



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



Condition Monitoring

Products & Custom Solutions



ENGINEERING YOUR SUCCESS.

icountLaserCM20

Fluid Condition Monitoring

Portable Particle Counter



A 2-minute contamination test procedure:

A portable particle counter designed to be used in the field

icountLCM20 is a proven answer to fluid system contamination monitoring offering a 2-minute test procedure. Multi-standard ISO and NAS cleanliness reporting, data entry, data graphing and integral printing are all standard on this world proven contamination monitor.



Product Features:

- icountLCM20 is a proven answer to fluid system contamination monitoring.
- 2-minute test procedure.
- Multi-standard ISO, NAS and AS4059 cleanliness reporting.
- Data entry, data graphing and integral printer.
- 420 bar rated maximum pressure.
- Supported by the offline UBS and online SPS accessories.

icountLaserCM20

Portable Particle Counter

Features & Benefits

Test time:	2 minutes
Particle counts:	MTD 4+, 6+, 14+, 21+, 38+ and 70+ microns(c) ACFTD 2+, 5+, 15+, 25+, 50+ and 100+ microns
International codes:	ISO 7-22, NAS 0-12
Data retrieval:	Memory access gives test search facility
Max. working pressure:	420 bar
Max. flow rate:	400 l/min when used with system 20 Sensors. Higher with single point sampler (see page 357)
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 icountLaserCM microprocessor control to ensure effective testing.
- Routine contamination monitoring of oil systems with icountLaserCM saves time and saves money.
- Contamination monitoring is now possible during application operation - icountLaserCM 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 to USB 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 Centre.

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



icountLaserCM20

Specifications

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

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

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

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

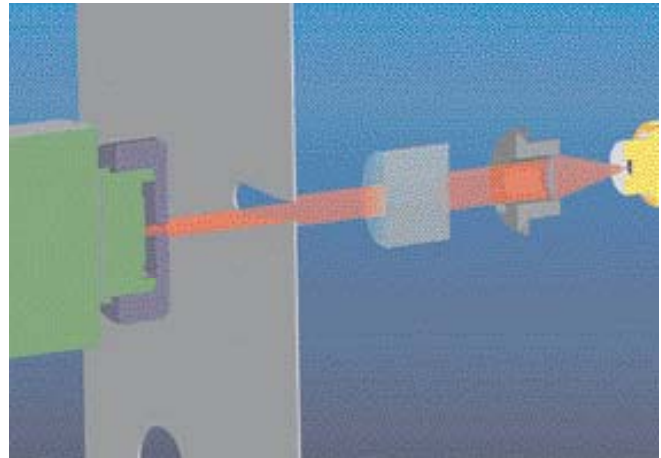
On-line APC's must be able to test the oil sample at whatever cleanliness it is delivered to the machine. Parker therefore had to develop technology to ensure the on-line APC was able to test a sample without the conventional laboratory technique which requires dilution - a practice that would have been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

By careful design and window sizing, gravimetric levels as high as 310mg of dirt per litre, (equivalent to up to 4 million particles >6 micron per 100 ml), can be achieved without making the instrument susceptible to counter saturation.

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



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



Laser Optical Sensing

Core technology that proves itself in icountLaserCM

The icountLaserCM portable particle counter features microprocessor controlled optical scanning for accurate contaminant measurement with a calibration range from ISO 7 to ISO 22 with no counter saturation.

How does icountLaserCM work?

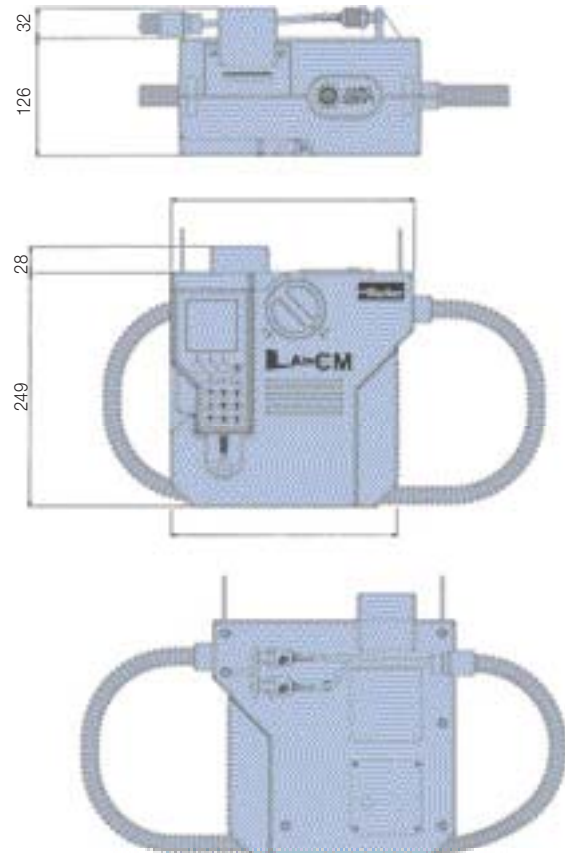
- The particles are measured by a photo diode that converts light intensity to a voltage output which is recorded against time.
- As the particle moves across the window the amount of light lost is proportional to the size of the particle. This reduction in voltage is measured and recorded.
- This "voltage" lost relates directly to the area of the particle measured, is changed into a "positive" voltage and then in turn changed into a capacitance value.
- This value is counted and stored in the icountLaserCM computer in one of 6 channels 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.

icountLaserCM20

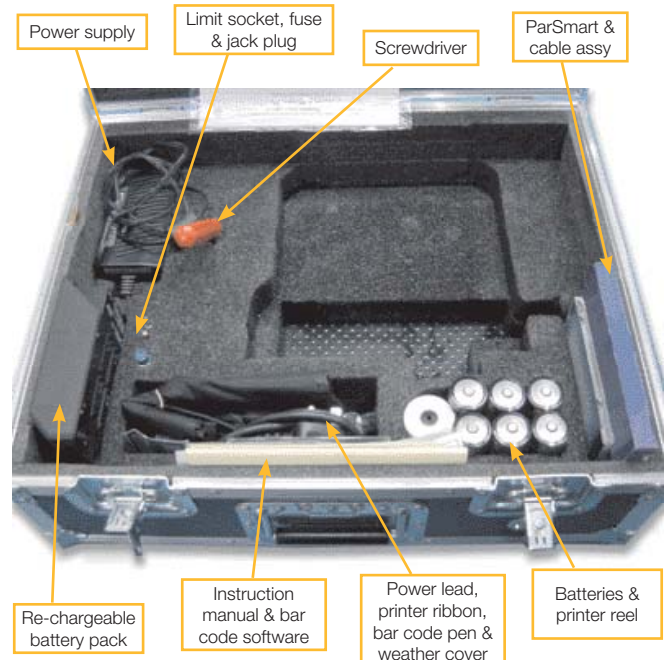
Portable Particle Counter

Specification

Description	LaserCM	LaserCM
	(LCM20 20 22)	(LCM20 20 62)
ABS structural foam and injection moulded case	•	•
ABS handheld display	•	•
Mechanical composition – Brass, plated steel, stainless steel and aluminium	•	•
Fluorocarbon seals	•	•
Perfluoroelastomer seals	•	•
Nylon hoses (kevlar braided microbore)	•	•
Stainless steel armoured hose ends	•	•
1.2m fluid connection hose	•	•
Rechargeable battery pack	•	•
12Vdc power supply	•	•
Fast blow fuse	•	•
Unique optical scanning system	•	•
Bonded glass optical window enclosed in SS plate	•	•
Micron channels analysis (Six)	•	•
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	•	•
Ambient temp.+5 to +40°C	•	•
2 minute test completion time	•	•
Memory store – 300 test memory	•	•
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 to USB computer interface	•	•
Astra board case weight – (Kg)	5	5
Unit weight – (Kg)	8	8
ParSmart software and cable link pack	•	•
Weather protector cover	•	•
CE certified	•	•
Auto logging	•	•



Commissioning Kit



*Note: In compliance with international standards, all Parker portable particle counters can meet the ISO Medium test dust standards. The icountLaserCM'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.

icountLaserCM20

Operation

icountLCM20 Using SPS



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

icountLCM20 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. icountLaserCM offers users advanced laser technology, a fast, dynamic and on-line 2 minute system test cycle. An icountLaserCM Aggressive Fluids model is also available, suitable for monitoring corrosive fluids such as phosphate ester based lubricants used in commercial aviation.

MTD calibration

icountLaserCM 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.

icountLCM20 Using SPS



Understanding MTD

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

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

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

Particles sizes reported based on NIST would be represented as µm (c), with "c" referring to "certified". Therefore the icountLCM20 reported sizes are as follows:

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

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

icountLaserCM20

Portable Particle Counter

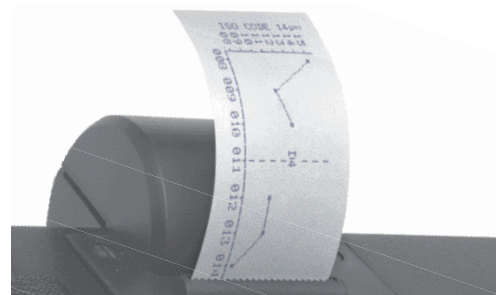
Why On-Site Fluid Contamination Monitoring?

- 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.



Data Download Management

Dedicated software, provides the link between an icountLaserCM20 and the H₂Oil - Water in Oil monitor and your computer management system.



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

icountLaserCM Test	
ON LINE TEST	
TEST NUMBER 022	
	D M Y
Date	04-03-10
Time	15-52
ISO:	20/15/09
Count / 100ml	
>4µ (c)	820721
>6µ (c)	31564
>14µ (c)	314
>21µ (c)	64
>38µ (c)	14
>70µ (c)	0
NOTES	

icountLaserCM Test	
ON LINE TEST	
TEST NUMBER 022	
	D M Y
Date	04-03-10
Time	15-52
NAS CLASS:	7
Count / 100ml	
4/6µ (c)	789157
6/14µ (c)	31250
NAS CLASS	7
14/21µ (c)	250
NAS CLASS	3
21/38µ (c)	50
NAS CLASS	3
38/70µ (c)	14
NAS CLASS	4
>70µ (c)	0
NAS CLASS	0
NOTES	

icountLaserCM20

Portable Particle Counter

Introducing the new icountLCM 'Classic'

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

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

How have we done this?

Parker listened to our existing customers and then to the engineers and maintenance operatives to find out the features that make the icountLaserCM a unique predictive maintenance instrument.

Then, we removed peripheral items such as the aluminium case and all the accessories, so a customer receives the icountLCM, with a CD user guide, professionally and securely boxed. One thing that has not altered is the icountLCM accuracy and icountLCM 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 icountLCM. The icountLCM 'Classic' remains an instrument to be proud of.



Ordering Information (icountLaserCM and 'Classic' icountLaserCM)

Part Number	Supersedes	Description
LCM202022	LCM20.2022	icountLCM20 (MTD calibrated)
LCM202026	LCM20.2026	icountLCM20 'classic' (MTD calibrated)
ACC6NE015	B84702	Printer roll x 5
ACC6NE014	P.843702	Printer ribbon
ACC6NE013	B84609	Re-chargeable battery pack
ACC6ND002	P849603	Weather protector cover
ACC6ND000	B84703	USB to RS232 Download Cable

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.

Model	Fluid Type		Options	
LCM202022	2	Hydraulic mineral	1	icountLCM20 (ACFTD calibrated)
		Skydrol	2	icountLCM20 (MTD calibrated)
			3	icountLCM20 (ACFTD calibrated) + bar code pen
			4	icountLCM20 (MTD calibrated) + bar code pen
			5	icountLCM20 'classic' (ACFTD calibrated)
			6	icount LCM20 ' classic' (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.

Universal Bottle Sampler

Simple and efficient offline oil sampling



Clean and contamination free sampling

Ideal for batch oil sampling and laboratory testing

The UBS provides the dynamic link to portable particle and water counters. The UBS off-line sampler has microprocessor technology to recognise and adjust to the connecting monitor including the icountLCM20 and H₂Oil water in oil monitor.



Product Features:

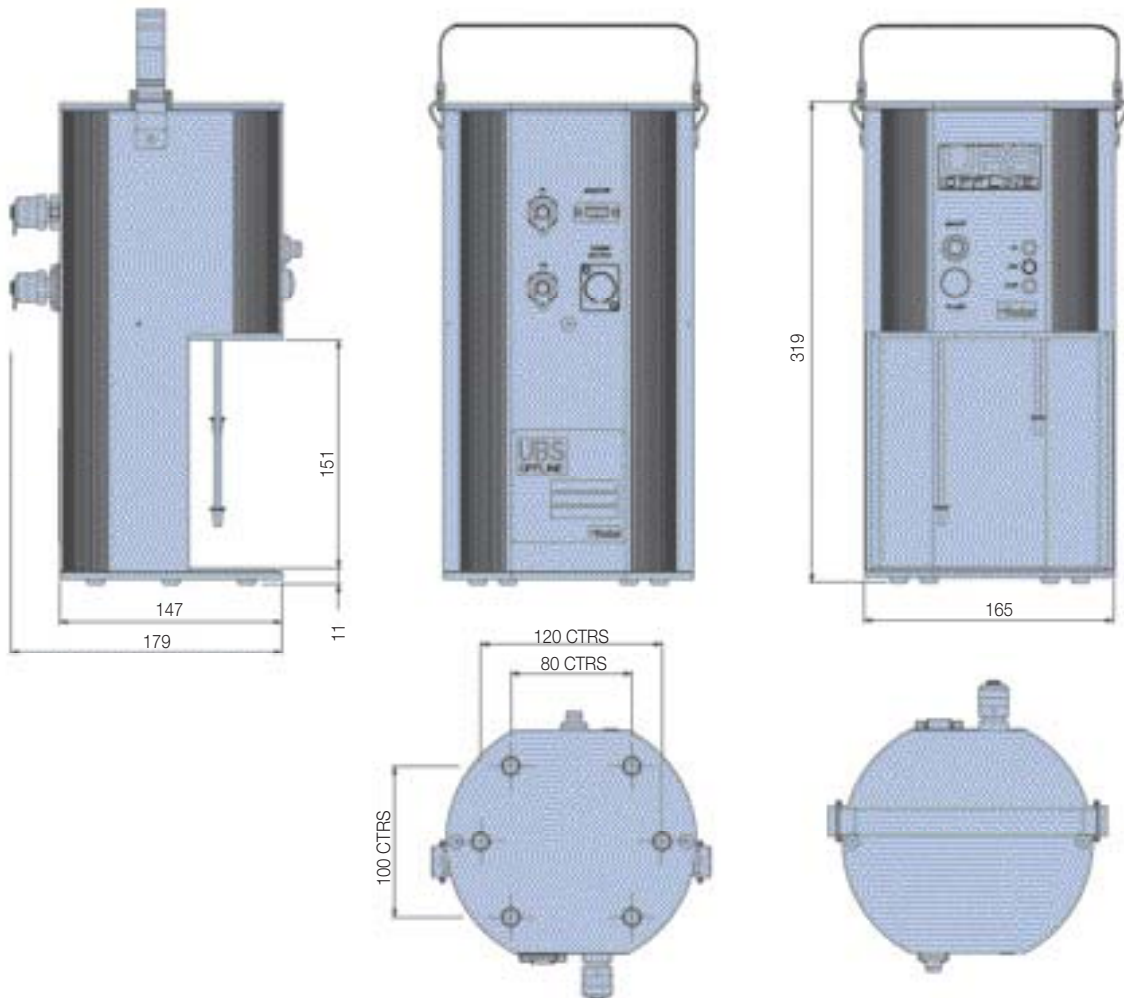
- Simple operation
- Efficient testing procedure
- Clean and contamination free sampling
- Available for both mineral based and aggressive fluids
- Further advances the LCM20's flexibility into laboratory bottle sampling environments
- Can accept various different sized bottles
- Minimal working parts
- Internal auto setting fuse for overload protection
- Simple maintenance procedures

Universal Bottle Sampler

Specifications

Description	UBS offline
Viscosity range 2 to 250 cSt	•
Operating temp +5 to +80°C	•
Test time 2m15s / 4m15s (Flush 2m)	•
12 Vdc power supply	•
Extruded aluminium construction	•
Unit weight - (Kg)	4
Mineral oil and petroleum based compatibility	Fluorocarbon seal
Phosphate Ester group compatibility	EPDM seals
CE certified	•
Military approved	•
Manual operation	•
Bottle pack	•
De-gassing chamber	•
Manual	•
Sample tube pack	•
Interface cable to LCM20, H ₂ Oil etc.	•

Installation Details



Universal Bottle Sampler

Simple and Efficient Offline Oil Sampling

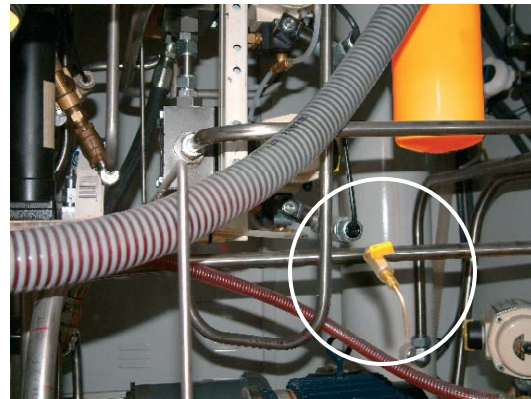
System Flow Rate

Samples are best taken from a point in the system where the flow is TURBULENT (Reynolds No. greater than 4000). The turbulent flow creates a mixing action. Where flow is streamline or LAMINAR, larger particulate may tend to settle toward the lower pipe surface and not be sampled.

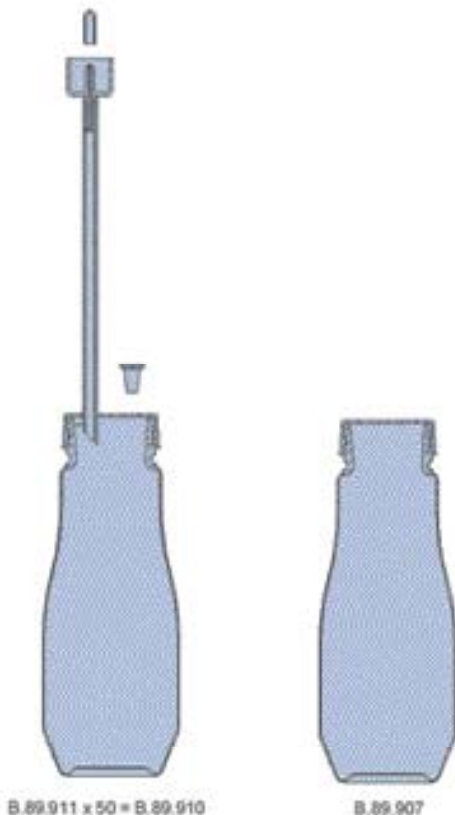
System Condition Changes

Changes in the system operating condition, flow, temperature, pressure or vibration, can result in previously sedimented contaminant being retrained into the flowing oil. It is also possible that these changes may cause partially contaminated filter elements to shed particulate into the system. Samples should, therefore, be extracted when the system is in a steady state condition and the result less likely to be distorted by contaminant peaks.

There are a number of proprietary sampling valves available which adhere to good theoretical principles. However, they do tend to generate a level of precision and cost which is unnecessary for trend monitoring.



Sampling points should enable extraction of a sample without changing the system's condition. Fine control needle valves are not desirable, as they have a tendency to silt up under some operating conditions, causing the distribution of contaminants in the fluid to be changed. The sampling port should be protected to maintain cleanliness and thoroughly flushed before collecting the sample for analysis. Allow sufficient airspace in the bottle to enable 80% fill.



ACC6NW001 x 50 = ACC6NW002

ACC6NK001

Bottle Cleanliness

It is preferable that bottles have sealing screw caps and both parts are cleaned to a suitable level in accordance with ISO3722.

The bottle should not contain more than one tenth the number of particles per 100ml than are expected to be monitored. Standard Parker bottles are supplied clean to ISO13/11 (NAS Class 4) and should not be used to accurately count oils cleaner than ISO 15/12 (NAS Class 6) although they may be used for "trend monitoring" at lower levels.

The bottle should remain capped until time of sample filling and re-capped immediately afterwards.

Sample Mixing

Sedimentation of contaminant in a sample will occur, the rate of which is dependent upon both fluid and particle characteristics.

Samples should be analysed, without delay, once agitated and de-glassed.

Universal Bottle Sampler

Ordering Information

Standard products table

Part Number	Description
UBS9002	Universal bottle sampler (includes aluminium case and accessories)
UBS9003	Universal bottle sampler
UBS9004	Aggressive universal bottle sampler
UBS9005	Aggressive universal bottle sampler (Includes aluminium case and accessories)

Accessories

Part Number	Supersedes	Description
ACC6NK001	B89907	Sample bottle pair no cap
ACC6NW001	B89911	Sample bottle pair with extraction hose
ACC6NW002	B89910	Sample bottle pack (50 x ACC6NW001)
ACC6NK002	S840054	UBS power supply
ACC6NK003	S890005	UBS degassing chamber and pump
ACC6NK004	B89603	UBS degassing chamber only
ACC6NK005	B89902	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.



Typical Applications

- Batch sampling
- Aircraft rig certification
- Oil research
- Laboratory testing
- Transfer line monitoring



Simple To Use UBS

The oil sample is drawn into the UBS Off-line where it is secured, free from further contamination, in a bottle together with a clean waste bottle by a peristaltic, self-priming pump. Simple operation and efficient testing are assured once the UBS Off-line is connected to any of the CM monitors, and powered up using its own power source. The oil sample requires agitation and de-gassing before carrying out the contamination test. A de-gassing kit option is available and consists of a vacuum chamber and pump. (Standard with UBS9002)



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



icountBS - Bottle Sampler

The benchtop solution to fluid contamination
bottle sampling



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 and NAS1638 particle count distributions. For other calibration standards consult Parker Hydraulic Filter Division.
- 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 included.
- Internal printer.

Bottle ID: FILTERED 1

Bottle No : 157
Tested at : 12:24 PM
on : 05/26/2009
Standard : ISO 4406 : 1999
Dust : MTD
icountBS : IC6NW004

Result : 16/13/9
Volume : 30 ml

Size	Counts	Code
>4um(c)	41850	16
>6um(c)	4150	13
>14um(c)	276	9
>21um(c)	20	>5
>38um(c)	6	>3
>70um(c)	0	>0

Particle counts are per 100ml

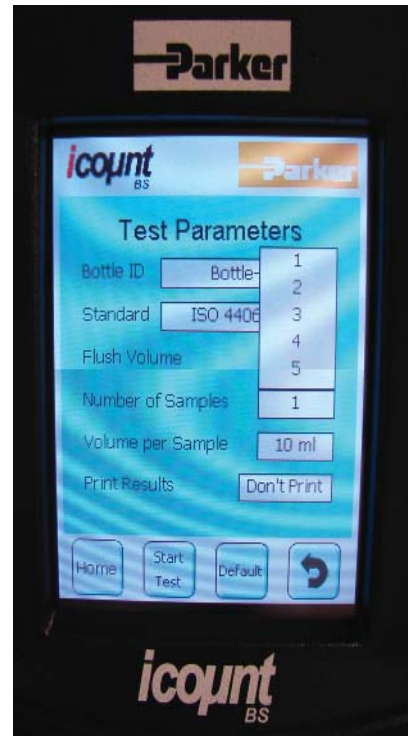




Home Screen



Sample ID Input



Number of Sample Runs



Sample Volume



Flush Volume



Start Test

Analyzing the Test Results

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

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

The ISO code number corresponds to contamination levels relating to three sizes.

