

FLOWMETERING SYSTEM:

- Flowmeter with one or two measurement channels, graphic LCD display, internal datalogger and input/output options
- For commonly used pipe materials and diameters from 10 mm to over 3.0 m
- Intuitive menu, Setup Wizard and Audible Sensor Positioning Assistant™ for easy and quick setup and installation
- Transit-time correlation measurement using dual DSP-technology for better measurement accuracy
- Heat Quantity Measurement capability and Ex approved instrument versions
- 230 Volt plug *standard*
- Batterypack *optional*
- Remote measurement read out - GPRS based *optional*
- Pressure Transmitter *optional*



Features

- Lockable and sturdy IP 67 transmitter enclosure with keypad and multifunctional display
- Bi-directional measurement with totalizer function and process input, output and serial communication options including Modbus and HART
- Available with optional Heat Quantity Measurement function and PT100 clamp-on sensors for contactless metering of thermal energy consumption
- Optional Sound Velocity Measurement and output function for contactless product recognition and interface detection
- Transmitter and transducer options approved for use in hazardous areas Zone 1 or 2 - *optional*
- KATdata+ software for offline/online data transfer via RS 232 or USB cable
- Batterypack for long term use - *optional*

Description

The UFM-70 FS is the premier flowmetering system for flexibility and performance, providing you with a comprehensive specification and a list of configuration options. The practical modular design and the wide variety of different transmitter and transducer versions available ensure this system is suitable for everything from simple water flow measurements to energy flow monitoring, automated process control and installation in hazardous areas.

The UFM-70 FS flowmetering system is non-invasive and works on the transit time ultrasonic principle. U-F-M uses clamp-on transducers which are mounted externally on the surface of the pipe. They 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 very accurate results. The advanced electronics of the flowmeter compensate for and adapt to changes in the flow profile and medium temperature to deliver reliable measurements.

The incorporated KATflow 150 is an ultrasonic flowmeter which can be supplied with one or two measurement channels. This enables the flowmeter to simultaneously monitor up to two separate pipes. Alternatively, a dual-channel setup can be used for a multi-path mounting configuration of the sensors on one single pipe.

Additionally, the UFM-70 FS offers optional functions for level, heat quantity and concentration measurement with process input, output and serial GPRS based communication (Netbiter). These features can be complemented by a pressure transmitter to measure flow and pressure simultaneously, an external battery pack for long term use, an internal datalogger and software for the recording and download of measured values.

