

High Pressure Full Flow Bi-Directional Filter



450 bar, 6225 psi Operating Pressure
300 lpm, 79 gpm Max Flow Rate
Bi-Directional Full Flow Filtration

APPLICATIONS

PFB high pressure filter assemblies are designed for applications where flow direction changes and fluid must be filtered full flow in both directions.

- Large cylinders remotely located from valve manifold. Protect both components and clean fluid that typically does not return to the reservoir.
- Steel mills, Board plants, Scrap yards, concrete mixers.
- Any line where flow can reverse direction.
- Hydrostatic loop circuit applications.

PRODUCT FEATURES

DFE rated elements (Dynamic Filter Efficiency)	G8 Dualglass media filter elements are DFE rated to assure performance even when exposed to the toughest hydraulic systems (See DFE literature for details)
Circumferential o-ring bowl seal	Circumferential seal on the bowl eliminates leaking and weeping.
Low housing pressure drop	Unique internal flow paths provide low resistance to flow. (Low pressure drop)
Coreless elements	PFH419 housings (with bypass valve) can be ordered with Hy-Pro coreless filter element for easy disposal (crush or incinerate).
Differential indicator	Available with visual, electrical, or electrical with LED (visual signal) differential indicators.

PRODUCT SPECIFICATIONS

Materials	
Head	Cast steel
Bowl	Extruded steel
Seals	Buna or Viton
Media options	G8 Dualglass, Stainless mesh
Interior coating	Phosphate coating
Exterior coating	Power paint coated
ISO standards	
ISO 2941	Collapse and burst resistance
ISO 2942	Fabrication and integrity test
ISO 2943	Material compatibility with fluids
ISO 3724	Flow fatigue test
ISO 3968	Pressure drop vs flow rate
ISO 16889	Multi-pass filter performance
DIN 24550	Nominal pressure rating
Temperature rating	Buna -40f(-40c) to 225f(107c) Viton -15f(-26c) to 275f(135c)
Fluid compatibility	Biodegradable and mineral based fluids. For high water based or specified synthetics consult factory



