Embracing Challenge

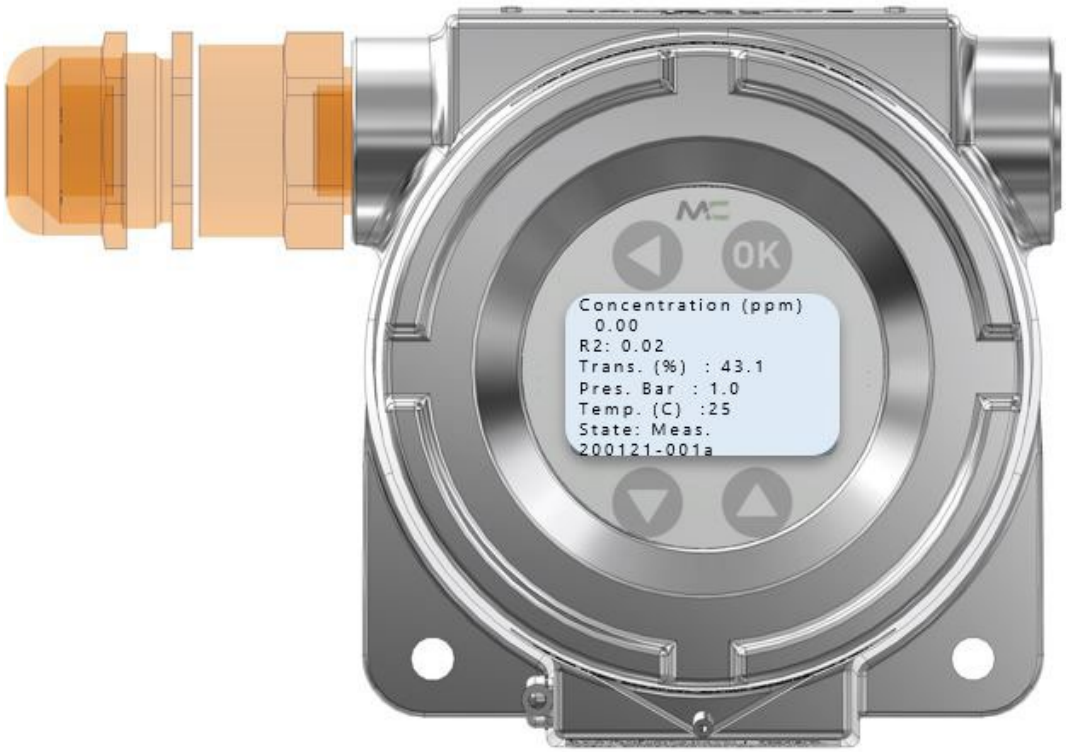
In-situ Laser Analyzer ILA1-X000-EX

User Interface ILA HMI DCU10 EX

Ⓔx II 2G Ex db IIC T6 Gb

Ⓔx II 2D Ex tb IIIC T85°C Db

Instruction Manual
Version 1.00.00
Software version starting at 1.0



Dear customer,

Thank you for buying our product. In this instruction manual you will find all necessary information about this M&C product. The information in the instruction manual is fast and easy to find, so you can start using your M&C product right after you have read the manual.

If you have any question regarding the product or the application, please don't hesitate to contact M&C or your M&C authorized distributor. You will find all the addresses in the appendix of this manual.

For additional information about our products and our company, please go to M&C's website http://www.mc-techgroup.com. There you will find the data sheets and manuals of our products in German and English.

With the release of this version all older manual versions will no longer be valid. The German instruction manual is the original instruction manual. In case of arbitration only the German wording shall be valid and binding.

Version: 1.00.00
Software version starting at 1.0

Table of Contents

Table of Figures

Table index

Manufacturer (Headquarters)

M&C TechGroup Germany GmbH ◆ Rehhecke 79 ◆ 40885 Ratingen ◆ Germany

Phone: +49 2102 935–0

E - mail: info@mc-techgroup.com

Website: www.mc-techgroup.com

1 General Information

The product described in this manual has been built and tested in our production facility.

All M&C products are packed to be shipped safely. To ensure the safe operation and to maintain the safe condition, all instructions and regulations stated in this manual need to be followed. This manual includes all information regarding proper transportation, storage, installation, operation and maintenance of this product by qualified personnel.

Follow all instructions and warnings closely.

Read this manual carefully before commissioning and operating the device. If you have any questions regarding the product or the application, please don't hesitate to contact M&C or your M&C authorized distributor.

2 Declaration of Conformity

CE - Certification

The product described in this operating manual complies with the following EU directives:

ATEX-Directive

The ATEX-version of the product described in this manual is produced in accordance with the EU directive for devices and protection systems for appropriate use in hazardous areas 2014/34/EU appendix II.

EMC-Instruction

The requirements of the EU directive 2014/30/EU "Electromagnetic compatibility" are met.

RoHS Directive

The requirements of the RoHS2 ('Restriction of Hazardous Substances 2') directive 2011/65/EU and its annexes are met.

Declaration of conformity

The EU Declaration of conformity can be directly requested from **M&C**.

3 Warranty

In case of a device failure, please contact immediately M&C or your M&C authorized distributor.

We have a warranty period of 12 months from the delivery date. The warranty covers only appropriately used products and does not cover the consumable parts. Please find the complete warranty conditions in our terms and conditions.

The warranty includes a free-of-charge repair in our production facility or the free replacement of the device. If you return a device to M&C, please be sure that it is properly packaged and shipped with protective packaging. The repaired or replaced device will be shipped free of delivery charges to the point of use.

4 Warning Signs and Definitions

Danger

The 'Danger' warning sign indicates that death, serious injury and/or significant material damage will be the consequence, if the appropriate precautions should not be taken.

Warning

The 'Warning' warning sign indicates that death, serious injury or damage to property may occur if the relevant precautionary measures are not observed.

Caution

The 'Caution' warning sign indicates that slight personal injury can occur if the appropriate safety precautions are not observed.

Caution

'Caution' indicates that damage to property can occur if the appropriate safety precautions are not observed.

Note

'Note' indicates important information relating to the product or highlights parts of the documentation for special attention.

Qualified personnel

'Qualified personnel' are experts who are familiar with the installation, commissioning, maintenance and operation of these types of products. The following knowledge is at least required for the work:

- Instruction in EX-protection
- Training in the electrotechnical field
- Detailed knowledge of the manual and the applicable safety regulations

'Ex' indicates important information about the product or about the corresponding parts in the instruction manual, relating to usage in potentially explosive atmospheres.

High voltages!

Protect yourself and others against damage which might be caused by high voltages.

Toxic!
Acute toxicity (oral, dermal, inhalation)! Toxic when in contact with skin, swallowed or inhaled.

Corrosive!
These substances destroy living tissue and equipment upon contact. Do not breathe vapors; avoid contact with skin and eyes.

Wear protective gloves!
Working with chemicals, sharp objects or extremely high temperatures requires wearing protective gloves.

Wear safety glasses!
Protect your eyes while working with chemicals or sharp objects. Wear safety glasses to avoid getting something in your eyes.

Wear protective clothes!
Working with chemicals, sharp objects or extremely high temperatures requires wearing protective clothes.

5 Safety Instructions for Using the HMI in Potentially Explosive Atmospheres

The Ex-version of the HMI is approved for installation in hazardous areas ATEX zones 1 and 21.
The explosion protection marking of the ILA HMI DCU10 EX is:

$T_{ambient}$ -40 °C to +65 °C: T6 ≤ 85 °C
Ex II 2G Ex db IIC T6 Gb
Ex II 2D Ex tb IIIC T85°C Db

The type examination certificate of the human machine interface (HMI) is issued by IBExU Institut für Sicherheitstechnik GmbH, an affiliate institute of the TU Bergakademie Freiberg. You will find a copy of the type examination certificate IBExU24ATEX1067 X, IECEx IBE 24.0027X available in the corresponding editions, in the appendix of this instruction manual.

Qualified personnel

The HMI may only be installed by qualified personnel. Qualified personnel must have at least the following knowledge:

- Instruction in EX-protection
- Training in the electrotechnical field
- Detailed knowledge of the operating instructions and the applicable safety regulations.

Warning

Do not install, maintain or repair the HMI while explosive atmosphere is present.

Do not open the terminal box and the HMI in hazardous areas.

An easily accessible main switch with appropriate labeling must be provided externally.

If the standard configuration is changed by using components or parts not specified and not authorized by M&C, the type examination certificate will no longer be valid. Repair and services with parts not specified by M&C will also lead to the cancellation of the EX certificate.

Note

If you have any questions or doubts about parts, components or repair and services, please don't hesitate to contact M&C or one of our official distributors.

5.1 Correct Operation

Follow these safety precautions during installation, commissioning and operation of the device:

- Read this instruction manual before commissioning and operating the product. Make sure to follow all warnings and safety instructions.
- Installation and commissioning of electrical devices must be carried out only by qualified skilled personnel in compliance with the current regulations. All electrical connection work must only be carried out by suitably qualified electricians (IEC 60079-14).
- Attention should be paid to all relevant national and international regulations and standards regarding the usage of the device in potentially explosive atmospheres.
- Before connecting the device, please make sure to compare the supply voltage with the specified voltage on the product label.
- Protection against contact to components carrying high voltages: Disconnect the power supply before opening the device for access. Make sure that all extern power supplies are disconnected.
- Operate the device only in the permitted temperature and pressure ranges. For details please refer to the technical data sheet or instruction manual.
- Installation, maintenance, inspections and any repairs of the devices must be carried out only by qualified skilled personnel in compliance with the current regulations.
- The clearance and creepage distances acc. to IEC 60079-7, table 1, must be maintained for the customer´s connection to the terminals in the Ex e terminal box. For the nominal 24 V DC (< 32 V DC), a min. creep distance of 1.8 mm must be observed when connecting the individual wires to the terminal blocks.
- Opening the enclosure of an Ex-version HMI is only permitted in an Ex-free environment.

Note

If you are unsure about the handling and commissioning of the system, contact M&C or the M&C representative for further information or assistance.

5.2 Wrong Operation

Make sure to install and operate the HMI for the intended use described in this instruction manual only.

Warning

The appliance must be installed and used in such a way that electrostatic charges caused by operation, maintenance or cleaning are not occurring.
In order to operate the HMI, it needs to be securely installed.
Do not mount or unmount the HMI with connected power cord.
Always wear personal protective equipment (PPE) in accordance with the risk assessment.

During the operation, the ambient temperature must not exceed the values stated in the specification.
In potentially explosive areas (zones) use only the HMI, which are in the corresponding equipment category, explosive group and temperature class. The Ex markings are clearly stated on the product label.

Do not use the HMI without Ex markings in potentially explosive atmospheres.

Do not rework or repair flameproof joints.

6 Application and Description

The ILA HMI DCU10 EX can be used to operate, configure or perform diagnostics on the ILA1-X000-EX In-situ Laser Analyzer.

It can be connected directly to the terminal box of the In-situ Laser Analyzer or to another location where the laser signals are available (e.g. control cabinet or terminal box). The power supply can be supplied via the analyzer cable or via a suitable separate power supply with a suitable supply line (usage of the second cable entry).

The device can be installed to a flat surface using appropriate mounting material. It is possible to get the HMI display installed in an 180° orientation in order to implement a different cable routing in the installation.

