

- Flowmeter with one or two measurement channels, graphic LCD display, internal datalogger and input/output options
- For commonly used pipe materials and diameters from 10 mm to over 3.0 m
- Intuitive menu, Setup Wizard and *Audible Sensor Positioning Assistant*™ for easy and quick setup and installation
- Transit-time correlation measurement using dual DSP-technology for better measurement accuracy
- Heat quantity measurement capability and Ex approved instrument versions
- AC, DC and solar panel power supply



Features

- Lockable and sturdy IP 66 transmitter enclosure with keypad and multifunctional display
- Bi-directional measurement with totalizer function and process input, output and serial communication options including Modbus RTU and HART*
- Available with optional heat quantity measurement function and PT100 clamp-on sensors for contactless metering of thermal energy consumption
- Optional sound velocity output function for contactless product recognition and interface detection; optional internal data logger for up to 100,000 measurements
- Transmitter and transducer options approved for use in hazardous areas Zone 1 or 2
- KATdata+ software for offline/online data transfer via RS 232 or USB cable
- AC, DC, battery and solar panel power supply options available

Description

The KATflow clamp-on ultrasonic flow meters work on the transit-time method. This is based on the principle that sound waves travelling with the flow will move faster than those travelling against it. The resulting difference in transit time is directly proportional to the flow velocity of the liquid and consequently to the volumetric flow rate.

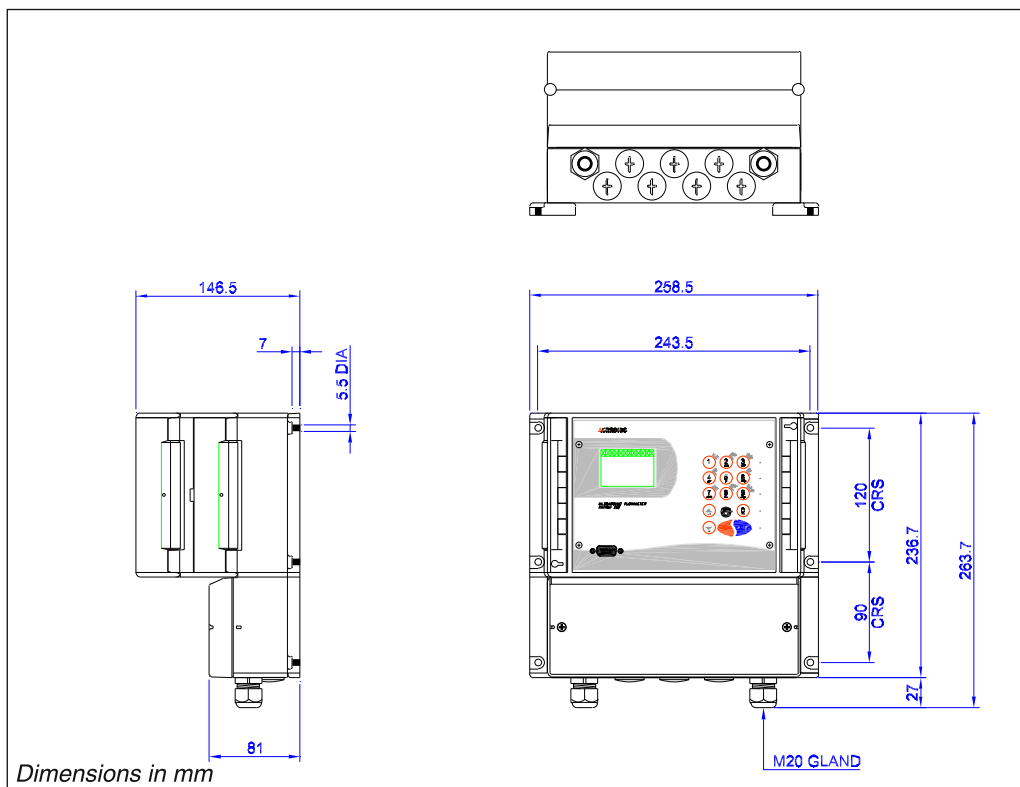
The ultrasonic transducers (sensors) of the flow meter are mounted on the external surface of the pipe and are used to generate and receive pulses. The flowing liquid within causes time differences in the ultrasonic signals, which are evaluated by the flow meter to produce an accurate flow measurement. The advanced electronics of the flow meter compensate for and adapt to changes in the flow profile and medium temperature to deliver reliable measurements.

