TABLE OF CONTENTS

HF2/HF3/HF4 Element Test Information

SAE J2066/1 filter element for hydraulic system(s) used on manufacturing and assembly equipment. The following is a list of these test procedures:

ISO 3723
End Load test method for a Hydraulic Fluid Power Filter Element. A test to verify the ability of a hydraulic fluid power filter element to withstand the designated axial loading imposed by installation.

ISO 2942
Verification of Fabrication Integrity. This national standard specifies a method for verifying the compatibility of the materials comprising a hydraulic fluid power filter element with a designated fluid, by verifying the ability of the filter element to maintain it's collapse / burst rating after being subjected to the designated system fluid at an elevated temperature. The filter mounting seal will not be included as part of the element.

ISO 2943
Method for verification of Material Compatibility With Fluids. The process of immersing the filter element in the designated system fluid for at least 72 hours at a temperature 15° Celsius above the manufacturer's recommended maximum operating temperature. The 15° Celsius temperature difference is a practical compromise to achieve an accelerated test rather than a long test at rated temperature. Afterwards, subject the filter element to the collapse / burst test in accordance with ANSI B93.25M.

ISO 3724
Flow Fatigue Characteristics of a Hydraulic Fluid Power Element. A uniform method for verifying the ability of a filter element to withstand the flexing caused by cyclic differential pressures without altering it's collapse / burst rating.

ISO 2941
Verification of the collapse / burst rating of a hydraulic fluid power element, i.e. the capability of the filter element to withstand a designated differential pressure at the normal (intended direction of) flow.

ISO 4572
Multi-Pass method for evaluating filter element performance. This standard is intended to provide a test procedure which yields reproducible test data for appraising the filtration performance of a fine hydraulic fluid power filter element, without influence of the electrostatic charge. Note: This standard was recently superceded by ISO16889; see page 87 for details.

Independent Multi-Pass Test Results For NORCO/PARKER HF Series Elements

HF2-4" and 8" Length

[2]Micron Rating	Filter Media	[1]Beta Ratio	4" Length [3]Retained Dirt Capacity (Grams)	8" Length [3]Retained Dirt Capacity (Grams)
03	Microglass	B_3 > 200	> 5	> 12
05	Microglass	B_5 > 200	> 5	> 12
10	Microglass	B_{10} > 200	> 5	> 12
20	Microglass	B_{20} > 200	> 4	> 10

HF3-1

[2]Micron Rating	Filter Media	[1]Beta Ratio	[3]Retained Dirt Capacity (Grams)
03	Microglass	B_3 > 200	> 50
05	Microglass	B_5 > 200	> 50
10	Microglass	B_{10} > 200	> 50
20	Microglass	B_{20} > 200	> 50

HF4-1

[2]Micron Rating	Filter Media	[1]Beta Ratio	[3]Retained Dirt Capacity (Grams)
03	Microglass	B_3 > 200	> 80
05	Microglass	B_5 > 200	> 80
10	Microglass	B_{10} > 200	> 80
20	Microglass	B_{20} > 200	> 70

Element Test Terminology

Multi-Pass Test:

The most popular filter test method used, and today accepted, as an **NFPA**, **ANSI** and **ISO** standard. The outstanding feature of the multi-pass filter test is the recirculation of the particulate contaminant through the filter as it would occur in a typical fluid system. If the contaminant is not captured on the first pass through the filter, it is recirculated through the filter - hence the name Multi-pass Test.

This internationally approved test was the first to actually receive industrial acceptance. It is recognized as the granddaddy of "high tech" assessment methods, using the "filtration ratio" as the figure of merit – in this case the **Beta Ratio**. This beta test assesses three fundamental aspects of filters: **Separability** (beta ratio), **Pressure Loss** and **Dirt Holding Capacity**.

[1]Beta Ratio:

The filtration ratio or beta is calculated by dividing the number of particles entering the filter by the number of particles leaving the filter. This is the ratio of upstream particles to downstream particles at a stated particle size at a given ΔP during the Multi-pass test.

$$\beta x = \left(\frac{\text{Number of particles upstream (entering)>X}\mu\text{m}}{\text{Number of particles downstream (exiting)>X}\mu\text{m}} \right)$$

[2]Micron Rating:

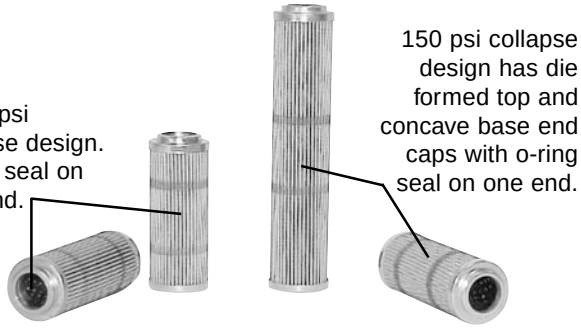
The filter element micron rating is the particle size at which the average **Beta Ratio** of 200 or greater is obtained in a multi-pass test.

[3]Dirt Holding Capacity:

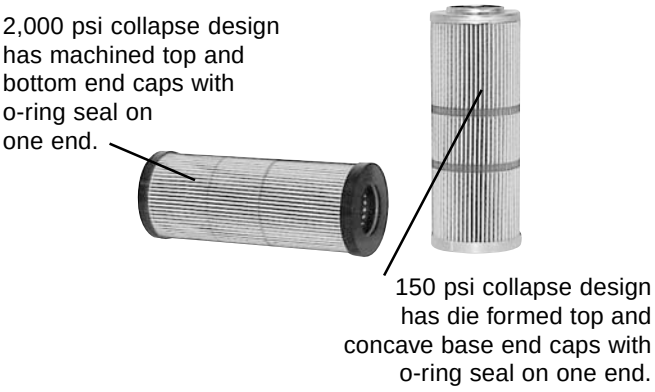
An element's retained dirt holding capacity is obtained through the multi-pass test. Its capacity is expressed in grams of retained dirt.

Pictorial Selection Guide

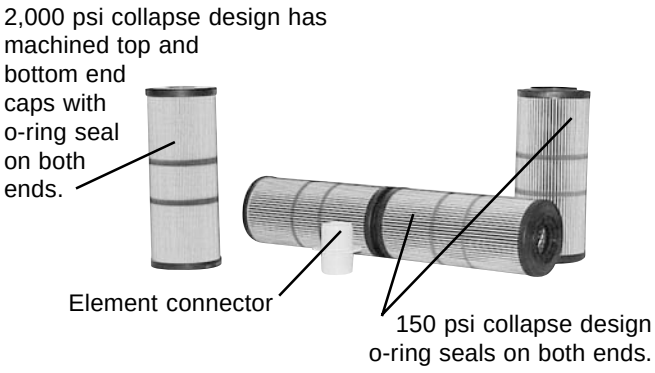
HF2
2" Diameter, 4" and 8" Lengths



HF3
3" Diameter, 8" Length



HF4
4" Diameter, 9" Length



SLAT/AB
Spin-On Cans

HOW TO ORDER:

Select the desired symbol (in the correct position) to construct a model code.
Example:

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	BOX 7	BOX 8	BOX 9
		HF	4	1	L	10	N	Q

BOX 1: Automotive Division Code

Symbol	Description
None	Leave blank

Note: Used for specific automotive program identification.

BOX 2: Plant Code

Symbol	Description
None	Leave blank

Note: Used for specific automotive plant location.

BOX 3: Configuration

Symbol	Description
HF	Hydraulic/Lube/DC3

(For Hydraulic/Lube/DC3 elements, complete remaining model code boxes.)

BOX 4: Element Diameter

Symbol	Description
2	2 Inch
3	3 Inch
4	4 Inch

BOX 5: Bowl / Housing Length

Symbol	Description
1	HF2 4” Length
2	HF2 8” Length
1	HF3 8” Length
1	HF4 9” Length
2	HF4 9” (2) Length

BOX 6: Element Collapse Rating

Symbol	Description
L	Low Collapse (150 psi)
H	High Collapse (2000 psi)

BOX 7: Element Rating

Symbol	Description
3	3 Micron Microglass
5	5 Micron Microglass
10	10 Micron Microglass
20	20 Micron Microglass
149W	149 Micron Wire Mesh

BOX 8: Seal Compound

Symbol	Description
N	Nitrile
V	Fluorocarbon

BOX 9: Media Identification

Symbol	Description
W	Wire Mesh
Q	Microglass III

HF4 Pressure Filter

3000 psi Application

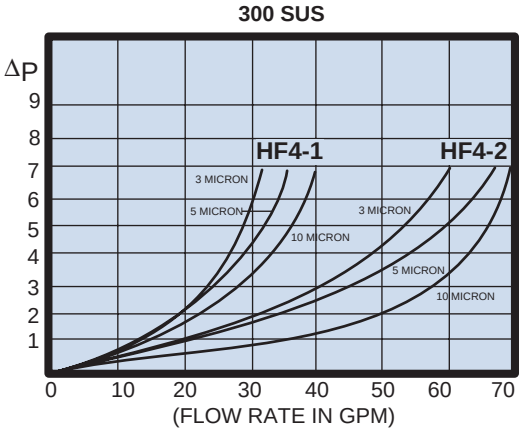
- **Element Check**
  Prevents filter operation without element in place.
- **Non-Bypass Design**
- **Air Bleed Port**
  Guarantees total use of element dirt holding capacity.
  For bleed fitting kit, see page 62.
- **Upstream and Downstream Test Ports**
  Allows user to do maintenance troubleshooting.
  For test fitting kit, see page 62.
- **Lifting Provision**
- **Mechanical Visual or Electrical Visual Indicator**
  With 50 ΔP setting. For electrical indicator options and factory pin wiring, see pages 82-83.
- **Elements**
  3, 5, 10 and 20 micron HF4 elements with $\beta \geq 200$ dual stage filtering media for up to 40% increased dirt holding capacity.
- **Mounting Provision**
- **Manifold Mounting Available**

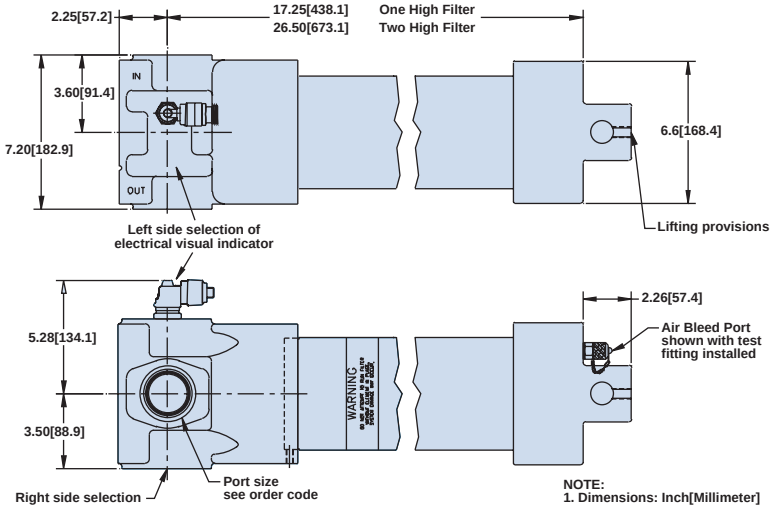
Flow Rate Curves

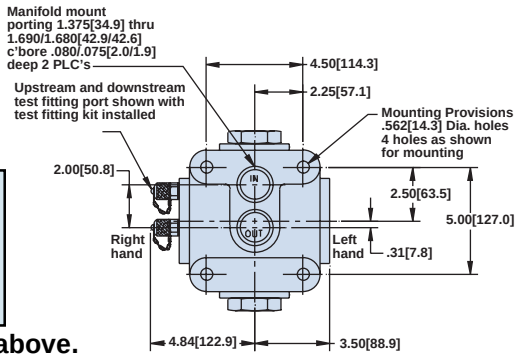
A.) Select flow rate (GPM).

B.) Determine micron selection.

C.) For maximum filter life, ΔP should not exceed 1/3 bypass/indicator setting.







Assembly ΔP Formula

$$\text{PSID Assembly} = \Delta P \text{ from curve} \times \frac{\text{New Viscosity}}{300} \times \frac{\text{New Specific Gravity}}{.90}$$

Note: For "H" High collapse elements use 1.4 x Δp from curves above.

HOW TO ORDER:

Select the desired symbol (in the correct position) to construct a model code.
Example:

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	BOX 7	BOX 8	BOX 9	BOX 10	BOX 11	BOX 12
		HF	4	1	P3	H	10	IR	50	M48	N

BOX 1: Division Code

Symbol	Description
None	Leave blank

Note: Used for specific automotive program identification.

BOX 2: Plant Code

Symbol	Description
None	Leave blank

Note: Used for specific automotive plant location.

BOX 3: Configuration

Symbol	Description
HF	Hydraulic Filter

BOX 4: Element Diameter

Symbol	Description
4	4 Inch (NOMINAL)

BOX 5: Housing Bowl Length

Symbol	Description
1	1 Element
2	2 Elements

BOX 6: Housing Pressure Type

Symbol	Description
P3	3,000 PSI Pressure

BOX 7: Element Collapse Rating

Symbol	Description
H	2000 PSI

BOX 8: Element Filtration Rating

Symbol	Description
3	3 Micron Microglass
5	5 Micron Microglass
10	10 Micron Microglass
20	20 Micron Microglass

**Consult factory for other requirements*

BOX 9: Indicator Type

Symbol	Description
IR	Visual, right side
IL	Visual, left side
E3B*	Electrical/Visual
E4A*	Electrical/Visual
E4D*	Electrical/Visual
E4MB*	Electrical/Visual
E4MC*	Electrical/Visual
E4MD*	Electrical/Visual
E5A*	Electrical/Visual
E5B*	Electrical/Visual
E5D*	Electrical/Visual
E5MD*	Electrical/Visual
F4M	Dual output electronic indicator

**Please refer to indicator drawings and chart on pages 82 and 83 for connector and wiring options. Located at left side of outlet - for right side add R to symbol. Example: E3BR.*

BOX 10: Indicator Setting

Symbol	Description
50	50 psid (3.5 bar)
125*	125 psid (8.6 bar)

*Note: F4M indicator only.

BOX 11: Port Size

Symbol	Description
ST24	1 7/8-12 UN-2B (ISO 11926)
M48	M48 x 2 (ISO 6149)
G24	G 1 1/2-11 BSPP (ISO 1179-1)
SMP	SAE Manifold Mount
MMP	Metric Manifold Mount
GMP	BSPP Manifold Mount
FS	1 1/2" Flange (ISO 6162) 5/8"-UNC-2b bolt holes, 1.03 in deep
FM	1 1/2" Flange (ISO 6162) M16 x 2 bolt holes, 25.5 mm deep

BOX 12: Seal Compound

Symbol	Description
N	Nitrile
V	Fluorocarbon

Replacement Elements

Media	Element Collapse Rating	Single Length	Double Length
		Fluorocarbon/Nitrile	Fluorocarbon/Nitrile
3 Micron	2000 psi	HF41H3VQ	HF42H3VQ
5 Micron	2000 psi	HF41H5VQ	HF42H5VQ
10 Micron	2000 psi	HF41H10VQ	HF42H10VQ
20 Micron	2000 psi	HF41H20VQ	HF42H20VQ

50P4 Pressure Filter

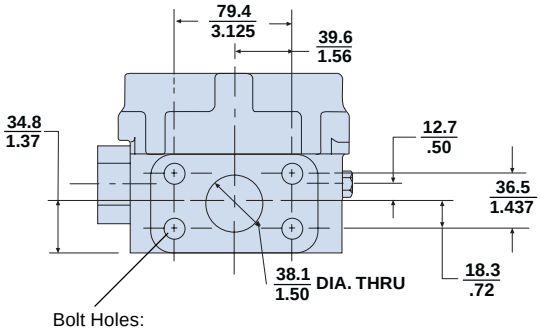
3000 psi Applications

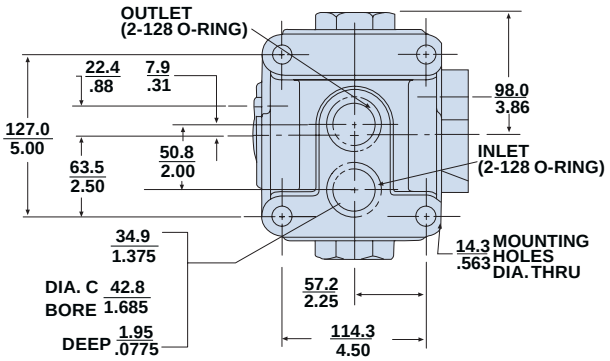
- **Air Bleed Port**
  Guarantees total use of element dirt holding capacity. For bleed fitting kit, see page 62.
- **Mechanical Visual or Electrical Visual Indicator**
  With 50 ΔP setting. For electrical indicator options and factory pin wiring, see pages 82-83.
- **Elements**
  3, 5, 10 and 20 micron HF4 elements with β > 200 with dual stage filtering media for up to 40% increased dirt holding capacity.
- **Mounting Provisions**
- **Top Service Elements**
- **Element Connector Single Or Double**
- **Non Bypass Option**

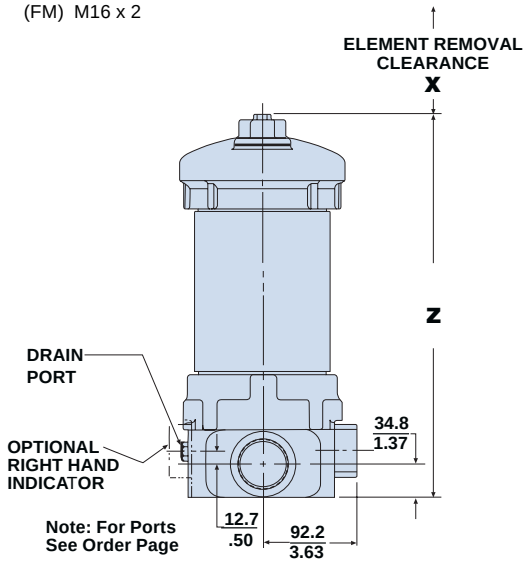
Dimensions= mm/inches	50P4-1	50P4-2
X	254.0 / 10.00	508.0 / 20.00
Z	387.1 / 15.24	622.8 / 24.52

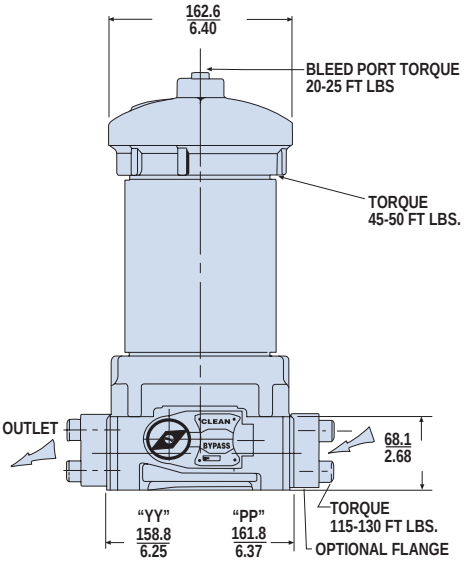
Linear Measure: millimeter / inch

50P4-2



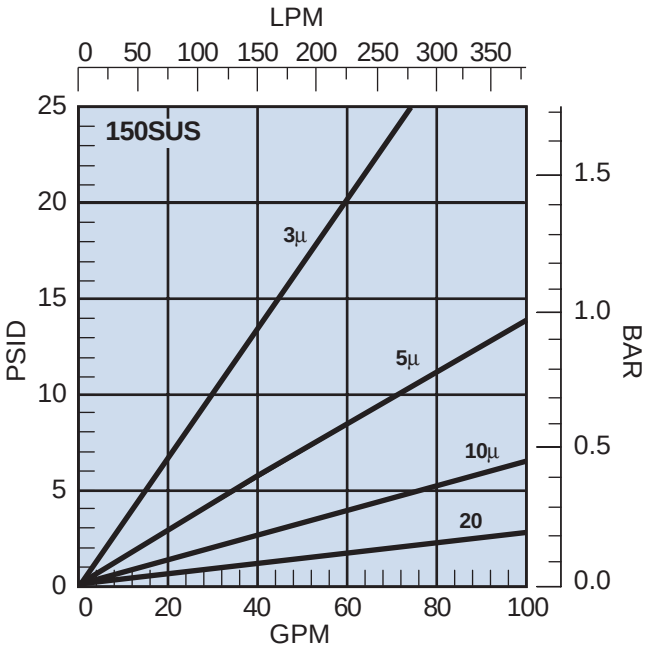


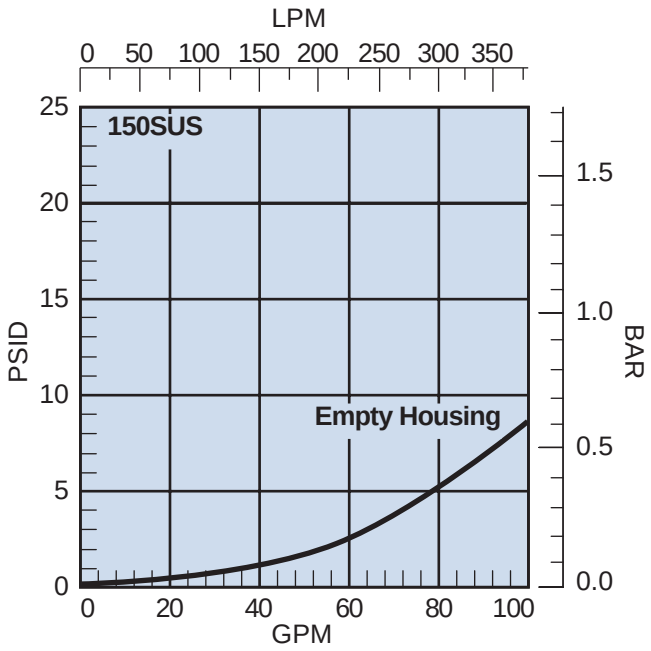




50P4-1 Element Performance

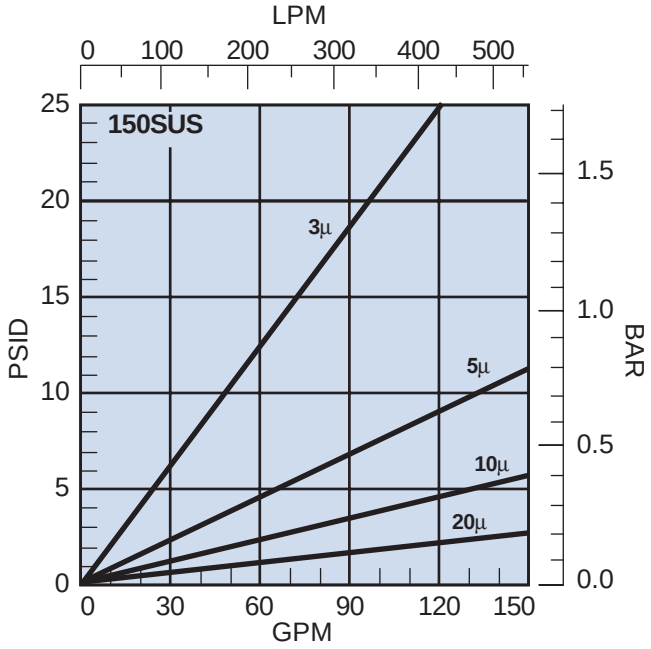
Flow vs. Pressure Loss

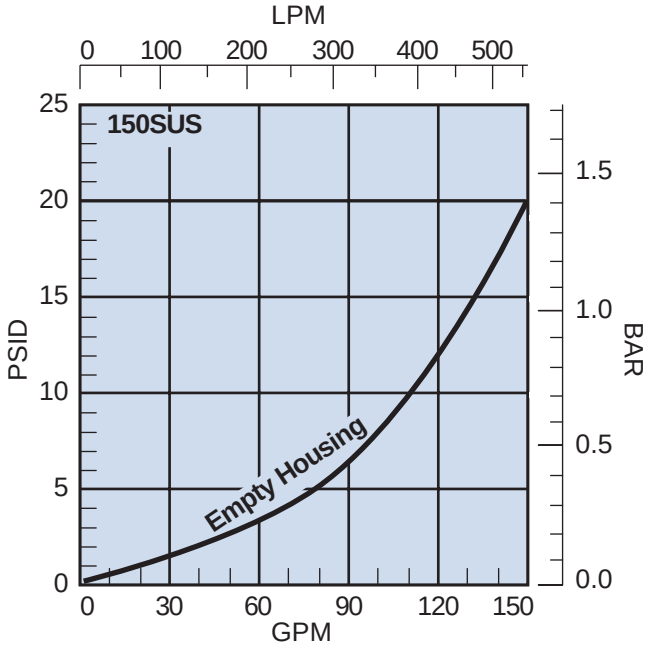




50P4-2 Element Performance

Flow vs. Pressure Loss





Assembly ΔP Formula

$$\text{PSID Assembly} = \left(\Delta P \text{ Empty Housing} + \text{Element } \Delta P\right) \times \frac{\text{New Viscosity}}{150} \times \frac{\text{New Specific Gravity}}{.90}$$

Note: For "H" High collapse elements use 1.4 x Δp from curves above.

HOW TO ORDER:

Select the desired symbol (in the correct position) to construct a model code.
Example:

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	BOX 7	BOX 8	BOX 9	BOX 10	BOX 11
		50P4	1	H	10	DE5MD	50	FM	11	N

BOX 1: Division Code

Symbol	Description
None	Leave blank

Note: Used for specific automotive program identification.

BOX 2: Plant Code

Symbol	Description
None	Leave blank

Note: Used for specific automotive plant location.

BOX 3: Configuration

Symbol	Description
50P4	Hydraulic Pressure Filter

BOX 4: Housing Bowl Length

Symbol	Description
1	1 Element
2	2 Elements

BOX 5: Element Collapse Rating

Symbol	Description
H	2000 PSI* (-11 Option Box 10)
L	150 PSI* (-1 Option Box 10)

BOX 6: Element Filtration Rating

Symbol	Description
3	3 Micron Microglass
5	5 Micron Microglass
10	10 Micron Microglass
20	20 Micron Microglass

**Consult factory for other requirements*

BOX 7: Indicator Type

Symbol	Description
DIR	Visual, right side
DIL	Visual, left side
DE3B*	Electrical/Visual
DE4A*	Electrical/Visual
DE4D*	Electrical/Visual
DE4MB*	Electrical/Visual
DE4MC*	Electrical/Visual
DE4MD*	Electrical/Visual
DE5A*	Electrical/Visual
DE5B*	Electrical/Visual
DE5D*	Electrical/Visual
DE5MD*	Electrical/Visual
F4M	Dual output electronic indicator

**Please refer to indicator drawings and chart on pages 82 and 83 for connector and wiring options. Located at left side of inlet - for right side add R to symbol. Example: E3BR.*

BOX 8: Indicator Setting

Symbol	Description
50	50 psid (3.5 bar)
125*	125 psid (8.6 bar)

*Note: F4M indicator, Option -11 only.

BOX 9: Port Size

Symbol	Description
ST24	1 7/8-12 UN-2B (ISO 11926)
M48	M48 x 2 (ISO 6149)
G24	1 1/2-11 BSPP (ISO 1179G228)
SMP	SAE Manifold Mount
MMP	Metric Manifold Mount
GMP	BSPP Manifold Mount
FS	1 1/2" Flange (ISO 6162) 5/8"-11bolt holes x1.03 in deep
FM	1 1/2" Flange (ISO 6162) M16 x 2 bolt holes, 25.5 mm deep

BOX 10: Bypass Option

Symbol	Description
1	*50 psi bypass "L" element
11	*Non bypass "H" element

BOX 11: Seal Compound

Symbol	Description
N	Nitrile
V	Fluorocarbon

Replacement Elements

Media	Element Collapse Rating	Single Length	Double Length
		Fluorocarbon/Nitrile	Fluorocarbon/Nitrile
3 Micron	150 psi	HF41L3VQ	HF42L3VQ
3 Micron	2000 psi	HF41H3VQ	HF42H3VQ
5 Micron	150 psi	HF41L5VQ	HF42L5VQ
5 Micron	2000 psi	HF41H5VQ	HF42H5VQ
10 Micron	150 psi	HF41L10VQ	HF42L10VQ
10 Micron	2000 psi	HF41H10VQ	HF42H10VQ
20 Micron	150 psi	HF41L20VQ	HF42L20VQ
20 Micron	2000 psi	HF41H20VQ	HF42H20VQ

Medium Pressure Duplex

1200 psi Applications

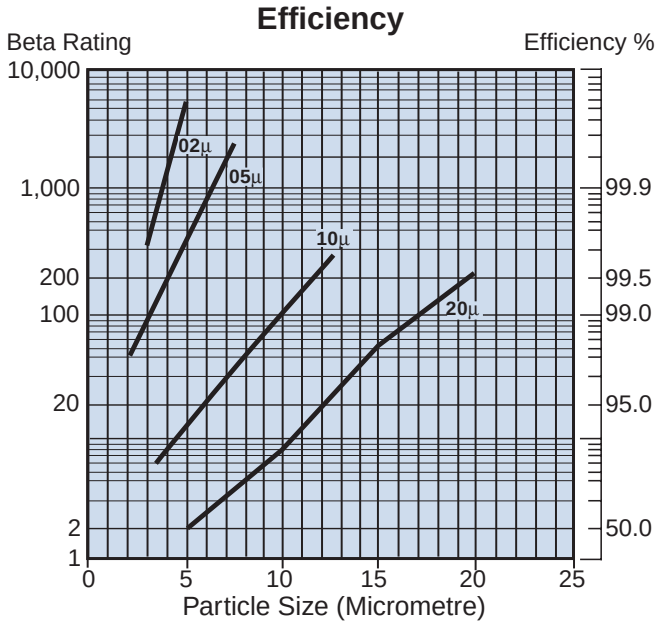
- **True duplex design with full neutral center valve**
- **ANSI and SAE porting**
- **Operating pressures to 1200 psi**
- **Flows to 110 gpm**
- **Modular design with double-length extension and flanged side chambers**
- **Internal equalization**
- **Coreless and HF4 elements as standard**
- **Non Bypass Option**

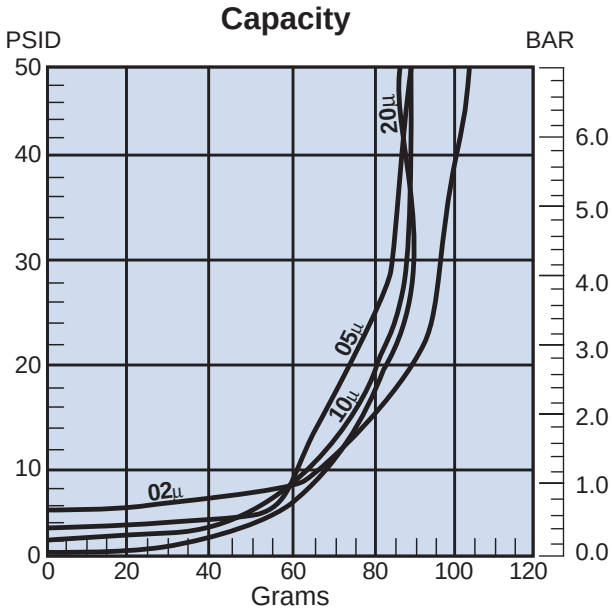
** Consult factory for fatigue pressure rating.*

HF4 Elements

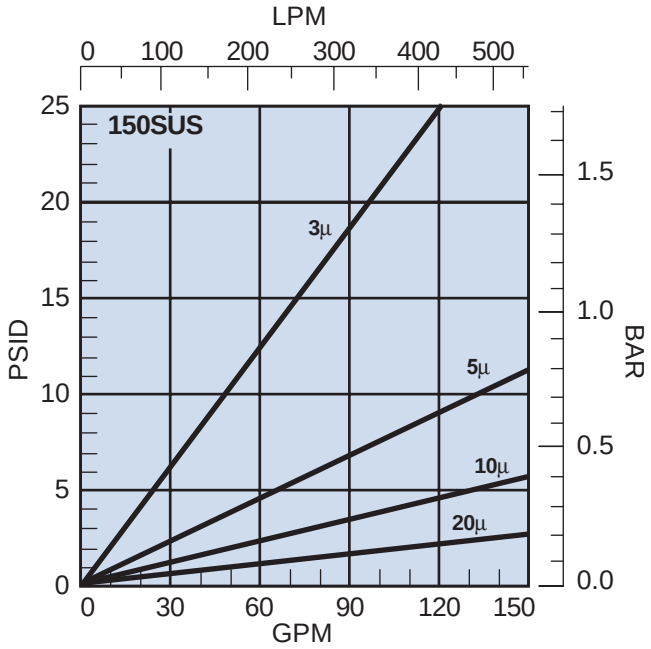
Coreless Elements

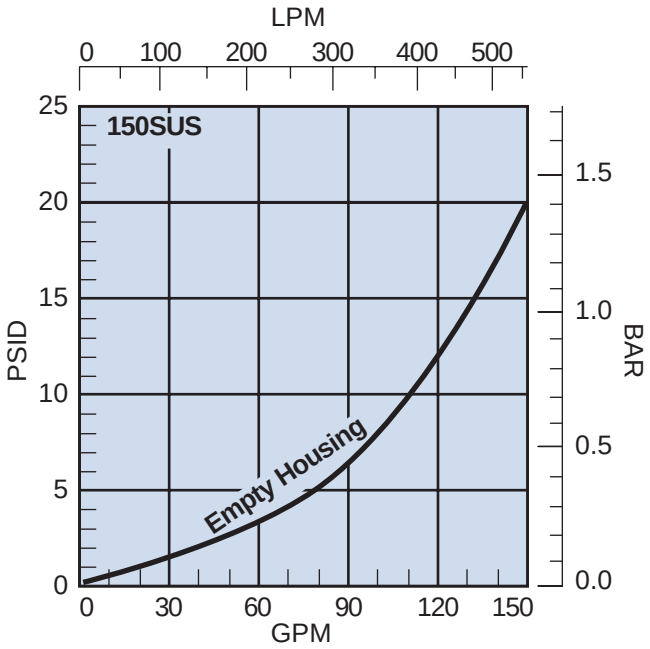
MPD-1 Element Performance





Flow vs. Pressure Loss



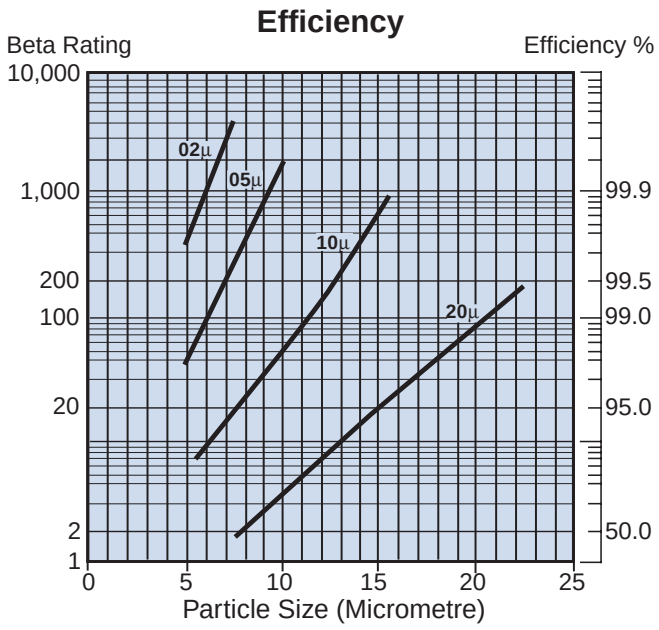


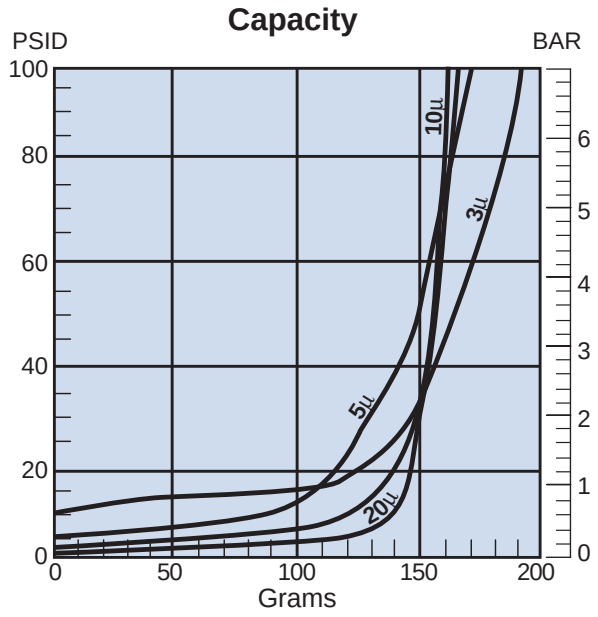
Assembly ΔP Formula

$$\text{PSID Assembly} = \left(\Delta P \text{ Empty Housing} + \text{Element } \Delta P\right) \times \frac{\text{New Viscosity}}{150} \times \frac{\text{New Specific Gravity}}{.90}$$

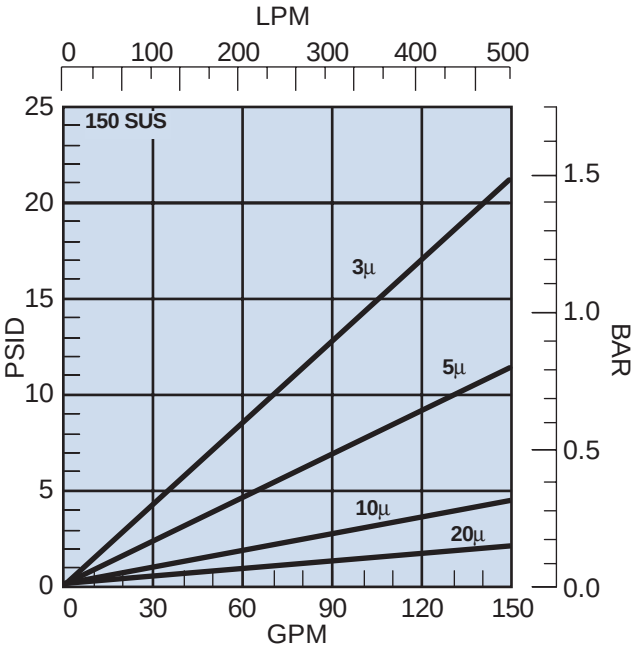
Note: For "H" High collapse elements use 1.4 x Δp from curves above.

