



Analog Transmitter device

MAT 4110/4190/4220/4240/4260

- Analog evaluation signal
- Display of %-/ mA-/ Pulses
- 1 or 2 Measuring
- Analog output 4–20 mA
- Limit value with relay or OC output

- MAT-Version V1.1x
- Technical specifications
- Operating
- Commissioning
- Installation

mipromex
for monitoring product
measurement values



Sales: **Aquasant Messtechnik AG**
Hauptstrasse 22
CH - 4416 Bubendorf / Switzerland
T. +41 (0)61 935 5000

info@aquasant-mt.com
www.aquasant.com



Manufacturer: **Aquasant Messtechnik AG**

Manual No.: VEB-Mipromex-MAT-V1.1x_ATEX22

Version: 11427/8

Pages: 50

Author: R. Inauen

Modifications: Subject to modifications

© 2022 Aquasant Messtechnik AG claims copyright protection for this document. The document may not be modified or supplemented without prior written consent. We reserve the right to make changes to technical details compared to the description, information and illustrations in these operating instructions.

change index

Version	Date	Description
2.00	01.2022	Second edition, new Ex certification

Using this manual

Symbols and conventions

- In this document the following conventions are used at formatting to differentiate text elements.
- The names of equipment pieces are written in BOLD.
Example: **mipromex**

In this document the following terms and symbols are used for special program messages:

Emphasized symbols and notices and their meaning:



















	Mortal Danger: the non-observance can lead to injuries or death.		Step by step: Text enhanced/marked this way, contains detailed instructions and comments
	Caution: the non-observance can lead to equipment damages or loss of information.		Actions to be carried out by user.
	Information / Notice: describes equipment characteristic features.		Read and follow instruction steps.
	A waiting time is required during which the equipment does recalibrate itself.	<i>mipromex display</i>	Compare with the mipromex display.
	Adjustment of the measuring electronic MTI (visualized by red and green LED's).		Plug in mains 230/115 V (24 V AC/DC).
	Observe and control equipment display.		Send equipment back to manufacturer.
	Button on mipromex front panel		mipromex Error message on display with Time/Date
	Function: change value according to displayed character set		Button on mipromex front panel
	Change line without store		Function: select number or character
	Button on mipromex front panel, Function: back	ok	Button on mipromex front panel, Functions: menu, select, next, store (press more than 2s)
"next step" in navigation bar	press ok button on mipromex . Press less than 2 seconds to advance to the next parameter	"store" in navigation bar	press ok button on mipromex . Press more than 2 s to store

Chart 1 Symbol description

Index

1. Security and precautions	6
1.1. <i>Installation</i>	6
1.2. <i>Setup</i>	6
1.3. <i>Hazardous Area protection</i>	6
1.3.1. Following notices must be observed:	7
1.4. <i>SIL Safety Integrity Level</i>	7
1.5. <i>Cleaning of units</i>	7
1.6. <i>Maintenance</i>	7
1.7. <i>Warranty claims</i>	7
1.8. <i>Waste disposal of electrical and mechanical components</i>	7
2. mipromex type description	8
2.1. <i>MAT-Hardware types</i>	8
2.1.1. mipromex type code:	9
2.2. <i>Software Versions</i>	10
2.2.1. Basic	10
2.3. <i>Basic functions</i>	11
2.4. <i>Measuring circuit</i>	11
2.5. <i>Function</i>	11
3. Structure of data input (parameterization)	12
3.1. <i>General</i>	12
3.2. <i>Key functions</i>	12
3.2.1. Input / changing of characters	12
3.2.2. Select language	12
3.3. <i>Graphic display</i>	13
3.3.1. Display at switch-on of mipromex	13
3.3.2. Measured value display	13
3.3.3. Menu parameter settings	14
4. Program structure with parameters of the analog transmitter	15
4.1. <i>Description of the menu, program structure General, for all mipromex units</i>	18
4.1.1. [1.] Basic settings	18
4.1.2. [2.] Device specs	21
4.1.3. [3.] Signal settings	22
4.1.4. [5.] Measuring range	24
4.1.5. [6.] Limit value	24
4.1.6. [7.] Test functions	25
4.1.7. [8.] Programmable mA output	26
5. Commissioning example	27
5.1. <i>Commissioning the mipromex with a pipe probe</i>	27
5.1.1. Detection of water in petrochemical products	27
5.1.2. Oil detection in process- or rain-water	27
5.2. <i>Commissioning the mipromex with a bar probe</i>	28
5.2.1. Oil detection in process- or rain-water with float	28
5.2.2. Foam detection	28

5.3. Electronic calibration MTI, basic equalization -----	29
5.4. Inspection release of the parameters -----	30
5.4.1. Chart for operating settings of the analog transmitter -----	30
6. Fault finding -----	32
6.1. After power on -----	32
6.2. During operation -----	32
6.2.1. Data error -----	32
6.2.2. Display error -----	34
6.2.3. Radio equipment -----	34
7. Wiring diagram -----	35
7.1. Measuring electronic/probe with fix connection -----	35
7.2. Connections to female multipoint connector with 32 poles, type: MAT 4110 -----	36
7.3. Connections to female multipoint connector with 32 poles, type: MAT 4220/4240 -----	37
7.1. Connections to female multipoint connector with 32 poles, type: MAT 4190/4260 -----	38
7.2. Printed circuit board for 19"-Rack, Monorack, Wall- and Table Top housing -----	38
7.3. Earthing of microprocessor units and probes -----	40
8. Technical Data -----	41
8.1. mipromex Analog transmitter type: MAT 4110 -----	41
8.2. mipromex Analogtransmitter type: MAT 4190 -----	42
8.3. mipromex Analog transmitter type: MAT 4220/4240 -----	43
8.4. mipromex Analogtransmitter type: MAT 4260 -----	44

1. Security and precautions

The following points must be considered at installation and setting up of microprocessor units 24 V AC/DC:

1.1. Installation

- ⇒ The units are IP20 according to EN 60529 and must be protected against e.g. splash water or pollution exceeding the degree of pollution 2.
- ⇒ The units must be installed outside the hazardous area.
Maximum 7 units can be installed into a 19"-Rack. Multipoint connector type: FI32 must only be equipped with d- and z – contacts. Solder connections are to be isolated with heat shrinkable sleeves (see chapter 7.2)
- ⇒ Single units installed with Monorack Type: MRM 2 (see chapter 7.4)
Housings or switch cabinets must be ventilated (dissipation of heat built-up)
- ⇒ Hazardous area blue line to lead separately (cable channel or joined to loom of cables)
Equipotential bond must be installed; Hazardous area protection
Outside installations: a corresponding lightning protection of the probe supply cables is recommended.
- ⇒ Installation instructions for impedance probes I must be observed

1.2. Setup

- ⇒ Verify wiring and power supply tension (chapter 7.2)
- ⇒ Perform probe and system specific parameterization in the menu (chapter 5)
- ⇒ Check max. load of the opto-electronic coupling transistor outputs (NPN) according to datasheet (chapter 7.6)
- ⇒ Adjustments under tension are only allowed to be carried out by manufacturer
Handling by user is performed only via protected film keypad
Repair of unit only by trained personnel with manufacturer certificate

1.3. Hazardous Area protection

Control devices with intrinsically safe output, approved for the connection of defined rod probes in the Ex zone according to SEV ATEX22.



The EU type examination certificate must be observed. Compliance with the "Special Conditions" contained therein is particularly important. Ex certification according to directive RL 2014/34/EU

Please note the following documents:

- *VDZ-SEV22-ATEX-ISO_Zertifikat-Doc.pdf* (currently valid certificates)
- *VDD-STM*** ...Technical probe data sheet with the specific (X) Ex-relevant layer thicknesses and information about use in which zone.

1.3.1. Following notices must be observed:

1. The microprocessor control unit **mipromex** as per EN 60079-0:2006 can only be used outside of the hazardous area.
2. The highest allowed ambient temperature is 60°C (also inside a protective housing)
3. The microprocessor unit **mipromex** is to install in a manner that at least the protection standard IP 20 as per Standard IEC 529 resp. EN 60529 is fulfilled. By corresponding mount into rack unit this condition is fulfilled.
4. At installation of the microprocessor control unit **mipromex** a minimum distance of 50mm must be created by insertion of a separation wall between the intrinsic safe and non intrinsic safe wiring circuit or the connecting parts must be insulated (i.e. with a heat-shrinkable sleeve). The input lines are secured to the rack or the monorack with a strain relief.
5. The intrinsic safe signal wiring circuits are safe galvanic separated from the remaining wiring circuits up to a peak value of 375 V of the nominal voltage

1.4. SIL Safety Integrity Level

The microprocessor unit **mipromex** is produced as per the SIL standards Norm IEC 61508/61511.

1.5. Cleaning of units

The microprocessor unit **mipromex** and the measuring electronic **MTI** built-in on the probe head are not allowed to be cleaned with water.

The cleaning of the front panel is to be done with a slightly damped, clean cloth. The printed circuit boards, to remove the dust, shall only be slightly blown-out with compressed air (low pressure 4 bar).

The bar probes must be cleaned with alcohol or a corresponding solvent.

Probes with stainless steel electrodes (SRK or SRM or probes made to measure powders/solids) are not allowed to be cleaned with water or liquids.

1.6. Maintenance

The data transmission of the microprocessor units remains stable, even over a long period of time. Therefore, a periodic adjustment or similar, is not necessary.

1.7. Warranty claims

Your measuring system had to undergo a precise final inspection at the factory. Interventions are only allowed to be carried out by a competent person. Warranty according to Aquasant Messtechnik AG warranty.

1.8. Waste disposal of electrical and mechanical components



The Waste Electrical and Electronic Equipment (WEEE) Directive, which came into force on 13 February 2003, has brought about a major change in the way we handle electrical and electronic equipment that is no longer used. The WEEE logo (see on left), either on the product itself or on the packaging, indicates that this product must not be disposed of with normal household waste. For more information regarding the disposal of waste electrical and electronic equipment and for recycling and collection points, please contact your relevant local authority or the business where you purchased the device.

2. mipromex type description



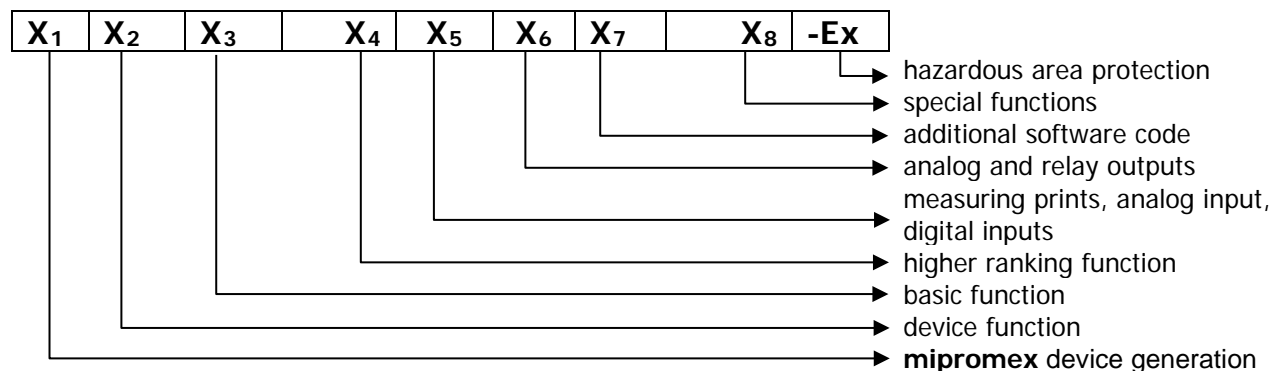
Pic. 1 mipromex

2.1. MAT-Hardware types

- | | |
|---------------------|--|
| MAT 4110 | 1 measuring circuit with 1 analog output and 1 limit value output OC |
| MAT 4110/220 | 2 measuring circuits with 1 analog outputs each (not potentially separated against each other) and 1 limit value output OC each. The second measuring circuit can be activated with an activation code subject to costs. |
| MAT 4220 | 2 measuring circuits with 1 analog output each (not potentially separated against each other)* |
| MAT 4240 | 2 measuring circuits with 1 analog output each (potentially separated against each other)* |
| MAT 4260 | 2 measuring circuits with 1 analog output each (not potentially separated against each other)*
1 limit value relay output each. |

*) no change in software except type code)

2.1.1. mipromex type code:



X₁ M = **mipromex**

X₂ A = Analog I = Interface
L = Level P = Product

X₃ L = Limit/Level M = Monitoring T = Transmitter
R = Recognition Q = Quality S = Switch
L = Level U = Universal

X₄ 1 = Limit switch 4 = Analog output 7 =
2 = Level switch empty 5 = Universal new 8 = Interfacial layer
3 = Level switch full 6 = Filling level 9 = Product (quality, type, concentration)

X ₅	Meas. print	MeV of 2nd. unit	analog input	digital input
1	1			3
2	2			3
3	2	1 MeV ex Rackbus		3
4	2	2 MeV ex Rackbus		3
5	1		1	3
6	2		1	3

X ₆	relay	OC	analog output	DC-converter
0	2			
1		1	1	1
2		2	2	1
3	2		1	1
4		2	2	2
5	2		2	2
6	2		2	1
7		2		
8	2 intern		1	1
9	1		1	1

One DC-converter, with potential separation, analog output toward power supply
Two DC-converter, additional potential separation, analog outputs toward each other

X₇ 0 = standard - software
1 = first expansion of a standard - software

X₈ - = without
C = controller (device with control function) e.g. **MIL 8110 C** interfacial layer level controller
P = product compensation
S = Segment

Ex Ex = with hazardous area protection according to ATEX II(2)G [Ex ia] IIC // II(2)D [Ex iaD]
Exd = with hazardous area protection according to ATEX II(2)GD [Ex d ia] IIC
NEEx = without hazardous area protection on measuring print

2.2. Software Versions

2.2.1. Basic

The standard operating software is used for all basic hardware units. The basic functions are identical for all software versions; you can use them on all the units. Software versions are marked according to NAMUR EN53.

Example:

MAT 4110	V1.1x	1 measuring circuit with one analog output and one limit value
MAT 4110/220	V1.1x	2 measuring circuits with 1 analog outputs each (not potentially separated against each other) and 1 limit value output OC each. The second measuring circuit can be activated with an activation code subject to costs.
MAT 4220	V1.1x	2 measuring circuits with one analog output each and one limit value each*
MAT 4240	V1.1x	2 measuring circuits with one analog output each (potentially separated against each other) and one limit value each*
MAT 4260	V1.1x	2 measuring circuits with one analog output each (potentially separated against each other) and one limit value relay each*

(* no change in software except type code)

Within each software type, at cost, additional functions can be activated.

