KATflow 100

Standard Clamp-On Ultrasonic Flow Transmitter

SMALL. SIMPLE. STURDY.

The KATflow 100 is a compact clamp-on ultrasonic flow transmitter with a robust and practical design for permanent installation and flow measurement on single pipes. The instrument offers a cost-effective option owing to its simplified specification and the availability of a range of transducer types. The varied functionality and simple operation of the KATflow 100 make it the perfect product for large projects and customer specific solutions.

Specification

- Pipe diameter range 10 mm to 3,000 mm
- Temperature range for sensors -30 °C to +80 °C (-22 °F to +176 °F)
- Weight 750 g
- Robust IP 66 aluminium enclosure
- Sturdy unit with LCD display and five-key keypad
- Wall or pipe mounted

Features

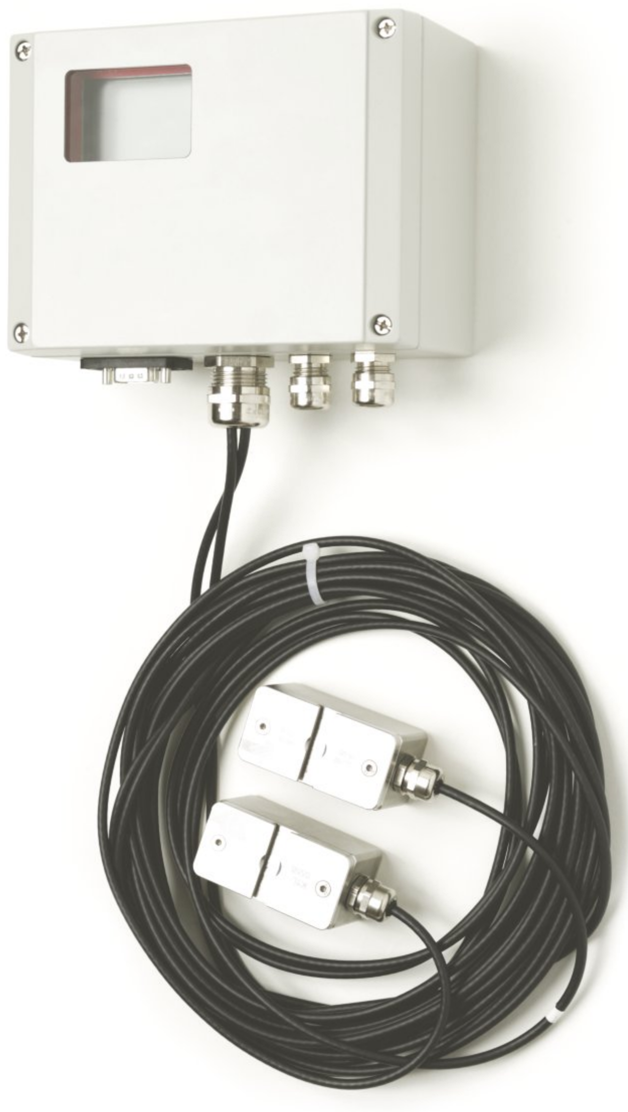
- Low cost of ownership
- Process outputs including RS 485, Modbus RTU and HART* compatible output
- PT100 inputs for heat quantity (thermal energy) measurement
- Bi-directional measurement with totaliser function
- Innovative installation wizard for quick and intuitive programming
- Configuration can be changed to suit customer requirements

Accessories

- Optional blind transmitters supplied pre-configured or with external programming tool
- Available with special "P" transducers for simple applications
- Optional PT100 sensors or analogue temperature inputs for heat quantity measurement and temperature compensation

Applications

- Water and wastewater measurements
- Replacement of electromagnetic flowmeters
- Monitoring and controlling of Heating, Ventilation and Air Conditioning (HVAC) systems
- Cost-effective solution for large scale projects
- Automated process control
- Shipping applications

