

**FILTERS FOR POTENTIALLY
EXPLOSIVE ATMOSPHERE**

**HYDRAULIC
FILTRATION**

CATALOGUE



MPFILTRI®

PASSION TO PERFORM



A WORLDWIDE LEADER IN THE FIELD OF HYDRAULIC FILTRATION EQUIPMENT.

Our company started life in 1964, when Bruno Pasotto decided to attempt to cater for the requests of a market still to be fully explored, with the study, design, development, production and marketing of a vast range of filters for hydraulic equipment, capable of satisfying the needs of manufacturers in all sectors. The quality of our products, our extreme competitiveness compared with major international producers and our constant activities of research, design and development has made us a worldwide leader in the field of hydraulic circuit filtering. Present for over 50 years in the market, we have played a truly decisive role in defining our sector, and by now we are a group capable of controlling our entire chain of production, monitoring all manufacturing processes to guarantee superior quality standards and to provide concrete solutions for the rapidly evolving needs of customers and the market.

HYDRAULIC FILTRATION PRODUCTS

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30	page	SUCTION FILTERS	up to Q_{max}	
			l/min	gpm
33	STRC & MPAC	Submerged suction filter, with bypass or magnetic filter	1000	264
41	SFEX	In-line filter with plastic bowl	100	26
51	SFMC	Semi-submerged positive head suction filter, low flow rate	160	42
61	SFSC	Semi-submerged positive head suction filter, high flow rate	700	185
711		CLOGGING INDICATORS		

72	page	RETURN FILTERS	up to P_{max}		up to Q_{max}	
			bar	psi	l/min	gpm
75	RFEX	Return filter, tank mounted filter suitable for all mineral oil and water glycol applications	16	232	260	69
85	MPFX	Tank top semi-immersed filter, standard filter element disassembly	8	116	900	238
113	MPLX	Tank top semi-immersed filter, standard filter element disassembly	10	145	1800	476
121	MPTX	Tank top semi-immersed filter, easy filter element disassembly	8	116	300	79
139	MFBX	Bowl assembly	8	116	700	185
147	MPF	Tank top semi-immersed filter, standard filter element disassembly	8	116	900	238
175	MPT	Tank top semi-immersed filter, easy filter element disassembly	8	116	300	79
193	MFB	Bowl assembly	8	116	700	185
201	MDH	Heavy industrial applications integrated in the tank - air separation	10	145	500	132
209	MPH	Tank top semi-immersed filter, standard filter element disassembly	10	145	3500	925
233	MPI	Tank top semi-immersed filter, standard filter element disassembly	10	145	3500	925
245	FRI	Tank top semi-immersed filter, easy filter element disassembly, it can be used also as in-line filter	20	290	2500	660
261	RF2	Semi-immersed under-head filter, easy filter element disassembly	20	290	615	162
268		ACCESSORIES				
712		CLOGGING INDICATORS				

270	page	RETURN / SUCTION FILTERS	up to P_{max}		up to Q_{max}	
			bar	psi	l/min	gpm
273	MRSX	Unique TANK TOP filter for mobile machinery, with combined filtration on return and suction to the inlet at the hydrostatic transmissions in closed circuit	10	145	250	66
287	LMP 124 MULTIPOST	Unique IN-LINE filter for mobile machinery, with combined filtration on return and suction to the inlet at the hydrostatic transmissions in closed circuit	80	1160	120	32
714		CLOGGING INDICATORS				

294	page	SPIN-ON FILTERS	up to P_{max}		up to Q_{max}	
			bar	psi	l/min	gpm
297	MPS	Low pressure filter, available with single cartridge (CS) for in-line or flange mounting or with two cartridge on the same axis on the opposite sides	12	174	365	96
717		CLOGGING INDICATORS				

312 page			LOW & MEDIUM PRESSURE FILTERS		up to P _{max}		up to Q _{max}	
			bar	psi	l/min	gpm		
315	LFEX	In-line filter with plastic bowl	16	232	300	79		
325	LPH 630	Off-line low pressure filter	10	145	1600	352		
333	LMP 110	In-line low & medium pressure filter, low to medium flow rate	80	1160	165	44		
341	LMP 112 - 123 MULTIPORT	In-line filter with Multiport design for multiple choice connection	80	1160	175	46		
357	LMP 210 - 211	In-line low & medium pressure filter, low flow rate	60	870	365	96		
367	LMP 400 - 401	In-line low & medium pressure filter, high flow rate	60	870	780	206		
375	LMP 430 - 431	In-line low & medium pressure filter, high flow rate	60	870	780	206		
383	LMP 950 - 951	In-line filter, available with 2 and up to 6 different heads	30	435	2400	634		
391	LMP 952 - 953 - 954	In-line low pressure filter specifically designed to be mounted in series	25	363	4500	1189		
403	LMD 211	In-line duplex medium pressure filter	60	870	200	53		
411	LMD 400 - 401 & 431	In-line duplex low pressure filter	16	232	600	159		
427	LMD 951	In-line duplex filter, available with 2 up to 6 different heads	16	232	1200	317		
435		Filters featuring filter elements designed according to DIN24550						
437	LDP - LDD	In-line and duplex medium pressure filter	60	870	360	95		
447	LMP 900 - 901	In-line low pressure filter	30	435	2000	528		
455	LMP 902 - 903	In-line filter specifically designed to be mounted in series	20	290	3000	793		
464		ACCESSORIES						
720		CLOGGING INDICATORS						

			up to P _{max}		up to Q _{max}	
466	page	HIGH PRESSURE FILTERS	bar	psi	l/min	gpm
469	FMMX	Typical high pressure filter for mobile applications, low flow rate	420	6092	300	79
479	FMM	Typical high pressure filter for mobile applications, low flow rate	420	6092	300	79
489	FHA	Filter optimized for use in high pressure operating systems, low flow rate	560	8122	150	40
497	FMP 039	Filter high pressure, low flow rate applications	110	1595	80	21
505	FMP	Filter high pressure, high flow rate applications	320	4641	500	132
517	FHP	Typical high pressure filter for mobile applications, high flow rate	420	6092	630	166
537	FHM	High pressure filter with intermediate manifold construction	320	4641	400	106
557	FHB	High pressure for block mounting	320	4641	485	128
569	FHF	In-line manifold top mounting according to SAE J2066	350	5076	550	145
579	FHD	In-line duplex high pressure filter	350	5076	250	66
593	HPB	Pressure filter kits for integration in control manifolds	420	6092	300	79
721	CLOGGING INDICATORS					

			up to P _{max}		up to Q _{max}	
602	page	STAINLESS STEEL HIGH PRESSURE FILTERS	bar	psi	l/min	gpm
605	FZP	In-line pressure filter with threaded mount	420	6092	160	42
615	FZH	In-line pressure filter with threaded mount for higher pressure	700	10153	80	21
625	FZX	In-line pressure filter with threaded mount up to 1000 bar	1000	14504	10	3
633	FZM	Manifold top mounting	320	4641	70	18
641	FZB	Manifold side mounting	320	4641	70	18
649	FZD	Duplex pressure filter for continuous operation requirements	350	5076	60	16
722	CLOGGING INDICATORS					

			up to P _{max}		up to Q _{max}	
660	page	FILTERS FOR POTENTIALLY EXPLOSIVE ATMOSPHERE	bar	psi	l/min	gpm
663	FMMX	Typical high pressure filter for mobile applications, low flow rate	420	6092	300	79
673	FZP	In-line pressure filter with threaded mount	420	6092	160	42
683	FZH	In-line pressure filter with threaded mount for higher pressure	700	10153	80	21
693	FZX	In-line pressure filter with threaded mount up to 1000 bar	1000	14504	10	3
723	CLOGGING INDICATORS					

701 page		CLOGGING INDICATORS	
706	QUICK REFERENCE GUIDE		
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Our work is based on a skillful interaction between advanced technology and fine workmanship, **customizing products according to specific market requests**, focusing strongly on innovation and quality, and following every step in the manufacturing of both standard and special products, fully respecting customer expectations.

MARKET LEADER



Our customer-oriented philosophy, which enables us to satisfy all customer requests **rapidly** and **with personalized products**, makes us a **dynamic and flexible enterprise**.

The possibility of constantly controlling and monitoring the entire production process is essential to allow us to guarantee the quality of our products.

WORLDWIDE PRESENCE



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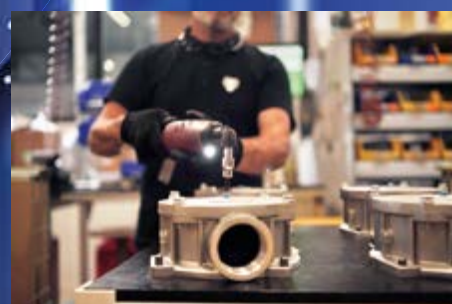
Our foreign Branches enable us to offer a diversified range of products that allow us to successfully face the aggressive challenge of international competition, and also to maintain a stable presence at a local level.

The Group boasts **9** business branches



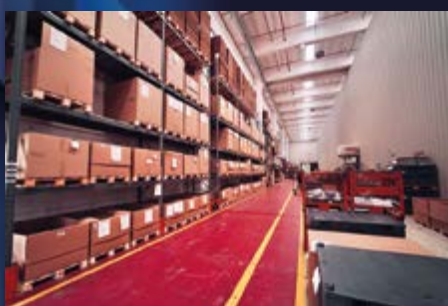
TECHNOLOGY

Our constant **quest for excellence in quality and technological innovation** allows us to offer only the best solutions and services for applications in many fields, including general industry, test rigs, lubrication, heavy engineering, renewable energies, naval engineering, offshore engineering, aviation systems, emerging technologies and mobile plant (i.e. tractors, excavators, concrete pumps, platforms).



AND PRODUCTION

Our high level of technological expertise means **we can rely entirely on our own resources, without resorting to external providers.** This in turn enables us to satisfy a growing number of customer requests, also exploiting our constantly updated range of machines and equipment, featuring **fully-automated workstations** capable of **24-hour production.**





SUCTION FILTERS

Mounting:

- Tank immersed
- In-Line
- In tank with shut off valve
- In tank with flooded suction



RETURN FILTERS

Mounting:

- In-Line
- Tank top
- In single and duplex designs



RETURN / SUCTION FILTERS

Mounting:

- In-Line
- Tank top



SPIN-ON FILTERS

Mounting:

- In-Line
- Tank top



LOW & MEDIUM PRESSURE FILTERS

Mounting:

- In-Line
- Parallel version
- In single and duplex designs



HIGH PRESSURE FILTERS

Mounting:

- In-Line
- Manifold
- In single and duplex designs

PRODUCT RANGE

MP Filtri can offer a vast and articulated range of products for the global market, suitable for all industrial sectors using hydraulic equipment.

This includes filters (suction, return, return/suction, spin-on, pressure, stainless steel pressure, ATEX filters) and structural components (motor/pump bell-housings, transmission couplings, damping rings, foot brackets, aluminium tanks, cleaning covers).

We can provide all the skills and solutions required by the modern hydraulics industry to monitor contamination levels and other fluid conditions.

Mobile filtration units and a full range of accessories allow us to supply everything necessary for a complete service in the hydraulic circuits.



STAINLESS STEEL HIGH PRESSURE FILTERS

Mounting:
- In-Line
- Manifold
- In single and duplex designs



FILTERS FOR POTENTIALLY EXPLOSIVE ATMOSPHERE

Mounting:
- In-Line



CONTAMINATION CONTROL SOLUTIONS

- Off-line, in-line particle analyser
- Off-line bottle sampling products
- Fully calibrated using relevant ISO standards
- A wide range of variants to support fluid types and communication protocols
- Mobile Filtration Units with flow rates from 15 l/min up to 200 l/min



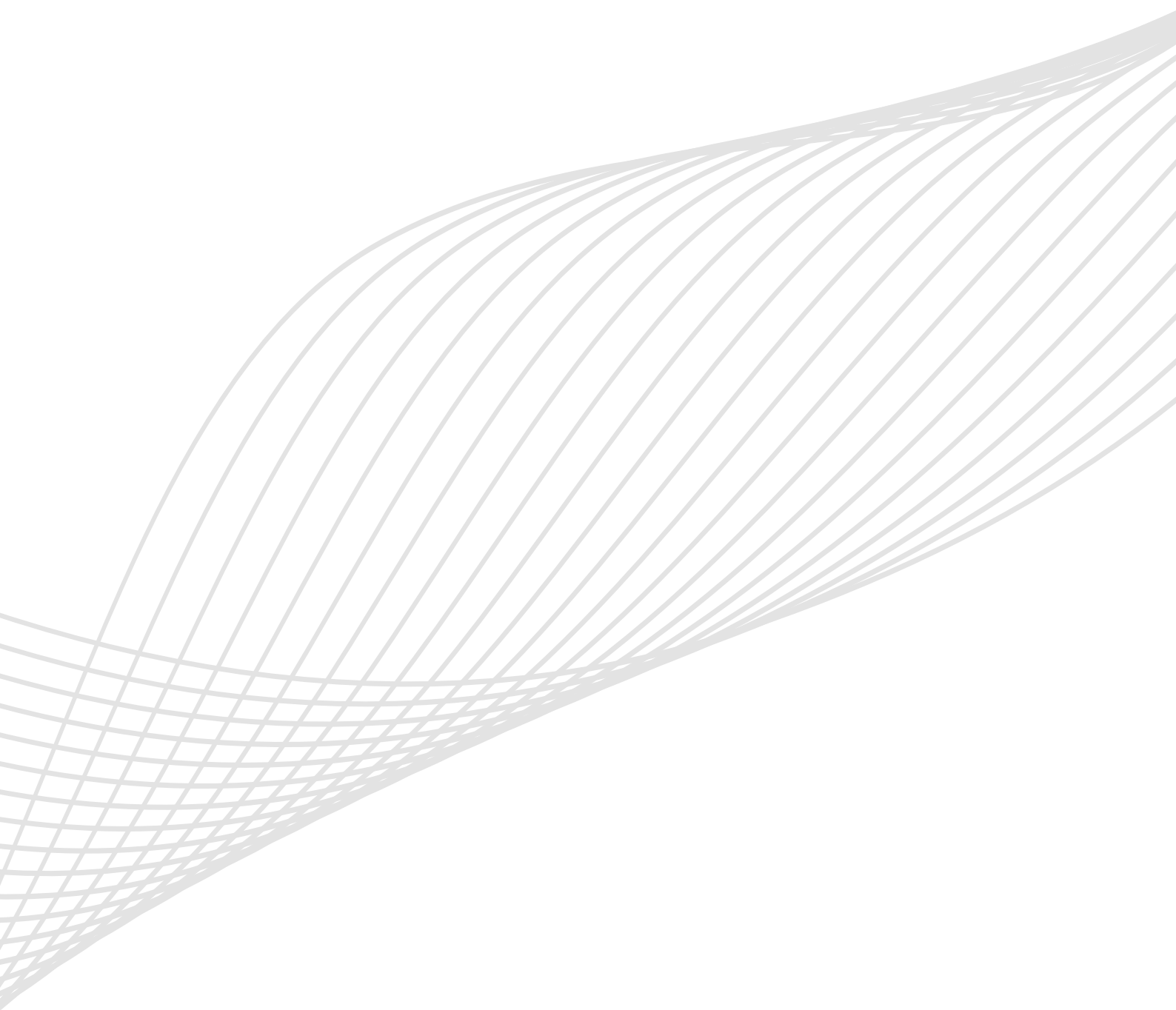
POWER TRANSMISSION PRODUCTS

- Aluminium bell-housings for motors from 0.12 kW to 400 kW
- Couplings in Aluminium Cast Iron - Steel
- Damping rings
- Foot bracket
- Aluminium tanks
- Cleaning covers



TANK ACCESSORIES

- Oil filler and air breather plugs
- Optical and electrical level gauges
- Pressure gauge valve selectors
- Pipe fixing brackets
- Pressure gauges



CONTAMINATION MANAGEMENT

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1 HYDRAULIC FLUIDS

The fluid is the vector that transmits power, energy within an oleodynamic circuit. In addition to transmitting energy through the circuit, it also performs additional functions such as lubrication, protection and cooling of the surfaces.

The classification of fluids used in hydraulic systems is coded in many regulatory references, different Standards.

The most important classification system for hydraulic fluids is the one defined by International Organization for Standardization (ISO), which established a classification system within their standard: "ISO 6743-4 Lubricants, Industrial Oils and Related Products". In particular, the parts of interest for hydraulic fluids are:

- Lubricants, industrial oils and related products (class L)
- Classifications - Part 4L - Family H (Hydraulic systems)

The ISO 6743-4 classification system can be generally applied to the three primary classes of hydraulic fluids:

- Mineral Oils (i.e.: petroleum) Hydraulic Fluids (i.e.: HH: Mineral lubricants without corrosion inhibitors; HL: HH-type lubricants with oxidation reduction and anticorrosive additives; HM: HL-type lubricants with anti-wear additives; HV: HM-type lubricants with a higher viscosity grade and temperature properties; and others).
- Biodegradable Hydraulic Fluids (HExx), also defined as "Environmentally acceptable hydraulic fluids".
- Fire Resistant Hydraulic Fluids (HFxx), which could be further split into: Fire-resistant aqueous fluids (HFAx, HFB; HFC); Fire-resistant synthetic anhydrous fluids (HFDx).

The choice of fluid for an hydraulic system must take into account several parameters.

These parameters can adversely affect the performance of an hydraulic system, causing delay in the controls, pump cavitation, excessive absorption, excessive temperature rise, efficiency reduction, increased drainage, wear, jam/block or air intake in the plant.

The main properties that characterize hydraulic fluids and affect their choice are:

- **DYNAMIC VISCOSITY**
It identifies the fluid's resistance to sliding due to the impact of the particles forming it.
- **KINEMATIC VISCOSITY**
It is a widespread formal dimension in the hydraulic field.
It is calculated with the ratio between the dynamic viscosity and the fluid density.
Kinematic viscosity varies with temperature and pressure variations.
- **VISCOSITY INDEX**
This value expresses the ability of a fluid to maintain viscosity when the temperature changes.
A high viscosity index indicates the fluid's ability to limit viscosity variations by varying the temperature.
- **FILTERABILITY INDEX**
It is the value that indicates the ability of a fluid to cross the filter materials.
A low filterability index could cause premature clogging of the filter material.
- **WORKING TEMPERATURE**
Working temperature affects the fundamental characteristics of the fluid.
As already seen, some fluid characteristics, such as cinematic viscosity, vary with the temperature variation.

When choosing a hydraulic oil, must therefore be taken into account of the environmental conditions in which the machine will operate.

- **COMPRESSIBILITY MODULE**
Every fluid subjected to a pressure contracts, increasing its density.
The compressibility module identifies the increase in pressure required to cause a corresponding increase in density.
- **HYDROLYTIC STABILITY**
It is the characteristic that prevents galvanic pairs that can cause wear in the plant/system.
- **ANTIOXIDANT STABILITY AND WEAR PROTECTION**
These features translate into the capacity of a hydraulic oil to avoid corrosion of metal elements inside the system.
- **HEAT TRANSFER CAPACITY**
It is the characteristic that indicates the capacity of hydraulic oil to exchange heat with the surfaces and then cool them.

2 FLUID CONTAMINATION

Whatever the nature and properties of fluids, they are inevitably subject to contamination. Fluid contamination can have two origins:

- **INITIAL CONTAMINATION**
Caused by the introduction of contaminated fluid into the circuit, or by incorrect storage, transport or transfer operations.
- **PROGRESSIVE CONTAMINATION**
Caused by factors related to the operation of the system, such as metal surface wear, sealing wear, oxidation or degradation of the fluid, the introduction of contaminants during maintenance, corrosion due to chemical or electrochemical action between fluid and components, cavitation.
The contamination of hydraulic systems can be of different nature:
- **SOLID CONTAMINATION**
For example rust, slag, metal particles, fibers, rubber particles, paint particles or additives
- **LIQUID CONTAMINATION**
For example, the presence of water due to condensation or external infiltration or acids
- **GASEOUS CONTAMINATION**
For example, the presence of air due to inadequate oil level in the tank, drainage in suction ducts, incorrect sizing of tubes or tanks.

3 FLUID COMPATIBILITY CHARTS

For more detailed information on specific fluid compatibility please refer to the fluid compatibility charts on our website:



Scan or click me!

④ EFFECTS OF CONTAMINATION ON HYDRAULIC COMPONENTS

Solid contamination is recognized as the main cause of malfunction, failure and early degradation in hydraulic systems. It is impossible to delete it completely, but it can be effectively controlled by appropriate devices.

CONTAMINATION IN PRESENCE OF LARGE TOLERANCES



CONTAMINATION IN PRESENCE OF NARROW TOLERANCES



Solid contamination mainly causes surface damage and component wear.

- ABRASION OF SURFACES
Cause of leakage through mechanical seals, reduction of system performance, failures.
- SURFACE EROSION
Cause of leakage through mechanical seals, reduction of system performance, variation in adjustment of control components, failures.
- ADHESION OF MOVING PARTS
Cause of failure due to lack of lubrication.
- DAMAGES DUE TO FATIGUE
Cause of breakdowns and components breakdown.

ABRASION



EROSION



ADHESION



FATIGUE



Liquid contamination mainly results in decay of lubrication performance and protection of fluid surfaces.

DISSOLVED WATER

- INCREASING FLUID ACIDITY
Cause of surface corrosion and premature fluid oxidation
- GALVANIC COUPLE AT HIGH TEMPERATURES
Cause of corrosion

FREE WATER - ADDITIONAL EFFECTS

- DECAY OF LUBRICANT PERFORMANCE
Cause of rust and sludge formation, metal corrosion and increased solid contamination
- BATTERY COLONY CREATION
Cause of worsening in the filterability feature

- ICE CREATION AT LOW TEMPERATURES
Cause damage to the surface
- ADDITIVE DEPLETION
Free water retains polar additives

Gaseous contamination mainly results in decay of system performance.

- CUSHION SUSPENSION
Cause of increased noise and cavitation.
- FLUID OXIDATION
Cause of corrosion acceleration of metal parts.
- MODIFICATION OF FLUID PROPERTIES (COMPRESSIBILITY MODULE, DENSITY, VISCOSITY)
Cause of system's reduction of efficiency and of control.
It is easy to understand how a system without proper contamination management is subject to higher costs than a system that is provided.
- MAINTENANCE
Increase maintenance activities, spare parts, machine stop costs.
- ENERGY AND EFFICIENCY
Efficiency and performance reduction due to friction, drainage, cavitation.

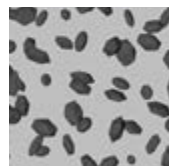
⑤ MEASURING THE SOLID CONTAMINATION LEVEL

The level of contamination of a system identifies the amount of contaminant contained in a fluid. This parameter refers to a unit volume of fluid. The level of contamination may be different at different points in the system. From the information in the previous paragraphs it is also apparent that the level of contamination is heavily influenced by the working conditions of the system, by its working years and by the environmental conditions.

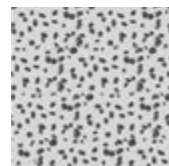
What is the size of the contaminating particles that we must handle in our hydraulic circuit?



HUMAN HAIR
(75 µm)



MINIMUM DIMENSION
VISIBLE WITH HUMAN
EYES
(40 µm)



TYPICAL CONTAMINANT
DIMENSION IN A
HYDRAULIC CIRCUIT
(4 - 14 µm)

Contamination level analysis is significant only if performed with a uniform and repeatable method, conducted with standard test methods and suitably calibrated equipment. To this end, ISO has issued a set of standards that allow tests to be conducted and express the measured values in the following ways.

- GRAVIMETRIC LEVEL - ISO 4405

The level of contamination is defined by checking the weight of particles collected by a laboratory membrane. The membrane must be cleaned, dried and desiccated, with fluid and conditions defined by the Standard. The volume of fluid is filtered through the membrane by using a suitable suction system. The weight of the contaminant is determined by checking the weight of the membrane before and after the fluid filtration.



CLEAN
MEMBRANE



CONTAMINATED
MEMBRANE

CONTAMINATION MANAGEMENT

- CUMULATIVE DISTRIBUTION OF THE PARTICLES SIZE - ISO 4406

The level of contamination is defined by counting the number of particles of certain dimensions per unit of volume of fluid. Measurement is performed by Contamination Monitoring Products (CMP).

Following the count, the contamination classes are determined, corresponding to the number of particles detected in the unit of fluid.

The most common classification methods follow ISO 4406 and SAE AS 4059 (Aerospace Sector) regulations.

NAS 1638 is still used although obsolete.

Classification example according to ISO 4406

The International Standards Organization standard ISO 4406 is the preferred method of quoting the number of solid contaminant particles in a sample. The level of contamination is defined by counting the number of particles of certain dimensions per unit of volume of fluid. The measurement is performed by Contamination Monitoring Products (CMP).

The numbers represent a code which identifies the number of particles of certain sizes in 1ml of fluid. Each code number has a particular size range. The first scale number represents the number of particles equal to or larger than 4 $\mu\text{m}_{(c)}$ per millilitre of fluid; The second scale number represents the number of particles equal to or larger than 6 $\mu\text{m}_{(c)}$ per millilitre of fluid; The third scale number represents the number of particles equal to or larger than 14 $\mu\text{m}_{(c)}$ per millilitre of fluid.

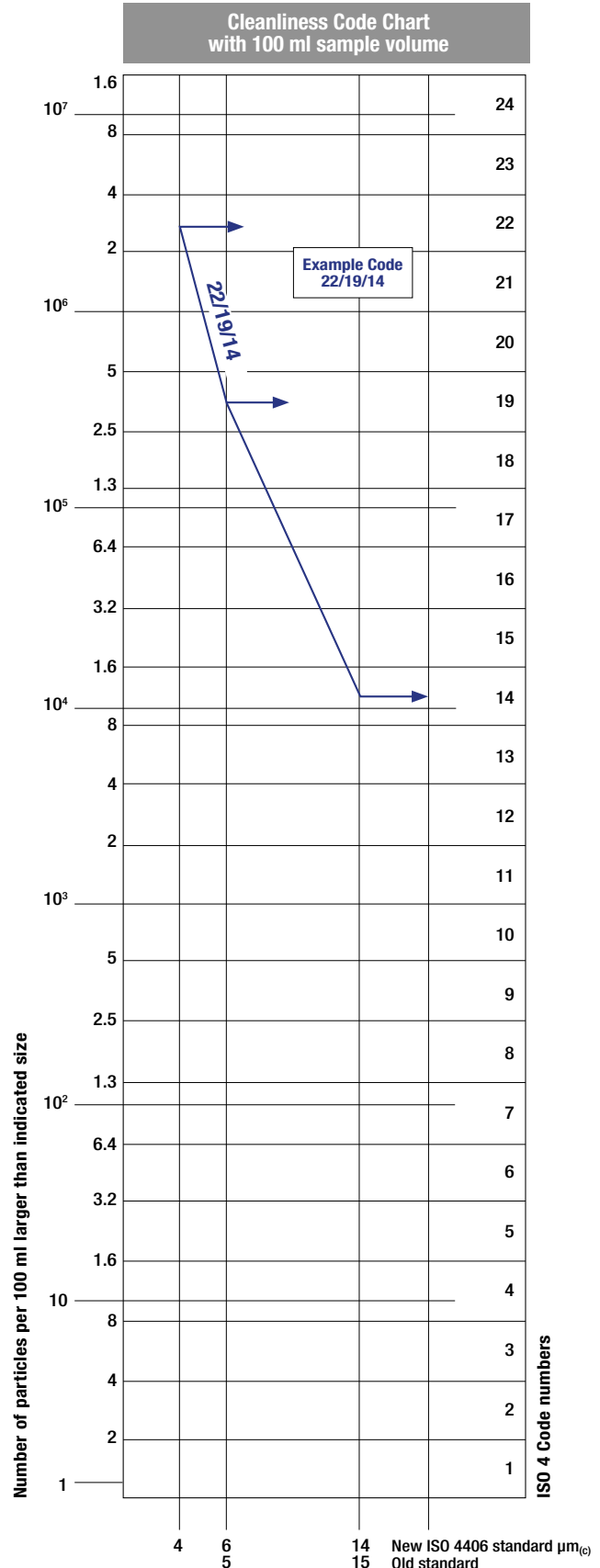
ISO 4406 - Allocation of Scale Numbers

Class	Number of particles per ml	
	Over	Up to
28	1 300 000	2 500 000
27	640 000	1 300 000
26	320 000	640 000
25	160 000	320 000
24	80 000	160 000
23	40 000	80 000
22	20 000	40 000
21	10 000	20 000
20	5 000	10 000
19	2 500	5 000
18	1 300	2 500
17	640	1 300
16	320	640
15	160	320
14	80	160
13	40	80
12	20	40
11	10	20
10	5	10
9	2.5	5
8	1.3	2.5
7	0.64	1.3
6	0.32	0.64
5	0.16	0.32
4	0.08	0.16
3	0.04	0.08
2	0.02	0.04
1	0.01	0.02
0	0	0.01

> 4 $\mu\text{m}_{(c)}$ = 350 particles
> 6 $\mu\text{m}_{(c)}$ = 100 particles
> 14 $\mu\text{m}_{(c)}$ = 25 particles
16 / 14 / 12

ISO 4406 Cleanliness Code System

Microscope counting examines the particles differently to Contamination Monitoring Products (CMP) and the code is given with two scale numbers only. These are at 5 μm and 15 μm equivalent to the 6 $\mu\text{m}_{(c)}$ and 14 $\mu\text{m}_{(c)}$ of Contamination Monitoring Products (CMP).



- CUMULATIVE DISTRIBUTION OF THE PARTICLES SIZE SAE AS4059-1 and SAE AS4059-2

Classification example according to SAE AS4059 - Rev. G

The code, prepared for the aerospace industry, is based on the size, quantity, and particle spacing in a 100 ml fluid sample. The contamination classes are defined by numeric codes, the size of the contaminant is identified by letters (A-F).

This SAE Aerospace Standard (AS) defines cleanliness levels for particulate contamination of hydraulic fluids and includes methods of reporting data relating to the contamination levels. Tables 1 and 2 below provide differential and cumulative particle counts respectively for counts obtained by an automatic particle counter, e.g. LPA3.

Table 1 - Class for differential measurement

Class	Dimension of contaminant Maximum Contamination Limits per 100 ml					(3)
	5-15 µm	15-25 µm	25-50 µm	50-100 µm	>100 µm	
	6-14 µm _(c)	14-21 µm _(c)	21-38 µm _(c)	38-70 µm _(c)	>70 µm _(c)	
00	125	22	4	1	0	(1)
0	250	44	8	2	0	(2)
1	500	89	16	3	1	
2	1 000	178	32	6	1	
3	2 000	356	63	11	2	
4	4 000	712	126	22	4	
5	8 000	1 425	253	45	8	
6	16 000	2 850	506	90	16	
7	32 000	5 700	1 012	180	32	
8	64 000	11 400	2 025	360	64	
9	128 000	22 800	4 050	720	128	
10	256 000	45 600	8 100	1 440	256	
11	512 000	91 200	16 200	2 880	512	
12	1 024 000	182 400	32 400	5 760	1 024	

6 - 14 µm _(c) = 15 000 particles
14 - 21 µm _(c) = 2 200 particles
21 - 38 µm _(c) = 200 particles
38 - 70 µm _(c) = 35 particles
> 70 µm _(c) = 3 particles
SAE AS4059 REV G - Class 6

(1) Size range, optical microscope, based on longest dimension as measured per AS598 or ISO 4407. (2) Size range CMP calibrated per ISO 11171 or an optical or electron microscope with image analysis software, based on projected area equivalent diameter. (3) Contamination classes and particle count limits are identical to NAS 1638.

Table 2 - Class for cumulative measurement

Class	Dimension of contaminant Maximum Contamination Limits per 100 ml						(1)
	>1 µm	>5 µm	>15 µm	>25 µm	>50 µm	>100 µm	
	>4 µm _(c)	>6 µm _(c)	>14 µm _(c)	>21 µm _(c)	>38 µm _(c)	>70 µm _(c)	
000	195	76	14	3	1	0	(2)
00	390	152	27	5	1	0	
0	780	304	54	10	2	0	
1	1 560	609	109	20	4	1	
2	3 120	1 217	217	39	7	1	
3	6 250	2 432	432	76	13	2	
4	12 500	4 864	864	152	26	4	
5	25 000	9 731	1 731	306	53	8	
6	50 000	19 462	3 462	612	106	16	
7	100 000	38 924	6 924	1 224	212	32	
8	200 000	77 849	13 849	2 449	424	64	
9	400 000	155 698	27 698	4 898	848	128	
10	800 000	311 396	55 396	9 796	1 696	256	
11	1 600 000	622 792	110 792	19 592	3 392	512	
12	3 200 000	1 245 584	221 584	39 184	6 784	1 024	

> 4 µm _(c) = 45 000 particles
> 6 µm _(c) = 15 000 particles
> 14 µm _(c) = 1 500 particles
> 21 µm _(c) = 250 particles
> 38 µm _(c) = 15 particles
> 70 µm _(c) = 3 particle
SAE AS4059 REV G
cpc* Class 6 6/6/5/5/4/2

* cumulative particle count

- CLASSES OF CONTAMINATION ACCORDING TO NAS 1638 (January 1964)

The NAS system was originally developed in 1964 to define contamination classes for the contamination contained within aircraft components.

The application of this standard was extended to industrial hydraulic systems simply because nothing else existed at the time.

The coding system defines the maximum numbers permitted of 100 ml volume at various size intervals (differential counts) rather than using cumulative counts as in ISO 4406. Although there is no guidance given in the standard on how to quote the levels, most industrial users quote a single code which is the highest recorded in all sizes and this convention is used on MP Filtri Contamination Monitoring Products (CMP).

The contamination classes are defined by a number (from 00 to 12) which indicates the maximum number of particles per 100 ml, counted on a differential basis, in a given size bracket.

Size Range Classes (in microns)

Maximum Contamination Limits per 100 ml					
Class	5-15	15-25	25-50	50-100	>100
00	125	22	4	1	0
0	250	44	8	2	0
1	500	89	16	3	1
2	1 000	178	32	6	1
3	2 000	356	63	11	2
4	4 000	712	126	22	4
5	8 000	1 425	253	45	8
6	16 000	2 850	506	90	16
7	32 000	5 700	1 012	180	32
8	64 000	11 400	2 025	360	64
9	128 000	22 800	4 050	720	128
10	256 000	45 600	8 100	1 440	256
11	512 000	91 200	16 200	2 880	512
12	1 024 000	182 400	32 400	5 760	1 024

5-15 µm = 42 000 particles
15-25 µm = 2 200 particles
25-50 µm = 150 particles
50-100 µm = 18 particles
> 100 µm = 3 particles
Class NAS 8

- CUMULATIVE DISTRIBUTION OF THE PARTICLES SIZE - ISO 4407

The level of contamination is defined by counting the number of particles collected by a laboratory membrane per unit of fluid volume. The measurement is done by a microscope. The membrane must be cleaned, dried and desiccated, with fluid and conditions defined by the Standard. The fluid volume is filtered through the membrane, using a suitable suction system.

The level of contamination is identified by dividing the membrane into a predefined number of areas and by counting the contaminant particles using a suitable laboratory microscope.

MICROSCOPE CONTROL
AND MEASUREMENT



Example figure 1 and 2

COMPARISON PHOTOGRAPH'S
1 graduation = 10µm



Fig. 1



Fig. 2



For other comparison photographs for contamination classes see the "Filtration and Particle Analyser Handbook".

Scan or click me!

- CLEANLINESS CODE COMPARISON

Although ISO 4406 standard is being used extensively within the hydraulics industry other standards are occasionally required and a comparison may be requested. The table below gives a very general comparison but often no direct comparison is possible due to the different classes and sizes involved.

ISO 4406	SAE AS4059 Table 2	SAE AS4059 Table 1	NAS 1638
> 4 $\mu\text{m}_{(c)}$ 6 $\mu\text{m}_{(c)}$ 14 $\mu\text{m}_{(c)}$	> 4 $\mu\text{m}_{(c)}$ 6 $\mu\text{m}_{(c)}$ 14 $\mu\text{m}_{(c)}$	4-6 6-14 14-21 21-38 38-70 >70	5-15 15-25 25-50 50-100 >100
23 / 21 / 18	13A / 12B / 12C	12	12
22 / 20 / 17	12A / 11B / 11C	11	11
21 / 19 / 16	11A / 10B / 10C	10	10
20 / 18 / 15	10A / 9B / 9B	9	9
19 / 17 / 14	9A / 8B / 8C	8	8
18 / 16 / 13	8A / 7B / 7C	7	7
17 / 15 / 12	7A / 6B / 6C	6	6
16 / 14 / 11	6A / 5B / 5C	5	5
15 / 13 / 10	5A / 4B / 4C	4	4
14 / 12 / 09	4A / 3B / 3C	3	3

6 FILTRATION TECHNOLOGIES

Various mechanisms such as mechanical stoppage, magnetism, gravimetric deposit, or centrifugal separation can be used to reduce the level of contamination.

The mechanical stoppage method is most effective and can take place in two ways:

- SURFACE FILTRATION

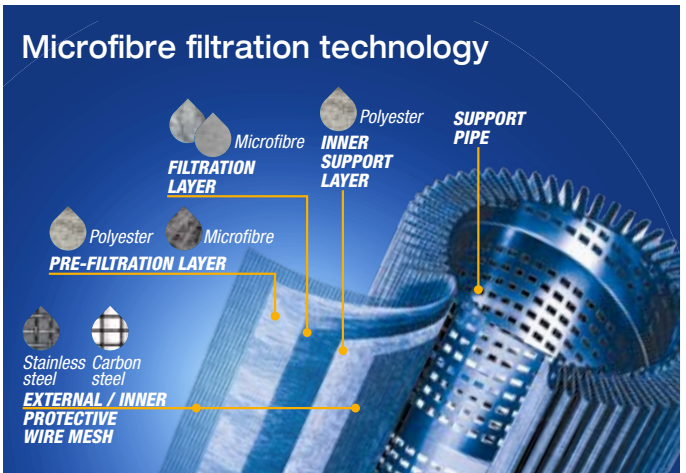
It is by direct interception. The filter prevents particles larger than the pores from continuing in the plant / system. Surface filters are generally manufactured with metal canvases or meshes.

- DEPTH FILTERING

Filters are constructed by fiber interlacing. Such wraps form pathways of different shapes and sizes in which the particles remain trapped when they find smaller apertures than their diameter.

Depth filters are generally produced with papers impregnated with phenolic resins, metal fibers or inorganic fibers.

In inorganic fiber filtration, commonly called microfibre, the filtering layers are often overlapped in order to increase the ability to retain the contaminant.



The filtration efficiency of metallic mesh filtrations is defined as the maximum particle size that can pass through the meshes of the filtering grid. The efficiency of microfibre and paper filtration ($\beta_{x(c)}$) is defined through a lab test called Multipass Test. The efficiency value ($\beta_{x(c)}$) is defined as the ratio between the number of particles of certain dimensions detected upstream and downstream of the filter.

$$\frac{\text{Upstream particles number} > X \mu\text{m}_{(c)}}{\text{Downstream particles number} > X \mu\text{m}_{(c)}} = \beta_{x(c)}$$



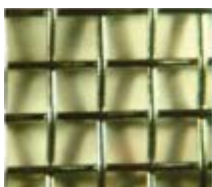
Value ($\beta_{x(c)}$)	2	10	75	100	200	1000
Efficiency	50%	90%	98.7%	99%	99.5%	99.9%

Test conditions, such as type of fluid to be used (MIL-H-5606), type of contaminant to be used (ISO MTD), fluid viscosity, test temperature, are determined by ISO 16889.

In addition to the filtration efficiency value during the Multipass test, other important features, such as filtration stability (β stability) and dirt holding capacity (DHC), are also tested.

Poor filtration stability is the cause of the filtering quality worsening as the filter life rises. Low dirt holding capacity causes a reduction in the life of the filter.

