.-	
300291	01.E 900.25VG.HR.E.P.-	
305728	01.E 900.25G.30.E.P.-	
300293	01.E 900.25G.HR.E.P.-	
	01.E 900.40G.30.E.P.-	
300738	01.E 900.40G.HR.E.P.-	
	01.E 900.80G.30.E.P.-	
304649	01.E 900.80G.HR.E.P.-	
303153	01.E 900.130G.30.E.P.-	
305400	01.E 900.130G.HR.E.P.-	
1)	01.E 900 MEHRPREIS VITON DICHTUNG	
2)	01.E 900 MEHRPREIS AUSF. KPL. EDELSTAHL	
3)	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
4)	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%

1) Surplus price: viton sealing
2) Surplus price: execution complete stainless steel
3) Surplus price: element execution IS 06
4) Surplus price: element execution IS 08

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Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price
328368	01.E 1350.3VG.30.E.P.-	
325646	01.E 1350.3VG.HR.E.P.-	
326652	01.E 1350.6VG.30.E.P.-	
320899	01.E 1350.6VG.HR.E.P.-	
324007	01.E 1350.10VG.30.E.P.-	
319629	01.E 1350.10VG.HR.E.P.-	
329744	01.E 1350.16VG.30.E.P.-	
320557	01.E 1350.16VG.HR.E.P.-	
323251	01.E 1350.25VG.30.E.P.-	
	01.E 1350.25VG.HR.E.P.-	
334187	01.E 1350.25G.30.E.P.-	
	01.E 1350.25G.HR.E.P.-	
329356	01.E 1350.40G.30.E.P.-	
	01.E 1350.40G.HR.E.P.-	
	01.E 1350.80G.30.E.P.-	
	01.E 1350.80G.HR.E.P.-	
	01.E 1350.130G.30.E.P.-	
	01.E 1350.130G.HR.E.P.-	
[1]	01.E 1350 MEHRPREIS VITON DICHTUNG	
[2]	01.E 1350 MEHRPREIS AUSF. KPL. EDELSTAHL	
[3]	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
[4]	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%

1.2 Filterelemente/Filter Elements 01.E 41...3001

304306	01.E 41.10P.16.S.P.-	
305406	01.E 41.25P.16.S.P.-	
322478	01.E 41.3VG.16.S.P.-	
305748	01.E 41.6VG.16.S.P.-	
305749	01.E 41.10VG.16.S.P.-	
305750	01.E 41.16VG.16.S.P.-	
305752	01.E 41.25VG.16.S.P.-	
305751	01.E 41.25G.16.S.P.-	
305753	01.E 41.40G.16.S.P.-	
305754	01.E 41.80G.16.S.P.-	
305755	01.E 41.130G.16.S.P.-	
[1]	01.E 41 MEHRPREIS VITON DICHTUNG	
[2]	01.E 41 MEHRPREIS AUSF. KPL. EDELSTAHL	
[3]	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
[4]	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%

300086	01.E 70.10P.16.E.P.-	
300087	01.E 70.10P.16.S.P.-	
300091	01.E 70.25P.16.E.P.-	
300092	01.E 70.25P.16.S.P.-	
305627	01.E 70.3VG.16.E.P.-	

1) Surplus price: viton sealing
2) Surplus price: execution complete stainless steel
3) Surplus price: element execution IS 06
4) Surplus price: element execution IS 08

Artikelnr. / Ident.no.	Artikelbezeichnung / Designation	Netto-Preis / Unit-Price
305628	01.E 70.3VG.16.S.P.-	
300615	01.E 70.6VG.16.E.P.-	
300616	01.E 70.6VG.16.S.P.-	
300088	01.E 70.10VG.16.E.P.-	
300089	01.E 70.10VG.16.S.P.-	
300099	01.E 70.16VG.16.E.P.-	
300100	01.E 70.16VG.16.S.P.-	
300093	01.E 70.25VG.16.E.P.-	
300094	01.E 70.25VG.16.S.P.-	
300095	01.E 70.25G.16.E.P.-	
300096	01.E 70.25G.16.S.P.-	
300097	01.E 70.40G.16.E.P.-	
300098	01.E 70.40G.16.S.P.-	
300613	01.E 70.80G.16.E.P.-	
305630	01.E 70.80G.16.S.P.-	
305772	01.E 70.130G.16.E.P.-	
305773	01.E 70.130G.16.S.P.-	
1)	01.E 70 MEHRPREIS VITON DICHTUNG	
2)	01.E 70 MEHRPREIS AUSF. KPL. EDELSTAHL	
3)	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
4)	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%
300120	01.E 120.10P.16.E.P.-	
300121	01.E 120.10P.16.S.P.-	
300125	01.E 120.25P.16.E.P.-	
300126	01.E 120.25P.16.S.P.-	
300632	01.E 120.3VG.16.E.P.-	
303263	01.E 120.3VG.16.S.P.-	
300132	01.E 120.6VG.16.E.P.-	
300640	01.E 120.6VG.16.S.P.-	
300122	01.E 120.10VG.16.E.P.-	
300123	01.E 120.10VG.16.S.P.-	
303115	01.E 120.16VG.16.E.P.-	
300133	01.E 120.16VG.16.S.P.-	
300127	01.E 120.25VG.16.E.P.-	
300128	01.E 120.25VG.16.S.P.-	
300129	01.E 120.25G.16.E.P.-	
300130	01.E 120.25G.16.S.P.-	
300131	01.E 120.40G.16.E.P.-	
300637	01.E 120.40G.16.S.P.-	
300638	01.E 120.80G.16.E.P.-	
300639	01.E 120.80G.16.S.P.-	
305631	01.E 120.130G.16.E.P.-	
305632	01.E 120.130G.16.S.P.-	
1)	01.E 120 MEHRPREIS VITON DICHTUNG	
2)	01.E 120 MEHRPREIS AUSF. KPL. EDELSTAHL	
3)	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
4)	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%
300154	01.E 175.10P.16.E.P.-	
300155	01.E 175.10P.16.S.P.-	
300158	01.E 175.25P.16.E.P.-	

1) Surplus price: viton sealing
2) Surplus price: execution complete stainless steel
3) Surplus price: element execution IS 06
4) Surplus price: element execution IS 08

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Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price
300668	01.E 175.25P.16.S.P.-	
300663	01.E 175.3VG.16.E.P.-	
305633	01.E 175.3VG.16.S.P.-	
300671	01.E 175.6VG.16.E.P.-	
303072	01.E 175.6VG.16.S.P.-	
300156	01.E 175.10VG.16.E.P.-	
300157	01.E 175.10VG.16.S.P.-	
300169	01.E 175.16VG.16.E.P.-	
303073	01.E 175.16VG.16.S.P.-	
300159	01.E 175.25VG.16.E.P.-	
300160	01.E 175.25VG.16.S.P.-	
300161	01.E 175.25G.16.E.P.-	
300163	01.E 175.25G.16.S.P.-	
300164	01.E 175.40G.16.E.P.-	
300166	01.E 175.40G.16.S.P.-	
300167	01.E 175.80G.16.E.P.-	
300168	01.E 175.80G.16.S.P.-	
301892	01.E 175.130G.16.E.P.-	
302074	01.E 175.130G.16.S.P.-	
[1]	01.E 175 MEHRPREIS VITON DICHTUNG	
[2]	01.E 175 MEHRPREIS AUSF. KPL. EDELSTAHL	
[3]	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
[4]	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%
300173	01.E 210.10P.16.E.P.-	
300174	01.E 210.10P.16.S.P.-	
300178	01.E 210.25P.16.E.P.-	
300179	01.E 210.25P.16.S.P.-	
305635	01.E 210.3VG.16.E.P.-	
305636	01.E 210.3VG.16.S.P.-	
303119	01.E 210.6VG.16.E.P.-	
303123	01.E 210.6VG.16.S.P.-	
300175	01.E 210.10VG.16.E.P.-	
300176	01.E 210.10VG.16.S.P.-	
300676	01.E 210.16VG.16.E.P.-	
300677	01.E 210.16VG.16.S.P.-	
300180	01.E 210.25VG.16.E.P.-	
300181	01.E 210.25VG.16.S.P.-	
300673	01.E 210.25G.16.E.P.-	
300182	01.E 210.25G.16.S.P.-	
300183	01.E 210.40G.16.E.P.-	
300674	01.E 210.40G.16.S.P.-	
300675	01.E 210.80G.16.E.P.-	
303120	01.E 210.80G.16.S.P.-	
304689	01.E 210.130G.16.E.P.-	
305638	01.E 210.130G.16.S.P.-	
[1]	01.E 210 MEHRPREIS VITON DICHTUNG	
[2]	01.E 210 MEHRPREIS AUSF. KPL. EDELSTAHL	
[3]	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
[4]	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%

1) Surplus price: viton sealing
2) Surplus price: execution complete stainless steel
3) Surplus price: element execution IS 06
4) Surplus price: element execution IS 08

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Artikelnr. / Ident.no.	Artikelbezeichnung / Designation	Netto-Preis / Unit-Price
300198	01.E 320.10P.16.E.P.-	
300199	01.E 320.10P.16.S.P.-	
300202	01.E 320.25P.16.E.P.-	
300203	01.E 320.25P.16.S.P.-	
305639	01.E 320.3VG.16.E.P.-	
316541	01.E 320.3VG.16.S.P.-	
300209	01.E 320.6VG.16.E.P.-	
303124	01.E 320.6VG.16.S.P.-	
300200	01.E 320.10VG.16.E.P.-	
300201	01.E 320.10VG.16.S.P.-	
305640	01.E 320.16VG.16.E.P.-	
300689	01.E 320.16VG.16.S.P.-	
300204	01.E 320.25VG.16.E.P.-	
300205	01.E 320.25VG.16.S.P.-	
300206	01.E 320.25G.16.E.P.-	
300207	01.E 320.25G.16.S.P.-	
300688	01.E 320.40G.16.E.P.-	
300208	01.E 320.40G.16.S.P.-	
303121	01.E 320.80G.16.E.P.-	
305642	01.E 320.80G.16.S.P.-	
305643	01.E 320.130G.16.E.P.-	
305644	01.E 320.130G.16.S.P.-	
[1)]	01.E 320 MEHRPREIS VITON DICHTUNG	
[2)]	01.E 320 MEHRPREIS AUSF. KPL. EDELSTAHL	
[3)]	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
[4)]	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%

300212	01.E 330.10P.16.E.P.-	
300213	01.E 330.10P.16.S.P.-	
300216	01.E 330.25P.16.E.P.-	
300217	01.E 330.25P.16.S.P.-	
300210	01.E 330.3VG.16.E.P.-	
304119	01.E 330.3VG.16.S.P.-	
300227	01.E 330.6VG.16.E.P.-	
303086	01.E 330.6VG.16.S.P.-	
301797	01.E 330.10VG.16.E.P.-	
300690	01.E 330.10VG.16.S.P.-	
303729	01.E 330.16VG.16.E.P.-	
300228	01.E 330.16VG.16.S.P.-	
300218	01.E 330.25VG.16.E.P.-	
300219	01.E 330.25VG.16.S.P.-	

1) Surplus price: viton sealing
2) Surplus price: execution complete stainless steel
3) Surplus price: element execution IS 06
4) Surplus price: element execution IS 08

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Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price
300220	01.E 330.25G.16.E.P.-	
300221	01.E 330.25G.16.S.P.-	
300222	01.E 330.40G.16.E.P.-	
300224	01.E 330.40G.16.S.P.-	
300225	01.E 330.80G.16.E.P.-	
300226	01.E 330.80G.16.S.P.-	
302221	01.E 330.130G.16.E.P.-	
302017	01.E 330.130G.16.S.P.-	
[1]	01.E 330 MEHRPREIS VITON DICHTUNG	
[2]	01.E 330 MEHRPREIS AUSF. KPL. EDELSTAHL	
[3]	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
[4]	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%
300244	01.E 425.10P.16.E.P.-	
300245	01.E 425.10P.16.S.P.-	
300248	01.E 425.25P.16.E.P.-	
300249	01.E 425.25P.16.S.P.-	
305645	01.E 425.3VG.16.E.P.-	
303755	01.E 425.3VG.16.S.P.-	
304504	01.E 425.6VG.16.E.P.-	
303125	01.E 425.6VG.16.S.P.-	
300246	01.E 425.10VG.16.E.P.-	
300247	01.E 425.10VG.16.S.P.-	
300252	01.E 425.16VG.16.E.P.-	
300253	01.E 425.16VG.16.S.P.-	
300250	01.E 425.25VG.16.E.P.-	
300251	01.E 425.25VG.16.S.P.-	
300707	01.E 425.25G.16.E.P.-	
300708	01.E 425.25G.16.S.P.-	
303122	01.E 425.40G.16.E.P.-	
300709	01.E 425.40G.16.S.P.-	
305646	01.E 425.80G.16.E.P.-	
327665	01.E 425.80G.16.S.P.-	
305648	01.E 425.130G.16.E.P.-	
305649	01.E 425.130G.16.S.P.-	
[1]	01.E 425 MEHRPREIS VITON DICHTUNG	
[2]	01.E 425 MEHRPREIS AUSF. KPL. EDELSTAHL	
[3]	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
[4]	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%

1) Surplus price: viton sealing
2) Surplus price: execution complete stainless steel
3) Surplus price: element execution IS 06
4) Surplus price: element execution IS 08

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Artikelnr. / Ident.no.	Artikelbezeichnung / Designation	Netto-Preis / Unit-Price
	01.E 625.10P.10.B.P.-	
	01.E 625.25P.10.B.P.-	
321118	01.E 625.3VG.10.B.P.-	
319427	01.E 625.6VG.10.B.P.-	
318415	01.E 625.10VG.10.B.P.-	
331694	01.E 625.16VG.10.B.P.-	
321029	01.E 625.25VG.10.B.P.-	
	01.E 625.25G.10.B.P.-	
	01.E 625.40G.10.B.P.-	
	01.E 625.80G.10.B.P.-	
	01.E 625.130G.10.B.P.-	
1)	01.E 625 MEHRPREIS VITON DICHTUNG	
2)	01.E 625 MEHRPREIS AUSF. KPL. EDELSTAHL	
3)	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
4)	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%
312087	01.E 631.10P.16.E.P.-	
311191	01.E 631.10P.16.S.P.-	
312495	01.E 631.25P.16.E.P.-	
312065	01.E 631.25P.16.S.P.-	
312518	01.E 631.3VG.16.E.P.-	
312066	01.E 631.3VG.16.S.P.-	
312424	01.E 631.6VG.16.E.P.-	
312389	01.E 631.6VG.16.S.P.-	
312239	01.E 631.10VG.16.E.P.-	
311275	01.E 631.10VG.16.S.P.-	
311546	01.E 631.16VG.16.E.P.-	
311828	01.E 631.16VG.16.S.P.-	
312466	01.E 631.25VG.16.E.P.-	
311589	01.E 631.25VG.16.S.P.-	
312441	01.E 631.25G.16.E.P.-	
311436	01.E 631.25G.16.S.P.-	
311831	01.E 631.40G.16.E.P.-	
300282	01.E 631.40G.16.S.P.-	
312436	01.E 631.80G.16.E.P.-	
312684	01.E 631.80G.16.S.P.-	
312606	01.E 631.130G.16.E.P.-	
312686	01.E 631.130G.16.S.P.-	
1)	01.E 631 MEHRPREIS VITON DICHTUNG	
2)	01.E 631 MEHRPREIS AUSF. KPL. EDELSTAHL	
3)	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
4)	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%

* Preise auf Anfrage / prices on request

1) Surplus price: viton sealing
2) Surplus price: execution complete stainless steel
3) Surplus price: element execution IS 06
4) Surplus price: element execution IS 08

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300297	01.E 950.10P.10.E.P.-	
300298	01.E 950.10P.10.S.P.-	
300302	01.E 950.25P.10.E.P.-	
300303	01.E 950.25P.10.S.P.-	
300740	01.E 950.3VG.10.E.P.-	
300296	01.E 950.3VG.10.S.P.-	
300314	01.E 950.6VG.10.E.P.-	
302335	01.E 950.6VG.10.S.P.-	
300299	01.E 950.10VG.10.E.P.-	
300300	01.E 950.10VG.10.S.P.-	
305652	01.E 950.16VG.10.E.P.-	
300742	01.E 950.16VG.10.S.P.-	
300304	01.E 950.25VG.10.E.P.-	
300306	01.E 950.25VG.10.S.P.-	
300307	01.E 950.25G.10.E.P.-	
300308	01.E 950.25G.10.S.P.-	
300310	01.E 950.40G.10.E.P.-	
300311	01.E 950.40G.10.S.P.-	
300312	01.E 950.80G.10.E.P.-	
300313	01.E 950.80G.10.S.P.-	
300315	01.E 950.130G.10.E.P.-	
305481	01.E 950.130G.10.S.P.-	
[1)]	01.E 950 MEHRPREIS VITON DICHTUNG	
[2)]	01.E 950 MEHRPREIS AUSF. KPL. EDELSTAHL	
[3)]	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
[4)]	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%

