

icountPD

Online Particle Detector

For mineral oil, aggressive fluids or fuels
(ATEX approved version available. See page 476)



Independent monitoring of system contamination trends

The icountPD Particle Detector from Parker represents the most up to date technology in particle detection. The design dynamics, attention to detail and moulding compactness of the permanently mounted, on-line particle detector module, combined with on-board, laser based, leading-edge technology, brings to all industries a truly revolutionary, particle detector as a remarkable cost effective market solution to fluid management and contamination control.



icountPD for mineral oil applications

Contact Information: Product Features:

Parker Hannifin
Hydraulic Filter Division Europe

**European Product
Information Centre**
Freephone: 00800 27 27 5374
**(from AT, BE, CH, CZ, DE, EE, ES,
FI, FR, IE, IT, PT, SE, SK, UK)**
filtrationinfo@parker.com

www.parker.com/hfde

- Independent monitoring of system contamination trends.
- Warning LED or digital display indicators for Low, Medium and High contamination levels.
- Visual indicators with power and alarm output warnings.
- Moisture %RH indicator (optional).
- Cost effective solution to prolong fluid life and reduce machine downtime.
- M12 8 pin or Deutsch Connector options.
- Continuous performance for prolonged analysis.
- Fuel, Hydraulic and phosphate Ester fluid compatible construction.
- 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

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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

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)

Particle / % RH Output Signal:

Continuous

Principle of operation:

Laser diode optical detection of actual particulates

International Codes:

ISO 7 – 22, NAS 0 – 12

Calibration:

By recognised online methods confirmed by the relevant ISO procedures

MTD – Via a certified primary ISO 11171 automatic particle detector using ISO 11943 principles, with particle distribution reporting to ISO 4406:1996

ACFTD – Conforming to ISO 4402 principles with particle distribution reporting to ISO 4406:1996

Recalibration:

Contact Parker Hannifin

Performance:

+/- 1 ISO Code (Dependant on stability of flow)

Reproducibility / Repeatability:

Better than 1 ISO Code

Power Requirement:

Regulated 9 to 40Vdc

Current Rating:

Typically 120mA

Hydraulic Connection:

Mineral M16x2 test Points

Aggressive: 5/8" BSF test Points

Fuel: No test Points 1/8 BSP (Female) Ports (Plugged)

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:

Ambient storage temperature -20°C to +40°C (-4°F to +104°F)

Environment operating temperature +5°C to +60°C (+41°F to +140°F)

Fluid operating temperature +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:

IP66 rated. Refer to the EC Declaration of Conformity.

EMC/RFI – EN61000-6-2:2001

EN61000-6-3:2001

Materials:

User friendly Abs construction.

Stainless Steel hydraulic block.

Dimensions:

182mm x 155mm x 86mm (7.2" x 6.1" x 3.4")

Weight:

1.3kg (2.9lb)

Seals:

Mineral: Fluorocarbon. Aggressive: EPDM. Fuel: Fluorocarbon.

Computer Compatibility:

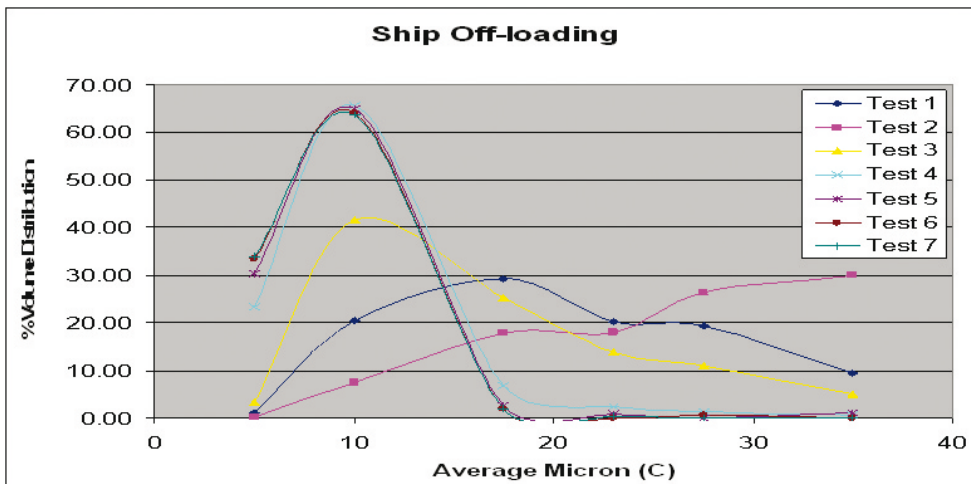
Parker recommends the use of a 9-way D-type connector. This can be connected to a USB port using a USB-serial adaptor. Note that these connectors/adaptors are **NOT** supplied with icountPD units: contact Parker Hannifin for advice.

