INLEC.COM

DATASHEET

WHY BUY WHEN YOU CAN HIRE

Portable Ultrasonic Flowmeter
*KAT*flow 220

- **Portable dual mode flowmeter**

- **Easy to install clamp-on sensors with no process interruption**

- **Non-invasive flow measurement of liquids, no pipeline disturbance, no pressure loss**

- **Suitable for all commonly used pipe materials with pipe diameters from 6 mm to 6.5 m (1/4" to 256")**

- **Integrated wall thickness measurement, 2 flow channels as standard**

Description

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

The portable device has been designed to meet the needs of the Service/Maintenance and Commissioning Engineer wishing to check the flow rate of liquids at different locations in the plant. The set-up of the unit is simple and user friendly in order to obtain the required flow information in minutes.

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.

The ultrasonic sensors are clamped onto the outside of the pipe, thus eliminating the need to dismantle the pipework and interrupt the process. The *KAT*flow 220 can be applied to any type of standard pipe carrying clean or dirty liquids.

Advantages

- Low installation effort and costs
- Dual measuring mode (transit-time and Doppler-NoiseTrek™)
- 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 Doppler-NoiseTrek™
Flow velocity range	:	0.01 ... 25 m/s
Resolution	:	0.25 mm/s
Repeatibility	:	0.15 % of measured value ± 0.01 m/s
Accuracy	:	*Volume flow* ± 1 ... 3 % of measured value depending on application, ± 0.5 % of measured value with process calibration *Flow velocity* ± 0.5 % of measured value
Rangeability	:	1/2500
Turn down ratio	:	1/100
Measurable liquids	:	All acoustically conductive liquids with a gas or solid content of < 10 % of volume

KATRONIC

Flowmeter

Enclosure	: Portable
Degree of protection	: IP 54 according EN 60529, IP 67 optional
Operating temperature	: -10 ... 60 °C (14 ... 140 °F)
Housing material	: Aluminium, powder coated
Flow channels	: 2
Power supply	: Internal rechargeable battery 6 V/4 Ah or external power supply 9 ... 15 V DC
Operating time	: > 14 h with fully charged battery
Display	: 2 x 16 digit LCD, dot matrix, backlit
Dimensions	: H 118 x W 276 x D 310 mm (with handle)
Weight	: 3.5 kg
Power consumption	: < 2.5 W in measurement mode
Signal damping	: 0 ... 60 s, configurable
Response time	: 1 s, 70 ms optional
Measuring cycle	: 100 ... 1000 Hz, single channel
Calculation functions	: Average/difference/sum
Operating languages	: Selectable between Danish, English, German, French, Dutch, Norwegian, Polish, Czech, Turkish, other languages on request

Quantity and units of measurement

Volumetric flow rate	: m^3/h, m^3/min, m^3/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	: 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)

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
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, ME, NT, 2000

Process inputs

	: Galvanically isolated from main electronics
Temperature	: PT 100, four-wire circuit, measuring range -50 ... 400 °C
Current	: 0/4 ... 20 mA, R_i = 50 Ω
Voltage	: 0 ... 1 V, R_i = 1 $M\Omega$

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 M

Rated (possible) diameter range	: (50) 100 ... 2500 ... 6500 mm
Dimensions	: 60 x 30 x 34 mm
Material	: Stainless steel
Temperature range	: *MxN* -30 ... 130 °C (-22 ... 266 °F) *MxE* -30 ... 200 °C (-22 ... 392 °F) for short periods up to 300 °C (572 °F) Specials up to 500 °C
Degree of protection	: IP 65 acc. EN 60529, IP 67 or IP68 optional

Type Q

Rated diameter range	: 10 ... 400 mm
Dimensions	: 43 x 18 x 22 mm
Material	: Stainless steel
Temperature range	: *Q3N* -30 ... 130 °C (-22 ... 266 °F) *Q3E* -30 ... 200 °C (-22 ... 392 °F) for short periods up to 300 °C (572 °F) Specials up to 500 °C
Degree of protection	: IP 65 acc. EN 60529, IP 67 or IP 68 optional

Special clamp-on sensors

Type S	: For very small pipe diameters 6 ... 40 mm
Type K	: For very large pipe diameters 400 ... 6500 mm and liquids with very high solid/gas content
Other types	: Hazardous area sensors, specials on request

