



Dead-man's limit switch

MLS 1101 mipromex[®]



- 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] IIIC;

SEV 09 ATEX 0132; EMC STS 024 CE 1254

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 C/Y/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.

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

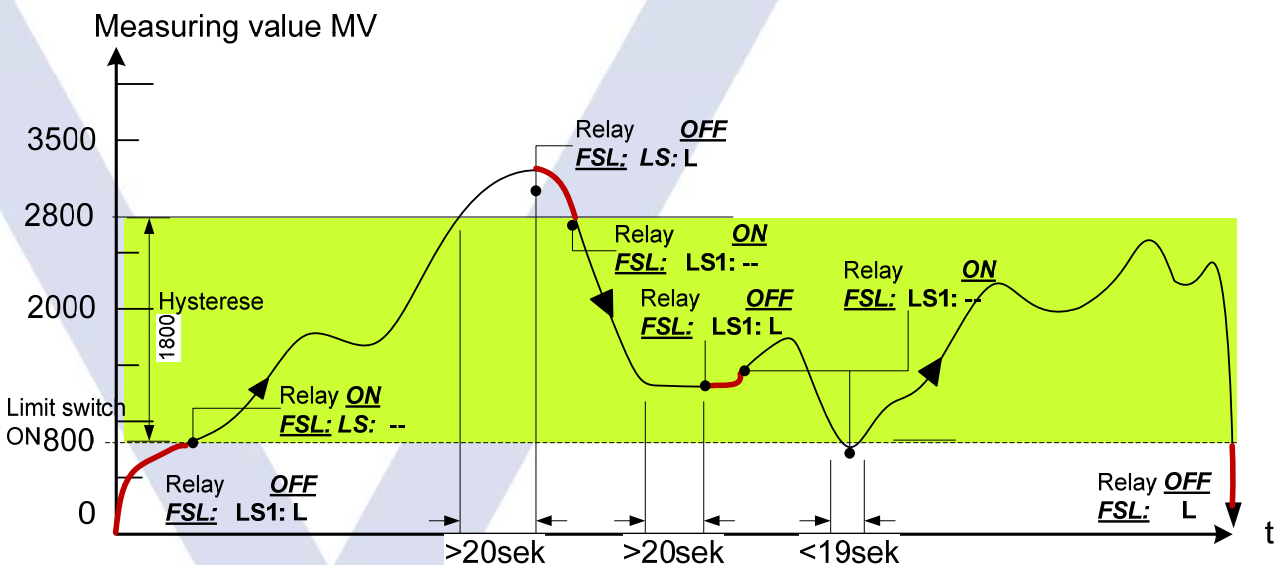
The MLS 1101 safety dead man's monitoring device is equipped with the dynamic measured value processing. It cannot be bypassed since the measuring signal is dynamically monitored.

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.

Dynamic measured value



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:

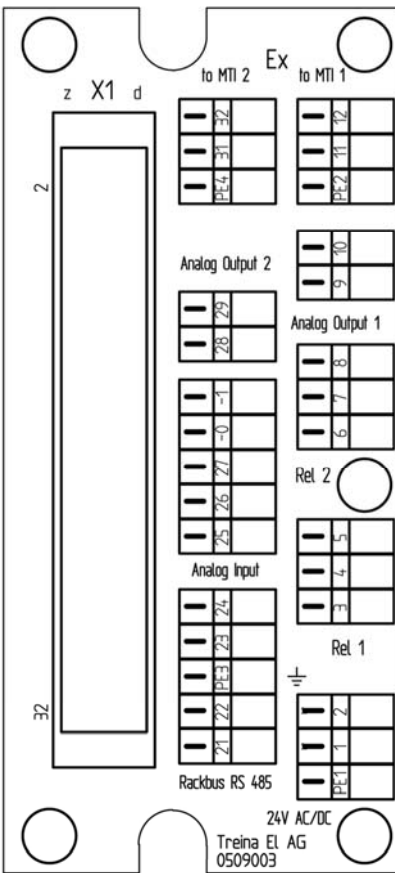
The fail-safe field circuit is connected to the **blue** terminals. It may be guided into the hazardous area with connecting cables as per DIN EN 60079-14.