icountPD for use with aviation fuels

Field Data - Major International Airport

First 3 measurements represent fuel from a previous cargo followed by a regular clean delivery, thus demonstrating the range of fuel cleanliness being experienced at this particular location.

| | >4µ | >6µ | >14µ | >21µ | | >4µ | >6µ | >14µ | >21µ |
|--------|---------|---------|---------|---------|--------|--------|-------|------|------|
| Test 1 | 81058.3 | 62126.1 | 17817.6 | 6066.2 | Test 5 | 1226.1 | 261.5 | 2.4 | 0.4 |
| Test 2 | 87834.5 | 74763.0 | 35454.1 | 18044.4 | Test 6 | 1085.7 | 210.9 | 1.3 | 0.1 |
| Test 3 | 51383.4 | 32796.9 | 4424.8 | 1213.4 | Test 7 | 1037.9 | 198.7 | 1.3 | 0.1 |
| Test 4 | 1593.3 | 422.7 | 9.6 | 1.7 | | | | | |

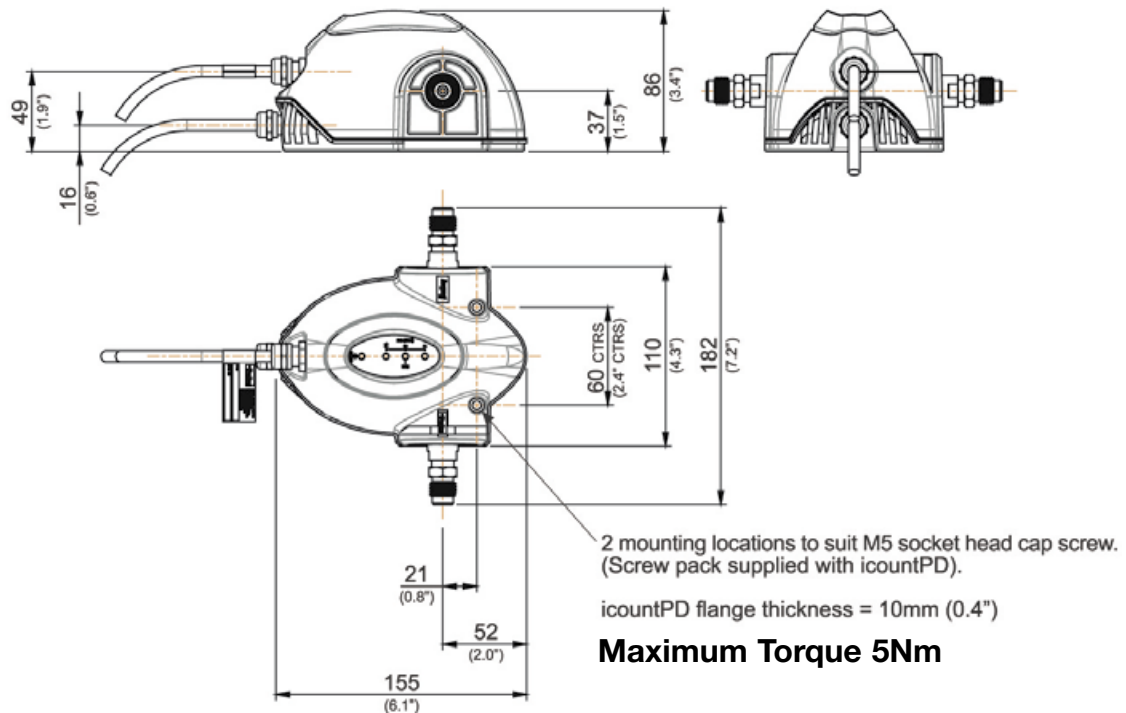


icountPD for use with aviation fuels



Dimensions / Installation Details

mm
(inches)



Typical Applications

- **Mobile Equipment**

- Earth Moving Machinery
- Harvesting
- Forestry
- Agriculture

Monitoring of the hydraulics, enabling the vehicles to function to their best capability under load conditions through pistons, servo valves, control rams and gear pumps.

- **Industrial Equipment**

- Production Plants
- Fluid Transfers
- Pulp & Paper
- Refineries

To monitor the cleanliness of the equipment throughout the production line, from the machine tool controlled hydraulics through to contamination of fluid transfer. Ensuring the integrity of the fluid is maintained throughout the refining process.

