SERIES
FRI

Maximum working pressure 20 bar

Flow rate to 1200 l/min

MP FILTRI® s.p.a

FRI series filter has been designed and developed to satisfy the demands of applications, on return or low preessure line in Hydraulic market.

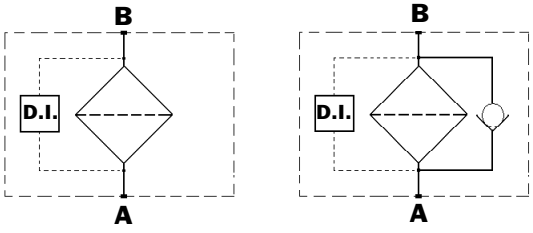
For example:

- in line & off-line filtration
- test bench application
- return filtration
- lubrication systems

SERIES FRI

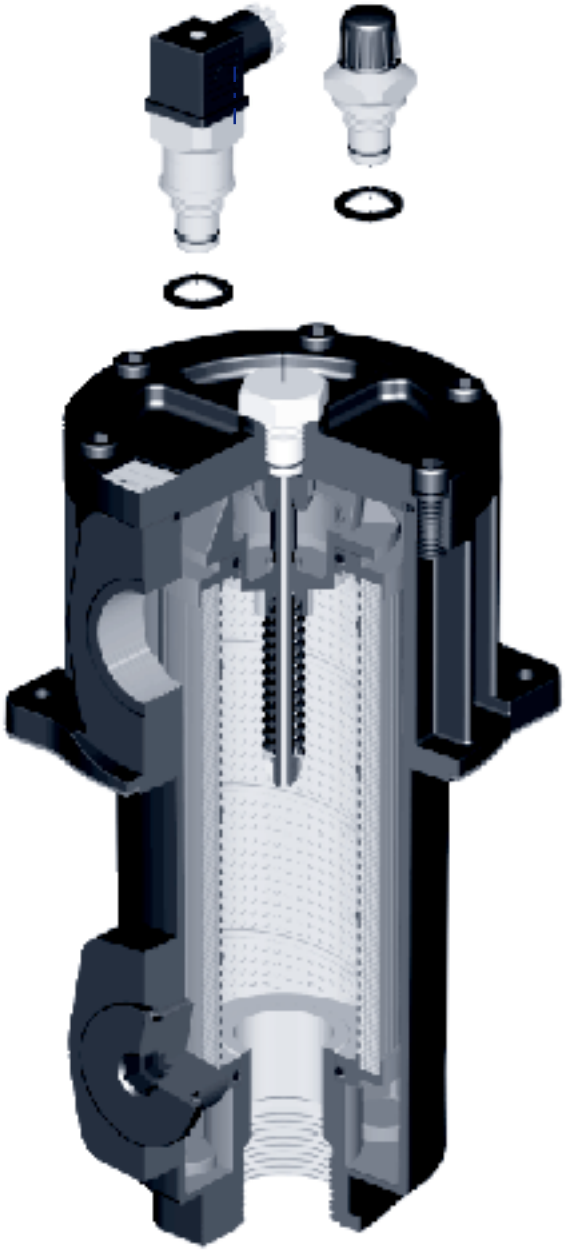
Working pressure 20 bar

Simbol



Filter without By-pass

Filter with By-pass



Technical information

Material

- Bowl: Aluminium Anodized
  Steel (only for FRI 850)
- By-pass valve : Plastic material
- Indicators: Brass
- Cover: Aluminium Anodized
  Nylon (only for FRI 255)

Pressure

- Working pressure:
  FRI 20 bar
- Fatigue test: 1.000.000 of cycles from 0 to 20 bar

Temperature

- From -25°C to + 110°C

By-pass valve

- By-pass valve setting: 2,4 bar ±10%
- Other pressure settings available.

Δp Filter element

- Microfibre elements A series: 10 bar
- Stainless square wire mesh elements M series: 10 bar
- Paper elements P series: 10 bar

Seals

- Standard NBR series A
- FPM option series V

Compatibility with fluids

- Body, compatible with:
  Mineral oil according to ISO 2943 - water-based emulsions - synthetic fluids, water-glycol.
- Filter elements, compatible with:
  mineral oil according to ISO 2943, synthetic fluids and water-based emulsions.
- Seals in NBR A series, compatible with:
  Mineral oil according to ISO 2943 - water-based emulsions- water-glycol
- Seals in FPM V series, compatible with:
  Synthetic fluids type HS-HFDR-HFDS-HFDU

Filter	Weights (Kg.)	Volume (dm³)
• FRI 025	1,0	0,28
• FRI 100	3,8	1,09
• FRI 250	6,3	2,60
• FRI 255	4,2	3,2
• FRI 630	13,8	7,05
• FRI 850	48,0	21,5

