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Contents

1.	Safety	5
1.1	Symbols Used	5
1.2	Warnings	5
1.3	Notes on CE Marking	6
1.4	Notes on FCC Marking	6
1.5	Intended Use	6
1.6	Proper Environment.....	6
2.	Functional Principle, Technical Data	7
2.1	Short Description	7
2.2	System Design.....	7
2.3	Special Performance Features	8
2.4	Technical Data	8
2.5	Control and Indicator Elements.....	9
3.	Delivery	10
3.1	Unpacking/Included in Delivery	10
3.2	Storage	10
4.	Installation and Assembly.....	11
4.1	Controller	11
4.2	Electrical Connections.....	12
	4.2.1 Connection Diagram	12
	4.2.2 Interfaces	13
	4.2.3 Supply Voltage (Power).....	13
4.3	Installation instructions	14
4.4	Initial Operation.....	14
5.	Operating System.....	15
6.	Operation	16
6.1	Turning On	16
6.2	System Start-Up.....	16
6.3	Users and Passwords.....	16
6.4	Setting Up for Initial Use.....	17
7.	Setting Up Fieldbus Operation	18
7.1	General	18
7.2	Running Firmware on the Fieldbus Card	18
7.3	Operating Program.....	19
8.	Limitation of Liability	20
9.	Service, Repair	20
10.	Decommissioning, Disposal	21
	Appendix.....	22
A 1	Further Literature	22
A 2	Accessories	22

1. Safety

System operation assumes knowledge of the operating instructions. The Industrial Performance Unit will also be referred to in the following as “controller”.

1.1 Symbols Used

The following symbols are used in these operating instructions:



Indicates a hazardous situation which, if not avoided, may result in minor or moderate injury.

NOTICE

Indicates a situation that may result in property damage if not avoided.



Indicates a user action.



Indicates a tip for users.

Measurement

Indicates hardware or a software button/menu.

1.2 Warnings



Connect the power supply and the display/output device according to the safety regulations for electrical equipment.

- > Risk of injury
- > Damage to or destruction of the sensor

NOTICE

Avoid shocks and impacts to the controller.

- > Damage to or destruction of the controller

The supply voltage must not exceed the specified limits.

- > Damage to or destruction of the controller

Lay the power supply cable according to the provisions for electrical equipment. Protect the cables against damage.

- > Failure of the controller

The controller housing may only be opened by authorized persons.

- > Damage to or destruction of the controller possible

Only plug in or disconnect devices when disconnected from the power supply.

Disconnect the controller from the power supply before cleaning. Only use a damp cloth for cleaning. Do not use liquid or aerosol cleaners.

Protect the controller from moisture.

Place the controller on a stable surface during installation. Dropping the controller may damage it.

The openings on the housing provide ventilation. Prevent the controller from overheating. Do not cover the openings.

If the controller will not be used again for a while, disconnect it from the power supply.

Never pour liquid into a housing opening.

NOTICE

If one of the following instances occurs, have the controller checked by service personnel:

- The power supply cable or plug is damaged.
- Liquid has got into the device.
- The controller was exposed to moisture.
- The controller is malfunctioning or not working as per the operating instructions.
- The controller was dropped and damaged.
- The controller has obvious signs of breakage.

Store the device within the storage temperature limits. The equipment should be stored in a controlled environment.

CAUTION: Batteries may explode if they are used incorrectly. Only replace with the same or equivalent types, as recommended by the manufacturer. Dispose of used batteries according to the instructions of the manufacturer.

The controller should only be installed in an area with restricted access.

Store or save the operating instructions in a secure location.

1.3 Notes on CE Marking

The following apply for the Industrial Performance Unit:

- EU Directive 2014/30/EU
- EU Directive 2011/65/EU

Products which carry the CE mark satisfy the requirements of the EU directives cited and the relevant applicable harmonized European standards (EN). The measuring system is designed for use in industrial environments. The EU Declaration of Conformity and the technical documentation are available to the responsible authorities according to the EU Directives.

1.4 Notes on FCC Marking

The device meets the requirements of section 15 of the FCC rules.

1.5 Intended Use

- The Industrial Performance Unit is designed for use in industrial environments. It is used as a high-performance solution for 3D measuring tasks, with the connection to master control units being possible via conventional fieldbuses.
- The controller must only be operated within the limits specified in the technical data, see [Chap. 2.4](#).
- The controller must be used in such a way that no persons are endangered or machines and other material goods are damaged in the event of malfunction or total failure of the controller.
- Take additional precautions for safety and damage prevention in case of safety-related applications.

1.6 Proper Environment

- Protection class: IP40

The IP40 protection class is a specification that is limited to protection from dust and water. Oil, steam and emulsion effects are not included in this protection class and must be evaluated separately.

