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CMP 1007 UK 001 B

SERIES
INLINE FILTERS
LMP

Maximum pressure 60 bar

Maximum flow to 3000 l/min

MP FILTRI s.p.a ®

Production Programme

Contamination monitoring products

- Particle counters calibrated to ISO 11171
- On-line and In-line counting to 400 bar
- Bottle sampler options
- Mobile designs RS 232 - RS 485 digital bus interface

Suction filters

- Flow rates to 620 l/min

Mounting:

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

Return Filters

- Flow rates to 1500 l/min
- Pressure to 20 bar

Mounting:

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

Pressure Filters

- Flow rates to 700 l/min
- Pressure from 110 bar to 420 bar

Mounting:

- In-line
- Manifold
- In single and duplex designs

Spin-On filters

- Flow rates to 300 l/min
- Pressure to 35 bar

Mounting:

- In-line
- Tank top

Production Programme

Stainless Steel Pressure Filters

- Flow rates to 100 l/min
- Pressure from 350 bar to 700 bar

Mounting:

- In-line
- Manifold
- In single and duplex designs

In-line filters

- Flow rates to 3000 l/min
- Pressures to 60 bar

Mounting:

- In-line
- Parallel manifold version
- In single and duplex designs

Filtration units

- Flow rates from 15 l/min to 200 l/min
- In static and mobile style

Accessories

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

Mechanical Products

- Aluminium bell housings for motors from 0.12 Kw to 400 Kw
- Couplings in aluminium - cast iron - steel
- Damping rings
- Support feet
- Aluminium tanks
- Inspection doors

Foreword

Filters are essential components in hydraulic systems since they perform a role of primary importance **"Cleaning of the fluid"**. Hydraulic systems require filtration products in order to reduce and maintain particulate contamination in-line with the ISO 4406 cleanliness code.

In-line filters in single and duplex designs are designed and built to meet market demands for applications in high pressure, Off-Line and in-line hydraulic systems.
Studies conducted by our R&D department on filter bodies and filter elements led to the development of a line of products offering excellent technical features including a reduction in pressure drops combined with high dirt holding capacity of the filter elements.

The choice of filter for a given application must take into account the technical characteristics of the hydraulic system and its components in relation to the work to be performed.

Filter selection and sizing parameters

1.	Application type	
2.	Type of filter(s)	
3.	Sensitivity of components:	**to ISO 4406 class x / x / x**
4.	Filtration efficiency:	**μm $\beta_{x\,(c)} \geq 1.000$**
5.	Fluid type:	**HLP - HFC - HFD others**
6.	Kinematic viscosity:	**mm^2 / sec (cSt)**
7.	Operating temperature:	**min - max °C (°K)**
8.	Working pressure:	**bar (MPa)**
9.	Effective flow rate:	**l / min**
10.	Maximum pressure drop:	**Δp bar (MPa)**
11.	Bypass valve:	**with / without**
12.	Differential indicator:	**pressure differential type Δp bar (MPa)**

Index

Head at top
In-line connection
Series **LMP400**
LMP900

Head at top
90° connection
Series **LMP401**
LMP901

Head at bottom
In-line connection
Series **LMP430**
LMP950

Head at bottom
90° connection
Series **LMP431**
LMP951

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Filter elements	8
Sizing	10
Differential indicators	12
SAE flanges	19

FILTER

LMP	210	In-line filter working pressure	60 bar	20
LMP	400	In-line filter working pressure	60/50 bar	26
LMD	400/01/31	In-line filter working pressure	16 bar	38
LMP	900	In-line filter working pressure	30 bar	50
LMP	902-903	In-line filter working pressure	25 bar	60
LMP	950	In-line filter working pressure	30 bar	68
LMP	952-956	In-line filter working pressure	25 bar	76
LMD	951-953	In-line duplex filter working pressure	16 bar	88

	Fixing accessories	100
	Operation and maintenance	102

Foreword

Installation in open circuits:

Positioning

Return filter mounted externally from the tank

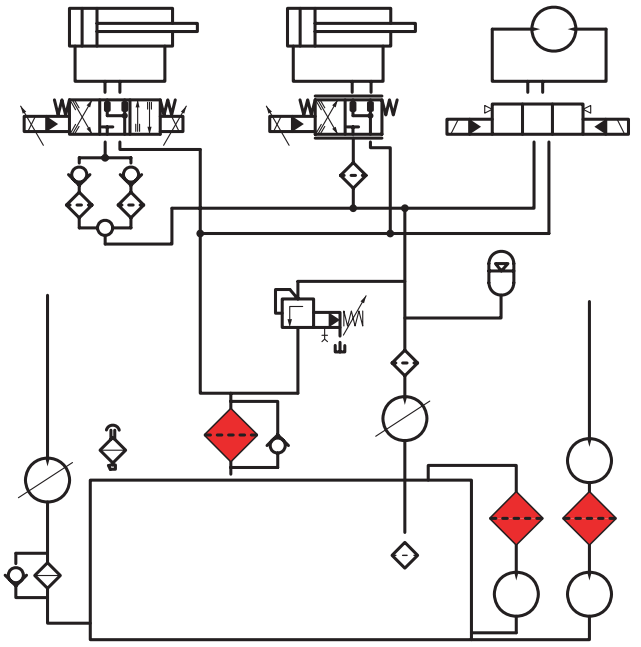
For large size systems.
For flushing systems.

Off-line filter

For fluid power plants.
For test benches.

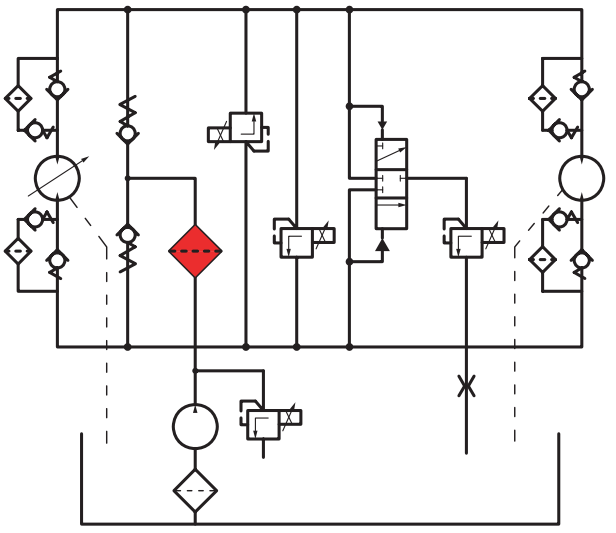
Over-boost filter

Positioning between the boost pump and piston pump.



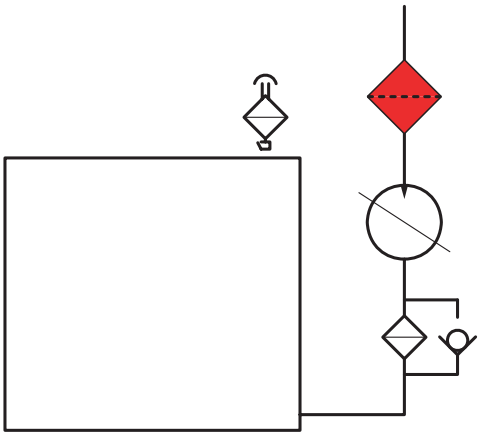
Installations in closed circuits with the following functions:

Working filter: down-stream from the hydrostatic transmission boost pump.



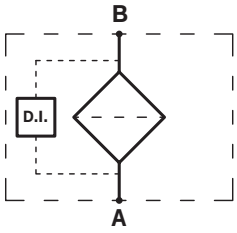
Installations in forced lubrication circuits:

In-line filter for low and medium pressures: protection of individual components or actuator.



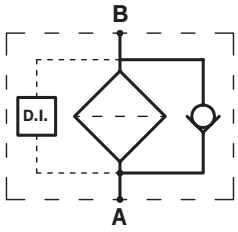
HYDRAULIC SCHEMATICS

Style **S**



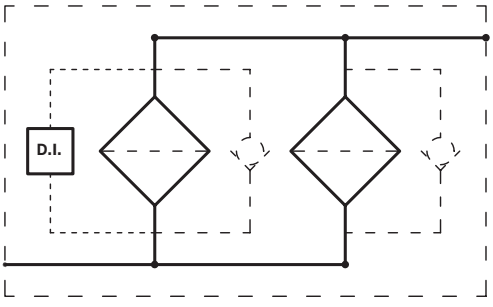
Filter without bypass valve, the entire flow must pass through the cartridge for maximum protection of the system in all operating conditions.

Style **B**



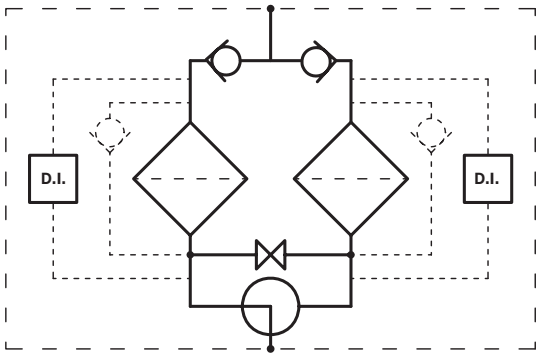
Filter with bypass valve, standard opening Δp 3.5 bar, filtration cannot be assured in all operating conditions. The flow that passes through the bypass valve is proportional to the differential pressure caused by clogging of the cartridge and variations in fluid viscosity related to temperature (see cold starts).

Manifold version



Filters with or without bypass valves, standard opening Δp 3.5 bar, mounted in parallel on 2 to 6 position multiple manifolds.
Single differential indicator required.

Duplex filter



Duplex filter with or without bypass valve, standard opening Δp 3.5 bar.
Two differential clogging indicators required.
The filter is composed of a ball valve on the inlet connection, in 3-way execution layout “L” negative overlap, balancing connection between the two filters and double check valve on the outlet connection.

Filter elements

Description

The filter elements are available with surface and depth filtration media.

Surface media are made of stainless steel wire mesh, nominal filtration.

Depth filtration media are made of inorganic fibre impregnated with epoxy resins, absolute filtration.

Differential collapse pressure

Mesh M	Δp 20 bar	Serie N
Fibre A	Δp 20 bar	Serie N
Cellulose P	Δp 20 bar	Serie N
Mesh M	Δp 20 bar	Serie W
Fibre A	Δp 20 bar	Serie W

Support tubes - steel with heat-chemical treatment.
Inner support tube - steel with heat-chemical treatment.

Compatibility with fluids and filter elements Series N

- The filter elements are compatible with:
  Mineral oils to ISO 2943 - 4
  Synthetic fluids.
- Seals, standard in NBR compatible with:
  Mineral oils to ISO 2943 - 4
  Synthetic fluids.
- FPM seals (test to ISO 2943), compatible with:
  Synthetic fluids type HS-HFDR-HFDS-HFDU
  To ISO 6743 - 4.

Compatibility with fluids and W series filter elements

- The filter elements are compatible with:
  Mineral oils to ISO 2943 - 4
  Aqueous emulsions
  Synthetic fluids, water and glycol.
- Seals, standard in NBR compatible with:
  Mineral oils to ISO 2943 - 4
  Aqueous emulsions
  Synthetic fluids, water and glycol.
- FPM seals (test to ISO 2943), compatible with:
  Synthetic fluids type HS-HFDR-HFDS-HFDU
  To ISO 6743 - 4.
  To ISO 2943

N.B. P series cellulose cartridges are compatible only with mineral oils to ISO 2943 - 4.

Composition of filtration media

Series N-W: mesh M (style M25)
Internal support mesh, filtration mesh, external support mesh.

Series N-W: Fibre A
Internal support mesh, filter media support, filtration media, prefilter media, external support mesh.

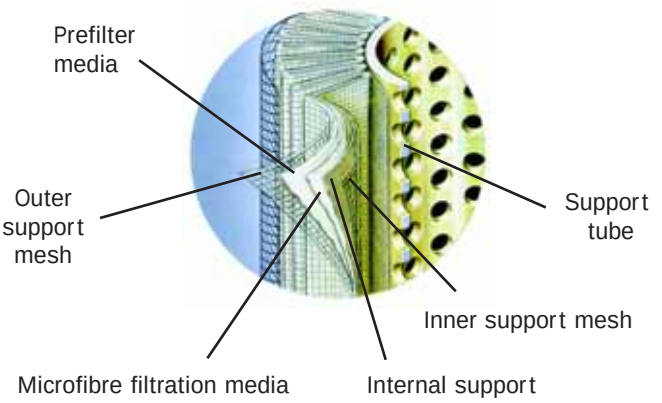
Series N: Cellulose P
Internal support mesh, cellulose filtration media, external support mesh.

Reference standards

All filter elements comply with the following **ISO** standards.

ISO	**2941**	- Collapse and burst resistance
ISO	**2942**	- Bubble point test resistance.
ISO	**2943**	- Compatibility with fluids.
ISO	**3723**	- Resistance to axial deformation.
ISO	**3724**	- Fatigue test with flow.
ISO	**3968**	- Pressure drop.
ISO	**16889**	- Filtration efficiency by means of Multipass.

Inorganic microfibre



Multipass test in compliance with new ISO 16889 standard. Contaminant ISO MTD							Multipass test in compliance with original ISO 4572 standard. Contaminant ACFTD	
Value β	2	10	75	100	200	1000	Value β	200
Filtration efficiency in %	50%	90%	98.70%	99%	99.50%	99.90%	Filtration efficiency in %	99.50%
Filter element			(µm ©)					µm
A03	<3	<3	<3	<3	3.30	4.2	A03 3 µm	3
A06	<3	<3	4.31	4.53	5.07	6.3	A06 6 µm	6
A10	<6	<6	6.12	6.41	7.12	9.0	A10 10 µm	10
A16	<7	<7	10.45	10.97	12.13	13.9	A16 16 µm	16
A25	<9	12.34	15.82	16.30	17.46	19.3	A25 25 µm	25

The above data are referred to a final Δp value of 16 bar

Characteristics of filter elements with nominal filtration, M series

For the square stainless steel wire mesh, filtration degree is defined as the maximum diameter of a sphere corresponding to the mesh size, in microns.

Characteristics of filter elements with nominal filtration, P series

For cellulose cartridges, filtration efficiency expressed in micron is to be construed as nominal $\beta_{X©} > 2$

International standards for fluid contamination control

Components	Recommended filtrations								
Servo valves			●	●	●				
Proportional Valves				●	●	●			
Variable displacement pumps.					●	●	●		
Cartridge valves						●	●	●	
Piston pumps						●	●	●	
Vane pumps							●	●	●
Pressure / flow rate control valves							●	●	●
Solenoid valves							●	●	●
ISO code	12/10/7	13/11/8	14/12/9	15/13/10	16/14/11	17/15/12	18/16/13	19/17/14	20/18/15
NAS code	1	2	3	4	5	6	7	8	9
Absolute filtration recommended	3 micron				6 micron		10 micron		>10

Microfibre filter elements tested in collaboration with the following independent institutes.

Institute of Filtration (France) I.F.T.S.

VETENSKAP OCH KONST KUNGL TEKNISKA HÖGSKOLAN
Royal Institute of Technology

Filter sizing

Correct sizing of the filter must be based on a variable pressure drop depending on the application:

- return filter — Δp from 0.4 to 0.6 bar
- filter on lubrication lines — Δp from 0.3 to 0.5 bar
- off-line fluid power plants — Δp from 0.3 to 0.4 bar
- off-line filter test benches — Δp from 0.1 to 0.3 bar
- over-boost filter — Δp from 0.4 to 0.6 bar

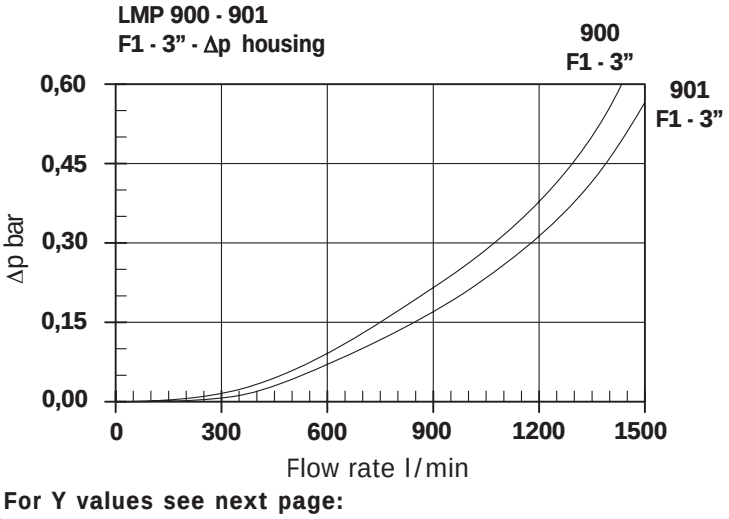
The pressure drop calculation is performed by adding together the value for the housing and the value for the filter element.
The pressure drop in the housing is proportional to the fluid density kg/dm^3; all the graphs in the catalogue are referred to mineral oil with density of 0.86 kg/dm^3.
The filter element pressure drop value is proportional to viscosity mm^2/s, the Y values in the catalogue are referred to viscosity of 30 mm^2/s.

Number of working cartridges installed in LMP - LMD filters

LMP 210 1	1 cartridge	CU 210 1
LMP 210 2	1 cartridge	CU 210 2
LMP 210 3	1 cartridge	CU 210 3
LMP 400 2	1 cartridge	CU 400 2
LMP 400 3	1 cartridge	CU 400 3
LMP 400 4	1 cartridge	CU 400 4
LMP 400 5	1 cartridge	CU 400 5
LMP 400 6	1 cartridge	CU 400 6
LMD 400/401 4	1 cartridge	CU 400 4
LMD 431 5	1 cartridge	CU 400 5
LMD 431 6	1 cartridge	CU 400 6
LMP 900 1	1 cartridge	CU 900
LMP 900 2	2 cartridges	CU 900
LMP 902 2	4 cartridges	CU 900
LMP 903 2	6 cartridges	CU 900
LMP 950 2	1 cartridge	CU 950 2
LMP 950 3	1 cartridge	CU 950 3
LMP 952 3	2 cartridges	CU 950 3
LMP 953 3	3 cartridges	CU 950 3
LMP 954 3	4 cartridges	CU 950 3
LMP 955 3	5 cartridges	CU 950 3
LMP 956 3	6 cartridges	CU 950 3
LMD 951 3	1 cartridge	CU 950 3
LMD 952 3	2 cartridges	CU 950 3
LMD 953 3	3 cartridges	CU 950 3

Filter housing Δp pressure drop

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



For Y values see next page:

Sizing data for single cartridge, head at top

Δp Tot.
Δpc Filter housing
Δpe Filter element
Y Multiplication factor (see page 11)
Q l/min = flow rate
V1 = reference viscosity 30 mm^2/s (cSt)
V2 = operating viscosity in mm^2/s (cSt)
Δp Tot. = Δpc + Δpe
Δpe = Y : 1000 x Q x (V2/V1)

Calculation example with HLP Mineral Oil Variation in viscosity

Data:
Filter with in-line connections
Pressure = 15 bar
Flow rate = 700 l/min
Viscosity = 46 mm^2/s (cSt)
Density = 0.86 kg/dm^3
Filtration = 10 μ absolute
With bypass valve

Filter type - LMP 900 1 (see housings pressure drop graphs on page 52)

Practical example

Q = 700 l/min
V_2 = 46 mm^2/s (cSt)
Pmax = 15 bar
Filtration = 10 μ absolute
Δp Tot. max = **0.6 bar** (max. recommended value)
Filter element series N, Δp max 20 bar
Δpc = 0.13 bar (* see diagram)
Δpe = (0.3166 : 1000) x 700 x (46/30) = 0.34 bar
Δp Tot. = 0.13 + 0.34 = 0.47 bar

Sized filter type:
LMP 900 1 B A F1 A10 N P01

Calculation examples with HFD fluid Variations in viscosity and density

Data:
Filter with in-line connections
Pressure = 15 bar
Flow rate = 700 l/min
Viscosity = 46 mm^2/s (cSt)
Density = 1.1 kg/dm^3
Filtration = 10 μ absolute
With bypass valve

Filter type - LMP 900 1 (see housings pressure drop graphs on page 52)

Practical example

Q = 700 l/min
V_2 = 46 mm^2/s (cSt)
Pmax = 15 bar
Filtration = 10 μ absolute
Δp Tot. max = **0.6 bar** (max. recommended value)
Filter element series N, Δp max 20 bar
Δpc = 0.13 x (1.1/0.86)= 0.17
Δpe = (0.3166 : 1000) x 700 x (46/30) = 0.34 bar
Δp Tot. = 0.17 + 0.34 = 0.51 bar
Filter type:
LMP 900 1 B V F1 A10 N P01

Data for sizing multicartridge filters with head at top

Δp Tot.
Δpc Filter housing
Δpe Filter element
Y Multiplication factor (see below)
Q l/min = flow rate
V1 = reference viscosity 30 mm^2/s (cSt)
V2 = operating viscosity in mm^2/s (cSt)
Δp Tot. = Δpc + Δpe
Δpe = Y : 1000 x Q x (V2/V1)

For multicartridge filter sizing, the value of flow rate "Q l/min" must be divided by the number of cartridges.

Calculation example with HLP Mineral Oil Variation in viscosity

Data:
Filter with in-line connections
Pressure = 10 bar
Flow rate = 1400 l/min
Viscosity = 46 mm^2/s (cSt)
Density = 0.86 kg/dm^3
Filtration = 6 μ absolute
With bypass valve

Filter type - LMP 952 number of installed cartridges 2
(see housings pressure drop graphs on pages 78 to 79)

Practical example

Q = 1400 l/min
V_2 = mm^2/s (cSt)
Pmax = 10 bar
Filtration = 6 μ absolute
Δp Tot. max = **0.6 bar** (max. recommended value)
Filter element series N, Δp max 20 bar
Δpc = 0.1 bar (* see diagram)
Δpe = (0.4 : 1000) x (1400/2) x (46/30) = 0.43 bar
Δp Tot. = 0.1 + 0.43 = 0.53 bar

Sized filter type:
LMP 952 B A F3 A06 N P01

Calculation examples with HFD fluid Variations in viscosity and density

Data:
Filter with in-line connections
Pressure = 10 bar
Flow rate = 1400 l/min
Viscosity = 46 mm^2/s (cSt)
Density = 1.1 kg/dm^3
Filtration = 6 μ absolute
With bypass valve

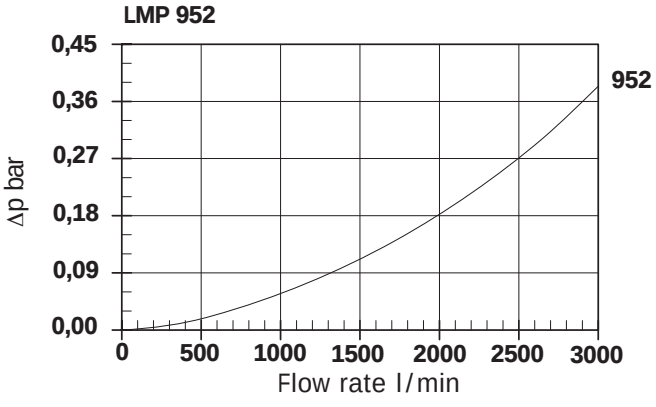
Filter type - LMP 952
(see housings pressure drop graphs on pages 78 to 79)

Practical example

Q = 1400 l/min
V_2 = mm^2/s (cSt)
Pmax = 10 bar
Filtration = 6 μ absolute
Δp Tot. max = **0.6 bar** (max. recommended value)
Filter element series N, Δp max 20 bar
Δpc = 0.1 x (1.1/0.86)= 0.127 bar
Δpe = (0.4 : 1000) x (1400/2) x (46/30) = 0.43 bar
Δp Tot. = 0.127 + 0.43 = 0.557 bar
Filter type:
LMP 952 B V F3 A06 N P01

Filter housing Δp pressure drop

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



Multiplication factor "Y" for definition of the pressure drop of filter elements.

Reference viscosity 30 mm^2/s

Filter Element		Filtration							
		Serie N - W						Serie N	
Type		A 0 3	A 0 6	A 1 0	A 1 6	A 2 5	M 2 5	P 1 0	P 2 5
CU 210	1	5,3	3,92	1,9	1,66	1,2	0,098	0,48	0,41
	2	3	2,3	1,21	0,88	0,68	0,065	0,42	0,35
	3	1,55	1,33	0,69	0,49	0,42	0,049	0,23	0,17
CU 400	2	3,133	2,550	1,457	1,225	0,780	0,192	0,750	0,640
	3	2,150	1,700	0,940	0,781	0,500	0,102	0,400	0,340
	4	1,600	1,285	0,709	0,615	0,400	0,084	0,340	0,270
	5	1,000	0,833	0,475	0,340	0,200	0,057	0,240	0,190
	6	0,822	0,580	0,300	0,267	0,175	0,053	0,220	0,177
CU 900	1	0,860	0,6333	0,3166	0,300	0,2142	0,050	-	-
CU 950	2	1,030	0,8	0,5875	0,4	0,2571	0,050		
	3	0,443	0,4	0,2625	0,1833	0,152	0,020	-	-

Differential indicators

A guarantee of maintenance of the correct ISO 4406 contamination class achieved through the use of the filters can be provided exclusively with the correct use of the specific differential indicators.
The trip threshold of the indicator must be selected taking account of the maximum differential pressure indicated for each type of filter element and the trip pressure of the bypass valve, if incorporated in the filter.

Indicator housing (Materials)

- Brass

Pressure

- Max. working pressure: 420 bar (42 MPa)

Temperature

- From -35°C to +110°C

Seals

- HNBR
- FPM

Compatibility

- Housings compatible with:
  Mineral oils to ISO 2943 - aqueous emulsions
  Synthetic fluids, water and glycol.
- V and H series FPM and HNBR seals, compatible with:
  Mineral oils to ISO 2943 - aqueous emulsions
  Synthetic fluids, water and glycol.
  For synthetic fluids type HS-HFDR-HFDS-HFDU, series V FPM seals.

Order code

1	2	3	4

Example: 1 E 7

1 - Differential trip pressure

1	1,2 bar ± 10% (only for style V - E)

2 - Styles

V	Visual
E	Electrical-Visual
J	Electrical-Visual-Thermostat controlled

3 - Differential trip pressure

6	2 bar ± 10%
7	5 bar ± 10%

4 - Seals

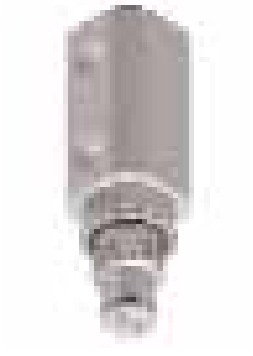
FPM Standard

x	Others on request

Seal for indicator/filter head, Bonded Seal.

ADAPTER

Order code
ICPAP01



CLOGGING INDICATOR SELECTION

Filter for forced lubrication with or without bypass indicator opening value Δp 1.2 - Δp 2 bar.

Return or in-line filter with bypass valve indicator opening value Δp 2 bar.

Off-line and over-boost filter, without bypass valve indicator opening value Δp 2 bar - 5 bar.

Order code

1	2	3	4	5	6	7	8

Example: NM 8 C 11 P01

1 - Styles

NR	Electrical
KR	Electrical-Visual
NM	Electrical IP 67
Z	Visual
N	Electrical
K	Electrical-Visual
NE	Electronic

2 - Differential trip pressure

2	1,2 bar ± 10%
6	2 bar ± 10%
7	5 bar ± 10%

3 - Power supply voltage*

(only for style K - KR)

1	24 Volt
2	110 Volt (only DC voltage for KR style)
3	220 Volt (excluding style KR)

4 - Seals

H	HNBR Standard
V	FPM
x	Others on request

5 - Thermostat (only for style NM)

A	Without
C	50°

6 - Electrical connector (only for style NM)

11	AMP Superseal connector

7 - Opzioni (only for style NE)

S	Standard
T	Double contact 75% - 100% 6 sec. signalling delay

8 - Options

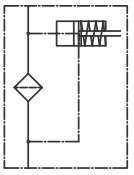
P01	MP standard

Seal for indicator/filter head, flat profiled.
* Other power supply voltages on request.

STYLE

TECHNICAL CHARACTERISTICS

SERIES Z VISUAL

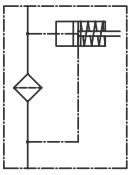


Standard visual indicator with manual reset.

Nylon signalling button.

Button depressed position	= cartridge clean.
Button raised position, Red	= cartridge clogged.
Weight:	118 g.
Tightening torque:	65 Nm.

SERIES V VISUAL

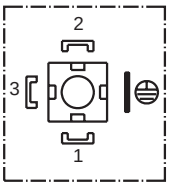


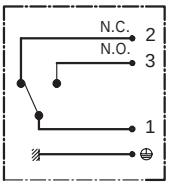
Cover and lens in nylon.

Visual indicator green	= cartridge clean.
Visual indicator red	= cartridge clogged.
Weight:	137 g.
Tightening torque:	95 Nm.

SERIES E ELECTRICAL / VISUAL

Connector EN 175301-803 A/ISO 4400

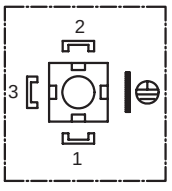


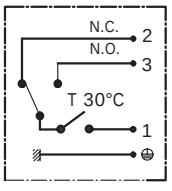


Protection rating	IP 65
Max. contact rating	5 A/250V ~
Power supply voltage	230 V ~
Connector	DIN 43650 Microswitch contact
Cablegland	PG 9
Cover and lens in nylon.	
Visual indicator green	= cartridge clean.
Visual indicator red	= cartridge clogged.
Weight:	188 g.
Tightening torque:	95 Nm.

SERIES J ELECTRICAL / VISUAL WITH THERMOSTAT CONTROL

Connector EN 175301-803 A/ISO 4400





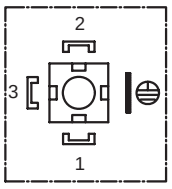
Protection rating	IP 65
Max. contact rating	5 A/250V ~
Power supply voltage	230 V ~
Connector	DIN 43650 Microswitch contact
Cable gland	PG 9
Cover and lens in nylon	
Visual indicator green	= cartridge clean.
Visual indicator red	= cartridge clogged.
CONTACT	N.O.
Operation on reaching temperature of +30°C	
Weight:	198 g.
Tightening torque:	95 Nm.

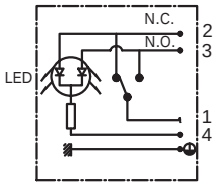
STYLE

TECHNICAL CHARACTERISTICS

SERIES K ELECTRICAL / VISUAL

Connector EN 175301-803 A/ISO 4400

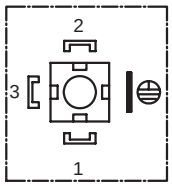


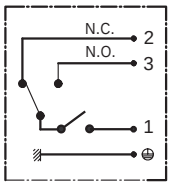


Protection rating	P 65
Max. contact rating	5 A/250V ~
Power supply voltage	24V DC - 115V DC/AC - 230V AC
Connector	DIN 43650 Microswitch contact
Cable gland	PG 9
SIGNALLING LEDS	
GREEN LED	= Cartridge clean.
RED LED	= Cartridge clogged.
Weight:	183 g.
Tightening torque:	65 Nm.

SERIES N ELECTRICAL

Connector EN 175301-803 A/ISO 4400

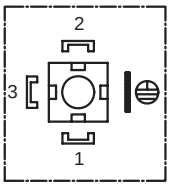


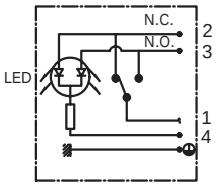


Protection rating	IP 65
Max. contact rating	5 A/250V ~
Power supply voltage	230 V ~
Connector	DIN 43650 Microswitch contact
Cable gland	PG 9
Weight:	183 g.
Tightening torque:	65 Nm.

SERIES KR ELECTRICAL / VISUAL

Connector EN 175301-803 A/ISO 4400

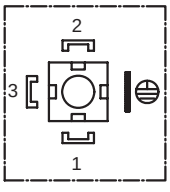


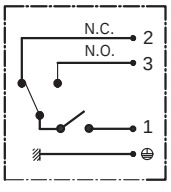


Protection rating	IP 65
Max. contact rating	0.8 A/24V DC 0.17 A/115V DC
Power supply voltage	24V - 115V DC
Connector	DIN 43650 Reed switch
Cable gland	PG 9
SIGNALLING LEDS	
GREEN LED	= Cartridge clean.
RED LED	= Cartridge clogged.
Weight :	123 g.
Tightening torque:	65 Nm.

SERIES NR ELECTRICAL

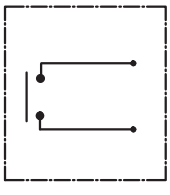
Connector EN 175301-803 A/ISO 4400





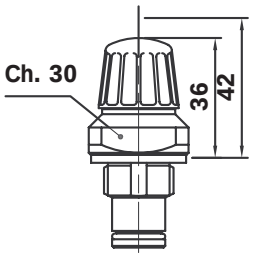
Protection rating	IP 65
Max. contact rating	0.17 A/115V DC
Max power supply voltage 1	max 120V DC
Connector	DIN 43650 Reed switch
Cable gland	PG 9
Weight :	123 g.
Tightening torque:	65 Nm.

SERIES NM.A ELECTRICAL

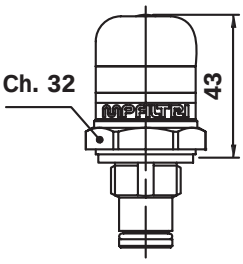


Connector	AMP Superseal
Cable and cablegland	PVC
Max. contact rating	0.17 A/115V DC
Max power supply voltage	max 120V DC
Protection rating	IP 67
Contacts	N.O.
Weight :	110 g.
Tightening torque:	65 Nm.

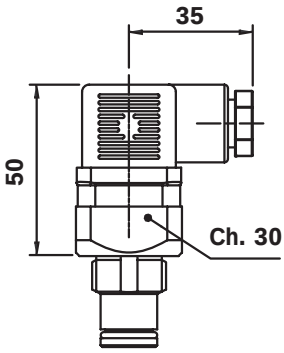
Differential indicator dimensions



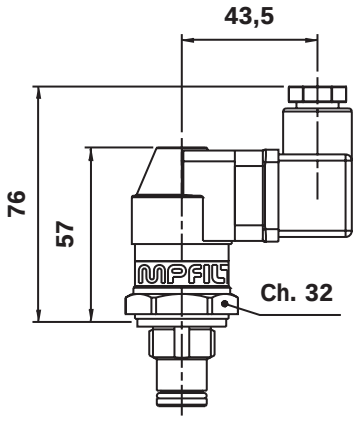
SERIES Z



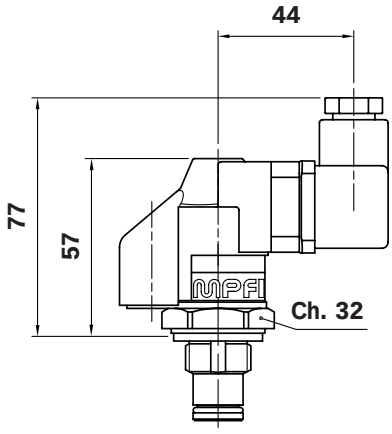
SERIES V



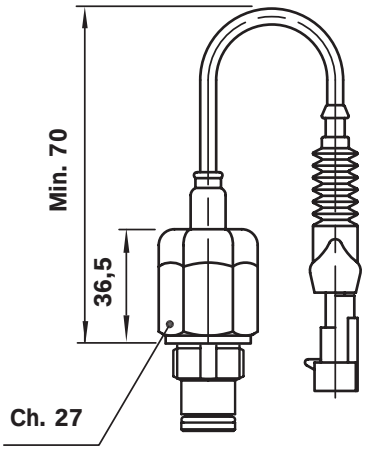
SERIES NR - KR



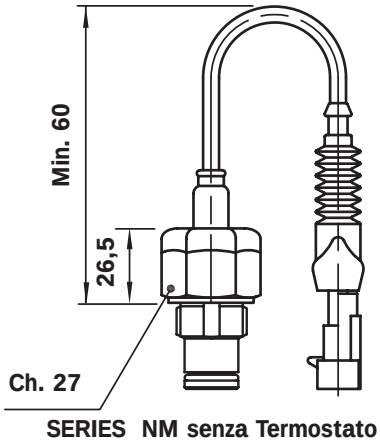
SERIES E



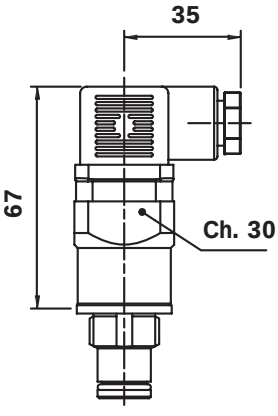
SERIES J



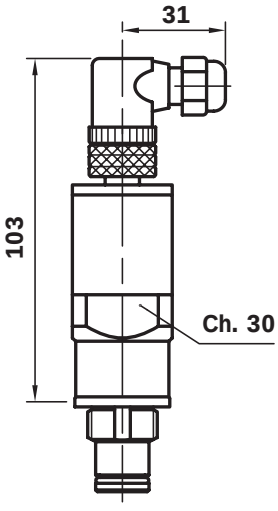
SERIES NM con Termostato



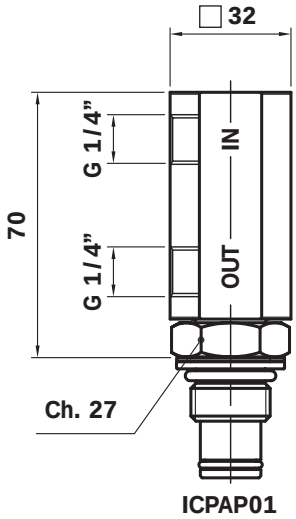
SERIES NM senza Termostato



SERIES N - K - NE



SERIES NE...T

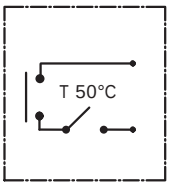


ICPAP01

STYLE

TECHNICAL CHARACTERISTICS

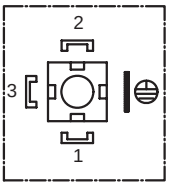
SERIES NM.C ELECTRICAL / THERMOSTAT



Connector	AMP Superseal
Cable and cable gland	PVC
Max. contact rating	0.17 A/115V DC
Max power supply voltage	max 120V DC
Protection rating	IP 67
N.O. Contacts	
Thermostat (N.O.)	Switching +50°C
Weight :	136 g.
Tightening torque:	65 Nm.

SERIES NE ELECTRONIC

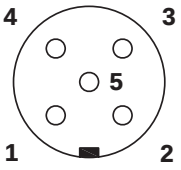
1= + 24 VCC
2= Out 4 - 20 mA
3= - 24 VCC



Protection rating	IP 65
Power supply voltage from	19 to 28 VCC
Output signal	4 - 20 mA
Input impedance	100 Ohm
Non-linearity + hysteresis	≤10% of full scale
Thermal deviation from zero	< 5% of full scale from 0°C to +60°C
Operating temperature	from -20°C to +80°C
Storage temperature	from -35°C to +110°C
Connector	DIN 43650
Cable gland	PG 9
Weight:	200 g.
Tightening torque:	65 Nm.

INDICATOR NE...T ELECTRONIC

1= + 24 VCC
2= Out 4 > 20 mA
3= Out N.O. 20 mA
4= Out N.O. 16 mA
5= - 24 VCC



Protection rating	IP 67
Power supply voltage from	19 to 28 VCC
Output signal	4 - 20 mA
Input impedance	100 Ohm
Non-linearity + hysteresis≤	≤10% of full scale
Thermal deviation from zero	< 5% of full scale from 0°C to +70°C
N° 1 N.O. alarm threshold	16 mA (75% of full scale)
N° 2 N.O. alarm threshold	20 mA (100% of full scale)
Fixed timer interval	thresold N° 1 and N° 2 6 seconds
Operating temperature	from -20°C to +80°C
Storage temperature	from -35°C to +110°C
Connector	M12 5 pin IEC 60947-5-2
Weight:	350 g.
Tightening torque:	65 Nm.

ADAPTER ICPAP01

Adapter for oil outlet and pressure sensing up-stream and down-stream from the filter element.

IN/OUT connections G 1/4”

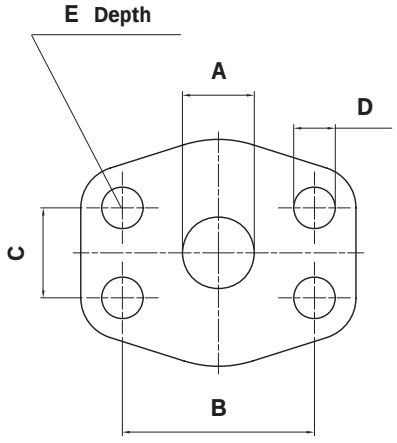
Orientation of IN/OUT connections 360°

Material: Phosphated stainless steel

Seals: NBR (others on request)

Sizes / Connections to SAE flange

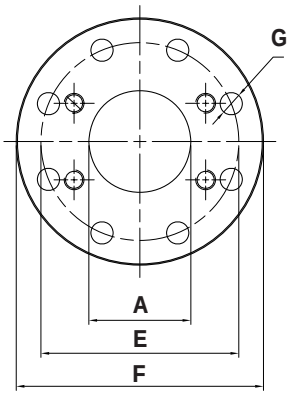
FLANGE SAE 3000 PSI



Connection to 3000 psi SAE flange

Dimension	2" SAE 3000 PSI M	2" SAE 3000 PSI UNC	2 1/2" SAE 3000 PSI M	2 1/2" SAE 3000 PSI UNC	3" SAE 3000 PSI M	3" SAE 3000 PSI UNC	4" SAE 3000 PSI M	4" SAE 3000 PSI UNC
A	51	51	63	63	73	73	99	99
B	77,77	77,77	88,90	88,90	106,38	106,38	130,18	130,18
C	42,88	42,88	50,80	50,80	61,93	61,93	77,77	77,77
D	M12	1/2" UNC	M12	1/2" UNC	M16	5/8" UNC	M16	5/8" UNC
E	20	20	20	20	25	25	25	25

FLANGE DIN PN 16



Connection Flange IN-OUT	DIN PN16 DN80	DIN PN16 DN100
A	73	99
E	160	180
F	200	220
G	18	18

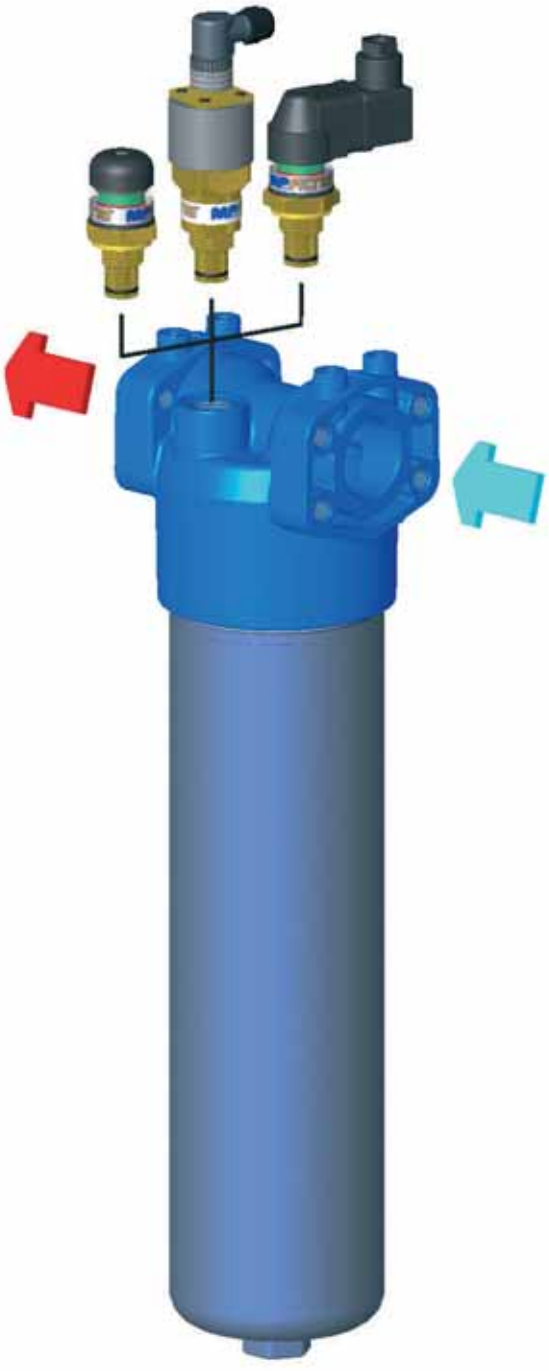
SAE flange connections available on in-Line filters

Filter	SAE 3000 PSI				DIN PN16	
Type	2"	2 1/2"	3"	4"	DN80	DN100
LMP400/1	X	X				
LMP430/1	X	X				
LMD400/1/31		X				
LMP900/1			X	X		
LMP902/3				X		
LMP950/1			X	X		
LMP952/3/4/5/6				X		
LMD951/2/3			X	X	X	X

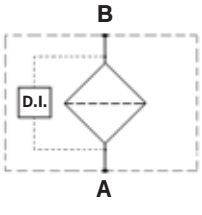
LMP 210

SERIES LMP 210

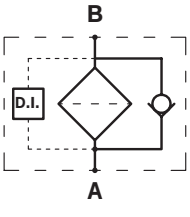
Working pressure
60 bar



Style **S**



Style **B**



Technical data

Filter housing (Materials)

- Head: Anodised Aluminium
- Housing: Anodised Aluminium
- Bypass valve: Nylon

Pressure

- Working pressure: 60 bar (6 MPa)
- Test pressure: 90 bar (9 MPa)
- Burst pressure: 180 bar (18 MPa)
- Pulsed pressure fatigue test: 1.000.000 cycles with pressure from 0 to 60 bar (6 MPa)

Temperature

- From -25°C to +110°C

Bypass valve

- Opening pressure 3.5 bar ±10%
- Other opening pressures on request.