The KATflow 150 is a fixed-installation clamp-on ultrasonic flow meter for non-invasive and non-intrusive flow measurement of liquids and liquefied gases in fully filled pipes. It can be supplied with one or two measurement channels. This enables the flow meter to simultaneously monitor up to two separate pipes. Alternatively, a dual-channel setup can be used for a two-path mounting configuration of the sensors on one single pipe. Additionally, the KATflow 150 offers optional functions for heat quantity and concentration measurement with process input, output and serial communication options available. These features are complemented by an optional internal datalogger and software for the recording and download of measured values. Thanks to its intuitive instrument menu, Setup Wizard, and *Audible Sensor Positioning Assistant*™ the flow meter can be set up and its sensors correctly installed in a matter of minutes. Optional transmitter and transducer versions are available for installation in hazardous areas.

Specification: Transmitter

Performance	Measurement principle	:	Ultrasonic transit-time difference correlation
	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> $\pm 1 \dots 3$ % of measured value depending on application ± 0.5 % of measured value with process calibration <i>Flow velocity (mean)</i> ± 0.5 % of measured value
	Turn down ratio	:	1/100
	Measurement rate	:	1 Hz as standard, higher rates on application
	Response time	:	1 s, 70 ms (optional)
	Damping of displayed value	:	0 ... 99 s (selectable by user)
	Gaseous and solid content of liquid media	:	< 10 % of volume
General	Enclosure type	:	Wall mounted
	Degree of protection	:	IP 66 according to EN 60529
	Operating temperature	:	-10 ... 60 °C (14 ... 140 °F)
	Housing material	:	Polycarbonate (UL94 V-0)
	Measurement channels	:	1 or 2
	Calculation functions	:	Average, difference, sum, highest (dual-channel use only)
	Power supply	:	100 ... 240 V AC 50/60 Hz 9 ... 36 V DC Special solutions (e.g. solar panel, battery) upon request
	Display	:	LCD graphic display, 128 x 64 dots, backlit
	Dimensions	:	237 (h) x 258 (w) x 146 (d) mm
	Weight	:	Approx. 2.3 kg
	Power consumption	:	< 5 W
	Operating languages	:	English, German, French, Spanish, Russian

Drawings

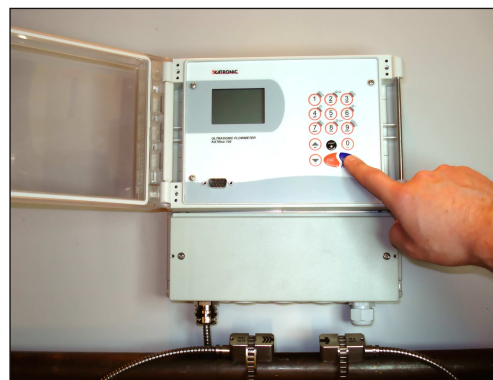


Specification: Transmitter (continued)

Images



KATflow 150 close-up



KATflow 150 wall-mounted with transducers

Communication	Type	:	RS 232, USB converter cable (optional), RS 485 (optional), Modbus RTU (optional)
	Transmitted data	:	Measured and totalized 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 totalized 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 7, Vista, XP, NT, 2000 Linux Mac (optional)
Quantity & 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)
	Temperature	:	°C (only with heat quantity measurement option)

Specification: Transmitter (continued)