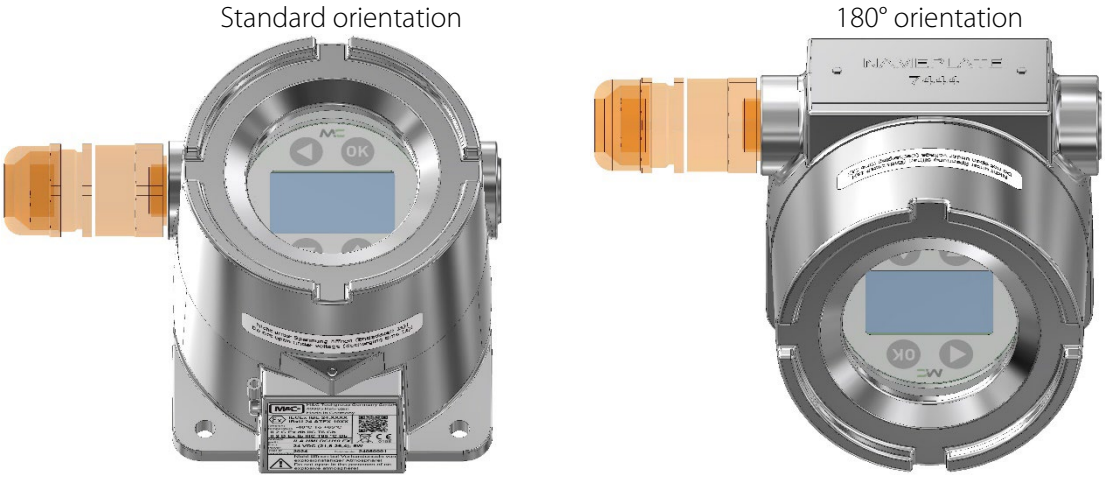


Figure 1 Display in 0° and 180°-orientation of the EX d housing

The HMI is equipped with a 128 x 64 dot LCD-display (equivalent to 8 x 21 characters). The HMI allows monitoring of pre-defined measurements and editing of essential parameters. The user can access and toggle between the menu positions using the buttons that are placed above and below the display by capacitive touch functionality.

① Cable gland type PXSS2K-REX or other cable gland approved for Ex d housing
② Blind plug

Figure 2 HMI device, display with standard process parameters

7 Technical Data

ILA HMI DCU10 EX	
Electrical Data	
Power supply	24 V DC ±10 % 6 W fused with max. 80 A (short-circuit current) Note: in case it is operated with the ILA1X it is already fused with max. 20 A (below 80 A)
Power consumption	< 6 VA
EMC immunity	In accordance with EN 61326-1
Ambient Conditions	
Ambient pressure	700 to 1200 hPa
Ambient humidity	RH < 99 %, non-condensing
Ambient temperature	-40 to +65 °C [-40 to +138.2 °F] for T6
Storage temperature	-40 to +70 °C [-40 to +158 °F]
Degree of protection	In accordance with IP65
Interfaces	
Analog and digital interfaces	Analog outputs: 4 x 4-20 mA, programmable, active Analog inputs: 2 x 4-20 mA, programmable, active/passive Relay outputs: 2 x relay output programmable: 60 V AC/60 V DC, max. 120 mA, NO (normally open) Relay inputs: 2 x relay input programmable: min. 16 V DC, max. 60 V DC, NO (normally open) Digital interfaces: CAN (connection to sensor head) CAN (connection to In-situ Laser Analyzer ILA1-X000-EX)
Dimensions	
Dimensions (W x H x L)	146.4 x 134.4 x 120.7 mm [≈ 5.8" x 5.3" x 4.8"]
Weight	Approx. 2.1 kg [≈ 4.6 lbs]
Ex safety	
Marking	$T_{ambient}$ -40 °C to +65 °C: T6 ≤ 85 °C Ⓔx II 2G Ex db IIC T6 Gb Ⓔx II 2D Ex tb IIIC T85°C Db
ATEX Directives	IEC 60079-0:2017 Ed. 7 IEC 60079-1:2014 Ed. 7 IEC 60079-31:Ed. 3 IEC 60079-14:2014 Ed. 6 EN 60079-0:2018/AC:2020 EN 60079-1:2014/AC:2018 EN 60079-14:2014/AC:2016 EN 60079-31:2014

7.1 Options

Options for ILA HMI DCU10 EX:	
SU EL10	Supply unit with 24 V DC including: 2 x cable glands (5-14 mm) for connecting laser head and HMI, 5 x cable glands (4-11 mm) for power supply, analog signals and status signals; interfaces: RJ45 for Modbus TCP/IP; operating elements: mains switch and maintenance switch; protection class: IP65

Options for ILA HMI DCU10 EX:	
SU EP10	Supply unit incl. 24 V DC power supply unit with 50 W for supply voltage 100-240 V AC including: 2 x cable glands (5-14 mm) for connecting laser head and HMI, 5 x cable glands (4-11 mm) for power supply, analog signals and status signals; interfaces: RJ45 for Modbus TCP/IP; operating elements: mains switch and maintenance switch; protection class: IP65
SU EP10 EX	EX supply unit incl. 24 V DC power supply unit with 50 W for supply voltage 100-240 V AC including: 2 x cable gland (5-14 mm) for connecting laser head and HMI, 5 x cable gland (4-11 mm) for power supply, analog signals and status signals; interfaces: RJ45 for Modbus TCP/IP; operating elements: mains switch and maintenance switch; protection class: IP65
ILA HMI, cable, 10 m, 12 x 2 x 0.25 mm	Pre-assembled ILA cable, 12 x 2 x 0.25 mm, length: 10 m, for connecting HMI and electrical supply unit

7.2 Technical Drawing

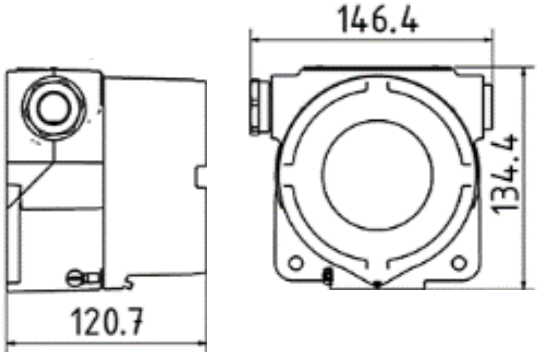


Figure 3 Technical drawing HMI

7.3 Product Label and Serial Number

The product label on the HMI shows the following information.

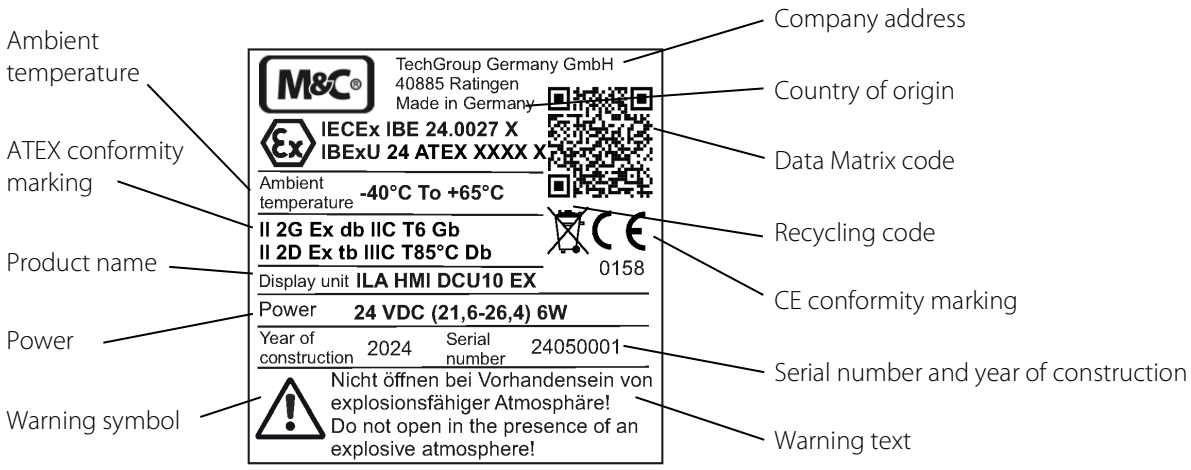


Figure 4 Product label for the HMI

The serial number of the HMI has the following structure:

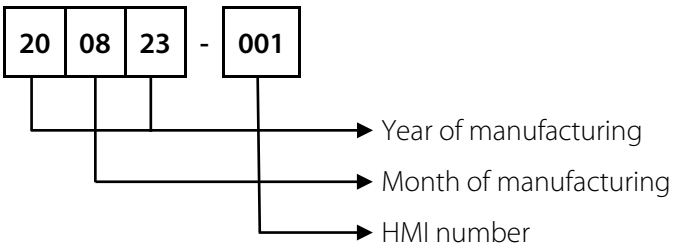


Figure 5 Serial number structure of the ILA HMI DCU10 EX

8 Operating Instructions

There are four buttons on the lid of the HMI. Each button has a function depending on the mode. There are two modes "Normal input" and "Editing".

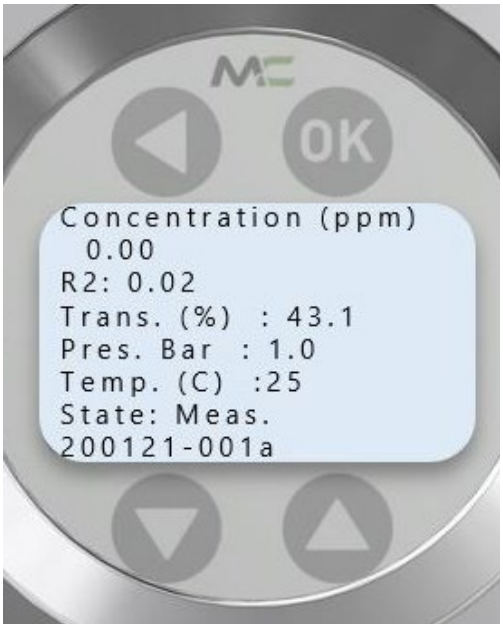


Figure 6 HMI buttons

HMI buttons		Normal input	Editing
	Up	Move up	Increment digit
	Down	Move down	Decrement digit
	Left/return	Return to last menu	Go left
OK	Enter	Select item	Confirm changes/value

Table 1 Description of the button functionality

8.1 Menu Navigation

The HMI has two different authorization levels (=> three levels in total). In the administrator menu (User), trained employees of the customer can access display measurements, parameters and IOs (Inputs/Outputs) using a password.