WIRE MESH FILTRATION



PAPER FILTRATION



MICROFIBER FILTRATION



Filtration ISO Standard Comparison

$\beta_{x(c)} > 1000$ ISO 16889	$\beta_x > 200$ ISO 4572	MP Filtri Filter media code
5 $\mu\text{m}_{(c)}$	3 μm	A03
7 $\mu\text{m}_{(c)}$	6 μm	A06
10 $\mu\text{m}_{(c)}$	10 μm	A10
16 $\mu\text{m}_{(c)}$	18 μm	A16
21 $\mu\text{m}_{(c)}$	25 μm	A25

7 RECOMMENDED CONTAMINATION CLASSES

Any are the nature and the properties of fluids, they are inevitably subject to contamination. The level of contamination can be managed by using special components called filters.

Hydraulic components builders, knowing the problem of contamination, recommend the filtration level appropriate to the use of their products.

Example of recommended contamination levels for pressures below 140 bar.

Piston pumps with fixed flow rate	•					
Piston pumps with variable flow rate			•			
Vane pumps with fixed flow rate		•				
Vane pumps with variable flow			•			
Engines	•					
Hydraulic cylinders	•					
Actuators					•	
Test benches						•
Check valve	•					
Directional valves	•					
Flow regulating valves	•					
Proportional valves				•		
Servo-valves					•	
Flat bearings			•			
Ball bearings				•		
ISO 4406 CODE	20/18/15	19/17/14	18/16/13	17/15/12	16/14/11	15/13/10
Recommended filtration $\beta_{x(c)} \geq 1.000$	$\beta_{21(c)} > 1000$	$\beta_{15(c)} > 1000$	$\beta_{10(c)} > 1000$	$\beta_{7(c)} > 1000$	$\beta_{7(c)} > 1000$	$\beta_{5(c)} > 1000$
MP Filtri media code	A25	A16	A10	A06	A06	A03

The common classification of filters is determined by their position in the plant.

8 TYPES OF FILTERS

Suction filters

They are positioned before the pump and are responsible for protecting the pump from dirty contaminants. It also provides additional flow guidance to the pump suction line.

Being subject to negligible working pressures are manufactured with simple and lightweight construction.

They are mainly produced with gross grade surface filtrations, mainly $60 \div 125 \mu\text{m}$.

They can be equipped with a magnetic filter for retaining ferrous particles.

They are generally placed under the fluid head to take advantage of the piezometric thrust of the fluid and reduce the risk of cavitation.

There are two types of suction filters:

- IMMERSION FILTERS

Simple filter element screwed on the suction pipe

- FILTERS WITH CONTAINER

Container filters that are more bulky, but provide easier maintenance of the tank

Delivery (or Pressure) filters

They are positioned between the pump and most sensitive regulating and controlling components, such as servo valves or proportional valves, and are designed to ensure the class of contamination required by the components used in the circuit.

Being subjected to high working pressures are manufactured with more robust and articulated construction. In particular situations of corrosive environments or aggressive fluids can be made of stainless steel.

They are mainly produced with filtering depths of $3 \div 25 \mu\text{m}$.

They can be manufactured with in-line connections, with plate or flange connections or directly integrated into the circuit control blocks / manifolds.

They can also be manufactured in duplex configuration to allow the contaminated section to be maintained even when the plant / system is in operation without interruption of the working cycle.

Return filters

They are positioned on the return line to the tank and perform the task of filtering the fluid from particles entering the system from the outside or generated by the wear of the components.

They are generally fixed to the reservoir (for this reason also called top tank mounted), positioned semi-immersed or completely immersed.

The positioning of the return filters must guarantee in all operating conditions that the fluid drainage takes place in immersed condition; this is to avoid creating foams in the tank that can cause malfunctions or cavitation in the pumps.

For the sizing of the return filters, account must be taken of the presence of accumulators or cylinders that can make the return flow considerably greater than the pump suction flow rate.

Being subject to contained working pressures are manufactured with simple and lightweight construction.

Normally it is possible to extract the filter element without disconnecting the filter from the rest of the system.

Combined filters

They are designed to be applied to systems with two or more circuits. They are commonly used in hydrostatic transmission machines where they have a dual filtration function of the return line and suction line of the hydrostatic transmission pump.

The filter is equipped with a valve that keeps the 0.5 bar pressure inside the filter. A portion of the fluid that returns to the tank is filtered by the return filter element, generally produced with absolute filtration, and returns to the transmission booster pump.

Only excess fluid returns to the tank through the valve.

The internal pressure of the filter and the absolute filtration help to avoid the cavitation phenomenon inside the pump.

Off-line filters

They are generally used in very large systems / plants, placed in a closed circuit independent from the main circuit. They remain in operation regardless of the operation of the main circuit and are crossed by a constant flow rate.

They can also be manufactured in duplex configuration to allow the contaminated section to be maintained even when the unit is in operation without interruption of the work cycle.

Venting filters

During the operation of the plants, the fluid level present in the reservoir changes continuously.

The result of this continuous fluctuation is an exchange of air with the outside environment.

The venting filter function, positioned on the tank, is to filter the air that enters the tank to compensate for fluid level variations.

9 FILTER SIZING PARAMETERS

The choice of the filter system for an hydraulic system is influenced by several factors.

It is necessary to consider the characteristics of the various components present in the plant and their sensitivity to contamination.

It is also necessary to consider all the tasks that the filter will have to do within the plant:

- FLUID PROTECTION FROM CONTAMINATION
- PROTECTION OF OLEODYNAMIC COMPONENTS SENSITIVE TO CONTAMINATION
- PROTECTION OF OLEODYNAMIC PLANTS FROM ENVIRONMENTAL WASTE
- PROTECTION OF OLEODYNAMIC PLANTS FROM CONTAMINATION CAUSED BY COMPONENTS' FAILURES

The advantages of proper positioning and sizing of the filters are

- MORE RELIABILITY OF THE SYSTEM
- LONGER LIFE OF THE FLUID COMPONENTS
- REDUCTION OF STOP TIME
- REDUCTION OF FAILURE CASUALTIES

Each hydraulic filter is described by general features that identify the possibility of use in different applications.

- **MAXIMUM WORKING PRESSURE (P_{max})**

The maximum working pressure of the filter must be greater than or equal to the pressure of the circuit section in which it will be installed.

- **PRESSURE DROP (ΔP)**

The pressure drop depends on a number of factors, such as the working circuit temperature, the fluid viscosity, the filter element cleaning condition.

- **WORKING TEMPERATURE (T)**

The working temperature deeply affect the choice of materials. Excessively high or low temperatures may adversely affect the strength of the materials or the characteristics of the seals.

- **FILTRATION EFFICIENCY (%) / FILTRATION RATIO ($\beta_{x(c)}$)**

Filtration efficiency is the most important parameter to consider when selecting a filter.

When choosing the filtration performances, the needs of the most sensitive components in the system must be considered.

- **FLUID TYPE**

The type of fluid influences the choice of filters in terms of compatibility and viscosity. It is always mandatory to check the filterability.

- **PLACEMENT IN THE PLANT**

The position of the filter in the system conditions the efficiency of all filter performances.

10 APPLICABLE STANDARDS FOR FILTER DEVELOPMENT

In order to obtain unique criteria for development and verification of the filters performance, specific regulations for the filters and filter elements testing have been issued by ISO. These norms describe the target, the methodology, the conditions and the presentation methods for the test results.

ISO 2941

Hydraulic fluid power -- Filter elements -- Verification of collapse/burst pressure rating

This Standard describes the method for testing the collapse / burst resistance of the filter elements.

The test is performed by crossing the contaminated fluid filter element at a predefined flow rate. The progressive clogging of the filter element, determined by contamination, causes an increase in differential pressure.

ISO 2942

Hydraulic fluid power -- Filter elements -- Verification of fabrication integrity and determination of the first bubble point

This Standard describes the method to verify the integrity of the assembled filter elements.

It can be used to verify the quality of the production process or the quality of the materials by verifying the pressure value of the first bubble point.

ISO 2943

Hydraulic fluid power -- Filter elements -- Verification of material compatibility with fluids

This Standard describes the method to verify the compatibility of materials with certain hydraulic fluids.

The test is carried out by keeping the element (the material sample) immersed in the fluid under high or low temperature conditions for a given period of time and verifying the retention of the characteristics.

ISO 3723

Hydraulic fluid power -- Filter elements -- Method for end load test

This Standard describes the method for verifying the axial load resistance of the filter elements.

After performing the procedure described in ISO 2943, the designed axial load is applied to the filter element. To verify the test results, then the test described in ISO 2941 is performed.

ISO 3968

Hydraulic fluid power -- Filters -- Evaluation of differential pressure versus flow characteristics

This Standard describes the method for checking the pressure drop across the filter.

The test is carried out by crossing the filter from a given fluid and by detecting upstream and downstream pressures.

Some of the parameters defined by the Standard are the fluid, the test temperature, the size of the tubes, the position of the pressure detection points.

ISO 16889

Hydraulic fluid power -- Filters -- Multi-pass method for evaluating filtration performance of a filter element

This Standard describes the method to check the filtration characteristics of the filter elements.

The test is performed by constant introduction of contaminant (ISO MTD). The characteristics observed during the test are the filtration efficiency and the dirty holding capacity related to the differential pressure.

ISO 23181

Hydraulic fluid power -- Filter elements -- Determination of resistance to flow fatigue using high viscosity fluid

This Standard describes the method for testing the fatigue resistance of the filter elements. The test is carried out by subjecting the filter to continuous flow variations, thus differential pressure, using a high viscosity fluid.

ISO 11170

Hydraulic fluid power -- Sequence of tests for verifying performance characteristics of filter elements

The Standard describes the method for testing the performance of filter elements. The protocol described by the regulations provides the sequence of all the tests described above in order to verify all the working characteristics (mechanical, hydraulic and filtration).

ISO 10771-1

Hydraulic fluid power -- Fatigue pressure testing of metal pressure-containing envelopes -- Test method

This Standard describes the method to check the resistance of the hydraulic components with pulsing pressure.

It can be applied to all metal components (excluding tubes) subject to cyclic pressure used in the hydraulic field.

Saturation Levels

Since the effects of free (also emulsified) water is more harmful than those of dissolved water, water levels should remain well below the saturation point.

However, even water in solution can cause damage and therefore every reasonable effort should be made to keep saturation levels as low as possible. There is no such thing as too little water. As a guideline, we recommend maintaining saturation levels below 50% in all equipment.

TYPICAL WATER SATURATION LEVEL FOR NEW OILS

Examples:

Hydraulic oil @ 30°C = 200 ppm = 100% saturation

Hydraulic oil @ 65°C = 500 ppm = 100% saturation

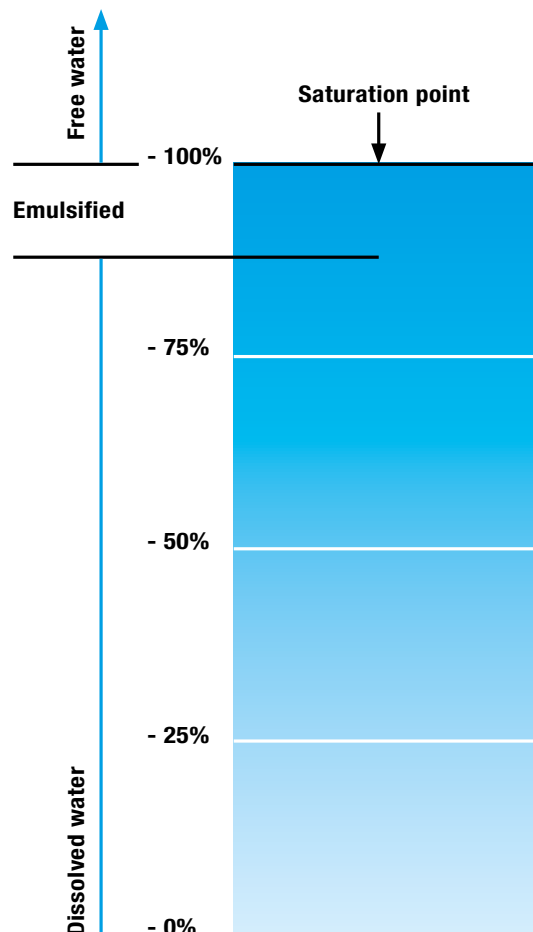
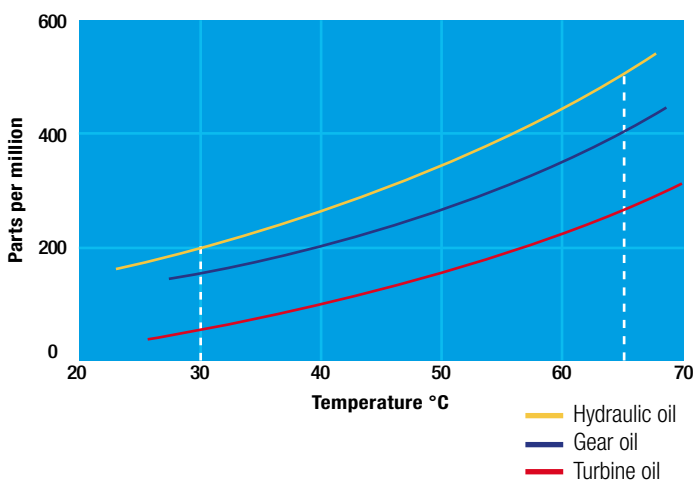
11 WATER IN HYDRAULIC AND LUBRICATING FLUIDS

Water Content

In mineral oils and non aqueous resistant fluids water is undesirable. Mineral oil usually has a water content of 50-300 ppm (@40°C) which it can support without adverse consequences.

Once the water content exceeds about 300ppm the oil starts to appear hazy. Above this level there is a danger of free water accumulating in the system in areas of low flow. This can lead to corrosion and accelerated wear.

Similarly, fire resistant fluids have a natural water which may be different to mineral oil.



WATER REMOVAL

Water is present everywhere, during storage, handling and servicing.

MP Filtri filter elements feature an absorbent media which protects hydraulic systems from both particulate and water contamination.

MP Filtri's filter element technology is available with inorganic microfiber media with a filtration rating 25 μm (therefore identified with media designation WA025), providing absolute filtration of solid particles to $\beta_{x(c)} = 1000$.

Absorbent media is made by water absorbent fibres which increase in size during the absorption process.

Free water is thus bonded to the filter media and completely removed from the system (it cannot even be squeezed out).

Filter Media

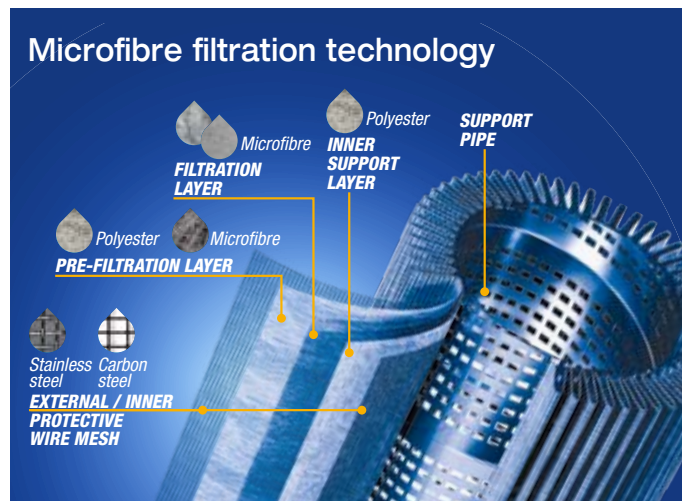


Fabric that absorbs water

Absorber media layer



The Filter Media has absorbed water



By removing water from your fluid power system, you can prevent such key problems as:

- corrosion (metal etching)
- loss of lubricant power
- accelerated abrasive wear in hydraulic components
- valve-locking
- bearing fatigue
- viscosity variance (reduction in lubricating properties)
- additive precipitation and oil oxidation
- increase in acidity level
- increased electrical conductivity (loss of dielectric strength)
- slow/weak response of control systems



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For more details please refer to our dedicate brochure "WATER REMOVAL"

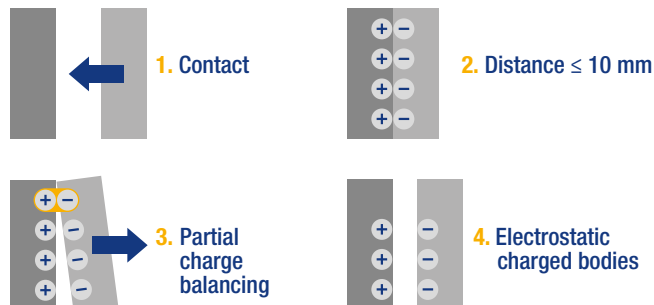
12 THE ANTI-STATIC FILTERS

zerospark®

zerospark is a specialist solution designed to solve the problem of electrostatic discharge inside hydraulic filters. Caused by the electrical charge build-up due to the passage of oil through the filters, this can result in damage to filter elements, oils and circuit components. It can even cause fire hazards in environments where flammable materials are present.

THE TRIBOELECTRIC EFFECT

The body with the most electronegativity strips electrons from the other, generating a build-up of a net negative charge on itself. The other body is charged by the same amount but with the opposite sign, giving rise to very high potential differences. These, if not dissipated, can give rise to electrostatic discharges.



Scan or click me!

For more details please refer to our dedicate brochure "ZEROSPARK"

FILTER SIZING

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FILTER SIZING Calculation

THE CORRECT FILTER SIZING HAS TO BE BASED ON THE TOTAL PRESSURE DROP DEPENDING ON THE APPLICATION.

FOR EXAMPLE, THE MAXIMUM TOTAL PRESSURE DROP ALLOWED BY A NEW AND CLEAN RETURN FILTER HAS TO BE IN THE RANGE 0.4 - 0.6 bar / 5.80 - 8.70 psi.

The pressure drop calculation is performed by adding together the value of the housing with the value of the filter element. The pressure drop Δp_c of the housing is proportional to the fluid density (kg/dm^3 / lb/ft^3). The filter element pressure drop Δp_e is proportional to its viscosity (mm^2/s / SUS), the corrective factor Y have to be used in case of an oil viscosity different than $30 \text{ mm}^2/\text{s}$ (cSt) / 150 SUS.

Sizing data for single filter element, head at top

Δp_c = Filter housing pressure drop [bar / psi]

Δp_e = Filter element pressure drop [bar / psi]

Y = Corrective factor Y (see correspondent table), depending on the filter type, on the filter element size, on the filter element length and on the filter media

Q = flow rate (l/min - gpm)

V_1 reference oil viscosity = $30 \text{ mm}^2/\text{s}$ (cSt) / 150 SUS

V_2 = operating oil viscosity in mm^2/s (cSt) / SUS

Filter element pressure drop calculation with an oil viscosity different than $30 \text{ mm}^2/\text{s}$ (cSt) / 150 SUS

International system:

$$\Delta p_e = Y : 1000 \times Q \times (V_2:V_1)$$

Imperial system:

$$\Delta p_e = Y : 17.2 \times Q \times (V_2:V_1)$$

$$\Delta p_{\text{Tot.}} = \Delta p_c + \Delta p_e$$

Verification formula

$$\Delta p_{\text{Tot.}} \leq \Delta p_{\text{max allowed}}$$

Maximum total pressure drop (Δp_{max}) allowed by a new and clean filter

Filter family	Δp_{max}	
	[bar]	[psi]
Suction	0.08 bar	1.15 psi
Return	0.50 bar	7.25 psi
Return - Suction (*)	1.50 bar	22.00 psi
Low & Medium Pressure/Duplex	0.70 bar	10.15 psi
High Pressure Pressure/Duplex	1.50 bar	22.00 psi
Stainless Steel	1.50 bar	22.00 psi
ATEX	1.50 bar	22.00 psi

(*) The suction flow rate should not exceed 30% of the return flow rate

Filter pressure drop calculation example

Application data:

Selected filter: tank top return filter - MPT110 series with bypass valve and G 1 1/4" inlet connection.

Selected filter element: **MF100 length 4**

Required filtration efficiency = **25 μm** absolute filtration with microfibre

Pressure P_{max} = 10 bar / 145.03 psi

Flow rate Q = 120 l/min / 31.7 gpm

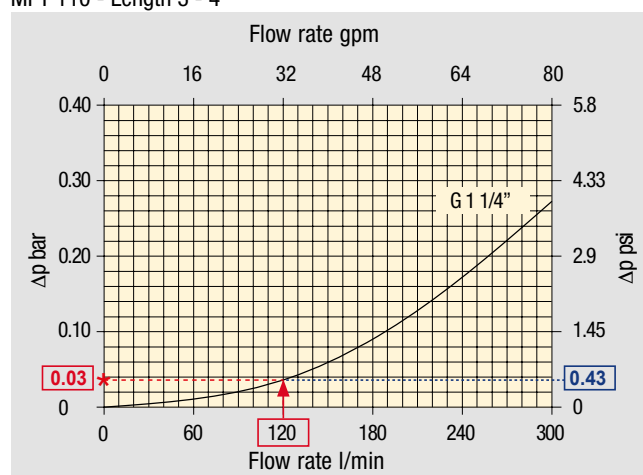
Viscosity V_2 = 46 mm^2/s (cSt) / 216 SUS

Oil density = 0.86 kg/dm^3 / 53.68 lb/ft^3

Calculation:

$$\Delta p_c = \mathbf{0.03 \text{ bar}} / \mathbf{0.43 \text{ psi}}$$
 (see graphic below)

MPT 110 - Length 3 - 4



Filter housings Δp pressure drop.

The curves are plotted using mineral oil with density of 0.86 kg/dm^3 in compliance with ISO 3968. Δp varies proportionally with density.

Filter element		Absolute filtration H Series					Nominal filtration N Series		
Type		A03	A06	A10	A16	A25	P(00)10	P(00)25	M(00)10 M(00)6 M(00)9
Return filters									
MF 020		74.00	50.08	20.00	16.00	9.00	6.43	5.51	4.40
	2	29.20	24.12	8.00	7.22	5.00	3.33	2.85	2.00
	3	22.00	19.00	6.56	5.33	4.33	1.68	1.44	1.30
MF 030 MFX 030	1	74.00	50.08	20.00	16.00	9.00	6.43	5.51	3.40
MF 100 MFX 100	1	28.20	24.40	8.67	8.17	6.88	4.62	3.96	1.25
	2	17.33	12.50	6.86	5.70	4.00	3.05	2.47	1.10
	3	10.25	9.00	3.65	3.33	2.50	1.63	1.32	0.96
	4	6.10	5.40	2.30	2.20	2.00	1.19	0.96	0.82

$$\Delta p_e = (2.00 : 1000) \times 120 \times (46 : 30) = 0.37 \text{ bar}$$

$$\Delta p_e = (2.00 : 17.2) \times 32 \times (216 : 150) = 5.36 \text{ psi}$$

$$\Delta p_{\text{Tot.}} = 0.03 + 0.37 = 0.4 \text{ bar}$$

$$\Delta p_{\text{Tot.}} = 0.43 + 5.36 = 5.79 \text{ psi}$$

The selection is correct because the total pressure drop value is inside the admissible range for top tank return filters.

In case the max allowed total pressure drop is not verified, it is necessary to repeat the calculation changing the filter and/or filter element length/size.

SUCTION FILTERS

Filter element		Nominal filtration Filter element ΔP Series : A - C					
Type	Length	P0010	P0025	M0025	M0060	M0090	M0250
SMC 250	10	0.65	0.20	0.10	0.08	0.05	0.03
SSC 503	10	-	-	0.17	0.11	0.11	0.11
SSC 504	10	-	-	0.11	0.08	0.08	0.08
SSC 505	10	-	-	0.23	0.18	0.18	0.18
SSC 510	10	-	-	0.18	0.14	0.14	0.14
SSC 535	10	-	-	0.08	0.05	0.05	0.05
SSC 540	10	-	-	0.05	0.04	0.04	0.04
FEX 060	10	4.58	3.22	1.02	0.89	0.63	0.63
	20	1.97	1.38	0.62	0.45	0.29	0.29
FEX 110	10	1.33	1.12	0.22	0.18	0.14	0.14
	20	0.90	0.76	0.15	0.10	0.09	0.09

RETURN FILTERS

Filter element		Absolute filtration Filter element ΔP Series: H					Nominal filtration Filter Element ΔP Series: N		
Type	Length	A03	A06	A10	A16	A25	P10	P25	M25 - M60 - M90
MF 020	1	74.00	50.08	20.00	16.00	9.00	6.43	5.51	4.40
	2	29.20	24.12	8.00	7.22	5.00	3.33	2.85	2.00
	3	22.00	19.00	6.56	5.33	4.33	1.68	1.44	1.30
MF 030 MFX 030	1	74.00	50.08	20.00	16.00	9.00	6.43	5.51	3.40
MF 100 MFX 100	1	28.20	24.40	8.67	8.17	6.88	4.62	3.96	1.25
	2	17.33	12.50	6.86	5.70	4.00	3.05	2.47	1.10
	3	10.25	9.00	3.65	3.33	2.50	1.63	1.32	0.96
	4	6.10	5.40	2.30	2.20	2.00	1.19	0.96	0.82
MF 180 MFX 180	1	3.67	3.05	1.64	1.56	1.24	1.18	1.06	0.26
	2	1.69	1.37	0.68	0.54	0.51	0.43	0.39	0.12
MF 190 MFX 190	2	1.69	1.37	0.60	0.49	0.44	0.35	0.31	0.11
MF 400 MFX 400	1	3.20	2.75	1.39	1.33	1.06	0.96	0.87	0.22
	2	2.00	1.87	0.88	0.85	0.55	0.49	0.45	0.13
	3	1.90	1.60	0.63	0.51	0.49	0.39	0.35	0.11
MF 750 MFX 750	1	1.08	0.84	0.49	0.36	0.26	0.21	0.19	0.06
MLX 250	2	3.00	3.04	1.46	1.25	1.17	-	-	M25 0.20
MLX 660	2	1.29	1.26	0.52	0.44	0.38	-	-	M25 0.10
CU 025		78.00	48.00	28.00	24.00	9.33	9.33	8.51	1.25
CU 040		25.88	20.88	10.44	10.00	3.78	3.78	3.30	1.25
CU 100		15.20	14.53	5.14	4.95	2.00	2.00	0.17	1.10
CU 250		3.25	2.55	1.55	1.35	0.71	0.71	0.59	0.25
CU 630		1.96	1.68	0.85	0.72	0.24	0.42	0.36	0.09
CU 850		1.06	0.84	0.42	0.33	0.17	0.17	0.13	0.04

TO BE CONTINUED >>

Corrective factor Y to be used for the filter element pressure drop calculation. The values depend to the filter size and length and to the filter media.
Reference oil viscosity 30 mm²/s

FILTER SIZING Corrective factor

RETURN FILTERS

Filter element		Absolute filtration Filter element ΔP Series: H					Nominal filtration Filter Element ΔP Series: N		
Type	Length	A03	A06	A10	A16	A25	P10	P25	M25 - M60 - M90
DH 250	2	3.61	4.08	1.81	1.71	1.35	-	-	M25 0.55
	4	2.10	1.70	1.14	0.77	0.53	-	-	0.60
MR 100	1	19.00	17.00	6.90	6.30	4.60	2.94	2.52	1.60
	2	11.70	10.80	4.40	4.30	3.00	2.94	2.52	1.37
	3	7.80	6.87	3.70	3.10	2.70	2.14	1.84	1.34
	4	5.50	4.97	2.60	2.40	2.18	1.72	1.47	1.34
	5	4.20	3.84	2.36	2.15	1.90	1.60	1.37	1.34
MR 250	1	5.35	4.85	2.32	1.92	1.50	1.38	1.20	0.15
	2	4.00	3.28	1.44	1.10	1.07	0.96	0.83	0.13
	3	2.60	2.20	1.08	1.00	0.86	0.77	0.64	0.12
	4	1.84	1.56	0.68	0.56	0.44	0.37	0.23	0.11
MR 630	1	3.10	2.48	1.32	1.14	0.92	0.83	0.73	0.09
	2	2.06	1.92	0.82	0.76	0.38	0.33	0.27	0.08
	3	1.48	1.30	0.60	0.56	0.26	0.22	0.17	0.08
	4	1.30	1.20	0.48	0.40	0.25	0.21	0.16	0.08
	5	0.74	0.65	0.30	0.28	0.13	0.10	0.08	0.04
MR 850	1	0.60	0.43	0.34	0.25	0.13	0.12	0.09	0.03
	2	0.37	0.26	0.23	0.21	0.11	0.08	0.07	0.03
	3	0.27	0.18	0.17	0.17	0.05	0.04	0.04	0.02
	4	0.23	0.16	0.13	0.12	0.04	0.03	0.03	0.02

Filter element		Absolute filtration Filter element ΔP Series: H					Nominal filtration Filter Element ΔP Series: N		
Type		A03	A06	A10	A16	A25	P10	P25	M60 - M90
FEX 060		11.63	10.79	5.1	4.78	4.26	4.58	3.22	0.89
FEX 080		6.83	6.69	3.35	3.19	2.56	1.97	1.38	0.45
FEX 110		5.73	5.22	2.52	2.16	1.66	1.33	1.12	0.18
FEX 160		3.72	3.59	1.79	1.76	1.22	0.9	0.76	0.1

RETURN / SUCTION FILTERS

Filter element		Absolute filtration		
Type	Length	A10	A16	A25
RSX 116	1	5.12	4.33	3.85
	2	2.22	1.87	1.22
RSX 165 RSX 166	1	2.06	1.75	1.46
	2	1.24	1.05	0.96
	3	0.94	0.86	0.61

Filter element		Absolute filtration Filter Element ΔP Series: N							
Type	Length	A03	A06	A10	A16	A25	P10	P25	M25 - M60 - M90
CU 110	1	16.25	15.16	8.75	8.14	5.87	2.86	2.65	0.14
	2	12.62	10.44	6.11	6.02	4.16	1.60	1.49	0.12
	3	8.57	7.95	5.07	4.07	2.40	1.24	1.15	0.11
	4	5.76	4.05	4.05	2.36	1.14	0.91	0.85	0.05

Corrective factor Y to be used for the filter element pressure drop calculation. The values depend to the filter size and length and to the filter media.
Reference oil viscosity 30 mm²/s

LOW & MEDIUM PRESSURE FILTERS

Filter element		Absolute filtration Filter Element ΔP Series: N - W					Nominal filtration Filter Element ΔP Series: N		
Type	Length	A03	A06	A10	A16	A25	P10	P25	M25 M60 M90
CU 110	1	16.25	15.16	8.75	8.14	5.87	2.86	2.65	0.14
	2	12.62	10.44	6.11	6.02	4.15	1.60	1.49	0.12
	3	8.57	7.95	5.07	4.07	2.40	1.24	1.15	0.11
	4	5.76	4.05	2.80	2.36	1.14	0.91	0.85	0.05
CU 210	1	5.30	4.80	2.00	1.66	1.32	0.56	0.43	0.12
	2	3.44	2.95	1.24	1.09	0.70	0.42	0.35	0.09
	3	2.40	1.70	0.94	0.84	0.54	0.33	0.23	0.05
DN	016	7.95	7.20	3.00	2.49	1.98	0.84	0.65	0.18
	025	5.00	4.53	1.89	1.57	1.25	0.53	0.41	0.11
	040	3.13	2.66	1.12	0.98	0.63	0.38	0.32	0.08
CU 400	2	3.14	2.55	1.46	1.22	0.78	0.75	0.64	0.19
	3	2.15	1.70	0.94	0.78	0.50	0.40	0.34	0.10
	4	1.60	1.28	0.71	0.61	0.40	0.34	0.27	0.08
	5	1.00	0.83	0.47	0.34	0.20	0.24	0.19	0.06
	6	0.82	0.58	0.30	0.27	0.17	0.22	0.18	0.105
CU 900	1	0.86	0.63	0.32	0.30	0.21	-	-	0.05
CU 950	2	1.03	0.80	0.59	0.40	0.26	-	-	0.05
	3	0.44	0.40	0.27	0.18	0.15	-	-	0.02
MR 630	7	0.88	0.78	0.36	0.34	0.16	0.12	0.96	0.47

Filter element		Absolute filtration Filter Element ΔP Series: N - W					Nominal filtration Filter Element ΔP Series: N			
Type		A03	A06	A10	A16	A25	P10	P25	M25	M60 M90
FEX 060		11.63	10.79	5.1	4.78	4.26	4.58	3.22	1.02	0.89
FEX 080		6.83	6.69	3.35	3.19	2.56	1.97	1.38	0.62	0.45
FEX 110		5.73	5.22	2.52	2.16	1.66	1.33	1.12	0.22	0.18
FEX 160		3.72	3.59	1.79	1.76	1.22	0.9	0.76	0.15	0.1

HIGH PRESSURE FILTERS

Filter element		Absolute filtration Filter Element ΔP Series: N - R					Nominal filtration Filter El. ΔP Series: N
Type	Length	A03	A06	A10	A16	A25	M25
HP 010 HP 011	1	332.71	250.07	184.32	152.36	128.36	-
	2	220.28	165.56	74.08	59.13	37.05	-
	3	123.24	92.68	41.48	33.08	20.72	-
	4	77.76	58.52	28.37	22.67	16.17	-
HP 039	2	70.66	53.20	25.77	20.57	14.67	4.90
	3	36.57	32.28	18.00	13.38	8.00	2.90
	4	26.57	23.27	12.46	8.80	5.58	2.20
HP 050 HPX 050	1	31.75	30.30	13.16	12.3	7.29	1.60
	2	24.25	21.26	11.70	9.09	4.90	1.40
	3	17.37	16.25	8.90	7.18	3.63	1.25
	4	12.12	10.75	6.10	5.75	3.08	1.07
	5	7.00	6.56	3.60	3.10	2.25	0.80
HP 065	1	58.50	43.46	23.16	19.66	10.71	1.28
	2	42.60	25.64	16.22	13.88	7.32	1.11
	3	20.50	15.88	8.18	6.81	3.91	0.58
HP 135	1	20.33	18.80	9.71	8.66	4.78	2.78
	2	11.14	10.16	6.60	6.38	2.22	1.11
	3	6.48	6.33	3.38	3.16	2.14	1.01

TO BE CONTINUED >>

Corrective factor Y to be used for the filter element pressure drop calculation. The values depend to the filter size and length and to the filter media.
Reference oil viscosity 30 mm²/s

FILTER SIZING Corrective factor

HIGH PRESSURE FILTERS

Filter element		Absolute filtration Filter Element ΔP Series: N - R					Nominal filtration Filter El. ΔP Series: N
Type	Length	A03	A06	A10	A16	A25	M25
HP 150 HPX 150	1	17.53	15.91	7.48	6.96	5.94	1.07
	2	8.60	8.37	3.54	3.38	3.15	0.58
	3	6.53	5.90	2.93	2.79	2.12	0.49
HP 320	1	10.88	9.73	5.02	3.73	2.54	1.04
	2	4.40	3.83	1.75	1.48	0.88	0.71
	3	2.75	2.11	1.05	0.87	0.77	0.61
	4	2.12	1.77	0.98	0.78	0.55	0.47
HP 500	1	4.44	3.67	2.30	2.10	1.65	0.15
	2	3.37	2.77	1.78	1.68	1.24	0.10
	3	2.22	1.98	1.11	1.09	0.75	0.08
	4	1.81	1.33	0.93	0.86	0.68	0.05
	5	1.33	1.15	0.77	0.68	0.48	0.04
HP 325	1	3.65	2.95	2.80	1.80	0.90	0.38
	2	2.03	1.73	1.61	1.35	0.85	0.36
	3	1.84	1.42	1.32	1.22	0.80	0.35

Filter element		Absolute filtration S - H - U Series				
Type	Length	A03	A06	A10	A16	A25
HP 010 HP 011	1	424.58	319.74	235.17	194.44	163.78
	2	281.06	211.25	94.35	75.45	47.26
	3	130.14	97.50	43.63	34.82	21.81
	4	109.39	82.25	36.79	29.37	18.40
HP 039	2	73.00	57.00	28.00	24.00	17.20
	3	40.90	36.33	21.88	18.80	11.20
	4	31.50	28.22	17.22	9.30	6.70
HP 050	1	47.33	34.25	21.50	20.50	14.71
	2	29.10	25.95	10.04	10.90	5.88
	3	20.85	19.50	10.68	8.61	4.36
	4	14.55	12.90	7.32	6.90	3.69
	5	9.86	9.34	6.40	4.80	2.50
HP 135	1	29.16	25.33	13.00	12.47	5.92
	2	14.28	11.04	7.86	7.90	4.44
	3	8.96	7.46	4.89	4.16	3.07
HP 150 HPX 150	1	25.14	21.44	10.01	10.02	7.36
	2	11.02	9.09	4.22	4.19	4.00
	3	9.03	6.95	3.82	3.67	3.04
HP 320	1	13.00	12.19	6.80	6.40	3.32
	2	6.45	5.31	3.01	2.89	1.73
	3	4.13	3.14	1.90	1.78	1.17
	4	3.17	2.71	1.80	1.70	1.10
HP 500	1	9.70	8.81	4.55	4.47	2.80
	2	5.46	4.63	2.88	2.68	2.20
	3	3.90	3.74	2.22	2.07	1.53
	4	3.10	2.84	1.56	1.53	1.02
	5	1.93	1.83	1.14	1.08	0.69

Corrective factor Y to be used for the filter element pressure drop calculation. The values depend to the filter size and length and to the filter media.
Reference oil viscosity 30 mm²/s

STAINLESS STEEL HIGH PRESSURE FILTERS

Filter element		Absolute filtration Filter Element ΔP Series: N - R					Nominal filtration Filter El. ΔP Series: N
Type	Length	A03	A06	A10	A16	A25	M25
HP 010 HP 011	1	332.71	250.07	184.32	152.36	128.36	-
	2	220.28	165.56	74.08	59.13	37.05	-
	3	123.24	92.68	41.48	33.08	20.72	-
	4	77.76	58.52	28.37	22.67	16.17	-
HP 039	2	70.66	53.20	25.77	20.57	14.67	4.90
	3	36.57	32.28	18.00	13.38	8.00	2.90
	4	26.57	23.27	12.46	8.80	5.58	2.20
HP 050	1	31.75	30.30	13.16	12.3	7.29	1.60
	2	24.25	21.26	11.70	9.09	4.90	1.40
	3	17.37	16.25	8.90	7.18	3.63	1.25
	4	12.12	10.75	6.10	5.75	3.08	1.07
	5	7.00	6.56	3.60	3.10	2.25	0.80
HP 135	1	20.33	18.80	9.71	8.66	4.78	2.78
	2	11.14	10.16	6.60	6.38	2.22	1.11
	3	6.48	6.33	3.38	3.16	2.14	1.01

Filter element		Absolute filtration Filter Element ΔP Series: S - H - U				
Type	Length	A03	A06	A10	A16	A25
HP 010 HP 011	1	424.58	319.74	235.17	194.44	163.78
	2	281.06	211.25	94.35	75.45	47.26
	3	130.14	97.50	43.63	34.82	21.81
	4	109.39	82.25	36.79	29.37	18.40
HP 039	2	73.00	57.00	28.00	24.00	17.20
	3	40.90	36.33	21.88	18.80	11.20
	4	31.50	28.22	17.22	9.30	6.70
HP 050	1	47.33	34.25	21.50	20.50	14.71
	2	29.10	25.95	10.04	10.90	5.88
	3	20.85	19.50	10.68	8.61	4.36
	4	14.55	12.90	7.32	6.90	3.69
	5	9.86	9.34	6.40	4.80	2.50
HP 135	1	29.16	25.33	13.00	12.47	5.92
	2	14.28	11.04	7.86	7.90	4.44
	3	8.96	7.46	4.89	4.16	3.07

Corrective factor Y to be used for the filter element pressure drop calculation. The values depend to the filter size and length and to the filter media.
Reference oil viscosity 30 mm²/s

FILTER SIZING Corrective factor

FILTERS FOR POTENTIALLY EXPLOSIVE ATMOSPHERE

Filter element		Absolute filtration Filter Element ΔP Series: N - R					Nominal filtration Filter El. ΔP Series: N
Type	Length	A03	A06	A10	A16	A25	M25
HP 011	1	332.71	250.07	184.32	152.36	128.36	-
	2	220.28	165.56	74.08	59.13	37.05	-
	3	123.24	92.68	41.48	33.08	20.72	-
	4	77.76	58.52	28.37	22.67	16.17	-
HP 039	2	70.66	53.20	25.77	20.57	14.67	4.90
	3	36.57	32.28	18.00	13.38	8.00	2.90
	4	26.57	23.27	12.46	8.80	5.58	2.20
HPX 050	1	31.75	30.30	13.16	12.3	7.29	1.60
	2	24.25	21.26	11.70	9.09	4.90	1.40
	3	17.37	16.25	8.90	7.18	3.63	1.25
	4	12.12	10.75	6.10	5.75	3.08	1.07
	5	7.00	6.56	3.60	3.10	2.25	0.80
HP 135	1	20.33	18.80	9.71	8.66	4.78	2.78
	2	11.14	10.16	6.60	6.38	2.22	1.11
	3	6.48	6.33	3.38	3.16	2.14	1.01
HPX 150	1	17.53	15.91	7.48	6.96	5.94	1.07
	2	8.60	8.37	3.54	3.38	3.15	0.58
	3	6.53	5.90	2.93	2.79	2.12	0.49

Filter element		Absolute filtration Filter Element ΔP Series: S - H - U				
Type	Length	A03	A06	A10	A16	A25
HP 011	1	424.58	319.74	235.17	194.44	163.78
	2	281.06	211.25	94.35	75.45	47.26
	3	130.14	97.50	43.63	34.82	21.81
	4	109.39	82.25	36.79	29.37	18.40
HP 039	2	73.00	57.00	28.00	24.00	17.20
	3	40.90	36.33	21.88	18.80	11.20
	4	31.50	28.22	17.22	9.30	6.70
HP 135	1	29.16	25.33	13.00	12.47	5.92
	2	14.28	11.04	7.86	7.90	4.44
	3	8.96	7.46	4.89	4.16	3.07
HPX 150	1	25.14	21.44	10.01	10.02	7.36
	2	11.02	9.09	4.22	4.19	4.00
	3	9.03	6.95	3.82	3.67	3.04

Corrective factor Y to be used for the filter element pressure drop calculation. The values depend to the filter size and length and to the filter media.

