

Type U3000 V2 Ultrasonic Flowsensor / Heatmeter (HM)



Product description

The type U3000 V2 is the solution for permanent ultrasonic Clamp-On flowmetering.

Providing various options for high accuracy measurement, power, communication, pipe dimension, data storage & export it can be customized to almost any application need.

The type U3000 V2 Heatmeter (HM) is an ultrasonic permanent clamp-on heatmeter / energy meter / BTU meter. Additionally to an ultrasonic flowmeter it is equipped with Pt100 temperature sensors to calculate the energy of a heat exchanging system.

The 'Clamp-On' concept allows for easy installation without process disruption. Compact, robust and reliable – the type U3000 V2 (HM) was designed for long-term use in industrial applications.

The type U3000 V2 can be used on PVDF, ABS, PVC, CPVC, PP, PE, PB-Instaflex, iron and steel pipes. Processes can be monitored directly by a higher-level system via 4 to 20 mA, Modbus, pulse or frequency output.

Benefits/features

- Large, easy to read graphic display with backlighting
- Easy to install with 'Clamp-On' design
- Datalogger option (up to 100 million datapoints)
- USB port for easy data export
- Analog, digital Modbus, pulse & alarm outputs
- Reynolds number correction
- Compatible with almost all pipe types
- Automatic energy calculation with two Pt100 temperature sensors (HM version)

Applications

- HVAC & Energy System Audits
- Pump Verification
- Process Control
- Chemical Addition
- Hydraulic Systems
- Fire Systems
- Leak Detection
- Boiler Testing



Technical data

Specification

General		
Measuring method	Ultrasonic runtime measurement	
Flow range	0.1 m/s - 20 m/s	
Accuracy	Pipes > DN75	± 0.5 % – 3 % of the measured value for flow throughput rates > 0.2 m/s
	Pipes DN13 – DN75	± 0.3 % of the measured value for flow throughput rates > 0.2 m/s
Repetition accuracy	± 0.5 % of the measured value for flow or ± 0.02 m/s depending on which value is larger	
Response time	< 500 ms, depending on pipe diameter	
Selectable flow units	Velocity	m/s, ft/s
	Volume	l/s, l/min, l/h, gal/min, gal/h, USgals/min, USgals/h, Barrel/h, Barrel/day, m ³ /s, m ³ /min, m ³ /h
Selectable totalizer units	Liters, m ³ , gallons, US gallons, barrels	
Totalizer	12 digits	
Menu languages	EN, DE, FR, RU, SE, IT, SP, P, NO, DEN	

Temperature sensors (Heatmeter types only)

Operating temperature	0 °C to +50 °C	32 °F to +122 °F
Storage temperature	-10 °C to +60 °C	14 °F to +140 °F
Pipe wall temperature	-20 °C to +85 °C	-4 °F to +185 °F
Accuracy	Pt100 Class B 4-wire	
Resolution	0.1 °C (0.2 °F)	
Humidity during operation	Max. 90 % relative humidity at +50 °C (122 °F)	

Environment

Operating temperature	-20 °C to +50 °C	-4 °F to +122 °F
Storage temperature	-25 °C to +75 °C	-13 °F to +167 °F
Pipe wall temperature	-20 °C to +135 °C	-4 °F to +275 °F
Humidity during operation	Max. 90 % relative humidity at +50 °C (122 °F)	

Suitable pipe types

Pipe material	PVDF-SYGEF, PP-PROGEF, PE-ELGEF, PB-INSTAFLEX, ABS, PVC-U/PVC-C, construction steel, cast iron, stainless steel, copper	
Pipe dimensions [d]	13 - 2'000 mm	0.5 - 78 inch
Pipe wall thickness	1 - 75 mm	0.04 - 3 inch
Pipe coating	Possible materials: rubber, glass, concrete, epoxy, steel	
Pipe coating thickness	0 - 25 mm	0 - 1 inch

Electronics

Power supply	12 V to 24 V AC/DC, 1A max. or 86 V to 264 V AC (47 Hz to 63 Hz)	
Power consumption	max. 10,5 W	

Outputs (output options depending on type)

Analog output	Range	4 - 20 mA, 0 - 20 mA, 0 - 16 mA
	Resolution	0.1 % of full scale
	Load max.	620 Ω
	Insulation	1,500 V opto-isolated
	Alarm current	Adjustable between 0 – 26 mA