- Temperature range
 - Operation: 0 ... +50 °C ¹
 - Storage: -40 ... +85 °C
- Humidity: 20 ... 95% (non-condensing)
- Ambient pressure: Atmospheric pressure

1) Maximum permissible operating temperature at 0.7 m/s air flow

2. Functional Principle, Technical Data

2.1 Short Description

The Industrial Performance Unit is a powerful computing platform for the efficient commissioning of Micro-Epsilon sensors and systems, which offers full compatibility for inline processes in customer applications.

You can connect Micro-Epsilon sensors to the Industrial Performance Unit via the GigE Vision standard. The intuitive 3DInspect software with Valid3D technology from Micro-Epsilon enables simple sensor parameter setting, which allows measurements to start immediately. The Industrial Performance Unit directly processes three-dimensional data, which is subsequently evaluated and assessed via the 3DInspect software.

Industrial Ethernet (TCP/IP, UDP, Modbus protocol) or the fieldbuses listed below are available for outputting results and controlling the system:

- PROFINET
- EtherNet/IP

The flexible, industrial-grade hardware with passive cooling allows easy and space-saving installation. This makes integration in a control cabinet or directly in the machine very easy. Thanks to the intuitive 3DInspect software, Micro-Epsilon sensors can be commissioned efficiently. Accessories such as monitors and keyboards can be connected to the computer without a problem.

2.2 System Design

The Industrial Performance Unit, referred to as “controller” for short in the following, is the link between 3D sensors and an industrial environment. The captured 3D data are computed by the Industrial Performance Unit and transmitted to a PLC, for example.

