KATflow 210

Integrated Clamp-On Ultrasonic Flowmeter

ROUGH. ROBUST. REMOTE.

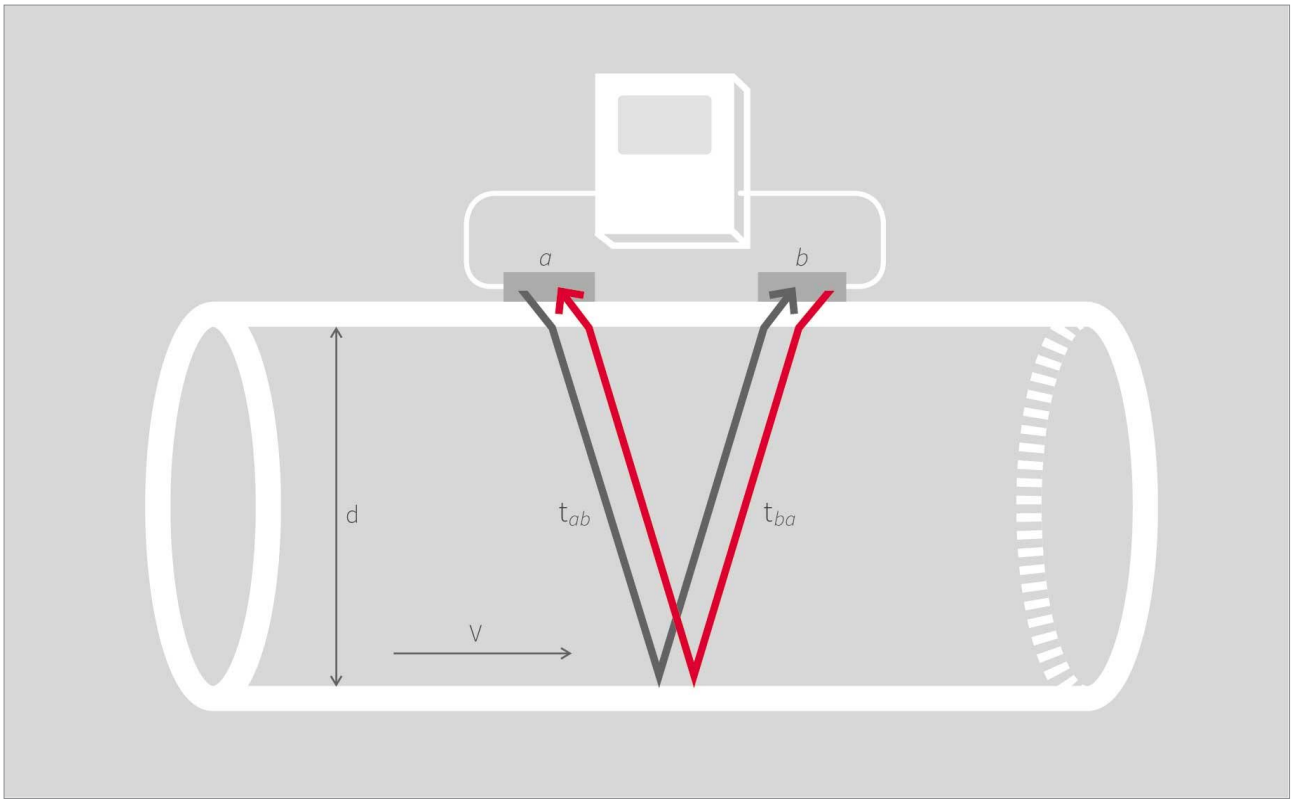
The KATflow 210 is a portable flowmeter designed for situations which require a reliable flow measurement regardless of the conditions in which it needs to be operated. With its advanced battery technology and durable waterproof housing the instrument is intended for long-term installation in remote areas where access to power is limited and exposure to the worst of elements is likely. This device has been further enhanced by the inclusion of a specially manufactured IP 68 version of the K1N stainless steel transducers which increases shock protection and ensures this ruggedised package provides the perfect balance of reliability, robustness and autonomy.

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.



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*.

