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# **Automotive Filters and Fluid Contamination Monitoring** Solutions for the Automotive Industry





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# **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-tonone 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:

Within this catalog, each product has been allocated an operating temperature and pressure range.
 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.

<sup>4.</sup> The use of non-Parker replacement elements and parts may invalidate your warranty.

## Contents

Parker Automotive Filter Catalog

### **DIN Filters**

### **High Pressure**

		 -			
FDA.	<b>FDB</b>	 	 	 	4
,		 	 	 	

#### Low Pressure Filters

10DT, 16DT, 25DT	12
40RF, 50RF	16

### SAE Series

#### **High Pressure Filters**

HF15P Series	18
HF3 Series	22
HF3 Duplex	24
HF4 Series	26
HF4 Duplex	29

#### Low Pressure Return Filters

HF2 Series - 15CN Return	rn34
HF3 Series - 40CN Return	rn38
HF4 Series - IL4/DIL4	

#### **High Flow Filters**

IL8/HDIL8 Fi	ilters²	13
--------------	---------	----

#### **Special Applications Filters**

Splash Lube Filter	
--------------------	--

#### Electrical Information ......54

#### **Offline Systems**

5MFP/10MFP Filter Cart	56
SMR Series	64
PVS Series	75
Guardian®	83
SOS	
	94

### Reservoir Equipment

EAB Environmental Air Filters	98
ABL Environmental Air Filters	102
AB Series Reservoir Breathers	106

### Fluid Condition Monitoring

LaserCM Portable Particle Counter	108
SPS - Single Point Sampler	116
System 20 – Inline Sensors	119
icountPD - Online Particle Detector	120
icountBS	128
Moisture Sensor Range	134
Par-Test <sup>™</sup>	141



## **DIN Series**

High Pressure DIN Filters





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## **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 ( $\beta_x \ge 200$ ).

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 antiextrusion 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 ( $\beta_x \ge 200$ ). Media is supported both upand 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



#### 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





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 antiextrusion 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	F	DA	FDB	
	mm	ins	mm	ins
A	32	1.26	49	1.93
В	26	1.02	39	1.54
С	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
Н	48	1.89	80	3.15
1	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
М	55	2.17	82	3.23
N	40	1.57	60	2.36
0	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
Filter FDA	<b>R = Mounting Holes</b> 4 Mounting Holes
Filter FDA	R = Mounting Holes 4 Mounting Holes M8 x 1.25 -
Filter FDA	R = Mounting Holes4 Mounting HolesM8 x 1.25 -6H x 12 Deep
FDA	R = Mounting Holes 4 Mounting Holes M8 x 1.25 - 6H x 12 Deep M10 x 1.5 -



#### $\Delta \mathbf{P}$ 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

FMUX ATEX certified indicator - contact Parker

#### **FMUF Electronic**





#### 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.	LED status			5	Output
setting	G	<b>Y1</b>	Y2	R	
50%	$\otimes$	$\otimes$			_
75%	$\otimes$	$\otimes$	$\otimes$		2 active
100%	$\otimes$	$\otimes$	$\otimes$	$\otimes$	1 active

	Enclosure class	IP65
	Electrical connector	DIN 43650, cable connection PG9 or optionally M12 4-pir
ĺ	Input supply voltage	+10 to 36 Vdc
	*Indication output	max. 300 mA/36 Vdc
Î	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			



	U14	4 <b>M</b>	U14H		
	mm ins mm		mm	ins	
Α	105	4.13	105	4.13	
В	32	1.26	32	1.26	
С	Ø19.78	Ø0.77	Ø18.83	Ø0.74	
	±0.06		±0.06		
D	7/8-14		7/8-14		
	UNF-2A		UNF-2A		





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  $\Delta P$  = Housing  $\Delta P$  + Element  $\Delta P$ Flow curves at 30 cSt viscosity.

































## **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 (I/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	1 <sup>1</sup> /2"	02	No	N/A	7 bar	FDBE2A02Q
FDB2A10N98G24Y	250	1 <sup>1</sup> /2"	10	Indication	N/A	7 bar	FDBE2A10Q
FDB3A03N98G24Y	400	1 <sup>1</sup> / <sub>2</sub> "	02		N/A	7 bar	FDBE3A02Q
FDB3A10N98G24Y	400	1 <sup>1</sup> / <sub>2</sub> "	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 (I/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	1 <sup>1</sup> / <sub>2</sub> "	02	Electronic	5 bar	7 bar	FDBE2A02Q
FDB2A10B98G24Y	250	1 <sup>1</sup> / <sub>2</sub> "	10	4 LED	5 bar	7 bar	FDBE2A10Q
FDB3A03B98G24Y	400	1 <sup>1</sup> / <sub>2</sub> "	02		5 bar	7 bar	FDBE3A02Q
FDB3A10B98G24Y	400	1 <sup>1</sup> / <sub>2</sub> "	10		5 bar	7 bar	FDBE3A10Q

#### Standard products table

Part number	Flow (I/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	<b>1</b> <sup>1</sup> / <sub>2</sub> "	02	Electronic	5 bar	No	FDBE2A02Q
FDB2A10HB98G24Y	250	1 <sup>1</sup> / <sub>2</sub> "	10	4 LED	5 bar	bypass	FDBE2A10Q
FDB3A03HB98G24Y	400	1 <sup>1</sup> / <sub>2</sub> "	02		5 bar		FDBE3A02Q
FDB3A10HB98G24Y	400	<b>1</b> <sup>1</sup> / <sub>2</sub> "	10		5 bar		FDBE3A10Q

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



## **DIN Series**

**DIN Low Pressure Filters** 





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## **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	G1 <sup>1</sup> /4
25DT	G11/2

#### 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**

 $50.8 \text{ psi} \pm 10\% (3.5 \text{ bar} \pm 10\%)$ 

#### **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 75%	
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 Ib.
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 ( $\beta_x \ge 75$ )

## **10DT, 16DT, 25DT** Installation and Indicators

Installation



#### Indicators



Optional	Indicator	Location
----------	-----------	----------

А	S04479	Visual
В	S04478	3 LED
А	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 depressurized. 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 (I/min)	Ports (BSP)	Media rating (µ)	Indication	Indicator rating	Bypass rating (bar)	Replacement elements
10DTA06EL50G16A	100	G1"	06		2.5 bar	3.5 bar	10DTEA05Q
10DTA10EL50G16A	100	G1"	10		2.5 bar	3.5 bar	10DTEA10Q
25DTA03EL50G24A	250	G1 <sup>1</sup> / <sub>2</sub> "	03	Electronic	2.5 bar	3.5 bar	25DTEA03Q
25DTA06EL50G24A	250	G1 <sup>1</sup> / <sub>2</sub> "	06	4 LED	2.5 bar	3.5 bar	25DTEA05Q
25DTA10EL50G24A	250	G1 <sup>1</sup> / <sub>2</sub> "	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

**Specification** 

#### **Operating Temperature**

-40°C to 120°C (-40°F to 250°F)

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

Inlet Ports

initer i orto	
Model	Туре
40RF-1	2" 3000-M Flange face
40RF-2	21/2" 3000-M Flange face
50BE-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.

Pressure differential (bar)

0.3

0.2

0.

0

150

300

Flow (I/min)

#### 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)

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.



