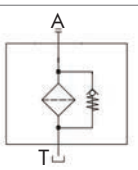
FR1 SERIES
Tank top return filters

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

TECHNICAL INFORMATION

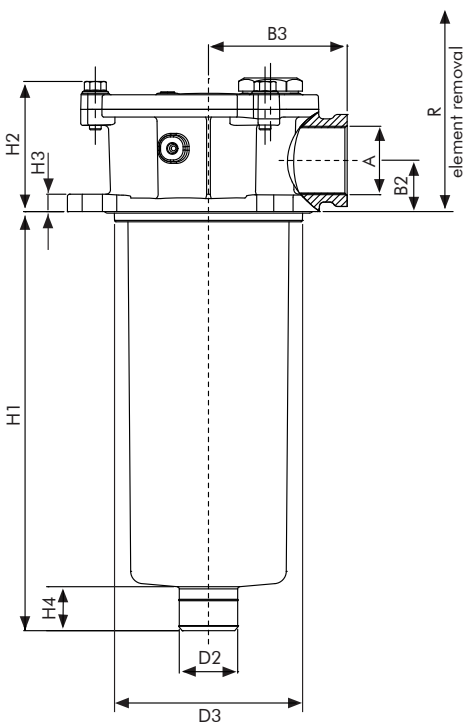
HOUSING	tested according to NFPA T3.10.5.1* , ISO3968
HYDRAULIC SYMBOL:	
PRESSURE:	Max working 8 bar Burst 16 bar
CONNECTION PORTS:	G 3/8" ÷ G 2"
MATERIALS:	Cover: aluminium alloy Head: aluminium alloy Bowl: PA6 reinforced (size 10 to 43) - zinc plated steel (size 50 to 64) Seal: NBR (FKM on request)
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 Cellulose C10-C25 Wire mesh T60
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 Filtrec Customer Service (info@filtrec.it).

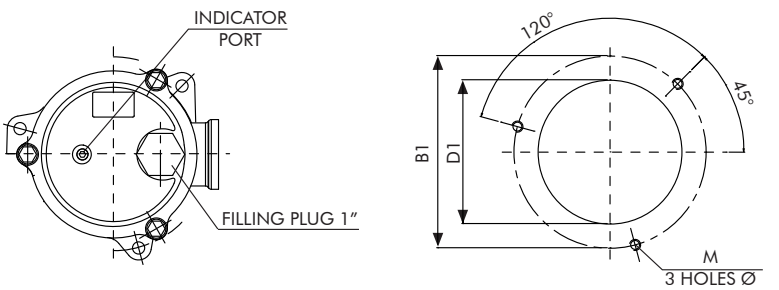
* as reference method only for verifying the pressure fatigue resistance and establishing the burst pressure ratings.

OVERALL DIMENSIONS

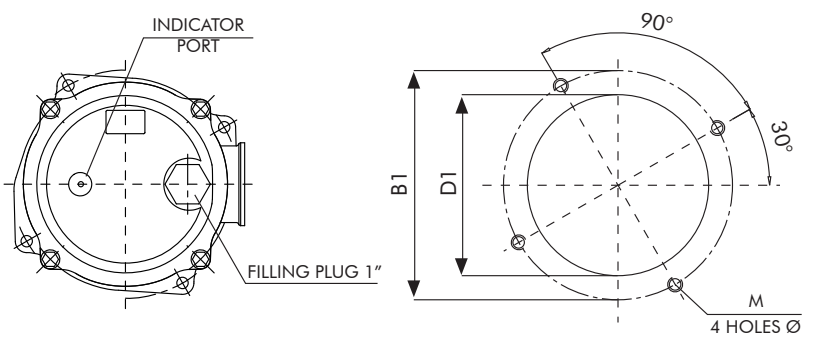


FR - 1 - 10 / 11 / 20 / 22 / 30 / 31 — TANK MOUNTING PATTERN

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	G3/8"	89	25	51	67,5	24	67	82	60	8	22	M6	150	0,45
FR1 11	G1/2"							155					220	0,60
FR1 20	G1/2"	115	28,5	67	88,5	28	87	106	73	11	24	M8	190	0,80
FR1 22	G3/4"							151					230	0,90
FR1 30	G1"		32			40		232			24		310	1,10
FR1 31	G1 1/4"							336					420	1,30
FR1 40	G1 1/4"	175	35	95	130		129	241	90		30	M10	320	2,10
FR1 43	G1 1/2"							287					360	2,40
FR1 50	G1 1/4"	220	42	115	175	50	174	181	105		50		270	3,20
FR1 51	G1 1/2"							240					340	3,60
FR1 60	G2"					63								3,60
FR1 64								289					380	4,20

