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.

Portable

-30°C +250°C

Specification

- Pipediameterrange10mmto6,500mm
- Temperaturerangeforsensors
  -30 °C to +250 °C (-22 °F to +482 °F)
- Weight650g
- RobustIP65enclosurewithadded rubber shock protector
- Selectablethree-lineLCDdisplay and full keypad
- Batterylifeupto24hourswithstandard NiMH AA batteries for simple replacement

Fea tu res

- 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 environmentalconditions
  KATdata+softwarefordataevaluation

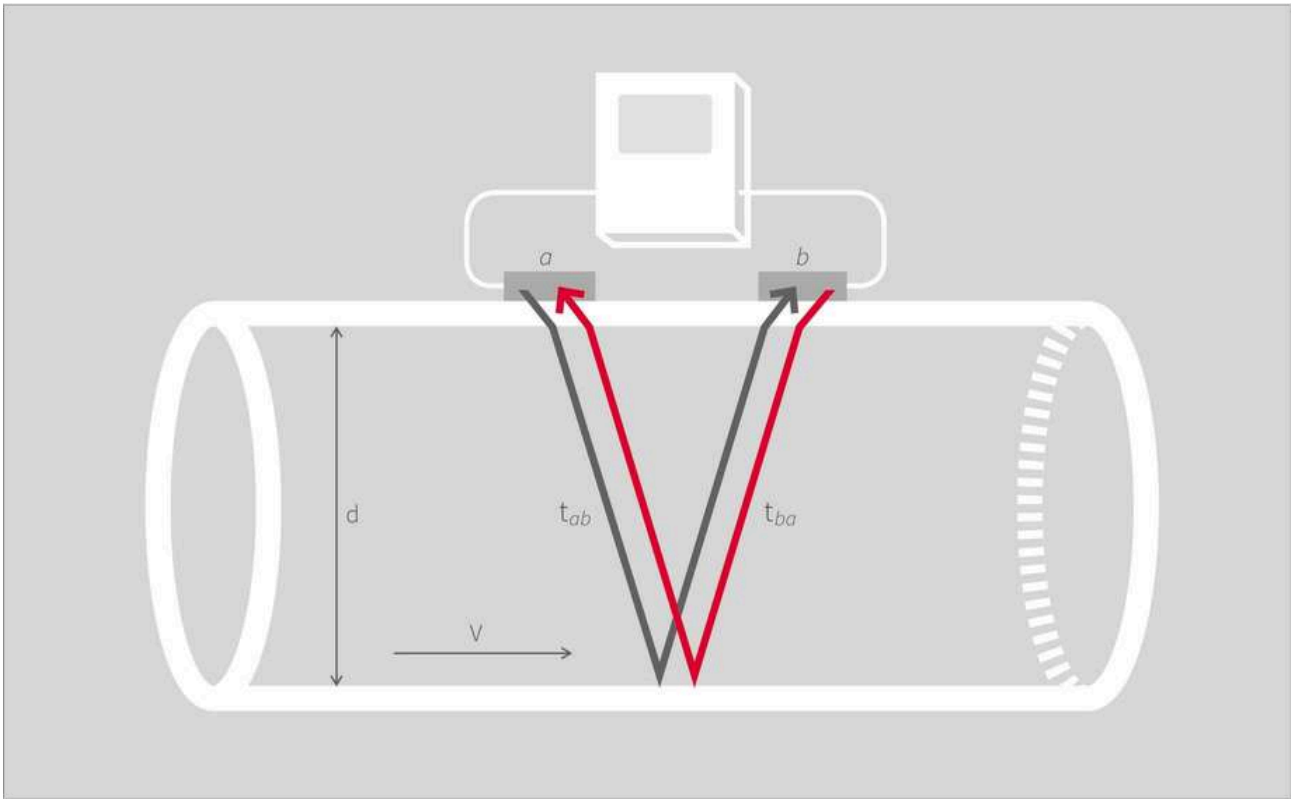
Applications

- Pump testing and inspection
- In-lineflowmeterperformanceverification
- Leakage and blockage detection
- Clean in process system (CIP) testing
- Monitoringofhydraulicsystems
- Clean room applications

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

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.



