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Icount PD

Online Particle Detector



ENGINEERING YOUR SUCCESS.



Icount PD

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



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

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

Features and benefits of the Icount PD include:

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

Typical Applications

Mobile Equipment

- Earth Moving Machinery
- Harvesting
- Forestry
- Agriculture

Industrial Equipment

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

Power Generation

- Wind Turbines
- Gearboxes
- Lubrication Systems

Maintenance

- Test Rigs
- Flushing Stands



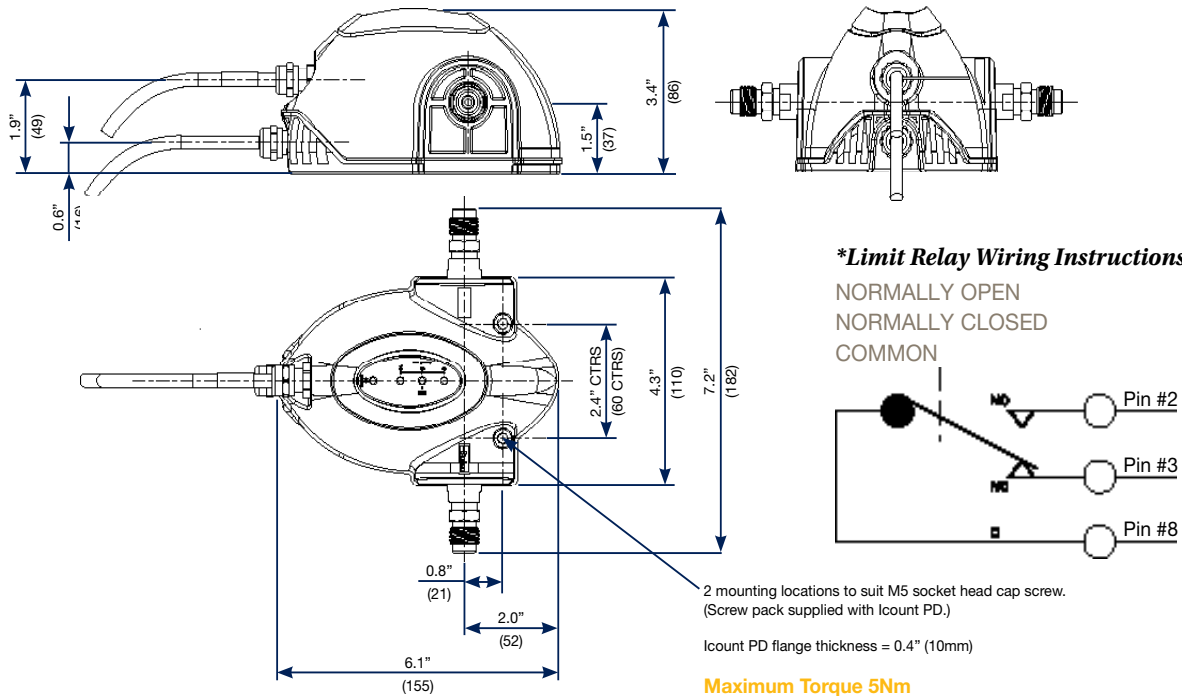
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Features and Benefits

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

Icount PD

Dimensions / Installation Details



M12 Communication Cable: Wiring Configuration

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

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

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

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

*M12 Limit Relay & Alarm Levels: Wiring Configuration

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

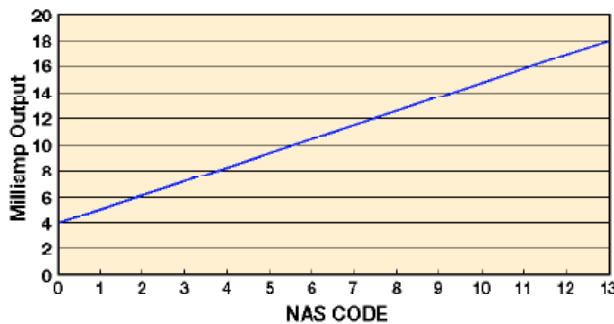
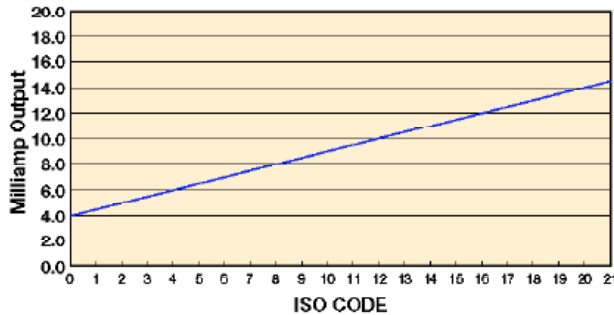
Note: If the moisture sensor is fitted without either option, then the output is RS232.