For each additional function a separate activation code is generated for each measuring circuit. The activation code is serial number depending.

Examples for additional functions:

- Second measuring circuit for **MAT 4110/4220**

The simple menu navigation (language selectable) assures a fast and accurate operation.

Input can be made via buttons and display of the device or via connection to a laptop or the process control system.

2.3. Basic functions

The **mipromex MAT** has one or two separated and independent measuring circuits. Depending on the device type, one or two measured signal processing can be activated.

The pulse signal transmitted by the measuring electronic MTI is transformed into an offset compensated and filtrated pulse value and converted into a 4 – 20 mA signal in function of the selected measuring span.

The output signal is displayed as pulses value, % value or as mA value.

The offset range can be set between 10 and 2000 pulses.

The measuring signal offset (zero point) can be picked up automatically and/or the stored value can be modified via the keypad buttons. The measuring span is product dependent determined and automatically stored and/or the stored value can also be modified manually via the keypad buttons.

The pulses signal is converted into a 0 – 100 %-value.

The 4 - 20 mA analog output can be spread via programmable start and end values.

Parameter input is menu-driven and device-type based. Inactive positions are hidden.

The parameters can be stored and reloaded.

For each measuring circuit, an opto-electronic coupler transistor output (OC) with Low and Hi function as well as an adjustable time delay for drop and activation is at disposal. Fault messages are visualized with time and date of the error.

2.4. Measuring circuit

One or two probes with the measuring electronic MTI in the connecting head are connected to the **mipromex MAT** using a shielded two core cable. Between field and control room an equipotential bond must be installed.

2.5. Function

A product surrounding or filling an Aquasant-mt impedance pipe or bar probe you varied the impedance in function of the dielectrical constant and/or conductivity characteristics of organic products or aqueous solutions as, well as the immersion depth of the active part of the bar probe .

The measured impedance sum signal is converted directly by the measuring electronic MTI into a normed signal and is transmitted as pulse packages to the analog transmitter **mipromex MAT**.

The measured values within the normed signal range are product specific and characteristic for the different products and changing in accordance with product mixtures or immersion depth - This product specific measured value correspond to a value in the range of 0 – 3700. The physical impedance measured value of a product is registered in digits, designed as pulses value.

In a measuring electronic range (e.g. MTI 100) the dielectrical value of 100 pF is converted into a range of 0 – 3500 pulses.

A modern and menu driven operation and calibration concept enables a time saving commissioning of the analog transmitter. The frontal key pad with function and graphic display assure a user friendly operation and reliable working.

Use for foam and powder surveillance, recognition of water in petrochemical products or organic products in water or surveillance of surface oil layers with floater probes

3. Structure of data input (parameterization)

3.1. General

To select a menu point or to go forward/ "next" step in the menu, use the **OK** button. The function of the **OK** button is shown in the inverted bar at the bottom of the display. The position number of the actual menu item is displayed at bottom left. To select the desired menu item use the **▲ ▼** buttons. The selected menu item is shown inverted. To execute the shown function use the **ok** button, to delete a value or go back to the previous menu, use the **C** button.

3.2. Key functions

Key	description	measured value	in main menu	menu line	Data input
▲	up	Advancing display	"next" menu item	1 step up	0 - 9 / A - Z
▼	down	next dysplai	"next" menu item	1 step down	0 - 9 / A - Z
▶	right	-	no function	no function	input right
◀	left	-	no function	no function	input left
OK	"next" / menu / select / store	(>2 s) Confirmation error	select	confirm	forward or (>2 s) store and forward
C	back	retour	back	back	back

Chart 2 Key functions

3.2.1. Input / changing of characters

Every parameter has its own input field. The input and change of parameter values can be done using the **mipromex** menu or via PC-Software. For several menu configuration text input is required. Text input is done the same way in all functions. Input via buttons on the **mipromex** key pad is done as follows: The first position, beginning on the left, is inverted. To change the character use the **▲ ▼** buttons. To select the next position use the **◀ ▶** buttons. With the **ok** button (press >2 sec) the new value is stored and the display changes to the next parameter. You can reactivate the old value using the **C** button. If no input is made during an adjustable amount of time, the display changes back to measured value.

Define your position, instrument or tag-number, 11 characters max.

active key-navigation

Menu-Pos.-Nr.-Code /**ok** button function

Input Tag.-No.

1 Tag SR10P _ _ _ _ _

▲▼◀▶ adjust

3.1.1. Store

press **ok** key more than 2s; store and advance to the next Menu item

Change and input

1. position character input using ▲▼ buttons alpha-numerical

active button function

Chart 3 Display

3.2.2. Select language

The languages Deutsch/English/Français are available and selectable in the **mipromex** menu. A fourth language can be programmed. The parameter text field is loaded according to language code via PC-Software. Changes of the text can not be done using only the microprocessor unit **mipromex!**



3.3. Graphic display

The format of the display is as follows:

Every menu position, parameter and device unit can be set active or inactive (not visible) according to the function of the device. The display is also adjusted to the function of the device.

3.3.1. Display at switch-on of mipromex

Vendor	
Name of device generation	
ok button function	Next

ok: forward to device type

Unit description	Analog transmitter Device type MAT 4110/4220
Device type and hardware model	
ok button function	Next

ok: forward to meas.value display

3.3.2. Measured value display

Unit type (with 1 measuring circuit) **MLS 1100, MAT 4110, MLT 6130, MIQ 8130, MIL 8110**

Description of the 1. measuring position
 Description of the (1st) measured value
 Actual calibrated meas.value display in %
 Change and input in Menu 5.1.2
ok button function / active keys

Change and input in measuring circuit 1, Menu 3.1.1.

Limit value "Hi" (high) is reached
 Change and input in measuring circuit 1, Menu 6.1.2

ok: change back to menu

▲▼: circulate (loop) in display mode

Pos. no. can be entered in the menu

Unit types with 2 measuring circuits: **MLS 1200, MAT 4220/4240, MLT 6250, MIL 8240**

Description of the 2nd measuring position
 Description of the 2nd measured value
 Actual calibrated meas.value display in %
 Change and input in Menu 5.1.2.
ok button function / active keys

Change and input in measuring circuit 2, Menu 3.1.1.

Limit value "Hi" (high) is reached
 Change and input in measuring circuit 2, Menu 6.1.2

ok: change back to menu

▲▼: circulate (loop) in display mode

Description of the outputs
 Display of the 1st and 2nd measured value
 Actual calibrated meas. value display in %
 Change and input in Menu 5.1.2.
ok button function / active keys

ok: change back to menu

▲▼: circulate (loop) in display mode

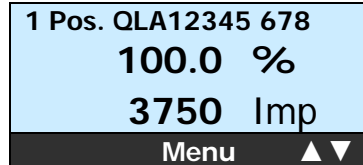
In case of alarm sign **▲**, "Lo" or "Hi" : no display of impulse or % values/digits

Description of the outputs
 Display of the 1st and 2nd measured value
 Display of actual current output values
ok button function / active keys

ok: change back to menu

▲▼: circulate (loop) in display mode (loop)

Description of the 1st measuring position
 Display of the measured value
 Actual calibrated meas.value display in %
 measured value display in pulses
ok button function / active keys

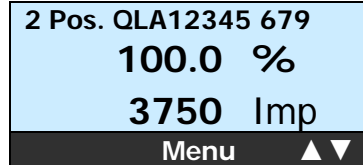


Change and input in Menu 3.1.1.

ok: change back to menu

▲▼: circulate (loop) in display mode

Description of the 2nd measuring position
 Display of the measured value
 Actual calibrated meas.value display in %
 measured value display in pulses
ok button function / active keys



Change and input in Menu 3.1.1.

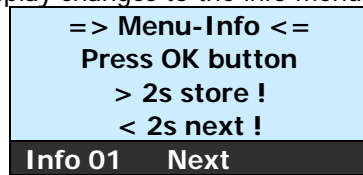
ok: change back to menu

▲▼: circulate (loop) in display mode

3.3.3. Menu parameter settings

After pressing the OK button the display changes to the info menu.

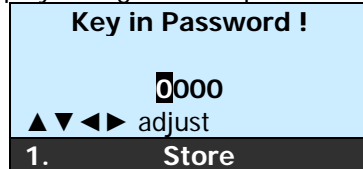
Menu-Information
 Both functions of the **ok** button
 store or
 next
 Menu Pos. No. / **ok** button function



ok: change to password input

After pressing the OK button the display changes to the password input.

selected character is inverted
 Menu Pos. No. / **ok** button function

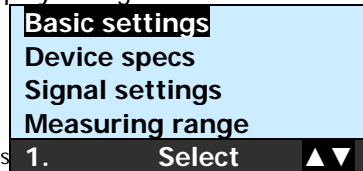


ok: change to the menu

1. key-in the numerical password using the ▲▼◀▶-buttons
2. press **ok** button more than 2 seconds
 Standard factory password 0000
 Display changes to the menu
 Parameters can be changed

After pressing the OK button the display changes to the menu.














































selected menu item is inverted
 Menu Pos. No./**ok** function/active keys























































ok: change to the selected menu item

▲▼: circulate (loop) menu items

4. Program structure with parameters of the analog transmitter

Legend:  = Select /  = Input /  = Display /  = only available with activation code						
Menu-Code Parameter	Type:	MAT 4110	MAT 4110/220	MAT 4220/60	MAT 4240	Change
1. Basic settings		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
1.1. Language		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
1.1.1. Deutsch		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
1.1.2. English		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
1.1.3. Français		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
1.1.4. Free language / text		-	-	-	-	
1.2. Time/Date		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
1.2.1. Time, input/correction		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
1.2.2. Date, input/correction		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
1.3. Modify Password		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
1.3.1. Password input		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
1.3.2. Modify password		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
1.4. Lighting		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
1.4.1. Lighting on/off		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
1.4.2. Duration of lighting in min. / 0 = continuous ON		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
1.5. Contact information		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
1.5.1. Contact address		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
1.5.2. Contact Tel./E-Mail		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
1.5.3. Contact Web		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
1.6. Factory settings		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
1.6.1. Store parameter set		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
1.6.2. Load parameter set		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
1.6.3. Initialize device no/yes		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
1.7. Activation code						
1.7.1. Activation of 2 nd measuring circuit, Code: *****		-	<input checked="" type="checkbox"/>	-	-	
2. Device specs		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
2.1. Device type: MAT 4110 or 4110/220 or 4220 or 4240 Software: Version V....		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
2.2. S/N and system verification date		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
2.3. Quantity of measuring circuits (1 measuring circuit: skips 2.4.0/3.1.0/4.1.0) Battery type: CR2032		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
2.4. Select measuring circuit 1 or 2		-	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
2.4.1. Type code probe 1 / 2		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
2.4.2. S/N 1 / 2		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
3. Signal settings		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
3.1. Select measuring circuit 1 or 2		-	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
3.1.1. Input position number / TAG number		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
3.1.2. Probe factor		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
3.1.3. Zero point input (Offset), accept at press of OK button, store		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	

Legend:  = Select /  = Input /  = Display /  = only available with activation code						Type:	MAT 4110	MAT 4110/220	MAT 4220/60	MAT 4240	Change
Menu-Code Parameter											
3.1.4.	Manual input of the zero point (Offset)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						
3.1.5.	Measuring span, accept at press button	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						
3.1.6.	Height in percent at auto measuring span	-	-	-	-						
3.1.7.	Measuring span input / correction manual	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						
3.1.8.	Signal filter	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						
4.	Commissioning according to device type	-	-	-	-						
4.1	Select measuring circuit 1 or 2	-	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						
5.	Measuring range	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						
5.1	Select measuring circuit 1 or 2	-	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						
5.1.2.	Measuring range starting point	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						
5.1.3.	Measuring range end point	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						
6.	Limit values	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						
6.1	Select measuring circuit 1 or 2	-	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						
6.1.1.	static/dynamic	-	-	-	-						
6.1.2.	Limit value(s)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						
6.1.3.	Hysteresis /max. measured value	-	-	-	-						
6.1.4.	Time delay, drop 1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						
6.1.5.	Time delay, tension 1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						
6.1.6.	FSL/FSH position	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						
7.	Test functions	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						
7.1.	Select measuring circuit 1 or 2	-	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						
7.1.1.	mA- output simulation (0.1 mA steps) beginning at 0.5 mA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						
8.	Error message mA output	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						
8.1.	Data error, measured value underflow, <0010 pulses	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						
8.2.	Data error, measured value overflow, >3750 pulses	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						
8.3.	Technical error	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						
	Display actual error with time/date	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						
9.	Controller function	-	-	-	-						
10.	Protocol of active data set										
11.	Service parameter basic settings	-	-	-	-						
11.1.	Service parameter list (encoded)	-	-	-	-	PC					
11.2.	Parameter list for different device types										
12.	Calculation parameters	-	-	-	-						
12.1.	Select measuring circuit 1 or 2	-	-	-	-						
12.1.1	Drift memory	-	-	-	-						
12.1.2	Drift gradient	-	-	-	-						
13.	Archive										
13.1.	Operation parameter sets (last set of parameters)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						

Legend: = Select / = Input / = Display / = only available with activation code	Type:	MAT 4110	MAT 4110/220	MAT 4220/60	MAT 4240	Change
	Menu-Code Parameter					

<i>Display modes</i>					
Analog output 1 in %	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Analog output 2 in %	-	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Analog output 1 in mA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	-	
Analog output 1/2 in %	-	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Analog output 1/2 in mA	-	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
1. Pos. Number analog output 1 in % and measured value in pulses	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
2. Pos. Number analog output 2 in % and measured value in pulses	-	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Display actual error with time /date	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	

Chart 4 Program structure

4.1. Description of the menu, program structure General, for all mipromex units



mipromex display



Your TAG or Position number
Measuring position, number
Display measured value in %
Hi = High Alarm

1 Pos. QLA12345678
Analog output 1
100.0 % Hi
Menu ▲▼

After pressing the **ok** button the display changes to the info menu.

ok button function / active keys

Information about storing or next

=> Menu-Info <=
Press OK button
>2s store !
< 2s next !
Info 01 Next

After pressing the **ok** button, the display changes to password input.