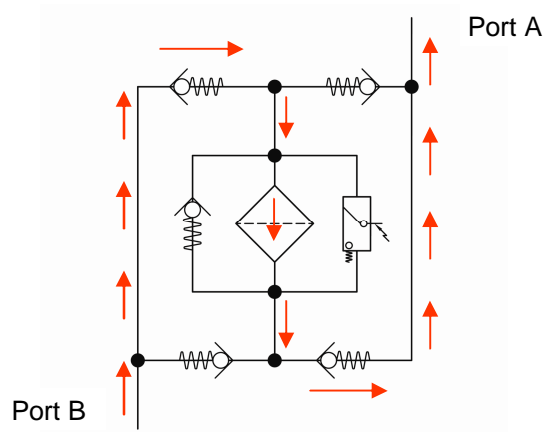
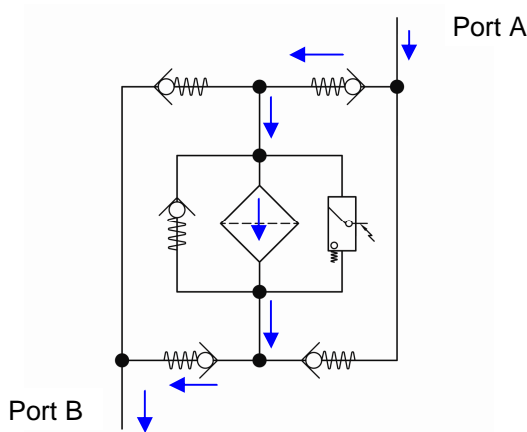
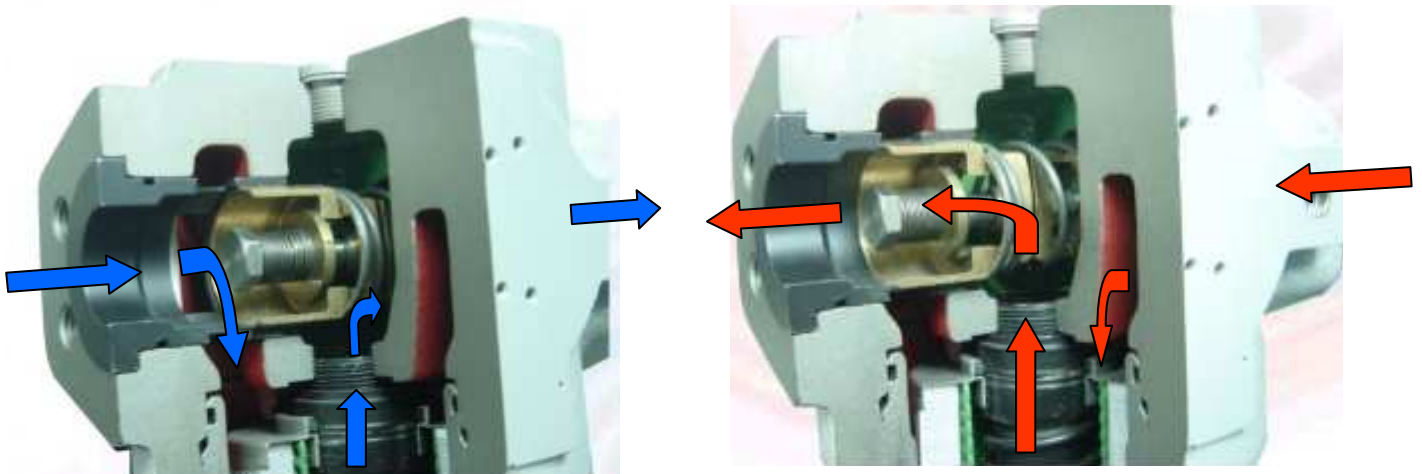
FILTRATION

FILTER ASSEMBLY SIZING & OPERATING PRESSURE GUIDELINES

PFHB Series

Media code	Bowl code Length	Max flow rate* gpm (lpm)	Port size	Assembly Δp factor* psid / gpm	Max operating Pressure, fatigue rating
3M	~8"	37 (138.7)	SAE-20 1 1/4" Flange Code 62	0.52	psi (bar) 6090 psi, 420 bar 10 ⁷ pressure cycles 8700 psi, 615 bar 10 ⁴ pressure cycles
6M		42 (157.5)		0.383	
10M		50 (187.5)		0.28	
25M		58 (217.5)		0.185	
**W (mesh)		72 (270)		0.119	
3M	~13"	60 (225)	SAE-24 1 1/2" Flange Code 62	0.42	psi (bar) 6090 psi, 420 bar 10 ⁷ pressure cycles 8700 psi, 615 bar 10 ⁴ pressure cycles
6M		66 (247.5)		0.308	
10M		74 (277.5)		0.175	
25M		90 (337.5)		0.146	
**W (mesh)		118 (442.5)		0.105	

*Max flow rate and Δp factor assumes $\nu = 150$ sus, 32 Centistokes. See Δp viscosity conversion formula for viscosity



PFHB FILTER ASSEMBLY SIZING & OPERATING PRESSURE GUIDELINES

Effective filter sizing requires consideration of flow rate, viscosity (operating and cold start), fluid type and degree of filtration. When properly sized bypass during cold start can be avoided/minimized and optimum element efficiency and life achieved. The filter assembly differential pressure values provided for sizing differ for each media code, and assume 150 SSU (32cSt) viscosity and 0.86 fluid specific gravity. Use the following steps to identify the correct high pressure filter assembly.

