

### icountPD

**Online Particle Detector - For mineral oil, aggressive fluids or fuels**  
(ATEX approved version available)

#### DESCRIPTION

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.



#### BENEFITS

- 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.
- MI2 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)
- Set up and Data logging support software included.
- 420 bar rated maximum pressure.
- Supported by the offline UBS and online SPS accessories.



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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.

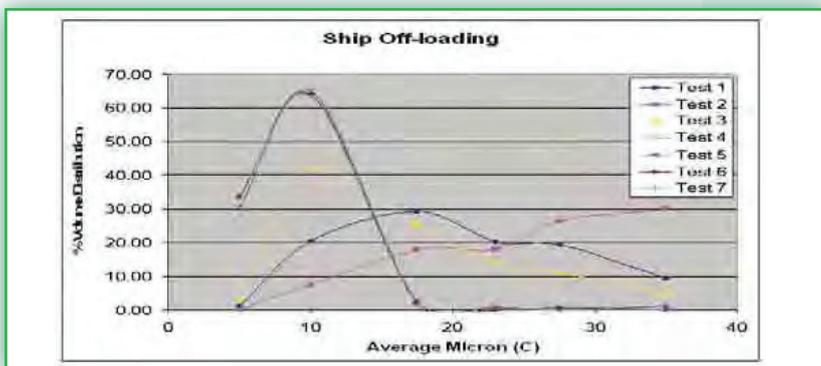
**Computer Compatibility:**

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

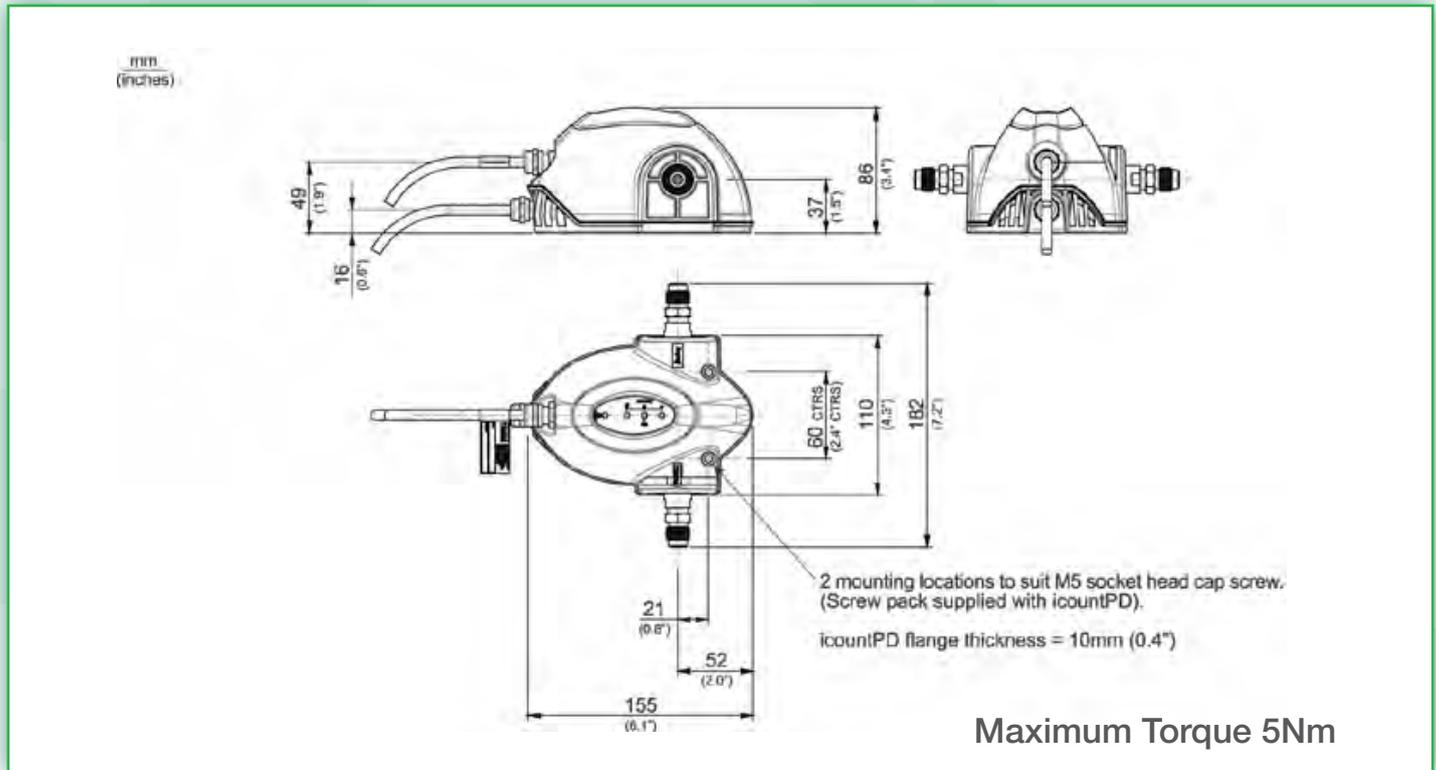


icountPD  
for use with  
aviation fuels

## icountPD

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### DIMENSIONS / INSTALLATION DETAILS



