

# PFH92

## High Pressure In-Line Filter Assemblies

Hy-Pro's PFH92 pressure filters are designed to protect sensitive components in hydraulic circuits. Install the series upstream of specific components or directly after the pressure pump to minimize risk of system failure and costly downtime.

Ideal for use in all high pressure and high flow hydraulic applications.

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



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



## Dynamic Filter Efficiency.

Hydraulic applications see dynamic flow changes on a regular basis. Dynamic Filter Efficiency testing takes the ISO16889 Multi-Pass testing even further with variable flow shifts to ensure your filter elements stand up to real world conditions and maintain the highest capture and retention rates in the industry.



## Industrial duty.

Standard code 62 port connections for high pressure applications. Mounting holes and bracket for head-up or inverted mounting options. Side-in / end-out "L-Head" port orientation make the PFH92 the ideal choice for heavy duty hydraulic filtration.



## You choose the element.

Choose between a cored or coreless style element. Housings for coreless elements use a permanent inner liner, making element servicing and disposal easier. For critical applications where unfiltered fluid can not reach critical components, we offer high collapse elements with up to a 3000 psi collapse rating. The choice is yours to make.



## Bypass and Reverse Flow Check Valve.

Hy-Pro's PFH92 uses a unique bypass valve design that can be configured for a variety of bypass, reverse flow check, and filter element options. Whether you want a standard bypass and element or a non-bypass element with reverse flow check valve, we can customize a solution to fit your needs.



## Installation made easy.

With the optional mounting bracket, adding the PFH92 to your equipment just got easier. The mounting bracket provides a solid support mounted to the head that can be bolted to your equipment. The standard lifting hook allows the housing to easily be placed into position during installation.



