

# HYDRAULIC FILTRATION PRODUCTS

LOW & MEDIUM PRESSURE FILTERS



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.

## MARKET LEADER



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.



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

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 **8** business branches



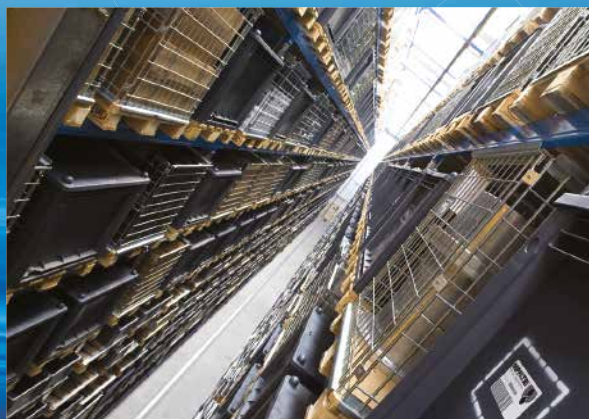
## TECHNOLOGY

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

Flow rates  
up to 875 l/min

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

### RETURN FILTERS

Flow rates  
up to 3000 l/min

- Pressure  
up to 20 bar
- Mounting:
- In-Line
  - Tank top
  - In single and duplex designs

### RETURN / SUCTION FILTERS

Flow rates  
up to 300 l/min

- Pressure  
up to 80 bar
- Mounting:
- In-Line
  - Tank top

### SPIN-ON FILTERS

Flow rates  
up to 365 l/min

- Pressure  
up to 35 bar
- Mounting:
- In-Line
  - Tank top

### LOW & MEDIUM PRESSURE FILTERS

Flow rates  
up to 3000 l/min

- Pressure  
up to 80 bar
- Mounting:
- In-Line
  - Parallel manifold version
  - In single and duplex designs

### HIGH PRESSURE FILTERS

Flow rates  
up to 750 l/min

- Pressure from 110 bar  
up to 560 bar
- 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) 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

Flow rates up to 150 l/min  
Pressure from 320 bar  
up to 1000 bar

Mounting:

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

### CONTAMINATION MONITORING PRODUCTS

- Online, in-line particle counters
- 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

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

### ACCESSORIES

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

# HYDRAULIC FILTRATION PRODUCTS

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<b>286</b>	<b>page</b>	<b>SPIN-ON FILTERS</b>		<b>up to <math>P_{max}</math></b>	<b>up to <math>Q_{max}</math></b>
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311	CLOGGING INDICATORS				

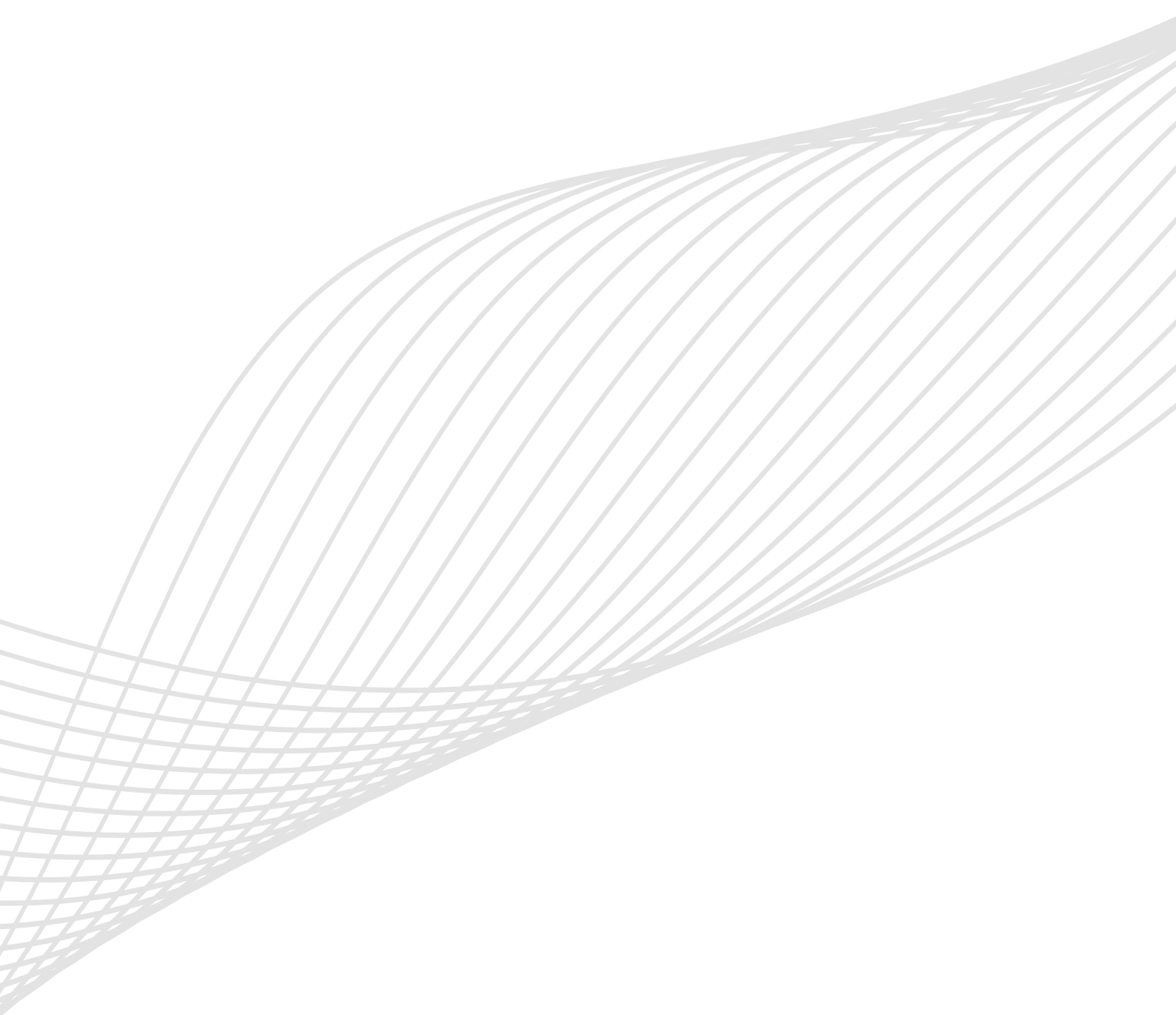
page	LOW & MEDIUM PRESSURE FILTERS	up to P <sub>max</sub>		up to Q <sub>max</sub>		
		bar	psi	l/min	gpm	
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363	LMP 950 - 951	In-line filter, available with 2 and up to 6 different heads	30	435	2400	634
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417	LDP - LDD	In-line and duplex medium pressure filter	60	870	330	87
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444	CLOGGING INDICATORS					

page	HIGH PRESSURE FILTERS	up to P <sub>max</sub>		up to Q <sub>max</sub>		
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# 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 popular classification criterion divides them into the following families:

- MINERAL OILS

Commonly used oil deriving fluids.

- FIRE RESISTANT FLUIDS

Fluids with intrinsic characteristics of incombustibility or high flash point.

- SYNTHETIC FLUIDS

Modified chemical products to obtain specific optimized features.

- ECOLOGICAL FLUIDS

Synthetic or vegetable origin fluids with high biodegradability characteristics.

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.

- CINEMATIC 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.

Cinematic 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 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



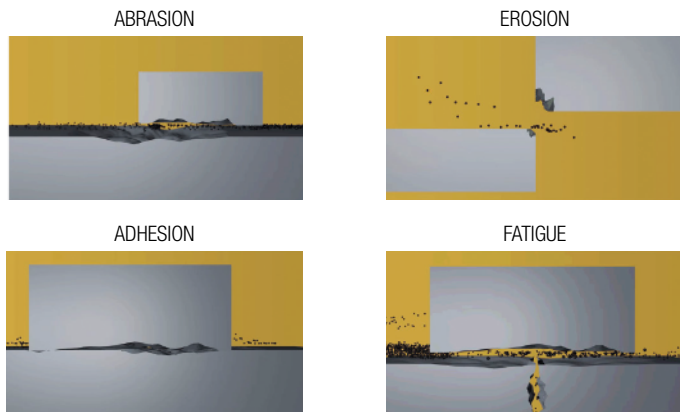
Solid contamination mainly causes surface damage and component wear.

- 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 stem performance, failures.

- 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  
Maintenance activities, spare parts, machine stop costs
- ENERGY AND EFFICIENCY  
Efficiency and performance reduction due to friction, drainage, cavitation.



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.

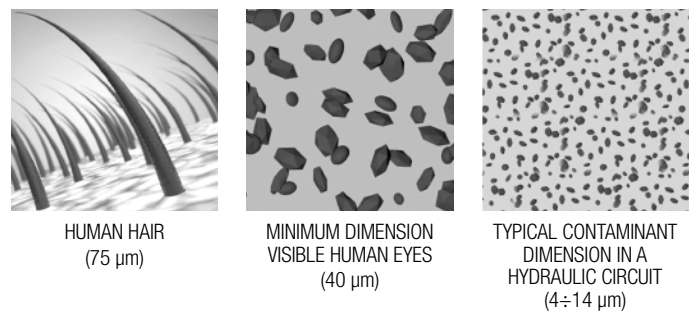
## 4 MEASURING THE SOLID CONTAMINATION LEVEL

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?



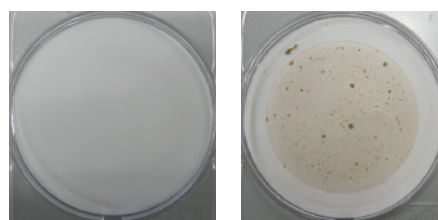
Contamination level analysis is significant only if performed with a uniform and repeatable method, conducted with standard test methods and suitably calibrated equipment.

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.



# 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 Automatic Particle Counters (APC).

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 code refers to the number of particles of the same size or greater than 4, 6 or 14  $\mu\text{m}$  in a 1 ml fluid.

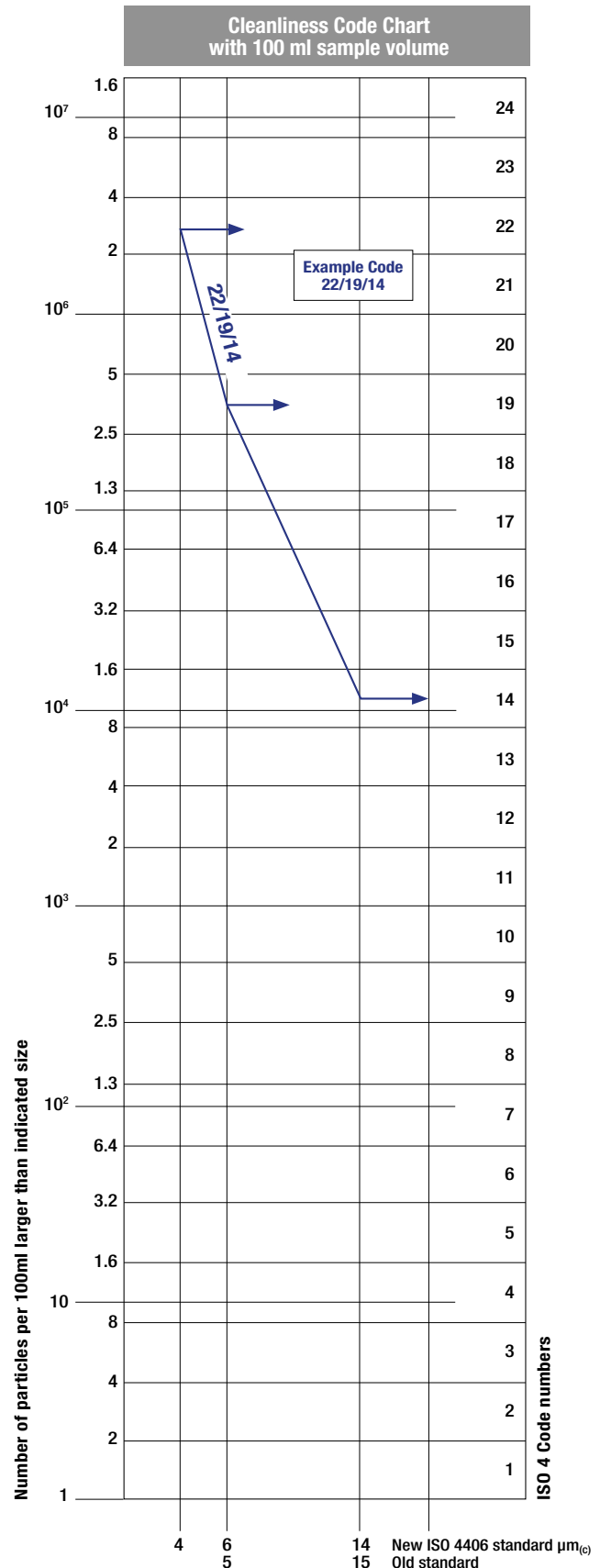
Class	Number of particles per ml	
	Over	Up to
28	1 300 000	2 500 000
27	640 000	1 300 000
26	320 000	640 000
25	160 000	320 000
24	80 000	160 000
23	40 000	80 000
22	20 000	40 000
21	10 000	20 000
20	5 000	10 000
19	2 500	5 000
18	1 300	2 500
17	640	1 300
16	320	640
15	160	320
14	80	160
13	40	80
12	20	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 4406:2017 Cleanliness Code System

Microscope counting examines the particles differently to APCs and the code is given with two scale numbers only.

These are at 5  $\mu\text{m}$  and 15  $\mu\text{m}$  equivalent to the 6  $\mu\text{m}_{(c)}$  and 14  $\mu\text{m}_{(c)}$  of APCs.



- CUMULATIVE DISTRIBUTION OF THE PARTICLES SIZE - SAE AS 4059-1 and SAE AS 4059-2

**Classification example according to SAE AS 4059-1 and SAE AS 4059-2**

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).

It can be made a differential measurement (Table 1) or a cumulative measurement (Table 2)

Table 1 - Class for differential measurement

Class	Dimension of contaminant				
	6÷14 µm <sub>(c)</sub>	14÷21 µm <sub>(c)</sub>	21÷38 µm <sub>(c)</sub>	38÷70 µm <sub>(c)</sub>	>70 µm <sub>(c)</sub>
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

- 6÷14 µm<sub>(c)</sub> = 15 000 particles
  - 14÷21 µm<sub>(c)</sub> = 2 200 particles
  - 21÷38 µm<sub>(c)</sub> = 200 particles
  - 38÷70 µm<sub>(c)</sub> = 35 particles
  - > 70 µm<sub>(c)</sub> = 3 particles
- Class 6

Table 2 - Class for cumulative measurement

Class	Dimension of contaminant					
	>4 µm <sub>(c)</sub> A	>6 µm <sub>(c)</sub> B	>14 µm <sub>(c)</sub> C	>21 µm <sub>(c)</sub> D	>38 µm <sub>(c)</sub> E	>70 µm <sub>(c)</sub> F
000	195	76	14	3	1	0
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<sub>(c)</sub> = 45 000 particles
  - > 6 µm<sub>(c)</sub> = 15 000 particles
  - > 14 µm<sub>(c)</sub> = 1 500 particles
  - > 21 µm<sub>(c)</sub> = 250 particles
  - > 38 µm<sub>(c)</sub> = 15 particles
  - > 70 µm<sub>(c)</sub> = 3 particle
- Class from 2F to 4E

- 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 100ml volume at various size intervals (differential counts) rather than using cumulative counts as in ISO 4406:1999. 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 APC's.

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<sub>(c)</sub> = 42 000 particles
  - 15÷25 µm<sub>(c)</sub> = 2 200 particles
  - 25÷50 µm<sub>(c)</sub> = 150 particles
  - 50÷100 µm<sub>(c)</sub> = 18 particles
  - > 100 µm<sub>(c)</sub> = 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



COMPARISON PHOTOGRAPHS

1 graduation = 10µm



ISO 4406:1999	Class 16/14/11	Class 22/20/17
SAE AS4059E Table 1	Class 5	Class 11
NAS 1638	Class 5	Class 11
SAE AS4059E Table 2	Class 6A/5B/5C	Class 12A/11B/11C

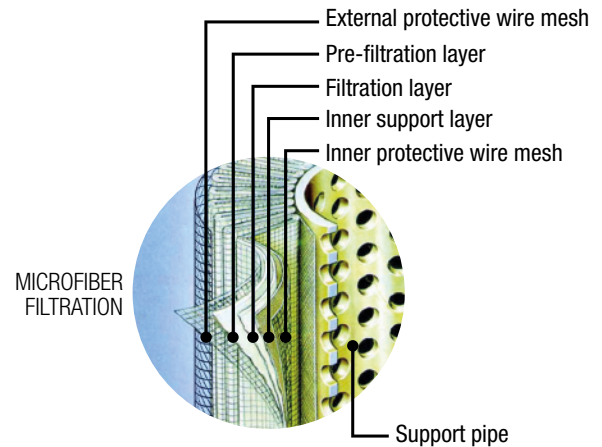


# CONTAMINATION MANAGEMENT

## - CLEANLINESS CODE COMPARISON

Although ISO 4406:2017 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 4406:2017	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



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.

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

## 5 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.



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 ( $\beta$  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.



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 $\mu\text{m}$	A03
7 $\mu\text{m}_{(c)}$	6 $\mu\text{m}$	A06
10 $\mu\text{m}_{(c)}$	10 $\mu\text{m}$	A10
16 $\mu\text{m}_{(c)}$	18 $\mu\text{m}$	A16
21 $\mu\text{m}_{(c)}$	25 $\mu\text{m}$	A25



## 6 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 $\beta_{x(c)} \geq 1.000$	$\beta_{20(c)} > 1000$	$\beta_{15(c)} > 1000$	$\beta_{10(c)} > 1000$	$\beta_{7(c)} > 1000$	$\beta_{7(c)} > 1000$	$\beta_{5(c)} > 1000$

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

## 7 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 ÷ 125  $\mu\text{m}$ .

They can be equipped with a magnetic column 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 ÷ 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.

## 8 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 ( $\Delta P$ )**

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.

## 9 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.

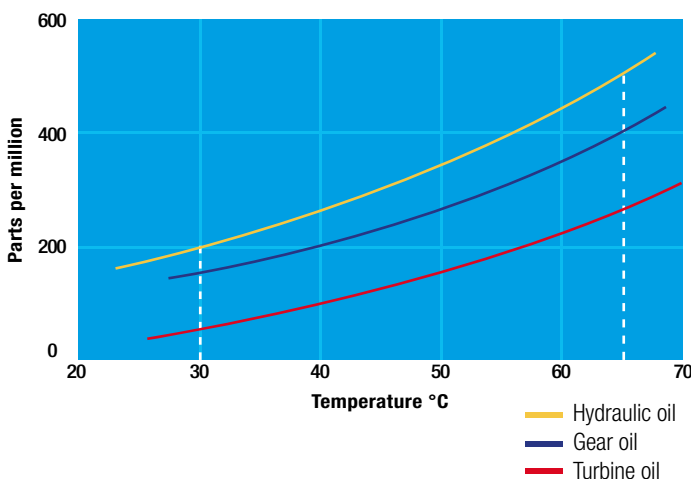
## 10 WATER IN HYDRAULIC AND LUBRICATING FLUIDS

### 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.



## 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.

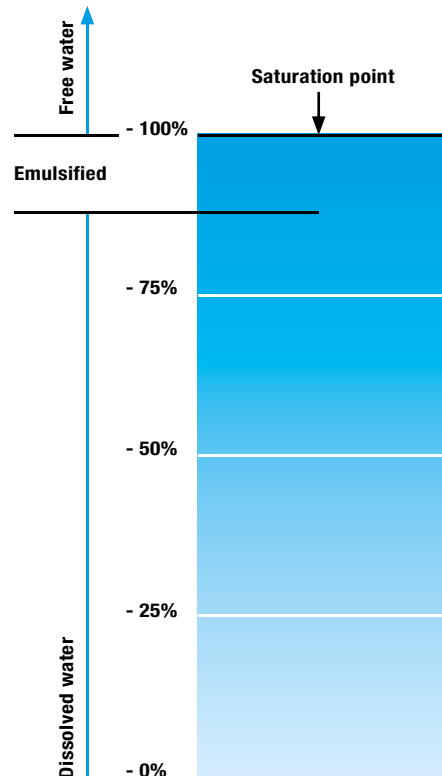
However, even water in solution can cause damage and therefore every reasonable effort should be made to keep saturation levels as low as possible. There is no such thing as too little water. As a guideline, we recommend maintaining saturation levels below 50% in all equipment.

### TYPICAL WATER SATURATION LEVEL FOR NEW OILS

Examples:

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

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



# CONTAMINATION MANAGEMENT

## Water absorber

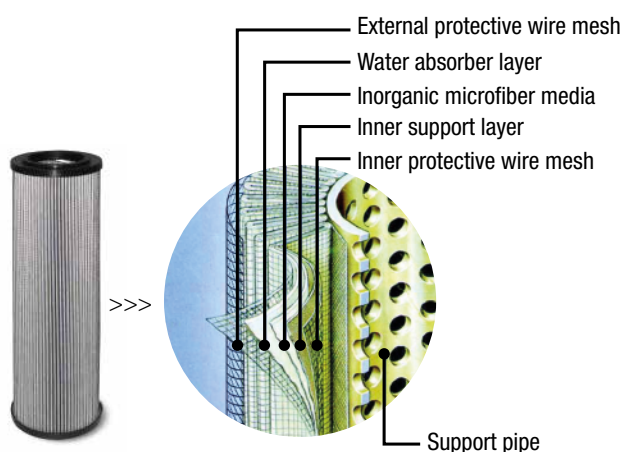
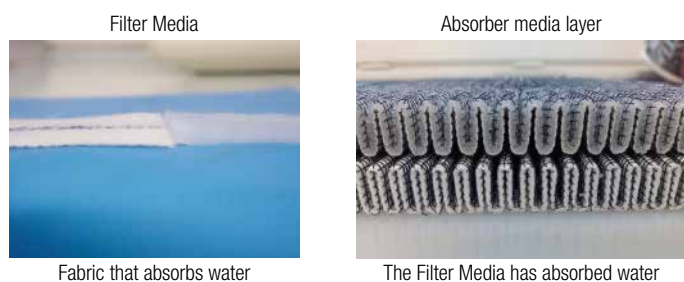
Water is present everywhere, during storage, handling and servicing.

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  $\mu\text{m}$  (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).



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

## Product availability:

### LOW & MEDIUM PRESSURE FILTERS - LMP Series

LMP 210	LMP 900
LMP 211	LMP 901
LMP 400	LMP 902
LMP 401	LMP 903
LMP 430	LMP 950
LMP 431	LMP 951



# FILTER SIZING

## INDEX

	Page
CALCULATION	23
CORRECTIVE FACTOR	24

**THE CORRECT FILTER SIZING HAVE TO BE BASED ON THE TOTAL PRESSURE DROP DEPENDING BY THE APPLICATION.**

FOR EXAMPLE, THE MAXIMUM TOTAL PRESSURE DROP ALLOWED BY A NEW AND CLEAN RETURN FILTER HAVE TO BE IN THE RANGE 0.4 ÷ 0.6 bar.

The pressure drop calculation is performed by adding together the value of the housing with the value of the filter element. The pressure drop  $\Delta pc$  of the housing is proportional to the fluid density ( $kg/dm^3$ ); all the graphs in the catalogue are referred to mineral oil with density of  $0.86 kg/dm^3$ .

The filter element pressure drop  $\Delta pe$  is proportional to its viscosity ( $mm^2/s$ ), the corrective factor Y have to be used in case of an oil viscosity different than  $30 mm^2/s$  (cSt).

**Sizing data for single filter element, head at top**

$\Delta pc$  = Filter housing pressure drop [bar]

$\Delta pe$  = Filter element pressure drop [bar]

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)

V1 reference oil viscosity =  $30 mm^2/s$  (cSt)

V2 = operating oil viscosity in  $mm^2/s$  (cSt)

**Filter element pressure drop calculation with an oil viscosity different than  $30 mm^2/s$  (cSt)**

$\Delta pe = Y : 1000 \times Q \times (V2:V1)$

$\Delta p Tot. = \Delta pc + \Delta pe$

**Verification formula**

$\Delta p Tot. \leq \Delta p max allowed$

**Maximum total pressure drop ( $\Delta p max$ ) allowed by a new and clean filter**

Application	Range (bar)
Suction filters	0.08 ÷ 0.10
Return filters	0.4 ÷ 0.6
	0.4 ÷ 0.6 return lines
	0.3 ÷ 0.5 lubrication lines
Low & Medium Pressure filters	0.3 ÷ 0.4 off-line in power systems
	0.1 ÷ 0.3 off-line in test benches
	0.4 ÷ 0.6 over-boost
High Pressure filters	0.8 ÷ 1.5
Stainless Steel filters	0.8 ÷ 1.5

**Generic filter calculation example**

Application data:

Tank top return filter

Pressure Pmax = 10 bar

Flow rate Q = 120 l/min

Viscosity V2 =  $46 mm^2/s$  (cSt)

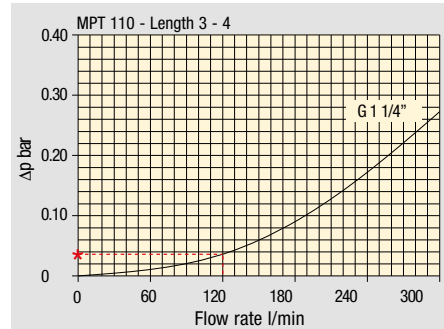
Oil density =  $0.86 kg/dm^3$

Required filtration efficiency =  $25 \mu m$  with absolute filtration

With bypass valve and G 1 1/4" inlet connection

Calculation:

$\Delta pc = 0.03 bar$  (see graphic below)



Filter housings  $\Delta p$  pressure drop. The curves are plotted using mineral oil with density of  $0.86 kg/dm^3$  in compliance with ISO 3968.  $\Delta p$  varies proportionally with density.

$\Delta pe = (2.00 : 1000) \times 120 \times (46 : 30) = 0.37 bar$

Filter element	Absolute filtration H Series					Nominal filtration N Series			
	A03	A06	A10	A16	A25	P10	P25	M25 M60 M90	
Type									
Return filters									
MF 020	2	74.00	50.08	20.00	16.00	9.00	6.43	5.51	4.40
	3	29.20	24.12	8.00	7.22	5.00	3.33	2.85	2.00
MF 030 MFX 030	1	22.00	19.00	6.56	5.33	4.33	1.68	1.44	1.30
	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

$\Delta p Tot. = 0.03 + 0.37 = 0.4 bar$

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

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



# FILTER SIZING Corrective factor

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 mm<sup>2</sup>/s

## Return filters

Filter element	Absolute filtration H Series					Nominal filtration N Series			
	Type	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	0.42	0.42	0.36	0.09
CU 850		1.06	0.84	0.42	0.33	0.17	0.17	0.13	0.04
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

## Return / Suction filters

Filter element	Absolute filtration			
	Type	A10	A16	A25
RSX 116	1	5.12	4.33	3.85
	2	2.22	1.87	1.22
RSX 165	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 N Series								
	Type	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	2.80	2.36	1.14	0.91	0.85	0.05

## Low & Medium pressure filters

Filter element	Absolute filtration N-W Series					Nominal filtration N Series			
	Type	A03	A06	A10	A16	A25	P10	P25	M25
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	3.13	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	0.05
	CU 900	1	0.86	0.63	0.32	0.30	0.21	-	-
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

**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 mm<sup>2</sup>/s

## High pressure filters

Filter element	Absolute filtration N - R Series					Nominal filtration N Series	
	Type	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
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 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
HP 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

Filter element	Absolute filtration N Series					Nominal filtration N Series	
	Type	A03	A06	A10	A16	A25	M25
HF 320	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

## Suction filters

Filter element	Nominal filtration N Series	
	P10	P25
SF 250	65	21

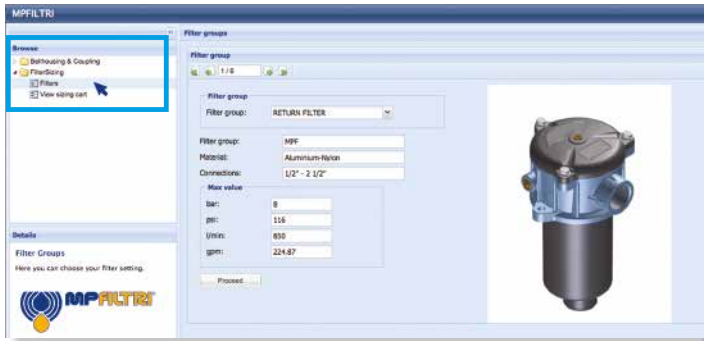
## Stainless steel high pressure filters

Filter element	Absolute filtration N Series					
	Type	A03	A06	A10	A16	A25
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
	3	36.57	32.28	18.00	13.38	8.00
	4	26.57	23.27	12.46	8.80	5.58
HP 050	1	31.75	30.30	13.16	12.3	7.29
	2	24.25	21.26	11.70	9.09	4.90
	3	17.37	16.25	8.90	7.18	3.63
	4	12.12	10.75	6.10	5.75	3.08
	5	7.00	6.56	3.60	3.10	2.25
HP 135	1	20.33	18.80	9.71	8.66	4.78
	2	11.14	10.16	6.60	6.38	2.22
	3	6.48	6.33	3.38	3.16	2.14

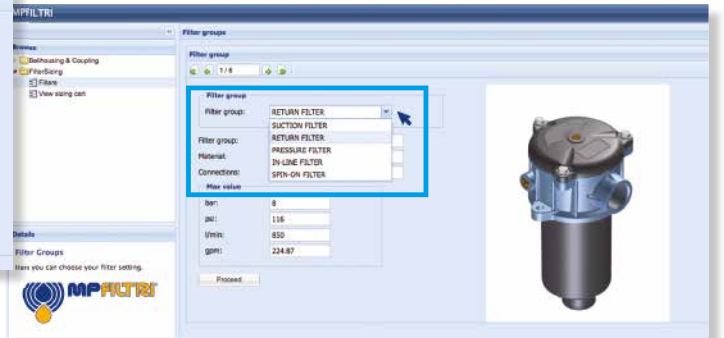
Filter element	Absolute filtration H - U Series					
	Type	A03	A06	A10	A16	A25
HP 011	1	424.58	319.74	235.17	194.44	163.78
	2	281.06	211.25	94.53	75.45	47.26
	3	130.14	97.50	43.63	34.82	21.81
	4	109.39	82.25	36.79	29.37	18.40
HP 039	2	70.66	53.20	25.77	20.57	14.67
	3	36.57	32.28	18.00	13.38	8.00
	4	26.57	23.27	12.46	8.80	5.58
HP 050	1	47.33	34.25	21.50	20.50	14.71
	2	29.10	25.95	14.04	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	7.60	4.44
	3	8.96	7.46	4.89	4.16	3.07

# FILTER SIZING Selection Software

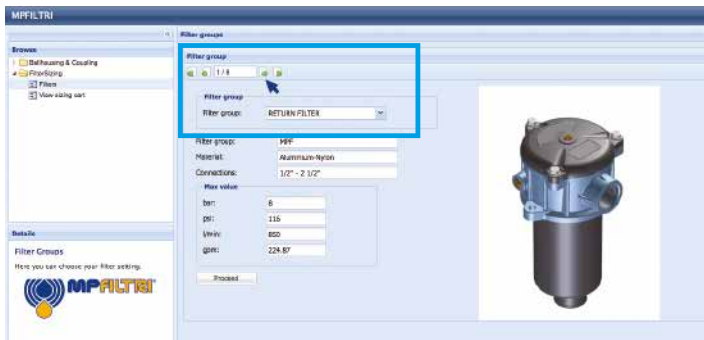
## Step 1 Select "FILTERS"



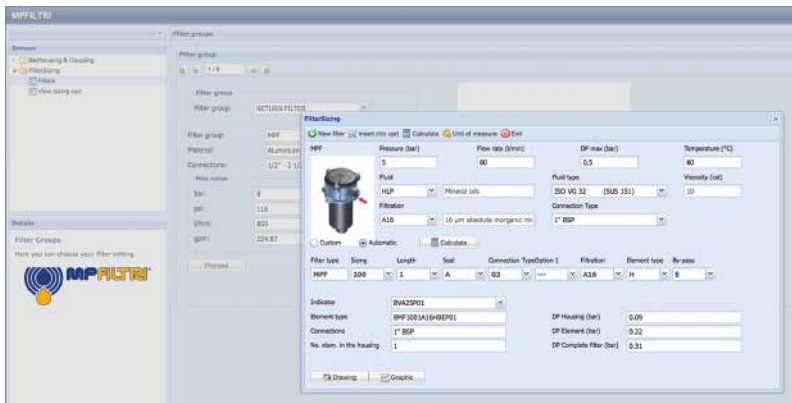
## Step 2 Choose filter group (Return Filter, Pressure Filter, etc.)



## Step 3 Choose filter type (MPF, MPT, etc.) in function of the max working pressure and the max flow rate



## Step 4 Push "PROCEED"



## Step 5

Insert all application data to calculate the filter size following the sequence:

- working pressure
- working flow rate
- working pressure drop
- working temperature
- fluid material and fluid type
- filtration media
- connection type

## Step 6

Push "CALCULATE" to have result; in case of any mistake, the system will advice which parameter is out of range to allow to modify/adjust the selection



## Step 7

Download PDF Datasheet "Report.aspx" pushing the button "Drawing"



**LMP - low and medium pressure filters are used as process filters to protect pumps, pressure reducers and hydraulic circuits from damage due to oil contamination as per ISO 4406.**

**LMP series is available in 5 different sizes: 100, 200, 400, 900 and 950 and a wide range of versions.**

**LMP filters are available with several working pressures suitable for all hydraulic circuits as:**

- **return filters in external tank mounting construction for medium and high flow rates in single and duplex versions**
- **in-line filters for low and medium pressures for off-line applications**
- **in-line process filters for medium pressures, for example, for forced lubrication applications, in single or duplex versions**
- **in-line filters for medium pressures for filtering hydraulic boost circuits**
- **in-line filters as high holding capacity filters on test beds**

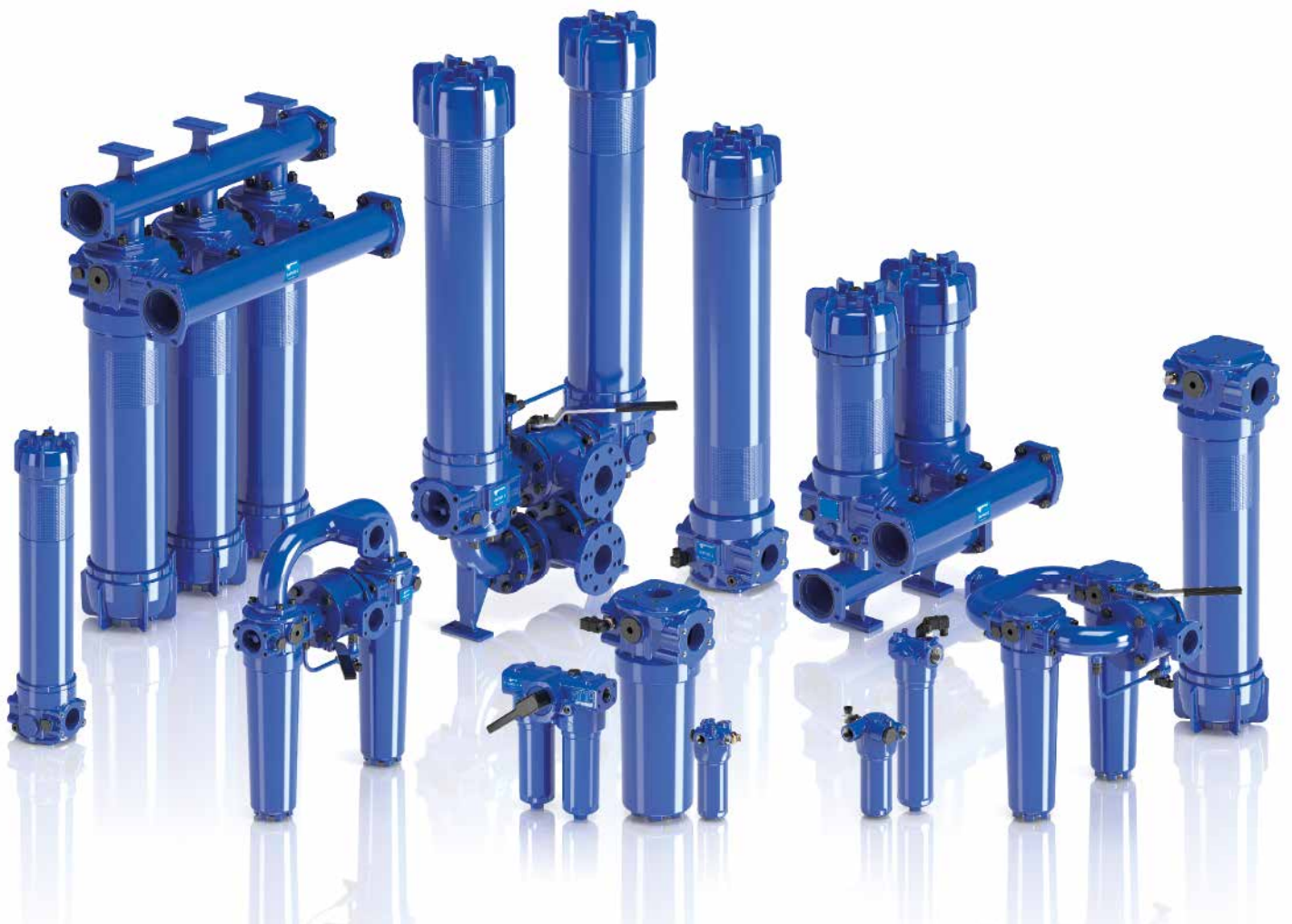
**LMP filters are thus specifically designed to be suitable for a wide range of application: from steel plants to mobile equipments, from test benches to naval application, providing the right solution for filtering requirements in all sectors.**

**LMP filters are available in single, manifold and duplex versions (LMD series).**

## FILTER SIZING

For the proper corrective factor Y see chapter at page 24

# Low & Medium Pressure filters



LMP 110 - 120 - 123 MULTIPORT	page 325
LMP 210 - 211	341
LMP 400 - 401 & 430 - 431	351
LMP 950 - 951	363
LMP 952 - 953 - 954	371
LMD 211	383
LMD 400 - 401 & 431	391
LMD 951	407

<b>Filter element according to DIN 24550</b>	page 415
LDP - LDD	417
LMP 900 - 901	427
LMP 902 - 903	435

<b>INDICATORS</b>	page 444
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# LMP 110-120-123 series

MULTIPOINT

Maximum working pressure up to 8 MPa (80 bar) - Flow rate up to 200 l/min



### Description

### Technical data

#### Low & Medium Pressure filters

**Maximum working pressure up to 8 MPa (80 bar)**  
**Flow rate up to 200 l/min**

LMP110 is a range of versatile low pressure filter for transmission, protection of sensitive components in low pressure hydraulic systems and filtration of the coolant into the machine tools.

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

#### Available features:

- Female threaded connections up to 1", for a maximum return flow rate of 200 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
- Visual, electrical and electronic differential clogging indicators
- Multiport and multifunction schemes, to meet any type of application.
- LMP112: 3/4" additional input port
- LMP116: 3/4" additional output port
- LMP118: 3/4" bypass port, to send the bypass flow to the reservoir instead of the system
- LMP119: 3/4" relief port, to relief the input pressure in the filter, protecting the components downstream the filter against back pressure caused by the pressure drop (cold starts)
- LMP120: connections placed in the same side
- LMP122: connections placed in the same side and 1" additional output port
- LMP123: 2 and 3 bar integrated relief valve

#### Common applications:

Delivery lines, in any low pressure industrial equipment or mobile machines

#### Filter housing materials

- Head: Aluminium
- Housing: Cathaphoresis - Painted Steel
- Bypass valve: Brass - Aluminium

#### Pressure

- Test pressure: 12 MPa (120 bar)
- Burst pressure:
  - LMP 110: 29 MPa (290 bar)
  - LMP 120/130: 38 MPa (380 bar)
- Pulse pressure fatigue test: 1 000 000 cycles with pressure from 0 to 8 MPa (80 bar)

#### Bypass valve

- Opening pressure 350 kPa (3.5 bar) ±10%
- Other opening pressures on request.

#### Δp element type

- Microfibre filter elements - series N - W: 20 bar
- Wire mesh filter elements - series N: 20 bar
- Fluid flow through the filter element from OUT to IN

#### Seals

- Standard NBR series A
- Optional FPM series V

#### Temperature

From -25 °C to +110 °C

#### Note

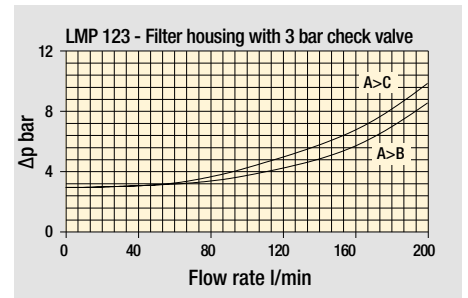
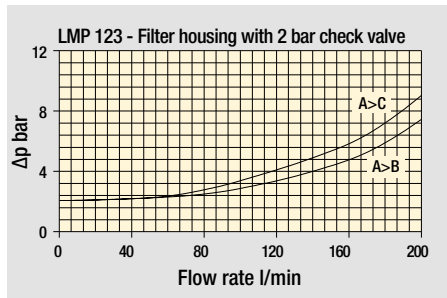
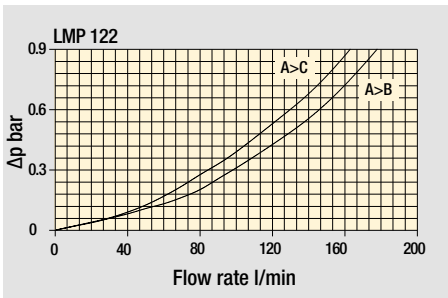
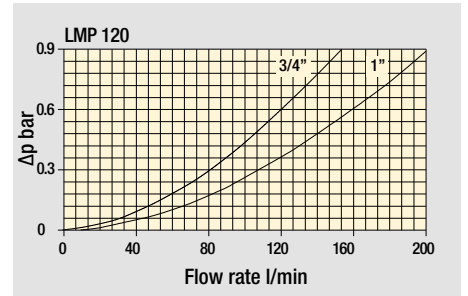
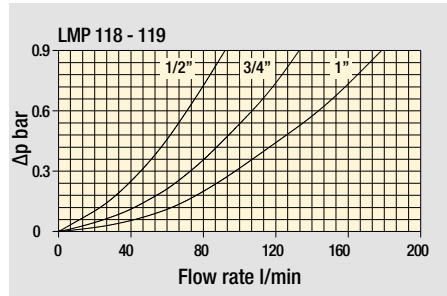
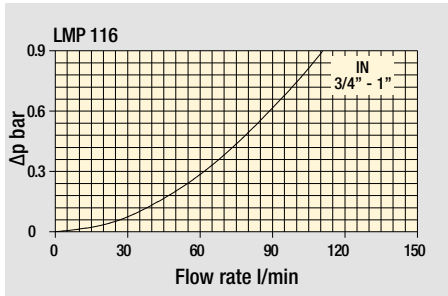
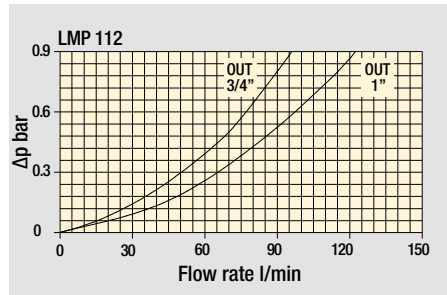
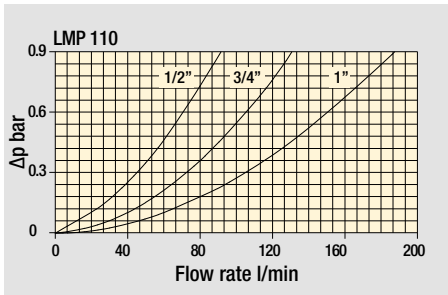
LMP MULTIPOINT filters are provided for vertical mounting



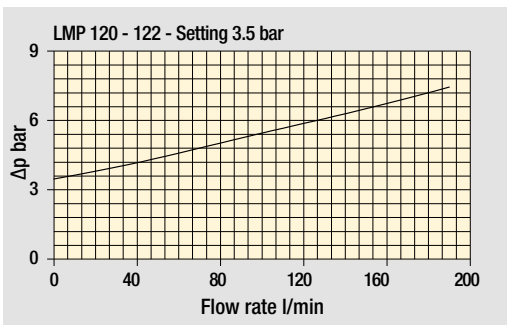
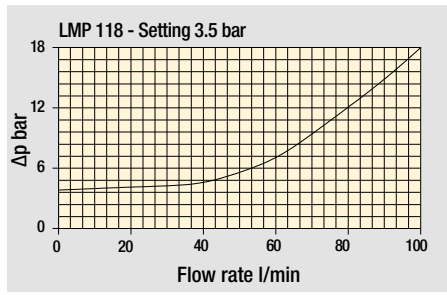
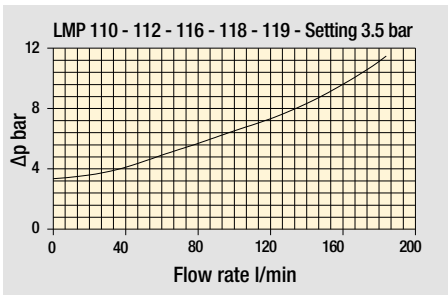
### Weights [kg] and volumes [dm<sup>3</sup>]

Filter series	Weights [kg]				Volumes [dm <sup>3</sup> ]					
	Length	1	2	3	4	Length	1	2	3	4
<b>LMP 110-112-116-118-119</b>		1.60	1.80	2.10	2.60		0.75	0.81	1.11	1.53
<b>LMP 120-122</b>		1.90	2.10	2.40	2.90		0.75	0.81	1.11	1.53
<b>LMP 123</b>		1.70	1.90	2.20	2.70		0.75	0.81	1.11	1.53

Filter housings  $\Delta p$  pressure drop



Bypass valve pressure drop



The curves are plotted using mineral oil with density of 0.86 kg/dm<sup>3</sup> in compliance with ISO 3968.  $\Delta p$  varies proportionally with density.

Flow rates [l/min]

		Filter element design - N Series							
Filter series	Length	A03	A06	A10	A16	A25	M25 M60 M90 M250	P10	P25
<b>LMP 110</b>	<b>1</b>	40	42	65	69	85	163	117	120
	<b>2</b>	49	57	83	83	101	163	136	138
	<b>3</b>	66	70	92	102	124	164	142	144
	<b>4</b>	86	102	118	124	144	165	148	149
<b>LMP 112</b>	<b>1</b>	36	38	55	57	67	105	84	86
	<b>2</b>	44	49	66	66	76	105	93	94
	<b>3</b>	56	58	71	77	87	106	96	97
	<b>4</b>	67	77	85	88	97	106	99	99
<b>LMP 116</b>	<b>1</b>	36	38	54	56	64	96	79	80
	<b>2</b>	43	49	63	64	72	96	86	87
	<b>3</b>	54	57	68	73	82	96	88	89
	<b>4</b>	65	73	79	82	89	96	91	91
<b>LMP 118</b>	<b>1</b>	40	42	65	69	85	163	117	120
	<b>2</b>	49	57	83	83	101	163	136	138
	<b>3</b>	66	70	92	102	124	164	142	144
	<b>4</b>	86	102	118	124	144	165	148	149
<b>LMP 120</b>	<b>1</b>	40	43	66	70	87	172	121	125
	<b>2</b>	50	58	85	85	104	172	142	144
	<b>3</b>	67	71	94	105	129	173	149	151
	<b>4</b>	88	106	122	129	151	174	155	157
<b>LMP 122</b>	<b>1</b>	39	42	64	67	81	146	109	111
	<b>2</b>	49	56	80	80	96	146	124	126
	<b>3</b>	65	68	88	96	114	146	129	130
	<b>4</b>	82	97	110	115	131	147	134	135

**Maximum flow rate for a complete low and medium pressure filter with a pressure drop  $\Delta p = 0.7$  bar.**

The reference fluid has a kinematic viscosity of 30 mm<sup>2</sup>/s (cSt) and a density of 0.86 kg/dm<sup>3</sup>.

For different pressure drop or fluid viscosity we recommend to use our selection software available on [www.mpfiltri.com](http://www.mpfiltri.com).

Please, contact our Sales Department for further additional information.

		Filter element design - N Series							
Filter series	Length	A03	A06	A10	A16	A25	M25 M60 M90	P10	P25
<b>LMP 123</b>	<b>1</b>	35	37	50	52	59	83	70	71
	<b>2</b>	41	46	58	58	65	83	76	76
	<b>3</b>	51	53	62	65	72	83	77	78
	<b>4</b>	59	65	70	72	78	83	79	79


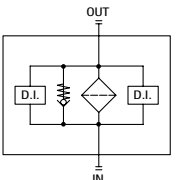
**Maximum flow rate for a complete low and medium pressure filter with a pressure drop  $\Delta p = 2.7$  bar.**

The reference fluid has a kinematic viscosity of 30 mm<sup>2</sup>/s (cSt) and a density of 0.86 kg/dm<sup>3</sup>.

For different pressure drop or fluid viscosity we recommend to use our selection software available on [www.mpfiltri.com](http://www.mpfiltri.com).


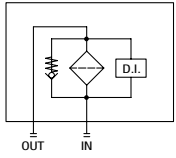
Please, contact our Sales Department for further additional information.

**LMP 110** In-Line filter


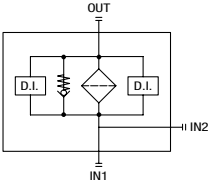
The 3D view shows a blue cylindrical filter with a central inlet and outlet. The hydraulic symbol shows a diamond-shaped filter element in the main line between the IN and OUT ports, with two D.I. (Direct Inlet) ports branching off.

**LMP 120** Port IN-OUT on the same side


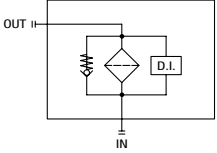
The 3D view shows a blue cylindrical filter with two ports on the same side. The hydraulic symbol shows a diamond-shaped filter element with IN and OUT ports on the same side, and a D.I. port branching off.