Filter element material

Series A

- Inorganic microfibre with acrylic support

Series P

- Resin treated paper

Series M

- Square wire mesh
- Endcap: Nylon galvanized
- Internal tube: steel

Dirt molding capacit

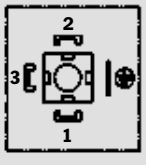
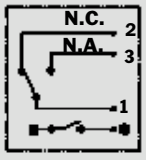
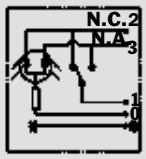
- In according ISO 16889: Multi-pass test

Filter elements, conform to the following ISO standard:

- ISO 2941 - Verification of collapse/burst resistence
- ISO 2942 - Integrity of the first bubble point
- ISO 2943 - Compatibility with fluids
- ISO 3723 - Method for end load test
- ISO 3724 - Verification of flow fatigue characteristics
- ISO 3968 - Flow rate
- ISO16889 - Multi-pass method for evaluating filtration performance

Electrical characteristics for indicator

	Series K - E - N	
Supply voltage	Load	
	Resistive load	Inductive load
(V)	(A)	(A)
Vca 125 (~)	5	5
Vca 250 (~)	5	5
Vcc 30 (⎓)	5	3
Vcc 125 (⎓)	0,5	0,03
Vcc 250 (⎓)	0,25	0,03

Connector DIN 43650	Electrical connection Series E - N	Electrical connection Series K
		

General - Filter selection

For a quick reference guide, refer to page 5

Filter assembly pressure drop:

Δp Total = Δp filter housing + Δp filter element

- Housing pressure drop:
  The Δp is proportional to the fluid density.
- Filter element pressure drop:
  The Δp is proportional to the kinematic viscosity.

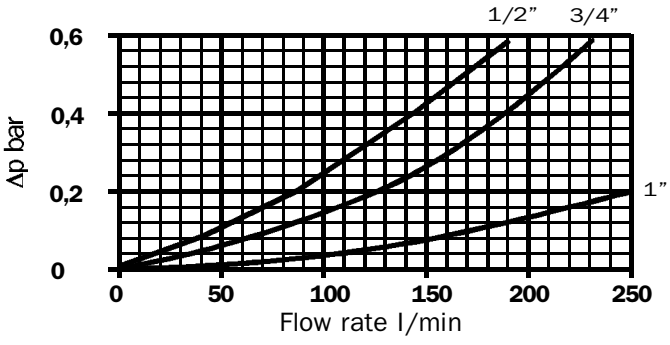
The pressure drop data of the filter elements reported in this brochure were obtained using mineral oil fluid with a kinematic viscosity of 30 mm²/s (cSt).

Technical data

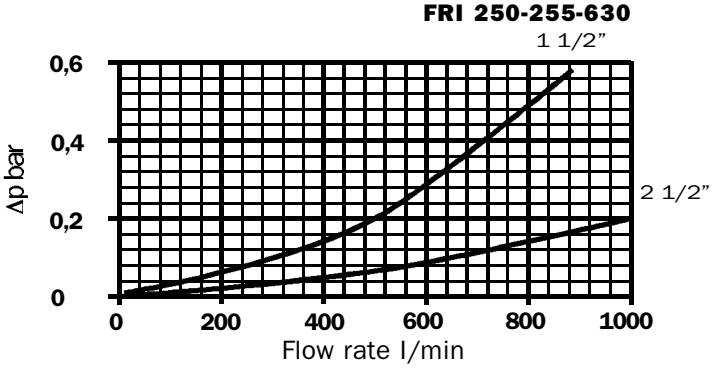
The curves were obtained using a mineral oil with a density of 0,86 Kg/dm³ according to ISO 3968.
The Δp is proportional to the fluid density.

Housing pressure drop

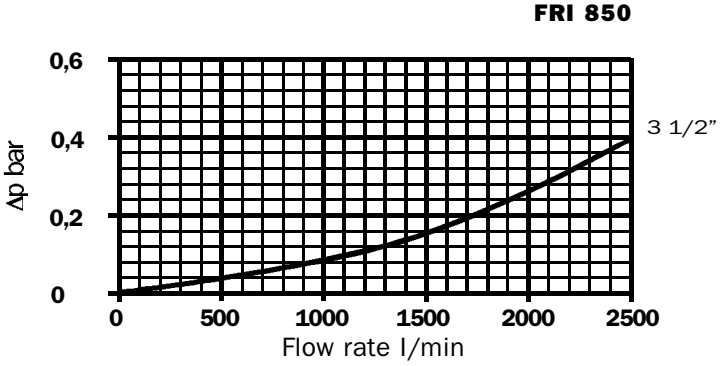
FRI 025-040-100



FRI 250-255-630



FRI 850



Filter assembly sizing example

Δp Total
Δpc Filter housing
Δpe Filter element
Y Factor
Q l/min = Flow rate
V1 = Reference viscosity 30 mm²/s (cSt)
V2 = Working viscosity in mm²/s

Δp Total = Δpc + Δpe

Δpe = Y x Q x (V2/V1)

For application with kinematic viscosity's other than 30 mm²/s (cSt) - see below.