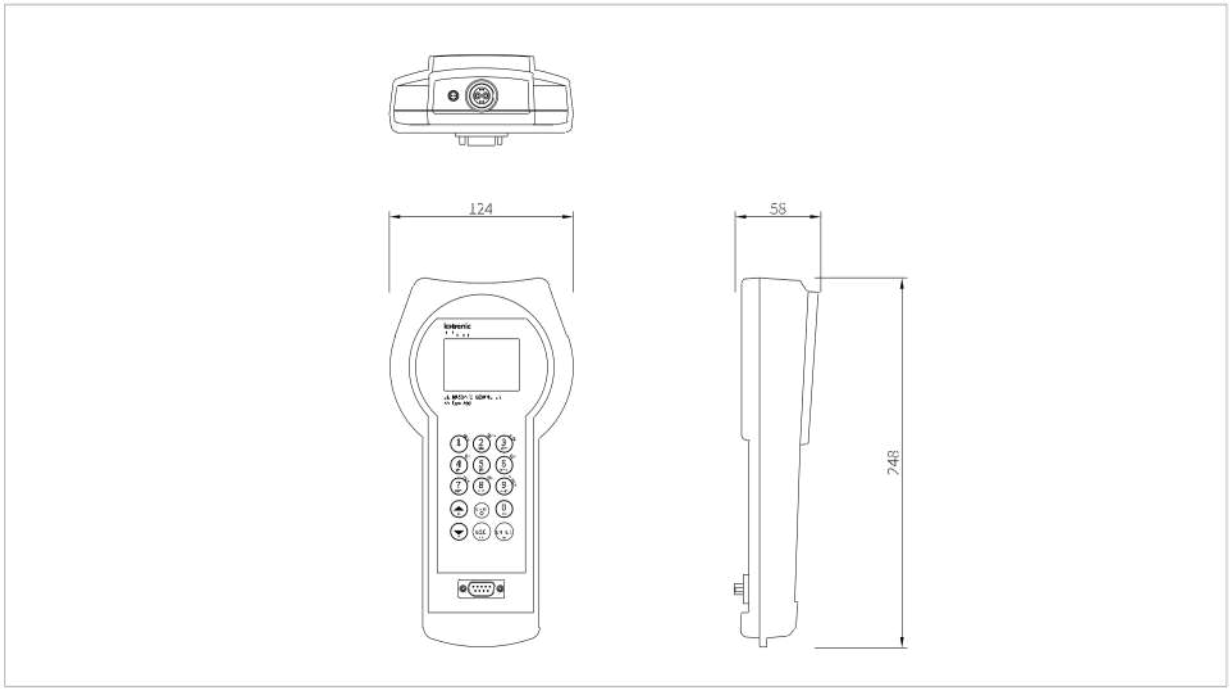
Sensors a and b work alternately to send and receive ultrasonic pulses. The sound wavesab travelling with the flow move faster than those travelling against it ba.

TechnicalData: Flowmeter

Performance

Measurement principle	Ultrasonictransit-timedifference
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	1 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
Operatingtemperature	-10 ... +60 °C (+14 ... +140 °F)
Housingmaterial	ABS (UL 94 HB)
Measurementchannels	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)
Operatingtime	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
Operatinglanguages	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,loggeddata

Images

KATflow 200 in crush-proof IP 67 transport case

KATflow 200 in operation

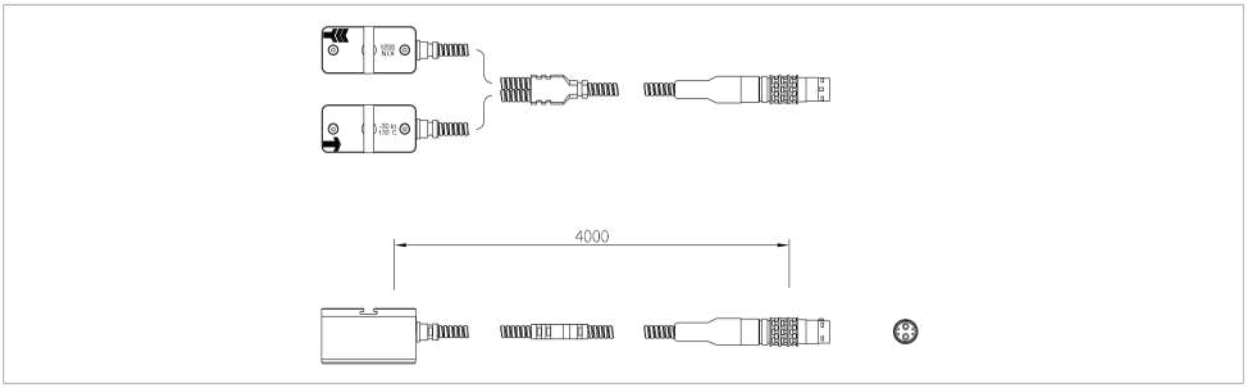
Internal data logger	
Storage capacity	Approx. 30,000 measurements (each comprising up to 10 selectable measurement units), logger size 5 MB Approx. 100,000 measurements (each comprising up to 10 selectable measurement units), logger size 16 MB
Logged data	All measured and totalised values, parameter 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	m3/h, m3/min, m3/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	m3, l, gal (US gallons), bbl
Mass	g, kg, t

