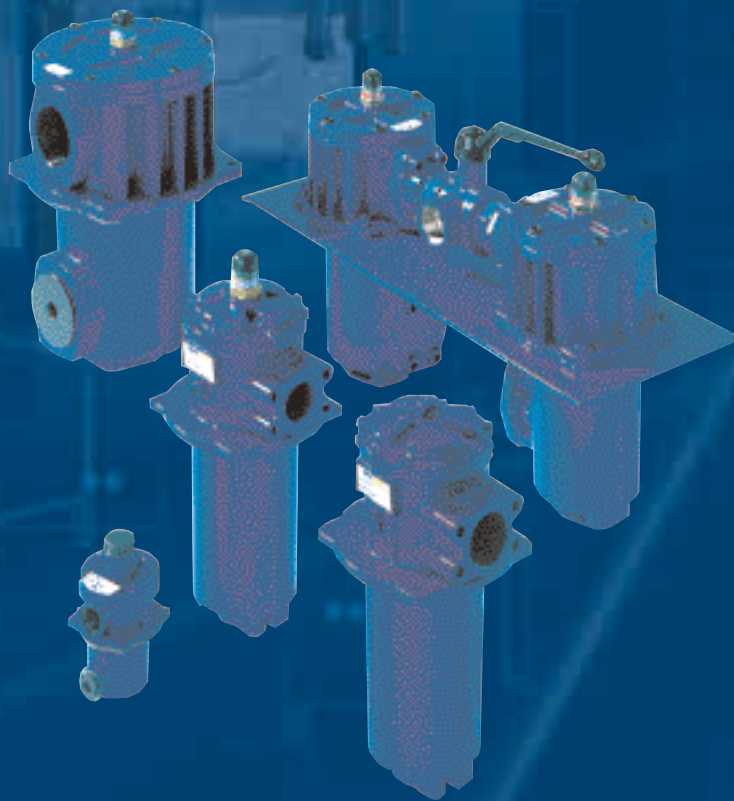


# SERIES FRI



**Maximum working pressure 20 bar**

**Flow rate to 1200 l/min**



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

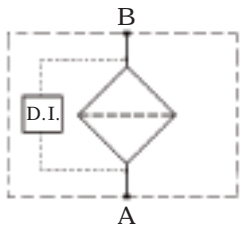
For example:

- in line & off-line filtration
- test bench
- return filtration
- lubrication system

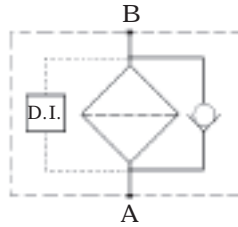
SERIE  
**FRI**

Working pressure  
**20 bar**

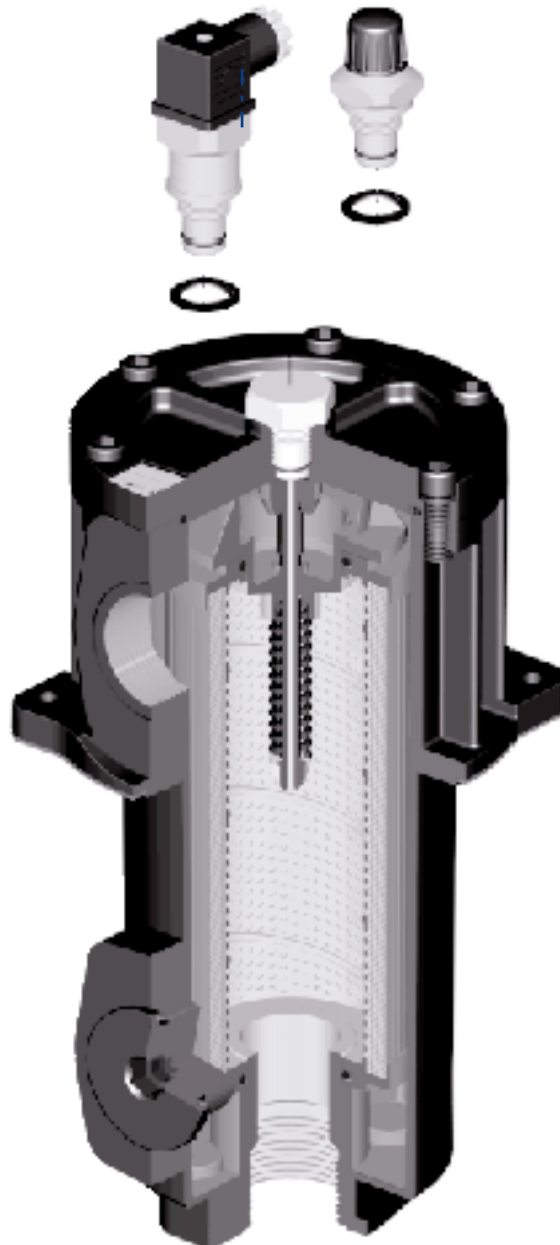
### Symbol



Filter without  
By-pass



Filter with  
By-pass



# Caratteristiche tecniche

## 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 di cicli 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 Nitrile (Buna-N) serie A
- Viton optional serie V
- EPDM optional serie E

