



Interfacial level measuring unit

MIL 8130 mipromex[®]



- For continuous interfacial layer measurement
- Evaluation for impedance bar probes
- Menu guidance in 3 languages
- Commissioning procedure
- DIN rail or wall mounting

Site of use

The aquasant[®] evaluation unit for continuous interfacial layer adjustment in mixers, settlers or decanters. The interfacial layer height is monitored and adjusted analogously via the current output.

A high and low alarm can also be set within the length of the measuring electrode by means of two digital outputs.



Overview

- Continuous interfacial layer measurement
- Menu-guided parameterisation in selectable languages: D / F / E
- Device data and item/TAG no. storage
- Measured value processing in microprocessor technology
- 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
- Analogue output 4...20 mA with galvanic isolation, max. load 750 Ohm active (non-Ex)
- Fault message programmable on analogue output
- Fault indication Time/Date
- 2 LV relay outputs max. 2A/30VDC
- mA output and limit value simulation
- 1 measurement input for MTI probe connection, max. cable length: approx. 200 m (<120 nF)
- 256 kB Flash Firmware V1.17

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

SEV 09 ATEX 0132; EMC STS 024 CE 1254

Basic function

The pulse signal transmitted from the aquasant® transmitter module is converted into an offset-compensated, filtered pulse value.

The interfacial layer height is measured in function of the calculated measuring span in accordance with the saved parameter set. The indication is shown on the display as pulse, % value or mA output signal, and the limit value outputs are depicted in fail-safe status.

The measured product values of the lower and upper layer are accepted with the press of a key. The measuring span is thus automatically calculated and can be saved in one of 7 parameter sets. The measuring span corresponds to the interfacial layer progression within the length of the measuring electrode from 0-100%. The 4...20 mA analogue output can be spread by means of programmable start and end value percentage. A corresponding sequence is available for commissioning.

Parameter entries are menu-guided and type-dependent. A parameter set can be stored and reloaded.

Via 3 digital inputs, 7 parameter sets can be selected via BCD coding. For the interfacial level measurement, 2 further relays are available, each with Low and High function, as well as adjustable on/off time delay plus fail-safe setting.

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

The electrode system of a probe, surrounded by product, changes the impedance in function of the dielectric properties and conductivity of organic products and aqueous solutions. The measured impedance sum signal is converted directly by the aquasant® transmitter module into a normed signal and is transmitted as pulse packages to the analogue transmitter mipromex® MIL.

The measured value in the range normed by Aquasant Messtechnik AG (0–3700 pulses) is product-specific and varies in function of interfacial layer height, product mixes or immersion depth. The physical measured impedance value of a product at a given interfacial layer height or immersion depth is thus displayed as a numeric value, which is designated as a pulse count.

Continuous separation

Continuous interfacial layer monitoring requires the product-specific measured values for organic and aqueous layers to be stored. The device offers the option of storing 50 measured product values and of creating 7 interfacial layer combinations from these. These can be dialled via digital inputs from the process control system (PCS) into multi-purpose installations.

Detritus, emulsion layers and remixing do not disrupt the interfacial layer adjustment as a rule. They are included in the active measurement. Organic contamination of the measuring electrode influences the measurement only slightly and is negligible.



Connection circuit board for 19" rack, Monorack

The 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:

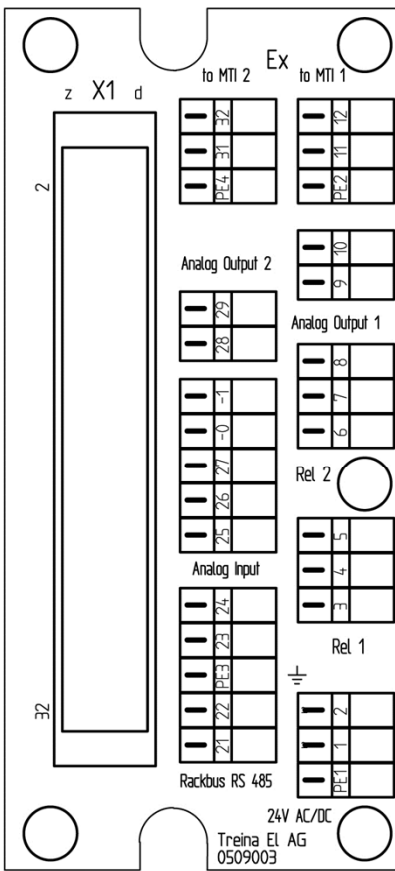
The fail-safe field circuit is connected to the **blue** terminals. It may be guided into the hazardous area with connecting cables as per DIN EN 60079-14.

