FPL

Dedicated Off-line Filter Panel

A dedicated contamination solution for bulk oil handling, fluid transfer and reservoir or gearbox conditioning.

Enhance cleanliness by adding the FPL to an existing hydraulic system and extend the life of in-line filters.

HY-PRO

hyprofiltration.com/FPL

Ready when you are.

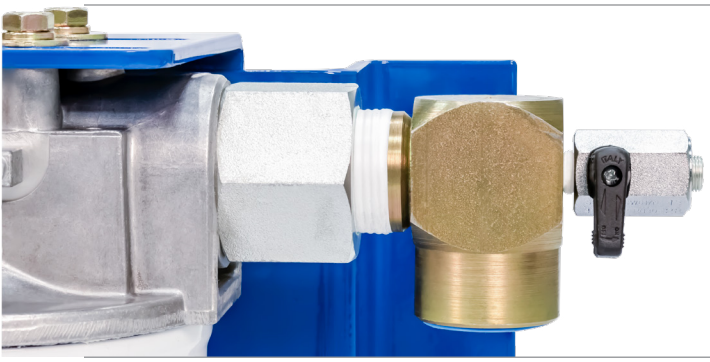
From the pump to the seals, every FPL arrives fully assembled and ready for installation so you can get straight to cleaning your fluids and improving the efficiency of your equipment.

The first stage of success.

Staged filtration allows a range of media selections for particulate and water removal to deliver ISO Codes right on target. Choose between dual MF3 cartridge or up to four Spin-On elements to tackle the most viscous fluids and achieve unimaginably low ISO Codes in a single pass.

Media matters.

DFE rated filter elements stay true to efficiency ratings and ensure the highest level of particulate capture and retention capabilities. And with media options down to $\beta 2.5_{[C]} = 1000$, you can be sure contamination stays exactly where you want it: out of your system.

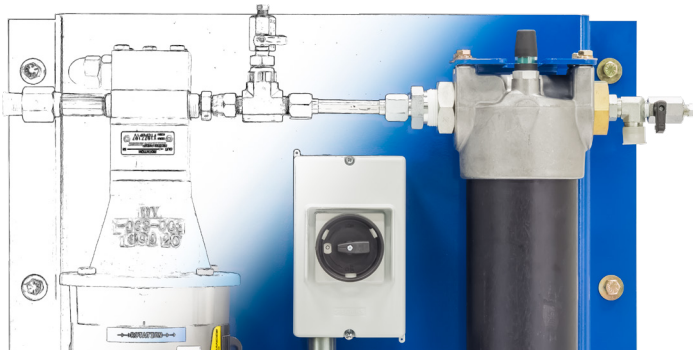


Setting the new standard.

Sample ports in the right locations arm you with access to consistently accurate system conditions which is why every FPL comes standard with upstream and downstream sample ports in their proper positions.

Engineered for industrial use.

Precision engineered and built from heavy gauge steel, the FPL is designed to be a powerhouse addition to your equipment. To top it off, the cast iron gear pump with internal relief gives you the durability you want with the safety you need.



From concept to creation.

Whether for plastic injection molding hydraulics with varnish issues or a wind turbine gearbox with small size restrictions, the FPL can be custom designed and built to meet the exact needs to solve your contamination problems.

Filter Sizing Guidelines

Filter Sizing Guidelines and Viscosity Conversion

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.

FPL Filter Sizing Guidelines

MF3 Options ΔP Factors[1]

Series	Length	Units	Media 1M	3M	6M	12M	16M	25M	**W
MF3	L13	psid/gpm	0.237	0.200	0.155	0.139	0.136	0.131	0.024
		bard/lpm	0.006	0.005	0.004	0.003	0.003	0.003	0.000

S75 Options ΔP Factors[1]

Series	Length	Units	Media 1M	3M	6M	12M	16M	25M	**W
S75	L8	psid/gpm	0.183	0.155	0.120	0.107	0.105	0.101	0.018
		bard/lpm	0.003	0.003	0.002	0.002	0.002	0.002	0.000
S75D	L8	psid/gpm	0.092	0.077	0.060	0.054	0.053	0.051	0.009
		bard/lpm	0.002	0.001	0.001	0.001	0.001	0.001	0.000

Series	Length	Units	Media 3A	6A	12A	25A	3C	10C	25C
S75	L8	psid/gpm	0.172	0.133	0.119	0.113	0.247	0.161	0.157
		bard/lpm	0.003	0.002	0.002	0.002	0.005	0.003	0.003
S75D	L8	psid/gpm	0.086	0.067	0.060	0.056	0.124	0.081	0.078
		bard/lpm	0.002	0.001	0.001	0.001	0.002	0.001	0.001

