



## FR1 SERIES

### Tank top return filters

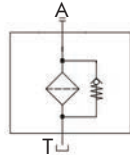
Return filter for mounting on the tank lid. Filter element with inbuilt bypass valve. Flow rates up to 600 l/min.

## TECHNICAL INFORMATION

### HOUSING

tested according to NFPA T3.10.5.1\* , ISO3968

HYDRAULIC SYMBOL:



PRESSURE: Max working 8 bar  
Burst 16 bar

CONNECTION PORTS: G 3/8" ÷ G 2"

MATERIALS: Cover: aluminium alloy  
Head: aluminium alloy  
Bowl: PA6 reinforced (size 10 to 43) - zinc plated steel (size 50 to 64)  
Seal: NBR (FKM on request)

BYPASS: Inbuilt in the filter element  
B version 1,7 bar  
C version 3 bar

### ELEMENT

tested according to ISO 2941, 2942, 2943, 3968, 16889, 23181

FILTER MEDIA: Microglass fiber G06-G10-G15-G25-G40  
Cellulose C10-C25  
Wire mesh T60  
Synthetic M05-M10-M15

DIFFERENTIAL COLLAPSE PRESSURE: 10 bar

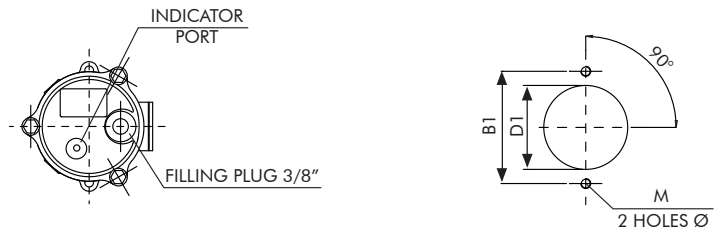
OPERATING TEMPERATURE RANGE: -25°C +100°C

FLUID COMPATIBILITY: Full with HH-HL-HM-HV (acc. To ISO 2943).  
For use with other fluid please contact Filtrac Customer Service (info@filtrac.it).

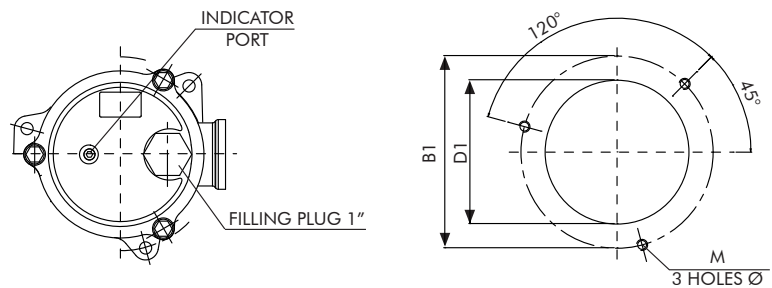
\* as reference method only for verifying the pressure fatigue resistance and establishing the burst pressure ratings.

