



OPERATING MANUAL

Level Switch device

MLS 1100/1200/1170/1270

- Display of %-/ Pulses
- 1 or 2 Measuring
- 1100/1200 Relais
- 1170/1270 with OC
- Limit value with relay output

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

mipromex®
for limit values detection in
production plants



Aquasant Messtechnik AG | Postfach 107 | Hauptstrasse 22 | 4416 Bubendorf | Switzerland
T: +41 61 935 50 00 | info@aquasant-mt.com | www.aquasant-mt.com

Sales:

Aquasant Messtechnik AG

Hauptstrasse 22
CH - 4416 Bubendorf / Switzerland
T. +41 (0)61 935 5000
F. +41 (0)61 931 2777
info@aquasant-mt.com
www.aquasant.com

Manufacturer:

Aquasant Messtechnik AG



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Dear Customer

Congratulations! With this system you have chosen a high performance unit of the famous **mipromex®** line from **Aquasant**. The level-switch **MLS** for one or two measuring circuits changes the normed impedance measuring signal of a pipe- or bar-probe into a static or dynamic limit value input.

Reading and carefully following the operating instructions, assures a perfect functioning of your **MLS** system.

There's something else which is important for you to know: If any troubles should appear (opposite all our expectations), then our **Aquasant** service department will assist you even long time after you purchased your **MLS Level Switch**.

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/marketed 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.		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		Button on mipromex® front panel, Functions: menu, select, next, store (press more than 2s)
"next step" in Na- vigation 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

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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

- ſ 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.
- ſ 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)
- ſ Single units installed with Monorack Type: MRM 2 (see chapter 7.4)
Housings or switch cabinets must be ventilated (dissipation of heat built-up)
- ſ 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.
- ſ Installation instructions for impedance probes I must be observed

1.2. Setup

- ſ Verify wiring and power supply tension (chapter 7.2)
- ſ Perform probe and system specific parameterization in the menu (chapter 5)
- ſ Check max. load of the opto-electronic coupling transistor outputs (NPN) according to datasheet (chapter 7.6)
- ſ 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

The EC-type examination certificate has to be respected. It is specially important to respect the contained "special conditions". Ex certification according to Directive 94/9/CE (ATEX 100 A).

Confidential test certificate no. 08-IK-0396.01 **CE 1254**
EC-type examination certificate SEV09 ATEX 0132

Notification no.:

QS 11 ATEX 2081 

Ex classification:

II (2)G [Ex ia] IIC

II (2)D [Ex iaD]

II (2)GD

Please pay attention to the following documents:

- **VEZ-SEV-ATEX-09-ISO_Certifcat-Doc.pdf** (actually valid certificates)
- **VED-TSS**....probe data sheet with specific (X) Ex-relevant coat thicknesses and information regarding the application in which zone**
- **08-IK-0396.01** the test certificate with the characteristics is submitted in strict confidence.

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 (Safety Integrity Level). IEC/EN 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 is according to Aquasant Messtechnik AG guarantee.

1.8. Waste disposal of electrical and mechanical components

The disposal of the components must be carried out in compliance with the country valid regulations.

2. mipromex® type description

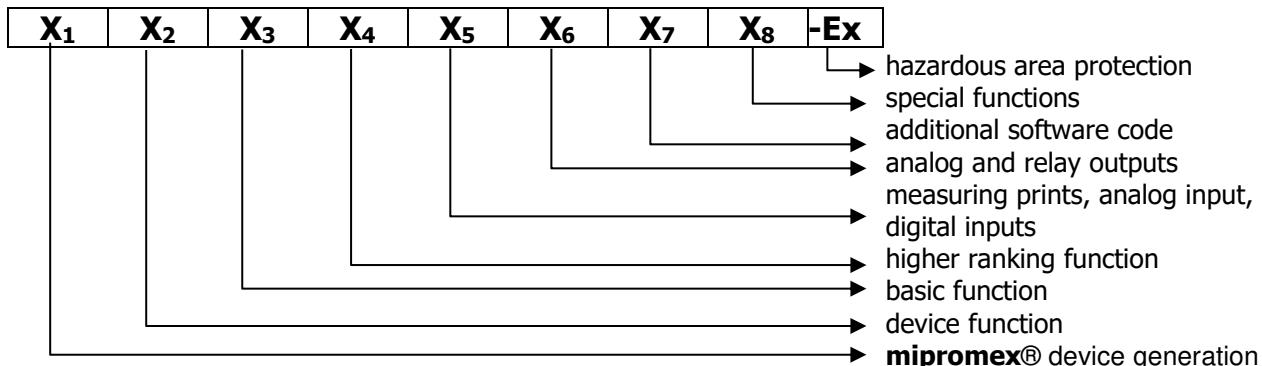


Pic. 1 **mipromex®**

2.1. MLS-Hardware types

- MLS 1100** 1 measuring circuit with 2 limit values output Relais (2 relais with reversing contact)
MLS 1200 2 measuring circuits with a limit value output (with one relay with directional contact each)
- MLS 1170** 1 measuring circuits with 2 limit values outputs (2 open collector transistor outputs NPN)
MLS 1270 2 measuring circuits with one limit value output each (one open collector transistor ouput NPN each)

2.1.1. mipromex® type code:



X₁ M = **mipromex®**

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

X₃ C = Concentration 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)

X₅	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

X₆	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
 NEx = 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. Therefor you purchase knowledge about the basic functionality which applicable for all processor. 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:

MLS 1100 1 measuring circuit with two limit values (2 Relay with directional contact)

MLS 1170 1 measuring circuit with two limit values (2 open collector transistor outputs NPN)

MSL 1200 2 measuring circuits with one limit value each (with one relay with directional contact each)

MLS 1270 2 measuring circuits with one limit value each (one open collector transistor output NPN each)

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.

2.3. Basic functions

The **mipromex®-MLS** can be equipped with one or two independent measuring circuits. Depending on the device type, the processing of one or two measurement signals is activated.

The pulse signal transmitted by the MTI measuring electronics unit is transformed into an offset compensated, filtered pulse value and processed according to the limit value entered. The graphic display shows the actual pulse value and the limit pulse value. The offset range (basic or zero compensation of the measuring electronics) can be set between 10 and 2000 pulses.

The measuring signal offset (zero point) can be picked up automatically by pressing one key, or the stored value can be modified using the keypad. The pulse range (measuring range) is 3700 pulses. The pulse signal can be converted, based on a particular measuring span, into a percentage value between 0 and 100 %. Limit values can also be entered as percentages.

As well as entering a normal static limit value, it is also possible to carry out dynamic monitoring of the measurement values. If an adjustable hysteresis is exceeded or fallen short of, the corresponding digital output will switch. As a safety feature, a maximum limit value can be set. The outputs can be configured with a time delay on switching on and/or off. In the event of a failure, the relay or the open collector - transistor output will trigger an alarm at a high or low threshold, according to the setting, FSH or FSL.

A set of parameters can be stored and reloaded.

Fault messages are displayed with the date and time.

2.4. Measuring circuit

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

2.5. Function

The product surrounding the electrode systems of a bar probe or pipe probe varies the impedance according to the dielectric and conductive properties of organic products and aqueous solutions as well as the immersion depth of the active measuring electrodes.

The sum signal of the measured impedance is converted directly by the MTI measuring electronics into a standardised digital signal and transmitted as pulse packets to the **mipromex®- MLS**.

The measurement values within the standardised signal range of 0 to 3700 pulses are product specific and will vary according to product mixtures or immersion depth. The physical impedance measurement value of a product at given immersion depth is thus represented as a numerical value, characterised as a pulse number.

With an MTI 50 measuring electronics unit a purely dielectric measurement value of 1 pF is converted into a pulse value of 65 pulses.

A modern, menu-based operational and calibration concept allows for exceedingly rapid setting up of the limit switches, and a membrane keyboard and fully graphic function display make it user-friendly and reliable.

It can be used as a limit switch for liquids, foams and powders according to level or product type.

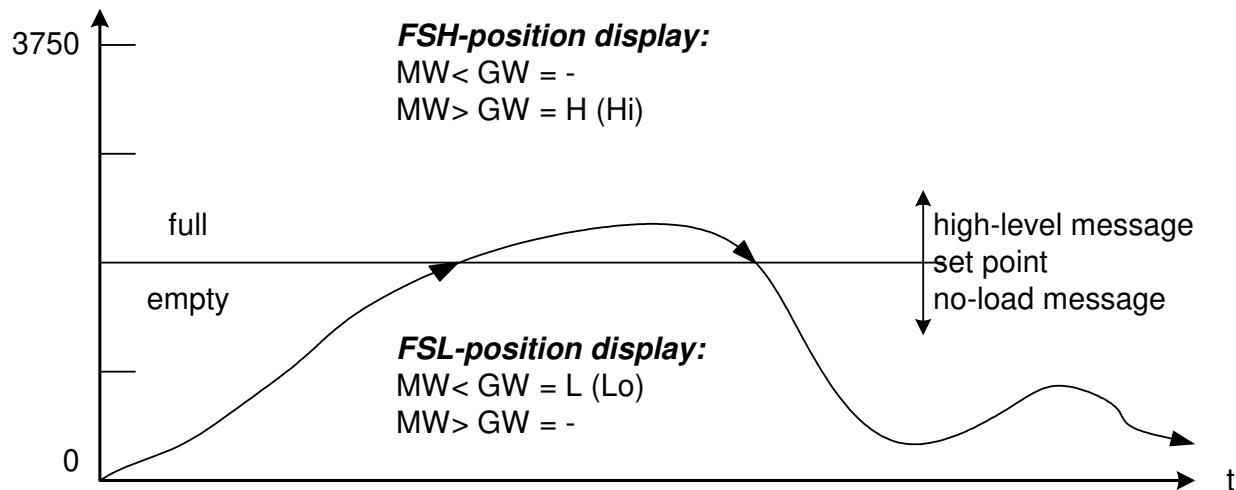
2.6. Measured values processing

The safety level switch MLS is equipped with 2 different measured values processing modes: **stat** and **dyn**. The factory setting at delivery or after initialization is the **stat** (static) process mode.

