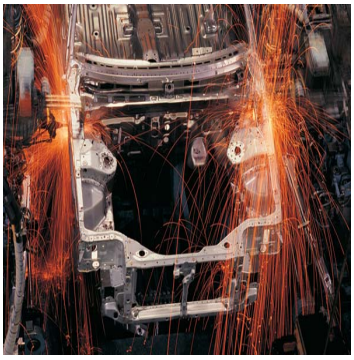


aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding

Automotive Filters and Fluid Contamination Monitoring

Solutions for the Automotive Industry

Parker

ENGINEERING YOUR SUCCESS.

Parker Automotive Filters

Providing the products and service our customers expect

A Global Product Range
With this catalog, we offer our automotive customers an easy way to find technical specification and ordering information about Parker hydraulic filtration, fluid contamination monitoring and fluid power products.

Products shown in this catalog have a broad range of applications. Our filter products are particularly designed for hydraulic and lubrication systems and transmissions. The fluid power products are also used in many industries and applications.

Typical applications can vary from road sweepers, fork lift trucks, agriculture harvesting machines, grass cutting equipment, lorry mounted cranes, forestry equipment, press brakes, industrial power units, waste management trucks, drilling equipment, marine, military equipment, paper mills, water treatment and filtration systems.

For more information about our products, send your inquiry to your nearest sales location. See contact information at the back of this catalog.

BSP ports offered in this catalog conform to ISO228.

Supply chain management, service and support
Parker is addressing operation efficiency by expanding the systematic approach called 'Lean Manufacturing.' Value stream analysis, flow manufacturing, reduced set-ups, manufacturing cell flexibility and fool-proofing systems are all contributing to the continuous improvement in our manufacturing sites. 'Lean' is also expressed in our premier customer service and second-to-none customer partnerships in supply chain management.

Engineering and manufacturing excellence
Parker's manufacturing focus is driven by a number of key elements that affect all areas of the business. People productivity, customer satisfaction, production throughput, quality and lean achievements are the drivers that help Parker achieve ISO9001, QS9000, ISO9001 and ISO14001.

Significant investment by our parent, Parker Hannifin Corporation, continues to give the Filtration Group flexible manufacturing systems, automated test equipment and excellent laboratory test facilities.

New product development programs and on-going product improvement initiatives are vital elements in maintaining a product range that meets customer demands for quality, reliability and engineering excellence.

R & D resources at Parker locations in the U.K., Finland, The Netherlands and the U.S. are both complementary and comprehensive. Including, as examples, Multipass Test Installations, fatigue test unit, cleanliness service (water detection, special analysis, particle counting and analysis), 3D workstations, Thermal Cycle Test Chamber, Salt Spray and Humidity chambers.

Parker Hannifin Corporation, herewith declares that Parker Hydraulic Filtration products are intended to be incorporated into machinery covered by Directive 89/392/EEC, as amended and that the following harmonized standards have been applied; EN982, EN292-1, EN292-2.

We furthermore declare that, machinery incorporating Parker Hydraulic Filtration products, is not allowed to be put into service until the machinery has been found and declared to be in conformity with the provisions of Directive 89/392/EEC and with national implementing legislation.

In line with our policy of continuous product improvement, Parker Hannifin Corporation reserves the right to alter product data and specification without notice. This does not affect your statutory rights.

Notes:
1. *Within this catalog, each product has been allocated an operating temperature and pressure range.*
2. *The range listed for each filter is dedicated by the materials of construction and the capability of the seals specified.*
3. *Consideration should also be given to the characteristics of the system fluid when specifying filters for extreme temperature and/or pressure applications.*
4. *The use of non-Parker replacement elements and parts may invalidate your warranty.*

Contents

Parker Automotive Filter Catalog

DIN Series

High Pressure DIN Filters

ENGINEERING YOUR SUCCESS.

FDA, FDB

High Pressure DIN Filters

A range of hydraulic DIN filters to DIN 24550.

Parker's DIN specification high pressure filters utilize the proven high efficiency "Q" media ($ß_x \geq 200$).

These filters, with a range of bowl lengths, offer exceptional dirt holding capacity for filters with flows up to 65 gpm (250 lpm) and pressures of up to 5,800 psi (400 bar).

With a range of visual and electrical indicators including the 4 LED indicator with two setting points, these filters offer contamination protection for hydraulic systems ranging in use from standard power units to complex automotive systems.

Specification

Maximum Allowable Operating Pressure
5,800 psi (400 bar)
Design factor of safety 3:1 minimum

Operating Temperature
-40°F to 250°F (-40°C to 120°C)

Construction
SG Iron head, Steel Bowl

Fluid Compatibility
Suitable for use with mineral oils, most water glycols and other water based fluids. For other fluids, please consult the Hydraulic Filter Division.

Seals
Head to bowl, diametric with anti-extrusion ring.
Materials - Nitrile.

Bypass valve
98psi ±10% (7.0 bar ± 10%)

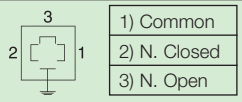
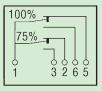
Element Condition Indicators (Differential Pressure Type)
- Visual type cartridge, with auto reset.
- Electrical type cartridge, with auto reset and socket to DIN43650.
- 4 LED with 2 set points at 75% & 100%.

Ports
See ordering information table.

Filter element

Microglass III disposable inorganic fiber media. Available as 3, 5, 10 or 20 micron ($ß_x \geq 200$). Media is supported both up- and downstream and the whole assembly bonded resulting in a 20 bar collapse rating. End caps and support tube are tin plated giving excellent corrosion protection.

Electrical Indicator ratings

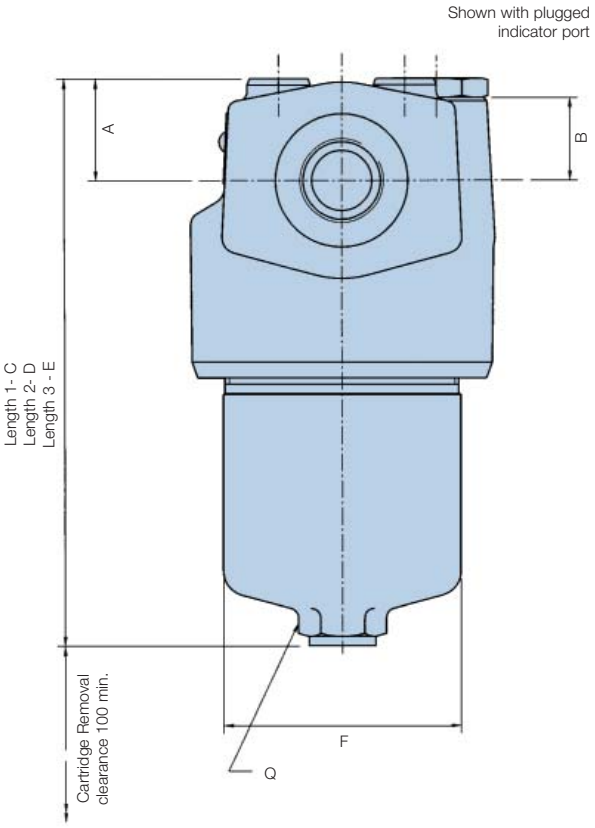
	Electrical	3 LED
Power	20VA	20VA
Current	1A	1A
Voltage	28 Vdc max, 28 Vac (50-60Hz) max	10 - 30V
Plug Pin Code		

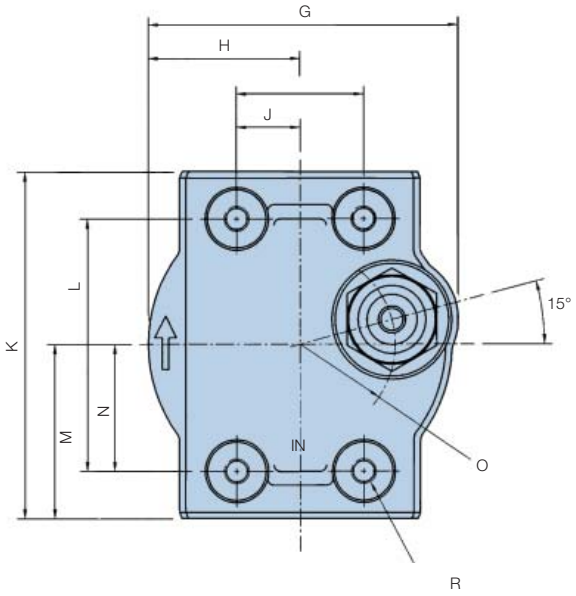
Weights lbs. (kg)

Model	Length 1	Length 2	Length 3
FDA	10.3 (4.7)	12.5 (5.7)	13.6 (6.2)
FDB	36.8 (16.7)	44 (20)	N/A

FDA, FDB

Installation & Element Service Instructions





Installation

The FDA and FDB DIN high pressure filters are designed to operate in systems where the operating pressure does not exceed 5,800 psi.

The filter should be mounted with the bowl down and secured to a suitable bracket using the mounting holes provided on the filter head. Ensure that the filter is orientated so that the visual indicator, if fitted, is clearly visible. The arrow stamped on the filter head should coincide with the flow direction.

Element Servicing

Ensure that the hydraulic system is switched off and that the pipework is de-pressurized. Drain fluid from filter bowl by removing bowl drain plug if fitted. With suitable spanner, unscrew the bowl from the filter head revealing the dirty element. Grasp the element and pull downwards with a slight twisting movement to remove. Discard used element and check head and bowl for damage. Clean inside bowl with a cleaning agent (do not use cloth or paper towels).

Check that the appropriate seal is fitted to the element, lubricate and replace the element in the filter head. Replace the head to bowl seal and anti-extrusion ring as shown in the instructions included with the new element, lubricate and refit the bowl to the head. On re-pressurizing the filter check for leaks.

Dimensions

Length	FDA		FDB	
	mm	ins	mm	ins
A	32	1.26	49	1.93
B	26	1.02	39	1.54
C	183	7.20	302	11.89
D	243	9.57	392	15.43
E	333	13.11	N/A	N/A
F	Ø75	Ø2.95	Ø128	Ø5.04
G	98	3.86	160	6.30
H	48	1.89	80	3.15
I	40	1.57	50	1.97
J	20	0.79	25	0.98
K	110	4.33	164	6.46
L	80	3.15	120	4.72
M	55	2.17	82	3.23
N	40	1.57	60	2.36
O	R30	R1.18	R48	R1.89

Filter	Q = Across Flats
FDA	Hexagonal 23.3/24.0 A/F
FDB	Hexagonal 35.5/36.0 A/F

Filter	R = Mounting Holes
FDA	4 Mounting Holes M8 x 1.25 - 6H x 12 Deep
FDB	M10 x 1.5 - 6H x 12 Deep

FDA, FDB

Indicators

FMUX ATEX certified indicator - contact Parker

ΔP Indicator

4 LEDs giving visual indication:

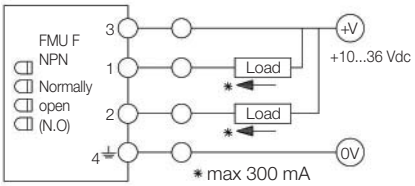
- Green (G): Power ON
- Yellow 1 (Y1): Pre-alarm 1 (presetting 50%)
- Yellow 2 (Y2): Pre-alarm 2 (presetting 75%)
- Red (R): Indication (presetting 100%)

Setting range: 0,5 – 10 bar
Thermal lock-out range: 0°C – 100°C
Includes a microchip with memory logs

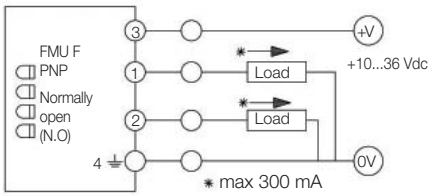
FMUF Electronic

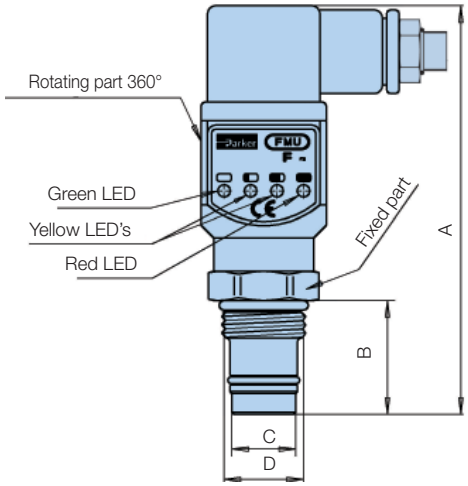
Contact configuration

NPN



PNP





Thermal lock-out (standard setting +68°F (+20°C))

- Indicator operates only when temperature is above setting.
- Green LED is blinking if temperature is lower. (not in U12H)

Ind. press. setting	LED status G	Y1	Y2	R	Output
50%	⊗	⊗			–
75%	⊗	⊗	⊗		2 active
100%	⊗	⊗	⊗	⊗	1 active

Enclosure class	IP65
Electrical connector	DIN 43650, cable connection PG9 or optionally M12 4-pin
Input supply voltage	+10 to 36 Vdc
*Indication output	max. 300 mA/36 Vdc
Output type:	N.O. or N.C./NPN or PNP

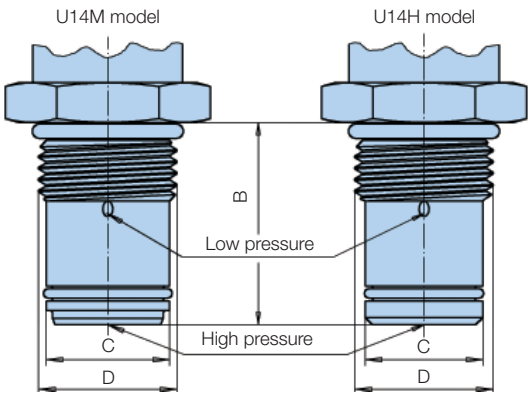
Note: Do not connect output terminals 1 or 2 directly (without load) to power supply terminals, because this will damage the equipment.

Ordering Information

Automotive Electronic Indicator Option

Part Number	Description
FMUF5MBMU14H	M12 x 4 Pin Electronic Indicator

	U14M		U14H	
	mm	ins	mm	ins
A	105	4.13	105	4.13
B	32	1.26	32	1.26
C	Ø19.78 ±0.06	Ø0.77	Ø18.83 ±0.06	Ø0.74
D	7/8-14 UNF-2A		7/8-14 UNF-2A	



FDA, FDB

Performance

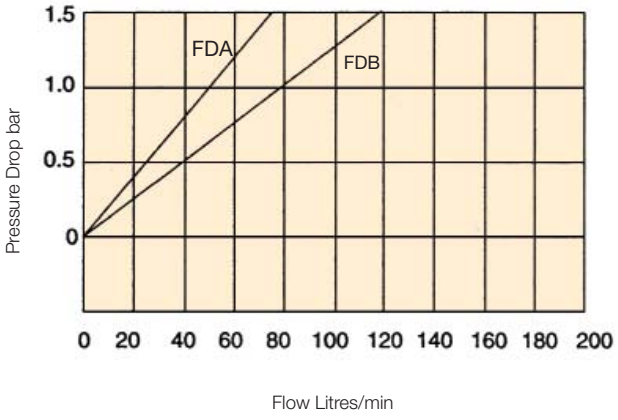
To select the correct housing and element, it is recommended that the ratio between the bypass setting and the differential pressure across the filter with a clean element, at the rated flow, should be at least 2:1.

To find total pressure differential through the filter assembly, add the 'housing only' pressure differential to the 'element only' pressure differential, at the rated flow.

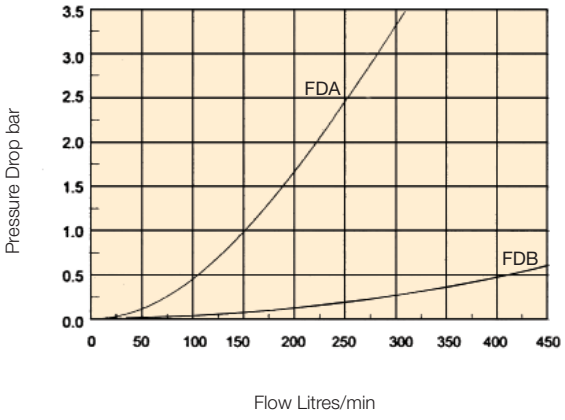
Total ΔP = Housing ΔP + Element ΔP

Flow curves at 30 cSt viscosity.

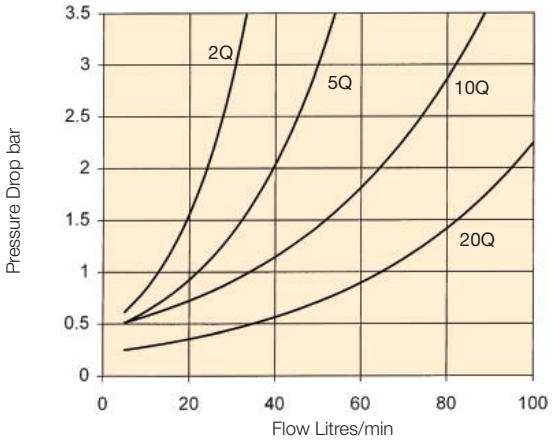
Bypass Valve FDA, FDB



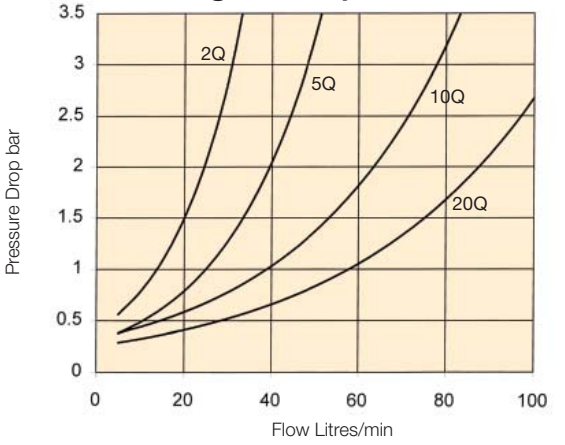
Housings FDA, FDB



FDA-1 Standard Elements

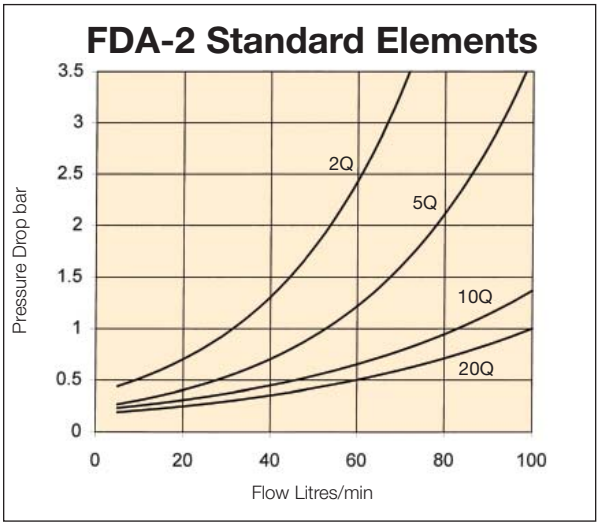


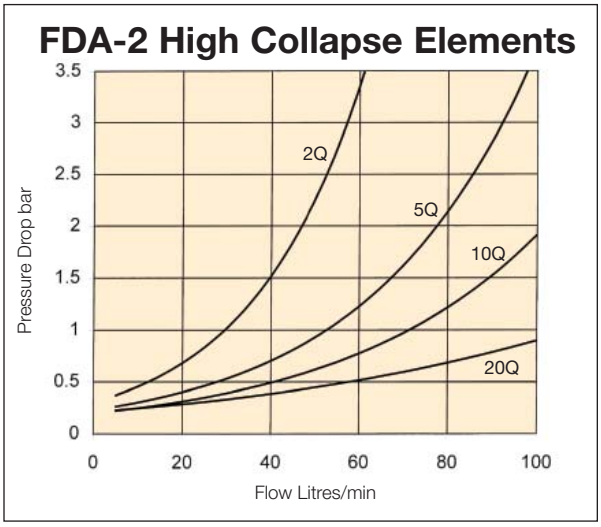
FDA-1 High Collapse Elements

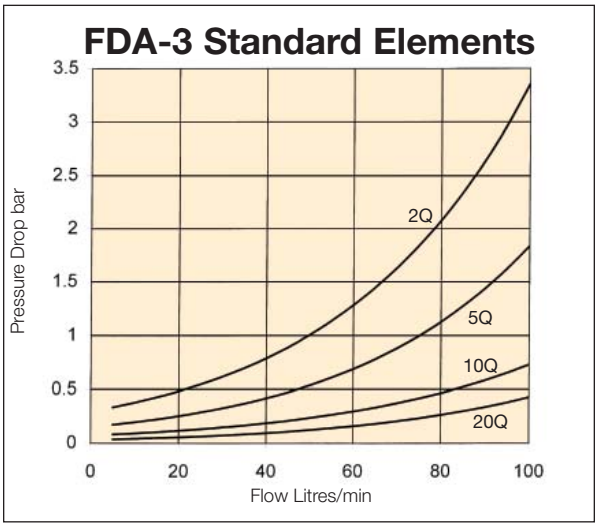


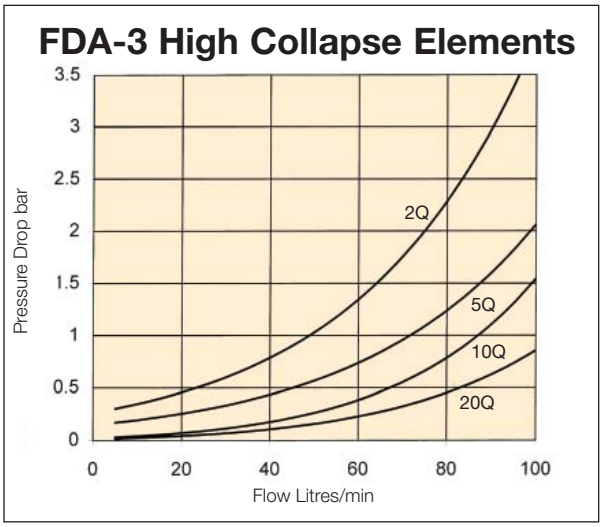
FDA

Performance



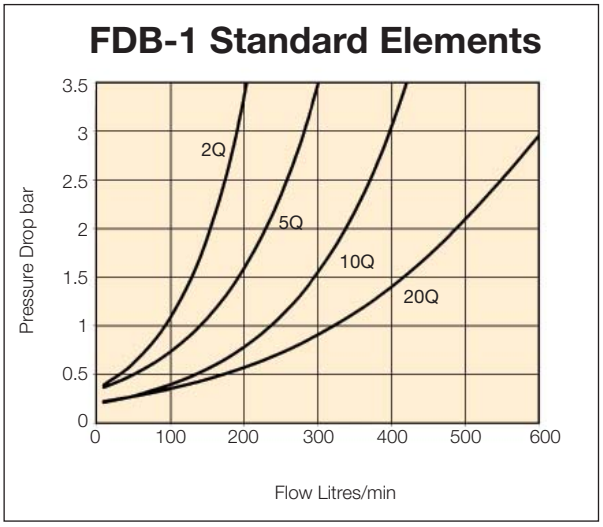


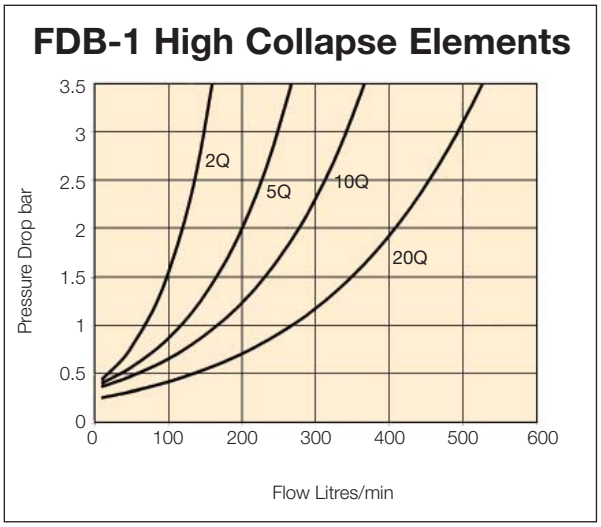


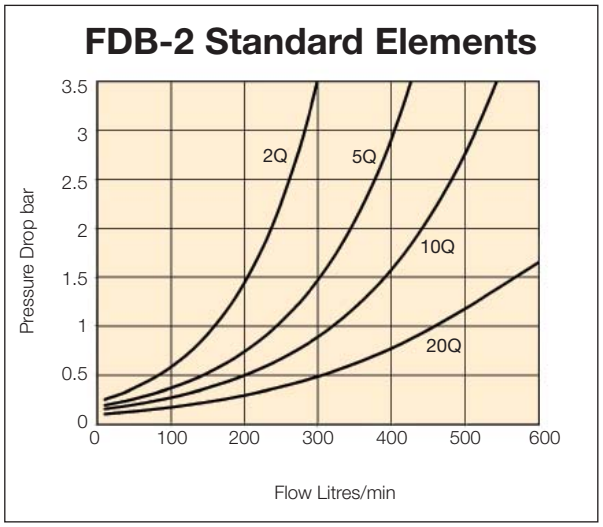


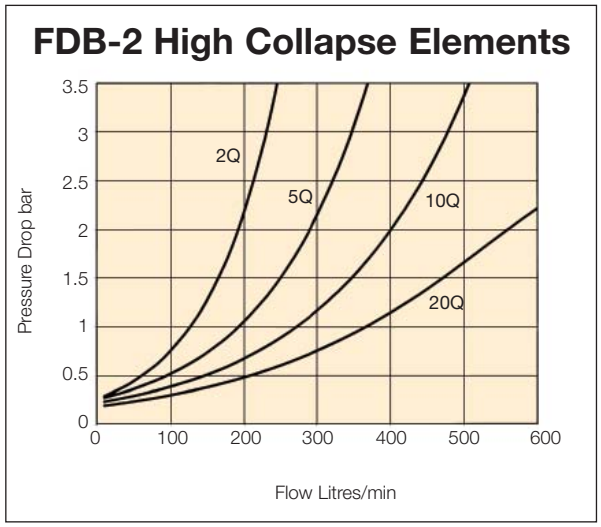
FDB

Performance









FDA, FDB

Ordering Information

The following filter assemblies are supplied **WITH** bypass, but **WITHOUT** an indicator.

Indicators should be ordered separately.

Standard products table

Part number	Flow (l/min)	Ports (BSP)	Media rating (µ)	Indication	Indicator rating	Bypass rating (bar)	Replacement elements
FDA3A03N98G16Y	100	1"	02		N/A	7 bar	**FDAE3A02Q**
FDA3A10N98G16Y	100	1"	10		N/A	7 bar	**FDAE3A10Q**
FDB2A03N98G24Y	250	1½"	02	No	N/A	7 bar	**FDBE2A02Q**
FDB2A10N98G24Y	250	1½"	10	Indication	N/A	7 bar	**FDBE2A10Q**
FDB3A03N98G24Y	400	1½"	02		N/A	7 bar	**FDBE3A02Q**
FDB3A10N98G24Y	400	1½"	10		N/A	7 bar	**FDBE3A10Q**

The following filter assemblies are supplied **WITH** bypass and 4 LED indicator.

A range of 5,800 psi (400 bar) no bypass, high pressure filters, designed to meet the very specialized requirements of the automotive industry.

Utilizing the same, high quality, high efficiency Microglass III media as fitted to the standard filters, these are designed to be installed where limited flows of unfiltered oil passing through the bypass, as a result of a blocked element, cannot be tolerated.

Standard products table

Part number	Flow (l/min)	Ports (BSP)	Media rating (µ)	Indication	Indicator rating	Bypass rating (bar)	Replacement elements
FDA3A03B98G16Y	100	1"	02		5 bar	7 bar	**FDAE3A02Q**
FDA3A10B98G16Y	100	1"	10		5 bar	7 bar	**FDAE3A10Q**
FDB2A03B98G24Y	250	1½"	02	Electronic	5 bar	7 bar	**FDBE2A02Q**
FDB2A10B98G24Y	250	1½"	10	4 LED	5 bar	7 bar	**FDBE2A10Q**
FDB3A03B98G24Y	400	1½"	02		5 bar	7 bar	**FDBE3A02Q**
FDB3A10B98G24Y	400	1½"	10		5 bar	7 bar	**FDBE3A10Q**

The following filter assemblies are supplied **WITHOUT** bypass **WITH** 4 LED indicator.

Standard products table

Part number	Flow (l/min)	Ports (BSP)	Media rating (µ)	Indication	Indicator rating	Bypass rating (bar)	Replacement elements
FDA3A03HB98G16Y	100	1"	02		5 bar		**FDAE3A02Q**
FDA3A10HB98G16Y	100	1"	10		5 bar		**FDAE3A10Q**
FDB2A03HB98G24Y	250	1½"	02	Electronic	5 bar	No	**FDBE2A02Q**
FDB2A10HB98G24Y	250	1½"	10	4 LED	5 bar	bypass	**FDBE2A10Q**
FDB3A03HB98G24Y	400	1½"	02		5 bar		**FDBE3A02Q**
FDB3A10HB98G24Y	400	1½"	10		5 bar		**FDBE3A10Q**

DIN Series

DIN Low Pressure Filters

ENGINEERING YOUR SUCCESS.

10DT, 16DT, 25DT

Tanktop DIN Filters

A range of hydraulic DIN filters to DIN 24550.

Parker's DT series of DIN specification tanktop filters are available in three size ranges with flows up to 65 gpm (250 lpm).

With two indicators, a visual gauge, and an electrical 3 LED indicator with two setting points, these filters offer contamination protection for hydraulic systems ranging in use from standard power units to complex automotive systems.

Specification

Maximum Allowable Operating Pressure
145 psi (10 bar)

Operating Temperature
14˚F to 175˚F (-10˚C to 80˚C)

Construction

Model	10DT	16DT	25DT
Head	Aluminum	Aluminum	Aluminum
Cover	Composite	Aluminum	Aluminum
Bowl	Composite	Steel	Steel

Ports

Model	Port
10DT	G1
16DT	G1¼
25DT	G1½

Fluid Compatibility
Suitable for use with mineral oils, most water glycols and other water based fluids. For other fluids, please consult Hydraulic Filter Division Europe.

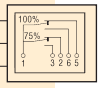
Seals
Material - Nitrile

Bypass valve
50.8 psi ± 10% (3.5 bar ± 10%)

Element condition indicators
Plugged indicator ports allow the installer to select from a choice of optional visual and/or electrical condition indicators.

3 LED (with 2 set points at 75% & 100%)

	Ratings
Set pressure	1.7 Yellow/2.2 bar Red
Contacts	Normally Open/Closed
Voltage	10 - 30 V
Max. current	1 A
Max. contact load	20VA
Protection	IP 65



Visual Indicator
Pressure gauge – 40mm diameter (0 - 6 bar) color coded to indicate bypass condition.

Weights (kg)

Model	Weight kg	Weight lb.
10DT	0.74	1.6
16DT	2.80	6.1
25DT	4.20	9.25

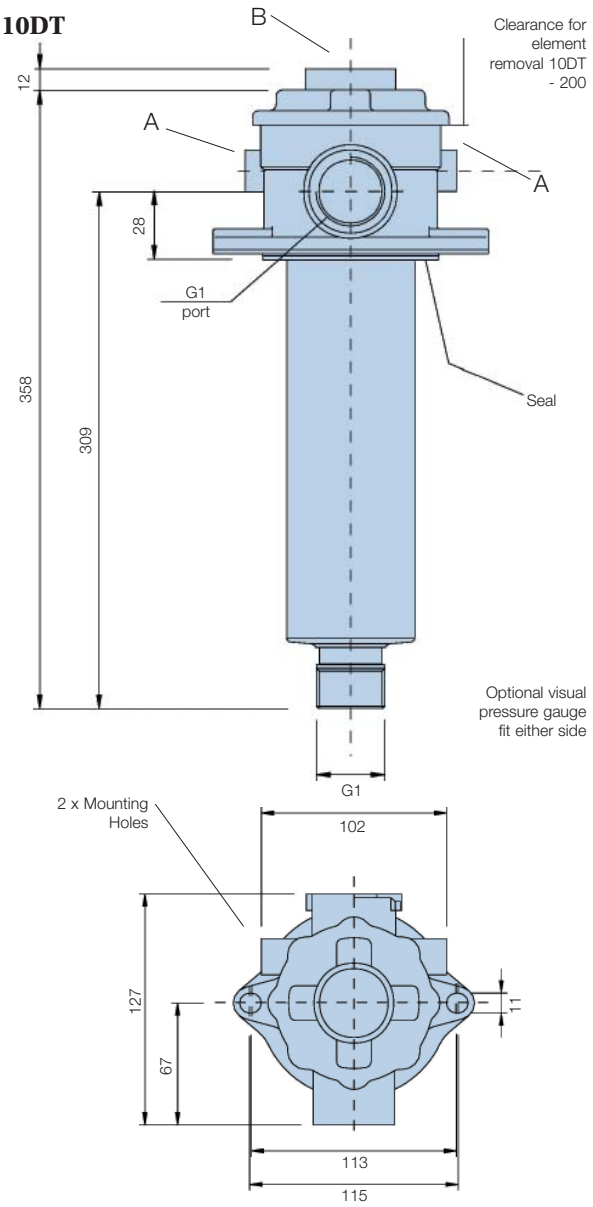
Filter Element
Disposable inorganic fibre media.
Available as 3, 6, 10, 16 and 25 absolute ($ß_x \geq 75$)

10DT, 16DT, 25DT

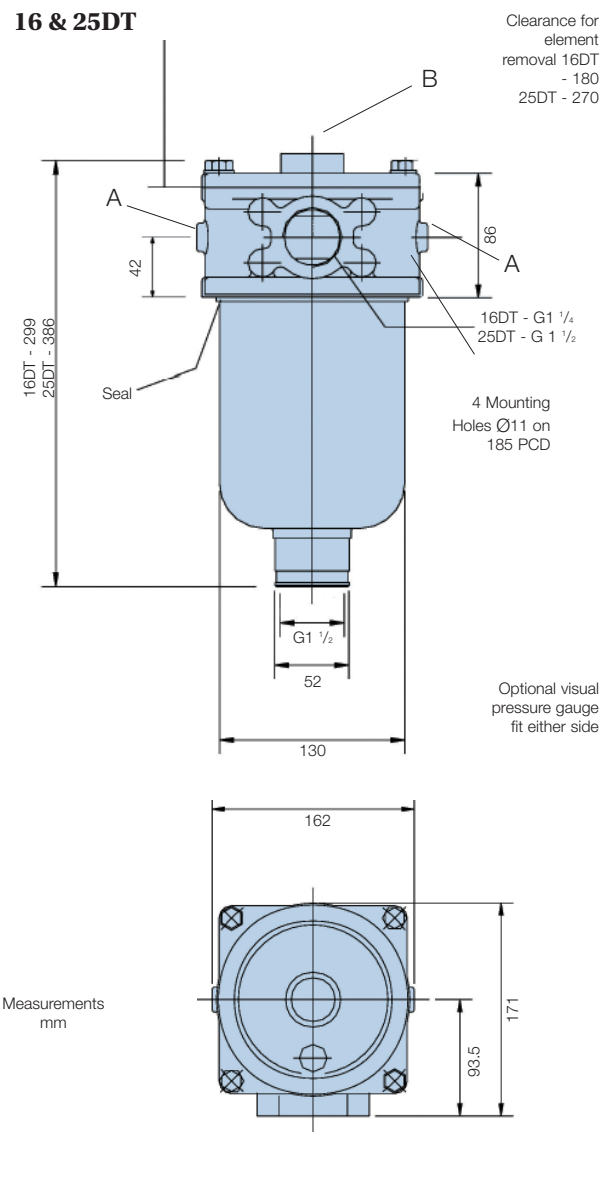
Installation and Indicators

Installation

10DT

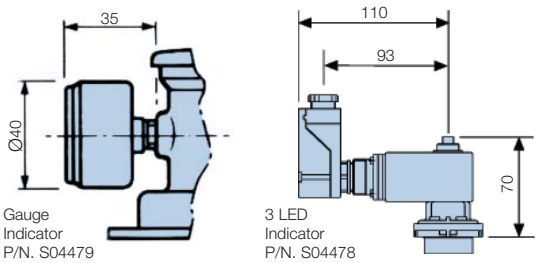


16 & 25DT



Measurements mm

Indicators



Measurements mm

Optional Indicator Location

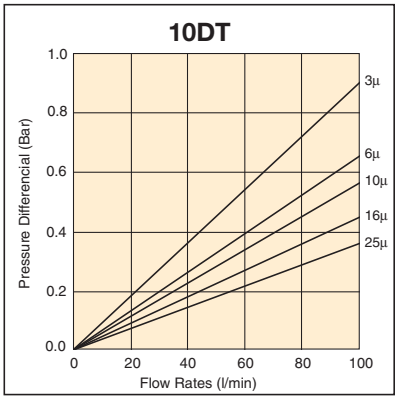
A	S04479	Visual
B	S04478	3 LED
A	940719	3 LED

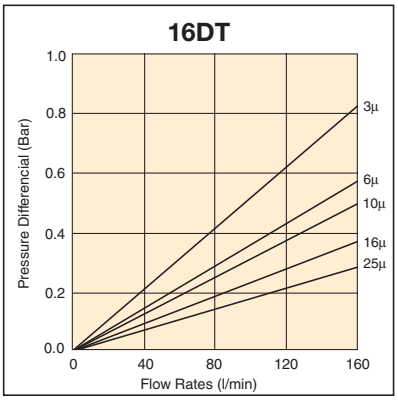
10DT, 16DT, 25DT

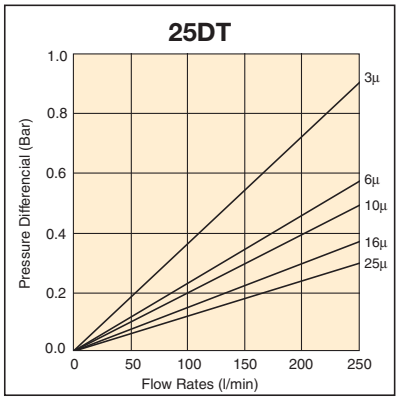
Performance

To select the correct housing and element, it is recommended that the ratio between the bypass setting and the differential pressure across the filter with a clean element, at the rated flow, should be at least 2:1.

Flow curves at 30cSt (140 SUS) viscosity show total pressure drop through housing and element.







Installation & Element Servicing Instructions

Installation

The DT series Return Line filters are designed to operate in systems where the operating pressure does not exceed 10 bar. The filter should be mounted to the tank lid via 2 or 4 bolt fixings, with the bowl pointing vertically downwards.

Element Servicing

Stop and isolate the system and ensure that it has been de-pressurized. Remove the cover by un-screwing the cover on the 10DT or removing the 4 bolts on the cover of the 16DT and 25DT. Remove the filter bowl and element by pulling upwards.

Check the cover and bowl O rings and replace as required using a seal kit. Twist the element slightly to break the seal. Install the new element in the bowl and then refit the bowl into the housing. Re-install the cover.

Ordering Information

The following filter assemblies are supplied **WITH** bypass and indicator.

Standard products table

Part number	Flow (l/min)	Ports (BSP)	Media rating (µ)	Indication	Indicator rating	Bypass rating (bar)	Replacement elements
10DTA06EL50G16A	100	G1"	06	Electronic 4 LED	2.5 bar	3.5 bar	**10DTEA05Q**
10DTA10EL50G16A	100	G1"	10		2.5 bar	3.5 bar	**10DTEA10Q**
25DTA03EL50G24A	250	G1½"	03		2.5 bar	3.5 bar	**25DTEA03Q**
25DTA06EL50G24A	250	G1½"	06		2.5 bar	3.5 bar	**25DTEA05Q**
25DTA10EL50G24A	250	G1½"	10		2.5 bar	3.5 bar	**25DTEA10Q**

40RF, 50RF

High Flow Tank Mounted Filters

High Flow Tank Mounted Filters For Hydraulic Return Line Applications

The 40/50 RF series filters supplement the existing tank mounted range. They have been introduced to handle high flow applications incorporating Parker's customary housing strength and element quality, and yet including optional features to enable the user to install in a wide variety of applications. This filter has also been designed to offer mounting and element interchangeability recommended by the DIN 24550 proposal.

Specification

Operating Temperature
-40°C to 120°C (-40°F to 250°F)

Construction
Housing - iron; cover - iron; bowl - steel

Inlet Ports

Model	Type
40RF-1	2" 3000-M Flange face
40RF-2	21/2" 3000-M Flange face
50RF-1	3" 3000-M Flange face

Bypass Settings
3.5 bar (50psi)

Indication
Visual pressure gauge 0-6 bar color code to indicate bypass condition or Electrical pressure switch. (Note: Above options mounted on either side of housing) Alternatively differential pressure visual pop-up indicator or Differential electrical pressure switch with pop-up visual indicator or 4 LED with 2 set points at 75% & 100%. Mounted to cover plate position only.

Weights

Model	kg (lb)
40RF-1	27 (59.5)
40RF-2	31 (68.3)
50RF-1	36 (79.4)

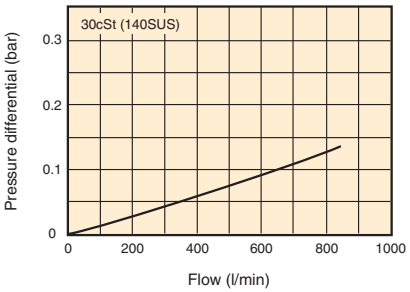
Fluid Compatibility
Suitable for use with mineral oils. For other fluids, please consult Parker Filtration.

Seals
Nitrile

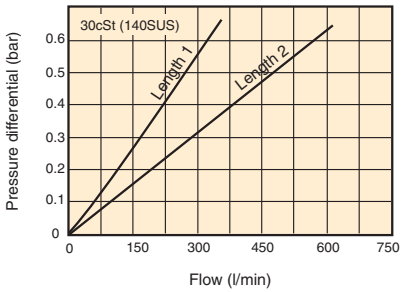
Filter Element
Absolute 10, 20 micron microglass

Element Collapse Rating
10 bar (145psi)

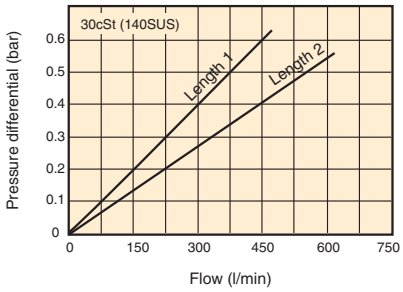
40RF/50RF Housing Flow Curve



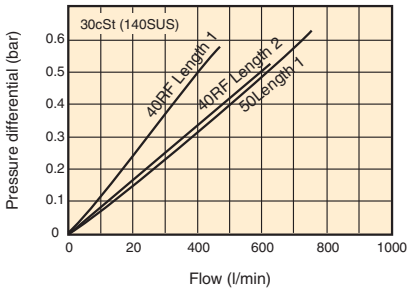
40RF Filter with 3Q Element



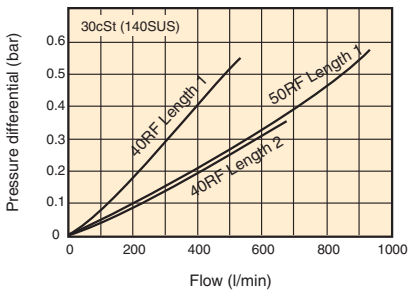
40RF Filter with 6Q Element



40RF/50RF 10Q Element

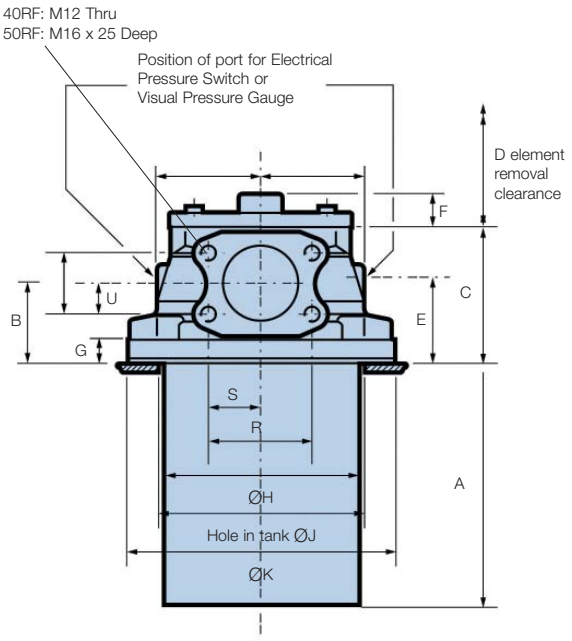


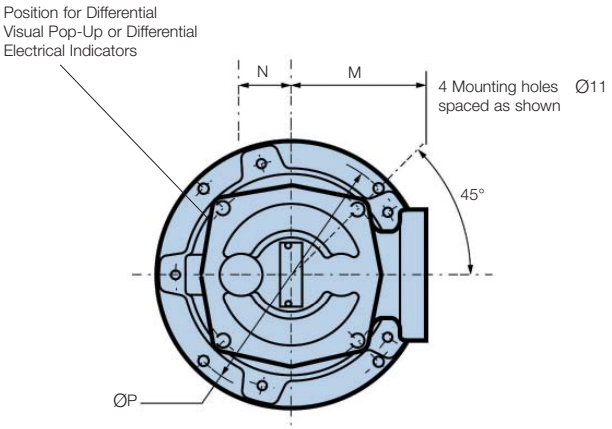
40RF/50RF 20Q Element



40RF, 50RF

Installation Details





Electrical Pressure Switch P/N 1050911009

Dimensions (mm)

Model	A		B		C		D		E		F		G		H		J	
	mm	ins	mm	ins	mm	ins	mm	ins	mm	ins	mm	ins	mm	ins	mm	ins	mm	ins
40 RF-1	267	10.51	73	2.87	120	4.72	260	10.24	80	3.15	34	1.34	23	0.91	178	7.01	180	7.09
40 RF-2	417	16.42	73	2.87	120	4.72	410	16.14	80	3.15	34	1.34	23	0.91	178	7.01	180	7.09
50 RF-1	402	15.83	80	3.15	136	5.35	410	16.14	85	3.35	34	1.34	23	0.91	194	7.64	205	8.07
Model	**K**		**L**		**M**		**N**		**P**		**R**		**S**		**T**		**U**	
	mm	ins	mm	ins	mm	ins	mm	ins	mm	ins	mm	ins	mm	ins	mm	ins	mm	ins
40 RF-1	240	9.45	97	3.82	129	5.08	52	2.05	220	8.66	77.77	3.06	38.89	1.53	42.88	1.69	21.44	0.84
40 RF-2	240	9.45	97	3.82	129	5.08	52	2.05	220	8.66	88.9	3.50	44.45	1.75	50.8	2.00	25.40	1.00
50 RF-1	270	10.63	104	4.09	138	5.43	52	2.05	250	9.84	106.4	4.19	53.19	2.09	61.93	2.44	30.96	1.22

Ordering Information

Standard products table

Part number	Flow (l/min)	Flow (g/min)	Ports (BSP)	Media rating (µ)	Indication	Indicator rating	Bypass rating	Replacement elements
40RF203QPPL50YG91	630	95	2'½"	03	4 LED Electronic	2.5 bar (36psi)	3.5 bar (50psi)	**G04711Q**
40RF206QPPL50YG91	630	95	-3000	06				**G04712Q**
40RF210QPPL50YG91	630	95	flange	10				**G04713Q**

Note: Optional side-mounted indicator Part Number 940719

SAE Series

SAE High Pressure Filters

Parker

ENGINEERING YOUR SUCCESS.