"Y" factor for the pressure drop of the individual filter elements.

Sizing Example

Q = 400 l/min
V_2 = 46 mm²/s (cSt) - working viscosity
Pmax = 15 bar
Filtration = 25 **µ**m absolute
Δp Total max = **0,6 bar** (recommendation)
Pressure drop = Δp max 10 bar

Δpc = 0,15 bar (* housing pressure drop FRI 250)

Δpe = 0,00071 x 400 x (46/30) = 0,4355 bar

Δp Tot. = 0,15 + 0,4355 = 0,5855 bar

Filter selected

FRI 255 with A25 filter element

CU 025-040- "Y" Factor

"Y" factor for the pressure drop of the individual filter element.

Filter element	Y Factor Filter element
CU 025	
A03	0,07750
A06	0,04770
A10	0,02780
A16	0,02390
A25	0,00930
P10	0,01030
P25	0,00458
M25	0,00130
CU 040	
A03	0,03257
A06	0,02080
A10	0,01040
A16	0,00990
A25	0,00380
P10	0,00333
P25	0,00255
M25	0,00225

CU 100-250 - “Y” Factor

“Y” factor for the pressure drop of the individual filter element.

Filter element	Y Factor Filter element
CU 100	
A03	0,01510
A06	0,01360
A10	0,00530
A16	0,00490
A25	0,00200
P10	0,00257
P25	0,00180
M25	0,00020
CU 250	
A03	0,00323
A06	0,00263
A10	0,00154
A16	0,00134
A25	0,00071
P10	0,00098
P25	0,00060
M25	0,00010

CU 630-850 - “Y” Factor

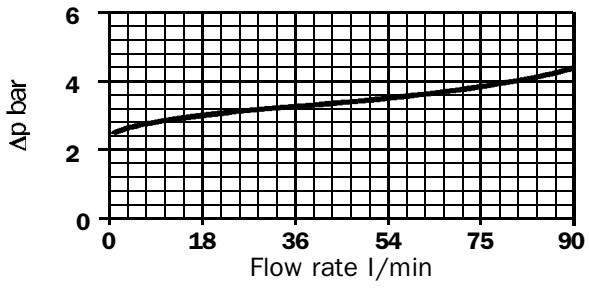
Filter element	Y Factor Filter element
CU 630	
A03	0,00195
A06	0,00161
A10	0,00084
A16	0,00072
A25	0,00042
P10	0,00070
P25	0,00038
M25	0,00007
CU 850	
A03	0,00105
A06	0,00084
A10	0,00041
A16	0,00033
A25	0,00016
P10	0,00017
P25	0,00009
M25	0,00004

By-pass valve

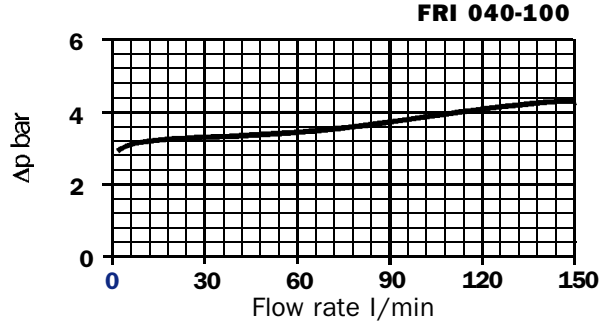
The curves were obtained using a mineral oil with a density of 0,86 kg/dm^3 according to ISO 3968.
The Δp is propotional to the fluid density.