310898	01.E 1201.10P.10.E.P.-	
310867	01.E 1201.10P.10.S.P.-	
310899	01.E 1201.25P.10.E.P.-	
310900	01.E 1201.25P.10.S.P.-	
307926	01.E 1201.3VG.10.E.P.-	
311103	01.E 1201.3VG.10.S.P.-	
310868	01.E 1201.6VG.10.E.P.-	
300744	01.E 1201.6VG.10.S.P.-	
309619	01.E 1201.10VG.10.E.P.-	
310869	01.E 1201.10VG.10.S.P.-	
308028	01.E 1201.16VG.10.E.P.-	
309375	01.E 1201.16VG.10.S.P.-	
309655	01.E 1201.25VG.10.E.P.-	
310391	01.E 1201.25VG.10.S.P.-	
310870	01.E 1201.25G.10.E.P.-	
310871	01.E 1201.25G.10.S.P.-	
310748	01.E 1201.40G.10.E.P.-	
310872	01.E 1201.40G.10.S.P.-	
310873	01.E 1201.80G.10.E.P.-	

1) Surplus price: viton sealing
2) Surplus price: execution complete stainless steel
3) Surplus price: element execution IS 06
4) Surplus price: element execution IS 08

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Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price
310874	01.E 1201.80G.10.S.P.-	
310875	01.E 1201.130G.10.E.P.-	
310876	01.E 1201.130G.10.S.P.-	
1)	01.E 1201 MEHRPREIS VITON DICHTUNG	
2)	01.E 1201 MEHRPREIS AUSF. KPL. EDELSTAHL	
3)	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
4)	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%
310902	01.E 2001.10P.10.E.P.-	
305655	01.E 2001.10P.10.S.P.-	
310901	01.E 2001.25P.10.E.P.-	
310881	01.E 2001.25P.10.S.P.-	
305654	01.E 2001.3VG.10.E.P.-	
314498	01.E 2001.3VG.10.S.P.-	
307925	01.E 2001.6VG.10.E.P.-	
307954	01.E 2001.6VG.10.S.P.-	
306631	01.E 2001.10VG.10.E.P.-	
310882	01.E 2001.10VG.10.S.P.-	
310570	01.E 2001.16VG.10.E.P.-	
310883	01.E 2001.16VG.10.S.P.-	
310253	01.E 2001.25VG.10.E.P.-	
310884	01.E 2001.25VG.10.S.P.-	
329351	01.E 2001.10G.10.E.P.-	
300333	01.E 2001.25G.10.E.P.-	
310885	01.E 2001.25G.10.S.P.-	
307485	01.E 2001.40G.10.E.P.-	
318926	01.E 2001.40G.10.S.P.-	
304818	01.E 2001.80G.10.E.P.-	
310887	01.E 2001.80G.10.S.P.-	
310889	01.E 2001.130G.10.E.P.-	
310888	01.E 2001.130G.10.S.P.-	
1)	01.E 2001 MEHRPREIS VITON DICHTUNG	
2)	01.E 2001 MEHRPREIS AUSF. KPL. EDELSTAHL	
3)	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
4)	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%
318503	01.E 3001.10P.10.E.P.-	
	01.E 3001.10P.10.S.P.-	
327484	01.E 3001.25P.10.E.P.-	
	01.E 3001.25P.10.S.P.-	
328977	01.E 3001.3VG.10.E.P.-	
323171	01.E 3001.3VG.10.S.P.-	

1) Surplus price: viton sealing
2) Surplus price: execution complete stainless steel
3) Surplus price: element execution IS 06
4) Surplus price: element execution IS 08

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Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price
333644	01.E 3001.6VG.10.E.P.-	
323170	01.E 3001.6VG.10.S.P.-	
318499	01.E 3001.10VG.10.E.P.-	
311476	01.E 3001.10VG.10.S.P.-	
327642	01.E 3001.16VG.10.E.P.-	
332130	01.E 3001.16VG.10.S.P.-	
318500	01.E 3001.25VG.10.E.P.-	
332292	01.E 3001.25VG.10.S.P.-	
318502	01.E 3001.25G.10.E.P.-	
	01.E 3001.25G.10.S.P.-	
311033	01.E 3001.40G.10.E.P.-	
	01.E 3001.40G.10.S.P.-	
307360	01.E 3001.80G.10.E.P.-	
326933	01.E 3001.80G.10.S.P.-	
	01.E 3001.130G.10.E.P.-	
	01.E 3001.130G.10.S.P.-	
[1)]	01.E 3001 MEHRPREIS VITON DICHTUNG	
[2)]	01.E 3001 MEHRPREIS AUSF. KPL. EDELSTAHL	
[3)]	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
[4)]	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%
	01.E 4001.10P.10.E.P.-	
	01.E 4001.10P.10.S.P.-	
	01.E 4001.25P.10.E.P.-	
	01.E 4001.25P 10.S.P.-	
322241	01.E 4001.3VG.10.E.P.-	
323172	01.E 4001.3VG.10.S.P.-	
328976	01.E 4001.6VG.10.E.P.-	
323168	01.E 4001.6VG.10.S.P.-	
321321	01.E 4001.10VG.10.E.P.-	
332001	01.E 4001.10VG.10.S.P.-	
	01.E 4001.16VG.10.E.P.-	
	01.E 4001.16VG.10.S.P.-	
333010	01.E 4001.25VG.10.E.P.-	
332677	01.E 4001.25VG.10.S.P.-	
321371	01.E 4001.25G.10.E.P.-	
	01.E 4001.25G.10.S.P.-	
	01.E 4001.40G.10.E.P.-	
	01.E 4001.40G.10.S.P.-	
	01.E 4001.80G.10.E.P.-	
	01.E 4001.80G.10.S.P	
	01.E 4001.130G.10.E.P.-	
	01.E 4001.130G.10.S.P.-	
[1)]	Mehrpreis E 4001 für Viton-Dichtung	
[2)]	Mehrpreis E 4001 Ausf. Kompl. VA	
[3)]	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
[4)]	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%

1) Surplus price: viton sealing
2) Surplus price: execution complete stainless steel
3) Surplus price: element execution IS 06
4) Surplus price: element execution IS 08

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Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price
302797	01.FE 200.10P.16.E.P.-	
300763	01.FE 200.10P.16.S.P.-	
303292	01.FE 200.25P.16.E.P.-	
300347	01.FE 200.25P.16.S.P.-	
302795	01.FE 200.3VG.16.E.P.-	
301803	01.FE 200.3VG.16.S.P.-	
303160	01.FE 200.6VG.16.E.P.-	
300767	01.FE 200.6VG.16.S.P.-	
300344	01.FE 200.10VG.16.E.P.-	
300345	01.FE 200.10VG.16.S.P.-	
305704	01.FE 200.16VG.16.E.P.-	
305705	01.FE 200.16VG.16.S.P.-	
300348	01.FE 200.25VG.16.E.P.-	
300765	01.FE 200.25VG.16.S.P.-	
300349	01.FE 200.25G.16.E.P.-	
300351	01.FE 200.25G.16.S.P.-	
303166	01.FE 200.40G.16.E.P.-	
300352	01.FE 200.40G.16.S.P.-	
300353	01.FE 200.80G.16.E.P.-	
304877	01.FE 200.80G.16.S.P.-	
302173	01.FE 200.130G.16.E.P.-	
300768	01.FE 200.130G.16.S.P.-	
[1]	01.FE 200 MEHRPREIS VITON DICHTUNG	
[2]	01.FE 200 MEHRPREIS AUSF. KPL. EDELSTAHL	
[3]	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
[4]	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%

1) Surplus price: viton sealing
2) Surplus price: execution complete stainless steel
3) Surplus price: element execution IS 06
4) Surplus price: element execution IS 08

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Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price
	1.3 Filterelemente/Filter Elements 01.N, NL, NR	
306802	01.N 100.3VG.16.E.P.-	
304583	01.N 100.6VG.16.E.P.-	
300360	01.N 100.10VG.16.E.P.-	
303266	01.N 100.16VG.16.E.P.-	
302108	01.N 100.25VG.16.E.P.-	
300362	01.N 100.25G.16.E.P.-	
300363	01.N 100.40G.16.E.P.-	
300364	01.N 100.80G.16.E.P.-	
300777	01.N 100.130G.16.E.P.-	
1)	01.N 100 MEHRPREIS VITON DICHTUNG	
2)	01.N 100 MEHRPREIS AUSF. KPL. EDELSTAHL	
3)	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
4)	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%
312621	01.NL 40.3VG.30.E.P.-	
313873	01.NL 40.3VG.HR.E.P.-	
312623	01.NL 40.6VG.30.E.P.-	
312884	01.NL 40.6VG.HR.E.P.-	
311433	01.NL 40.10VG.30.E.P.-	
312299	01.NL 40.10VG.HR.E.P.-	
312211	01.NL 40.16VG.30.E.P.-	
311520	01.NL 40.16VG.HR.E.P.-	
312542	01.NL 40.25VG.30.E.P.-	
314169	01.NL 40.25VG.HR.E.P.-	
312624	01.NL 40.25G.30.E.P.-	
319349	01.NL 40.25G.HR.E.P.-	
1)	01.NL 40 MEHRPREIS VITON DICHTUNG	
2)	01.NL 40 MEHRPREIS AUSF. KPL. EDELSTAHL	
3)	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
4)	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%

* Preise auf Anfrage / prices on request

1) Surplus price: viton sealing
2) Surplus price: execution complete stainless steel
3) Surplus price: element execution IS 06
4) Surplus price: element execution IS 08

Artikelnr. / Ident.no.	Artikelbezeichnung / Designation	Netto-Preis / Unit-Price
312636	01.NL 63.3VG.30.E.P.-	
316536	01.NL 63.3VG.HR.E.P.-	
312637	01.NL 63.6VG.30.E.P.-	
317323	01.NL 63.6VG.HR.E.P.-	
311365	01.NL 63.10VG.30.E.P.-	
311487	01.NL 63.10VG.HR.E.P.-	
312482	01.NL 63.16VG.30.E.P.-	
314423	01.NL 63.16VG.HR.E.P.-	
311571	01.NL 63.25VG.30.E.P.-	
315123	01.NL 63.25VG.HR.E.P.-	
312638	01.NL 63.25G.30.E.P.-	
325068	01.NL 63.25G.HR.E.P.-	
312639	01.NL 63.40G.30.E.P.-	
	01.NL 63.40G.HR.E.P.-	
312640	01.NL 63.80G.30.E.P.-	
	01.NL 63.80G.HR.E.P.-	
312641	01.NL 63.130G.30.E.P.-	
	01.NL 63.130G.HR.E.P.-	
	1) 01.NL 63 MEHRPREIS VITON DICHTUNG	
	2) 01.NL 63 MEHRPREIS AUSF. KPL. EDELSTAHL	
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%
312649	01.NL 100.3VG.30.E.P.-	
312797	01.NL 100.3VG.HR.E.P.-	
312651	01.NL 100.6VG.30.E.P.-	
313670	01.NL 100.6VG.HR.E.P.-	
311574	01.NL 100.10VG.30.E.P.-	
312301	01.NL 100.10VG.HR.E.P.-	
312652	01.NL 100.16VG.30.E.P.-	
314446	01.NL 100.16VG.HR.E.P.-	
312653	01.NL 100.25VG.30.E.P.-	
301752	01.NL 100.25VG.HR.E.P.-	
312654	01.NL 100.25G.30.E.P.-	
333415	01.NL 100.25G.HR.E.P.-	
312655	01.NL 100.40G.30.E.P.-	
333570	01.NL 100.40G.HR.E.P.-	
312656	01.NL 100.80G..30.E.P.-	
	01.NL 100.80G..HR.E.P.-	
312657	01.NL 100.130G.30.E.P.-	
	01.NL 100.130G.HR.E.P.-	
	1) 01.NL 100 MEHRPREIS VITON DICHTUNG	
	2) 01.NL 100 MEHRPREIS AUSF. KPL. EDELSTAHL	
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%

* Preise auf Anfrage / prices on request

1) Surplus price: viton sealing
2) Surplus price: execution complete stainless steel
3) Surplus price: element execution IS 06
4) Surplus price: element execution IS 08

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Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price
331299	01.NL 160.6VG.30.E.P.-	
326145	01.NL 160.10VG.30.E.P.-	
326205	01.NL 160.10VG.HR.E.P.-	
*	01.NL 160.16VG.30.E.P.-	
*	01.NL 160.16VG.HR.E.P.-	
324128	01.NL 160.25VG.30.E.P.-	
1)	01.NL 160 MEHRPREIS VITON DICHTUNG	
2)	01.NL 160 MEHRPREIS AUSF. KPL. EDELSTAHL	
3)	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
4)	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%
300784	01.NL 250.3VG.30.E.P.-	
300790	01.NL 250.6VG.30.E.P.-	
300367	01.NL 250.10VG.30.E.P.-	
306809	01.NL 250.16VG.30.E.P.-	
301900	01.NL 250.25VG.30.E.P.-	
300368	01.NL 250.25G.30.E.P.-	
300789	01.NL 250.40G.30.E.P.-	
300370	01.NL 250.80G.30.E.P.-	
303040	01.NL 250.130G.30.E.P.-	
1)	01.NL 250 MEHRPREIS VITON DICHTUNG	
2)	01.NL 250 MEHRPREIS AUSF. KPL. EDELSTAHL	
3)	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
4)	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%
307250	01.NL 400.3VG.30.E.P.-	
311449	01.NL 400.3VG.HR.E.P.-	
307251	01.NL 400.6VG.30.E.P.-	
311448	01.NL 400.6VG.HR.E.P.-	
307252	01.NL 400.10VG.30.E.P.-	
312800	01.NL 400.10VG.HR.E.P.-	
307253	01.NL 400.16VG.30.E.P.-	
319969	01.NL 400.16VG.HR.E.P.-	
307255	01.NL 400.25VG.30.E.P.-	
314880	01.NL 400.25VG.HR.E.P.-	
307254	01.NL 400.25G.30.E.P.-	
	01.NL 400.25G.HR.E.P	
307256	01.NL 400.40G.30.E.P.-	
307257	01.NL 400.80G.30.E.P.-	
307258	01.NL 400.130G.30.E.P.-	
1)	01.NL 400 MEHRPREIS VITON DICHTUNG	
2)	01.NL 400 MEHRPREIS AUSF. KPL. EDELSTAHL	
3)	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
4)	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%

1) Surplus price: viton sealing
2) Surplus price: execution complete stainless steel
3) Surplus price: element execution IS 06
4) Surplus price: element execution IS 08

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Artikelnr. / Ident.no.	Artikelbezeichnung / Designation	Netto-Preis / Unit-Price
300371	01.NL 630.3VG.30.E.P.-	
300795	01.NL 630.6VG.30.E.P.-	
300791	01.NL 630.10VG.30.E.P.-	
305010	01.NL 630.16VG.30.E.P.-	
300792	01.NL 630.25VG.30.E.P.-	
300373	01.NL 630.25G.30.E.P.-	
300374	01.NL 630.40G.30.E.P.-	
300794	01.NL 630.80G.30.E.P.-	
300798	01.NL 630.130G.30.E.P.-	
	1) 01.NL 630 MEHRPREIS VITON DICHTUNG	
	2) 01.NL 630 MEHRPREIS AUSF. KPL. EDELSTAHL	
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%
332285	01.NL 1000.3VG.30.E.P.-	
333730	01.NL 1000.6VG.30.E.P.-	
329301	01.NL 1000.10VG.30.E.P.-	
	01.NL 1000.16VG.30.E.P.-	
329942	01.NL 1000.25VG.30.E.P.-	
	01.NL 1000.10G.30.E.P.-	
327855	01.NL 1000.25G.30.E.P.-	
	01.NL 1000.40G.30.E.P.-	
	01.NL 1000.80G.30.E.P.-	
	01.NL 1000.130G.30.E.P.-	
	1) 01.NL 1000 MEHRPREIS VITON DICHTUNG	
	2) 01.NL 1000 MEHRPREIS AUSF. KPL. EDELSTAHL	
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%
325921	01.NR 40.10VG.10.B.P.-	
331789	01.NR 40.16VG.10.B.P.-	
324901	01.NR 40.25VG.10.B.P.-	
	1) 01.NR 40 MEHRPREIS VITON DICHTUNG	
	2) 01.NR 40 MEHRPREIS AUSF. KPL. EDELSTAHL	
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%

* Preise auf Anfrage / prices on request

1) Surplus price: viton sealing
2) Surplus price: execution complete stainless steel
3) Surplus price: element execution IS 06
4) Surplus price: element execution IS 08

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Vergleichsliste Filterelemente
Cross Reference List Filter - Elements

Artikelnr. / Ident.no.	Artikelbezeichnung / Designation	Netto-Preis / Unit-Price
317483	01.NR 63.3VG.10.B.P.-	
317484	01.NR 63.6VG.10.B.P.-	
314218	01.NR 63.10VG.10.B.P.-	
313876	01.NR 63.16VG.10.B.P.-	
312792	01.NR 63.25VG.10.B.P.-	
	1) 01.NR 63 MEHRPREIS VITON DICHTUNG	
	2) 01.NR 63 MEHRPREIS AUSF. KPL. EDELSTAHL	
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%
317487	01.NR 100.3VG.10.B.P.-	
316886	01.NR 100.6VG.10.B.P.-	
313167	01.NR 100.10VG.10.B.P.-	
314015	01.NR 100.16VG.10.B.P.-	
312504	01.NR 100.25VG.10.B.P.-	
	1) 01.NR 100 MEHRPREIS VITON DICHTUNG	
	2) 01.NR 100 MEHRPREIS AUSF. KPL. EDELSTAHL	
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%
314485	01.NR 160.3VG.10.B.P.-	
314486	01.NR 160.6VG.10.B.P.-	
314220	01.NR 160.10VG.10.B.P.-	
314448	01.NR 160.16VG.10.B.P.-	
314449	01.NR 160.25VG.10.B.P.-	
	1) 01.NR 160 MEHRPREIS VITON DICHTUNG	
	2) 01.NR 160 MEHRPREIS AUSF. KPL. EDELSTAHL	
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%
315444	01.NR 250.1VG.10.B.P.-	
314491	01.NR 250.3VG.10.B.P.-	
314492	01.NR 250.6VG.10.B.P.-	
314191	01.NR 250.10VG.10.B.P.-	
314453	01.NR 250.16VG.10.B.P.-	
314454	01.NR 250.25VG.10.B.P.-	
319214	01.NR 250.25G.10.B.P.-	
322204	01.NR 250.40G.10.B.P.-	
327737	01.NR 250.80G.10.B.P.-	
	1) 01.NR 250 MEHRPREIS VITON DICHTUNG	
	2) 01.NR 250 MEHRPREIS AUSF. KPL. EDELSTAHL	
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%
317489	01.NR 400.3VG.10.B.P.-	
314817	01.NR 400.6VG.10.B.P.-	
314870	01.NR 400.10VG.10.B.P.-	