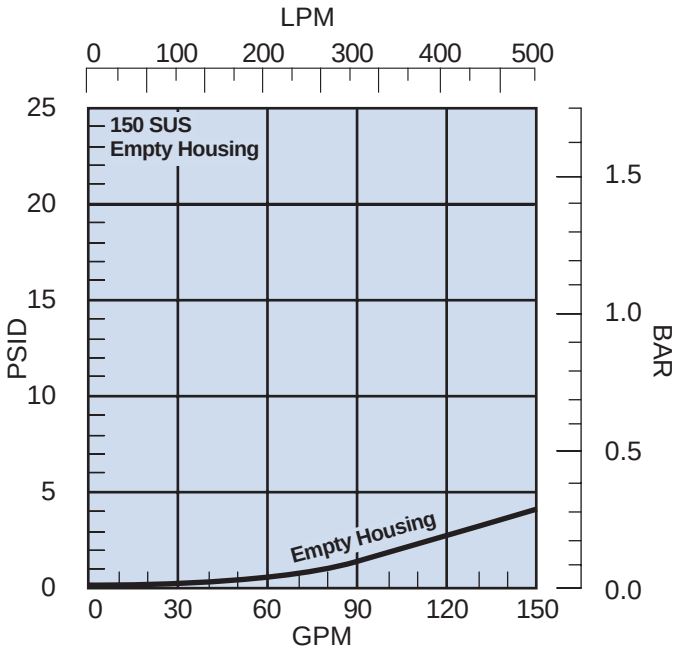
MPD-1 Element Performance





Flow vs. Pressure Loss





Assembly ΔP Formula

$$\text{PSID Assembly} = \left(\Delta P \text{ Empty Housing} + \text{Element } \Delta P\right) \times \frac{\text{New Viscosity}}{150} \times \frac{\text{New Specific Gravity}}{.90}$$

Note: For "H" High collapse elements use 1.4 x Δp from curves above.

HOW TO ORDER:

Select the desired symbol (in the correct position) to construct a model code.
Example:

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	BOX 7	BOX 8	BOX 9	BOX 10	BOX 11	BOX 12
		MPD	1	L	R	10QE	E5MD	25	AF	19	V

BOX 1: DIVISION CODE

Symbol	Description
None	Leave blank

Note: Used for specific automotive program identification.

BOX 2: PLANT CODE

Symbol	Description
None	Leave blank

Note: Used for specific automotive plant location.

BOX 3: Model Number

Symbol	Description
MPD	Duplex Filter

BOX 4: Element Length

Symbol	Description
1	Single
2	*Double*

BOX 5: ELEMENT COLLAPSE RATING

Symbol	Description
L	150 PSI* (-19 Option in Box 10 must be selected)
H	2000 PSI* (-21 Option in Box 10 must be selected)

BOX 6: Core

Symbol	Description
None	Disposable core
R*	Reusable core

*Only available with Buna seals, for double and triple length versions

BOX 7: Element Media

Symbol	Description
Reuseable Core (Low Collapse Only)	
20QE	Ecoglass III
10QE	Ecoglass III
05QE	Ecoglass III
02QE	Ecoglass III
Standard HF4 Type	
20	Microglass III (HF4)
10	Microglass III (HF4)
5	Microglass III (HF4)
3	Microglass III (HF4)

BOX 8: INDICATOR TYPE

Symbol	Description
M2	Visual/Auto reset
H	Electrical w/ ½" NPT conduit connection and wire pads
H1	Electrical w/ 12" leads only
E2	Electrical (DIN 43650 Hirschman style connection)
E3B*	Electrical/Visual
E4A*	Electrical/Visual
E4D*	Electrical/Visual
E4MB*	Electrical/Visual
E4MC*	Electrical/Visual
E4MD*	Electrical/Visual
E5A*	Electrical/Visual
E5B*	Electrical/Visual
E5D*	Electrical/Visual
E5MD*	Electrical/Visual
P	Indicator port plugged
N	No side chamber indicator port
F4M	Dual output electronic with 50 psi or non-bypass only

**Please refer to indicator drawings and chart on pages 82 and 83 for connector and wiring options. Located at left side of inlet - for right side add R to symbol. Example: E3BR.*

BOX 9: Bypass

Symbol	Pressure Setting
25	25 PSI (1.7 bar) setting
50	50 PSI (3.5 bar) setting If "no bypass" option (-21) and an indicator is selected, above symbols (25,50) denote indicator setting
125	125 psid (8.6 bar)

BOX 10: Ports

Symbol	Description
AF	2" Raised Face ANSI flange
FS	2" Flange (ISO 6162) 1/2 - 13 Bolt Holes, .75" Deep

BOX 11: Options

Symbol	Description
19	Drain port on bowl
21	No bypass and drain port (*Not available with Ecoglass II elements)

BOX 12: Seals

Symbol	Description
N	Nitrile
V	Fluorocarbon

Ecoglass II Replacement Elements (Fluorocarbon)

Media	MPD-1	MPD-2
20QE	935519Q	935521Q
10QE	935518Q	935520Q
05QE	935517Q	935458Q
02QE	935516Q	935488Q

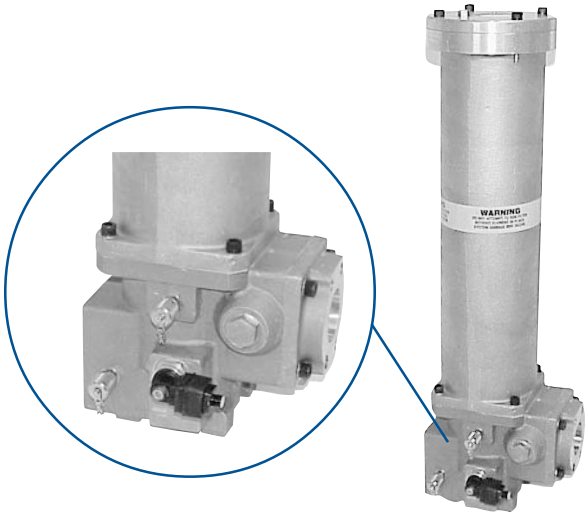
HF-4 Replacement Elements (Fluorocarbon)

Media	Element Collapse Rating	Single Length	Double Length
3 Micron	150 psi	HF41L3VQ	HF42L3VQ
3 Micron	2000 psi	HF41H3VQ	HF42H3VQ
5 Micron	150 psi	HF41L5VQ	HF42L5VQ
5 Micron	2000 psi	HF41H5VQ	HF42H5VQ
10 Micron	150 psi	HF41L10VQ	HF42L10VQ
10 Micron	2000 psi	HF41H10VQ	HF42H10VQ
20 Micron	150 psi	HF41L20VQ	HF42L20VQ
20 Micron	2000 psi	HF41H20VQ	HF42H20VQ

HF4 Return Filter

300 psi Application

- **Inlet Check Valve**
  Prevents fluid loss from system during filter service.
- **Outlet Check Valve**
  Prevents fluid loss from reservoir during filter service.
- **Element Check**
  Prevents filter operation without element in place.
- **25# Full Flow Bypass**
  Mandatory to prevent excessive back pressure into system, which could cause improper adjustments to actuator circuits to meet cycle times.
- **Upstream and Downstream Test Ports**
  Allows user to do maintenance troubleshooting. For test fitting kit, see page 62.
- **Filtered Fill Port**
  When off-line units are not used, provision for installing proper fill connections are provided. For fill disconnect kit, see page 63.
- **Mechanical Visual or Electrical Visual Indicator**
  With 25 ΔP setting. For electrical indicator options and factory pin wiring, see pages 82-83.



HF4-2

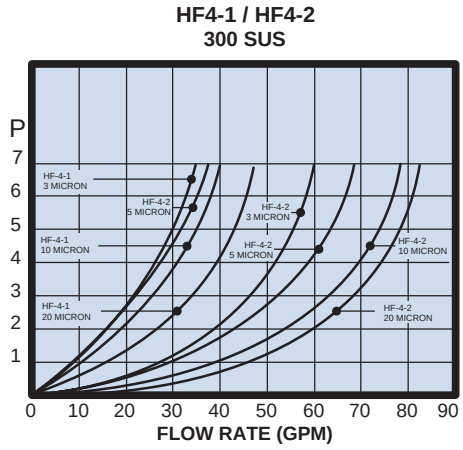
- **Element**
  3, 5, 10, and 20 micron HF4 elements with $\beta \geq 200$ with dual stage filtering media for up to 40% increased dirt holding capacity.
- **Mounting Provisions**
  For HF4 isolation mount kit, see page 64.
- **Air Bleed Port**
  Guarantees total use of element dirt holding capacity.
  For bleed fitting kit, see page 62.

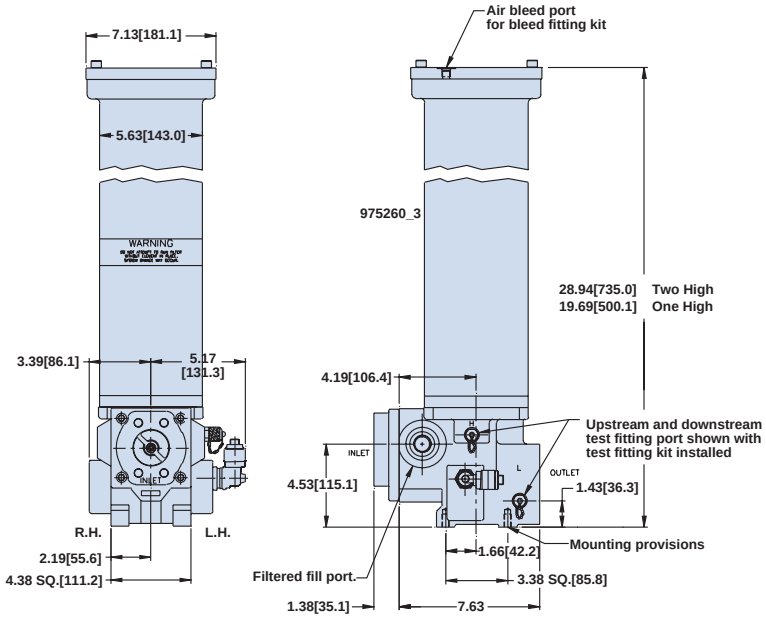
Flow Rate Curves

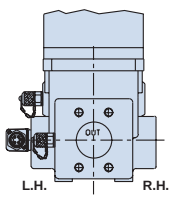
A.) Select flow rate (GPM).

B.) Determine micron selection.

C.) For maximum filter life, ΔP should not exceed 1/3 bypass/indicator setting.







Assembly ΔP Formula

$$\text{PSID Assembly} = \Delta P \text{ from curve} \times \frac{\text{New Viscosity}}{300} \times \frac{\text{New Specific Gravity}}{.90}$$

HOW TO ORDER:

Select the desired symbol (in the correct position) to construct a model code.
Example:

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	BOX 7	BOX 8	BOX 9	BOX 10	BOX 11	BOX 12
		HF	4	1	R1	L	10	IR	25	M48/F	N

BOX 1: Division Code

Symbol	Description
None	Leave blank

Note: Used for specific automotive program identification.

BOX 2: Plant Code

Symbol	Description
None	Leave blank

Note: Used for specific automotive plant location.

BOX 3: Configuration

Symbol	Description
HF	Hydraulic Filter

BOX 4: Element Diameter

Symbol	Description
4	4 Inch (NOMINAL)

BOX 5: Housing Bowl Length

Symbol	Description
1	1 Element
2	2 Elements

BOX 6: Housing Pressure Type

Symbol	Description
R1	300 PSI Return

BOX 7: Element Collapse Rating

Symbol	Description
L	150 PSI

BOX 8: Element Filtration Rating

Symbol	Description
3	3 Micron Microglass
5	5 Micron Microglass
10	10 Micron Microglass
20	20 Micron Microglass

**Consult factory for other requirements*

BOX 9: Indicator Type

Symbol	Description
IR	Visual, right side
IL	Visual, left side
E3B*	Electrical/Visual
E4A*	Electrical/Visual
E4D*	Electrical/Visual
E4MB*	Electrical/Visual
E4MC*	Electrical/Visual
E4MD*	Electrical/Visual
E5A*	Electrical/Visual
E5B*	Electrical/Visual
E5D*	Electrical/Visual
E5MD*	Electrical/Visual

**Please refer to indicator drawings and chart on pages 82 and 83 for connector and wiring options. Located at left side of outlet - for right side add R to symbol. Example: E3BR.*

BOX 10: Indicator or Bypass Setting

Symbol	Description
25	25 psid

BOX 11: Port Size

Symbol	Description
ST24/F	1 7/8-12 UN-2B (ISO 11926) Inlet Port, 2" Flange (ISO 6162) Outlet Port, 1/2-13 Bolt Holes, .75" deep
M48/F	M48 x 2 (ISO 6149) Inlet Port, 2" Flange (ISO 6162) Outlet Port, M12 x 1.75 Bolt Holes 19.5 mm Deep
G24/F	1 1/2-11 BSPP (ISO 1179G-228) Inlet port, 2" Flange (ISO 6162) Outlet Port, M12 x 1.75Bolt Holes, 19.5 mm Deep
F/FS	2" Flange (ISO 6162) Inlet & Outlet Ports, 1/2-13 Bolt Holes, .75" Deep, Fill and Test Ports (ISO 6149)
F/FM	2" Flange (ISO 6162) Inlet & Outlet Ports, M12 x 1.75 Bolt Holes, 19.5 mm Deep, Fill and Test Ports (ISO 6149)
F/FG	2" Flange (ISO 6162) Inlet & Outlet Ports, M12 x 1.75 Bolt Holes, 19.5 mm Deep, Fill and Test Ports (ISO 1179G-228)

BOX 12: Seal Compound

Symbol	Description
N	Nitrile
V	Fluorocarbon

Replacement Elements

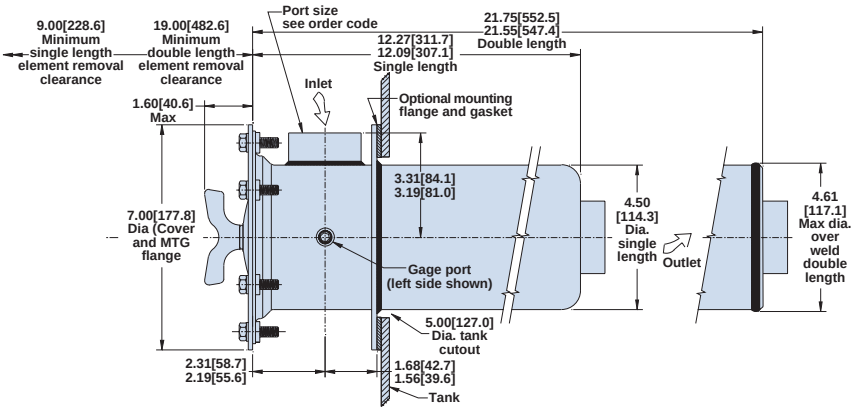
Media	Element Collapse Rating	Single Length	Double Length
		Fluorocarbon/Nitrile	Fluorocarbon/Nitrile
3 Micron	150 psi	HF41L3VQ	HF42L3VQ
5 Micron	150 psi	HF41L5VQ	HF42L5VQ
10 Micron	150 psi	HF41L10VQ	HF42L10VQ
20 Micron	150 psi	HF41L20VQ	HF42L20VQ
149W Micron	150 psi	HF41L149WV	HF42L149WV

RF4 Return Filter

150 psi Application

RF4-1

- **25# Full Flow Bypass**
  Mandatory to prevent excessive back pressure into system, which could cause improper adjustments to actuator circuits to meet cycle times.
- **Upstream Gauge Port**
  For visual or electrical indication.
- **Gauge or Electrical Indicator**
  With 25 PSI calibration. For electrical indicator options and factory pin wiring, see pages 82-83.
- **Element**
  3, 5, 10, and 20 micron HF4 elements with $\beta \geq 200$ with dual stage filtering media for up to 40% increased dirt holding capacity.
- **Mounting Provisions**
  Mounting flange (optional). Simple in-tank installation.
- **Single or Double Length**

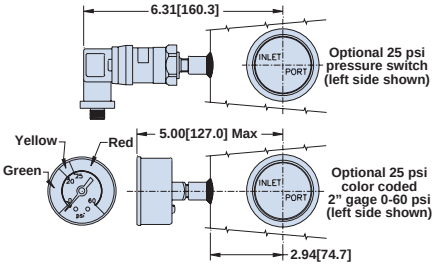


Flow Rate Curves

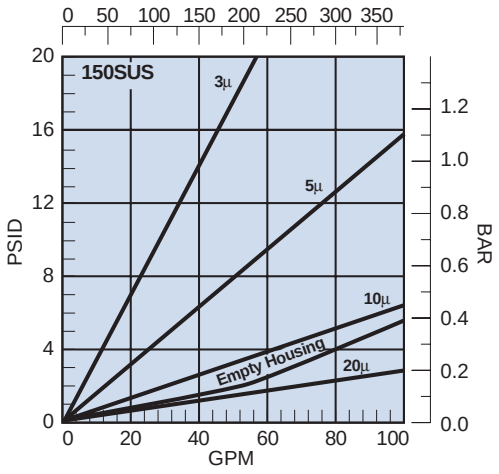
A.) Select flow rate (GPM).

B.) Determine micron selection.

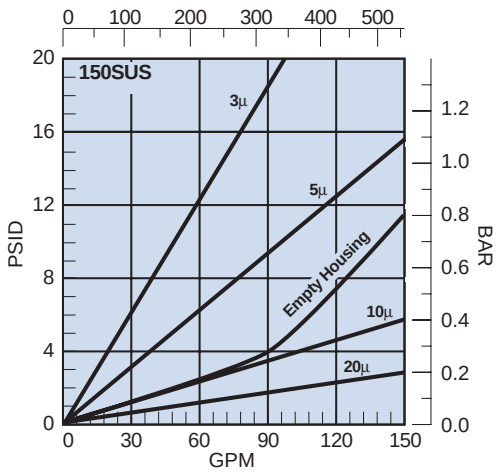
C.) For maximum filter life, ΔP should not exceed 1/3 bypass/indicator setting.

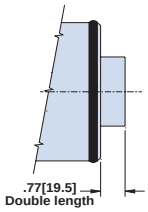


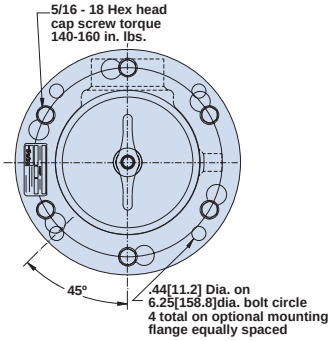
RF4-1



RF4-2







Assembly ΔP Formula

$$\text{PSID Assembly} = (\Delta P \text{ Empty Housing} + \text{Element } \Delta P) \times \frac{\text{New Viscosity}}{150} \times \frac{\text{New Specific Gravity}}{.90}$$

HOW TO ORDER:

Select the desired symbol (in the correct position) to construct a model code.
Example:

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	BOX 7	BOX 8	BOX 9	BOX 10
		RF4	1	L	10	GL	25	ST24	V

BOX 1: Division Code

Symbol	Description
None	Leave blank

Note: Used for specific automotive program identification.

BOX 2: Plant Code

Symbol	Description
None	Leave blank

Note: Used for specific automotive plant location.

BOX 3: Configuration

Symbol	Description
RF4	Return Filter

BOX 4: Housing Bowl Length

Symbol	Description
1	Single Length
2	Double Length
1F	Single Length with mounting flange
2F	Double Length with mounting flange

BOX 5: Element Collapse Rating

Symbol	Description
L	150 PSI

BOX 6: Element Filtration Rating

Symbol	Description
3	3 Micron Microglass
5	5 Micron Microglass
10	10 Micron Microglass
20	20 Micron Microglass

**Consult factory for other requirements*

BOX 7: Indicator Type

Symbol	Description
GL	Gauge, left side
PSL3*	Pressure switch, left side w/ 3-pin Brad Harrison style connection
PSL4*	Pressure switch, left side w/ 4-pin Brad Harrison style connection
PSL5*	Pressure switch, left side w/ 5-pin Brad Harrison style connection

**Please refer to indicator drawings and chart on pages 82 and 83 for connector and wiring options. Example: PSL5MD*

BOX 8: Indicator or Bypass Setting

Symbol	Description
25	25 psid (1.7 bar)

BOX 9: Port Size

Symbol	Description	
	INLET	OUTLET
P24	1 1/2" NPT	1 1/2" NPT
ST24	1 7/8-12 UN-2B (ISO 11926)	1 1/2" NPT
G24	1 1/2-11 BSPP (ISO 1179 G228)	1 1/2" BSPP
M42	M42 X 2 (ISO 6149)	1 1/2" BSPP

BOX 10: Seal Compound

Symbol	Description
N	Nitrile
V	Fluorocarbon

Replacement Elements

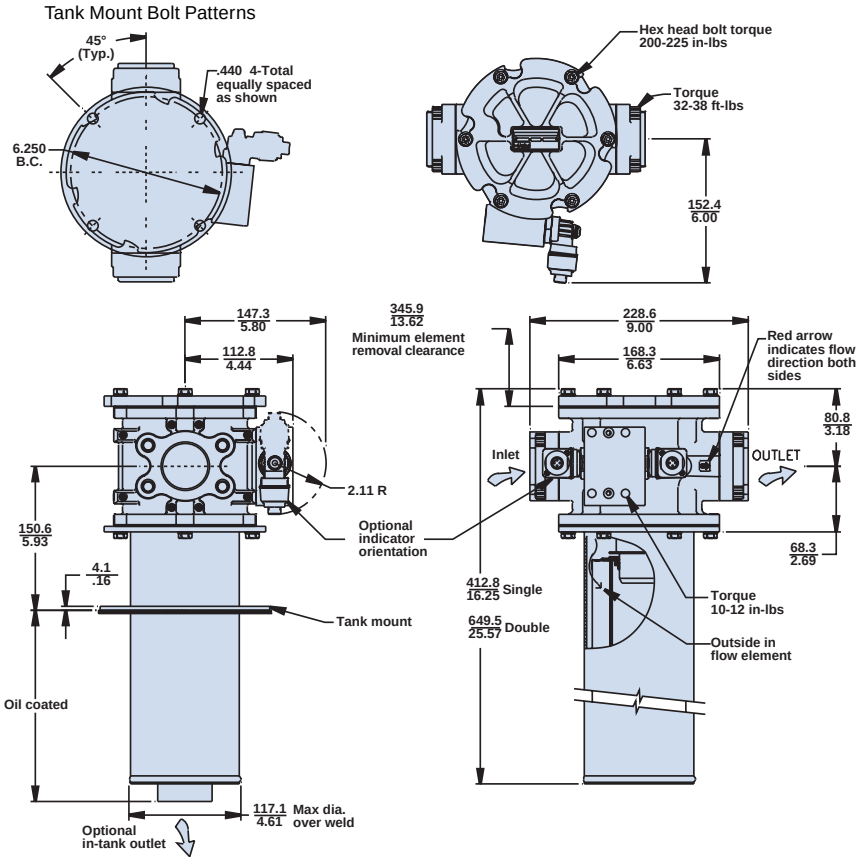
Media	Element Collapse Rating	Single Length	Double Length
		Fluorocarbon/Nitrile	Fluorocarbon/Nitrile
3 Micron	150 psi	HF41L3VQ	HF42L3VQ
5 Micron	150 psi	HF41L5VQ	HF42L5VQ
10 Micron	150 psi	HF41L10VQ	HF42L10VQ
20 Micron	150 psi	HF41L20VQ	HF42L20VQ

HT4/IL4 Filter

300 psi Application

HT4-1

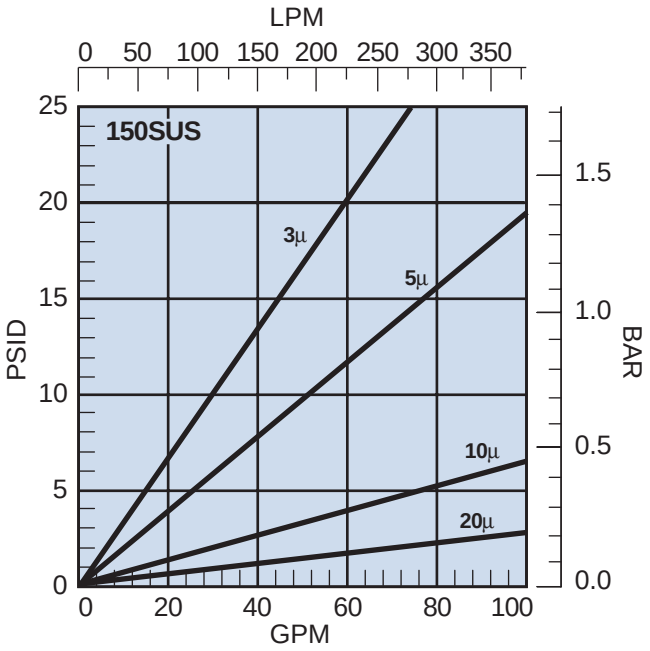
- **25# Full Flow Bypass**
  Mandatory to prevent excessive back pressure into system, which could cause improper adjustments to actuator circuits to meet cycle times.
- **Visual or Electrical Indicator**
  With 25 PSI calibration.
  For electrical indicator options and factory pin wiring, see pages 82-83.
- **Elements**
  3, 5, 10, and 20 micron HF4 elements with $\beta \geq 200$ with dual stage filtering media for up to 40% increased dirt holding capacity.
- **Mounting Provisions**
  Mounting flange HT version simple in-tank installation
- **Upstream and Downstream Test Ports**
  Allows user to do maintenance troubleshooting.
- **Single or Double Length**

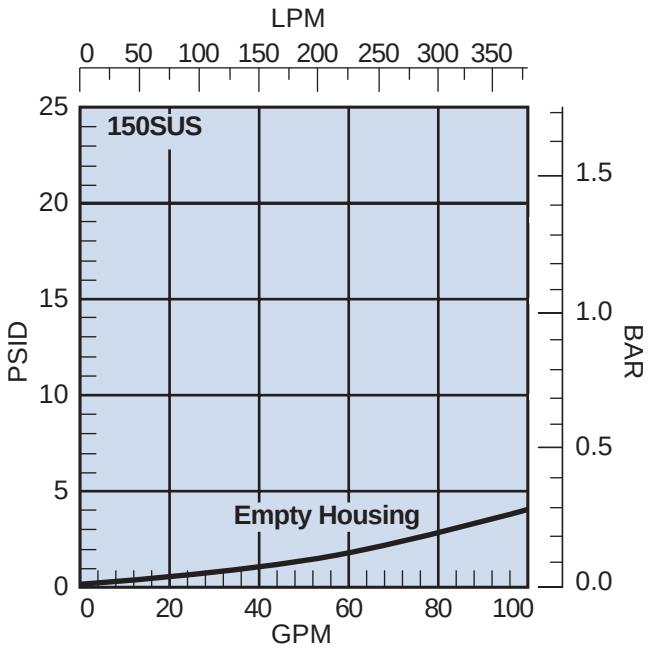


HT4 IL4

HT4-1/IL4-1 Element Performance

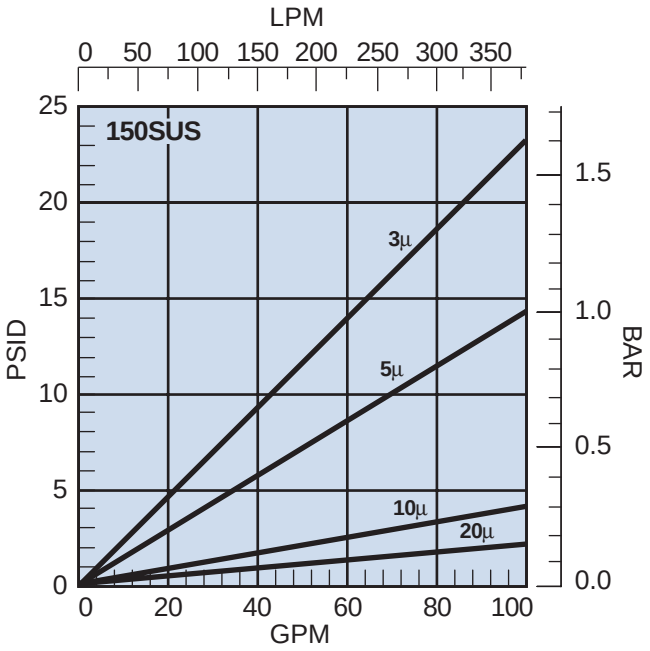
Flow vs. Pressure Loss

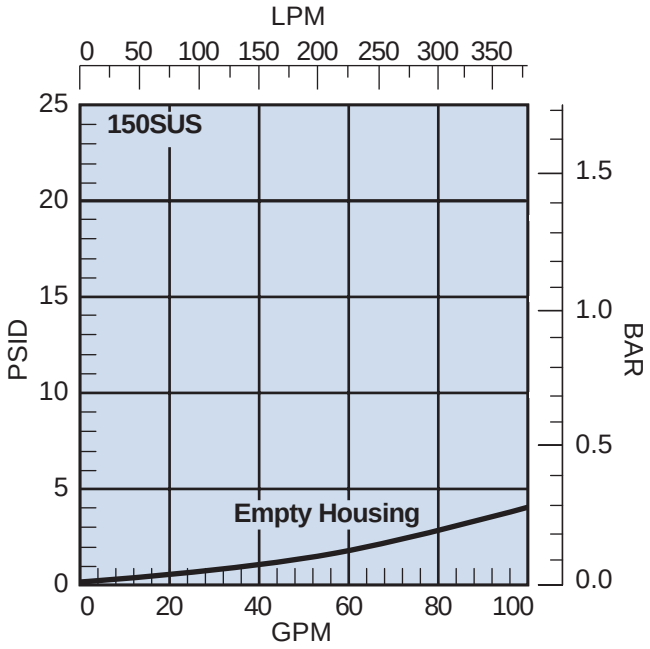




HT4-2/IL4-2 Element Performance

Flow vs. Pressure Loss





Assembly ΔP Formula

$$\text{PSID Assembly} = (\Delta P \text{ Empty Housing} + \text{Element } \Delta P) \times \frac{\text{New Viscosity}}{150} \times \frac{\text{New Specific Gravity}}{.90}$$

HOW TO ORDER:

Select the desired symbol (in the correct position) to construct a model code.
Example:

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	BOX 7	BOX 8	BOX 9	BOX 10
		IL4	2	L	10	E5MD	25	FM	N

BOX 1: Division Code

Symbol	Description
None	Leave blank

Note: Used for specific automotive program identification.

BOX 2: Plant Code

Symbol	Description
None	Leave blank

Note: Used for specific automotive plant location.

