LMP SERIES

MP spa FILTRI®

PRINCIPLES OF FILTRATION

SELECTING FILTRATION PRODUCTS FOR HYDRAULIC SYSTEMS

Basic requirements of filter for an hydraulic system are:

(I) It should be capable of reducing initial contamination present in the fluid and/or system to the desidered level within an acceptable period of time.

(II) It must then be capable of maintaining the desired level of contaminant removal over a suitable period, (i.e. have sufficient dirt holding capacity).

(III) Filters should incorporate some form of indicating device to show their state in use.

Filters themselves should also have:

(I) Adequate element strength and freedom from migration.

(II) An adequate contaminant retaining capacity.

(III) Adequate size for the required maximum flow rate.

(IV) Low back pressure or pressure drop across the filter.

(V) Low pressure drop relative fo flow rate, (i.e. low pressure drop/flow ratio).

(VI) Performance maintained over a suitable temperature range (bearing in mind the change in fluid viscosity over that temperature range).

(VII) Component parts suitable for and compatible with th hydraulic fluid concerned.

(VIII) Low weight.

(IX) Compact size.

(X) An ability to withstand high pressure surges, or high pressure differentials without rupturing or bypassing the medium.

(XI) Compatibility with standard system components.

(XII) A design which permits rapid servicing, (e.g. easy cleaning or replacement of the element).

(XIII) Economic cost (both initial cost and servicing costs)

MP FILTRI-FILTER SELECTION GUIDE

(REF: AHEM GUIDLINES TO CONTAMINATION CONTROL IN HYDRAULIC SYSTEMS ps. 1985)

1. Study the individual operating parameters of the system and obtain a «total weighting number».
2. Decide on a suitable «Absolute Micron Rating» for the filters that will be required for the system.

1. Study the individual operating parameters of the system:

A. COMPONENT SENSITIVITY
B. OPERATING PRESSURE AND DUTY CYCLE
C. ENVIRONMENTAL
D. LIFE EXPECTANCY
E. ECONOMIC LIABILITIES (COMPONENTS)
F. ECONOMIC LIABILITIES (OPERATIONAL)
G. SAFETY LIABILITIES

A. COMPONENT SENSITIVITY

- Determine which types of components are to be used in the system.
- Ask the component manufacturer to confirm an ISO Cleanliness Code for the components.
- Alternatively use this table as a guide to the ISO Cleanliness Codes.

SENSITIVITY	EXAMPLES	ISO CODE	WEIGHTING
EXTRA HIGH	High performance servo-valves	13/9	8
HIGH	Industrial servovalves	14/10	6
ABOVE AVERAGE	Piston pumps, proportional valves, compensated flow controls	15/11	4
AVERAGE	Vane pumps, spool valves	16/13	3
BELOW AVERAGE	Gear pumps, manual and poppet valves	17/14	2
MINIMAL	Ram pumps	18/15	1

B. OPERATING PRESSURE AND DUTY CYCLE

To take account of the normal operating pressure and its severity of change, both in magnitude and frequency.

Pressure: select operating pressure.

Duty:

LIGHT continuous operation at rated pressure or lower.
MEDIUM medium pressure changes up to rated pressure.

HEAVY zero to full pressure
SEVERE zero to full pressure - with transients at high frequency (0,6 Hz) e.g. power pack supplying punching machine.

Select weighting from table below:

PRESSURE (bar)	DUTY LIGHT WEIGHTING	DUTY MEDIUM WEIGHTING	DUTY HEAVY WEIGHTING	DUTY SEVERE WEIGHTING
0-70	1	2	3	4
70-150	1	3	4	5
150-250	2	3	4	6
250-350	3	5	6	7
350+	4	6	7	8

C. ENVIRONMENT

		WEIGHTING
GOOD	Clean areas, laboratories	0
AVERAGE	General machine shops, lifts	1
POOR	Mobile plant	2
HOSTILE	Foundries, also where ingression of contaminant is expected e.g. component test rigs	3

D. LIFE EXPECTANCY

Service life required for components	WEIGHTING
0- 1.000 hours	0
1.000- 5.000 hours	1
5.000-10.000 hours	2
10.000-20.000 hours	3
20.000+ hours	5

E. ECONOMIC LIABILITIES (COMPONENTS)

To account for the cost of components replacement

		WEIGHTING
VERY HIGH	Large piston pumps, large high torque low speed motors	4
HIGH	Cylinders, servovalves, piston	3
AVERAGE	Pumps, line mounted valves	2
LOW	Gasket mounted valves, inexpensive cartridge pumps and gear pumps	1

F. ECONOMIC LIABILITIES (OPERATIONAL)

To account for the cost of downtime

		WEIGHTING
VERY HIGH	Very expensive downtime e.g. certain steel mill equipment	5
HIGH	High volume production plant	3
AVERAGE	Mobile installations	2
LOW	Equipment not critical to production	1

G. SAFETY LIABILITIES

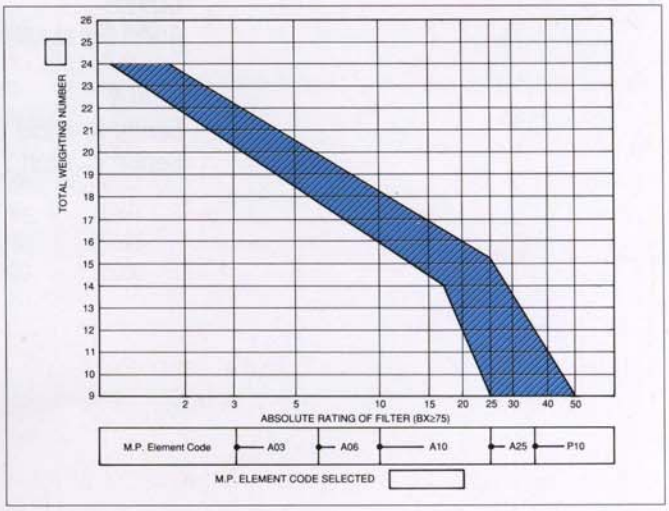
To account for the need for additional safety of operation

	EXAMPLES	WEIGHTING
HIGH	mine winding gear braking systems	3
AVERAGE	where failure is likely to cause a hazard	1
LOW	some hydraulic component test rigs	0

1. OBTAIN THE TOTAL WEIGHTING BY ADDING THE SEVEN INDIVIDUAL WEIGHTINGS OBTAINED IN TABLES A B C D E F G

TOTAL WEIGHTING:

2. DECIDE ON A SUITABLE ABSOLUTE MICRON RATING



DESCRIPTION

Filters of **LMP** series are designed for mounting on low pressure lines (up to 35 bar) or on external return lines. Available in 4 sizes and different bowl lenghts and port options, for nominal flow rates up to 1.000 lt/min.

These filters are particularly suitable for industrial application (i.e. presses for steel or for plastics, ironmaking plants, paper mills, lubrication systems, compressors, turbines, etc.) but they are also used on mobile machines (excavators, cranes, etc.).

Manufacturing with advanced materials and technologies gives highest efficiency to the filter elements, performing at the highest ISO standards.

