

Datasheet

# 400-PF Portable Ultrasonic Flowmeter

vr 1.0a, November 2016.



**THE ONEFLOW 400-PF IS A HIGH PERFORMANCE CLAMP-ON ULTRASONIC FLOWMETER INTENDED FOR SINGLE PHASE FLOW MEASUREMENT USING THE TRANSIT-TIME DIFFERENCE TECHNIQUE & ADVANCED DIGITAL SIGNAL PROCESSING.**



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Tel: +44 (0)1392 829926.

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**SPECIFICATIONS**

Rugged Custom IP67 Housing and IP68 Sensors  
 Rechargeable lithium polymer 3.7 V, 4200 mAh battery  
 Outstanding flow rate measurement performance.  
 USB Connection, Charger, 5 V, 1 A  
 Remote Firmware update, Date Transfer  
 32Mbit Data Logger with power saving mode  
 High contrast 128 x 64 pixel back lit LED display 70 x 40 mm Screen  
 Lightweight, (875g excluding sensors)

**CONNECTIONS**

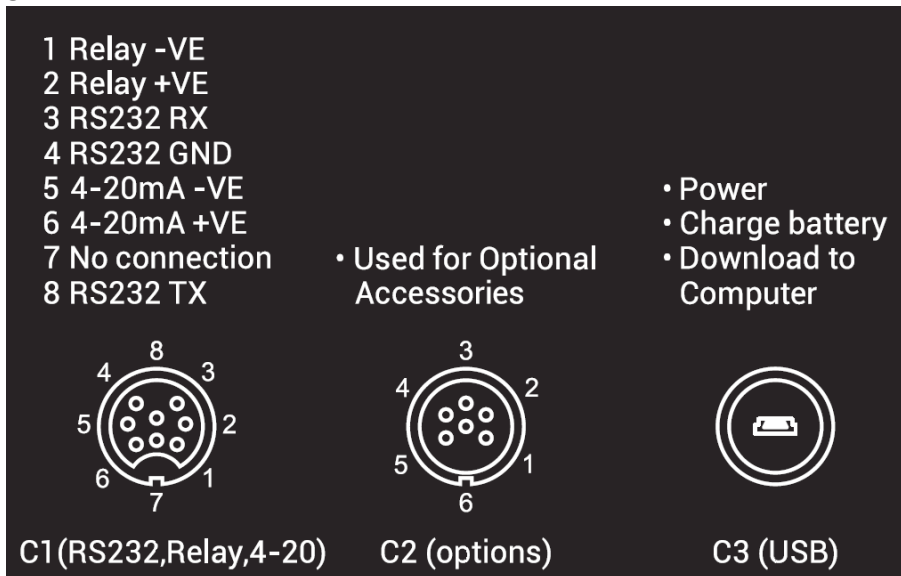


Illustration 1: 400-PF Connections

CONNECTOR	DESCRIPTION
S1	Sensor 1
S2	Sensor 2 (& Thickness gauge)
C1	Communications 1 x Current Output (Scalable Isolated 4-20mA), 1 x Comms (Relay and RS232) 1 x Configurable Opto-Isolated Relay.
C2	Reserved for optional plug in components such as the dual temperature board (for energy flow)
C3	Power & data download - Mini USB (type B) Charge and Download

Performance Specifications

Flow Measuring principle: Complete coded signal correlation measuring transit time difference  
 Range Bi-directional up to 25 m/sec  
 Processor electronics resolution: Typically 0.01 x 10<sup>9</sup> seconds For water and different pipe bores this equates to:

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Pipebore[mm]	50	200	1000
Velocity[mm/sec]	0.300	0.075	0.015
Flow[litre/sec]	0.001	0.003	0.012

Overall resolution: Defined as still water noise time difference, typically  $0.2 \times 10^9$  seconds to peak.  
For water and different pipe bores this equates to:

Pipe bore [mm]	50	200	1000
Velocity [mm/sec]	6	1.5	0.3
Flow rate [litre/sec]	0.01	0.05	0.23

Zero bias: Time difference for zero flow with internally smooth pipes typically better than  $1 \times 10^9$  seconds For water and different pipe bores this equates to:

Pipe bore [mm]	50	200	1000
Velocity [mm/sec]	30	15	1.5
Flow [litre/sec]	0.06	0.24	1.2

If greater accuracy is required, the zero bias can be eliminated by a zero flow check on installation.  
Repeatability: Without moving sensors, typically  $\pm 0.15\%$  of reading

Accuracy for fully developed and symmetrical flow

Accuracy without process calibration	$\pm 1 - 2\%$ of reading + zero bias
Accuracy with process calibration	$\pm 0.5\%$ of reading + zero bias

Speed of Sound Measuring principle: Completed coded signal correlation measuring mean transit time during normal operation.