## 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-HFUDU

Filter	Weights (Kg.)	Volume (dm <sup>3</sup> )
• 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 microfibra with acrylic support

## Series P

- Resin treated paper

## Series M

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

## Dirt molding capacit

- In according ISO 16889: Multi-pass test

## Filter elements, conform to the following ISO standard:

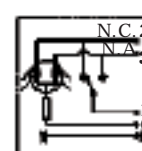
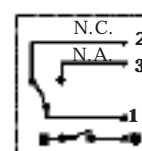
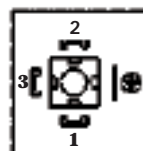
- ISO 2941 - Verification of collapse/burst resistance
- ISO 2942 - Integrity of the first bubble point
- ISO 2943 - Compatibility with fluids
- ISO 3723 - Method for end load test
- ISO 3724 - Verification of flow fatigue characteristics
- ISO 3968 - Flow rate
- ISO16889 - Multi-pass method for evaluating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

## Elettrical characteristics for indicator

Series K - E - N		
Supply voltage	Carico 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:

$$\Delta p_{\text{Total}} = \Delta p_{\text{filter housing}} + \Delta p_{\text{filter element}}$$

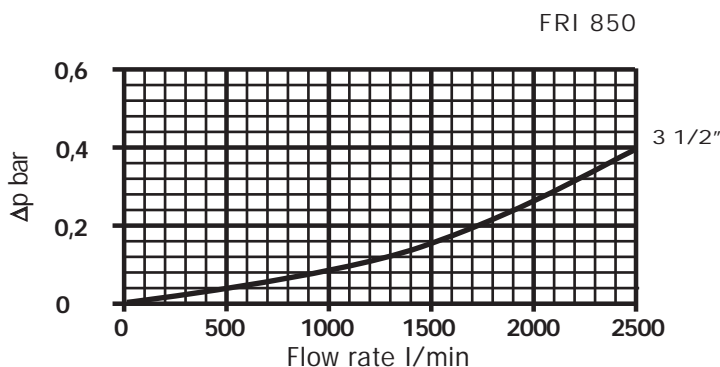
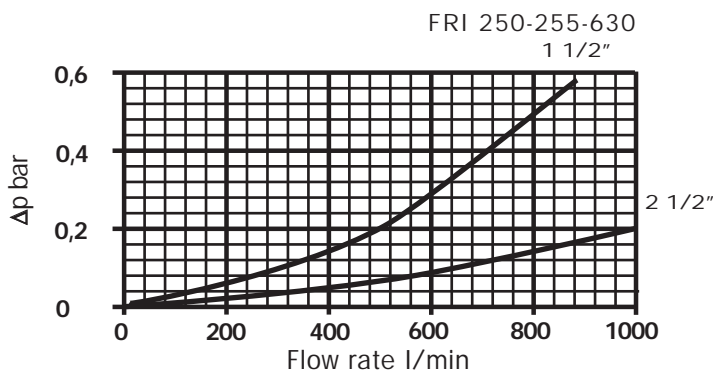
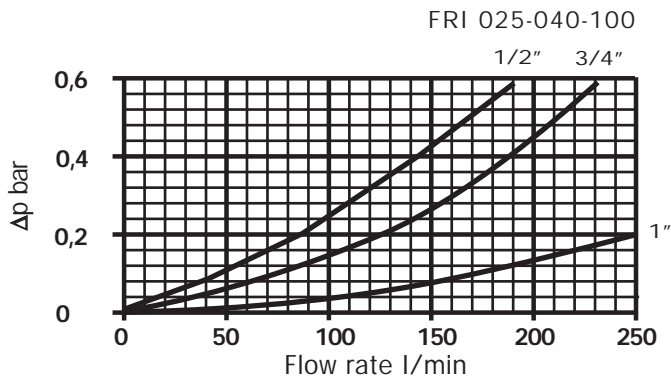
- Housing pressure drop:  
The  $\Delta p$  is proportional to the fluid density.
- Filter element pressure drop:  
The  $\Delta p$  is proportional to the kinematic viscosity.