The first scale number represents the number of particles that are equal to and greater than 4µm (c) per 100 milliliters of fluid, the second number for particles that are equal to and greater than 6 µm(c) per 100 milliliters of fluid and the third number for particles that are equal to and greater than 14 µm(c) per 100 milliliters of fluid.

For example: An ISO code 20/18/14 indicates that there are between 500,000 and 1,000,000 particles that are equal to and

greater than 4µm(c), between 130,000 and 250,000 particles that are equal to and greater than 6µm(c), and between 8,000 and 16,000 particles that are equal to and greater than 14µm(c).



Component Cleanliness Guide

Suggested acceptable contamination levels for various hydraulic systems

Target Contamination Class to ISO 4406: 1999			Suggested Maximum Particle Level			Sensitivity	Type of System	Typical Components
4 µm(c)	6 µm(c)	14 µm(c)	4 µm(c)	6 µm(c)	14 µm(c)			
15	13	9	16,000	4,000	250	Super critical	Silt-sensitive control systems with very high reliability. Laboratory or aerospace	High performance servo valves
17	15	11	64,000	16,000	1,000	Critical	High performance servo and high pressure long life systems, e.g. aircraft, machine tools, etc.	Industrial servo valves
18	16	13	130,000	32,000	4,000	Very Important	High quality reliable systems. General machine requirements	Piston pumps, proportional valves, compensated flow controls
20	18	14	500,000	130,000	8,000	Important	General machinery and mobile systems. Medium pressure, medium capacity	Vane pumps, spool valves
21	19	15	1,000,000	250,000	16,000	Average	Low pressure heavy industrial systems, or applications where long life is not critical	Gear pumps, manual and poppet valves, cylinders
23	21	17	4,000,000	1,000,000	64,000	Main protection	Low pressure systems with large clearances	Ram pumps

Notes:

Tables have been generated by organizations in various industries.

Some of the tables are defined in cumulative counts, e.g. '>6µm' and others are represented as differential counts e.g. '6-14µm'. All µm(c) refer to MTD distributions. All µm references will refer to ACFTD distributions.

All standards are in counts per 100ml and provide easy methods for converting particle counts into limits that are simple to interpret. By noting the requirements of the standard, particle counts can be accurately converted to contamination levels.

icountBS Product Specification

Principle of Operation	Laser based light obscuration
Calibration Dust	MTD or ACFTD
Dimensions	H=20.9" x W=7.48" (8.27" Door) x D=16.1"
Weight	39.7 lb. (18kg)
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(c), >5µ(c), >15µ(c), >25µ(c), >50µ(c), >100µ(c)
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 For further contamination standards consult Parker CMC
Calibration Standard	ISO MTD and ACFTD calibration to traceable ISO Standards. (Contact Parker CMC 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 (consult manufacturer) and some esters (consult manufacturer)
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

Key	Fluid Type		Calibration		Future Option		Future Option	Future Option	Future Option	Transportation Case		Power Supply Region		
	1	Mineral	1	ACFTD	0	Lab Unit				0	0	1	0	No Case
IBS	1	Mineral	2	MTD						1	Case	1	USA	
													2	Europe

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	*
UK Power Supply	ACC6NW006	
USA Power Supply	ACC6NW007	*
European Power	ACC6NW008	
Transport Case	P893865	*
1m Waste Tube (Clear)	ACC6NW009	*
1m Vapour Hose (Blue)	ACC6NW010	*
USB Memory Stick	ACC6NW011	*
icountBS CD Manual	ACC6NW012	*

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



Single Point Sampler

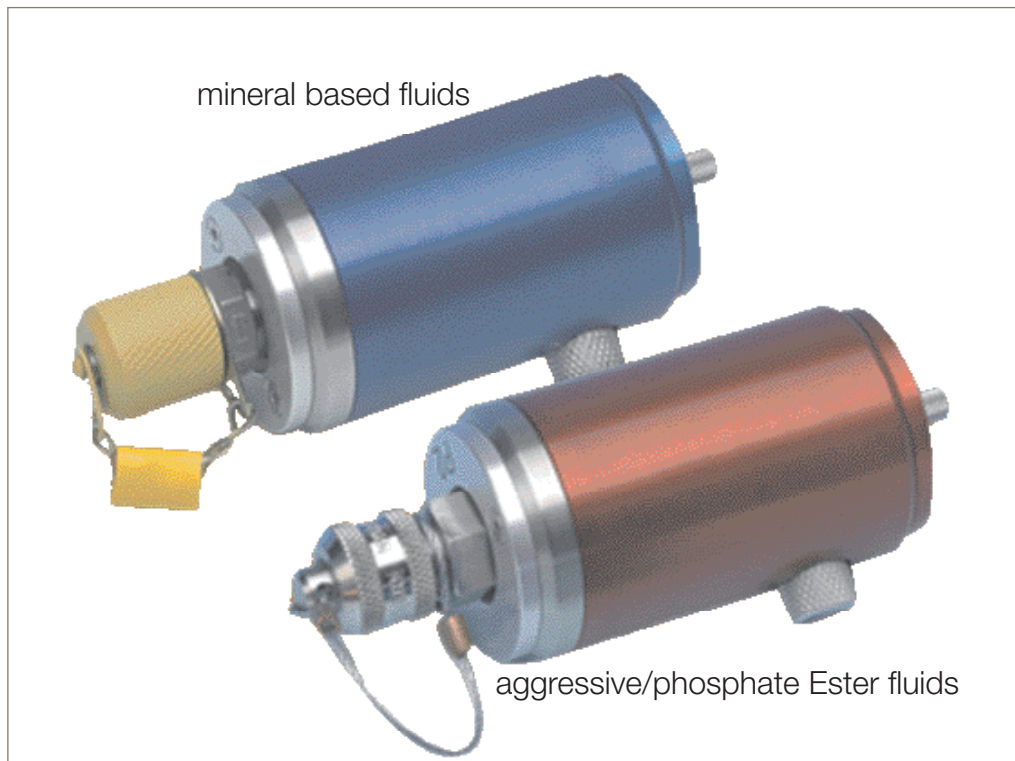
Online Sampling



Lightweight and compact connection

The effective link to ensure accurate contamination monitoring

The SPS (Single Point Sampler) is a lightweight, compact and easy to use online sampling unit that connects an icountLCM20 or H₂Oil to a single pressure test point in a fluid system. Suitable for use with mineral and biodegradable oils, petroleum based and phosphate ester fluids, the SPS offers fingertip operated control even at high pressures - 420 bar (6000 PSI) rated maximum pressure.



Product Features:

- Lightweight, compact and easy to use online sampling unit.
- Connects an icountLCM20 or H₂Oil to a single pressure test point in a fluid system.
- Suitable for use with mineral and biodegradable oils, petroleum based and phosphate ester fluids.
- 420 bar (6000 PSI) rated maximum pressure

Single Point Sampler

Online Sampling

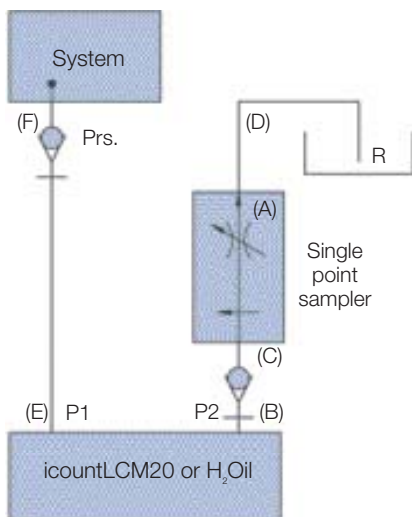
Features & Benefits

The Single Point Sampler provides a means to connect an icountLCM20 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 icountLCM20 or H₂Oil and away into a waste oil receptacle.

- Lightweight, compact and easy to use design
- Fingertip operated control valve even at high pressures
- 420 bar (6,000PSI) rated
- Facilitates testing from large diameter pipework
- Capability to test up to 500cSt viscosity oils (pressure permitting)
- Pressure compensated flow control mechanism
- Possible to control the valve with the same level of accuracy whether the device is operating at high or low pressure
- Capable of allowing a flow rate in excess of 10ml/min when operating at any viscosity within the product specification
- Suitable for fluid temperatures from +5°C to +80°C (+41°F to +176°F)
- High quality polished finish. (stainless steel/ aircraft grade aluminium)
- Capable of working with an icountLCM20 or H₂Oil connected into a system via the standard one metre extension hose kit
- Suitable for use with mineral and biodegradable oils, petroleum based and phosphate ester fluids
- Phosphate ester version utilises the 5/8" BSF HSP style fitting
- Designed so that it meets the lowest possible level of magnetic permeability
- Supplied with accessories kit
- It will maintain the set flow rate between upper and lower limits within a 100 bar inline pressure change
- Clear product identification to ensure that it is connected correctly. (i.e. downstream of the icountLCM20 or H₂Oil)



Connection Instructions



1. Ensure valve is closed (A).
2. Connect P2 on icountLCM20 or H₂Oil (B) to P2 on Single Point Sampler (SPS) (C).
3. Connect drain line on SPS (D).
4. Connect P1 of icountLCM20 or H₂Oil (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) into a reservoir or receptacle (R).
7. Switch on monitor and begin testing.

icountLCM20 Only

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

WARNING! Ensure that SPS valve is closed and icountLCM20 or H₂Oil is connected to the SPS BEFORE connection to system.

Single Point Sampler

Online Sampling

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 max. (Not including hoses).

Packaging standard:

Cardboard carton (military usage - plastic carry case).

Unit size:

45mm dia x 123mm long. (1.77in dia x 4.8in long).

System connection:

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

Operating temp range:

+5°C to +80°C (+41°F to +176°F).

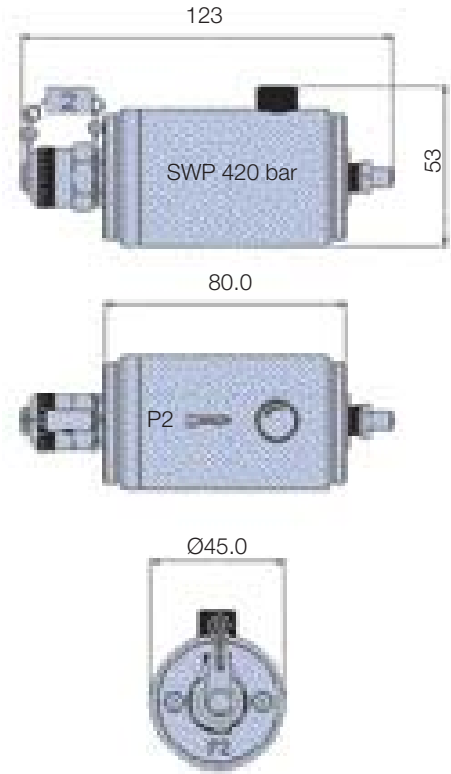
Storage temperature range:

-26°C to +80°C (-15°F to +176°F).

Construction:

Body: Aluminium BS 1470 – pressurised end stainless steel.

Finish: Anodised blue (standard version) - Mineral Oil.
Anodised red (dual seal version) - Aggressive Oil.



Ordering Information

Standard products table

Part Number	Supersedes	Description
SPS2021	SPS.2021	Single point sampler (mineral oil fluids)
SPS2061	SPS.2061	Single point sampler (agressive/phosphate ester fluids)
ACC6NW003	B84784	Waste bottle (Universal)
ACC6NH001	B84224	Extension hose/coupling (mineral fluids)
ACC6NH002	B84225	Extension hose/coupling (aggressive/phosphate ester fluids)
ACC6NH003	B84788	Waste hose (mineral oil)
ACC6NH004	B84787	Waste hose (aggressive/phosphate ester fluids)

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.

System20

Inline Sensors & Monitors



A proven method of accurate condition monitoring of a system

Effective inline sensors and monitors for fluid condition monitoring

Inline System20 sensors and hand-held monitors designed to give accurate and instant fluid system readings of flow, pressure and temperature. 3 sizes of inline System20 sensor for pressures up to 420 bar, an analogue monitor that utilizes 3 day-glow gauges with protective cover. EM20 electronic monitor with full digital display and 300 test memory.



Product Features:

- 2 types of System20 sensor are available.
STI=industrial with reverse flow capability.
STS=Mobile without reverse flow capability.
- 3 sizes of industrial inline System20 sensor for pressures up to 420 bar. 2 sizes of Mobile System20 sensor.
- Analogue monitor utilizes 3 day-glow gauges with protective cover.
- EM20 electronic monitor with full digital display and 300 test memory.
- For use with all mineral oils, water and oil/water emulsions.

System20

Features & Benefits

Covering a wide range of flow rates, fluid types and applications, Parker's System 20 sensors are designed to be used with System 20 electronic or analogue monitors, icountLCM, icountPD and the H₂Oil. Specially developed System20 sensors are available for use with aggressive fluids. (EPDM Seals)

- System20 monitors, combined with the inline sensor, give the user accurate and instant readings of flow, pressure and temperature without the need for costly system downtime.
- For use with all mineral oils, water and water/oil emulsions.

Analogue Monitor

- Utilises 3 Day-Glo dial gauges with a protective hinged cover.
- Calibrated up to 380 l/min with dual scale bar/PSI & °C/°F. (USGPM also available)

EM20 Electronic Monitor

- Gives a full digital display.
- Automatically calibrated for all 3 sizes of sensor.
- Indicates line, differential and rising peak pressure.
- Easily scrolled from metric to US.
- 300 test memory.
- Capable of downloading saved data to download software.

Typical Applications

- Drilling equipment
- Mining
- Grinding and conveying
- Industrial hydraulics
- Mobile applications

Hydraulic system users need to ensure that lost production is kept to the absolute minimum. To ensure this, predictive maintenance utilising routine condition monitoring of hydraulic systems is essential.

System20 inline sensors remain at the heart of condition and contamination monitoring. Whether you're mining the coal, building the new bypass, harvesting the crops, crossing the oceans or drilling offshore – whatever your industry, System20 represents the premier system monitoring available today.



2 sizes of System20 Inline Mobile Sensors are available

System20

Specifications: Sensors

Construction:

Industrial: (STI)
 Body: S/Steel 303
 Internal components: S/Steel and Brass
 Mobile: (STS)
 Body: S/Steel 303
 Internal components: Cast Aluminium and S/Steel

Flow capacities:

All suitable for use with oil, water and oil/water emulsion
 Size 0: 6-25 l/min (0.5-7US GPM)
 Size 1: 20-100 l/min (1.5-26 US GPM)
 Size 2: 80-380 l/min (5-100 US GPM)

Max. working pressure:

420 bar (6000PSI)

Capability:

Reverse flow (STI only)

Pressure drop:

At max. rated flow, Δp is 1.1 bar (mineral oil fluid at 30 cSt 140 SSU).

Ports:

Size 0: G³/₈
 Size 1: G³/₄
 Size 2: G1¹/₄

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 seals



Dimensions (mm)

	Size	Model	AØ	B	C
Industrial	0	STI	30	95	56
	1	STI	41	137	66.5
	2	STI	66.7	231.3	73.5
Mobile	1	STS	41	105	79
	2	STS	60	165	97

Ordering Information

Standard products table

Product Name	Supersedes	Size	Flow Range (l/min)	Fluid Type	Port Threads	Reverse Flow Capability
STI0144100	STI.0144.100	0	6-25	Mineral	3/8	Yes
STI1144100	STI.1144.100	1	20-100	Mineral	3/4	Yes
STI2144100	STI.2144.100	2	80-380	Mineral	1-1/4	Yes
STI0148100	STI.0148.100	0	6-25	Aggressive	3/8	Yes
STI1148100	STI.1148.100	1	20-100	Aggressive	3/4	Yes
STI0248100	STI.2148.100	2	80-380	Aggressive	1-1/4	Yes
STS5117210	STS.5117.210	1	20-100	Mineral	3/4	No
STS5217210	STS.5217.210	2	80-380	Mineral	1-1/4	No

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

Note 4: *Accuracy 5.5% > 95 L/min. (Applies to STI1144100 and STI1148100 only)

System20

Specifications: Electronic Monitor

Electronic Monitor Specification

Construction:

A sealed assembly requiring no routine maintenance or adjustment. Body moulding in Acrylonitrile Butadiene Styrene (ABS). Key pad moulded in silicon rubber. The monitor is suitable for use with all mineral oils, water and oil/water emulsions.

LCD details

Flow section:

The analogue flow scale has reverse flow and overflow indication and provides a percentage reading of the digital full scale display automatically calibrated for all sizes of System 20 Sensor.

Pressure section:

Designed to indicate line pressure, differential pressure and rising peak pressure. Connected to a System 20 Sensor it will monitor pressure up to 420 bar (6000 psi) with an accuracy of ±1% FSD.

Temperature section:

Temperature reading between -10°C and +110°C (14°F to 230°F).

Weight:

1.4kg (3lbs).

Data logging:

Each test logs the following data:

Test number; time & date; sensor size; media tested; flow rate, pressure & temperature.

Data download:

The System 20 electronic monitor is capable of downloading saved test data to a compatible PC via an RS232 connection using datum.

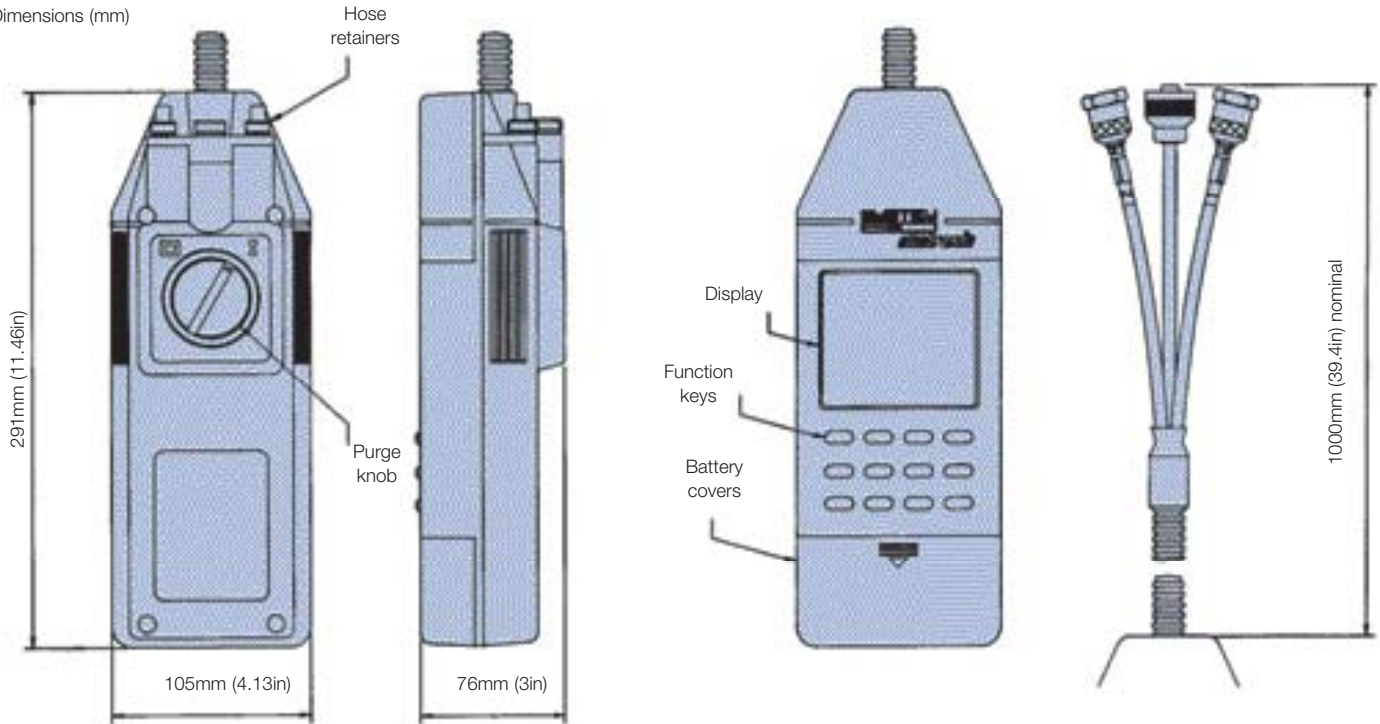
Batteries:

6 x AA batteries.

Re-calibration:

Annual certification by an approved Parker Service Centre.

Dimensions (mm)



Ordering Information

Standard products table

Part Number	Supersedes	Description
EM209000	EM20.9000	System 20 electronic monitor
ACC6NK000	P653607	Transit case
ACC6NJ001	B85617	Dongle and cable assembly

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.

System20

Analog Monitor

Construction:

A sealed assembly requiring no routine maintenance or adjustment. Body moulding in Acrylonitrile Butadene Styrene (ABS). The monitor is suitable for use with all mineral oils, water and oil/water emulsions. The monitor has 3 dayglo dial gauges and features a protective hinged cover.

Gauge details

Flow section:

The flow scale has double scales for size 1 and 2 sensors only. Calibrated up to 100 l/min (26 US GPM) and 380 l/min (100 US GPM). The flow dial has excess-flow indication.

When the system is in reverse flow or when the high pressure lines to the sensor have been transposed, a 'below zero' indication is given.

Pressure section:

Dial readings in both bar and psi up to 420 bar (6000psi).

Temperature section:

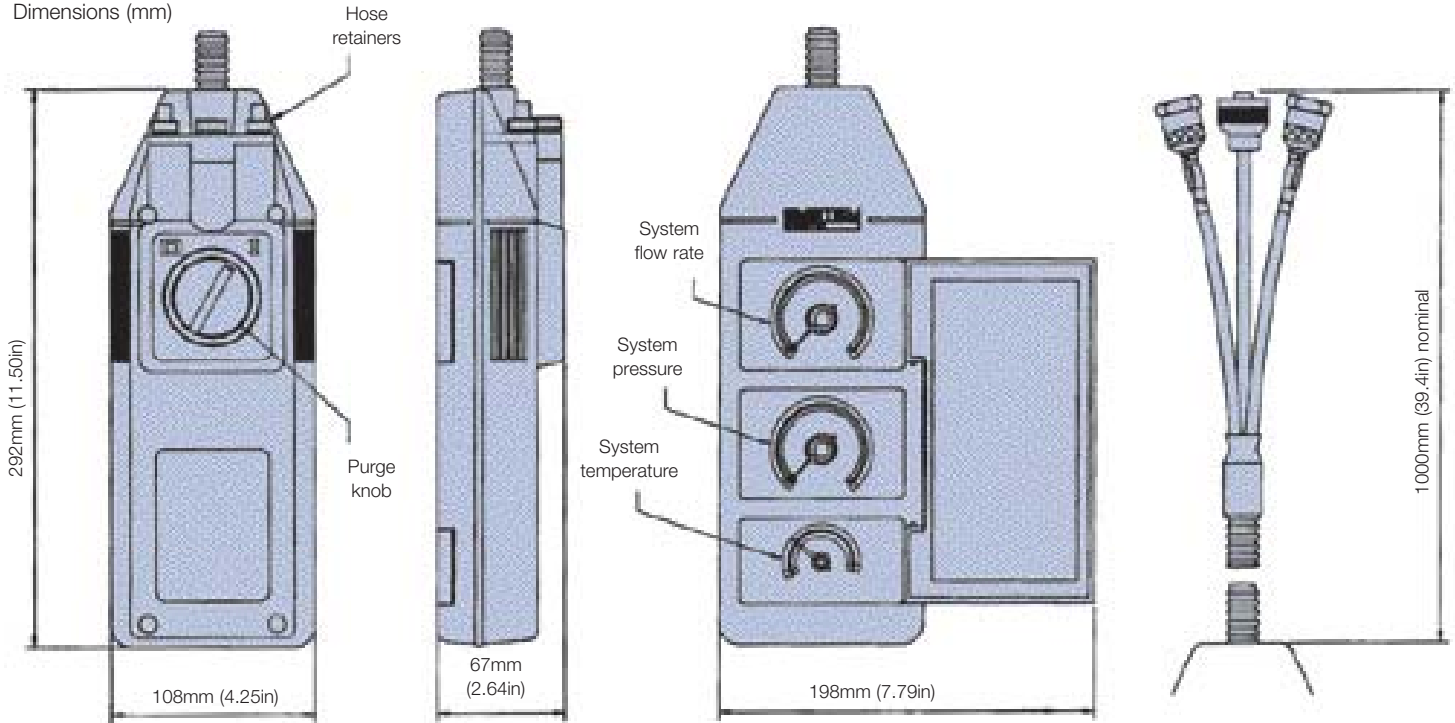
The temperature dial gives readings between -10°C and +110°C (14°F to 230°F).

