

Ultrasonic Flowmeter

KATflow 120

- Dual mode flowmeter, wall mounted unit
- Easy to install clamp-on sensors with no process interruption
- Non-invasive flow measurement of liquids, with no pipeline disturbance
- Suitable for connection to Zone 1 or 2 hazardous area sensors
- Suitable for all commonly used pipe materials with pipe diameters from 6 mm to 6.5 m (1/4" to 256")
- 1 or 2 flow channels



Description

The KATflow range of non-invasive flowmeters utilises ultrasonic technology for the accurate flow measurement of liquids in full pipes.

The KATflow 120 is designed for permanent installation on applications where advanced options and configurations are required. The flowmeter includes a variety of input and output options for a variety of measurement requirements.

The measurement of flow is based on the principle that sound waves are influenced by a flowing medium. Measurements are made by penetrating the pipe with ultrasound and subsequently time differences, frequency variations and phase shifts of the ultrasonic signals are evaluated. This measuring technique has no effect on the flowing liquid. There is no pressure loss in the pipe and no wear on components of the measuring device.

The ultrasonic sensors are clamped onto the outside of the pipe, thus eliminating the need to dismantle the pipework and interrupt the process. The KATflow 120 can be applied to any type of standard pipe carrying clean or dirty liquids.

Advantages

- Low installation effort and costs
- Measurement is independent of fluid conductivity and pressure
- No pressure loss, no possibility of leakage
- Retrospective installation for existing plants possible
- No cutting of pipes necessary, no interruption of process, no plant shut down
- No additional fittings for maintenance required
- Hygienic measurement, no risk of contamination, suitable for ultra clean liquids
- No contact with medium, no risk of corrosion when used with aggressive media
- Cost advantages when used with large diameter pipes, high pressure systems, etc.

Specification

General

Measuring principle	: Ultrasonic time difference correlation principle and NoiseTrek™
Flow velocity range	: 0.01 ... 25 m/s
Resolution	: 0.025 cm/s
Repeatability	: 0.15 % of measured value ± 0.015 m/s
Accuracy	: <i>Volume flow</i> ± 1 ... 3 % of measured value depending on application, ± 0.5 % of measured value with process calibration <i>Flow velocity</i> ± 0.5 % of measured value
Turn down ratio	: 1/200
Gaseous and solid content of medium	: < 10 % of volume

Flow transmitter

Enclosure	: Wall mounted housing
Degree of protection	: IP 65 according EN 60529
Operating temperature	: -10 ... 60 °C (14 ... 140 °F)
Housing material	: Aluminium, powder coated
Flow channels	: 1 or 2
Power supply	: 100 ... 240 V AC / 9 ... 18 V DC / 18 ... 36 V DC / 36 ... 72 V DC
Display	: 2 x 16 digit LCD, dot matrix, backlit
Dimensions	: H 200 x W 280 x D 70 mm
Weight	: Approx. 2.8 kg
Power consumption	: < 15 W
Signal damping	: 0 ... 60 s
Response time	: 1 s, 70 ms optional
Measuring cycle	: 100 ... 1000 Hz, single channel
Calculation functions	: Average/difference/sum



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Flow transmitter (cont.)

Operating languages: Selectable between Danish, English, German, French, Dutch, Norwegian, Polish, Czech, Turkish

Quantity and units of measurement

Volumetric flow rate : m³/h, m³/min, m³/s, l/h, l/min, l/s, USgph (US gallons per hour), USgpm, USgps, bbl/d (barrels per day), bbl/min, bbl/s

Flow velocity : m/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

Heat flow : W, kW, MW (only with heat quantity measurement option)

Heat quantity : J, kJ, MJ (only with heat quantity measurement option)

Internal data logger

Storage capacity : approx. 27,000 (optional > 100,000) measuring values

Logging data : All measured and totalised values, parameter sets

Communication

Serial interface : RS 232 or RS 485

Data : Instantaneous measured value, parameter set and configuration, logged data