**LMP 112** Double IN port


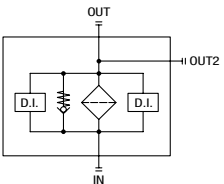
The 3D view shows a blue cylindrical filter with two inlet ports. The hydraulic symbol shows a diamond-shaped filter element with two IN ports (IN1 and IN2) and one OUT port, with two D.I. ports branching off.

**LMP 122** Lateral OUT port high flow

The 3D view shows a blue cylindrical filter with a lateral outlet port. The hydraulic symbol shows a diamond-shaped filter element with an IN port, an OUT port, and a D.I. port, with a bypass line for high flow.


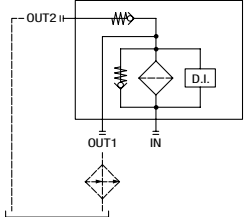
**LMP 116** Double OUT port

The 3D view shows a blue cylindrical filter with two outlet ports. The hydraulic symbol shows a diamond-shaped filter element with one IN port and two OUT ports (OUT1 and OUT2), with two D.I. ports branching off.

**LMP 123** Bypass valve for heat exchanger high flow


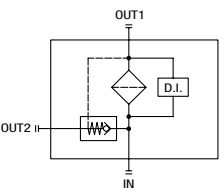
Type 1

The 3D view shows a blue cylindrical filter with a bypass valve. The hydraulic symbol shows a diamond-shaped filter element with an IN port, two OUT ports (OUT1 and OUT2), and a D.I. port, with a bypass valve and a check valve for high flow.

**LMP 118** Bypass lateral


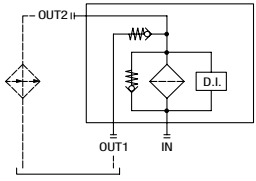
Always cleaning fluid in OUT port

The 3D view shows a blue cylindrical filter with a lateral bypass port. The hydraulic symbol shows a diamond-shaped filter element with an IN port, two OUT ports (OUT1 and OUT2), and a D.I. port, with a bypass valve and a check valve for cleaning fluid.


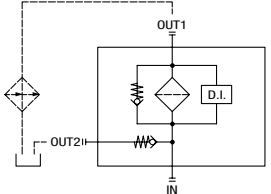
**LMP 123** Bypass valve for heat exchanger high flow

Type 2

The 3D view shows a blue cylindrical filter with a bypass valve. The hydraulic symbol shows a diamond-shaped filter element with an IN port, two OUT ports (OUT1 and OUT2), and a D.I. port, with a bypass valve and a check valve for high flow.

**LMP 119** Safety valve 6 bar for heat exchanger

The 3D view shows a blue cylindrical filter with a safety valve. The hydraulic symbol shows a diamond-shaped filter element with an IN port, two OUT ports (OUT1 and OUT2), and a D.I. port, with a safety valve and a check valve for heat exchanger protection.

## Designation & Ordering code

### COMPLETE FILTER

Configuration example: **LMP112** | **4** | **B** | **A** | **D** | **1** | **A10** | **N** | **P01**

**LMP110** | **LMP112** | **LMP116**

**Length**  
1 | 2 | 3 | 4

**Bypass valve**  
**S** Without bypass | **B** 3.5 bar

Seals and treatments	Filtration rating		
	Axx	Mxx	Pxx
<b>A</b> NBR	•	•	•
<b>V</b> FPM	•	•	•
<b>W</b> NBR compatible with fluids HFA-HFB-HFC	•	•	

Connections	Aux (only LMP 112 - 116)	
	<b>A</b> G 3/4"	G 3/4"
<b>B</b> G 1"	G 3/4"	
<b>C</b> 3/4" NPT	3/4" NPT	
<b>D</b> 1" NPT	3/4" NPT	
<b>E</b> SAE 12 - 1 1/16" - 12 UN	SAE 12 - 1 1/16" - 12 UN	
<b>F</b> SAE 16 - 1 5/16" - 12 UN	SAE 12 - 1 1/16" - 12 UN	

**Connection for differential indicator**  
1 Without  
2 With standard connection  
3 With connection on the opposite side  
6 With two connections on both sides

Filtration rating (filter media)	
<b>A03</b> Inorganic microfiber 3 µm	<b>M25</b> Wire mesh 25 µm
<b>A06</b> Inorganic microfiber 6 µm	<b>M60</b> Wire mesh 60 µm
<b>A10</b> Inorganic microfiber 10 µm	<b>M90</b> Wire mesh 90 µm
<b>A16</b> Inorganic microfiber 16 µm	<b>P10</b> Resin impregnated paper 10 µm
<b>A25</b> Inorganic microfiber 25 µm	<b>P25</b> Resin impregnated paper 25 µm

**Element Δp**  
**N** 20 bar

**Execution**  
**P01** MP Filtri standard  
**Pxx** Customized

### FILTER ELEMENT

Configuration example: **CU110** | **4** | **A10** | **A** | **N** | **P01**

**CU110**

**Element length**  
1 | 2 | 3 | 4

Filtration rating (filter media)	
<b>A03</b> Inorganic microfiber 3 µm	<b>M25</b> Wire mesh 25 µm
<b>A06</b> Inorganic microfiber 6 µm	<b>M60</b> Wire mesh 60 µm
<b>A10</b> Inorganic microfiber 10 µm	<b>M90</b> Wire mesh 90 µm
<b>A16</b> Inorganic microfiber 16 µm	<b>P10</b> Resin impregnated paper 10 µm
<b>A25</b> Inorganic microfiber 25 µm	<b>P25</b> Resin impregnated paper 25 µm

Seals	Filtration rating		
	Axx	Mxx	Pxx
<b>A</b> NBR	•	•	•
<b>V</b> FPM	•	•	•
<b>W</b> NBR compatible with fluids HFA-HFB-HFC	•	•	

**Element Δp**  
**N** 20 bar

**Execution**  
**P01** MP Filtri standard  
**Pxx** Customized

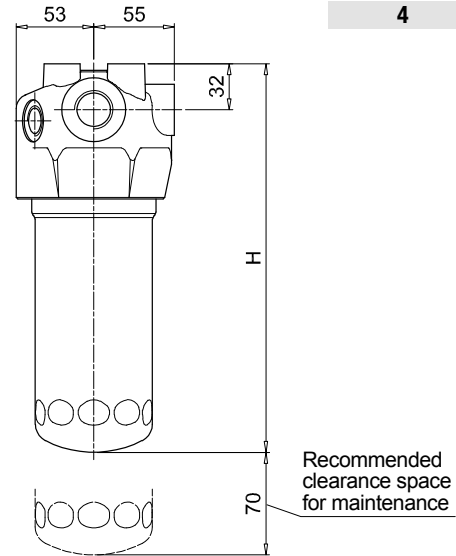
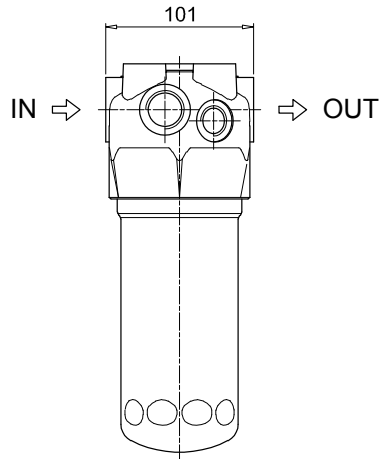
### ACCESSORIES

<b>Differential indicators</b>	page		page
<b>DEA</b> Electrical differential indicator	445	<b>DTA</b> Electronic differential indicator	448
<b>DEM</b> Electrical differential indicator	445-446	<b>DVA</b> Visual differential indicator	448
<b>DLA</b> Electrical / visual differential indicator	446-447	<b>DVM</b> Visual differential indicator	448
<b>DLE</b> Electrical / visual differential indicator	447		
<b>Additional features</b>	page		
<b>T2</b> Plug	449		

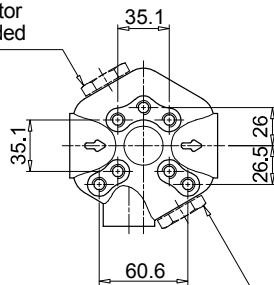


LMP110 - LMP112  
LMP116

Filter length	H [mm]
<b>1</b>	182
<b>2</b>	215
<b>3</b>	265
<b>4</b>	365

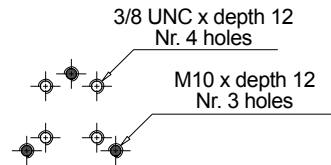


2 - Standard connection for differential indicator  
T2 plug not included

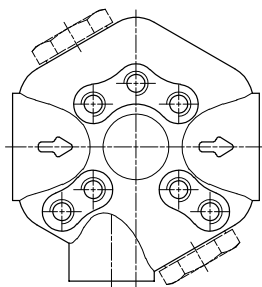


3 - Connection for differential indicator  
on the opposite side  
T2 plug not included

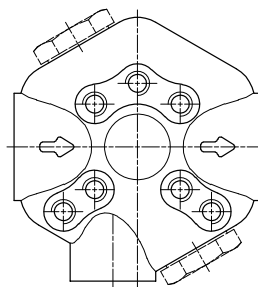
Fixing holes  
Option for Metric and UNC screws



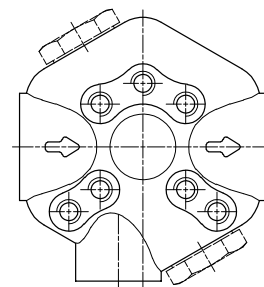
LMP 110



LMP 112



LMP 116



↑  
Aux  
IN

↓  
Aux  
OUT

Designation & Ordering code

**COMPLETE FILTER**

<b>Series and size</b>		Configuration example: <b>LMP118</b>   <b>4</b>   <b>B</b>   <b>A</b>   <b>D</b>   <b>1</b>   <b>A10</b>   <b>N</b>   <b>P01</b>									
<b>LMP118</b>   <b>LMP119</b>											
<b>Length</b>											
<b>1</b>   <b>2</b>   <b>3</b>   <b>4</b>											
<b>Bypass valve</b>											
<b>B</b> 3.5 bar											
<b>Seals and treatments</b>		<b>Filtration rating</b>									
		<b>Axx</b>	<b>Mxx</b>	<b>Pxx</b>							
<b>A</b>	NBR	•	•	•							
<b>V</b>	FPM	•	•	•							
<b>W</b>	NBR compatible with fluids HFA-HFB-HFC	•	•								
<b>Connections</b>											
		<b>Aux OUT</b>									
<b>A</b>	G 3/4"	G 3/4"									
<b>B</b>	G 1"	G 3/4"									
<b>C</b>	3/4" NPT	3/4" NPT									
<b>D</b>	1" NPT	3/4" NPT									
<b>E</b>	SAE 12 - 1 1/16" - 12 UN	SAE 12 - 1 1/16" - 12 UN									
<b>F</b>	SAE 16 - 1 5/16" - 12 UN	SAE 12 - 1 1/16" - 12 UN									
<b>Connection for differential indicator</b>											
<b>1</b> Without											
<b>2</b> With standard connection											
<b>Filtration rating (filter media)</b>											
<b>A03</b>	Inorganic microfiber 3 µm	<b>M25</b> Wire mesh 25 µm									
<b>A06</b>	Inorganic microfiber 6 µm	<b>M60</b> Wire mesh 60 µm									
<b>A10</b>	Inorganic microfiber 10 µm	<b>M90</b> Wire mesh 90 µm									
<b>A16</b>	Inorganic microfiber 16 µm	<b>P10</b> Resin impregnated paper 10 µm									
<b>A25</b>	Inorganic microfiber 25 µm	<b>P25</b> Resin impregnated paper 25 µm									
		<b>Element Δp</b>		<b>Execution</b>							
		<b>N</b> 20 bar		<b>P01</b> MP Filtri standard							
				<b>Pxx</b> Customized							

**FILTER ELEMENT**

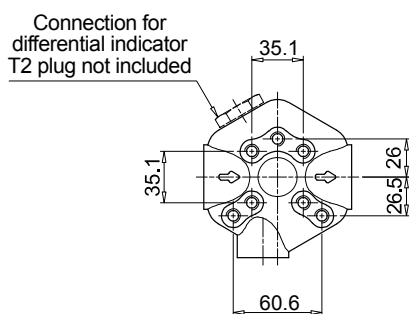
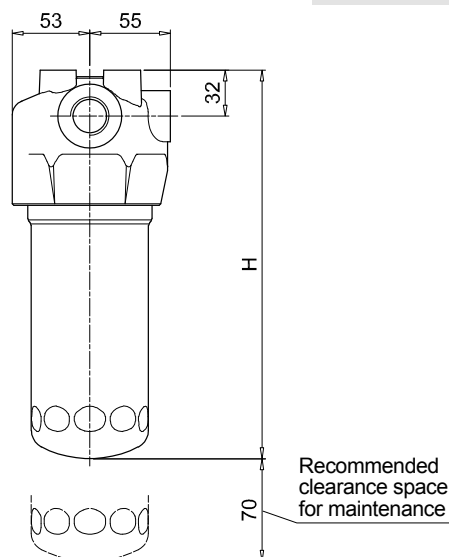
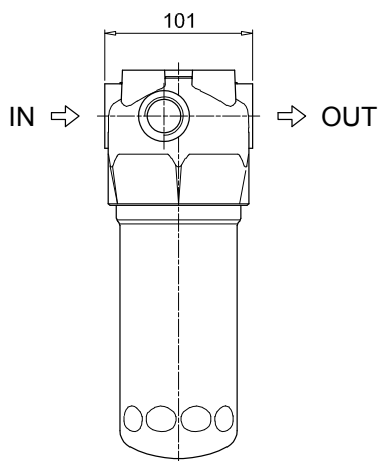
<b>Element series and size</b>		Configuration example: <b>CU110</b>   <b>4</b>   <b>A10</b>   <b>A</b>   <b>N</b>   <b>P01</b>									
<b>CU110</b>											
<b>Element length</b>											
<b>1</b>   <b>2</b>   <b>3</b>   <b>4</b>											
<b>Filtration rating (filter media)</b>											
<b>A03</b>	Inorganic microfiber 3 µm	<b>M25</b> Wire mesh 25 µm									
<b>A06</b>	Inorganic microfiber 6 µm	<b>M60</b> Wire mesh 60 µm									
<b>A10</b>	Inorganic microfiber 10 µm	<b>M90</b> Wire mesh 90 µm									
<b>A16</b>	Inorganic microfiber 16 µm	<b>P10</b> Resin impregnated paper 10 µm									
<b>A25</b>	Inorganic microfiber 25 µm	<b>P25</b> Resin impregnated paper 25 µm									
<b>Seals</b>		<b>Filtration rating</b>									
		<b>Axx</b>	<b>Mxx</b>	<b>Pxx</b>							
<b>A</b>	NBR	•	•	•							
<b>V</b>	FPM	•	•	•							
<b>W</b>	NBR compatible with fluids HFA-HFB-HFC	•	•								
		<b>Element Δp</b>		<b>Execution</b>							
		<b>N</b> 20 bar		<b>P01</b> MP Filtri standard							
				<b>Pxx</b> Customized							

**ACCESSORIES**

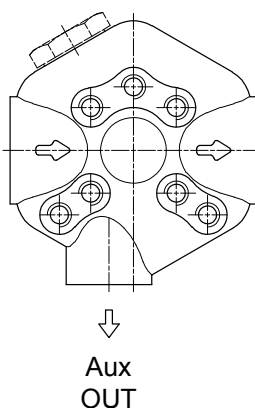
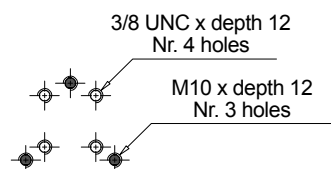
<b>Differential indicators</b>		page		page
<b>DEA</b>	Electrical differential indicator	445	<b>DTA</b>	Electronic differential indicator 448
<b>DEM</b>	Electrical differential indicator	445-446	<b>DVA</b>	Visual differential indicator 448
<b>DLA</b>	Electrical / visual differential indicator	446-447	<b>DVM</b>	Visual differential indicator 448
<b>DLE</b>	Electrical / visual differential indicator	447		
<b>Additional features</b>		page		
<b>T2</b>	Plug	449		

LMP118 - LMP119

Filter length	H [mm]
1	182
2	215
3	265
4	365



**Fixing holes**  
Option for Metric and UNC screws



Designation & Ordering code

**COMPLETE FILTER**

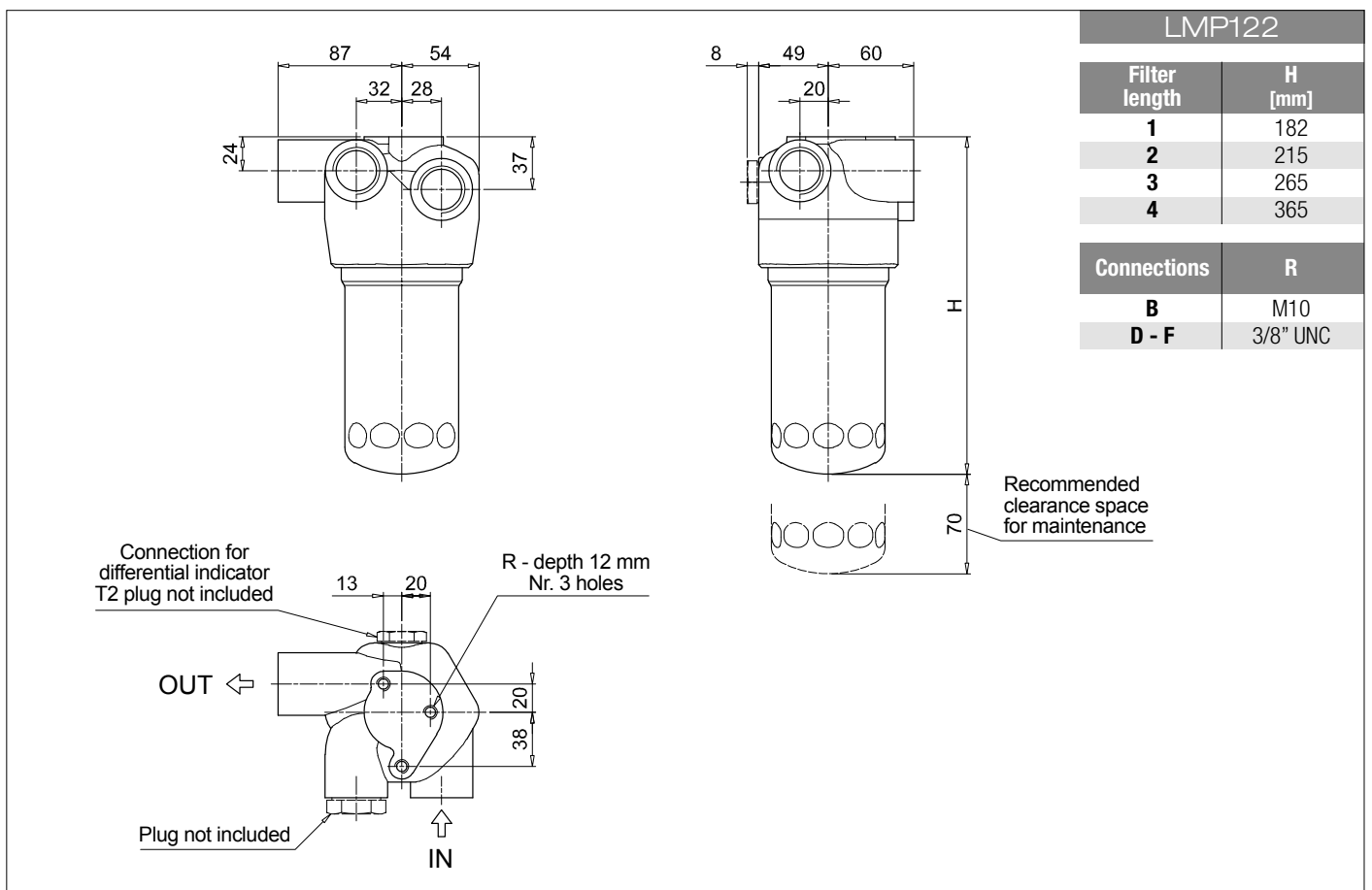
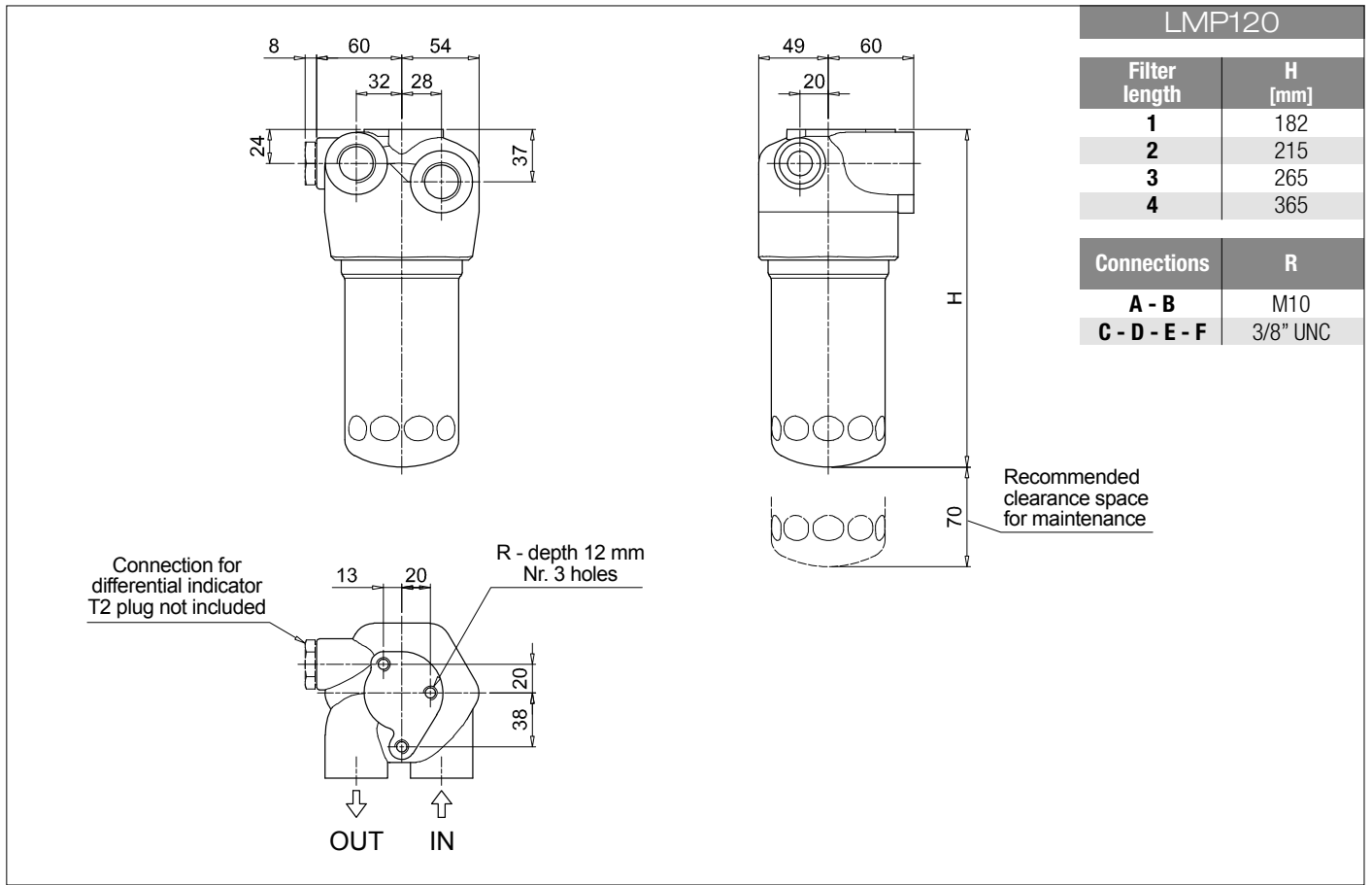
Series and size		Configuration example: <b>LMP120</b>   <b>4</b>   <b>B</b>   <b>A</b>   <b>D</b>   <b>1</b>   <b>A10</b>   <b>N</b>   <b>P01</b>									
<b>LMP120</b>   <b>LMP122</b>											
Length											
<b>1</b>   <b>2</b>   <b>3</b>   <b>4</b>											
Bypass valve											
<b>S</b> Without bypass		<b>B</b> 3.5 bar									
Seals and treatments		Filtration rating									
		Axx	Mxx	Pxx							
<b>A</b> NBR		•	•	•							
<b>V</b> FPM		•	•	•							
<b>W</b> NBR compatible with fluids HFA-HFB-HFC		•	•								
Connections		LMP120		LMP122							
<b>A</b> G 3/4"		•									
<b>B</b> G 1"		•		•							
<b>C</b> 3/4" NPT		•									
<b>D</b> 1" NPT		•		•							
<b>E</b> SAE 12 - 1 1/16" - 12 UN		•									
<b>F</b> SAE 16 - 1 5/16" - 12 UN		•		•							
Connection for differential indicator											
<b>1</b> Without											
<b>2</b> With standard connection											
Filtration rating (filter media)											
<b>A03</b> Inorganic microfiber 3 µm		<b>M25</b> Wire mesh 25 µm									
<b>A06</b> Inorganic microfiber 6 µm		<b>M60</b> Wire mesh 60 µm									
<b>A10</b> Inorganic microfiber 10 µm		<b>M90</b> Wire mesh 90 µm									
<b>A16</b> Inorganic microfiber 16 µm		<b>P10</b> Resin impregnated paper 10 µm									
<b>A25</b> Inorganic microfiber 25 µm		<b>P25</b> Resin impregnated paper 25 µm									
		Element Δp			Execution						
		<b>N</b> 20 bar			<b>P01</b> MP Filtri standard						
					<b>Pxx</b> Customized						

**FILTER ELEMENT**

Element series and size		Configuration example: <b>CU110</b>   <b>4</b>   <b>A10</b>   <b>A</b>   <b>N</b>   <b>P01</b>									
<b>CU110</b>											
Element length											
<b>1</b>   <b>2</b>   <b>3</b>   <b>4</b>											
Filtration rating (filter media)											
<b>A03</b> Inorganic microfiber 3 µm		<b>M25</b> Wire mesh 25 µm									
<b>A06</b> Inorganic microfiber 6 µm		<b>M60</b> Wire mesh 60 µm									
<b>A10</b> Inorganic microfiber 10 µm		<b>M90</b> Wire mesh 90 µm									
<b>A16</b> Inorganic microfiber 16 µm		<b>P10</b> Resin impregnated paper 10 µm									
<b>A25</b> Inorganic microfiber 25 µm		<b>P25</b> Resin impregnated paper 25 µm									
Seals		Filtration rating									
		Axx	Mxx	Pxx							
<b>A</b> NBR		•	•	•							
<b>V</b> FPM		•	•	•							
<b>W</b> NBR compatible with fluids HFA-HFB-HFC		•	•								
		Element Δp			Execution						
		<b>N</b> 20 bar			<b>P01</b> MP Filtri standard						
					<b>Pxx</b> Customized						

**ACCESSORIES**

<b>Differential indicators</b>		page			page
<b>DEA</b> Electrical differential indicator		445	<b>DTA</b> Electronic differential indicator		448
<b>DEM</b> Electrical differential indicator		445-446	<b>DVA</b> Visual differential indicator		448
<b>DLA</b> Electrical / visual differential indicator		446-447	<b>DVM</b> Visual differential indicator		448
<b>DLE</b> Electrical / visual differential indicator		447			
<b>Additional features</b>		page			
<b>T2</b> Plug		449			



Designation & Ordering code

**COMPLETE FILTER**

<b>Series and size</b>		Configuration example: <b>LMP123</b>   <b>4</b>   <b>R</b>   <b>A</b>   <b>F</b>   <b>1</b>   <b>A10</b>   <b>N</b>   <b>P01</b>									
<b>LMP123</b>											
<b>Length</b>		1   2   3   4									
<b>Valves</b>	<b>Bypass</b>	<b>OUT to cooler</b>	<b>Check valve</b>								
<b>C</b>	without	front	2 bar								
<b>D</b>			3 bar								
<b>G</b>		side	2 bar								
<b>H</b>			3 bar								
<b>M</b>	3.5 bar	front	2 bar								
<b>N</b>			3 bar								
<b>Q</b>		side	2 bar								
<b>R</b>			3 bar								
<b>Seals and treatments</b>		<b>Filtration rating</b>									
		<b>Axx</b>	<b>Mxx</b>	<b>Pxx</b>							
<b>A</b>	NBR	•	•	•							
<b>V</b>	FPM	•	•	•							
<b>W</b>	NBR compatible with fluids HFA-HFB-HFC	•	•								
<b>Connections</b>											
<b>B</b>	G 1"										
<b>F</b>	SAE 16 - 1 5/16" - 12 UN										
<b>Connection for differential indicator</b>											
<b>1</b>	Without										
<b>2</b>	With standard connection										
<b>Filtration rating (filter media)</b>											
<b>A03</b>	Inorganic microfiber	3 µm	<b>M25</b>	Wire mesh 25 µm							
<b>A06</b>	Inorganic microfiber	6 µm	<b>M60</b>	Wire mesh 60 µm							
<b>A10</b>	Inorganic microfiber	10 µm	<b>M90</b>	Wire mesh 90 µm							
<b>A16</b>	Inorganic microfiber	16 µm	<b>P10</b>	Resin impregnated paper 10 µm							
<b>A25</b>	Inorganic microfiber	25 µm	<b>P25</b>	Resin impregnated paper 25 µm							
		<b>Element Δp</b>		<b>Execution</b>							
		<b>N</b> 20 bar		<b>P01</b> MP Filtri standard <b>Pxx</b> Customized							

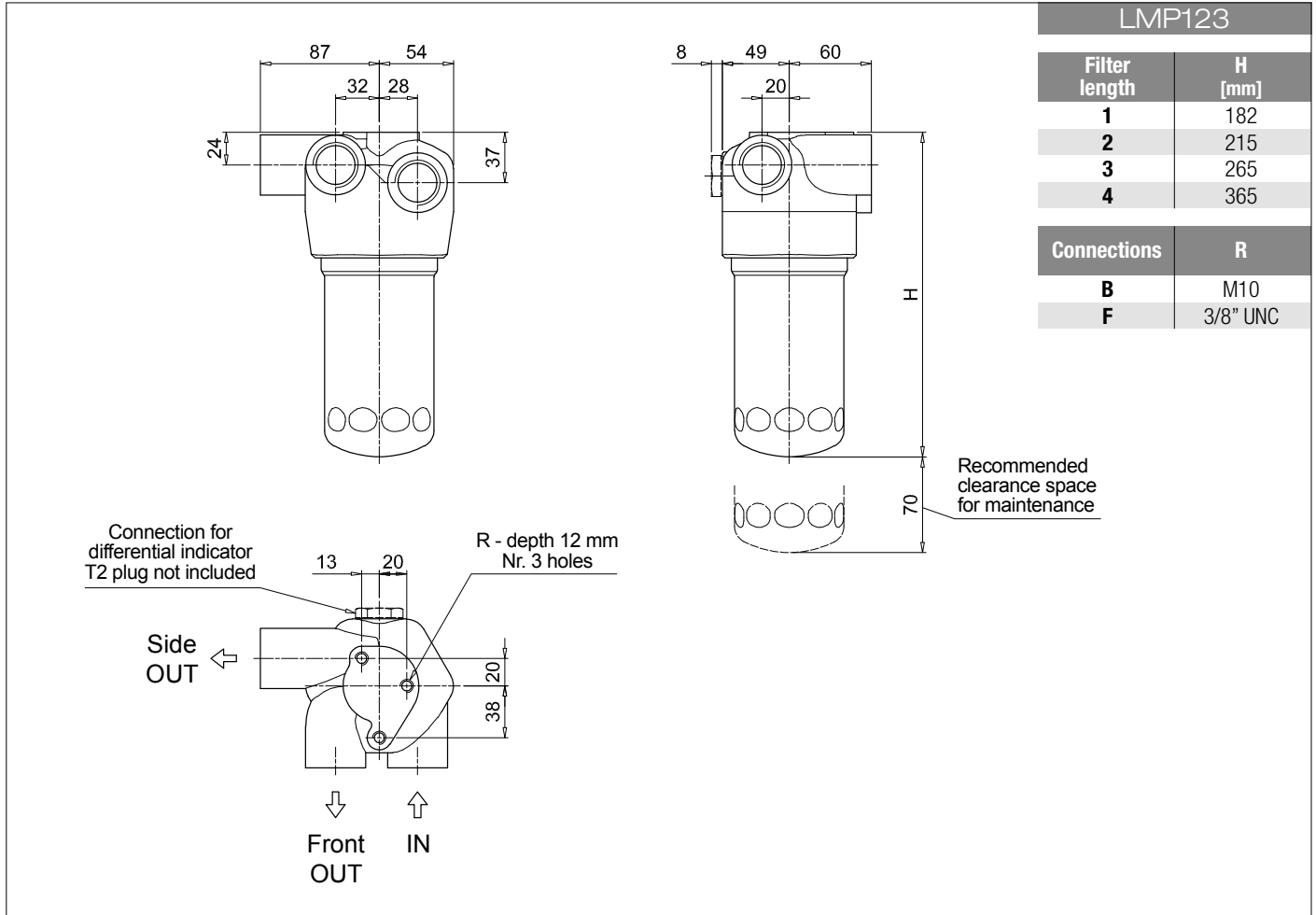
**FILTER ELEMENT**

<b>Element series and size</b>		Configuration example: <b>CU110</b>   <b>4</b>   <b>A10</b>   <b>A</b>   <b>N</b>   <b>P01</b>									
<b>CU110</b>											
<b>Element length</b>		1   2   3   4									
<b>Filtration rating (filter media)</b>											
<b>A03</b>	Inorganic microfiber	3 µm	<b>M25</b>	Wire mesh 25 µm							
<b>A06</b>	Inorganic microfiber	6 µm	<b>M60</b>	Wire mesh 60 µm							
<b>A10</b>	Inorganic microfiber	10 µm	<b>M90</b>	Wire mesh 90 µm							
<b>A16</b>	Inorganic microfiber	16 µm	<b>P10</b>	Resin impregnated paper 10 µm							
<b>A25</b>	Inorganic microfiber	25 µm	<b>P25</b>	Resin impregnated paper 25 µm							
<b>Seals</b>		<b>Filtration rating</b>									
		<b>Axx</b>	<b>Mxx</b>	<b>Pxx</b>							
<b>A</b>	NBR	•	•	•							
<b>V</b>	FPM	•	•	•							
<b>W</b>	NBR compatible with fluids HFA-HFB-HFC	•	•								
		<b>Element Δp</b>		<b>Execution</b>							
		<b>N</b> 20 bar		<b>P01</b> MP Filtri standard <b>Pxx</b> Customized							

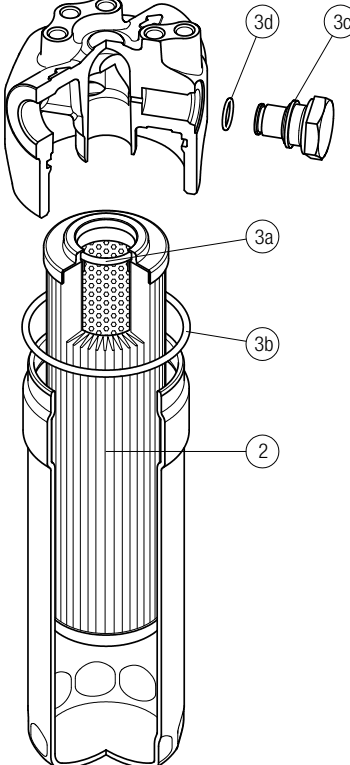
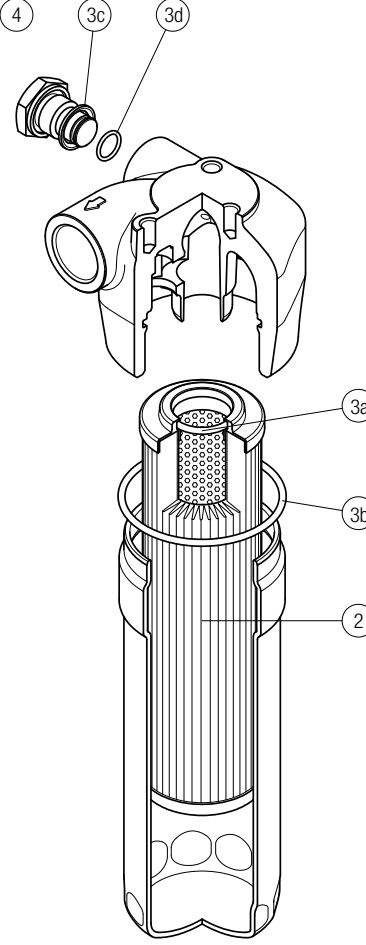
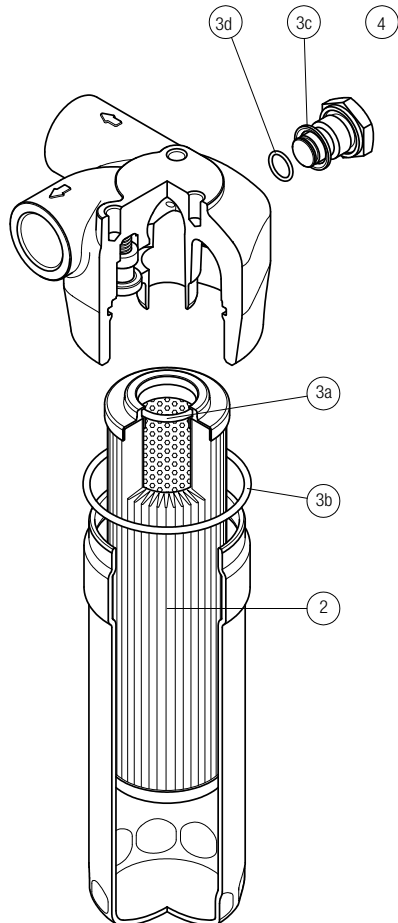
**ACCESSORIES**

<b>Differential indicators</b>		page			page
<b>DEA</b>	Electrical differential indicator	445	<b>DTA</b>	Electronic differential indicator	448
<b>DEM</b>	Electrical differential indicator	445-446	<b>DVA</b>	Visual differential indicator	448
<b>DLA</b>	Electrical / visual differential indicator	446-447	<b>DVM</b>	Visual differential indicator	448
<b>DLE</b>	Electrical / visual differential indicator	447			
<b>Additional features</b>		page			
<b>T2</b>	Plug	449			





Order number for spare parts

	LMP 110 - 112 - 116 - 118 - 119	LMP 120	LMP 122 - 123
			
	Q.ty: 1 pc.	Q.ty: 1 pc.	Q.ty: 1 pc.
<b>Item:</b>	<b>2</b>	<b>3</b> (3a ÷ 3d)	<b>4</b>
<b>Filter series</b>	<b>Filter element</b>	<b>Seal Kit code number</b>	<b>Indicator connection plug</b>
<b>LMP 110-112-116-118-119</b>	See order table	<b>NBR</b>	<b>NBR</b>
<b>LMP 120</b>		<b>FPM</b>	<b>FPM</b>
<b>LMP 122-123</b>			
		02050478	02050479
			T2H
			T2V





# LMP 210-211

Maximum working pressure up to 6 MPa (60 bar) - Flow rate up to 330 l/min



# LMP 210-211 GENERAL INFORMATION

## Description

## Technical data

### Low & Medium Pressure filters

**Maximum working pressure up to 6 MPa (60 bar)**  
**Flow rate up to 330 l/min**

LMP210 is a range of versatile low pressure filter for transmission, protection of sensitive components in low pressure hydraulic systems and filtration of the coolant into the machine tools. They are also suitable for the off-line filtration of small reservoirs. They are directly connected to the lines of the system through the hydraulic fittings.

#### Available features:

- Flanged connections up to 1 1/2", for a maximum flow rate of 330 l/min (LMP210)
- Female threaded connections up to 1 1/2", for a maximum return flow rate of 330 l/min (LMP211)
- Fine filtration rating, to get a good cleanliness level into the system
- Water removal elements, to remove the free water from the hydraulic fluid
- Bypass valve, to relieve excessive pressure drop across the filter media
- Visual, electrical and electronic differential clogging indicators

#### Common applications:

Delivery lines, in any low pressure industrial equipment or mobile machines

### Filter housing materials

- Head: Aluminium
- Bowl: Cataphoretic Painted Steel
- Bypass valve: AISI 304 - Nylon

### Pressure

- Test pressure: 9 MPa (90 bar)
- Burst pressure: 21 MPa (210 bar)
- Pulse pressure fatigue test: 1 000 000 cycles with pressure from 0 to 6 MPa (60 bar)

### Bypass valve

- Opening pressure 350 kPa (3.5 bar)  $\pm$ 10%
- Other opening pressures on request.

### $\Delta p$ element type

- Microfibre filter elements - series N: 20 bar
- Fluid flow through the filter element from OUT to IN

### Seals

- Standard NBR series A
- Optional FPM series V

### Temperature

From -25 °C to +110 °C

### Connections

Inlet/Outlet In-Line

### Note

LMP 210 - 211 filters are provided for vertical mounting



## Weights [kg] and volumes [dm<sup>3</sup>]

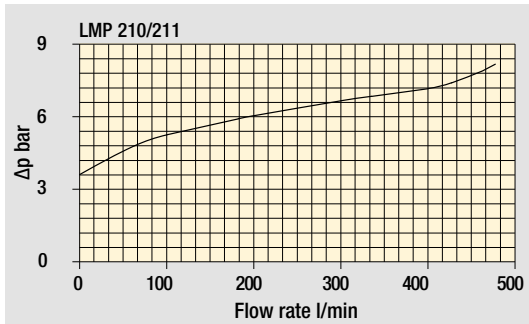
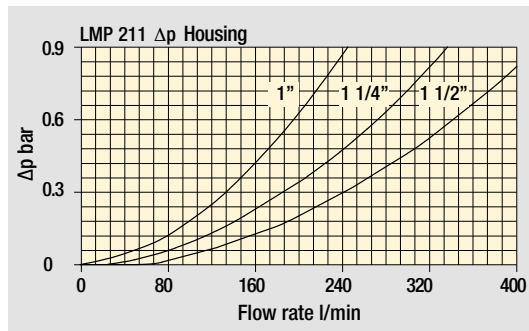
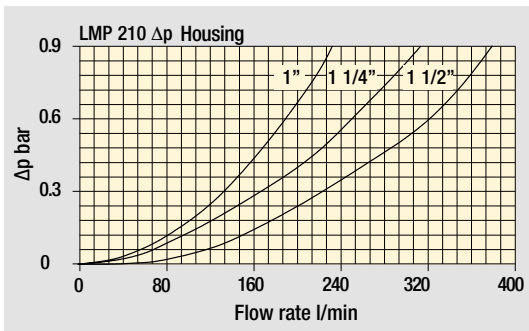
Filter series	Weights [kg]			Volumes [dm <sup>3</sup> ]				
	Length	1	2	3	Length	1	2	3
<b>LMP 210-211</b>		3.10	4.80	6.40		1.60	2.10	2.80



# GENERAL INFORMATION LMP 210-211

Pressure drop

Filter housings  $\Delta p$  pressure drop



Bypass valve pressure drop

The curves are plotted using mineral oil with density of  $0.86 \text{ kg/dm}^3$  in compliance with ISO 3968.  $\Delta p$  varies proportionally with density.

Flow rates [l/min]

Filter series	Length	Filter element design - N Series										
		A03	A06	A10	A16	A25	M25	M60	M90	M250	P10	P25
LMP 210	1	106	130	190	200	221	286	287	287	288	261	265
	2	153	175	220	237	249	288	289	290	290	265	269
	3	204	214	248	260	265	289	290	291	291	277	281
LMP 211	1	118	149	227	240	269	358	359	360	361	324	330
	2	178	207	268	292	307	361	362	363	364	329	335
	3	247	260	306	323	329	362	363	364	365	345	351

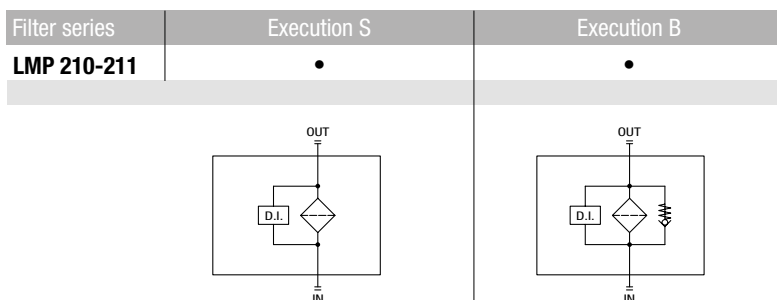
**Maximum flow rate for a complete low and medium pressure filter with a pressure drop  $\Delta p = 0.7 \text{ bar}$ .**

The reference fluid has a kinematic viscosity of  $30 \text{ mm}^2/\text{s}$  (cSt) and a density of  $0.86 \text{ kg/dm}^3$ .

For different pressure drop or fluid viscosity we recommend to use our selection software available on [www.mpfiltri.com](http://www.mpfiltri.com).

Please, contact our Sales Department for further additional information.

