

Ultrasonic Flowmeter KATflow 230

- Transit-time correlation measurement
- Dual DSP-technology, coded signals for better measurement accuracy
- Two channel portable unit with graphic display
- Easy to install clamp-on sensors with no process interruption
- Non-invasive flow measurement of liquids or liquified gases
- Optional wall thickness, heat quantity and sound velocity measurement
- Suitable for all commonly used pipe materials with pipe diameters from 10 mm (4/10") to 6.5 m (256")



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 230 is designed for portable use to meet the needs of the Service/Maintenance and Commissioning Engineer wishing to check the flow rate at different locations in the plant. The set-up of the unit is simple through a setup wizard 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 KATflow 230 can be applied to any type of standard pipe carrying clean or dirty liquids and liquified gases.

Advantages

- **Low installation effort and costs**
- **Measurement is independent of fluid conductivity**
- **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
Flow velocity range :	0.01 ... 25 m/s
Resolution :	0.25 mm/s
Repeatability :	0.15 % of measured value ± 0.015 m/s
Accuracy :	<i>Volume flow</i> ±1 ... 3 % of measured value depending on application, ±0.5 % of measured value with process calibration <i>Flow velocity</i> ±0.5 % of measured value
Turn down ratio :	1/100
Gaseous and solid content of liquid media :	< 10 % of volume

Flowmeter

Enclosure :	Portable
Degree of protection :	IP 65 according EN 60529
Operating temperature :	-10 ... 60 °C (14 ... 140 °F)
Housing material :	Extruded aluminium, Al MG Si 0.5, lids die-cast zinc alloy GD-Zn AL 4 CU 1
Flow channels :	2
Power supply :	Internal rechargeable batteries, 8 x NiMH AA 2850 mAh or external power supply 9 V DC
Display :	LCD graphic display, 128 x 64 dots, backlit
Dimensions :	H 266 x W 168 x D 37 mm
Weight :	Approx. 2.0 kg

Flowmeter (cont.)

Power consumption	: < 5 W
Signal damping	: 0 ... 99 s
Measurement rate	: 10 ... 1000 s ⁻¹
Operating languages	: English, German, French, Spanish, Russian
Response time	: 1 s, faster rates upon request
Calculation functions	: Average/difference/sum

Quantity and units of measurement

Volumetric flow rate	: m ³ /h, m ³ /min, m ³ /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
Flow velocity	: m/s, ft/s, inch/s
Mass flow rate	: g/s, t/h, kg/h, kg/min
Volume	: m ³ , l, gal (US gallons), bbl
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. 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, 07, Linux Mac (optional)

Process inputs	: Galvanically isolated from main electronics and from other I/O's
Temperature	: PT 100, four-wire circuit, measuring range -50 ... 400 °C, resolution 0.1 K, accuracy ±0.2 K

Process outputs	: Galvanically isolated from main electronics and from other I/O's
Current	: 0 ... 20 mA, active ($R_{Load} < 500 \Omega$), 16 bit resolution, U = 30 V, accuracy 0.1 %

Digital (Open-Collector)	: Totaliser, value 0.01 ... 1000/unit, width 30 ... 999 ms, U = 24 V, I _{max} = 4 mA
Digital (relay)	: Alarm, fault (programmable) Form C (SPDT-CO) contacts, U = 48 V, I _{max} = 250 mA

Clamp-on sensors

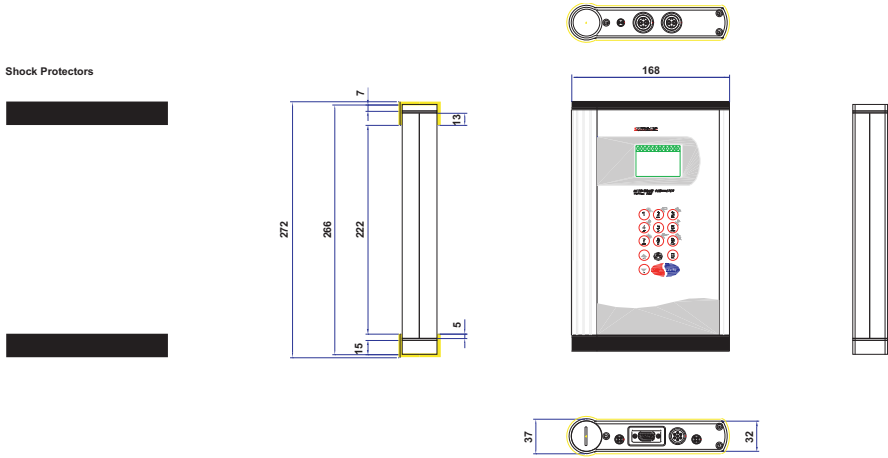
Type K1L, K1N, K1E

Diameter range	: 50 ... 3000 mm for type K1N/E, 50 ... 6500 mm for type K1L
Dimensions	: 60 x 30 x 34 mm
Material	: Stainless steel
Temperature range	: <i>Type K1L</i> : -30 ... 80 °C (-22 ... 176 °F) <i>Type K1N</i> : -30 ... 130 °C (-22 ... 266 °F) <i>Type K1E</i> : -30 ... 200 °C (-22 ... 392 °F), for short periods up to 300 °C (572 °F)
Degree of protection	: IP 66 acc. EN 60529, IP 67 and IP 68 optional
Cable lengths	: K1N and K1E = 4 m, K1L = 10 m