Δp Elements type

- Series N and W elements: 20 bar
- Oil flow from exterior to interior.

Seals

- Standard NBR series A
- Optional FPM series V

Weights (kg)

	Length
• LMP210 - 1	3.5
• LMP210 - 2	4.4
• LMP210 - 3	5.4

Volumes (dm^3)

	Length
• LMP210 - 1	1.5
• LMP210 - 2	2
• LMP210 - 3	2.7

Connections

In-line Inlet/Outlet LMP 210

Compatibility

- Housings compatible with: Mineral oils to ISO 2943 - aqueous emulsions synthetic fluids, water and glycol.
- The filter elements are compatible with: Mineral oils to ISO 2943, Synthetic fluids Aqueous emulsions, water and glycol (series W required).
- NBR seals series A, compatible with: Mineral oils to ISO 2943 - aqueous emulsions synthetic fluids, water and glycol.
- V series FPM seals, compatible with: Synthetic fluids type HS-HFDR-HFDS-HFDU To ISO 2943

Filter Element Area

Filter element in stainless steel mesh

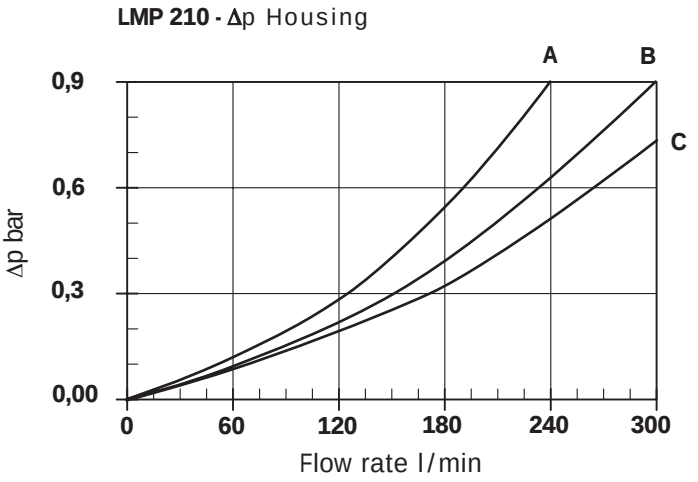
Type	Length 1	2	3
CU 210	3100	4950	7520

Values expressed in **cm^2**

Filter housing Δp pressure drop

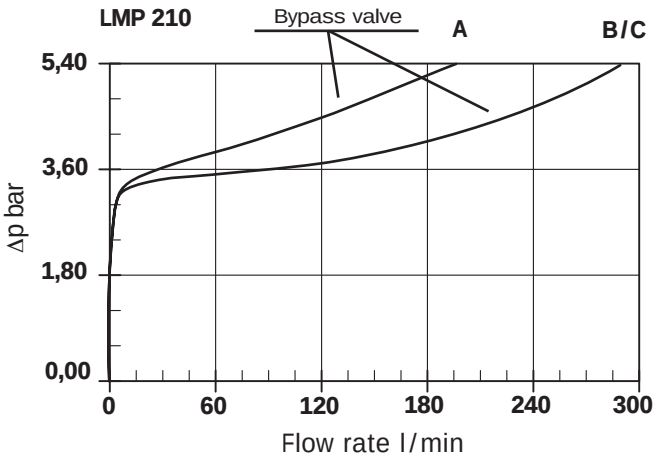
The curves are plotted utilising mineral oil with density of 0.86 kg/dm^3 to ISO 3968.

Δp varies proportionally with density.



Valves

Bypass valve pressure drop



Filter housing and valves Δp pressure drop connection

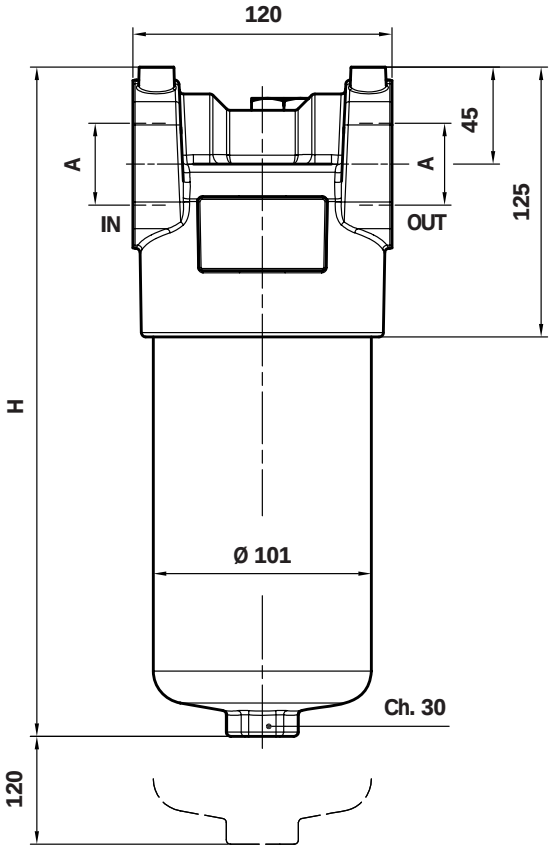
Type	Connection (dimensions page 23)
A	G1 - G4 - G7- F1 - F4
B	G2 - G5 - G8 - F2 - F5
C	G3 - G6 - G9 - F3 - F6

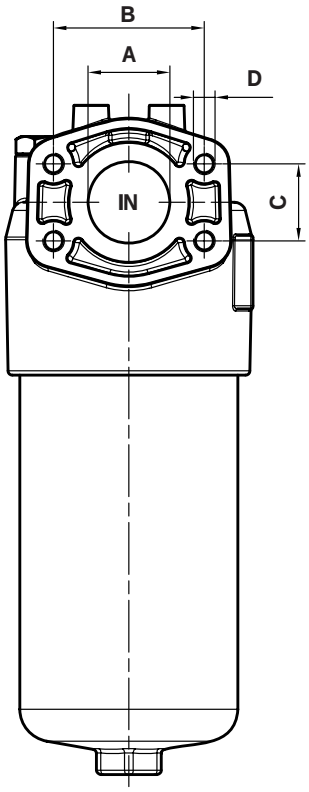
Recommended maximum flow rate

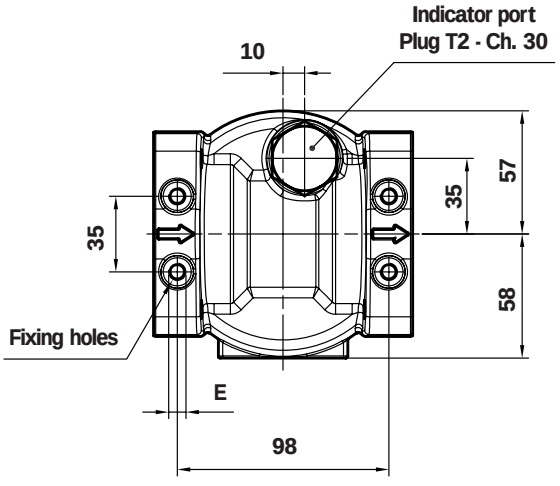
- Pressure drop of filter assembly equal to Δp 0,6 bar.
- Oil kinematic viscosity 30 $mm^{2/s}$ (sCt).
- Density 0,86 kg/dm^3.
- Connections of filter under test G 3".

Filter element type	Flow rate l/min Series N Filter lenght 1	2	3
A03	98	140	190
A06	120	162	200
A10	175	205	235
A16	185	225	245
A25	208	235	250
M25	265	270	270
P10	245	250	260
P25	250	255	268

LMP 210







Threaded Connections

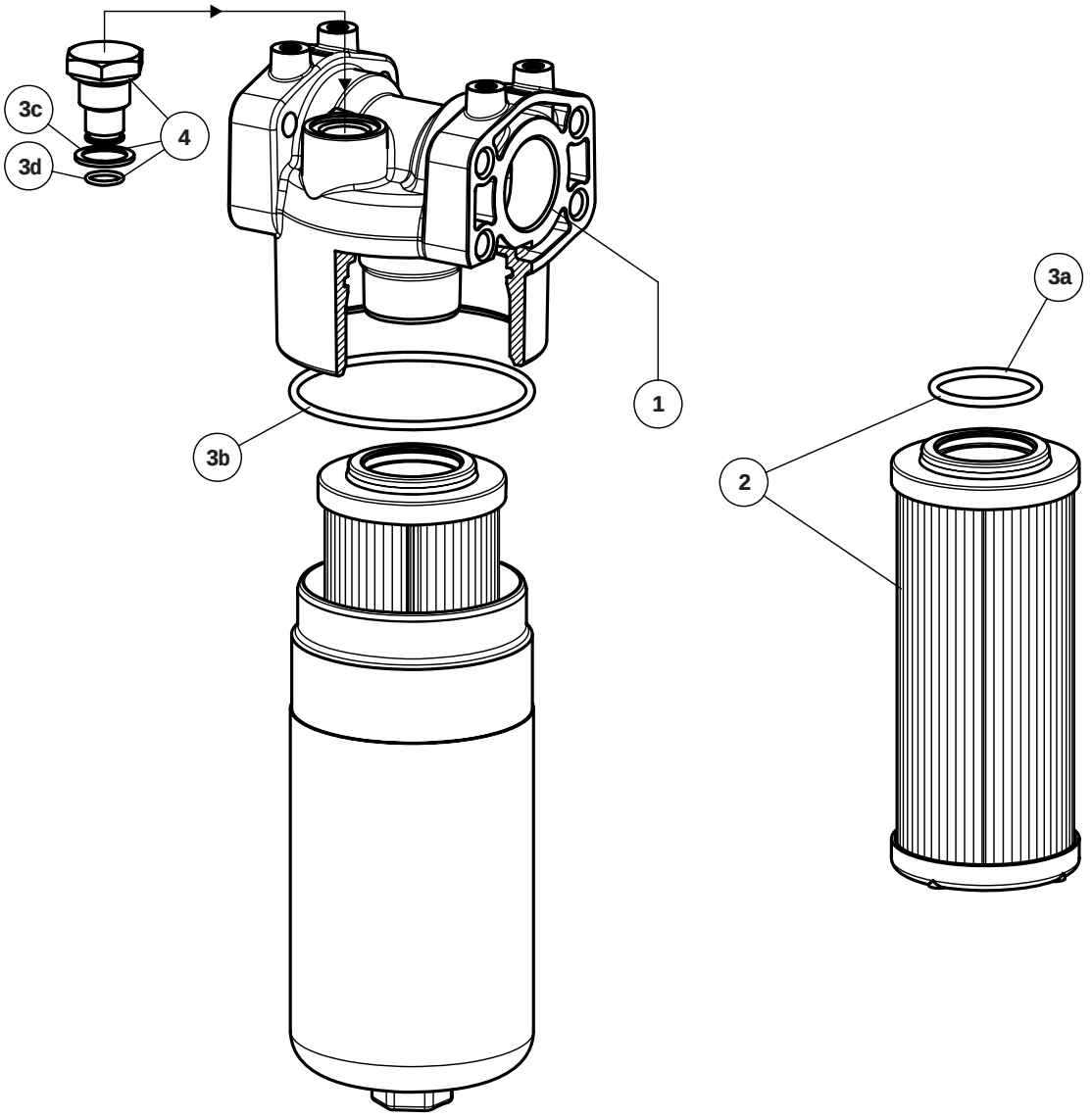
Type	Connection "A"	E Depth 12 mm
G1	G1	M8
G2	G 1 1/4"	M8
G3	G 1 1/2"	M8
G4	1" NPT	5/16" UNC
G5	1 1/4" NPT	5/16" UNC
G6	1 1/2" NPT	5/16" UNC
G7	SAE 16 1 5/16" 12 UN	5/16" UNC
G8	SAE 20 1 5/8" 12 UN	5/16" UNC
G9	SAE 24 1 7/8" 12 UN	5/16" UNC

Filter Length	H mm
1	360
2	492
3	630

Flanged Connections

Type	Connection "A"	"B"	"C"	"D"	E Depth 12 mm
F1	1" SAE - 3000 psi/M	52,37	26,19	M10	M8
F2	1 1/4" SAE - 3000 psi/M	58,72	30,18	M10	M8
F3	1 1/2" SAE - 3000 psi/M	69,85	35,71	M12	M8
F4	1" SAE - 3000 psi/UNC	52,37	26,19	3/8" UNC	5/16" UNC
F5	1 1/4" SAE - 3000 psi/UNC	58,72	30,18	7/16" UNC	5/16" UNC
F6	1 1/2" SAE - 3000 psi/UNC	69,85	35,71	1/2" UNC	5/16" UNC

LMP 210 spare parts



Pos.	Description	Qty	FILTER Series LMD 401	
1	Filter assembly	1	See order table	
2	Filter element	1	See order table	
3	Seals kit	1	NBR 02050435	FPM 02050436
3a	O-Ring filter element	1	O-R 144 Ø 39,69 x 3,53	
3b	O-Ring housing	1	O-R 4375 Ø 94,84 x 3,53	
3c	Seal	1	01030058	01030046
3d	O-Ring	2	O-R 2050 Ø 12,42 x 1,78	
4	Indicator plug	1	T2H	T2V
-	Indicators	1	See order table	

LMP 210 ordering information

Filter assembly
LMP210

	1	2	3	4	5	6	7
Example: LMP210	2	B	A	G3	A10	N	P01

Filter Element
CU210

	1	5	3	6	7
Example: CU210	2	A10	A	N	P01

1 - Sizes

1	
2	
3	

2 - Valves

S	Without by-pass
B	With by-pass

3 - Seals

A	NBR
V	FPM

4 - Connections

Threaded		Flanged	
G1	G 1”	F1	1” SAE 3000 psi/M
G2	G 1 1/4”	F2	1 1/4” SAE 3000 psi/M
G3	G 1 1/2”	F3	1 1/2” SAE 3000 psi/M
G4	1” NPT	F4	1” SAE 3000 psi/UNC
G5	1 1/4” NPT	F5	1 1/4” SAE 3000 psi/UNC
G6	1 1/2” NPT	F6	1 1/2” SAE 3000 psi/UNC
G7	SAE 16 1 5/16” 12UN		
G8	SAE 20 1 5/8” 12UN		
G9	SAE 24 1 7/8” 12UN		

5 - Filter element

A03	3 µm	A16	16 µm	Absolute filtration Inorganic microfibre ßx (c) ≥ 1000
A06	6 µm	A25	25 µm	
A10	10 µm			
M25	25 µm	M90	90 µm	Nominal Filtration Metal mesh
M60	60 µm			
P10	10 µm			Nominal Filtration Cellulose
P25	25 µm			

6 - Filter elements series

N	Δp 20 bar
W	Δp 20 bar Compatible with fluid FH AFH BFH C (not available for filter element Pxx)

7 - Options

a - Filter

P01	MP Standard filters

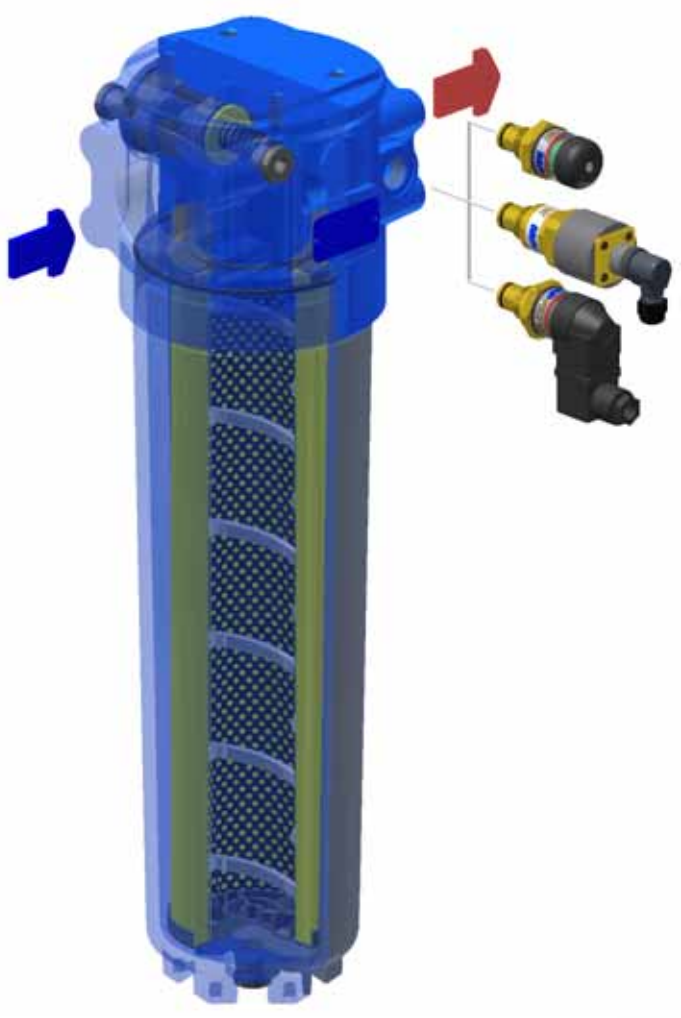
DIFFERENTIAL INDICATORS (see page 12)

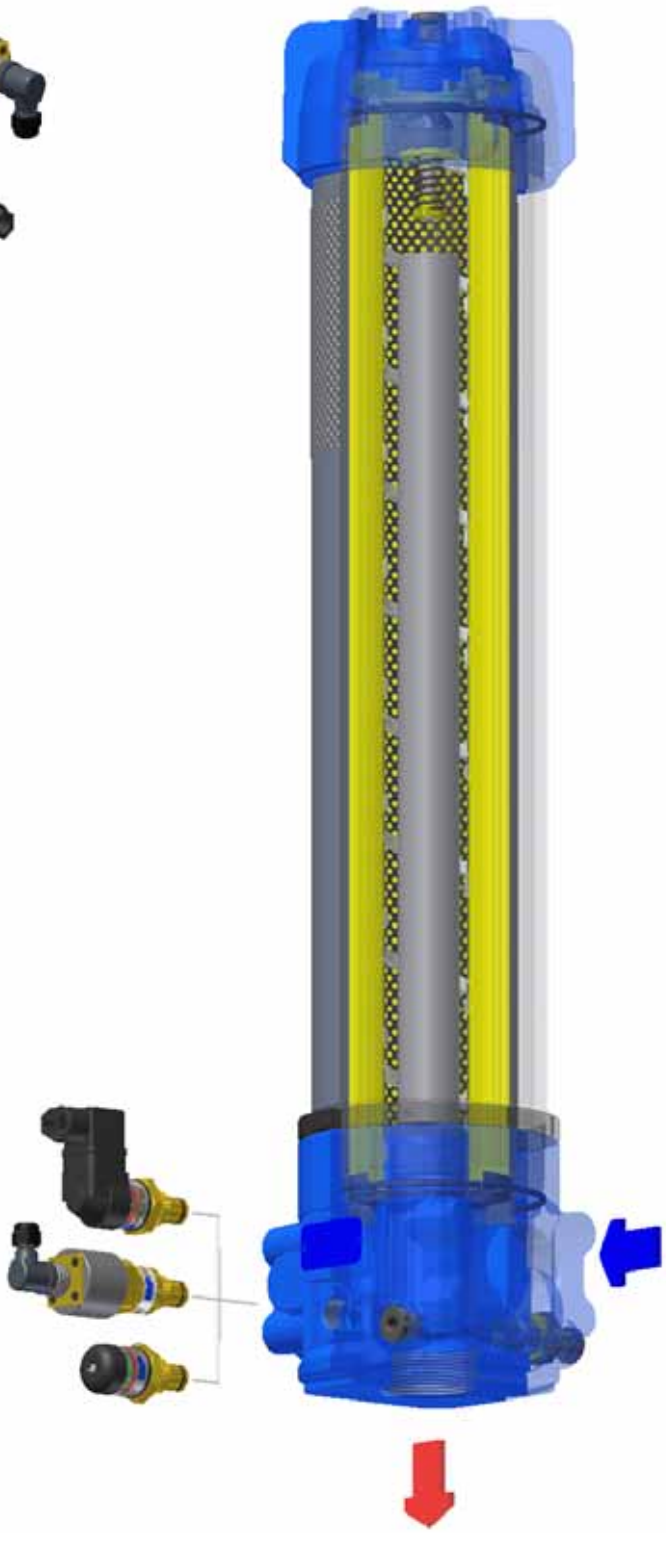
LMP 400 - 401
430 - 431

LMP

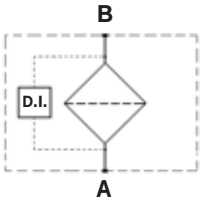
SERIES
400 - 401
430 - 431

Working pressure
60/50 bar

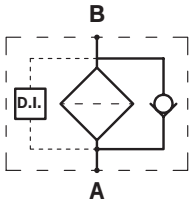




Style **S**



Style **B**



Technical data

Filter housing (Materials)

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

Pressure

LMP 400 lenght: 2 - 3 - 4

- Working pressure: 60 bar (6 MPa)
- Test pressure: 90 bar (9 MPa)
- Burst pressure: 180 bar (18 MPa)
- Pulsed pressure fatigue test: 1.000.000 cycles with pressure from 0 to 60 bar (6 MPa)

LMP 400 lenght: 5 - 6

- Working pressure: 50 bar (5 MPa)
- Test pressure: 75 bar (7,5 MPa)
- Burst pressure: 150 bar (15 MPa)
- Pulsed pressure fatigue test: 1.000.000 cycles with pressure from 0 to 50 bar (5 MPa)

Temperature

- From -25°C to +110°C

Bypass valve

- Opening pressure 3.5 bar ±10%
- Other opening pressures on request.

Δp Elements type

- Series N and W elements: 20 bar
- Oil flow from exterior to interior.

Seals

- Standard NBR series A
- Optional FPM series V

Weights (kg)

	Length
• LMP400 - 2	6.7
• LMP400 - 3	7.3
• LMP400 - 4	8.1
• LMP400 - 5	11.3
• LMP400 - 6	14.4

Volumes (dm^3)

	Length
• LMP400 - 2	3.5
• LMP400 - 3	5
• LMP400 - 4	6.5
• LMP400 - 5	9.5
• LMP400 - 6	13.5

Connections

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

Compatibility

- Housings compatible with: Mineral oils to ISO 2943 - aqueous emulsions synthetic fluids, water and glycol.
- The filter elements are compatible with: Mineral oils to ISO 2943, Synthetic fluids Aqueous emulsions, water and glycol (series W required).
- NBR seals series A, compatible with: Mineral oils to ISO 2943 - aqueous emulsions synthetic fluids, water and glycol.
- V series FPM seals, compatible with: Synthetic fluids type HS-HFDR-HFDS-HFDU To ISO 2943

Filter Element Area

Filter element in stainless steel mesh

Type	Length 2	3	4	5	6
CU 400	3300	4950	6550	10200	15300

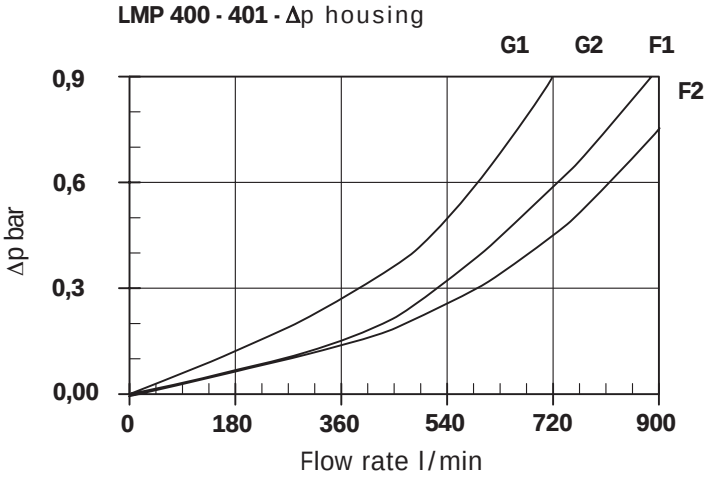
Values expressed in **cm^2**

Filter housing Δp pressure drop

The curves are plotted utilising mineral oil with density of 0.86 kg/dm^3 to ISO 3968.

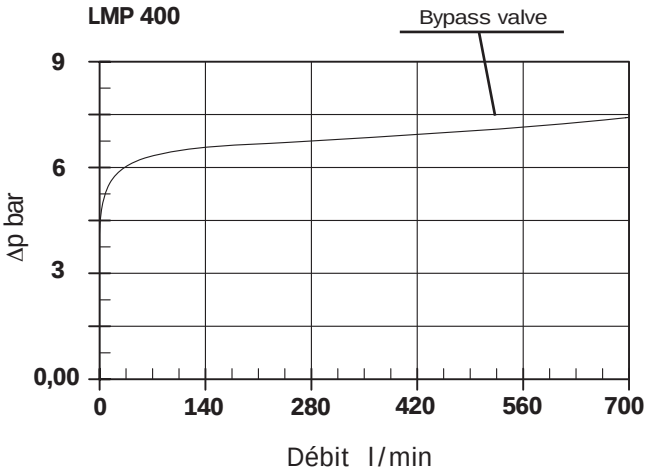
Δp varies proportionally with density.

LMP 400 - 401 - Δp housing

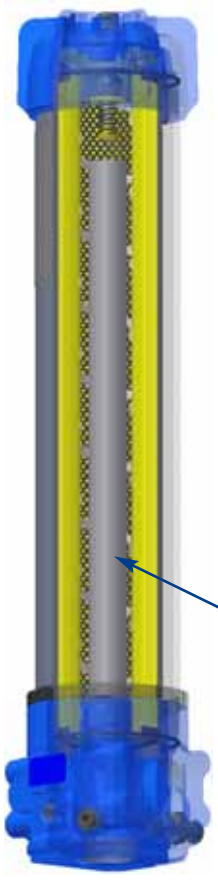


Valves

Bypass valve pressure drop



Option P02 for LMP 430/431



Option P02 “Internal tube for reduced flow rate” is recommended for flow rate values below 100/150 l/min. The use of option P02 makes it easier to fill the housing with the operating fluid.

P02 “Internal tube for reduced flow rates”

Recommended maximum flow rate

Recommended maximum flow rate for filters installed on lubrication lines, return or in-line filters is defined by the maximum oil velocity in the connections.
For filters mounted on Off-Line lines the maximum recommended flow rate is defined by the pressure drop of the filter element.

Filter for pressurised lubrication, max. oil velocity 2.5 m/sec.
Return or in-line filter, max oil velocity 5 m/sec.

	Connections		
Oil velocity	1 1/2”	2”	2 1/2”
2,5 m/sec.	120	300	500
5 m/sec.	240	600	1000

Flow rate l/min.

Off-Line filter, filter element recommended maximum pressure drop must be equal to Δp 0.2 ÷ 0.3 bar.

Recommended maximum flow rate

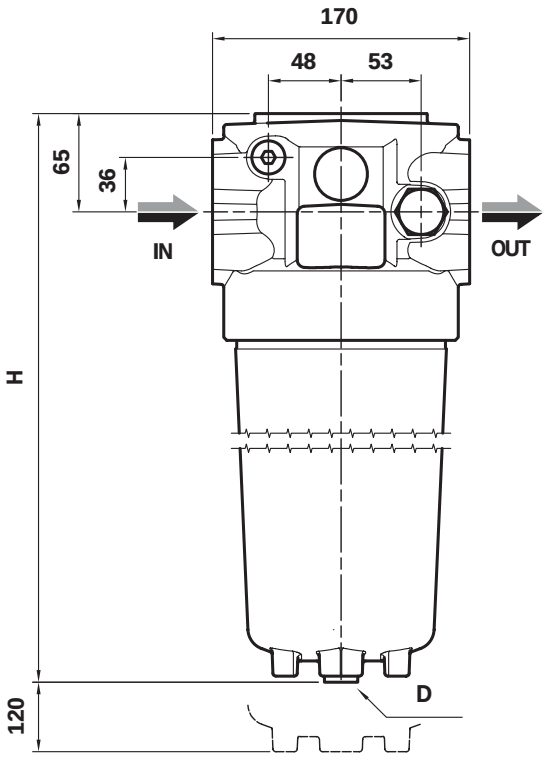
- Pressure drop of filter assembly equal to Δp 0.6 bar.
- Oil kinematic viscosity 30 mm^2/s (cSt).
- Density 0.86 kg/dm^3.
- Connections of filter under test G 2 1/2”.

Filter element type	Flow rate l/min Series N	Filter length
A03	180	2
A06	215	
A10	325	
A16	360	
A25	460	
M25	660	
P10	470	
P25	500	
A03	245	3
A06	295	
A10	420	
A16	460	
A25	540	
M25	700	
P10	580	
P25	600	
A03	305	4
A06	350	
A10	480	
A16	510	
A25	575	
M25	720	
P10	600	
P25	630	
A03	405	5
A06	445	
A10	550	
A16	600	
A25	660	
M25	740	
P10	640	
P25	670	
A03	450	6
A06	520	
A10	610	
A16	630	
A25	670	
M25	740	
P10	650	
P25	670	

Dimensions

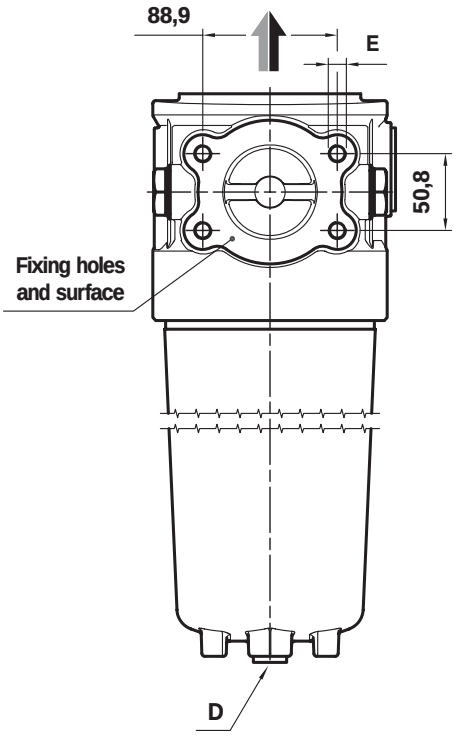
LMP 400

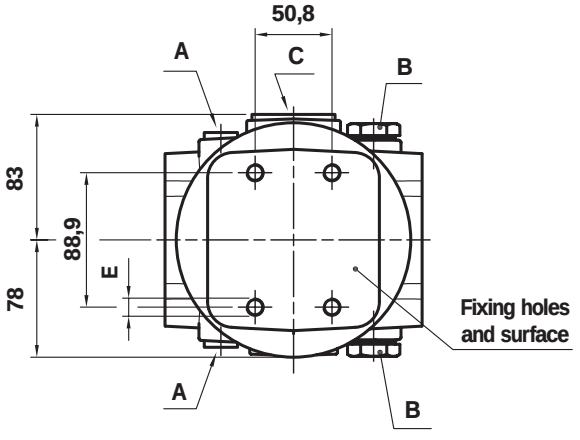
Length 2-3-4

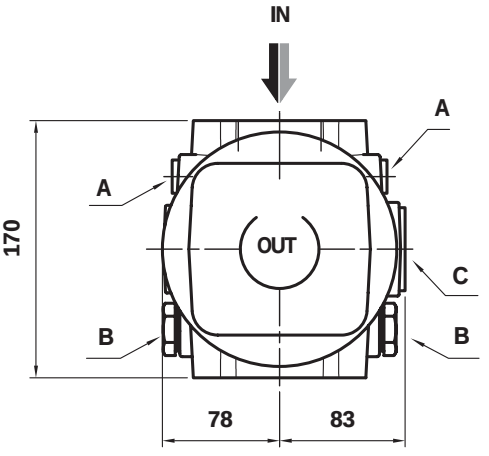


LMP 401

Length 2-3-4







Flanged IN/OUT connections	E Depth 20 mm
2" SAE 3000 psi/M	M12
2 1/2" SAE 3000 psi/M	M12
2" SAE 3000 psi/UNC	1/2" UNC
2 1/2" SAE 3000 psi/UNC	1/2" UNC

Threaded IN/OUT connections	E Depth 20 mm
G 1 1/2"	M12
G 2"	M12
1 1/2" NPT	1/2" UNC
2" NPT	1/2" UNC
SAE 24 - 1 7/8"- 12 UN	1/2" UNC
SAE 32 - 2 1/2"- 12 UN	1/2" UNC

Length Filter	H mm
2	378
3	478
4	578

A Breather plug - G 3/8" - Ch. 8

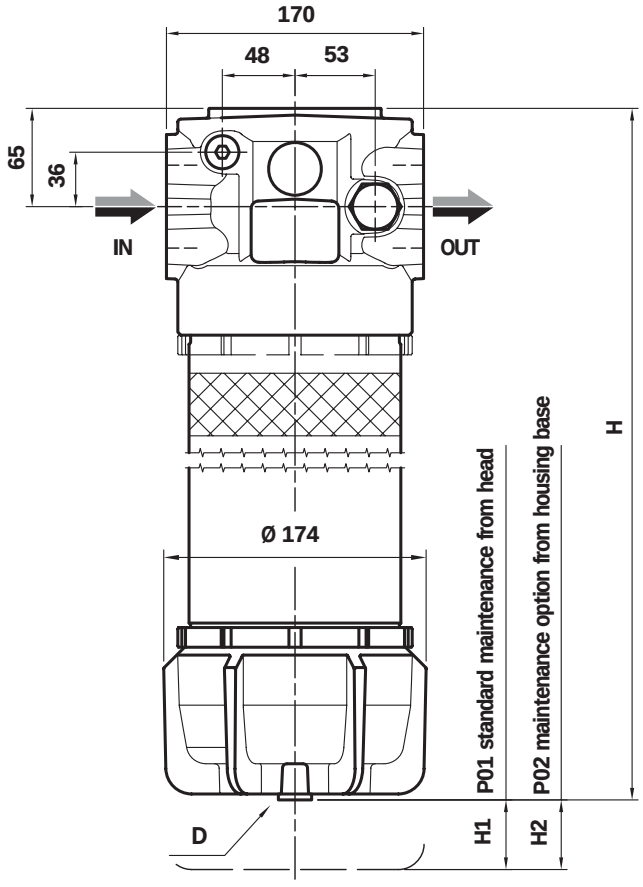
B Indicator connection - Plug T2 - Ch. 30

C Bypass valve - Ch. 17

D Oil drain plug - G 3/8" - Ch. 8

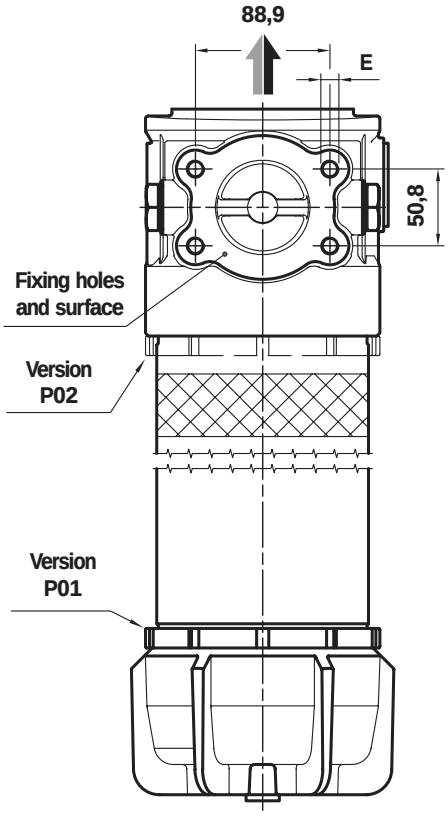
LMP 400

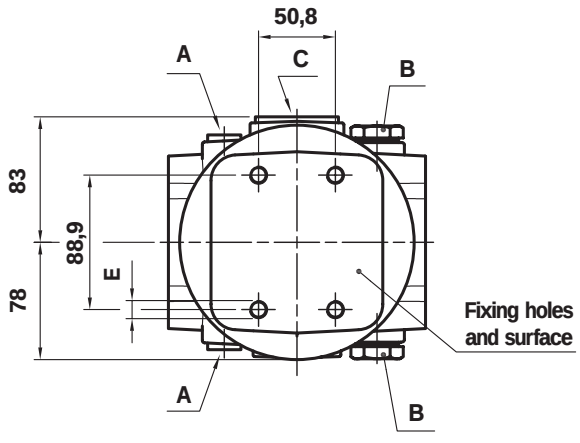
Length 5 - 6

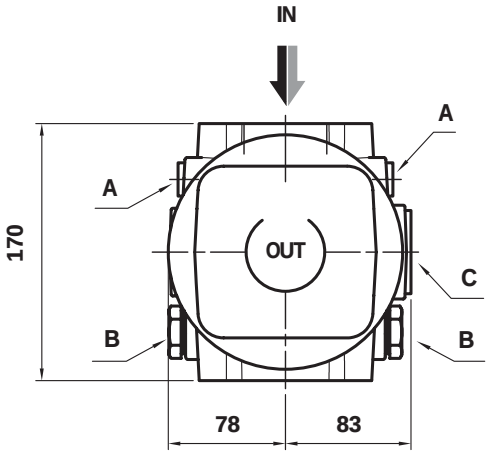


LMP 401

Length 5 - 6





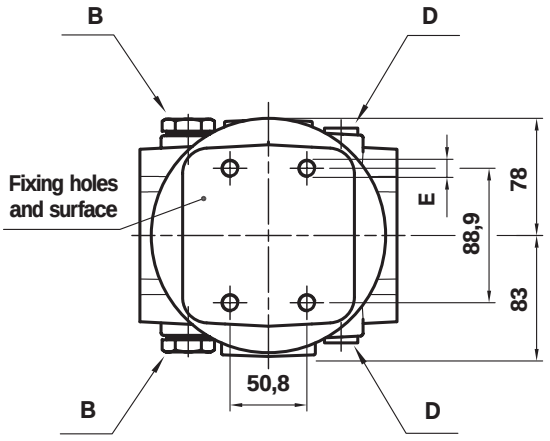


Length Filter	H mm	H1 mm	H2 mm
5	828	120	660
6	1158	120	990

A	Breather plug - G 3/8" - Ch. 8
B	Indicator connection - Plug T2 - Ch. 30
C	Bypass valve - Ch. 17
D	Oil drain plug - G 3/8" - Ch. 8

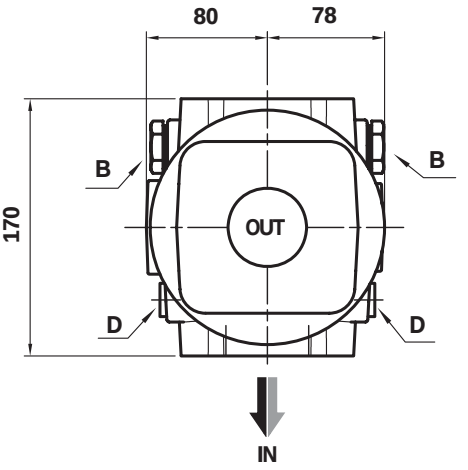
LMP 430

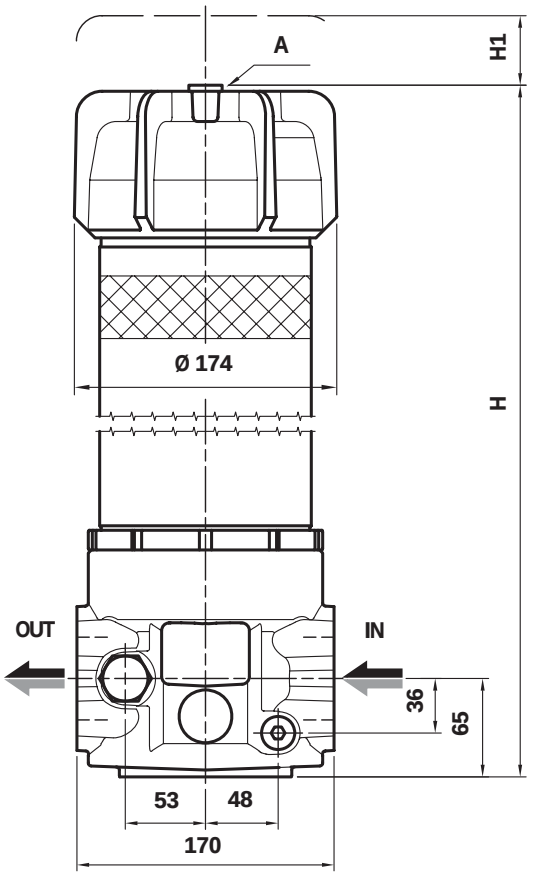
Length 5 - 6

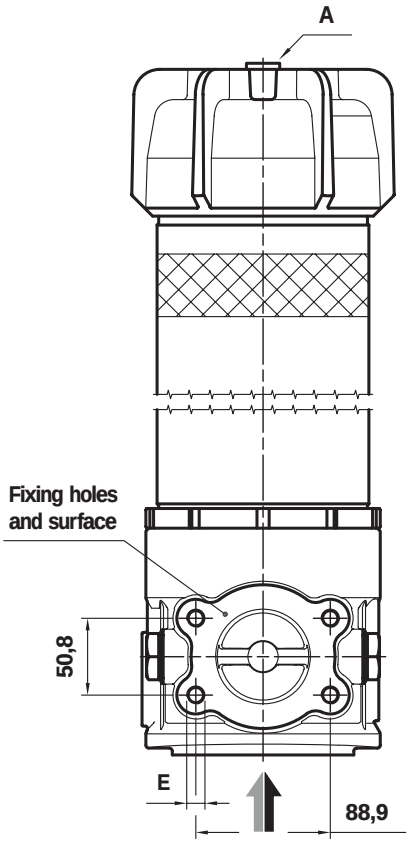


LMP 431

Length 5 - 6







Flanged IN/OUT connections	E Depth 20 mm
2" SAE 3000 psi/M	M12
2 1/2" SAE 3000 psi/M	M12
2" SAE 3000 psi/UNC	1/2" UNC
2 1/2" SAE 3000 psi/UNC	1/2" UNC