Housing pressuredrop

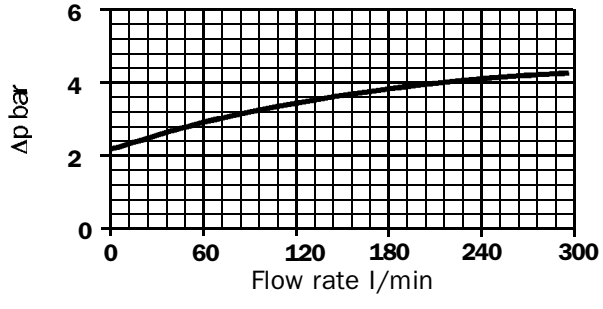
FRI 025



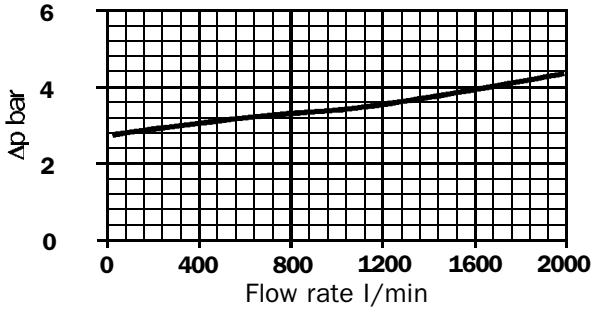
FRI 040-100



FRI 250-255



FRI 630-850



Ordering information FRI

Filter assembly

FRI

	1	2	3	4	5	6	8	9
Example: FRI	040	B	A	G1	A10	N	P01	V6

Filter element

CU

	1	2	6	8
Example: CU	040	A10	N	P01

1 - Size

025	FRI 025
040	FRI 040
100	FRI 100
250	FRI 250
255	FRI 255
630	FRI 630
850	FRI 850

2 - By-pass valve

B	With by-pass
S	Without by-pass

3 - Seals

A	NBR
V	FPM

5 - Filter element

A03	Inorganic microfibre 3 µ	ßx (c) ≥1000
A06	Inorganic microfibre 6 µ	
A10	Inorganic microfibre 10 µ	
A16	Inorganic microfibre 16 µ	
A25	Inorganic microfibre 25 µ	
P10	Resin-treated paper	
P25	Resin-treated paper	
M25	Square wire mesh	

6 - Collaps Δp

N	10 Bar

7 - Filter element for seals

N	NBR
V	FPM

8 - Filter assembly type

P01	MP Filtri standard
Pxx	Customer request

9 - Element condition indicator

S	With threaded hole only
T2	With plug
T	With threaded hole and plug (only for FRI 255)
Z6	Visual (Pop-up) 2 bar
V6	Visual 2 bar
N6	Electrical 2 bar
E6	Visual-electrical 2 bar
K6*	Visual-electrical 2 bar
VR25	Visual indicator (only for FRI 255)
FX20	Electrical 2 bar (only for FRI 255)
FK20	Visual-electrical 2 bar (only for FRI 255)

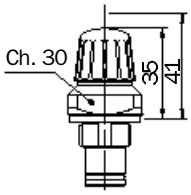
* 1 - 24 Volt; 2 - 115 Volt; 3 - 230 Volt

4 - Port options

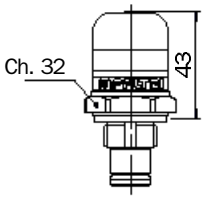
Type	025	040	100	250	255	630	850
G1	G 1/2"	G 3/4"	G 1"	G 1 1/2"	G 1 1/2"	G 2 1/2"	-
G2	1/2" NPT	3/4" NPT	1" NPT	1 1/2" NPT	1 1/2" NPT	2 1/2" NPT	-
G3	SAE 8	SAE 12	SAE 16	SAE 24	SAE 24	SAE 32	-
G4	-	-	-	-	G 1 1/4"	-	-
G5	-	-	-	-	1 1/4" NPT	-	-
G6	-	-	-	-	SAE 20	-	-
F1	-	-	1" SAE 3000 PSI/M	1 1/2" SAE 3000 PSI/M	1 1/2" SAE 3000 PSI/M	2 1/2" SAE 3000 PSI/M	3 1/2" SAE 3000 PSI/M
F2	-	-	1" SAE 3000 PSI/UNC	1 1/2" SAE 3000 PSI/UNC	1 1/2" SAE 3000 PSI/UNC	2 1/2" SAE 3000 PSI/UNC	3 1/2" SAE 3000 PSI/UNC