The pressure drop data of the filter elements reported in this brochure were obtained using mineral oil fluid with a kinematic viscosity of 30 mm<sup>2</sup>/s (cSt).

## Technical data

The curves were obtained using a mineral oil with a density of 0,86 Kg/dm<sup>3</sup> according to ISO 3968. The  $\Delta p$  is proportional to the fluid density.

### Housing pressure drop



## Filter assembly sizing example

$\Delta p$  Total

$\Delta p_c$  Filter housing

$\Delta p_e$  Filter element

Y Factor

Q l/min = Flow rate

V1 = Reference viscosity 30 mm<sup>2</sup>/s (cSt)

V2 = Working viscosity in mm<sup>2</sup>/s

$$\Delta p_{\text{Total}} = \Delta p_c + \Delta p_e$$

$$\Delta p_e = Y \times Q \times (V_2/V_1)$$

Per applicazioni con viscosità cinematica diversa da 30 mm<sup>2</sup>/s (cSt) vedi esempio

Coefficiente "Y" per la definizione della perdita di carico degli elementi filtranti

## Sizing Example

Q = 400 l/min

V<sub>2</sub> = 46 mm<sup>2</sup>/s (cSt) - working viscosity

P<sub>max</sub> = 15 bar

Filtration = 25 μm absolute

$\Delta p$  Total max = 0,6 bar (recommendation)

Pressure drop =  $\Delta p$  max 10 bar

$\Delta p_c = 0,15$  bar (\* housing pressure drop FRI 250 )

$\Delta p_e = 0,00071 \times 400 \times (46/30) = 0,4355$  bar

$\Delta p_{\text{Tot.}} = 0,15 + 0,4355 = 0,5855$  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 series N - M
<b>CU 025</b>	
A03	0,07750
A06	0,04770
A10	0,02780
A16	0,02390
A25	0,00930
P10	0,01030
P25	0,00458
M25	0,00130
<b>CU 040</b>	
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 series N - M
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 series N - M
A03	0,00195
A06	0,00161
A10	0,00084
A16	0,00072
A25	0,00042
P10	0,00070
P25	0,00038
M25	0,00007

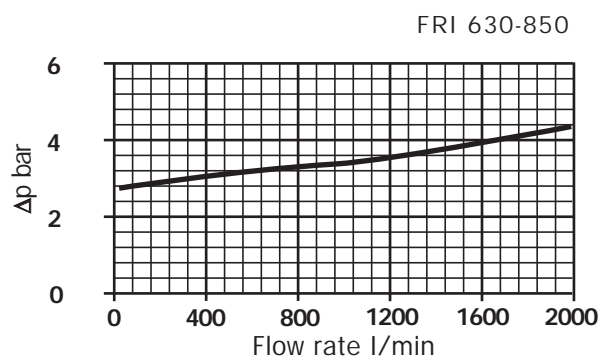
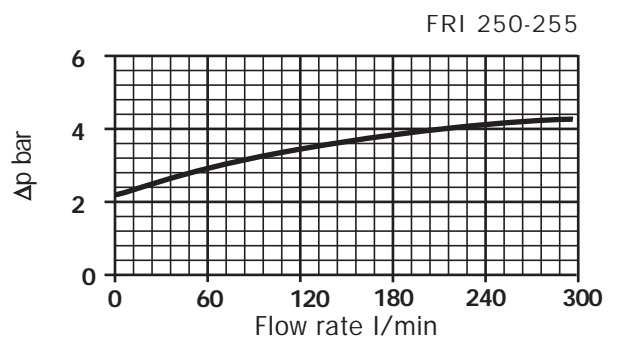
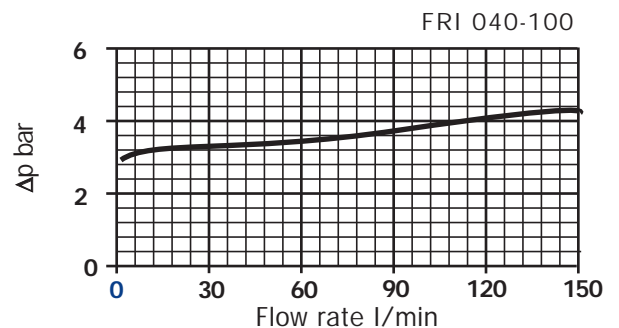
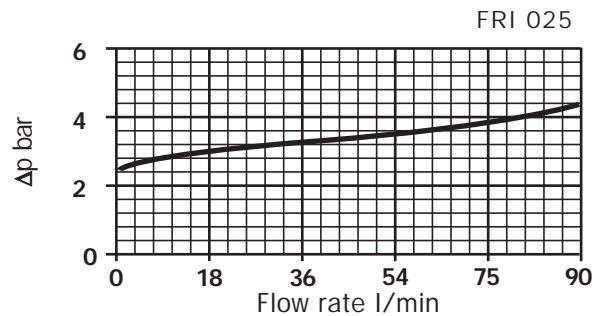
### CU 850

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<sup>3</sup> according to ISO 3968.  
The  $\Delta p$  is proportional to the fluid density.

