

# 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.

**Max Operating Pressure: 6,000 psi (414 bar)**



[hyprofiltration.com/](http://hyprofiltration.com/)



## 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.



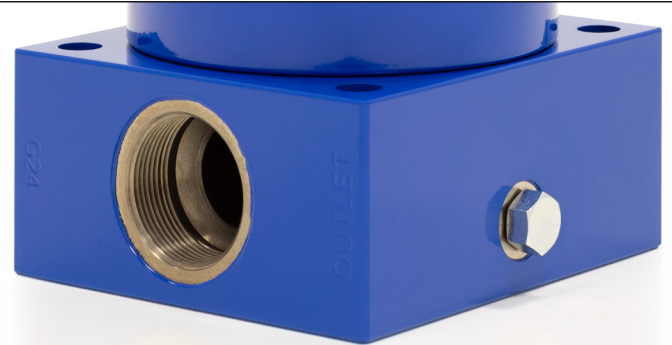
## Minimize the mess.

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.



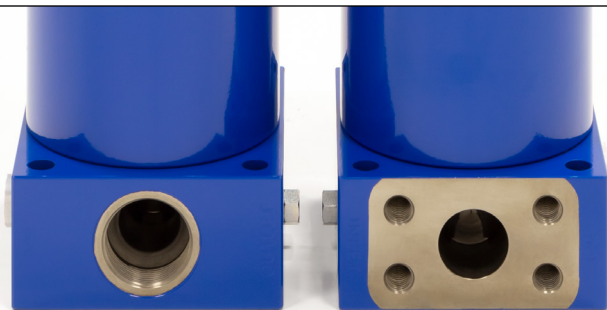
## HF4 Compatible Design.

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.



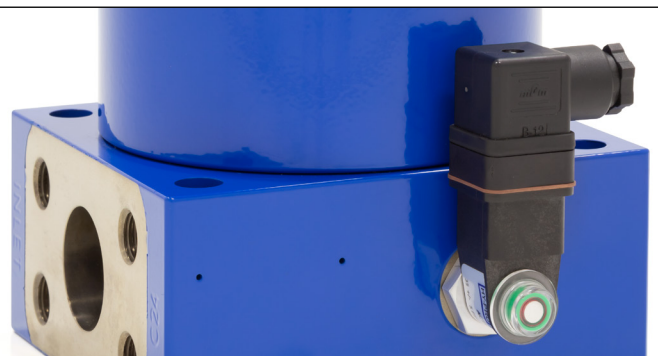
## Works with your system.

Available with several port and length configurations, you'll be amazed at how easily the PF4 integrates directly into your system.



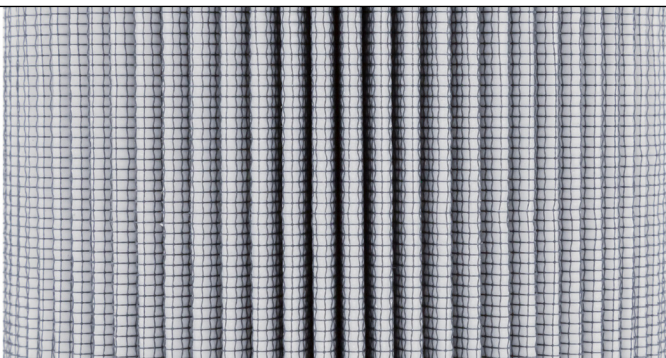
## Tailored to your needs.

PF4 assemblies come with an array of standard indicator options to allow you to customize your assemblies for your exact applications. From thermal lockouts to surge protection, your system will be prepared for whatever comes its way.