Weight:

1.4kg (3lbs).

A viscosity chart is provided for mineral oil applications where monitoring is required at variable viscosities (cSt).

Dimensions (mm)



Ordering Information

Standard products table

Part Number	Supersedes	Media Type	Flow Readings	Pressure Readings	Temperature Readings
STM6211110	STM.6211.110	Oil	l/min	Dual scale bar/PSI	Dual scale °C/°F
STM6611110	STM.6611.110	Oil	US GPM	Dual scale bar/PSI	Dual scale °C/°F
STM6211120	STM.6211.120	Water	l/min	Dual scale bar/PSI	Dual scale °C/°F
STM6611120	STM.6611.120	Water	US GPM	Dual scale bar/PSI	Dual scale °C/°F

Note 1: Part numbers featured with bold highlighted codes will ensure a 'standard' product selection.

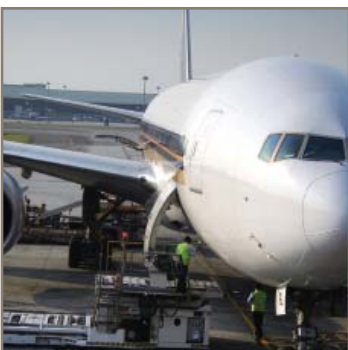
Note 2: Alternate displayed part number selection will require you to contact Parker Filtration for availability.

Accessories

Product Number	Supersedes	Description
ACC6NJ000	P653607	Transit Case
ACC6NJ002	P653106	Metal sensor protective cap



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



icountPD

Online Particle Detector



ENGINEERING YOUR SUCCESS.

icountPD

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



The design dynamics, attention to detail, and small size of the permanently mounted, on-line particle detector brings a truly innovative product to all industry. The laser based, leading-edge technology is a cost effective market solution to fluid management and contamination control.

3 Versions Available

Standard icountPD is designed for test stand, flushing skids, filter carts and other industrial applications.

icountPDR is designed for mobile equipment or any outside use other than hazardous environment.

icountPDZ is intended for applications that require a zone 2 safety such as off-shore platforms or any other hazardous environment.

For Zone 1 applications the standard icountPD can be used within a NEMA7 enclosure.

Features and benefits of the icountPD include:

- Independent monitoring of system contamination trends.
- Early warning LED or digital display indicators for Low, Medium and High contamination levels.
- Moisture % RH LED indicator (optional).
- Cost effective solution in prolonging fluid life and reducing machine downtime.
- Visual indicators with power and alarm output warnings.
- Continuous performance for dependable analysis.
- Hydraulic, phosphate ester & fuel fluid compatible construction.
- Self diagnostic software.
- Fully integrated PC/PLC integration technology such as:
RS232 and 0-5 Volt, 4-20mA, and CANBUS J1939.

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



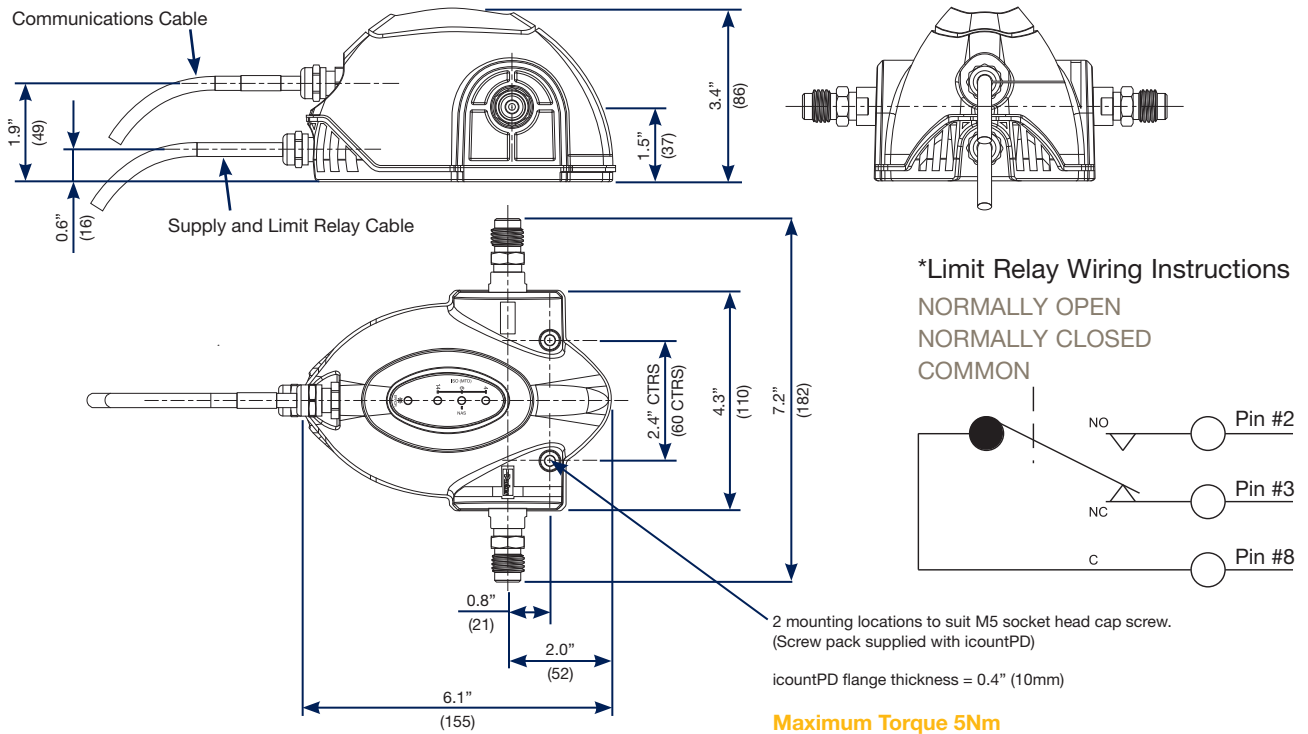
icountPD

Features and Benefits

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

icountPD

Dimensions / Installation Details



M12 Communication Cable: Wiring Configuration for Standard iPD

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

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

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

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

*M12 Limit Relay & Alarm Levels: Wiring Configuration

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

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

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

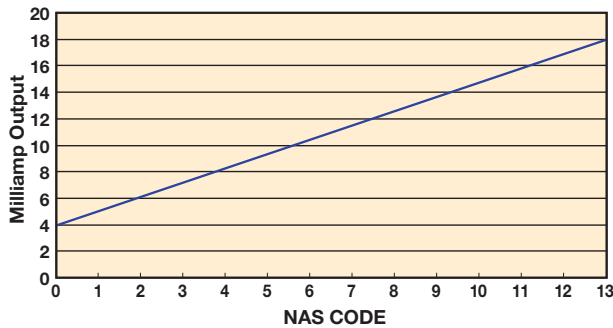
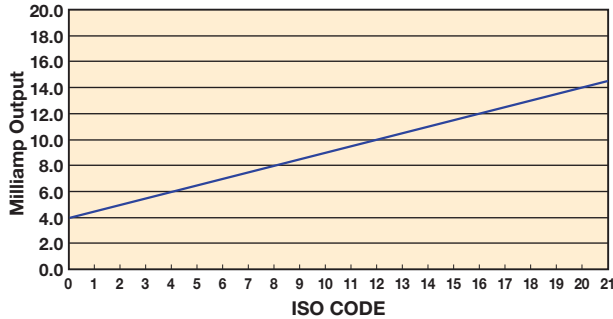
*** Optional – refer to ordering information section.

icountPD

Variable mA Output Settings

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

Example: ISO code 12 is equal to 10mA.



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

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

4-20mA output settings

ISO Setting

mA current = (ISO Code / 2) +4

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

or

ISO Code = (mA current - 4) *2

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

NAS Setting

mA current = NAS Code +5

eg. 15mA = NAS 10 +5

or

NAS Code = mA current -5

eg. NAS 10 = 15mA - 5

Variable Voltage Output Settings

The variable voltage output option has the capability of two different voltage ranges: a 0-5Vdc range as standard, and a user-selectable 0-3Vdc range.

The full list of commands on how to change the voltage output is available from Parker.

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

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

Table relating ISO codes to voltage output

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

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

Table relating NAS codes to voltage output

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

icountPD

Display Parameters (ISO 4406/NAS 1638)

Digital display indication

The digital display will show the actual measured codes, the channel (μ) size and the user definable limits. Visible display of the channel size and user definable limits will alternate.

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 icountPD will simply display the actual error code only – i.e. ERROR 13 (a full list of error codes is detailed in the icountPD user manual).

Moisture sensor output settings

The moisture sensor is an option that can be included when specifying the icountPD. The moisture sensor reports on the saturation levels of the fluid passing through the icountPD 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

icountPD

Auxiliary Flow Device - P/N ACC6NN019

This simple to use flow control device fits on the downstream (outlet) side of the icountPD and is fitted with a differential pressure valve that adjusts the system flow to a range inside the icountPD specifications.

Note: The flow control device will still operate correctly even with the high pressure side at 2900 psi (200 bar) and the return back to an open system of 0 psi (0 bar) (DP = 2900 psi, 200 bar). Minimum system pressure of 150 psi (2.5 bar) needed to function properly.



P/N ACC6NN019

Communication Options

The icountPD may be configured using the icountPD Setup Utility. For more direct control of the device using its communications protocol, you may also use the Microsoft Windows® HyperTerminal program (this program is not currently supplied with the Windows Vista™ operating system, and is not available in Windows 7).

Communication protocol

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

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

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

Optional Accessories					
Description	Part Number		IPD	IPDR	IPDZ
	Mineral/Fuel	Phosphate Esters			
1 Meter Hose Length	ACC6NN001	ACC6NN002	X		
2 Meter Hose Length	ACC6NN003	ACC6NN004	X		
5 Meter Hose Length	ACC6NN005	ACC6NN006	X		
1/4" BSP Test point	ACC6NN007	ACC6NN008	X		
1/8" BSP Test point	ACC6NN009	ACC6NN010	X		
1/8" NPT Test point	ACC6NN011	ACC6NN012	X		
Single Point Sampler	SPS2021	SPS2061	X	X	X
External Flow Device	ACC6NN019		X	X	X
Power Supply	ACC6NN013		X	X	X
5 meter, M12, 8-pin plug and socket cable kit*	ACC6NN014	ACC6NN015	X		
Deutsch 12-pin connector kit	ACC6NN016		X	X	
RS232 to USB converter	ACC6NN017		X	X	X
12" long M12 8-way RS232 & power cable kit	ACC6NN018		X		X
M12, 12 way cable	ACC6NN024			X	

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

icountPD

Online Particle Detector

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	BOX 7	BOX 8
IPD	1	2	2	2	2	1	30

BOX 1: Basic Assembly

Symbol	Description
IPD	Standard Particle Detector
IPDR	Particle Detector - Robust Construction
IPDZ	Particle Detector - Hazardous (Zone 2)

BOX 5: Limit Relay

Symbol	Description
1	No (iPDR only)
2	Yes

BOX 2: Fluid Type^{1,2}

Symbol	Description
1	Mineral Oil
2	Phosphate Ester (iPD, iPDR only)
3	Aviation Fuel (4 channel) (iPD, iPDZ only)

BOX 6: Communication^{3,4}

Symbol	Pressure Setting
2	RS232 / 4-20mA
3	RS232 / 0-5V (iPD, iPDR only)
5	RS232 / CAN-bus (J1939)

BOX 3: Calibration

Symbol	Description
2	MTD

BOX 7: Moisture

Symbol	Description
1	No
2	Yes

BOX 4: Display

Symbol	Description
1	None (iPDR, iPDZ only)
2	LED (iPD only)
3	Digital (iPD only)

BOX 8: Cable Connector⁵

Symbol	Description
10	Deutsch DT Series (iPD, iPDR only)
30	M12, 8-pin plug connector (iPD, iPDZ only)
40	M12, 12-pin plug connector (iPDR only)

Notes:

- When "3" is selected in Box 2, "1" must be selected in Box 7.
- Aviation Fuel option can also be used for diesel fluids.
- For iPD and iPDR units, when "5" is selected in Box 6, "10" must be selected in Box 8.
- Contact Parker for additional communication options (RS485, GPRS, LAN, WiFi, Sat, etc.)
- The required connecting cables are available as a kit. The kit consists of two 5 meter cables (Communications cable and Relay/Power Supply cable) to enable all output options. See Accessory table on page 7 for applicable part number.

Early Warning

icount Lubrication and Hydraulic Oil Monitoring system



An all-in-one particle detection system

Developed around the proven Parker icountPD particle detector

Particle detection is the best known way to determine whether oil is contaminated or not and the best way to detect particles online or offline is by using Parker's icountPD. To make results even easier to obtain we added some extra equipment.



Product Features:

Wind turbines

- Gear boxes
- Hydraulic systems in pitch, yaw and brake

Shipping and shipbuilding industry

- Propulsion systems
- Thrusters
- Deck machinery

Steel and pulp & paper industry

- Lubrication oil systems
- Hydraulic system control of presses and winders

Power generation

- Lubrication oil systems
- Hydraulic system control for fuel feeding

Proactive maintenance with icount

With the icount System, the early bird stands every chance of catching the worm.

Be that early bird and schedule oil changes through predictive maintenance of the system and plan service times. Parker's icount system provides early warning of any unwanted changes in hydraulic or lubrication oil quality. Thus increasing the availability of the machinery by reducing the need for unnecessary downtime.

Insurance companies are able to lower fees as the icount System warns of possible component failure. It also reduces the warranty costs thanks to an integrated pump unit that enables a cost effective solution to monitor oil from different points of a system.

icount SYSTEM		
	Standard	Options
Electric motor	230VAC	110VAC, 24 VDC
Pump	X	
Flow control unit	X	
Pressure control valve		for pressurized systems
Particle detector	icountPD	
Local display	led	none, digital, GSM
Communications	RS232	RS232/4-20mA, RS232/0-5V, RS232/Canbus
Moisture sensor		X
Limit Relay		X
Cable connector kit	M12 - 8 pin	
Short start module		X
Mounting	bracket	sealed box

Parker's icount System housing can include several options to guarantee uniform sample handling and measuring any required aspect of oil quality.

You can trust icount accuracy

Parker icount Lubrication and Hydraulic Oil Monitoring System is available today. It features Parker's laser technology and all necessary components for reliable monitoring up to 1000 cSt oil viscosities. The unit allows

system monitoring and accurate particle detection from any available source.

A moisture sensor as an option to measure the relative humidity of the oil and other add-on sensors like viscosity measurement are also available.

Several power versions for easy installation and worldwide operation are

available. The system is capable of data transmission in multiple forms and central control can collect information and manage easily for example large marine wind farms off shore and on land.

A special design for wind turbine applications with pressurized connection is available. Correct oil pressure and steady flow ensure consistent measuring.



For more information contact Parker.

The icountPD Particle Detector from Parker represents the most up to date laser based technology in particle detection. Standard in every icount Monitoring System.

H₂Oil - Water in Oil Monitor

Fluid Condition Monitoring



Monitoring water contact during system operation

Measure the level of water content polluting your oil

H₂Oil is a two-channel, non-dispersive absorption spectrometer designed to measure the level of water content polluting your oil. Fully portable, H₂Oil can operate without the need for mains power. A 90 second test time and 500 test memory together with data entry and on-board printer as standard makes H₂Oil an outstanding performer in the field or factory environment.



Product Features:

- H₂Oil is a two-channel, non-dispersive absorption spectrometer, designed to measure the level of water content polluting oil.
- Fully portable unit without the need for mains power.
- 90 second test time and 500 test memory.
- Data entry and on-board thermal printer.

H₂Oil - Water in Oil Monitor

Features and Benefits

- Water monitoring is now possible during system operation - H₂Oil saves on production downtime.
- Fully portable, can be used easily in the field without the need for mains power, as well as in the laboratory.
- Connects into system at pressures up to 420 bar, via either system 20 sensor or single point sampler.
- 90 second test time.
- Scrolling memory for 500 tests plus memory for 20 different oil calibration curves.
- Routine water monitoring of oil systems with H₂Oil saves time and money, promoting oil longevity.
- Samples that are tested are truly representative of water in the system. Analysis carried out before sample hydrodynamics change.
- Data entry facility enables user to store unique data test log details with every test carried out.
- Instant, accurate results are available on the display or the built-in thermal printer ensuring maintenance decisions can be taken immediately.
- Computer interface available for downloading data on to the computer through the RS232 serial port.
- Internal diagnostics features ensures H₂Oil will work accurately and reliably.
- Supplied in a robust aluminium carrying case.
- Optional oil delivery kit for simple offline sampling.

Typical Applications

- Off-shore & power generation
- Marine
- Construction machinery
- Paper mills
- Hydraulic equipment & system manufacturers
- Research & testing institutes
- Military equipment application

The H₂Oil is a two channel non-dispersive absorption spectrometer, designed to measure the level of water content polluting the oil, reducing system efficiency, promoting wear and affecting safety.

The H₂Oil makes it possible for an end user or service engineer to carry out quick, accurate measurements, taken in the field instead of remote laboratory analysis.

With its secured hoses the H₂Oil connects to an in-line System 20 sensor or single point sampler and features a re-chargeable 12Vdc power pack, diagnostic computer and on-board printer for effective logging and retrieval of data.



Oil delivery unit
P/N S840134



H₂Oil - Water in Oil Monitor

Fluid Condition Monitoring

Specification

Construction:

Case-Noryl structural foam and ABS printer cover. Key pad silicone rubber.

Mechanical composition:

Brass, plated steel, stainless steel.

Seals:

Fluorocarbon.

Hoses:

Nylon (Kevlar braided microbore).

Hose length:

Fluid connection hose 1.2 metre (3.9 feet).

Flow rate:

Up to 400 l/min (100 US GPM).
(System 20 Sensors). Higher flows with SPS.

Max. working pressure:

Up to 420 Bar (6000 psi).

Fluid compatibility:

Mineral oil and petroleum based fluids.

Power:

Re-chargeable battery pack (12Vdc trickle charger supplied).

Fuse:

5.0 amp fast blow fuse included for overload protection.

H₂Oil technology:

Infrared absorption spectroscopy

Measurement and range:

PPM (0-3000) or % content.

Max operating temperature:

+5°C to +80°C (+41°F to +176°C).

Environmental temperature:

+5°C to +40°C (+41°F to +104°F).

Test completion time:

90 seconds.

Memory store:

500 TEST (scrolling memory) capacity.

Printer facility:

Integral 16 column thermal printer for hard copy data.

Computer interface RS232.

Repeatability/accuracy:

Better than 5% (typical).

Viscosity range:

2-100 cSt (9-460 SSU). 500cSt with SPS.

Commissioning kit:

Includes 2 re-chargeable battery packs (1 fitted to monitor), 2 x thermal printer rolls, spare fuse, screwdriver, 12Vdc trickle charger and user manual.

Data entry:

24 character two line back lit dot matrix LCD. Full alpha numeric keypad.

Data retrieval:

Memory access gives test search facility.

Monitor carry case:

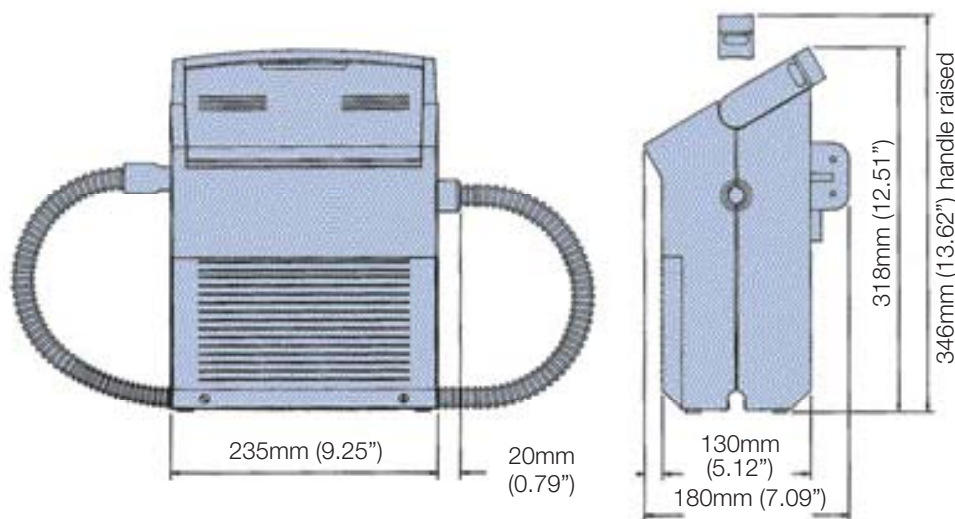
Robust aluminium transportation case.

Data Download:

Condition monitoring data software pack plus cable included in commissioning kit.

Performance recheck:

Annual recheck of performance by an approved Parker Service Centre.



FACT: The H₂Oil can be considered the best alternative solution re-agent chemical Karl Fischer analysis test methods, which is being considered to phase out under strict European legislation regarding the use of carcinogenic fluids, a fundamental part of all Karl Fischer test procedures

H₂Oil - Water in Oil Monitor

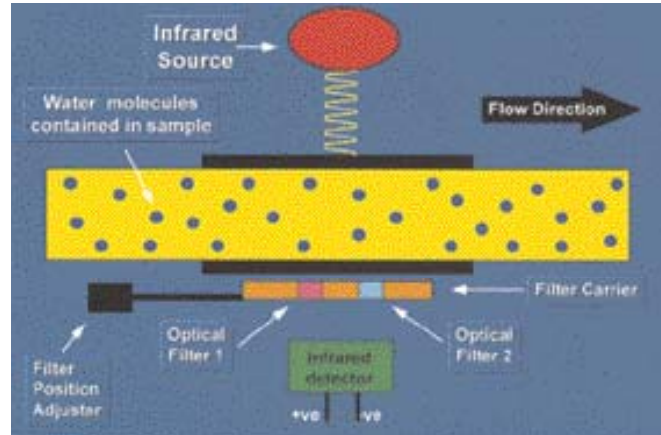
Fluid Condition Monitoring

How the H₂Oil Works

On-line testing allows a mixed and flowing sample of oil and water to pass through the infrared measuring cell. A series of measurements can be taken and the average given as a result. With this method a representative oil sample is seen, unlike the usual reservoir samples sent for analysis. Also, by taking the test at working temperature and pressure, a true water content is taken, as both affect the way water is absorbed in oil.

The flowing sample passes through a special “water free” optical cell.

The infrared detector monitors two narrow band pass filters, one of which matches the spectral width of the water attenuation band. The second narrow wave band selected is unaffected by water and serves as a reference. By taking the transmission ratio between the two points an effective measurement of water can be made.



Core Technology

H₂Oil uses true infrared (IR) analysis technique - the principle used in all laboratory spectrometers, to measure absorbed water (before saturation point).

Channel one (2.6 μ) is the reference point, whereas channel two (3 μ) is H₂O.