Housing pressure drop



# Ordering information FRI

## Filter assembly

Inorganic microfibra

### FRI

Esempio: FRI

## Filter element

### CU

Esempio: CU

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>8</b>	<b>9</b>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
040	B	A	G1	A10	N	P01	V6
<b>1</b>	<b>2</b>	<b>6</b>	<b>8</b>				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
040	A10	N	P01				

### 1 - Size

<b>025</b>	FRI 025
<b>040</b>	FRI 040
<b>100</b>	FRI 100
<b>250</b>	FRI 250
<b>255</b>	FRI 255
<b>630</b>	FRI 630
<b>850</b>	FRI 850

### 5 - Filter element

<b>A03</b>	Inorganic microfibra 3 μ
<b>A06</b>	Inorganic microfibra 6 μ
<b>A10</b>	Inorganic microfibra 10 μ
<b>A16</b>	Inorganic microfibra 16 μ
<b>A25</b>	Inorganic microfibra 25 μ
<b>P10</b>	Resin-treated paper
<b>P25</b>	
<b>M25</b>	Square wire mesh

Bx (c) ≥ 1000

### 8 - Filter assembly type

<b>P01</b>	MP Filtri standard
<b>Pxx</b>	Customer request

### 9 - Element condition indicator

<b>S</b>	With threaded hole only
<b>T2</b>	With plug
<b>T</b>	With threaded hole and plug (only for FRI 255)
<b>Z6</b>	Visual (Pop-up) 2 bar
<b>V6</b>	Visual 2 bar
<b>N6</b>	Electrical 2 bar
<b>E6</b>	Visual-electrical 2 bar
<b>K6*</b>	Visual-electrical 2 bar

\* { 1 - 24 Volt  
2 - 115 Volt  
3 - 230 Volt

### 2 - By-pass valve

<b>B</b>	With by-pass
<b>S</b>	Without by-pass

### 6 - Collaps Δp

<b>N</b>	10 Bar
<b>M</b>	10 Bar
<b>P</b>	7 Bar

### 3 - Seals

<b>A</b>	NBR
<b>V</b>	FPM

### 7 - Filter element for seals

<b>N</b>	NBR
<b>V</b>	FPM

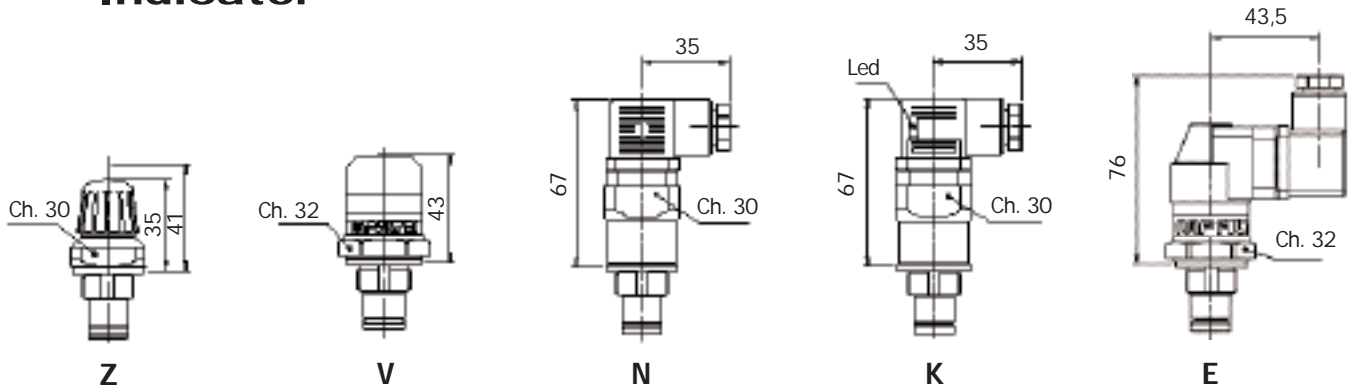
### 4 - Porty options

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

Date help in this publication is given only for indicative purposes. MP Filtri reserves to introduce modification to described items for technical or commercial reasons. Copyright reserved.