HF15P Series

High Pressure Filters

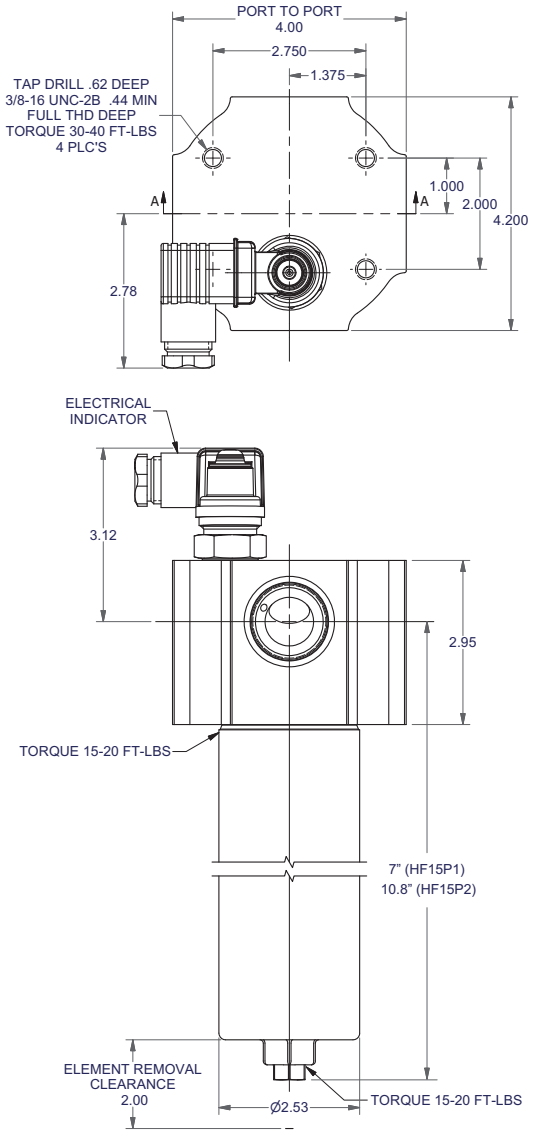
Pressure Filters - 3000 psi (207 bar) Application

Mechanical Visual or Electrical Visual Indicator

Mounting Provisions

Pressure Ratings:

Maximum Allowable Operating Pressure (MAOP): 3000 psi (207 bar)
Rated Fatigue Pressure: 3000 psi (207 bar)
Design Safety Factor: 3:1

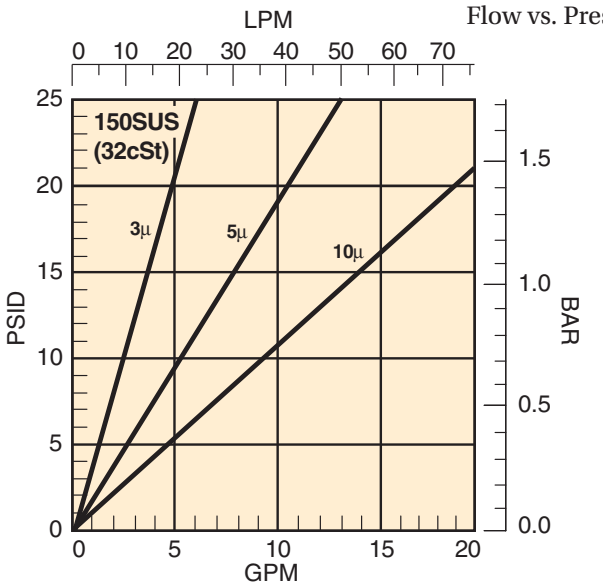


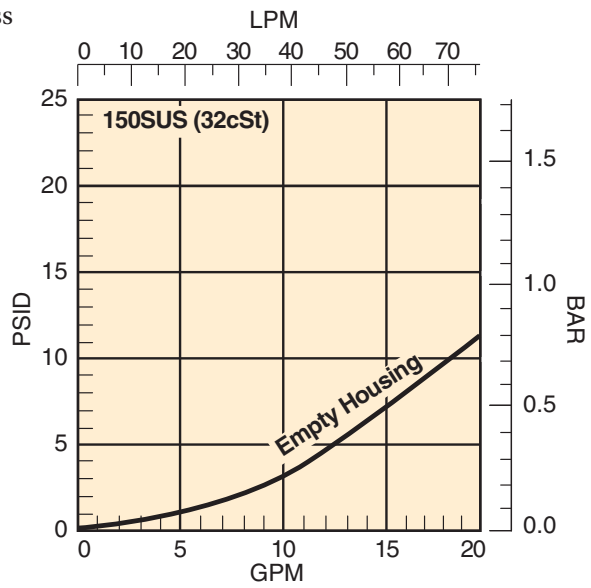
HF15P Series

Performance

HF15P-1 Element Performance

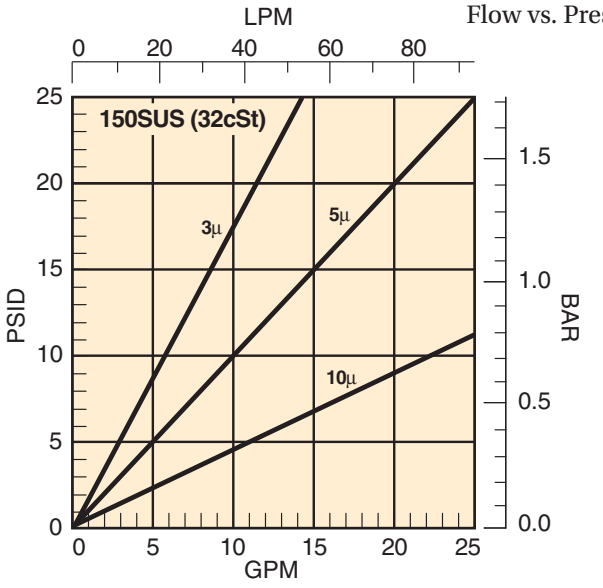
Flow vs. Pressure Loss

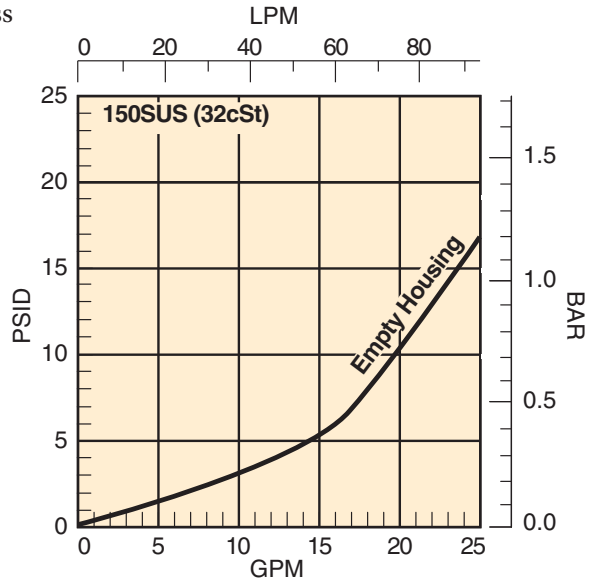




HF15P-2 Element Performance

Flow vs. Pressure Loss





Assembly ΔP Formula

$$\Delta P_{Assembly} = \Delta P_{Empty\ Housing + Element} \times \frac{New\ Viscosity}{150} \times \frac{New\ Specific\ Gravity}{.90}$$

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

HF15P Series

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
		HF15P	1	L	3	M2	50	ST12	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: Configuration

Symbol	Description
HF15P	3,000 psi Filter

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 (138 bar) (-21 option in Box 10 must be selected)
L	150 psi (10 bar) (-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
E3B*	Electrical/Visual
E4MB*	Electrical/Visual
E4MC*	Electrical/Visual
E5B*	Electrical/Visual
E5MD*	Electrical/Visual
F4MS	Standard Dual output electrical indicator
F4MN	Device Net Dual output electrical indicator
F4MC	MC Dual output electrical indicator

*NOTE: Please refer to indicator drawings and chart on pages 54 and 55 for connector and wiring options.

BOX 8: Indicator Setting

Symbol	Description
50	50 psid (3.5 bar)
125	125 psid (8.6 bar) F4MS/F4MN indicator with 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

BOX 11: Seal Compound

Symbol	Description
V	Fluorocarbon

Replacement Elements

Media	Element Collapse Rating	Single Length (Fluorocarbon)	Double Length (Fluorocarbon)
3 Micron	150 psi (10 bar)	HF21L3VQ	HF22L3VQ
3 Micron	2000 psi (138 bar)	HF21H3VQ	HF22H3VQ
5 Micron	150 psi (10 bar)	HF21L5VQ	HF22L5VQ
5 Micron	2000 psi (138 bar)	HF21H5VQ	HF22H5VQ
10 Micron	150 psi (10 bar)	HF21L10VQ	HF22L10VQ
10 Micron	2000 psi (138 bar)	HF21H10VQ	HF22H10VQ
20 Micron	150 psi (10 bar)	HF21L20VQ	HF22L20VQ
20 Micron	2000 psi (138 bar)	HF21H20VQ	HF22H20VQ

HF3 Series

High Pressure Filters

HF3 Pressure Filter - 2500 psi (172 bar) Application

Non-Bypass Design

Upstream and Downstream Test Ports

Allows user to do maintenance troubleshooting.

Electrical Visual Indicator

For electrical indicator options and factory pin wiring, see pages 53-54 (types E and F4M electrical indicators).

Drain Port

Elements

3, 5, and 10 micron HF3 elements with ß ≥ 200 with dual stage filtering media for up to 40% increased dirt holding capacity.

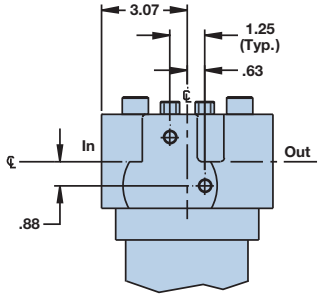
Mounting Provisions

Pressure Ratings:

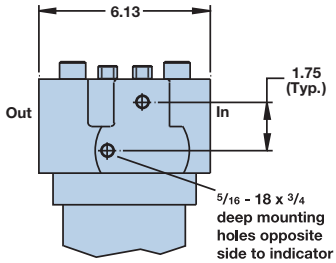
Maximum Allowable Operating Pressure (MAOP): 2500 psi (172 bar)

Rated Fatigue Pressure: 2500 psi (172 bar)

HF3



Right Hand



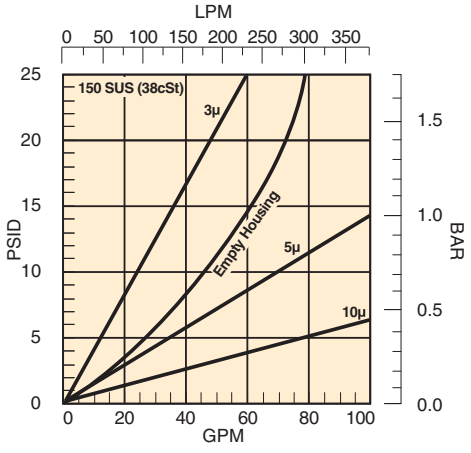
Left Hand

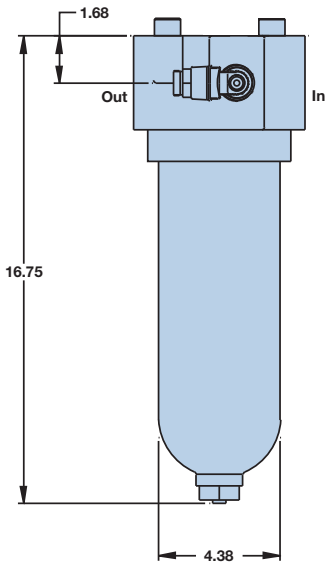
Flow Rate Curves

A) Select flow rate.

B) Determine micron selection.

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





Assembly ΔP Formula

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

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

HF3 Series

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	M2	50	ST16	11	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
HF	Hydraulic Filter

BOX 4: Element Diameter

Symbol	Description
3	3 inch (NOMINAL)

BOX 5: Housing Bowl Length

Symbol	Description
1	1 Element, 8” Long

BOX 6: Housing Pressure Type

Symbol	Description
P3	Pressure Type

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

*Consult factory for other requirements.

BOX 9: Indicator Type

Symbol	Description
M2	Visual
E3B*	Electrical/Visual
E4MB*	Electrical/Visual
E4MC*	Electrical/Visual
E5B*	Electrical/Visual
E5MD*	Electrical/Visual
F4MS	Standard Dual output electrical indicator
F4MN	Device Net Dual output electrical indicator
F4MC	MC Dual output electrical indicator

*NOTE: Please refer to indicator drawings and chart on pages 54 and 55 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

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
V	Fluorocarbon

Replacement Elements

Media	Element Collapse Rating	Single Length (Fluorocarbon)
3 Micron	2000 psi (138 bar)	HF31H3VQ
5 Micron	2000 psi (138 bar)	HF31H5VQ
10 Micron	2000 psi (138 bar)	HF31H10VQ

HF3 Duplex

High Pressure Filter

30PDHF3 Duplex Pressure Filter - 3000 psi (207 bar) Application

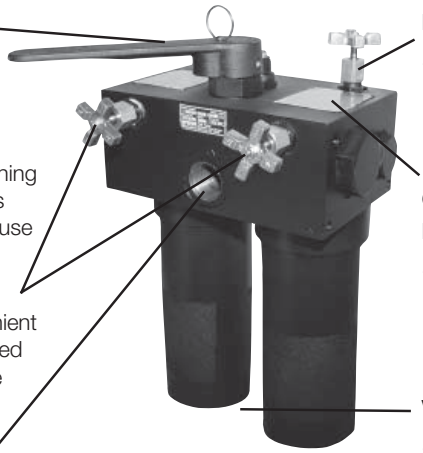
The Parker 30PDHF3 duplex pressure filter provides uninterrupted filtration for equipment that cannot be shut down for servicing.

The 30PDHF3 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 30PDHF3 makes use of industry proven components. Elements are multi-pass tested in accordance with ISO4572/ ISO16889. 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/ metric/BSPP ports for positive sealing

Balance Valve

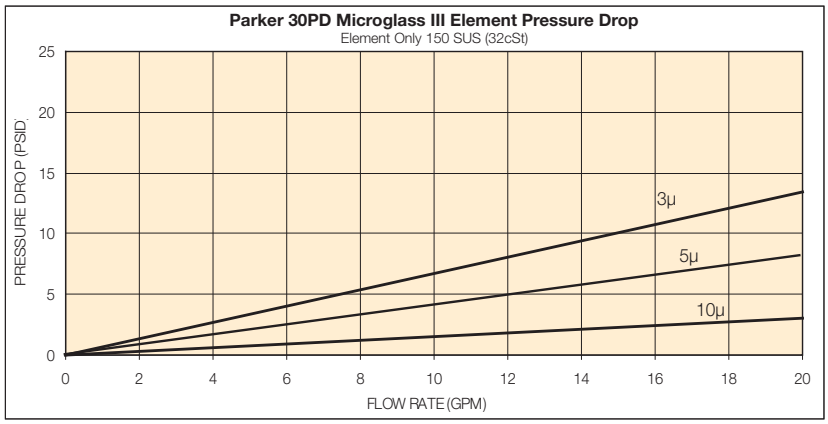
- Safety valve equalizes pressure between the two bowls

Operating Instructions

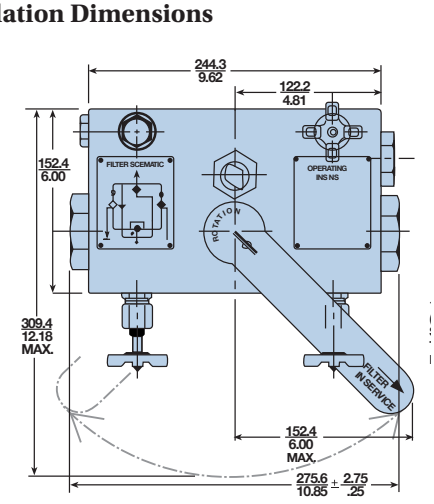
- Name tag and operating instructions riveted to manifold

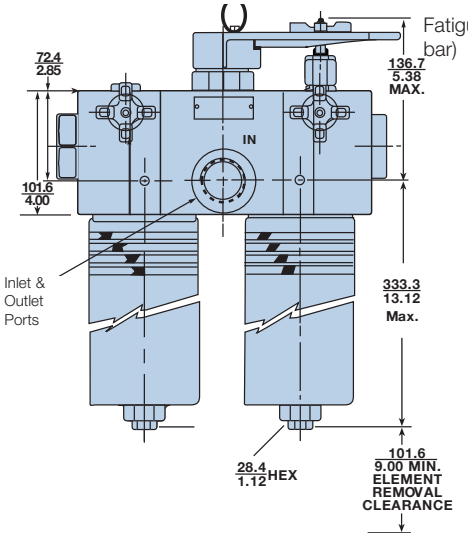
Vent Drains

- SAE-4 'o' ring drain port, both sides



Installation Dimensions





Fatigue Pressure: 3000 psi (207 bar)

mm
in.

HF3 Duplex Series

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
		30PDHF3	2	L	10	E5MD	50	ST16	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: Configuration

Symbol	Description
30PDHF3	Hydraulic Filter, duplex

BOX 4: Housing Bowl Length

Symbol	Description
2	1 Element, 8” Long

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

*Consult factory for other requirements.

BOX 7: Indicator Type

Symbol	Description
M2	Visual
E3B*	Electrical/Visual
E4MB*	Electrical/Visual
E4MC*	Electrical/Visual
E5B*	Electrical/Visual
E5MD*	Electrical/Visual
F4MS	Standard Dual output electrical indicator
F4MN	Device Net Dual output electrical indicator
F4MC	MC Dual output electrical indicator

*NOTE: Please refer to indicator drawings and chart on pages 54 and 55 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 with Option -21 only.

BOX 9: 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 10: Options

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

BOX 11: Seal Compound

Symbol	Description
V	Fluorocarbon

Replacement Elements

Media	Element Collapse Rating	Single Length (Fluorocarbon)
3 Micron	150 psi (10 bar)	HF31L3VQ
3 Micron	2000 psi (138 bar)	HF31H3VQ
5 Micron	150 psi (10 bar)	HF31L5VQ
5 Micron	2000 psi (138 bar)	HF31H5VQ
10 Micron	150 psi (10 bar)	HF31L10VQ
10 Micron	2000 psi (138 bar)	HF31H10VQ

HF4 Series

High Pressure Filter

50P4 Pressure Filter - 3500 psi (241 bar) Applications

Air Bleed Port

Guarantees total use of element dirt holding capacity.

Mechanical Visual or Electrical Visual Indicator

For electrical indicator options and factory pin wiring, see pages 53-54 (type D electrical indicator).

Elements

3, 5 and 10 micron HF4 elements with ß ≥ 200 with dual stage filtering media for up to 40% increased dirt holding capacity.

Pressure Ratings:

Maximum Allowable Operating Pressure (MAOP): 3500 psi (241 bar)

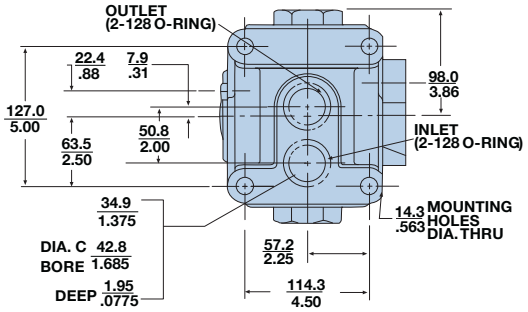
Rated Fatigue Pressure: 3500 psi (241 bar)

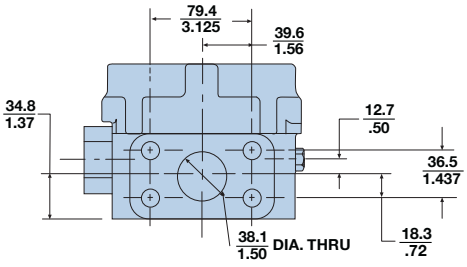
Design Safety Factor: 3:1

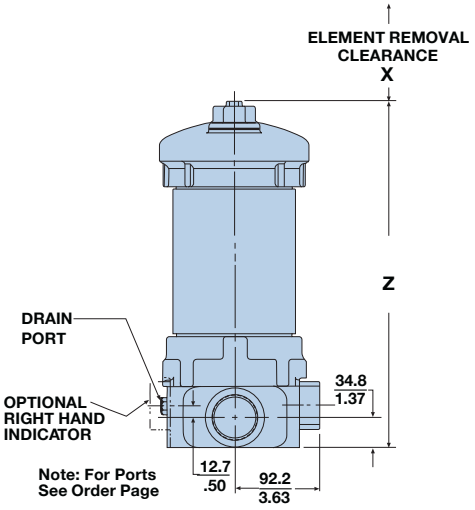
50P4-2

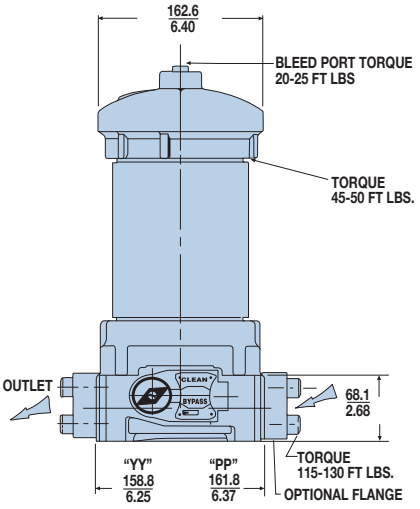
Linear Measure: millimeter / inch

Length	50P4-1	50P4-2
X	254.0 10.00	508.0 20.00
Z	387.1 15.24	622.8 24.52





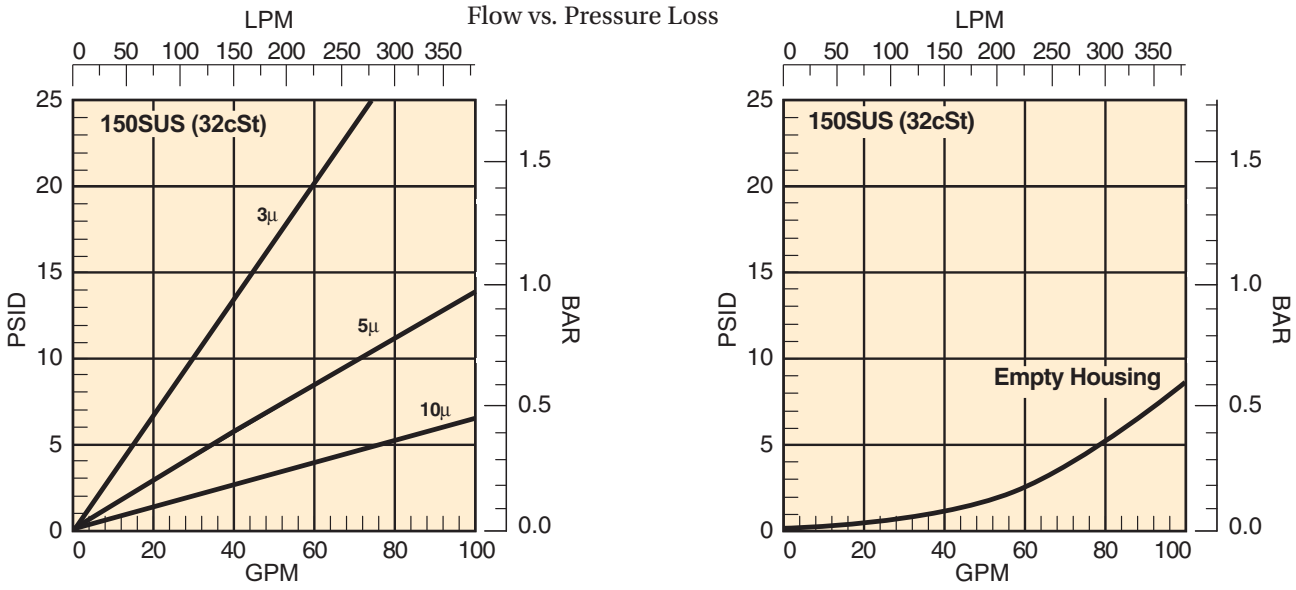




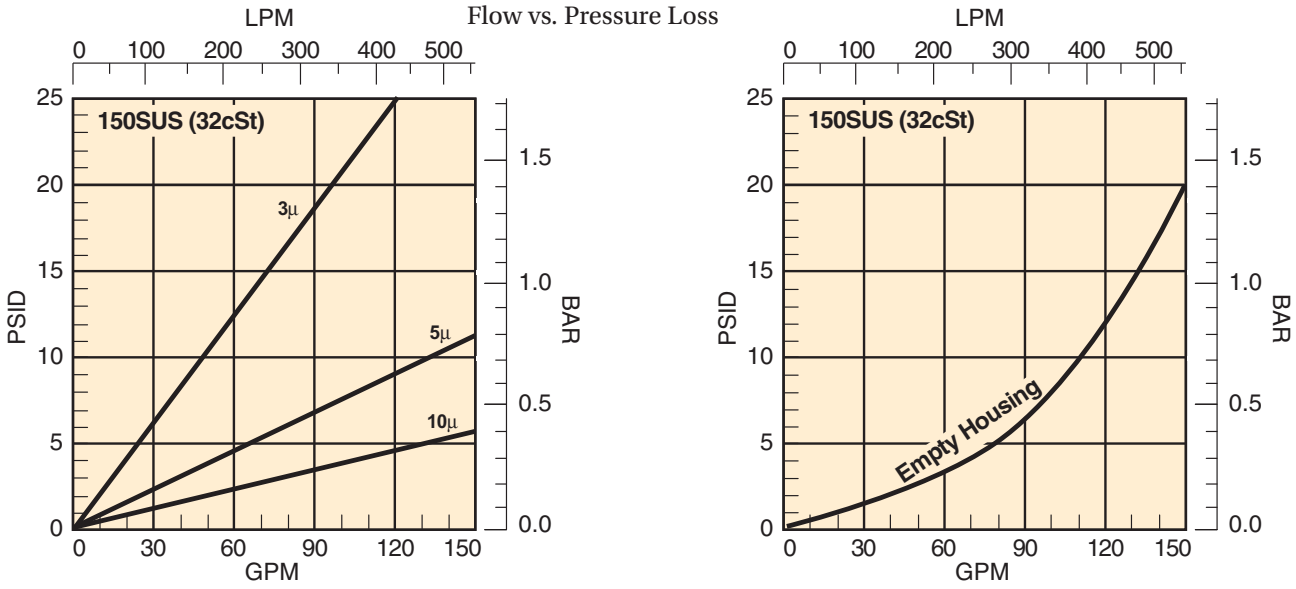
HF4 Series

Performance

50P4-1 Element Performance



50P4-2 Element Performance



Assembly ΔP Formula

$$\Delta P_{Assembly} = \Delta P_{Empty\ Housing + Element} \times \frac{New\ Viscosity}{150} \times \frac{New\ Specific\ Gravity}{.90}$$

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

HF4 Series

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	E4MB	50	FM	11	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
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 (138 bar) (-11 option in Box 10 must be selected)
L	150 PSI (10 bar) (-1 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

*Consult factory for other requirements.

BOX 7: Indicator Type

Symbol	Description
IR	Visual, Right Side
IL	Visual, Left Side
E3B*	Electrical/Visual
E4MB*	Electrical/Visual
E4MC*	Electrical/Visual
E5B*	Electrical/Visual
E5MD*	Electrical/Visual
F4MS	Standard Dual output electrical indicator
F4MN	Device Net Dual output electronic indicator
F4MC	MC Dual output electrical indicator

*NOTE: Please refer to indicator drawings and chart on pages 54 and 55 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 (8.62 bar)

*NOTE: Only available on F4MS and F4MN indicators.

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"-11 bolt holes x 1.03 in. deep
FM	1 1/2" Flange (ISO 6162) M16 x 2 bolt holes, 25.5 mm deep

BOX 10: Bypass Options

Symbol	Description
1	50 psi (3.5 bar) bypass (-L option in Box 5 must be selected)
11	Non bypass (-H option in Box 5 must be selected)

BOX 11: Seal Compound

Symbol	Description
V	Fluorocarbon

Replacement Elements

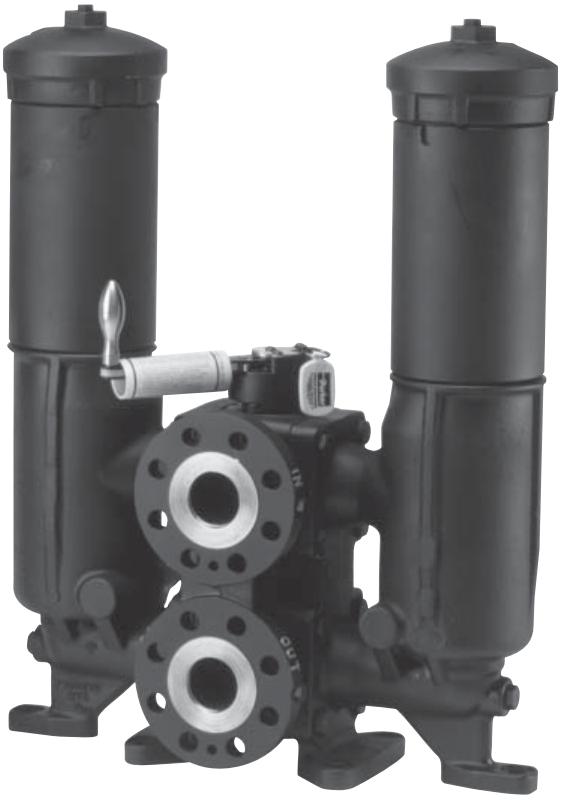
Media	Element Collapse Rating	Single Length (Fluorocarbon)	Double Length (Fluorocarbon)
3 Micron	150 psi (10 bar)	HF41L3VQ	HF42L3VQ
3 Micron	2000 psi (138 bar)	HF41H3VQ	HF42H3VQ
5 Micron	150 psi (10 bar)	HF41L5VQ	HF42L5VQ
5 Micron	2000 psi (138 bar)	HF41H5VQ	HF42H5VQ
10 Micron	150 psi (10 bar)	HF41L10VQ	HF42L10VQ
10 Micron	2000 psi (138 bar)	HF41H10VQ	HF42H10VQ

HF4 Duplex

Medium and High Pressure Filters

MPD/MPDH/Duplex Pressure Filter - MPD – Dual 1500 psi (103 bar), MPDH – Dual 3000 psi (207 bar)

- True duplex design with full neutral center valve
- SAE porting
- Flows to 110 gpm (416 l/min)
- Modular design with double- or triple-length side chamber extensions
- Internal equalization
- HF4 elements as standard
- Non Bypass Option



Pressure Ratings:

Maximum Allowable Operating Pressure (MAOP):
MPD – 1500 psi (103 bar)
MPDH – 3000 psi (207 bar)

Rated Fatigue Pressure:
MPD – 1500 psi (103 bar)
MPDH – 3000 psi (207 bar)

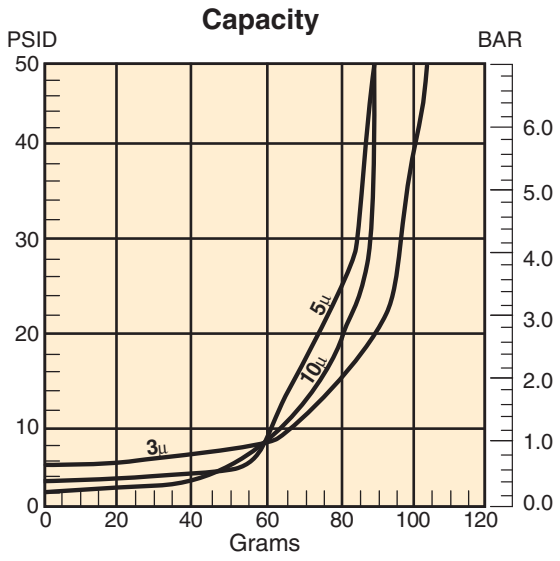
Design Safety Factor: 3:1

HF4 Elements

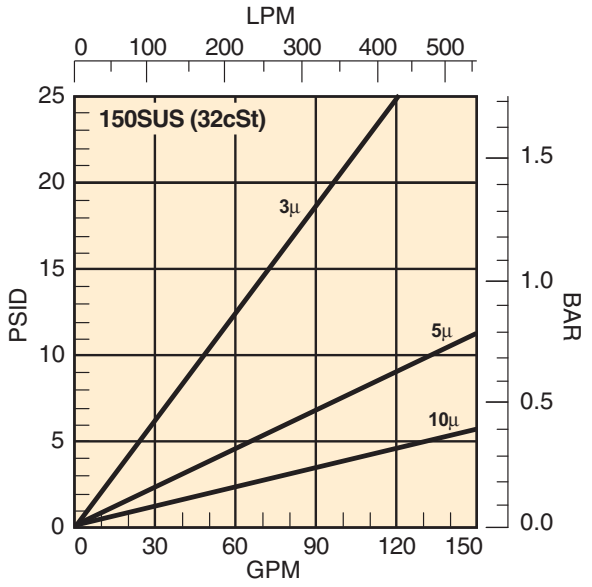
HF4 Duplex

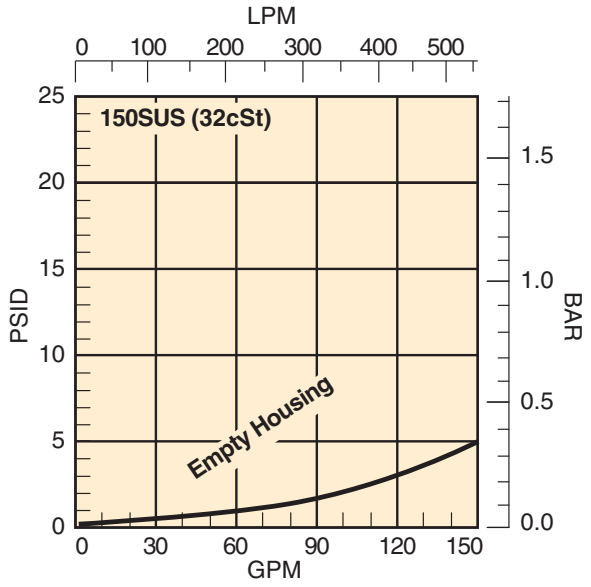
Performance

MPD/MPDH-1 Element Performance



Flow vs. Pressure Loss





Assembly ΔP Formula

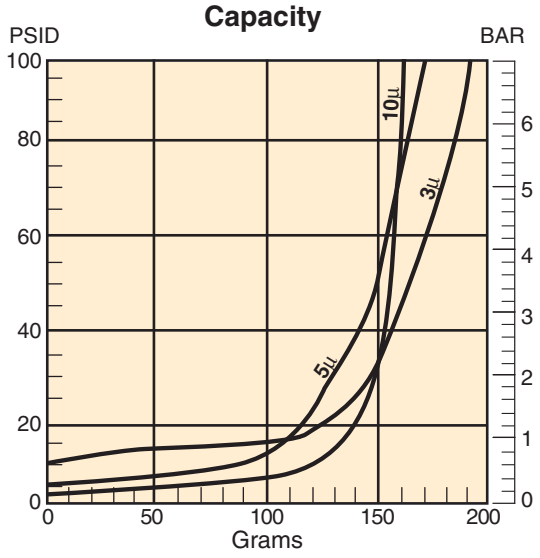
$$\Delta P_{Assembly} = \Delta P_{Empty\ Housing} + \Delta P_{Element} \times \frac{New\ Viscosity}{150} \times \frac{New\ Specific\ Gravity}{.90}$$

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

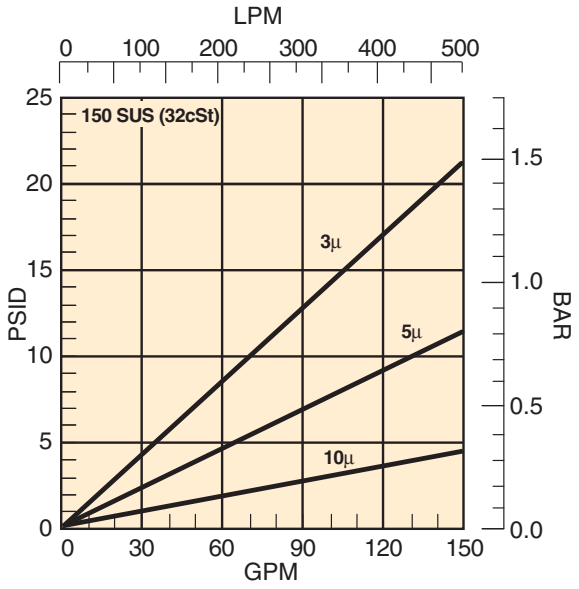
HF4 Duplex

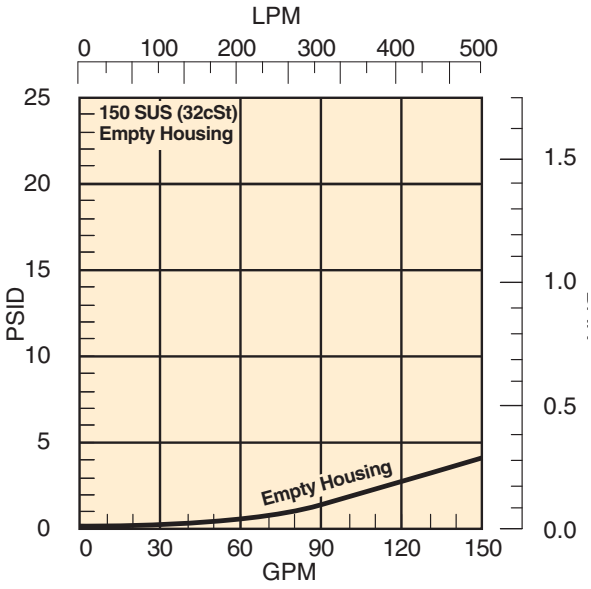
Performance

MPD/MPDH-2 Element Performance



Flow vs. Pressure Loss





Assembly ΔP Formula

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

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

HF4 Duplex Series

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	
		MPD	1	L		10Q	E5MD	25	FS	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: Configuration

Symbol	Description
MPD	Duplex Filter
MPDH	Duplex Filter, High Pressure

BOX 4: Housing Bowl Length

Symbol	Description
1	Single
2	Double
3	Triple

BOX 5: Element Collapse Rating

Symbol	Description
L	150 PSI (10 bar) (-1 option in Box 11 must be selected)
H	2000 PSI (138 bar) (-21 option in Box 11 must be selected)

BOX 6: Core

Symbol	Description
None	Permanent Core

BOX 7: Element Filtration Rating

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

BOX 8: Indicator Type

Symbol	Description
M2	Visual/Auto Reset
E2	Electrical (DIN 43650 Hirschman style)
E3B*	Electrical/Visual
E4MB*	Electrical/Visual
E4MC*	Electrical/Visual
E5B*	Electrical/Visual
E5MD*	Electrical/Visual
P	Indicator Port Plugged
F4MS	Standard Dual output electrical indicator with non bypass only
F4MN	Device Net Dual output electronic indicator with non bypass only
F4MC	MC Dual output electrical indicator

*NOTE: Please refer to indicator drawings and chart on pages 54 and 55 for connector and wiring options.

BOX 9: Indicator Setting

Symbol	Description
25	25 psi (1.7 bar)
50	50 psi (3.5 bar)
	If "no bypass" option (-21) and an indicator is selected, above symbols (25, 50) denote indicator setting
125	125 psid (8.6 bar) *F4M indicator only (-21 option in Box 11 must be selected)

BOX 10: 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"-11 bolt holes x 1.03 in. deep
FM	1 1/2" Flange (ISO 6162) M16 x 2 bolt holes, 25.5 mm deep

BOX 11: Bypass Options

Symbol	Description
1	None
11	No bypass

BOX 12: Seal Compound

Symbol	Description
V	Fluorocarbon

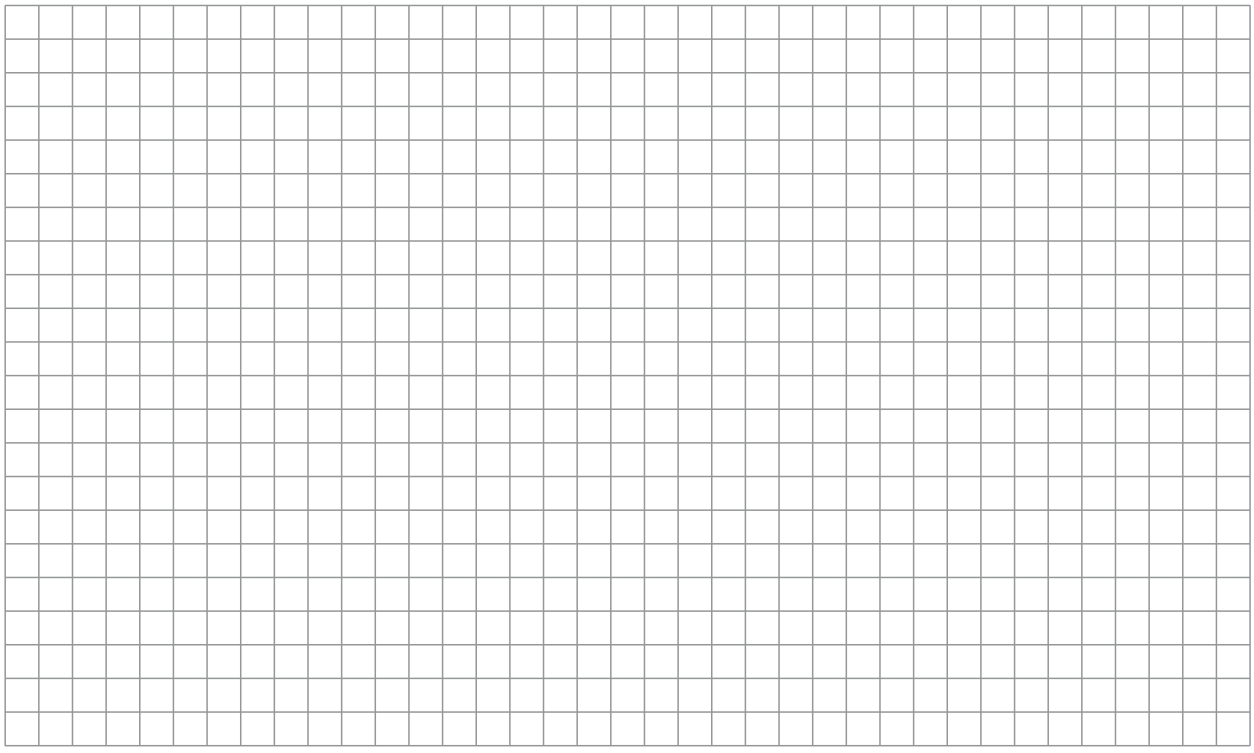
Replacement Elements

Media	Element Collapse Rating	Single Length (Fluorocarbon)	Double Length (Fluorocarbon)
3 Micron	150 psi (10 bar)	HF41L3VQ	HF42L3VQ
3 Micron	2000 psi (138 bar)	HF41H3VQ	HF42H3VQ
5 Micron	150 psi (10 bar)	HF41L5VQ	HF42L5VQ
5 Micron	2000 psi (138 bar)	HF41H5VQ	HF42H5VQ
10 Micron	150 psi (10 bar)	HF41L10VQ	HF42L10VQ
10 Micron	2000 psi (138 bar)	HF41H10VQ	HF42H10VQ

HF4 Duplex

Medium and High Pressure

Notes



SAE Series

Return Filters

ENGINEERING YOUR SUCCESS.

15CN Return Filter: HF2 Series

HF2 Series Filters
Low Pressure

15CN Return Filters - 800 psi (55 bar) Applications

Mechancial Visual or Electrical Visual Indicator

For electrical indicator options and factory pin wiring, see pages 53-54 (types E and F4M electrical indicators).

Element

HF2 4" and 8" Long. 3, 5, and 10 micron element with ß ≥ 200 and dual stage filtering media for up to 40% increased dirt holding capacity.

Mounting Provisions

Reverse Check Option

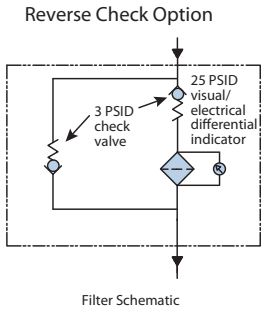
For system decompression, includes Element Check to prevent back flow during system decompression.