Password

The password protects the programming level of the **mipromex**. If you start up for the first time, the standard password is **0000** and is displayed. If you change the password (under point 1.3.) every user has to log-in using the new password!

Note: If you loose the new password, contact aquasant-mt to obtain an override password.

After the input password and leave the parameter that remains one hours use.

Key in your new password or accept the standard password
selected digit is inverted

Key in Password !
0000
1. Store

1. Key-in the numerical password using the ▲▼◀▶ buttons
2. Press **ok** button more than 2 seconds

Display changes to the menu
Parameters can be changed

4.1.1. [1.] Basic settings

You can set the device specific parameters in the basic settings menu. Please note that you first have to activate the password before you can make any changes.

Main menu

selected menu item is inverted

Basic settings
Device specs
Signal settings
Measuring range
1. Select ▲▼

After pressing the **ok** button the display changes to the sub menu basic settings

Sub menu

Selected sub menu item is inverted

Language / Sprache
Time/Date
Modify password
Lighting settings
1.1. Select ▲▼

After pressing the **ok** button the display changes to the sub menu Language / Sprache

[1.1.] Language/Sprache

Select the desired language. After you selected the language and stored your choice, the new language will be activated immediately. On the internet homepage [www.aquasant-mt.com / Downloads](http://www.aquasant-mt.com/Downloads), you can download an Excel-file. The three languages Deutsch, English and Français are listed. Replenish all text blocks in your language (max 16-characters), send it to us and we will be glad to implement your language.

selected menu item is inverted

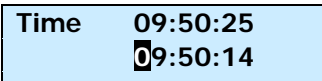
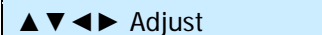

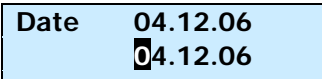
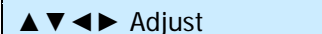

Deutsch
English
Français
1.1.1 Store ▲▼

1. select language with the ▲▼-buttons
2. press **ok** button more than 2 seconds

The selected language is immediately activated
Display changes back to menu item 1.1.

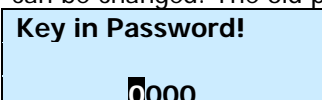

[1.2.] Time/Date

Correction of device time and date. The time is displayed in hours, minutes and seconds. Daylight saving time is not adjusted automatically! The date is displayed in day, month and year. The device time is used for the protocol logger.

current time selected character is inverted		<ol style="list-style-type: none"> 1. use ▲▼◀▶-buttons to change the time 2. press ok button more than 2 seconds
active key-navigation		Time is stored
		Display changes to date 1.2.1.
current date selected character is inverted		<ol style="list-style-type: none"> 1. use ▲▼◀▶-buttons to change the date 2. press ok button more than 2 seconds
active key-navigation		Date is stored
		Display changes back to menu item 1.2.

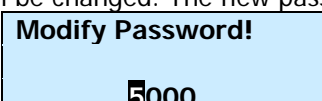

[1.3.1.] Key-in and change password

The *standard password (0000)* can be changed. The old password has to be confirmed first.

selected character is inverted		<ol style="list-style-type: none"> 1. use ▲▼◀▶-buttons to input the numerical password 2. press ok button more than 2 seconds
		Password is stored Display changes to modify password 1.3.2.

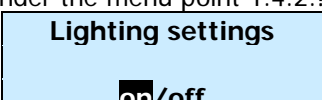

[1.3.2.] Modify password

The standard password (0000) can be changed. The new password has not to be confirmed.

selected character is inverted		<ol style="list-style-type: none"> 1. use ▲▼◀▶-buttons to input the numerical password 2. press ok button more than 2 seconds
		New password is stored Display changes back to menu item 1.3.

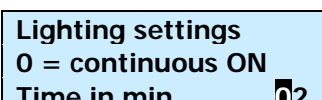
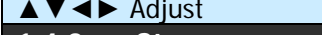

[1.4.1.] Lighting

The display lighting can be switched on or off. The duration of the lighting can be set in minute-steps; for continuously on choose time 00, under the menu point 1.4.2.!

selected character is inverted		<ol style="list-style-type: none"> 1. use ◀▶-buttons to switch the lighting on or off 2. press ok button more than 2 seconds
		Selection is stored Display changes to sub menu lighting duration 1.4.2.

[1.4.2.] Lighting settings

The display lighting can be switched on or off. The duration of the lighting can be set in minute-steps; for continuously on choose 00!

selected character is inverted		<ol style="list-style-type: none"> 1. use ▲▼◀▶-buttons to select the lighting duration 2. press ok button more than 2 seconds
active key-navigation		Lighting duration is immediately activated
		Display changes back to menu item 1.4.

[1.5.] Contact

Our contact information: Address / Phone-No. / Email / Web

**Aquasant-mt
measuring tech. Ltd
Hauptstrasse 22
CH-4416 Bubendorf**
1.5.1. Next

After pressing the **ok** button the display changes to the next menu item.

/ **Switzerland**

**Tel.:
+41(0)61 9355000
Email: info@
aquasant-mt.com**
1.5.2. Next

After pressing the **ok** button the display changes to the next menu item.

/ **info@aquasant-mt.com**

**Web: www.
aquasant-mt.com**
1.5.3. Next

After pressing the **ok** button the display changes back to the sub menu Contact 1.5

/ www.aquasant-mt.com

[1.6.] Factory settings

Under the *Factory settings* Menu Level, the programmed device parameters can also be stored, reloaded or deleted. All parameters are set back to factory settings at initialization of the device.

[1.6.1.] Store Parameter set

All keyed-in parameters are stored in the flash memory of the unit. The parameters can be reloaded afterwards.

Store parameter
ok
1.6.1. Store

[1.6.2.] Load Parameter set

If parameters have been changed or deleted, the last flash stored parameter set can be reloaded into the RAM.

Load parameter
ok
1.6.2. confirm

[1.6.3.] Initialize unit no/yes

If the device is initialized, all user-programmed parameters are deleted and set back to factory settings.

Initialize unit
no/yes
1.6.3. confirm

[1.7.] Activation code

With the activation code, several optional dutiable *software packages/functions* can be activated. You can obtain the activation code by ordering the optional packages/functions (e.g. *MK 220* Article-No.: 02.05.03.0019). The activation code is *depending on the serial-number* and can not be used for other devices.

[1.7.1.] Activation of/for 2nd measuring circuit

On the Hardware type **MAT 4110/220** with one active measuring circuit, the second measuring circuit can be activated. If the code is entered incorrectly the menu jumps back to menu item 1.7. The code can be entered again! Once the second measuring circuit is activated, it can not be deactivated. At start-up the new hardware type **MAT 4220** will be displayed.

<p>Description</p> <p>Code input</p> <p>active key-navigation</p>	<p>Activation for 2nd meas. circuit, code: xxxxxxxxxxxxxxxx ▲▼◀▶ Adjust 1.7.1 Store</p>	<p>1. use ▲▼◀▶-buttons to input the alpha-numerical Code</p> <p>2. press ok button more than 2 seconds</p> <p>Input is stored</p> <p>Display changes back to menu 1.</p>
---	---	---

4.1.2. [2.] Device specs

In the device specs you will find specific information about the **mipromex**.

<p>Main menu</p> <p>selected menu item is inverted</p>	<p>Basic settings</p> <p>Device specs</p> <p>Signal settings</p> <p>Measuring ranges</p> <p>2. Select ▲▼</p>	<p>After pressing the ok button the display changes to the sub menu Device specs</p>
--	---	---

[2.1.] Device type MAT 4110 or 4110/220 or 4220 or 4240

In the device type menu the hardware type and the software-release are displayed. Example:

- MAT 4110** with 1 measuring circuit (activation code 1.7.1. inactive)
- MAT 4110/220** with 2 measuring circuits, but only one is activated (activation code 1.7.1.)
- MAT 4220** with 2 active measuring circuits
- MAT 4240** with 2 active measuring circuits, plus analog outputs galvanically separated against each other

Software versions are marked according to NAMUR EN53. (V 1.00)

<p>Device type: MAT4110/4220</p> <p>Software: V1.16</p> <p>2.1. Next</p>	<p>After pressing the ok button the display changes to the next menu item 2.2.</p>
--	---

[2.2.] Serial number and date of the system verification

The serial number is fix stored in the **mipromex** and can not be changed. The serial number is linked to the activation codes. The date of the system verification marks the QS-function control during the final function test.

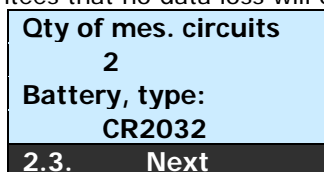
<p>Serial number: 42200001-07</p> <p>Verification date: 10.12.07</p> <p>2.2. Next</p>	<p>After pressing the ok button the display changes to the next menu item 2.3.</p>
---	---

[2.3.] Number of measuring circuits (1. measuring circuit, skip 3.1/4.1)

Here is displayed if there is one or two measuring circuits activated.

Battery type

The inserted battery type is displayed. The battery has not to be charged before using the **mipromex**. The battery lifetime of 10 years guarantees that no data loss will occur.

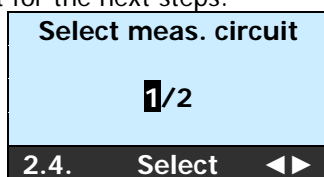


After pressing the **ok** button the display changes to the next menu item 2.4.

[2.4.] Select measuring circuit 1 or 2

Select the active measuring circuit for the next steps.

selected menu item is inverted



After pressing the **ok** button the display changes to the menu of the selected measuring circuit (1). 2.4.1.

[2.4.1.] Probe Type 1 / 2

This is an input field. If the system is delivered with a probe, the probe type is stored here.

selected character is inversed 16-char. max



1. use ▲▼◀▶-buttons to input the alpha-numerical type code of the probe
2. press **ok** button more than 2 seconds

Type code is stored
Display changes to the next menu item 2.4.2.

[2.4.2.] Serial No. 1 / 2

This is an input field. If the system is delivered with a probe, the serial no. of the probe is stored here.

selected character is inversed 16-char. max



1. use ▲▼◀▶-buttons to input the alpha-numerical serial number of the probe
2. press **ok** button more than 2 seconds

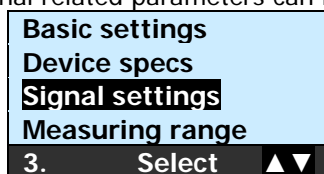
Serial number is stored
Display changes back to menu 2.4.

4.1.3. [3.] Signal settings

In the signal settings menu all signal related parameters can be set.

Main menu

selected menu item is inverted

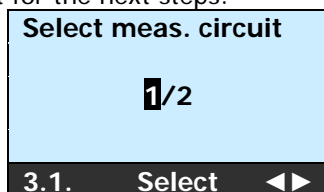


After pressing the **ok** button the display changes to the sub menu signal settings

[3.1.] Select measuring circuit 1 or 2

Select the active measuring circuit for the next steps.

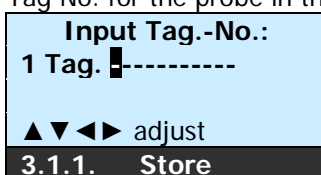
selected menu item is inverted



After pressing the **ok** button the display changes to the menu of the selected measuring circuit (1). 3.1.1.

[3.1.1.] Input Pos. No.

You have the possibility to store a Tag No. for the probe in the **mipromex**. The field is alphanumeric. You can define your position- or Tag-number, 11-characters max. selected character is inverted



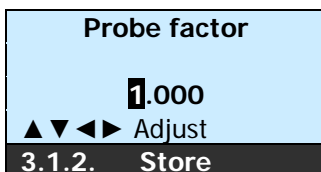
1. use ▲▼◀▶-buttons to input the alpha-numerical position number
 2. press **ok** button more than 2 seconds
- Pos.-No. is stored
Display changes to menu item 3.1.2.

[3.1.2.] Probe factor

The probe factor is a probe specific number which indicates the correlation to the standard probe (factor 1.00). If you replace the probe you will get a reproducible measurement with the same measured values. The probe factor has only to be changed when using a replacement probe. By changing the factor, you will get with the replacement probe, the same pulses value at 100 %

$$e. g. \text{ MeV old probe } 2600 / 2955 \text{ MeV new probe} = f \text{ 0.879}$$

The probe factor has only to be changed when using a replacement probe selected character is inverted



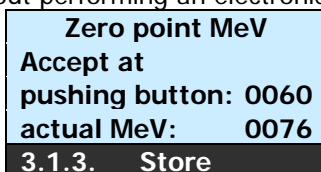
1. use ▲▼◀▶-buttons to define the probe factor
 2. press **ok** button more than 2 seconds
- Probe factor is stored
Display changes to the next menu item 3.1.3. After changing the probe factor the zero point must be actualized and stored 3.1.3.

[3.1.3.] Zero point acceptance at push button (Offset) OK store

The probe electronic is calibrated in the factory to 60 ± 2 pulses. If the probe is installed, this value can be higher due to the environment. If the probe is installed; empty and dry, the zero point can be checked and/or manually corrected. Attention: switch-on the unit 30 minutes before the zero adjust. A measured value between 10 and 2000 pulses can be adjusted without performing an electronic calibration. **Attention; Probe must be dry and clean!**

MeV = normed measured value in pulses

actual stored zero point offset
actual raw measured value, empty probe

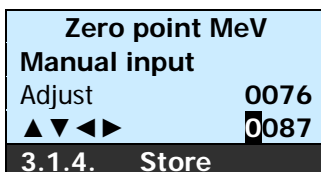


1. press **ok** button more than 2 seconds
- The new zero point is immediately activated
Display changes to the next menu item 3.1.4.

[3.1.4.] Manual zero point input (offset)

The programmable probe zero point can be changed or corrected manually. If the installation cannot be emptied for the zero point of the probe, then the zero point is manually keyed-in from the protocol

You can manually correct the zero point of the probe actual raw measured value of the probe adjust zero point



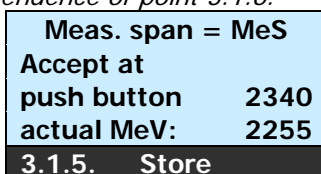
1. use ▲▼◀▶-buttons to define the zero point
 2. press **ok** button more than 2 seconds
- The new zero point is immediately activated
Display changes to the next menu item 3.1.5.