Pos.-Nr.	settings	description
6.1.2	stat/dyn	Static measure processing mode
6.1.7	FSL/FSH	Safety level (full) switch

2.6.1. Static measure processing mode

Measured value MW

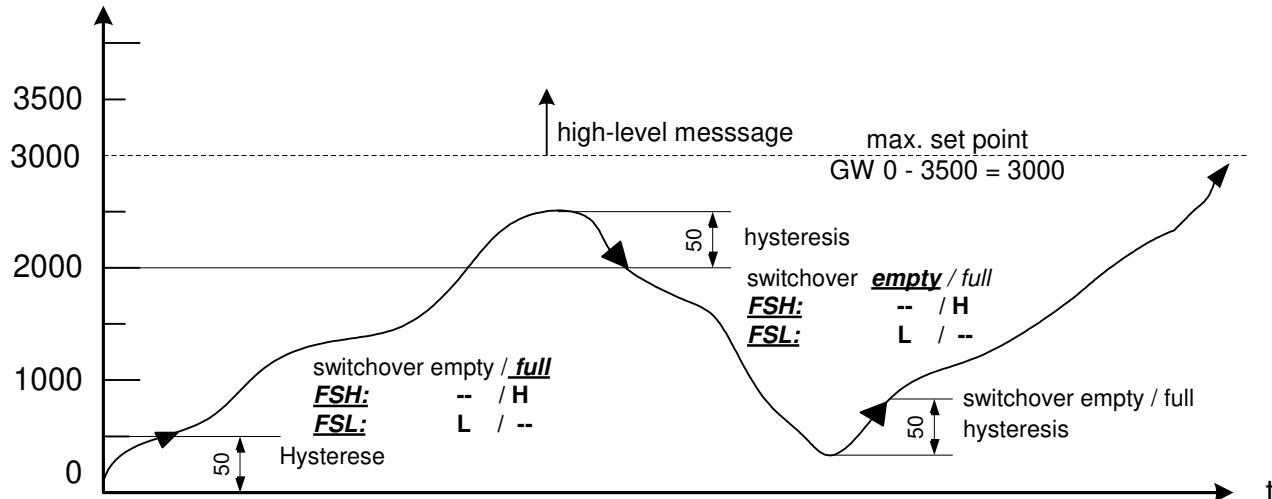


Pic. 2 static measure processing mode

2.6.2. Dynamic measure processing mode

Nr.	settings	description
6.1.2.	stat/dyn	Dynamic measure processing mode
6.1.3.	3000 Imp	Max. limit value (as example below)
6.1.4.	50 Imp	Hysteresis (as example below)
6.1.5.	00.02 mm.ss	Relay Time delay, drop
6.1.6.	00.00 mm.ss	Relay Time delay, tension
6.1.7.	FSL/FSH	Safety level (full) switch

Measured value MW



Pic. 3 dynamic processing mode

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	Display	in main menu	menu line	Data input
▲	up	previous display	"next" menu item	1 step up	., /, 0-9, :, A-Z, -
▼	down	next display	"next" menu item	1 step down	., /, 0-9, :, A-Z, -
►	right	no function	no function	select right	input right
◀	left	no function	no function	select left	input left
OK	"next" / menu / select / store	(>2 s) error confirmation	select	confirm	forward or (>2 s) store and forward
C	back	back	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.

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:

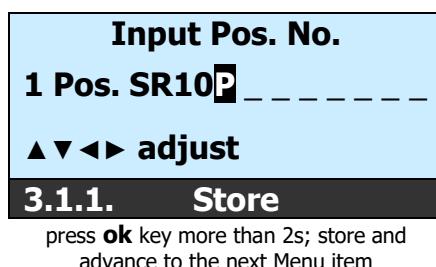
The first position, beginning on the left, is inverted. To change the character use the **▲ ▼** buttons.

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
Gauge- or tag-number,
11 characters max.
active key-navigation
Menu-Pos.-Nr.-Code /**ok** button function



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 Device type and hardware model	Level Switch device type MLS 1200
MLS 1100, 1200, 1170, 1270 ok button function	Next
	ok: forward to meas.value display

3.3.2. Measured value display

% or Impulse can be changed in the menu 5.1.1

Unit type (with 1 measuring circuit)

MLS 1100, MLS 1170

Description of the 1. measuring position
Description of the (1st) measured value

Actual calibrated meas.value display in %
Change and input in **Menu 5.1.1**

ok button function / active keys

1 Pos. QLA12345 678	
GW1 stat	GW2 stat
100.0 %	Hi
	Lo
Menu	▲▼

Change and input in measuring circuit 1, **Menu 3.1.1**

Limit value 2 "Hi"-alarm (high) MW>GW2 (stat / FSH)
Change and input in measuring circuit 1, **Menu 6.1.2**
Limit value 1 "Lo"-alarm (low) MW<GW1 (stat / FSL)

▲▼: circulate (loop) in display mode

Pos. no. can be entered in the menu 3.1.1

Unit types with 2 measuring circuits:

MLS 1200, MAT 4220/4240, MLT 6260, MIQ 8260

Description of the 1nd measuring position
Description of the 1nd measured value

Actual calibrated meas.value display in %
Change and input in **Menu 5.1.1**.

ok button function / active keys

1 Pos. QLA12345 679	
measur.sig 1	stat
100.0 %	Hi
	Lo
Menu	▲▼

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**

▲▼: circulate (loop) in display mode

Description of the 2nd measuring position
Description of the 2nd measured value

Actual calibrated meas.value display in %
Change and input in **Menu 5.1.1**.

ok button function / active keys

2 Pos. QLA12345 679	
measur.sig 2	stat
12.0 %	Lo
	Hi
Menu	▲▼

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**

▲▼: 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 5.1.1**.

ok button function / active keys

signal limit val	
1	100.0 % Hi
2	12.0 % Lo
Menu	▲▼

ok: change back to menu

▲▼: circulate (loop) in display mode

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

3.3.3. Menu parameter settings

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

Menu-Information	=> Menu-Info <=
Both functions of the ok button	Press OK button
store or	> 2s store !
next	< 2s next !

Menu Pos. No. / **ok** button function 1. Next

ok: change to password input

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

selected menu item is inverted	Key in Password!
Menu Pos. No. / ok button function	0000
	▲▼◀▶ adjust

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

ok: change to the selected menu item

▲▼ : circulate (loop) menu items

4. Program structure with parameters of the Level Switch

Legend:

☞ = Select / ↗ = Input / ↘ = Display /

☞ = only available with activation code

Menu-Code Parameter

	Type:	MLS 1100	MLS 1170	MLS 1200	MLS 1270	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"/>	☞
2. Device specs		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	☞
2.1. Device type: MLS 1100 or 1170 or 1200 or 1270 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 for MLS 1200/1270 Select level switch 1 or 2 for MLS 1100/1170		-	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	☞
3.1.1. Input position number / TAG number		<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"/>	↗
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"/>	↗

Legend:

☞ = Select / ↗ = Input / ⇠ = Display /

☒ = only available with activation code

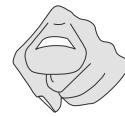
Menu-Code Parameter

	Type:	MLS 1100	MLS 1170	MLS 1200	MLS 1270	Change
3.1.5. Measuring span, accept at press button	<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"/>	☞				
3.1.8. Signal filter	<input checked="" type="checkbox"/>	☞				
5. Measuring range	<input checked="" type="checkbox"/>	☞				
5.1 Select measuring circuit 1 or 2	-	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	☞
5.1.1. Measuring range units [% / Imp.]	<input checked="" type="checkbox"/>	☞				
6. Limit values	<input checked="" type="checkbox"/>	☞				
6.1 Select measuring circuit 1 or 2 MLS 1200/1270	-	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	☞
Select limit value 1 or 2 MLS 1100/1170	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	-	-	☞
6.1.1. Function relay 2 Llimit value or Fault msg	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	-	-	☞
6.1.2. static/dynamic	<input checked="" type="checkbox"/>	☞				
6.1.3. Limit value (static) or max. Limit value (dynamic)	<input checked="" type="checkbox"/>	☞				
6.1.4. Hysteresis /max. measured value	<input checked="" type="checkbox"/>	☞				
6.1.5. Time delay, drop 1	<input checked="" type="checkbox"/>	☞				
6.1.6. Time delay, tension 1	<input checked="" type="checkbox"/>	☞				
6.1.7. FSL/FSH position	<input checked="" type="checkbox"/>	☞				
6.1.8. min/max MW display	<input checked="" type="checkbox"/>	☞				
7. Test functions	<input checked="" type="checkbox"/>	☞				
7.1. Select measuring circuit 1 or 2	-	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	☞
Select Limit value 1 or 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	-	-	-
7.1.3. Relay position simulation	<input checked="" type="checkbox"/>	☞				
8. Error message mA output	<input checked="" type="checkbox"/>	☞				
Display actual error with time/date	<input checked="" type="checkbox"/>	☞				
12. Calculation parameters	<input checked="" type="checkbox"/>	☞				
12.1. Select measuring circuit 1 or 2 for MLS 1200/1270	-	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	☞
12.1.1 Drift memory	<input checked="" type="checkbox"/>	☞				
12.1.2 Drift gradient pulses	<input checked="" type="checkbox"/>	☞				
12.1.3 Drift gradient time	<input checked="" type="checkbox"/>	☞				
13. Archive	☒	☒	☒	☒	☒	☞
13.1. Operation parameter sets (last set of parameters)	<input checked="" type="checkbox"/>	☞				

Display modes					
1. Pos. Number measured value in pulses /% Limit value GW1/GW2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-	-	☞
2. Pos. Number measured value in pulses /% Limit value GW1/GW2 (stat or dyn)	-	-	<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



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

ok button function / active keys

Information about storing or
next

Menu Pos. No. / **ok** button function

**1 Pos. QLA12345678
measur.sig. 1**
100.0 % Hi

Menu ▲▼
with **OK** change to menu

=> **Menu-Info <=**
Press OK Button
>2s store !
< 2s next !