Hydraulic symbols



# LMP 210

## Designation & Ordering code

### COMPLETE FILTER

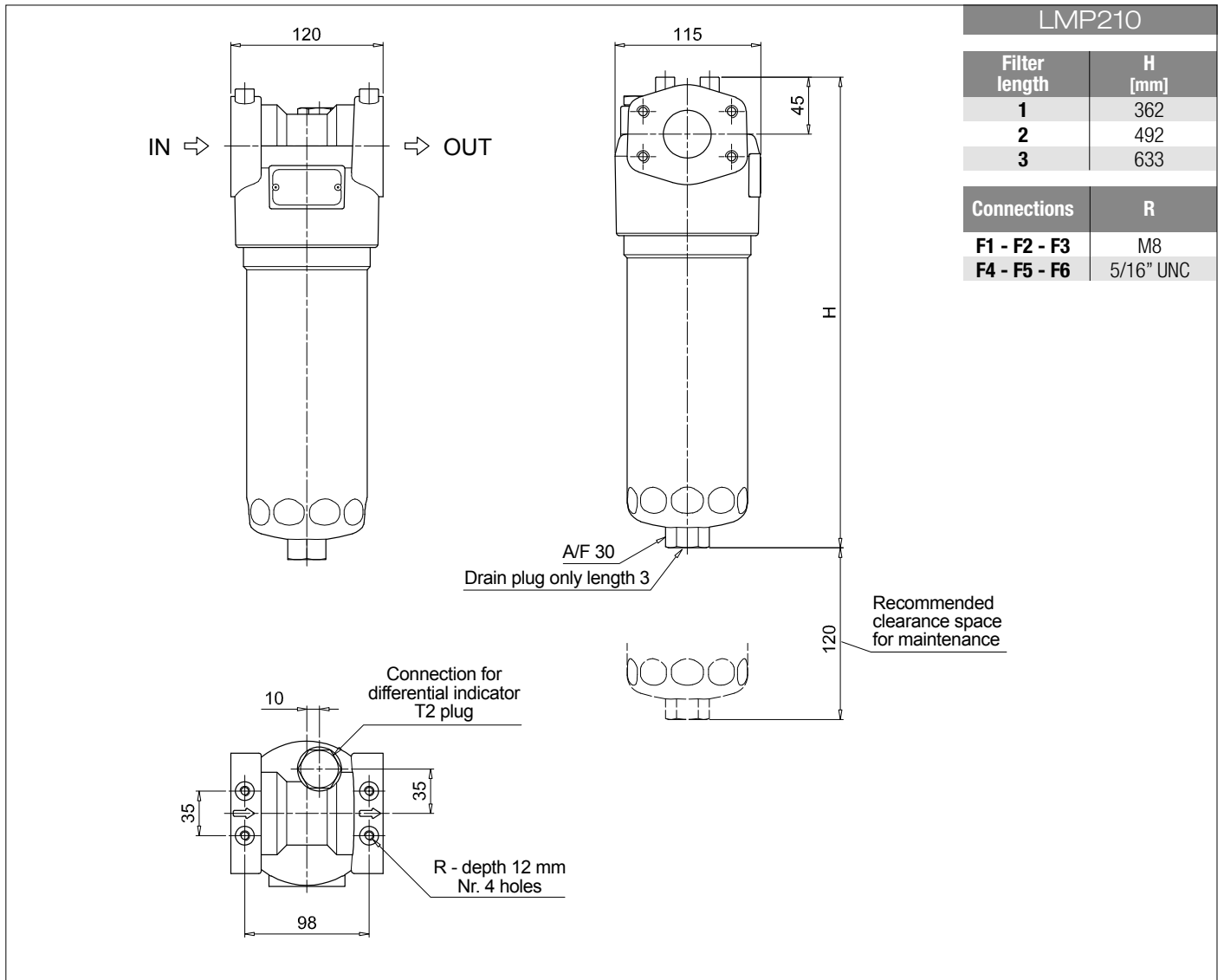
<b>Series and size</b>	Configuration example: <b>LMP210</b>   <b>3</b>   <b>B</b>   <b>A</b>   <b>F1</b>   <b>A10</b>   <b>N</b>   <b>P01</b>																		
<b>LMP210</b>																			
<b>Length</b>	1   2   3																		
<b>Bypass valve</b>	S Without bypass   B 3.5 bar																		
<b>Seals and treatments</b>	Filtration rating																		
A NBR	Axx	Mxx	Pxx																
V FPM	•	•	•																
W NBR compatible with fluids HFA-HFB-HFC	•	•																	
<b>Connections</b>	F1 1" SAE 3000 psi/M F2 1 1/4" SAE 3000 psi/M F3 1 1/2" SAE 3000 psi/M F4 1" SAE 3000 psi/UNC F5 1 1/4" SAE 3000 psi/UNC F6 1 1/2" SAE 3000 psi/UNC																		
<b>Filtration rating (filter media)</b>	<table border="0"> <tr> <td>A03 Inorganic microfiber 3 µm</td> <td>M25 Wire mesh 25 µm</td> </tr> <tr> <td>A06 Inorganic microfiber 6 µm</td> <td>M60 Wire mesh 60 µm</td> </tr> <tr> <td>A10 Inorganic microfiber 10 µm</td> <td>M90 Wire mesh 90 µm</td> </tr> <tr> <td>A16 Inorganic microfiber 16 µm</td> <td>P10 Resin impregnated paper 10 µm</td> </tr> <tr> <td>A25 Inorganic microfiber 25 µm</td> <td>P25 Resin impregnated paper 25 µm</td> </tr> </table>									A03 Inorganic microfiber 3 µm	M25 Wire mesh 25 µm	A06 Inorganic microfiber 6 µm	M60 Wire mesh 60 µm	A10 Inorganic microfiber 10 µm	M90 Wire mesh 90 µm	A16 Inorganic microfiber 16 µm	P10 Resin impregnated paper 10 µm	A25 Inorganic microfiber 25 µm	P25 Resin impregnated paper 25 µm
A03 Inorganic microfiber 3 µm	M25 Wire mesh 25 µm																		
A06 Inorganic microfiber 6 µm	M60 Wire mesh 60 µm																		
A10 Inorganic microfiber 10 µm	M90 Wire mesh 90 µm																		
A16 Inorganic microfiber 16 µm	P10 Resin impregnated paper 10 µm																		
A25 Inorganic microfiber 25 µm	P25 Resin impregnated paper 25 µm																		
<b>WA025</b> Water absorber inorganic microfiber 25 µm																			
	<b>Element Δp</b>			<b>Execution</b>															
	N 20 bar			P01 MP Filtri standard Pxx Customized															

### FILTER ELEMENT

<b>Element series and size</b>	Configuration example: <b>CU210</b>   <b>3</b>   <b>A10</b>   <b>A</b>   <b>N</b>   <b>P01</b>																
<b>CU210</b>																	
<b>Element length</b>	1   2   3																
<b>Filtration rating (filter media)</b>	<table border="0"> <tr> <td>A03 Inorganic microfiber 3 µm</td> <td>M25 Wire mesh 25 µm</td> </tr> <tr> <td>A06 Inorganic microfiber 6 µm</td> <td>M60 Wire mesh 60 µm</td> </tr> <tr> <td>A10 Inorganic microfiber 10 µm</td> <td>M90 Wire mesh 90 µm</td> </tr> <tr> <td>A16 Inorganic microfiber 16 µm</td> <td>P10 Resin impregnated paper 10 µm</td> </tr> <tr> <td>A25 Inorganic microfiber 25 µm</td> <td>P25 Resin impregnated paper 25 µm</td> </tr> </table>							A03 Inorganic microfiber 3 µm	M25 Wire mesh 25 µm	A06 Inorganic microfiber 6 µm	M60 Wire mesh 60 µm	A10 Inorganic microfiber 10 µm	M90 Wire mesh 90 µm	A16 Inorganic microfiber 16 µm	P10 Resin impregnated paper 10 µm	A25 Inorganic microfiber 25 µm	P25 Resin impregnated paper 25 µm
A03 Inorganic microfiber 3 µm	M25 Wire mesh 25 µm																
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<b>WA025</b> Water absorber inorganic microfiber 25 µm																	
	<b>Element Δp</b>			<b>Execution</b>													
	N 20 bar			P01 MP Filtri standard Pxx Customized													

### ACCESSORIES

<b>Differential indicators</b>	page		page
DEA Electrical differential indicator	445	DTA Electronic differential indicator	448
DEM Electrical differential indicator	445-446	DVA Visual differential indicator	448
DLA Electrical / visual differential indicator	446-447	DVM Visual differential indicator	448
DLE Electrical / visual differential indicator	447		
<b>Additional features</b>	page		
T2 Plug	449		



# LMP 211

## Designation & Ordering code

### COMPLETE FILTER

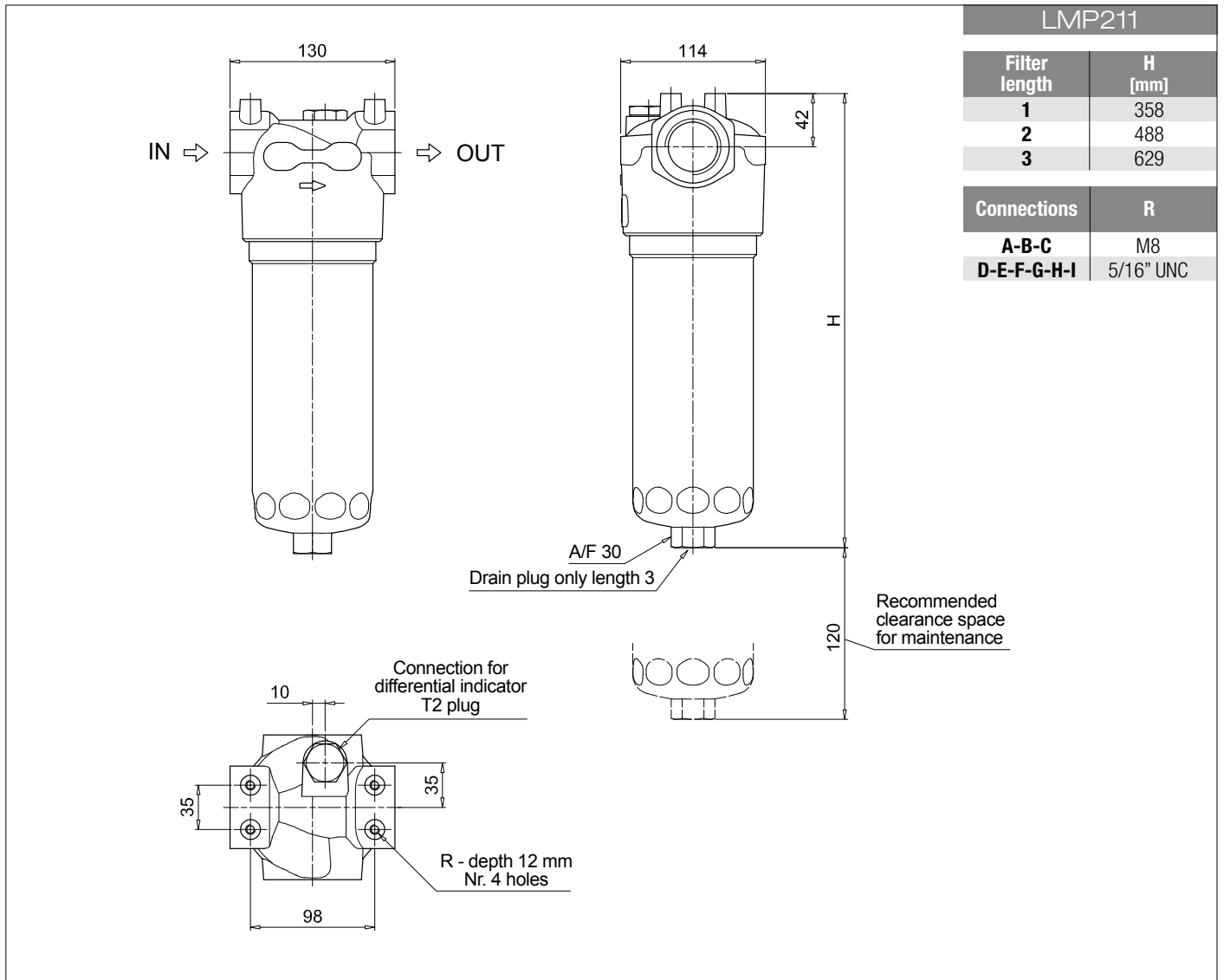
<b>Series and size</b>	Configuration example: <b>LMP211</b>   <b>3</b>   <b>B</b>   <b>A</b>   <b>D</b>   <b>6</b>   <b>A10</b>   <b>N</b>   <b>P01</b>									
<b>LMP211</b>										
<b>Length</b>	1   2   3									
<b>Bypass valve</b>	S Without bypass   B 3.5 bar									
<b>Seals and treatments</b>	Filtration rating									
A NBR	Axx	Mxx	Pxx							
V FPM	•	•	•							
W NBR compatible with fluids HFA-HFB-HFC	•	•								
<b>Connections</b>										
A G 1"										
B G 1 1/4"										
C G 1 1/2"										
D 1" NPT										
E 1 1/4" NPT										
F 1 1/2" NPT										
G SAE 16 - 1 5/16" - 12 UN										
H SAE 20 - 1 5/8" - 12 UN										
I SAE 24 - 1 7/8" - 12 UN										
<b>Connection for differential indicator</b>	6 With plugged connection									
<b>Filtration rating (filter media)</b>										
A03 Inorganic microfiber 3 µm	M25 Wire mesh 25 µm									
A06 Inorganic microfiber 6 µm	M60 Wire mesh 60 µm									
A10 Inorganic microfiber 10 µm	M90 Wire mesh 90 µm									
A16 Inorganic microfiber 16 µm	P10 Resin impregnated paper 10 µm									
A25 Inorganic microfiber 25 µm	P25 Resin impregnated paper 25 µm									
WA025 Water absorber inorganic microfiber 25 µm										
			<b>Element Δp</b>	<b>N</b> 20 bar						
						<b>Execution</b>	<b>P01</b> MP Filtri standard <b>Pxx</b> Customized			

### FILTER ELEMENT

<b>Element series and size</b>	Configuration example: <b>CU210</b>   <b>3</b>   <b>A10</b>   <b>A</b>   <b>N</b>   <b>P01</b>							
<b>CU210</b>								
<b>Element length</b>	1   2   3							
<b>Filtration rating (filter media)</b>								
A03 Inorganic microfiber 3 µm	M25 Wire mesh 25 µm							
A06 Inorganic microfiber 6 µm	M60 Wire mesh 60 µm							
A10 Inorganic microfiber 10 µm	M90 Wire mesh 90 µm							
A16 Inorganic microfiber 16 µm	P10 Resin impregnated paper 10 µm							
A25 Inorganic microfiber 25 µm	P25 Resin impregnated paper 25 µm							
WA025 Water absorber inorganic microfiber 25 µm								
<b>Seals</b>	Filtration rating							
A NBR	Axx	Mxx	Pxx					
V FPM	•	•	•					
W NBR compatible with fluids HFA-HFB-HFC	•	•						
			<b>Element Δp</b>	<b>N</b> 20 bar				
						<b>Execution</b>	<b>P01</b> MP Filtri standard <b>Pxx</b> Customized	

### ACCESSORIES

<b>Differential indicators</b>	page		page
DEA Electrical differential indicator	445	DTA Electronic differential indicator	448
DEM Electrical differential indicator	445-446	DVA Visual differential indicator	448
DLA Electrical / visual differential indicator	446-447	DVM Visual differential indicator	448
DLE Electrical / visual differential indicator	447		
<b>Additional features</b>	page		
T2 Plug	449		

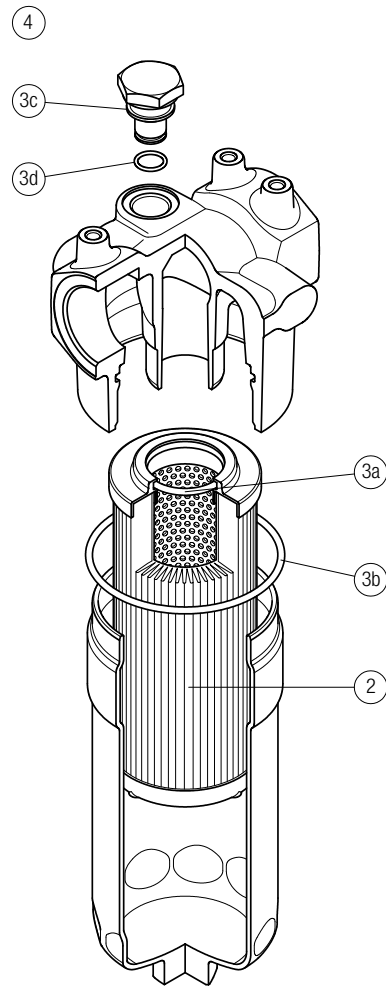
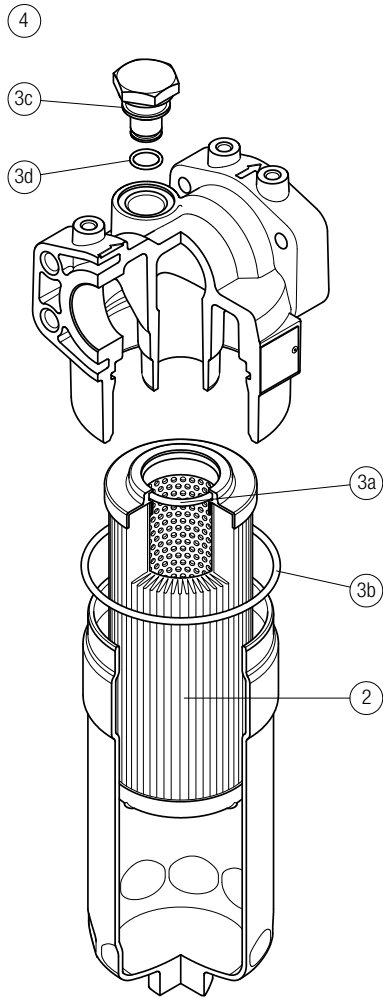


# LMP 210-211 SPARE PARTS

Order number for spare parts

LMP 210

LMP 211



Item:	Q.ty: 1 pc.		Q.ty: 1 pc.		Q.ty: 1 pc.	
Filter series	Filter element	Seal Kit code number		Indicator connection plug		
LMP 210-211	See order table	NBR	FPM	NBR	FPM	
	<b>2</b>	<b>3</b> (3a ÷ 3d)		<b>4</b>		
		02050435	02050436	T2H	T2V	







# LMP 400-401 & 430-431 series

Maximum working pressure up to 6 MPa (60 bar) - Flow rate up to 740 l/min



## Description

## Technical data

### Low & Medium Pressure filters

**Maximum working pressure up to 6 MPa (60 bar)**  
**Flow rate up to 740 l/min**

LMP400 is a range of low pressure filter with large filtration surface mainly suitable for lubrication, off-line filtration of the reservoirs and filtration equipment.

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

#### Available features:

- Female threaded connections up to 2" and flanged connections up to 2 1/2", for a maximum flow rate of 740 l/min
- In line or 90° connections, to meet any type of application
- Base-mounting design also available, for ease of the replacement of the filter element
- Fine filtration rating, to get a good cleanliness level into the system
- Water removal elements, to remove the free water from the hydraulic fluid
- Bypass valve, to relieve excessive pressure drop across the filter media
- Vent ports, to avoid air trapped into the filter going into the system
- Drain ports, to remove the fluid from the housing prior the maintenance work
- Visual, electrical and electronic differential clogging indicators

#### Common applications:

- Off-line filtration of reservoirs
- Filtration systems

#### Filter housing materials

- Head: Anodized Aluminium
- Housing: Anodized Aluminium
- Bypass valve: Steel

#### Pressure LMP 400 length 2 - 3 - 4

- Working pressure: 6 MPa (60 bar)
- Test pressure: 9 MPa (90 bar)
- Burst pressure: 21 MPa (210 bar)
- Pulse pressure fatigue test: 1 000 000 cycles with pressure from 0 to 6 MPa (60 bar)

#### Pressure LMP 400 length 5 - 6

- Working pressure: 5 MPa (50 bar)
- Test pressure: 7.5 MPa (75 bar)
- Burst pressure: 15 MPa (150 bar)
- Pulse pressure fatigue test: 1 000 000 cycles with pressure from 0 to 5 MPa (50 bar)

#### Bypass valve

- Opening pressure 350 kPa (3.5 bar) ±10%
- Other opening pressures on request.

#### Δp element type

- Microfibre filter elements - series N - W: 20 bar
- Fluid flow through the filter element from OUT to IN

#### Seals

- Standard NBR series A
- Optional FPM series V

#### Temperature

From -25 °C to +110 °C

#### Connections

LMP 400 - 430: In-line Inlet/Outlet  
 LMP 401 - 431: 90° Inlet/Outlet

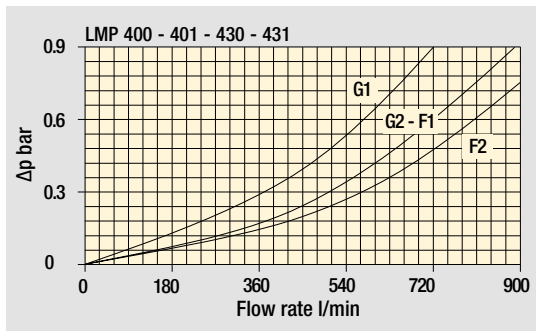
#### Note

LMP 400 filters are provided for vertical mounting

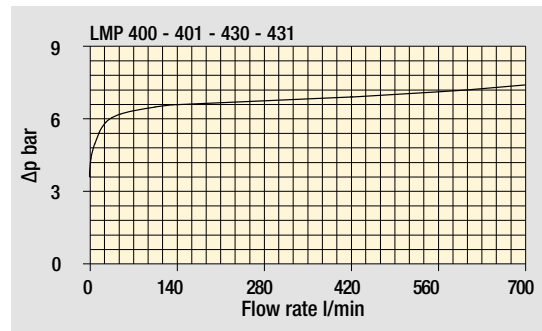


## Weights [kg] and volumes [dm<sup>3</sup>]

Filter series	Weights [kg]					Volumes [dm <sup>3</sup> ]						
	Length	2	3	4	5	6	Length	2	3	4	5	6
<b>LMP 400-401 &amp; 430-431</b>		7.20	8.10	8.80	11.90	14.40		3.50	5.00	6.50	9.50	13.50



Filter housings  
Δp pressure drop



Bypass valve  
pressure drop

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

Flow rates [l/min]

Filter series	Length	Filter element design - N Series							
		A03	A06	A10	A16	A25	M25 M60 M90 M250	P10	P25
LMP 400	2	205	244	370	411	515	720	524	556
	3	280	333	474	515	602	760	637	660
	4	347	400	535	564	637	769	660	688
	5	459	501	610	660	717	781	700	721
	6	504	575	676	689	728	783	708	727
LMP 401	2	200	236	347	382	468	628	475	501
	3	268	315	434	468	537	659	565	582
	4	328	373	484	507	565	665	582	603
	5	423	456	544	582	626	674	613	629
	6	459	516	594	604	634	676	619	633
LMP 430	5	459	501	610	660	717	781	700	721
	6	504	575	676	689	728	783	708	727
LMP 431	5	423	456	544	582	626	674	613	629
	6	459	516	594	604	634	676	619	633

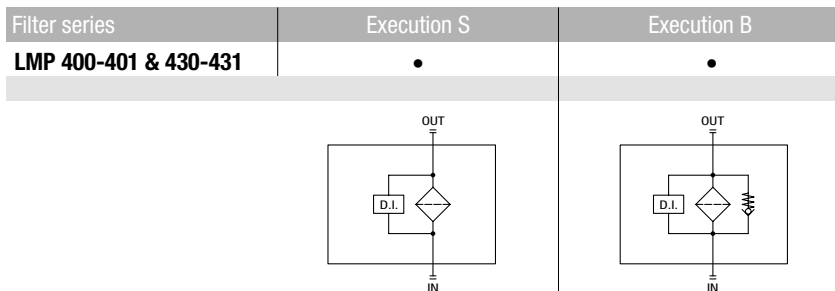
**Maximum flow rate for a complete low and medium pressure filter with a pressure drop Δp = 0.7 bar.**

The reference fluid has a kinematic viscosity of 30 mm<sup>2</sup>/s (cSt) and a density of 0.86 kg/dm<sup>3</sup>.

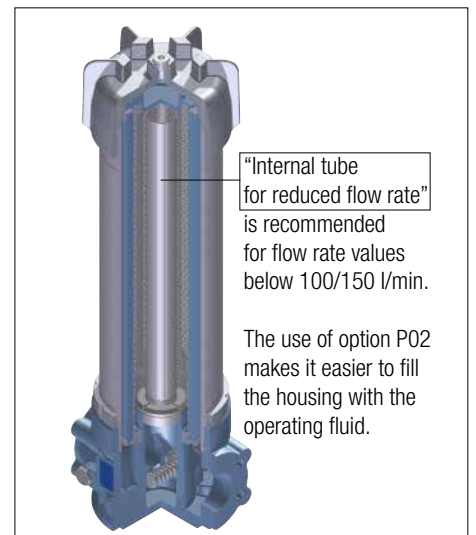
For different pressure drop or fluid viscosity we recommend to use our selection software available on [www.mpfiltri.com](http://www.mpfiltri.com).

Please, contact our Sales Department for further additional information.

Hydraulic symbols



LMP 430-431: execution P02



# LMP 400-401

## Designation & Ordering code

### COMPLETE FILTER

Series and size <b>LMP400</b>   <b>LMP401</b>		Configuration example: <b>LMP401</b>   <b>3</b>   <b>B</b>   <b>A</b>   <b>G1</b>   <b>A10</b>   <b>N</b>   <b>P01</b>									
Length <b>2</b>   <b>3</b>   <b>4</b>   <b>5</b>   <b>6</b>											
Bypass valve <b>S</b> Without bypass   <b>B</b> 3.5 bar											
Seals and treatments		Filtration rating									
		<b>Axx</b>	<b>Mxx</b>	<b>Pxx</b>							
<b>A</b> NBR		•	•	•							
<b>V</b> FPM		•	•	•							
<b>W</b> NBR compatible with fluids HFA-HFB-HFC		•	•								
Connections											
<b>G1</b> G 1 1/2"	<b>F1</b> 2" SAE 3000 psi/M										
<b>G2</b> G 2"	<b>F2</b> 2 1/2" SAE 3000 psi/M										
<b>G3</b> 1 1/2" NPT	<b>F3</b> 2" SAE 3000 psi/UNC										
<b>G4</b> 2" NPT	<b>F4</b> 2 1/2" SAE 3000 psi/UNC										
<b>G5</b> SAE 24 - 1 7/8" - 12 UN											
<b>G6</b> SAE 32 - 2 1/2" - 12 UN											
Filtration rating (filter media)											
<b>A03</b> Inorganic microfiber 3 µm	<b>M25</b> Wire mesh 25 µm										
<b>A06</b> Inorganic microfiber 6 µm	<b>M60</b> Wire mesh 60 µm										
<b>A10</b> Inorganic microfiber 10 µm	<b>M90</b> Wire mesh 90 µm										
<b>A16</b> Inorganic microfiber 16 µm	<b>P10</b> Resin impregnated paper 10 µm										
<b>A25</b> Inorganic microfiber 25 µm	<b>P25</b> Resin impregnated paper 25 µm										
<b>WA025</b> Water absorber inorganic microfiber 25 µm											
Element Δp <b>N</b> 20 bar		Execution		Filter length							
				<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>			
		<b>P01</b> MP Filtri standard		•	•	•	•	•			
		<b>P02</b> Maintenance from the bottom of the housing							•	•	
		<b>Pxx</b> Customized									

### FILTER ELEMENT

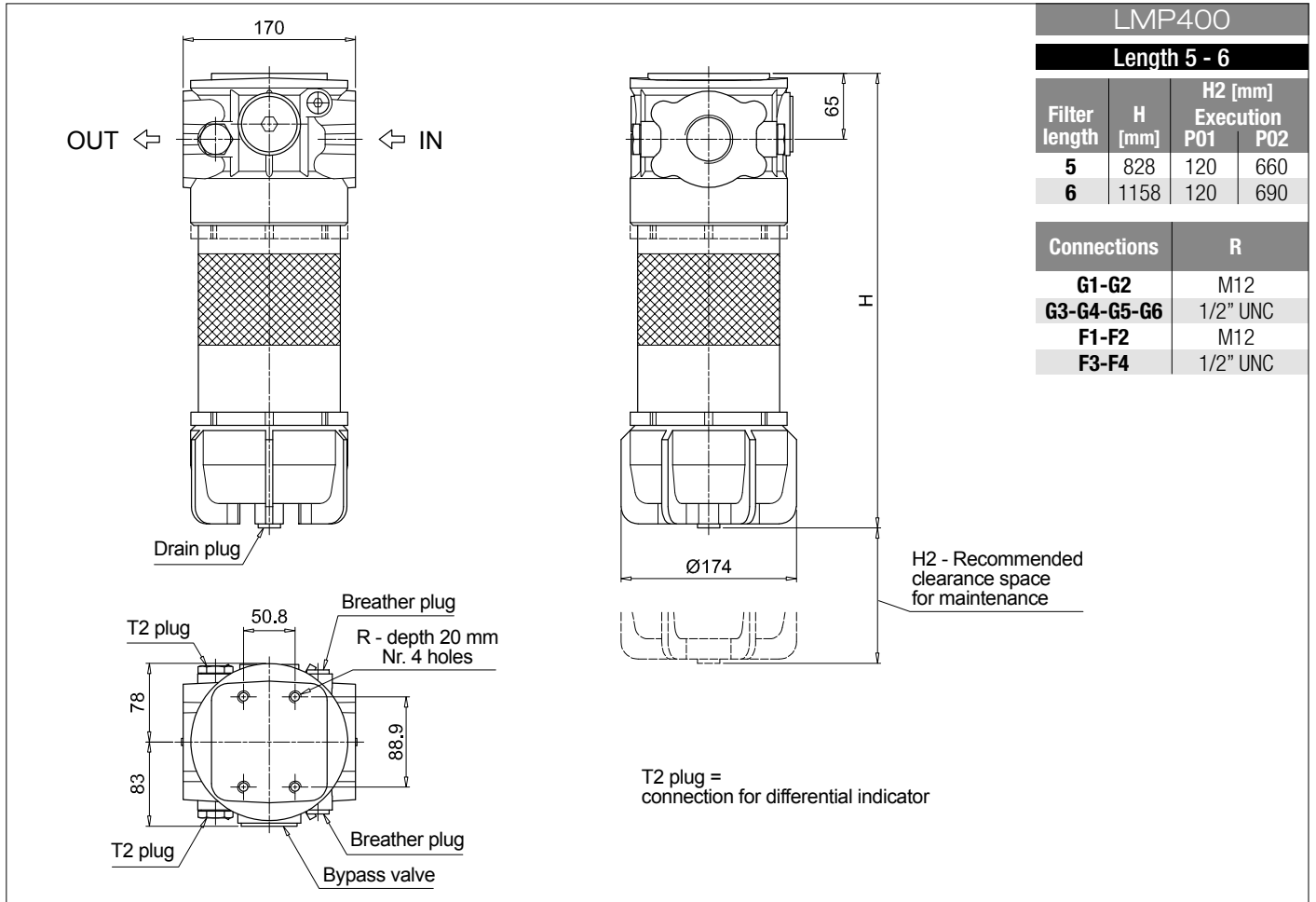
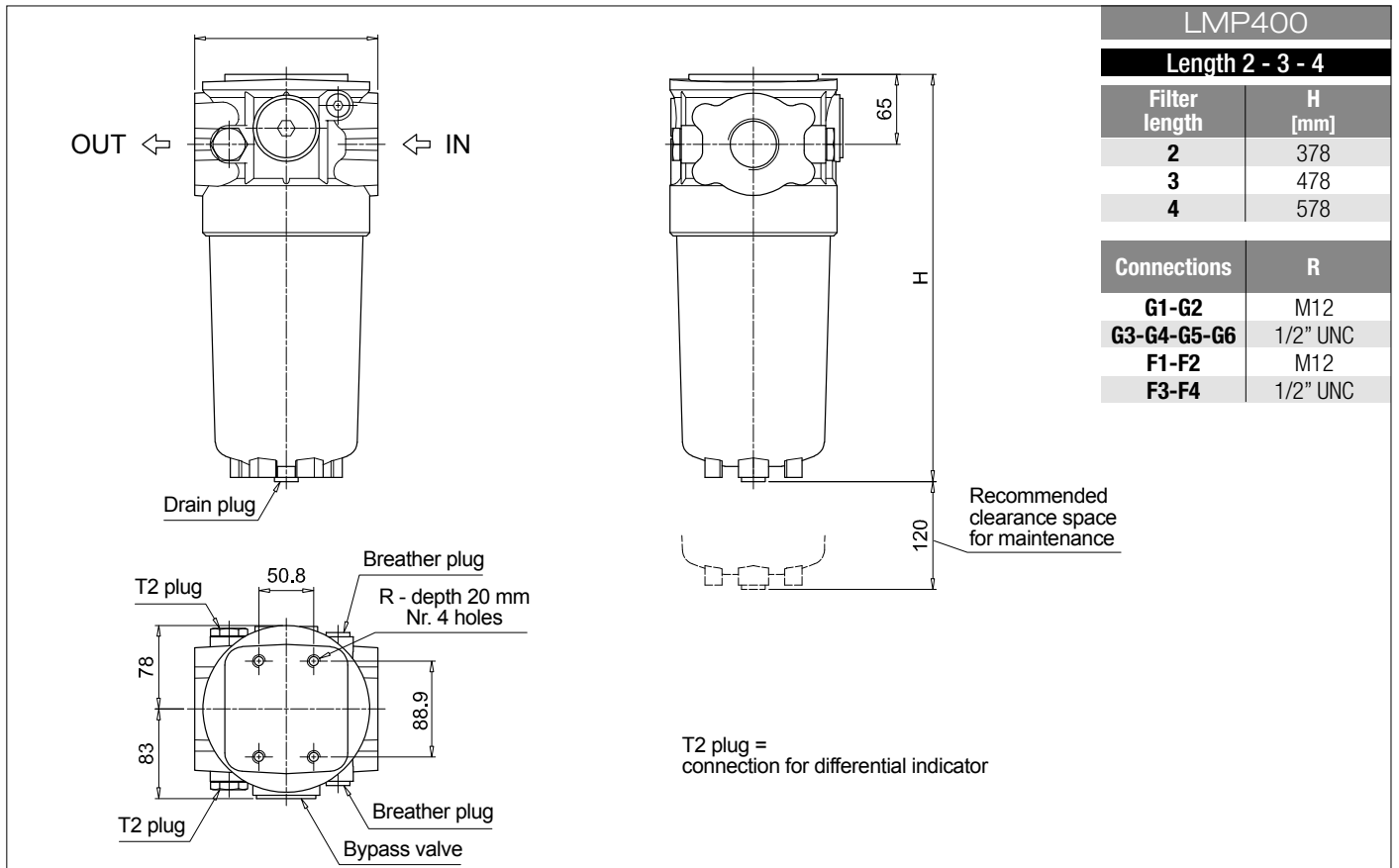
Element series and size <b>CU400</b>		Configuration example: <b>CU400</b>   <b>3</b>   <b>A10</b>   <b>A</b>   <b>N</b>   <b>P01</b>									
Element length <b>2</b>   <b>3</b>   <b>4</b>   <b>5</b>   <b>6</b>											
Filtration rating (filter media)											
<b>A03</b> Inorganic microfiber 3 µm	<b>M25</b> Wire mesh 25 µm										
<b>A06</b> Inorganic microfiber 6 µm	<b>M60</b> Wire mesh 60 µm										
<b>A10</b> Inorganic microfiber 10 µm	<b>M90</b> Wire mesh 90 µm										
<b>A16</b> Inorganic microfiber 16 µm	<b>P10</b> Resin impregnated paper 10 µm										
<b>A25</b> Inorganic microfiber 25 µm	<b>P25</b> Resin impregnated paper 25 µm										
<b>WA025</b> Water absorber inorganic microfiber 25 µm											
Seals		Filtration rating									
		<b>Axx</b>	<b>Mxx</b>	<b>Pxx</b>							
<b>A</b> NBR		•	•	•							
<b>V</b> FPM		•	•	•							
<b>W</b> NBR compatible with fluids HFA-HFB-HFC		•	•								
Element Δp <b>N</b> 20 bar		Execution									
		<b>P01</b> MP Filtri standard									
		<b>Pxx</b> Customized									

### ACCESSORIES

Differential indicators		page			page
<b>DEA</b> Electrical differential indicator		445	<b>DTA</b> Electronic differential indicator		448
<b>DEM</b> Electrical differential indicator		445-446	<b>DVA</b> Visual differential indicator		448
<b>DLA</b> Electrical / visual differential indicator		446-447	<b>DVM</b> Visual differential indicator		448
<b>DLE</b> Electrical / visual differential indicator		447			
Additional features		page			
<b>T2</b> Plug		449			

# LMP 400-401

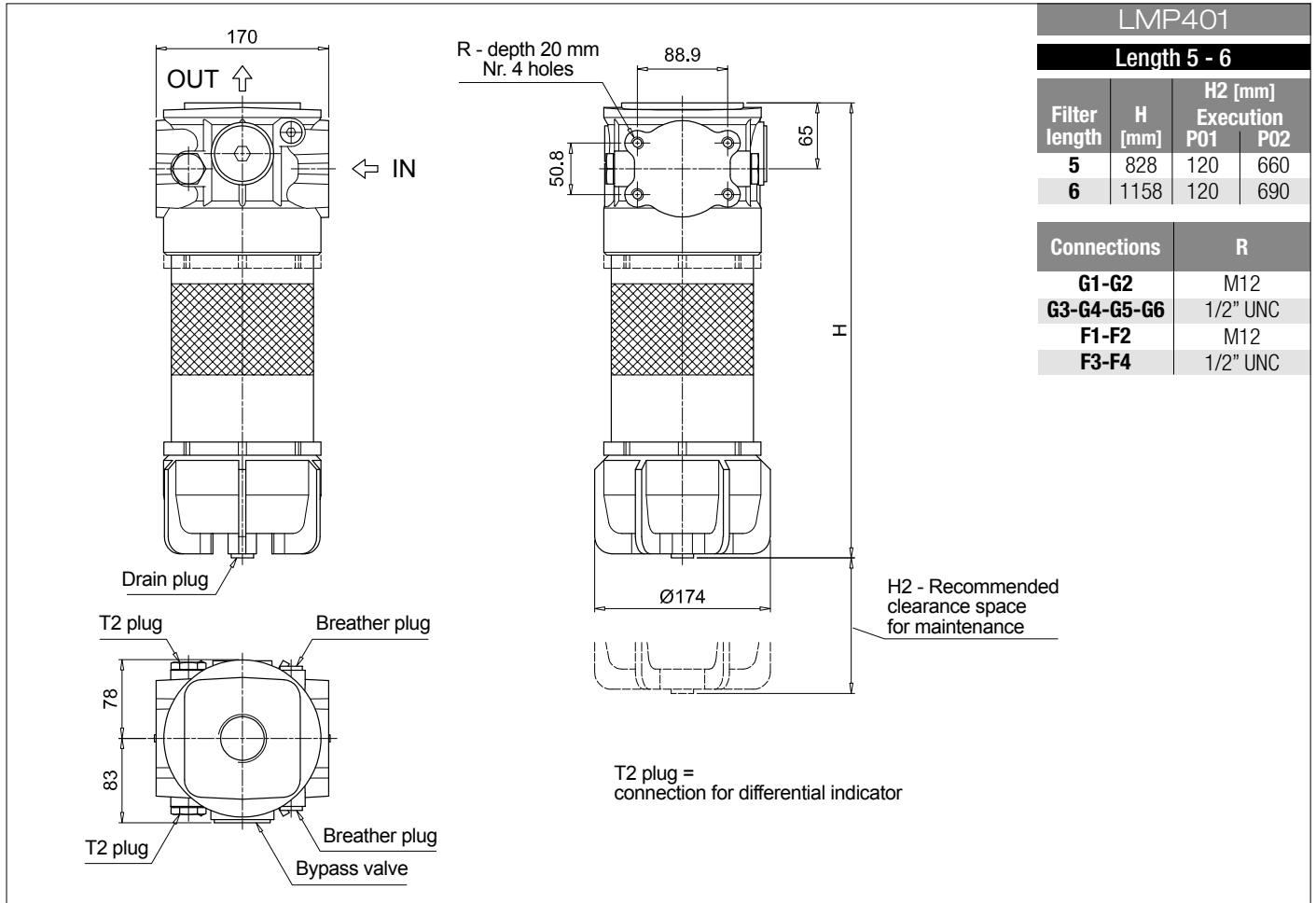
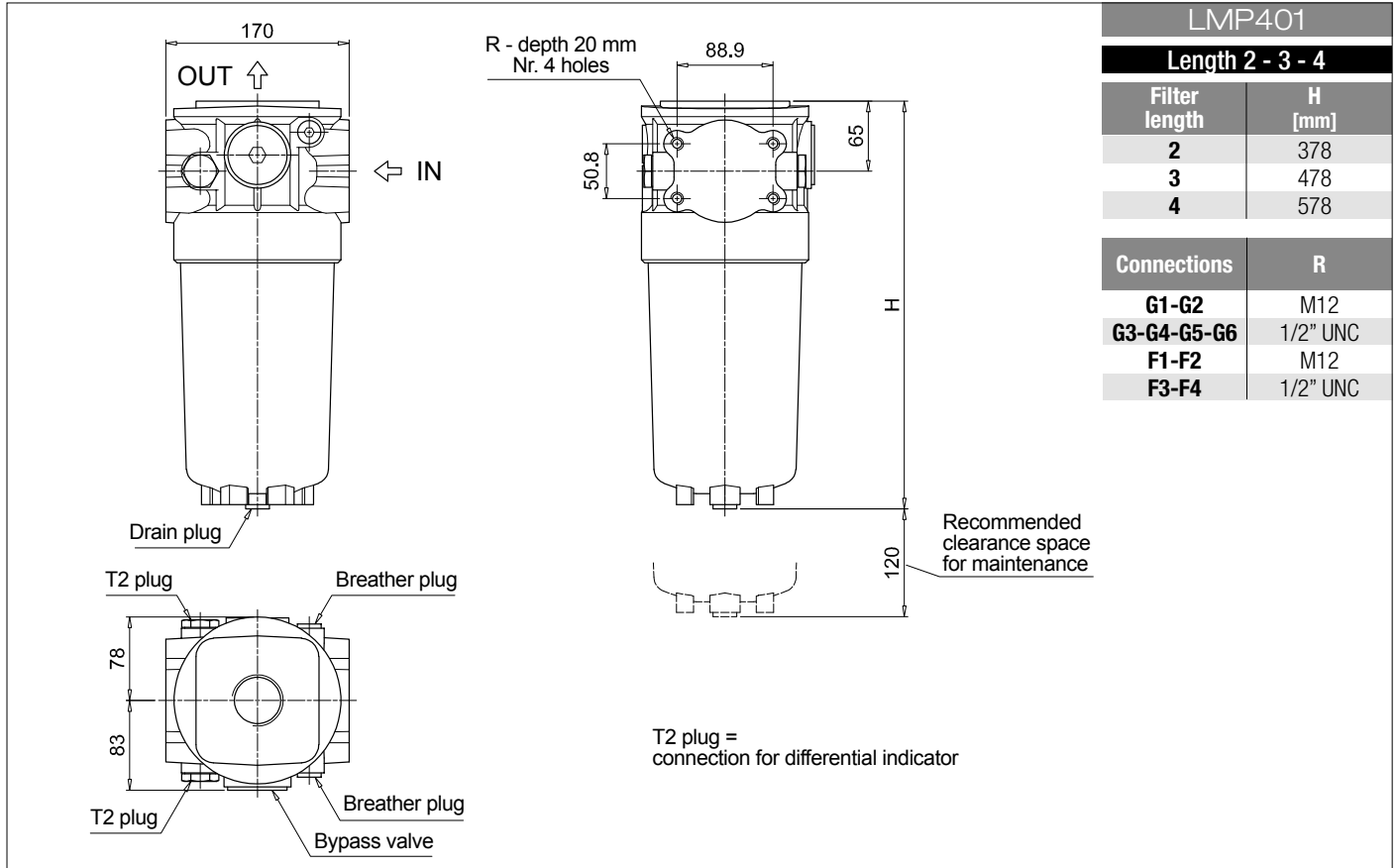
## Dimensions





# LMP 400-401

## Dimensions





# LMP 430-431

## Designation & Ordering code

### COMPLETE FILTER

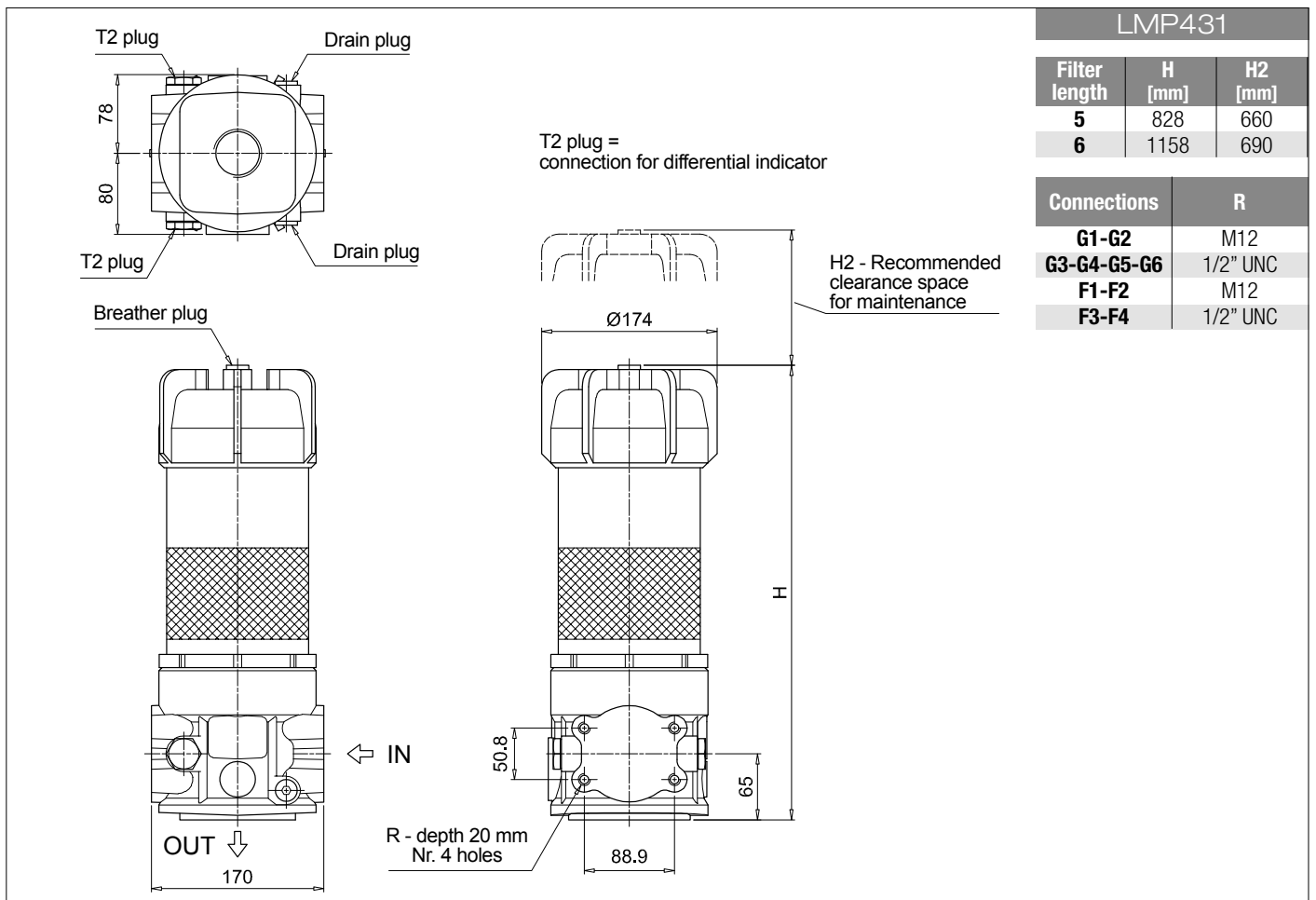
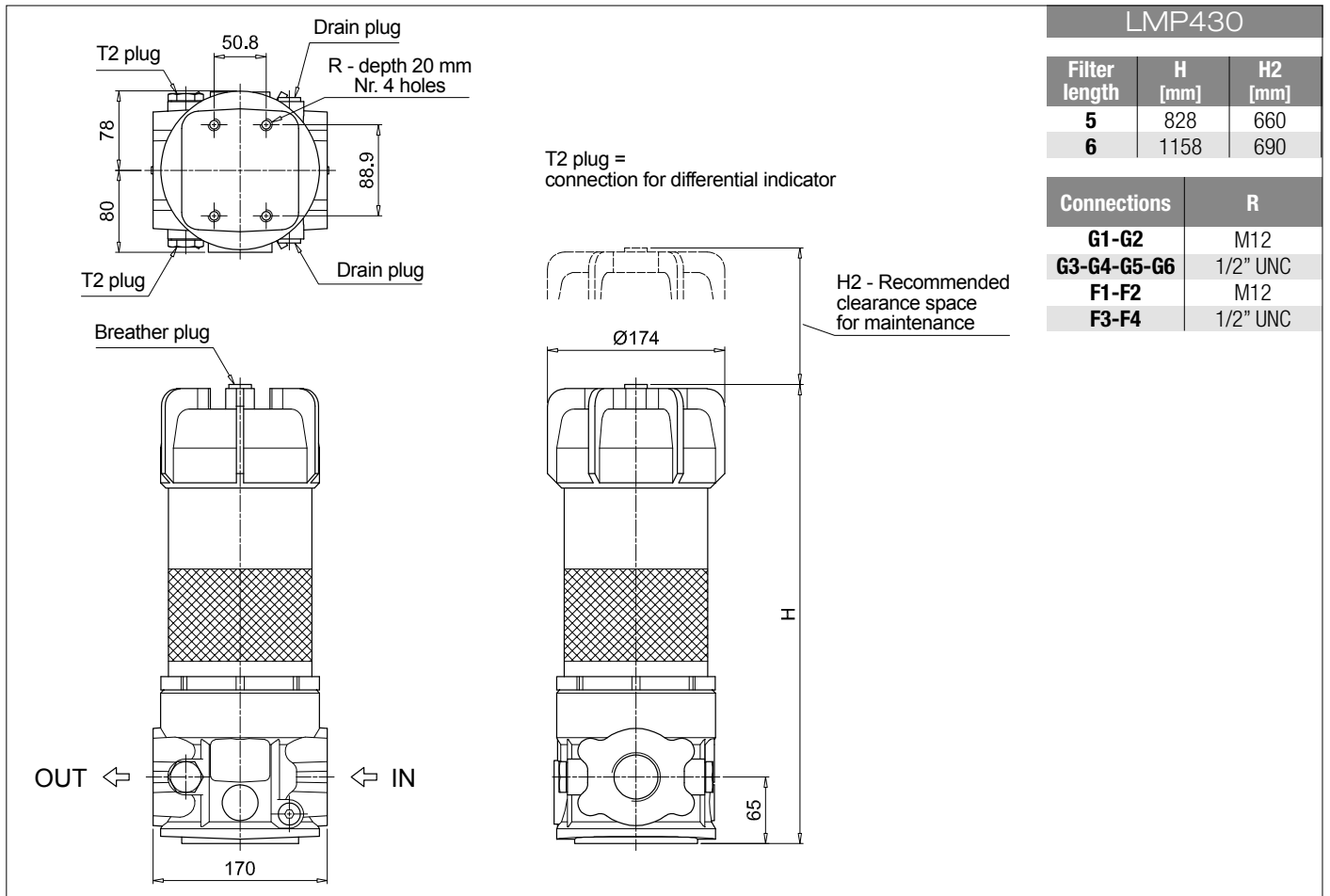
Series and size		Configuration example: <b>LMP431</b>   <b>5</b>   <b>B</b>   <b>A</b>   <b>G1</b>   <b>A10</b>   <b>N</b>   <b>P01</b>									
<b>LMP430</b>   <b>LMP431</b>											
Length											
<b>5</b>   <b>6</b>											
Bypass valve											
<b>S</b> Without bypass		<b>B</b> 3.5 bar									
Seals and treatments		Filtration rating									
		Axx	Mxx	Pxx							
<b>A</b> NBR		•	•	•							
<b>V</b> FPM		•	•	•							
<b>W</b> NBR compatible with fluids HFA-HFB-HFC		•	•								
Connections											
<b>G1</b> G 1 1/2"		<b>F1</b> 2" SAE 3000 psi/M									
<b>G2</b> G 2"		<b>F2</b> 2 1/2" SAE 3000 psi/M									
<b>G3</b> 1 1/2" NPT		<b>F3</b> 2" SAE 3000 psi/UNC									
<b>G4</b> 2" NPT		<b>F4</b> 2 1/2" SAE 3000 psi/UNC									
<b>G5</b> SAE 24 - 1 7/8" - 12 UN											
<b>G6</b> SAE 32 - 2 1/2" - 12 UN											
Filtration rating (filter media)											
<b>A03</b> Inorganic microfiber 3 µm		<b>M25</b> Wire mesh 25 µm									
<b>A06</b> Inorganic microfiber 6 µm		<b>M60</b> Wire mesh 60 µm									
<b>A10</b> Inorganic microfiber 10 µm		<b>M90</b> Wire mesh 90 µm									
<b>A16</b> Inorganic microfiber 16 µm		<b>P10</b> Resin impregnated paper 10 µm									
<b>A25</b> Inorganic microfiber 25 µm		<b>P25</b> Resin impregnated paper 25 µm									
<b>WA025</b> Water absorber inorganic microfiber 25 µm											
Element Δp											
<b>N</b> 20 bar											
Execution											
<b>P01</b> MP Filtri standard											
<b>P02</b> With internal tube for reduced flow rate											
<b>Pxx</b> Customized											

### FILTER ELEMENT

Element series and size		Configuration example: <b>CU400</b>   <b>5</b>   <b>A10</b>   <b>A</b>   <b>N</b>   <b>P01</b>									
<b>CU400</b>											
Element length											
<b>5</b>   <b>6</b>											
Filtration rating (filter media)											
<b>A03</b> Inorganic microfiber 3 µm		<b>M25</b> Wire mesh 25 µm									
<b>A06</b> Inorganic microfiber 6 µm		<b>M60</b> Wire mesh 60 µm									
<b>A10</b> Inorganic microfiber 10 µm		<b>M90</b> Wire mesh 90 µm									
<b>A16</b> Inorganic microfiber 16 µm		<b>P10</b> Resin impregnated paper 10 µm									
<b>A25</b> Inorganic microfiber 25 µm		<b>P25</b> Resin impregnated paper 25 µm									
<b>WA025</b> Water absorber inorganic microfiber 25 µm											
Seals		Filtration rating									
		Axx	Mxx	Pxx							
<b>A</b> NBR		•	•	•							
<b>V</b> FPM		•	•	•							
<b>W</b> NBR compatible with fluids HFA-HFB-HFC		•	•								
Element Δp											
<b>N</b> 20 bar											
Execution											
<b>P01</b> MP Filtri standard											
<b>Pxx</b> Customized											

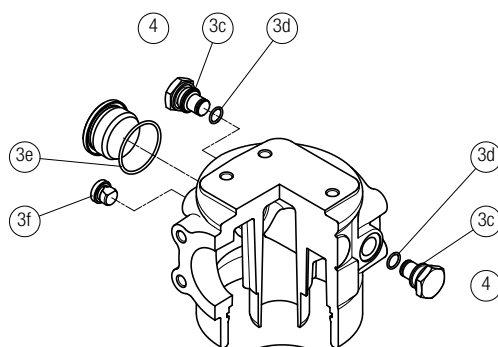
### ACCESSORIES

Differential indicators		page			page
<b>DEA</b>	Electrical differential indicator	445	<b>DTA</b>	Electronic differential indicator	448
<b>DEM</b>	Electrical differential indicator	445-446	<b>DVA</b>	Visual differential indicator	448
<b>DLA</b>	Electrical / visual differential indicator	446-447	<b>DVM</b>	Visual differential indicator	448
<b>DLE</b>	Electrical / visual differential indicator	447			
Additional features		page			
<b>T2</b>	Plug	449			

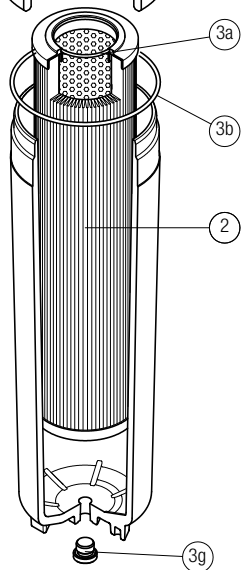
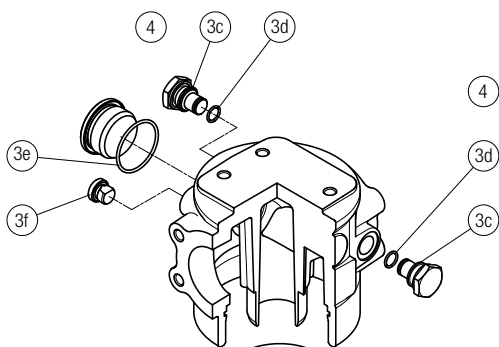


Order number for spare parts

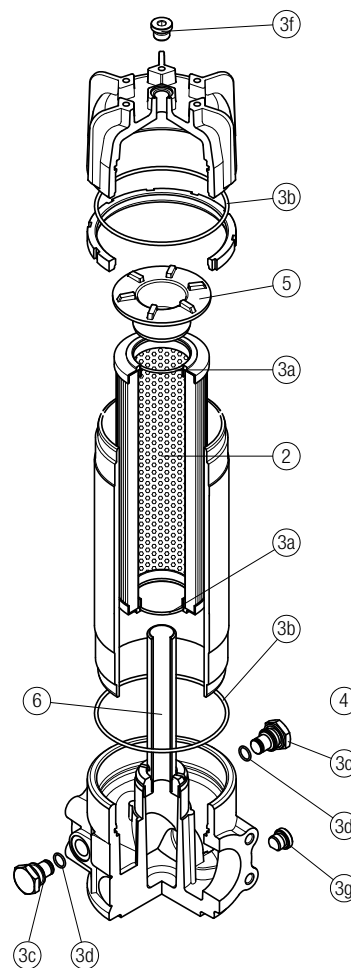
**LMP 400 - 401**  
length 2 - 3 - 4



**LMP 400 - 401**  
length 5 - 6



**LMP 430 - 431**  
length 5 - 6



Item:	Q.ty: 1 pc.	Q.ty: 1 pc.	Q.ty: 2 pcs.	Q.ty: 2 pcs.	Q.ty: 1 pc.
Filter series	Filter element	Seal Kit code number NBR FPM	Indicator connection plug NBR FPM	Housing spigot no bypass with bypass	Tube assembly
LMP 400-401 length 2-3-4	See order table	02050391 02050392	T2H T2V	01044108	
LMP 400-401 length 5-6		02050393 02050394		01044108	
LMP 430-431 length 5-6		02050393 02050394		02001414	Length 5: 02025041   Length 6: 02025042





# LMP 950-951 series

Maximum working pressure up to 3 MPa (30 bar) - Flow rate up to 2400 l/min





# LMP 950-951 GENERAL INFORMATION

## Description

## Technical data

### Low & Medium Pressure filters

**Maximum working pressure up to 3 MPa (30 bar)**  
**Flow rate up to 2400 l/min**

LMP950 is a range of low pressure filter with large filtration surface mainly suitable for lubrication, off-line filtration of the reservoirs and filtration equipment.