Wall thickness measurement

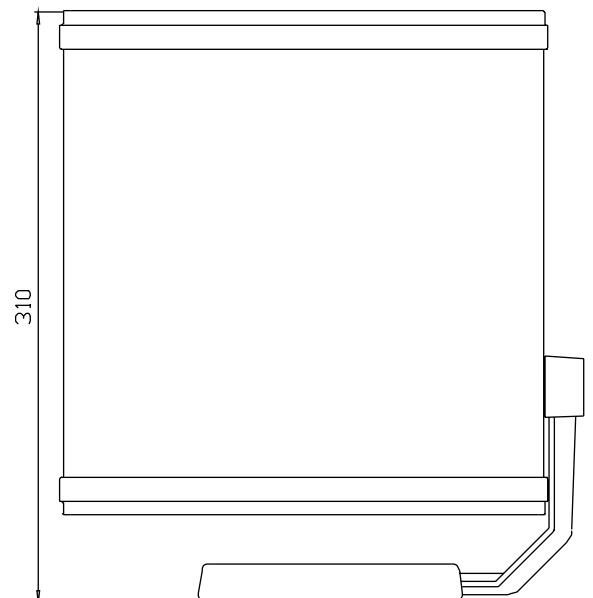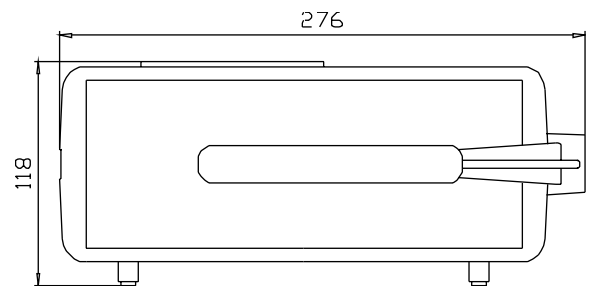|	
Measuring range	: 1.0 ... 200 mm
Resolution	: 0.01 mm
Linearity	: 0.1 mm
Temperature range	: Standard version NT -20 ... 60 °C High temperature HT version 0 ... 200 °C, for short periods up to 540 °C

![KATRONIC]

Accessories

- External power supply 230 V, 50Hz/12 V, 1.2 A; IP 30
- Car power adapter 12 V, 2 A
- Soft carying case
- Cable extension 5 m, 10 m or 20 m
- Sensor mounting fixtures
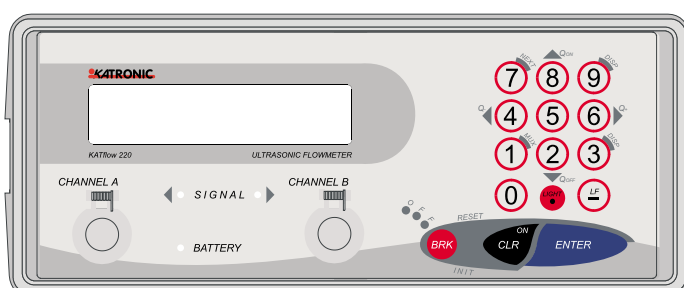- External printer, ink jet 192 dpi

Recommended spares

- Acoustic coupling component
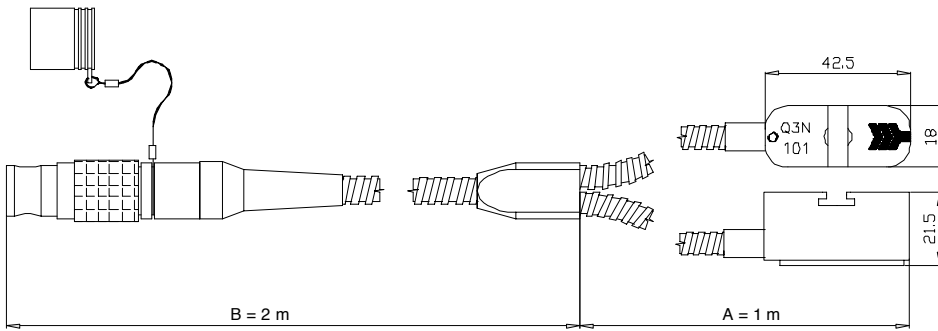- Transducer mounting clips and chains, chain repair set

