

KATflow 200

Hand-Held Clamp-On Ultrasonic Flowmeter

INNOVATIVE. INTUITIVE. INTELLIGENT.

The KATflow 200 is a fully portable instrument with a power which is belied by its small size. This light-weight flowmeter is incredibly easy to use and can be operated one-handed which makes it an ideal tool for use in confined spaces or when working at height. The

KATflow 200 offers measurement performance normally associated with more complex and expensive devices and is complemented by the exceptional quality and robustness of the Katronic transducers.



Katronic

Your Solution Starts With Our Product

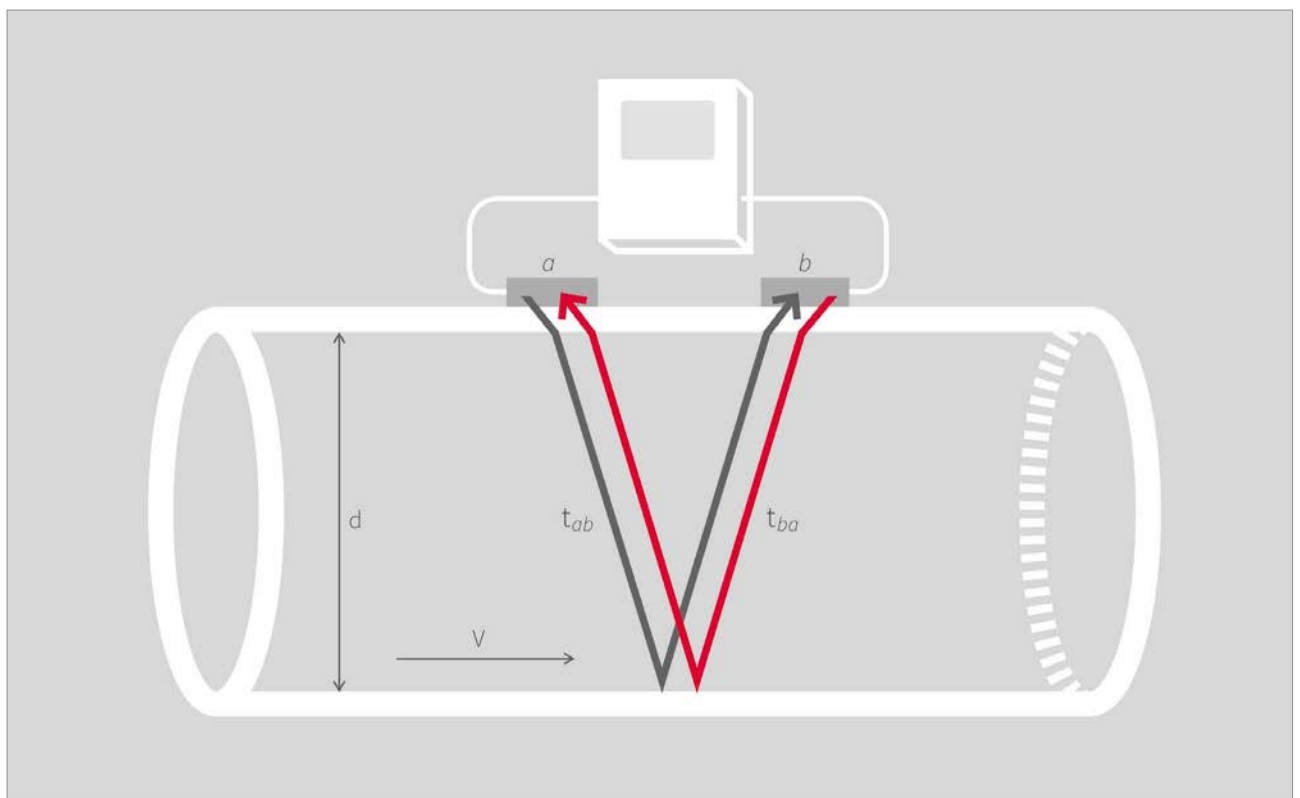
THE TECHNOLOGY BEHIND THE MEASUREMENT

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*.

