

FRI SERIES



FRI FILTRI

DESCRIPTION

Filters from **FRI** series are conceived to meet different installation and filtration requirements on return or low pressure lines.

Thanks to their construction these filters can be tank or in line mounted; their modular structure allows changing easily the same filter from one option to another one.

They are particularly suitable for industrial applications, like metal sheet presses, plastic injection machines, steel industries, etc.

Being by high quality aluminium, these filters can withstand operating pressures up to 300 PSI and their range covers nominal flow rates up to 320 G.P.M.

Visual or electrical differential clogging indicators and bypass option available.

TECHNICAL DATA

MATERIALS

BOWL
Aluminium
Steel (FRI 850)

BYPASS VALVE
Plastic

COVER
Aluminium

INDICATORS
brass

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

SERIES A

Inorganic microfibre with acrylic support

SERIES P

resin-impregnated paper

SERIES M

square wire mesh grid of nickel-treated polyester (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: Multi-pass test

FILTER ELEMENT MATERIALS

Filter element	Dimensions for β (μm) values			Filtration ratios			Δp (PSI)
	$\beta \geq 2$ (50%)	$\beta \geq 20$ (95%)	$\beta \geq 75$ (98.7%)	β_2	β_{10}	β_{20}	
A03	—	2	3	20	> 10.000	> 10.000	100
A06	—	3	6	8	> 2.000	> 10.000	100
A10	3	6	8	1,5	150	> 10.000	100
A25	13	19	23	1	1,5	3,5	100
P10	10	> 30	> 30	1	2	4,5	100
P25	25	> 30	> 30	1	1	1,3	100

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

FILTERING AREA

TIPO	P10-P25	M10	M25	M60	M90	M250	A03-A25
CU 025	64	43	43	45	45	45	52
CU 040	144	70	67	73	73	73	98
CU 100	248	120	120	111	111	111	155
CU 250	612	364	364	286	286	286	666
CU 630	1283	651	651	595	502	502	1358
CU 850	2340	1751	1751	1751	1751	1751	2495

Values in in²

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 6473/4)
- synthetic fluids (types HS-HFDR-HFDU-HFDS as per ISO 6743/4)
- water glycol (type HFC as per ISO 6743/4)

Ask for anodised version

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.

PRESSURES COMPLETE FILTER

Maximum working pressure: up to 300 PSI

Fatigue test: a filter subjected to pressure impulses from 0 to 300 PSI will withstand 1,000,000 cycles

COLLAPSE PRESSURE FILTER ELEMENTS

150 PSI

BYPASS VALVE CALIBRATION PRESSURES

Series B:
bypass valve, differential opening pressure

37,5 PSI \pm 10%
Series S:
no bypass (blanking plug)

WORKING TEMPERATURE

from -13°F to $+230^{\circ}\text{F}$
For temperatures outside this range, please consult our Sales Department.

Description:
FRI filters are designed to be fitted with indicators of differential

type, switching at differential pressures of $30 \text{ PSI} \pm 10\%$

TYPES OF INDICATOR

Visual indicator: **Z6**
Pop-up type
Manual resetting.

VISUAL INDICATOR

Electrical indicator, **N6**

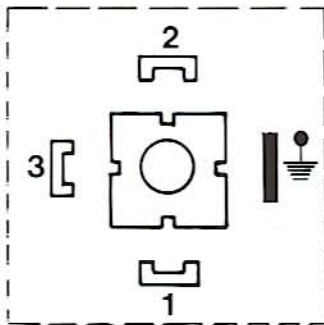
- connector as per DIN 43650
- electrical protection as per DIN 40050: IP 65

- electrical characteristics: switch contacts with the following ratings:

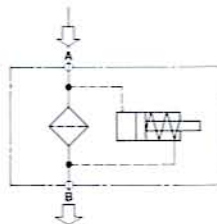
ELECTRICAL INDICATOR

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

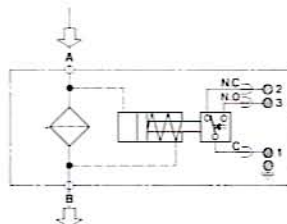
DIN 43650 CONNECTOR



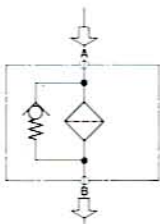
FRI ...S.../S



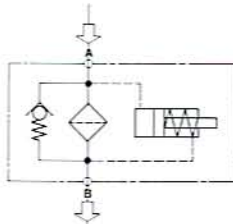
FRI ...S.../Z 6



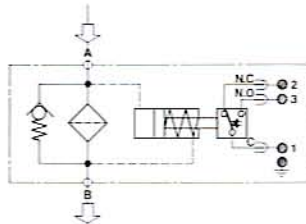
FRI ...S.../N 6



FRI ...B.../S

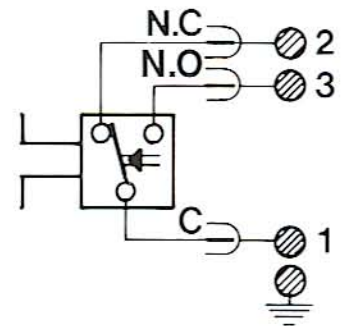


FRI ...B.../Z 6



FRI ...B.../N 6

ELECTRICAL CONNECTION



SYMBOLS

PRESSURE DROPS

GENERAL