1) Surplus price: viton sealing
2) Surplus price: execution complete stainless steel
3) Surplus price: element execution IS 06
4) Surplus price: element execution IS 08

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Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price
317491	01.NR 400.16VG.10.B.P.-	
317492	01.NR 400.25VG.10.B.P.-	
319373	01.NR 400.25G.10.B.P.-	
327541	01.NR 400.80G.10.B.P.-	
1)	01.NR 400 MEHRPREIS VITON DICHTUNG	
2)	01.NR 400 MEHRPREIS AUSF. KPL. EDELSTAHL	
3)	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
4)	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%
315136	01.NR 630.1VG.10.B.P.-	
304533	01.NR 630.3VG.10.B.P.-	
304534	01.NR 630.6VG.10.B.P.-	
304535	01.NR 630.10VG.10.B.P.-	
306650	01.NR 630.16VG.10.B.P.-	
305036	01.NR 630.25VG.10.B.P.-	
304916	01.NR 630.25G.10.B.P.-	
306601	01.NR 630.40G.10.B.P.-	
306602	01.NR 630.80G.10.B.P.-	
306603	01.NR 630.130G.10.B.P.-	
1)	01.NR 630 MEHRPREIS VITON DICHTUNG	
2)	01.NR 630 MEHRPREIS AUSF. KPL. EDELSTAHL	
3)	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
4)	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%
317272	01.NR 1000.1VG.10.B.P.-	
306604	01.NR 1000.3VG.10.B.P.-	
305449	01.NR 1000.6VG.10.B.P.-	
306605	01.NR 1000.10VG.10.B.P.-	
306607	01.NR 1000.16VG.10.B.P.-	
306606	01.NR 1000.25VG.10.B.P.-	
319414	01.NR 1000.25VG.10.B.N.IS07	
306608	01.NR 1000.25G.10.B.P.-	
306609	01.NR 1000.40G.10.B.P.-	
306610	01.NR 1000.80G.10.B.P.-	
306611	01.NR 1000.130G.10.B.P.-	
1)	01.NR 1000 MEHRPREIS VITON DICHTUNG	
2)	01.NR 1000 MEHRPREIS AUSF. KPL. EDELSTAHL	
3)	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
4)	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%

1.4 Filterelemente/Filter Elements 01.FEK, FEKS

300339	01.FEK 60.25G.4.E.O.-	
300340	01.FEKS 60.25G.16.E. O.VA	
300341	01.FEKS 60.80G.16.E. O.VA	

1.5 Filterelemente/Filter Elements 01.DSF

300356	01.DSF 150.25G.16.E.P.-	
300357	01.DSF 150.40G.16.E.P.-	
300772	01.DSF 300.25G.16.E.P.-	
306056	01.DSF 300.40G.16.E.P.-	

1) Surplus price: viton sealing
2) Surplus price: execution complete stainless steel
3) Surplus price: element execution IS 06
4) Surplus price: element execution IS 08

Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price

1.6 Filterelemente/Filter Elements 01.NBF

312425	01.NBF 25-40.3VL.B.P
300033	01.NBF 25-40.10P.B.O
312426	01.NBF 55-85.3VL.B.P
300035	01.NBF 55-85.10P.B.O

1.7 Filterelemente/Filter Elements 01.AS

312237	01.AS 220.25G.-.B.-.-
314166	01.AS 220.40G.-.B.-.-
305032	01.AS 220.80G.-.B.-.-
311175	01.AS 631.25G.-.B.-.-
311176	01.AS 631.40G.-.B.-.-
311178	01.AS 631.80G.-.B.-.-

1.8 Filterelemente/Filter Elements 01.TS

305214	01.TS 210.10P.-.B.-.-
308052	01.TS 210.25P.-.B.-.-
308049	01.TS 210.3VG.-.B.-.-
308050	01.TS 210.6VG.-.B.-.-
307697	01.TS 210.10VG.-.B.-.-
308053	01.TS 210.16VG.-.B.-.-
308055	01.TS 210.25VG.-.B.-.-
308056	01.TS 210.25G.-.B.-.-
308057	01.TS 210.40G.-.B.-.-
310858	01.TS 210.80G.-.B.-.-
331219	01.TS 210.130G.-.B.-.-
305926	01.TS 310.10P.-.B.-.-
305771	01.TS 310.25P.-.B.-.-
308058	01.TS 310.3VG.-.B.-.-
308059	01.TS 310.6VG.-.B.-.-
307233	01.TS 310.10VG.-.B.-.-
308060	01.TS 310.16VG.-.B.-.-
308061	01.TS 310.25VG.-.B.-.-
308062	01.TS 310.25G.-.B.-.-
308063	01.TS 310.40G.-.B.-.-
318170	01.TS 310.80G.-.B.-.-
321931	01.TS 310.130G.-.B.-.-
308067	01.TS 425.10P.-.B.-.-
308068	01.TS 425.25P.-.B.-.-
308064	01.TS 425.3VG.-.B.-.-
308066	01.TS 425.6VG.-.B.-.-
307478	01.TS 425.10VG.-.B.-.-
308069	01.TS 425.16VG.-.B.-.-
306592	01.TS 425.25VG.-.B.-.-

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308070	01.TS 425.25G.-.B.-.-	
308072	01.TS 425.40G.-.B.-.-	
322341	01.TS 425.80G.-.B.-.-	
322342	01.TS 425.130G.-.B.-.-	
322440	01.TS 625.10P.-.B.-.-	
323030	01.TS 625.25P.-.B.-.-	
	01.TS 625.3VG.-.B.-.-	
	01.TS 625.6VG.-.B.-.-	
321951	01.TS 625.10VG.-.B.-.-	
327407	01.TS 625.16VG.-.B.-.-	
318706	01.TS 625.25VG.-.B.-.-	
326764	01.TS 625.25G.-.B.-.-	
321955	01.TS 625.40G.-.B.-.-	
323028	01.TS 625.80G.-.B.-.-	
330203	01.TS 625.130G.-.B.-.-	

1.9 Filterelemente/Filter Elements 01.RS...

314539	01.RS 175.10VG.10.B.P.-	
314686	01.RS 175.16VG.10.B.P.-	
	01.RS 175.25VG.10.B.P.-	
314540	01.RS 225.10VG.10.B.P.-	
317199	01.RS 225.16VG.10.B.P.-	
316976	01.RS 225.25VG.10.B.P.-	

1.10 Filterelemente/Filter Elements 01.WSNR...

322233	01.WSNR 250.3WVG.10.B.P.-	
326676	01.WSNR 250.3WVG.10.B.V.-	
322225	01.WSNR 250.10WVG.10.B.P.-	
323529	01.WSNR 250.10WVG.10.B.V.-	
324003	01.WSNR 250.10WVG.10.B.V.IS06	
320911	01.WSNR 630.3WVG.10.B.P.-	
327113	01.WSNR 630.3WVG.10.B.V.-	
319982	01.WSNR 630.10WVG.10.B.P.-	
326121	01.WSNR 630.10WVG.10.B.V.-	
322223	01.WSNR 1000.3WVG.10.B.P.-	
322220	01.WSNR 1000.10WVG.10.B.P.-	

1.11 Kombielemente/Combi Elements

	01.NL 630.32760.6VG.25G.30.B.V.-.S1	
	01.NL 630.32760.10VG.25G.30.B.V.-.S1	
321284	01.NR 1000.32227.6VG.25G.25.B.V.-.S1	
319435	01.NR 1000.32227.10VG.25G.25.B.V.-.S1	

Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price

2. Abmessungen/Sizes Hydac

2.1 Filterelemente/Filter Elements 02.R..HC

323181	02.0060 R.3VG.30.HC.S.P	0060 R 003 BN HC
324829	02.0060 R.6VG.30.HC.S.P	0060 R 005 BN HC
322642	02.0060 R.10VG.30.HC.S.P	0060 R 010 BN HC
322087	02.0060 R.20VG.30.HC.S.P	0060 R 020 BN HC
323103	02.0060 R.25G.30.HC.S.P	0060 R 025 W HC
1)	02.0060 R MEHRPREIS VITON DICHTUNG	

324832	02.0110 R.3VG.30.HC.S.P	0110 R 003 BN HC
324834	02.0110 R.6VG.30.HC.S.P	0110 R 005 BN HC
322668	02.0110 R.10VG.30.HC.S.P	0110 R 010 BN HC
322085	02.0110 R 20VG.30.HC.S.P	0110 R 020 BN HC
322409	02.0110 R.25G.30.HC.S.P	0110 R 025 W HC
1)	02.0110 R MEHRPREIS VITON DICHTUNG	

310581	02.0160 R.3VG.30.HC.S.P	0160 R 003 BN HC
310584	02.0160 R.6VG.30.HC.S.P	0160 R 005 BN HC
310585	02.0160 R.10VG.30.HC.S.P	0160 R 010 BN HC
310586	02.0160 R.20VG.30.HC.S.P	0160 R 020 BN HC
311039	02.0160 R.25G.30.HC.S.P	0160 R 025 W HC
1)	02.0160 R MEHRPREIS VITON DICHTUNG	

325671	02.0165 R.3VG.30.HC.S.P	0165 R 003 BN HC
324389	02.0165 R.6VG.30.HC.S.P	0165 R 005 BN HC
320121	02.0165 R.10VG.30.HC.S.P	0165 R 010 BN HC
319506	02.0165 R.20VG.30.HC.S.P	0165 R 020 BN HC
324697	02.0165 R.25G.30.HC.S.P	0165 R 025 W HC
1)	02.0165 R MEHRPREIS VITON DICHTUNG	

310591	02.0240 R.3VG.30.HC.S.P	0240 R 003 BN HC
310592	02.0240 R.6VG.30.HC.S.P	0240 R 005 BN HC
310593	02.0240 R.10VG.30.HC.S.P	0240 R 010 BN HC
310594	02.0240 R.20VG.30.HC.S.P	0240 R 020 BN HC
311041	02.0240 R.25G.30.HC.S.P	0240 R 025 W HC
1)	02.0240 R MEHRPREIS VITON DICHTUNG	

307308	02.0330 R.3VG.30.HC.S.P	0330 R 003 BN HC
307309	02.0330 R.6VG.30.HC.S.P	0330 R 005 BN HC
307302	02.0330 R.10VG.30.HC.S.P	0330 R 010 BN HC
307310	02.0330 R.20VG.30.HC.S.P	0330 R 020 BN HC
311043	02.0330 R.25G.30.HC.S.P	0330 R 025 W HC
1)	02.0330 R MEHRPREIS VITON DICHTUNG	

1) Surplus price: viton sealing

Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price
307311	02.0500 R.3VG.30.HC.S.P	0500 R 003 BN HC
307312	02.0500 R.6VG.30.HC.S.P	0500 R 005 BN HC
307215	02.0500 R.10VG.30.HC.S.P	0500 R 010 BN HC
307313	02.0500 R.20VG.30.HC.S.P	0500 R 020 BN HC
311045	02.0500 R.25G.30.HC.S.P	0500 R 025 W HC
1)	02.0500 R MEHRPREIS VITON DICHTUNG	
307617	02.0660 R.3VG.30.HC.S.P	0660 R 003 BN HC
307618	02.0660 R.6VG.30.HC.S.P	0660 R 005 BN HC
307620	02.0660 R.10VG.30.HC.S.P	0660 R 010 BN HC
307621	02.0660 R.20VG.30.HC.S.P	0660 R 020 BN HC
311047	02.0660 R.25G.30.HC.S.P	0660 R 025 W HC
326614	02.0660 R.50G.30.HC.S.P	0660 R 050 W HC
1)	02.0660 R MEHRPREIS VITON DICHTUNG	
307622	02.0850 R.3VG.30.HC.S.P	0850 R 003 BN HC
307623	02.0850 R.6VG.30.HC.S.P	0850 R 005 BN HC
307624	02.0850 R.10VG.30.HC.S.P	0850 R 010 BN HC
307625	02.0850 R.20VG.30.HC.S.P	0850 R 020 BN HC
311049	02.0850 R.25G.30.HC.S.P	0850 R 025 W HC
1)	02.0850 R MEHRPREIS VITON DICHTUNG	
310573	02.0950 R.3VG.30.HC.S.P	0950 R 003 BN HC
310574	02.0950 R.6VG.30.HC.S.P	0950 R 005 BN HC
310575	02.0950 R.10VG.30.HC.S.P	0950 R 010 BN HC
310576	02.0950 R.20VG.30.HC.S.P	0950 R 020 BN HC
311051	02.0950 R.25G.30.HC.S.P	0950 R 025 W HC
1)	02.0950 R MEHRPREIS VITON DICHTUNG	
310557	02.1300 R.3VG.30.HC.S.P	1300 R 003 BN HC
310558	02.1300 R.6VG.30.HC.S.P	1300 R 005 BN HC
310559	02.1300 R.10VG.30.HC.S.P	1300 R 010 BN HC
310560	02.1300 R.20VG.30.HC.S.P	1300 R 020 BN HC
311053	02.1300 R.25G.30.HC.S.P	1300 R 025 W HC
1)	02.1300 R MEHRPREIS VITON DICHTUNG	
322897	02.1700 R.3VG.30.HC.S.P	1700 R 003 BN HC
322363	02.1700 R.6VG.30.HC.S.P	1700 R 005 BN HC
319011	02.1700 R 10VG.30.HC.S.P	1700 R 010 BN HC
319012	02.1700 R 20VG.30.HC.S.P	1700 R 020 BN HC
	02.1700 R 25G.30.HC.S.P	1700 R 025W HC
1)	02.1700 R MEHRPREIS VITON DICHTUNG	
322788	02.2600 R.3VG.30.HC.S.P	2600 R 003 BN HC
322789	02.2600 R.6VG.30.HC.S.P	2600 R 005 BN HC
315502	02.2600 R.10VG.30.HC.S.P	2600 R 010 BN HC
323912	02.2600 R.20VG.30.HC.S.P	2600 R 020 BN HC
319469	02.2600 R.25G.30.HC.S.P	2600 R 025 W HC
1)	02.2600 R MEHRPREIS VITON DICHTUNG	

1) Surplus price: viton sealing

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Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price

2.2 Filterelemente/Filter Elements 02.D..HC

	02.0055 D.3VG.30.HC.E.P	0055 D 003 BN HC
333977	02.0055 D.6VG.30.HC.E.P	0055 D 005 BN HC
330089	02.0055 D.10VG.30.HC.E.P	0055 D 010 BN HC
	02.0055 D.20VG.30.HC.E.P	0055 D 020 BN HC
	02.0055 D MEHRPREIS VITON DICHTUNG	
305276	02.0060 D.3VG.30.HC.E.P	0060 D 003 BN HC
306002	02.0060 D.3VG.HR.HC.E.P	0060 D 003 BH HC
300400	02.0060 D.6VG.30.HC.E.P	0060 D 005 BN HC
300833	02.0060 D.6VG.HR.HC.E.P	0060 D 005 BH HC
300398	02.0060 D.10VG.30.HC.E.P	0060 D 010 BN HC
300399	02.0060 D.10VG.HR.HC.E.P	0060 D 010 BH HC
300832	02.0060 D.20VG.30.HC.E.P	0060 D 020 BN HC
302192	02.0060 D.20VG.HR.HC.E.P	0060 D 020 BH HC
317991	02.0060 D.25G.30.HC.E.P	0060 D 025 W HC
1)	02.0060 D MEHRPREIS VITON DICHTUNG	
	02.0075 D.3VG.30.HC.E.P	0075 D 003 BN HC
331320	02.0075 D.6VG.30.HC.E.P	0075 D 005 BN HC
330091	02.0075 D.10VG.30.HC.E.P	0075 D 010 BN HC
	02.0075 D.20VG.30.HC.E.P	0075 D 020 BN HC
1)	02.0075 D MEHRPREIS VITON DICHTUNG	

