TFR-B

In-Tank Return Line Filter Assemblies

Hy-Pro TFR-B in-tank filter assemblies are ideal for mobile and industrial power unit hydraulic applications where the breather integrated into the filter head can save space to yield a compact solution.

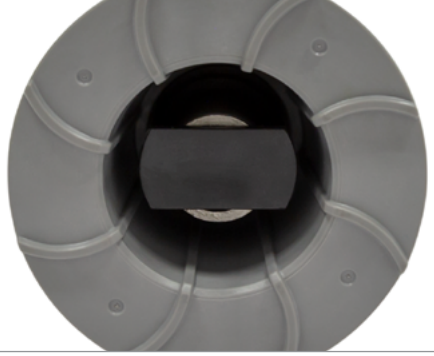
Max Operating Pressure: 150 psi (10.3 bar)

HY-PRO

hyprofiltration.com/TFR-B

Go beyond industry standard.

Advanced DFE rated filter elements deliver lower operating ISO Codes with high efficiency particulate removal and retention efficiency. With integral element bypasses and a range of media options down to $\beta 2.5_{[c]} > 4000$ + water absorption, you get the perfect element for your application, every time.

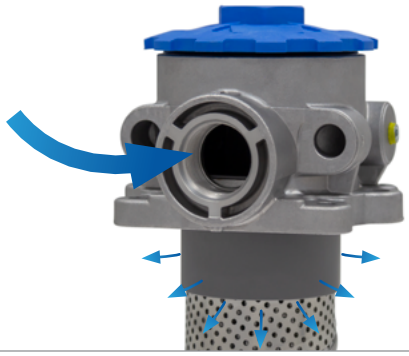


Minimize the mess.

The top loading TFR-B housing provides easy and clean access during element service – no slippery spin-ons to handle. A threaded cover allows for quick element changes with no special tools required.

Inside to out flow.

The TFR-B housings utilizes an inside-to-outside element flow, meaning all the dirt captured by the element stays in the element during service. They don't release dirt back into the system with traditional outside-to-in element designs that re-contaminate hydraulic tanks during filter changes.

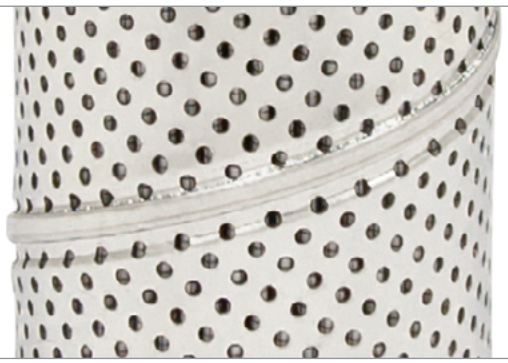


Dirt removal's never been so easy.

Packed with features including; easy service composite threaded cover, integral BT TRAP breather, industry standard 2-bolt and 4-bolt mounting patters, additional auxiliary: inlet ports optional, integral element hold-down / removal handle (no-spring), integral bypass (new bypass with every element change).

Eliminate aeration.

Smaller reservoirs, high return flow and high velocity through outside-to-in flow elements add up to tank turbulence and reservoir aeration with poor air release. TFR-B prevents aeration by diffusing return flow and creating laminar conditions inside the hydraulic tank.