1. Calculate Δp coefficient at both operating and cold start viscosity:

$$\Delta p \text{ Coefficient} = \frac{\text{Actual Operating Viscosity (SSU)}}{150} \times \frac{\text{Actual S.G.}}{0.86}$$

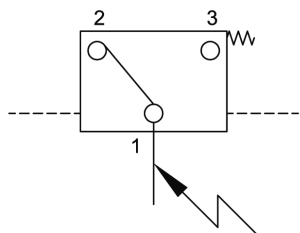
2. Calculate actual clean filter assembly Δp at both operating and cold start viscosity:

$$\text{Actual assembly clean } \Delta p = \text{Flow rate} \times \Delta p \text{ Coefficient} \times \text{Assembly } \Delta p \text{ factor (from sizing table)}$$

3. Sizing Recommendations to optimize performance and permit future flexibility:

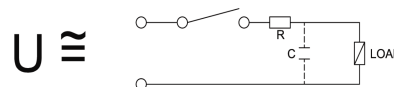
- To avoid or minimize bypass during cold start the actual assembly clean Δp calculation should be repeated for start-up conditions if cold starts are frequent.
- Actual assembly clean Δp should not exceed 15 psid at normal operating viscosity.
- If suitable assembly size is approaching the upper limit of the recommended flow rate at the desired degree of filtration consider increasing the assembly to the next larger size if a finer degree of filtration might be preferred in the future. This practice allows the future flexibility to enhance fluid cleanliness without compromising clean Δp or filter element life.
- Once a suitable filter assembly size is determined consider increasing the assembly to the next larger size to optimize filter element life and avoid bypass during cold start.
- When using water glycol or other specified synthetics we recommend increasing the filter assembly by 1-2 sizes.
- High viscosity fluid (ie gear lube ISO 220) will typically display very high viscosity as the temperature drops below 100f. For such applications avoiding bypass during start-up might not be possible.

ELECTRICAL + LED, ELECTRICAL DIFFERENTIAL PRESSURE INDICATOR INFORMATION

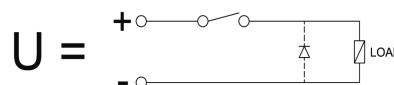


- Indication pressure - 73 psid (5.18 bar)
- Switching voltage - max 120 V AC / 175 V DC
- Switching current - max 0,17 A AC / 0,25 A DC
- Switching power - max 3,5 VA AC / 5 W DC
- Contact type - Change-over
- Electrical protection - IP 65

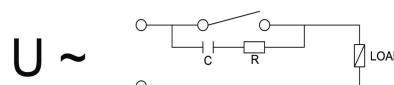
- Current limiter for DC and AC voltage. If loads are connected over long distances a protective resistor should be connected in series in order to limit the current.



- Spark suppression in DC applications. The contacts of reed switches open very fast which causes voltage peaks to be induced when switching off inductive loads (relays, lifting magnets, solenoids). The self-induction currents are short-circuited by connecting a diode in parallel to the inductive load



- Spark suppression in AC applications. In AC applications a diode connected in parallel to the load is not sufficient. RC elements should be connected in parallel to the reed switch.



HIGH PERFORMANCE FILTER ELEMENTS — THE HEART OF A FILTER

Dynamic Filter Efficiency (DFE) Testing

Revolutionary test methods assure that DFE rated elements perform true to rating even under demanding variable flow and vibration conditions. Today’s industrial and mobile hydraulic circuits require elements that deliver specified cleanliness under ALL circumstances. Wire mesh supports the media to ensure against cyclical flow fatigue, temperature, and chemical resistance failures possible in filter elements with synthetic support mesh. Contact your distributor or Hy-Pro for more information and published articles on DFE testing.