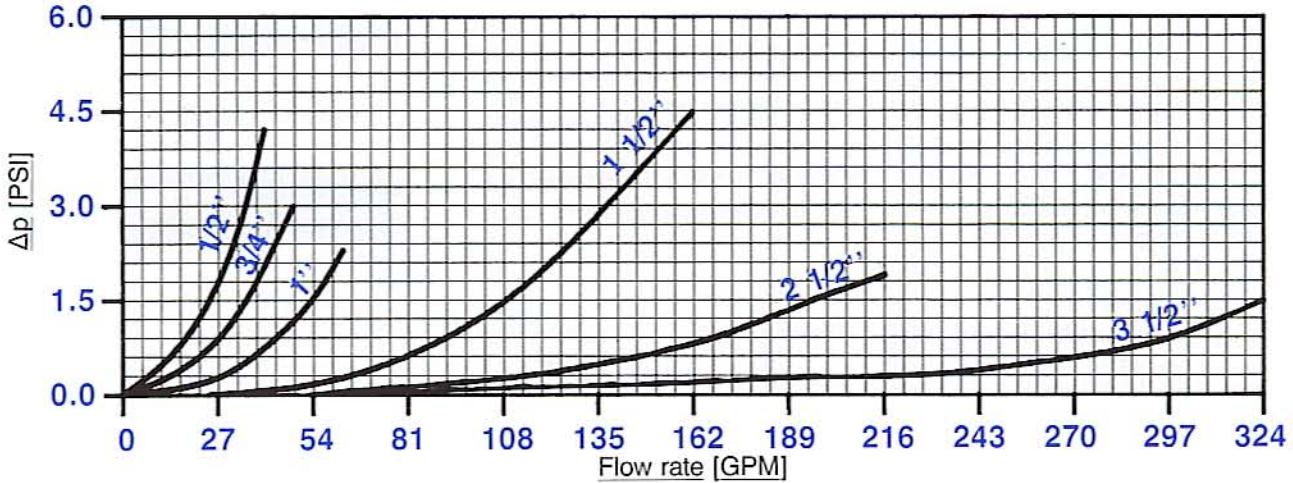
The curves shown were obtained experimentally in accordance with standard ISO 3968, using new filter elements.

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

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



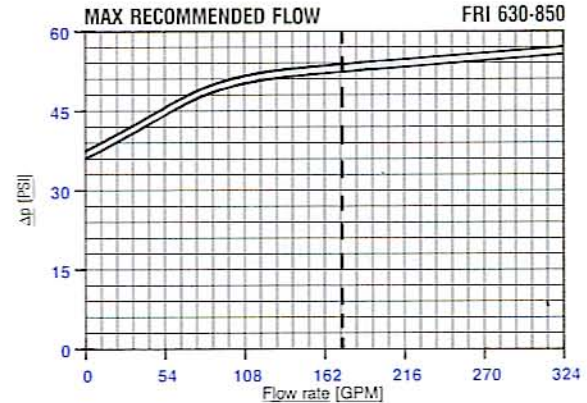
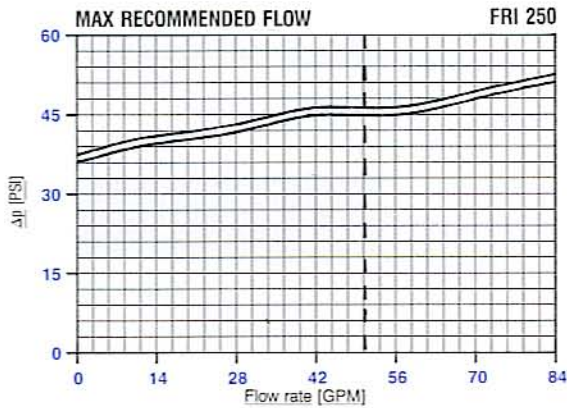
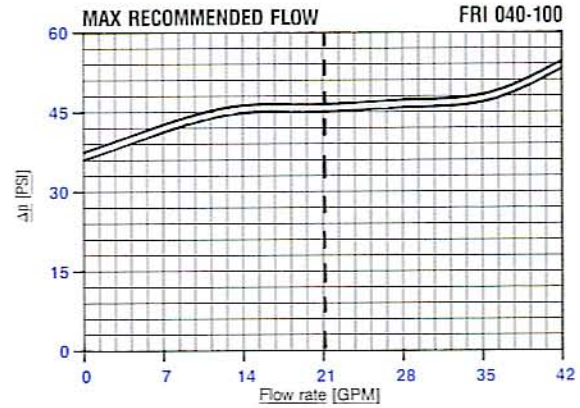
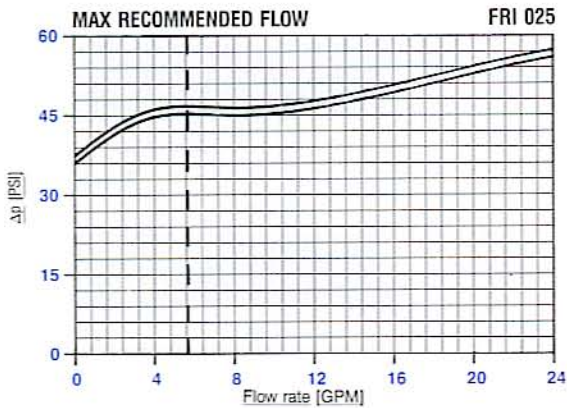
As a rough guide, flows $\leq 5\%$ of the bottom value shown on each filter size are laminar.