1) Surplus price: viton sealing

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306194	02.0110 D.3VG.30.HC.E.P	0110 D 003 BN HC
300839	02.0110 D.3VG.HR.HC.E.P	0110 D 003 BH HC
303530	02.0110 D.6VG.30.HC.E.P	0110 D 005 BN HC
300405	02.0110 D.6VG.HR.HC.E.P	0110 D 005 BH HC
300403	02.0110 D.10VG.30.HC.E.P	0110 D 010 BN HC
300840	02.0110 D.10VG.HR.HC.E.P	0110 D 010 BH HC
300404	02.0110 D.20VG.30.HC.E.P	0110 D 020 BN HC
300841	02.0110 D.20VG.HR.HC.E.P	0110 D 020 BH HC
323407	02.0110 D.25G.30.HC.E.P	0110 D 25 W HC
1)	02.0110 D MEHRPREIS VITON DICHTUNG	
306199	02.0140 D.3VG.30.HC.E.P	0140 D 003 BN HC
306203	02.0140 D.3VG.HR.HC.E.P	0140 D 003 BH HC
306200	02.0140 D.6VG.30.HC.E.P	0140 D 005 BN HC
306204	02.0140 D.6VG.HR.HC.E.P	0140 D 005 BH HC
303306	02.0140 D.10VG.30.HC.E.P	0140 D 010 BN HC
306334	02.0140 D.10VG.HR.HC.E.P	0140 D 010 BH HC
306202	02.0140 D.20VG.30.HC.E.P	0140 D 020 BN HC
306205	02.0140 D.20VG.HR.HC.E.P	0140 D 020 BH HC
	02.0140 D.25G.30.HC.E.P	0140 D 25 W HC
1)	02.0140 D MEHRPREIS VITON DICHTUNG	
304872	02.0160 D.3VG.30.HC.E.P	0160 D 003 BN HC
300847	02.0160 D.3VG.HR.HC.E.P	0160 D 003 BH HC
300416	02.0160 D.6VG.30.HC.E.P	0160 D 005 BN HC
300417	02.0160 D.6VG.HR.HC.E.P	0160 D 005 BH HC
300848	02.0160 D.10VG.30.HC.E.P	0160 D 010 BN HC
300412	02.0160 D.10VG.HR.HC.E.P	0160 D 010 BH HC
300413	02.0160 D.20VG.30.HC.E.P	0160 D 020 BN HC
300414	02.0160 D.20VG.HR.HC.E.P	0160 D 020 BH HC
324245	02.0160 D.25G.30.HC.E.P	0160 D 025 W HC
1)	02.0160 D MEHRPREIS VITON DICHTUNG	

1) Surplus price: viton sealing

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306211	02.0240 D.3VG.30.HC.E.P	0240 D 003 BN HC
300853	02.0240 D.3VG.HR.HC.E.P	0240 D 003 BH HC
300426	02.0240 D.6VG.30.HC.E.P	0240 D 005 BN HC
306214	02.0240 D.6VG.HR.HC.E.P	0240 D 005 BH HC
300423	02.0240 D.10VG.30.HC.E.P	0240 D 010 BN HC
302841	02.0240 D.10VG.HR.HC.E.P	0240 D 010 BH HC
300425	02.0240 D.20VG.30.HC.E.P	0240 D 020 BN HC
304431	02.0240 D.20VG.HR.HC.E.P	0240 D 020 BH HC
325077	02.0240 D.25G.30.HC.E.P	0240 D 025 W HC
328269	02.0240 D.50G.30.HC.E.P	0240 D 050 W HC
1)	02.0240 D MEHRPREIS VITON DICHTUNG	
306217	02.0280 D.3VG.30.HC.E.P	0280 D 003 BN HC
306221	02.0280 D.3VG.HR.HC.E.P	0280 D 003 BH HC
306218	02.0280 D.6VG.30.HC.E.P	0280 D 005 BN HC
306222	02.0280 D.6VG.HR.HC.E.P	0280 D 005 BH HC
306219	02.0280 D.10VG.30.HC.E.P	0280 D 010 BN HC
306223	02.0280 D.10VG.HR.HC.E.P	0280 D 010 BH HC
306220	02.0280 D.20VG.30.HC.E.P	0280 D 020 BN HC
306224	02.0280 D.20VG.HR.HC.E.P	0280 D 020 BH HC
329623	02.0280 D.25G.30.HC.E.P	0280 D 025 W HC
1)	02.0280 D MEHRPREIS VITON DICHTUNG	
300431	02.0330 D.3VG.30.HC.E.P	0330 D 003 BN HC
300861	02.0330 D.3VG.HR.HC.E.P	0330 D 003 BH HC
300864	02.0330 D.6VG.30.HC.E.P	0330 D 005 BN HC
300865	02.0330 D.6VG.HR.HC.E.P	0330 D 005 BH HC
300862	02.0330 D.10VG.30.HC.E.P	0330 D 010 BN HC
300432	02.0330 D.10VG.HR.HC.E.P	0330 D 010 BH HC
300863	02.0330 D.20VG.30.HC.E.P	0330 D 020 BN HC
300433	02.0330 D.20VG.HR.HC.E.P	0330 D 020 BH HC
326 980	02.0330 D.25G.30.HC.E.P	0330 D 025 W HC
1)	02.0330 D MEHRPREIS VITON DICHTUNG	

1) Surplus price: viton sealing

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Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price
306230	02.0500 D.3VG.30.HC.E.P	0500 D 003 BN HC
306234	02.0500 D.3VG.HR.HC.E.P	0500 D 003 BH HC
306231	02.0500 D.6VG.30.HC.E.P	0500 D 005 BN HC
306235	02.0500 D.6VG.HR.HC.E.P	0500 D 005 BH HC
306232	02.0500 D.10VG.30.HC.E.P	0500 D 010 BN HC
306236	02.0500 D.10VG.HR.HC.E.P	0500 D 010 BH HC
306233	02.0500 D.20VG.30.HC.E.P	0500 D 020 BN HC
306237	02.0500 D.20VG.HR.HC.E.P	0500 D 020 BH HC
306229	02.0500 D.25G.30.HC.E.P	0500 D 025 W HC
[1]	02.0500 D MEHRPREIS VITON DICHTUNG	
301800	02.0660 D.3VG.30.HC.E.P	0660 D 003 BN HC
303658	02.0660 D.3VG.HR.HC.E.P	0660 D 003 BH HC
306239	02.0660 D.6VG.30.HC.E.P	0660 D 005 BN HC
300441	02.0660 D.6VG.HR.HC.E.P	0660 D 005 BH HC
300438	02.0660 D.10VG.30.HC.E.P	0660 D 010 BN HC
303305	02.0660 D.10VG.HR.HC.E.P	0660 D 010 BH HC
300439	02.0660 D.20VG.30.HC.E.P	0660 D 020 BN HC
300440	02.0660 D.20VG.HR.HC.E.P	0660 D 020 BH HC
319747	02.0660 D.25G.30.HC.E.P	0660 D 025 W HC
[1]	02.0660 D MEHRPREIS VITON DICHTUNG	
	02.0990 D.3VG.30.HC.E.P	0990 D 003 BN HC
333006	02.0990 D.3VG.HR.HC.E.P	0990 D 003 BH HC
	02.0990 D.6VG.30.HC.E.P	0990 D 005 BN HC
334877	02.0990 D.6VG.HR.HC.E.P	0990 D 005 BH HC
330193	02.0990 D.10VG.30.HC.E.P	0990 D 010 BN HC
330190	02.0990 D.10VG.HR.HC.E.P	0990 D 010 BH HC
	02.0990 D.20VG.30.HC.E.P	0990 D 020 BN HC
	02.0990 D.20VG.HR.HC.E.P	0990 D 020 BH HC
331976	02.0990 D.25G.30.HC.E.P	0990 D 025 W HC
[1]	02.0990 D MEHRPREIS VITON DICHTUNG	

1) Surplus price: viton sealing
2) Surplus price: execution complete stainless steel
3) Surplus price: element execution IS 06
4) Surplus price: element execution IS 08

Artikelnr. Ident.no.	Artikelbezeichnung Designation		Netto-Preis Unit-Price
	02.1320 D.3VG.30.HC.E.P	1320 D 003 BN HC	
321741	02.1320 D.3VG.HR.HC.E.P	1320 D 003 BH HC	
332990	02.1320 D.6VG.30.HC.E.P	1320 D 005 BN HC	
	02.1320 D.6VG.HR.HC.E.P	1320 D 005 BH HC	
334557	02.1320 D.10VG.30.HC.E.P	1320 D 010 BN HC	
321740	02.1320 D.10VG.HR.HC.E.P	1320 D 010 BH HC	
	02.1320 D.20VG.30.HC.E.P	1320 D 020 BN HC	
	02.1320 D.20VG.HR.HC.E.P	1320 D 020 BH HC	
	02.1320 D.25G.30.HC.E.P	1320 D 025 W HC	
	[1] 02.1320 D MEHRPREIS VITON DICHTUNG		

2.3 Filterelemente/Filter Elements 02.RN..HC

317483	01.NR 63.3VG.10.B.P.-	0063 RN 003 BN HC	
317484	01.NR 63.6VG.10.B.P.-	0063 RN 005 BN HC	
314218	01.NR 63.10VG.10.B.P.-	0063 RN 010 BN HC	
312792	01.NR 63.25VG.10.B.P.-	0063 RN 025 BN HC	
	[1] 01.NR 63 MEHRPREIS VITON DICHTUNG		
	[2] 01.NR 63 MEHRPREIS AUSF. KPL. EDELSTAHL		
	[3] MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	[4] MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%

317487	01.NR 100.3VG.10.B.P.-	0100 RN 003 BN HC	
316886	01.NR 100.6VG.10.B.P.-	0100 RN 005 BN HC	
313167	01.NR 100.10VG.10.B.P.-	0100 RN 010 BN HC	
312504	01.NR 100.25VG.10.B.P.-	0100 RN 025 BN HC	
	[1] 01.NR 100 MEHRPREIS VITON DICHTUNG		
	[2] 01.NR 100 MEHRPREIS AUSF. KPL. EDELSTAHL		
	[3] MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	[4] MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%

314485	01.NR 160.3VG.10.B.P.-	0160 RN 003 BN HC	
314486	01.NR 160.6VG.10.B.P.-	0160 RN 005 BN HC	
314220	01.NR 160.10VG.10.B.P.-	0160 RN 010 BN HC	
314449	01.NR 160.25VG.10.B.P.-	0160 RN 025 BN HC	
	[1] 01.NR 160 MEHRPREIS VITON DICHTUNG		
	[2] 01.NR 160 MEHRPREIS AUSF. KPL. EDELSTAHL		
	[3] MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	[4] MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%

1) Surplus price: viton sealing
2) Surplus price: execution complete stainless steel
3) Surplus price: element execution IS 06
4) Surplus price: element execution IS 08

Vergleichsliste Filterelemente
Cross Reference List Filter - Elements

Artikelnr. / Ident.no.	Artikelbezeichnung / Designation		Netto-Preis / Unit-Price
314491	01.NR 250.3VG.10.B.P.-	0250 RN 003 BN HC	
314492	01.NR 250.6VG.10.B.P.-	0250 RN 005 BN HC	
314191	01.NR 250.10VG.10.B.P.-	0250 RN 010 BN HC	
314454	01.NR 250.25VG.10.B.P.-	0250 RN 025 BN HC	
	1) 01.NR 250 MEHRPREIS VITON DICHTUNG		
	2) 01.NR 250 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%
317489	01.NR 400.3VG.10.B.P.-	0400 RN 003 BN HC	
314817	01.NR 400.6VG.10.B.P.-	0400 RN 005 BN HC	
314870	01.NR 400.10VG.10.B.P.-	0400 RN 010 BN HC	
317492	01.NR 400.25VG.10.B.P.-	0400 RN 025 BN HC	
	1) 01.NR 400 MEHRPREIS VITON DICHTUNG		
	2) 01.NR 400 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%
304533	01.NR 630.3VG.10.B.P.-	0630 RN 003 BN HC	247,98
304534	01.NR 630.6VG.10.B.P.-	0630 RN 005 BN HC	247,98
304535	01.NR 630.10VG.10.B.P.-	0630 RN 010 BN HC	219,86
305036	01.NR 630.25VG.10.B.P.-	0630 RN 025 BN HC	219,86
	1) 01.NR 630 MEHRPREIS VITON DICHTUNG		9,20
	2) 01.NR 630 MEHRPREIS AUSF. KPL. EDELSTAHL		227,01
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%
306604	01.NR 1000.3VG.10.B.P.-	1000 RN 003 BN HC	
305449	01.NR 1000.6VG.10.B.P.-	1000 RN 005 BN HC	
306605	01.NR 1000.10VG.10.B.P.-	1000 RN 010 BN HC	
306606	01.NR 1000.25VG.10.B.P.-	1000 RN 025 BN HC	
	1) 01.NR 1000 MEHRPREIS VITON DICHTUNG		
	2) 01.NR 1000 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%

1) Surplus price: viton sealing
2) Surplus price: execution complete stainless steel
3) Surplus price: element execution IS 06
4) Surplus price: element execution IS 08

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Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price

2.4 Filterelemente/Filter Elements 02.DN..HC

312621	01.NL 40.3VG.30.E.P.-	0040 DN 003 BN HC
313873	01.NL 40.3VG.HR.E.P.-	0040 DN 003 BH HC
312623	01.NL 40.6VG.30.E.P.-	0040 DN 005 BN HC
312884	01.NL 40.6VG.HR.E.P.-	0040 DN 005 BH HC
311433	01.NL 40.10VG.30.E.P.-	0040 DN 010 BN HC
312299	01.NL 40.10VG.HR.E.P.-	0040 DN 010 BH HC
312542	01.NL 40.25VG.30.E.P.-	0040 DN 025 BN HC
314169	01.NL 40.25VG.HR.E.P.-	0040 DN 025 BH HC
	1) 01.NL 40 MEHRPREIS VITON DICHTUNG	
	2) 01.NL 40 MEHRPREIS AUSF. KPL. EDELSTAHL	
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%

312636	01.NL 63.3VG.30.E.P.-	0063 DN 003 BN HC
316536	01.NL 63.3VG.HR.E.P.-	0063 DN 003 BH HC
312637	01.NL 63.6VG.30.E.P.-	0063 DN 005 BN HC
317323	01.NL 63.6VG.HR.E.P.-	0063 DN 005 BH HC
311365	01.NL 63.10VG.30.E.P.-	0063 DN 010 BN HC
311487	01.NL 63.10VG.HR.E.P.-	0063 DN 010 BH HC
311571	01.NL 63.25VG.30.E.P.-	0063 DN 025 BN HC
315123	01.NL 63.25VG.HR.E.P.-	0063 DN 025 BH HC
	1) 01.NL 63 MEHRPREIS VITON DICHTUNG	
	2) 01.NL 63 MEHRPREIS AUSF. KPL. EDELSTAHL	
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%

312649	01.NL 100.3VG.30.E.P.-	0100 DN 003 BN HC
312797	01.NL 100.3VG.HR.E.P.-	0100 DN 003 BH HC
312651	01.NL 100.6VG.30.E.P.-	0100 DN 005 BN HC
313670	01.NL 100.6VG.HR.E.P.-	0100 DN 005 BH HC
311574	01.NL 100.10VG.30.E.P.-	0100 DN 010 BN HC
312301	01.NL 100.10VG.HR.E.P.-	0100 DN 010 BH HC
312653	01.NL 100.25VG.30.E.P.-	0100 DN 025 BN HC
301752	01.NL 100.25VG.HR.E.P.-	0100 DN 025 BH HC
	1) 01.NL 100 MEHRPREIS VITON DICHTUNG	
	2) 01.NL 100 MEHRPREIS AUSF. KPL. EDELSTAHL	
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%

1) Surplus price: viton sealing
2) Surplus price: execution complete stainless steel
3) Surplus price: element execution IS 06
4) Surplus price: element execution IS 08

Artikelnr. Ident.no.	Artikelbezeichnung Designation		Netto-Preis Unit-Price
331299	01.NL 160.6VG.30.E.P.-	0160 DN 006 BN HC	
326145	01.NL 160.10VG.30.E.P.-	0160 DN 010 BN HC	
326205	01.NL 160.10VG.HR.E.P.-	0160 DN 010 BH HC	
324128	01.NL 160.25VG.30.E.P.-	0160 DN 025 BN HC	
	1) 01.NL 160 MEHRPREIS VITON DICHTUNG		
	2) 01.NL 160 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%
300784	01.NL 250.3VG.30.E.P.-	0250 DN 003 BN HC	
300790	01.NL 250.6VG.30.E.P.-	0250 DN 005 BN HC	
300367	01.NL 250.10VG.30.E.P.-	0250 DN 010 BN HC	
301900	01.NL 250.25VG.30.E.P.-	0250 DN 025 BN HC	
	1) 01.NL 250 MEHRPREIS VITON DICHTUNG		
	2) 01.NL 250 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%
307250	01.NL 400.3VG.30.E.P.-	0400 DN 003 BN HC	
311449	01.NL 400.3VG.HR.E.P.-	0400 DN 003 BH HC	
307251	01.NL 400.6VG.30.E.P.-	0400 DN 005 BN HC	
311448	01.NL 400.6VG.HR.E.P.-	0400 DN 005 BH HC	
307252	01.NL 400.10VG.30.E.P.-	0400 DN 010 BN HC	
312800	01.NL 400.10VG.HR.E.P.-	0400 DN 010 BH HC	
307255	01.NL 400.25VG.30.E.P.-	0400 DN 025 BN HC	
314880	01.NL 400.25VG.HR.E.P.-	0400 DN 025 BH HC	
	1) 01.NL 400 MEHRPREIS VITON DICHTUNG		
	2) 01.NL 400 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%
300371	01.NL 630.3VG.30.E.P.-	0630 DN 003 BN HC	
300795	01.NL 630.6VG.30.E.P.-	0630 DN 005 BN HC	
300791	01.NL 630.10VG.30.E.P.-	0630 DN 010 BN HC	
300792	01.NL 630.25VG.30.E.P.-	0630 DN 025 BN HC	
	1) 01.NL 630 MEHRPREIS VITON DICHTUNG		
	2) 01.NL 630 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%