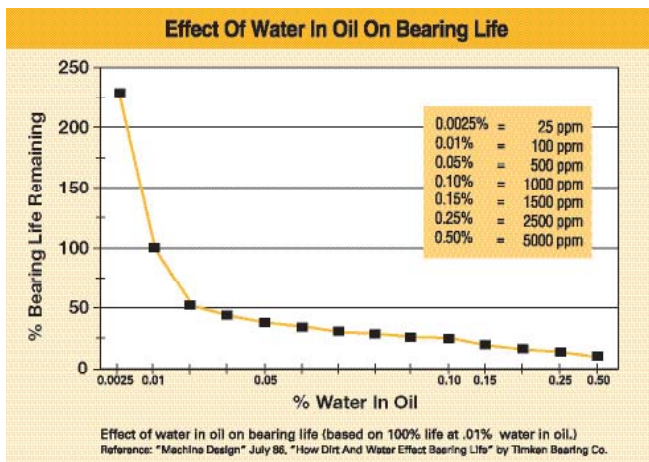
The IR source is a tungsten halogen bulb.

Effective Oil Maintenance

Take a typical application where water can have a very detrimental effect on bearings. Cracks are generated early in life of a bearing and water, once condensed in the crack, leads to corrosion and early damage.

Loss of bearing life, due to water contamination, (see below) can be prevented by stopping the water from entering the system in the first place. Introducing a regular water content monitoring function into the programme, such as the H₂Oil, would support such efforts.

Whatever the application, whether it be offshore in the oil industry or off-road in the construction or earth moving industry, the portability of the H₂Oil makes it an essential kit for the service van or engineers tool.



Ordering Information

Standard products table

Part Number	Supersedes	Description
WOM9100EUR	N/A	Water in Oil Monitor with European Power Supply
WOM9100UK	N/A	Water in Oil Monitor with UK Power Supply
WOM9100US	N/A	Water in Oil Monitor with US Power Supply
ACC6NC003	B91701	Thermal printer roll (x5)
ACC6ND003	B91706	Download cable and adaptor
ACC6NC000	N/A	H ₂ Oil Trickle power supply (UK)
ACC6NC001	N/A	H ₂ Oil Trickle power supply (EURO)
ACC6NC002	N/A	H ₂ Oil Trickle power supply (US)

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.

icountMS Range

Fluid Condition Monitoring – Moisture Sensors



An essential component of any predictive maintenance programme

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. MS150 is the 'low pressure' option for suction line/reservoir applications. 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 programmes.
- MS150 'low pressure' suction/Return line applications. 10 bar maximum operating pressure.
- MS200 'Programmable' sensor monitoring and reporting relative humidity (RH), moisture content in oils. 420 bar MAOP.
- MS300 'Intrinsically safe' sensor ATEX certificated for use in hazardous Zone 0 environments. 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.
- Not available on MS150

Typical Applications

- Ground support vehicles
- Pulp and paper plants
- Marine hydraulics
- Power transmission & distribution
- Forestry
- Industrial hydraulics
- Earth moving applications
- Agricultural
- Hazardous Areas (Zone 2)
- Theme parks (Ride hydraulics)



In-Line Moisture Measurement of Hydraulic & Lubricating Oils.

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

Specification

Pressure:

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

Operating temperature:

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

Flow through sensor cell:

Installed in active flowstream.

Fluid compatibility:

Mineral oils, petroleum-based and Phosphate ester.

Viscosity range:

Unlimited.

Port connections:

1/4" BSPT or 1/4" NPT.

Supply voltage:

+8 to +30 Vdc.

Sensor size/weight/material:

80mm x 43mm/0.1kg/Aluminium

IP ratings:

IP68

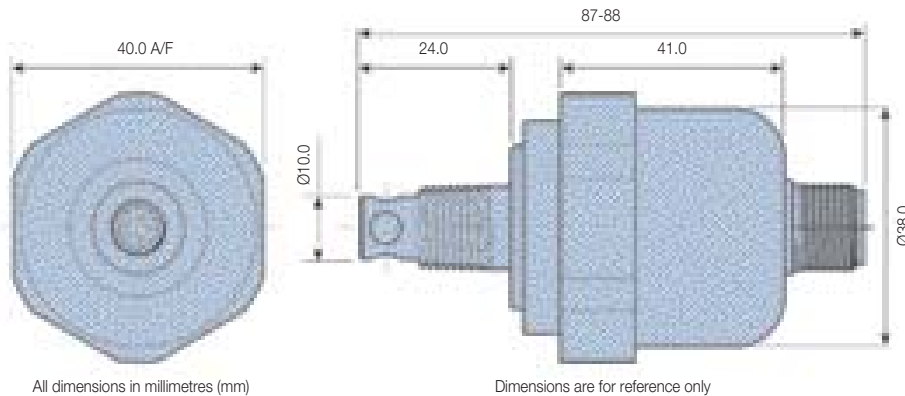
%RH Outputs:

(+1 to +5 Vdc) or (4 to 20mA)

Temperature Outputs:

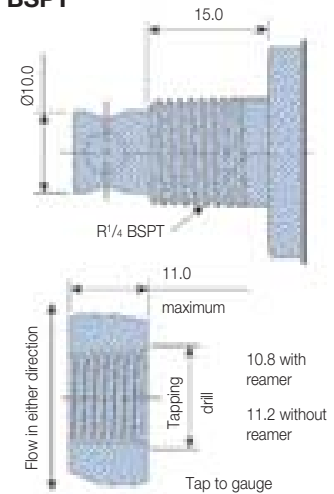
0 to +5 Vdc

Installation Details

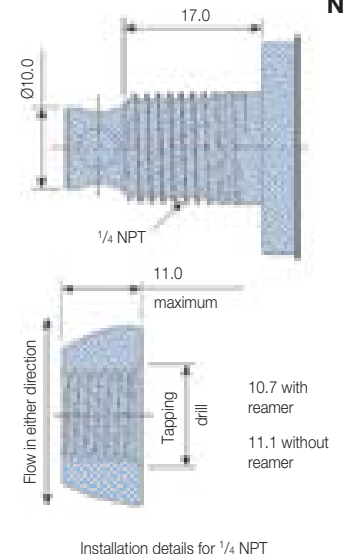


Thread Form Options

BSPT



NPT



Sensor Outputs

MS150 moisture sensor pin designations			
Pin	Designation	I/O	Description
1	Supply	Input	Supply voltage (+8 to +30Vdc)
2	%RH	Output	% Saturation out (+1 to +5Vdc)
3	%RH	Output	% Saturation out (+4 to +20mA)
4	Temperature	Output	Temperature out (0 to +5Vdc)
5	Common	Input	Common (0Vdc) ground from power supply (not chassis ground)

Interpreting the data

Oil type: Texaco Rando 46.

Saturation point: 400ppm @ 65°C (150°F).

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 65°C (150°F).

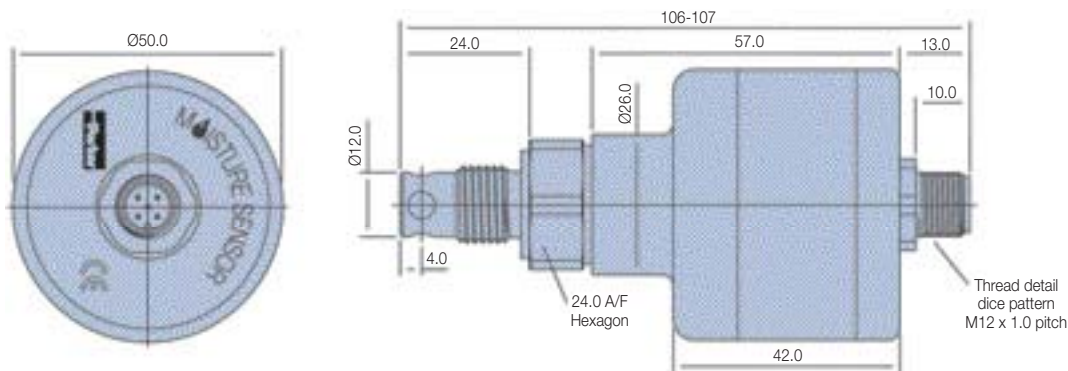
MS200 'Programmable'

Specifications

Specification

% Saturation Calibration Accuracy:	+3% RH
Temperature Calibration Accuracy:	±1°C
Thermal Stability:	±1% RH (over compensated temperature range +10 to +80°C)
Stability:	±0.2% RH typical at 50% RH in 1 year
Linearity:	±0.5% RH typical
Analogue Output Hysteresis:	±0.5% RH Full Scale
Switched Output Hysteresis:	2% RH
Operating Temperature Range:	-40°C to +85°C (-40 to +185°F)
Operating Humidity Range:	5 to 100% RH (non condensing)
Response Time:	60 sec in slow moving air at 25°C
Maximum rated pressure:	420 Bar (6000 PSI)
Maximum torque on spanner flats:	30 Nm (ONLY USE SPANNER FLATS TO INSTALL AND REMOVE THE MOISTURE SENSOR)
Seal Material (depending on MS):	Fluorocarbon, EPDM, Perfluoroelastomer
Material:	Stainless Steel 303
Connector Details:	M12x1, 8 Way, IP67 Connector (IP68 when mated with moulded cable)
Maximum Cable Length:	10 Metres with Voltage Output 100 Metres with Current Output
Output:	SEE ORDERING INFORMATION

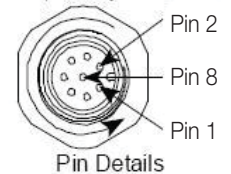
Installation Details



Moisture Sensor Wiring and Pin Designations

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

M12, 8 Way Connector



MS300 Intrinsically Safe

Specification

Pressure:

Maximum allowable operating pressure.
(MAOP): 420 bar (6000 PSI).

Operating temperature:

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

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 (+ 10°C to +80°C)

Materials:

Stainless steel 303.

Sensor size/weight:

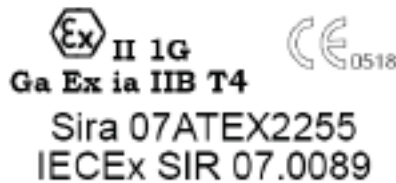
107mm x ø50mm/0.3Kg.

IP ratings:

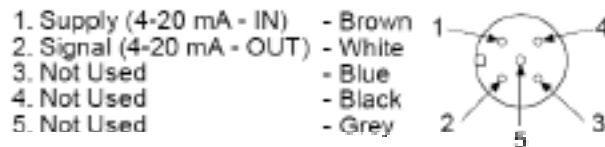
IP68 (with specified moulded cable)

Developed in association with Triteq Ltd.

Installation Details - See MS200



Moisture Sensor Connection Diagram



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: U_i : 28V I_i : 93mA P_i :0.65W C_i : 380nF L_i : 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 temperatures in the range -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).

Visual Indicators

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:

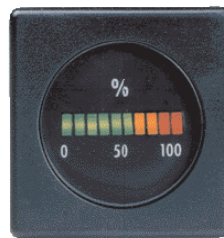
Polarised.

Weight:

29gms.

Alternative Indicator

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



PBG8341A



DDU1001/DDU1002

Product accessories part numbers

Product Number	Supersedes	Description
DDU1001	P.9732PVC-10	Digital display unit 22-55 Vdc
DDU1002	P.9732PVC-05	Digital display unit 110-240 Vdc
PBG8341A	PBG.8341.1A	Bar Graph Indicator (+11 to +30 Vdc)
PAM8342	PAM.8342	Bar Graph alarm module
ACC6NF000	B97200	5 meter M12, 8 pin moulded cable (IP68)
ACC6NF001	P973200	M12, 5 pin rewirable 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 metre M12, 5 pin moulded 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

Visual Indicators

Ordering Information

MS150 Standard Product Table

Product Number	Supersedes	Fluid type	Thread Forms	Connector
MS1503	MS150-3	Mineral + Aggressive	G 1/4" BSPT Taper	M12 5 WAY
MS1504	MS150-4	Mineral + Aggressive	1/4" NPT Taper	M12 5 WAY

MS200 - Product Configurator

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

MS200 - Standard Product Table

Key	Model	Fluid type	Output Options	Thread Forms	Connector	Future option
MS	2	2	02	1	1	0
MS	2	2	02	2	1	0
MS	2	2	02	3	1	0
MS	2	2	02	4	1	0
MS	2	2	02	5	1	0
MS	2	2	04	1	1	0
MS	2	2	04	2	1	0
MS	2	2	04	3	1	0
MS	2	2	04	4	1	0
MS	2	2	04	5	1	0

MS300 - Product Configurator

Key	Model	Fluid type	Output	Thread form	Connector	Future option						
MS	3	Programmable	2	Mineral	04	4 - 20 mA	1	G 1/4" BSP Bonded Seal	1	5 WAY	0	None
			6	Aggressive	2	G 1/4" BSP Integral Seal						
			3	R 1/4" Taper Thread								
			4	1/4" NPT Taper Thread								
			5	9/16 - 18 UNF 2A Integral Seal								
			6	G 3/8" BSP Female Swivel Equal Tee								

MS300 - Standard Product Table

Key	Model	Fluid type	Output	Thread Forms	Connector	Future option
MS	3	2	04	1	1	1
MS	3	2	04	2	1	1
MS	3	2	04	3	1	1
MS	3	2	04	4	1	1
MS	3	2	04	5	1	1

Oilcheck

Hand-held Oil Condition Monitor



Portable and battery powered for 'go-anywhere' monitoring

Hand-held condition monitor provides a visual comparison between new and used oils

Parker's Oilcheck is completely portable and battery powered with a numerical display that indicates positive or negative increase in dielectrics. Oilcheck gives an early warning of impending engine failure and the simplistic hand-held design makes it easy to use.



Product Features:

- Oilcheck hand-held condition monitor provides a visual comparison between new and used oils.
- Completely portable and battery powered.
- Numerical display shows positive or negative increase in dielectrics.
- Gives early warning of impending engine failure.

Oilcheck

Hand-held Oil Condition Monitor

Features & Benefits

- A comparator between new and used oils.
- Oilcheck gives early warning of impending engine failure.
- Cost effective solution to save money and help increase engine life.
- Completely portable, battery powered.
- Ideal for fleet owners, garages and DIY mechanics.
- Numerical display to show positive or negative increase in dielectrics.

Using Oilcheck

Following the simple sampling procedure, Parker's Oilcheck will ensure effective and highly repeatable results. Once a clean oil sample has been placed in the 'Sensor Well' and the 'TEST' button has been pressed, the instrument will 'zero' on the sample.

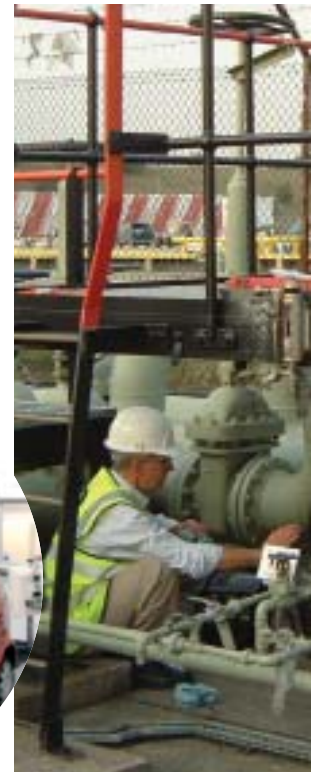
Once cleaned out with a degreaser and replaced by a contaminated sample, a new reading is obtained on the LCD, which can be easily compared against the green/amber/red efficiency scale.

Typical Applications

- Fleet owners
- Construction equipment maintenance
- Vehicle service garages
- Plant hire maintenance

The Oilcheck from Parker Filtration's Condition Monitoring Centre detects and measures the dielectric constant of oil, by comparing the measurements obtained from used and unused oils of the same brand.

Used as a regular service monitoring instrument, the Oilcheck will give the engineer warning of an impending engine failure and promote increased engine life. Oilcheck is the low-cost solution that will take the guesswork out of oil changes, saving money and time.



Oilcheck

Specifications

Case construction:

ABS.

Circuitry:

Microprocessor control.

Battery:

1 x 9V alkaline (supplied).

Display:

LCD.

Suitable oil types:

Mineral and synthetic based oils.

Repeatability:

Better than 5%.

Readout:

Green/amber/red grading, Numerical value (0-100%).

Battery lifetime:

>150 hours or 3,000 tests.

Dimensions:

250mm x 95mm x 34mm (9.8" x 3.7" x 1.3").

Weight:

0.4kg.

Using Oilcheck



Green/amber/red numerical value

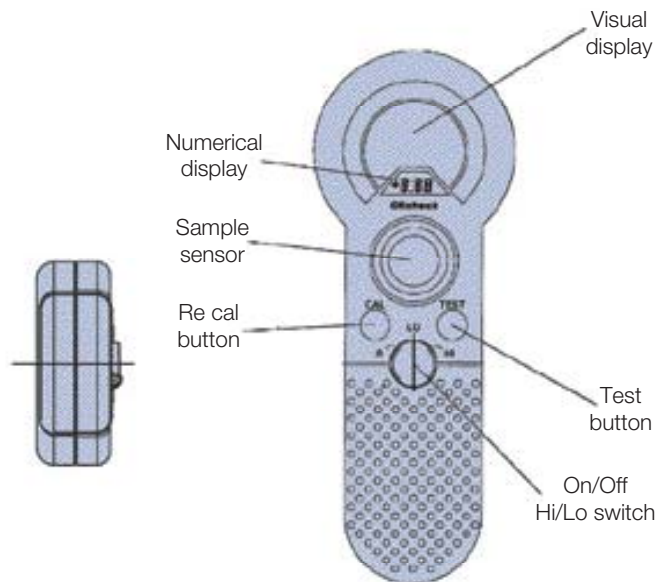
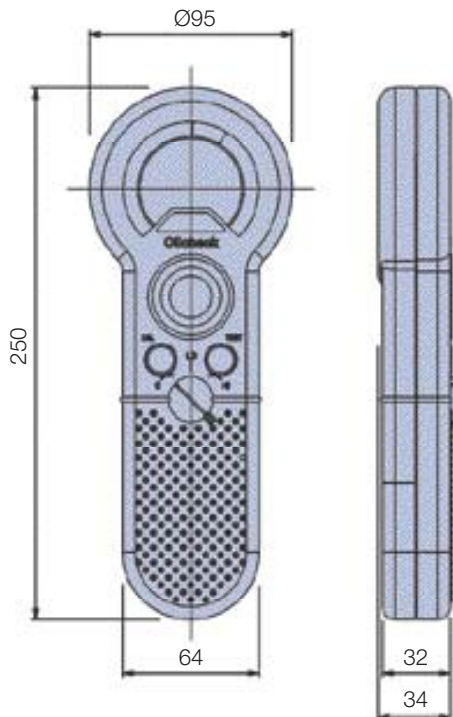
The Oilcheck can remove the need for costly and time consuming laboratory analysis of mineral and synthetic oils used in engines, gearboxes and bearing lubrication systems. It detects mechanical wear and any loss of lubricating properties in the oil with a repeat accuracy of less than 5%.

The Oilcheck is able to show changes in the oil condition brought about by the ingress of water content, fuel contamination, metallic content and oxidation.



Function buttons

Installation Details



Ordering Information

Standard products table

Product Number	Description
OLK605	Oilcheck kit with numerical readout
OLK611	Oilcheck cleaner

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.

icountACM20 Lab Unit

Aviation Fuel Contamination Monitoring

Note: For information on icountPD for aviation fuels see page 27



A unique product with pedigree

DEFSTAN 91-91 Issue 6 Jet A-1 Fuel Specification, adopts particle counting.

Development work carried out by the CMC engineers, in conjunction with Exxon Mobil Aviation, highlighted the need for an alternative test method to determine the levels of dispersed contamination in Jet fuel. 5 years of field testing and development of the already established and successful icountLCM20 Hydraulic Laser Particle Counter saw the introduction of the Parker icountACM20 with enhanced software providing the user with a better understanding of the contamination present in a sample. As the benchmark particle counter for use in measuring the levels of contamination in fuels, the icountACM20, as per the UK's Energy Institute Test Method IP564, has now been included in the DEFSTAN 91-91 Issue 6 Jet Fuel Specification as a report only test alongside the current Gravimetric test method (IP423 or ASTM D5452) and Clear & Bright Visual test method (IP216 or ASTM D2276)



Product Features:

- icountACM20 monitors aviation fuel contamination to DEFSTAN 91-91 Issue 6 Jet A-1 fuel specification.
- Energy Institute Test Method IP 564.
- 2-minute test procedure.
- Fully manufactured by Parker with 20 years experience in the Particle Counter Measuring market.
- Laser optical scanning analysis.
- Multi-standard ISO cleanliness reporting.
- On-board, rear-mounted pump enables monitoring possibilities. For example: Fuel storage/ vehicle tanks and fuel storage drums.
- Latest averaging software as standard.
- Downloader software.

icountACM20 Lab Unit

Aviation Fuel Contamination Monitoring



Features & Benefits

Test Time:

2 minutes

Repeat Test Time:

Every 2 minutes (Manual testing), every 6 minutes (automatic)

Principle of Operation:

Optical scanning analysis and measurement of actual particles and inference to water presence

Primary Output:

$\geq 4\mu(c)$, $\geq 6\mu(c)$, $\geq 14\mu(c)$, $\geq 21\mu(c)$, $\geq 25\mu(c)$, $\geq 30\mu(c)$ counts per ml

Secondary Diagnostic Output:

% Volume Distribution, via graphical display on handset and printout

International codes:

ISO 7-22 in accordance with ISO 4406-1999

Data entry:

32 character two line dot matrix LCD. Full alpha numeric entry facility on keypad

Data retrieval:

Memory access gives test search facility for up to 300 saved tests

Calibration:

In accordance with Parker Calibration Procedure CM20-N, which complies to ISO11171:1999, Clause 6 (Omitting Annex F)

Re-calibration:

Every 12 months by a dedicated Parker Service Centre (Consult Parker) as required under strict EI methods

Max. working pressure:

420 bar

Operating Temperature:

+5°C to +80°C

Memory store:

300 test capacity

Computer compatibility:

Interface via RS 232 connection @ 9600 baud rate (USB serial cable to RS232 option available)

Laboratory sampling:

Utilizes on-board rear mounted pump

Portability:

Only 8 kg. icount ACM20 has its own battery pack and carry case with wheels 13kg total weight

Power requirement:

12vDC input, 6 x 'D' Cell batteries or rechargeable battery pack

Printer facility:

Integral 16 column printer for hard copy data

Certification:

Complies with all relevant EC declarations of conformity

icount ACM20 Case Mounted Pump

- Integrated Pump assembly incorporated onto the ACM20 unit.
- Powered directly from ACM20 unit, LED power indication with no additional power supplies required.
- Direct sampling from fuel sample bottles or tank via 3 metre inlet suction tube.
- Incorporated double speed flush and test sequence.
- Managed flow rate/correct volume sample as per IP 564 test method.

FACT: icountACM20 is fully compliant with the EI (Energy Institute) test method

Applications

The Parker icountACM20 Portable Particle Counter has been developed from existing technology for monitoring contamination in AvTur and other hydrocarbon fuels, in accordance with the Energy Institute (EI) Method IP 564.

In addition, the ACM can also be used to monitor various fuels from existing sampling points in locations from refineries, pipelines, distribution terminals, airport fuel supply systems all the way through to the point of uplift into aircraft*.

* Hot works permit required for online sampling (ATEX Zone 2 unit available). Page 14.