- **Power Generation**

- Wind Turbines
- Gearboxes
- Lubrication Systems

With continuous monitoring the optimum level is achieved in the least amount of time.

- **Maintenance**

- Test Rigs
- Flushing Stands

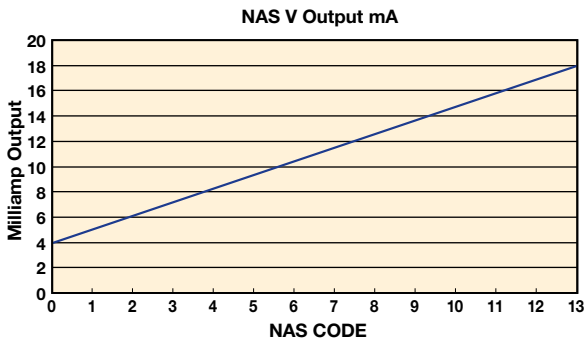
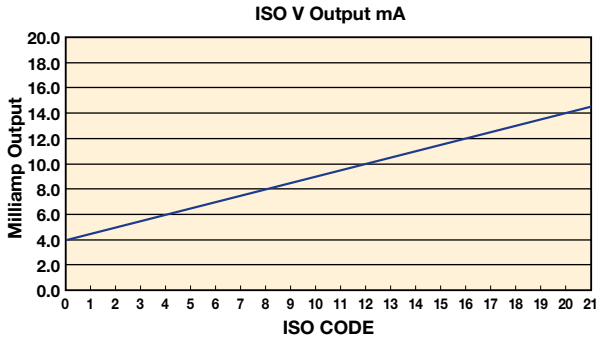
To increase efficiency of your equipment by continuously monitoring the cleanliness level of the hydraulic fluid.

- **Fuel Contamination Detection**

- Fuel Storage Tanks
- Vehicle fuel tanks
- Uploading fuel into an aircraft

24/7 detection of particulate levels in most fuels including aviation fuel - Jet A-1 fuel specification.

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 | mA | NAS |
|------|-----------|----|-------|
| 4.0 | 0 | 4 | 00 |
| 4.5 | 1 | 5 | 0 |
| 5.0 | 2 | 6 | 1 |
| 5.5 | 3 | 7 | 2 |
| 6.0 | 4 | 8 | 3 |
| 6.5 | 5 | 9 | 4 |
| 7.0 | 6 | 10 | 5 |
| 7.5 | 7 | 11 | 6 |
| 8.0 | 8 | 12 | 7 |
| 8.5 | 9 | 13 | 8 |
| 9.0 | 10 | 14 | 9 |
| 9.5 | 11 | 15 | 10 |
| 10.0 | 12 | 16 | 11 |
| 10.5 | 13 | 17 | 12 |
| 11.0 | 14 | 18 | ** |
| 11.5 | 15 | 19 | ** |
| 12.0 | 16 | 20 | ERROR |
| 12.5 | 17 | | |
| 13.0 | 18 | | |
| 13.5 | 19 | | |
| 14.0 | 20 | | |
| 14.5 | 21 | | |
| 15.0 | ** | | |
| 15.5 | ** | | |
| 16.0 | ** | | |
| 16.5 | ** | | |
| 17.0 | ** | | |
| 17.5 | ** | | |
| 18.0 | ** | | |
| 18.5 | ** | | |
| 19.0 | OVERRANGE | | |
| 19.5 | OVERRANGE | | |
| 20.0 | ERROR | | |

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

Example ISO code 12 is equal to 10mA

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, are available from Parker.

The following tables can be used to relate the analogue 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 |

cont.

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

Table relating NAS codes to Voltage output

| NAS | 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

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Digital display parameters (ISO 4406/NAS 1638)

Start up

1. Once the icountPD has been connected to a regulated power supply, the product logo is displayed for approximately five seconds as the icountPD performs a self system diagnostic check.
2. The icountPD then automatically starts monitoring using factory default test parameters.



Notes: ISO 17/16/14 and MS = 43% RH if fitted

Digital display indication

The digital display will show the actual measured codes, the channel (μ) size and the user definable limits. Note that the channel size and limits are displayed alternately.

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

The order of trigger for both 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.

Error detection:

In the unlikely event of a 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 are detailed in the icountPD User Manual).

Moisture sensor output settings

The Moisture Sensor is an option that can be included when ordering 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.