1) Surplus price: viton sealing
2) Surplus price: execution complete stainless steel
3) Surplus price: element execution IS 06
4) Surplus price: element execution IS 08

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Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price

3. Abmessungen/Sizes EPE

3.1 Filterelemente/Filter Elements 03.1.56...03.1.1801

306379	03.1.56.3VG.16.B.O	1.56 H 3 SL
306380	03.1.56.6VG.16.B.O	1.56 H 6 SL
303721	03.1.56.10VG.16.B.O	1.56 H 10 SL
300448	03.1.56.25VG.16.B.O	1.56 H 20 SL
300449	03.1.56.25G.16.B.O	1.56 G 25
300884	03.1.56.40G.16.B.O	1.56 G 40
306377	03.1.56.60G.16.B.O	1.56 G 60
300450	03.1.56.100G.16.B.O	1.56 G 100
306381	03.1.90.3VG.16.B.O	1.90 H 3 SL
306382	03.1.90.6VG.16.B.O	1.90 H 6 SL
304548	03.1.90.10VG.16.B.O	1.90 H 10 SL
303736	03.1.90.25VG.16.B.O	1.90 H 20 SL
300885	03.1.90.25G.16.B.O	1.90 G 25
300451	03.1.90.40G.16.B.O	1.90 G 40
300886	03.1.90.60G.16.B.O	1.90 G 60
300887	03.1.90.100G.16.B.O	1.90 G 100
306385	03.1.140.3VG.16.B.O	1.140 H 3 SL
306386	03.1.140.6VG.16.B.O	1.140 H 6 SL
302098	03.1.140.10VG.16.B.O	1.140 H 10 SL
306387	03.1.140.25VG.16.B.O	1.140 H 20 SL
300888	03.1.140.25G.16.B.O	1.140 G 25
300452	03.1.140.40G.16.B.O	1.140 G 40
306383	03.1.140.60G.16.B.O	1.140 G 60
300453	03.1.140.100G.16.B.O	1.140 G 100
306390	03.1.225.3VG.16.B.O	1.225 H 3 SL
306391	03.1.225.6VG.16.B.O	1.225 H 6 SL
300454	03.1.225.10VG.16.B.O	1.225 H 10 SL
303275	03.1.225.25VG.16.B.O	1.225 H 20 SL
300455	03.1.225.25G.16.B.O	1.225 G 25
302229	03.1.225.40G.16.B.O	1.225 G 40
306388	03.1.225.60G.16.B.O	1.225 G 60
300889	03.1.225.100G.16.B.O	1.225 G 100
319249	03.1.361.3VG.16.B.P	1.361 H 3 SL
321246	03.1.361.6VG.16.B.P	1.361 H 6 SL
314527	03.1.361.10VG.16.B.P	1.361 H 10 SL
321206	03.1.361.25VG.16.B.P	1.361 H 20 SL
317535	03.1.361.25G.16.B.P	1.361 G 25
323658	03.1.361.40G.16.B.P	1.361 G 40
332370	03.1.361.60G.16.B.P	1.361 G 60
323086	03.1.361.100G.16.B.P	1.361 G 100

[1] 03.1.361 MEHRPREIS VITON DICHTUNG

1) Surplus price: viton sealing

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Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price
323368	03.1.561.3VG.16.B.P	1.561 H 3 SL
	03.1.561.6VG.16.B.P	1.561 H 6 SL
323819	03.1.561.10VG.16.B.P	1.561 H 10 SL
325169	03.1.561.25VG.16.B.P	1.561 H 20 SL
321098	03.1.561.25G.16.B.P	1.561 G 25
314524	03.1.561.40G.16.B.P	1.561 G 40
321873	03.1.561.60G.16.B.P	1.561 G 60
315407	03.1.561.100G.16.B.P	1.561 G 100
1)	03.1.561 MEHRPREIS VITON DICHTUNG	
331228	03.1.901.3VG.16.B.P	1.901 H 3 SL
316638	03.1.901.6VG.16.B.P	1.901 H 6 SL
311596	03.1.901.10VG.16.B.P	1.901 H 10 SL
317207	03.1.901.25VG.16.B.P	1.901 H 20 SL
319450	03.1.901.25G.16.B.P	1.901 G 25
312528	03.1.901.40G.16.B.P	1.901 G 40
312529	03.1.901.60G.16.B.P	1.901 G 60
312530	03.1.901.100G.16.B.P	1.901 G 100
1)	03.1.901 MEHRPREIS VITON DICHTUNG	
322812	03.1.1401.3VG.16.B.P	1.1401 H 3 SL
312076	03.1.1401.6VG.16.B.P	1.1401 H 6 SL
316656	03.1.1401.10VG.16.B.P	1.1401 H 10 SL
305404	03.1.1401.25VG.16.B.P	1.1401 H 20 SL
317437	03.1.1401.25G.16.B.P	1.1401 G 25
317598	03.1.1401.40G.16.B.P	1.1401 G 40
317980	03.1.1401.60G.16.B.P	1.1401 G 60
321591	03.1.1401.100G.16.B. P	1.1401 G 100
1)	03.1.1401 MEHRPREIS VITON DICHTUNG	
320300	03.1.1801.3VG.16.B.P	1.1801 H 3 SL
318820	03.1.1801.6VG.16.B.P	1.1801 H 6 SL
316301	03.1.1801.10VG.16.B.P	1.1801 H 10 SL
312270	03.1.1801.25VG.16.B.P	1.1801 H 20 SL
314228	03.1.1801.25G.16.B.P	1.1801 G 25
318837	03.1.1801.40G.16.B.P	1.1801 G 40
322748	03.1.1801.60G.16.B.P	1.1801 G 60
331933	03.1.1801.100G.16.B.P	1.1801 G 100
1)	03.1.1801 MEHRPREIS VITON DICHTUNG	

3.2 Filterelemente/Filter Elements 03.2.56...03.2.900

306338	03.2.56.3VG.16.E.P	2.56 H 3 SL
306339	03.2.56.6VG.16.E.P	2.56 H 6 SL
300476	03.2.56.10VG.16.E.P	2.56 H 10 SL
304957	03.2.56.25VG.16.E.P	2.56 H 20 SL
300477	03.2.56.25G.16.E.P	2.56 G 25
300478	03.2.56.40G.16.E.P	2.56 G 40
300906	03.2.56.60G.16.E.P	2.56 G 60
300479	03.2.56.100G.16.E.P	2.56 G 100
1)	03.2.56 MEHRPREIS VITON DICHTUNG	

1) Surplus price: viton sealing

Artikelnr. / Ident.no.	Artikelbezeichnung / Designation	Netto-Preis / Unit-Price
306340	03.2.90.3VG.16.E.P	2.90 H 3 SL
300907	03.2.90.6VG.16.E.P	2.90 H 6 SL
300480	03.2.90.10VG.16.E.P	2.90 H 10 SL
300482	03.2.90.25VG.16.E.P	2.90 H 20 SL
300483	03.2.90.25G.16.E.P	2.90 G 25
300484	03.2.90.40G.16.E.P	2.90 G 40
300485	03.2.90.60G.16.E.P	2.90 G 60
300486	03.2.90.100G.16.E.P	2.90 G 100
[1)]	03.2.90 MEHRPREIS VITON DICHTUNG	
300908	03.2.140.3VG.16.E.P	2.140 H 3 SL
300912	03.2.140.6VG.16.E.P	2.140 H 6 SL
300487	03.2.140.10VG.16.E.P	2.140 H 10 SL
300910	03.2.140.25VG.16.E.P	2.140 H 20 SL
300488	03.2.140.25G.16.E.P	2.140 G 25
300911	03.2.140.40G.16.E.P	2.140 G 40
300491	03.2.140.60G.16.E.P	2.140 G 60
300492	03.2.140.100G.16.E.P	2.140 G 100
[1)]	03.2.140 MEHRPREIS VITON DICHTUNG	
300493	03.2.225.3VG.16.E.P	2.225 H 3 SL
306341	03.2.225.6VG.16.E.P	2.225 H 6 SL
300913	03.2.225.10VG.16.E.P	2.225 H 10 SL
300914	03.2.225.25VG.16.E.P	2.225 H 20 SL
300495	03.2.225.25G.16.E.P	2.225 G 25
300497	03.2.225.40G.16.E.P	2.225 G 40
300498	03.2.225.60G.16.E.P	2.225 G 60
300499	03.2.225.100G.16.E.P	2.225 G 100
[1)]	03.2.225 MEHRPREIS VITON DICHTUNG	
306342	03.2.360.3VG.16.E.P	2.360 H 3 SL
306343	03.2.360.6VG.16.E.P	2.360 H 6 SL
300500	03.2.360.10VG.16.E.P	2.360 H 10 SL
300919	03.2.360.25VG.16.E.P	2.360 H 20 SL
300502	03.2.360.25G.16.E.P	2.360 G 25
300920	03.2.360.40G.16.E.P	2.360 G 40
300921	03.2.360.60G.16.E.P	2.360 G 60
300922	03.2.360.100G.16.E.P	2.360 G 100
[1)]	03.2.360 MEHRPREIS VITON DICHTUNG	
306349	03.2.460.3VG.16.E.P	2.460 H 3 SL
306350	03.2.460.6VG.16.E.P	2.460 H 6 SL
304958	03.2.460.10VG.16.E.P	2.460 H 10 SL
306351	03.2.460.25VG.16.E.P	2.460 H 20 SL
306347	03.2.460.25G.16.E.P	2.460 G 25
306346	03.2.460.40G.16.E.P	2.460 G 40
306345	03.2.460.60G.16.E.P	2.460 G 60
306344	03.2.460.100G.16.E.P	2.460 G 100
[1)]	03.2.460 MEHRPREIS VITON DICHTUNG	

1) Surplus price: viton sealing

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Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price
306356	03.2.560.3VG.16.E.P	2.560 H 3 SL
306357	03.2.560.6VG.16.E.P	2.560 H 6 SL
300503	03.2.560.10VG.16.E.P	2.560 H 10 SL
303274	03.2.560.25VG.16.E.P	2.560 H 20 SL
303276	03.2.560.25G.16.E.P	2.560 G 25
305275	03.2.560.40G.16.E.P	2.560 G 40
306353	03.2.560.60G.16.E.P	2.560 G 60
306352	03.2.560.100G.16.E.P	2.560 G 100
1)	03.2.560 MEHRPREIS VITON DICHTUNG	
300923	03.2.900.3VG.16.E.P	2.900 H 3 SL
306362	03.2.900.6VG.16.E.P	2.900 H 6 SL
305860	03.2.900.10VG.16.E.P	2.900 H 10 SL
306363	03.2.900.25VG.16.E.P	2.900 H 20 SL
300504	03.2.900.25G.16.E.P	2.900 G 25
306360	03.2.900.40G.16.E.P	2.900 G 40
306359	03.2.900.60G.16.E.P	2.900 G 60
306358	03.2.900.100G.16.E.P	2.900 G 100
1)	03.2.900 MEHRPREIS VITON DICHTUNG	

3.3 Filterelemente/Filter Elements 03.RL...

306429	03.RL 65.3VG.16.E.O	RL65 H 3 SL
306430	03.RL 65.6VG.16.E.O	RL65 H 6 SL
306431	03.RL 65.10VG.16.E.O	RL65 H 10 SL
306432	03.RL 65.25VG.16.E.O	RL65 H 20 SL
300506	03.RL 65.25G.16.S.O	RL65 G 25
300925	03.RL 65.40G.16.S.O	RL65 G 40
300926	03.RL 65.60G.16.S.O	RL65 G 60
300507	03.RL 65.100G.16.S.O	RL65 G 100
306433	03.RL 85.3VG.16.E.O	RL85 H 3 SL
306434	03.RL 85.6VG.16.E.O	RL85 H 6 SL
306435	03.RL 85.10VG.16.E.O	RL85 H 10 SL
300931	03.RL 85.25VG.16.E.O	RL85 H 20 SL
300508	03.RL 85.25G.16.S.O	RL85 G 25
300934	03.RL 85.40G.16.S.O	RL85 G 40
300509	03.RL 85.60G.16.S.O	RL85 G 60
303217	03.RL 85.100G.16.S.O	RL85 G 100
306436	03.RL 125.3VG.16.E.O	RL125 H 3 SL
306437	03.RL 125.6VG.16.E.O	RL125 H 6 SL
302167	03.RL 125.10VG.16.E.O	RL125 H 10 SL
306438	03.RL 125.25VG.16.E.O	RL125 H 20 SL
300510	03.RL 125.25G.16.S.O	RL125 G 25
300939	03.RL 125.40G.16.S.O	RL125 G 40
300940	03.RL 125.60G.16.S.O	RL125 G 60
300941	03.RL 125.100G.16.S.O	RL125 G 100

1) Surplus price: viton sealing

Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price
306440	03.RL 165.3VG.16.E.O	RL165 H 3 SL
300953	03.RL 165.6VG.16.E.O	RL165 H 6 SL
300511	03.RL 165.10VG.16.E.O	RL165 H 10 SL
300949	03.RL 165.25VG.16.E.O	RL165 H 20 SL
300513	03.RL 165.25G.16.S.O	RL165 G 25
300514	03.RL 165.40G.16.S.O	RL165 G 40
300515	03.RL 165.60G.16.S.O	RL165 G 60
300516	03.RL 165.100G.16.S.O	RL165 G 100
306441	03.RL 250.3VG.16.E.O	RL250 H 3 SL
306442	03.RL 250.6VG.16.E.O	RL250 H 6 SL
300955	03.RL 250.10VG.16.E.O	RL250 H 10 SL
300517	03.RL 250.25VG.16.E.O	RL250 H 20 SL
300518	03.RL 250.25G.16.S.O	RL250 G 25
300520	03.RL 250.40G.16.S.O	RL250 G 40
300521	03.RL 250.60G.16.S.O	RL250 G 60
300522	03.RL 250.100G.16.S.O	RL250 G 100
306443	03.RL 330.3VG.16.E.P	RL330 H 3 SL
306444	03.RL 330.6VG.16.E.P	RL330 H 6 SL
300523	03.RL 330.10VG.16.E.P	RL330 H 10 SL
306201	03.RL 330.25VG.16.E.P	RL330 H 20 SL
300525	03.RL 330.25G.16.S.P	RL330 G 25
300526	03.RL 330.40G.16.S.P	RL330 G 40
300967	03.RL 330.60G.16.S.P	RL330 G 60
300527	03.RL 330.100G.16.S.P	RL330 G 100
306445	03.RL 500.3VG.16.E.O	RL500 H 3 SL
306446	03.RL 500.6VG.16.E.O	RL500 H 6 SL
303213	03.RL 500.10VG.16.E.O	RL500 H 10 SL
300528	03.RL 500.25VG.16.E.O	RL500 H 20 SL
300529	03.RL 500.25G.16.S.O	RL500 G 25
300531	03.RL 500.40G.16.S.O	RL500 G 40
300532	03.RL 500.60G.16.S.O	RL500 G 60
300533	03.RL 500.100G.16.S.O	RL500 G 100
306448	03.RL 660.3VG.16.E.O	RL660 H 3 SL
306449	03.RL 660.6VG.16.E.O	RL660 H 6 SL
306450	03.RL 660.10VG.16.E.O	RL660 H 10 SL
300534	03.RL 660.25VG.16.E.O	RL660 H 20 SL
300536	03.RL 660.25G.16.S.O	RL660 G 25
300538	03.RL 660.40G.16.S.O	RL660 G 40
300539	03.RL 660.60G.16.S.O	RL660 G 60
300540	03.RL 660.100G.16.S.O	RL660 G 100
300541	03.RL 750.3VG.16.E.O	RL750 H 3 SL
300981	03.RL 750.6VG.16.E.O	RL750 H 6 SL
300974	03.RL 750.10VG.16.E.O	RL750 H 10 SL
300543	03.RL 750.25VG.16.E.O	RL750 H 20 SL
300545	03.RL 750.25G.16.S.O	RL750 G 25
300979	03.RL 750.40G.16.S.O	RL750 G 40
300980	03.RL 750.60G.16.S.O	RL750 G 60
300982	03.RL 750.100G.16.S.O	RL750 G 100

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Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price

3.4 Filterelemente/Filter Elements 03.DL...

306415	03.DL 65.3VG.16.E.P	DL65 H 3 SL
300984	03.DL 65.6VG.16.E.P	DL65 H 6 SL
306416	03.DL 65.10VG.16.E.P	DL65 H 10 SL
300988	03.DL 65.25VG.16.E.P	DL65 H 20 SL
300943	03.DL 65.25G.16.S.P	DL65 G 25
300552	03.DL 65.40G.16.S.P	DL65 G 40
300553	03.DL 65.60G.16.S.P	DL65 G 60
300555	03.DL 65.100G.16.S.P	DL65 G 100
306417	03.DL 85.3VG.16.E.P	DL85 H 3 SL
300998	03.DL 85.6VG.16.E.P	DL85 H 6 SL
301845	03.DL 85.10VG.16.E.P	DL85 H 10 SL
300993	03.DL 85.25VG.16.E.P	DL85 H 20 SL
300556	03.DL 85.25G.16.S.P	DL85 G 25
300996	03.DL 85.40G.16.S.P	DL85 G 40
300557	03.DL 85.60G.16.S.P	DL85 G 60
300558	03.DL 85.100G.16.S.P	DL85 G 100
306419	03.DL 125.3VG.16.E.P	DL125 H 3 SL
306420	03.DL 125.6VG.16.E.P	DL125 H 6 SL
301001	03.DL 125.10VG.16.E.P	DL125 H 10 SL
301002	03.DL 125.25VG.16.E.P	DL125 H 20 SL
300560	03.DL 125.25G.16.S.P	DL125 G 25
300561	03.DL 125.40G.16.S.P	DL125 G 40
300562	03.DL 125.60G.16.S.P	DL125 G 60
301006	03.DL 125.100G.16.S.P	DL125 G 100

