KATflow 100

Compact Clamp-On Ultrasonic Flowmeter

SMALL. SIMPLE. STURDY.

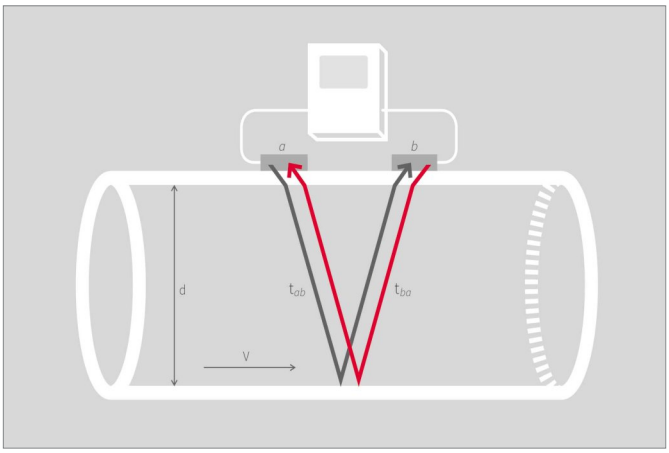
The KATflow 100 is made for project applications where its compact, single-channel design fits well across a process plant or network. Setup is simple and straightforward and offers the same accuracy as the rest of the range. Combined with either L-type or P-type transducers and providing up to four outputs, including telemetry, the KATflow 100 seamlessly integrates into your workflow.

THE TECHNOLOGY BEHIND THE MEASUREMENT

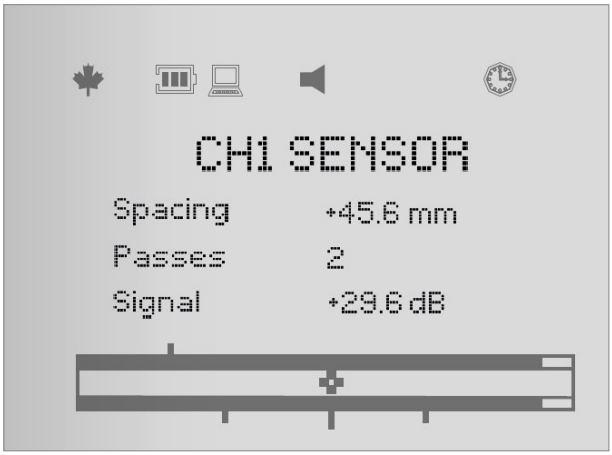
KATflow non-invasive flowmeters work on the transit time principle, utilising ultrasonic pulses transmitted and received by a compact transducer pair externally mounted on the pipe. These pulses travel through both the pipe wall and the medium. With the ability to measure on liquids and gases in pipes ranging from 0.4 in to 21 ft in diameter, clamp-on meters determine flow velocity by precisely measuring the difference between transit times of sound waves traveling in the same direction as the flow and those moving against it. This allows them to calculate the volumetric flow. Additionally, the instruments compensate for variables such as flow profile, pipe material, and fluid changes to ensure reliable results. Advanced signal processing means that KATflow meters work with an exceptional variety of liquid and gas media, and offer the user many advantages over inline measurement technologies. Katronic's reliable instruments have seen success in a vast array of applications from measurements on submarines, to installations on systems destined for use in space.

PERFECTLY PLACED: AUDIBLE SENSOR POSITIONING ASSISTANT

Katronic flowmeters include the *Audible Sensor Positioning Assistant*, a unique tool that ensures accurate sensor placement for quick and efficient measurements. By simply following the 'Quick Start' process and pressing 'Start Measurement', operators can easily fine-tune the installation to get the best possible results. The Assistant presents the recommended sensor spacing, number of pipe transits, and signal-to-noise ratio. Intuitive graphic bars displaying signal strength and signal confidence are augmented by a central cursor that makes it easy to precisely position the transducers. An audible signal means that the operator is not reliant on the display as the Assistant helps them place the sensors perfectly for optimal performance. This tool also serves as a first check for any setup errors, providing assurance for accurate measurements.



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



Katronic's unique *Audible Sensor Positioning Assistant* displays key information about the installation. The central cursor makes it easy to optimize sensor position.