TECHNICAL DATA

MATERIALS

BOWL
Anodized aluminium
Steel (LMP 450/2 - LMP 850)

COVER
Anodized aluminium

SEALS
Series A: nitrile (Buna-N)
Series V: viton

BYPASS VALVE
Steel

INDICATORS
brass

FILTER ELEMENT MATERIALS

SERIES A
Inorganic microfibre with acrylic support

SERIES P
resin-impregnated paper

SERIES M
square wire mesh grid (filtration degree is defined in microns by the maximum diameter of a sphere fitting in the mesh of the grid)

OTHER MATERIALS USED
End caps: reinforced nylon; support tube: galvanized steel; supporting framework; galvanized steel with epoxy coating.

DIRT HOLDING CAPACITY
in accordance with ISO 4572: Multipass test

Filter element	Dimensions for ß (μm) values			Filtration ratios			Δp (bar)
	ß ⩾ 2 (50%)	ß ⩾ 20 (95%)	ß ⩾ 75 (98.7%)	$ß_2$	$ß_{10}$	$ß_{20}$	
A03	—	2	3	20	>10.000	>10.000	7
A06	—	3	6	8	> 2.000	>10.000	7
A10	3	6	8	1,5	150	>10.000	7
A25	13	19	23	—	1,5	3,5	7
P10	10	>30	>30	1	2	4,5	7
P25	25	>30	>30	1	1	1,3	7

N.B. Other materials giving different filtration degrees available on request.

FILTERING AREA

TYPE	P10-P25	M10	M25	M60	M90	M250	A03-A25
CU 040	930	450	430	470	470	470	630
CU 100	1600	775	775	720	720	760	1000
CU 200	2120	1260	1260	1046	1046	1046	2310
CU 250	3950	2350	2350	1850	1850	1850	4300
CU 350	8240	4700	4700	3700	3700	3700	8600
CU 630	8280	4200	4200	3840	3240	3240	8760
CU 730	16560	8400	8400	7680	6480	6480	17520
CU 850	15100	11300	11300	11300	11300	11300	16000

Values in cm^2

TECHNICAL DATA

COMPATIBILITY WITH FLUIDS

FILTER HEADS AND BOWLS
compatible for use with:
- mineral oils (types HH-HL-HM-HR-HG as per ISO 6743/4)
- water-based emulsions (types HFAE-HFAS as per ISO 6743/4)
- synthetic fluids (types HS-HFDR-HFDU-HFDS as per ISO 6743/4)
- water glycol (type HFC as per ISO 6743/4)

SEALS
Series A
Nitrile (Buna-N) compatible with all mineral oils (types HH-HL-HM-HR-HV-HG as per ISO 6743/4)
water-based emulsions (types HFAE-HFAS as per ISO 6743/4)
Water glycol (type HFC as per ISO 6743/4)
Series V
Viton, compatible with synthetic fluids (types HS-HFDR-HFDS as per ISO 6743/4).

FILTER ELEMENTS
As per ISO 2943; suitable for mineral oils (types HH-HM-HR-HV-HG as per ISO 6743/4) and synthetic fluids (types HS-HFDR-HFDS-HFDU as per ISO 6743/4).
For water-based emulsions (types HFAE-HFAS as per ISO 6743/4) and fluid other than those mentioned, please consult our Sales Department.

PRESSURE COMPLETE FILTER

Maximum working pressure: up to 35 bar

Fatigue test: a filter subjected to pressure impulses from 0 to 35 bar will withstand 1,000,000 cycles

COLLAPSE PRESSURE FILTER ELEMENTS

10 bar

BYPASS VALVE CALIBRATION PRESSURE

Series B:
bypass valve, differential opening pressure

3 bar $\pm$ 10%
Series S:
no bypass (blanking plug)

WORKING TEMPERATURE

from —25°C to +110°C
For temperatures outside this range, please consult our Sales Department.

TECHNICAL DATA

TYPES OF INDICATOR

Description:
LMP filters are designed to be fitted with indicators of differential type, switching at differential pressures of 2 bar ± 10%

VISUAL INDICATOR

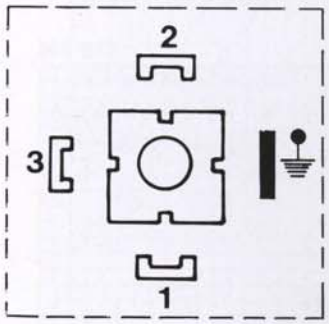
Visual indicator: Z6

VISUAL-ELECTRICAL INDICATOR

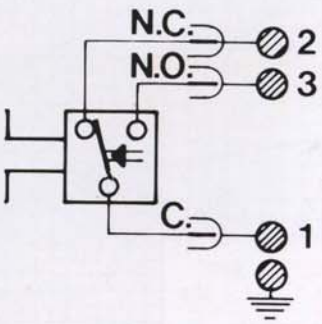
Visual-electrical indicator: N6
- connector as per DIN 43650
- electrical protection as per DIN 40050: IP 65
- electrical characteristics: switch contacts with the following ratings:

Supply voltage (V)	Resistive load (A)	Inductive load (A)
AC 125	5	5
AC 250	5	5
DC 30	5	3
DC 50	1	1
DC 75	0,75	0,75
DC 125	0,5	0,03
DC 250	0,25	0,03