Flanged IN/OUT connections	E Depth 20 mm
G 1 1/2"	M12
G 2"	M12
1 1/2" NPT	1/2" UNC
2" NPT	1/2" UNC
SAE 24 - 1 7/8"- 12 UN	1/2" UNC
SAE 32 - 2 1/2"- 12 UN	1/2" UNC

A **Breather plug - G 3/8" - Ch. 8**

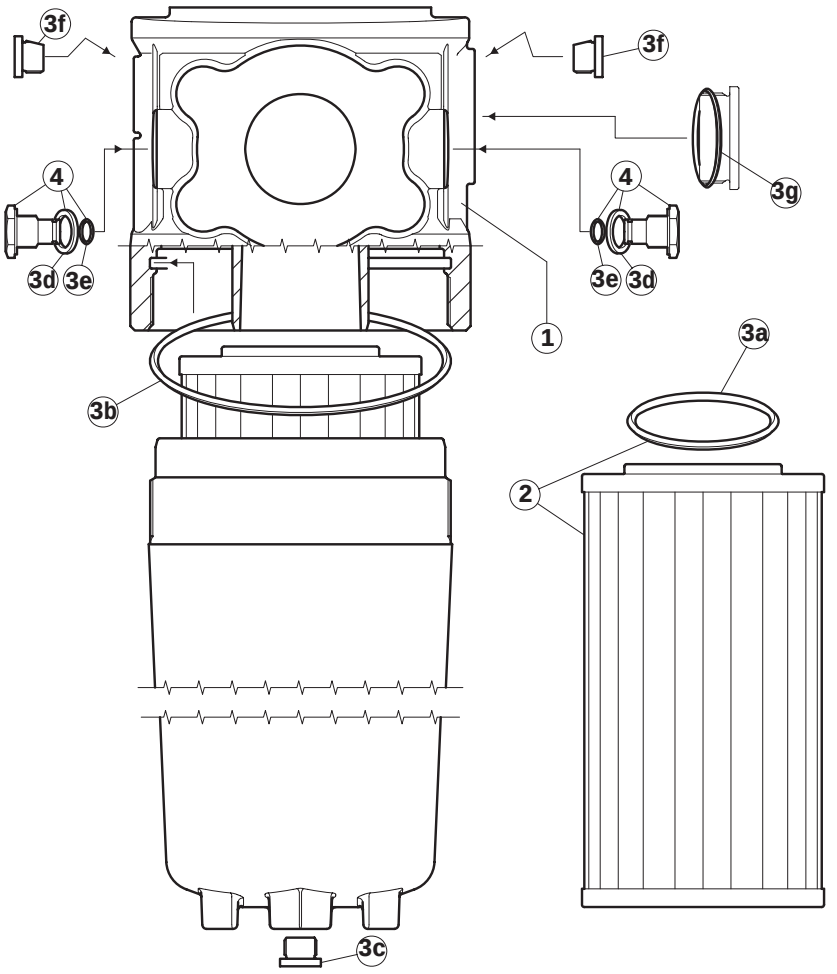
B **Indicator connection - Plug T2 - Ch. 30**

D **Oil drain plug - G 3/8" - Ch. 8**

Length Filter	H mm	H1 mm
5	828	660
6	1158	990

LMP400/401 spare parts

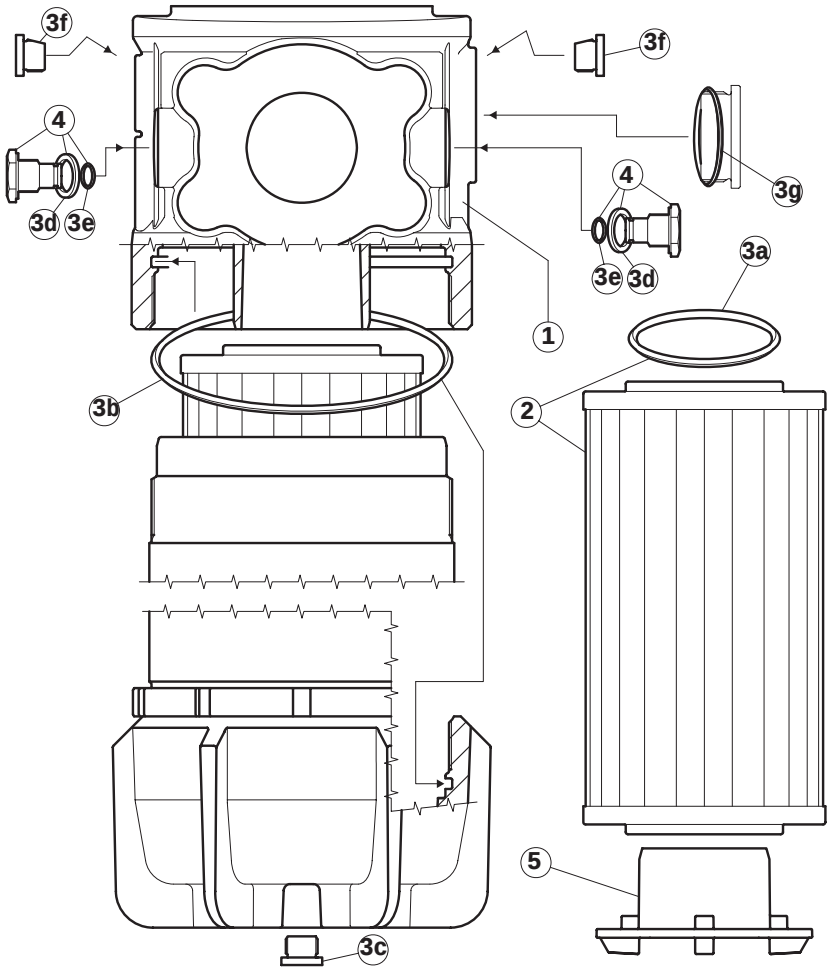
Length 2, 3, 4



Pos.	Description	Qty	FILTER Series LMP 400/401 2 - 3 - 4	
1	Filter assembly	1	See order table	
2	Filter Element	1	See order table	
3	Seals kit	1	NBR 02050391	FPM 02050392
3a	Filter element O-Ring	1	O-R 3237 Ø 59,99 x 2,62	
3b	O-Ring for housing	1	O-R 4525 Ø 132,95 x 3,53	
3c	Oil drain plug	1	G 3/8" with seal	
3d	Bonded seal	2	01030058	01030046
3e	O-Ring	2	O-R 2050 Ø 12,42 x 1,78	
3f	Breather plug	2	01029436	
3g	By-pass plug O-Ring	1	O-R 3193 Ø 48,90 x 2,62	
4	Indicator connection plug	2	T2H	T2V
-	Indicators	1	See order table	

LMP 400/401 spare parts

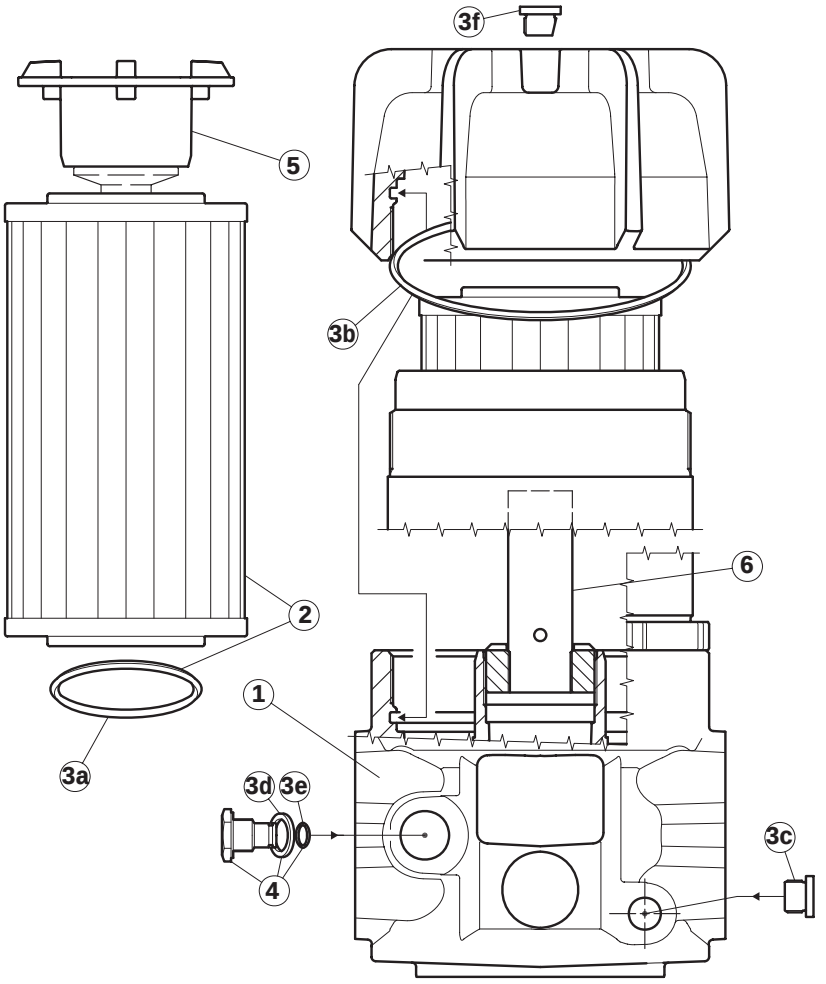
Length 5, 6



Pos.	Description	Qty	FILTER Series LMP 400/401 5 - 6	
1	Filter assembly	1	See order table	
2	Filter Element	1	See order table	
3	Seals kit	1	NBR 02050393	FPM 02050394
3a	Filter element O-Ring	2	O-R 3237 Ø 59,99 x 2,62	
3b	O-Ring for housing	2	O-R 4525 Ø 132,95 x 3,53	
3c	Oil drain plug	1	G 3/8" with seal	
3d	Bonded seal	2	01030058	01030046
3e	O-Ring	2	O-R 2050 Ø 12,42 x 1,78	
3f	Breather plug	2	01029436	
3g	By-pass plug O-Ring	1	O-R 3193 Ø 48,90 x 2,62	
4	Indicator connection plug	2	T2H	T2V
5	Housing spigot	1	01044108	
-	Indicators	1	See order table	

LMP430 / 431 spare parts

Length 5, 6



Pos.	Description	Qty	FILTER Series LMP 430 / 431 5 - 6	
1	Filter assembly	1	See order table	
2	Filter Element	1	See order table	
3	Seals kit	1	NBR 02050395	FPM 02050396
3a	Filter element O-Ring	2	O-R 3237 Ø 59,99 x 2,62	
3b	O-Ring for housing	2	O-R 4525 Ø 132,95 x 3,53	
3c	Oil drain plug	2	G 3/8" with seal	
3d	Bonded seal	2	01030058	01030046
3e	O-Ring	2	O-R 2050 Ø 12,42 x 1,78	
3f	Breather plug	1	01029436	
4	Indicator connection plug	2	T2H	T2V
5	Housing spigot	1	Spigot no by-pass 01044108 Spigot with by-pass 02001414	
6	Tube assembly	1	Length 5 - 02025041 Length 6 - 02025042	
-	Indicators	1	See order table	

Ordering information LMP400÷431

Filter assembly
LMP

	1	2	3	4	5	6	7	8 a
	☐	☐	☐	☐	☐	☐	☐	☐
Example: LMP	**400**	**4**	**B**	**A**	**G3**	**A10**	**N**	**P01**

Filter Element
CU 400

	2	6	4	7	8 b
	☐	☐	☐	☐	☐
Example: CU400	**4**	**A10**	**A**	**N**	**P01**

1 - Sizes

400	**430**
401	**431**

2 - Filter length

2	LMP 430 - 431 excluded
3	
4	
5	
6	

3 - Valves

S	Without by-pass
B	With by-pass

4 - Seals

A	NBR
V	FPM (series P10 - P25 filter elements excluded)

5 - Connections

Type	
G1	G 1 1/2"
G2	G 2"
G3	1 1/2" NPT
G4	2" NPT
G5	SAE 24 (1 7/8" 12 UN)
G6	SAE 32 (2 1/2" 12 UN)
F1	2" SAE 3000 PSI/M
F2	2 1/2" SAE 3000 PSI/M
F3	2" SAE 3000 PSI/UNC
F4	2 1/2" SAE 3000 PSI/UNC

6 - Filter element

A03	3 µm	**A16**	16 µm	Absolute filtration Inorganic microfibre ßx (c) ≥ 1000 see page 9
A06	6 µm	**A25**	25 µm	
A10	10 µm			
M25	25 µm	**M90**	90 µm	Nominal Filtration Metal mesh see page 9
M60	60 µm			
P10	10 µm			Nominal Filtration Cellulose see page 9
P25	25 µm			

7 - Filter elements series

N	Δp 20 bar
W	Δp 20 bar (aqueous emulsions - water and glycol, not available for series P10 - P25 filter elements)

8 - Options

a - Filter

P01	MP Standard filters
P02	LMP 400 - 401 Maintenance from base of housing (lengths 5 and 6 only)
P02	LMP 430 - 431 With internal tube for reduced flow rate
Pxx	Customer request

b - Filter elements

P01	MP Standard filters
Pxx	Customer request

DIFFERENTIAL INDICATORS (see page 12)

LMD 400 - 401
431

LMD

SERIES 400 - 401 431

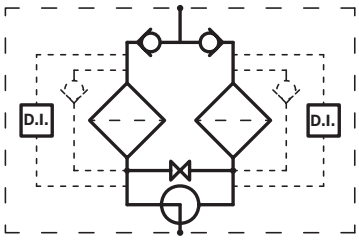
LMD 431

Working pressure
16 bar

LMD 401

LMD 400

LMD 400 - 401 - 431
Duplex filter



Technical data

Filter housings (Materials)

- Head: Anodised Aluminium
- Housing: Anodised Aluminium
- Manifolds: Steel - Painted black
- Bypass valve: Steel / Stainless steel
- 3-way ball valve: - Steel housings
  - Stainless steel ball
- Valve: phosphated steel - ASI 304

Pressure

- SAE Flange
- Working pressure: 16 bar (1.6 MPa)
- Test pressure: 25 bar (2.5 MPa)

Temperature

- From -25°C to +110°C

Bypass valve

- Opening pressure 3.5 bar ±10%
- Other opening pressures on request.

Filter elements Δp

- Series N and W elements: 20 bar
- Oil flow from exterior to interior.

Seals

- Standard FPM series V

Weights (kg)

Length	
• LMD400/401 4	60
• LMD400/401 5	65
• LMD400/401 6	72
• LMD431 5	68
• LMD431 6	75

Volumes (dm^3)

Length	
• LMD400/401/431 4	18
• LMD400/401/431 5	24
• LMD400/401/431 6	32

Connections

Inlet/Outlet

- Twin vertically mounted (excluded version LMD400)
- In-line

Compatibility

- Housings compatible with:
  Mineral oils to ISO 2943 - aqueous emulsions
  synthetic fluids, water and glycol.
- The filter elements are compatible with:
  Mineral oils to ISO 2943, Synthetic fluids
  Aqueous emulsions, water and glycol (series W required).
- NBR seals series A, compatible with:
  Mineral oils to ISO 2943 - aqueous emulsions
  synthetic fluids, water and glycol.
- V series FPM seals, compatible with:
  Synthetic fluids type HS-HFDR-HFDS-HFDU
  To ISO 2943

Filter Element Area of Working Housing / Housings

Filter element in stainless steel mesh

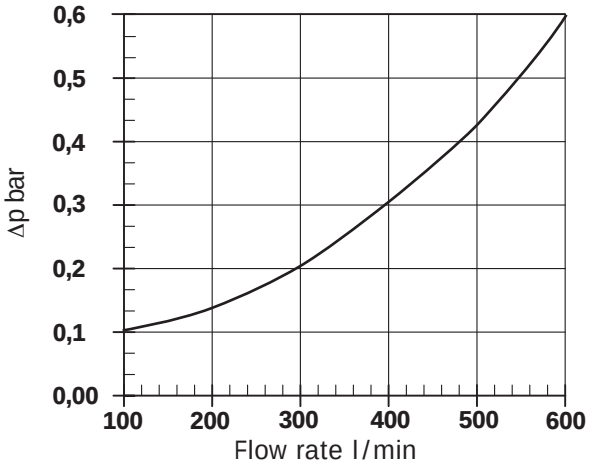
	LMD 400/401/431 Length		
Type	**4**	**5**	**6**
CU400	6550	10200	15300
	Values expressed in cm^2		

Filter housings Δp pressure drop

The curves are plotted utilising mineral oil with density of 0.86 kg/dm^3 to ISO 3968.

Δp varies proportionally with density.

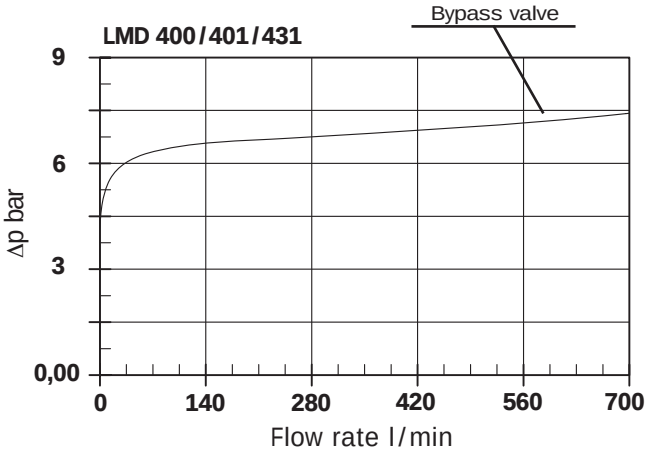
LMD 400/401/431
Δp Housings

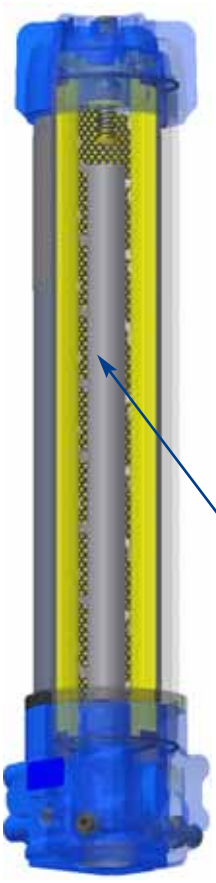


Valves

Bypass valve pressure drop

For individual filter





Option P02 “Internal tube for reduced flow rate” is recommended for flow rate values below: 150 l/min.
The use of option P02 makes it easier to fill the housing with the operating fluid.

P02 “Internal tube for reduced flow rates”

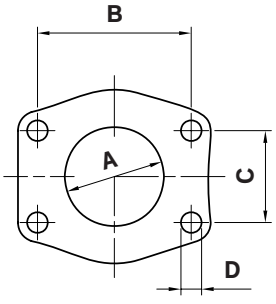
Recommended maximum flow rate

Recommended maximum flow rate for filters installed on lubrication lines, return or in-line filters is defined by the maximum oil velocity in the connections.
For filters mounted on Off-Line lines the maximum recommended flow rate is defined by the pressure drop of the filter element.

Filter for pressurised lubrication, max. oil velocity 2.5 m/sec.
Return or in-line filter, max oil velocity 5 m/sec.

Flange Connection

Flange
2 1/2” SAE 3000 psi



	Connections
Oil velocity	2 1/2”
2,5 m/sec.	500
5 m/sec.	1000

Flow rate l/min

Connections Flange IN-OUT	2 1/2” SAE 3000 psi/M	2 1/2” SAE 3000 psi/UNC
A	63	63
B	88,90	88,90
C	50,80	50,80
D	M12	1/2” UNC

Recommended maximum flow rate

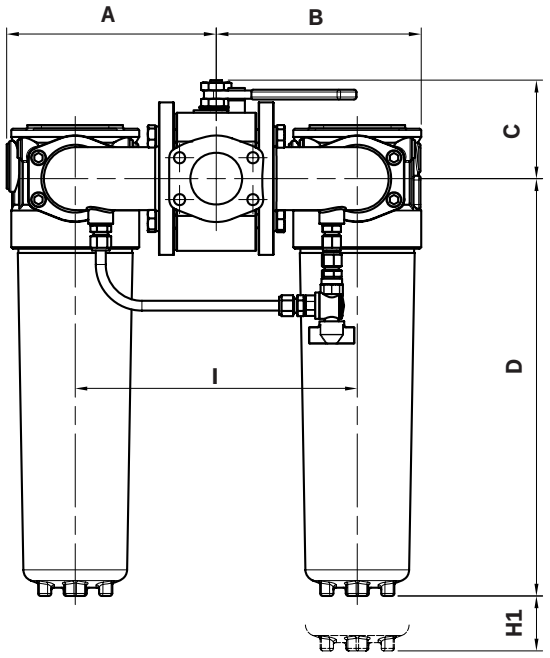
- Pressure drop of filter assembly equal to Δp 0.6 bar.
- Oil kinematic viscosity 30 mm²/s (cSt).
- Density 0.86 kg/dm³.

Filter element type	Flow rate l/min Series N	Filter Type	Length
A03	265	LMD 400 LMD 401	4
A06	310		
A10	410		
A16	430		
A25	485		
P10	500		
P25	520		
M25	570		
A03	355	LMD 400 LMD 401 LMD 431	5
A06	385		
A10	465		
A16	500		
A25	540		
P10	530		
P25	540		
M25	580		
A03	390	LMD 400 LMD 401 LMD 431	6
A06	440		
A10	510		
A16	520		
A25	560		
P10	540		
P25	555		
M25	590		

Dimensions

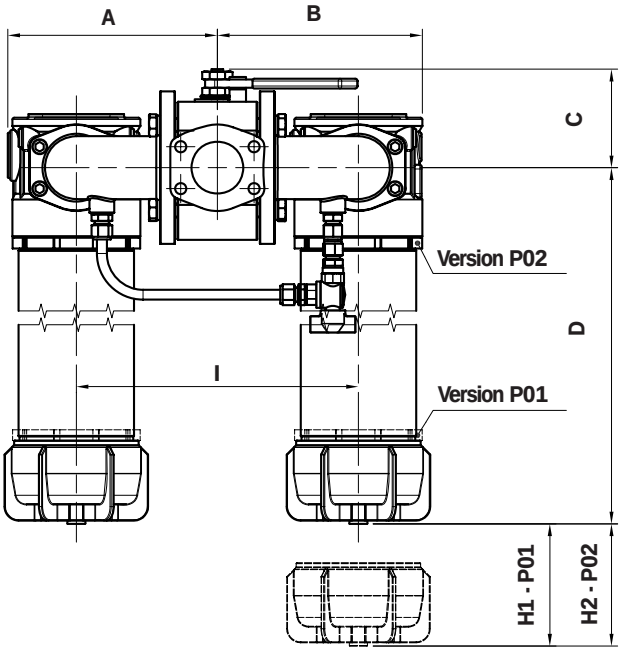
LMD 400

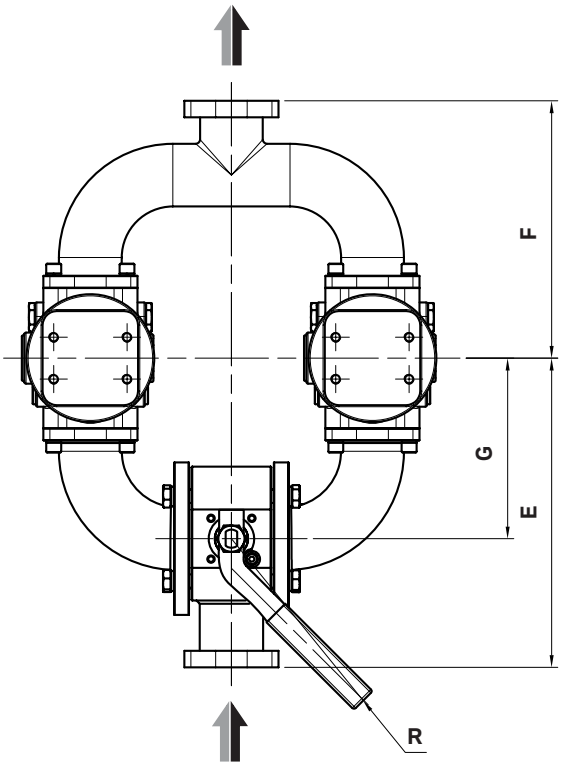
Length 4



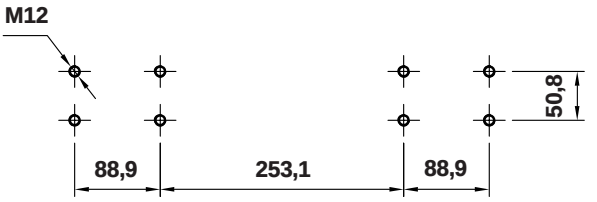
LMD 400

Length 5 - 6





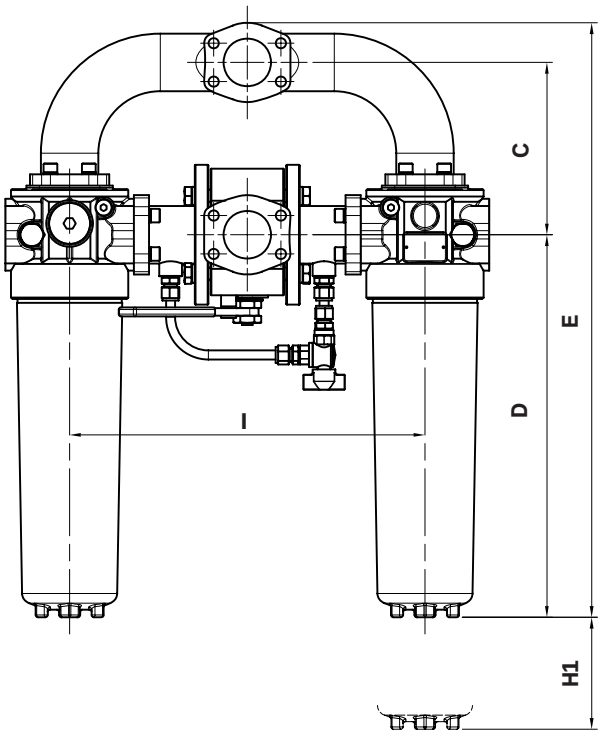
Filter fixing holes LMD 400

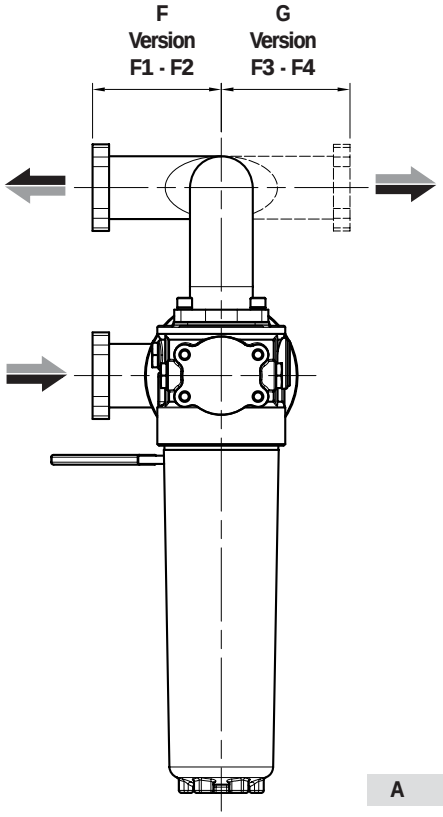


	Length 4	Length 5	Length 6
A	255	255	255
B	255	255	255
C	120	120	120
D	513	765	1095
E	351	351	351
F	285	285	285
G	195	195	195
H1	120	120	120
H2	-	660	990
I	342	342	342
R	255	255	255

LMD 401

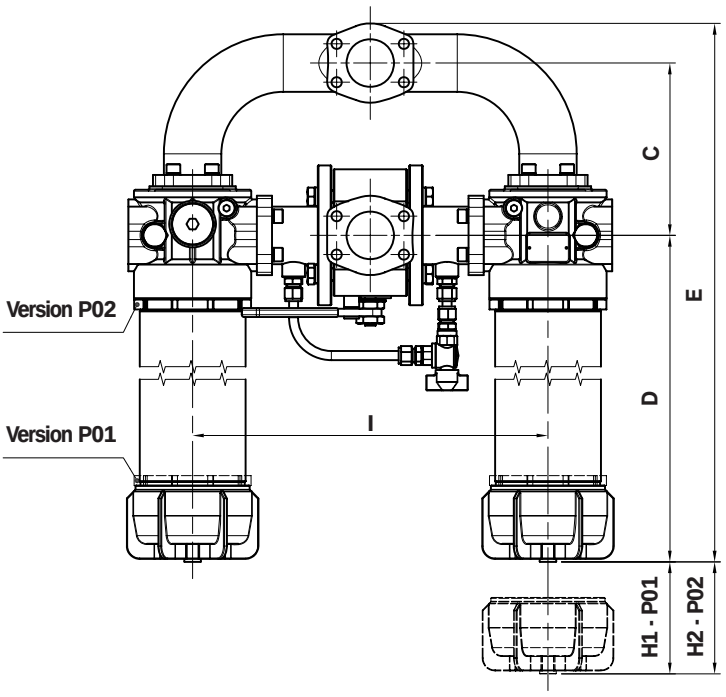
Length 4

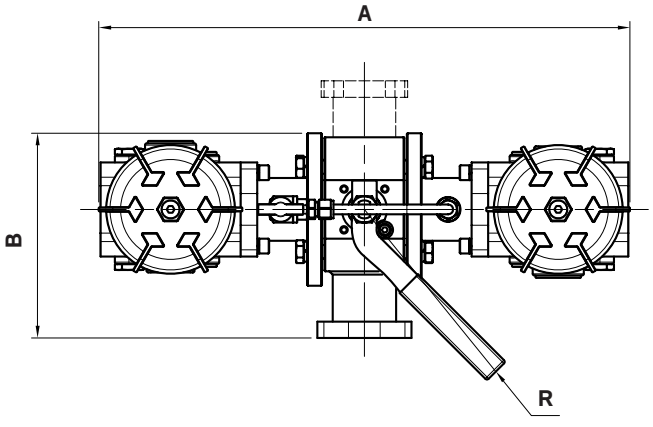




LMD 401

Length 5 - 6



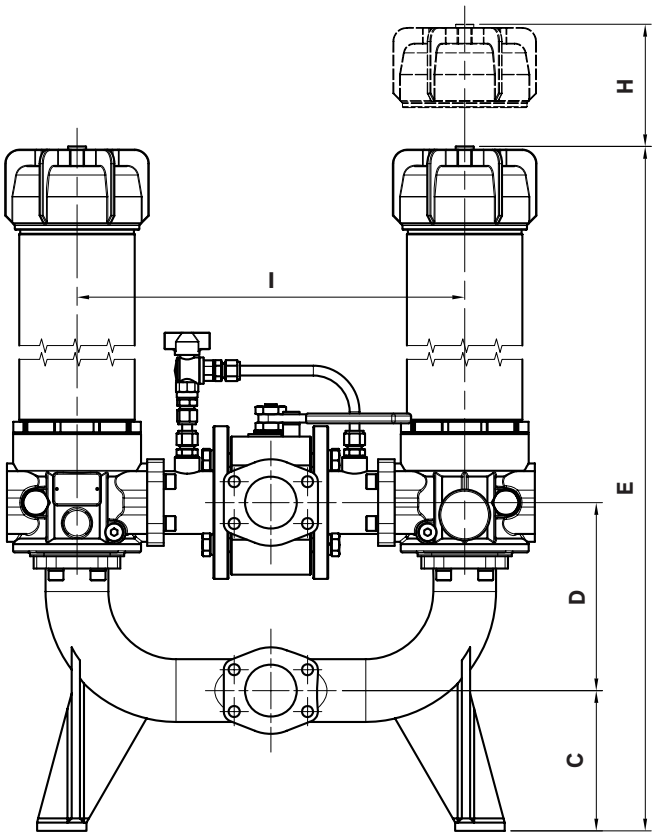


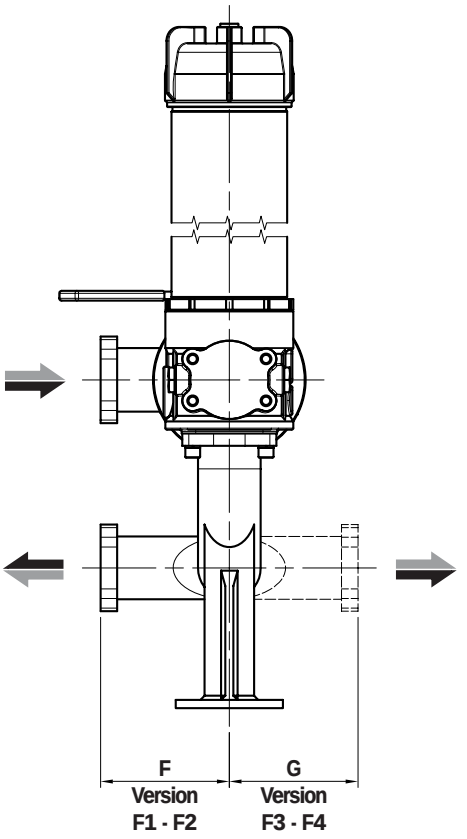
	Length 4	Length 5	Length 6
A	640	640	640
B	250	250	250
C	228	228	228
D	513	765	1095
E	796	1048	1378
F	156	156	156

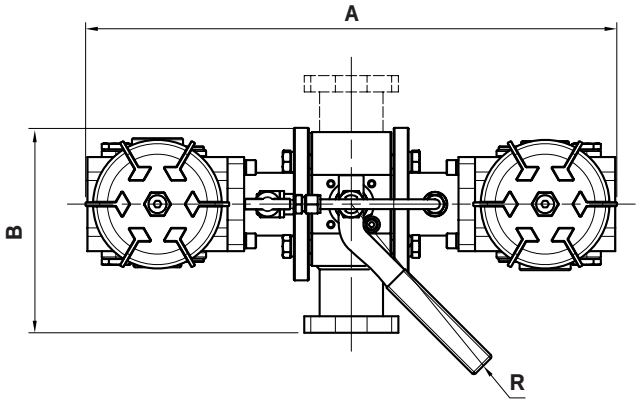
	Length 4	Length 5	Length 6
G	156	156	156
H1	120	120	120
H2	-	660	990
I	470	470	470
R	255	255	255

LMD 431

Length 5 - 6

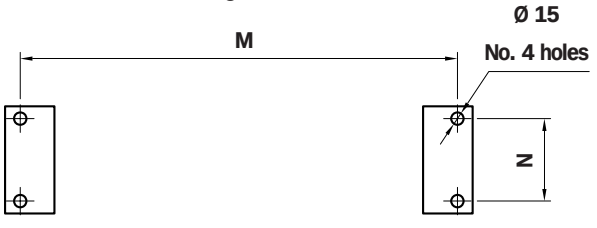




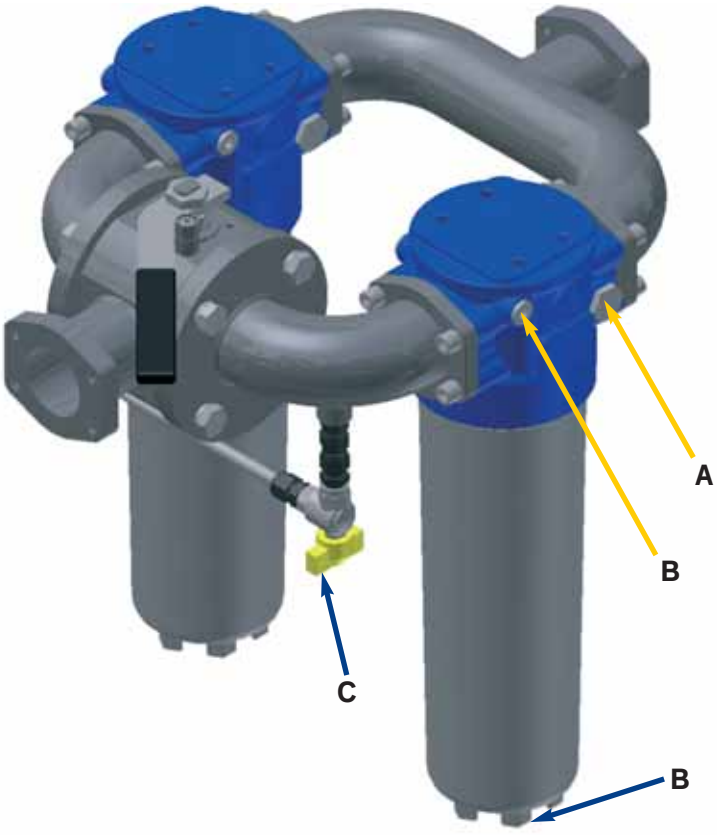


	Length 5	Length 6
A	640	640
B	250	250
C	170	170
D	228	228
E	1165	1495
F	156	156
G	156	156
H	660	990
I	470	470
M	530	530
N	100	100
R	255	255

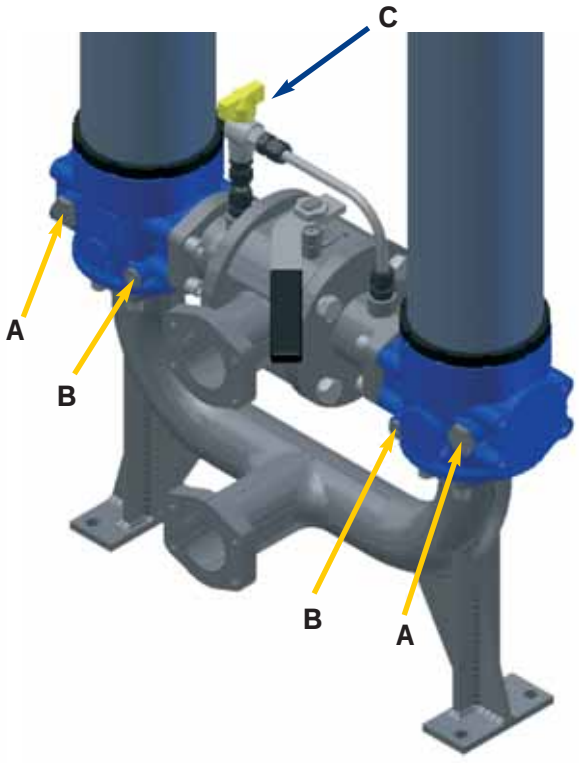
Filter fixing holes LMD 431



LMD 400



LMD 431



A Indicator connection plug T2 Ch. 30

B Oil drain plug G 1/2" Ch. 10

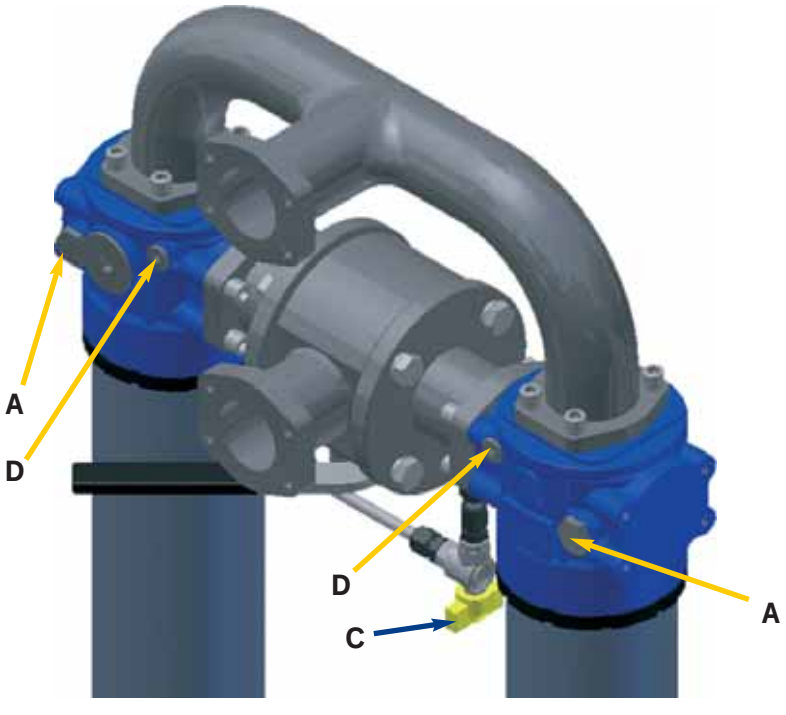
C Compensation valve

D Breather plug G 1/2" Ch. 10

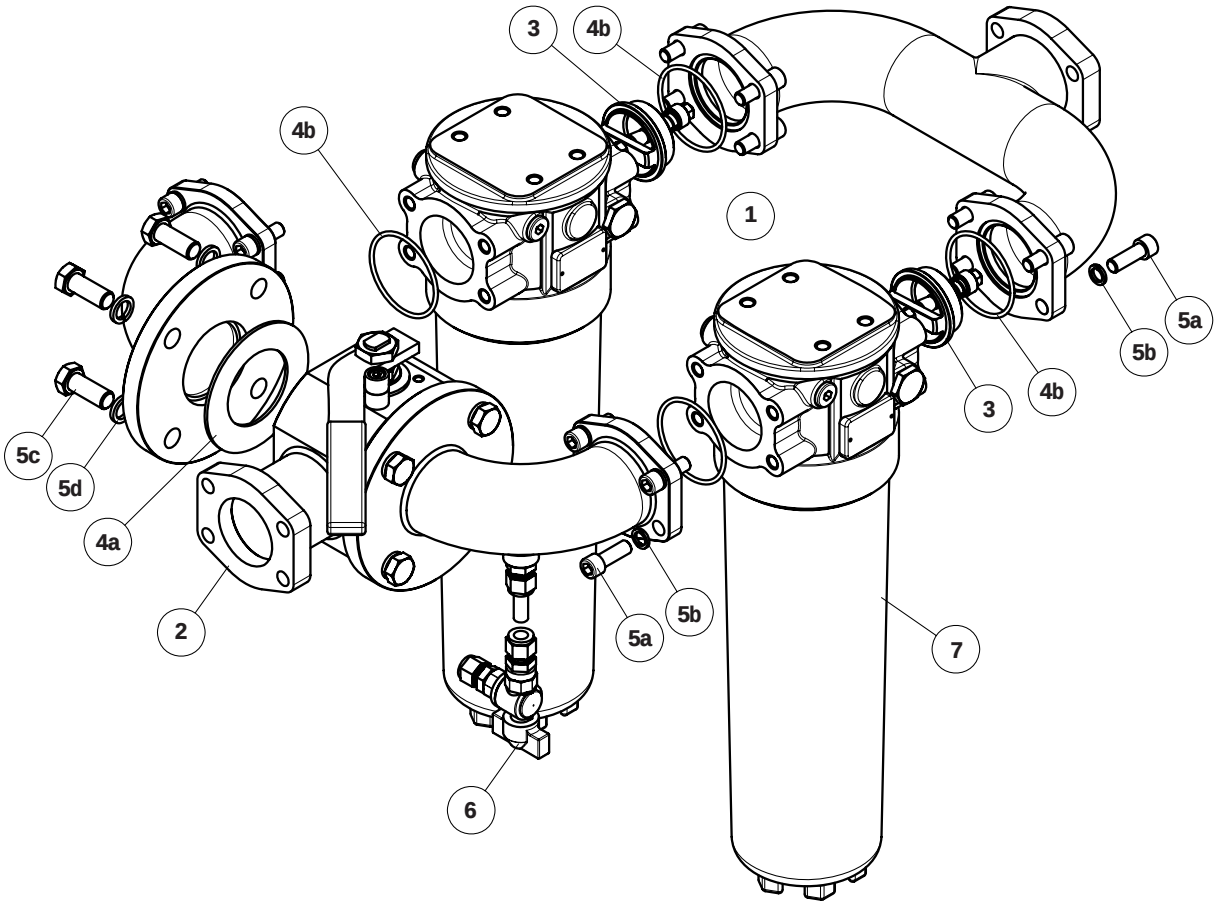
Differential indicator:

LMD 400 - 401 - 431 Fit one indicator per individual filter assembly

LMD 401

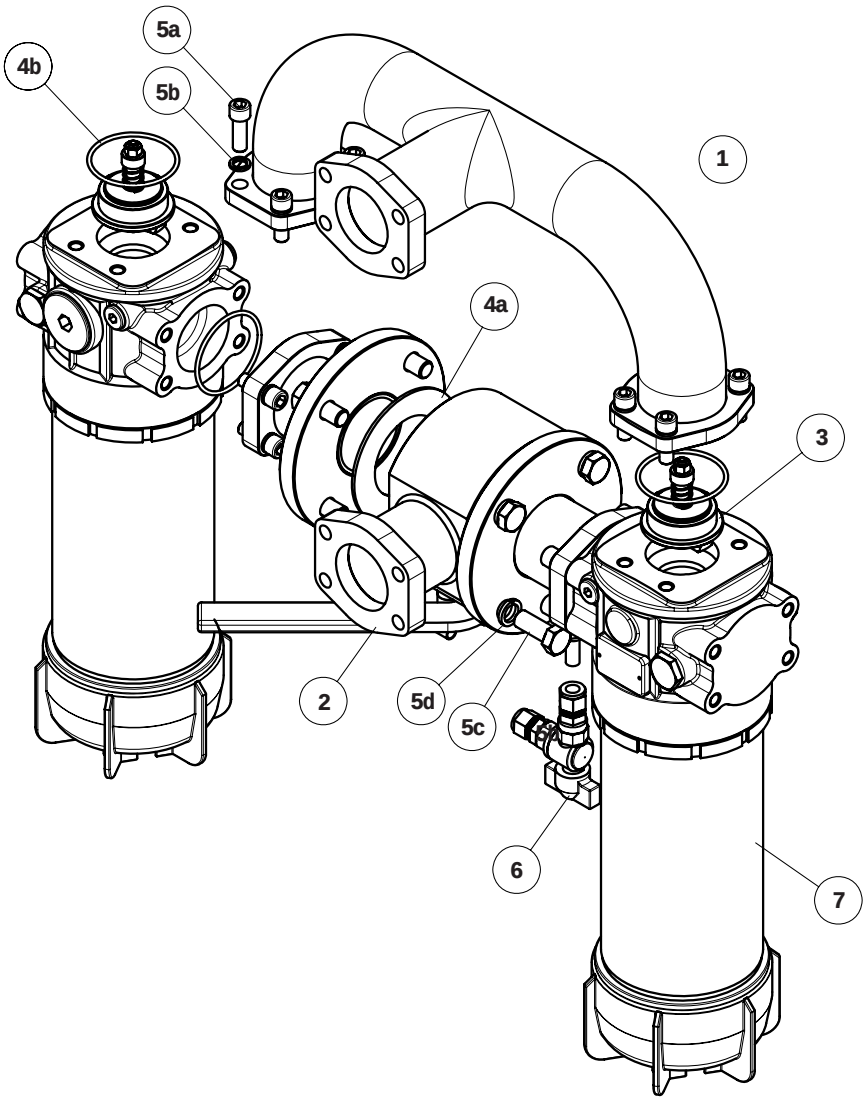


LMD 400 spare parts



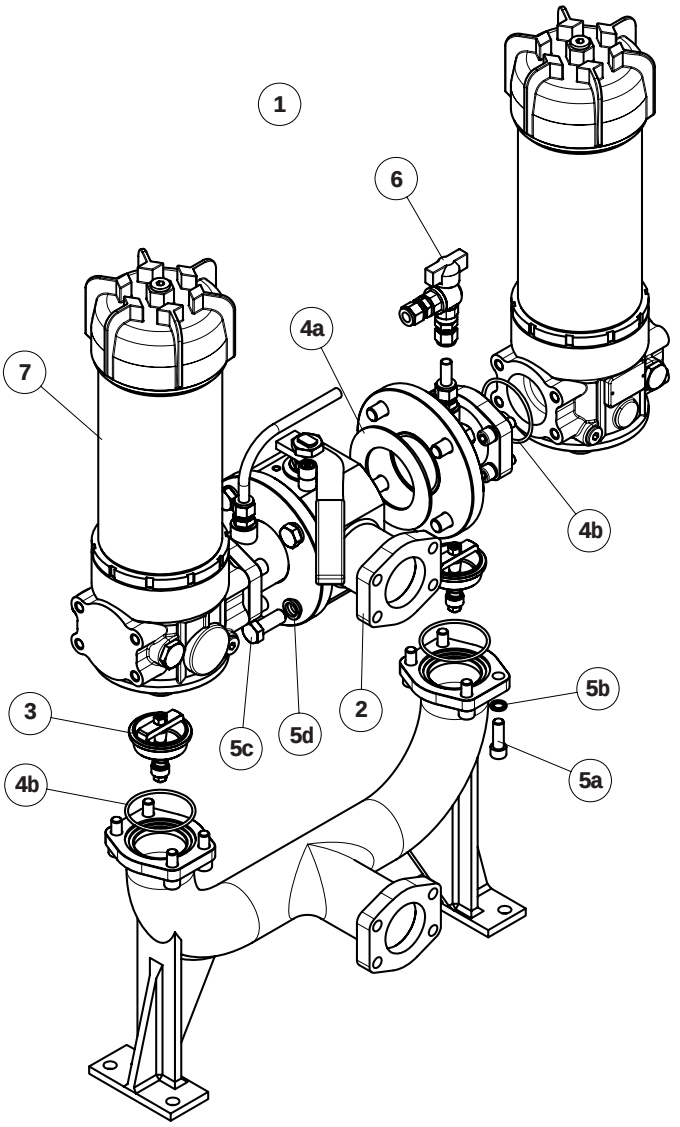
Pos.	Description	Qty	FILTER Series LMD 400
1	Filter assembly	1	See order table
2	3-way ball valve PN 16	1	2 1/2" SAE 3000 psi/M 02001440 2 1/2" SAE 3000 psi/UNC 02001441
3	One-way valve	2	02001429
4	Seals kit	1	02050399
4a	Flat seal	2	To DN 65
4b	IN-OUT O-Ring	4	O-R 4287
5	Threaded fasteners kit	1	02049062
5a	Allen screw	16	UNI 5931 - M12 x 35 - 10.9
5b	Circlips	16	UNI 1751-B 12
5c	Screw hexagon head	8	UNI EN 24017 - M16 x 40 - 10.9
5d	Circlips	8	UNI 1751-B 16
6	Kit ball valve with hose fitting	1	02025043
7	Filter	2	See order table LMP400xF2..... pag. 49
-	Indicators	2	See order table

LMD 401 spare parts



Pos.	Description	Qty	FILTER Series LMD 401
1	Filter assembly	1	See order table
2	3-way ball valve PN 16	1	2 1/2" SAE 3000 psi/M 02001440 2 1/2" SAE 3000 psi/UNC 02001441
3	One-way valve	2	02001429
4	Seals kit	1	02050399
4a	Flat seal	2	To DN 65
4b	IN-OUT O-Ring	4	O-R 4287
5	Mounting set accessories	1	02049062
5a	Allen screw	16	UNI 5931 - M12 x 35 - 10.9
5b	Circlips	16	UNI 1751-B 12
5c	Screw hexagon head	8	UNI EN 24017 - M16 x 40 - 10.9
5d	Circlips	8	UNI 1751-B 16
6	Kit ball valve with hose fitting	1	02025043
7	Filter	2	See order table LMP401xF2..... pag. 49
-	Indicators	2	See order table

LMD 431 spare parts



Pos.	Description	Qty	FILTER Series LMD 431
1	Filter assembly	1	See order table
2	3-way ball valve PN 16	1	2 1/2" SAE 3000 psi/M 02001440 2 1/2" SAE 3000 psi/UNC 02001441
3	One-way valve	2	02001429
4	Seals kit	1	02050399
4a	Flat seal	2	To DN 65
4b	IN-OUT O-Ring	4	O-R 4287
5	Threaded fasteners kit	1	02049062
5a	Allen screw	16	UNI 5931 - M12 x 35 - 10.9
5b	Circlips	16	UNI 1751-B 12
5c	Screw hexagon head	8	UNI EN 24017 - M16 x 40 - 10.9
5d	Circlips	8	UNI 1751-B 16
6	Kit ball valve with hose fitting	1	02025043
7	Filter	2	See order table LMP431xF2..... pag. 49
-	Indicators	2	See order table

LMD400 / 401 / 431 ordering information

Filter assembly
LMD

	1	2	3	4	5	6	7	8 a
Example: LMD	400	5	B	V	F1	A10	N	P01

Filter Element
CU 400

	2	6	4	7	8 b
Example: CU400	5	A10	A	N	P01

1 - Sizes

- **400**
- **401**
- **431**

2 - Filter length

- **4** LMD 431 excluded
- **5**
- **6**

3 - Valves

- **S** Without by-pass
- **B** With by-pass

4 - Seals

a - Filter

- **V** FPM

b - Filter elements

- **A** NBR
- **V** FPM (excluded series P10 and P25)

5 - Connections

Type

- **F1** 2 1/2" SAE 3000 psi/M
- **F2** 2 1/2" SAE 3000 psi/UNC
- **F3** = F1 In-line connections (only LMD 401 - 431)
- **F4** = F2 In-line connections (only LMD 401 - 431)

6 - Filter element

Absolute filtration Inorganic microfibre — ßx (c) ≥ 1000 — see page 9

- **A03** 3 µm
- **A06** 6 µm
- **A10** 10 µm
- **A16** 16 µm
- **A25** 25 µm

Nominal Filtration Metal mesh — see page 9

- **M25** 25 µm
- **M60** 60 µm
- **M90** 90 µm

Nominal Filtration Cellulose — see page 9

- **P10** 10 µm
- **P25** 25 µm

7 - Filter elements series

- **N** Δp 20 bar
- **W** Δp 20 bar (aqueous emulsions - water and glycol, not available for series P10 - P25 filter elements)

8 - Options

a - Filter

- **P01** MP Standard filters
- **P02** Maintenance from base of housing (only for length 5 - 6 / excluded LMD 431)
- **P02** LMD 431 With internal tube for reduced flow rate
- **Pxx** Customer request

b - Filter elements

- **P01** MP Standard filters
- **Pxx** Customer request

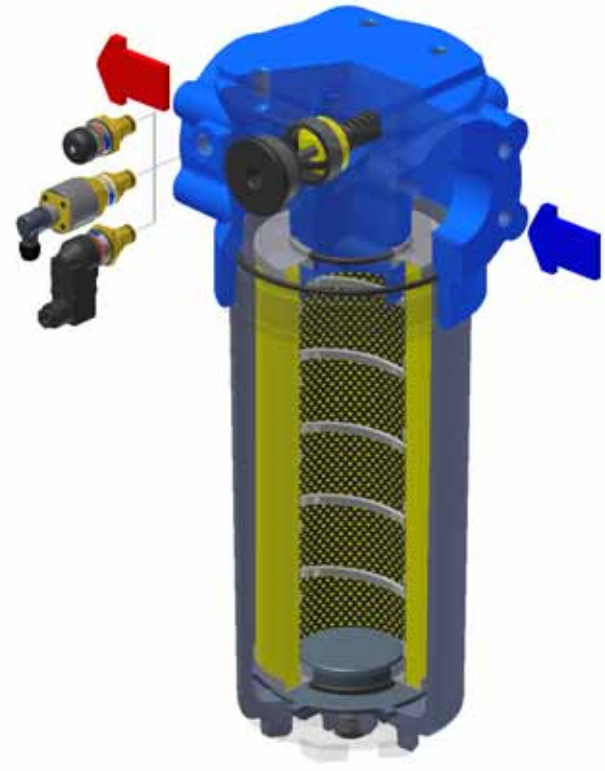
DIFFERENTIAL INDICATORS (see page 12)

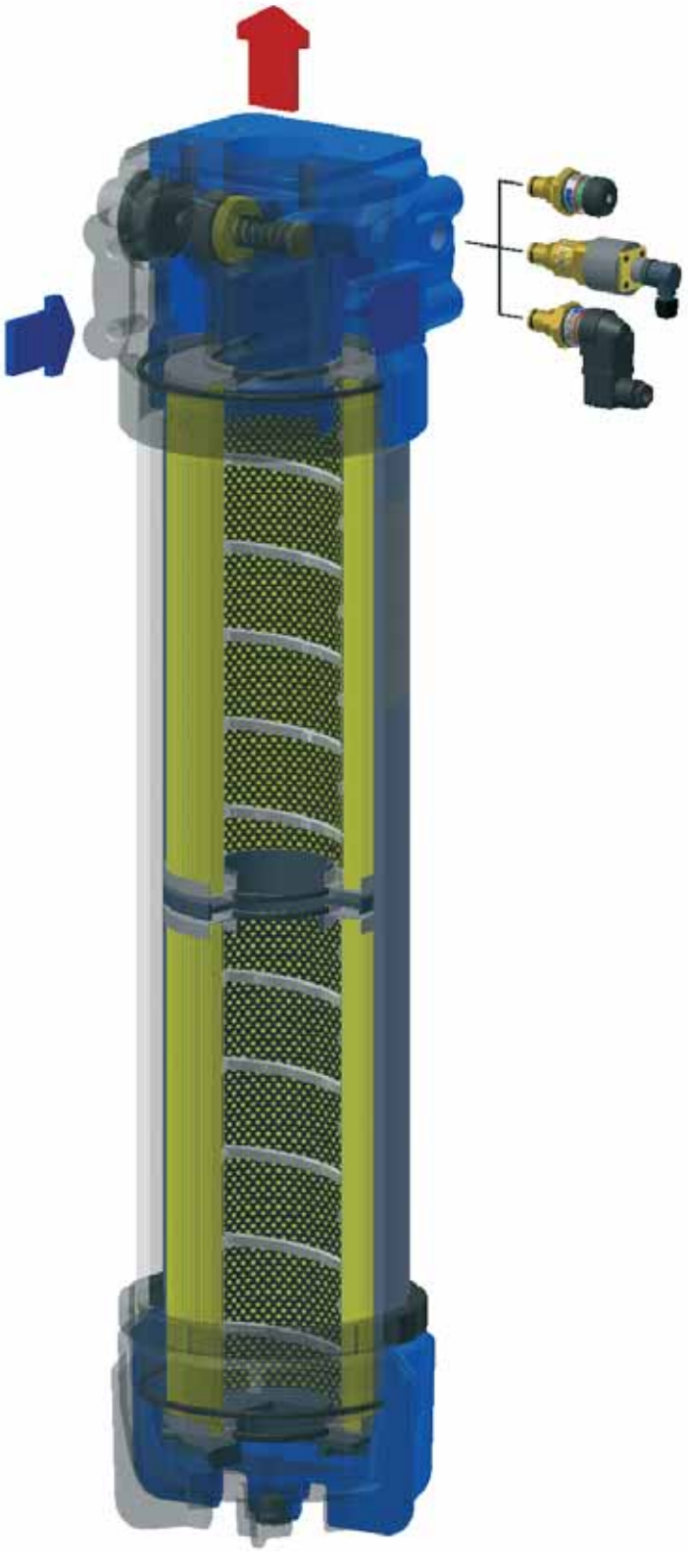
LMP 900-901

LMP

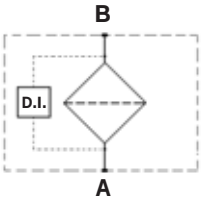
SERIES 900 - 901

Working pressure
30 bar
Filter elements in compliance with
DIN 24550 standards

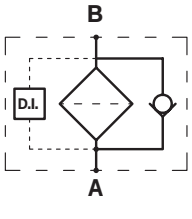




Style **S**



Style **B**



Technical data

Filter housing (Materials)

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

Pressure

- Working pressure: 30 bar (3 MPa)
- Test pressure: 45 bar (4.5 MPa)
- Burst pressure: 120 bar (12 MPa)
- Pulsed pressure fatigue test: 1.000.000 cycles with pressure from 0 to 30 bar (3 MPa)

Temperature

- From -25°C to +110°C

Bypass valve

- Opening pressure 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 in compliance with DIN 24550 standard
  Size: 1000

Elements type Δp

- Series N and W elements: 20 bar
- Oil flow from exterior to interior.

Seals

- Standard NBR series A
- Optional FPM series V

Weights (kg)

	Length
• LMP900 -1	19.2
• LMP900 -2	30.4

Volumes (dm^3)

	Length
• LMP900 -1	16
• LMP900 -2	24

Connections

In-line Inlet/Outlet LMP 900
90° Inlet/Outlet LMP 901

Compatibility

- Housings compatible with:
  Mineral oils to ISO 2943 - aqueous emulsions synthetic fluids, water and glycol.
- The filter elements are compatible with:
  Mineral oils to ISO 2943, Synthetic fluids
  Aqueous emulsions, water and glycol (series W required).
- NBR seals series A, compatible with:
  Mineral oils to ISO 2943 - aqueous emulsions synthetic fluids, water and glycol.
- V series FPM seals, compatible with:
  Synthetic fluids type HS-HFDR-HFDS-HFDU
  To ISO 2943

Filter Element Area

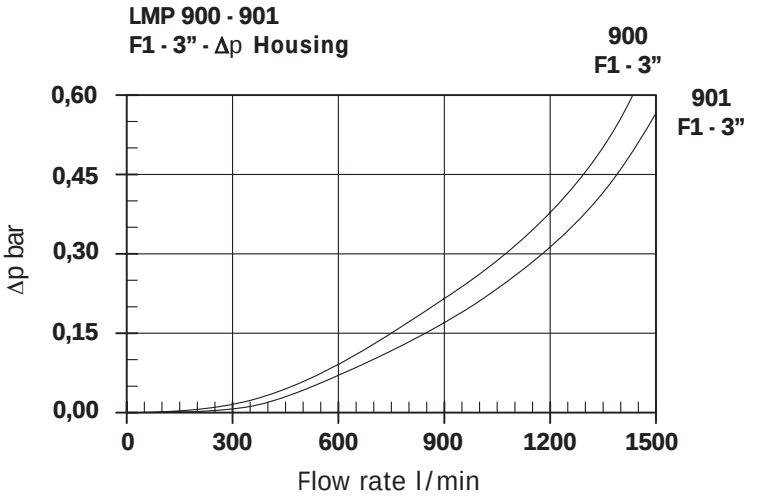
Filter element in stainless steel mesh

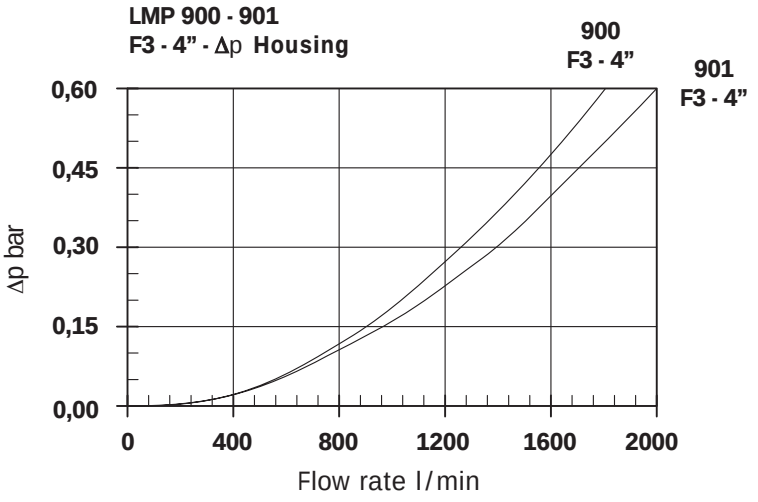
Type	Length 1	Length 2
CU 900	13000	26000
	Values expressed in **cm^2**	

Filter housing Δp pressure drop

The curves are plotted utilising mineral oil with density of 0.86 kg/dm^3 to ISO 3968.

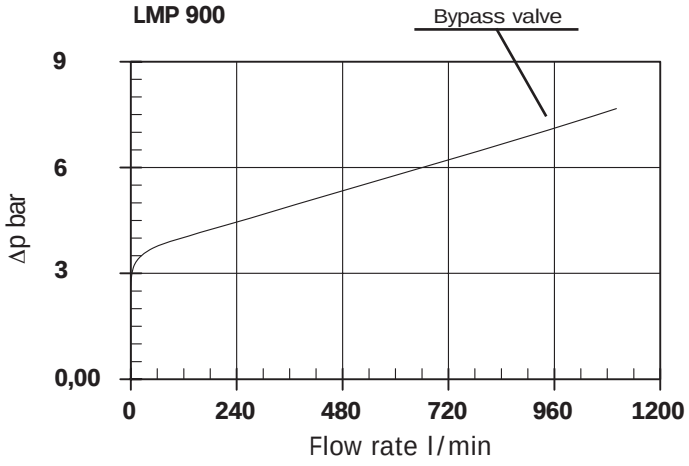
Δp varies proportionally with density.





Valves

Bypass valve pressure drop



Recommended maximum flow rate

Recommended maximum flow rate for filters installed on lubrication lines, return or in-line filters is defined by the maximum oil velocity in the connections.
For filters mounted on Off-Line lines the maximum recommended flow rate is defined by the pressure drop of the filter element.

Filter for pressurised lubrication, max. oil velocity 2.5 m/sec.
Return or in-line filter, max oil velocity 5 m/sec.

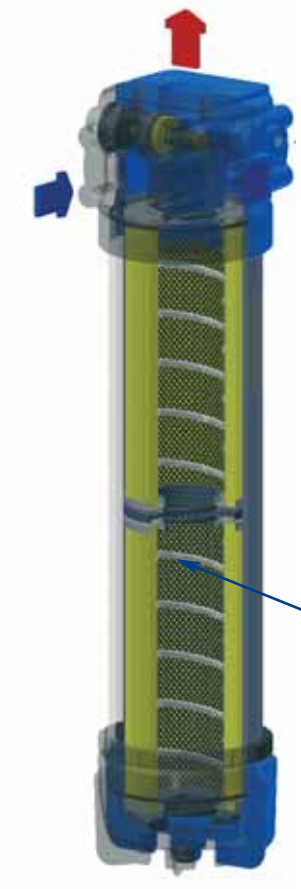
	Connections	
Oil velocity	3”	4”
2,5 m/sec.	750	1200
5 m/sec.	1500	2400

Flow rate l/min

Off-Line filter, filter element recommended maximum pressure drop must be equal to Δp 0.2 ÷ 0.3 bar.

LMP 900

Length 2



LMP 900 - 901 filters are equipped with two 1000 size cartridges in compliance with DIN 24550 standard, connected by means of a removable coupling spigot.

Recommended maximum flow rate

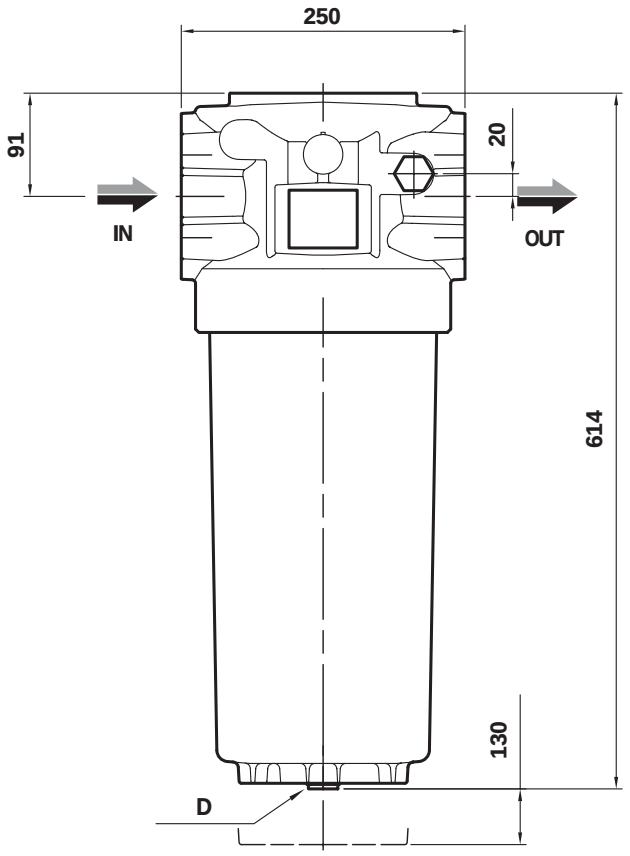
- Pressure drop of filter assembly equal to Δp 0.6 bar.
- Oil kinematic viscosity 30 mm^2/s (cSt).
- Density 0.86 kg/dm^3.

Filter element type	Flow rate l/min Series N	Filter length	Connections
A03	600	1	Flange SAE 3000 3”
A06	750		
A10	1100		
A16	1150		
A25	1250		
M25	1500		
A03	950	2	
A06	1100		
A10	1300		
A16	1350		
A25	1400		
M25	1500		
A03	650	1	Flange SAE 3000 4”
A06	800		
A10	1200		
A16	1250		
A25	1400		
M25	1900		
A03	1000	2	
A06	1200		
A10	1550		
A16	1550		
A25	1650		
M25	2000		

Dimensions

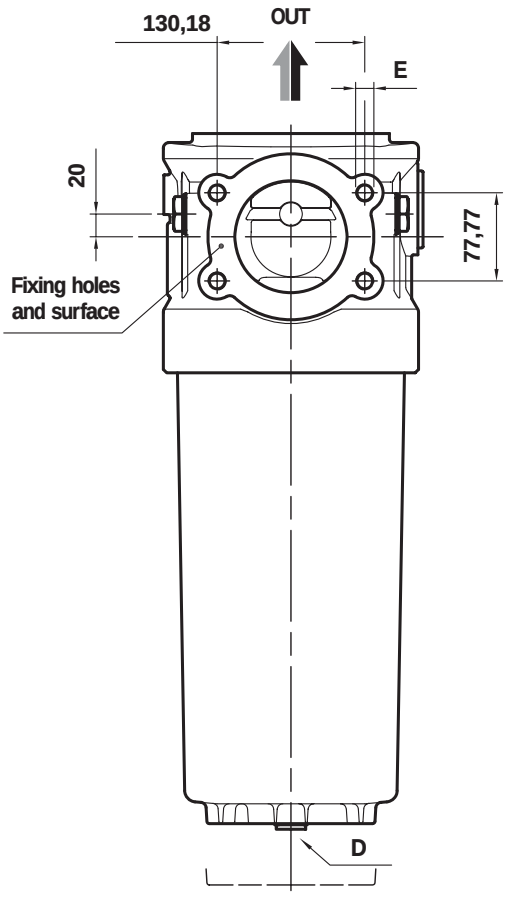
LMP 900

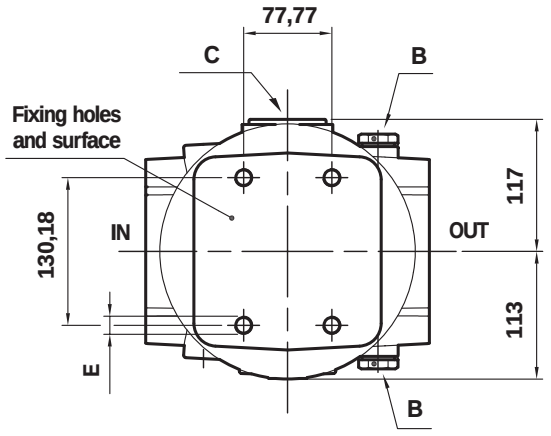
Length 1

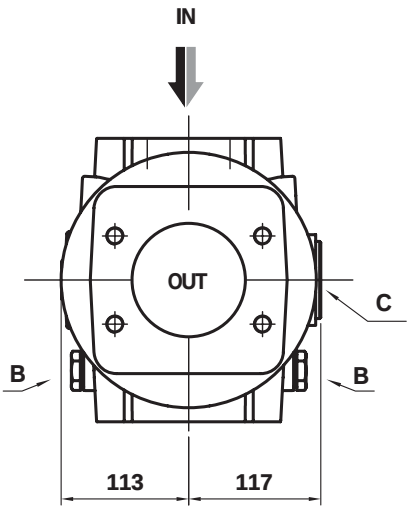


LMP 901

Length 1







Flanged IN / OUT connections	E Depth 25 mm
3" SAE 3000 psi/M	M16
4" SAE 3000 psi/M	M16
3" SAE 3000 psi/UNC	5/8" UNC
4" SAE 3000 psi/UNC	5/8" UNC

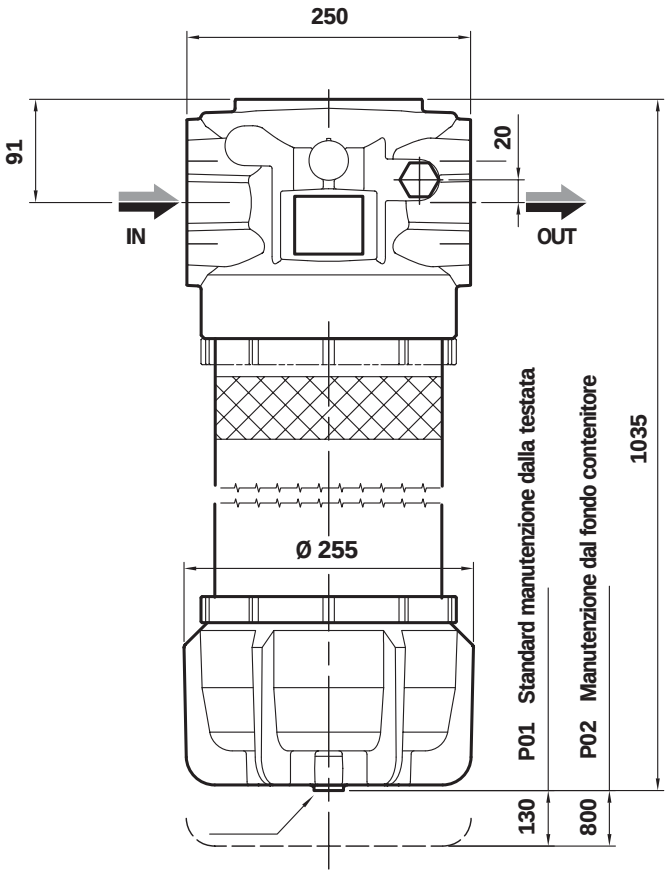
B Indicator connection - Plug T2 - Ch. 30

C Bypass valve - Ch. 17

D Oil drain plug - G 1/2" - Ch. 10

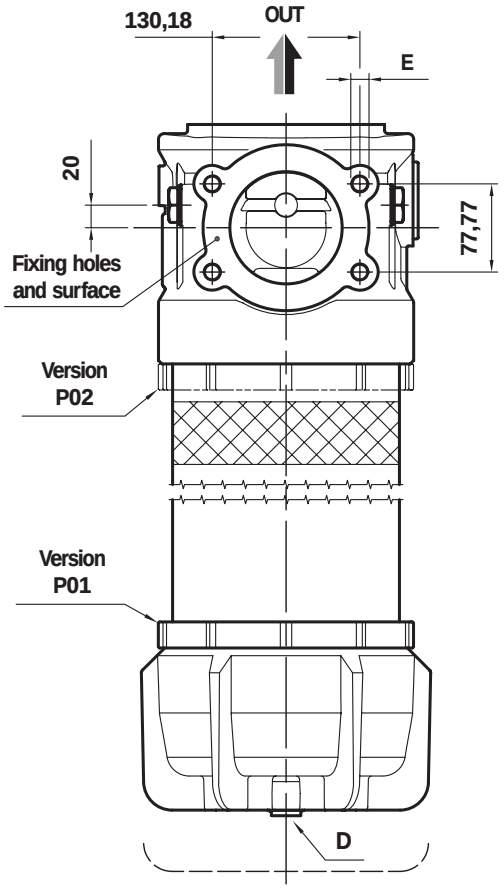
LMP 900

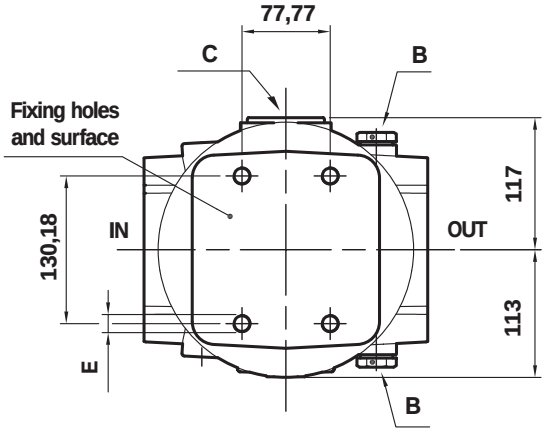
Length 2

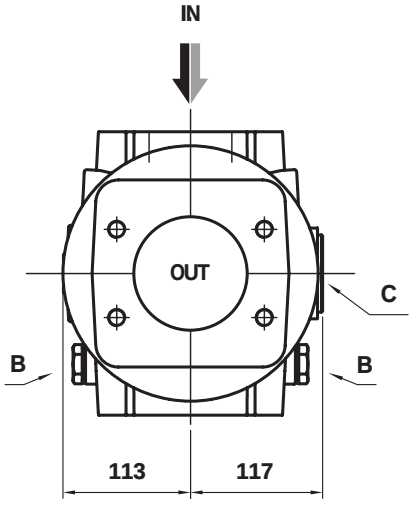


LMP 901

Length 2





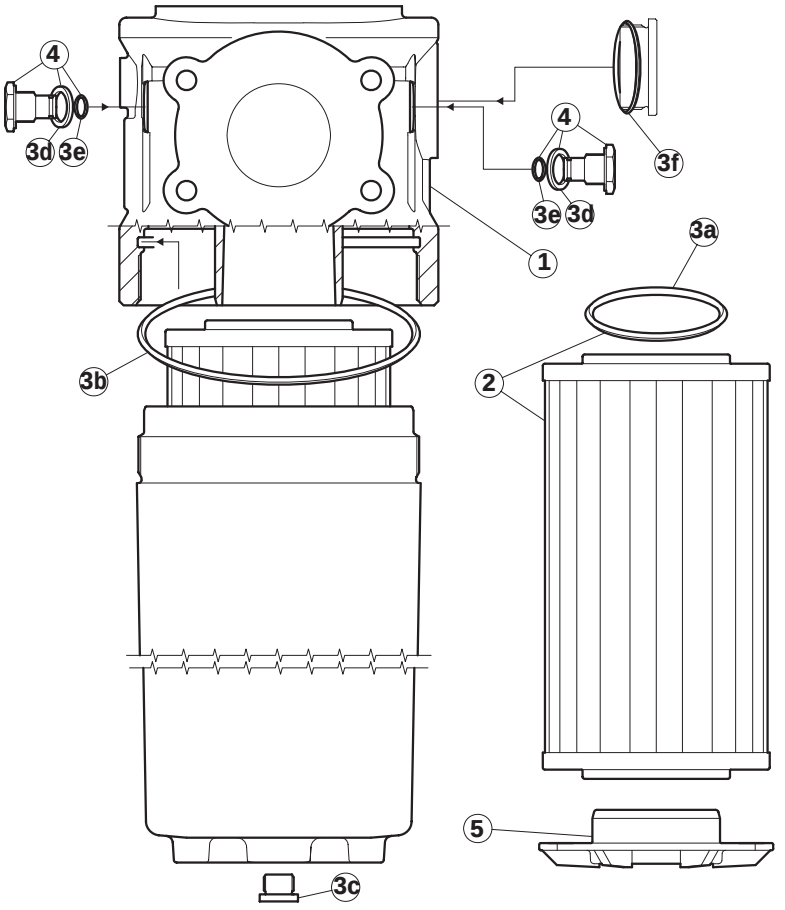


Flanged IN/OUT connections	E Depth 25 mm
3" SAE 3000 psi/M	M16
4" SAE 3000 psi/M	M16
3" SAE 3000 psi/UNC	5/8" UNC
4" SAE 3000 psi/UNC	5/8" UNC

B	Indicator connection - Plug T2 - Ch. 30
C	Bypass valve - Ch. 17
D	Oil drain plug - G 1/2" - Ch. 10

LMP900/901 spare parts

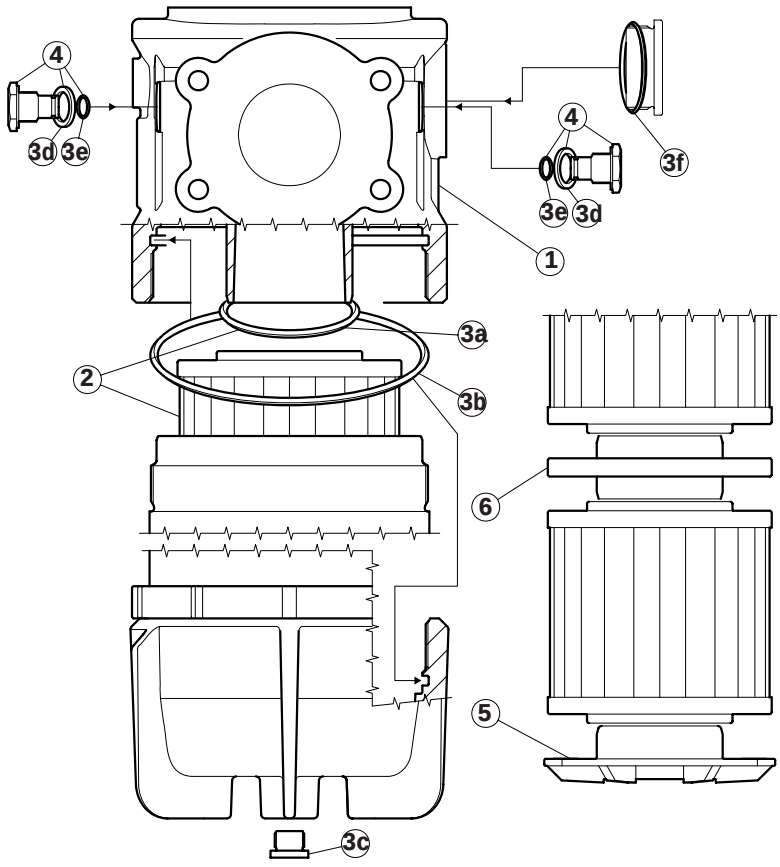
Length 1



Pos.	Description	Qty	FILTER Series LMP 900/901 - 1	
1	Filter assembly	1	See order table	
2	Filter Element	1	See order table	
3	Seals kit	1	NBR 02050363	FPM 02050364
3a	Filter element O-Ring	2	OR Ø 90 x 6 (NBR-50Sh)	
3b	O-Ring for housing	1	OR 6745 Ø 189,86 x 5,33	
3c	Oil drain plug	1	G 1/2" with seal	
3d	Bonded seal	2	01030058	01030046
3e	O-Ring	2	OR 2050 Ø 12,42 x 1,78	
3f	By-pass plug O-Ring	1	OR 3243 Ø 61,6 x 2,62	
4	Indicator connection plug	2	T2H	T2V
5	Housing spigot	1	01044104	
-	Indicator	1	See order table	

LMP 900/901 spare parts

Length 2



Pos.	Description	Qty	FILTER Series LMP 900/901 - 2	
1	Filter assembly	1	See order tablee	
2	Filter Element	2	See order table	
3	Seals kit	1	NBR 02050365	FPM 02050366
3a	Filter element O-Ring	4	O-R Ø 90 x 6 (NBR-50 Sh)	
3b	O-Ring for housing	2	O-R 6745 Ø 189,86 x 5,33	
3c	Oil drain plug	1	G 1/2" - with seal	
3d	Bonded seal	2	01030058	01030046
3e	O-Ring	2	O-R 2050 Ø 12,42 x 1,78	
3f	By-pass plug O-Ring	1	O-R 3243 Ø 61,6 x 2,62 - VITON	
4	Indicator connection plug	2	T2H	T2V
5	Housing spigot	1	01044104	
6	Coupling spigot	1	01044099	
-	Indicator	1	See order table	

LMP 900 / 901 ordering information

Filter assembly
LMP

	1	2	3	4	5	6	7	8a
Example: LMP	**900**	**2**	**B**	**A**	**F1**	**A10**	**N**	**P01**

Filter Element
CU 900

	6	4	7	8b
Example: CU900	**A10**	**A**	**N**	**P01** (2 cartridges required)

1 - Filter sizes

900	LMP900 (in-line IN-OUT)
901	LMP900 (90° IN-OUT)

2 - Filter length

1	With 1 CU900 cartridge
2	With 2 CU900 cartridges

3 - Valves

S	Without by-pass
B	With by-pass

4 - Seals

A	NBR
V	FPM

5 - Connections

Type

F1	3” SAE 3000 PSI/M
F2	3” SAE 3000 PSI/UNC
F3	4” SAE 3000 PSI/M
F4	4” SAE 3000 PSI/UNC

6 - Filter element

A03	3 µm	**A16**	16 µm	Absolute filtration Inorganic microfibre ßx (c) ≥ 1000 see page 9
A06	6 µm	**A25**	25 µm	
A10	10 µm			
M25	25 µm	**M90**	90 µm	Nominal Filtration Metal mesh see page 9
M60	60 µm			

7 - Filter elements series

N	Δp 20 bar
W	Δp 20 bar (aqueous emulsions - water and glycol)

8 - Options

a - Filters

P01	MP Standard filters
P02	Maintenance from base of housing (length 2 only)
Pxx	Customer reques

b - Filter elements

P01	MP Standard filters
Pxx	Customer reques

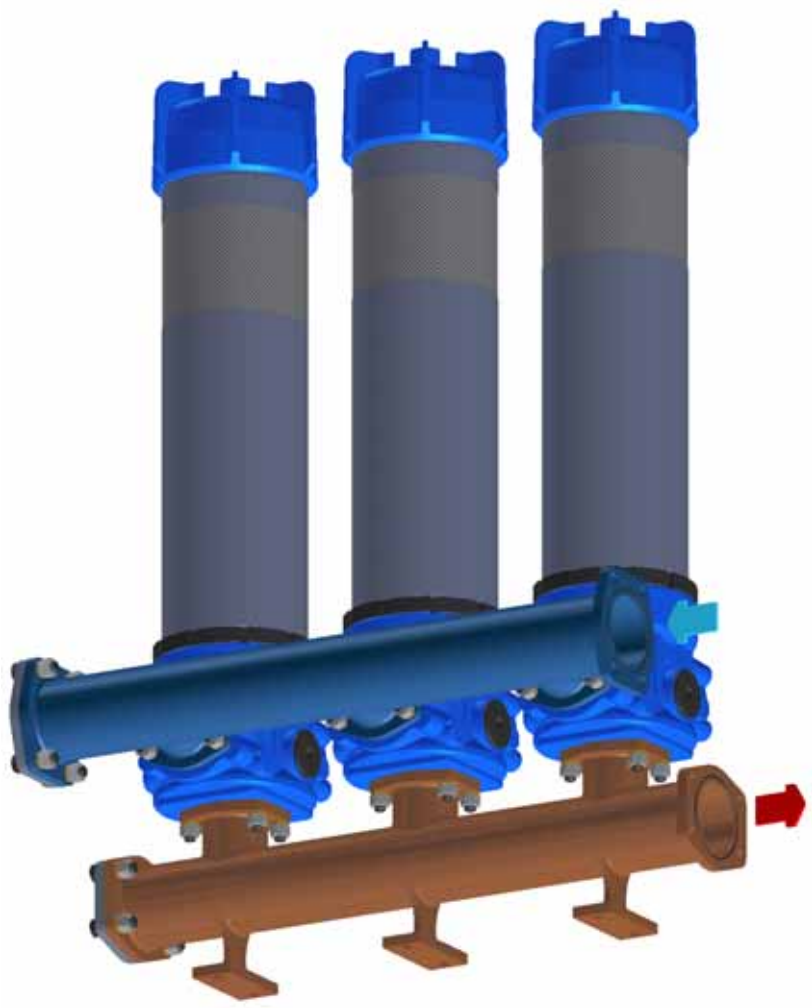
DIFFERENTIAL INDICATORS (see page 12)

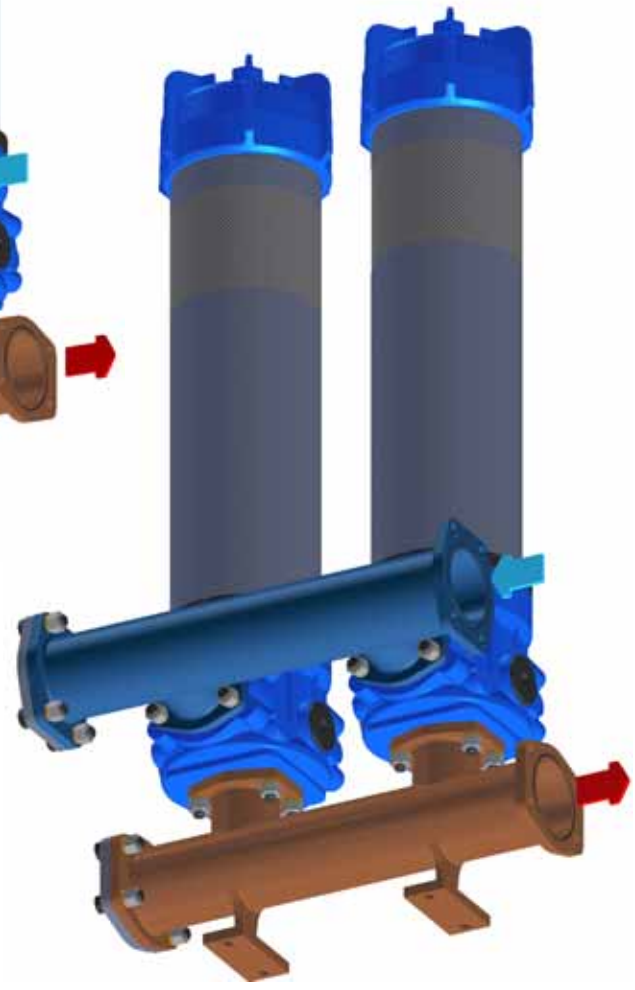
LMP 902 - 903

LMP

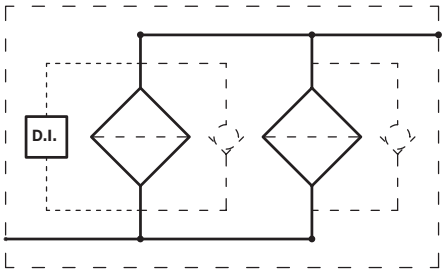
SERIES 902-903

Working pressure
25 bar
Filter elements in compliance with DIN 24550





Manifold version



Technical data

Filter housing (Materials)

- Head: Anodised Aluminium
- Housing: Anodised Aluminium
- Manifolds: Welded - phosphated steel
- Bypass valve: Steel
- 1000 size filter elements complying with DIN 24550 standard .