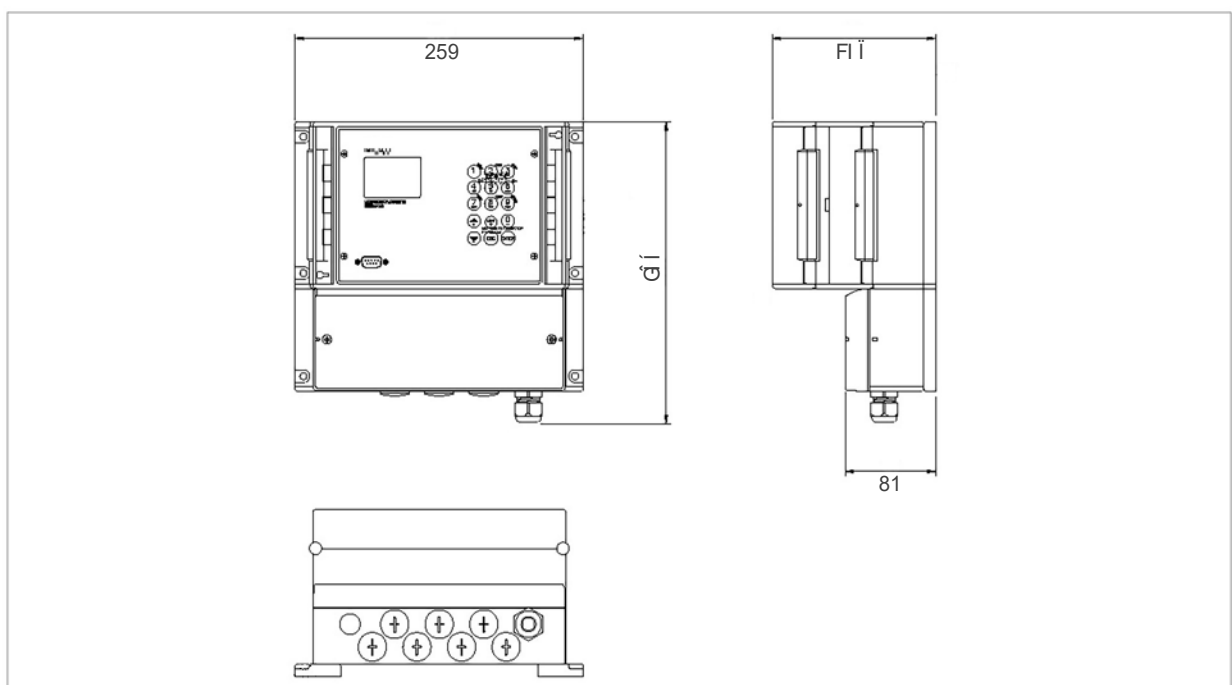
Performance

Measurement principle	Ultrasonic transit-time difference correlation
Flow velocity range	0.01 ... 25 m/s
Resolution	0.25 mm/s
Repeatability Accuracy	0.15 % of measured value, ± 0.015 m/s
	<i>Volume flow</i>
	± 1 ... 3 % of measured value depending on application
	± 0.5 % of measured value with process calibration
	<i>Flow velocity (mean)</i> ± 0.5 % of measured value
Turn down ratio	1/100
Measurement rate:	10 ... 1000 s ⁻¹
Response time	1 s, 70 ms (optional)
Damping of displayed value	0 ... 99 s
Gaseous and solid content of liquid media	< 10 % of volume

General

Enclosure type	Wall mounted
Degree of protection	IP 66 according to EN 60529
Operating temperature	-10 ... 60 °C (14 ... 140 °F)
Housing material	Plastic, ABS, Polycarbonate (transparent front door)
Measurement channels	1 or 2
Calculation functions	Average, difference, sum, highest (dual-channel use only)
Power supply	100 ... 240 V AC 50/60 Hz 9 ... 36V DC Special solutions (e.g. solar panel, battery) upon request
Display	LCD graphic display, 128 x 64 dots, backlit
Dimensions	237 (h) x 258 (w) x 146 (d) mm
Weight	Approx. 2.3 kg
Power consumption	<5W
Operating languages	English, German, French, Spanish, Russian

Drawings



Dimensions in mm

Images



UFM-70 FS close-up



UFM-70 FS wa/1-mounted with transducers

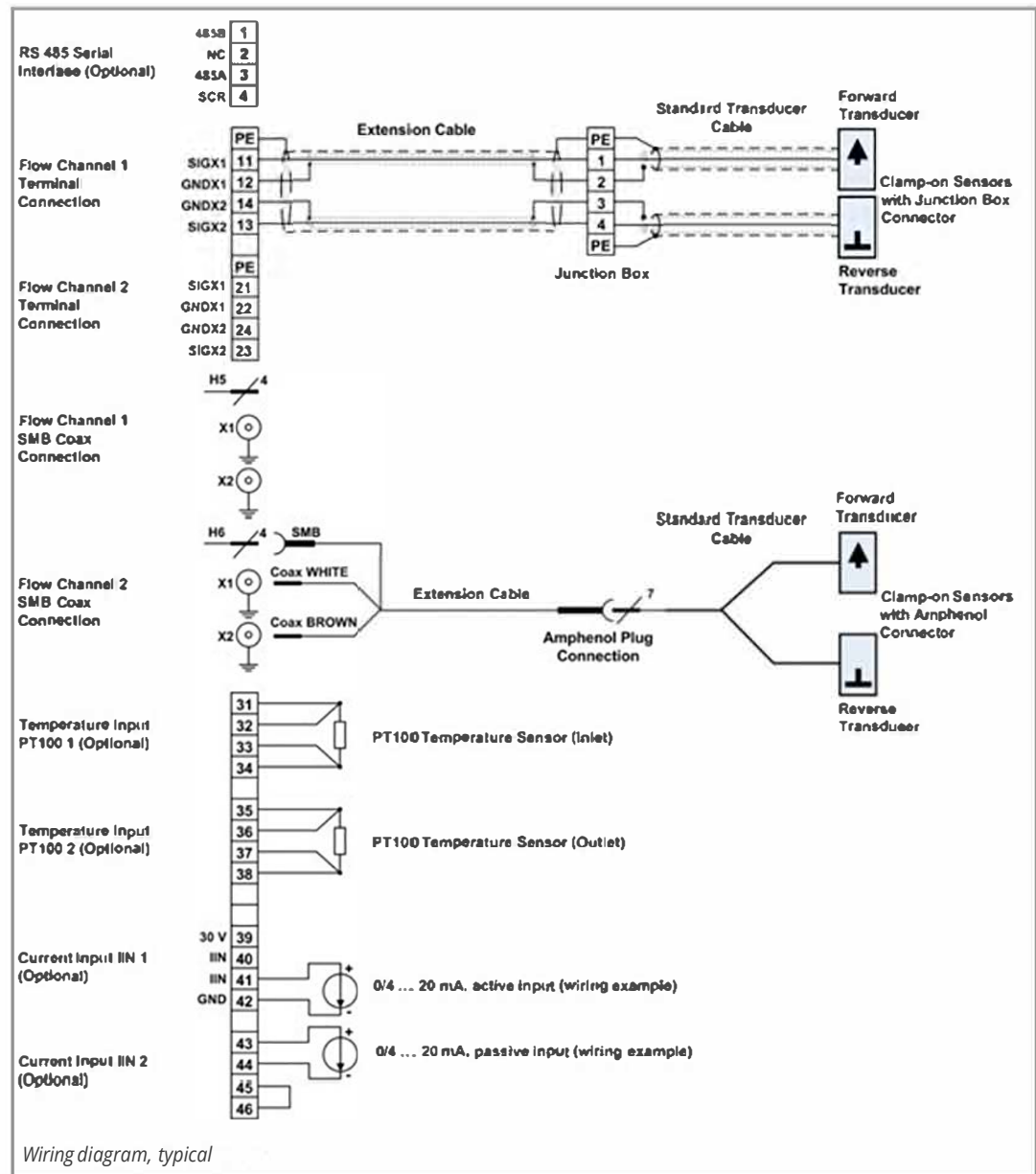
Communication	Type	:	AS 232, USB converter cable (optional), AS 485 (optional), Modbus RTU (optional), HART output (optional)
	Transmitted data	:	Measured and totalized value, parameter set and configuration, logged data
Internal data logger	Storage capacity	:	Approx. 30,000 data items (128 kByte)
	Logged data	:	Approx. 100,000 data items (512 kByte) All measured and totalized 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 7, Vista, XP, NT, 2000 Linux Mac (optional)
Quantity & units of measurement	Volumetric flow rate	:	m ³ /h, m ³ /min, m ³ /s, l/h, l/min, 1/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	:	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)