TechnicalData: 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
Materialofsensorheads	Stainless steel
Materialofcableconduits	TypeK1L: PVC Type K1N/E: Stainless steel
Temperaturerange	TypeK1L: -30...+80°C(-22...+176°F) TypeK1N: -30...+130°C(-22...+266°F) TypeK1E: -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)
Sta n d a rd ca ble len gth s	TypeK1L: 5.0m Type K1N/E: 4.0 m

Images



K1 N /E tra n sd u cers

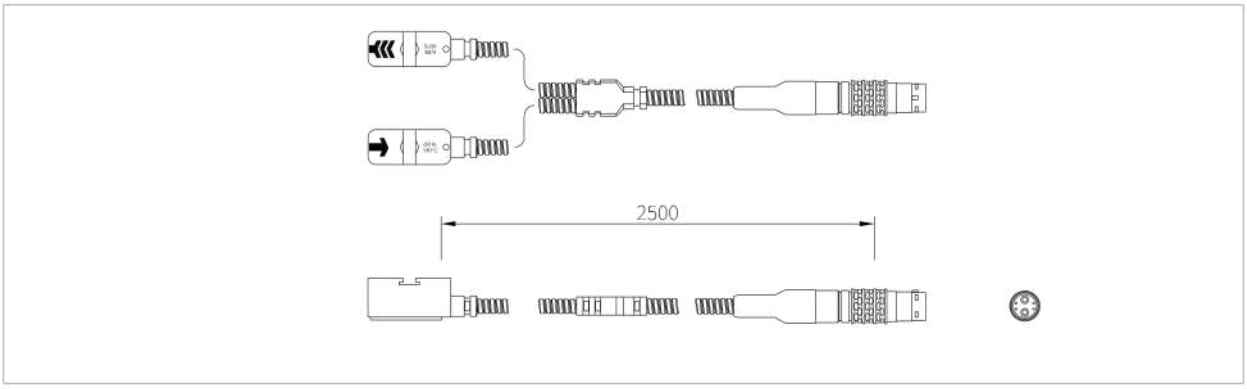
K1L transducers

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
Materialofsensorheads	Stainless steel
Materialofcableconduits	TypeK4L: PVC Type K4N/E: Stainless steel
Temperaturerange	TypeK4L: -30...+80°C(-22...+176°F) TypeK4N: -30...+130°C(-22...+266°F) TypeK4E: -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)
Sta n d a rd ca ble len gth s	TypeK4L: 5.0m Type K4N/E: 2.5 m

Images



K4N/E transducers

K4N/E transducers with ODU/LEMO connector

K4L transducers

TechnicalData: Transducer Mounting Accessories

General

Diameter range and mounting types

Clamping set (metal strap with screw), stainlesssteel: DN10...DN40

Clips and chains, chain length 1 m, stainlesssteel: DN15...DN310

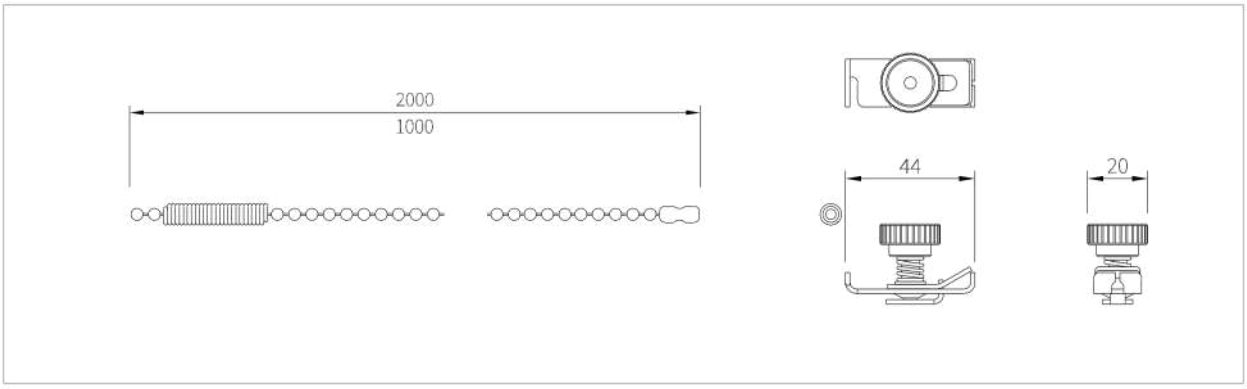
Clips and chains, chain length 2 m, stainlesssteel: DN25...DN600

Clips and chains, chain length 4 m (2 x 2 m), stainlesssteel: DN25...DN1,200

Textile tension straps, up to 15 m in length

DN 1,000 ... DN 3,000 (6,500)