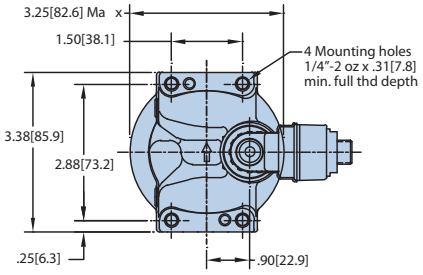
Pressure Ratings:

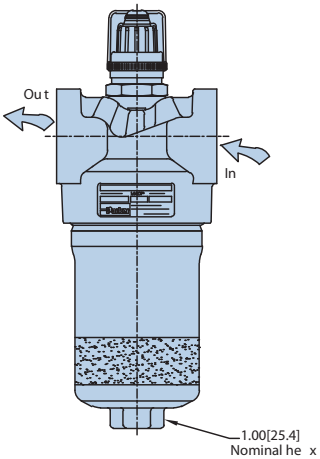
Maximum Allowable Operating Pressure (MAOP): 800 psi (55 bar)

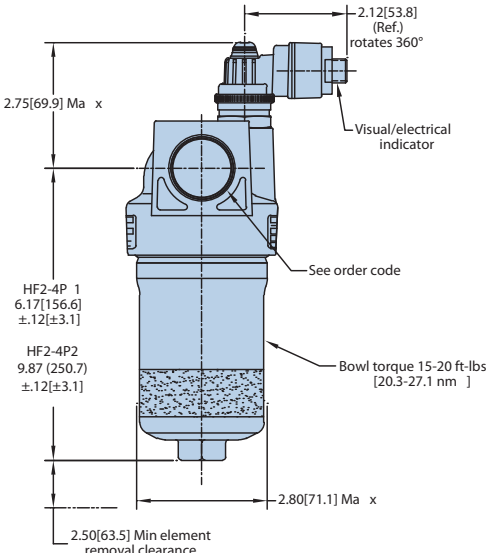
Rated Fatigue Pressure: 800 psi (55 bar)

Design Safety Factor: 2.5:1





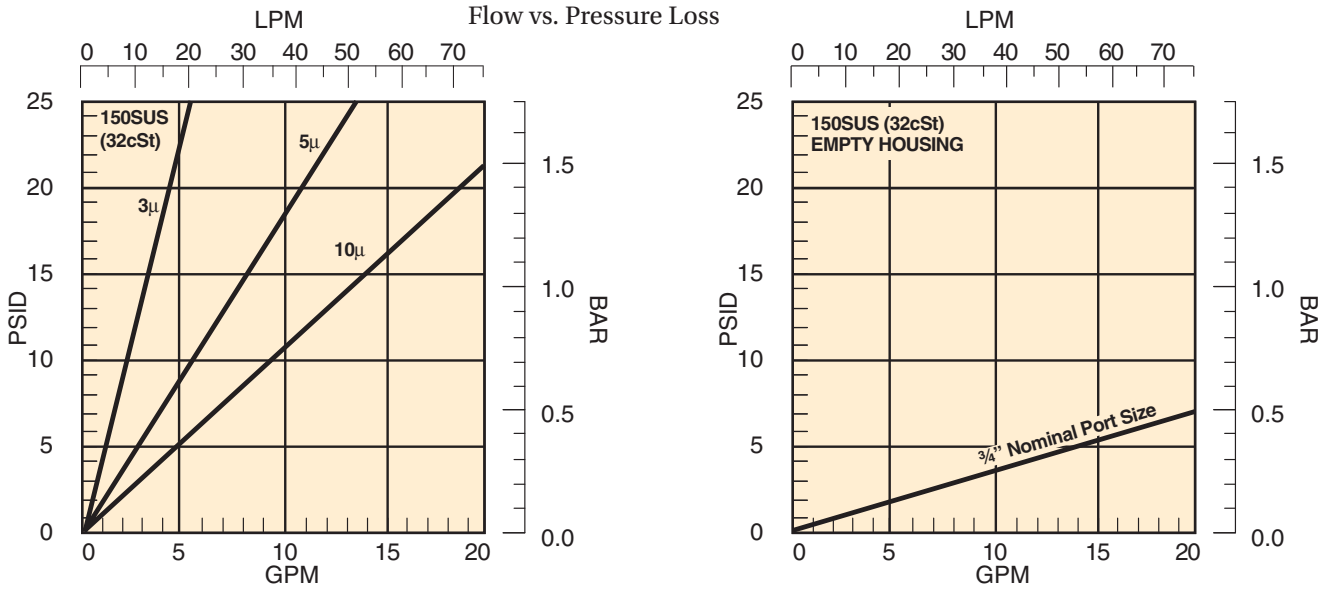




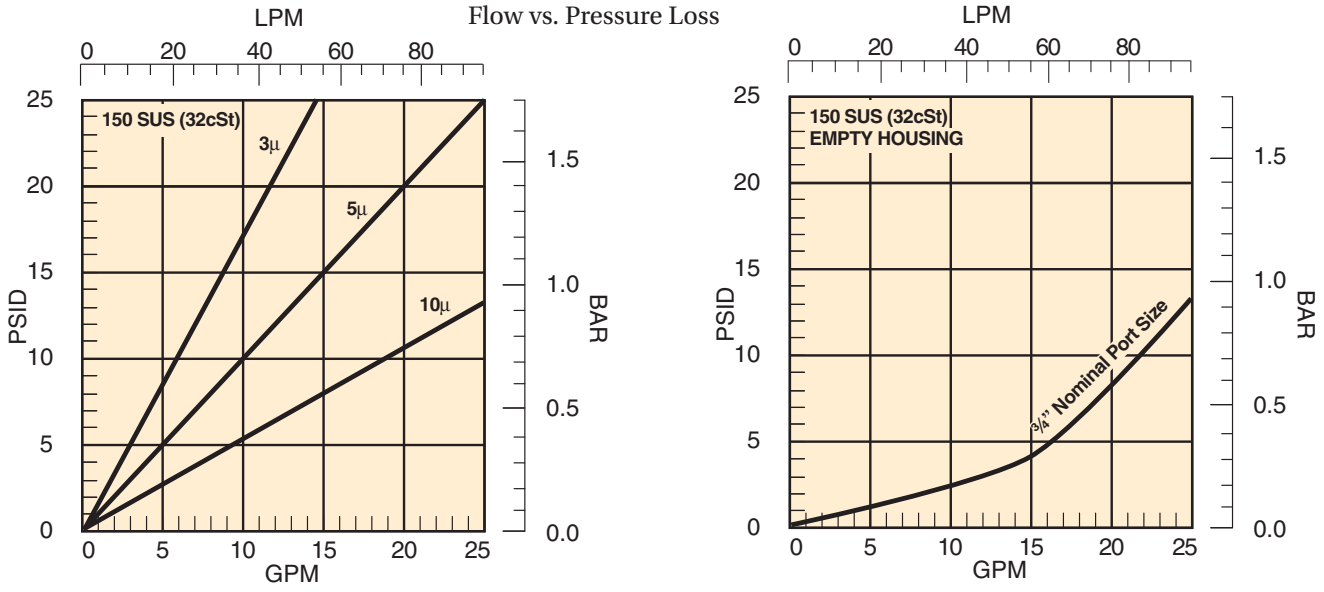
15CN Return Filter: HF2 Series

Performance

15CN-1 Element Performance



15CN-2 Element Performance



Assembly ΔP Formula

$$\Delta P_{Assembly} = \Delta P_{Empty\ Housing + Element} \times \frac{New\ Viscosity}{150} \times \frac{New\ Specific\ Gravity}{.90}$$

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

15CN Return Filter: HF2 Series

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	E5B	25	ST12	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: 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 (138 bar) (-21 or -R5 option in Box 10 must be selected)
L	150 PSI (10 bar) (-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

*Consult factory for other requirements.

BOX 7: Indicator Type

Symbol	Description
M2	Visual, Top
E3B*	Electrical/Visual
E4MB*	Electrical/Visual
E4MC*	Electrical/Visual
E5B*	Electrical/Visual
E5MD*	Electrical/Visual
F4MS	Standard Dual output electrical indicator
F4MN	Device Net Dual output electrical indicator
F4MC	MC Dual output electrical indicator

*NOTE: Please refer to indicator drawings and chart on pages 54 and 55 for connector and wiring options.

BOX 8: Indicator Setting

Symbol	Description
25	25 psid (1.7 bar)
35[1]	35 psid (2.4 bar)
50	50 psid (3.5 bar)

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: Bypass 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
V	Fluorocarbon

Notes:

1. 35 psid indicator setting only available in F4M indicator type.

Replacement Elements

Media	Element Collapse Rating	Single Length (Fluorocarbon)	Double Length (Fluorocarbon)
3 Micron	150 psi (10 bar)	HF21L3VQ	HF22L3VQ
3 Micron	2000 psi (138 bar)	HF21H3VQ	HF22H3VQ
5 Micron	150 psi (10 bar)	HF21L5VQ	HF22L5VQ
5 Micron	2000 psi (138 bar)	HF21H5VQ	HF22H5VQ
10 Micron	150 psi (10 bar)	HF21L10VQ	HF22L10VQ
10 Micron	2000 psi (138 bar)	HF21H10VQ	HF22H10VQ

40CN Return Filter: HF3 Series

HF3 Series Filters
Low Pressure

40CN Return Filter - up to 800 psi (55 bar) Application

Non-Bypass Option

Mechancial Visual or Electrical Visual Indicator

With 25 DP setting. For electrical indicator options and factory pin wiring, see pages 53-54 (type E and F4M electrical indicators).

Element

HF3 8" Long. 3, 5, and 10 micron element with
b ≥ 200 and dual stage filtering media for up to 40% increased dirt holding capacity.

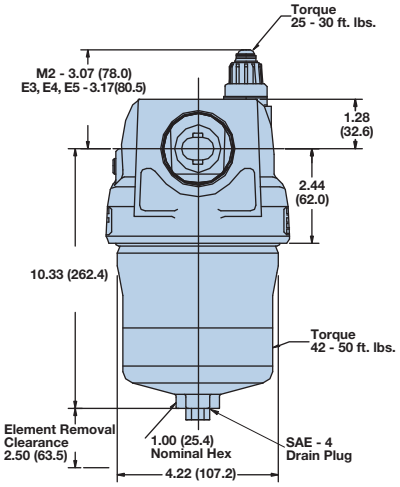
Mounting Provisions

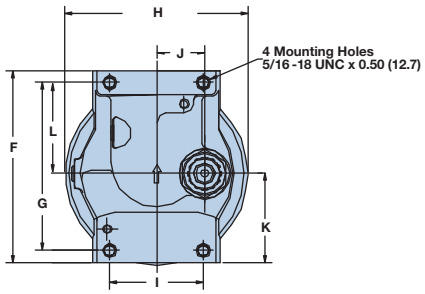
Pressure Ratings:

Maximum Allowable Operating Pressure (MAOP): 800 psi (55 bar)

Rated Fatigue Pressure: 800 psi (55 bar)

Design Safety Factor: 2.5:1





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)

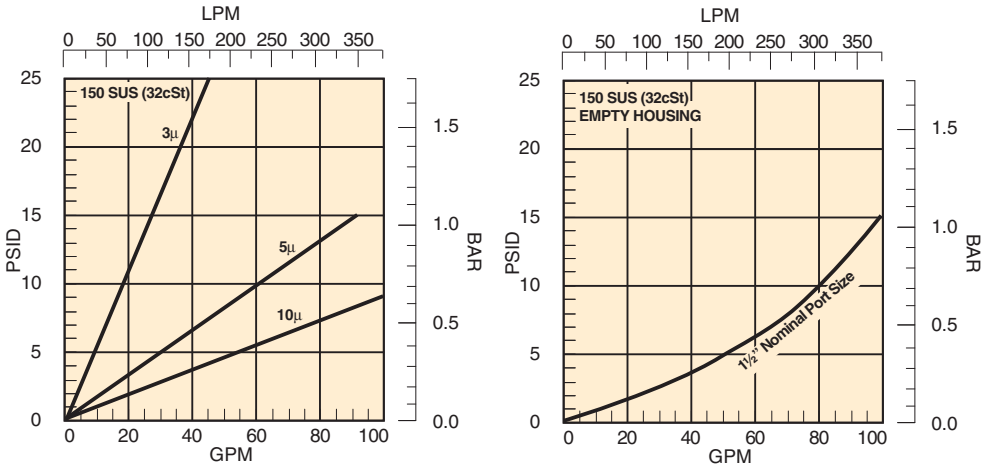
Assembly ΔP Formula

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

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

40CN HF3-2 Element Performance

Flow vs. Pressure Loss



40CN Return Filter: HF3 Series

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	E3B	50	ST24	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: Configuration

Symbol	Description
40CN	Hydraulic Filter

BOX 4: Housing Bowl Length

Symbol	Description
2	1 Element, 8” Long

BOX 5: Element Collapse Rating

Symbol	Description
H	2000 PSI (138 bar) (-21 option in Box 10 must be selected)
L	150 PSI (10 bar) (-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

*Consult factory for other requirements.

BOX 7: Indicator Type

Symbol	Description
M2	Visual, Top
E3B*	Electrical/Visual
E4MB*	Electrical/Visual
E4MC*	Electrical/Visual
E5B*	Electrical/Visual
E5MD*	Electrical/Visual
F4MS	Standard Dual output electrical indicator
F4MN	Device Net Dual output electrical indicator
F4MC	MC Dual output electrical indicator

*NOTE: Please refer to indicator drawings and chart on pages 54 and 55 for connector and wiring options.

BOX 8: Indicator Setting

Symbol	Description
25	25 psid (1.7 bar)
35[1]	35 psid (2.4 bar)
50	50 psid (3.5 bar)

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 1179G228)

BOX 10: Bypass Options

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

BOX 11: Seal Compound

Symbol	Description
V	Fluorocarbon

Notes:

1. 35 psid indicator setting only available in F4M indicator type.

Replacement Elements

Media	Element Collapse Rating	Single Length (Fluorocarbon)
3 Micron	150 psi (10 bar)	HF31L3VQ
3 Micron	2000 psi (138 bar)	HF31H3VQ
5 Micron	150 psi (10 bar)	HF31L5VQ
5 Micron	2000 psi (138 bar)	HF31H5VQ
10 Micron	150 psi (10 bar)	HF31L10VQ
10 Micron	2000 psi (138 bar)	HF31H10VQ

HT4/IL4/DIL4 Filter: HF4 Series

Low Pressure HF4 Series Filters

IL4/DIL4 Filter - 150 psi (10 bar) Application

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 (1.7 bar) bypass setting. For electrical indicator options and factory pin wiring, see pages 53-54 (type E electrical indicator).

Elements

3, 5, and 10 micron HF4 elements with ß ≥ 200 with dual stage filtering media for up to 40% increased dirt holding capacity.

Upstream and Downstream Test Ports

Allows user to do maintenance troubleshooting.

Single or Double Length

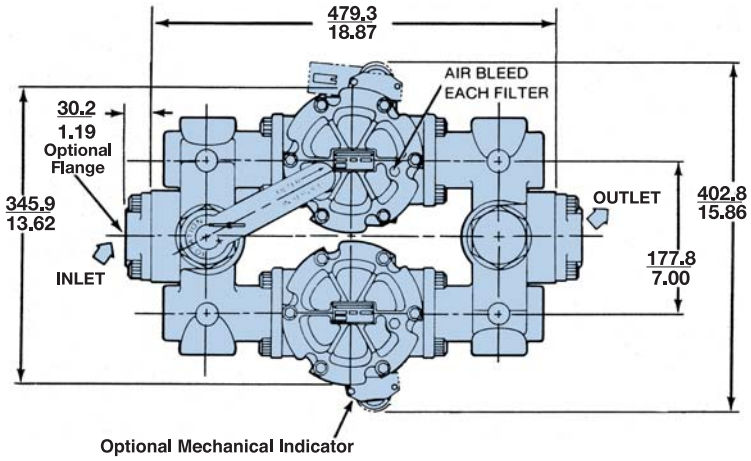
Pressure Ratings:

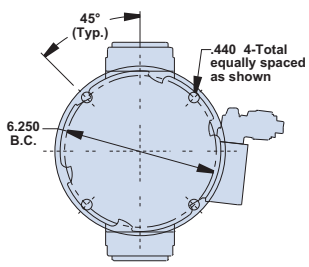
Maximum Allowable Operating Pressure (MAOP): 150 psi (10 bar)

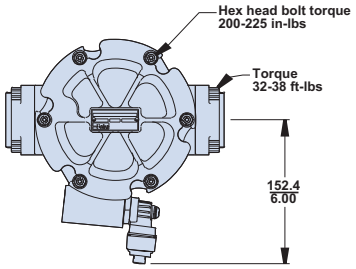
Rated Fatigue Pressure:

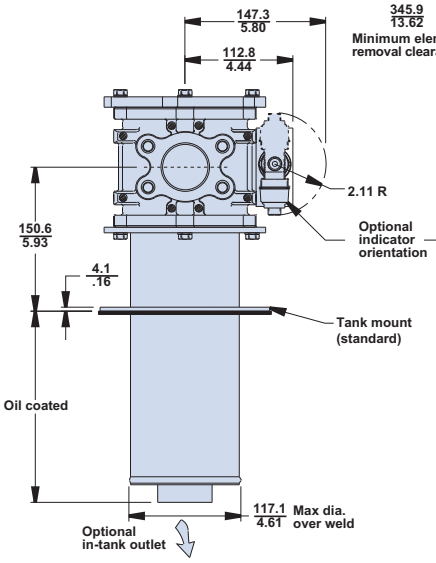
150 psi (10 bar)

IL4-1

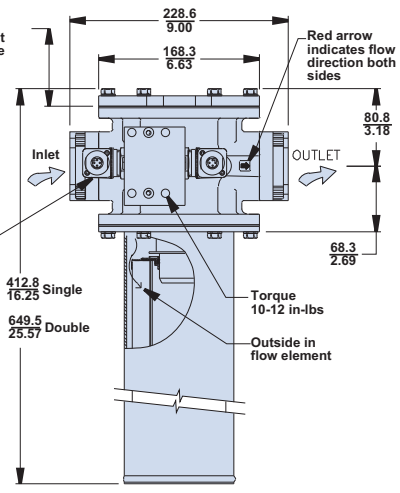








HT4

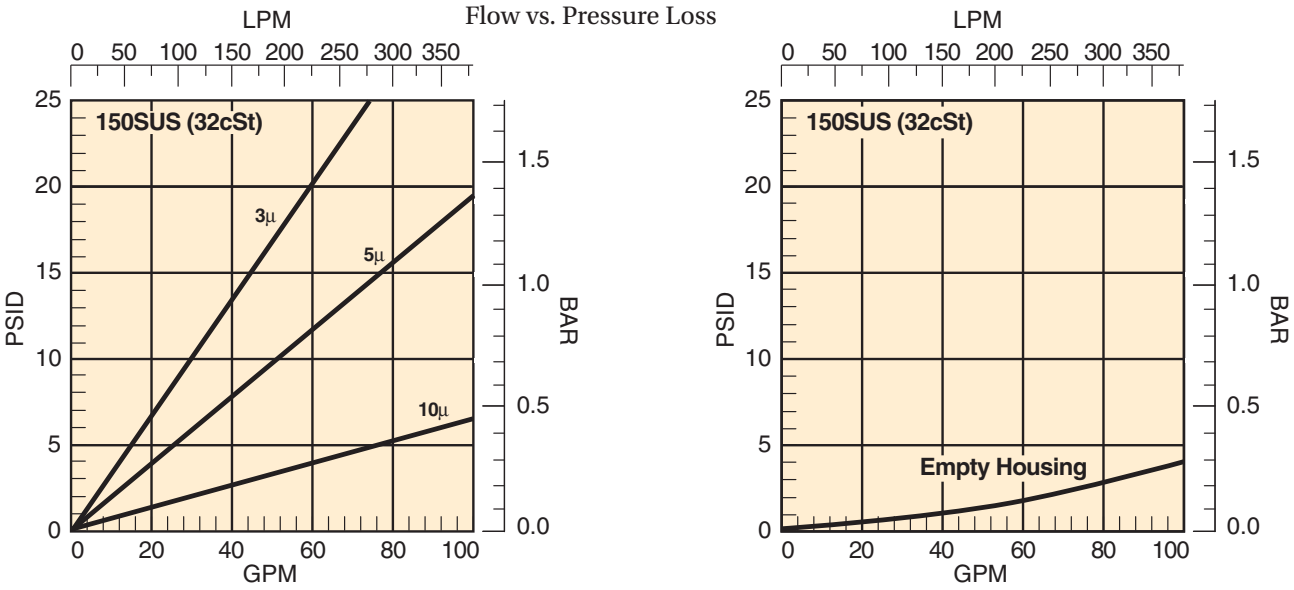


IL4

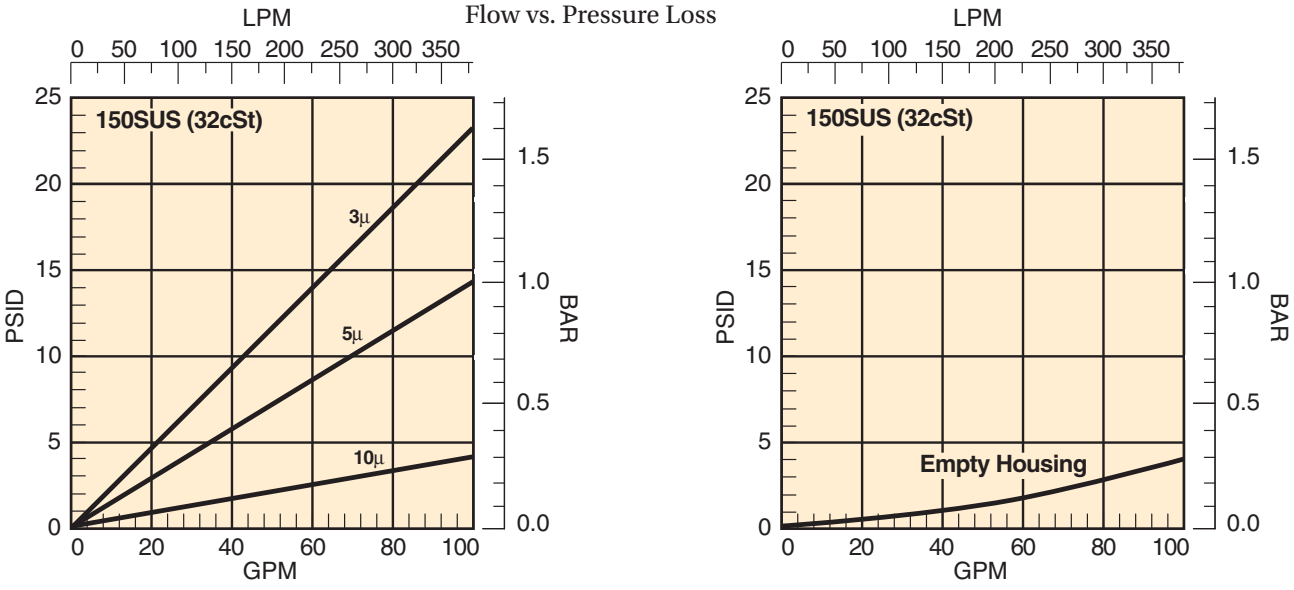
IL4/DIL4 Filter: HF4 Series

Performance

IL4-1/DIL4-1 Element Performance



IL4-2/DIL4-2 Element Performance



Assembly ΔP Formula

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

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

IL4/DIL4 Filter: HF4 Series

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	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
HT4	In-Tank Return Filter
IL4	In-line Return Filter
DIL4	In-line Duplex Filter

BOX 4: Housing Bowl Length

Symbol	Description
1	Single Length
2	Double Length

BOX 5: Element Collapse Rating

Symbol	Description
L	150 PSI (10 bar)

BOX 6: Element Filtration Rating

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

BOX 7: Indicator Type

Symbol	Description
IR	Visual, Right Side
IL	Visual, Left Side
E3B*	Electrical/Visual
E4MB*	Electrical/Visual
E4MC*	Electrical/Visual
E5B*	Electrical/Visual
E5MD*	Electrical/Visual
F4MS	Standard Dual output electrical indicator
F4MN	Device Net Dual output electrical indicator
F4MC	MC Dual output electrical indicator

*NOTE: Please refer to indicator drawings and chart on pages 54 and 55 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
25	25 psid (1.7 bar)
35[1]	35 psid (2.4 bar)

BOX 9: Port Size

Symbol	Description	
	HT4	
	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 1179G-228)	1 1/2" BSPP
FS	2" Flange (ISO 6162), 1/2-13 bolt holes, 3/4" deep	1 1/2" NPT
FM	2" Flange (ISO 6162), M12 x 1-3/4 bolt holes, 19.5 mm deep	1 1/2" BSPP
	IL4	
	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, 3/4" deep	
FM	2" Flange (ISO 6162), M12 x 1-3/4 bolt holes, 19.5 mm deep	

BOX 10: Seal Compound

Symbol	Description
V	Fluorocarbon

Notes:

1. 35 psid indicator setting only available in F4M indicator type.

Replacement Elements

Media	Element Collapse Rating	Single Length (Fluorocarbon)	Double Length (Fluorocarbon)
3 Micron	150 psi (10 bar)	HF41L3VQ	HF42L3VQ
5 Micron	150 psi (10 bar)	HF41L5VQ	HF42L5VQ
10 Micron	150 psi (10 bar)	HF41L10VQ	HF42L10VQ

IL8/HDIL8 Filter

Low Pressure

IL8/HDIL8 Filter - 300 psi (20 bar) Applications

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

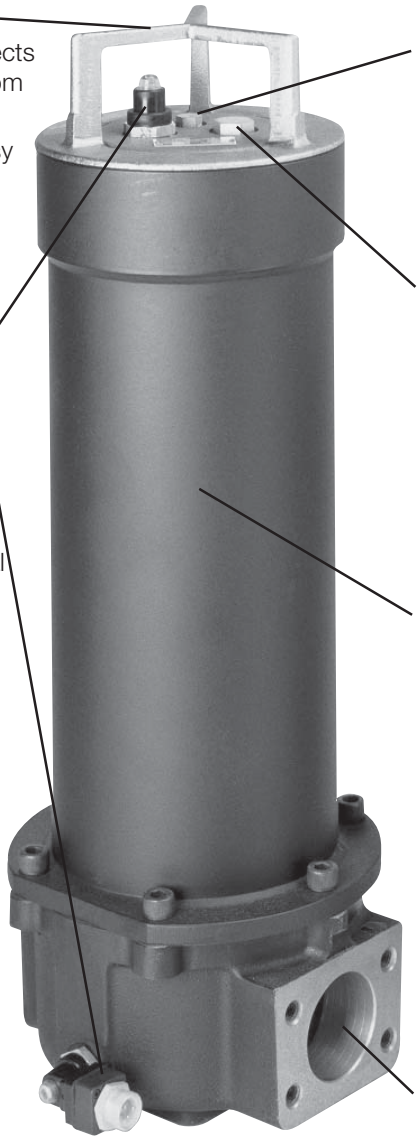
IL8 series filters are excellent choices for your demanding applications whether you require simplex, duplex or quadplex assemblies.

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

Indicators

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

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

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

IL8/HDIL8 Filter

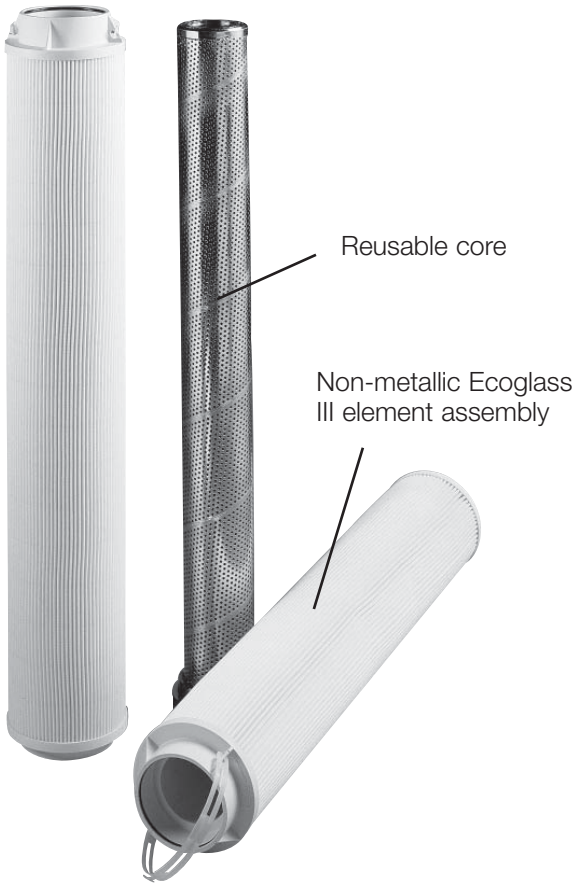
Low Pressure

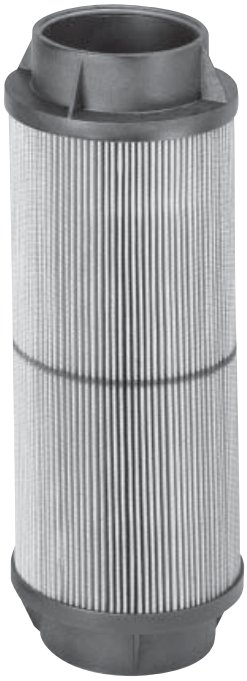
Ecoglass III - Replacement Elements

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.

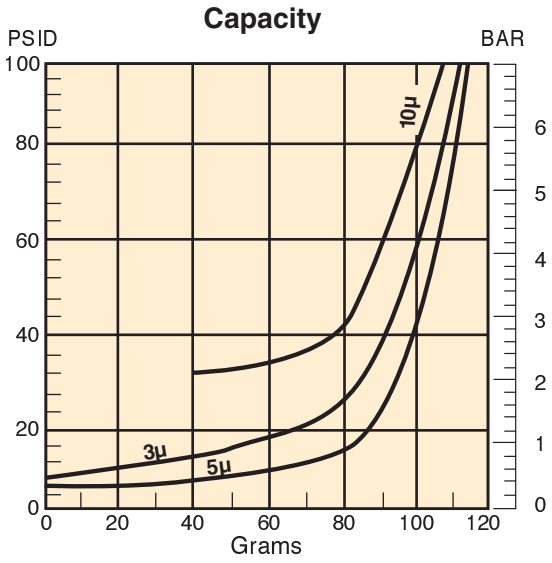
The unique multi-layer design combines high efficiencies with exceptional dirt holding capacities for performance that is unequalled in the industry today. This performance is further enhanced in the IL8 series with the introduction of the deep pleat design. The deep pleat element design increases the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

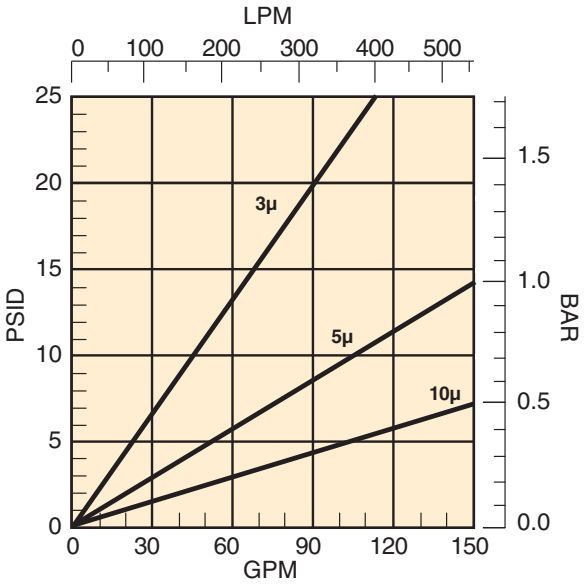
IL8/HDIL8 Filter

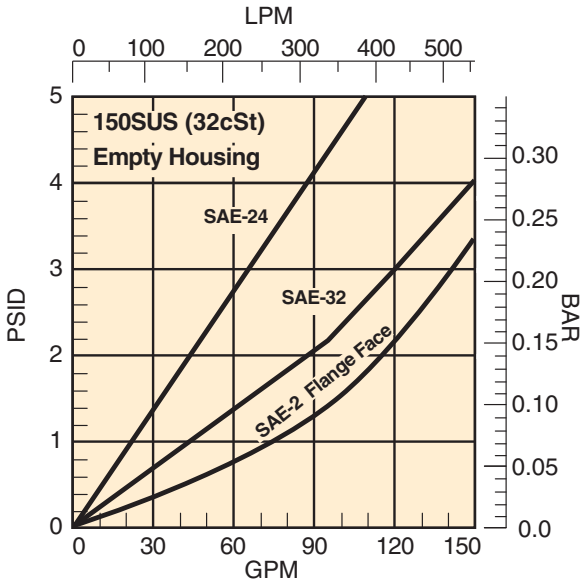
IL8-1 Performance

IL8-1 Element Performance



Flow vs. Pressure Loss

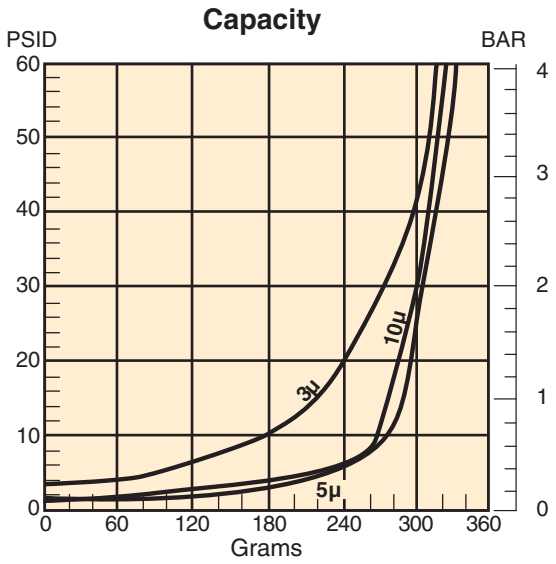




IL8/HDIL8 Filter

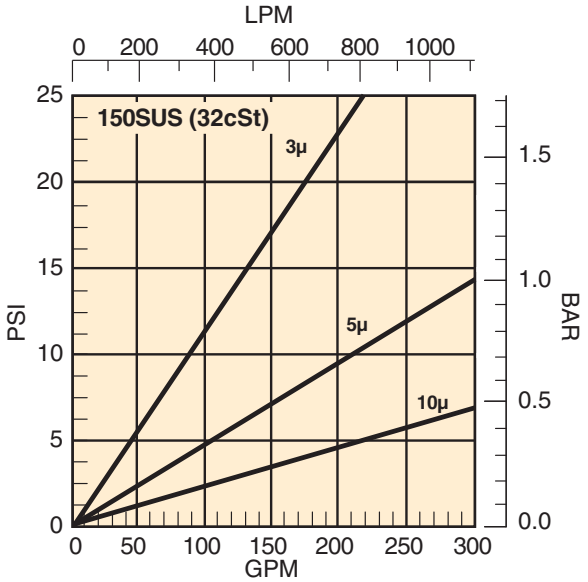
IL8-2 Performance

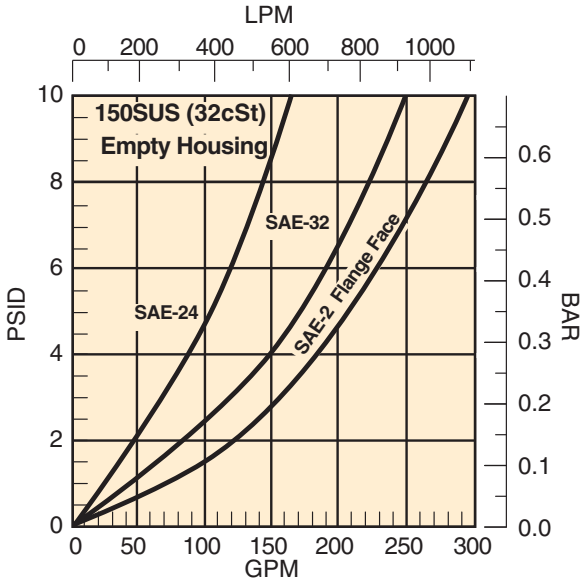
IL8-2 Element Performance



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

Flow vs. Pressure Loss

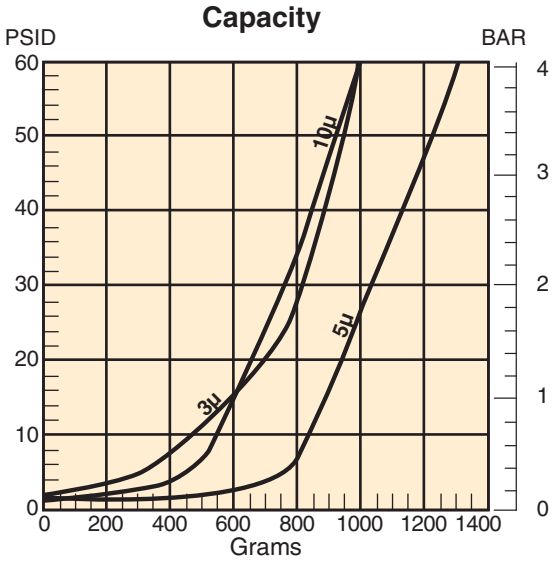




IL8/HDIL8 Filter

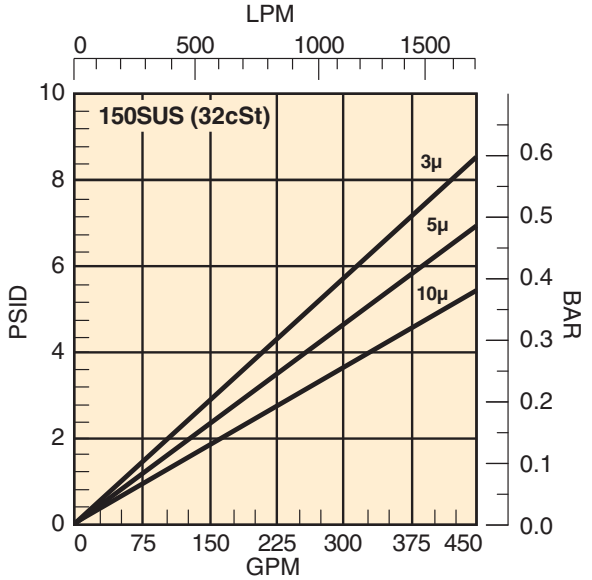
IL8-3 Performance

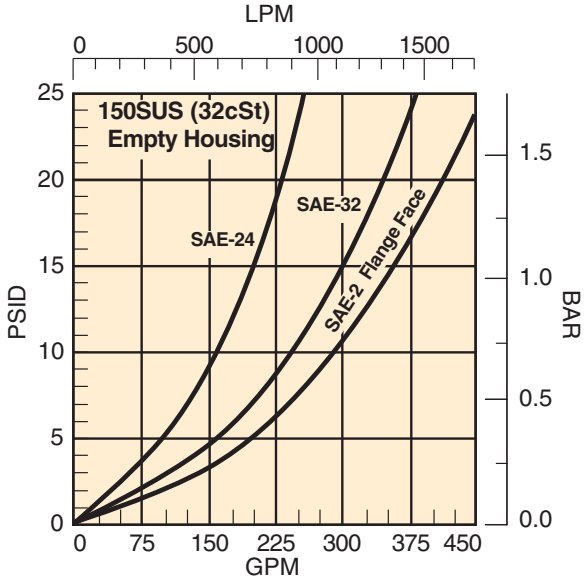
IL8-3 Element Performance



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

Flow vs. Pressure Loss





IL8 Filter

Specifications

Pressure Ratings:

Maximum Allowable Operating Pressure (MAOP): 500psi (34.5 bar)
Rated Fatigue Pressure: 330 psi (22 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 bar)

Element Condition Indicators:

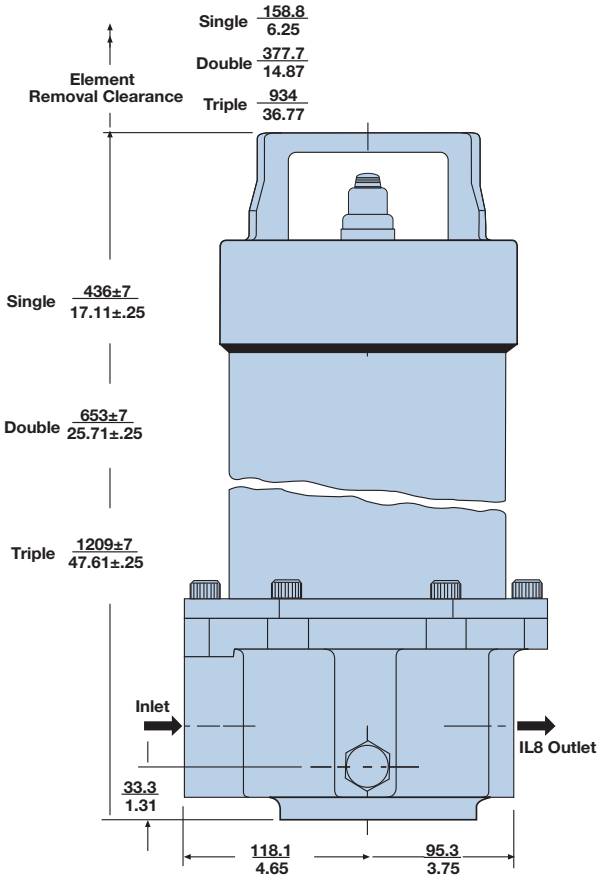
Visual (optional)
Electrical -heavy duty (optional)
SPDT .25 amps (resistive) MAX 5 watts 12 to 28 VDC & 110 to 175 VAC
Note: Product of switching voltage and current must not exceed wattage rating

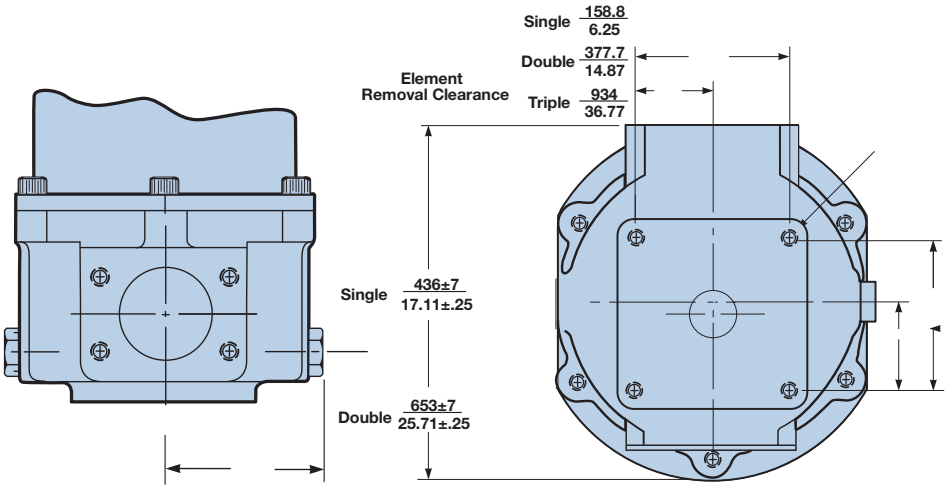
Materials:

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

HDIL8/HQIL8 Filter

Specifications

Pressure Ratings:
Maximum Allowable Operating Pressure (MAOP): 400psi (27 bar)
Rated Fatigue Pressure: 330psi (22 bar)
Design Safety Factor: 2.5:1

Operating Temperatures:
-15°F (-26°C) to 200°F (93°C)

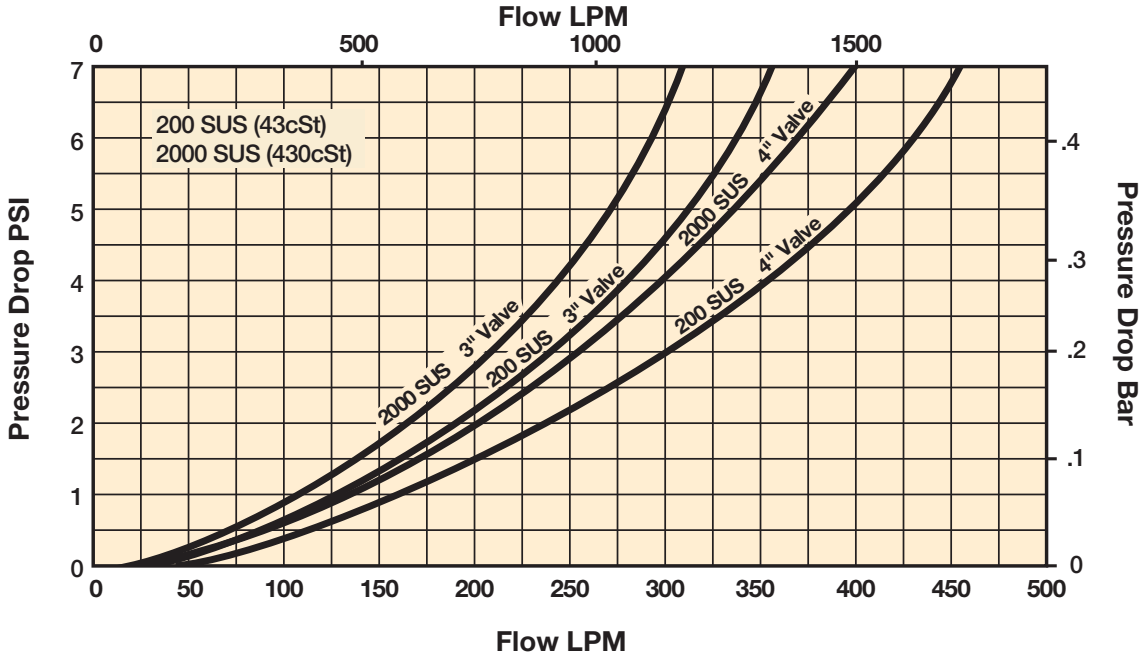
Element Collapse Rating:
150 psid (10 bar)

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

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)

Changeover Valve Flow vs. Pressure Loss



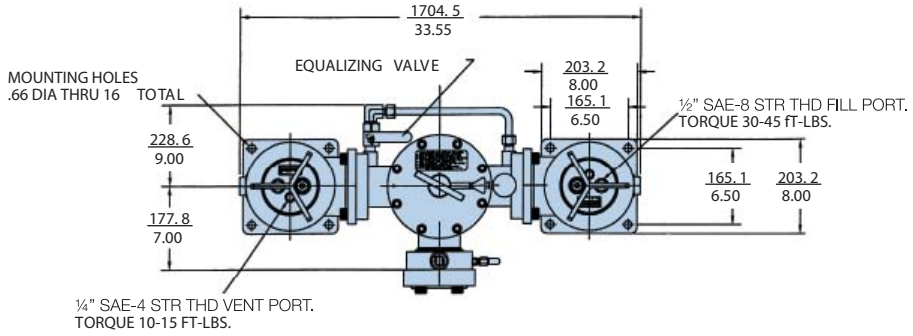
HDIL8/HQIL8 Filter

Specifications

Linear Measure: millimeter / inch

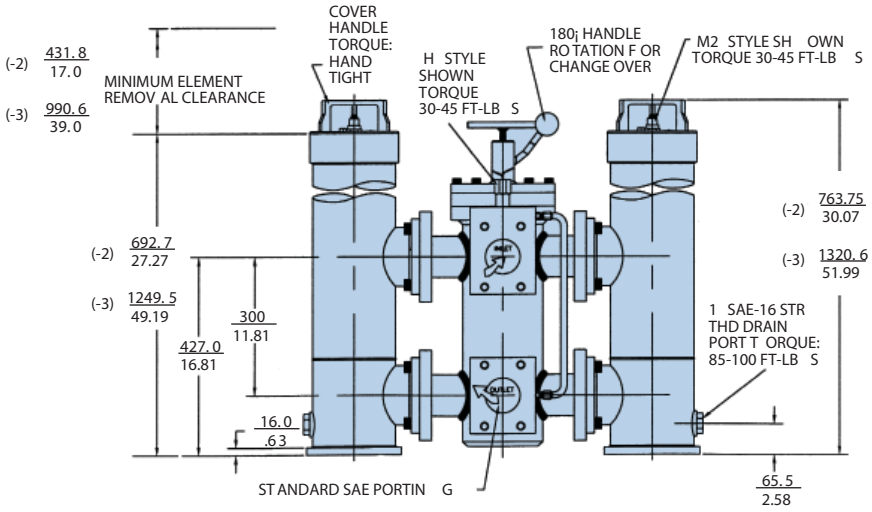
HDIL8

Top View



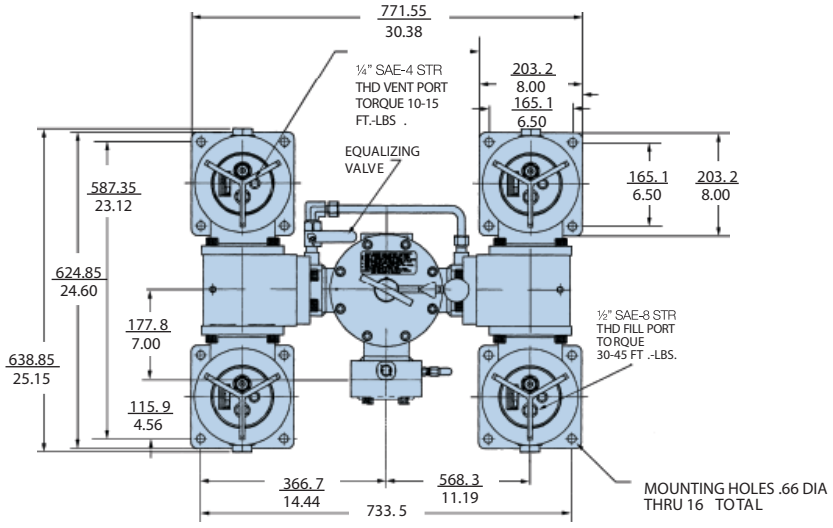
HDIL8/HQIL8

Side View



HQIL8

Top View



IL8/HDIL8/HQIL8 Filter

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	E3BP	50	ST24	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: Configuration

Symbol	Description
IL8	In-line Hydraulic Filter
HDIL8	In-line Duplex Filter
HQIL8	In-line Quadplex Filter

BOX 4: Housing Bowl Length

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

*NOTE: Not available for HDIL8 or HQIL8.