SPECIFICATION

- Pipe diameter range 25 mm to 2,500 mm
- Temperature range for sensors
  -30 °C to +130 °C (-22 °F to +266 °F)
- Rugged integrated IP 67 portable design
- Weight 6 kg
- Selectable three-line LCD display and full keypad
- Battery life up to 100 days with rapid charging

FEATURES

- Three different operating modes to maximise battery life
- Process output options including current, open-collector, relay
- Compact housing 260 (h) x 280 (w) x 200 (d) mm
- IP 68 stainless steel sensors, cable and connectors as standard
- Large data logger and software for sampling and data transfer
- Innovative installation wizard for quick and intuitive programming

ACCESSORIES

- Optional wireless data transmission
- KATdata+ software for data evaluation
- Optional pipe wall thickness gauge

APPLICATIONS

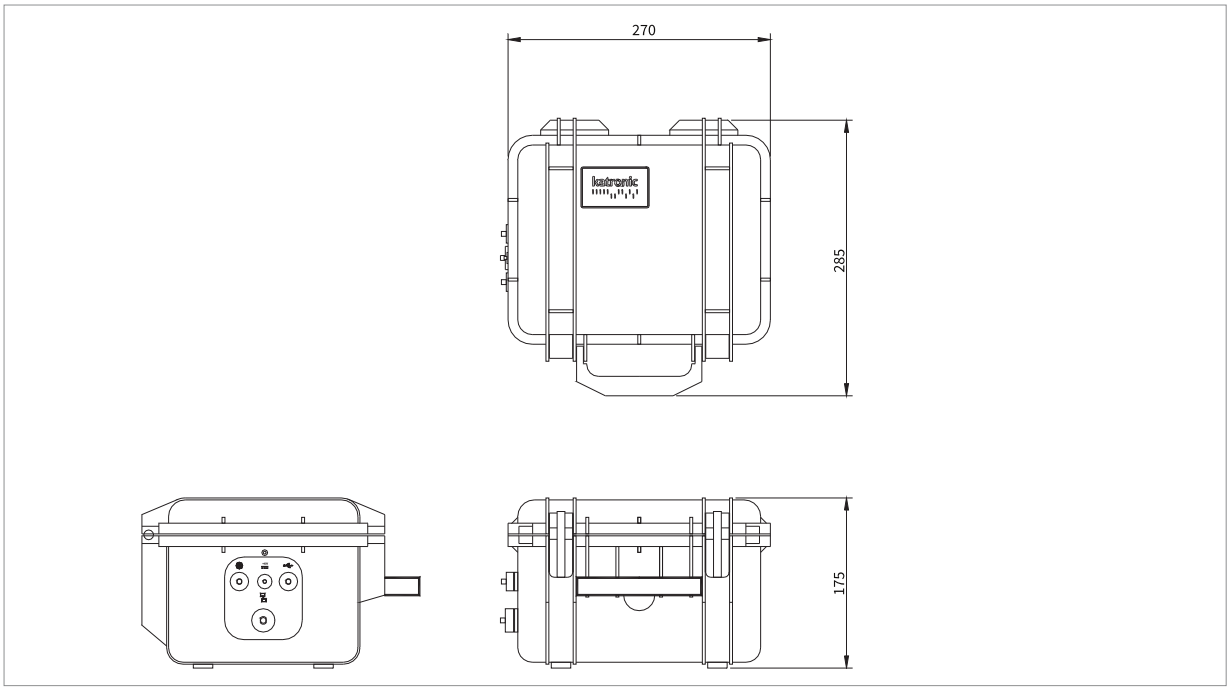
- Long-term leakage surveys
- Metering in pits, wells and areas where flooding is likely
- In-line flowmeter inspection verification
- Metering of pipes in exposed locations
- Temporary replacement of conventional in-line flowmeters

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: ±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	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

Images



KATflow 210 (dimensions in mm)

General

Enclosure type	Portable
Degree of protection	IP 67 according to EN 60529
Operating temperature	-10 ... +60 °C (+14 ... +140 °F)
Housing material	Polyproylene Copolymer
Measurement channels	1 standard (2 on request)
Calculation functions	*Average*, *difference*, *sum, maximum* (dual-channel use only)
Power supply	1, 2 or 3 x LiFePo4 12.4 Ah Power adapter: 100 ... 240 V AC input, 9 V DC output
Operating time	1 battery pack - up to 7 days continuous operation, 30 days in saver mode* 2 battery packs - up to 14 days continuous operation, 60 days in saver mode* 3 battery packs - up to 21 days continuous operation, 100 days in saver mode*
Display	LCD graphic display, 128 x 64 dots, backlit
Dimensions	260 (h) x 280 (w) x 200 (d) mm
Weight	Approx. 6 kg
Operating languages	English, French, German, Dutch, Spanish, Italian, Russian, Czech, Turkish, Romanian (others on request)

* Based on normal operating conditions, with no process outputs enabled.

