

# Hand-held Ultrasonic Flowmeter KATflow 200

- Transit-time correlation measurement
- Dual DSP-technology, coded signals for better measurement accuracy
- Light-weight, hand-held unit with graphic display
- Easy to install clamp-on sensors with no process interruption
- Non-invasive flow measurement of liquids or liquified gases
- Suitable for all commonly used pipe materials with pipe diameters from 10 mm (4/10") to 3 m (118")
- Two types of sensors to cover complete pipe range
- Battery life > 24 hours



## Description

The KATflow range of non-invasive flowmeters utilises ultrasonic technology for the accurate flow measurement of liquids and liquified gases in full pipes.

The KATflow 200 is a hand-held device designed for quick non-invasive spot measurements throughout plants, buildings and pipe systems. The set-up of the unit is simple through a wizard-like guided menu structure. Therefore flow measurements can be obtained quickly. This flowmeter is light-weight and can be carried to inaccessible locations easily.

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. This measuring technique has no effect on the flowing medium. There is no pressure loss in the pipe and no wear on components of the measuring device.

The ultrasonic sensors are clamped onto the outside of the pipe, thus eliminating the need to dismantle the pipework and interrupt the process. The KATflow 200 can be applied to any type of standard pipe carrying clean or dirty liquids and liquified gases.

## Advantages

- **Quick and easy installation**
- **Light-weight, hand-held device**
- **No cutting of pipes necessary, no interruption of process, no plant shut down**
- **Robust instrument with IP 65 housing shock-protected by rubber protector**
- **Integral data logger for comprehensive data analysis**

## Specification

### General

|   |  |
|---|--|
| Measuring principle :                       | Ultrasonic time difference correlation principle   |
| Flow velocity range :                       | 0.01 ... 25 m/s  |
| Resolution :                                | 0.25 mm/s  |
| Repeatability :                             | 0.15 % of measured value $\pm$ 0.015 m/s   |
| Accuracy :                                  | <i>Volume flow</i><br>$\pm 1 \dots 3$ % of measured value depending on application,<br>$\pm 0.5$ % of measured value with process calibration<br><i>Flow velocity</i><br>$\pm 0.5$ % of measured value |
| Turn down ratio :                           | 1/100  |
| Gaseous and solid content of liquid media : | < 10 % of volume   |

### Flowmeter

|                         |   |
|-------------------------|---|
| Enclosure :             | Hand-held   |
| Degree of protection :  | IP 65 according EN 60529  |
| Operating temperature : | -10 ... 60 °C (14 ... 140 °F)   |
| Housing material :      | ABS (UL 94 HB)  |
| Flow channels :         | 1   |
| Power supply :          | Internal rechargeable batteries<br>4 x NiMH AA 2850 mAh or external power supply 9 V DC |
| Operating time :        | > 24 h with fully charged batteries   |

## Flowmeter (cont.)

|                     |   |
|---------------------|---|
| Display             | : LCD graphic display, 128 x 64 dots, backlit |
| Dimensions          | : H 228 x W 72/117 x D 47 mm                  |
| Weight              | : Approx. 650 g                               |
| Power consumption   | : < 1 W in measurement mode                   |
| Signal damping      | : 0 ... 99 s                                  |
| Measurement rate    | : 10 ... 100 s <sup>-1</sup>                  |
| Operating languages | : English, German, French, Spanish, Russian   |
| Response time       | : 1 s   |

## Quantity and units of measurement

|                      |   |
|----------------------|---|
| Volumetric flow rate | : m <sup>3</sup> /h, m <sup>3</sup> /min, m <sup>3</sup> /s, l/h, l/min, l/s, USgal/h (US gallons per hour), USgal/min, USgal/s, bbl/d (barrels per day), bbl/h, bbl/min, bbl/s |
| Flow velocity        | : m/s, ft/s, inch/s   |
| Mass flow rate       | : g/s, t/h, kg/h, kg/min  |
| Volume               | : m <sup>3</sup> , l, gal (US gallons), bbl   |
| Mass                 | : g, kg, t  |

## Internal data logger

|                  |  |
|------------------|--|
| Storage capacity | : approx. 30,000 samples (128 kByte), optional > 100,000 samples (512 kByte) |
| Logging data     | : All measured and totalised values, parameter sets                          |

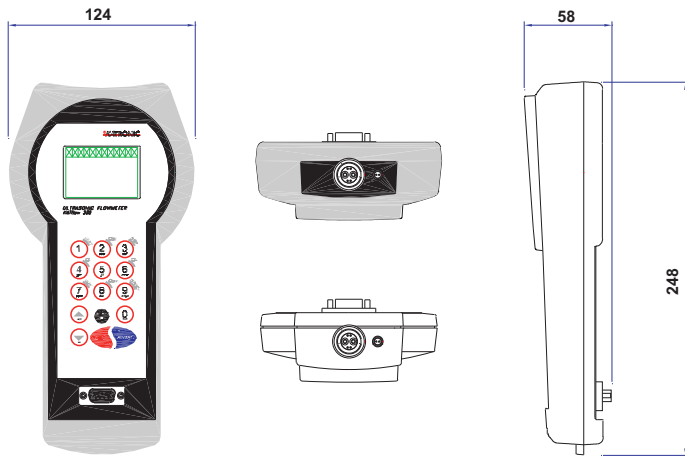
## Communication

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

## Software KATdata+

|                   |   |
|-------------------|---|
| Functionality     | : Downloading of measured values/parameter sets, graphical presentation, list format, export to third party software, on-line transfer of measured data |
| Operating systems | : Windows 2000, NT, XP, Vista<br>Linux<br>Mac (optional)  |