Outputs (output options depending on type)

Pulse output	Type	3x Opto-isolated MOSFET volt free contact (NO/NC)
	Options	Flow totals, energy (HM version only), loss of signal, low flow alarms
	Pulse sequence	Volumetric mode: 1 to 50 pulses/sec user-programmable Frequency mode: 200Hz max. pulse frequency
	Pulse width	50 ms standard value, 3 to 99 ms user-programmable
	Max. Voltage	48 V
	Max. Current	150 mA
	Isolation	>110 V AC/DC
Modbus output	Format	RTU
	Baud Rate	1200, 2400, 4800, 9600, 19200, 38400
	Data-Parity-StopBits	8-None-2, 8-None-1, 8-Odd-2, 8-Even-1
	Standards	PI-MBUS-300 Rev. J
	Physical Connection	RS485
USB interface (Optional)	Protocol	Supports full speed (12Mbps/sec) data connection
	Software	USB driver software is provided with the package
	Connector	Mini USB

Datalogger (optional)

Data Logged	Application details, time, date, flowrate, forward total, reverse total, flow velocity, flow side temperature, return side temperature, temperature difference, power, total energy, signal quality, signal SNR, signal status	
Number of data points	100 million	
Number of data sets	12	
Number of data points per set	No limit	
Programmable capture rate	5 s – 1 hour	
Start/stop	Manual or time-controlled	
Data download	USB interface	

Transducer Sets

Type A	13 to 114 mm (1/2 inch to 4.5 inch) pipe OD (2MHz)	
Type B	50 to 2000 mm (2 inch to 40 inch) pipe OD (1MHz)	

Enclosure and Display

Material	ABS and aluminum	
Dimensions	230 x 180 x 120 mm	9.0 x 7.1 x 4.7 inch
Weight	1.2 kg	2.65 lb
Keypad	15 key tactile feedback membrane keypad	
Display	Type	240 x 64 pixel graphic display, high contrast black-on-white, with backlight.
	Viewing angle	Min. 30°, typically 40°
	Active surface	127 x 34 mm
Protection class	IP 65	

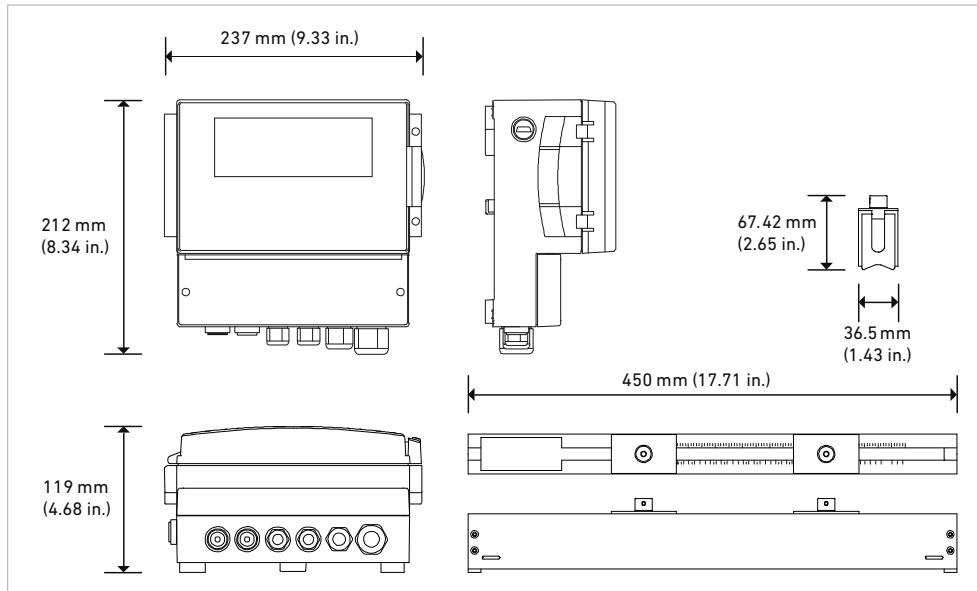
Shipping information

Package dimensions	480 x 320 x 230 mm	19 x 12.5 x 9 inch
Weight	4.8 kg	10.6 lb
Volume weight	5.8 kg	12.8 lb