- **Fuel Testing Laboratories – DEFSTAN 91-91 Issue 6**

In order to better understand dispersed contamination in jet fuel, particle counting is now included alongside existing laboratory techniques

- **Bottle Sampling - Energy Institute (EI) - IP 564**

Laboratory determination of the level of dispersed contamination in aviation kerosine using an Automatic Particle Counter (APC)

- **Replace Clear & Bright and Gravimetric**

With the introduction of the icount ACM20, all subjectivity surrounding Clear & Bright and Gravimetric methods can be removed

- **Also for use on petroleum based hydraulic applications (Skydrol compatible available)**

Suitable for use with mineral oil and petroleum based fluid as per standard hydraulic particle counter, reporting fluid cleanliness to ISO 4406:1999

icountACM20 Lab Unit

Specifications



Construction:

ABS structural foam and injection moulded case
Hand-held display - ABS
Keypad fluoro silicone rubber

Mechanical Components:

Brass, plated steel, stainless steel and aluminium

Seals:

Fluorocarbon

Hoses:

Nylon (Kevlar braided microbore). St. steel armoured ends

Flow Rate:

25 - 28ml/min (dictated by CMP) 100ml/min with additional flush button

Fluid Compatibility:

Hydrocarbon Fuel, Mineral Oil. For other fluids consult Parker

Fuse:

1.25 amp fast blow fuse included for overload protection (spare supplied)

icountACM20 Technology:

Patented flow cell, light obscuration

Repeatability/Accuracy:

As per or better than ISO 11171

Coincidence:

40,000 particles per ml

Viscosity Range:

1 -100 centistokes

icountACM20 Weight:

8 kg

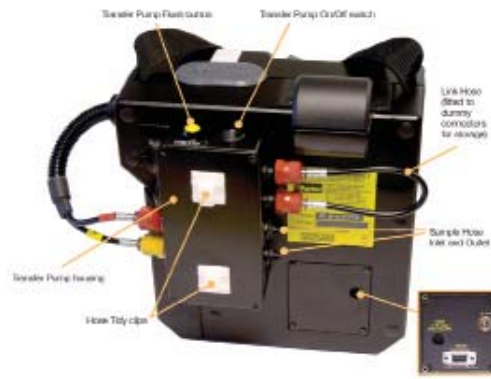
Monitor Carrying Case:

Astra Board case

Carrying Case Weight:

5 kg

icountACM20 - rear view



Input Power Socket (note that you will have to remove the plastic dust cap to access the 12Vdc power socket).

A fast blow 1.25A fuse and the RS232 connection are located behind the removable cover plate. The RS232 interface is provided to download all test data stored in the instrument. See the **ParSmart Downloader** software for more information.

Ordering Information

Standard products table - icount ACM20

Product Number	Supersedes	Description
ACM202022UK	N/A	icountACM20 (UK)
ACM202022US	N/A	icountACM20 (US)
ACM202022EUR	N/A	icountACM20 (EURO)
ACM202024UK	N/A	icountACM20 with lab kit - UK (DEFSTAN 9191)
ACM202024US	N/A	icountACM20 with lab kit - US (DEFSTAN 9191)
ACM202024EUR	N/A	icountACM20 with lab kit - EURO (DEFSTAN 9191)
ACC6ND000	B84794	1 meter process cable
ACC6NE006	B84816	ParSMART downloader software
ACC6NE019	P843855	icountACM20 transit Case
ACC6NW003	B84746	Vapour/waste bottle assembly
ACC6NE029	B84745	Throttle kit
ACC6NE001	B84645	Millipore adaptor kit
ACC6NE013	B84609	Re-chargeable battery pack
ACC6NE008	B84817	UK power supply
ACC6NE010	B84830	US power supply
ACC6NE009	B84831	Euro power supply
ACC6NE020	B84832	UK Offline kit
ACC6NE021		Euro Offline kit
ACC6NE022		US Offline kit
SERMISC067	N/A	500ml verification fluid
ACC6NE015	B84702	Printer reel (x5)
ACC6NE014	P843702	Printer ribbon (x1)



Field Monitoring - icountACM202022

For use in non-hazardous areas, the icountACM202022 is designed for online sampling of hydrocarbon fuels and hydraulic systems, utilising existing "quick connect" sampling points such as the Millipore 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.
Note 3: Selected spare parts - for a full list contact Parker.
* Hot works permit required for online sampling.

icountACM20 Lab Unit

Aviation Fuel Contamination Monitoring

DEFSTAN 91-91 Issue 6
Defence Standard 91-91 is the specification for aviation turbine fuel, which the United Kingdom Civil Aviation Authority (CAA) has agreed is under the technical authority of the Director of the Defence Fuels Group.

IP 564

Laboratory determination of the level of dispersed contamination in aviation kerosene using an Automatic Particle Counter (APC). This standard describes a method for determining the level of dispersed contamination in aviation kerosene fuels, specifically dirt particles and water droplets in the range from $\geq 4\mu(c)$ to $\geq 30\mu(c)$. This method relates specifically to Aviation fuels but the equipment can be used on all fuels, petroleum and mineral based fluids.

Note:

The mandatory implementation date for IP 564 test method "Determination of the level of cleanliness of aviation turbine fuel - laboratory automatic particle counter" is July 1st 2009. It is the specification authorities intention to replace current test methods with particle counting at the earliest opportunity.

IP 564 Procedure

Step 1

The apparatus shall be set up in accordance with Parker's operating instructions.

Step 2

Test Portion Preparation:

Decant a minimum of 450ml of the field sample into a clean test portion container.

Step 3

Prior to starting a test, tumble the test portion end over end for 60 seconds to ensure any settled particles are redistributed.

Step 4

Turn on the Case Mounted Pump and flush for 60 seconds. Do not press the fast flush button. While flushing, enter the test identifier (see manual).

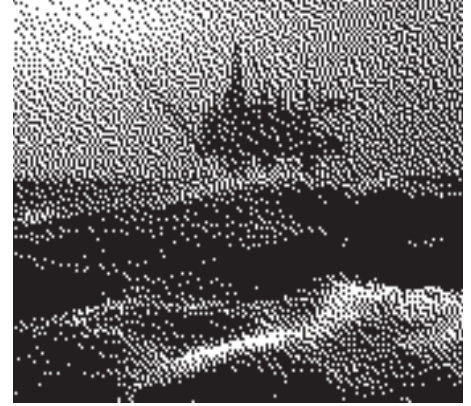
Step 5

Following the flush, start a test by turning the blue valve in the direction indicated. Perform a further 3 tests. (4 in total).



icountPD Z2

ATEX Approved Online Particle Detector



For use in explosive and hazardous areas

The icountPD Particle Detector from Parker represents the most up to date technology in solid particle contamination analysis. This compact, permanently mounted laser-based ATEX approved particle detector module is designed for use in Zone 2 areas and is housed in a robust Stainless Steel IP69K approved enclosure that provides a cost effective solution to fluid management and contamination control.



Product Features:

- Independent monitoring of system contamination trends.
- Assembled in an approved and certified Stainless Steel enclosure to comply with ATEX Directive 94/9/EC.
- Can be used in explosive and hazardous areas.
- ATEX Zone 2.
- Certified to CE Ex II 3GD, Ex nA IIC T4 Gc, Ex tc IIIC Dc SIRA 09ATEX4340X and IECEx SIR 09.0137X (-30°C < Ta < +60°C).
- Moisture & %RH indicator (optional).
- Warning limit relay outputs for low, medium and high contamination levels.
- Continuous performance for prolonged analysis.
- Self diagnostic software.
- Full PC/PLC integration technology such as:- RS232 and 0-5Volt, 4-20mA, CAN(J1939) (Contact Parker for other options).
- Set up and Data logging support software included.

icountPD Z2

Features & Benefits



Diagnostic Self Check Start-up Time:

Customer selectable 5-900 seconds

Measurement Period:

5 to 180 seconds

Reporting interval through RS232:

0 to 3600 seconds

Limit Relay Output:

Changes occur +/- 1 ISO code at set limit (Hysteresis ON) or customer set (Hysteresis OFF)

Particle / % RH 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 recognised on-line methods, confirmed by the relevant International Standard Organisation procedures.

Calibration Recommendation:

24 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:

Size: 066

Connection: EO 24 cone end

Required Flow Range through the icountPD:

40 to 140 ml/min (Optimum Flow = 60ml/min)

Online Flow Range via System 20 Inline Sensors (Hydraulic systems only):

Size 0 = 6 to 25 l/min - (Optimum Flow = 15 l/min)

Size 1 = 24 to 100 l/min - (Optimum Flow = 70 l/min)

Size 2 = 170 to 380 l/min - (Optimum Flow = 250 l/min)

Required Differential Pressure across Inline Sensors:

0.4 bar (Minimum)

Viscosity Range:

1-500 cSt

Temperature:

Operating Environment -30°C to +60°C (-22°F to +140°F)

Storage -40°C to +80°C (-40°F to +176°F)

Operating Fluid +5°C to +80°C (+41°F to +176°F)

Working pressure:

2 to 420 bar (30-6000 PSI)

Moisture sensor calibration (Not offered with the fuel version):

±5% RH (over compensated temperature range of +10°C to +80°C (+50°F to +176°F))

Operating humidity range:

5% RH to 100% RH

Moisture sensor stability:

±0.2% RH typical at 50% RH in one year

Certification:

IP69K rating

EMC/RFI – EN61000-6-3:2007

EN61000-6-2:2005

Materials:

Stainless Steel case construction.

Stainless Steel hydraulic block.

Dimensions:

260mm x 114mm x 110mm

Weight:

2.6kg

Seals:

Fluorocarbon seals.

Ordering Information

Product Configurator

Key	Fluid type	Calibration	Display	Limit relay	Communications	Moisture	Cable connector kit
IPD	1 Mineral	1 ACFTD	1 None	1 No	1 RS232	1 No	00 No
IPDZ	2 *Phosphate ester	2 MTD	2 LED	2 Yes	2 RS232 / 4-20mA	2 Yes	10 Deutsch 12-pin DT Series connector
IPDR	3 Aviation fuel (4 channel)	3 AS4059	3 Digital		3 RS232 / 0-5V		30 M12, 8 pin plug connector
					4 RS232 / RS485		
					5 RS232/CAN-bus		
			4 GSM				

*Consult Parker Filtration

Standard Products Table

Part number	Fluid type	Calibration	Display	Limit relay	Communications	Moisture sensor	Cable connector kit
IPDZ12122230	Mineral	MTD	None	Yes	RS232 / 4-20mA	Yes	M12, 8 pin plug connector
IPDZ12121230	Mineral	MTD	None	Yes	RS232	Yes	M12, 8 pin plug connector
IPDZ12123230	Mineral	MTD	None	Yes	RS232 / 0-5V	Yes	M12, 8 pin plug connector
IPDZ12125230	Mineral	MTD	None	Yes	RS232 / CAN-bus	Yes	M12, 8 pin plug connector

Accessory Part Numbers

Product Number	Description
SPS2021	Single Point Sampler
S840074	External flow device
ACC6NN013	Power supply
ACC6NN021	2 x 10 metre M12, 8-pin plug and socket Ultrat cable kit
ACC6NN017	RS232 to USB converter

Note: For System 20 Sensor part numbers see page 380.

icountACM20 Z2

ATEX Approved Portable Particle Counter



For use in explosive and hazardous areas

icountACM20 Z2 is designed to be used to monitor various fuels from existing sampling points in hazardous locations such as refineries, pipelines, distribution terminals, airport fuel supply systems all the way through to the point of uplift into aircraft. With Zone 2 classification, the icount ACM20 Z2 is the worlds **only** ATEX approved particle counter.



Product Features:

- Assembled in an approved and certified stainless steel enclosure to comply with ATEX Directive 94/9/EC.
- Can be used in explosive and hazardous areas, including offshore and mining applications.
- ATEX Zone II
- Certified to CE Ex II 3 G Ex nR/ nL IIC T6
- “A” Class product defined for the Aviation market.
- ATEX approved Handset and keypad.
- Suitable for use with mineral oil and petroleum based fluid as per ACM20/LCM20 particle counters.

icountACM20 Z2

ATEX Approved Portable Particle Counter

Features & Benefits

Test Time:

2 minutes.

Repeat Test Time:

Every 2 minutes (Manual testing) Every 6 minutes (Automatic).

Principle of Operation:

Optical scanning analysis and measurement of actual particles and inference to water presence.

Primary Output:

$\geq 4\mu(c)$, $\geq 6\mu(c)$, $\geq 14\mu(c)$, $\geq 21\mu(c)$, $\geq 25\mu(c)$, $\geq 30\mu(c)$ counts per ml.

Secondary Diagnostic Output:

% Volume Distribution, via graphical display on handset.

International codes:

ISO 7-22 in accordance with ISO 4406-1999

Data entry:

32 character two line dot matrix LCD. Full alpha numeric entry facility on keypad.

Data retrieval:

Memory access gives test search facility for up to 300 saved tests.

Calibration:

In accordance with Parker Calibration Procedure CM20-N, which complies to ISO11171:1999, Clause 6 (Omitting Annex F).

Re-calibration:

Every 12 months by a dedicated Parker Service Centre (Consult Parker).

Max. working pressure:

420 bar.

Operating Temperature:

+5°C to +80°C

Memory store:

300 test (scrolling memory) capacity.

Computer compatibility:

Interface via RS 232 connection @ 9600 baud rate.

Portability:

15 kg. ACM20 has its own battery pack and carry case with wheels.

Power requirement:

Rechargeable battery powered or via the 12VDC input.

System connection:

Via Millipore adaptor with flow restriction through supplied needle valve.

Certification:

Complies with all relevant EC declarations of conformity.

Printer facility:

No printer. Data download only.

Online Commission Kit

- a – icountACM20 Zone II Particle Counter
- b – Battery Charger
- c – Process Cable
- d – User Manual
- e – Downloader Software
- f – Throttle Kit
- g – Millipore Adaptor Assembly
- h – Aluminium Case
- i – Bottle Assembly



icountACM20 Z2

Specifications

Construction:

Unit: Stainless Steel

Carrying case: ABS

Hand-held display: ABS

Keypad: polyester membrane

Mechanical components:

Brass, plated steel, stainless steel and aluminium

Seals: Fluorocarbon

Hoses: Nylon (Kevlar braided microbore)

Fluid compatibility:

All fuels. For other fluids consult Parker

Internal rechargeable battery:

Note: ONLY to be charged outside of the hazardous area, with the unit switched off

Fuse:

1.25A fast blow fuse included for overload protection

Return to Parker Hannifin if fuse is blown

icountACM20 2032 technology:

Unique optical scanning system

Applications in Fuels

● Oil Refinery

- To count and verify the levels of dispersed contamination in accordance with specification limits. (Consult Parker CMC).

● Distribution Terminals/Hubs

- For use on receipt and outbound supply. Also to provide filtration performance, tank cleanliness and product quality checks.

● Storage

- Settling times can be reduced by monitoring with the ACM by ensuring that levels of dispersed contamination are below acceptable levels.

● Airport Fuel Farm

- Monitoring of fuels into storage, through the fuel farm, hydrant system and during uplift into wing.

● Pipeline Commissioning

- Fast real time monitoring of pipelines following pigging and cleaning processes.

● Oil and Gas Platforms

- Used to monitor the filtration performance, system cleanliness and quality of delivered product.

Using icountACM20 Z2

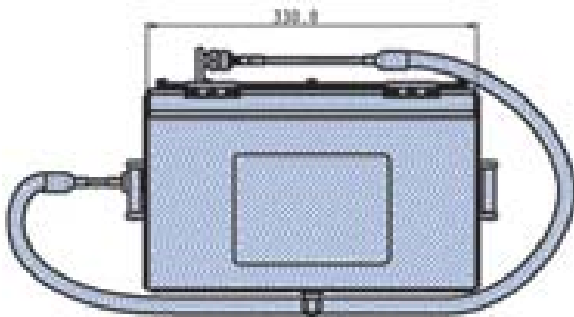
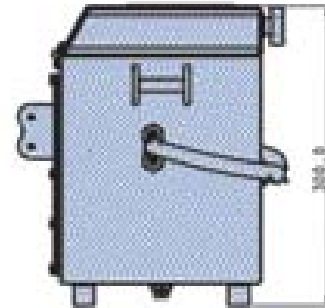
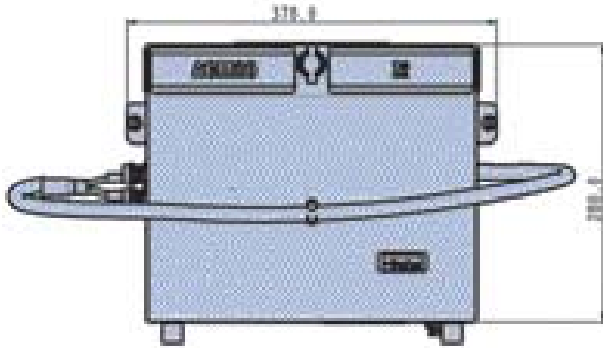
icountACM20 Z2 is designed to be used to monitor various fuels from existing sampling points in hazardous locations from refineries, pipelines, distribution terminals, airport fuel supply systems all the way through to the point of uplift into aircraft. With Zone II classification, the icountACM20 Z2 is the worlds **only** ATEX approved particle counter.



icountACM20 Z2

ATEX Approved Portable Particle Counter

Installation Details



Ordering Information

Standard products table - icountACM20 Z2

Product Number	Supersedes	Description
ACM202032UK	N/A	icountACM20 Z2 + online kit & UK battery charger
ACM202032US	N/A	icountACM20 Z2 + online kit & US battery charger
ACM202032EUR	N/A	icountACM20 Z2 + online kit & Euro battery charger
ACM202034UK		icountACM20 Z2 + online & lab kit + UK battery charger
ACM202034US		icountACM20 Z2 + online & lab kit + US battery charger
ACM202034EUR		icountACM20 Z2 + online & lab kit + Euro battery charger
ACC6NE023	B84647	UK battery charger
ACC6NE025	B84652	US battery charger
ACC6NE024	B84653	Euro battery charger
ACC6NE027	B84650	2m process cable assembly
ACC6NE006	B84816	Parsmart downloader software
ACC6NE028	P843066	Carry case
ACC6NW003	B84746	Bottle assembly
ACC6NE029	B84745	Throttle kit
ACC6NE001	B84645	Millipore adaptor assy

icountACM20 Z2

ATEX Approved Portable Particle Counter

Applications in hydraulics

OFFSHORE

Solutions in the offshore industry.

In addition, the icountACM20 Z2 can be used in many hydraulic system applications as detailed below.

In many industries, worker awareness needs to be maintained at a high level to ensure the safety of their operation. This is particularly relevant to offshore oil-drilling and gas-drilling crews, given the interactive and hazardous nature of their work. The Zone II ACM portable particle analyser is a tried and tested technology designed, proven and approved as a fluid contamination monitor that crews are using and trusting in such hazardous and demanding environments.

- Certified to CE Ex II 3 G Ex nR/nL IIC T6
- Can be used in explosive and hazardous areas, including Offshore and Mining.
- Primary Output. Six cumulative particle size channels ranging from $\geq 4\mu\text{m}(c)$ to $\geq 30\mu\text{m}(c)$ and numbers per ml in accordance with ISO4406-1999.



REFINERIES



icountACM20 Z2 – operational in oil refineries and fuel fields.

Already operational in oil refineries and designed to be used inside commercial airfield fuel locations and at the point of upload of fuel into the aircraft, icountACM20 Z2 has an impressive success record in this approval sensitive area of operation.

With a number of safety features designed in as operational standards, the icountACM20Z2 can be taken to the point of use, connected in moments and reporting in little more than 2 minutes to ISO approved standards.

- Assembled in an approved and certified stainless steel enclosure to comply with ATEX Directive 94/9/EC and EN50 021 requirements.
- 'A' Class product defined for the aviation market.
- Designed for on-line operation, connecting to the process line via existing Millipore™ fittings, already in use for other industry equipment.

QUARRYING

Applications in other hazardous environments.

- Railroad equipment manufacturer - Warranty protection.
- Power generation stations - Preventative maintenance.
- Mobile equipment - Roll-off cleanliness testing.
- Mining operations - Service tool.
- Steel mills - Preventative maintenance.



icountACM20 Z2

ATEX Approved Portable Particle Counter

Average Particle Counts in AV System

The table below gives estimated counts found in a typical aviation fuel distribution system, and is given as guidance, in which API/EI filtration equipment is installed.

Receipt into Microfilter
Expect 2,500 counts per ml
or cleaner @ 4µ(c)



MF



Receipt into FWS (After MF)
Expect 500 counts per ml
or cleaner @ 4µ(c)



FWS



Receipt into Storage (After FWS/MF)
Expect 100 counts per ml
or cleaner @ 4µ(c)



Airport storage



FWS out of storage
Expect 500 counts per ml
or cleaner @ 4µ(c)



FWS



After FWS into Hydrant
Expect 100 counts per ml
or cleaner @ 4µ(c)



To Hydrant/Refueller



After Monitor Into Aircraft
Expect 100 counts per ml
or cleaner @ 4µ(c)



Note: Figures will vary from location to location.
Key: MF=Microfilter (API/EI 1590)
FWS=Filter Water Separator (API/EI 1581)

Receipt into Microfilter		ISO Code - 4406 1999
	High Count	High Count Code
≥4µ(c)	2,500	18
≥6µ(c)	350	15
≥14µ(c)	10	10

Receipt into FWS (After MF)		ISO Code - 4406 1999
	High Count	High Count Code
≥4µ(c)	500	16
≥6µ(c)	50	13
≥14µ(c)	5	9

Receipt into Storage (After FWS/MF)		ISO Code - 4406 1999
	High Count	High Count Code
≥4µ(c)	100	14
≥6µ(c)	10	10
≥14µ(c)	1	7

FWS Out of Storage		ISO Code - 4406 1999
	High Count	High Count Code
≥4µ(c)	50	16
≥6µ(c)	50	13
≥14µ(c)	5	9

After FWS into Hydrant		ISO Code - 4406 1999
	High Count	High Count Code
≥4µ(c)	100	14
≥6µ(c)	10	10
≥14µ(c)	1	7

After Monitor into Plane		ISO Code - 4406 1999
	High Count	High Count Code
≥4µ(c)	100	14
≥6µ(c)	10	10
≥14µ(c)	1	7

ASIC 'Performer'

Pressure Transducers and Transmitters
25, 60, 100, 250, 400 and 600 bar



One product range, designed for many industry applications

All Stainless Steel Construction

A quality range of transducers and transmitters with pressure ratings - 25, 60, 100, 250, 400 and 600 bar. One-piece body and diaphragm machining ensures long-term stability and an all Stainless Steel construction ensures reliability. A cost-effective solution in many industrial applications.



Product Features:

- A quality range of transducers and transmitters with pressure ratings - 25, 60, 100, 250, 400 and 600 bar.
- One-piece body and diaphragm machining ensures long-term stability.
- All Stainless Steel construction.
- Cost-effective solution in many industry applications.
- 0-5 Volt, 1-6 Volt Transducers.
- 4-20mA Transmitters.
- 1/4 " BSP thread.
- M12 or MicroDIN plug options.

ASIC 'Performer'

Pressure Transducers and Transmitters

Applications for the ASIC Performer

- Fork lift trucks - braking and load systems.
- Truck mounted cranes - load safety systems.
- Earth moving machinery - hydraulic gearbox control.
- Racing car - gearbox, fuel, cooling and suspension systems.
- Water usage systems - pressurised systems for industrial and hi-rise usage.
- Forest Machinery - felling and logging.
- Paper mills - speed control and weighing systems.



The Parker Filtration ASIC Performer Pressure Transducers and Transmitters.

The ASIC Performer offers a wide range of pressure sensors for mobile or industrial applications.

These sensors have been designed for the requirements of industrial instrumentation systems. Accordingly, the housings and all components in contact with the medium are made of stainless steel. Thus giving compatibility with a wide range of media. There is a choice of two plug connectors of either DIN or M12. There are

six measuring ranges available and a choice of outputs in the form of either voltage or current signals. Sensors with output signals from 4...20 mA are available in two wire technology.