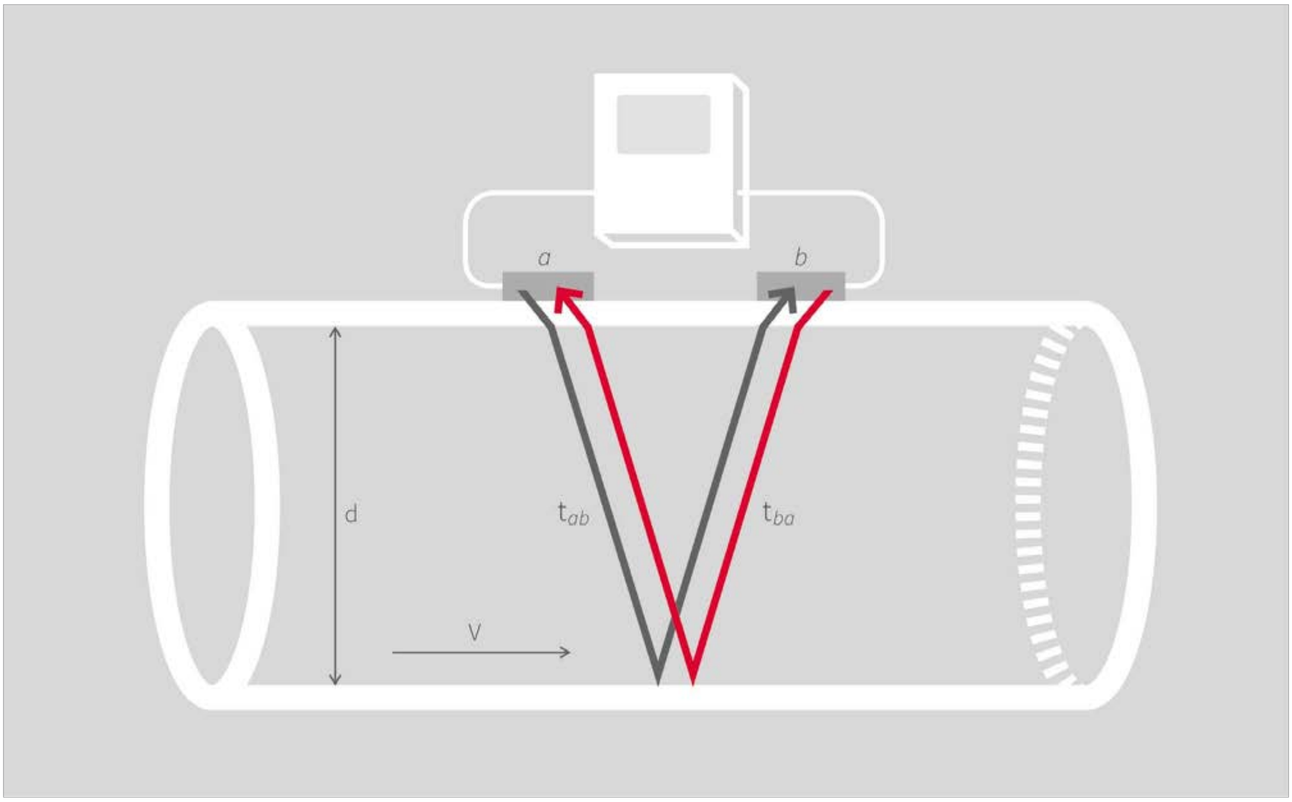


The Technology Behind the Measurement

The KATflow non-invasive flowmeters work on the transit time ultrasonic principle. This involves sending and receiving ultrasonic pulses from a pair of sensors and examining the time difference in the signal. Katronic uses clamp-on transducers that are mounted externally on the surface of the pipe and which generate pulses that pass through the pipe wall. The flowing liquid within causes time differences in the ultrasonic signals, which are then evaluated by the flowmeter to produce an accurate flow measurement.

The key principle of the method applied is that sound waves travelling with the flow will move faster than those travelling against it. The difference in the transit time of these signals is proportional to the flow velocity of the liquid and consequently the flow rate.

