



# Portable Clamp-on Ultrasonic Flowmeter

## EESIFLO 6000 Series

- Portable dual mode flowmeter
- Easy to install clamp-on sensors with no process interruption
- Non-invasive flow measurement of liquids, no pipeline disturbance, no pressure loss
- Suitable for all commonly used pipe materials with pipe diameters from 6 mm to 6.5 m (1/4" to 256")
- Integrated wall thickness measurement, 2 flow channels



### Description

Our range of non-invasive flowmeters utilises ultrasonic technology for the accurate flow measurement of liquids in full pipes .

The portable device has been designed to meet the needs of the Service/Maintenance and Commissioning Engineer wishing to check the flow rate of liquids at different locations in the plant. The set-up of the unit is simple and user friendly in order to obtain the required flow information in minutes.

The measurement of flow is based on the principle that sound waves are influenced by a flowing medium. Measurements are made by penetrating the pipe with ultrasound and subsequently time differences, frequency variations and phase shifts of the ultrasonic signals are evaluated.

The ultrasonic sensors are clamped onto the outside of the pipe, thus eliminating the need to dismantle the pipework and interrupt the process. The EESIFLO 6000 Series can be applied to any type of standard pipe carrying clean or dirty liquids.

### Advantages

- Low installation effort and costs
- Dual measuring mode (transit-time and doppler)
- Measurement is independent of fluid conductivity and pressure
- No pressure loss, no possibility of leakage
- Retrospective installation for existing plants possible
- No cutting of pipes necessary, no interruption of process, no plant shut down
- No additional fittings for maintenance required
- Hygienic measurement, no risk of contamination, suitable for ultra clean liquids
- No contact with medium, no risk of corrosion when used with aggressive media
- Cost advantages when used with large diameter pipes, high pressure systems, etc.

### Specification

#### General

- Measuring principle : Ultrasonic time difference correlation principle and doppler
- Flow velocity range : 0.01 ... 25 m/s
- Resolution : 0.025 cm/s
- Repeatability : 0.15 % of measured value  $\pm$  0.015 m/s
- Accuracy : Volume flow  $\pm$  1 ... 3 % of measured value depending on application,  $\pm$  0.5 % of measured value with process calibration
- Flow velocity  $\pm$  0.5 % of measured value
- Turn down ratio : 1/200
- Gaseous and solid content of medium : < 10 % of volume

#### Flow transmitter

- Enclosure : Portable
- Degree of protection : IP 54 according EN 60529, IP 68 optional
- Operating temperature : -10 ... 60 °C (14 ... 140 °F)
- Housing material : Aluminium, powder coated
- Flow channels : 2
- Power supply : Internal rechargeable battery, 6 V/4 Ah, or external power supply 9 ... 15 V DC
- Operating time : > 14 h with fully charged battery
- Display : 2 x 16 digit LCD , dot matrix, backlit
- Dimensions : H 118 x W 276 x D 310 mm (with handle)
- Weight : 3.5 kg
- Power consumption : < 2.5 W in measurement mode
- Signal damping : 0 ... 60 s, configurable

## Flow transmitter (cont.)

Response time : 1 s, 70 ms optional  
Measuring cycle : 100 ... 1000 Hz, single channel  
Calculation functions : Average/difference/sum  
Operating languages : Selectable between Danish, English, German, French, Dutch, Norwegian, Polish, Czech, Turkish

### Quantity and units of measurement

Volumetric flow rate :  $m^3/h$ ,  $m^3/min$ ,  $m^3/s$ ,  $l/h$ ,  $l/min$ ,  $l/s$ , USgph, bls/d (barrels per day)  
Flow velocity :  $m/s$ ,  $inch/s$   
Mass flow rate :  $g/s$ ,  $t/h$ ,  $kg/h$ ,  $kg/min$   
Volume :  $m^3$ ,  $l$ ,  $gal$  (gallons)  
Mass :  $g$ ,  $kg$ ,  $t$   
Heat flow :  $W$ ,  $kW$ ,  $MW$  (only with heat quantity measurement option)  
Heat quantity :  $J$ ,  $kJ$ ,  $MJ$  (only with heat quantity measurement option)

### Internal data logger

Storage capacity : approx. 27,000 (optional > 100,000) measuring values  
Logging data : All measured and totalised values, parameter sets

### Communication

Serial interface : RS 232  
Data : Instantaneous measured value, parameter set and configuration, logged data

### Software EESIDATA

Functionality : Downloading of measured values/parameter set, graphical presentation, list format, export to third party software, on-line transfer of measured data  
Operating systems : Windows™ 3.11, 95, 98, NT

### Process inputs

Temperature : Galvanically isolated from main electronics  
PT 100, four-wire circuit, measuring range - 50 ... 400 °C  
Current : 0 ... 20 mA;  $R_i = 50 \Omega$   
Voltage : 0 ... 1 V;  $R_i = 1 M\Omega$

### Process outputs

Current : Galvanically isolated from main electronics  
0/4 ... 20 mA; passive ( $U_{ext} < 24 V$ ) or active ( $R_{ext} < 500 \Omega$ )  
Voltage : 0 ... 1 V or 0 ... 10 V,  $R_i = 500 \Omega$   
Frequency : 0 ... 1 kHz or 0 ... 10 kHz; (OC)  
Digital (pulse, status) : Totaliser value 0.01 ... 1000 / unit; width 80 ... 1000 ms; (OC/Reed)  
Reed = Reed-NO contact (300 V / 0.5 A)  
OC = Open-Collector