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

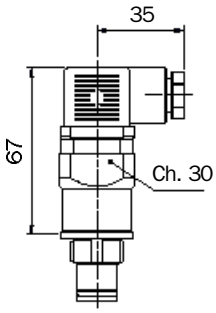
Indicator



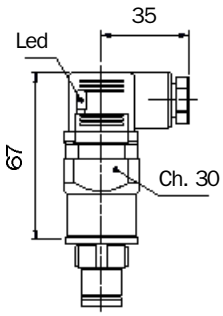
Z



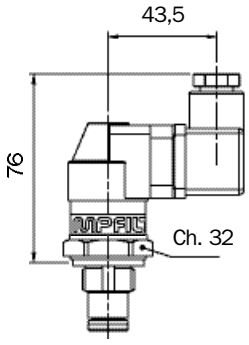
V



N



K

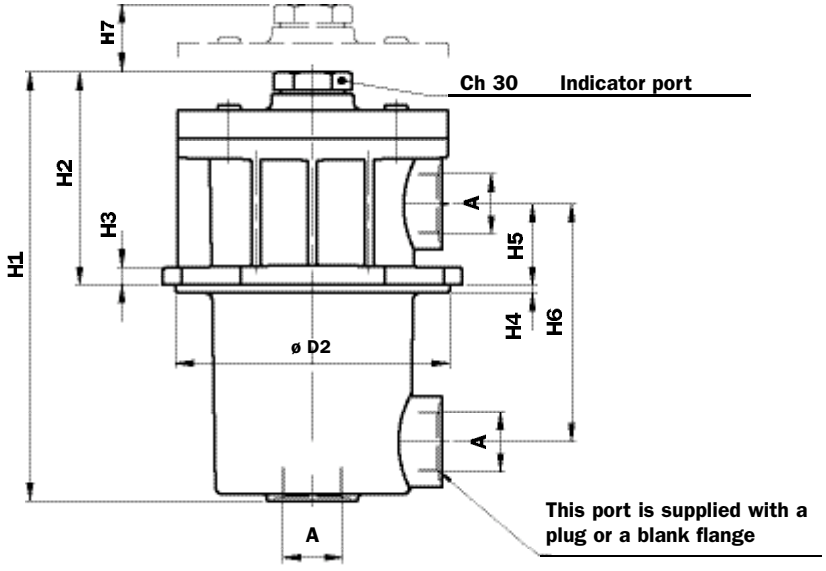


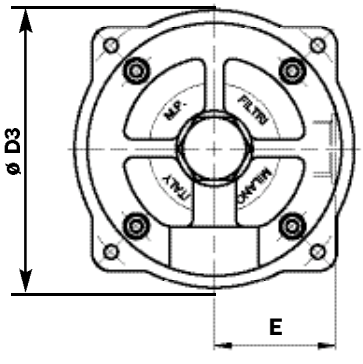
E

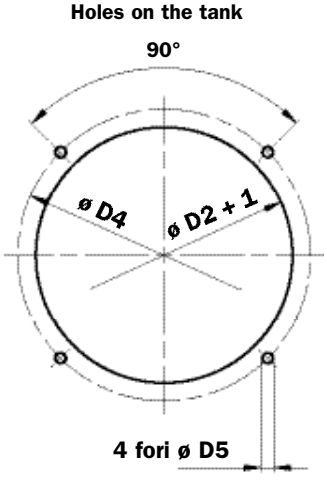
FRI 025-040

Filter selection-quick reference guide

The following filter sizing recommendations are based on using a mineral oil fluid 30 mm²/s (cSt) with a maximum filter assembly (housing & filter element) pressuredrop of 1,5 bar.







	Filter element Type	Flow rate l/min
FRI 025		
	A03	6
	A06	10
	A10	18
	A16	20
	A25	45
	P10	48
	P25	50*
	M25	50*
FRI 040		
	A03	19
	A06	24
	A10	47
	A16	50
	A25	80*
	P10	80*
	P25	80*
	M25	80*

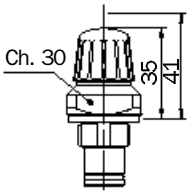
* Max flow recomended

Type	H1	H2	H3	H4	H5	H6	H7	D2	D3	D4	D5	E
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
025	150	85	5	3	19	62,5	105	83,5	89	95	M5	44
040	190	98	8	3,5	36	105	110	121	132	138	M6	57

Thread connections

	A		
TYPE	**G1**	**G2**	**G3**
025	G 1/2"	1/2" NPT	SAE 8 (3/4" 16 UN)
040	G 3/4"	3/4" NPT	SAE 12 (1 1/16" 12 UN)

Indicator



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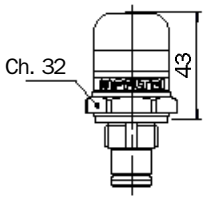

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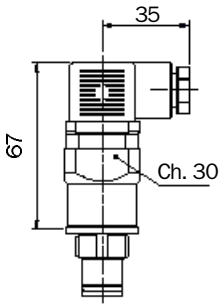

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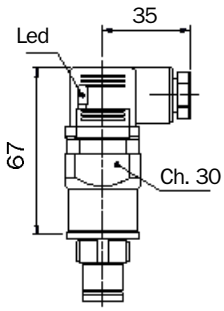

