PF4

High Pressure Base Mounted Filter Assemblies

Hy-Pro PF4 pressure filters are designed for protecting sensitive components in hydraulic circuits. Install the series upstream of specific components or directly after the pressure pump to minimize risk of failure and costly system downtime.

Ideal for components that are sensitive to particulate contamination, such as the servo valve, and require clean pressurized fluid for reliable operation.

HY-PRO

hyprofiltration.com/PF4

Filtration starts with the filter.

G8 Dualglass elements are DFE rated to assure performance even when exposed to the toughest hydraulic systems and provide unmatched particulate capture and retention to protect servo valves and ensure you're operating at maximum efficiency.

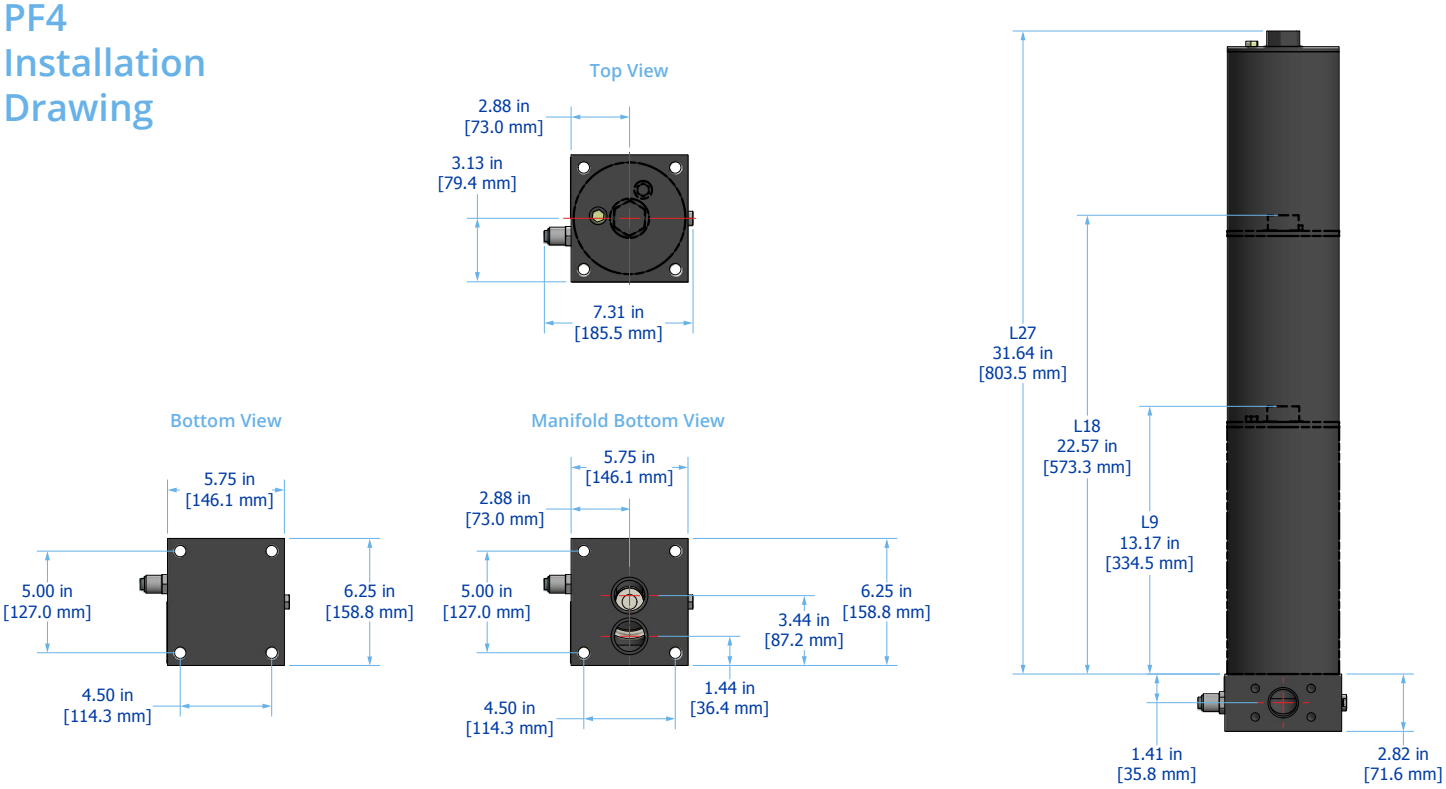
Minimize the mess.

The top loading housing on PF4 filter assemblies provide easy and clean access when servicing or changing the element. Accessing the element is as simple as removing the housing cover, meaning you have no heavy bowl to lift and can get back in operation quicker than ever.

HF4 Compatible Design.