1. Next

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

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.

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, 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	Time 09:50:25 09:50:14 ▲▼◀▶ Adjust 1.2.1 Store	1. use ▲▼◀▶ -buttons to change the time 2. press ok button more than 2 seconds
active key-navigation	Date 04.12.06 04.12.06 ▲▼◀▶ Adjust 1.2.1 Store	Time is stored Display changes to date 1.2.1.

current date selected character is inverted	Date 04.12.06 04.12.06 ▲▼◀▶ Adjust 1.2.1 Store	1. use ▲▼◀▶ -buttons to change the date 2. press ok button more than 2 seconds
active key-navigation	▲▼◀▶ Adjust 1.2.1 Store	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	Key in Password! 0000 ▲▼◀▶ Adjust 1.3.1. Store	1. use ▲▼◀▶ -buttons to input the numerical password 2. press ok button more than 2 seconds
--------------------------------	---	--

[1.3.2.] Modify password

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

selected character is inverted	Modify Password! 5000 ▲▼◀▶ Adjust 1.3.2. Store	1. use ▲▼◀▶ -buttons to input the numerical password 2. press ok button more than 2 seconds
--------------------------------	---	--

[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	Lighting settings on/off 1.4.1. Store ◀▶	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	Lighting settings 0 = continuous ON Time in Min. 02 ▲▼◀▶ Adjust 1.4.2. Store	1. use ▲▼◀▶ -buttons to select the lighting duration 2. press ok button more than 2 seconds
--------------------------------	---	--

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 is 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

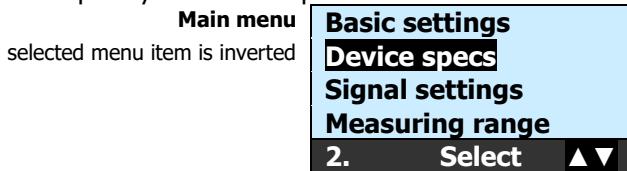
[1.6.3.] Initialize unit no/yes

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

4.1.2. [2.] Device specs

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



After pressing the **ok** button the display changes to the sub menu Device specs

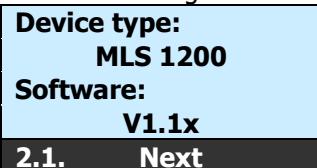
[2.1.] Device type MLS 1100/1170 or 1200/1270

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

MLS 1100 1 measuring circuit with 2 limit values (2 Relais with change-over contact)
MLS 1170 1 measuring circuit with 2 limit values (2 open collectors transistor outputs NPN)

MSL 1200 2 measuring circuits with 1 limit value each (one relay with change-over contact each)
MLS 1270 2 measuring circuits with 1 limit value each (one open collector transistor output NPN each)

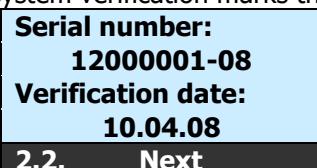
Software versions are marked according to NAMUR EN53. (V 1.x)



After pressing the **ok** button the display changes to the next menu item 2.2.

[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.



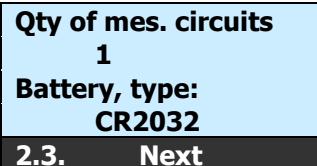
After pressing the **ok** button the display changes to the next menu item 2.3.

[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.



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 inverted 16-char. max

Probe
Type code

▲▼◀▶ Adjust
2.4.1. Store

- use ▲▼◀▶-buttons to input the alpha-numerical type code of the probe
- 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 inverted 16-char. max

Probe
S/N:

▲▼◀▶ Adjust
2.4.2. Store

- use ▲▼◀▶-buttons to input the alpha-numerical serial number of the probe
- 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

Basic settings

Device specs

Signal settings

Measuring range

3. Select

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

selected menu item is inverted

Select meas. circuit
1/2

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 alphanumerical.

define your position-

or Tag-number, 11-characters max.

Input Tag. -No.:
1. Pos -----

▲▼◀▶ Adjust
3.1.1. Store

- use ▲▼◀▶-buttons to input the alpha-numerical position number
- 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. MeV old probe 2600 / 2955 MeV new probe = f 0.879

The probe factor has only to be changed

when using a replacement probe

selected character is inverted

Probe factor
1.000

▲▼◀▶ Adjust
3.1.2. Store

- use ▲▼◀▶-buttons to define the probe factor
- 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

Zero point MeV
Accept at
pushing button: 0060
actual MeV: 0076
3.1.3. Store

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

Zero point MeV
Manual Input
Adjust 0076
▲▼◀▶ 0087
3.1.4. Store

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)

Meas. span = MeS
Accept at
pushing button 2340
actual MeV: 2255
3.1.5. Store

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

Meas. span = MeS
Manual input
Adjust 2255
▲▼◀▶ 0255
3.1.7. Store

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

Signal filter
00.2 s
▲▼◀▶ Adjust
3.1.8. Store

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. [4.] Commissioning

4.1.5. [5.] Measuring ranges

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

Main menu

Basic settings
Device specs
Signal settings
Measuring range
5. Select

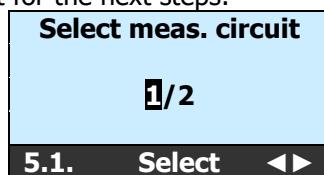
After pressing the **ok** button the display changes to the sub menu measuring range 5.1.

selected menu item is inverted

[5.1.] Select measuring circuit 1 or 2 (MLS 1200/1270)

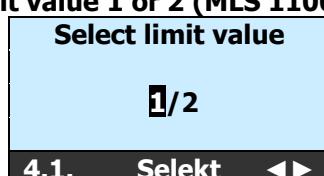
Select the active measuring circuit for the next steps.

selected menu item is inverted



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

selected menu item is inverted



1. With the **◀▶** buttons the output relay or open collector transistor output (NPN) 1 or 2 is selected
2. Press **ok** button more than 2 seconds

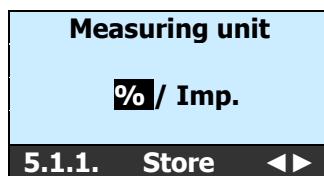
selected menu item is inverted

The digital output is immediately activated
Display changes to menu 6.1.1.

[5.1.1.] Measurement range unit

Select % or pulses

Change possible units



1. With the **◀▶** buttons the unit is defined, % or pulse
2. Press **ok** button more than 2 seconds

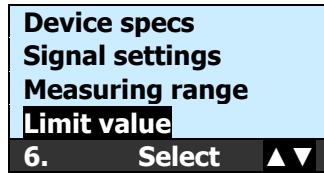
Display changes to the next menu item

4.1.6. [6.] Limit values

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.

MLS 1200 / 1270

Choice of measuring circuit 1 or 2 (Only one limit value output is available)

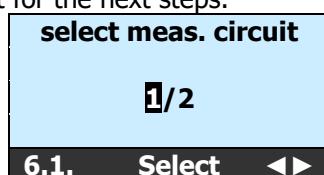
MLS 1100 / 1170

Only 1 measuring circuit is available (Choice of limit value 1 or limit value 2)

[6.1.] Select measuring circuit 1 or 2 (MLS 1200/1270)

Select the active measuring circuit for the next steps.

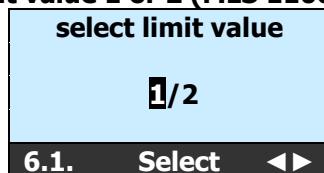
selected menu item is inverted



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

[6.1.] Select limit value 1 or 2 (MLS 1100/1170)

selected menu item is inverted

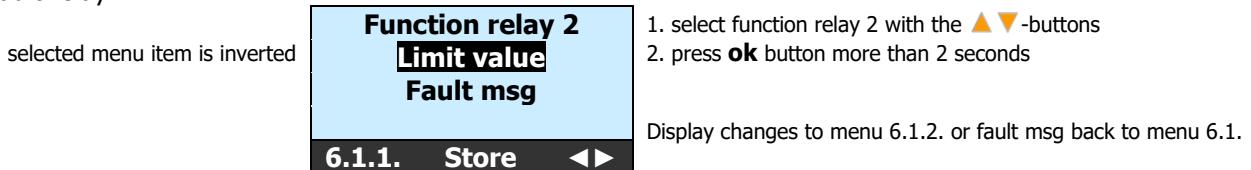


1. With the **◀▶** buttons the output relay or open collector transistor output (NPN) 1 or 2 is selected
2. Press **ok** button more than 2 seconds

The digital output is immediately activated
Display changes to menu 6.1.1.