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 |

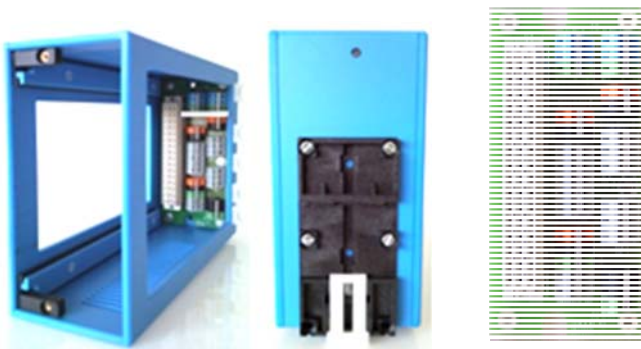
Relais	Optokoppler	FI32
3. 1 NO	Ausgang E-	FI32: z24
4. 1 COM	Ausgang C+	FI32: d24
5. 1 NC	-	FI32: z22
6. 2 NO	Ausgang E-	FI32: z16
7. 2 COM	Ausgang C+	FI32: d16
8. 2 NC	-	FI32: z14

- | | |
|-------------------------------|-----------|
| 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

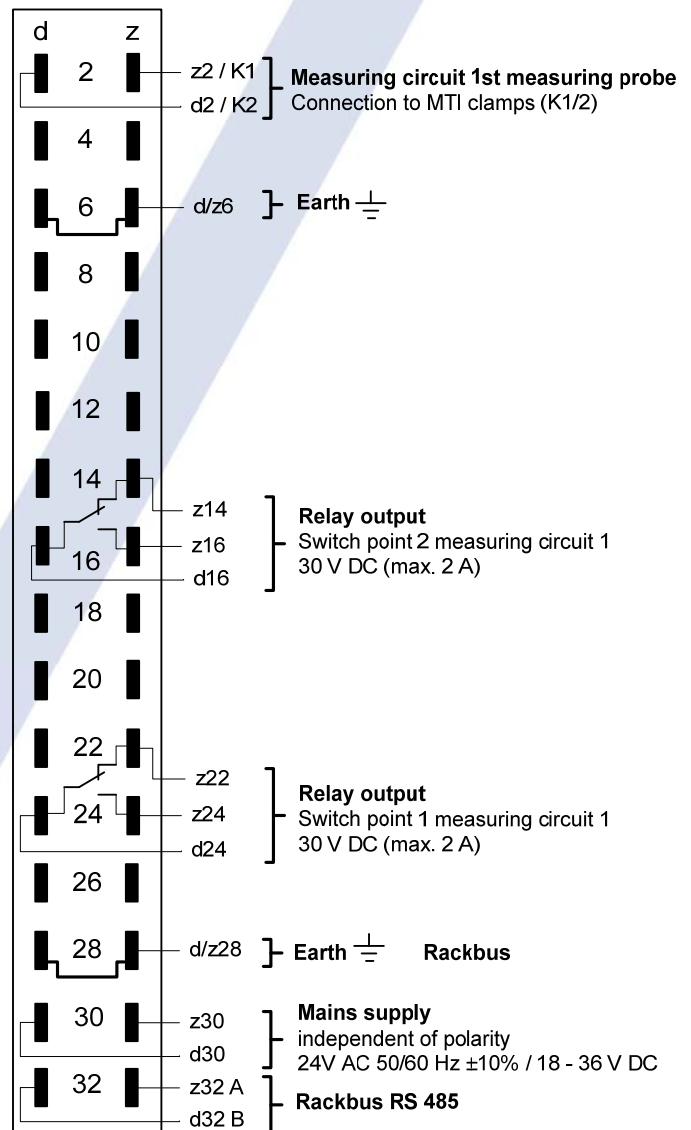
Switchpoint 1 for measuring circuit 1 **FSL** (Fail Safe Lo) **L Alarm**

Relay de-energised (Measured value < Limit value)