The PF4 series is engineered to meet mill and plant target cleanliness codes and required ISO4406:1999 cleanliness standards to meet hydraulic component manufacturers warranties. Available with HF4 compatible port to port dimension, mounting pattern, and element design to meet the automotive manufacturing standard.

PF4 Installation Drawing



HY-PRO

hyprofiltration.com/PF4

Filter Assembly Sizing

Filter Assembly Sizing 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 32 cSt (150 SUS) viscosity and 0.86 fluid specific gravity. Use the following steps to calculate clean element assembly pressure drop.

Calculate ΔP coefficient for actual viscosity

Using Saybolt Universal Seconds (SUS)

$$\text{ΔP Coefficient} = \frac{\text{Actual Operating Viscosity}^{1}\text{ (SUS)}}{150} \times \frac{\text{Actual Specific Gravity}}{0.86}$$

Using Centistokes (cSt)

$$\text{ΔP Coefficient} = \frac{\text{Actual Operating Viscosity}^{1}\text{ (cSt)}}{32} \times \frac{\text{Actual Specific Gravity}}{0.86}$$

Calculate actual clean filter assembly ΔP at both operating and cold start viscosity

$$\text{Actual Assembly Clean ΔP} = \text{Flow Rate} \times \text{ΔP Coefficient (from calculation above)} \times \text{Assembly ΔP Factor (from sizing table)}$$

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 10% of bypass ΔP gauge/indicator set point 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.

PF4 Specifications

Dimensions
See Installation Drawings on page 197 for model specific dimensions.

Operating Temperature

Fluid Temperature	Ambient Temperature
30°F to 225°F (0°C to 105°C)	-4°F to 140°F (-20C to 60C)

Operating Pressure
5,000 psi (310 bar) max

Flow Fatigue Rating
3,500 psi (238 bar)

Burst Pressure
13,500 psi (931 bar)

ΔP Indicator Trigger
35 psid (2.4 bard) bypass or 100 psid (6.9 bard) non-bypass
All indicators revert to original state when ΔP is removed (auto-reset).

Element Collapse Rating

HPK	HPK3	HPK5	HPKC
290 psid (20.0 bard)	3000 psid (206.8 bard)	5000 psid (344.7 bard)	150 psid (10.3 bard)

Integral Bypass Setting
50 psid (3.4 bard)

Materials of Construction

Head/Lid	Bowl	Element Bypass Valve
Ductile iron	Seamless steel tubing	Nylon

Media Description

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

Replacement Elements
To determine replacement elements, use corresponding codes from your assembly part number:

Filter Element Part Number	Example
HP[Collapse Rating Code]L[Length Code] – [Media Selection Code] [Seal Code]	HPKL18–16MV

Fluid Compatibility
Petroleum and mineral based fluids (standard). For polyol ester, phosphate ester, and other specified synthetic fluids use fluorocarbon seal option or contact factory.

Filter Sizing[1]
Filter assembly clean element ΔP after actual viscosity correction should not exceed 10% of filter assembly bypass setting. See previous page for filter assembly sizing guidelines & examples. For applications with extreme cold start condition contact Hy-Pro for sizing recommendations.

ΔP Factors[1]

Collapse	Length	Units	Media 1M	3M	6M	12M	16M	25M	**W
PF4K**, PF4K1**, PF4KC**	L9	psid/gpm	0.2374	0.2003	0.1553	0.1392	0.1362	0.1312	0.0236
		bard/lpm	0.0043	0.0036	0.0028	0.0025	0.0025	0.0024	0.0004
	L18	psid/gpm	0.1167	0.0985	0.0764	0.0685	0.0670	0.0645	0.0116
		bard/lpm	0.0021	0.0018	0.0014	0.0012	0.0012	0.0012	0.0002
	L27	psid/gpm	0.0775	0.0654	0.0507	0.0454	0.0444	0.0428	0.0077
		bard/lpm	0.0014	0.0012	0.0009	0.0008	0.0008	0.0008	0.0001
PF4K3** (non-bypass housing)	L9	psid/gpm	0.3376	0.2849	0.2208	0.1980	0.1937	0.1866	0.0336
		bard/lpm	0.0061	0.0052	0.0040	0.0036	0.0035	0.0034	0.0006
	L18	psid/gpm	0.1651	0.1393	0.1080	0.0968	0.0947	0.0912	0.0164
		bard/lpm	0.0030	0.0025	0.0020	0.0018	0.0017	0.0017	0.0003
	L27	psid/gpm	0.1094	0.0924	0.0716	0.0642	0.0628	0.0605	0.0109
		bard/lpm	0.0020	0.0017	0.0013	0.0012	0.0011	0.0011	0.0002

[1]Max flow rates and ΔP factors assume υ = 150 SUS, 32 cSt. See filter assembly sizing guideline for viscosity conversion formula.