[6.1.1.] Select limit value 2 (MLS 1100/1170)

The K2 relay can be used differently. Define the function of the relay output. Limit value function corresponding relay 1. Function as a fail safe any faults are displayed on the alarm relay: Fail Safe good state: de-energized relay drawn / fault relay



[6.1.2.] Select static or dynamic

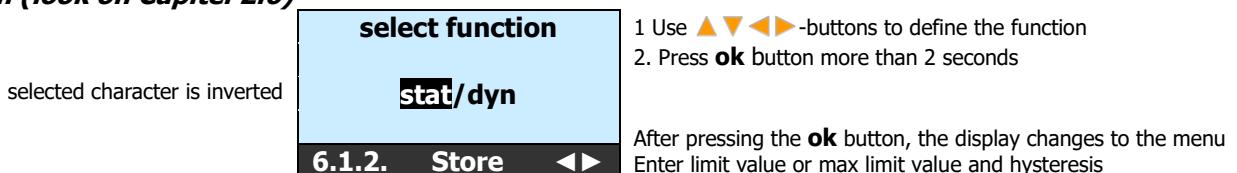
With the static limit value you can:

- obtain a precise and reproducible limit value for a given measuring range corresponding to 100 %
- read a chosen limit value as a percentage and programme it as a limit value
- enter very small limit values, starting at 1.1 %, thanks to the high performance measuring circuit and the precise and reproducible processing of the measurement values

With the dynamic limit value you can:

- detect the limit value inside the length of the active measuring electrode independently of the product's properties and its adherence to the measuring electrode
- only one dynamic limit value should be set for each measuring circuit.
- see diagram for the processing of the measurement value

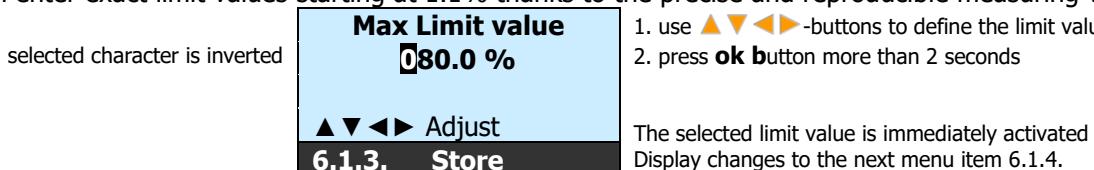
Diagramm (look on Capitel 2.6)



[6.1.3.] Limit value

With the static limit value you:

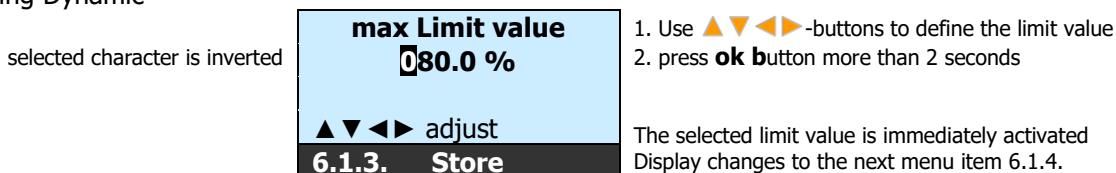
- get an exact and reproducible limit value for a defined measuring span corresponding to 100 %
- can display read a desired percentage at the desired limit value and program it/store it, as limit value
- can enter exact limit values starting at 1.1% thanks to the precise and reproducible measuring values.



Or wen your select dyn...

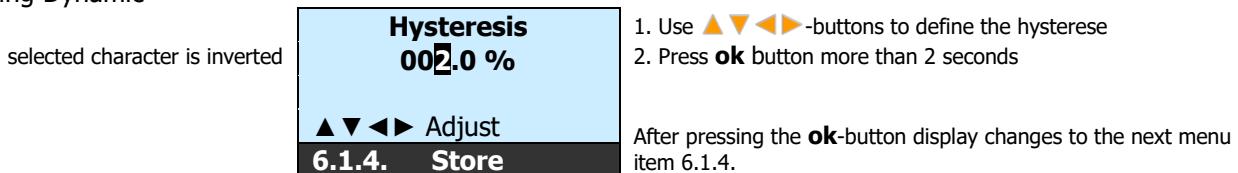
[6.1.3.] max. Limit value

After entering Dynamic



[6.1.4.] Hysterese

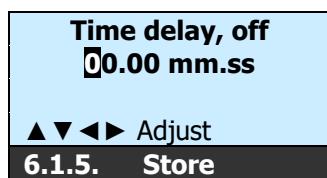
After entering Dynamic



[6.1.5.] 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



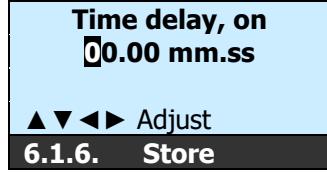
1. Use ▲▼◀▶-buttons to define the time delay off, drop
2. press **ok** button more than 2 seconds

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

[6.1.6.] 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.

[6.1.7.] FSL/FSH Position

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

Active position	Measured value	Display	Relay or opto-el. coupler
<i>Fail Safe Low</i>	FSL	is lower than limit value	Lo de-energized
		is higher than limit value	none switched on
<i>Fail Safe High</i>	FSH	is lower than limit value	none switched on
		is higher than limit value	Hi de-energized

Chart 5 Fail Safe settings

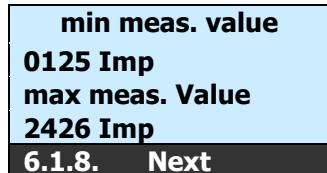
selected menu item is inverted



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.

[6.1.8.] min/max Measurement value



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

4.1.7. [7.] Test functions

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

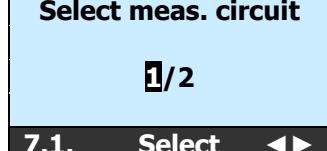
Main menu



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

selected menu item is inverted

selected menu item is inverted



After pressing the **ok** button the display changes to the selected measuring circuit menu (1). 7.1.3.

[7.1.3] Relaisstellung Simulation

selected menu item is inverted



1. Using the **▲▼◀▶** buttons the output relay or open collector transistor output (NPN) is switched over to 1 or 2
2. **C** button back

The digital output is immediately activated

4.1.8. [12.] Calculation parameters

Main menu

selected menu item is inverted



After pressing the **ok** button the display changes to the sub menu 12.1. select measuring circuit

[12.1.] Select measuring circuit 1 or 2 (MLS 1200/1270)

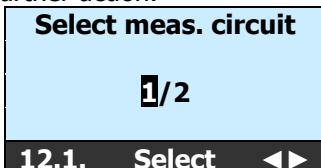
With the drift compensation small measurement modifications like temperature drift are compensated for by HF wire or probes. ± 1-3 impulses per minute correspond to normal drift compensation. With the drift compensation the measurement has left constantly if the drift is smaller than the drift gradient. This means the measurement corrects itself the max. drift in impulses is fixed in the drift memory within a minute (adjusting drift time 60 s). The sum of the individual drift compensations becomes e.g. 30 (impulses) to change the measurement more greatly than 30 impulses begin itself into function of the drift. At a zero comparison [3.1.3.] the drift loft is put on 0000. Around min. 40 impulses, the zero comparison must always be GREATER than Max Driftspeicher. The measurement otherwise sinks at a negative drift under the zero. Consequence is: Technical disturbance measurement underrun!

At the measuring of at times slow modifications like filling level measuring the drift compensation must get prepared for 0 Imp, i.e. turned off.

Caution: With the drift compensation no probe pollutions can be compensated for.

Select the measuring circle for the further action.

selected menu item is inverted



After pressing the **ok** button, display changes to the menu for the measuring circuit selected (1). 12.1.1.

[12.1.1.] Drift memory

selected menu item is inverted

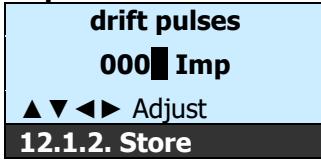


1. use **▲▼◀▶**-buttons to define max. drift
 2. press **ok** button more than 2 seconds
- + - drift

If the max. drift is exceeded, no more drift compensation is possible

[12.1.2.] Driftgradient pulses

selected menu item is inverted



1. use **▲▼◀▶**-buttons to define max. drift pluses
 2. press **ok** button more than 2 seconds
- + - drift

If the max. drift is exceeded, no more drift compensation is possible

[12.1.3.] Driftgradient time

selected menu item is inverted



1. use **▲▼◀▶**-buttons to define max. drift time
 2. press **ok** button more than 2 seconds
- + - drift time

If the max. drift is exceeded, no more drift compensation is possible

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 bar probe

5.1.1. Full/Empty level detector for Liquid or Powder

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	STM 500/100	
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	
3.1.4	The zero point offset can also be entered manually	75	
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	1230	100
5.1.1.	Define the start point of the signal spread at 4 mA	Impulse	%
6.	Limit value settings		
6.1.2.	Statisch / dynamisch as you see the diagram on page 12	stat	

Chart 6 Commissioning of water detection

5.1.2. Full/Empty foam level detection

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: Fill the pipeline with your petrochemical product with the highest water content The MS is product and nominal diameter depending	1230	100
5.1.1.	Define the start point of the signal spread at 4 mA	Impulse	%
6.	Limit value settings		
6.1.2.	Statisch / dynamisch	dyn	
6.1.3.	Limit value / max limit value	20 %	
6.1.4.	Hysterese as you see the diagram on page 12	4 %	

Chart 7 Commissioning of foam detection

5.2. 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.

	<i>Probe dry and clean, built in the vessel</i>	Go to the menu point 3.1.3.
or	<p><i>Calibration of MTI as follows:</i> 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</p> <p>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.</p> <p>Menu position Number-Code</p>	<p>1. press ok button more than 2 seconds: actual MeV is stored Display changes to the next parameter input</p> <p>Zero point MeV Accept at push button 0060 actual MeV 0085</p> <p>3.1.3. Store</p> <p>change to the next menu item by pressing the Ok button</p>

Chart 8 Electronic calibration operating sequences

5.3. Inspection release of the parameters MLS 11xx/12xx

Operating parameters (settings at final inspection on site at commissioning)

Company		Order		
Building		PO no.		
Plant		Project no.		
mipromex®	MLS	V1.12	Ex ia <input type="checkbox"/> Exd <input type="checkbox"/> Non-ex <input type="checkbox"/>	Serial no.
Measuring circuit 1				Pos./Tag no.
Probe type				Serial no.
Coax cable	Serial no.	MTI		Serial no.
Measuring circuit 2				Pos./Tag no.
Probe type				Serial no.
Coax cable	Serial no.	MTI		Serial no.