40RF/50RF Housing Flow Curve





450

600

**40RF Filter with 3Q Element** 





#### 40RF/50RF 10Q Element



Flow (I/min)



Pressure differential (bar)



750





Electrical Pressure Switch P/N 1050911009

#### Dimensions (mm)

Model	4	<b>A</b>	E	3	C	)		<b>)</b>	E		F		G	i	H	I .	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		1						a l				•	C			•		
Model	, r	<b>N</b>		-	I N	n		N I	-	·		<b>b</b>	ت ا	•				,
Woder	mm	ins	mm	- ins	mm	ins	mm	ins	mm	ins	mm	ins	mm	ins	mm	ins	mm	ins
40 RF-1	<b>mm</b> 240	ins 9.45	<b>mm</b> 97	ins 3.82	<b>mm</b> 129	ins 5.08	<b>mm</b> 52	ins 2.05	<b>mm</b> 220	ins 8.66	77.77	ins 3.06	mm 38.89	ins 1.53	<b>mm</b> 42.88	<b>ins</b> 1.69	<b>mm</b> 21.44	<b>ins</b> 0.84
40 RF-1 40 RF-2	240 240	ins 9.45 9.45	97 97	ins 3.82 3.82	mm 129 129	ins 5.08 5.08	<b>mm</b> 52 52	ins 2.05 2.05	220 220	ins 8.66 8.66	77.77 88.9	ins 3.06 3.50	mm 38.89 44.45	ins 1.53 1.75	mm 42.88 50.8	<b>ins</b> 1.69 2.00	21.44 25.40	ins 0.84 1.00

### Ordering Information

#### Standard products table

Part number	Flow (I/min)	Flow (g/min)	Ports (BSP)	Media rating (µ)	Indication	Indicator rating	Bypass rating	Replacement elements
40RF203QPPL50YG91	630	95	21/2"	03	41.50	0.5 h au	0.5 h au	G04711Q
40RF206QPPL50YG91	630	95	-3000	06		2.5 bar	3.5 bar	G04712Q
40RF210QPPL50YG91	630	95	flange	10	Electronic	(Jopsi)	(SUPSI)	G04713Q

Note: Optional side-mounted indicator Part Number 940719



## **SAE Series**

SAE High Pressure Filters





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## **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-1 Element Performance**





#### **HF15P-2 Element Performance**





Note: For "H" High collapse elements use  $1.4 \ge \Delta P$  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: Divi Symbol	ision Code Description
None	Leave Blank
Note: Used program ide	for specific automotive ntification.
BOX 2: Pla	nt Code
Symbol	Description
None	Leave Blank
Note: Used plant locatio	for specific automotive n.
BOX 3: Cor	nfiguration
Symbol	Description
HF15P	3,000 psi Filter
BOX 4: Hou	using Bowl Length
Symbol	Description
1	1 Element, 4" Long
2	1 Element, 8" Long

BOX 5: El Symbol	ement Collapse Rating Description
Н	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: El Symbol	ement Filtration Rating Description
3	3 Micron Microglass
5	5 Micron Microglass
10	10 Micron Microglass
20	20 Micron Microglass

BOX 7: I Symbol	ndicator Type 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
	Please refer to indicator

drawings and chart on pages 54 and 55 for connector and wiring options.

BOX 8: Ind Symbol	icator Setting 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: 0 Symbol	Options 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  $\beta \ge 200$  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)

#### **Flow Rate Curves**

A) Select flow rate.

 $\Delta \mathbf{P}$ 

Assembly

- B) Determine micron selection.
- C) For maximum filter life,  $\Delta P$  should not exceed 1/3 bypass/indicator setting.









Out

Left Hand





Note: For "H" High collapse elements use  $1.4 \times \Delta P$  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	Н	3	M2	50	ST16	11	V

BOX 1: Division Code				
Symbol	Description			
None	Leave Blank			
Note: Use	ed for specific automotive			
program identification.				

BOX 2: Pla Symbol	nt Code Description
None	Leave Blank
Note: Used plant location	for specific automotiv n.

BOX 3: Co Symbol	nfiguration Description
HF	Hydraulic Filter
BOX 4: Ele	ment Diameter
Symbol	Description
3	3 inch (NOMINAL)
BOX 5: Ho	using Bowl Length
Symbol	Description
1	1 Element, 8" Long
BOX 6: Ho Symbol	using Pressure Type Description
BOX 6: Ho Symbol P3	using Pressure Type Description Pressure Type

BOX 7: Element Collapse Rating		
Symbol	Description	
Н	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.

### 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

BOX 10: Symbol	Indicator Setting Description	
50	50 psid (3.5 bar)	
125	125 psid (8.6 bar) F4M indicator	

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

BOX 12: Symbol	Options Description	
11	Non-Bypass	

BOX 13:	Seal Compound
Symbol	Description
V	Fluorocarbon

## 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.

#### **Installation Dimensions**



#### **Diverter Valve**

- Low torque for easy servicingDetent 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





# **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: Div	vision Code
Symbol	Description
None	Leave Blank
Note: Used	d for specific automotive
program ide	entification.

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: H Symbol	ousing Bowl Length Description
2	1 Element, 8" Long
BOX 5: EI	ement Collapse Rating
Symbol	Description

н	2000 PSI
	(-21 option in Box 10
	must be selected)
L	150 PSI
	(-19 option in Box 10
	must be selected)

BOX 6: Ele Symbol	ement Filtration Rating Description
3	3 Micron Microglass
5	5 Micron Microglass
10	10 Micron Microglass

\*Consult factory for other requirements.

BOX 7: Inc Symbol	licator Type 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: Ind Symbol	licator Setting Description
50	50 psid (3.5 bar)
125	125 psid (8.6 bar) F4M indicator with Option -21 only.

BOX 9: Por Symbol	t Size Description
ST16	1 5/16-12 UN-2B (ISO 11926)
M33	M33 x 2 (ISO 6149)
G16	1-11 BSPP (ISO 1179G228)

BOX 10: Symbol	Options Description
19	SAE-5 drain port on bowl
21	No bypass and drain

<b>BOX 11:</b>	Seal Compound	
Symbol	Description	
/	Eluorocarbon	

### **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  $\beta \ge 200$  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



001 4-2

Length	50P4-1	50P4-2
Х	254.0	508.0
	10.00	20.00
Ζ	387.1	622.8
	15.24	24.52









Linear Measure: <u>millimeter</u> inch



#### **50P4-1 Element Performance**





#### **50P4-2 Element Performance**





Note: For "H" High collapse elements use  $1.4\,\mathrm{x}\,\Delta P$  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	Н	10	E4MB	50	FM	11	V

BOX 1: Division Code		
Symbol	Description	
None	Leave Blank	
Note: Used program ider	for specific automotive ntification.	

BOX 2: Plant Code		
Symbol	Description	
None	Leave Blank	
Note: Used plant locatio	for specific automotive n.	

BOX 3: Co	nfiguration
Symbol	Description
50P4	Hydraulic Pressure Filter

BOX 4: Housing Bowl Length		
Symbol	Description	
1	1 Element	
2	2 Elements	

BOX 5: Ele Symbol	ment Collapse Rating Description
Н	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: El Symbol	ement Filtration Rating Description
3	3 Micron Microglass
5	5 Micron Microglass
10	10 Micron Microglass

\*Consult factory for other requirements.

BOX 7: Symbol	Indicator Type 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

\*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: Inc Symbol	dicator Setting Description		
50	50 psid (3.5 bar)		
125*	125 psid (8.62 bar)		
*NOTE: Only available on F4MS and F4MN indicators.			

BOX 9: Po Symbol	rt Size 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: Symbol	Bypass Options 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: Symbol	Seal Compound Description	
V	Eluorocarbon	

### **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







#### MPD/MPDH-1 Element Performance







Note: For "H" High collapse elements use  $1.4 \text{ x} \Delta P$  from curves above.



#### MPD/MPDH-2 Element Performance





Note: For "H" High collapse elements use  $1.4 \times \Delta P$  from curves above.

