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TECHNICAL DOCUMENTATION

Interface clamp-on sensor

FR(G)L 60/50 SE R U EFS GR60 ExG

- For glass pipe ø 60 mm mounting
- High-resolution measuring signal
- Non-invasive measurement
- Protection class IP30
- Process temperature 170 °C
- Stainless steel housing
- Lemo-connector for HF-cable

Use

Recommended to install on glass reactors or glass columns as used in multipurpose plants, separators in labs, pilot plants or production environment.
For liquid/liquid interface separation of organic to aqueous media.

Application

The clamp-on probe used for interface detection is manufactured from stainless steel. It combines a measuring and ground/reference electrode in one device. The media to be measured must have constant electrical properties. If the dielectric constant or the electrical conductivity changes, a product compensated measuring system has to be used.

Serial number: TAG number:

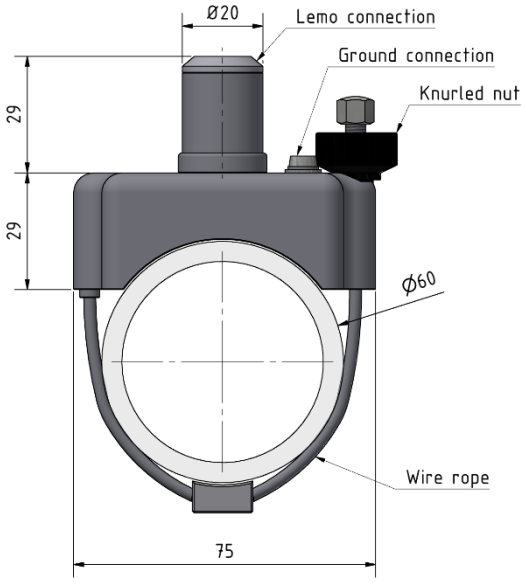
Model code:

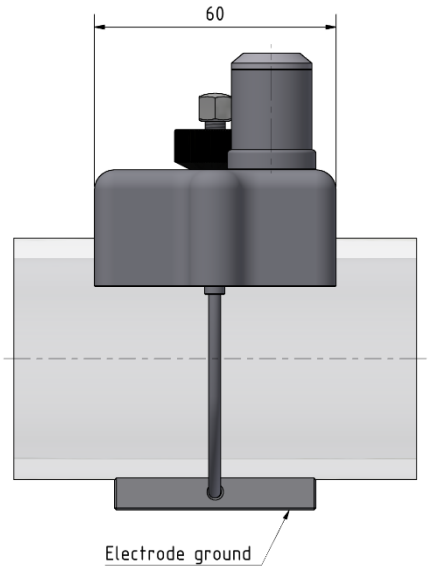
FR(G)L 60/50 SE R U EFS GR60 ExG

F	|	Flat, clamp probe, IP code: IP30
R(G)	|	Measuring electrode stainless steel, glass pipe in contact with media with Ø 60 mm, s = 5 mm ±0.5mm (customer specific)
L	|	Lemo-connector for remote measuring electronics in protective housing
L	|	Outer dimensions: Length x Width x Depth 60 x 75 x 29 mm (R=30.5)
EL	|	Measuring probe length 50 mm (located internal)
SE	|	Disk electrode with anti-slip silicone strips
R	|	Probe material stainless steel 316L
U	|	Universal: Interface level and detection, fill level, limit value full/empty
EFS	|	Flange (bar) reference electrode
GR	|	Glass pipe Ø 60 mm, ±1 mm; mounted with wire tensioning system with counter electrode

Probe Ex-protection: SEV 09 ATEX 0133 X CE**

ExG	|	(Gas-) Ex-version (probe/MTI) II 1/2G Ex ia IIC Ga/Gb





Technical data

Temperature range –20 ... +170 °C media

Cleaning Wipe with organic solvents, pressureless

Pressure Atmospheric

Measuring principle Impedance

Measuring range DC 1.4 ... 80 / 0 - 1555 Imp

Resolution Up to < 1 mm

Conductivity optimum of the organic phase
MTI standard: 0 ...200 µS/cm (constant)

