



Water



GWF



KATflow 230

Mobile Clamp-On ultrasonic flow meter

Powerful. Practical. Portable.

The KATflow 230 is easily portable but incorporates an advanced specification for situations which require comprehensive measurement features coupled with easy operation. The flow meter has two measurement channels, which allow it to monitor two pipes simultaneously or to improve accuracy in non-ideal conditions. The KATflow 230 can also be supplied with a variety of options to meet the most diverse application requirements.

Specification

- Pipe diameter range 10 mm to 3000 mm
- Temperature range for sensors -30 °C to +250 °C (-22 °F to +482 °F)
- Robust IP 65 aluminium enclosure
- Selectable three-line LCD display and full keypad
- Battery life up to 24 hours with easily replaceable battery cartridge
- Measurement of two flows simultaneously

Features

- Dual flow monitoring with sum, average, difference and maximum calculations
- PT100 inputs for heat quantity (thermal energy) measurement
- Process output options including current, open-collector, relay
- Large data logger and software for sampling and data transfer
- Stainless steel sensors, cable and connectors as standard

Accessories

- Available with crush-proof IP 67 transport case or lightweight soft case
- Expansion box for additional input or output configuration and special solutions
- Optional pipe wall thickness gauge
- Special waterproof solution available for harsh environmental conditions
- Software for data evaluation