The built-in voltage regulator allows the sensors to be operated with a supply voltage of 12-36/9-36 Vdc. All sensors are manufactured in our own production facility, typical of Parker Hannifin's continued commitment to flexibility and quality.



The Complete Performer range utilises ASIC technology (Application Specific Integrated Circuit) programmable software.



A comprehensive range of Pressure Transducers and Transmitters are available from Parker Filtration.

- One-piece body and diaphragm machining ensures long-term product stability.
- All stainless steel construction.
- 6 transducer pressure ratings with 0-5Vdc and 1-6Vdc outputs.
- 6 transmitter pressure ratings with a 2-wire 4-20mA output.
- Microdin plug and M12 connector options.



AC/DC display unit (DDU10012 or DDU1002)

ASIC 'Performer'

Specifications

Pressure ranges:
25, 60, 100, 250, 400, 600 bar.

Pressure Tolerance Specifications:

Rating	Maximum Overload Pressure	Maximum Burst Pressure
25	x 2 (50 bar)	x 3 (75 Bar)
60	x 2 (120 Bar)	x 3 (180 Bar)
100	x 2 (200 bar)	x 3 (300 Bar)
250	x 2 (500 Bar)	x 3 (750 Bar)
400	x 2 (800 Bar)	x 3 (1200 Bar)
600	x 2 (1200 Bar)	x 2.5 (1500 Bar)

Vibration resistance:
IEC 60068-2-6:
+/- 5mm/10Hz...32Hz
200m/s² / 32Hz...2kHz

Installation:
Spanner size 22A/F.
Max. (recommended) tightening torque = 30Nm.

Weight:
200 - 230g

Lifespan:
10 million cycles

Thread Forms

G¹/₄ (1/4BSP) with ED seal.
All thread forms and sensor interface are made from 1.4301 stainless steel.
Non standard threads - contact Parker CMC

Electrical

Supply voltage	Output
12 - 36Vdc	0 - 5Vdc
12 - 36Vdc	1 - 6Vdc
9 - 36Vdc	4 - 20mA

Transducer current draw = <6mA
Load impedance (ohm) = >10K
Output signal noise = 0.1%FS

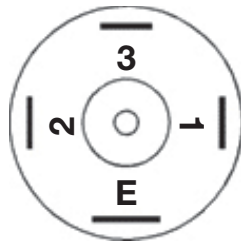
Product Performance

Linearity:
Typical: 0.3%FS.
Max: 0.6%FS.
Hysteresis:
Typical: 0.1%FS.
Max: 0.25%FS.
Repeatability:
Typical: 0.2%FS.
Max: 0.4%FS.

Functional temp range:
-40°C to +85°C.
Compensated temperature:
-20°C to +85°C.
Stability:
<0.1%FS/a (typ).
Response time:
= <1mS.

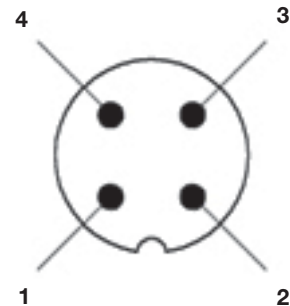
Wiring Information

Connector
Industrial Micro Din
9.4mm



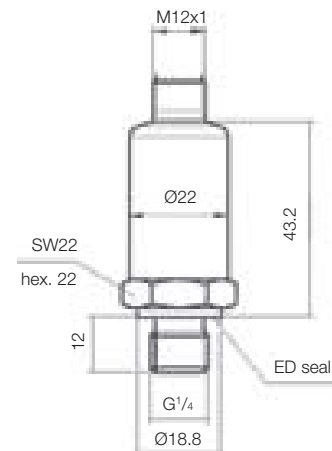
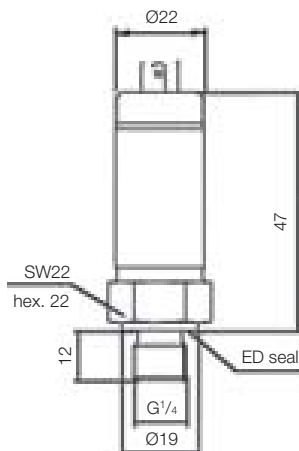
PIN	4 - 20mA	0 - 5Vdc	1 - 6Vdc
1	Do not connect	Signal output	Signal output
2	Supple +ve	Supply +ve	Supply +ve
3	Do not connect	Do not connect	Do not connect
E	Return	Supply ref. (0v)	Supply ref. (0v)

Connector
M12



PIN	4 - 20mA	0 - 5Vdc	1 - 6Vdc
1	Supply +ve	Supply +ve	Supply +ve
2	Do not connect	Signal output	Signal output
3	Return	Supply ref. (0v)	Supply ref. (0v)
E	Do not connect	Do not connect	Do not connect

Installation Details



ASIC 'Performer'

Ordering Information

Standard products table

Product Number	Description - Pressure Transducer	Model	Output	Pressure	Thread Form	Connector
PTDVB2501B1C1	0 - 5 Vdc 250 bar 1/4 BSP ED seal micro-din	PTD	VB	250	1	B1C1
PTDVB4001B1C1	0 - 5 Vdc 400 bar 1/4 BSP ED seal micro-din	PTD	VB	400	1	B1C1
PTDVB2501B1C2	0 - 5 Vdc 250 bar 1/4 BSP ED seal M12	PTD	VB	250	1	B1C2
PTDVB4001B1C2	0 - 5 Vdc 400 bar 1/4 BSP ED seal M12	PTD	VB	400	1	B1C2
PTDVB0251B1C1	0 - 5 Vdc 25 bar 1/4 BSP ED seal micro-din	PTD	VB	025	1	B1C1
PTDVB0251B1C2	0 - 5 Vdc 25 bar 1/4 BSP ED seal M12	PTD	VB	025	1	B1C2

Product Number	Description - Pressure Transducer	Model	Output	Pressure	Thread Form	Connector
PTXB4001B1C2	4 - 20 mA 400 bar 1/4 BSP ED seal M12	PTX	B	400	1	B1C2
PTXB0251B1C1	4 - 20 mA 25 bar 1/4 BSP ED seal micro-din	PTX	B	025	1	B1C1
PTXB0251B1C2	4 - 20 mA 25 bar 1/4 BSP ED seal M12	PTX	B	025	1	B1C2
PTXB4001B1C1	4 - 20 mA 400 bar 1/4 BSP ED seal micro-din	PTX	B	400	1	B1C1
PTXB2501B1C1	4 - 20 mA 250 bar 1/4 BSP ED seal micro-din	PTX	B	250	1	B1C1
PTXB2501B1C2	4 - 20 mA 250 bar 1/4 BSP ED seal M12	PTX	B	250	1	B1C2

Accessories

Product Number	Supercedes	Description
P833PVC2M	P.833PVC-2M	2 meter PVC coated 4 core cable
P833PVC5M	P.833PVC-5M	5 meter PVC coated 4 core cable
P833PVC10M	P.833PVC-10M	10 meter PVC coated 4 core cable

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

Product Number	Output Options	Pressure Range (bar)	Thread Form	Connector
PTD	VB 0 - 5Vdc	025 0 - 25	1 1/4 BSP with ED seal	B1C1 Micro-din
PTX	SB 1 - 6 Vdc	060 0 - 60		B1C2 M12
	B 4 - 20mA (PTX only)	100 0 - 100		
	RB 0.5 - 4.5 ratiometric	250 0 - 250		
	RB 0.1 - 4.9	400 0 - 400		
		600 0 - 600		

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.

Examples of standard part number product ordering

PTDVB2501B1C1 0 – 5 volt output transducer
 250 bar maximum pressure
 1/4" BSP with ED seal
 Industrial micro-din 9.4mm connector

PTDSB4001B1C2 1 – 6 volt output transducer
 400 bar maximum pressure
 1/4" BSP with ED seal
 M12 connector
 (See accessories for IP68 protected cable)

PTXB0251B1C2 4 – 20mA output transmitter
 25 bar maximum pressure
 1/4" BSP with ED seal
 M12 connector
 (See accessories for IP68 protected cable)

Flowmeters & Monitors

A range of cost saving solutions



**Protect systems,
reduce fluid and air
loss and increase
efficiency**

**Effective and accurate flow
measurement**

An extensive range of flow metering products. LoFlow oil and water flowmeters. 10 bar max. working pressure. Easiflow meters and flowswitches with flows from 1 to 150 l/min. Dataflow 4-20mA and pulse output flow transmitters and the Dataflow Compact inline flow transmitter. Flowline oil, water and air calibrated flowmeters and flowswitches available in brass or Stainless Steel. Hydraulic Test Units for the speedy diagnosis of hydraulic circuit faults with flow ranges from 2 to 360 l/min.



Product Features:

- LoFlow oil and water flowmeters. 10 bar max. working pressure.
- Easiflow meters and Flowswitches. Work in any plane. Flows from 1 to 150 l/min.
- Dataflow 4-20mA and pulse output flow transmitters and Dataflow Compact inline flow transmitter.
- Flowline oil, water and air calibrated flowmeters and flowswitches available in brass or Stainless Steel.
- Hydraulic Test Units for the speedy diagnosis of hydraulic circuit faults with flow ranges from 2 to 360 l/min.

LoFlow - Oil and Water Flowmeters

Flowmeters

Features & Benefits



- Easy to read, permanent printed scales.
- Large scale definition for precise measurement.
- Easy panel mounting assembly.
- Negligible pressure drop characteristics.
- 10 bar pressure rating.
- Simple to use.

Specification

Construction:

Body Grillon TR55.
 Back body half ABS 7020.
 Ball retainer ABS 7020.
 Back panel PVC.
 Float See below.

Maximum working pressure:
 10 bar.

Maximum working temperature:
 60°C.

Accuracy:
 ±2% typical.

Repeatability:
 ±1%.

Connections:
 1/4" and 3/4" tapered threads.

Note: Always install vertically.

Installation Details

Simple to fit, easy to use

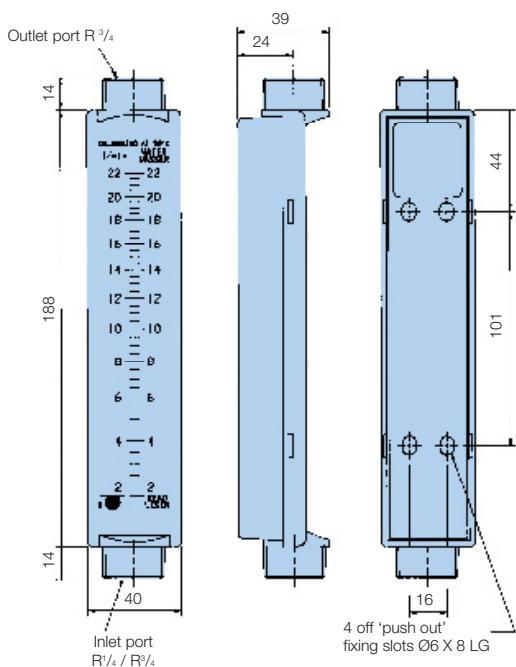
The LoFlow meter has been designed for those industries where the need exists for a low cost solution to small measurements of flow with an accurate reading. LoFlow uses the well tried and tested principle of variable area flow measurement utilising the movement of a ball or float inside a calibrated tapered bore.

Typical Applications

Pharmaceutical industry
 Filtration systems
 Hospital equipment
 For water applications

Water treatment
 Photography and X-ray
 Equipment
 Swimming pools

Installation Details



Ordering Information

Standard products table

Product Number	Supersedes	Media	Ports (BSPT male)	Flow Range (l/min)	Float Material
LF802412	LF.2020	Water	3/4 - 3/4	0.2 - 2.0	Acetal
LF802413	LF.2100	Water	3/4 - 3/4	2.0 - 10.0	S/Steel
LF802414	LF.2220	Water	3/4 - 3/4	3.0 - 22.0	S/Steel
LF801431	LF.1002	Oil	1/4 - 3/4	0.010 - 0.20	S/Steel
LF802432	LF.1009	Oil	3/4 - 3/4	0.1 - 0.9	Acetal
LF802434	LF.1090	Oil	3/4 - 3/4	1.0 - 9.0	S/Steel
LF801411	LF.2005	Water	1/4 - 3/4	0.06 - 0.55	S/Steel

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.

Easiflow - Meters and Flowswitches

Flowmeters

Features & Benefits



- Oil and water calibrated.
- Works in any plane.
- Pressures up to 10 bar.
- Flows from 1 to 150 l/min.
- Accuracy $\pm 5\%$ FSD.
- Repeatability $\pm 1\%$ FSD.
- Switches – fully adjustable flow rate signalling.
- Plant and equipment protection.



Easiflow Meters Specification

Construction:

Cone Acetal
Viewing glass Borosilicate glass
Calibrated spring Stainless steel
Seal Nitrile
Body Glass filled nylon

Maximum working pressure:
10 bar.

Minimum working pressure:
1 bar.

Temperature range:
+5°C to +80°C - Oil.
+5°C to +60°C - Water.

Flow rate:

1 to 150 l/min.

Viscosity range:
10 to 200 centistokes (oil).

Accuracy:
 $\pm 5\%$ FSD.

Repeatability:
 $\pm 1\%$ FSD.

Connections:
1" BSP parallel threads.

Weight:
0.4kg.

Flowswitch Specifications

The Easiflow switch is a flow measuring device incorporating an AC/DC switch suitable for controlling valves or pump motors or for activating alarm signals.

General flowmeter specification:
See material details opposite.

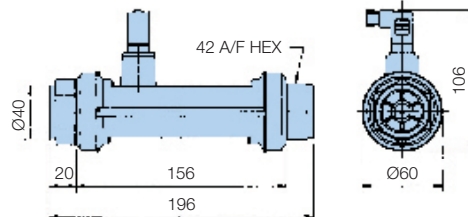
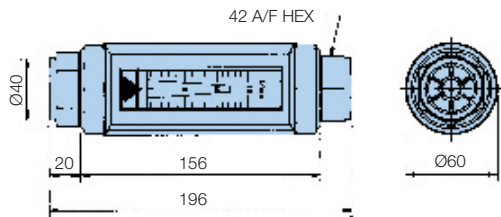
Switch type specifications:
Magnetically operated reed switch.

Electrical details:

Voltage range 300Vac/dc
Maximum current 2.5Amps
Maximum load 100W resistive
70W inductive



Installation Details



Ordering Information

Standard products table – Flowmeter only

Product Number	Supersedes	Media	Flow Range (l/min)
EF773111220	EFW.0302	Water	2 - 30
EF773112220	EFW.0502	Water	4 - 50
EF773113220	EFW.1002	Water	5 - 100
EF773114220	EFW.1502	Water	10 - 150
EF7731110120	EFL.0151	Oil	1 - 15
EF7731111120	EFL.0301	Oil	2 - 30
EF7731112120	EFL.0501	Oil	4 - 50
EF7731113120	EFL.1001	Oil	5 - 100
EF7731114120	EFL.1501	Oil	10 - 150
EF7731110220	EFW.0152	Water	1 - 15

Standard products table – Flowmeter plus one switch

Product Number	Supersedes	Media	Flow Range (l/min)	Switch Range (l/min)
EF7731110221	EFW.015S1	Water	1 - 15	5 - 15
EF7731111221	EFW.030S1	Water	2 - 30	5 - 30
EF7731110121	EFL.015S1	Oil	1 - 15	5 - 15
EF7731111121	EFL.030S1	Oil	2 - 30	5 - 30
EF7731112121	EFL.050S1	Oil	4 - 50	10 - 50
EF7731113121	EFL.100S1	Oil	5 - 100	20 - 100
EF7731114121	EFL.150S1	Oil	10 - 150	30 - 150
EF7731112221	EFW.050S1	Water	4 - 50	10 - 50
EF7731113221	EFW.100S1	Water	5 - 100	20 - 100
EF7731114221	EFW.150S1	Water	10 - 150	30 - 150

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 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.

Dataflow - 4 to 20mA and Pulse Output Flow Transmitters

Features and Benefits



- 4 to 20mA output.
- Pulse output available for totalising/batching.
- Works in any plane.
- Accepts reverse flow.
- Maximum flow 150 l/min.
- Negligible pressure drop.
- Pressures up to 10 bar.
- Low cost. Simple to install.
- For use with most liquids.
- Factory calibrated. Accuracy $\pm 2\%$.
- DIN 43650 plug connection (included).

Specification

Construction:

Borosilicate glasstube.
Nitrile seals.
Body – Glass filled nylon.
Rotor and locator – Acetal.
Washers and shaft – Stainless steel.
Rotor tips – Stainless steel.

Max. working pressure:
10 bar oil/water.

Flow indication:

Min: 2 l/min.
Max: 150 l/min.
Accepts reverse flow.

Accuracy:

$\pm 2\%$ FSD.

Temp range:

+5°C to +80°C oil.
+5°C to +60°C water.

Connections:

1" BSP parallel threads.

Weight:

0.7Kg.

Calibration 4 to 20mA:

4mA = 0 l/min,
20mA = 100 l/min.

Calibration pulse output per litre:

'K' factors.

Oil = 51.14
Water = 44.25

Electrical details 4 to 20mA:

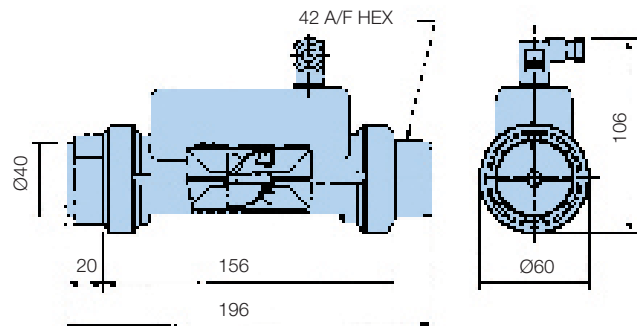
Supply = 24Vdc.

Pulse output:

Supply = 24Vdc.
(open collector transistor).



Installation Details



Ordering Information

Standard products table

Product Number	Supersedes	Description
DFT980	DFT.980	Dataflow "Pulse" output transmitter
DFT990	DFT.990	Dataflow 4-20mA transmitter

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.



Dataflow 4-20mA transmitter can be connected to a Digital Display Unit (DDU1001 or DDU1002)

Digital Display Specification (DFT 990 only)

For indicator options please refer to MS150 section of the catalogue, reference DDU1001 and DDU1002 indicators

4 to 20mA On-Site Calibration

Set your system to zero flow. Connect a multimeter across terminals 1 (+20mA) and \ominus (0mA) (Dia. 2). Set the zero to read 4mA on your multimeter (Dia. 1). Set your system to full flow and set the span to read 20mA on your multimeter. (Dia. 1)

Note: Minimum span setting = 30 l/min

Diagram 1

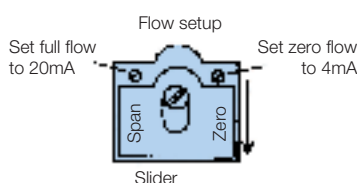
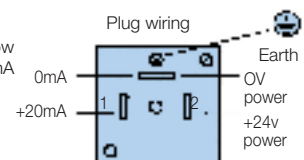


Diagram 2



Dataflow Compact - Inline Flow Transmitter

Features and Benefits



- Pulse output signal for flows up to 25 l/min.
- Lightweight and robust.
- Operates in any plane. Simple to install.
- Low cost flow measurement.
- Negligible pressure drop.
- Accepts reverse flow.
- $\frac{3}{8}$ BSP male connection.
- Water or compatible clear fluids only.
- Ideal for washing machines, showers and vending machines.

Specification

Construction:

Body Grilamid – TR55.
 Rotor 18% PTFE filled nylon.
 Shaft Stainless steel.
 Shaft
 Retainers Grilamid TR55.

Operation:

Infra-red.

Maximum working pressure:

20 bar.

Pressure drop:

Max 0.1 bar at 15 l/min.

Flow range:

1 to 25 l/min.
 (Accepts reverse flow).

Calibration:

'K' Factor 752 pulses per litre, typical.
 Subject to application.

Accuracy:

±2% typical.

Repeatability:

±1%.

Temperature range:

+5°C to +70°C.

Overall dimensions:

52mm x 29mm x 27mm.

Weight:

16 grams.

Connections:

$\frac{3}{8}$ BSP

Cable length:

300mm.

Power supply:

5 Vdc.

Output signal:

5 Vdc - square wave



Dataflow Compact – The Low Cost Transmitter

The Dataflow Compact Transmitter was designed to offer OEM's and end users alike a means of monitoring low flows on liquids with an electronic output signal – but at LOW COST. Fluid passes through the one piece sensor body impacting on the twin vaned turbine rotor, causing it to rotate at a speed proportional to the flow rate. Two opposing photo-transistors are mounted either side of the rotor and externally of the clear sensor body, these generate a continuous signal.

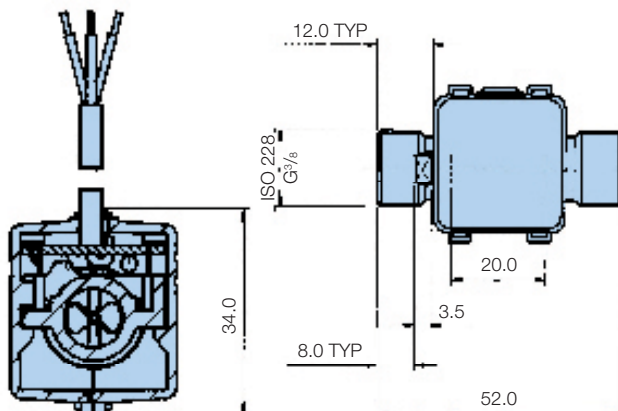
As the rotor spins each blade obscures the infra red signal. This is then converted into an industry standard pulse output signal – compatible with inexpensive display units for flow rate, totalising, batch control and large, central control systems. The lightweight Grilamid body with its virtually unrestricted flow path, offers negligible pressure drop for flows up to 25 l/min and withstanding pressures up to 20 bar.

Flow Rate • Totalising • Batch Control and applications in many industries

Dataflow Compact Transmitters are small and very robust having been developed and tested extensively in industry applications where space is a restriction. Dataflow Compact with its Grilamid body and BSP connections can be installed almost anywhere and once installed will give accurate and reliable output signalling.

Installation Details

Red wire +5V supply
 Green wire Output signal
 Blue wire 0V supply



Ordering Information

Standard products table

Product Number	Supersedes	Description
DFC9000100	DFC.9000.100	Dataflow compact flow transmitter

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.

Flowline - Oil and Water Calibrated Flowmeters (Brass Version)

Features and Benefits



- Works in any plane.
- Pressure up to 350 bar (5000 psi).
- Flows up to 360 l/min.
- Accuracy $\pm 5\%$ FSD.
- Repeatability $\pm 1\%$ FSD.
- Direct reading.
- Relatively insensitive to viscosity changes.
- Oil or water calibrated.
- Optional reed switch upgrade.

Specification

Construction:
Brass body to BS 2874 CZ114.

Maximum working pressure:
Up to 350 bar.

Minimum working pressure:
1 bar.

Temperature range:
Brass -20°C to $+90^{\circ}\text{C}$.

Calibration:
Oil Specific gravity
0.856 at 20°C .
Water Specific gravity
1.0 at 20°C .

Viscosity range:
10 to 200 cSt (oil).

Accuracy:
 $\pm 5\%$ FSD.

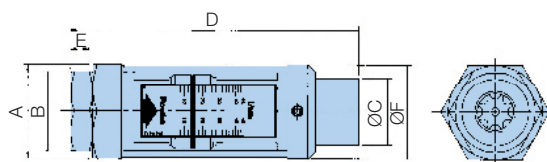
Repeatability:
 $\pm 1\%$ FSD.