BOX 5: Core

Symbol	Description
None	Disposable Core
R	Reusable Core

BOX 6: Element Filtration Rating

Symbol	Description
3	3 Micron Microglass
5	5 Micron Microglass
10	10 Micron Microglass
02QE	Ecoglass III
05QE	Ecoglass III
10QE	Ecoglass III

NOTE: Ecoglass III elements must utilize -R option in Box 4.

BOX 7: Indicator Type

Symbol	Description
P	Port Plugged
M2	Visual Auto Reset
IR	Visual, Right Side
IL	Visual, Left Side
E3B*	Electrical/Visual
E4MB*	Electrical/Visual
E4MC*	Electrical/Visual
E5B*	Electrical/Visual
E5MD*	Electrical/Visual
F4MS	Standard Dual output electrical indicator
F4MN	Device Net Dual output electronic indicator
F4MC	MC Dual output electrical indicator

NOTE: Two symbols required. First is for housing, second is for the cover(s). Electrical indicators only available on the housing.

*Please refer to indicator drawings and chart on pages 54 and 55 for connector and wiring options.

BOX 8: Indicator Setting

Symbol	Description
25	25 psid (1.7 bar)
35[1]	35 psid (2.4 bar)
50	50 psid (3.5 bar)
125	125 psid (8.6 bar) F4M indicator w/ option -11 only.

BOX 9: Port Size

Symbol	Description
	IL8
FS	SAE 2" Flange Face (code 61)
	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: Seal Compound

Symbol	Description
V	Fluorocarbon

Notes:

1. 35 psid indicator setting only available in F4M indicator type.

Replacement Elements

Microglass III (Fluorcarbon)				Ecoglass III (Fluorcarbon)			
Media	Single	Double	Triple	Media	Single	Double	Triple
3	927663Q	933044Q	932872Q	02QE	NA	933834Q	933734Q
5	927861Q	933045Q	932873Q	05QE	NA	933835Q	933612Q
10	927661Q	933046Q	932874Q	10QE	NA	933836Q	933735Q
				Reusable Core	NA	933838	933636

Splash Lube Filter

Special Applications Filters

Splash Lube Filters -
150 psi Application

Non-Bypass Design

10 and 25 Micron Cellulose

Electrical or Gauge Indicator

With 25 psi (1.7 bar) ΔP setting. For electrical indicator options and factory pin wiring, see pages 53-54.

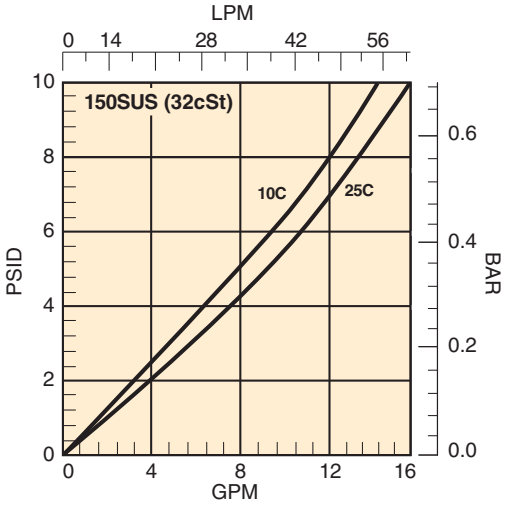
Prevention Feature

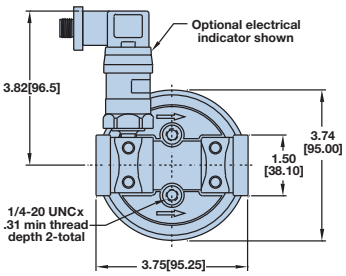
Prevents filter operation without element in place.

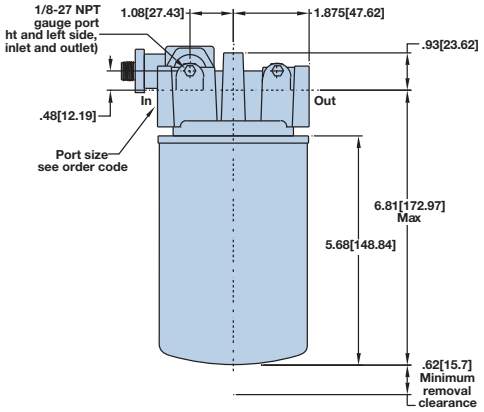
Mounting Provisions

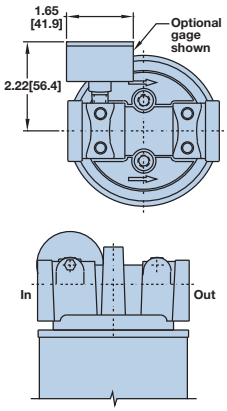
Located on top of filter.

Slat Assembly









Assembly ΔP Formula

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

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

Splash Lube Filter

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	G	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: Configuration

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
G*	Gauge, Left Side
PS3*	Pressure switch, left side with 3-pin Brad Harrison style connection
PS4*	Pressure switch, left side with 4-pin Brad Harrison style connection
PS5*	Pressure switch, left side with 5-pin Brad Harrison style connection

*Please refer to indicator drawings and chart on pages 54 and 55 for connector and wiring options. Example: PS4MD. Indicator type gauge or switch supplied with 3 plugs.

BOX 6: Indicator Setting

Symbol	Description
25	25 psid (1.7 bar)

BOX 9: 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

Electrical Information

Pictorial Guide and Specifications

F4M Electronic Indicator

		Part Number	Indication Pressure
F4MS	PNP N/C Standard	937037 W3	8.5 bar (125 psi)
	PNP N/C Standard	942638 W6	8.5 bar (125 psi)
	PNP N/C Standard	942711 W3	1.5 bar (22 psi)
F4MN	PNP N/C Device Net	937409 W3	8.5 bar (125 psi)
	PNP N/C Device Net	942743 W6	8.5 bar (125 psi)
	PNP N/C Device Net	942744 W3	1.5 bar (22 psi)
F4MC	PNP N/C	942745 W3	8.5 bar (125 psi)
	PNP N/C	942746 W6	8.5 bar (125 psi)
	PNP N/C	942747 W3	1.5 bar (22 psi)

DC3 Pressure Switch
Type SE Electrical Housing

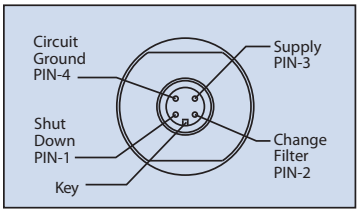
HF2, HF3, HF4
Type E Electrical Indicator

Ind. press	LED status	Output2	Output1
Power on	⊗	Active	Active
50%	⊗ ⊗	Active	Active
75%	⊗ ⊗ ⊗	Inactive	Active
100%	⊗ ⊗ ⊗ ⊗	Inactive	Inactive

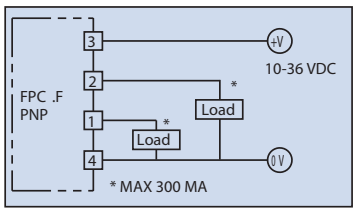
SLAT
Type PS Electrical Indicator

F4MS

937037: 4-pin Micro Receptacle
Standard Factory Wiring

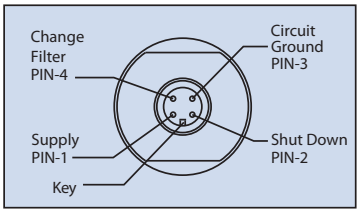


CONTACT CONFIGURATION

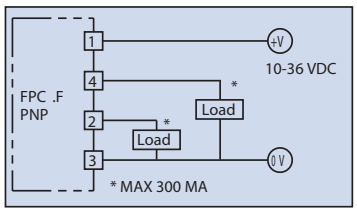


F4MN

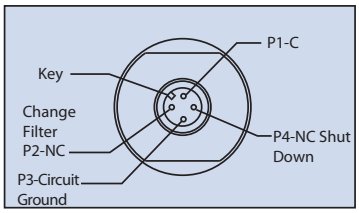
937409: 4-pin Micro Receptacle
Device Net Compatible



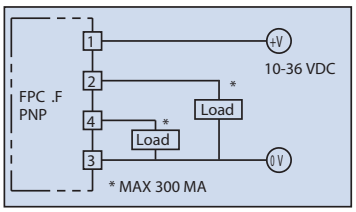
CONTACT CONFIGURATION



F4MC



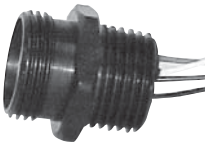
CONTACT CONFIGURATION



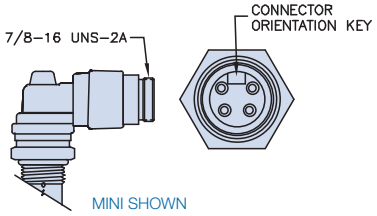
SAE Series Filters

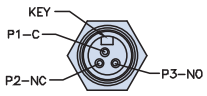
Electrical Information

Pictorial Guide and Specifications



Mini Connector





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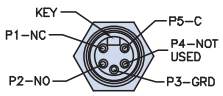

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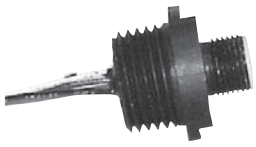
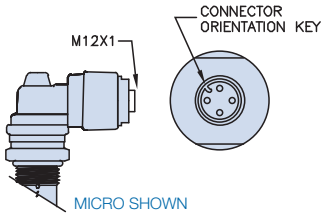
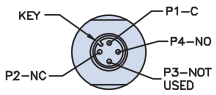


Micro Connector





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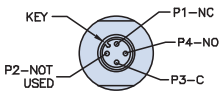
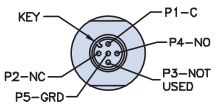


E4MB



E5MD

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	MICRO	E4MB	NC	NOT USED	C	NO		935325	934912
4	MICRO	E4MC	C	NC	NOT USED	NO		935722	935723
5	MINI	E5B	NC	NO	GRD	NOT USED	C	934928	934930
5	MICRO	E5MD	C	NC	NOT USED	NO	GRD	934601	934595

*Consult factory

aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding

Portable Filter Carts

Models 5MFP & 10MFP with Moduflow™ *Plus* and Intelli-Cart™

Parker

ENGINEERING YOUR SUCCESS.

Portable Filter Carts

Applications

- **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 and emulsified water from a system**
- **For use with fluids such as hydraulic, gear and lube oils**

Parker portable 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 a very high affinity for free water. Once water comes into contact with this material, it is removed from the system.

The Parker portable filter cart uses two high capacity ModuFlow™ Plus filters for long element life and better system protection. The first stage (inlet) filter captures larger particles, while the second stage (outlet) filter captures 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 w/ 2.5 times increased dirt holding capacity	• 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	• Extends fluid life and system performance
• 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
• 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

Portable Filter Carts

Applications

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

Visual indicator
- Tells you when to change element

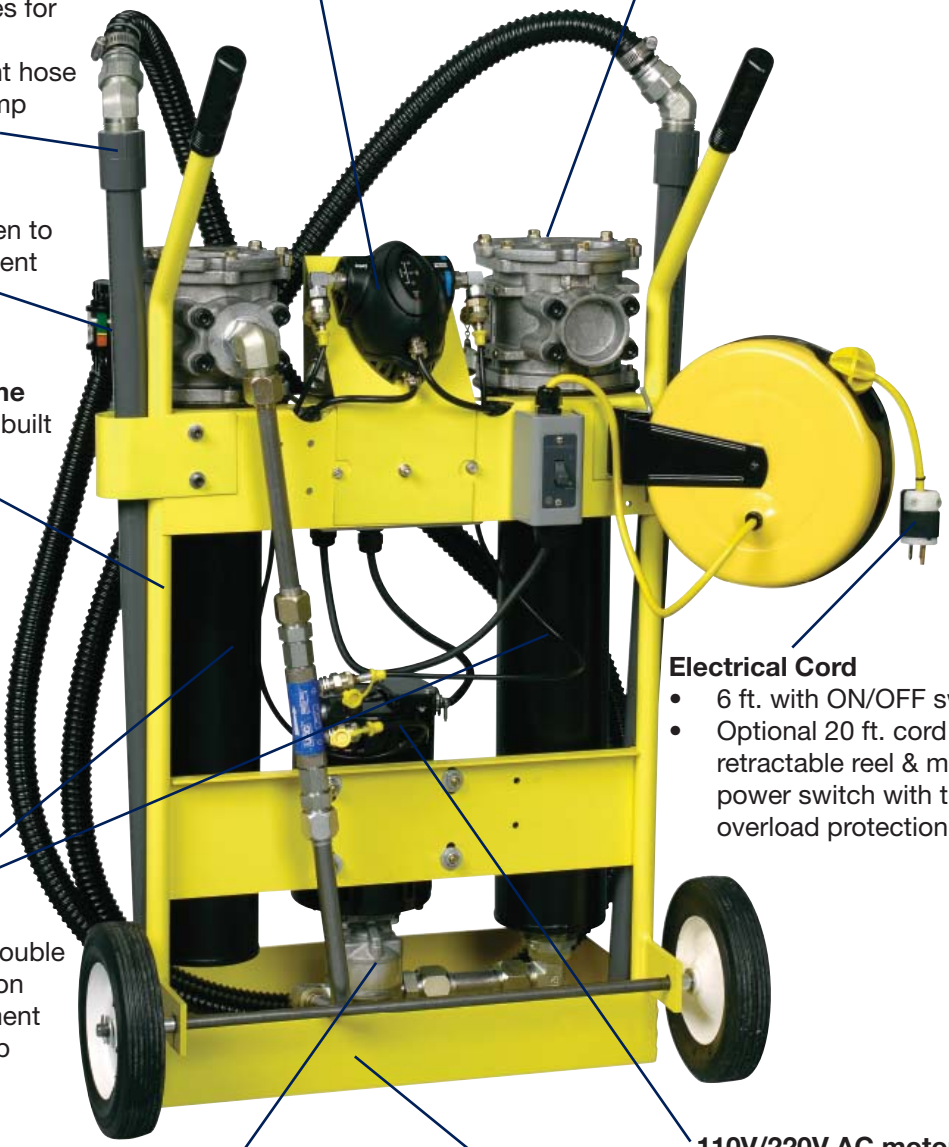
Heavy Duty frame
- Rugged and built to last

Dual filters
- Two stage, double length filtration for long element life and pump protection

Elements (not shown)
- Available for both particulate and Water Removal (WR) in double length w/ 2.5 times increased dirt holding capacity

icountPD (Intelli-Cart™ option)
- Early warning LED or digital display indicators for Low,Medium and High contamination levels
- Self diagnostic software

Service cover
- Top-accessible for easy changing of elements



Electrical Cord
- 6 ft. with ON/OFF switch
- Optional 20 ft. cord with retractable reel & mounted power switch with thermal overload protection

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

110V/220V AC motor
- Industrial brand name

Drip tray
- Helps keep the work area safe and clean

Portable Filter Carts

Specifications

Maximum Recommended Fluid Viscosity:
5MFP – 3000 SUS (647cSt)
0.85 specific gravity
10MFP – 500 SUS (108 cSt)
0.85 specific gravity

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

Filter Bypass Valve Settings (Integral to Element):
Inlet – 3 psid (0.2 bar)
Outlet – 35 psid (2.4 bar)

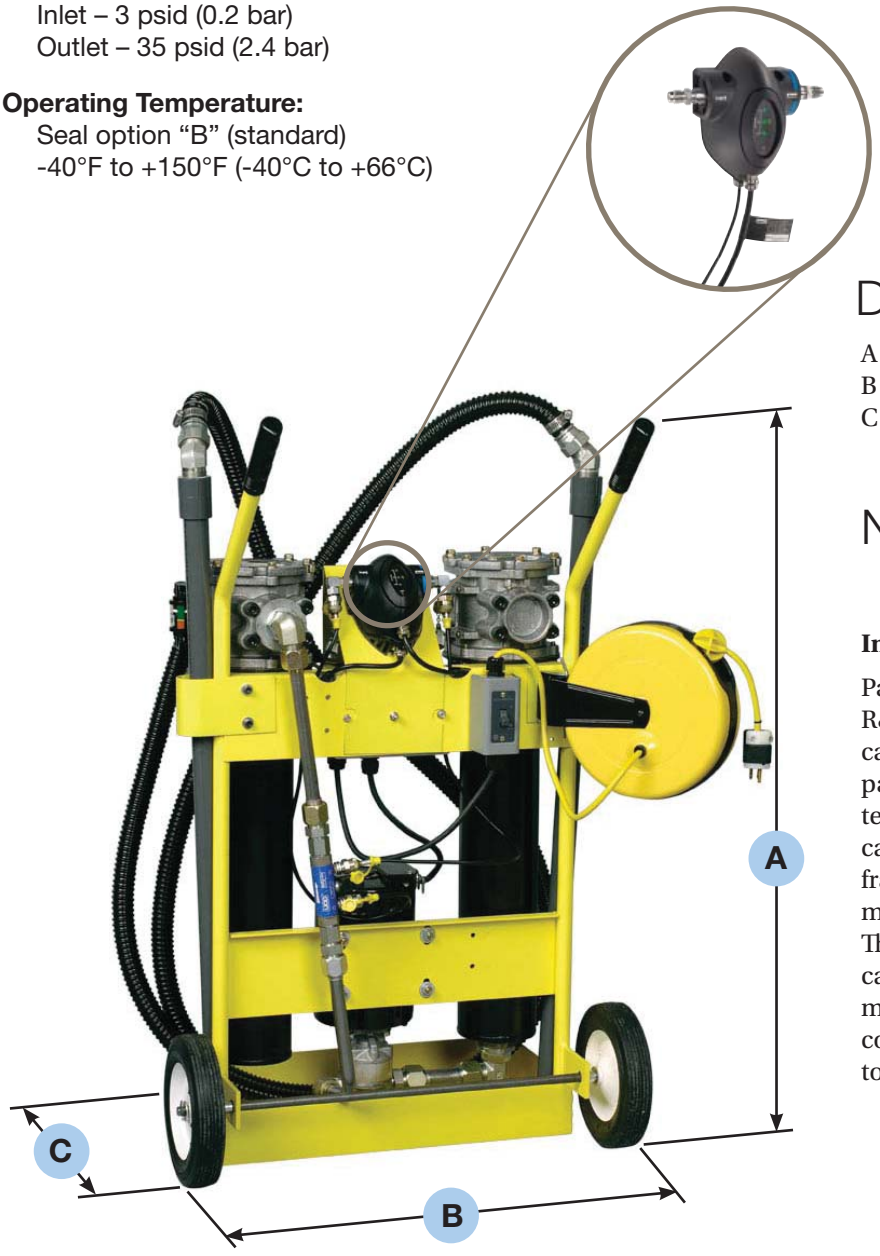
Operating Temperature:
Seal option "B" (standard)
-40°F to +150°F (-40°C to +66°C)

Electrical Service Required:
5MFP – 110/220 volts, 60/50 Hz, single phase, 8/4 amps
10MFP – 110/220 volts, 60/50 Hz, single phase, 10/5 amps

Electrical Motor:
5MFP – ½ hp @ 1725 rpm, Open, Drip Proof
10MFP – ¾ hp @ 3450 rpm, Open, Drip Proof
Thermal overload protection

Construction:
Cart frame – Steel
Filter head – Aluminum
Filter bowl – Steel
Hoses – PVC (Std.)
EPDM (high temp option)
Wands – PVC (Std.)
Steel tube (high temp option)

Weight:
110 lbs. (45.4kg)



Dimensions:

A = Height: 1034mm (40.7 in.)
B = Width: 648mm (25.5 in.)
C = Depth: 503mm (19.8 in.)

New feature!

Intelli-Cart™

Parker is pleased to announce its R&D effort to offer a diagnostic filter cart - the Intelli-Cart. The icountPD particle detector, the most up-to-date technology in solid particle detection, can be mounted to the standard frame of the filter cart for enhanced monitoring of your hydraulic system. The icountPD, coupled with the filter cart is a cost effective solution to fluid management and contamination control. Ask your sales representative today for more information.

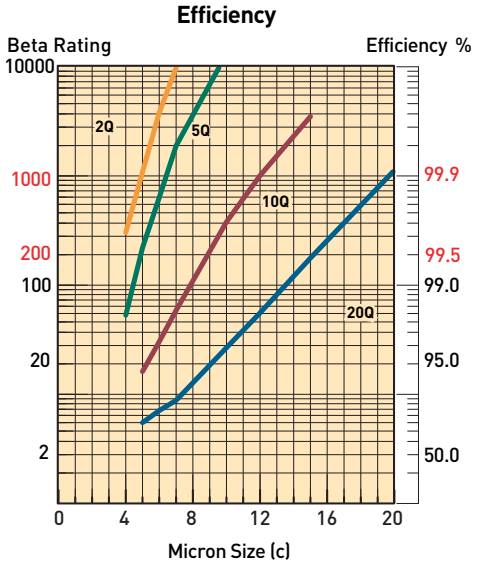
Typical Fluid Cleanliness Level Requirements

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 Element Performance

Media Code	Filter Media	Capacity (Grams)
40W	Woven Wire	*
40SA	Synthetic	*
20Q	Microglass III	140
10Q	Microglass III	135
05Q	Microglass III	130
02Q	Microglass III	110



Notes: Multipass test run @ 80 gpm to 50 psid terminal - 5 mg/l BUGL.

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 (10MFP cart).
2. Inlet filter fitted with 40SA element; outlet with 20Q element.
3. System ingression rate equal to 1 X 10^6 particles greater than 10 micrometers entering the system per minute.

The Intelli-Cart™ with particle detector provides an excellent method for filtering and trending contamination levels.

For optimum particle detector performance results when monitoring contamination levels, fluid viscosity range should be 50 - 250 SUS.

Par-Gel™ Media Water Capacity

Model	Fluid Viscosity	Capacity
5MFP	75 SUS 200 SUS	600 ml 420 ml
10MFP	75 SUS 200 SUS	500 ml 300 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 excess of 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. When servicing the PVC tube wand, do not over-torque the metal fittings going into the PVC coupling. Over-torque will result in cracking the coupling. Generally, 1/4 turn beyond hand-tight is sufficient.
3. The Intelli-Cart™ is shipped with a bag that contains user manuals, iPD programming disk, and accessory parts.
4. The iPD is shipped with the factory default setting. Users can reprogram the iPD with the cable located in the attached bag, the program disk and the iPD owners manual.

Operating Instructions

1. Insert the inlet wand assembly into the supply fluid receptacle (drum/reservoir). The RFP filter is the inlet filter.
2. Insert the outlet wand assembly into the clean fluid receptacle (drum/reservoir). The ILP fIlter is the outlet filter.
3. Verify that the ON/OFF switch is OFF and plug the cord into the proper grounded power source (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 RFP inlet filter housing to prime pump initially.
5. The condition of the filter element should be monitored by observing the cleanliness indicator on the outlet filter. When the indicator is in the CHANGE position, both inlet and outlet filter elements MUST be replaced to prevent fluid from going through the bypass in the filters.
6. The inlet filter element is provided with a 3PSI by-pass spring, and prevents the pump from cavitating if the element is not changed. The outlet filter element is provided with a 35PSI bypass spring to prevent excessive pressure which may be harm-ful to personnel or to the filter cart.

   Warning: The filter bypass spring acts as a relief valve for the pump. Do not restrict the outlet hose with a shut-off valve which will defeat the function of the bypass valve, causing excessive pressure, which may be harmful to per-sonnel 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.

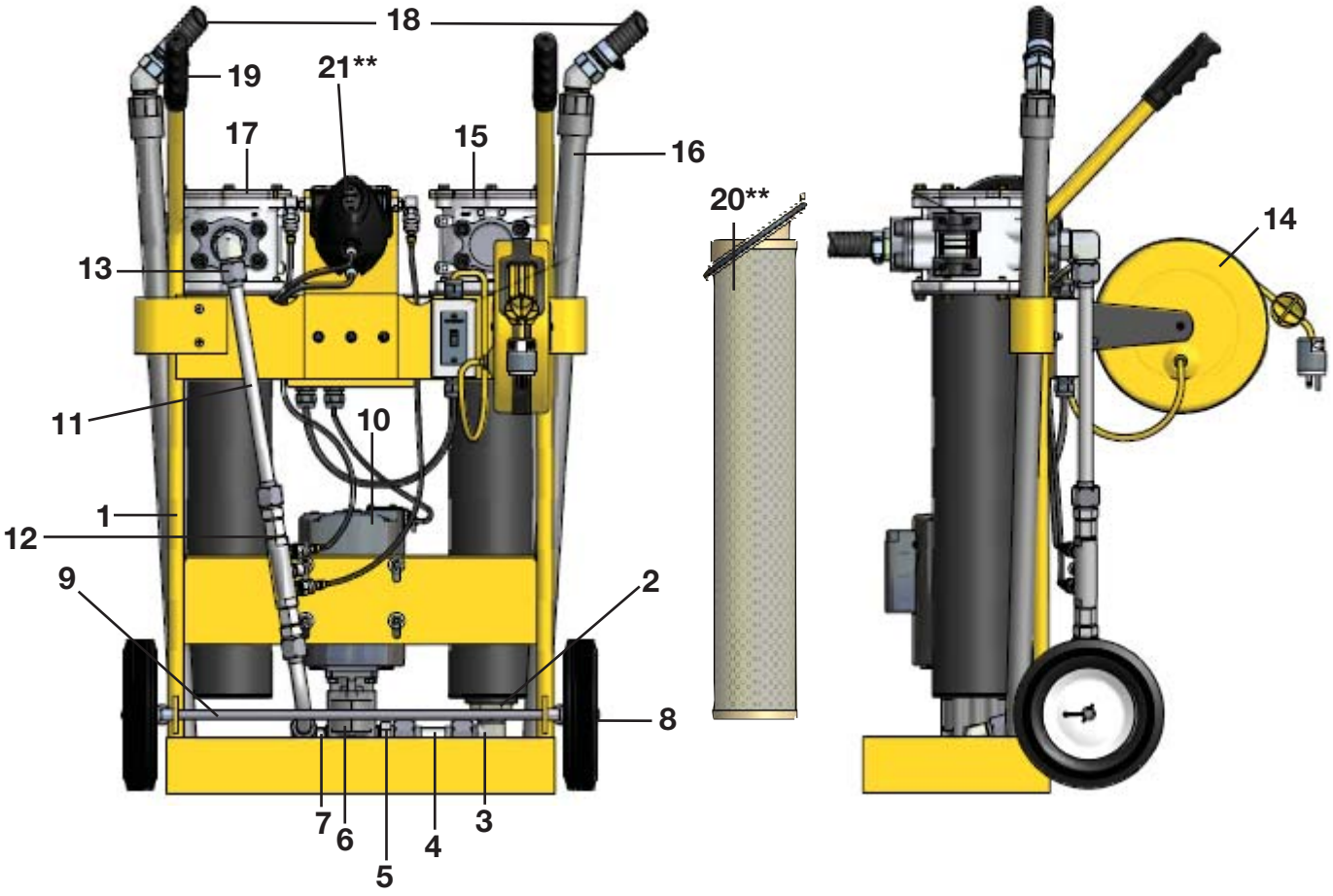
Maintenance Instructions

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 filter element from the filter head.
   a) Replace the synthetic or Microglass III elements. Verify correct element replacement.
   b) Wire mesh elements can be cleaned. Ultrasonic cleaners provide best results.
5. Install element in filter housing. Make sure element o-rings seat properly into the head, making sure that the notch on the element lines up with the notch in the head.
6. Inspect the cover o-ring and replace if necessary.
7. Replace cover and tighten hex head screws until they are snug. Do not over-torque (16 - 19 Ft. Lbs.) these screws. Do not interchange the inlet filter cover with the outlet filter cover. (The inlet filter has a “RFP” prefix, the outlet filter has a “ILP” prefix).
8. Contact the HFD service department at 419-644-0259 regarding iPD calibration.
9. iPD removal: remove oil lines from the iPD at the two fittings closest to the iPD. Disconnect the two cables from the iPD. Remove iPD from cart via two screws. The cart can be used without the iPD as long as the sample hoses are removed from the System 20. Protect sampling connectors from contamination.

Trouble Shooting

Problem	Cause	Solution
Does not start	ON/OFF Switch	Turn switch ON, replace switch if defective
	No electrical power	Plug in cart
	Defective motor	Replace
No oil flow or erratic pump noise	Filter housing not filled with oil	Allow pump to run 30 to 60 seconds
	Suction leak	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
	Defective pump	Replace pump
Indicator reads CHANGE or BYPASS	Element dirty	Replace or clean elements (both filters)
	Oil extremely cold or viscous	Change element to coarser micron rating
Indicator does not seem to move	No outlet element	Install element
	40 micron element installed in outlet filter	Check cart model number to verify correct element. The inlet filter has a rating RFP prefix; the outlet filter has an ILP prefix

Filter Cart Replacement Parts



Item No.	Part No.	Description	Qty
1	928690	Frame	1
1	941468	Frame (Intelli-Cart™)	1
2	940980	Pipe Reducer Fitting	1
3	940979	Tube Fitting	1
4	937526	Suction Tube Assy.	1
5	928652	Adapter Fitting	1
6	928731	Pump	1
7	940977	Adapter Fitting	1
8	928650	Wheel	2
9	928653	Axle	1
10	928678	Motor 10MFP	1
10	929692	Motor 5MFP	1
11	937527	Discharge Tube Assy.	1
12	941467	Discharge Tube Top (Intelli-Cart™)	1
	941466	Discharge Tube Bottom (Intelli-Cart™)	1
	STI.0144.100	System 20 (Intelli-Cart™)	1
	3/8-8F40HG5S	System 20 Fitting 1 (Intelli-Cart™)	2
	12/8 F50X-S	System 20 Fitting 2 (Intelli-Cart™)	2

Item No.	Part No.	Description	Qty
13	940978	Tube Fitting	1
14	928623	Cord Reel	1
15	940960	Inlet Filter – Nitrile	1
15	941024	Inlet Filter – Fluorocarbon	1
16	928784	Tube Wand Assy. – Seal Option B	2
17	940961	Outlet Filter – Nitrile	1
17	941025	Outlet Filter – Fluorocarbon	1
18	928663	Hose Assy. – Seal Option B	2
19	928651	Handle Grip	2
20	See Chart**	Element, (1) Inlet & (1) Outlet	2
21	See Chart**	icountPD (Intelli-Cart™)	1
	B84654	icount Cable (Intelli-Cart™)	1
	B84224	icount Hoses (Intelli-Cart™)	2
	2/2A40EG4M-S	icount Fitting 1(Intelli-Cart™)	2
	EMA3/1/8ED	icount Fitting 2 (Intelli-Cart™)	2

**Refer to chart on How to Order page.

Portable Filter Carts

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
10MFP	2	40SA	10Q	B	VP	I	1

BOX 1: Basic Assembly	
Symbol	**Description**
5MFP	**5 GPM (3000 SUS MAX.)**
10MFP	**10 GPM (500 SUS MAX.)**

BOX 2: Length	
Symbol	**Description**
2	**Double**

BOX 3: Inlet Filter Element	
Symbol	**Description**
40SA	**Synthetic, 40 micron**
40W	Stainless Steel Mesh, 40 micron nominal
20Q	Microglass III, 20 micron

Please note the bolded options reflect standard options with a reduced lead-time. Consult factory on all other lead-time options.

BOX 4: Outlet Filter Element	
Symbol	**Description**
02Q	Microglass III, 2 micron
05Q	Microglass III, 5 micron
10Q	**Microglass III, 10 micron**
20Q	Microglass III, 20 micron
WR	Par-Gel™ Water Removal

BOX 5: Seals	
Symbol	**Description**
B	**Nitrile (NBR)**

BOX 6: Indicator	
Symbol	**Description**
VP	**Visual indicator, 3-band** (mounted on Outlet Filter only)

BOX 7: Bypass	
Symbol	**Description**
I	**35 PSID (2.4 bar) (outlet filter element)**

BOX 8: Options	
Symbol	**Description**
1	**None**
6*	20' electrical cord (retractable reel)
9	Visual indicator on Inlet Filter
PD**	iPD with standard LED Display
PDL**	iPD with LCD display and integrated Moisture Sensor

* standard with option PD or PDL
** only available in 10MFP configuration

Replacement Elements

Media	Nitrile Seals		Fluorocarbon Seals	
	Inlet Filter (3 psid integral bypass)	Outlet Filter (35 psid integral bypass)	Inlet Filter (3 psid integral bypass)	Outlet Filter (35 psid integral bypass)
02Q	N/A	937397Q	N/A	937405Q
05Q	N/A	937398Q	N/A	937406Q
10Q	N/A	937399Q	N/A	937407Q
20Q	940971Q	937400Q	940974Q	937408Q
40SA	940802	N/A	940972	N/A
40W	940803	N/A	940973	N/A
WR	N/A	940734	N/A	940736

aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding

SMR Series

Submicronic Removal
Fluid Purification Systems

Parker

ENGINEERING YOUR SUCCESS.

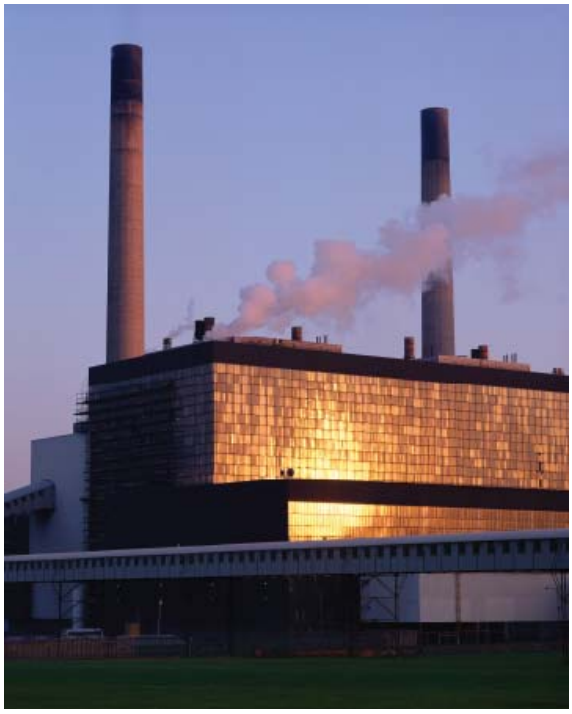
SMR Series

Applications

The SMR Series is the smart purification solution for fluid flow in the 2-10 GPM (8 - 38 LPM) range. The SMR contains patented Balanced Charge Agglomeration (BCA™) technology, which maintains hydraulic and lubricating fluids in optimum condition while preventing/ removing the build-up of sludge and varnish. The system is available in a PLC or simplified control version.

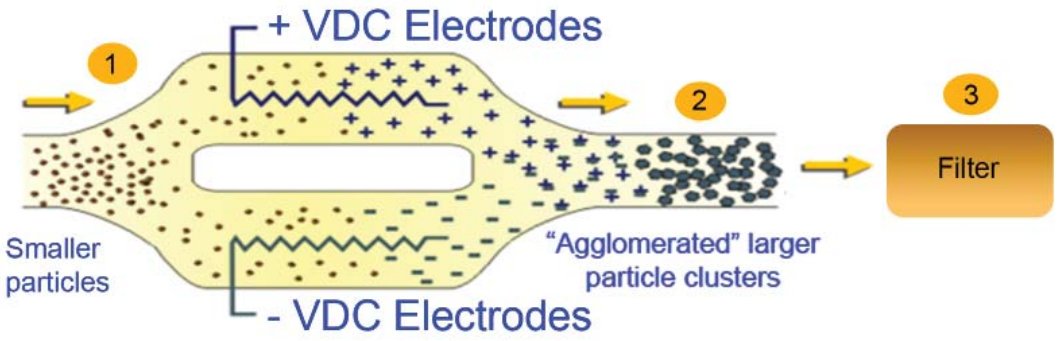
Balanced Charge Agglomeration (BCA™) technology does not remove water, however with the removal of thousands of sub-micron particles, the majority of sites where water can readily attach are mitigated. Water is more easily separated and removed, improving demulsibility.

- **Power Generation**
  - Steam & Gas Turbine
  - hydraulics & lubrication
- **Oil & Gas**
  - Compressor/Turbine hydraulics & lubrication
- **Pulp & Paper**
  - Lube oil
  - Hydraulics
- **Manufacturing**
  - Hydraulics
  - Lubrication
  - EDM
  - Injection molders
- **Others**
  - Cooking oil
  - Gear oil
  - Fuels
  - Bio fuels
  - Steel
  - Military



SMR Series

Balanced Charge Agglomeration (BCA™) - How the Technology Works



1. Particles are passed across high-voltage electrodes, inducing a charge on the particles (+) and (-) in separate paths.

2. Oppositely charged particles are mixed and are attracted to each other, forming larger particle clusters.

3. Particle clusters are more efficiently filtered.

Evaluation of the SMR Process - Actual Test Results

- Varnish is stripped from the hydraulic or lubrication system as fluid is processed through the SMR.
- The varnish is suspended in the hydraulic fluid as sub-micron particulate.
- BCA™ develops larger particles (see graphic above).
- The particulate is effectively removed from the hydraulic or lubrication fluid by high efficiency filters.

Result 1 | Result 2 | Result 3 | Result 4 | Result 5

Result 6 | Result 7 | Result 8 | Result 9 | Result 10

Results from a 10 month field trial

SMR Series

Features and Benefits

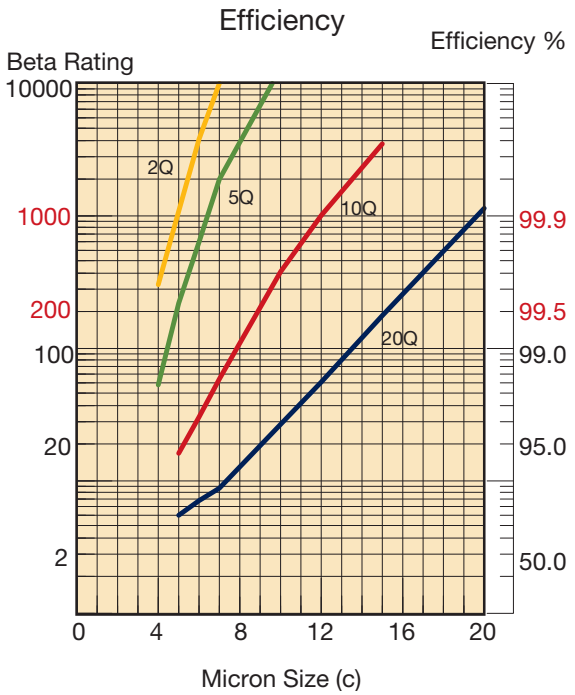
- Contaminant Removal to the Sub-Micron Level
- Prevention and Removal of Sludge and Varnish
- Removal of Oxidation Byproducts and Biological Contamination
- Removal of Ferrous and Non-Ferrous Contaminants

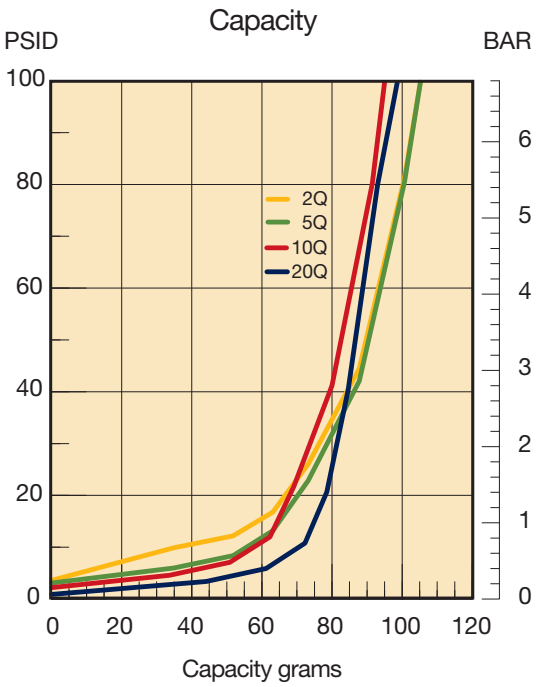
The Parker SMR Benefit

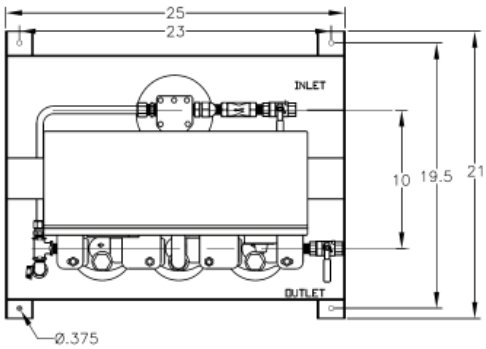
- Unmatched Fluid Purification & System Polishing
- Proven Varnish Removal
- PLC Control & Data Tracking
- OEM Approvals

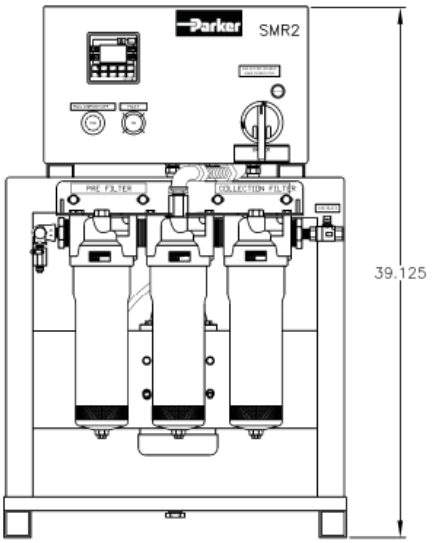
SMR2

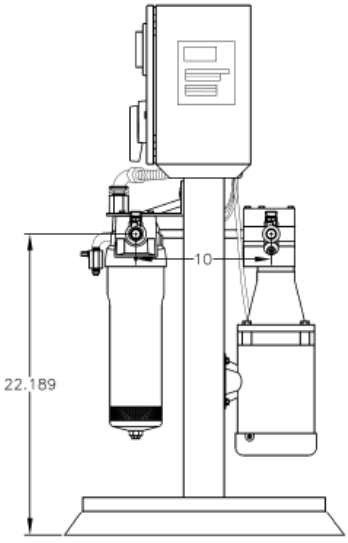
Element Performance











Dimensions are in inches.

Drawings are for reference only.
Contact factory for current version.