Specification: Transmitter (continued)

Process inputs	Temperature	:	PT100 (clamp-on sensors), four-wire circuit, measurement range -50 ... 400 °C (-58 ... 752 °F), resolution 0.1 K, accuracy ± 0.2 K
	Current	:	0/4 ... 20 mA active or 0/4 ... 20 mA passive, $U = 30$ V, $R_i = 50 \Omega$, accuracy 0.1 % of measured value
	Note	:	All process inputs galvanically isolated from main electronics and from other inputs and outputs.

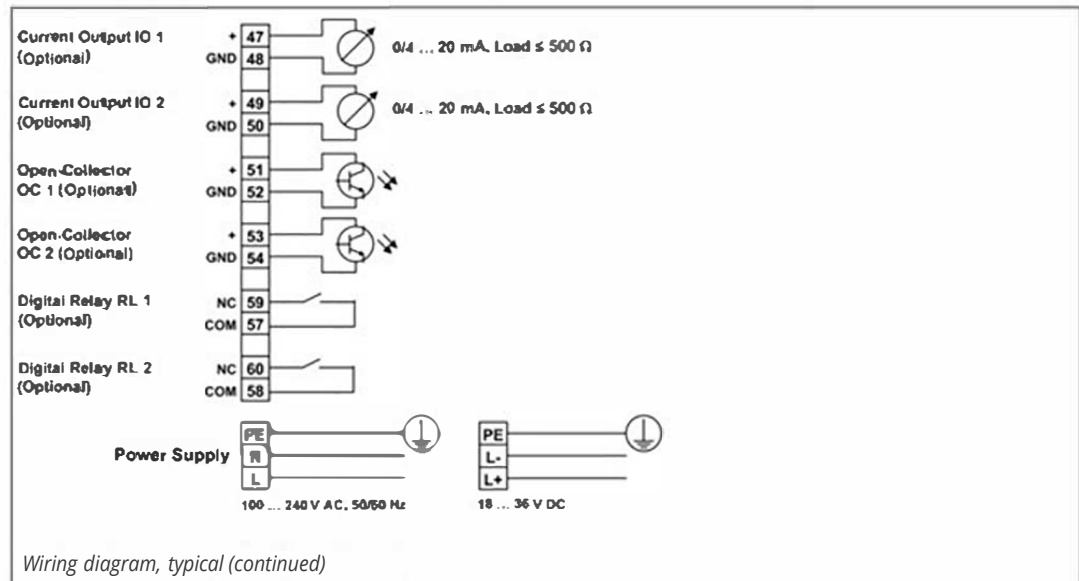
Process outputs	Current	:	0/4 ... 20 mA active ($R_{Load} < 500 \Omega$), 16 bit resolution, $U = 30$ V, accuracy = 0.1 %
	Voltage	:	0 ... 10 V, $R_i = 500 \Omega$ (optional upon request)
	Digital Open-Collector	:	Totaliser, value 0.01 ... 1000/unit, width 30 ... 999 ms, $U = 24$ V, $I_{max} = 4$ mA
	Digital relay	:	Alarm, fault (programmable), Form C (SPDT-CO) contacts, $U = 48$ V, $I_{max} = 250$ mA
	Note	:	All process outputs galvanically isolated from main electronics and from other inputs and outputs.