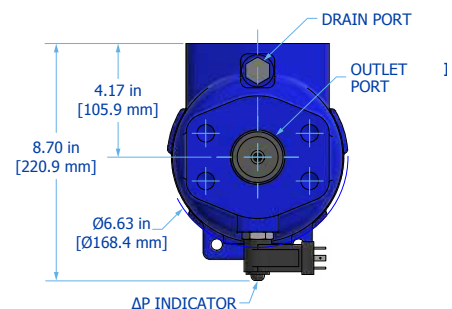
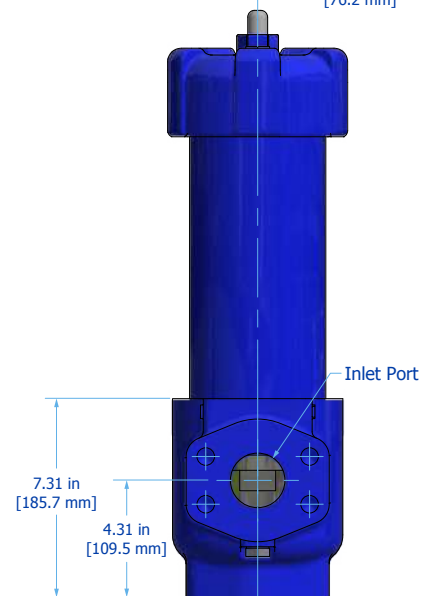
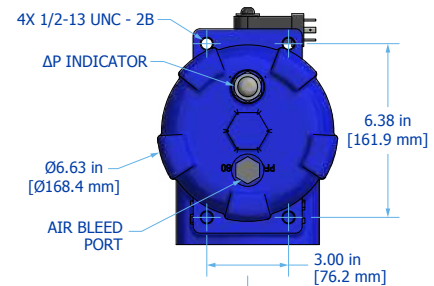
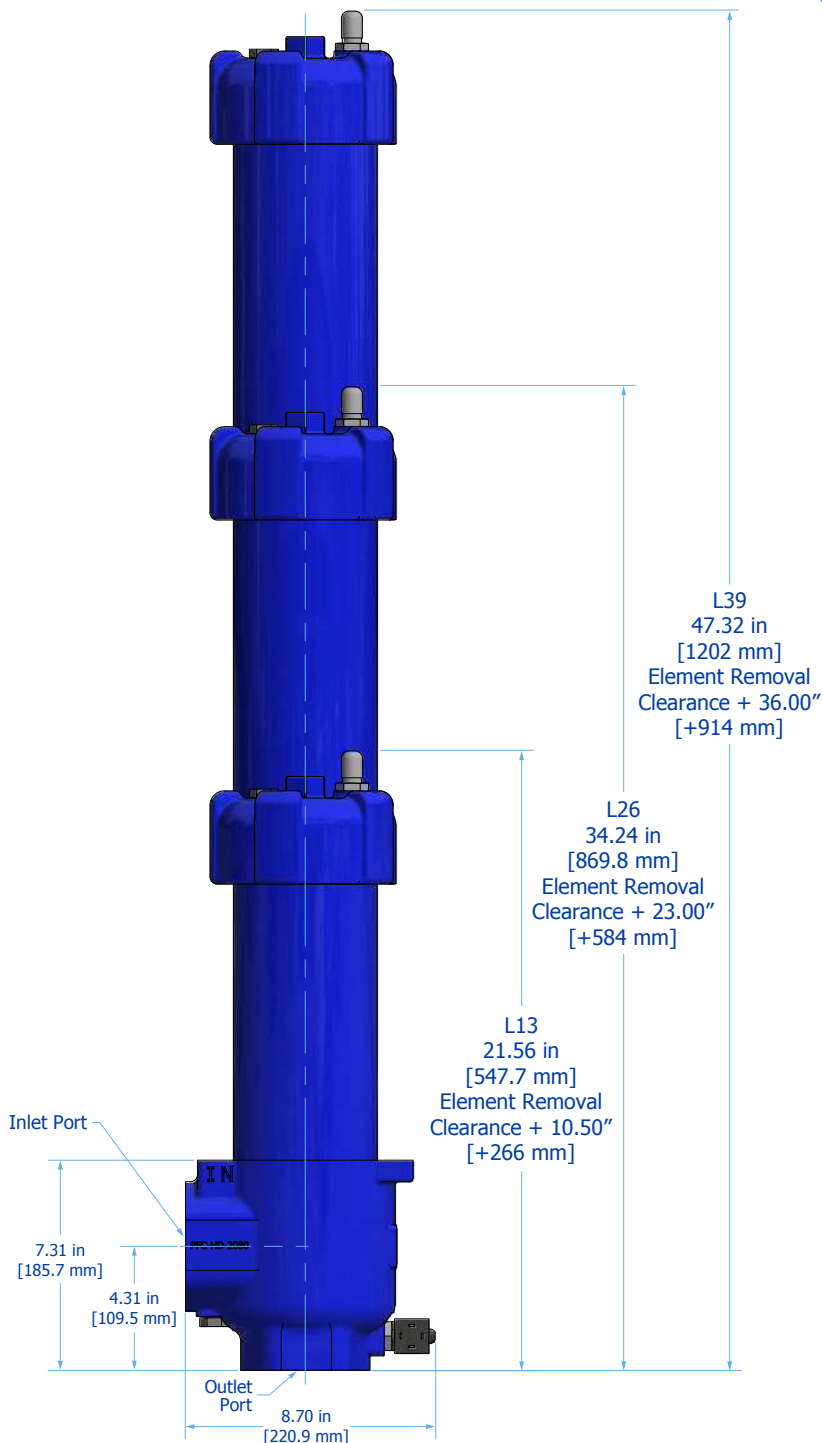
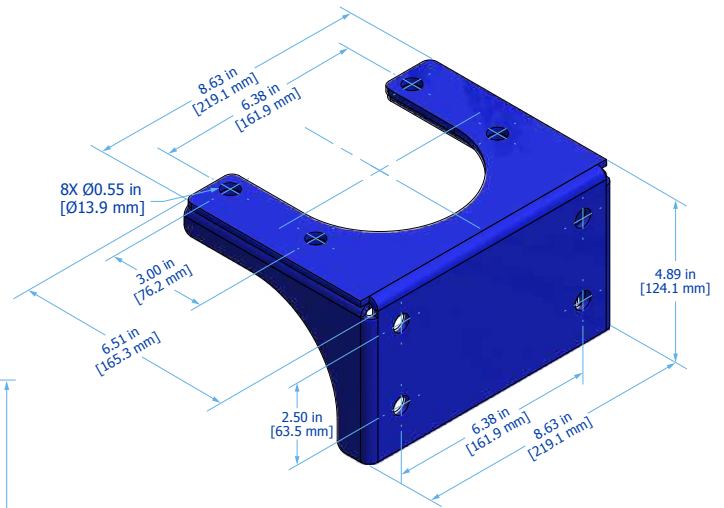
## Minimize the mess.