Pressure

- Working pressure: 25 bar (2.5 MPa)
- Test pressure: 35 bar (3,5 MPa)

Temperature

- From -25°C to +110°C

Bypass valve

- Opening pressure 3.5 bar ±10%
- Other opening pressures on request.

Filter elements

- Filter element in compliance with DIN 24550 standard Size: 1000

Number of filter elements

- LMP 902: 4 filter elements CU900
- LMP 903: 6 filter elements CU900

Elements type Δp

- Series N and W elements: 20 bar
- Oil flow from exterior to interior.

Seals

- Standard NBR series A
- Optional FPM series V

Weights (kg)

Length

- LMP902 89.6
- LMP903 129.2

Volumes (dm^3)

Length

- LMP902 58
- LMP903 87

Connections

In-line Inlet/Outlet

Compatibility

- Housings compatible with:
  Mineral oils to ISO 2943 - aqueous emulsions synthetic fluids, water and glycol.
- The filter elements are compatible with:
  Mineral oils to ISO 2943, Synthetic fluids Aqueous emulsions, water and glycol (series W required).
- NBR seals series A, compatible with:
  Mineral oils to ISO 2943 - aqueous emulsions synthetic fluids, water and glycol.
- V series FPM seals, compatible with:
  Synthetic fluids type HS-HFDR-HFDS-HFDU To ISO 2943

Filter Element Area

Filter element in stainless steel mesh

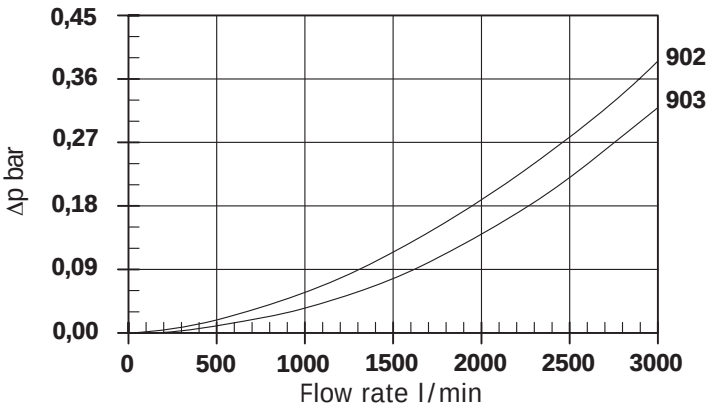
	LMP	
Type	**902**	**903**
CU900	52000	78000
	Values expressed in **cm^2**	

Filter housing Δp pressure drop

The curves are plotted utilising mineral oil with density of 0.86 kg/dm^3 to ISO 3968.

Δp varies proportionally with density.

LMP 902 - 903

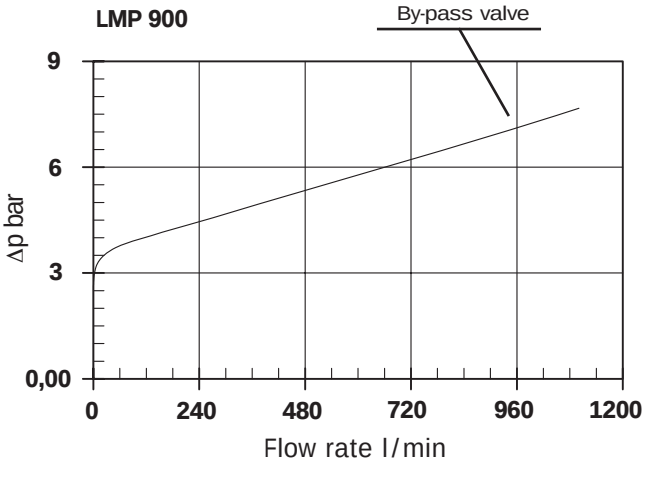


Valves

Bypass valve pressure drop

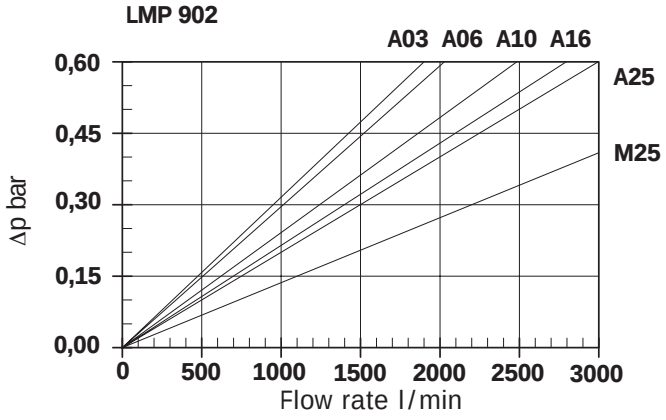
For single filter

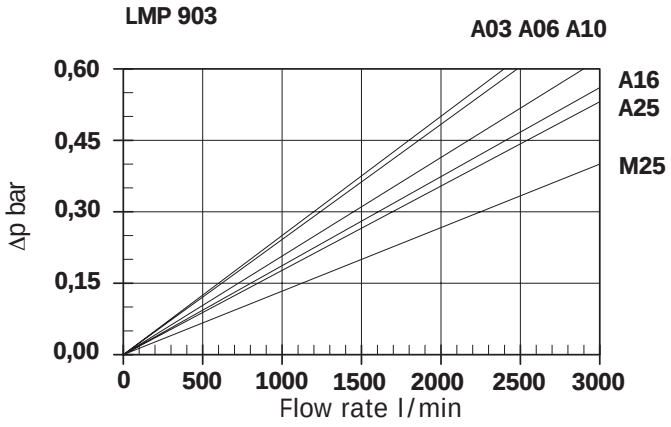
LMP 900



Recommended maximum flow rate

- Pressure drop of filter assembly equal to Δp 0.6 bar.
- Oil kinematic viscosity 30 mm^2/s (cSt).
- Density 0.86 kg/dm^3.
- Connections of filter under test G 4".





Recommended maximum flow rate

The recommended maximum flow rate for filters installed on lubrication lines, return or in-line filters is defined by the oil maximum velocity in the connections. For filters mounted on Off-Line lines the maximum recommended flow rate is defined by the pressure drop of the filter element.

Filter for pressurised lubrication, max. oil velocity 2.5 m/sec.
Return or in-line filter, max oil velocity 5 m/sec.

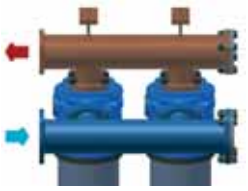
	Connection
Oil velocity	4"
2,5 m/sec.	1200
5 m/sec.	2400

Flow rate l/min

Off-Line filter, the recommended maximum pressure drop of exclusively the filter element must be equal to Δp 0.2 ÷ 0.3 bar.

Manifolds

Position of manifolds IN - OUT connections



FA

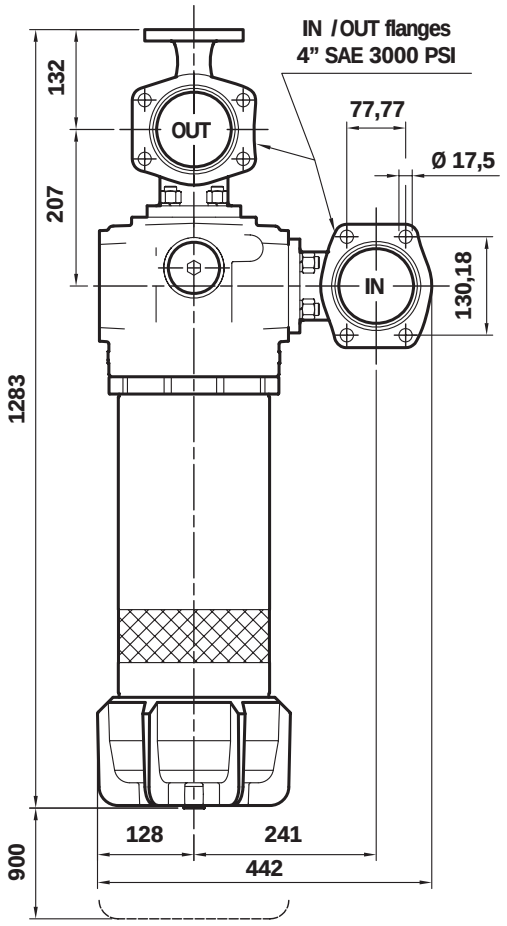
FB

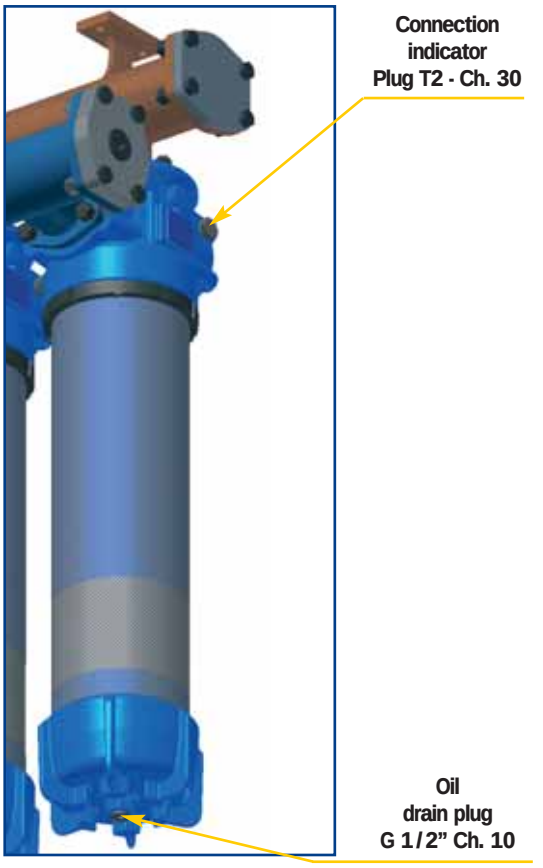
FC

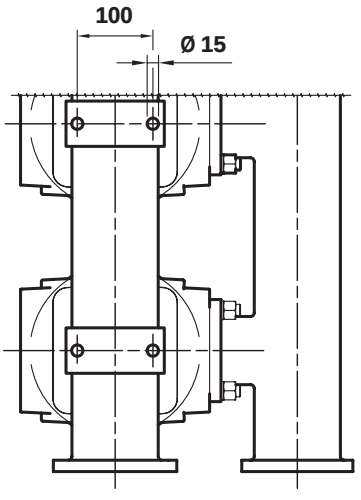
FD

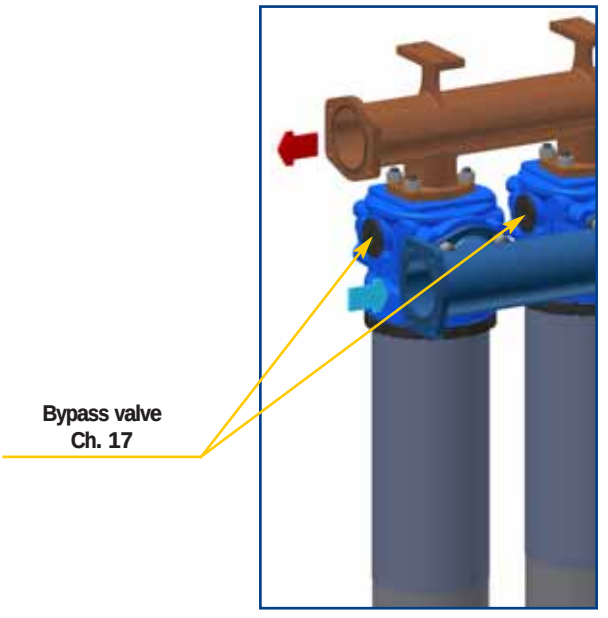
Dimensions

LMP 902-903

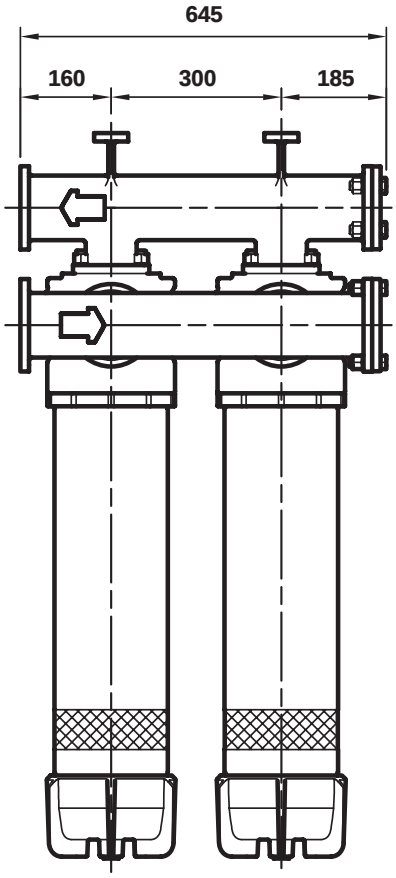




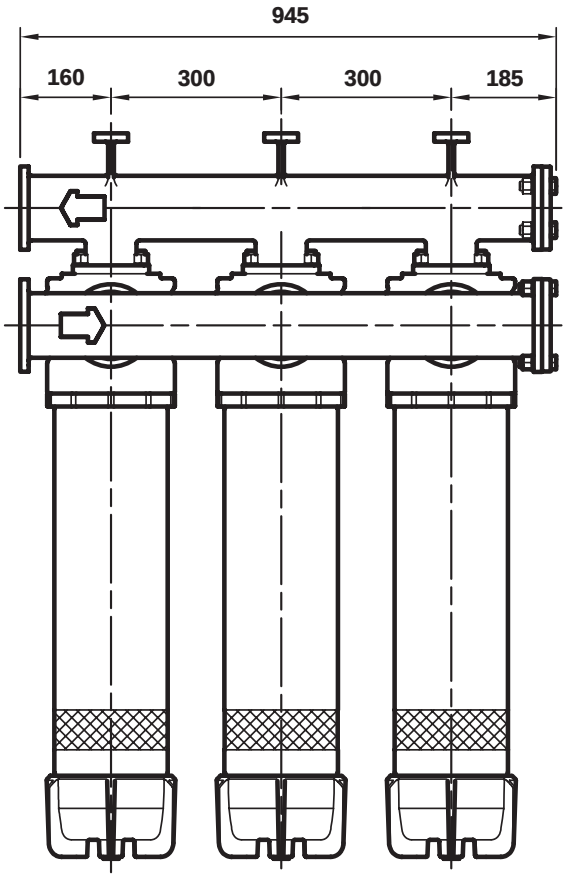




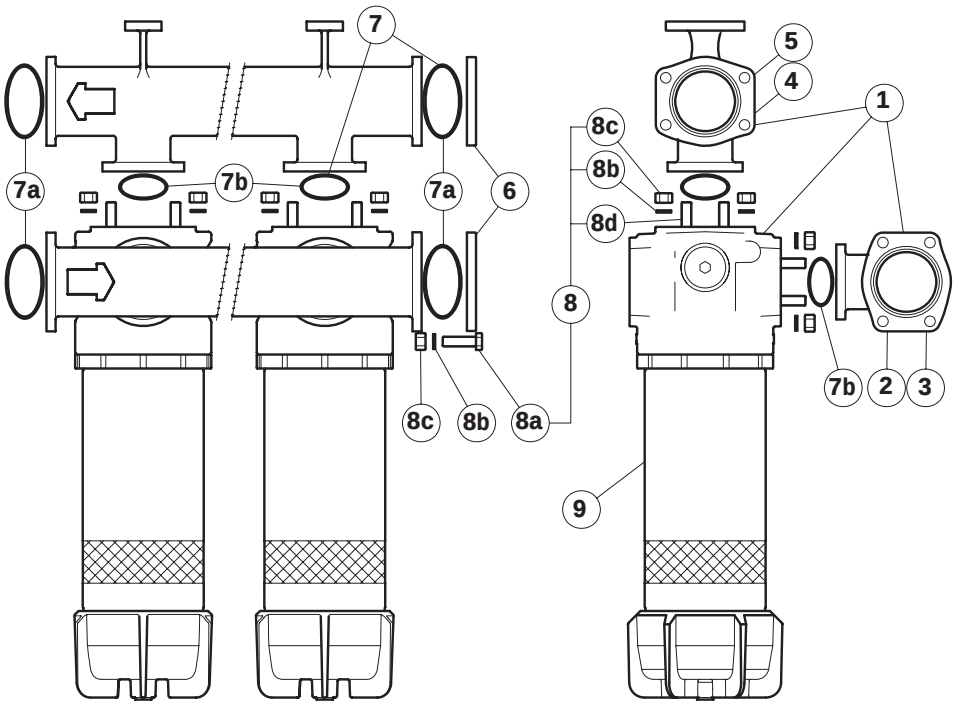
LMP 902



LMP 903



LMP 902 / 903 Spare parts



Pos.	Description	Qty / LMP 90*		FILTER Series LMP 902/903 - 2	
		*2	*3		
1	Filter assembly	1		See order table	
2	IN manifold with with 2 filter connections	1	-	01039270	
3	IN manifold with 3 filter connections	-	1	01039272	
4	OUT manifold with 2 filter connections	1	-	01039271	
5	OUT manifold with 3 filter connections	-	1	01039273	
6	SAE 4" 3000 psi flange	2		01042020	
7	Manifolds seal kit	1		NBR 02050404	FPM 02050405
7a	IN - OUT O-Ring	4	4	O-R 4437 Ø 110.7 x 3.53	
7b	Manifolds/filter O-Ring	4	6	O-R 4337 Ø 85.32 x 3.53	
8	Threaded fasteners kit	1		LMP902 - 02049051 LMP903 - 02049052	
8a	Screws for IN-OUT flanges	8	8	UNI-EN 24017 M16 x 55-10.9	
8b	Circlips	24	32	UNI 1751 - B16	
8c	Nuts	24	32	UNI-EN 24032-M16-10.9	
8d	Studs	16	24	M16 x 40 - 10.9	
9	Filter	2	3	See order table LMP 9012F1.....P02 page 59	
-	Filter spare parts pos. 9	2	3	See table spare parts LMP 9012F1.....P02 page 57	
-	Filter seals kit pos. 9	2	3	See table spare parts LMP 9012F1.....P02 page 57	
-	Indicators	1		See order table	

LMP902/903 ordering information

Filter assembly
LMP

	1	2	3	4	5	6	7	8
	☐	☐	☐	☐	☐	☐	☐	☐
Example: LMP	**903**	**2**	**B**	**A**	**FB**	**A10**	**N**	**P01**

Filter Element
CU 900

	6	4	7	8
	☐	☐	☐	☐
Example: CU900	**A10**	**A**	**N**	**P01** (6 cartridges required)

1 - Sizes

902	With 4 cartridges CU900
903	With 6 cartridges CU900

2 - Filter length

2

3 - Valves

S	Without by-pass
B	With by-pass

4 - Seals

A	NBR
V	FPM

5 - Connections

Type

FA	See page 63
FB	See page 63
FC	See page 63
FD	See page 63

6 - Filter element

A03	3 µm	**A16**	16 µm	Absolute filtration Inorganic microfibre ßx (c) ≥ 1000 see page 9
A06	6 µm	**A25**	25 µm	
A10	10 µm			
M25	25 µm	**M90**	90 µm	Nominal Filtration Metal mesh see page 9
M60	60 µm			

7 - Filter elements series

N	Δp 20 bar
W	Δp 20 bar (aqueous emulsions - water and glycol)

8 - Options

P01	MP Standard filters
Pxx	Customer request

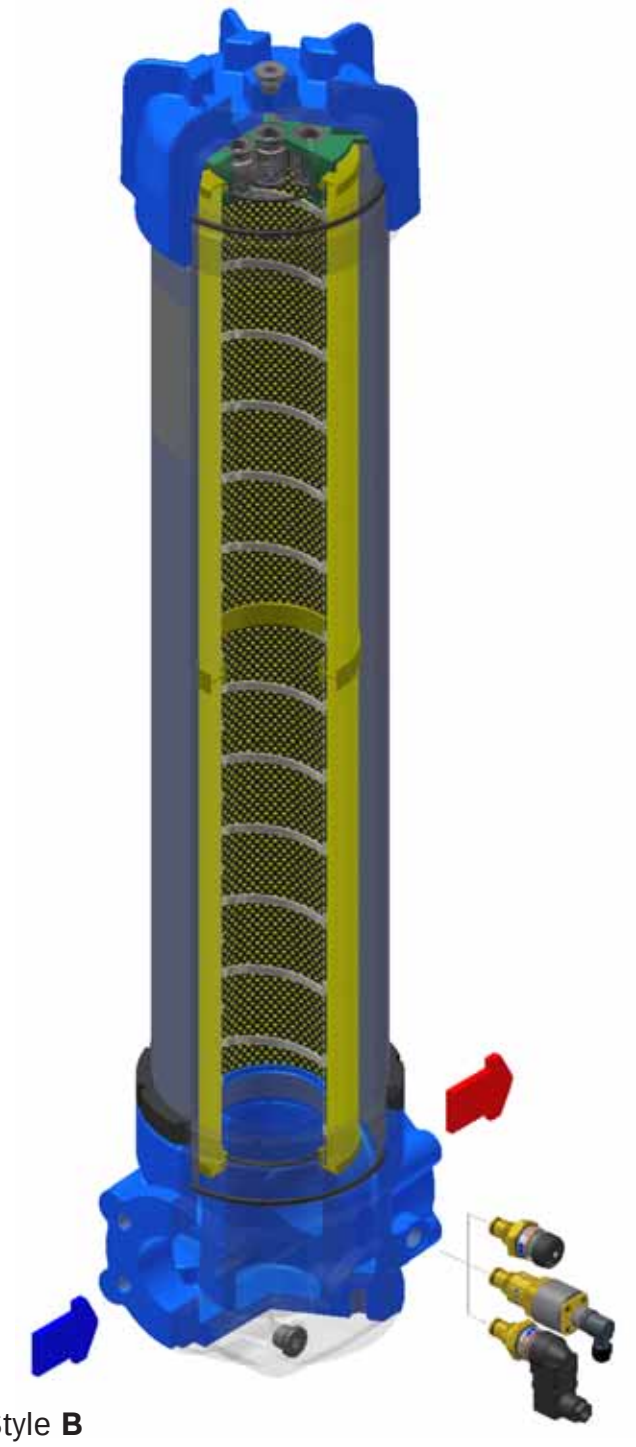
DIFFERENTIAL INDICATORS (see page 12)

LMP 950-951

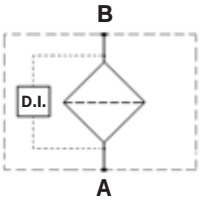
LMP

SERIES 950-951

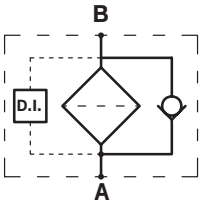
Working pressure
30 bar



Style **S**



Style **B**



Technical data

Filter housing (Materials)

- Head: Anodised Aluminium
- Housing: Anodised Aluminium
- Bypass valve: Anodised Aluminium

Pressure

- Working pressure: 30 bar (3 MPa)
- Test pressure: 45 bar (4.5 MPa)
- Burst pressure: 120 bar (12 MPa)
- Pulsed pressure fatigue test: 1.000.000 cycles with pressure from 0 to 30 bar (3 MPa)

Temperature

- From -25°C to +110°C

Bypass valve

- Opening pressure 3.5 bar ±10%
- Other opening pressures on request.

Δp filter elements

- Series N and W elements: 20 bar
- Oil flow from exterior to interior.

Seals

- Standard NBR series A
- Optional FPM series V

Weights (kg)

	Length
• LMP950 - 2	25.1
• LMP950 - 3	33.5

Volumes (dm^3)

	Length
• LMP950 - 2	15
• LMP950 - 3	28

Connections

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

Compatibility

- Housings compatible with:
  Mineral oils to ISO 2943 - aqueous emulsions synthetic fluids, water and glycol.
- The filter elements are compatible with:
  Mineral oils to ISO 2943, Synthetic fluids Aqueous emulsions, water and glycol ((series W required).
- NBR seals series A, compatible with:
  Mineral oils to ISO 2943 - aqueous emulsions synthetic fluids, water and glycol.
- V series FPM seals, compatible with:
  Synthetic fluids type HS-HFDR-HFDS-HFDU To ISO 2943

Filter Element Area

Filter element in stainless steel mesh

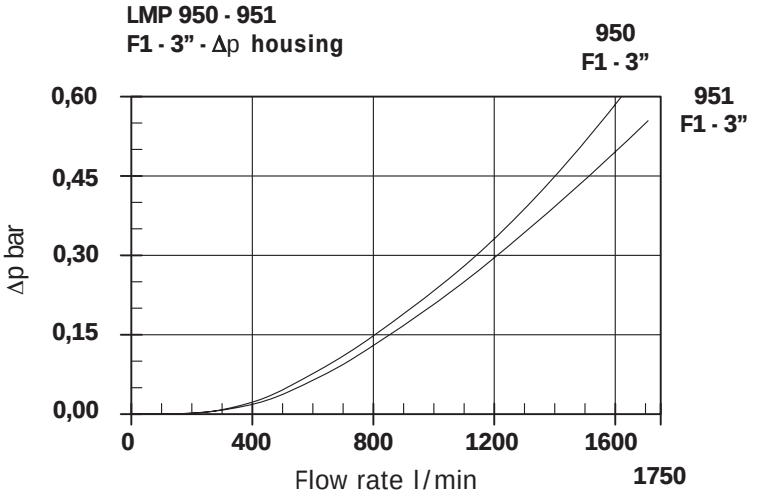
Type	Length 2	3
CU 950	10950	25100

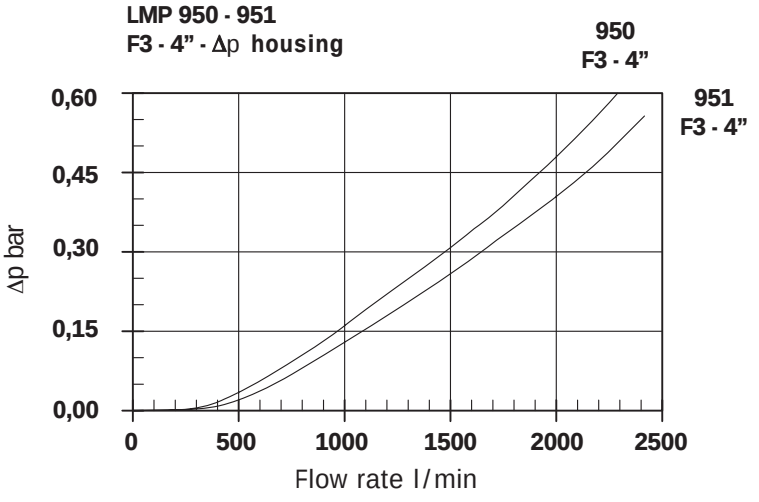
Values expressed in cm^2

Filter housing Δp pressure drop

The curves are plotted utilising mineral oil with density of 0.86 kg/dm^3 to ISO 3968.

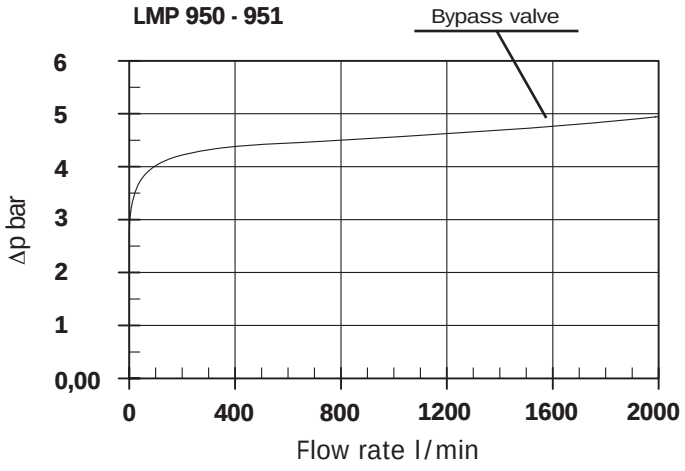
Δp varies proportionally with density.





Valves

Bypass valve pressure drop

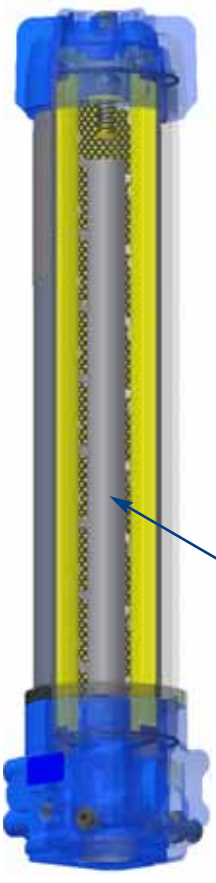


Recommended maximum flow rate

- Pressure drop of filter assembly equal to Δp 0.6 bar.
- Oil kinematic viscosity 30 mm²/s (cSt).
- Density 0.86 kg/dm³.

Filter element type	Flow rate l/min Series N	Filter length	Connections
A03	550	2	Flange SAE 3000 3”
A06	650		
A10	800		
A16	1000		
A25	1200		
M25	1700		
A03	950	3	
A06	1000		
A10	1200		
A16	1350		
A25	1400		
M25	1700		
A03	550	2	Flange SAE 3000 4”
A06	700		
A10	850		
A16	1100		
A25	1400		
M25	2300		
A03	1000	3	
A06	1100		
A10	1400		
A16	1600		
A25	1800		
M25	2400		

Option P02 for LMP 950/951



Option P02 “Internal tube for reduced flow rate” recommended for flow rate values below 100/150 l/min. The use of option P02 makes it easier to fill the housing with the operating fluid.

P02 “Internal tube for reduced flow rates”

Recommended maximum flow rate

The recommended maximum flow rate for filters installed on lubrication lines, return or in-line filters is defined by the oil maximum velocity in the connections. Recommended maximum flow rate for Off-Line filters is defined by the filter element pressure drop.

Filter for pressurised lubrication, max. oil velocity 2.5 m/sec.
Return or in-line filter, max oil oil velocity 5 m/sec.

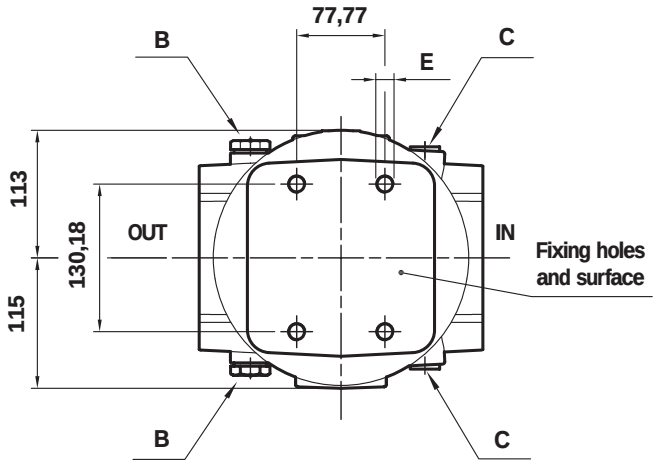
	Connections	
Oil velocity	3”	4”
2,5 m/sec.	750	1200
5 m/sec.	1500	2400

Flow rate l/min.

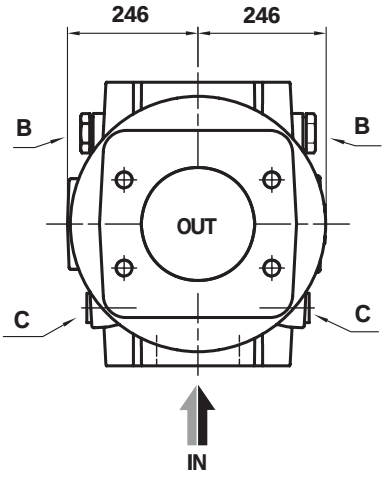
Off-Line filter, the recommended maximum pressure drop of exclusively the filter element must be equal to Δp 0.2 ÷ 0.3 bar.

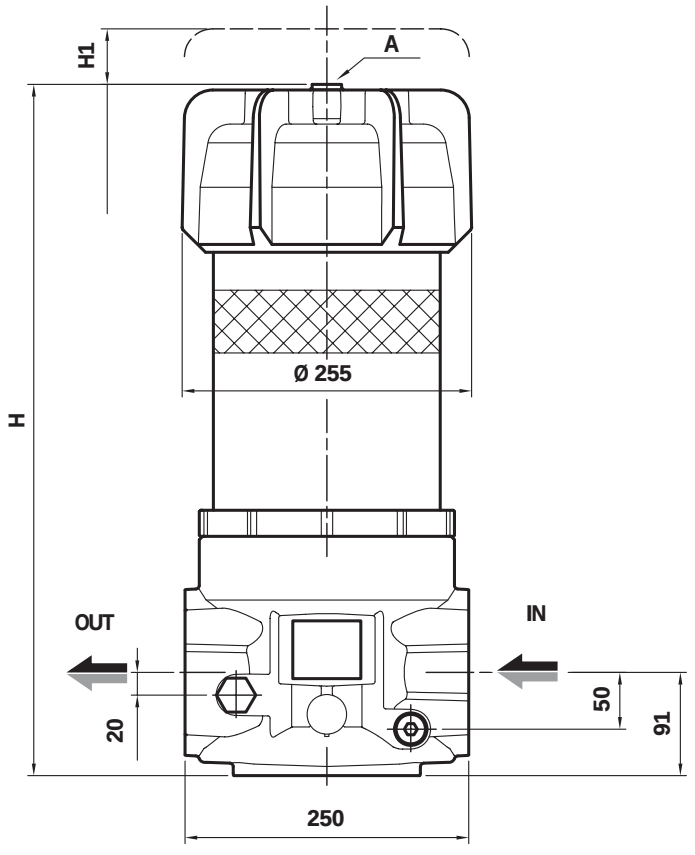
Dimensions

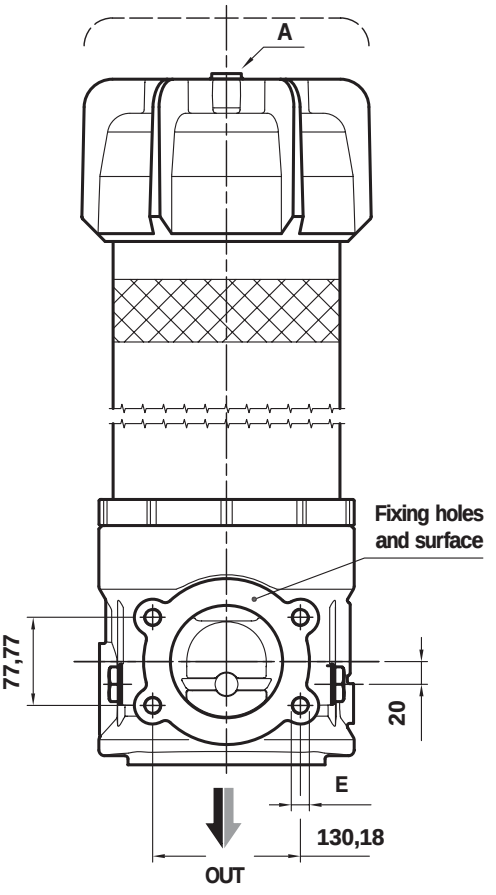
LMP 950



LMP 951







Flanged IN/OUT connections	E Depth 25 mm
3" SAE 3000 psi/M	M16
4" SAE 3000 psi/M	M16
3" SAE 3000 psi/UNC	5/8" UNC
4" SAE 3000 psi/UNC	5/8" UNC

Filter length	H mm	H1 mm
2	680	350
3	1230	900

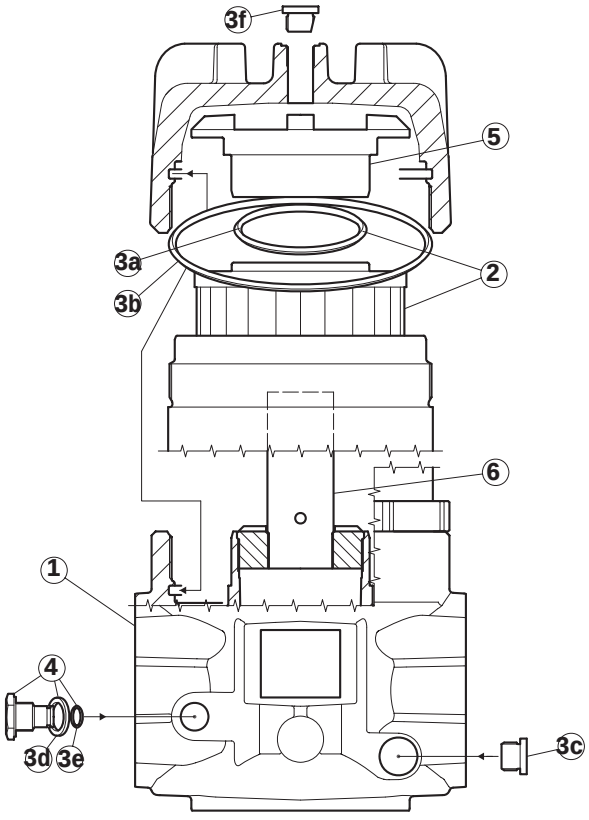
A Breather plug - G 1/2" - Ch. 10

B Indicator connection - Plug T2 - Ch. 30

C Oil drain plug - G 1/2" - Ch. 10

LMP 950/951 spare parts

Length 2 - 3



Pos.	Description	Qty	FILTER Series LMP 950/951 2 - 3	
1	Filter assembly	1	See order table	
2	Filter Element	1	See order table	
3	Seals kit	1	NBR 02050367	FPM 02050368
3a	Filter element O-Ring	2	OR 4412 Ø 104,37 x 3,53	
3b	O-Ring for housing	2	OR 6745 Ø 189,86 x 5,33	
3c	Oil drain plug	2	G 1/2" with seal	
3d	Bonded seal	2	01030058	01030046
3e	O-Ring	2	OR 2050 Ø 12,42 x 1,78	
3f	Breather plug	1	01029444	
4	Indicator connection plug LMP 950/951	2	T2H	T2V
5	Housing spigot	1	Spigot without By-pass 01044106 Spigot with By-pass 02001379	
6	Tube assembly	1	x L. 2 02025032 x L. 3 02025033	
-	Indicator	1	See order table	

LMP950 / 951 ordering information

Filter assembly
LMP

	1	2	3	4	5	6	7	8 a
Example: LMP	**950**	**2**	**B**	**A**	**F1**	**A10**	**N**	**P01**

Filter Element
CU 950

	2	6	4	7	8 b
Example: CU950	**2**	**A10**	**A**	**N**	**P01**

1 - Sizes

950	LMP950 (in-line IN-OUT)
951	LMP951 (90° IN-OUT)

2 - Filter length

2
3

3 - Valves

S	Without by-pass
B	With by-pass

4 - Seals

A	NBR
V	FPM

5 - Connections

Type

F1	3” SAE 3000 PSI/M
F2	3” SAE 3000 PSI/UNC
F3	4” SAE 3000 PSI/M
F4	4” SAE 3000 PSI/UNC

6 - Filter element

Absolute filtration Inorganic microfibre — ßx (c) ≥ 1000 — see page 9

A03	3 µm	**A16**	16 µm
A06	6 µm	**A25**	25 µm
A10	10 µm		

Nominal Filtration Metal mesh — see page 9

M25	25 µm	**M90**	90 µm
M60	60 µm		

7 - Filter elements series

N	Δp 20 bar
W	Δp 20 bar (aqueous emulsions - water and glycol)

8 - Options

a - Filters

P01	MP Standard filter
P02	With internal tube for reduced flow rate
Pxx	Customer request

b - Filter elements

P01	MP Standard filter
Pxx	Customer request

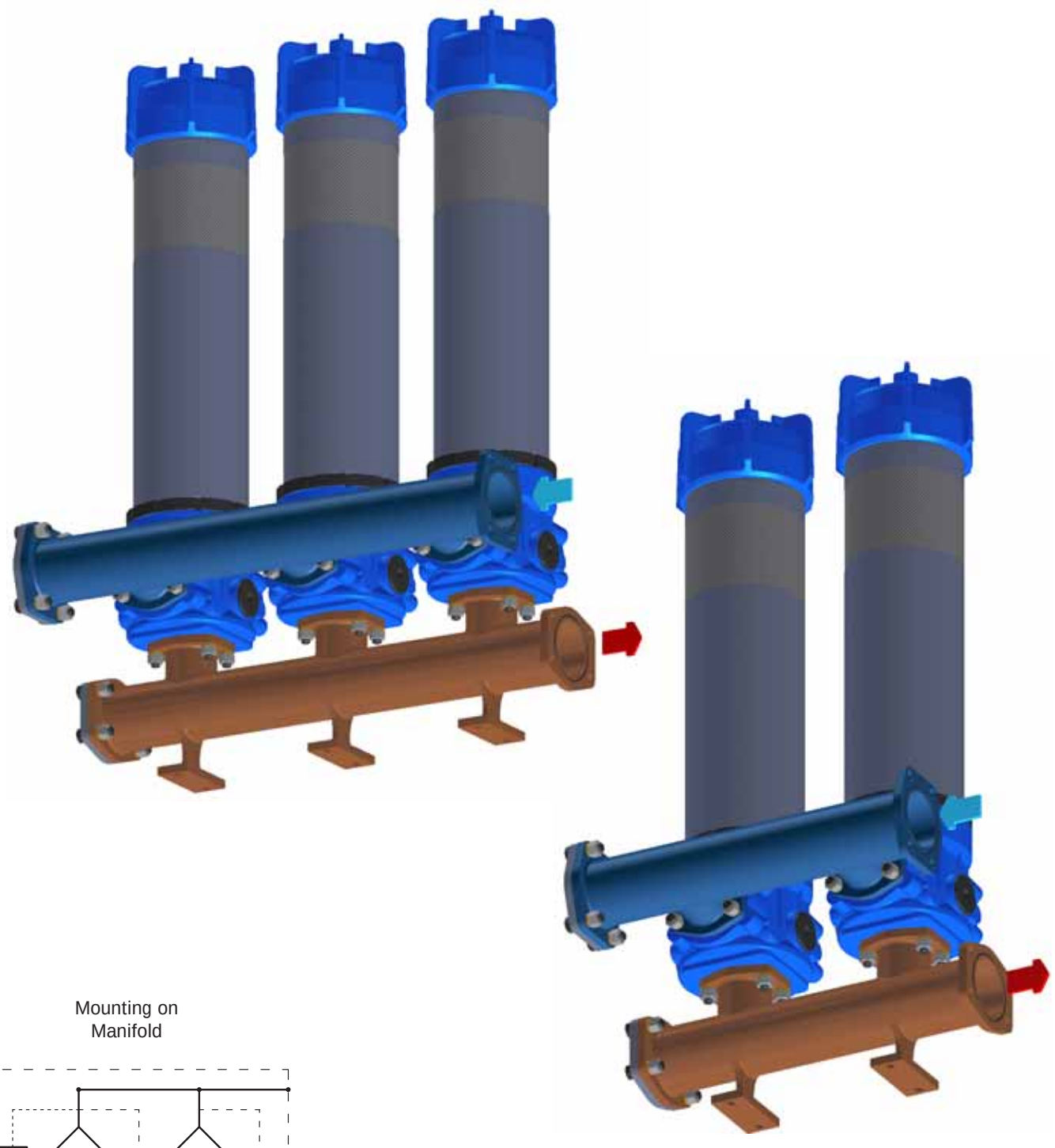
DIFFERENTIAL INDICATORS (see page 12)

LMP 952÷956

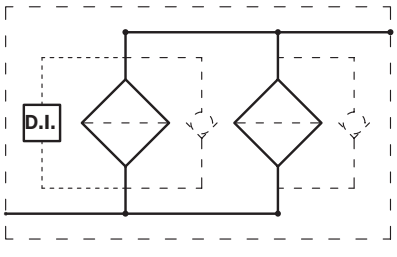
LMP

SERIES 952÷956

Working pressure
25 bar



Mounting on
Manifold



Technical data

Filter housing (Materials)

- Head: Anodised Aluminium
- Housing: Anodised Aluminium
- Manifolds: Welded - phosphated steel
- Bypass valve: Anodised Aluminium

Pressure

- Working pressure: 25 bar (2.5 MPa)
- Test pressure: 35 bar (3.5 MPa)

Temperature

- From -25°C to +110°C

Bypass valve

- Opening pressure 3.5 bar ±10%
- Other opening pressures on request.