Drawings



Specification: Transmitter (continued)

Drawings



Specification: PT100 clamp-on sensors (for Heat Quantity Measurement function)

General	Type	:	PT 100 (clamp-on)
	Measurement range	:	-30 ... 250 °C (-22 ... 482 °F)
	Design	:	4-wire
	Accuracy T	:	$\pm(0.15 \text{ °C} + 2 \times 10^{-3} \times T [\text{°C}])$, class A
	Accuracy ΔT	:	$\leq 0.1 \text{ K}$ ($3 \text{ K} < \Delta T < 6 \text{ K}$), corresponding to EN 1434-1
	Response time	:	50 s
	Dimensions sensor head	:	
	Material sensor head	:	Aluminum
	Material cable jacket	:	PTFE
	Cable length	:	3m

Images



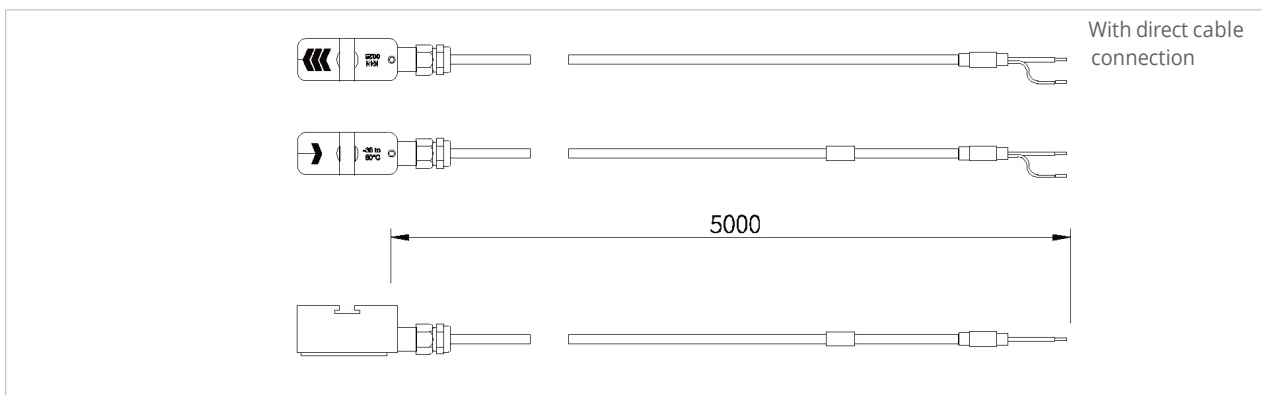
PT100 sensor fixed to pipe



UFM-70 FS for Heat Quantity Measurement application using PT100 sensors

K1L, K1N, K1E	Pipe diameter range	50 ... 3000 mm for type K1 N/E 50 ... 6500 mm for type K1 L
	Dimensions of sensor heads	60 (h) x 30 (w) x 34 (d) mm
	Material of sensor heads	Stainless steel
	Material of cable conduits	Type K1L : PVC Type K1N/E : Stainless steel
	Temperature range	Type K1L : -30 ... 80 °C (-22 ... 176 °F) Type K1N : -30 ... 130 °C (-22 ... 266 °F) Type K1E : -30 ... 200 °C (-22 ... 392 °F) (for short periods up to 300 °C (572 °F))
	Degree of protection	IP 66 acc. EN 60529, (IP 67 and IP 68 upon request)
	Standard cable lengths	Type K1L : 5.0m Type K1N/E : 4.0m