Media Options

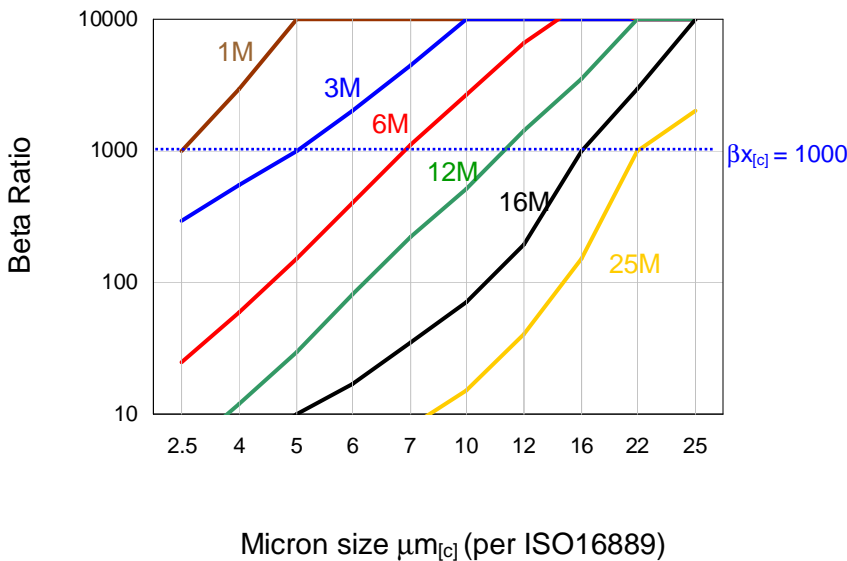
Through extensive testing we have developed media choices to handle any application. Options include G8 Dualglass, Dynafuzz (stainless fiber), and Wire mesh (stainless).

Fluid Compatibility

Petroleum based fluids, water glycol, polyol ester, phosphate ester, high water based fluids and many other synthetics. Contact us for seal material selection assistance.

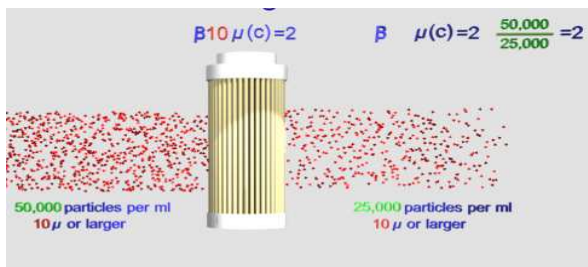
FILTER MEDIA SPECIFICATIONS

Glass Media Code Filtration Efficiency (Beta Ratio) vs Micron

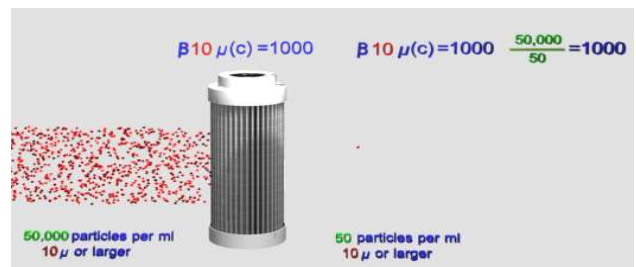


media code	media description
A	G8 Dualglass high performance media combined with water removal scrim. $\beta_{x[c]} = 1000$ ($\beta_x = 200$)
M	G8 Dualglass our latest generation of DFE rated, high performance glass media for all hydraulic & lubrication fluids. $\beta_{x[c]} = 1000$ ($\beta_x = 200$)
W	Stainless steel wire mesh media $\beta_{x[c]} = 2$ ($\beta_x = 2$) nominally rated

Typical cellulose media performance



Hy-Pro G8 Dualglass media performance



PFHB FILTER ASSEMBLY PART NUMBER GUIDE

PFHB

table 1

table 2

table 3

table 4

table 5

table 6

table 7

table 8

Option
D

table 8

Option
N

PFHB FILTER ELEMENT PART NUMBER GUIDE

HP419

table 1

L

table 2

-

table 4

table 5

Bold denotes standard product option. Non-standard options are subject to longer than standard lead time