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

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 150 SUS.

The Δp varies in relation to variations in the following formulae:

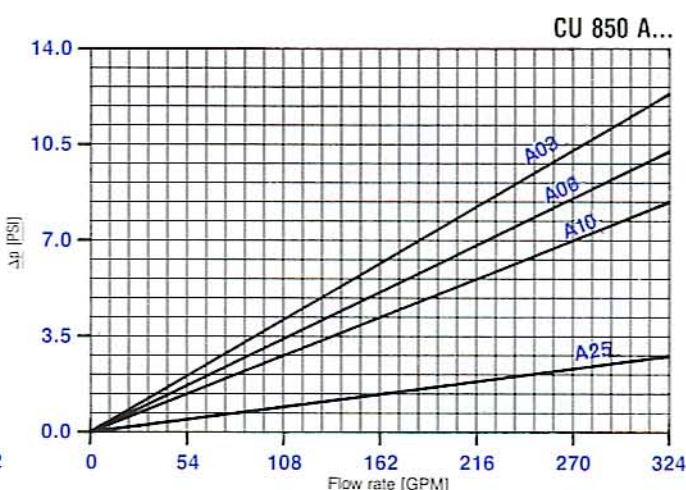
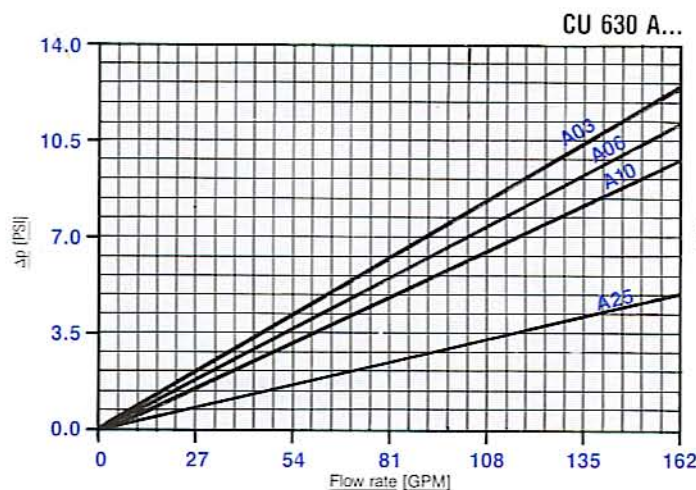
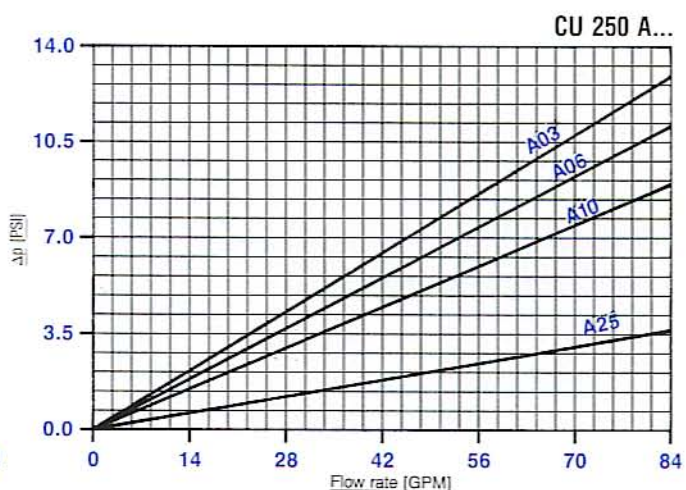
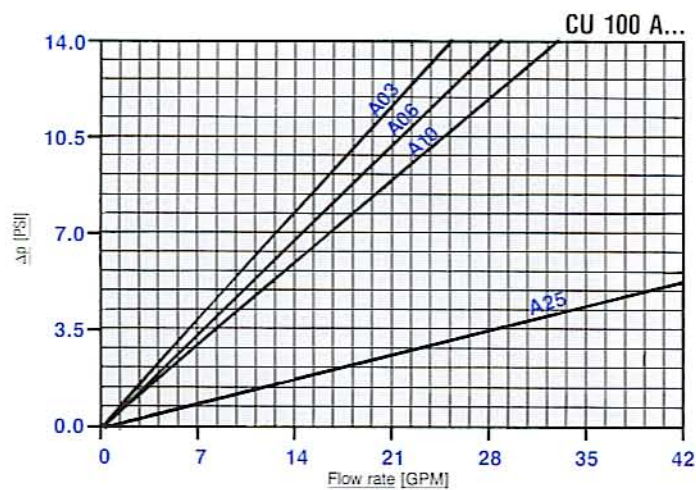
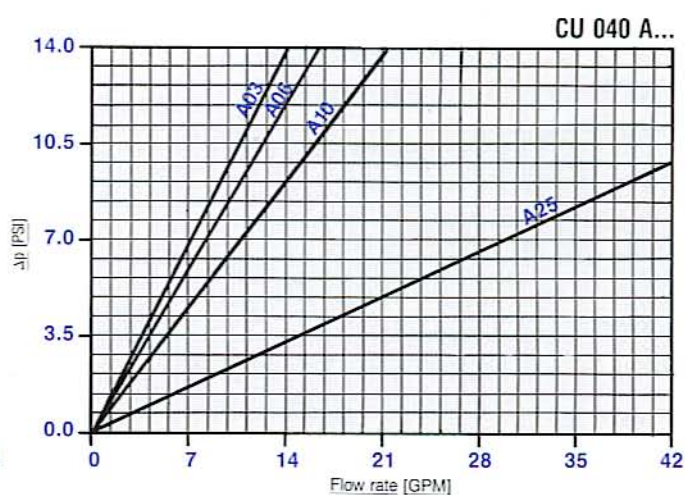
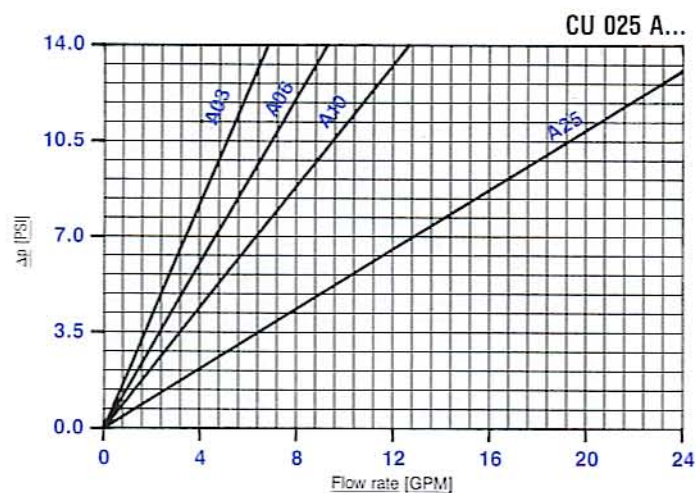
1) For variations in kinematic viscosity ≤ 5