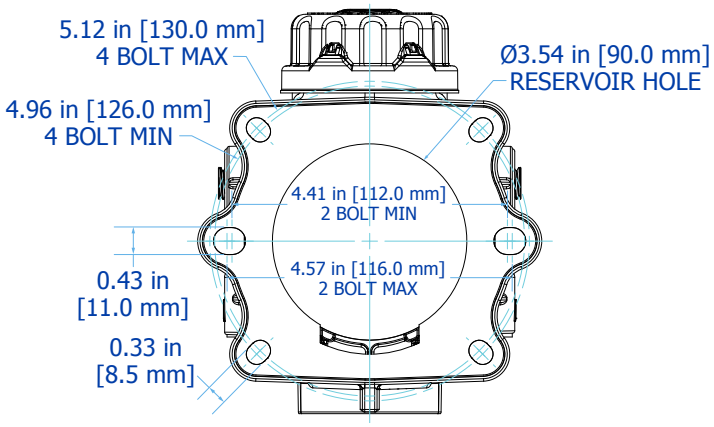


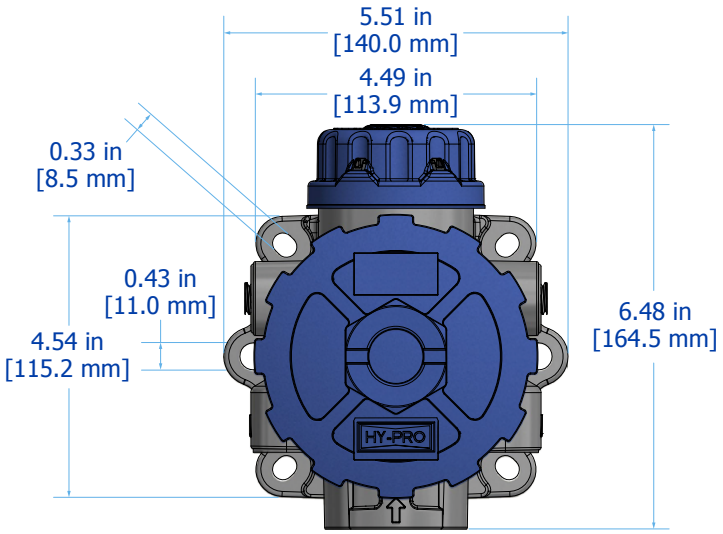
Breather incorporated.

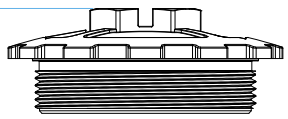
With typical in-tank filters, a separate connection is required on the tank to add a breather. With the TFR-B, the breather is incorporated right into the filter housing making it simpler and easier to add a breather to the system. Utilizing exclusive T.R.A.P. technology, the breathers remove both airborne moisture as well as 97% of particulate 3 micron and larger. Servicing the breather is tool-free and can be done in just seconds.