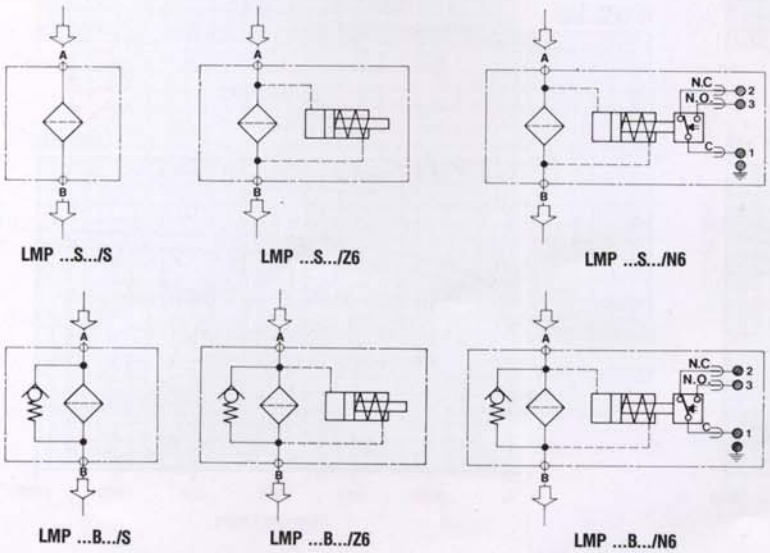
DIN 43650 CONNECTOR



ELECTRICAL CONNECTION



SYMBOLS



LMP ...S.../S — LMP ...S.../Z6 — LMP ...S.../N6

LMP ...B.../S — LMP ...B.../Z6 — LMP ...B.../N6

PRESSURE DROPS

GENERAL

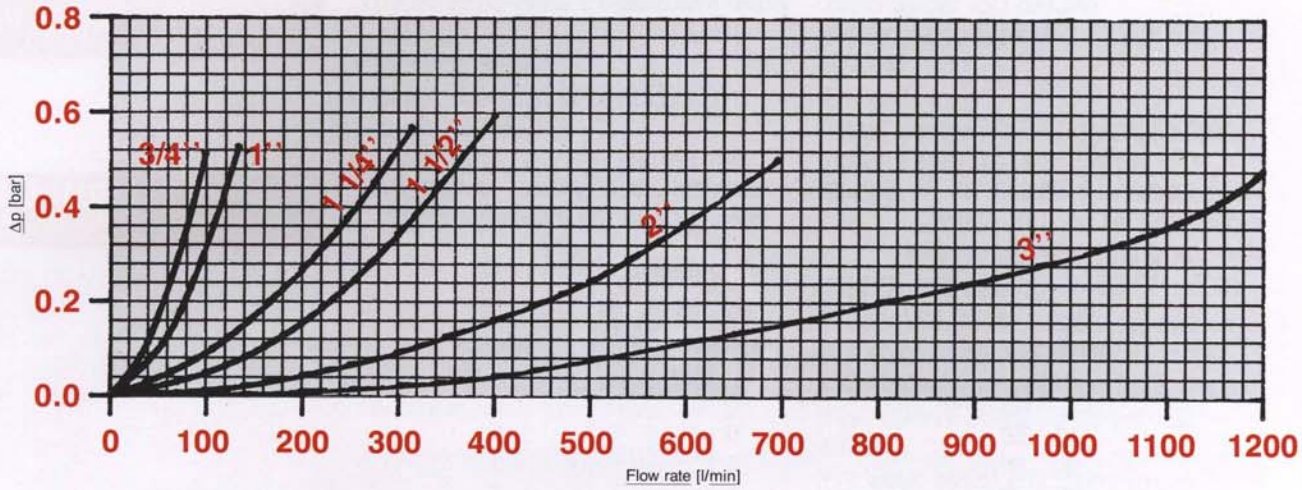
The curves shown were obtained experimentally in accordance with standard ISO 3698, using new filter elements.

The Δp will vary proportionally to the density in the case of turbulent flow and proportionally to the kinematic viscosity in the case of laminar flow.

HOUSING PRESSURE DROP

The curves were obtained using a mineral oil with a density of 0.86 kg/dm³

The Δp vary proportionally to the specific weight of the fluid.



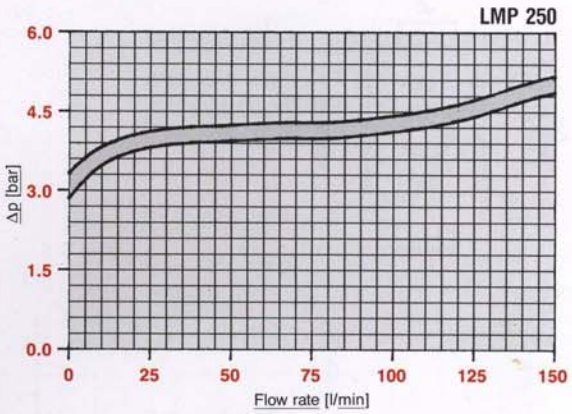
As a rough guide, flows ⩽ 5% of the bottom value shown on each filter size are laminar.

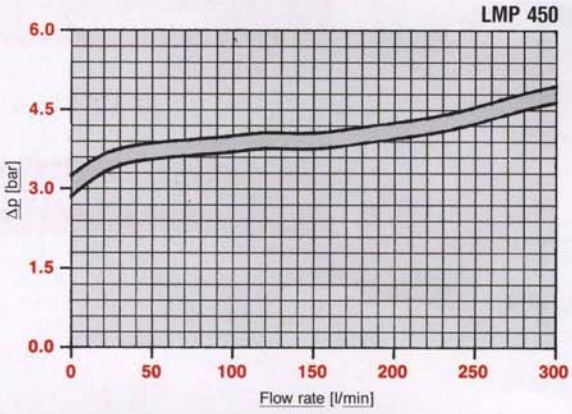
As a rough rule, the Δp varies proportionally to the density.

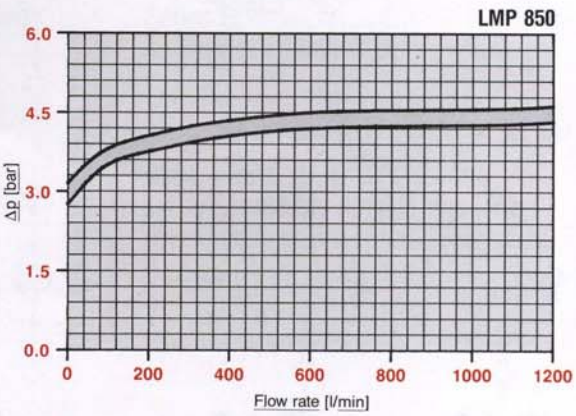
BYPASS VALVE PRESSURE DROP

The curves were obtained using a mineral oil with a density of 0.86 kg/dm³

As a rough rule, the Δp varies proportionally to the density.







ELEMENTS PRESSURE DROP

The curves were obtained using a mineral oil with a kinematic viscosity of 30 mm²/sec. (cSt).
The Δp varies in relation to variations in the following formulae:

1) For variations in kinematic viscosity $\leqslant 5$

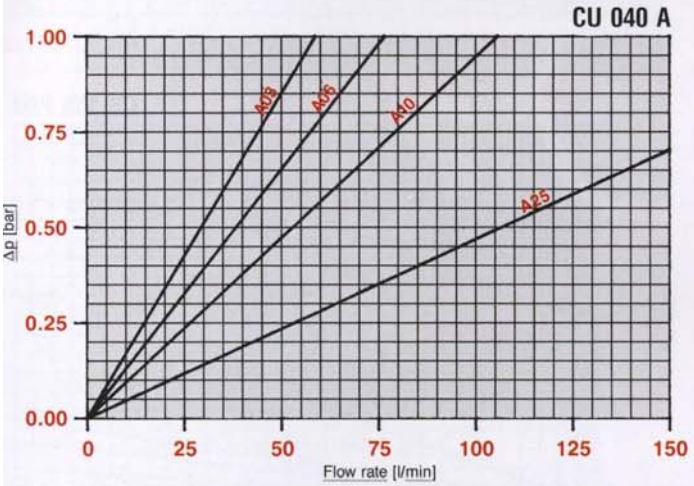
$$\Delta p = \frac{\nu_1}{\nu} \Delta p$$