[3.1.5.] Measuring span acceptance at push button

The measuring span for the calculation of the 100 % point is product depending. This pulses value is obtained by fully immersing the measuring electrode into the product and by saving "at push button" the measured value. **Attention: this procedure is in dependence of point 3.1.6.**

MS = normed measuring span in pulses

actual stored measuring span (raw measured value – zero point offset)

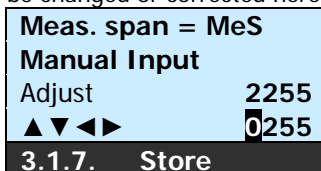


1. press **ok** button more than 2 seconds
- The new measuring span is immediately activated
Display changes to the next menu item 3.1.7.

[3.1.7.] Measuring span

The measuring span (point 3.1.5) can be changed or corrected here manually.

You can manually correct the Measuring span of the probe actual measured value of the probe Adjust measuring span

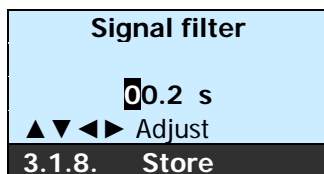


1. use ▲▼◀▶-buttons to define the measuring span
 2. press **ok** button more than 2 seconds
- The new measuring span is immediately activated
Display changes to the next menu item 3.1.8.

[3.1.8.] Signal filter

With the free selectable filter time constant (max 30 seconds) you can attenuate the raw measuring signal. A way to center the displayed and power output values

Input the filter constant
filter of the first order
actual stored filter constant



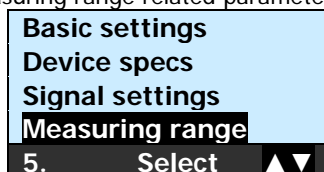
1. use ▲▼◀▶-buttons to define the signal filter time
2. press **ok** button more than 2 seconds

The new time is immediately activated
Display changes back to menu 3.1.

4.1.4. [5.] Measuring range

In the measuring range menu all measuring range related parameters can be set.

Main menu
selected menu item is inverted

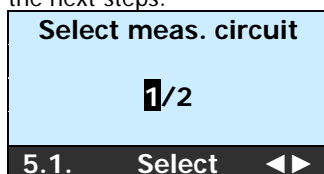


After pressing the **ok** button the display changes to the sub menu measuring range 5.1.

[5.1.] Select measuring circuit 1 or 2

Select the active measuring circuit for the next steps.

selected menu item is inverted

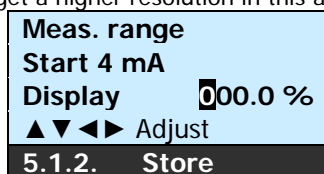


After pressing the **ok** button the display changes to the selected measuring circuit menu (1). 5.1.2

[5.1.2.] Measuring range starting point

Set the start point of the selected measuring range (e.g. 20.0 – 60.0 %). By defining the start and the end point you can **spread** the mA signal and therefore get a higher resolution in this area.

selected character is inverted



1. use ▲▼◀▶-buttons to define the start point
2. press **ok** button more than 2 seconds

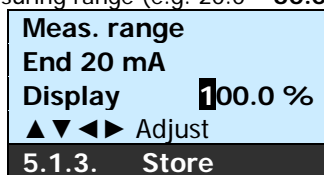
The new spreading is immediately activated

Display changes to the next menu item 5.1.3.

[5.1.3.] Measuring range end point

Set the end point of the selected measuring range (e.g. 20.0 – 60.0 %)

selected character is inverted



1. use ▲▼◀▶-buttons to define the end point
2. press **ok** button more than 2 seconds

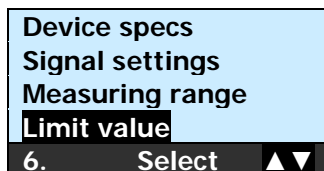
The new spreading is immediately activated

Display changes back to menu 5.1.

4.1.5. [6.] Limit value

In the limit value menu all limit values related parameters can be set.

Main menu
selected menu item is inverted

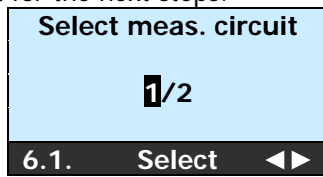


After pressing the **ok** button the display changes to the sub menu measuring ranges 6.1. select measuring circuit.

[6.1.] Select measuring circuit 1 or 2

Select the active measuring circuit for the next steps.

selected menu item is inverted



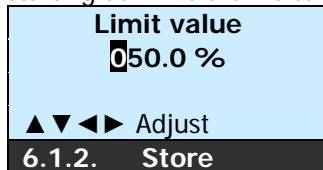
After pressing the **ok** button the display changes to the selected measuring circuit menu (1). 6.1.2

[6.1.2.] Limit value

With the static limit value you:

- get an exact and reproducible limit value for a defined measuring span corresponding to 100 %
- can display read a desired percentage at the desired limit value and program it/store it, as limit value
- can enter exact limit values starting at 1.1% thanks to the precise and reproducible measuring values.

selected character is inverted



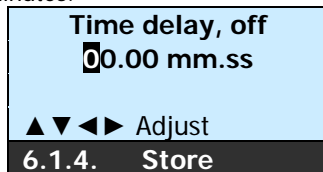
1. use ▲▼◀▶-buttons to define the limit value
2. press **ok** button more than 2 seconds

The selected limit value is immediately activated
Display changes to the next menu item 6.1.4.

[6.1.4.] Time, drop down delay, 1

The relay- or opto-electronic coupler- transistor- output can be activated with a drop down time delay. Input of the time delay drop, in 1 second steps from 0 - 30 minutes.

selected character is inverted



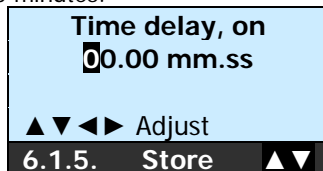
1. use ▲▼◀▶-buttons to define the time delay off, drop
2. press **ok** button more than 2 seconds

The selected time delay is immediately activated
Display changes to the next menu item 6.1.5.

[6.1.5.] Time, on delay, 1

The relay- or opto-electronic coupler- transistor- output can be activated with an on/raise time delay. Input of the time delay, of raise, in 1 second-steps from 0 - 30 minutes.

selected character is inverted



1. use ▲▼◀▶-buttons to define the time delay on, raise
2. press **ok** button more than 2 seconds

The selected time delay is immediately activated
Display changes to the next menu item 6.1.6.

[6.1.6.] FSL/FSH Position

Define the security settings of the Relay- or opto-electronic-coupler- transistor- outputs, ...

Active position	Measured value	Display	opto-electronic coupler	
Fail Safe Low	FSL	is lower than limit value	Lo	de-energized
Lo-Alarm		is higher than limit value	none	switched on
Fail Safe High	FSH	is lower than limit value	none	switched on
Hi-Alarm		is higher than limit value	Hi	de-energized

Chart 5 Fail Safe settings

selected menu item is inverted



1. use ◀▶-buttons to define the opto-electronic coupler-output
2. press **ok** button more than 2 seconds

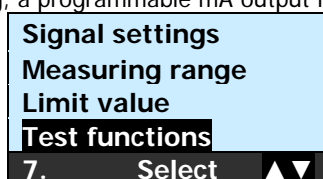
The selected definition is immediately activated
Display changes back to menu item 6.

4.1.6. [7.] Test functions

To test the functions at commissioning, a programmable mA output is available.

Main menu

selected menu item is inverted

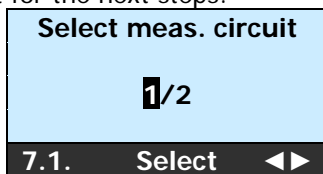


After pressing the **ok** button the display changes to the sub menu test functions 7.1. select measuring circuit

[7.1.] Select measuring circuit 1 or 2

Select the active measuring circuit for the next steps.

selected menu item is inverted



After pressing the **ok** button the display changes to the selected measuring circuit menu (1). 7.1.1

[7.1.1.] Simulation of mA- output (in 0.1 mA steps, starting at 0.5 mA)

With this function the active current output (burden 750 Ω) can be tested.

The current output can be increased in 0.1 steps starting at 0.5 mA and ending at max. 22.0 mA.

selected character is inverted



1. use ▲▼◀▶-buttons to define the current output
2. press **ok** button more than 2 seconds

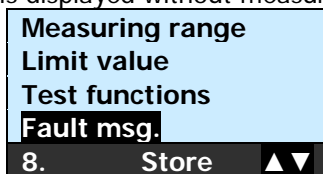
Current output is immediately activated
Display changes back to 7.1.

4.1.7. [8.] Programmable mA output

All **mipromex** microprocessor units are equipped with a diagnostic system, which makes fault-finding easier and facilitates quicker correction in case of malfunction occurrence. The error levels can be set in 0.1 mA-steps between 0.5 - 4.0 and 20.0 - 22.0 mA. Error messages are set at factory to automatically acknowledge the fault. The fault-type is displayed with time and date. By pressing > 2 seconds the **ok** button, the display changes back to the measured value. The error is displayed without measured value ---.- and an arrow up ↑ or down ↓ .

Main menu

selected menu item is inverted



After pressing the **ok** button the display changes to the sub menu fault messages 8.1.

[8.1.] Data error measuring value underflow MeV <0010

The data transmission of the measured value, between measuring electronic MTI and the control unit **mipromex** is faulty. The control unit **mipromex** is unable to process the measured data.

Error level 1 see fault finding on page 32

selected character is inverted



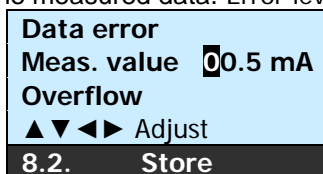
1. use ▲▼◀▶-buttons to define the current output
2. press **ok** button more than 2 seconds

Current output is immediately activated
Display changes to the next menu item 8.2.

[8.2.] Data error measuring value overflow MeV >3750

The measured value of the measuring electronic MTI is higher than the allowed range of pulses. The control unit **mipromex** is unable to process the measured data. Error level 2 see fault finding on page 32

selected character is inverted



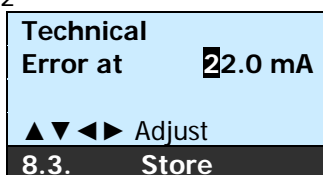
1. use ▲▼◀▶-buttons to define the current output
2. press **ok** button more than 2 seconds

Current output is immediately activated
Display changes to the next menu item 8.3.

[8.3.] Technical Error

The control unit **mipromex** generates a periodic checksum test. If it is faulty, an error message is displayed. Error level 3 see fault finding on page 32

selected character is inverted



1. use ▲▼◀▶-buttons to define the current output
2. press **ok** button more than 2 seconds

Current output is immediately activated
Display changes back to menu 8.

5. Commissioning example

Make sure the connections in the Monorack or 19"-Rack are wired correctly and the probe is connected.
The control unit **mipromex** is installed in the Rack and under tension.
The green or red LED inside the MTI (measuring electronic) of the probe is lit.
The vessel is empty; the probe is dry and clean.
Follow the steps of the commissioning:

5.1. Commissioning the mipromex with a pipe probe

5.1.1. Detection of water in petrochemical products

The pipe probe is installed in the pipeline. The pipeline must be empty!

Menu-Code	Description	Example		Input
2.4.1	Check the probe type	TSS90 DN50		
2.4.2	Check the serial no. of the probe	1050066-06		
3.1.1.	Enter your TAG-, position- or measuring site- number	LS1200		
3.1.2.	Check the probe factor Only to be changed when using a replacement probe	1.000		
3.1.3.	Accept the actual zero point Important: the pipeline must be empty, Important: the pipe probe must be dry and clean Pipe probes are calibrated in the factory to 60 pulses If the probe is already product, please keep the factory settings	ideal between 60 – 80		
3.1.5.	Accept measuring span MS: Fill the pipeline with your petrochemical product with the highest water content The MS is product and nominal diameter depending	5 % water in paraffin oil MS 860 Imp = 100 %	paraffin oil 110 Imp = 12.5 %	
5.1.2.	Define the start point of the signal spread at 4 mA	instead of 0.0 %	new at 10.0 %	
5.1.3.	Define the end point of the signal spread at 20 mA	instead 100.0 %	new at 80.0 % = 4 % water	

Chart 6 Commissioning of water detection

5.1.2. Oil detection in process- or rain-water

The pipe probe is installed in the pipeline. The pipeline must be empty!

Menu-Code	Description	Example		Input
2.4.1	Check the probe type	TSS90 DN50		
2.4.2	Check the serial no. of the probe	1050066-06		
3.1.1.	Enter your TAG-, position- or measuring site- number	LS1200		
3.1.2.	Check the probe factor Only to be changed when using a replacement probe	1.000		
3.1.3.	Accept the actual zero point Important: the pipeline must be empty Important: the pipe probe must be and clean Pipe probes are calibrated in the factory to 60 pulses If the probe is already soiled with product, please keep the factory settings	ideal between 60 – 80		
3.1.5.	Accept measuring span MS: Fill the pipe with your process water The MS depends on the product and the nominal diameter	water MS 2570 Imp	5 % oil in water 2050 Imp	
5.1.2.	Define the start point of the signal spread at 4 mA	instead of 0.0 %	new at 80.0 %	
5.1.3.	Define the end point of the signal spread at 20 mA	instead 100.0 %	remains at 100.0 %	

Chart 7 Commissioning of oil detection

5.2. Commissioning the mipromex with a bar probe

5.2.1. Oil detection in process- or rain-water with float

Bar probe is installed and adjusted in the float. The bar probe must be dry and clean!

Menu-Code	Description	Example		Input
2.4.1	Check the probe type	STM 180/100 SB R TN ES SW V		
2.4.2	Check the serial no. of the probe	1050066-06		
3.1.1.	Enter your TAG-, position- or measuring site- number	LS1200		
3.1.2.	Check the probe factor Only to be changed when using a replacement probe	1.000		
3.1.3.	Accept the actual zero point Important: the bar probe must be dry and clean If the probe is already soiled with product please keep the factory settings	ideal between 60 – 80		
3.1.5.	Accept measuring span MS: Bar probe is 100 % immersed in your process water Accept the measured value as measuring span Probe 100 mm in water = 100% Probe 80 mm in water and 20 mm in oil	100 mm water 2700 Imp = MS =100%	80 mm water 20 mm oil 2200 Imp = 81 %	
5.1.2.	Define the start point of the signal spread at 4 mA	instead of 0.0 %	new at 80.0 %	
5.1.3.	Define the end point of the signal spread at 20 mA	100.0 %	remains at 100.0 %	

Without an oil layer at surface of water, the display shows 100% = 20.0 mA
Chart 8 Commissioning of oil layer detection

5.2.2. Foam detection



Attention: A limit switch detection of the top of the foam is a relative measurement. Due to varying structure and consistence, and foam plus product variations, the measurement can not be considered as a filling level measure.