Chart for operating settings

Menu	item	Meas. circuit	Description	Final inspection	Commissioning
1. Basic settings					
	1.1.		Language Deutsch/Français/English	English	
	1.2.1.		Time	Local time	Local time
	1.2.2.		Date	Local date	Local date
	1.3.1		Password	0000	
	1.4.1.		Lighting	on	
	1.4.2.		Lighting time in minutes	1	
	1.6.1.		Store the parameters	OK <input type="checkbox"/>	OK <input type="checkbox"/>
	1.6.2.		Load the parameters	press OK button >2s	
	1.6.3.		Initialize the device	Yes <input type="checkbox"/>	
	1.7.1.		Activation for the 2nd measuring circuit		
2. Device data					
	2.1.		Device type Software version	MLS V1.12	MLS V
	2.2.		Serial no. Testing date		
	2.3.		Number of measuring circuits / Battery type: CR2032		
	2.4.1.	MC1	Probe type		
	2.4.2.	MC1	Probe serial no.		
	2.4.1.	MC2	Probe type		
	2.4.2.	MC2	Probe serial no.		
3. Signal settings					
	3.1.1.	MC1	Entry of position/TAG no.		
	3.1.2.	MC1	Probe factor	1.000	
			Zero adjustment for tube/bar probe empty/clean		
	3.1.3./4.	MC1	Zero point importing on keystroke / manual entry	Imp	
	3.1.5./7.	MC1	Measuring span importing on keystroke / manual entry / adjustment	Imp	
	3.1.8.	MC1	Signal filter	s 00.1	
	3.1.1.	MC2	Entry of position/TAG no.		
	3.1.2.	MC2	Probe factor	1.000	
			Zero adjustment for tube/bar probe empty/clean		
	3.1.3./4.	MC2	Zero point importing on keystroke / manual entry	Imp	
	3.1.5./7.	MC2	Measuring span importing on keystroke / manual entry / adjustment	Imp	
	3.1.8.	MC2	Signal filter	s 00.1	
5. Measuring ranges					
	5.1.1.	MC/DO1	Measuring range unit		

	5.1.1.	MC/DO2	Measuring range unit		
6. Limit values					
	6.1.2.	MC1/DO1	Selection: stat / dyn		
	6.1.3.	MC1/DO1	Set limit value 1 / (max. limit value → dyn)	%	
	6.1.4.	MC1/DO1	Hysteresis (→ dyn)	Imp	
	6.1.5.	MC1/DO1	Time delay, off	mm.ss	00.00
	6.1.6.	MC1/DO1	Time delay, on	mm.ss	00.00
	6.1.7.	MC1/DO1	FSL / FSH position		FSL
	6.1.8.	MC1/DO1	min/max limit value display (→ dyn)		
	6.1.1.	MC1/DO2	Selection: Limit value / Fault message → MLS 1100 / 1101 / 1170 only		
	6.1.2.	MC2/DO2	Selection stat / dyn		
	6.1.3.	MC2/DO2	Set limit value 1 / (max. limit value → dyn)	%	
	6.1.4.	MC2/DO2	Hysteresis (→ dyn)	Imp	
	6.1.5.	MC2/DO2	Time delay, off	mm.ss	00.00
	6.1.6.	MC2/DO2	Time delay, on	mm.ss	00.00
	6.1.7.	MC2/DO2	FSL / FSH position		FSH
	6.1.8.	MC2/DO2	min/max limit value display (→ dyn)		
7. Test functions					
	7.1.3.	MC1/DO1	Limit value 1 simulation	OFF/ON	<input type="checkbox"/> i.O.
	7.1.4.	MC2/DO2	Limit value 2 simulation	OFF/ON	<input type="checkbox"/> i.O.
8. Fault messages					
	8.1.		Actual fault with time/date		
12. Calculation parameters					
	12.1.1.	MC1	Maximal drift storage in pulses	Imp	0100
	12.1.2.	MC1	Drift pulses per time unit	Imp	0
	12.1.3.	MC1	Drift time	s	0060
	12.1.1.	MC2	Maximal drift storage in pulses	Imp	0100
	12.1.2.	MC2	Drift pulses per time unit	Imp	0
	12.1.3.	MC2	Drift time	s	0060
	1.6.1.		Storing the parameters	OK <input type="checkbox"/>	OK <input type="checkbox"/>

Final inspection carried out by:

Commissioning carried out by:

Aquasant Messtechnik AG / Bubendorf /

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 or low Battery

The error message can have different origin.

1. RAM memory check has failed



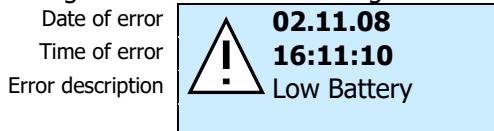
1. press **ok** button more than 2 seconds, the error is confirmed and the display changes back to last active menu point

2. Flash memory check has failed



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



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:

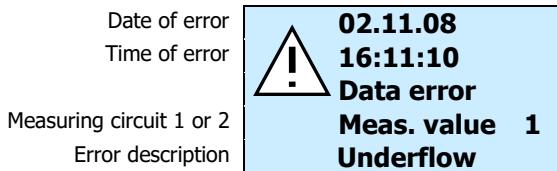
Send unit back for repair! 

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.



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

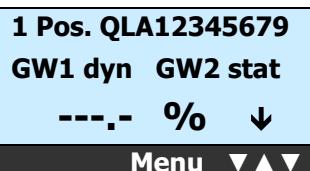
The mA output falls to the value programmed under menu point 8.3!

Description of 1st meas. circuit position

Description of 1st meas. value

**Non display of meas. value
Error display**

ok button-functions / active keys



Press **Ok** to change to menu

Limit value low alarm is reached

Arrow down ↓ signalizes : Meas. range underflow

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!

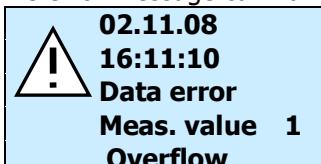
7.1.1.

Technical error; Measured value 1 overflow

The error message can have different origin.

Date of error
Time of error

Measuring circuit 1 or 2
Error description



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

Description of 1st meas. circuit position

Description of 1st meas. value

Non display of meas. value
Error display

ok button-functions / active keys

1 Pos. QLA12345679

GW1 dyn GW2 stat

----. - % ↑

Menu ▼▲▼

Press **Ok** to change to menu

Limit value high alarm is reached

Arrow up ↑ signalizes : Meas. range overflow

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

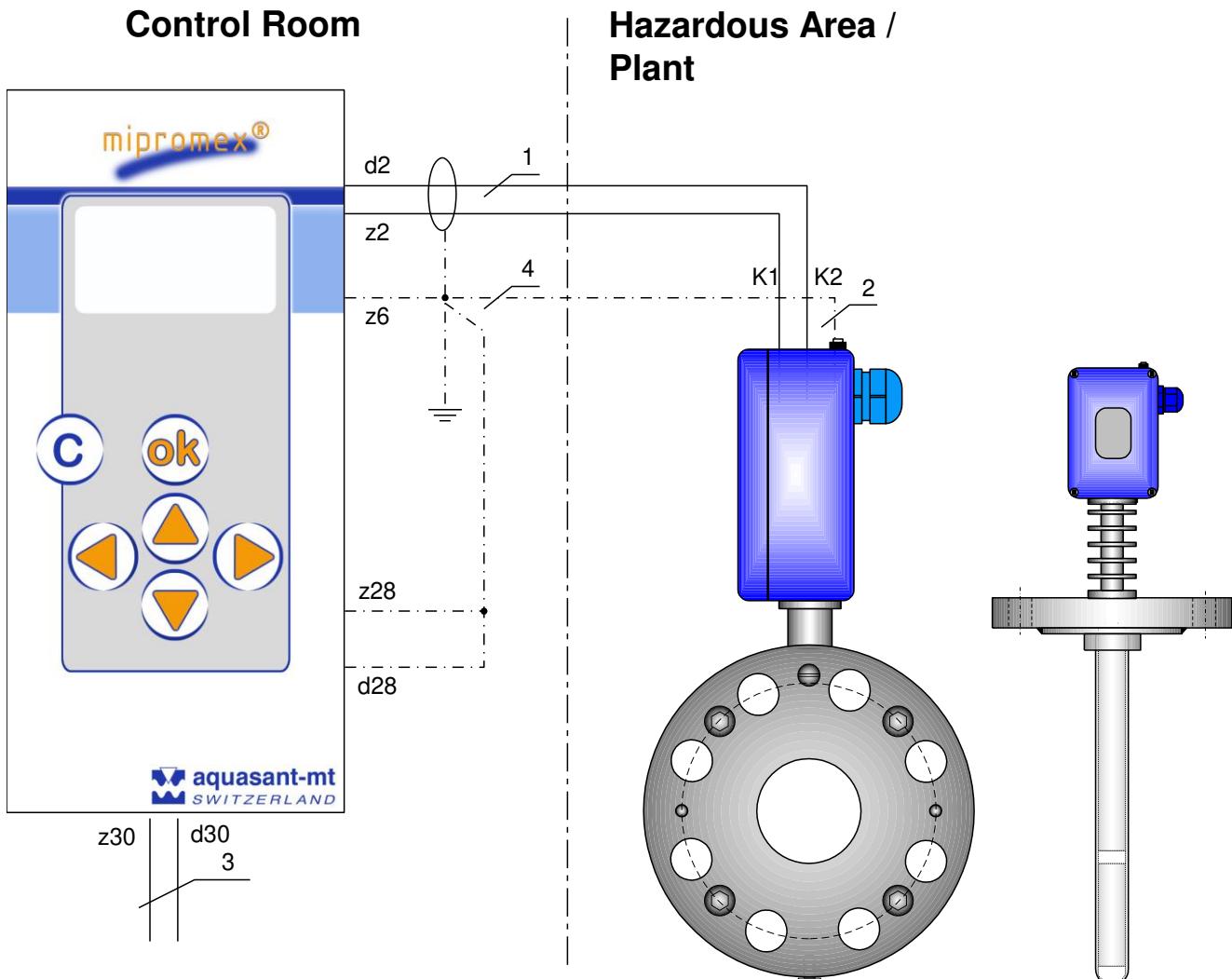
1. Restart the program after 5 seconds of mains interruption.