Artikelnr. Ident.no.	Artikelbezeichnung Designation		Netto-Preis Unit-Price
	3.5 Filterelemente/Filter Elements 03.1.0063...03.1.1000		
317483	01.NR 63.3VG.10.B.P.-	1.0063 H 3 SL	
317484	01.NR 63.6VG.10.B.P.-	1.0063 H 6 SL	
314218	01.NR 63.10VG.10.B.P.-	1.0063 H 10 SL	
312792	01.NR 63.25VG.10.B.P.-	1.0063 H 20 SL	
	1) 01.NR 63 MEHRPREIS VITON DICHTUNG		
	2) 01.NR 63 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%
317487	01.NR 100.3VG.10.B.P.-	1.0100 H 3 SL	
316886	01.NR 100.6VG.10.B.P.-	1.0100 H 6 SL	
313167	01.NR 100.10VG.10.B.P.-	1.0100 H 10 SL	
312504	01.NR 100.25VG.10.B.P.-	1.0100 H 20 SL	
	1) 01.NR 100 MEHRPREIS VITON DICHTUNG		
	2) 01.NR 100 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%
314485	01.NR 160.3VG.10.B.P.-	1.0160 H 3 SL	
314486	01.NR 160.6VG.10.B.P.-	1.0160 H 6 SL	
314220	01.NR 160.10VG.10.B.P.-	1.0160 H 10 SL	
314449	01.NR 160.25VG.10.B.P.-	1.0160 H 20 SL	
	1) 01.NR 160 MEHRPREIS VITON DICHTUNG		
	2) 01.NR 160 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%
314491	01.NR 250.3VG.10.B.P.-	1.0250 H 3 SL	
314492	01.NR 250.6VG.10.B.P.-	1.0250 H 6 SL	
314191	01.NR 250.10VG.10.B.P.-	1.0250 H 10 SL	
314454	01.NR 250.25VG.10.B.P.-	1.0250 H 20 SL	
	1) 01.NR 250 MEHRPREIS VITON DICHTUNG		
	2) 01.NR 250 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%

1) Surplus price: viton sealing
2) Surplus price: execution complete stainless steel
3) Surplus price: element execution IS 06
4) Surplus price: element execution IS 08

Artikelnr. / Ident.no.	Artikelbezeichnung / Designation		Netto-Preis / Unit-Price
317489	01.NR 400.3VG.10.B.P.-	1.0400 H 3 SL	
314817	01.NR 400.6VG.10.B.P.-	1.0400 H 6 SL	
314870	01.NR 400.10VG.10.B.P.-	1.0400 H 10 SL	
317492	01.NR 400.25VG.10.B.P.-	1.0400 H 20 SL	
	1) 01.NR 400 MEHRPREIS VITON DICHTUNG		
	2) 01.NR 400 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%
304533	01.NR 630.3VG.10.B.P.-	1.0630 H 3 SL	
304534	01.NR 630.6VG.10.B.P.-	1.0630 H 6 SL	
304535	01.NR 630.10VG.10.B.P.-	1.0630 H 10 SL	
305036	01.NR 630.25VG.10.B.P.-	1.0630 H 20 SL	
	1) 01.NR 630 MEHRPREIS VITON DICHTUNG		
	2) 01.NR 630 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%
306604	01.NR 1000.3VG.10.B.P.-	1.1000 H 3 SL	
305449	01.NR 1000.6VG.10.B.P.-	1.1000 H 6 SL	
306605	01.NR 1000.10VG.10.B.P.-	1.1000 H 10 SL	
306606	01.NR 1000.25VG.10.B.P.-	1.1000 H 20 SL	
	1) 01.NR 1000 MEHRPREIS VITON DICHTUNG		
	2) 01.NR 1000 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%

1) Surplus price: viton sealing
2) Surplus price: execution complete stainless steel
3) Surplus price: element execution IS 06
4) Surplus price: element execution IS 08

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Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price

3.6 Filterelemente/Filter Elements 03.2.0040...03.2.0630

312621	01.NL 40.3VG.30.E.P.-	2.0040 H 3 SL
313873	01.NL 40.3VG.HR.E.P.-	2.0040 H 3 SL.B
312623	01.NL 40.6VG.30.E.P.-	2.0040 H 6 SL
312884	01.NL 40.6VG.HR.E.P.-	2.0040 H 6 SL.B
311433	01.NL 40.10VG.30.E.P.-	2.0040 H 10 SL
312299	01.NL 40.10VG.HR.E.P.-	2.0040 H 10 SL.B
312542	01.NL 40.25VG.30.E.P.-	2.0040 H 20 SL
314169	01.NL 40.25VG.HR.E.P.-	2.0040 H 20 SL.B
[1)]	01.NL 40 MEHRPREIS VITON DICHTUNG	
[2)]	01.NL 40 MEHRPREIS AUSF. KPL. EDELSTAHL	
[3)]	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
[4)]	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%

312636	01.NL 63.3VG.30.E.P.-	2.0063 H 3 SL
316536	01.NL 63.3VG.HR.E.P.-	2.0063 H 3 SL.B
312637	01.NL 63.6VG.30.E.P.-	2.0063 H 6 SL
317323	01.NL 63.6VG.HR.E.P.-	2.0063 H 6 SL.B
311365	01.NL 63.10VG.30.E.P.-	2.0063 H 10 SL
311487	01.NL 63.10VG.HR.E.P.-	2.0063 H 10 SL.B
311571	01.NL 63.25VG.30.E.P.-	2.0063 H 20 SL
315123	01.NL 63.25VG.HR.E.P.-	2.0063 H 20 SL.B
[1)]	01.NL 63 MEHRPREIS VITON DICHTUNG	
[2)]	01.NL 63MEHRPREIS AUSF. KPL. EDELSTAHL	
[3)]	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
[4)]	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%

312649	01.NL 100.3VG.30.E.P.-	2.0100 H 3 SL
312797	01.NL 100.3VG.HR.E.P.-	2.0100 H 3 SL.B
312651	01.NL 100.6VG.30.E.P.-	2.0100 H 6 SL
313670	01.NL 100.6VG.HR.E.P.-	2.0100 H 6 SL.B
311574	01.NL 100.10VG.30.E.P.-	2.0100 H 10 SL
312301	01.NL 100.10VG.HR.E.P.-	2.0100 H 10 SL.B
312653	01.NL 100.25VG.30.E.P.-	2.0100 H 20 SL
301752	01.NL 100.25VG.HR.E.P.-	2.0100 H 20 SL.B
[1)]	01.NL 100 MEHRPREIS VITON DICHTUNG	
[2)]	01.NL 100 MEHRPREIS AUSF. KPL. EDELSTAHL	
[3)]	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06	10%
[4)]	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08	25%

1) Surplus price: viton sealing
2) Surplus price: execution complete stainless steel
3) Surplus price: element execution IS 06
4) Surplus price: element execution IS 08

Artikelnr. Ident.no.	Artikelbezeichnung Designation		Netto-Preis Unit-Price
300784	01.NL 250.3VG.30.E.P.-	2.0250 H 3 SL	
300790	01.NL 250.6VG.30.E.P.-	2.0250 H 6 SL	
300367	01.NL 250.10VG.30.E.P.-	2.0250 H 10 SL	
301900	01.NL 250.25VG.30.E.P.-	2.0250 H 20 SL	
	1) 01.NL 250 MEHRPREIS VITON DICHTUNG		
	2) 01.NL 250 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%
307250	01.NL 400.3VG.30.E.P.-	2.0400 H 3 SL	
311449	01.NL 400.3VG.HR.E.P.-	2.0400 H 3 SL.B	
307251	01.NL 400.6VG.30.E.P.-	2.0400 H 6 SL	
311448	01.NL 400.6VG.HR.E.P.-	2.0400 H 6 SL.B	
307252	01.NL 400.10VG.30.E.P.-	2.0400 H 10 SL	
312800	01.NL 400.10VG.HR.E.P.-	2.0400 H 10 SL.B	
307255	01.NL 400.25VG.30.E.P.-	2.0400 H 20 SL	
314880	01.NL 400.25VG.HR.E.P.-	2.0400 H 20 SL.B	
	1) 01.NL 400 MEHRPREIS VITON DICHTUNG		
	2) 01.NL 400 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%
300371	01.NL 630.3VG.30.E.P.-	2.0630 H 3 SL	
300795	01.NL 630.6VG.30.E.P.-	2.0630 H 6 SL	
300791	01.NL 630.10VG.30.E.P.-	2.0630 H 10 SL	
300792	01.NL 630.25VG.30.E.P.-	2.0630 H 20 SL	
	1) 01.NL 630 MEHRPREIS VITON DICHTUNG		
	2) 01.NL 630 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%

1) Surplus price: viton sealing
2) Surplus price: execution complete stainless steel
3) Surplus price: element execution IS 06
4) Surplus price: element execution IS 08

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Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price

4. Abmessungen/Sizes Mahle

4.1 Filterelemente/Filter Elements 04.PI...

302240	04.PI 2105.3VG.16.E.O	PI 2105 SMX 3
306470	04.PI 2108.3VG.16.E.O	PI 2108 SMX 3
306482	04.PI 2111.3VG.16.E.O	PI 2111 SMX 3
300814	04.PI 2115.3VG.16.E.O	PI 2115 SMX 3
300815	04.PI 2130.3VG.16.E.O	PI 2130 SMX 3
303025	04.PI 2145.3VG.16.E.O	PI 2145 SMX 3
301034	04.PI 2205.3VG.HR.E.O	PI 2205 SMX VST 3
301035	04.PI 2208.3VG.HR.E.O	PI 2208 SMX VST 3
306149	04.PI 2211.3VG.HR.E.O	PI 2211 SMX VST 3
301036	04.PI 2215.3VG.HR.E.O	PI 2215 SMX VST 3
300816	04.PI 2230.3VG.HR.E.O	PI 2230 SMX VST 3
306521	04.PI 2245.3VG.HR.E.O	PI 2245 SMX VST 3
300817	04.PI 3105.10VG.16.E.O	PI 3105 SMX 10
303313	04.PI 3108.10VG.16.E.O	PI 3108 SMX 10
300818	04.PI 3111.10VG.16.E.O	PI 3111 SMX 10
301039	04.PI 3115.10VG.16.E.O	PI 3115 SMX 10
300819	04.PI 3130.10VG.16.E.O	PI 3130 SMX 10
301040	04.PI 3145.10VG.16.E.O	PI 3145 SMX 10
301042	04.PI 3205.10VG.HR.E.O	PI 3205 SMX VST 10
301043	04.PI 3208.10VG.HR.E.O	PI 3208 SMX VST 10
300820	04.PI 3211.10VG.HR.E.O	PI 3211 SMX VST 10
300821	04.PI 3215.10VG.HR.E.O	PI 3215 SMX VST 10
301044	04.PI 3230.10VG.HR.E.O	PI 3230 SMX VST 10
301045	04.PI 3245.10VG.HR.E.O	PI 3245 SMX VST 10
301046	04.PI 4105.25VG.16.E.O	PI 4105 SMX 25
301047	04.PI 4108.25VG.16.E.O	PI 4108 SMX 25
306483	04.PI 4111.25VG.16.E.O	PI 4111 SMX 25
303318	04.PI 4115.25VG.16.E.O	PI 4115 SMX 25
300822	04.PI 4130.25VG.16.E.O	PI 4130 SMX 25
306517	04.PI 4145.25VG.16.E.O	PI 4145 SMX 25
301851	04.PI 4205.25VG.HR.E.O	PI 4205 SMX VST 25
301049	04.PI 4208.25VG.HR.E.O	PI 4208 SMX VST 25
301050	04.PI 4211.25VG.HR.E.O	PI 4211 SMX VST 25
301967	04.PI 4215.25VG.HR.E.O	PI 4215 SMX VST 25
300823	04.PI 4230.25VG.HR.E.O	PI 4230 SMX VST 25
301051	04.PI 4245.25VG.HR.E.O	PI 4245 SMX VST 25
311314	04.PI 5105.6VG.16.E.O	PI 5105 SMX 6
311317	04.PI 5108.6VG.16.E.O	PI 5108 SMX 6
	04.PI 5111.6VG.16.E.O	PI 5111 SMX 6
303314	04.PI 5115.6VG.16.E.O	PI 5115 SMX 6
322470	04.PI 5130.6VG.16.E.O	PI 5130 SMX 6
319334	04.PI 5145.6VG.16.E.O	PI 5145 SMX 6

Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price
	04.PI 5205.6VG.HR.E.O	PI 5205 SMX VST 6
	04.PI 5208.6VG.HR.E.O	PI 5208 SMX VST 6
326692	04.PI 5211.6VG.HR.E.O	PI 5211 SMX VST 6
301037	04.PI 5215.6VG.HR.E.O	PI 5215 SMX VST 6
301038	04.PI 5230.6VG.HR.E.O	PI 5230 SMX VST 6
319461	04.PI 5245.6VG.HR.E.O	PI 5245 SMX VST 6
301052	04.PI 8205.25G.16.E.O	PI 8205 DRG 25
306472	04.PI 8208.25G.16.E.O	PI 8208 DRG 25
306485	04.PI 8211.25G.16.E.O	PI 8211 DRG 25
304590	04.PI 8215.25G.16.E.O	PI 8215 DRG 25
301053	04.PI 8230.25G.16.E.O	PI 8230 DRG 25
301054	04.PI 8245.25G.16.E.O	PI 8245 DRG 25
303309	04.PI 8305.40G.16.E.O	PI 8305 DRG 40
306473	04.PI 8308.40G.16.E.O	PI 8308 DRG 40
306486	04.PI 8311.40G.16.E.O	PI 8311 DRG 40
303316	04.PI 8315.40G.16.E.O	PI 8315 DRG 40
303580	04.PI 8330.40G.16.E.O	PI 8330 DRG 40
302040	04.PI 8345.40G.16.E.O	PI 8345 DRG 40
303308	04.PI 8405.60G.16.E.O	PI 8405 DRG 60
306474	04.PI 8408.60G.16.E.O	PI 8408 DRG 60
306487	04.PI 8411.60G.16.E.O	PI 8411 DRG 60
303317	04.PI 8415.60G.16.E.O	PI 8415 DRG 60
301825	04.PI 8430.60G.16.E.O	PI 8430 DRG 60
306519	04.PI 8445.60G.16.E.O	PI 8445 DRG 60
300824	04.PI 8505.100G.16.E.O	PI 8505 DRG 100
306475	04.PI 8508.100G.16.E.O	PI 8508 DRG 100
306489	04.PI 8511.100G.16.E.O	PI 8511 DRG 100
306497	04.PI 8515.100G.16.E.O	PI 8515 DRG 100
300825	04.PI 8530.100G.16.E.O	PI 8530 DRG 100
306520	04.PI 8545.100G.16.E.O	PI 8545 DRG 100
303310	04.PI 9205.25G.HR.E.O	PI 9205 DRG VST 25
306477	04.PI 9208.25G.HR.E.O	PI 9208 DRG VST 25
306492	04.PI 9211.25G.HR.E.O	PI 9211 DRG VST 25
306500	04.PI 9215.25G.HR.E.O	PI 9215 DRG VST 25
306513	04.PI 9230.25G.HR.E.O	PI 9230 DRG VST 25
306523	04.PI 9245.25G.HR.E.O	PI 9245 DRG VST 25
306467	04.PI 9305.40G.HR.E.O	PI 9305 DRG VST 40
306478	04.PI 9308.40G.HR.E.O	PI 9308 DRG VST 40
306493	04.PI 9311.40G.HR.E.O	PI 9311 DRG VST 40
306501	04.PI 9315.40G.HR.E.O	PI 9315 DRG VST 40
306514	04.PI 9330.40G.HR.E.O	PI 9330 DRG VST 40
306524	04.PI 9345.40G.HR.E.O	PI 9345 DRG VST 40

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Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price
306468	04.PI 9405.60G.HR.E.O	PI 9405 DRG VST 60
303724	04.PI 9408.60G.HR.E.O	PI 9408 DRG VST 60
306494	04.PI 9411.60G.HR.E.O	PI 9411 DRG VST 60
306502	04.PI 9415.60G.HR.E.O	PI 9415 DRG VST 60
306515	04.PI 9430.60G.HR.E.O	PI 9430 DRG VST 60
306525	04.PI 9445.60G.HR.E.O	PI 9445 DRG VST 60
306469	04.PI 9505.100G.HR.E.O	PI 9505 DRG VST 100
306479	04.PI 9508.100G.HR.E.O	PI 9508 DRG VST 100
306495	04.PI 9511.100G.HR.E.O	PI 9511 DRG VST 100
306503	04.PI 9515.100G.HR.E.O	PI 9515 DRG VST 100
306516	04.PI 9530.100G.HR.E.O	PI 9530 DRG VST 100
306526	04.PI 9545.100G.HR.E.O	PI 9545 DRG VST 100