Since elements such as flow profile, type of liquid and pipe material will have an effect on the measurement, the flowmeter compensates for and adapts to changes in the medium in order to provide reliable results. The instruments can be used in a variety of locations, from measurements on submarines to installations on systems destined for use in space, and on process fluids as different as purified water in the pharmaceutical sector and toxic chemical effluent. The flowmeters will operate on various pipe materials and diameters over a range of 10 mm to 6,500 mm.

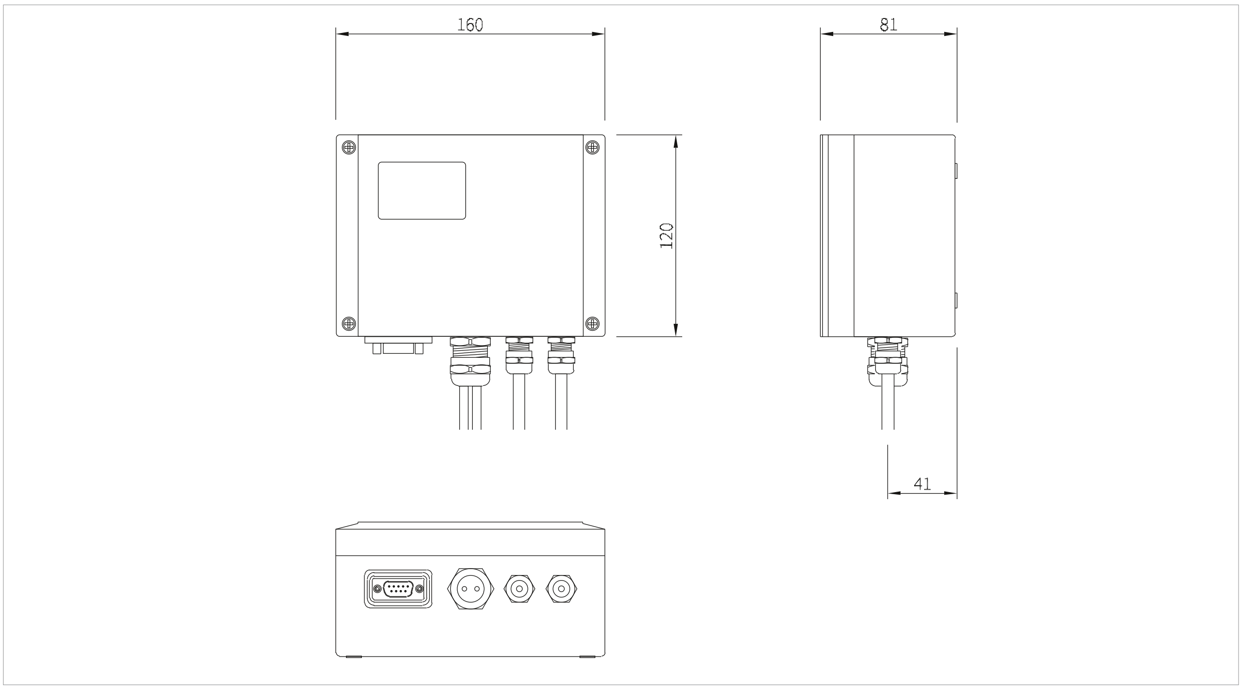


Technical Data: Transmitter

Performance

Measurement principle	Ultrasonic transit-time difference
Flow velocity range	0.01 ... 25 m/s
Resolution	0.25 mm/s
Repeatability	0.15 % of measured value, ±0.015 m/s
Accuracy	Volume flow: ±1 ... 3 % of measured value depending on application ±0.5 % of measured value with process calibration Flow velocity (mean): ±0.5 % of measured value
Turn down ratio	1/100 (equivalent to 0.25 ... 25 m/s)
Measurement rate	1 Hz (standard)
Response time	1 s (standard), 90 ms (optional)
Damping of displayed value	0 ... 99 s (selectable by user)
Gaseous and solid content of liquid media	< 10 % of volume

Images



KATflow 100 (dimensions in mm)