Fixed Installation

-22 °F +176 °F

SPECIFICATION

- Pipe diameter range 0.4 in to 10 ft
- Temperature range for sensors -22 °F to +176 °F
- Weight 1.65 lb
- Robust IP66 aluminum enclosure
- Sturdy unit with LCD display and five-key keypad
- Wall or pipe mounted

FEATURES

- Low cost of ownership
- Process outputs including 4 ... 20 mA, 0 ... 10 V, pulse, M-Bus, BACnet, Modbus RTU and HART* compatible output
- Pt 100 inputs for BTU measurement
- Bi-directional measurement with totalizer function
- Setup 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 Pt 100 sensors or analogue temperature inputs for heat quantity measurement and temperature compensation

APPLICATIONS

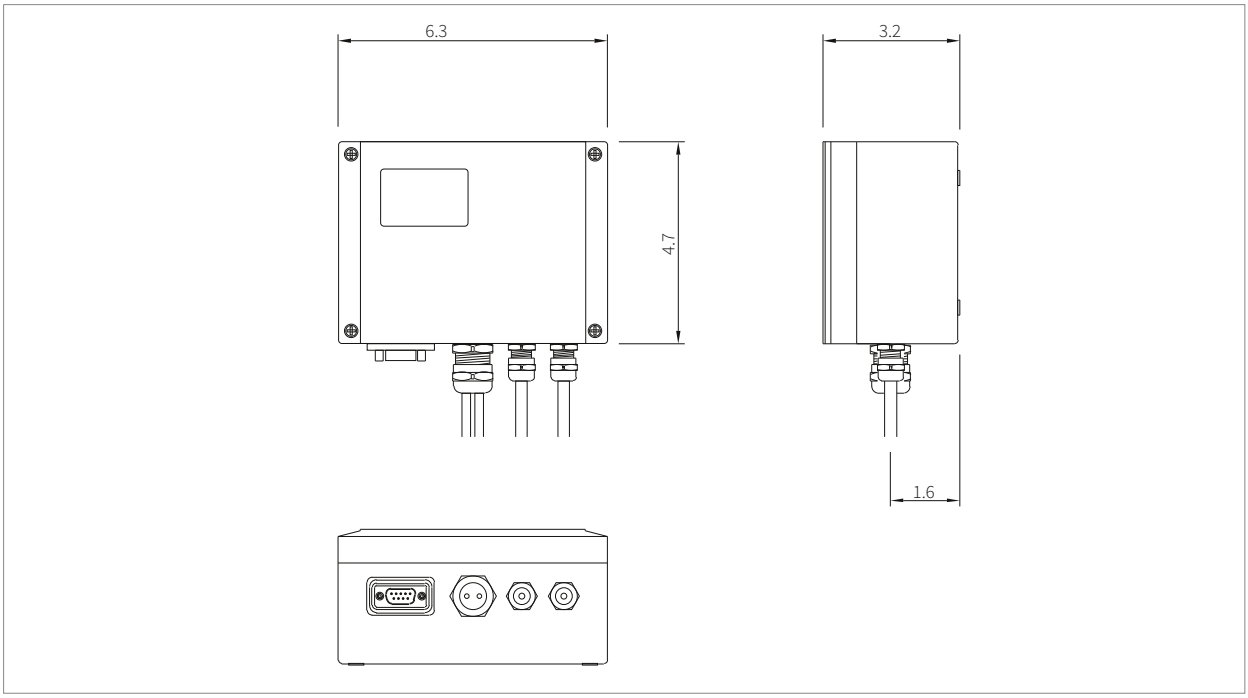
- Water and wastewater measurements
- Replacement of electromagnetic flowmeters
- Monitoring and controlling of Heating, Ventilation and Air Conditioning (HVAC) systems
- Cost-effective solution for large scale projects
- Automated process control
- Shipping applications

TRANSMITTER

Performance

Measurement principle	Ultrasonic transit-time difference
Flow velocity range	0.03 ... 82 ft/s
Resolution	0.01 in/s
Repeatability	0.15 % of measured value, ±0.6 in/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 0.8 ... 82 ft/s)
Measurement rate	100 Hz
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 inches)