Software KATdata

Functionality : Downloading of measured values/parameter set, graphical presentation, list format, export to third party software, on-line transfer of measured data

Operating systems : Windows™ 95, 98, 2000, NT, XP

Process inputs

: Galvanically isolated from main electronics

Temperature : PT 100, four-wire circuit, measuring range - 50 ... 400 °C

Current : 0 ... 20 mA; R_i = 50 Ω

Voltage : 0 ... 1 V; R_i = 1 MΩ

Process outputs

: Galvanically isolated from main electronics

Current : 0/4 ... 20 mA; passive (U_{ext} < 24 V) or active (R_{ext} < 500 Ω)

Voltage : 0 ... 1 V or 0 ... 10 V, R_i = 500 Ω

Frequency : 0 ... 1 kHz or 0 ... 10 kHz; (OC)

Digital (pulse, status): Totaliser value 0.01 ... 1000 / unit; width 80 ... 1000 ms; (OC/Reed)

Reed = Reed-NO contact (300 V / 0.5 A)

OC = Open-Collector

Clamp-on sensors

Type M2N, M2E

Rated (possible)

diameter range : (50) 100 ... 6500 mm

Dimensions : 60 x 30 x 34 mm

Material : Stainless steel

Temperature range : *Type M2N*: -30 ... 130 °C (-22 ... 266 °F)
Type M2E: -30 ... 200 °C (-22 ... 392 °F), for short periods up to 300 °C (572 °F)

Degree of protection : IP 65 acc. EN 60529, IP 67 and IP 68 optional

Type Q3N, Q3E

Rated (possible)

diameter range : 10 ... 400 mm

Dimensions : 43 x 18 x 22 mm

Material : Stainless steel

Temperature range : *Type Q3N*: -30 ... 130 °C (-22 ... 266 °F)
Type Q3E: -30 ... 200 °C (-22 ... 392 °F), for short periods up to 300 °C (572 °F)

Degree of protection : IP 65 acc. EN 60529, IP 67 and IP 68 optional

Type Q4N-Ex, M4N-Ex (for use in hazardous areas Zone 1)

Rated (possible)

diameter range : *Type Q4N-Ex*: 10 ... 400 mm
Type M4N-Ex: (50) 100 ... 3000 mm

Dimensions : 60 x 30 x 34 mm

Material : Stainless steel

Temperature range : -20 °C ... 120 °C

Degree of protection : IP 65 acc. EN 60529

Protection concept : Encapsulation

Certification code : EEx m II T4 - T6

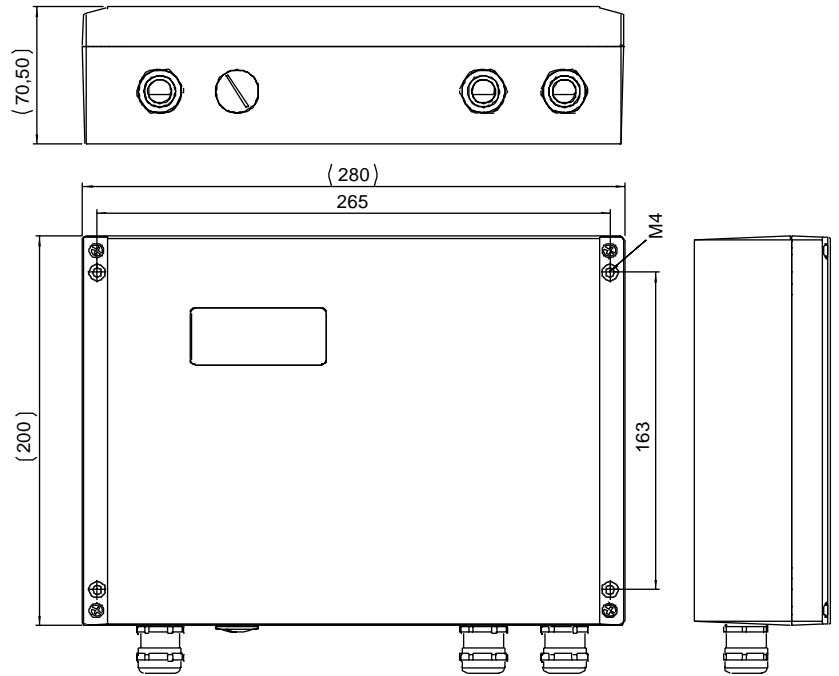
The sensors are suitable for use in hazardous areas classified as Zone 1 and 2. The transmitter unit must be placed in the safe area.