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
- LMP 955: 5 filter elements CU950-3
- LMP 956: 6 filter elements CU950-3

Δp filter elements

- Series N and W elements: 20 bar
- Oil flow from exterior to interior.

Seals

- Standard NBR series A
- Optional FPM series V

Weights (kg)

	Length
• LMP952	96
• LMP953	138
• LMP954	192
• LMP955	234
• LMP956	277

Volumes (dm^3)

	Length
• LMP952	66
• LMP953	99
• LMP954	132
• LMP955	165
• LMP956	198

Connections
In-line Inlet/Outlet

Compatibility

- Housings compatible with:
  Mineral oils to ISO 2943 - aqueous emulsions
  synthetic fluids, water and glycol.
- The filter elements are compatible with:
  Mineral oils to ISO 2943, Synthetic fluids
  Aqueous emulsions, water and glycol (series W required).
- NBR seals series A, compatible with:
  Mineral oils to ISO 2943 - aqueous emulsions
  synthetic fluids, water and glycol.
- V series FPM seals, compatible with:
  Synthetic fluids type HS-HFDR-HFDS-HFDU
  To ISO 2943

Filter Element Area

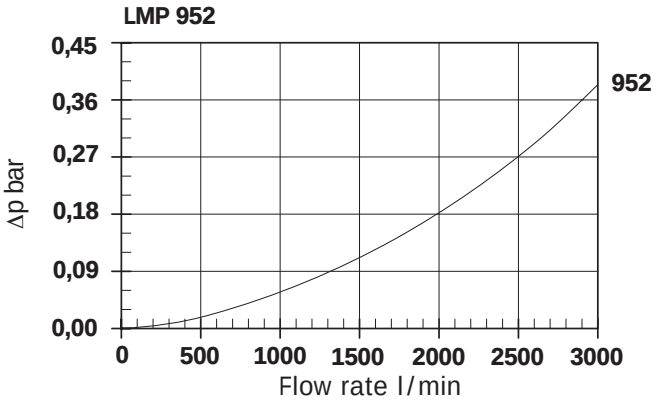
Filter element in stainless steel mesh

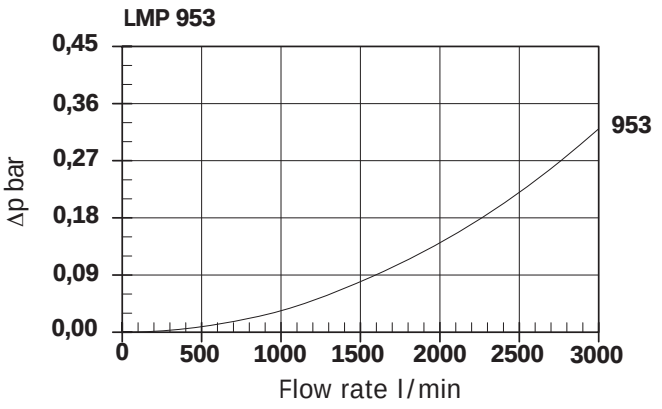
	LMP				
Type	**952**	**953**	**954**	**955**	**956**
CU950 - 3	50200	75300	100400	125500	150600
	Values expressed in **cm^2**				

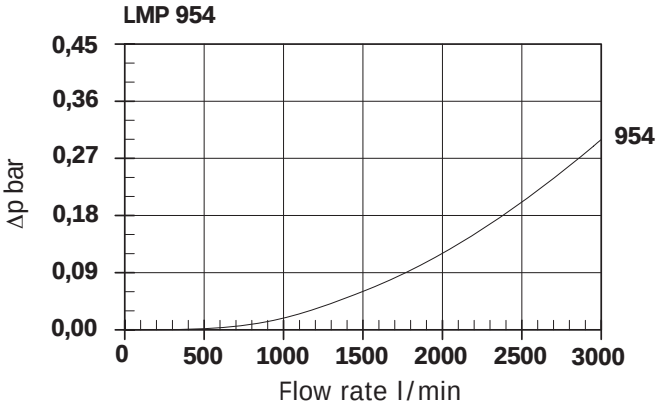
Filter housing Δp pressure drop

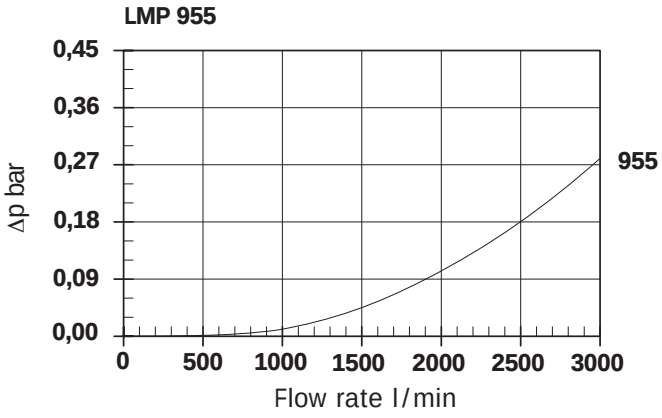
The curves are plotted utilising mineral oil with density of 0.86 kg/dm^3 to ISO 3968.

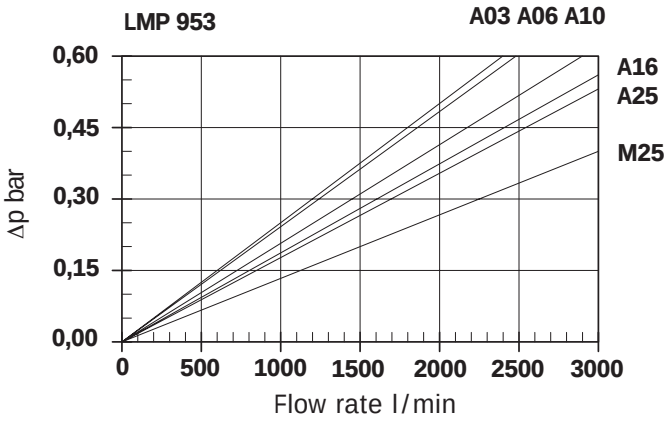
Δp varies proportionally with density.

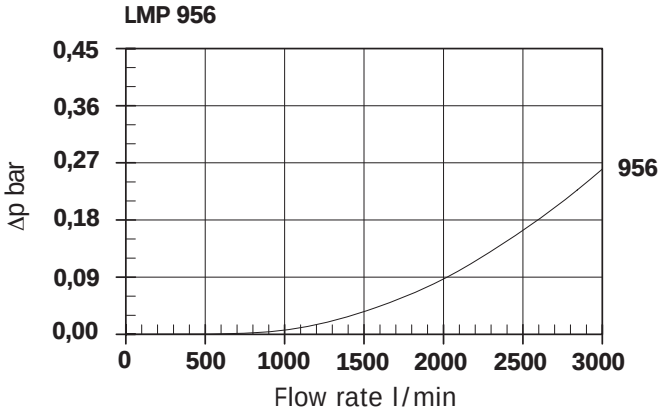


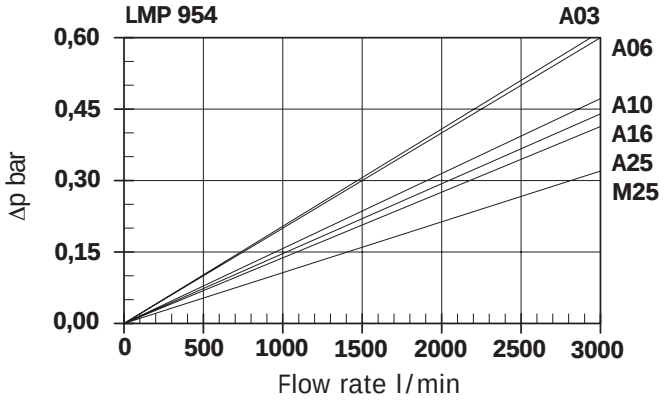








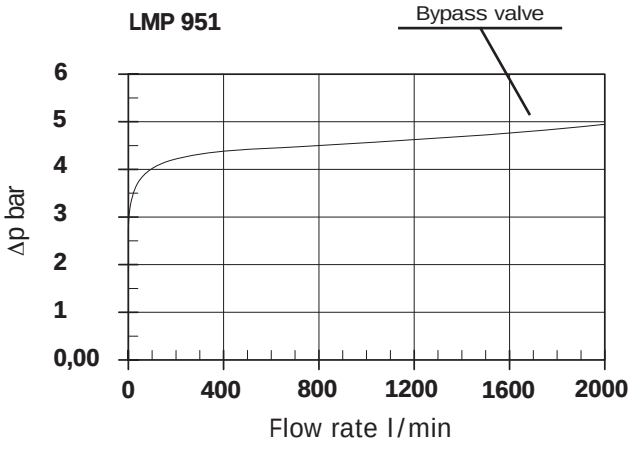


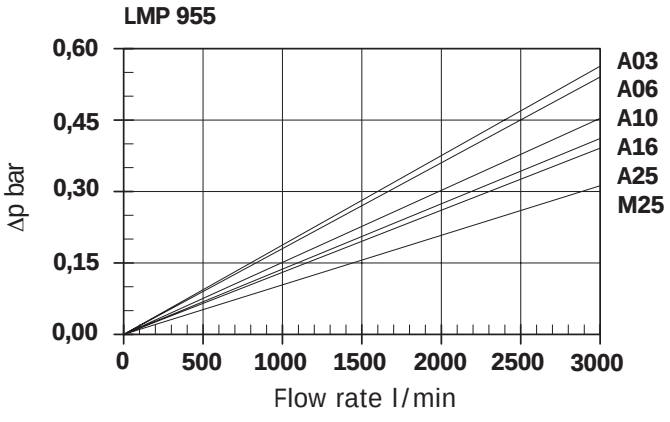


Valves

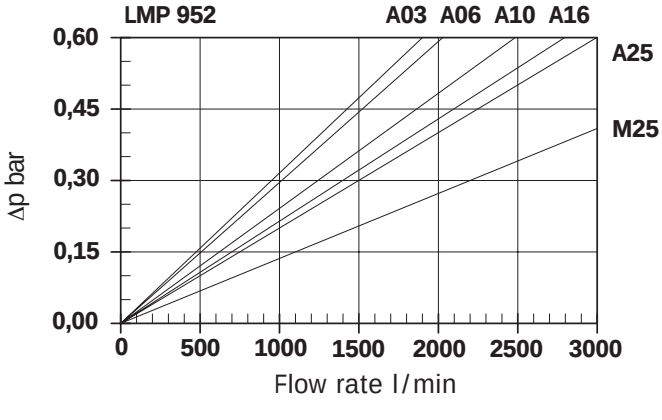
Bypass valve pressure drop

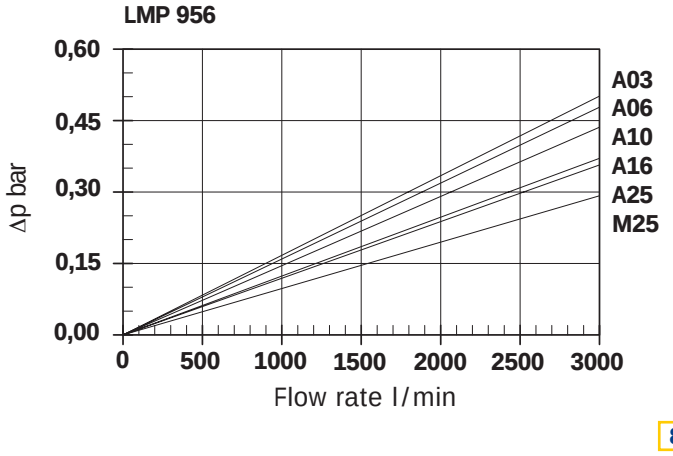
For individual filter





Pressure drop of filter complete with cartridge, oil viscosity 30 mm²/s (cSt)





Manifolds

Position of manifolds IN - OUT connections

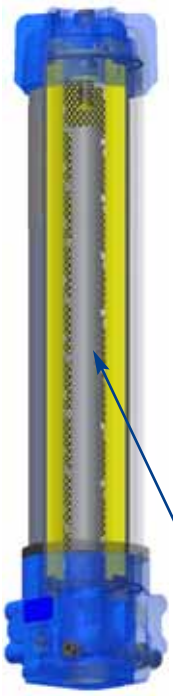
FA

FB

FC

FD

Option P02 for LMP 952 / 956



Option P02 “Internal tube for reduced flow rate” is recommended
for flow rate values below:
LMP 952 - 300 l/min
LMP 953 - 450 l/min
LMP 954 - 600 l/min
LMP 955 - 750 l/min
LMP 956 - 900 l/min
The use of option P02 makes it easier to fill the housing with the operating fluid.

P02 “Internal tube for reduced flow rates”

Recommended maximum flow rate

Recommended maximum flow rate for filters installed on lubrication or return lines or in-line filters is defined by the maximum oil velocity in the connections.
Recommended maximum flow rate for Off-Line filters is defined by the filter element pressure drop.

Filter for pressurised lubrication, max. oil velocity. 2.5 m/sec.
Return or in-line filter,
max. oil velocity 5 m/sec.

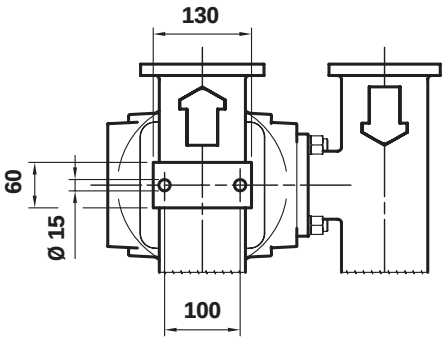
	Connection
Oil velocity	4”
2,5 m/sec.	1200
5 m/sec.	2400

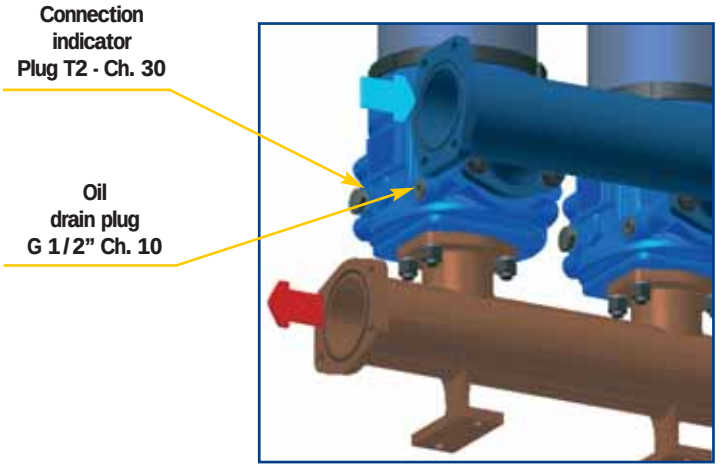
Flow rate l/min.

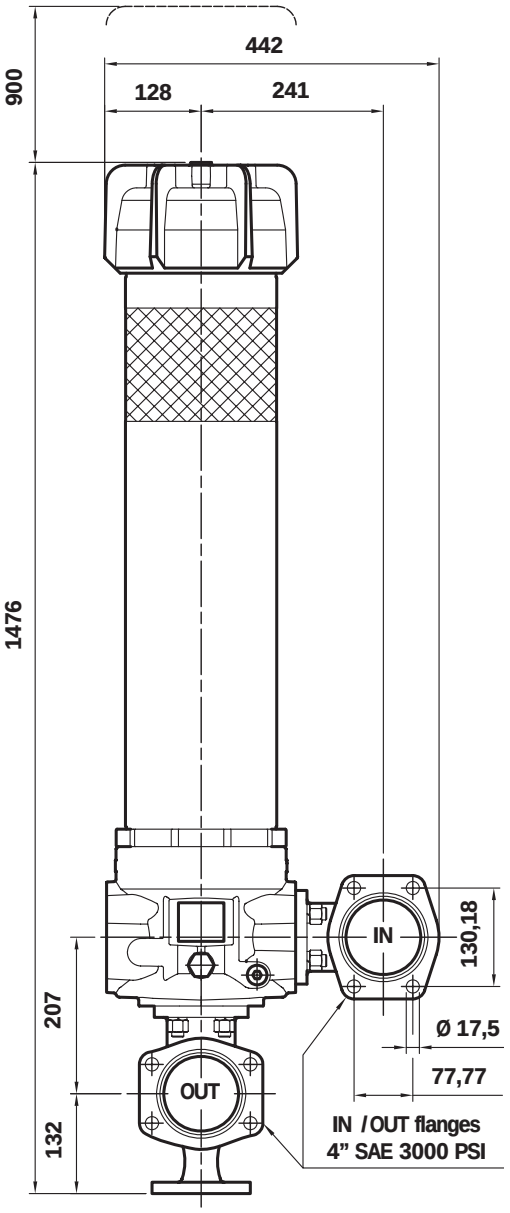
Off-Line filter, filter element recommended maximum pressure drop must be equal to Δp 0.2 ÷ 0.3 bar.

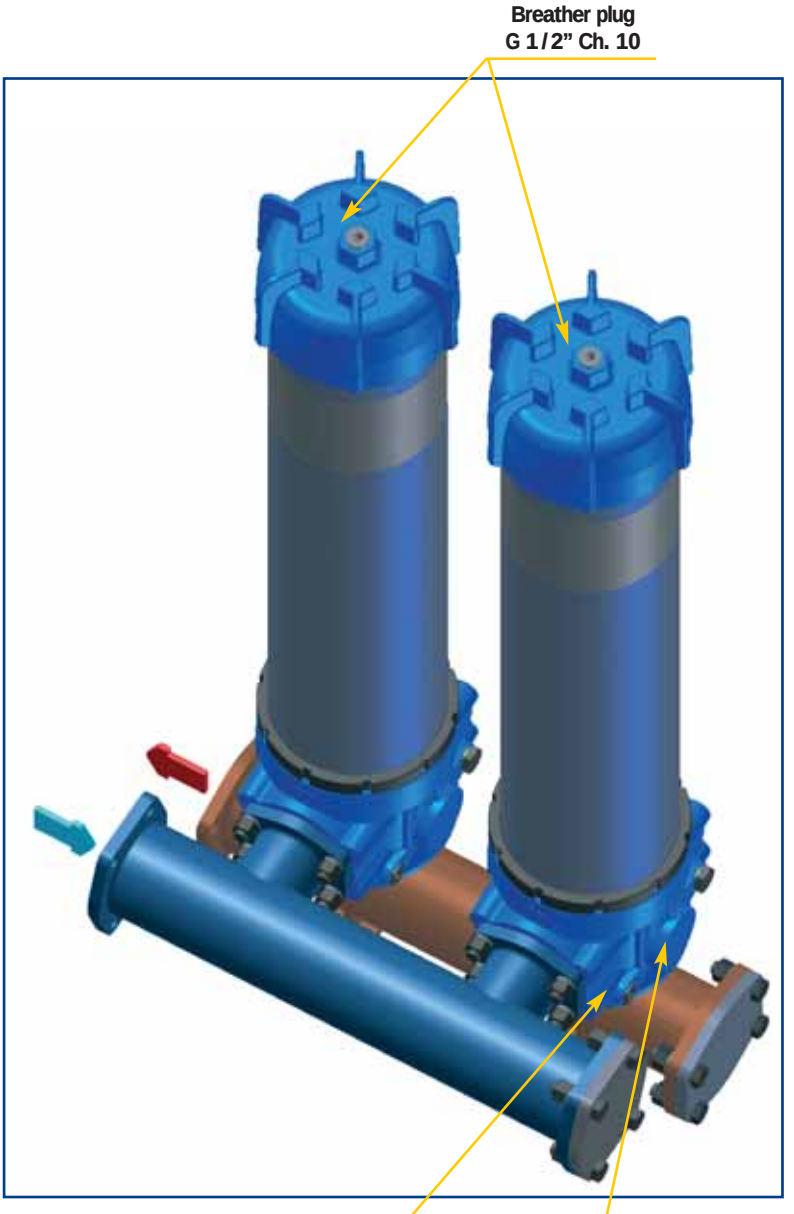
Dimensions

LMP 95x

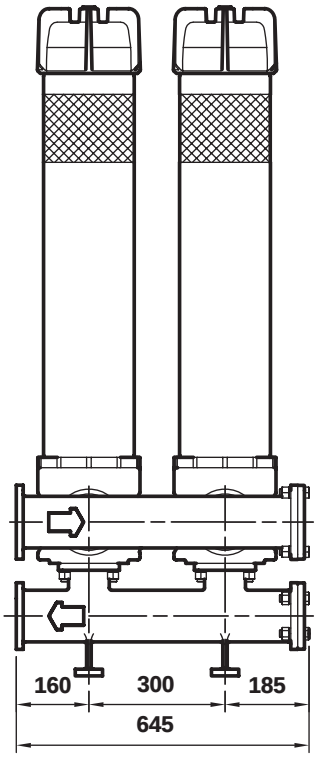




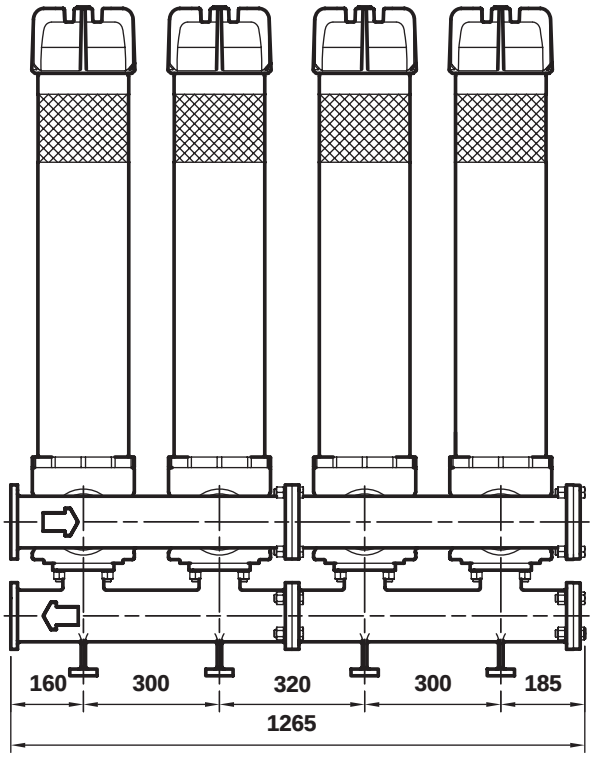


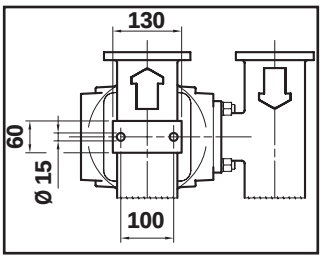


LMP 952

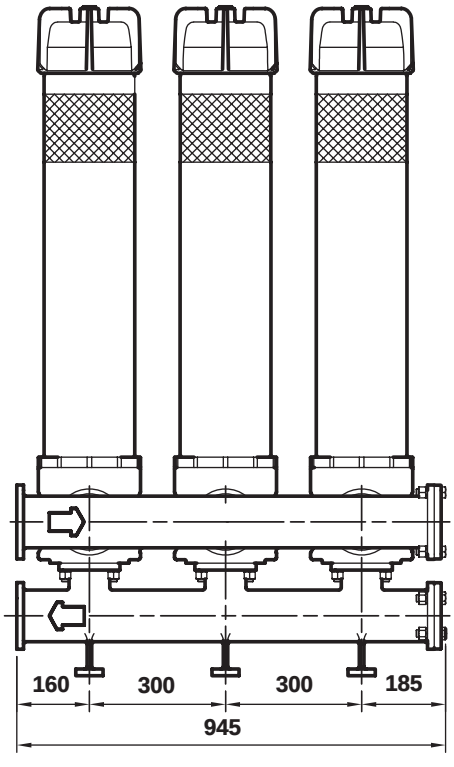


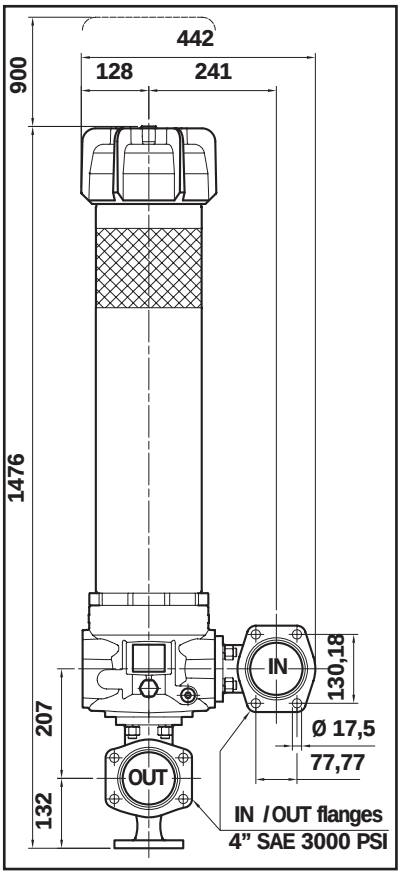
LMP 954



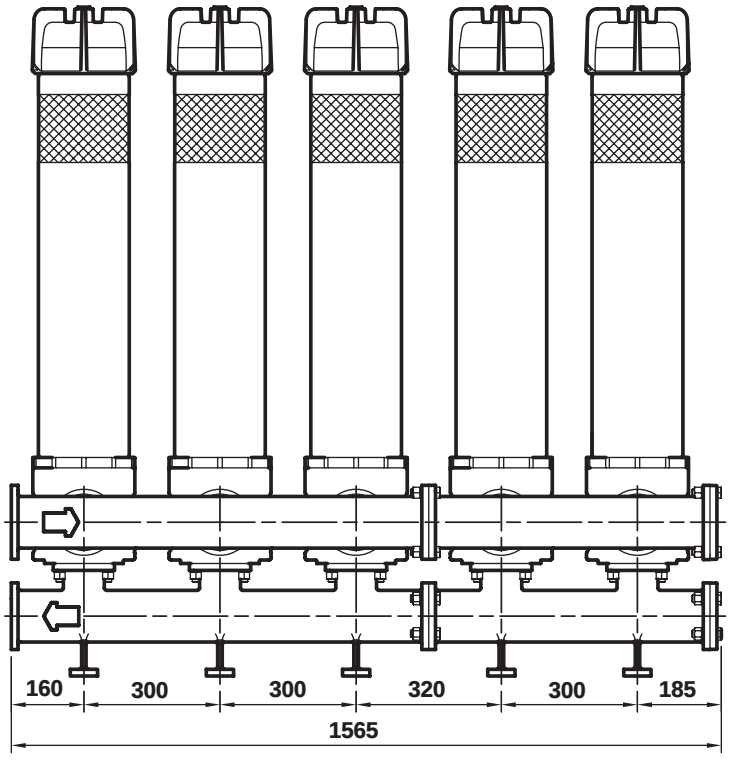


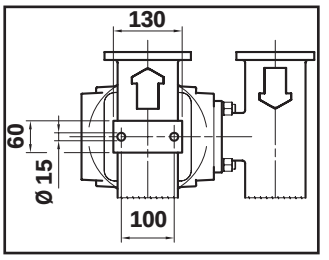
LMP 953



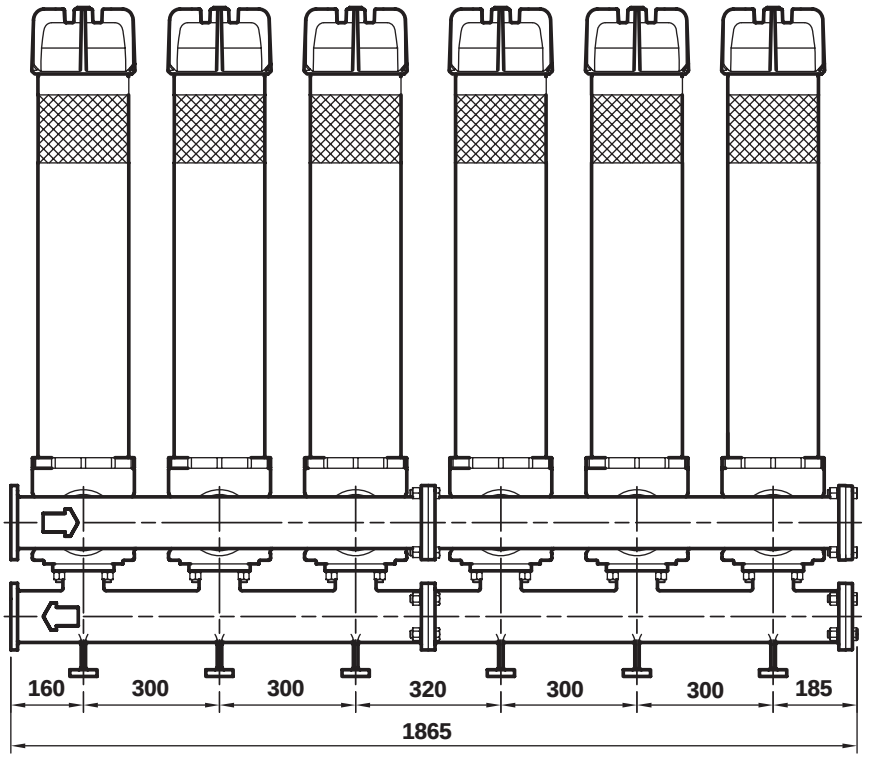


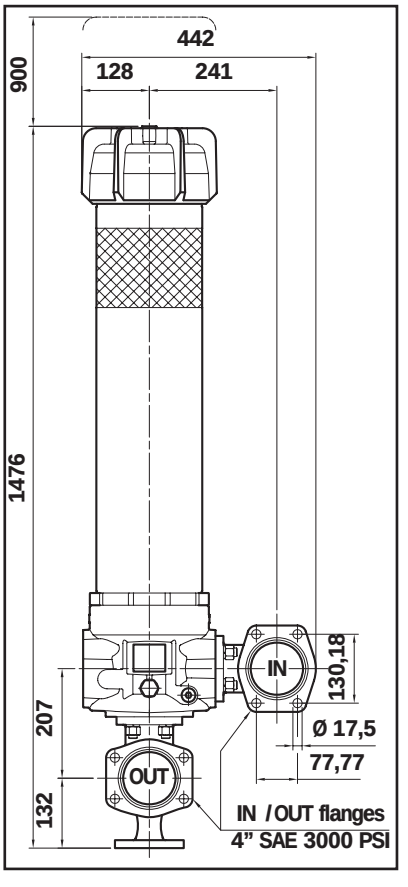
LMP 955





LMP 956



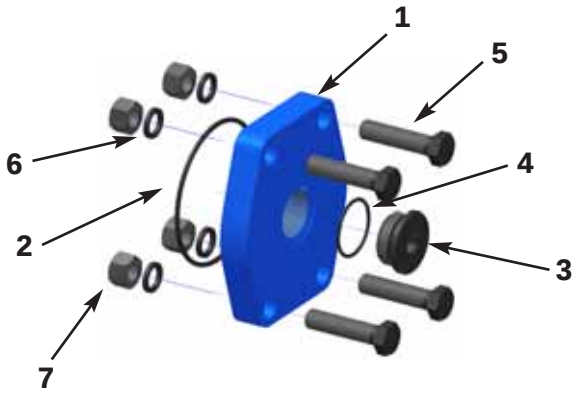


Option

Flange with oil drain plug for rapid discharge

Order code

CMV4
CUV4



CMV4

Bill of materials:

- 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 screws UNI-EN 24017 M16 x 65-10.9
- 6 No. 4 Circlips UNI 1751-B 16
- 7 No. 4 Nuts UNI 5587 - M16

CUV4

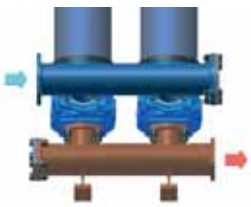
Bill of materials:

- 1 4” SAE flange
- 2 O-R 4437 (FPM) for flange
- 3 Plug SAE 20
- 4 1147 O-R for plug (FPM)
- 5 No. 4 Hex screws 5/8” UNC x 2” 1/2
- 6 No. 4 Circlips UNI 1751-B 16
- 7 No. 4 Nuts 5/8” UNC

Manifolds

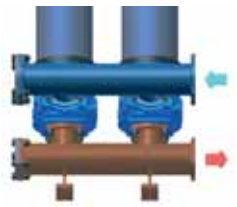
Position and designation of manifolds IN - OUT connections

GA / EA



GB / EB

GC / EC

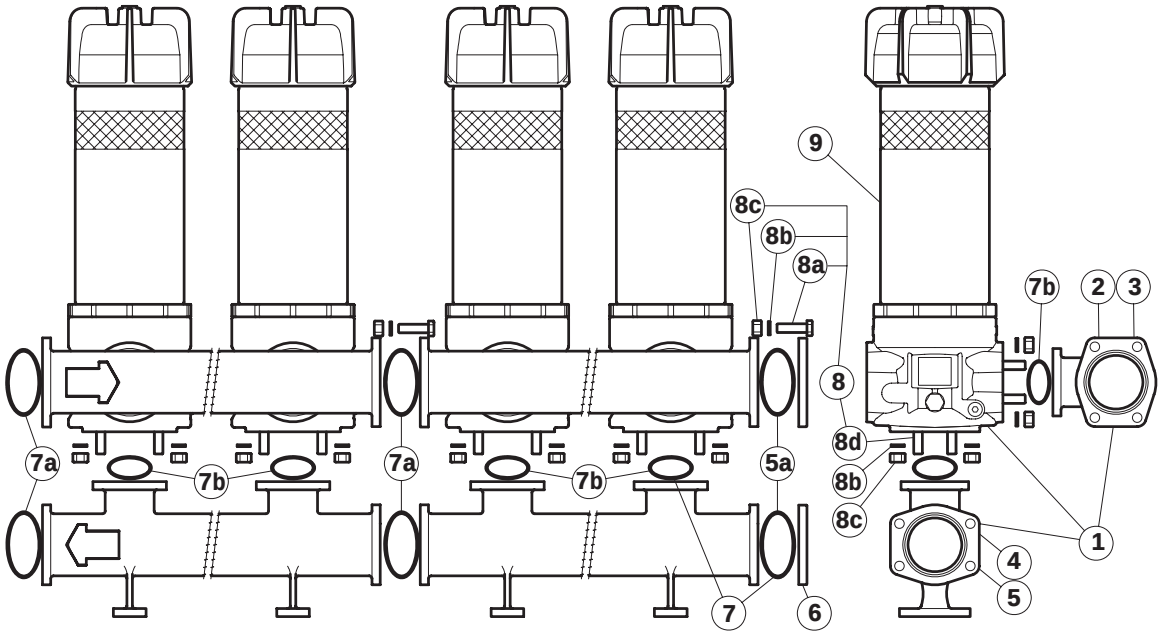


GD / ED

Oil drain plug

Code	CMV4	CUV4
	A	A
Thread	G 1 1/4”	SAE 20
	GA	EA
	GB	EB
	GC	EC
	GD	ED

LMP 952÷956 spare parts



Pos.	Description	Q.té / LMP 95*					FILTER Series LMP 952/953/954/955/956				
		*2	*3	*4	*5	*6					
1	Filter assembly	1					See order table				
2	IN manifold with 2 filter connections	1	-	2	1 + 1	-	01039270				
3	IN manifold with 3 filter connections	-	1	-		2	01039272				
4	OUT manifold with 2 filter connections	1	-	2	1 + 1	-	01039271				
5	OUT manifold with 3 filter connections	-	1	-		2	01039273				
6	3000 psi SAE 4" flange	2					01042020				
7	Manifolds seal kit	1					LMP 952 - 953 NBR 02050404 FPM 02050405		LMP 954 - 955 - 956 NBR 02050406 FPM 02050407		
7a	IN - OUT O-Ring	4	4	6	6	6	O-R 4437 Ø 110,7 x 3,53				
7b	Manifolds/filter O-Ring	4	6	8	10	12	O-R 4337 Ø 85,32 x 3,53				
8	Threaded fasteners kit for manifolds	1					*2F... 02049051	*3F... 02049052	*4F... 02049053	*5F... 02049054	*6F... 02049055
8a	Screws for IN-OUT flanges	8	8	16	16	16	UNI-EN 24017 M16 x 55-10.9				
8b	Circlips	24	32	48	56	64	UNI 1751 - B16				
8c	Nuts	24	32	48	56	64	UNI-EN 24032 M16 10.9				
8d	Studs	16	24	32	40	48	UNI 5911 - M16 x 40 - 10.9				
9	Filter	2	3	4	5	6	See order table LMP 9513F1.....P0* page 75				
-	Filter spare parts pos. 9	2	3	4	5	6	See table spare parts LMP 9513F1.....P0* page 73				
-	Filter seals kit pos. 9	2	3	4	5	6	See table spare parts LMP 9513F1.....P0* page 73		NBR 02050367 FPM 02050368		
-	Indicators	1					See order table				

LMP952÷956 ordering information

Filter assembly
LMP

	1	2	3	4	5	6	7	8 a
Example: LMP	**953**	**3**	**B**	**A**	**FB**	**A10**	**N**	**P01**

Filter Element
CU 950

	2	6	4	7	8 b
Example: CU950	**3**	**A10**	**A**	**N**	**P01** (3 cartridges required)

1 - Sizes

952	2 filter elements CU950-3
953	3 filter elements CU950-3
954	4 filter elements CU950-3
955	5 filter elements CU950-3
956	6 filter elements CU950-3

2 - Filter length

3

3 - Valves

S	Without by-pass
B	With by-pass

4 - Seals

A	NBR
V	FPM

5 - Connections

Standard

FA
FB
FC
FD

See page 80

Rapid discharge oil drain

GA **EA**
GB **EB**
GC **EC**
GD **ED**

See page 85

6 - Filter element

A03	3 µm	**A16**	16 µm	Absolute filtration Inorganic microfibre
A06	6 µm	**A25**	25 µm	ßx (c) ≥ 1000
A10	10 µm			see page 9
M25	25 µm	**M90**	90 µm	Nominal Filtration Metal mesh
M60	60 µm			see page 9

7 - Filter elements series

N	Δp 20 bar
W	Δp 20 bar (aqueous emulsions - water and glycol)

8 - Options

a - Filters

P01	MP Standard filters
P02	With internal tube for reduced flow rate
Pxx	Customer request

b - Filter elements

P01	MP Standard filters
Pxx	Customer request

DIFFERENTIAL INDICATORS (see page 12)

Option:

Flange with rapid discharge oil drain plug

See page 85

CMV4 Plug G 1 1/4”

CUV4 Plug SAE 20

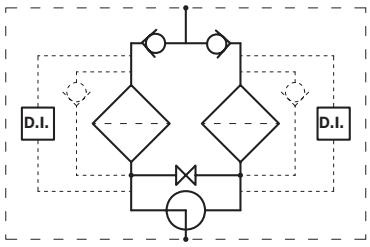
LMD 951

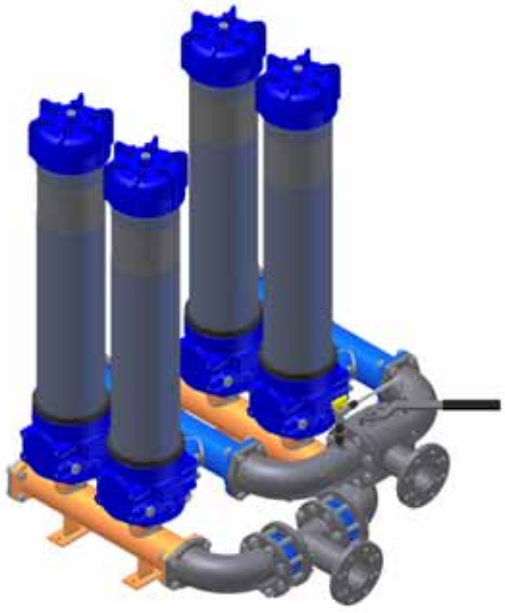
LMD

SERIES 951

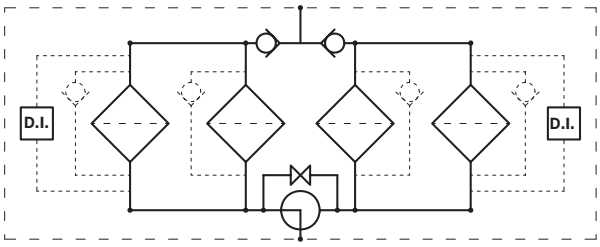
Working pressure
16 bar

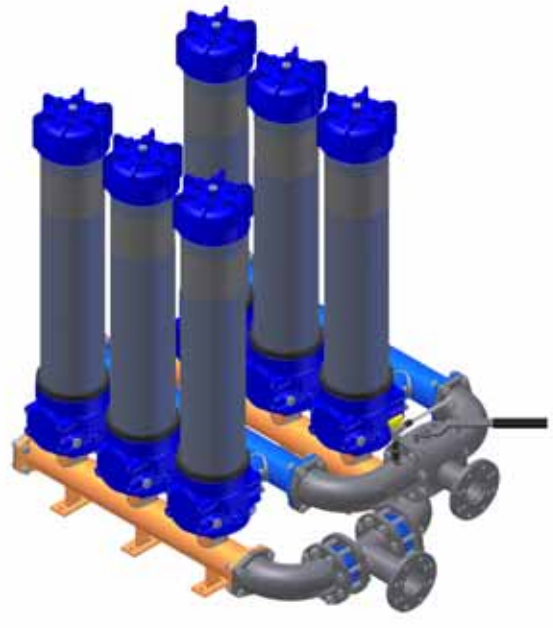
LMD 951
Double filter



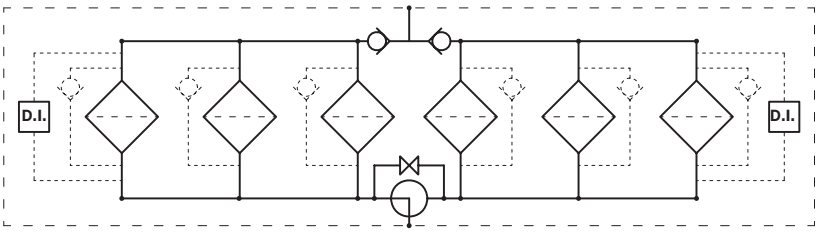


LMD 952
Double filter with manifolds for two filters





LMD 953
Double filter with manifolds for three filters



Technical data

Filter housing (Materials)

- Head: Anodised Aluminium
- Housing: Anodised Aluminium
- Manifolds: Steel / Painted black
- Bypass valve: Nylon - Steel
- 3-way ball valve: - Steel body
  - Stainless steel ball
- Check valve: - Cast iron body
  - AISI 304 leaf

Pressure

- DIN Flange
- Working pressure: 16 bar (1.6 MPa)
- Test pressure: 25 bar (2.5 MPa)

Temperature

- From -25°C to +110°C

Bypass valve

- Opening pressure 3.5 bar ±10%
- Other opening pressures on request.