Range 800 to 2,000 m/sec	Accuracy $<0.25\%$ read value	Resolution 2 mm/sec
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Wall thickness Gauge

Measuring principle Complete coded signal correlation measuring echo reflection times. Uses separate (optional) thickness transducer.

Range Metallic pipe: 2 - 50 mm	Plastic pipe: 2 - 30 mm	Accuracy 0.1 mm	Resolution 0.05 mm
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Temperature Measuring principle: External input from 2 channel 4 - 20mA temperature sensors

Range -40 to 150°C	Accuracy 1% of reading	Resolution 0.1°C
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Factory Calibration available. This function (Energy flow measurement) is available separately using the

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options port and using the Two channel RTD Input Board (OPB2RTD).

### Fluids Types

Sonically Conductive

Sediment/Air levels < 20% but volumetric fluid flow will not be accurate with entrained sediment/air

Pipe Material Metals, glass, and sonically conductive homogeneous polymers/plastics

Lining Bitumen, glass, epoxy paint and most concrete liners. Excludes loose liners

### Operational

Languages [Programmable through new software update – please consult factory for new translations]:  
English.

Units Selectable: Feet, meters, ml, litres, m<sup>3</sup>, ft<sup>3</sup>, pints, gallons, US gallons, seconds, minutes, hours, days. Plus user defined units and time. Input units in metric and Imperial.

Power Supply: 3.7V 4.2Ah Internal Battery Rechargeable (5 hour recharge) - lithium polymer batteries  
Battery life, (nominal) Standard: 16 hours continuous use (LCD on, back-light on).

### Low power mode.

This minimises power consumption. The LCD and all other outputs are shutdown and the device goes into a low power mode, except when it is sampling. Therefore the battery life depends very much on how often readings are taken. The device

### Logging Interval

<b>Logging Interval</b>	<b>Normal Operation (backlight off)</b>	<b>Low Power Mode</b>
1 per second	24 hours	Does not work
1 per 30 seconds	24 hours	11 days
1 per minute	24 hours	21 days
1 per 5 minutes	24 hours	80 days
1 per 10 minutes	24 hours	150 days

\* For 'special' logging requirements please contact the factory.

External Controls: RS232 (8 data, 1 stop bit, none] baud rate up to 115200

Inputs Transit Time Sound Speed 2 sensors, single channel

1 x Analogue 4-20mA isolated current output. Choice of output under software control so can be set to any parameter measured by flowmeter, range, scale and window

Totaliser (pulse) Alarm 1 x opto-isolated relay. 60 V, 1500 V isolation. Choice of output under software control, 1 KHz max

Site Information: 16 separate sites. Data rate, start/stop times, RTC setting

Settings: 4 Hz standard update rate, with user set moving average (1 - 360 seconds).

Logging interval: User set from 1 - 9999 seconds and average over period is logged

Display Type: 128 x 64 pixel LCD graphic. Blue LED Back-light.

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Data Points: Alpha-numeric and Graphics display output, graphs and logging traces

Logging 32 Mbit: Universal multi-point data-logger, 416,900 records  
e.g. flow and Date/time

Keypad: 9 keys, On/Off on Keypad

External Connections:

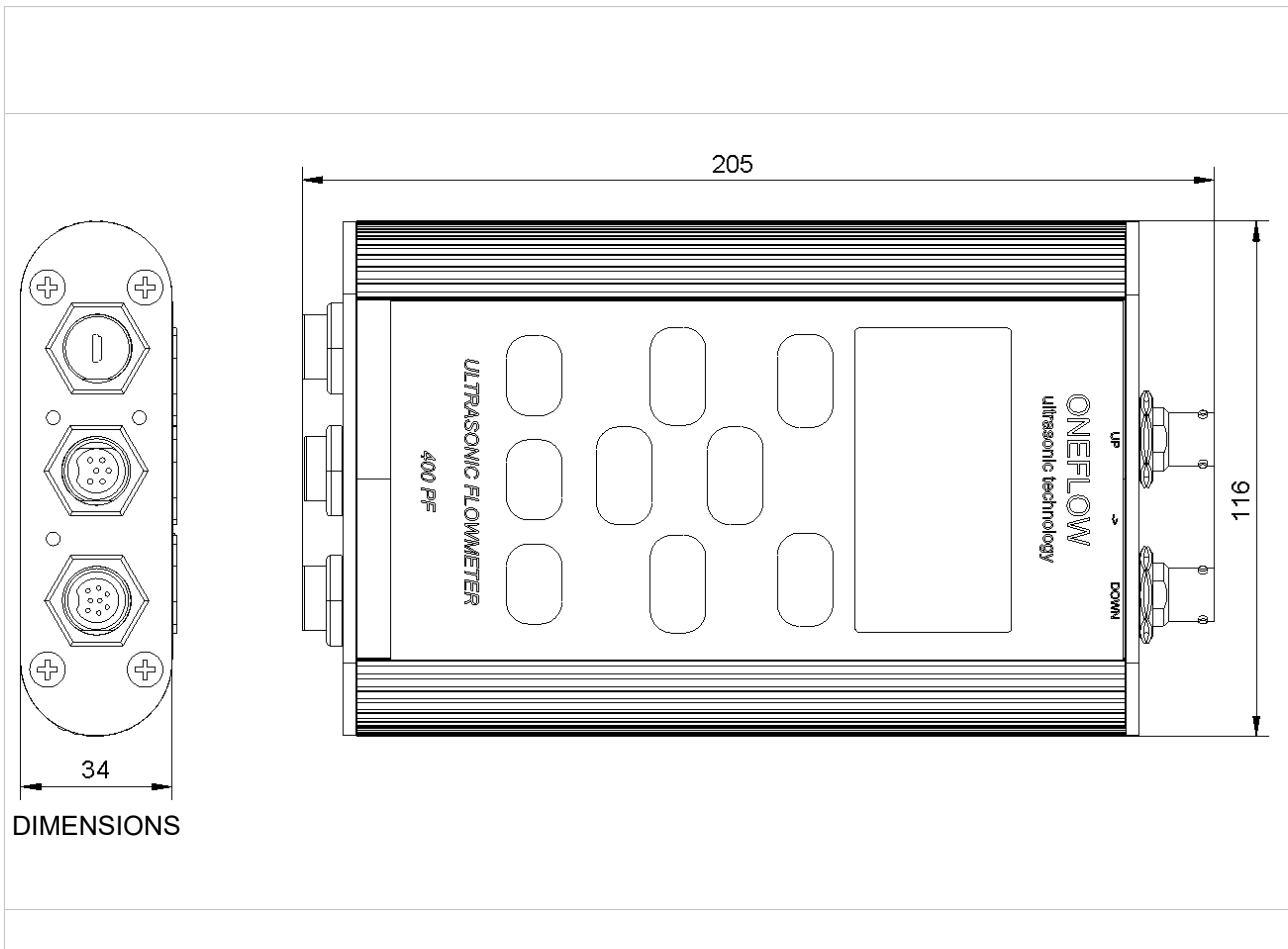
Military & Industrial Specification connectors are used throughout – Ensure protective caps are fully screwed on with when a connector is not used.

Physical

<b>TEMPERATURE SPECIFICATION</b>		
Temperature Range	Low Temperature [°C]	High Temperature [°C]
Transducer (Standard SENS-STD-XXX, Mini, SENS-MINI-XXX) * Note: Pipe Temperature, with ambient surroundings can then be +200°C (maximum).	-40	+120 * Note.
Sensor Cable	-20	+80
400-PF Electronics unit	-10	+50
Storage Temperature Transducers	-40	+120
Storage 400-PF Electronics unit	-20	+50
<b>INGRESS PROTETION RATING SPECIFICATION</b>		
Transducer & Cable	IP68	
400-PF Electronics Unit & Connectors	IP67 (ensure caps are tightened)	
<b>CABLE LENGTHS</b>		
Standard Sensor length	2.9 metres	
Optional length (specify when ordering) SENS-STD-1MHz-XXM (where XX = length in metres)	5m, 10m, 15m, 25m. (consult factory for other requirements)	
<b>TRANSDUCER MOUNTING OPTIONS</b>		
Rail mounting with chains for from 13mm diameter up to 2000+ mm. Chains for larger pipes with alternative magnetic blocks for ferrous metal pipes. Permanent rail (with protective cover) also available using 'jubilee' permanent straps.		
<b>PHYSICAL DIMENSIONS</b>		
Dimensions 400 Series Control Unit	182 x 115 x 34 mm	
Shipping Weight	2 kg.	
<b>PHYSICAL MATERIALS</b>		
400-PF unit: Anodised aluminium, stainless steel (304L). Transducers PEEK and Acetal with aluminium/stainless steel mounting block/rails. All materials corrosion resistant in most outdoor applications (not Marine).		

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Supplied in Carrying Case

Kit contents

- 1 x Main Electronics units
- 1 x pair of sensors
- 1 x clamping rail
- 1 x 250 mL water based couplant
- 1 x 4GB USB stick with manuals and calibration certificate.
- 1 x bubble level
- 1 x 5 metre retractable tape measure
- 1 x Carrying strap.
- 1 x Universal 80-240 V Charging adapter
- 1 x 8 way communications lead

***Many thanks for taking the time to read this data-sheet and considering a ONEFLOW Technologies product. Please contact us or one of our representatives for further information.***

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