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

*** Optional - refer to ordering information section.

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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
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	

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

Table relating NAS codes to voltage output

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

Icount PD

Display parameters (ISO 4406/NAS 1638)

Digital display indication

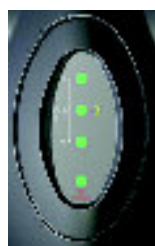
The digital display will show the actual measured codes, the channel (μ) size and the user defineable limits. Note that the channel size and limits will alternate between the two.

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

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

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

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



LED display indication

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

The order of trigger will be:

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

Error detection

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

Moisture sensor output settings

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

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

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Auxilliary Flow Device

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

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

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

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

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

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

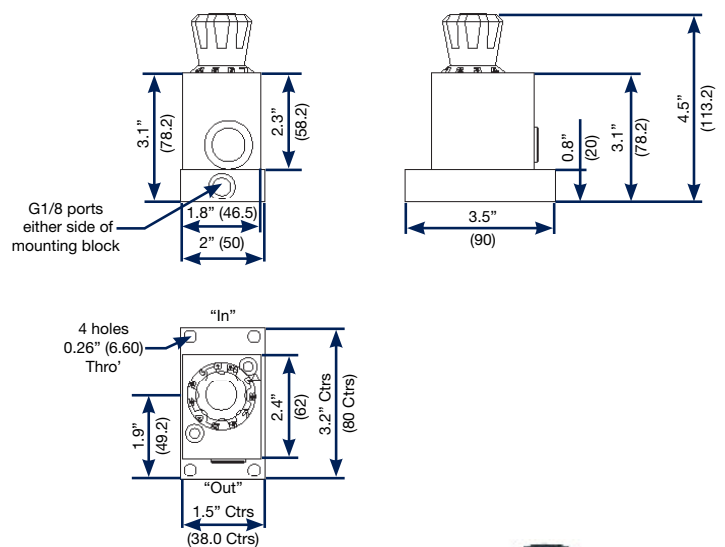
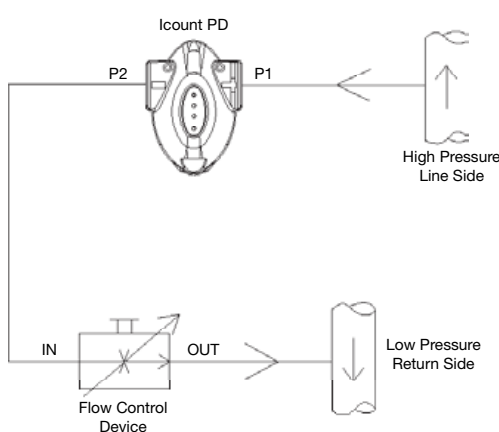
Example:

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

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

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

Hydraulic Connection Diagram



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



Icount PD

Communication Options

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

Communication protocol

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

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

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

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

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

SDF
SdF

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

Ordering Information

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

Notes:

1. When "5" is selected as the Communication option, "1" must be selected as the Limit Relay option and "10" must be selected as the Cable Connector End option.

2. Icount PD comes with set-up utility disc and operator manual.

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

Accessories	Part Number	
	Mineral	Aggressive
1 Meter Hose Length	ACC6NN001	ACC6NN002
2 Meter Hose Length	ACC6NN003	ACC6NN004
5 Meter Hose Length	ACC6NN005	ACC6NN006
1/4" BSP Test point	ACC6NN007	ACC6NN008
1/8" BSP Test point	ACC6NN009	ACC6NN010
1/8" NPT Test point	ACC6NN011	ACC6NN012
Single Point Sampler	SPS2021	SPS2061
External Flow Device	S840074	Contact Parker
Power Supply	ACC6NN013	
5 meter, M12, 8-pin plug and socket cable kit*	ACC6NN014	ACC6NN015
Deutsch 12-pin connector kit	ACC6NN016	
RS232 to USB converter	ACC6NN017	
12" long M12 8-way RS232 & power cable kit	ACC6NN018	