BOX 3: Housing

Symbol	Description
HT4	In-tank return
IL4	In-line return

BOX 4: Housing Length

Symbol	Description
1	Single length
2	Double length
1F	Single length with mounting flange HT4 only
2F	Double length with mounting flange HT4 only

BOX 5: Element Collapse Rating

Symbol	Description
L	150 PSI

BOX 6: Element Filtration Rating

Symbol	Description
3	3 Micron Microglass
5	5 Micron Microglass
10	10 Micron Microglass
20	20 Micron Microglass

BOX 7: Indicator type

Symbol	Description
IR	Visual, right side
IL	Visual, left side
E3B*	Electrical/Visual
E4A*	Electrical/Visual
E4D*	Electrical/Visual
E4MB*	Electrical/Visual
E4MC*	Electrical/Visual
E4MD*	Electrical/Visual
E5A*	Electrical/Visual
E5B*	Electrical/Visual
E5D*	Electrical/Visual
E5MD*	Electrical/Visual

**Please refer to indicator drawings and chart on pages 82 and 83 for connector and wiring options. Located at left side of inlet - for right side add R to symbol. Example: E3BR.*

BOX 8: Indicator or Bypass Setting

Symbol	Description
25	25 psid (1.7 bar)

BOX 9: Port (Inlet & Outlet)

HT4

Symbol	INLET	OUTLET
P24	1 1/2" NPT	1 1/2" NPT
ST24	1 7/8-12 UN-2B (ISO 11926)	1 1/2" NPT
G24	1 1/2-11 BSPP (ISO 1179G228)	1 1/2" BSPP
FS	2" Flange (ISO 6162) 1/2-13 Bolt Holes, .75" Deep	1 1/2" NPT
FM	2" Flange (ISO 6162) M12 x 1.75 Bolt Holes, 19.5 mm Deep	1 1/2" BSPP

IL4

Symbol	INLET & OUTLET
P24	1 1/2" NPT
ST24	1 7/8-12 UN-2B (ISO 11926)
G24	1 1/2-11 BSPP (ISO 1179G-228)
FS	2" Flange (ISO 6162), 1/2-13 Bolt Holes, .75" Deep
FM	2" Flange (ISO 6162), M12 x 1.75 Bolt Holes, 19.5 mm Deep

BOX 10: Seal Compound

Symbol	Description
N	Nitrile
V	Fluorocarbon

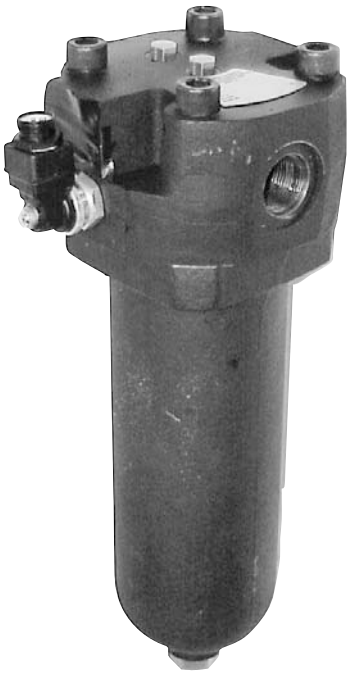
Replacement Elements

Media	Element Collapse Rating	Single Length	Double Length
		Fluorocarbon/Nitrile	Fluorocarbon/Nitrile
3 Micron	150 psi	HF41L3VQ	HF42L3VQ
5 Micron	150 psi	HF41L5VQ	HF42L5VQ
10 Micron	150 psi	HF41L10VQ	HF42L10VQ
20 Micron	150 psi	HF41L20VQ	HF42L20VQ

HF3 Pressure Filter

3000 psi Application

- **Non-Bypass Design**
- **Upstream and Downstream Test Ports**
  Allows user to do maintenance troubleshooting. For test fitting kit, see page 62.
- **Electrical Visual Indicator**
  With 50 ΔP setting. For electrical indicator options and factory pin wiring, see pages 82-83.
- **Drain Port**
- **Elements**
  3, 5, 10 and 20 micron HF3 elements with $\beta \geq 200$ with dual stage filtering media for up to 40% increased dirt holding capacity.
- **Mounting Provisions**



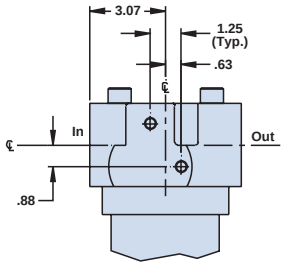
HF3

Flow Rate Curves

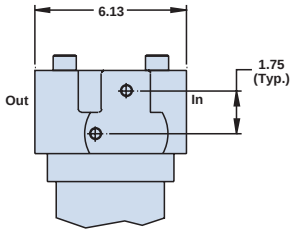
A.) Select flow rate (GPM).

B.) Determine micron selection.

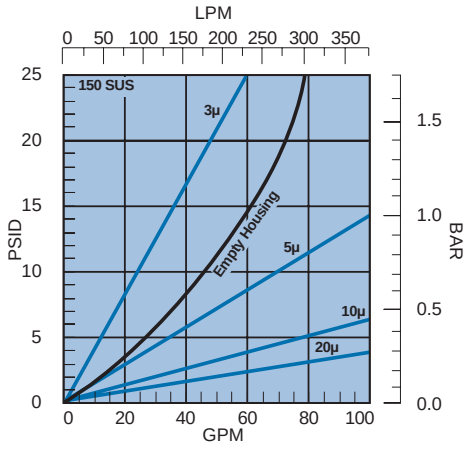
C.) For maximum filter life, ΔP should not exceed 1/3 bypass/indicator setting.

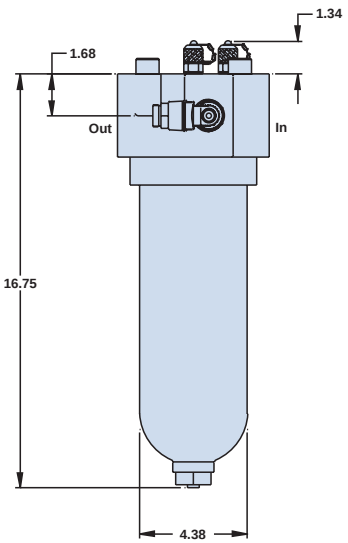


Right Hand



Left Hand





Assembly ΔP Formula

$$\text{PSID Assembly} = \Delta P \text{ from curve} \times \frac{\text{New Viscosity}}{300} \times \frac{\text{New Specific Gravity}}{.90}$$

Note: For "H" High collapse elements use 1.4 x Δp from curves above.

HOW TO ORDER:

Select the desired symbol (in the correct position) to construct a model code.
Example:

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	BOX 7	BOX 8	BOX 9	BOX 10	BOX 11	BOX 12	BOX 13
		HF	3	1	P3	H	3	IR	50	ST16	11	N

BOX 1: Division Code

Symbol	Description
None	Leave blank

Note: Used for specific automotive program identification.

BOX 2: Plant Code

Symbol	Description
None	Leave blank

Note: Used for specific automotive plant location.

BOX 3: Configuration

Symbol	Description
HF	Hydraulic Filter

BOX 4: Element Diameter

Symbol	Description
3	3 Inch (NOMINAL)

BOX 5: Housing Bowl Length

Symbol	Pressure Setting
1	1 Element 8” Long

BOX 6: Housing Pressure Type

Symbol	Description
P3	3000 PSI Pressure

BOX 7: Element Collapse Rating

Symbol	Description
H	2000 PSI (-11 Option Box 12)

BOX 8: Element Filtration Rating

Symbol	Description
3	3 Micron Microglass
5	5 Micron Microglass
10	10 Micron Microglass
20	20 Micron Microglass

**Consult factory for other requirements*

BOX 9: Indicator Type

Symbol	Description
IR	Visual, right side
IL	Visual, left side
E3B*	Electrical/Visual
E4A*	Electrical/Visual
E4D*	Electrical/Visual
E4MB*	Electrical/Visual
E4MC*	Electrical/Visual
E4MD*	Electrical/Visual
E5A*	Electrical/Visual
E5B*	Electrical/Visual
E5D*	Electrical/Visual
E5MD*	Electrical/Visual
F4M	Dual output electronic indicator

**Please refer to indicator drawings and chart on pages 82 and 83 for connector and wiring options. Located at left side of inlet - for right side add R to symbol. Example: E3BR.*

BOX 10: Indicator Setting

Symbol	Description
50	50 psid (3.5 bar)
125	125 psid (8.6 bar) F4M indicator w/ Option -11 only.

BOX 11: Port Size

Symbol	Description
ST16	1 5/16-12 UN-2B (ISO 11926)
M33	M33 x 2 (ISO 6149)
G16	1-11 BSPP (ISO 1179G228)

BOX 12: Options

Symbol	Description
11	Non-Bypass

BOX 13: Seal Compound

Symbol	Description
N	Nitrile
V	Fluorocarbon

Replacement Elements

Media	Element Collapse Rating	Single Length
		Fluorocarbon/Nitrile
3 Micron	2000 psi	HF31H3VQ
5 Micron	2000 psi	HF31H5VQ
10 Micron	2000 psi	HF31H10VQ
20 Micron	2000 psi	HF31H20VQ

30PD Duplex Filter

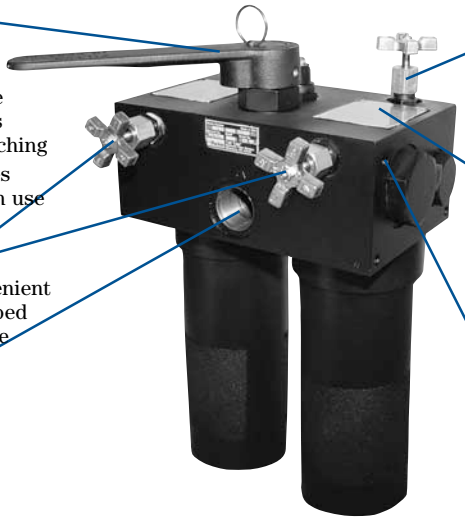
The Parker 30PD duplex pressure filter provides uninterrupted filtration for equipment that cannot be shut down for servicing.

The 30PD allows you to simply switch the diverter valve and service the element while the other side is in service.

A pressure balancing valve and downstream check valves are all neatly assembled in a compact manifold head that makes operation safe, smooth and easy.

Vent valves are also included to insure all air is purged after the off-duty element is serviced so that maximum system performance is achieved.

The Parker 30PD makes use of industry proven components. Elements are multi-pass tested in accordance with ANSI/NFPA T3.10.8.8 R1 -1990. Bowls and head are subjected to rigorous fatigue testing to insure a trouble free service life.



Diverter Valve
- Low torque for easy servicing
- Detent for valve handle prevents accidental switching
- Handle indicates which filter is in use

Vent Valves
- Allow for convenient purging of trapped air, and pressure

Ports
- SAE straight thread ports for positive sealing

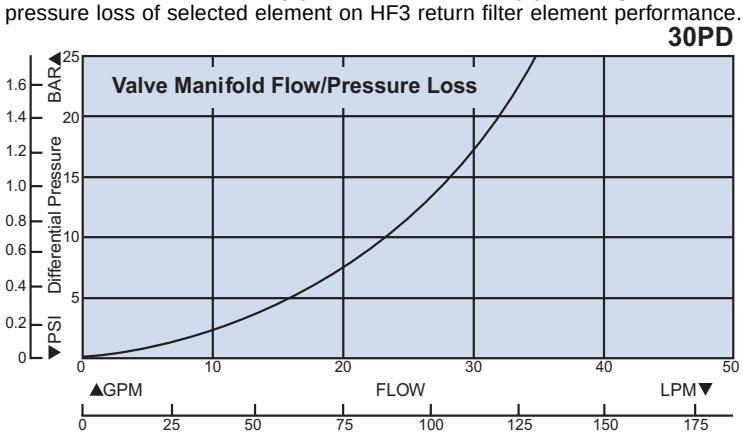
Balance Valve
- Safety valve equalizes pressure between the two bowls

Operating Instructions
- Name tag and operating instructions riveted to manifold

Vent Drains
- 1/8-27 NPT drain port, both sides

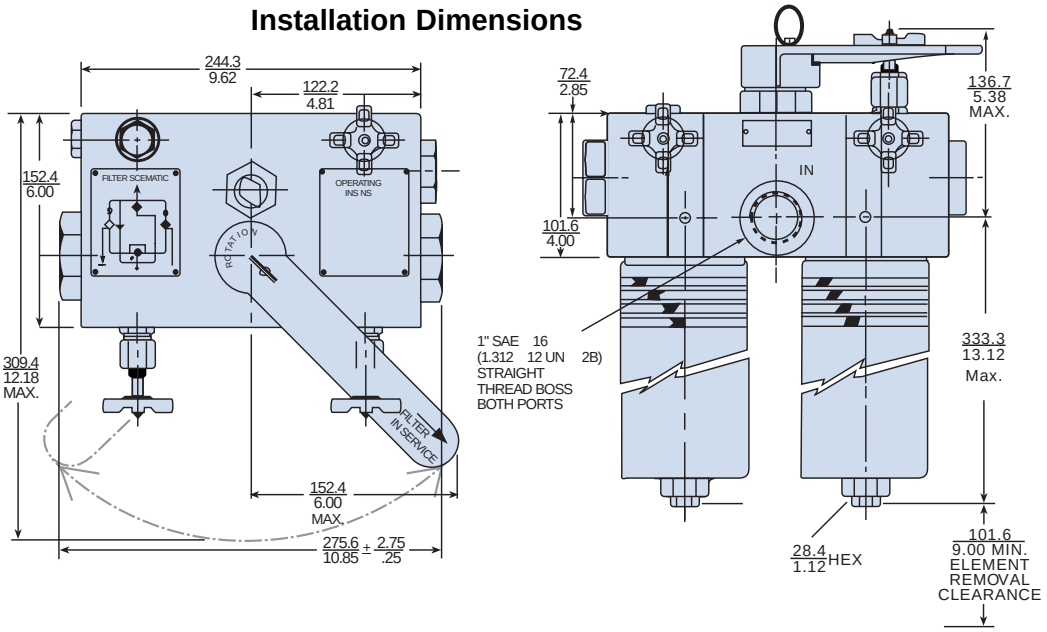
30PD Empty Housing Flow vs Pressure Loss

To obtain total filter assembly pressure loss, add empty housing loss to the pressure loss of selected element on HF3 return filter element performance.



Dimensions= $\frac{\text{mm}}{\text{in.}}$

Installation Dimensions



HOW TO ORDER:

Select the desired symbol (in the correct position) to construct a model code.
Example:

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	BOX 7	BOX 8	BOX 9	BOX 10	BOX 11
		30PD HF3	1	L	10	E4MD	50	ST16	19	N

BOX 1: Division Code

Symbol	Description
None	Leave blank

Note: Used for specific automotive program identification.

BOX 2: Plant Code

Symbol	Description
None	Leave blank

Note: Used for specific automotive plant location.

BOX 3: Basic Assembly

Symbol	Description
30PD HF3	Hydraulic filter duplex style 30P

BOX 4: Length

Symbol	Description
1	Single

BOX 5: Element Collapse Rating

Symbol	Description
H	1000 PSI* (-21 Option in Box 10 must be selected)
L	150 PSI* (-19 Option in Box 10 must be selected)

BOX 6: Indicator

Symbol	Description
20	20 micron Microglass
10	10 micron Microglass
5	5 micron Microglass
3	3 micron Microglass

BOX 7: Indicator Type

Symbol	Description
M2	Visual, top
E3B*	Electrical/Visual
E4A*	Electrical/Visual
E4D*	Electrical/Visual
E4MB*	Electrical/Visual
E4MC*	Electrical/Visual
E4MD*	Electrical/Visual
E5A*	Electrical/Visual
E5B*	Electrical/Visual
E5D*	Electrical/Visual
E5MD*	Electrical/Visual
F4M	Dual output electronic indicator

**Please refer to indicator drawings and chart on pages 82 and 83 for connector and wiring options.*

BOX 8: Bypass Or Indicator Setting

Symbol	Description
50	50 psid (3.5 bar)
125	125 psid (8.6 bar) F4M indicator w/ Option -21 only.

BOX 9: Ports

Model	Symbol	Description
ST16		1 5/16-12 UN-2B (ISO 11926)
M33		M33 x 2 (ISO 6149)
G16		1-11 BSPP (ISO 1179G228)

BOX 10: Options

Symbol	Description
19	SAE-5 drain port on bowl
21	No bypass and drain

BOX 11: Seals

Symbol	Description
N	Nitrile
V	Fluorocarbon

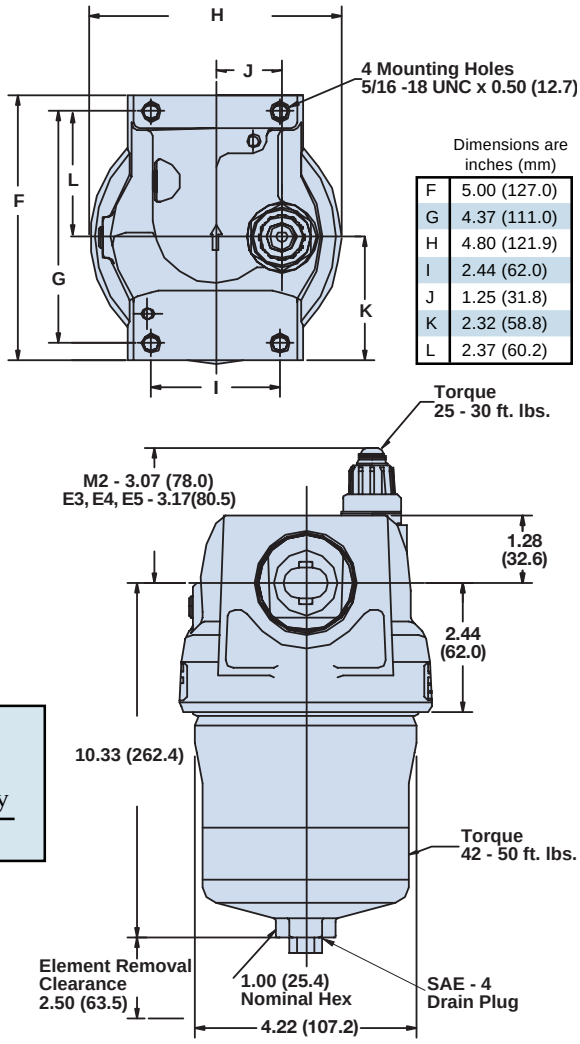
REPLACEMENT ELEMENTS

Media	Element Collapse Rating	Single Length Fluorocarbon/Nitrile
3 Micron	150 psi	HF31L3VQ
3 Micron	2000 psi	HF31H3VQ
5 Micron	150 psi	HF31L5VQ
5 Micron	2000 psi	HF31H5VQ
10 Micron	150 psi	HF31L10VQ
10 Micron	2000 psi	HF31H10VQ
20 Micron	150 psi	HF31L20VQ
20 Micron	2000 psi	HF31H20VQ

HF3 Return Filter

1000 psi Application

- **Non-Bypass Option**
- **Mechancial Visual or Electrical Visual Indicator**
  With 25 ΔP setting.
  For electrical indicator options and factory pin wiring, see pages 82-83.
- **Element**
  HF3 8" Long
  3, 5, 10, 20 micron high collapse element with β ≥ 200 and dual stage filtering media for up to 40% increased dirt holding capacity.
- **Mounting Provisions**
- **Automatic Air Bleed**



Dimensions are inches (mm)

F	5.00 (127.0)
G	4.37 (111.0)
H	4.80 (121.9)
I	2.44 (62.0)
J	1.25 (31.8)
K	2.32 (58.8)
L	2.37 (60.2)

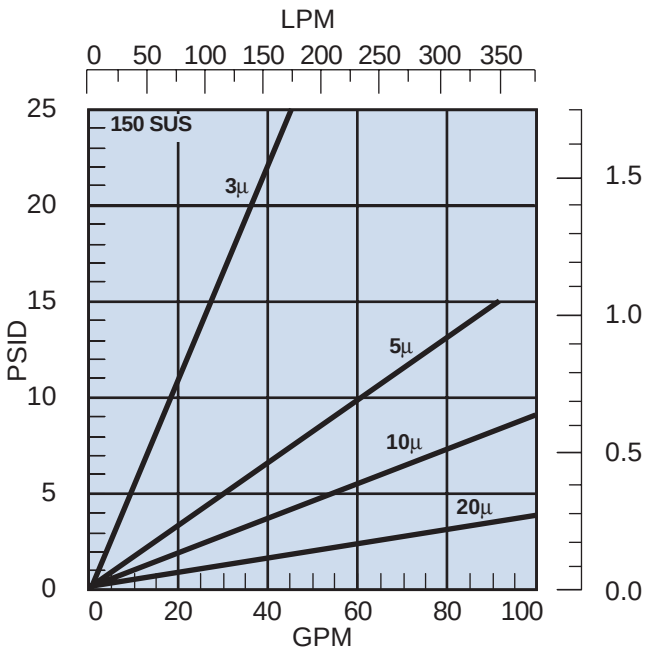
Assembly ΔP Formula

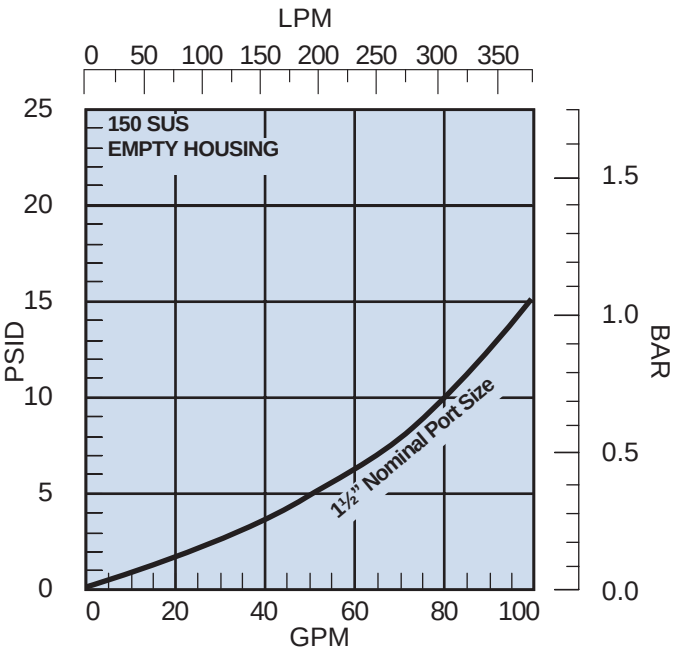
$$\text{PSID Assembly} = \left(\Delta P \text{ Empty Housing} + \text{Element } \Delta P\right) \times \frac{\text{New Viscosity}}{150} \times \frac{\text{New Specific Gravity}}{.90}$$

Note: For "H" High collapse elements use 1.4 x Δp from curves below.

40CN-2 Element Performance

Flow vs. Pressure Loss





HOW TO ORDER:

Select the desired symbol (in the correct position) to construct a model code.
Example:

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	BOX 7	BOX 8	BOX 9	BOX 10	BOX 11
		40CN	2	L	10	E5D	50	ST24	19	N

BOX 1: Division Code

Symbol	Description
None	Leave blank

Note: Used for specific automotive program identification.

BOX 2: Plant Code

Symbol	Description
None	Leave blank

Note: Used for specific automotive plant location.

BOX 3: Configuration

Symbol	Description
40CN	Hydraulic Filter (1,000 psi, HF3)

BOX 4: Housing Bowl Length

Symbol	Description
2	1-8" long element HF3-40CN only

BOX 5: Element Collapse Rating

Symbol	Description
H	2000 PSI* (-21 Option in Box 10 must be selected)
L	150 PSI* (-19 Option in Box 10 must be selected)

BOX 6: Element Filtration Rating

Symbol	Description
3	3 Micron Microglass
5	5 Micron Microglass
10	10 Micron Microglass
20	20 Micron Microglass

BOX 7: Indicator Type

Symbol	Description
M2	Visual, top
E3B*	Electrical/Visual
E4A*	Electrical/Visual
E4D*	Electrical/Visual
E4MB*	Electrical/Visual
E4MC*	Electrical/Visual
E4MD*	Electrical/Visual
E5A*	Electrical/Visual
E5B*	Electrical/Visual
E5D*	Electrical/Visual
E5MD*	Electrical/Visual
F4M	Dual output electronic indicator

**Please refer to indicator drawings and chart on pages 82 and 83 for connector and wiring options.*

BOX 8: Indicator Setting

Symbol	Description
25	25 psid (1.7 bar)
50	50 psid (3.5 bar)
125	125 psid (8.6 bar) F4M indicator w/ Option -21 only.

BOX 9: Port Size

Symbol	Description
ST24	1 7/8-12 UN-2B (ISO 11926)
M48	M48 x 2 (ISO 6149)
G20	1 1/4-11 BSPP
G24	1 1/2-11 BSPP (ISO 1179-1)

BOX 10: Options

Symbol	Description
19	Drain port on bowl
21	Non bypass with drain port

BOX 11: Seal Compound

Symbol	Description
N	Nitrile
V	Fluorocarbon

Replacement Elements

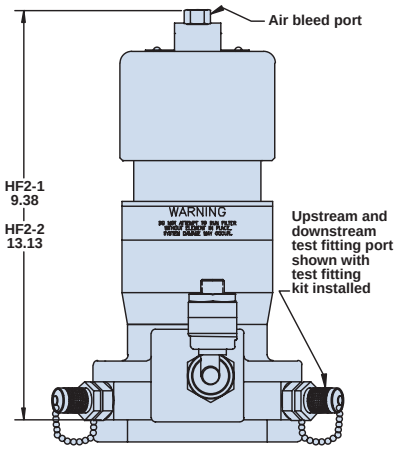
Media	Element Collapse Rating	Single Length
		Fluorocarbon/Nitrile
3 Micron	150 psi	HF31L3VQ
3 Micron	2000 psi	HF31H3VQ
5 Micron	150 psi	HF31L5VQ
5 Micron	2000 psi	HF31H5VQ
10 Micron	150 psi	HF31L10VQ
10 Micron	2000 psi	HF31H10VQ
20 Micron	150 psi	HF31L20VQ
20 Micron	2000 psi	HF31H20VQ

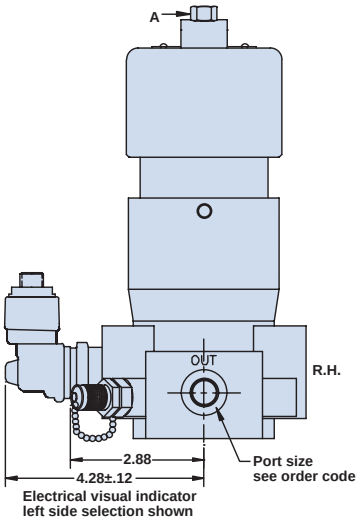
HF2 Pressure Filter

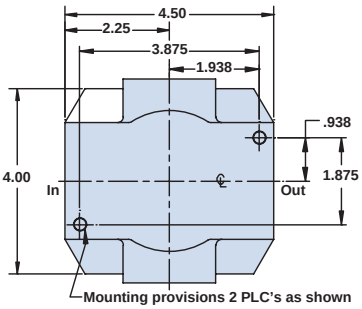
3000 psi Application

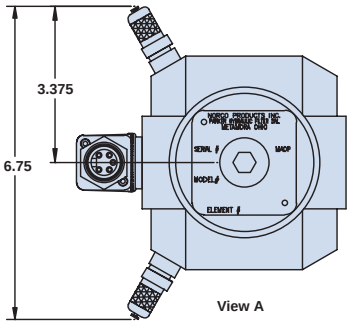
HF2-1

- **Outlet Check**
  Prevents fluid loss from reservoir during filter service.
- **Element Check**
  Prevents filter operation without element in place.
- **Non-Bypass Design**
- **Upstream and Downstream Test Ports**
  Allows user to do maintenance troubleshooting.
  For test fitting kit, see page 62.
- **Mechanical Visual or Electrical Visual Indicator**
  With 50 ΔP setting.
  For electrical indicator options and factory pin wiring, see pages 82-83.
- **Element**
  HF2 4" or 8" Long
  3, 5, 10, 20 micron high collapse element with $\beta \geq 200$ and dual stage filtering media for up to 40% increased dirt holding capacity.
- **Mounting Provisions**
- **Air Bleed Port**
  Guarantees total use of element dirt holding capacity.
  For bleed fitting kit, see page 62.



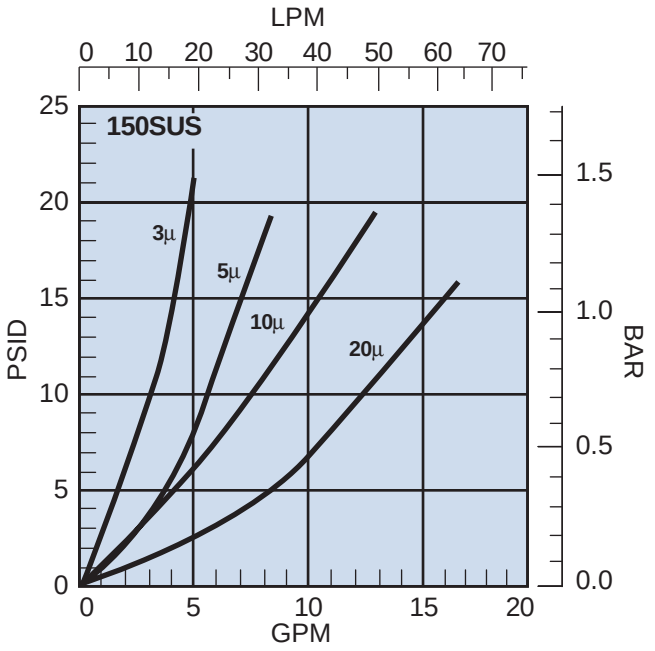






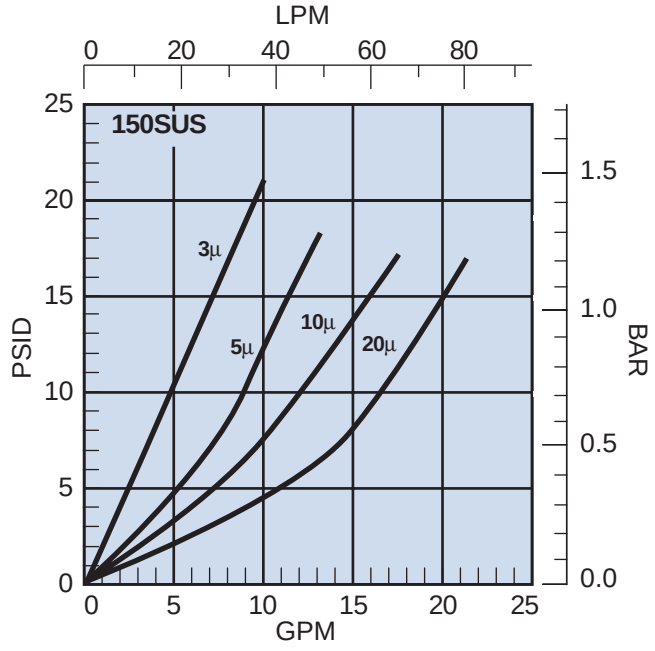
HF2-1 Element Performance

Flow vs. Pressure Loss



HF2-2 Element Performance

Flow vs. Pressure Loss



Assembly ΔP Formula

$$\text{PSID Assembly} = \Delta P \text{ from curve} \times \frac{\text{New Viscosity}}{300} \times \frac{\text{New Specific Gravity}}{.90}$$

Note: For "H" High collapse elements use 1.4 x Δp from curves above.

HOW TO ORDER:

Select the desired symbol (in the correct position) to construct a model code.
Example:

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	BOX 7	BOX 8	BOX 9	BOX 10	BOX 11	BOX 12
		HF	2	2	P3	H	3	IR	50	ST8	N

BOX 1: Division Code

Symbol	Description
None	Leave blank

Note: Used for specific automotive program identification.

BOX 2: Plant Code

Symbol	Description
None	Leave blank

Note: Used for specific automotive plant location.