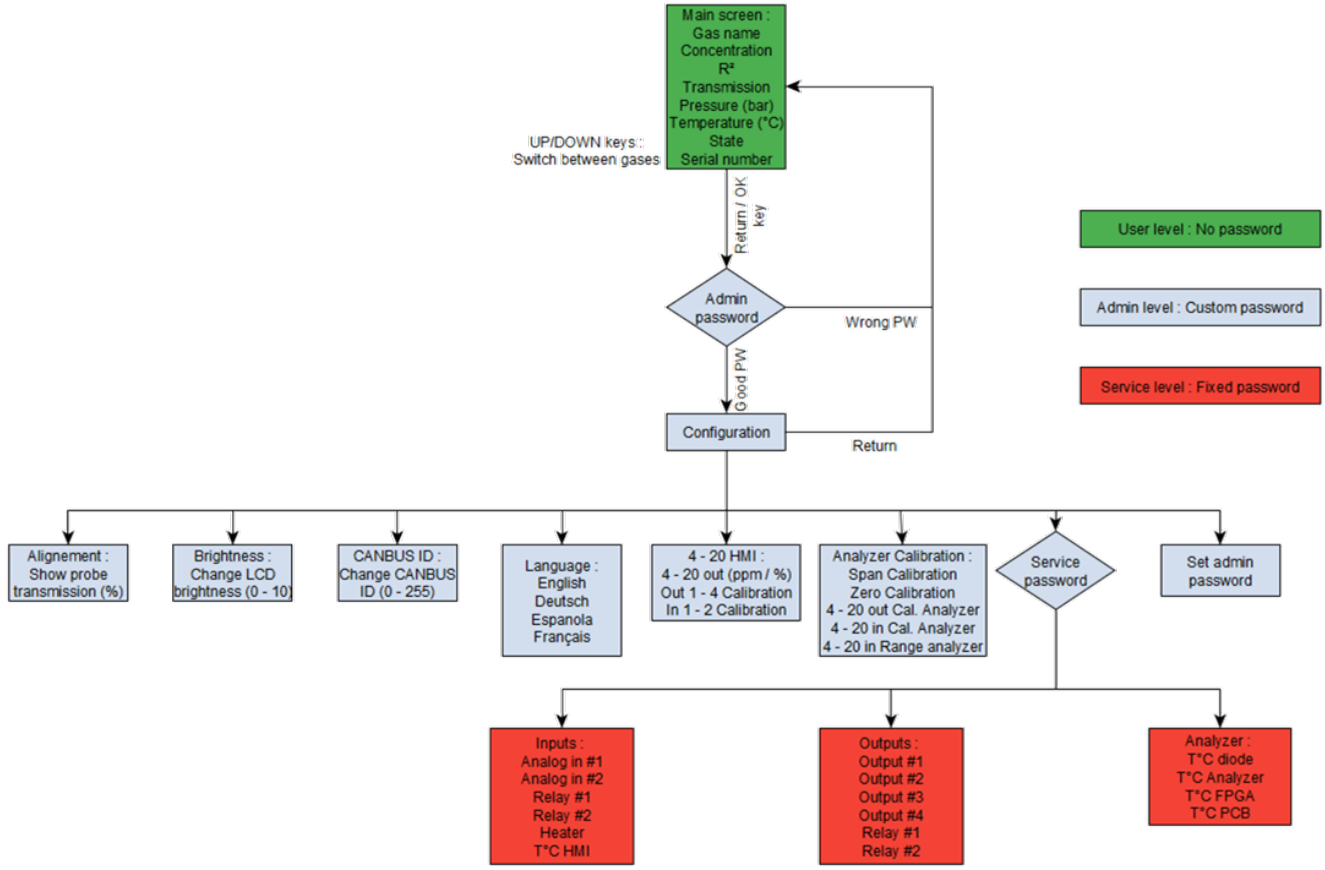


Figure 7 HMI access structure

The user has access to the menu from the HMI level. The menu structure is as following (English).

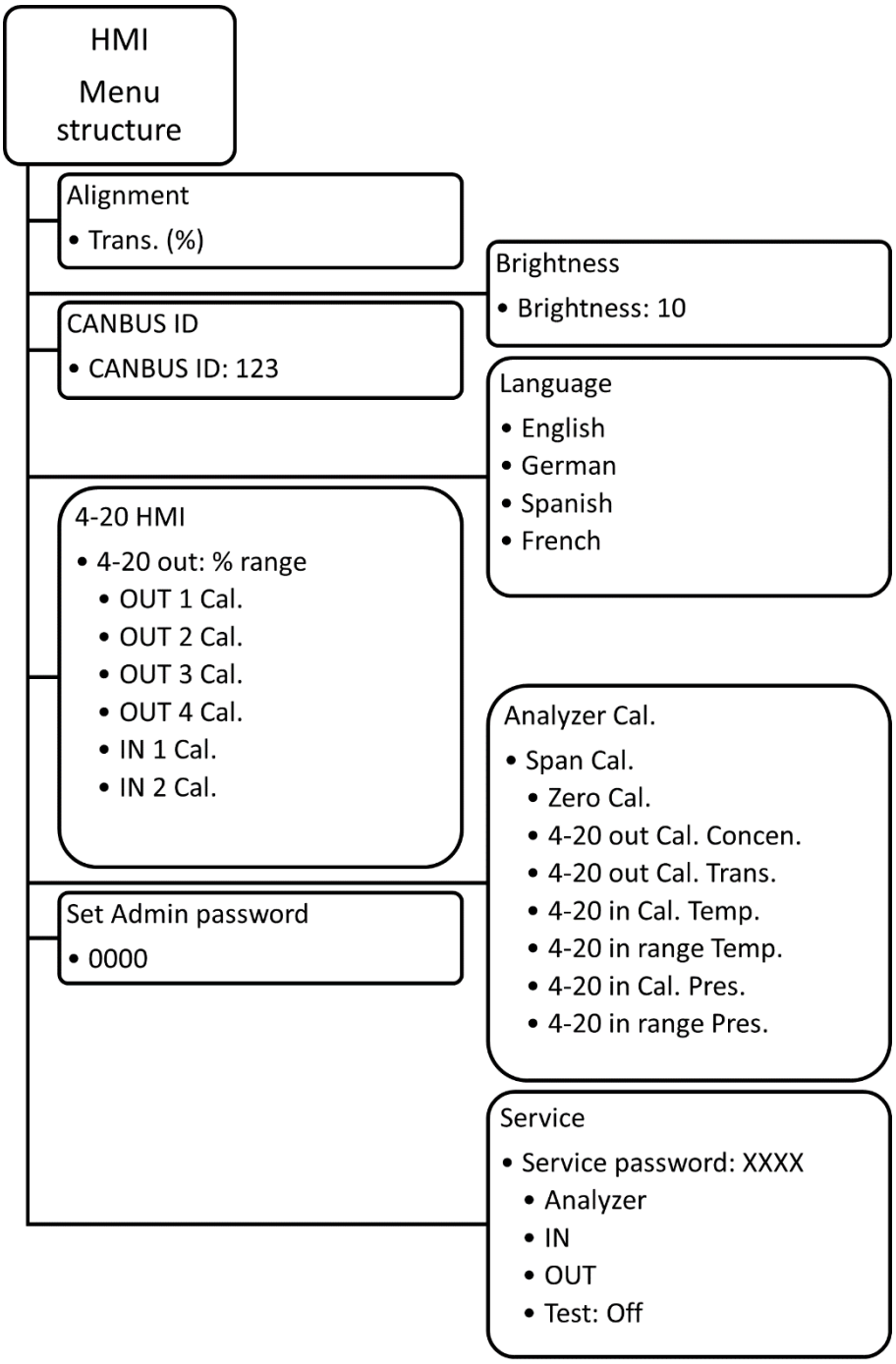


Figure 8 HMI menu structure - English

8.2 Service Menu Navigation

The service menu, which can be called up using a different password, is reserved for the manufacturer and has more extensive access and setting options, as well as diagnosis values (e.g. temperatures).

8.3 Admin Password

A password is required to change parameters, settings, offsets or the scale of AINx/AOUTx.

The following password has four digits: **XXXX.** The default "Admin" password is: **0000**. We recommend changing the default password as soon as possible.

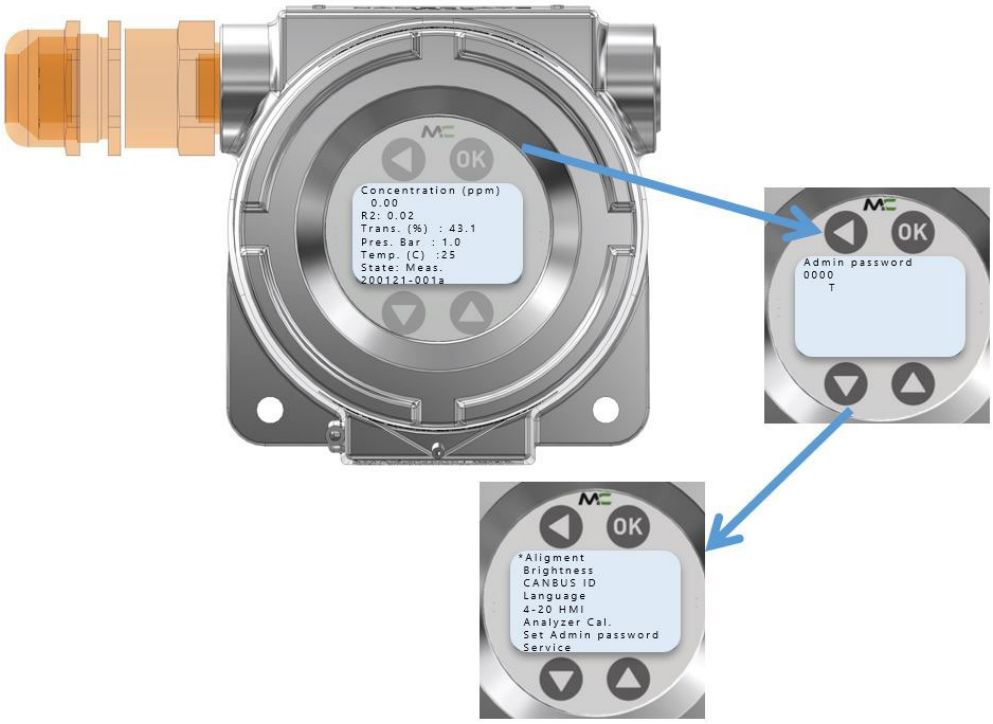


Figure 9 HMI admin password – enter XXXX to access admin menu

To enter the admin-password, press the or OK key. Type password XXXX by increasing or decreasing the specific digit and moving left to adapt the next digit. Finally press the OK key to confirm. After confirmation of the correct password, the Admin menu opens. In case the wrong password has been confirmed, the main menu is shown.

9 HMI Display: Measurements

The measurements in the standard view are displayed in the following figure.

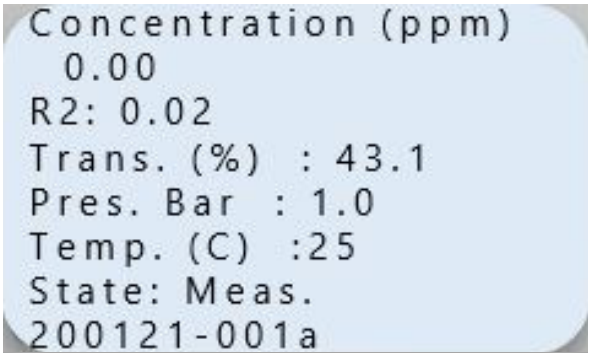


Figure 10 HMI display: measurements

Note

Items in this category are read-only.