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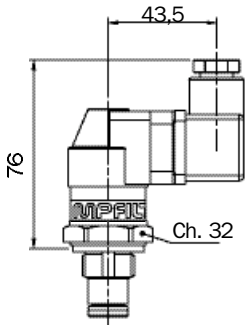
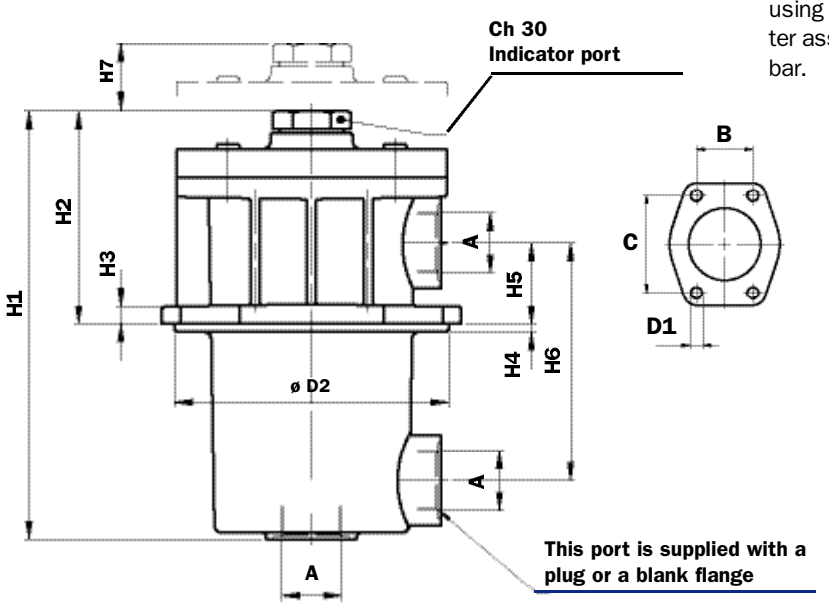
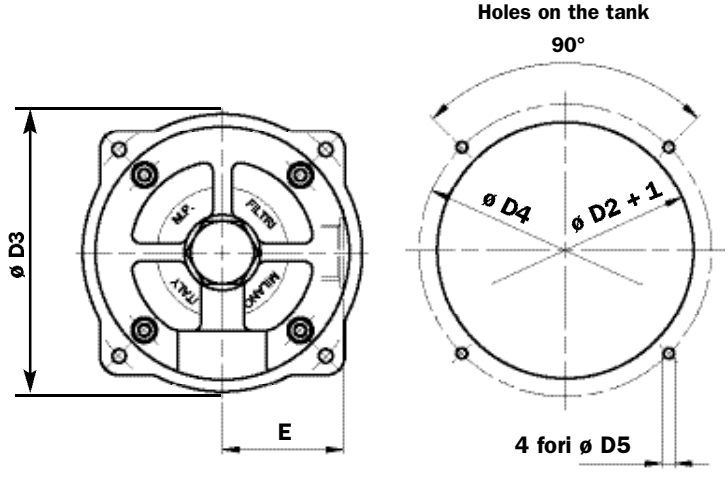


E

FRI 100-250-630





Filter selection-quick reference guide

The following filter sizing recommendations are based on using a mineral oil fluid 30 mm²/s (cSt) with a maximum filter assembly (housing & filter element) pressure drop of 1,5 bar.

	Filter element Type	Flow rate l/min
FRI 100		
	A03	32
	A06	35
	A10	90
	A16	90
	A25	120*
	P10	120*
	P25	120*
	M25	120*
FRI 250		
	A03	150
	A06	180
	A10	280
	A16	310
	A25	330*
	P10	330*
	P25	330*
	M25	330*
FRI 630		
	A03	245
	A06	285
	A10	500
	A16	600
	A25	800*
	P10	800*
	P25	800*
	M25	800*

* Max flow recomended

Type	H1 mm	H2 mm	H3 mm	H4 mm	H5 mm	H6 mm	H7 mm	D2 mm	D3 mm	D4 mm	D5 mm	E mm
100	256	117	10	5	49	140	155	135	146	154	M6	67
250	345	140	10	5	57	177	240	162	174	180	M8	82
630	401	177	13	10	79	218	275	237	253	275	M10	117,5

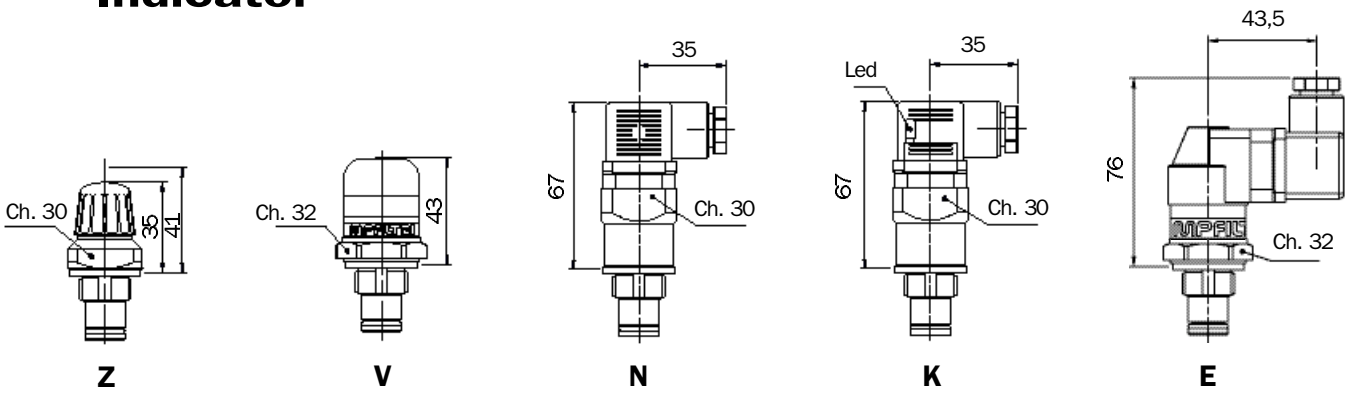
Thread connections

	A		
TYPE	**G1**	**G2**	**G3**
100	G 1"	1" NPT	SAE 16 (1 5/16" 12 UN)
250	G 1 1/2"	1 1/2" NPT	SAE 24 (1 7/8" 12 UN)
630	G 2 1/2"	2 1/2" NPT	SAE 32 (2 1/2" 12 UN)