OVERALL DIMENSIONS

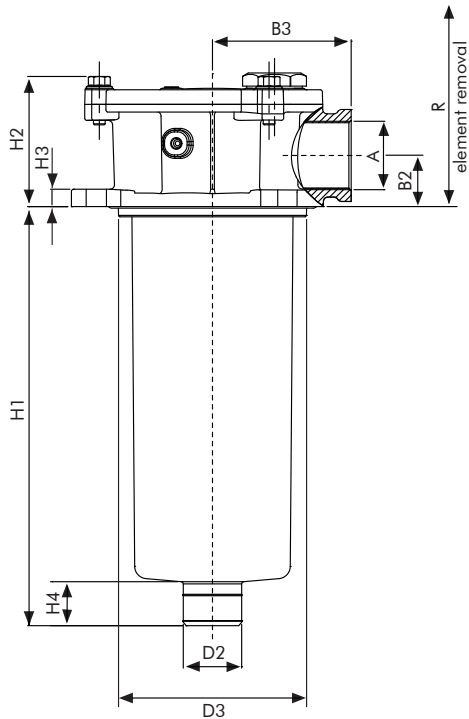
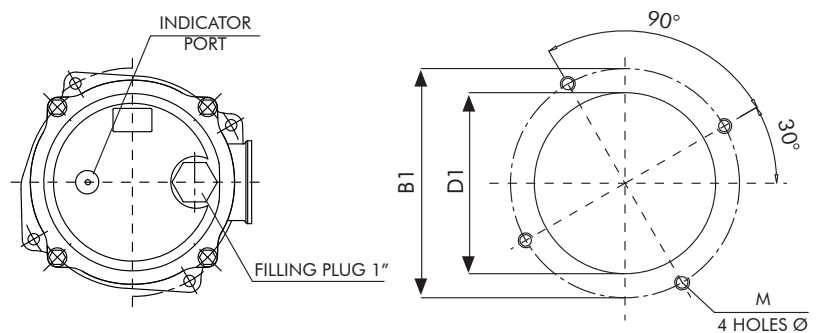
FR - 1 - 10 / 11 / 20 / 22 / 30 / 31 TANK MOUNTING PATTERN



FR - 1 - 40 / 43 TANK MOUNTING PATTERN



FR - 1 - 50 / 51 / 60 / 64 TANK MOUNTING PATTERN



NOMINAL SIZE

MODEL	A	Ø B1	B2	B3	Ø D1	Ø D2	Ø D3	H1	H2	H3	H4	M	R	WEIGHT Kg	
FR1 10	G 3/8"	89	25	51	67,5	24	67	82	60	8	22	M6	150	0,45	
FR1 11	G 3/4" - G 1/2"							155						220	0,60
FR1 20	G 1/2"	115	28,5	67	88,5	87	87	106	73		24	M8	190	0,80	
FR1 22	G 3/4"							151						230	0,90
FR1 30	G 1"							232						310	1,10
FR1 31	G 1 1/4"							336						420	1,30
FR1 40	G 1" - G 1 1/4"	175	35	95	130	129	129	241	90	11	30	M10	320	2,10	
FR1 43	G 1 1/2"							287					360	2,40	
FR1 50	G 1 1/4"	220	42	115	175	174	174	181	105		50	M10	270	3,20	
FR1 51								G 1 1/2"					240	340	3,60
FR1 60								G 2"					289	380	4,20
FR1 64															

## ORDERING INFORMATION

1.	2.	3.	4.	5.	6.	7.	8.	9.
<b>FR1</b>	<b>30</b>	<b>G15</b>	<b>B</b>	<b>B</b>	<b>B6</b>	<b>0</b>	<b>C</b>	<b>000</b>
<b>R1</b>	<b>30</b>	<b>G15</b>	<b>B</b>	SPARE ELEMENT				

1. FILTER SERIES	FR1	
2. FILTER SIZE	10-11	
	20-22-30-31	
	40-43	
	50-51-60-64	
3. FILTER MEDIA	G06	glassfiber $\beta_{7\mu\text{m(c)}} > 1.000$
	G10	glassfiber $\beta_{12\mu\text{m(c)}} > 1.000$
	G15	glassfiber $\beta_{17\mu\text{m(c)}} > 1.000$
	G25	glassfiber $\beta_{22\mu\text{m(c)}} > 1.000$
	G40	glassfiber $\beta_{35\mu\text{m(c)}} > 1.000$
	C10	paper $\beta_{10\mu\text{m(c)}} > 2$
	C25	paper $\beta_{25\mu\text{m(c)}} > 2$
	T60	wire mesh 60 $\mu\text{m}$
	M05	synthetic $\beta_{10\mu\text{m(c)}} > 1.000$
	M10	synthetic $\beta_{15\mu\text{m(c)}} > 1.000$
4. BYPASS VALVE	B	1,7 bar
	C	3 bar (for glassfiber elements only)
5. SEALS	B	NBR
6. CONNECTION PORT	B2	G 3/8" size 10 to 11
	B3	G 1/2" size 10 to 31
	B4	G 3/4" size 10 to 31
	B5	G 1" size 20 to 43
	B6	G 1 1/4" size 20 to 64
	B7	G 1 1/2" size 40 to 64
	B8	G 2" size 50 to 64
	7. FILLING PLUG	0
T		with filling plug
8. INDICATOR PORT	C	1/8" plugged
9. CLOGGING INDICATORS	000	no indicator
	MPB (ex R9)	press. gauge rear connection
	MRB (ex R10)	press. gauge radial connection for "B" bypass
	PDB (ex R13)	pressure switch
	MPC	press. gauge rear connection
	MRC	press. gauge radial connection for "C" bypass
	PDC (ex R14)	pressure switch