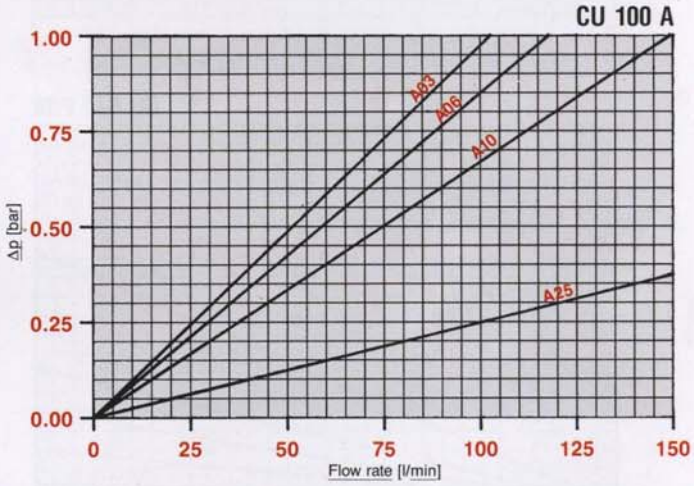
2) For variations in kinematic viscosity > 5

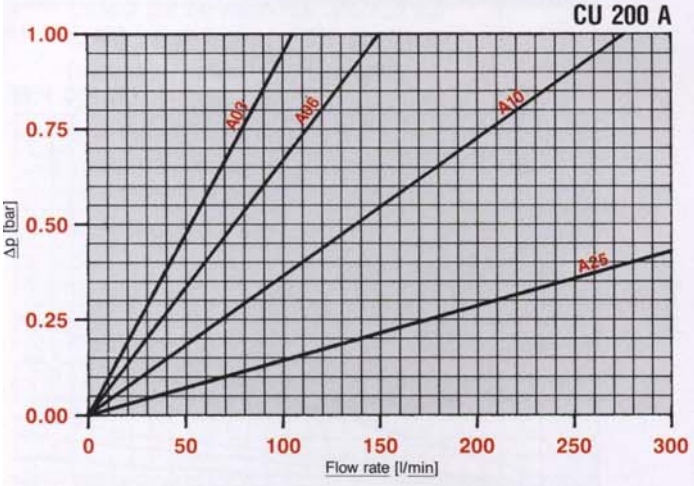
$$\Delta p_1 = \frac{\frac{\nu_1}{\nu} + \sqrt{\frac{\nu_1}{\nu}}}{2} \Delta p$$

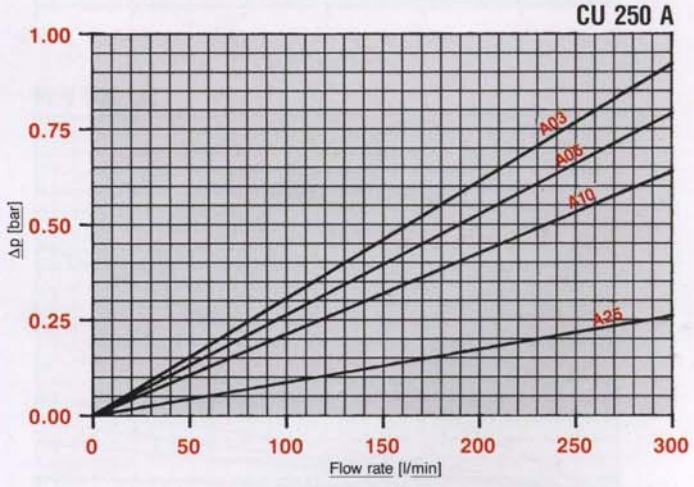
where Δp is the pressure drop derived from the curve; ν is the kinematic viscosity taken as a reference (i.e. 30 mm²/sec.); Δp_1 is the drop to be calculated and ν_1 is the effective kinematic viscosity of the fluid used.