Process inputs (galvanically isolated)	Temperature	:	PT100 (clamp-on sensors), four-wire circuit, measurement range -50 ... 400 °C (-58 ... 752 °F), resolution 0.1 K, accuracy ± 0.2 K (one, two or four inputs available)
	Current	:	0/4 ... 20 mA active or 0/4 ... 20 mA passive, $U = 30$ V, $R_i = 50 \Omega$, accuracy 0.1 % of measured value
Process outputs (galvanically isolated)	Current	:	0/4 ... 20 mA active/passive ($R_{Load} < 500 \Omega$), 16 bit resolution, $U = 30$ V, accuracy = 0.1 %
	Voltage	:	0 ... 10 V, $R_{Load} = 1000 \Omega$
	Frequency	:	0 ... 10 kHz, 24 V/4 mA
	HART*	:	0/4 ... 20 mA, 24 V DC, $R_{GND} = 220 \Omega$
	Digital Open-Collector	:	Value 0.01 ... 1000/unit, width 1 ... 990 ms, $U = 24$ V, $I_{max} = 4$ mA
	Digital relay	:	Form C (SPDT-CO) contacts, $U = 48$ V, $I_{max} = 250$ mA

Specification: PT100 clamp-on sensors

General	Type	:	PT 100 (clamp-on)
	Measurement range	:	-30 ... 250 °C (-22 ... 482 °F)
	Design	:	4-wire
	Accuracy T	:	$\pm(0.15 \text{ °C} + 2 \times 10^{-3} \times T \text{ [°C]})$, class A
	Accuracy ΔT	:	≤ 0.1 K ($3 \text{ K} < \Delta T < 6 \text{ K}$), corresponding to EN 1434-1
	Response time	:	50 s
	Dimensions of sensor head	:	20 (h) x 15 (w) x 15 (d) mm
	Material of sensor head	:	Aluminum
	Material cable jacket	:	PTFE
	Cable length	:	3 m

Images



PT100 sensor fixed to pipe



KATflow 150 for heat quantity measurement application using PT100 sensors

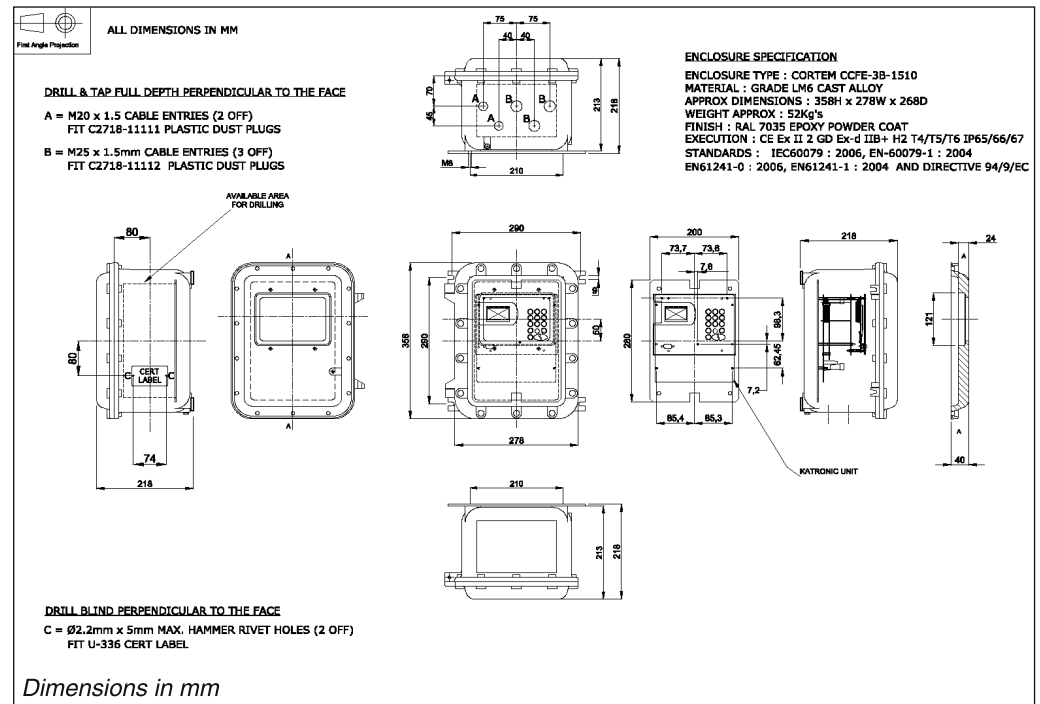
Specification: Hazardous area transmitter enclosure