Table relating Saturation levels in the sensing cell to icountPD outputs

| 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 |

Flow control ACC6NN019

A pressure compensated, flow control device (Parker Hannifin part number ACC6NN019) has been developed to give the icount PD greater flexibility.

The flow control device enables testing where flow ranges are outside the icountPD specification i.e. (40 – 140 ml/min), or where pipe diameters do not allow the icountPD to be installed.

The flow control device fits onto the downstream (outlet) side of the icountPD. A 06L EO 24 deg cone and hydraulic adaptor is supplied which enables connection directly to the icountPD. Alternatively the flow control device can be fitted further downstream.

The compact design requires no setting up or further user intervention as long as the system conditions remain within the recommended pressure and viscosity ranges as below.



P/N ACC6NN019

| | |
|-----------------------------|---------------|
| Working pressure range | 10 to 300 bar |
| Differential pressure range | 10 to 300 bar |
| Working viscosity range | 10 to 150 Cst |

icontains – Oil Sampler (IOS)

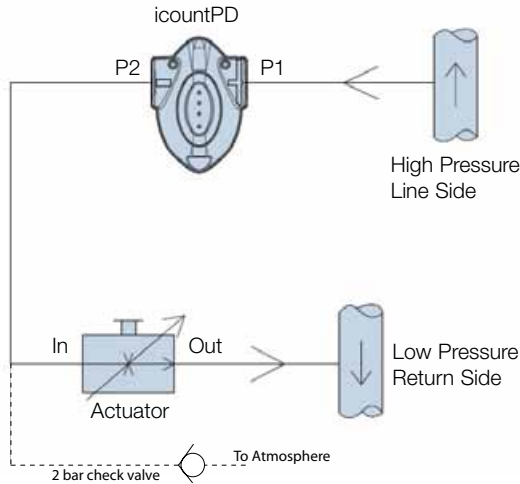
- New and under development in the detection of contaminates distribution in various Aviation fuels.
- Portable monitoring tool providing fluid qualification to ISO 4406:1999 standards.
- Supplements the icount LCM20 and ACM20 product portfolio.
- Quick, simple to use monitoring tool for sampling fluids from containers, fuel bunkers and holding tanks.
- Field solution to Laboratory methods for the detection of solid contamination and free water inference.



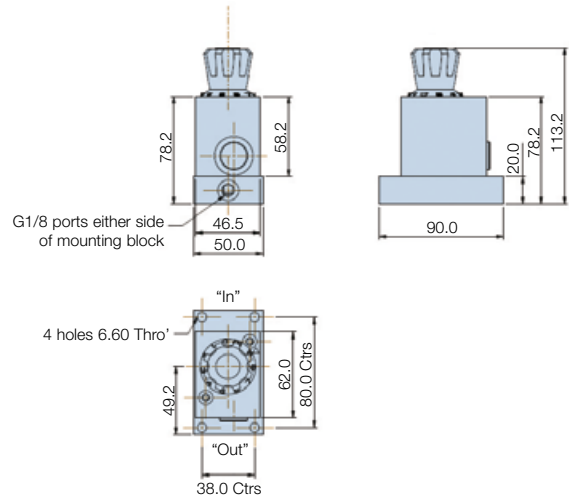
icountPD

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Hydraulic Connection Diagram



Dimensions



Flow Control Actuator Specification (P/N S840074)

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

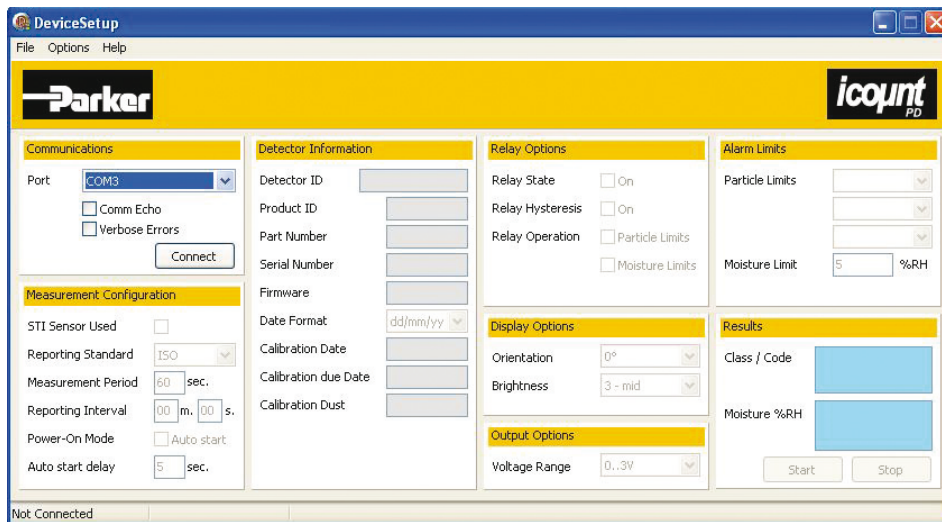


This application shows uploading fuel into an aircraft with the icountPD in use to monitor as a 'go/no go' device.