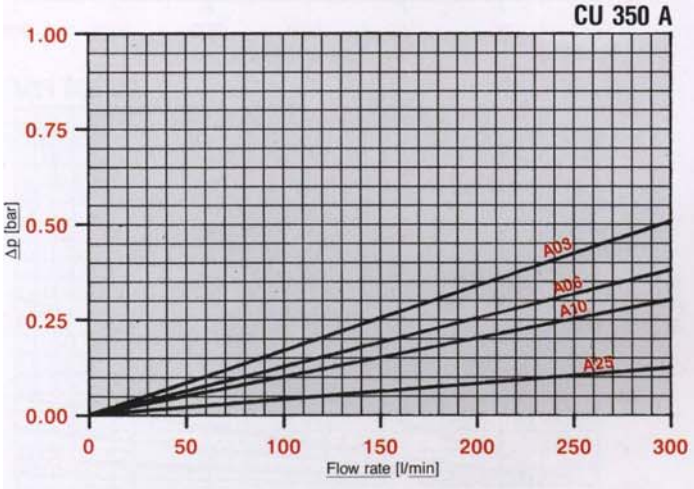
FILTER ELEMENTS

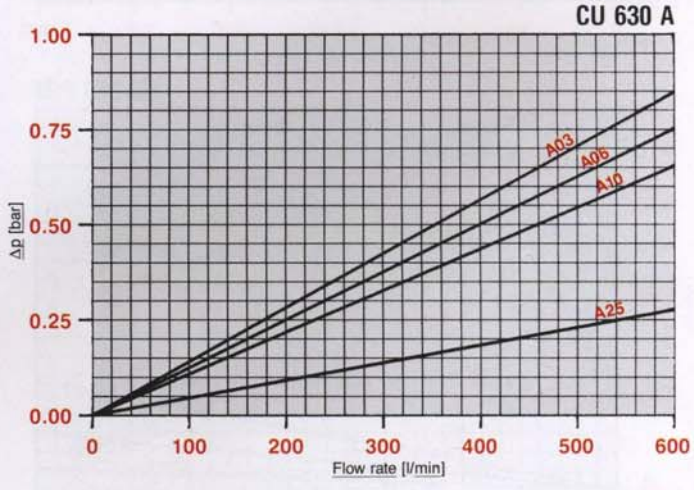






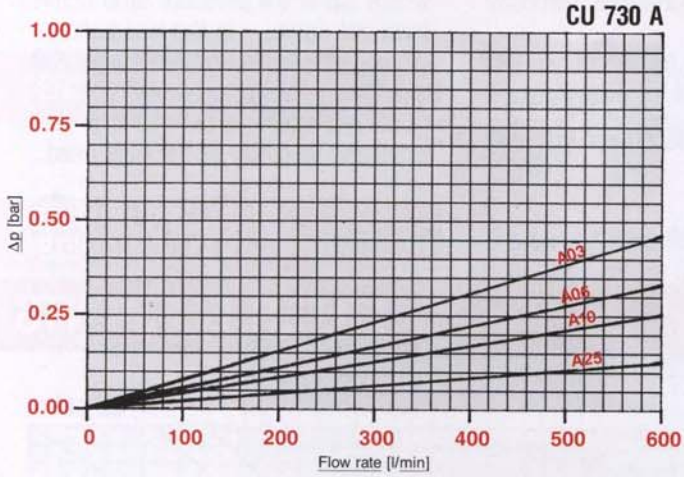




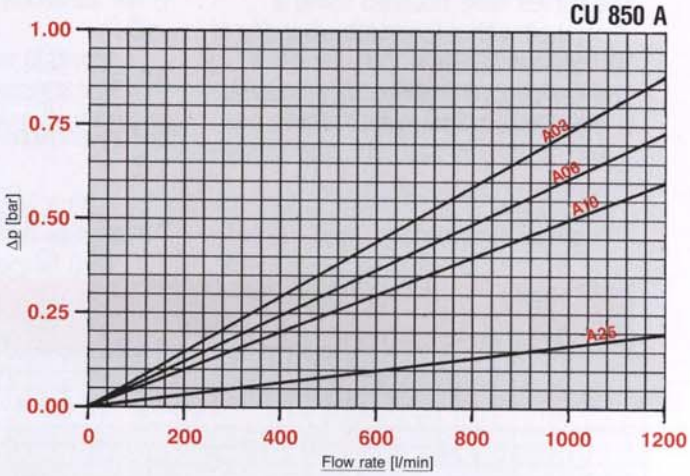


FILTER ELEMENTS

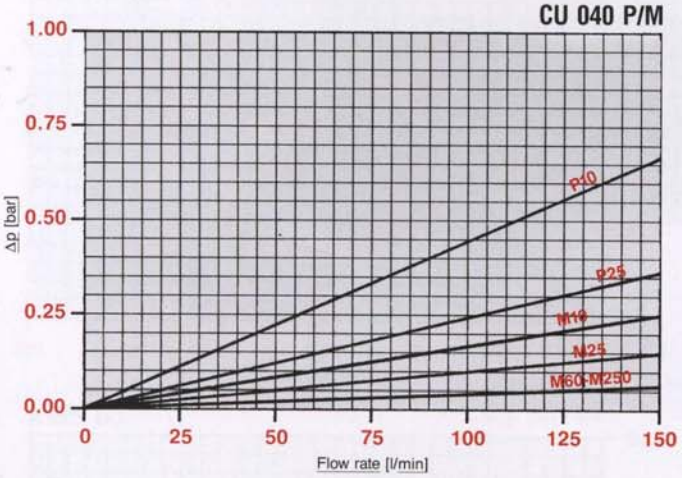
CU 730 A



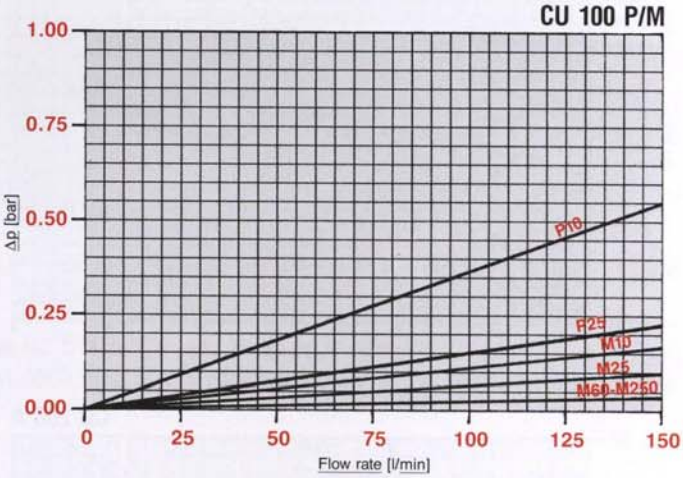
CU 850 A



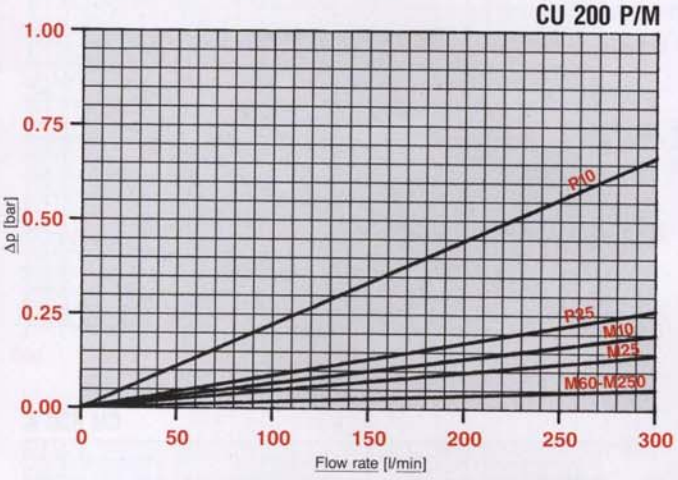
CU 040 P/M



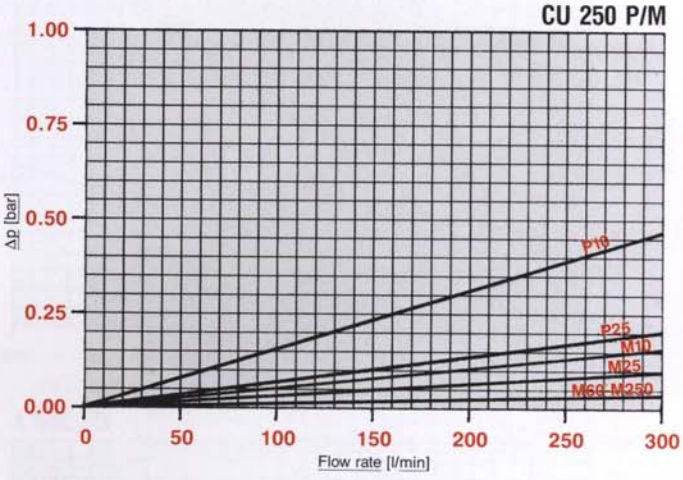
CU 100 P/M



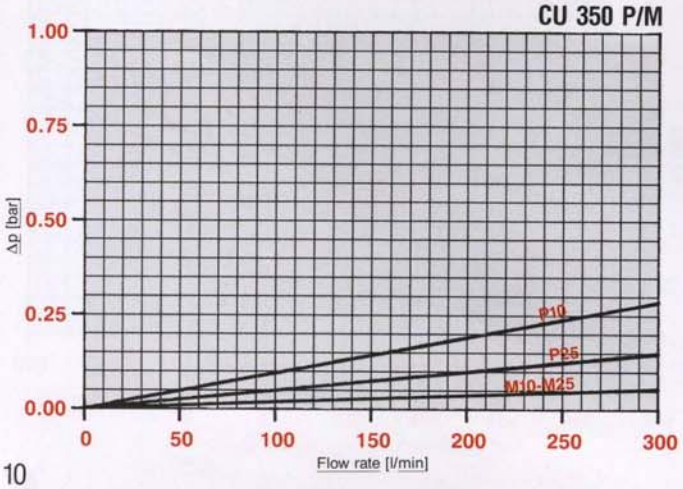
CU 200 P/M



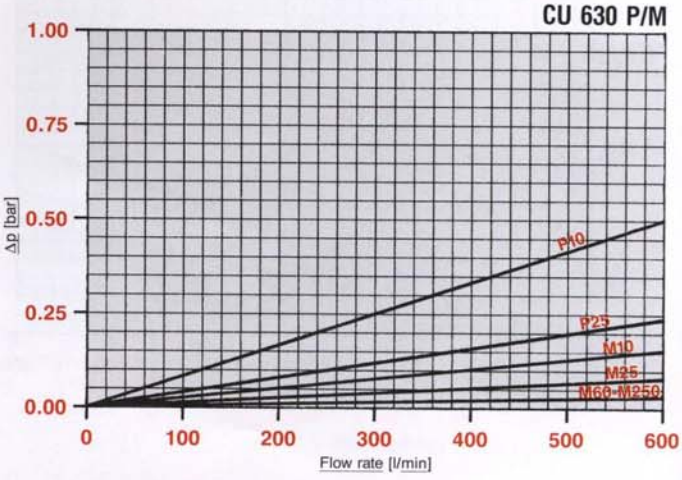
CU 250 P/M

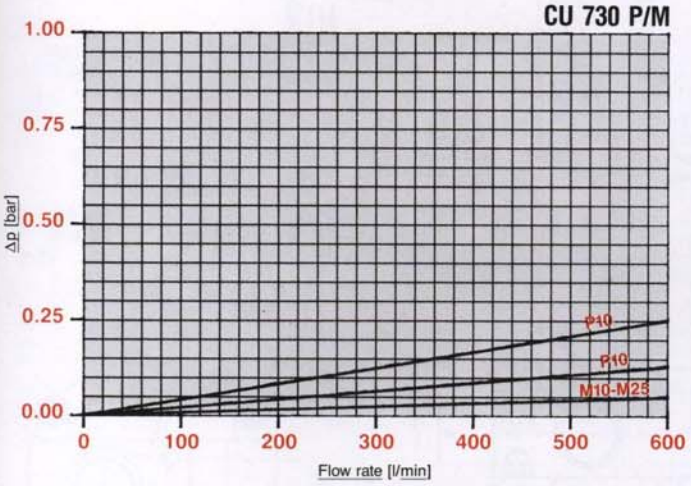


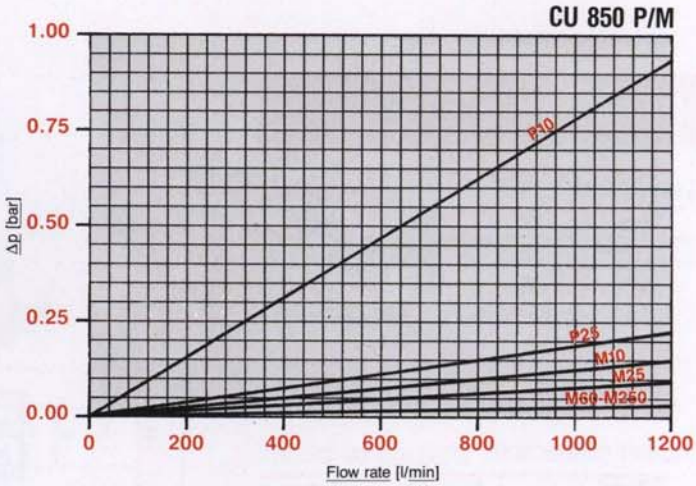
CU 350 P/M



CU 630 P/M







NB:
According our experiences when choosing a LMP filter, the following points should be taken into account:

1) The maximum Δp of the new filter should fall between 0,4 and 0,6 bar in the most testing work conditions (minimum working temperature, maximum fluid density, maximum flow through the filter).
2) In normal working conditions, the maximum Δp should fall between 0,2 and 0,4 bar.

INSTALLATION DATA

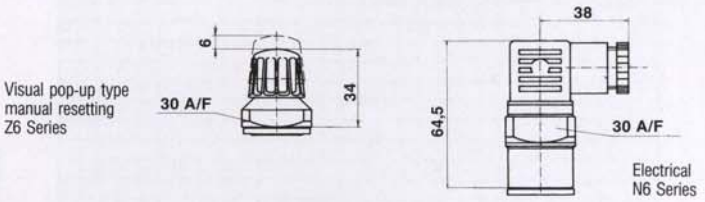
LMP 100

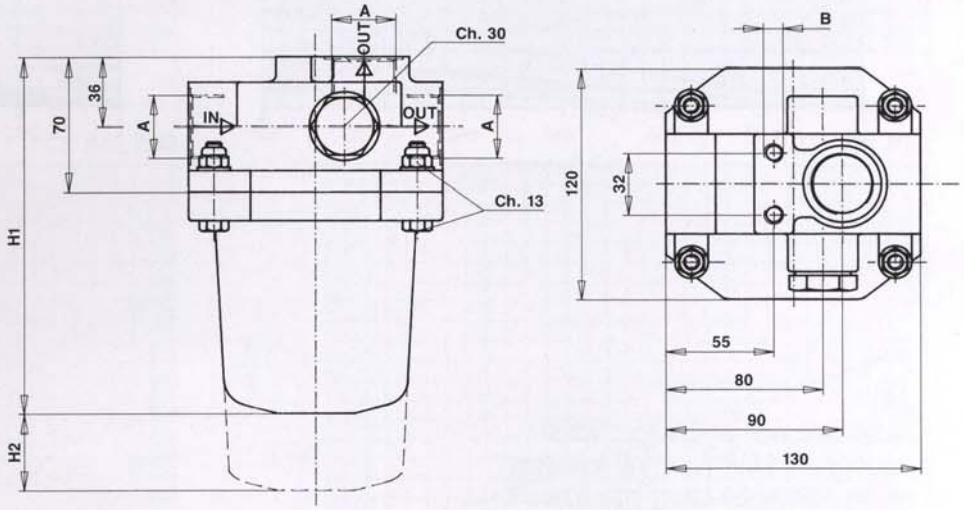
Lenght			Weights*
Type	**H1**	**H2**	**Kg.**
1	190	200	2,5
2	240	200	3,0

* Weights including the element

Thread connections

Type	A	B
G1	1'' BSP	M10
G2	3/4'' BSP	M10
G3	1'' NPT	3/8'' UNC
G4	3/4'' NPT	3/8'' UNC
G5	SAE 16	3/8'' UNC
G6	SAE 12	3/8'' UNC





LMP 250

Lenght			Weights*
Type	**H1**	**H2**	**Kg.**
1	270	200	6,0
2	360	200	7,0
3	570	200	10,0