Bar probe is installed in the vessel. The bar probe must be dry and clean!


Code	Description	Example		Input
2.4.1	Check the probe type	ST2M 500/300 SB T2R GS DN50 C		
2.4.2	Check the serial no. of the probe	1050066-06		
3.1.1.	Enter your tag-, position- or measuring site-number	LS1200		
3.1.2.	Check the probe factor Only to be changed when using a replacement probe	1.000		
3.1.3.	Accept the actual zero point Important: the bar probe must be dry and clean If the probe is already soiled with product, please keep the factory settings	ideal between 60 – 80		
	If the measured value shows > 400 an electronic calibration is recommended Point 5.3 page 29 Otherwise the measuring span MS is limited			
3.1.5.	Accept measuring span MS: Immerse the probe 100 % in your foam and accept the measuring span If the probe is not fully immersed, the measuring span must be calculated to 100 % and keyed-in at menu item 3.1.7.	Full range 1270 Imp	50 % 635 Imp	
5.1.2.	Define the start point of the signal spread at 4 mA	0.0 %	remains at 0.0 %	
5.1.3.	Define the end point of the signal spread at 20 mA	100.0 %	remains at 100.0 %	

Chart 9 Commissioning of foam detection

5.3. Electronic calibration MTI, basic equalization

An electronic calibration has only to be done at following occurrences:

- ☑ Probes without reference electrode, flexible- or flat-probes where the *measured value* inside the *empty* vessel is smaller than 10 or bigger than 200
- ☑ After exchange of the measuring electronic MTI, or of the coax cable, or of the probe, or after repair of the probe
- ☑ If the zero adjust is not possible: displayed measured value >2000 or <10



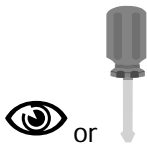
Tip:

Adjust the measuring electronic MTI between 60 and 80 pulses
This allows the biggest possible measuring span of up to max. 3750 pulses.
Soiled or uncleaned probes should not be adjusted with an MTI calibration.



Probe dry and clean, built in the vessel

Go to the menu point 3.1.3.



Calibration of MTI as follows:
Using a screwdriver size No. 1, fine adjust to switch point of the LED from red to green (red will flicker).
Display between 60 and 80

The 0-point has been stored at the system test. If the probe is built in, dry and empty the 0-point can be checked and corrected.

Menu position Number-Code

Zero point MeV	
Accept at	
push button	0060
actual MeV	0085
3.1.3. Store	

change to the next menu item by pressing the **Ok** button

1. press **ok** button more than 2 seconds:

actual MeV is stored
Display changes to the next parameter input

Chart 10 Electronic calibration operating sequences

5.4. Inspection release of the parameters

Operating parameters (Settings at commissioning)

Company : Apparatus :
 Pos.-No : Product :
 mipromex : MAT Version: S/N :

Measuring circuit 1

Probe, type : S/N :
 Coax cable : S/N: MTI S/N:

Measuring circuit 2

Probe, type : S/N :
 Coax cable : S/N: MTI S/N:

5.4.1. Chart for operating settings of the analog transmitter

Menu-Code	Meas. circuit	Description	Example	Input
Basic settings				
1.1.		Language D/F/E	English	
1.2.1.		Time	actual time	
1.2.2.		Date	actual date	
1.3.1		Password	0000	
1.4.1.		Lighting	on	
1.4.1.		Duration of lighting	5	
2.4.1.	MC1	Probe type	TSS90 DN50 MTI50/1	
2.4.2.	MC1	Probe serial-no.		
2.4.1.	MC2	Probe type		
2.4.2.	MC2	Probe serial-no.		
Signal settings				
3.1.1.	MC1	Enter position-, TAG number		
3.1.2.	MC1	Probe factor	1.000	
3.1.3.	MC1	Zero point input accept at push-button	60 - 80	
3.1.4.	MC1	Manual zero point input (Offset)		
3.1.5.	MC1	Measuring span accept at push-button		
3.1.7.	MC1	Measuring span input / correction		
3.1.8.	MC1	Signal filter	0.02 s	
3.1.1.	MC2	Enter position-, TAG number		
3.1.2.	MC2	Probe factor	1.000	
3.1.3.	MC2	Zero point input accept at push-button	60 – 80	
3.1.4.	MC2	Manual zero point input (Offset)		
3.1.5.	MC2	Measuring span accept at push-button		
3.1.7.	MC2	Measuring span input / correction		
3.1.8.	MC2	Signal filter	0.02 s	
Measuring range				
5.1.2.	MC1	Measuring range starting point	00.0 %	
5.1.3.	MC1	Measuring range end point	100.0 %	
5.1.2.	MC2	Measuring range starting point	00.0 %	
5.1.3.	MC2	Measuring range end point	100.0 %	

Chart 11 1-2 Commissioning protocol - page 1 of 2

Menu-Code	Meas. circuit	Description	Example	Input
Limit value settings				
6.1.2.	MC1	Limit value		
6.1.4.	MC1	Time delay, drop	0	
6.1.5.	MC1	Time delay, tension	0	
6.1.6.	MC1	FSL/FSH –Position		
MC2 settings				
6.1.2.	MC2	Limit value		
6.1.4.	MC2	Time delay, drop	0	
6.1.5.	MC2	Time delay, tension	0	
6.1.6.	MC2	FSL/FSH –Position		
Fault messages				
8.1.		Data error, measured value underflow <0010	00.5 mA	
8.2.		Data error, measured value overflow >3750	00.5 mA	
8.3.		Technical error	00.5 mA	
Factory settings				
1.6.1.		Store parameter	ok	ok

Chart 12 2-2 Commissioning protocol – page 2 of 2

Product	MAT-Display [%]	measured value MeV /measuring span MS	
		measuring circuit 1	measuring circuit 2
		/	/
		/	/
		/	/
		/	/
		/	/

Commissioning by:

Company / location:

Date, signature:

6. Fault finding


All **mipromex** –microprocessor units are equipped with a diagnostic system, which makes fault finding easier and facilitates quicker correction in case of malfunction occurrence.

6.1. After power on

7.1.1. Technical error; All oder Nv Init from Flash oder low Battery


The error message can have different origin.

1. RAM memory check has failed

Date of error	02.11.08
Time of error	16:11:10
Error description	 Nv Init from Flash


1. press **ok** button more than 2 seconds, the error is confirmed and the display changes back to last active menu point

2. Flash memory check has failed

Date of error	02.11.08
Time of error	16:11:10
Error description	 All Init from Flash

1. press **ok** button more than 2 seconds, the error is confirmed and the display changes back to last active menu point

3. Battery is discharged and has to be exchanged

Date of error	02.11.08
Time of error	16:11:10
Error description	 Low Battery

1. press **ok** button more than 2 seconds, the error is confirmed and the display changes back to last active menu point

Switch OFF and then switch ON the unit. If error reoccurs then:


⌋ **Send unit back for repair!** 

6.2. During operation

6.2.1. Data error

7.1.1. Technical error; Measured value 1 underflow

The error message can have different origin.

Date of error	02.11.07
Time of error	16:11:10
Measuring circuit 1 or 2	 Data error
Error description	Meas. value 1 Underflow

1. press **ok** button more than 2 seconds, the error is confirmed and the display changes back to last active menu point

The mA output falls to the value programmed under menu point 8.3!

Description of 1 st meas. circuit position	1 Pos. QLA12345679
Description of 1 st meas. value	Analog output 1
Non display of meas. value Error display	---.- % Lo ↓
ok button-functions / active keys	Menu ▲▼

Limit value low alarm is reached
Arrow down ↓ signalizes : Meas. range underflow

use the ▲▼ buttons to scroll within display mode

Description of the outputs	Analog outputs
Description of 1. and 2, meas. value	1 00.50 mA
Display of actual value of current outputs	2 11.20 mA
ok button-functions / active keys	Menu ▲▼

Press **Ok** to change to menu use the ▲▼ buttons to scroll within display mode



LEDs on measuring electronic MTI are dark/OFF

1. Short circuit or circuit break. Change connection wires on clamp 1 / 2 of probe electronic.

⌋ **Check connections of measuring electronic MTI**

2. Hazardous area output microprocessor unit **mipromex** or measuring electronic MTI defective

⌋ **Send unit back for repair!** 

The electronic insert MTI is plugged in the blue protection housing. Loosen the two outer M4-screws and remove the electronic insert MTI laterally towards the cable gland.



LED's on measuring electronic MTI are ON

3. Range monitoring did respond, measured value <10

⌋ **Check with 0-point-function at menu item 5.3. , perform a new zero adjust**

4. Coax cable or probe defective (circuit break)

⌋ **Send coax cable and probe back for repair!** 



Calibration of MTI was possible, microprocessor unit mipromex showing fault or after power cut showing measured value underflow (no measure):

5. Hazardous area data input of **mipromex** defective;

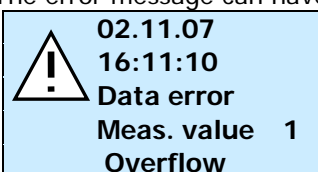
⌋ **Send mipromex unit back for repair!** 

7.1.1.

Technical error; Measured value 1 overflow

The error message can have different origin.

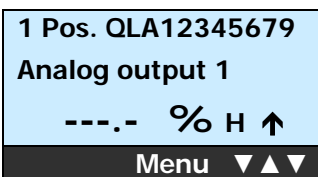
Date of error
Time of error



1. press **ok** button more than 2 seconds, the error is confirmed and the display changes back to last active menu point

Measuring circuit 1 or 2
Error description



Description of 1st meas. circuit position
Description of 1st meas. value



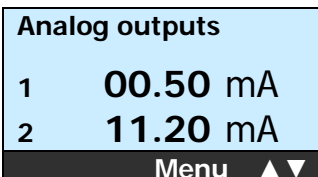
Limit value high alarm is reached
Arrow up ↑ signalizes : **Meas. range overflow**

Non display of meas. value
Error display
ok button-functions / active keys

Press **Ok** to change to menu



use the   buttons to scroll within display mode

Description of the outputs
Description of 1. and 2, meas. value
Display of actual value of current outputs





ok button-functions / active keys


Press **Ok** to change to menu

use the   buttons to scroll within display mode

⌋ **Check probe, product intrusion**

-  **LEDs on MTI measuring electronic are ON**
6. Range control active, measured value >3750
- ┌ **Scheck with 0-point function under Menu 5.3, perform new basic calibration**
- ┌ Probe not covered (empty), coax cable or probe defective (coax plug wet)
- ┌ Fault occurs only when probe covered (full): Impedance in function of product too high:
- ┌ **Send probe back for repair!** 

6.2.2. Display error

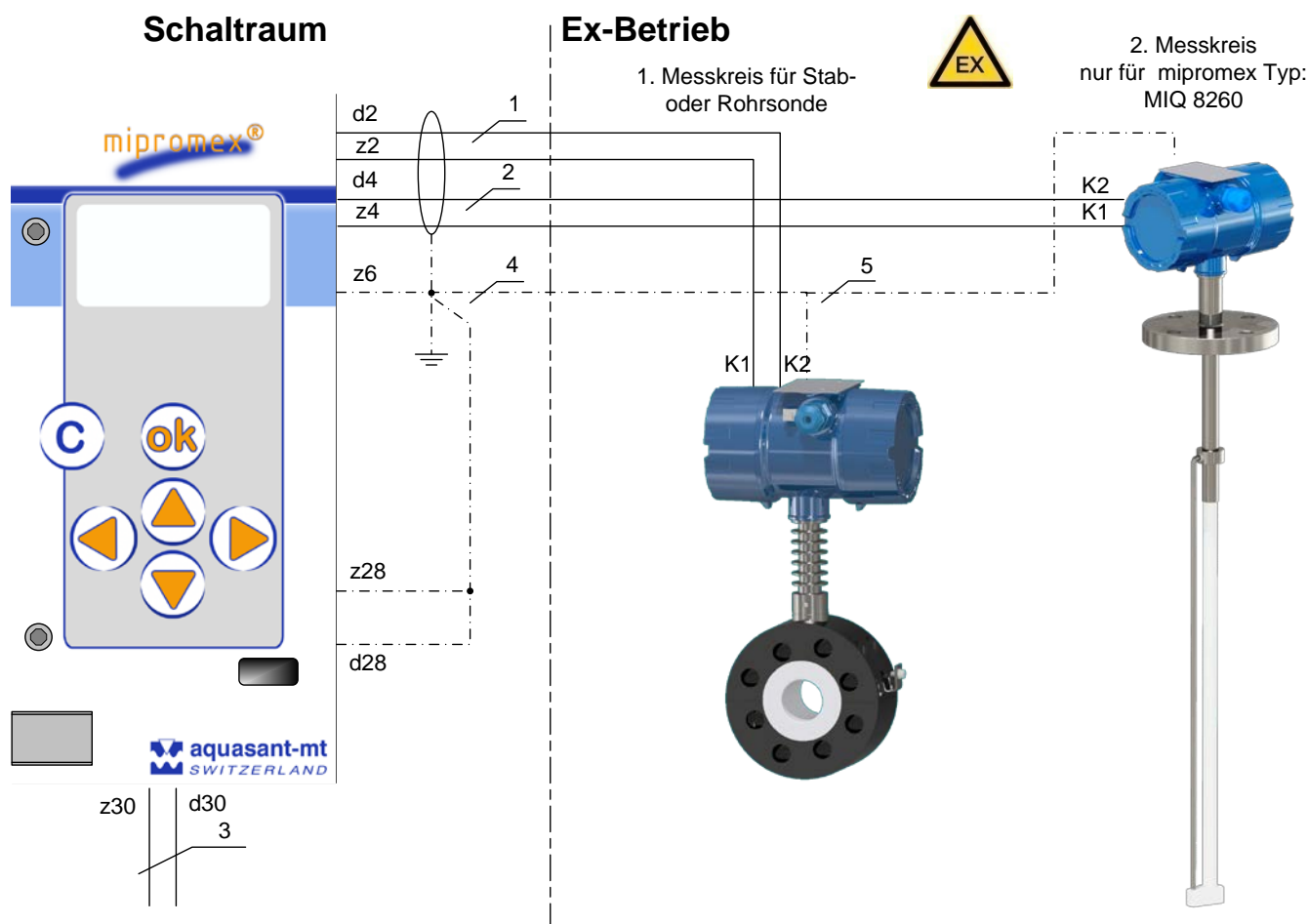
-  **Faulty or no display on the LCD display**
1. Restart the program after 5 seconds of mains interruption.

