



Personal monitoring for truck loading (PMTL) Dead-man's limit switch

Mipromex MLS 1101



- Limit switch for dead man's monitoring during the lorry filling process
- Evaluation for manual impedance probes
- Menu guidance in 3 languages
- Dynamic measured value processing
- DIN rail or wall mounting

Use

At the lorry filling station, it is ensured that the driver is monitoring events during the filling process. The manual dead man's probe for personal protection is ensured by the dynamic measured value monitoring system. The system cannot be bypassed due to the measuring dynamic.

The dynamic limit monitoring allows for the safe monitoring of the loading process.



Overview

- ▼ MLS 11x0: 1 measuring circuit with two limit value outputs (2 relays)
- Dynamic limit value detection with compensation for contamination
- Parameterisation in languages: D / F / E
- Device data and item no. storage
- Film keypad with graphic display
- 19" plug-in cartridge 3 HE/12 TE (European format)
- Supply: 24 V AC 50/60 Hz / DC; independent of polarity
- Fault message can be parameterised on 2nd relay contact
- Fault indication Time/Date
- 2 LV relay outputs max. 2A/30VDC
- Limit value simulation
- 1 or 2 measurement inputs for transmitter modules, max. cable length approx. 200 m (<120 nF)
- 256 kB Flash Firmware V1.17

Ex version: Gas II (2) G [Ex ia Gb] IIC
 Dust II (2) D [Ex ia Db] IIC

Basic function

The mipromex MLS 1101 is equipped with a measuring circuit. The pulse signal transmitted from the MTI measuring electronics is converted into an offset-compensated, filtered pulse value and processed dynamically. The indicator on the graphic display visualises the 1 Position -----, the actual, normed pulse value and the relay position. The offset range (due to the respective zero adjustment of measuring electronics) can be set between 10 and 2000 pulses (100 pulses is ideal and is set as the factory default).

The measuring signal offset (zero point) is automatically applied by pressing the button or the saved value can be modified using the keyboard.

The measured value is dynamically monitored within a set hysteresis range. If the dynamic of the measurement signal is not detected, the corresponding digital output (relay 1) switches. The hysteresis range is above the max. limit. Relay output 1 is parameterised with a 10 second shut-off delay. After releasing the manual or lever probe or in the event of a malfunction, the relay will switch as a depth alarm.

A parameter set can be stored and reloaded. Error messages are displayed with time and date.

Measuring circuit

A measuring probe with MTI transmitter module in the probe head is connected to the mipromex MIQ by means of a shielded 2-core cable. A potential equalisation line must be installed between the earthing of the plant room and the control room.

Measuring principle

Impedance measurement; dependent on electrical conductivity and dielectric constant.

Wiring

2-core cable 0.75 mm² twisted CY/EIG cable length up to 200 m or max. C= 120 nF / R = 30 Ohm line impedance

Connection

All aquasant® on-site electronic units for impedance measurement can be connected.

Function

A fully-insulated hand or lever probe functionally changes the affect of the impedance.

The measured impedance is converted as a sum signal by the aquasant® measuring electronics into a normed digital signal and is transmitted to the mipromex MLS as an pulse package.

The measured value in the range normed by Aquasant Messtechnik AG (0–3700 pulses) is product-specific and functionally varies as a result of moisture on the hands and applied pressure.

A modern, menu-guided operating and parameter concept allows for greatly time-saving commissioning of the limit value switch. The film keypad with function and graphic displays makes operation safe and user-friendly.

To activate the relay output, the hand or lever probe must be completely surrounded by the entire hand (measured between 800 and 2600). The measurement is dynamically monitored in this area. If the hand or lever probe is released, the output relay will close and the system will shut down. At tanker truck filling stations, the filling process is interrupted after approx. 20 seconds.

The excellent safety concept is what makes this industrial measuring device stand out.