General

Enclosure type	Wall mounted, optional pipe stands and brackets available
Degree of protection	IP66 according to EN 60529
Operating temperature	+14 ... +140 °F
Housing material	Die-cast aluminum
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	4.7 (h) x 6.3 (w) x 3.2 (d) in (without cable glands)
Weight	Approx. 1.65 lb
Power consumption	< 5 W
Operating languages	English, French, German, Dutch, Spanish, Italian, Russian, Czech, Turkish, Romanian (others on request)

Communication

Type	RS 232, optional: Modbus RTU, Modbus TCP/IP, HART* compatible, Profibus PA, Profibus DP
Transmitted data	Measured and totalized value, parameter set and configuration, logged data

Images

KATflow 100 with open enclosure

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 11, 10, 8, 7 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, in/s
Mass flow rate	g/s, t/h, kg/h, kg/min
Volume	m^3, l, USgal, 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	°F (with heat quantity measurement option)

Process inputs (galvanically isolated)

Temperature	Pt 100 (clamp-on sensors), three- or four-wire circuit, measurement range: -22 ... +482 °F, resolution: 0.1 K, accuracy: ±0.2 K
Current	0/4 ... 20 mA active or 4 ... 20 mA passive, U = 30 V, R_i = 50 Ω, accuracy: 0.1 % of measured value

Process outputs (galvanically isolated)

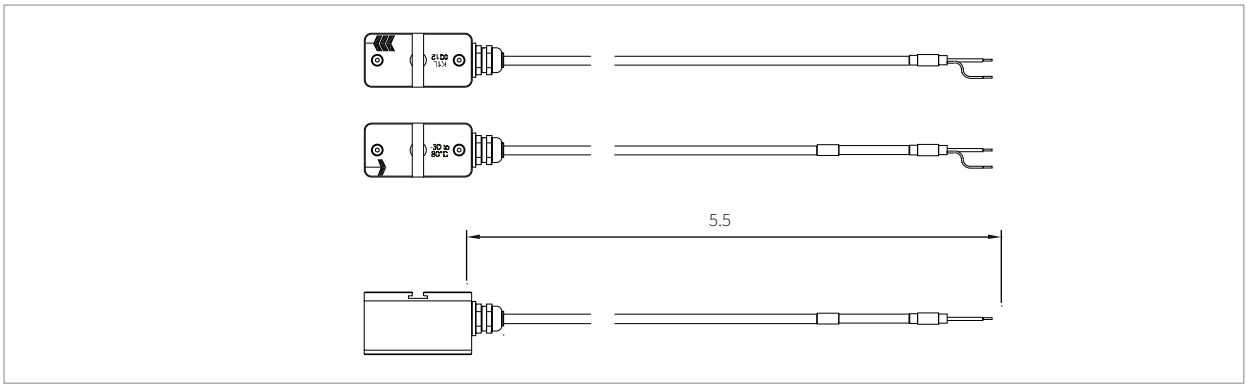
Current	0/4 ... 20 mA active/passive (R_{Load} < 500 Ω), 16 bit resolution, U = 30 V, accuracy: 0.1 %
Digital open-collector	Value: 0.01 ... 1 000/unit, width: 1 ... 990 ms, U = 24 V, I_{max} = 4 mA
Digital relay	2 x Form A SPST (NO and NC), U = 48 V, I_{max} = 250 mA
Voltage	0 ... 10 V, R_{Load} = 1 000 Ω
Frequency	2 Hz ... 10 kHz, 24 V/4 mA
HART* compatible	0/4 ... 20 mA, 24 V DC, R_{GND} = 220 Ω

TRANSDUCERS

K1P, K1L

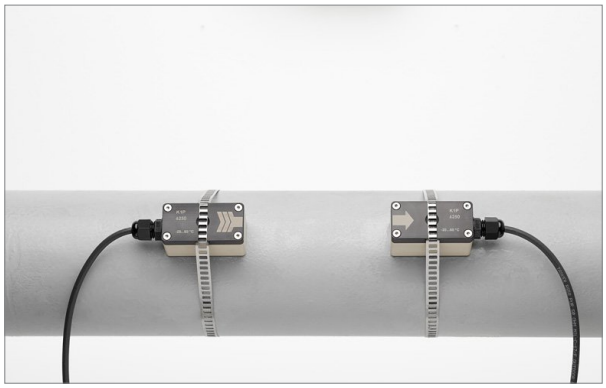
Pipe diameter range	2 ... 20 in for type K1P 2 ... 120 in for type K1L
Dimensions of sensor heads	Type K1P: 2.4 (l) x 1.2 (w) x 1.4 (h) in Type K1L: 2.4 (l) x 1.2 (w) x 1.4 (h) in
Material of sensor heads	Type K1P: Plastic Type K1L: Stainless steel
Material of cable conduits	Type K1P/L: PVC
Temperature range	Type K1P: -4 ... +122 °F Type K1L: -22 ... +176 °F
Degree of protection	IP66 according to EN 60529 (IP67 and IP68 on request)
Standard cable lengths	Type K1P/L: 5.5 yd