6.2.3. Radio equipment

- ┌ Radio/wireless equipment should not be operated in the immediate vicinity of the microprocessor unit **mipromex**, of an open MTI measuring electronic or of the bar probe (measurements can be affected)
- ┌ Minimum distance 1 to 2 m

7. Wiring diagram

7.1. Measuring electronic/probe with fix connection

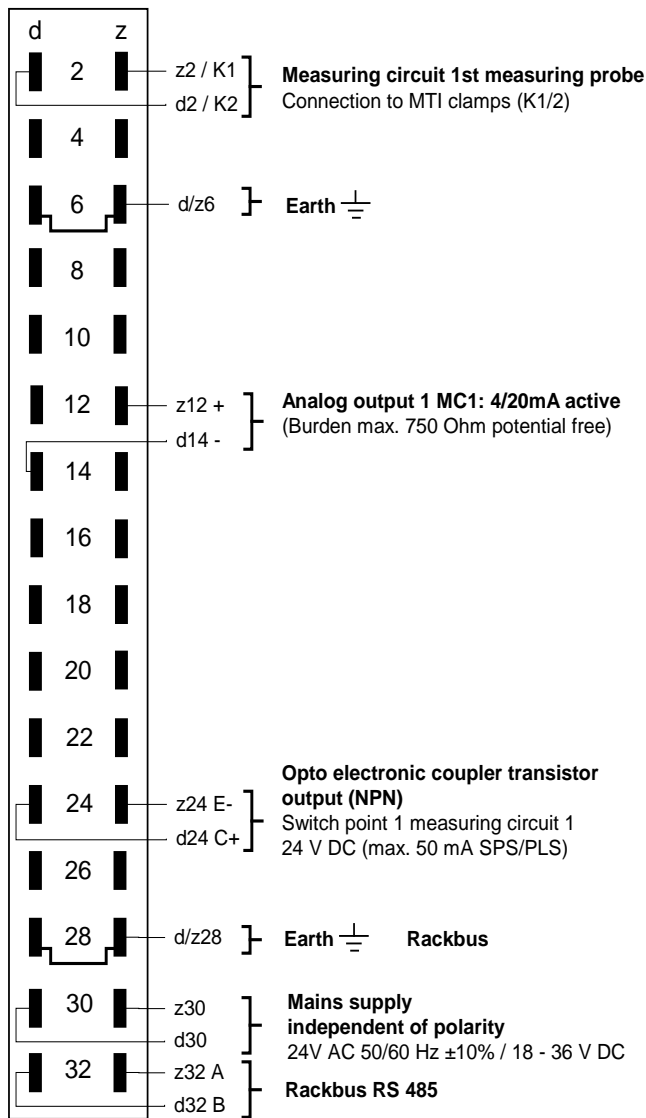


Pic. 2 Wiring diagram

1. 2 x 0.75 mm² shielded (both sides earthed in switch room and probe head)
2. MTI housing and probe are connected to the (factory/plant) equipment earths
3. Mains 24 V AC 50/60 Hz /DC ±10 % control voltage, polarity independent, without inductive load
4. Equipotential bond
An equipotential bond must be fitted between the control room earth and the equipment earth (condition of hazardous area protection and for accurate data transmission)

7.2. Connections to female multipoint connector with 32 poles, type: MAT 4110

Microprocessor units with one measuring circuit input
Connections to female multipoint connector FI 32

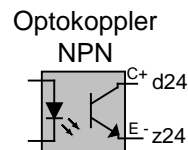


ELECTRICAL DATA

Euro plug-in card pin assignment

24 V-Version

Error message programmable in
0.1 mA-steps;
0.5 – 3.9 / 20.1 – 22 mA



Pic. 3 FI 32 female multipoint connector to MAT 4110

Switch point 1 for measuring circuit 1 **FSL** (Fail Safe Low) **Lo-Alarm**

Opto-electronic coupler transistor output NPN 1 disabled (measured value < limit switch value)

Switch point 1 for measuring circuit 1 **FSH** (Fail Safe High) **Hi-Alarm**

Opto-electronic coupler transistor output NPN 1 disabled (measured value > limit switch value)

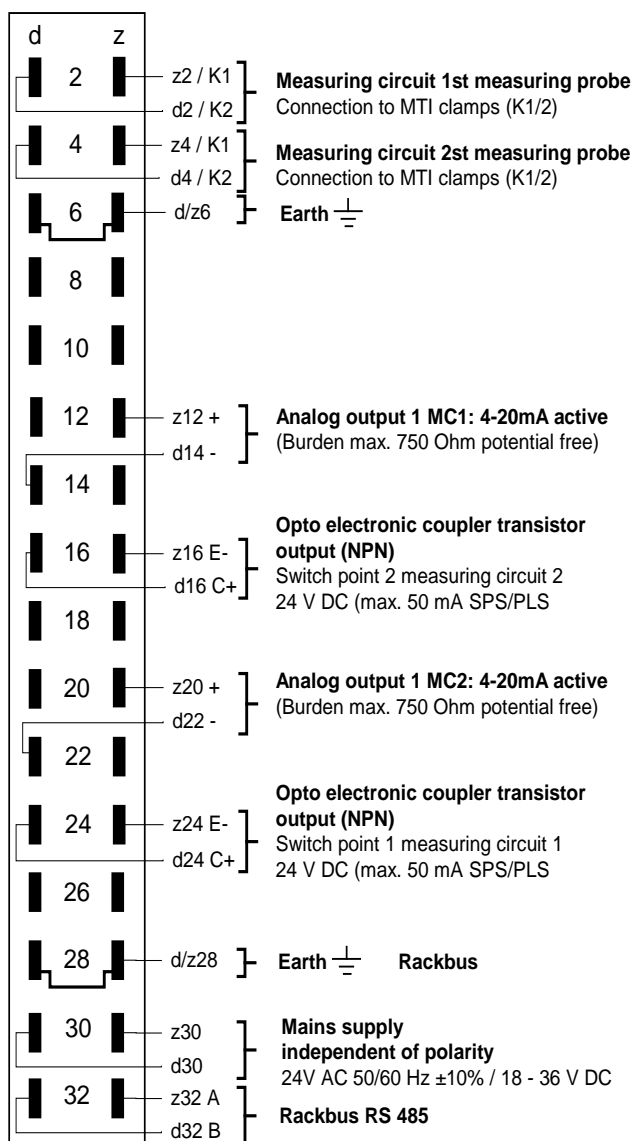
Switch point 2 not activated

Technical error level of analog output according to parameterization

Opto-electronic coupler transistor output NPN 1 disabled

7.3. Connections to female multipoint connector with 32 poles, type: MAT 4220/4240

Microprocessor units with two measuring circuit inputs
Connections to female multipoint connector FI 32



Pic. 4 FI 32 female multipoint connector to MAT 4220

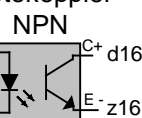
ELECTRICAL DATA

Euro plug-in card pin assignment

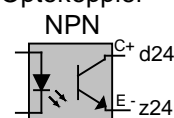
24 V-Version

Error message programmable in
0.1 mA-steps;
0.5 – 3.9 / 20.1 – 22 mA

Optokoppler



Optokoppler



Switch point 1 for measuring circuit 1 or 2 **FSL** (Fail Safe Low) **Lo-Alarm**
Opto-electronic coupler transistor output NPN 1 disabled (measured value < limit switch value)

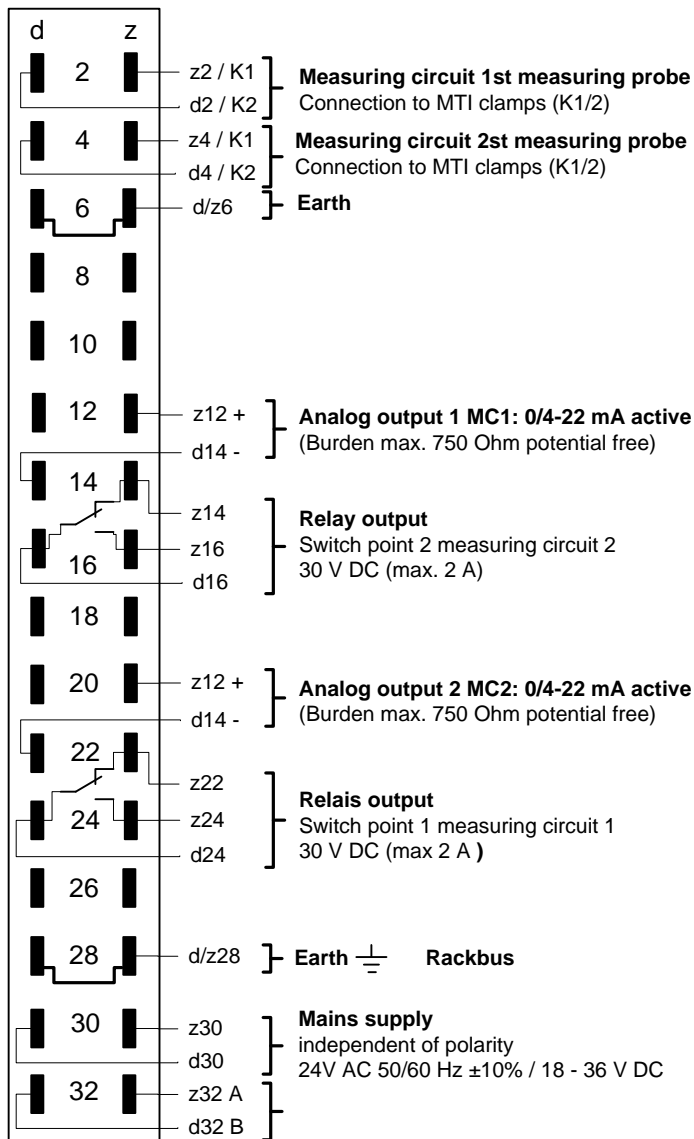
Switch point 1 for measuring circuit 1 or 2 **FSH** (Fail Safe High) **Hi-Alarm**
Opto-electronic coupler transistor output NPN 1 disabled (measured value > limit switch value)

Switch point 2 not activated

Technical error level of analog output according to parameterization
Opto-electronic coupler transistor output NPN 1 disabled

7.1. Connections to female multipoint connector with 32 poles, type: MAT 4190/4260

*Microprocessor units with one measuring circuit input
Connections to female multipoint connector FI 32*



Pic. 5 FI 32 female multipoint connector to MAT 4260

ELECTRICAL DATA

Euro plug-in card pin assignment

24 V-Version

Error message programmable in
0.1 mA-steps;
0.5 – 3.9 / 20.1 – 22 mA

Switch point 1 for measuring circuit 1 **FSL** (Fail Safe Low) **Lo-Alarm**
Switch point 1 for measuring circuit 1 **FSH** (Fail Safe Low) **Hi-Alarm**
Relay 1 disabled (measured value < limit switch value)

Switch point 2 disabled (measured value < limit switch value)

Technical error level of analog output according to parameterization
Relay 1/2 disabled

7.2. Printed circuit board for 19"-Rack, Monorack, Wall- and Table Top housing

The Cage Clamp® connection clamps for cable diameter 0.08 – 2.5 mm² bared length 5 – 6 mm / 0.22 in (without cable cover) are mounted with a special pre spanning tool.

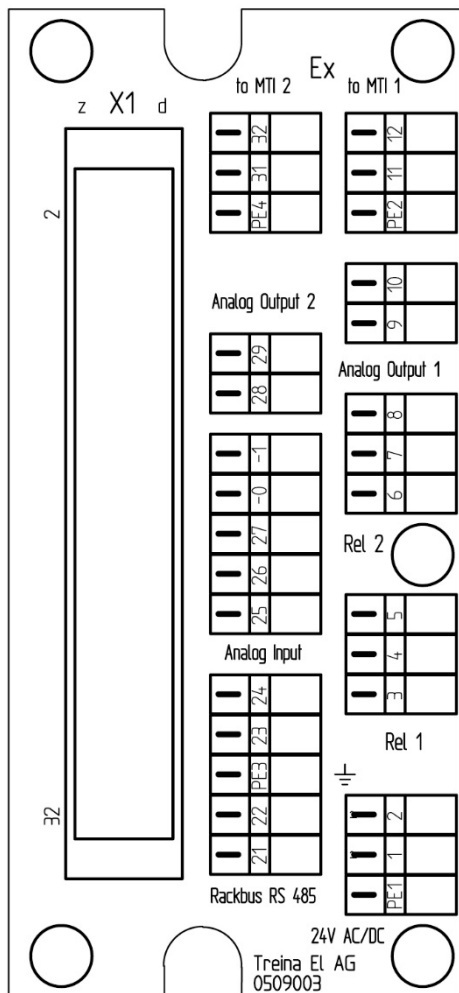
Color coding:

- To the **blue** clamps: connection of the intrinsically safe field circuit. This one being allowed, with connection lines in accordance to DIN EN 60079-14, to be routed into the hazardous area.
- The **black/orange**- clamps are polarity independent current- inputs or -outputs

Dimension: H x B x T 137 x 77 x 210 mm /for 19"-plug in module Euro 3 HE/12TE profundity 160 mm

Anschluss an: Microprocessor unit mipromex

Artikel-Nr.: 02.03.18.011



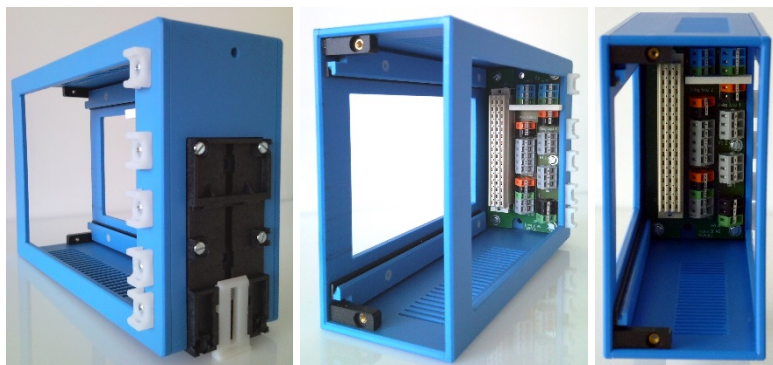
- PE1 Earthing
 1. Mains 24 V AC/DC 50/60 Hz (polarity independent)
 2. Mains 24 V AC/DC 50/60 Hz (polarity independent)