Filters sizing software

The web-based software program will allow you to select the most suitable MP Filtri's Filters, in accordance with your process design requirements.

The program will automatically check your input design process prior to propose you the acceptable solutions and create an output in PDF report style format.

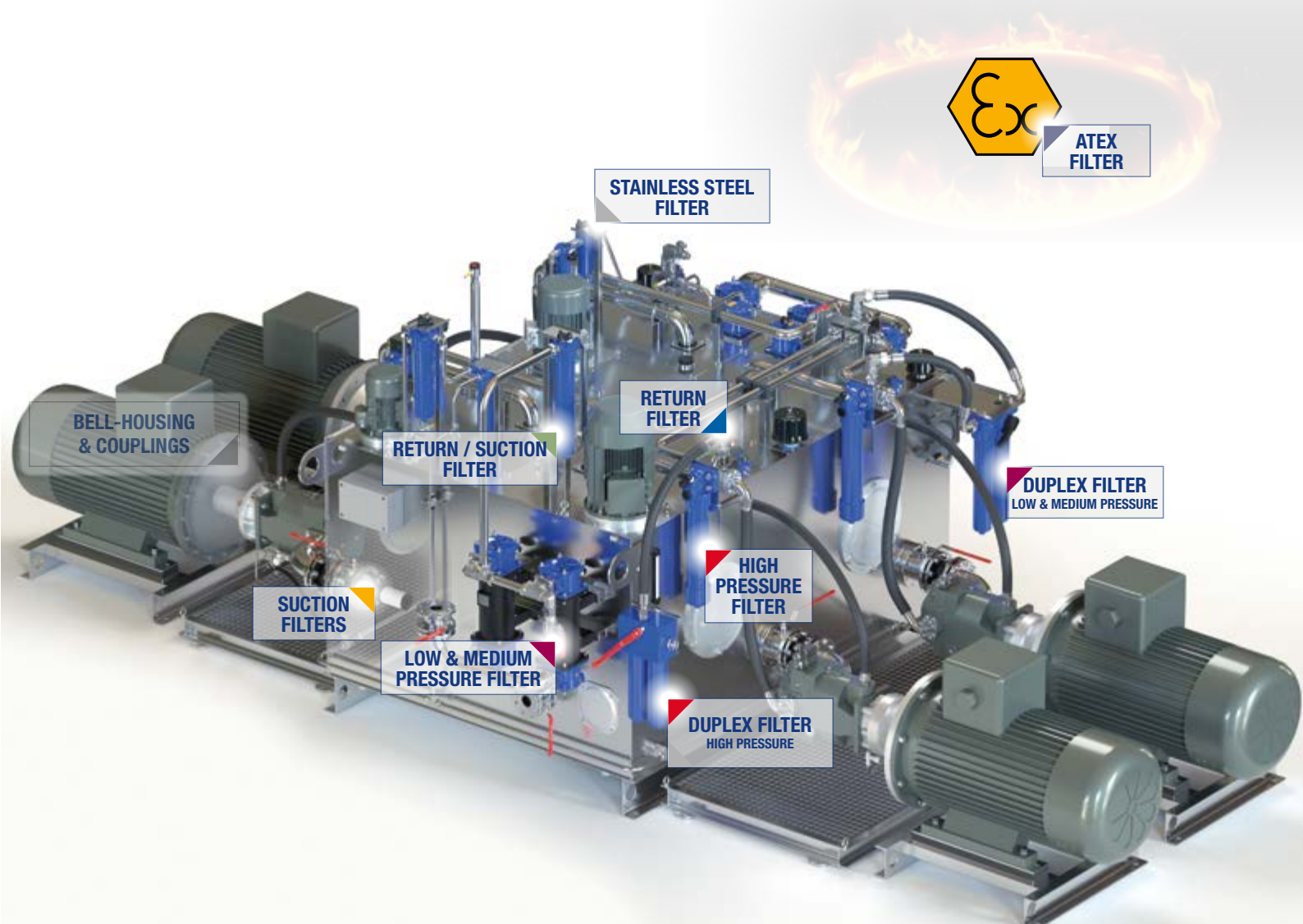
The MP Filtri Selection Tool software program is easy to use with a flexible fast design method and provides improved layout formats with full descriptions.

The web-based tool is available at MP Filtri website at following link:
<https://www.mpfiltri.com/tools/>

The related, complete user guide is available as Manual and downloadable from the "Download" section of MP Filtri website, as well as scanning the following QR code



Scan or click me!



MP Filtri knows how to manage it thanks to our

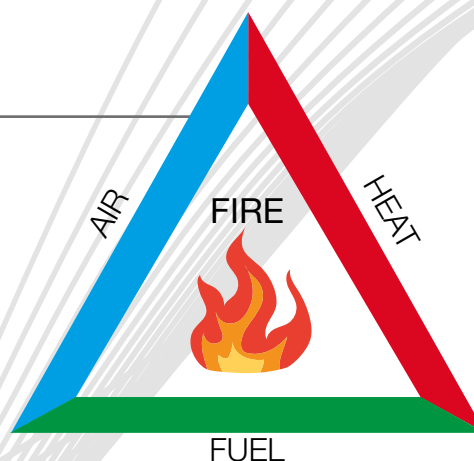


ATEX CERTIFIED PRODUCTS

Standard ATEX Directive 2014/34/EU and UK Regulation S.I. 2016 No. 1107 (as amended)

FIRE TRIANGLE

According to the legislation, each appliance used in explosive atmospheres must ensure adequate ATEX protection, that is, it must present the precautions necessary to ensure it is removed at least one of the components of the triangle of fire.



zerospark®
THE ANTI-STATIC FILTERS

zerospark® filter element
is the default concept for all MP Filtri ATEX filters

FILTER SIZING

For the proper calculation see pag. 22

Filters for potentially explosive atmosphere



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INDICATORS	723



THE X CONCEPT FOR OUR FILTERS

Protect the performance of your system with MYclean.

Quality and efficiency are fundamental for MP Filtri: this exclusive new filter element possesses polygon shape geometry and specific seal that ensures only original spare parts can be used - ensuring correct operation and higher system reliability.

+

zerospark®

THE ANTI-STATIC FILTERS

THE Z CONCEPT FOR OUR FILTERS



Zerospark® is a specialist solution designed to solve the problem of electrostatic discharge inside hydraulic filters. Caused by the electrical charge build-up due to the passage of oil through the filters, this can result in damage to filter elements, oils and circuit components. It can even cause fire hazards in environments where flammable materials are present.



FMMX ATEX series 

with  + 

HPX Filter Element

-  **Protects the machine from improper use of non-original products.**
-  **Safety of constant quality protection & reliability**

With exclusive filter element you are sure that only MP Filtri filter elements can be used, ensuring the best cleaning level of the oil due to the use of originals filter elements.

The products identified as FMMX series are protected by:

-  Italian Patent n° 102014902261205
-  Canadian Patent n° 2,937,258
-  European Patent n° 3 124 092 B1
-  US Patent n° 20170030384 A1

FMMX series

Maximum working pressure up to 42 MPa (420 bar) - Flow rate up to 300 l/min



INSTALLATION, SERVICE AND MAINTENANCE MANUAL AND SAFETY INSTRUCTIONS



Please scan or click the QR codes
to get updated electronic version
of the related document.



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Description

Filters for potentially explosive atmosphere

In-line

Maximum working pressure up to 42 MPa (420 bar)

Flow rate up to 300 l/min

FMMX is a range of versatile high pressure filter for protection of sensitive components in high pressure hydraulic systems in the mobile machines. They are directly connected to the lines of the system through the hydraulic fittings.

Available features:

- Female threaded connections up to 1 1/4", for a maximum flow rate of 300 l/min
- Fine filtration rating, to get a good cleanliness level into the system
- Bypass valve, to relieve excessive pressure drop across the filter media
- Low collapse filter element with external support "N", for filter element protection against the back pressure caused by the check valve in filters provided with the bypass valve
- Visual, electrical and electronic differential clogging indicators
- MYclean interface connection for the filter element, to protect the product against non-original spare parts

Common applications:

- Agricultural machines
- Mobile machines

Filter with:

NBR seal in configuration **zerospark+**



II 3G Ex h IIC T6 Gc X
II 3D Ex h IIIC T85°C Dc X

FPM seal in configuration

zerospark+



II 3G Ex h IIC T6... T4 Gc X
II 3D Ex h IIIC T85°C...T115°C Dc X

Technical data

Filter housing materials

- Head: Painted cast iron, black RAL 9005
- Housing: Phosphatized steel
- Bypass valve: Steel

Pressure

- Test pressure: 63 MPa (630 bar)
- Min. Burst pressure: 126 MPa (1260 bar)
- Pulse pressure fatigue test: 1 000 000 cycles with pressure from 0 to 42 MPa (420 bar)

Bypass valve

- Opening pressure 0.6 MPa (6 bar) $\pm 10\%$
- Other opening pressures on request.

Filter element features

Filter FMMX		Filter element HPX	
Δp Element type			
Element media	Construction	Δp Series	Δp
A - Microfiber	Standard	N	20 bar
A - Microfiber	High Δp with external support	S	210 bar
M - Wire mesh	Standard	N	20 bar
Please see ordering code tables to check element Δp series availability based on filter features.			
Flow direction through the filter element:			
From OUT to IN			

Temperature

Seals	Ambient Temperature	Max fluid Temperature	Temperature Class	Max surface temperature
NBR	-15 °C ÷ +80 °C	+80 °C	T6	T85 °C
FPM	-15 °C ÷ +80 °C	+80 °C	T6	T85 °C
	-15 °C ÷ +95 °C	+95 °C	T5	T100 °C
	-15 °C ÷ +110 °C	+110 °C	T4	T115 °C

Seals

- Standard NBR series A
- Optional FPM series V

Note

FMMX filters are provided for vertical mounting

Connections

In-line Inlet/Outlet

Weights [kg] and volumes [dm³]

Filter series	Weights [kg]					Volumes [dm³]						
	Length	1	2	3	4	5	Length	1	2	3	4	5
FMMX 050		3.11	3.48	3.90	4.36	5.54		0.34	0.48	0.63	0.81	1.23
FMMX 150		7.50	9.50	10.90	-	-		0.60	1.00	1.25	-	-

Flow rates [l/min]

Filter series	Length	Filter element design - N Series						Filter element design - S Series				
		A03	A06	A10	A16	A25	M25	A03	A06	A10	A16	A25
FMMX 050	1	42	43	79	82	106	147	29	39	57	59	74
	2	52	57	85	96	121	149	45	49	76	88	114
	3	66	69	97	106	130	150	58	61	89	99	125
	4	83	89	113	115	134	152	74	80	106	108	129
	5	107	110	130	134	141	154	93	95	111	121	139
FMMX 150	1	81	88	156	163	179	295	58	67	128	128	158
	2	142	145	227	230	236	312	119	137	212	212	207
	3	170	180	242	245	263	315	138	164	211	224	239

Maximum flow rate for a complete pressure filter with a pressure drop $\Delta p = 1.5$ bar.

The reference fluid has a kinematic viscosity of 30 mm²/s (cSt) and a density of 0.86 kg/dm³.

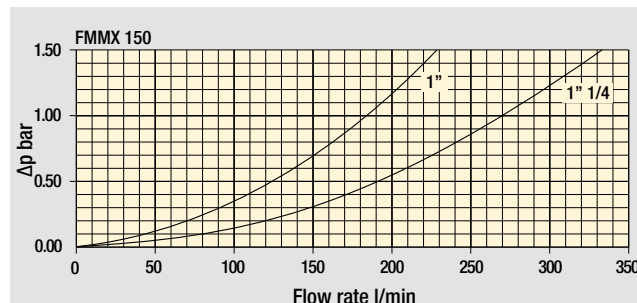
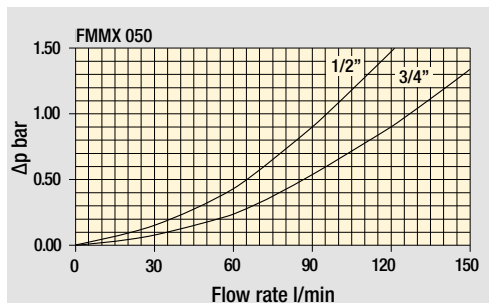
For different pressure drop or fluid viscosity we recommend to use our selection software available on www.mpfiltri.com.

You can also calculate the right size using the formulas present on the FILTER SIZING paragraph at the beginning of the full catalogue or at the beginning of the filter family brochure.

Please, contact our Sales Department for further additional information.

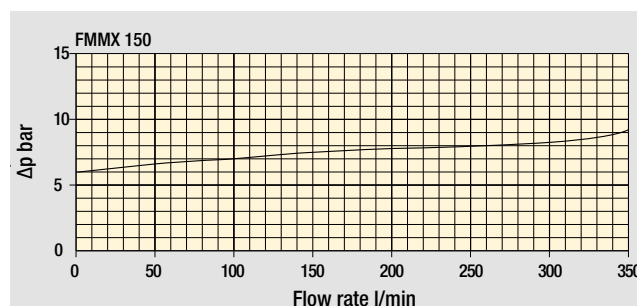
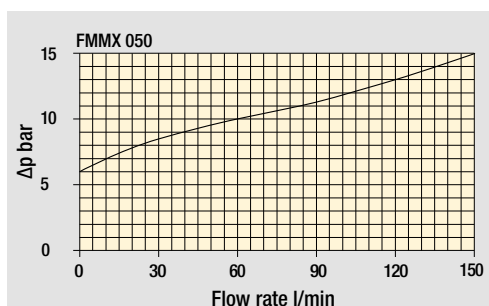
Hydraulic symbols

Filter series	Style S	Style B	Style T	Style D
FMMX 050	•	•	•	•
FMMX 150	•	•	•	•

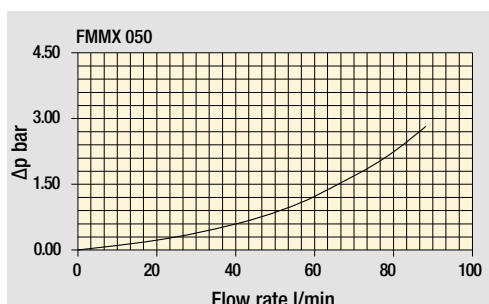


Pressure drop

Filter housings
 Δp pressure drop



Bypass valve
pressure drop



Filter housing
with check valve

The curves are plotted using mineral oil with density of 0.86 kg/dm³ in compliance with ISO 3968.
 Δp varies proportionally with density.

Designation & Ordering code

COMPLETE FILTER

Series and size		Configuration example: FMMX050									
FMMX050 Filter featuring MYCLEAN Filter Element		3	B	A	G	A10	N	Z01	EX		
Length											
1 2 3 4 5											
Valves											
B With bypass 6 bar											
D With check valve, with bypass 6 bar											
Seals											
A NBR											
V FPM											
Connections											
A M18x1.5 - ISO 6149											
B M22x1.5 - ISO 6149											
C G 1/2"											
D G 3/4"											
E 1/2" NPT											
F 3/4" NPT											
G SAE 8 - 3/4" - 16 UNF											
H SAE 12 - 1 1/16" - 12 UN											
Filtration rating (filter media)											
A03 Inorganic microfiber 3 µm											
A06 Inorganic microfiber 6 µm											
A10 Inorganic microfiber 10 µm											
A16 Inorganic microfiber 16 µm											
A25 Inorganic microfiber 25 µm											
Element Δp											
N 20 bar											
S 210 bar											
Executions											
zérospark®											
Z01 Upper connection for clogging indicator											
Z02 Without connection for clogging indicator											
Z03 Frontal connection for clogging indicator											
Zxx Customized											
Certifications											
EX ATEX certifications											

FILTER ELEMENT

Element series and size		Configuration example: HPX050					
HPX050 Filter Element with MYCLEAN feature		3	A10	A	N	Z01	
Element length							
1 2 3 4 5							
Filtration rating (filter media)							
A03 Inorganic microfiber 3 µm							
A06 Inorganic microfiber 6 µm							
A10 Inorganic microfiber 10 µm							
A16 Inorganic microfiber 16 µm							
A25 Inorganic microfiber 25 µm							
Seals							
A NBR							
V FPM							
Element Δp							
N 20 bar							
S 210 bar							
Execution							
zérospark®							
Z01 MP Filtri standard							
Zxx Customized							

CLOGGING INDICATORS

See page 723

DEH Electrical differential pressure indicator 420 bar

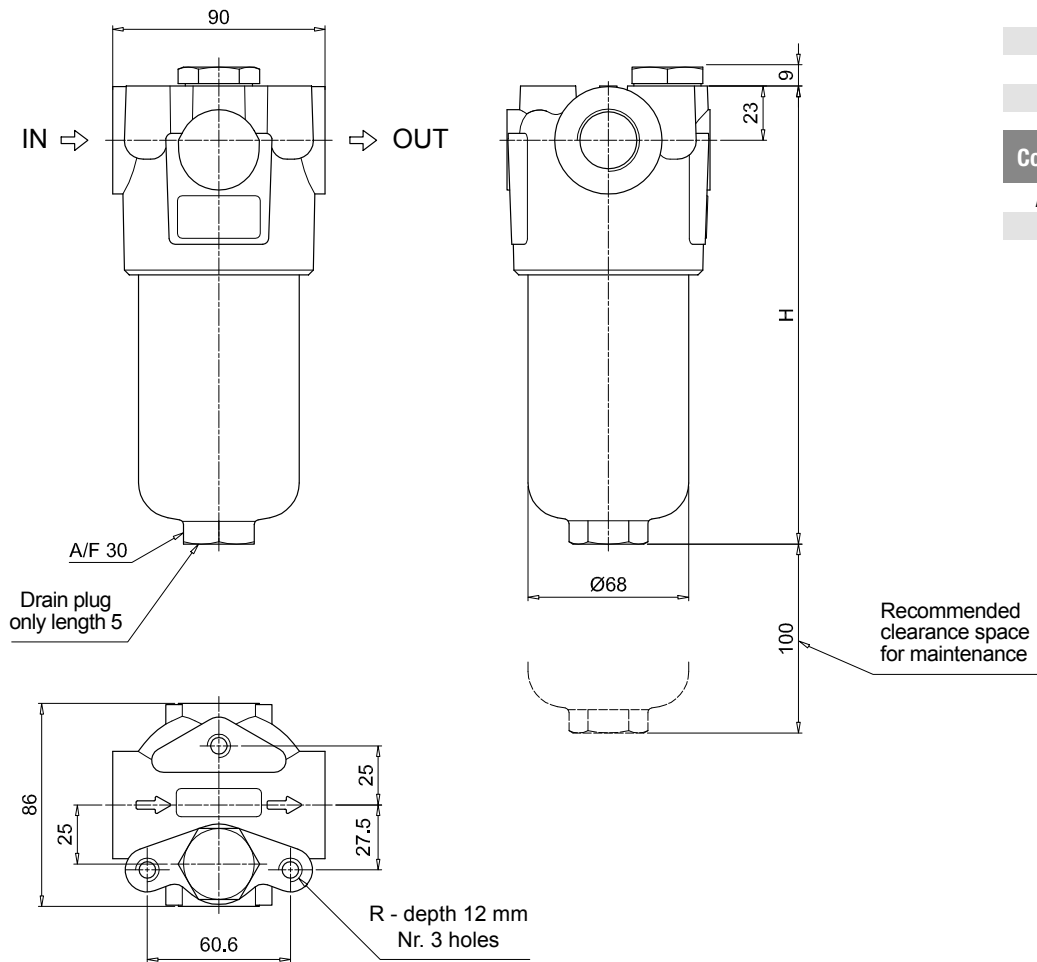
DVM Visual differential pressure indicator

DVA Visual differential pressure indicator

PLUGS

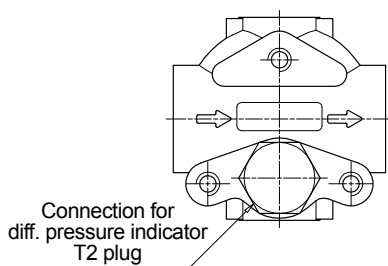
See page 741

T2 Plug

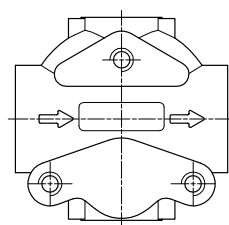


FMMX050	
Filter length	H [mm]
1	158
2	195
3	237
4	285
5	407
Connections	R
A-B-C-D	M10
E-F-G-H	3/8" UNC

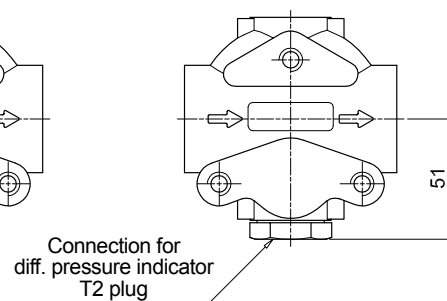
Execution P01



Execution P02



Execution P03



FMMX FMMX150

Designation & Ordering code

COMPLETE FILTER

Series and size **FMMX150** Filter featuring **MYCLEAN** Filter Element

Config. example: **FMMX150** **2** **B** **A** **D** **2** **M25** **N** **Z01** **EX**

Length
1 | **2** | **3** |

Valves
S Without bypass **B** With bypass 6 bar

Seals
A NBR **V** FPM

Connections
C G1" **F** 1 1/4" NPT
D G1 1/4" **G** SAE 16 - 1 5/16" - 12 UN
E 1" NPT **H** SAE 20 - 1 5/8" - 12 UN

Connections for differential indicator
1 Without connection
2 Upper connection
3 Frontal connection

Filtration rating (filter media)
A03 Inorganic microfiber 3 µm
A06 Inorganic microfiber 6 µm
A10 Inorganic microfiber 10 µm
A16 Inorganic microfiber 16 µm
A25 Inorganic microfiber 25 µm
M25 Wire mesh 25 µm

Element Δp
N 20 bar
S 210 bar

Execution
zerospark
Z01 MP Filtri standard
Zxx Customized

Certifications
EX ATEX certifications

FILTER ELEMENT

Element series and size **HPX150** Filter Element with **MYCLEAN** feature

Configuration example: **HPX150** **3** **A10** **A** **N** **Z01**

Element length
1 | **2** | **3** |

Filtration rating (filter media)
A03 Inorganic microfiber 3 µm
A06 Inorganic microfiber 6 µm
A10 Inorganic microfiber 10 µm
A16 Inorganic microfiber 16 µm
A25 Inorganic microfiber 25 µm
M25 Wire mesh 25 µm

Seals
A NBR
V FPM

Element Δp
N 20 bar
S 210 bar

Execution
zerospark
Z01 MP Filtri standard
Zxx Customized

CLOGGING INDICATORS

See page 723

DEH Electrical differential pressure indicator 420 bar

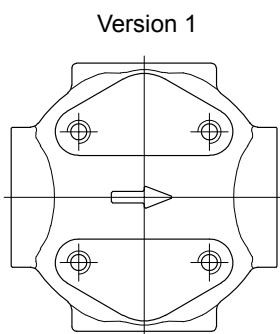
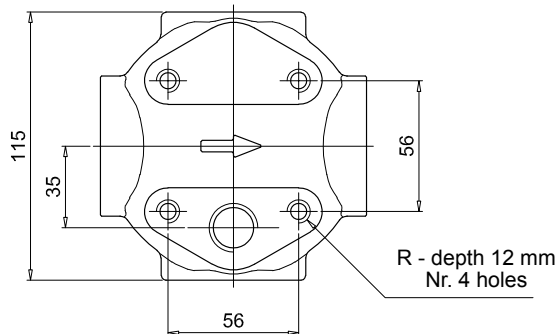
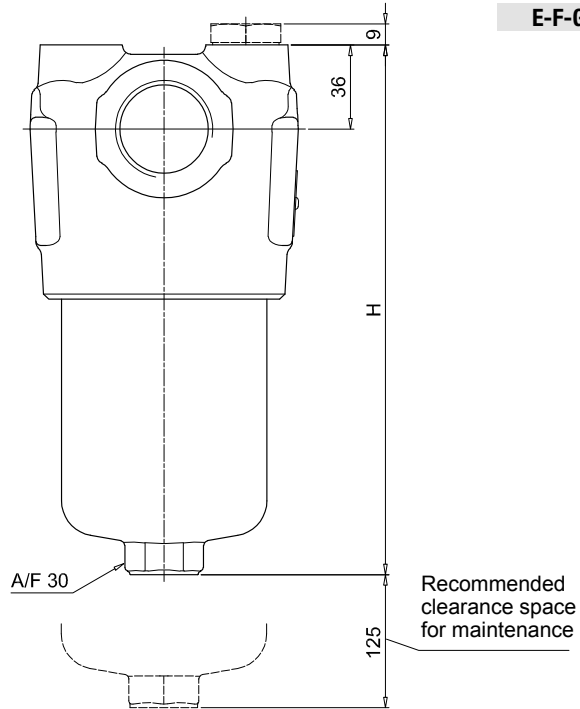
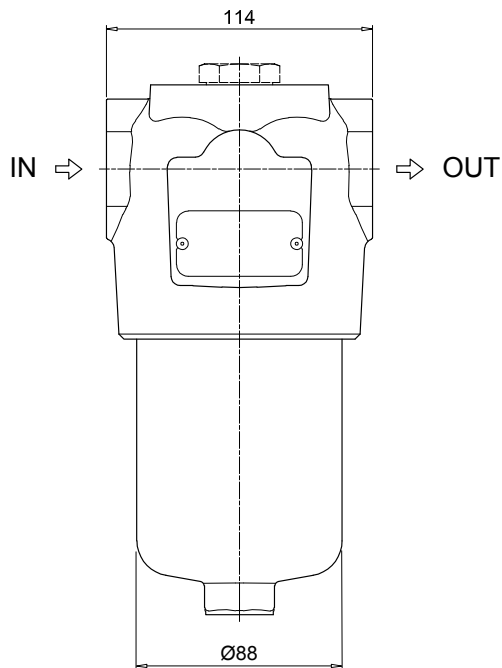
DVM Visual differential pressure indicator

DVA Visual differential pressure indicator

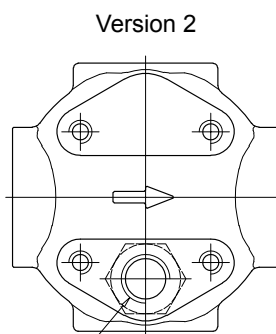
PLUGS

See page 741

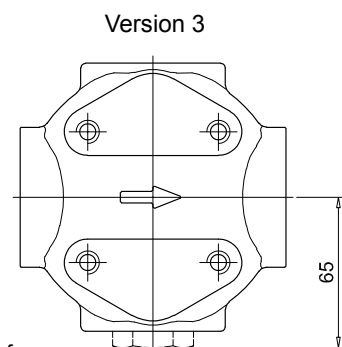
T2 Plug



Connection for differential indicator
T2 plug not included



Connection for differential indicator
T2 plug not included



FMMX150

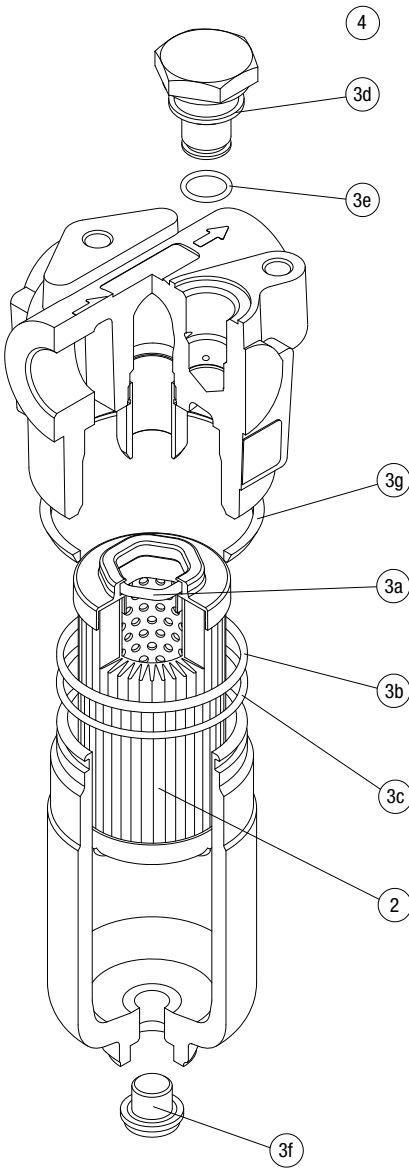
Filter length	H [mm]
1	230
2	340
3	415

Connections	R
C-D	M10
E-F-G-H	3/8" UNC

FMMX SPARE PARTS

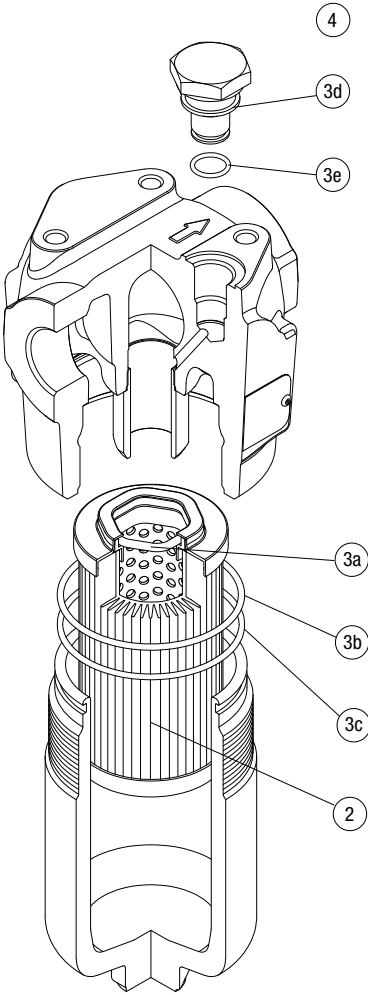
Order number for spare parts

FMMX 050



Item:	Q.ty: 1 pc.	Q.ty: 1 pc.	Q.ty: 1 pc.
Filter series	Filter element	Seal Kit code number	Indicator connection plug
FMMX 050	See order table	NBR	NBR
		FPM	FPM
		02050864	T2H
		02050865	T2V

FMMX 150



Item:		Q.ty: 1 pc.		Q.ty: 1 pc.		Q.ty: 1 pc.	
		2		3 (3a ÷ 3e)		4	
Filter series	Filter element	Seal Kit code number		Indicator connection plug			
		NBR	FPM	NBR	FPM		
FMMX 150	See order table	02050868	02050869	T2H	T2V		

FZP series

Maximum working pressure up to 42 Mpa (420 bar) - Flow rate up to 160 l/min



INSTALLATION, SERVICE AND MAINTENANCE MANUAL AND SAFETY INSTRUCTIONS



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Description

Technical data

Filters for potentially explosive atmosphere

In-line

Maximum working pressure up to 42 Mpa (420 bar)

Flow rate up to 160 l/min

FZP is a range of stainless steel high pressure filter for protection of sensitive components in high pressure hydraulic systems placed in difficult environmental conditions.

They are directly connected to the lines of the system through the hydraulic fittings.

Available features:

- 1 1/4" female threaded connections, for a maximum flow rate of 160 l/min
- Fine filtration rating, to get a good cleanliness level into the system
- Bypass valve, to relieve excessive pressure drop across the filter media
- Low collapse filter element with external support "R", for filter element protection against the back pressure caused by the check valve or the reverse flow in filters provided with the bypass valve
- High collapse filter element with external support "S", for filter element protection against the back pressure caused by the check valve or the reverse flow in filters not provided with the bypass valve
- High collapse filter element "U", for use with aggressive fluids
- Visual, electrical and electronic differential clogging indicators

Common applications:

- Off-shore equipment
- Water filtration systems
- Systems with strong or corrosive environmental conditions
- Systems with corrosive fluids

Filter housing materials

- Head: AISI 316L
- Housing: AISI 316L
- Bypass valve: AISI 316L

Bypass valve

Opening pressure 6 bar \pm 10%

Pressure

- Test pressure: 63 MPa (630 bar)
- Min. Burst pressure: 126 MPa (1260 bar)
- Pulse pressure fatigue test: 1 000 000 cycles with pressure from 0 to 42 MPa (420 bar)

Filter element features

Filter FZP		Filter element HP		
Δp Element type				
Element media	Construction	Δp Series	Δp	
A - Microfiber	with external support	R	20 bar	
	High Δp with external support	S	210 bar	
	High Δp with stainless steel components	U	210 bar	
Please see ordering code tables to check element Δp series availability based on filter features.				
Flow direction through the filter element:				
From OUT to IN				
Filter element components materials		Δp Series		
		R	S	U
End cap		Polyamide	Tinned Steel	Stainless steel
Core tube		Tinned Steel	Tinned Steel	Stainless steel
External support		Wire mesh epoxy painted	Wire mesh epoxy painted	Stainless steel
Internal support		Wire mesh epoxy painted	Stainless steel	Stainless steel
Pre-filter		Synthetic	Synthetic	Synthetic

Temperature

Seals	Ambient Temperature	Max fluid Temperature	Temperature Class	Max surface temperature
NBR	-15 °C ÷ +80 °C	+80 °C	T6	T85 °C
FPM / MFQ	-15 °C ÷ +80 °C	+80 °C	T6	T85 °C
	-15 °C ÷ +95 °C	+95 °C	T5	T100 °C
	-15 °C ÷ +110 °C	+110 °C	T4	T115 °C

Seals

- Standard NBR series A
- Optional FPM series V
- Optional MFQ series F

Note

FZP filters are provided for vertical mounting

Filter with:

NBR seal in configuration **zerospark+**



II 3G Ex h IIC T6 Gc X
II 3D Ex h IIIC T85°C Dc X

FPM / MFQ seal in configuration **zerospark+**



II 3G Ex h IIC T6... T4 Gc X
II 3D Ex h IIIC T85°C...T115°C Dc X

Weights [kg] and volumes [dm³]

Filter series	Weights [kg]					Volumes [dm³]				
	Length	1	2	3	4	Length	1	2	3	4
FZP 039		-	4.5	5.1	5.6		-	0.19	0.26	0.34
FZP 136		8.3	10.2	11.5	-		0.45	0.78	1.00	-

Flow rates [l/min]

Filter series	Length	Filter element design - R Series					Filter element design - S-U Series				
		A03	A06	A10	A16	A25	A03	A06	A10	A16	A25
FZP 039	2	19	25	43	50	59	19	23	41	45	55
	3	34	37	53	62	74	31	34	48	52	66
	4	42	46	63	72	81	38	41	55	71	78
FZP 136	1	63	67	102	108	136	47	53	87	89	127
	2	95	100	122	123	159	81	95	113	115	138
	3	122	124	148	150	160	106	116	135	141	151

Maximum flow rate for a complete stainless steel high pressure filter with a pressure drop $\Delta p = 1.5$ bar.

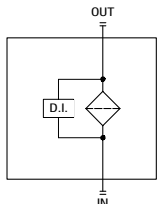
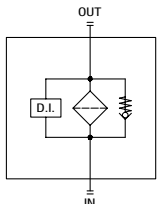
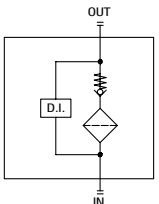
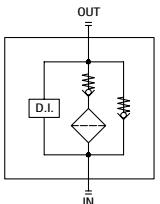
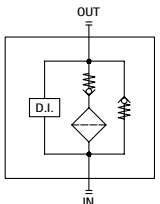
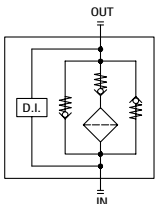
The reference fluid has a kinematic viscosity of 30 mm²/s (cSt) and a density of 0.86 kg/dm³.

For different pressure drop or fluid viscosity we recommend to use our selection software available on www.mpfiltri.com.

You can also calculate the right size using the formulas present on the FILTER SIZING paragraph at the beginning of the full catalogue or at the beginning of the filter family brochure.

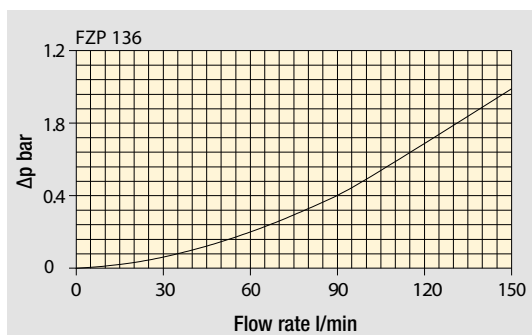
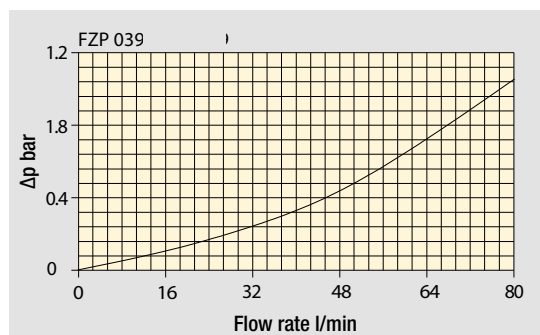
Please, contact our Sales Department for further additional information.

Hydraulic symbols

Filter series	Style S	Style B	Style T	Style D	Style V	Style Z
FZP 039	•	•	•	•	•	•
FZP 136	•	•	-	-	-	-
						

Pressure drop

Filter housings Δp pressure drop



The curves are plotted using mineral oil with density of 0.86 kg/dm³ in compliance with ISO 3968. Δp varies proportionally with density.