MEASUREMENTS	
Display	**Description**
Conc. (ppm)	Displays the concentration value of the measured gas (in this case oxygen)
R2	The R^2 is a linear regression figure of merit. It shows the quality of the measurement (R^2) and should be > 0.9. It´s maximum is 1.0
Trans. (%)	Displays the transmission value in %
Pres. Bar	Displays the pressure value of the process gas
Temp. (C)	Displays the temperature value of the process gas
State	Shows the current status of the ILA1-X000-EX (measuring, warm-up, malfunction, maintenance etc.)
SN/IP/CAN Bus ID	The display switches between Serial number, IP and CAN Bus ID of the analyzer

Table 2 Description of HMI display – measurements

ALIGNMENT	
Display	**Description**
Alignment	The transmission is a measure of the amount of light that returns from the transmitter (usually a laser diode) through the sample gas to the receiver. Therefore, effects such as dust exposure, contamination with dirt or dust of the optical elements (e.g. wedge windows) or alignment deviations (alignment accuracy, deviation due to asymmetrical thermal expansion, etc.) become visible here. The transmission value should be at least 100 % after realignment and cleaning. Since the value is standardized in the factory setting, it can have a value greater than 100 % after realignment and cleaning.

Table 3 Description of HMI display – alignment

Note

The parameter transmission in "Alignment" is read-only.

9.1 Parameter Settings

Note

Items in this category can be both read and written.

Settings I		
Display	**Description**	**Allowed range of values**
Brightness	The desired brightness of the LCD display can be entered here.	0…10
CAN Bus-ID	The unique CAN bus ID must be entered here.	1…256
Language	The desired language can be selected here.	

Table 4 Description of settings I in the HMI

9.2 Analog Inputs and Outputs (IOs) Settings

Note

Sub-elements from "AIN x" or "AOUT x" can be edited.

Settings Outputs "4-20 HMI"		
Display	**Description**	**Allowed range of values**
OUT 1 Cal.	Calibration of Output 1	0.00….99.99
OUT 2 Cal.	Calibration of Output 2	0.00….99.99
OUT 3 Cal.	Calibration of Output 3	0.00….99.99
OUT 4 Cal.	Calibration of Output 4	0.00….99.99
IN 1 Cal.	Calibration of Input 1	0.00….99.99
IN 2 Cal.	Calibration of Input 2	0.00….99.99

Table 5 Description of the "4-20 HMI" panel in the HMI

Settings Inputs "Analyzer Cal."		
Display	**Description**	**Allowed range of values**
Span Cal.	Calibration of the span point of the gas-measuring signal. Span gas has to be provided at least 5 min before starting span calibration. Concentration of the span gas has to be provided in the same unit as the one displayed in the main screen (ppm or %).	0.0…999.9
Zero Cal.	Calibration of the zero point of the gas-measuring signal. Zero gas has to be provided at least 5 min before starting zero calibration.	
4-20 out Cal. Concen.	Calibration of the 4-20 mA output for the analyzer's gas-measuring signal. The value is to be given in mA.	0.0…99.99

Settings Inputs "Analyzer Cal."		
Display	**Description**	**Allowed range of values**
4-20 in Cal. Temp.	Calibration of the analyzer's temperature input signal. The value is to be given in Kelvin.	0…9999
4-20 in range Temp.	Scaling of the output signal for the analyzer's temperature input signal. The values are to be given in Kelvin. A minimum (4 mA) and a maximum (20 mA) are asked.	0…9999
4-20 in Cal. Pres.	Calibration of the analyzer's pressure input signal. The value is in bar. A minimum (4 mA) and a maximum (20 mA) are asked.	0.00…99.99
4-20 in range Pres.	Scaling of the output signal for the analyzer's pressure input signal. The values are to be given in bar.	0.00…99.99

Table 6 Description of the settings input "Analyzer Cal." in the HMI

Note

X [°C] = Y [Kelvin] + 273.15
X [°F] = ((Y [Kelvin] - 273.15) x 9) / 5 + 32

9.3 Status Settings

At the display entry for "State:", the current status of the measuring system is shown. If the measurement is running without any problems, it shows "Meas.". In the event of an error, "Error" is displayed.

When starting up, "Init." is displayed first. Then, the system is performing a self-check. After the self-check, the system goes into the "Idle" state. "Cal." is the output for the calibration mode.
The six possible signals are:

Name shown on the HMI	Status	Description
Init.	Initialisation	System is starting up
Check	Check	System is performing a self-check
Idle	Idle	System is ready for measuring
Meas.	Measuring	System is running without any warning or error
Error	Error	Critical error
Cal.	Calibrate	System is in calibration mode

Table 7 Description of the different status of the measuring device

10 Receiving the HMI

Please remove the ILA HMI DCU10 EX carefully from the packaging. Check the scope of the delivery specified on the delivery note. Please make sure that you have received all items stated on the delivery note. The scope of delivery contains the following items:

- ILA HMI DCU10 EX
- Instruction manual

Please check the unit for any transport damage after receipt and report any complaints to the transport company immediately.

Note

The cables to connect the HMI to the terminal box of the In-situ Laser Analyzer and to the power supply are not included in the scope of the delivery. See chapter 12.1 for more information.

11 Installation

Warning

Contact with live parts!
Probably dead or serious injury could occur if you come in contact with live parts during installation or de-installation of the HMI.
Make sure that the power supply is disconnected during installation and de-installation.
The housing may only be opened after a waiting period of 4 seconds after the power supply has been disconnected.

11.1 Information about ATEX Installation

Qualified personnel

The ILA HMI DCU10 EX can only be installed by qualified personnel.
Qualified personnel must have at least the following knowledge:

- Instruction in EX-protection
- Training in the electrotechnical field
- Detailed knowledge of the operating instructions and the applicable safety regulations.

Do not install, maintain, or repair the ILA HMI DCU10 EX while explosive atmosphere is present.
Do not open the terminal box of the In-situ Laser Analyzer and the HMI in hazardous areas.

Warning

An easily accessible main switch with appropriate labeling must be provided externally.
If the standard configuration is changed by using components or parts not specified and not authorized by M&C, the type examination certificate will no longer be valid. Repair and services with parts not specified by M&C will also lead to the cancellation of the ATEX certificate.

Installation in a zone not according to the ATEX certificate:
The ATEX certificate is not valid if the ILA HMI DCU10 EX is installed in a zone not stated in the ATEX certificate.
Follow the information in the ATEX certificate closely.

Caution

Electrostatic discharges can act as an ignition spark in hazardous areas. Do not use the device in areas where:
- mechanical friction and separation processes occur,
- spraying of electrons takes place (e.g. in the vicinity of electrostatic painting systems), or
- pneumatically conveyed dusts are present.

11.2 Ignition Paths at the Flameproof Joints of the Ex d housing

Do not rework or repair flameproof joints.

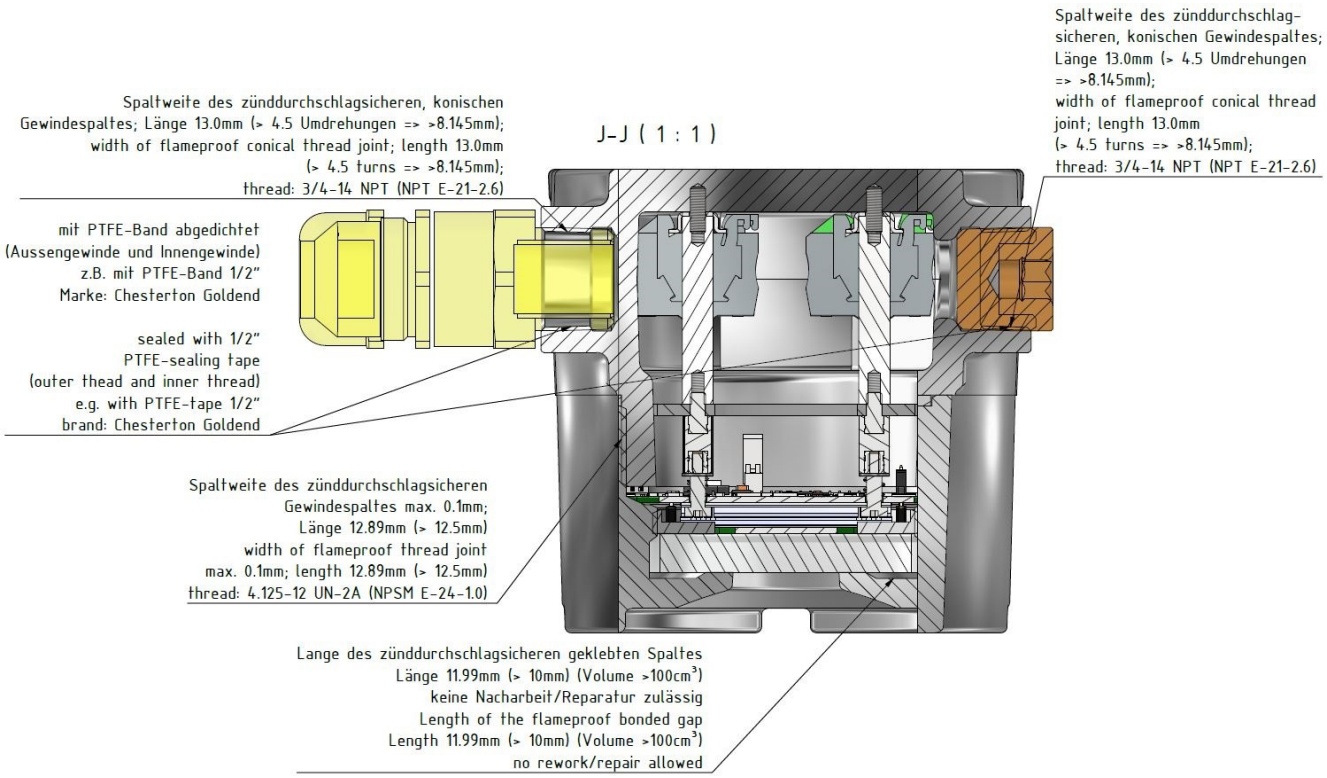


Figure 11 Flameproof joints at the HMI

12 Connecting the HMI to the In-situ Laser-Analyzer

Warning

The relevant IEC standards and national regulations in respect of machine safety codes and also the generally accepted state of the art is obligatory for the setting up and operating processes.

All electrical connection work must only be carried out by suitably qualified electricians (IEC 60079-14).

Check all electrical connections. Only connect the device to the power supply when all connections are correctly connected.

The In-situ Laser-Analyzer has a terminal box to connect to the terminals inside the HMI housing.
The housing of the terminal box of the ILA1-X000-EX In-situ Laser-Analyzer is certified as an Ex e terminal box. This terminal box is equipped with 2 x M 16 cable glands with seal (O-ring) (for cable Ø 4 to Ø 11 mm) and 1 x M 20 cable gland with seal (O-ring) (for cable Ø 5 to Ø 14 mm). The cable glands at the terminal box have an ingress protection (IP) rating higher than IP54 for explosive gas atmospheres.

The housing of the HMI with the electrical terminals inside, is certified as an Ex d housing. The cable gland of the HMI housing must have an IP6X for explosive dust atmospheres. Therefore the cable gland of the HMI housing must be sealed by epoxy to achieve an IP6X and tightness better than EN60079-14 appendix E / IEC 60079-14 appendix E.