BOX 3: Configuration

Symbol	Description
HF	Hydraulic filter

BOX 4: Element Diameter

Symbol	Description
2	2 Inch (NOMINAL)

BOX 5: Housing Bowl Length

Symbol	Pressure Setting
1	1 Element 4” Long
2	1 Element 8” Long

BOX 6: Housing Pressure Type

Symbol	Description
P3	3000 PSI Pressure

BOX 7: Element Collapse Rating

Symbol	Description
H	2000 PSI

BOX 8: Element Filtration Rating

Symbol	Description
3	3 Micron Microglass
5	5 Micron Microglass
10	10 Micron Microglass
20	20 Micron Microglass

**Consult factory for other requirements*

BOX 9: Indicator Type

Symbol	Description
IR	Visual, right side
IL	Visual, left side
E3B*	Electrical/Visual
E4A*	Electrical/Visual
E4D*	Electrical/Visual
E4MB*	Electrical/Visual
E4MC*	Electrical/Visual
E4MD*	Electrical/Visual
E5A*	Electrical/Visual
E5B*	Electrical/Visual
E5D*	Electrical/Visual
E5MD*	Electrical/Visual
F4M	Dual output electronic

**Please refer to indicator drawings and chart on pages 82 and 83 for connector and wiring options. Located at left side of outlet - for right side add R to symbol. Example: E3BR.*

BOX 10: indicator Setting

Symbol	Description
50	50 psid (3.5 bar)
125	125 psid (8.6 bar) F4M indicator only

BOX 11: Port Size

Symbol	Description
ST8	3/4-16 UN-2B (ISO 11926)
M22	M22 x 1.5 (ISO 6149)
G6	G 3/8-19 BSPP (ISO 1179-1)

BOX 12: Seal Compound

Symbol	Description
N	Nitrile
V	Fluorocarbon

Replacement Elements

Media	Element Collapse Rating	Single Length	Double Length
		Fluorocarbon/Nitrile	Fluorocarbon/Nitrile
3 Micron	2000 psi	HF21H3VQ	HF22H3VQ
5 Micron	2000 psi	HF21H5VQ	HF22H5VQ
10 Micron	2000 psi	HF21H10VQ	HF22H10VQ
20 Micron	2000 psi	HF21H20VQ	HF22H20VQ

HF2 Return

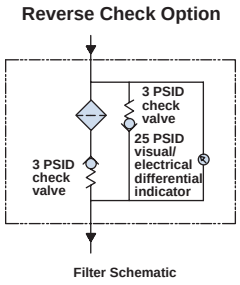
Lubrication/Return Filters

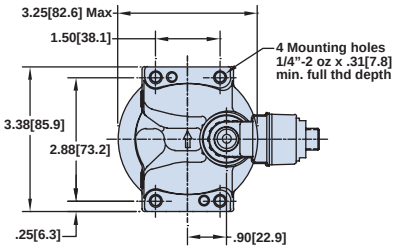
1000 psi Applications

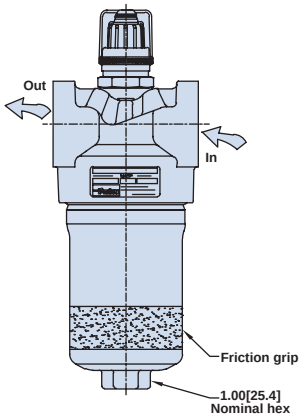
- **Mechancial Visual or Electrical Visual Indicator**
  With 25 ΔP setting.
  For electrical indicator options and factory pin wiring, see pages 82-83.
- **Element**
  HF2 4" and 8" Long
  3, 5, 10, 20 micron high collapse element with β ≥ 200 and dual stage filtering media for up to 40% increased dirt holding capacity.
- **Mounting Provisions**
- **Reverse Check Option**
  For system decompression, includes Element Check to prevent back flow during system decompression.
- **Automatic Air Bleed**

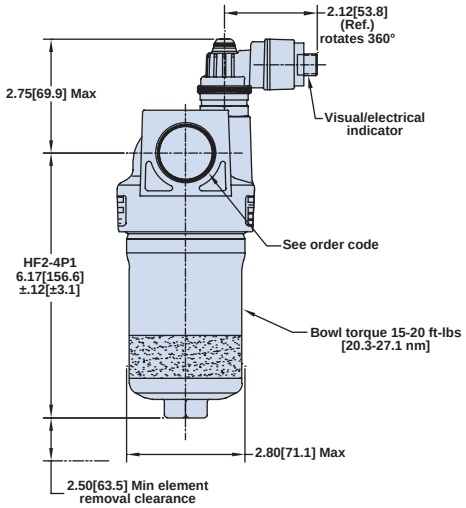
15CN-1

15CN-2



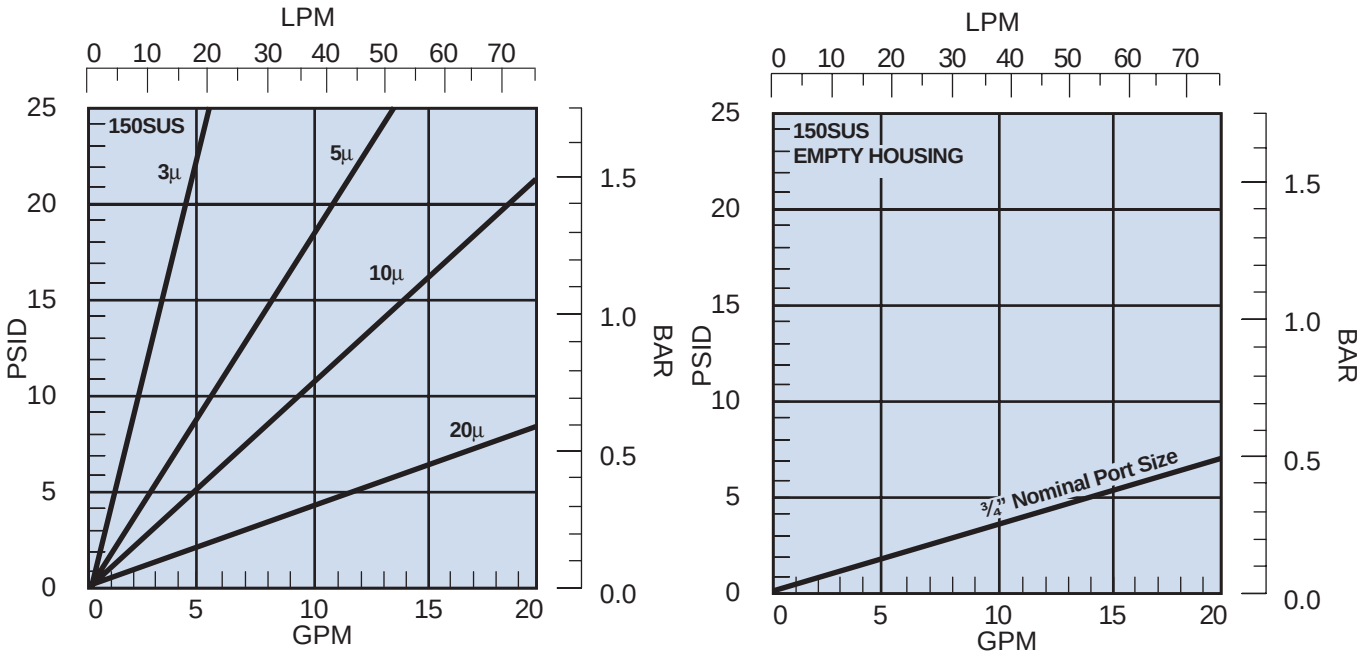






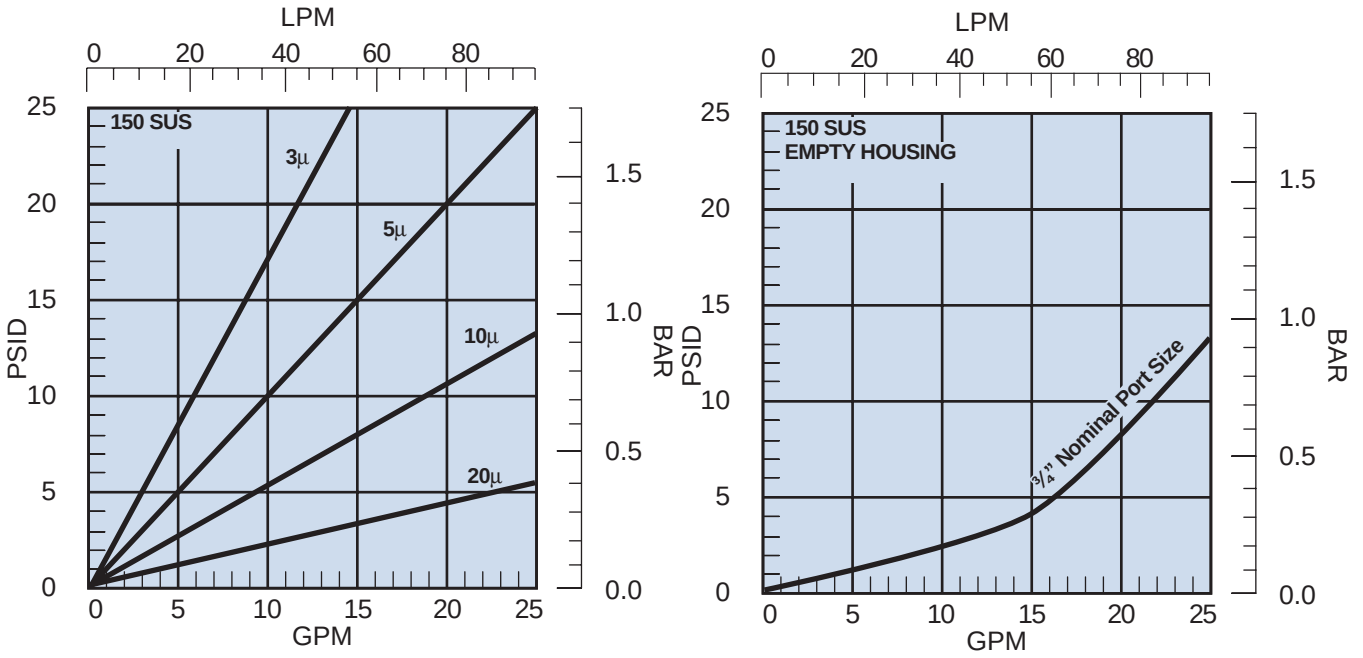
15CN-1 Element Performance

Flow vs. Pressure Loss



15CN-2 Element Performance

Flow vs. Pressure Loss



Assembly ΔP Formula

$$\text{PSID Assembly} = (\Delta P \text{ Empty Housing} + \text{Element } \Delta P) \times \frac{\text{New Viscosity}}{150} \times \frac{\text{New Specific Gravity}}{.90}$$

Note: For "H" High collapse elements use 1.4 x Δp from curves above.

HOW TO ORDER:

Select the desired symbol (in the correct position) to construct a model code.
Example:

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	BOX 7	BOX 8	BOX 9	BOX 10	BOX 11
		15CN	2	L	10	E5A	25	ST12	19	N

BOX 1: DIVISION CODE

Symbol	Description
None	Leave blank

Note: Used for specific automotive program identification.

BOX 2: PLANT CODE

Symbol	Description
None	Leave blank

Note: Used for specific automotive plant location.

BOX 3: CONFIGURATION

Symbol	Description
15CN	Hydraulic Filter HF2

BOX 4: HOUSING BOWL LENGTH

Symbol	Description
1	1 Element 4" Long
2	1 Element 8" Long

BOX 5: ELEMENT COLLAPSE RATING

Symbol	Description
H	2000 PSI* (-21 or -R5 Option in Box 10 must be selected)
L	150 PSI* (-19 Option in Box 10 must be selected)

BOX 6: ELEMENT RATING

Symbol	Description
3	3 Micron Microglass
5	5 Micron Microglass
10	10 Micron Microglass
20	20 Micron Microglass

**Consult factory for other requirements*

BOX 7: INDICATOR TYPE

Symbol	Description
M2	Visual, top
E3B*	Electrical/Visual
E4A*	Electrical/Visual
E4D*	Electrical/Visual
E4MB*	Electrical/Visual
E4MC*	Electrical/Visual
E4MD*	Electrical/Visual
E5A*	Electrical/Visual
E5B*	Electrical/Visual
E5D*	Electrical/Visual
E5MD*	Electrical/Visual
F4M	Dual output electronic indicator

**Please refer to indicator drawings and chart on pages 82 and 83 for connector and wiring options.*

BOX 8: INDICATOR OR BYPASS SETTING

Symbol	Description
25	25 psid (1.7 bar)
50	50 psid (3.5 bar)
125	125 psid (8.6 bar)
	F4M indicator w/ Option -21 only.

BOX 9: PORT SIZE

Symbol	Description
ST12	1 1/16-12 UN-2B (ISO 11926)
M27	M27 x 2 (ISO 6149)
G12	G 3/4-14 BSPP (ISO 1179-1)

BOX 10: OPTIONS

Symbol	Description
19	Drain port on bowl
21	Non bypass with drain port
R5	Reverse check option for injector type lube systems

BOX 11: SEAL COMPOUND

Symbol	Description
N	Nitrile
V	Fluorocarbon

Replacement Elements

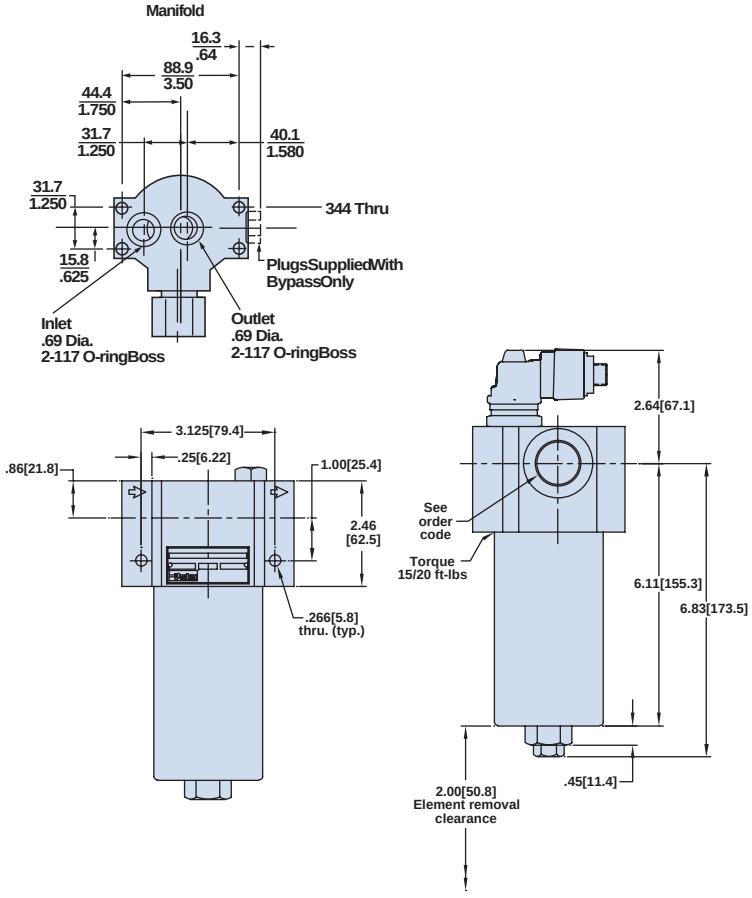
Media	Element Collapse Rating	Single Length	Double Length
		Fluorocarbon/Nitrile	Fluorocarbon/Nitrile
3 Micron	150 psi	HF21L3VQ	HF22L3VQ
3 Micron	2000 psi	HF21H3VQ	HF22H3VQ
5 Micron	150 psi	HF21L5VQ	HF22L5VQ
5 Micron	2000 psi	HF21H5VQ	HF22H5VQ
10 Micron	150 psi	HF21L10VQ	HF22L10VQ
10 Micron	2000 psi	HF21H10VQ	HF22H10VQ
20 Micron	150 psi	HF21L20VQ	HF22L20VQ
20 Micron	2000 psi	HF21H20VQ	HF22H20VQ

Centralized Grease/Pressure Filters

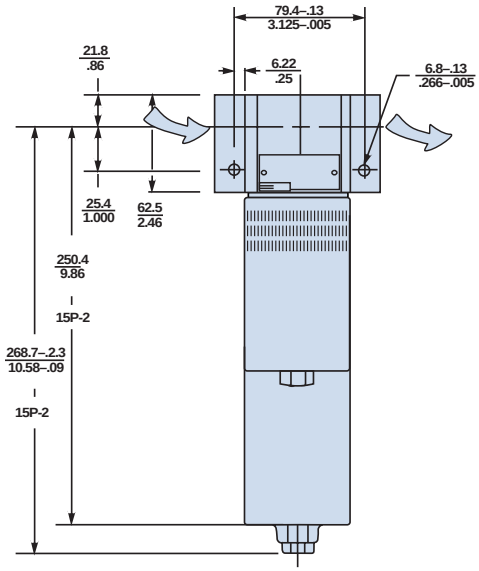
3000 psi Application

- **Mechancial Visual or Electrical Visual Indicator**
  With 50 ΔP setting.
  For electrical indicator options and factory pin wiring, see pages 82-83.
- **Specially Designed Element**
  To prevent decompression rupture of 149 micron element in grease applications.
- **Mounting Provisions**

15P-1



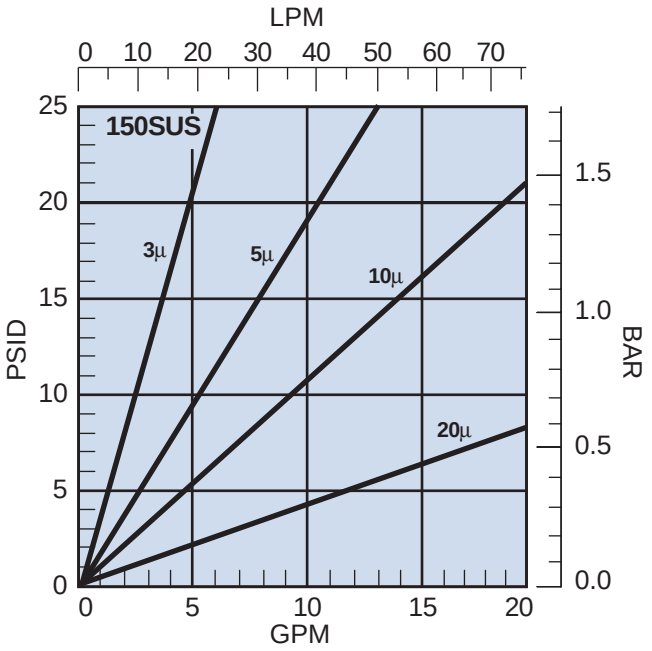
15P-1

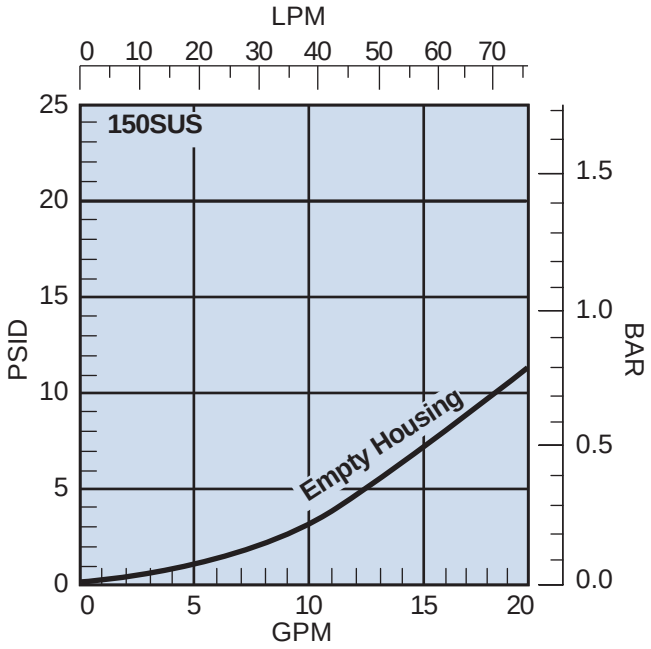


15P-2

15P-1 Element Performance

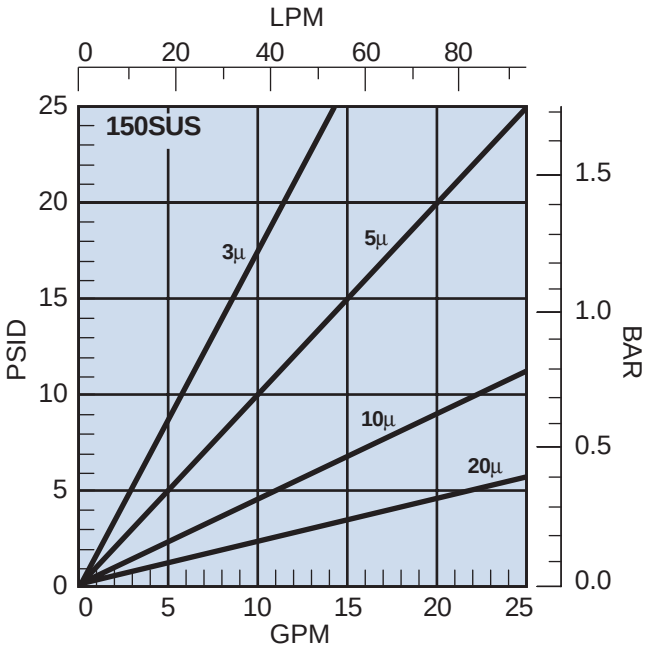
Flow vs. Pressure Loss

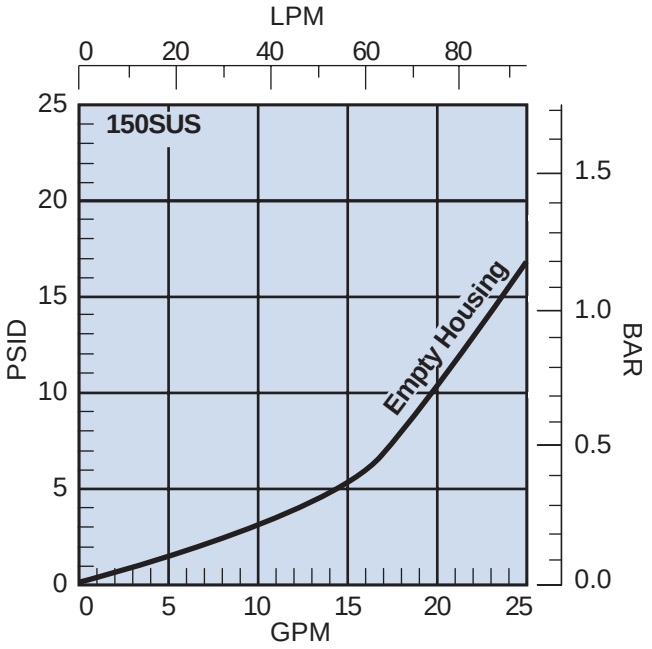




15P-2 Element Performance

Flow vs. Pressure Loss





Assembly ΔP Formula

$$\text{PSID Assembly} = \left(\Delta P \text{ Empty Housing} + \text{Element } \Delta P\right) \times \frac{\text{New Viscosity}}{150} \times \frac{\text{New Specific Gravity}}{.90}$$

Note: For "H" High collapse elements use 1.4 x Δp from curves above.

HOW TO ORDER:

Select the desired symbol (in the correct position) to construct a model code.
Example:

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	BOX 7	BOX 8	BOX 9	BOX 10	BOX 11
		15P	1	H	149W	M2	50	ST12	11	N

BOX 1: DIVISION CODE

Symbol	Description
None	Leave blank

Note: Used for specific automotive program identification.

BOX 2: PLANT CODE

Symbol	Description
None	Leave blank

Note: Used for specific automotive plant location.

BOX 3: CONFIGURATION

Symbol	Description
15P	HF2 3000 psi filter

BOX 4: HOUSING BOWL LENGTH

Symbol	Description
1	1 element 4" length
2	1 element 8" length

BOX 5: ELEMENT COLLAPSE RATING

Symbol	Description
H	2000 psi (-21 option in Box 10 must be selected)
L	150 psi (-19 option in Box 10 must be selected)

BOX 6: ELEMENT RATING

Symbol	Description
3	3 Micron Microglass
5	5 Micron Microglass
10	10 Micron Microglass
20	20 Micron Microglass
149W	149 Micron Wire Mesh

**Consult factory for other requirements*

BOX 7: INDICATOR TYPE

Symbol	Description
M2	Visual
E3B*	Electrical/Visual
E4A*	Electrical/Visual
E4D*	Electrical/Visual
E4MB*	Electrical/Visual
E4MC*	Electrical/Visual
E4MD*	Electrical/Visual
E5A*	Electrical/Visual
E5B*	Electrical/Visual
E5D*	Electrical/Visual
E5MD*	Electrical/Visual
F4M	Dual output electronic indicator

**Please refer to indicator drawings and chart on pages 82 and 83 for connector and wiring options.*

BOX 8: INDICATOR SETTING

Symbol	Description
50	50 psid (3.5 bar)
125	125 psid (8.6 bar) F4M indicator w/ Option -21 only.

BOX 9: PORT SIZE

Symbol	Description
ST12	3/4-16 UN-2B (ISO 11926)
M27	M27 x 2 (ISO 6149)
G12	G 3/4-14 BSPP (ISO 1179-1)
SMP	SAE Manifold Mount
MMP	Metric Manifold Mount
GMP	BSPP Manifold Mount

BOX 10: OPTIONS

Symbol	Description
19	Drain port on bowl
21	Non Bypass with drain port

BOX 11: SEAL COMPOUND

Symbol	Description
N	Nitrile
V	Fluorocarbon

Replacement Elements

Media	Element Collapse Rating	Single Length	Double Length
		Fluorocarbon/Nitrile	Fluorocarbon/Nitrile
3 Micron	150 psi	HF21L3VQ	HF22L3VQ
3 Micron	2000 psi	HF21H3VQ	HF22H3VQ
5 Micron	150 psi	HF21L5VQ	HF22L5VQ
5 Micron	2000 psi	HF21H5VQ	HF22H5VQ
10 Micron	150 psi	HF21L10VQ	HF22L10VQ
10 Micron	2000 psi	HF21H10VQ	HF22H10VQ
20 Micron	150 psi	HF21L20VQ	HF22L20VQ
20 Micron	2000 psi	HF21H20VQ	HF22H20VQ
149W Micron	150 psi	HF21L149WVQ	HF22L149WVQ
149W Micron	2000 psi	HF21H149WVQ	HF22H149WVQ

Splash Lube Filters

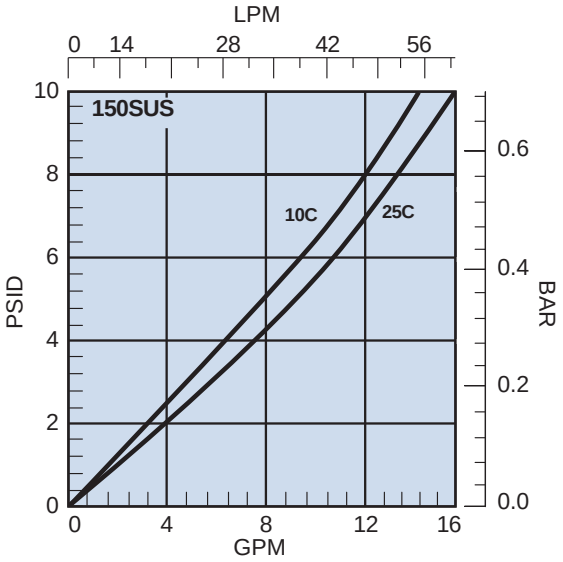
150 psi Application

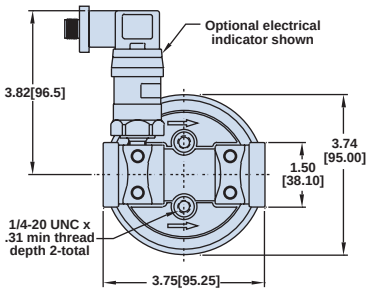
- **Non-Bypass Design**
- **10 and 25 Micron Cellulose**
- **Electrical or Gauge Indicator**
  With 25 ΔP setting.
  For electrical indicator options and factory pin wiring, see pages 82-83.
- **Prevention Feature**
  Prevents filter operation without element in place.
- **Mounting Provisions**
  Located on top of filter.

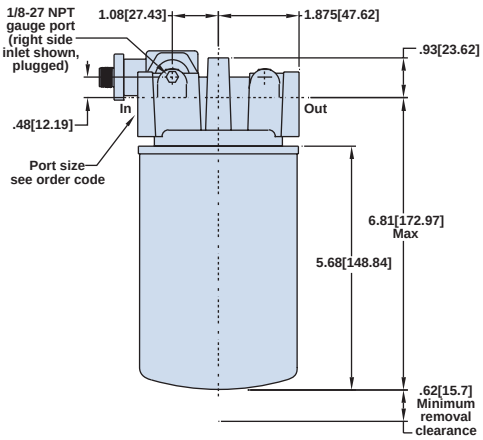
SLAT w/PSL4M

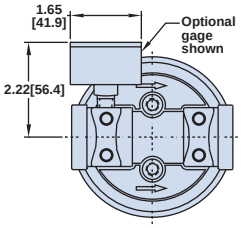
SLAT w/GL

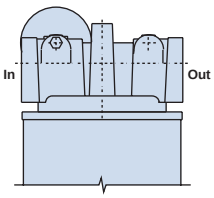
SLAT ASSEMBLY











Assembly ΔP Formula

$$\text{PSID Assembly} = \Delta P \text{ from curve} \times \frac{\text{New Viscosity}}{150} \times \frac{\text{New Specific Gravity}}{.90}$$

HOW TO ORDER:

Select the desired symbol (in the correct position) to construct a model code.
Example:

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	BOX 7	BOX 8
		SLAT	10C	GL	25	ST12	N

BOX 1: DIVISION CODE

Symbol	Description
None	Leave blank

Note: Used for specific automotive program identification.

BOX 2: PLANT CODE

Symbol	Description
None	Leave blank

Note: Used for specific automotive plant location

BOX 3: SIZE

Symbol	Description
SLAT	Splash Lube 12AT

BOX 4: CANISTER MEDIA

Symbol	Description
10C	10 Micron Cellulose
25C	25 Micron Cellulose

BOX 5: INDICATOR TYPE

Symbol	Description
GL	Gauge, left side
PSL3*	Pressure switch, left side w/ 3-pin Brad Harrison style connection
PSL4*	Pressure switch, left side w/ 4-pin Brad Harrison style connection
PSL5*	Pressure switch, left side w/ 5-pin Brad Harrison style connection

**Please refer to indicator drawings and chart on pages 82 and 83 for connector and wiring options. Example: PSL4MD*

BOX 6: INDICATOR SETTING

Symbol	Description
25	25 psid

BOX 7: PORT SIZE

Symbol	Description
P12	3/4-14 NPT
ST12	1 1/16-12 UN-2B (ISO 11926)
M27	M27 x 2 (ISO 6149)
G12	3/4-14 BSPP (ISO 1179 G228)

BOX 8: SEAL COMPOUND

Symbol	Description
N	Nitrile

Replacement Canisters

Symbol	Part Number
10C	921999
25C	925023

Applications for IL8 series filters

- Lube oil systems
- Power generation plants
- Test stands
- Primary metal equipment
- Pulp & paper equipment
- Offshore drilling and oil patch
- Flushing skids

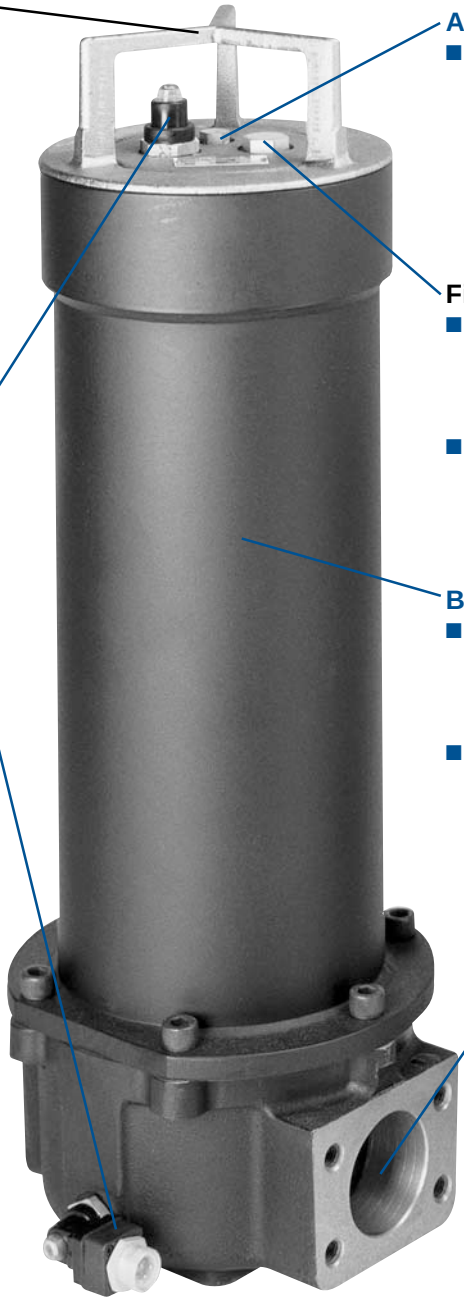
IL8 series filters are excellent choices for your demanding applications whether you require simplex, duplex or quadplex assemblies.

Wherever high flow or high capacity filters are required, the IL8 series can be applied with confidence.

Filter housings have a simple yet critical job... securely contain the filter element with positive internal sealing.

The IL8 series filter housings are the result of careful engineering. High grade materials are used to provide strength at critical stress points.

The cover and base are annodized aluminum, the handle is nickel plated ductile iron and the bowl is rugged carbon steel. The result is a reliable high performance filter for an array of applications.



Cover
- Handle protects indicators from damage
- Easy on, easy off, for fast service

Air Bleed
- Helps protect bearings and other sensitive components from trapped air

Fill Port
- Prefilter the fluid, before it gets into the machine's system
- Purge air while filling

Indicators
- You can tell element condition at a glance
- Both visual and electrical available

Bowl
- Rugged cold drawn steel—excellent fatigue resistance
- Three sizes for any application: Single (8"), Double (16"), and Triple (39")

Ports
- SAE straight thread or flange face

Drain Port
(not visible)
- Clean and easy servicing
- Lets you drain bowl of fluid before element changes

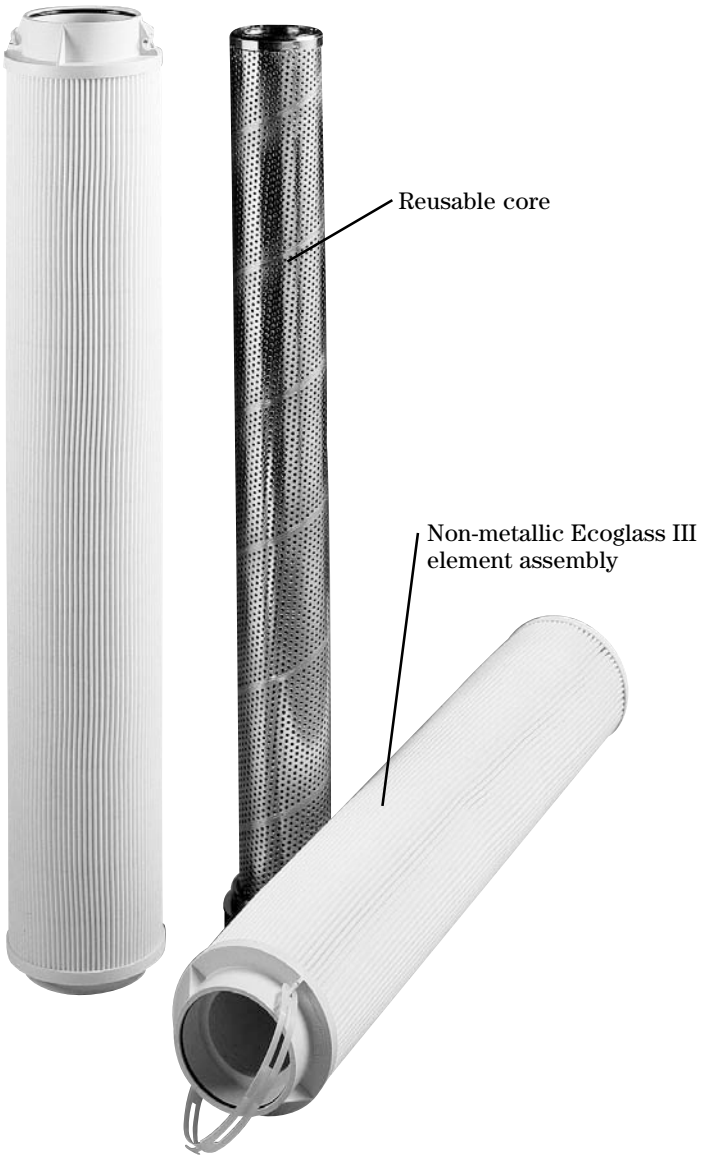
Bypass Valve
(not visible)
- Soft seat design for zero internal leakage
- Located in cover assembly

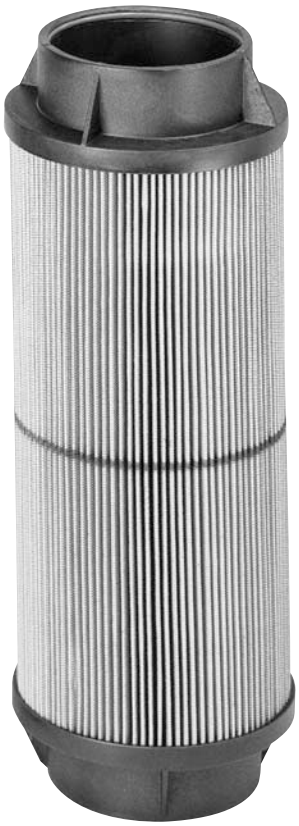
Ecoglass III Replacement Elements

Ecoglass III represents the merging of high performance filtration technology with environmentally conscious engineering. The Ecoglass III line of replacement elements feature 100% non-metallic construction. The design reduces solid waste and minimizes disposal costs for industry. The non-metallic construction means lightweight elements (60% less weight) for easier servicing.