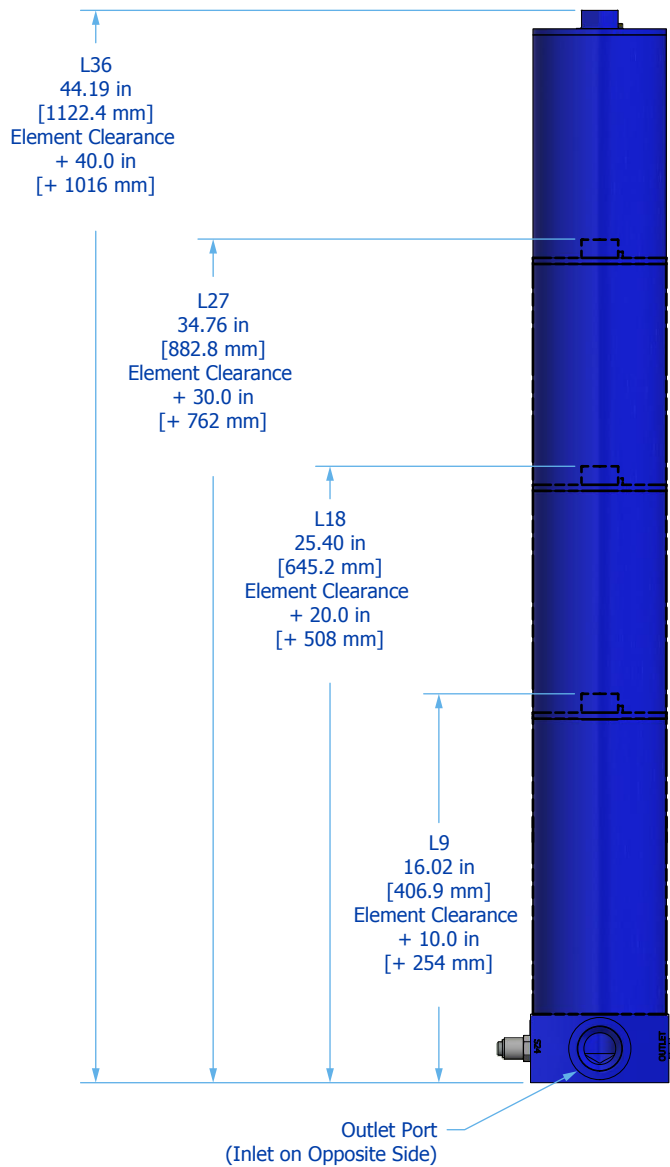


## Extend the life of your element.

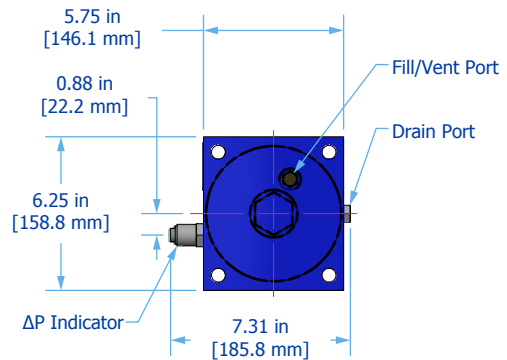
Hy-Pro's advanced filter media delivers lower operating ISO Codes to eliminate internally generated contamination. With the widest range of media options and the large surface area of PF4 elements, your filter will have an incredibly long service life to protect your sensitive components better than ever.