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

#### Available features:

- Flanged connections up to 4", for a maximum flow rate of 2400 l/min
- In line or 90° connections, to meet any type of application
- Base-mounting design, for ease of the replacement of the filter element
- Fine filtration rating, to get a good cleanliness level into the system
- Water removal elements, to remove the free water from the hydraulic fluid
- Bypass valve, to relieve excessive pressure drop across the filter media
- Vent ports, to avoid air trapped into the filter going into the system
- Drain ports, to remove the fluid from the housing prior the maintenance work
- Visual, electrical and electronic differential clogging indicators

#### Common applications:

- Off-line filtration of reservoirs
- Filtration systems
- Lubrication systems

### Filter housing materials

- Head: Anodized Aluminium
- Housing: Anodized Aluminium
- Bypass valve: Anodized Aluminium

### Pressure

- Test pressure: 4,5 MPa (45 bar)
- Burst pressure: 12 MPa (120 bar)
- Pulse pressure fatigue test: 1 000 000 cycles with pressure from 0 to 3 MPa (30 bar)

### Bypass valve

- Opening pressure 350 kPa (3.5 bar) ±10%
- Other opening pressures on request.

### Δp element type

- Microfibre filter elements - series N: 20 bar
- Fluid flow through the filter element from OUT to IN

### Seals

- Standard NBR series A
- Optional FPM series V

### Temperature

From -25 °C to +110 °C

### Connections

LMP 950: In-line Inlet/Outlet  
 LMP 951: 90° Inlet/Outlet

### Note

LMP 950 - 951 filters are provided for vertical mounting



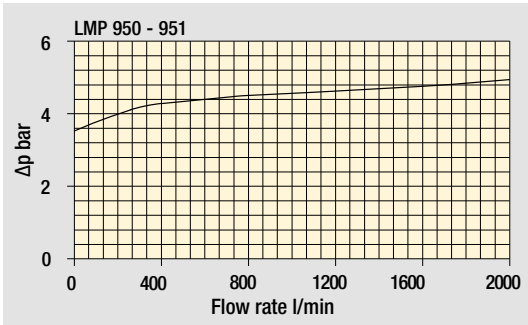
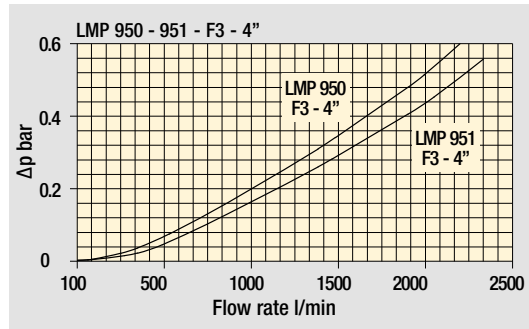
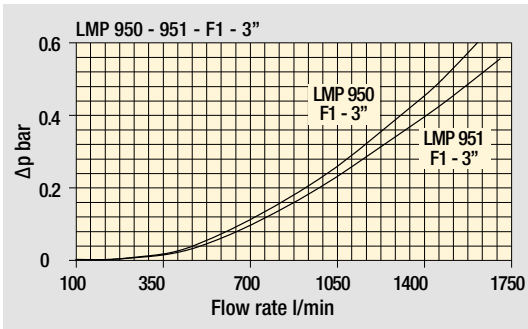
## Weights [kg] and volumes [dm<sup>3</sup>]

Filter series	Weights [kg]			Volumes [dm <sup>3</sup> ]		
	Length	2	3	Length	2	3
<b>LMP 950-951</b>		25.1	33.5		15	28

# GENERAL INFORMATION LMP 950-951

Pressure drop

Filter housings  $\Delta p$  pressure drop



Bypass valve pressure drop

The curves are plotted using mineral oil with density of  $0.86 \text{ kg/dm}^3$  in compliance with ISO 3968.  $\Delta p$  varies proportionally with density.

Flow rates [l/min]

Filter series	Length	Filter element design - N Series						M25 M60 M90 M250
		A03	A06	A10	A16	A25		
LMP 950	2	613	756	953	1219	1515	2170	
	3	1148	1219	1502	1713	1808	2293	
LMP 951	2	635	789	1007	1308	1649	2420	
	3	1226	1308	1634	1881	1993	2566	

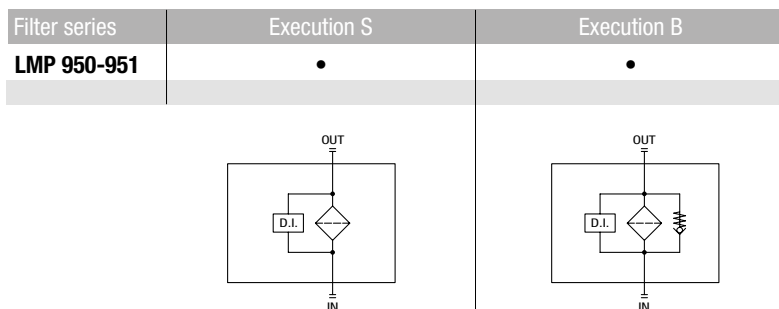
**Maximum flow rate for a complete low and medium pressure filter with a pressure drop  $\Delta p = 0.7 \text{ bar}$ .**

The reference fluid has a kinematic viscosity of  $30 \text{ mm}^2/\text{s}$  (cSt) and a density of  $0.86 \text{ kg/dm}^3$ .

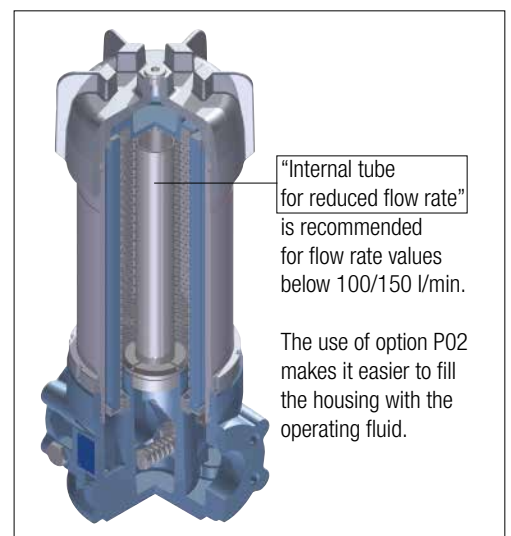
For different pressure drop or fluid viscosity we recommend to use our selection software available on [www.mpfiltri.com](http://www.mpfiltri.com).

Please, contact our Sales Department for further additional information.

Hydraulic symbols



Execution P02



# LMP 950-951

## Designation & Ordering code

### COMPLETE FILTER

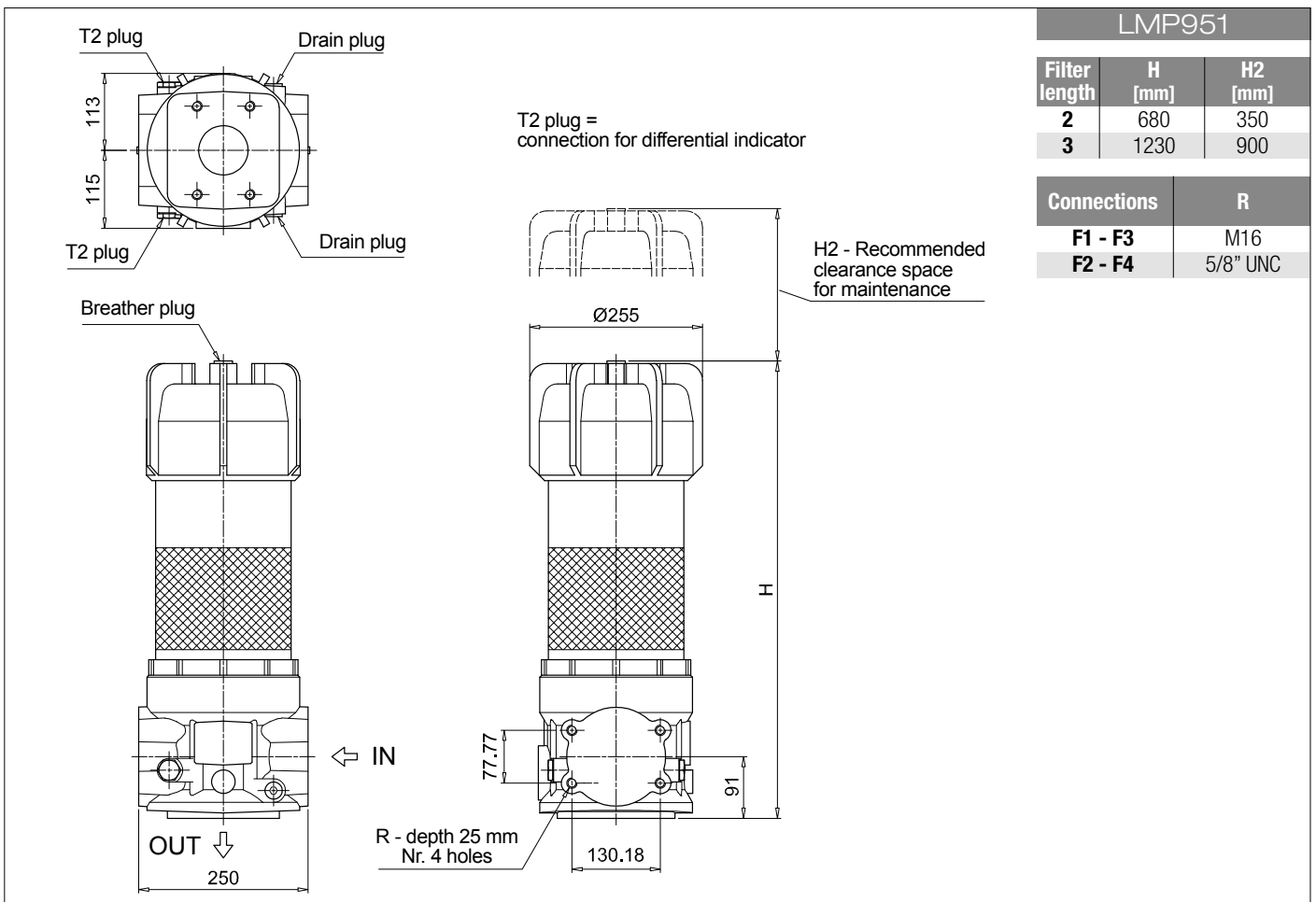
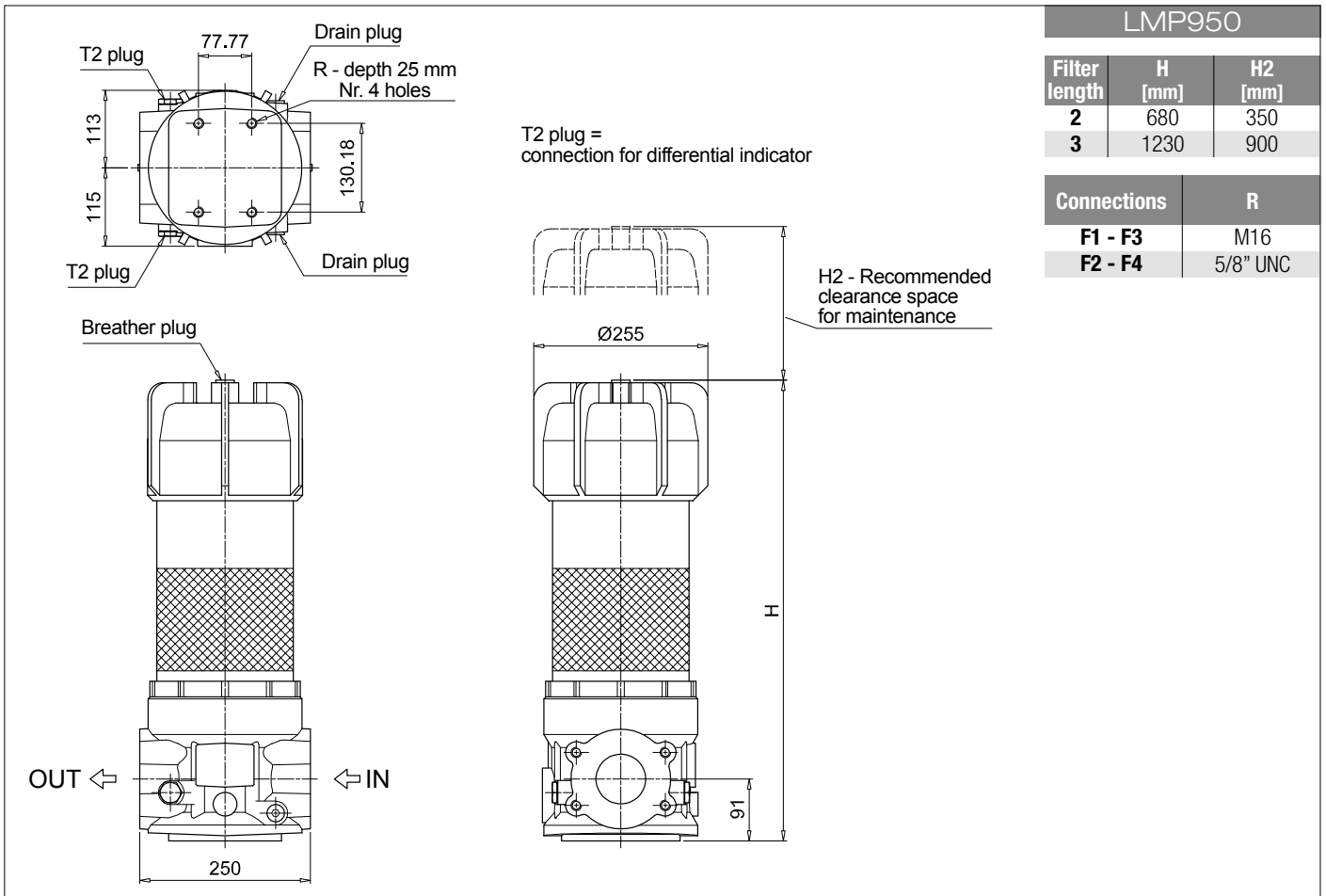
<b>Series and size</b> <b>LMP950   LMP951</b>	Configuration example: <b>LMP951</b>   <b>2</b>   <b>B</b>   <b>A</b>   <b>F2</b>   <b>A10</b>   <b>N</b>   <b>P01</b>
<b>Length</b> <b>2</b>   <b>3</b>	
<b>Bypass valve</b> <b>S</b> Without bypass   <b>B</b> 3.5 bar	
<b>Seals and treatments</b> <b>A</b> NBR <b>V</b> FPM	
<b>Connections</b> <b>F1</b> 3" SAE 3000 psi/M <b>F2</b> 3" SAE 3000 psi/UNC <b>F3</b> 4" SAE 3000 psi/M <b>F4</b> 4" SAE 3000 psi/UNC	
<b>Filtration rating (filter media)</b> <b>A03</b> Inorganic microfiber 3 µm   <b>M25</b> Wire mesh 25 µm <b>A06</b> Inorganic microfiber 6 µm   <b>M60</b> Wire mesh 60 µm <b>A10</b> Inorganic microfiber 10 µm   <b>M90</b> Wire mesh 90 µm <b>A16</b> Inorganic microfiber 16 µm <b>A25</b> Inorganic microfiber 25 µm <b>WA025</b> Water absorber inorganic microfiber 25 µm	
	<b>Element Δp</b> <b>N</b> 20 bar
	<b>Execution</b> <b>P01</b> MP Filtri standard <b>P02</b> With internal tube for reduced flow rate <b>Pxx</b> Customized

### FILTER ELEMENT

<b>Element series and size</b> <b>CU950</b>	Configuration example: <b>CU950</b>   <b>2</b>   <b>A10</b>   <b>A</b>   <b>N</b>   <b>P01</b>
<b>Element length</b> <b>2</b>   <b>3</b>	
<b>Filtration rating (filter media)</b> <b>A03</b> Inorganic microfiber 3 µm   <b>M25</b> Wire mesh 25 µm <b>A06</b> Inorganic microfiber 6 µm   <b>M60</b> Wire mesh 60 µm <b>A10</b> Inorganic microfiber 10 µm   <b>M90</b> Wire mesh 90 µm <b>A16</b> Inorganic microfiber 16 µm <b>A25</b> Inorganic microfiber 25 µm <b>WA025</b> Water absorber inorganic microfiber 25 µm	
<b>Seals</b> <b>A</b> NBR <b>V</b> FPM	
	<b>Element Δp</b> <b>N</b> 20 bar
	<b>Execution</b> <b>P01</b> MP Filtri standard <b>Pxx</b> Customized

### ACCESSORIES

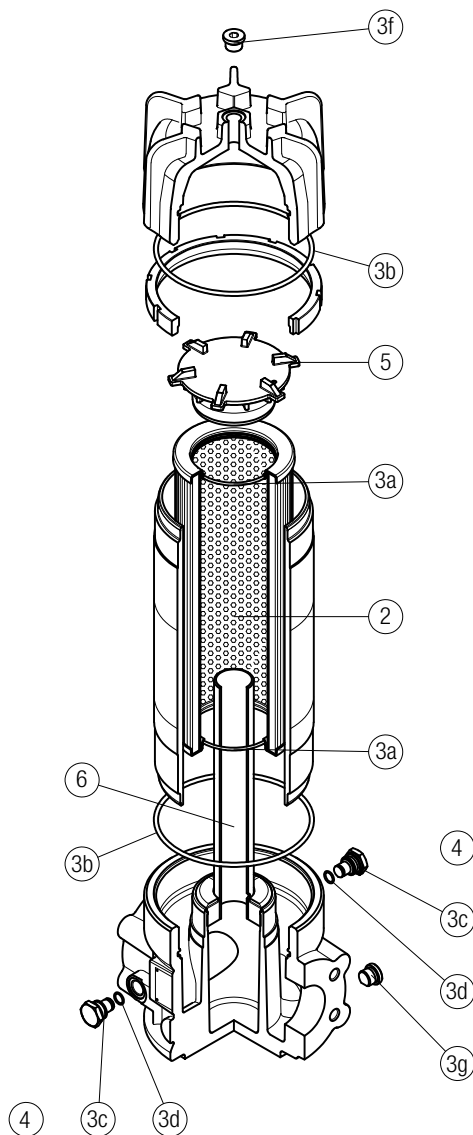
<b>Differential indicators</b>	page		page
<b>DEA</b> Electrical differential indicator	445	<b>DTA</b> Electronic differential indicator	448
<b>DEM</b> Electrical differential indicator	445-446	<b>DVA</b> Visual differential indicator	448
<b>DLA</b> Electrical / visual differential indicator	446-447	<b>DVM</b> Visual differential indicator	448
<b>DLE</b> Electrical / visual differential indicator	447		
<b>Additional features</b>	page		
<b>T2</b> Plug	449		



# LMP 950-951 SPARE PARTS

Order number for spare parts

LMP 950 - 951



Item:	Q.ty: 2 pcs.	Q.ty: 1 pc.		Q.ty: 2 pcs.		Q.ty: 1 pc.		Q.ty: 1 pc.	
Filter series	Filter element	Seal Kit code number		Indicator connection plug		Housing spigot		Tube assembly	
LMP 950-951 length 2-3	See order table	NBR	FPM	NBR	FPM	no bypass	with bypass	length 2	length 3
		02050367	02050368	T2H	T2V	01044106	02001379	02025032	02025033





# LMP 952-953-954 series

Maximum working pressure up to 2.5 MPa (25 bar) - Flow rate up to 3000 l/min





# LMP 952-953-954 GENERAL INFORMATION

## Description

## Technical data

### Low & Medium Pressure filters

**Maximum working pressure up to 2.5 MPa (25 bar)**  
**Flow rate up to 3000 l/min**

LMP952, LMP953 and LMP954 are ranges of low pressure filter with large filtration surface mainly suitable for lubrication, off-line filtration of the reservoirs and filtration equipment.

Multiple LMP950 filters are connected to a manifold to reduce the pressure drop caused by the filter media and to increase the life time of the filter element.

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

#### Available features:

- 4" flanged connections, for a maximum flow rate of 3000 l/min
- Base-mounting design, for ease of the replacement of the filter element
- Fine filtration rating, to get a good cleanliness level into the system
- Water removal elements, to remove the free water from the hydraulic fluid
- Bypass valve, to relieve excessive pressure drop across the filter media
- Vent ports, to avoid air trapped into the filter going into the system
- Drain ports, to remove the fluid from the housing prior the maintenance work
- Visual, electrical and electronic differential clogging indicators

#### Common applications:

- Off-line filtration of reservoirs
- Filtration systems

### Filter housing materials

- Head: Anodized Aluminium
- Housing: Anodized Aluminium
- Manifolds: Welded - Phosphatized Steel
- Bypass valve: Anodized Aluminium

### Pressure

Test pressure: 3.5 MPa (35 bar)

### Bypass valve

- Opening pressure 350 kPa (3.5 bar)  $\pm 10\%$
- Other opening pressures on request.

### $\Delta p$ element type

- Microfibre filter elements - series N: 20 bar
- Fluid flow through the filter element from OUT to IN

### Number of filter elements

- LMP 952: 2 filter elements CU950-3
- LMP 953: 3 filter elements CU950-3
- LMP 954: 4 filter elements CU950-3

### Seals

- Standard NBR series A
- Optional FPM series V

### Temperature

From -25 °C to +110 °C

### Connections

LMP 952-953-954:  
In-line Inlet/Outlet

### Note

LMP 952 - 953 - 954 filters  
are provided for vertical mounting



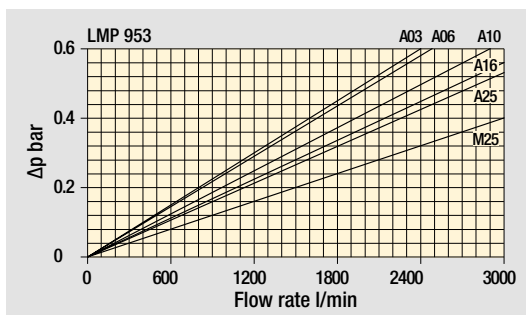
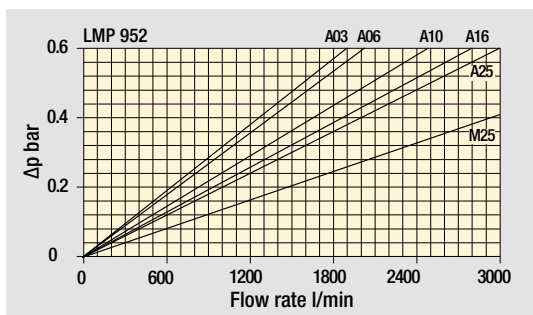
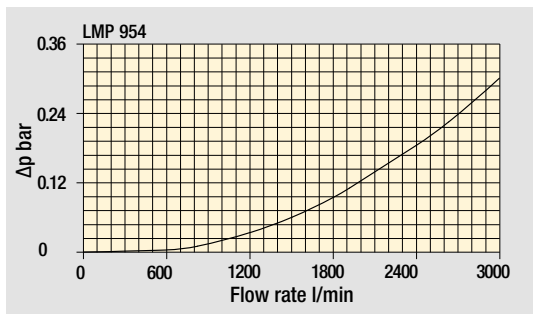
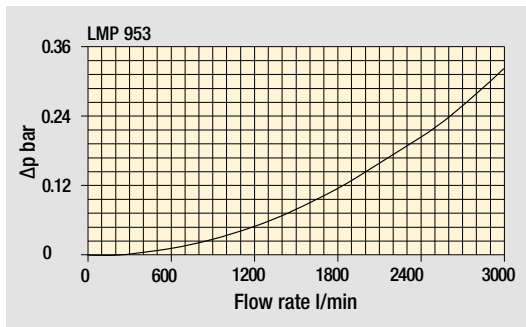
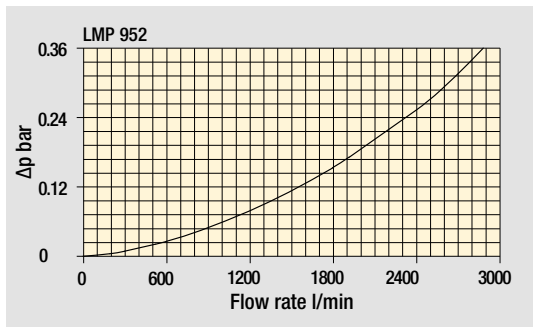
## Weights [kg] and volumes [dm<sup>3</sup>]

Filter series	Weights [kg]		Volumes [dm <sup>3</sup> ]	
	Length	3	Length	3
<b>LMP 952</b>		96		66
<b>LMP 953</b>		138		99
<b>LMP 954</b>		192		132

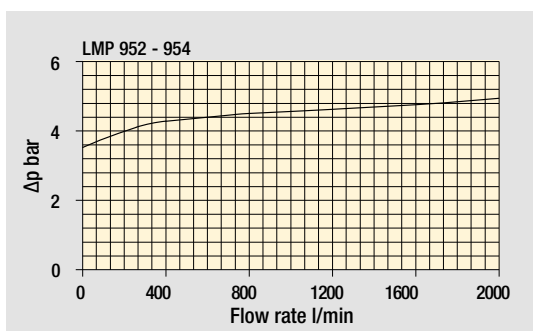
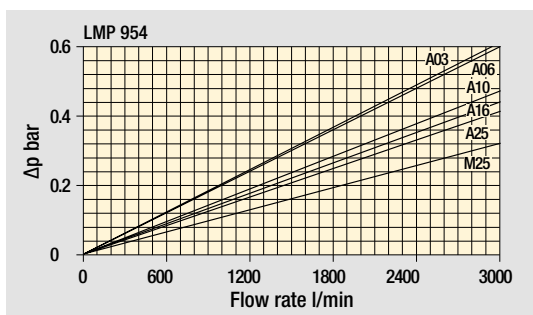
# GENERAL INFORMATION LMP 952-953-954

Pressure drop

Filter housings  $\Delta p$  pressure drop



Pressure drop of filter complete with cartridge, oil viscosity 30 mm<sup>2</sup>/s (cSt)



Bypass valve pressure drop

The curves are plotted using mineral oil with density of 0.86 kg/dm<sup>3</sup> in compliance with ISO 3968.  $\Delta p$  varies proportionally with density.

# LMP 952-953-954 GENERAL INFORMATION

Flow rates [l/min]

Filter series	Length	Filter element design - N Series					
		A03	A06	A10	A16	A25	M25 M60 M90 M250
<b>LMP 952</b>	<b>3</b>	2172	2294	2766	3106	3256	3998
<b>LMP 953</b>	<b>3</b>	2842	2964	3403	3696	3820	4395
<b>LMP 954</b>	<b>3</b>	3259	3372	3770	4026	4133	4618

**Maximum flow rate for a complete low and medium pressure filter with a pressure drop  $\Delta p = 0.7$  bar.**

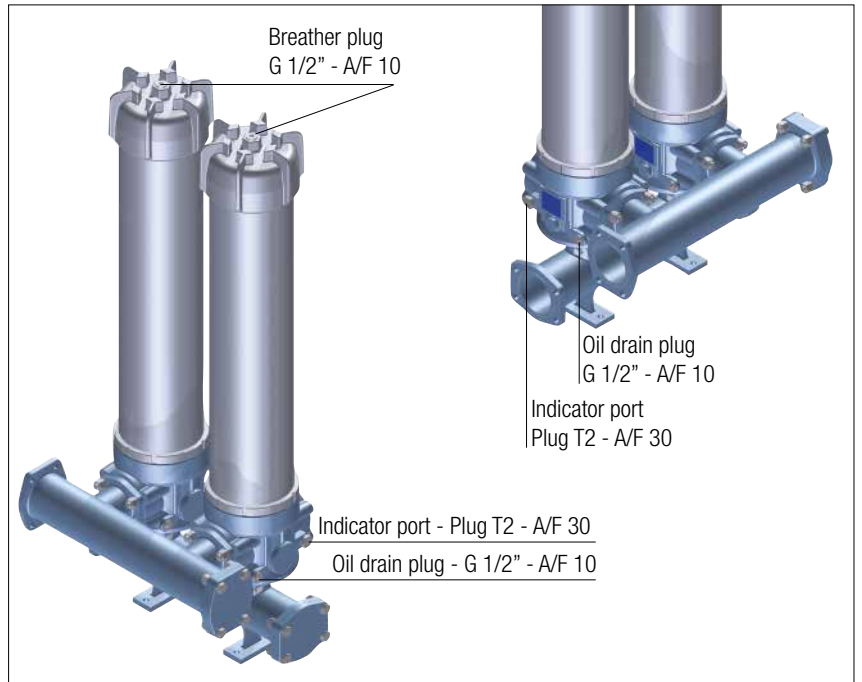
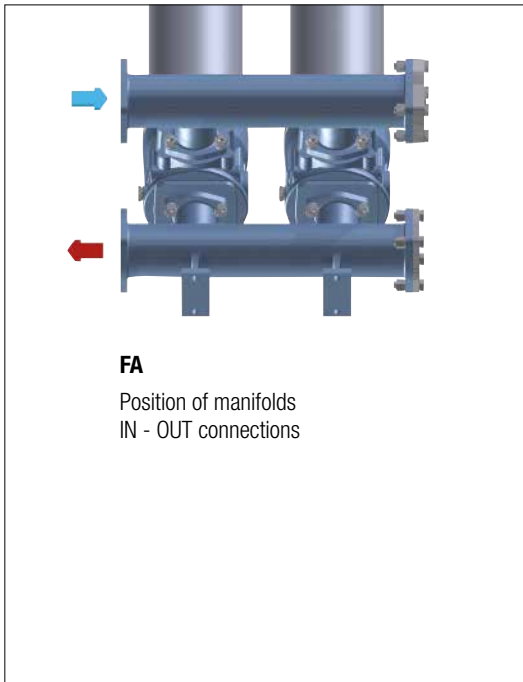
The reference fluid has a kinematic viscosity of 30 mm<sup>2</sup>/s (cSt) and a density of 0.86 kg/dm<sup>3</sup>.

For different pressure drop or fluid viscosity we recommend to use our selection software available on [www.mpfiltri.com](http://www.mpfiltri.com).

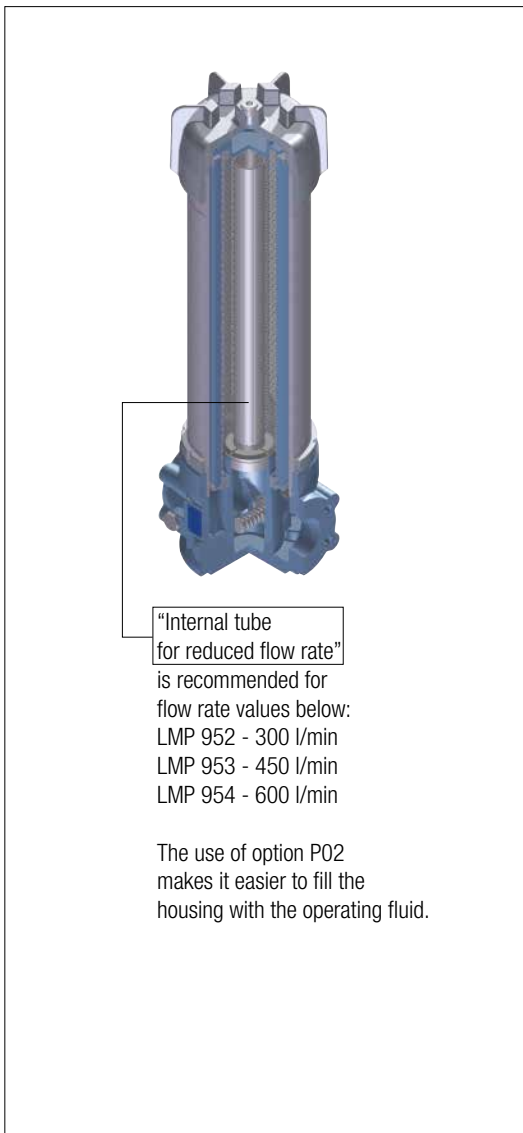
Please, contact our Sales Department for further additional information.

## Hydraulic symbols

Filter series	Execution S - Execution B	Execution S - Execution B	Execution S - Execution B
<b>LMP 952</b>	•		
<b>LMP 953</b>		•	
<b>LMP 954</b>			•

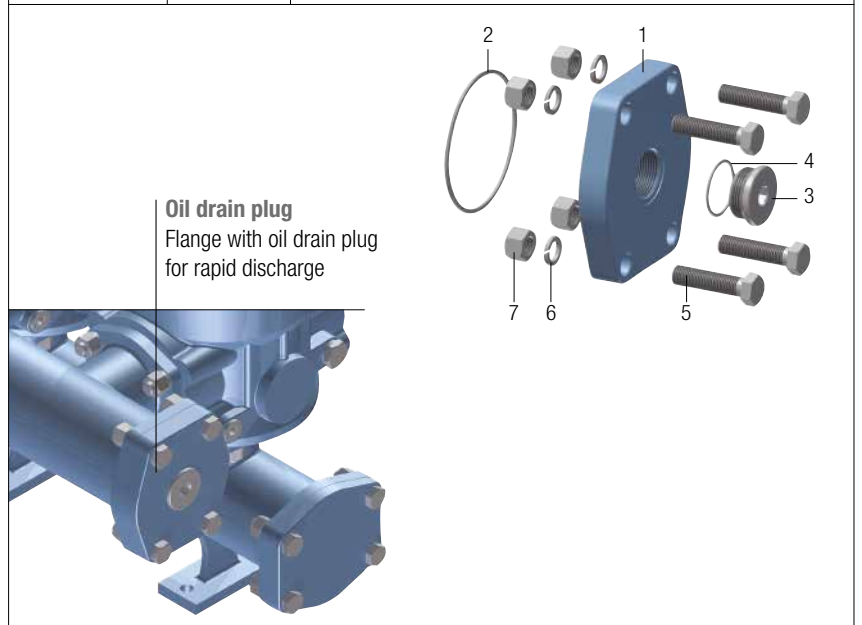


Execution P02



CMV4 & CUV4 Flange options

Code	Thread	Materials
CMV4	G 1 1/4"	1 - 4" SAE flange 2 - O-R 4437 (FPM) for flange 3 - Plug G 1-1/4" 4 - O-R 3168 for plug (FPM) 5 - No. 4 Hex bolt screws UNI-EN 24017 M16 x 65-10.9 6 - No. 4 Spring washers UNI 1751-B 16 7 - No. 4 Nuts UNI 5587 - M16
CUV4	SAE 20	1 - 4" SAE flange 2 - O-R 4437 (FPM) for flange 3 - Plug SAE 20 1 5/8" - 12 UN 4 - 1147 O-R for plug (FPM) 5 - No. 4 Hex bolt screws 5/8" UNC x 2 1/2" 6 - No. 4 Spring washers UNI 1751-B 16 7 - No. 4 Nuts 5/8" UNC



# LMP 952-953-954

## Designation & Ordering code

### COMPLETE FILTER

<b>Series and size</b>	Configuration example: <b>LMP952</b>   <b>3</b>   <b>B</b>   <b>A</b>   <b>FA</b>   <b>A10</b>   <b>N</b>   <b>P01</b>																	
<b>LMP952</b>   <b>LMP953</b>   <b>LMP954</b>																		
<b>Length</b>	<b>3</b>																	
<b>Bypass valve</b>	<b>S</b> Without bypass   <b>B</b> 3.5 bar																	
<b>Seals and treatments</b>	<b>A</b> NBR <b>V</b> FPM																	
<b>Connections</b>	<b>FA</b> 4" SAE 3000 psi																	
<b>Filtration rating (filter media)</b>	<table border="0"> <tr> <td><b>A03</b> Inorganic microfiber 3 µm</td> <td><b>M25</b> Wire mesh 25 µm</td> </tr> <tr> <td><b>A06</b> Inorganic microfiber 6 µm</td> <td><b>M60</b> Wire mesh 60 µm</td> </tr> <tr> <td><b>A10</b> Inorganic microfiber 10 µm</td> <td><b>M90</b> Wire mesh 90 µm</td> </tr> <tr> <td><b>A16</b> Inorganic microfiber 16 µm</td> <td></td> </tr> <tr> <td><b>A25</b> Inorganic microfiber 25 µm</td> <td></td> </tr> </table>								<b>A03</b> Inorganic microfiber 3 µm	<b>M25</b> Wire mesh 25 µm	<b>A06</b> Inorganic microfiber 6 µm	<b>M60</b> Wire mesh 60 µm	<b>A10</b> Inorganic microfiber 10 µm	<b>M90</b> Wire mesh 90 µm	<b>A16</b> Inorganic microfiber 16 µm		<b>A25</b> Inorganic microfiber 25 µm	
<b>A03</b> Inorganic microfiber 3 µm	<b>M25</b> Wire mesh 25 µm																	
<b>A06</b> Inorganic microfiber 6 µm	<b>M60</b> Wire mesh 60 µm																	
<b>A10</b> Inorganic microfiber 10 µm	<b>M90</b> Wire mesh 90 µm																	
<b>A16</b> Inorganic microfiber 16 µm																		
<b>A25</b> Inorganic microfiber 25 µm																		
<b>WA025</b> Water absorber inorganic microfiber 25 µm																		
	<b>Element Δp</b>				<b>Execution</b>													
	<b>N</b> 20 bar				<b>P01</b> MP Filtri standard <b>P02</b> With internal tube for reduced flow rate <b>Pxx</b> Customized													

### FILTER ELEMENT

<b>Element series and size</b>	Configuration example: <b>CU950</b>   <b>3</b>   <b>A10</b>   <b>A</b>   <b>N</b>   <b>P01</b>																
<b>CU950</b>																	
<b>Element length</b>	<b>3</b>																
<b>Filter series and size</b>	<b>LMP952</b> Nr. 2 filter elements <b>LMP953</b> Nr. 3 filter elements <b>LMP954</b> Nr. 4 filter elements																
<b>Filtration rating (filter media)</b>	<table border="0"> <tr> <td><b>A03</b> Inorganic microfiber 3 µm</td> <td><b>M25</b> Wire mesh 25 µm</td> </tr> <tr> <td><b>A06</b> Inorganic microfiber 6 µm</td> <td><b>M60</b> Wire mesh 60 µm</td> </tr> <tr> <td><b>A10</b> Inorganic microfiber 10 µm</td> <td><b>M90</b> Wire mesh 90 µm</td> </tr> <tr> <td><b>A16</b> Inorganic microfiber 16 µm</td> <td></td> </tr> <tr> <td><b>A25</b> Inorganic microfiber 25 µm</td> <td></td> </tr> </table>							<b>A03</b> Inorganic microfiber 3 µm	<b>M25</b> Wire mesh 25 µm	<b>A06</b> Inorganic microfiber 6 µm	<b>M60</b> Wire mesh 60 µm	<b>A10</b> Inorganic microfiber 10 µm	<b>M90</b> Wire mesh 90 µm	<b>A16</b> Inorganic microfiber 16 µm		<b>A25</b> Inorganic microfiber 25 µm	
<b>A03</b> Inorganic microfiber 3 µm	<b>M25</b> Wire mesh 25 µm																
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<b>A16</b> Inorganic microfiber 16 µm																	
<b>A25</b> Inorganic microfiber 25 µm																	
<b>WA025</b> Water absorber inorganic microfiber 25 µm																	
<b>Seals</b>	<b>A</b> NBR <b>V</b> FPM																
	<b>Element Δp</b>				<b>Execution</b>												
	<b>N</b> 20 bar				<b>P01</b> MP Filtri standard <b>Pxx</b> Customized												

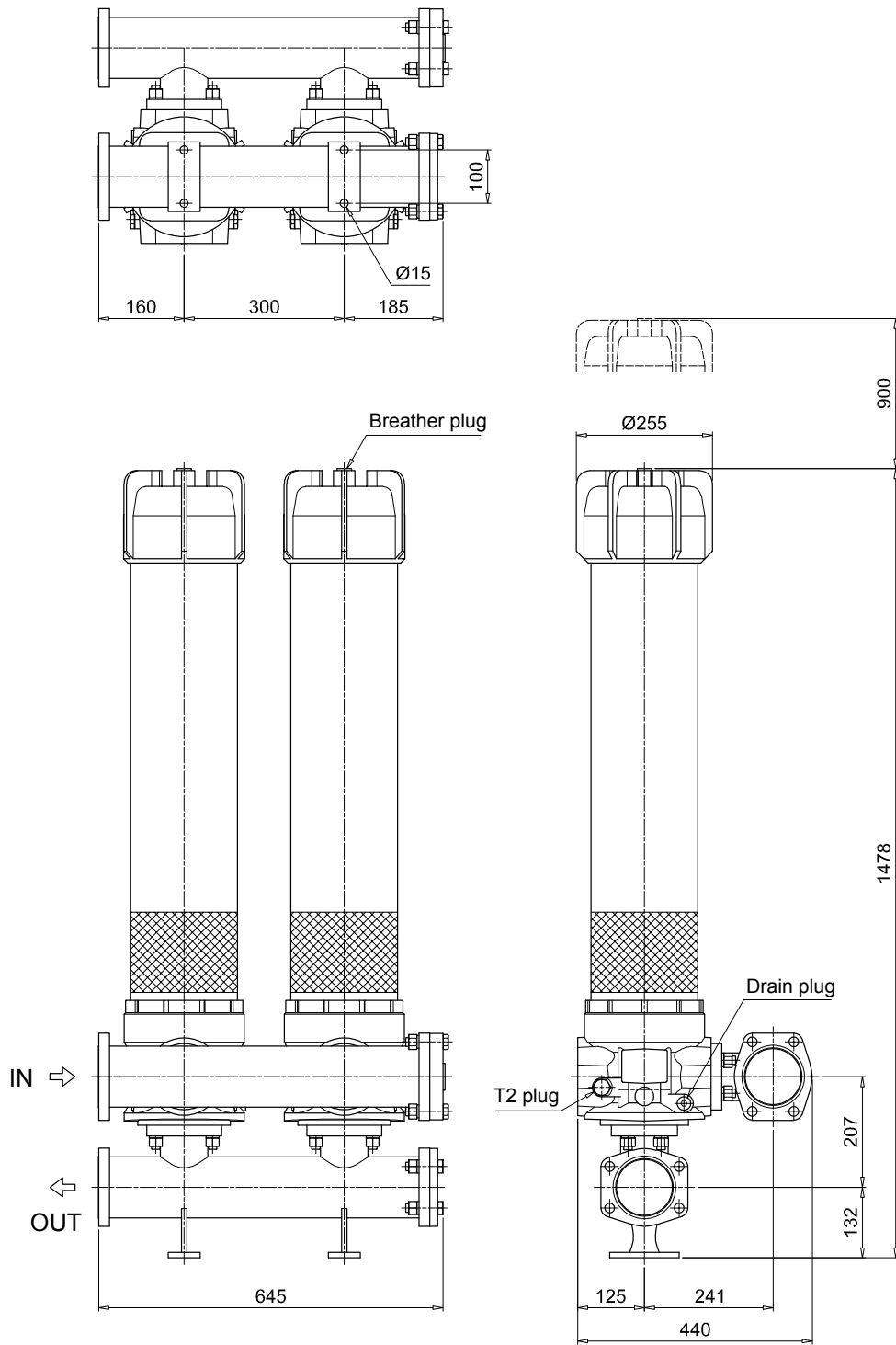
### ACCESSORIES

<b>Differential indicators</b>	page		page
<b>DEA</b> Electrical differential indicator	445	<b>DTA</b> Electronic differential indicator	448
<b>DEM</b> Electrical differential indicator	445-446	<b>DVA</b> Visual differential indicator	448
<b>DLA</b> Electrical / visual differential indicator	446-447	<b>DVM</b> Visual differential indicator	448
<b>DLE</b> Electrical / visual differential indicator	447		
<b>Additional features</b>	page		
<b>T2</b> Plug	449		