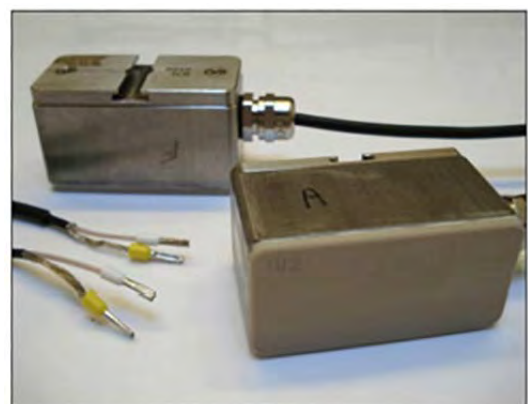
Drawings and images



K1L transducers



K1N/E transducers

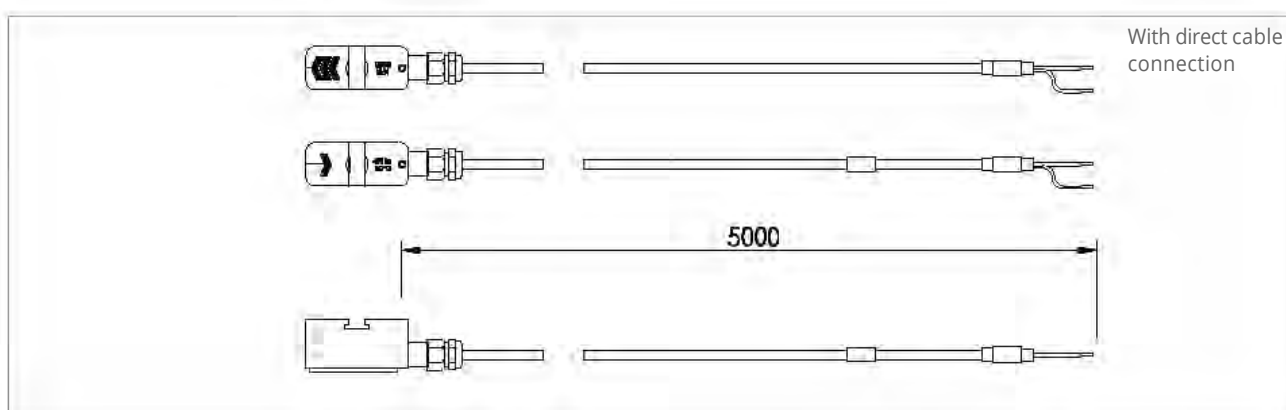


K1L transducers

Specification: Transducers (continued)

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
	Material of sensor heads :	Stainless steel
	Material of cable conduits :	Type K4L : PVC Type K4N/E : Stainless steel
	Temperature range :	Type K4L : -30 ... 80 °C (-22 ... 176 °F) Type K4N : -30 ... 130 °C (-22 ... 266 °F) Type K4E : -30 ... 200 °C (-22 ... 392 °F) (for short periods up to 300 °C (572 °F))
	Degree of protection :	IP 66 acc. EN 60529, (IP 67 and IP 68 upon request)
	Standard cable lengths :	Type K4L : 5.0m Type K4N/E : 2.5m

Drawings and images



K4N/E transducers



K4N/E transducers



K4L transducers

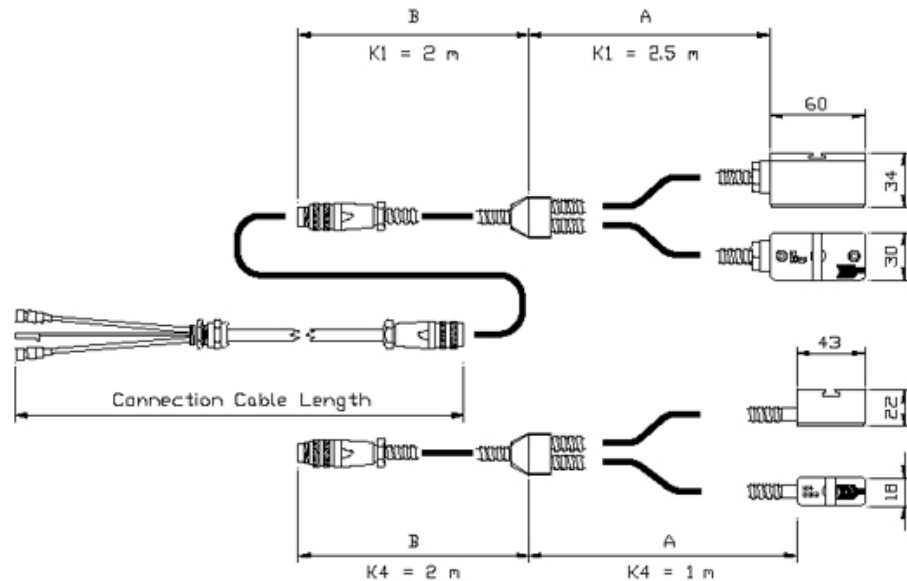
Specification: Transducers (continued)

Extension cable	Available lengths	5.0 ... 100 m
	Cable type	Coaxial
	Material cable jacket	TPE
	Operating temperature	-40 ... 80 °C (-40 ... 176 °F)
	Min. bend radius	67mm

Cable connection	Connection types	Junction box, Amphenol connectors
	Termination into transmitter	SMB connector (SubMiniature version B), direct cable connection (terminal block)

Drawings

TOP: K1 transducers connected via Amphenol connectors to extension cable and terminating into transmitter via SMB connectors



Bottom: K4 transducers with Amphenol connector (terminal termination via SMS connectors only)

Cable connection via male/female Amphenol plugs with SMB termination into transmitter

