

# Ultrasonic Flowmeter

## KAT-PLUS L

The KAT-PLUS L range of non-invasive flowmeters utilises ultrasonic technology for the accurate flow measurement of liquids in full pipes. The field mounted flow transmitter can be configured via keypad without any additional programming devices and is available as single or dual channel unit. 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 ultra-sound 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 KATPLUS-L can be applied to any type of standard pipe carrying clean or dirty liquids.

## FEATURES

- Dual mode flowmeter mounted in IP 65 field enclosure
- 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 10mm to 6.5mm
- 1 or 2 flow channels

## 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.
- Low stocking costs, nearly all pipe sizes are covered with only 2 types of sensors



## SPECIFICATION

### General

**Measuring Principle** Ultrasonic time difference correlation principle and Noise Trek™

**Flow Velocity Range** 0.01...25m/s  
**Resolution** 0.025 cm/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 ±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** IP65 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 Vac / 9 ... 18 Vdc / 18 36 Vdc / 36 ... 72 Vdc

**Display** 2 x 16 digit LCD, dot matrix, backlit

**Dimensions** H200 x W280 x D70mm  
**Weight** Approximately 2.8kg  
**Power Consumption** <15W  
**Signal Damping** 0 ... 60s  
**Response Time** 1s  
**Measuring Cycle** 100...10000 Hz, single channel  
**Calculation Functions** Average/difference/sum  
**Operating Languages** Selectable between Danish, English, German, French, Dutch, Norwegian, Polish, Czech, Turkish

### Communication

**Serial Interface** RS485 optional  
**Process Outputs** Galvanically isolated from main electronics

**Current** 0/4 ... 20mA; passive (U ext <24V) or active (R ext <500\_))

**Voltage** 0 ... 1V or 0 ... 10V, Ri = 500ohms

**Frequency** 0 ... 1 kHz or 0 ... 10 kHz; (OC)  
**Digital (Plus, Status)** Totaliser Value 0.01 ... 1000/unit; width 80 ... 1000 ms; (OC/Reed) Reed = Reed-NO contact (300 V/0.5A)  
OC=Open-Collector

### Quantity and Units of Measurement

**Volumetric Flow Rate** m<sup>3</sup>/h, m<sup>3</sup>/min, m<sup>3</sup>/s, L/h, L/min, L/s, USgph, bls/d (barrels per day)  
**Flow Velocity** m/s, inch/s  
**Mass Flow Rate** g/s, t/h, kg/h, kg/min  
**Volume** m<sup>3</sup>, L, gal (gallons)  
**Mass** g, kg, t

### Clamp-on Sensors

**Type M2N, M2E**  
**Rated (Possible)** (50) 100 ... 6500mm  
**Diameter Range**  
**Dimensions** 30 x 33 x 60mm  
**Material** Stainless Steel  
**Temperature Range** M2N: -30 ... 130°C  
M2E: -30 ... 200°C for short periods up to 300°C

**Degree of Protection** IP 65 acc EN 60529, IP 67 optional

### Type Q3N, Q3E

**Rated (Possible)** (10) 25 ... 400 (1000)mm  
**Diameter Range**  
**Dimensions** 16 x 18 x 33mm  
**Material** Q3N: -30 ... 130°C  
Q3E: -30 ... 200°C for short periods up to 300°C  
**Degree of Protection** IP 65 acc. EN 60529, IP 67 optional

### Type Q4N-Ex, M4N-Ex

**(For use in hazardous areas Zone 1 and 2)**  
**Rated (Possible)** Q4N-Ex: DN (10) 25  
**Diameter Range** 400 (1000) M4N-Ex: DN (50) 100 ... 3000  
**Dimensions** 30 x 33 x 60mm  
**Material** Stainless Steel  
**Temperature Range** -20°C ... 120°C  
**Degree of Protection** IP 65 acc EN 60529, IP 67 optional  
**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 (max cable length = 200m)

## ACCESSORIES

- Cable extension 10m, 20m, 50m special
- Sensor positioning rail for sensors type Q3, stainless steel V2A

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