General



Enclosure type	:	Wall mounted (additional to KATflow 150 transmitter)
Degree of protection	:	IP 66 according to EN 60529
Operating temperature	:	-20 ... 40 °C (-4 ... 104 °F)
Housing material	:	Grade LM6 cast alloy
Finish	:	RAL 7035 epoxy powder coat
Dimensions:	:	358 (h) x 278 (w) x 268 (d) mm
Weight	:	Approx. 20.0 kg (with KATflow 150 transmitter)
Ex certification code	:	Ex II 2 GD Ex-d IIB+ H2 T4/T5/T6 IP65/66/67
Ex certification number	:	CESI 01 ATEX 027

Drawings and images



KATflow 150 in closed Ex enclosure

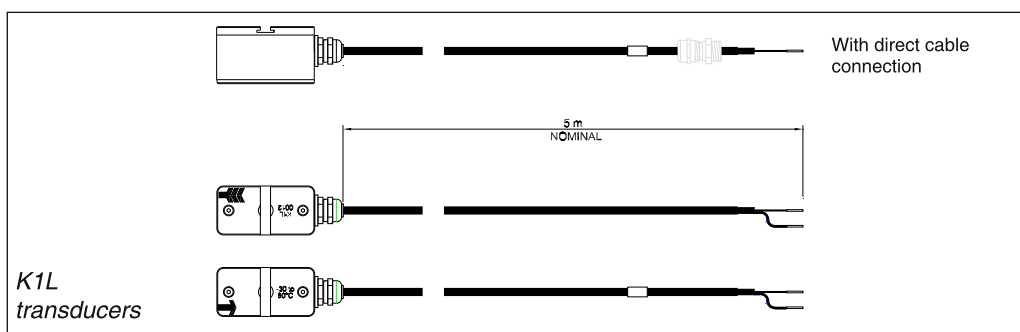
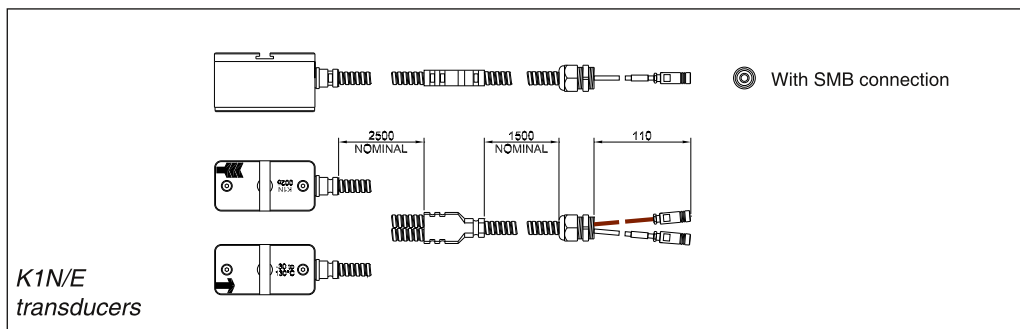


KATflow 150 in opened Ex enclosure

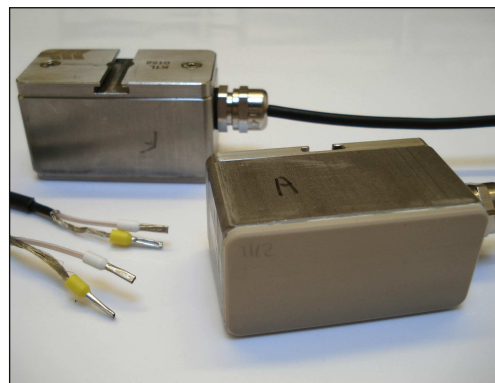
Specification: Transducers

K1L, K1N, K1E	Pipe diameter range	:	50 ... 3000 mm for type K1N/E 50 ... 6500 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 ... 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 upon request)
	Standard cable lengths	:	Type K1L: 5.0 m Type K1N/E: 4.0 m