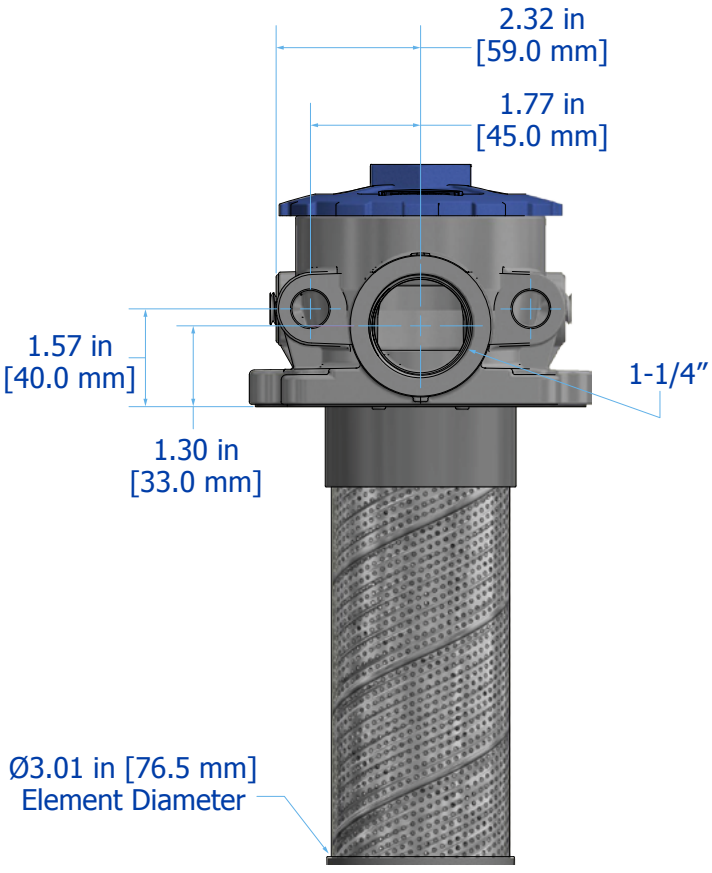
TFR-B Installation Drawings

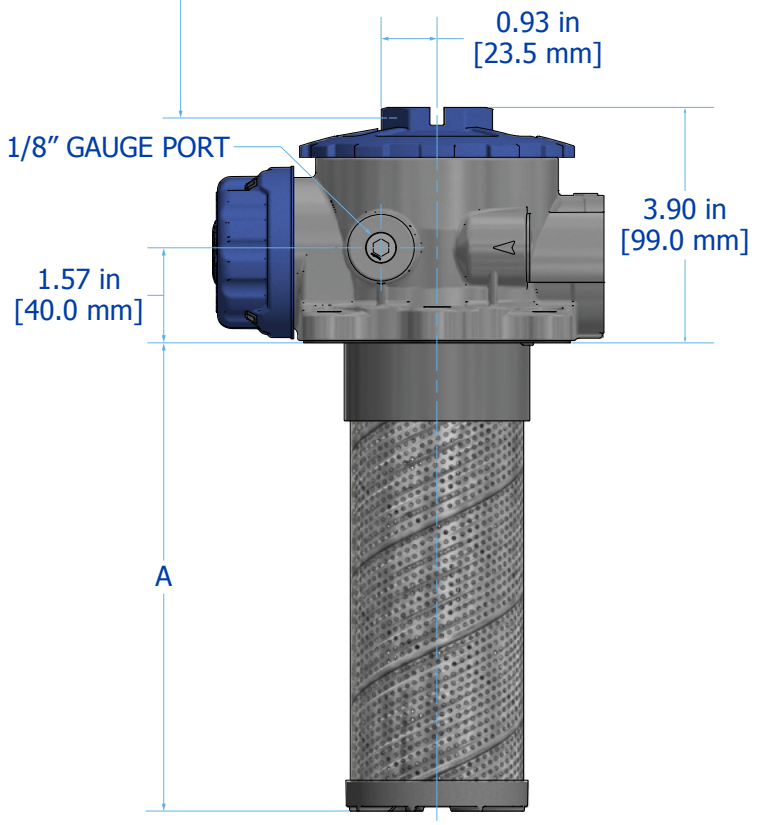
Dimensions Table				
Length	L8	L10	L13	L19
A	7.75 in 152.4 mm	9.67 in 245.6 mm	12.88 in 327.1 mm	19.3 in 490.2 mm
B	11.5 in 292.1 mm	13.42 in 340.9	16.63 in 422.4 mm	23.05 in 585.5 mm











TFR-B Sizing Guide

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 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.

Step 1: Calculate ΔP coefficient for actual viscosity

Using Saybolt Universal Seconds (SUS)

$$\text{ΔP Coefficient} = \frac{\text{Actual Operating Viscosity1 (SUS)}}{150} \times \frac{\text{Actual Specific Gravity}}{0.86}$$

Using Centistokes (cSt)

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

Step 2: Calculate actual clean filter assembly ΔP at both operating and cold start viscosity

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

TFR-B Sizing Guide

Filter Sizing[1]

Filter assembly clean element ΔP 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[1]

Series	Length	Units	Media 1M	3M	6M	10M	16M	25M	**W
TFR-B	L8	psid/gpm	0.6049	0.5104	0.3956	0.3548	0.3471	0.3343	0.0612
		bard/lpm	0.0110	0.0093	0.0072	0.0065	0.0063	0.0061	0.0011
	L10	psid/gpm	0.4840	0.4085	0.3166	0.2839	0.2778	0.2676	0.0490
		bard/lpm	0.0088	0.0074	0.0058	0.0052	0.0051	0.0049	0.0009
	L13	psid/gpm	0.3629	0.3063	0.2374	0.2129	0.2082	0.2006	0.0367
		bard/lpm	0.0066	0.0056	0.0043	0.0039	0.0038	0.0037	0.0007
	L19	psid/gpm	0.2418	0.2041	0.1582	0.1418	0.1388	0.1337	0.0245
		bard/lpm	0.0044	0.0037	0.0029	0.0026	0.0025	0.0024	0.0004

[1]Max flow rates and ΔP factors assume υ = 150 SUS, 32 cSt. See filter assembly sizing guideline for viscosity conversion formula on page 22 for viscosity change.