The Ecoglass III elements utilizes the same proprietary media design as our Microglass III line of replacement elements.

With Ecoglass III, a reuseable core is installed into the filter housing and remains in service throughout the life of the assembly.





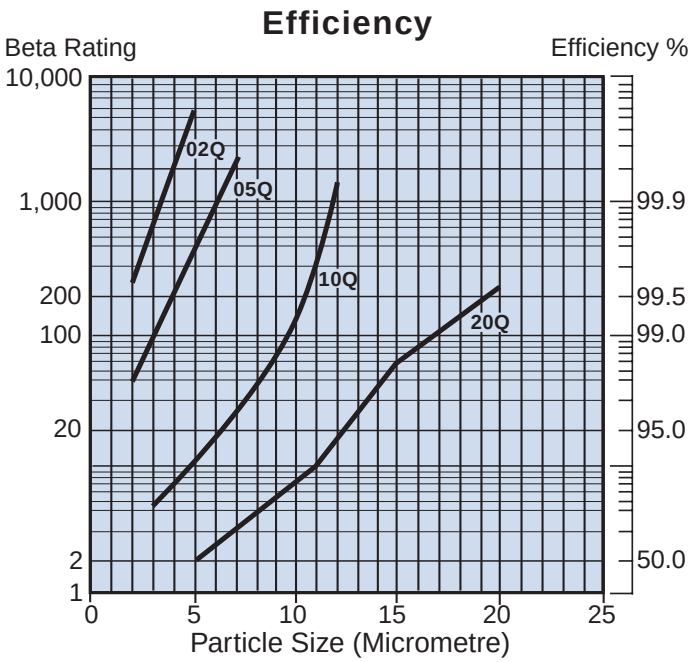
Microglass III Replacement Elements

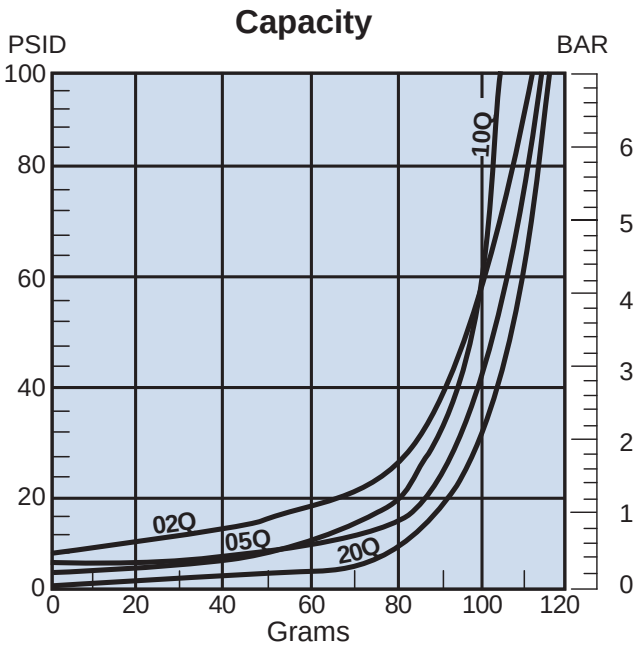
Microglass III represents a leap forward in the performance obtainable in hydraulic and lube filter elements.

The unique multi-layer design combines high efficiencies with exceptional dirt holding capacities for performance that is unequalled in the industry today. This performance is further enhanced in the IL8 series with the introduction of the deep pleat design. The deep pleat element design increases the amount of media in the element and therefore capacity.

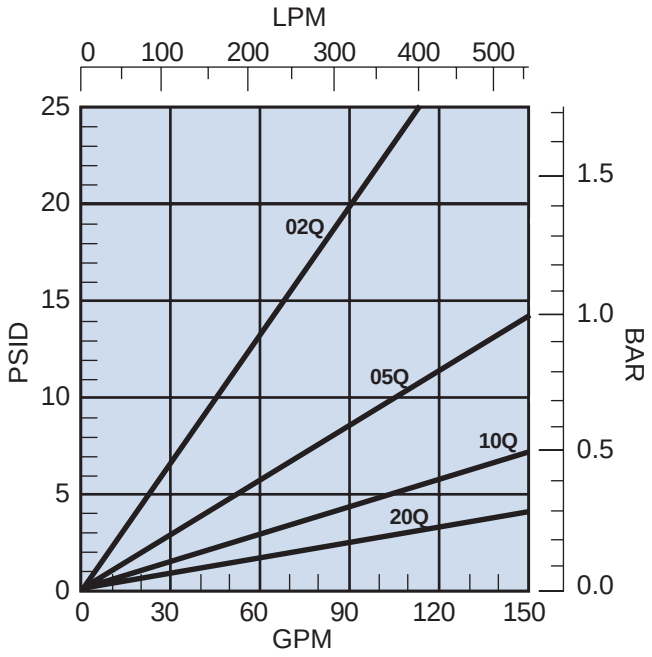
With Microglass III you do not have to make a compromise between efficiency and capacity, you can have both.

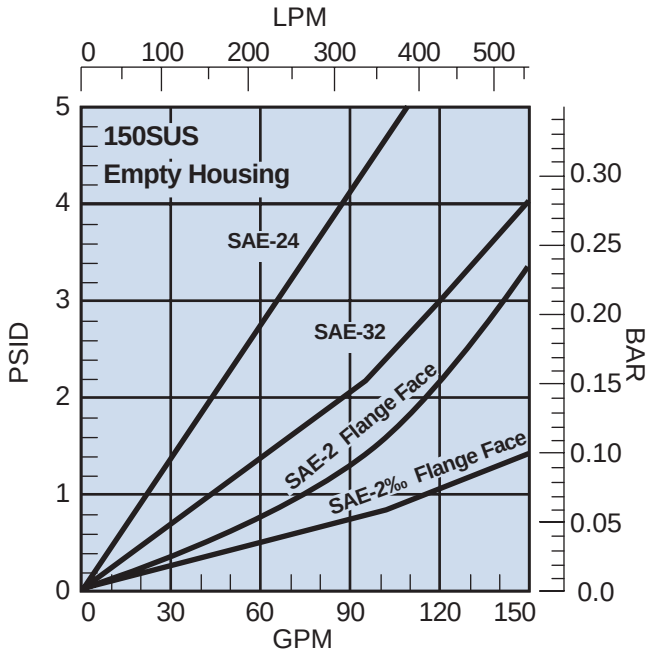
IL8-1 Element Performance



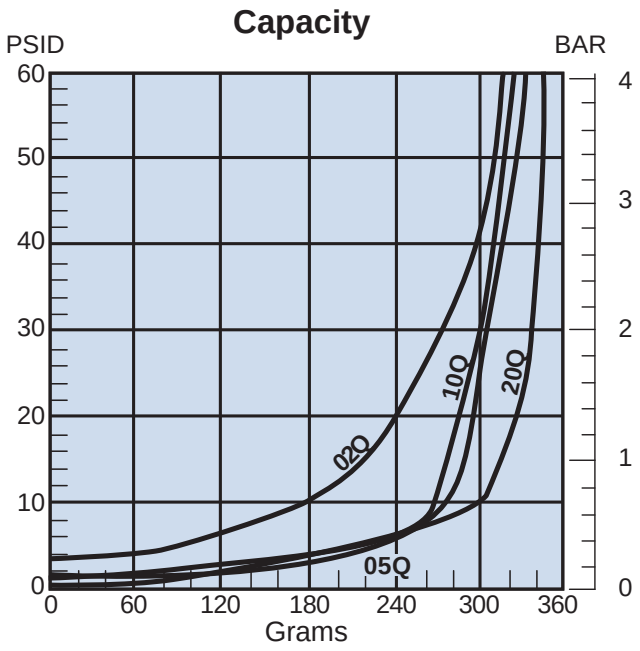


Flow vs. Pressure Loss



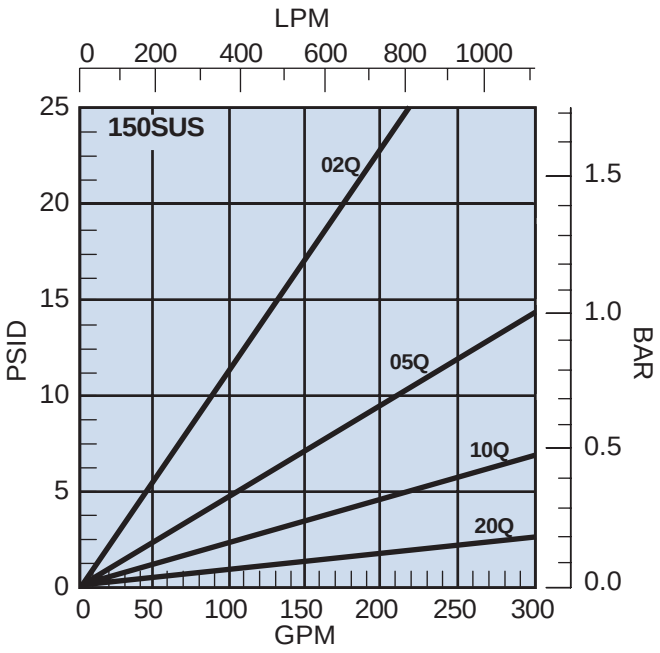


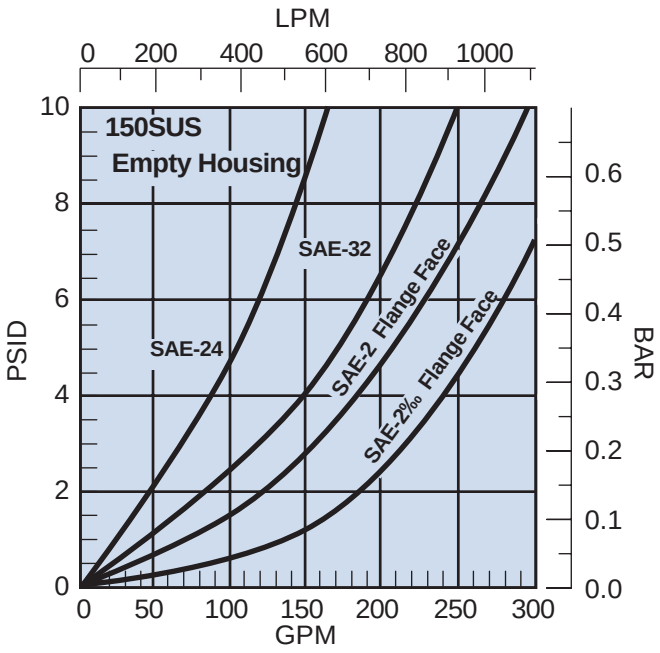
IL8-2 Element Performance



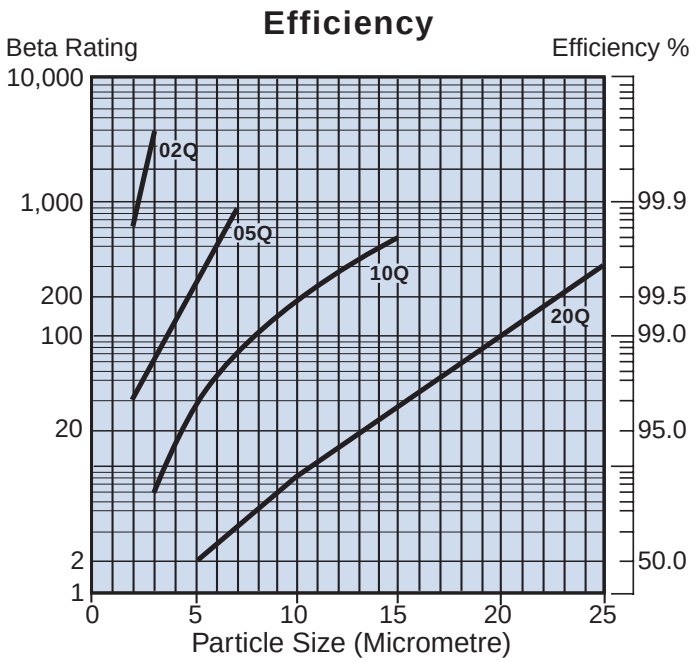
Multipass tests run @ 50 gpm to 50 psid terminal - 10mg/L BUGL

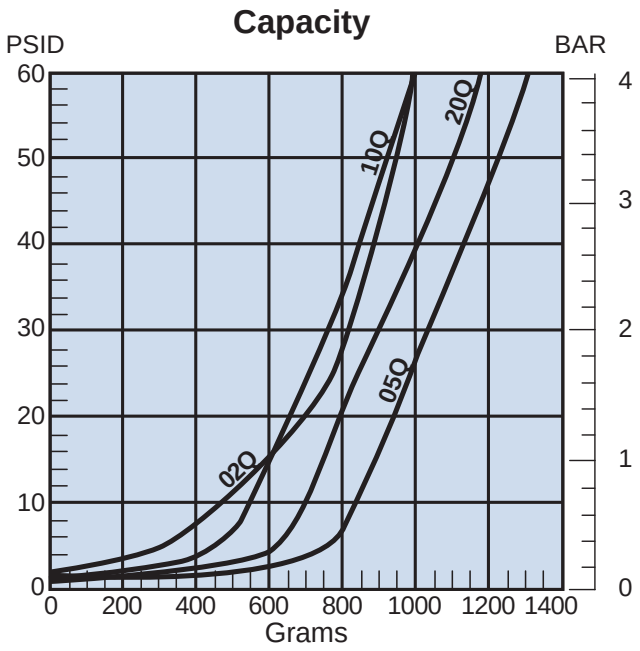
Flow vs. Pressure Loss





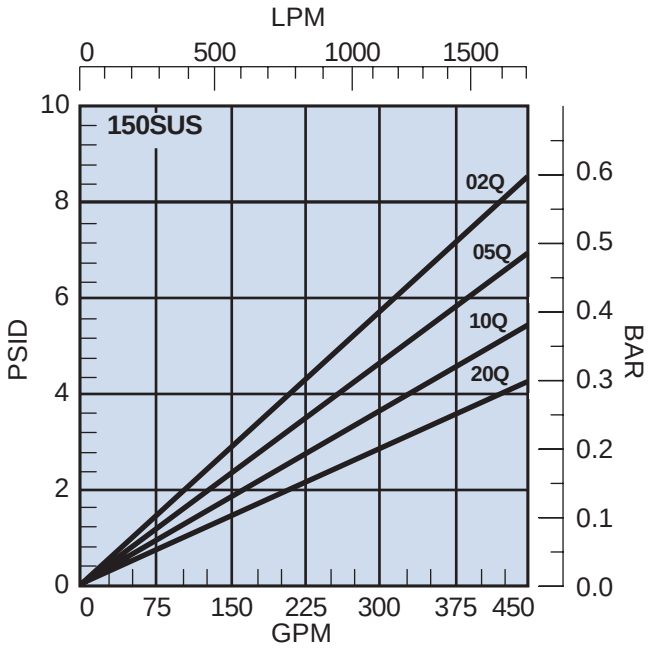
IL8-3 Element Performance

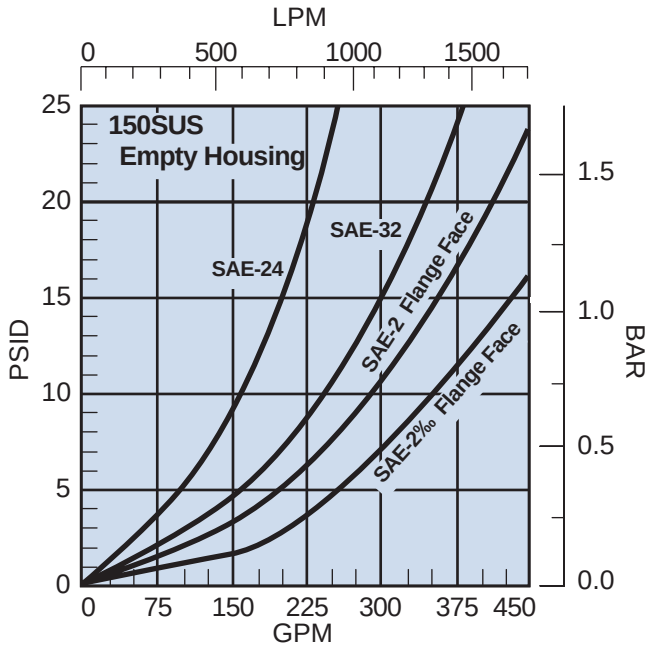




Multipass tests run @ 70 gpm to 50 psid terminal - 10mg/L BUGL

Flow vs. Pressure Loss





Specifications: IL8/LL8

Pressure Ratings:
Maximum Allowable Operating Pressure (MAOP): 500psi (34.5 bar)
Rated Fatigue Pressure: 330psi (22.8 bar)
Design Safety Factor: 3:1

Operating Temperatures:
Buna: -40°F (-40°C) to 225°F (107°C)
Fluorocarbon: -15°F (-26°C) to 275°F (135°C)

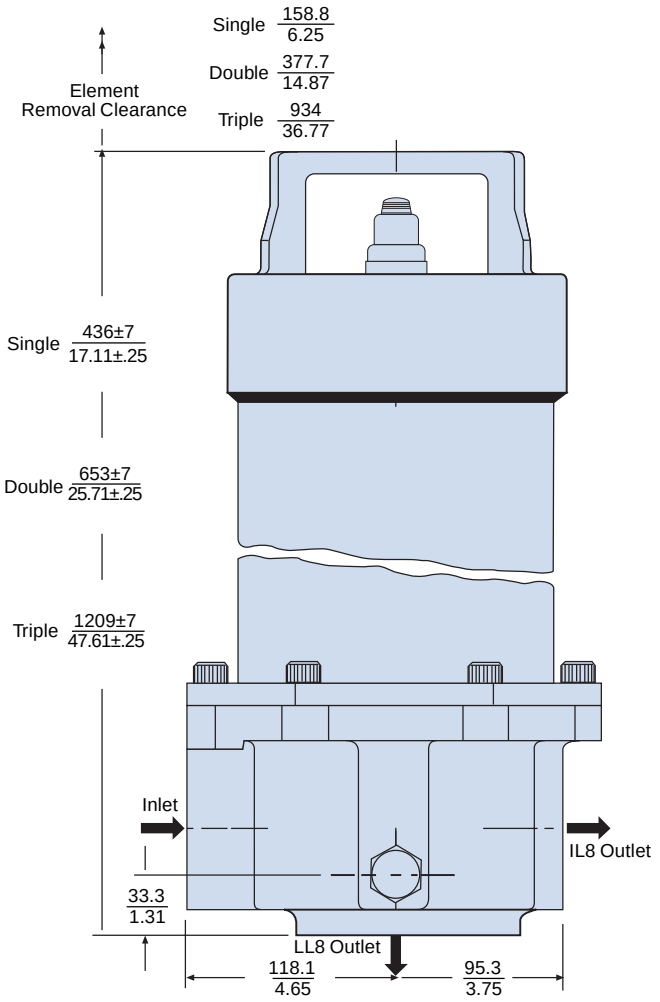
Element Collapse Rating:
150 psid (10.3 bar)

Element Condition Indicators:
Visual (optional)
Electrical -heavy duty (optional)
SPDT .25 amps (resistive) MAX 5 watts 12 to 28 VDC & 110 to 175 VAC
Note: Product of switching voltage and current must not exceed wattage rating

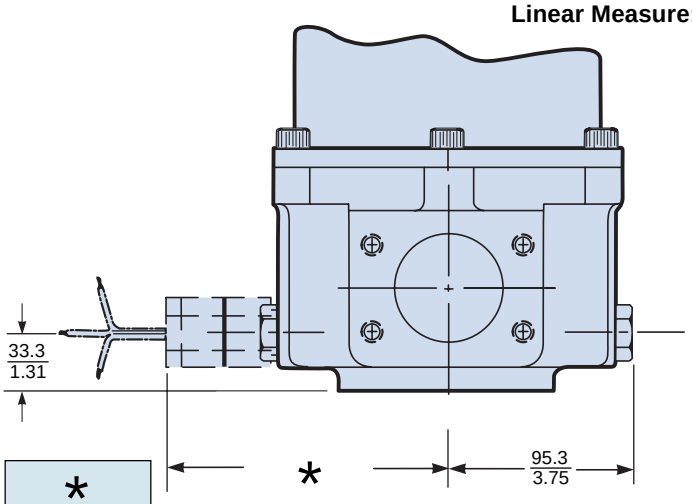
Color Coding:
White (common)
Black (normally open)
Blue (normally closed)

Materials:
Bowl: low carbon steel
Cover: anodized aluminum
Handle: nickel plated ductile iron
Base: anodized aluminum

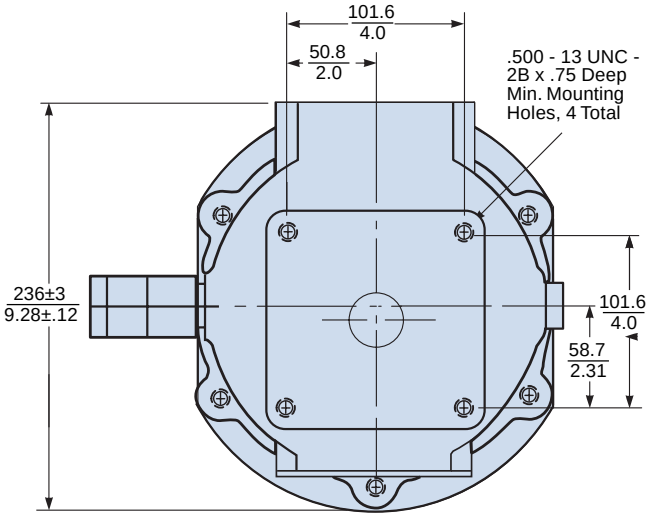
Shipping Weights (approximate):
Single: 40 lbs. (18.1 kg)
Double: 50 lbs. (22.7 kg)
Triple: 75 lbs. (34 kg)



Linear Measure: millimeter / inch



*	
M2	138.2 5.44
H1	141.7 5.58
H2	203.2 8.00
H3	175.3 6.90



Specifications: HDIL8/HQIL8

Pressure Ratings:
Maximum Allowable Operating Pressure (MAOP): 400psi (27.6 bar)
Rated Fatigue Pressure: 330psi (22.8 bar)
Design Safety Factor: 2.5:1

Operating Temperatures:
-15ºF (-26ºC) to 200ºF (93ºC)

Element Collapse Rating:
150 psid (10.3 bar)

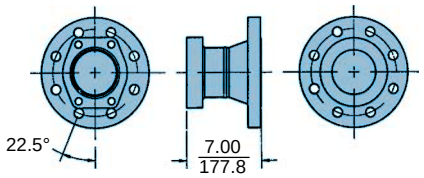
Materials:
Changeover valve: steel
Bowl: low carbon steel
Cover: anodized aluminum
Cover handle: nickel plated ductile iron
Base: steel

Element Condition Indicators:
Visual (optional)
Electrical-heavy duty (optional)
SPDT .25 amps (resistive) MAX 5 watts
12 to 28 VDC & 110 to 175 VAC
Note: Product of switching voltage and current must not exceed wattage rating

Color Coding:
White (common)
Black (normally open)
Blue (normally closed)

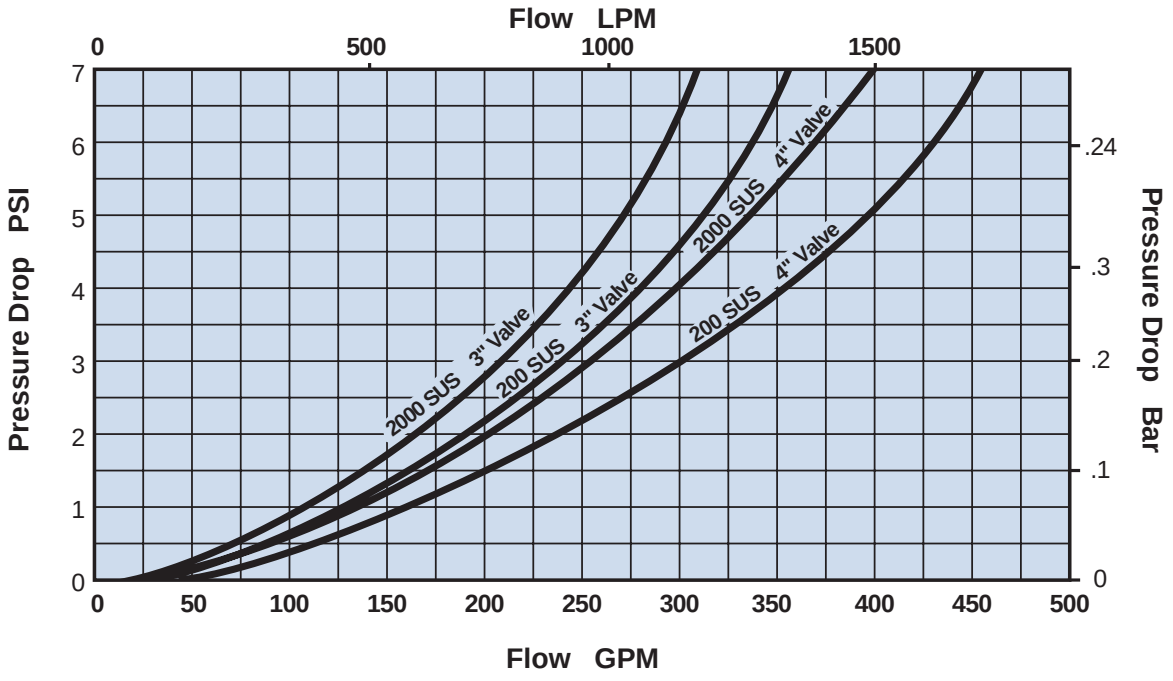
Shipping Weights (approximate):
HDIL8-2 320 lbs. (145 kg)
HDIL8-3 375 lbs. (170 kg)
HQIL8-2 525 lbs. (238 kg)
HQIL8-3 650 lbs. (295 kg)

Ansi Flange Adapter
End, Side View



Linear Measure: millimeter / inch

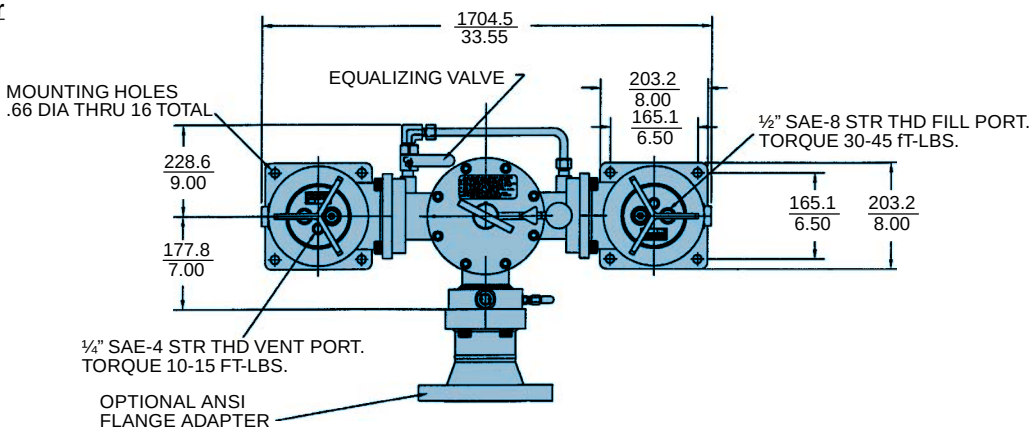
Changeover Valve Flow vs. Pressure Loss



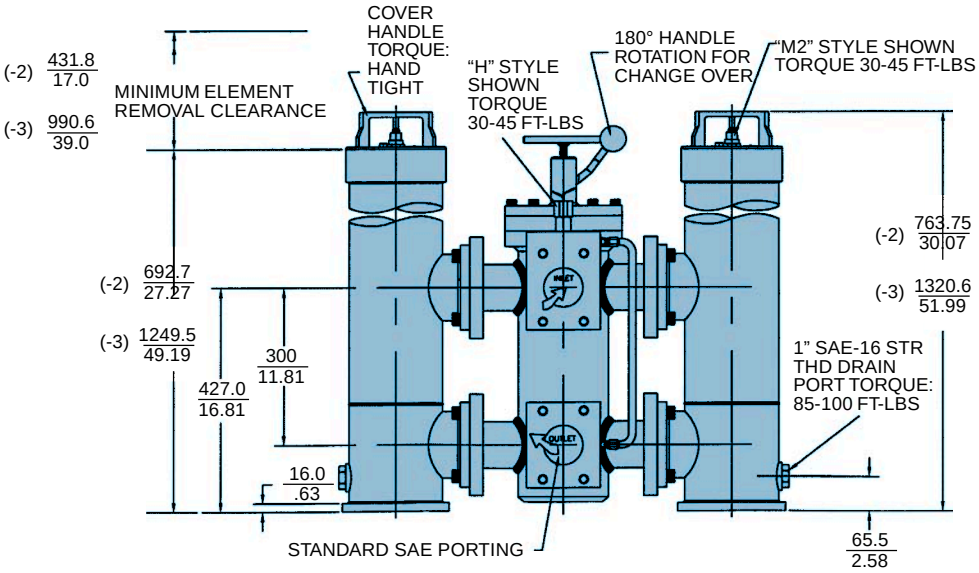
Specifications: HDIL8/HQIL8

Linear Measure: millimeter / inch

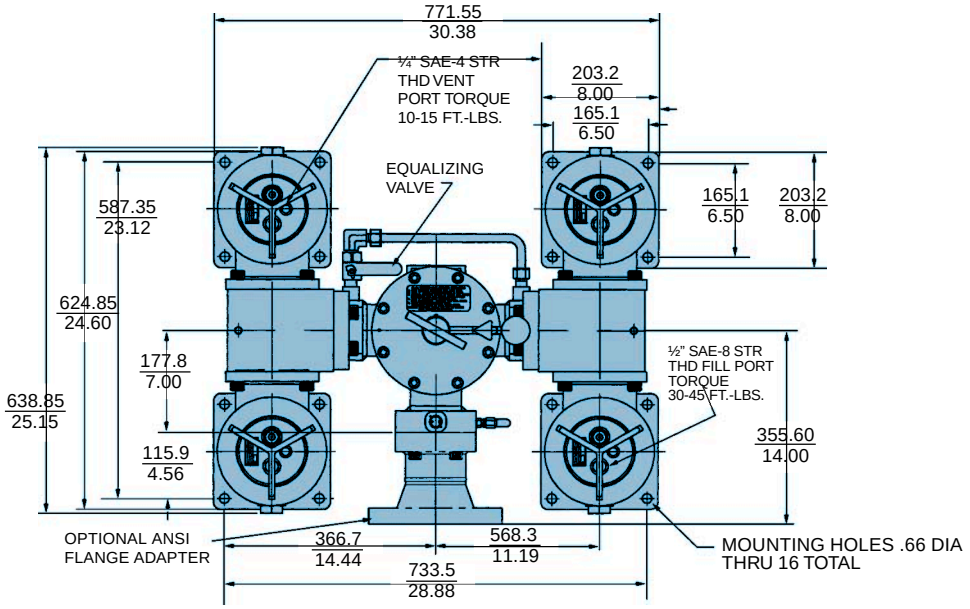
HDIL8
Top View



HDIL8/HQIL8
Side View



HQIL8
Top View



HOW TO ORDER:

Select the desired symbol (in the correct position) to construct a model code.
Example:

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	BOX 7	BOX 8	BOX 9	BOX 10	BOX 11
		IL8	3	R	10QE	HP	50	RR	1	V

BOX 1: DIVISION CODE

Symbol	Description
None	Leave blank

Note: Used for specific automotive program identification.

BOX 2: PLANT CODE

Symbol	Description
None	Leave blank

Note: Used for specific automotive plant location.

BOX 3: Basic Assembly

Symbol	Description
IL8	In-line
LL8	90° angle porting
HDIL8	Duplex
HQIL8	Quadplex

BOX 4: Length

Symbol	Description
1*	Single length
2	Double length
3	Triple length

*Not available for HDIL8 or HQIL8

BOX 5: Core

Symbol	Description
None	Disposable core
R*	Reusable core

*Only available with Buna seals, for double and triple length versions

BOX 6: Element Media

Symbol	Description
Reuseable Core (Low Collapse Only)	
20QE	**Ecoglass III**
10QE	**Ecoglass III**
05QE	**Ecoglass III**
02QE	**Ecoglass III**

Note: Ecoglass III elements must utilize "R" option in BOX 4.