Element  $\Delta P$ 

Assembly

.90

150

# **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: Div Symbol	ision Code Description					
None	Leave Blank					
Note: Used for specific automotive program identification.						
BOX 2: Pla Symbol	nt Code Description					
None	Leave Blank					
Note: Used plant locatio	for specific automotive n.					
BOX 3: Cor Symbol	nfiguration Description					
MPD	Duplex Filter					
MPDH	Duplex Filter, High Pressure					
BOX 4: Hou Symbol	using Bowl Length Description					
1	Single					
2	Double					
3	Triple					
BOX 5: Elei Symbol	ment Collapse Rating Description					
L	150 PSI (10 bar) (-1 option in Box 11 must be selected)					
Ц	2000 PSI (128 bar)					

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				
	monermanny			
Symbol	Description			
Symbol 3	Description           3 Micron Microglass			
Symbol 3 5	Description 3 Micron Microglass 5 Micron Microglass			

BOX 8: Ind Symbol	licator Type 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
Р	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.

### **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

BOX 9: Ind	icator 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: Symbol	Port Size 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: Symbol	Bypass Options Description	
1	None	
11	No bypass	

BOX 12:	Seal Compound
Symbol	Description
V	Fluorocarbon

## **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  $\& \ge 200$  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**





Note: For "H" High collapse elements use  $1.4 \text{ x} \Delta P$  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: Div	vision Code
Symbol	Description
None	Leave Blank
Note: Used	d for specific automotive
program ide	entification.

BOX 2: Plant Code			
Symbol	Description		
None	Leave Blank		
Note: Used plant location	for specific automotive		

BOX 3: Co	nfiguration
Symbol	Description
15CN	Hydraulic Filter HF2

BOX 4: Housing Bowl Length		
escription		
Element, 4" Long		
Element, 8" Long		

BOX 5: Ele Symbol	ment Collapse Rating Description
Η	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: Ele Symbol	ement Filtration Rating Description
3	3 Micron Microglass
5	5 Micron Microglass
10	10 Micron Microglass

\*Consult factory for other requirements.

BOX 7: Symbol	Indicator Type 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

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

BOX 8: Inc Symbol	licator Setting Description
25	25 psid (1.7 bar)
35 <sup>1</sup>	35 psid (2.4 bar)
50	50 psid (3.5 bar)

BOX 9: Por Symbol	t Size 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: Symbol	Bypass Options 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  $b \ge 200$  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)
Н	4.80 (121.9)
I	2.44 (62.0)
J	1.25 (31.8)
Κ	2.32 (58.8)
L	2.37 (60.2)



Note: For "H" High collapse elements use 1.4 x  $\Delta P$  from curves above.



# **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: Div Symbol	ision Code Description	
None	Leave Blank	
Note: Used program ide	for specific automotive ntification.	
BOX 2: Pla Symbol	nt Code Description	
None	Leave Blank	
Note: Used for specific automotive plant location.		
BOX 3: Cor Symbol	nfiguration Description	
40CN	Hydraulic Filter	

BOX 4:	Housing Bowl Length
Symbol	Description
2	1 Element, 8" Long

BOX 5: Ele Symbol	ment Collapse Rating Description
Н	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: Ele Symbol	ement Filtration Rating Description
3	3 Micron Microglass
5	5 Micron Microglass
10	10 Micron Microglass

\*Consult factory for other requirements.

BOX 7: In Symbol	dicator Type 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: Ind	icator Setting
Symbol	Description
25	25 psid (1.7 bar)
35 <sup>1</sup>	35 psid (2.4 bar)
50	50 psid (3.5 bar)

BOX 9: Por Symbol	rt Size 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: By Symbol	pass Options 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  $\beta \ge 200$  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:**









# IL4/DIL4 Filter: HF4 Series Performance

### IL4-1/DIL4-1 Element Performance





### IL4-2/DIL4-2 Element Performance





Note: For "H" High collapse elements use  $1.4 \ge \Delta P$  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
Symb	ol Desc	ription
None	Leav	e Blank
Note: progra	Used for sp am identifica	pecific automotive ation.

BOX 2: Plant Code		
Symbol	Description	
None	Leave Blank	
Note: Used for specific automotive plant location.		
BOX 3: Co	nfiguration	

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

BOX 4: Ho Symbol	using Bowl Length Description
1	Single Length
2	Double Length

BOX 5:	Element Collapse Rating
Symbol	Description
L	150 PSI (10 bar)

BOX 6: El Symbol	lement Filtration Rating Description
3	3 Micron Microglass
5	5 Micron Microglass
10	10 Micron Microglass

BOX 7: In Symbol	dicator Type 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: Ple and chart c	ease refer to indicator drawings on pages 54 and 55 for

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 <sup>1</sup>	35 psid (2.4 bar)	

BOX 9: Symbol	Port Size 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
		r
P24	1 1/2" NPT	
ST24	1 7/8-12 LINI-2B (	11026)
0124		11700 200
G24	0" Flamma (IOO 01	SO 1179G-220)
-9	2 Flange (ISU 61	02), 1/2-13
	Boit Holes, 3/4" d	leep
	O" Floren /ICO Ct	60) M10 v

IVI	2 Thange (100 0102), 1012 X
	1-3/4 bolt holes, 19.5 mm deep

BOX 10: Symbol	Seal Compound 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

### Bypass Valve (not visible)

- Soft seat design for zero internal leakage
- Located in cover assembly

### Drain Port (not visible)

- Clean and easy servicing
- Lets you drain bowl of fluid before element changes

#### 43

# 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**



psid terminal - 10mg/L BUGL



### Flow vs. Pressure Loss



# IL8/HDIL8 Filter IL8-3 Performance

### **IL8-3 Element Performance**





1.5

1.0

0.5

0.0

BAR



# **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:**

Single:

Triple:

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

### **Shipping Weights** (approximate):





# 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

### 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)

**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



### **Changeover Valve Flow vs. Pressure Loss**

# HDIL8/HQIL8 Filter Specifications



### 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 ide	ntification.		

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: Ho Symbol	using Bowl Length Description
1*	Single Length
2	Double Length
3	Triple Length
THOTE NO	

\*NOTE: Not available for HDIL8 or HQIL8.

BOX 5: Core		
Symbol	Description	
None	Disposable Core	
R	Reusable Core	

BOX 6: Ele Symbol	ement Filtration Rating 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: Inc Symbol	licator Type Description
Р	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: Ind Symbol	icator Setting Description
25	25 psid (1.7 bar)
35 <sup>1</sup>	35 psid (2.4 bar)
50	50 psid (3.5 bar)
125	125 psid (8.6 bar) F4M indicator w/ option -11 only.

3OX 9: Por Symbol	t Size Description
-S	IL8 SAE 2" Flange Face (code 61)
-S3	HDIL8/HQIL8 3" SAE Flange Face (code 61)
-S4	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)				Eco	glass III (Fluorca	rbon)	
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)  $\Delta P$  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.





Note: For "H" High collapse elements use  $1.4 \ge \Delta P$  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	10 <i>C</i>	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				

Leave Blank Note: Used for specific automotive plant location.