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

1. Speisung 24 V AC/DC 50/60 Hz (polungsunabhängig)
2. Speisung 24 V AC/DC 50/60 Hz (polungsunabhängig)

FI32: d/z6

FI32: z30

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 -
10. MK1 Analogausgang 1 +
11. MK1 MTI 1 K1
12. MK1 MTI 1 K2

FI32: d14

FI32: z12

FI32: z2

FI32: d2

21. Rackbus RS 485 A
22. Rackbus RS 485 B
23. Analog-Eingang -
24. Analog-Eingang +
25. Digital-Eingang 3 (+24 V)
26. Digital-Eingang 2 (+24 V)
27. Digital-Eingang 1 (+24 V)
- 0 Digital input D1-3 (0 V)
- 1 Digital input D1-3 (0 V)
28. MK2 Analogausgang 2 -
29. MK2 Analogausgang 2 +

FI32: z32

FI32: d32

FI32: d18

FI32: d12

FI32: d10

FI32: z10

FI32: d8

FI32: z8

FI32: z8

FI32: d22

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

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

Standard setting

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

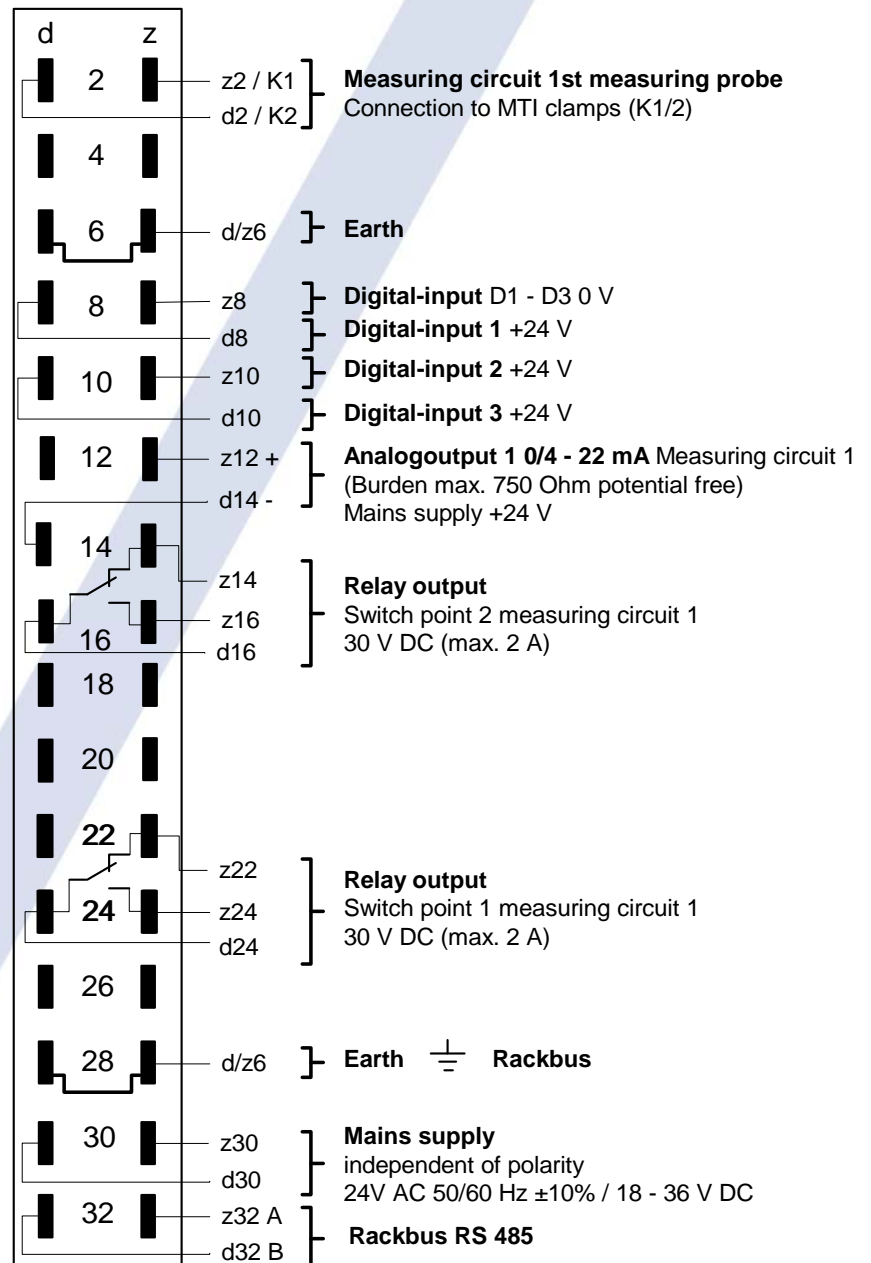
Relay de-energised (Measured value < Limit value)

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

Relay de-energised (Measured value > Limit value)