# LMP 952-953-954

Dimensions

LMP952

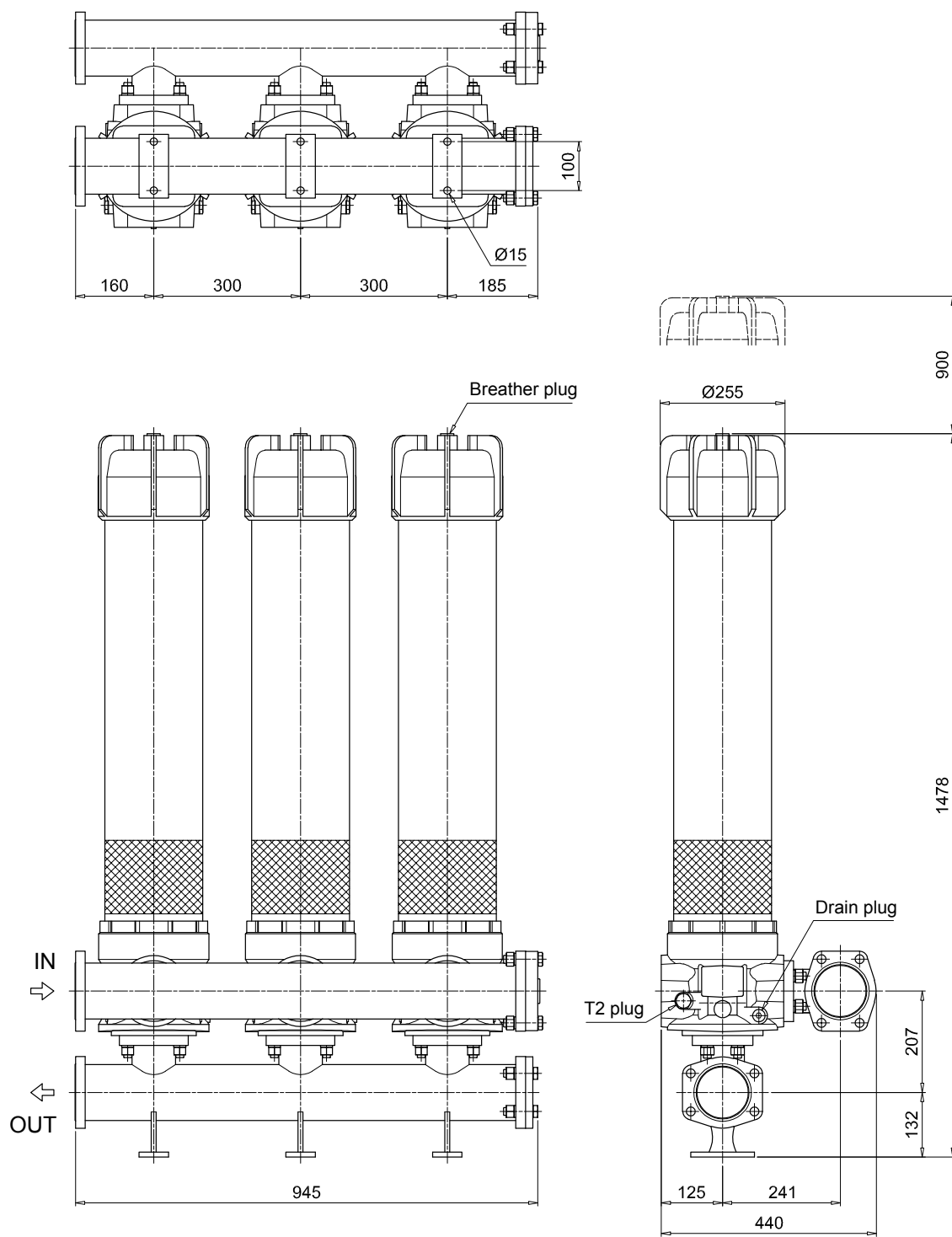


T2 plug =  
connection for differential indicator

# LMP 952-953-954

## Dimensions

LMP953

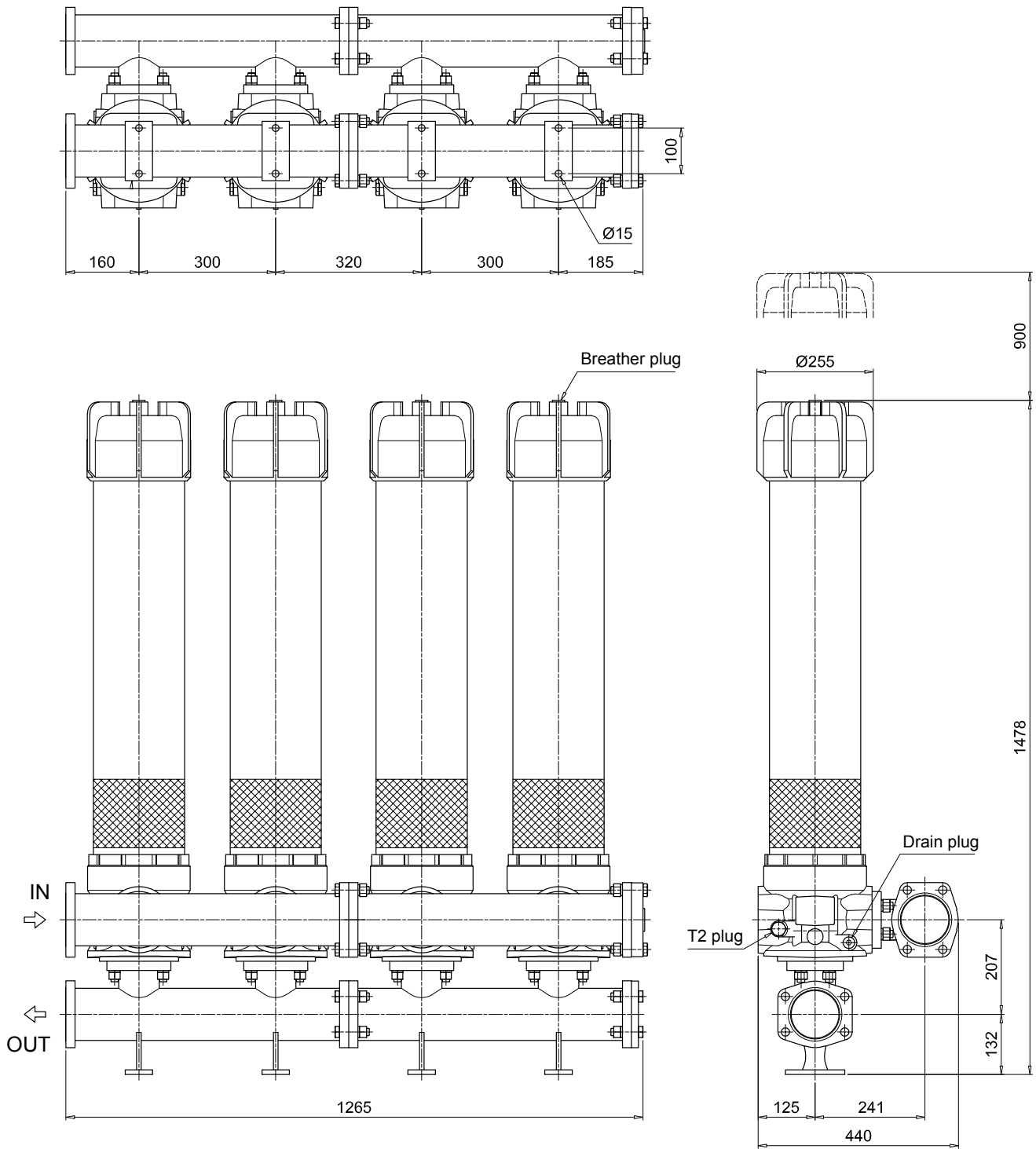


T2 plug =  
connection for differential indicator

# LMP 952-953-954

Dimensions

LMP954



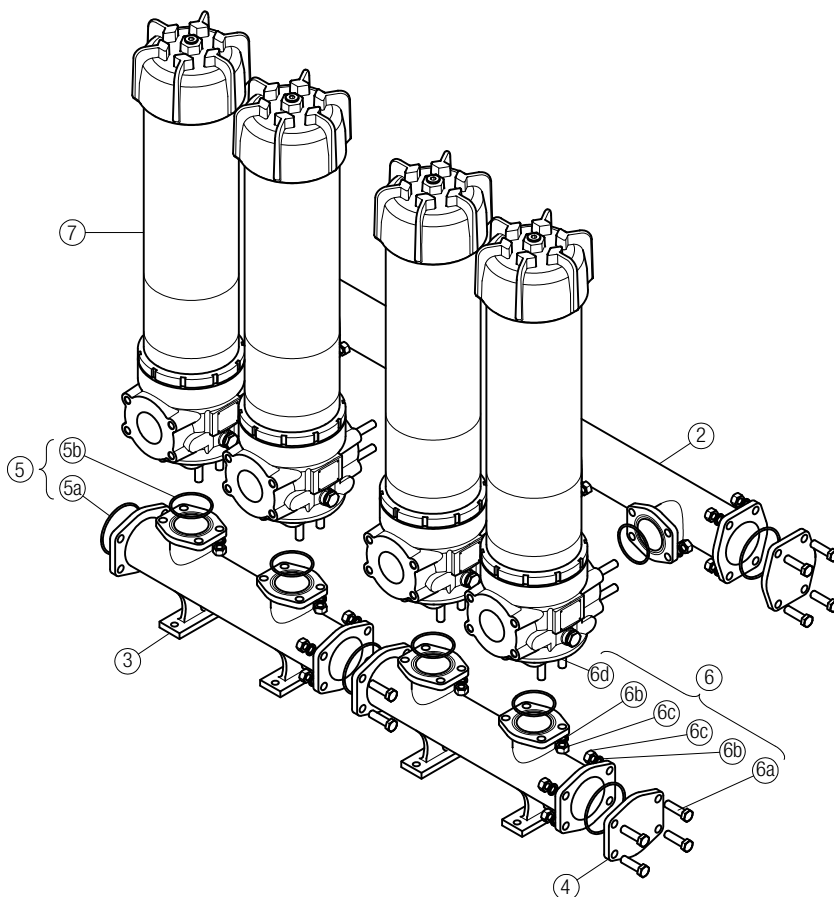
T2 plug =  
connection for differential indicator



# LMP 952-953-954 SPARE PARTS

Order number for spare parts

LMP 952 - 953 - 954



Item 7:  
for complete filter code and  
spare parts, see  
LMP 950 - 951 series chapter

Quantity:  
- filter spare parts:  
LMP 952 - 2 pcs.  
LMP 953 - 3 pcs.  
LMP 954 - 4 pcs.

- filter seal kit:  
LMP 952 - 2 pcs.  
LMP 953 - 3 pcs.  
LMP 954 - 4 pcs.

Item:	2		3		4		5 (5a-5b)		6 (6a ÷ 6d)		7	
Filter series	Q.ty	Manifold IN	OUT	Q.ty	4" SAE 3000 psi plugged flange	Q.ty	Manifolds seal kit NBR	FPM	Q.ty	Threaded fasteners kit	Q.ty	Filter
LMP 952	1 pc.	01039270	01039271	2 pcs.	01042012	1 pc.	02050404	02050405	1 pc.	02049051	2 pcs.	LMP9513xxF1xxxNP0x
LMP 953	1 pc.	01039337	01039338	2 pcs.		1 pc.	02050404	02050405	1 pc.	02049052	3 pcs.	
LMP 954	2 pcs.	01039270	01039271	2 pcs.		1 pc.	02050406	02050407	1 pc.	02049053	4 pcs.	





# LMD 211 series

Maximum working pressure up to 6 MPa (60 bar) - Flow rate up to 330 l/min



# LMD 211 GENERAL INFORMATION

## Description

## Technical data

### Low & Medium Pressure filters

#### Duplex

**Maximum working pressure up to 6 MPa (60 bar)**

**Flow rate up to 330 l/min**

LMD211 is a range of versatile low pressure duplex filter with integrated changeover function to allow the filter element replacement without the system shut-down.

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

#### Available features:

- Female threaded connections up to 1 1/2" and flanged connections up to 1 1/2", for a maximum flow rate of 330 l/min
- Fine filtration rating, to get a good cleanliness level into the system
- Water removal elements, to remove the free water from the hydraulic fluid
- Balancing valve integrated in the changeover lever, to equalize the housing pressure before the switch
- Bypass valve, to relieve excessive pressure drop across the filter media
- Vent ports, to avoid air trapped into the filter going into the system
- Drain ports, to remove the fluid from the housing prior the maintenance work
- Optional sampling ports, to get samples of fluid or to connect additional instrument to the system
- Visual, electrical and electronic differential clogging indicators

#### Common applications:

- Systems where shut-down causes high costs
- Systems where shut-down causes safety issues

#### Filter housing materials

- Head: Aluminium
- Bowl: Cataphoretic Painted Steel
- Bypass valve: AISI 304 - Nylon

#### Pressure

- Test pressure: 9 MPa (90 bar)
- Burst pressure: 21 MPa (210 bar)
- Pulse pressure fatigue test: 1 000 000 cycles with pressure from 0 to 6 MPa (60 bar)

#### Bypass valve

- Opening pressure 350 kPa (3.5 bar)  $\pm 10\%$
- Other opening pressures on request.

#### $\Delta p$ element type

- Microfibre filter elements - series N: 20 bar
- Fluid flow through the filter element from OUT to IN

#### Seals

- Standard NBR series A
- Optional FPM series V

#### Temperature

From -25° C to +110° C

#### Connections

Inlet/Outlet In-Line

#### Note

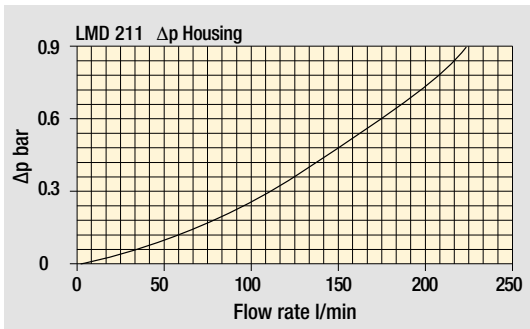
LMD 211 filters are provided for vertical mounting



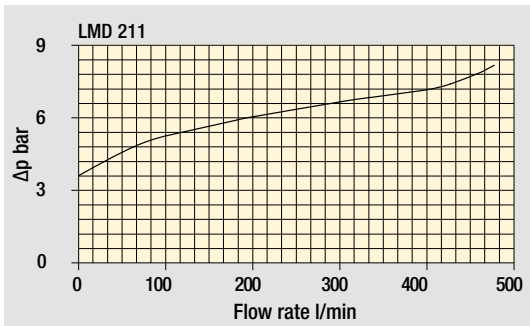
## Weights [kg] and volumes [dm<sup>3</sup>]

Filter series	Weights [kg]				Volumes [dm <sup>3</sup> ]			
	Length	1	2	3	Length	1	2	3
<b>LMD 211</b>		9.5	11.2	12.8		4.1	4.6	5.3

Filter housings  $\Delta p$  pressure drop



Bypass valve pressure drop



The curves are plotted using mineral oil with density of 0.86 kg/dm<sup>3</sup> in compliance with ISO 3968.  $\Delta p$  varies proportionally with density.

Flow rates [l/min]

Filter series	Length	Filter element design - N Series										
		A03	A06	A10	A16	A25	M25	M60	M90	M250	P10	P25
<b>LMD 211</b>	<b>1</b>	90	95	140	147	156	191	192	192	193	177	181
	<b>2</b>	113	121	158	162	173	192	192	193	193	181	183
	<b>3</b>	131	146	166	169	177	193	194	194	194	184	187

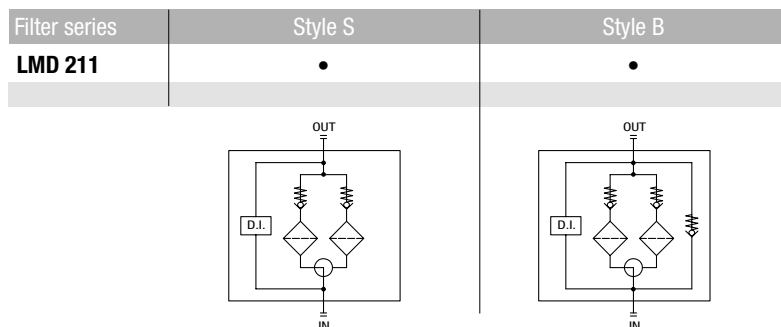
### Maximum flow rate for a complete low and medium pressure filter with a pressure drop $\Delta p = 1.5$ bar.

The reference fluid has a kinematic viscosity of 30 mm<sup>2</sup>/s (cSt) and a density of 0.86 kg/dm<sup>3</sup>.

For different pressure drop or fluid viscosity we recommend to use our selection software available on [www.mpfiltri.com](http://www.mpfiltri.com).

Please, contact our Sales Department for further additional information.

Hydraulic symbols



# LMD 211

## Designation & Ordering code

### COMPLETE FILTER

<b>Series and size</b>	Configuration example: <b>LMD211</b>   <b>3</b>   <b>B</b>   <b>A</b>   <b>C</b>   <b>6</b>   <b>A10</b>   <b>N</b>   <b>P01</b>																			
<b>LMD211</b>																				
<b>Length</b>	1   2   3																			
<b>Bypass valve</b>	S Without bypass   B 3.5 bar																			
<b>Seals and treatments</b>	Filtration rating																			
A NBR	Axx	Mxx	Pxx																	
V FPM	•	•	•																	
W NBR compatible with fluids HFA-HFB-HFC	•	•																		
<b>Connections</b>	C G 1 1/2"																			
F 1 1/2" NPT																				
I SAE 24 - 1 7/8" - 12 UN																				
L 1 1/2" SAE 3000 psi/M + G 1 1/4"																				
M 1 1/2" SAE 3000 psi/UNC + 1 1/4" NPT																				
N 1 1/2" SAE 3000 psi/UNC + SAE 20 - 1 5/8" UN																				
<b>Connection for differential indicator</b>	6 With plugged connection																			
<b>Filtration rating (filter media)</b>	<table border="0"> <tr> <td><b>A03</b> Inorganic microfiber 3 µm</td> <td><b>M25</b> Wire mesh 25 µm</td> </tr> <tr> <td><b>A06</b> Inorganic microfiber 6 µm</td> <td><b>M60</b> Wire mesh 60 µm</td> </tr> <tr> <td><b>A10</b> Inorganic microfiber 10 µm</td> <td><b>M90</b> Wire mesh 90 µm</td> </tr> <tr> <td><b>A16</b> Inorganic microfiber 16 µm</td> <td><b>P10</b> Resin impregnated paper 10 µm</td> </tr> <tr> <td><b>A25</b> Inorganic microfiber 25 µm</td> <td><b>P25</b> Resin impregnated paper 25 µm</td> </tr> </table>										<b>A03</b> Inorganic microfiber 3 µm	<b>M25</b> Wire mesh 25 µm	<b>A06</b> Inorganic microfiber 6 µm	<b>M60</b> Wire mesh 60 µm	<b>A10</b> Inorganic microfiber 10 µm	<b>M90</b> Wire mesh 90 µm	<b>A16</b> Inorganic microfiber 16 µm	<b>P10</b> Resin impregnated paper 10 µm	<b>A25</b> Inorganic microfiber 25 µm	<b>P25</b> Resin impregnated paper 25 µm
<b>A03</b> Inorganic microfiber 3 µm	<b>M25</b> Wire mesh 25 µm																			
<b>A06</b> Inorganic microfiber 6 µm	<b>M60</b> Wire mesh 60 µm																			
<b>A10</b> Inorganic microfiber 10 µm	<b>M90</b> Wire mesh 90 µm																			
<b>A16</b> Inorganic microfiber 16 µm	<b>P10</b> Resin impregnated paper 10 µm																			
<b>A25</b> Inorganic microfiber 25 µm	<b>P25</b> Resin impregnated paper 25 µm																			
<b>WA025</b> Water absorber inorganic microfiber 25 µm																				
	<b>Element Δp</b>				<b>Execution</b>															
	N 20 bar				P01 MP Filtri standard Pxx Customized															

### FILTER ELEMENT

<b>Element series and size</b>	Configuration example: <b>CU210</b>   <b>3</b>   <b>A10</b>   <b>A</b>   <b>N</b>   <b>P01</b>																
<b>CU210</b>																	
<b>Element length</b>	1   2   3																
<b>Filtration rating (filter media)</b>	<table border="0"> <tr> <td><b>A03</b> Inorganic microfiber 3 µm</td> <td><b>M25</b> Wire mesh 25 µm</td> </tr> <tr> <td><b>A06</b> Inorganic microfiber 6 µm</td> <td><b>M60</b> Wire mesh 60 µm</td> </tr> <tr> <td><b>A10</b> Inorganic microfiber 10 µm</td> <td><b>M90</b> Wire mesh 90 µm</td> </tr> <tr> <td><b>A16</b> Inorganic microfiber 16 µm</td> <td><b>P10</b> Resin impregnated paper 10 µm</td> </tr> <tr> <td><b>A25</b> Inorganic microfiber 25 µm</td> <td><b>P25</b> Resin impregnated paper 25 µm</td> </tr> </table>							<b>A03</b> Inorganic microfiber 3 µm	<b>M25</b> Wire mesh 25 µm	<b>A06</b> Inorganic microfiber 6 µm	<b>M60</b> Wire mesh 60 µm	<b>A10</b> Inorganic microfiber 10 µm	<b>M90</b> Wire mesh 90 µm	<b>A16</b> Inorganic microfiber 16 µm	<b>P10</b> Resin impregnated paper 10 µm	<b>A25</b> Inorganic microfiber 25 µm	<b>P25</b> Resin impregnated paper 25 µm
<b>A03</b> Inorganic microfiber 3 µm	<b>M25</b> Wire mesh 25 µm																
<b>A06</b> Inorganic microfiber 6 µm	<b>M60</b> Wire mesh 60 µm																
<b>A10</b> Inorganic microfiber 10 µm	<b>M90</b> Wire mesh 90 µm																
<b>A16</b> Inorganic microfiber 16 µm	<b>P10</b> Resin impregnated paper 10 µm																
<b>A25</b> Inorganic microfiber 25 µm	<b>P25</b> Resin impregnated paper 25 µm																
<b>WA025</b> Water absorber inorganic microfiber 25 µm																	
	Filtration rating																
<b>Seals</b>	Axx	Mxx	Pxx														
A NBR	•	•	•														
V FPM	•	•	•														
W NBR compatible with fluids HFA-HFB-HFC	•	•															
	<b>Element Δp</b>			<b>Execution</b>													
	N 20 bar			P01 MP Filtri standard Pxx Customized													

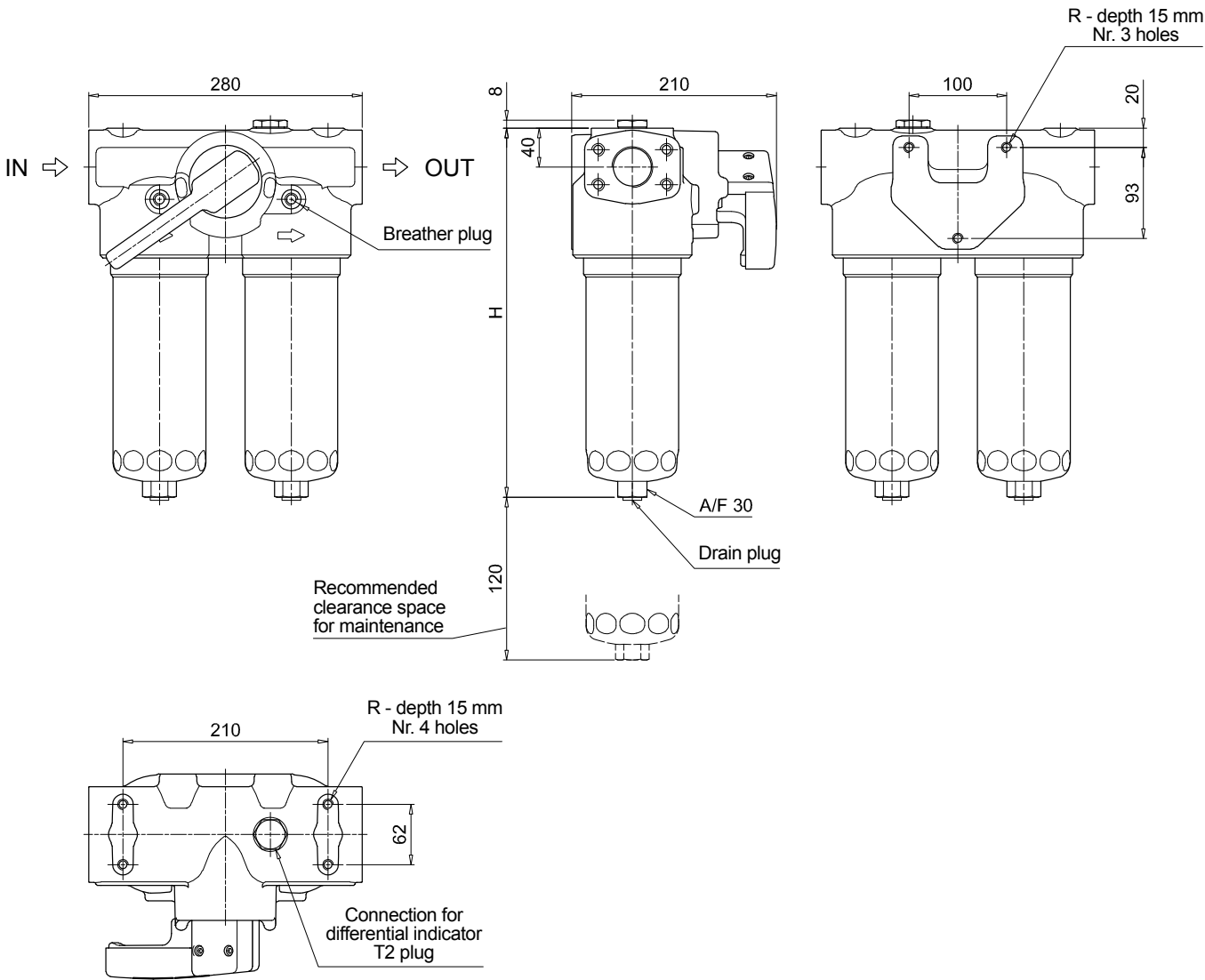
### ACCESSORIES

<b>Differential indicators</b>	page		page
<b>DEA</b> Electrical differential indicator	445	<b>DTA</b> Electronic differential indicator	448
<b>DEM</b> Electrical differential indicator	445-446	<b>DVA</b> Visual differential indicator	448
<b>DLA</b> Electrical / visual differential indicator	446-447	<b>DVM</b> Visual differential indicator	448
<b>DLE</b> Electrical / visual differential indicator	447		
<b>Additional features</b>	page		
<b>T2</b> Plug	449		

# LMD 211

## Dimensions

LMD211	
Filter length	H [mm]
<b>1</b>	383
<b>2</b>	513
<b>3</b>	651
Connections	R
<b>C</b>	M10
<b>F - I</b>	3/8" UNC
<b>L</b>	M10
<b>M - N</b>	3/8" UNC

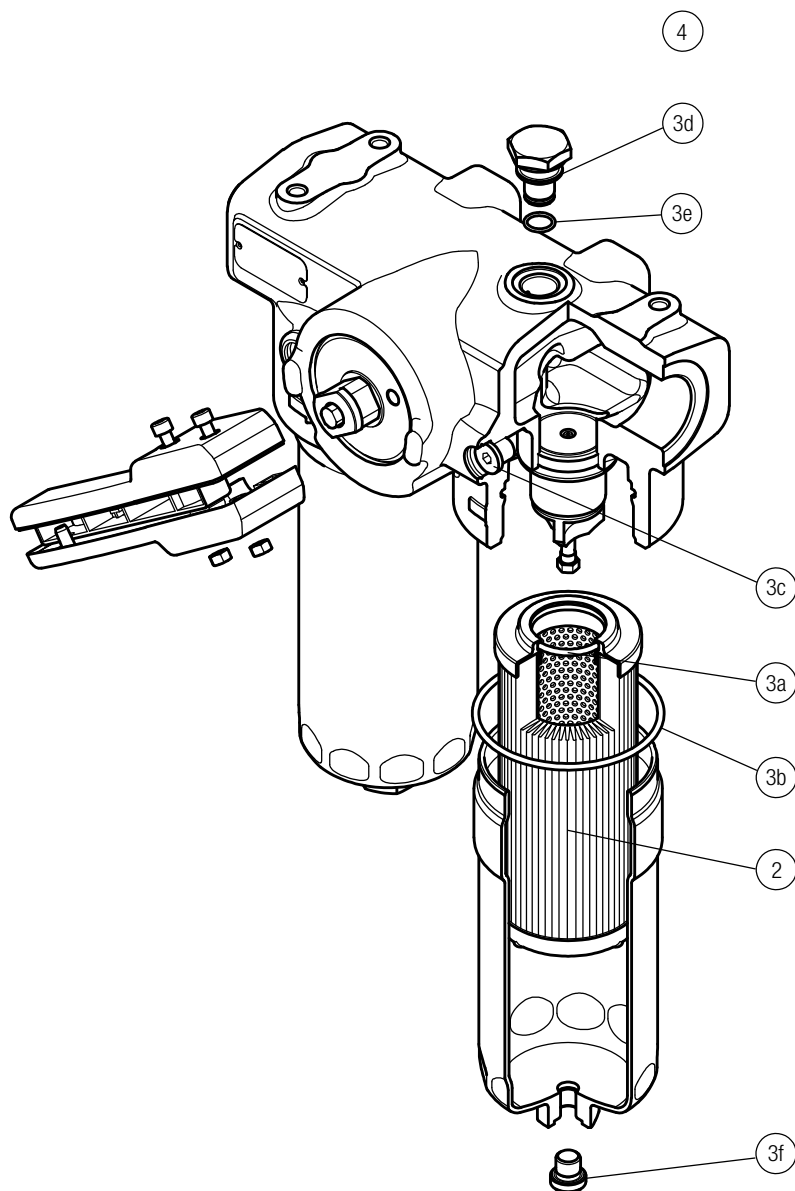




# LMD 211 SPARE PARTS

Order number for spare parts

LMD 211



Item:	Q.ty: 1 pc.		Q.ty: 1 pc.		Q.ty: 2 pcs.	
Filter series	Filter element	Seal Kit code number	Seal Kit code number	Indicator connection plug	Indicator connection plug	Indicator connection plug
LDD	See order table	NBR	FPM	NBR	FPM	FPM
	<b>2</b>	<b>3</b>	<b>3a - 3f</b>	<b>4</b>		
		02050671	02050672	T2H	T2V	





# LMD 400-401 & 431 series

Maximum working pressure up to 1.6 MPa (16 bar) - Flow rate up to 590 l/min



## Description

## Technical data

### Low & Medium Pressure filters

#### Duplex

**Maximum working pressure up to 1.6 MPa (16 bar)**

**Flow rate up to 590 l/min**

LMD400 is a range of versatile low pressure duplex filter with integrated changeover function to allow the filter element replacement without the system shut-down.

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

#### Available features:

- 2 1/2" flanged connections, for a maximum flow rate of 590 l/min
- LMD400: In-line connections
- LMD401: In-line connections with compact design
- LMD431: In-line connections with compact design and base mounting
- Base-mounting design also available, for ease of the replacement of the filter element
- Fine filtration rating, to get a good cleanliness level into the system
- Water removal elements, to remove the free water from the hydraulic fluid
- Balancing valve, to equalize the housing pressure before the switch
- Bypass valve, to relieve excessive pressure drop across the filter media
- Vent ports, to avoid air trapped into the filter going into the system
- Drain ports, to remove the fluid from the housing prior the maintenance work
- Visual, electrical and electronic differential clogging indicators

#### Common applications:

- Systems where shut-down causes high costs
- Systems where shut-down causes safety issues

#### Filter housing materials

- Head: Anodized Aluminium
- Housing: Anodized Aluminium
- Manifolds: Steel - Painted black
- Bypass valve: Steel
- 3-way ball valve: Steel housings - Stainless Steel ball
- Valve: Phosphatized Steel - Stainless Steel

#### Pressure

Test pressure: 2.5 MPa (25 bar)

#### Bypass valve

- Opening pressure 350 kPa (3.5 bar)  $\pm$ 10%
- Other opening pressures on request.

#### $\Delta p$ element type

- Microfibre filter elements - series N - W: 20 bar
- Fluid flow through the filter element from OUT to IN

#### Seals

FPM series V

#### Temperature

From -25° C to +110° C

#### Connections

- LMD 400-401: In-line Inlet/Outlet
- LMD 401: Same side
- LMD 400-401-431: In-Line

#### Note

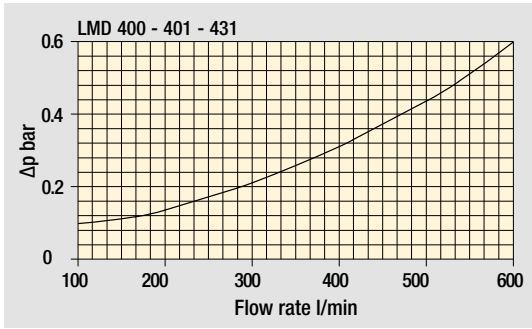
LMP 400 - 401 - 431 filters are provided for vertical mounting



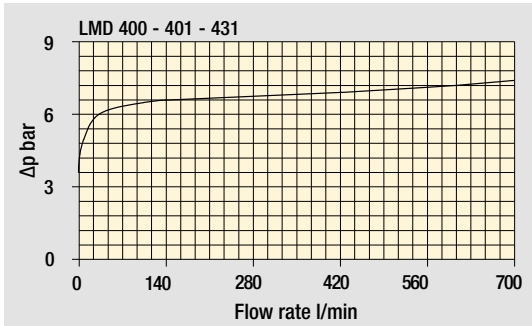
## Weights [kg] and volumes [dm<sup>3</sup>]

Filter series	Weights [kg]				Volumes [dm <sup>3</sup> ]			
	Length	4	5	6	Length	4	5	6
<b>LMD 400 - 401</b>	60	65	72		20	28	33	
<b>LMD 431</b>	-	68	78		-	28	33	

Filter housings  $\Delta p$  pressure drop



Bypass valve pressure drop



The curves are plotted using mineral oil with density of 0.86 kg/dm<sup>3</sup> in compliance with ISO 3968.  $\Delta p$  varies proportionally with density.

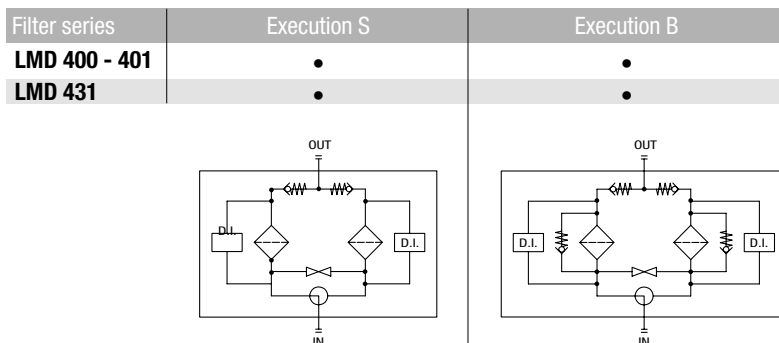
Flow rates [l/min]

Filter series	Length	Filter element design - N Series							
		A03	A06	A10	A16	A25	M25 M60 M90 M250	P10	P25
<b>LMD 400 - 401</b>	<b>4</b>	308	349	453	474	530	628	547	567
	<b>5</b>	395	427	509	547	589	637	577	592
	<b>6</b>	429	483	558	568	597	639	583	597
<b>LMD 431</b>	<b>5</b>	395	427	509	547	589	637	577	592
	<b>6</b>	429	483	558	568	597	639	583	597

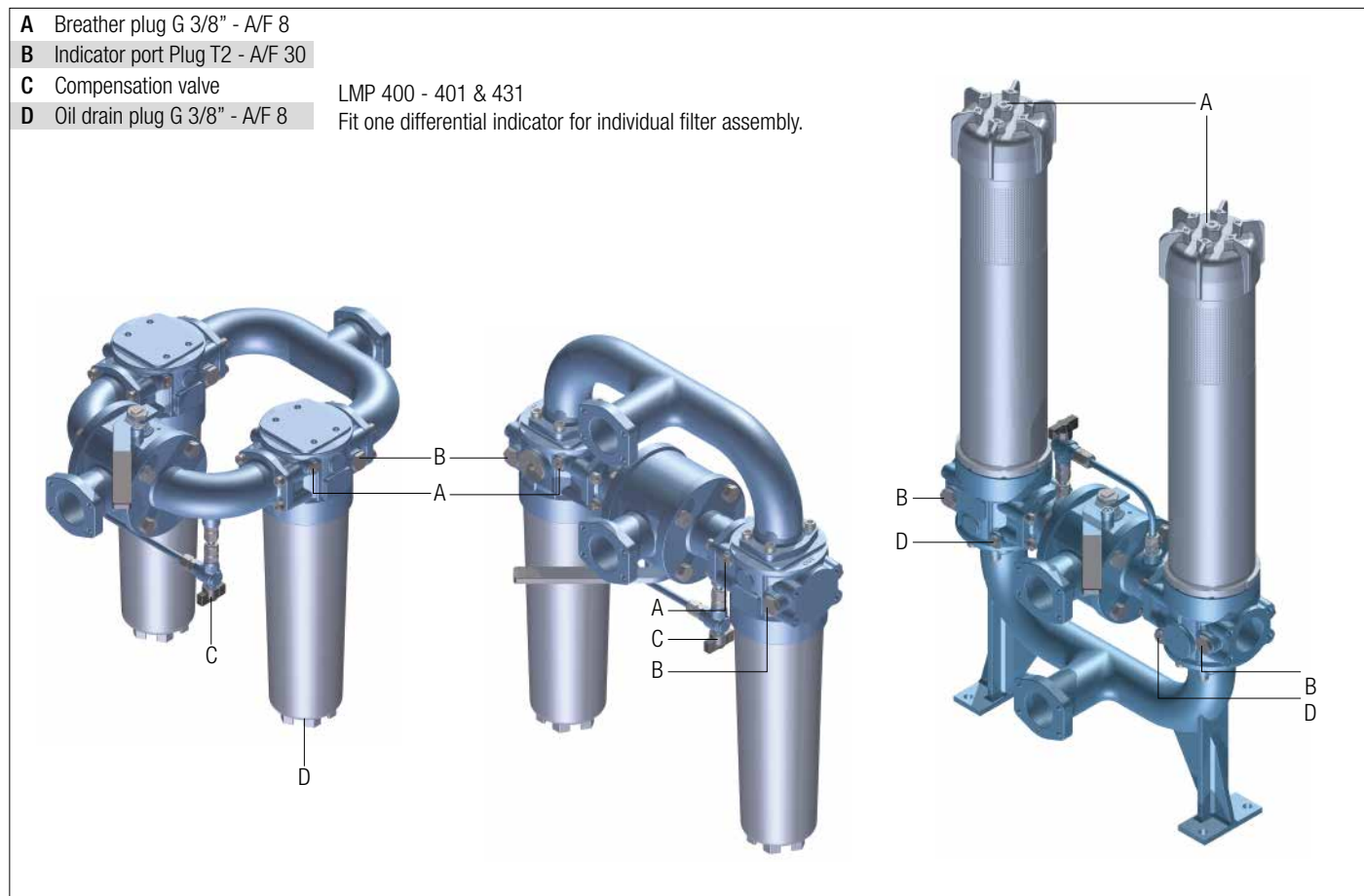
**Maximum flow rate for a complete low and medium pressure filter with a pressure drop  $\Delta p = 0.7$  bar.**

The reference fluid has a kinematic viscosity of 30 mm<sup>2</sup>/s (cSt) and a density of 0.86 kg/dm<sup>3</sup>. For different pressure drop or fluid viscosity we recommend to use our selection software available on [www.mpfiltri.com](http://www.mpfiltri.com). Please, contact our Sales Department for further additional information.

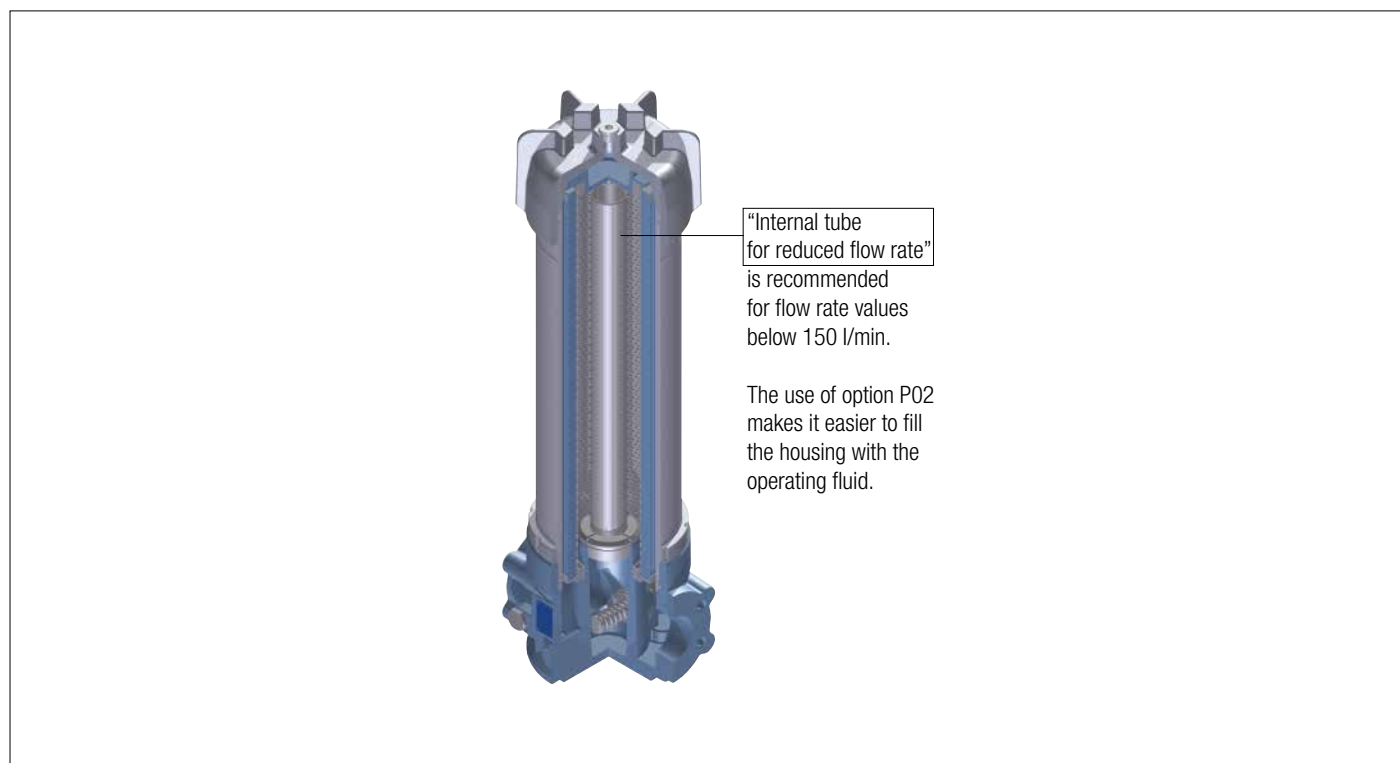
Hydraulic symbols



## Focus on



## LMD 431: Execution P02







# LMD 400-401

## Designation & Ordering code

### COMPLETE FILTER

Series and size		Configuration example: <b>LMD401</b>   <b>4</b>   <b>B</b>   <b>V</b>   <b>F1</b>   <b>A10</b>   <b>N</b>   <b>P01</b>										
<b>LMD400</b>   <b>LMD401</b>												
Length												
<b>4</b>   <b>5</b>   <b>6</b>												
Bypass valve												
<b>S</b> Without bypass   <b>B</b> 3.5 bar												
Seals and treatments		Filtration rating										
<b>V</b> FPM		<b>Axx</b>	<b>Mxx</b>	<b>Pxx</b>								
		•	•	•								
Connections		LMD400		LMD401								
<b>F1</b> 2 1/2" SAE 3000 psi/M		•	•									
<b>F2</b> 2 1/2" SAE 3000 psi/UNC		•	•									
<b>F3</b> 2 1/2" SAE 3000 psi/M, In-line connections				•								
<b>F4</b> 2 1/2" SAE 3000 psi/UNC, In-line connections				•								
Filtration rating (filter media)												
<b>A03</b> Inorganic microfiber 3 µm		<b>M25</b> Wire mesh 25 µm										
<b>A06</b> Inorganic microfiber 6 µm		<b>M60</b> Wire mesh 60 µm										
<b>A10</b> Inorganic microfiber 10 µm		<b>M90</b> Wire mesh 90 µm										
<b>A16</b> Inorganic microfiber 16 µm		<b>P10</b> Resin impregnated paper 10 µm										
<b>A25</b> Inorganic microfiber 25 µm		<b>P25</b> Resin impregnated paper 25 µm										
<b>WA025</b> Water absorber inorganic microfiber 25 µm												
Element Δp					Execution					Filter length		
<b>N</b> 20 bar										<b>4</b>	<b>5</b>	<b>6</b>
					<b>P01</b> MP Filtri standard					•	•	•
					<b>P02</b> Maintenance from the bottom of the housing					•	•	
					<b>Pxx</b> Customized							

### FILTER ELEMENT

Element series and size		Configuration example: <b>CU400</b>   <b>4</b>   <b>A10</b>   <b>V</b>   <b>N</b>   <b>P01</b>										
<b>CU400</b>												
Element length												
<b>4</b>   <b>5</b>   <b>6</b>												
Filtration rating (filter media)												
<b>A03</b> Inorganic microfiber 3 µm		<b>M25</b> Wire mesh 25 µm										
<b>A06</b> Inorganic microfiber 6 µm		<b>M60</b> Wire mesh 60 µm										
<b>A10</b> Inorganic microfiber 10 µm		<b>M90</b> Wire mesh 90 µm										
<b>A16</b> Inorganic microfiber 16 µm		<b>P10</b> Resin impregnated paper 10 µm										
<b>A25</b> Inorganic microfiber 25 µm		<b>P25</b> Resin impregnated paper 25 µm										
<b>WA025</b> Water absorber inorganic microfiber 25 µm												
Seals		Filtration rating										
<b>V</b> FPM		<b>Axx</b>	<b>Mxx</b>	<b>Pxx</b>								
		•	•	•								
Element Δp					Execution							
<b>N</b> 20 bar										<b>4</b>	<b>5</b>	<b>6</b>
					<b>P01</b> MP Filtri standard					•	•	•
					<b>Pxx</b> Customized							

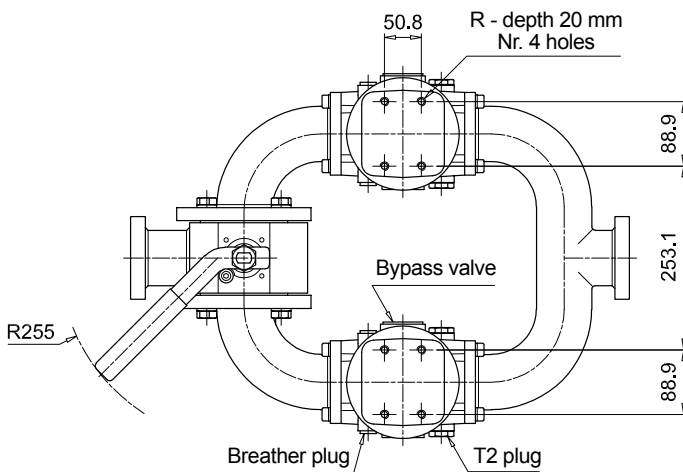
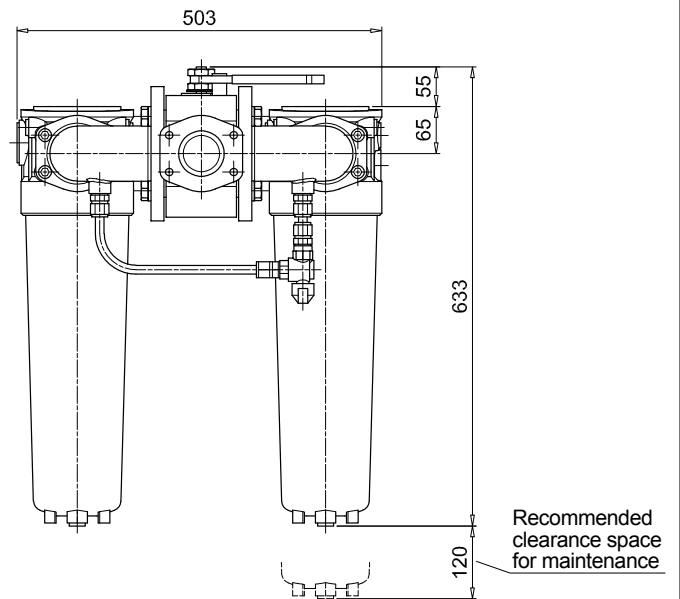
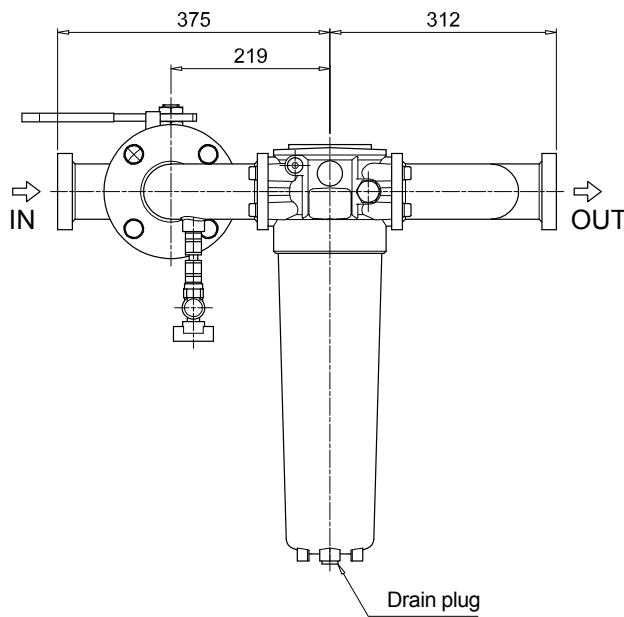
### ACCESSORIES

Differential indicators		page			page
<b>DEA</b> Electrical differential indicator		445	<b>DTA</b> Electronic differential indicator		448
<b>DEM</b> Electrical differential indicator		445-446	<b>DVA</b> Visual differential indicator		448
<b>DLA</b> Electrical / visual differential indicator		446-447	<b>DVM</b> Visual differential indicator		448
<b>DLE</b> Electrical / visual differential indicator		447			
Additional features		page			
<b>T2</b> Plug		449			