ORDERING INFORMATION

1.	2.	3.	4.	5.	6.	7.	8.	9.
FR1	**30**	**G15**	**B**	**B**	**B6**	**0**	**C**	**000**
R1	**30**	**G15**	**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 $ß_{7\mu m(c)} > 1.000$	
G10	glassfiber $ß_{12\mu m(c)} > 1.000$	
G15	glassfiber $ß_{18\mu m(c)} > 1.000$	
G25	glassfiber $ß_{22\mu m(c)} > 1.000$	
C10	paper $ß_{10\mu m(c)} > 2$	
C25	paper $ß_{25\mu m(c)} > 2$	
T60	wire mesh 60 μm	

4. BYPASS VALVE

B	1,7 bar (for paper and wire mesh elements)	
C	3 bar (for glassfiber elements)	

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 20 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	no filling plug
T	with filling plug

8. INDICATOR PORT

C	1/8" plugged

9. CLOGGING INDICATORS

000	no indicator	
MPB (ex R9)	press. gauge rear connection	for "B" bypass
MRB (ex R10)	press. gauge radial connection	
PDB (ex R13)	pressure switch	
MPC	press. gauge rear connection	for "C" bypass
MRC	press. gauge radial connection	
PDC (ex R14)	pressure switch	

PRESSURE DROP (Δp) INFORMATION FOR FILTER SIZING

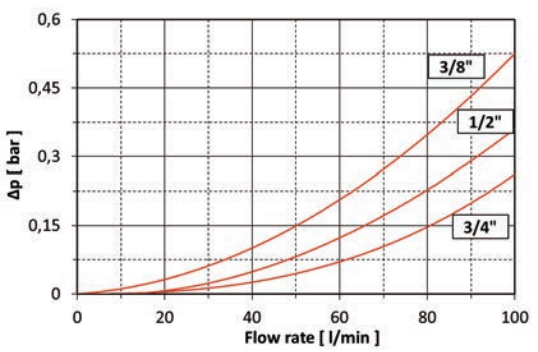
The total Delta P through a filter assembly is given from Housing Δp + Element Δp.
The max recommended total Δp for return filters is 0,4 – 0,6 bar with clean element.

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^3.

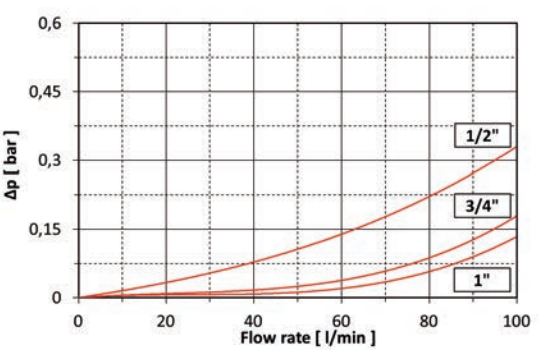
HOUSING PRESSURE DROP

The housing Δp is given by the curve of the considered model and port, in correspondence of the flow rate value.