BOX 3: Co	nfiguration
Symbol	Description
SLAT	Splash Lube 12A

None

#### **BOX 4: Canister Media** Symbol Description

10C	10 Micron Cellulose
25C	25 Micron Cellulose

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 9: Por	't 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			

Description

Nitrile

Description

25 psid (1.7 bar)

**BOX 6: Indicator Setting** 

Symbol

Symbol

Ν

25

## **Replacement Canisters**

Symbol	Part Number
10C	921999
25C	925023

# **Electrical Information**

Pictorial Guide and Specifications

### **F4M Electronic Indicator**

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

Ind. press	LED status	Output2	Output1
Power on	$\otimes$	Active	Active
50%	$\otimes \otimes$	Active	Active
75%	$\otimes \otimes \otimes$	Inactive	Active
100%	$\otimes \otimes \otimes \otimes$	Inactive	Inactive



DC3 Pressure Switch Type SE Electrical Housing





HF2, HF3, HF4 Type E Electrical Indicator





SLAT Type PS Electrical Indicator

F4MC



### CONTACT CONFIGURATION



### F4MS

937037: 4-pin Micro Receptacle Standard Factory Wiring



### CONTACT CONFIGURATION



F4MN 937409: 4-pin Micro Receptacle Device Net Compatible



CONTACT CONFIGURATION



# **SAE Series Filters** Electrical Information

### **Pictorial Guide and Specifications**





**Mini Connector** 









PIN	ТҮРЕ	WIRING TYPE	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	E TYPE IN IND. SWITC 25 PSI	IDICATORS CH SETTING 50 PSI
3	MINI	E3B	С	NC	NO			935952	*
4	MICRO	E4MB	NC	NOT USED	С	NO		935325	934912
4	MICRO	E4MC	С	NC	NOT USED	NO		935722	935723
5	MINI	E5B	NC	NO	GRD	NOT USED	С	934928	934930
5	MICRO	E5MD	С	NC	NOT USED	NO	GRD	934601	934595

### Connector and Wiring Options

\*Consult factory





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





# **Portable Filter Carts**

Models 5MFP & 10MFP with Moduflow TM  $\mathcal{Plus}$  and Intelli-Cart TM





ENGINEERING YOUR SUCCESS.

### 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<sup>™</sup> elements in the outlet filter. Par-Gel<sup>™</sup> 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
<ul> <li>Two filters instead of one w/ 2.5 times increased dirt holding capacity</li> </ul>	Pump protection and long     element life	<ul> <li>Element cost savings and trouble-free service</li> </ul>
Wide variety of particulate elements available	Capable of getting a fluid to a desired cleanliness level	Extends fluid life and system performance
<ul> <li>Par-Gel<sup>™</sup> water removal elements available</li> </ul>	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
<ul> <li>Two flow rates available:</li> <li>5 gpm or 10 gpm</li> </ul>	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

## Applications

### icountPD (Intelli-Cart™ option)

- 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

- 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

### **Dual filters**

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

Elements (not shown)

### 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

• Available for both particulate and Water Removal (WR) in double length w/ 2.5 times increased dirt holding capacity

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:**

 $5MFP - \frac{1}{2}$  hp @ 1725 rpm, Open, Drip Proof  $10MFP - \frac{3}{4}$  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<sup>™</sup>

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.
- System ingression rate equal to 1 X 10<sup>6</sup> particles greater than 10 micrometers entering the system per minute.

The Intelli-Cart<sup>™</sup> 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:

- Par-Gel<sup>™</sup> 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

- Install hoses to inlet and outlet filters by threading the hose end with the straight thread o-ring seal fitting into the filter flange.
- 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 handtight is sufficient.
- The Intelli-Cart<sup>™</sup> 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 fllter 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.
- 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 bypass 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 harmful to personnel or to the filter cart.

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

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

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

### Maintenance Instructions

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

### 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 Filter housing not filled with oil Allow pump to run 30 to 60 seconds pump noise 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 Element dirty Replace or clean elements (both filters) CHANGE or BYPASS Oil extremely cold or viscous Change element to coarser micron rating Indicator does not No outlet element Install element seem to move 40 micron element installed in

 Check cart model number to verify correct element. The inlet filter has a rating RFP prefix; the outlet filter has an ILP prefix

- 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.
- 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.
- 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.

outlet filter



## Filter Cart Replacement Parts

12/8 F50X-S System 20 Fitting 2 (Intelli-Cart™)

Item No	o. Part No.	Description	Qty	Item No	. Part No.	Description	Qty
1	928690Fr	ame	1	13	940978	Tube Fitting	1
1	941468Fr	ame (Intelli-Cart™)	1	14	928623	Cord Reel	1
2	940980Pi	pe Reducer Fitting	1	15	940960	Inlet Filter – Nitrile	1
3	940979Tu	be Fitting	1	15	941024	Inlet Filter – Fluorocarbon	1
4	937526Sı	iction Tube Assy.	1	16	928784	Tube Wand Assy. – Seal Option B	2
5	928652Ac	lapter Fitting	1	17	940961	Outlet Filter – Nitrile	1
6	928731Pı	Imp	1	17	941025	Outlet Filter – Fluorocarbon	1
7	940977Ac	lapter Fitting	1	18	928663	Hose Assy. – Seal Option B	2
8	928650W	heel	2	19	928651	Handle Grip	2
9	928653Ax	le	1	20	See Chart**	Element, (1) Inlet & (1) Outlet	2
10	928678M	otor 10MFP	1	21	See Chart**	icountPD (Intelli-Cart™)	1
10	929692M	otor 5MFP	1		B84654	icount Cable (Intelli-Cart™)	1
11	937527Di	scharge Tube Assy.	1		B84224	icount Hoses (Intelli-Cart™)	2
12	941467Di	scharge Tube Top (Intelli-Cart™)	1	2	2/2A40EG4M-S	icount Fitting 1(Intelli-Cart™)	2
	941466Di	scharge Tube Bottom (Intelli-Cart™)	1		EMA3/1/8ED	icount Fitting 2 (Intelli-Cart™)	2
S	TI.0144.100	System 20 (Intelli-Cart™)	1	**Refer t	o chart on How to	o Order page.	
3/8	3-8F40HG5S	System 20 Fitting 1 (Intelli-Cart™)	2				

2

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	405A	10Q	В	VP	I	1

BOX 1: Ba Symbol	asic Assembly Description
5MFP	5 GPM (3000 SUS MAX.)
10MFP	10 GPM (500 SUS MAX.)
BOX 2: Le	ength Description
Symbol	Description
2	Double
BOX 3: In	let Filter Element
Symbol	Description
40SA	Synthetic 40 micron

-	
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 leadtime. Consult factory on all other lead-time options.

Microglass III, 2 micron
Microalass III 5 micron
Microglass III, 5 Microff
Microglass III, 10 micron
Microglass III, 20 micron
Par-Gel™ Water Removal

### BOX 5: Seals Symbol Descrip

Symbol	Description		
В	Nitrile (NBR)		

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

### BOX 7: Bypass

Symbol	Description
[	35 PSID (2.4 bar)
	(outlet filter element)

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

## Replacement Elements

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

	Nitrile Seals		Fluorocarbon Seals	
Media	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





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<sup>™</sup>) 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<sup>™</sup>) technology does not remove water, however with the removal of thousands of submicron 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<sup>™</sup>) - How the Technology Works



- 1 Particles are passed across high-voltage electrodes, inducing a charge on the particles (+) and (-) in separate paths.
- 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<sup>™</sup> develops larger particles (see graphic above).
- The particulate is effectively removed from the hydraulic or lubrication fluid by high efficiency filters.