Drawings and images



K1N/E transducers

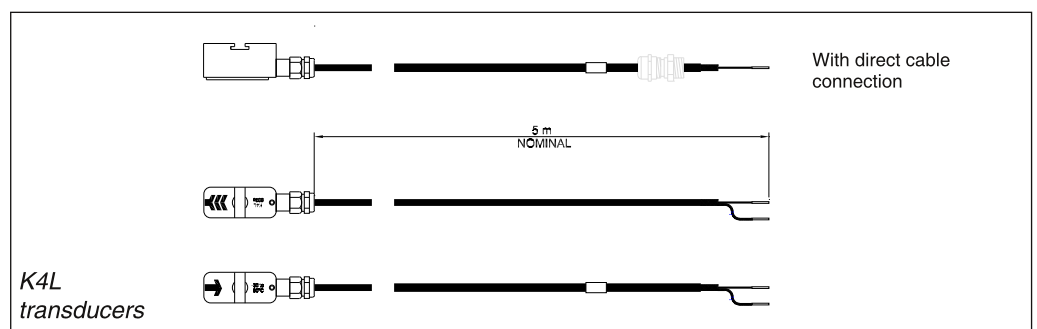
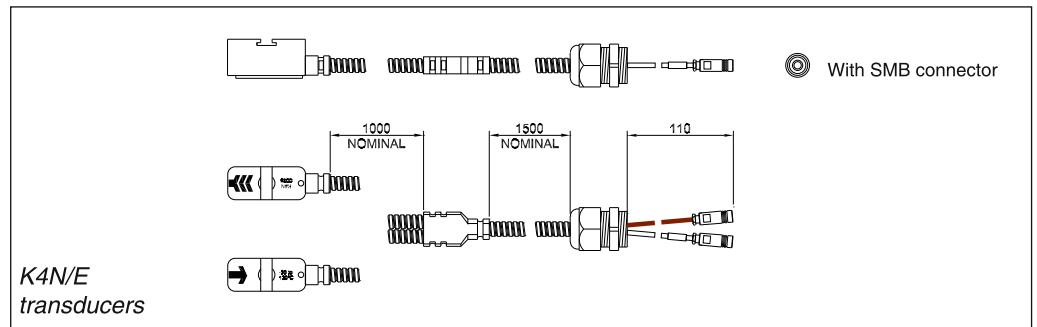


K1L transducers

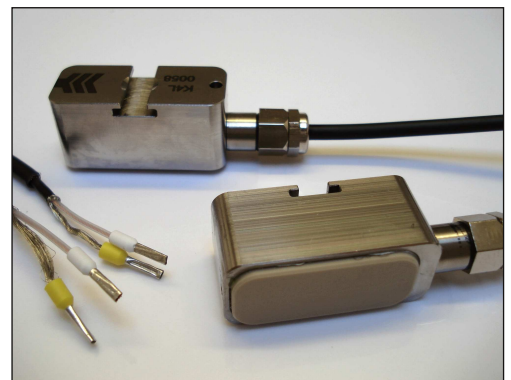
Specification: Transducers (continued)

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 acc. EN 60529, (IP 67 and IP 68 upon request)
	Standard cable lengths	:	Type K4L: 5.0 m Type K4N/E: 2.5 m

Drawings and images



K4N/E transducers



K4L transducers

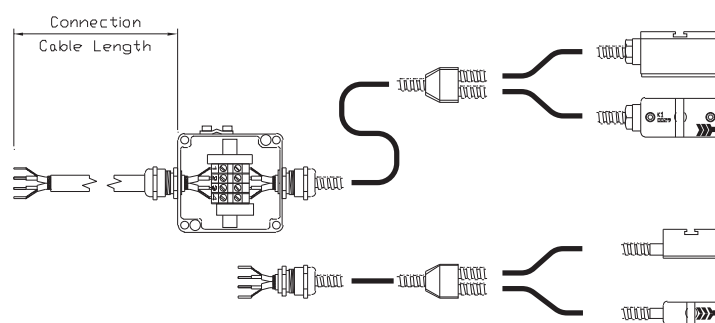
Specification: Transducers (continued)