# LMD 400-401

## Dimensions

LMD400	
Length 4	
Connections	R
F1	M12
F2	1/2" UNC
F3	M12
F4	1/2" UNC



T2 plug =  
Connection for differential indicator

# LMD 400-401

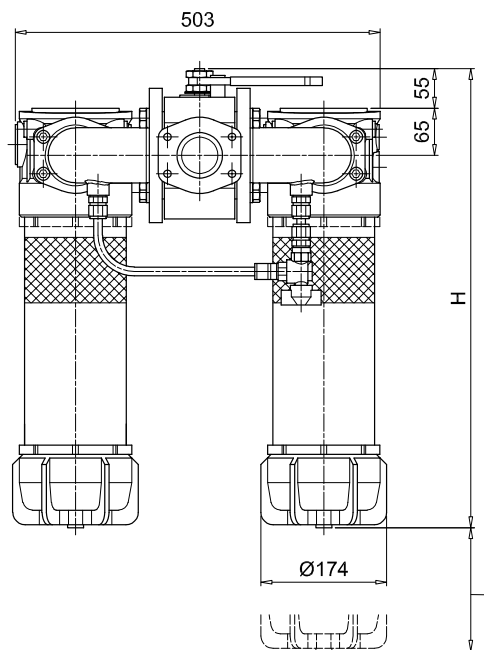
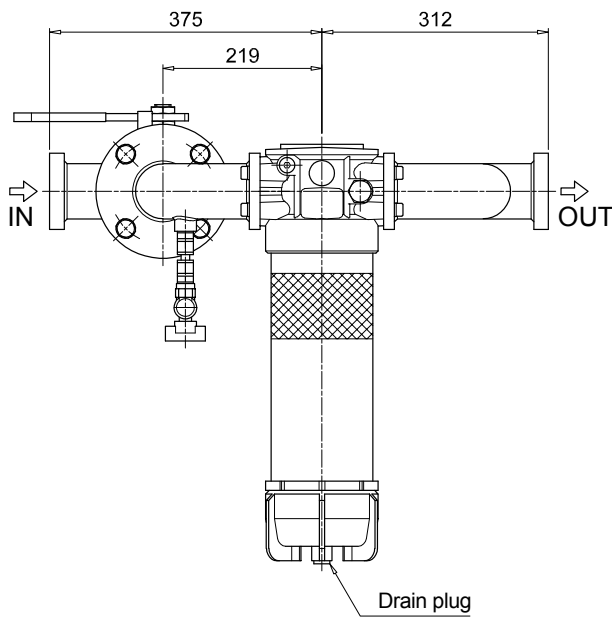
## Dimensions

LMD400

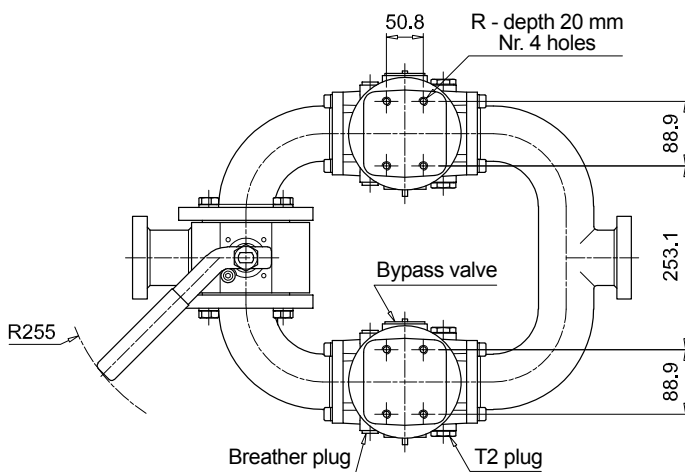
Length 5 - 6

Filter length	H [mm]	H2 [mm] Execution	
		P01	P02
5	883	120	660
6	1213	120	690

Connections	R
F1	M12
F2	1/2" UNC
F3	M12
F4	1/2" UNC



H2 - Recommended clearance space for maintenance

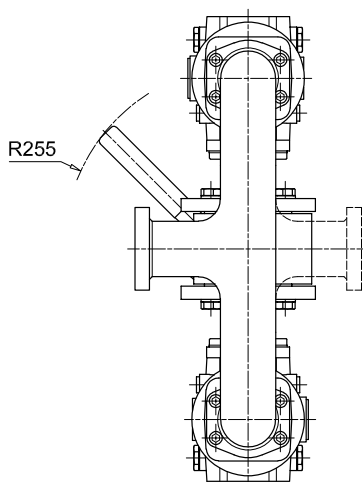
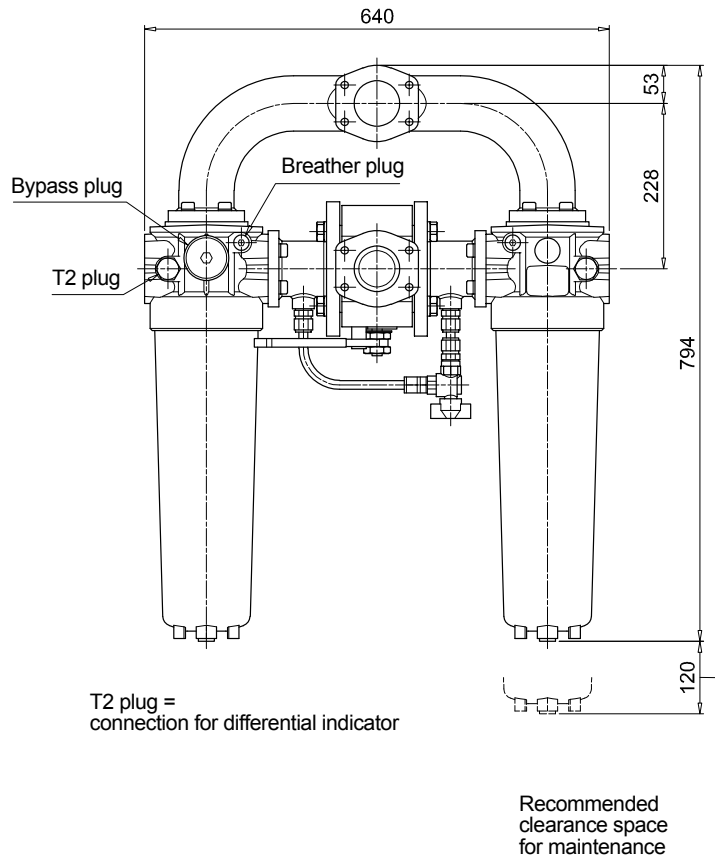
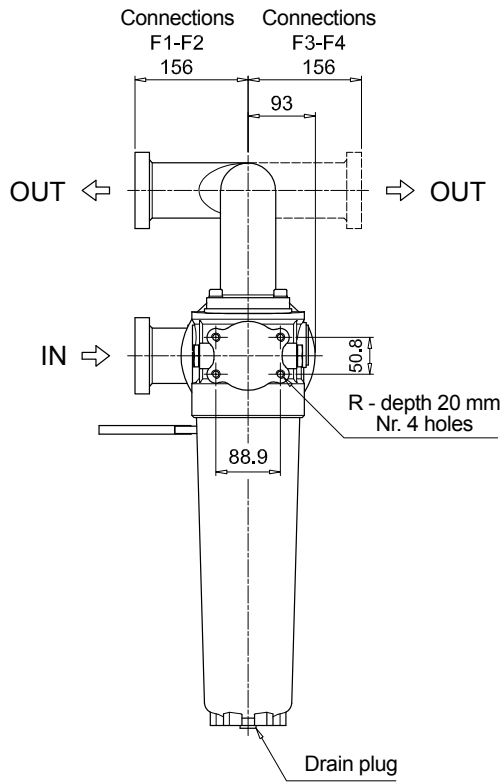


T2 plug =  
Connection for differential indicator

# LMD 400-401

## Dimensions

LMD401	
Length 4	
Connections	R
<b>F1</b>	M12
<b>F2</b>	1/2" UNC
<b>F3</b>	M12
<b>F4</b>	1/2" UNC



# LMD 400-401

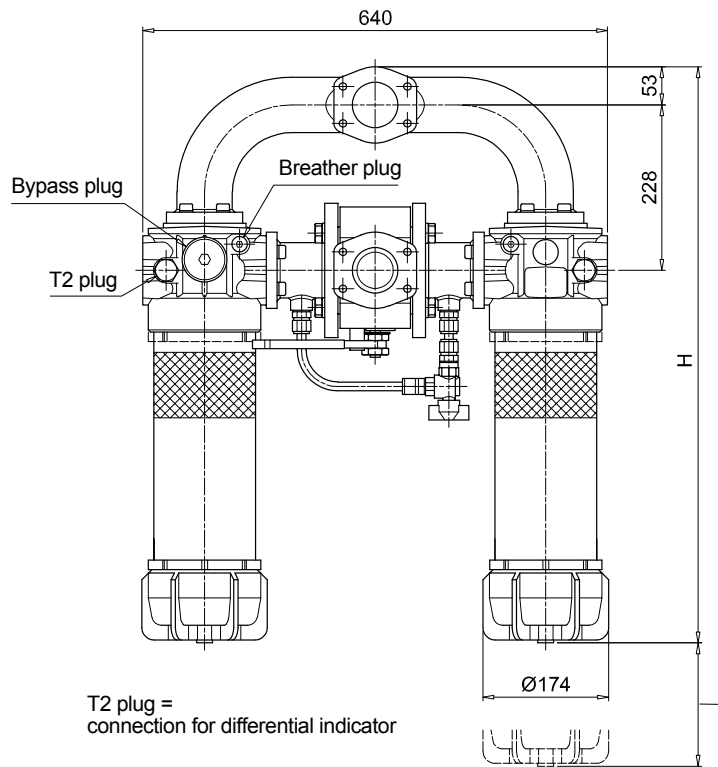
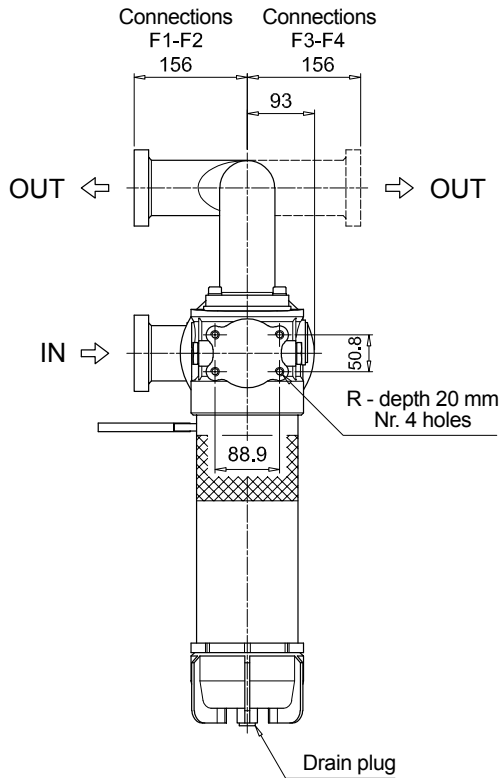
## Dimensions

LMD401

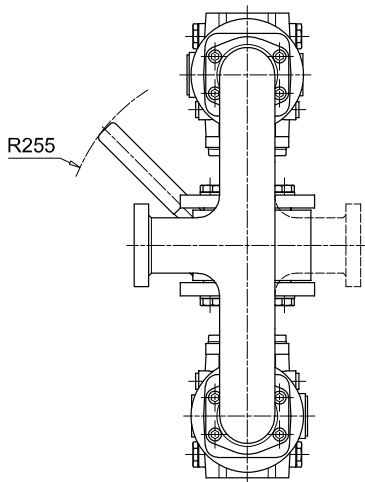
Length 5 - 6

Filter length	H [mm]	H2 [mm] Execution	
		P01	P02
5	1044	120	660
6	1374	120	690

Connections	R
F1	M12
F2	1/2" UNC
F3	M12
F4	1/2" UNC



H2 - Recommended clearance space for maintenance





# LMD 431

## Designation & Ordering code

### COMPLETE FILTER

<b>Series and size</b>	Configuration example: <b>LMD431</b>   <b>5</b>   <b>B</b>   <b>V</b>   <b>F1</b>   <b>A10</b>   <b>N</b>   <b>P01</b>									
<b>LMD431</b>										
<b>Length</b>	5   6									
<b>Bypass valve</b>	S Without bypass   B 3.5 bar									
<b>Seals and treatments</b>	Filtration rating									
V FPM	Axx	Mxx	Pxx							
	•	•	•							
<b>Connections</b>										
F1	2 1/2" SAE 3000 psi/M									
F2	2 1/2" SAE 3000 psi/UNC									
F3	2 1/2" SAE 3000 psi/M, In-line connections									
F4	2 1/2" SAE 3000 psi/UNC, In-line connections									
<b>Filtration rating (filter media)</b>										
A03	Inorganic microfiber 3 µm		M25	Wire mesh 25 µm						
A06	Inorganic microfiber 6 µm		M60	Wire mesh 60 µm						
A10	Inorganic microfiber 10 µm		M90	Wire mesh 90 µm						
A16	Inorganic microfiber 16 µm		P10	Resin impregnated paper 10 µm						
A25	Inorganic microfiber 25 µm		P25	Resin impregnated paper 25 µm						
WA025	Water absorber inorganic microfiber 25 µm									
<b>Element Δp</b>	N 20 bar									
<b>Execution</b>	P01 MP Filtri standard									
	P02 With internal tube for reduced flow rate									
	Pxx Customized									

### FILTER ELEMENT

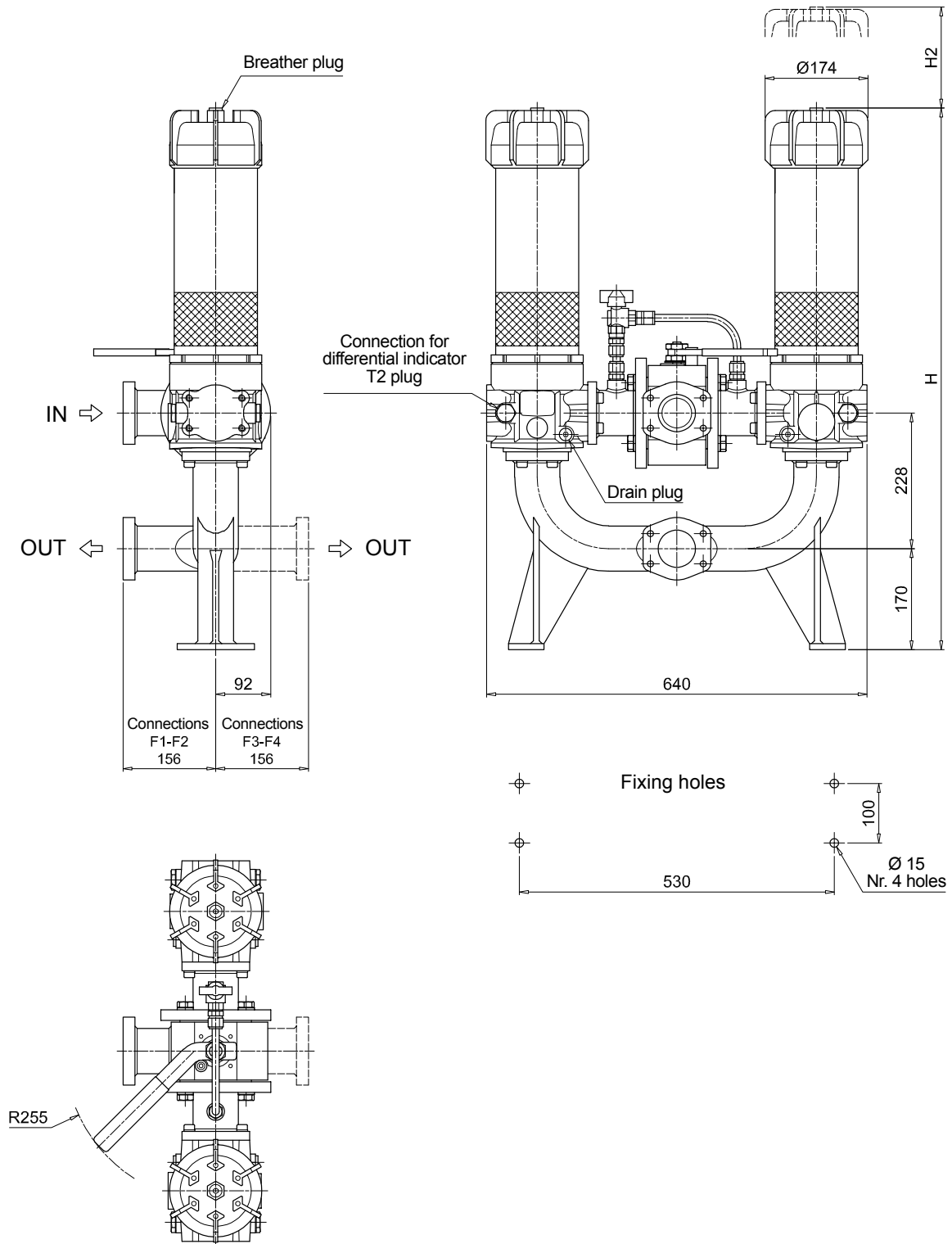
<b>Element series and size</b>	Configuration example: <b>CU400</b>   <b>5</b>   <b>A10</b>   <b>V</b>   <b>N</b>   <b>P01</b>						
<b>CU400</b>							
<b>Element length</b>	5   6						
<b>Filtration rating (filter media)</b>							
A03	Inorganic microfiber 3 µm		M25	Wire mesh 25 µm			
A06	Inorganic microfiber 6 µm		M60	Wire mesh 60 µm			
A10	Inorganic microfiber 10 µm		M90	Wire mesh 90 µm			
A16	Inorganic microfiber 16 µm		P10	Resin impregnated paper 10 µm			
A25	Inorganic microfiber 25 µm		P25	Resin impregnated paper 25 µm			
WA025	Water absorber inorganic microfiber 25 µm						
<b>Seals</b>	Filtration rating						
V FPM	Axx	Mxx	Pxx				
	•	•	•				
<b>Element Δp</b>	N 20 bar						
<b>Execution</b>	P01 MP Filtri standard						
	Pxx Customized						

### ACCESSORIES

<b>Differential indicators</b>	page		page
DEA Electrical differential indicator	445	DTA Electronic differential indicator	448
DEM Electrical differential indicator	445-446	DVA Visual differential indicator	448
DLA Electrical / visual differential indicator	446-447	DVM Visual differential indicator	448
DLE Electrical / visual differential indicator	447		
<b>Additional features</b>	page		
T2 Plug	449		

### LMD431

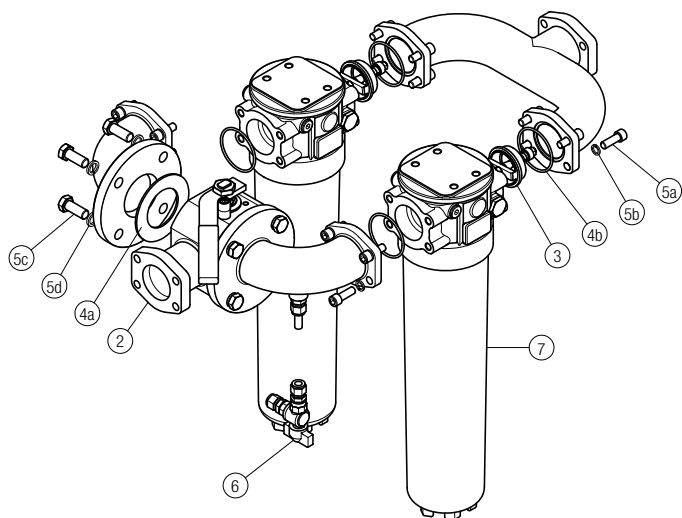
Filter length	H [mm]	H2 [mm]
5	1161	660
6	1491	690



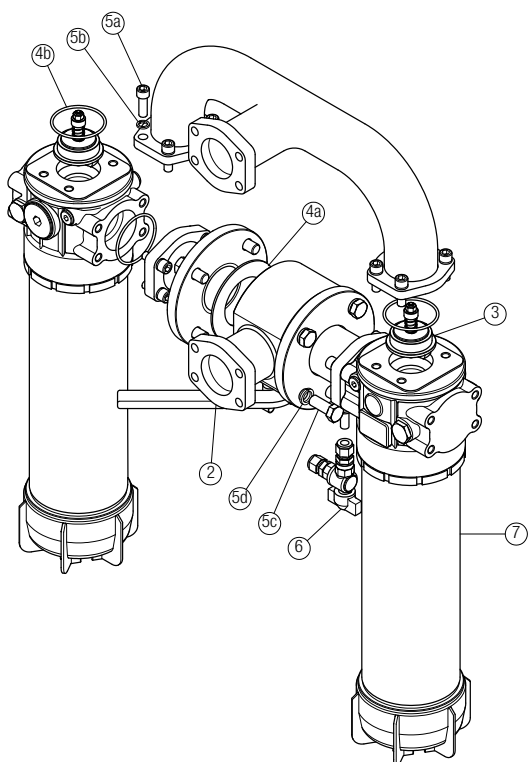


Order number for spare parts

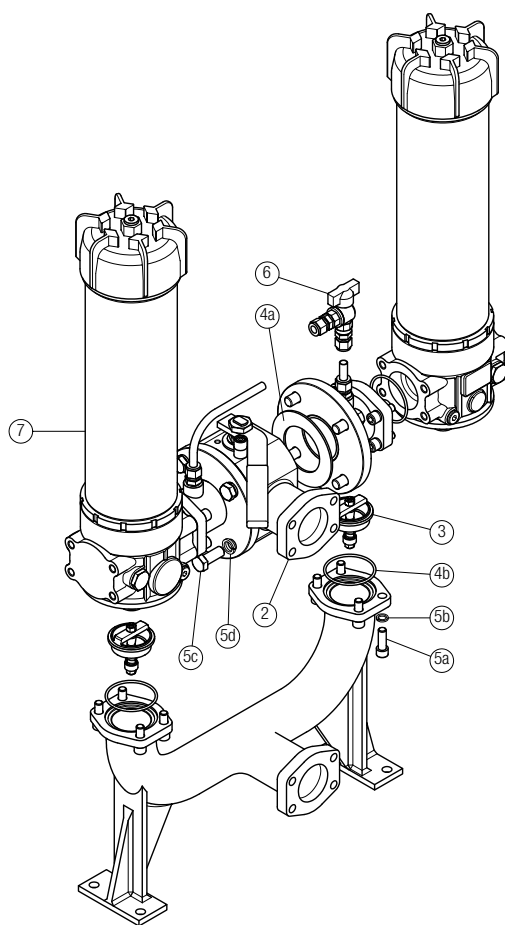
**LMD 400**



**LMD 401**



**LMD 431**



Item:	Q.ty: 1 pc.		Q.ty: 2 pcs.	Q.ty: 1 pc.	Q.ty: 1 pc.	Q.ty: 1 pc.	Q.ty: 2 pcs.
Filter series	3-way ball valve PN 16 2 1/2" SAE 3000 psi/M 2 1/2" SAE 3000 psi/UNC		One-way valve	Seal Kit	Threaded fasteners kit	Kit ball valve with hose fitting	Filter See order table
<b>LMD 400-401-431</b>	02001440	02001441	02001429	02050399	02049062	02025043	LMP400xF2.....





# LMD 951 series

Maximum working pressure up to 1.6 MPa (16 bar) - Flow rate up to 1200 l/min



# LMD 951 GENERAL INFORMATION

## Description

## Technical data

### Low & Medium Pressure filters

#### Duplex

**Maximum working pressure up to 1.6 MPa (16 bar)**

**Flow rate up to 1200 l/min**

LMD950 is a range of versatile low pressure duplex filter with integrated changeover function to allow the filter element replacement without the system shut-down.

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

#### Available features:

- Flanged connections up to 4", for a maximum flow rate of 1200 l/min
- Base-mounting design, for ease of the replacement of the filter element
- Fine filtration rating, to get a good cleanliness level into the system
- Water removal elements, to remove the free water from the hydraulic fluid
- Balancing valve, to equalize the housing pressure before the switch
- Bypass valve, to relieve excessive pressure drop across the filter media
- Drain ports, to remove the fluid from the housing prior the maintenance work
- Visual, electrical and electronic differential clogging indicators

#### Common applications:

- Systems where shut-down causes high costs
- Systems where shut-down causes safety issues

#### Filter housing materials

- Head: Anodized Aluminium
- Housing: Anodized Aluminium
- Manifolds: Welded - Painted black
- Bypass valve: Steel
- 3-way ball valve: Steel body - Stainless Steel ball
- Check valve: Cast Iron body - AISI 304 leaf

#### Pressure

- SAE + DIN Flange
- Test pressure: 2.5 MPa (25 bar)

#### Bypass valve

- Opening pressure 350 kPa (3.5 bar)  $\pm 10\%$
- Other opening pressures on request.

#### Number of filter elements

LMD 951: 2 filter elements CU950-3

#### $\Delta p$ element type

- Microfibre filter elements - series N: 20 bar
- Fluid flow through the filter element from OUT to IN

#### Seals

FPM series V

#### Temperature

From  $-25^{\circ}\text{C}$  to  $+110^{\circ}\text{C}$

#### Connections

- LMD 951: In-line Inlet/Outlet
- Same side

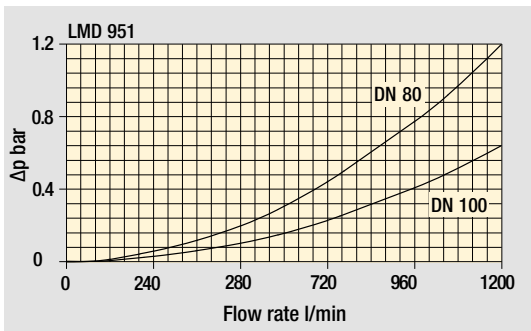
#### Note

LMD 951 filters are provided for vertical mounting

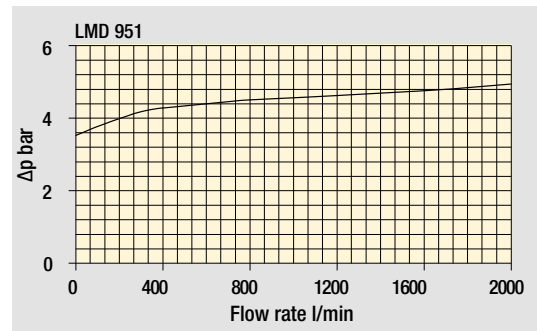


## Weights [kg] and volumes [dm<sup>3</sup>]

Filter series	Weights [kg]		Volumes [dm <sup>3</sup> ]	
	DN 80	DN 100	DN 80	DN 100
<b>LMD 951</b>	102	130	62	66



Filter housings  
Δp pressure drop



Bypass valve  
pressure drop

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

## Flow rates [l/min]

Filter series	Length	Filter element design - N Series					
		A03	A06	A10	A16	A25	M25 M60 M90 M250
<b>LMD 951</b>	<b>3</b>	853	884	995	1066	1096	1233

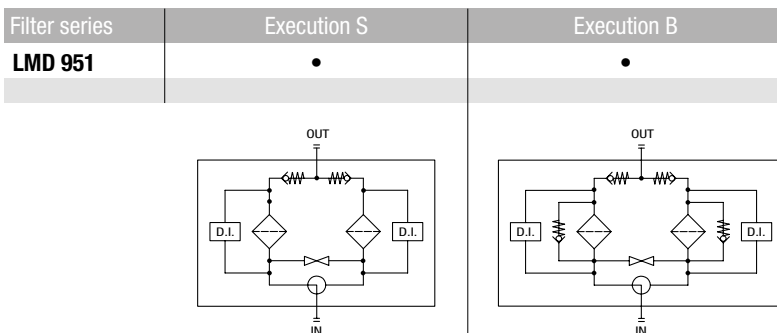
### Maximum flow rate for a complete low and medium pressure filter with a pressure drop Δp = 0.7 bar.

The reference fluid has a kinematic viscosity of 30 mm<sup>2</sup>/s (cSt) and a density of 0.86 kg/dm<sup>3</sup>.

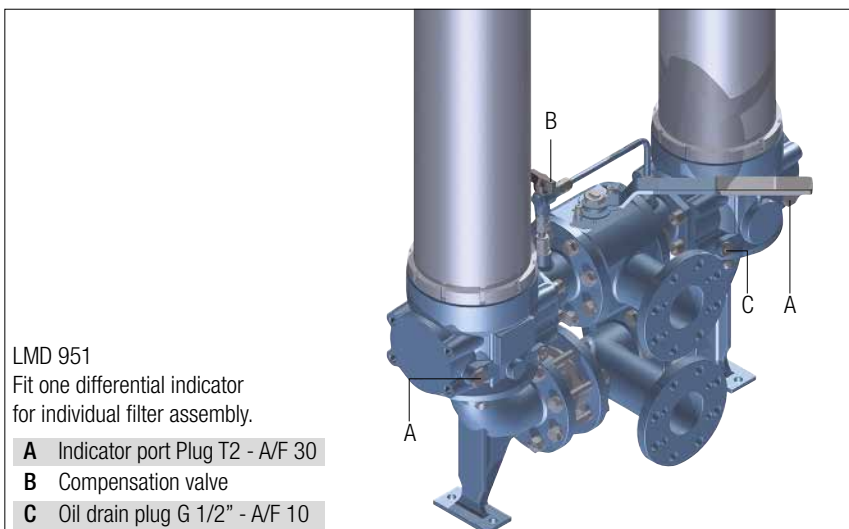
For different pressure drop or fluid viscosity we recommend to use our selection software available on [www.mpfiltri.com](http://www.mpfiltri.com).

Please, contact our Sales Department for further additional information.

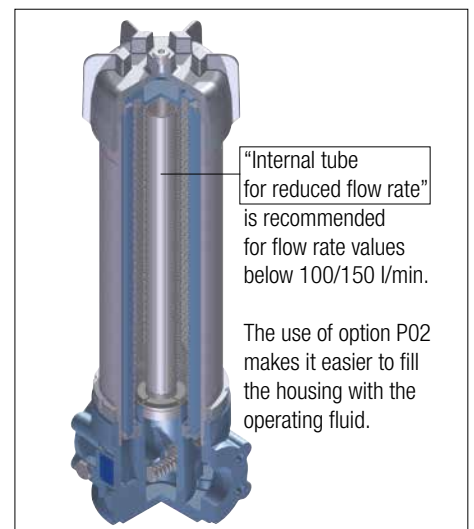
## Hydraulic symbols



## Focus on



## Execution P02



# LMD 951

## Designation & Ordering code

### COMPLETE FILTER

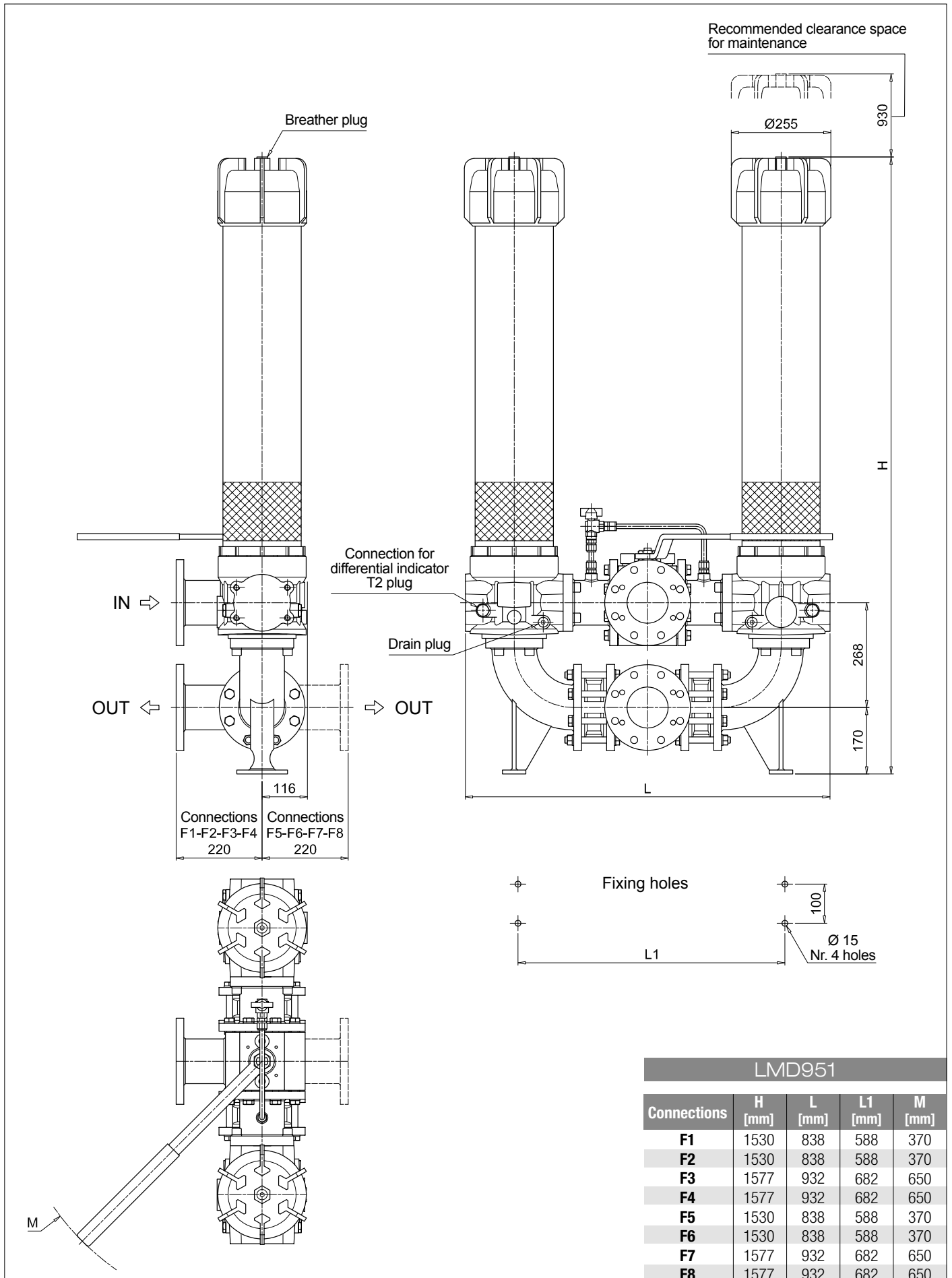
<b>Series and size</b>	Configuration example: <b>LMD951</b> <b>3</b> <b>B</b> <b>V</b> <b>F1</b> <b>A10</b> <b>N</b> <b>P01</b>							
<b>LMD951</b>								
<b>Length</b>	<b>3</b>							
<b>Bypass valve</b>	<b>S</b> Without bypass <b>B</b> 3.5 bar							
<b>Seals and treatments</b>	<b>V</b> FPM							
<b>Connections</b>	<b>F1</b> 3" SAE 3000 psi/M <b>F2</b> 3" SAE 3000 psi/UNC <b>F3</b> 4" SAE 3000 psi/M <b>F4</b> 4" SAE 3000 psi/UNC <b>F5</b> 3" SAE 3000 psi/M, In-line connections <b>F6</b> 3" SAE 3000 psi/UNC, In-line connections <b>F7</b> 4" SAE 3000 psi/M, In-line connections <b>F8</b> 4" SAE 3000 psi/UNC, In-line connections							
<b>Filtration rating (filter media)</b>	<b>A03</b> Inorganic microfiber 3 µm <b>M25</b> Wire mesh 25 µm <b>A06</b> Inorganic microfiber 6 µm <b>M60</b> Wire mesh 60 µm <b>A10</b> Inorganic microfiber 10 µm <b>M90</b> Wire mesh 90 µm <b>A16</b> Inorganic microfiber 16 µm <b>A25</b> Inorganic microfiber 25 µm <b>WA025</b> Water absorber inorganic microfiber 25 µm							
	<b>Element Δp</b>				<b>Execution</b>			
	<b>N</b> 20 bar				<b>P01</b> MP Filtri standard <b>P02</b> With internal tube for reduced flow rate <b>Pxx</b> Customized			

### FILTER ELEMENT

<b>Element series and size</b>	Configuration example: <b>CU950</b> <b>3</b> <b>A10</b> <b>V</b> <b>N</b> <b>P01</b>					
<b>CU950</b>						
<b>Element length</b>	<b>3</b>					
<b>Filtration rating (filter media)</b>	<b>A03</b> Inorganic microfiber 3 µm <b>M25</b> Wire mesh 25 µm <b>A06</b> Inorganic microfiber 6 µm <b>M60</b> Wire mesh 60 µm <b>A10</b> Inorganic microfiber 10 µm <b>M90</b> Wire mesh 90 µm <b>A16</b> Inorganic microfiber 16 µm <b>A25</b> Inorganic microfiber 25 µm <b>WA025</b> Water absorber inorganic microfiber 25 µm					
<b>Seals</b>	<b>V</b> FPM					
	<b>Element Δp</b>			<b>Execution</b>		
	<b>N</b> 20 bar			<b>P01</b> MP Filtri standard <b>Pxx</b> Customized		

### ACCESSORIES

<b>Differential indicators</b>	page		page
<b>DEA</b> Electrical differential indicator	445	<b>DTA</b> Electronic differential indicator	448
<b>DEM</b> Electrical differential indicator	445-446	<b>DVA</b> Visual differential indicator	448
<b>DLA</b> Electrical / visual differential indicator	446-447	<b>DVM</b> Visual differential indicator	448
<b>DLE</b> Electrical / visual differential indicator	447		
<b>Additional features</b>	page		
<b>T2</b> Plug	449		

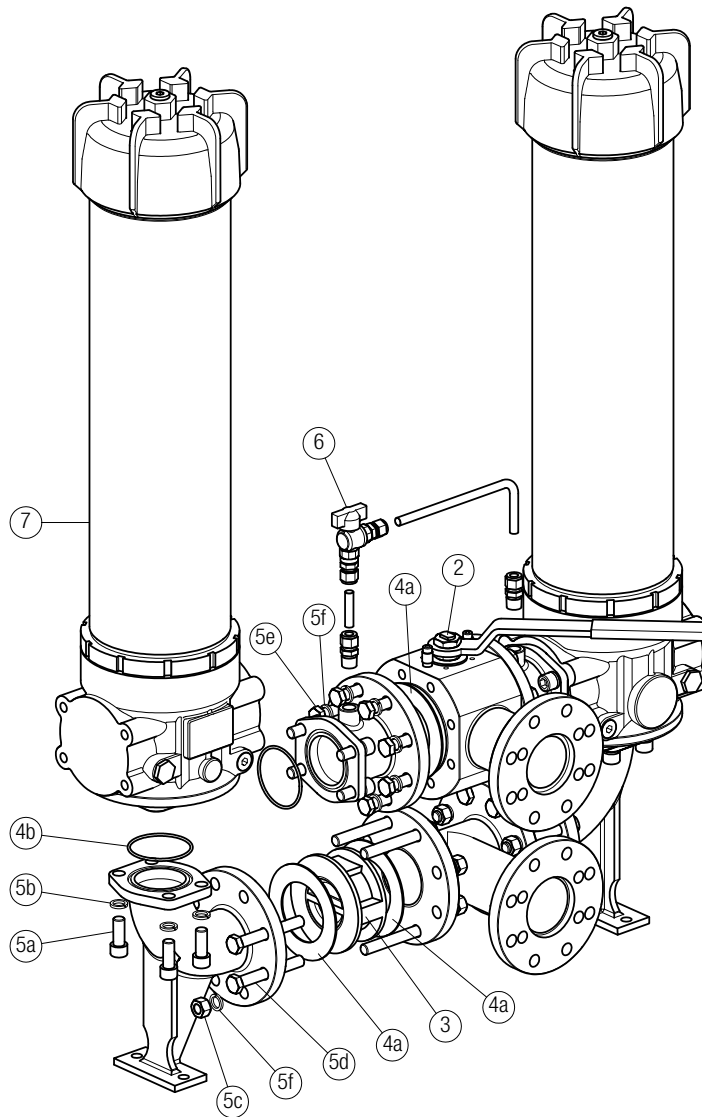




# LMD 951 SPARE PARTS

Order number for spare parts

## LMD 951



Item 7:  
for complete filter code and  
spare parts, see  
LMP 950 - 951 series chapter

Quantity:  
- filter spare parts: 2 pcs.  
- filter seal kit: 2 pcs.

Item:	Q.ty: 1 pc. <b>2</b>		Q.ty: 2 pcs. <b>3</b>	Q.ty: 1 pc. <b>4</b>	Q.ty: 1 pc. <b>5</b> (5a ÷ 5f)	Q.ty: 1 pc. <b>6</b>	Q.ty: 2 pcs. <b>7</b>
Filter series LMD 951	3-way ball valve PN 16		One-way valve	Seal Kit	Threaded fasteners kit	G 1/2" Ball Valve Kit with straight fittings	Filter
<b>F1 - F2 - F5 - F6 / D1 - D3 (3" SAE / DIN PN16 DN 80)</b>	3" SAE 3000 psi/M 02001135	3" SAE 3000 psi/UNC 02001438	02001418	02050388	02049056	02025043	LMP9513xVF1xxxNP01
<b>F3 - F4 - F7 - F8 / D2 - D4 (4" SAE / DIN PN16 DN 100)</b>	4" SAE 3000 psi/M 02001162	4" SAE 3000 psi/UNC 02001439	02001419	02050389	02049057		LMP9513xVF3xxxNP01





# DIN 24550 **Filter element according to DIN 24550**

## LDP & LDD series

Maximum working pressure up to 6 MPa (60 bar) - Flow rate up to 330 l/min

## LMP 900-901 series

Maximum working pressure up to 3 MPa (30 bar) - Flow rate up to 2000 l/min

## LMP 902-903 series

Maximum working pressure up to 2 MPa (20 bar) - Flow rate up to 3000 l/min



# LDP & LDD series

Filter element according to DIN 24550

---

Maximum working pressure up to 6 MPa (60 bar) - Flow rate up to 330 l/min

# LDP & LDD GENERAL INFORMATION

## Filter element according to DIN 24550

### Descriptions

#### Low & Medium Pressure filters

**Maximum working pressure up to 6 MPa (60 bar)**  
**Flow rate up to 330 l/min**

**LDP** is a range of versatile low pressure filter for transmission, protection of sensitive components in low pressure hydraulic systems and filtration of the coolant into the machine tools.

They are also suitable for the off-line filtration of small reservoirs. They are directly connected to the lines of the system through the hydraulic fittings.

#### Available features:

- Female threaded connections up to 1 1/2", for a maximum return flow rate of 330 l/min
- Filter element designed in accordance with DIN 24550 regulation
- Fine filtration rating, to get a good cleanliness level into the system
- Water removal elements, to remove the free water from the hydraulic fluid
- Bypass valve, to relieve excessive pressure drop across the filter media
- Visual, electrical and electronic differential clogging indicators

#### Common applications:

Delivery lines, in low pressure industrial equipment or mobile machines

**LDD** is a range of versatile low pressure duplex filter with integrated changeover function to allow the filter element replacement without the system shut-down.

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

#### Available features:

- Female threaded connections up to 1 1/2" and flanged connections up to 1 1/2", for a maximum flow rate of 330 l/min
- Filter element designed in accordance with DIN 24550 regulation
- Fine filtration rating, to get a good cleanliness level into the system
- Water removal elements, to remove the free water from the hydraulic fluid
- Balancing valve integrated in the changeover lever, to equalize the housing pressure before the switch
- Bypass valve, to relieve excessive pressure drop across the filter media
- Vent ports, to avoid air trapped into the filter going into the system
- Drain ports, to remove the fluid from the housing prior the maintenance work
- Optional sampling ports, to get samples of fluid or to connect additional instrument to the system
- Visual, electrical and electronic differential clogging indicators

#### Common applications:

- Systems where shut-down causes high costs
- Systems where shut-down causes safety issues

### Technical data

#### Filter housing materials

- Head: Aluminium
- Bowl: Cataphoretic Painted Steel
- Bypass valve: AISI 304 - Nylon

#### Pressure

- Test pressure: 9 MPa (90 bar)
- Burst pressure: 21 MPa (210 bar)
- Pulse pressure fatigue test: 1 000 000 cycles with pressure from 0 to 6 MPa (60 bar)

#### Bypass valve

- Opening pressure 350 kPa (3.5 bar)  $\pm$ 10%
- Other opening pressures on request.

#### $\Delta p$ element type

- Microfibre filter elements - series N: 20 bar
- Fluid flow through the filter element from OUT to IN

#### Seals

- Standard NBR series A
- Optional FPM series V

#### Temperature

From -25° C to +110° C

#### Connections

Inlet/Outlet In-Line

#### Note

LDP - LDD filters are provided for vertical mounting



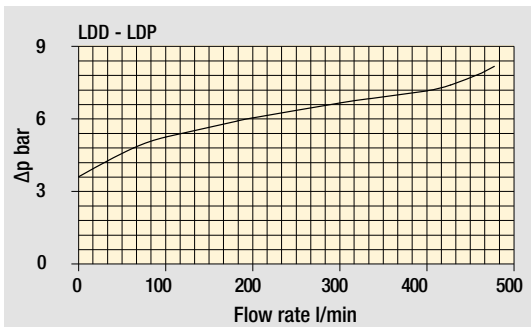
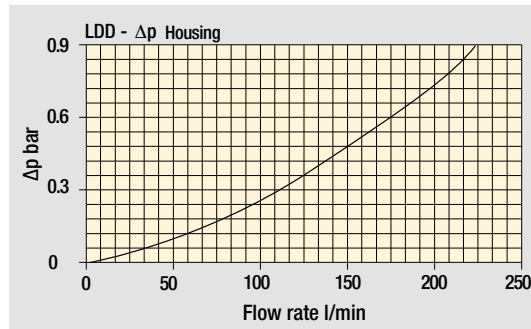
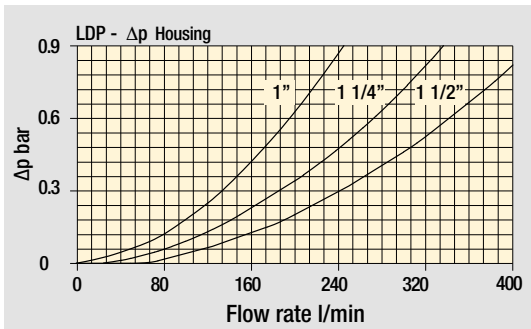
### Weights [kg] and volumes [dm<sup>3</sup>]

Filter series	Weights [kg]	Volumes [dm <sup>3</sup> ]
<b>LDP 016</b>	2.0	1.2
<b>LDP 025</b>	3.0	1.6
<b>LDP 040</b>	5.0	2.2
<b>LDD 016</b>	9.3	3.6
<b>LDD 025</b>	9.5	4.1
<b>LDD 040</b>	11.3	4.8

# GENERAL INFORMATION LDP & LDD

Filter element according to DIN 24550

Pressure drop  
Filter housings  $\Delta p$  pressure drop



Bypass valve pressure drop

The curves are plotted using mineral oil with density of  $0.86 \text{ kg/dm}^3$  in compliance with ISO 3968.  
 $\Delta p$  varies proportionally with density.

Flow rates [l/min]

Filter series	Filter element design - N Series										
	A03	A06	A10	A16	A25	M25	M60	M90	M250	P10	P25
<b>LDP 016</b>	83	91	178	198	222	350	353	358	359	295	309
<b>LDP 025</b>	124	134	227	245	265	357	358	358	359	319	330
<b>LDP 040</b>	173	191	274	284	311	359	360	361	362	332	337
<b>LDD 016</b>	68	73	120	130	140	189	190	192	192	169	174
<b>LDD 025</b>	93	98	142	149	157	191	192	192	192	178	181
<b>LDD 040</b>	118	126	161	165	175	192	192	193	193	182	184

**Maximum flow rate for a complete low and medium pressure filter with a pressure drop  $\Delta p = 0.7 \text{ bar}$ .**

The reference fluid has a kinematic viscosity of  $30 \text{ mm}^2/\text{s}$  (cSt) and a density of  $0.86 \text{ kg/dm}^3$ .

For different pressure drop or fluid viscosity we recommend to use our selection software available on [www.mpfiltri.com](http://www.mpfiltri.com).

Please, contact our Sales Department for further additional information.