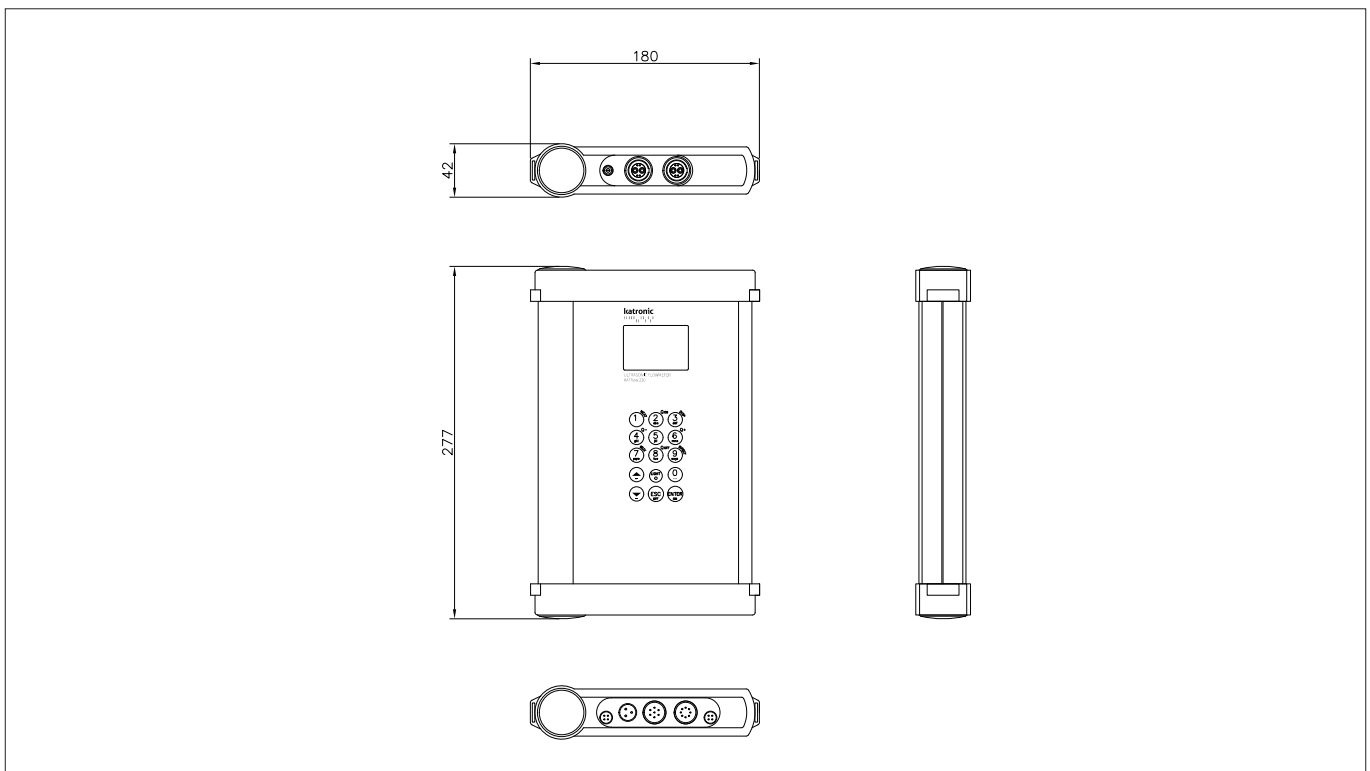
Applications

- Heating, Ventilation and Air Conditioning (HVAC) measurements
- Large pipe measurement with two sensor pairs in 'X' configuration
- Temporary replacement of conventional in-line flowmeters
- Building surveys on large facilities
- Efficiency monitoring of heat exchangers

Flowmeter

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: $\pm 1 \dots 3$ % 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	100 Hz (standard)
Response time	1 s
Damping of displayed value	0 ... 99 s (selectable by user)
Gaseous and solid content of liquid media	< 10 % of volume



KATflow 230 (dimensions in mm)

General

Enclosure type	Portable
Degree of protection	IP 65 according to 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
Measurement channels	1 or 2
Calculation functions	Average, difference, sum, maximum (dual-channel use only)
Power supply	Internal rechargeable batteries: 8 x NiMH AA 2850 mAh Power adapter: 100 ... 240 V AC input, 9 V DC output External battery pack: 12 V 105 Ah, 25 kg (optional)
Operating time	Up to 24 h with fully charged internal batteries
Display	LCD graphic display, 128 x 64 dots, backlit
Dimensions	266 (h) x 168 (w) x 37 (d) mm
Weight	Approx. 2.0 kg
Power consumption	< 5 W