Special clamp-on sensors

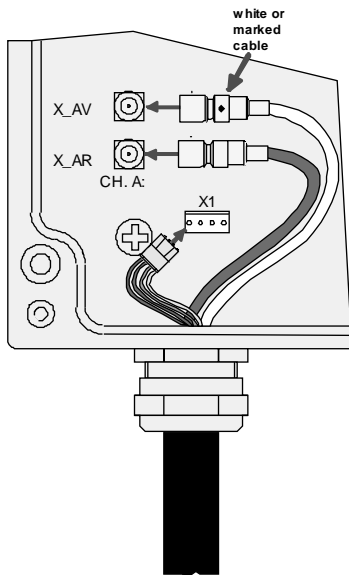
Type S2N : For very small pipe diameters 6 ... 40 mm

Gas flow : On request, please consult sales department.

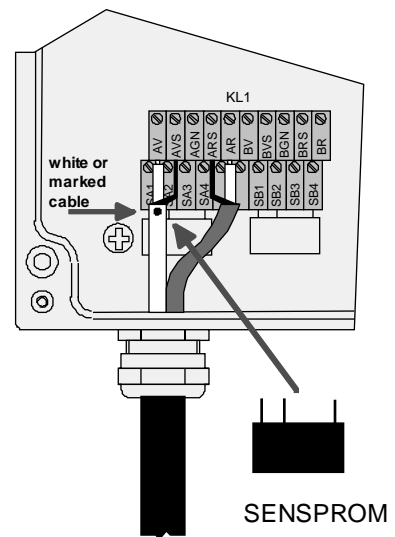
External dimensions



Flowmeter *KATflow 120* (wall mounted unit)



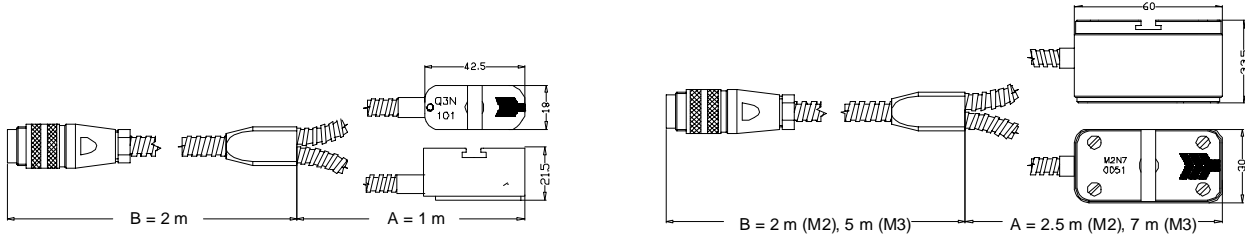
Sensor connection for transducers with Amphenol connectors