DFN39 Option ΔP Factors[1]

Series	Length	Units	Media 1M	3M	6M	12M	16M	25M	**W
DFN39N	L15	psid/gpm	0.463	0.391	0.301	0.266	0.218	0.210	0.117
		bard/lpm	0.008	0.007	0.005	0.005	0.004	0.004	0.002

PFH419 Option ΔP Factors[1]

Series	Length	Units	Media 1M	3M	6M	12M	16M	25M	**W
PFH419N	L13	psid/gpm	0.236	0.200	0.155	0.139	0.136	0.131	0.024
		bard/lpm	0.004	0.004	0.003	0.003	0.002	0.002	0.000

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

FPL Specifications

Dimensions[1]	**Height** 22" (58 cm)	**Length** 42" (107 cm)	**Depth** 12" (31 cm)	**Weight** 138 lbs (63 kg)
Connections	**Inlet with 3-way valve** 1" FNPT		**Outlet** 1" FNPT	
Operating Temperature	**Fluid Temperature** 30°F to 225°F (0°C to 105°C)		**Ambient Temperature** -4°F to 104°F (-20C to 40C)	
ΔP Indicator Trigger	**Standard MF3 Assemblies** 22 psi (1.5 bar)	**Special Options D1 + S1 (S75/D)** 22 psi (1.5 bar)	**Special Option D2 (DFN)** 32 psid (2.2 bard)	**Special Option P1 (PFH)** 73 psid (5 bard)
Filter Assembly Bypass	**Standard MF3 Assemblies** 25 psid (1.7 bard)	**Special Options D1 + S1 (S75/D)** 25 psid (1.7 bard)	**Special Option D2 (DFN)** 50 psid (3.4 bard)	**Special Option P1 (PFH)** 102 psid (7 bard)
Materials of Construction	**Frame** Carbon steel with industrial coating			
Electric Motor	TEFC, 56-145 frame 1 hp, 1450-1750 RPM			
Motor Starter	MSP (motor starter/protector) in an IP65, aluminum enclosure with short circuit and overload protection.			
Pump	Cast iron, positive displacement gear pump with internal relief. Maximum pressure on pump inlet 15 psi (1 bar). Consult factory for higher pressures.			
Pump Bypass	Full bypass at 150 psi (10 bar)[2]			
Pneumatic Option Air Consumption	~40 cfm @ 80 psi[3]			
Media Description	**M** G8 Dualglass, our latest generation of DFE rated, high performance glass media for all hydraulic & lubrication fluids. $\beta x_{[C]} = 1000$ ($\beta x = 200$)	**A** G8 Dualglass high performance media combined with water removal scrim. $\beta x_{[C]} = 1000$ ($\beta x = 200$)	**W** Stainless steel wire mesh media $\beta x_{[C]} = 2$ ($\beta x = 2$)	

Replacement Elements

To determine replacement elements, use corresponding codes from your equipment part number:

Model	Filter Element Part Number	Example
Standard FPL (2x MF3 13" bowls)	HP60L13 – [Media Selection Code] [Seal Code]	HP60L13-12MV
Special Option D1	HP75L8 – [Media Selection Code] [Seal Code]	HP75L8-25MB
Special Option D2	HP39NL15 – [Media Selection Code] [Seal Code]	HP39NL15-10AB
Special Option P1	HP419NL13 – [Media Selection Code] [Seal Code]	HP419NL13-10MV
Special Option S1	HP75L8 – [Media Selection Code] [Seal Code]	HP75L8-3AB

Viscosity	2-5000 cSt[4]
Fluid Compatibility	Petroleum and mineral based fluids, #2 diesel fuels (standard). For specified synthetics contact factory for compatibility with fluorocarbon seal option. For phosphate ester (P9) or skydrol fluid (S9) compatibility select fluid compatibility from special options.
Hazardous Environment Options	Select pneumatic powered unit (Power Option 00) or explosion proof NEC Article 501, Class 1, Division 1, Group C+D. Call for IEC, Atex or other requirements. If Explosion Proof option (X--) selected, no electrical cord will be included.

[1]Dimensions are approximations taken from base model and will vary according to options chosen.
[2]10 GPM pump is rated for intermittent duty only at pressures above 100 psi. Continual operation with dual clogged filters resulting in operating pressures over 100 psi will reduce pump life and/or cause premature pump failure.
[3]Air consumption values are estimated maximums and will vary with regulator setting.
[4]When sized and installed appropriately. Contact factory for applications above 800 cSt for sizing requirements.