Min. scale reading:
10% FSD.

Connections:
BSP parallel threads.

Wetted/non-wetted parts:
Consult Parker for information.

1/4", 1/2" and 3/4" BSP thread options
(1/4" version on next page)



Note: To add an electrically operated reed switch to your flowmeter please order B26307

Ordering Information - Oil

Standard products table

Brass flowmeter for oil		Ports BSP	Flow range (l/min)	Maximum pressure (bar)	Dimensions (mm)						Weight (kg)
Product number	Supersedes				A (A/F Hex)	B (A/F Hex)	C	D	E	F	
FM26122212	FM.26 122 212	1/4	0.5 - 4.5	350	32	29	19	123	7	32	0.4
FM26122312	FM.26 122 312	1/4	1 - 9	350	32	29	19	123	7	32	0.4
FM26222112	FM.26 222 112	1/2	2 - 20	350	41	38	32	165.5	12.5	46	0.9
FM26222212	FM.26 222 212	1/2	5 - 46	350	41	38	32	165.5	12.5	46	0.9
FM26322112	FM.26 322 112	3/4	5 - 55	350	58	46	43	190	15	58	1.75
FM26322212	FM.26 322 212	3/4	10 - 110	350	58	46	43	190	15	58	1.75
FM26122112	FM.26 122 112	1/4	0.2 - 2.0	350	32	29	19	123	7	32	0.4
FM26422112	FM.26 422 112	1 1/4	20 - 180	210	For installation details for 1 1/4 flowmeters see next page						8.0
FM26422212	FM.26 422 212	1 1/4	30 - 270	210							8.0
FM26422312	FM.26 422 312	1 1/4	40 - 360	210							8.0

Ordering Information - Water

Standard products table

Brass flowmeter for water		Ports BSP	Flow range (l/min)	Maximum pressure (bar)	Dimensions (mm)						Weight (kg)
Product number	Supersedes				A (A/F Hex)	B (A/F Hex)	C	D	E	F	
FM26222122	FM.26 222 122	1/2	2 - 20	350	41	38	32	165.5	12.5	46	0.9
FM26222222	FM.26 222 222	1/2	5 - 46	350	41	38	32	165.5	12.5	46	0.9
FM26322122	FM.26 322 122	3/4	5 - 55	350	58	46	43	190	15	58	1.75
FM26322222	FM.26 322 222	3/4	10 - 110	350	58	46	43	190	15	58	1.75
FM26122122	FM.26 122 122	1/4	0.2 - 2.0	350	32	29	19	123	7	32	0.4
FM26122222	FM.26 122 222	1/4	0.5 - 4.5	350	32	29	19	123	7	32	0.4
FM26122322	FM.26 122 322	1/4	1 - 9	350	32	29	19	123	7	32	0.4
FM26422122	FM.26 422 122	1 1/4	20 - 180	210	For installation details for 1 1/4 flowmeters see next page						8.0
FM26422222	FM.26 422 222	1 1/4	30 - 270	210							8.0
FM26422322	FM.26 422 322	1 1/4	40 - 360	210							8.0

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.

Flowline - Oil and Water Calibrated Flowmeters (Stainless Steel)

Features and Benefits



- For flow measurement of corrosive or chemical media or in harsh locations.
- Manufactured in stainless steel 316.
- Works in any plane.
- Pressure up to 350 bar (5000 psi).
- Flows up to 360 l/min.
- Accuracy $\pm 5\%$ FSD.
- Repeatability $\pm 1\%$ FSD.
- Direct reading.
- Oil or water calibrated.
- Optional reed switch upgrade.

1 1/4" BSP option
(1/4", 1/2" and 3/4" on previous page)

Specification

Construction:
Stainless steel to BS 970 316S.

Maximum working pressure:
Up to 350 bar.

Minimum working pressure:
1 bar.

Temperature range:
-20°C to +105°C.

Calibration:
Oil Specific gravity
0.856 at 20°C.
Water Specific gravity
1.0 at 20°C.

Viscosity range:
10 to 200 cSt (oil).

Accuracy:
 $\pm 5\%$ FSD.

Repeatability:
 $\pm 1\%$ FSD.

Min. scale reading:
10% FSD.

Connections:
BSP parallel threads.



Wetted parts:
Body, thread adaptor

Piston, etc: cone locknut:
Stainless Steel.

Flow cone:
BS 970 316S 16.

Magnet encapsulation:
Stainless steel BS970/1:1991.
:316S31.

Spring:
Stainless steel to BS 2056 EN 58J.

Seal:
Fluoroelastomer.

Ordering Information - Oil

Note: To add an electrically operated reed switch to your flowmeter please order B26307

Standard products table

Stainless steel flowmeter for oil		Dimensions (mm)										Weight (kg)
Product number	Supersedes	Ports BSP	Flow range (l/min)	Maximum pressure (bar)	A (A/F Hex)	B (A/F Hex)	C	D	E	F		
FM26232112	FM.26 232 112	1/2	2 - 20	350	41	38	32	165.5	12.5	46	0.9	
FM26332112	FM.26 332 112	3/4	5 - 55	350	58	46	43	190	15	58	1.75	
FM26332212	FM.26 332 212	3/4	10 - 110	350	58	46	43	190	15	58	1.75	
FM26132112	FM.26 132 112	1/4	0.2 - 2.0	350	32	29	19	123	7	32	0.4	
FM26132212	FM.26 132 212	1/4	0.5 - 4.5	350	32	29	19	123	7	32	0.4	
FM26132312	FM.26 132 312	1/4	1 - 9	350	32	29	19	123	7	32	0.4	
FM26232212	FM.26 232 212	1/2	5 - 46	350	41	38	32	165.5	12.5	46	0.9	
FM26432112	FM.26 432 112	1 1/4	20 - 180	350	For installation details for 1 1/4 flowmeters see above						8.0	
FM26432212	FM.26 432 212	1 1/4	30 - 270	350							8.0	
FM26432312	FM.26 432 312	1 1/4	40 - 360	350							8.0	
											8.0	

Ordering Information - Water

Standard products table

Stainless steel flowmeter for water		Dimensions (mm)										Weight (kg)
Product number	Supersedes	Ports BSP	Flow range (l/min)	Maximum pressure (bar)	A (A/F Hex)	B (A/F Hex)	C	D	E	F		
FM26132122	FM.26 132 122	1/4	0.2 - 2.0	350	32	29	19	123	7	32	0.4	
FM26132222	FM.26 132 222	1/4	0.5 - 4.5	350	32	29	19	123	7	32	0.4	
FM26132322	FM.26 132 322	1/4	1 - 9	350	32	29	19	123	7	32	0.4	
FM26232122	FM.26 232 122	1/2	2 - 20	350	41	38	32	165.5	12.5	46	0.9	
FM26232222	FM.26 232 222	1/2	5 - 46	350	41	38	32	165.5	12.5	46	0.9	
FM26332122	FM.26 332 122	3/4	5 - 55	350	58	46	43	190	15	58	1.75	
FM26332222	FM.26 332 222	3/4	10 - 110	350	58	46	43	190	15	58	1.75	
FM26432122	FM.26 432 122	1 1/4	20 - 180	350	For installation details for 1 1/4 flowmeters see above						8.0	
FM26432222	FM.26 432 222	1 1/4	30 - 270	350							8.0	
FM26432322	FM.26 432 322	1 1/4	40 - 360	350							8.0	
											8.0	

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.

Flowline - Flowswitches

Features and Benefits



- 'Boxed' two-switch type.
- Intrinsically safe versions (supplied complete with flowmeter).
- Maximum/minimum switching models.
- Maximum working pressure 350 bar. (min 1 bar)
- Flows from 2.0 to 110 l/min.
- Stainless steel – suitable for corrosive fluids.
- Stainless steel to BS970 316516.

Ordering Information

To order the required switching unit, simply add the appropriate prefix before the part numbers shown below.

Standard products table

Product Number	Supersedes	Description	Switch Range (Typical)
FS643222112	FS.643 222 112	2 switches, 2 - 20 l/min (1/2 BSP) Oil	2 -12 l/min and 10-20 l/min
FS643222212	FS.643 222 212	2 switches, 5 - 46 l/min (1/2 BSP) Oil	6-24 l/m and 20-46 l/m
FS643322112	FS.643 322 112	2 switches, 5 - 55 l/min (3/4 BSP) Oil	5-30 l/min and 30-55 l/min
FS643322212	FS.643 322 212	2 switches, 10 - 110 l/min (3/4 BSP) Oil	10-50 l/min and 50-110 l/min

Product configurator

Brass flowswitch for oil or water		Flow range and (port size)		Fluid type		Switch Range (Typical)
Product Number						
FS643	2 switches	2221	2 - 20 l/min (1/2 BSP)	12	Oil	2 -12 l/min and 10-20 l/min
FS67A	Intrinsically safe high switch	2222	5 - 46 l/min (1/2 BSP)	22	Water	20-24 l/m
FS67B	Intrinsically safe low switch	3221	5 - 55 l/min (3/4 BSP)			5-30 l/min
FS67C	Intrinsically safe hi/low switch	3222	10 - 110 l/min (3/4 BSP)			10-50 l/min and 50-110 l/min

Product configurator

Stainless steel flowswitch for oil or water		Flow range and (port size)		Fluid type		Switch Range (Typical)
Product Number						
FS643	2 switches	2321	2 - 20 l/min (1/2 BSP)	12	Oil	2 -12 l/min and 10-20 l/min
FS67A	Intrinsically safe high switch	2322	5 - 46 l/min (1/2 BSP)	22	Water	24-46 l/m
FS67B	Intrinsically safe low switch	3321	5 - 55 l/min (3/4 BSP)			5-30 l/min
FS67C	Intrinsically safe hi/low switch	3322	10 - 110 l/min (3/4 BSP)			10-50 l/min and 50-110 l/min

Ordering example

Product Number	Supersedes
FS64332212	FS.643 322 212

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.

Hydraulic Test Equipment

Features and Benefits



- Speedy diagnosis of hydraulic circuit faults.
- Flows ranging from 2 to 360 l/min.
- Measuring flow, pressure and temperature.
- Fully Portable – No power source required.
- Hydrotrac unit for flows from 2 to 110 l/min available.
- Designed for oil applications only.

Specification

Flow range:
2 to 360 l/min.

Pressure range:
1 to 350 bar.

Temperature range:
0°C to +90°C.

Troubleshooting Test Units

Hydraulic Test Units are designed specifically for the speedy diagnosis of hydraulic circuit faults in mobile, marine and industrial systems using the normal range of mineral oils. Their rugged construction based mainly on mild steel, manganese bronze and acrylic materials makes them ideally suited for arduous use in the field.

Each unit is supplied in a convenient carrying case providing full protection and additional storage space for fittings. Because they need no power source such as batteries etc, they are always ready for instant use.

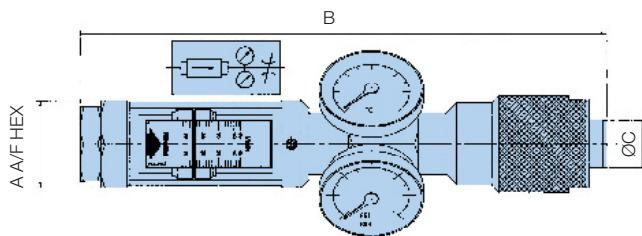
6 models are available to cover flow capacities up to 360 l/min and each incorporates a direct reading, uni-directional flow meter. The meter, which is both self cleaning and reasonably tolerant of contaminated fluids is coupled to a manifold that houses a glycerine-filled pressure gauge calibrated 0 to 350 bar and a dial-type thermometer with a 0°C to 100°C range.

Unit can only operate up to 90°C.

For further convenience the scale on the flow meter can be rotated to ensure visibility in any situation and the installed attitude of the assembly is not critical, though whenever possible the unit should be mounted with pressure gauge vertical and gauge case relief valve uppermost. The unit is designed for flow to be in the direction of the arrow on the flowmeter scale and must not be installed with the flow reversed.

¹Note: Permissible allowed seepage <50ml/min at 350 bar (5076 psi)

Installation Details



Safety

An axial flow restrictor valve is fitted which can be adjusted under full load from open to fully closed¹, and to complete the specification, a safety blow-out disc, set to fail at 455 bar is fitted to the manifold in a position facing away from the operator when reading the gauges normally. Two spare blow-out discs are supplied which are easily replaced by removing the hexagonal plug on the gauge manifold.

Additional blow out discs can be ordered - 41203B (Bag of 10)

Ordering Information

Standard products table

Product Number	Flow range (l/min)	Weight Kg (with case)	Dimensions (mm)		
			A	B	C
4121	10 - 110	7.4	46	350	35
4120	5 - 55	7.4	46	350	35
4123	2 - 110	11.8	46	350	35
4168	20 - 180	13.85	75	496	87
4169	30 - 270	13.85	75	496	87
4170	40 - 360	13.85	75	496	87
Part Number	Supersedes	Description			
41203B	4120.3.B	Safety blow out discs x 10			

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: 4123 'Hydrotrac' unit features 2 flowmeters (2 - 20 and 10 - 110 l/min) and 1 pressure gauge and 1 thermometer.

Flow Products - For Compressed Air Applications

Flowmeters & Monitors

Features & Benefits



(A) Flowline Flowswitches and Flowmeters

- Calibrated for direct reading of compressed air at 7 bar.
- Works in any plane.
- Brass or stainless steel models available in 4 sizes.
- Calibrated at 7 bar and 20°C.
- Flow ranges from 2 to 600 SCFM.
- Pressure 1-41 bar max.
- Optional reed switch upgrade.

(B) LoFlow Air Flowmeters

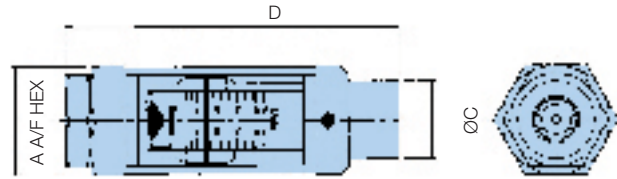
- Flow measurement from 1.1 to 720 l/min. Max 10 bar rating.

(C) Compressed Air Test Equipment

- 6 models available – 1/4", 3/4" and 1 1/4" BSP.
- Air flow range 2 to 600 SCFM.
- Pressure 1-41 bar max.

Specification

Full technical specifications for the Flowmeter, Flowswitch, LoFlow and test equipment products are provided in the respective pages for these products.



Note: To add an electrically operated reed switch to your flowmeter please order B.26307

Ordering Information

Standard products table

Brass flowmeter for air		Ports BSP	Flow range		Maximum working pressure (bar)
Product number	Supersedes		SCFM	l/sec	
FM26123332	FM.26 123 332	1/4	2 - 20	1 - 10	41
FM26223132	FM.26 223 132	1/2	5 - 50	2 - 25	41
FM26223232	FM.26 223 232	1/2	10 - 110	5 - 50	41
FM26323132	FM.26 323 132	3/4	15 - 125	6 - 60	41
FM26323232	FM.26 323 232	3/4	20 - 225	10 - 100	41
FM26423132	FM.26 423 132	1 1/4	40 - 400	20 - 200	25
FM26423232	FM.26 423 232	1 1/4	60 - 600	30 - 300	25

Standard products table - LoFlow

Product number	Supersedes	Ports (BSPT male)	Flow range	Float material
LF801450	LF.3007E	1/4 - 3/4	1.1 - 8.0 l/min	Acetal
LF802455	LF.3050E	3/4 - 3/4	10 - 50 l/min	Acetal
LF802452	LF.3135E	3/4 - 3/4	20 - 135 l/min	Acetal
LF802454	LF.3720E	3/4 - 3/4	2 - 12 l/sec	S/Steel
LF801451	LF.3021E	1/4 - 3/4	4 - 22 l/min	S/Steel
LF802453	LF.3330E	3/4 - 3/4	1.0 - 5.5 l/sec	S/Steel

Standard products table

Stainless steel flowmeter for air		Ports BSP	Flow range		Maximum working pressure (bar)
Product Number	Supersedes		SCFM	l/sec	
FM26133332	FM.26 133 332	1/4	2 - 20	1 - 10	41
FM26233132	FM.26 233 132	1/2	5 - 50	2 - 25	41
FM26233232	FM.26 233 232	1/2	10 - 110	5 - 50	41
FM26333132	FM.26 333 132	3/4	15 - 125	6 - 60	41
FM26333232	FM.26 333 232	3/4	20 - 225	10 - 100	41
FM26433132	FM.26 433 132	1 1/4	40 - 400	20 - 200	41
FM26433232	FM.26 433 232	1 1/4	60 - 600	30 - 300	41

Product configurator

Brass flowswitch for air		Flow range SCFM and (l/sec)	Ports (BSP)	Fluid type
Product Number				
FS643	2 switches	2231 5 - 50 (2 - 25)	1/2	32 Air
FS67A	Intrinsically safe high switch	2232 10 - 110 (5 - 50)	1/2	
FS67B	Intrinsically safe low switch	3231 15 - 125 (6 - 60)	3/4	
		3232 20 - 225 (10 - 100)	3/4	

Ordering example

Product Number	Supersedes
FS643323232	FS.643 323 232

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.

Guide to Contamination Control

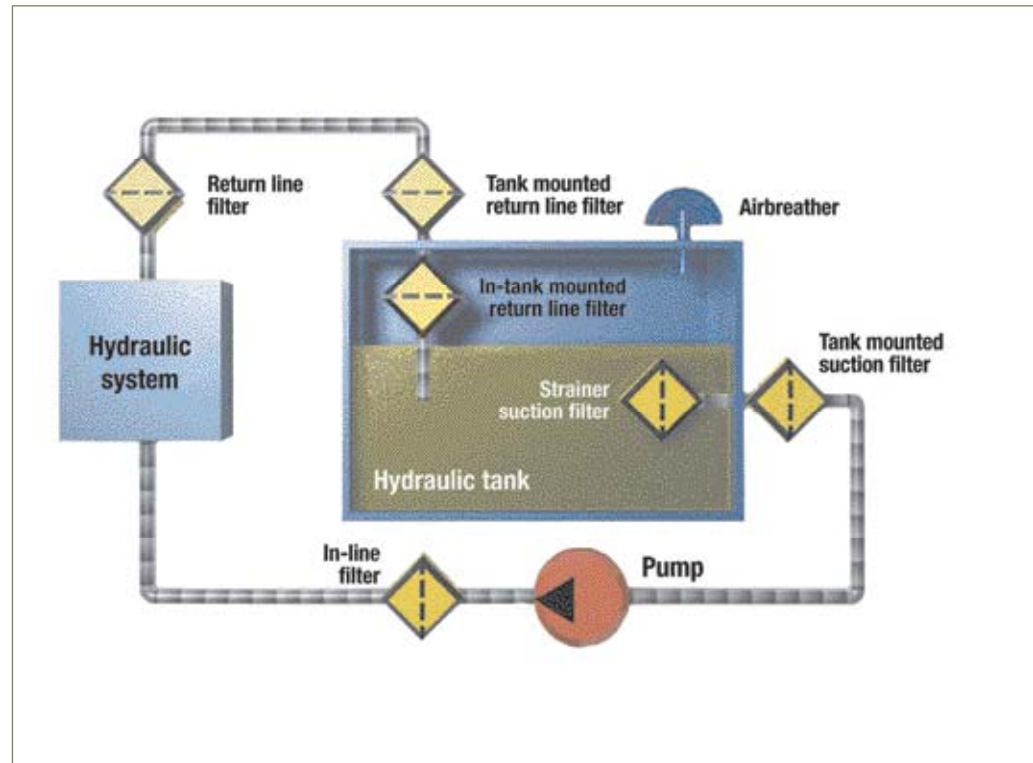
Understanding and Answering the Threat of Contamination



Reduce downtime with effective contamination monitoring

Understanding and answering the threat of contamination

Understanding the significance that solid and liquid contamination can play in undermining the efficiency and effectiveness of hydraulic oils is a complex subject but one that has some basic components and solutions as to how to monitor, measure and ultimately remove any particulate from a system. Parker Filtration can offer many years of experience on this subject.



Product Features:

- Examples and explanations of ISO contamination levels.
- Solid contamination codes charted.
- Condition monitoring equipment explained.
- Degree of filtration overview

Guide to Contamination Control

Understanding and Answering the Threat of Contamination

The Threat of Contamination

Industry requirements with regard to hydraulic and oil lubrication systems emphasise reliability, long lifetime and reduced energy use. Depending on the circumstances, some 70 - 80% of system failures are due to contamination. Cleanliness monitoring is essential in contamination control, as is selecting the right filter components. The first step, however, is understanding the specific system requirements and local operating conditions.

This guide to contamination control describes:

- Types of failures
- Sources of contamination
- Fluid cleanliness level
- Condition monitoring equipment
- Cleanliness service
- Filtration: parameters and facts
- Filter selection and filter types

Types of Failures

Component failure is often an invisible process. In general three types of failure can be distinguished:

1. Catastrophic Failures

This failure occurs suddenly and without warning; it is of a permanent nature. It is often caused by larger sized particles entering a component and obstructing the relative movement between surfaces, resulting in seizure of the component.

2. Transient Failures

Generally speaking, this type of failure is short-lived and goes unnoticed, although the consequences rarely do. It is caused by particles that momentarily interfere with the function of a component. The particles lodge in a critical clearance between matching parts, only to be washed away during the next operation cycle. As a result, components become less predictable and thus unsafe.

3. Degradation Failures

Gradual deterioration in the performance of a component results in its eventual repair or replacement. This failure is caused by the effect of wear induced by contamination. Additional generated contamination can lead to a catastrophic failure. Failures or reduced system performance have a direct impact on the cost of ownership, the efficiency rate and the perceived quality perception of the end users.



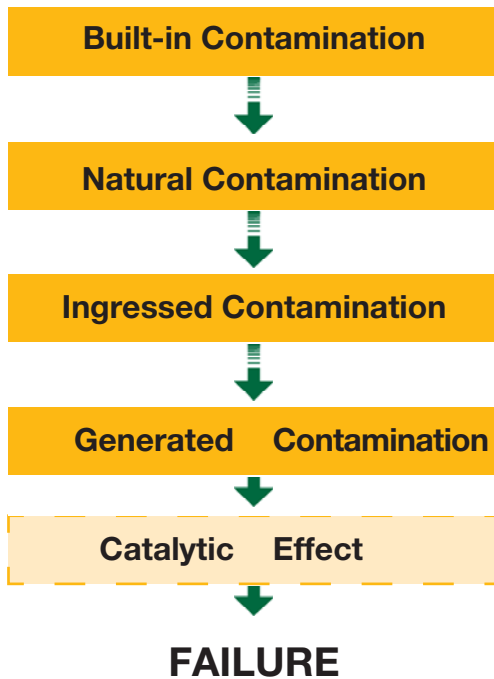
Guide to Contamination Control

Understanding and Answering the Threat of Contamination

Sources of Contamination

Finding the balance

What does it take to implement system-matched filtration? A review of the sources of contamination is the first step in finding the balance between the performance of the filtration system and the system demands.



Sources of Contamination

Several sources of contamination must be taken into account when it comes to the effective implementation of system-matched filtration. Without adequate filtration, the protection of the system is jeopardised and component or system failure is imminent. System-matched filtration changes the deterioration into a balanced situation, representing the continuously controlled process that is needed to achieve system reliability. Realising this is only possible when the required fluid cleanliness levels are maintained.

1. Built-in Contamination

Residual contamination from the manufacturing and assembly processes cannot be avoided. Examples are machining debris, weld spatters, casting sand, paint, pipe sealant or fibres from cleaning rags. Flushing system components prior to assembly and decent housekeeping during the various stages of the assembly process are a must to reduce the amount of built-in contamination.