Designation & Ordering code

COMPLETE FILTER

Filter series and size	Configuration example: FZP039											
FZP039	2	B	F	B	2	A03	U	Z01	EX			
Filter length												
2 3 4												
Valves												
S Without bypass	D With reverse flow, with bypass 6 bar											
B With bypass 6 bar	V With reverse flow, without bypass											
T With reverse flow, without bypass	Z With reverse flow, with bypass 6 bar											
Seals												
A NBR												
V FPM												
F MFQ												
Connections												
A G 1/2"												
B 1/2" NPT												
C SAE 8 - 3/4" - 16 UNF												
Connections for differential pressure indicator												
1 Without connection												
2 With connection												
Filtration rating (filter media)												
A03 Inorganic microfiber 3 µm												
A06 Inorganic microfiber 6 µm												
A10 Inorganic microfiber 10 µm												
A16 Inorganic microfiber 16 µm												
A25 Inorganic microfiber 25 µm												
Element Δp	S		B		T		D		V		Z	
R 20 bar	-		•		-		•		-		•	
S 210 bar	•		-		•		-		•		-	
U 210 bar, stainless steel filter element	•		•		•		•		•		•	
Execution												
zerospark®												
Z01 MP Filtri standard												
Zxx Customized												
Certifications												
EX ATEX certifications												

FILTER ELEMENT

Element series and size	Configuration example: HP039					
HP039	2	A03	F	U	Z01	
Element length						
2 3 4						
Filtration rating (filter media)						
A03 Inorganic microfiber 3 µm						
A06 Inorganic microfiber 6 µm						
A10 Inorganic microfiber 10 µm						
A16 Inorganic microfiber 16 µm						
A25 Inorganic microfiber 25 µm						
Seals						
A NBR						
V FPM						
F MFQ						
Element Δp						
R 20 bar						
S 210 bar						
U 210 bar, stainless steel filter element						
Execution						
zerospark®						
Z01 MP Filtri standard						
Zxx Customized						

CLOGGING INDICATORS

See page 723

DEH Electrical differential pressure indicator

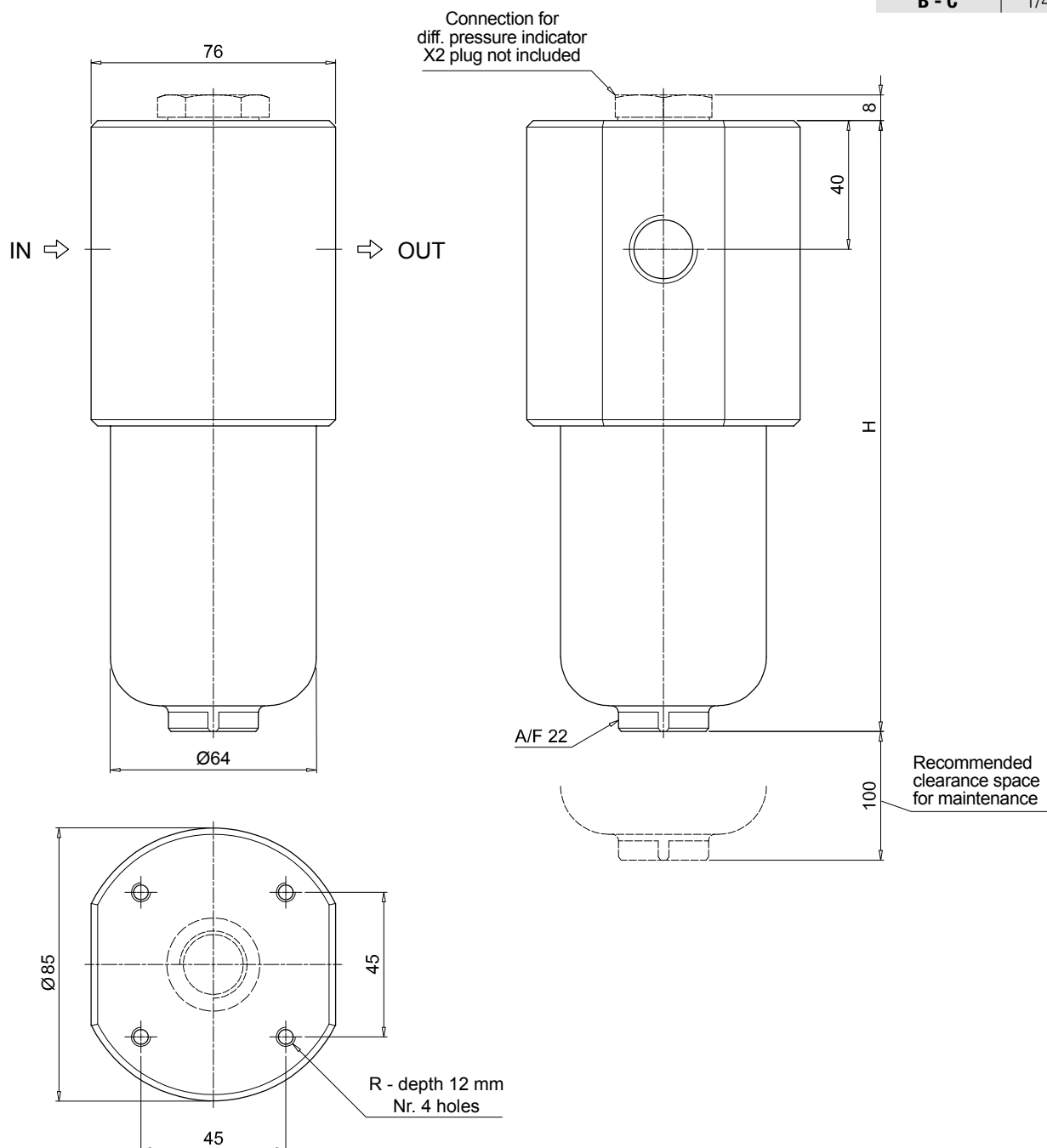
DVX Visual differential pressure indicator

DVY Visual differential pressure indicator

PLUGS

See page 741

X2 Stainless steel plug (not included)



FZP039	
Filter length	H [mm]
2	179
3	222
4	266
Connections	R
A	M6
B - C	1/4" UNC

Designation & Ordering code

COMPLETE FILTER

Filter series and size FZP136	Configuration example: FZP136 1 B A B 6 A03 R Z01 EX										
Filter length 1 2 3											
Valves S Without bypass B With bypass 6 bar											
Seals A NBR V FPM F MFQ											
Connections A G 3/4" B 3/4" NPT C SAE 12 - 1 1/16" - 12 UN D G 1" E 1" NPT F SAE 16 - 1 5/16" - 12 UN G G 1 1/4" H 1 1/4" NPT I SAE 20 - 1 5/8" - 12 UN											
Connections for differential pressure indicator 1 Without connection 6 With two connections on both sides											
Filtration rating (filter media) A03 Inorganic microfiber 3 µm A06 Inorganic microfiber 6 µm A10 Inorganic microfiber 10 µm A16 Inorganic microfiber 16 µm A25 Inorganic microfiber 25 µm											
Element Δp R 20 bar S 210 bar U 210 bar, stainless steel filter element	Valves S B - • • - • •		Execution zerospark+ Z01 MP Filtri standard Zxx Customized		Certifications EX ATEX certifications						

FILTER ELEMENT

Element series and size HP135	Configuration example: HP135 1 A03 A R Z01					
Element length 1 2 3						
Filtration rating (filter media) A03 Inorganic microfiber 3 µm A06 Inorganic microfiber 6 µm A10 Inorganic microfiber 10 µm A16 Inorganic microfiber 16 µm A25 Inorganic microfiber 25 µm						
Seals A NBR V FPM F MFQ						
Element Δp R 20 bar S 210 bar U 210 bar, stainless steel filter element					Execution zerospark+ Z01 MP Filtri standard Zxx Customized	

CLOGGING INDICATORS

See page 723

DEH Electrical differential pressure indicator

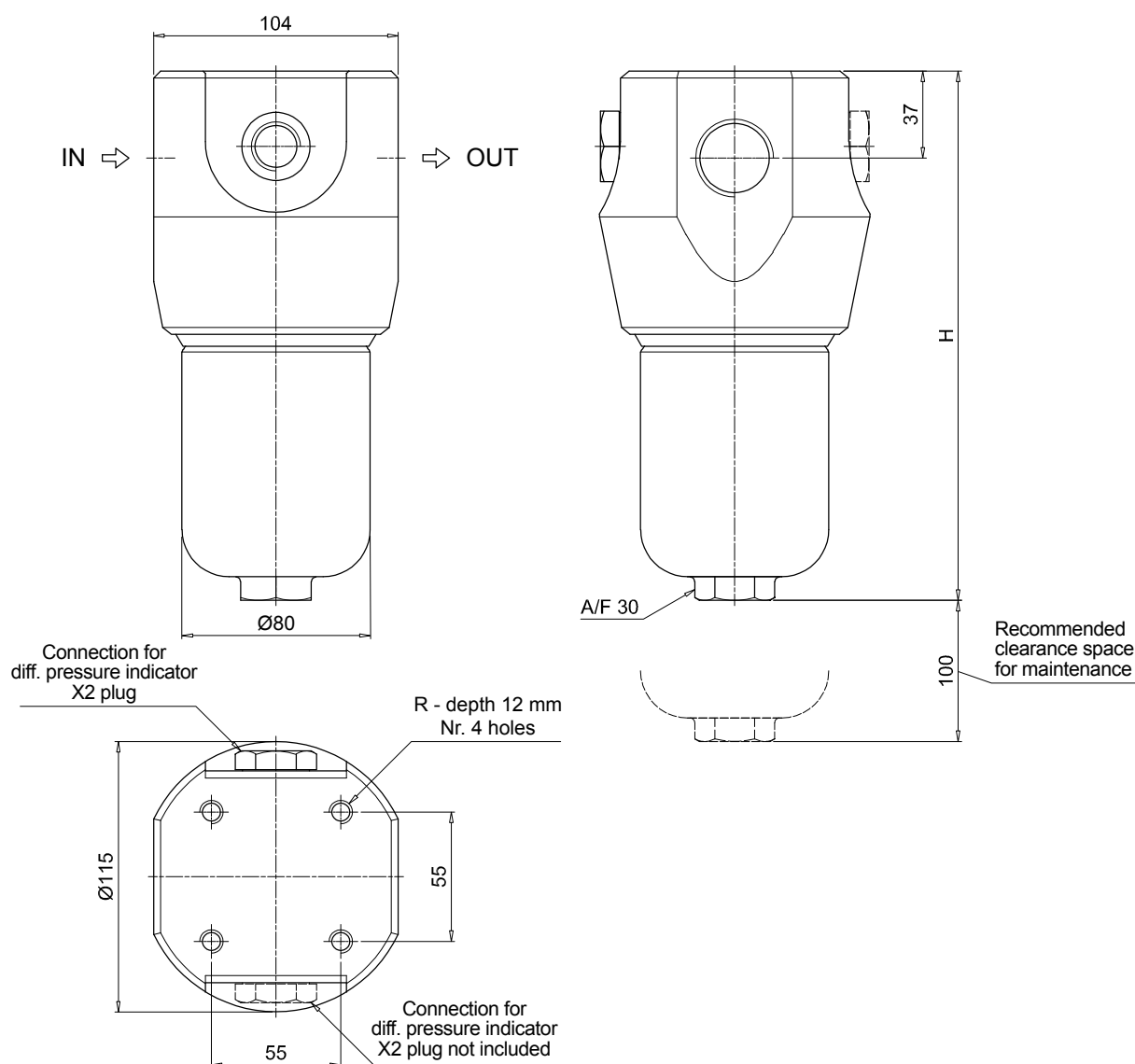
DVX Visual differential pressure indicator

DVY Visual differential pressure indicator

PLUGS

See page 741

X2 Stainless steel plug (not included)

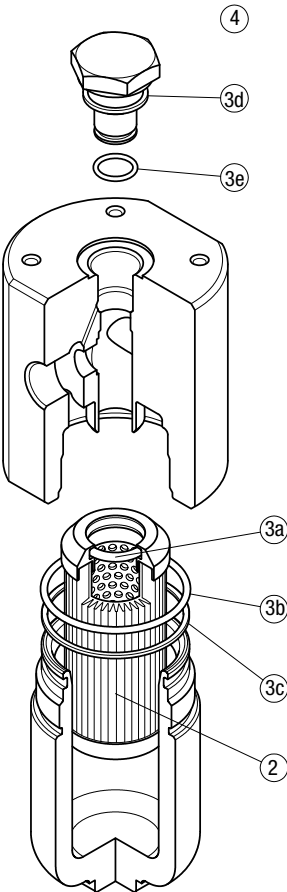


The position of the X2 plug is reversible

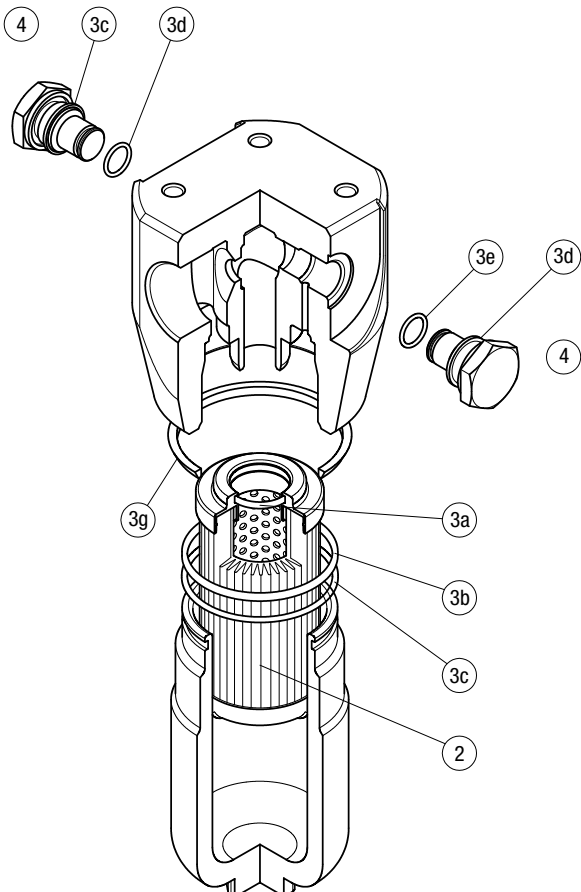
FZP SPARE PARTS

Order number for spare parts

FZP 039



FZP 136



Q.ty: 1 pc.		Q.ty: 1 pc.		Q.ty: 1 pc.	
Item:		3 (3a ÷ 3g)		4	
Filter series	Filter element	Seal Kit code number		Indicator connection plug	
		NBR	FPM	NBR	FPM
FZP 039	See order table	02050299	02050300	X2H	X2V
FZP 136		02050636	02050637		

FZH series

Maximum working pressure up to 70 Mpa (700 bar) - Flow rate up to 80 l/min



INSTALLATION, SERVICE AND MAINTENANCE MANUAL AND SAFETY INSTRUCTIONS



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Description

Technical data

Filters for potentially explosive atmosphere

In-line

Maximum working pressure up to 70 Mpa (700 bar)

Flow rate up to 80 l/min

FZH is a range of stainless steel high pressure filter for protection of sensitive components in high pressure hydraulic systems placed in difficult environmental conditions.

They are directly connected to the lines of the system through the hydraulic fittings.

Available features:

- 1/2" female threaded connections, for a maximum flow rate of 80 l/min
- Fine filtration rating, to get a good cleanliness level into the system
- Bypass valve, to relieve excessive pressure drop across the filter media
- Low collapse filter element "N", for use with filters provided with bypass valve
- High collapse filter element "H", for use with filters not provided with bypass valve
- Low collapse filter element with external support "R", for filter element protection against the back pressure caused by the check valve or the reverse flow in filters provided with the bypass valve
- High collapse filter element with external support "S", for filter element protection against the back pressure caused by the check valve or the reverse flow in filters not provided with the bypass valve
- High collapse filter element "U", for use with aggressive fluids
- Visual, electrical and electronic differential clogging indicators

Common applications:

- Off-shore equipment
- Water filtration systems
- Systems with strong or corrosive environmental conditions
- Systems with corrosive fluids

Filter housing materials

- Head: AISI 316L
- Housing: AISI 316L
- Bypass valve: AISI 316L

Bypass valve

Opening pressure 6 bar \pm 10%

Pressure

- Test pressure: 105 MPa (1050 bar)
- Min. Burst pressure: 210 MPa (2100 bar)
- Pulse pressure fatigue test: 1 000 000 cycles with pressure from 0 to 70 MPa (700 bar)

Filter element features

Filter FZH		Filter element HP	
Δp Element type			
Element media	Construction	Δp Series	Δp
A - Microfiber	Standard	N	20 bar
	with external support	R	20 bar
	High Δp	H	210 bar
	High Δp with external support	S	210 bar
	High Δp with stainless steel components	U	210 bar
Please see ordering code tables to check element Δp series availability based on filter features.			
Flow direction through the filter element: From OUT to IN			
Filter element components materials	Δp Series		
	N - R	H - S	U
End cap	Polyamide	Tinned Steel	Stainless steel
Core tube	Tinned Steel	Tinned Steel	Stainless steel
External support	Wire mesh epoxy painted	Wire mesh epoxy painted	Stainless steel
Internal support	Wire mesh epoxy painted	Stainless steel	Stainless steel
Pre-filter	Synthetic	Synthetic	Synthetic

Temperature

Seals	Ambient Temperature	Max fluid Temperature	Temperature Class	Max surface temperature
NBR	-15 °C \div +80 °C	+80 °C	T6	T85 °C
FPM / MFQ	-15 °C \div +80 °C	+80 °C	T6	T85 °C
	-15 °C \div +95 °C	+95 °C	T5	T100 °C
	-15 °C \div +110 °C	+110 °C	T4	T115 °C

Seals

- Standard NBR series A
- Optional FPM series V
- Optional MFQ series F

Note

FZH filters are provided for vertical mounting

Filter with:

NBR seal in configuration **zerospark+**



II 3G Ex h IIC T6 Gc X
II 3D Ex h IIIC T85°C Dc X

FPM / MFQ seal in configuration **zerospark+**



II 3G Ex h IIC T6... T4 Gc X
II 3D Ex h IIIC T85°C...T115°C Dc X

Weights [kg] and volumes [dm³]

Filter series	Weights [kg]					Volumes [dm³]				
	Length	1	2	3	4	Length	1	2	3	4
FZH 012		2.1	2.2	2.7	3.3		0.10	0.12	0.15	0.20
FZH 040		-	4.5	5.1	5.6		-	0.19	0.26	0.34

Flow rates [l/min]

Filter series	Length	Filter element design - N Series					Filter element design - H-U Series				
		A03	A06	A10	A16	A25	A03	A06	A10	A16	A25
FZH 012	1	4	6	8	9	11	3	5	6	7	9
	2	7	9	17	20	26	5	7	14	17	23
	3	11	14	25	27	32	11	14	24	27	32
	4	17	20	29	31	34	13	16	26	29	33

Filter series	Length	Filter element design - R Series					Filter element design - S-U Series				
		A03	A06	A10	A16	A25	A03	A06	A10	A16	A25
FZH 040	2	19	25	43	50	59	19	23	41	45	55
	3	34	37	53	62	74	31	34	48	52	66
	4	42	46	63	72	81	38	41	55	71	78

Maximum flow rate for a complete stainless steel high pressure filter with a pressure drop $\Delta p = 1.5$ bar.

The reference fluid has a kinematic viscosity of 30 mm²/s (cSt) and a density of 0.86 kg/dm³.

For different pressure drop or fluid viscosity we recommend to use our selection software available on www.mpfiltri.com.

You can also calculate the right size using the formulas present on the FILTER SIZING paragraph at the beginning of the full catalogue or at the beginning of the filter family brochure.

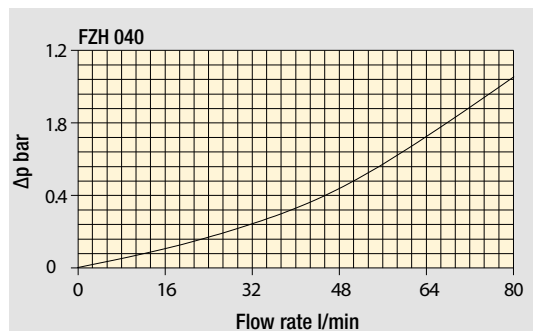
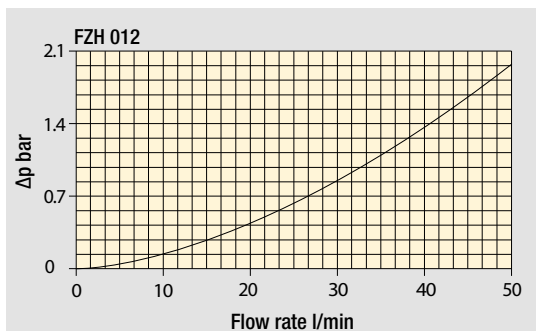
Please, contact our Sales Department for further additional information.

Hydraulic symbols

Filter series	Style S	Style B	Style T	Style D	Style V	Style Z
FZH 012	•	•	-	-	•	•
FZH 040	•	•	•	•	•	•

Pressure drop

Filter housings Δp pressure drop



The curves are plotted using mineral oil with density of 0.86 kg/dm³ in compliance with ISO 3968. Δp varies proportionally with density.

Designation & Ordering code

COMPLETE FILTER

Filter Series and size	Configuration example: FZH012										2	B	F	B	2	A03	U	Z01	EX
FZH012																			
Filter length																			
1	2	3	4																
Valves																			
S	Without bypass																		
B	With bypass 6 bar																		
V	With reverse flow, without bypass																		
Z	With reverse flow, with bypass 6 bar																		
Seals																			
A	NBR																		
V	FPM																		
F	MFQ																		
Connections																			
A	G 1/4"																		
B	1/4" NPT																		
C	SAE 5 - 1/2" - 20 UNF																		
D	G 3/8"																		
E	3/8" NPT																		
F	SAE 6 - 9/16" - 18 UNF																		
Connection for differential pressure indicator																			
1	Without connection																		
2	With connection																		
Filtration rating (filter media)																			
A03	Inorganic microfiber 3 µm																		
A06	Inorganic microfiber 6 µm																		
A10	Inorganic microfiber 10 µm																		
A16	Inorganic microfiber 16 µm																		
A25	Inorganic microfiber 25 µm																		
Element Δp																			
N	20 bar																		
H	210 bar																		
U	210 bar, stainless steel filter element																		
Valves																			
S																			
B																			
V																			
Z																			
Execution																			
zerospark®																			
Z01	MP Filtri standard																		
Zxx	Customized																		
Certifications																			
EX	ATEX certifications																		

FILTER ELEMENT

Element series and size	Configuration example: HP011										2	A03	F	U	Z01
HP011															
Element length															
1	2	3	4												
Filtration rating (filter media)															
A03	Inorganic microfiber 3 µm														
A06	Inorganic microfiber 6 µm														
A10	Inorganic microfiber 10 µm														
A16	Inorganic microfiber 16 µm														
A25	Inorganic microfiber 25 µm														
Seals															
A	NBR														
V	FPM														
F	MFQ														
Element Δp															
N	20 bar														
H	210 bar														
U	210 bar, stainless steel filter element														
Execution															
zerospark®															
Z01	MP Filtri standard														
Zxx	Customized														

CLOGGING INDICATORS

See page 723

DEZ Electrical differential pressure indicator

DVZ Visual differential pressure indicator

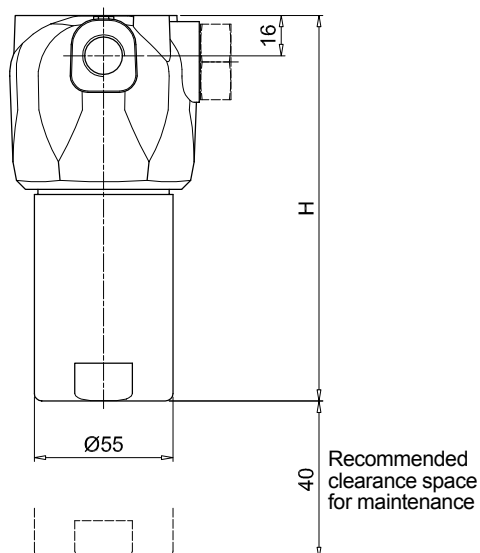
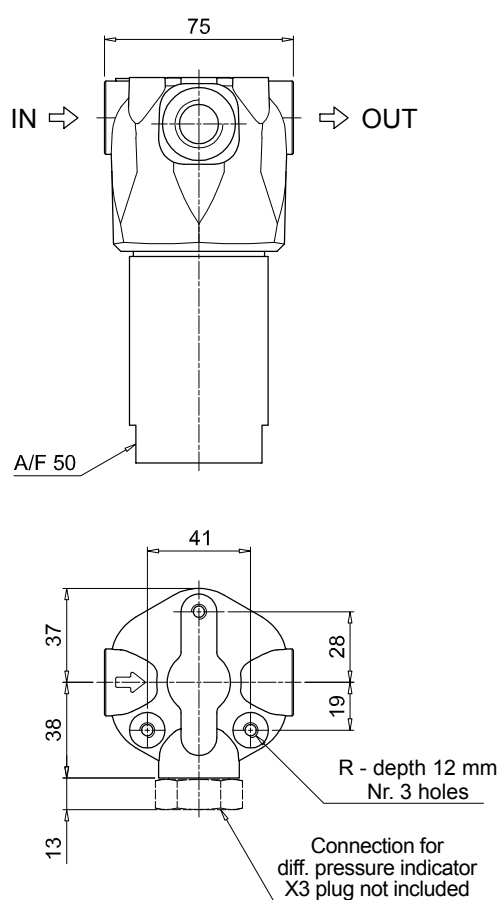
PLUGS

See page 741

X3 Stainless steel plug (not included)

FZH012	
Filter length	H [mm]
1	93
2	104
3	154
4	204

Connections	R
A	M6
B - C	1/4" UNC
D	M6
E - F	1/4" UNC



Designation & Ordering code

COMPLETE FILTER

Filter Series and size	Configuration example: FZH040										2	T	A	A	2	A03	S	Z01	EX
FZH040																			
Filter length																			
2 3 4																			
Valves																			
S Without bypass																			
B With bypass 6 bar																			
T With check valve, without bypass																			
D With check valve, with bypass 6 bar																			
V With reverse flow, without bypass																			
Z With reverse flow, with bypass 6 bar																			
Seals																			
A NBR	F MFQ																		
V FPM																			
Connections																			
A G 1/2"																			
B 1/2" NPT																			
C SAE 8 - 3/4" - 16 UNF																			
Connection for differential pressure indicator																			
1 Without connection																			
2 With connection																			
Filtration rating (filter media)																			
A03 Inorganic microfiber	3 µm																		
A06 Inorganic microfiber	6 µm																		
A10 Inorganic microfiber	10 µm																		
A16 Inorganic microfiber	16 µm																		
A25 Inorganic microfiber	25 µm																		
Element Δp	Valves																		
R 20 bar	S	B	T	D	V	Z													
S 210 bar	•	•	•	•	•	•													
U 210 bar, stainless steel filter element	•	•	•	•	•	•													
Execution	zerospark® Z01 MP Filtri standard Zxx Customized																		
Certifications	EX ATEX certifications																		

FILTER ELEMENT

Element series and size	Configuration example: HP039										2	A03	A	S	Z01
HP039															
Element length															
2 3 4															
Filtration rating (filter media)															
A03 Inorganic microfiber															
A06 Inorganic microfiber															
A10 Inorganic microfiber															
A16 Inorganic microfiber															
A25 Inorganic microfiber															
Seals															
A NBR															
V FPM															
F MFQ															
Element Δp															
R 20 bar															
S 210 bar															
U 210 bar, stainless steel filter element															
Execution															
Z01 MP Filtri standard															
Zxx Customized															

CLOGGING INDICATORS

See page 723

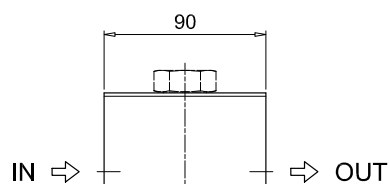
DVZ Visual differential pressure indicator

PLUGS

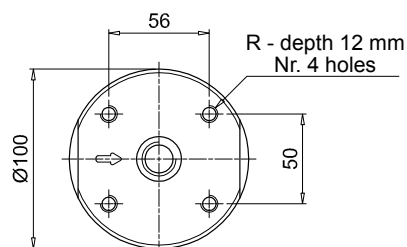
See page 741

X3 Stainless steel plug (not included)

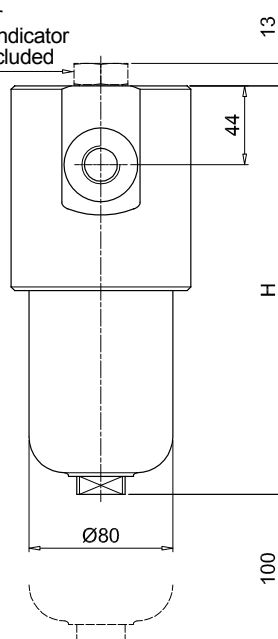
Valves S - B - T - D



A/F 27



Connection for
diff. pressure indicator
X3 plug not included



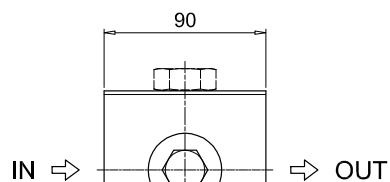
Recommended
clearance space
for maintenance

FZH040

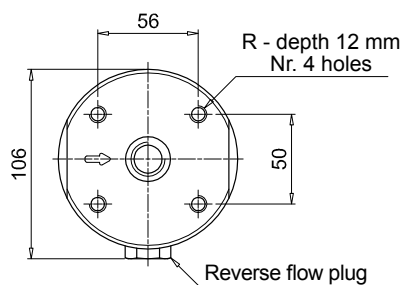
Filter length	H [mm]
2	204
3	247
4	291

Connections	R
A	M10
B	3/8" UNC
C	3/8" UNC

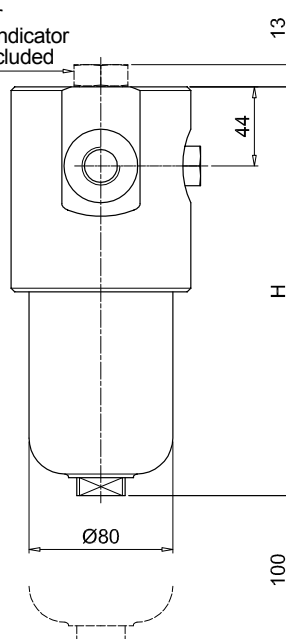
Valves V - Z



A/F 27



Connection for
diff. pressure indicator
X3 plug not included



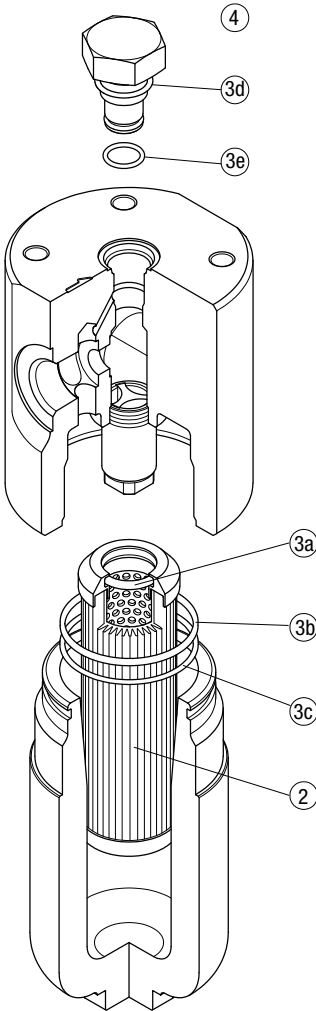
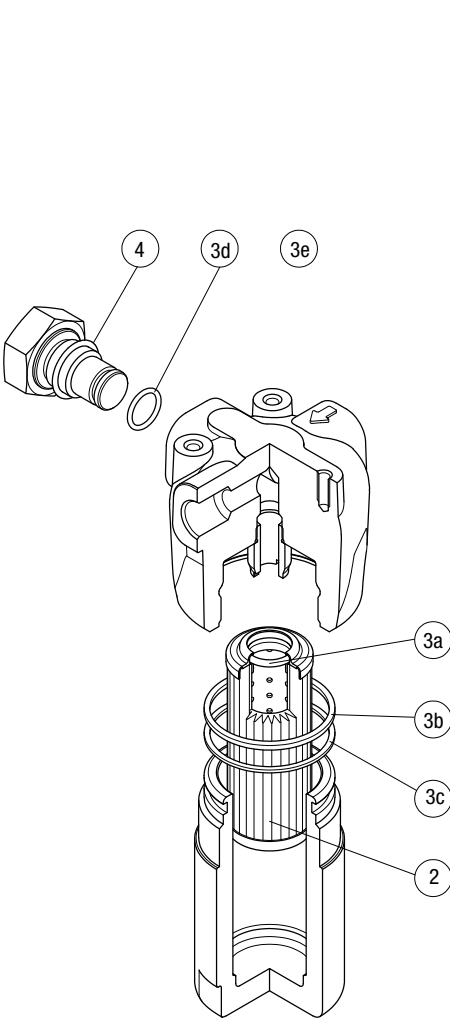
Recommended
clearance space
for maintenance

FZH SPARE PARTS

Order number for spare parts

FZH 012

FZH 040



Q.ty: 1 pc.		Q.ty: 1 pc.		Q.ty: 1 pc.	
Item:	2	3 (3a ÷ 3e)		4	
Filter series	Filter element	Seal Kit code number		Indicator connection plug	
		NBR	FPM	NBR	FPM
FZH 012	See order table	02050856	02050857	X2H	X2V
FZH 040		02050860	02050861		

FZX series

Maximum working pressure up to 100 Mpa (1000 bar) - Flow rate up to 10 l/min



INSTALLATION, SERVICE AND MAINTENANCE MANUAL AND SAFETY INSTRUCTIONS



Please scan or click the QR codes
to get updated electronic version
of the related document.



Scan or click me!

Description

Technical data

Filters for potentially explosive atmosphere

In-line

Maximum working pressure up to 100 Mpa (1000 bar)

Flow rate up to 10 l/min

FZX is a range of stainless steel high pressure filter for protection of sensitive components in high pressure hydraulic systems placed in difficult environmental conditions.

They are directly connected to the lines of the system through the hydraulic fittings.

Available features:

- 1/2" female threaded connections, for a maximum flow rate of 10 l/min
- Fine filtration rating, to get a good cleanliness level into the system
- High collapse filter element "H", for use with filters not provided with bypass valve
- High collapse filter element "U", for use with aggressive fluids

Common applications:

- Off-shore equipment
- Water filtration systems
- Systems with strong or corrosive environmental conditions
- Systems with corrosive fluids

Filter housing materials

- Head: AISI 316L
- Housing: AISI 316L
- Bypass valve: AISI 316L

Pressure

- Test pressure: 150 MPa (1500 bar)
- Min. Burst pressure: 300 MPa (3000 bar)
- Pulse pressure fatigue test: 1 000 000 cycles with pressure from 0 to 100 MPa (1000 bar)

Bypass valve

Opening pressure 6 bar \pm 10%

Filter element features

Filter FZX		Filter element HP	
Δp Element type			
Element media	Construction	Δp Series	Δp
A - Microfiber	High Δp	H	210 bar
	High Δp with stainless steel components	U	210 bar
Please see ordering code tables to check element Δp series availability based on filter features.			
Flow direction through the filter element:			
From OUT to IN			
Filter element components materials		Δp Series	
		H	U
End cap		Tinned Steel	Stainless steel
Core tube		Tinned Steel	Stainless steel
External support		Wire mesh epoxy painted	Stainless steel
Internal support		Stainless steel	Stainless steel
Pre-filter		Synthetic	Synthetic

Temperature

Seals	Ambient Temperature	Max fluid Temperature	Temperature Class	Max surface temperature
NBR	-15 °C ÷ +80 °C	+80 °C	T6	T85 °C
FPM / MFQ	-15 °C ÷ +80 °C	+80 °C	T6	T85 °C
	-15 °C ÷ +95 °C	+95 °C	T5	T100 °C
	-15 °C ÷ +110 °C	+110 °C	T4	T115 °C

Seals

- Standard NBR series A
- Optional FPM series V
- Optional MFQ series F

Note

FZX filters are provided for vertical mounting

Filter with:

NBR seal in configuration **zerospark+**



II 3G Ex h IIC T6 Gc X
II 3D Ex h IIIC T85°C Dc X

FPM / MFQ seal in configuration **zerospark+**



II 3G Ex h IIC T6... T4 Gc X
II 3D Ex h IIIC T85°C...T115°C Dc X

Weights [kg] and volumes [dm³]

Filter series	Weights [kg]				Volumes [dm³]					
	Length	1	2	3	4	Length	1	2	3	4
FZX 011		-	-	6.5	-		-	-	0.15	-

Flow rates [l/min]

Filter series	Length	Filter element design - H-U Series				
		A03	A06	A10	A16	A25
FZX 011	3	1.57	1.63	1.73	1.74	1.77

Maximum flow rate for a complete stainless steel high pressure filter with a pressure drop $\Delta p = 1.5$ bar.

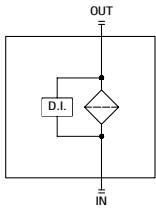
The reference fluid has a kinematic viscosity of 30 mm²/s (cSt) and a density of 0.86 kg/dm³.

For different pressure drop or fluid viscosity we recommend to use our selection software available on www.mpfiltri.com.

You can also calculate the right size using the formulas present on the FILTER SIZING paragraph at the beginning of the full catalogue or at the beginning of the filter family brochure. Please, contact our Sales Department for further additional information.

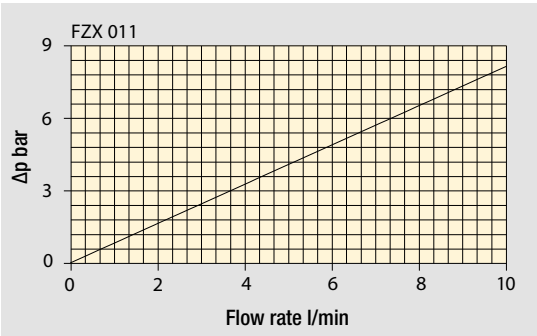
Hydraulic symbols

Filter series	Style S
FZX 011	•



Pressure drop

Filter housings Δp pressure drop



The curves are plotted using mineral oil with density of 0.86 kg/dm³ in compliance with ISO 3968. Δp varies proportionally with density.