### Typical Applications

- Mobile Equipment
  - o Earth Moving Machinery
  - o Harvesting
  - o Forestry
  - o 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
  - o Production Plants
  - o Fluid Transfers
  - o Pulp & Paper
  - o 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
  - o Wind Turbines
  - o Gearboxes
  - o Lubrication Systems

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

- Maintenance
  - o Test Rigs
  - o Flushing Stands

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

- Fuel Contamination Detection
  - o Fuel Storage Tanks
  - o Vehicle fuel tanks
  - o Uploading fuel into an aircraft

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

## icountPD

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### MI2 COMMUNICATION CABLE: WIRING CONFIGURATION

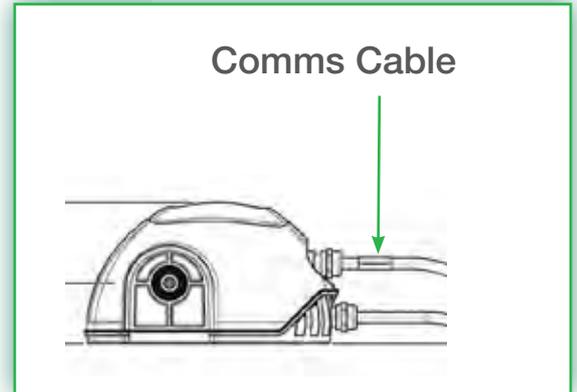
M12 Communication cable

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)* (if selected)
5	RS232 Receive (Pin 3**)	RX232 Receive (Pin3**)
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)*

Important 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 this manual.

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



### LIMIT RELAY ALARM LEVELS

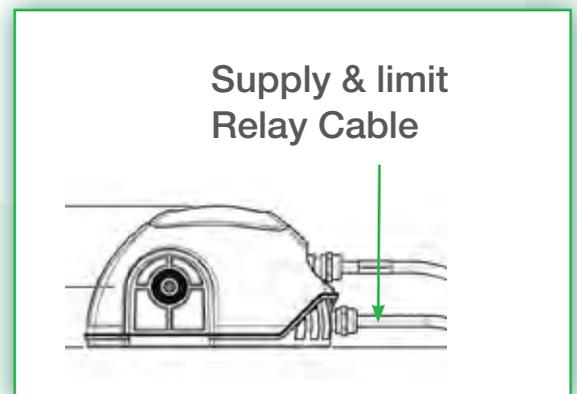
The IcountPD can be specified with a built-in limit switch relay which can be triggered when a preset alarm level is reached. The relay contacts can be used to switch on or off an external device.

M12 Supply and Relay (if fitted) cable

Pin	Current loop options 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	0-5V / 0-3V Supply 0 Vdc
7	Main supply 0Vdc	Product supply 0Vdc
8	Relay (Common)*** (if fitted)	Relay (Common)*** (if fitted)

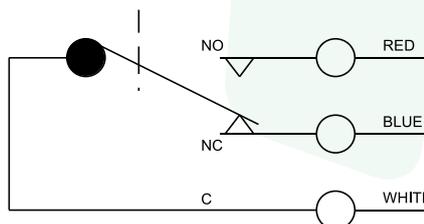
Note: If the moisture sensor is fitted without either option then the output is RS232. Parker Hannifin recommend that the mating M12 connector cables are screened. These cables are available from Parker Hannifin – ordering information section.

\*\*\* Optional – refer to ordering information section.



### (LIMIT RELAY WIRING INSTRUCTIONS)

NORMALLY OPEN  
NORMALLY CLOSED  
COMMON



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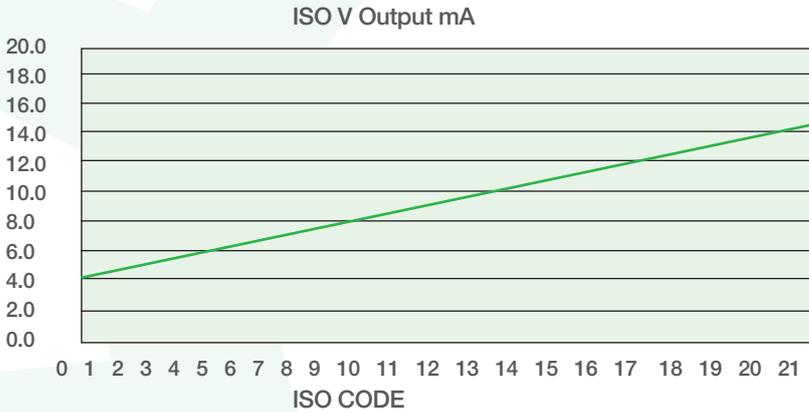
## icountPD