Images



Mounting clip and chains for use with portable flowmeter

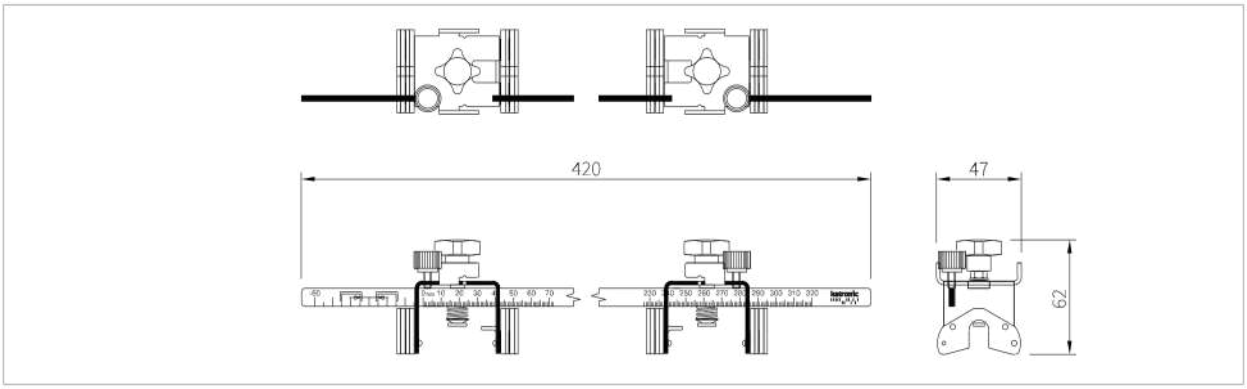
Mountingclip

Transducers mounted using chains and clips

General

Diameter range and mounting types	Mounting fixture, rail and magnets (for type K4) DN 10 ... DN 250 Mounting fixture, rail and magnets (for type K1) DN 50 ... DN 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

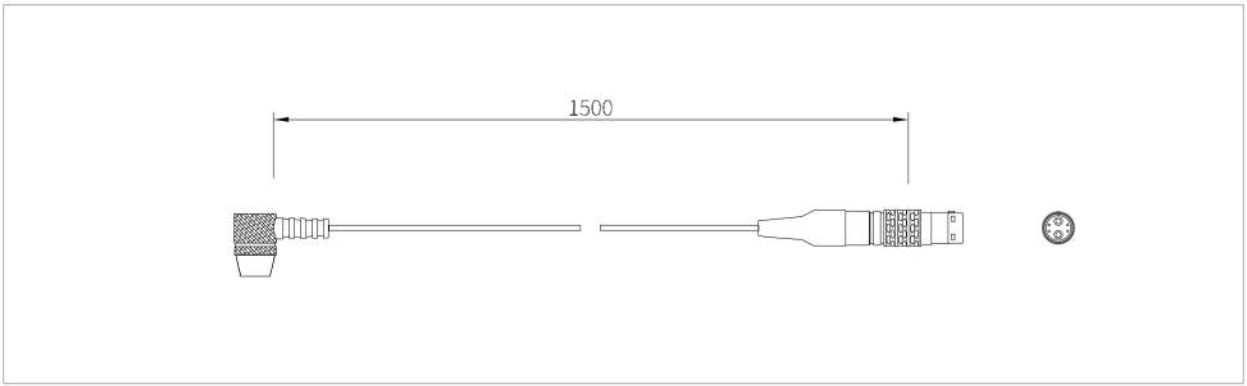
Example of mounting fixture for flexible hoses

TechnicalData: Wall Thickness Gauges (optional)

Wall thickness gauge NT	
Temperaturerange	-20 ... +60 °C (-4 ... +140 °F)
Measuringrange	1.0 ... 200 mm
Resolution	0.01 mm
Li n ea ri ty	0.1 mm
Cable length	1.5m

Wall thickness gauge HT	
Temperaturerange	0 ... +500 °C (+32 ... +932 °F)
Measuringrange	1.0 ... 200 mm
Resolution	0.01 mm
Li n ea ri ty	0.1 mm
Cable length	1.5m

Images



Wall thickness gauge NT

Wall thickness gauge NT in use (alternative design)

Wall thickness gauge HT in use

TechnicalData: TransportAccessories

Cru sh -proof tra n sport ca se	
Dimensions (external)	190 (h) x 480 (w) x 385 (d) mm
Wei gh t (em pty)	3.71 kg
Degree of protection	IP 67 according to EN 60529
Outsidematerial	Polypropylene/resincompound
Inside material	H i gh -d en si ty polyu reth a n e foa m

Soft transport case	
Dimensions (external)	240 (h) x 350 (w) x 180 (d) mm
Wei gh t (em pty)	500g No
Degree of protection	IP rating
Outsidematerial	N ylon N
Inside material	ylon

Images

Crush-proof IP 67 transport case

KATflow 200 soft transport case

Configuration Code: 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.

Configuration Code: 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 ... 6500					
				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.