Table 1 Code	Element Collapse
N	450 psid
H	3000 psid
C*	250 psid

*coreless element

Table 2 Code	Element Length
8	~9.180"
13	~13.110"

Table 3 Code	Port Option
F1	SAE-20 Flange (Code 62)
F2	SAE-24 Flange (Code 62)

Table 4 Code	Media Selection
1M	$\beta_{2.5[c]} = 1000, \beta_1 = 200$
3M	$\beta_{5[c]} = 1000, \beta_3 = 200$
6M	$\beta_{7[c]} = 1000, \beta_6 = 200$
10M	$\beta_{12[c]} = 1000, \beta_{12} = 200$
25M	$\beta_{22[c]} = 1000, \beta_{25} = 200$
25W	25u nominal mesh media
40W	40u nominal mesh media
74W	74u nominal mesh media
149W	149u nominal mesh media

Table 5 Code	Seal
B	Buna -40f(-40t) to 225f(107t)
V	Viton -15f(-26t) to 275f(135t)

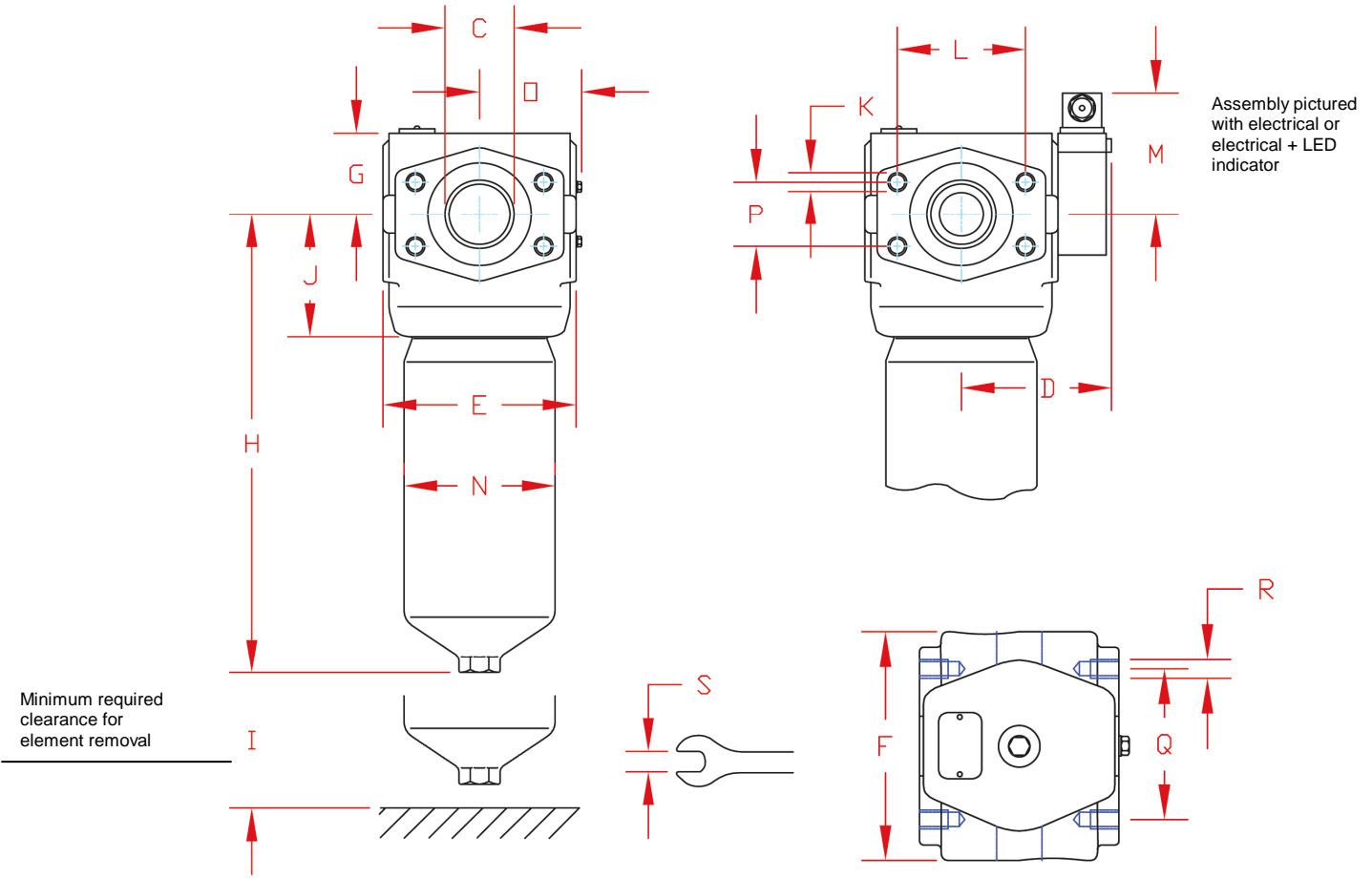
Table 6 Code	Bypass Valve
7	102 psid bypass
X*	No bypass