Images

Integrated IP 67 KATflow 210

KATflow 210 in operation

Communication

Type	USB cable
Transmitted data	Measured and totalised value, parameter set and configuration, logged data

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
Logged data	All measured and totalised values, parameter sets

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, kWh (with heat quantity measurement option)
Temperature	°C (with heat quantity measurement option)

Process outputs* (galvanically isolated)

Current	0/4 ... 20 mA active (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	Form A SPST (NO), U = 48 V, I_{max} = 250 mA

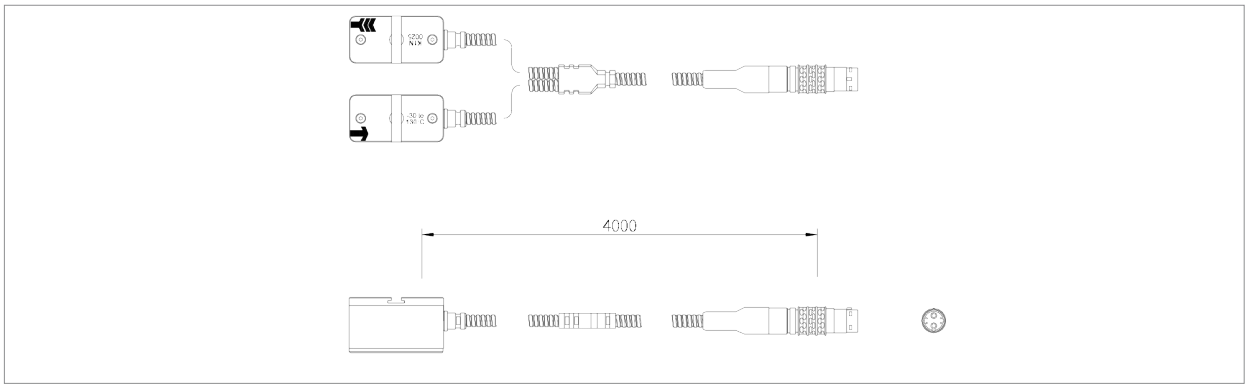
* Further process outputs available on application.

TRANSDUCERS

K1N

Pipe diameter range	25 ... 2,500 mm
Dimensions of sensor heads	60 (h) x 30 (w) x 34 (d) mm
Material of sensor heads	Stainless steel
Material of cable conduits	Stainless steel
Temperature range	-30 ... +130 °C (-22 ... +266 °F)
Degree of protection	IP 68 (1.5 m) according to EN 60529
Standard cable lengths	4.0 m