Sensor connections for transducers with junction box

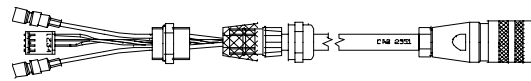
Clamp-on Sensors

With Amphenol connector



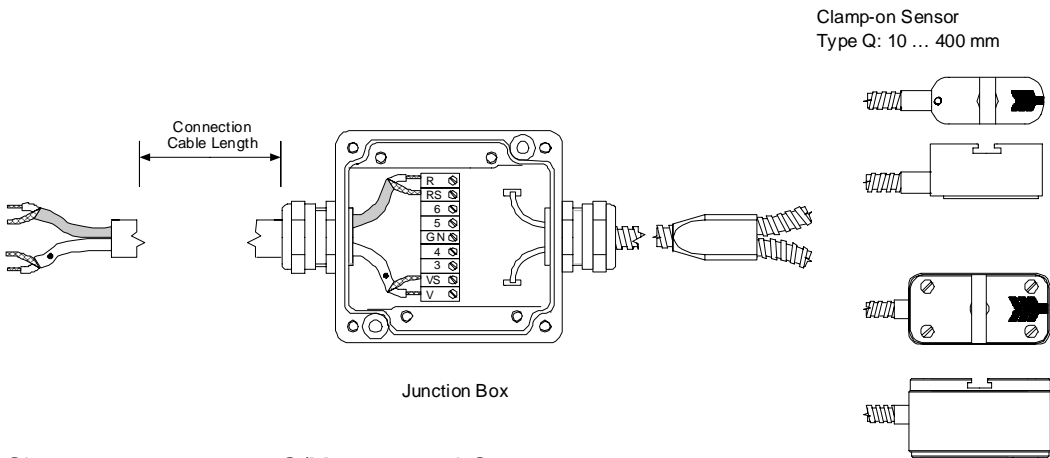
Clamp-on sensors type Q3x-7-1-xx-A-C_ _ _

Clamp-on sensors type Mxx-7-1-xx-A-C_ _ _



Connection cable

With junction box

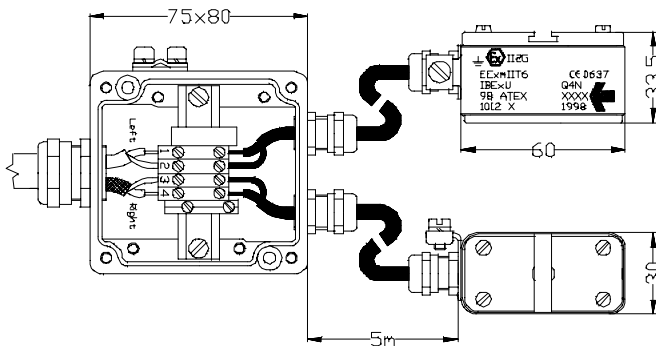


Clamp-on sensors type Q/Mxx-7-1-xx-J-C_ _ _

Clamp-on Sensor
 Type Q: 10 ... 400 mm

Clamp-on Sensor
 Type M: (50) 100 ... 6500 mm

Hazardous area sensors



Clamp-on sensors type Q/M4N-Ex-7-1-xx-J-C_ _ _



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Order code	KF120 - x - x - x - x - x x x x - x x - x - x - x - x x									
Number of flow channels:										
1 flow channel	1									
2 flow channels	2									
Special (please specify)	Z									
Power supply:										
100 ... 240 V AC, 50/60 Hz	1									
18 ... 36 V DC	2									
Special (please specify)	Z									
Enclosure type:										
Aluminium, wall mount, IP 65	1									
Special (please specify)	Z									
Serial communication:										
None	0									
RS 485	1									
Special (please specify)	Z									
Process outputs:										
<i>Slot 1</i>										
Without		N								
Current 0/4 ... 20 mA, active (source)		C								
Current 0/4 ... 20 mA, passive (sink)		P								
Voltage 0 ... 1 V		U								
Voltage 0 ... 10 V		V								
Frequency 0 ... 1 kHz		F								
Frequency 0 ... 10 kHz		G								
Digital (pulse/status), Open-Collector		D								
Digital (pulse/status), relay		R								
Special (please specify)		Z								
<i>Slot 2</i>										
<i>Slot 3</i>										
<i>Slot 4</i>										
Process inputs:										
<i>Slot A</i>										
Without						N				
2 x PT100 temperature input						A2				
2 x current 0/4 ... 20 mA, active (source)						B2				
2 x current 0/4 ... 20 mA, passive (sink)						E2				
2 x voltage 0 ... 1 V						H2				
Special (please specify)						Z				
<i>Slot B</i>										
Internal data logger:										
Standard 27,000 values							1			
Extended 100,000 values							2			
Special (please specify)							Z			
Heat quantity measurement (HQM):										
Without								0		
With heat quantity measurement incl.								1		
2 x PT100 clamp-on temperature sensors										
Special (please specify)								Z		
Sound velocity measurement (SVM):										
Without									0	
With sound velocity measurement incl. current output (source)					C				1	
Special (please specify)									Z	
Options:										
Without									0	0
Suitable for connection with hazardous area sensors									Ex	
Special (please specify)									Z	
Without data logger download software										0
With data logger download software incl. cable										1