The top loading housing on PFH92 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 there is no heavy bowl to remove. A hex nut on the cover makes servicing simple to minimize the downtime required to service the element.



# PFH92 Installation Drawings

## PFH92 Installation Drawing



# PFH92 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

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

# PFH92 Sizing Guide

## 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 page 4 for filter assembly sizing guidelines & examples. For applications with extreme cold start condition contact Hy-Pro for sizing recommendations.

ΔP Factors <sup>1</sup>	Element Type	Length	Units	Media							
				1M	3M	6M	12M	16M	25M	**W	
94	L13		psid/gpm	0.22560	0.15060	0.10909	0.08054	0.06887	0.06264	0.03797	
			bard/lpm	0.00411	0.00274	0.00199	0.00147	0.00125	0.00114	0.00069	
		L26		psid/gpm	0.12803	0.09073	0.07009	0.05589	0.05008	0.04699	0.03472
	bard/lpm			0.00233	0.00165	0.00128	0.00102	0.00091	0.00086	0.00063	
	L39		psid/gpm	0.09550	0.07077	0.05708	0.04767	0.04382	0.04177	0.03363	
			bard/lpm	0.00174	0.00129	0.00104	0.00087	0.00080	0.00076	0.00061	
	944	L13		psid/gpm	0.21663	0.14510	0.10550	0.07828	0.06714	0.06120	0.03767
				bard/lpm	0.00395	0.00264	0.00192	0.00143	0.00122	0.00111	0.00069
			L26		psid/gpm	0.11812	0.08465	0.06613	0.05339	0.04818	0.04540
bard/lpm		0.00215			0.00154	0.00120	0.00097	0.00088	0.00083	0.00063	
L39			psid/gpm	0.08742	0.06582	0.05385	0.04563	0.04227	0.04047	0.03337	
			bard/lpm	0.00159	0.00120	0.00098	0.00083	0.00077	0.00074	0.00061	
				Media							
				1M	2M	6M	15M	16M	25M	**W	
91	L13		psid/gpm	0.29551	0.19351	0.13703	0.09821	0.08233	0.07386	0.04031	
			bard/lpm	0.00538	0.00352	0.00250	0.00179	0.00150	0.00135	0.00073	
		L26		psid/gpm	0.16097	0.11095	0.08325	0.06421	0.05642	0.05227	0.03582
	bard/lpm			0.00293	0.00202	0.00152	0.00117	0.00103	0.00095	0.00065	
	L39		psid/gpm	0.11734	0.08417	0.06581	0.05319	0.04803	0.04527	0.03436	
			bard/lpm	0.00214	0.00153	0.00120	0.00097	0.00087	0.00082	0.00063	

<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.

# PFH92 Specifications

Dimensions	See Installation Drawings on page 3 for model specific dimensions.			
Weight	<b>PFH92 L13</b> 92 lbs (41.7 kg)	<b>PFH92 L26</b> 127 lbs (57.6 kg)	<b>PFH92 L39</b> 152 lbs (68.9 kg)	
Operating Temperature	-20°F to 250°F (-29°C to 121°C)			
Operating Pressure	6,000 psi (415 bar) max			
Burst Pressure	17,300 psi (1,193 bar) max			
ΔP Indicator Trigger	70 psid (4.8 bar) for bypass 100 psid (6.9 bar) for non-bypass			
Element Collapse Rating	<b>HP94</b> 290 psid (20.0 bar) max	<b>HP91</b> 3000 psid (206.8 bar) max	<b>HP944</b> 150 psid (10.3 bar) max	
Integral Bypass Setting	90 psid (6.2 bard)			
Materials of Construction	<b>Head + Cover</b> Ductile iron	<b>Bowl</b> Seamless steel tubing	<b>Exterior Coating</b> Powder coated	
Media Description	<b>M</b> G8 Dualglass, our latest generation of DFE rated, high performance glass media for all hydraulic & lubrication fluids. $\beta_{x_{[C]}} \geq 4000$	<b>A</b> G8 Dualglass high performance media combined with water removal scrim. $\beta_{x_{[C]}} \geq 4000$	<b>SF</b> Dynafuzz stainless steel fiber media $\beta_{x_{[C]}} \geq 4000$	<b>W</b> Stainless steel wire mesh media $\beta_{x_{[C]}} \geq 2$
Replacement Elements	To determine replacement elements, use the selected codes from the following page below: <b>Filter Element Part Number</b> HP[Element Type Code] L [Length Code] – [Media Selection Code][Seal Code]  <b>Example</b> HP91L13-2MB HP94L26-6MB HP944L39-25MB			
Fluid Compatibility	Biodegradable and mineral based fluids. For high water based or specified synthetics consult factory.			