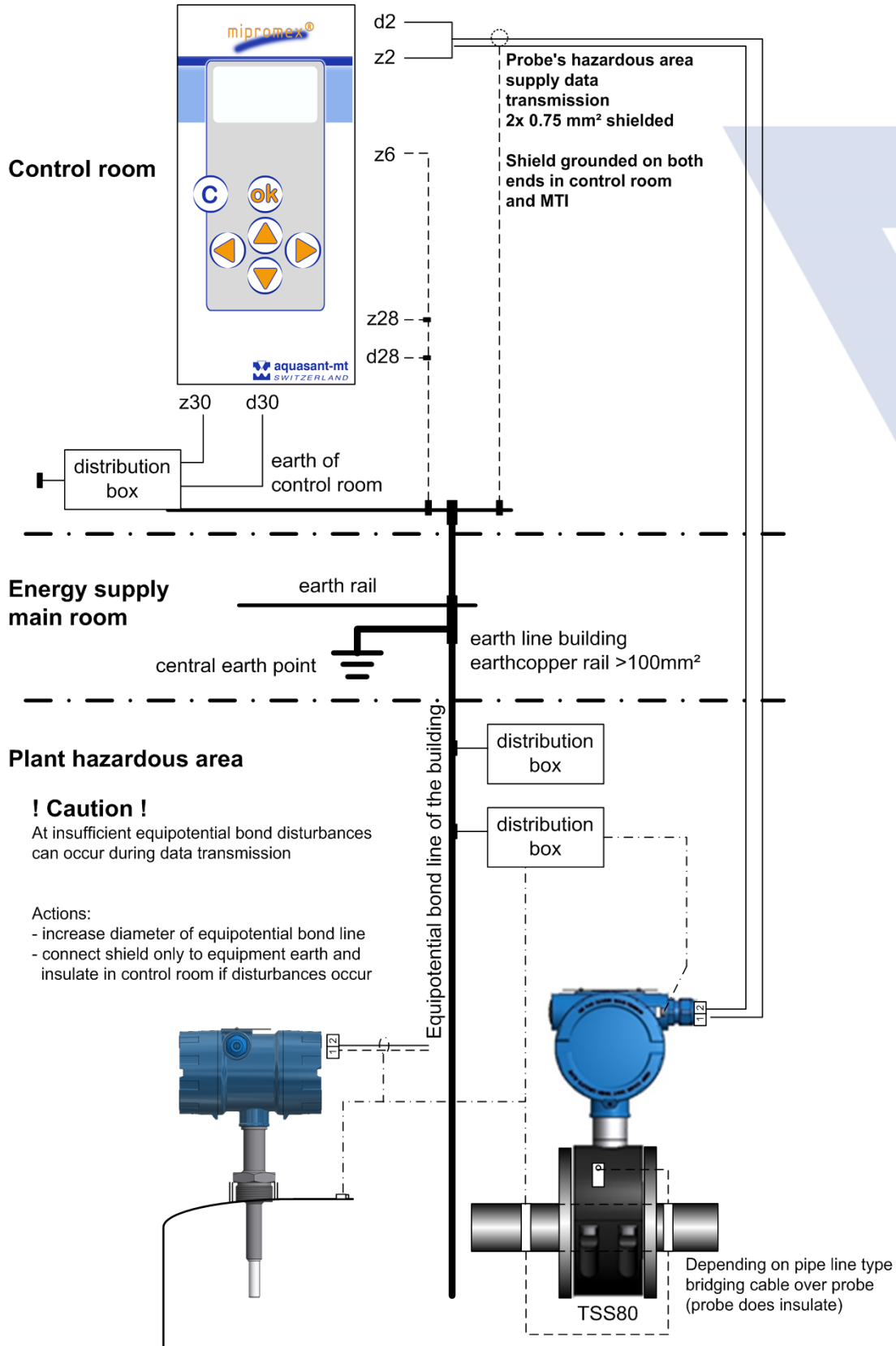
Technical error: Switching levels analogue output as per parameterisation, relay de-energised

Fault message programmable in 0.1 mA increments; 0.5 ... 3.9 / 20.1 ... 22 mA



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

Interface layer measuring device with fail-safe supply for one MTI xx measurement transducer.

- Continuous interfacial level measurement
- Menu-guided multilingual device communication
- Commissioning procedure
- 1 analogue and 2 digital outputs

Operation/Display

Front panel with film keypad with graphic LCD display, backlight, 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

Supply voltage

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

Start-up current

Short-time (1 ms) approx. 1 A

Power consumption

approx. 3.4 VA (I = 140 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 $U_0 \leq 18.9$ V

Short-circuit current $I_0 \leq 49$ mA

Power $P_0 \leq 231$ 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 $L_0 \leq 10$ mH

Max outer capacity $C_0 \leq 180$ nF



Signal transmission

1 measuring circuit, modulated pulse supply signal

Signal line short-circuit

max. current consumption 160 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)

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. Switching voltage 30 V DC / 2 A, I/O=2kV, -40 ... 85 °C
One relay each for two-channel devices

Switching voltage relay output

30 V DC

Continuous current relay output

2 A

Breaking capacity relay output

60 W

Analogue output

1 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 (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
	Staub	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



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