SMR2

Specifications

Fluid

Viscosity: 1,020 SUS (220 cSt) maximum
Maximum Pressure: 50/80 PSI (operating/static)
Minimum Fluid Temperature: 65° F (18° C)
Maximum Fluid Temperature: 200° F (93° C)
Minimum Fluid Flash Point: >140° F (60° C)

Power

Customer Provided
Voltage: 110VAC/1Ph/60Hz, 230VAC/3Ph/60Hz, 460VAC/3Ph/60Hz
Phase: 1/3
Frequency 60Hz

Motor

Power: 0.5 HP
Voltage/Ph/Freq: 0-230/460/3/variable
RPM: 0 to 2000

Pump

Positive Displacement - Variable Frequency Drive (VFD)
Design Flow Rate: 0.5 - 2.5 GPM

Parameter Settings			
Parameter	**Default**	Minimum	Maximum
Flow	**2 GPM [7.58 LPM]**	0.5 GPM [1.9 LPM]	2.5 GPM [9.45 LPM]
Shutdown Pressure	**70 psi [4.82 bar]**	0 psi/bar	75 psi [5.17 bar]
Max Operating Pressure	**50 psi [3.4 bar]**	0 psi/bar	60 psi [4.13 bar]
Min Operating Pressure	**0 psi [0.0 bar]**	0 psi/bar	5 psi [0.34 bar]
Maximum Temperature	**200° F [93.3°C]**	35° F [1.6°C]	200° F [93.3°C]
Minimum Temperature	**35° F [1.5°C]**	35° F [1.6°C]	200° F [93.3°C]
Upstream Filter Delta-P	**15 psi [1.0 bar]**	5 psi [0.34 bar]	25 psi [1.7 bar]
Downstream Filter Delta-P	**10 psi [0.67 bar]**	5 psi [0.34 bar]	25 psi [1.7 bar]
Auto-Restart after power loss	**OFF**	n/a	n/a
Auto-Restart after temperature shutdown	**OFF**	n/a	n/a
US or Metric units	**US**		

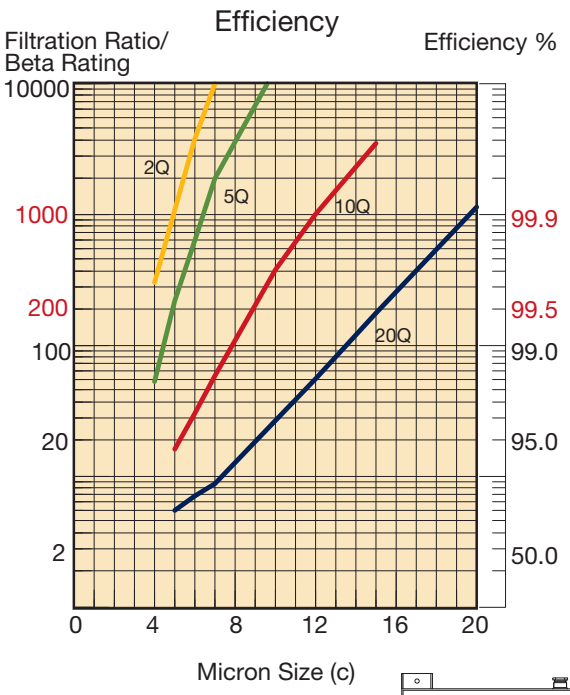
SMR2

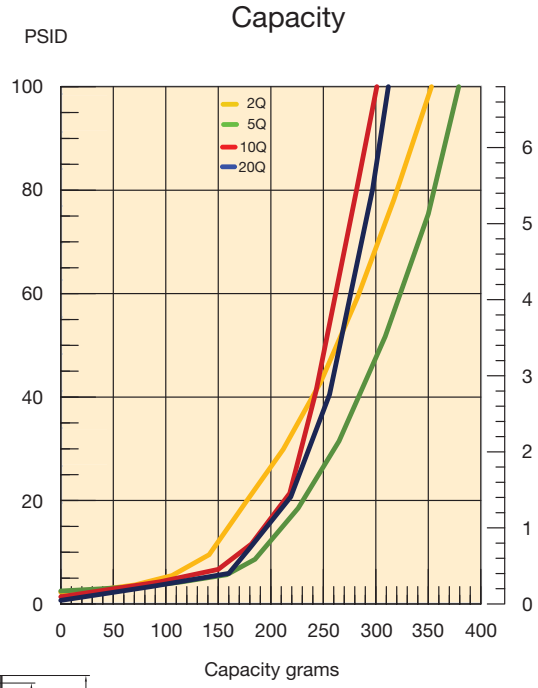
Parts List

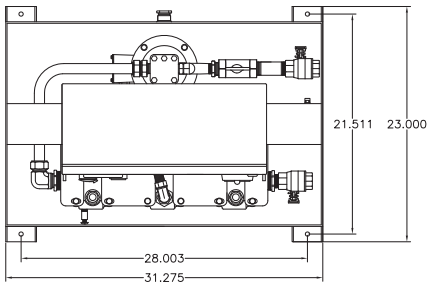
Quantity	Parker Part #	Description
1	165-00002	Drive, AC, A/B .5 HP 240V 1 PH
	165-00001	Drive, AC, A/B .5 HP 480V 3 PH
	165-00011	Drive, Line Filter, .5 HP 120V & 240V 1 PH
	165-00014	Drive, Line Filter, .5 HP 460V 3 PH
1	270-00006	PLC/HMI
1	275-00007	Power Supply, H.V.
1	275-00002	Power Supply, A/B 24V 110-240V
1	275-00006	Power Supply, C/H 24V 380-480V
1	290-00001	Relay, H.V., A/B
1	245-00006	Light Module, A/B, Green
1	245-00005	Light Module, A/B, Yellow
1	250-00005	Motor, .5 HP, 230-380 STD
1	280-00014	Pump/Bypass, 2 GPM, STD
1	255-00016	O-Ring, vessel 1, 2 or 3
1	936623Q	5 Micron Filter, Upstream
1	936622Q	2 Micron Filter, Downstream
1	195-00003	Feedthru, H.V.
4	350-00001	Transducer, pressure

SMR10

Element Performance

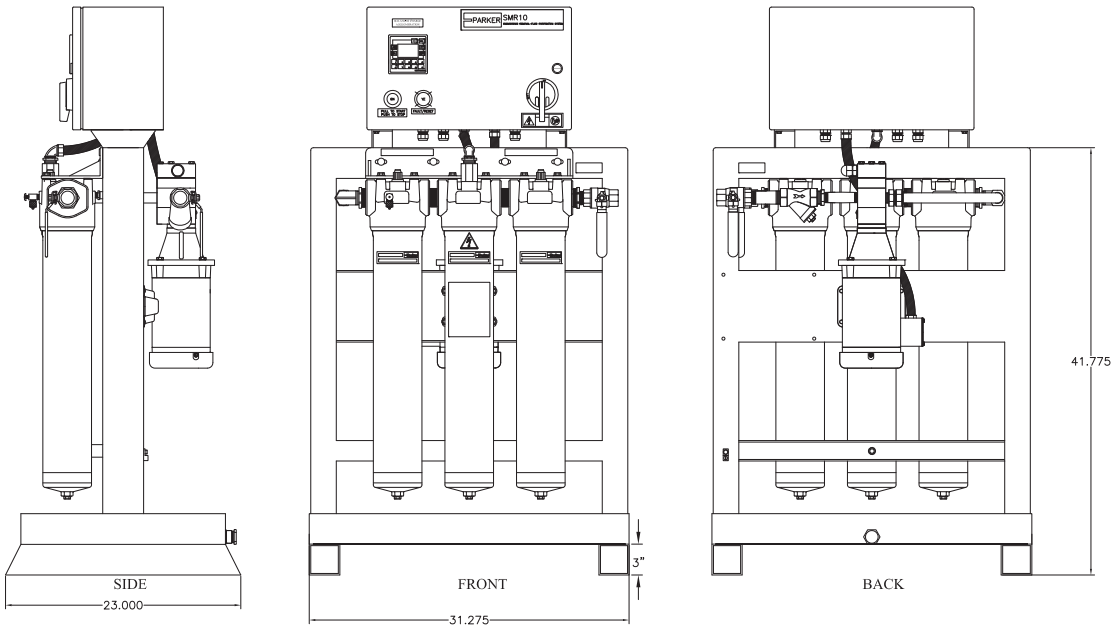






Dimensions are in inches.

Drawings are for reference only.
Contact factory for current version.



SMR10

Specifications

Fluid

Viscosity: 1,020 SUS (220 cSt) maximum
Maximum Pressure: 50/80 PSI (operating/static)
Minimum Fluid Temperature: 65° F (18° C)
Maximum Fluid Temperature: 200° F (93° C)
Minimum Fluid Flash Point: >140° F (60° C)

Power

Customer Provided
Voltage: 110VAC/1Ph/60Hz, 230VAC/3Ph/60Hz, 460VAC/3Ph/60Hz
Phase: 1/3
Frequency 60Hz

Motor

Power: 0.5 HP
Voltage/Ph/Freq: 0-230/460/3/variable
RPM: 0 to 2000

Pump

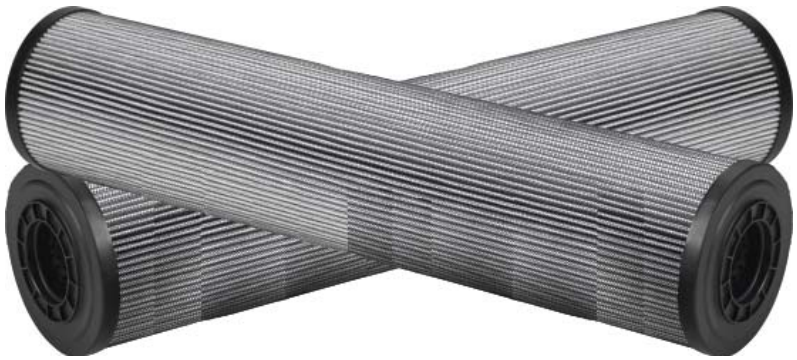
Positive Displacement - Variable Frequency Drive (VFD)
Design Flow Rate: 2.5 - 10 GPM

Parameter Settings			
Parameter	**Default**	Minimum	Maximum
Flow	**10 GPM [37.9 LPM]**	2.5 GPM [9.45 LPM]	10 GPM [37.85 LPM]
Shutdown Pressure	**70 psi [4.82 bar]**	0 psi/bar	75 psi [5.17 bar]
Max Operating Pressure	**50 psi [3.4 bar]**	0 psi/bar	60 psi [4.13 bar]
Min Operating Pressure	**0 psi [0.0 bar]**	0 psi/bar	5 psi [0.34 bar]
Maximum Temperature	**200°F [93.3°C]**	35°F [1.6°C]	200°F [93.3°C]
Minimum Temperature	**35°F [1.5°C]**	35°F [1.6°C]	200°F [93.3°C]
Upstream Filter Delta-P	**15 psi [1.0 bar]**	5 psi [0.34 bar]	25 psi [1.7 bar]
Downstream Filter Delta-P	**10 psi [0.67 bar]**	5 psi [0.34 bar]	25 psi [1.7 bar]
Auto-Restart after power loss	**OFF**	n/a	n/a
Auto-Restart after temperature shutdown	**OFF**	n/a	n/a
US or Metric units	**US**		

SMR10

Parts List

Quantity	Parker Part #	Description
1	165-00002	Drive, AC, A/B .5 HP 240V 1 PH
	165-00001	Drive, AC, A/B .5 HP 480V 3 PH
	165-00011	Drive, Line Filter, .5 HP 120V & 240V 1 PH
	165-00014	Drive, Line Filter, .5 HP 460V 3 PH
1	270-00006	PLC/HMI
1	275-00007	Power Supply, H.V.
1	275-00002	Power Supply, A/B 24V 110-240V
1	275-00006	Power Supply, C/H 24V 380-480V
1	290-00001	Relay, H.V., A/B
1	245-00006	Light Module, A/B, Green
1	245-00005	Light Module, A/B, Yellow
1	250-00005	Motor, .5 HP, 230-380 STD
1	280-00014	Pump/Bypass, 2 GPM, STD
1	255-00016	O-Ring, vessel 1, 2 or 3
1	933219Q	5 Micron Filter, Upstream
1	933218Q	2 Micron Filter, Downstream
1	195-00003	Feedthru, H.V.
4	350-00001	Transducer, pressure



SMR Series

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
SMR	2	460	20QE	V	M2	X	N08	MS

BOX 1: Basic Assembly	
Symbol	**Description**
SMR	Submicronic Filtration System

BOX 2: Flow Rate	
Symbol	**Description**
2	2 GPM (7.6 LPM)
10	10 GPM (38 LPM)

BOX 3: Power	
Symbol	**Description**
120	120VAC, 1Ph, 60Hz
230	230VAC, 3Ph, 60Hz
380	380VAC, 3Ph, 50Hz
460	460VAC, 3Ph, 60Hz
575	575VAC, 3Ph, 60Hz

BOX 4: Element Media[1]	
Symbol	**Description**
	SMR2
02QE	Ecoglass III, 2 micron
05QE	Ecoglass III, 5 micron
10QE	Ecoglass III, 10 micron
20QE	Ecoglass III, 20 micron
	SMR10
02Q	Microglass III, 2 micron
05Q	Microglass III, 5 micron
10Q	Microglass III, 10 micron
20Q	Microglass III, 20 micron

BOX 5: Seals	
Symbol	**Description**
V	Fluorocarbon (FKM)
E	Ethylene Propylene (EPR)

BOX 6: Indicator	
Symbol	**Description**
P	No Indicator
M2	Analog Visual Indicator

BOX 7: Bypass	
Symbol	**Description**
X	No Bypass

BOX 8: Ports	
Symbol	**Description**
	SMR2
N08	½" NPT threaded ports
	SMR10
N16	1" NPT threaded ports

BOX 9: Options	
Symbol	**Description**
SS	Stainless steel wetted parts
EXP	Explosion proof (Class 1, Div. 2, Gp. C & D)
MS	Moisture Sensor
PD[2]	Particle Detector
PDM[2]	Particle Detector with Moisture Sensor

Note:

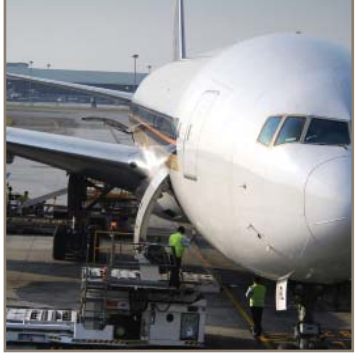
1. **Outlet polishing filter is always fitted with 02QE/02Q element.**

2. **icountPD not available when EXP option is selected.**

Replacement Elements

Note: "CF" = Consult Factory

SMR2			SMR10		
Ecoglass III Media	Fluorocarbon	Ethylene Propylene	Microglass III Media	Fluorocarbon	Ethylene Propylene
02QE	936622Q	940848Q	**02Q**	933218Q	CF
05QE	936623Q	940847Q	**05Q**	933219Q	CF
10QE	936720Q	940846Q	**10Q**	933220Q	CF
20QE	936721Q	940845Q	**20Q**	933221Q	CF



aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding

Guardian®

Portable Filtration System

Parker

ENGINEERING YOUR SUCCESS.

Ground Support

Hydraulic Service

Mining

The Guardian portable filtration system is a unique pump/motor/filter combination designed for conditioning and transferring petroleum-based and water emulsion fluids. It protects your system from contamination added with new fluid because new fluid is not necessarily clean fluid. Most new fluids right out of the drum are unfit for use due to high initial concentrations of contaminants. Contamination may be added to a new fluid during processing, mixing, handling, and storage.

The Guardian also circulates and “polishes” fluid in your existing systems to reduce the contamination to an acceptable level.

There are literally hundreds of applications that the Guardian is suited for, with more being discovered each day. If your system is sensitive to the harmful effects of contamination, then the Guardian may be ideal for you.

Features	Advantages	Benefits
Lightweight, hand held, compact design (less than 24 lbs 16" X 8" approximate foot print).	Easy to carry and fits easily on top of 55 gallon drums.	One person operation, capable of getting to hard to reach areas.
Flow rate to 4 gpm.	Filters and transfers simultaneously.	One step operation.
Powerful pump/motor combination with Carboxylated Nitrile seals standard.	Handles fluids up to 16,000 SUS viscosity (11,000 SUS -24 VDC).	Reliable performance in a wide variety of operating conditions.
Built-in relief valve with no downstream fluid bypass.	Only filtered fluid reaches downstream components.	100% filtration ensured, even when unattended.
Wide variety of filter elements available.	High capacity 2 micron absolute disposable microglass to 74 micron cleanable wire and water removal.	Maximizes element life between changes.
Clear, wire-reinforced 5' hose assemblies with wand attachments.	No additional hardware required.	Ready to use and easy to maneuver.
Optional quick disconnect hose connections.	Fast, easy setup and tear-down.	Eliminates messy drips.
Heavy-duty ¼ HP, 115 VAC (230 VAC, 24 VDC- optional) motor with thermal overload protection.	UL recognized and CSA listed, with replaceable brushes.	Safe, reliable performance; field serviceable.
Geroter pump with visible serviceable inlet strainer.	Dirt tolerant design with added protection.	Pump reliability in highly contaminated fluids.
Quiet operation.	Less than 70dB noise level @ 3 feet.	Can be used most anywhere with minimal disturbance.
Convenient inlet-to-outlet hose connection.	Contains fluids when transporting.	Clean and safe operation.
Low center of gravity.	Guardian stability.	Unattended reliability.
Dual motor seals.	Added motor protection.	Longer motor life.
Auxiliary inlet/outlet ports.	Used in place of, or in addition to, standard ports. The outlet can also be used as a sampling port.	Flexibility.

Mobile

Industrial

Marine

Guardian Series

Installation and Specification Data

Maximum Allowable Operating Pressure (MAOP): 50 psi (3.4 bar)

Flow Capacity: Up to 4 gpm (15 lpm)

Maximum Recommended Fluid Viscosity: (.85 specific gravity)

110-120 VAC and 220-240 VAC	16,000 SUS
24VDC	**11,000 SUS**

Warning: Explosion hazard. Do not pump flammable liquids such as gasoline, alcohol, solvents, etc.

Operating Temperatures:
Unit: -15°F to 180°F (-26°C to 82°C)
Wand/Hose: 25°F to 120°F (-4°C to 49°C)

Visual Indicator: Differential pressure type, set at 25 psid

Recommended Fluids: petroleum based oils, water emulsions, and diesel fuels

Integral Relief Valve: set at 50 psi for motor protection.

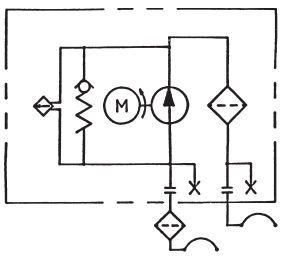
Noise Level: <70db at 3 ft.

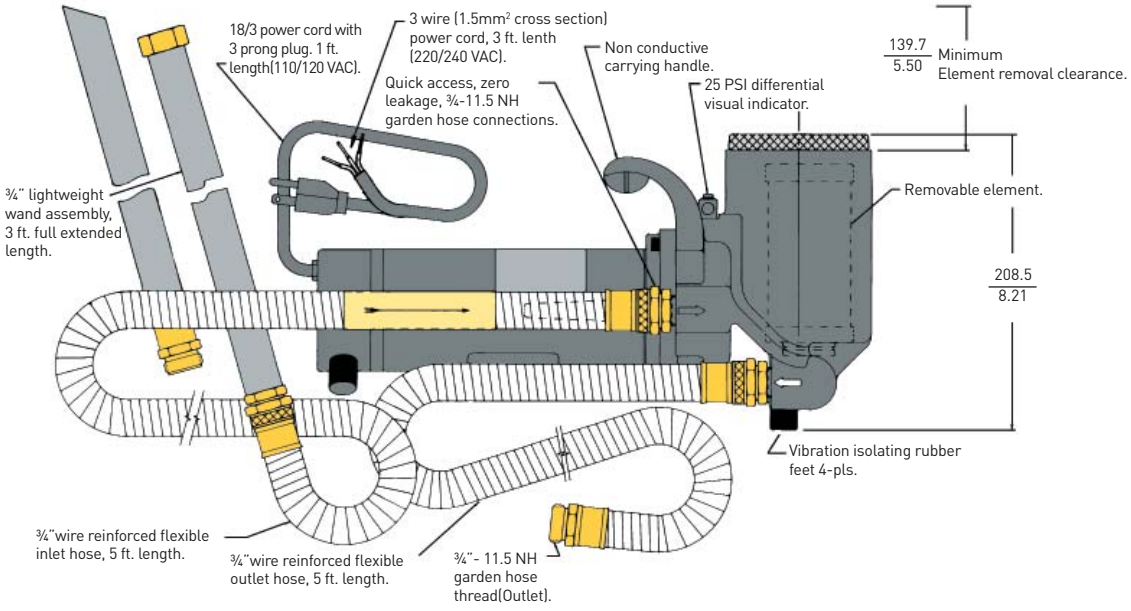
Electrical Motor: ¼ hp@2500 rpm.
24 VDC; 10A max.
110-120 VAC; 50/60 Hz; 3A max.
220-240 VAC; 50/60 Hz; 1.5A max.
Thermal overload protected.
Replaceable brushes (500 hours).

Weight: approximately 23 lbs. 5 oz.

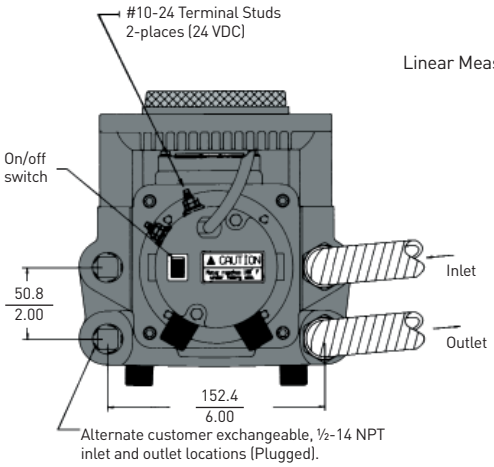
Materials:
Housing: cast aluminum
Cover: die cast aluminum
Handle and Indicator: nylon
Wands and Hose: PVC
Fittings: brass
Seals: fluorocarbon/ carboxylated nitrile

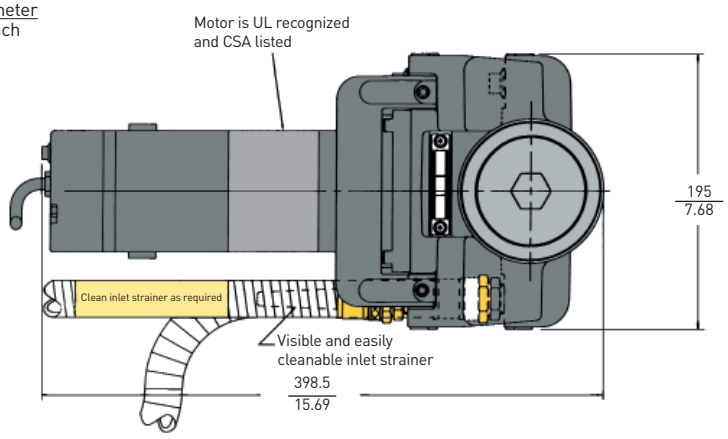
Guardian Schematic





Linear Measure: millimeter / inch





Guardian Series

Element Performance

Media Code	Filter Media	Time Averaged Beta x/y/z =2/20/75 Where x/y/z is:	Dirt Capacity (Grams)
74W	Woven Wire	74 micron[1]	*
40W	Woven Wire	40 micron[1]	*
25W	Woven Wire	25 micron[1]	*
20C	Cellulose	20 micron[1]	*
10C	Cellulose	5/8/16	4
20Q	Microglass III	7.1/13.7/17.3	16.2
10Q	Microglass III	2.7/7.3/10.3	14.4
05Q	Microglass III	<2/2.1/4.0	14.9
02Q	Microglass III	<2/<2/<2	14.3

Multipass test run at 4 gpm to 35 psid

[1]Reference ratings only. Not multipass tested due to coarseness.

* Not applicable

Beta Rating	Efficiency at x Particle Size
$B_x = 2$	50.0%
$B_x = 20$	95.0%
$B_x = 75$	98.7%
$B_x = 200$	99.5%
$B_x = 1000$	99.9%

Estimated Guardian Element Life and Cleanliness Levels

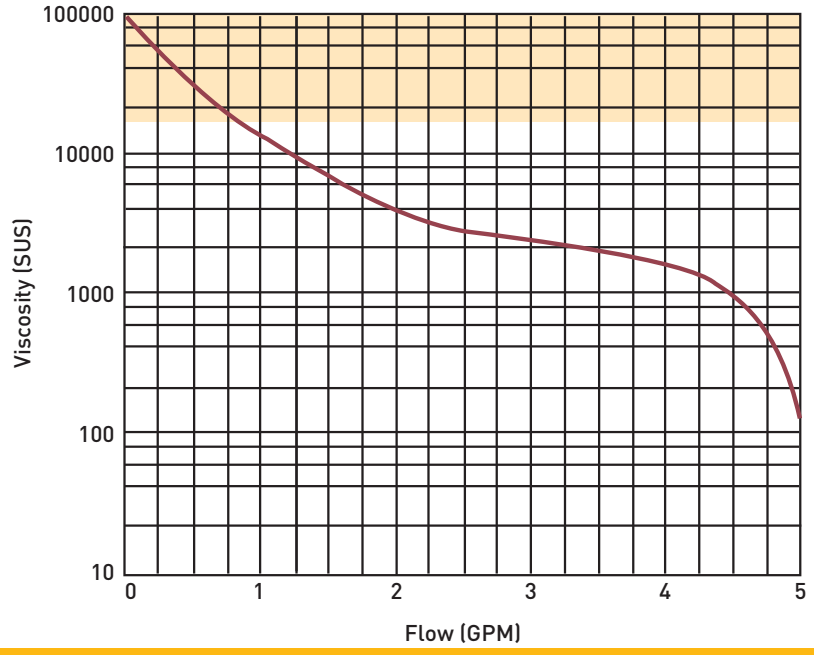
The following chart shows typical element life (in gallons of oil passed) and cleanliness levels achieved by standard Parker elements available with the Guardian. Some assumptions have been made.*

Media Code	New Oil ISO	ISO Achieved	Element Life	Elements Used per 250 gallons
10C	22/20/16	21/19/15	120 gallons	2.08
20Q	22/20/16	21/19/15	486 gallons	.51
10Q	22/20/16	19/16/14	407 gallons	.61
05Q	22/20/16	17/15/12	330 gallons	.75
02Q	22/20/16	15/13/10	316 gallons	.79

* 1. New oil is at ISO 22/20/16.
2. No environment or work ingression.
3. Single pass oil transfer.

NOTE: Data for fluid transfer only. For continuous fluid polishing, lower ISO cleanliness levels will be achieved.

Guardian Flow vs. Viscosity Performance



Note 1: Guardian not recommended for fluid viscosities greater than 16,000 SUS (11,000 SUS;24VDC)

Note 2: Flows based on Guardian with no element installed

Guardian Operation

A. Remove all shipping plugs from the hoses and fittings.
B. Connect the inlet and outlet hose assemblies to the unit.
C. Connect the wand assemblies, if required.
D. Place the inlet hose wand assembly into the fluid to be filtered and/or transferred.
E. Place the outlet hose/wand assembly into the container where the fluid discharge is desired.
F. Plug in the unit.
G. Flip the switch on the end of the unit to the “on” position.

NOTE: For no-mess transportation, the inlet and outlet hose assemblies can be screwed together by removing the wand assembly.

Guardian Element Servicing

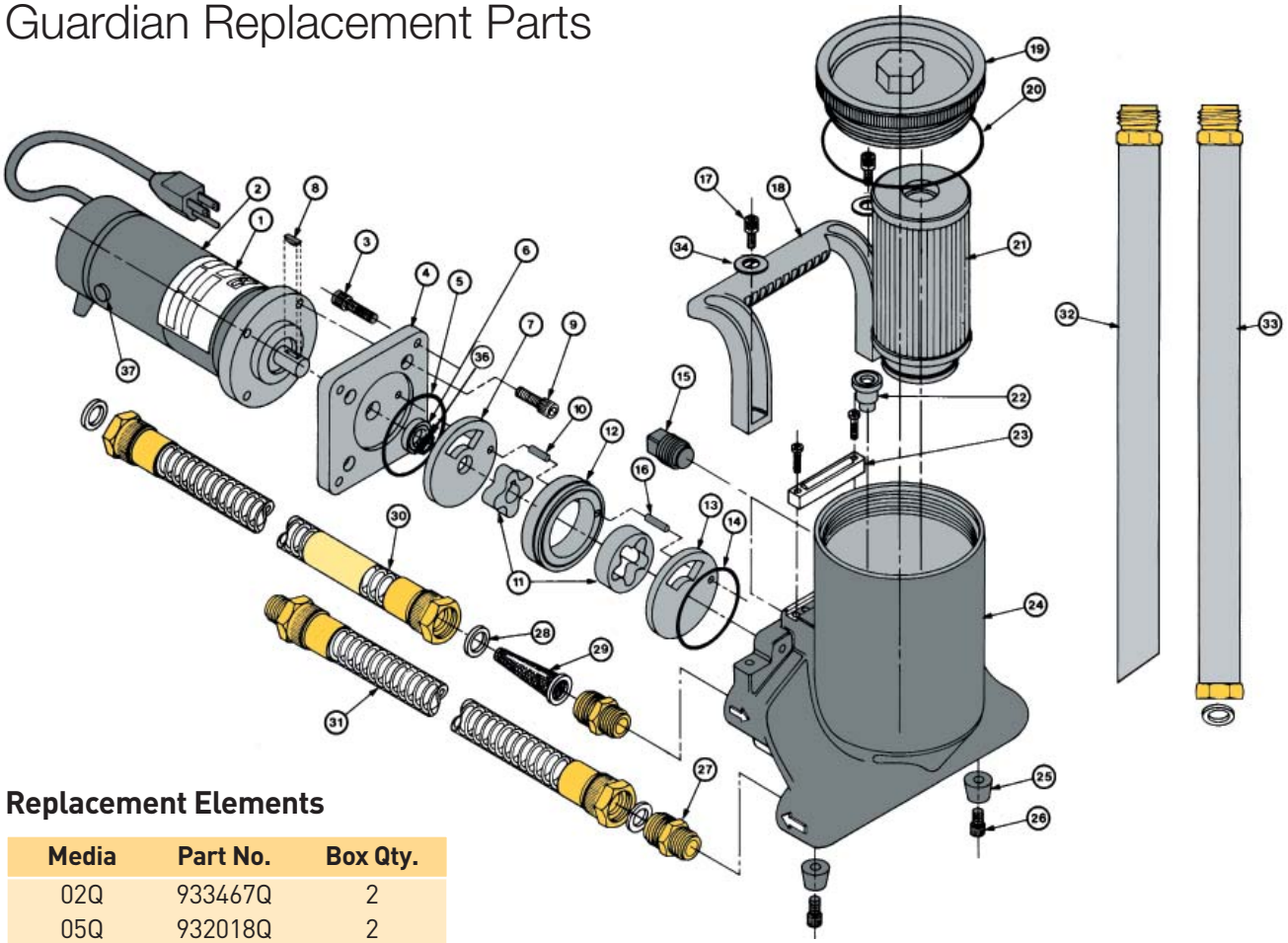
A. Flip the switch on the end of the unit to the “off” position and disconnect the electrical plug.
B. Rotate the cover counter-clockwise and remove.
C. Remove the element from the housing. Discard all disposable elements. These elements are not cleanable,
D. Place the new element In the housing, fitting the o-ring neck into the large hole at the bottom.
E. Inspect the cover o-ring and replace if necessary.
F. Replace the cover and hand-tighten.

NOTE 1: It is recommended that the Guardian be cleaned and flushed between uses with dissimilar fluids to prevent fluid mixing.
NOTE 2: Motor brushes may require changeout every 500 service hours

Troubleshooting Guide

Problem	Cause	Solution
Does not start.	ON/OFF switch. No electrical power. Rectifier. Motor overheats (160°F). Defective motor.	Turn switch on, replace switch if defective. Plug in Guradian, check for tripped circuit breakers, check for blown fuses. Replace if defective. Allow motor to cool, thernal overload will automatically reset. Replace motor.
Does not start or errattic motor noise.	Worn motor brushes.	Replace motor brushes.
Intermittent start.stop oeration.	High viscosity fluids. Worn motor brushes. Defective motor.	High viscosity fluids can cause the motor to overheat and cycle intermittently. Replace motor grushes. Replace motor.
Hot motor.	Pumping under heavy load. Defective motor.	It is normal, under a heavy pumping load for the motor to reach 160°F. Replace motor if shell temperature reaches greater than 170°F.
No flow or erratic pump noise.	Filter housing not filled with oil. Suction leak. Obstructed outlet. Element dirty. Sheared pump key. Defective Guardian.	Allow Guardian to run a few seconds. Check tghtness of inlet fittings and hoses. Check gaskets are in place and are not damaged. Kink or restriction in the inlet hose. Clear outlet. Replace or clean element. Replace woodruff key. Replace unit.
No flow, erratic pump noise, motor overheats.	Gears binding.	Disassemble Guardian and throroughly clean the gear set. Always use the inlet strainer provided to protect the unit. Replace defective gears.
No suction.	Plugged strainer.	Clean or replace the inlet strainer as required. Clean relief valve. Check for damaged internal o-rings.
Reduced oil flow.	High viscosity fluids. Element dirty. Relief valve sticks or is lodged open. Partially obstructed inlet or outlet hose. Suction leak. Worn gears.	High viscosity fluids can cause reduced flow, which is normal. Replace or clean element. Clean releif valve or replace if defective. Clear the hose obstruction. Check tightness of inlet fittings and hose. Replace gear set.
Indicator moves to RED Area.	Element dirty. Oil extremely cold or viscous. Obstruced outlet. Defective indicator.	Replace or clean element. Change element to coarser micron rating. Clear outlet obstruction. Replace indicator.
Indicator dows not seem to move.	No element. Defective indicator.	Install element. Replace indicator.
Joses discolor or are hard.	Fluid compatibility.	Certain fluids, over time, will cause the hoses to discolor. This does not impair their performance. But, some fluids will cause the hoses to become brittle, requiring replacement.
Oil formation under unit.	Defective shaft seal.	Replace the motor shaft seal.

Guardian Replacement Parts



Replacement Elements

Media	Part No.	Box Qty.
02Q	933467Q	2
05Q	932018Q	2
10Q	932017Q	2
20Q	933468Q	2
10C	932016	2
20C	932020	2
25W	922627	1
40W	922628	1
74W	922626	1
WR	932019	2

Parts List

1. Label. . . . . Consult Factory
2. Motor, 110-120 VAC 931913
220-440 VAC. 932381
24 VDC. 932759
3. SHCS(4),¼-20x1 902734
4. Adapter Plate 931890
5. Housing O-Ring V72041
6. Polypak Seal 931921
7. Shadow Plate 931899
8. Woodruff Key ⅛ x ⅜ 931877
9. SHCS(4), ¼-20 x ¾ 902679
10. Roll Pin ⅛ x ¾ 903630
11. Geroter Set 931873
12. Geroter Ring 931903
13. Outlet Plate 931900
14. Geroter O-ring V72135
15. Brass Pipe Plug (2) ½-14. 931920
16. Roll Pin ⅛ x ⅝ 903426
17. SHCS (2), ¼-20 x ⅝ 931889
18. Handle 931897
19. Cover 931892
20. Cover O-Ring. V72237
21. Element . . . . . .
22. Relief Valve 928981
23. Indicator Kit. 927422
24. Housing 931838
25. Rubber Bumpers (2) 931888
26. SHCS(2), ¼-20 x ½ 902907
27. Brass Fitting (2) 931928
28. Gasket (4). 931956
29. Inlet Screen. 931927
30. Inlet Hose Assembly 931936
31. Outlet Hose Assembly 931937
32. Wand Crevice Assembly 931965
33. Wand Adapter Assembly 931966
34. Washer (2) 926106
35. Quick Disconnect Kit 932097
(Not Shown)
36. Washer. 932085
37. Brush Kit (110/120) 934329
(220/240 VAC) 934327
(24 VDC) 932761
Seal Kit 932263
Bowl Extension Kit 932081

NOTE: SHCS denotes "socket head cap screw"

Guardian Series

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
	GT4	10C	1

BOX 1: Seals	
Symbol	**Description**
None	**Carboxylated Nitrile (Standard)**
Note: Consult factory for fluids not compatible with fluorocarbon.	

BOX 2: Model	
Symbol	**Description**
GT4	**Guardian® 110/120 VAC**
GT4D	24VDC
GT4E	220/240 VAC

BOX 3: Media	
Symbol	**Description**
74W	Wire Mesh
40W	Wire Mesh
25W	Wire Mesh
10C	**Cellulose**
20Q	Microglass III
10Q	Microglass III
05Q	Microglass III
02Q	Microglass III
WR	Water Removal

BOX 4: Options	
Symbol	**Description**
1	**None**
6	Quick disconnect hose connections

Please note the bolded options reflect standard options with a reduced lead-time. Consult factory on all other lead-time options.

aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding

Portable Purification Systems

Models PVS 185, 600, 1200, 1800, 2700

Parker

ENGINEERING YOUR SUCCESS.

PVS Series

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.

Typical Saturation Points

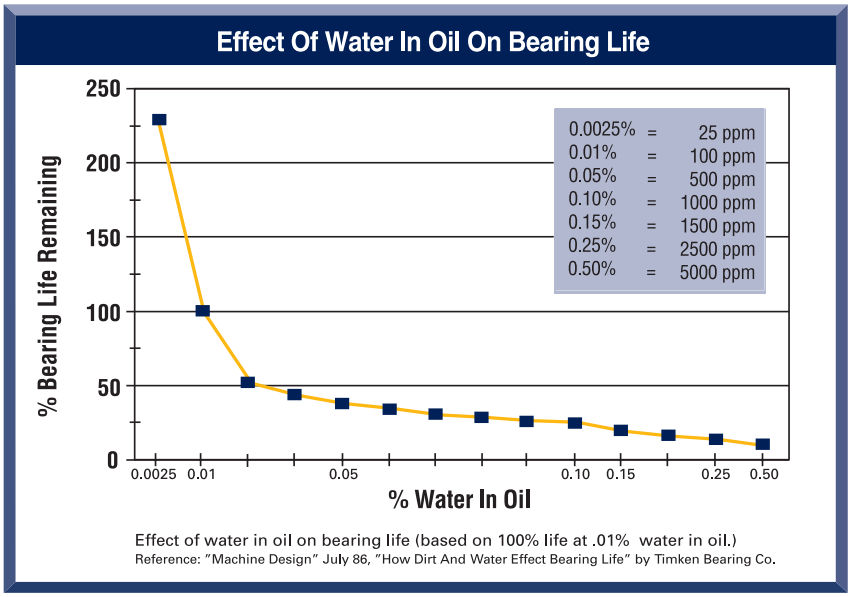
Fluid Type	PPM	%
Hydraulic Fluid	300	.03%
Lubrication Fluid	400	.04%
Transformer Fluid	50	.005%

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

Free water occurs when oil becomes saturated and cannot hold any more water. This water is usually seen as cloudy oil or puddles of water at the bottom of an oil reservoir. Water which is absorbed into the oil is called dissolved water. At higher temperatures, oil has the ability to hold more water in the dissolved stage due to the expansion of oil molecules. As the oil cools, this ability reverses and free water will appear where not visible before. In addition to temperature, fluid type also determines the saturation point for your system (see chart above).



Effect of water in oil on bearing life (based on 100% life at .01% water in oil.)
Reference: "Machine Design" July 86, "How Dirt And Water Effect Bearing Life" by Timken Bearing Co.

PVS Series

Applications

- Hydraulic Systems
- Lubrication Systems
- Turbine Oil
- Transformer Oil
- New Oil (oil storage)
- Seal Oil
- Explosion Proof Environments

NEMA 7 Explosion Proof

Markets

- Power Generation
- Pulp and Paper
- Primary Metals
- Mining
- Plastic Injection Molding
- Oil Exploration
- Petrochemical
- Automotive
- Aerospace
- Refineries
- Transportation

Standard Features	Advantages	Benefits
Variable flow circuit	• Allows oil to heat more quickly so water is removed faster	• Time savings
Moisture sensor	• Real-time water content indication in % saturation	• At-a-glance visual confirmation
Automatic operation	• Unattended use • Designed for 24/7 operation	• Reduces labor costs • Increases operation time
316 Stainless steel used for primary wetted surfaces	• No corrosion	• Product reliability
Ecoglass particulate element	• Coreless, non-metallic construction	• Environmentally friendly, easy disposal
Clear plexiglass covers on the condensate tank and vacuum chamber	• See the vacuum dehydration process work	• Visual verification of water removal
Desiccant breather	• Insures dry, clean intake air	• More efficient operation
Reverse phase switch	• Enables easy changing of motor rotation if out-of-phase	• Ease of maintenance • Prevents incorrect rotation
Condensate holding tank with optional auto drain	• Large volume for infrequent servicing intervals	• Reduces maintenance costs
Programmable thermostat	• Maintains oil within 1°F • Prevents overheating the oil	• Unattended operation
Forklift guides and lifting eyes	• Provides safe and secure method of lifting the unit	• Employee safety
Coalescing or packed tower oil dispersal elements	• Flexibility with various fluid viscosities	• Greater efficiency in removing moisture

PVS Series

Vacuum Dehydration Performance

Potential Contaminant	PVS Performance
Solid particulate	ISO Cleanliness Code* 14/13/10 Attainable
Water	Removes 100% of free water, 90% of dissolved water
Air/Gases	Removes 100% of free air and gases, 90% of dissolved air and gases

When utilizing 02Q media.

Typical Performance	
Tank Size	60 Gallons (227 liters)
Run Time	62 minutes
Parker Model	PVS 600 (10 GPM)
Water Content (ppm)	Start: 10,000 PPM (1.0%) Stop: 50 PPM (0.005%)
Contamination Level	Start: ISO 21/18/16 Stop: ISO 16/14/11

Start Stop

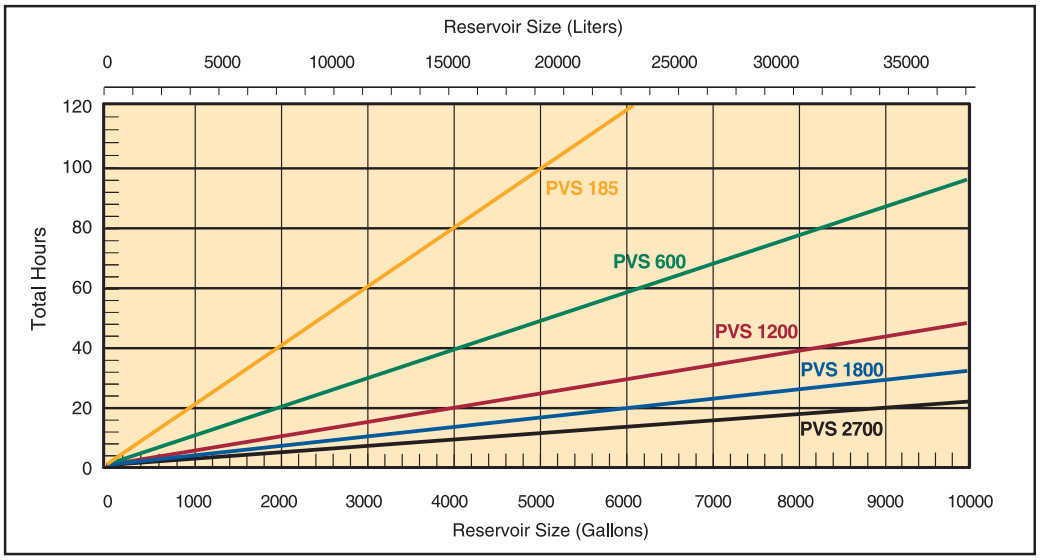
PVS (Vacuum Dehydration) Compared to Other Technologies

Centrifuge units – Removes free water only; has difficulty breaking stable emulsions; larger envelope dimensions but lower flows; higher initial and operating costs.

Desiccant units – Have limited water removal capability due to absorbing material; only removes air ingressed particles; expensive compared to the volume of water removed.

Coalescer units – Removes free water only; has difficulty breaking stable emulsions; does not work well in viscous fluids (>100 sus); much larger in size compared to PVS.

Estimated Water Removal Time
5000 ppm (0.5%) to 150 ppm (0.015%)



PVS 185 Series

Specifications

Flow rate	5 gpm (18.9 lpm)
Dimensions	65" H x 33" W x 48" L
	(1651mm x 838mm x 1219mm)
Weight	650 lbs. (295 kg)
Seal material	Fluorocarbon (EPR optional)
Condensate tank	4.1 gal (15.5 ltrs)
Dispersal elements	1
Minimum operating capacity	5 gal (18.9 ltrs)
Vacuum (max)	25 In/Hg
Viscosity (max)	500 sus (108 cSt)-Disposable
	2150 sus (460 cSt)-Packed Tower
Outlet pressure (max)	60 psi (4.1 bar)
Ports	3/4" JIC (male) inlet
	3/4" JIC (male) outlet
FLA (full load amps)	15-41 amps
	(Depending on options & voltages)
Shipping Weight	1400 lbs. (635 kg) maximum
Shipping Dimensions	70" H x 48" W x 60" L
	(1778mm x 1219mm x 1524mm)

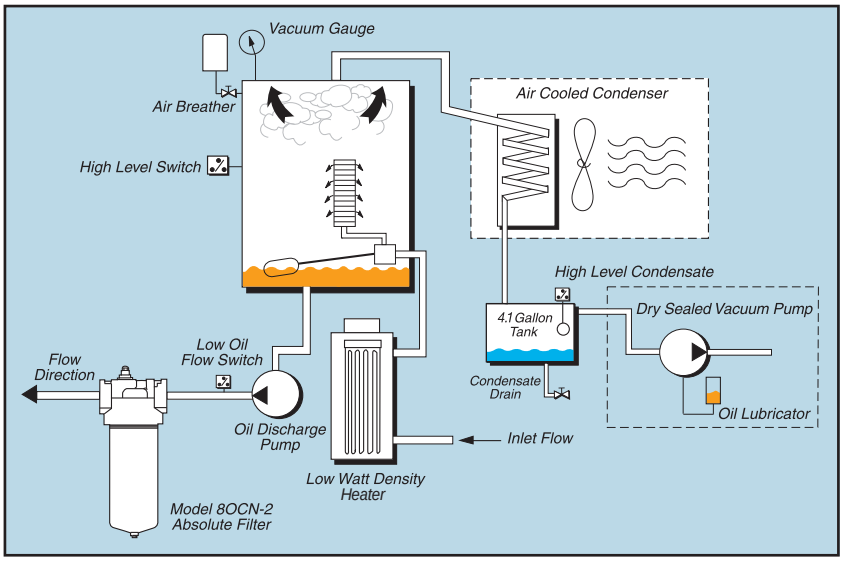
UL and CUL Marked

Note: Dimensions and weights are approximate and for reference only.