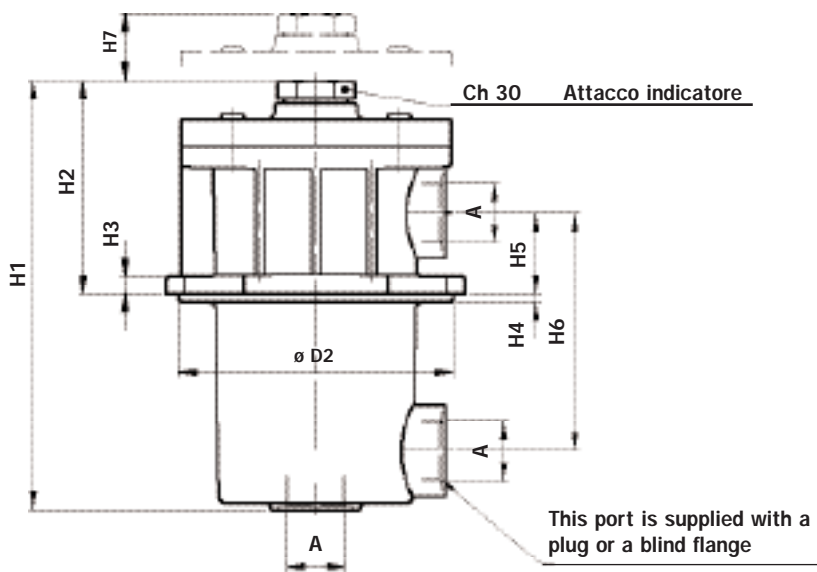
# Indicator



## FRI 025-040

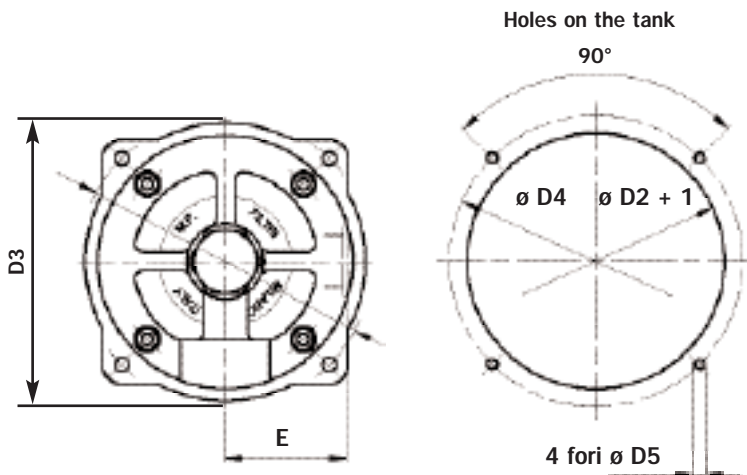
### Filter selection-quick reference guide

The following filter sizing recommendations are based on using a mineral oil fluid 30 mm<sup>2</sup>/s (cSt) with a maximum filter assembly (housing & filter element) pressure drop of 1,5 bar.



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

\* Portata massima consigliata

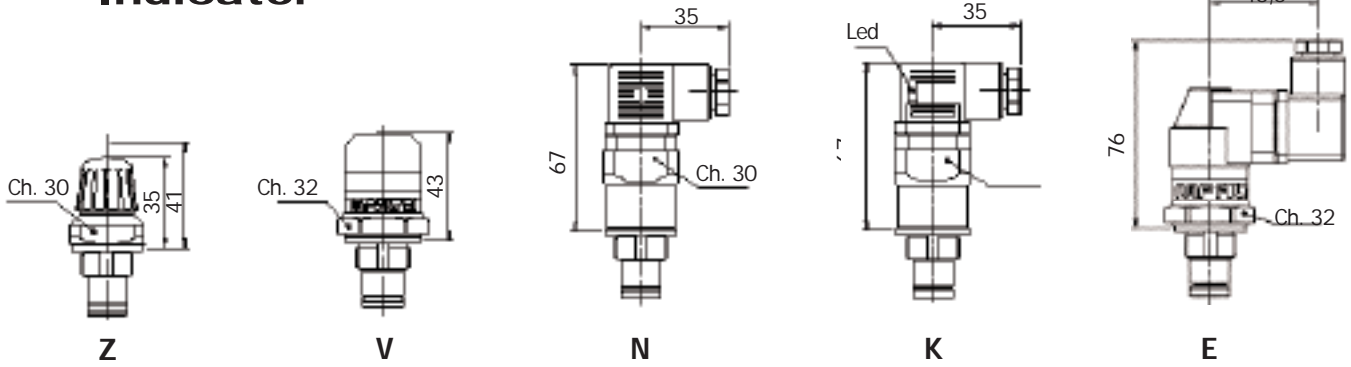


Tipo	H1	H2	H3	H4	H5	H6	H7	D2	D3	D4	D5	E
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
025	150	85	5	3	19	62,5	105	83,5	89	95	M5	44
040	190	98	8	3,5	36	105	110	121	132	138	M6	57