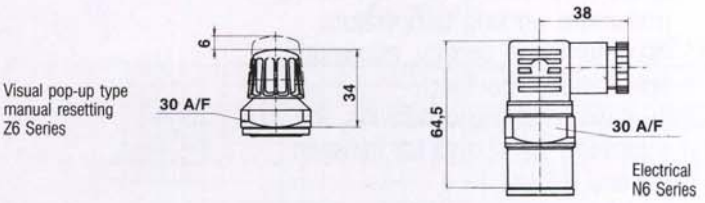
* Weights including the element

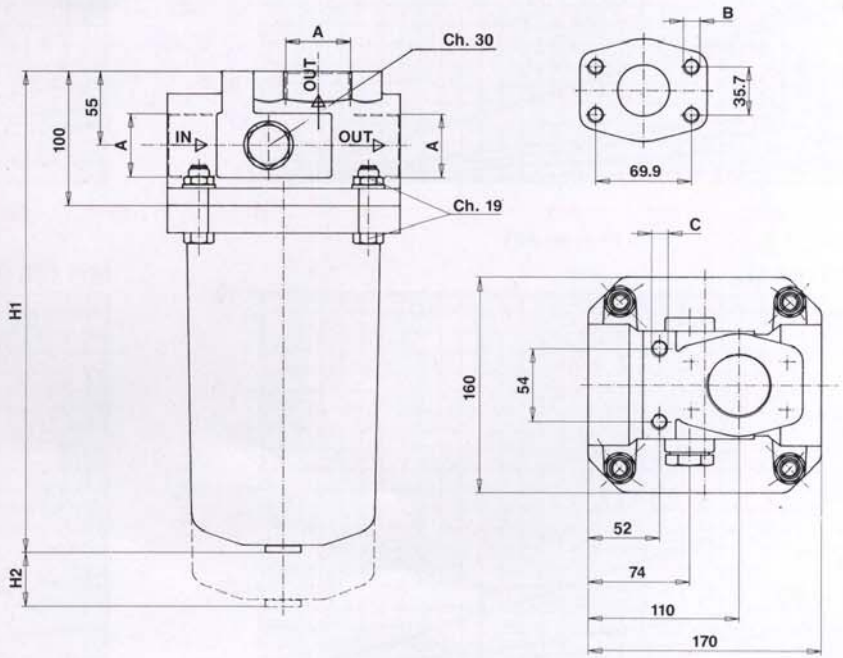
Thread connections

Type	A	C
G1	1 1/2'' BSP	M12
G2	1 1/4'' BSP	M12
G3	1 1/2'' NPT	1/2'' UNC
G4	1 1/4'' NPT	1/2'' UNC
G5	SAE 24	1/2'' UNC
G6	SAE 20	1/2'' UNC