$$\Delta p_1 = \frac{\nu_1}{\nu} \Delta p$$

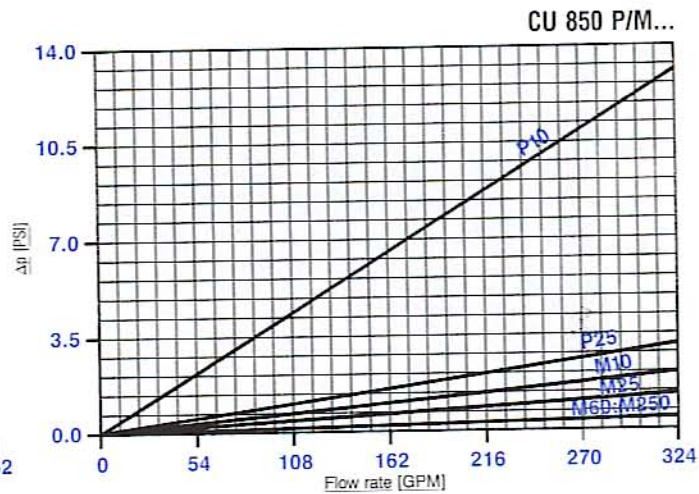
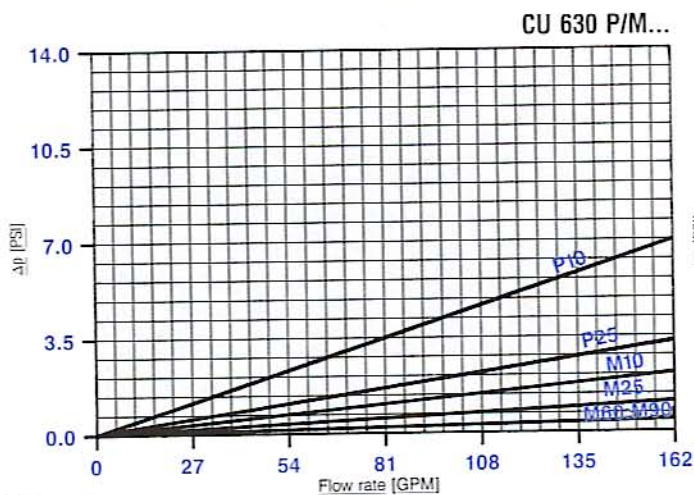
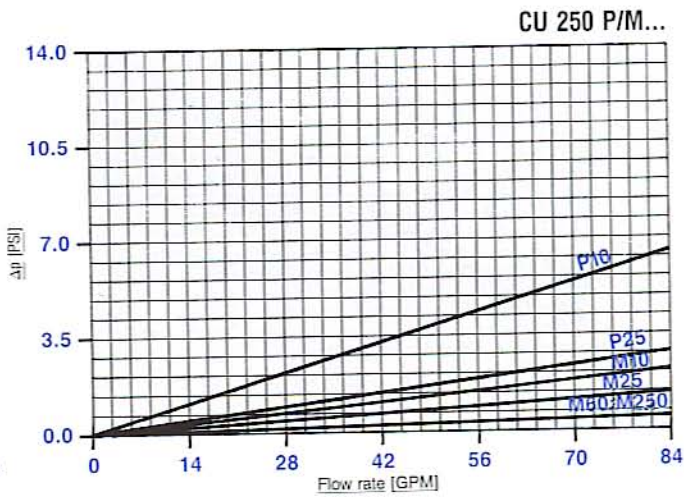
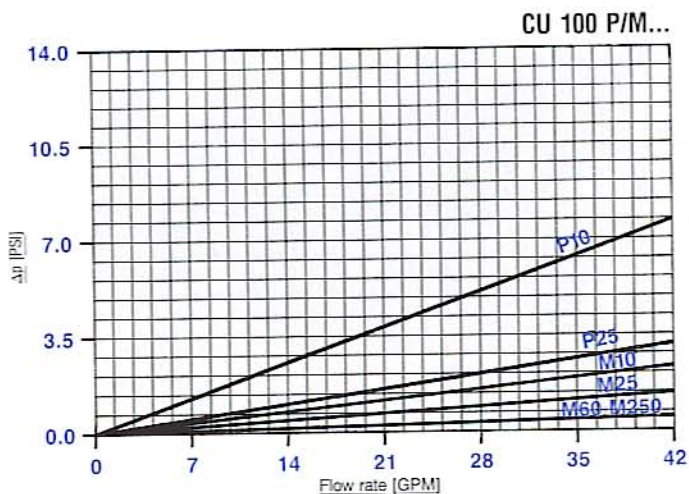
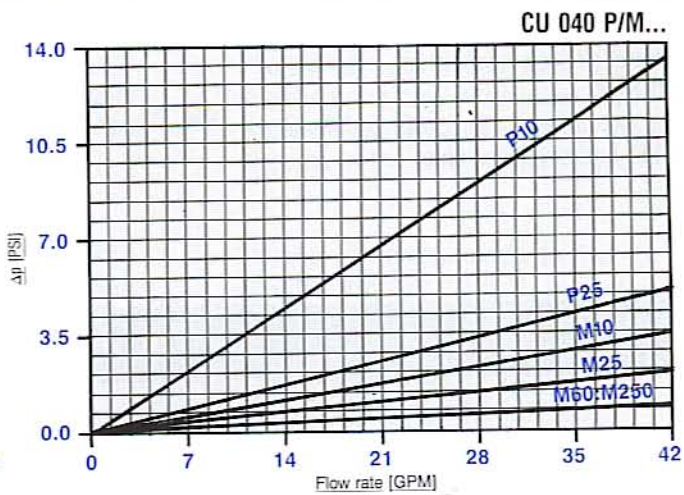
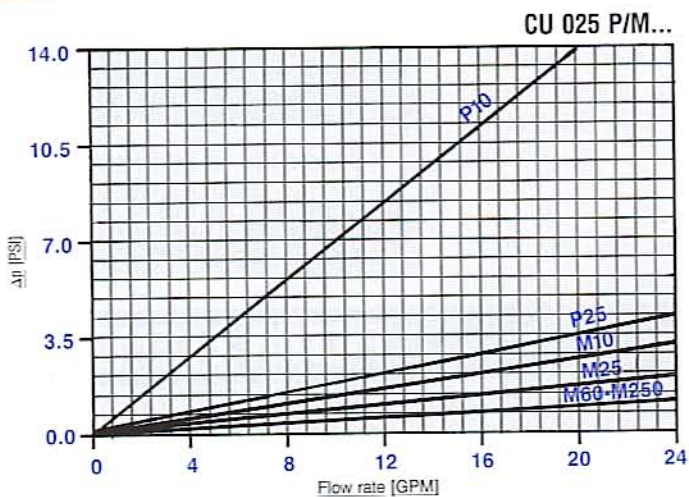
where Δp is the pressure drop derived from the curve; ν is the kinematic viscosity taken as a reference (i.e. 150 SUS);

Δp_1 is the drop to be calculated and ν_1 is the effective kinematic viscosity of the fluid used.