Specification: Transducers for hazardous area

K1Ex and K4Ex



Pipe diameter range

Dimensions of sensor heads

Material of sensor heads

Material of cable conduits

Temperature range

Standard cable length

Degree of protection

Ex certification code

Ex certification number

Ex protection method Nota

10 ... 250 mm for type K4Ex

10 ... 3000mm for type K1Ex

60(h) x 30(w) x 34 (d) mm

Stainless steel

PVC

-50... 115 °C (-4 ... 248 °F)

5.0m

IP 68 acc. EN 60529

II 2 G Ex mb IIC T4-T6 X, II 2 D Ex mbD 21

TRAC09ATEX21226X

Encapsulation

The transducers are approved for use in hazardous areas classified as Ex Zone 1 and 2. They are connected to the transmitter via extension cables and Ex approved junction boxes. The transmitter can be installed in a safe area or - if equipped with the additional Ex enclosure - together with the transducers in an hazardous environment (see hazardous area enclosure for UFM-70 FS transmitter, page 6).

Images



K1Ex transducer pair



K1Ex certification code and number

Specification: Transducer mounting accessories

General

Diameter range and mounting types

Clamping set (metal collar with screw), stainless steel

DN 10 ... DN 40

Metallic straps and clamps

DN 15 ... DN 310

Metallic straps and clamps

DN 25 ... DN 3000

Metallic straps and clamps

DN 1000 ... DN 3000 (6500)

Metallic mounting rail and straps (available upon request)

DN 50 ... DN 3000

Mounting fixture for flexible hoses

Custom made mounting bracket, stainless steel
(available upon request)

Images



Transducers mounted using strap and clamps



Metallic mounting rail with cover (example)

U-F-M b.v. | Ultrasonic Flow Management

Argon 24

4751 XC Oud Gastel | The Netherlands

Phone: +31(0) 165 855 655

Web: www.u-f-m.nl

Email: info@u-f-m.nl

Configuration code: Transmitter and accessories

KF150 Ultrasonic flow meter KATflow 150, serial interface RS 232, operating instructions

Number of measurement channels

- 1 1 measurement channel
- 2 2 measurement channels ¹⁾

Power supply

- 1 100 ... 240 V AC, 50/60 Hz
- 2 9 ... 36 V DC
- Z Special (please specify)

Enclosure type

- 1 Plastic ABS, wall mount, IP 66
- 2 Ex enclosure, powder coated LM6 cast alloy, IP 67
- Z Special (please specify)

Communication

- 0 Without
- 1 RS 485 serial interface, Modbus RTU (please consult factory)
- 2 HART output, 0/4 ... 20 mA, active (please consult factory)
- Z Special (please specify)

Analogue outputs

- CI 1 x current 0/4 ... 20 mA, active, (standard)
- C2 2 x current 0/4 ... 20 mA, active

Digital Open-Collector outputs

- DI 1 x digital Open-Collector, (standard)
- D2 2 x digital Open-Collector

Digital relay outputs

- N Without
- R1 1 x digital relay
- R2 2 x digital relay

Temperature inputs ²⁾

- N Without
- A2 2 x PT100 temperature inputs

Analogue Inputs

- N Without
- 62 2 x current input 0/4 ... 20 mA, active/passive
- Z Special (please specify)

Internal data logger

- 0 Without
- 1 30,000 data items
- 2 100,000 data items
- Z Special (please specify)

Heat Quantity Measurement (HQM) ²⁾

- 0 Without
- 1 With HQM incl. 2 x PT100 clamp-on sensors
- Z Special (please specify)

Sound Velocity Measurement (SVM) ³⁾

- 0 Without
- 1 With SVM

Optional items

- Ex Suitable for connection with Ex sensors
- SW Download software KATdata+ and RS 232 cable
- SU Download software KATdata+ and USB cable

KF150 - 1 - 1 - 1 - 0 - C1 D2 N - N N - 0 - 0 - 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.

- 1) For simultaneous measurement on two separate pipes or for measurement on one single pipe in a multi-path sensor mounting configuration.
- 2) For contactless measurement of thermal energy consumption. Always select both options.
- 3) For contactless product recognition and interface detection.