Operating languages	English, French, German, Dutch, Spanish, Italian, Russian, Czech, Turkish, Romanian (others on request)

Communication

Type	RS 232, USB cable (optional)
Transmitted data	Measured and totalised value, parameter set and configuration, logged data



KATflow 230 in crush-proof IP 67 transport case



KATflow 230 in operation

Internal data logger

Storage capacity	Approx. 30,000 measurements (each comprising up to 10 selectable measurement units), logger size 5 MB Approx. 100,000 measurements (each comprising up to 10 selectable measurement units), logger size 16 MB (on request)
Logged data	All measured and totalised values, parameter sets

Software KATdata+

Functionality	Download of measured values/parameter sets, graphical presentation, list format, export to third party software, online transfer of measured data
Operating systems	Windows 10, 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 (two or four inputs available)
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Process outputs* (galvanically isolated)

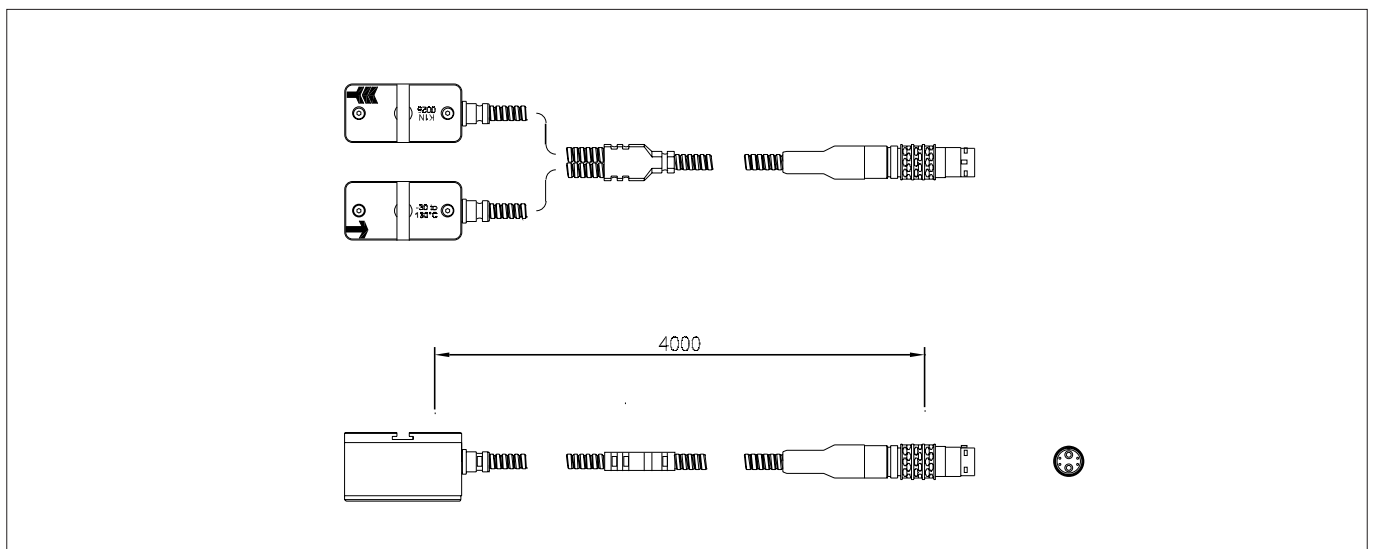
Current	0/4 ... 20 mA active ($R_{Load} < 500 \Omega$), 16 bit resolution, U = 30 V, accuracy: 0.1 %
Digital open-collector	Value: 0.01 ... 1000/unit, width: 1 ... 990 ms, U = 24 V, $I_{max} = 4 \text{ mA}$
Digital relay	Form A SPST (NO), U = 48 V, $I_{max} = 250 \text{ mA}$