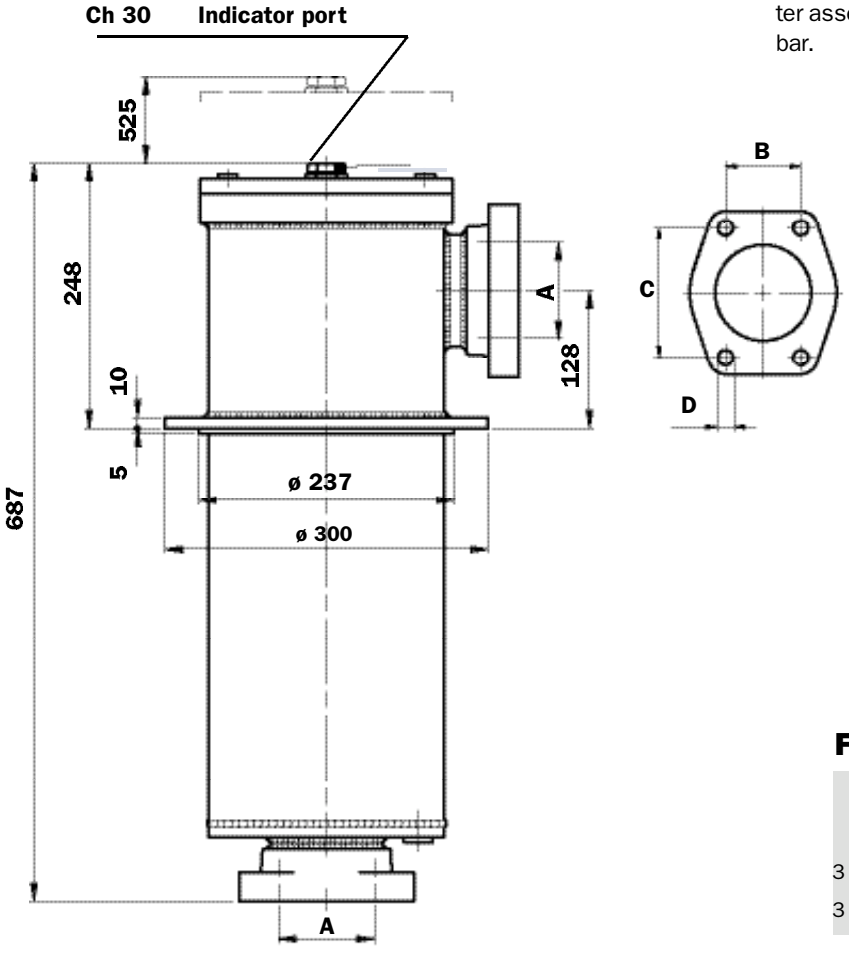
Flange connections

Type	Connections A	B	C	D1
100 F1	1" SAE 3000 PSI/M	26,19	53,37	M10
F2	1" SAE 3000 PSI/UNC	26,19	52,37	3/8" UNC
250 F1	1 1/2" SAE 3000 PSI/M	35,71	69,85	M12
F2	1 1/2" SAE 3000 PSI/UNC	35,71	69,85	1/2" UNC
630 F1	2 1/2" SAE 3000 PSI/M	50,80	88,90	M12
F2	2 1/2" SAE 3000 PSI/UNC	50,80	88,90	1/2" UNC

Indicator



FRI 850



Filter selection-quick reference guide

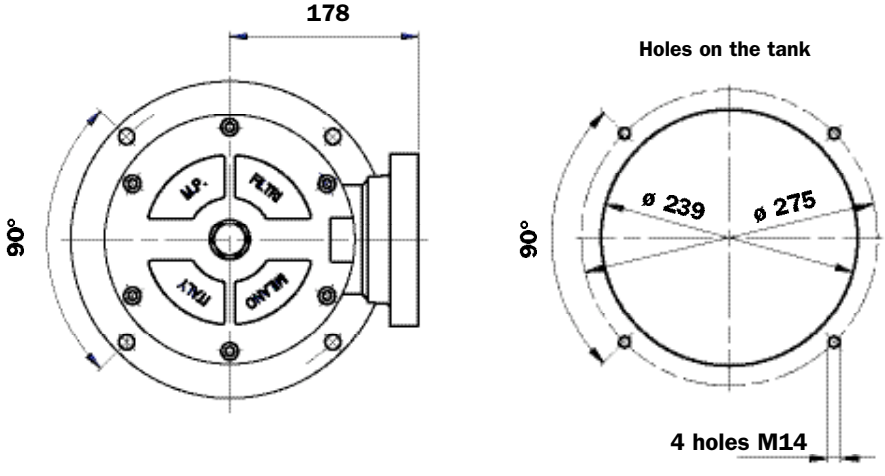
The following filter sizing recommendations are based on using a mineral oil fluid 30 mm²/s (cSt) with a maximum filter assembly (housing & filter element) pressuredrop of 1,5 bar.