4.2 Filterelemente/Filter Elements 04.852...

306678	04.852 024.25G.16.B.P	852 024 DRG 25
306679	04.852 024.60G.16.B.P	852 024 DRG 60
306680	04.852 024.100G.16.B.P	852 024 DRG 100
306681	04.852 034.3VG.16.E.P	852 034 SMX 3
306682	04.852 034.3VG.HR.E.P	852 034 SMX VST 3
303321	04.852 034.10VG.16.E.P	852 034 SMX 10
300801	04.852 034.10VG.HR.E.P	852 034 SMX VST 10
304485	04.852 034.25VG.16.E.P	852 034 SMX 25
306683	04.852 034.25VG.HR.E.P	852 034 SMX VST 25
303323	04.852 034.25G.16.E.P	852 034 DRG 25
306686	04.852 034.25G.HR.E.P	852 034 DRG VST 25
303324	04.852 034.60G.16.E.P	852 034 DRG 60
306687	04.852 034.60G.HR.E.P	852 034 DRG VST 60
306684	04.852 034.100G.16.E.P	852 034 DRG 100
306688	04.852 034.100G.HR.E.P	852 034 DRG VST 100
306707	04.852 059.10VG.16.B.O	852 059 SMX 10
306708	04.852 059.25VG.16.B.O	852 059 SMX 25
303326	04.852 059.25G.16.B.O	852 059 DRG 25
306710	04.852 059.60G.16.B.O	852 059 DRG 60
306711	04.852 059.100G.16.B.O	852 059 DRG 100
306726	04.852 070.3VG.16.B.P	852 070 SMX 3
300803	04.852 070.10VG.16.B.P	852 070 SMX 10
303327	04.852 070.25VG.16.B.P	852 070 SMX 25
306728	04.852 070.25G.16.B.P	852 070 DRG 25
306729	04.852 070.60G.16.B.P	852 070 DRG 60
306730	04.852 070.100G.16.B.P	852 070 DRG 100
306731	04.852 087.10VG.16.B.O	852 087 SMX 10
306732	04.852 087.25VG.16.B.O	852 087 SMX 25
306734	04.852 087.25G.16.B.O	852 087 DRG 25
303331	04.852 087.60G.16.B.O	852 087 DRG 60
306735	04.852 087.100G.16.B.O	852 087 DRG 100
303024	04.852 125.3VG.16.E.P	852 125 SMX 3
303023	04.852 125.3VG.HR.E.P	852 125 SMX VST 3

Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price
303333	04.852 125.10VG.16.E.P	852 125 SMX 10
303050	04.852 125.10VG.HR.E.P	852 125 SMX VST 10
306736	04.852 125.25VG.16.E.P	852 125 SMX 25
300804	04.852 125.25VG.HR.E.P	852 125 SMX VST 25
306737	04.852 125.25G.16.E.P	852 125 DRG 25
306742	04.852 125.25G.HR.E.P	852 125 DRG VST 25
306738	04.852 125.40G.16.E.P	852 125 DRG 40
306743	04.852 125.40G.HR.E.P	852 125 DRG VST 40
306739	04.852 125.60G.16.E.P	852 125 DRG 60
306744	04.852 125.60G.HR.E.P	852 125 DRG VST 60
306740	04.852 125.100G.16.E.P	852 125 DRG 100
306745	04.852 125.100G.HR.E.P	852 125 DRG VST 100
306746	04.852 126.3VG.16.E.P	852 126 SMX 3
306747	04.852 126.3VG.HR.E.P	852 126 SMX VST 3
300805	04.852 126.10VG.16.E.P	852 126 SMX 10
300806	04.852 126.10VG.HR.E.P	852 126 SMX VST 10
300807	04.852 126.25VG.16.E.P	852 126 SMX 25
306749	04.852 126.25VG.HR.E.P	852 126 SMX VST 25
306750	04.852 126.25G.16.E.P	852 126 DRG 25
303337	04.852 126.25G.HR.E.P	852 126 DRG VST 25
306751	04.852 126.40G.16.E.P	852 126 DRG 40
306753	04.852 126.40G.HR.E.P	852 126 DRG VST 40
303339	04.852 126.60G.16.E.P	852 126 DRG 60
303338	04.852 126.60G.HR.E.P	852 126 DRG VST 60
303340	04.852 126.100G.16.E.P	852 126 DRG 100
300808	04.852 126.100G.HR.E.P	852 126 DRG VST 100
303049	04.852 127.3VG.16.E.P	852 127 SMX 3
303027	04.852 127.3VG.HR.E.P	852 127 SMX VST 3
303342	04.852 127.10VG.16.E.P	852 127 SMX 10
303026	04.852 127.10VG.HR.E.P	852 127 SMX VST 10
303341	04.852 127.25VG.16.E.P	852 127 SMX 25
306072	04.852 127.25VG.HR.E.P	852 127 SMX VST 25
306755	04.852 127.25G.16.E.P	852 127 DRG 25
303343	04.852 127.25G.HR.E.P	852 127 DRG VST 25
303344	04.852 127.40G.16.E.P	852 127 DRG 40
306758	04.852 127.40G.HR.E.P	852 127 DRG VST 40
303345	04.852 127.60G.16.E.P	852 127 DRG 60
306759	04.852 127.60G.HR.E.P	852 127 DRG VST 60
306756	04.852 127.100G.16.E.P	852 127 DRG 100
306760	04.852 127.100G.HR.E.P	852 127 DRG VST 100
306761	04.852 264.10VG.16.B.O	852 264 SMX 10
306762	04.852 264.25VG.16.B.O	852 264 SMX 25
306764	04.852 264.25G.16.B.O	852 264 DRG 25
306765	04.852 264.60G.16.B.O	852 264 DRG 60
306766	04.852 264.100G.16.B.O	852 264 DRG 100
306776	04.852 444.6VG.16.B.P	852 444 SMX 6
306777	04.852 444.10VG.16.B.P	852 444 SMX 10
303531	04.852 444.25VG.16.B.P	852 444 SMX 25
306778	04.852 444.25G.16.B.P	852 444 DRG 25
302044	04.852 444.40G.16.B.P	852 444 DRG 40

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Artikelnr. Ident.no.	Artikelbezeichnung Designation		Netto-Preis Unit-Price
	4.3 Filterelemente/Filter Elements 04.PI...RN		
317483	01.NR 63.3VG.10.B.P.-	PI 21006 RN SMX 3	
317484	01.NR 63.6VG.10.B.P.-	PI 22006 RN SMX 6	
314218	01.NR 63.10VG.10.B.P.-	PI 23006 RN SMX 10	
312792	01.NR 63.25VG.10.B.P.-	PI 25006 RN SMX 25	
	1) 01.NR 63 MEHRPREIS VITON DICHTUNG		
	2) 01.NR 63 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%
317487	01.NR 100.3VG.10.B.P.-	PI 21010 RN SMX 3	
316886	01.NR 100.6VG.10.B.P.-	PI 22010 RN SMX 6	
313167	01.NR 100.10VG.10.B.P.-	PI 23010 RN SMX 10	
312504	01.NR 100.25VG.10.B.P.-	PI 25010 RN SMX 25	
	1) 01.NR 100 MEHRPREIS VITON DICHTUNG		
	2) 01.NR 100 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%
314485	01.NR 160.3VG.10.B.P.-	PI 21016 RN SMX 3	
314486	01.NR 160.6VG.10.B.P.-	PI 22016 RN SMX 6	
314220	01.NR 160.10VG.10.B.P.-	PI 23016 RN SMX 10	
314449	01.NR 160.25VG.10.B.P.-	PI 25016 RN SMX 25	
	1) 01.NR 160 MEHRPREIS VITON DICHTUNG		
	2) 01.NR 160 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%
314491	01.NR 250.3VG.10.B.P.-	PI 21025 RN SMX 3	
314492	01.NR 250.6VG.10.B.P.-	PI 22025 RN SMX 6	
314191	01.NR 250.10VG.10.B.P.-	PI 23025 RN SMX 10	
314454	01.NR 250.25VG.10.B.P.-	PI 25025 RN SMX 25	
	1) 01.NR 250 MEHRPREIS VITON DICHTUNG		
	2) 01.NR 250 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%

1) Surplus price: viton sealing
2) Surplus price: execution complete stainless steel
3) Surplus price: element execution IS 06
4) Surplus price: element execution IS 08

Artikelnr. Ident.no.	Artikelbezeichnung Designation		Netto-Preis Unit-Price
317489	01.NR 400.3VG.10.B.P.-	PI 21040 RN SMX 3	
314817	01.NR 400.6VG.10.B.P.-	PI 22040 RN SMX 6	
314870	01.NR 400.10VG.10.B.P.-	PI 23040 RN SMX 10	
317492	01.NR 400.25VG.10.B.P.-	PI 25040 RN SMX 25	
1)	01.NR 400 MEHRPREIS VITON DICHTUNG		
2)	01.NR 400 MEHRPREIS AUSF. KPL. EDELSTAHL		
3)	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
4)	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%
304533	01.NR 630.3VG.10.B.P.-	PI 21063 RN SMX 3	
304534	01.NR 630.6VG.10.B.P.-	PI 22063 RN SMX 6	
304535	01.NR 630.10VG.10.B.P.-	PI 23063 RN SMX 10	
305036	01.NR 630.25VG.10.B.P.-	PI 25063 RN SMX 25	
1)	01.NR 630 MEHRPREIS VITON DICHTUNG		
2)	01.NR 630 MEHRPREIS AUSF. KPL. EDELSTAHL		
3)	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
4)	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%
306604	01.NR 1000.3VG.10.B.P.-	PI 21100 RN SMX 3	
305449	01.NR 1000.6VG.10.B.P.-	PI 22100 RN SMX 6	
306605	01.NR 1000.10VG.10.B.P.-	PI 23100 RN SMX 10	
306606	01.NR 1000.25VG.10.B.P.-	PI 25100 RN SMX 25	
1)	01.NR 1000 MEHRPREIS VITON DICHTUNG		
2)	01.NR 1000 MEHRPREIS AUSF. KPL. EDELSTAHL		
3)	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
4)	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%

4.4 Filterelemente/Filter Elements 04.PI...DN

312621	01.NL 40.3VG.30.E.P.-	PI 21004 DN SMX 3	
313873	01.NL 40.3VG.HR.E.P.-	PI 71004 DN SMX VST 3	
312623	01.NL 40.6VG.30.E.P.-	PI 22004 DN SMX 6	
312884	01.NL 40.6VG.HR.E.P.-	PI 72004 DN SMX VST 6	
311433	01.NL 40.10VG.30.E.P.-	PI 23004 DN SMX 10	
312299	01.NL 40.10VG.HR.E.P.-	PI 73004 DN SMX VST 10	
312542	01.NL 40.25VG.30.E.P.-	PI 25004 DN SMX 25	
314169	01.NL 40.25VG.HR.E.P.-	PI 75004 DN SMX VST 25	
1)	01.NL 40 MEHRPREIS VITON DICHTUNG		
2)	01.NL 40 MEHRPREIS AUSF. KPL. EDELSTAHL		
3)	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
4)	MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%

1) Surplus price: viton sealing
2) Surplus price: execution complete stainless steel
3) Surplus price: element execution IS 06
4) Surplus price: element execution IS 08

Artikelnr. Ident.no.	Artikelbezeichnung Designation		Netto-Preis Unit-Price
312636	01.NL 63.3VG.30.E.P.-	PI 21006 DN SMX 3	
316536	01.NL 63.3VG.HR.E.P.-	PI 71006 DN SMX VST 3	
312637	01.NL 63.6VG.30.E.P.-	PI 22006 DN SMX 6	
317323	01.NL 63.6VG.HR.E.P.-	PI 72006 DN SMX VST 6	
311365	01.NL 63.10VG.30.E.P.-	PI 23006 DN SMX 10	
311487	01.NL 63.10VG.HR.E.P.-	PI 73006 DN SMX VST 10	
311571	01.NL 63.25VG.30.E.P.-	PI 25006 DN SMX 25	
315123	01.NL 63.25VG.HR.E.P.-	PI 75006 DN SMX VST 25	
	1) 01.NL 63 MEHRPREIS VITON DICHTUNG		
	2) 01.NL 63 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%

312649	01.NL 100.3VG.30.E.P.-	PI 21010 DN SMX 3	
312797	01.NL 100.3VG.HR.E.P.-	PI 71010 DN SMX VST 3	
312651	01.NL 100.6VG.30.E.P.-	PI 22010 DN SMX 6	
313670	01.NL 100.6VG.HR.E.P.-	PI 72010 DN SMX VST 6	
311574	01.NL 100.10VG.30.E.P.-	PI 23010 DN SMX 10	
312301	01.NL 100.10VG.HR.E.P.-	PI 73010 DN SMX VST 10	
312653	01.NL 100.25VG.30.E.P.-	PI 25010 DN SMX 25	
301752	01.NL 100.25VG.HR.E.P.-	PI 75010 DN SMX VST 25	
	1) 01.NL 100 MEHRPREIS VITON DICHTUNG		
	2) 01.NL 100 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%

300784	01.NL 250.3VG.30.E.P.-	PI 21025 DN SMX 3	
300790	01.NL 250.6VG.30.E.P.-	PI 22025 DN SMX 6	
300367	01.NL 250.10VG.30.E.P.-	PI 23025 DN SMX 10	
301900	01.NL 250.25VG.30.E.P.-	PI 25025 DN SMX 25	
	1) 01.NL 250 MEHRPREIS VITON DICHTUNG		
	2) 01.NL 250 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%

1) Surplus price: viton sealing
2) Surplus price: execution complete stainless steel
3) Surplus price: element execution IS 06
4) Surplus price: element execution IS 08

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Artikelnr. Ident.no.	Artikelbezeichnung Designation		Netto-Preis Unit-Price
307250	01.NL 400.3VG.30.E.P.-	PI 21040 DN SMX 3	
311449	01.NL 400.3VG.HR.E.P.-	PI 71040 DN SMX VST 3	
307251	01.NL 400.6VG.30.E.P.-	PI 22040 DN SMX 6	
311448	01.NL 400.6VG.HR.E.P.-	PI 72040 DN SMX VST 6	
307252	01.NL 400.10VG.30.E.P.-	PI 23040 DN SMX 10	
312800	01.NL 400.10VG.HR.E.P.-	PI 73040 DN SMX VST 10	
307255	01.NL 400.25VG.30.E.P.-	PI 25040 DN SMX 25	
314880	01.NL 400.25VG.HR.E.P.-	PI 75040 DN SMX VST 25	
	1) 01.NL 400 MEHRPREIS VITON DICHTUNG		
	2) 01.NL 400 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%

300371	01.NL 630.3VG.30.E.P.-	PI 21063 DN SMX 3	
300795	01.NL 630.6VG.30.E.P.-	PI 22063 DN SMX 6	
300791	01.NL 630.10VG.30.E.P.-	PI 23063 DN SMX 10	
300792	01.NL 630.25VG.30.E.P.-	PI 25063 DN SMX 25	
	1) 01.NL 630 MEHRPREIS VITON DICHTUNG		
	2) 01.NL 630 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%

1) Surplus price: viton sealing
2) Surplus price: execution complete stainless steel
3) Surplus price: element execution IS 06
4) Surplus price: element execution IS 08

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5. Abmessungen/Sizes PALL

5.1 Filterelemente/Filter Elements 05...

306531	05.8300.3VG.10.B.P.8	HC8300 F*P 8 H
305209	05.8300.3VG.10.B.P.16	HC8300 F*P 16 H
301916	05.8300.3VG.10.B.P.39	HC8300 F*P 39 H
304655	05.8300.6VG.10.B.P.8	HC8300 F*N 8 H
301081	05.8300.6VG.10.B.P.16	HC8300 F*N 16 H
301059	05.8300.6VG.10.B.P.39	HC8300 F*N 39 H
306532	05.8300.12.200.10.B.P.8	HC8300 F*S 8 H
301080	05.8300.12.200.10.B.P.16	HC8300 F*S 16 H
301056	05.8300.12.200.10.B.P.39	HC8300 F*S 39 H
301826	05.8300.25VG.10.B.P.8	HC8300 F*T 8 H
301057	05.8300.25VG.10.B.P.16	HC8300 F*T 16 H
301058	05.8300.25VG.10.B.P.39	HC8300 F*T 39 H
1)	05.8300 MEHRPREIS VITON DICHTUNG	

333429	05.8304.1VG.10.B.P.16	HC8304 FKZ 16 H
333430	05.8304.1VG.10.B.V.16	HC8304 FKZ 16 Z
333427	05.8304.1VG.10.B.P.39	HC8304 FKZ 39 H
333431	05.8304.1VG.10.B.V.39	HC8304 FKZ 39 Z
333420	05.8304.3VG.10.B.P.16	HC8304 FKP 16 H
333421	05.8304.3VG.10.B.V.16	HC8304 FKP 16 Z
333422	05.8304.3VG.10.B.P.39	HC8304 FKP 39 H
333423	05.8304.3VG.10.B.V.39	HC8304 FKP 39 Z
333419	05.8304.6VG.10.B.P.16	HC8304 FKN 16 H
333417	05.8304.6VG.10.B.V.16	HC8304 FKN 16 Z
333418	05.8304.6VG.10.B.P.39	HC8304 FKN 39 H
333407	05.8304.6VG.10.B.V.39	HC8304 FKN 39 Z
333424	05.8304.25VG.10.B.P.16	HC8304 FKT 16 H
333425	05.8304.25VG.10.B.V.16	HC8304 FKT 16 Z
333426	05.8304.25VG.10.B.P.39	HC8304 FKT 39 H
333428	05.8304.25VG.10.B.V.39	HC8304 FKT 39 Z
333432	05.8304.12.200.10.B.P.16	HC8304 FKS 16 H
333434	05.8304.12.200.10.B.V.16	HC8304 FKS 16 Z
333433	05.8304.12.200.10.B.P.39	HC8304 FKS 39 H
333435	05.8304.12.200.10.B.V.39	HC8304 FKS 39 Z