* Further process outputs available on application.

Transducers

K1L, K1N, K1E

Pipe diameter range	50 ... 3000 mm
Dimensions of sensor heads	60 (h) x 30 (w) x 34 (d) mm
Material of sensor heads	Stainless steel
Material of cable conduits	Type K1L: PVC Type K1N/E: Stainless steel
Temperature range	Type K1L: -30 ... +80 °C (-22 ... +176 °F) Type K1N: -30 ... +130 °C (-22 ... +266 °F) Type K1E: -30 ... +250 °C (-22 ... +482 °F) (for short periods up to +300 °C (+572°F))
Degree of protection	IP 66 according to EN 60529 (IP 67 and IP 68 on request)
Standard cable lengths	Type K1L: 5.0 m Type K1N/E: 4.0 m



K1N/E transducers



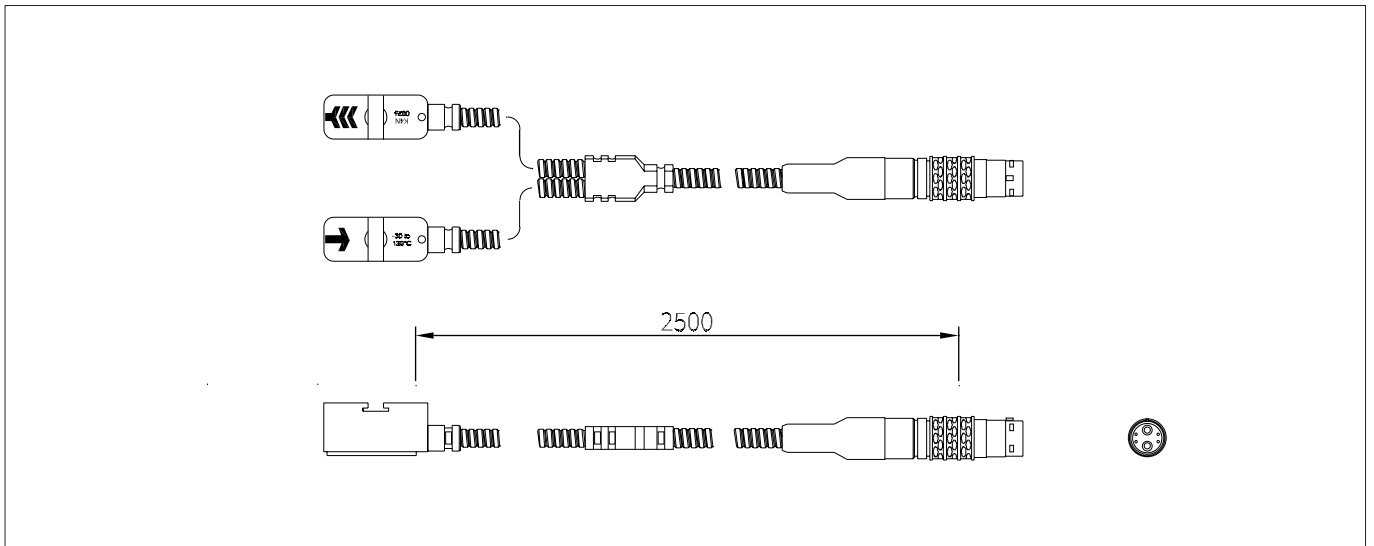
K1L transducers



K1N/E transducers with ODU/LEMO connector

K4L, K4N, K4E

Pipe diameter range	10 ... 250 mm for type K4N/E 10 ... 250 mm for type K4L
Dimensions of sensor heads	43 (h) x 18 (w) x 22 (d) mm
Material of sensor heads	Stainless steel
Material of cable conduits	Type K4L: PVC Type K4N/E: Stainless steel
Temperature range	Type K4L: -30 ... +80 °C (-22 ... +176 °F) Type K4N: -30 ... +130 °C (-22 ... +266 °F) Type K4E: -30 ... +250 °C (-22 ... +482 °F) (for short periods up to +300 °C (+572°F))
Degree of protection	IP 66 according to EN 60529 (IP 67 and IP 68 on request)
Standard cable lengths	Type K4L: 5.0 m Type K4N/E: 2.5 m



K4N/E transducers



K4L transducers



K4N/E transducers with ODU/LEMO connector

Transducer mounting accessories

General

Diameter range and mounting types

Clamping set (metal strap with screw), stainless steel:

DN 10 ... 40

Clips and chains, chain length 1 m, stainless steel:

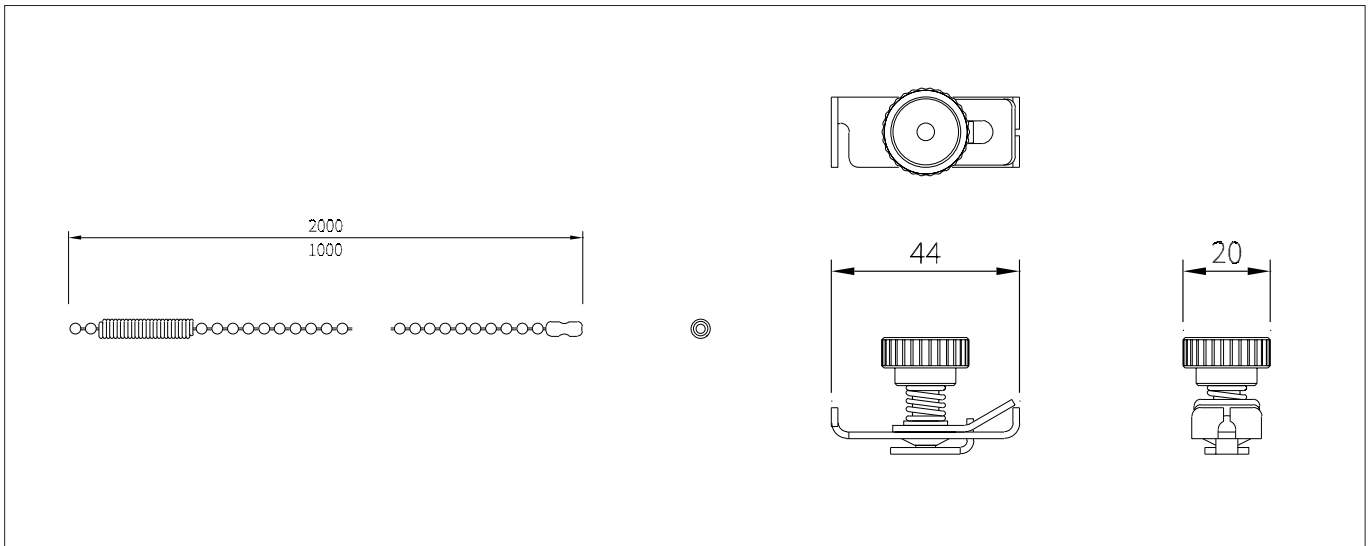
DN 15 ... 310

Clips and chains, chain length 2 m, stainless steel:

DN 25 ... 600

Clips and chains, chain length 4 m (2 x 2 m), stainless steel:

DN 25 ... 1,200



Mounting clip and chains for use with portable flowmeter



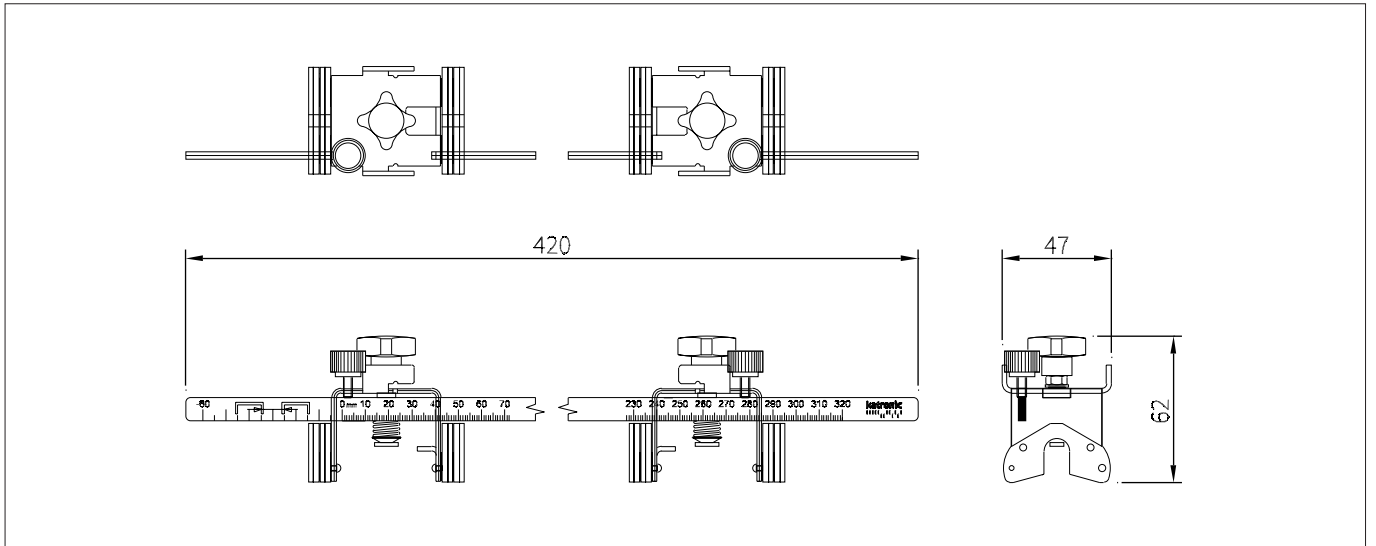
Mounting clip



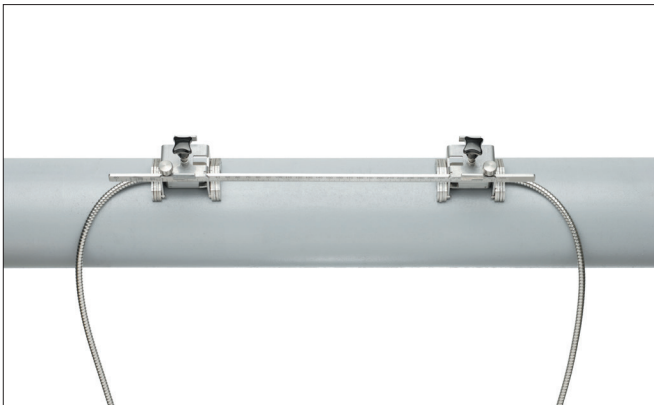
Transducers mounted using chains and clips

General

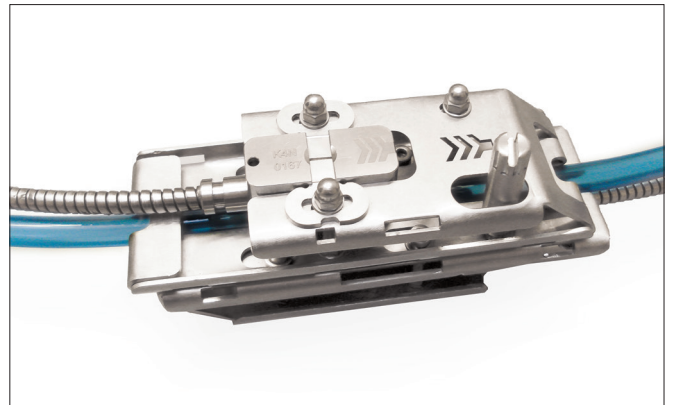
Diameter range and mounting types	Mounting fixture, rail and magnets (for type K4): DN 10 ... 250 Mounting fixture, rail and magnets (for type K1): DN 50 ... 3000
Mounting fixture for flexible hoses	Custom made mounting bracket, stainless steel (available on request)