Result 1



Result 6





Result 3



Result 4



Result 9



Result 5



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





### 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		



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





### 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		


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	Х	N08	MS
BOX 1: Ba Symbol	sic Assembly Description		BOX 4: Ele Symbol	ement Media <sup>1</sup> Description		BOX 6: In Symbol	dicator Description	
SMR	Submicronic F	iltration		SMR2		Р	No Indicator	
	System		02QE	Ecoglass III, 2	2 micron	M2	Analog Visua	I Indicator
BOX 2: Flo Symbol	w Rate Description		05QE 10QE	Ecoglass III, 5 Ecoglass III, 7	5 micron 10 micron	BOX 7: B Symbol	ypass Description	
2	2 GPM (7.6 LF	PM)	20QE	Ecoglass III, 2	20 micron	X	No Bypass	
10	10 GPM (38 LI	PM)						
BOX 3: Po	wer			SMR10		Symbol	Description	
Symbol 120	Description 120VAC, 1Ph,	60Hz	02Q 05Q	Microglass III Microglass III	, 2 micron	N08	SMR2 ½" NPT threa	ided ports
230	230VAC, 3Ph,	60Hz	10Q	Microglass III	, 10 micron	N16	SMR10	ded ports
380	380VAC, 3Ph,	50Hz	20Q	Microglass III	, 20 micron	NIO	i ni i tiloa	
460 575	460VAC, 3Ph, 575VAC, 3Ph,	60Hz 60Hz				BOX 9: O Symbol	ptions Description	
			BOX 5: Se Symbol	als		SS	Stainless ste	el wetted parts
			V	Fluorocarbon	(FKM)	EXP	Explosion pro (Class 1, Div.	oof 2, Gp. C & D)
			E	Ethylene Prop	oylene (EPR)	MS	Moisture Sen	sor

N	ote	:
	~	

 $\mathsf{P}\mathsf{D}^2$ 

PDM<sup>2</sup>

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

Particle Detector

Particle Detector with Moisture Sensor

2. icountPD not available when EXP option is selected.

		Replaceme	nt 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

### Replacement Flements





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**Guardian®** Portable Filtration System





### ENGINEERING YOUR SUCCESS.



**Ground Support** 





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" ap- proximate 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 Car- boxylated 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.



Marine

5-

# **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 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 <sup>1</sup>	*
40W	Woven Wire	40 micron <sup>1</sup>	*
25W	Woven Wire	25 micron <sup>1</sup>	*
20C	Cellulose	20 micron <sup>1</sup>	*
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/	14.3

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

Multipass test run at 4 gpm to 35 psid

<sup>1</sup>Reference ratings only. Not multipass tested due to coarseness.

\* Not applicable

### **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.

> Note 1: Guardian not recommended for fluid viscosities greater than

Note 2: Flows based on Guardian with no element installed

16.000 SUS (11,000 SUS;24VDC)



**Guardian Flow vs. Viscosity Performance** 

### 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 oera- tion.	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.



#### Parts List

1. Label Consult Factory	
<b>2.</b> Motor, 110-120 VAC931913	
220-440 VAC 932381	
24 VDC932759	
<b>3.</b> SHCS(4), <sup>1</sup> / <sub>4</sub> -20x1902734	
<b>4.</b> Adapter Plate931890	
<b>5.</b> Housing O-RingV72041	
<b>6.</b> Polypak Seal	
<b>7.</b> Shadow Plate931899	
<b>8.</b> Woodruff Key <sup>1</sup> / <sub>8×3</sub> / <sub>8</sub> 931877	
<b>9.</b> SHCS(4), <sup>1</sup> / <sub>4</sub> -20 × <sup>3</sup> / <sub>4</sub>	
<b>10.</b> Roll Pin <sup>1</sup> / <sub>8</sub> × <sup>3</sup> / <sub>4</sub>	
<b>11.</b> Geroter Set	

<b>12.</b> Geroter Ring
<b>13.</b> Outlet Plate
<b>14.</b> Geroter O-ringV72135
15. Brass Pipe Plug (2) 1/2-14 931920
<b>16.</b> Roll Pin <sup>1</sup> / <sub>8 × 5</sub> / <sub>8</sub>
<b>17.</b> SHCS (2), <sup>1</sup> / <sub>4</sub> -20 × <sup>5</sup> / <sub>8</sub>
<b>18.</b> Handle
<b>19.</b> Cover
<b>20.</b> Cover O-Ring
<b>21.</b> Element
<b>22.</b> Relief Valve
<b>23.</b> Indicator Kit
<b>24.</b> Housing

<b>25.</b> Rubber Bumpers (2)931888
<b>26.</b> SHCS(2), <sup>1</sup> / <sub>4</sub> -20 x <sup>1</sup> / <sub>2</sub>
<b>27.</b> Brass Fitting (2)931928
<b>28.</b> Gasket (4)
<b>29.</b> Inlet Screen
<b>30.</b> Inlet Hose Assembly
<b>31.</b> Outlet Hose Assembly 931937
<b>32.</b> Wand Crevice Assembly931965
<b>33.</b> Wand Adapter Assembly 931966
<b>34.</b> Washer (2)
<b>35.</b> Quick Disconnect Kit932097
(Not Shown)
<b>36.</b> Washer
<b>37.</b> Brush Kit (110/120)
(220/240 VAC)934327
(24 VDC)
Seal Kit
Bowl Extension Kit

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		10 <i>C</i>			1
BOX 1: SealsBOX 3: MediaSymbolDescriptionSymbolDescriptionDescription		cription	BOX Sym	4: Op bol	tions Description			
None	Carboxylated Nitr	ile	74W	Wire	Mesh	1		None
	(Stanuaru)		40W	Wire	Mesh	6		Quick disconnect hose
Note: Consult factory for fluids not		not	25W	Wire	Mesh			connections
compatible	with inderocarbon.		10C	Cellu	ulose			
BOX 2: Ma	odel		20Q	Micr	oglass III			
Symbol	Description		10Q	Micr	oglass III			
GT4	Guardian® 110/120	VAC	05Q	Micr	oglass III			
	241/00		02Q	Micr	oglass III			
GT4D	24000		WR	Wate	er Removal			
GT4E	220/240 VAC							

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



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.

### **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

### **Typical Saturation Points**

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

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).



# **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	<ul><li>Unattended use</li><li>Designed for 24/7 operation</li></ul>	<ul><li>Reduces labor costs</li><li>Increases operation time</li></ul>
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	<ul> <li>See the vacuum dehydration process work</li> </ul>	<ul> <li>Visual verification of water removal</li> </ul>
Desiccant breather	Insures dry, clean intake air	More efficient operation
Reverse phase switch	<ul> <li>Enables easy changing of motor rotation if out-of-phase</li> </ul>	<ul><li>Ease of maintenance</li><li>Prevents incorrect rotation</li></ul>
Condensate holding tank with optional auto drain	Large volume for infrequent servicing intervals	Reduces maintenance costs
Programmable thermostat	<ul> <li>Maintains oil within 1°F</li> <li>Prevents overheating the oil</li> </ul>	<ul> <li>Unattended operation</li> </ul>
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.

## 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.

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



### 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 ln/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 ln/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.

### 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			



UL and CUL Marked

## 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	11/2" 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) 68" H x 42" W x 75" L Dimensions (1727mm x 1067mm x 1905mm) Weight 2550 lbs. (1157 kg) Seal material Fluorocarbon (EPR optional) Condensate tank 8.3 gal (31.4 ltrs) 8 **Dispersal elements** 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) 2" JIC (male) inlet Ports 1.5" JIC (male) outlet FLA (full load amps) 40-65 amps @ 460 V/60hz **Shipping Weight** 3000 lbs. (1361 kg) maximum 70" H x 48" W x 80" L **Shipping Dimensions** (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.