# PFH92 Part Number Builder

PFH92      -  -

Connection Element Type Length Bypass ΔP Indicator Special Options Media Seal

Connection	Port Option		Max Flow Rate	
	C24	1.5" Code 62 flange (6000 psi)	175 gpm (662 lpm)	
	C32	2" Code 62 flange (6000 psi)	250 gpm (946 lpm)	
Element Type	94 <sup>1</sup>	290 psid (20.0 bard) cored filter element		
	91	3000 psid (206.8 bard) cored filter element		
	944 <sup>1</sup>	150 psid (10.3 bard) coreless filter element		
Element Length	13	13" (33 cm) nominal element		
	26	26" (66 cm) nominal element		
	39	39" (99 cm) nominal element		
Bypass	6	90 psid (6.2 bar) bypass		
	X <sup>2</sup>	No bypass		
ΔP Indicator	Indicator Options		Thermal Lockout	Surge Control
	D	Visual / Electrical (DIN 43650)	No	No
	S	Visual / Electrical (DIN 43650)	Yes	Yes
	V	Visual/Mechanical	No	No
	X	No indicator (port plugged)	-	-
	Y	Visual only	Yes	Yes
				Reset
				Auto
				Manual
				Auto
				-
				Manual
Special Options	C	Reverse flow check valve		
	M2	Head mounting bracket		
	N <sup>3</sup>	Nickel plated for high water applications (non-bypass only)		
Media Selection	G8 Dualglass		G8 Dualglass + water removal	
	1M	β <sub>3</sub> ≥ 4000	3A <sup>5</sup>	β <sub>4</sub> ≥ 4000
	2M <sup>4</sup>	β <sub>4</sub> ≥ 4000	6A <sup>5</sup>	β <sub>6</sub> ≥ 4000
	3M <sup>5</sup>	β <sub>4</sub> ≥ 4000	12A <sup>5</sup>	β <sub>11</sub> ≥ 4000
	6M	β <sub>6</sub> ≥ 4000	16A <sup>5</sup>	β <sub>16</sub> ≥ 4000
	12M <sup>5</sup>	β <sub>11</sub> ≥ 4000	25A <sup>5</sup>	β <sub>22</sub> ≥ 4000
	15M <sup>4</sup>	β <sub>11</sub> ≥ 4000		
	16M	β <sub>16</sub> ≥ 4000		
	25M	β <sub>22</sub> ≥ 4000		
	Dyna fuzz stainless fiber		Stainless wire mesh	
	3SF	β <sub>4</sub> ≥ 4000	10W	10μ nominal
	6SF	β <sub>6</sub> ≥ 4000	25W	25μ nominal
	10SF	β <sub>11</sub> ≥ 4000	40W	40μ nominal
	25SF	β <sub>22</sub> ≥ 4000	74W	74μ nominal
			149W	149μ nominal
Seals	B	Nitrile (Buna)		
	V	Fluorocarbon		
	E-WS	EPR seals + stainless steel support mesh		

<sup>1</sup> Requires Bypass option 6 selected.

<sup>2</sup> Only available when paired with "H" high collapse element.

<sup>3</sup> When selected, automatically adds nickel plating to filter element. For replacement elements, add "-N" to end of filter element part number.

<sup>4</sup> Compatible only with Element Type "91", HP91L filter elements.

<sup>5</sup> Compatible only with Element Types "94" and "944", HP94L and HP944L filter elements.





# 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  $\beta_{3, \mu} > 4000$ , 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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