12.1 Electrical Cables for Connecting the HMI to the In-situ Laser-Analyzer

Use the following cables to connect the HMI to the In-situ Laser-Analyzer:

	LiYCY (TP)-12 x 2 x 0.25 **BK** (Ø a = 11.3) for transferring all signals from the HMI to a cabinet (incl. power supply) Minimum bending radius: fixed installation: 6 x outer diameter Temperature range: fixed installation: - 40 °C to +80 °C

12.1.1 Alternative Cable Choice

The "LiYCY (TP) 12x2x0.25 **BK**" cable is hardly available on the market. There is an alternative cable available, which does not comply with the IEC 60079-14 regarding UV protection. To use this cable, it must be fully protected from any UV exposure. The "LiYCY (TP) 12x2x0.25" cable can be used only if these requirements are fulfilled:

- The cable must be routed in a suitable cable duct or must be covered with suitable shrink tubing and optionally covered with a suitable braided hose
- Suitable shrink tubing must be used to cover the cable entry on the terminal box of the ILA1-X000-EX In-situ Laser-Analyzer and on the HMI.
- In addition, pay attention to the conditions specified in IEC 60079-14.

Contact M&C for more information on cable alternatives.

12.2 Cable Gland, Ex d Certified with Epoxy for Longitudinal Tightness

The housing of the HMI with the electrical terminals inside, is certified as an Ex d housing. The cable gland of the HMI housing must be sealed by epoxy to achieve an IP6X for explosive dust atmospheres and must prevent gas or vapor from migrating through the gaps between the individual wires of the connecting cable (non-longitudinally sealed cable).
Only cable glands certified to EN60079-1/IEC60079-1 fulfilling the tightness according EN60079-14 appendix E/ IEC60079-14 appendix E for non-longitudinally sealed cable may be used. For longitudinally sealed cable, tested according EN60079-14 cable glands certified to EN60079-1 (db) are sufficient.

A maximum of one reducer certified for use in hazardous areas may be used with any single cable entry on the EX d housing. All conduit sealing fittings must be certified as flameproof “db” or “Db”, dust ignition protection “tb” and have a minimum IP66 rating equal to the marking on the HMI housing.

All unused device openings must be fitted with a certified blind plug rated equivalent or greater to the marking on the HMI housing. Possibly used plastic thread protection plugs (shipping plugs) shipped with the unit must be replaced during installation.

Example cable glands are:

PXSS2K-REX from CMP Products:

- Size 25, 3/4" NPT, part No. 25PXSS2KREX1RA532, for an outside overall cable diameter of 11.1 to 20 mm
- Only in combination with a reducer type 737 (3/4" NPT to M 20): size 20, M 20, part No. 20PXSS2KREX1EX5, for an outside overall cable diameter of 6.5 to 14 mm.

Contact M&C for more information on suitable cable glands.

12.2.1 Installation Information for Type PXSS2K-REX

Note

The PXSS2K-REX cable gland is suitable for fixed installations only. Make sure that the cable is securely fastened in the cable gland so that it cannot be pulled out or twisted.

The PXSS2K-REX cable gland is certified for explosive dust atmospheres. The cable gland must be sealed by an epoxy to achieve an IP6X and tightness better than EN60079-14 appendix E / IEC 60079-14 appendix E.

Usually the PXSS2K-REX cable gland is pre-assembled and part of the delivery.

Warning

Not pre-assembled PXSS2K-REX cable gland:

Read and follow closely the instructions in the original manufacturer manual to assembly the PXSS2K-REX cable gland. The original manufacturer manual is supplied with the PXSS2K-REX cable gland.

Note

Make sure that the wires are long enough to connect to the terminals inside the HMI housing.

The braided shield of the cable must be unraveled and pulled to a single core. Use suitable heat shrink tubing for the braiding except the last 10 mm, but leave 9 mm space between the outer sheat of the cable and where the heat shrink tubing starts to allow the epoxy resin to penetrate into the mesh of the braiding.

12.3 Connecting the Terminals Inside the HMI

Warning

Do not install, maintain or repair the ILA HMI DCU10 EX while explosive atmosphere is present.
Do not open the terminal box of the In-situ Laser Analyzer and the HMI housing in hazardous areas.

If the standard configuration is changed by using components or parts that are not specified and not approved by M&C, the type examination certificate loses its validity. Repairs and services with parts that are not specified by M&C will also invalidate the EX certificate.

The terminals for connecting the HMI to the power supply, the inner ground and the terminal box of the In-situ Laser-Analyzer are located inside the HMI. All wiring necessary for connecting needs to be ordered separately.

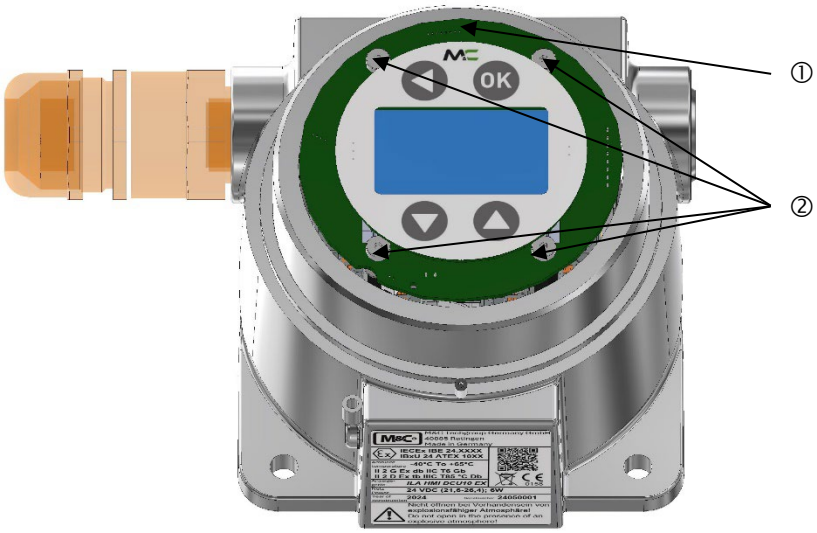
Required tools and accessories for opening the HMI housing and connecting the wires:

- wire stripping tool
- Insulated ferrules for stranded copper wire with a cross section of 0.25 mm^2, ferrule pin length 8 mm
- Crimp-on ring terminal with a cross section of 4 mm^2 M5 or N10-24 UNC
- shrink tubing for shielding of the cable
- crimp tool for insulated ferrules
- crimping pliers for ring terminals
- hex key (size 1.5) for the set screw securing the lid of the housing

- hex key (size 2) to unscrew fitting screws
- slotted screwdriver (size 0.4 x 2.5 mm) to open the terminals
- slotted screwdriver (size 1.2 x 8 mm) for connecting to ground

To open the HMI housing follow these steps:

1. Use a hex key (size 1.5) to release the set screw on the front of the HMI housing securing the lid. There is no need to remove the set screw.
2. Unscrew the lid counterclockwise and remove it from the HMI housing. Inside the HMI housing there is the display with the circuit board. The circuit board is connected to the HMI housing by four fitting screws.



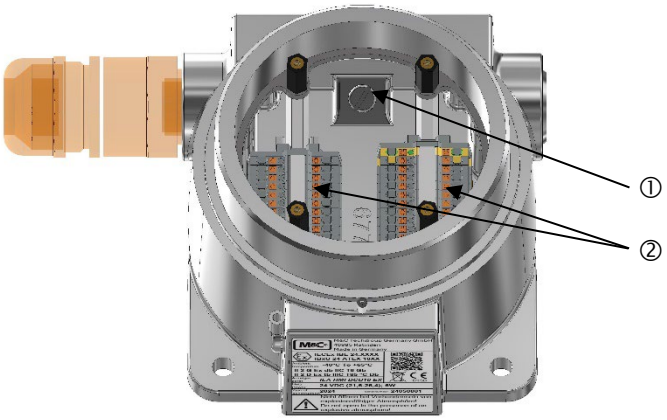
① Circuit board with display
② Fixing screws to hold the circuit board (tightening torque: 0.65 N m)

Figure 12 Circuit board and display inside HMI housing

Note

The circuit board with the display can be rotated by 180°.
Note the orientation of your display. Insert the display in the same position in which you removed it.

3. Unscrew the four fitting screws by using a hex key (size 2). To refasten the fitting screws, you need a tightening torque of 0.65 N m. Remove the fitting screws and set them aside. The circuit board is wired to the electrical terminals. Flip the circuit board with the display upwards or sidewards. Inside the HMI housing there are the electrical terminals.



① Connector for connecting to ground (to connect two ring terminals)
② Terminals for electrical connections: MTP1.5/S; MTP1.5/S-PE

Figure 13 Connections inside the HMI housing (circuit board not shown)

Prepare and connect the wires:

1. Use a wire stripping tool to strip the insulation of the wires to a length of 8 mm.
2. Slide an insulated ferrule over each stripped wire and use the crimp tool to fasten it. The test requirements according to DIN 46228 Part 4 need to be met.
3. Twist the corresponding pairs again (1&2; 3&4; 5&6 etc.)
4. See the following table for PIN assignments.
   Push the slotted screwdriver (size 0.4 x 2.5 mm) down on the integrated actuating push button to open the terminals. Insert the wires as far as possible into the connection opening of the terminal block.

Connect the wires to the terminals according to the following table (see also chapter 17.1 Analyzer/HMI connection):

PIN	Colour	Function
1	white	4-20mA OUT 4 I-
2	brown	4-20mA OUT 4 I+
3	green	4-20mA OUT 3 I-
4	yellow	4-20mA OUT 3 I+
5	grey	4-20mA OUT 2 I-
6	pink	4-20mA OUT 2 I+
7	blue	4-20mA OUT 1 I-
8	red	4-20mA OUT 1 I+
9	black	4-20mA IN 2 Meas.
10	violet	4-20mA IN 2 +15V/GND
11	grey-pink	4-20mA IN 1 Meas.
12	red-blue	4-20mA IN 1 +15V/GND
13	white-green	Relay 1 IN V-
14	brown-green	Relay 1 IN V+
15	white-yellow	Relay 2 IN V-
16	yellow-brown	Relay 2 IN V+
17	white-grey	Relay 1 OUT V+
18	grey-brown	Relay 1 OUT V-
19	white-pink	Relay 2 OUT V+

PIN	Colour	Function
20	pink-brown	Relay 2 OUT V-
21	white-blue	+24V
22	brown-blue	Ground power supply
23	white-red	CANH
24	brown-red	CANL

Table 8 Electrical terminals inside the HMI housing

Connect the shielding of the cable to ground (see Figure 13):
The ground connector connects two ring terminals to ground. The first ring terminal is already attached.

1. The cross section of the ground connection wire is AWG 12 (4 mm^2).
2. Slide an AWG12 crimp-on ring terminal M5 or N10-24 UNC over the single core and use the crimping pliers for ring terminals to fasten it. The test requirements according to DIN 46228 Part 4 need to be met.
3. Use a slotted screwdriver (size 1.2 x 8 mm) to loosen the screw for connecting to ground. This loosens the first ring terminal.
4. Insert the first ring terminal and the new ring terminal.
5. Use a slotted screwdriver (size 1.2 x 8 mm) to fasten the screw for connecting to ground (4.5 Nm).