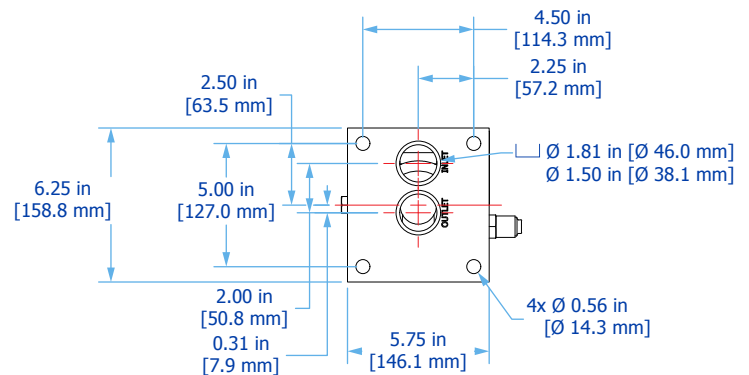
# PF4 Installation Drawings



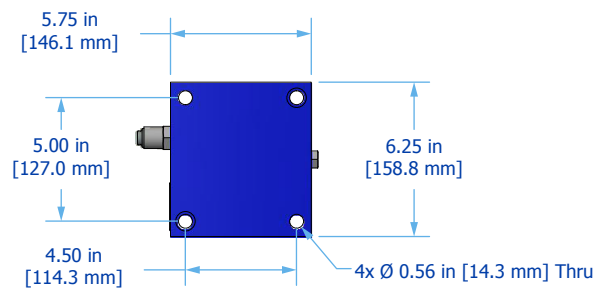
## Top View



## Manifold Bottom View (90 Durometer O-rings Supplied)



## Bottom View



# PF4 Sizing Guidelines

## 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.

## Sizing recommendations to optimize performance and permit future flexibility

- To avoid or minimize bypass during cold start the actual assembly clean  $\Delta P$  calculation should be repeated for start-up conditions if cold starts are frequent.
- Actual assembly clean  $\Delta P$  should not exceed 10% of bypass  $\Delta P$  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  $\Delta P$  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.

Step 1: Calculate  $\Delta P$  coefficient for actual viscosity

### Using Saybolt Universal Seconds (SUS)

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

### Using Centistokes (cSt)

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

Step 2: Calculate actual clean filter assembly  $\Delta P$  at both operating and cold start viscosity

$$\text{Actual Assembly Clean } \Delta P = \text{Flow Rate} \times \Delta P \text{ Coefficient (from Step 1)} \times \text{Assembly } \Delta P \text{ Factor (from sizing table)}$$

# PF4 Sizing Guidelines

## Filter Sizing<sup>1</sup>

Filter assembly clean element  $\Delta P$  after actual viscosity correction should not exceed 10% of filter assembly bypass setting. See above for filter assembly sizing guidelines. For applications with extreme cold start condition contact Hy-Pro for sizing recommendations.

$\Delta P$ Factors <sup>1</sup>	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

<sup>1</sup>Max flow rates and  $\Delta P$  factors assume  $\mu = 150$  SUS, 32 cSt. See filter assembly sizing guideline for viscosity conversion formula on page 22 for viscosity change.

# PF4 Specifications

**Dimensions** See Installation Drawings on page 219 for model specific dimensions.

<b>Weight</b>	<b>PF4 L9</b> 56 lbs (25.4 kg)	<b>PF4 L18</b> 82 lbs (37.5 kg)	<b>PF4 L27</b> 109 lbs (49.5 kg)	<b>PF4 L36</b> 135 lbs (61.3 kg)
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**Operating Temperature** -20°F to 250°F  
(-29°C to 121°C)

**Operating Pressure** 6,000 psi (414 bar) max code 62 port only  
5,500 psi (379 bar) max all other ports

**Flow Fatigue Rating** 3,500 psi (238 bar)

**Burst Pressure** 16,400 psi (1130 bar)

**ΔP Indicator Trigger** 70 psid (4.8 bard) for both bypass and non-bypass  
Refer to Appendix for indicator wiring diagrams

<b>Element Collapse Rating</b>	<b>HPK</b> 290 psid (20.0 bard)	<b>HPK3</b> 3000 psid (206.8 bard)	<b>HPK5</b> 5000 psid (344.7 bard)	<b>HPKC</b> 150 psid (10.3 bard)
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**Integral Bypass Setting** 90 psid (6.2 bard)

<b>Materials of Construction</b>	<b>Head/Lid</b> Ductile iron (powder coated)	<b>Bowl</b> Seamless steel tubing (powder coated)	<b>Assembly Bypass Valve</b> Delrin
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<b>Media Description</b>	<b>M</b> G8 Dualglass, our latest generation of DFE rated, high performance glass media for all hydraulic & lubrication fluids. $\beta_{x_{10}} \geq 4000$	<b>A</b> G8 Dualglass high performance media combined with water removal scrim. $\beta_{x_{10}} \geq 4000$	<b>W</b> Stainless steel wire mesh media $\beta_{x_{10}} \geq 2$
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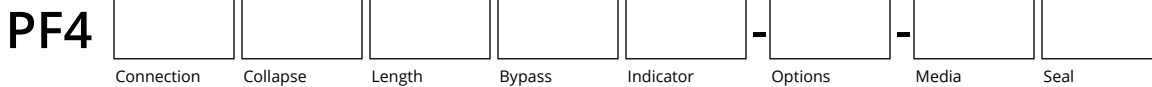
**Replacement Elements** To determine replacement elements, use corresponding codes from your assembly part number:

<b>Filter Element Part Number</b> HP[Collapse Rating Code]L[Length Code] - [Media Selection Code] [Seal Code]	<b>Example</b> HPKL18-16MV
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**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.



# PF4 Part Number Builder



Connection	Port Option	Max Flow Rate	Max Pressure Rate
<b>C24</b>	1.5" Code 62 flange	150 gpm (568 lpm) <sup>1</sup>	6000 psi (414 bar)
<b>F24</b>	1.5" Code 61 flange	150 gpm (568 lpm) <sup>1</sup>	5500 psi (379 bar)
<b>G24</b>	1.5" G Thread (BSPP)	150 gpm (568 lpm) <sup>1</sup>	5500 psi (379 bar)
<b>M24</b>	Manifold mount (see installation detail)	150 gpm (568 lpm) <sup>1</sup>	5500 psi (379 bar)
<b>S24</b>	1.5" SAE	150 gpm (568 lpm) <sup>1</sup>	5500 psi (379 bar)

Collapse Rating	Options
<b>K</b>	290 psid (20.0 bard), HF4 element configuration
<b>K3</b>	3000 psid (206.8 bard), HF4 element configuration
<b>K5</b>	5000 psid (344.7 bard), HF4 element configuration
<b>KC</b>	150 psid (10.3 bard), Coreless with o-ring seals

Element Length	Options
<b>9</b>	9" (23 cm) nominal length filter element and housing
<b>18</b>	18" (46 cm) nominal length filter element and housing
<b>27</b>	27" (69 cm) nominal length filter element and housing
<b>36</b>	36" (91 cm) nominal length filter element and housing

Bypass	Options
<b>3</b>	50 psid (3.4 bard) bypass
<b>6</b>	90 psid (6.2 bard) bypass
<b>X</b>	No bypass

ΔP Indicator	Indicator Options	Thermal Lockout	Surge Control	Reset
<b>D</b>	Visual / Electrical (DIN 43650)	No	No	Auto
<b>S</b>	Visual / Electrical (DIN 43650)	Yes	Yes	Manual
<b>V</b>	Visual	No	No	Auto
<b>X</b>	No indicator (port plugged)	-	-	-
<b>Y</b>	Visual only	Yes	Yes	Manual

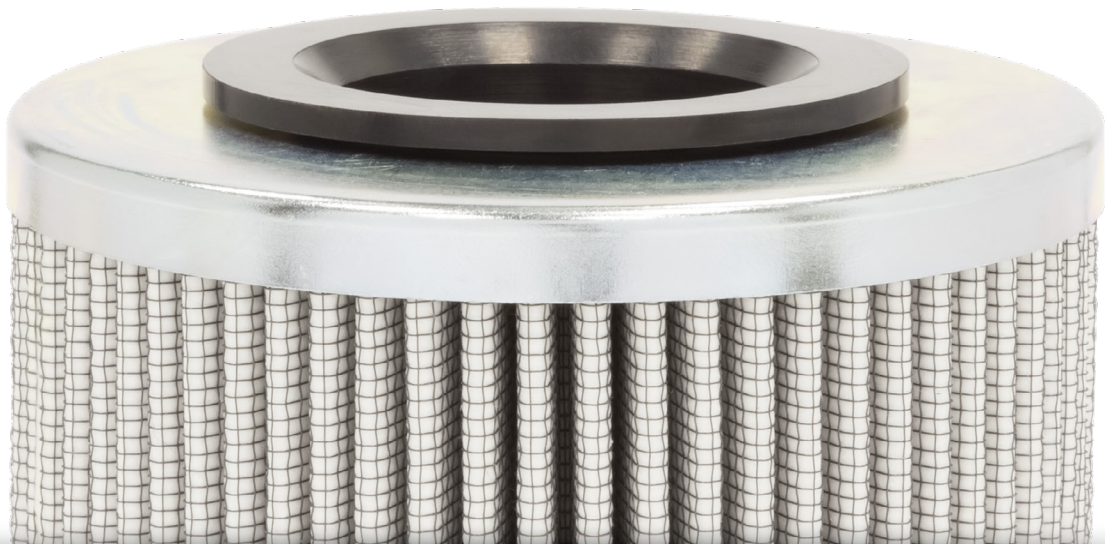
Special Options	Options
<b>C</b>	Reverse flow check valve
<b>N</b>	Nickel plated internal components for high water applications (not available with Special Option C)