## **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.



## **PVS Series** Specification Worksheet

1.	Application:						
2.	Fluid Type: Grade:			Brand: Specific G	Gravity:		
3.	Viscosity: Mir Ma No	n ax prmal	SUS/cS SUS/cS SUS/cS	St @ St @ St @		°F/°C °F/°C °F/°C	
4.	Contamination le	evel:	Current ISO level _ Desired ISO level _	/	/		
5.	Water concentrat	tion:	Current PPM level _ Desired PPM level _				
6.	Suction head:	Positiv	e/Negative			Ft./meters	
7.	Operating distance	ce:				Ft./meters	
8.	System fluid oper	rating ten	nperature:		°F/°C	Is there a cooler?	
9.	Operating enviror	nment air Min Max Norma mperature Min Max Norma	temperature: (air coo I e: (liquid ring model)	led model)	°F/°C °F/°C °F/°C °F/°C °F/°C °F/°C		
11	. Operating enviro	onment ab	oove/below sea level:				Ft./meters
12	2. Voltage options:	• 230' • 380' • 460' • 575'	VAC, 3P, 60Hz (185, 6 VAC, 3P, 50Hz (185, 6 VAC, 3P, 60Hz (185, 6 VAC, 3P, 60Hz (185, 6	600) 600, 1200, 600, 1200, 600, 1200, 600, 1200,	1800, 2 1800, 2 1800, 2	700) 700) 700)	
13	. Available ampera	age:					
14	. Reservoir volume	e:					
15	5. Special requirem	nents:					
16	6. Any previous filtr	ration pro	blems with the applic	ation:			
17	. PVS model selec	cted:					

**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: Bas Symbol	se Unit Flow rate 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 Model	POWER S Symbol	UPPLY * Description
185	230 380 460 575	230VAC, 3P, 60HZ 380VAC, 3P, 50HZ 460VAC, 3P, 60HZ 575VAC, 3P, 60HZ
600	380 460 575	380VAC, 3P, 50HZ 460VAC, 3P, 60HZ 575VAC, 3P, 60HZ
1200	380 460 575	380VAC, 3P, 50HZ 460VAC, 3P, 60HZ 575VAC, 3P, 60HZ
1800	380 460 575	380VAC, 3P, 50HZ 460VAC, 3P, 60HZ 575VAC, 3P, 60HZ
2700	380 460 575	380VAC, 3P, 50HZ 460VAC, 3P, 60HZ 575VAC, 3P, 60HZ

\*Consult factory for special voltages.

BOX 4: Va Symbol	Cuum Pump Description	
DS	Dry sealed	
LR	Liquid ring	

BOX 5: Dispersal Element Symbol Description		
D	Coalescing (disposable)	
Р	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: I Model	Heater Symbol	Description
185	12	12 KW/3 phase
600	12 24 36	12 KW/3 phase 24 KW/3 phase 36 KW/3 phase
1200	24 36 48	24 KW/3 phase 36 KW/3 phase 48 KW/3 phase
1800	36 48	36 KW/3 phase 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: Opt	tions*
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.







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











requirements.

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

Dimensions are in inches.

 $\langle \rangle$ 

 $\subset$ 

2.77

# **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	В	OX 4	BOX 5	E	BOX 6	BOX 7	BOX 8
SOS	5	02Q		В	E		I	N12	1
BOX 1: Filter Series         Symbol       Description         SOS       Stationary Offline System			BOX 5: Indicator         Symbol       Description         E       Electrical with visual gauge         (includes external lighted beacen)				BOX 7: Symbol N12	Ports Description ¾" NPT inte	gral threads
BOX 2: Model Symbol Description			(includes external lighted beacon)			acon)	BOX 8: Symbol	Options Description	
5 5 gpm flow rate			BOX 6: Bypass Symbol Description				1	With Bypass	5
BOX 3: Media Code			I 35 PSID				Heater (consult factory)		
02Q	Microglass III, 2 micro	n							
05Q	Microglass III, 5 micro	n					Please no	ote the bolded opt	ons reflect
10Q Microglass III, 10 micron							standard Consult fa	options with a redu actory on all other I	ced lead-time. ead-time options.
WR	Water removal							-	
BOX 4: Sea Symbol	ls Description								
В	Nitrile (NBR)								

## **Replacement Elements**

Fluorocarbon (FKM)

V

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





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.

#### Pressure Drop Curves

 $\Delta P$  total =  $\Delta P$  housing +  $\Delta P$  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.

The recommended level of the initial pressure drop for this filter is max 0.02 bar/2.0kPa (0.29 psi).







## 6 hole fixing mounting dimensions





#### 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 option		Media options	Mounting options		Overp	ressure 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	G³/₄ external thread	V2	0.2 bar	A	Vacuum/pressure gauge
	Q010	1.0µ abs glass fibre	GE16	G1 external thread G <sup>3</sup> / <sub>4</sub> 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<sup>1</sup>/4 (ISO 228), 1<sup>1</sup>/2" (UN-16-2B).

**Seal material:** Seals integrated in LEIF<sup>®</sup> 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<sup>®</sup> 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**









### Extensions and filling mounting adaptors





### 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		1 <sup>1</sup> / <sub>2</sub> UN-16-2B	QXWL13	ABL2 Only	v	Visual	SNG	Vacuum/Pressure Gauge
								FP	Adaptor With Filler Connection

### **Product configurator**

Product number	N	lounting 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	Зµ

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.



Notes





### **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: I Symbol	Division Code Description
None	Leave Blank
Note: Us program	ed for specific automotive identification.

			4
BOX 2: Plant Code			BOX 5:
None	Leave Blank		Symbol
Note: Used for specific automotive plant location.			P12
BOX 3: Co Symbol	nfiguration Description		G12
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: Tai Symbol	nk Connection Thread 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	
3*	3 micron Cellulose
10	10 micron Cellulose
*Note: 3 micro	on Cellulose is not available in can
size 4 (5" x 11	").

BOX 7: Indicator			
Symbo	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





ENGINEERING YOUR SUCCESS.
## LaserCM Portable Particle Counter

### **Typical Applications**

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



### 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.

### **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.



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 online 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.



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



Laser Optical Sensing

- 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.



Description	LaserCM	LaserCM
	(LCM20.2021)	(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)





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 online 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  $\mu$ m (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)
100u	70u (c)

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



## 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**



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 NUME	3ER 022	
Date 04-03-06 Time 15-52 NAS CLASS: 7		
Count / 1	00ml	
4/6μ (c) 6/14μ (c) NAS CLASS 14/21μ (c) NAS CLASS 21/38μ (c) NAS CLASS 38/70μ (c) NAS CLASS >70μ (c) NAS CLASS NOTES	789157 31250 7 250 3 50 3 14 4 0 0	

Correlation to NAS 1638



Laser	CM Test
ON LIN	NE TEST
TEST NU	MBER 022
Date Time ISO:	D M Y 04-03-06 15-52 20/15/09
Count	/ 100ml
>4μ (c) >6μ (c) >14μ (c) >21μ (c) >38μ (c) >70μ (c) NOTES	820721 31564 314 64 14 0

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 onboard 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.



Notes



## SPS Single Point Sampler

Fluid Condition Monitoring





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## **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

### **Connection Instructions**



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 <sup>5</sup>/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)



### 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  $\Delta t$  3.6°C (38°F) then carry out test as normal. If, however, test is above  $\Delta t$  3.6°C (38°F) then increase oil flow by turning valve (A) counterclockwise and then carry out flow test. Do this until  $\Delta t$  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 (G<sup>1</sup>/4" BSP) with cap, Aggressive -  $\frac{5}{8}$ " BSF HSP.

**Operating temp range:**  $+5^{\circ}$ C to  $+80^{\circ}$ C ( $+41^{\circ}$ F to  $+176^{\circ}$ 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).

### **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.



Dimensions in mm (ins)

Ø45.0 (1.77)



## 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,  $\Delta P$  is 1.1 bar (16 psi) (mineral oil fluid at 30 cSt 140 SSU).