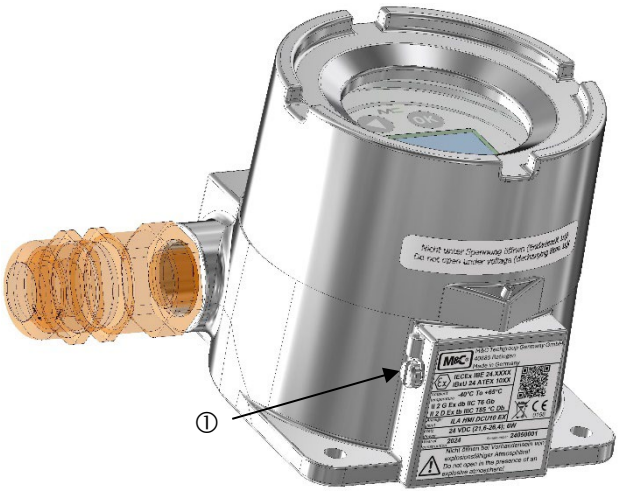
The shield of the cable has to be connected on both sides of the cable (EMC requirement).

Close the HMI housing:

1. Flip the circuit board with the display back onto the electrical terminals. Use a hex key (size 2) to fasten the four fitting screws. To fasten the fitting screws, you need a tightening torque of 0.65 N m.
2. Screw the lid back on to the HMI housing (clockwise).
3. Use a hex key (size 1.5) to fasten the set screw on the front of the HMI housing securing the lid.

12.4 Connecting the Potential Equalization to the HMI Housing

Protective and potential equalization wire connection of the HMI must be earthed in accordance with the requirements of IEC 60079 ff., IEC 61439 ff. and IEC 60364-5-54.
The potential equalization connector is located on the side of the HMI housing. The connector is a crimp-on ring terminal with a lock washer.



① Connector for potential equalization with crimp-on ring terminal and lock washer

Figure 14 Connector for potential equalization

The following tools are required:

- slotted torque screw driver
- crimping pliers for ring terminals

To connect the earth wire follow these steps:

1. Loosen the screw holding the crimp-on ring and the lock washer.
2. The cross-section of the earth wire must have a cross-section of at least 4 mm^2. Fit the earth wire into the crimp-on ring terminal and use crimping pliers for ring terminals to fasten it.
3. Screw the crimp-on ring with the wire attached and the lock washer back onto the HMI housing. The torque of the screw (N10-24 UNC – length 0.25") is 4.5 N m.

13 Starting Up the HMI

The start-up procedure takes about 3 minutes. When starting up, "initialization" is displayed first. Then, the system performs a self-check. After this, the system goes into the "Idle" state. When the system is set to automatically measuring, it is starting the measurement directly after it is in idle state.

When the system has an error or warning, the screensaver will be disabled.
The word "Measurement" displayed at a certain interval indicates a proper operation. In this case the system is running without any warning or error.

14 Decommissioning

No special measures are to be taken for decommissioning the HMI.

15 Maintenance and Repair

Caution

Electrostatic discharges can act as an ignition spark in hazardous areas. Avoid electrostatic charging of the housing surface due to friction. Do not clean the device with a dry cloth.

Rework or repair of the flameproof joints is not allowed.

The intervals between servicing are dependent on the process and system conditions in your facility. The facility QA/QC plan should address the frequency for maintenance and should be updated based on your operations.

Warning

Maintenance work on equipment for use in potentially explosive areas needs to comply with the corresponding national standards regarding 'regulations of electrical systems in potentially explosive areas'. It also needs to follow all safety notes and descriptions stated in this manual.

Disconnect power supply before any assembly, maintenance or disassembly.

In case the HMI is defective, please send the device to M&C TechGroup for repair.

15.1 Cleaning

The **HMI** should be checked in suitable time intervals. Dust layers of more than 5 mm [approx. 0.2"] must be removed immediately.

Warning

To avoid static charges, always clean with a damp cloth.

16 Proper Disposal of the Device

At the end of the life cycle of our products, it is important to take care of the appropriate disposal of obsolete electrical and non-electrical devices. To help protect our environment, please follow the rules and regulations of your country regarding recycling and waste management.

17 Appendix

17.1 Analyzer/HMI connection

Pin	Electrical connection: In-situ Laser Analyzer terminal box to HMI terminals inside the housing	Description
1	Ground power supply	
2	+24 V	Power supply 24 V ±10 %; 10 W
11	CANH	CAN Bus Communication
12	CANL	

Table 9 Electrical terminals to connect to the HMI

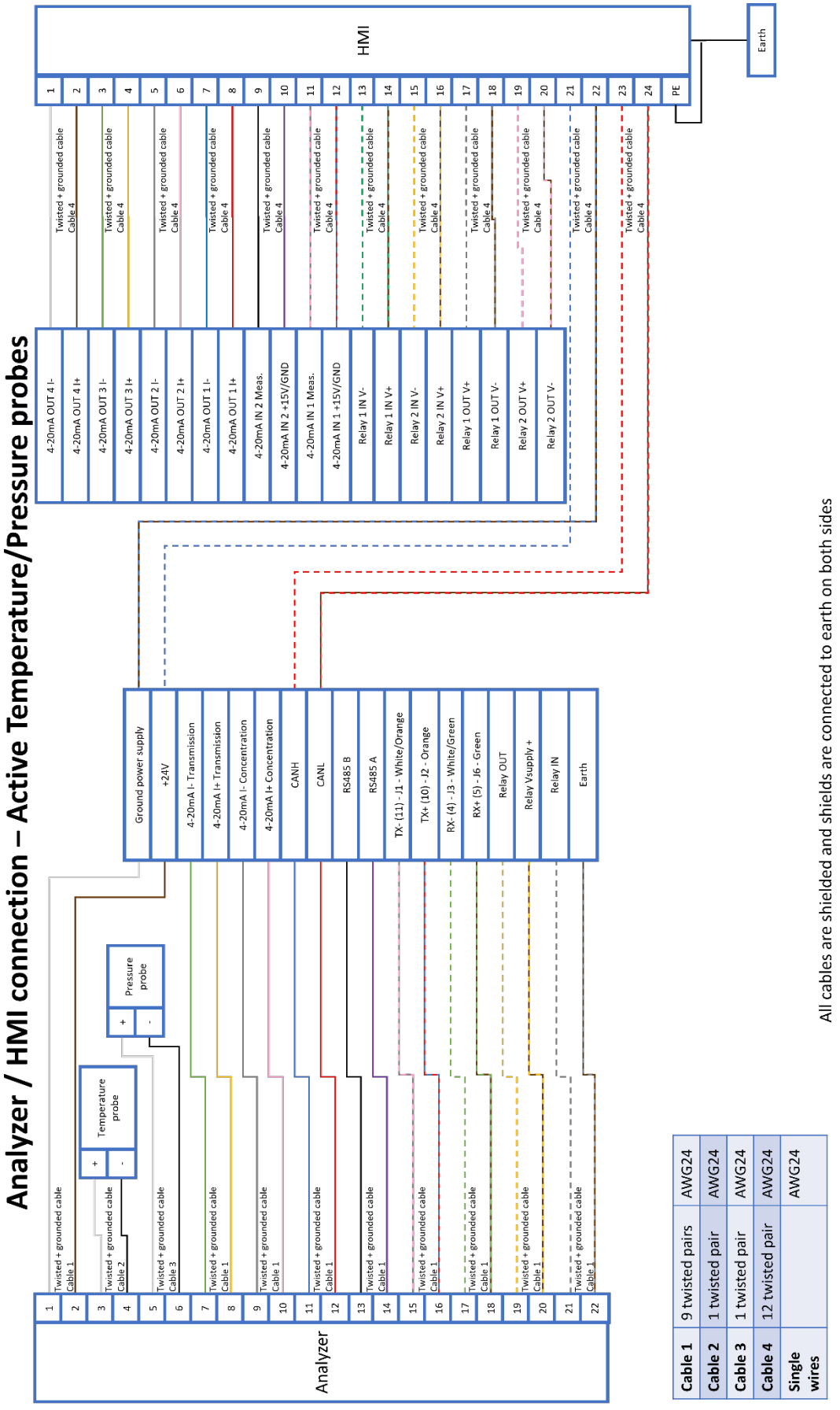


Figure 15 Analyzer/HMI connection – active temperature/pressure probes

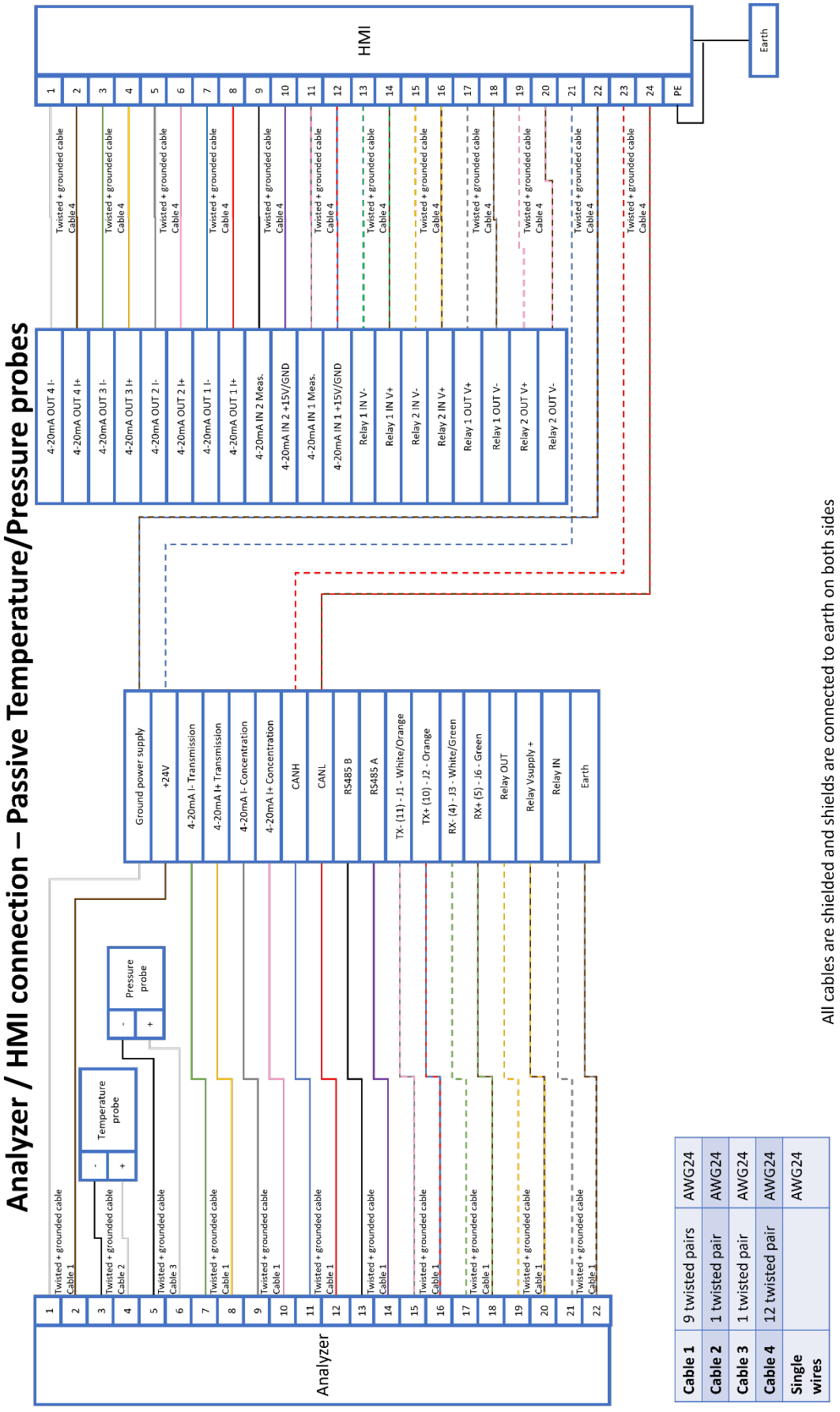


Figure 16 Analyzer/HMI connection – passive temperature/pressure probes

17.2 Trouble Shooting Codes shown on the HMI

Most of the codes shown on the HMI are related to the In-situ Laser Analyzer. The highlighted code is for the HMI only.