Extension cable	Available lengths	:	5.0 ... 100 m
	Cable type	:	Coaxial
	Material cable jacket	:	TPE
	Operating temperature	:	-40 ... 80 °C (-40 ... 176 °F)
	Min. bend radius	:	67 mm

Cable connection	Connection types	:	Junction box, Amphenol connectors (for transducer type N)
	Termination into transmitter	:	SMB connector (SubMiniature version B), direct cable connection (terminal block)

Drawings

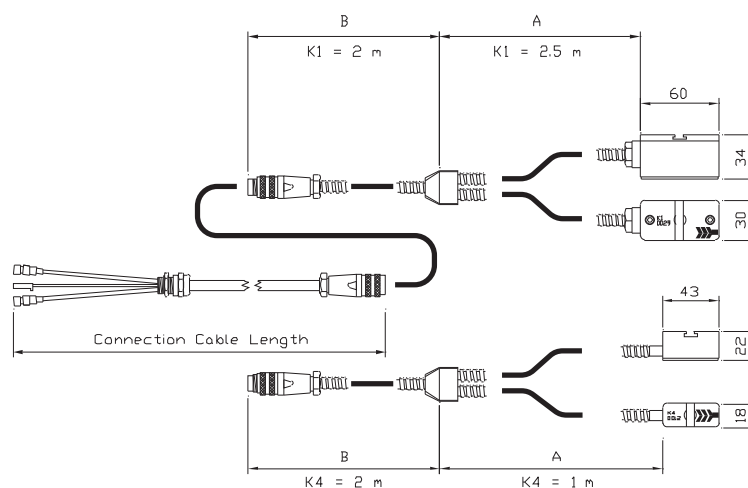
Top: K1 transducers connected via junction box to extension cable and terminating into transmitter via direct cable connection



Bottom: K4 transducers terminating via direct cable connection

Cable connection via junction box with direct cable termination into transmitter

Top: K1 transducers connected via Amphenol connectors to extension cable and terminating into transmitter via SMB connectors



Bottom: K4 transducers with Amphenol connector (terminal termination via SMB connectors only)

Cable connection via male/female Amphenol plugs with SMB termination into transmitter

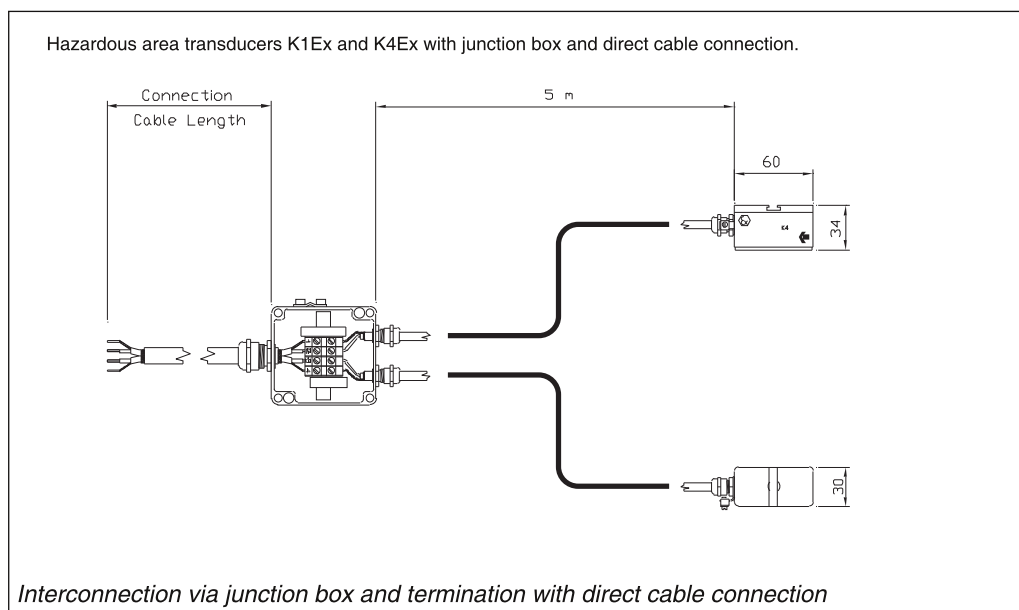
Specification: Hazardous area transducers