Media Selection	G8 Dualglass	G8 Dualglass + water removal
	<b>1M</b> $\beta_{3, [C]} \geq 4000$ <b>3M</b> $\beta_{4, [C]} \geq 4000$ <b>6M</b> $\beta_{6, [C]} \geq 4000$ <b>12M</b> $\beta_{11, [C]} \geq 4000$ <b>16M</b> $\beta_{16, [C]} \geq 4000$ <b>25M</b> $\beta_{22, [C]} \geq 4000$	<b>3A</b> $\beta_{4, [C]} \geq 4000$ <b>6A</b> $\beta_{6, [C]} \geq 4000$ <b>12A</b> $\beta_{11, [C]} \geq 4000$ <b>25A</b> $\beta_{22, [C]} \geq 4000$

Dynafuzz stainless fiber	Stainless wire mesh
<b>3SF</b> $\beta_{4, [C]} \geq 4000$	<b>10W</b> 10μ nominal
<b>6SF</b> $\beta_{6, [C]} \geq 4000$	<b>25W</b> 25μ nominal
<b>10SF</b> $\beta_{11, [C]} \geq 4000$	<b>40W</b> 40μ nominal
<b>25SF</b> $\beta_{22, [C]} \geq 4000$	<b>74W</b> 74μ nominal
	<b>149W</b> 149μ nominal

Seals	Options
<b>B</b>	Nitrile (Buna)
<b>V</b>	Fluorocarbon
<b>E-WS</b>	EPR seals + stainless steel support mesh

Maximum recommended flow rate based on velocity through port and internal flow path. Consult sizing guidelines or consult factory for sizing based on flow rate, viscosity, temperature, filter media selection. For all up to date option details and compatibilities, please reference our Contamination Solutions Price List or contact customer service.



# Filtration starts with the filter.

**Lower ISO Codes: Lower Total Cost of Ownership** Hy-Pro filter elements deliver lower operating ISO Codes so you know your fluids are always clean, meaning lower total cost of ownership and reducing element consumption, downtime, repairs, and efficiency losses.

**DFE Rated Filter Elements** DFE is Hy-Pro's proprietary testing process which extends ISO 16889 Multi Pass testing to include real world, dynamic conditions and ensures that our filter elements excel in your most demanding hydraulic and lube applications.

**Upgrade Your Filtration** Keeping fluids clean results in big reliability gains and upgrading to Hy-Pro filter elements is the first step to clean oil and improved efficiency.

**Advanced Media Options** DFE glass media maintaining efficiency to  $\beta_{3, \text{eq}} > 4000$ , Dualglass + water removal media to remove free and emulsified water, stainless wire mesh for coarse filtration applications, and Dynafuzz stainless fiber media for EHC and aerospace applications.

**Delivery in days, not weeks** From a massive inventory of ready-to-ship filter elements to flexible manufacturing processes, Hy-Pro is equipped for incredibly fast response time to ensure you get your filter elements and protect your uptime.

**More than just filtration** Purchasing Hy-Pro filter elements means you not only get the best filters, you also get the unrivaled support, training, knowledge and expertise of the Hy-Pro team working shoulder-to-shoulder with you to eliminate fluid contamination.

**Want to find out more? Get in touch.**

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