Problem/Indication	Possible cause	Error code	Check/Action	M&C service needed
Sensor head (TDL-System) is not starting at all	No main supply		Check power supply; Check power cable for proper connection.	
Sensor head (TDL-System) is not starting completely	Parameters file unreadable	40	Impossible to read the parameters file. Call M&C-service to connect to the file server to investigate.	x
	Database unreadable	41	Impossible to read the database. Call M&C-service to connect to the file server to investigate.	x
	FPGA problem	50	The FPGA is not working properly. Shutdown the sensor head for at least 1 minute and restart it.	
	FPGA communication problem	51	The FPGA is not communicating properly. Shutdown the sensor head for at least 1 minute and restart it.	
	FPGA acquisition timeout occured	54	The acquisition took more than 30 s. Check the analyzer parameters.	
	CAN Bus controller not working	62	The CAN Bus is not working properly. Shutdown the sensor head for at least 1 minute and restart it.	
			Use right CAN-Bus ID	
System is starting, but TDL is not measuring	Laser thermalization problem	1	The laser diode temperature stabilization is impossible. Call M&C-service to connect to the maintenance interface and/or open sensor head to investigate.	x
	Laser temperature incorrect	4	The laser diode temperature is incorrect. Call M&C-service to open sensor head and check the laser diode thermistor connection.	x
	Laser emission too high	11	The laser diode is emitting too much power or the reference photodiode is having a problem. Call M&C-service to connect to the maintenance interface and/or open sensor head to investigate.	x
	Laser temperature too low	2	The laser diode temperature is too low (T < 10 °C) to thermalize properly. Check probe temperature.	

Problem/Indication	Possible cause	Error code	Check/Action	M&C service needed
	FPGA temperature too low	52	The FPGA temperature is too low (T < 0 °C). Check sensor head temperature	
	PCB temperature too low	55	The PCB temperature is too low (T < -10 °C). Check sensor head temperature	
	Sensor head temperature too low	60	The sensor head temperature is too low (T < -40 °C). Check sensor head temperature.	
	Laser temperature too high	3	The laser diode temperature is too high (T > 80 °C) to thermalize properly. Check probe temperature.	
	FPGA temperature too high	53	The FPGA temperature is too high (T > 120 °C). Check sensor head temperature.	
	PCB temperature too high	56	The PCB temperature is too high (T > 85 °C). Call M&C-service to check sensor head temperature.	x
	Sensor head temperature too high	61	The sensor head temperature is too high (T > 80 °C). Call M&C-service to check sensor head temperature.	
HMI not working	**Wrong CAN-Bus ID**		**Use right CAN-Bus ID**	
Low transmission	Sun heats up the sensor head on one side		Protect sensor head from asymmetric sun radiation	
	Poor alignment of laser beam	10	Realignment of beam	
	No purge gas => optics got dirty	10	Clean optics	
	Dirty optics due to dust	10	Clean optics and call M&C-service for a dust filter on the probe	
	Laser emission is too low	10	The laser diode is not emitting enough power or the reference photodiode is having a problem. Connect to the maintenance interface and/or open sensor head to investigate.	
Measurement signal too high	System has been calibrated with purge gas flow and purge gas flow has been stopped		Calibrate system without purge gas flow	
	Leakage between buffer zone and process zone with additional too low pressure in the buffer zone		Check pressure in buffer zone and replace gasket between process zone and buffer zone	

Problem/Indication	Possible cause	Error code	Check/Action	M&C service needed
	Process gas pressure not correct		Use proper pressure probe to have more precise compensation of the measuring signal	
	Process gas pressure too low	120	Adapt process gas temperature	
	Process gas pressure too high	121	Adapt process gas temperature	
	Process gas temperature is not correct	-/112	Use proper temperature probe to have more precise compensation of the measuring signal	
	Process gas temperature too low	110	Adapt process gas temperature	
	Process gas temperature too high	111	Adapt process gas temperature	
	Process gas temperature out of range		Adapt process gas pressure	
Measurement signal too low	Purge gas flow is too high and displaces the gas to be measured from the measuring zone		Adjust the purge gas flow as described in the manual	
	Leakage between buffer zone and process zone		Replace gasket between buffer zone and process zone	
	Process gas pressure not correct		Use proper pressure probe to have more precise compensation of the measuring signal	
	Process gas pressure too low	120	Adapt process gas temperature	
	Process gas pressure too high	121	Adapt process gas temperature	
	Process gas temperature is not correct	-/112	Use proper temperature probe to have more precise compensation of the measuring signal	
	Process gas temperature too low	110	Adapt process gas temperature	
	Process gas temperature too high	111	Adapt process gas temperature	
	Process gas temperature out of range		Adapt process gas pressure	
Purge gas demand too high	Usage of wrong pressure regulator (with bleeding instead of without bleeding)		Use correct pressure regulator without bleeding	

Problem/Indication	Possible cause	Error code	Check/Action	M&C service needed
	Leakage on the sensor head		Call M&C-service to replace O-Ring	x

Table 10 Trouble shooting in-situ Laser Analyzer

In the case of unexpected operating states, a distinction is made between critical errors, which do not allow measurement, and warnings, where measurement continues.

ID (0-255)	Name	Description
1	Laser thermalization problem	The laser diode temperature stabilization is impossible. Connect to the maintenance interface and/or open sensor head to investigate.
2	Laser temperature too low	The laser diode temperature is too low (T < 10 °C) to thermalize properly. Check probe temperature.
3	Laser temperature too high	The laser diode temperature is too high (T > 80 °C) to thermalize properly. Check probe temperature.
4	Laser temperature incorrect	The laser diode temperature is incorrect. Open sensor head and check the laser diode thermistor connection.
10	Laser emission too low	The laser diode is not emitting enough power or the reference photodiode is having a problem. Connect to the maintenance interface and/or open sensor head to investigate.
11	Laser emission too high	The laser diode is emitting too much power or the reference photodiode is having a problem. Connect to the maintenance interface and/or open sensor head to investigate.
40	Parameters file unreadable	Impossible to read the parameters file. Connect to the file server to investigate.
41	Database unreadable	Impossible to read the database. Connect to the file server to investigate.
50	FPGA problem	The FPGA is not working properly. Shutdown the sensor head for at least 1 minute and restart it.
51	FPGA communication problem	The FPGA is not communicating properly. Shutdown the sensor head for at least 1 minute and restart it.
52	FPGA temperature too low	The FPGA temperature is too low (T < 0 °C). Check sensor head temperature.
53	FPGA temperature too high	The FPGA temperature is too high (T > 120 °C). Check sensor head temperature.
54	FPGA acquisition timeout occured	The acquisition took more than 30 sec. Check the analyzer parameters.
55	PCB temperature too low	The PCB temperature is too low (T < -10 °C). Check sensor head temperature.
56	PCB temperature too high	The PCB temperature is too high (T > 85 °C). Check sensor head temperature.
60	Sensor head temperature too low	The sensor head temperature is too low (T < -40 °C). Check sensor head temperature.

61	Sensor head temperature too high	The sensor head temperature is too high (T > 80 °C). Check sensor head temperature.
62	CAN Bus controller not working	The CAN Bus is not working properly. Shutdown the sensor head for at least 1 minute and restart it.

Table 11 Trouble shooting in-situ Laser Analyzer – error code list

ID (0-255)	Name	Description
100	Transmission too low	The measurement channel is not receiving enough power. The probe is either not transmitting enough (dust/fouling) or is misaligned. Realign the probe and/or check for window/retroreflector fouling.
101	Measure channel saturation	The measurement channel is saturated. It either receive too much optical power or the channel is having a problem. Connect to the maintenance interface and/or open sensor head to investigate.
102	Quality of measurement too low	The quality of measurement is too low. Connect to the maintenance interface and check the spectrum.
110	Gas temperature too low	The gas temperature is too low (T < -40 °C). The measurement can be inaccurate. Increase the gas temperature.
111	Gas temperature too high	The gas temperature is too high (T > 600 °C). The measurement can be inaccurate. Reduce the gas temperature.
112	Gas temperature probe not connected	The gas temperature probe is not connected. A default 20 °C temperature is selected.
120	Gas pressure too low	The gas pressure is too low (P < 0 bar). The measurement can be inaccurate. Increase gas pressure.
121	Gas pressure too high	The gas pressure is too high (P > 5 bar). The measurement can be inaccurate. Reduce gas pressure.
122	Gas pressure probe not connected	The gas pressure probe is not connected. A default pressure of 1 bar is selected.
150	CAN Bus device not connected	No CAN Bus device is connected to the sensor head. Connect a CAN Bus device to the sensor head.

Table 12 Trouble shooting in-situ Laser Analyzer – warning code list

17.3 Certificates

IBExU Institut für Sicherheitstechnik GmbH
An-Institut der TU Bergakademie Freiberg

[1] **EU-BAUMUSTERPRÜFBESCHEINIGUNG**

[2] Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen, Richtlinie 2014/34/EU

[3] EU-Baumusterprüfbescheinigung Nummer **IBExU24ATEX1067 X** | Ausgabe 0

[4] Produkt: **Anzeige- und Bedieneinheit**
Typ: ILA HMI DCU10 EX

[5] Hersteller: M&C TechGroup Germany GmbH

[6] Anschrift: Rehhecke 79
40885 Ratingen
GERMANY

[7] Dieses Produkt sowie die verschiedenen zulässigen Ausführungen sind in der Anlage zu dieser Bescheinigung sowie den darin aufgeführten Unterlagen festgelegt.

[8] IBExU Institut für Sicherheitstechnik GmbH, notifizierte Stelle mit der Nummer 0637 in Übereinstimmung mit Artikel 17 der Richtlinie 2014/34/EU des Europäischen Parlaments und des Rates vom 26. Februar 2014, bestätigt, dass dieses Produkt die wesentlichen Sicherheits- und Gesundheitsanforderungen für die Konzeption und den Bau von Produkten zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen aus Anhang II der Richtlinie erfüllt.

Die Untersuchungs- und Prüfergebnisse werden in dem vertraulichen Prüfbericht IB-24-3-0043 festgehalten.

[9] Die Beachtung der wesentlichen Sicherheits- und Gesundheitsanforderungen wurde in Übereinstimmung mit folgenden Normen gewährleistet:

EN IEC 60079-0:2018 EN 60079-1:2014 EN 60079-31:2014

Hiervon ausgenommen sind jene Anforderungen, die unter Punkt [18] der Anlage aufgelistet werden.

[10] Ein „X" hinter der Bescheinigungsnummer weist darauf hin, dass das Produkt den besonderen Bedingungen für die Verwendung unterliegt, die in der Anlage zu dieser Bescheinigung festgehalten sind.