### Thread connections

TIPO	A		
	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

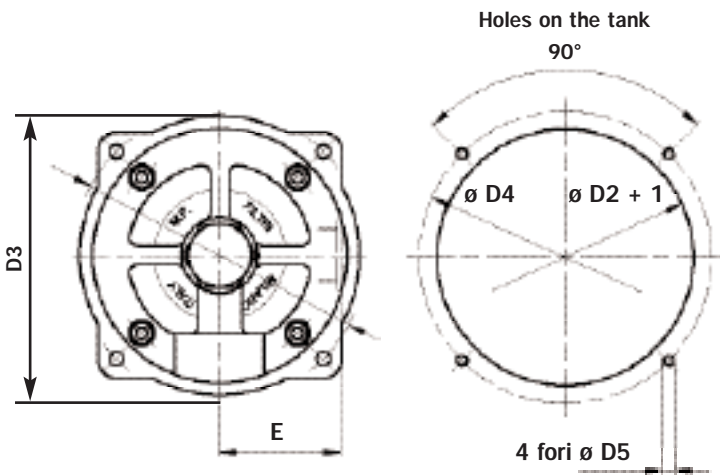
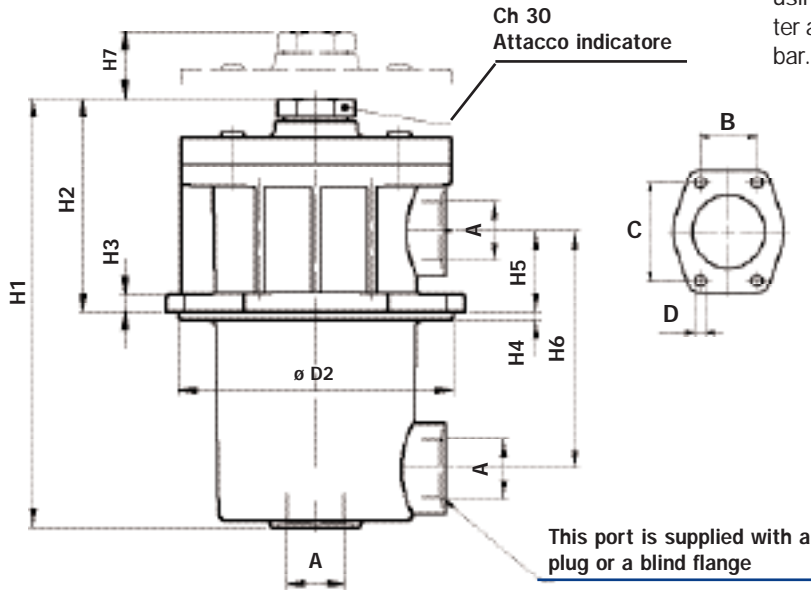
# Indicator



## FRI 100-250-630

### Filter selection-quick reference guide

The following filter sizing recommendations are based on using a mineral oil fluid 30 mm<sup>2</sup>/s (cSt) with a maximum filter assembly (housing & filter element) pressure drop of 1,5 bar.



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

\* Portata massima consigliata

Tipo	H1	H2	H3	H4	H5	H6	H7	D2	D3	D4	D5	E
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	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

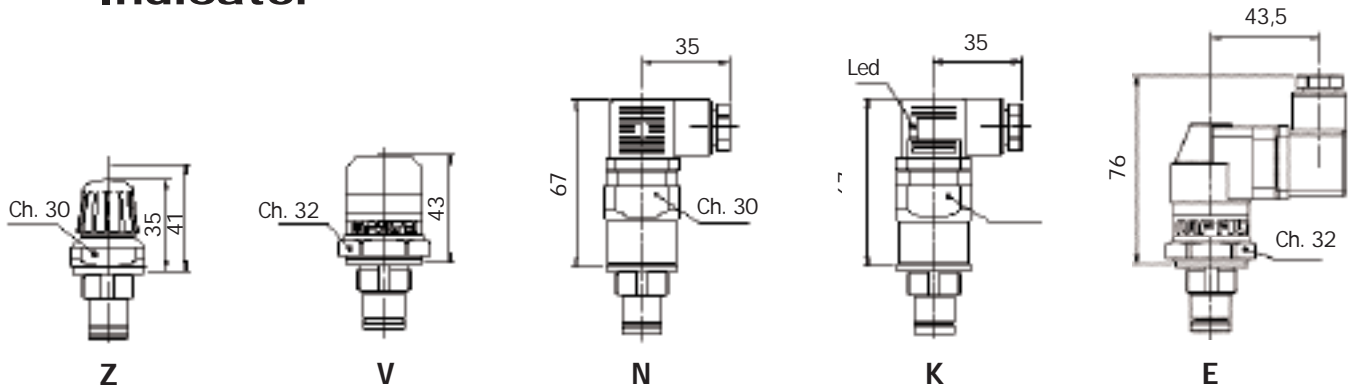
TIPO	A		
	G1	G2	G3
100	G 1"	1" NPT	SAE 16 1 5/16" 12 UN
250	G 1 1/2"	1 1/2" NPT	SAE 24 1 7/8" 12 UN
630	G 2 1/2"	2 1/2" NPT	SAE 32 2 1/2" 12 UN