Images



K1L transducers (dimensions in yd)

K1L transducers

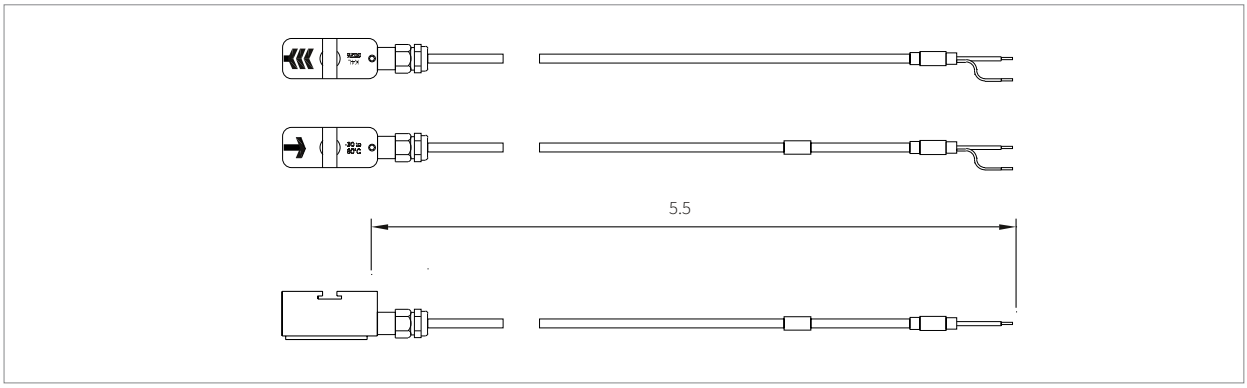


K1P transducers mounted using straps and clamps

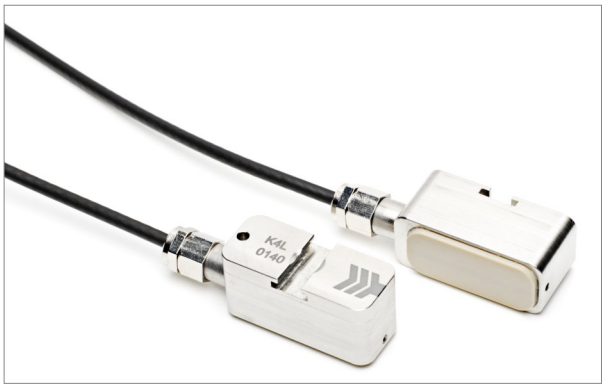
K4L

Pipe diameter range	0.4 ... 10 in for type K4L
Dimensions of sensor heads	Type K4L: 1.7 (l) x 0.7 (w) x 0.9 (h) in
Material of sensor heads	Type K4L: Stainless steel
Material of cable conduits	Type K4L: PVC
Temperature range	Type K4L: -22 ... +176 °F
Degree of protection	IP66 according to EN 60529 (IP67 and IP68 on request)
Standard cable lengths	Type K4L: 5.5 yd

Images



K4L transducers (dimensions in yd)



K4L transducers

Extension cable

Available lengths	5.5 ... 110 yd
Cable type	Coaxial
Material of cable jacket	TPE
Operating temperature	-40 ... +176 °F
Minimum bend radius	2.6 in

Cable connection

Connection types	Junction box
Termination into transmitter	Direct cable connection (terminal block)