Dynamic measured value

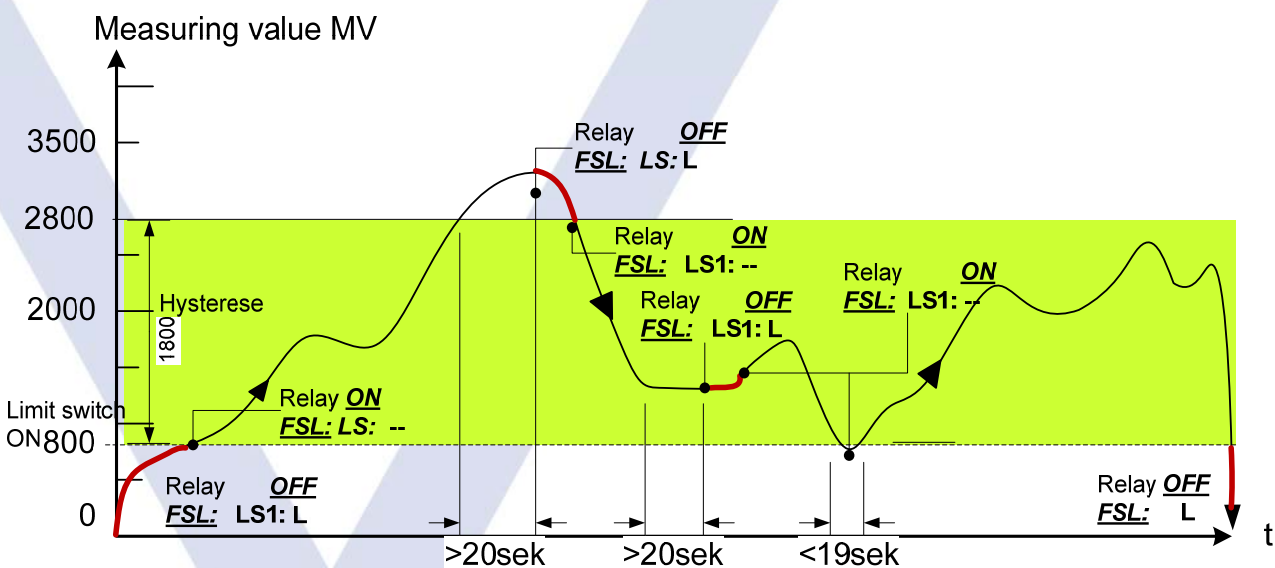
A dynamic measured value monitoring system detects the change in the measured value by means of hysteresis and is fully automated and extremely reliable.

The MLS 1101 safety dead man's monitoring device is equipped with the dynamic measured value processing. It cannot be bypassed since the measuring signal is dynamically monitored.

The limits can be set freely and the open/close delay and failsafe position can be selected.

Readjustment (image below):

Measured value progression with active hysteresis switch, dynamic measured value processing.



Connection circuit board for 19" rack, Monorack

Cage Clamp® terminals for 0.08–2.5 mm² cable cross section, stripping length 5–6 mm / 0.22 in (without cable end sleeve), are mounted using a special tensioning tool.

Colour coding:

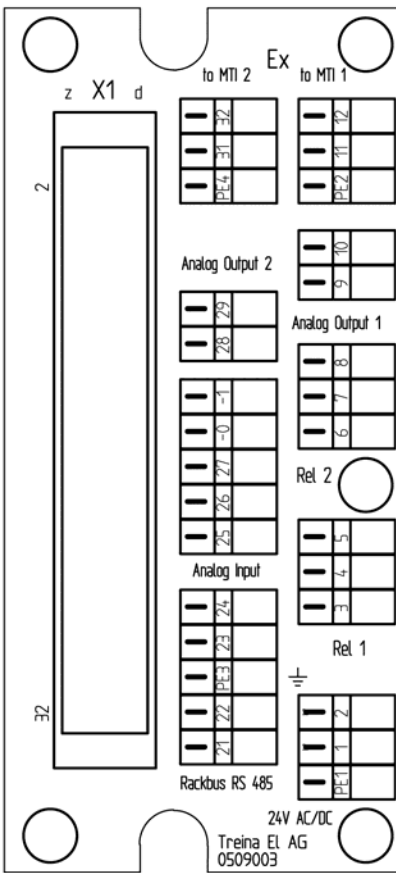
The fail-safe field circuit is connected to the **blue** terminals. It may be guided into the hazardous area with connecting cables as per DIN EN 60079-14.

The **black/orange** terminals are polarity-dependent current inputs and outputs.