Relay	Opto-e. coupler	
3. 1 NO	output E-	FI32: z24
4. 1 COM	output C+	FI32: d24
5. 1 NC	-	FI32: z22
6. 2 NO	output E-	FI32: z16
7. 2 COM	output C+	FI32: d16
8. 2 NC	-	FI32: z14

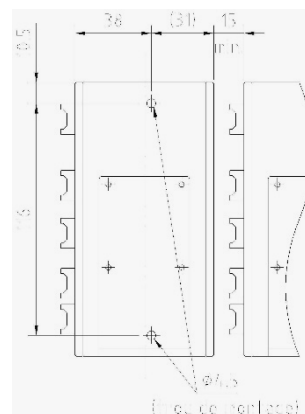
9. MC1 analog output 1 -
 10. MC1 analog output 1 +
 11. MC1 MTI 1 K1
 12. MC1 MTI 1 K2

21. FI32: z32
 22. FI32: d32
 23. Analog input - FI32: d18
 24. Analog input + FI32: d12
 25. Digital input 1 (+24 V) FI32: d10
 26. Digital input 2 (+24 V) FI32: z10
 27. Digital input 3 (+24 V) FI32: d8
 -0 Digital input D1-3 (0 V) FI32: z8
 -1 Digital input D1-3 (0 V) FI32: z8
 28. MC2 Analog output 2 - FI32: d22
 29. MC2 Analog output 2 + FI32: z20

31. MC2 MTI 2 K1 FI32: z4
 32. MC2 MTI 2 K2 FI32: d4

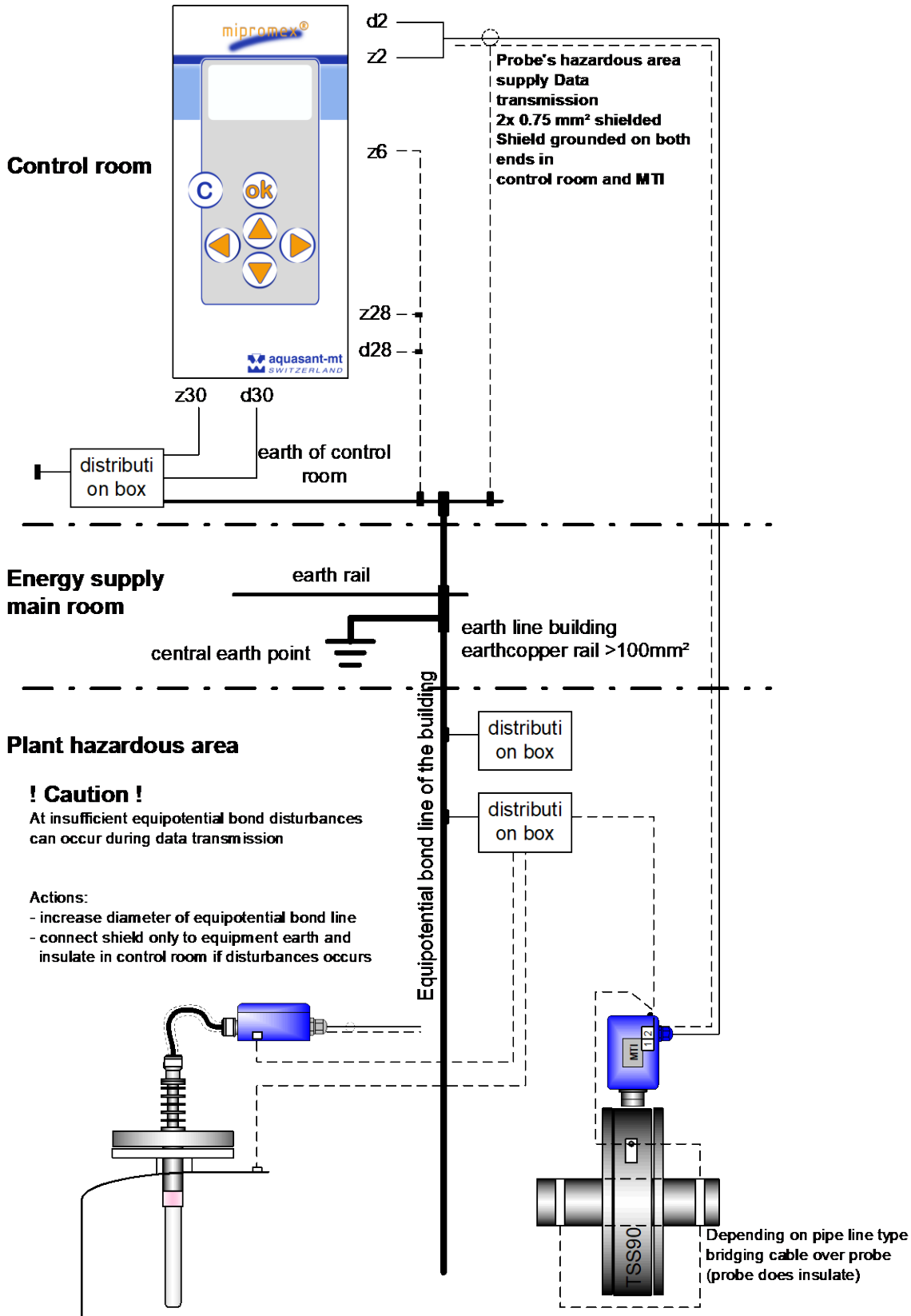


Pic. 6 Connection print to mipromex



7.3. Earthing of microprocessor units and probes

Equipotential bond and correct earthing for the hazardous area protection and against disturbances of the data transmission



Pic. 7 Earthing principle

8. Technical Data

8.1. mipromex Analog transmitter type: MAT 4110

Construction

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

Assembly

19"-Rack type MR 7; 3 HE (Europ.sizes)
Monorack type MRM2; plastic housing for DIN-rail- or wall mounting.
Front plate fitting with Bopla housing.
Compact or table top housing

Purpose

- analog transmitter with intrinsically safe supply for one measuring electronic MTI xx. Transformation of a digital measuring signal into an analog signal with measuring range spread
- analog output 4 – 20 mA
- menu driven, multi language unit
- hazardous area (Ex) supply for one measuring electronic MTI xx
- shielded 19" plug in module
- one open collector outputs NPN

Operation/Display

Film keypad-front plate with graphical LCD-display, backlit, 6 buttons for data and parameter input

Data saving during power cuts

Battery buffer max. 10 years. Parameter storage into flash at battery failure

Dimensions

Height 3 HE; Width 12 TE
Front plate: Height x width 128 x 61 mm
Plug in module: Height x width x depth 100 x 60 x 160 mm
7 units can be inserted on a 19"-rack

Weight

690 g

Mains supply

24 VDC 50/60 Hz / 24 VDC Range 20 – 39 VDC
independent of polarity

Switch on current

momentary (1ms) approx. 1A

Power input t

ca. 3.4 VA (I = 140 mA)

Fuses

8.5 x 8.5 mm miniature fuse MST 400 mA

Hazardous area supply and signal transmission

[Ex ia] IIC Pulse modulated supply signal
open circuit voltage max. 18.9 V; typically 17 V
short circuit current max. 49 mA; typically 40 mA

[Ex d ia], Pulse modulated supply signal
open circuit voltage max. $U \leq 19.3$ V; typ. 17 V
short circuit current max. $I \leq 75$ mA; typ. 70 mA

Signal transmission

1 measuring circuit, pulse modulated supply signal

Signal line short circuit

power input max. MAT 4110: 160 mA

Ambient temperature

0 °C ... 45 °C

Storage temperature

-20 °C ... +45 °C, ideally 20 °C

Measurement range

0 – 3700 pulses

Data display

MeV 0 – 3700

Switching hysteresis

1 pulse = 0.028 pF for the 100 pF measuring range

Connection

32 pole FI connector, coding facility

Open collector NPN output

1 potential free NPN transistor output
Limit switch min./max.
Security min. or max. selectable

Rupturing tension NPN output

30 V DC

Continuous current NPN output

50 mA

Rupturing capacity NPN output

150 mW

Analog output

one active 4 – 20 mA output, max.working resistance/burden 750 Ω ,
not for hazardous area, with potential separation, tech. fault 0.5 – 4
/ 20 - 22 mA adjustable

Interface

RS 232 / RS 485

Monitoring

Self-monitoring detection system for: defective probe; short circuit/interruption signal supply to hazardous area (cable break security); measurement range; main power interruption
mipromex -error messages

8.2. mipromex Analogtransmitter type: MAT 4190

Construction

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

Assembly

19"-Rack type MR 2; 3 HE (Europ.sizes)
 Monorack type MRM2; plastic housing for DIN-rail- or wall mounting. Front plate fitting with Bopla housing.
 Compact or table top housing

Purpose

- analog transmitter with intrinsically safe supply for one measuring electronic MTI xx. Transformation of a digital measuring signal into an analog signal with measuring range spread
- analog output 4 – 20 mA
- menu driven, multi language unit
- hazardous area (Ex) supply for one measuring electronic MTI xx
- shielded 19" plug in module
- one relay output

Operation/Display

Film keypad-front plate with graphical LCD-display, backlit, 6 buttons for data and parameter input

Data saving during power cuts

Battery buffer max. 10 years. Parameter storage into flash at battery failure

Dimensions

Height 3 HE; Width 12 TE
 Front plate: Height x width 128 x 61 mm
 Plug in module: Height x width x depth 100 x 60 x 160 mm
 7 units can be inserted on a 19"-rack

Weight

690 g

Mains supply

24 VAC \pm 10% 50/60 Hz / 24 VDC Range 18 – 36 VDC
 independent of polarity

Switch on current

momentary (1ms) approx. 1A

Power input t

ca. 3.4 VA (I = 140 mA)

Fuses

8.5 x 8.5 mm miniature fuse MST 400 mA

Hazardous area supply and signal transmission

[Ex ia] IIC Pulse modulated supply signal
 open circuit voltage max. 18.9 V; typically 17 V
 short circuit current max. 49 mA; typically 40 mA

[Ex d ia], Pulse modulated supply signal
 open circuit voltage max. $U \leq 19.3$ V; typ. 17 V
 short circuit current max. $I \leq 75$ mA; typ. 70 mA

Signal transmission

1 measuring circuit, pulse modulated supply signal

Signal line short circuit

power input max. MAT 4190: 160 mA

Ambient temperature

0 °C ... 45 °C

Storage temperature

-20 °C ... +45 °C, ideally 20 °C

Measurement range

0 – 3700 pulses

Data display

MeV 0 – 3700

Switching hysteresis

1 pulse = 0.028 pF for the 100 pF measuring range

Connection

32 pole FI connector, coding facility

Relay output

1 relay per measuring point with a changeover contact for the limit value. Example: min./max. Deviation min. or max. selectable safety value. Switching voltage 30 VDC / 2 A, I/O=2kV, -40 to 85°C

Analog output

one active 4 – 20 mA output, max.working resistance/burden 750 Ω , not for hazardous area, with potential separation, tech. fault 0.5 – 4 / 20 - 22 mA adjustable

Interface

RS 232 / RS 485

Monitoring

Self-monitoring detection system for: defective probe; short circuit/interruption signal supply to hazardous area (cable break security); measurement range; main power interruption
mipromex -error messages

8.3. mipromex Analog transmitter type: MAT 4220/4240

Construction

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

Assembly

19"-Rack type MR 7; 3 HE (Euro)
Monorack type MRM2; plastic housing for DIN-rail- or wall mounting.
Front plate fitting with Bopla housing.
Compact or table top housing

Purpose

- analog transmitter with intrinsically safe supply for two measuring electronics MTI xx. Transformation of the digital measuring signals into analog signals with measuring range spread
- analog outputs 4 – 20 mA
- menu driven, multi language unit
- Ex supply for two measuring electronics MTI xx
- shielded 19" plug in module
- one each open collector outputs NPN

Operation/Display

Film keypad-front plate with graphical LCD-display, backlit, 6 buttons for data and parameter input

Data saving during power cuts

Battery buffer max. 10 years. Parameter storage into flash at battery failure

Dimensions

Height 3 HE; Width 12 TE
Front plate: Height x width 128 x 61 mm
Plug in module: Height x width x depth 100 x 60 x 160 mm
7 units can be inserted on a 19"-rack

Weight

705 g

Mains supply

24 VAC \pm 10 % 50/60 Hz / 24 VDC Range 18 – 36 VDC independent of polarity

Switch on current

momentary (1ms) ca. 1A

Power input

ca. 4 VA (I = 200 mA)

Fuses

8.5 x 8.5 mm miniature fuse MST 400 mA

Hazardous area supply and signal transmission

[Ex ia] IIC Pulse modulated supply signal
open circuit voltage max. 18.9 V; typically 17 V
short circuit current max. 49 mA; typically 40 mA

[Ex d ia], Pulse modulated supply signal
open circuit voltage max. $U \leq 19.3$ V; typ. 17 V
short circuit current max. $I \leq 75$ mA; typ. 70 mA

Signal transmission

2 measuring circuits, pulse modulated supply signal

Signal line short circuit

power input max. MAT 4220/4240: 280 mA

Ambient temperature

0 °C ... 45 °C

Storage temperature

-20 °C ... +45 °C, ideally 20 °C

Measurement range

0 – 3700 pulses

Data display

MeV 0 – 3700

Switching hysteresis

1 pulse = 0.028 pF for the 100 pF measuring range

Connection

32 pole FI connector, coding facility

Open collector NPN output

one each potential free NPN transistor output for each measuring circuit Limit switch min./max.
Security min. or max. selectable

Rupturing tension NPN output

30 V DC

Continuous current NPN output

50 mA

Rupturing capacity NPN output

150 mW

Analog output

one each, active 4 – 20 mA output each, max. working resistance/burden 750 Ω , not for hazardous area, with potential separation, tech. fault 0.5 – 4 / 20 - 22 mA adjustable