[11] Diese EU-Baumusterprüfbescheinigung bezieht sich ausschließlich auf die Konzeption und den Bau des angegebenen Produktes. Für den Fertigungsprozess und die Bereitstellung dieses Produkts gelten weitere Anforderungen der Richtlinie. Diese fallen jedoch nicht in den Anwendungsbereich dieser Bescheinigung.

[12] Die Kennzeichnung des Produktes muss Folgendes beinhalten:

Ex II 2 G Ex db IIC T6 Gb **Ex II 2 D Ex tb IIIC T85 °C Db**

$-40\ °C \leq T_a \leq +65\ °C$

IBExU Institut für Sicherheitstechnik GmbH
Fuchsmühlenweg 7
09599 Freiberg, GERMANY

Tel.: +49 (0)3731 3805-0
Fax: +49 (0)3731 3805-10

Im Auftrag

Dr.-Ing. P. Cimalla

- Siegel -
(notifizierte Stelle Nummer 0637)

Bescheinigungen ohne Siegel und Unterschrift haben keine Gültigkeit. Bescheinigungen dürfen nur vollständig und unverändert vervielfältigt werden.

Freiberg, 12.02.2025

IBExU Institut für Sicherheitstechnik GmbH
An-Institut der TU Bergakademie Freiberg

[13] **Anlage**

[14] **Bescheinigung Nummer IBExU24ATEX1067 X** | Ausgabe 0

[15] **Beschreibung des Produkts**

Die Anzeige- und Bedieneinheit Typ ILA HMI DCU10 EX wird zur Bedienung, Konfiguration oder Diagnose des In-situ Laser Analyzer Typ ILA1-X000-EX verwendet. Es besteht aus einem als Ex-Komponente separat bescheinigten druckfesten Gehäuse mit elektronischen Einbauten.

Technische Daten

- Nennspannung:	24 V DC
- Leistungsaufnahme:	max. 6 W
- Analogausgang:	4 x 4-20 mA
- Analogeingang:	2 x 4-20 mA
- Relaisausgang (max. 2):	60 V AC/DC, max. 120 mA
- Relaiseingang (max. 2):	max. 60 V DC
- Umgebungstemperaturbereich:	-40 °C bis +65 °C

[16] **Prüfbericht**

Die Prüfergebnisse sind im vertraulichen Prüfbericht IB-24-3-0043 vom 12.02.2025 festgehalten.
Die Prüfunterlagen sind Teil des Prüfberichts und werden darin aufgelistet.

Zusammenfassung der Prüfergebnisse

Die Anzeige- und Bedieneinheit Typ ILA HMI DCU10 EX genügt den Anforderungen des Explosionsschutzes für Geräte der Gruppe II, Kategorie 2 G in Zündschutzart druckfeste Kapselung „db“ sowie Kategorie 2 D in Zündschutzart Staubexplosionsschutz durch Gehäuse „tb“.

[17] **Besondere Bedingungen für die Verwendung**

- Die Anzeige- und Bedieneinheit ist gegen intensive elektrostatische Aufladevorgänge zu schützen.
- Die verwendete Kabelverschraubung ist nur für feste Installationen geeignet. Das Kabel muss wirksam befestigt werden, um ein Ziehen oder Verdrehen zu verhindern.
- Bei eigener Auswahl der Kabel- und Leitungseinführung ist zu beachten, dass diese für eine Betriebstemperatur von mindestens 75 °C geeignet sein muss. Die Gewindegröße ist in der Betriebsanleitung angegeben.

[18] **Wesentliche Sicherheits- und Gesundheitsanforderungen**

Zusätzlich zu den wesentlichen Sicherheits- und Gesundheitsanforderungen, die in den Anwendungsbereich der unter Punkt [9] genannten Normen fallen, wird Folgendes für dieses Produkt als relevant angesehen und die Konformität wird im Prüfbericht dargelegt:

- nicht zutreffend -

[19] **Zeichnungen und Unterlagen**

Die Dokumente sind im Prüfbericht aufgelistet.

IBExU Institut für Sicherheitstechnik GmbH
Fuchsmühlenweg 7
09599 Freiberg, GERMANY

Im Auftrag

Dr.-Ing. P. Cimalla

Freiberg, 12.02.2025

IBExU Institut für Sicherheitstechnik GmbH
An-Institut der TU Bergakademie Freiberg

[1] **EU-TYPE EXAMINATION CERTIFICATE** - TRANSLATION

[2] Equipment and protective systems intended for use in potentially explosive atmospheres, directive 2014/34/EU

[3] EU-Type Examination Certificate Number **IBExU24ATEX1067 X** | Issue 0

[4] Equipment: User Interface
Type: ILA HMI DCU10 EX

[5] Manufacturer: M&C TechGroup Germany GmbH

[6] Address: Rehhecke 79
40885 Ratingen
GERMANY

[7] This product and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.

[8] IBExU Institut für Sicherheitstechnik GmbH, Notified Body number 0637 in accordance with Article 17 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this product has been found to comply with the essential health and safety requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in the confidential test report IB-24-3-0043.

[9] Compliance with the essential health and safety requirements has been assured by compliance with:

EN IEC 60079-0:2018 EN 60079-1:2014 EN 60079-31:2014

Except in respect of those requirements listed at item [18] of the schedule.

[10] If the sign "X" is placed after the certificate number, it indicates that the product is subject to the specific conditions of use specified in the schedule to this certificate.

[11] This EU-type examination certificate relates only to the design and construction of the specified product. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

[12] The marking of the product shall include the following:

Ex II 2 G Ex db IIC T6 Gb **Ex II 2 D Ex tb IIIC T85 °C Db**

$-40\ °C \leq T_a \leq +65\ °C$

IBExU Institut für Sicherheitstechnik GmbH
Fuchsmühlenweg 7
09599 Freiberg, GERMANY

Phone: +49 (0)3731 3805-0
Fax: +49 (0)3731 3805-10

By order

Dr.-Ing. P. Cimalla

- Seal -
(Notified Body number 0637)

Certificates without seal and signature are not valid. Certificates may only be duplicated completely and unchanged. In case of dispute, the German text shall prevail.

Freiberg, 12.02.2025

IBExU Institut für Sicherheitstechnik GmbH
An-Institut der TU Bergakademie Freiberg

[13] **Schedule**

[14] **Certificate Number IBExU24ATEX1067 X** | Issue 0

[15] **Description of product**

The User Interface type ILA HMI DCU10 EX is used to operate, configure or diagnose the In-situ Laser Analyser type ILA1-X000-EX. It consists of a separately certified explosion-proof housing with electronic components.

Technical data

- Nominal voltage:	24 V DC
- Power input:	max. 6 W
- Analog output:	4 x 4-20 mA
- Analog input:	2 x 4-20 mA
- Relay output (max. 2):	60 V AC/DC, max. 120 mA
- Relay input (max. 2):	max. 60 V DC
- Ambient temperature range:	-40 °C up to +65 °C

[16] **Test report**

The test results are recorded in the confidential test report IB-24-3-0043 of 2025-02-12.
The test documents are part of the test report and they are listed there.

Summary of the test results

The User Interface type ILA HMI DCU10 EX fulfils the requirements of explosion protection for equipment of Group II, Category 2 G, type of protection flameproof enclosure „db" and Category 2 D, type of protection dust ignition protection by enclosure „tb".

[17] **Special conditions for use**

- The User Interface must be protected against intensive electrostatic charging.
- The used cable gland is only suitable for fixed installations. The cable must be effectively clamped to prevent pulling or twisting.
- When selecting your own cable gland, please note that it must be suitable for an operating temperature of at least 75 °C. The thread size is specified in the manual.

[18] **Essential health and safety requirements**

In addition to the essential health and safety requirements (EHSRs) covered by the standards listed at item [9], the following are considered relevant to this product, and conformity is demonstrated in the test report:

- not applicable -

[19] **Drawings and documents**

The documents are listed in the test report.

IBExU Institut für Sicherheitstechnik GmbH
Fuchsmühlenweg 7
09599 Freiberg, GERMANY

By order

Dr.-Ing. P. Cimalla

Freiberg, 12.02.2025

FB106100 | 1

Page 2/2
IBExU24ATEX1067 X | 0

IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification System for Explosive Atmospheres
for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.:	**IECEx IBE 24.0027X**	Page 1 of 3	Certificate history:
Status:	**Current**	Issue No: 0	
Date of Issue:	2025-02-13		
Applicant:	**M&C TechGroup Germany GmbH** Rehhecke 79 40885 Ratingen **Germany**		
Equipment:	**User Interface type ILA HMI DCU10 EX**		
Optional accessory:			
Type of Protection:	**Flameproof enclosure "db" and protection by enclosure "tb"**		
Marking:	Ex db IIC T6 Gb Ex tb IIIC T85 °C Db -40 °C ≤ T_a ≤ +65 °C		

Approved for issue on behalf of the IECEx Certification Body: **Dr.-Ing. Peter Cimalla**

Position: **Deputy Head of department Certification Body**

Signature: (for printed version)

Date: (for printed version) 2025-02-13

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
3. The Status and authenticity of this certificate may be verified by visiting www.iecex.com or use of this QR Code.

Certificate issued by:

IBExU Institut für Sicherheitstechnik GmbH
Fuchsmühlenweg 7
09599 Freiberg
Germany

IECEx Certificate of Conformity

Certificate No.: **IECEx IBE 24.0027X** Page 2 of 3

Date of issue: 2025-02-13 Issue No: 0

Manufacturer: **M&C TechGroup Germany GmbH**
Rehhecke 79
40885 Ratingen
Germany

Manufacturing locations:

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEx Quality system requirements.This certificate is granted subject to the conditions as set out in IECEx Scheme Rules, IECEx 02 and Operational Documents as amended

STANDARDS :
The equipment and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards

IEC 60079-0:2017 Explosive atmospheres - Part 0: Equipment - General requirements
Edition:7.0

IEC 60079-1:2014 Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures "d"
Edition:7.0

IEC 60079-31:2022 Explosive atmospheres – Part 31: Equipment dust ignition protection by enclosure "t"
Edition:3.0

This Certificate **does not** indicate compliance with safety and performance requirements other than those expressly included in the Standards listed above.

TEST & ASSESSMENT REPORTS:
A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in:

Test Report:

DE/IBE/ExTR24.0007/00

Quality Assessment Report:

DE/BVS/QAR17.0009/07

IECEx Certificate of Conformity

Certificate No.: **IECEx IBE 24.0027X** Page 3 of 3

Date of issue: 2025-02-13 Issue No: 0

EQUIPMENT:
Equipment and systems covered by this Certificate are as follows:

The User Interface type ILA HMI DCU10 EX is used to operate, configure or diagnose the In-situ Laser Analyser type ILA1-X000-EX. It consists of a separately certified explosion-proof housing with electronic components.

- Rated voltage: 24 V DC
- Power input: max. 6 W
- Analog output: 4 x 4-20 mA
- Analog input: 2 x 4-20 mA
- Relay output (max. 2): 60 V AC/DC, max. 120 mA
- Relay input (max. 2): 60 V DC
- Ambient temperature range: -40 °C to +65 °C

SPECIFIC CONDITIONS OF USE: YES as shown below:
The User Interface must be protected against intensive electrostatic charging.

The used cable gland is only suitable for fixed installations. The cable must be effectively clamped to prevent pulling or twisting.

When selecting your own cable gland, please note that it must be suitable for an operating temperature of at least 75 °C. The thread size is specified in the manual.