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

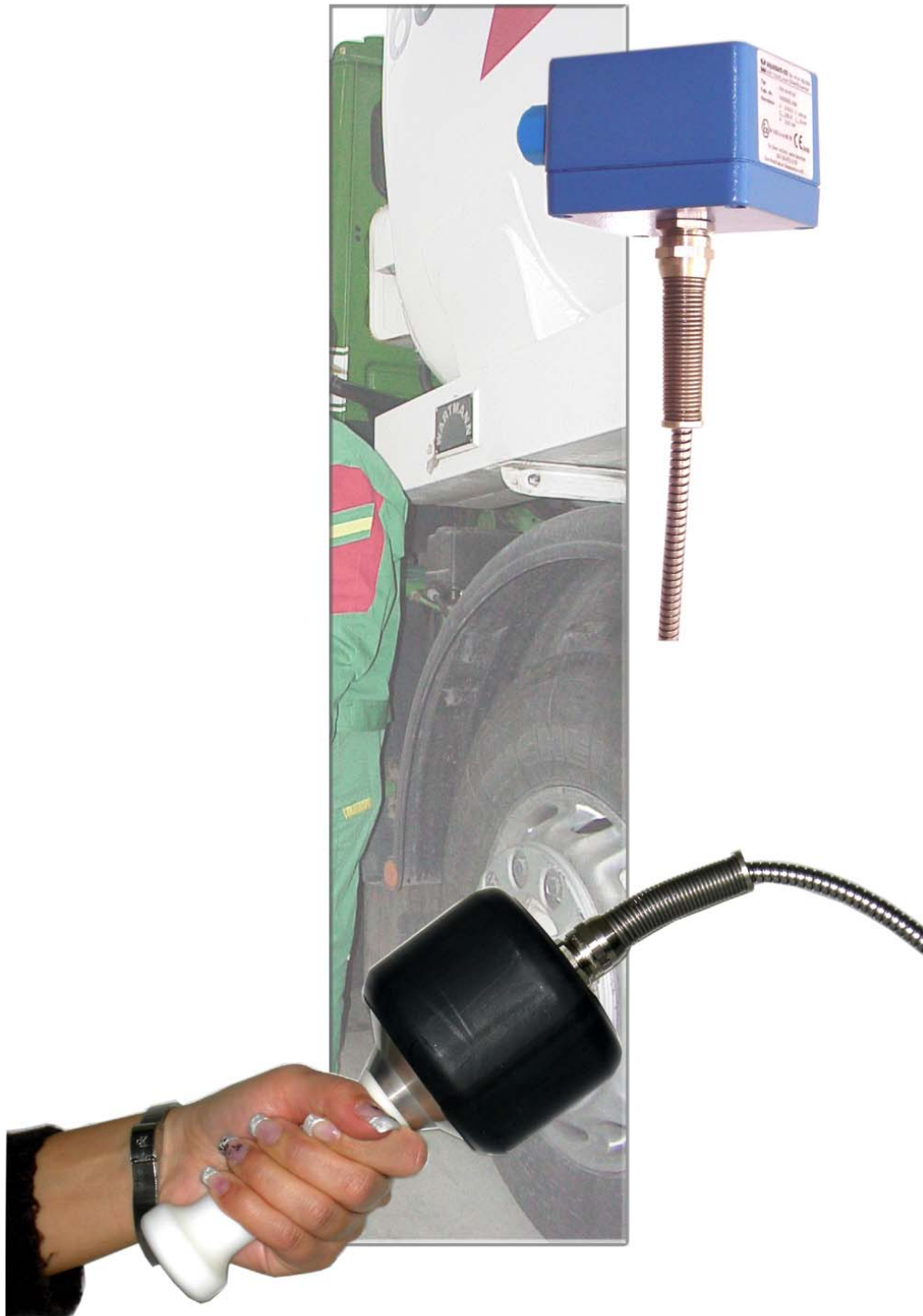
Relay de-energised (Measured value > Limit value)