Filter media pleating

2. Natural Contamination

In general, the cleanliness level of new oil does not always meet the requirements of the system. Despite the efforts to control the fluid cleanliness level during the production processes, transport and distribution may contaminate the oil. Depending on the requirements for system cleanliness, we advise that you filter new oil before usage.

3. Ingressed Contamination

Systems are always under attack from contamination. Unfortunately it is not possible to avoid ingressed contamination. Air breathers, cylinder rod seals, wiper seals, component seals or poorly fitted covers are a few examples of system parts that may have an important influence on the amount of ingressed contamination.

4. Generated Contamination

Particles generate particles. This phenomenon is known as abrasion. Other processes like cavitation, corrosion, erosion, fatigue and metallic contact between moving parts generates particles and thus influences the contamination that is already present in the system. Even though these processes cannot always be avoided, their impact is strongly influenced by effective filtration.

5. Catalytic Effect

During the filter selection process, attention is generally given to the removal of solid, hard-type contamination only. The performance of hydraulic and lubrication fluids is influenced by the catalytic effect. As a result of the catalytic effect, the lifetime of the oil is significantly reduced.

Guide to Contamination Control

Understanding and Answering the Threat of Contamination

Lifetime of Oil

Selecting the Right Oil

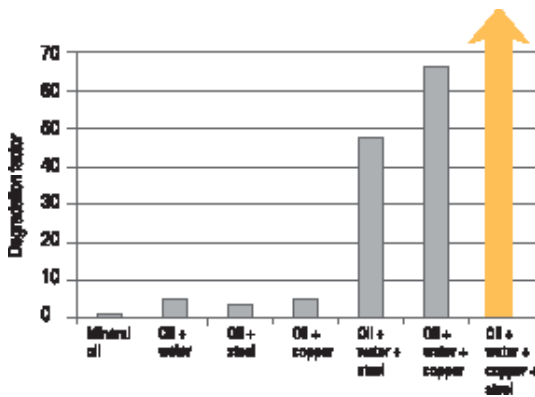
Oils are selected based on their unique performance with regard to:

- Energy transfer
- Corrosion protection
- Cooling (transfer of heat)
- Lubrication

The lifetime of oils is influenced by the amount of oxygen, oil temperature, water content and presence of catalyser type elements. The allowed water content varies for each type of oil. Due to, for example, seal leakage or condensation, the water content can easily reach concentrations far above the allowed water content value. The combination of water and wear elements like iron or copper causes a catalytic effect and as a result, reduces the lifetime of the oil. The lifetime of oil is also influenced by the amount of generated static electric.

Lifetime Reduction

The lifetime reduction of oil is expressed by the degradation factor. The influence of the catalytic effect of the degradation factor is shown below.



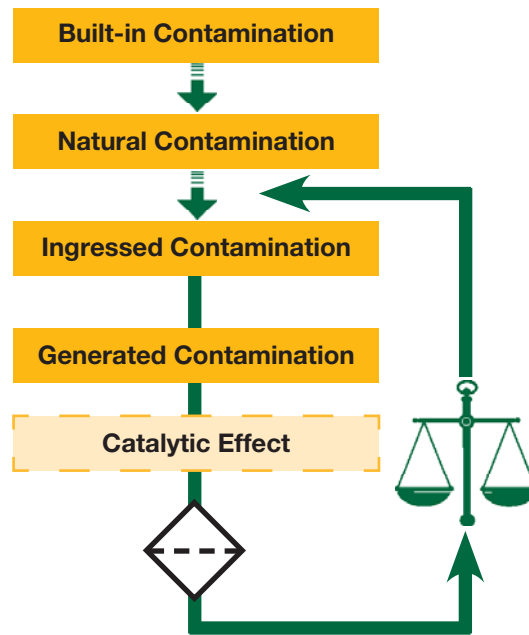
Oil degradation can reduce the protection against corrosion and lubrication performance.

Regular oil analysis is important to monitor the condition of the hydraulic or lubrication fluid. This analysis is also used to obtain information related to the process of selecting system-matched filter components.



The Balance between System Requirements and Filtration System Performance

Parker's philosophy exceeds the traditional approach of protecting the system by means of filtration.



System-matched filtration is not limited to a filter alone. The process of system-matched filtration is based on the correct implementation of suitable filtration products, taking into account the requirements from the hydraulic or lubrication fluids, system components and customer expectations.

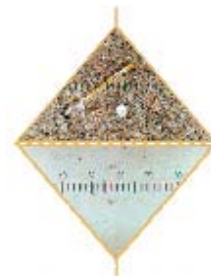
Contamination Control

Achieving the required system protection implicates a correct understanding of the system. Today filters are selected based on several parameters like β -values, pressure drop and dirt holding capacity.

Filtration is built-in safety, meant to achieve and maintain the required fluid cleanliness level during a defined period. This implicates a more detailed approach, which can only be realised when several filtration parameters are considered.

Before

Filtration



After

Filtration

Guide to Contamination Control

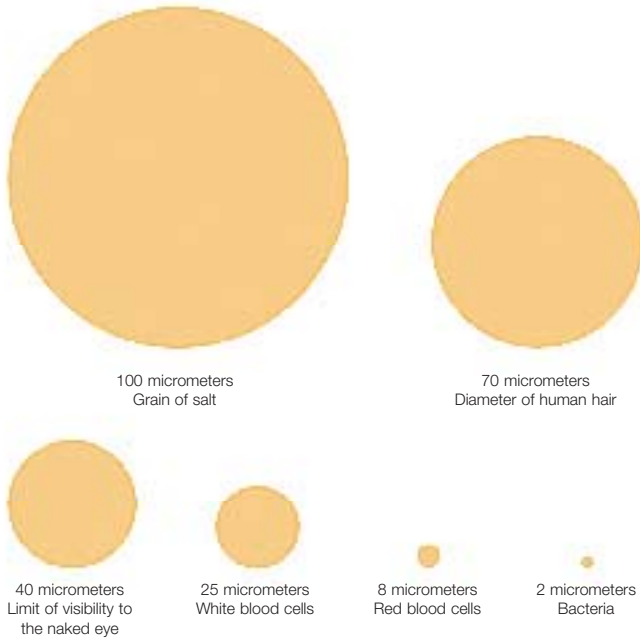
Understanding and Answering the Threat of Contamination

Contamination & Cleanliness Level

Sizes of Contamination

Filters are selected to capture contamination from hydraulic and lubrication fluids.

Contamination is an invisible enemy. The human eye cannot see particles smaller than 40 micron. For the correct understanding a comparison is given below.



Component	Microns
Anti-friction bearings	0.5
Vane pump (vane tip to other ring)	0.5 - 1
Gear pump (gear to side plate)	0.5 - 5
Servo valves (spool to sleeve)	1 - 4
Hydrostatic bearings	1 - 25
Piston pump (piston to bore)	5 - 40
Servo valves flapper wall	18 - 63
Actuators	50 - 250
Servo valve orifice	130 - 450

Typical hydraulic component clearances are given as an indication only

Fluid Cleanliness Level

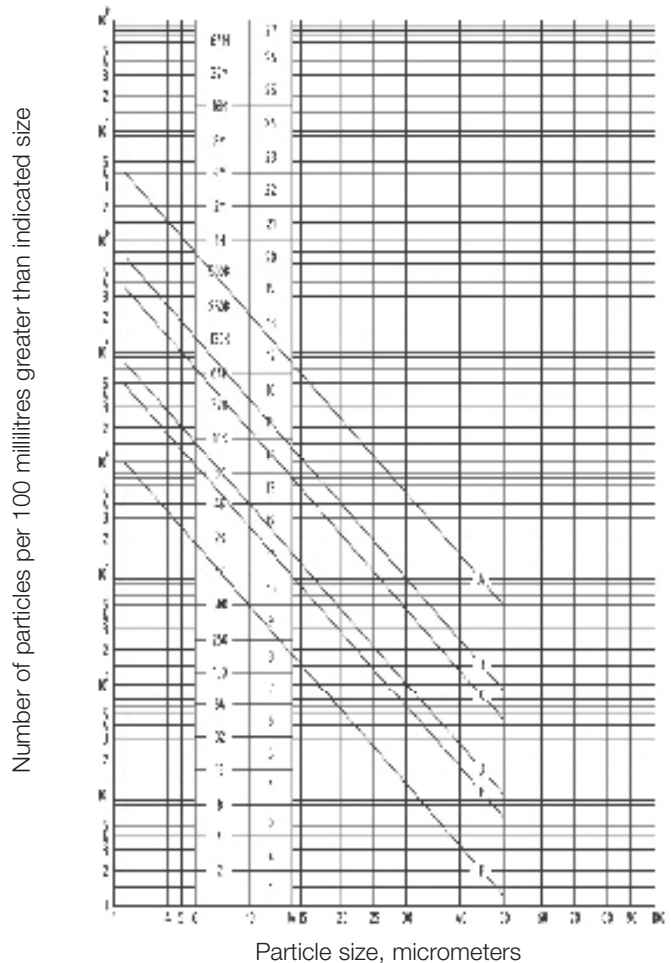
The ISO 4406:1999 standard is an important code to define the fluid cleanliness level using a solid contamination code.

This ISO code is determined by allocating a first scale number to the total number of particles larger than 4µm, allocating a second scale number to all particles larger than 6µm and allocating a third scale number to the total number of particles larger than 14µm.

In the recent past, the fluid cleanliness level code was determined using the ISO 4406:1987 standard. Instead of counting particles sizes 4, 6 and 14µm, the fluid cleanliness level was determined by counting particles larger than 5 and 15µm. The particle size 2µm was added later.

As a result of upgrading the ISO standards, new particle sizes have been defined. In general, the fluid cleanliness code will not change as a result of this new standard. Built-up historic data remains directly comparable to new data.

ISO 4406:1999 cleanliness classes



Guide to Contamination Control

Understanding and Answering the Threat of Contamination

Cleanliness Level

Examples of cleanliness level are given in the ISO graph. These lines represent:

- A. Low-pressure systems (code 21/20/17)
- B. Low-pressure control systems (code 19/18/14)
- C. Sophisticated pumps/motors control valves (code 18/17/13)
- D. Highly sophisticated systems and hydrostatic transmissions (code 16/15/11)
- E. Sensitive servo systems (code 15/14/10)
- F. High performance sensitive systems (code 12/11/8)

We recommend verifying the required cleanliness level based on the components used for the system. Manufacturers of system components often provide information related to the required fluid cleanliness level for their products.

Condition Monitoring Equipment

Over the years, fluid condition monitoring has become increasingly important. By offering system-matched filtration solutions, the stringent customer demands related to extended component lifetime or improved system reliability can be met. Parker has developed a complete range of instruments and components for maintenance programmes and local fluid condition analysis such as the LaserCM below.



icountLaserCM

Parker's particle counters are well known for their accurate performance in the field or in a production line environment. Lightweight portable particle counters can be used for temporary fluid cleanliness measurements.

The MCM20, designed for permanent installation, is meant for continuous fluid monitoring. The compact MS100 and MS150 moisture sensor together with the H2Oil means a complete solution is available to measure the water content in hydraulic or lubrication fluids.

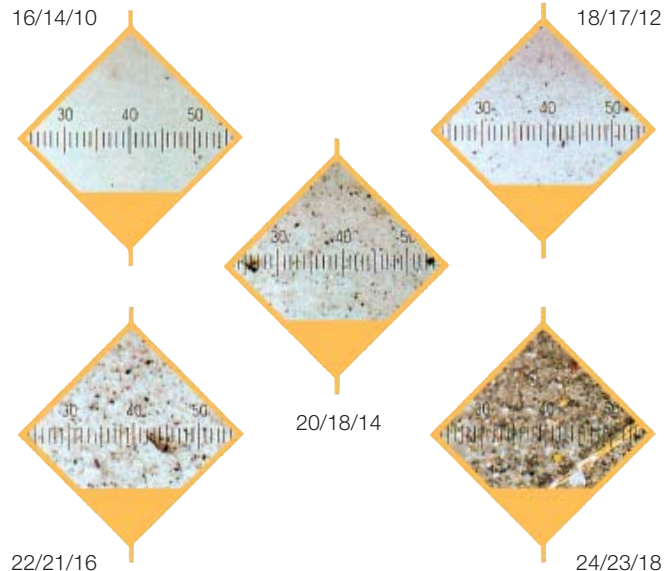
Solid Contaminant Codes

In addition to ISO 4406: 1999, other standards are used to express the fluid cleanliness level. A comparison between the codes is given below.

ISO 4406: 1999	ISO 4406: 1987	NAS 1638 CLASS
13/11/8	11/8	2
14/12/9	12/9	3
15/13/10	13/10	4
16/14/9	14/9	-
16/15/11	14/10	5
17/15/9	15/9	-
17/15/10	15/10	-
17/15/12	15/12	6
18/16/10	16/10	-
18/16/11	16/11	-
18/16/13	16/13	7
19/17/12	17/12	-
19/17/14	17/14	8
20/18/12	18/12	-
20/18/13	18/13	-
20/18/15	18/15	9
21/19/13	19/13	-
21/19/16	19/16	10
22/20/13	20/13	-
22/20/17	20/17	11

Note:
 ISO 4406: 1987 is based on particle sizes larger than 5 and 15µm
 ISO 4406: 1999 is based on particles sizes larger than 4, 6 and 14µm

Several Cleanliness Levels



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Cleanliness Service

Cleanliness Service to Prevent Failures

As Parker has no financial interest in the oil industry, the company can operate as an independent laboratory. The development laboratory at Parker Filtration BV in Arnhem - the only laboratory of its kind in Belgium, the Netherlands and Luxembourg - has at its disposal all the facilities for its extensive R & D department. In addition, the services are offered on a commercial basis to third parties.

Equipment

The laboratory uses state-of-the-art test equipment. The company has invested in the latest Karl Fischer coulometric equipment, that prevents tests from being influenced by, among other things, additives in the oil. The particle-counting equipment is calibrated according to the recent ISO 11171 standard. It is now possible to indicate the measured cleanliness according to ISO 4406:1999.

Standard Test

The high-quality standard test, carried out in Parker's laboratory, consists of a water analysis and a cleanliness calculation according to ISO 4406, the new ISO 4406:1999 and the NAS 1638 standard, as part of which particles from 2 to 100µm are measured and reported. Membrane research and digital photography of the membrane are also part of the standard test. The results of each test are described in a report that contains clear conclusions. It is also possible to conduct a spectral analysis.

In Practice

How do the laboratory services work? Only three days after receipt of the oil sample, the standard analysis is completed. The results of a spectral analysis are known after seven days. The reports can be sent directly and completely by e-mail. A free sample bottle is available upon request.

Filtration: Parameters and Facts

Generally speaking, fibre-type materials like cellulose and glass fibre are applied for hydraulic and lubrication fluid filtration. Filters are selected based on the following parameters:

- Required protection of system components
- Location of filter(s) in the system
- Flow rate and allowed pressure loss
- Desired filter element life time
- Hydraulic or lubrication fluid type

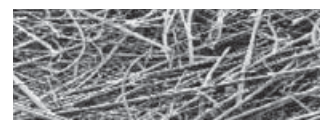
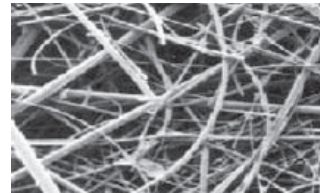
The dirt holding capacity is the amount of solid contamination a filter can hold before the filter material is plugged. This value is measured in accordance to ISO 16889 using ISO MTD test dust. The filter element lifetime strongly depends on the contamination conditions that are present in the system and its environment.

Predicting the filter element lifetime in the system is complicated, because of the variety in contamination (e.g. metal, sand and fibres, each with a certain distribution of particle sizes) in relation to the specified dirt holding capacity.

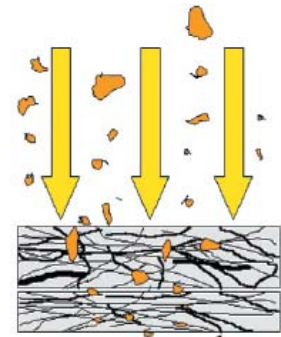
Degree of Filtration

Parker's filtration philosophy is based on the optimum distribution of several particle sizes by using the complete thickness of glass fibre layers.

Pre-layer



Main layer



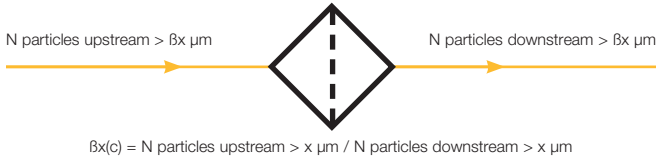
Each selected filter layer has a unique performance for the removal of solid contamination. System-matched filtration implicates the removal of harmful particles. For some systems an improved removal efficiency for smaller sized particles is more important compared to other systems using components. The combination of pre- and main layers results in an achievable fluid cleanliness level. The complete package of filter and support layers is indicated as pleat pack.

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Degree of Filtration

The β -value is used to express the removal efficiency for a defined particle size.



The ISO 4572 standard formerly required only the $\beta x > 75$ value. That standard has now been upgraded and replaced by ISO 16889, reporting the β -value of 2, 10, 75, 100, 200 and 1000 for each filter medium or pleat pack. The corresponding efficiencies are given below.

β -value	2	10	75	100	200	1000
Efficiency	50,00%	90,00%	98,67%	99,00%	99,50%	99,99%

Taking into account a $\beta 75(c) > 10$ element, the removal efficiency is 98.67% of particles larger than 10 micron.

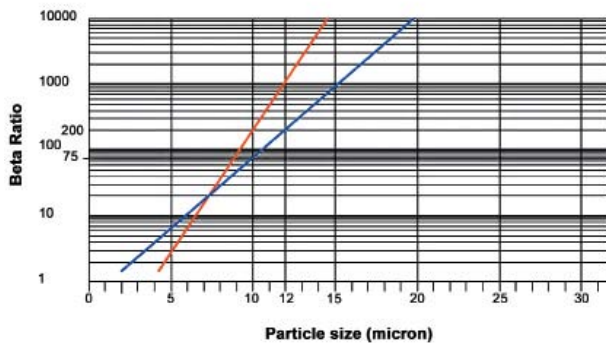
Too often filter elements are compared by looking at one β -value only. The focus on high β -values is misleading and does not always provide the required information.

Comparison β -value	Filter element I	Filter element II
Beta-value	$\beta-75(c) > 10$	$\beta-200(c) > 10$
Number of particles at upstream of filter >10 micron	5,000,000	5,000,000
Removal efficiency	98,67%	99,50%
Number of particles at downstream of filter >10 micron	66,500	25,000

Statements that a $\beta 200$ filter improves the fluid cleanliness level by a factor 2.6 (66,500/25,000) are misleading. Fluid cleanliness codes are based on several particle sizes. More information is needed to determine the overall removal performance of filter media.

A comparison between two 10-micron filter medias.

Beta versus size

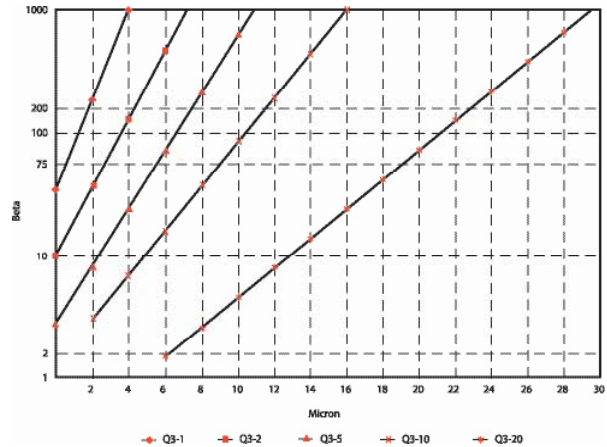


Filter element (blue) I: $\beta 10(c) > 75$, Filter element (red) II: $\beta 10(c) > 200$

Filter element II has a lower removal efficiency for smaller sized particles. Smaller sized particles can easily flow in narrow tolerances areas. Smaller sized particles will accelerate the amount of generated contamination, effecting the functionality of other system components and accelerating oil degradation.

The overall removal efficiency of the element forms the core of fluid cleanliness levels

The correct degree of filtration is chosen based on the required fluid cleanliness level, not based on one β -value.



An indication of recommended fluid cleanliness levels is given in this table. It is common use in the industry that manufacturers of components prescribe required fluid cleanliness level for the reliable functioning of their products.

Components	ISO Code
Servo control valves	16/14/11
Proportional valves	17/15/12
Valve & piston pumps/motors	18/16/13
Directional & pressure control valves	18/16/13
Gear pumps/motors	19/17/14
Flow control valves	20/18/15
Cylinders	20/18/15

The ISO codes are indicative values only.



Filter media composition

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Flow Rate & Pressure Lost

Flow Rate and Allowable Pressure Lost

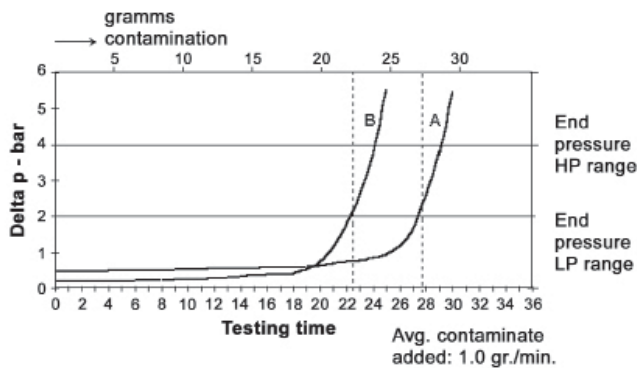
Each filter element is designed to handle a nominal flow rate. The allowed flow rate depends on fluid viscosity, degree of filtration, and the amount of pressure that is lost. Indirectly, the required element lifetime is an important parameter. A larger sized element with a more effective filter element area has a positive influence on the element lifetime.

Media	Degree of filtration	Upper range	Lower range
Q3	2	16/14/10	13/11/8
Q3	5	18/16/13	17/15/9
Q3	10	20/18/15	19/17/12
Q3	20	22/20/17	21/19/13

The given cleanliness levels are indicative values only, based on average values

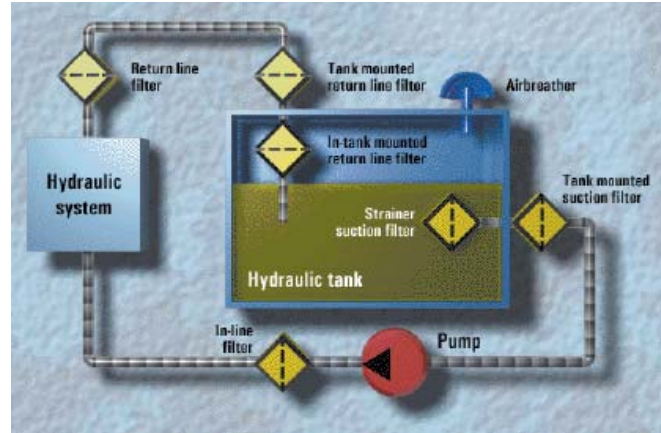
Filter elements are chosen based on their initial clean element pressure drop. It is preferred to apply a ratio of at least three between element bypass settings and element initial pressure drops.

Life time diagram



Comparing filter elements with different filter media based on the initial clean element pressure drop does not give a reliable indication of the element dirt holding capacity. In this example the filter media A has a higher initial pressure drop. However, during its lifetime the pressure lost is more constant compared to media B. This results in a longer element lifetime. The difference in performance is caused by a more effective distribution of captured particles in media A.

Filter Types and Locations



Depending on the filter type and corresponding location, a general pressure lost recommendation can be given

Suction Line: 0.03-0.05 bar

Pressure Line: 1 bar

Return Line: 0.3-0.5 bar

Suction Return Filter: 1 bar

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