Dimensions: H x W x D 137 x 77 x 210 mm / for Eurocard 3 HE/12TE Depth 60 mm

Connection to: mipromex microprocessor device

Article no.: 02.03.18.011



- | | |
|---|------------|
| PE1 Erdung | FI32: d/z6 |
| 1. Speisung 24 V AC/DC 50/60 Hz (polungsunabhängig) | FI32: z30 |
| 2. Speisung 24 V AC/DC 50/60 Hz (polungsunabhängig) | FI32: d30 |

	Relais	Optokoppler	
3.	1 NO	Ausgang E-	FI32: z24
4.	1 COM	Ausgang C+	FI32: d24
5.	1 NC	-	FI32: z22
6.	2 NO	Ausgang E-	FI32: z16
7.	2 COM	Ausgang C+	FI32: d16
8.	2 NC	-	FI32: z14

- | | |
|---------------------------|-----------|
| 9. MK1 Analogausgang 1 - | FI32: d14 |
| 10. MK1 Analogausgang 1 + | FI32: z12 |
| 11. MK1 MTI 1 K1 | FI32: z2 |
| 12. MK1 MTI 1 K2 | FI32: d2 |

- | | |
|-------------------------------|-----------|
| 21. Rackbus RS 485 A | FI32: z32 |
| 22. Rackbus RS 485 B | FI32: d32 |
| 23. Analog-Eingang - | FI32: d18 |
| 24. Analog-Eingang + | FI32: d12 |
| 25. Digital-Eingang 3 (+24 V) | FI32: d10 |
| 26. Digital-Eingang 2 (+24 V) | FI32: z10 |
| 27. Digital-Eingang 1 (+24 V) | FI32: d8 |
| -0 Digital input D1-3 (0 V) | FI32: z8 |
| -1 Digital input D1-3 (0 V) | FI32: z8 |
| 28. MK2 Analogausgang 2 - | FI32: d22 |
| 29. MK2 Analogausgang 2 + | FI32: z20 |

- | | |
|------------------|----------|
| 31. MK2 MTI 2 K1 | FI32: z4 |
| 32. MK2 MTI 2 K2 | FI32: d4 |

Mounting/Installation:

The 19" cartridge is used in a MRM Monorack for DIN rail or wall mounting.

The connection board with FI32 female multi-point connector can also be installed in table-tops or 19" racks. For Ex applications, the connection boards are different (female multi-point connectors are coded).



Connections to FI32 female multi-point connector MLS 1101

Microprocessor device with one measuring circuit input | Connections to FI32 female multi-point connector

Electrical data

Euro plug-in print pin assignment 24 V version

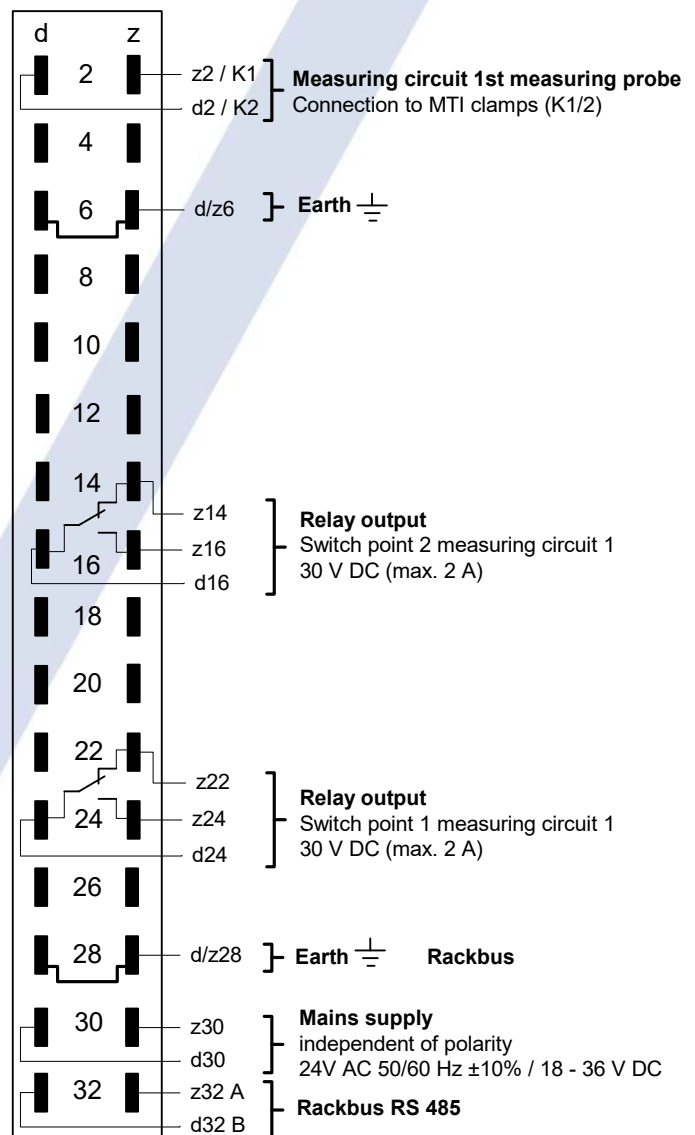
Switchpoint 1 for measuring circuit 1 **FSL** (Fail Safe Lo) **L Alarm**