Standards/approvals

CE, RoHS compliant		
Safety	BS EN 61010-1:2010	
EMV	BS EN 61326-1:2013	BS EN 61326-2-3:2013
Environmental	BS EN 60068-1:2014	
	BS EN 60068-2-1:2007	BS EN 60068-2-2:2007

Dimensions



Packaging content



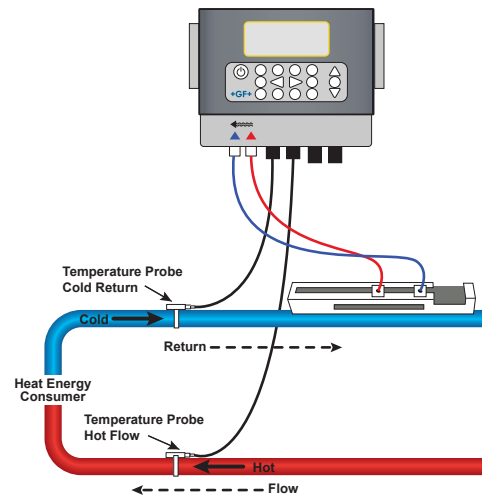
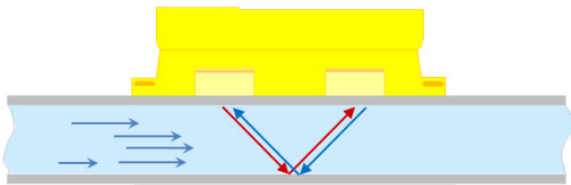
- 1 Type U3000 V2 (HM)
- 2 Flow sensors / transducers
- 3 Sensor cable (2pcs, each 5 m length)
- 4 Gel pads
- 5 Guide rail
- 6 S/steel hose-clips for guide rail
- 7 Ultrasonic coupling grease
- 8 Heatsink compound (HM types only)
- 9 Pt100 temperature probes incl. cable (3 m length) (HM types only)
- 10 S/steel hose-clips for temperature probes (HM types only)
- 11 Product documentation (User manual & Factory calibration certificate)

Function

The type U3000 V2 (HM) functions, as do all current ultrasonic flowmeters, according to the transit time principle of ultrasonic waves.

The device is installed directly on a pipe surface and transmits ultrasonic waves back and forth between the two sound transducers. Depending on the flow, a small time difference arises between the two ultrasonic signals – this is proportional to the flow speed.

By measuring the temperature change between the flow and return pipe of the heat exchanging system with the integrated Pt100 sensors the type U3000 V2 HM (without brackets) is additionally calculating its thermal energy (in BTU, J or kWh).



