

# **ULTRAFLO** *2000CE*

**ULTRASONIC LIQUID FLOW  
AND HEAT/ENERGY METERS**

**HIGH TEMPERATURE SENSORS AS STANDARD**

# ULTRAFLO 2000

## ULTRASONIC LIQUID FLOW AND HEAT/ENERGY METERS

The Ultraflo 2000 is a "Transit Time" ultrasonic flowmeter designed to work with clamp-on transducers, enabling accurate measurement of liquid flowing within a closed pipe, without the need for any mechanical parts to be inserted through the pipe wall and into the flow system. The Ultraflo 2000 is therefore simple to install requiring no shut downtime, with the added advantage of no pressure drop or contact with the process liquid.

The Ultraflo 2000 has been designed for permanent metering on a pipe range of 13mm up to 5000mm and is supplied with transducers and mounting hardware to suit the application. The Ultraflo displays volumetric flow rate in a wide range of units, linear flow rate in metres and feet per second with total volume flow displayed up to a maximum of 12 digits.

Additional facilities offered by the Ultraflo are a 4-20 mA flow proportional output, Pulse output or Set point, Negative flow indication and Display/Output variable damping, helping the Ultraflo cope with poor and unstable flow conditions. All outputs are configured to interface with different types of data collection systems including Building Management Systems.

An optionally available version, the Ultraflo 2000HM, can be used to meter Heat or Energy. By using the ultrasonic transducers to measure the flow and two PT100 temperature sensors to measure the flow and return temperature, the amount of Heat/Energy used can be displayed as kW, kCal/hr, MJ/min and MJ/sec. Flow rate, Total flow and Temperature differential are also displayed. The Heatmeter version has two 4-20mA remote outputs to monitor these measurements as well as pulse output to record Total flow or Energy.

The instrument is able to work on a wide variety of pipe sizes from 13mm up to 5000mm, simply by selecting the correct transducers and attaching them to the outside of the pipewall using the mounting hardware provided.

The setup operation is easily accomplished on the push button keypad with the user only requiring to know the pipe dimensions and the type of pipe wall material. All other application parameters can be measured by the instrument itself.



### INDUSTRY TYPES

- Water Distribution
- Building Services
- Power Generation
- Energy Management
- Semi Conductor
- Steel
- Chemical
- Pharmaceutical
- Petro Chemical
- Food
- Water Treatment
- Light Industrial

### USES

- Balancing Systems
- Flow Monitoring
- Energy Monitoring
- Check Existing Meters
- Effluent Monitoring
- Leak Detection
- Emergency Standby
- Commissioning
- Survey Work

## ELECTRONICS

THE Ultraflo 2000 electronics are housed in an ABS, IP67 enclosure. The complete system including transducers have been CE approved. Programming of the Flowmeter and Heatmeter is carried out using the keypad incorporated in the housing. Simple set up instructions are displayed after entering data on pipe size, pipe material and application data (liquid type and temperature). Follow the instructions on the display, connect the transducers as instructed and mount on the pipe at the specified separation distance. The instrument is now ready to read flow. All application and calibration data is password protected to prevent programmed data being changed inadvertently, whilst the clear front cover and the backlit display protect the keypad and ensure that the instrument is easy to read in poor lighting conditions.

## FLOW MEASUREMENT PRINCIPLE

When ultrasound is transmitted between the two transducers X and Y, the speed at which the sound travels through the liquid is accelerated slightly by the velocity of the liquid in the pipe. When ultrasound is transmitted in the opposite direction the flow of the liquid causes the transmitted sound to decelerate.

The subsequent time difference is directly proportional to the flow velocity in the pipe. Having measured the flow velocity and knowing the pipe cross-sectional area, the volumetric flow can easily be calculated. Micronics engineers have developed a measurement technique which has the ability to resolve extremely small time differences down to 25 pico seconds ( $25 \times 10^{-12}$  seconds), therefore giving extremely good performance on small pipes or in large pipes with low velocity flows.