Portable -30°C $+250^{\circ}\text{C}$



SPECIFICATION

- Pipe diameter range 10 mm to 6,500 mm
- Temperature range for sensors -30°C to $+250^{\circ}\text{C}$ (-22°F to $+482^{\circ}\text{F}$)
- Weight 650 g
- Robust IP 65 enclosure with added rubber shock protector
- Selectable three-line LCD display and full keypad
- Battery life up to 24 hours with standard NiMH AA batteries for simple replacement

FEATURES

- Lightweight and tactile for easy one-handed use
- Stainless steel sensors, cable and connectors as standard
- Innovative installation wizard for quick and intuitive programming
- Full instrument diagnostics and scope function
- Large data logger and software for sampling and data transfer

ACCESSORIES

- Optional pipe wall thickness gauge
- Crush-proof IP 67 transport case or lightweight soft case
- Special waterproof solution available for harsh environmental conditions
- KATdata+ software for data evaluation
- Optional external battery pack available for long-term measurements

APPLICATIONS

- Pump testing and inspection
- In-line flowmeter performance verification
- Leakage and blockage detection
- Clean in process system (CIP) testing
- Monitoring of hydraulic systems
- Clean room applications

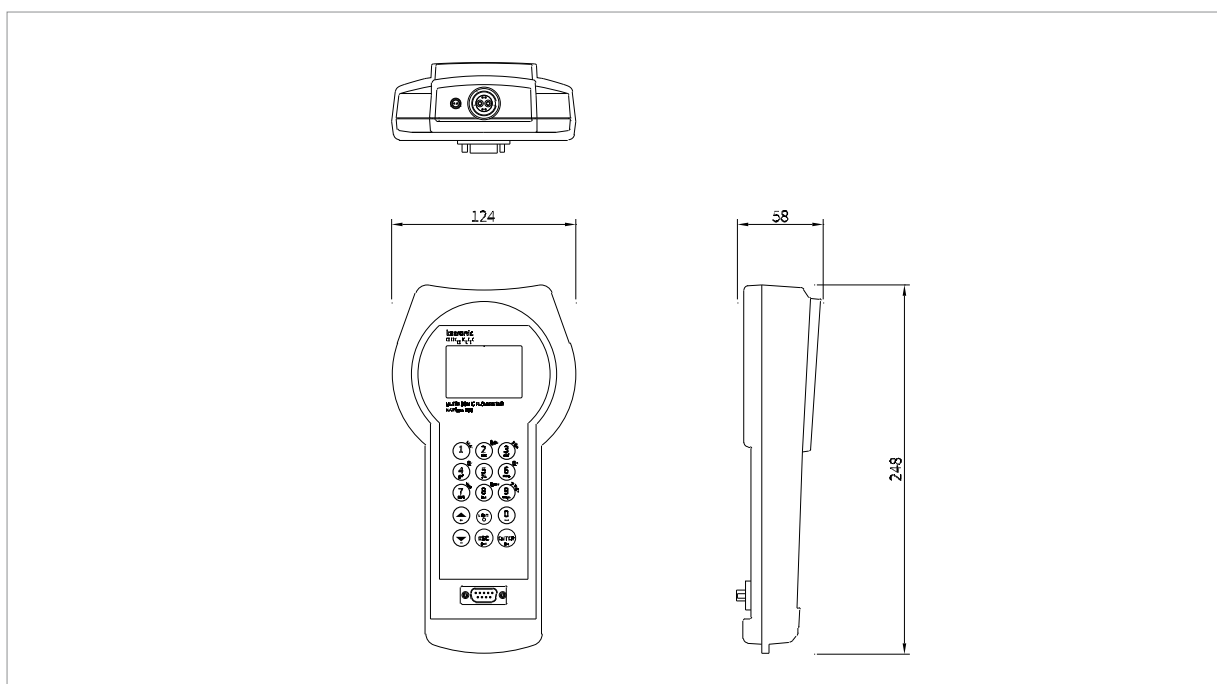


FLOWMETER

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 |

Images



KATflow 200 (dimensions in mm)

General

| | |
|-----------------------|---|
| Enclosure type | Hand-held |
| Degree of protection | IP 65 according to EN 60529 |
| Operating temperature | -10 ... +60 °C (+14 ... +140 °F) |
| Housing material | ABS (UL 94 HB) |
| Measurement channels | 1 |
| Power supply | Internal rechargeable batteries: 4 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 | 228 (h) x 72/124 (w) x 58 (d) mm (without cable glands) |
| Weight | Approx. 650 g |
| Power consumption | < 3 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 |

Images



KATflow 200 in crush-proof IP 67 transport case



KATflow 200 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 |
| 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