FILTER ELEMENTS



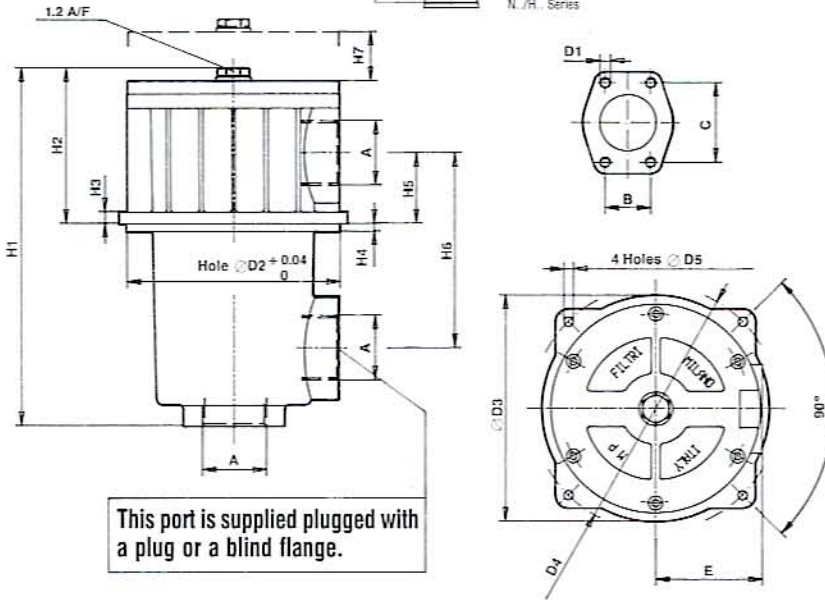
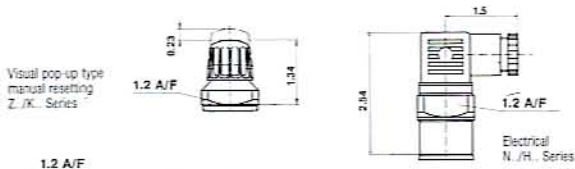
FILTER ELEMENTS



NB:

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

- 1) the maximum Δp of the new filter should fall between 6 and 9 PSI 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 3 and 6 PSI.



FRI 025 - 040 - 100 - 250 - 630

Thread connections

TYPE	A		
	G1	G2	G3
025	1/2" BSP	1/2" NPT	SAE 8-3/4" - 16 UNF
040	3/4" BSP	3/4" NPT	SAE 12-1 1/16"-12 UN
100	1" BSP	1" NPT	SAE 16-1 5/16"-12 UN
250	1 1/2" BSP	1 1/2" NPT	SAE 20-1 5/8"-12 UN
630	2 1/2" BSP	2 1/2" NPT	SAE 32-2 1/2"-12 UN

Flange connections

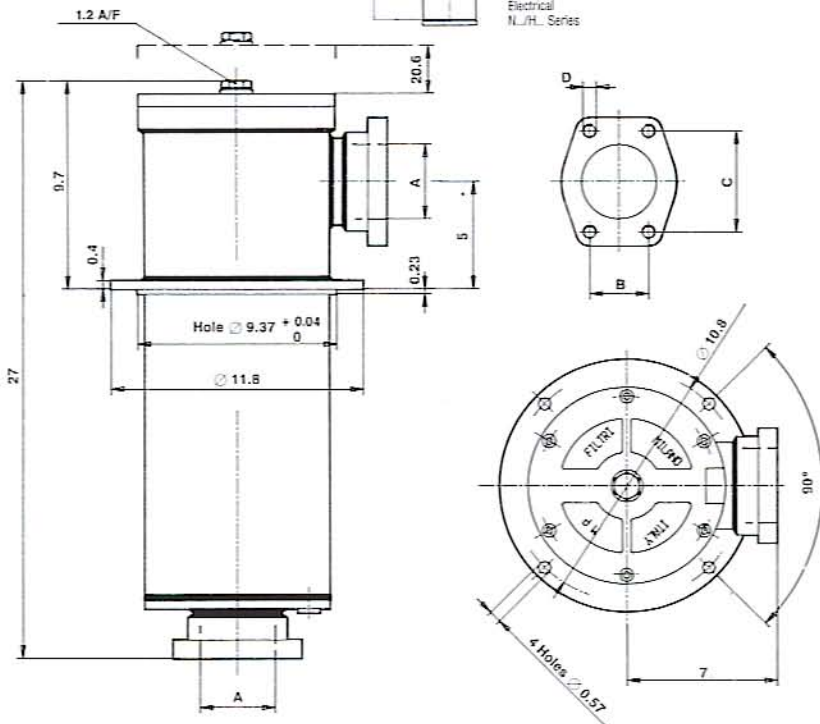
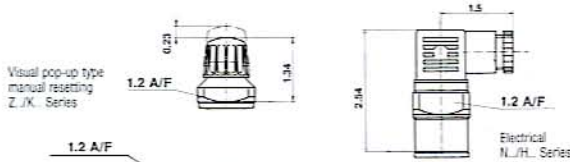
TYPE	A	B	C	D1
100 F1	1" SAE 3000PSI/M	1.03	2.06	M10
F2	1" SAE 3000PSI/UNC	1.03	2.06	3/8" UNC
250 F1	1 1/2" SAE 3000PSI/M	1.4	2.75	M12
F2	1 1/2" SAE 3000PSI/UNC	1.4	2.75	1/2" UNC
630 F1	2 1/2" SAE 3000PSI/M	2.0	3.5	M12
F2	2 1/2" SAE 3000PSI/UNC	2.0	3.5	1/2" UNC