## FLOW TRANSDUCERS

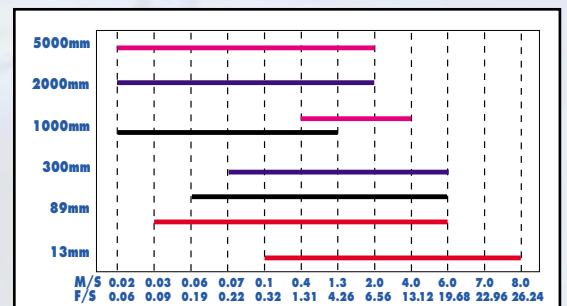
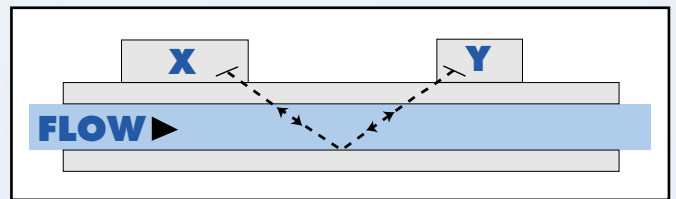
Transducers are supplied according to the application information given when placing an order. All transducers are clamped to the outside of the pipe wall with the rugged mounting hardware provided. Transducers are available to operate on pipework from 13mm up to 5000mm and at temperatures between  $-20^{\circ}\text{C}$  and  $+200^{\circ}\text{C}$ . The electronics are connected to the transducers via coax cable which can be as much as 200 metres long without affecting performance.

## FLOW RANGE

The Ultraflo 2000 will measure the flow of clean and dirty liquids in full pipes with a velocity range of 0.02 m/sec to 12 m/sec. The flow range of the meter is dependent on the pipe size and the liquid velocity, which determines the selection of transducers that are supplied with each instrument. The instrument can be reprogrammed to use different transducers in other different modes in order to overcome signal strength difficulties, ease installation problems or to re-adjust the flow range of the instrument, should it be required.

## HEAT METERS

The Heatmeter has been designed for general purpose energy monitoring using clamp-on flow and temperature transducers. The Heatmeter combines a flow measurement generated by using the ultrasonic "Time of Flight" technique to measure flow with the temperature differential input generated by a pair of PT100 temperature transducers, the combined output produces a measurement of heat or energy used. The Heatmeter version gives two 4-20mA outputs that can be used to monitor either the Flow, Energy or Temperature Differential. The pulse output can be used to record Total Flow or Total Energy.



# ULTRAFLO 2000

## Electronic Enclosure

Protection class	: IP67
Material	: ABS
Dimensions	: 264 x 230 x 101mm
Display	: 2x16 character super twist LCD backlight
Keypad	: IP67
Sensor connection	: TNC coax connectors
All other connections	: IP65 glands
Temperature range	: 0°C to +50°C operating : -10°C to +60°C storage

## Supply Voltage

Switchable	: 110-230 VAC $\pm$ 10% 50/60Hz : 24 Volts DC
Max. power consumption	: $\pm$ 10 watts

## Flow Outputs

Flow Display:	Volumetric units	: m <sup>3</sup> , Gallons (US and Imperial), Litres
	Velocity unit	: metres/sec, feet/sec
	Velocity range	: 0.2...12m/sec to 4 significant figures
	Total volume	: 12 Digits
	Signal level indication	
	ERROR messages	
Analogue:	4-20mA into 750 $\Omega$	: Opto Isolated with user definable scaling
	Resolution	: 0.1% of full scale
Set Point or Pulse:	Max. 1 pulse per second	: User definable scaling

## Heatmeter Options

Display:	Energy	: kW, kCal/hr, MJ/hr, Min, sec, Kj/hr, min, sec
Analogue:	2 off 4-20mA	: Opto Isolated with user definable scaling
Pulse Output:	Max. 1 pulse per second	: User definable scaling
Temperature Sensors:	PT100	: -20°C to + 220°C
	Max. temp. differential	: 220°C

## Transducers

	Pipe Size	Flow Velocity Ranges (Diagonal)
"A"	13mm ...89mm	0.02 m/sec...4 m/sec (8 m/sec)
"B"	90mm...1000mm	0.02 m/sec...8 m/sec (12 m/sec)
"C"	300mm...2000mm	0.02 m/sec to 4 m/sec (7 m/sec)
"D"	1000mm...5000mm	0.02 m/sec to 4 m/sec (7.5 m/sec)
	Frequency	: 1MHz, 2MHz, 0.5MHz
	Flow transducer cables	: 50 Ohm coax cable
	Flow transducer cable length	: 3m standard - optional up to 200m
	Flow transducer temperature range	: -20°C to +200°C ('D' only up to +80°C)
	Flow transducer protection	: Standard IP65

## Accuracy

1% or  $\pm$ 0.02 m/s whichever is the greater  
Specification assumes turbulent flow profile with Reynolds numbers above 4000.

## Repeatability

$\pm$  0.5% with unchanged transducer position.

## Pipe Materials

Any sonic conducting medium such as Carbon Steel, Stainless Steel, Copper, UPVC, PVDF, Concrete, Galvanised Steel, Mild Steel, Glass, Brass. Includes lined pipes - Epoxy, Rubber, Steel, Plastic

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