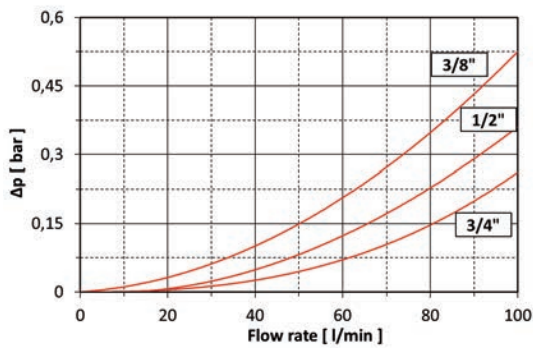
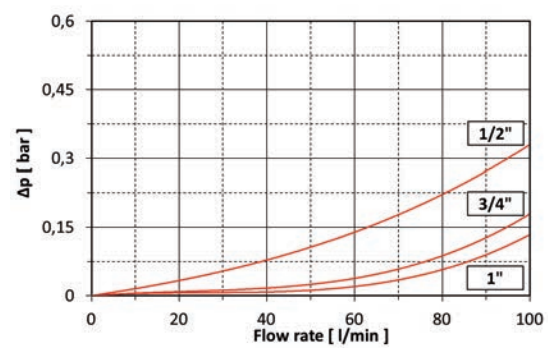
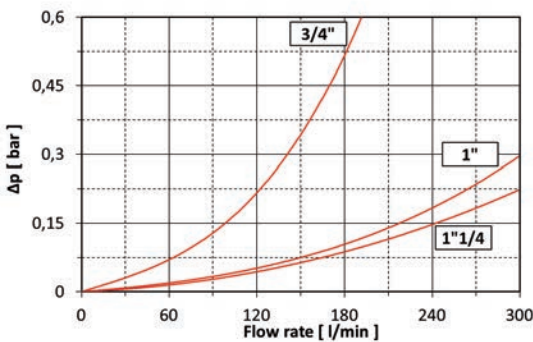
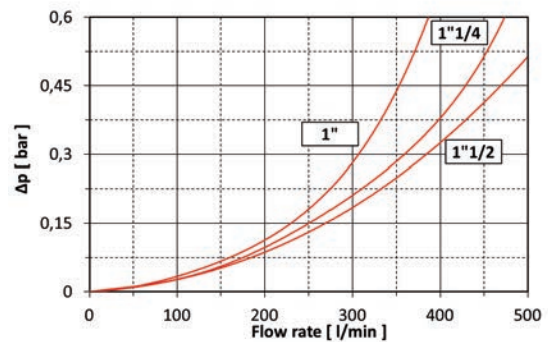
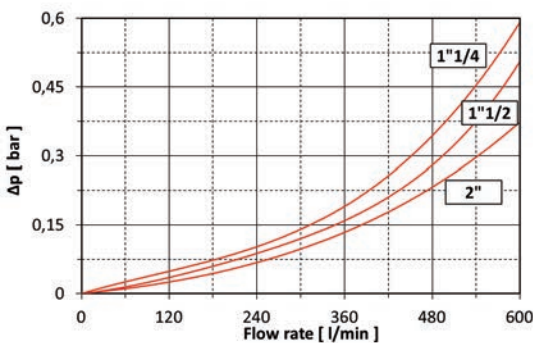
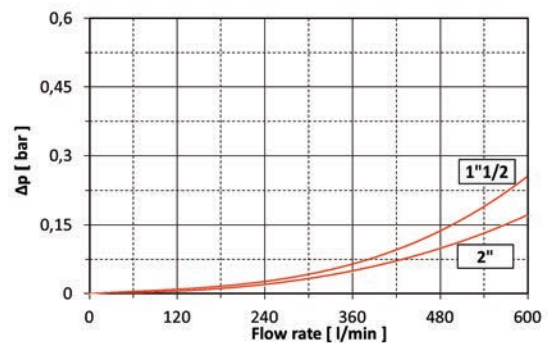
## PRESSURE DROP ( $\Delta p$ ) INFORMATION FOR FILTER SIZING