Replacement Elements

Standard Coreless Particulate (80CN-2)	
02QE (2 micron)	936716Q
05QE (5 micron)	936717Q
10QE (10 micron)	936718Q
20QE (20 micron)	936719Q
Optional Coreless Particulate (IL8-3)	
02QE (2 micron)	933734Q
05QE (5 micron)	933612Q
10QE (10 micron)	933735Q
20QE (20 micron)	933736Q
Dispersal	
Disposable (Coalescing)	933180
Packed tower (Cleanable)	933553

PVS 185 Flow Diagram



PVS 600 Series

Specifications

Flow rate	10 gpm (37.9 lpm)
Dimensions	65" H x 33" W x 48" L (1651mm x 838mm x 1219mm)
Weight	900 lbs. (408.2 kg)
Seal material	Fluorocarbon (EPR optional)
Condensate tank	4.1 gal (15.5 ltrs)
Dispersal elements	2
Minimum operating capacity	6 gal (22.7 ltrs)
Vacuum (max)	25 In/Hg
Viscosity (max)	500 sus (108 cSt)-Disposable 2150 sus (460 cSt)-Packed Tower
Outlet pressure (max)	60 psi (4.1 bar)
Ports	1" JIC (male) inlet 1" JIC (male) outlet
FLA (full load amps)	24-38 amps (Depending on options & voltages)
Shipping Weight	1500 lbs. (680 kg) maximum
Shipping Dimensions	70" H x 48" W x 60" L (1778mm x 1219mm x 1524mm)

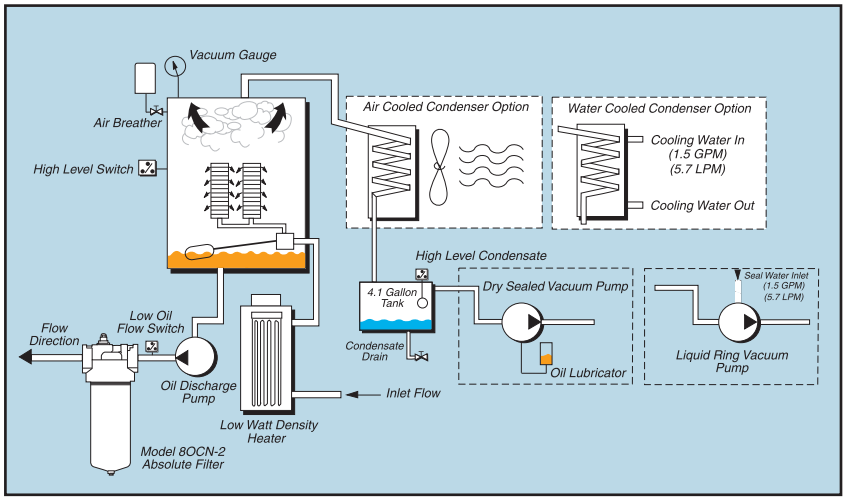
Note: Dimensions and weights are approximate and for reference only.

UL and CUL Marked

Replacement Elements

Standard Coreless Particulate (80CN-2)	
02QE (2 micron)	936716Q
05QE (5 micron)	936717Q
10QE (10 micron)	936718Q
20QE (20 micron)	936719Q
Optional Coreless Particulate (IL8-3)	
02QE (2 micron)	933734Q
05QE (5 micron)	933612Q
10QE (10 micron)	933735Q
20QE (20 micron)	933736Q
Dispersal	
Disposable (Coalescing)	933180
Packed tower (Cleanable)	933553

PVS 600 Flow Diagram



PVS 1200 Series

Specifications

Flow rate	20 gpm (75.7 lpm)
Dimensions	65" H x 44" W x 61" L
	(1651mm x 1118mm x 1549mm)
Weight	1550 lbs. (703 kg)
Seal material	Fluorocarbon (EPR optional)
Condensate tank	8.3 gal (31.4 ltrs)
Dispersal elements	4
Minimum operating capacity	11 gal (41.6 ltrs)
Vacuum (max)	25 In/Hg
Viscosity (max)	500 sus (108 cSt)-Disposable
	2150 sus (460 cSt)-Packed Tower
Outlet pressure (max)	60 psi (4.1 bar)
Ports	1½" JIC (male) inlet
	1" JIC (male) outlet
FLA (full load amps)	30-48 amps
	(Depending on options & voltages)
Shipping Weight	2300 lbs. (1043 kg) maximum
Shipping Dimensions	70" H x 48" W x 65" L
	(1778mm x 1651mm x 1524mm)

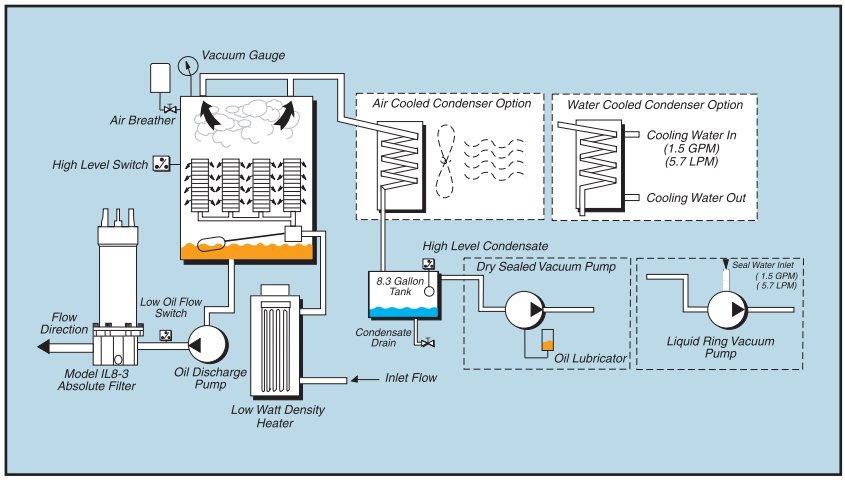
Note: Dimensions and weights are approximate and for reference only.

UL and CUL Marked

Replacement Elements

Standard Coreless Particulate (IL8-3)	
02QE (2 micron)	933734Q
05QE (5 micron)	933612Q
10QE (10 micron)	933735Q
20QE (20 micron)	933736Q
Dispersal	
Disposable (Coalescing)	933180
Packed tower (Cleanable)	933553

PVS 1200 Flow Diagram



PVS 1800 Series

Specifications

Flow rate	30 gpm (113.6 lpm)
Dimensions	68” H x 42” W x 75” L (1727mm x 1067mm x 1905mm)
Weight	2550 lbs. (1157 kg)
Seal material	Fluorocarbon (EPR optional)
Condensate tank	8.3 gal (31.4 ltrs)
Dispersal elements	8
Minimum operating capacity	18 gal (68.1 ltrs)
Vacuum (max)	25 In/Hg
Viscosity (max)	500 sus (108 cSt)-Disposable 2150 sus (460 cSt)-Packed Tower
Outlet pressure (max)	60 psi (4.1 bar)
Ports	2" JIC (male) inlet 1.5" JIC (male) outlet
FLA (full load amps)	40-65 amps @ 460 V/60hz
Shipping Weight	3000 lbs. (1361 kg) maximum
Shipping Dimensions	70” H x 48” W x 80” L (1778mm x 1219mm x 2032mm)

Note: Dimensions and weights are approximate and for reference only.

Replacement Elements

Standard Coreless Particulate (IL8-3)	
02QE (2 micron)	933734Q
05QE (5 micron)	933612Q
10QE (10 micron)	933735Q
20QE (20 micron)	933736Q
Dispersal	
Disposable (Coalescing)	933180
Packed tower (Cleanable)	933553

UL and CUL Marked

PVS 2700 Series

Specifications

Flow rate	45 gpm (170.3 lpm)
Dimensions	65" H x 42" W x 75" L (1727mm x 1067mm x 1905mm)
Weight	2550 lbs. (1157 kg)
Seal material	Fluorocarbon (EPR optional)
Condensate tank	8.3 gal (31.4 ltrs)
Dispersal elements	8
Minimum operating capacity	18 gal (68.1 ltrs)
Vacuum (max)	25 In/Hg
Viscosity (max)	500 sus (108 cSt)-Disposable 2150 sus (460 cSt)-Packed Tower
Outlet pressure (max)	60 psi (4.1 bar)
Ports	3" JIC (male) inlet 2" JIC (male) outlet
FLA (full load amps)	50-70 amps @ 460 V/60hz
Shipping Weight	3000 lbs. (1361 kg) maximum
Shipping Dimensions	70" H x 48" W x 80" L (1778mm x 1219mm x 2032mm)

Replacement Elements

Standard Coreless Particulate (IL8-3)	
02QE (2 micron)	933734Q
05QE (5 micron)	933612Q
10QE (10 micron)	933735Q
20QE (20 micron)	933736Q
Dispersal	
Disposable (Coalescing)	933180
Packed tower (Cleanable)	933553

Note: Dimensions and weights are approximate and for reference only.

UL and CUL Marked

PVS Series

Specification Worksheet

1. Application: _____

2. Fluid Type: _____ Brand: _____
   Grade: _____ Specific Gravity: _____

3. Viscosity: Min _____ SUS/cSt @ _____ °F/°C
   Max _____ SUS/cSt @ _____ °F/°C
   Normal _____ SUS/cSt @ _____ °F/°C

4. Contamination level: Current ISO level _____/____ / ____
   Desired ISO level _____/____ / ____

5. Water concentration: Current PPM level _____
   Desired PPM level _____

6. Suction head: Positive/Negative _____ Ft./meters _____

7. Operating distance: _____ Ft./meters _____

8. System fluid operating temperature: _____°F/°C Is there a cooler? _____

9. Operating environment air temperature: (air cooled model)
   Min _____°F/°C
   Max _____°F/°C
   Normal _____°F/°C

10. Water supply temperature: (liquid ring model)
    Min _____°F/°C
    Max _____ °F/°C
    Normal _____°F/°C

11. Operating environment above/below sea level: _____ Ft./meters

12. Voltage options:
    - 230VAC, 3P, 60Hz (185, 600)
    - 380VAC, 3P, 50Hz (185, 600, 1200, 1800, 2700)
    - 460VAC, 3P, 60Hz (185, 600, 1200, 1800, 2700)
    - 575VAC, 3P, 60Hz (185, 600, 1200, 1800, 2700)

13. Available amperage: _____

14. Reservoir volume: _____

15. Special requirements: _____

    _____

    _____

16. Any previous filtration problems with the application: _____

17. PVS model selected: _____

NOTE: Specification sheet must be completed before order can be entered.

PVS Series

How to Order

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

BOX 1	STD	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	BOX 7	BOX 8	BOX 9
	PVS	600	460	DS	D	10QE	12	AC	ACD DFL CR

BOX 1: Seals

Symbol	Description
None	Fluorocarbon
E8	EPR

BOX 2: Base Unit 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 3: POWER SUPPLY *

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

*Consult factory for special voltages.

BOX 4: Vacuum Pump

Symbol	Description
DS	Dry sealed
LR	Liquid ring

BOX 5: Dispersal Element

Symbol	Description
D	Coalescing (disposable)
P	Packed tower (cleanable)

BOX 6: Particulate Element

Symbol	Pressure Setting
02QE	Ecoglass III, 2 micron
05QE	Ecoglass III, 5 micron
10QE	Ecoglass III, 10 micron
20QE	Ecoglass III, 20 micron

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

BOX 7: Heater

Model	Symbol	Description
185	12	12 KW/3 phase
600	12	12 KW/3 phase
	24	24 KW/3 phase
	36	36 KW/3 phase
1200	24	24 KW/3 phase
	36	36 KW/3 phase
	48	48 KW/3 phase
1800	36	36 KW/3 phase
	48	48 KW/3 phase
2700	48	48 KW/3 phase

BOX 8: Condenser

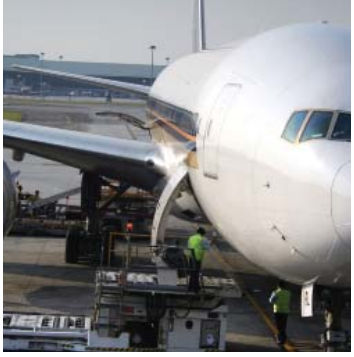
Symbol	Description
AC	Air cooled
LC	Liquid cooled
BC	Air and water cooled

BOX 9: Options*

Symbol	Description
3HP	3HP High Viscosity Circuit
5DW	5” Diameter Wheels
ACD	Auto Condensate Drain
CDC	Condensate Drain Counter
CE	CE Marked
CF	Carbon Exhaust Filter
CR	Cable Reel
DFL	Dirty Filter Light
DPG	Differential pressure gauge
EX1	Explosion Proof (Class I, Division I, Zone I and II)
EX2	Explosion Proof (Class I, Division II, Zone I and II)
NM7	NEMA 7 Explosion Proof
ICV	Inlet Control Valve
IL8	Upgrade to IL8-3 coreless filter
PNW	Pneumatic Wheels
RHM	Resetable Hour Meter
SFI	Sight Flow Indicator
PD	LED Particle Detector
PDL	LCD Particle Detector
NYM	No Yellow Metals

* Consult factory for other options.

Global products as identified are offered worldwide through all Parker locations and utilize a common ordering code.



aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding

Stationary Offline System

SOS for Indoor/Outdoor Fluid Filtration Needs

ENGINEERING YOUR SUCCESS.

Stationary Offline System

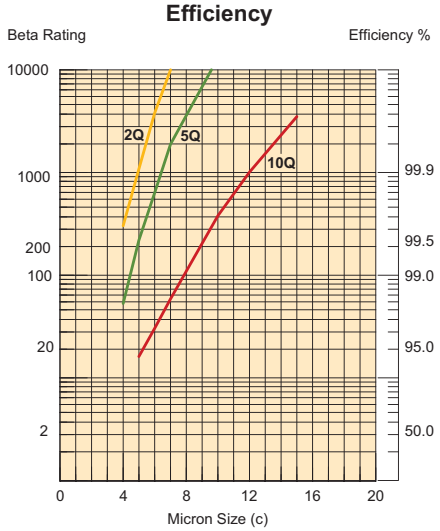
Performance Data

Parker's new patented Moduflow™ Plus element was designed with built-in diverter cone and bypass valve, to meet your application needs.

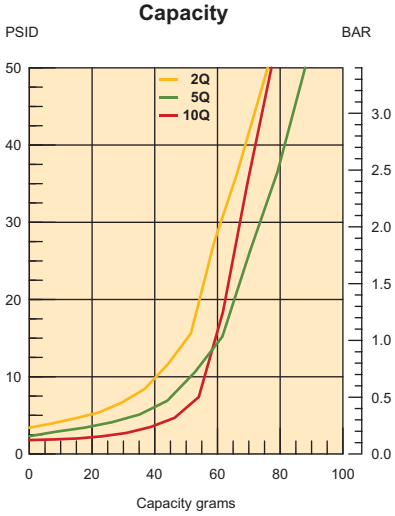
Applications

- Oil & Gas
- Plastic Injection Molding
- Die Casting
- Steel
- General Industrial
- Power Generation
  - Load Tap Changer
  - Wind Turbines
  - Transformer
- Mining
- Off-highway Equipment
- Food Processing
- Refining
- Paper Mills
- Aircraft Ground Support

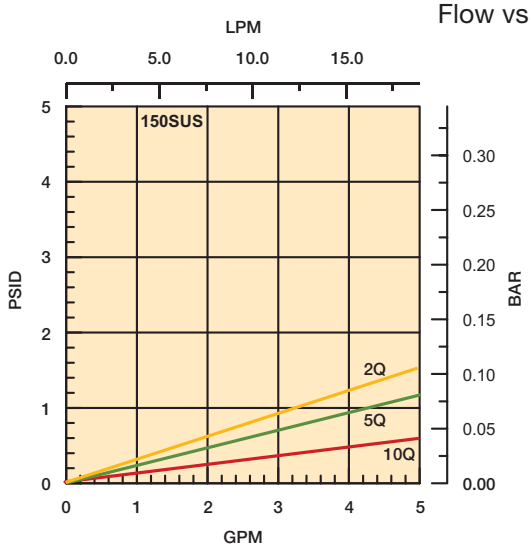
Efficiency

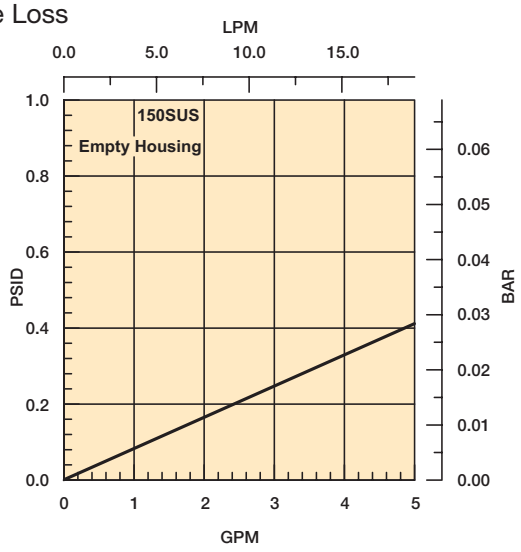


Capacity



Flow vs Pressure Loss



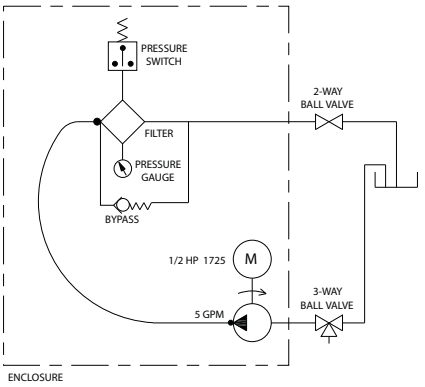


Stationary Offline System

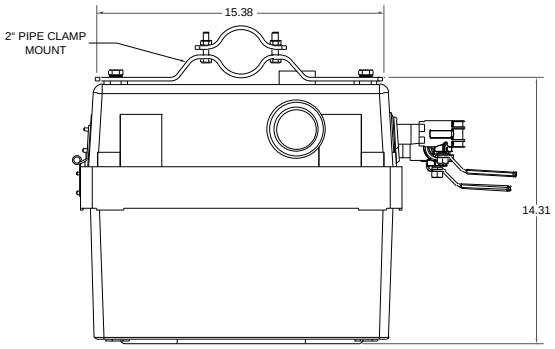
Specifications

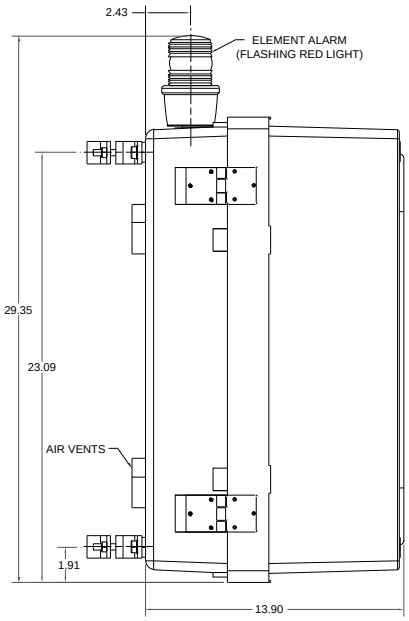
Flow rate: 5 gpm
Filtration: High efficiency Microglass III (B_x = 200+).
Enclosure: Weatherproof NEMA 4 IP 65 with sealed safety glass window.
Electrical service required: 115V, 10A, single phase, 60 Hz
Electrical motor: ½ HP @ 1725 rpm w/ thermal overload protection.
Filter bypass alarm: Red strobe light indicates at 20 psid filter element pressure drop. Auto shut-down at 40 psid.
Seals: Nitrile
Weight: Approximately 80 lbs.

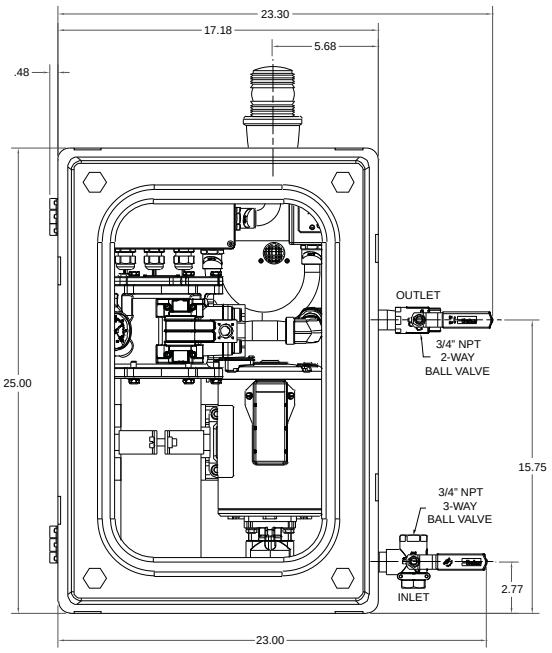
Compatible with most petroleum based fluids, including dielectric oils. Rated for continuous duty.

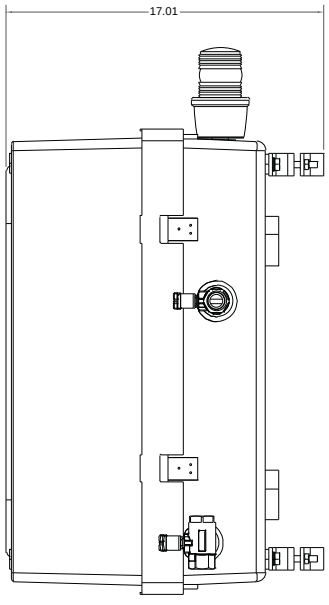


The Moduflow™ Plus filter is known for its performance and durability. It has been engineered to provide the highest level of performance for today's demanding filtration requirements.









Drawings are for reference only.
Contact factory for current version.

Dimensions are in inches.

Stationary Offline System

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
SOS	5	02Q	B	E	I	N12	1

BOX 1: Filter Series

Symbol	Description
SOS	**Stationary Offline System**

BOX 2: Model

Symbol	Description
5	**5 gpm flow rate**

BOX 3: Media Code

Symbol	Description
02Q	Microglass III, 2 micron
05Q	Microglass III, 5 micron
10Q	Microglass III, 10 micron
WR	Water removal

BOX 4: Seals

Symbol	Description
B	**Nitrile (NBR)**
V	Fluorocarbon (FKM)

BOX 5: Indicator

Symbol	Description
E	**Electrical with visual gauge** (includes external lighted beacon)

BOX 6: Bypass

Symbol	Description
I	**35 PSID**

BOX 7: Ports

Symbol	Description
N12	**¾" NPT integral threads**

BOX 8: Options

Symbol	Description
1	**With Bypass**
	Heater (consult factory)

Please note the bolded options reflect standard options with a reduced lead-time. Consult factory on all other lead-time options.

Replacement Elements

Media	Nitrile Seals Part Number	Fluorocarbon Seals Part Number
02Q	937393Q	937401Q
05Q	937394Q	937402Q
10Q	937395Q	937403Q
WR	940733	—

Environmental Air Filters
Reservoir Equipment

Automotive Filter Catalog

Parker

ENGINEERING YOUR SUCCESS.

EAB Series

Reservoir Equipment

Typical Applications

- Agricultural machines
- Articulated dump trucks
- Forestry equipment
- Wheeled loaders
- Lubricating systems
- Excavators
- Mobile cranes
- Industrial power units

Technical Data

The filter has been designed to achieve a low pressure drop and high dirt holding capacity with airflows up to 1500 l/min (400 gpm). A compact EAB10 with airflows up to 1000 l/min (260 gpm) is also available.

Construction:
Glass reinforced composite housing with Eco-element.

Filter media options:
P020: High quality polyester media. 2µm (abs).
C015: Polyester media with water-resistant layer. 1.5µm (abs)
Q010: Glass fibre media. 1.0µm (abs)

Mounting options:
With 6 screws. Includes machine and plate screws, a strainer and gaskets.
External threads G3/4", G1".
Internal thread G3/4".

Options:
Visual gauge type vacuum/ pressure indicator.
Overpressure valve, pressure setting 0.2 bar (2.9 psi). (available for EAB20 only)
EAB10 cannot be specified with an overpressure valve and vacuum/pressure gauge at the same time.

Advantages of the EAB filters:
Easy maintenance.
Indicator states the need for element change.
Quick and easy element change (no tools required).

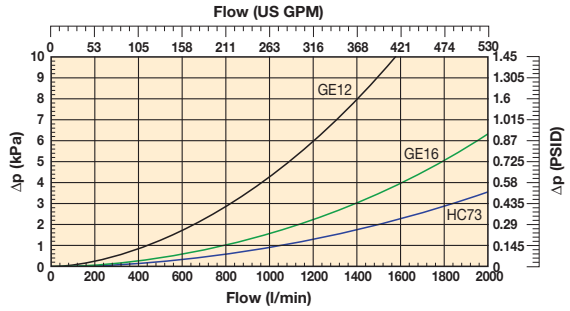
Environmentally friendly:
EAB elements contains no metal parts: therefore it can be crushed and burned minimising the volume of waste material.

Other features:
The optional indicator is located in a safe place inside the housing. Housing includes mounting holes for a padlock, which allows you to increase the security against theft and vandalism.

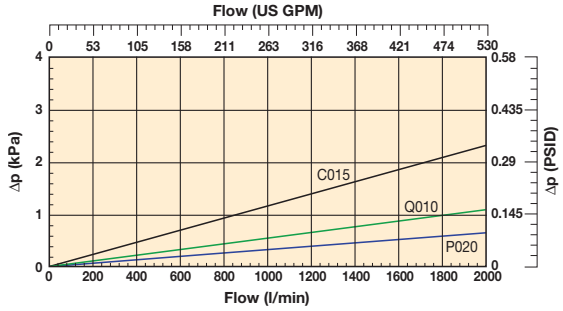
Pressure Drop Curves

ΔP total = ΔP housing + ΔP element. The recommended level of the initial pressure drop for this filter is max 0.02 bar/2.0kPa (0.29 psi).

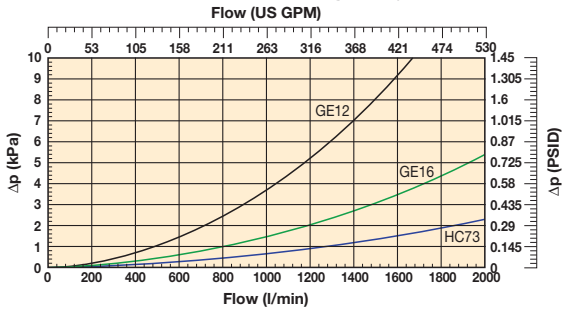
EAB10 Housing Only



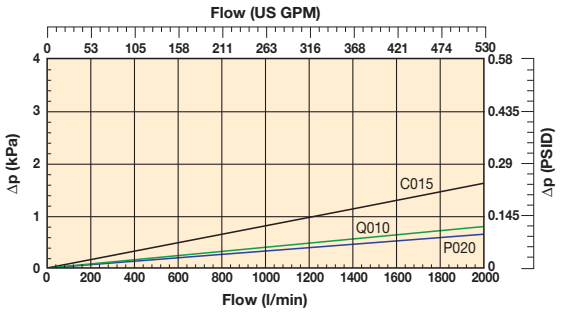
EAB10 Elements



EAB20 Housing Only



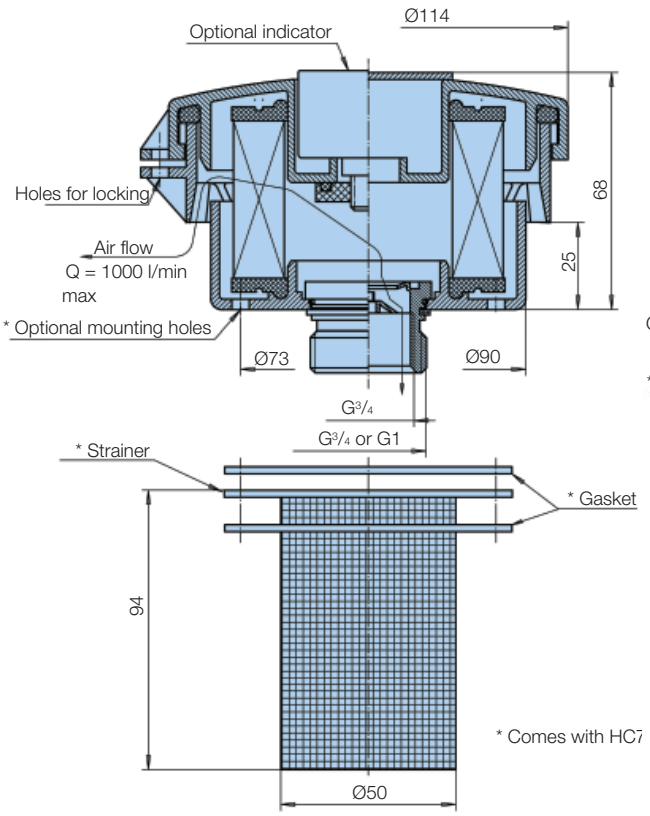
EAB20 Elements



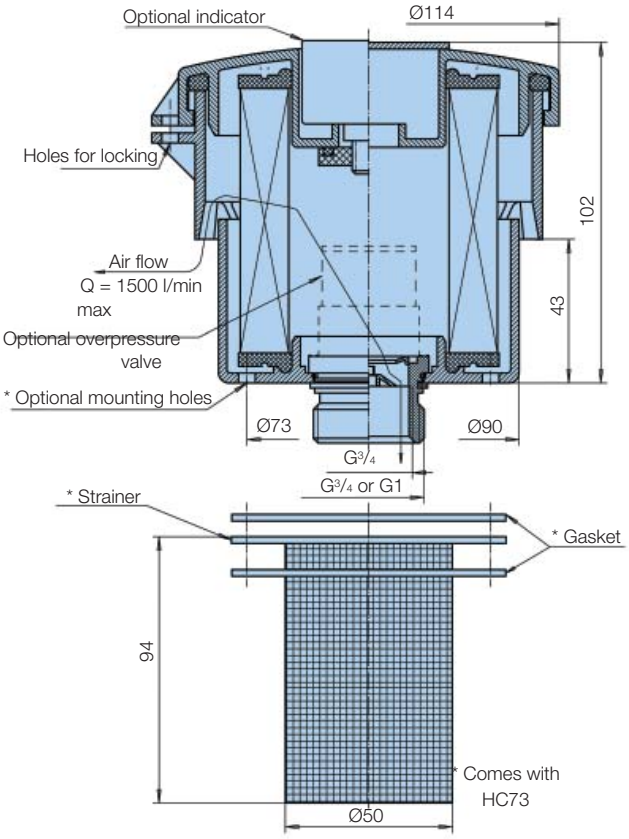
EAB Series

Specifications

EAB10



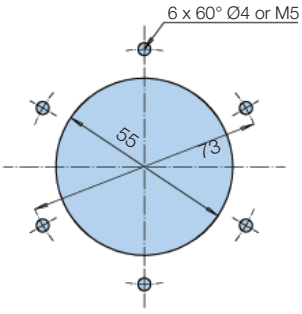
EAB20



NOTICE!
Air filters are an essential part of the system and the element needs to be replaced regularly.

Mounting	Code
6 mounting holes	HC73
G1 external	GE16
G¾ external	GE12
G¾ internal	GS12

6 hole fixing mounting dimensions



EAB Series

How to Order

Standard products table

Part number	Supercedes	Model	Media	Mounting	Overpressure valve	Indicator	Replacement elements
EAB20P020GE16A	N/A	EAB20	P020	GE16	V2	A	**EAC20P020**

Product configurator

Product number	Media options		Mounting options		Overpressure valve options		Indicator options	
EAB20	**P020**	2µ abs polyester	**HC73**	6 hole fixing		No overpressure valve		No indicator
EAB10	**C015**	1.5µ abs water resistant	GE12	G¾ external thread	**V2**	0.2 bar	**A**	Vacuum/pressure gauge
	Q010	1.0µ abs glass fibre	**GE16**	G1 external thread G¾ internal				
			GS12	thread M33 x 2 external				
			ME33	thread				

Replacement elements

Product number	Media options	
EAC20	**P020**	2µ abs polyester
EAC10	**C015**	1.5µ abs water resistant
	Q010	1.0µ abs glass fibre

Note 1: Part numbers featured with bold highlighted codes will ensure a 'standard' product selection.
Note 2: For alternative part number options, consult Parker Filtration.

ABL Series

Reservoir Equipment

Typical Applications

The Parker Filtration ABL-2 Series Air Filters.

- Saw mills
- Agricultural machines
- Articulated dump trucks
- Forestry equipment
- Wheeled loaders
- Lubricating systems
- Excavators
- Industrial power units
- Mobile cranes

Technical Data

Assembly:
Tank top mounted.

Connections:
Threads G1 1/4 (ISO 228), 1 1/2" (UN-16-2B).

Seal material:
Seals integrated in LEIF® element.

Operating temperature range:
-20°C (-4F), +80°C (176F)

Filtration media:
3 micron.

Flow fatigue characteristics:
Filter media is supported so that the optimal fatigue life is achieved.

Vacuum indicator:
ABL-2 0.04 bar. Visual with latch out memory.

Breather housing:
High impact strength composite.

Filter element:
LEIF® element.

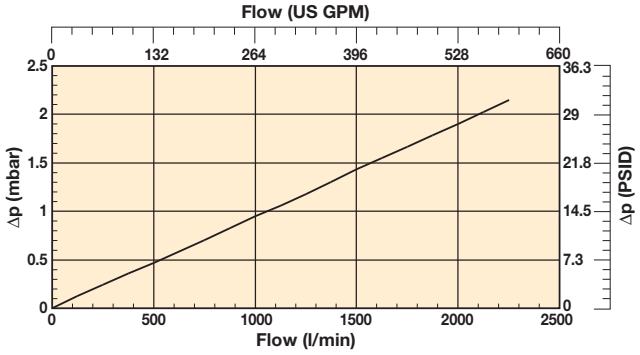
Options:

- Adaptor with filter connection.
- Single adaptor.
- Breather with integrated pressure relieve valve for pressurised tank on request only.

LEIF® elements can be used for hydraulic fluids only. For other fluids contact Parker Filtration.

Pressure Drop Curves

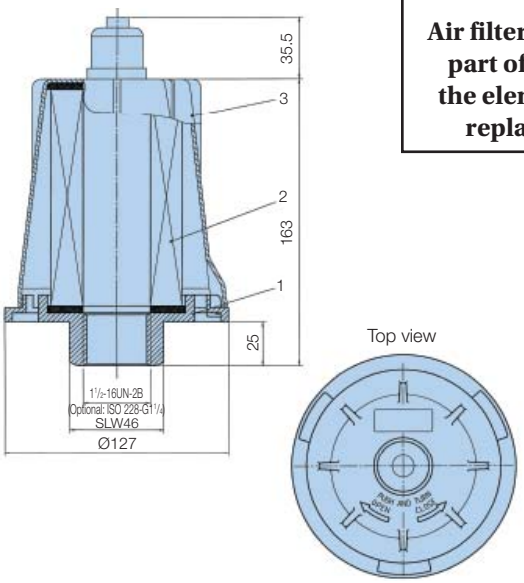
ABL2



ABL Series

Specifications

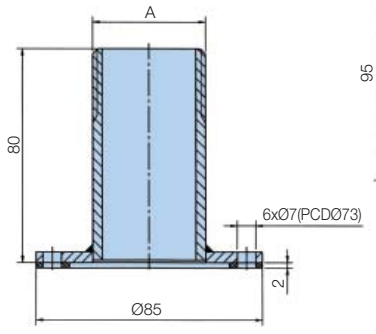
ABL-2



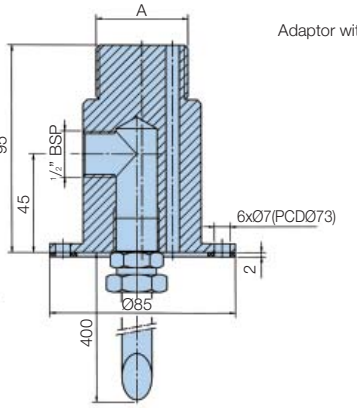
NOTICE!
Air filters are an essential part of the system and the element needs to be replaced regularly.

Extensions and filling mounting adaptors

Adaptor single



Adaptor with filler connection



ABL Series

How to Order

Standard products table

Part number	Supercedes	Replacement elements
ABL2G114QXWL13V	ABL2-G1¹/₄-QXWL-1-3-V	**QXWL13**
ABL2U112QXWL13V	ABL2-U1¹/₂-QXWL-1-3-V	**QXWL13**
ADAPTORABLG114FP	ADAPTOR-ABL-G1¹/₄-FP	**-**

Product configurator

Product number		Mounting options		Filtration (3µm)		Indicators		Options	
ABL2	2000 l/min		1¹/₂ UN-16-2B	**QXWL13**	ABL2 Only	**V**	Visual	SNG	Vacuum/Pressure Gauge
								FP	Adaptor With Filler Connection

Product configurator

Product number	Mounting options		Options	
Adaptor ABL	**G114**	ISO 228 - G1¹/₄ (BSP)	**SNG**	Single Adaptor
	U112	1¹/₂ UN-16-2B	**FP**	Adaptor With Filler Connection

Replacement elements

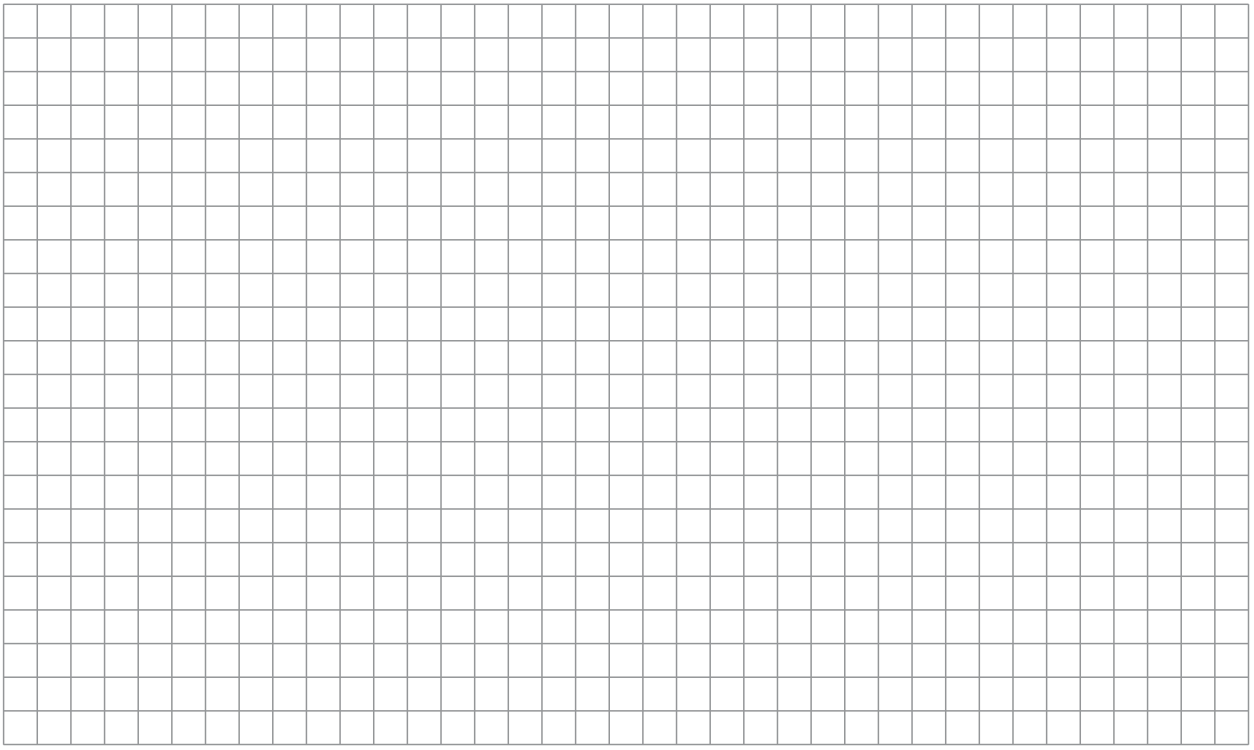
Part number	Supercedes	Description
QXWL13	QXWL1-3	3µ

Note 1: Part numbers featured with bold highlighted codes will ensure a 'standard' product selection.
Note 2: Alternate displayed part number selection will require you to contact Parker Filtration for availability.

ABL Series

Reservoir Equipment

Notes



AB Series

Reservoir Equipment

AB Series - Reservoir Breathers

- High Efficiency Air Breather
- Indicator Notes Replacement Condition

Air Breather With Memory Indicator

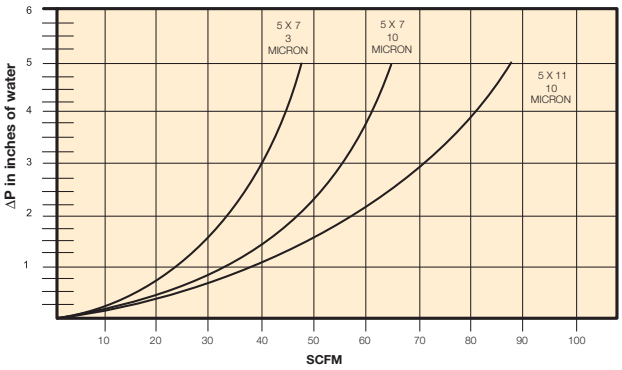
Flow Rate Curves

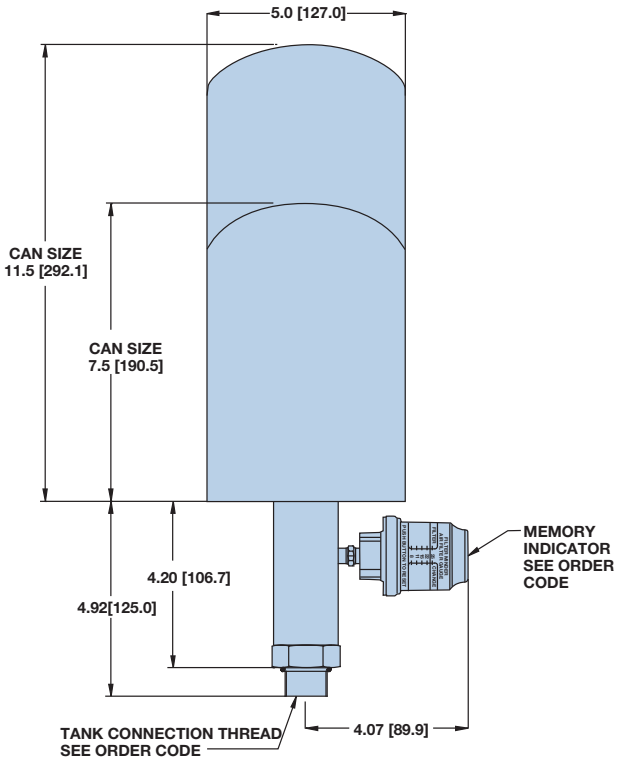
A) Determine maximum exchange flow of reservoir in GPM.

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.)





AB Series

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
G12	G 3/4”-14 BSPP thread (ISO 1179-1) *Only available with option -2, Box 4
ST16	1 5/16-12 SAE straight thd. (ISO 11926) *Only available with options -3 & -4, Box 4
M27	M27 x 2 metric thread (ISO 6149)
G16	G 1”-11 BSPP thread (ISO 1179-1) *Only available with options -3 & -4, Box 4)

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: Not available for option -2, Box 4.

Replacement Breather Cans

Media	Designate Size 3.5” x 5”	Designate Size 5” x 7.5”	Designate Size 5” x 11”
3 Micron	926543	926541	NA
5 Micron	921999	926169	927136

LaserCM
Portable Particle Counter

Fluid Condition Monitoring

Parker

ENGINEERING YOUR SUCCESS.

LaserCM

Portable Particle Counter

Parker LaserCM Portable Particle Counter.

With 15 years experience in manufacturing the world's best selling 'white light' portable particle counter – CM20, the progression to the LaserCM with its opto-mechanical, continuous wave single point source laser (SPSL) is both a natural and customer driven development.

Typical Applications

- Construction machinery
- Industrial plant
- Hydraulic equipment & system manufacturers
- Research & testing institutes
- Offshore & power generation
- Marine
- Military equipment applications

Features & Benefits

Test time: 2 minutes

Particle counts:

>2µ, >5µ, >15µ, >25µ, >50µ and >100µ microns

>4µ, >6µ, >14µ, >21µ, >38µ and >70µ microns(c)

International codes:

ISO 7-22, NAS 0-12, SAE 0-12

Data retrieval:

Memory access gives test search facility

Max. working pressure:

420 bar (100 USgpm)

Max. flow rate:

400 I/min (6000 psi) when used with system 20 Sensors. Higher with single point sampler (consult Parker)

Working conditions:

LaserCM will operate with the system working normally

Computer compatibility:

Interface via RS232 connection @ 9600 baud rate.

- Special 'diagnostics' are incorporated into the LaserCM microprocessor control to ensure effective testing.
- Routine contamination monitoring of oil systems with LaserCM saves time and saves money.
- Contamination monitoring is now possible while machinery is working - LaserCM saves on production downtime.
- Data entry allows individual equipment test log details to be recorded.
- Data retrieval of test results from memory via hand set display.
- Automatic test cycle logging of up to 300 tests can be selected via hand set display.
- Totally portable, can be used as easily in the field as in the laboratory.
- Automatic calibration reminder.
- Instant, accurate results achieved with a 2 minute test cycle.
- Data entry allows individual equipment footprint record.
- Data graphing selectable via the integral printer.
- Auto 300-test cycle logging via LCD handset input.
- RS232 serial port computer interface.
- Limit level output to control peripheral equipment such as off-line filtration via internal relay limit switches.
- Auto-testing allows for the conducting of automatic sequencing tests on flushing systems for example.
- Optional bar code swipe wand to allow handset data loading.
- Worldwide service and technical support.
- Re-calibration - Annual certification by an approved Parker Service Center.

LaserCM

Specifications

Automatic Particle Counters (APC's), have been widely used for many years in condition monitoring of hydraulic fluids. However, it is only recently that APC's have become flexible enough to enable the instruments to be taken out of the laboratory and used on-line in order to obtain the most credible form of results.

Unusually, the move from fixed laboratory use, to portable field use has not been at the expense of accuracy or user flexibility, but has actually enabled the instruments to be used over a wider range of applications and situations.

The most common monitoring technique used in APC's is that of light obscuration or light blockage. Here, a focused light source is projected through a moving column of oil, (in which the contaminants being measured are contained), causing an image of the contaminant to be projected on to a photo diode cell, (changing light intensity to an electrical output).

The electrical output of the photo diode cell will vary in accordance with the size of the particles contained in the column of oil; the larger the particle, the bigger the change in the photo diode electrical output.

On-line APC's must be able to test the oil sample at whatever cleanliness it is delivered to the machine. Parker therefore had to develop technology to ensure the on-line APC was able to test a sample without the conventional laboratory technique which requires dilution - a practice that would have been simply impossible with a portable unit.