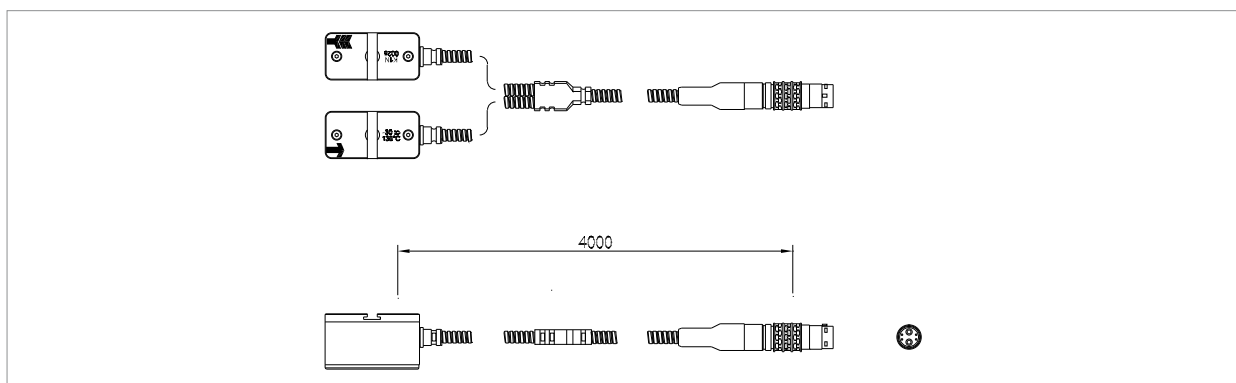
| | |
|----------------------|--|
| Volumetric flow rate | m ³ /h, m ³ /min, m ³ /s, l/h, l/min, l/s USgal/h (US gallons per hour), USgal/min, USgal/s bbl/d (barrels per day), bbl/h, bbl/min |
| Flow velocity | m/s, ft/s, inch/s |
| Mass flow rate | g/s, t/h, kg/h, kg/min |
| Volume | m ³ , l, gal (US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

TRANSDUCERS

K1L, K1N, K1E

| | |
|----------------------------|---|
| Pipe diameter range | 50 ... 3,000 mm for type K1N/E 50 ... 6,500 mm for type K1L |
| 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 ... +392 °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 |

Images



K1N/E transducers



K1L transducers

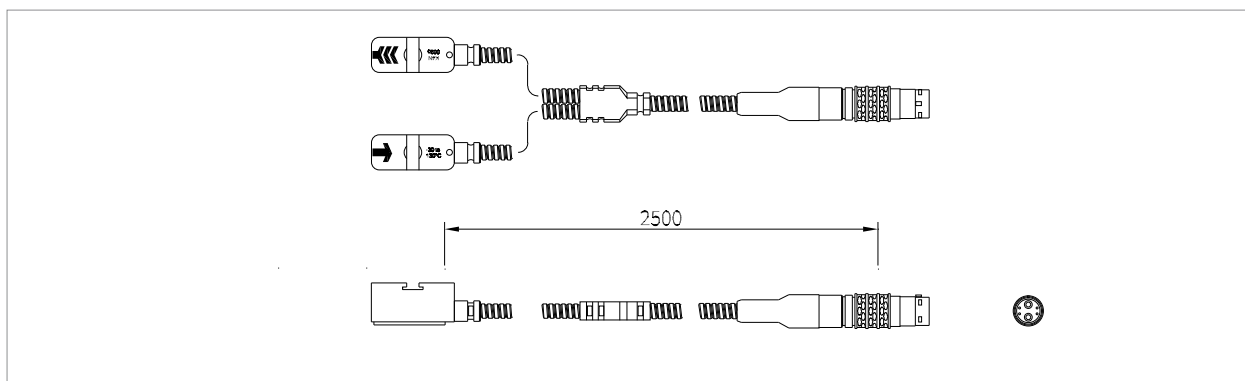


K1N/E transducers with ODU/LEMO connector

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 ... +200 °C (-22 ... +392 °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 |