Relay de-energised (Measured value < Limit value)

Switchpoint 2 for measuring circuit 1 **FSH** (Fail Safe Hi) **H Alarm**

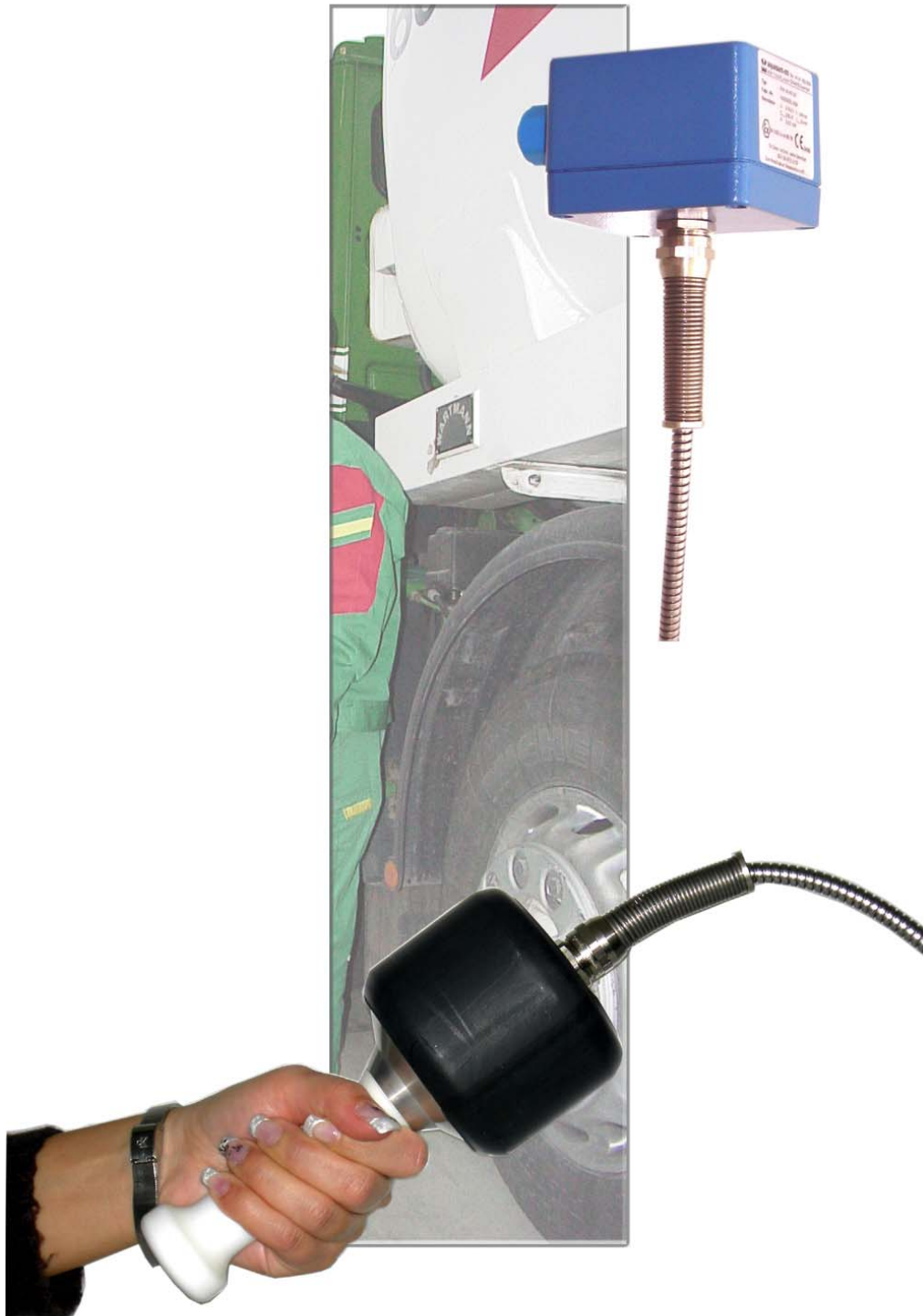
Relay de-energised (Measured value > Limit value)