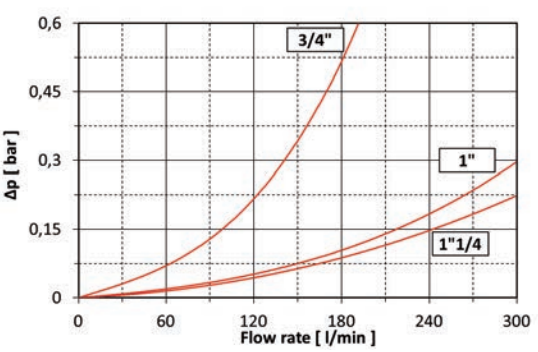
FR110-11



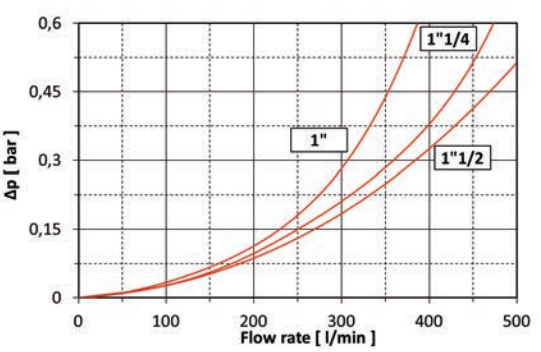
FR120-22



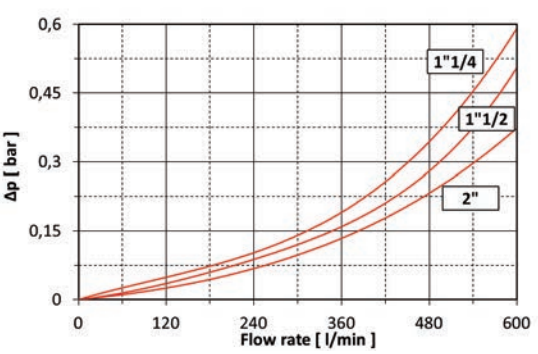
FR130-31



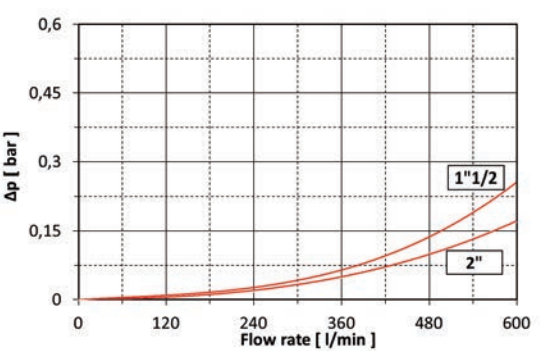
FR140-43



FR150-51



FR160-64



ELEMENT PRESSURE DROP

The element Δp (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 x 3,54/1000 x 46/32 = 0,41 bar

	G06	G10	G15	G25	C10	C25	T60
R110	37,60	16,00	12,50	8,81	4,83	4,13	2,56
R111	28,90	8,15	7,14	3,10	2,80	2,40	0,90
R120	15,39	10,77	7,02	7,15	5,52	2,52	2,15
R122	8,67	5,86	4,00	3,92	2,70	1,41	0,76
R130	5,66	3,54	2,29	2,25	1,64	0,82	0,49
R131	3,71	2,15	1,40	1,37	0,85	0,39	0,20
R140	2,70	1,46	1,39	1,10	1,06	0,25	0,24
R143	2,50	1,34	1,28	1,00	0,94	0,22	0,20
R150	2,40	1,24	1,20	0,96	0,88	0,80	0,20
R151	2,00	0,98	0,85	0,71	0,64	0,42	0,15
R160	1,66	0,82	0,79	0,51	0,45	0,12	0,10
R164	1,47	0,58	0,47	0,45	0,36	0,33	0,10

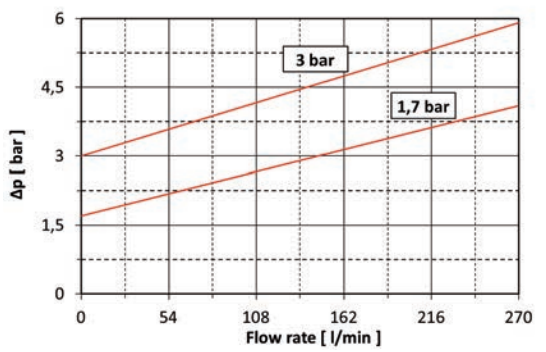
EXAMPLE OF TOTAL Δp CALCULATION

FR12**R130**G10BB**B6**001B000 with **80** l/min and oil **46** cSt:
Housing Δp 0,01 bar + element Δp 0,41 bar (80 x 3,54/1000 x 46/32) = total assembly Δp 0,42 bar

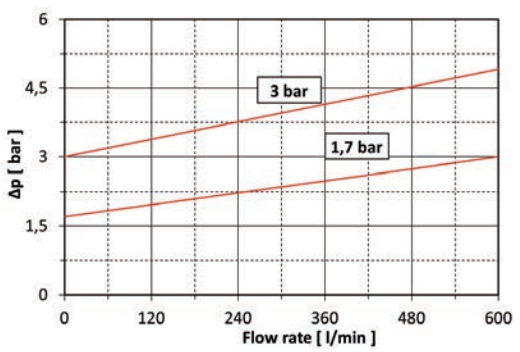
BYPASS VALVE PRESSURE DROP

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

FR110 to 31



FR140 to 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

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Technical information may change without notice

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