FRI 850	Filter element Type	Flow rate l/min Series N
	A03	450
	A06	560
	A10	1000
	A16	1200
	A25	1500*
	P10	1500*
	P25	1500*
	M25	1500*

* Max flow recomended

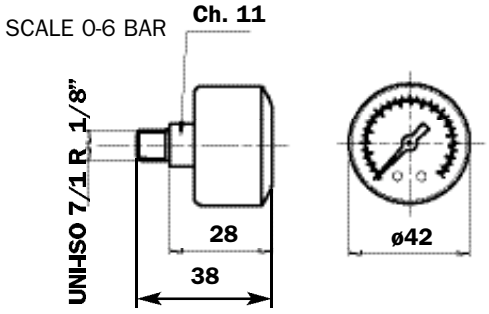
Flange connections

Connections A	B	C	D
3 1/2" SAE-3000 PSI/M	69,9	120,7	M16
3 1/2" SAE-3000 PSI/UNC	69,9	120,7	5/8" UNC

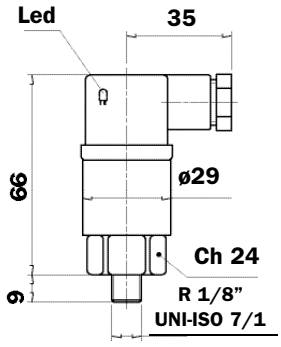


Indicator

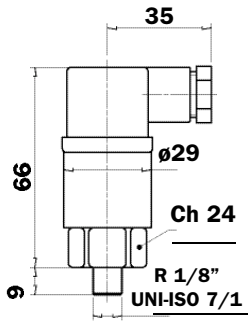
VR 25



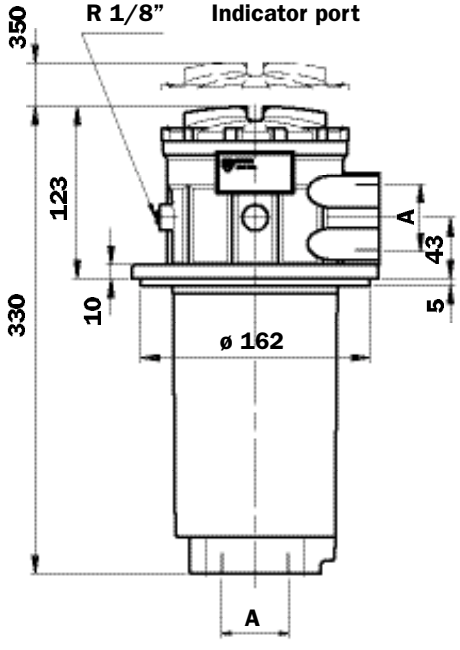
FK 20

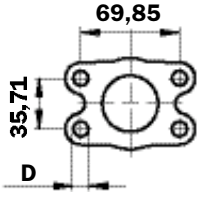


FX 20



FRI 255



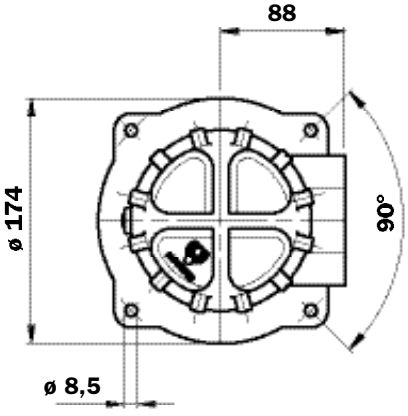


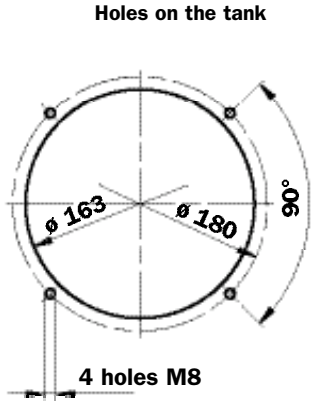
Filter selection-quick reference guide

The following filter sizing recommendations are based on using a mineral oil fluid 30 mm²/s (cSt) with a maximum filter assembly (housing & filter element) pressure drop of 1,5 bar.

FRI 255	Filter element Type	Flow rate l/min
	A03	150
	A06	180
	A10	280
	A16	310
	A25	330*
	P10	330*
	P25	330*
	M25	330*

* Max flow recomended





Thread connections

TYPE	G1	G2	A G3	G4	G5	G6
255	G 1 1/2"	1 1/2" NPT	SAE 24	G 1 1/4"	1 1/4" NPT	SAE 20

Flange connections

Connections A	D
1 1/2" SAE-3000 PSI/M	M12
1 1/2" SAE-3000 PSI/M	1/2"UNC