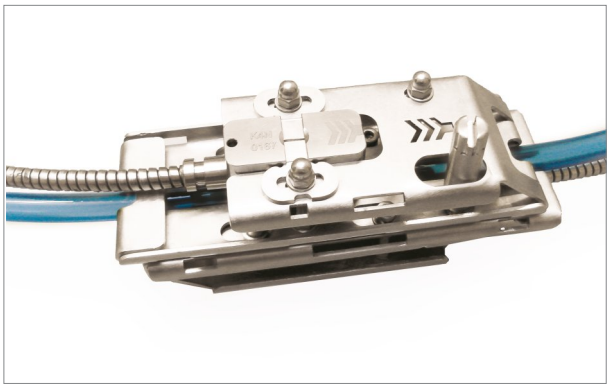
TRANSDUCER MOUNTING ACCESSORIES

General

Diameter range and mounting types	Clamping set (metal strap with screw), stainless steel: DN 0.4 ... 1.6 in Metallic straps and clamps: DN 1 ... 4 in Metallic straps and clamps: DN 4 ... 120 in Metallic mounting rail and straps (available on request): DN 2 ... 10 in or DN 2 ... 120 in
Mounting fixture for flexible hoses	Custom made mounting bracket, stainless steel (available on request)

Images

Metallic mounting rail with transducers



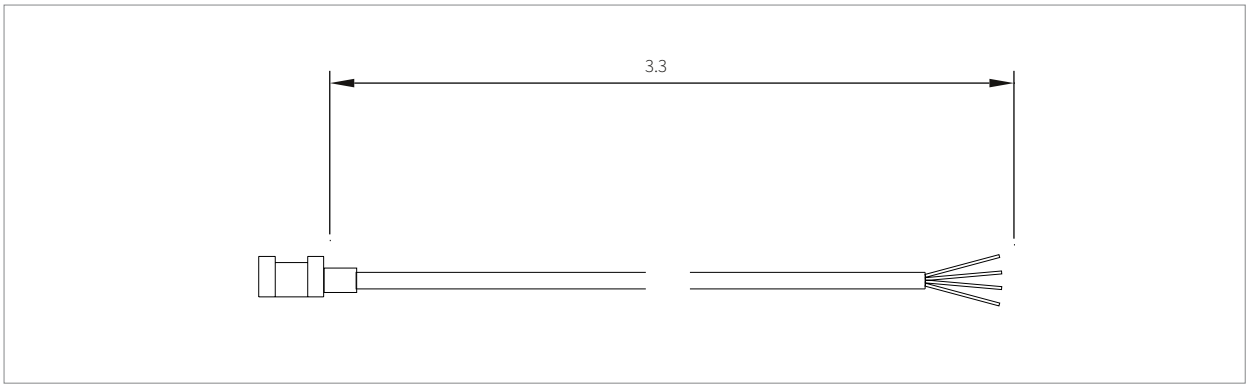
Example of mounting fixture for flexible hoses

PT 100 CLAMP-ON SENSORS

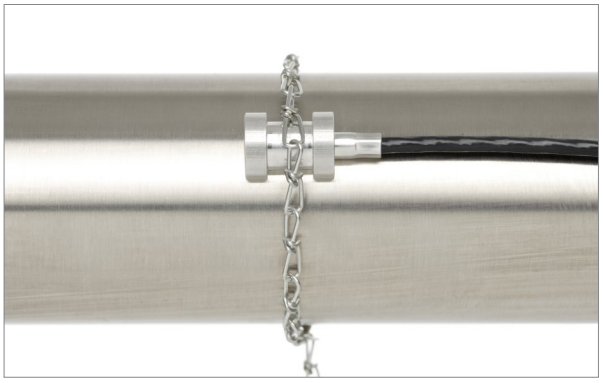
General

Type	Pt 100 (clamp-on sensors)
Measurement range	-22 ... +482 °F
Circuits	4-wire
Accuracy T	±(0.15 °F + 2 x 10^{-3} x T [°F]), class A
Accuracy ΔT	≤ 0.1 K (3 K < ΔT < 6 K) corresponding to EN 1434-1
Response time	50 s
Dimensions of sensor heads	0.8 (l) x 0.6 (w) x 0.6 (h) in
Material of sensor heads	Aluminum
Material of cable jacket	PTFE
Cable length	3.3 yd