K1Ex and K4Ex



Pipe diameter range	:	10 ... 250 mm for type K4Ex 10 ... 3000 mm for type K1Ex
Dimensions of sensor heads	:	60 (h) x 30 (w) x 34 (d) mm
Material of sensor heads	:	Stainless steel
Material of cable conduits	:	PTFE
Temperature range	:	-50 ... 115 °C (-4 ... 248 °F)
Standard cable length	:	5.0 m
Degree of protection	:	IP 68 acc. EN 60529
Ex certification code	:	II 2 G Ex mb IIC T4-T6 X, II 2 D Ex mbD 21
Ex certification number	:	TRAC09ATEX21226X
Ex protection method	:	Encapsulation
Note	:	The transducers are approved for use in hazardous areas classified as Ex Zone 1 and 2. They are connected to the transmitter via extension cables and Ex approved junction boxes. The transmitter can be installed in a safe area or - if equipped with the additional Ex enclosure - together with the transducers in an hazardous environment (see hazardous area enclosure for KATflow 150 transmitter, page 5).

Drawings and images



K1Ex transducer pair

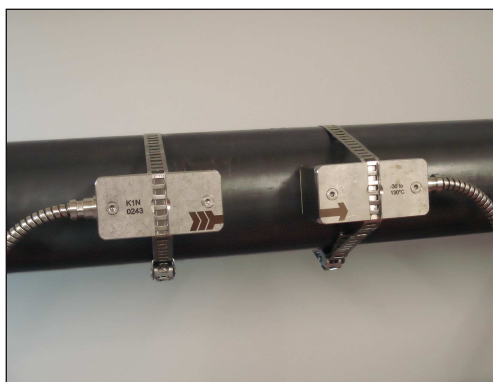


K1Ex certification code and number

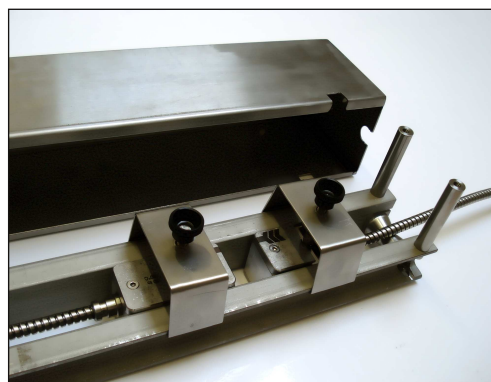
Specification: Transducer mounting accessories

General	Diameter range and mounting types	:	<i>Clamping set (metal collar with screw), stainless steel</i> DN 10 ... DN 40 <i>Metallic straps and clamps</i> DN 15 ... DN 310 <i>Metallic straps and clamps</i> DN 25 ... DN 3000 <i>Metallic straps and clamps</i> DN 1000 ... DN 3000 (6500) <i>Metallic mounting rail and straps (available upon request)</i> DN 50 ... DN 250 or DN 50 ... DN 3000
	Mounting fixture for flexible hoses	:	Custom made mounting bracket, stainless steel (available upon request)

Images



Transducers mounted using strap and clamps



Metallic mounting rail with cover (example)