## Clamp-on sensors

### Type M2N, M2E

Rated (possible) diameter range : (50) 100 ... 6500 mm  
Dimensions : 60 x 30 x 34 mm  
Material : Stainless steel  
Temperature range : M2N-30 ... 130 °C (-22 ... 266 °F)  
M2E-30 ... 200 °C (-22 ... 392 °F), for short periods up to 300 °C (572 °F)  
Degree of protection : IP 65 acc. EN 60529, IP 68 optional

### Type Q3N, Q3E

Rated (possible) diameter range : (10) 25 ... 400 (1000) mm  
Dimensions : 43 x 18 x 22 mm  
Material : Stainless steel  
Temperature range : Q3N-30 ... 130 °C (-22 ... 266 °F)  
Q3E-30 ... 200 °C (-22 ... 392 °F), for short periods up to 300 °C (572 °F)  
Degree of protection : IP 65 acc. EN 60529, IP 68 optional

### Special clamp-on sensors

Type S2N : For very small pipe diameters 6 ... 40 (100) mm  
Other types : On request

### Wall thickness measurement

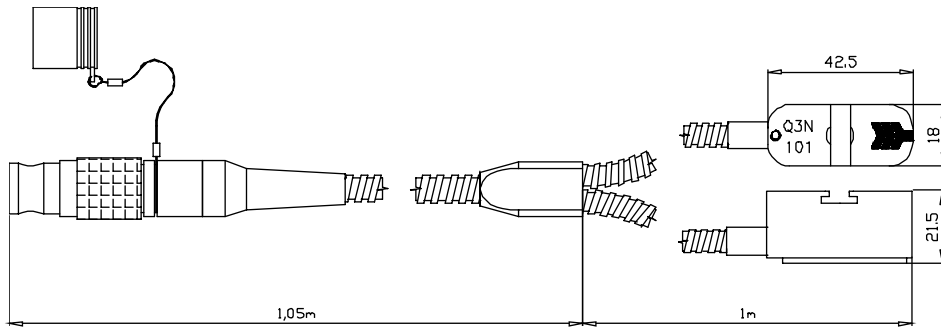
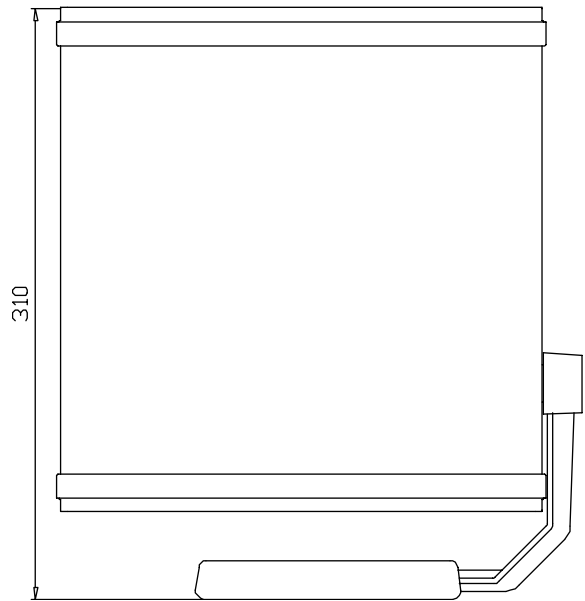
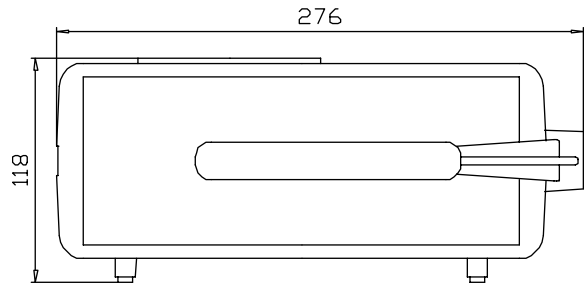
Measuring range : 1.0 ... 200 mm  
Resolution : 0.01 mm  
Linearity : 0.1 mm  
Temperature range : Standard version -20 ... 60 °C  
High temperature version 0 ... 200 °C, for short periods up to 540 °C

## Accessories

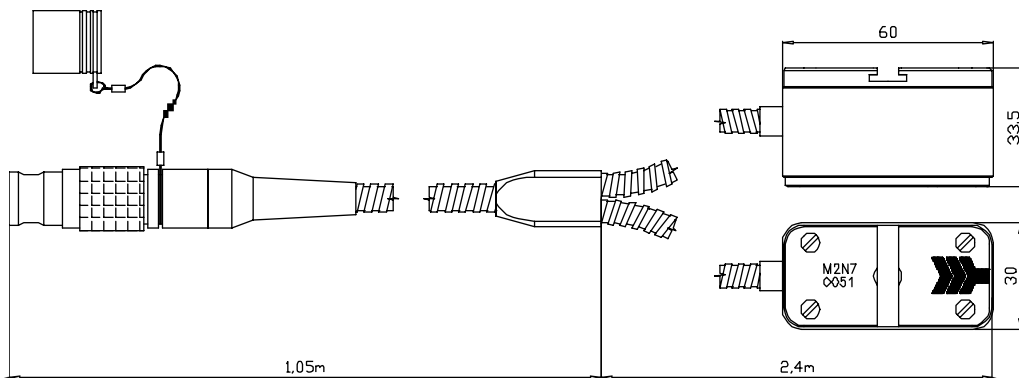
- External power supply 230 V, 50Hz/12 V, 1.2 A; IP 30
- Car power adapter 12 V, 2 A
- Leather carrying case 330 x 340 x 220 mm
- Cable extension 3 m, 5 m, 10 m or 20 m
- Sensor positioning rail for sensors type Q3, stainless steel V2A
- External printer, ink jet 192 dpi

## External dimensions

Portable flow transmitter  
EESIFLO 6000 Series



Clamp-on sensors type Q3N-7-P002



Clamp-on sensors type M2N-7-P003