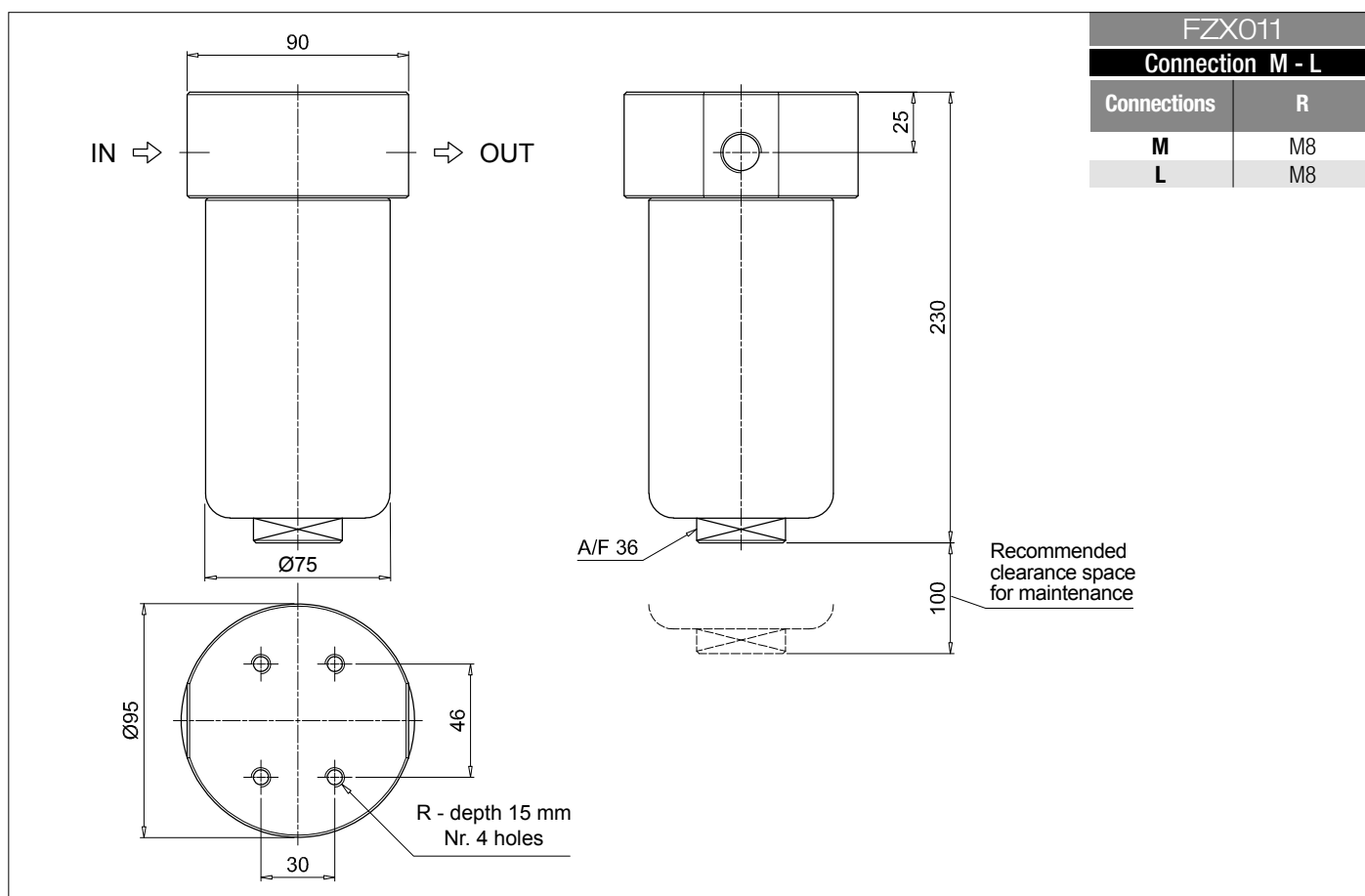
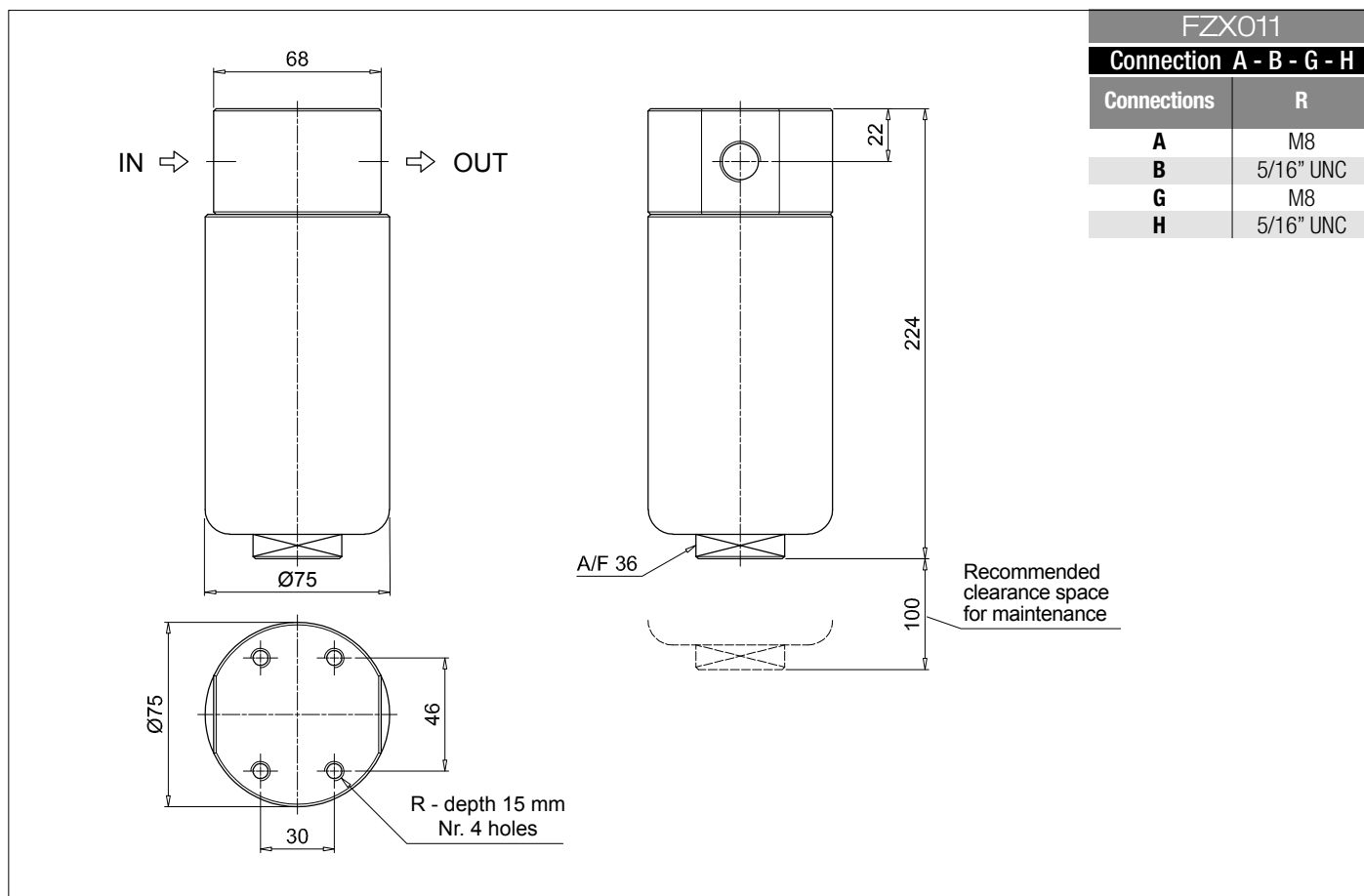
Designation & Ordering code

COMPLETE FILTER

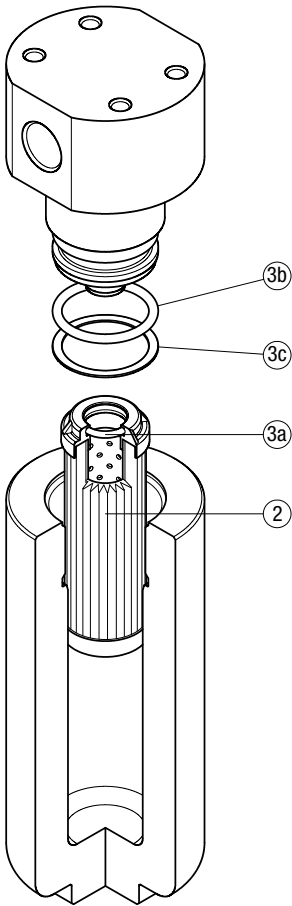
Filter series and size	Configuration example:	FZX011	3	S	V	B	1	A03	U	Z01	EX
FZX011											
Filter length											
3											
Bypass valve											
S Without bypass											
Seals											
A NBR											
V FPM											
F MFQ											
Connections											
700 bar											
A G 1/4"											
B 1/4" NPT											
G G 1/2"											
H 1/2" NPT"											
Autoclave 1000 bar											
M 9/16" - 18 UNF											
L 3/4" - 14 NPS											
Connection for differential pressure indicator											
1 Without connection											
Filtration rating (filter media)											
A03 Inorganic microfiber 3 µm											
A06 Inorganic microfiber 6 µm											
A10 Inorganic microfiber 10 µm											
A16 Inorganic microfiber 16 µm											
A25 Inorganic microfiber 25 µm											
Element Δp											
H 210 bar											
U 210 bar, stainless steel filter element											
Execution											
zerospark®											
Z01 MP Filtri standard											
Zxx Customized											
Certifications											
EX ATEX certifications											

FILTER ELEMENT

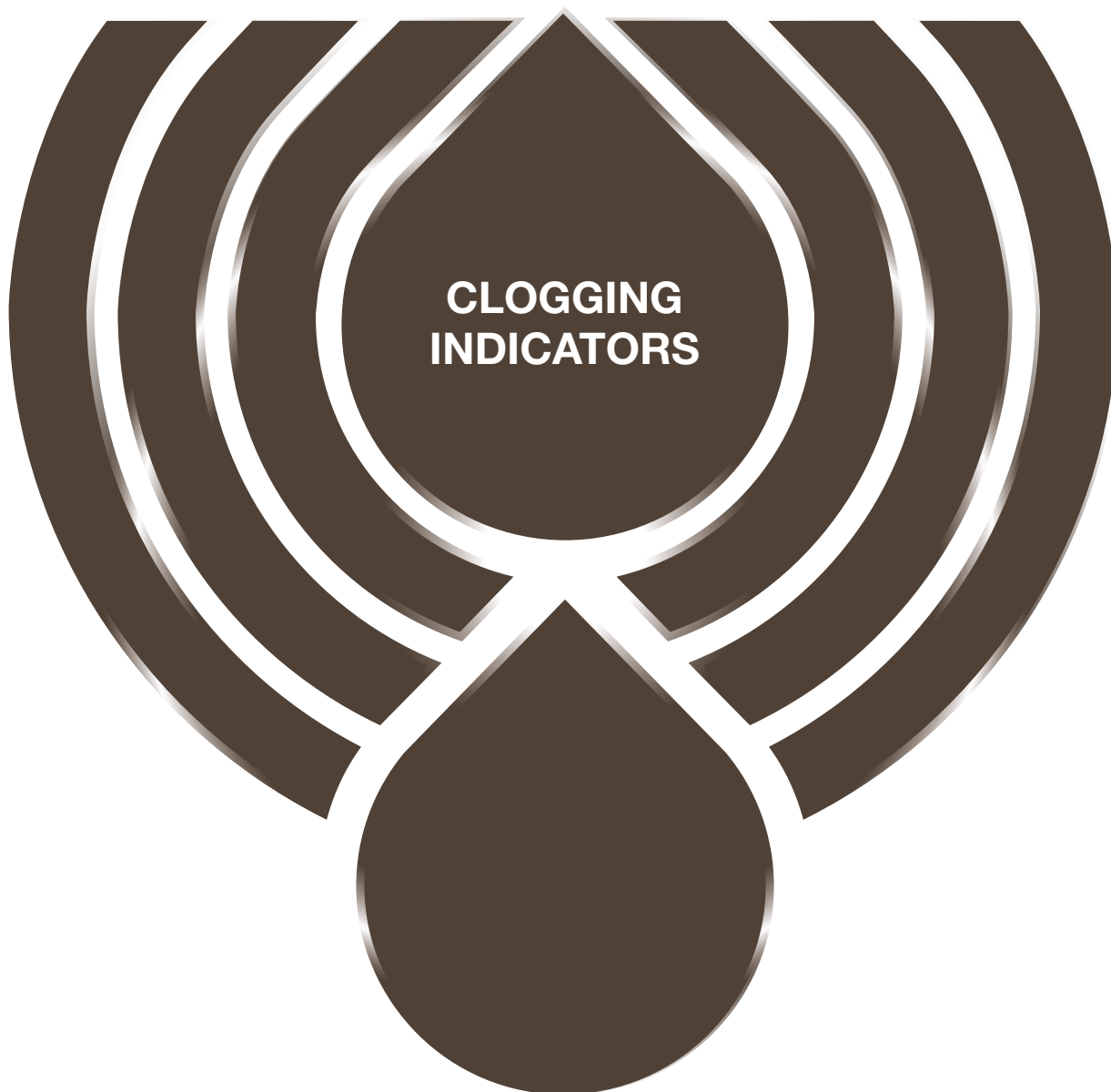
Element series and size	Example:	HP011	3	A03	V	U	Z01
HP011							
Element length							
3							
Filtration rating (filter media)							
A03 Inorganic microfiber 3 µm							
A06 Inorganic microfiber 6 µm							
A10 Inorganic microfiber 10 µm							
A16 Inorganic microfiber 16 µm							
A25 Inorganic microfiber 25 µm							
Seals							
A NBR							
V FPM							
F MFQ							
Element Δp							
H 210 bar							
U 210 bar, stainless steel filter element							
Execution							
zerospark®							
Z01 MP Filtri standard							
Zxx Customized							



FZX 011



Q.ty: 1 pc.		Q.ty: 1 pc.	
Item:	2	3	(3a ÷ 3c)
Filter series	Filter element	Seal Kit code number	
		NBR	FPM
FZX 011	See order table	02050643	02050644



Clogging indicators are devices that check the life time of the filter elements. They measure the pressure drop through the filter element directly connected to the filter housing.

These devices trip when the clogging of the filter element causes a pressure drop increasing across the filter element.

Filter elements are efficient only if their Dirt Holding Capacity is fully exploited. This is achieved by using filter housings equipped with clogging indicators.

The indicator is set to alarm before the element becomes fully clogged.

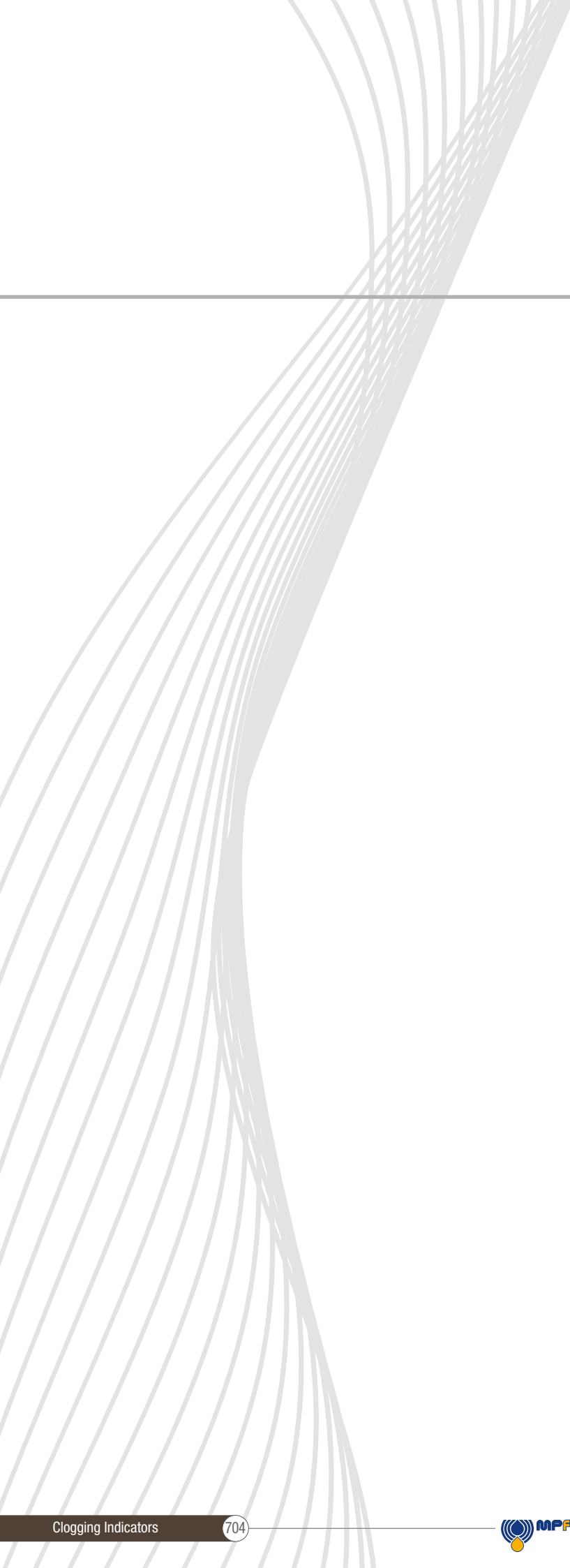
MP Filtri can supply indicators of the following designs:

- Vacuum switches and gauges
- Pressure switches and gauges
- Differential pressure indicators

These type of devices can be provided with a visual, electrical or both signals. The electronic differential pressure clogging indicator is also available. It provides both analogical 4-20 mA output and digital warning (75% of clogging) and alarm (clogging) outputs.

In the following pages you can find a reference guide about the types of clogging indicators available in the different families of MP Filtri's Hydraulic Filtration range of products.





DESIGNATION, ORDERING CODES & TECHNICAL DATA

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QUICK REFERENCE GUIDE

Ordering codes

Filter family	Filter series	Visual indicators	Electrical indicators	Electronic / Electrical-Visual indicators
SUCTION FILTERS	ELIXIR® SFEX060-110	VVB20P01 VVS20P01	VEB21AA50P01	VLB21AA51P01 VLB21AA52P01 VLB21AA53P01 VLB21AA71P01
	Suction Line SFMC250	VVA20P01 VVR20P01	VEA21xA50P01 VEA21xA50P01UL	VLA21xA51P01 VLA21xA52P01 VLA21xA53P01 VLA21xA71P01
	Without bypass SFSC 500 - 503 - 504 - 505 SFSC 510 - 535 - 540	VVA20P01 VVR20P01	VEA21xA50P01 VEA21xA50P01UL	VLA21xA51P01 VLA21xA52P01 VLA21xA53P01 VLA21xA71P01
RETURN FILTERS	With bypass 1.75 bar ELIXIR® RFEX060-080-110-160	BVA14P01 BVR14P01 BVP15HP01 BVQ15HP01	BEA15HA50P01 BEA15HA50P01UL BEM15HA41P01	BLA15HA51P01 BLA15HA52P01 BLA15HA53P01 BLA15HA71P01
	Without bypass ELIXIR® RFEX060-080-110-160	BVA25P01 BVR25P01 BVP20HP01 BVQ20HP01	BEA20HA50P01 BEA20HA50P01UL BEM20HA41P01	BLA20HA51P01 BLA20HA52P01 BLA20HA53P01 BLA20HA71P01
	With bypass 1.75 bar MDH 250	BVA14P01 BVR14P01 BVP15HP01 BVQ15HP01 DVS12HP01	BEA15HA50P01 BEA15HA50P01UL BEM15HA41P01 DES12HA10P01 DES12HA30P01 DES12HA80P01	BLA15HA51P01 BLA15HA52P01 BLA15HA53P01 BLA15HA71P01
	With bypass 3 bar MDH 250	BVA25P01 BVR25P01 BVP20HP01 BVQ20HP01 DVS25HP01	BEA20HA50P01 BEA20HA50P01UL BEM20HA41P01 BET20HF10P01 BET20HF30P01 BET25HF10P01 BET25HF30P01 DES25HA10P01 DES25HA30P01 DES25HA80P01	BLA20HA51P01 BLA20HA52P01 BLA20HA53P01 BLA20HA71P01
	With bypass 1.75 bar MPFX MPTX MPF MPT MPH	BVA14P01 BVR14P01 BVP15HP01 BVQ15HP01	BEA15HA50P01 BEA15HA50P01UL BEM15HA41P01	BLA15HA51P01 BLA15HA52P01 BLA15HA53P01 BLA15HA71P01
	With bypass 3 bar MPFX MPTX MPF MPT	BVA25P01 BVR25P01 BVP20HP01 BVQ20HP01	BEA20HA50P01 BEA20HA50P01UL BEM20HA41P01 BET20HF10P01 BET20HF30P01	BLA20HA51P01 BLA20HA52P01 BLA20HA53P01 BLA20HA71P01
	With bypass 2.5 bar MPH			
	With bypass 4.5 bar MPLX	DVA20xP01 DVM20xP01	DEA20xA50P01 DEM20xx10P01 DEM20xx20P01 DEM20xx30P01 DEM20xx35P01	DLA20xA51P01 DLA20xA52P01 DLA20xA71P01 DLE20xA50P01 DLE20xF50P01
	With bypass 2.4 bar FRI		DEU20VA50P01UL	DTA20xF70P01
	Without bypass valve FRI	DVA50xP01 DVM50xP01	DEA50xA50P01 DEM50xx10P01 DEM50xx20P01 DEM50xx30P01 DEM50xx35P01 DEU50VA50P01UL	DLA50xA51P01 DLA50xA52P01 DLA50xA71P01 DLE50xA50P01 DLE50xF50P01 DTA50xF70P01

Filter family	Filter series	Visual indicators	Electrical indicators	Electronic / Electrical-Visual indicators
RETURN / SUCTION FILTERS	With bypass valve 2.5 bar	MRSX 116 - 165 - 166 Suction line	VVB20P01 VVS20P01	VEB21AA50P01 VLB21AA51P01 VLB21AA52P01 VLB21AA53P01 VLB21AA71P01
		MRSX 116 - 165 - 166 Return line	BVA25P01 BVR25P01 BVP20HP01 BVQ20HP01	BEA20HA50P01 BEA20HA50P01UL BEM20HA41P01 BET25HF10P01 BET25HF30P01 BET25HF50P01 BLA20HA51P01 BLA20HA52P01 BLA20HA53P01 BLA20HA71P01
	With bypass valve 2.5 bar	LMP 124 MULTIPORT	BVA25P01 BVR25P01 BVP20HP01 BVQ20HP01	BEA20HA50P01 BEA20HA50P01UL BEM20HA41P01 BET25HF10P01 BET25HF30P01 BET25HF50P01 DLA20xA51P01 DLA20xA52P01 DLA20xA71P01 DLE20xA50P01 DLE20xF50P01
			DVA20xP01 DVM20xP01	DEA20xA50P01 DEM20xx10P01 DEM20xx20P01 DEM20xx30P01 DEM20xx35P01 DTA20xF70P01 DEU20VA50P01UL
SPIN-ON FILTERS	Suction line	MPS 050 - 070 - 100 - 150 MPS 200 - 250 - 300 - 350	WVB20P01 VVS20P01	VEB21AA50P01 VLB21AA51P01 VLB21AA52P01 VLB21AA53P01 VLB21AA71P01
	Return line	MPS 050 - 070 - 100 - 150 MPS 200 - 250 - 300 - 350	BVA14P01 BVR14P01 BVP15HP01 BVQ15HP01	BEA15HA50P01 BEA15HA50P01UL BEM15HA41P01 BLA15HA51P01 BLA15HA52P01 BLA15HA53P01 BLA15HA71P01
	In-line	MPS 051 - 071 - 101 - 151 MPS 301 - 351 MSH 050 - 070 - 100 - 150	DVA12xP01 DVM12xP01 DVA20xP01 DVM20xP01	DEA12xA50P01 DEM12xAxxP01 DEA20xA50P01 DEM20xAxxP01 DEU20VA50P01UL DLA12xA51P01 DLA12xA52P01 DLA12xA71P01 DLA20xA51P01 DLA20xA52P01 DLA20xA71P01 DLE12xA50P01 DLE12xF50P01 DLE20xF50P01 DLE20xF50P01 DTA12xF70P01 DTA20xF70P01

QUICK REFERENCE GUIDE

Ordering codes

Filter family	Filter series	Visual indicators	Electrical indicators	Electronic / Electrical-Visual indicators
LOW & MEDIUM PRESSURE FILTERS	ELIXIR® LFEX 060-080-110-160	DVS25HP01	DES25HA10P01 DES25HA30P01 DES25HA80P01	
	With bypass valve 3.5 bar	LMP 110 LMP 112 - 116 - 118 - 119 MULTIPOINT LMP 120 - 122 - 123 MULTIPOINT LMP 210 - 211 - LDP LMP 400 - 401 & 430 - 431 LMP 900 - 901 LMP 902 - 903 LMP 950 - 951 LMP 952 - 953 - 954 LMD 211 - 400 - 401 - 431 - 951 - LDD	DVA20xP01 DVM20xP01	DEA20xA50P01 DEA20xA51P01 DLA20xA52P01 DLA20xA71P01 DEM20xx10P01 DEM20xx20P01 DEM20xx30P01 DEM20xx35P01 DLE20xA50P01 DLE20xF50P01 DEU20VA50P01UL DTA20xF70P01
	With bypass valve 2.5 bar	LPH 630	DVA20xP01 DVM20xP01	DEA20xA50P01 DEA20xA51P01 DLA20xA52P01 DLA20xA71P01 DEM20xx10P01 DEM20xx20P01 DEM20xx30P01 DEM20xx35P01 DLE20xA50P01 DLE20xF50P01 DEU20VA50P01UL DTA20xF70P01
	With bypass valve 1.75 bar	LPH 630	DVA12xP01 DVM12xP01	DEA12xA50P01 DEA12xA51P01 DLA12xA52P01 DLA12xA71P01 DEM12xx10P01 DEM12xx20P01 DEM12xx30P01 DEM12xx35P01 DLE12xA50P01 DLE12xF50P01 DTA12xF70P01
	Without bypass valve	LMP 110 LMP 112 - 116 - 118 - 119 MULTIPOINT LMP 120 - 122 - 123 MULTIPOINT LMP 210 - 211 - LDP LMP 400 - 401 & 430 - 431 LMP 900 - 901 LMP 902 - 903 LMP 950 - 951 LMP 952 - 953 - 954 LMD 211 - 400 - 401 - 431 - 951 - LDD LPH 630	DVA50xP01 DVM50xP01	DES40HA10P01 DES40HA30P01 DES40HA80P01 DEA50xA50P01 DEA50xA51P01 DLA50xA52P01 DLA50xA71P01 DEM50xx10P01 DEM50xx20P01 DEM50xx30P01 DEM50xx35P01 DLE50xA50P01 DLE50xF50P01 DEU50VA50P01UL DTA50xF70P01
	With bypass valve 6 bar	FMP 039 - 065 - 135 - 320 FHP 010 - 011 - 065 - 135 - 350 - 351 - 500 FMMX 050 - 150 FMM 050 - 150 FHA 051 FHM 006 - 007 - 010 - 050 - 065 - 135 - 320 - 500 FHB 050 - 135 - 320 FHF 325 FHD 021 - 051 - 326 - 333	DVA50xP01 DVM50xP01	DEA50xA50P01 DEA50xA51P01 DLA50xA52P01 DLA50xA71P01 DEM50xx10P01 DEM50xx20P01 DEM50xx30P01 DEM50xx35P01 DLE50xA50P01 DLE50xF50P01 DEU50VA50P01UL
	Without bypass valve	FMP 039 - 065 - 135 - 320 FHP 010 - 011 - 065 - 135 - 350 - 351 - 500 FMMX 050 - 150 FMM 050 - 150 FHA 051 FHM 006 - 007 - 010 - 050 - 065 - 135 - 320 - 500 FHB 050 - 135 - 320 FHF 325 FHD 021 - 051 - 326 - 333	DVA70xP01 DVA95xP01 DVM70xP01 DVM95xP01	DEA70xA50P01 DEA95xA50P01 DEA70xA51P01 DLA70xA52P01 DLA70xA71P01 DEM70xx10P01 DEM70xx20P01 DEM70xx30P01 DEM70xx35P01 DLE70xA50P01 DLE70xF50P01 DEU70VA50P01UL DTA70xF70P01 DTA95xF70P01
				DEM95xx10P01 DEM95xx20P01 DEM95xx30P01 DEM95xx35P01
HIGH PRESSURE FILTERS	With bypass valve 6 bar	FMP 039 - 065 - 135 - 320 FHP 010 - 011 - 065 - 135 - 350 - 351 - 500 FMMX 050 - 150 FMM 050 - 150 FHA 051 FHM 006 - 007 - 010 - 050 - 065 - 135 - 320 - 500 FHB 050 - 135 - 320 FHF 325 FHD 021 - 051 - 326 - 333	DVA50xP01 DVM50xP01	DEA50xA50P01 DEA50xA51P01 DLA50xA52P01 DLA50xA71P01 DEM50xx10P01 DEM50xx20P01 DEM50xx30P01 DEM50xx35P01 DLE50xA50P01 DLE50xF50P01 DEU50VA50P01UL
	Without bypass valve	FMP 039 - 065 - 135 - 320 FHP 010 - 011 - 065 - 135 - 350 - 351 - 500 FMMX 050 - 150 FMM 050 - 150 FHA 051 FHM 006 - 007 - 010 - 050 - 065 - 135 - 320 - 500 FHB 050 - 135 - 320 FHF 325 FHD 021 - 051 - 326 - 333	DVA70xP01 DVA95xP01 DVM70xP01 DVM95xP01	DEA70xA50P01 DEA95xA50P01 DEA70xA51P01 DLA70xA52P01 DLA70xA71P01 DEM70xx10P01 DEM70xx20P01 DEM70xx30P01 DEM70xx35P01 DLE70xA50P01 DLE70xF50P01 DEU70VA50P01UL DTA70xF70P01 DTA95xF70P01

Filter family	Filter series		Visual indicators	Electrical indicators	Electronic / Electrical-Visual indicators
STAINLESS STEEL HIGH PRESSURE FILTERS	With bypass valve 6 bar	FZH 012 - 040	DVZ50xP01	DEZ50xA50P01	DLZ50xA51P01 DLZ50xA52P01
	Without bypass valve	FZH 012 - 040	DVZ70xP01 DVZ95xP01	DEZ70xA50P01 DEZ95xA50P01	DLZ70xA51P01 DLZ70xA52P01 DLZ95xA51P01 DLZ95xA52P01
	With bypass valve 6 bar	FZP 039 - 136 FZB 039 FZM 039 FZD 051	DVX50xP01 DYY50xP01	DEX50xA50P01	DLX50xA51P01 DLX50xA52P01
	Without bypass valve	FZP 039 - 136 FZB 039 FZM 039 FZD 010 - 021 - 051	DVX70xP01 DVX95xP01 DYY70xP01 DYY95xP01	DEX70xA50P01 DEX95xA50P01	DLX70xA51P01 DLX70xA52P01 DLX95xA51P01 DLX95xA52P01
FILTERS FOR POTENTIALLY EXPLOSIVE ATMOSPHERE	With bypass valve 6 bar	FMMX 050 - 150	DVA50xP01 DVM50xP01	DEH50xA48P01 DEH50xA49P01 DEH50xA70P01	
	Without bypass valve	FMMX 050 - 150	DVA70xP01 DVA95xP01 DVM70xP01 DVM95xP01	DEH70xA48P01 DEH70xA49P01 DEH70xA70P01	
	With bypass valve 6 bar	FZP 039 - 136	DVX50xP01 DYY50xP01	DEH50xA48P01 DEH50xA49P01 DEH50xA70P01	
	Without bypass valve	FZP 039 - 136	DVX70xP01 DVX95xP01 DYY70xP01 DYY95xP01	DEH70xA48P01 DEH70xA49P01 DEH70xA70P01	
	With bypass valve 6 bar	FZH 012 - 040	DVZ50xP01		
	Without bypass valve	FZH 012 - 040	DVZ70xP01 DVZ95xP01		

Suitable indicator types

V ACUUM INDICATORS

Vacuum indicators are used on the Suction line to check the efficiency of the filter element.

They measure the pressure downstream of the filter element.

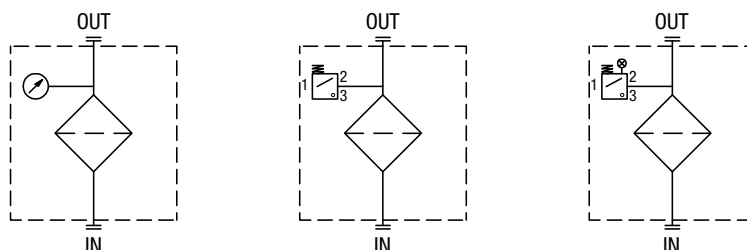
Standard items are produced with R 1/4" EN 10226 connection.

Available products with R 1/8" EN 10226 to be fitted on MPS series.

Vacuum indicators are identified in the Hydraulic Filtration catalogue and in the Quick Reference Guide table by the letter "V".

Example:

V VVB20P01



B BAROMETRIC (PRESSURE) INDICATORS

Pressure indicators are used on the Return line to check the efficiency of the filter element.

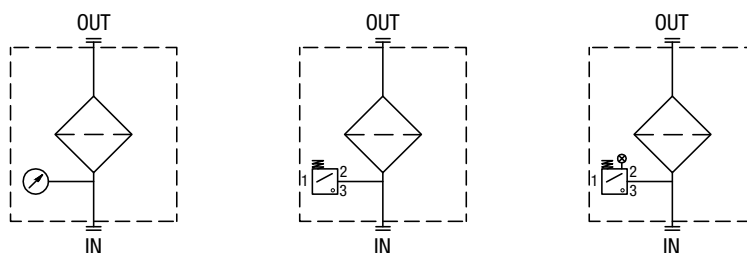
They measure the pressure upstream of the filter element.

Standard items are produced with R 1/8" EN 10226 connection.

Barometric (pressure) indicators are identified in the Hydraulic Filtration catalogue and in the Quick Reference Guide table by the letter "B".

Example:

B BVA14P01



D DIFFERENTIAL PRESSURE INDICATORS

Differential pressure indicators are used on the Pressure line to check the efficiency of the filter element.

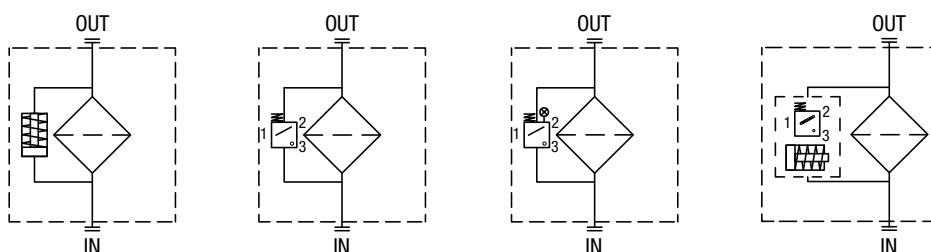
They measure the pressure upstream and downstream of the filter element (differential pressure).

Standard items are produced with special connection G 1/2" size.

Also available in Stainless Steel models. Differential pressure indicators are identified in the Hydraulic Filtration catalogue and in the Quick Reference Guide table by the letter "D".

Example:

D DVA20xP01



Designation & Ordering code

APPLICABLE VACUUM INDICATORS BY FILTER SERIES

Filter Series	VEA	VEB	VLA	VLB	VVA	VVB	VVR	VVS
STRC	-	-	-	-	-	-	-	-
MPAC	-	-	-	-	-	-	-	-
SFEX	-	•	-	•	-	•	-	•
SFMC	•	-	•	-	•	-	•	-
SFSC	•	-	•	-	•	-	•	-

VACUUM INDICATORS

Series		Configuration example 1: VE <table><tr><td>A</td><td>21</td><td>V</td><td>A</td><td>50</td><td>P01</td></tr><tr><td>B</td><td>21</td><td>A</td><td>A</td><td>71</td><td>P01</td></tr><tr><td>R</td><td>20</td><td></td><td></td><td></td><td>P01</td></tr></table>										A	21	V	A	50	P01	B	21	A	A	71	P01	R	20				P01	EX
A	21	V	A	50	P01																									
B	21	A	A	71	P01																									
R	20				P01																									
VE Electrical vacuum indicator		Configuration example 2:																												
VL Electrical/Visual vacuum indicator		Configuration example 3:																												
VV Vacuum gauge																														
Type VE - VL		Type VV		SFxC	SFEX																									
A	Connection EN 10226 - R1/4"	A Axial connection EN 10226 - R1/4"		•	-																									
B	Connection EN 10226 - R1/8"	B Axial connection EN 10226 - R1/8"		-	•																									
		R Radial connection EN 10226 - R1/4"		•	-																									
		S Radial connection EN 10226 - R1/8"		-	•																									
Vacuum setting		VE	VL	VVA	VVB	VVR	VVS																							
20	0.20 bar	-	-	•	•	•	•																							
21	0.21 bar	•	•	-	-	-	-																							
Seals		VEA - VLA		VEB - VLB		VV																								
A	NBR	•		•		-																								
V	FPM	•		-		-																								
Thermostat		VE	VL	VV																										
A	Without	•	•	-																										
Electrical connections		VE	VL	VV																										
50	Connection EN 175301-803	•	-	-																										
51	Connection EN 175301-803, transparent base with lamps 24 Vdc	-	•	-																										
52	Connection EN 175301-803, transparent base with lamps 110 Vdc	-	•	-																										
53	Connection EN 175301-803, transparent base with lamps 230 Vac	-	•	-																										
71	Connection IEC 61076-2-101 D (M12), black base with lamps 24 Vdc	-	•	-																										
		Option																												
		P01 MP Filtri standard																												
		Pxx Customized																												
		Certifications																												
		Without	VEA21A	VEA21V	VEB	VL	VV																							
EX	ATEX certification	•	•	•	-	-																								
UL	UL certification	•	-	-	-	-																								

Designation & Ordering code

APPLICABLE BAROMETRIC (PRESSURE) INDICATORS BY FILTER SERIES

Filter Series	BEA	BEM	BET	BLA	BVA	BVR	BVP	BVQ
RFEX	•	•	-	•	•	•	•	•
MPFX	•	•	•	•	•	•	•	•
MPLX	-	-	-	-	-	-	-	-
MPTX	•	•	•	•	•	•	•	•
MFBX	-	-	-	-	-	-	-	-
MPF	•	•	•	•	•	•	•	•
MPT	•	•	•	•	•	•	•	•
MFB	-	-	-	-	-	-	-	-
MDH	•	•	•	•	•	•	•	•
MPH	•	•	-	•	•	•	•	•
MPI	-	-	-	-	-	-	-	-
FRI (all sizes, except 255)	-	-	-	-	-	-	-	-
FRI 255	•	•	-	•	•	•	•	•
RF2	-	-	-	-	-	-	-	-

BAROMETRIC (PRESSURE) INDICATORS

Series	Configuration example 1:	BE	A	15	H	A	41	P01	EX
BE Electrical pressure indicator	Configuration example 2:	BL	A	20	H	A	71	P01	
BL Electrical/Visual pressure indicator	Configuration example 3:	BV	R	14				P01	
BV Visual pressure indicator	Configuration example 4:	BV	P	20	H			P01	

Type	BE	BL	BV
A Standard type	•	•	A Axial connection pressure gauge
M With wired electrical connection	•	-	R Radial connection pressure gauge
T With thermal switch	•	-	P Visual indicator with automatic reset
			Q Visual indicator with manual reset

Pressure setting	BEA-BEM	BET	BLA	BVA-BVR-BVE-BVH	BVP-BVQ-BVN-BVO
14 1.4 bar	-	-	-	•	-
15 1.5 bar	•	-	•	-	•
20 2.0 bar	•	•	•	-	•
25 2.5 bar	-	•	-	•	-

Seals	BE	BLA	BVA-BVR-BVE-BVH	BVP-BVQ-BVN-BVO
H HNBR	•	•	-	•

Thermostat	BEA-BEM	BET	BLA	BV
A Without thermostat	•	-	•	-
F With thermostat	-	•	-	-

Electrical connections	BEA	BEM	BET	BL	BV
10 Connection AMP Superseal series 1,5	-	-	•	-	-
30 Connection Deutsch DT-04-2-P	-	-	•	-	-
41 Connection via four-core cable	-	•	-	-	-
50 Connection EN 175301-803	•	-	-	-	-
51 Connection EN 175301-803, transparent base with lamps 24 Vdc	-	-	-	•	-
52 Connection EN 175301-803, transparent base with lamps 110 Vdc	-	-	-	•	-
53 Connection EN 175301-803, transparent base with lamps 230 Vac	-	-	-	•	-
71 Connection IEC 61076-2-101 D (M12), black base with lamps 24 Vdc	-	-	-	•	-

Option
P01 MP Filtri standard
Pxx Customized

Certifications	BEA	BEM-BET	BL	BV
Without	•	•	•	•
EX ATEX certification	•	-	-	-
UL UL certification	•	-	-	-

APPLICABLE DIFFERENTIAL PRESSURE INDICATORS BY FILTER SERIES

Filter Series	DEA	DEM	DEU	DES	DLA	DLE	DTA	DVA	DVM	DVS
RFEX	-	-	-	-	-	-	-	-	-	-
MPFX	-	-	-	-	-	-	-	-	-	-
MPLX	•	•	•	-	•	•	•	•	•	-
MPTX	-	-	-	-	-	-	-	-	-	-
MFBX	-	-	-	-	-	-	-	-	-	-
MPF	-	-	-	-	-	-	-	-	-	-
MPT	-	-	-	-	-	-	-	-	-	-
MFB	-	-	-	-	-	-	-	-	-	-
MDH	-	-	-	•	-	-	-	-	-	•
MPH	-	-	-	-	-	-	-	-	-	-
MPI	-	-	-	-	-	-	-	-	-	-
FRI (all sizes, except 255)	•	•	•	-	•	•	•	•	•	-
FRI 255	-	-	-	-	-	-	-	-	-	-
RF2	-	-	-	-	-	-	-	-	-	-