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



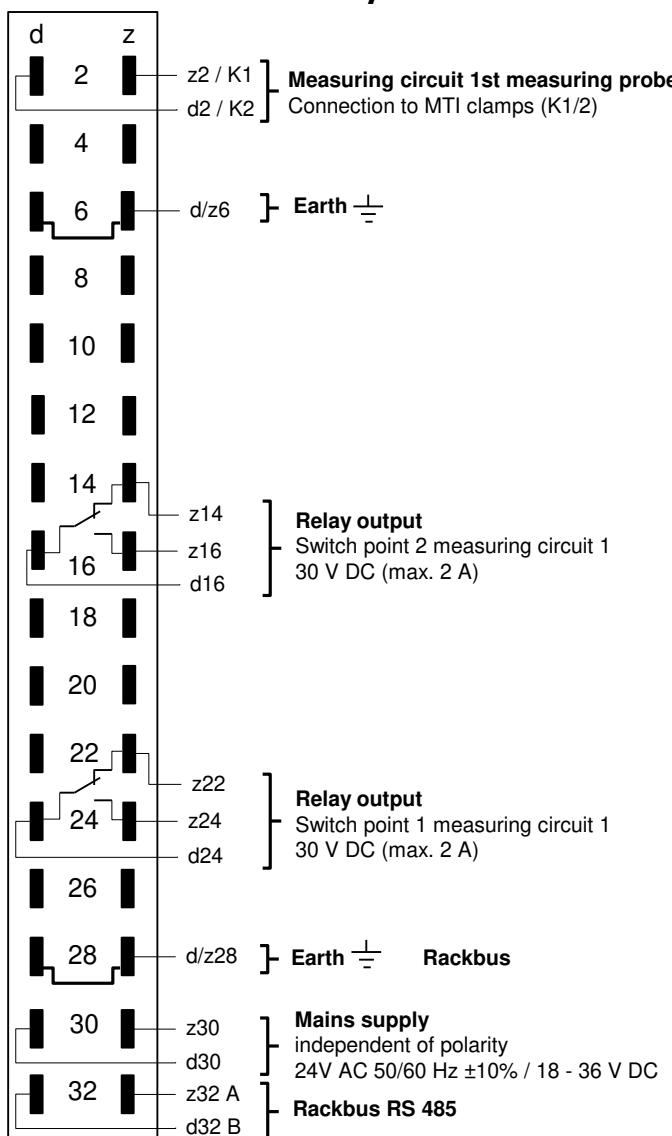
Pic. 4 Wiring diagram

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: MLS 1100

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

Pic. 5 FI 32 female multipoint connector to MLS 1100

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

Switch point 2 for measuring circuit 1 **FSH** (Fail Safe Low) **Hi-Alarm**

Relay 1 disabled (measured value < limit switch value)

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

Switch point 2 for measuring circuit 1 **FSL** (Fail Safe High) **Lo-Alarm**

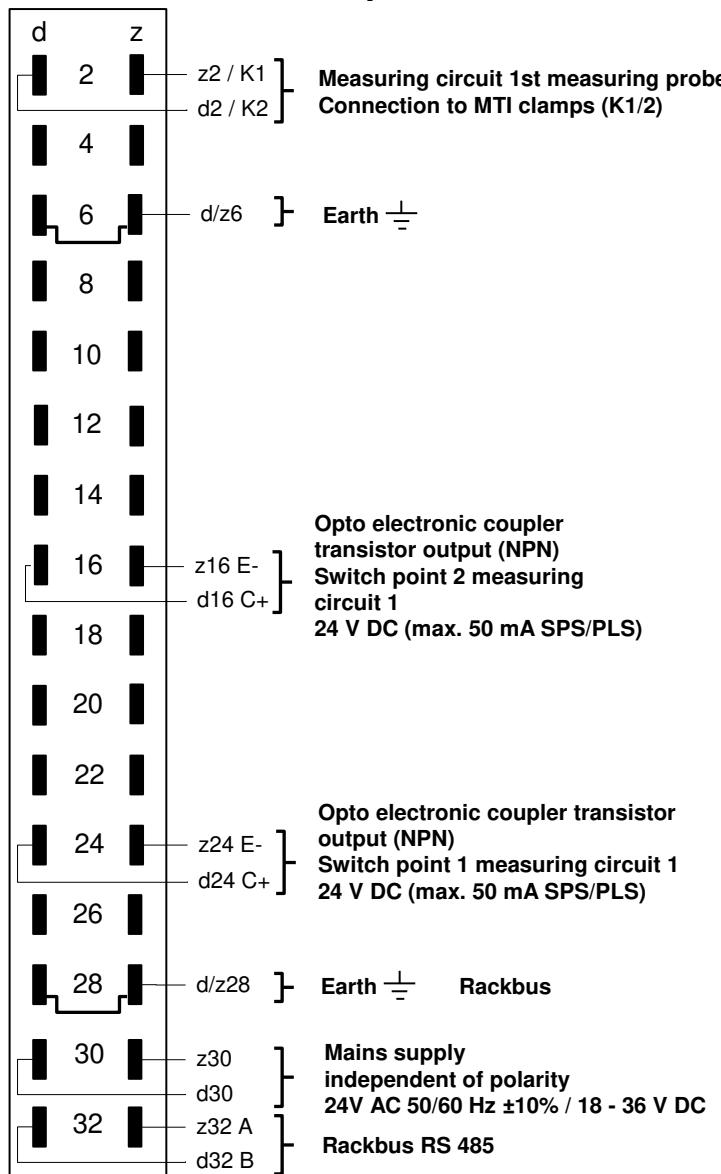
Relay 1 disabled (measured value > limit switch value)

Technical error level

Relay 1/2 disabled

7.3. Connections to female multipoint connector with 32 poles, type: MLS 1170

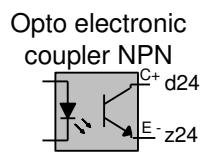
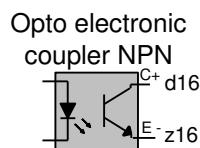
Microprocessor units with one measuring circuit input
Connections to female multipoint connector FI 32



ELECTRICAL DATA

Euro plug-in card pin assignment

24 V-Version



Pic. 6 FI 32 female multipoint connector to MLS 1170

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

Switch point 2 for measuring circuit 1 **FSH** (Fail Safe Low) **Hi-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**

Switch point 2 for measuring circuit 1 **FSL** (Fail Safe High) **Lo-Alarm**

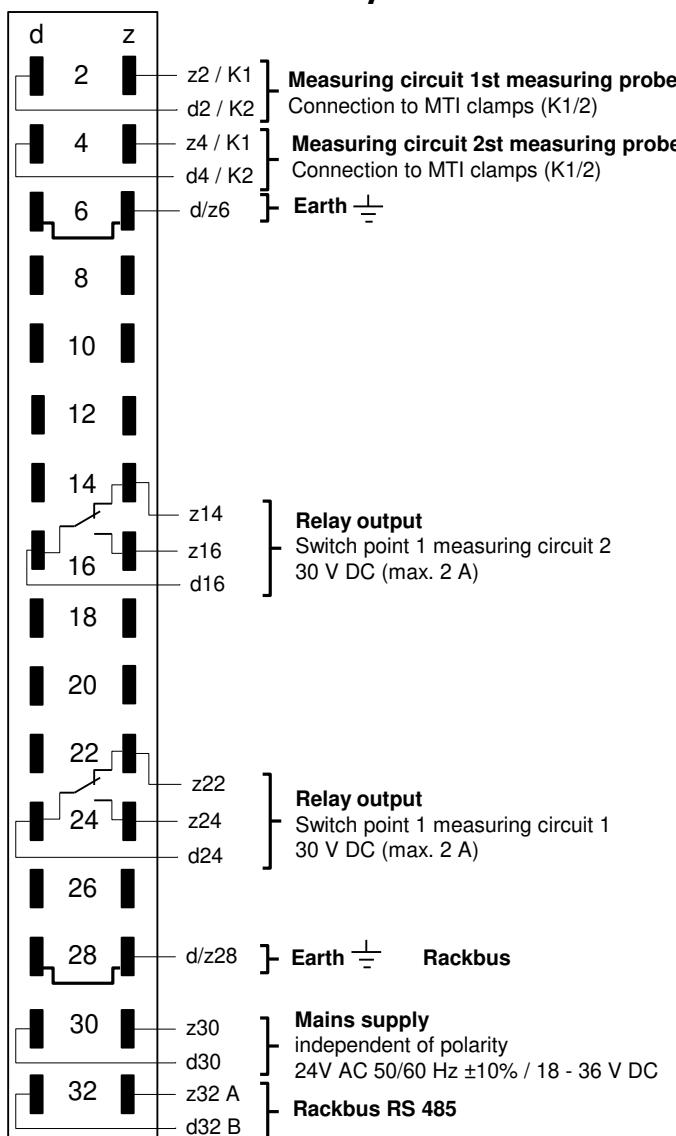
Opto-electronic coupler transistor output NPN 1 disabled (measured value > limit switch value)

Technical error level

Opto-electronic coupler transistor output NPN 1/2 disabled

7.4. Connections to female multipoint connector with 32 poles, type: MLS 1200

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



ELECTRICAL DATA

Euro plug-in card pin assignment

24 V-Version

Pic. 7 FI 32 female multipoint connector to MLS 1200

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

Switch point 1 for measuring circuit 2 **FSH** (Fail Safe High) **Hi-Alarm**

Relay 1 disabled (measured value < limit switch value)