### Flange connections

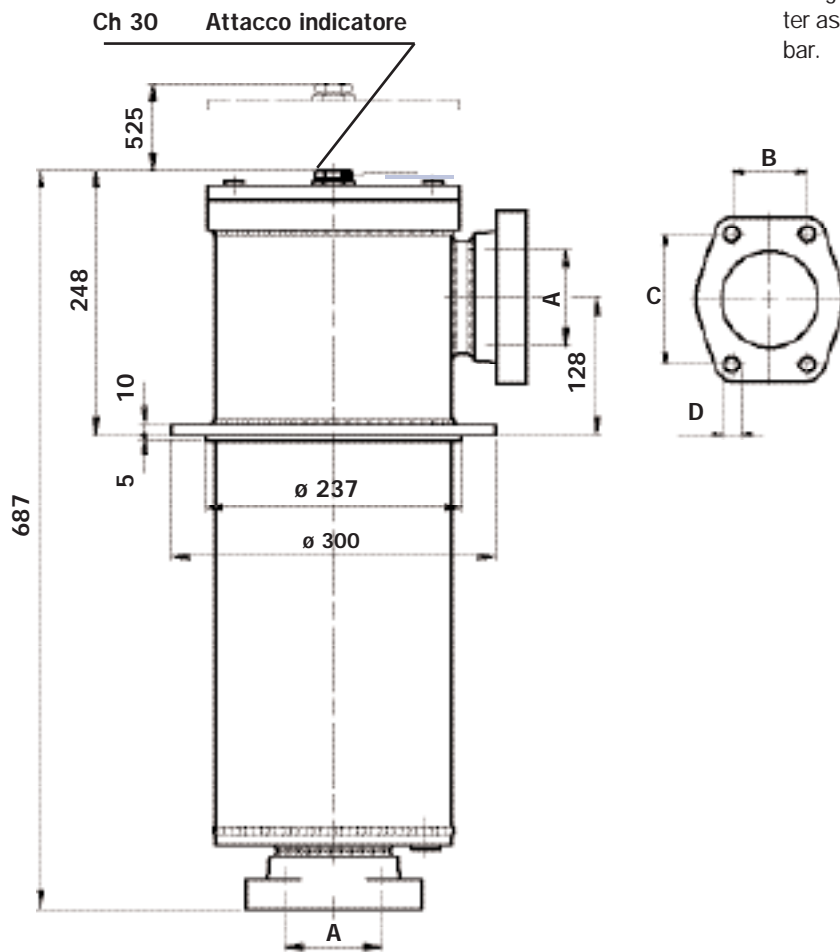
Tipe	Connections A	B	C	D1
100 F1	1" SAE 3000 PSI/M	26,19	53,37	M10
F2	1" SAE 3000 PSI/UNC	26,19	52,37	3/8" UNC
250 F1	1 1/2" SAE 3000 PSI/M	35,71	69,85	M12
F2	1 1/2" SAE 3000 PSI/UNC	35,71	69,85	1/2" UNC
630 F1	2 1/2" SAE 3000 PSI/M	50,80	88,90	M12
F2	2 1/2" SAE 3000 PSI/UNC	50,80	88,90	1/2" UNC