DIFFERENTIAL PRESSURE INDICATORS

Series	Configuration example 1:										Configuration example 2:		Configuration example 3:		Configuration example 4:		Configuration example 5:		UL
DE Electrical differential pressure indicator	DE	M	20	H	F	50	P01			DE	U	50	V	A	50	P01			
DL Electrical/Visual differential pressure indicator	DL	E	20	V	A	71	P01			DL	E	20	V	A	71	P01			
DT Electrical differential pressure indicator	DT	A	20	H	F	70	P01			DT	A	20	H	F	70	P01			
DV Visual differential pressure indicator	DV	M	20	V			P01			DV	M	20	V			P01			
Type	DE	DL	DT	DV															
A Standard type	•	•	•	A	With automatic reset														
M With wired electrical connection	•	-	-	M	With manual reset														
U Standard type 210 bar, UL certified	•	-	-	S	With automatic reset														
E For high power supply	-	•	-																
S Compact version	•	-	-																
Pressure setting	DEA	DEM	DEU	DES	DL	DT	DVA	DVM	DVS										
12 1.2 bar	-	-	-	•	-	-	-	-	•										
20 2.0 bar	•	•	•	-	•	•	•	•	•										
25 2.5 bar	-	-	-	•	-	-	-	-	•										
50 5.0 bar	•	•	•	-	•	•	•	•	-										
Seals	DEA	DEM	DEU	DES	DL	DT	DVA	DVM	DVS										
H HNBR	•	•	-	•	•	•	•	•	•										
V FPM	•	•	•	-	•	•	•	•	-										
Thermostat	DEA	DEM	DEU	DES	DLA	DLE	DT												
A Without thermostat	•	•	•	•	•	•	-												
F With thermostat	-	•	-	-	-	•	•												
Electrical connections	DEA	DEM	DEU	DES	DLA	DLE	DT												
10 Connection AMP Superseal series 1.5	-	•	-	•	-	-	-												
20 Connection AMP Timer Junior	-	•	-	-	-	-	-												
30 Connection Deutsch DT-04-2-P	-	•	-	•	-	-	-												
35 Connection Deutsch DT-04-3-P	-	•	-	-	-	-	-												
50 Connection EN 175301-803	•	-	•	-	-	•	-												
51 Connection EN 175301-803, transparent base with lamps 24 Vdc	-	-	-	-	•	-	-												
52 Connection EN 175301-803, transparent base with lamps 110 Vdc	-	-	-	-	•	-	-												
70 Connection IEC 61076-2-101 D (M12)	-	-	-	-	-	-	•												
71 Connection IEC 61076-2-101 D (M12), black base with lamps 24 Vdc	-	-	-	-	•	-	-												
80 Connection Stud #10-32 UNF	-	-	-	•	-	-	-												
Option																			
P01	MP Filtri standard																		
Pxx	Customized																		

Option

P01	MP Filtri standard
Pxx	Customized

PLUGS

Series	Configuration example	T2	H
T2 Plug			
T4 Plug			
Seals	T2	T4	
A NBR	-	•	
H HNBR	•	-	
V FPM	•	-	

Certifications	DEU	OTHERS
Without	-	•
UL UL certification	•	-

VACUUM CLOGGING INDICATORS RETURN/SUCTION FILTERS

Designation & Ordering code

APPLICABLE VACUUM INDICATORS BY FILTER SERIES

Filter Series	VEB	VLB	VVB	VVS
MRSX	•	•	•	•
LMP124	-	-	-	-

VACUUM INDICATORS

Series		Configuration example 1:										EX
VE Electrical vacuum indicator		VL		B	21	V	A	50	P01			
VL Electrical/Visual vacuum indicator		VV		S	20				P01			
VV Vacuum gauge												
Type VE - VL		Type VV										
B Connection EN 10226 - R1/8"		B Axial connection EN 10226 - R1/8"										
		S Radial connection EN 10226 - R1/8"										
Vacuum setting		VE	VL	VVB	VVS							
20 0.20 bar		-	-	•	•							
21 0.21 bar		•	•	-	-							
Seals		VEB - VLB			VV							
A NBR		•			-							
V FPM		-			-							
Thermostat		VE	VL	VV								
A Without		•	•	-								
Electrical connections		VE	VL									
50 Connection EN 175301-803		•	-									
51 Connection EN 175301-803, transparent base with lamps 24 Vdc		-	•									
52 Connection EN 175301-803, transparent base with lamps 110 Vdc		-	•									
53 Connection EN 175301-803, transparent base with lamps 230 Vac		-	•									
71 Connection IEC 61076-2-101 D (M12), black base with lamps 24 Vdc		-	•									
Option												
P01 MP Filtri standard												
Pxx Customized												

APPLICABLE BAROMETRIC (PRESSURE) INDICATORS BY FILTER SERIES

Filter Series	BEA	BEM	BET	BLA	BVA	BVR	BVP	BVQ
MRSX	•	•	•	•	•	•	•	•
LMP124	•	•	•	•	•	•	•	•

BAROMETRIC (PRESSURE) INDICATORS

Series	Configuration example 1:	BE	M	15	H	A	41	P01	EX
BE Electrical pressure indicator	Configuration example 2:	BL	A	20	H	A	71	P01	
BL Electrical/Visual pressure indicator	Configuration example 3:	BV	R	14				P01	
BV Visual pressure indicator	Configuration example 4:	BV	P	20	H			P01	

Type	BE	BL	BV
A Standard type	•	•	A Axial connection pressure gauge
M With wired electrical connection	•	-	R Radial connection pressure gauge
T With thermal switch	•	-	P Visual indicator with automatic reset
			Q Visual indicator with manual reset

Pressure setting	BEA-BEM	BET	BLA	BVA-BVR-BVE-BVH	BVP-BVQ-BVN-BVO
14 1.4 bar	-	-	-	•	-
15 1.5 bar	•	-	•	-	•
20 2.0 bar	•	•	•	-	•
25 2.5 bar	-	•	-	•	-

Seals	BE	BLA	BVA-BVR-BVE-BVH	BVP-BVQ-BVN-BVO
H HNBR	•	•	-	•

Thermostat	BEA-BEM	BET	BLA	BV
A Without thermostat	•	-	•	-
F With thermostat	-	•	-	-

Electrical connections	BEA	BEM	BET	BL
10 Connection AMP Superseal series 1.5	-	-	•	-
30 Connection Deutsch DT-04-2-P	-	-	•	-
41 Connection via four-core cable	-	•	-	-
50 Connection EN 175301-803	•	-	•	-
51 Connection EN 175301-803, transparent base with lamps 24 Vdc	-	-	-	•
52 Connection EN 175301-803, transparent base with lamps 110 Vdc	-	-	-	•
53 Connection EN 175301-803, transparent base with lamps 230 Vac	-	-	-	•
71 Connection IEC 61076-2-101 D (M12), black base with lamps 24 Vdc	-	-	-	•

Option
P01 MP Filtri standard
Pxx Customized

Certifications	BEA	BEM-BET	BL	BV
Without	•	•	•	•
EX ATEX certification	•	-	-	-
UL UL certification	•	-	-	-

DIFFERENTIAL CLOGGING INDICATORS RETURN/SUCTION FILTERS

Designation & Ordering code

APPLICABLE DIFFERENTIAL PRESSURE INDICATORS BY FILTER SERIES

Filter Series	DEA	DEM	DEU	DLA	DLE	DTA	DVA	DVM
MRSX	-	-	-	-	-	-	-	-
LMP124	•	•	•	•	•	•	•	•

DIFFERENTIAL PRESSURE INDICATORS

Series				Configuration example 1:							DE		M	12	H	F	50	P01	UL
DE Electrical differential pressure indicator				Configuration example 2:							DE		U	50	V	A	50	P01	
DL Electrical/Visual differential pressure indicator				Configuration example 3:							DL		E	20	V	A	71	P01	
DT Electronic differential pressure indicator				Configuration example 4:							DT		A	50	H	F	70	P01	
DV Visual differential pressure indicator				Configuration example 5:							DV		M	70	V			P01	
Type				DE	DL	DT	DV												
A Standard type				•	•	•	A With automatic reset												
M With wired electrical connection				•	-	-	M With manual reset												
U Standard type 210 bar, UL certified				•	-	-													
E For high power supply				-	•	-													
Pressure setting				DEA	DEM	DEU	DLA	DLE	DTA	DVA	DVM								
20 2.0 bar				•	•	•	•	•	•	•	•								
Seals				DEA	DEM	DEU	DLA	DLE	DTA	DVA	DVM								
H HNBR				•	•	-	•	•	•	•	•								
V FPM				•	•	•	•	•	•	•	•								
Thermostat				DEA	DEM	DEU	DLA	DLE	DT										
A Without thermostat					•	•	•	•	•	-									
F With thermostat					-	•	-	-	•	•									
Electrical connections				DEA	DEM	DEU	DLA	DLE	DT										
10 Connection AMP Superseal series 1.5				-	•	-	-	-	-										
20 Connection AMP Timer Junior				-	•	-	-	-	-										
30 Connection Deutsch DT-04-2-P				-	•	-	-	-	-										
35 Connection Deutsch DT-04-3-P				-	•	-	-	-	-										
50 Connection EN 175301-803				•	-	•	-	•	-										
51 Connection EN 175301-803, transparent base with lamps 24 Vdc				-	-	-	•	-	-										
52 Connection EN 175301-803, transparent base with lamps 110 Vdc				-	-	-	•	-	-										
70 Connection IEC 61076-2-101 D (M12)				-	-	-	-	-	•										
71 Connection IEC 61076-2-101 D (M12), black base with lamps 24 Vdc				-	-	-	•	-	-										
											Option								
											P01 MP Filtri standard								
											Pxx Customized								
											Certifications				DEU	OTHERS			
											Without				-	•			
											UL UL certification				•	-			

PLUGS

Series	Configuration example T2 H									
T2 Plug										
Seals										
H HNBR										
V FPM										

APPLICABLE VACUUM INDICATORS BY FILTER SERIES

Filter Series	VEA	VEB	VLA	VLB	VVA	VVB	VVR	VVS
MPS	-	•	-	•	-	•	-	•

VACUUM INDICATORS

Series	Configuration example 1:										VE	B	21	A	A	50	P01	EX
VE Electrical vacuum indicator	Configuration example 2:										VL	B	21	A	A	71	P01	
VL Electrical/Visual vacuum indicator	Configuration example 3:										VV	S	20				P01	
VV Vacuum gauge																		
Type VE - VL										Type VV								
B Connection EN 10226 - R1/8"										B Axial connection EN 10226 - R1/8"								
										S Radial connection EN 10226 - R1/8"								
Vacuum setting										VE	VL	VVB	VVS					
20 0.20 bar										-	-	•	•					
21 0.21 bar										•	•	-	-					
Seals										VEA - VLA	VEB - VLB	VV						
A NBR										•		•	-					
V FPM										•		-	-					
Thermostat										VE	VL	VV						
A Without											•	•	-					
Electrical connections										VE	VL							
50 Connection EN 175301-803										•	-							
51 Connection EN 175301-803, transparent base with lamps 24 Vdc										-	•							
52 Connection EN 175301-803, transparent base with lamps 110 Vdc										-	•							
53 Connection EN 175301-803, transparent base with lamps 230 Vac										-	•							
71 Connection IEC 61076-2-101 D (M12), black base with lamps 24 Vdc										-	•							
										Option								
										P01 MP Filtri standard								
										Pxx Customized								
Certifications										VEA21A	VEA21V	VEB	VL	VV				
Without										•	•	•	•	•				
EX ATEX certification										•	•	•	-	-				
UL UL certification										•	-	-	-	-				

Designation & Ordering code

APPLICABLE BAROMETRIC (PRESSURE) INDICATORS BY FILTER SERIES

Filter Series	BEA	BEM	BET	BLA	BVA	BVR	BVP	BVQ
MPS	•	•	•	•	•	•	•	•

BAROMETRIC (PRESSURE) INDICATORS

Series	Configuration example 1:	BE	M	15	H	A	41	P01
BE Electrical pressure indicator	Configuration example 2:	BL	A	20	H	A	71	P01
BL Electrical/Visual pressure indicator	Configuration example 3:	BV	R	14				P01
BV Visual pressure indicator	Configuration example 4:	BV	P	20	H			P01

Type	BE	BL	BV
A Standard type	•	•	A Axial connection pressure gauge
M With wired electrical connection	•	-	R Radial connection pressure gauge
			P Visual indicator with automatic reset
			Q Visual indicator with manual reset

Pressure setting	BEA-BEM	BET	BLA	BVA-BVR-BVE-BVH	BVP-BVQ-BVN-BVO
14 1.4 bar	-	-	-	•	-
15 1.5 bar	•	-	•	-	•
20 2.0 bar	•	•	•	-	•
25 2.5 bar	-	•	-	•	-

Seals	BE	BLA	BVA-BVR-BVE-BVH	BVP-BVQ-BVN-BVO
H HNBR	•	•	-	•

Thermostat	BEA-BEM	BET	BLA	BV
A Without thermostat	•	-	•	-
F With thermostat	-	•	-	-

Electrical connections	BEA	BEM	BL
10 Connection AMP Superseal series 1.5	-	-	-
30 Connection Deutsch DT-04-2-P	-	-	-
41 Connection via four-core cable	-	•	-
50 Connection EN 175301-803	•	-	-
51 Connection EN 175301-803, transparent base with lamps 24 Vdc	-	-	•
52 Connection EN 175301-803, transparent base with lamps 110 Vdc	-	-	•
53 Connection EN 175301-803, transparent base with lamps 230 Vac	-	-	•
71 Connection IEC 61076-2-101 D (M12), black base with lamps 24 Vdc	-	-	•

Option
P01 MP Filtri standard
Pxx Customized

Certifications	BEA	BEM-BET	BL	BV
Without	•	•	•	•
EX ATEX certification	•	-	-	-
UL UL certification	•	-	-	-

APPLICABLE DIFFERENTIAL PRESSURE INDICATORS BY FILTER SERIES

Filter Series	DEA	DEM	DEU	DLA	DLE	DTA	DVA	DVM
MPS	•	•	•	•	•	•	•	•

DIFFERENTIAL PRESSURE INDICATORS

Series	Configuration example 1:										DE	M	12	H	F	50	P01	UL	
DE Electrical differential pressure indicator	Configuration example 2:										DE	U	50	V	A	50	P01		
DL Electrical/Visual differential pressure indicator	Configuration example 3:										DL	E	20	V	A	71	P01		
DT Electronic differential pressure indicator	Configuration example 4:										DT	A	50	H	F	70	P01		
DV Visual differential pressure indicator	Configuration example 5:										DV	M	70	V			P01		
Type	DE	DL	DT	DV															
A Standard type	•	•	•	A With automatic reset															
M With wired electrical connection	•	-	-	M With manual reset															
U Standard type 210 bar, UL certified	•	-	-																
E For high power supply	-	•	-																
Pressure setting	DEA	DEM	DEU	DLA	DLE	DTA	DVA	DVM											
12 1.2 bar	•	•	-	•	•	•	•	•											
20 2.0 bar	•	•	•	•	•	•	•	•											
Seals	DEA	DEM	DEU	DLA	DLE	DTA	DVA	DVM											
H HNBR	•	•	-	•	•	•	•	•											
V FPM	•	•	•	•	•	•	•	•											
Thermostat	DEA	DEM	DEU	DLA	DLE	DT													
A Without thermostat		•	•	•	•	•	-												
F With thermostat	-	•	-	-	•	•													
Electrical connections	DEA	DEM	DEU	DLA	DLE	DT													
10 Connection AMP Superseal series 1.5	-	•	-	-	-	-													
20 Connection AMP Timer Junior	-	•	-	-	-	-													
30 Connection Deutsch DT-04-2-P	-	•	-	-	-	-													
35 Connection Deutsch DT-04-3-P	-	•	-	-	-	-													
50 Connection EN 175301-803	•	-	•	-	•	-													
51 Connection EN 175301-803, transparent base with lamps 24 Vdc	-	-	-	•	-	-													
52 Connection EN 175301-803, transparent base with lamps 110 Vdc	-	-	-	•	-	-													
70 Connection IEC 61076-2-101 D (M12)	-	-	-	-	-	•													
71 Connection IEC 61076-2-101 D (M12), black base with lamps 24 Vdc	-	-	-	•	-	-													
Option																			
P01 MP Filtri standard																			
Pxx Customized																			
Certifications																			
Without																			
UL UL certification																			

PLUGS

Series	Configuration example	T2	H
T2 Plug			
Seals			
H HNBR			
V FPM			

DIFFERENTIAL CLOGG.INDIC. LOW & MEDIUM PRESS. FILTERS

Designation & Ordering code

APPLICABLE DIFFERENTIAL PRESSURE INDICATORS BY FILTER SERIES

Filter Series	DEA	DEM	DEU	DES	DLA	DLE	DTA	DVA	DVM	DVS
LFEX	-	-	-	•	-	-	-	-	-	•
LPH 630	•	•	•	-	•	•	•	•	•	-
LMP 110	•	•	•	-	•	•	•	•	•	-
LMP 112 / 123 MULTIPOINT	•	•	•	-	•	•	•	•	•	-
LMP 210 - 211	•	•	•	-	•	•	•	•	•	-
LMP 400 - 401	•	•	•	-	•	•	•	•	•	-
LMP 430 - 431	•	•	•	-	•	•	•	•	•	-
LMP 950 - 951	•	•	•	-	•	•	•	•	•	-
LMP 952 - 953 - 954	•	•	•	-	•	•	•	•	•	-
LMD 211	•	•	•	-	•	•	•	•	•	-
LMD 400 - 401 & 431	•	•	•	-	•	•	•	•	•	-
LMD 951	•	•	•	-	•	•	•	•	•	-
LDP-LDD	•	•	•	-	•	•	•	•	•	-
LMP 900 - 901	•	•	•	-	•	•	•	•	•	-
LMP 902 - 903	•	•	•	-	•	•	•	•	•	-

DIFFERENTIAL PRESSURE INDICATORS

Series	Configuration example 1:	DE	M	20	H	F	50	P01	
DE Electrical differential pressure indicator	Configuration example 2:	DE	U	50	V	A	50	P01	UL
DL Electrical/Visual differential pressure indicator	Configuration example 3:	DL	E	50	V	A	71	P01	
DT Electronic differential pressure indicator	Configuration example 4:	DT	A	20	H	F	70	P01	
DV Visual differential pressure indicator	Configuration example 5:	DV	M	50	V			P01	

Type	DE	DL	DT	DV
A Standard type	•	•	•	A With automatic reset
M With wired electrical connection	•	-	-	M With manual reset
U Standard type 210 bar, UL certified	•	-	-	S With automatic reset
E For high power supply	-	•	-	
S Compact version	•	-	-	

Pressure setting	DEA	DEM	DEU	DES	DLA	DLE	DTA	DVA	DVM	DVS
12 1.2 bar	•	•	-	•	•	•	•	•	•	•
20 2.0 bar	•	•	•	-	•	•	•	•	•	-
25 2.5 bar	-	-	-	-	-	-	-	-	-	•
40 4.0 bar	-	-	-	•	-	-	-	-	-	•
50 5.0 bar	•	•	•	-	•	•	•	•	•	-

Seals	DEA	DEM	DEU	DES	DL	DT	DVA	DVM	DVS
H HNBR	•	•	-	•	•	•	•	•	•
V FPM	•	•	•	-	•	•	•	•	-

Thermostat	DEA	DEM	DEU	DES	DLA	DLE	DT
A Without thermostat	•	•	•	•	•	•	-
F With thermostat	-	•	-	-	-	•	•

Electrical connections	DEA	DEM	DEU	DES	DLA	DLE	DT
10 Connection AMP Superseal series 1.5	-	•	-	•	-	-	-
20 Connection AMP Timer Junior	-	•	-	-	-	-	-
30 Connection Deutsch DT-04-2-P	-	•	-	•	-	-	-
35 Connection Deutsch DT-04-3-P	-	•	-	-	-	-	-
50 Connection EN 175301-803	•	-	•	-	-	•	-
51 Connection EN 175301-803, transparent base with lamps 24 Vdc	-	-	-	-	•	-	-
52 Connection EN 175301-803, transparent base with lamps 110 Vdc	-	-	-	-	•	-	-
70 Connection IEC 61076-2-101 D (M12)	-	-	-	-	-	-	•
71 Connection IEC 61076-2-101 D (M12), black base with lamps 24 Vdc	-	-	-	-	•	-	-
80 Connection Stud #10-32 UNF	-	-	-	•	-	-	-

Option	DEU	OTHERS
P01 MP Filtri standard	•	•
Pxx Customized	-	-

PLUGS

Series	Configuration example	T2	H
T2 Plug			
T4 Plug			

Seals	T2	T4
A NBR	-	•
H HNBR	•	-
V FPM	•	-

Certifications	DEU	OTHERS
Without	-	•
UL UL certification	•	-

APPLICABLE DIFFERENTIAL PRESSURE INDICATORS BY FILTER SERIES

Filter Series	DEA	DEM	DEU	DLA	DLE	DTA	DVA	DVM
FMMX	•	•	•	•	•	•	•	•
FMM	•	•	•	•	•	•	•	•
FHA	•	•	•	•	•	•	•	•
FMP 039	•	•	•	•	•	•	•	•
FMP	•	•	•	•	•	•	•	•
FHP	•	•	•	•	•	•	•	•
FHM	•	•	•	•	•	•	•	•
FHB	•	•	•	•	•	•	•	•
FHF	•	•	•	•	•	•	•	•
FHD	•	•	•	•	•	•	•	•
HPB	-	-	-	-	-	-	-	-

DIFFERENTIAL PRESSURE INDICATORS

Series				Configuration example 1:									
DE Electrical differential pressure indicator				Configuration example 2:		DE	U	50	V	A	50	P01	UL
DL Electrical/Visual differential pressure indicator				Configuration example 3:		DL	E	20	V	A	71	P01	
DT Electronic differential pressure indicator				Configuration example 4:		DT	A	50	H	F	70	P01	
DV Visual differential pressure indicator				Configuration example 5:		DV	M	70	V			P01	
Type	DE	DL	DT	DV									
A Standard type	•	•	•	A	With automatic reset								
M With wired electrical connection	•	-	-	M	With manual reset								
U Standard type 210 bar, UL certified	•	-	-										
E For high power supply	-	•	-										
Pressure setting				DEA	DEM	DEU	DLA	DLE	DTA	DVA	DVM		
50	5.0 bar			•	•	•	•	•	•	•	•		
70	7.0 bar			•	•	•	•	•	•	•	•		
95	9.5 bar			•	•	-	•	•	•	•	•		
Seals				DEA	DEM	DEU	DLA	DLE	DTA	DVA	DVM		
H	HNBR			•	•	-	•	•	•	•	•		
V	FPM			•	•	•	•	•	•	•	•		
Thermostat				DEA	DEM	DEU	DLA	DLE	DT				
A	Without thermostat			•	•	•	•	•	-				
F	With thermostat			-	•	-	-	•	•				
Electrical connections				DEA	DEM	DEU	DLA	DLE	DT				
10	Connection AMP Superseal series 1.5			-	•	-	-	-	-				
20	Connection AMP Timer Junior			-	•	-	-	-	-				
30	Connection Deutsch DT-04-2-P			-	•	-	-	-	-				
35	Connection Deutsch DT-04-3-P			-	•	-	-	-	-				
50	Connection EN 175301-803			•	-	•	-	•	-				
51	Connection EN 175301-803, transparent base with lamps 24 Vdc			-	-	-	•	-	-				
52	Connection EN 175301-803, transparent base with lamps 110 Vdc			-	-	-	•	-	-				
70	Connection IEC 61076-2-101 D (M12)			-	-	-	-	-	•				
71	Connection IEC 61076-2-101 D (M12), black base with lamps 24 Vdc			-	-	-	•	-	-				
				Option									
				P01 MP Filtri standard									
				Pxx Customized									
Certifications				DEU	OTHERS								
Without				-	•								
UL UL certification				•	-								

PLUGS

Series	Configuration example	T2	H
T2 Plug			
Seals			
H HNBR			
V FPM			

APPLICABLE DIFFERENTIAL PRESSURE INDICATORS BY FILTER SERIES

Filter Series	DEX	DEZ	DLX	DLZ	DVX	DVY	DVZ
FZP	●	-	●	-	●	●	-
FZH	-	●	-	●	-	-	●
FZX	-	-	-	-	-	-	-
FZM	●	-	●	-	●	●	-
FZB	●	-	●	-	●	●	-
FZD	●	-	●	-	●	●	-

Series					Configuration example 1:					
DE Electrical differential pressure indicator					DL	X	70	V	A	50
DL Electrical / Visual differential pressure indicator					Configuration example 2:					
DV Visual differential pressure indicator					P01					

Type	DE	DL	DV
X Stainless steel standard type 420 bar	•	•	•
Y Stainless steel optional type 420 bar	-	-	•
Z Stainless steel 700 bar (only for FZH)	•	•	•

Pressure setting	DEX	DEZ	DL	DV
50 5.0 bar	•	•	•	•
70 7.0 bar	•	•	•	•
95 9.5 bar	•	•	•	•

Seals	DEX	DEZ	DL	DV
H HNBR	•	•	•	•
V FPM	-	-	•	•
F MFQ	•	•	-	-

Thermostat	DEX	DEZ	DL	DV
A Without thermostat	•	•	•	-

Electrical connections	DEX	DEZ	DL
50 Connection EN 175301-803	•	•	-
51 Connection EN 175301-803, transparent base with lamps 24 Vdc	-	-	•
52 Connection EN 175301-803, transparent base with lamps 110 Vdc	-	-	•

Series	Configuration example	X2	H
X2 Stainless Steel plug 420 bar			
X3 Stainless Steel plug 700 bar (only for FZH)			
Seals			
H HNBR			
V FPM			
F MEQ			

FILTERS FOR POTENTIALLY EXPLOSIVE ATMOSPHERE

Designation & Ordering code

APPLICABLE DIFFERENTIAL PRESSURE INDICATORS BY FILTER SERIES

Filter Series	DEH	DEX	DEZ	DVA	DVM	DVX	DVY	DVZ
FMMX	.	.	•	.	.	•	•	•
FZP	.	•	•	•	•	.	.	•
FZH 012	•	•	.	•	•	•	•	.
FZH 040	•	•	•	•	•	•	•	.
FZX	•	•	•	•	•	•	•	•

DIFFERENTIAL PRESSURE INDICATORS

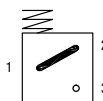
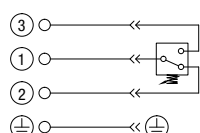

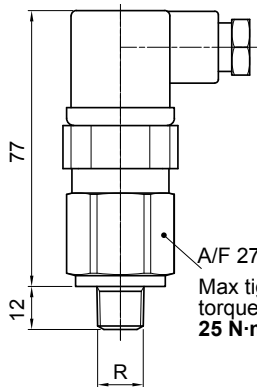
Series		Configuration example 1:		DE	H	50	F	A	48	P01
DE Electrical differential pressure indicator		Configuration example 2:		DV	X	70	V			P01
DV Visual differential pressure indicator										
Type		DE	DV							
A	With automatic reset	-	•							
M	With manual reset	-	•							
H	Stainless steel hazardous area 420 bar	•	-							
X	Stainless steel standard type 420 bar	-	•							
Y	Stainless steel optional type 420 bar	-	•							
Pressure setting		DEH	DVA	DVM	DVX	DVY				
50	5.0 bar	•	•	•	•	•				
70	7.0 bar	•	•	•	•	•				
95	9.5 bar	-	•	•	•	•				
Seals		DEH	DVA	DVM	DVX	DVY				
H	HNBR	-	•	•	•	•				
V	FPM	•	•	•	•	•				
F	MFQ	•	-	-	-	-				
Thermostat		DEH								
A	Without thermostat	•								
T	With thermostat	-								
Electrical connections		DEH								
48	Connection via three-core cable - fitting M20x1.5	•								
49	Connection via four-core cable - fitting 1/2" NPT	•								
70	Connection IEC 61076-2-101 D (M12)	•								
Option										
P01 MP Filtri standard										
Pxx Customized										

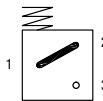
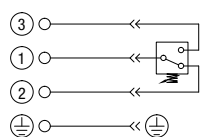

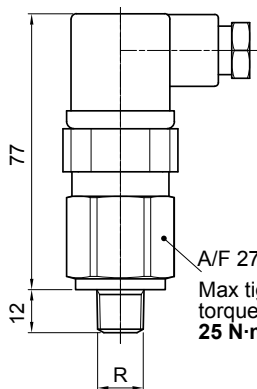
PLUGS

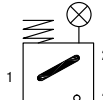
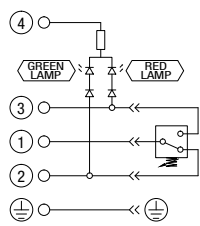

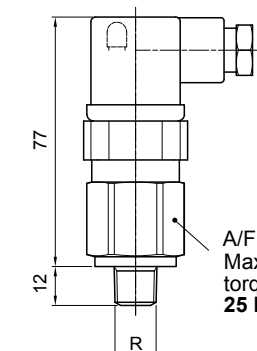
Series	Configuration example X2 H		
T2 Plug			
X2 Stainless Steel plug 420 bar			
X3 Stainless Steel plug 700 bar (only for FZH)			
Seals	T2	X2	X3
H HNBR	•	•	•
V FPM	•	•	•
F MFQ	-	•	•

VACUUM INDICATORS

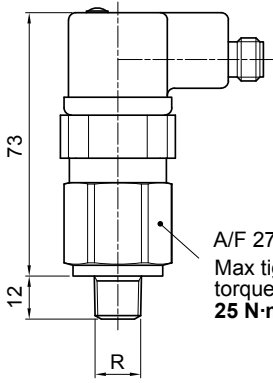
Technical data

VE*50 (EX) Electrical Vacuum Indicator Connection: EN 175301-803		Hydraulic symbol 		Materials <ul style="list-style-type: none">- Body: Brass- Base: Black polyamide- Contacts: Silver- Seal: VEA: NBR/FPM VEB: NBR	
R	Ordering code	Electrical symbol 		Technical data <ul style="list-style-type: none">- Vacuum setting: 0.21 bar ±10%- Max working pressure: 10 bar- Proof pressure: 15 bar- Working temperature: From -25 °C to +80 °C- Compatibility with fluids: Mineral oils, Synthetic fluids HFB and HFC according to ISO 2943- Degree of protection: IP65 according to EN 60529	
EN 10226 - R1/4"	VE A 21 x A 50 P01 VE A 21 x A 50 P01 EX	 <ul style="list-style-type: none">- Certification: ATEX, IECEx- Certification included as standard		Electrical data <ul style="list-style-type: none">- Electrical connection: EN 175301-803- Resistive load: 5 A / 14 Vdc 4 A / 30 Vdc 5 A / 125 Vac 4 A / 250 Vac- CE certification- Available Atex product: II 1GD Ex ia IIC Tx Ex ia IIIC Tx °C X	
EN 10226 - R1/8"	VE B 21 A A 50 P01 VE B 21 A A 50 P01 EX				
 <p>A/F 27 Max tightening torque: 25 N·m</p>					

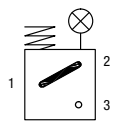
VEA50 UL Electrical Vacuum Indicator Connection: EN 175301-803		Hydraulic symbol 		Materials <ul style="list-style-type: none">- Body: Brass- Base: Black polyamide- Contacts: Silver- Seal: VEA: NBR/FPM VEB: NBR	
R	Ordering code	Electrical symbol 		Technical data <ul style="list-style-type: none">- Vacuum setting: 0.21 bar ±10%- Max working pressure: 10 bar- Proof pressure: 15 bar- Working temperature: From -25 °C to +80 °C- Compatibility with fluids: Mineral oils, Synthetic fluids HFB and HFC according to ISO 2943- Degree of protection: IP65 according to EN 60529	
EN 10226 - R1/4"	VE A 21 A A 50 P01 UL	 <ul style="list-style-type: none">- Certification: UL- Certification included as standard		Electrical data <ul style="list-style-type: none">- Electrical connection: EN 175301-803- Resistive load: 5 A / 14 Vdc 4 A / 30 Vdc 5 A / 125 Vac 4 A / 250 Vac	
 <p>A/F 27 Max tightening torque: 25 N·m</p>					

VL*51 - VL*52 - VL*53 Electrical/Visual Vacuum Indicator Connection: EN 175301-803		Hydraulic symbol 		Materials <ul style="list-style-type: none">- Body: Brass- Base: Transparent polyamide- Contacts: Brass - Polyamide- Seal: VLA: NBR/FPM VLB: NBR	
51: Transparent base with lamps 24 Vdc 52: Transparent base with lamps 110 Vdc 53: Transparent base with lamps 230 Vac		Electrical symbol 		Technical data <ul style="list-style-type: none">- Vacuum setting: 0.21 bar ±10%- Max working pressure: 10 bar- Proof pressure: 15 bar- Working temperature: From -25 °C to +80 °C- Compatibility with fluids: Mineral oils, Synthetic fluids HFB and HFC according to ISO 2943- Degree of protection: IP65 according to EN 60529	
R	Ordering code	 <ul style="list-style-type: none">- Certification: ATEX, IECEx- Certification included as standard		Electrical data <ul style="list-style-type: none">- Electrical connection: EN 175301-803- Type: 51 52 53- Lamps: 24 Vdc 110 Vdc 230 Vac- Resistive load: 1 A / 24 Vdc 1 A / 110 Vdc 1 A / 230 Vac	
EN 10226 - R1/4"	VL A 21 x A xx P01				
EN 10226 - R1/8"	VL B 21 A A xx P01				
 <p>A/F 27 Max tightening torque: 25 N·m</p>					

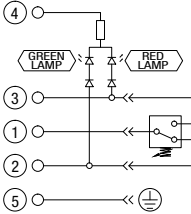
VL*71	
Electrical/Visual Vacuum Indicator Connection IEC 61076-2-101 D (M12), black base with lamps 24 Vdc	
Connections	Indicator code
EN 10226 - R1/4"	VL A 21 x A 71 P01
EN 10226 - R1/8"	VL B 21 A A 71 P01



Hydraulic symbol



Electrical symbol



Materials

- Body: Brass
- Base: Black polyamide
- Contacts: Silver
- Seal: VLA: NBR/FPM
VLB: NBR

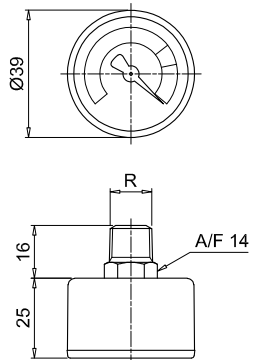
Technical data

- Vacuum setting: 0.21 bar ±10%
- Max working pressure: 10 bar
- Proof pressure: 15 bar
- Working temperature: From -25 °C to +80 °C
- Compatibility with fluids: Mineral oils, Synthetic fluids
HFB and HFC according to ISO 2943
- Degree of protection: IP65 according to EN 60529


Electrical data

- Electrical connection: IEC 61076-2-101 D (M12)
- Lamps: 24 Vdc (black base)
- Resistive load: 0.4 A / 24 Vdc

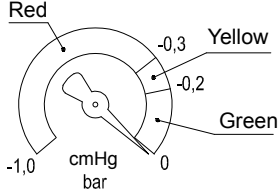
VVA - VVB	
Axial Vacuum Gauge	
R	Ordering code
EN 10226 - R1/4"	VVA 20 P01
EN 10226 - R1/8"	VVB 20 P01



Hydraulic symbol



Dial scale



Conversion to SI units

[cmHg]	[bar]
-12	-0.16
-18	-0.24
-76	-1.01

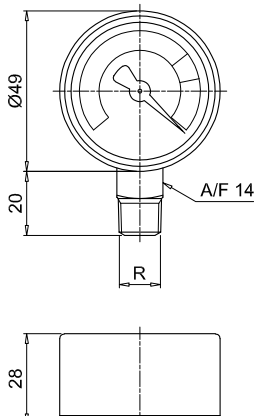
Materials

- Case: Black plastic
- Window: Clear plastic
- Dial: White plastic
- Pointer: Black plastic
- Pressure connection: Cu-alloy
- Pressure element: Bourdon tube Cu-alloy soft soldered, C type
- Movement: Cu-alloy


Technical data

- Max working pressure: Steady: -0.7 bar
Fluctuating: -0.6 bar
Short time: -1.0 bar
- Working temperature: Ambient from -40 °C to +60 °C
Fluid max + 60 °C
Storage from -40 °C to +60 °C
- Compatibility with fluids: Mineral oils, Synthetic fluids
HFB and HFC according to ISO 2943
- Accuracy: Class 2.5 according to EN 13190
- Degree of protection: IP31 according to EN 60529

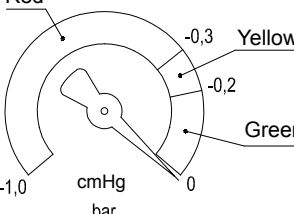
VVR - VVS		
Radial Vacuum Gauge		
R	A/F	Ordering code
EN 10226 - R1/4"	14	VVR 20 P01
EN 10226 - R1/8"	11	VVS 20 P01



Hydraulic symbol



Dial scale



Conversion to SI units

[cmHg]	[bar]
-12	-0.16
-18	-0.24
-76	-1.01

Materials

- Case: Black plastic
- Window: Clear plastic
- Dial: White plastic
- Pointer: Black plastic
- Pressure connection: Cu-alloy
- Pressure element: Bourdon tube Cu-alloy soft soldered, C type
- Movement: Cu-alloy

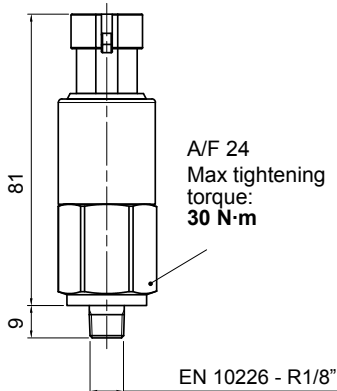
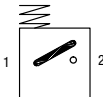
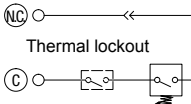
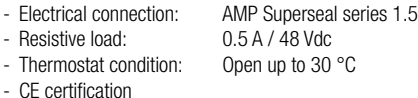
Technical data

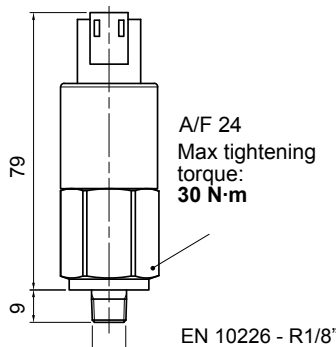
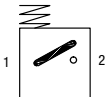
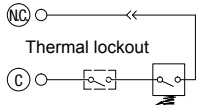
- Max working pressure: Steady: -0.7 bar
Fluctuating: -0.6 bar
Short time: -1.0 bar
- Working temperature: Ambient from -40 °C to +60 °C
Fluid max + 60 °C
Storage from -40 °C to +60 °C
- Compatibility with fluids: Mineral oils, Synthetic fluids
HFB and HFC according to ISO 2943
- Accuracy: Class 2.5 according to EN 13190
- Degree of protection: IP31 according to EN 60529

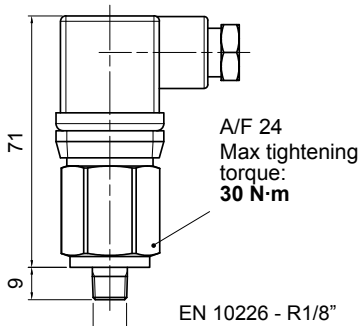
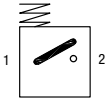
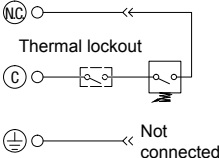
BAROMETRIC (PRESSURE) INDICATORS