By careful design and window sizing, gravimetric levels as high as 310mg of dirt per litre, (equivalent to up to 4 million particles >5 micron per 100 ml), can be achieved without making the instrument susceptible to counter saturation.

These high saturation point on-line APC's, whilst losing none of the accuracy of their laboratory counterparts, enable particle counting to be carried out quickly and accurately.

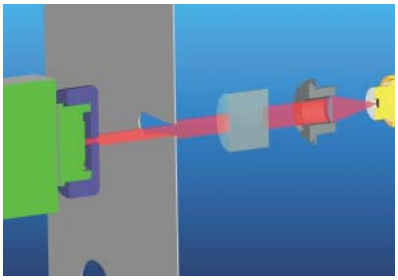
Core technology that proves itself in LaserCM

The LaserCM portable particle counter features microprocessor controlled optical scanning for accurate contaminant measurement with a calibration range from ISO 7 to ISO 22 (NAS 0-12) with no counter saturation.

How does LaserCM work?

- The particles are measured by a photo diode that converts light intensity to a voltage output which is recorded against time.
- As the particle moves across the window the amount of light lost is proportional to the size of the particle. This reduction in voltage is measured and recorded.
- This "voltage" lost relates directly to the area of the particle measured, is changed into a "positive" voltage and then in turn changed into a capacitance value.
- This value is counted and stored in the LaserCM computer in one of 6 channels, >2, >5, >15, >25, >50 and >100µ according to particle size.
- Readouts are displayed on the hand-held LCD in the accepted ISO and NAS standards ready for hard copy printing or RS232 computer download.
- The on-board computer allows storage of up to 300 test results.

A focused light source is projected through a moving column of oil.



Laser Optical Sensing

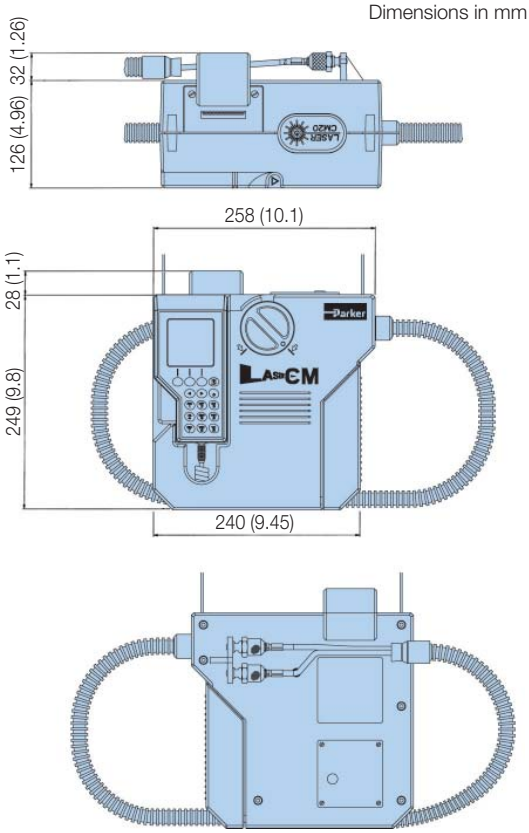
LaserCM

Specifications

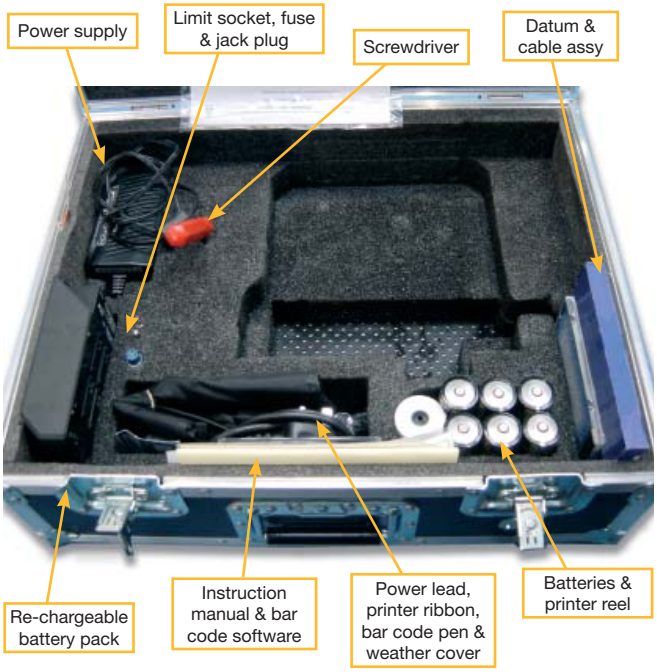
Description	LaserCM (LCM20.2021)	LaserCM (LCM20.2061)
Lexan, structural foam and ABS case	●	●
ABS handheld display	●	●
Mechanical composition – Brass, plated steel, stainless steel and aluminum	●	●
Fluorocarbon seals	●	●
Perfluoroelastomer seals		●
Nylon hoses (kevlar braided microbore)	●	●
Stainless steel armoured hose ends	●	●
1.2m (4ft) fluid connection hose	●	●
System 20 sensors. Higher with single point sampler	●	●
Rechargeable battery pack	●	●
12Vdc power supply	●	●
Fast blow fuse	●	●
Unique optical scanning system	●	●
Bonded glass optical window enclosed in SS plate	●	●
Micron channels analysis (2µ,5µ,15µ,25µ,50µ & 100µ)	●	●
Analysis range ISO 7 to 22 incl. (NAS 0 to 12)	●	●
32 character dot matrix LCD. Alpha numeric keypad	●	●
Data retrieval	●	●
Calibration to ISO standards*	●	●
Viscosity range 2 to 100 cSt. 500 cSt.with SPS	●	●
Operating temp.+5 to +80°C (+41 to +176°C)	●	●
Ambient temp.+5 to +40°C (+41 to +104°C)	●	●
2 minute test completion time	●	●
Memory store – 300 test memory	●	●
12Vdc regulated power supply input	●	●
Battery operated 6 x 1.5 D cells	●	●
Phosphate Ester group compatibility		●
Mineral oil & petroleum based fluid compatibility	●	●
Up to 420 bar (6000 psi)	●	●
Integral 16 column printer	●	●
RS232 computer interface	●	●
Astra board case weight – Kg (lbs)	5 (11lbs)	5 (11lbs)
Unit weight – Kg (lbs)	8 (17.6lbs)	8 (17.6lbs)
DATUM software and cable link pack	●	●
Weather protector cover	●	
CE certified	●	●
Auto logging	●	●

*Note: In compliance with international standards, all Parker portable particle counters can meet the ISO Medium test dust standards. The LaserCM's, in addition to the complete range of Condition Monitoring products, are capable of achieving certification to ISO 4406:1999 and with traceability to ISO 11171 for SRM 2806, via ISO 11943.

Dimensions in mm (ins)



Commissioning Kit



LaserCM

Operation

Operating the Parker LaserCM is as simple as pressing the start button and turning the dial. The test procedure is automatic and in the case of the LaserCM takes no more than 2 minutes to complete.

LaserCM makes the difference in industry

Fully accredited to BS EN 60825:1992 and IEC 60825-1 (safety of laser products) Standards, accredited to USA Standards and achieving full ISO certification. LaserCM offers users advanced laser technology, a fast, dynamic and on-line 2 minute system test cycle. A LaserCM Aggressive Fluids model is also available, suitable for monitoring corrosive fluids such as phosphate ester based lubricants used in commercial aviation.

MTD calibration

Laser CM20 MTD Calibration variants are certified via a primary ISO 11171 calibrated automatic particle counter. All MTD Laser CM20's achieve ISO 4406:1999 criteria, via ISO 11943.

Understanding MTD

ACFTD (Air Cleaner Fine Test Dust) was formatted in the 1960's, but is no longer being produced. The obsolescence of this dust has led to the adoption of a new dust MTD.

MTD (Medium Test Dust) having a particle size distribution close to ACFTD was selected as a replacement. However, MTD produced results somewhat different to ACFTD, so the NIST (National Institute of Standards & Technology) undertook a project to certify the particle size distribution of ISO MTD.

The result was particle sizes below 10µm were greater than previously measured.

Particles sizes reported based on NIST would be represented as µm (c), with "c" referring to "certified". Therefore the CM20 reported sizes are as follows:

ACFTD	MTD
2µ	4µ (c)
5µ	6µ (c)
15µ	14µ (c)
25µ	21µ (c)
50µ	38µ (c)
100µ	70µ (c)

MTD offers true traceability, improved particle size accuracy and better batch to batch reproduction.

LCM20
Using SPS

LaserCM

Portable Particle Counter

Why On-Site Fluid Contamination Monitoring

- Certification of fluid cleanliness levels.
- Early warning instrument to help prevent catastrophic failure in critical systems.
- Immediate results with laboratory accuracy.
- To comply with customer cleanliness requirements and specifications.
- New equipment warranty compliance.
- New oil cleanliness testing.

Datum Data Management

DATµm

Datum, dedicated software, provides the link between a Laser CM20, System 20 EM20 or the H2Oil - Water in Oil and your computer management system.

Features:

- Windows based, Icon driven program
- Full graphic output
- Tables/results download
- Trend analysis and predictive maintenance
- Auto test communication allows Datum to control particle counter testing and water in oil monitoring
- Certification creator using downloaded data
- Customer customized fields

Laser CM Test

ON LINE TEST

TEST NUMBER 022

	D M Y
Date	04-03-06
Time	15-52
NAS CLASS:	7

Count / 100ml

4/6µ (c)	789157
6/14µ (c)	31250
NAS CLASS	7
14/21µ (c)	250
NAS CLASS	3
21/38µ (c)	50
NAS CLASS	3
38/70µ (c)	14
NAS CLASS	4
>70µ (c)	0
NAS CLASS	0

NOTES

Correlation to NAS 1638

Laser CM Test

ON LINE TEST

TEST NUMBER 022

	D M Y
Date	04-03-06
Time	15-52
ISO:	20/15/09

Count / 100ml

>4µ (c)	820721
>6µ (c)	31564
>14µ (c)	314
>21µ (c)	64
>38µ (c)	14
>70µ (c)	0

NOTES

ISO 4406 - 1996
(MTD calibration comes under ISO 4406 - 1999 revised standards)

16-column printer for hard copy data. A feature of the LaserCM is the on-board printout data graphing option developed to support predictive maintenance procedures.

LaserCM

Portable Particle Counter

Introducing the new LCM 'Classic'

There is a new addition to the proven range – the LCM 'Classic'. Only available from Parker, the 'Classic' retains all the technology that made the LaserCM one of the most accurate, reliable and popular portable particle counters available.

Our design engineers have re-configured the LaserCM specification in a way that has reduced our manufacturing costs. These savings have been passed onto LCM 'Classic' customers.

How have we done this?

First we talked to our existing customers and then to the engineers and maintenance operatives to find out the features that make the LaserCM a unique predictive maintenance instrument.

Then, we removed peripheral items such as the aluminum case and all the accessories, so a customer receives the monitor, with a CD user guide, professionally and securely boxed. One thing that has not altered is laser accuracy and laser reliability. Our in-house software engineers have re-configured the EPROM, removing Data programming, User ID, Automatic Testing, Data retrieval, Alarm level settings, the barcode pen and Graph printing functions to reduce costs still further without in any way reducing the efficiency of the monitor. The LCM 'Classic' is an instrument to be proud of.

Ordering Information (LaserCM and 'Classic' LaserCM)

Standard products table

Part number	Supercedes	Description
LCM202022	N/A	MTD calibrated
LCM202026	N/A	Classic unit - MTD calibrated
B84702	B.84.702	Printer paper (5 rolls)
P843702	N/A	Printer ribbon
B84729	B.84.729	12Vdc power supply
B84609	B.84.609	Re-chargeable battery pack
P849613	N/A	Weather protector cover
B84779	B.84.779	Datum software pack
B84708	B.84.708	Cable and adaptor

Note 1: Part numbers featured with bold highlighted codes will ensure a 'standard' product selection.
Note 2: Alternate displayed part number selection will require you to contact Parker Filtration for availability.

Product configurator

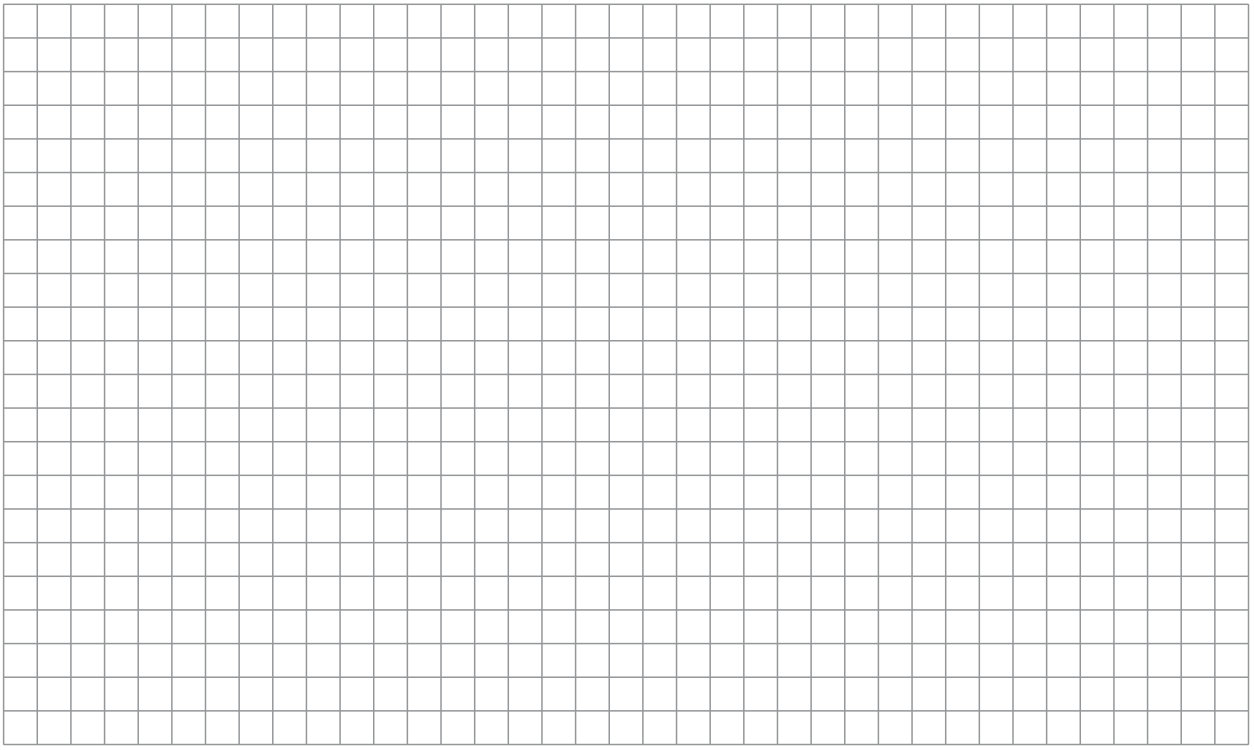
Model	Fluid type		Options	
LCM2020	**2**	Hydraulic mineral	**1**	ACFTD calibrated
LCM2020	**6**	Skydrol	**2**	MTD calibrated
			3	ACFTD calibrated + bar code pen
			4	MTD calibrated + bar code pen
			5	Classic unit - ACFTD calibrated
			6	Classic unit - MTD calibrated

Note 1: Part numbers featured with bold highlighted codes will ensure a 'standard' product selection.
Note 2: Alternate displayed part number selection will require you to contact Parker Filtration for availability.

LaserCM

Portable Particle Counter

Notes



SPS
Single Point Sampler

Fluid Condition Monitoring

Parker

ENGINEERING YOUR SUCCESS.

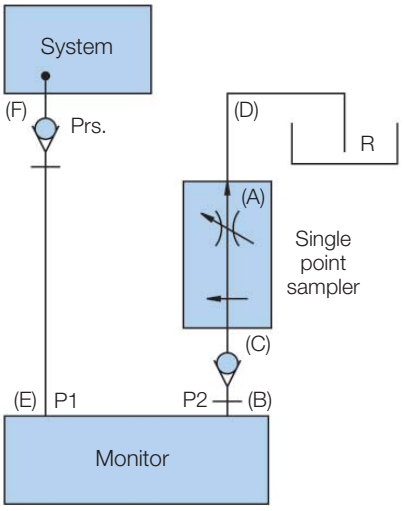
SPS Single Point Sampler

Features & Benefits

The Single Point Sampler provides a means to connect a CM20 or H2Oil to a single pressure test point and balance the differential pressure across the system, to provide a controlled flow of oil into the monitor and away into a waste oil receptacle.

- Lightweight, compact and easy to use design
- Fingertip operated control valve even at high pressures
- 420 bar (6000 psi) rated
- Facilitates testing from large diameter pipes
- Capability to test up to 500cSt (106 SUS) viscosity oils (pressure permitting)
- Pressure compensated flow control mechanism
- Possible to control the valve with the same level of accuracy whether the device is operating at high or low pressure
- Capable of allowing a flow rate in excess of 10ml/min when operating at any viscosity within the product specification
- Suitable for fluid temperatures from +5°C to +80°C (+41°F to +176°F)
- High quality polished finish. (stainless steel/ aircraft grade aluminum)
- Capable of working with a CM20 or H2Oil connected into a system via the standard one meter extension hose kit
- Suitable for use with mineral and biodegradable oils, petroleum based and phosphate ester fluids
- Phosphate ester version utilises the 5/8" BSF HSP style fitting
- Designed so that it meets the lowest possible level of magnetic permeability
- Supplied with accessories kit
- It will maintain the set flow rate between upper and lower limits within a 100 bar (1450 psi) inline pressure change
- Clear product identification to ensure that it is connected correctly. (i.e. downstream of the CM20 or H2Oil)

Connection Instructions



1. Ensure valve is closed (A).
2. Connect P2 on monitor (B) to P2 on Single Point Sampler (SPS) (C).
3. Connect drain line on SPS (D).
4. Connect P1 of monitor (E) to the system (F).
5. The SPS is ready to operate.
6. Open valve (A) slowly until the oil flows continuously from the drainline (D).
7. Switch on monitor and begin testing.

LCM20 Only

Carry out flow test as shown in the manual. If test is showing below Δt 3.6°C (38°F) then carry out test as normal. If, however, test is above Δt 3.6°C (38°F) then increase oil flow by turning valve (A) counterclockwise and then carry out flow test. Do this until Δt is below 3.6°C (38°F) and carry out test as normal once this is achieved.

WARNING! Ensure that SPS valve is closed and monitor is connected to the SPS BEFORE connection to system.

SPS Single Point Sampler

Specifications

Specification

Fluid compatibility:
Mineral oil and petroleum based fluids (standard version). Aggressive fluid (dual seal version) for other fluids consult Parker Hannifin.

Seals:
Fluorocarbon or Perfluoroelastomer.

Maximum working pressure:
420 bar (6000 psi).

Weight:
500 grams (18 oz) max. (Not including hoses).

Packaging standard:
Cardboard carton (military usage - plastic carry case).

Unit size:
45mm dia x 123mm long. (1.77 dia x 4.84 long)

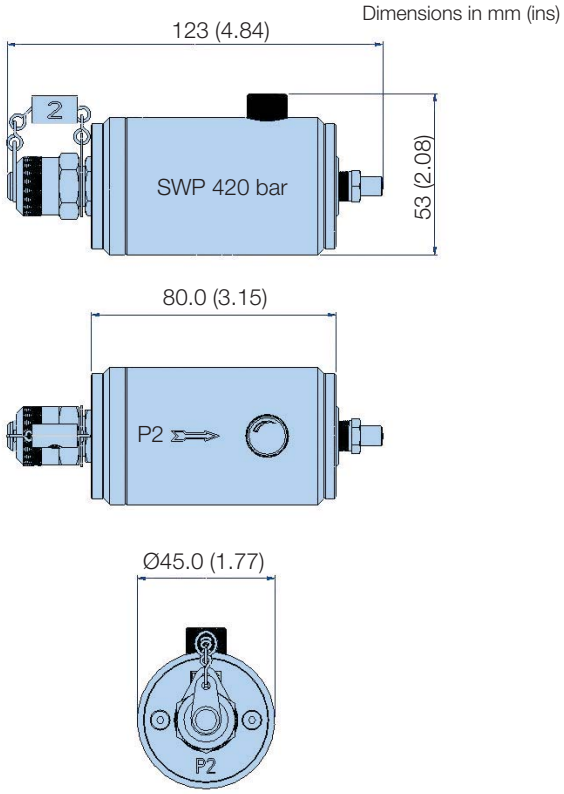
System connection:
Standard - minimess M16 (G1/4" BSP) with cap,
Aggressive - 5/8" BSF HSP.

Operating temp range:
+5°C to +80°C (+41°F to +176°F).

Storage temperature range:
-26°C to +80°C (-15°F to +176°F).

Construction:
Body: Aluminum BS 1470 – pressurized end stainless steel.
Finish: Anodized blue (standard version). Anodized red (dual seal version).

Dimensions in mm (ins)



Ordering Information

Standard products table

Product number	Supercedes	Description
SPS2021	N/A	Mineral single point sampler
SPS2061	N/A	Aggressive single point sampler
B84784	B.84.784	Mineral or aggressive bottle assembly
B84224	B.84.224	Mineral oil extension hose/coupling
B84225	B.84.225	Aggressive oil extension hose/coupling
B84788	B.84.788	Mineral oil waste hose
B84787	B.84.787	Aggressive oil waste hose

Note 1: Part numbers featured with bold highlighted codes will ensure a 'standard' product selection.
Note 2: Alternate displayed part number selection will require you to contact Parker Filtration for availability.

System 20

Inline Sensors & Monitors/Fluid Condition Monitoring

Specification: Sensors

Construction:
Machined steel body. Electroless nickel coating to minimum depth of 40 microns
Brass/stainless steel internal components

Flow capacities:
All suitable for use with oil, water and water/oil emulsion
Size 0 – 6-25 l/min (1.58-6.60 US GPM)
Size 1 – 20-100 l/min (5.28-26.4 US GPM)
Size 2 – 80-380 l/min (21.1-100 US GPM)

Max. working pressure:
420 bar (6000psi)

Capability:
Reverse flow

Pressure drop:
At max. rated flow, ΔP is 1.1 bar (16 psi) (mineral oil fluid at 30 cSt 140 SSU).

Ports:
Size 0 – G3/8
Size 1 – G3/4 (SAE threads also available)
Size 2 – G1 1/4

Repeatability:
±1% FSD

Accuracy:
Flow ±2.5% full scale deflection

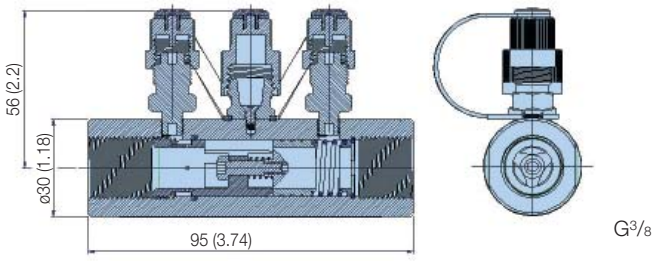
Weight:
Size 0 – 0.5kg (1.2lbs)
Size 1 – 3.5kg (8.4lbs)
Size 2 – 4.4kg (9lbs)

Aggressive Fluid Applications:
EPDM internal/external o-rings and seals

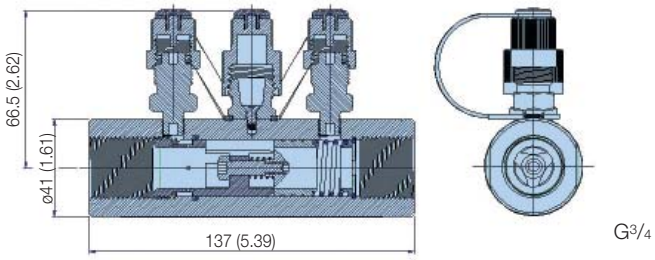
Installation Details

Dimensions in mm (ins)

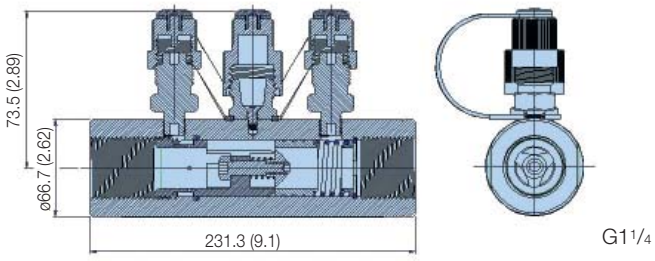
Size 0 Sensor



Size 1 Sensor



Size 2 Sensor



Ordering Information

Standard products table

Product number	Supercedes	Size	Flow range l/min (USgpm)	Fluid type	Port threads
STI0144100	STI.0144.100	0	6-25 (1.58-6.60)	Mineral	3/8
STI1144100	STI.1144.100	1	20-100 (5.28-26.4)	Mineral	3/4
STI2144100	STI.2144.100	2	80-380 (21.1-100)	Mineral	1 1/4
STI0148100	STI.0148.100	0	6-25 (1.58-6.60)	Aggressive	3/8
STI1148100	STI.1148.100	1	20-100 (5.28-26.4)	Aggressive	3/4
STI2148100	STI.2148.100	2	80-380 (21.1-100)	Aggressive	1 1/4

Note 1: Part numbers featured with bold highlighted codes will ensure a 'standard' product selection.
Note 2: Alternate displayed part number selection will require you to contact Parker Filtration for availability.
Note 3: Mobile Sensors are also available - Contact Parker

Icount PD

Online Particle Detector

Parker

ENGINEERING YOUR SUCCESS.

Icount PD

The Icount Particle Detector from Parker represents the most up-to-date technology in solid particle detection.

The design dynamics, attention to detail, and small size of the permanently mounted, on-line particle detector brings a truly innovative product to all industry.

The laser based, leading-edge technology is a cost effective market solution to fluid management and contamination control.

Features and benefits of the Icount PD include:

- Independent monitoring of system contamination trends.
- Early warning LED or digital display indicators for Low, Medium and High contamination levels.
- Moisture % RH LED indicator (optional).
- Cost effective solution in prolonging fluid life and reducing machine downtime.
- Visual indicators with power and alarm output warnings.
- Continuous performance for dependable analysis.
- Hydraulic, phosphate ester & fuel fluid compatible construction.
- Self diagnostic software.
- Fully PC/PLC integration technology such as:
  RS232 and 0-5 Volt, 4-20mA.

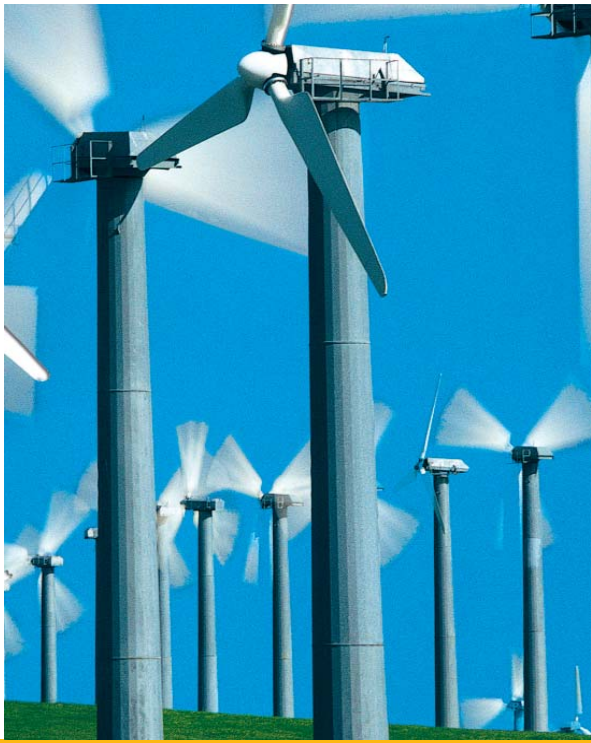
Typical Applications

Mobile Equipment
- **Earth Moving Machinery**
- **Harvesting**
- **Forestry**
- **Agriculture**

Industrial Equipment
- **Production Plants**
- **Fluid Transfers**
- **Pulp & Paper**
- **Refineries**

Power Generation
- **Wind Turbines**
- **Gearboxes**
- **Lubrication Systems**

Maintenance
- **Test Rigs**
- **Flushing Stands**



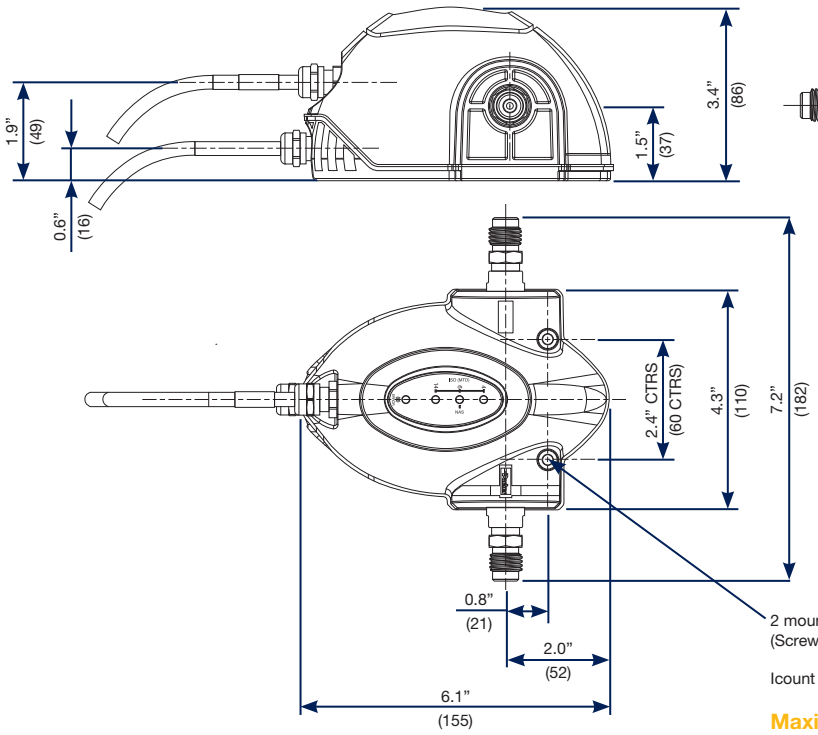
Icount PD

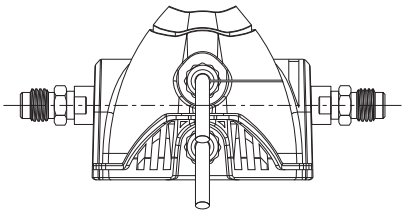
Features and Benefits

Diagnostic self check start-up time	5 seconds
Measurement period	5 to 180 seconds
Reporting interval through RS232	0 to 3600 seconds
Digital LED display update time	Every second
Limit relay output	Changes occur +/- 1 ISO code at set limit (Hysteresis ON) or customer set (Hysteresis OFF)
4-20mA output signal	Continuous
Principle of operation	Laser diode optical detection of actual particulates
Reporting codes	ISO 7 – 21, NAS 0 – 12, (AS 00 – 12 contact Parker) Icount will also report less than ISO 7, subject to the statistical uncertainty defined in ISO4406:1999, which is shown in the RS232, reporting results as appropriate e.g “>6”
Calibration	By recognized on-line methods, confirmed by the relevant International Standards Organization procedures
Calibration recommendation	12 months
Performance	+/- 1 ISO Code (dependant on stability of flow)
Reproducibility / Repeatability	Better than 1 ISO Code
Power requirement	Regulated 9 to 40Vdc
Maximum current draw	150mA
Hydraulic connection	M16 x 2 hydraulic test points (5/8” BSF for aggressive version)
Flow range through the device	40 to 140 ml/min (optimum flow = 60ml/min)
Online flow range via System 20 Inline Sensors	Size 0 = 6 to 25 l/min - (optimum flow = 15 l/min) Size 1 = 24 to 100 l/min - (optimum flow = 70 l/min) Size 2 = 170 to 380 l/min - (optimum flow = 250 l/min)
Required differential pressure across Inline Sensors	5.8 psi (0.4 bar) minimum
Viscosity range	10 to 500 cSt
Temperature	Operating environment: -20°C to +60°C (-4°F to +140°F) Storage: -40°C to +80°C (-40°F to +176°F) Operating fluid: 0°C to +85°C (+32°F to +185°F)
Working pressure	2 to 420 bar (30 to 6,000 PSI)
Moisture sensor calibration	±5% RH (over compensated temperature range of +10°C to +80°C)
Operating humidity range	5% RH to 100% RH
Moisture sensor stability	±0.2% RH typical at 50% RH in one year
Certification	IP66 rated EMC/RFI – EN61000-6-2:2001 EN61000-6-3:2001
Materials	User friendly construction Stainless Steel hydraulic block Viton seals
Dimensions	7.2” x 6.1” x 3.4” (182mm x 155mm x 86mm)
Weight	2.9 lbs. (1.3 kg)

Icount PD

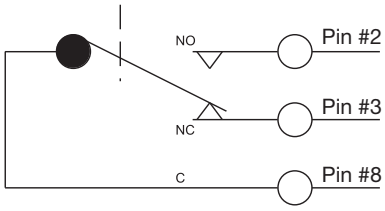
Dimensions / Installation Details





***Limit Relay Wiring Instructions**

NORMALLY OPEN
NORMALLY CLOSED
COMMON



2 mounting locations to suit M5 socket head cap screw.
(Screw pack supplied with Icount PD.)

Icount PD flange thickness = 0.4" (10mm)

Maximum Torque 5Nm

M12 Communication Cable: Wiring Configuration

Pin	4-20mA option connections	0-5V/0-3V option connections
1	NOT USED	NOT USED
2	RS232 Ground (pin 5**)	RS232 Ground (pin 5**)
3	Channel A, ISO 4µm (c)*	Channel A, ISO 4µm (c)*
4	Channel B, ISO 6µm (c)* **or** NAS (if selected)	Channel B, ISO 6µm (c)* **or** NAS (if selected)
5	RS232 Receive (Pin 3**)	RS232 Receive (Pin 3**)
6	RS232 Transmit (Pin 2**)	RS232 Transmit (Pin 2**)
7	Moisture sensor channel (if fitted)	Moisture sensor channel (if fitted)
8	Channel C, ISO 14µm (c)*	Channel C, ISO 14µm (c)*

Note: It is the responsibility of the end user to ensure that the cable's braided screen is terminated to a suitable earth bonding point.

* Optional – refer to the Icount PD part number specifier section in the manual.

** A standard USB serial adaptor can be used with the recommended 9-way D-type connector to convert RS232 to USB.

*M12 Limit Relay & Alarm Levels: Wiring Configuration

Pin	Current loop option connections	0-5V/0-3V option connections
1	Product supply 9-40Vdc	Product supply 9-40Vdc
2	4-20mA supply 12-20Vdc	0-5 / 0-3V supply 12-24Vdc
3	Relay (Normally Closed)*** (if fitted)	Relay (Normally Closed)*** (if fitted)
4	Relay (Normally Open)*** (if fitted)	Relay (Normally Open)*** (if fitted)
5	NOT USED	NOT USED
6	NOT USED	0-5 / 0-3V supply 0Vdc
7	Main supply 0Vdc	Product supply 0Vdc
8	Relay (Common)*** (if fitted)	Relay (Common)*** (if fitted)

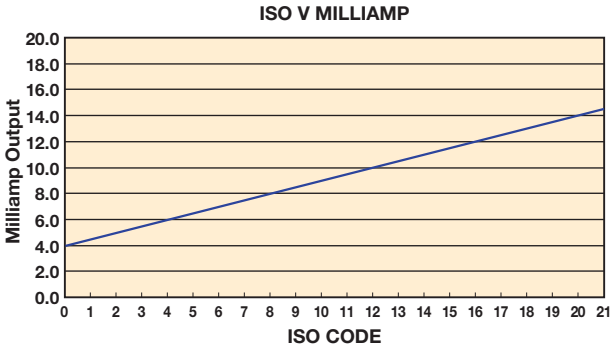
Note: If the moisture sensor is fitted without either option, then the output is RS232.

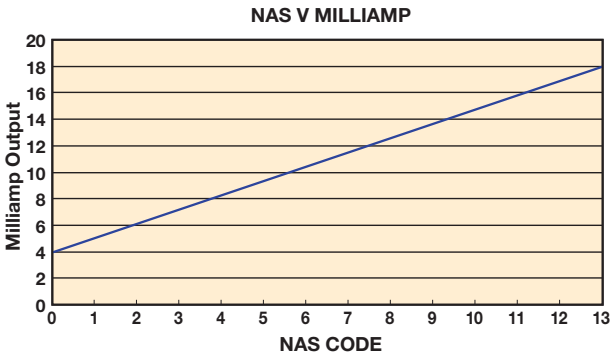
Parker recommends that the mating M12 connector cables are screened. These cables are available from Parker through the ordering information section.

*** Optional – refer to ordering information section.

Icount PD

Variable mA output settings





The following table can be used to equate the analogue output to an ISO or NAS Code.

Example: ISO code 12 is equal to 10mA.

mA	ISO
4.0	0
4.5	1
5.0	2
5.5	3
6.0	4
6.5	5
7.0	6
7.5	7
8.0	8
8.5	9
9.0	10
9.5	11
10.0	12
10.5	13
11.0	14
11.5	15
12.0	16
12.5	17
13.0	18
13.5	19
14.0	20
14.5	21
15.0	**
15.5	**
16.0	**
16.5	**
17.0	**
17.5	**
18.0	**
18.5	**
19.0	OVERRANGE
19.5	OVERRANGE
20.0	ERROR

mA	NAS
4	00
5	0
6	1
7	2
8	3
9	4
10	5
11	6
12	7
13	8
14	9
15	10
16	11
17	12
18	**
19	**
20	ERROR

4-20mA output settings

ISO Setting

mA current = (ISO Code / 2) +4

eg. 10mA = (ISO 12 / 2) +4

or

ISO Code = (mA current - 4) *2

eg. ISO 12 = (10mA -4) *2

NAS Setting

mA current = NAS Code +5

eg. 15mA = NAS 10 +5

or

NAS Code = mA current -5

eg. NAS 10 = 15mA – 5

Variable voltage output settings

The variable voltage output option has the capability of two different voltage ranges: a 0-5Vdc range as standard, and a user-selectable 0-3Vdc range. The full list of commands on how to change the voltage output is available from Parker.

The following tables can be used to relate the analog output to an ISO or NAS code.

For example, in a 0-5Vdc range, ISO code 16 is eaual to an output of 3.5Vdc. In a 0-3Vdc range, ISO code 8 is equal to an output of 1.0Vdc.

Table relating ISO codes to voltage output

ISO	Err	0	1	2	3	4	5	6	7	8	9	10	11
0-5Vdc	<0.2	0.3	0.5	0.7	0.9	1.1	1.3	1.5	1.7	1.9	2.1	2.3	2.5
0-3Vdc	<0.15	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3

▶▷

▷▶ cont.

ISO	12	13	14	15	16	17	18	19	20	21	22	Err
0-5Vdc	2.7	2.9	3.1	3.3	3.5	3.7	3.9	4.1	4.3	4.5	4.7	>4.8
0-3Vdc	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	>2.45

Table relating NAS codes to voltage output

ISO	Err	00	0	1	2	3	4	5	6	7	8	9	10	11	12	Err
0-5Vdc	<0.4	0.6	0.9	1.2	1.5	1.8	2.1	2.4	2.7	3.0	3.3	3.6	3.9	4.2	4.5	>4.6
0-3Vdc	<0.2	N.S.	0.3	0.5	0.7	0.9	1.1	1.3	1.5	1.7	1.9	2.1	2.3	2.5	2.7	>2.8

Icount PD

Display parameters (ISO 4406/NAS 1638)

Digital display indication

The digital display will show the actual measured codes, the channel (μ) size and the user defineable limits. Note that the channel size and limits will alternate between the two.

The moisture sensor reading (%RH) will also be shown – if the moisture sensor option is fitted.

The order of trigger for both of the codes and moisture sensor option is:

- Solid digit(s) = code(s) that are at or below the set point (limit)
- Flashing digit(s) = code(s) that are above the set point (limit)

The display for ISO4406 and NAS1638 are identical. The ISO display is shown below.

LED display indication

The LED display uses 3 sets of LED for the indication of ISO 4406 and NAS1638 code figures. Individual code lights will trigger based on the customer settings.

The order of trigger will be:

- Solid green = one ISO code, or better, below the set point (limit)
- Blinking green = ISO code at the set point (limit)
- Solid red = one ISO code above the set point (limit)
- Blinking red = two ISO codes, or more, above the set point (limit)

Error detection

In the unlikely event of an error occurring, the digital display on the Icount PD will simply display the actual error code only – i.e. ERROR 13 (a full list of error codes is detailed in the Icount PD user manual).

Moisture sensor output settings

The moisture sensor is an option that can be included when specifying the Icount PD. The moisture sensor reports on the saturation levels of the fluid passing through the Icount PD sensing cell. The output is a linear scale, reporting within the range of 5% saturation to 100% saturation.

Saturation	4-20mA	0-3Vdc	0-5Vdc
5%	4.8	0.15	0.25
25%	8	0.75	1.25
50%	12	1.50	2.50
75%	16	2.25	3.75
100%	20	3.00	5.00

Icount PD

Auxilliary Flow Device

The pressure compensated, flow control device (Part Number S840074) has been developed to give the Icount PD user greater flexibility. The flow control device will enable testing where flow ranges are outside the Icount PD specifications (40 – 140 ml/min), or where pipe diameters do not allow the Icount PD to be installed.

The flow control device fits onto the downstream (outlet) side of the Icount PD, connecting through a manifold block, via a self-sealing quick connection test point and is fitted with a differential pressure valve.

This flow control device automatically compensates for pressure and viscosity changes, while maintaining its setting even as the workload changes.

Simply position the valve to match the viscosity of the oil you are testing.

The chart below can be used to determine the valve position:

Valve Position	cSt Range
3	up to 100
3.8	90 - 200
4.2	190 - 320
5	310 - 500

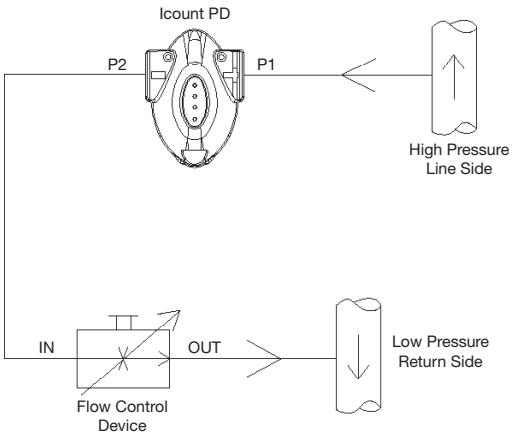
Example:

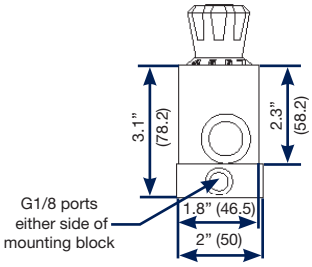
If the fluid you wish to analyse has a viscosity of 50cSt under normal operating conditions then the control knob on the Flow Control Device should be set to valve position '3.'

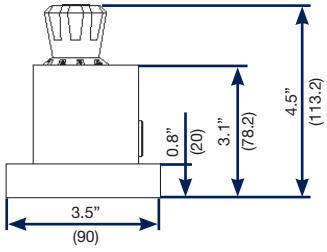
The flow device will now automatically control the flow rate through the IcountPD to within its working range of 40-140ml/min.

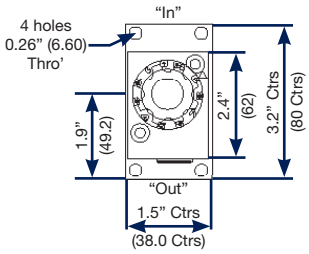
Note: The flow control device will still operate correctly even with the high pressure side at 200bar and the return back to an open system of 0 bar (DP = 200bar).

Hydraulic Connection Diagram









Actuator	Manual flow rate adjustable via control knob
Mounting type	4 off mounting holes to suit M6 screws (not supplied)
Mounting position	Any
Weight	3.7 lb. (1.7 kg)
Fluid temperature	+41°F to +176°F (+5°C to +80°C)
Ambient storage temperature	-4°F to +104°F (-20°C to +40°C)
Viscosity range	20cSt to 500cSt (if lower than 20cSt, contact Parker)
Differential pressure range	5 to 315 bar
Maximum pressure	315 bar
Flow direction	IN to OUT flow control function
Port thread detail	1/8" BSPP (test points not supplied)
Internal seals	Viton

Icount PD

Communication Options

The IcountPD may be configured using the Icount PD Setup Utility. For more direct control of the device using its communications protocol, you may also use the Microsoft Windows® HyperTerminal program (this program is not currently supplied with the Windows Vista™ operating system).

Communication protocol

The communication protocol for the serial communication link is to be used with Microsoft Windows HyperTerminal. The settings are as follows:

Baud rate 9600
Data bits. 8
Parity. . . . . .None
Stop bits 1
Flow control . . . . . .None

The commands used with this product are made up of Set, Read and Start/Stop commands.

- Set commands allow the value or values of parameters to be set
- Read commands allow the value or values of parameters to be read
- Start/Stop allows the user to start and stop tests

All commands are sent in ASCII characters, and the protocol accepts both upper and lower case characters as the examples below:

SDF
SdF

Note: A full list of commands is detailed in the user manual.

Ordering Information

Key	Fluid Type	Calibration	Display	Limit Relay	Communication	Moisture Sensor	Cable Connector Kit
IPD	1 Mineral	1 ACFTD	2 LED	2 Yes	2 RS232/4-20mA	1 No	10 Deutsch DT series connector
	2 Aggressive	2 MTD	3 LCD		3 RS232/0-5V	2 Yes	30 M12, 8-pin plug connector*
	3 Aviation fuel Hazardous areas	3 AS4059					
	4 Aviation fuel Non Hazardous areas						

Accessories	Part Number	
	Mineral	Aggressive
1 Meter Hose Length	B.84.224	B.84.827
2 Meter Hose Length	B.94.802	B.94.801
5 Meter Hose Length	B.84.730	B.84.828
1/4" BSP Test point	P.653109 (M16)	P.843081 (5/8 BSF)
1/8" BSP Test point	P.653110 (M16)	P.853008 (5/8 BSF)
1/8" NPT Test point	P.653512 (M16)	P.853005 (5/8 BSF)
Single Point Sampler	SPS2021	SPS2026
External Flow Device	S840074	Contact Factory
Power Supply	B.84.829	B.84.829
5 meter, M12, 8-pin plug and socket cable kit*	Contact Factory	Contact Factory

*M12 Cable kit consists of two 5 meter cables to enable all output options (Communications cable and Relay/Power Supply cable)

aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding

icountBS - Bottle Sampler

The benchtop solution to fluid contamination bottle sampling

Parker

ENGINEERING YOUR SUCCESS.