TYPE	H1	H2	H3	H4	H5	H6	H7	D2	D3	D4	D5	E
025	5.9	3.3	.2	.11	.7	2.46	4.1	3.2	3.5	3.7	.2	1.7
040	7.5	3.8	.3	.13	1.4	4.13	4.3	4.7	5.2	5.4	.25	2.2
100	10.2	4.7	.39	.2	1.9	5.5	6.1	5.3	5.7	6.0	.33	2.6
250	13.6	5.7	.39	.2	2.2	13.3	9.4	6.3	6.8	7.0	.4	3.2
630	15.7	7.5	.47	.39	3.1	15.6	10.8	9.3	9.9	10.8	.57	4.6

Weights*

TYPE	Lbs
025	2.2
040	5.5
100	8.4
250	13.8
630	30.4

* Weights complete of element



FRI 850

TYPE	Lbs	Kg
850		105.6

* Weights complete of element

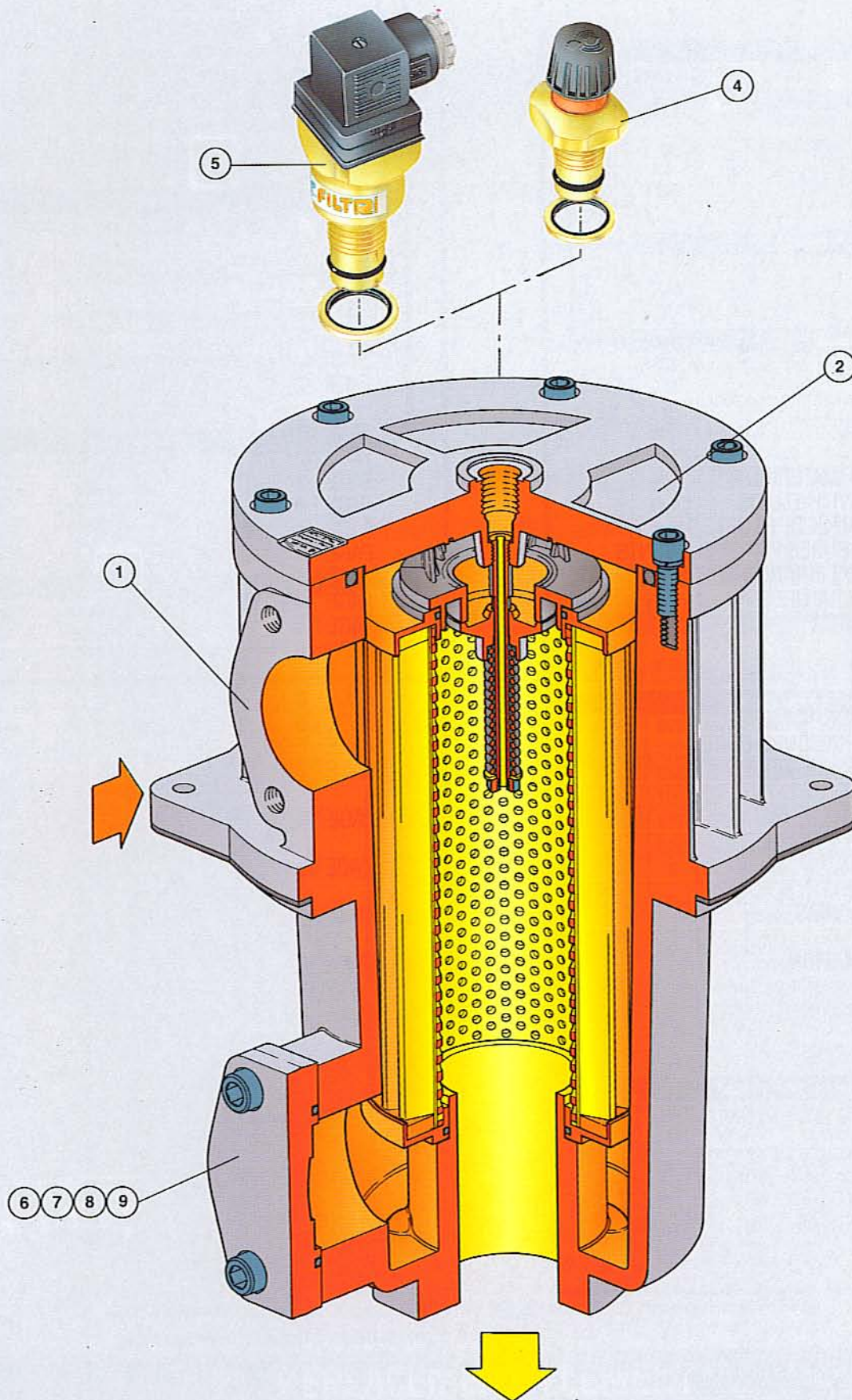
Flange connections

TYPE	A	B	C	D1
F1	3 1/2" SAE 3000PSI/M	2.75	4.75	M16
F2	3 1/2" SAE 3000PSI/UNC	2.75	4.75	5/8" UNC

SPARE PARTS

		FRI SERIES						
N	DESCRIPTION	Q	025	040	100	250	630	850
			CODE					
1	FILTER BODY	1	See order key on page 13, without filter element. EXAMPLE: FRI 100, with bypass valve, Buna-N seals, port 1" NPT, no indicator: FRI 100-B-A-G2-S					
2	COVER WITHOUT BYPASS	1	2.007.060	2.007.075	2.007.090	2.007.105	2.007.120	2.007.120
	COVER WITH BYPASS	1	2.007.063	2.007.078	2.007.093	2.007.108	2.007.122	2.007.122
3	INDICATOR BLANKING PLUG							
	W/BUNA N SEALS	1				T2		
	W/VITON SEALS	1				T4		
4	VISUAL INDICATOR							
	W/BUNA N SEALS	1				Z6		
	W/VITON SEALS	1				K6		
5	ELECTRICAL INDICATOR							
	W/BUNA N SEALS	1				N6		
	W/VITON SEALS	1				H6		
6	BSP PLUG • (CLOSURE FOR SECOND INLET)							
	W/BUNA N SEALS	1	2.011.007	2.011.009	2.011.011	2.011.013	2.011.015	—
	W/VITON SEALS	1	2.011.008	2.011.010	2.011.012	2.011.014	2.011.016	—
7	NPT PLUG • (CLOSURE FOR SECOND INLET)	1	1.029.300	1.029.301	1.029.302	1.029.303	1.029.304	—
8	BLINDED FLANGE F1 • (CLOSURE FOR SECOND INLET)							