General

Enclosure type	Wall mounted, optional pipe stands and brackets available
Degree of protection	IP 66 according to EN 60529
Operating temperature	-10 ... +60 °C (+14 ... +140 °F)
Housing material	Die-cast aluminium
Measurement channels	1
Power supply	100 ... 240 V AC, 50/60 Hz 9 ... 36 V DC Special solutions (e.g. solar panel, battery) on request
Display	LCD graphic display, 128 x 64 dots, backlit
Dimensions	120 (h) x 160 (w) x 81 (d) mm (without cable glands)
Weight	Approx. 750 g
Power consumption	< 5 W
Operating languages	English, French, German, Dutch, Spanish, Italian, Russian, Czech, Turkish, Romanian (others on request)

Communication

Type	RS 232 (used for external programming and data transfer), USB cable (optional), Modbus RTU (optional)
Transmitted data	Measured and totalised value, parameter set and configuration, logged data

Images

KATflow 100

KATflow 100 in operation

KATdata+ software

Functionality	Download of measured values/parameter sets, graphical presentation, list format, export to third party software, online transfer of measured data
Operating systems	Windows 8, 7, Vista, XP, NT, 2000 Linux

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 (with heat quantity measurement option)
Heat quantity	J, kJ, kW/h (with heat quantity measurement option)
Temperature	°C (with heat quantity measurement option)

Process inputs (galvanically isolated)

Temperature	PT100 (clamp-on sensors), three- or four-wire circuit, measurement range: -30 ... +250 °C (-22 ... +482 °F), resolution: 0.1 K, accuracy: ±0.2 K
Current	0/4 ... 20 mA active or 0/4 ... 20 mA passive, U = 30 V, R_i = 50 Ω, accuracy: 0.1 % of measured value

Process outputs (galvanically isolated)

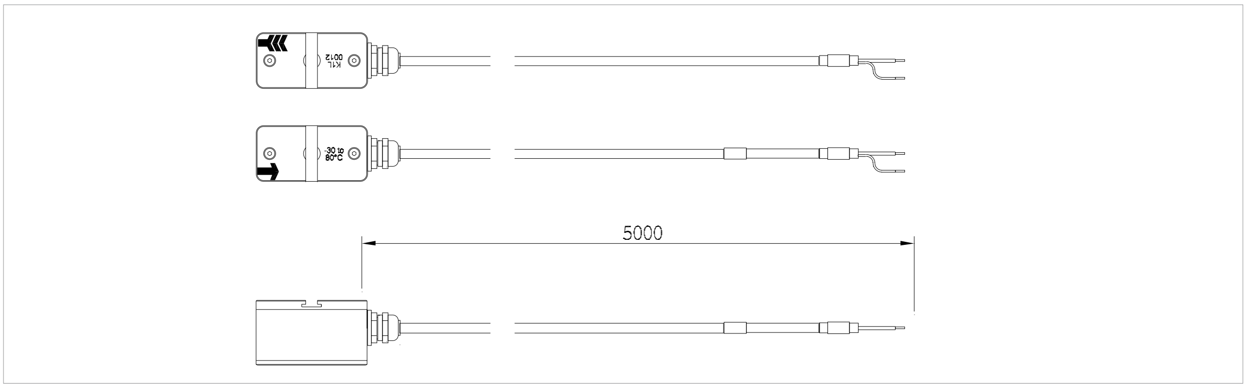
Current	0/4 ... 20 mA active/passive (R_{Load} < 500 Ω), 16 bit resolution, U = 30 V, accuracy: 0.1 %
Digital open-collector	Value: 0.01 ... 1000/unit, width: 1 ... 990 ms, U = 24 V, I_{max} = 4 mA
Digital relay	2 x Form A SPST (NO and NC), U = 48 V, I_{max} = 250 mA
Voltage	0 ... 10 V, R_{Load} = 1000 Ω
Frequency	2 Hz ... 10 kHz, 24 V/4 mA
HART* compatible	0/4 ... 20 mA, 24 V DC, R_{GND} = 220 Ω