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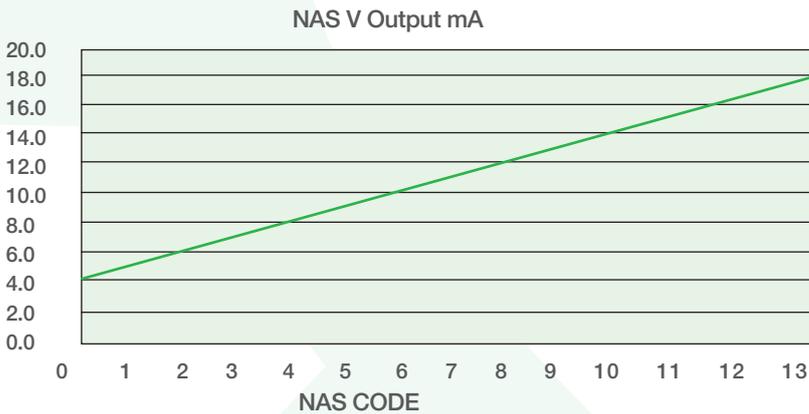
### VARIABLE mA OUTPUT SETTINGS

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.

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

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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.



### Digital display indication

The digital display will show the actual measured codes, the channel ( $\mu$ ) 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

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### 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.



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

### ICOUNTOS – 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.

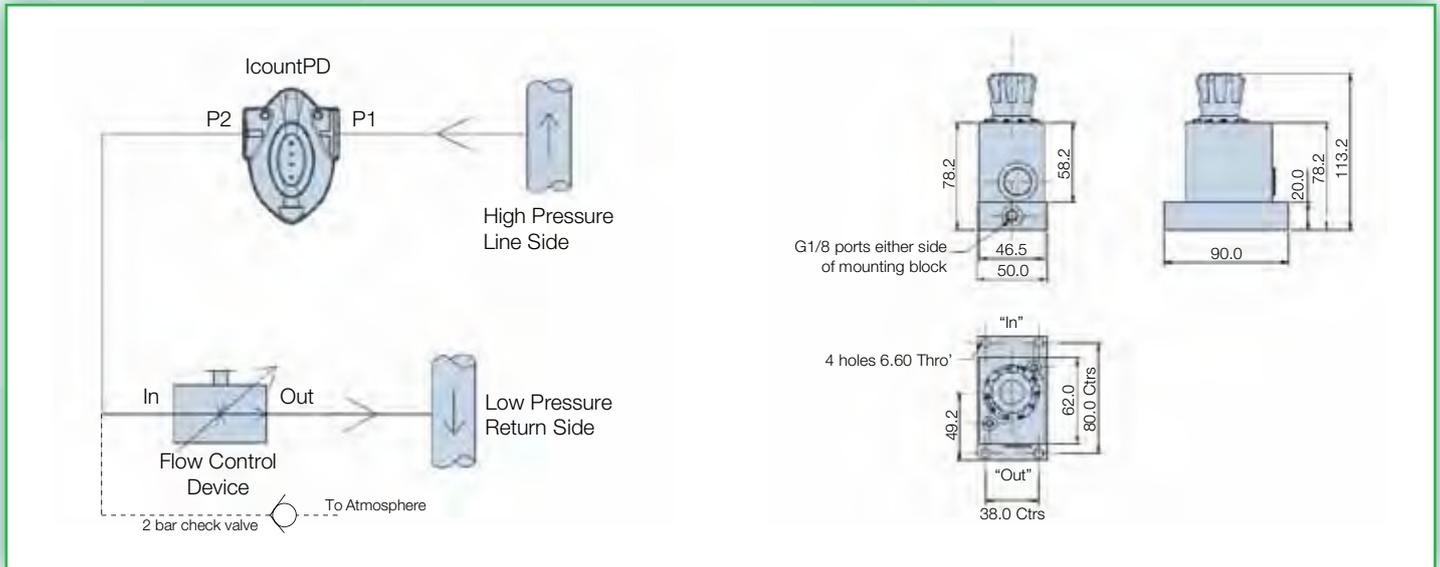


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### HYDRAULIC CONNECTION DIAGRAM

### DIMENSIONS



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



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

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### 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.

### COMMUNICATION OPTIONS



### 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

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### 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	
	2 Phosphate ester		3 LED		3 RS232 / 0-5V			2 YES
	3 Aviation fuel (4 channel)				5 RS232/CAN-bus (J1939)			

Fluid type	
3 Aviation fuel (4 channel)	This version can not come with a Moisture sensor option
3 Aviation fuel (4 channel)	This version can not come with a Moisture sensor option

Note - Aviation Fuel option can also be used for Diesel fluids  
 Note - RS485 option - communication upto 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
ACCNN011	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

\* 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.

Part number	Supersedes	Size	DFlow 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