Dimensions

<div>BEA*50 (EX)</div> <div>Electrical Pressure Indicator</div> <div>Connection EN 175301-803</div> <table><tr><th>Settings</th><th>Ordering code</th></tr><tr><td>1.5 bar ±10%</td><td>BE A 15 HA 50 P01 BE A 15 HA 50 P01 EX</td></tr><tr><td>2.0 bar ±10%</td><td>BE A 20 HA 50 P01 BE A 20 HA 50 P01 EX</td></tr></table> <div><div>A/F 27 Max tightening torque: 25 N·m</div><div>EN 10226 - R1/8"</div></div>		Settings	Ordering code	1.5 bar ±10%	BE A 15 HA 50 P01 BE A 15 HA 50 P01 EX	2.0 bar ±10%	BE A 20 HA 50 P01 BE A 20 HA 50 P01 EX	<div>Hydraulic symbol</div> <div></div> <div>Electrical symbol</div> <div></div> <div><div>- Certification: ATEX, IECEx - Certification included as standard</div></div>	<div>Materials</div> <div><div>- Body:</div><div>- Base:</div><div>- Contacts:</div><div>- Seal:</div></div> <div>Brass Black polyamide Silver HNBR</div> <div>Technical data</div> <div><div>- Max working pressure:</div><div>- Proof pressure:</div><div>- Working temperature:</div><div>- Compatibility with fluids:</div><div>- Degree of protection:</div></div> <div>40 bar 60 bar From -25 °C to +80 °C Mineral oils, Synthetic fluids HFB and HFC according to ISO 2943 IP65 according to EN 60529</div> <div>Electrical data</div> <div><div>- Electrical connection:</div><div>- Resistive load:</div><div>- CE certification</div><div>- Available Atex product:</div></div> <div>EN 175301-803 5 A / 14 Vdc 4 A / 30 Vdc 5 A / 125 Vac 4 A / 250 Vac I M1 Ex ia I Ma II 1GD Ex ia IIC Tx Ex ia IIIC Tx °C X</div>
Settings	Ordering code								
1.5 bar ±10%	BE A 15 HA 50 P01 BE A 15 HA 50 P01 EX								
2.0 bar ±10%	BE A 20 HA 50 P01 BE A 20 HA 50 P01 EX								
<div>BEA*50 UL</div> <div>Electrical Pressure Indicator</div> <div>Connection EN 175301-803</div> <table><tr><th>Settings</th><th>Ordering code</th></tr><tr><td>1.5 bar ±10%</td><td>BE A 15 HA 50 P01 UL</td></tr><tr><td>2.0 bar ±10%</td><td>BE A 20 HA 50 P01 UL</td></tr></table> <div><div>A/F 27 Max tightening torque: 25 N·m</div><div>EN 10226 - R1/8"</div></div>		Settings	Ordering code	1.5 bar ±10%	BE A 15 HA 50 P01 UL	2.0 bar ±10%	BE A 20 HA 50 P01 UL	<div>Hydraulic symbol</div> <div></div> <div>Electrical symbol</div> <div></div> <div><div>- Certification: UL - Certification included as standard</div></div>	<div>Materials</div> <div><div>- Body:</div><div>- Base:</div><div>- Contacts:</div><div>- Seal:</div></div> <div>Brass Black polyamide Silver HNBR</div> <div>Technical data</div> <div><div>- Max working pressure:</div><div>- Proof pressure:</div><div>- Working temperature:</div><div>- Compatibility with fluids:</div><div>- Degree of protection:</div></div> <div>40 bar 60 bar From -25 °C to +80 °C Mineral oils, Synthetic fluids HFB and HFC according to ISO 2943 IP65 according to EN 60529</div> <div>Electrical data</div> <div><div>- Electrical connection:</div><div>- Resistive load:</div></div> <div>EN 175301-803 5 A / 14 Vdc 4 A / 30 Vdc 5 A / 125 Vac 4 A / 250 Vac</div>
Settings	Ordering code								
1.5 bar ±10%	BE A 15 HA 50 P01 UL								
2.0 bar ±10%	BE A 20 HA 50 P01 UL								
<div>BEM*41</div> <div>Electrical Pressure Indicator</div> <div>Connection via four-core cable</div> <table><tr><th>Settings</th><th>Ordering code</th></tr><tr><td>1.5 bar ±10%</td><td>BE M 15 HA 41 P01</td></tr><tr><td>2.0 bar ±10%</td><td>BE M 20 HA 41 P01</td></tr></table> <div><div>A/F 27 Max tightening torque: 25 N·m</div><div>EN 10226 - R1/8"</div></div>		Settings	Ordering code	1.5 bar ±10%	BE M 15 HA 41 P01	2.0 bar ±10%	BE M 20 HA 41 P01	<div>Hydraulic symbol</div> <div></div> <div>Electrical symbol</div> <div></div>	<div>Materials</div> <div><div>- Body:</div><div>- Base:</div><div>- Contacts:</div><div>- Seal:</div></div> <div>Brass Black polyamide Silver HNBR</div> <div>Technical data</div> <div><div>- Max working pressure:</div><div>- Proof pressure:</div><div>- Working temperature:</div><div>- Compatibility with fluids:</div><div>- Degree of protection:</div></div> <div>40 bar 60 bar From -25 °C to +80 °C Mineral oils, Synthetic fluids HFB and HFC according to ISO 2943 IP67 according to EN 60529</div> <div>Electrical data</div> <div><div>- Electrical connection:</div><div>- Resistive load:</div><div>- CE certification</div></div> <div>Four-core cable 5 A / 14 Vdc 4 A / 30 Vdc 5 A / 125 Vac 4 A / 250 Vac On request this indicator can be provided with main connectors in use for wirings.</div>
Settings	Ordering code								
1.5 bar ±10%	BE M 15 HA 41 P01								
2.0 bar ±10%	BE M 20 HA 41 P01								

BET*F10		Hydraulic symbol	Materials
Electrical Pressure Indicator Connection AMP Superseal series 1.5			
Settings	Ordering code	Electrical symbol	Technical data
2.0 bar ±10%	BET 20 H F 10 P01		
2.5 bar ±10%	BET 25 H F 10 P01		
			<ul style="list-style-type: none">- Body: Brass- Base: Black polyamide- Contacts: Silver- Seal: HNBR
			<ul style="list-style-type: none">- Max working pressure: 10 bar- Proof pressure: 15 bar- Working temperature: From -25 °C to +100 °C- Compatibility with fluids: Mineral oils, Synthetic fluids HFB and HFC according to ISO 2943- Degree of protection: IP65 according to EN 60529
			

BET*F30		Hydraulic symbol	Materials	
Electrical Pressure Indicator Deutsch DT-04-2-P				
Settings	Ordering code	Electrical symbol	Technical data	
2.0 bar ±10%	BE T 20 H F 30 P01			
2.5 bar ±10%	BE T 25 H F 30 P01			
			<p>Materials</p> <ul style="list-style-type: none">- Body: Brass- Base: Black polyamide- Contacts: Silver- Seal: HNBR <p>Technical data</p> <ul style="list-style-type: none">- Max working pressure: 10 bar- Proof pressure: 15 bar- Working temperature: From -25 °C to +100 °C- Compatibility with fluids: Mineral oils, Synthetic fluids HFB and HFC according to ISO 2943- Degree of protection: IP65 according to EN 60529 <p>Electrical data</p> <ul style="list-style-type: none">- Electrical connection: Deutsch DT-04-2-P- Resistive load: 0.5 A / 48 Vdc- Thermostat condition: Open up to 30 °C- CE certification	
A/F 24 Max tightening torque: 30 N·m				
EN 10226 - R1/8"				

BET*F50		Hydraulic symbol	Materials	
Electrical Pressure Indicator Connection EN 175301-803				
Settings	Ordering code	Electrical symbol	Technical data	
2.0 bar ±10%	BE T 20 H F 50 P01			
2.5 bar ±10%	BE T 25 H F 50 P01			
		<p>Hydraulic symbol</p> 	<p>Materials</p> <ul style="list-style-type: none">- Body: Brass- Base: Black polyamide- Contacts: Silver- Seal: HNBR <p>Technical data</p> <ul style="list-style-type: none">- Max working pressure: 10 bar- Proof pressure: 15 bar- Working temperature: From -25 °C to +100 °C- Compatibility with fluids: Mineral oils, Synthetic fluids HFB and HFC according to ISO 2943- Degree of protection: IP65 according to EN 60529 <p>Electrical data</p> <ul style="list-style-type: none">- Electrical connection: EN 175301-803- Resistive load: 0.5 A / 48 Vdc- Thermostat condition: Open up to 30 °C- CE certification	
				<p>Electrical symbol</p> 

BAROMETRIC (PRESSURE) INDICATORS

Dimensions

BL*51 - BL*52 - BL*53	
Electrical/Visual Pressure Indicator Connection: EN 175301-803	
51: Transparent base with lamps 24 Vdc 52: Transparent base with lamps 110 Vdc 53: Transparent base with lamps 230 Vac	
Settings	Ordering code
1.5 bar ±10%	BL A 15 H A xx P01
2.0 bar ±10%	BL A 20 H A xx P01

Hydraulic symbol	
Electrical symbol	

Materials	
- Body:	Brass
- Base:	Transparent polyamide
- Contacts:	Silver
- Seal:	HNBR
Technical data	
- Max working pressure:	40 bar
- Proof pressure:	60 bar
- Working temperature:	From -25 °C to +80 °C
- Compatibility with fluids:	Mineral oils, Synthetic fluids HFB and HFC according to ISO 2943
- Degree of protection:	IP65 according to EN 60529
Electrical data	
- Electrical connection:	EN 175301-803
- Type:	51 52 53
- Lamps:	24 Vdc 110 Vdc 230 Vac
- Resistive load:	1 A / 24 Vdc 1 A / 110 Vdc 1 A / 230 Vac

BL*71	
Electrical/Visual Pressure Indicator Connection IEC 61076-2-101 D (M12), black base with lamps 24 Vdc	
Settings	**Ordering code**
1.5 bar ±10%	BL A 15 H A 71 P01
2.0 bar ±10%	BL A 20 H A 71 P01

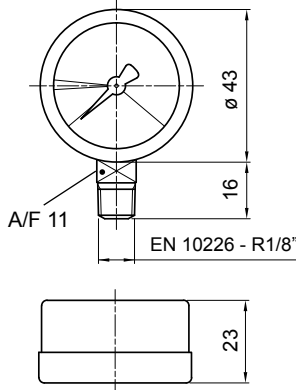

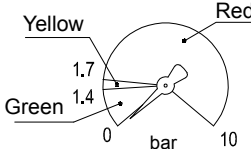
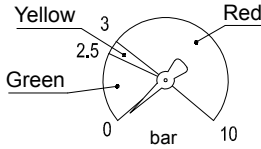
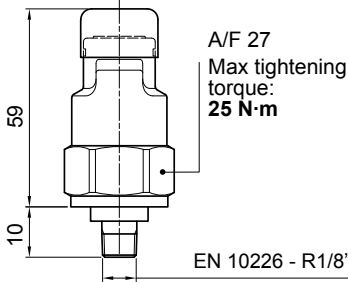
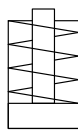
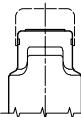
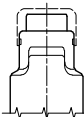
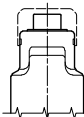
Hydraulic symbol	
Electrical symbol	

Materials	
- Body:	Brass
- Base:	Black polyamide
- Contacts:	Silver
- Seal:	HNBR
Technical data	
- Max working pressure:	40 bar
- Proof pressure:	60 bar
- Working temperature:	From -25 °C to +80 °C
- Compatibility with fluids:	Mineral oils, Synthetic fluids HFB and HFC according to ISO 2943
- Degree of protection:	IP65 according to EN 60529
Electrical data	
- Electrical connection:	IEC 61076-2-101 D (M12)
- Lamps:	24 Vdc (black base)
- Resistive load:	0.4 A / 24 Vdc

BVA	
Axial Pressure Gauge	
Settings	**Ordering code**
1.4 bar ±10%	BV A 14 P01
2.5 bar ±10%	BV A 25 P01

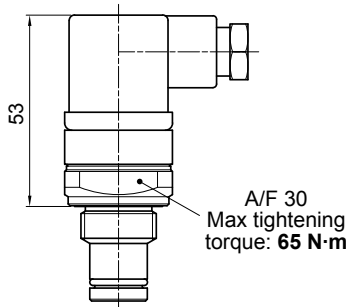
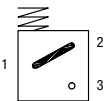
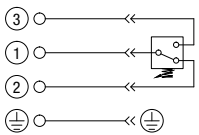
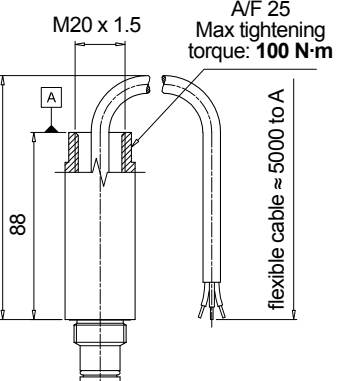
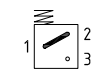
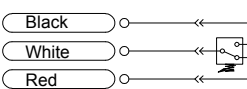

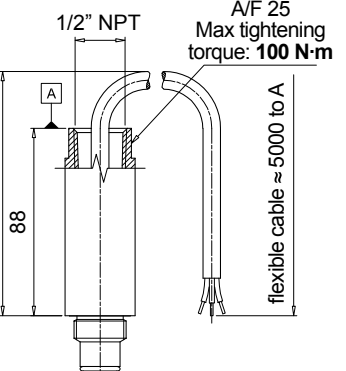
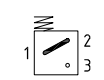
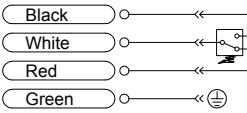

Hydraulic symbol	
Dial scale	
BV A 14 P01	
BV A 25 P01	

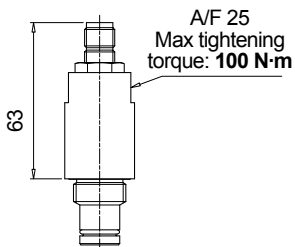

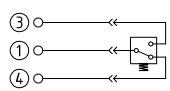

Materials	
- Case:	Painted Steel
- Window:	Clear plastic
- Dial:	Painted Steel
- Pointer:	Black plastic
- Pressure connection:	Brass
- Pressure element:	Bourdon tube Cu-alloy soft soldered, C type
- Movement:	Cu-alloy
Technical data	
- Max working pressure:	Static: 7 bar Fluctuating: 6 bar Short time: 10 bar
- Working temperature:	Ambient from -40 °C to +60 °C Fluid max +60 °C Storage from -40 °C to +60 °C
- Compatibility with fluids:	Mineral oils, Synthetic fluids HFB and HFC according to ISO 2943
- Accuracy:	Class 2.5 according to EN 13190
- Degree of protection:	IP31 according to EN 60529

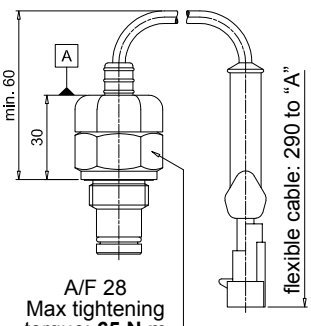

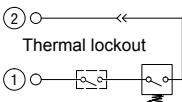
<div>BVR</div> <div>Radial Pressure Gauge</div> <table><tr><th>Settings</th><th>Ordering code</th></tr><tr><td>1.4 bar ±10%</td><td>BV R 14 P01</td></tr><tr><td>2.5 bar ±10%</td><td>BV R 25 P01</td></tr></table> <div></div>		Settings	Ordering code	1.4 bar ±10%	BV R 14 P01	2.5 bar ±10%	BV R 25 P01	<div>Hydraulic symbol</div> <div></div> <div>Dial scale</div> <div>BV R 14 P01</div> <div></div> <div>BV R 25 P01</div> <div></div>	<div>Materials</div> <div><div>- Case:</div><div>- Window:</div><div>- Dial:</div><div>- Pointer:</div><div>- Pressure connection:</div><div>- Pressure element:</div><div>- Movement:</div></div> <div>Painted Steel Clear plastic Painted Steel Black plastic Brass Bourdon tube Cu-alloy soft soldered, C type Cu-alloy</div> <div>Technical data</div> <div><div>- Max working pressure:</div><div>- Working temperature:</div><div>- Compatibility with fluids:</div><div>- Accuracy:</div><div>- Degree of protection:</div></div> <div>Static: 7 bar Fluctuating: 6 bar Short time: 10 bar Ambient from -40 °C to +60 °C Fluid max +60 °C Storage from -40 °C to +60 °C Mineral oils, Synthetic fluids HFB and HFC according to ISO 2943 Class 2.5 according to EN 13190 IP31 according to EN 60529</div>		
Settings	Ordering code										
1.4 bar ±10%	BV R 14 P01										
2.5 bar ±10%	BV R 25 P01										
<div>BVP - BVQ</div> <div>Visual Pressure Indicator</div> <div>BVP - Automatic reset</div> <div>BVQ - Manual reset</div> <table><tr><th>Setting</th><th>Ordering code</th></tr><tr><td rowspan="2">1.5 bar ±10%</td><td>BV P 15 H P01</td></tr><tr><td>BV Q 15 H P01</td></tr><tr><td rowspan="2">2.0 bar ±10%</td><td>BV P 20 H P01</td></tr><tr><td>BV Q 20 H P01</td></tr></table> <div></div>		Setting	Ordering code	1.5 bar ±10%	BV P 15 H P01	BV Q 15 H P01	2.0 bar ±10%	BV P 20 H P01	BV Q 20 H P01	<div>Hydraulic symbol</div> <div></div>	<div>Materials</div> <div><div>- Body:</div><div>- Cover / internal parts:</div><div>- Caps:</div><div>- Seal:</div></div> <div>Brass Nylon VMQ HNBR</div> <div>Technical data</div> <div><div>- Reset:</div><div>- Max working pressure:</div><div>- Proof pressure:</div><div>- Working temperature:</div><div>- Compatibility with fluids:</div><div>- Degree of protection:</div></div> <div>BVP - Automatic reset BVQ - Manual reset 10 bar 15 bar From -25 °C to +80 °C Mineral oils, Synthetic fluids HFB and HFC according to ISO 2943 IP45 according to EN 60529</div>
Setting	Ordering code										
1.5 bar ±10%	BV P 15 H P01										
	BV Q 15 H P01										
2.0 bar ±10%	BV P 20 H P01										
	BV Q 20 H P01										
<div>Signals</div> <div><div>Absence of pressure (no indicator)</div></div> <div><div>Presence of pressure (green button rises gradually)</div></div> <div><div>Clogged filter element (red button risen)</div></div>											

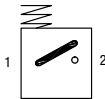
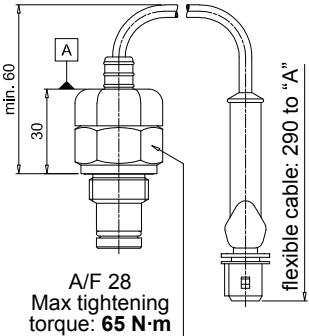
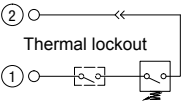
DIFFERENTIAL PRESSURE INDICATORS

Dimensions

<div>DEA*50</div> <div>Electrical Differential Pressure Indicator</div> <div>Connection: EN 175301-803</div> <table><tr><th>Settings</th><th>Ordering code</th></tr><tr><td>1.2 bar ±10%</td><td>DE A 12 x A 50 P01</td></tr><tr><td>2.0 bar ±10%</td><td>DE A 20 x A 50 P01</td></tr><tr><td>5.0 bar ±10%</td><td>DE A 50 x A 50 P01</td></tr><tr><td>7.0 bar ±10%</td><td>DE A 70 x A 50 P01</td></tr><tr><td>9.5 bar ±10%</td><td>DE A 95 x A 50 P01</td></tr></table> <div></div>		Settings	Ordering code	1.2 bar ±10%	DE A 12 x A 50 P01	2.0 bar ±10%	DE A 20 x A 50 P01	5.0 bar ±10%	DE A 50 x A 50 P01	7.0 bar ±10%	DE A 70 x A 50 P01	9.5 bar ±10%	DE A 95 x A 50 P01	<div>Hydraulic symbol</div> <div></div> <div>Electrical symbol</div> <div></div>	<div>Materials</div> <div><div>- Body:</div><div>- Base:</div><div>- Contacts:</div><div>- Seal:</div></div> <div><div>Brass</div><div>Black polyamide</div><div>Silver</div><div>HNBR - FPM</div></div> <div>Technical data</div> <div><div>- Max working pressure:</div><div>- Proof pressure:</div><div>- Burst pressure:</div><div>- Working temperature:</div><div>- Compatibility with fluids:</div><div>- Degree protection:</div></div> <div><div>420 bar</div><div>630 bar</div><div>1260 bar</div><div>From -25 °C to +110 °C</div><div>Mineral oils, Synthetic fluids HFB and HFC according to ISO 2943</div><div>IP66 according to EN 60529 IP69K according to ISO 20653</div></div> <div>Electrical data</div> <div><div>- Electrical connection:</div><div>- Resistive load:</div></div> <div><div>EN 175301-803</div><div>0.2 A / 115 Vdc</div></div>
Settings	Ordering code														
1.2 bar ±10%	DE A 12 x A 50 P01														
2.0 bar ±10%	DE A 20 x A 50 P01														
5.0 bar ±10%	DE A 50 x A 50 P01														
7.0 bar ±10%	DE A 70 x A 50 P01														
9.5 bar ±10%	DE A 95 x A 50 P01														
<div>DEH*48</div> <div>Hazardous Area</div> <div>Electrical Differential Pressure Indicator</div> <div>Connection via three-core cable - fitting M20x1.5</div> <table><tr><th>Settings</th><th>Ordering code</th></tr><tr><td>2.0 bar ±10%</td><td>DE H 20 x A 48 P01</td></tr><tr><td>5.0 bar ±10%</td><td>DE H 50 x A 48 P01</td></tr><tr><td>7.0 bar ±10%</td><td>DE H 70 x A 48 P01</td></tr></table> <div></div>		Settings	Ordering code	2.0 bar ±10%	DE H 20 x A 48 P01	5.0 bar ±10%	DE H 50 x A 48 P01	7.0 bar ±10%	DE H 70 x A 48 P01	<div>Hydraulic symbol</div> <div></div> <div>Electrical symbol</div> <div></div> <div></div> <div><div>- Certification / Approvals:</div><div>- Certification included as standard</div></div>	<div>Materials</div> <div><div>- Body:</div><div>- Contacts:</div><div>- Seal:</div></div> <div><div>AISI 316L</div><div>Rhodium</div><div>FPM - MFQ</div></div> <div>Technical data</div> <div><div>- Max working pressure:</div><div>- Proof pressure:</div><div>- Burst pressure:</div><div>- Working temperature:</div><div>- Compatibility with fluids:</div><div>- Temperature class:</div><div>- Degree of protection:</div><div>- Connection type:</div><div>- Contact type:</div></div> <div><div>420 bar</div><div>630 bar</div><div>1260 bar</div><div>From -60 °C to +125 °C</div><div>Mineral oils, Synthetic fluids HFB and HFC according to ISO 2943</div><div>T4 (135 °C) and T6 (85 °C)</div><div>IP 66/67/68 according to EN 60529</div><div>Three-core cable, fitting M20x1.5</div><div>SPCO/SPDT (Hermetically sealed - Volt-free contacts)</div></div> <div>Electrical data</div> <div><div>- Connection via three-core cable - fitting M20x1.5</div><div>- Resistive Load:</div><div>- Electrical Ratings:</div><div>- Available ATEX product:</div></div> <div><div></div><div>830 mA / 24 Vdc - 180 mA / 110 Vac</div><div>$U_i = 30$ Vdc / $I_i = 250$ mA / $P_i = 1.3$ W</div><div>II 1 GD Ex ia IIC T6 Ga -60°C ≤ Ta ≤ 80°C Ex ia IIC T4 Ga -60°C ≤ Ta ≤ 125°C II 2 GD Ex db IIC T6* Gb Ex tb IIIC T85°C* Db (Tamb : = -60°C to +70°C)* IP66/67 * alternative T/Class and ambients T4, T135°C (Tamb = -60°C to +120°C)</div></div>				
Settings	Ordering code														
2.0 bar ±10%	DE H 20 x A 48 P01														
5.0 bar ±10%	DE H 50 x A 48 P01														
7.0 bar ±10%	DE H 70 x A 48 P01														
<div>DEH*49</div> <div>Hazardous Area</div> <div>Electrical Differential Pressure Indicator</div> <div>Connection via four-core cable - fitting 1/2" NPT</div> <table><tr><th>Settings</th><th>Ordering code</th></tr><tr><td>2.0 bar ±10%</td><td>DE H 20 x A 49 P01</td></tr><tr><td>5.0 bar ±10%</td><td>DE H 50 x A 49 P01</td></tr><tr><td>7.0 bar ±10%</td><td>DE H 70 x A 49 P01</td></tr></table> <div></div>		Settings	Ordering code	2.0 bar ±10%	DE H 20 x A 49 P01	5.0 bar ±10%	DE H 50 x A 49 P01	7.0 bar ±10%	DE H 70 x A 49 P01	<div>Hydraulic symbol</div> <div></div> <div>Electrical symbol</div> <div></div> <div></div> <div><div>- Certification / Approvals:</div><div>- Certification included as standard</div></div>	<div>Materials</div> <div><div>- Body:</div><div>- Contacts:</div><div>- Seal:</div></div> <div><div>AISI 316L</div><div>Rhodium</div><div>FPM - MFQ</div></div> <div>Technical data</div> <div><div>- Max working pressure:</div><div>- Proof pressure:</div><div>- Burst pressure:</div><div>- Working temperature:</div><div>- Compatibility with fluids:</div><div>- Temperature class:</div><div>- Degree of protection:</div><div>- Connection type:</div><div>- Contact type:</div></div> <div><div>420 bar</div><div>630 bar</div><div>1260 bar</div><div>From -60 °C to +120 °C : ATEX, IECEx, EAC TR CU, INMETRO From -60 °C to +105 °C : UL/CSA</div><div>Mineral oils, Synthetic fluids HFB and HFC according to ISO 2943</div><div>T4 (135 °C) and T6 (85 °C)</div><div>IP 66/67/68 according to EN 60529</div><div>Four-core cable, fitting 1/2" NPT</div><div>SPCO/SPDT (Hermetically sealed - Volt-free contacts)</div></div> <div>Electrical data</div> <div><div>- Connection via four-core cable - fitting 1/2" NPT</div><div>- Resistive Load:</div><div>- Max voltage</div><div>- Power</div><div>- Available ATEX product:</div></div> <div><div></div><div>830 mA / 24 Vdc - 180 mA / 110 Vac</div><div>150 Vac/dc</div><div>20 W</div><div>II 1 GD Ex ia IIC T6 Ga -60°C ≤ Ta ≤ 80°C Ex ia IIC T4 Ga -60°C ≤ Ta ≤ 125°C II 2 GD Ex db IIC T6* Gb Ex tb IIIC T85°C* Db (Tamb : = -60°C to +70°C)* IP66/67 * alternative T/Class and ambients T4, T135°C (Tamb = -60°C to +120°C)</div></div>				
Settings	Ordering code														
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5.0 bar ±10%	DE H 50 x A 49 P01														
7.0 bar ±10%	DE H 70 x A 49 P01														

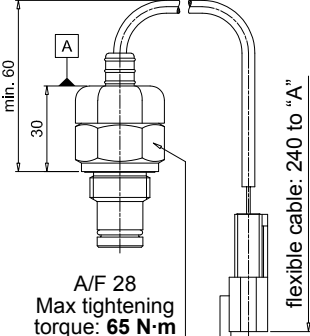
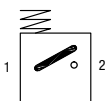
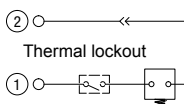
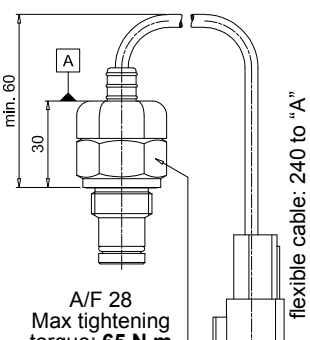
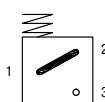
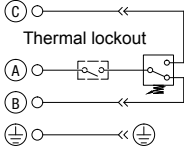
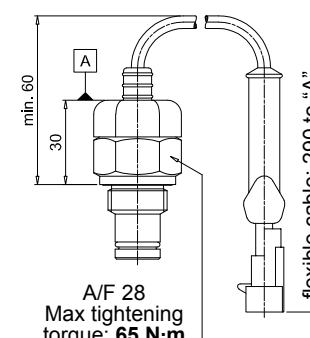
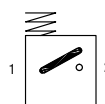
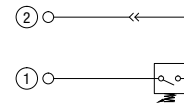
DEH*70		Hydraulic symbol	Materials
Hazardous Area Electrical Differential Pressure Indicator Connection IEC 61076-2-101 D (M12)			
Settings	Ordering code	Electrical symbol	Technical data
2.0 bar ±10%	DE H 20 x A 70 P01		
5.0 bar ±10%	DE H 50 x A 70 P01		
7.0 bar ±10%	DE H 70 x A 70 P01		
<div></div>		<div></div> <div></div> <div></div>	<p>Materials</p> <p>- Body: AISI 316L with internal engineered resin switch</p> <p>- Contacts: Rhodium</p> <p>- Seal: FPM - MFQ</p> <p>Technical data</p> <p>- Max working pressure: 420 bar</p> <p>- Proof pressure: 630 bar</p> <p>- Burst pressure: 1260 bar</p> <p>- Working temperature: From -60 °C to +80 °C</p> <p>- Compatibility with fluids: Mineral oils, Synthetic fluids</p> <p>- Temperature class: HFB and HFC according to ISO 2943</p> <p>- Degree of protection: IP 66/67 according to EN 60529</p> <p>- Connection type: IEC 61076-2-101 D (M12)</p> <p>- Contact type: SPCO/SPDT (Hermetically sealed - Volt-free contacts)</p> <p>Electrical data</p> <p>- Connection IEC 61076-2-101 D (M12)</p> <p>- Resistive Load: 830 mA / 24 Vdc - 180 mA / 110 Vdc</p> <p>- Electrical Ratings: $U_i = 30 \text{ Vdc}$ $I_i = 250 \text{ mA}$ $P_i = 1.3 \text{ W}$</p> <p>- Available ATEX product: II 1 GD Ex ia IIC T6 Ga -60°C ≤ Ta ≤ 80°C Ex ia IIC T4 Ga -60°C ≤ Ta ≤ 125°C II 2 GD Ex db IIC T6* Gb Ex tb IIC T85°C* Db (Tamb : = -60°C to +70°C)* IP66/67 * alternative T/Class and ambients T4, T135°C (Tamb = -60°C to +120°C)</p>

DEM*F10		Hydraulic symbol	Materials
Electrical Differential Pressure Indicator Connection: AMP Superseal series 1.5			
Settings	Ordering code	Electrical symbol	Technical data
1.2 bar ±10%	DE M 12 x F 10 P01		
2.0 bar ±10%	DE M 20 x F 10 P01		
5.0 bar ±10%	DE M 50 x F 10 P01		
7.0 bar ±10%	DE M 70 x F 10 P01		
9.5 bar ±10%	DE M 95 x F 10 P01		
		 	<p>Materials</p> <ul style="list-style-type: none">- Body: Brass- Base: Black polyamide- Contacts: Silver- Seal: HNBR - FPM <p>Technical data</p> <ul style="list-style-type: none">- Max working pressure: 420 bar- Proof pressure: 630 bar- Burst pressure: 1260 bar- Working temperature: From -25 °C to +110 °C- Compatibility with fluids: Mineral oils, Synthetic fluids- Degree protection: HFB and HFC according to ISO 2943- Degree protection: IP66 according to EN 60529 <p>Electrical data</p> <ul style="list-style-type: none">- Electrical connection: AMP Superseal series 1.5- Resistive load: 0.2 A / 115 Vdc- Switching type: Normally open contacts (NC on request)- Thermal lockout: Normally open up to 30 °C (option "F")

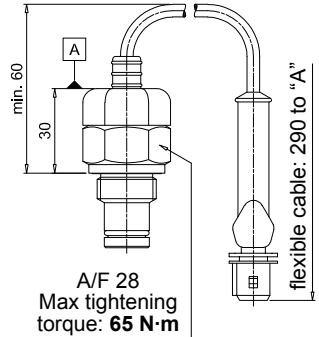
DEM*F20		Hydraulic symbol	Materials
Electrical Differential Pressure Indicator AMP Time junior			
Settings	Ordering code		<ul style="list-style-type: none">- Body: Brass- Base: Black polyamide- Contacts: Silver- Seal: HNBR - FPM
1.2 bar ±10%	DE M 12 x F 20 P01		
2.0 bar ±10%	DE M 20 x F 20 P01		
5.0 bar ±10%	DE M 50 x F 20 P01		
7.0 bar ±10%	DE M 70 x F 20 P01		
9.5 bar ±10%	DE M 95 x F 20 P01	Electrical symbol	Technical data
			<ul style="list-style-type: none">- Max working pressure: 420 bar- Proof pressure: 630 bar- Burst pressure: 1260 bar- Working temperature: From -25 °C to +110 °C- Compatibility with fluids: Mineral oils, Synthetic fluids- Degree protection: HFB and HFC according to ISO 2943- Degree protection: IP66 according to EN 60529
		Electrical data	
		<ul style="list-style-type: none">- Electrical connection: AMP Time junior- Resistive load: 0.2 A / 115 Vdc- Switching type: Normally open contacts (NC on request)- Thermal lockout: Normally open up to 30 °C (option "F")	

DIFFERENTIAL PRESSURE INDICATORS

Dimensions

<div>DEM*F30</div> <div>Electrical Differential Pressure Indicator</div> <div>Deutsch DT-04-2-P</div> <table><tr><th>Settings</th><th>Ordering code</th></tr><tr><td>1.2 bar ±10%</td><td>DE M 12 x F 30 P01</td></tr><tr><td>2.0 bar ±10%</td><td>DE M 20 x F 30 P01</td></tr><tr><td>5.0 bar ±10%</td><td>DE M 50 x F 30 P01</td></tr><tr><td>7.0 bar ±10%</td><td>DE M 70 x F 30 P01</td></tr><tr><td>9.5 bar ±10%</td><td>DE M 95 x F 30 P01</td></tr></table> <div><p>A/F 28 Max tightening torque: 65 N·m</p></div>		Settings	Ordering code	1.2 bar ±10%	DE M 12 x F 30 P01	2.0 bar ±10%	DE M 20 x F 30 P01	5.0 bar ±10%	DE M 50 x F 30 P01	7.0 bar ±10%	DE M 70 x F 30 P01	9.5 bar ±10%	DE M 95 x F 30 P01	<div>Hydraulic symbol</div> <div></div> <div>Electrical symbol</div> <div></div>	<div>Materials</div> <div><ul style="list-style-type: none">- Body: Brass- Base: Black polyamide- Contacts: Silver- Seal: HNBR - FPM</div> <div>Technical data</div> <div><ul style="list-style-type: none">- Max working pressure: 420 bar- Proof pressure: 630 bar- Burst pressure: 1260 bar- Working temperature: From -25 °C to +110 °C- Compatibility with fluids: Mineral oils, Synthetic fluids HFB and HFC according to ISO 2943- Degree protection: IP66 according to EN 60529</div> <div>Electrical data</div> <div><ul style="list-style-type: none">- Electrical connection: Deutsch DT-04-2-P- Resistive load: 0.2 A / 115 Vdc- Switching type: Normally open contacts (NC on request)- Thermal lockout: Normally open up to 30 °C (option "F")</div>
Settings	Ordering code														
1.2 bar ±10%	DE M 12 x F 30 P01														
2.0 bar ±10%	DE M 20 x F 30 P01														
5.0 bar ±10%	DE M 50 x F 30 P01														
7.0 bar ±10%	DE M 70 x F 30 P01														
9.5 bar ±10%	DE M 95 x F 30 P01														
<div>DEM*F35</div> <div>Electrical Differential Pressure Indicator</div> <div>Deutsch DT-04-3-P</div> <table><tr><th>Settings</th><th>Ordering code</th></tr><tr><td>1.2 bar ±10%</td><td>DE M 12 x F 35 P01</td></tr><tr><td>2.0 bar ±10%</td><td>DE M 20 x F 35 P01</td></tr><tr><td>5.0 bar ±10%</td><td>DE M 50 x F 35 P01</td></tr><tr><td>7.0 bar ±10%</td><td>DE M 70 x F 35 P01</td></tr><tr><td>9.5 bar ±10%</td><td>DE M 95 x F 35 P01</td></tr></table> <div><p>A/F 28 Max tightening torque: 65 N·m</p></div>		Settings	Ordering code	1.2 bar ±10%	DE M 12 x F 35 P01	2.0 bar ±10%	DE M 20 x F 35 P01	5.0 bar ±10%	DE M 50 x F 35 P01	7.0 bar ±10%	DE M 70 x F 35 P01	9.5 bar ±10%	DE M 95 x F 35 P01	<div>Hydraulic symbol</div> <div></div> <div>Electrical symbol</div> <div></div>	<div>Materials</div> <div><ul style="list-style-type: none">- Body: Brass- Base: Black polyamide- Contacts: Silver- Seal: HNBR - FPM</div> <div>Technical data</div> <div><ul style="list-style-type: none">- Max working pressure: 420 bar- Proof pressure: 630 bar- Burst pressure: 1260 bar- Working temperature: From -25 °C to +110 °C- Compatibility with fluids: Mineral oils, Synthetic fluids HFB and HFC according to ISO 2943- Degree protection: IP66 according to EN 60529</div> <div>Electrical data</div> <div><ul style="list-style-type: none">- Electrical connection: Deutsch DT-04-3-P- Resistive load: 0.2 A / 115 Vdc- Switching type: SPDT contact- Thermal lockout: Normally open up to 30 °C (option "F")</div>
Settings	Ordering code														
1.2 bar ±10%	DE M 12 x F 35 P01														
2.0 bar ±10%	DE M 20 x F 35 P01														
5.0 bar ±10%	DE M 50 x F 35 P01														
7.0 bar ±10%	DE M 70 x F 35 P01														
9.5 bar ±10%	DE M 95 x F 35 P01														
<div>DEM*A10</div> <div>Electrical Differential Pressure Indicator</div> <div>Connection: AMP Superseal series 1.5</div> <table><tr><th>Settings</th><th>Ordering code</th></tr><tr><td>1.2 bar ±10%</td><td>DE M 12 x A 10 P01</td></tr><tr><td>2.0 bar ±10%</td><td>DE M 20 x A 10 P01</td></tr><tr><td>5.0 bar ±10%</td><td>DE M 50 x A 10 P01</td></tr><tr><td>7.0 bar ±10%</td><td>DE M 70 x A 10 P01</td></tr><tr><td>9.5 bar ±10%</td><td>DE M 95 x A 10 P01</td></tr></table> <div><p>A/F 28 Max tightening torque: 65 N·m</p></div>		Settings	Ordering code	1.2 bar ±10%	DE M 12 x A 10 P01	2.0 bar ±10%	DE M 20 x A 10 P01	5.0 bar ±10%	DE M 50 x A 10 P01	7.0 bar ±10%	DE M 70 x A 10 P01	9.5 bar ±10%	DE M 95 x A 10 P01	<div>Hydraulic symbol</div> <div></div> <div>Electrical symbol</div> <div></div>	<div>Materials</div> <div><ul style="list-style-type: none">- Body: Brass- Base: Black polyamide- Contacts: Silver- Seal: HNBR - FPM</div> <div>Technical data</div> <div><ul style="list-style-type: none">- Max working pressure: 420 bar- Proof pressure: 630 bar- Burst pressure: 1260 bar- Working temperature: From -25 °C to +110 °C- Compatibility with fluids: Mineral oils, Synthetic fluids HFB and HFC according to ISO 2943- Degree protection: IP66 according to EN 60529</div> <div>Electrical data</div> <div><ul style="list-style-type: none">- Electrical connection: AMP Superseal series 1.5- Resistive load: 0.2 A / 115 Vdc- Switching type: Normally open contacts (NC on request)</div>
Settings	Ordering code														
1.2 bar ±10%	DE M 12 x A 10 P01														
2.0 bar ±10%	DE M 20 x A 10 P01														
5.0 bar ±10%	DE M 50 x A 10 P01														
7.0 bar ±10%	DE M 70 x A 10 P01														
9.5 bar ±10%	DE M 95 x A 10 P01														


DEM*A20	
Electrical Differential Pressure Indicator AMP Time junior	
Settings	Ordering code
1.2 bar $\pm 10\%$	DE M 12 x A 20 P01
2.0 bar $\pm 10\%$	DE M 20 x A 20 P01
5.0 bar $\pm 10\%$	DE M 50 x A 20 P01
7.0 bar $\pm 10\%$	DE M 70 x A 20 P01
9.5 bar $\pm 10\%$	DE M 95 x A 20 P01