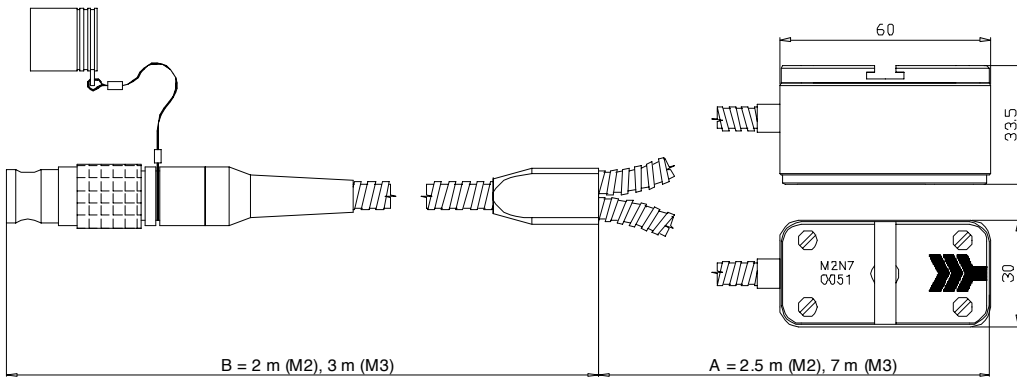## External dimensions

Portable flowmeter
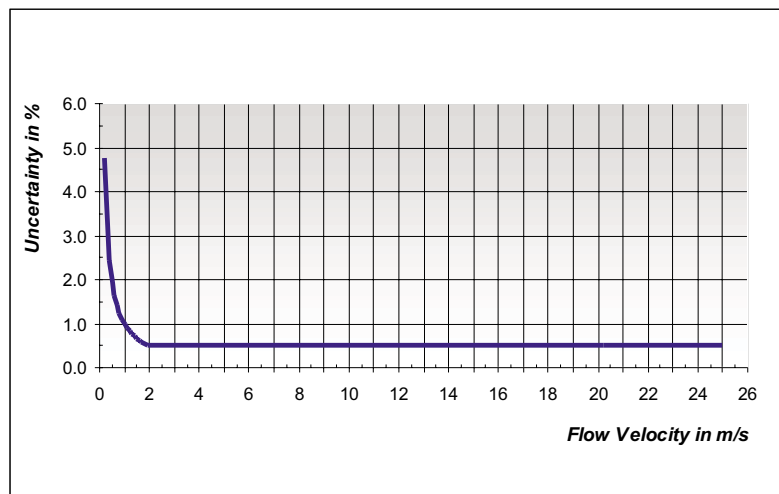**KATflow 220**

Front panel - portable flowmeter
KATflow 220

42.5

18

Q3N
101

21.5

B = 2 m

A = 1 m

Clamp-on sensors type Q3x-7-1-00-P-E000 for pipe
diameters DN 10 ... 400

60

33.5

M2N7
0051

30

B = 2 m (M2), 3 m (M3)

A = 2.5 m (M2), 7 m (M3)

Clamp-on sensors type Mxx-7-1-00-P-E000 for pipe
diameters DN (50) 100 ... 2500 ... 6500

Uncertainty specification *KA*Tflow ultrasonic flowmeters

Uncertainty in %

6.0
5.0
4.0
3.0
2.0
1.0
0.0

0   2   4   6   8   10   12   14   16   18   20   22   24   26

Flow Velocity in m/s

KATRONIC

Order code   KF220 - x - x - x - x x x x - x   x - x - x - x - x - x

Portable flowmeter

Configuration:

Basic unit without accessories	0
With standard accessories *)	1
Special (please specify)	

Power cord:

Without	0
UK	1
US	2
Europe	3
Special (please specify)	Z

Degree of protection:

IP 54 (standard)	1
IP 67	2
Special (please specify)	Z

Process outputs:

Slot 1

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

Slot 2 *
Slot 3 *
Slot 4 *

Process inputs:

Slot A

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

Slot B **

Internal data logger:

Without	0
Standard 27,000 values incl. software/cable	1
Extended 100,000 values incl. software/cable	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	C	1
incl. current output (source)		
Special (please specify)		Z

Wall thickness measurement (WTM):

Without	0
With wall thickness probe NT incl. cable	1
With wall thickness probe HT incl. cable	2

Options:

Without	0
Suitable for connection with hazardous area sensors	Ex
Special (please specify)	Z

Notes:

*) Standard accessories include transport case, power adapter and battery charging unit, operating instructions and measuring tape

* 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:

KF220-1-1-1-CNNN-A2N-1-1-0-1-0
Portable flowmeter **KAT**flow 220 including standard accessories, UK power cord, degree of protection IP 54, 1 x 0/4 ... 20 mA current output (source), 2 x PT100 temperature inputs, standard data logger including software/ cable, with heat quantity measurement, no sound velocity measurement, with wall thickness probe NT including cable, no options

![KATRONIC logo]

Order code	Clamp-on transducer	x x x - x - x - x x - x - x xxx

Pipe diameter range:

6 ... 40 mm	S 2 N								
10 ... 400 mm	Q 3								
(50) 100 ... 2500 mm	M2								
(50) 100 ... 6500 mm	M3 N								
Special (please specify)	Z								

Temperature range:

Standard -30 ... 130 °C	N
Extended - 30 ... 200 (300) °C	E
Special (please specify)	

Internal code:

Always	7

Degree of protection:

IP 65 (standard)	1
Special (please specify)	Z

Transducer mounting accessories:

No mounting accessories	0
With clips and chains DN 15 ... 310	4
With clips and chains DN 25 ... 600	5
With clips and chains DN 25 ... 1200	6
With mounting fixture, rail and chains DN 6 ... 40 (always for S2N)	7
With mounting fixture, rail and magnet DN 10 ... 250 (optional for Q3)	8
With mounting fixture, rail and magnets DN 50 .... 3000 (optional for M)	9
Always	0

Electrical connections:

With LEMO connector (for portable units)	P
Special (please specify)	Z

Extension cable:

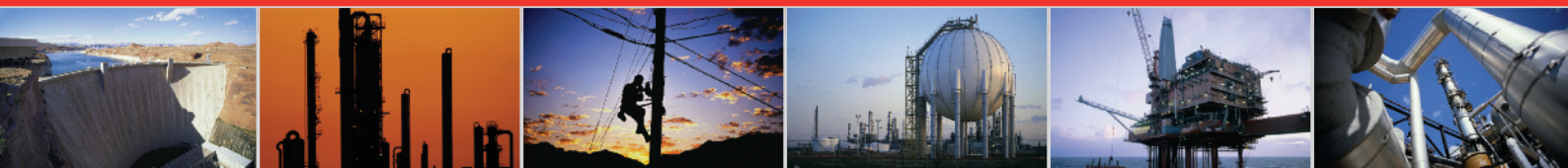|	
Without	E 000
5 m cable length	E 005
10 m cable length	E 010
Special (specify in meter)	E ___

Clamp-on flow sensors

Ordering examples:
Q3N-7-1-40-P-E000
Clamp-on transducer for pipe diameter range 10 ... 400 m, standard temperature range -30 ... 130 °C, degree of protection IP 65, with mounting clips and chains DN 15 ... 310, with LEMO connector (for portable unit), no extension cable

M2E-7-1-90-P-E010
Clamp-on transducer for pipe diameter range (50) 100 ... 2500 mm, extended temperature range -30 ... 200 (300) °C, degree of protection IP 65, with mounting fixture, rail and magnets DN 50 ... 3000 with LEMO connector (for portable unit), with extension cable 10 m length

INLEC, supporting you to deliver a world class service, every day, in every sector ...

OUR COMMITMENT TO YOU

A wealth of knowledge and experience.

You can take advantage of expert advice to ensure you get the best, most appropriate and cost effective equipment for the job. We supply a wide variety of industries, so if there is another way to do the job or save you time and money we'll pass on the benefit of our experience for free.

Honest advice, just a phone call away.

If we don't have a particular item, rather than hiring you something that won't do the job, we would rather direct you to an alternative supplier. You will always be provided with full instructions and if you still need help, call our technical team on Nationwide Low Call 0333 6000 600. Our aim is to save you time, frustration and money.

Top quality equipment from major manufacturers.

With Inlec you'll get the most accurate, reliable and well-maintained equipment available. Prices are regularly reviewed to ensure you always enjoy the best value for money. We have made a significant investment in test equipment so we ensure that it's well packed to minimise damage and delay.

We really do listen to you.

You won't waste your time contacting Inlec. Every request for equipment is logged and carefully considered. Listening to our customers helps keep our product range up to date and relevant. If you are unhappy about any aspect of our service please let us know so we can put it right.

YOUR 5 WAY GUARANTEE

❶ GUARANTEE SAME DAY DESPATCH

We understand why prompt delivery is important to you. So, if we confirm your order before 3pm, you are guaranteed same day despatch.

❷ OUR PRICE GUARANTEE

Inlec guarantee you real value for money. Our price match policy is simple - if you can hire the same product for less elsewhere, we guarantee to match that price and reduce it by a further 10% of the difference - and still deliver our industry leading technical and customer support.

For full details check our price-match guarantee online

❸ TOP QUALITY GUARANTEED

All equipment is thoroughly checked prior to dispatch to ensure you receive it in full, safe working order. Your shipment will be securely packed and include manufacturer's instructions, accessories or consumables and a valid calibration certificate where appropriate. In addition, Inlec offer a 24 hour replacement service if you decide the equipment is not suitable for your application*.

❹ FRIENDLY, KNOWLEDGEABLE ADVICE GUARANTEED

Inlec are happy to provide you with free advice, from anunbeatable team of experienced, knowledgeable and friendly engineers and hire experts.

❺ YOUR GUARANTEE OF THE BEST CUSTOMER SERVICE

Throughout your hire we will work hard to ensure you enjoy the very best in support and service from Inlec. We guarantee you won't find better service anywhere in the industry.

*subject to availability and conditions

Europe's leading Test Equipment Hire Specialist

Nationwide Low Call 0333 6000 600
Online: www.inlec.com

LAB NO. 0535

CERT. NO. GB93/1773

Inlec UK Ellerbeck Way, Stokesley Business Park, Stokesley N Yorkshire TS9 5JZ United Kingdom