333453	05.8314.1VG.10.B.P.16	HC8314 FKZ 16 H
333454	05.8314.1VG.10.B.V.16	HC8314 FKZ 16 Z
333455	05.8314.1VG.10.B.P.39	HC8314 FKZ 39 H
333456	05.8314.1VG.10.B.V.39	HC8314 FKZ 39 Z
333442	05.8314.3VG.10.B.P.16	HC8314 FKP 16 H
333444	05.8314.3VG.10.B.V.16	HC8314 FKP 16 Z
333443	05.8314.3VG.10.B.P.39	HC8314 FKP 39 H
333445	05.8314.3VG.10.B.V.39	HC8314 FKP 39 Z
333438	05.8314.6VG.10.B.P.16	HC8314 FKN 16 H
333439	05.8314.6VG.10.B.V.16	HC8314 FKN 16 Z
333441	05.8314.6VG.10.B.P.39	HC8314 FKN 39 H
333440	05.8314.6VG.10.B.V.39	HC8314 FKN 39 Z

* Hier kann beliebig D, K oder U eingesetzt werden / Here you can fit in D, K or U

1) Surplus price: viton sealing

Artikelnr. Ident.no.	Artikelbezeichnung Designation	Netto-Preis Unit-Price
333449	05.8314.25VG.10.B.P.16	HC8314 FKT 16 H
333450	05.8314.25VG.10.B.V.16	HC8314 FKT 16 Z
333451	05.8314.25VG.10.B.P.39	HC8314 FKT 39 H
333452	05.8314.25VG.10.B.V.39	HC8314 FKT 39 Z
333457	05.8314.12.200.10.B.P.16	HC8314 FKS 16 H
333458	05.8314.12.200.10.B.V.16	HC8314 FKS 16 Z
333459	05.8314.12.200.10.B.P.39	HC8314 FKS 39 H
333436	05.8314.12.200.10.B.V.39	HC8314 FKS 39 Z
306533	05.8400.3VG.10.B.P.8	HC8400 F*P 8 H
306537	05.8400.3VG.10.B.P.16	HC8400 F*P 16 H
306540	05.8400.3VG.10.B.P.26	HC8400 F*P 26 H
306543	05.8400.3VG.10.B.P.39	HC8400 F*P 39 H
306534	05.8400.6VG.10.B.P.8	HC8400 F*N 8 H
306538	05.8400.6VG.10.B.P.16	HC8400 F*N 16 H
301084	05.8400.6VG.10.B.P.26	HC8400 F*N 26 H
306544	05.8400.6VG.10.B.P.39	HC8400 F*N 39 H
306535	05.8400.12.200.10.B.P.8	HC8400 F*S 8 H
306539	05.8400.12.200.10.B.P.16	HC8400 F*S 16 H
306541	05.8400.12.200.10.B.P.26	HC8400 F*S 26 H
306545	05.8400.12.200.10.B.P.39	HC8400 F*S 39 H
306536	05.8400.25VG.10.B.P.8	HC8400 F*T 8 H
301082	05.8400.25VG.10.B.P.16	HC8400 F*T 16 H
306542	05.8400.25VG.10.B.P.26	HC8400 F*T 26 H
306546	05.8400.25VG.10.B.P.39	HC8400 F*T 39 H
[1)]	05.8400 MEHRPREIS VITON DICHTUNG	
306547	05.8500.3VG.10.B.P.8	HC8500 F*P 8 H
306550	05.8500.3VG.10.B.P.13	HC8500 F*P 13 H
301085	05.8500.3VG.10.B.P.26	HC8500 F*P 26 H
306548	05.8500.6VG.10.B.P.8	HC8500 F*N 8 H
301060	05.8500.6VG.10.B.P.13	HC8500 F*N 13 H
301090	05.8500.6VG.10.B.P.26	HC8500 F*N 26 H
306549	05.8500.12.200.10.B.P.8	HC8500 F*S 8 H
305443	05.8500.12.200.10.B.P.13	HC8500 F*S 13 H
301086	05.8500.12.200.10.B.P.26	HC8500 F*S 26 H
301087	05.8500.25VG.10.B.P.8	HC8500 F*T 8 H
301088	05.8500.25VG.10.B.P.13	HC8500 F*T 13 H
301089	05.8500.25VG.10.B.P.26	HC8500 F*T 26 H
[1)]	05.8500 MEHRPREIS VITON DICHTUNG	

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** Preise auf Anfrage / prices on request

1) Surplus price: viton sealing

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306551	05.8700.3VG.10.B.P.4	HC8700 F*P 4 H
301091	05.8700.3VG.10.B.P.8	HC8700 F*P 8 H
306552	05.8700.6VG.10.B.P.4	HC8700 F*N 4 H
301094	05.8700.6VG.10.B.P.8	HC8700 F*N 8 H
312747	05.8700.12.200.10.B.P.4	HC8700 F*S 4 H
312746	05.8700.12.200.10.B.P.8	HC8700 F*S 8 H
306553	05.8700.25VG.10.B.P.4	HC8700 F*T 4 H
301093	05.8700.25VG.10.B.P.8	HC8700 F*T 8 H
1)	05.8700 MEHRPREIS VITON DICHTUNG	
306554	05.8900.3VG.10.E.P.8	HC8900 F*P 8 H
306561	05.8900.3VG.10.E.P.13	HC8900 F*P 13 H
301095	05.8900.3VG.10.E.P.16	HC8900 F*P 16 H
318751	05.8900.3VG.10.E.P.26	HC8900 F*P 26 H
	05.8900.3VG.10.E.P.39	HC8900 F*P 39 H
306555	05.8900.6VG.10.E.P.8	HC8900 F*N 8 H
306562	05.8900.6VG.10.E.P.13	HC8900 F*N 13 H
301096	05.8900.6VG.10.E.P.16	HC8900 F*N 16 H
318753	05.8900.6VG.10.E.P.26	HC8900 F*N 26 H
321936	05.8900.6VG.10.E.P.39	HC8900 F*N 39 H
306559	05.8900.12.200.10.E.P.8	HC8900 F*S 8 H
312748	05.8900.12.200.10.E.P.13	HC8900 F*S 13 H
306565	05.8900.12.200.10.E.P.16	HC8900 F*S 16 H
318750	05.8900.12.200.10.E.P.26	HC8900 F*S 26 H
318766	05.8900.12.200.10.E.P.39	HC8900 F*S 39 H
306560	05.8900.25VG.10.E.P. 8	HC8900 F*T 8 H
306564	05.8900.25VG.10.E.P.13	HC8900 F*T 13 H
306566	05.8900.25VG.10.E.P.16	HC8900 F*T 16 H
318752	05.8900.25VG.10.E.P.26	HC8900 F*T 26 H
317615	05.8900.25VG.10.E.P.39	HC8900 F*T 39 H
1)	05.8900 MEHRPREIS VITON DICHTUNG	
301061	05.9020.3VG.10.E.P.4	HC9020 F*P 4 H
301097	05.9020.3VG.10.E.P.8	HC9020 F*P 8 H
301102	05.9020.6VG.10.E.P.4	HC9020 F*N 4 H
306567	05.9020.6VG.10.E.P.8	HC9020 F*N 8 H
301098	05.9020.12.200.10.E.P.4	HC9020 F*S 4 H
301099	05.9020.12.200.10.E.P.8	HC9020 F*S 8 H
301100	05.9020.25VG.10.E.P.4	HC9020 F*T 4 H
301101	05.9020.25VG.10.E.P.8	HC9020 F*T 8 H
1)	05.9020 MEHRPREIS VITON DICHTUNG	
301104	05.9021.3VG.210.E.P.4	HC9021 F*P 4 H
301105	05.9021.3VG.210.E.P.8	HC9021 F*P 8 H
301107	05.9021.6VG.210.E.P.4	HC9021 F*N 4 H
301108	05.9021.6VG.210.E.P.8	HC9021 F*N 8 H
301106	05.9021.12.200.210.E.P.4	HC9021 F*S 4 H
312762	05.9021.12.200.210.E.P.8	HC9021 F*S 8 H
303167	05.9021.25VG.210.E.P.4	HC9021 F*T 4 H
306568	05.9021.25VG.210.E.P.8	HC9021 F*T 8 H
1)	05.9021 MEHRPREIS VITON DICHTUNG	

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329620	05.9400.3VG.10.B.P.13	HC9400 F*P 13 H
309654	05.9400.3VG.10.B.P.26	HC9400 F*P 26 H
304784	05.9400.3VG.10.B.P.39	HC9400 F*P 39 H
329724	05.9400.6VG.10.B.P.13	HC9400 F*N 13H
	05.9400.6VG.10.B.P.26	HC9400 F*N 26H
323931	05.9400.6VG.10.B.P.39	HC9400 F*N 39 H
328513	05.9400.12.200.10.B.P.13	HC9400 F*S 13 H
312764	05.9400.12.200.10.B.P.26	HC9400 F*S 26 H
326835	05.9400.12.200.10.B.P.39	HC9400 F*S 39 H
331865	05.9400.25VG.10.B.P.13	HC9400 F*T 13 H
327025	05.9400.25VG.10.B.P.26	HC9400 F*T 26 H
	05.9400.25VG.10.B.P.39	HC9400 F*T 39 H
	1) 05.9400 MEHRPREIS VITON DICHTUNG	
301110	05.9600.3VG.10.E.P.4	HC9600 (9620) F*P 4 H
301062	05.9600.3VG.10.E.P.8	HC9600 (9620) F*P 8 H
301063	05.9600.3VG.10.E.P.13	HC9600 (9620) F*P 13 H
301064	05.9600.3VG.10.E.P.16	HC9600 (9620) F*P 16 H
301115	05.9600.6VG.10.E.P.4	HC9600 (9620) F*N 4 H
301070	05.9600.6VG.10.E.P.8	HC9600 (9620) F*N 8 H
301071	05.9600.6VG.10.E.P.13	HC9600 (9620) F*N 13 H
301072	05.9600.6VG.10.E.P.16	HC9600 (9620) F*N 16 H
312752	05.9600.12.200.10.E.P.4	HC9600 (9620) F*S 4 H
301065	05.9600.12.200.10.E.P.8	HC9600 (9620) F*S 8 H
312751	05.9600.12.200.10.E.P.13	HC9600 (9620) F*S 13 H
312753	05.9600.12.200.10.E.P.16	HC9600 (9620) F*S 16 H
301067	05.9600.25VG.10.E.P.4	HC9600 (9620) F*T 4 H
301068	05.9600.25VG.10.E.P.8	HC9600 (9620) F*T 8 H
301069	05.9600.25VG.10.E.P.13	HC9600 (9620) F*T 13 H
301114	05.9600.25VG.10.E.P.16	HC9600 (9620) F*T 16 H
	1) 05.9600 (9620) MEHRPREIS VITON DICHTUNG	
301073	05.9601.3VG.210.E.P.4	HC9601 F*P 4 H
301117	05.9601.3VG.210.E.P.8	HC9601 F*P 8 H
301118	05.9601.3VG.210.E.P.13	HC9601 F*P 13 H
301074	05.9601.3VG.210.E.P.16	HC9601 F*P 16 H
301129	05.9601.6VG.210.E.P.4	HC9601 F*N 4 H
301130	05.9601.6VG.210.E.P.8	HC9601 F*N 8 H
301131	05.9601.6VG.210.E.P.13	HC9601 F*N 13 H
301132	05.9601.6VG.210.E.P.16	HC9601 F*N 16 H
312769	05.9601.12.200.210.E.P.4	HC9601 F*S 4 H
312766	05.9601.12.200.210.E.P.8	HC9601 F*S 8 H
312768	05.9601.12.200.210.E.P.13	HC9601 F*S 13 H
312767	05.9601.12.200.210.E.P.16	HC9601 F*S 16 H
301125	05.9601.25VG.210.E.P.4	HC9601 F*T 4 H
303350	05.9601.25VG.210.E.P.8	HC9601 F*T 8 H
301127	05.9601.25VG.210.E.P.13	HC9601 F*T 13 H
301128	05.9601.25VG.210.E.P.16	HC9601 F*T 16 H
	1) 05.9601 MEHRPREIS VITON DICHTUNG	

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1) Surplus price: viton sealing

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303348	05.9800.3VG.10.E.P.4	HC9800 F*P 4 H
306570	05.9800.3VG.10.E.P.8	HC9800 F*P 8 H
301137	05.9800.6VG.10.E.P.4	HC9800 F*N 4 H
305375	05.9800.6VG.10.E.P.8	HC9800 F*N 8 H
312775	05.9800.12.200.10.E.P.4	HC9800 F*S 4 H
312776	05.9800.12.200.10.E.P.8	HC9800 F*S 8 H
301076	05.9800.25VG.10.E.P.4	HC9800 F*T 4 H
301077	05.9800.25VG.10.E.P.8	HC9800 F*T 8 H
1)	05.9800 MEHRPREIS VITON DICHTUNG	
301138	05.9801.3VG.210.E.P.4	HC9801 F*P 4 H
301139	05.9801.3VG.210.E.P.8	HC9801 F*P 8 H
306571	05.9801.3VG.210.E.P.13	HC9801 F*P 13 H
301145	05.9801.6VG.210.E.P.4	HC9801 F*N 4 H
301146	05.9801.6VG.210.E.P.8	HC9801 F*N 8 H
306572	05.9801.6VG.210.E.P.13	HC9801 F*N 13 H
301079	05.9801.12.200.210.E.P.4	HC9801 F*S 4 H
312782	05.9801.12.200.210.E.P.8	HC9801 F*S 8 H
312784	05.9801.12.200.210.E.P.13	HC9801 F*S 13 H
301143	05.9801.25VG.210.E.P.4	HC9801 F*T 4 H
301144	05.9801.25VG.210.E.P.8	HC9801 F*T 8 H
306573	05.9801.25VG.210.E.P.13	HC9801 F*T 13 H
1)	05.9801 MEHRPREIS VITON DICHTUNG	
306578	05.9901.3VG.210.B.P.13	HC9901 F*P 13 H
301981	05.9901.3VG.210.B.P.26	HC9901 F*P 26 H
306579	05.9901.6VG.210.B.P.13	HC9901 F*N 13 H
306582	05.9901.6VG.210.B.P.26	HC9901 F*N 26 H
306580	05.9901.12.200.210.B.P.13	HC9901 F*S 13 H
306583	05.9901.12.200.210.B.P.26	HC9901 F*S 26 H
306581	05.9901.25VG.210.B.P.13	HC9901 F*T 13 H
306584	05.9901.25VG.210.B.P.26	HC9901 F*T 26 H
1)	05.9901 MEHRPREIS VITON DICHTUNG	

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1) Surplus price: viton sealing

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	5.2 Filterelemente/Filter Elements 05...		
317487	01.NR 100.3VG.10.B.P.-	HC0251 F*P 10 H	
316886	01.NR 100.6VG.10.B.P.-	HC0251 F*N 10 H	
313167	01.NR 100.10VG.10.B.P.-	HC0251 F*S 10 H	
	1) 01.NR 100 MEHRPREIS VITON DICHTUNG		
	2) 01.NR 100 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%
314491	01.NR 250.3VG.10.B.P.-	HC0252 F*P 10 H	
314492	01.NR 250.6VG.10.B.P.-	HC0252 F*N 10 H	
314191	01.NR 250.10VG.10.B.P.-	HC0252 F*S 10 H	
	1) 01.NR 250 MEHRPREIS VITON DICHTUNG		
	2) 01.NR 250 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%
304533	01.NR 630.3VG.10.B.P.-	HC0171 F*P 16 H	
304534	01.NR 630.6VG.10.B.P.-	HC0171 F*N 16 H	
304535	01.NR 630.10VG.10.B.P.-	HC0171 F*S 16 H	
	1) 01.NR 630 MEHRPREIS VITON DICHTUNG		
	2) 01.NR 630 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%
306604	01.NR 1000.3VG.10.B.P.-	HC0600 F*P 16 H	
305449	01.NR 1000.6VG.10.B.P.-	HC0600 F*N 16 H	
306605	01.NR 1000.10VG.10.B.P.-	HC0600 F*S 16 H	
	1) 01.NR 1000 MEHRPREIS VITON DICHTUNG		
	2) 01.NR 1000 MEHRPREIS AUSF. KPL. EDELSTAHL		
	3) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 06		10%
	4) MEHRPREIS FÜR ELEMENTE AUSFÜHRUNG IS 08		25%

* Hier kann beliebig D, K oder U eingesetzt werden / Here you can fit in D, K or U

1) Surplus price: viton sealing
2) Surplus price: execution complete stainless steel
3) Surplus price: element execution IS 06
4) Surplus price: element execution IS 08