Configuration code: Transducers and accessories

K1	Transducer pair, pipe diameter range 50 ... 3000 mm (K1L: 50 ... 6500 mm)													
K4	Transducer pair, pipe diameter range 10 ... 250 mm													
Z	Special (please consult factory)													
	Temperature range													
L	Process temperature -30 ... 80 °C, including accoustic coupling paste													
N	Process temperature -30 ... 130 °C, including accoustic coupling paste													
E	Process temperature -30 ... 200 °C, including accoustic coupling paste													
Ex	Process temperature -50 ... 115 °C, including accoustic coupling paste													
Z	Special (please consult factory)													
	Internal code													
x	Version number (internal code)													
	Degree of protection													
1	IP 66 (standard)													
2	IP 67 (please consult factory)													
3	IP 68 (please consult factory)													
Z	Special (please consult factory)													
	Transducer mounting accessories													
0	Without													
1	Clamping set DN 10 ... 40													
2	Metallic straps and clamps DN 15 ... 310													
3	Metallic straps and clamps DN 25 ... 3000													
4	Metallic straps and clamps DN 1000 ... 6500													
5	Metallic mounting rail and straps DN 50 ... 3000													
Z	Special (please consult factory)													
	Stainless steel tag													
0	Without													
1	With stainless steel tag													
	Transducer connection and extension cables													
0	Direct SMB/cable termination													
A	Extension via Amphenol connectors (not available for Ex sensors)													
J	Extension via junction box													
C005	Extension cable length 5 m													
C010	Extension cable length 10 m													
C020	Extension cable length 20 m													
C_	Specify length in meters													
Z	Special (please specify)													
	Optional items													
CA	5-point calibration with certificate													
ZZ	Special (please specify)													
K1	N	-	x	1	-	3	0	-	J	-	C010	/		(example configuration)

The configuration is customised by selecting the above-listed options and is expressed by the resulting code at the bottom of the table.

U-F-M b.v. | Ultrasonic Flow Management

Argon 24

4751 XC Oud Gastel | The Netherlands

Phone: +31(0) 165 855 655

Web: www.u-f-m.nl

Email: info@u-f-m.nl

- No IT expertise required
- No firewall issues
- No VPN required
- No static IP needed
- No programming
- No hassles

Netbiter EasyConnect gateways are connecting field equipment in many different industry segments such as:

- Power generators
- Telecom base stations
- Building HVAC systems
- Industrial machinery
- Tank monitoring
- Pump stations
- Renewable energy



Fast and easy deployment

Wherever your field equipment is located, just simply connect it to an EasyConnect gateway and you will be able to access equipment data directly through the Netbiter Argos data center. The plug-and-play feature makes it possible to perform large scale installations quickly without being an IT/Mobile network expert.

Connectivity

Easyconnect gateways connect to the most U-F-M field equipment via a serial RS-232/485 Modbus interface. On-board I/O extends the EasyConnect gateways by allowing sensors and additional equipment to be added to the system.

Netbiter Argos™ data center

EasyConnect gateways interface directly to the Netbiter Argos data center. Through Argos, users can access and visualize equipment data through the use of user-friendly, customizable, graphical HMI/dashboards. Equipment data such as alarms, usage and trend data can be presented in various reporting formats which can also be included into customer service contracts.

Security

Netbiter EasyConnect gateways offer unique technology for secure access to your industrial equipment behind firewalls and via mobile GSM/GPRS based communication networks. The gateways eliminate the need for public and fixed IP address, VPN tunnels and expensive M2M specific SIM cards.

Netbiter SIM-cards

For EasyConnect gateways that use cellular technology, U-F-M offers a SIM card with roaming capabilities to a large number of operators around the world.

Live values			Value	
Name			1.5	
Temperature input A11			9	°C
Flow test rig			38.04	l/min
Name	Value		Date logged	
Analog input 2 (0-20mA)	18.09	mA	2013-05-14 15:07:00	
Flow test rig	38.04	l/min	2013-05-17 16:57:00	
Temperature 1	19.5	°C	2013-05-17 16:57:00	

EasyConnect EC220

Netbiter EasyConnect EC220 is a small remote gateway that connects with a range of common discrete and analog I/O's to integrate with I/O based installations.

It includes a built-in GSM/GPRS modem that automatically communicates with the Netbiter Argos data center (www.netbiter.net) on power up. It automatically starts to show I/O data from the connected equipment. An optional SIM card (with local taxes) can be included at shipment.

Description	EC220
Order Code	Metal housing
Ethernet interface	NB1000
GSM/GPRS	-
Relay Output (max 24 V, AC/DC, 1A)	Quad band GPRS Class 12 850/900/1800/1900 Mhz
Digital Inputs (isolated, max 24 V DC)	1
Analog Inputs (PT100, 0-10 V or 0-20 mA)	2
Analog Outputs (0-10 V)	2
Serial port #1	1
Serial port #2	RS-232 up to 115 kbit/s
Antenna connector	RS-485 up to 115 kbit/s (isolated)
Wall mounting / DIN-rail	SMA female
Mechanical dimensions	YES / YES (optional)
Operating temperature	92 x 115 x 25 mm
Power supply	-30 to +65°C
Power consumption	9-24 V DC
Certification	2W
Guarantee	CE
	3 years