Basic capacity Cp: 21.8 pF / Rp: 1.8 MΩ (at glass pipe)

Integration time 40 - 400 ms / 0 - 3750 Imp

Use Ex-zone II 1/2G Zone 1

Application Continuous interface detection, level-, switch

Measuring electronics Housing square: MTI 30/4 AGK0 K

Connection: Probe to measuring electronics
HF cable hb 1 m Lemo

Wiring
From MTI shielded 2-core cable 0.75 mm^2 twisted CY/EIG to all evaluation devices mipromex®, cable length up to 200 m or max. C = 120 nF / R = 30 Ohm line impedance

Connection to evaluation unit mipromex® MIQ / MIL / MAT / MLS

Article n° 02.29.12.17821

Technical data on-site MTI measuring electronics

Design type
Plug-in electronics with square stainless cover in the protective housing, with HF-connection; IP 20

Installation
Protection housing with mounting holes, plug-in electronic module, fixed with 2 screws M4x8

Performance
Linear conversion of an impedance range into a normed digital measurement signal

Use/Display
One-time compensation of basic capacity of the RF cable and uncovered dry probe, LED display for quick adjustment

Dimensions
Square version height x width x length 57 x 80 x 175 mm

Weight electronics
140 g

Ex-power supply / connection wiring
Shielded two-wire connection 0.75 mm2 twisted CY/EIG to all evaluation devices mipromex®, cable length up to 200 m or max. C= 120 nF / R = 30 Ohm line impedance

Transfer signal
Impulse packages, superimposed on the supply current

Measuring voltage/current
U ~ 14.5 V I ~ 13,5 mA

Nominal data of the supply voltage
Rate data **Ex ia** IIC only for connection to mipromex® type M** **** * - or *TI*K-units

Circuit with the following maximum output values
$U_i \leq$ 18,9 V $I_i \leq$ 49 mA
$P_i \leq$ 231 mW
$C_i =$ 60 nF $L_i =$ 0 mH

Ambient temperature
–20 … +60 °C

Storage temperature
–30 … +80 °C, ideal +20 °C

Measuring ranges
10 / 20 / 50 / 100 / 200 / 300 respective 0 up to max. 3750 impulses, special ranges available. The resolution range depends on the probe dimensions and is product specific.

Resolution
Max. 0.003 pF/impulses

Norm range for pipe probe with remote MTI housing
Type STK .../100/200/300
55 pF, type MTI 30/, 50/(0 - 16) basic adjustment range depending on probe and HF-cable length, determined by the manufacturer

Basic adjustment range
MTI .../. 0 to 16, 0 to 500 pF

Measurement frequency
~ 500 kHz

Linearity
Deviation < 0,1 % (without probe)

Hysteresis
1 measured impulse

Temperature influence 5 – 45 °C
Type MTI .../.A analog: < ± 3 measuring impulse

Certification
Gas II 1/2G Ex ia Gb IIC T6
Dust II 1/2D Ex iaD 20/21 IP65 T85°C
II 1/2G Ex d ia IIC T6
RL 2014/34/EU
Inspection report n°: 08-IK-0395.01 with extension 1
Unit can be supplied without Ex-protection

Intrinsically save Ex-connection:
Measuring electronics MTI ... In a protective housing or bar probe type S**; K** ; F**
EMC-tested, STS 024 report n° 990102WS
corresponds to EN 1127-1 : 20011
EN 61000-6-2 2005 EN 6100-6-4 : 2007
EN 60079-0 : 2012 EN 60079-11 : 2012

Measuring system

The measuring loop consists of a probe with remote on-site electronics MTI and the evaluation unit mipromex® in the non-hazardous area. The cable length for an Ex ia application is max. 200 m.