Technical error: Relay de-energised



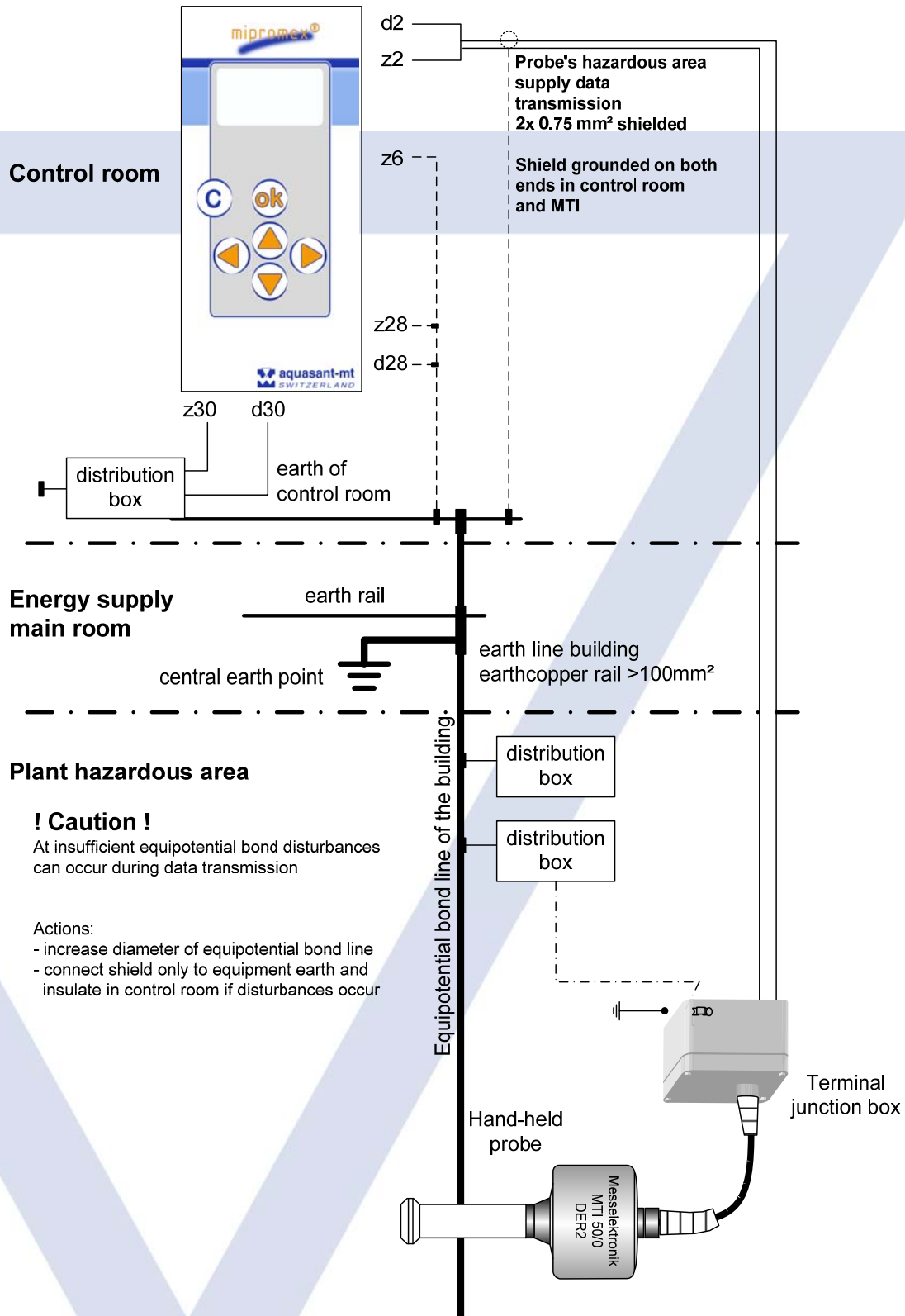
Operation

Wall installation at the lorry filling station with connection casing for 2-wire cable. Dead man's handle with 2m radius with steel spiral hose and kink protection springs.



Earthing for microprocessor devices and probes

Earth-related measuring must be earthed in accordance with Ex regulations.