U-F-M b.v. | Ultrasonic Flow Management

 Argon 24
 4751 XC Oud Gastel | The Netherlands

 Phone: +31(0) 165 855 655
 Web: www.u-f-m.nl
 Email: info@u-f-m.nl



See page 16 for specifications

U-F-M b.v. | Ultrasonic Flow Management

Argon 24

4751 XC Oud Gastel | The Netherlands

Phone: +31(0) 165 855 655

Web: www.u-f-m.nl

Email: info@u-f-m.nl



Nominal technical specification of the LiFeP04 batteries with the PCM

Battery pack

for UFM-7 FS

Specification		LP6V4AHP	LP12V7AHP	LP12V12AHP	LP12V17AHP	LP12V25AHP	LP12V34AHP	LP12V42AHP
Charge voltage		7.3 V	14.6 V	14.6 V	14.6 V	14.6 V	14.6 V	14.6 V
Nominal voltage		6V	12 V	12 V	12 V	12 V	12 V	12 V
Open terminal voltage	minimal	6.4 V	12.8 V	12.8 V	12.8 V	12.8 V	12.8 V	12.8 V
Nominal energy (Wh)	at 25°C	25 Wh	90 Wh	153 Wh	217 Wh	320 Wh	435 Wh	537 Wh
Typical capacity (new)	at 25°C	4 Ah	7 Ah	12 Ah	17 Ah	25 Ah	34 Ah	42 Ah
Minimal capacity (new)	at 25°C	3.8 Ah	6.8 Ah	11.5 Ah	16.2 Ah	23.8 Ah	31.8 Ah	40 Ah
Initial capacity range (new)		3.8 Ah to 4.2 Ah	6.8 Ah to 7.5 Ah	11.5 Ah to 12.4 Ah	16.2 Ah to 17.5 Ah	23.8 Ah to 26 Ah	31.8 Ah to 36 Ah	40 Ah to 43 Ah
Standard charge	0.2C	0.8 A	1.4 A	2.4 A	3.4 A	5 A	7 A	8 A
Rapid charge	0.5C	2 A	3.5 A	6 A	8 A	12 A	17 A	21 A
Max. charge current	1C	4 A	7 A	12 A	17 A	25 A	34 A	42 A
Standard discharge	0.5C	2 A	3.5 A	6 A	8 A	12 A	17 A	21 A
Fast discharge	1C	4 A	7 A	12 A	17 A	25 A	34 A	42 A
Max discharge current		8 A	14 A	24 A	34 A	50 A	50 A	50 A
Overcharge current protection	by PCM	10 A	20 A	30 A	40 A	60 A	60 A	60 A
Low voltage level		11 V	11 V	11 V	11 V	11 V	11 V	11 V
Deep discharge level		10 V	10 V	10 V	10 V	10 V	10 V	10 V
Discharge cut-off voltage	by PCM	8V (<10V)	8V (<10V)	8V (<10V)	8V (<10V)	8V (<10V)	8V (<10V)	8V (<10V)
Battery Weight		600±100g	1200±100g	1900±100g	2100±100g	3200±100g	4200±100g	5350±100g
Battery Dimension		70x47x101	151x65x100	151x98x100	180x76x166	175x166x125	195x130x180	197x165x170
Cycle Life (0.5C)		1000	1000	1000	1000	1000	1000	1000
Capacity after 500 cycles (0.5C)	80%	3.2 Ah	5.6 Ah	9.6 Ah	13.6 Ah	20 Ah	27 Ah	33 Ah
Capacity after 800 cycles (0.5C)	60%	2.4 Ah	4.2 Ah	7.2 Ah	10.2 Ah	15 Ah	20 Ah	25 Ah
Operating temperature		-20 ~ 60°C	-20 ~ 60°C	-20 ~ 60°C	-20 ~ 60°C	-20 ~ 60°C	-20 ~ 60°C	-20 ~ 60°C
Capacity at -20°C (new)	45%	1.8 Ah	3.1 Ah	5.4 Ah	7.6 Ah	11 Ah	15 Ah	19 Ah
Capacity at 0°C (new)	80%	3.2 Ah	5.6 Ah	9.6 Ah	13.6 Ah	20 Ah	27 Ah	33 Ah
Capacity at 20°C (new)	100%	4 Ah	7 Ah	12 Ah	17 Ah	25 Ah	34 Ah	42 Ah
Capacity at 60°C (new)	100%	4 Ah	7 Ah	12 Ah	17 Ah	25 Ah	34 Ah	42 Ah
Capacity after 30 days storage (new)	80%	3.2 Ah	5.6 Ah	9.6 Ah	13.6 Ah	20 Ah	27 Ah	33 Ah

PCM - Protection Circuit Module - protects the LiFeP04 battery against accidental damage and limits the improper use of the battery.