Configuration code: Transmitter and accessories

KF150	Ultrasonic flow meter KATflow 150, serial interface RS 232, operating instructions
Number of measurement channels	
1	1 measurement channel
2	2 measurement channels ¹⁾
Internal code	
03	Internal code
Power supply	
1	100 ... 240 V AC, 50/60 Hz
2	9 ... 36 V DC
Z	Special (please specify)
Enclosure type	
1	Polycarbonate (UL94 V-0), wall mounted, IP 66
2	Hazardous area enclosure, powder coated LM6 cast alloy, IP 66 (Ex d IIB T4 - T6)
Z	Special (please specify)
Communication	
0	Without
1	RS 485 serial interface
2	Modbus RTU protocol
Z	Special (please specify)
Process inputs/outputs (select a maximum of 8 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* output, 0/4 ... 20 mA
V	Voltage output, 0 ... 10 V
F	Frequency output, 0 ... 10 kHz
A	1 x PT100 input for temperature compensation (select TC function) ²⁾
AA	2 x PT100 input for 1-channel heat quantity measurement (select HQM option no. 2) ³⁾
AAAA	4 x PT100 input for 2-channel heat quantity measurement (select HQM option no. 3) ³⁾
Internal data logger	
0	Without
1	30,000 measurements
2	100,000 measurements
Z	Special (please specify)
Temperature compensation (TC) / Heat quantity measurement (HQM)	
0	Without
1	With TC incl. 1 x PT100 sensor, 3 m cable ²⁾
2	With HQM incl. 2 x PT100 sensor, 3 m cable ³⁾
3	With HQM incl. 4 x PT100 sensor, 3 m cable ³⁾
Z	Special (please consult factory)
Sound velocity output (SVO) ⁴⁾	
0	Without
1	With SVO
PT100 cable extension	
0	Without
PTJ	With 1 x junction box for PT100 sensor
2PTJ	With 2 x junction box for PT100 sensor
3PTJ	With 3 x junction box for PT100 sensor
4PTJ	With 4 x junction box for PT100 sensor
PT100 extension cable length in m	
000	Without
—	With extension cable (specify length in m)
Optional items	
	Without (leave space blank)
Ex	Suitable for connection with Ex transducers
SW	KATdata+ download software and RS 232 cable
SU	KATdata+ download software and USB cable

KF150 - 1 -03-1-1-0 -CDR - 0-0-0-0 - 000 / (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.

- 1) For simultaneous measurement on two separate pipes or for measurement on one single pipe in a two-path sensor mounting configuration.
- 2) For temperature compensation in cases of significant changes in medium temperature during measurement.
- 3) For contactless measurement of thermal energy consumption (1-channel for one circuit, 2-channel for two circuits).
- 4) For contactless product recognition and interface detection.

Configuration code: Transducers and accessories

K1	Transducer pair, pipe diameter range 50 ... 3000 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
N	Process temperature -30 ... 130 °C, including acoustic coupling paste
E	Process temperature -30 ... 200 °C, including acoustic coupling paste
Ex	Process temperature -50 ... 115 °C, including acoustic coupling paste (for hazardous areas, Ex II 2 G Ex mb IIC T4-T6)
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	
0	Without
3	Clamping set DN 10 ... 40
4	Metallic straps and clamps DN 15 ... 310
5	Metallic straps and clamps DN 25 ... 3000
6	Metallic straps and clamps DN 1000 ... 6500
7	Metallic mounting rail and straps DN 50 ... 250 (transducer type K4)
8	Metallic mounting rail and straps DN 50 ... 3000 (transducer type K1)
Z	Special (please consult factory)
Stainless steel tag	
0	Without
1	With stainless steel tag (please specify text to be engraved)
Transducer connection type and extension cable length	
O	Without connector or junction box (transducer type L or Ex)
C 000	Wired transducer connection to flowmeter
D	Without connector or junction box (transducer type N)
C 000	Direct transducer connection to flowmeter
A	Extension via Amphenol type connector (transducer type N)
C 010	With extension cable, 10 m length
C ____	With extension cable, (specify length in m)
J	Extension via junction box (transducer type L or N)
C 005	With extension cable, 5 m length
C 010	With extension cable, 10 m length
C ____	With extension cable, (specify length in m)
JX	Extension via ATEX junction box (transducer type Ex)
C 005	With extension cable, 5 m length
C 010	With extension cable, 10 m length
C ____	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 - 5 0 - J - C 010 / (example configuration)

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

Katronon Technologies Limited | 23 Cross Street
Leamington Spa | CV32 4PX | United Kingdom

Phone: +44 (0)1926 882 954
Fax: +44 (0)1926 338 649

Email: info@katronon.co.uk
Web: www.katronon.co.uk

Subject to changes without prior notice.
Issue: DataSheetKATflow150_V31_E0711_120711.
© Copyright Katronon Technologies Ltd. 2010 | All rights reserved.