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

Switch point 1 for measuring circuit 2 **FSL** (Fail Safe Low) **Lo-Alarm**

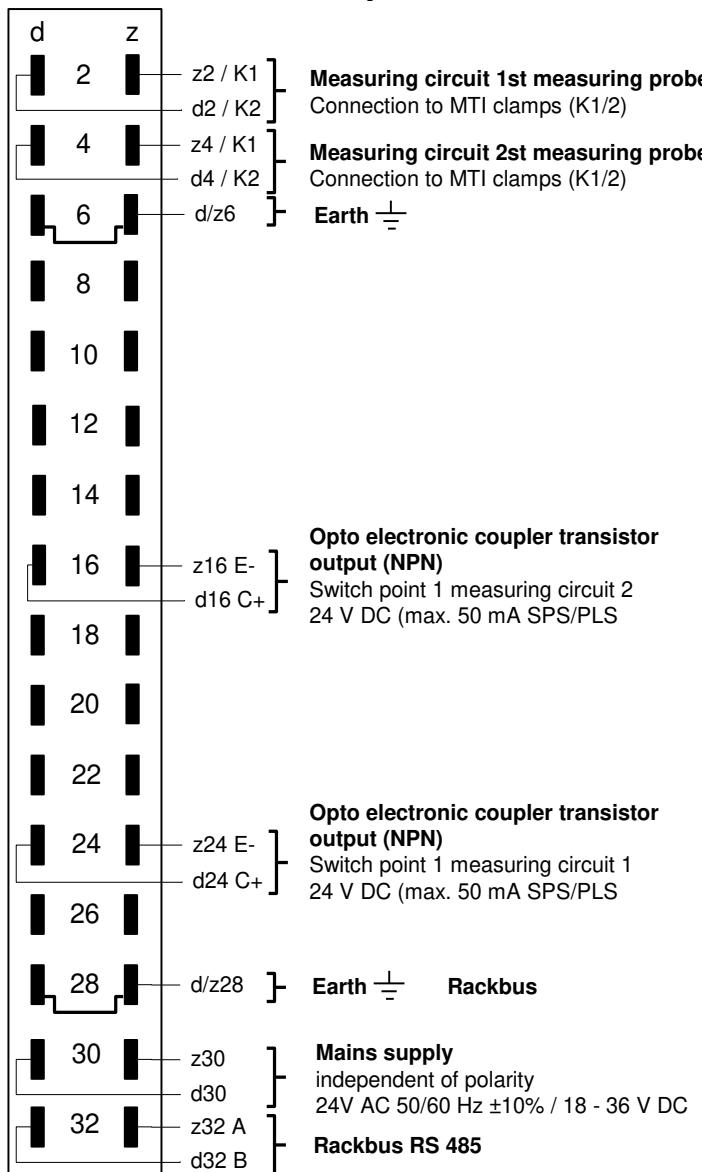
Relay 1 disabled (measured value > limit switch value)

Technical error level

Relay disabled

7.5. Connections to female multipoint connector with 32 poles, type: MLS 1270

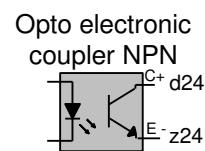
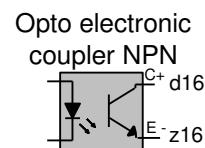
Microprocessor units with two measuring circuit inputs
Connections to female multipoint connector FI 32



ELECTRICAL DATA

Euro plug-in card pin assignment

24 V-Version



Pic. 8 FI 32 female multipoint connector to MLS 1270

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

Switch point 1 for measuring circuit 2 **FSH** (Fail Safe Low) **Hi-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**

Switch point 1 for measuring circuit 2 **FSL** (Fail Safe High) **Lo-Alarm**

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

Technical error level

Opto-electronic coupler transistor output NPN disabled

7.6. 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.

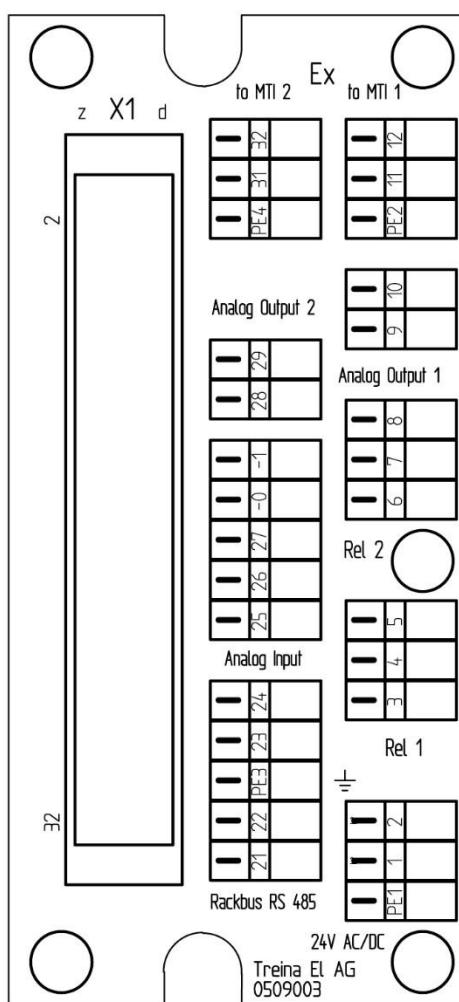
Color coding:

- 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 modul Euro 3 HE/12TE profundity 160 mm

Anschluss an: Microprocessor unit mipromex®

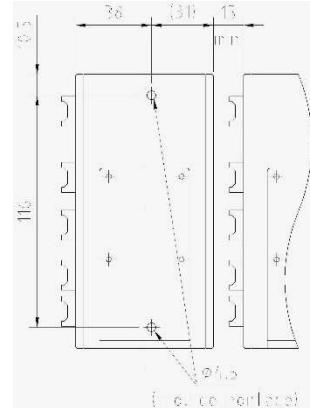
Artikel-Nr.: 02.03.18.011



PE1 Earthing		FI32: d/z6
1. Mains 24 V AC/DC 50/60 Hz (polarity independent)		FI32: z30
2. Mains 24 V AC/DC 50/60 Hz (polarity independent)		FI32: d30
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 -		FI32: d14
10. MC1 analog output 1 +		FI32: z12
11. MC1 MTI 1 K1		FI32: z2
12. MC1 MTI 1 K2		FI32: d2
21. Rackbus RS 485 A		FI32: z32
22. Rackbus RS 485 B		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

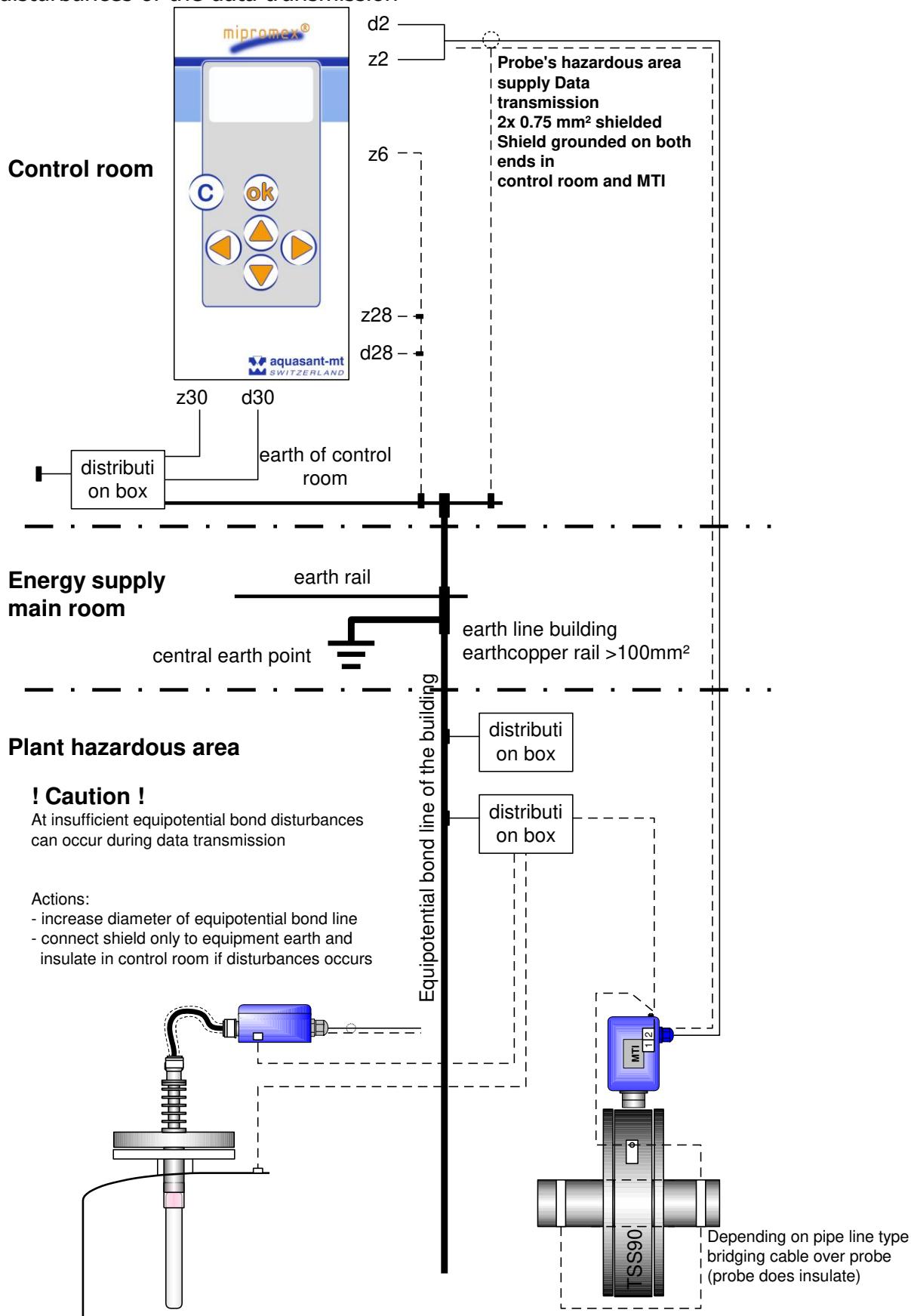


Pic. 9 Connection print to mipromex



7.7. Earthing of microprocessor units and probes

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



8. Technical Data

8.1. mipromex® Level Switch type: MLS 1100/1170

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

- Level Switch with intrinsically safe supply for one measuring electronic MTI xx. Transformation of a digital measuring signal into an limit value
- static or dynamic limit value transmitter
- programmable drift compensation
- menu driven, multi language unit
- hazardous area (Ex) supply for one measuring electronic MTI xx
- shielded 19" plug in module
- two open collector or Relays outputs