The total Delta P through a filter assembly is given from Housing  $\Delta p$  + Element  $\Delta p$ .  
 The max recommended total  $\Delta p$  for return filters is 0,4 – 0,6 bar with clean element.

N.B. All the reported data have been obtained at our laboratory, according to specification ISO3968 with mineral oil having 32 cSt viscosity at 40°C and density 0,875 kg/dm<sup>3</sup>.

### HOUSING PRESSURE DROP

The housing  $\Delta p$  is given by the curve of the considered model and port, in correspondence of the flow rate value.

**FR110-11**

**FR120-22**

**FR130-31**

**FR140-43**

**FR150-51**

**FR160-64**


## ELEMENT PRESSURE DROP

The element  $\Delta p$  (bar) is given by the flow rate (l/min) multiplied by the factor in the table here below corresponding to the selected media and divided by 1000.

If the oil has a viscosity  $V_1$  different than 32 cSt a corrective factor  $V_1/32$  must be applied.

Example: 80 l/min with R130G10B and oil viscosity 46 cSt  $> 80 \times 3,19/1000 \times 46/32 = 0,36$  bar

	G06	G10	G15	G25	G40	C10	C25	T60	M05	M10	M15
<b>R110</b>	33,84	15,68	12,50	8,81	4,54	4,83	4,13	2,56	10,46	8,94	5,58
<b>R111</b>	12,28	7,32	4,48	4,28	2,27	2,74	2,06	0,81	4,79	4,09	2,00
<b>R120</b>	13,85	8,65	6,44	6,32	2,77	4,09	2,52	0,86	5,65	4,83	3,19
<b>R122</b>	7,80	5,27	3,92	3,60	1,55	2,70	1,41	0,76	3,83	3,27	1,79
<b>R130</b>	5,09	3,19	2,25	2,06	0,90	1,64	0,82	0,49	2,31	1,98	1,02
<b>R131</b>	3,34	1,94	1,37	1,26	0,46	1,06	0,42	0,24	1,41	1,20	0,63
<b>R140</b>	2,43	1,31	1,25	1,10	0,43	0,85	0,39	0,22	0,95	0,82	0,62
<b>R143</b>	2,25	1,21	1,15	1,00	0,39	0,83	0,35	0,20	0,88	0,75	0,57
<b>R150</b>	2,16	1,12	1,08	0,96	0,37	0,82	0,34	0,19	0,81	0,69	0,54
<b>R151</b>	1,80	0,88	0,77	0,71	0,29	0,64	0,26	0,15	0,64	0,55	0,38
<b>R160</b>	1,49	0,74	0,71	0,51	0,25	0,45	0,23	0,10	0,54	0,46	0,35
<b>R164</b>	1,32	0,52	0,45	0,42	0,13	0,36	0,12	0,10	0,38	0,32	0,21

## EXAMPLE OF TOTAL $\Delta p$ CALCULATION

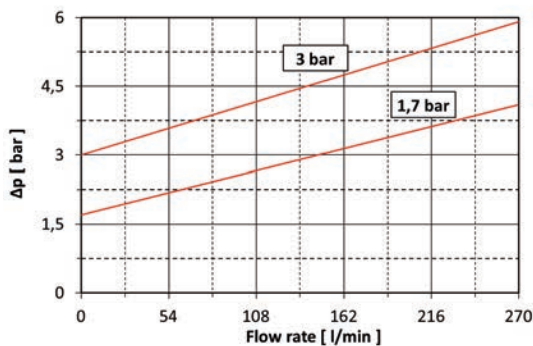
FR130G10BBB60C000 with **80 l/min** and oil **46 cSt**:

Housing  $\Delta p$  0,01 bar + element  $\Delta p$  0,36 bar ( $80 \times 3,19/1000 \times 46/32$ ) = total assembly  $\Delta p$  0,37 bar

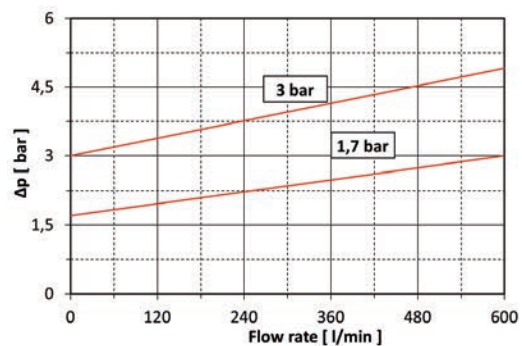
## BYPASS VALVE PRESSURE DROP

The bypass valve  $\Delta p$  is given by the curve of the considered model and setting, in correspondence of the flow rate value.

FR110-31



FR140-64



## USER TIPS



- 1 FILTER HEAD
- 2 FILTER BOWL
- 3 FILTER ELEMENT
- 4 SPRING
- 5 INDICATOR PORT
- 6 FILLING PLUG

### SPARE SEALS KIT

	NBR	FKM
FR-1-10/11	06.021.00170	06.021.00174
FR-1-20/22/30/31	06.021.00171	06.021.00175
FR-1-40/43	06.021.00172	06.021.00176
FR-1-50/51/60/64	06.021.00173	06.021.00177

### FIXING BOLTS TIGHTENING TORQUE

M6	10 Nm
M8	25 Nm
M10	50 Nm

### INDICATOR TIGHTENING TORQUE

10 Nm

### SPARE SPRING

When a spare spring (4) is needed please ask for, specifying model and production batch (data given in the identification label on the top cover)

## WARNING

- ⚠ Make sure that Personal Protective Equipment (PPE) is worn during installation and maintenance operation.

## DISPOSAL OF FILTER ELEMENT

- ⚠ The used filter elements and the filter parts dirty of oil are classified as "Dangerous waste material": they must be disposed according to the local laws by authorized Companies.

## INSTALLATION

1. the filter head (1) must be properly positioned and well secured on the tank lid through the fixing holes
2. the hose must be properly connected to the IN port
- ⚠ 3. the OUT port must be clear (an extension tube could be fitted, if needed for having the outlet below the oil level)
4. verify that no tension is present on the filter after mounting
5. enough space must be available for filter element replacement
6. the visual clogging indicator must be in a easily viewable position
7. when a electrical indicator is used, make sure that it is properly wired
8. keep in stock a spare FILTREC filter element for timely replacement when required

## OPERATION

- ⚠ 1. the filter must work within the operating conditions of pressure, temperature and compatibility given in the first page of this data sheet
2. the filter element must be replaced as soon as the clogging indicator signals at working temperature
3. If no clogging indicator is mounted, replace the element according to the system manufacturer's recommendations

## MAINTENANCE

- ⚠ 1. before removing the top cover from the head, ensure that the system is switched off and there is no residual pressure in the filter
2. unscrew the fixing bolts of the top cover and remove it
3. remove the spring (4) first, then the dirty element (3) and the bowl (2)
4. clean the bowl (2) and fit a new FILTREC element (3), verifying the part number, particularly concerning the micron rating
5. when fitting the new element (3), open its plastic protection on the open end side and insert it onto the spigot in the filter bowl, then remove completely the plastic protection
6. check the top cover O-ring conditions and replace if necessary
7. put the spring (4) in its position on the filter element (3)
8. mount the top cover onto the head and fix it screwing the fixing bolts
- ⚠ 9. the used filter elements cannot be cleaned and re-used