Symbol	Description
Standard HF4 Type	
20Q	**Microglass III (HF4)**
10Q	**Microglass III (HF4)**
05Q	**Microglass III (HF4)**
03Q	**Microglass III (HF4)**

BOX 7: INDICATOR TYPE

Symbol	Description
IR	Visual, right side
IL	Visual, left side
E3B	Electrical/Visual
E4A	Electrical/Visual
E4D	Electrical/Visual
E4MB	Electrical/Visual
E4MC	Electrical/Visual
E4MD	Electrical/Visual
E5A	Electrical/Visual
E5B	Electrical/Visual
E5D	Electrical/Visual
E5MD	Electrical/Visual
F4M	Dual output electronic indicator with 50 psi only

**Please refer to indicator drawings and chart on pages 82 and 83 for connector and wiring options. Located at left side of inlet.*

BOX 8: Bypass and Indicator Setting

Symbol	Pressure Setting
25	25 psid (1.7 bar)
50	50 psid (3.5 bar)

BOX 9: Ports

Symbol	Description
	IL8/LL8
ST24	SAE-24 straight thread
ST32	SAE-32 straight thread
FS	SAE 2" flange face
	HDIL8/HQIL8
FS3	3" SAE flange face (code 61)
FS4	4" SAE flange face (code 61)

BOX 10: Options

Symbol	Description
1	None
11	Blocked bypass

BOX 11: Seals

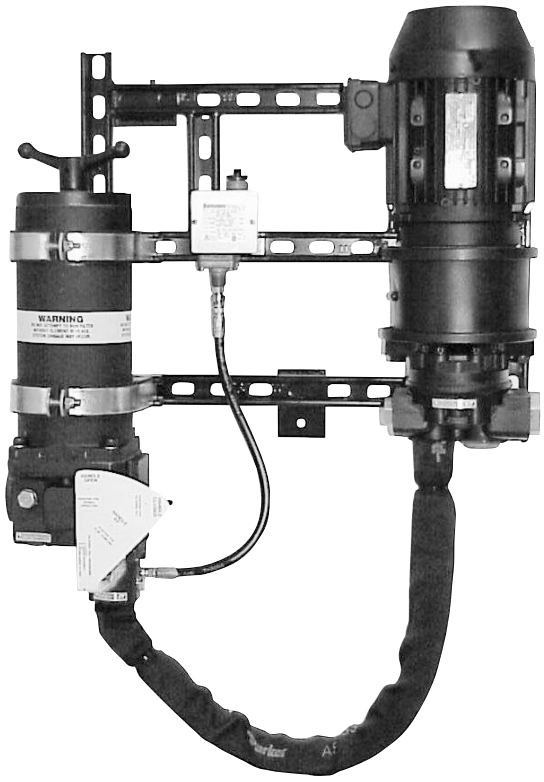
Symbol	Description
V	Fluorocarbon

Replacement Elements

Microglass III (Fluorocarbon)				Ecoglass III (Fluorocarbon)			
Media	**Single**	**Double**	**Triple**	**Media**	**Single**	**Double**	**Triple**
20Q	929099Q	933047Q	932875Q	20QE	N/A	933837Q	933736Q
10Q	927661Q	933046Q	932874Q	10QE	N/A	933836Q	933735Q
05Q	927861Q	933045Q	932873Q	05QE	N/A	933835Q	933612Q
03Q	927663Q	933044Q	932872Q	02QE	N/A	933834Q	933734Q
				Reuseable Core	N/A	933838	933636

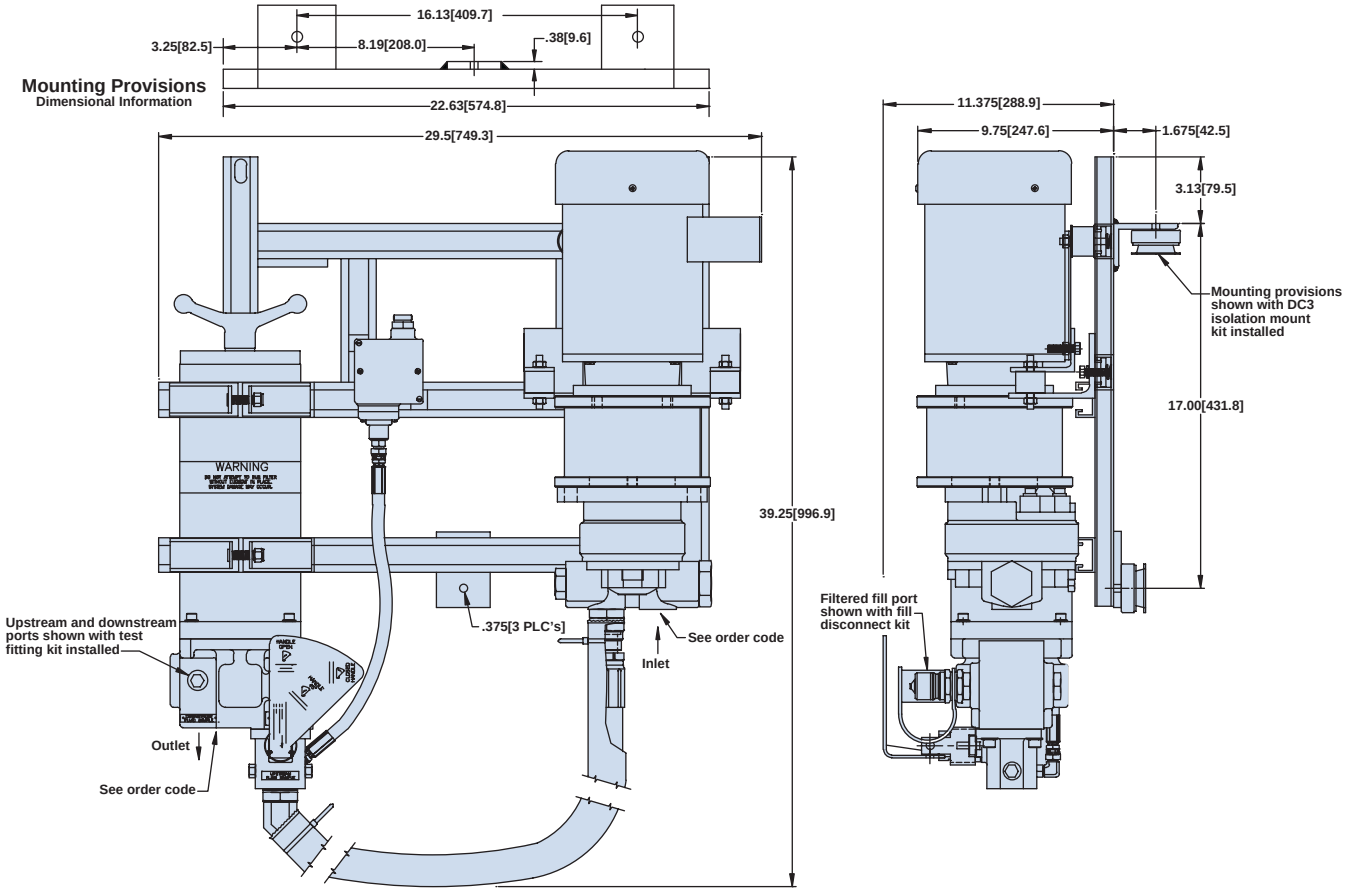
S Series Off-line

- **Universal Frame Mounting**
  Common to all units.
- **Permanent Unit Identification**
  With provisions for recording any package changes.
- **Motor**
  240/480 3 Phase 1 HP TEFC 145T Frame, Std.
- **Pump Delivery**
  Based on reservoir size.
- **HF4 Filter Housing Design With:**
  - **No Bypass**
    Factory pre-set pressure switch.
  - **Mechanical Safety Devices**
    Prevents operation of unit during maintenance.
  - **Filter Serviceable Without Tools**
  - **No Fluid Loss During Element Change**
  - **No Unfiltered Fluid**
    Enters reservoir after filter service.
- **Upstream and Downstream Sampling Test Ports**
  Proven design for on-line contamination checking and oil analysis.
  For test fitting kit, see page 62.
- **Filtered Fill Port**
  Safety approved means for disabling filter package when reservoir filling is required.
  Fill connections assure that only an identical filtered fluid can be added to the system. For fill disconnect kit, see page 63.
- **Element**
  3, 5, 10, and 20 micron HF4 elements with $\beta \geq 200$ with dual stage filtering media for up to 40% increased dirt holding capacity.
- **Power Unit Mfg. and O.E.M. Installation and Operation Packages**
- **Mounting Provisions**
  For DC3 isolation mount kit, see page 65.
- **Approved Sound Documentation**
  At 63 DBA or less.
- **Division Approved Fluid Connections**
  SAE “O” Ring 1 5/8 - 12 UN - 2B (ISO 11926)
  M42 X 2 Metric (ISO 6149)
  1 1/4-11 BSPP (ISO 1179G228)
- **DC3 Diagnostic Series Additional Features:**
  - Consult Factory

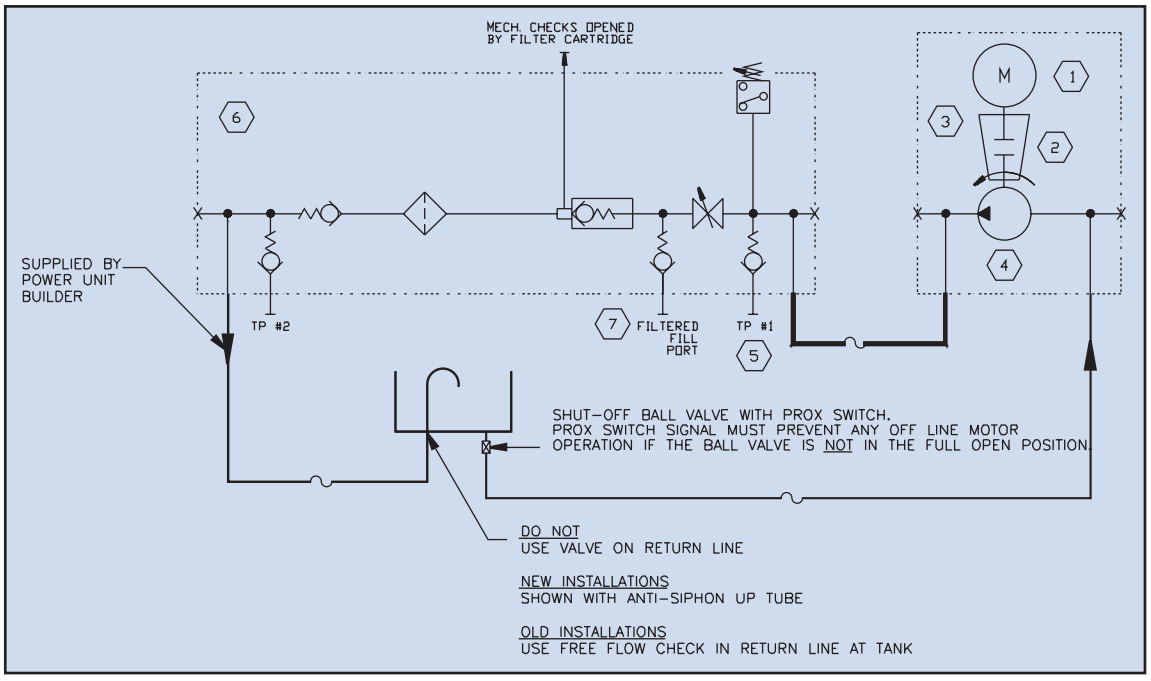


S Series

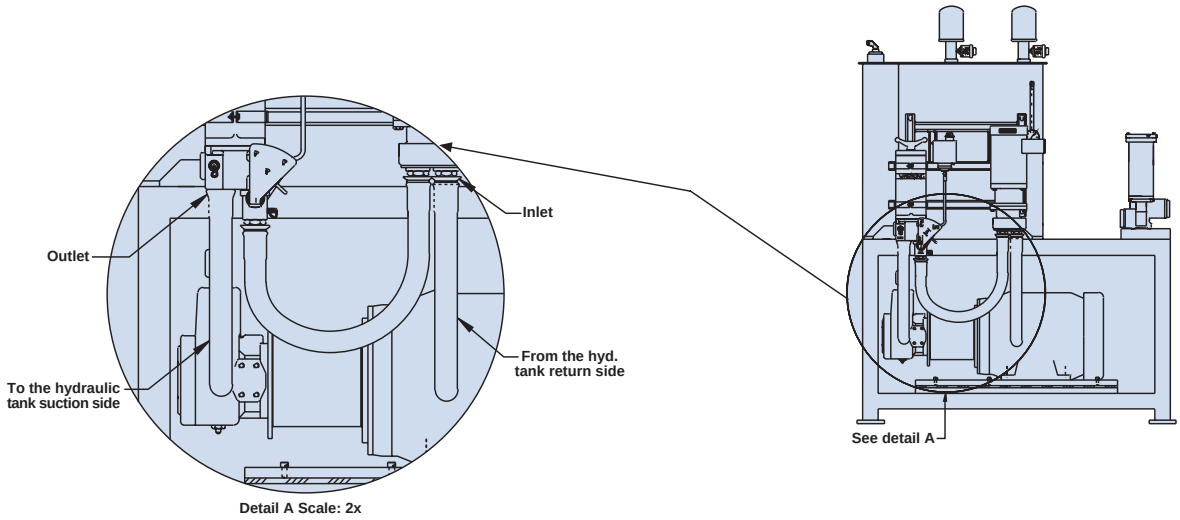
Installation Dimensions

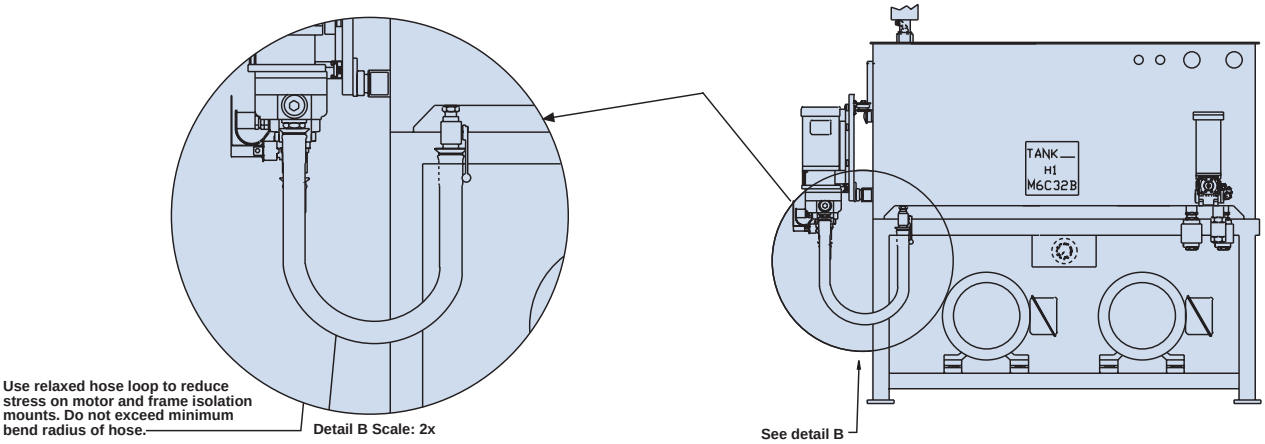


Hydraulic Schematic



Typical Installation





HOW TO ORDER:

Select the desired symbol (in the correct position) to construct a model code.
Example:

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	BOX 7	BOX 8	BOX 9	BOX 10	BOX 11	Box 12
		DC3	2	0	N	1	10	SE4MD	3/4	ST	U

BOX 1: DIVISION CODE

Symbol	Description
None	Leave blank

Note: Used for specific automotive program identification.

BOX 2: PLANT CODE

Symbol	Description
None	Leave blank

Note: Used for specific automotive plant location.

BOX 3: CONFIGURATION

Symbol	Description
DC3	Off-line

BOX 4: PUMP DELIVERY

Symbol	Description
1	Reservoirs less than 100 gal.
2	Reservoirs from 100 gal. to 250 gal.
3	Reservoirs greater than 250 gal.

BOX 5: FLUID TYPE

Symbol	Description
O	Mineral based fluid
W	Oil and water emulsion
H	High water base fluid

BOX 6: SEAL COMPOUND

Symbol	Description
N	Nitrile
V	Fluorocarbon

BOX 7: HOUSING SIZE

Symbol	Description
1	1 Element
2	2 Elements

BOX 8: ELEMENT RATING

Symbol	Description
3	3 Micron Microglass
5	5 Micron Microglass
10	10 Micron Microglass
20	20 Micron Microglass

BOX 9: PRESSURE SWITCH CONNECTORS

Symbol	Description
SE**	No connector
SE3B*	Electrical
SE4A*	Electrical
SE4D*	Electrical
SE4MB*	Electrical
SE4MC*	Electrical
SE4MD*	Electrical
SE5A*	Electrical
SE5B*	Electrical
SE5D*	Electrical
SE5MD*	Electrical

**Please refer to indicator drawings and chart on pages 82 and 83 for connector and wiring options.*

BOX 10: FILTERED FILL PORT

Symbol	Description
1/2	1/2" Quick Disconnect
3/4	3/4" Quick Disconnect
1	1" Quick Disconnect

BOX 11: PORT TYPE

Symbol	Description
ST	1 5/8-12 UN-2B (ISO 11926)
M	M42 X 2 (Metric) (ISO 6149)
G	G 1 1/4-11 BSPP (ISO 1179-1)

BOX 12: MOTOR FLANGE TYPE

Symbol	Description
U	NEMA C face motor & adaptor
E	IEC C face metric motor & adaptor

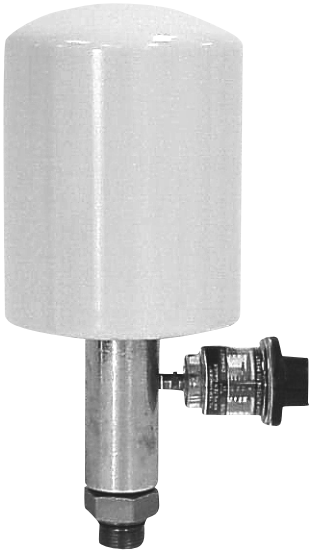
Replacement Elements

Media	Element Collapse Rating	Single Length	Double Length
		Fluorocarbon/Nitrile	Fluorocarbon/Nitrile
3 Micron	150 psi	HF41L3VQ	HF42L3VQ
5 Micron	150 psi	HF41L5VQ	HF42L5VQ
10 Micron	150 psi	HF41L10VQ	HF42L10VQ
20 Micron	150 psi	HF41L20VQ	HF42L20VQ

AB Series

Reservoir Breathers

- **High Efficiency Air Breather**
- **Indicator Notes Replacement Condition**



Air Breather With Memory Indicator

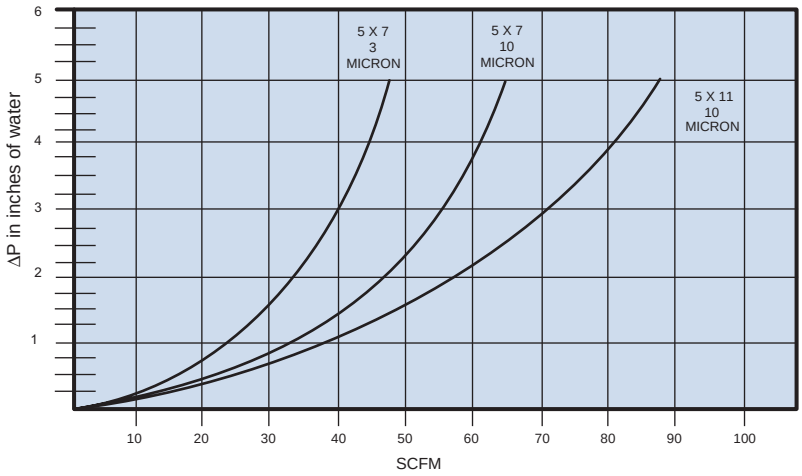
Flow Rate Curves

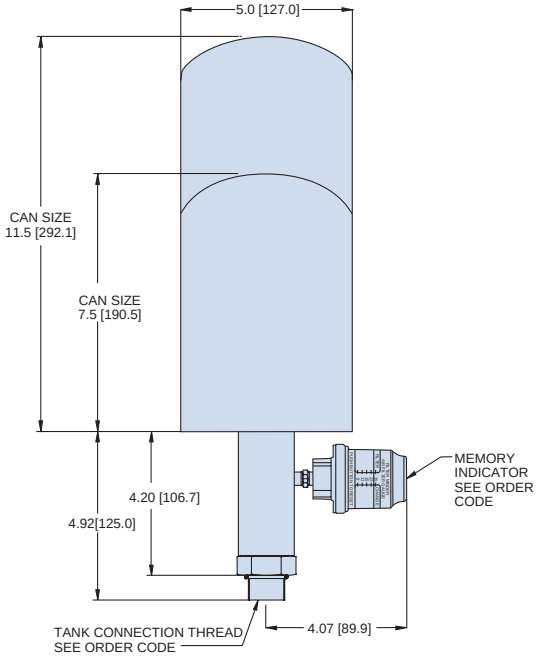
A.) Determine maximum exchange flow of reservoir in (GPM).

B.) Divide (GPM) by 7.4 to get SCFM.

C.) Select Air Filtration Required (in Microns). (Air filtration level should be the same or finer thant the filtration level of your Hydraulic system.)

D.) Select proper can size from the graph below. (Initial clean pressure drop should not exceed 6 inches of water.)





HOW TO ORDER:

Select the desired symbol (in the correct position) to construct a model code.
Example:

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	BOX 7
		AB	3	ST16	10	MI

BOX 1: DIVISION CODE

Symbol	Description
None	Leave blank

Note: Used for specific automotive program identification.

BOX 2: PLANT CODE

Symbol	Description
None	Leave blank.

Note: Used for specific automotive plant location.

BOX 3: CONFIGURATION

Symbol	Description
AB	Air breather

BOX 4: CAN SIZE

Symbol	Description
2	3.5" x 5"
3	5" x 7.5"
4	5" x 11"

BOX 5: TANK CONNECTION THREAD

Symbol	Description
P12	3/4" NPT male (only available with Option -2, Box 4)
P16	1" NPT male
ST16	1 5/16"-12 SAE straight thread (ISO 11926)
M27	M27 x 2 metric thread (ISO 6149)
G16	G 1"-11 BSPP thread (ISO 1179-1)

BOX 6: AIR FILTRATION

Symbol	Description
3*	3 Micron Cellulose
10	10 Micron Cellulose

*NOTE: 3 Micron Cellulose is not available in can size 4 (5" x 11").

BOX 7: INDICATOR

Symbol	Description
MI	Memory indicator

Note: Memory indicator not available when Option -2 is selected in Box 4.

Replacement Breather Cans

MEDIA	Designate Size 5" x 7.5"	Designate Size 5" x 11"
3 Micron	NOR-AB-3-3	NA
10 Micron	NOR-AB-3-10	NOR-AB-4-10

Breathers

Desiccant Type

Specifications:

Materials:
Casing: Clarified copolymer polypropylene.
Cap: Copolymer polypropylene.
Stand pipe: PVC.

Filtration Element: Polyester, silica gel, activated carbon.

Operating Temperatures: -20°F (-29°C) to 250°F (121°C).

Seals: None.

Maximum Allowable Operating Pressure (MAOP): 5 psi (.34 bar).

Particle Removal Efficiency:
98.7% (beta 75) @ 3 micron
99.5% (beta 200) @ 4 micron
99.9% (beta 1000) @ 5.3 micron

Weight:

934330	1.25 lbs. (.57 kg) each.
934331	1.75 lbs. (.79 kg) each.
934332	2.25 lbs. (1.02 kg) each.

P/N 934330

P/N 934331

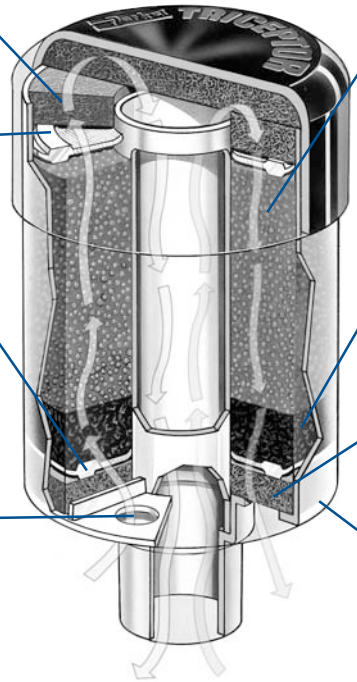
P/N 934332

Features

Foam Pads
Isolates the removal materials from contact with heavy reservoir mist and securely holds materials in place.

Filter Pads
Specially designed filter pads remove solid particulate on upstream side and then regenerate by releasing those particles when air flow reverses direction. Lower pad removes airborne contamination and second pad protects against any migration of desiccant and activated carbon.

Air Intakes
A total of eight air intakes may be exposed to allow air to freely flow in and out of the TriCeptor.



Silica Gel Desiccant
Has the highest removal capability by volume of any adsorption method. Indicates condition by changing color.

Activated Carbon
Removes oil vapors and associated odors. The mixture percentage is designed to provide a life consistent with the silica gel.

Foam pad
Insures filter pad is properly positioned and protects it from external damage.

Molded Housing
Durable shock absorbing casing provides reliable service and simple press in mounting.

Installation

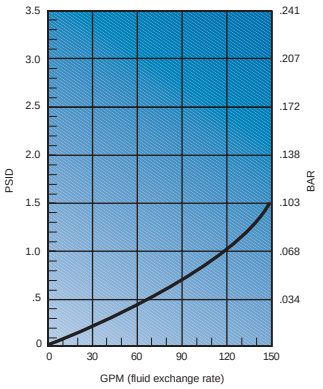
TriCeptor breathers are designed for simple installation on most equipment, regardless of mounting connection. Since TriCeptor breathers are disposable, the simple press fit design allows for quick and easy maintenance. Several mounting adapters (shown below) are available to provide the desired mounting. The installation/ replacement process consists of four easy steps:

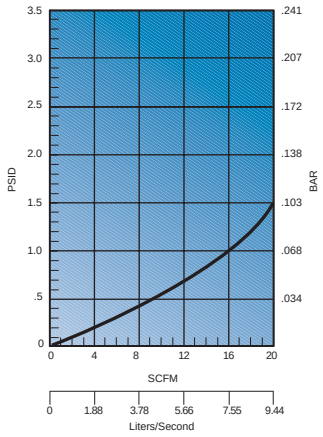
1. Remove from protective plastic wrap.
2. Remove 1" blue cap from standpipe.
3. Remove foil label to expose the necessary amount of air intake holes.
4. Press TriCeptor into mounting adapter.

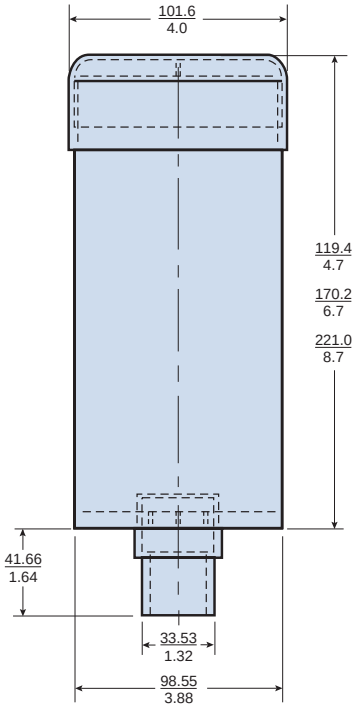
Servicing the TriCeptor breather is also very easy. When the silica gel changes color from blue to a pink, the breather is no longer active and needs to be replaced. Simply remove the unit and discard properly.

Air Flow Performance

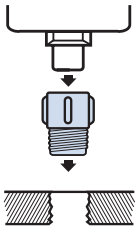
The curves below show the air flow performance of the three TriCeptor breathers. To insure the longest life possible, the initial clean pressure drop should not exceed 1.5 psid (.103 bar).



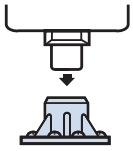




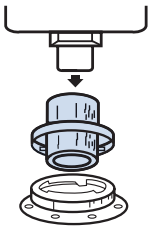
Linear Measurement= $\frac{mm}{in}$



Threaded Adapter



Field Adapter



Flange Adapter

Ordering Information

Model	Part Number	Quantity
5" Breather	934330	6 pcs.
7" Breather	934331	6 pcs.
9" Breather	934332	6 pcs.
Threaded Adapter	934365	1 pc.
Field Adapter	934366	1 pc.
Flange Adapter	934367	1 pc.

Bleed / Test Fitting Kit

HOW TO ORDER:

Select the desired symbol (in the correct position) to construct a model code.
Example:

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5
		EMA-3	2	ST

BOX 1: DIVISION CODE

Symbol	Description
None	Leave blank

Note: Used for specific automotive program identification.

BOX 3: FITTING BRAND

Symbol	Description
SP1	Stauff
SP2	Schroeder
EMA-3	Parker

BOX 4: CONFIGURATION

Symbol	Description
1	Air Bleed
2	Up & Downstream
3	Both

BOX 2: PLANT CODE

Symbol	Description
None	Leave blank

Note: Used for specific automotive plant location.

BOX 5: THREAD TYPE

Symbol	Description
ST	7/16-20 UN-2B (ISO 11926)
M	M14 x 1.5 (ISO 6149)
G	G 1/4-19 BSPP (ISO 1179-1)

Fill Disconnect Kit

HOW TO ORDER:

Select the desired symbol (in the correct position) to construct a model code.
Example:

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6
		FDK	1/2	P	ST

BOX 1: DIVISION CODE

Symbol	Description
None	Leave blank

Note: Used for specific automotive program identification.

BOX 2: PLANT CODE

Symbol	Description
None	Leave blank

Note: Used for specific automotive plant location.

BOX 3: CONFIGURATION

Symbol	Description
FDK	Fill Disconnect

BOX 4: DISCONNECT SIZE

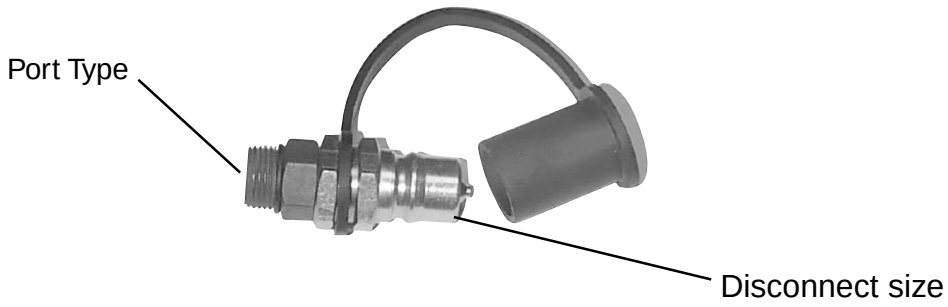
Symbol	Description
1/2	1/2" Body Size
3/4	3/4" Body Size
1	1" Body Size

BOX 5: BRAND

Symbol	Description
P	Parker

BOX 6: PORT TYPE

Symbol	Description
ST	SAE (ISO 11926)
M	Metric (ISO 6149)
G	BSPP (ISO 1179-1)



HF4 Isolation Mount Kit

(One [1] kit consists of four [4] mounts.)

HOW TO ORDER:

Select the desired symbol (in the correct position) to construct a model code.
Example:

BOX 1	BOX 2	BOX 3	BOX 4
		FIK	ST

BOX 1: DIVISION CODE

Symbol	Description
None	Leave blank

Note: Used for specific automotive program identification.

BOX 3: CONFIGURATION

Symbol	Description
FIK	HF4 Isolation Mount Kit

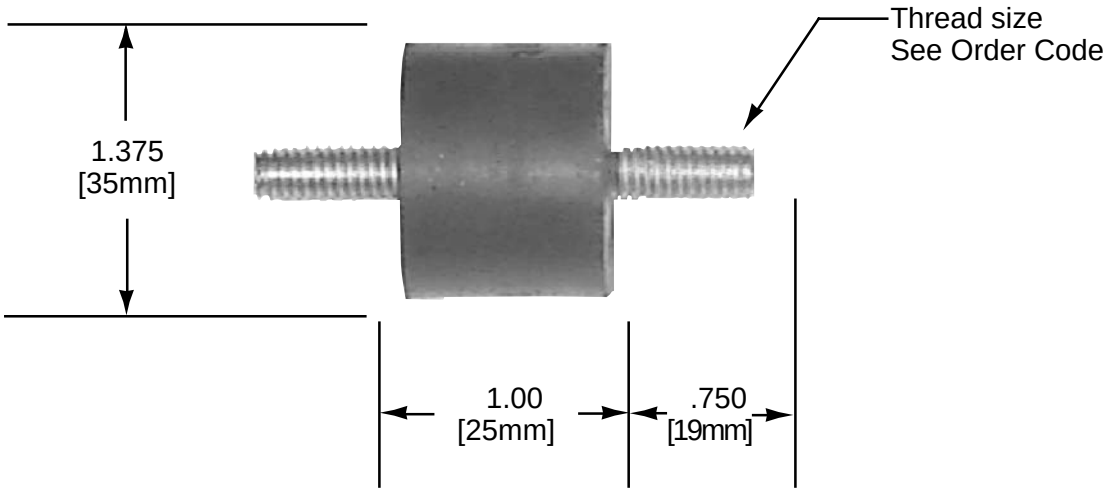
BOX 4: THREAD TYPE

Symbol	Description
ST	5/16 x 18
M	M10 x 1.5

BOX 2: PLANT CODE

Symbol	Description
None	Leave blank

Note: Used for specific automotive plant location.



DC3 Isolation Mount Kit

(One [1] kit consists of three [3] mounts.)

HOW TO ORDER:

Select the desired symbol (in the correct position) to construct a model code.
Example:

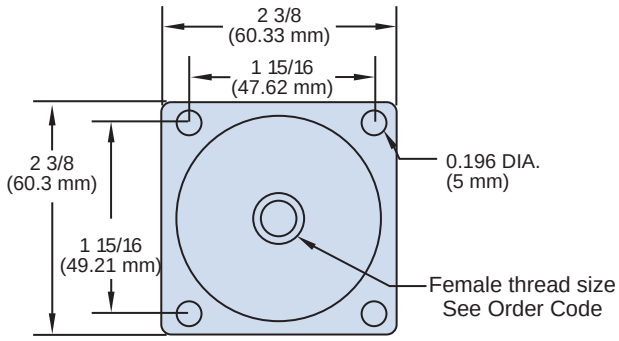
BOX 1	BOX 2	BOX 3	BOX 4
		DIK	ST

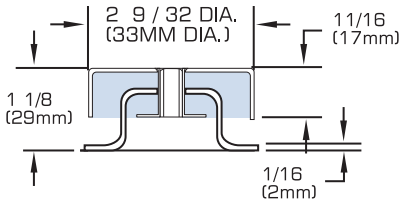
BOX 1: DIVISION CODE	
Symbol	**Description**
None	Leave blank
Note: Used for specific automotive program identification.	

BOX 3: CONFIGURATION	
Symbol	**Description**
DIK	DC3 Isolation Mount Kit

BOX 4: THREAD TYPE	
Symbol	**Description**
ST	5/16 x 18 Inch
M	M8 x 1.25 Metric

BOX 2: PLANT CODE	
Symbol	**Description**
None	Leave blank
Note: Used for specific automotive plant location.	





IQ200 Laser Particle Counter

NEW!