Technical Data: Transducers

K1P, K1L

Pipe diameter range	50 ... 500 mm for type K1P 50 ... 3,000 mm for type K1L
Dimensions of sensor heads	Type K1P: 40 (h) x 30 (w) x 30 (d) mm Type K1L: 60 (h) x 30 (w) x 35 (d) mm
Material of sensor heads	Type K1L: Stainless steel Type K1P: Plastic
Material of cable conduits	Type K1P/L: PVC
Temperature range	Type K1P: -20 ... +50 °C (-4 ... +122 °F) Type K1L: -30 ... +80 °C (-22 ... +176 °F)
Degree of protection	IP 66 according to EN 60529 (IP 67 and IP 68 on request)
Standard cable lengths	Type K1P/L: 5.0 m

Images



K1L transducers

K1P transducers

Fixed
Installation

-30 °C +80 °C

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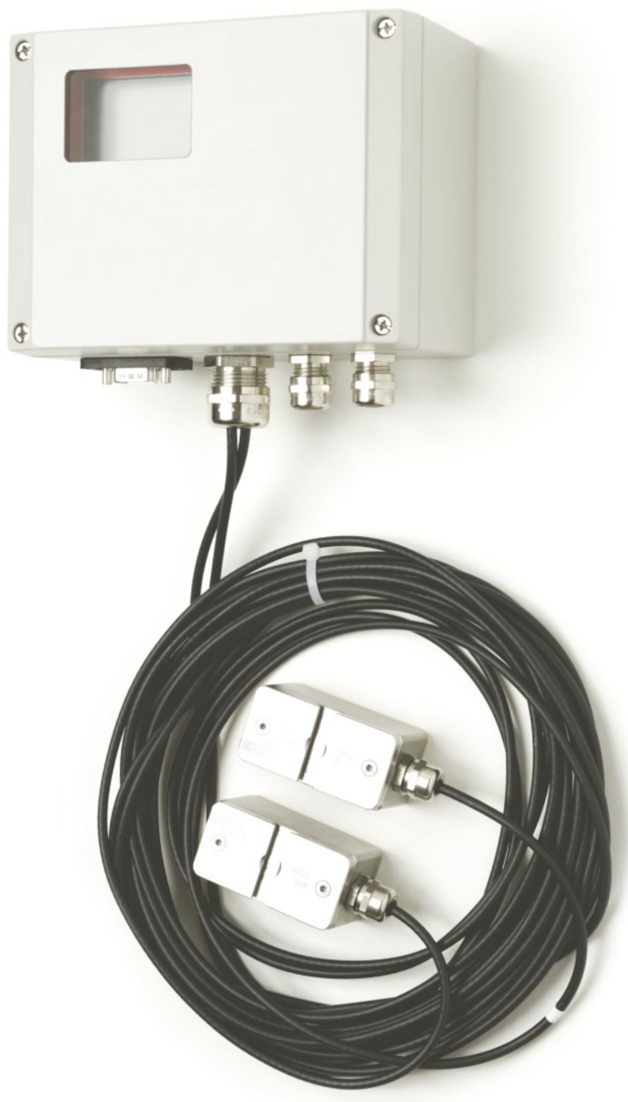

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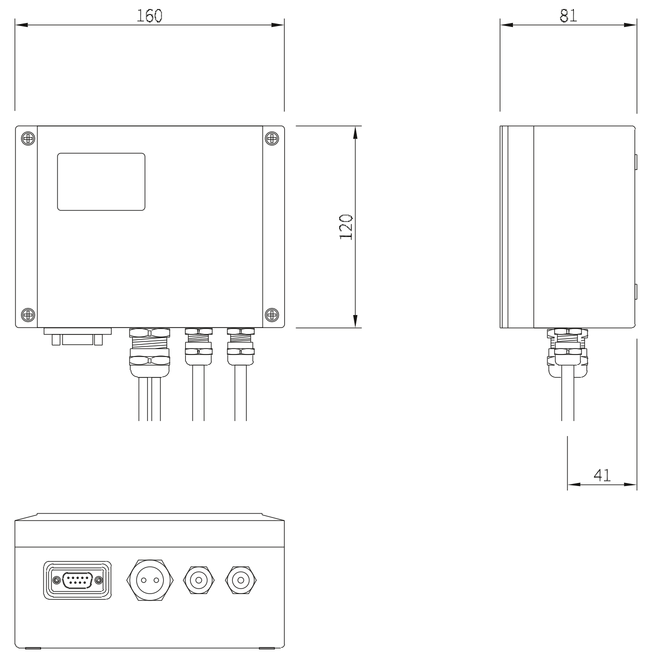