Hydraulic symbols

Filter series	Execution S	Execution B	Execution S	Execution B
<b>LDP 016</b>	•	•		
<b>LDP 025</b>	•	•		
<b>LDP 040</b>	•	•		
<b>LDD 016</b>			•	•
<b>LDD 025</b>			•	•
<b>LDD 040</b>			•	•

--	--	--	--



# LDP Filter element according to DIN 24550

## Designation & Ordering code

### COMPLETE FILTER

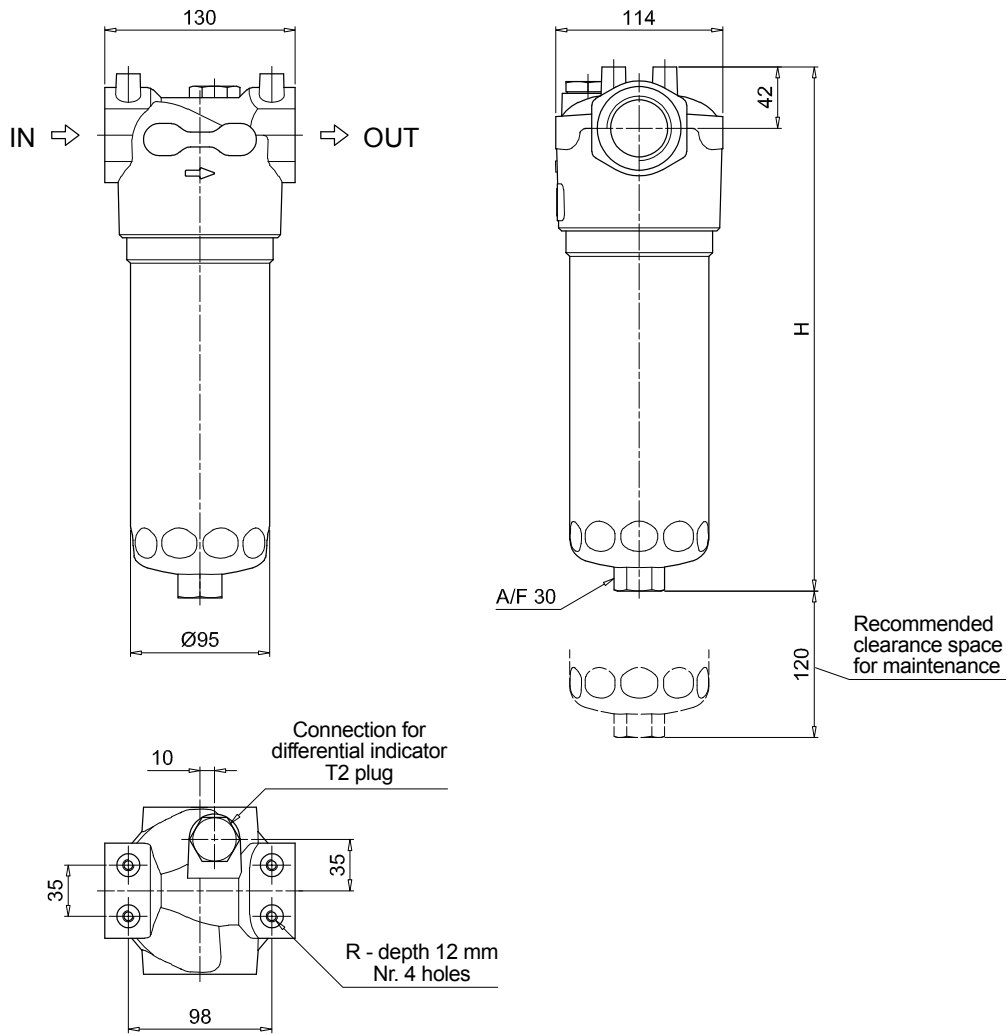
<b>Series</b>	Configuration example: <b>LDP</b> <b>025</b> <b>B</b> <b>A</b> <b>D</b> <b>6</b> <b>A10</b> <b>N</b> <b>P01</b>									
<b>LDP</b>										
<b>Size</b>										
<b>016</b>	Element according to DIN 24550 - T3 DN160									
<b>025</b>	Element according to DIN 24550 - T3 DN250									
<b>040</b>	Element according to DIN 24550 - T3 DN400									
<b>Bypass valve</b>										
<b>S</b>	Without bypass			<b>B</b> 3.5 bar						
<b>Seals and treatments</b>				Filtration rating						
<b>A</b>	NBR			Axx		Mxx		Pxx		
<b>V</b>	FPM			•		•		•		
<b>W</b>	NBR compatible with fluids HFA-HFB-HFC			•		•				
<b>Connections</b>										
<b>A</b>	G 1"					<b>F</b> 1 1/2" NPT				
<b>B</b>	G 1 1/4"					<b>G</b> SAE 16 - 1 5/16" - 12 UN				
<b>C</b>	G 1 1/2"					<b>H</b> SAE 20 - 1 5/8" - 12 UN				
<b>D</b>	1" NPT					<b>I</b> SAE 24 - 1 7/8" - 12 UN				
<b>E</b>	1 1/4" NPT									
<b>Connection for differential indicator</b>										
<b>6</b>	With plugged connection									
<b>Filtration rating (filter media)</b>										
<b>A03</b>	Inorganic microfiber 3 µm					<b>M25</b> Wire mesh 25 µm				
<b>A06</b>	Inorganic microfiber 6 µm					<b>M60</b> Wire mesh 60 µm				
<b>A10</b>	Inorganic microfiber 10 µm					<b>M90</b> Wire mesh 90 µm				
<b>A16</b>	Inorganic microfiber 16 µm					<b>P10</b> Resin impregnated paper 10 µm				
<b>A25</b>	Inorganic microfiber 25 µm					<b>P25</b> Resin impregnated paper 25 µm				
<b>WA025</b>	Water absorber inorganic microfiber 25 µm									
<b>Element Δp</b>	<b>N</b> 20 bar					<b>Execution</b>				
						<b>P01</b> MP Filtri standard				
						<b>Pxx</b> Customized				

### FILTER ELEMENT

<b>Element series</b>	Configuration example: <b>DN</b> <b>025</b> <b>A10</b> <b>A</b> <b>N</b> <b>P01</b>									
<b>DN</b>										
<b>Element size</b>										
<b>016</b>	Element according to DIN 24550 - T3 DN160									
<b>025</b>	Element according to DIN 24550 - T3 DN250									
<b>040</b>	Element according to DIN 24550 - T3 DN400									
<b>Filtration rating (filter media)</b>										
<b>A03</b>	Inorganic microfiber 3 µm					<b>M25</b> Wire mesh 25 µm				
<b>A06</b>	Inorganic microfiber 6 µm					<b>M60</b> Wire mesh 60 µm				
<b>A10</b>	Inorganic microfiber 10 µm					<b>M90</b> Wire mesh 90 µm				
<b>A16</b>	Inorganic microfiber 16 µm					<b>P10</b> Resin impregnated paper 10 µm				
<b>A25</b>	Inorganic microfiber 25 µm					<b>P25</b> Resin impregnated paper 25 µm				
<b>WA025</b>	Water absorber inorganic microfiber 25 µm									
<b>Seals</b>				Filtration rating						
<b>A</b>	NBR			Axx		Mxx		Pxx		
<b>V</b>	FPM			•		•		•		
<b>W</b>	NBR compatible with fluids HFA-HFB-HFC			•		•				
<b>Element Δp</b>	<b>N</b> 20 bar					<b>Execution</b>				
						<b>P01</b> MP Filtri standard				
						<b>Pxx</b> Customized				

### ACCESSORIES

<b>Differential indicators</b>	page		page
<b>DEA</b> Electrical differential indicator	445	<b>DTA</b> Electronic differential indicator	448
<b>DEM</b> Electrical differential indicator	445-446	<b>DVA</b> Visual differential indicator	448
<b>DLA</b> Electrical / visual differential indicator	446-447	<b>DVM</b> Visual differential indicator	448
<b>DLE</b> Electrical / visual differential indicator	447		
<b>Additional features</b>	page		
<b>T2</b> Plug	449		



LDP	
Filter size	H [mm]
<b>016</b>	268
<b>025</b>	358
<b>040</b>	508
Connections	R
<b>A-B-C</b>	M8
<b>D-E-F-G-H-I</b>	5/16" UNC

# LDD Filter element according to DIN 24550

## Designation & Ordering code

### COMPLETE FILTER

<b>Series</b>	Configuration example: <b>LDD</b> <b>025</b> <b>B</b> <b>A</b> <b>C</b> <b>6</b> <b>A10</b> <b>N</b> <b>P01</b>										
<b>LDD</b>											
<b>Size</b>											
<b>016</b>	Element according to DIN 24550 - T3 DN160										
<b>025</b>	Element according to DIN 24550 - T3 DN250										
<b>040</b>	Element according to DIN 24550 - T3 DN400										
<b>Bypass valve</b>											
<b>S</b>	Without bypass			<b>B</b>	3.5 bar						
<b>Seals and treatments</b>				Filtration rating							
<b>A</b>	NBR			Axx	Mxx	Pxx					
<b>V</b>	FPM										
<b>W</b>	NBR compatible with fluids HFA-HFB-HFC										
<b>Connections</b>											
<b>C</b>	G 1 1/2"										
<b>F</b>	1 1/2" NPT										
<b>I</b>	SAE 24 - 1 7/8" - 12 UN										
<b>L</b>	1 1/2" SAE 3000 psi/M + G 1 1/4"										
<b>M</b>	1 1/2" SAE 3000 psi/UNC + 1 1/4" NPT										
<b>N</b>	1 1/2" SAE 3000 psi/UNC + SAE 20 - 1 5/8" UN										
<b>Connection for differential indicator</b>											
<b>6</b>	With plugged connection										
<b>Filtration rating (filter media)</b>											
<b>A03</b>	Inorganic microfiber 3 µm			<b>M25</b>	Wire mesh 25 µm						
<b>A06</b>	Inorganic microfiber 6 µm			<b>M60</b>	Wire mesh 60 µm						
<b>A10</b>	Inorganic microfiber 10 µm			<b>M90</b>	Wire mesh 90 µm						
<b>A16</b>	Inorganic microfiber 16 µm			<b>P10</b>	Resin impregnated paper 10 µm						
<b>A25</b>	Inorganic microfiber 25 µm			<b>P25</b>	Resin impregnated paper 25 µm						
<b>WA025</b>	Water absorber inorganic microfiber 25 µm										
<b>Element Δp</b>				<b>N</b>	20 bar						
<b>Execution</b>				<b>P01</b>	MP Filtri standard						
				<b>Pxx</b>	Customized						

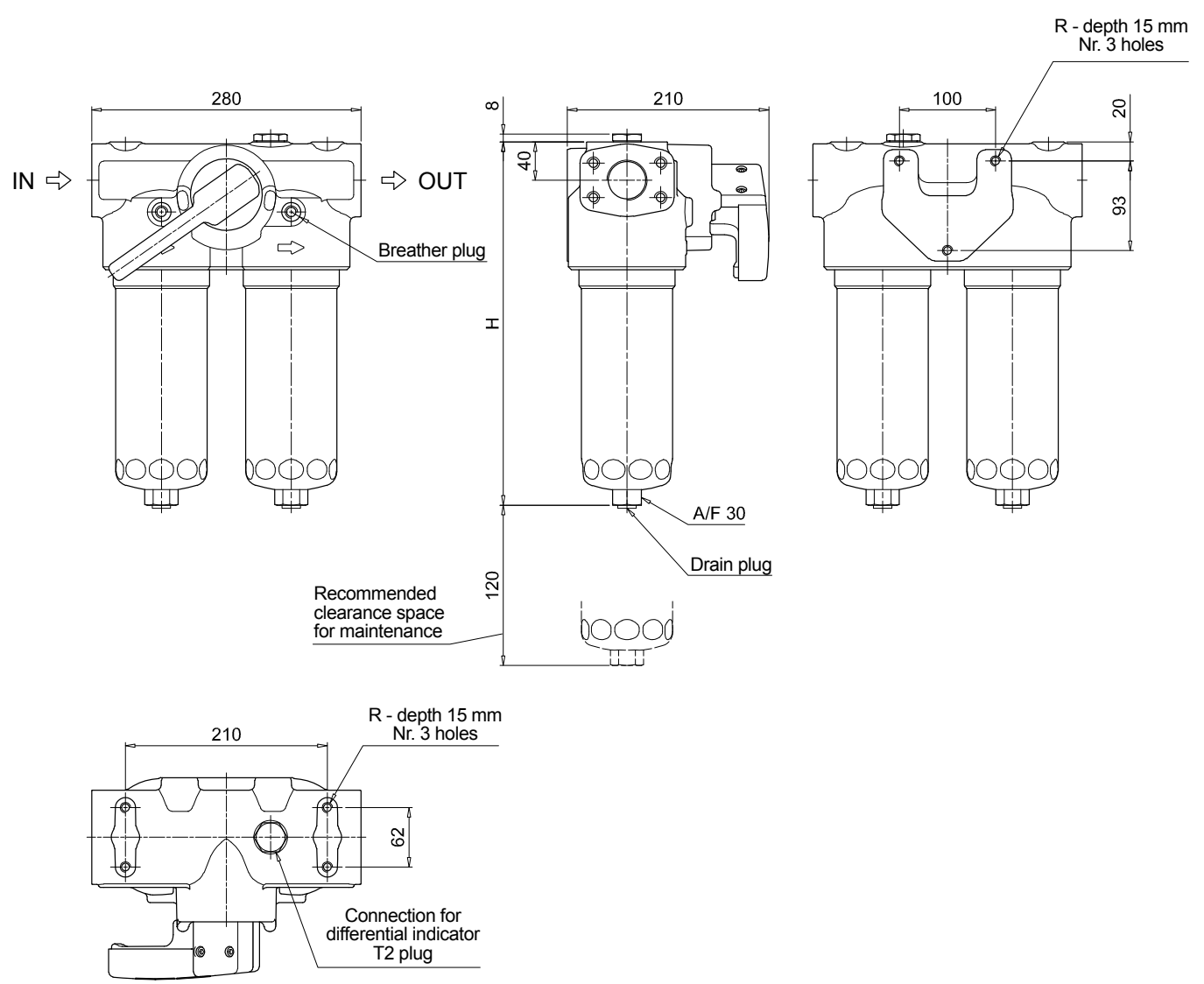
### FILTER ELEMENT

<b>Element series</b>	Configuration example: <b>DN</b> <b>025</b> <b>A10</b> <b>A</b> <b>N</b> <b>P01</b>									
<b>DN</b>										
<b>Element size</b>										
<b>016</b>	Element according to DIN 24550 - T3 DN160									
<b>025</b>	Element according to DIN 24550 - T3 DN250									
<b>040</b>	Element according to DIN 24550 - T3 DN400									
<b>Filtration rating (filter media)</b>										
<b>A03</b>	Inorganic microfiber 3 µm			<b>M25</b>	Wire mesh 25 µm					
<b>A06</b>	Inorganic microfiber 6 µm			<b>M60</b>	Wire mesh 60 µm					
<b>A10</b>	Inorganic microfiber 10 µm			<b>M90</b>	Wire mesh 90 µm					
<b>A16</b>	Inorganic microfiber 16 µm			<b>P10</b>	Resin impregnated paper 10 µm					
<b>A25</b>	Inorganic microfiber 25 µm			<b>P25</b>	Resin impregnated paper 25 µm					
<b>WA025</b>	Water absorber inorganic microfiber 25 µm									
<b>Seals</b>				Filtration rating						
<b>A</b>	NBR			Axx	Mxx	Pxx				
<b>V</b>	FPM									
<b>W</b>	NBR compatible with fluids HFA-HFB-HFC									
<b>Element Δp</b>				<b>N</b>	20 bar					
<b>Execution</b>				<b>P01</b>	MP Filtri standard					
				<b>Pxx</b>	Customized					

### ACCESSORIES

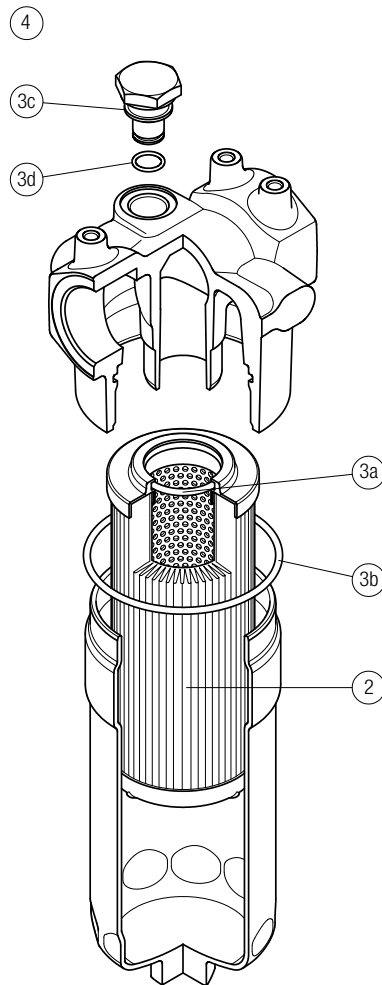
<b>Differential indicators</b>	page				page
<b>DEA</b>	Electrical differential indicator	445		<b>DTA</b>	Electronic differential indicator 448
<b>DEM</b>	Electrical differential indicator	445-446		<b>DVA</b>	Visual differential indicator 448
<b>DLA</b>	Electrical / visual differential indicator	446-447		<b>DVM</b>	Visual differential indicator 448
<b>DLE</b>	Electrical / visual differential indicator	447			
<b>Additional features</b>	page				
<b>T2</b>	Plug	449			

LDD	
Filter size	H [mm]
<b>016</b>	293
<b>025</b>	383
<b>040</b>	533
Connections	R
<b>C</b>	M10
<b>F - I</b>	3/8" UNC
<b>L</b>	M10
<b>M - N</b>	3/8" UNC



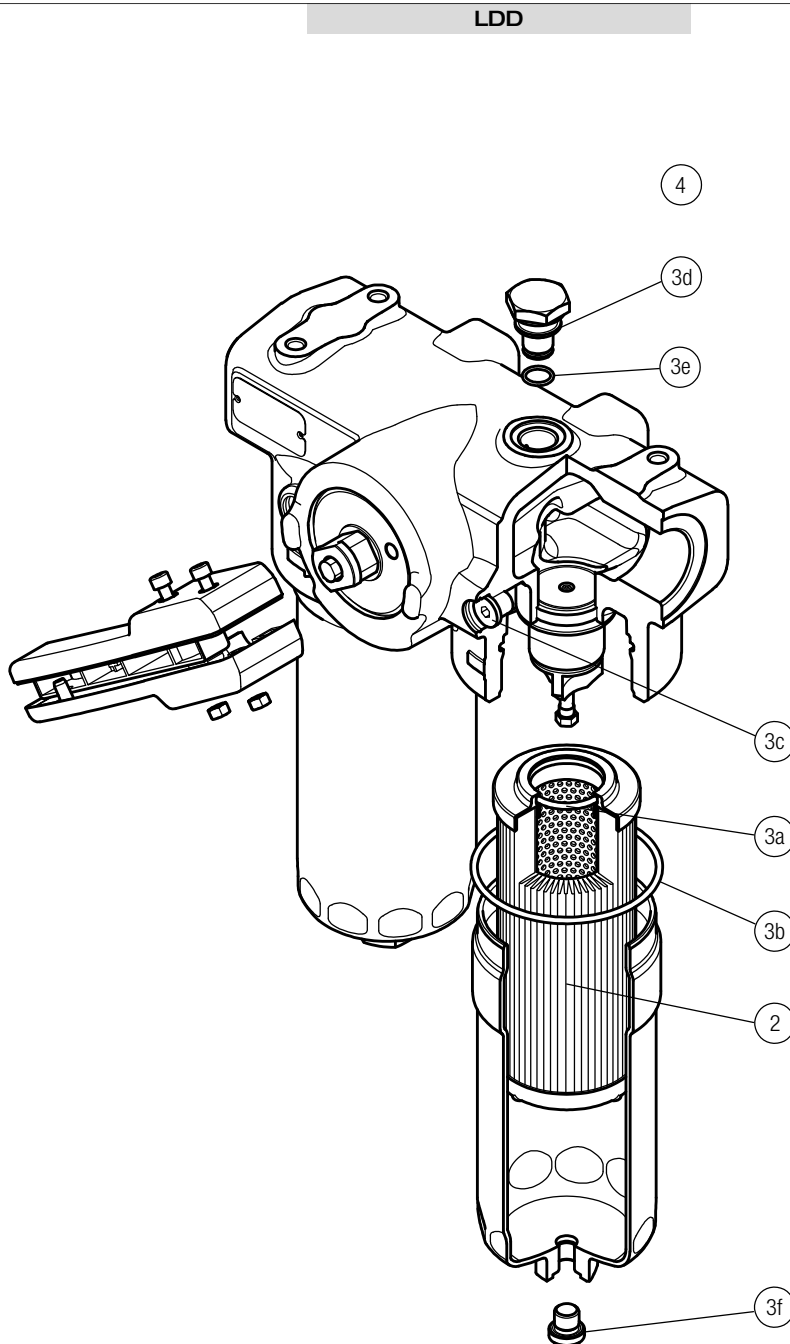
Order number for spare parts

LDP



Item:	Q.ty: 1 pc.	Q.ty: 1 pc.		Q.ty: 1 pc.	
Filter series	Filter element	Seal Kit code number		Indicator connection plug	
LDP	See order table	NBR	FPM	NBR	FPM
	<b>2</b>	<b>3</b> (3a ÷ 3d)		<b>4</b>	
		02050435	02050436	T2H	T2V

Order number for spare parts



Item:	Q.ty: 1 pc.		Q.ty: 1 pc.		Q.ty: 2 pc.	
Filter series	Filter element	Seal Kit code number		Indicator connection plug		
LDD	See order table	NBR	FPM	NBR	FPM	
	<b>2</b>	<b>3</b> (3a ÷ 3i)		<b>4</b>		
		02050671	02050672	T2H	T2V	



# LMP 900-901 series

Filter element according to DIN 24550

Maximum working pressure up to 3 MPa (30 bar) - Flow rate up to 2000 l/min





# LMP 900-901 GENERAL INFORMATION

## Filter element according to DIN 24550

### Description

#### Low & Medium Pressure filters

**Maximum working pressure up to 3 MPa (30 bar)**

**Flow rate up to 2000 l/min**

LMP900 is a range of low pressure filter with large filtration surface mainly suitable for lubrication, off-line filtration of the reservoirs and filtration equipment.

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

#### Available features:

- Flanged connections up to 4", for a maximum flow rate of 2000 l/min
- In line or 90° connections, to meet any type of application
- Filter element designed in accordance with DIN 24550 regulation
- Fine filtration rating, to get a good cleanliness level into the system
- Water removal elements, to remove the free water from the hydraulic fluid
- Bypass valve, to relieve excessive pressure drop across the filter media
- Vent ports, to avoid air trapped into the filter going into the system
- Drain ports, to remove the fluid from the housing prior the maintenance work
- Visual, electrical and electronic differential clogging indicators

#### Common applications:

- Off-line filtration of reservoirs
- Filtration systems
- Lubrication systems

### Technical data

#### Filter housing materials

- Head: Anodized Aluminium
- Housing: Anodized Aluminium
- Manifolds: Anodized Aluminium
- Bypass valve: Steel

#### Pressure

- Test pressure: 4.5 MPa (45 bar)
- Burst pressure: 12 MPa (120 bar)
- Pulse pressure fatigue test: 1 000 000 cycles with pressure from 0 to 3 MPa (30 bar)

#### Bypass valve

- Opening pressure 350 kPa (3.5 bar) ±10%
- Other opening pressures on request.

#### Number of filter elements

LMP 900-1: 1 filter element CU900

LMP 900-2: 2 filter elements CU900

#### Filter elements

Filter element according to DIN 24550

Size: 1000

#### Δp element type

- Microfibre filter elements - series N: 20 bar
- Fluid flow through the filter element from OUT to IN

#### Connections

LMP 900: In-line Inlet/Outlet

LMP 901: 90° Inlet/Outlet

#### Seals

- Standard NBR series A
- Optional FPM series V

#### Temperature

From -25 °C to +110 °C

#### Note

LMP 900 - 901 filters are provided for vertical mounting



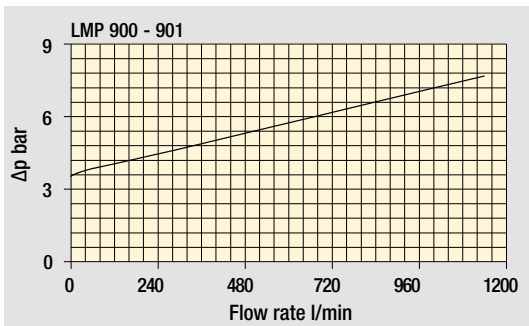
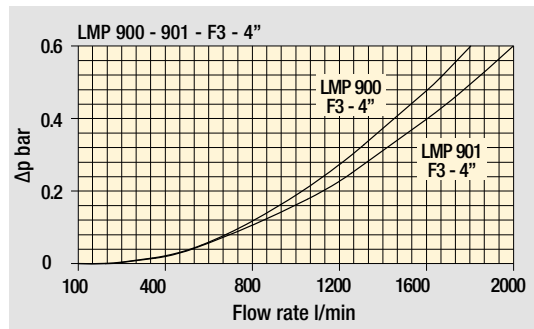
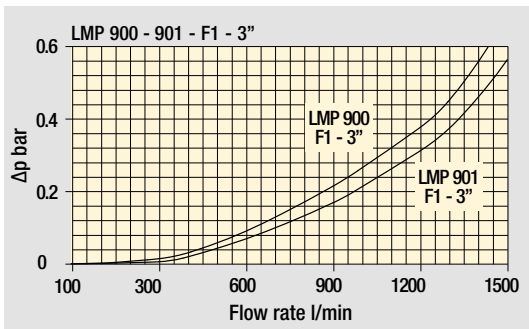
### Weights [kg] and volumes [dm³]

Filter series	Weights [kg]			Volumes [dm³]		
	Length	1	2	Length	1	2
<b>LMP 900-901</b>		19.2	30.4		16	24

# GENERAL INFORMATION LMP 900-901

Filter element according to DIN 24550

Pressure drop  
Filter housings  $\Delta p$  pressure drop



Bypass valve pressure drop

The curves are plotted using mineral oil with density of  $0.86 \text{ kg/dm}^3$  in compliance with ISO 3968.  
 $\Delta p$  varies proportionally with density.

Flow rates [l/min]

Filter series	Length	Filter element design - N Series						M25 M60 M90 M250
		A03	A06	A10	A16	A25		
LMP 900	1	706	877	1264	1291	1444	1803	
	2	1100	1264	1556	1573	1668	1867	
LMP 901	1	715	899	1337	1369	1552	2000	
	2	1147	1337	1689	1710	1828	2081	

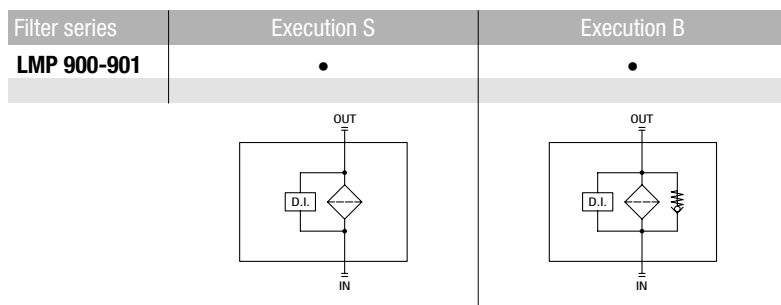
**Maximum flow rate for a complete low and medium pressure filter with a pressure drop  $\Delta p = 0.7 \text{ bar}$ .**

The reference fluid has a kinematic viscosity of  $30 \text{ mm}^2/\text{s}$  (cSt) and a density of  $0.86 \text{ kg/dm}^3$ .

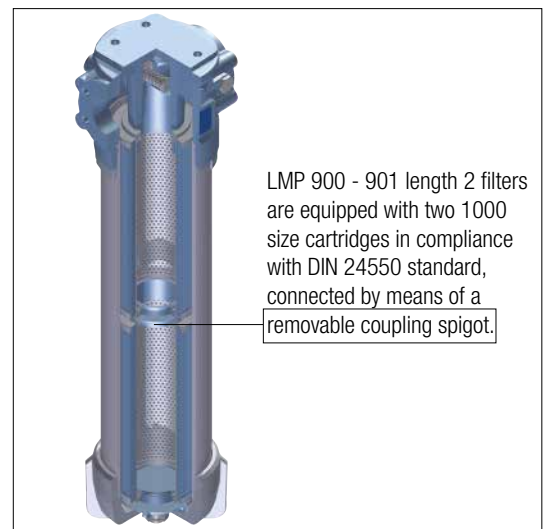
For different pressure drop or fluid viscosity we recommend to use our selection software available on [www.mpfiltri.com](http://www.mpfiltri.com).

Please, contact our Sales Department for further additional information.

## Hydraulic symbols



## LMP 900-901 Length 2



# LMP 900-901 Filter element according to DIN 24550

Designation & Ordering code

## COMPLETE FILTER

<b>Series and size</b> <b>LMP900   LMP901</b>	Configuration example: <b>LMP901</b> <b>2</b> <b>B</b> <b>A</b> <b>F2</b> <b>A10</b> <b>N</b> <b>P01</b>							
<b>Length</b> <b>1</b>   <b>2</b>								
<b>Bypass valve</b> <b>S</b> Without bypass   <b>B</b> 3.5 bar								
<b>Seals and treatments</b> <b>A</b> NBR <b>V</b> FPM								
<b>Connections</b> <b>F1</b> 3" SAE 3000 psi/M <b>F2</b> 3" SAE 3000 psi/UNC <b>F3</b> 4" SAE 3000 psi/M <b>F4</b> 4" SAE 3000 psi/UNC								
<b>Filtration rating (filter media)</b> <b>A03</b> Inorganic microfiber 3 µm <b>A06</b> Inorganic microfiber 6 µm <b>A10</b> Inorganic microfiber 10 µm <b>A16</b> Inorganic microfiber 16 µm <b>A25</b> Inorganic microfiber 25 µm <b>M25</b> Wire mesh 25 µm <b>M60</b> Wire mesh 60 µm <b>M90</b> Wire mesh 90 µm <b>WA025</b> Water absorber inorganic microfiber 25 µm								
<b>Element Δp</b> <b>N</b> 20 bar	<b>Execution</b>		<b>Filter length</b>					
	<b>P01</b> MP Filtri standard		<b>1</b>		<b>2</b>			
	<b>P02</b> Maintenance from the bottom of the housing							
	<b>Pxx</b> Customized							

## FILTER ELEMENT

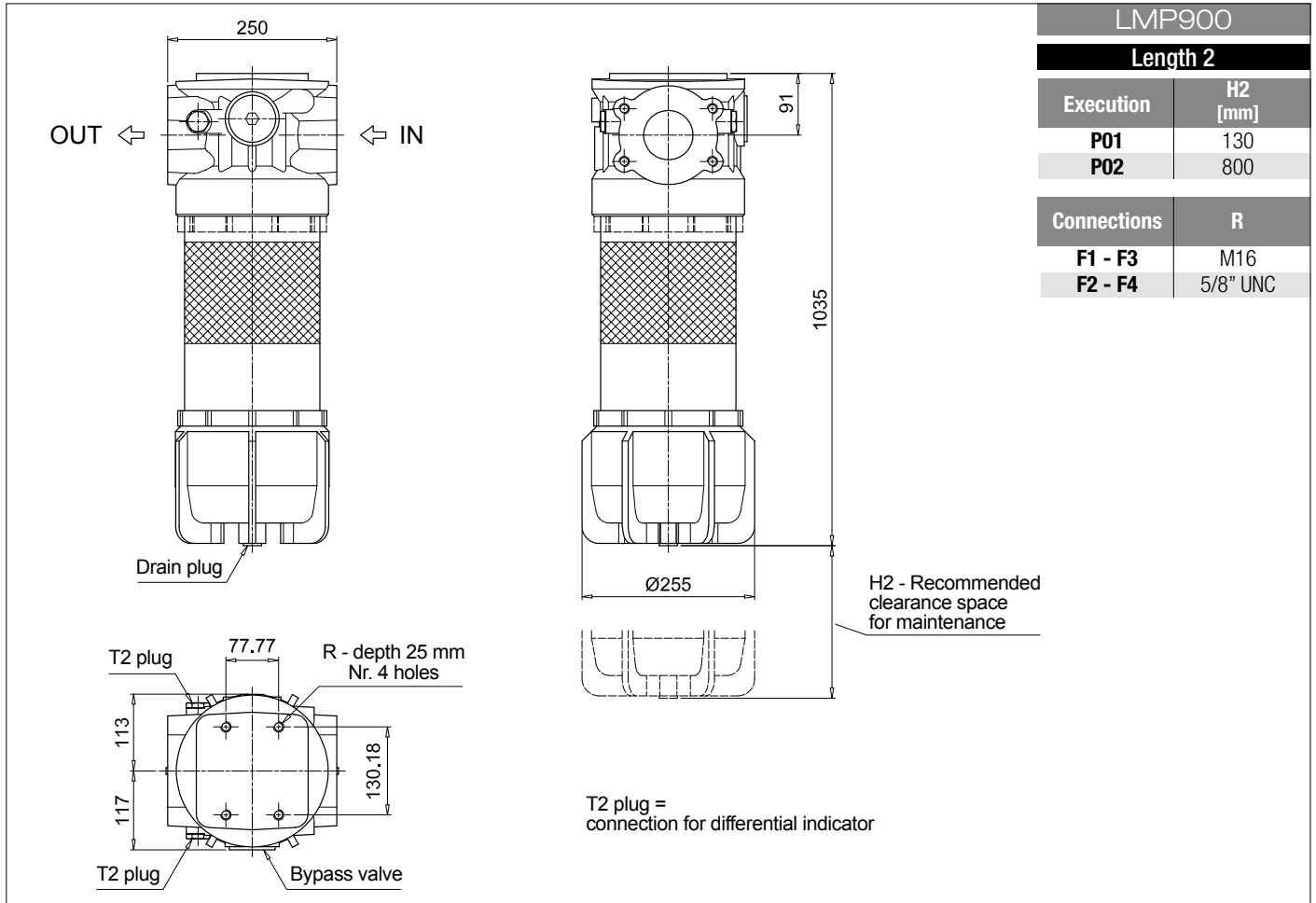
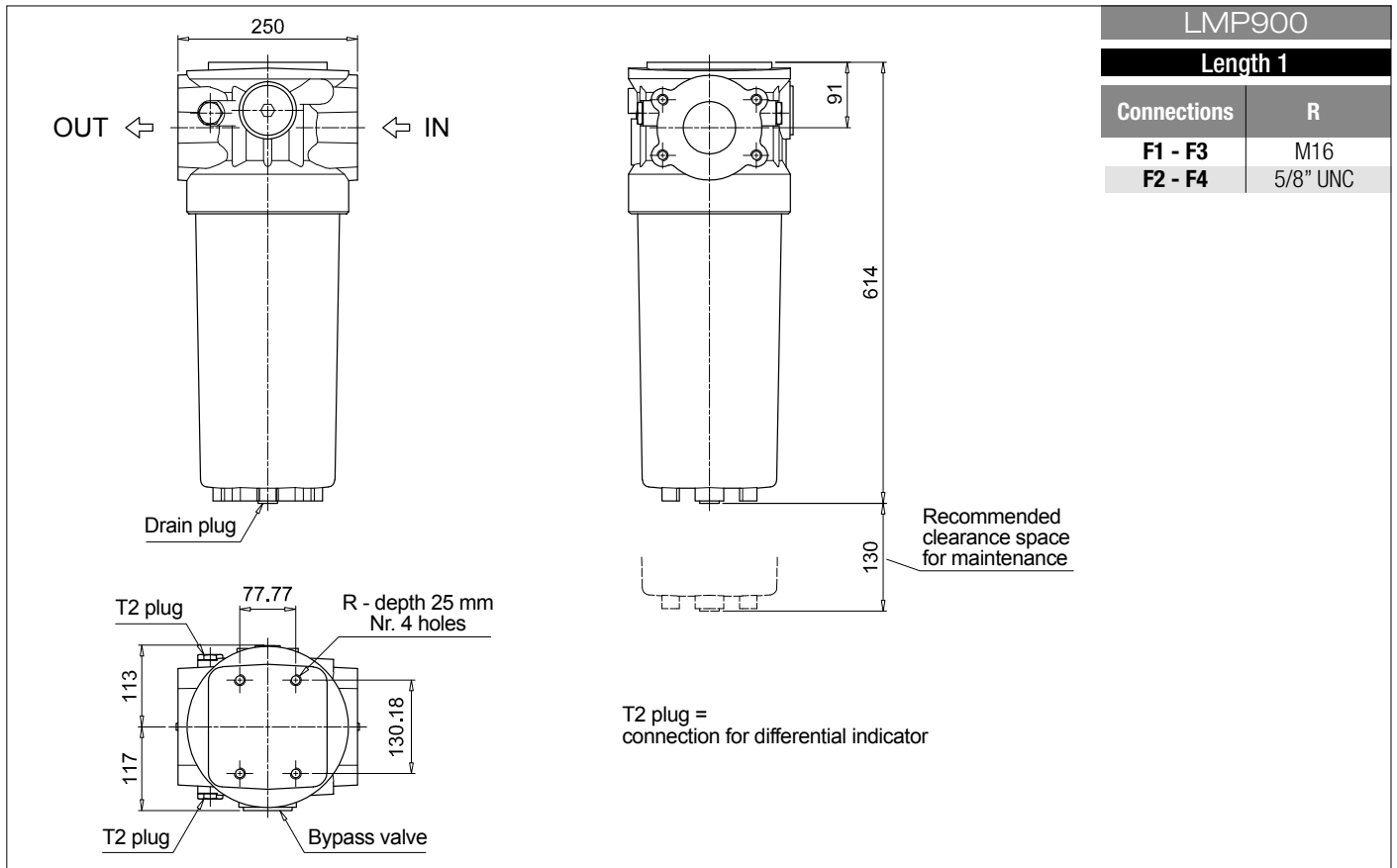
<b>Element series and size</b> <b>CU900</b>	Configuration example: <b>CU900</b> <b>A10</b> <b>A</b> <b>N</b> <b>P01</b>				
<b>Length</b> <b>1</b> Nr. 1 filter element <b>2</b> Nr. 2 filter elements					
<b>Filtration rating (filter media)</b> <b>A03</b> Inorganic microfiber 3 µm <b>A06</b> Inorganic microfiber 6 µm <b>A10</b> Inorganic microfiber 10 µm <b>A16</b> Inorganic microfiber 16 µm <b>A25</b> Inorganic microfiber 25 µm <b>M25</b> Wire mesh 25 µm <b>M60</b> Wire mesh 60 µm <b>M90</b> Wire mesh 90 µm <b>WA025</b> Water absorber inorganic microfiber 25 µm					
<b>Seals</b> <b>A</b> NBR <b>V</b> FPM					
<b>Element Δp</b> <b>N</b> 20 bar	<b>Execution</b>				
	<b>P01</b> MP Filtri standard				
	<b>Pxx</b> Customized				

## ACCESSORIES

<b>Differential indicators</b>	page		page
<b>DEA</b> Electrical differential indicator	445	<b>DTA</b> Electronic differential indicator	448
<b>DEM</b> Electrical differential indicator	445-446	<b>DVA</b> Visual differential indicator	448
<b>DLA</b> Electrical / visual differential indicator	446-447	<b>DVM</b> Visual differential indicator	448
<b>DLE</b> Electrical / visual differential indicator	447		
<b>Additional features</b>	page		
<b>T2</b> Plug	449		

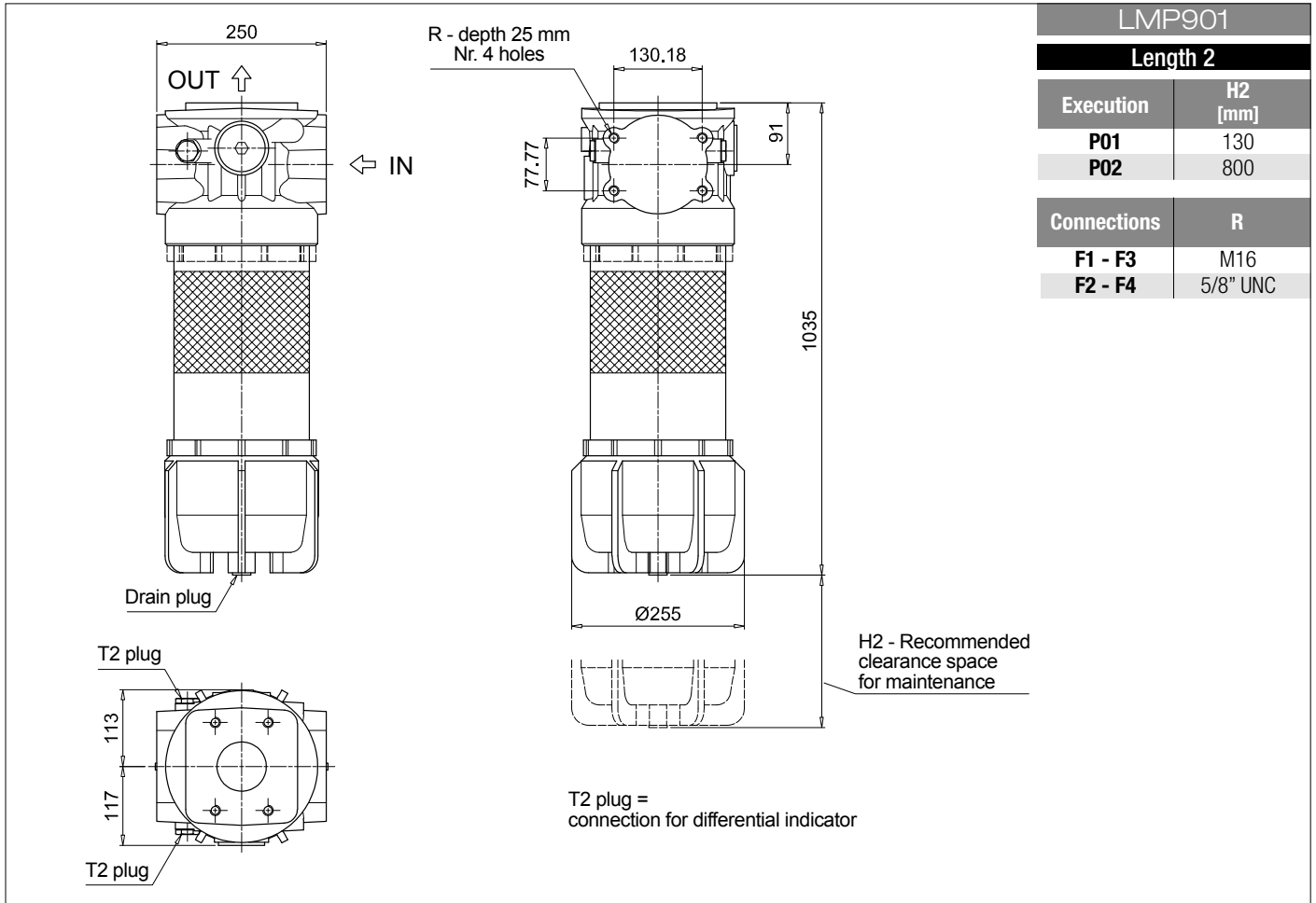
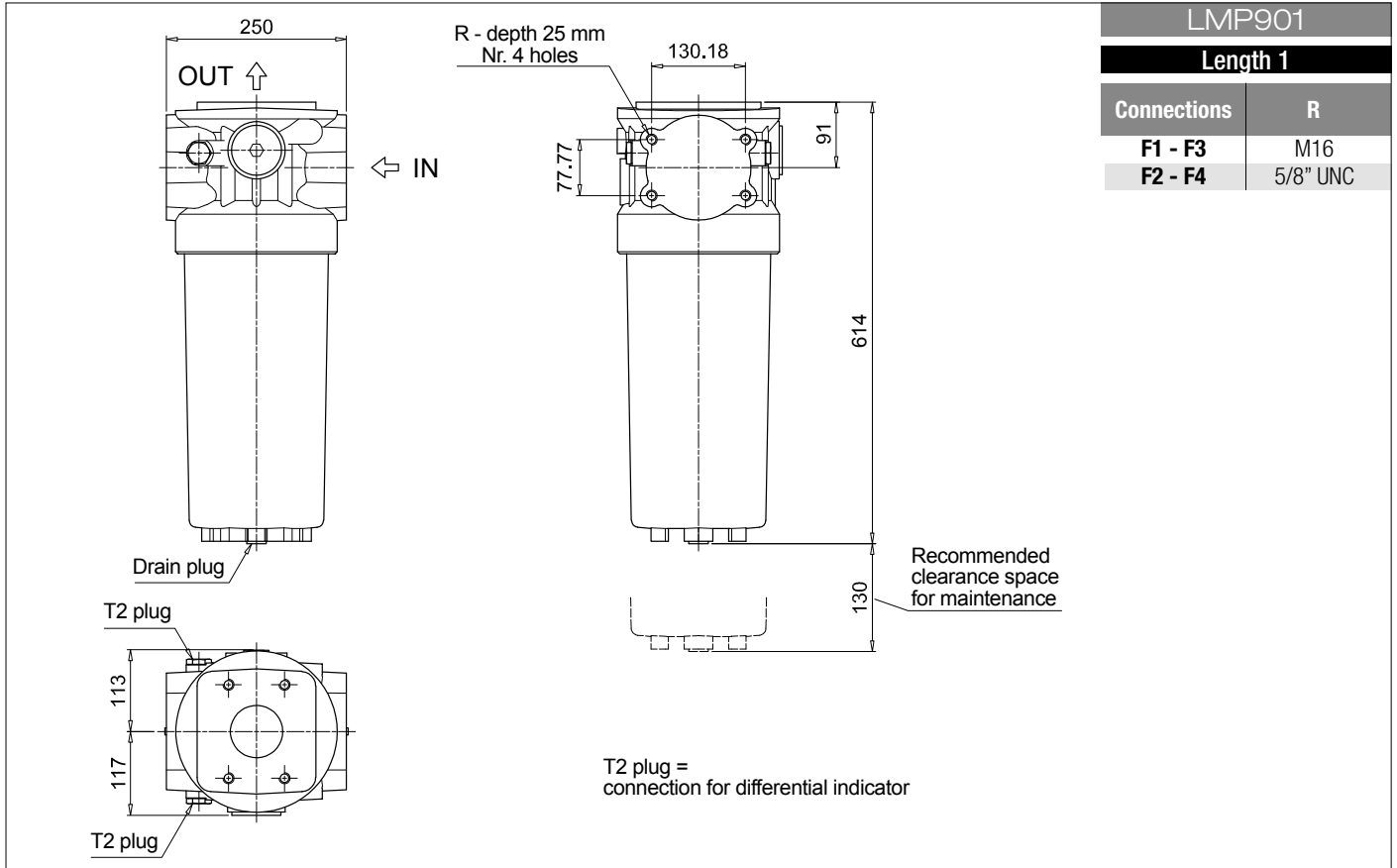
# Filter element according to DIN 24550 LMP 900-901

Dimensions



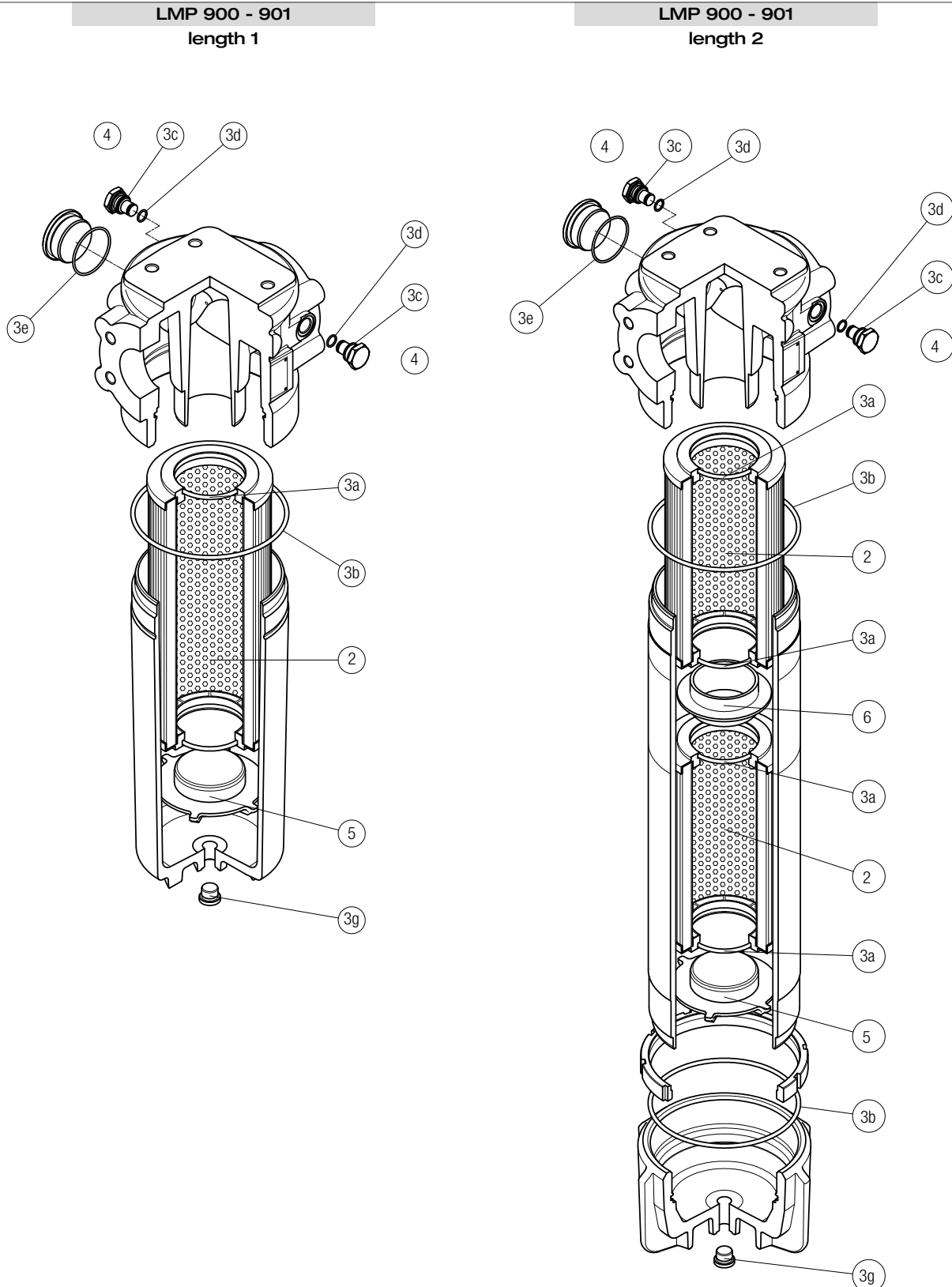
# LMP 900-901 Filter element according to DIN 24550

## Dimensions



# SPARE PARTS LMP 900-901

Order number for spare parts



Item:	2		3 (3a ÷ 3g)		4		5		6	
Filter series	Filter element	Seal Kit code number	Indicator connection plug	Housing spigot	Coupling spigot					
	Q.ty	Q.ty	Q.ty	Q.ty	Q.ty	NBR	FPM	Q.ty	Q.ty	Q.ty
LMP 900-901 length 1	1 pc.	See order table	1 pc.	2 pcs.	1 pc.	T2H	T2V	1 pc.	-	-
LMP 900-901 length 2	2 pcs.	See order table	1 pc.	2 pcs.	1 pc.	-	-	1 pc.	1 pc.	1 pc.



# LMP 902-903 series

Filter element according to DIN 24550

Maximum working pressure up to 2 MPa (20 bar) - Flow rate up to 3000 l/min





# LMP 902-903 GENERAL INFORMATION

## Filter element according to DIN 24550

### Description

#### Low & Medium Pressure filters

**Maximum working pressure up to 2 MPa (20 bar)**

**Flow rate up to 3000 l/min**

LMP902 and LMP903 are ranges of low pressure filter with large filtration surface mainly suitable for lubrication, off-line filtration of the reservoirs and filtration equipment.

Multiple LMP950 filters are connected to a manifold to reduce the pressure drop caused by the filter media and to increase the life time of the filter element.

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

#### Available features:

- 4" flanged connections, for a maximum flow rate of 3000 l/min
- Filter element designed in accordance with DIN 24550 regulation
- Fine filtration rating, to get a good cleanliness level into the system
- Water removal elements, to remove the free water from the hydraulic fluid
- Bypass valve, to relieve excessive pressure drop across the filter media
- Vent ports, to avoid air trapped into the filter going into the system
- Drain ports, to remove the fluid from the housing prior the maintenance work
- Visual, electrical and electronic differential clogging indicators

#### Common applications:

- Off-line filtration of reservoirs
- Filtration systems

### Technical data

#### Filter housing materials

- Head: Anodized Aluminium
- Housing: Anodized Aluminium
- Manifolds: Welded - Phosphatized Steel
- Bypass valve: Steel
- Size 1000 filter elements complying with DIN 24550 standard

#### Pressure

- Test pressure: 3.5 MPa (35 bar)

#### Bypass valve

- Opening pressure 350 kPa (3.5 bar)  $\pm 10\%$
- Other opening pressures on request.