#### **Ports:**

Size 0 - G3/8Size 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**







### **Ordering Information**

### Standard products table

Product number	Supercedes	Size	Flow range I/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	11/4
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 <sup>1</sup> /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





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## **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.

### 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.

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

- 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	Size 0 = 6 to 25 l/min - (optimum flow = 15 l/min)
Inline Sensors	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** 



### M12 Communication Cable: Wiring Configuration

	4-20mA	0-5V/0-3V
Pin	option connections	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 14um (c)*	Channel C. ISO 14um (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

	Current loop	0-5V/0-3V
Pin	option connections	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





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	

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.

ISO

mA

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.

11

2.5

1.3

10

2.3

**9** 2.1

1.1 1.2

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

$\triangleright \blacktriangleright$	ISO	12	13	14	15	16	17	18	19	20	21	22	Err
cont.	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

### Table relating ISO codes to voltage output

## **Icount PD** Display parameters (ISO 4406/NAS 1638)

### Digital display indication

The digital display will show the actual measured codes, the channel  $(\mu)$  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<sup>®</sup> HyperTerminal program (this program is not currently supplied with the Windows Vista<sup>™</sup> 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
Data bits8
ParityNone
Stop bits1
Flow controlNone

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

Кеу	Fluid Type	Calibration	Display	Limit Relay	Communication	Moisture Sensor	Cabl	e Connector Kit
IPD	1 Mineral	1 ACFTD	2 LED	2 Yes	2 RS232/4-20mA	1 No	10 Deutsc	h DT series connector
	2 Aggressive	2 MTD	3 LCD		3 RS232/0-5V	2 Yes	30 M12, 8	-pin plug connector*
	3 Aviation fuel	3 AS4059						
	Hazardous areas							
	4 Aviation fuel							
	Non Hazardous areas					Part Number		umber
					Accessories			
						Mine	ral	Aggressive

Assessmins	Part Number						
Accessories	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)





serospace climate control electromechanical fluid & gas handling hydroutics process control secting & shielding





## icountBS - Bottle Sampler

The benchtop solution to fluid contamination bottle sampling





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.





## **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  $4\mu$ m (c) per ml of fluid, the second number for particles that are equal to and greater than  $6 \mu$ m(c) per ml of fluid and the third number for particles that are equal to and greater than  $14 \mu$ m(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  $4\mu$ m(c), between

1,300 - 2,500 particles that are equal to and greater than  $6\mu$ m(c), and between 80 - 160 particles that are equal to and greater than 14 $\mu$ m(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.

### Installation Details

### 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



### Sensor Outputs

	MS150 mo	isture sens	or 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 @ 150°F (65°C). 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 150°F (65°C).





## MS200 Moisture Sensor

### Specifications

% Saturation Calibration Accuracy:	+3% RH
Temperature Calibration Accuracy:	±1°C
Thermal Stability:	$\pm 1\%$ RH (over compensated temperature range $\pm 10$ to $\pm 80^{\circ}$ 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	o +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**



### Moisture Sensor Wiring and Pin Designations

dimensions in inch (mm)

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.





### **Moisture Sensor Connection Diagram**

1. Supply (4-20 mA - IN)- Brown2. Signal (4-20 mA - OUT)- White3. Not Used- Blue4. Not Used- Black5. 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

### 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

### 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 <sup>1</sup> /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

# **Ordering Information**

### MS200 - Product Configurator

Key		Model	F	luid Type	Ou	tput Options		Thread Forms	С	onnector	Fu O	uture ption
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	F	luid Type	0	Output options		Thread Forms	С	onnector	F O	uture ption
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



M Par-Test Fluid Analysis





### 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 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.

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

International Andrews

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<sup>™</sup>





### 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<sup>™</sup>

	F	LUID ANA	LYSIS REPORT	,
SAMPLE CODE: Parker Har 16810 Fult Metamora, ATTN: Key	93844 nnifan ion Rd. Co #2 , OH, 43540 vin Noe	DATE: 09/01/04	PARTEST Fluid Analysis Service Parker Hannifin Corporation 1016 E. Airport Rd. Stillwater, OK 74075 Tele:: (405)624-0400 Fax: (405)624-0401	
				ļi
SPEC	CTROMETRIC ANA	LYSIS	Viscosity Analysis - ASTM D445	
WEAR METALS AND ADDITIVES	PPM BY WEIGHT	STATUS*	CST@100C: SSU@210F: CST@40C: 46.25 SSU@100F: 215.0	
IRON	120.0	н		
COPPER	510.0	н	Viscosity at 40C (100F) is reported in Centistokes (cST) and SUS	
CHROMIUM	< 1.0	N	(Saybolt Universal Seconds). The test is conducted in accor- dance with ASTM D445 procedures for determining the kinematic	
LEAD	< 1.0	N	viscosity of fluids	ľ
ALUMINUM	1.0	N	/	
TIN	< 1.0	N	Neutralization Analysis - ASTM D794	
SILICON	< 1.0	N	TAN: 0.44	
ZINC	423.0	N	0.44	
MAGNESIUM	< 1.0	N	The Total Acid Number (TAN) test measures the existing of	
CALCIUM	540.0	н	a hydraulic fluid. The higher the number, the more acidic	
PHOSPHORUS	10.0	L	the fluid. Over time this may mean the fluid is becoming oxidized.	'
BARIUM	1.0	N		
BORON	< 1.0	N		i
	< 1.0	N	vvater Analysis - ASTM Db304	
	< 1.0	N	WATER CONTENT (PPM): 410.0	
NICKEI	< 1.0	N	<u>_</u>	
	< 1.0	N	The water analysis test shows the actual parts per million of	1 '
MANGANESE	< 1.0	N	water in a sample. This is known as the Karl Fischer titration test and is conducted in accordance with ASTM D6304.	Ν.
ANTIMONY	< 1.0	N		<b>`</b> `
1-10		- HIGH	$\mathbf{i}$	
L = L0				
The Spectometic Ana metals and additives	alysis reports the ppm leve in the sample. Generally	el of 20 different wear the first 7 and last 5		1
elements are conside	ered wear elements not no	ermally present in		
common additives in	oil. If a baseline oil samp	e (new oil out of a	$\mathbf{X}$	
provided on whether	the status of the element	s are low, normal,		L '
or high.				
		C	omments	-
*Please check spectro	ometric status for abnorma	al conditions.		
			<u> </u>	
	V		S AND ADDITIVES	
Iron: Ec	errous wear particle tor	ically from		
pumps	, gears, cylinders, or ru	ist	Calcium: Dispersant additive or acid neutralizer	
Copper	r: Brass (copper/zinc) a	nd bronze	in fluid	
(coppe	r/tin) in bearings and b	ushings	Barium: Corrosion, rust inhibitor additive in oil	ļ
Chromi	ium: (white non ferrous	metal) Chrome	Boron: Detergent, dispersive additive in oil	1
	Rabbitt or conner lead	hearings	Sodium: Detergent or coolant additive	1
Alumin	um. White ponferrous r	netal from	Molybdenum: Alloy metal or anti friction	
pump b	oodies, bushings, bear	ngs, and	additive	
grinding	g compounds		Silver: White non ferrous metal	
Tin: Ba	bbitt bearings, plating		Nickel: Alloy metal	i

### osity Analysis

sity is a very important property uid in terms of system rmance. Viscosity expresses the al friction between molecules fluid. Typically a breakdown in sity will be seen as an increase. SSU at 100° F and cSt at 40° C ported.