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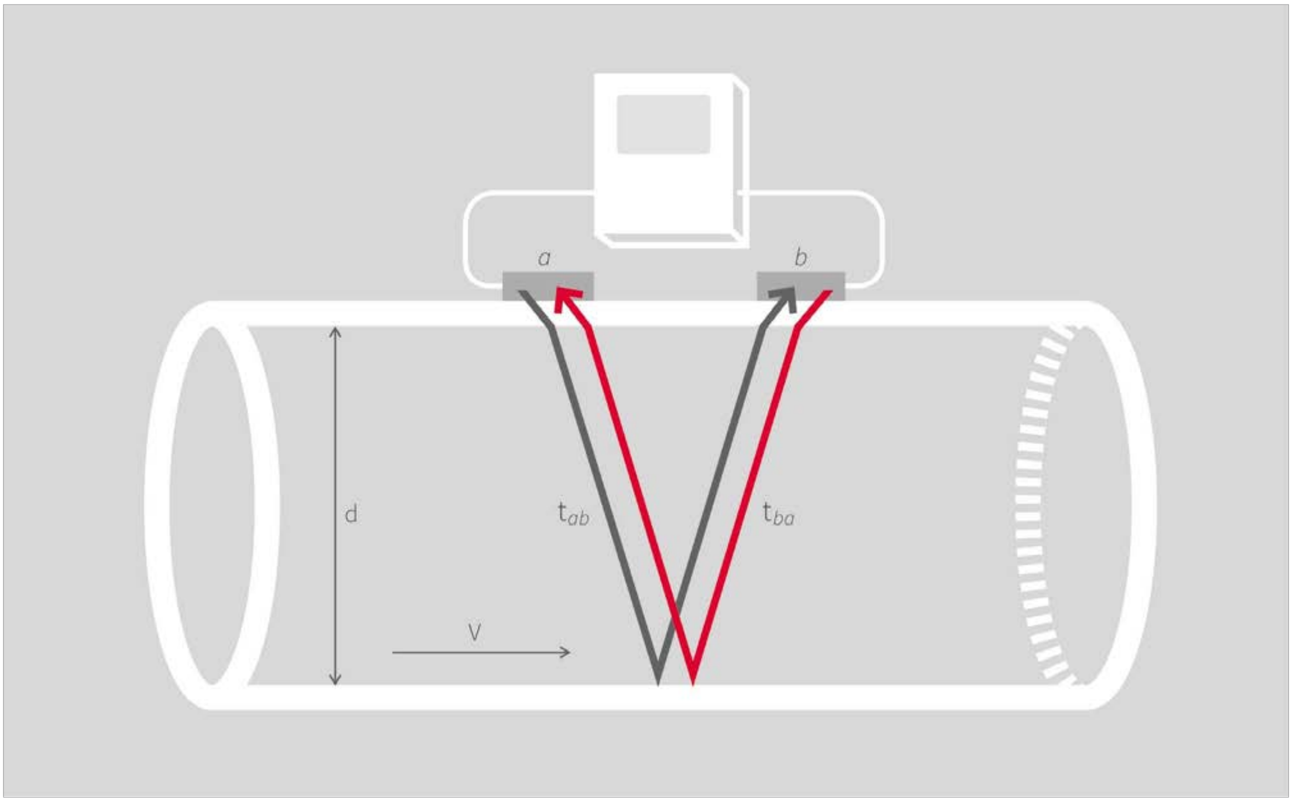

Sensors *a* and *b* work alternately to send and receive ultrasonic pulses. The sound waves *ab* travelling with the flow move faster than those travelling against it *ba*.