Images



K1N transducers

K1N transducers with ODU/LEMO connector

KATflow 210 output connectors

TRANSDUCER MOUNTING ACCESSORIES

General

Diameter range and mounting types

Clamping set (metal strap with screw),
stainless steel: DN 10 ... 40

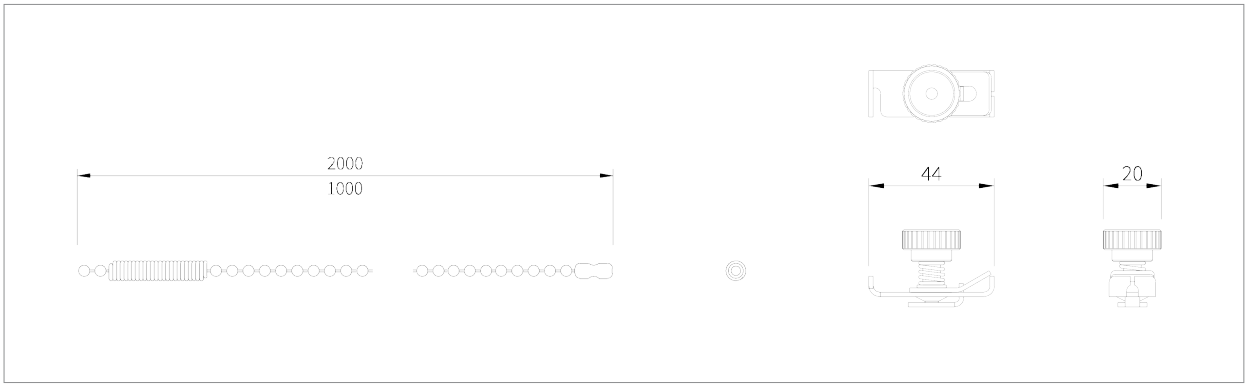
Clips and chains, chain length 1 m,
stainless steel: DN 15 ... 310

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

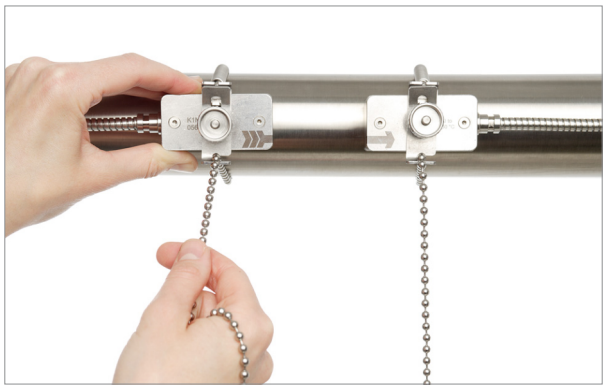
Textile tension straps, up to 15 m in length:
DN 1,000 ... 3,000 (6,500)

Images



Mounting clip and chains for use with portable flowmeter

Mounting clip



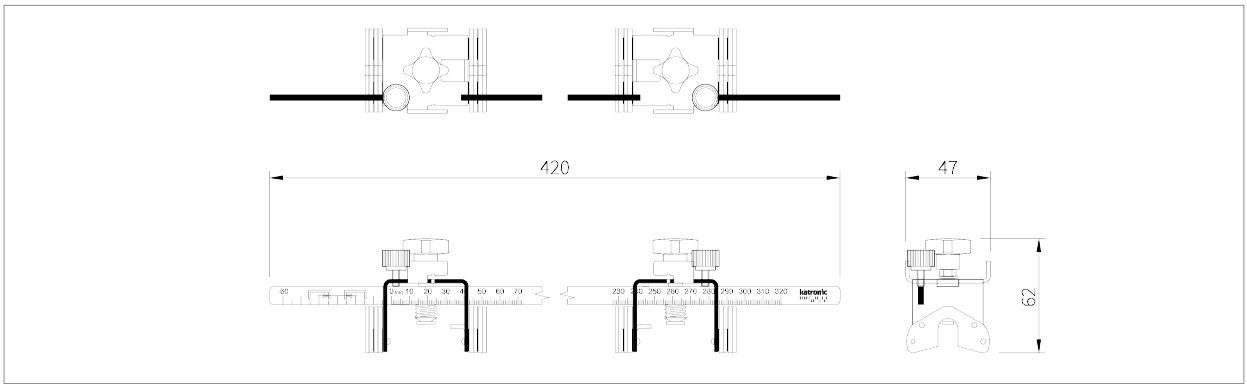
Transducers mounted using chains and clips