Images



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

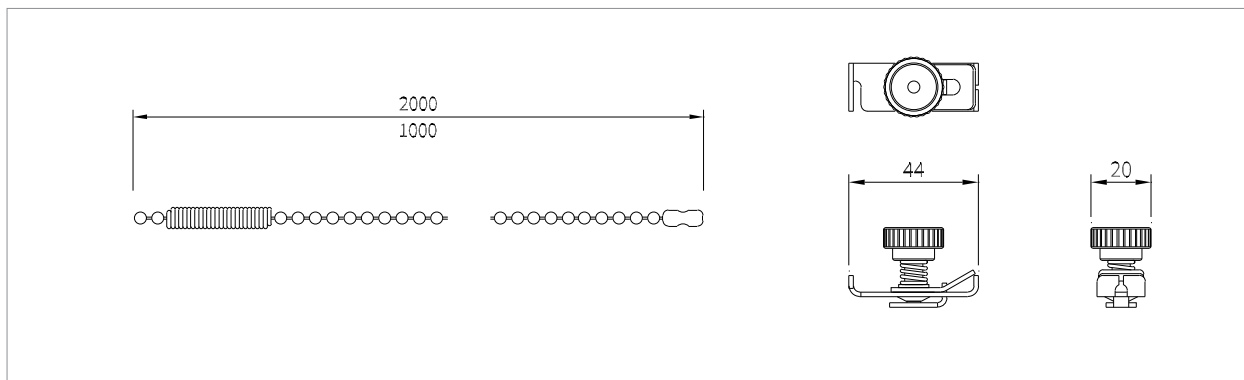
Clips and chains, chain length 1 m,
stainless steel: DN 15 ... 310

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

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

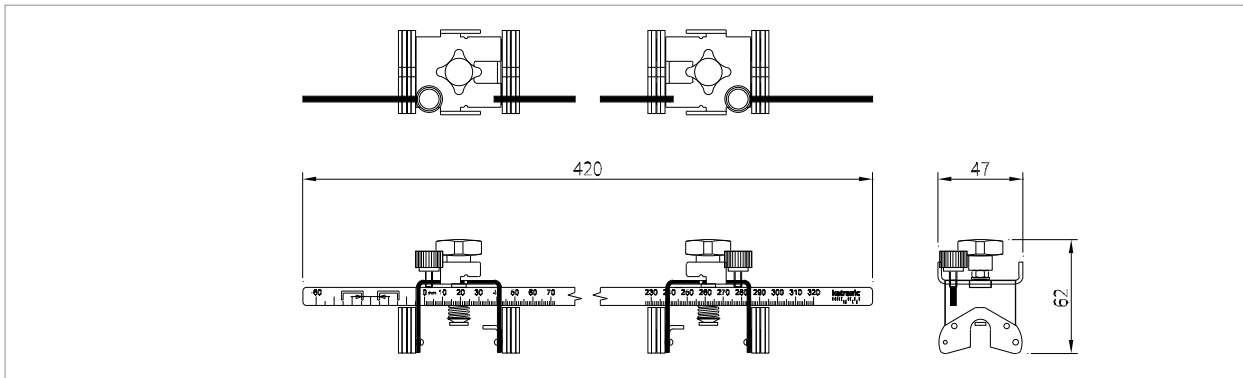
Mounting fixture, rail and magnets (for type K4)
DN 10 ... 250

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

Mounting fixture for flexible hoses

Custom made mounting bracket, stainless steel
(available on request)

Images



Mounting fixture, rail and magnets



Mounting fixture, rail and magnets



Example of mounting fixture for flexible hoses

WALL THICKNESS GAUGES (OPTIONAL)

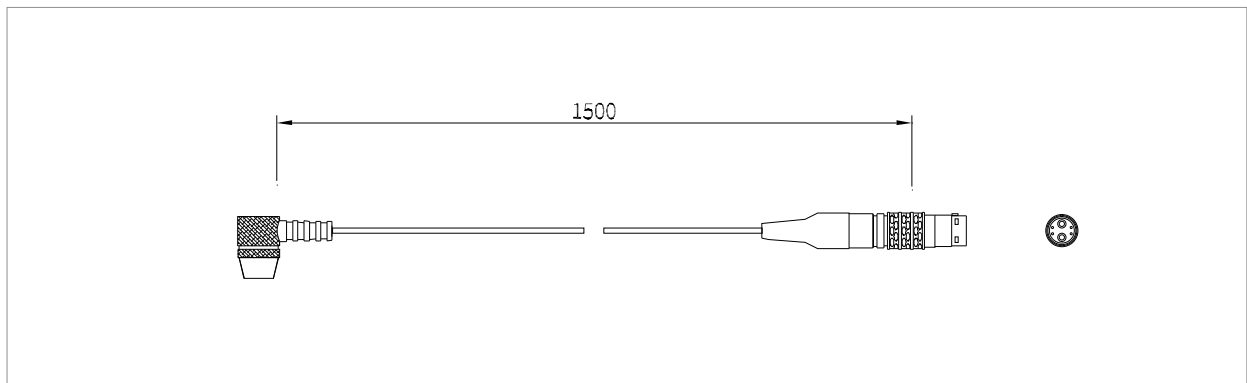
Wall thickness gauge NT

| | |
|-------------------|----------------------------------|
| 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 |