#### Number of filter elements

LMP 902: 4 filter elements CU900

LMP 903: 6 filter elements CU900

#### Filter elements

Filter element according to DIN 24550

Size: 1000

#### $\Delta p$ element type

- Microfibre filter elements - series N: 20 bar
- Fluid flow through the filter element from OUT to IN

#### Connections

LMP 902-903: In-line Inlet/Outlet

#### Seals

- Standard NBR series A
- Optional FPM series V

#### Temperature

From -25 °C to +110 °C

#### Note

LMP 902 - 903 filters are provided for vertical mounting



### Weights [kg] and volumes [dm<sup>3</sup>]

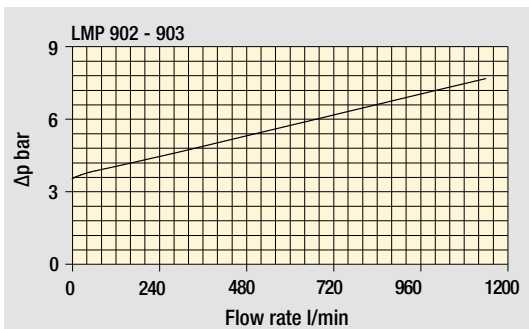
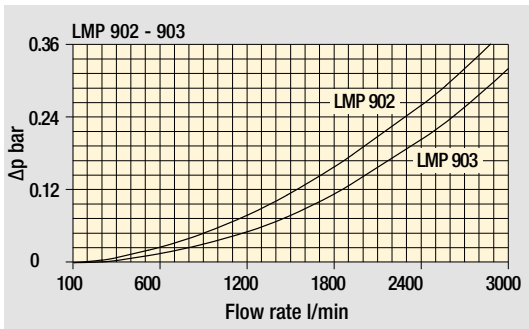
Filter series	Weights [kg]		Volumes [dm <sup>3</sup> ]	
	Length	2	Length	2
<b>LMP 902</b>		89.6		58
<b>LMP 903</b>		129.2		87

# GENERAL INFORMATION LMP 902-903

Filter element according to DIN 24550

Pressure drop

Filter housings  $\Delta p$  pressure drop



The curves are plotted using mineral oil with density of  $0.86 \text{ kg/dm}^3$  in compliance with ISO 3968.  $\Delta p$  varies proportionally with density.

Bypass valve pressure drop

Flow rates [l/min]

Filter series	Length	Filter element design - N Series						
		A03	A06	A10	A16	A25	M25 M60 M90 M250	
<b>LMP 902</b>	<b>2</b>	2217	2576	3241	3282	3506	3987	
<b>LMP 903</b>	<b>2</b>	2838	3170	3720	3755	3926	4278	

**Maximum flow rate for a complete low and medium pressure filter with a pressure drop  $\Delta p = 0.7 \text{ bar}$ .**

The reference fluid has a kinematic viscosity of  $30 \text{ mm}^2/\text{s}$  (cSt) and a density of  $0.86 \text{ kg/dm}^3$ .

For different pressure drop or fluid viscosity we recommend to use our selection software available on [www.mpfiltri.com](http://www.mpfiltri.com).

Please, contact our Sales Department for further additional information.

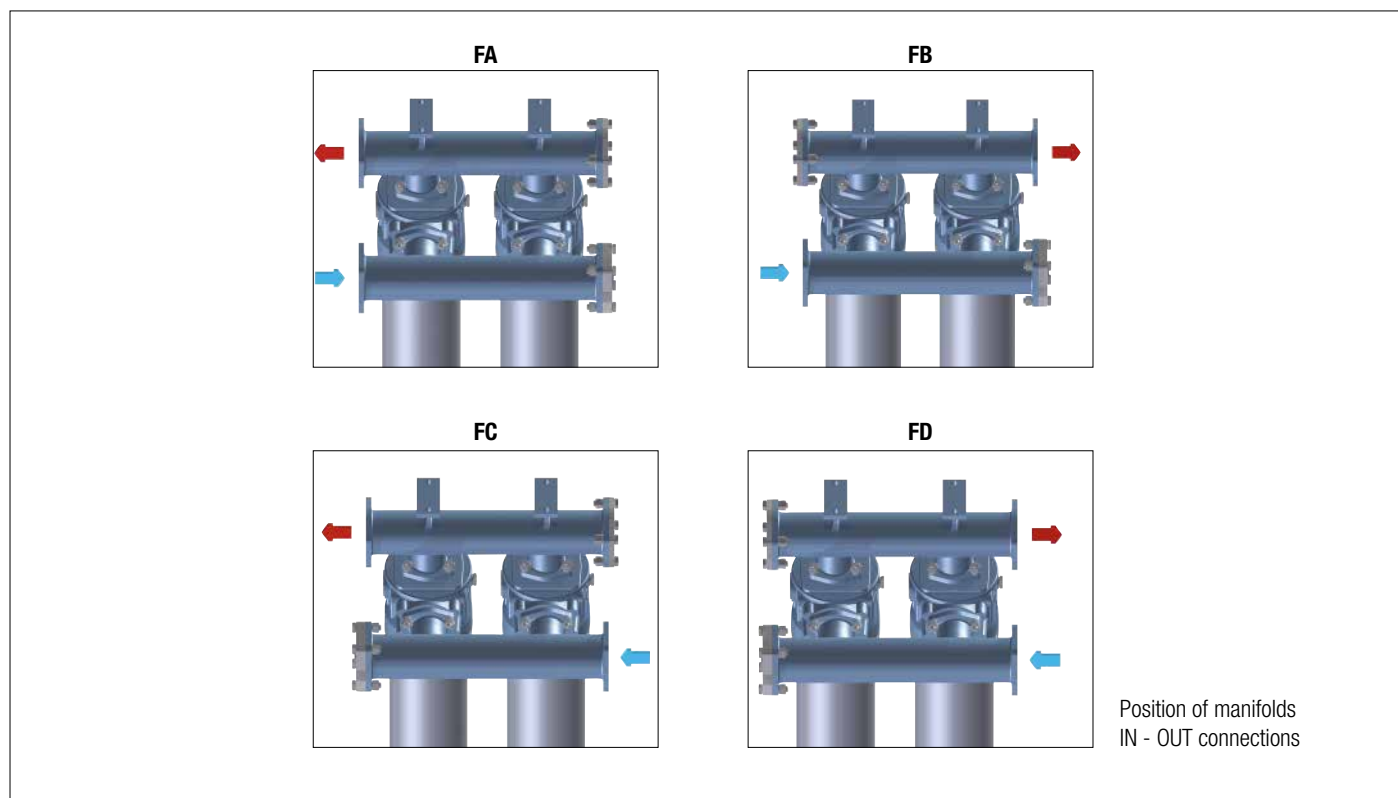
Hydraulic symbols

Filter series	Execution S	Execution B	Execution S	Execution B
<b>LMP 902</b>	•	•	•	•
<b>LMP 903</b>	•	•	•	•

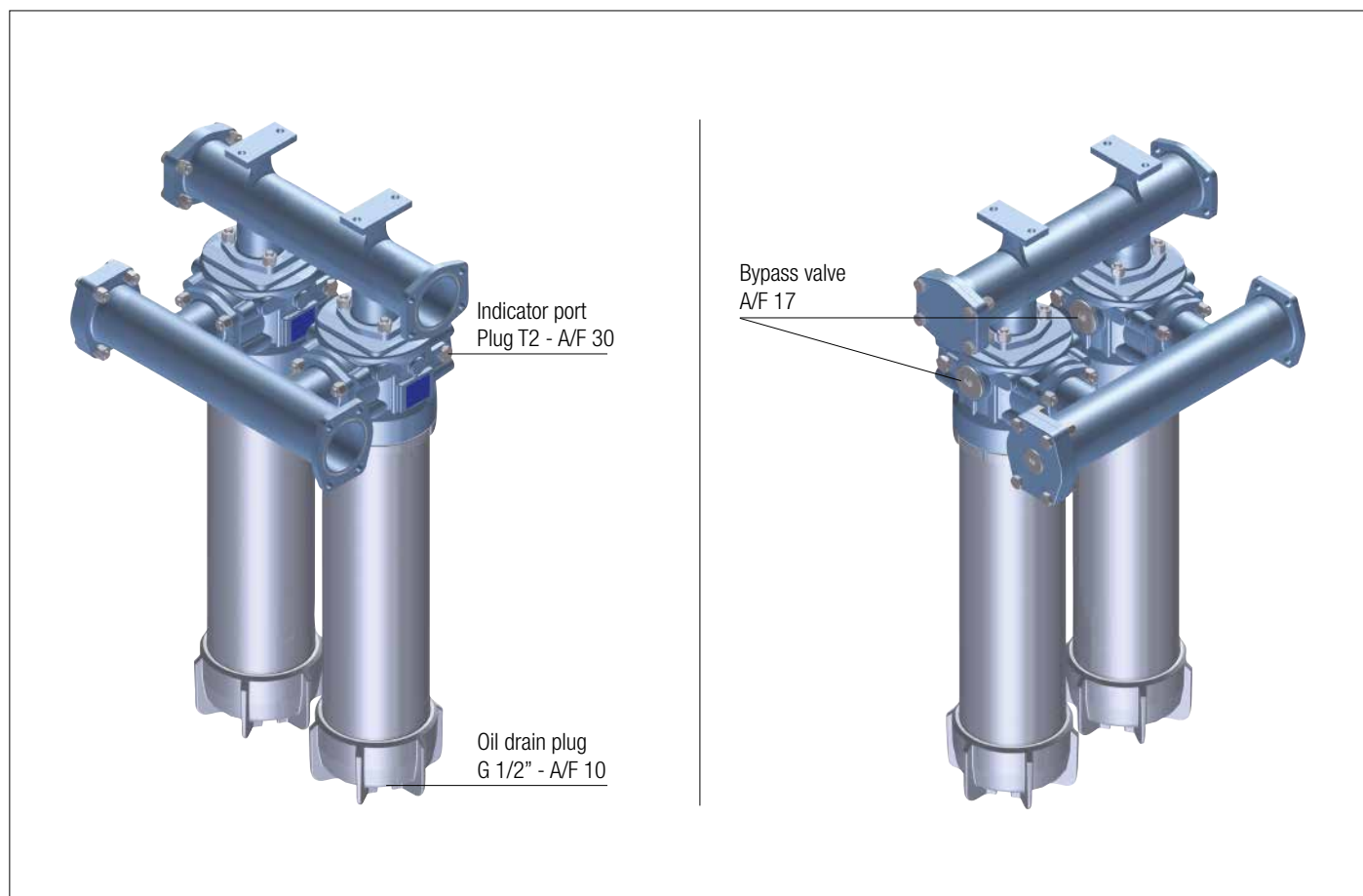
# LMP 902-903 GENERAL INFORMATION

Filter element according to DIN 24550

## Manifolds



## Focus on





# LMP 902-903 Filter element according to DIN 24550

## Designation & Ordering code

### COMPLETE FILTER

<b>Series and size</b>		Configuration example: <b>LMP902</b> <b>2</b> <b>B</b> <b>A</b> <b>FA</b> <b>A10</b> <b>N</b> <b>P01</b>							
<b>LMP902</b>   <b>LMP903</b>									
<b>Length</b>		<b>2</b>							
<b>Bypass valve</b>		<b>S</b> Without bypass <b>B</b> 3.5 bar							
<b>Seals and treatments</b>		<b>A</b> NBR <b>V</b> FPM							
<b>Connections</b>		<b>IN</b>	<b>OUT</b>						
<b>FA</b>	4" SAE 3000 psi	left	left						
<b>FB</b>	4" SAE 3000 psi	left	right						
<b>FC</b>	4" SAE 3000 psi	right	left						
<b>FD</b>	4" SAE 3000 psi	right	right						
<b>Filtration rating (filter media)</b>									
<b>A03</b>	Inorganic microfiber 3 µm	<b>M25</b>	Wire mesh 25 µm						
<b>A06</b>	Inorganic microfiber 6 µm	<b>M60</b>	Wire mesh 60 µm						
<b>A10</b>	Inorganic microfiber 10 µm	<b>M90</b>	Wire mesh 90 µm						
<b>A16</b>	Inorganic microfiber 16 µm								
<b>A25</b>	Inorganic microfiber 25 µm								
<b>WA025</b>		Water absorber inorganic microfiber 25 µm							
		<b>Element Δp</b>			<b>Execution</b>				
		<b>N</b> 20 bar			<b>P01</b> MP Filtri standard <b>Pxx</b> Customized				

### FILTER ELEMENT

<b>Element series and size</b>		Configuration example: <b>CU900</b> <b>A10</b> <b>A</b> <b>N</b> <b>P01</b>							
<b>CU900</b>									
<b>Filter series and size</b>									
<b>LMP902</b>	Nr. 4 filter elements								
<b>LMP903</b>	Nr. 6 filter elements								
<b>Filtration rating (filter media)</b>									
<b>A03</b>	Inorganic microfiber 3 µm	<b>M25</b>	Wire mesh 25 µm						
<b>A06</b>	Inorganic microfiber 6 µm	<b>M60</b>	Wire mesh 60 µm						
<b>A10</b>	Inorganic microfiber 10 µm	<b>M90</b>	Wire mesh 90 µm						
<b>A16</b>	Inorganic microfiber 16 µm								
<b>A25</b>	Inorganic microfiber 25 µm								
<b>WA025</b>		Water absorber inorganic microfiber 25 µm							
<b>Seals</b>		<b>A</b> NBR <b>V</b> FPM							
		<b>Element Δp</b>			<b>Execution</b>				
		<b>N</b> 20 bar			<b>P01</b> MP Filtri standard <b>Pxx</b> Customized				

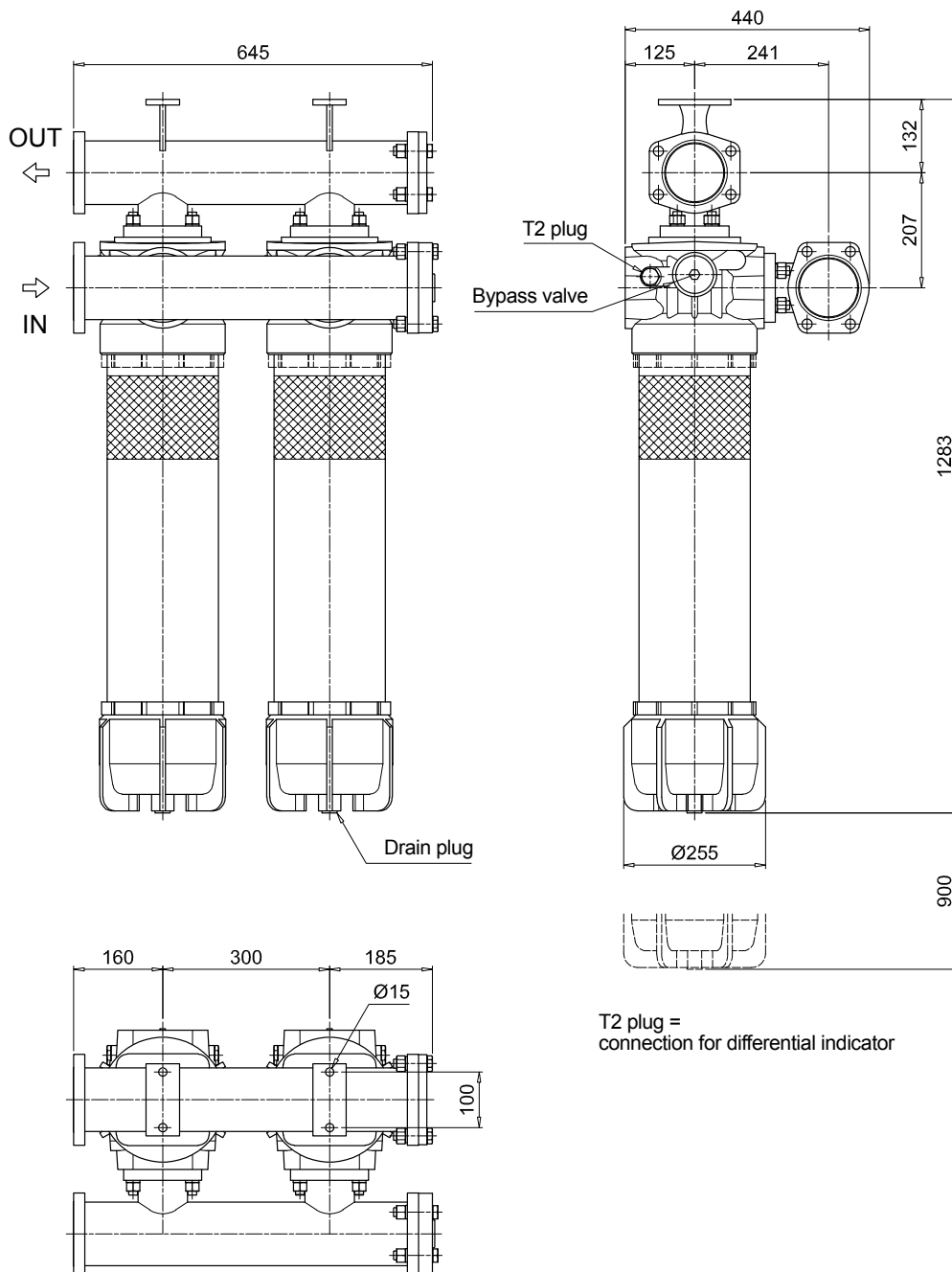
### ACCESSORIES

<b>Differential indicators</b>		page			page
<b>DEA</b>	Electrical differential indicator	445	<b>DTA</b>	Electronic differential indicator	448
<b>DEM</b>	Electrical differential indicator	445-446	<b>DVA</b>	Visual differential indicator	448
<b>DLA</b>	Electrical / visual differential indicator	446-447	<b>DVM</b>	Visual differential indicator	448
<b>DLE</b>	Electrical / visual differential indicator	447			
<b>Additional features</b>		page			
<b>T2</b>	Plug	449			

# Filter element according to DIN 24550 LMP 902-903

Dimensions

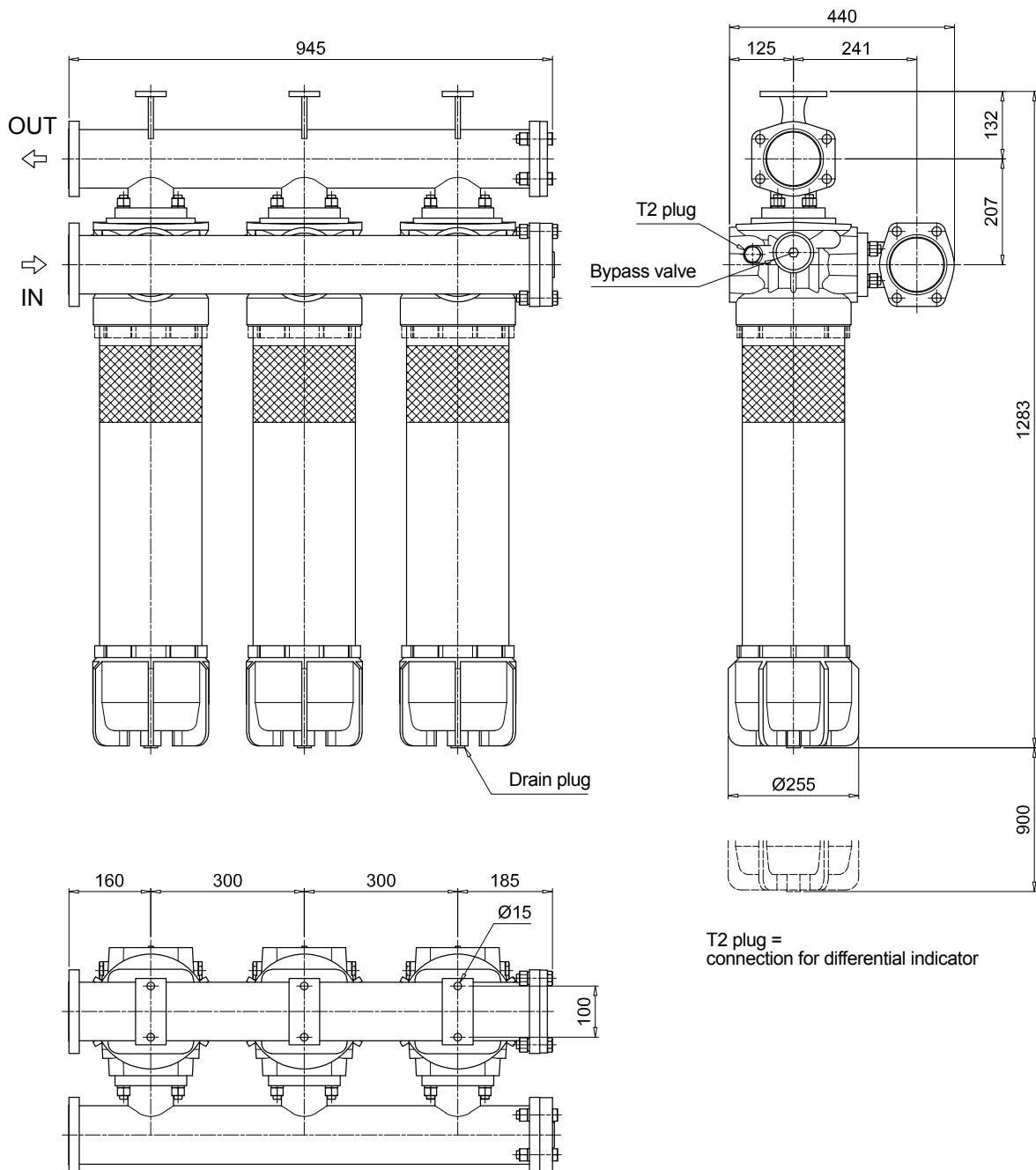
LMP902



# LMP 902-903 Filter element according to DIN 24550

## Dimensions

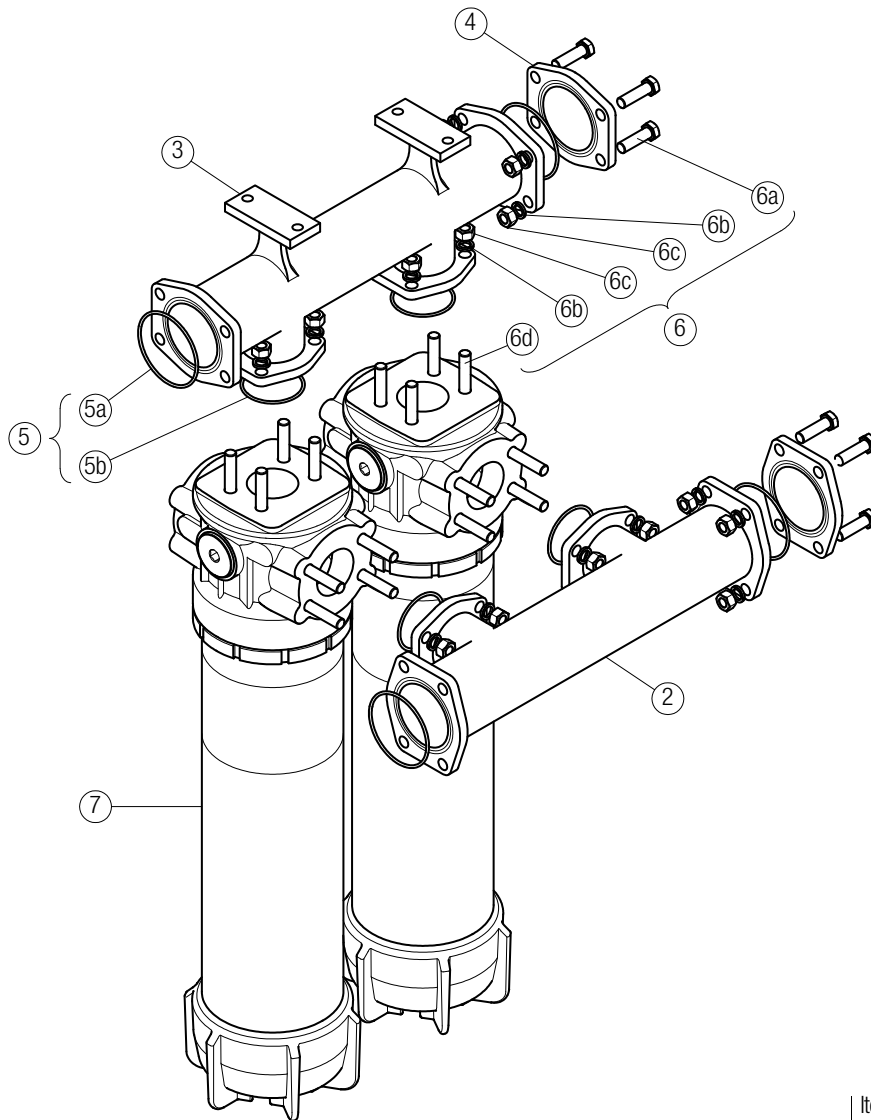
LMP903



# SPARE PARTS LMP 902-903

Order number for spare parts

LMP 902 - 903



Item 7:  
for complete filter code and  
spare parts, see  
LMP 900 - 901 series chapter

Quantity:  
- filter spare parts:  
LMP 902 - 2 pcs.  
LMP 903 - 3 pcs.

- filter seal kit:  
LMP 902 - 2 pcs.  
LMP 903 - 3 pcs.

Item:	2		3	4		5 (5a-5b)			6 (6a ÷ 6d)		7	
Filter series	Q.ty	Manifold IN	OUT	Q.ty	4" SAE 3000 psi plugged flange	Q.ty	Manifolds seal kit NBR	FPM	Q.ty	Threaded fasteners kit	Q.ty	Filter
LMP 902	1 pc.	01039270	01039271	2 pcs.	01042012	1 pc.	02050404	02050405	1 pc.	02049051	2 pcs.	LMP9012xxF1xxxNP02
LMP 903	1 pc.	01039337	01039338	2 pcs.		1 pc.	02050404	02050405	1 pc.	02049052	3 pcs.	



# Clogging indicators

## Differential indicators

### Introduction

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

These devices trip when the clogging of the filter element causes an increase in pressure drop across the filter element.

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

MP Filtri can supply differential pressure indicators with a visual, electrical or both signals.

### Suitable indicator types

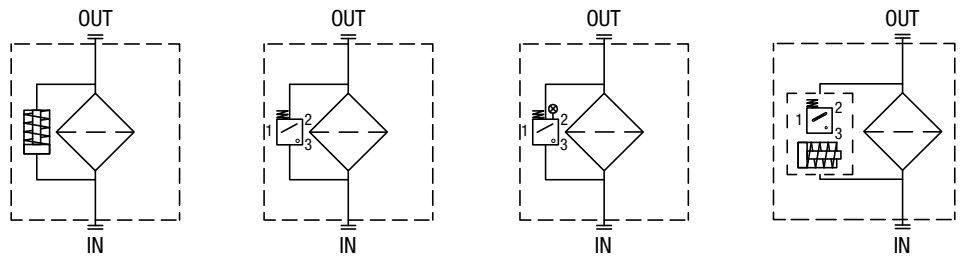
#### DIFFERENTIAL INDICATORS

Differential 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.

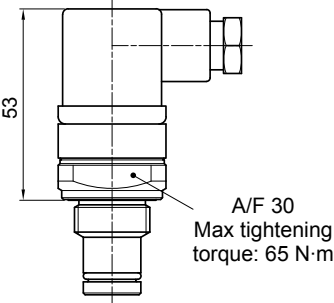
Also available in Stainless Steel models.



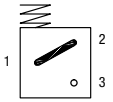
### Quick reference guide

Filter series	Visual indicator	Electrical indicator	Electrical / Visual indicator	Electronic indicator
With bypass valve LMP 110 - 112 - 116 - 118 - 119 MULTIPORT LMP 120 - 122 - 123 MULTIPORT 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 DEM20xAxxP01	DLA20xA51P01 DLA20xA52P01 DLA20xA71P01 DLE20xA50P01 DLE20xF50P01	DTA20xF70P01
Without bypass valve LMP 110 - 112 - 116 - 118 - 119 MULTIPORT LMP 120 - 122 - 123 MULTIPORT 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	DVA50xP01 DVM50xP01	DEA50xA50P01 DEM50xAxxP01	DLA50xA51P01 DLA50xA52P01 DLA50xA71P01 DLE50xA50P01 DLE50xF50P01	DTA50xF70P01

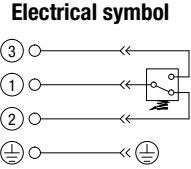
DEA*50	
<b>Electrical Differential Indicator</b>	
Settings	Ordering code
2 bar $\pm 10\%$	DE A 20 x A 50 P01
5 bar $\pm 10\%$	DE A 50 x A 50 P01



**Hydraulic symbol**



**Electrical symbol**



**Materials**

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

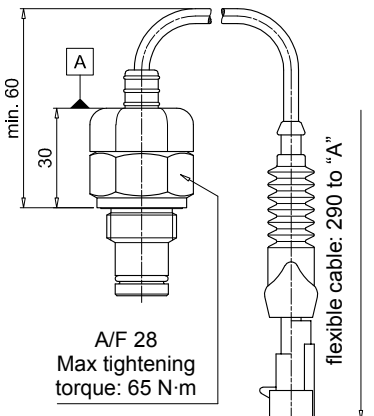
**Technical data**

- 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  
HFA, HFB, HFC according to ISO 2943
- Degree protection: IP66 according to EN 60529  
IP69K according to ISO 20653

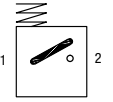
**Electrical data**

- Electrical connection: EN 175301-803
- Resistive load: 0.2 A / 115 Vdc

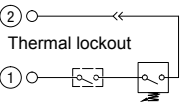
DEM*10	
<b>Electrical Differential Indicator</b>	
Settings	Ordering code
2 bar $\pm 10\%$	DE M 20 x x 10 P01
5 bar $\pm 10\%$	DE M 50 x x 10 P01



**Hydraulic symbol**



**Electrical symbol**



**Materials**

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

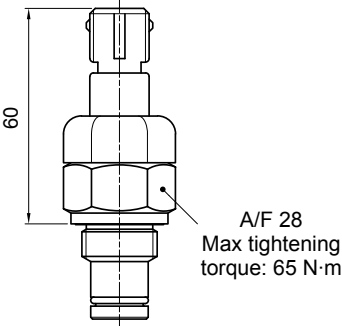
**Technical data**

- 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  
HFA, HFB, HFC according to ISO 2943
- Degree protection: IP66 according to EN 60529

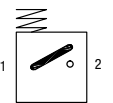
**Electrical data**

- 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")

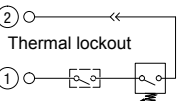
DEM*20	
<b>Electrical Differential Indicator</b>	
Settings	Ordering code
2 bar $\pm 10\%$	DE M 20 x x 20 P01
5 bar $\pm 10\%$	DE M 50 x x 20 P01



**Hydraulic symbol**



**Electrical symbol**



**Materials**

- Body: Brass
- Base: Black Nylon
- 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  
HFA, HFB, 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)
- Thermal lockout: Normally open up to 30 °C (option "F")

# DIFFERENTIAL INDICATORS

## Dimensions

DEM*30	
<b>Electrical Differential Indicator</b>	
Settings	Ordering code
2 bar $\pm$ 10%	DE M 20 x x 30 P01
5 bar $\pm$ 10%	DE M 50 x x 30 P01
<p>A/F 28 Max tightening torque: 65 N·m</p>	
<p><b>Hydraulic symbol</b></p>	
<p><b>Electrical symbol</b></p> <p>Thermal lockout</p>	
<p><b>Materials</b></p> <ul style="list-style-type: none"> <li>- Body: Brass</li> <li>- Base: Black Nylon</li> <li>- Contacts: Silver</li> <li>- Seal: HNBR - FPM</li> </ul>	
<p><b>Technical data</b></p> <ul style="list-style-type: none"> <li>- Max working pressure: 420 bar</li> <li>- Proof pressure: 630 bar</li> <li>- Burst pressure: 1260 bar</li> <li>- Working temperature: From -25 °C to +110 °C</li> <li>- Compatibility with fluids: Mineral oils, Synthetic fluids HFA, HFB, HFC according to ISO 2943</li> <li>- Degree protection: IP66 according to EN 60529</li> </ul>	
<p><b>Electrical data</b></p> <ul style="list-style-type: none"> <li>- Electrical connection: Deutsch DT-04-2-P</li> <li>- Resistive load: 0.2 A / 115 Vdc</li> <li>- Switching type: Normally open contacts (NC on request)</li> <li>- Thermal lockout: Normally open up to 30 °C (option "F")</li> </ul>	

DEM*35	
<b>Electrical Differential Indicator</b>	
Settings	Ordering code
2 bar $\pm$ 10%	DE M 20 x x 35 P01
5 bar $\pm$ 10%	DE M 50 x x 35 P01
<p>min. 60 30 flexible cable: 240 to "A" A/F 28 Max tightening torque: 65 N·m</p>	
<p><b>Hydraulic symbol</b></p>	
<p><b>Electrical symbol</b></p> <p>Thermal lockout</p>	
<p><b>Materials</b></p> <ul style="list-style-type: none"> <li>- Body: Brass</li> <li>- Base: Black Nylon</li> <li>- Contacts: Silver</li> <li>- Seal: HNBR - FPM</li> </ul>	
<p><b>Technical data</b></p> <ul style="list-style-type: none"> <li>- Max working pressure: 420 bar</li> <li>- Proof pressure: 630 bar</li> <li>- Burst pressure: 1260 bar</li> <li>- Working temperature: From -25 °C to +110 °C</li> <li>- Compatibility with fluids: Mineral oils, Synthetic fluids HFA, HFB, HFC according to ISO 2943</li> <li>- Degree protection: IP66 according to EN 60529</li> </ul>	
<p><b>Electrical data</b></p> <ul style="list-style-type: none"> <li>- Electrical connection: Deutsch DT-04-3-P</li> <li>- Resistive load: 0.2 A / 115 Vdc</li> <li>- Switching type: SPDT contact</li> <li>- Thermal lockout: Normally open up to 30 °C (option "F")</li> </ul>	

DLA*51 - DLA*52	
<b>Electrical/Visual Differential Indicator</b>	
Settings	Ordering code
2 bar $\pm$ 10%	DL A 20 x A x x P01
5 bar $\pm$ 10%	DL A 50 x A x x P01
<p>A/F 30 Max tightening torque: 65 N·m</p>	
<p><b>Hydraulic symbol</b></p>	
<p><b>Electrical symbol</b></p>	
<p><b>Materials</b></p> <ul style="list-style-type: none"> <li>- Body: Brass</li> <li>- Base: Transparent Nylon</li> <li>- Contacts: Silver</li> <li>- Seal: HNBR - FPM</li> </ul>	
<p><b>Technical data</b></p> <ul style="list-style-type: none"> <li>- Max working pressure: 420 bar</li> <li>- Proof pressure: 630 bar</li> <li>- Burst pressure: 1260 bar</li> <li>- Working temperature: From -25 °C to +110 °C</li> <li>- Compatibility with fluids: Mineral oils, Synthetic fluids HFA, HFB, HFC according to ISO 2943</li> <li>- Degree protection: IP66 according to EN 60529 IP69K according to ISO 20653</li> </ul>	
<p><b>Electrical data</b></p> <ul style="list-style-type: none"> <li>- Electrical connection: EN 175301-803</li> <li>- Type: 51                      52</li> <li>- Lamps: 24 Vdc              110 Vdc</li> <li>- Resistive load: 1 A / 24 Vdc      1 A / 110 Vdc</li> </ul>	

**DLA\*71**

**Electrical/Visual Differential Indicator**

Settings	Ordering code
2 bar ±10%	DL A 20 x A 71 P01
5 bar ±10%	DL A 50 x A 71 P01

**Hydraulic symbol**

**Electrical symbol**

**Materials**

- Body: Brass
- Base: Black Nylon
- 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  
HFA, HFB, HFC according to ISO 2943
- Degree protection: IP65 according to EN 60529  
IP69K according to ISO 20653

**Electrical data**

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

**DLE\*A50**

**Electrical/Visual Differential Indicator**

Settings	Ordering code
2 bar ±10%	DL E 20 x A 50 P01
5 bar ±10%	DL E 50 x A 50 P01

**Hydraulic symbol**

**Electrical symbol**

**Materials**

- Body: Brass
- Base: Black Nylon
- 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  
HFA, HFB, 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
- Available the connector with lamps

**DLE\*F50**

**Electrical/Visual Differential Indicator**

Settings	Ordering code
2 bar ±10%	DL E 20 x F 50 P01
5 bar ±10%	DL E 50 x F 50 P01

**Hydraulic symbol**

**Electrical symbol**

**Materials**

- Body: Brass
- Base: Black Nylon
- 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  
HFA, HFB, HFC according to ISO 2943
- Degree protection: IP65 according to EN 60529

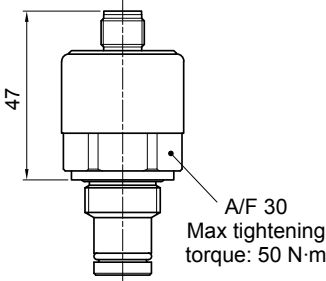
**Electrical data**

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

# DIFFERENTIAL INDICATORS

## Dimensions

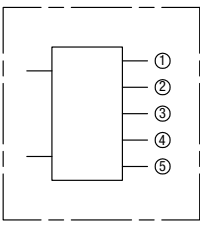
DTA*70	
<b>Electronic Differential Indicator</b>	
Settings	Ordering code
2 bar $\pm 10\%$	DT A 20 x x 70 P01
5 bar $\pm 10\%$	DT A 50 x x 70 P01



47

A/F 30  
Max tightening torque: 50 N-m

**Hydraulic symbol**



**Electrical symbol**

①	○	○	+24 Vdc
②	○	○	4 ÷ 20 mA
③	○	○	75% - N.O. Digital output
④	○	○	100% - N.O. Digital output
⑤	○	○	0 Vdc

**Materials**


- Body: Brass
- Internal parts: Brass - Nylon
- Contacts: Silver
- Seal: HNBR - FPM

**Technical data**

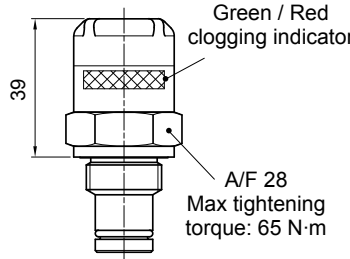
- Max working pressure: 420 bar
- Proof pressure: 630 bar
- Burst pressure: 1260 bar
- Compatibility with fluids: Mineral oils, Synthetic fluids HFA, HFB, HFC according to ISO 2943
- Degree protection: IP67 according to EN 60529

**Electrical data**

- Electrical connection: IEC 61076-2-101 D (M12)
- Power supply: 24 Vdc
- Analogue output: From 4 to 20 mA
- Thermal lockout: 30 °C (all output signals stalled up to 30 °C)



DVA	
<b>Visual Differential Indicator</b>	
Settings	Ordering code
2 bar $\pm 10\%$	DV A 20 x P01
5 bar $\pm 10\%$	DV A 50 x P01

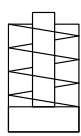


39

Green / Red clogging indicator

A/F 28  
Max tightening torque: 65 N-m

**Hydraulic symbol**



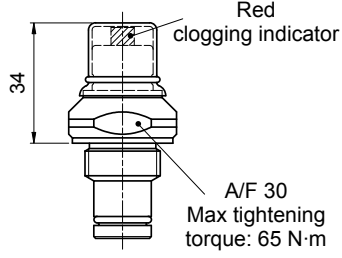
**Materials**

- Body: Brass
- Internal parts: Brass - Nylon
- Contacts: Silver
- Seal: HNBR - FPM

**Technical data**

- Reset: Automatic reset
- 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 HFA, HFB, HFC according to ISO 2943
- Degree protection: IP65 according to EN 60529

DVM	
<b>Visual Differential Indicator</b>	
Settings	Ordering code
2 bar $\pm 10\%$	DV M 20 x P01
5 bar $\pm 10\%$	DV M 50 x P01

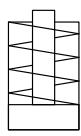


34

Red clogging indicator

A/F 30  
Max tightening torque: 65 N-m

**Hydraulic symbol**



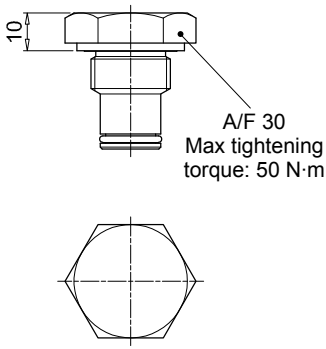
**Materials**

- Body: Brass
- Internal parts: Brass - Nylon
- Contacts: Silver
- Seal: HNBR - FPM

**Technical data**

- Reset: Manual reset
- 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 HFA, HFB, HFC according to ISO 2943
- Degree protection: IP65 according to EN 60529

T2	
<b>Indicator plug</b>	
Seal	Ordering code
HNBR	T2 H
FPM	T2 V



**Materials**

- Body: Phosphatized steel
- Seal: HNBR / FPM

### DESIGNATION & ORDERING CODE - DIFFERENTIAL INDICATORS

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

	Type	DE	DL	DT	DV				
<b>A</b>	Standard type	•	•	•	•	<b>A</b>	With automatic reset		
<b>M</b>	With wired electrical connection	•				<b>M</b>	With manual reset		
<b>E</b>	For high power supply		•						

Pressure setting
<b>20</b> 2 bar
<b>50</b> 5 bar

Seals
<b>H</b> HNBR
<b>V</b> FPM

Thermostat						
<b>A</b> Without	DEA	DEM	DLA	DLE	DT	DV
<b>F</b> With thermostat	•	•	•	•	•	•

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

Option
<b>P01</b> MP Filtri standard
<b>Pxx</b> Customized

### DESIGNATION & ORDERING CODE - DIFFERENTIAL INDICATOR PLUG

<b>Series</b>	Configuration example	T2	H
<b>T2</b> Indicator plug			

Seals
<b>H</b> HNBR
<b>V</b> FPM

**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.**



# Clogging Indicators





# Clogging indicators



## Suitable indicator types

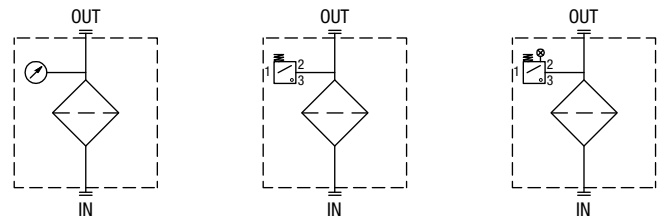
### VACUUM INDICATORS

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.

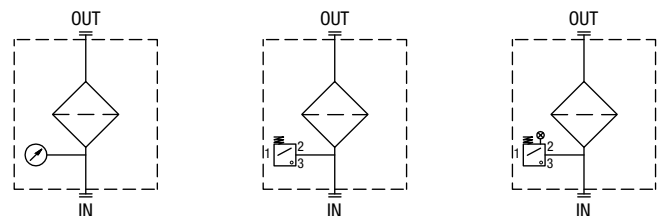


### BAROMETRIC INDICATORS

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.



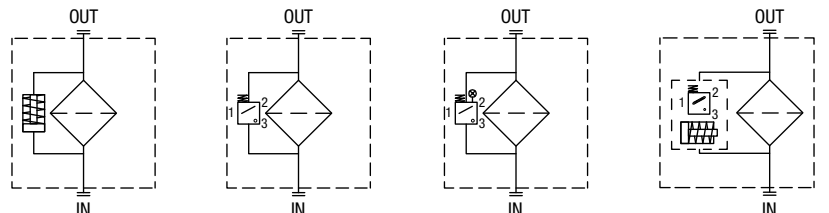
### DIFFERENTIAL INDICATORS

Differential 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.



Filter family	Filter series	Visual indicator	Electrical indicator	Electrical / Visual indicator	Electronic indicator
SUCTION FILTERS	SF2 250 - 350 SF2 500 - 501 - 503 - 504 - 505 SF2 510 - 535 - 540	WA16P01 VVR16P01	VEA21AA50P01	VLA21AA51P01 VLA21AA52P01 VLA21AA53P01 VLA21AA71P01	
RETURN FILTERS	MPFX-MPTX-MPF-MPT with bypass 1.75 bar MPH with bypass 1.75 bar	BVA14P01 BVR14P01 BVP20HP01 BVQ20HP01	BEA15HA50P01 BEM15HA41P01	BLA15HA51P01 BLA15HA52P01 BLA15HA53P01 BLA15HA71P01	
	MPFX-MPTX-MPF-MPT with bypass 3 bar MPH with bypass 2.5 bar FRI 255	BVA25P01 BVR25P01 BVP20HP01 BVQ20HP01	BEA20HA50P01 BEM20HA41P01	BLA20HA51P01 BLA20HA52P01 BLA20HA53P01 BLA20HA71P01	
	MPLX FRI 025 - 040 - 100 - 250 - 630 - 850	DVA20xP01 DVM20xP01	DEA20xA50P01 DEM20xAxxP01	DLA20xA51P01 DLA20xA52P01 DLA20xA71P01 DLE20xA50P01 DLE20xF50P01	DTA20xF70P01
RETURN / SUCTION FILTERS	Suction line MRSX 116 - 165 - 166	WB16P01 VVS16P01	VEB21AA50P01	VLB21AA51P01 VLB21AA52P01 VLB21AA53P01 VLB21AA71P01	
	Return line MRSX 116 - 165 - 166 LMP 124 MULTIPOINT	BVA25P01 BVR25P01 BVP20HP01 BVQ20HP01	BEA25HA50P01 BEM25HA41P01 BET25HF10P01 BET25HF30P01 BET25HF50P01	BLA25HA51P01 BLA25HA52P01 BLA25HA53P01 BLA25HA71P01	
SPIN-ON FILTERS	Suction line MPS 050 - 070 - 100 - 150 MPS 200 - 250 - 300 - 350	VWB16P01 VVS16P01	VEB21AA50P01	VLB21AA51P01 VLB21AA52P01 VLB21AA53P01 VLB21AA71P01	
	Return line MPS 050 - 070 - 100 - 150 MPS 200 - 250 - 300 - 350	BVA14P01 BVR14P01 BVP20HP01 BVQ20HP01	BEA15HA50P01 BEM15HA41P01	BLA15HA51P01 BLA15HA52P01 BLA15HA53P01 BLA15HA71P01	
	In-line MPS 051 - 071 - 101 - 151 MPS 301 - 351 MSH 050 - 070 - 100 - 150	DVA12xP01 DVM12xP01	DEA12xA50P01 DEM12xAxxP01	DLA12xA51P01 DLA12xA52P01 DLA12xA71P01 DLE12xA50P01 DLE12xF50P01	
LOW & MEDIUM PRESSURE FILTERS	With bypass valve LMP 110 - 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 DEM20xAxxP01	DLA20xA51P01 DLA20xA52P01 DLA20xA71P01 DLE20xA50P01 DLE20xF50P01	DTA20xF70P01
	Without bypass valve LMP 110 - 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	DVA50xP01 DVM50xP01	DEA50xA50P01 DEM50xAxxP01	DLA50xA51P01 DLA50xA52P01 DLA50xA71P01 DLE50xA50P01 DLE50xF50P01	DTA50xF70P01
HIGH PRESSURE FILTERS	With bypass valve FMP 039 - 065 - 135 - 320 FHP 010 - 011 - 065 - 135 - 320 - 500 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 DEM50xAxxP01	DLA50xA51P01 DLA50xA52P01 DLA50xA71P01 DLE50xA50P01 DLE50xF50P01	DEH50xA48P01 DEH50xA49P01 DEH50xA70P01 DEH70xA48P01 DEH70xA49P01 DEH70xA70P01
	Without bypass valve FMP 039 - 065 - 135 - 320 FHP 010 - 011 - 065 - 135 - 320 - 500 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 DVM70xP01	DEA70xA50P01 DEM70xAxxP01	DLA70xA51P01 DLA70xA52P01 DLA70xA71P01 DLE70xA50P01 DLE70xF50P01	DEH50xA48P01 DEH50xA49P01 DEH50xA70P01 DEH70xA48P01 DEH70xA49P01 DEH70xA70P01
STAINLESS STEEL HIGH PRESSURE FILTERS	With bypass valve FZH 010 - 011 - 039 FZP 039 - 136 FZX 011 FZB 039 FZM 039 FZD 051	DVX50xP01 DVY50xP01	DEX50xA50P01	DLX50xA51P01 DLX50xA52P01	DEH50xA48P01 DEH50xA49P01 DEH50xA70P01 DEH70xA48P01 DEH70xA49P01 DEH70xA70P01
	Without bypass valve FZH 010 - 011 - 039 FZP 039 - 136 FZB 039 FZM 039 FZD 010 - 021 - 051	DVX70xP01 DVY70xP01	DEX70xA50P01	DLX70xA51P01 DLX70xA52P01	DEH50xA48P01 DEH50xA49P01 DEH50xA70P01 DEH70xA48P01 DEH70xA49P01 DEH70xA70P01

**Hazardous area electronic indicator**

**NEW**









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## WORLDWIDE NETWORK

### HEADQUARTERS

**MP Filtri S.p.A.**  
Via 1° Maggio, 3  
20060 Pessano con Bornago  
Milano - Italy

### BRANCH OFFICES

**MP Filtri U.K. Ltd.**  
Bourton Industrial Park  
Bourton on the Water  
GL54-2HQ Gloucestershire

**MP Filtri Canada Inc.**  
8831 Keele Street  
Concord, Ontario  
L4K 2N1 - Canada

**MP Filtri Germany GmbH**  
Hans-Wilhelmi-Straße  
DE-66386 St. Ingbert

**ITALFILTRI LLC**  
**Russian Federation**  
Yurievsky Pereulok 13 a, Building 1  
111020 Moscow - Russia

**MP Filtri France SAS**  
Parc d'activités des Chanteraines  
8 rue du Commandant d'Estienne d'Orves  
Immeuble D3  
92390 Villeneuve la Garenne

**MP Filtri (Shanghai) Co., Ltd.**  
1280 Lianxi Road, Bld 8 - 2nd Floor  
Shanghai - Pudong  
201204 China

**MP Filtri U.S.A. Inc.**  
2055 Quaker Pointe Drive  
Quakertown, PA 18951

**MP Filtri India Pvt. Ltd.**  
Plot-7F, Raj Pinnacle,  
Beside RMZ Centennial  
Brookefield Road, Whitefield  
560048 Bangalore

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