## Flowmeter



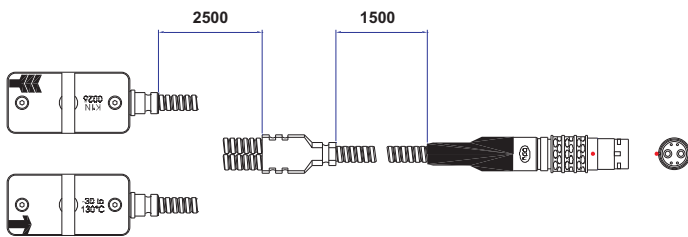
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Hand-held ultrasonic flowmeter KATflow 200 - General arrangement

## Clamp-on sensors



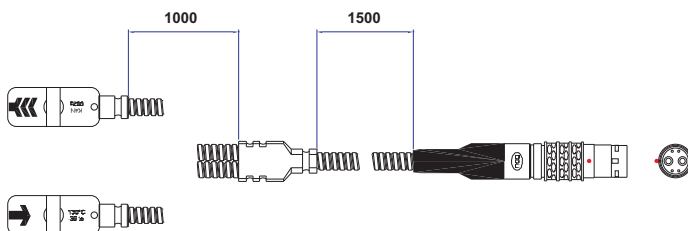
Transducer pair type K1 with ODU connector



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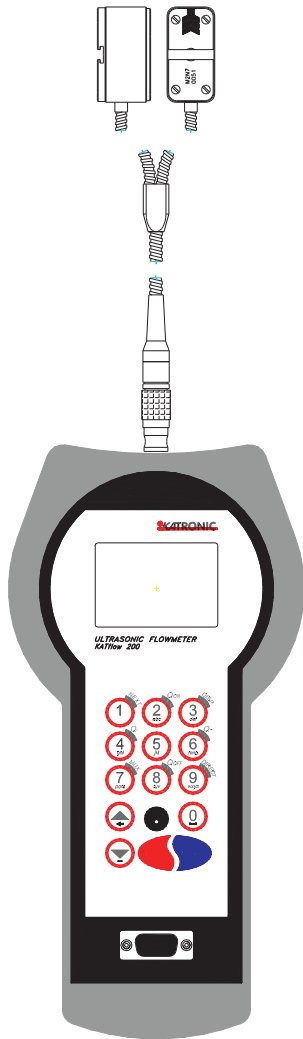


Transducer pair type K4 with ODU connector



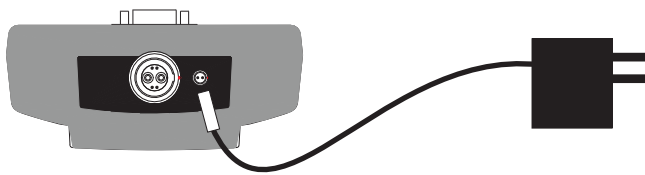
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**Electrical interconnection diagram**



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Flow measurement configuration



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Battery charging

## Ordering information

**KF200** Hand-held ultrasonic flowmeter KATflow 200, single flow channel, serial interface RS 232 including operating instructions

### Configuration

- 0 Basic unit without accessories
- 1 With standard accessories including crush-proof transport case IP67, power adapter/battery charging unit and measuring tape
- 2 With backpack, power adapter/battery charging unit and measuring tape
- Z Special (please consult factory)

### Internal code

xx Version

#### Power adapter

- 0 Without
- 1 UK
- 2 US
- 3 Europe
- Z Special (please consult factory)

#### Degree of protection

- 1 IP 65 (standard)
- 2 IP 67 transport case with external sensor connections
- Z Special (please consult factory)

#### Internal data logger

- 0 No internal data logger
- 1 Standard 30,000 samples, including data download software KATdata and RS 232 cable
- 2 Extended 100,000 samples, including data download software KATdata and RS 232 cable
- Z Special (please consult factory)

#### Wall thickness measurement (WTM)

- 0 Without
- 1 With wall thickness probe NT including cable

#### Optional items

- BA Spare battery set and external battery charging unit
- US USB cable
- ZZ Special options (please specify)

**KF200 - 1 - 01 - 1 - 1 - 1 - 0 / \*** typical Order Code

/ \* ... Leave blank for no optional items

**Pipe diameter range**

K1 Transducer pair, pipe diameter range 50 ... 3000 mm

K4 Transducer pair, pipe diameter range 10 ... 250 mm

Z Special

**Temperature range**

L Process temperature -30 ... 80 °C, including acoustic coupling component

N Process temperature -30 ... 130 °C, including acoustic coupling component

E Process temperature -30 ... 200 °C, including acoustic coupling component

Z Special, process temperature up to 500 °C (please consult factory)

**Internal code**

x Version

**Degree of protection**

1 Degree of protection IP 66 (standard)

2 Degree of protection IP 67 (please consult factory for availability)

3 Degree of protection IP 68 (please consult factory for availability)

**Transducer accessories**

00 No mounting accessories

40 With clips and chains DN 15 ... DN 310

50 With clips and chains DN 25 ... DN 600

60 With clips and chains DN 25 ... DN 1200

80 With mounting fixture, rail and magnets DN 10 ... 250 (optional for K4-type sensors only)

90 With mounting fixture, rail and magnets DN 50 ... 3000 (optional for K1-type sensors only)

Z Special mounting accessories (please consult factory)

**Electrical connection and cable length**

P *With ODU connector (for portable units)*

E000 Without cable extension

E005 With cable extension, 5 m length

E010 With cable extension, 10 m length

E\_\_\_ With extension cable, special (specify in m)

Z *Special (please consult factory)*

xxxx

**Options**

CA 5-point calibration with certificate

**K1 N - 1 - 1 - 20 - P - E000 / \* typical Order Code**

/ \* ... Leave blank for no optional items