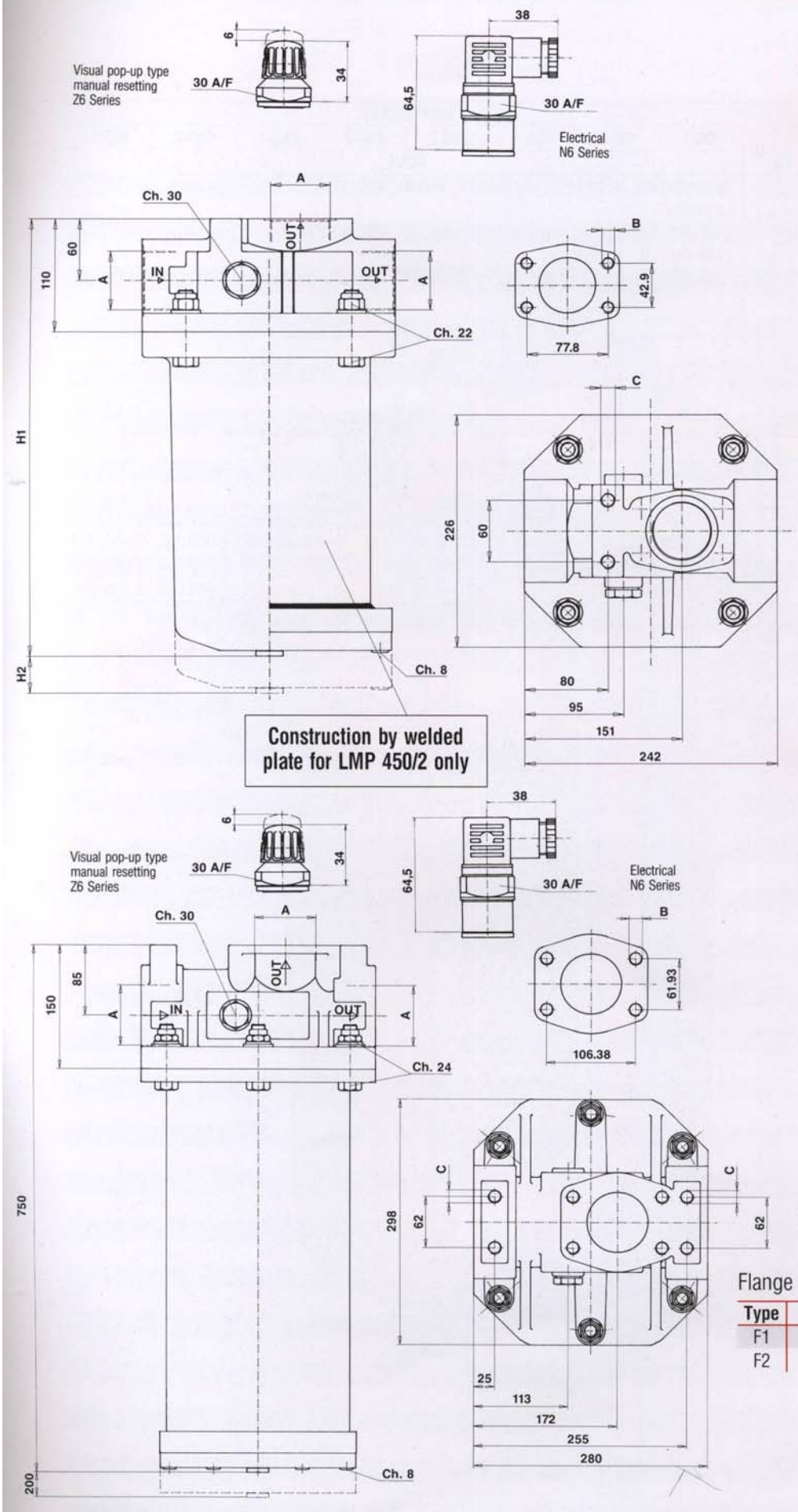
Flange connections

Type	A	B
F1	1 1/2'' SAE3000 PSI/M	M12
F2	1 1/2'' SAE3000 PSI/UNC	1/2'' UNC





INSTALLATION DATA



LMP 450

Lenght			Weights*
Type	**H1**	**H2**	**Kg.**
1	430	200	10,0
2	703	200	22,0

* Weights including the element

Thread connections

Type	A	C
G1	2'' BSP	M14
G3	2'' NPT	9/16'' UNC
G5	SAE 32	9/16'' UNC

Flange connections

Type	A	B
F1	2'' SAE3000 PSI/M	M12
F2	2'' SAE3000 PSI/UNC	1/2'' UNC

LMP 850

Lenght	Weights*
Type	**Weights***
1	36,0

* Weights including the element

Flange connections

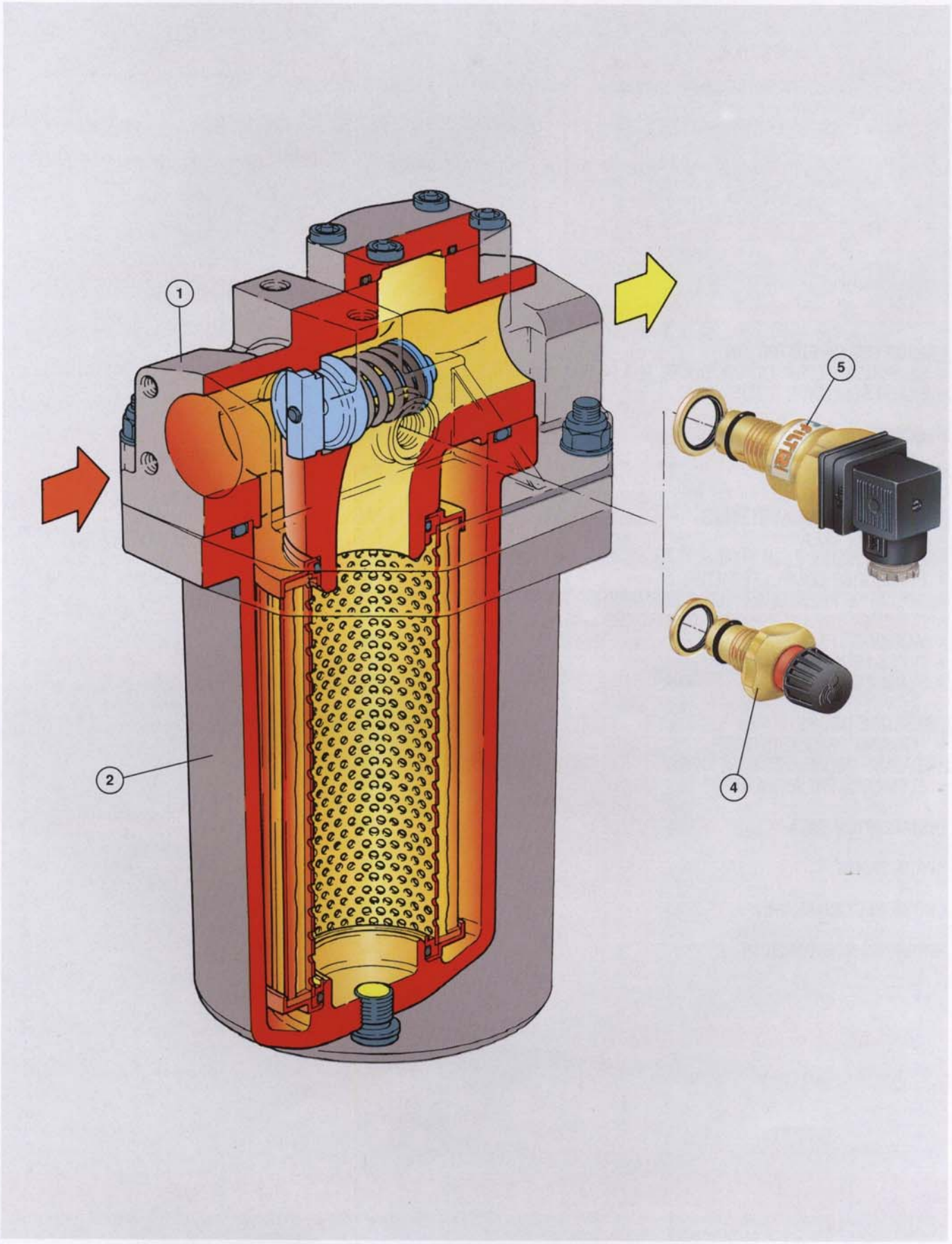
Type	A	B	C
F1	3'' SAE3000 PSI/M	M16	M16
F2	3'' SAE3000 PSI/UNC	5/8'' UNC	5/8'' UNC

SPARE PARTS

N	DESCRIPTION	Q	LMP SERIES							
			100-1	100-2	250-1	250-2	250-3	450-1	450-2	850-1
			CODE							
			See order key on pag. 17, without filter element and bowl.							
1	HEAD	1	EXAMPLE: LMP 450, with bypass valve, Buna-N seals, 2'' BSP, no indicator: LMP 450 - B - A - G1 - S							
*2	BOWL	1	2.008.069	2.008.070	2.008.037	2.008.038	2.008.073	2.008.054	2.008.057	2.008.068
	INDICATOR BLANKING PLUG									
3	BUNA-N SEALS	1	T2							
	VITON SEALS	1	T4							
	VISUAL INDICATOR									
4	BUNA-N SEALS	1	Z6							
	VITON SEALS	1	K6							
	ELECTRICAL INDICATOR									
5	BUNA-N SEALS	1	N6							
	VITON SEALS	1	H6							
	SEALS KIT									
6	BUNA-N	1	2.050.033		2.050.035			2.050.037	2.050.139	2.050.039
	VITON	1	2.050.034		2.050.036			2.050.038	2.050.140	2.050.040
7	COMPLETE KIT OF NUTS AND BOLTS		2.049.036		2.049.037			2.049.038	2.049.039	2.049.040

* For application with fluids requiring viton seals, these must always be ordered separatly (complete seal kit) with the relative spare part

CROSS SECTIONAL VIEW



SUMMARY

ORDERING INFORMATION

LMP [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

Nominal sizes
100
250
450
850

Element condition indicator		
Buna N	**Viton**	
S	S	With threaded hole only
T2	T4	With plug
Z6	K6	Visual 2 bar
N6	H6	Electrical 2 bar

Collapse Δp	
N	10 bar

Lenght
LMP 100= 1,2
LMP 250= 1,2,3
LMP 450= 1,2
LMP 850= 1

Filter elements	
A03	Inorganic microfibre Bx=75
A06	
A10	
A25	
P10	Resin-treated paper Bx=2
P25	
M10	Square wire mesh
M25	
M60	
M90	
M250	

Filter element nominal size	
040	For LMP 100-1
100	For LMP 100-2
200	For LMP 250-1
250	For LMP 250-2
350	For LMP 250-3
630	For LMP 450-1
730	For LMP 450-2
850	For LMP 850-1

Ports option				
TYPE	**100**	**250**	**450**	**850**
G1	1''	1 1/2''	2''	—
	BSP	BSP	BSP	—
G2	3/4''	1 1/4''	—	—
	BSP	BSP	—	—
G3	1''	1 1/2''	2''	—
	NPT	NPT	NPT	—
G4	3/4''	1 1/4''	—	—
	NPT	NPT	—	—
G5	SAE	SAE	SAE	—
	16	24	32	—
G6	SAE	SAE	—	—
	12	20	—	—
F1	—	1 1/2''SAE	2'' SAE	3'' SAE
	—	3000PSI/M	3000PSI/M	3000PSI/M
F2	—	1 1/2''SAE	2'' SAE	3 '' SAE
	—	3000PSI/	3000PSI/	3000PSI/
	—	UNC	UNC	UNC

Integral bypass valve	
S	Without bypass
B	With bypass

Seals (Filter elements only)	
N	Buna N
V	Viton

Seals	
A	Nitrile (Buna-N)
V	Viton

CU [ ] [ ] [ ]

REPLACEMENT ELEMENT

MP Filtri - filtration products will only be guaranteed if original MP Filtri replacement elements and spares are used.