Technical error: Relay de-energised



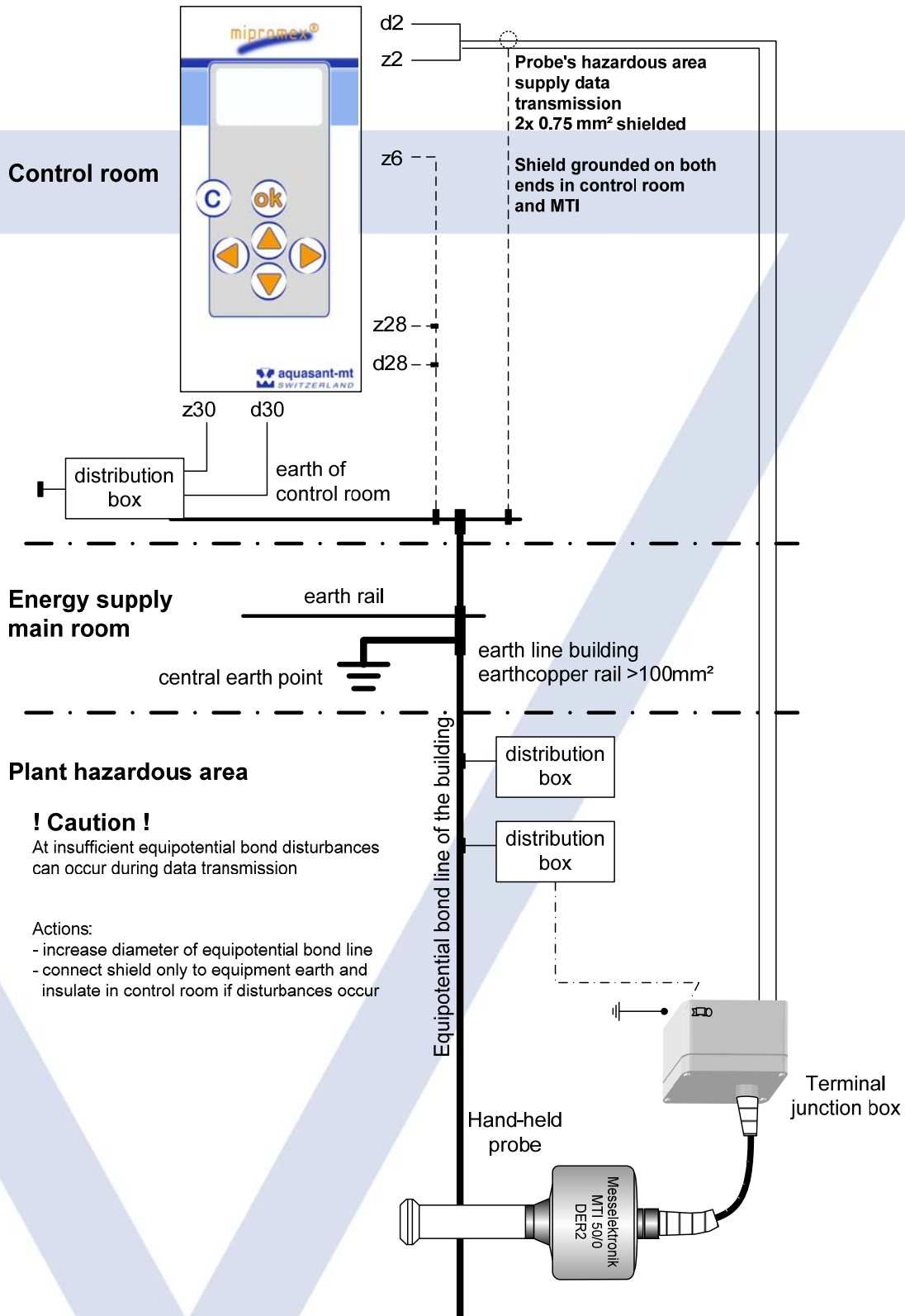
Operation

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

Design type

Plug-in electronics with square stainless cover in protective housing, with HF connection

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. Front panel mounting with BOPLA housing.

Compact or table-top for laboratory

Function

Limit value switch with fail-safe supply for one MTI xx measurement transducer.

- Static and/or dynamic limit value transmitter
- Drift compensation programmable
- Menu-guided multilingual device communication
- 2 relay outputs

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

MLS 1100: 690 g / MLS 1200: 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

MLS 1100: approx. 3.4 VA (I = 140 mA) / MLS 1200: approx. 4 VA (I = 200 mA)

Fuses

8.5 x 8.5 mm miniature fuse MST 400 mA

Hazardous area supply/Signal transmission

[Ex ia] IIC, modulated pulse supply signal

Open circuit voltage $U_o \leq 18.9$ V

Short-circuit current $I_o \leq 49$ mA

Power $P_o \leq 231$ mW output characteristic linear



Ex d ia, modulated pulse supply signal

Open circuit voltage $U \leq 19.3$ V

Short-circuit current $I \leq 75$ mA

Signal wiring circuit Ex ia IIC

Max. external inductance $L_o \leq 10$ mH

Max outer capacity $C_o \leq 180$ nF

Signal transmission

1 or 2 measuring circuits, modulated pulse supply signal

Signal line short-circuit

max. current consumption MLS 1100: 160 mA / MLS 1200 : 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 from 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)

Relay output

2 relays of 1st Measuring point with one switchover contact for the limit value, example: Min./max. deviation, min. or max. safety selectable. Switching voltage 30 Vdc /2 A, I/O=2kV, -40 to +85 °C
MLS 1200 one relay per measuring point

Switching voltage relay – output

30 V DC

Continuous current relay – output

2 A

Breaking capacity relay – output

60 W


Interface

RS 232 / RS 485 (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

Testing

	Gas	II (2) G [Ex ia Gb] IIC
	Dust	II (2) D [Ex ia Db] IIIC
		II (2) G / II (2) D (Probe [Ex d ia] IIC)

RL 2014/34/EU

Test report no.: 08-IK-0396.01 with extension 1

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

Fail-safe hazardous area connection:

MTI transmitter module ... In protective housing or S**; K**; F** bar probes

EMC-tested, STS 024 Report No. 990102WS
complies with EN 1127-1 : 20011

EN 61000-6-2 2005 EN 6100-6-4: 2007

EN 60079-0 : 2012 EN 60079-11 : 2012