The Complete Solution - Industrial Design Combined with State of the Art Technology

The icountBS - Bottle Sampler from Parker, with its innovative industrial design, has been developed for customers looking for state of the art technology, attention to detail and the compactness of a permanent laboratory particle analysis instrument.

Combine this with on-board, laser based, leading edge technology to bring to all industries a truly revolutionary Particle Counter. The innovative icountBS is a product from the next generation of Parker's fluid particle analysis and monitoring solutions.

The IBS features an easy to use interactive touch screen, environmentally controlled pressurized bottle chamber, an internal compressor pump, automated door locking mechanism, sample tube cleaning sleeve that minimizes cross contamination, and an internal printer.

The icountBS benefits from Parkers knowledge and experience of providing fluid analysis equipment to the market for over 15 years.

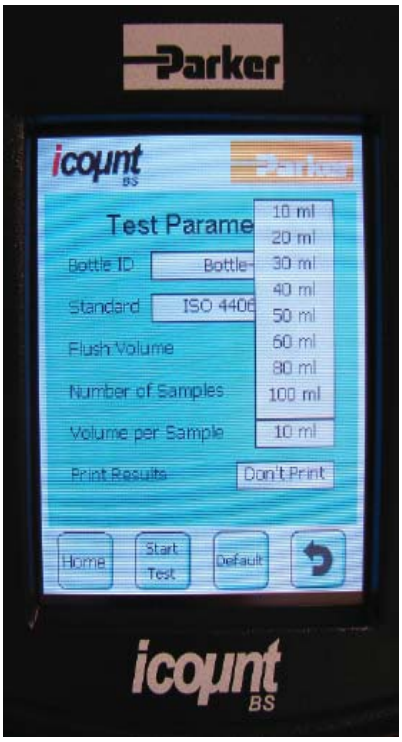
icountBS - Bottle Sampler Features & Benefits

- Customer programmable number of sample runs/sample bottle averaging and pre-test flush volumes from 10ml min. to 100ml max.
- Input via fluid resistant touch screen display.
- Repeatable and reproducible performance to ISO4406:1999, jAS4059E, and NAS1638 particle count distributions. Other calibration standards are included.
- On-board compressor and 'shop' air capable.
- Design concept allowing for portability. DC and rechargeable battery pack options built in.
- Sample tube self cleaning sleeve minimizing cross contamination.
- 500 test sample memory.
- Data download via USB jump drive or USB to USB included.
- Internal printer.

Home Screen

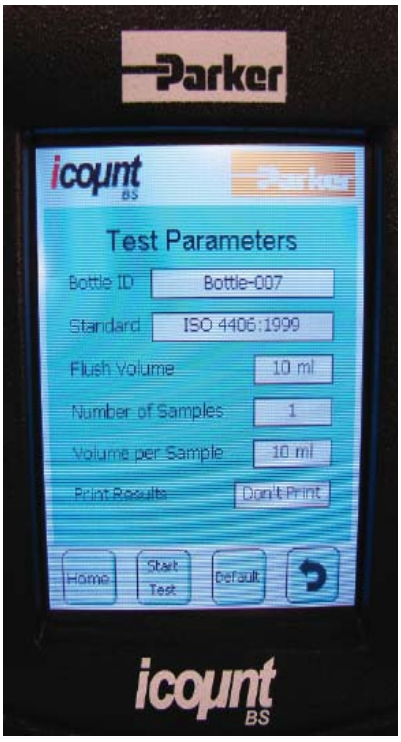
Sample ID Input

Number of Sample Runs



Sample Volume

Flush Volume



Start Test

Analyzing the Test Results

Once the automatic oil sample test has been completed, what next?

Solid contaminants in fluid power systems vary in size, shape, form and quantity. The most harmful contaminants are normally between 6 microns and 14 microns. The ISO code is the preferred method of reporting quantity of contaminants.

The ISO code number corresponds to contamination levels relating to three sizes. The first scale number represents the number of particles that are equal to and greater than 4µm (c) per ml of fluid, the second number for particles that are equal to and greater than 6 µm(c) per ml of fluid and the third number for particles that are equal to and greater than 14 µm(c) per ml of fluid.

For example: An ISO code 20/18/14 indicates that there are between 5,000 - 10,000 particles that are equal to and greater than 4µm(c), between 1,300 - 2,500 particles that are equal to and greater than 6µm(c), and between 80 - 160 particles that are equal to and greater than 14µm(c).

icountBS Product Specification

Principle of Operation	Laser based light obscuration
Dimensions	H=20.9” x W=7.48” (8.27” Door) x D=16.1”
Weight	31 lb. (14kg)
Mechanical Composition	Stainless steel 316, plated mild steel and aluminum
Plastics Composition	Precision polyurethane RIM moldings and ABS plastic
Environmental Operating Temperature (Tested)	41°F to 140°F (+5°C to +60°C)
Operating RH Range	20 - 85% [Tested at 86°F (30°C), no condensation]
Storage Temperature	40°F to 194°F (-40°C to +90°C)
Storage RH Range	10 - 90% (Tested at 30°C, no condensation)
Channel Sizes	MTD - >4µ(c), >6µ(c), >14µ(c), >21µ(c), >38µ(c), >70µ(c), ACFTD - >2µ, >5µ, >15µ, >25µ, >50µ, >100µ
Analysis Range	ISO 7 to 21, NAS 0 to 12
Contamination Standards	MTD - ISO 4406:1999 & NAS 1638 ACFTD - ISO 4406:1987, ISO 4406:1991, NAS 1638, and jAS4059E For further contamination standards consult Parker
Calibration Standard	ISO MTD and ACFTD calibration to traceable ISO Standards. (Contact Parker for further details)
Fluid Management	Maximum single sample = 100ml, Minimum single sample = 10ml
Possible Test Configurations	User selectable from single test up to 5 tests per run (eg. 1 x 100ml up to 5 x 50ml per run)
Pre-Test Flush Volume	Minimum = 10ml, Maximum = 100ml
Viscosity Range	5 to 400 cSt
Fluid Compatibility	Mineral oils, petroleum and hydrocarbon based fluids. For all other fluids, consult factory.
Sample Bottle Size	No specific bottle required. Maximum size = 2.95” (Dia.) x 5.90” (H). Maximum volume = 250ml
Memory Storage	500 tests (capacity warning after 450 tests)
Output Display	Backlight 256 color STN transmissive
Output Display Resolution	320 x 3 (RGB) (H) x 240 (W) dots
Display Active Area	115 (H) x 86 (W) mm
Data Input	Via icon driven resistive touch screen
Printer	Thermal dot-line printing
Printer Paper	Ø50mm - (57mm x 25mm)
Test Certification	Calibration & Certificate of Conformity
Power Supply	DC output - 12V @ 6.60Amps, 80 watts max. AC input - 100 to 240V @ 1.2Amps (50 - 60 Hz)
Battery Power	2 hours (recommended to be fully charged every 3 months)
Battery Stand-By Time	1 month (then 1 hour of operation)
Battery Fuse	6.3 Amps (anti-surge)
Air Pressure Source	50 psi (3.5 bar) internal mini-compressor or 101 psi (7 bar) shop air

icountBS - Bottle Sampler Ordering Information

Part Number
IBS3100US
IBS3000FUS (fuel version)
IBS3000MUS (minilab version)

Accessories	Part Number	Included
250ml Sample Bottle (2/pk)	ACC6NW001	* (2 pks.)
Sample Bottle Pack (50)	ACC6NW002	
Vapour/Waste Bottle	ACC6NW003	*
Waste Bottle Folder	ACC6NW004	
Printer Paper Reel (x1)	ACC6NW005	*
Transport Case	P893865	*
1m Waste Tube (Clear)	ACC6NW009	*
1m Vapour Hose (Blue)	ACC6NW010	*
USB Memory Stick	ACC6NW011	*
icountBS CD Manual	ACC6NW012	*
Air Connector	P.893318	*

* These items included with IBS unit within a transportation case.

icountMS Range

Moisture Sensors

Fast, reliable and accurate inline detection of moisture in fluids

MS moisture sensors provide fast, reliable and accurate inline detection of moisture in fluids. Technology developed for preventative maintenance programmes. MS200 is the ‘Programmable’ sensor monitoring and reporting relative humidity (RH), moisture content in oils. MS300 ‘Intrinsically safe’ sensor ATEX certified for use in hazardous Zone 0 environments.

Product Features

- MS moisture sensors provide fast, reliable and accurate inline detection of moisture in fluids.
- Technology developed for preventative maintenance programs.
- MS200 ‘Programmable’ sensor monitoring and reporting relative humidity (RH), moisture content in oils. 6,000 PSI (420 bar) MAOP.
- MS300 ‘Intrinsically safe’ sensor ATEX certificated for use in hazardous Zone 0 environments. 6,000 PSI (420 bar) MAOP.
- Temperature Outputs on all versions.

icountMS Range

Features and Benefits

- Continuous, online moisture indication, for hydraulic and lubricating systems.
- Reporting of % relative humidity of water content, giving the user information on how close to the fluids real saturation point.
- Reliable data on the rate of water absorption.
- Sensing cell technology using a laser trimmed thermoset polymer, for capacitive sensing that is capable of absorbing water molecules due to its micro porous structure.
- Uses a thermistor for temperature compensation correction. Offering total confidence in reporting the %RH relative humidity over the sensors temperature range.
- A purpose designed tee adaptor allows for easy installation into an existing fluid system.
- The MS200 can also be specified with a bench top wand offering the end user greater flexibility.

Typical Applications

- Ground support vehicles
- Pulp and paper plants
- Marine hydraulics
- Power transmission & distribution
- Forestry
- Industrial hydraulics
- Earth moving applications
- Agricultural
- Hazardous Areas (Zone II)
- Simulators

In-Line Moisture Measurement of Hydraulic & Lubricating Fluids.

Parkers Moisture Sensor Range offers fast, reliable and accurate in-line detection of moisture in fluids. The MS transducer type technology has been especially designed with the preventative maintenance programme environment in mind.

The industry accepted sensing cell device will monitor and report Relative Humidity (RH), moisture content in oils. The water content measurement technique offers the end user benefits over the current standard form of water content reporting (PPM).

This allows for real time preventative maintenance to be undertaken and corrective actions to be made. By knowing that the water contamination is still within the oils absorbing range, less than 100%, reclaiming fluid properties before additive damage occurs can initiate calculable cost savings.

MS150 Moisture Sensor

Specifications

Pressure:
Maximum allowable operating pressure. (MAOP): 10 bar (145 PSI).

Operating temperature:
Minimum: -20°C (-4°F).
Maximum: +85°C (+185°F).

Flow through sensor cell:
Installed in active flowstream.

Fluid compatibility:
Mineral oils, petroleum-based and Phosphate ester.

Viscosity range:
Unlimited.

Port connections:
1/4" BSPT or 1/4" NPT.

Supply voltage:
+8 to +30 Vdc.

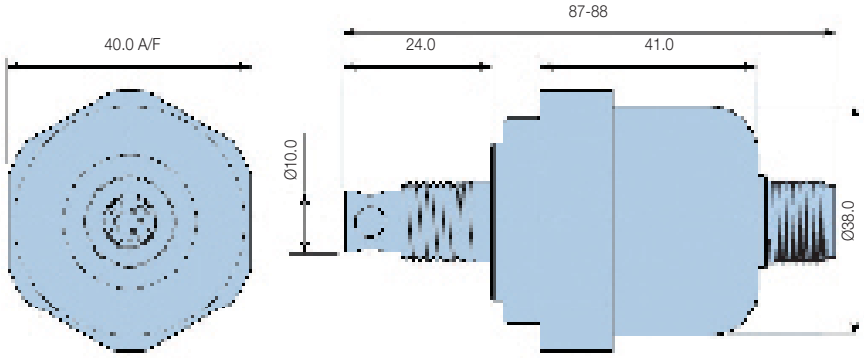
Sensor size/weight/material:
80mm x 43mm/0.1kg/Aluminium

IP ratings:
IP68

%RH Outputs:
(+1 to +5 Vdc) or (4 to 20mA)

Temperature Outputs:
0 to +5 Vdc

Installation Details

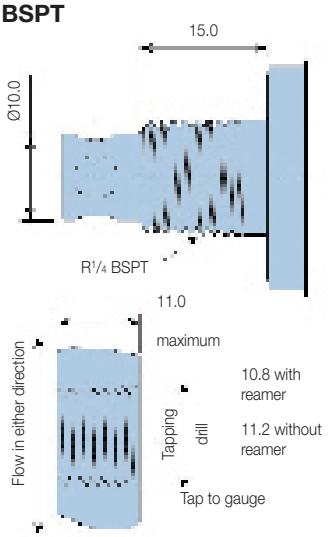


All dimensions in millimetres (mm)

Dimensions are for reference only

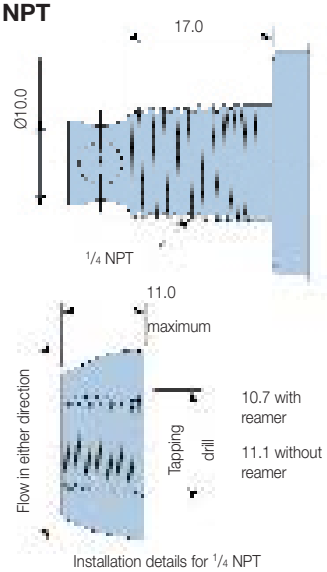
Thread Form Options

BSPT



Installation details for R1/4 BSPT taper

NPT



Installation details for 1/4 NPT

Sensor Outputs

MS150 moisture sensor pin designations

Pin	Designation	I/O	Description
1	Supply	Input	Supply voltage (+8 to +30Vdc)
2	%RH	Output	% Saturation out (+1 to +5Vdc)
3	%RH	Output	% Saturation out (+4 to +20mA)
4	Temperature	Output	Temperature out (0 to +5Vdc)
5	Common	Input	Common (0Vdc) ground from power supply (not chassis ground)

Interpreting the data

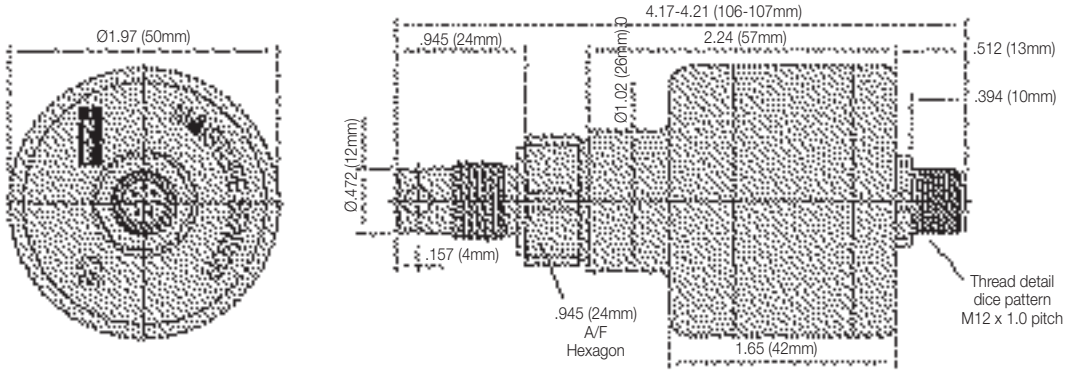
Oil type: Texaco Rando 46.
Saturation point: 400ppm @ 150ºF (65ºC).
At the above operating condition, the meter displays 100% saturation. As the meters scale indicates a reduction in the saturation percentage, there is also a corresponding reduction in PPM at a constant temperature. In the example above, a meter reading of 50% saturation could be interpreted as 200ppm at 150ºF (65ºC).

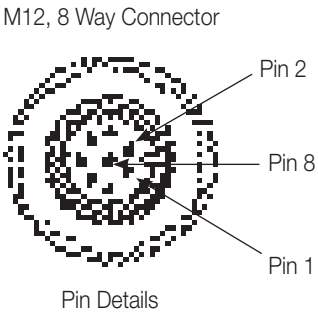
MS200 Moisture Sensor

Specifications

% Saturation Calibration Accuracy:	+3% RH
Temperature Calibration Accuracy:	±1°C
Thermal Stability:	±1% RH (over compensated temperature range +10 to +80°C)
Stability:	±0.2% RH typical at 50% RH in 1 year
Linearity:	±0.5% RH typical
Analog Output Hysteresis:	±0.5% RH Full Scale
Switched Output Hysteresis:	2% RH
Operating Temperature Range:	-40°F to +185°F (-40°C to +85°C)
Operating Humidity Range:	5 to 100% RH (non condensing)
Response Time:	60 sec in slow moving air at 25°C
Maximum Rated Pressure:	6,000 PSI (420 Bar)
Maximum Torque:	22 ft-lbs
Seal Material (depending on MS):	Fluorocarbon, EPDM, Perfluoroelastomer
Material:	Stainless Steel 303
Connector Details:	M12x1, 8 Way, IP67 Connector (IP68 when mated with molded cable)
Maximum Cable Length:	33 ft (10 m) with Voltage Output, 330 ft (100 m) with current output
Output:	SEE ORDERING INFORMATION

Installation Details





dimensions in inch (mm)

Moisture Sensor Wiring and Pin Designations

Pin	Wire Colour	Designation	I/O	Description
1	Brown	Analogue	Output	Temperature - Degí Celsius. User Select Output (0-3Vdc, 0-5Vdc, 1-6Vdc and 4-20mA).
2	Green	Alarm Limit	Output	Alarm Limit. Output that directly corresponds to the alarm set point.
3	Yellow	Analogue	Output	% Saturation. User Select Output (0-3Vdc, 0-5Vdc, 1-6Vdc and 4-20mA).
4	Grey	Receive	Input	RS232 Communication.
5	Pink	Send	Output	RS232 Communication.
6	Blue	Common	Input	Common (0Vdc). Ground from power supply.
7	White	Alarm Switch	Output	Alarm Switch. Constant 5Vdc when in normal operation. Switch to 0Vdc when in alarm condition. Red LED illuminates when Sensor is in an alarm condition.
8	Red	Supply	Input	Supply Voltage (+8 to +30Vdc). Green LED illuminates when power is properly applied.

MS300 Intrinsically Safe

Specifications

Pressure:
(MAOP): 6,000 PSI (420 bar)

Operating temperature:
Minimum: -40°F (-40°C) - dependent on seal material
Maximum: +185°F (+85°C)

Flow through sensor cell:
Installed in active flowstream

Fluid compatibility:
Mineral oils, petroleum-based and Phosphate ester-Skydrol option available

Viscosity range:
Unlimited

Thread form connections:
See ordering information

Outputs:
4-20mA (current loop)

Calibration accuracy:
+/- 5% RH

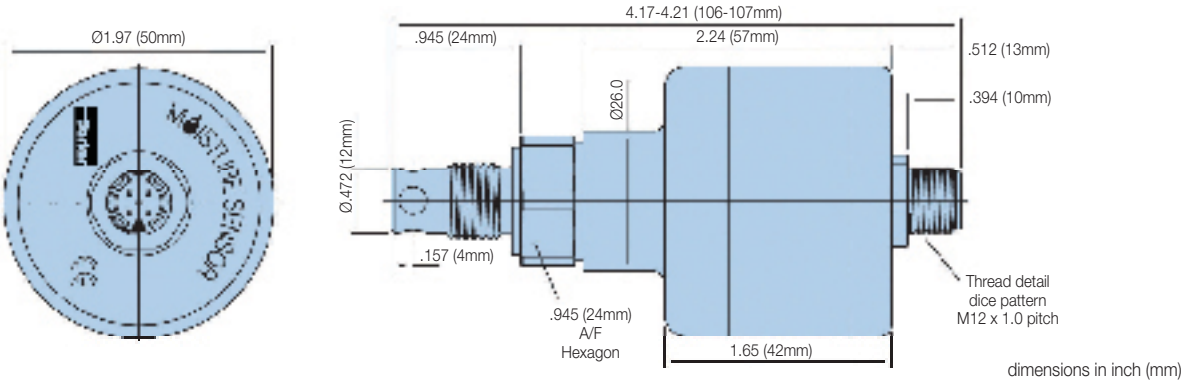
Compensated thermal stability:
+/- 1% RH (+ 50°F to +176°F)

Materials:
Stainless steel 303

Sensor size/weight:
4.21in x ø1.97in/0.66 lb (107mm x ø50mm/0.3Kg)

IP ratings:
IP68 (with specified molded cable)

Developed in association with Triteq Ltd.

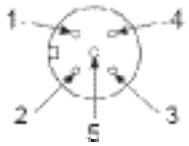


dimensions in inch (mm)

II 1G
Ga Ex ia IIB T4
0518
Sira 07ATEX2255
IECEx SIR 07.0089

Moisture Sensor Connection Diagram

1. Supply (4-20 mA - IN)	- Brown
2. Signal (4-20 mA - OUT)	- White
3. Not Used	- Blue
4. Not Used	- Black
5. Not Used	- Grey



The MS300 has been certified as Intrinsically Safe Electrical Apparatus and offers fast, reliable and accurate in-line detection of moisture in fluids for use in hazardous areas.

ATEX Certification allows the MS300 into areas of a potentially explosive atmosphere, that have previously not been allowed without permits, it is intended for use in Zone 0 hazardous areas requiring the use of category 1G equipment and has been designed for use with galvanic isolators to the specified values stated below:

The electrical parameters: Ui: 28V Ii: 93mA Pi:0.65W Ci: 380nF Li: 0

The following instructions apply to MS300 - 4-20mA Current Loop Moisture Sensor covered by certificate number Sira 07ATEX2255:

1. The equipment may be located where flammable gases of Group I may be present. The equipment is only certified for use in ambient tempera tures in the range -4°F to +104°F (-20°C to +40°C) and should not be used outside this range.

2. The equipment has not been assessed as a safety-related device (as referred to by Directive 94/9/EC Annex II, clause 1.5).

3. Installation of this equipment shall be carried out by suitably trained personnel in accordance with the applicable code of practice.

4. Repair of this equipment shall be carried out by the manufacturer or in accordance with the applicable code of practice (IEC 60079-19).

Moisture Sensor Displays

Specifications

Bar Graph Indicator (PBG8341A)

Construction:
Housing – nylon 6/6, window – acrylic,
bezel/board supports – ABS,
pins – phosphor bronze

Power supply:
11 – 30 Vdc

Signal input: (By dipswitch configuration)
Off – differential up to 5V
A – single signal (Ref. 0V) up to 5V
B – single signal (Ref. 1V) up to 6V

Cut out size:
45.6mm x 45.6mm

Fixing:
Push fit panel thickness 0.9mm to 3.2mm

Sealing:
Designed to IP50 standard.
(Front face may be silicon sealed after LED configuration)

Scale:
Supplied 0 to 100% in horizontal
Other scales, in volume, consult Parker Hannifin

Scaling factors:
10% to 100% range. Fully adjustable

Lamp intensity:
4mcd each

Front viewing:
Polarized

Weight:
29gms

Alternative Indicator

Description	DDU1001	DDU1002
Power supply	11 - 30 Vdc	110 - 240 Vdc
Accuracy	± 0.1% typical	± 0.1% typical
Sample rate	2.5 per second	2.5 per second
Operating temp (°C)	0 - 50	0 - 50
Storage temp (°C)	-10 to +70	-10 to +70
Display	N3.5 digit LEDA	$3^1/2$ digit LED
Power output (Vdc)	24	24
Weight (kg)	0.30	0.30
Panel cutout (mm)	93x45 ± 0.5	93x45 ±/0.5
Dimensions (mm)	48x96x93	48x96x93

PBG8341A

DDU1001/DDU1002

Product accessories part numbers

Product Number	Supersedes	Description
DDU1001	P.9732PVC-10	Digital display unit 22-55 Vdc
DDU1002	P.9732PVC-05	Digital display unit 110-240 Vdc
PBG8341A	PBG.8341.1A	Bar Graph Indicator (+11 to +30 Vdc)
PAM8342	PAM.8342	Bar Graph alarm module
ACC6NF000	B97200	5 meter M12, 8 pin molded cable (IP68)
ACC6NF001	P973200	M12, 5 pin rewireable connector (IP65)
ACC6NF002	S970410	10 meter extension box
ACC6NE008	S970400	UK 12 volt power supply
ACC6NE009	S970400	European 12 volt power supply
ACC6NE010	S970400	US 12 volt power supply
ACC6NF003	N/A	5 meter M12, 5 pin molded cable (IP68)

Moisture sensor output setting

The Moisture sensor reports on the saturation levels of the fluid passing through the sensing cell. The output is a linear scale, reporting within the range of 5% saturation to 100% saturation.

Saturation	4–20mA	0–3Vdc	0–5Vdc
5%	4.8	0.15	0.25
25%	8	0.75	1.25
50%	12	1.50	2.50
75%	16	2.25	3.75
100%	20	3.00	5.00

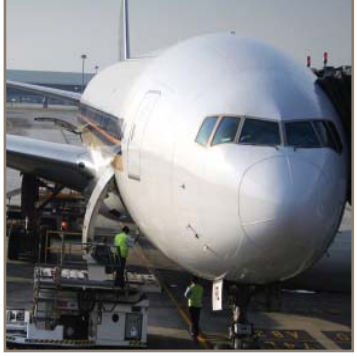
Ordering Information

MS200 - Product Configurator

Key	Model		Fluid Type		Output Options		Thread Forms		Connector		Future Option	
MS	**2**	Programmable	**2**	Mineral	01	0 -3 Vdc	**1**	G 1/4” BSP Bonded Seal	**1**	M12 8 Way	**0**	No
			6	Aggressive	**02**	0 - 5 Vdc	**2**	G 1/4” BSP Integral Seal				
					03	1 - 6 Vdc	**3**	R 1/4” Taper				
					04	4 - 20 mA	**4**	1/4” NPT Taper				
							5	9/16 - 18 UNF 2A Integral Seal				
							6	Hand Held Unit				
							7	G 3/8” BSP Female Swivel Equal T Adaptor				

MS300 - Product Configurator

Key	Model		Fluid Type		Output Options		Thread Forms		Connector		Future Option	
MS	**3**	Programmable	**2**	Mineral	**04**	4 - 20 mA	**1**	G 1/4” BSP Bonded Seal	**1**	5 Way	**0**	No
			6	Aggressive			2	G 1/4” BSP Integral Seal				
							3	R 1/4” Taper				
							4	1/4” NPT Taper				
							5	9/16 - 18 UNF 2A Integral Seal				
							6	G 3/8” BSP Female Swivel Equal Tee				



aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding

Par-Test™

Fluid Analysis

Parker

ENGINEERING YOUR SUCCESS.

Fluid Analysis

Par-Test™

Fluid analysis has proven to be a critical tool for any preventive maintenance program. Fluid analysis is able to identify potential problems that cannot be detected by human senses.

A comprehensive fluid analysis program can help prevent major hydraulic or lube oil system failures.

Par-Test is a complete laboratory analysis, performed on a small volume of fluid. The report you receive is a neatly organized three page format. One may quickly analyze the test results of an individual sample and/or look at a trend analysis for up to five different samples. Two types of services are offered through Par-Test, a water base fluid analysis kit or a petroleum base fluid analysis kit. For both types of services the Par-Test kit includes a pre-cleaned glass bottle, mailing container with pre-addressed label, sample information data sheet (to be completely filled out by end user) and the following analysis:

Fluid sampling for Par-Test involves important steps to insure you are getting a representative sample. Often, erroneous sample procedures will disguise the true nature of the system fluid. A complete sampling procedure is detailed on the back of this brochure. There also is a National Fluid Power Association standard (NFPA T2.9.1-1972) and an American National Standards Institute Standard (ANSI B93.13-1972) for extracting samples from a fluid power system.

Petroleum Base Kit

Particle Count
Photomicrograph
Free Water Analysis
Spectrometric Analysis
Viscosity Analysis
Water Analysis (PPM)
Neutralization Analysis

Water Base Kit

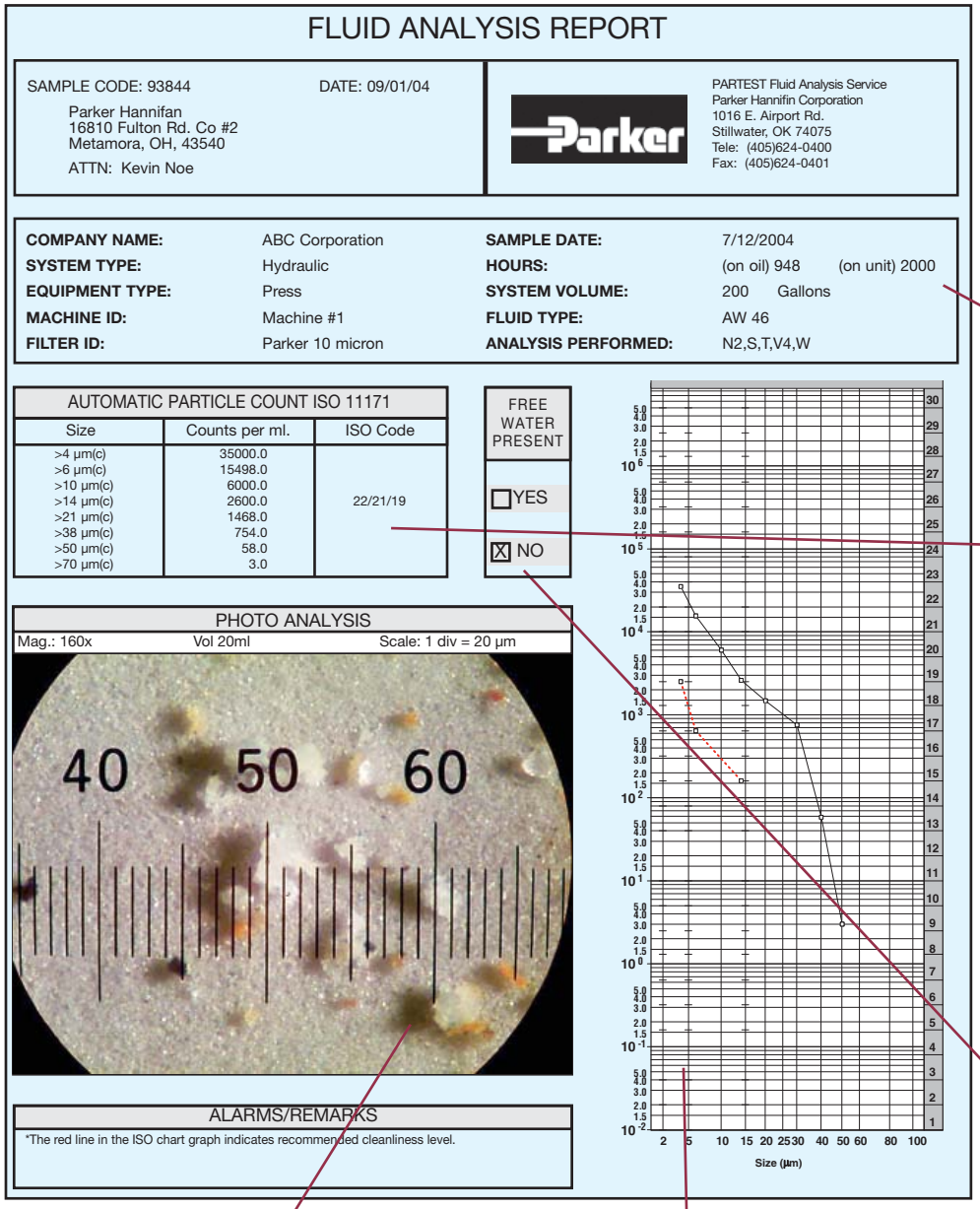
Particle Count
Photomicrograph
Spectrometric Analysis
Viscosity Analysis
Neutralization Analysis

How to Order

Description	Part Number
Petroleum base fluid kit (single test bottle)	927292
Petroleum base fluid kit (Carton of 10 test bottles)	927293
Water base fluid kit (single test bottle)	932995

Fluid Analysis

Par-Test™



FLUID ANALYSIS REPORT

SAMPLE CODE: 93844 DATE: 09/01/04

Parker Hannifan
16810 Fulton Rd. Co #2
Metamora, OH, 43540

ATTN: Kevin Noe

PARTEST Fluid Analysis Service
Parker Hannifin Corporation
1016 E. Airport Rd.
Stillwater, OK 74075
Tele: (405)624-0400
Fax: (405)624-0401

COMPANY NAME:	ABC Corporation	**SAMPLE DATE:**	7/12/2004
SYSTEM TYPE:	Hydraulic	**HOURS:**	(on oil) 948 (on unit) 2000
EQUIPMENT TYPE:	Press	**SYSTEM VOLUME:**	200 Gallons
MACHINE ID:	Machine #1	**FLUID TYPE:**	AW 46
FILTER ID:	Parker 10 micron	**ANALYSIS PERFORMED:**	N2,S,T,V4,W

AUTOMATIC PARTICLE COUNT ISO 11171

Size	Counts per ml.	ISO Code
>4 µm(c)	35000.0	
>6 µm(c)	15498.0	
>10 µm(c)	6000.0	
>14 µm(c)	2600.0	22/21/19
>21 µm(c)	1468.0	
>38 µm(c)	754.0	
>50 µm(c)	58.0	
>70 µm(c)	3.0	

FREE WATER PRESENT

☐ YES

☒ NO

PHOTO ANALYSIS

Mag.: 160x Vol 20ml Scale: 1 div = 20 µm

ALARMS/REMARKS

*The red line in the ISO chart graph indicates recommended cleanliness level.

For our Par-Test™ customers, the analysis report is available online for your ease and convenience. Historical data is also available. **Visit www.partestlab.com**

Sample Data

Information supplied by the user regarding the fluid to be analyzed. Complete and accurate information is crucial for a useful analysis.

Particle Count

Results are reported over 6 different particle size ranges and expressed as an ISO code (modified). The counts are per milliliter of fluid and the reporting is cumulative; ie. The particle count in the >2 micron row includes the number of particles greater than 5, 10, 15, 25 and 50 microns as well as particles between 2-5 microns in size. Particle resuspension method is utilized for water based fluid samples.

Free Water Analysis

Determines if the water present is beyond the saturation point of the fluid. At the saturation point, the fluid can no longer dissolve or hold any more water. Its appearance becomes cloudy or “milky”. Many hydraulic oils saturate between 500 and 1000 PPM of water.

Photo Analysis

A photomicrograph of a small volume of fluid (20 ml) magnified 100X. This analysis gives a quick glance at the contamination present in the fluid. Each line of the graduated scale represents 20 microns in size.

The full color photomicrograph helps identify particles which would otherwise be grouped by class.

ISO Chart

Graphically illustrates the particle count on a graph. The recommended cleanliness code level, if given on the submittal form, is shown by a broken line on the ISO chart.

Fluid Analysis

Par-Test™

FLUID ANALYSIS REPORT

SAMPLE CODE: 93844 DATE: 09/01/04

Parker Hannifan
16810 Fulton Rd. Co #2
Metamora, OH, 43540

ATTN: Kevin Noe

PARTEST Fluid Analysis Service
Parker Hannifin Corporation
1016 E. Airport Rd.
Stillwater, OK 74075
Tele: (405)624-0400
Fax: (405)624-0401

SPECTROMETRIC ANALYSIS

WEAR METALS AND ADDITIVES	PPM BY WEIGHT	STATUS*
IRON	120.0	H
COPPER	510.0	H
CHROMIUM	< 1.0	N
LEAD	< 1.0	N
ALUMINUM	1.0	N
TIN	< 1.0	N
SILICON	< 1.0	N
ZINC	423.0	N
MAGNESIUM	< 1.0	N
CALCIUM	540.0	H
PHOSPHORUS	10.0	L
BARIUM	1.0	N
BORON	< 1.0	N
SODIUM	< 1.0	N
MOLYBDENUM	< 1.0	N
SILVER	< 1.0	N
NICKEL	< 1.0	N
TITANIUM	< 1.0	N
MANGANESE	< 1.0	N
ANTIMONY	< 1.0	N

L = LOW N = NORMAL H= HIGH

The Spectometic Analysis reports the ppm level of 20 different wear metals and additives in the sample. Generally the first 7 and last 5 elements are considered wear elements not normally present in hydraulic oil. Zinc through molybdenum (shaded) represent some common additives in oil. If a baseline oil sample (new oil out of a drum) is provide, then comments on the analyzed sample can be provided on whether the status of the elements are low, normal, or high.

Viscosity Analysis - ASTM D445

CST@100C:		SSU@210F:	
CST@40C:	46.25	SSU@100F:	215.0

Viscosity at 40C (100F) is reported in Centistokes (cST) and SUS (Saybolt Universal Seconds). The test is conducted in accordance with ASTM D445 procedures for determining the kinematic viscosity of fluids

Neutralization Analysis - ASTM D794

TAN: 0.44

The Total Acid Number (TAN) test measures the acidity of a hydraulic fluid. The higher the number, the more acidic the fluid. Over time this may mean the fluid is becoming oxidized.

Water Analysis - ASTM D6304

WATER CONTENT (PPM): 410.0

The water analysis test shows the actual parts per million of water in a sample. This is known as the Karl Fischer titration test and is conducted in accordance with ASTM D6304.

Comments

*Please check spectrometric status for abnormal conditions.

WEAR METALS AND ADDITIVES

Iron: Ferrous wear particle typically from pumps, gears, cylinders, or rust

Copper: Brass (copper/zinc) and bronze (copper/tin) in bearings and bushings

Chromium: (white non ferrous metal) Chrome from cylinder rods, bearings, valve spools

Lead: Babbitt or copper lead bearings

Aluminum: White nonferrous metal from pump bodies, bushings, bearings, and grinding compounds

Tin: Babbitt bearings, plating

Silicon: Sand/dirt contamination or antifoaming additive in oil

Zinc: Plating or anti-wear additive in oil

Magnesium: Detergent, dispersive additive in oil, bearings, water

Calcium: Dispersant additive or acid neutralizer

Phosphorous: Anti-wear or fire resistant additive in fluid

Barium: Corrosion, rust inhibitor additive in oil

Boron: Detergent, dispersive additive in oil

Sodium: Detergent or coolant additive

Molybdenum: Alloy metal or anti friction additive

Silver: White non ferrous metal

Nickel: Alloy metal

Titanium: White non ferrous metal

Manganese: White non ferrous metal

Antimony: Babbit bearings, greases

Viscosity Analysis

Viscosity is a very important property of a fluid in terms of system performance. Viscosity expresses the internal friction between molecules in the fluid. Typically a breakdown in viscosity will be seen as an increase. Both SSU at 100° F and cSt at 40° C are reported.

Neutralization Analysis

Referred to as the Total Acid Number (TAN) this titration test measures the acid level of the sample fluid. The production of acidic material causes oxidation degradation or aging of most fluids. This activity is promoted by elevated temperatures, presence of entrained metal particles, and intimate contact with air. It is the rate of increase of the TAN during any given time period that is significant, not just the absolute value.

Water Analysis

Karl Fischer test gives accurate measure of water concentration in the sample fluid. The results are reported in parts per million (PPM) and allow for detection of water levels well below the saturation point.

Remarks

Quick statements or alerts about any unusual results from one of the tests reported on this page.

Spectrometric Analysis

Results obtained by Rotating Disk Electrode (ROE) Spectrometer and reported in terms of parts per million (PPM). Twenty different wear metals and additives are analyzed to help determine the condition of the fluid. The spectrometric test is limited to identifying particles below 5-7 micron in size. Base line (new) fluid samples should be sent in for each different fluid to be analyzed. This will be used to determine the status.

Fluid Analysis

Par-Test™

FLUID ANALYSIS REPORT

SAMPLE CODE: 93844 DATE: 09/01/04

Parker Hannifan
16810 Fulton Rd. Co #2
Metamora, OH, 43540

ATTN: Kevin Noe

PARTEST Fluid Analysis Service
Parker Hannifin Corporation
1016 E. Airport Rd.
Stillwater, OK 74075
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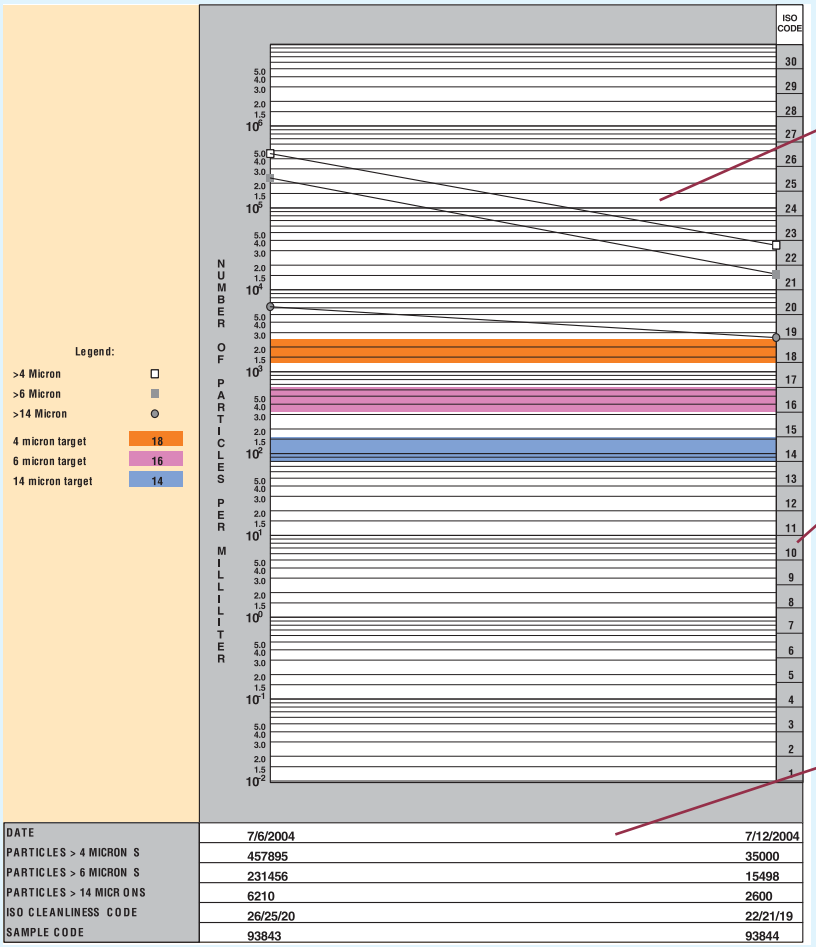

DATE	7/6/2004	7/12/2004
PARTICLES > 4 MICRON S	457895	35000
PARTICLES > 6 MICRON S	231456	15498
PARTICLES > 14 MICR ONS	6210	2600
ISO CLEANLINESS CODE	26/25/20	22/21/19
SAMPLE CODE	93843	93844

For our Par-Test™ customers, the analysis report is available online for your ease and convenience. Historical data is also available. Visit www.partestlab.com

Trend Analysis

Graphical history for up to 5 samples plotted for 2, 5 and 15 micron and greater size particles. This analysis is a valuable tool for tracking the progress of a system over a given time period.

ISO Range Code

Index Number that is associated with a range of particles. Below is a list of the range numbers and the corresponding particle quantities.

Sample Code

Assigned to the test kit form for a ready reference. This code can be used to track the sample from start to finish.

NUMBER OF PARTICLES PER ML

Range Code	More than	Up to and including	Range Code	More than	Up to and including
30	5,000,000	10,000,000	18	1,300	2,500
29	2,500,000	5,000,000	17	640	1,300
28	1,300,000	2,500,000	16	320	640
27	640,000	1,300,000	15	160	320
26	320,000	640,000	14	80	160
25	160,000	320,000	13	40	80
24	80,000	160,000	12	20	40
23	40,000	80,000	11	10	20
22	20,000	40,000	10	5	10
21	10,000	20,000	9	2.5	5
20	5,000	10,000	8	1.3	2.5
19	2,500	5,000	7	.64	1.3
			6	.32	.64

Fluid Analysis

Par-Test™

SAMPLING PROCEDURE

Obtaining a fluid sample for analysis involves important steps to make sure you are getting a representative sample. Often erroneous sampling procedures will disguise the true nature of system cleanliness levels. Use one of the following methods to obtain a representative system sample.

I. For systems with a sampling valve

A. Operate system for at least 1/2 hour.
B. With the system operating, open the sample valve allowing 200 ml to 500 ml (7 to 16 ounces) of fluid to flush the sampling port. (The sample valve design should provide turbulent flow through the sampling port.)
C. Using a wide mouth, pre-cleaned sampling bottle, remove the bottle cap and place in the stream of flow from the sampling valve. Do NOT "rinse" out the bottle with initial sample.
D. Close the sample bottle immediately. Next, close the sampling valve. (Make prior provision to "catch" the fluid while removing the bottle from the stream.)
E. Tag the sample bottle with pertinent data; include date, machine number, fluid supplier, fluid number code, fluid type, and time elapsed since last sample (if any).

II. Systems without a sampling valve

There are two locations to obtain a sample in a system without a sampling valve: in-tank and in the line. The procedure for both follows:

A. In the Tank Sampling

1. Operate the system for at least 1/2 hour.
2. Use a small hand-held vacuum pump to extract sample. Insert sampling device into the tank to one half of the fluid height. You will probably have to weight the end of the sampling tube. Your objective is to obtain a sample in the middle portion of the tank. Avoid the top or bottom of the tank. Do not let the syringe or tubing came in contact with the side of the tank.
3. Put extracted fluid into an approved, pre-cleaned sample bottle as described in the previous sampling valve method.
4. Cap immediately.
5. Tag with information as described in sampling valve method.

B. In-line Sampling

1. Operate the system for at least 1/2 hour.
2. Locate a suitable valve in the system where turbulent flow can be obtained (ball valve is preferred). If no such valve exists, locate a fitting which can be easily opened to provide turbulent flow (tee or elbow).
3. Flush the valve or fitting sample point with a filtered solvent. Open valve or fitting and allow adequate flushing. (Take care to allow for this step. Direct sample back to tank or into a large container. It is not necessary to discard this fluid.)
4. Place in an approved, pre-cleaned sample bottle under the stream of flow per sampling valve methods.
5. Cap sample bottle immediately.
6. Tag with important information per the sampling valve method.
   Note: Select a valve or fitting where the pressure is limited to 200 PSIG (14 bar) or less.

ON-SITE FLUID ANALYSIS PRODUCT

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