TFR-B Specifications

Operating Temperature	-20°F to 250°F (-29°C to 121°C)
Operating Pressure	150 psi (10.3 bar) maximum
Pressure Switch Trigger	17 psi (1.2 bar)
Visual Gauge	0-22 psi (0-1.5 bar), green to red
Element Burst Rating	100 psid (6.9 bard)
Integral Bypass Setting	25 psid (1.7 bard)

Materials of Construction

Head	**Cover and breather**	**Element Bypass Valve**
Cast aluminum	Nylon glass-filled	Plated steel

Media Description

M	**A**	**W**
G8 Dualglass, our latest generation of DFE rated, high performance glass media for all hydraulic & lubrication fluids. $\beta x_{[c]} \geq 4000$	G8 Dualglass high performance media combined with water removal scrim. $\beta x_{[c]} \geq 4000$	Stainless steel wire mesh media $\beta x_{[c]} \geq 2$

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.

Replacement Elements

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

Bypass Code	**Filter Element Part Number**
2	HP329L [Element Length Code] – [Media Selection Code][Seal Code] HP329L19-3MB

TFR-B Part Number Builder

TFR-B [ ] [ ] [ ] [ ] [ ] - [ ] - [ ] [ ]

Connection | Breather | Length | Bypass | ΔP Indicator | Special Options | Media | Seal

Connection

G16[1]	1" G thread (BSPP)
G20	1-1/4" G thread (BSPP)
S16[2]	1" SAE thread
S20	1-1/4" SAE thread

Breather

T	T.R.A.P. Breather
X	Blocked

Element Length

8	8" (20 cm) nominal
10	10" (25 cm) nominal
13	13" (33 cm) nominal
19	19" (48 cm) nominal

Bypass

2	Integrated bypass - 25 psid (1.7 bar)

Pressure Indicator

V	Visual pop-up
G	Visual pressure gauge
DX	Electrical (DIN 43650)
E	Electrical (3 wire flying leads)
H	Electrical (DIN 46248)
X	No indicator (port plugged)

Special Options

A	Front auxiliary ports 2x 1/2", plugged
W	Reservoir weld flange

Media Selection

G8 Dualglass

1M	$\beta 3_{[C]} \geq 4000$
3M	$\beta 4_{[C]} \geq 4000$
6M	$\beta 6_{[C]} \geq 4000$
10M	$\beta 11_{[C]} \geq 4000$
16M	$\beta 16_{[C]} \geq 4000$
25M	$\beta 22_{[C]} \geq 4000$

G8 Dualglass + water removal

3A	$\beta 4_{[C]} \geq 4000$
6A	$\beta 6_{[C]} \geq 4000$
16A	$\beta 16_{[C]} \geq 4000$
10A	$\beta 11_{[C]} \geq 4000$
25A	$\beta 22_{[C]} \geq 4000$

Stainless wire mesh

25W	25µ nominal
40W	40µ nominal
74W	74µ nominal
149W	149µ nominal

Seals

B	Nitrile (Buna)
V	Fluorocarbon
E-WS	EPR seals + stainless steel support mesh

[1]If G primary connection selected, aux ports G1/2.
[2]If S primary connection is selected, aux ports SAE-8.

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.

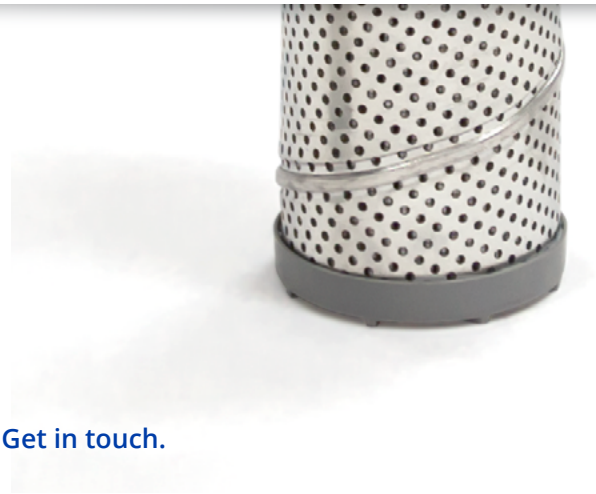
DFE Rated Filter Elements DFE is Hy-Pro's proprietary testing process which extends ISO 16889 Multi Pass testing to include real world, dynamic conditions and ensures that our filter elements excel in your most demanding hydraulic and lube applications.

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 $\beta 0.7_{[c]} > 1000$, 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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