Ordering Information

Article name	Order code	Description
U3000 V2	159 300 370	U3000 V2 Flowmeter 110/240 VAC d13-d115 0.5 in. to 4 in. 4-20 mA, Pulse
U3000 V2	159 300 371	U3000 V2 Flowmeter 110/240 VAC d13-d115 0.5 in. to 4 in. 4-20 mA, Pulse Datalogger
U3000 V2	159 300 372	U3000 V2 Flowmeter 110/240 VAC d13-d115 0.5 in. to 4 in. Modbus
U3000 V2	159 300 374	U3000 V2 Flowmeter 110/240 VAC d115-d300 4 in. to 12 in. 4-20 mA, Pulse
U3000 V2	159 300 375	U3000 V2 Flowmeter 110/240 VAC d115-d300 4 in. to 12 in. 4-20 mA, Pulse Datalogger
U3000 V2	159 300 376	U3000 V2 Flowmeter 110/240 VAC d115-d300 4 in. to 12 in. Modbus
U3000 V2	159 300 378	U3000 V2 Flowmeter 110/240 VAC d300-d2000 12 in. to 78 in. 4-20 mA, Pulse
U3000 V2	159 300 379	U3000 V2 Flowmeter 110/240 VAC d300-d2000 12 in. to 78 in. 4-20 mA, Pulse Datalogger
U3000 V2	159 300 380	U3000 V2 Flowmeter 110/240 VAC d300-d2000 12 in. to 78 in. Modbus
U3000 V2	159 300 382	U3000 V2 Flowmeter 12-24 VAC d13-d115 0.5 in. to 4 in. 4-20 mA, Pulse
U3000 V2	159 300 383	U3000 V2 Flowmeter 12-24 VAC d13-d115 0.5 in. to 4 in. 4-20 mA, Pulse Datalogger
U3000 V2	159 300 384	U3000 V2 Flowmeter 12-24 VAC d13-d115 0.5 in. to 4 in. Modbus
U3000 V2	159 300 386	U3000 V2 Flowmeter 12-24 VAC d115-d300 4 in. to 12 in. 4-20 mA, Pulse
U3000 V2	159 300 387	U3000 V2 Flowmeter 12-24 VAC d115-d300 4 in. to 12 in. 4-20 mA, Pulse Datalogger
U3000 V2	159 300 388	U3000 V2 Flowmeter 12-24 VAC d115-d300 4 in. to 12 in. Modbus
U3000 V2	159 300 390	U3000 V2 Flowmeter 12-24 VAC d300-d2000 12 in. to 78 in. 4-20 mA, Pulse
U3000 V2	159 300 391	U3000 V2 Flowmeter 12-24 VAC d300-d2000 12 in. to 78 in. 4-20 mA, Pulse Datalogger
U3000 V2	159 300 392	U3000 V2 Flowmeter 12-24 VAC d300-d2000 12 in. to 78 in. Modbus
U3000 V2 HM	159 300 394	U3000 V2 HM Heatmeter 110/240 VAC d13-d115 0.5 in. to 4 in. Modbus
U3000 V2 HM	159 300 396	U3000 V2 HM Heatmeter 110/240 VAC d115-d300 4 in. to 12 in. Modbus
U3000 V2 HM	159 300 398	U3000 V2 HM Heatmeter 110/240 VAC d300-d2000 12 in. to 78 in. Modbus
U3000 V2 HM	159 300 400	U3000 V2 HM Heatmeter 12-24 VAC d13-d115 0.5 in. to 4 in. Modbus
U3000 V2 HM	159 300 402	U3000 V2 HM Heatmeter 12-24 VAC d115-d300 4 in. to 12 in. Modbus
U3000 V2 HM	159 300 404	U3000 V2 HM Heatmeter 12-24 VAC d300-d2000 12 in. to 78 in. Modbus

Spare Parts and Accessories

Code	Description
159 300 088	Ultrasonic Flowmeter Spare parts Transducer gel pads (2 pcs)
159 300 038	Ultrasonic Flowmeter Spare parts Super Lube® coupling grease (85 g)
159 300 017	Ultrasonic Flowmeter type U3000 V2 Spare parts Transducer assembly A (2x Transducer A)
159 300 018	Ultrasonic Flowmeter type U3000 V2 Spare parts Transducer assembly B (2x Transducer B)
159 300 068	Ultrasonic Flowmeter type U3000 V2 Spare parts Sensor cable kit (5 meter, 16.4 ft. 2x cables)
159 300 069	Ultrasonic Flowmeter type U3000 V2 Spare parts Sensor cable kit (10 meter, 32.8 ft. 2x cables)
159 300 290	Ultrasonic Flowmeter type U3000 V2 Spare parts Sensor cable kit (15 meter, 49.2 ft. 2x cables)
159 300 070	Ultrasonic Flowmeter type U3000 V2 Spare parts Sensor cable kit (20 meter, 65.6 2x cables)
159 300 291	Ultrasonic Flowmeter type U3000 V2 Spare parts Sensor cable kit (25 meter, 82 ft. 2x cables)
159 300 292	Ultrasonic Flowmeter type U3000 V2 Spare parts Sensor cable kit (30 meter, 114.8 ft. 2x cables)
159 300 019	Ultrasonic Flowmeter type U3000 V2 Spare parts Diagonal guide rail
159 300 040	Ultrasonic Flowmeter type U3000 V2 Spare parts Stainless steel banding (1 piece = 1 meter, 39.4 in.)
159 300 041	Ultrasonic Flowmeter type U3000 V2 Spare parts Screw clip
159 300 042	Ultrasonic Flowmeter type U3000 V2 Spare parts Hose clip 620-020 S/steel 19mm - 44mm, 0.75 in. to 1.73 in.
159 300 043	Ultrasonic Flowmeter type U3000 V2 Spare parts Hose clip 620-036 S/steel 46mm - 70mm, 1.81 in. to 2.76 in.
159 300 044	Ultrasonic Flowmeter type U3000 V2 Spare parts Hose clip 620-072 S/steel 76mm - 127mm, 3 in. to 5 in.

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