Function

The impedance changes as a function of the dielectric constant and the conductivity of the organic and aqueous media, as well as depending on the immersion depth of the active measuring electrode. The detected impedance at the measuring electronics MTI is transformed directly into a normed digital sum signal and transmitted as a pulse train to the mipromex®.

Mounting directions

- Installation laterally on (vertical/horizontal) the glass pipe (outside), fixed hand-tight with cable system knurled nut, note glass tube diameter! Only single-walled pipes may be used.
- The reference electrode flange must be aligned with the sensor and the cable fixed with grub screws
- The red silicone strips prevent slipping on the glass tube
- Connect the sensor and measuring electronics with an HF cable. Attention, the cable length must not be changed!
- Glass tube clean with no liquid in the glass tube!
- Measuring electronics setting: With a number 2 screwdriver set the trimmer to a measuring value of 60 – 100 impulses (mipromex® signal-setting menu point: 3.1.3, zero point, accepted with keystroke)
- Caution! During installation the probe and glass needs to be handled truly carefully.
- Internal installation guidelines must always be followed

Disassembly instructions

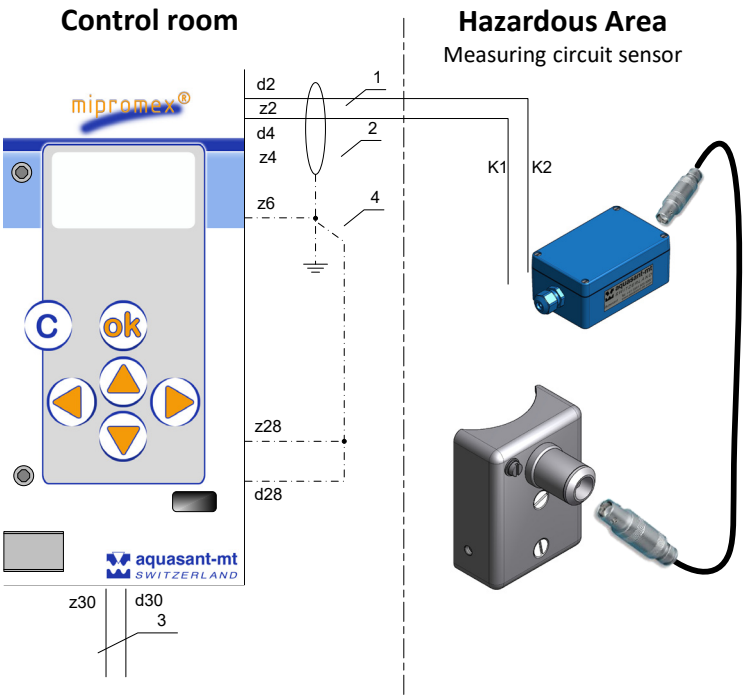
- Process must be completed, measurement becomes inactive!
- System does not have to be empty (observe internal safety regulations)
- Disconnect electrical connections; Lemo RF cable, ground at sensor
- Dismantling the probe: Loosen the fixing cable with the knurled nut and remove it from the holder

Electrical directions

- Wiring must comply with the circuit and grounding diagram, sensor must be grounded
- Connections to MTI clamps 1/2, protected against polarity reversal, suitable for wire cross-section 0.2 – 1.5 mm^2
- The connecting cable has to suit the demands at the measuring circle
- MTI housing lid in [Ex ia] zone can be opened under live-line working
- Output signal of mipromex® is a pulse modulated signal U_0 ≤18.9 V

Basic circuit diagram

Probe connection to evaluation unit mipromex®
Connection diagram MRM2 Monorack DIN housing



Certificates

Explosion protection (ATEX)
EC-type examination SEV 09 ATEX 0133 X
- Ex-certification according to directive 2014/34 EU
- Confidential test report no.: 08-IK-0395.01

CE-Mark
The probe fulfills the legal requirements according to the EC directives. CE**

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