General

Diameter range and mounting types

Mounting fixture, rail and magnets (for type K1)
DN 50 ... 3,000

Images



Mounting fixture, rail and magnets

Mounting fixture, rail and magnets

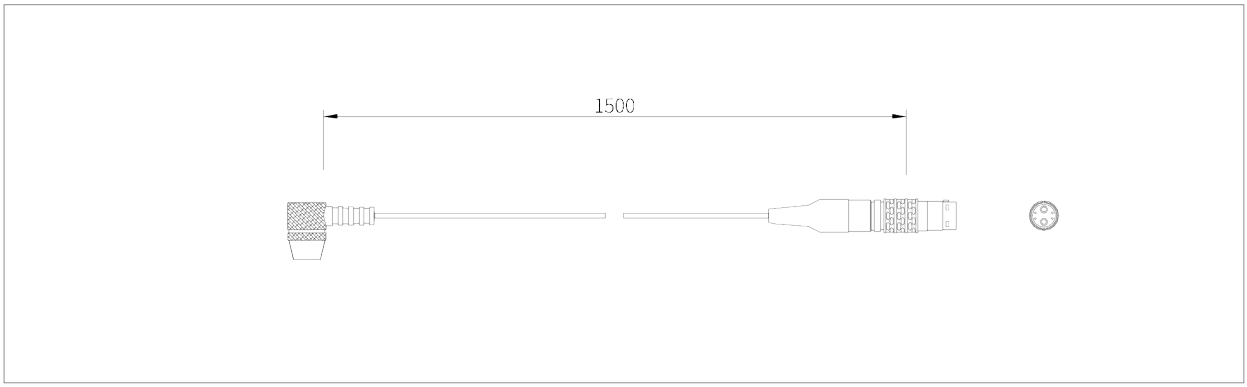
KATflow 210 with mounting rail and transducers

WALL THICKNESS GAUGE (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

Images



Wall thickness gauge NT

Wall thickness gauge NT with ODU/LEMO connector

Wall thickness gauge NT and KATflow 210 in use

FLOWMETER AND ACCESSORIES - Configuration Code

KF 210	KATflow 210, serial interface RS 232, operating instructions	
	Configuration	
	0	Basic unit without accessories
	1	With soft case, power adapter/battery charging unit, measuring tape
		Number of measurement channels
	1	1 measurement channel
	2	2 measurement channels (please consult factory)
		Internal code
	03	Internal code
		Battery size
	1	1 x 12.4 LiFePo4 cell 12.4 Ah
	2	2 x 12.4 LiFePo4 cell 24.8 Ah
	3	3 x 12.4 LiFePo4 cell 37.2 Ah
		Power adapter
	0	Without
	1	UK
	2	US
	3	Europe
	4	Australia
		Degree of protection
	1	IP 67 (standard)
		Process outputs (select a maximum of 5 slots)
	N	Without
	C	Current output, 0/4 ... 20 mA, active (source)
	P	Current output, 0/4 ... 20 mA, passive (sink)
	D	Digital output, open-collector
	R	Digital output, relay
	H	HART* compatible output, 0/4 ... 20 mA
	V	Voltage output, 0 ... 10 V
	F	Frequency output, 2 Hz ... 10 kHz
	Z	Special (please specify)
		Internal data logger
	0	Without
	1	30,000 measurements, KATdata+ download software, USB cable
	2	100,000 measurements, KATdata+ download software, USB cable
		Wall thickness measurement
	0	Without
	2	Wall thickness gauge NT

KF 210 - 1 - 1 - 03 - 1 - 1 - 1 - N - 1 - 0 (example configuration)

The configuration is customised by choosing from the above-listed options and is expressed by the resulting code at the bottom of the table.

TRANSDUCERS AND ACCESSORIES - Configuration Code

K1		Transducer pair, pipe diameter range 25 ... 2,500 mm
		Temperature range
	N	Process temperature -30 ... +130 °C (-22 °F to +266 °F) , including acoustic coupling paste
		Internal code
	3	Internal code
		Degree of protection
	1	IP 68
		Transducer mounting accessories
	00	Without
	30	Clamping set DN 10 ... 40
	40	Clips and chains DN 15 ... 310
	50	Clips and chains DN 25 ... 600
	60	Clips and chains DN 25 ... 1,200
	70	Textile tension straps DN 1,000 ... 6,500
	90	Mounting fixture, rail and magnets DN 50 ... 3,000 (optional for transducer type K1)
	Z	Special (please consult factory)
		Transducer connection and extension cables
	P	ODU/LEMO transducer plug
		Extension cables
	E___	With extension cable (specify length in m)
		Optional items
		Without (leave space blank)
	CA	5-point calibration with certificate

K1 N - 3 - 1 - 50 - P E010 / (example configuration)

The configuration is customised by choosing from the above-listed options and is expressed by the resulting code at the bottom of the table.

* HART® is a registered trademark of the *HART Communication Foundation*

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