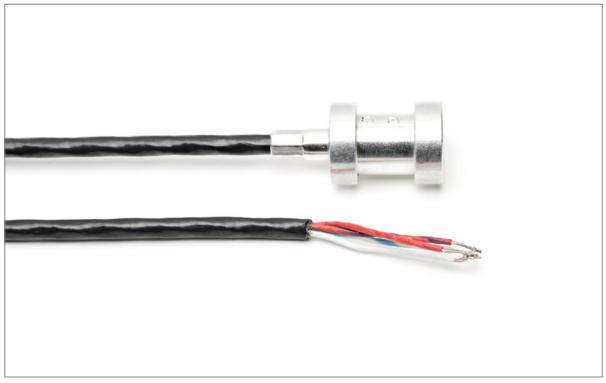
Images



Pt 100 transducer (in yd)



Pt 100 transducer fixed to pipe



Pt 100 with wired cable connection

TRANSMITTER AND ACCESSORIES

KF 100		Ultrasonic flow transmitter KATflow 100, one measurement channel, serial interface RS 232, operating instructions
		Configuration
	2	With LCD graphic display, 128 x 64 dots, backlit and 5-key keypad
		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	Die-cast aluminum, wall mounted, IP66
	Z	Special (please specify)
		Communication
	0	Without
	1	RS 232 serial interface
	2	Modbus RTU protocol[1]
	Z	Special (please specify)
		Process inputs/outputs (select a maximum of 4 slots)
	N	Without
	C	Current output, 0/4 ... 20 mA, active (source)
	P	Current output, 4 ... 20 mA, passive (sink)
	D	Digital output, open-collector
	R	Digital output, relay
	H	HART* compatible output, 0/4 ... 20 mA[1]
	V	Voltage output, 0 ... 10 V
	F	Frequency output, 2 Hz ... 10 kHz
	A	1 x Pt 100 input for temperature compensation (select TC function)[2]
	B	Current input, 0/4 ... 20 mA, active or passive (source/sink)
	Z	Special (please specify)
		Temperature compensation (TC)[2]/Heat quantity measurement (HQM)[3]
	0	Without
	1	With TC incl. 1 x Pt 100 sensor, 3.3 yd cable[2]
	2	With 1-channel HQM incl. 2 x Pt 100 sensor, 3.3 yd cable[3]
		Optional items
		Without (leave space blank)
	PS	2 in pipe stand
	PM	Pipe mounting bracket (diameter to be specified)
	HP	Hand-held programmer

KF 100 - 2 - 03 - 1 - 1 - 0 - C - 0 / (example configuration)

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

1) Modbus and HART* compatible outputs can not be used in conjunction with other output options. Please consult factory for more information.
2) For temperature compensation in cases of significant changes in medium temperature during measurement.
3) For contactless measurement of thermal energy consumption on a single circuit.

TRANSDUCERS AND ACCESSORIES

K4L	Transducer pair, pipe diameter range 0.4 ... 10 in, process temperature -22 ... +176 °F, including acoustic coupling paste								
K1P	Transducer pair, pipe diameter range 2 ... 20 in, process temperature -4 ... +122 °F, including acoustic coupling paste								
K1L	Transducer pair, pipe diameter range 2 ... 120 in, process temperature -22 ... +176 °F, including acoustic coupling paste								
Z	Special (please consult factory)								
	Internal code								
	03 Internal code								
		Degree of protection							
		1 IP66 (standard)							
		3 IP68 (please consult factory)							
		Z Special (please specify)							
			Transducer mounting accessories						
			0 Without						
			3 Clamping set DN 0.4 ... 1.6 in						
			4 Metallic straps and clamps DN 1 ... 4 in						
			5 Metallic straps and clamps DN 4 ... 120 in						
			7 Metallic mounting rail and straps DN 2 ... 10 in (optional for transducer type K4)						
			8 Metallic mounting rail and straps DN 2 ... 120 in (optional for transducer type K1)						
			Z Special (please specify)						
				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				
						C000 Wired transducer connection to transmitter			
					J Extension via junction box (transducer type L or P)				
						C005 With extension cable, 5.5 yd length			
						C010 With extension cable, 11 yd length			
						C___ With extension cable (specify length in yd)			
						Z Special (please specify)			
							Optional items		
							Without (leave space blank)		
							CA 5-point calibration with certificate		

K1L - 3 - 1 - 5 - 0 - J - C010 / ____ (example configuration)

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

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