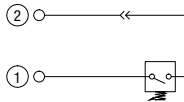
A/F 28
Max tightening torque: **65 N·m**

flexible cable: 290 to "A"

Hydraulic symbol



Electrical symbol



Materials

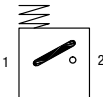
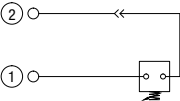
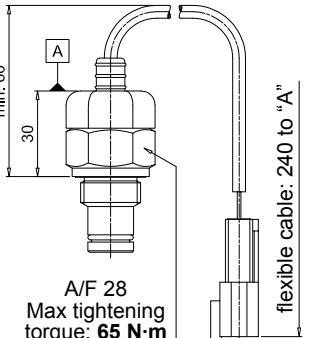
- Body: Brass
- Base: Black polyamide
- Contacts: Silver
- Seal: HNBR - FPM

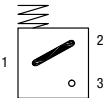
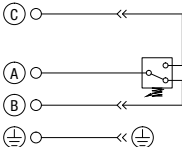
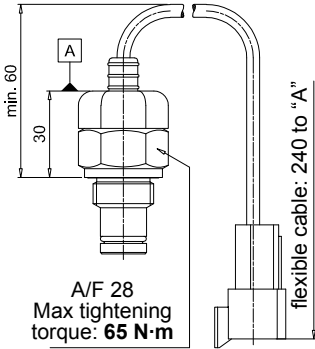
Technical data

- Max working pressure: 420 bar
- Proof pressure: 630 bar
- Burst pressure: 1260 bar
- Working temperature: From -25 °C to +110 °C
- Compatibility with fluids: Mineral oils, Synthetic fluids
HFB and HFC according to ISO 2943
- Degree protection: IP66 according to EN 60529

Electrical data

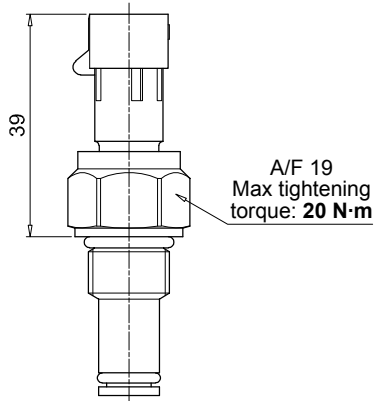
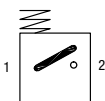
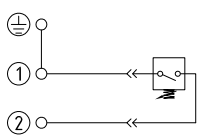
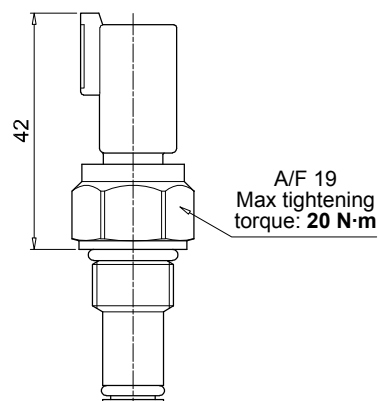
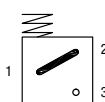
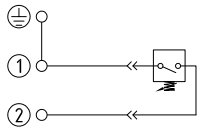
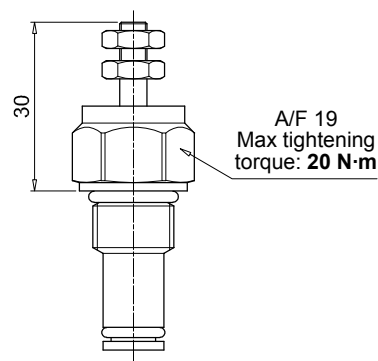
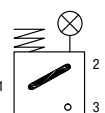
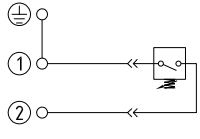
- Electrical connection: AMP Time junior
- Resistive load: 0.2 A / 115 Vdc
- Switching type: Normally open contacts (NC on request)

DEM*A30		Hydraulic symbol	Electrical symbol	Materials	Technical data	Electrical data			
Electrical Differential Pressure Indicator Deutsch DT-04-2-P									
Settings	Ordering code								
1.2 bar ±10%	DE M 12 x A 30 P01								
2.0 bar ±10%	DE M 20 x A 30 P01								
5.0 bar ±10%	DE M 50 x A 30 P01								
7.0 bar ±10%	DE M 70 x A 30 P01								
9.5 bar ±10%	DE M 95 x A 30 P01								
									

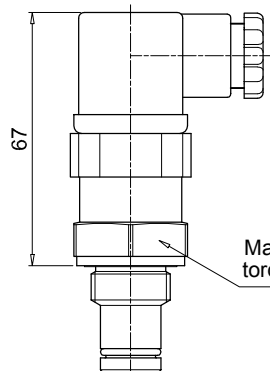
DEM*A35		Hydraulic symbol	Electrical symbol	Materials	Technical data	Electrical data			
Electrical Differential Pressure Indicator Deutsch DT-04-3-P									
Settings	Ordering code								
1.2 bar ±10%	DE M 12 x A 35 P01								
2.0 bar ±10%	DE M 20 x A 35 P01								
5.0 bar ±10%	DE M 50 x A 35 P01								
7.0 bar ±10%	DE M 70 x A 35 P01								
9.5 bar ±10%	DE M 95 x A 35 P01								
									

DIFFERENTIAL PRESSURE INDICATORS

Dimensions

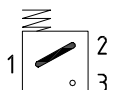
<div>DES*10</div> <div>Electrical Differential Pressure Indicator</div> <div>AMP Superseal series 1.5</div> <table><tr><th>Settings</th><th>Ordering code</th></tr><tr><td>1.2 bar ±10%</td><td>DE S 12 H A 10 P01</td></tr><tr><td>2.5 bar ±10%</td><td>DE S 25 H A 10 P01</td></tr><tr><td>4.0 bar ±10%</td><td>DE S 40 H A 10 P01</td></tr></table> <div></div>	Settings	Ordering code	1.2 bar ±10%	DE S 12 H A 10 P01	2.5 bar ±10%	DE S 25 H A 10 P01	4.0 bar ±10%	DE S 40 H A 10 P01	<div>Hydraulic symbol</div> <div></div> <div>Electrical symbol</div> <div></div>	<div>Materials</div> <div><div>- Body:</div><div>- Internal parts:</div><div>- Contacts:</div><div>- Seal:</div></div> <div><div>Brass</div><div>Brass - Polyamide</div><div>Silver</div><div>HNBR</div></div> <div>Technical data</div> <div><div>- Max working pressure:</div><div>- Proof pressure:</div><div>- Burst pressure:</div><div>- Working temperature:</div><div>- Compatibility with fluids:</div><div>- Degree protection:</div></div> <div><div>16 bar</div><div>24 bar</div><div>48 bar</div><div>From -25 °C to +110 °C</div><div>Mineral oils, Synthetic fluids HFB and HFC according to ISO 2943</div><div>IP67 according to EN 60529</div></div> <div>Electrical data</div> <div><div>- Electrical connection:</div><div>- Resistive load:</div><div>- Switching type:</div></div> <div><div>AMP Superseal series 1.5</div><div>0.2 A / 24 Vdc</div><div>Normally open contacts (NC on request)</div></div>
Settings	Ordering code									
1.2 bar ±10%	DE S 12 H A 10 P01									
2.5 bar ±10%	DE S 25 H A 10 P01									
4.0 bar ±10%	DE S 40 H A 10 P01									
<div>DES*30</div> <div>Electrical Differential Pressure Indicator</div> <div>Deutsch DT-04-2-P</div> <table><tr><th>Settings</th><th>Ordering code</th></tr><tr><td>1.2 bar ±10%</td><td>DE S 12 H A 30 P01</td></tr><tr><td>2.5 bar ±10%</td><td>DE S 25 H A 30 P01</td></tr><tr><td>4.0 bar ±10%</td><td>DE S 40 H A 30 P01</td></tr></table> <div></div>	Settings	Ordering code	1.2 bar ±10%	DE S 12 H A 30 P01	2.5 bar ±10%	DE S 25 H A 30 P01	4.0 bar ±10%	DE S 40 H A 30 P01	<div>Hydraulic symbol</div> <div></div> <div>Electrical symbol</div> <div></div>	<div>Materials</div> <div><div>- Body:</div><div>- Internal parts:</div><div>- Contacts:</div><div>- Seal:</div></div> <div><div>Brass</div><div>Brass - Polyamide</div><div>Silver</div><div>HNBR</div></div> <div>Technical data</div> <div><div>- Max working pressure:</div><div>- Proof pressure:</div><div>- Burst pressure:</div><div>- Working temperature:</div><div>- Compatibility with fluids:</div><div>- Degree protection:</div></div> <div><div>16 bar</div><div>24 bar</div><div>48 bar</div><div>From -25 °C to +110 °C</div><div>Mineral oils, Synthetic fluids HFB and HFC according to ISO 2943</div><div>IP67 according to EN 60529</div></div> <div>Electrical data</div> <div><div>- Electrical connection:</div><div>- Resistive load:</div><div>- Switching type:</div></div> <div><div>Deutsch DT-04-2-P</div><div>0.2 A / 24 Vdc</div><div>Normally open contacts (NC on request)</div></div>
Settings	Ordering code									
1.2 bar ±10%	DE S 12 H A 30 P01									
2.5 bar ±10%	DE S 25 H A 30 P01									
4.0 bar ±10%	DE S 40 H A 30 P01									
<div>DES*80</div> <div>Electrical Differential Pressure Indicator</div> <div>Stud #10-32 UNF</div> <table><tr><th>Settings</th><th>Ordering code</th></tr><tr><td>1.2 bar ±10%</td><td>DE S 12 H A 80 P01</td></tr><tr><td>2.5 bar ±10%</td><td>DE S 25 H A 80 P01</td></tr><tr><td>4.0 bar ±10%</td><td>DE S 40 H A 80 P01</td></tr></table> <div></div>	Settings	Ordering code	1.2 bar ±10%	DE S 12 H A 80 P01	2.5 bar ±10%	DE S 25 H A 80 P01	4.0 bar ±10%	DE S 40 H A 80 P01	<div>Hydraulic symbol</div> <div></div> <div>Electrical symbol</div> <div></div>	<div>Materials</div> <div><div>- Body:</div><div>- Internal parts:</div><div>- Contacts:</div><div>- Seal:</div></div> <div><div>Brass</div><div>Brass - Polyamide</div><div>Silver</div><div>HNBR</div></div> <div>Technical data</div> <div><div>- Max working pressure:</div><div>- Proof pressure:</div><div>- Burst pressure:</div><div>- Working temperature:</div><div>- Compatibility with fluids:</div><div>- Degree protection:</div></div> <div><div>16 bar</div><div>24 bar</div><div>48 bar</div><div>From -25 °C to +110 °C</div><div>Mineral oils, Synthetic fluids HFB and HFC according to ISO 2943</div><div>IP67 according to EN 60529</div></div> <div>Electrical data</div> <div><div>- Electrical connection:</div><div>- Resistive load:</div><div>- Switching type:</div></div> <div><div>Stud #10-32 UNF</div><div>0.2 A / 24 Vdc</div><div>Normally open contacts (NC on request)</div></div>
Settings	Ordering code									
1.2 bar ±10%	DE S 12 H A 80 P01									
2.5 bar ±10%	DE S 25 H A 80 P01									
4.0 bar ±10%	DE S 40 H A 80 P01									

DEU*50 UL	
Electrical Differential Pressure Indicator	
Connection EN 175301-803	
Settings	Ordering code
2.0 bar ±10%	DE U 20 V A 50 P01 UL
5.0 bar ±10%	DE U 50 V A 50 P01 UL
7.0 bar ±10%	DE U 70 V A 50 P01 UL

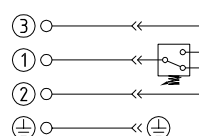



A/F 30
Max tightening
torque: 50 N·m

Hydraulic symbol



Electrical symbol





- Certification: UL
- Certification included as standard

Materials

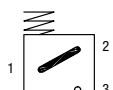
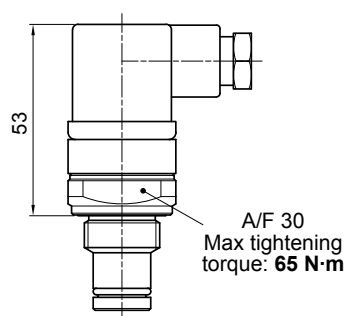
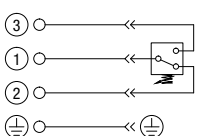
- Body: Brass
- Base: Black Polyamide
- Contacts: Silver
- Seal: FPM

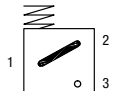
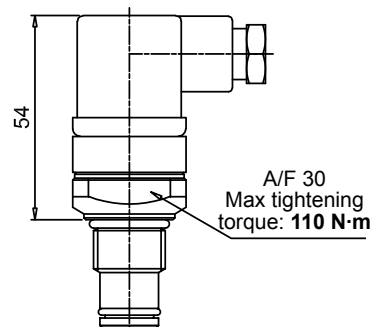
Technical data

- Max working pressure: 210 bar
- Proof pressure: 220 bar
- Burst pressure: 880 bar
- Working temperature: From -25 °C to +85 °C
- Compatibility with fluids: Mineral oils, Synthetic fluids
HFB and HFC according to ISO 2943
- Degree protection: IP65 according to EN 60529

Electrical data

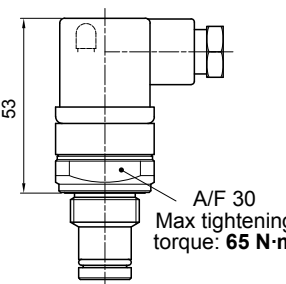
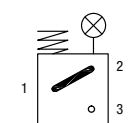
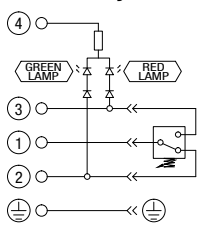
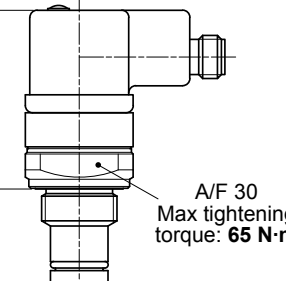
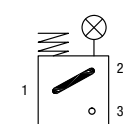
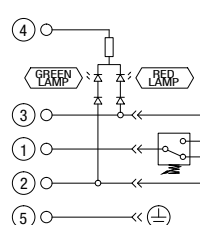
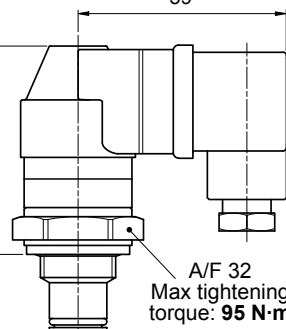
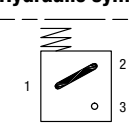
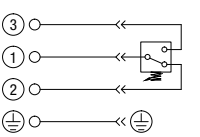
- Electrical connection: EN 175301-803
- Resistive load: 3 A / 30 Vdc
3 A / 125 Vac
3 (3) A / 250 Vac

DEX*50		Hydraulic symbol	Materials	
Electrical Differential Pressure Indicator Connection: EN 175301-803				
Settings	Ordering code		<p>Materials</p> <ul style="list-style-type: none">- Body: AISI 316L- Base: Black polyamide- Contacts: Silver- Seal: HNBR - MFQ <p>Technical data</p> <ul style="list-style-type: none">- Max working pressure: 420 bar- Proof pressure: 630 bar- Burst pressure: 1260 bar- Working temperature: From -25 °C to +110 °C- Compatibility with fluids: Mineral oils, Synthetic fluids HFB and HFC according to ISO 2943- Degree protection: IP66 according to EN 60529 IP69K according to ISO 20653 <p>Electrical data</p> <ul style="list-style-type: none">- Electrical connection: EN 175301-803- Resistive load: 0.2 A / 115 Vdc	
1.2 bar ±10%	DE X 12 x A 50 P01			
2.0 bar ±10%	DE X 20 x A 50 P01			
5.0 bar ±10%	DE X 50 x A 50 P01			
7.0 bar ±10%	DE X 70 x A 50 P01			
9.5 bar ±10%	DE X 95 x A 50 P01			
		<p>Electrical symbol</p> 		
		<p>Electrical data</p> <ul style="list-style-type: none">- Electrical connection: EN 175301-803- Resistive load: 0.2 A / 115 Vdc		

DEZ*50		Hydraulic symbol	Materials	
Electrical Differential Pressure Indicator Connection: EN 175301-803				
Settings	Ordering code		<p>Materials</p> <ul style="list-style-type: none">- Body: AISI 316L- Base: Black polyamide- Contacts: Silver- Seal: HNBR - MFQ <p>Technical data</p> <ul style="list-style-type: none">- Max working pressure: 700 bar- Proof pressure: 1050 bar- Burst pressure: 2100 bar- Working temperature: From -25 °C to +110 °C- Compatibility with fluids: Mineral oils, Synthetic fluids HFA, HFB, HFC according to ISO 2943- Degree protection: IP66 according to EN 60529 IP69K according to ISO 20653 <p>Electrical data</p> <ul style="list-style-type: none">- Electrical connection: EN 175301-803- Resistive load: 0.2 A / 115 Vdc	
1.2 bar ±10%	DE Z 12 x A 50 P01			
2.5 bar ±10%	DE Z 25 x A 50 P01			
5.0 bar ±10%	DE Z 50 x A 50 P01			
7.0 bar ±10%	DE Z 70 x A 50 P01			
9.5 bar ±10%	DE Z 95 x A 50 P01			
				

DIFFERENTIAL PRESSURE INDICATORS

Dimensions

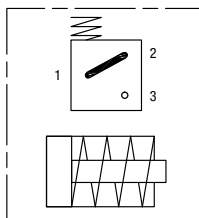
<div>DLA*51 - DLA*52</div> <div>Electrical/Visual Differential Pressure Indicator</div> <div>Connection: EN 175301-803</div> <div>51: Transparent base with lamps 24 Vdc</div> <div>52: Transparent base with lamps 110 Vdc</div> <table><tr><th>Settings</th><th>Ordering code</th></tr><tr><td>1.2 bar ±10%</td><td>DL A 12 x A xx P01</td></tr><tr><td>2.0 bar ±10%</td><td>DL A 20 x A xx P01</td></tr><tr><td>5.0 bar ±10%</td><td>DL A 50 x A xx P01</td></tr><tr><td>7.0 bar ±10%</td><td>DL A 70 x A xx P01</td></tr><tr><td>9.5 bar ±10%</td><td>DL A 95 x A xx P01</td></tr></table> <div></div>		Settings	Ordering code	1.2 bar ±10%	DL A 12 x A xx P01	2.0 bar ±10%	DL A 20 x A xx P01	5.0 bar ±10%	DL A 50 x A xx P01	7.0 bar ±10%	DL A 70 x A xx P01	9.5 bar ±10%	DL A 95 x A xx P01	<div>Hydraulic symbol</div> <div></div> <div>Electrical symbol</div> <div></div>	<div>Materials</div> <div><div>- Body:</div><div>- Base:</div><div>- Contacts:</div><div>- Seal:</div></div> <div><div>Brass</div><div>Transparent polyamide</div><div>Silver</div><div>HNBR - FPM</div></div> <div>Technical data</div> <div><div>- Max working pressure:</div><div>- Proof pressure:</div><div>- Burst pressure:</div><div>- Working temperature:</div><div>- Compatibility with fluids:</div><div>- Degree protection:</div></div> <div><div>420 bar</div><div>630 bar</div><div>1260 bar</div><div>From -25 °C to +110 °C</div><div>Mineral oils, Synthetic fluids HFB and HFC according to ISO 2943</div><div>IP66 according to EN 60529 IP69K according to ISO 20653</div></div> <div>Electrical data</div> <div><div>- Electrical connection:</div><div>- Type</div><div>- Lamps</div><div>- Resistive load:</div></div> <div><div>EN 175301-803</div><div>5152</div><div>24 Vdc110 Vdc</div><div>1 A / 24 Vdc1 A / 110 Vdc</div></div>
Settings	Ordering code														
1.2 bar ±10%	DL A 12 x A xx P01														
2.0 bar ±10%	DL A 20 x A xx P01														
5.0 bar ±10%	DL A 50 x A xx P01														
7.0 bar ±10%	DL A 70 x A xx P01														
9.5 bar ±10%	DL A 95 x A xx P01														
<div>DLA*71</div> <div>Electrical/Visual Differential pressure indicator</div> <div>Connection IEC 61076-2-101 D (M12), black base with lamps 24 Vdc</div> <table><tr><th>Settings</th><th>Ordering code</th></tr><tr><td>1.2 bar ±10%</td><td>DL A 12 x A 71 P01</td></tr><tr><td>2.0 bar ±10%</td><td>DL A 20 x A 71 P01</td></tr><tr><td>5.0 bar ±10%</td><td>DL A 50 x A 71 P01</td></tr><tr><td>7.0 bar ±10%</td><td>DL A 70 x A 71 P01</td></tr><tr><td>9.5 bar ±10%</td><td>DL A 95 x A 71 P01</td></tr></table> <div></div>		Settings	Ordering code	1.2 bar ±10%	DL A 12 x A 71 P01	2.0 bar ±10%	DL A 20 x A 71 P01	5.0 bar ±10%	DL A 50 x A 71 P01	7.0 bar ±10%	DL A 70 x A 71 P01	9.5 bar ±10%	DL A 95 x A 71 P01	<div>Hydraulic symbol</div> <div></div> <div>Electrical symbol</div> <div></div>	<div>Materials</div> <div><div>- Body:</div><div>- Base:</div><div>- Contacts:</div><div>- Seal:</div></div> <div><div>Brass</div><div>Black polyamide</div><div>Silver</div><div>HNBR - FPM</div></div> <div>Technical data</div> <div><div>- Max working pressure:</div><div>- Proof pressure:</div><div>- Burst pressure:</div><div>- Working temperature:</div><div>- Compatibility with fluids:</div><div>- Degree protection:</div></div> <div><div>420 bar</div><div>630 bar</div><div>1260 bar</div><div>From -25 °C to +110 °C</div><div>Mineral oils, Synthetic fluids HFB and HFC according to ISO 2943</div><div>IP65 according to EN 60529 IP69K according to ISO 20653</div></div> <div>Electrical data</div> <div><div>- Electrical connection:</div><div>- Lamps</div><div>- Resistive load:</div></div> <div><div>IEC 61076-2-101 D (M12)</div><div>24 Vdc (black base)</div><div>0.4 A / 24 Vdc</div></div>
Settings	Ordering code														
1.2 bar ±10%	DL A 12 x A 71 P01														
2.0 bar ±10%	DL A 20 x A 71 P01														
5.0 bar ±10%	DL A 50 x A 71 P01														
7.0 bar ±10%	DL A 70 x A 71 P01														
9.5 bar ±10%	DL A 95 x A 71 P01														
<div>DLE*A50</div> <div>Electrical/Visual Differential Pressure Indicator</div> <div>Without term. Connections: EN 175301-803</div> <table><tr><th>Settings</th><th>Ordering code</th></tr><tr><td>1.2 bar ±10%</td><td>DL E 12 x A 50 P01</td></tr><tr><td>2.0 bar ±10%</td><td>DL E 20 x A 50 P01</td></tr><tr><td>5.0 bar ±10%</td><td>DL E 50 x A 50 P01</td></tr><tr><td>7.0 bar ±10%</td><td>DL E 70 x A 50 P01</td></tr><tr><td>9.5 bar ±10%</td><td>DL E 95 x A 50 P01</td></tr></table> <div></div>		Settings	Ordering code	1.2 bar ±10%	DL E 12 x A 50 P01	2.0 bar ±10%	DL E 20 x A 50 P01	5.0 bar ±10%	DL E 50 x A 50 P01	7.0 bar ±10%	DL E 70 x A 50 P01	9.5 bar ±10%	DL E 95 x A 50 P01	<div>Hydraulic symbol</div> <div></div> <div>Electrical symbol</div> <div></div>	<div>Materials</div> <div><div>- Body:</div><div>- Base:</div><div>- Contacts:</div><div>- Seal:</div></div> <div><div>Brass</div><div>Black polyamide</div><div>Silver</div><div>HNBR - FPM</div></div> <div>Technical data</div> <div><div>- Max working pressure:</div><div>- Proof pressure:</div><div>- Burst pressure:</div><div>- Working temperature:</div><div>- Compatibility with fluids:</div><div>- Degree protection:</div></div> <div><div>420 bar</div><div>630 bar</div><div>1260 bar</div><div>From -25 °C to +110 °C</div><div>Mineral oils, Synthetic fluids HFB and HFC according to ISO 2943</div><div>IP65 according to EN 60529</div></div> <div>Electrical data</div> <div><div>- Electrical connections:</div><div>- Resistive load:</div><div>- Available the connector with lamps</div></div> <div><div>EN 175301-803</div><div>5 A / 250 Vac</div><div></div></div>
Settings	Ordering code														
1.2 bar ±10%	DL E 12 x A 50 P01														
2.0 bar ±10%	DL E 20 x A 50 P01														
5.0 bar ±10%	DL E 50 x A 50 P01														
7.0 bar ±10%	DL E 70 x A 50 P01														
9.5 bar ±10%	DL E 95 x A 50 P01														

DLE*F50
Electrical/Visual Differential Pressure Indicator
 With term. Connections: EN 175301-803

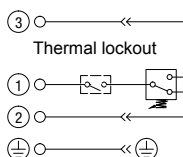
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5.0 bar $\pm 10\%$	DL E 50 x F 50 P01
7.0 bar $\pm 10\%$	DL E 70 x F 50 P01
9.5 bar $\pm 10\%$	DL E 95 x F 50 P01

A/F 32
Max tightening torque: 95 N·m

Hydraulic symbol



Electrical symbol



Materials

- Body: Brass
- Base: Black polyamide
- Contacts: Silver
- Seal: HNBR - FPM

Technical data

- Max working pressure: 420 bar
- Proof pressure: 630 bar
- Burst pressure: 1260 bar
- Working temperature: From -25 °C to +110 °C
- Compatibility with fluids: Mineral oils, Synthetic fluids
HFB and HFC according to ISO 2943
- Degree protection: IP65 according to EN 60529

Electrical data

- Electrical connections: EN 175301-803
- Resistive load: 5 A / 250 Vac
- Thermal lockout setting: +30 °C

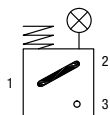
DLX*51 - DLX*52
Electrical/Visual Differential Pressure Indicator
 Connection: EN 175301-803

51: Transparent base with lamps 24 Vdc
 52: Transparent base with lamps 110 Vdc

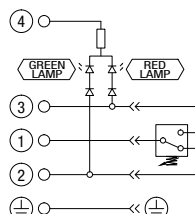
Settings	Ordering code
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2.0 bar $\pm 10\%$	DL X 20 x A 5x P01
5.0 bar $\pm 10\%$	DL X 50 x A 5x P01
7.0 bar $\pm 10\%$	DL X 70 x A 5x P01
9.5 bar $\pm 10\%$	DL X 95 x A 5x P01

A/F 30
Max tightening torque: 65 N·m

Hydraulic symbol



Electrical symbol



Materials

- Body: AISI 316L
- Base: Transparent polyamide
- Contacts: Silver
- Seal: HNBR - MFQ

Technical data

- Max working pressure: 420 bar
- Proof pressure: 630 bar
- Burst pressure: 1260 bar
- Working temperature: From -25 °C to +110 °C
- Compatibility with fluids: Mineral oils, Synthetic fluids
HFB and HFC according to ISO 2943
- Degree protection: IP66 according to EN 60529
IP69K according to ISO 20653

Electrical data

- Electrical connection: EN 175301-803
- Type: 51 52
- Lamps: 24 Vdc 110 Vdc
- Resistive load: 1 A / 24 Vdc 1 A / 110 Vdc

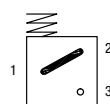
DLZ*51 - DLZ*52
Electrical/Visual Differential Pressure Indicator
 Connection: EN 175301-803

51: Transparent base with lamps 24 Vdc
 52: Transparent base with lamps 110 Vdc

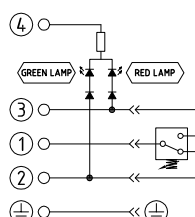
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2.5 bar $\pm 10\%$	DL Z 25 x A 5x P01
5.0 bar $\pm 10\%$	DL Z 50 x A 5x P01
7.0 bar $\pm 10\%$	DL Z 70 x A 5x P01
9.5 bar $\pm 10\%$	DL Z 95 x A 5x P01

A/F 30
Max tightening torque: 110 N·m

Hydraulic symbol



Electrical symbol



Materials

- Body: AISI 316L
- Base: Transparent polyamide
- Contacts: Silver
- Seal: HNBR - MFQ

Technical data

- Max working pressure: 700 bar
- Proof pressure: 1050 bar
- Burst pressure: 2100 bar
- Working temperature: From -25 °C to +110 °C
- Compatibility with fluids: Mineral oils, Synthetic fluids
HFB and HFC according to ISO 2943
- Degree protection: IP66 according to EN 60529
IP69K according to ISO 20653

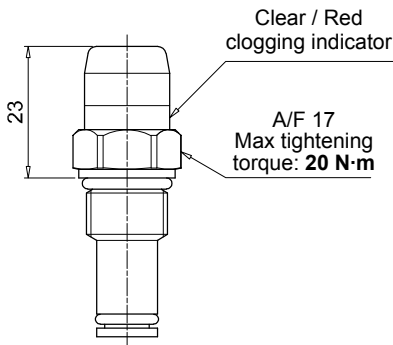
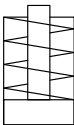
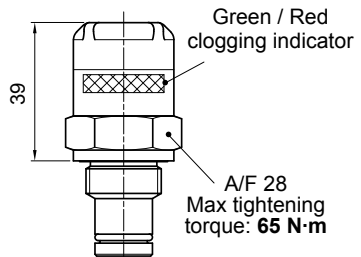

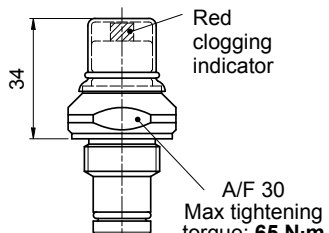

Electrical data

- Electrical connection: EN 175301-803
- Type: 51 52
- Lamps: 24 Vdc 110 Vdc
- Resistive load: 1 A / 24 Vdc 1 A / 110 Vdc

DIFFERENTIAL PRESSURE INDICATORS


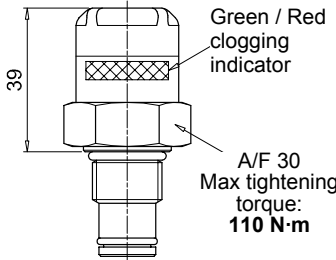
Dimensions

<div>DTA*F70</div> <div>Electronic Differential Pressure Indicator</div> <div>Connection: IEC 61076-2-101 D (M12)</div> <table><tr><th>Settings</th><th>Ordering code</th></tr><tr><td>1.2 bar ±10%</td><td>DT A 12 x F 70 P01</td></tr><tr><td>2.0 bar ±10%</td><td>DT A 20 x F 70 P01</td></tr><tr><td>5.0 bar ±10%</td><td>DT A 50 x F 70 P01</td></tr><tr><td>7.0 bar ±10%</td><td>DT A 70 x F 70 P01</td></tr><tr><td>9.5 bar ±10%</td><td>DT A 95 x F 70 P01</td></tr></table> <div><div><div>47</div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div>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code	1.2 bar ±10%	DT A 12 x F 70 P01	2.0 bar ±10%	DT A 20 x F 70 P01	5.0 bar ±10%	DT A 50 x F 70 P01	7.0 bar ±10%	DT A 70 x F 70 P01	9.5 bar ±10%	DT A 95 x F 70 P01
Settings	Ordering code												
1.2 bar ±10%	DT A 12 x F 70 P01												
2.0 bar ±10%	DT A 20 x F 70 P01												
5.0 bar ±10%	DT A 50 x F 70 P01												
7.0 bar ±10%	DT A 70 x F 70 P01												
9.5 bar ±10%	DT A 95 x F 70 P01												

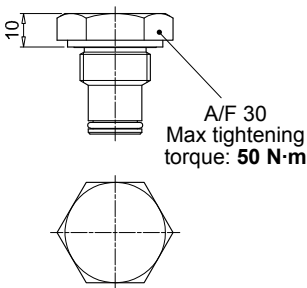
<div>DVS</div> <div>Visual Differential Pressure Indicator</div> <table><tr><th>Settings</th><th>Ordering code</th></tr><tr><td>1.2 bar ±10%</td><td>DV S 12 H P01</td></tr><tr><td>2.5 bar ±10%</td><td>DV S 25 H P01</td></tr><tr><td>4.0 bar ±10%</td><td>DV S 40 H P01</td></tr></table> <div><p>Clear / Red clogging indicator</p><p>A/F 17 Max tightening torque: 20 N·m</p></div>	Settings	Ordering code	1.2 bar ±10%	DV S 12 H P01	2.5 bar ±10%	DV S 25 H P01	4.0 bar ±10%	DV S 40 H P01	<div>Hydraulic symbol</div> 	<div>Materials</div> <div><div>- Body:</div><div>- Internal parts:</div><div>- Seal:</div></div> <div>Brass Brass - Polyamide HNBR</div> <div>Technical data</div> <div><div>- Reset:</div><div>- Max working pressure:</div><div>- Proof pressure:</div><div>- Burst pressure:</div><div>- Working temperature:</div><div>- Compatibility with fluids:</div><div>- Degree protection:</div></div> <div>Automatic reset 16 bar 24 bar 48 bar From -25 °C to +110 °C Mineral oils, Synthetic fluids HFB and HFC according to ISO 2943 IP67 according to EN 60529</div>				
Settings	Ordering code													
1.2 bar ±10%	DV S 12 H P01													
2.5 bar ±10%	DV S 25 H P01													
4.0 bar ±10%	DV S 40 H P01													
<div>DVX</div> <div>Visual Differential Pressure Indicator</div> <table><tr><th>Settings</th><th>Ordering code</th></tr><tr><td>1.2 bar ±10%</td><td>DV X 12 x P01</td></tr><tr><td>2.0 bar ±10%</td><td>DV X 20 x P01</td></tr><tr><td>5.0 bar ±10%</td><td>DV X 50 x P01</td></tr><tr><td>7.0 bar ±10%</td><td>DV X 70 x P01</td></tr><tr><td>9.5 bar ±10%</td><td>DV X 95 x P01</td></tr></table> <div><p>Green / Red clogging indicator</p><p>A/F 28 Max tightening torque: 65 N·m</p></div>	Settings	Ordering code	1.2 bar ±10%	DV X 12 x P01	2.0 bar ±10%	DV X 20 x P01	5.0 bar ±10%	DV X 50 x P01	7.0 bar ±10%	DV X 70 x P01	9.5 bar ±10%	DV X 95 x P01	<div>Hydraulic symbol</div> 	<div>Materials</div> <div><div>- Body:</div><div>- Internal parts:</div><div>- Seal:</div></div> <div>AISI 316L AISI 316L - Polyamide HNBR - MFQ</div> <div>Technical data</div> <div><div>- Reset:</div><div>- Max working pressure:</div><div>- Proof pressure:</div><div>- Burst pressure:</div><div>- Working temperature:</div><div>- Compatibility with fluids:</div><div>- Degree protection:</div></div> <div>Automatic reset 420 bar 630 bar 1260 bar From -25 °C to +110 °C Mineral oils, Synthetic fluids HFB and HFC according to ISO 2943 IP65 according to EN 60529</div>
Settings	Ordering code													
1.2 bar ±10%	DV X 12 x P01													
2.0 bar ±10%	DV X 20 x P01													
5.0 bar ±10%	DV X 50 x P01													
7.0 bar ±10%	DV X 70 x P01													
9.5 bar ±10%	DV X 95 x P01													
<div>DVY</div> <div>Visual Differential Pressure Indicator</div> <table><tr><th>Settings</th><th>Ordering code</th></tr><tr><td>1.2 bar ±10%</td><td>DV Y 12 x P01</td></tr><tr><td>2.0 bar ±10%</td><td>DV Y 20 x P01</td></tr><tr><td>5.0 bar ±10%</td><td>DV Y 50 x P01</td></tr><tr><td>7.0 bar ±10%</td><td>DV Y 70 x P01</td></tr><tr><td>9.5 bar ±10%</td><td>DV Y 95 x P01</td></tr></table> <div><p>Red clogging indicator</p><p>A/F 30 Max tightening torque: 65 N·m</p></div>	Settings	Ordering code	1.2 bar ±10%	DV Y 12 x P01	2.0 bar ±10%	DV Y 20 x P01	5.0 bar ±10%	DV Y 50 x P01	7.0 bar ±10%	DV Y 70 x P01	9.5 bar ±10%	DV Y 95 x P01	<div>Hydraulic symbol</div> 	<div>Materials</div> <div><div>- Body:</div><div>- Internal parts:</div><div>- Seal:</div></div> <div>AISI 316L AISI 316L - Polyamide HNBR - MFQ</div> <div>Technical data</div> <div><div>- Reset:</div><div>- Max working pressure:</div><div>- Proof pressure:</div><div>- Burst pressure:</div><div>- Working temperature:</div><div>- Compatibility with fluids:</div><div>- Degree protection:</div></div> <div>Manual reset 420 bar 630 bar 1260 bar From -25 °C to +110 °C Mineral oils, Synthetic fluids HFB and HFC according to ISO 2943 IP65 according to EN 60529</div>
Settings	Ordering code													
1.2 bar ±10%	DV Y 12 x P01													
2.0 bar ±10%	DV Y 20 x P01													
5.0 bar ±10%	DV Y 50 x P01													
7.0 bar ±10%	DV Y 70 x P01													
9.5 bar ±10%	DV Y 95 x P01													

DIFFERENTIAL PRESSURE INDICATORS

Dimensions

DVZ		Hydraulic symbol		Materials - Body: AISI 316L - Internal parts: AISI 316L - Polyamide - Seal: HNBR - MFQ
Visual Differential Pressure Indicator				
Settings	Ordering code			
1.2 bar ±10%	DV Z 12 x P01			
2.5 bar ±10%	DV Z 25 x P01			
5.0 bar ±10%	DV Z 50 x P01			
7.0 bar ±10%	DV Z 70 x P01			
9.5 bar ±10%	DV Z 95 x P01			
				

T2	
Plug	
Seal	Ordering code
HNBR	T2 H
FPM	T2 V



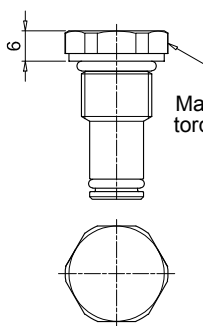
10

A/F 30
Max tightening
torque: **50 N·m**

Materials

- Body:
Phosphatized steel
- Seal:
HNBR / FPM

T4	
Plug	
Seal	Ordering code
NBR	T4 A

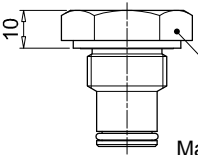


A/F 19
Max tightening
torque: **20 N·m**

Materials

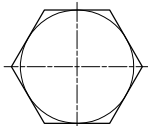
- Body:
Anodized aluminium
- Seal:
NBR

X2	
Stainless Steel plug 420 bar	
Seal	Ordering code
HNBR	X2 H
FPM	X2 V
MFQ	X2 F



10

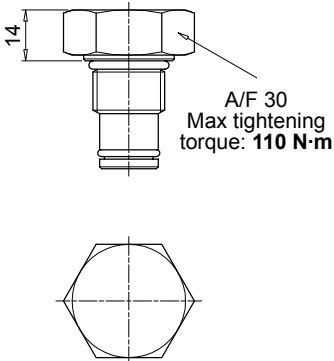
A/F 30
Max tightening
torque: **50 N·m**



Materials

- Body:
AISI 316L
- Seal:
HNBR / FPM / MFQ

X3	
Stainless Steel plug 700 bar (only for FZH)	
Seal	Ordering code
HNBR	X3 H
FPM	X3 V
MFQ	X3 F



A/F 30
Max tightening
torque: **110 N·m**

Materials

- Body:
AISI 316L
- Seal:
HNBR / FPM / MFQ

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