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, but note that this program is not currently supplied with the Windows Vista™ operating system. These two ways of communicating with icountPD are described in the following section.

icontainsPD Setup Utility software (supplied)



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
Flowcontrol None

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

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

Example:

[SDF dd/mm/yy] - sets the date format.

[RDF] - reads the product date format.

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

SDF

SdF

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

icountPD

Online Particle Detector

Ordering Information

Standard Products Table

| Part number | Fluid type | Calibration | Display | Limit relay | Communication | Moisture | Cable connector kit |
|-------------|------------|-------------|---------|-------------|------------------|----------|---------------------------|
| IPD12222130 | Mineral | MTD | LED | YES | RS232 / 4 - 20mA | NO | M12, 8 pin plug connector |
| IPD12222230 | Mineral | MTD | LED | YES | RS232 / 4 - 20mA | YES | M12, 8 pin plug connector |
| IPD12223130 | Mineral | MTD | LED | YES | RS232 / 0 - 5V | NO | M12, 8 pin plug connector |
| IPD12223230 | Mineral | MTD | LED | YES | RS232 / 0 - 5V | YES | M12, 8 pin plug connector |
| IPD12322130 | Mineral | MTD | Digital | YES | RS232 / 4 - 20mA | NO | M12, 8 pin plug connector |
| IPD12322230 | Mineral | MTD | Digital | YES | RS232 / 4 - 20mA | YES | M12, 8 pin plug connector |
| IPD12323130 | Mineral | MTD | Digital | YES | RS232 / 0 - 5V | NO | M12, 8 pin plug connector |
| IPD12323230 | Mineral | MTD | Digital | YES | RS232 / 0 - 5V | YES | M12, 8 pin plug connector |

Product Configurator

| Key | Fluid type | Calibration | Display | Limit relay | Communication | Moisture | Cable connector kit |
|-----|-----------------------------|-------------|-----------|-------------|-------------------------|----------|---------------------------------------|
| IPD | 1 Mineral | 2 MTD | 2 LED | 2 Yes | 2 RS232 / 4-20mA | 1 No | 10 Deutsch 12-pin DT Series connector |
| | 2 Phosphate ester | | 3 Digital | | 3 RS232 / 0-5V | 2 Yes | 30 M12, 8 pin plug connector |
| | 3 Aviation fuel (4 channel) | | | | 5 RS232/CAN-bus (J1939) | | |

Note - Aviation Fuel option can also be used for Diesel fluids
 Note - RS485 option - communication up to 5000 Meters - Contact Parker
 Note - Wireless communication (GPRS - LAN - WiFi - Sat) - Contact Parker

Accessories

| Part number | | Description |
|----------------|-------------------|-------------------------------------|
| Mineral fluids | Aggressive fluids | |
| ACC6NE003 | ACC6NN002 | 1 metre hose length |
| ACC6NN003 | ACC6NN004 | 2 metre hose length |
| ACC6NN005 | ACC6NN006 | 5 metre hose length |
| ACC6NN007 | ACC6NN008 | 1/4" BSP fitting |
| ACC6NN009 | ACC6NN010 | 1/8" BSP fitting |
| ACC6NN011 | ACC6NN012 | 1/8" BNPT fitting |
| SPS2021 | SPS2061 | Single point sampler |
| S840074 | Contact Parker | Flow control device |
| ACC6NN019 | Contact Parker | Flow control valve |
| ACC6NN013 | | 12 volt regulated power supply |
| ACC6NN014 | Contact Parker | 2 x 5 metre M12 - 8 pin cable kit* |
| ACC6NN016 | | Deutsch Connector Kit |
| ACC6NN017 | | RS232 To USB cable kit |
| ACC6NN018 | | M12 - 8 pin to RS232 engineers tool |

* M12 Cable kit consists of two 5 metre cables to enable all output options (Communications cable and Relay/Power Supply cable)
 ** Note that the aggressive fluid hoses are provided as a single hose, not in pairs.
 Note: For details on the icountPD Z2 ATEX approved particle detector see page 457.

| Part number | 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 |
| STI2148100 | 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 |