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 V DC/ AC 50/60 Hz / DC Range 20 – 39 V independent of polarity

Switch on current

Momentary (1ms) approx. 1A

Power input t

ca. 3.4 VA (I = 140 mA)

Fuse

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 ≤ 19.3 V; typ. 17 V
short circuit current max. I ≤ 75 mA; typ. 70 mA

Signal transmission

1 measuring circuit, pulse modulated supply signal

Signal line short circuit

Power input max. MLS 1100: 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 type 1170

1 potential free NPN transistor output
Limit switch min./max.
Security min. or max. selectable
2nd output as limit switch / malfunction message programmable

Rupturing tension NPN output type 1170

30 V DC

Continuous current NPN output type 1170

50 mA

Rupturing capacity NPN output type 1170

150 mW

Relaysoutput type 1100

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
2nd output as limit switch / malfunction message programmable

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

Test and certification

 II (2) G [Ex ia] IIC
II (2) D [Ex iaD]
II (2) GD

RL 94/9/EG SEV 09 ATEX 0132

Confidential test report No.: 08-IK-0396.01 with amendment 1
Unit also available without hazardous area protection

The **mipromex®** must be installed outside of the Ex-Zone
Ex-connection:

Measuring electronic MTI ... in protection housing or bar probe type S**; K**; F*

EMC-tested, STS 024 report NR. 990102WS corresponds to

EN 1127-1:2007
EN 61241-0:2006 EN 61241-11 :2006
EN 60079-0:2006 EN 60079-11 :2007



8.2. mipromex® Level Switch type: MLS 1200/1270

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

- Level Switch with intrinsically safe supply for two measuring electronics MTI xx. Transformation of the digital measuring signals into limit value
- static or dynamic limit value transmitter
- programmable drift compensation
- menu driven, multi language unit
- Ex supply for two measuring electronics MTI xx
- shielded 19" plug in module
- two open collector outputs

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 V DC/ AC 50/60 Hz / DC Range 20 – 39 V 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 ≤ 19.3 V; typ. 17 V

short circuit current max. I ≤ 75 mA; typ. 70 mA

Signal transmission

2 measuring circuits, pulse modulated supply signal

Signal line short circuit

power input max. MLS 1200/1270: 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

1 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

Relaysoutput

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

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

Test and certification

- | | |
|--|----------------------|
| | II (2) G [Ex ia] IIC |
| | II (2) D [Ex iaD] |
| | II (2) GD |

RL 94/9/EG SEV 09 ATEX 0132

Confidential test report No.: 08-IK-0396.01 with amendment 1
Unit also available without hazardous area protection

The **mipromex®** must be installed outside of the Ex-Zone
Ex-connection:

Measuring electronic MTI ... in protection housing or bar probe type S**; K**; F*

EMC-tested, STS 024 report NR. 990102WS corresponds to

EN 1127-1:2007

EN 61241-0:2006

EN 60079-0:2006

EN 61241-11 :2006

EN 60079-11 :2007



8.3. Measuring electronic MTI for measuring probes

Probes with separate or integrated measuring electronic MTI

HOTSPOTS

- MTI – measuring electronic in protection housing
- for bare-, strip- and pipe probes with and without measuring electronic in the connection head
- Measuring electronic slot
- Ex-version ATEX ExG / ExD

MTI structure:

- Aluminium gush, Inox or Polyester-protection housing IP 65
- Cover and screw are saved
- Viton cover joint
- screwed cable gland M16 x 1.5 or M20 x 1.5

Dimension:

Aluminium gush-housing: H x B x L = 57 x 80 x 125 mm
 Inox-housing: H x B x L = 85 x 82 x 142 mm
 Polyester-housing: H x B x L = 55 x 80 x 110 mm

Definition:

Under value -10/+0 pF // upper value -0/+10 pF

Temperature range:

-40 bis +60 °C ambient air temperature

Connection:

For all S*K ** bar- and TSS pipe probes with HF-connection

Article-N°.: 02.24.06.0000

Example: MTI in housing	MTI	50/2	A	Gv	L	-	2		K	H
--------------------------------	-----	------	---	----	---	---	---	--	---	---

Example: MTI slot	MTI	50/2	A	E	-	E	2		K	H
--------------------------	-----	------	---	---	---	---	---	--	---	---

Your version:	MTI									
----------------------	-----	--	--	--	--	--	--	--	--	--

MTI = measuring electronic slot MTI

Measuring range:

10	= 3000 Imp/10 pF	
15	= 2400 Imp/10 pF	
20	= 1600 Imp/10 pF	
50	= 650 Imp/10 pF	50
100	= 350 Imp/10 pF	
200	= 180 Imp/10 pF	
300	= 120 Imp/10 pF	
400	= 90 Imp/10 pF	
600	= 60 Imp/10 pF	
...	= Special range	

Base calibration range:

0	= calibration range in pF of measuring	
1...	= calibration range in pF of measuring	

Measuring technology:

A	= Analog measuring technics for interface	A
---	---	---

Form or housing version

E	= Slot	E
G	= Protection housing IP 65 blue powder coated angled	
Gd	= Protection housing IP 68 blue powder coated	
Gv	= Protection housing IP 68 stainless steel	Gv
Gk	= Protection housing IP 65 Polyester conductive	

Connection to the probe:

K	= UHF-connection	
L	= Lemo-connection	
S	= dual HF-connection SMA	

Slot-version:

E	= measuring electronic slot angled	E
R	= measuring electronic slot round (old)	
O	= measuring electronic slot round for ExD-head	
K	= measuring electronic slot angled for plastics-head	

Ex-version: SEV 09 ATEX 0133 X / CE 0036/049

0	= without protection for hazardous area CE	
2	= protection for hazardous area II 2G Ex ia IIC T6 / II 2D	2

Differential measuring:

2	= 2. Measuring input for compensation (Antistatic protection	
---	--	--

Trimmer:

K	= 20 pF Ceramic trimmer (vibrationsfest) (all MTI from 10 to 50)	K
---	--	---

Version:

H	= increased ESD (electrostatic) protection	H
---	--	---

Pic. 11 Measuring electronic

8.3.1. Technical Data MTI . . . / .

Construction/design type

Plug-in measuring electronic with stainless steel cover in protection housing, with coax connection

Installation

Protection housing with mounting holes, plug-in electronic insert, mounting with 2 screws

Function

Linear conversion of an impedance range into a digital measuring norm signal

Operation/display

One time only calibration of the coax cable and the (dry, clean, empty) probe. LED display for quick setting

Housing

Cast aluminum housing, powder coated, solvent resistant, cover and screws secured; IP 65; coax probe connector and cable gland M16, IP 65; blue color coded

Dimensions

Height x width x length 57 x 80 x 175 mm

Weight of electronic

140 g

Weight of housing

740 g incl. MTI and transmitter

Supply/connection hazardous area

Shielded 2 core cable 0.75 mm² to all TREINA microprocessor measuring and control units types VTI, LTI, FTI, QTI ... K/S and mipromex®; cable length up to (100m) or max. C = 120 nF / R = 30 Ohm line impedance.

Transmission signal

Pulse packages, superimposed to the power supply

Measuring circuit voltage/current

V ~ 11 V I ~ 13, 5 mA

Nominal data of supply voltage

U _N ≤ 18,9 V	I _N ≤ 49 mA
C _{i,max} 60 nF	L _{i,max} ≤ 0 mH
P ₀ ≤ 231 mW	

Ambient temperature

-20 . . . +60 °C

Storage temperature

-30 up to +80 °C, ideally +20 °C

Measurement range

10 / 20 / 50 / 100 / 200 / 300 corresponding to 0 to 3500 pulses, special ranges can be supplied, max. pulse range 3700 pulses

Resolution

Max. 0.003 pF/pulse

Standard measuring range for bar probes

Type STK .../100/200/300
55 pF, Type MTI 50/(0 - 16) basic calibration range (0 - 16)
depending on coax cable and probe length, is determined by manufacturer

Basic calibration range

MTI .../. 0 up to 16, 0 to 500 pF

Monitoring frequency

~ 500 kHz

Linearity

Deviation < 0,1 % (without probe)

Hysteresis

1 monitoring pulse

Influence of temperature 5 – 45 °C

Type MTI .../.D digital: < ± 10 measurement pulses

Type MTI .../.A analog: < ± 3 measurement pulses

Test and certification

	II 2 G	Ex ia IIC
	II 2 D	Ex iaD
	II 2 GD	

RL 94/9/EG SEV 09 ATEX 0133 X

confidential test report N° : 08-IK-0395-01

EN 1127-1:2007	EN 60079-26 :2007
EN 61241-0:2004	EN 61241-11 :2006
EN 60079-0:2006	EN 60079-11 :2007



Unit also available without (Ex-Zone) hazardous area protection

Only for connection to microprocessor unit .TI.... K/S and mipromex®

SEV 09 ATEX 0132 II (2)G [Ex ia] IIC
EMC-tested, STS 024 test report N° : 990102WS corresponds to directive 94/9/EG CENELEC Norms
EN 50081-2: 1993
+ EN 50082-2: 1995
+pr EN 50082-2: 1996

Feed line to probe

Version

- MTI fix mounted onto probe

- Coax cable with UHF plug on both ends

Mounting

Screw in UHF plugs and shrink heat-shrinkable sleeves

Length

0.3 m, 1 m, 2 m and 3 m

Code color brown

High temperature resistant up to 200 °C, Teflon coated, only suitable for permanent installations

Code color blue

Highly flexible, temperature resistant up to max. 80 °C
Deviation at cable move ±2 measuring pulse

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Aquasant Measuring Technique Ltd, Switzerland ii

Aquasant Messtechnik AG, Schweiz ii

Aquasant Mesure Technique S.A., Suisse ii

aquasant-mt = www.aquasant-mt.com ii, 18

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