Mounting fixture, rail and magnets



Mounting fixture, rail and magnets

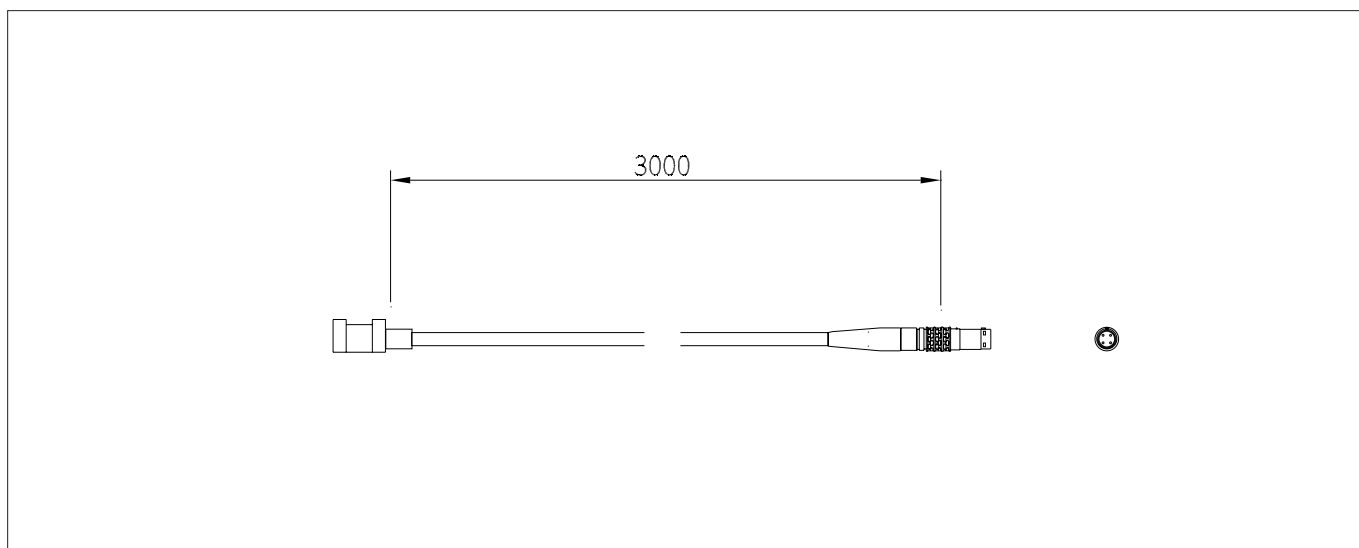


Example of mounting fixture for flexible hoses

PT100 Clamp-On sensors

General

Type	PT100 (Clamp-On sensors)
Measurement range	-30 ... +250 °C (-22 ... +482 °F)
Circuits	4-wire
Accuracy T	$\pm[0.15 \text{ °C} + 2 \times 10^{-3} \times T \text{ [°C]}]$, class A
Accuracy ΔT	$\leq 0,1 \text{ K}$ ($3 \text{ K} < \Delta T < 6 \text{ K}$) corresponding to EN 1434-1
Response time	50 s
Dimensions of sensor heads	20 (h) x 15 (w) x 15 (d) mm
Material of sensor heads	Aluminium
Material of cable jacket	PTFE
Cable length	3.0 m