*No bypass "X" option only recommended with "H" element collapse rating (table 2)

Table 7 Code	Δp Indicator
V	Visual, mechanical
E	Electrical
L	Electrical + LED visual
Z	Indicator port plugged

Table 8 Code	Special Options (Not Required)
D	Bowl drain w/plug
N	Nickel coated for high straight water applications (call factory)

PFHB INSTALLATION DRAWING AND SPARE PARTS LIST



	PFHB*8 IN (mm)	PFHB*13 IN (mm)
A/B	SAE-20, SAE-24 code 62 flange	SAE-20, SAE-24 code 62 flange
C	1.24 (31,49)	1.24 (31,49)
D	4.02 (102,10)	4.02 (102,10)
E	5.44 (138,17)	5.44 (138,17)
F	6.15 (156,21)	6.15 (156,21)
G	2.29 (58,16)	2.29 (58,16)
H	12.92 (328,17)	16.86 (428,24)
I	3.15 (80,01)	3.15 (80,01)
J	3.45 (87,63)	3.45 (87,63)
K	F1: M14 x 22mm depth F2: M16 x 24mm depth	F1: M14 x 22mm depth F2: M16 x 24mm depth
L	F1 port: 2.63 (66,80) F2 port: 3.12 (79,25)	F1 port: 2.63 (66,80) F2 port: 3.12 (79,25)
M	Optical 2.96 (75,18) Electrical 3.43 (87,12)	Optical 2.96 (75,18) Electrical 3.43 (87,12)
N	4.26 (108,2)	4.26 (108,2)
O	2.88 (73,15)	2.88 (73,15)
P	F1 port: 1.25 (31,75) F2 port: 1.44 (36,57)	F1 port: 1.25 (31,75) F2 port: 1.44 (36,57)
Q	3.94 (100,07)	3.94 (100,07)
R	M12 x 0.71(18,0) depth	M12 x 0.71(18,0) depth
S	1.26 (32,00)	1.26 (32,00)

	PFHB*8 lbs (kg)	PFHB*13 lbs (kg)
Weight	45 (19,98)	50 (22,70)

1	Element	See element p/n guide
2	Bowl Seal kit Nitrile NBR Fluorocarbon	PFHB419SKB PFHB419SKV
3	Bowl ~8" Length ~8" Length w/drain port ~13" Length ~13" Length w/drain port	PFB4192 PFB4192D PFB4193 PFB4193D
4	Indicator Visual indicator, Buna seal Visual, Viton seal Electrical, Buna seal Electrical, Viton seal Electrical + LED, Nitrile seal Electrical + LED, Fluoro seal	PFH840IVB PFH840IVV PFH840IEB PFH840IEV PFH840ILB PFH840ILV