Number of filter elements

- LMD 951: 2 filter elements CU950-3
- LMD 952: 4 filter elements CU950-3
- LMD 953: 6 filter elements CU950-3

Filter elements Δp

- Series N and W elements: 20 bar
- Oil flow from exterior to interior.

Seals

- Standard NBR series V

Weights (kg)

Length

- LMD951 102 (DN 80) - 130 (DN 100)
- LMD952 207 (DN 80) - 235 (DN 100)
- LMD953 312 (DN 80) - 340 (DN 100)

Volumes (dm^3)

Length

- LMD951 62
- LMD952 138
- LMD953 232

Connections

Inlet/Outlet

- Over and under
- In-line

Compatibility

- Housings compatible with:
  Mineral oils to ISO 2943 - aqueous emulsions
  synthetic fluids, water and glycol.
- The filter elements are compatible with:
  Mineral oils to ISO 2943, synthetic fluids
  Aqueous emulsions, water and glycol (series W required).
- NBR seals series A, compatible with:
  Mineral oils to ISO 2943 - aqueous emulsions
  synthetic fluids, water and glycol.
- V series FPM seals, compatible with:
  Synthetic fluids type HS-HFDR-HFDS-HFDU
  To ISO 2943

Filter Element Area of Working Body / Bodies

Filter element in stainless steel mesh

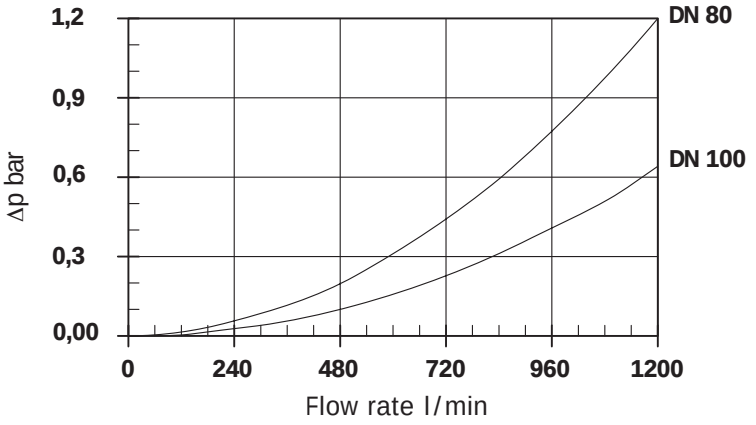
	LMD		
Tipo	**951**	**952**	**953**
CU950-3	25100	50200	75300
	Values expressed in **cm^2**		

Filter housing Δp pressure drop

The curves are plotted using mineral oil
with density of 0.86 kg/dm^3 to ISO 3968.

Δp varies proportionally with density.

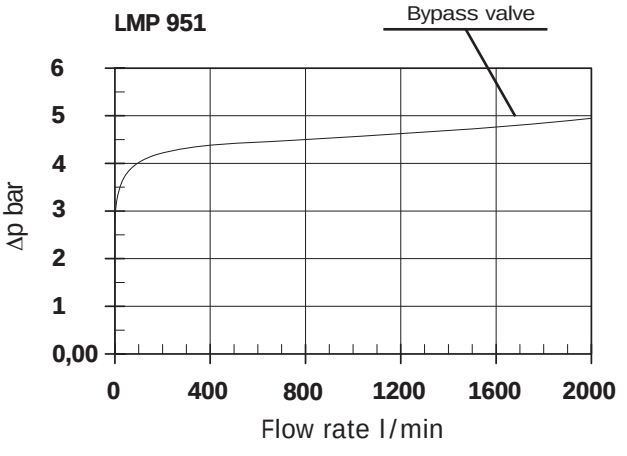
LMD 951 - 1 - 2 - 3
Δp housing



Valves

Bypass valve pressure drop

Per individual filter

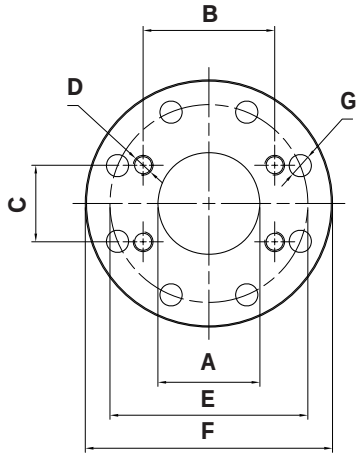


Recommended maximum flow rate

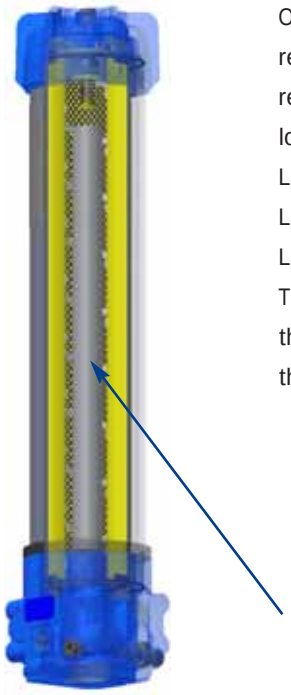
- Pressure drop of filter assembly equal to Δp 0.6 bar.
- Oil kinematic viscosity 30 mm^2/s (cSt).
- Density 0.86 kg/dm^3.

Filter element type	Flow rate l/min Series N	Filter Type	Flange SAE 3000
A03	625	**LMD 951**	**3”**
A06	650		
A10	700		
A16	760		
A25	780		
M25	830		
A03	720	**LMD 952**	**3”**
A06	750		
A10	800		
A16	800		
A25	820		
M25	850		
A03	780	**LMD 953**	**3”**
A06	800		
A10	800		
A16	850		
A25	850		
M25	880		
A03	780	**LMD 951**	**4”**
A06	820		
A10	900		
A16	1000		
A25	1050		
M25	1150		
A03	950	**LMD 952**	**4”**
A06	980		
A10	1050		
A16	1100		
A25	1100		
M25	1180		
A03	1000	**LMD 953**	**4”**
A06	1050		
A10	1100		
A16	1150		
A25	1150		
M25	1200		

Flange connection



Option P02 for LMD 951/952/953



Option P02 “Internal tube for reduced flow rates” is recommended for flow rates lower than:
LMD 951 - 150 l/min
LMD 952 - 300 l/min
LMD 953 - 450 l/min
The use of option P02 allows the operating fluid to fill the filter housing completely.

P02 “Internal tube for reduced flow rates”

Recommended maximum flow rate

The maximum recommended flow rate for the filters installed on lubrication lines, whether return or in-line, is defined by the maximum oil velocity in the connections. For filters installed on Off-Line lines, the maximum recommended flow rate is defined by the pressure drop of the filter element.

Filter for pressurised lubrication, max. oil velocity 2.5 m/sec.
Return or in-line filter, max. oil velocity 5 m/sec.

	Connection	
Oil velocity	3”	4”
2,5 m/sec.	750	1200
5 m/sec.	1500	2400

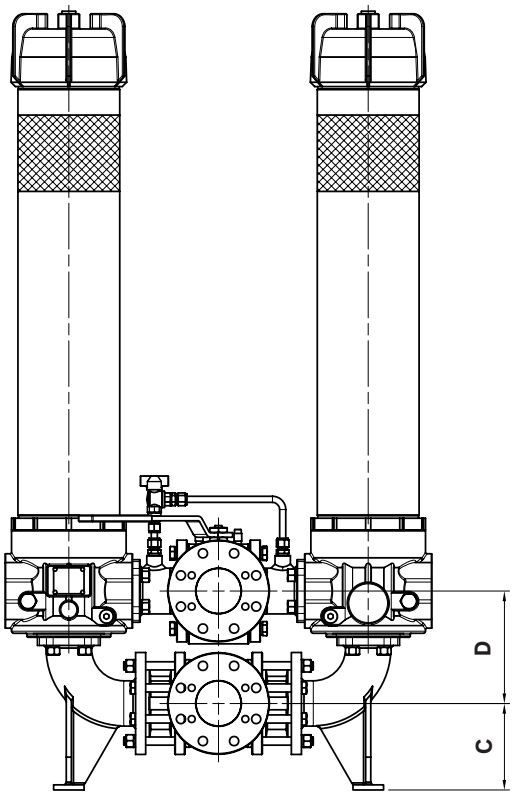
Flow rate l/min

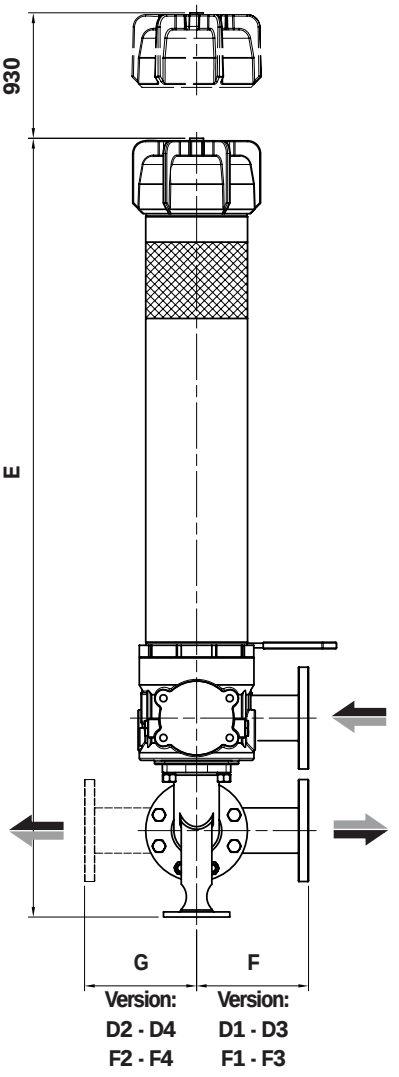
Connection Flange IN-OUT	3” SAE 3000 psi/M	3” SAE 3000 psi/UNC	4” SAE 3000 psi/M	4” SAE 3000 psi/UNC
A	73	99	73	99
B	106,38	106,38	130,18	130,18
C	61,93	61,93	77,77	77,77
D	M16	5/8” UNC	M16	5/8” UNC

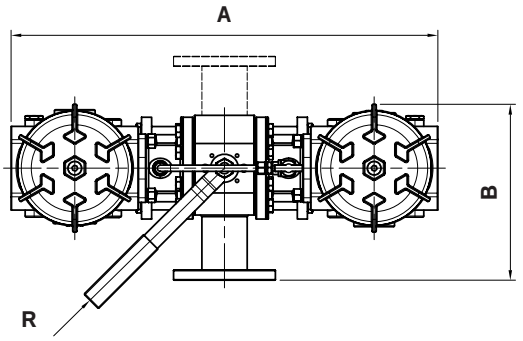
Connection Flange IN-OUT	DIN PN16 DN80	DIN PN16 DN100
A	73	99
E	160	180
F	200	220
G	18	18

Dimensions

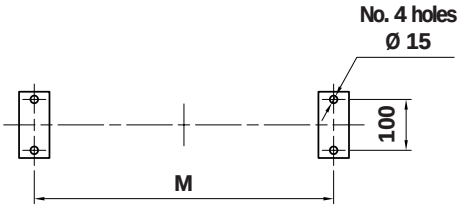
LMD 951





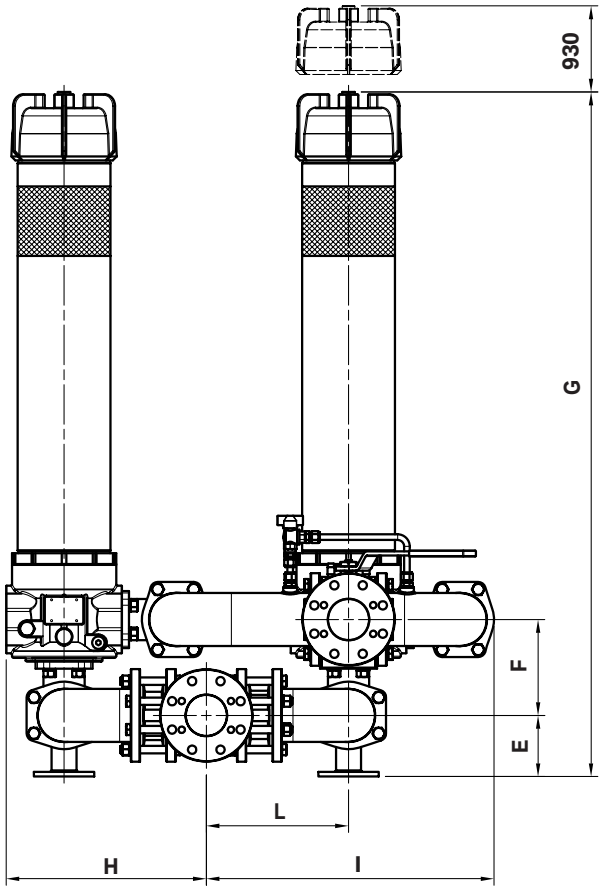


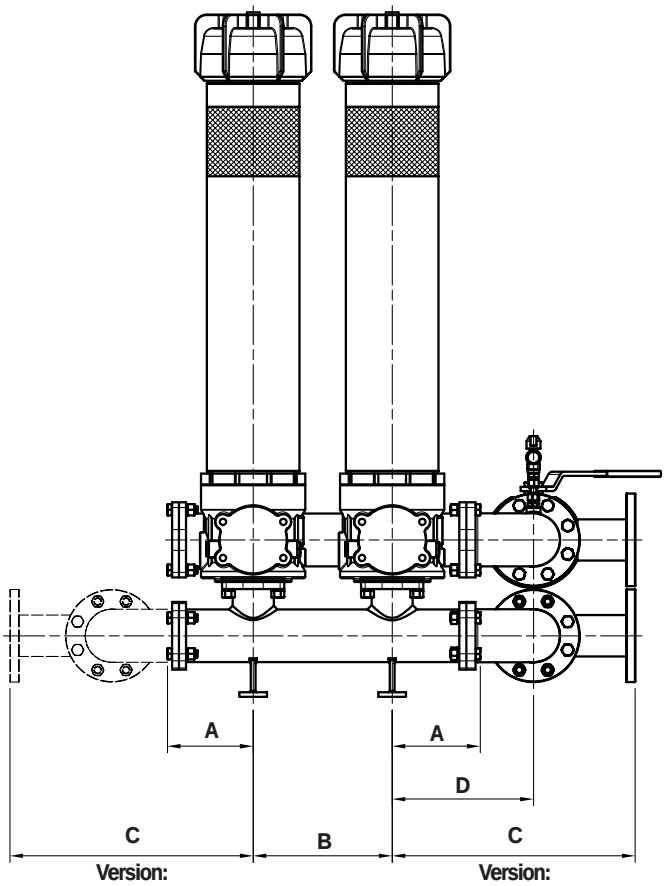
Filter fixing holes



	3" SAE DN 80	4" SAE DN 100
A	838	932
B	346	346
C	170	170
D	221	268
E	1530	1577
F	220	220
G	220	220
M	588	682
R	370	650

LMD 952

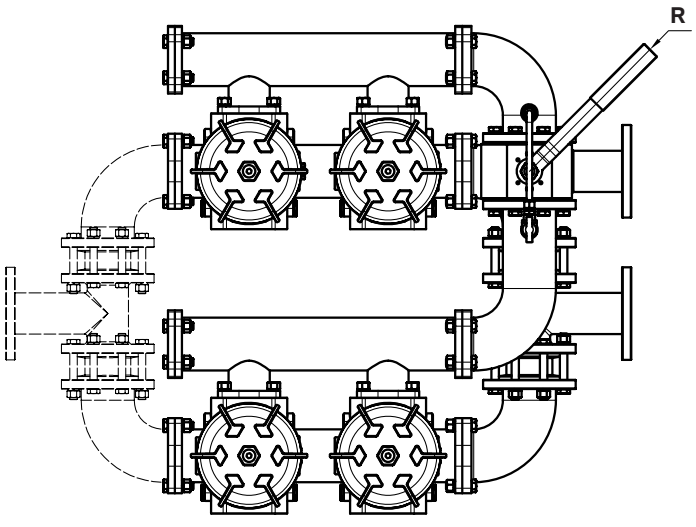




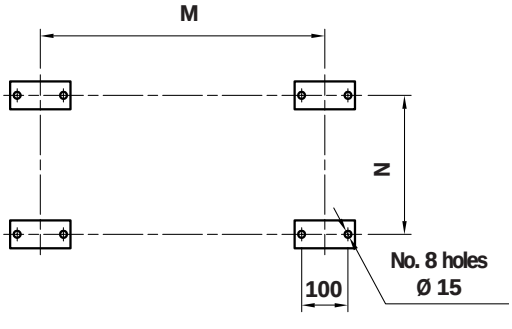
Version:
D3 - D4
F5 - F5 - F7 - F8

Version:
D1 - D2
F1 - F2 - F3 - F4

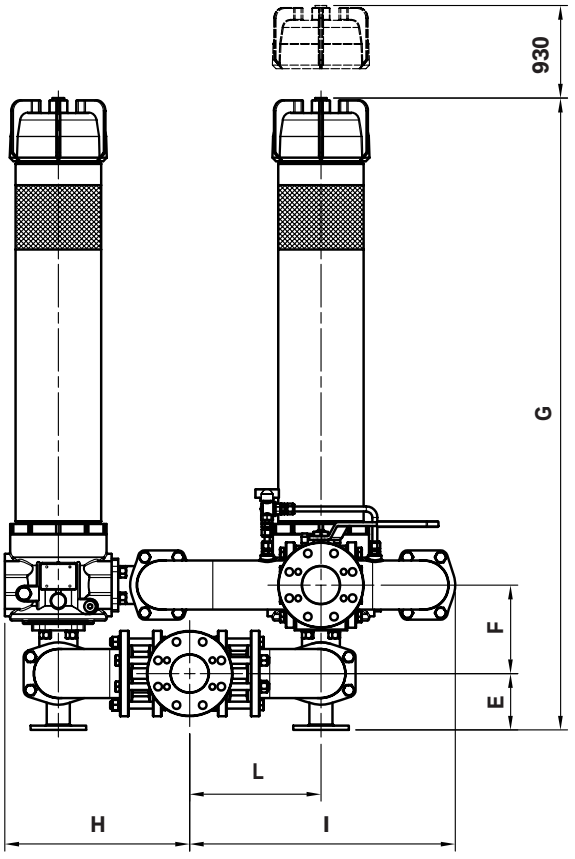
	3" SAE DN 80	4" SAE DN 100
A	190	190
B	300	300
C	552	552
D	332	332
E	132	132
F	207	207
G	1478	1478
H	432	456
I	621	647
L	269	278
M	614	662
N	300	300
R	370	650

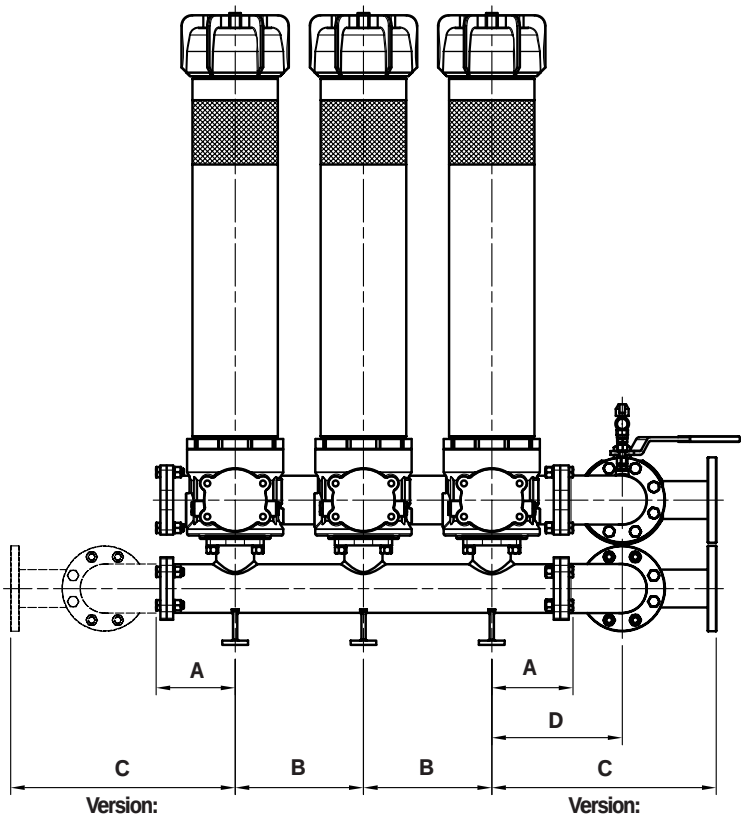


LMD 952 filter fixing holes



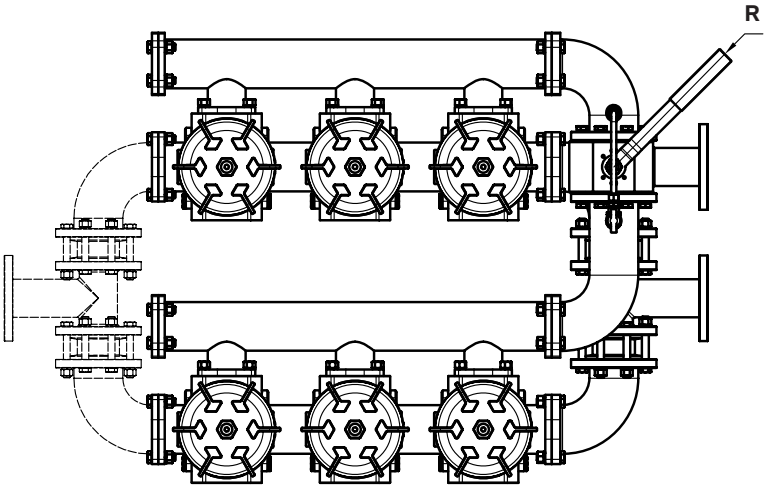
LMD 953





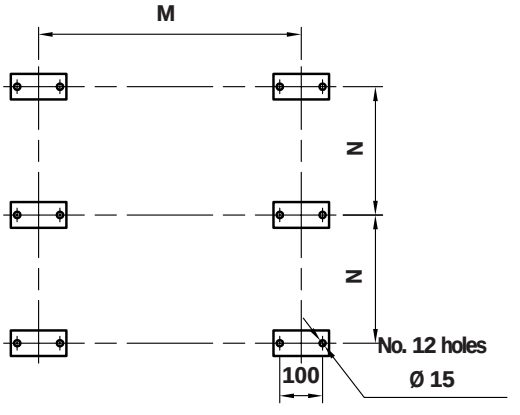
Version:
D3 - D4
F5 - F5 - F7 - F8

Version:
D1 - D2
F1 - F2 - F3 - F4

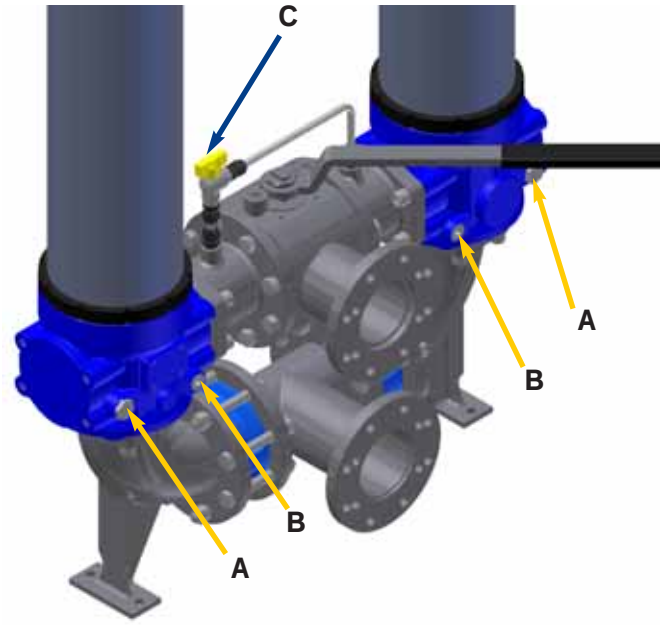


	3" SAE DN 80	4" SAE DN 100
A	190	190
B	300	300
C	552	552
D	332	332
E	132	132
F	207	207
G	1478	1478
H	432	456
I	621	647
L	269	278
M	614	662
N	300	300
R	370	650

LMD 953 filter fixing holes



LMD 951



A Indicator connection plug T2 Ch. 30

B Oil drain plug G 1/2" Ch. 10

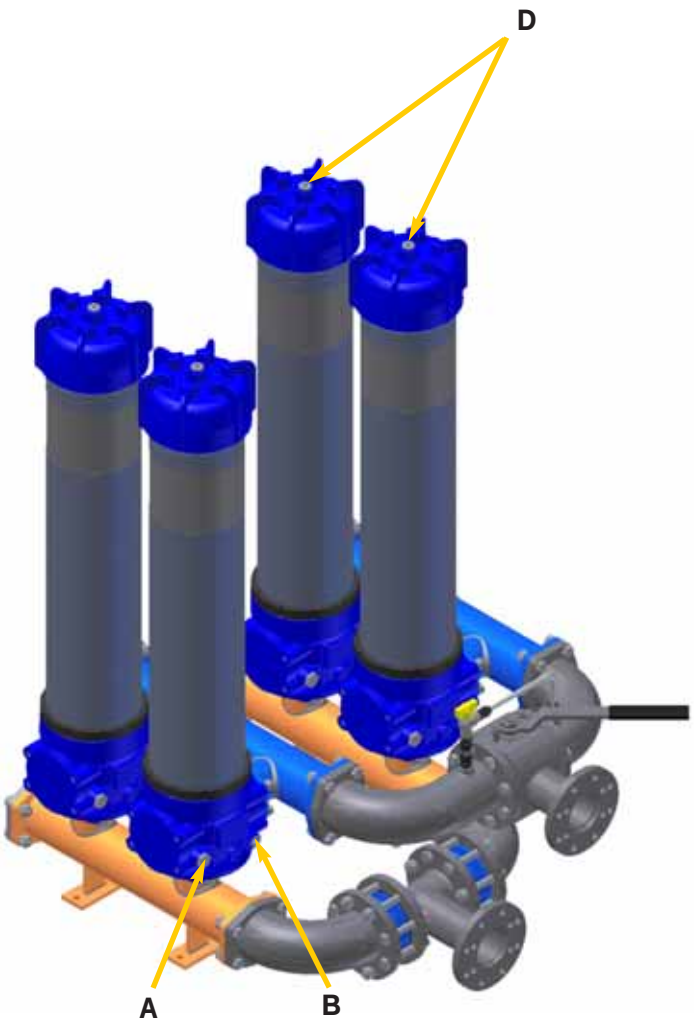
C Compensation valve

D Breather plug G 1/2" Ch. 10

Differential indicator:

LMD 951	Fit one indicator per filter housing
LMD 952 - 953	Fit one indicator per individual filter assembly

LMD 952 - 953



Option

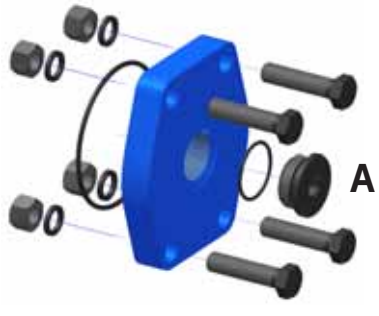
Flange with oil drain plug for rapid discharge LMD 952 - 953

Order code

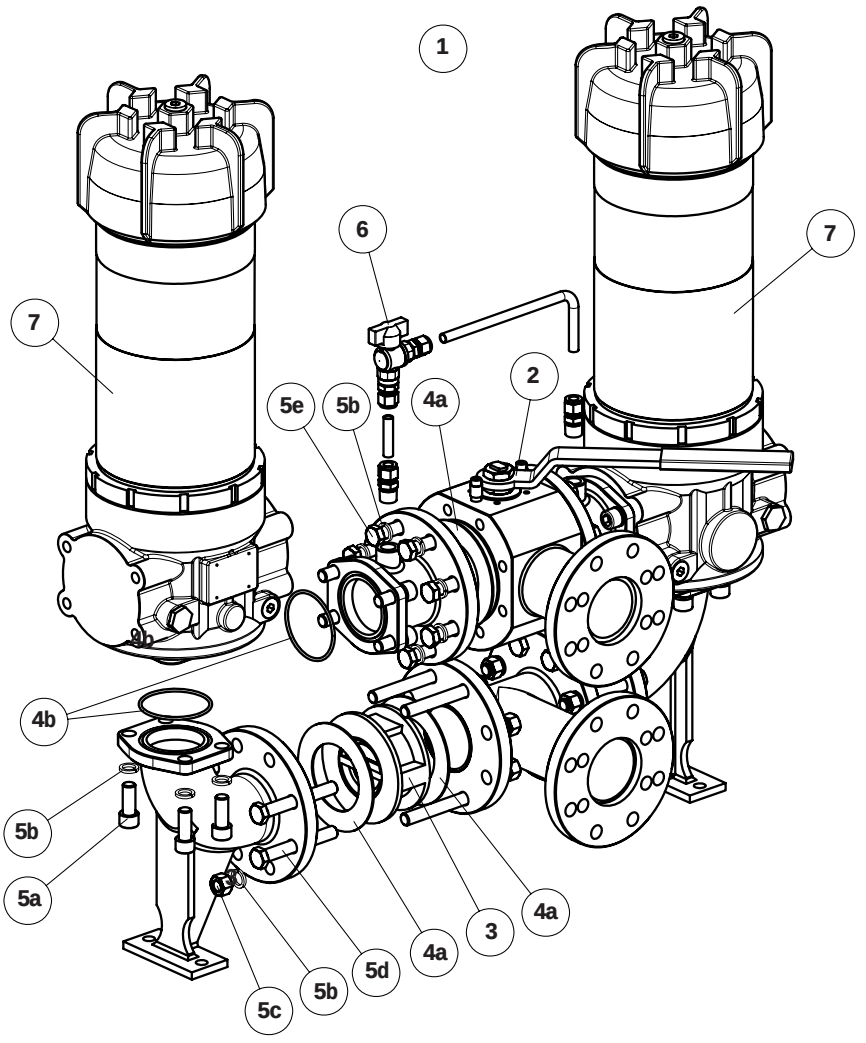
	A
CMV4	**G 1 1/4"**
CUV4	**SAE 20**

The order code includes:

- FLANGE
- SCREWS
- NUTS
- SEALS
- OIL DRAIN PLUG

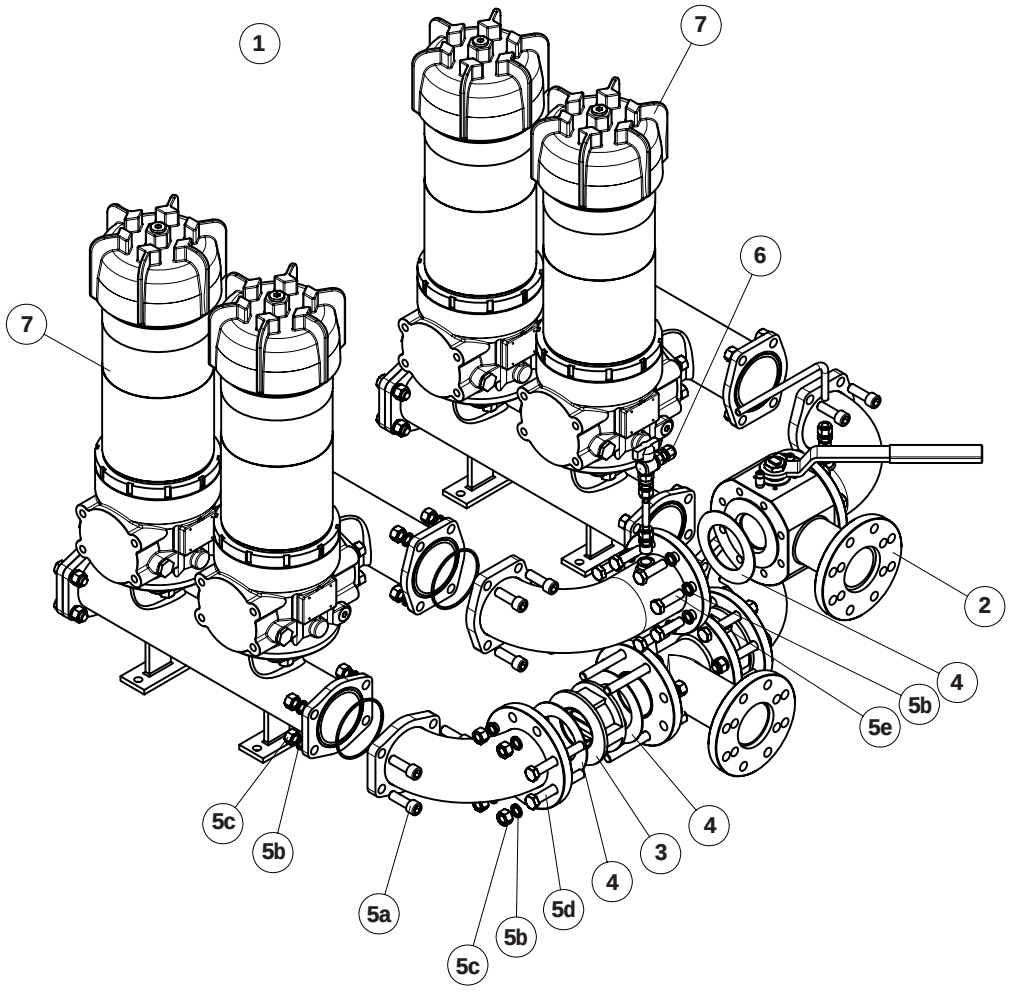


LMD 951 spare parts



Pos.	Description	Qty	LMD 951 Series Filter F1 - F2 - F5 - F6 / D1 - D3 (3" SAE / DIN PN16 DN 80)	LMD 951 Series Filter F3 - F4- F7 - F8 / D2 - D4 (4" SAE / DIN PN16 DN 100)
1	Filter assembly	1	See order table	
2	3-way ball valve PN 16	1	3" SAE 3000 psi/M 02001135 3" SAE 3000 psi/UNC 02001438	4" SAE 3000 psi/M 02001162 4" SAE 3000 psi/UNC 02001439
3	One-way valve	2	02001418	02001419
4	Seals kit	1	02050388	02050389
4a	Flat seal	6	To DN 80	To DN 100
4b	IN-OUT O-Ring	4	O-R 4337 Ø 85,32 x 3,53 FPM	O-R 4437 Ø 110,7 x 3,53 FPM
5	Threaded fasteners kit	1	02049056	02049057
5a	Stud bolts	16	UNI 5931 - M16 x 40 10.9	
5b	Circlips	48	UNI 1751-B 16	
5c	Nuts	16	UNI - EN 24032 - M16 10.9	
5d	Hex screws for flanges-valves pos. 3	16	UNI-EN 24014 - M16 x 120 - 10.9	UNI-EN 24014 - M16 x 130 10.9
5e	Hex screws for flanges-valves pos. 2	16	UNI-EN 24017 - M16 x 55 - 10.9	
6	G 1/2" Ball Valve Kit with straight fittings	1	02025043	
7	Filter	2	See order table LMP9513F.....PO* a pag. 75	
-	Indicators	2	See order table	

LMD 952-953 spare parts



Pos.	Description	Qty	LMD 952 - 953 Series Filter F1 - F2 - F5 - F6 / D1 - D3 (3" SAE / DIN PN16 DN80)	F3 - F4- F7 - F8 / D2 - D4 (4" SAE / DIN PN16 DN 100)
1	Filter assembly	1	See order table	
2	3-way ball valve PN 16	1	3" SAE 3000 psi/M 02001135 3" SAE 3000 psi/UNC 02001438	4" SAE 3000 psi/M 02001162 4" SAE 3000 psi/UNC 02001439
3	One-way valve	2	02001418	02001419
4	Flat seal	6	To DN 80	To DN 100
5	Threaded fasteners kit	1	02049058	02049059
5a	Hex screws for fittings - manifolds	16	UNI-EN 5931 - M16 x 55 10.9	
5b	Circlips	48	UNI 1751-B 16	
5c	Nuts	32	UNI-EN 24032 - M16 10.9	
5d	Hex screws for flanges- valves pos. 3	16	UNI-EN 24014 - M16 x 110 10.9	UNI-EN 24014 - M16 x 120 10.9
5e	Hex screws for flanges- valves pos. 2	16	UNI-EN 24017 - M16 x 55 - 10.9	
6	G 1/2" Ball Valve Kit with straight fittings	1	02025043	
7	Filter	2	See order table LMP9523F.....PO* a pag. 87 See order table LMP9533F.....PO* a pag. 87	
-	Indicators	2	See order table	

LMD951/2/3 ordering information

Filter assembly	1	2	3	4	5	6	7	8a
LMD								
Example: LMD	951	3	B	V	F1	A10	N	P01

Filter element	2	6	4	7	8b
CU 950					
Example: CU950	3	A10	A	N	P01

1 - Sizes

951	1+1 filter elements CU950-3
952	2+2 filter elements CU950-3
953	3+3 filter elements CU950-3

2 - Filter length

3	

3 - Valves

S	Without by-pass
B	With by-pass

4 - Seals

V	FPM

5 - Connections

Type		Type	
D1	DIN PN 16 DN 80	F1	3" SAE 3000 psi/M
D2	DIN PN 16 DN 100	F2	3" SAE 3000 psi/UNC
D3	= D1 In-line connections	F3	4" SAE 3000 psi/M
D4	= D2 In-line connections	F4	4" SAE 3000 psi/UNC
		F5	= F1 In-line connections
		F6	= F2 In-line connections
		F7	= F3 In-line connections
		F8	= F4 In-line connections

6 - Filter element

A03	3 µm	A16	16 µm	Absolute filtration Inorganic microfibre ßx (c) ≥ 1000 see page 9
A06	6 µm	A25	25 µm	
A10	10 µm			
M25	25 µm	M90	90 µm	Nominal Filtration Metal mesh see page 9
M60	60 µm			

7 - Filter element series

N	Δp 20 bar
W	Δp 20 bar (aqueous emulsions - water and glycol)

8 - Options

a - Filters

P01	MP Standard filters
P02	With internal tube for reduced flow rates
Pxx	Customer request

b - Filter elements

P01	MP Standard filters
Pxx	Customer request

DIFFERENTIAL INDICATORS (see page 12)

Option exclusively for LMD 952 - 953:

Flange with rapid oil drain plug

See page 95

CMV4 G 1 1/4" plug

CUV4 SAE 20 plug

Order 2 kits per filter

FIXING SYSTEMS FOR LMP 400-900 LMP 430-950 LMD 400-401

Fixing brackets

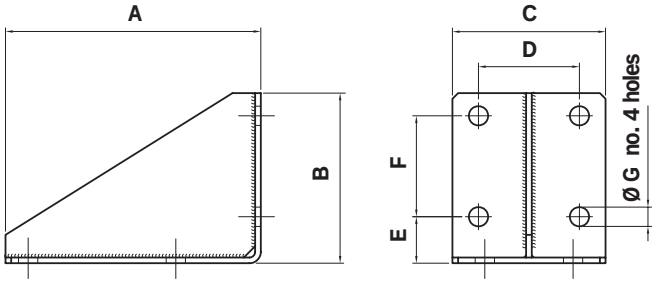
Materials

- Bracket: Welded steel - phosphated
- 4 M12 x 35 screws - Filter LMP 400 (fixing of bracket to filter head).
- 4 M16 x 35 screws - Filter LMP 900 (fixing of bracket to filter head).