- **Parker's IQ200 On-Line Particle Counter provides real time fluid analysis in a compact affordable package.**
- **Simple installation for up to 3,000 psi applications.**
- **User friendly Windows-based software**
- **Adjustable alarms notify changes in fluid cleanliness**
- **Particle count reporting data in 6 channels, including ISO and NAS format**
- **Proven light blocking laser optics for reliable, continuous performance**
- **Verifies cleanliness of parts in production and test**

TECHNICAL SPECIFICATIONS:

PRESSURE
Maximum Allowable Operating Pressure (MAOP): 3000 psi (207 bar)
Minimum Required Pressure: 50 psi (3.4 bar)

OPERATING TEMPERATURE
Maximum: 165°F (74°C)
Minimum: 32°F (0°C)

FLOW THRU SENSOR CELL
Maximum Allowed for Accuracy: 60 ml/min
Minimum Required for Accuracy: 30 ml/min

VISCOSITY RANGE
20-430 cSt (100-2000 SUS)

INLET/OUTLET PORT CONNECTION
SAE-4 straight thread female

PARTICLE SIZE RANGE
2-100 micron - 6 channels factory calibrated

OUTPUT
RS-232/485 with 6 channels of particle counts and flow rate, ½"-20 UNF (BH-3 pin)

POWER
12-24 VDC, ½"-20 UNF (BH-4 pin)

MATERIALS
Wetted: anodized aluminum. Viton seals.
Display cover: ABS Thermoplastic

INTERFACE SOFTWARE (INCLUDED)
Windows Based Data Acquisition (LABWINDOWS CVI)
Requires Windows version 3.1 or later

SIZE AND WEIGHT
6-7/8" D x 6-9/16" W x 5-5/8" H / 12 lbs.

*Consult factory for more information.

MS100 Moisture Sensor

NEW!

- **Parker's MS100 moisture sensor provides a compact, real time solution to continuous water contamination monitoring.**
- **Simple LED's provide local Go/No Go indication.**
- **Panel meter for local or remote display reports 0-100% saturation.**
- **Meter scale is color coded for positive/easy identification.**
- **0-10 VDC and 24 VDC outputs.**

APPLICATIONS

Water enters hydraulic and lubricating systems from a variety of sources.

Atmospheric ingression of water vapor, as well as internal heat exchanger leaks, create unfavorable operating conditions.

Water is virtually a universal contaminant, and just like solid particulate contaminants, it can adversely affect fluid performance and component life. Water can be either in a dissolved (≤ 100% saturation) or a free water (≥ 100% saturation) state. The Parker moisture sensor is designed to provide real time measurement of water at or below the oil's saturation point, thus allowing you to take action before system damage occurs.

The MS100 moisture sensor eliminates the guesswork by providing real time condition monitoring.

The MS100 moisture sensor works well with petroleum/synthetic hydraulic and lubricating fluids.

INTERPRETING DATA

The Parker MS100 moisture sensor is designed to provide real time, accurate and repeatable results reported as % Saturation of Water.

Percent Saturation is a useful measurement that offers the user a simple, quantitative method in determining how wet or dry a hydraulic or lubricating system may be.

In contrast, PPM and % water by volume measurements provide little information about a fluid's free or dissolved water condition. However, % Saturation can be converted to PPM as long as the fluid's saturation point is known at the system operating temperature.

Using the indicator as a go / no-go device, a blue LED will indicate when the oil's water concentration reaches > 80% saturation, as well as triggering a TTL compatible output.

The unit also features an analog output proportional to % Saturation with a dynamic range of 0.8 to 3.8 volts.

Example:

0.8V	=	0%	Saturation
2.3V	=	50%	Saturation
3.8V	=	100%	Saturation

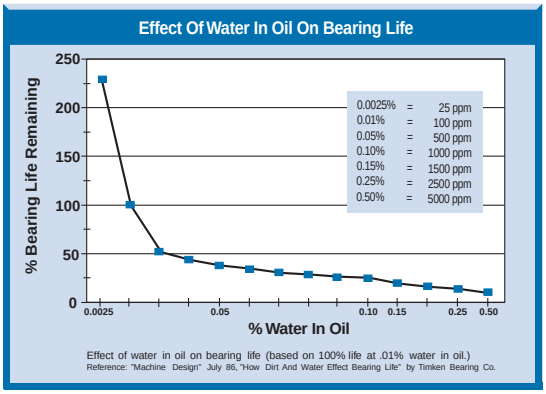
*Consult factory for more information.

Principles of Operation

Contaminated oil is drawn into the Parker Portable Purification System by a vacuum of 25 In/Hg. The oil passes through the in-line low watt density heater where the oil is heated to an optimum temperature of 150° F (66°C).

The oil then enters the distillation column where it is exposed to the vacuum through the use of special dispersal elements. This increases the exposed surface area of the oil and converts the water to vapor form, which is then drawn through the condenser by the vacuum pump.

The water-free oil falls to the bottom of the column and is removed by a heavy duty lube oil pump. This pump forces the dry oil through a final particulate removal filter. Clean oil passes out of the unit, back to the reservoir — and into the system.



Effects of Water Contamination

Water is one of the most common contaminants in a fluid system and one of the most damaging. When water contaminates a system, it can cause serious problems such as:

- Corrosion by etching metal
- Fluid breakdown, reduction of lubricating properties, additive precipitation, and oil oxidation
- Reduced dielectric strength
- Abrasive wear in hydraulic components

Features	Advantages	Benefits
Condensate holding tank	Captures removed water/ solvents Large enough to provide long service interval	Eliminate potential hazard of exhausting to atmosphere Reduced maintenance costs
Compact size	Smallest envelope in the industry Ease of portability	Fits through doorways and down narrow aisles Increased use
Forklift guides	Provides safe and secure method to lift unit	Employee safety Easily transported
Programmable thermostat	Maintains oil within 1° F Prevents overheating oil	Unattended operation Increases oil life
Automatic operation	Unattended use	Reduced labor costs Increased running time
Reverse pole switch/phase fail	Change motor rotation for different power source locations	Flexibility, less maintenance Prevents incorrect rotation
High temperature safety circuit	Shuts down heater if primary contacters fail Oil can never exceed 250°F	Prevents system damage Worker safety
Circuit breakers utilized in electrical panel	No fuses to replace Simple diagnostics	Fewer spare parts, increased uptime Reduced maintenance costs
Available with EPR seals and stainless steel	Phosphate ester compatible	Specifically designed for application
Solid state heater contacter	Longer more reliable service life	Reduced downtime

HOW TO ORDER:

Select the desired symbol (in the correct position) to construct a model code.
Example:

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	BOX 7	BOX 8	BOX 9	BOX 10	BOX 11
	PVS	600	460	DS	D	5	HF4	12	AC	DFL

BOX 1: SEALS

Symbol	Description
None	Fluorocarbon
E8	EPR

BOX 2: BASIC ASSEMBLY

Symbol	Description
PVS	Portable Purification System

BOX 3: FLOW RATE

Symbol	Description
185	5 GPM (18.9 lpm)
600	10 GPM (37.9 lpm)
1200	20 GPM (75.7 lpm)
1800	30 GPM (113.6 lpm)
2700	45 GPM (170.3 lpm)

BOX 4: POWER SUPPLY

Model	Symbol	Description
185	220	220VAC, 1P, 60HZ
	230	230VAC, 3P, 60HZ
	380	380VAC, 3P, 50HZ
	460	460VAC, 3P, 60HZ
	550	575VAC, 3P, 60HZ
600	230	230VAC, 3P, 60HZ
	380	380VAC, 3P, 50HZ
	460	460VAC, 3P, 60HZ
	550	550VAC, 3P, 60HZ
1200	380	380VAC, 3P, 50HZ
	460	460VAC, 3P, 60HZ
	550	550VAC, 3P, 60HZ
1800	380	380VAC, 3P, 50HZ
	460	460VAC, 3P, 60HZ
	550	550VAC, 3P, 60HZ
2700	380	380VAC, 3P, 50HZ
	460	460VAC, 3P, 60HZ
	550	550VAC, 3P, 60HZ

BOX 5: VACUUM PUMP

Symbol	Pressure Setting
DS	Dry sealed
LR	Liquid ring

BOX 6: DISPERSAL ELEMENT

Symbol	Description
D	Disposable (Coalescing)
P	Packed tower (cleanable-for use with viscious or highly contaminated fluids)

BOX 7: PARTICULATE ELEMENT

Symbol	Description
Reuseable Core (Low Collapse Only)	
20QE	**Ecoglass III**
10QE	**Ecoglass III**
05QE	**Ecoglass III**
02QE	**Ecoglass III**
Standard HF4 Type	
20	**Microglass III (HF4)**
10	**Microglass III (HF4)**
5	**Microglass III (HF4)**
3	**Microglass III (HF4)**

Note: Above elements are rated for Beta 200+ (99.5% efficiency)

BOX 8: FILTER HOUSING

Symbol	Description
HF4	84CN-2
E	IL8 (39") Coreless Upgrade

Note: IL8 option is available on 600 models, and is standard on 1200 models and larger.

BOX 9: HEATER

Model	Symbol	Description
185	3	3 KW (1 phase)
	10	10 KW (3 phase)
600	12	12 KW
	24	24 KW
1200	24	24 KW
1800	36	36 KW
2700	48	48 KW

BOX 10: CONDENSER

Symbol	Description
AC	Air cooled
LC	Liquid cooled

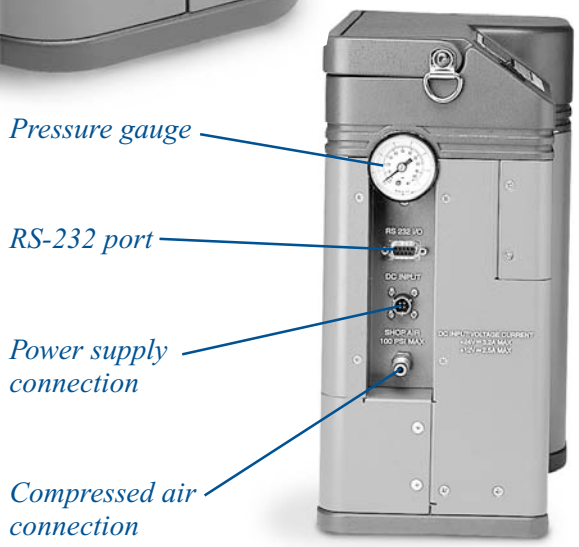
BOX 11: OPTIONS

Symbol	Description
PW	Pneumatic Wheels
ACD	Auto Condensate Drain
DFL	Dirty Filter Light
RHM	Resetable Hour Meter
SFI	Sight Flow Indicator
VFC	Variable Flow Circuit
ICV	Inlet Control Valve
CE	CE
CSA	CSA
EXP	Explosion Proof

Features

- Completely automatic "one touch" testing procedure takes about 60 seconds
- Compressed air *and* CO_2 connection for bottle sampling flexibility
- LCD *and* hard copy printout of results
- Internal thermal printer
- RS-232 computer communication interface port
- ISO *and* NAS report formats
- AC operation with universal power supply *or* DC operation with internal NiCd battery
- On-line *and* bottle sampling in *one* compact package

- ISO reporting in the 2/5/15 format
- Fluid viscosity and temperature read-out
- Skydrol® and petroleum based fluid compatibility with the same unit
- Windows based software included for data analysis and trending
- Lightweight, rugged and portable for easy on-site analysis



Ordering

PLC-3000 is the complete model number for ordering.

Standard PLC-3000 Components

Quantity	Description
1	Heavy duty portable travel case with protective foam insert, tilt wheels and retractable handle
1	Universal power supply/battery charger with power cord
2	68 gram CO_2 cartridges
2	Rolls thermal printing paper
3	120 cc pre-cleaned sample bottles
1	On-line sampling adapter
1	RS-232 communication cable
1	Software disk
1	Operations manual

Replacements/Accessories

Description	P/N
10-pack of 68 gram CO_2 cartridges	601895
25-pack of pre-cleaned 120cc sample bottles	601896
Thermal printing paper	601897
Verification fluid (.5 liter bottle)	932935
50 micron replacement element	Kit - 902208

LCM20 Laser Particle Counter

- **Parker's LCM20 Laser Particle Counter provides real time fluid analysis in a compact affordable package.**
- **Simple installation for up to 6,000 psi applications.**
- **Particle count reporting data in 6 channels, including ISO and NAS format**
- **Proven light blocking laser optics for reliable, continuous performance**
- **Verifies cleanliness of parts in production and test**
- **Rugged, lightweight design**
- **Laser accuracy and repeatability**
- **On-line design for optimum results**
- **Test results in ten minutes**
- **Calibration in compliance with ISO 11171 standard**
- **6 channel reporting (4, 6, 14, 21, 48 and 70 microns)**
- **ISO and NAS formats**
- **European CE approved**
- **Data retrieval and graphing software package included**

*Consult factory for more information.

TECHNICAL SPECIFICATIONS:

PARTICLE SENSITIVITY
6 preset particle sizes
(2µ, 5µ, 15µ, 25µ, 50µ, and 100µ)

ANALYSIS RANGE
ISO Codes 7 to 23
NAS Classes 0 to 12

VISCOSITY RANGE
2-100 cSt (32.6-463.5 SUS) with single-point sampler

OPERATING TEMPERATURES
+5°C to +80°C (+41°F to +176°F)

AMBIENT TEMPERATURES
+5°C to +40°C (+41°F to +104°F)

OPERATING PRESSURES
Up to 6,000 psi (413.8 bar) working

MEMORY STORAGE
300 test (scrolling) memory

SAMPLE IDENTIFICATION
32 alphanumeric characters entered
via hand-held display

DATA OUTPUT
Integral 16 column impact printer or
RS232 download port

POWER SUPPLY
Battery operated 6 alkaline "D" cells or
12VDC power supply or Rechargable battery pack

SIZE AND WEIGHT
9.75" L x 9.375" W x 5.00" D / 22 lbs.
(247.7mm L x 238.1mm W x 127mm D / 10 kg)

10 ON-BOARD SELF DIAGNOSTIC MESSAGES FOR SYSTEM INTEGRITY

1.2M NYLON (KEVLAR BRAIDED MICROBORE) CONNECTION HOSES

STAINLESS STEEL ARMORED HOSE ENDS

VITON SEALS THROUGHOUT

CALIBRATED TO ISO STANDARDS

CE APPROVED

Ordering Information

Part No.	Description
LCM20.2021	Portable 6 Channel Laser Particle Counter for mineral and petroleum based fluids only
LCM20.2061	Portable 6 Channel Laser Particle Counter for aggressive fluids (i.e. phosphate esters and Skydrol™)
B.84.3702	Spare printer ribbon
B.84.702	Spare printer paper (5 rolls per pack)

Applications for Parker Filter Carts

- Filtering new fluid before putting into service
- Transferring fluid from drums or storage tanks to system reservoirs
- Conditioning fluid that is already in use
- Complimenting existing system filtration
- Removing free water from a system
- For use with fluids such as hydraulic, gear and lube oils

Parker filter carts are the ideal way to prefilter and transfer fluids into reservoirs or to clean up existing systems.

Fluid should always be filtered before being put into use. New fluid is not necessarily clean fluid. Most new fluids (right out of the drum) are unfit for use due to high initial contamination levels. Contamination, both particulate and water, may be added to a new fluid during processing, mixing, handling and storage.

Water is removed by installing Par-Gel™ elements in the outlet filter. Par-Gel™ elements are made from a polymer which has an extremely high affinity for free water. Once water comes into contact with this material, it is removed from the system.

The Parker filter cart uses *two* high capacity ModuFlow™ filters for long element life and better system protection. The first stage (inlet) filter captures larger particles, while the second stage (outlet) filter controls finer particles or removes water. A rugged industrial quality gear pump gets the job done fast.

Using a Parker portable filter cart is the most economical way to protect your system from the harm that can be caused by contamination.

Features	Advantages	Benefits
• Two filters instead of one.	• Pump protection and long element life.	• Element cost savings and trouble-free service.
• Wide variety of particulate elements available.	• Capable of getting a fluid to a desired cleanliness level.	• Avoids excess costs due filter to over or under filtration.
• Par-Gel water removal elements available.	• Removes “free water” from a system.	• Gets dirt and water out of system with one process.
• Heavy duty frame.	• Rugged and durable.	• Built to last for many hours of use.
• Lightweight and portable.	• Easy to move from place-to-place.	• One person operation.
• Two flow rates available (5 gpm or 10 gpm).	• Enables use in low or high viscosity applications.	• Matched to your needs.
• Eleven-foot hose and wand assemblies included.	• Additional hardware not necessary.	• Ready to use as received.

Features

Service Cover
- Top-accessible for easy changing of elements

Dual Filters
- Two-stage filtration for long element life and pump protection

Hose & Wand Assembly
- Ready to use; no additional hardware needed
- Flexible hoses for tight spots
- Kink-resistant hose prevents pump cavitation

Gear Pump
- Industrial quality
- Quiet operation
- Dependable, long life

Visual Indicator
- Tells you when to change elements

Motor
- Industrial brand name

Heavy Duty Frame
- Rugged and built to last

Drip Pan
- Helps keep the work area safe and clean

Elements (not shown)
- Available for both particulate and water removal

Electrical Cord (not shown)
- 6ft. with on/off switch
- Optional 20 ft. cord with reel

Specifications

Maximum Recommended Fluid Viscosity:
10MF: 500 SUS (108 cSt) (.85 specific gravity)
5MF: 3000 SUS (627 cSt) (.85 specific gravity)

Visual Indicator:
Visual differential type
3-band (clean, change, bypass)

Filter Bypass Valve Settings:
Inlet: 3 psid (.2 bar)
Outlet: 25 psid (1.7 bar)

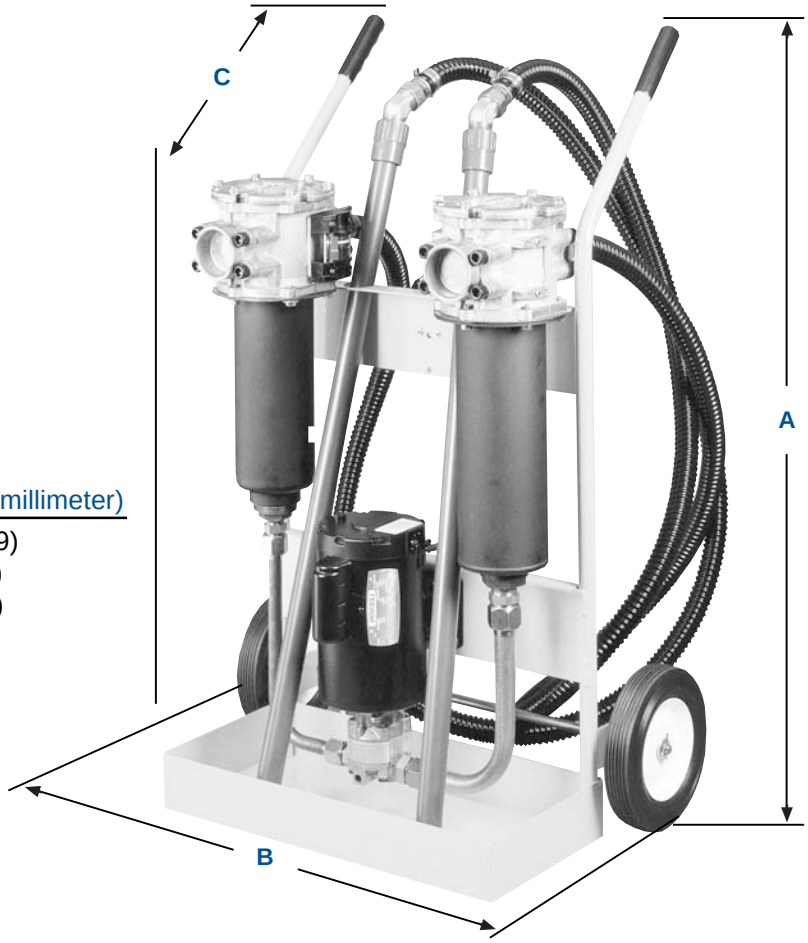
Operating Temperatures:
Buna N (Nitrile) -40°F to 150°F
(-40°C to 66°C)
F3 (high temp option)
-15°F to 200°F
(-26°C to 93°C)

Electrical Service Required:
115 volts, 10 amps, single phase, 60 Hz

Electrical Motor:
l0MF - ¾ hp @ 3450 rpm, O.D.P.
5MF - ½ hp @ 1725 rpm, O.D.P.
Thermal overload protection

Construction:
Cart Frame: Steel
Filter Head: Aluminum
Filter Bowl: Steel
Hoses: PVC (Std.)
EDPM (high temp option)
Wands: PVC (Std.)
Steel tube (high temp option)

Weight (approximate): 110 Lbs. (45.4 kg)



Dimensions: inches (millimeter)

A - Height: 40.5" (1029)
B - Width: 25.5" (648)
C - Depth: 19.0" (483)

Typical Fluid Cleanliness Level Requirements

Many manufacturers of hydraulic components have established fluid cleanliness levels for their components. Using a portable filter cart can be a very effective way to reach and maintain these cleanliness levels.

Component	ISO Cleanliness Level
Servo control valves	16/14/11
Proportional valves	17/15/12
Vane and piston pumps/motors	18/16/13
Directional and pressure control valves	18/16/13
Gear pumps/motors	19/17/14
Flow control valves cylinders	20/18/15
New fluid	20/18/15

Filter Cart Performance

Fluid cleanliness levels are a function of initial contamination levels, contamination ingression rates, reservoir size and filter element efficiency. The chart below lists approximate time requirements to achieve certain cleanliness levels based on the assumptions noted.

Reservoir Capacity (Gallons)	Time Required (Hours)	Projected Cleanliness Level (ISO)
50	0.5	20/18/15
50	1.0	17/15/12
50	2.5	16/14/11
100	1.5	18/16/13
100	2.5	17/15/12
100	4.0	16/14/11
200	2.5	19/17/14
200	3.5	18/16/13
200	5.0	17/15/12

Notes: The results in the chart are based on the following assumption:

1. Initial contamination level is 500,000 particles greater than 10 micrometers per 100 ml of fluid (10MF cart).
2. Inlet filter fitted with 40SA element. outlet with 10C element.
3. System ingression rate equal to 1 X 10^6 particles greater than 10 micrometers entering the system per minute.

Filter Cart Element Performance

Media Code	Filter Media	Time Averaged Beta x/y/z =2/20/75 Where x/y/z is:	Capacity (Grams)
74W	Woven Wire	0.0029[1]	*
40W	Woven Wire	0.0016[1]	*
40SA	Synthetic	40 Micron Nominal[2]	*
20C	Cellulose	20 Micron Nominal[2]	*
10C	Cellulose	6/18/22 Micron	15
03C	Cellulose	2/6/9 Micron	18
20Q	Microglass	7.5/12.5/17 Micron	47
10Q	Microglass	<2/6/9 Micron	42
05Q	Microglass	<2/<2/3.3 Micron	46
02Q	Microglass	<2/<2/2 Micron	45

Beta Rating	Efficiency at x,y,z Particle Size
Bx = 2	50.0%
By = 20	95.0%
Bz = 75	98.7%

Notes: Multipass test run @ 40 gpm to 25 psid.
ANSI/NFPA T3.10/8.8 R1-1990 w/50 ppm anti-static additive
*Not Applicable.

1. Not multipass tested- Number shown Is actual pore size in inches.
2. Not multipass tested.

Par-Gel™ Media Water Capacity

Model	Fluid Viscosity	Capacity
5MF	75 SUS 200 SUS	250 ml 140 ml
10MF	75 SUS 200 SUS	190 ml 80 ml

Notes: 1. Par-Gel elements are designed to remove “free water”, which is defined as water that is above a particular fluid’s saturation level.

2. Capacity is very dependent on flow rate and viscosity. Not recommended with fluids in excessof 500 SUS.

Assembly

1) Install hoses to inlet and outlet filters by threading the hose end with the straight thread “o”-ring seal fitting into the filter flange.

2) Connect the PVC tube wands to the swivel fitting on the hose end.

Whenever servicing the PVC tube wand *do not overtorque* the metal fittings going into the PVC coupling. Overtorque will result in cracking the coupling. Generally, 1/4 turn beyond handtight is sufficient.

Operating Instructions

1) Insert the inlet wand assembly into the supply fluid receptacle (drum/reservoir). The “RF". filter is the inlet filter.

2) Insert the outlet wand assembly into the clean fluid receptacle (drum/reservoir). The “CF” fIlter is the outlet filter.

Caution:

Do not kink the hose assemblies, this may result in excessive vacuum or pressure at the pump.

3) Verify that the ON/OFF switch is OFF and plug the cord into a 115V 10A grounded outlet (3 wire).

4) Turn switch to ON position and check outlet wand for oil flow. Allow 30 to 60 seconds for filters to fill with oil. If repeated attempts to obtain oil flow fail, check pump inlet fittings for tightness, remove inlet filter access cover and verify the cover sealing “o”-ring is in place. For very viscous fluids it may be necessary to pour 1 or 2 quarts of fluid into the “RF” inlet filter housing to prime pump initially.

5) The condition of the filter element should be monitored by observing the cleanliness indicator on the discharge filter. When the Indicator is in the CHANGE position, both inlet and outlet filter elements MUST be replaced to prevent fluid from going into bypass in the filters.

6) The inlet filter Is provided with a 3PSI bypass spring, and prevents the pump from cavitating If the element is not changed. The outlet filter is provided with a 25PSl bypass spring to prevent excessive pressure which may be harmful to personnel or to the filter cart.

Warning:

The filter bypass spring acts as a relief valve for the pump. Do not restrict the discharge hose with a shut-off valve which will defeat the function of the bypass valve, causing excessive pressure, which may be harmful to personnel or to the filter cart.

7) The cleanliness indicator works on differential pressure and will indicate the condition of the element (CLEAN, CHANGE, or BYPASS).

NOTE:

The filter cart must be in operation for the indicator to read properly.

Maintenance Instructions

1) Turn switch to OFF position and unplug cord from electrical outlet.

2) Remove tube wands from oil to prevent siphoning.

3) Loosen hex head screws on filter cover. Turn cover to clear screws, remove cover.

4) Pull flow diverter assembly from the filter head. Filter element will follow the diverter.

a) Replace the cellulose, synthetic or Microglass II elements. Verify replacement.

b) Wire mesh elements can be cleaned. Ultrasonic cleaners provide best results.

5) Install element on flow diverter and reinstall in filter housing. Make sure diverter “o"-rings seat properly into the head.

6) Check to be sure that the notch on the flow diverter lines up with the notch in the head.

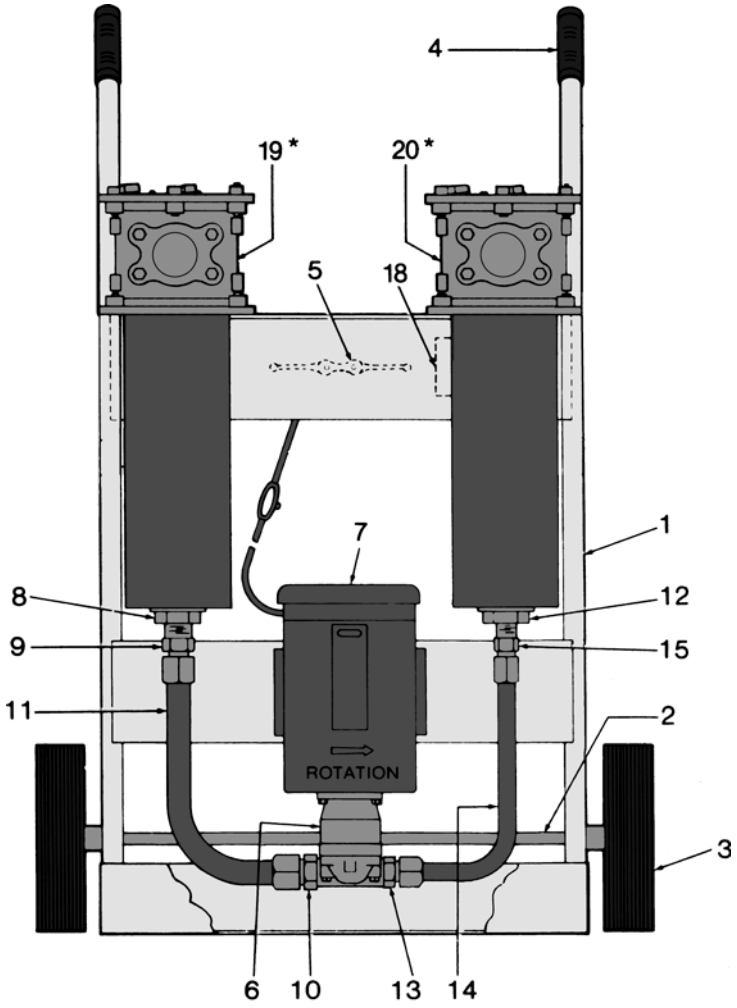
7) Inspect the cover “o"-ring and replace if necessary.

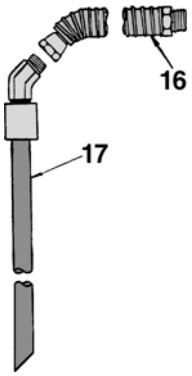
8) Replace cover and tighten hex head screws until they are snug. Do not over-torque these screws. Do not interchange the inlet filter cover with the outlet filter cover. (The inlet filter has a “RF” prefix, the outlet filter has a "CF" prefix).

Trouble Shooting

Problem	Cause	Solution
Does not start.	ON/OFF switch. No electrical power. Defective motor.	Turn switch ON, replace switch if defective. Plug in cart. Replace.
No oil flow or erratic pump noise	Filter housing not filled with oil. Suction leak. Defective pump.	Allow pump to run 30 to 60 seconds. Check tightness of inlet fittings. Check "o"-ring in inlet filter cover for nicks. Kink or restriction in inlet hose. Add 1 or 2 quarts of oil to inlet filter. Replace pump.
Indicator reads CHANGE or BYPASS.	Element dirty. Oil extremely cold or viscous.	Replace or clean elements (both filters). Change element to coarser micron rating.
Indicator does not seem to move.	No outlet element. 40 micron element installed in outlet filler.	Install element. Check cart model number to verify correct element. The inlet filter has a rating "RF" prefix; the ouflet filter has a "CF" prefix.

Filter Cart Replacement Parts





Replacement Element Part Numbers

Media Code	Buna Seals (Standard)	Viton Seals
74W	924456	925043
40W	924455	925042
40SA	924448	925035
20C	924451	925038
10C	924450	925037
03C	924449	925036
20Q	933742Q	933743Q
10Q	924453Q	925040Q
05Q	924452Q	925039Q
02Q	933068Q	933069Q
WR	927584	928908

Need Header Information

Item No.	Part No.	Description	Quantity	Item No.	Part No.	Description	Quantity
1	928690	Frame	1	12	928749	Pipe Reducer	1
2	928653	Axle	1	13	928729	Adapter Fitting	1
3	928650	Wheel	2	14	928676	Discharge Tube Assembly	
4	928651	Handle Grip	2	15	928727	Tube Fitting	1
5	928649	Cord Cleat	1	16	928663	Hose Assy. - Buna N	2
Opt. 5	928623	Cord Reel	1	16	928621	Hose Assy. - Fluorocarbon	—
6.	928731	Pump	1	17	928784	Tube Wand Assy. Buna N	2
7	928678	Motor 10MF	1	17	928620	Tube Wand Assy. Fluorocarbon	—
7	929692	Motor 5MF	—	18	932187	Name Plate	1
8	928748	Pipe Reducer	1	19*	RF2-1-**-PP3-YN-F9-1	Inlet Filter - Buna N	1
9	928728	Tube Fitting	1	19*	F3-RF2-1-**-PP3-YN-F9-1	Inlet Filter - Fluorocarbon	—
10	928652	Adapter Fitting	1	20*	CF2-1**-MP25-F9-YN-1	Outlet Filter - Buna N	1
11	928677	Suction Tube Assembly		20*	F3-CF2-1-**-MP25-F9-YN-1	Outlet Filter - Fluorocarbon	—

**Refer to table above

HOW TO ORDER:

Select the desired symbol (in the correct position) to construct a model code.
Example:

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	BOX 7
		10MF	40SA	10Q	6	N

BOX 1: SEALS

Symbol	Description
None	Leave blank.

Note: Used for specific automotive program idenitification.

BOX 2: PLANT CODE

Symbol	Description
None	Leave blank.

Note: Used for specific automotive plant location.

BOX 3: MODEL

Symbol	Description
10MF	10GPM (500 SUS Max.)
5MF	5 GPM (3000 SUS Max.)