Flowmeter

Notes:

* Please select the required type of process output as per coding for slot 1.

** Please select the required type of process inputs as per coding for slot A.

*** For HQM functionality, selection of process inputs required.

Ordering example:

KF120-2-1-1-1-CCNN-A2N-1-1-0-00

Ultrasonic flowmeter **KATflow 120**, 2 flow channels, power supply 100 ... 240 V AC, 50/60 Hz, wall mounted aluminium enclosure IP 65, with serial interface RS 485, 2 x 0/4 ... 20 mA current output (source), 2 x PT100 temperature inputs, standard data logger, with heat quantity measurement incl. 2 x PT100 sensors, no sound velocity measurement, no options

Order code	Clamp-on transducer	xxx	-	x	-	x	-	x	-	x	-	x	xxx
Pipe diameter range:													
6 ... 40 mm	S2N												
10 ... 400 mm	Q3												
10 ... 400 mm with hazardous area approval	Q4N-Ex												
(50) 100 ... 2500 mm	M2												
(50) 100 ... 6500 mm	M3N												
(50) 100 ... 3000 mm with hazardous area approval	M4N-Ex												
Special (please specify)	Z												
Temperature range *):													
For hazardous area sensors -30 ... 120 °C	N-Ex												
Standard -30 ... 130 °C	N												
Extended - 30 ... 200 (300) °C	E												
Special (please specify)	Z												
Internal code:													
Always				7									
Degree of protection:													
IP 65 (standard)						1							
Special (please specify)						Z							
Transducer mounting accessories:													
No mounting accessories								0					
With metallic straps & clamps, DN 40 ... 100								1					
With metallic straps & clamps, DN 100 ... 3000								2					
With clamping set DN 10 ... 40								3					
With mounting fixture, rail and chains DN 6 ... 40 (always for S2N)								7					
Special								Z					
Without stainless steel tag									0				
With stainless steel tag (please specify text)									1				
Electrical connections:													
With Amphenol connector										A			
With junction box										J			
Special (please specify)										Z			
Connection cable:													
Without												C 000	
10 m cable length												C 010	
Special (specify in meter)												C ____	

Note:
 *) Scope of supply includes acoustic coupling gel.

Clamp-on flow sensors

Ordering examples:

Q3N-7-1-10-A-C010

Clamp-on transducer for pipe diameter range 10 ... 400 mm, standard temperature range -30 ... 130 °C including acoustic coupling component, degree of protection IP 65, with metallic straps and clamps DN 40 ... 100, no stainless steel tag, with Amphenol connector, 10 m connection cable

M2E-7-1-20-J-C020

Clamp-on transducer for pipe diameter range (50) 100 ... 2500 mm, extended temperature range -30 ... 200 (300) °C including acoustic coupling gel, degree of protection IP 65, with metallic straps and clamps DN 100 ... 3000, with junction box, 20 m connection cable