PT100 transducer



PT100 transducer fixed to pipe



KATflow 230 with PT100 transducer

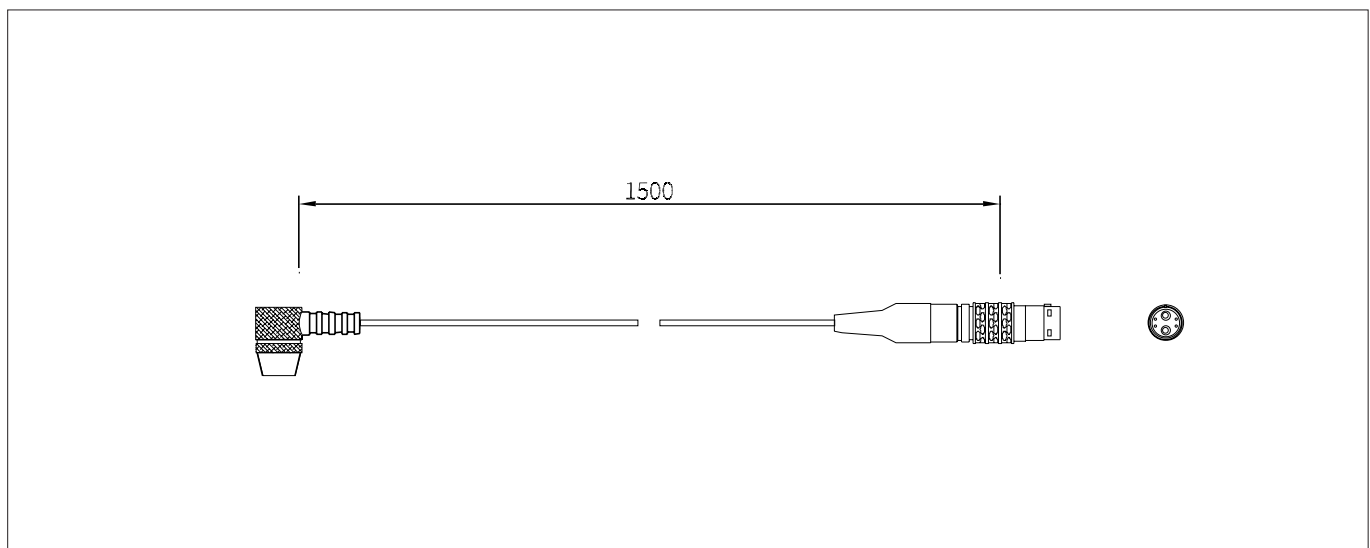
Wall thickness gauges (optional)

Wall thickness gauge NT

Temperature range	-20 ... +100 °C [-4 ... +212 °F]
Measuring range	1.0 ... 200 mm
Resolution	0.01 mm
Linearity	0.1 mm
Cable length	1.5 m

Wall thickness gauge HT

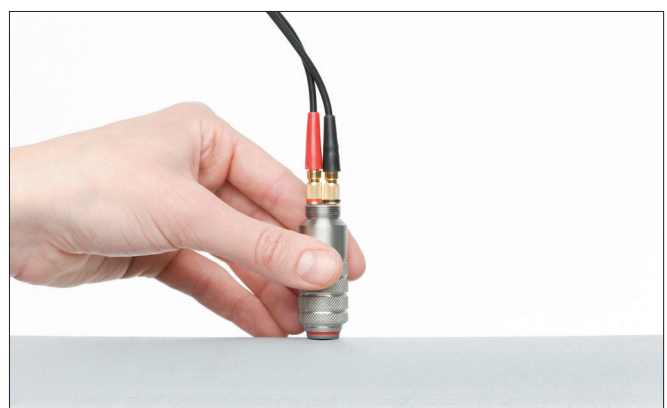
Temperature range	0 ... +500 °C [+32 ... +932 °F]
Measuring range	1.0 ... 200 mm
Resolution	0.01 mm
Linearity	0.1 mm
Cable length	1.5 m



Wall thickness gauge NT



Wall thickness gauge NT in use



Wall thickness gauge HT in use

Transport accessories

Crush-proof transport case

Dimensions (external)	190 (h) x 480 (w) x 385 (d) mm
Weight (empty)	3.71 kg
Degree of protection	IP 67 according to EN 60529
Outside material	Polypropylene/resin compound
Inside material	High-density polyurethane foam

Soft transport case

Dimensions (external)	175 (h) x 450 (w) x 320 (d) mm
Weight (empty)	750 g
Degree of protection	No IP rating
Outside material	Nylon
Inside material	Nylon



Crush-proof IP 67 transport case



KATflow 230 soft transport case

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printed in
switzerland

Subject to modification, 20.11.2020 – EPe60109