Interface

RS 232 / RS 485

Monitoring

Self-monitoring detection system for: defective probe; short circuit/interruption signal supply to hazardous area (cable break security); measurement range; main power interruption
mipromex -error messages

8.4. mipromex Analogtransmitter type: MAT 4260

Construction

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

Assembly

19"-Rack type MR 2; 3 HE (Europ.sizes)
 Monorack type MRM2; plastic housing for DIN-rail- or wall mounting. Front plate fitting with Bopla housing.
 Compact or table top housing

Purpose

- analog transmitter with intrinsically safe supply for one measuring electronic MTI xx. Transformation of a digital measuring signal into an analog signal with measuring range spread
- analog output 4 – 20 mA
- menu driven, multi language unit
- hazardous area (Ex) supply for one measuring electronic MTI xx
- shielded 19" plug in module
- one relay output

Operation/Display

Film keypad-front plate with graphical LCD-display, backlit, 6 buttons for data and parameter input

Data saving during power cuts

Battery buffer max. 10 years. Parameter storage into flash at battery failure

Dimensions

Height 3 HE; Width 12 TE
 Front plate: Height x width 128 x 61 mm
 Plug in module: Height x width x depth 100 x 60 x 160 mm
 7 units can be inserted on a 19"-rack

Weight

705 g

Mains supply

24 VAC \pm 10% 50/60 Hz / 24 VDC Range 18 – 36 VDC
 independent of polarity

Switch on current

momentary (1ms) approx. 1A

Power input t

ca. 4 VA (I = 140 mA)

Fuses

8.5 x 8.5 mm miniature fuse MST 400 mA

Hazardous area supply and signal transmission

[Ex ia] IIC Pulse modulated supply signal
 open circuit voltage max. 18.9 V; typically 17 V
 short circuit current max. 49 mA; typically 40 mA

[Ex d ia], Pulse modulated supply signal
 open circuit voltage max. $U \leq 19.3$ V; typ. 17 V
 short circuit current max. $I \leq 75$ mA; typ. 70 mA

Signal transmission

2 measuring circuit, pulse modulated supply signal

Signal line short circuit

power input max. MAT 4260: 280 mA

Ambient temperature

0 °C ... 45 °C

Storage temperature

-20 °C ... +45 °C, ideally 20 °C

Measurement range

0 – 3700 pulses

Data display

MeV 0 – 3700

Switching hysteresis

1 pulse = 0.028 pF for the 100 pF measuring range

Connection

32 pole FI connector, coding facility

Relay output

1 relay per measuring point with a changeover contact for the limit value. Example: min./max. Deviation min. or max. selectable safety value. Switching voltage 30 VDC / 2 A, I/O=2kV, -40 to 85°C

Analog output

one active 4 – 20 mA output, max.working resistance/burden 750 Ω , not for hazardous area, with potential separation, tech. fault 0.5 – 4 / 20 - 22 mA adjustable

Interface

RS 232 / RS 485

Monitoring

Self-monitoring detection system for: defective probe; short circuit/interruption signal supply to hazardous area (cable break security); measurement range; main power interruption
mipromex -error messages

Index

I

1 measuring circuit 13

2

2 measuring circuits 13
2nd measuring circuit, activation 21

A

Activation code 21
Activation code, Menu- 15
Activation of 2nd measuring circuit 21
Active dataset, protocol, Menu- 16
Active part 11
Ambient temperature 42, 44
Ambient temperature MAT 4110 41
Ambient temperature MAT 4220/4240 43
Analog output 42, 44
Analog output 1 (display) 13
Analog output 2 (display) 13
Analog output MAT 4110 41
Analog output MAT 4220/4240 43
Analog outputs %(display) 13
Analog outputs galvanically separated 21
Analog outputs mA (display) 13
Aquasant Measuring Technique Ltd, Switzerland ii
Aquasant Messtechnik AG, Schweiz ii
Aquasant Measure Technique S.A., Suisse ii
aquasant-mt = www.aquasant-mt.com ii, 18
Archive, Menu- 16
Arrow down ↓ signalizes
 Meas. range underflow 32
Arrow up ↑ signalizes
 Meas. range overflow 33
Assembly 42, 44
Assembly MAT 4110 41
Assembly MAT 4220/4240 43

B

Bar probe 11
Basic equalization 29
Basic settings 18
basic settings, Menu 15
Battery type 22
Battery type, Menu 15
Burden 750 Ohms- 26

C

Calculation parameters, Menu- 16
Chart of operating setting 30
Cleaning of units 7
Code parameter, Menu- 15, 16, 17
Code, activation 21
Code, type 8, 9, 10, 15

Commissioning 27
Commissioning according to..., Menu 16
Commissioning, with a bar probe 28
Commissioning, with a pipe probe TSS90 27
Conductivity 11
Connection 42, 44
Connection MAT 4110 41
Connection MAT 4220/4240 43
Connection to female multipoint connector 36, 37, 38
Construction 42, 44
Construction MAT 4110 41
Construction MAT 4220/4240 43
Contact- 20
Contact information, Menu- 15
Continuous current NPN output MAT 4110 41
Continuous current NPN output MAT 4220/4240 43
Controller function, Menu- 16

D

Data display 42, 44
Data display MAT 4110 41
Data display MAT 4220/4240 43
Data error- 32
Data error, measuring value overflow 26
Data error, measuring value underflow 26
Data input, structure 12
Data saving during power cuts 42, 44
Data saving during power cuts MAT 4110 41
Data saving during power cuts MAT 4220/4240 43
Detection of oil in process or rain water 27
Detection of water in petrochemical products 27
Device specs 21
Device specs, Menu 15
Device type (display) 13
Device type MAT 21
Diagnosesystem 26
Diagnostic system 32
Dielectrical constant 11
Dimensions 42, 44
Dimensions MAT 4110 41
Dimensions MAT 4220/4240 43
Display at switch on 13
Display modes, Menu 17
Display, Analog output 1 13
Display, Analog output 2 13
Display, Analog outputs mA 13
Display, Device type 13
Display, error 34
Display, software release 21
Display, type code 22
Display, Zero point MeV 29
dry and clean (probe must be...) 23, 27, 28, 29

E

Earthing of...- 40
Electronic calibration 29
Equipotential bond 35, 40
equipotential bond line 40
Error level, programmable- 26
Error message mA output, Menu 16
Error, technical- 26, 31

Error, technical- level..... 36, 37, 38

F

factory settings20
 Factory settings, Menu.....15
 Fail Safe High25
 Fail Safe Low25
 Fault finding 26, 32
 Fault finding, after power on32
 Fault finding, data error32
 Fault finding, operation32
 Foam detection28
 FSH Fail Safe High.....36
 FSL Fail Safe Low 36, 38
 FSL/FSH position25
 Function11
 Fuses 42, 44
 Fuses MAT 4110.....41
 Fuses MAT 4220/4240-43

G

Graphic display13

H

Hardware, types..... 8, 21
 Hazardous Area / Plant35
 Hazardous Area protection 6
 Hazardous area supply and signal transmission 42, 44
 Hazardous area supply and signal transmission MAT 4110 .41
 Hazardous area supply and signal transmission MAT
 4220/424043
 Hi Alarm High Low.....25

I

Impedance, bar probe11
 Impedance, function.....11
 Impedance, measured value11
 Impedance, pipe probe11
 Impedance, probe 6
 Impedance, sum signal11
 Impedance, too high, fault34
Information / Notice 3
 Initialize unit20
 Input / changing of chracters12
 Input field12
 Input Pos. No.....23
 Inspection release of the parameters30
 Installation 6
 Interface 42, 44

K

Key -C- =/back/delete/12
 Key description12
 Key -down-12
 Key functions12
 Key in Password, (display)18
 Key -left-12

Key -OK- 12
 Key -right- 12
 Key -up- 12
 Keypad6
 Keypad buttons 11
 Keypad frontplate 41, 42, 43, 44

L

Language, 4th, to program 12
 Language, Menu 15
 Language/Sprache 18
 Languages Deutsch/English/Français 12
 Lightning 19
 Lightning settings- 19
 Lightning, Menu- 15
 Limit value 24, 25
 Limit values, Menu- 16
 Lo Alarm Low 25
 Load parameter set 20

M

mA output, simulation 26
 mA, active current output 26
 mA, programmable error level output 26
 Mains supply 42, 44
 Mains supply MAT 4110..... 41
 Mains supply MAT 4220/4240 43
 Maintenance..... 7
 MAT 4110 13, 21
 MAT 4110, technical data 41
 MAT 4110/220.....21
 MAT 422021
 MAT 4220/4240 13
 MAT 4220/4240 technical data 43
 MAT 424021
 Measured value display- 13
 Measured value old probe..... 23
 Measurement range 42, 44
 Measurement range MAT 4110 41
 Measurement range MAT 4220/4240 43
 Measuring circuits, quantity, Menu 15
 Measuring range..... 11, 24
 Measuring range, end point 24
 Measuring range, Menu 16
 Measuring range, starting point..... 24
 Measuring span- 23
 Measuring span acceptance, push button..... 23
 Menu Activation code 15
 Menu Active dataset, protocol 16
 Menu Archive 16
 Menu Calculation parameters 16
 Menu Code..... 27, 28, 30, 31
 Menu Code parameter 15, 16, 17
 Menu Controller function 16
 Menu description,- 18
 Menu Limit values 16
 Menu parameter settings..... 14
 Monitoring 42, 44
 Multipoint connector, 32 poles 36, 37, 38

N

NAMUR EN53 21

Number of measuring circuits22

O

Oil detection, with a float28
 Oil in Water, detection-27
 OK button (key –OK-) 3, 12, 14
 Old probe, measured value23
 Open Collector NPN Ausgang MAT 4220/424043
 Open Collector NPN Output MAT 411041
 Operating settings, chart-30
 Operation / Display 42, 44
 Operation / Display MAT 411041
 Operation/Display MAT 4220/424043
 Opto-electronic coupler6, 11, 25, 36, 37, 39
 Opto-electronic coupler, de-energized25
 Opto-electronic coupler, define security settings25
 Opto-electronic coupler, switched on25

P

Parameter12
 Parameter set, load20
 Parameter set, store-20
 Parameter settings, Menu14
 Parameter values12
 Parameterization12
 Password18
 Password, key-in, change19
 Password, modify19
 Password, modify, Menu15
 Passwort input14
 PC software12
 Plant, Hazardous Area35
 Power Input 42, 44
 Power Input MAT 411041
 Power Input MAT 4220/424043
 Printed circuit board38
 Probe already soiled with products, (settings) 27, 28
 Probe factor23
 Probe type 1 / 222
 Probes, without reference electrode29
 Product11
 Program messages 3
 Program structure with parameters15
 Programmable error level mA output26
 Pulses11
 Purpose 42, 44

R

Rack, 1927
 Rack, Monorack27
 Radio equipment and transmitter-34
 Relays outputs 42, 44
 Rupturing capacity NPN output MAT 411041
 Rupturing capacity NPN output MAT 4220/424043
 Rupturing tension NPN output MAT 411041
 Rupturing tension NPN output MAT 4220/424043

S

Second measuring circuit, activation21
 Selec measuring circuit24

Select language 12
 Select measuring circuit 22, 25, 26
 Serial No 1 / 222
 Serial number and system verify, Menu15
 Serial number system verify21
 Service parameter basics, Menu16
 Settings at commissioning-30
 Settings chart, operating30
 Settings, basic, Menu15
 Settings, if probe already soiled with products 27, 28, 29
Setup6
 Signal filter-24
 Signal line short circuit42, 44
 Signal line short circuit MAT 411041
 Signal line short circuit MAT 4220/424043
 Signal settings22
 Signal settings, Menu15
 Signal transmission42, 44
 Signal transmission MAT 411041
 Signal transmission MAT 4220/424043
 Simulation of mA output26
 Software8
 Software (Display)21
 Software, activation21
 Software, codes9
 Software, dutiable21
 Software, functions21
 Software, marking21
 Software, operating10
 Software, packages21
 Software, PC12
 Software, release (Display)21
 Software, standard9
 Software, versions10, 15
 Soiled and uncleaned probes, settings...29
 Storage temperature42, 44
 Storage temperature MAT 411041
 Storage temperature MAT 4220/424043
 Store parameter set20
 Structure Data input-12
 Surface oil, detection28
 Switch on current42, 44
 Switch on current MAT 411041
 Switch on current MAT 4220/424043
 Switching hysteresis42, 44
 Switching hysteresis MAT 411041
 Switching hysteresis MAT 4220/424043
 Symbols3

T

Technical Data41
 Technical error26, 31
 Technical error level36, 37, 38
 Technical error, Measured value 1 overflow33
 Technical error, Measured value 1 underflow32
 Test functions25
 Test functions, Menu16
 Text input12
 Time, drop off or on raise delay25
 Time/Date19
 Time/Date, Menu15
 Type code8, 9, 10, 15
 Type code, (Display)22
 Types, of hardware8, 21

U

Using this manual 3

V

Version, 24 V 36, 37, 38
 Version, manual ii
 Version, software 10, 15, 21

W

Warranty claims 7

Waste disposal of...- 7
 Water in Oil, detection 27
 Weight 42, 44
 Weight MAT 4110 41
 Weight MAT 4220/4240 43
 Wiring diagram 35

Z

Zero point acceptance, push button 23
Zero point input, manual 23
 Zero point MeV (display) 29
 Zero point, accept actual 27

List of tables:

Chart 1 Symbol description 3
 Chart 2 Key functions 12
 Chart 3 Display 12
 Chart 4 Program structure 17
 Chart 5 Fail Safe settings 25
 Chart 6 Commissioning of water detection 27
 Chart 7 Commissioning of oil detection 27
 Chart 8 Commissioning of oil layer detection 28
 Chart 9 Commissioning of foam detection 28
 Chart 10 Electronic calibration operating sequences 29
 Chart 11 1-2 Commissioning protocol - page 1 of 2 30
 Chart 12 2-2 Commissioning protocol – page 2 of 2 31

List of pictures:

Pic. 1 **mipromex** 8
 Pic. 2 Wiring diagram 35
 Pic. 3 FI 32 female multipoint connector to MAT 4110 36
 Pic. 4 FI 32 female multipoint connector to MAT 4220 37
 Pic. 5 Connection print to mipromex 39
 Pic. 6 Earthing principle 40
 Pic. 7 Measuring electronic Fehler! Textmarke nicht definiert.