### tralization Analysis

red to as the Total Acid Num-AN) this titration test measures cid level of the sample fluid. The uction of acidic material causes tion degradation or aging of fluids. This activity is promoted evated temperatures, presence rained metal particles, and ate contact with air. It is the rate rease of the TAN during any time period that is significant, st the absolute value.

### er Analysis

ischer test gives accurate sure of water concentration sample fluid. The results ported in parts per million I) and allow for detection ter levels well below the ation point.

### arks

statements or alerts about any al results from one of the tests ted on this page.

### ctrometric Analysis

Its obtained by Rotating Disk rode (ROE) Spectrometer and ted in terms of parts per million ). Twenty different wear metals dditives are analyzed to help mine the condition of the fluid. pectrometric test is limited to fying 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.

Silicon: Sand/dirt contamination or antifoaming

Magnesium: Detergent, dispersive additive in oil,

Zinc: Plating or anti-wear additive in oil

additive in oil

bearings, water

- Titanium: White non ferrous metal
- Manganese: White non ferrous metal
- Antimony: Babbit bearings, greases
# Fluid Analysis

## Par-Test<sup>™</sup>



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<sup>™</sup>

### 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.
- 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.
- Put extracted fluid into an approved, precleaned 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.
- Locate a suitable valve in the system where turbulent flow can be obtained (ball valve is preferred). If no such valve ex-

ists, locate a fitting which can be easily opened to provide turbulent flow (tee or elbow).

- 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.)
- Place in an approved, pre-cleaned sample bottle under the stream of flow per sampling valve methods.
- 5. Cap sample bottle immediately.
- 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**





## Parker Hannifin Corporation Filtration Group Global Headquarters

6035 Parkland Boulevard Cleveland, OH 44124-4141 T 216 896 3000, F 216 896 4021 www.parker.com

#### North America Compressed Air Treatment

# Filtration & Separation/Balston 242 Neck Road

Haverhill, MA 01835-0723 T 978 858 0505, F 978 858 0625 www.parker.com/balston

#### Filtration & Separation/Finite

500 Glaspie Street, PO. Box 599 Oxford, MI 48371-5132 T 248 628 6400, F 248 628 1850 www.parker.com/finitefilter

# Purification, Dehydration and Filtration Division

4087 Walden Avenue Lancaster, NY 14086 T 716 685 4040, F 716 685 1010 www.airtek.com

Sales Office 5900-B Northwoods Parkway Charlotte, NC 28269 T 704 921 9303, F 704 921 1960 www.domnickhunter.com

# Engine Filtration & Water Purification

**Racor** 3400 Finch Road, PO Box 3208 Modesto, CA 95353 T 209 521 7860, F 209 529 3278 www.parker.com/racor

#### Racor

850 North West St., PO Box 6030 Holly Springs, MS 38635 T 662 252 2656, F 662 274 2118 www.parker.com/racor

#### Racor

302 Parker Drive Beaufort, SC 29906 T 843 846 3200, F 843 846 3230 www.parker.com/racor

#### Racor -- Village Marine Tec.

2000 West 135th Street Gardena, CA 90249 T 310 516 9911, F 310 538 3048 www.villagemarine.com

#### **Hydraulic Filtration**

**Hydraulic Filter** 16810 Fulton County Road #2 Metamora, OH 43540-9714 T 419 644 4311, F 419 644 6205 www.parker.com/hydraulicfilter

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#### **Process Advanced Filtration**

2340 Eastman Avenue Oxnard, CA 93030 T 805 604 3400, F 805 604 3401 www.parker.com/processfiltration

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### Europe Compressed Air Treatment

domnick hunter Industrial Dukesway, Team Valley Trading Estate Gateshead,Tyne & Wear England NE11 OPZ T +44 (0) 191 402 9000, F +44 (0) 191 482 6296 www.domnickhunter.com

## Hiross Zander

Padova Business Unit Strada Zona Industriale 4 35020 S. Angelo di Piove Padova, Italy T +39 049 9712 111, F +39 049 9701 911 www.dh-hiross.com

#### Hiross Zander

Essen Business Unit Zander Aufbereitungstechnik GmbH Im Teelbruch 118 D-45219 Essen, Germany T +49 2054 9340, F +49 2054 934164 www.zander.de

#### **Parker Gas Separations**

Oude Kerkstraat 4 P O Box 258 4870 AG Etten- Leur, Netherlands T +31 76 508 5300, F +31 76 508 5333

#### **Engine Filtration &**

#### Water Purification Racor

Shaw Cross Business Park Churwell Vale Dewsbury, WF12 7RD England T +44 (0) 1924 487000, F +44 (0) 1924 487038 www.parker.com/rfde

#### **Racor Research & Development**

Parker Hannifin GmbH & Co KG Inselstrasse 3 – 5 70327 Stuttgart Germany T +49 (0)711 7071 290-0, F +49 (0)711 7071 290 -70 www.parker.com/racor

#### **Hydraulic Filtration**

Hydraulic Filter Stieltjesweg 8, 6827 BV P.O. Box 5008 6802 EA Arnhem, Holland T +31 26 3760376, F +31 26 3643620 www.parker.com/eurofilt

#### **Urjala Operation**

Salmentie 260 31700 Urjala as Finland T +358 20 753 2500, F +358 20 753 2501 www.parker.com/fi

#### **Condition Monitoring Center**

Brunel Way Thetford, Norfolk IP 24 1HP England T +44 1842 763299, F +44 1842 756300 www.parker.com/cmc

#### **Process Filtration**

#### domnick hunter Process

Durham Road, Birtley Co. Durham, DH3 2SF England T +44 (0) 191 410 5121, F +44 (0) 191 410 5312 www.domnickhunter.com

#### **Asia Pacific**

#### Australia

9 Carrington Road, Castle Hill NSW 2154, Australia T +61 2 9634 777, F +61 2 9899 6184 www.parker.com/australia

#### China

280 YunQiao Road JinQiao Export Processing Zone Shanghai 101206 China T +86 21 5031 2525, F +86 21 5834 3714 www.parker.com/china

#### India

Plot EL 26, MIDC, TTC Industrial Area Mahape, Navi Mumbai 400 709 India T +91 22 5613 7081, 82, 83, 84, 85 F +91 22 2768 6618 6841 www. parker.com/india

#### Japan

626, Totsuka-cho, Totsuka-ku Yokohama-shi, 244-0003 Japan T +81 45 870 1522, F +81 45 864 5305 www.parker.com/japan

#### Korea

1-C Block, Industrial Complex of Jangan, 615-1, Geumui-Ri Jangan-Myeon, Hwaseong-City Gyeonggi-Do, Korea T +82 31 359 0771, F +82 31 359 0770 www.parker.com/korea

#### Singapore

11, Fourth Chin Bee Road Singapore 619 702 T +65 6887 6300, F +65 6261 4929 www.parker.com/singapore

#### Thailand

1023 3rd Floor, TPS Building Pattanakam Road, Suanluang, Bangkok 10250 Thailand T +66 2717 8140, F +66 2717 8148 www.parker.com/thailand

#### **Latin America**

#### Parker Comercio Ltda.

Filtration Division Estrada Municipal Joel de Paula 900 Eugenio de Melo, Sao Jose dos Campos CEP 12225-390 SP Brazil T +55 12 4009 3500, F +55 12 4009 3529 www.parker.com/br

#### Pan American Division - Miami

7400 NW 19th Street, Suite A Miami, FL 33128 T 305 470 8800 F 305 470 8808 www.parker.com/panam

#### Africa

Parker Hannifin Africa Pty Ltd Parker Place, 10 Berne Avenue, Aeroport Kempton Park, 1620 South Africa T +27 11 9610700, F +27 11 3927213 www.parker.com/eu