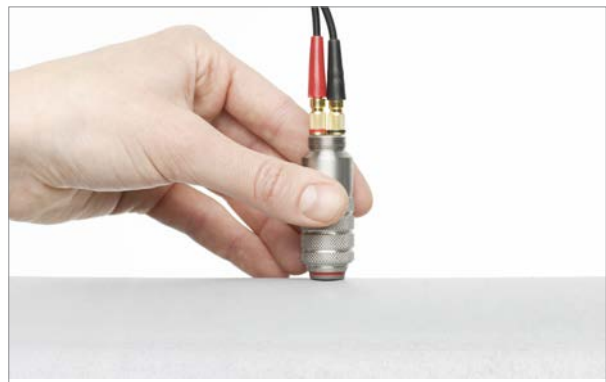
Images



Wall thickness gauge NT



Wall thickness gauge NT with KATflow 200 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) | 240 (h) x 350 (w) x 180 (d) mm |
| Weight (empty) | 500 g |
| Degree of protection | No IP rating |
| Outside material | Nylon |
| Inside material | Nylon |

Images



Crush-proof IP 67 transport case



KATflow 200 soft transport case

FLOWMETER AND ACCESSORIES

| | |
|-----------------------------------|---|
| KF 200 | Hand-held KATflow 200, one measurement channel, serial interface RS 232, operating instructions |
| Configuration | |
| 0 | Basic unit without accessories |
| 1 | With crush-proof transport case IP 67, power adapter/battery charging unit, measuring tape |
| 2 | With soft case, power adapter/battery charging unit, measuring tape |
| Internal code | |
| 03 | Internal code |
| Power adapter | |
| 0 | Without |
| 1 | UK |
| 2 | US |
| 3 | Europe |
| 4 | Australia |
| Z | Special (please specify) |
| Degree of protection | |
| 1 | IP 65 (standard) |
| 2 | IP 67 (transport case with external transducer connections) |
| Z | Special (please specify) |
| Internal data logger | |
| 0 | Without |
| 1 | 30,000 measurements, KATdata+ download software, RS 232 cable |
| 2 | 30,000 measurements, KATdata+ download software, USB cable |
| 3 | 100,000 measurements, KATdata+ download software, RS 232 cable |
| 4 | 100,000 measurements, KATdata+ download software, USB cable |
| Wall thickness measurement | |
| 0 | Without |
| 2 | Wall thickness gauge NT |
| 3 | Wall thickness gauge HT |
| Optional items | |
| | Without (leave space blank) |
| BA | Spare battery set and external battery charging unit |
| BP | External battery pack for long-term power supply |
| Z | Special (please specify) |

KF 200 - **1** - **03-1** - **1** - **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

| | |
|---|---|
| K1 | Transducer pair, pipe diameter range 50 ... 3,000 mm |
| K4 | Transducer pair, pipe diameter range 10 ... 250 mm |
| Z | Special (please consult factory) |
| Temperature range | |
| L | Process temperature -30 ... +80 °C, including acoustic coupling paste (for use with connection type PJ) |
| N | Process temperature -30 ... +130 °C, including acoustic coupling paste |
| E | Process temperature -30 ... +250 °C, including acoustic coupling paste |
| Z | Special (please consult factory) |
| Internal code | |
| 1 | Internal code |
| Degree of protection | |
| 1 | IP 66 (standard) |
| 2 | IP 67 (please consult factory) |
| 3 | IP 68 (please consult factory) |
| Z | Special (please specify) |
| 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 ... 1200 |
| 70 | Textile tension straps DN 1,000 ... 6,500 |
| 80 | Mounting fixture, rail and magnets DN 10 ... 250 (optional for transducer type K4) |
| 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 |
| PJ | ODU/LEMO transducer plug with junction box (transducer type L) |
| Extension cables | |
| E000 | Without |
| E005 | With extension cable, 5 m length |
| E010 | With extension cable, 10 m length |
| E____ | With extension cable (specify length in m) |
| Z | Special (please specify) |
| Optional items | |
| | Without (leave space blank) |
| CA | 5-point calibration with certificate |

K1 **N** - **1** - **1** - **50** - **P** **E000** / (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.

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