Technical data mipromex M** ****

Design type

19" plug-in module with aluminium-steel housing; IP 20

Mounting

MR 7 19" rack; 3 HE (European format)
MRM II monorack; plastic housing for DIN rail or wall mounting
Compact or desktop housing for laboratory as well as front panel mounting with Bopla housing

Function

Control unit with intrinsically safe power supply for one or two MTI measuring electronics **/*

Operation/Display

Front panel with film keypad with graphic LCD display, backlit, 6 push buttons for entering calibration data and parameters

Data backup in case of mains failure

Battery buffer max. 10 years. Parameter storage in case of battery failure

Dimensions

Heights 3 HE; width 12 TE
Front panel: Height x Width 128 x 61 mm
Plug-in module: Height x Width x Depth 100 x 60 x 160 mm
7 plug-in modules can be mounted per 19" rack

Weight

690 g | with 2 measuring circuits 705 g

Supply voltage

24 V DC/AC 50/60 Hz (22-26 VAC) / (18–36 VDC), independent of polarity

Start-up current

Short-time (1 ms) approx. 1 A

Power consumption

~ 3.4 VA (I = 140 mA) | with 2 measuring circuits ~ 4 VA (I = 200 mA)

Fuses

8.5 x 8.5 mm miniature fuse MST 400 mA

Signal transmission

modulated pulse supply signal

Rating data supply circuit

Type of protection Intrinsic Safety Ex ia IIC



The Ex-parameters are to be taken from the operating instructions or the Ex-documentation.

The mipromex must be mounted outside the Ex-zone.

The devices are also available without Ex-protection

Signal line short-circuit

max. current consumption 160 mA | with 2 measuring circuits 280 mA

Ambient temperature

0 °C ... +45 °C

Storage temperature

-20 °C ... +45 °C, ideally +20 °C

Measuring range / Data display, processing

0 – 3700 pulses / Transmission of MTI 400 ms, internal processing mipromex 20 ms, approx. 3 measurements/second

Switching hysteresis

1 pulse corresponds to 0.028 pF for measuring range 100 pF

Connection

FI male plug 32 poles, coding possible (Ex version)

Optocoupler transistor output NPN

1 potential-free NPN optocoupler transistor output
Limit values min./max. adjustable; safety FSL or FSH selectable
With two-channel device 1 OC each

Relay output

2 relays of 1st Measuring point with one switchover contact for the limit value; example: Min./max. deviation, FSL or FSH safety selectable.
I/O=2kV, -40-85 °C
1 relay each for two-channel devices

Switching voltage OC NPN output | Relay output

30 V DC

Continuous current

NPN 50 mA | Relais 2 A

Breaking capacity NPN output | Relay output

OC NPN 150 mW | Relay 60 W

Analog output

active 4–20 mA output, max. load 750 Ω, non-Ex, with potential separation, technical failure 0.5–4 / 20–22 mA adjustable

Interface

RS 232 / RS 485 (internal, only for firmware update)

Monitoring

Self-monitoring measuring system: defective probe, short-circuit / interrupted Ex supply (wire break protection); measuring range; mains failure and mipromex malfunctions

Certificate & Reports

RL 2014/34/EU

SEV 22 ATEX 0592

(SEV 09 ATEX 0132 Test report no.: 08-IK-0396.01)

Device also available without hazardous area protection mipromex must be installed outside the hazardous area.

EMC-tested, STS 024 Report No. 990102WS

Confirmation

Certificate of conformity in the operating instructions enclosed with the product, on request or via aquasant.com



Fault messages

Error messages are visualised on the display with time, date and error type.

Fault messages can be programmed on the analogue signal in the ranges of 0.5 – 4.0 mA and 20.0 – 22.0 mA, in increments of 0.1 mA.

In the event of a fault, the limit value outputs are de-energised.

Technical error:

All mipromex microprocessor devices are equipped with a diagnostic system, which facilitates the error search and helps to rectify faults more quickly.

mipromex technical errors which require the device to be sent to aquasant@ for repair:

- ▼ Flash memory checksum verification failed

In the case of repeated errors, send device in for repair!

- ▼ Flash memory failed

Flash is defective; send device in for repair!

- ▼ Low battery: Battery is drained and must be replaced

Battery change; send device in for repair!

- ▼ Program memory check failed

Microprocessor card is defective; send device in for repair!

Data error:

- ▼ Measured value undershot: mA output changes to the value programmed in menu item 8.3! Relays drop out.
Possible cause: Cable break, misaligned on-site MTI electronic unit

- ▼ Measured value exceeded: mA output changes to the value programmed in menu item 8.3! Relays drop out.
Possible cause: Measured value is greater than 3750 pulses, misaligned on-site MTI electronic unit