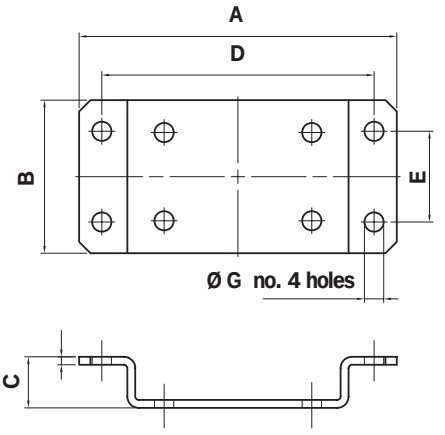
Ordering code

Bracket Code	Filter type
CFL 40 A P01	LMP 400
CFL 90 A P01	LMP 900
CFS 40 A P01	LMP 430
CFS 90 A P01	LMP 950

CFL



CFS



	A	B	C	D	E	F	G
CFL 40	165	120	115	70	35	70	13
CFL 90	225	150	135	89	41	89	17
CFS 40	260	115	45	220	60	-	13
CFS 90	280	135	45	240	80	-	17

Fixing with CFS bracket

LMP 400-900

Fixing with CFL bracket

LMP 430-950

Fixing with CFL bracket

LMP 400-900

Fixing with CFS bracket

LMP 430-950

Fixing with CFS bracket

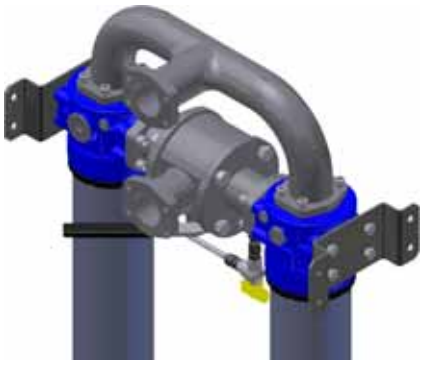
LMD 400

Fixing with CFL bracket

LMD 400

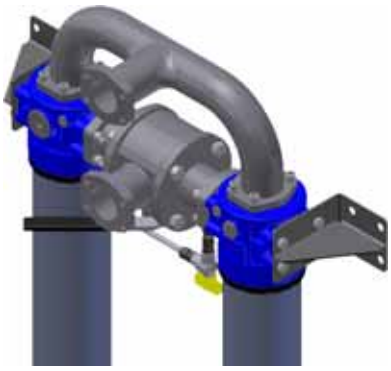
Fixing with CFS bracket

LMD 401



Fixing with CFL bracket

LMD 401



FIXING SYSTEMS FOR LMP 950

Fixing collar

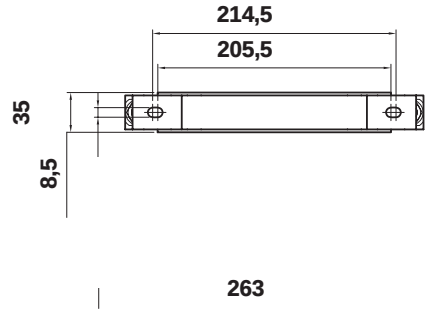
Materials

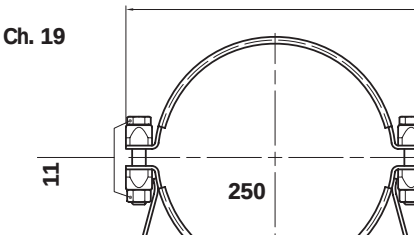
- Collar: Galvanised steel
- Seal: NBR
- Hex screw DIN-EN 24017 M12x65
- Nuts UNI-EN 24032 M12

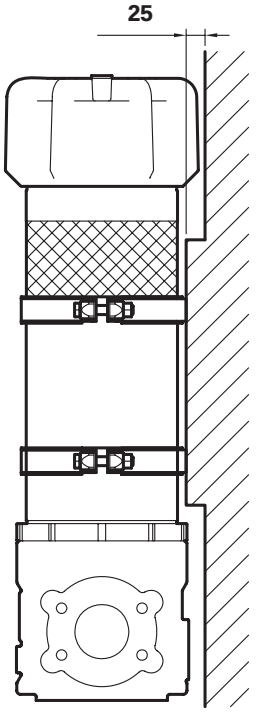
Ordering code

CFA 20 M P01

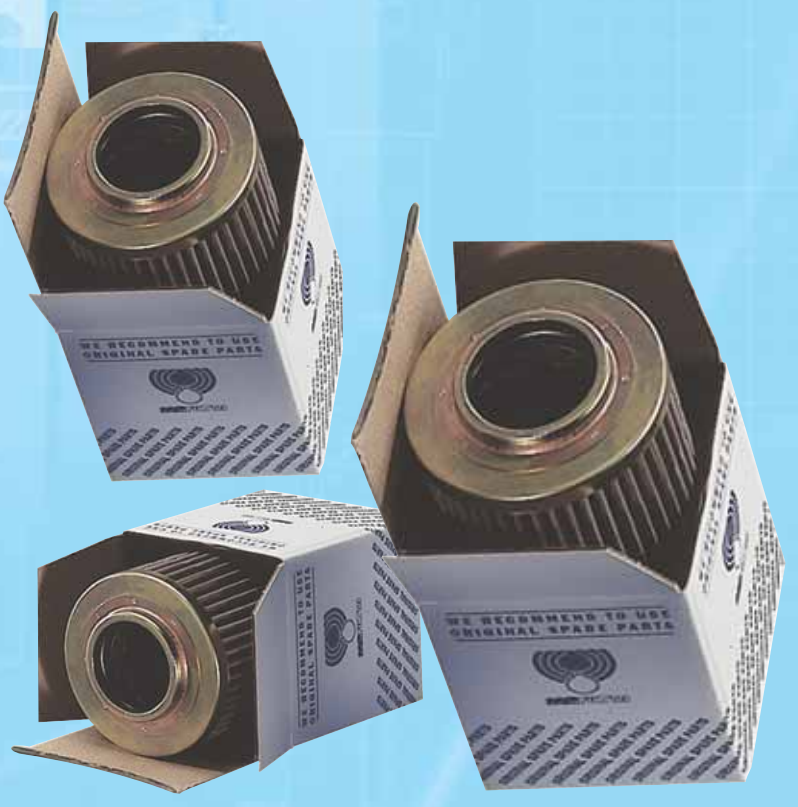
CFA 20







Operating & Maintenance Manual



In-line filters are utilised to remove contaminant from hydraulic systems.
Long working life of the hydraulic components and correct use of the hydraulic systems can be assured only when maintenance is performed correctly and at regular intervals.

In-line filters can be supplied with bypass valves, reverse flow valves, and check valves.

In order to prevent the filter elements from collapsing due to excessive hydraulic pressure it is essential to use differential indicators that serve to inform the user of the need to change the cartridge.
Effective contamination control can be assured only by the correct use of clogging differential.

MAINTENANCE TOOLS

Differential indicators	
Wrenches	Ch. 27/30/32
Bypass valves	
Allen key	Ch. 17
Oil drain plugs	
Allen keys	Ch. 8/10
Rapid oil drain plug Allen key	Ch. 14
Air breather plugs	
Allen keys	Ch. 8/10
Indicator plug T2	
Wrench	Ch. 30
Manifolds Flanges	
Wrench	Ch. 24
Accessories	
CFS - CFL Wrenches	Ch. 19/24
CFS - CFL Wrenches	Ch. 19

INSTALLATION

A Check that the pressure value of the selected filter is higher than the system's maximum operating pressure (the maximum pressure value is shown on the data-plate).
B Check that the filter body contains the filter cartridge.
C Check that the operating fluid is compatible with the material of the body, cartridge, and seals.
D Secure the filter using the relevant threaded holes, to rigid brackets. Rigid installation makes it possible to unscrew the housing without introducing flexing of the hydraulic fittings, limiting any points of stress transfer.
E Install the filter in an accessible position for correct and trouble-free maintenance and visibility.
F Start the machine and check for the absence of oil leaks from the filter and relative fittings.
G Repeat the visual inspection when the system arrives at the operating temperature of the oil.

MAINTENANCE

A All maintenance operations must be performed only by suitably trained personnel.
B The hydraulic system must be depressurised before performing maintenance operations (except in the case of LMD duplex filters)
C Maintenance must be carried out using suitable tools and containers to collect the fluid contained in the filter body.
Spent fluids must be disposed of in compliance with statutory legislation.
D Do not use naked flames during maintenance operations.
E Use the utmost caution in relation to the temperature of the fluid. High temperatures can lead to residual pressure with resulting undesirable movements of mechanical parts.

CHANGING THE FILTER ELEMENT

A The date on which the filter elements are changed must be entered in the machine datasheet.
B Spare parts installed must be in compliance with the specifications given in the machine operating and maintenance manual.
C Filter bodies and tools must be thoroughly cleaned prior to each maintenance operation.
D After having opened the filter to change the filter element, check the condition of the seals and renew them if necessary. Clean thoroughly before reassembling.

CHANGING THE FILTER ELEMENT IN LMP 400/401 FILTERS Length 2-3-4

1 Depressurise the system and clean the filter.
2 Unscrew the oil drain plug (pos. A) collecting the fluid in a suitable container.
When the operation is terminated screw the plug (pos. A) tightening it fully down and check check the condition of the seal.
Unscrew housing using the appropriate tools and extract the filter element.

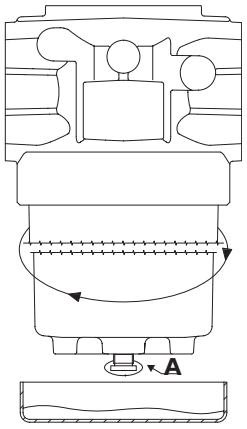


Fig. 1

3 Collect the spent oil and cartridge in a suitable container and dispose of them in compliance with statutory legislation

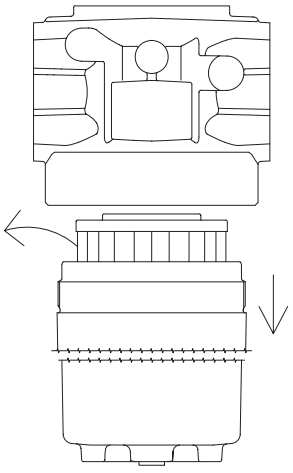


Fig. 2

!!! WARNING !!!

4 To avoid damaging the components clean seals (B), surfaces (A) and threads (C) of the housing and the head.

5 Check the condition of seals (B) -if renewing, lubricate the new seals with the operating fluid before installing.

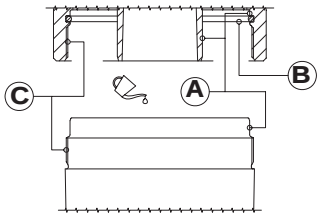


Fig. 3

6 Lubricate the filter element seal with the operating fluid.
Insert the filter element in the filter housing.
Insert the cartridge in the head spigot.

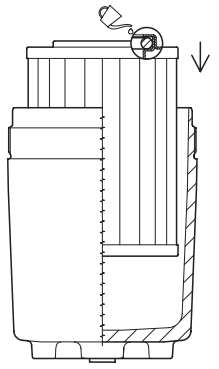


Fig. 4

7 Screw the housing onto the head using the correct tool.
WARNING: Screw the housing fully home into the head
"DO NOT APPLY EXCESSIVE TIGHTENING TORQUE".

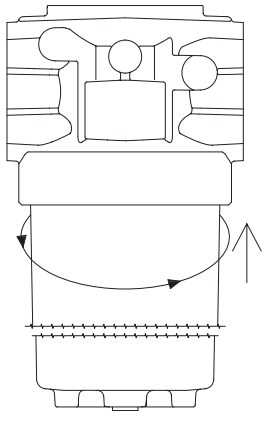


Fig. 5

8 Start the machine and check for the absence of leaks. Repeat the check when the machine has reached its operating temperature.

CHANGING THE FILTER ELEMENT ON LMP 400/401 FILTERS Length 5-6

1 Depressurise the system and clean the filter.

2 Unscrew the oil drain plug (pos. A) collecting the fluid in a suitable container.
When the operation is terminated screw down the plug (pos. A) tightening it fully down after having checked the condition of its seal.Unscrew the housing/cover using the appropriate tools and extract the filter element.

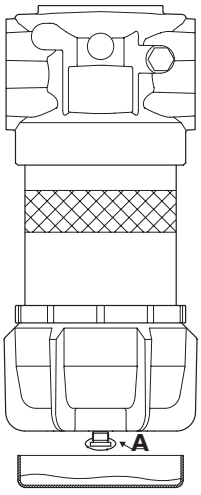


Fig. 1

3 Collect the spent oil and cartridge in a suitable container and dispose of them in compliance with statutory legislation.

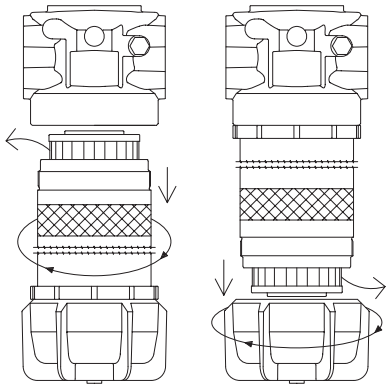


Fig. 2

!!! WARNING !!!

4 To avoid damaging the components clean the seals (B), the surfaces (A) and the threads (C) of the housing and the head or cover in version P01 and P02.

5 Check the condition of seals (B) - if renewing, lubricate the new seals with the operating fluid before installing.

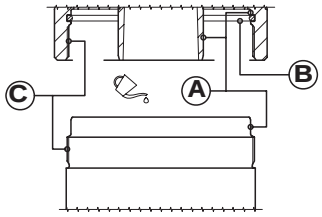


Fig. 3

6 Lubricate the filter element seal with the operating fluid.
Fit the lower spigot in the filter element, and insert the element - spigot assembly as shown in fig. 4 respectively for versions P01 and P02.

Version P01 **Version P02**

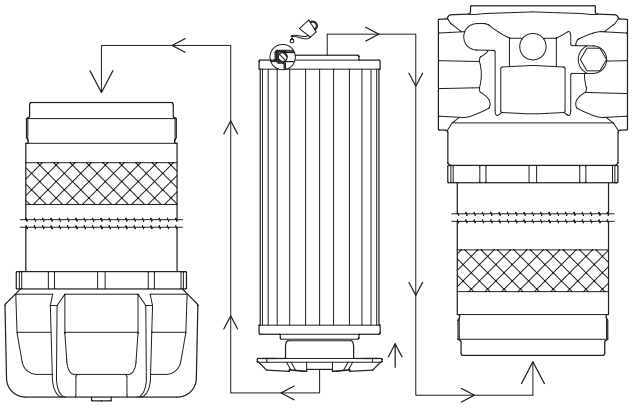


Fig. 4

7 Screw the cover onto the housing using the correct tool.
WARNING: Screw fully home on the housing **"DO NOT APPLY EXCESSIVE TIGHTENING TORQUE"**.

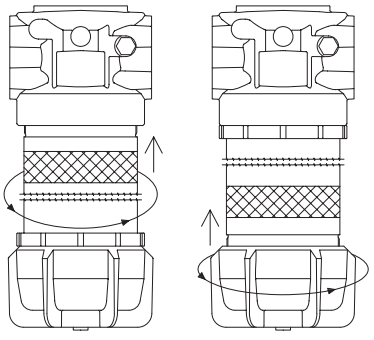


Fig. 5

8 Start the machine and check for the absence of leaks. Repeat the check when the machine has reached its operating temperature.

CHANGING THE FILTER ELEMENT ON LMP 430/431 FILTERS

1 Depressurise the system and clean the filter.

2 Unscrew the air breather plug (pos. A) and open the oil drain connection (pos. B) collecting the fluid in a suitable container.
When the operation is terminated screw the plug (pos. A) tightening it fully down after having checked the condition of its seal.
Close the oil drain connection (B).

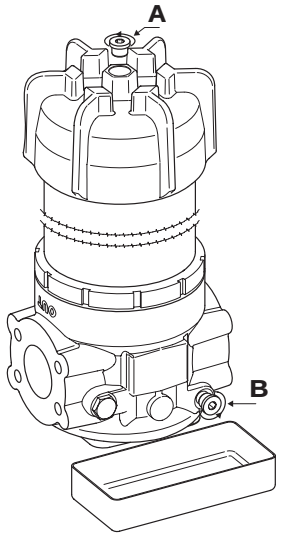


Fig. 1

3 Unscrew and remove the cover using the specific tools, extract the upper spigot, and extract the filter element.

4 Collect the spent oil and cartridge in a suitable container and dispose of them in compliance with statutorylegislation.

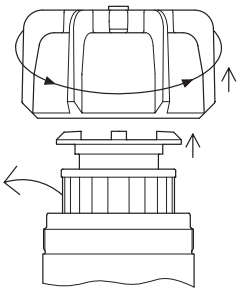


Fig. 2

!!! WARNING !!!

5 To avoid damaging the components clean the seal (B), surfaces (A) and threads (C) of thecover and the housing.

6 Check the condition of seals (B) if renewing, lubricate the new seals with the operating fluid before installing.

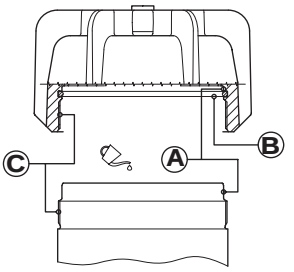


Fig. 3

7 Lubricate the filter element seal with the operating fluid.
Insert the filter element in the filter body, fit the spigot at the top of the filter element as shown in fig.4.

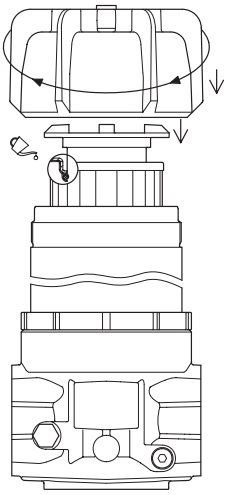


Fig. 4

8 Screw the cover onto the housing using the correct tool.
WARNING: Screw fully home on the housing **"DO NOT APPLY EXCESSIVE TIGHTENING TORQUE"**.

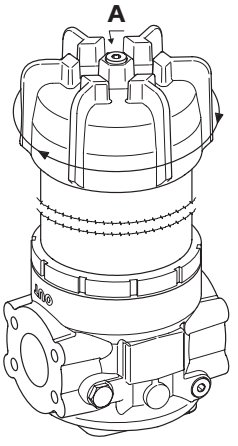


Fig. 5

9 Start the machine and bleed the air by unscrewing (max. one turn) the plug(pos.A).
When the operation is terminated tighten the plug fully.

10 Start the machine and check for the absence of leaks.
Repeat the check when the machine has reached its operating temperature.

CHANGING THE FILTER ELEMENT ON LMP 900/901 FILTERS Length 1

1 Depressurise the system and clean the filter.
2 Unscrew the oil drain plug (pos. A) collecting the fluid in a suitable container.
When the operation is terminated screw down the plug (pos. A) tightening it fully down after having checked the condition of its seal.
Unscrew the housing using the appropriate tools and extract the filter element.

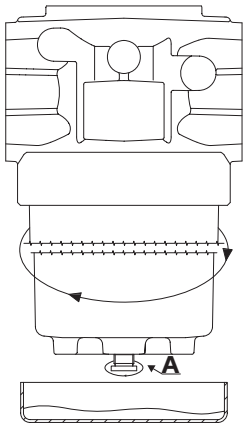


Fig. 1

3 Collect the spent oil and cartridge in a suitable container and dispose of them in compliance with statutorylegislation.

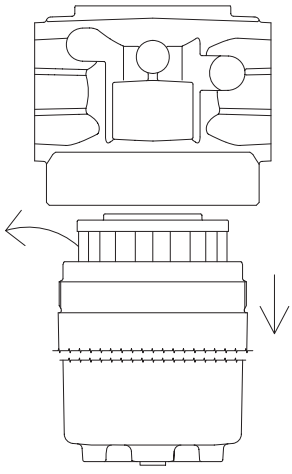


Fig. 2

!!! WARNING !!!

4 To avoid damaging the components clean seals (B), surfaces (A) and threads (C) of the housing and the head.

5 Check the condition of seals (B) -if renewing, lubricate the new seals with the operating fluid before installing.

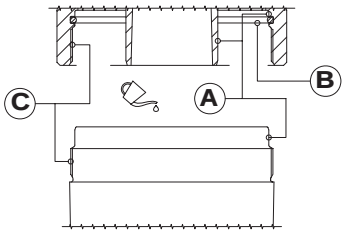


Fig. 3

6 Lubricate the filter element seals with the operating fluid.
Fit the lower spigot in the filter element, and insert the element - spigot assembly + as shown in fig. 4 into the housing.

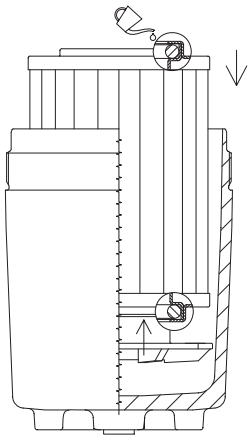


Fig. 4

7 Screw the housing onto the head using the correct tool.
WARNING: Screw the housing fully home into the head
"DO NOT APPLY EXCESSIVE TIGHTENING TORQUE".

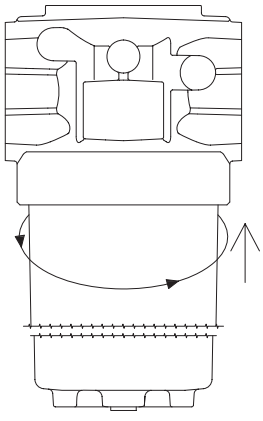


Fig. 5

8 Start the machine and check for the absence of leaks.
Repeat the check when the machine has reached its operating temperature.

CHANGING THE FILTER ELEMENT ON LMP 900/901 FILTERS Length 2

1 Depressurise the system and clean the filter.

2 Unscrew the air breather plug (pos. A) and open the oil drain connection (pos. B) collecting the fluid in a suitable container.
When the operation is terminated screw the plug (pos. A) tightening it fully down after having checked the condition of its seal.
Close the oil drain connection (B).

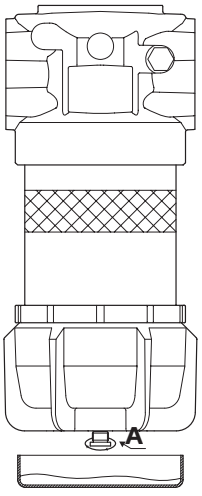


Fig. 1

3 Unscrew and remove the cover using the specific tools, extract the upper spigot, and extract the filter element.

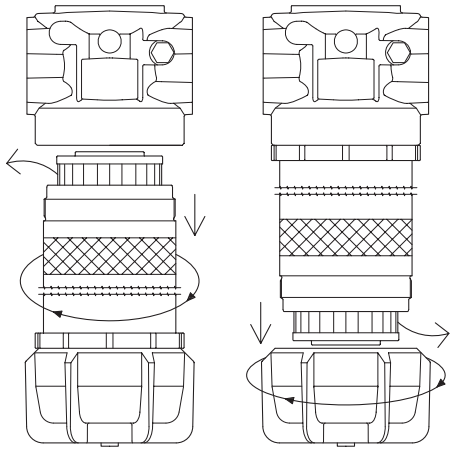


Fig. 2

!!! WARNING !!!

4 To avoid damaging the components clean the seal (B), surfaces (A) and threads (C) of thecover and the housing.

5 Check the condition of seals (B) if renewing, lubricate the new seals with the operating fluid before installing.

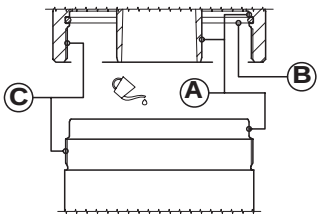


Fig. 3

6 Lubricate the filter element seal with the operating fluid.
Insert the filter element in the filter body, fit the spigot at the top of the filter element as shown in fig.4.

Version P01 **Version P02**

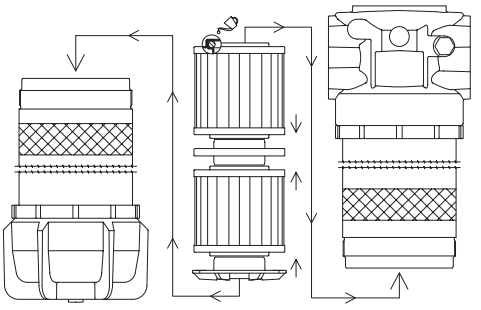


Fig. 4

7 Screw the cover onto the housing using the correct tool.
WARNING: Screw fully home on the housing **"DO NOT APPLY EXCESSIVE TIGHTENING TORQUE"**.

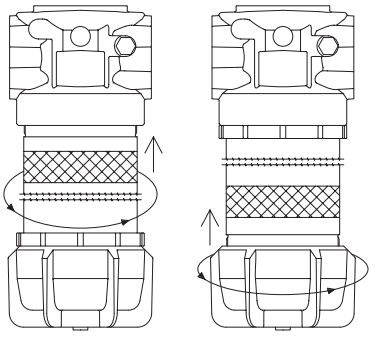


Fig. 5

8 Start the machine and check for the absence of leaks.
Repeat the check when the machine has reached its operating temperature.

CHANGING THE FILTER ELEMENT ON LMP 902/903 FILTERS Length 1

1 Depressurise the system and clean the filter.

2 Unscrew the oil drain plug (pos. A) collecting the fluid in a suitable container.
When the operation is terminated screw down the plug (pos. A) tightening it fully down after having checked the condition of its seal.
Unscrew the housing using the appropriate tools and extract the filter element.

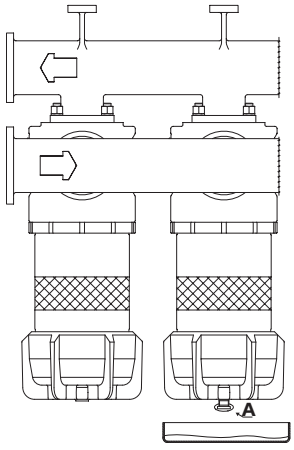


Fig. 1

3 Collect the spent oil and cartridge in a suitable container and dispose of them in compliance with statutorylegislation.

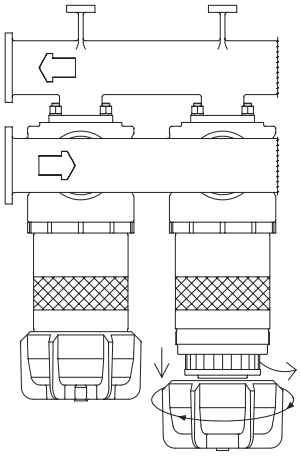


Fig. 2

!!! WARNING !!!

4 To avoid damaging the components clean seals (B), surfaces (A) and threads (C) of the housing and the head.

5 Check the condition of seals (B) -if renewing, lubricate the new seals with the operating fluid before installing.

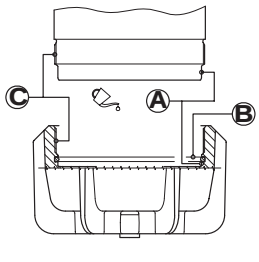


Fig. 3

6 Lubricate the filter element seals with the operating fluid.
Fit the lower spigot in the filter element, and insert the element - spigot assembly + as shown in fig. 4 into the housing.

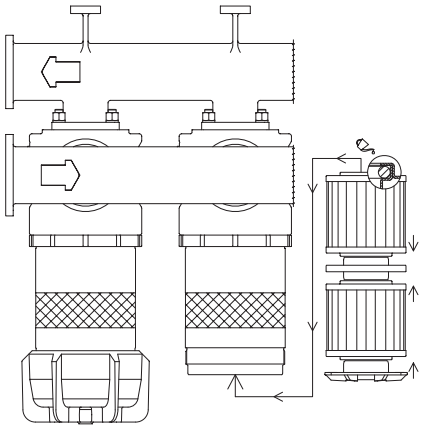


Fig. 4

7 Screw the housing onto the head using the correct tool.
WARNING: Screw the housing fully home into the head
"DO NOT APPLY EXCESSIVE TIGHTENING TORQUE".

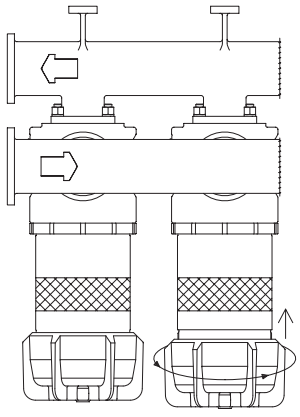


Fig. 5

8 Start the machine and check for the absence of leaks.
Repeat the check when the machine has reached its operating temperature.

9 Start the machine and check for the absence of leaks.
Repeat the check when the machine has reached its operating temperature.

CHANGING THE FILTER ELEMENT ON LMP 950 / 951 FILTERS

1 Depressurise the system and clean the filter.

2 Unscrew the air breather plug (pos. A) and open the oil drain connection (pos. B)collecting the fluid in a suitable container.
When the operation is terminated screw down the plug (pos. A) tightening it fully down after having checked the condition of its seal.
Close the oil drain connection (B).

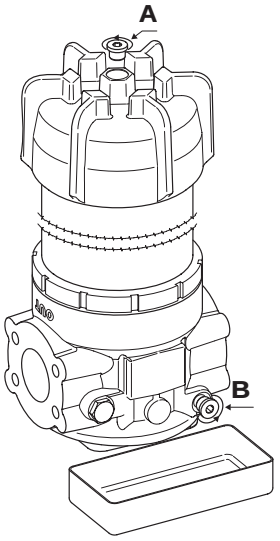


Fig. 1

3 Unscrew and remove the cover using the specific tools, extract the upper spigot, and extract the filter element.

4 Collect the spent oil and cartridge in a suitable container and dispose of them in compliance with statutorylegislation.

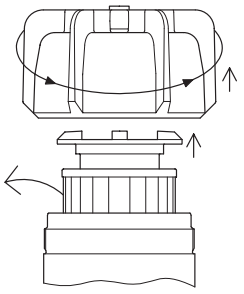


Fig. 2

!!! WARNING !!!

5 To avoid damaging the components clean the seal (B), surfaces (A) and threads (C) of the cover and the housing.

6 Check the condition of seals (B) if renewing, lubricate the new seals with the operating fluid before installing.

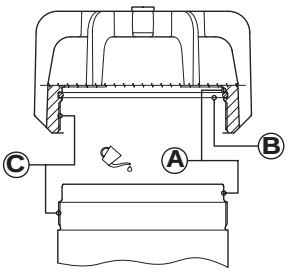


Fig. 3

7 Lubricate the filter element seal with the operating fluid.
Insert the filter element in the filter body, fit the spigot at the top of the filter element as shown in fig.4.

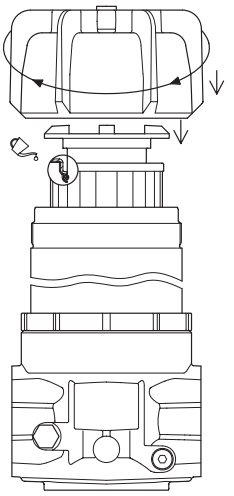


Fig. 4

8 Screw the cover onto the housing using the correct tool.
WARNING: Screw fully home on the housing **"DO NOT APPLY EXCESSIVE TIGHTENING TORQUE".**

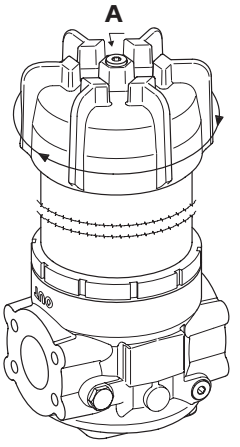


Fig. 5

9 Start the machine and bleed the air by unscrewing (max. one turn) the plug (pos.A).
When the operation is terminated tighten the plug fully.

10 Start the machine and check for the absence of leaks.
Repeat the check when the machine has reached its operating temperature.

CHANGING THE FILTER ELEMENT ON LMP 952 / 953 / 954 / 955 / 956 FILTERS

1 Depressurise the system and clean the filter.

2 Unscrew the air breather plug (pos. A) and open the oil drain connection (pos. B, pos. B1 when the rapid oil drain flange is present) collecting the fluid in a suitable container.
When the operation is terminated screw down the plug (pos. A) tightening it fully down after having checked the condition of its seal.
Close the oil drain connection (B).

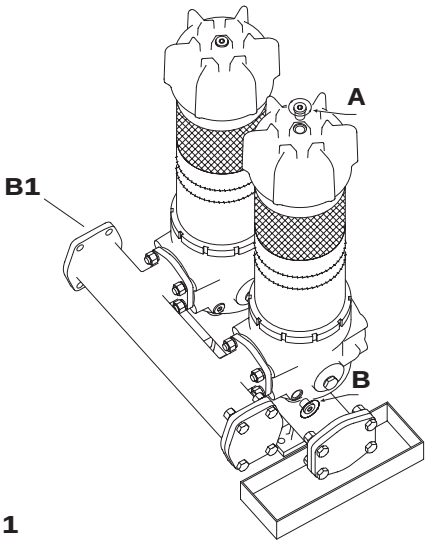


Fig. 1

3 Unscrew the cover using the specific tools and tools, extract the upper spigot, and extract the filter element.

4 Collect the spent oil and cartridge in a suitable container and dispose of them in compliance with statutory legislation.

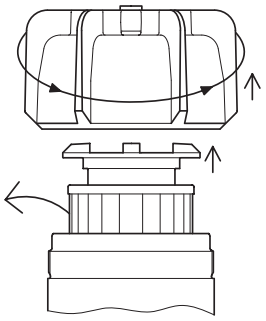


Fig. 2

!!! WARNING !!!

5 To avoid damaging the components clean seal (B), surfaces (A) and threads (C) of the cover and the housing.

6 Check the condition of seals (B) - if renewing, lubricate the new seals with the operating fluid before installing.

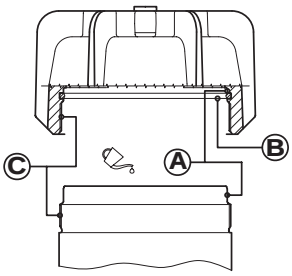


Fig. 3

7 Lubricate the filter element seal with the operating fluid.
Insert the cartridge in the head spigot or insert the upper spigot into the element.

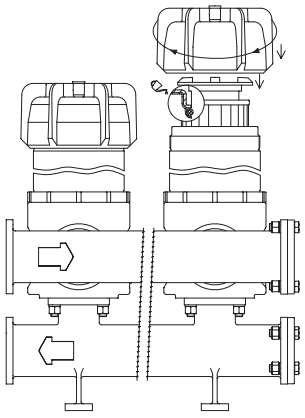


Fig. 4

8 Screw the cover onto the housing using the correct tool.
WARNING: Screw fully home on the housing **"DO NOT APPLY EXCESSIVE TIGHTENING TORQUE"**.

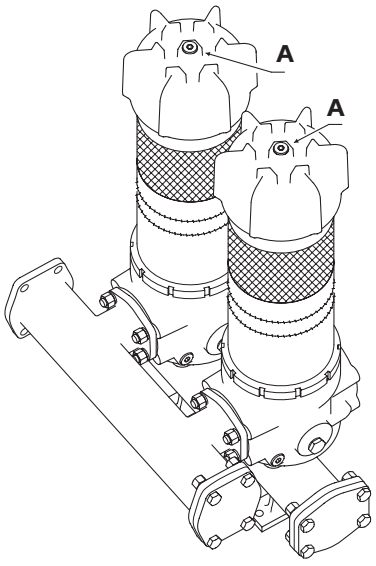


Fig. 5

9 Repeat the steps from point "2" on the other filters. Now start the machine and bleed the air by unscrewing (max. one turn) the plugs (pos. A). When the operation is terminated tighten the plugs fully.

10 Start the machine and check for the absence of leaks.
Repeat the check when the machine has reached its operating temperature.

CHANGING THE FILTER ELEMENT ON LMD 951 FILTERS

Indication of the lever position referred to the flow. As shown on the filter handle.

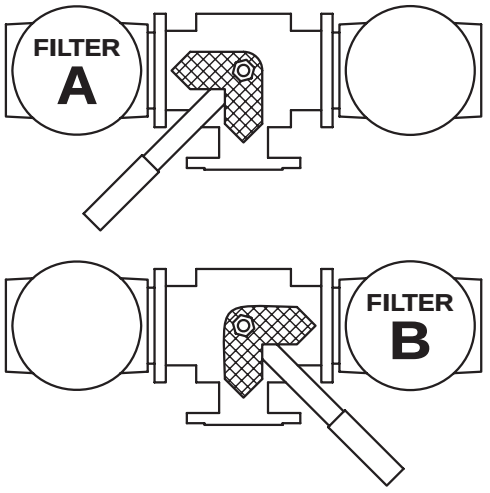


Fig. 1

1 Before rotating the lever from the filter B position to filter A, open the balancing valve (pos. C) by turning it counterclockwise. Bleed the air by means of the plug (pos. D), which must be turned through a **maximum of one revolution.**
After bleeding the air tighten the breather plug and close the balancing valve (pos. C) by turning it clockwise.

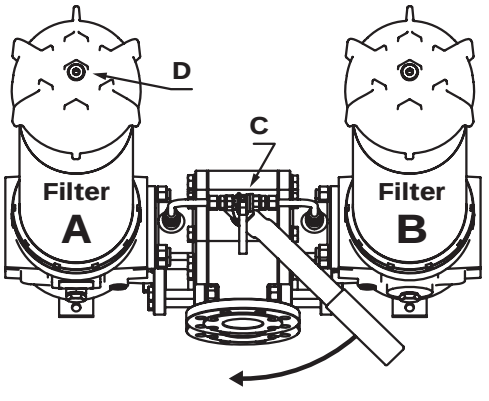


Fig. 2

2 Turn the lever to divert the oil flow from filter B to filter A. Loosen the oil drain plug (pos. B) to depressurise the filter, unscrew the air breather plug (pos. A) and open the oil drain connection (pos. B) or from the opposite part of the head - collecting the fluid in a suitable container.

When the operation is terminated screw down the plug (pos. A) tightening it fully down after having checked the condition of its seal. Close the oil drain connection (B).

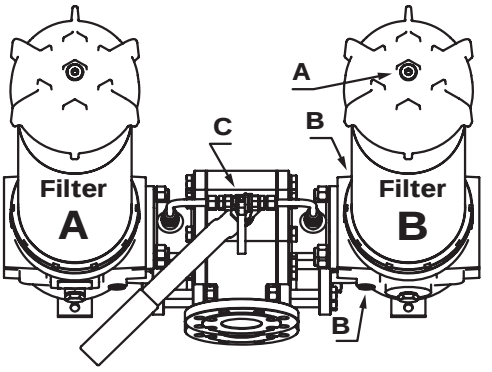


Fig. 3

4 Open the balancing valve (pos. C) by turning it counterclockwise.
Bleed the air through the plug (pos. A) which must be turned through a **maximum of one revolution.**
After bleeding the air refit the breather plug and close the balancing valve (pos. C) by turning it clockwise.

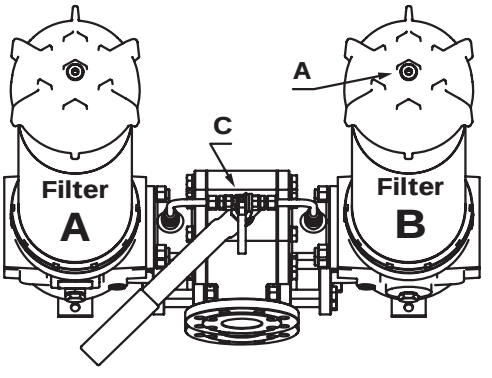


Fig. 4

5 Check for the absence of leaks.
Filter “B” is set up for use.

CHANGING THE FILTER ELEMENT ON LMD 952 - 953 FILTERS

Indication of the lever position referred to the flow. As shown on the filter lever.

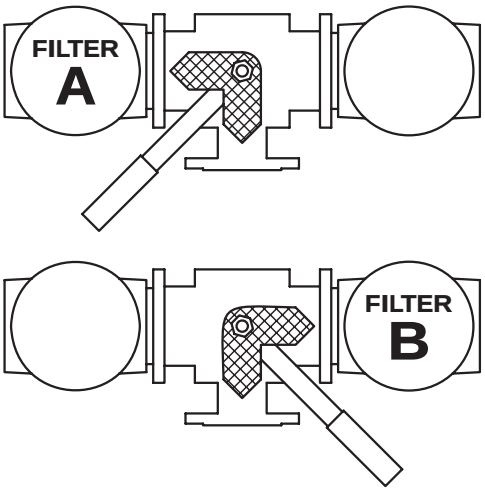


Fig. 1

1 Before rotating the lever from the filter B position to filter A, open the balancing valve (pos. C) by turning it counterclockwise. Bleed the air through the plugs (pos. D), which must be turned through a **maximum of one revolution.** After bleeding the air tighten the breather plugs and close the balancing valve (pos. C) by turning it clockwise.

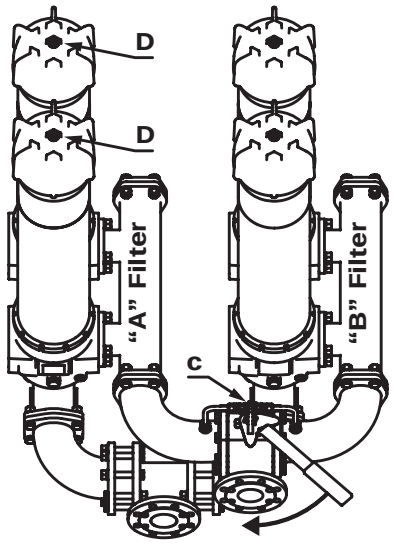


Fig. 2

2 Turn the lever to divert the oil flow from filter B to filter A. Loosen the oil drain plugs (pos. B) side "A", (present on all heads also from the part opposite to pos. B indicated), to depressurise the part of the filter in question.
Unscrew the air breather plugs (pos. A) and open the oil drain connections (pos B) collecting the fluid in a suitable container.

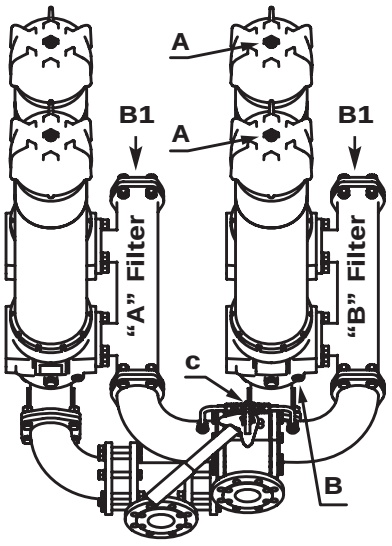


Fig. 3

4 Open the balancing valve (pos. C) by turning it counterclockwise to supply fluid to filters "A". Bleed the air through the plugs (pos. A) which must be turned through a **maximum of one revolution.** After bleeding the air tighten the breather plugs and close the balancing valve (pos. C) by turning it clockwise.

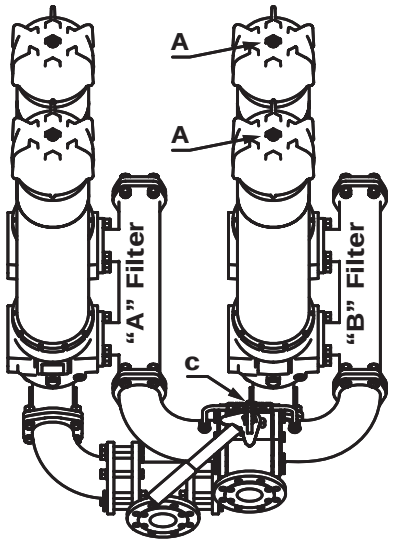


Fig. 4

5 Check for the absence of leaks.
Filter "B" is set up for use.