BOX 4: INLET FILTER

Symbol	Description
40SA	Synthetic
40W	Stainless Steel Mesh
74W	Stainless Steel Mesh
20C	Cellulose
20Q	Microglass III

BOX 5: OUTLET FILTER

Symbol	Description
10C	Cellulose
03C	Cellulose
20Q	Microglass III
10Q	Microglass III
05Q	Microglass III
02Q	Microglass III
WR	PAR-GEL™ Water Removal

BOX 6 : OPTIONS

Symbol	Description
1	None
3	Magnets in inlet filter
6	20 FT electrical cord (retractable reel)
9	Indicator on inlet filter

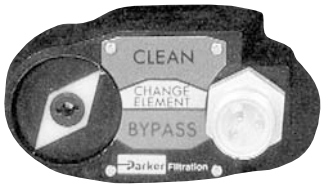
BOX 7: SEAL

Symbol	Description
N	Buna N (Nitrile) -- Std.
F3	High Temperature Service

Electrical Information

Pictorial Guide

HF2, HF3, HF4
Type E Electrical Indicator



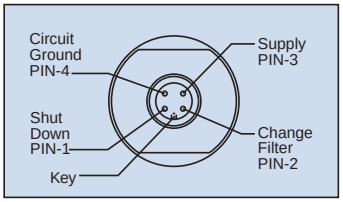
50P4
Type D Electrical Indicator

SLAT and RF4
Type PS Electrical Indicator

DC3 Pressure Switch
Type SE Electrical Housing

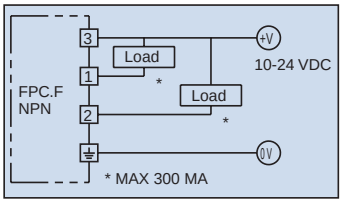
Part Number	Indication Pressure
935591	8.5 bar (125 psi)
935742	3.5 bar (50 psi)

4 PIN MICRO RECEPTACLE



Ind. press	LED status	Output
2/4	⊗ ⊗	-
3/4	⊗ ⊗ ⊗	2 active
4/4	⊗ ⊗ ⊗ ⊗	1 active

CONTACT CONFIGURATION

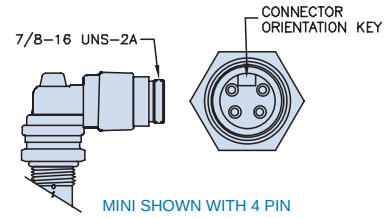


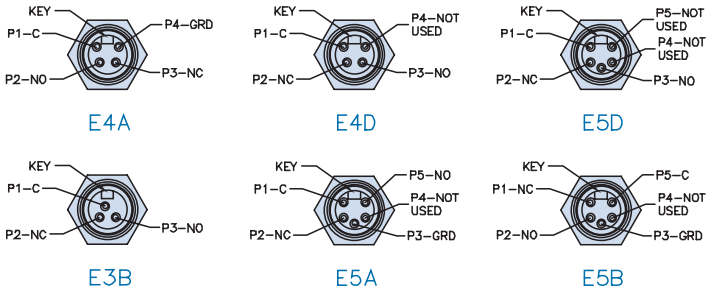
F4M ELECTRONIC INDICATOR

Electrical Information

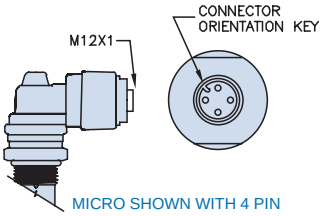
Pictorial Guide

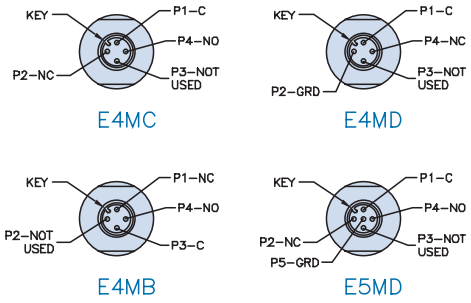
Mini Connector





Micro Connector





Connector and Wiring Options

PINS	TYPE	WIRING TYPE	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	E TYPE INDICATORS IND. SWITCH SETTING 25 PSI	50 PSI
3	MINI	E3B	C	NC	NO			935952	*
4	MINI	E4A	C	NO	NC	GRD		934914	934916
4	MINI	E4D	C	NC	NO	NOT USED		934922	934924
4	MICRO	E4MB	NC	NOT USED	C	NO		935325	934912
4	MICRO	E4MC	C	NC	NOT USED	NO		935722	935723
4	MICRO	E4MD	C	GRD	NOT USED	NC		934635	934636
5	MINI	E5A	C	NC	GRD	NOT USED	NO	934911	934821
5	MINI	E5B	NC	NO	GRD	NOT USED	C	934928	934930
5	MINI	E5D	C	NC	NO	NOT USED	NOT USED	934918	934920
5	MICRO	E5MD	C	NC	NOT USED	NO	GRD	934601	934595

*Consult factory

Filter Terminology

Strainer/Inlet Filter
A coarse element system generally used to prevent ingestion of large particles, chips or rags into the pump. (Not used as primary protection).

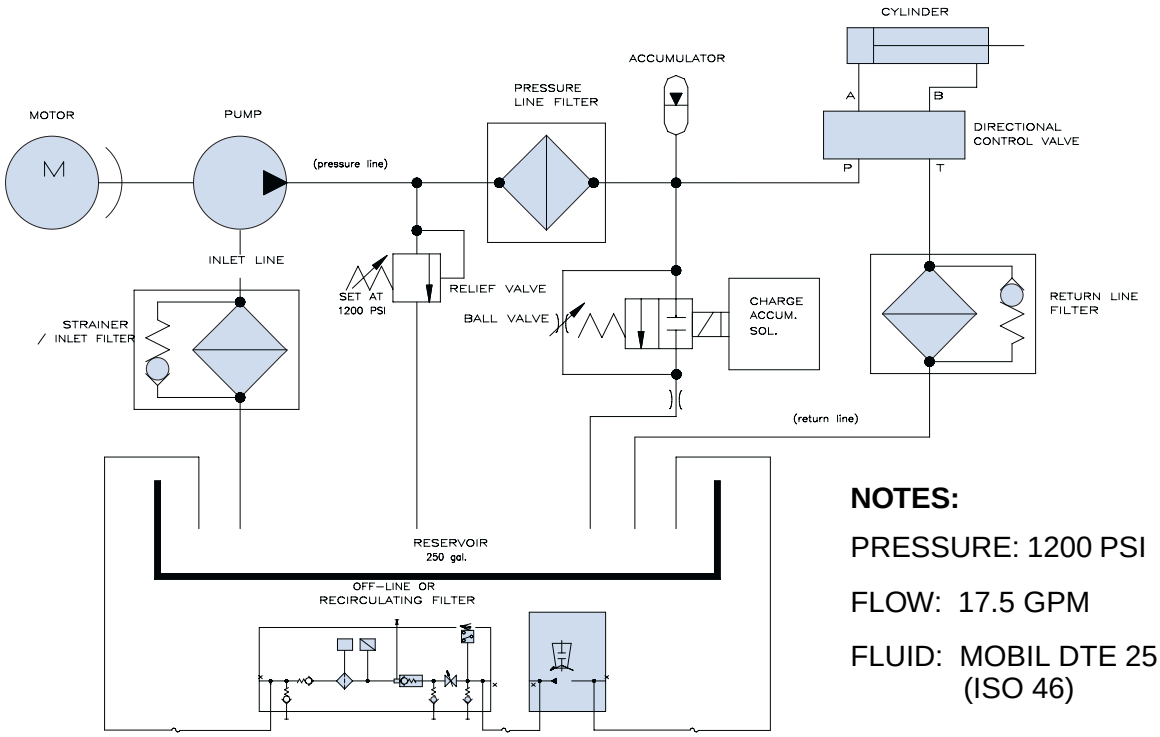
Pressure Line Filter (high pressure)
A fine element system located on the pump outlet line, specially suited for protecting sensitive components such as servo valves, and will protect the system from pump generated contamination.

Return Line Filter (low pressure)
A fine element system located on the return line to reservoir, usually the last component through which fluid passes before being discharged into the reservoir. Therefore it filters most component wear debris from the system.

Off-Line Or Recirculating Filter
A separate low flow rate low pressure fine element system located on the reservoir, which circulates fluid through independent filters. The main advantage is that continuous, multi-pass filtration occurs. Excellent cleanliness levels can be achieved with off-line filtration. In addition to filtration, total fluid conditioning can be accomplished by placing heat exchangers and in-line heaters in a circuit. Water absorption filters can also be added for removing free water.

Sample Circuit

General Component Locations And Symbols:



NOTES:

PRESSURE: 1200 PSI

FLOW: 17.5 GPM

FLUID: MOBIL DTE 25 (ISO 46)

NOTE: These symbols are for reference only.
For specific symbols and functions, consult
FLUID POWER DESIGNERS' LIGHTNING REFERENCE HANDBOOK.

Filter Selection

STEP 1.

Determine type of filter required. See filter type or sample circuit for clarification.
For pressure filter go to step 2A.
For return filter go to step 2B.
For off-line / recirculating filter go to page 54.

STEP 2.

Determine flow rate requirements:

A.) Pressure filter flow requirements:

1.) Determine if your circuit has an accumulator. (See sample circuit)

a.) If yes, is the location of the accumulator between the pump and filter?
YES - Consult Norco-Parker Hannifin Corp. for assistance.
NO - Go to step 2.

2.) From your circuit or manufactures specifications determine the cubic inch displacement per revolution of the pump. Insert the information in the formula below.

3.) From your circuit or manufactures specifications determine the motor RPM's and insert the information in the formula below.

FORMULA

Flow requirement in **GPM** (**G**allons **P**er **M**inute) = $\frac{\text{Cubic inch per revolution of pump} \times \text{Motor RPM}}{\text{231 Cubic Inches per Gallon}}$

EXAMPLE $\frac{\text{3.37 Cu. In} \times \text{1200 RPM}}{\text{231 Cubic Inches per Gallon}}$ = 17.5 GPM

4.) Select proper filter from ΔP curves.

B.) Return filter flow requirements:

1.) From your circuit or manufactures specifications determine the cubic inch displacement per revolution of the pump. Insert the information in the formula below.

2.) From your circuit or manufactures specifications determine the motor RPM's and insert the information in the formula below.

FORMULA

Flow requirement in **GPM** (**G**allons **P**er **M**inute) = $\frac{\text{Cubic inch per revolution of pump} \times \text{Motor RPM}}{\text{231 Cubic Inches per Gallon}}$

EXAMPLE = $\frac{\text{3.37 Cu. In} \times \text{1200 RPM}}{\text{231 Cubic Inches per Gallon}}$ = 17.5 GPM

3.) Take calculated GPM and multiply by 3 (EXAMPLE = 17.5 X 3 = 52.5 GPM FLOW) for normal safety factor involving actuators.

4.) Select proper filter from ΔP curves.

*Footnote: For reference, see lightning reference handbook.

Element Micron Selection

Manufacturing standards, December 1994, Hydraulic Standards for Industrial Equipment (HX1) has replaced manufacturing staff HF1 November 1984, 3.1 contamination levels with an international standard **ANSI / (NFPA / JIC) T2.24.1-1991, "Hydraulic Fluid Power Systems Standard for Stationary Industrial Machinery." TABLE 1** shows system contamination levels in **ISO 4066** cleanliness codes.

STEP 1.

A.) To determine what micron element we should select, we need to know:

1.) Type of hydraulic fluid system is using (or will use).
2.) Operating pressure of system.
4.) Is a servo controlled component used in the circuit.

EXAMPLE:
From the sample circuit on page 84 we see:

1.) Under **NOTES:** the fluid is Mobil DTE25. Section 9, Lightning Reference pg. 155 shows us this is a Hydrocarbon (mineral based fluid).
2.) Under **NOTES:** The pressure is 1200 PSI.
3.) No servo controlled components are in the circuit.

B.) From Table 1 select horizontal column (type of hydraulic fluid) and vertical column (operating pressure of system) to determine maximum target contamination level of system. Example above, mineral based and 1200 PSI = 16/13.

Table 1

(1) TYPE OF FLUID	(2) OPERATING PRESSURE OF SYSTEM			
	0-70 BAR (0-1000 PSI)	71-210 BAR (1001-3000 PSI)	211 BAR & UP (3001 & GREATER PSI)	SYSTEM WITH SERVO COMP.
MINERAL BASED	17/14	16/13	15/11	14/10
PHOSPHATE ESTER	17/14	16/13	15/11	14/10
WATER GLYCOL	17/14	16/13	15/11	14/10
WATER-IN-OIL EMULSION	17/14	16/13	15/11	14/10
	MAXIMUM TARGET CONTAMINATION LEVEL OF SYSTEM (ISO 4406)			

C.) From maximum target contamination level of system (example 16/13) use Table 2 to select filter element micron.

Table 2

TARGET CONTAMINATION LEVEL OF SYSTEM	SELECT FILTER ELEMENT
17/14	10 MICRON
16/13	10 MICRON
15/11	5 MICRON
14/10	3 MICRON

STEP 2. Select proper filter from ΔP curves.

Changes to ISO Standards and their impact on Filter Performance Reporting and the Contamination Code.

ISO 11171 is the new particle counter calibration method and utilizes calibration fluid made from ISO Medium Test Dust (ISO MTD) suspended in MIL-H-5606. The calibration fluid is traceable to the National Institute of Standards and Technology (NIST) and is designated by NIST as Standard Reference Material (SRM)2806. ISO 11171 is replacing ISO 4402 which is based on obsolete AC Fine Test Dust (ACFTD).

It is important to note that the ISO 11171 calibration method is based on a distribution of particles measured by their equivalent area diameter, whereas ISO 4402 is based on a distribution of particles measured by their longest chord. Also, the NIST work utilized scanning electron microscopy for particles below 10 um in size, whereas the sizing distribution on ACFTD utilized optical microscopy.

The new calibration method and resulting ISO code will typically produce a one to two level increase in the first digit (the >4um size range) of the three digit code. This is due to the greater number of particles in the small size range. The remaining two digits will typically remain unchanged between old and new calibration methods, and should not impact previously established ISO cleanliness standards.

ISO 16889 is the new multi-pass test standard for measuring filter performance and utilizes ISO MTD as the contaminant challenge. This standard is replacing ISO 4572 which utilized ACFTD. See the following graphs below for filtration beta ratio comparisons on our 2Q, 5Q, 10Q, and 20Q Microglass III media. The graphs reflect multi-pass test results using ISO 4572 with ACFTD and the revised ISO 16889 using ISO MTD.

Table 1 below shows the approximate particle size relationship between the calibration methods.

ACFTD size (per ISO 4402:1991) µm	NIST size (per ISO 11171:1999) µm (c)
1	4.2
2	4.6
3	5.1
5	6.4
7	7.7
10	9.8
15	13.6
20	17.5
25	21.2
30	24.9
40	31.7

The ISO cleanliness code reporting method will also be affected.

Example: Former two-digit ISO 4406:1987

5 um / 15 um

14 11

Former three-digit ISO code

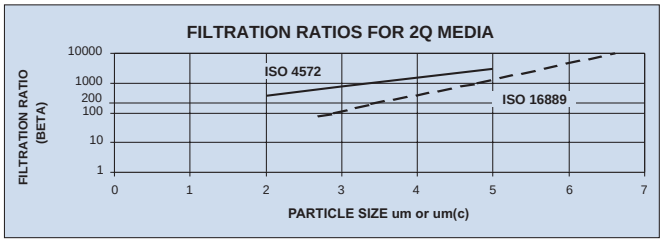
2 um / 5 um / 15 um

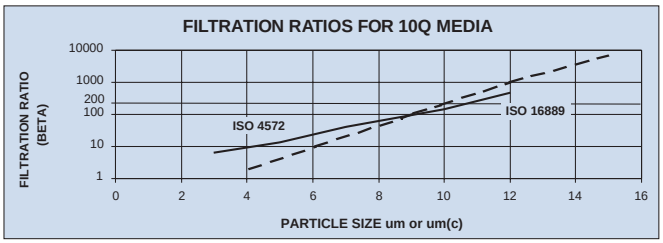
17 14 11

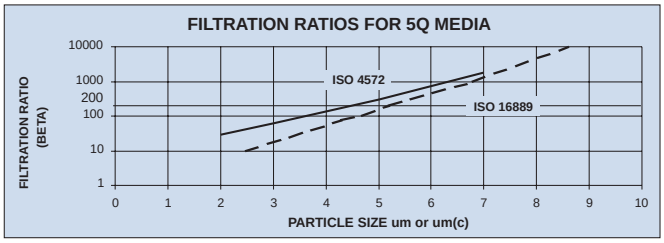
New three-digit **ISO 4406:1999**

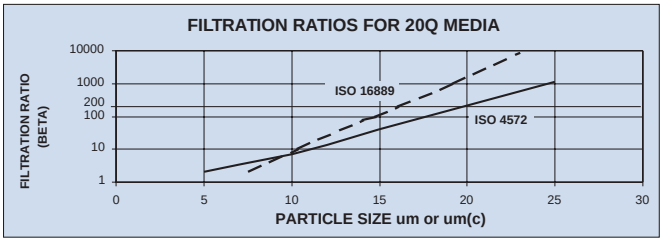
4 um (c) / 6 um (c) / 14 um (c)

18 14 11









Offer of Sale

The items described in this document are hereby offered for sale at prices to be established by Parker Hannifin Corporation, its subsidiaries and its authorized distributors. This offer and its acceptance by any customer ("Buyer") shall be governed by all of the following Terms and Conditions. Buyer's order for any item described in its document, when communicated to Parker Hannifin Corporation, its subsidiary or an authorized distributor ("Seller") verbally or in writing, shall constitute acceptance of this offer.

1. Terms and Conditions of Sale: All descriptions, quotations, proposals, offers, acknowledgments, acceptances and sales of Seller's products are subject to and shall be governed exclusively by the terms and conditions stated herein. Buyer's acceptance of any offer to sell is limited to these terms and conditions. Any terms or conditions in addition to, or inconsistent with those stated herein, proposed by Buyer in any acceptance of an offer by Seller, are hereby objected to. No such additional, different or inconsistent terms and conditions shall become part of the contract between Buyer and Seller unless expressly accepted in writing by Seller. Seller's acceptance of any offer to purchase by Buyer is expressly conditional upon Buyer's assent to all the terms and conditions stated herein, including any terms in addition to, or inconsistent with those contained in Buyer's offer. Acceptance of Seller's products shall in all events constitute such assent.

2. Payment: Payment shall be made by Buyer net 30 days from the date of delivery of the items purchased hereunder. Any claims by Buyer for omissions or shortages in a shipment shall be waived unless Seller receives notice thereof within 30 days after Buyer's receipt of the shipment.

3. Delivery: Unless otherwise provided on the face hereof, delivery shall be made F.O.B. Seller's plant. Regardless of the method of delivery, however, risk of loss shall pass to Buyer upon Seller's delivery to a carrier. Any delivery dates shown are approximate only and Seller shall have no liability for any delays in delivery.

4. Warranty: Seller warrants that the item sold hereunder shall be free from defects in material or workmanship for a period of 547 days from the date of shipment to Buyer, or 3,000 hours of use, whichever expires first. **THIS WARRANTY COMPRISES THE SOLE AND ENTIRE WARRANTY PERTAINING TO ITEMS PROVIDED HEREUNDER. SELLER MAKES NO OTHER WARRANTY, GUARANTEE, OR REPRESENTATION OF ANY KIND WHATSOEVER. ALL OTHER WARRANTIES, INCLUDING BUT NOT LIMITED TO, MERCHANTABILITY AND FITNESS FOR PURPOSE, WHETHER EXPRESS, IMPLIED, OR ARISING BY OPERATION OF LAW, TRADE USAGE, OR COURSE OF DEALING ARE HEREBY DISCLAIMED.**

NOTWITHSTANDING THE FOREGOING, THERE ARE NO WARRANTIES WHATSOEVER ON ITEMS BUILT OR ACQUIRED WHOLLY OR PARTIALLY, TO BUYERS DESIGNS OR SPECIFICATIONS.

5. Limitation of Remedy: SELLER'S LIABILITY ARISING FROM OR IN ANY WAY CONNECTED WITH THE ITEMS SOLD OR THIS CONTRACT SHALL BE LIMITED EXCLUSIVELY TO REPAIR OR REPLACEMENT OF THE ITEMS SOLD OR REFUND OF THE PURCHASE PRICE PAID BY BUYER, AT SELLER'S SOLE OPTION IN NO EVENT SHALL SELLER BE LIABLE FOR ANY INCIDENTAL OR SEQUENTIAL OR SPECIAL DAMAGES OF ANY KIND OR NATURE WHATSOEVER, INCLUDING BUT NOT LIMITED TO LOST PROFITS ARISING FROM OR IN ANY WAY CONNECTED WITH THIS AGREEMENT OR ITEM SOLD HEREUNDER, WHETHER ALLEGED TO ARISE FROM BREACH OF CONTRACT, EXPRESS OR IMPLIED WARRANTY, OR IN TORT, INCLUDING WITHOUT LIMITATION, NEGLIGENCE, FAILURE TO WARN OR STRICT LIABILITY.

6. Changes, Reschedules and Cancellations: Buyer may request to modify the designs or specifications for the items sold hereunder as well as the quantities and delivery dates thereof, or may request to cancel all or part of this order, however, no such requested modification or cancellation shall become part of the contract between Buyer and Seller unless accepted by Seller in a written amendment to this Agreement. Acceptance of any such requested modification or cancellation shall be at Seller's discretion, and shall be upon such terms and conditions as Seller may require.

7. Special Tooling: A tooling charge may be imposed for any special tooling, including without limitation, dies, fixtures, molds and patterns, acquired to manufacture items sold pursuant to this contract. Such special tooling shall be and remain Seller's property notwithstanding payment of any charges by Buyer. In no event will Buyer acquire any interest in apparatus belonging to Seller which is utilized in the manufacture of the items sold hereunder, even if such apparatus has been specially converted or adapted for such manufacture and notwithstanding any charges paid by Buyer. Unless otherwise agreed, Seller shall have the right to alter, discard or otherwise dispose of any special tooling or other property in its sole discretion at any time.

8. Buyer's Property: Any designs, tools, patterns, materials, drawings, confidential information or equipment furnished by Buyer or any other items which become Buyer's property, may be considered obsolete and may be destroyed by Seller after two (2) consecutive years have elapsed without Buyer placing an order for the items which are manufactured using such property. Seller shall not be responsible for any loss or damage to such property while it is in Seller's possession or control.

9. Taxes: Unless otherwise indicated on the face hereof, all prices and charges are exclusive of excise, sales, use, property, occupational or like taxes which may be imposed by any taxing authority upon the manufacture, sale or delivery of the items sold hereunder. If any such taxes must be paid by Seller or if Seller is liable for the collection of such tax, the amount thereof shall be in addition to the amounts for the items sold. Buyer agrees to pay all such taxes or to reimburse Seller therefore upon receipt of its invoice. If Buyer claims exemption from any sales, use or other tax imposed by any taxing authority, Buyer shall save Seller harmless from and against any such tax, together with any interest or penalties thereon which may be assessed if the items are held to be taxable.

10. Indemnity For Infringement of Intellectual Property Rights: Seller shall have no liability for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights except as provided in this Part 10. Seller will defend and indemnify Buyer against allegations of infringement of U.S. patents, U.S. trademarks, copyrights, trade dress and trade secrets (hereinafter 'Intellectual Property Rights'). Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on an allegation that an item sold pursuant to this contract infringes the Intellectual Property Rights of a third party. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of such allegations of infringement, and Seller having sole control over the defense of any allegations or actions including all negotiations for settlement or compromise. If an item sold hereunder is subject to a claim that it infringes the Intellectual Property Rights of a third party, Seller may, at its sole expense and option, procure for Buyer the right to continue using said item, replace or modify said time so as to make it noninfringing, or offer to accept return of said item and return the purchase price less a reasonable allowance for depreciation. Notwithstanding the foregoing Seller shall have no liability for claims of infringement based on information provided by Buyer, or directed to items delivered hereunder for which the designs are specified in whole or part by Buyer, or infringements resulting from the modification, combination or use in a system of any item sold hereunder. The foregoing provisions of this Part 10 shall constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for infringement of Intellectual Property Rights.

If a claim is based on information provided by Buyer or if the design for an item delivered hereunder is specified in whole or in part by Buyer, Buyer shall defend and indemnify Seller for all costs, expenses or judgments resulting from any claim that such item infringes any patent, trademark, copyright, trade dress, trade secret or any similar right.

11. Force Majeure: Seller does not assume the risk of and shall not be liable for delay or failure to perform any of Seller's obligations by reason of circumstances beyond the reasonable control of Seller (hereinafter 'Events of Force Majeure'). Events of Force Majeure shall include without limitation, accidents, acts of God, strikes or labor disputes, acts, laws, rules or regulations of any government or government agency, fires, floods, delays or failures in delivery of carriers or suppliers, shortages of materials and any other cause beyond Seller's control.

12. Entire Agreement/Governing Law: The terms and conditions set forth herein, together with any amendments, modifications and any different terms or conditions expressly accepted by Seller in writing, shall constitute the entire Agreement concerning the items sold, and there are no oral or other representations or agreements which pertain thereto. This Agreement shall be governed in all respects by the law of the State of Ohio. No actions arising out of the sale of the items sold hereunder or this Agreement may be brought by either party more than two (2) years after the cause of action accrues.

Parker Hannifin Corporation
6035 Parkland Blvd.
Cleveland, Ohio 44124-4141
Telephone: (216) 896-3000
Fax: (216) 896-4000
Web site: www.parker.com

Parker Hannifin Corporation

About Parker Hannifin Corporation

Parker Hannifin is a leading global motion-control company dedicated to delivering premier customer service. A Fortune 500 corporation listed on the New York Stock Exchange (PH), our components and systems comprise over 1,400 product lines that control motion in some 1,000 industrial and aerospace markets. Parker is the only manufacturer to offer its customers a choice of hydraulic, pneumatic, and electromechanical motion-control solutions. Our Company has the largest distribution network in its field, with over 7,500 distributors serving more than 350,000 customers worldwide.

Parker's Charter

To be a leading worldwide manufacturer of components and systems for the builders and users of durable goods. More specifically, we will design, market and manufacture products controlling motion, flow and pressure. We will achieve profitable growth through premier customer service.

Product Information

North American customers seeking product information, the location of a nearby distributor, or repair services will receive prompt attention by calling the Parker Product Information Center at our toll-free number: 1-800-C-PARKER (1-800-272-7537). In the UK, a similar service is available by calling 0500-103-203.

The Aerospace Group is a leader in the development, design, manufacture and servicing of control systems and components for aerospace and related high-technology markets, while achieving growth through premier customer service.

The Climate & Industrial Controls Group designs, manufactures and markets system-control and fluid-handling components and systems to refrigeration, air-conditioning and industrial customers worldwide.

The Fluid Connectors Group designs, manufactures and markets rigid and flexible connectors, and associated products used in pneumatic and fluid systems.

The Seal Group designs, manufactures and distributes industrial and commercial sealing devices and related products by providing superior quality and total customer satisfaction.

The Hydraulics Group designs, produces and markets a full spectrum of hydraulic compnents and systems to builders and users of industrial and mobile machinery and equipment.

The Filtration Group designs, manufactures and markets quality filtration and clarification products, providing customers with the best value, quality, technical support, and global availability.

The Automation Group is a leading supplier of pneu-matic and electro-mechanical components and systems to automation customers worldwide.

The Instrumentation Group is a global leader in the design, manufacture and distribution of high-quality critical flow components for worldwide processinstrumentation, ultra-high-purity, medical and analytical applications.

Parker Worldwide Sales Offices

Contact Parker's worldwide service and distribution network by calling:

Argentina • +54 (1) 752 4129
Australia • +61 (2) 634 7777
Austria • +43 (2622) 23501 5
Belgium • +32 (2) 762 1800
Brazil • +55 (11) 3917 1407
Canada • 1-800-272-7537
China • +86 (21) 6445 9339
Chile • +(562) 623-1216
Czech Republic • +42 613 41701
Denmark • +45 (43) 541133
Finland • +358 (3) 54 100
France • +33 (4) 50 258025
Germany • +49 (3727) 90991
Hong Kong • +852 2428 8008
Hungary • +36 (1) 25 22 539
India • +91 (22) 577 1671
Italy • +39 (2) 451921
Japan • +81 (45) 861 3811
Korea • +82 (2) 561 0414
Mexico • 1-800-272-7537
Netherlands • +31 (541) 58500
NewZealand • +64 (9) 573 1523
Norway • +(47) 64 86 77 60
Poland • +48 (22) 8634942
Singapore • +65 261 5233
South Africa • +27 (11) 3927280
Spain • +34 (1) 6757300
Sweden • +46 (8) 760 2960
Taiwan • +886 (2) 8787 3780
United Arab Emirates • +971 (2) 788587
United Kingdom +44 1442 238100
United States of America • 1-800-272-7537
Venezuela +58 (2) 238 5422

Filtration Group Technical Sales & Service Locations

Finite Filter Division
500 Glaspie Street
Oxford, MI 48371
Phone: (248) 628-6400
Fax: (248) 628-1850

Hydraulic Filter Division North America
16810 Fulton County Road #2
Metamora, OH 43540
Phone: (800) 253-1258
Phone: (419) 644-4311
Fax: (419) 644-6205

Process Filtration Division
6640 Intech Blvd.
Indianapolis, IN 46278
Phone: (888) 238-5356
Phone: (317) 275-8300
Fax: (317) 275-8410

Racor Division
3400 Finch Road
P.O. Box 3208
Modesto, CA 95353
Phone: (800) 344-3286
Phone: (209) 521-7860
Fax: (209) 529-3278

Racor Division
Hydrocarbon Products
Route #3 Box 9
Henryetta, OK 74437
Phone: (918) 652-4481
Fax: (918) 652-8882

Hydraulic Filter Division Europe
Churwell Vale
Shaw Cross Business Park
Dewsbury, England WF12 7RD
Ph: +44 1924 487000
Fax: +44 1924 487060

Hydraulic Filter Division Europe
UCC Products
P.O. Box 3
Thetford, Norfolk
IP24 3RT England
Ph: (44) 1842-754251
Fax: (44) 1842-753702

Finn Filter Division
Fin-31700
Urjala As., Finland
Phone: (358) 3 54 100
Fax: (358) 3 54 10100

Parker Hannifin Ind. e Com. Ltda. Filter Division
Via Anhanguera, Km.25,3
05276-977 - Sao Paulo
– SP, Brazil
Phone: +55 (11) 3917 1407
Fax: +55 (11) 3917 1623

Parker Hannifin Korea Limited
902 Dae Heung Bldg.
648-23 Yeoksam-dong
Kangnam-ku, Seoul,
Korea 135-080
Tel: 82 2 561 0414
Fax: 82 2 556 8187

Parker Filtration

Parker Hannifin Corporation
Hydraulic Filter Division
16810 Fulton County Road #2
Metamora, OH 43540
Phone: (800) 253-1258
Phone: (419) 644-4311
Fax: (419) 644-6205
http://www.parker.com/hydraulicfilter

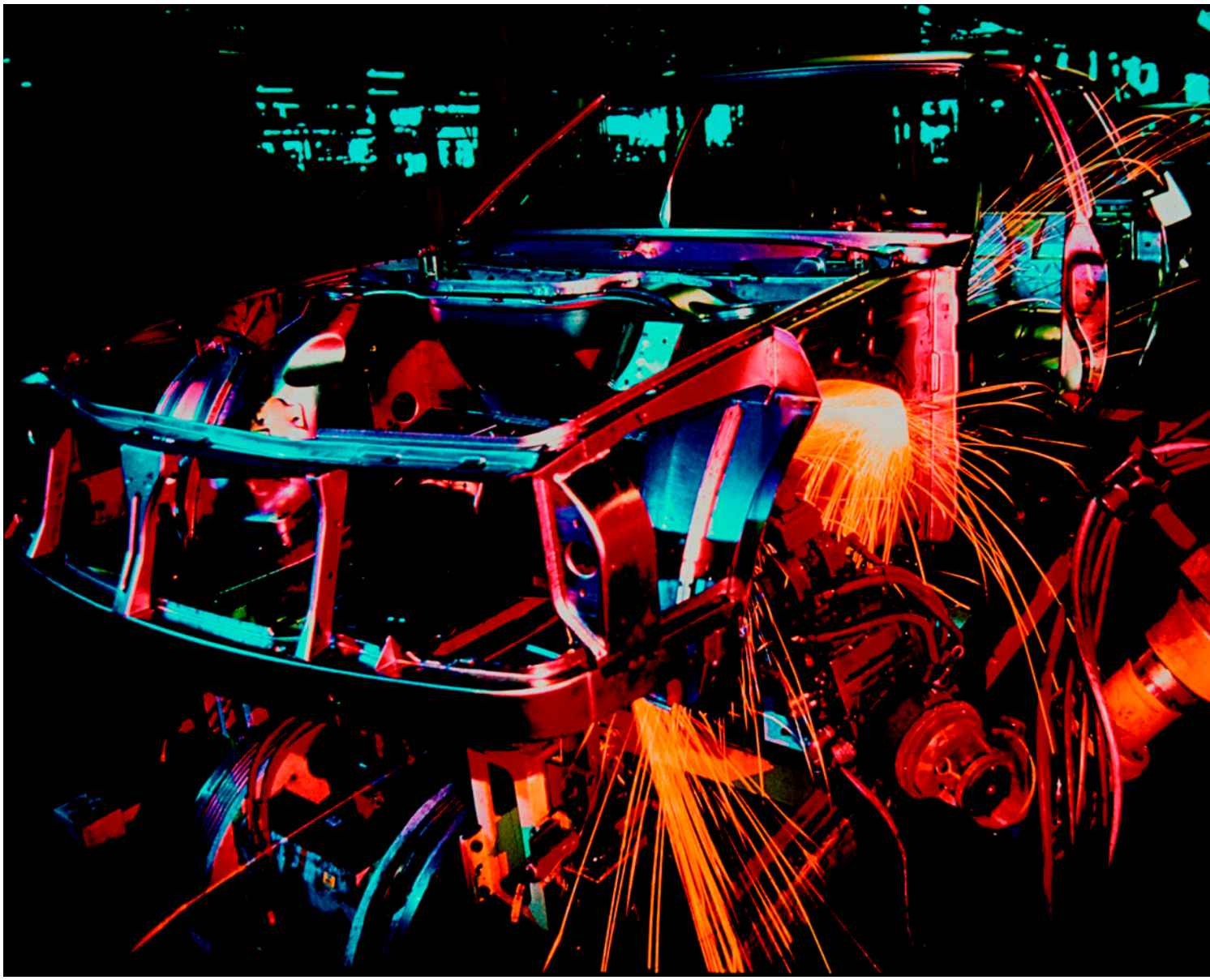
Brochure No. 2300-500-1/NA
1M, 11/01
Printed in USA

Parker Filtration

Parker Automotive

Filter Catalog

Catalog 2300-500-1/NA



Global Filtration Technology

The Parker Hannifin Filtration Group assures:

- Consistent quality
- Technical innovation
- Premier customer service

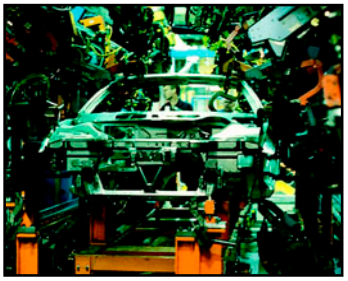
Parker's technical resources provide the right filtration technologies that conform to your requirements. That's why thousands of manufacturers and equipment users around the world rely on Parker Filtration products and people.

Worldwide Sales and Service

Parker operates sales and service centers in major industrial areas worldwide. Call 1-800-C-PARKER for more information and for a synopsis of our Filtration Technology Textbook.

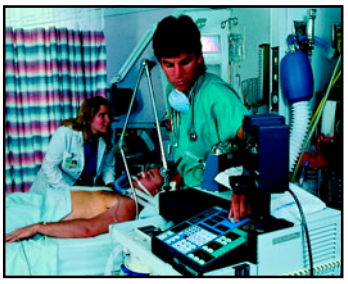
Hydraulic, Lubrication & Coolant Filtration

High-performance filtration systems for production machinery in industrial, mobile and military/marine.



Compressed Air & Gas Filtration

Complete line of compressed air/gas filtration products; coalescing, particulate and adsorption filters in many applications in many industries.



Process & Chemical Fluid Filtration

Liquid filtration systems for beverage, chemical and food processing; cosmetic, paint, water treatment; photo-processing; and micro-chip fabrication.

Fuel Conditioning & Filtration

Parker air, fuel and oil filtration systems provide quality protection for engines operating in any environment, anywhere in the world.