	W/BUNA N SEALS	1	—	—	2.013.001	2.013.002	2.013.003	—
	W/VITON SEALS	1	—	—	2.013.004	2.013.005	2.013.006	—
9	BLINDED FLANGE F2 • (CLOSURE FOR SECOND INLET)							
	W/BUNA N SEALS	1	—	—	2.013.007	2.013.008	2.013.009	—
	W/VITON SEALS	1	—	—	2.013.010	2.013.011	2.013.012	—
10	SEALS KIT							
	BUNA N	1	2.050.001	2.050.003	2.050.005	2.050.007	2.050.009	2.050.011
	VITON	1	2.050.002	2.050.004	2.050.006	2.050.008	2.050.010	2.050.012
11	COMPLETE KIT OF NUTS AND BOLTS	1	2.049.032	2.049.033	2.049.034	2.049.035	2.049.035	2.049.035

CROSS SECTIONAL VIEW



ORDERING INFORMATION

FRI

Nominal sizes

025
040
100
250
630
850

Integral bypass valves

S	Without bypass
B	With bypass

Seals

A	Nitrile (Buna-N)
V	Viton

Element condition indicator

Buna N	Viton	
S	S	With threaded hole only
T2	T4	With plug
Z6	K6	Visual 30 PSI
N6	H6	Electrical 30 PSI

Collapse Δp

N	150 PSI
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Filter elements

A03	Inorganic microfibre $B_x \geq 75$
A06	
A10	
A25	
P10	
P25	Resin-treated paper $B_x \geq 2$
M10	
M25	
M60	Square wire mesh
M90	
M250	

Ports option

TIPO	025	040	100	250	630	850
G1	1/2"	3/4"	1"	1 1/2"	2 1/2"	—
	BSP	BSP	BSP	BSP	BSP	—
G2	1/2"	3/4"	1"	1 1/2"	2 1/2"	—
	NPT	NPT	NPT	NPT	NPT	—
G3	SAE	SAE	SAE	SAE	SAE	—
	8	12	16	20	32	—
F1	—	—	1"SAE 3000PSI/M	1 1/2"SAE 3000PSI/M	2 1/2"SAE 3000PSI/M	3 1/2"SAE 3000PSI/M
F2	—	—	1"SAE 3000PSI/ UNC	1 1/2"SAE 3000PSI/ UNC	2 1/2"SAE 3000PSI/ UNC	3 1/2"SAE 3000PSI/ UNC

Seals (Filter elements only)

N	Buna N
V	Viton

CU

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

REPLACEMENT ELEMENT