# Indicator



# FRI 850



## Filter selection-quick reference guide

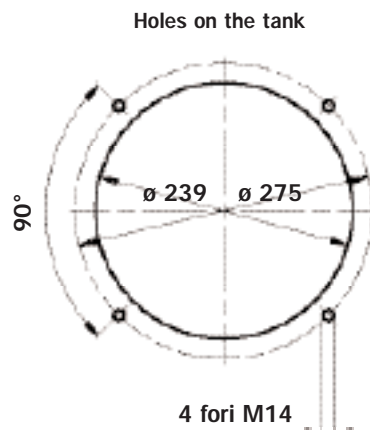
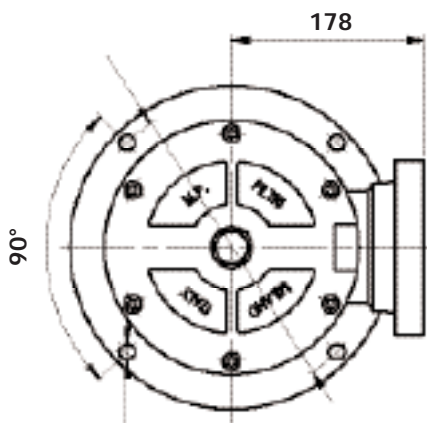
The following filter sizing recommendations are based on using a mineral oil fluid 30 mm<sup>2</sup>/s (cSt) with a maximum filter assembly (housing & filter element) pressure drop of 1,5 bar.

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

\* Portata massima consigliata

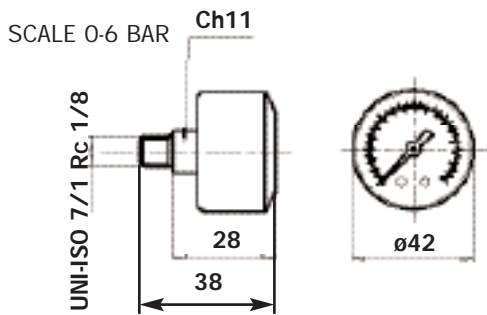
## Flange connections

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

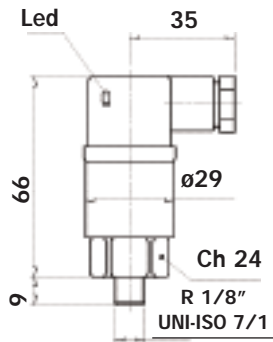


# Indicator

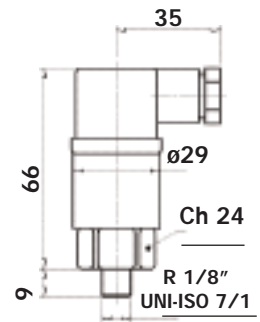
VR 25



FK 20



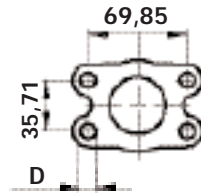
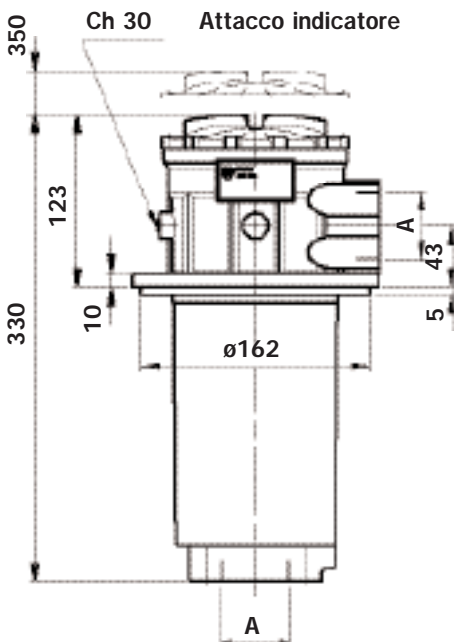
FX 20



# FRI 255

## Filter selection-quick reference guide

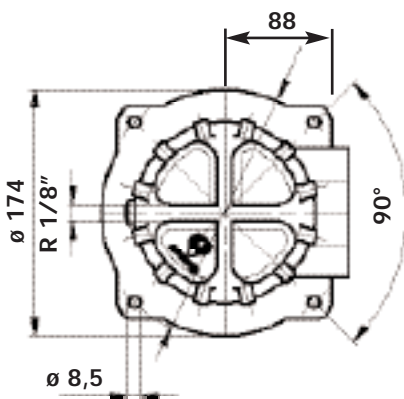
The following filter sizing recommendations are based on using a mineral oil fluid 30 mm<sup>2</sup>/s (cSt) with a maximum filter assembly (housing & filter element) pressure drop of 1,5 bar.



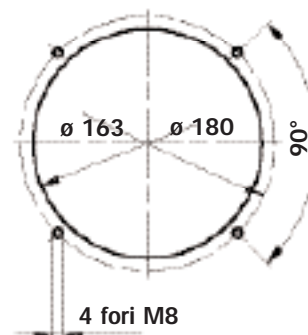
## FRI 255

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

\* Portata massima consigliata



Holes on the tank



## Thread connections

TIPO	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