Type K1L, K4N, K4E

Diameter range	: 10 ... 250 mm
Dimensions	: 43 x 18 x 22 mm
Material	: Stainless steel
Temperature range	: <i>Type K4L</i> : -30 ... 80 °C (-22 ... 176 °F) <i>Type K4N</i> : -30 ... 130 °C (-22 ... 266 °F) <i>Type K4E</i> : -30 ... 200 °C (-22 ... 392 °F), for short periods up to 300 °C (572 °F)
Degree of protection	: IP 66 acc. EN 60529, IP 67 and IP 68 optional
Cable lengths	: K1N and K1E = 2.5 m, K1L = 10 m

Flowmeter



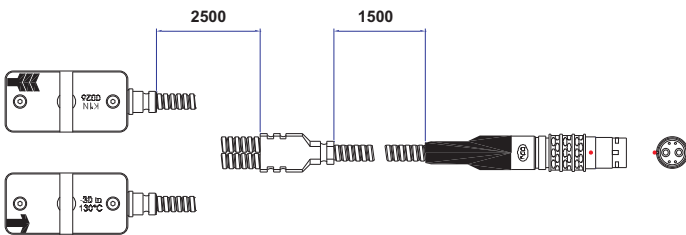
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Portable ultrasonic flowmeter KATflow 230 - General arrangement

Clamp-on sensors



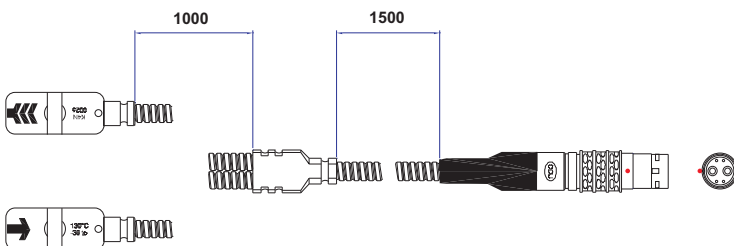
Transducer pair type K1 with ODU connector



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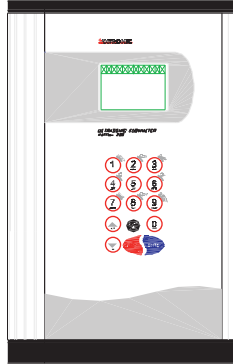
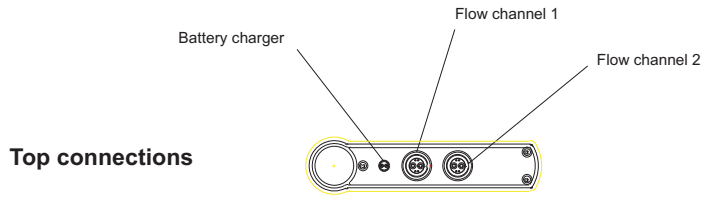


Transducer pair type K4 with ODU connector

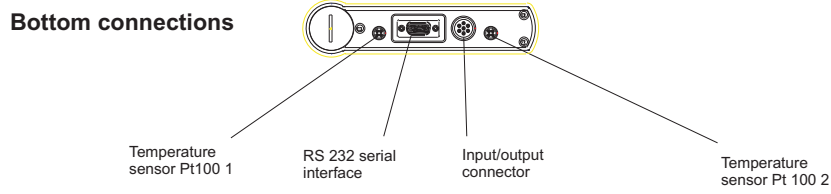


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Electrical connections



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Ordering information

KF230 Portable ultrasonic flowmeter KATflow 230, two flow channels, serial interface RS 232 including operating instructions

Configuration

- 0 Basic unit without accessories
- 1 With standard accessories including crush-proof transport case IP 67, power adapter/battery charging unit and measuring tape
- 2 With softcase, power adapter/battery charging unit and measuring tape

Internal code

x 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

Process outputs

Analogue output

- N Without
- C1 1 x current output 0 ... 20 mA, active (source)
- Z Special (please consult factory)

Digital output, Open-Collector

- N Without
- D1 1 x digital output, Open-Collector
- Z Special (please consult factory)

Digital output, relay

- N Without
- R1 1 x digital output, relay
- Z Special (please consult factory)

Process inputs

- N Without
- A2 2 x PT100 temperature input
- Z Special (please consult factory)

Internal data logger

- 0 Without
- 1 Standard 30,000 samples including SW KATdata+, RS 232 cable
- 2 Extended 100,000 samples including SW KATdata+, RS 232 cable
- Z Special (please consult factory)

Wall thickness measurement (WTM)

- 0 Without
- 1 With wall thickness probe NT including cable
- Z Special (please consult factory)

Heat quantity measurement (HQM)

- 0 Without
- 1 With HQM, including 2 x PT100 clamp-on sensors *)
- Z Special (please consult factory)

Sound velocity measurement (SVM)

- 0 Without
- 1 With SVM
- Z Special (please consult factory)

Options

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

KF230 - 2 - 1 - 1 - 1 - C1 D1 N - A2 - 1 - 1 - 0 - 0 / * typical Order Code

/ * ... Leave blank for no optional items

*) ... Selection of process input option A2 (2 x PT100 temperature input) required

Pipe diameter range

K1 Transducer pair, pipe diameter range 50 ... 3000 mm (K1N, K1E), 50 ... 6500 mm (K1L)

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