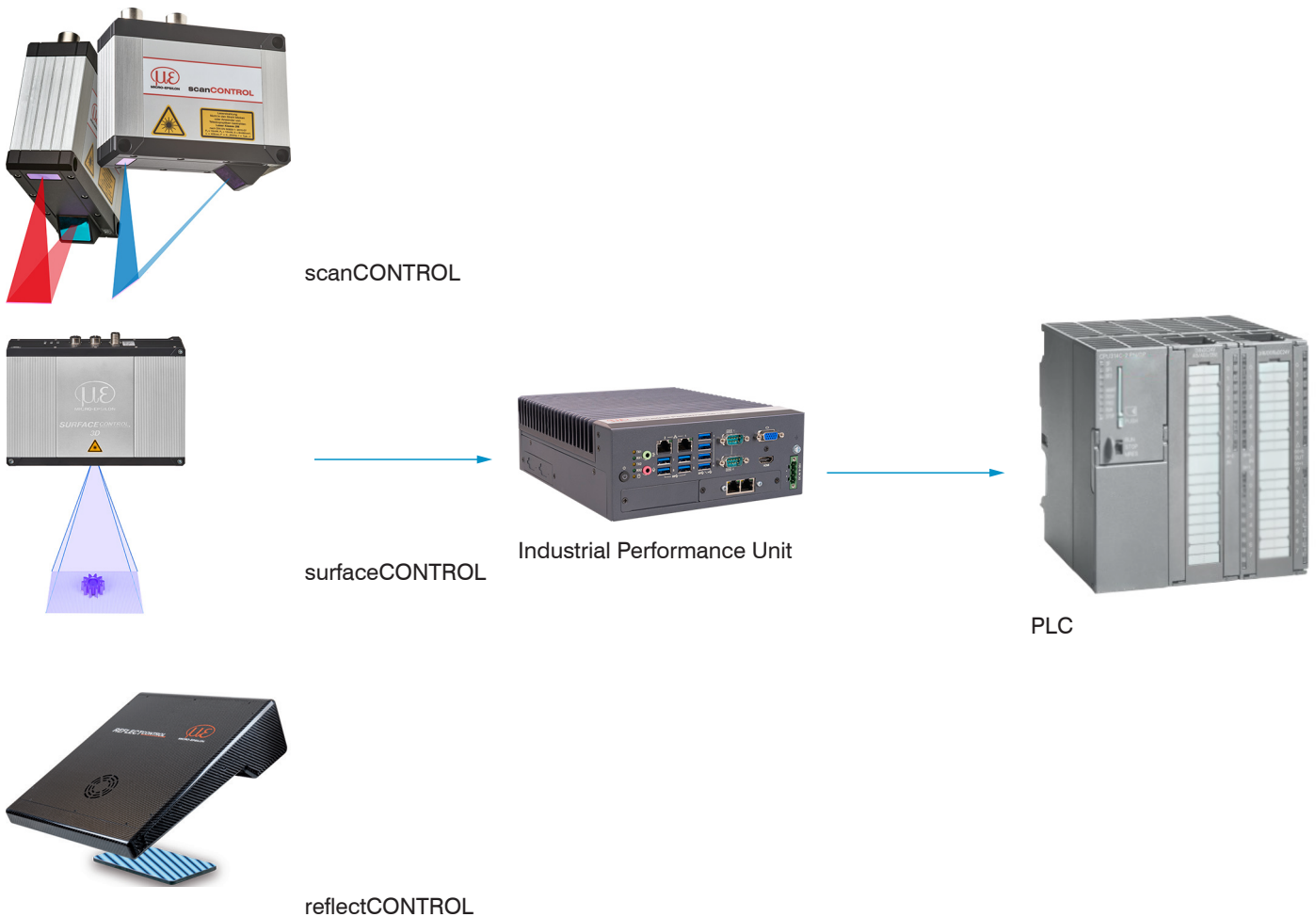


Fig. 1 Measurement setup variants with 3D sensors by Micro-Epsilon

2.3 Special Performance Features

The Industrial Performance Unit is characterized by its compact design while at the same time achieving high throughput of 3D points.

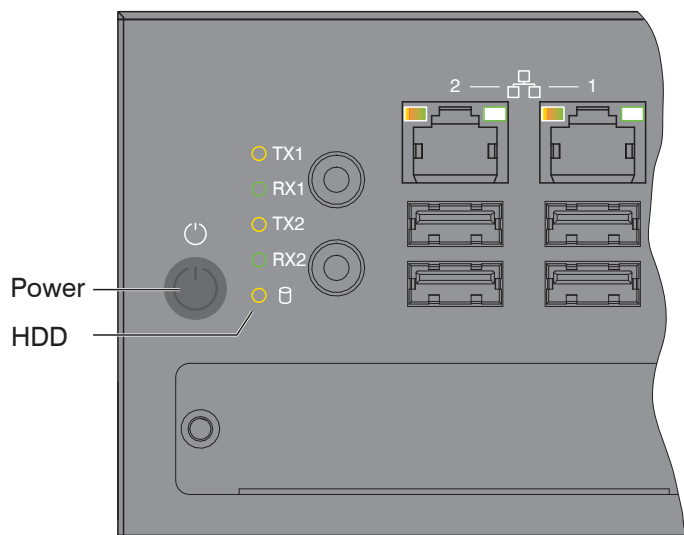
- High-performance solution for 3D measuring tasks
- Full compatibility and inline capability for customer applications
- Intuitive 3DInspect software with Valid3D technology by Micro-Epsilon
- Efficient commissioning of Micro-Epsilon sensors
- Integrated interfaces: PROFINET, EtherNet/IP
- Industrially compatible hardware with passive cooling

2.4 Technical Data

Model	Industrial Performance Unit	
RAM	16 GB	
Memory	128 GB SSD	
Supply voltage	9 ... 36 V DC	
Power consumption	50 W (max. 112 W)	
Digital interfaces	Gigabit Ethernet (GigE Vision / GenICam) / PROFINET / EtherNet/IP	
Connection	4-pin supply terminal block; 2x RJ45 for Gigabit Ethernet, 2x RJ45 for Industrial Ethernet (PROFINET or EtherNet/IP); 1x HDMI, 1x VGA, 1x USB3.2 (Gen1); 4x USB2.0	
Mounting	Mounting holes, Accessories for table or wall mounting and DIN rail mounting	
Temperature range	Storage	-40 ... +85 °C
	Operation ¹	0 ... +50 °C
Shock (DIN EN 60068-2-27)	20g / 11 ms half-sine	
Vibration (DIN EN 60068-2-6)	3 g / 5 ... 500 Hz	
Protection class	IP40	
Material	Metal housing	
Weight	2.8 kg	
Control and indicator elements	2 LEDs for storage and power; 4 LEDs for status display of Ethernet 1 power on/off switch	
Special features	Windows 10 IoT Enterprise	

1) Maximum permissible operating temperature at 0.7 m/s air flow

2.5 Control and Indicator Elements



Power LED	
Red	Switched off, supply voltage present
Green	Ready to use

HDD LED	Meaning
Off	No access to hard drive
On	Read/write access to hard drive

LAN 1 / 2 LEDs	Meaning
Link LED (left):	
Constant orange	Gigabit Ethernet connection established
Constant green	100 Mbit Ethernet connection established
Off	10 Mbit Ethernet connection established
Act LED (right):	
Green	Active data transmission
Off	No data transmission

Power button	Switches the controller on and off
--------------	------------------------------------

Fig. 2 Controller LEDs, on/off switch

3. Delivery

3.1 Unpacking/Included in Delivery

- 1 controller incl. license for Windows 10 IoT Enterprise
- I/O card / Mini PCI Express / Ethernet C1FX 90E-RE\F/20 / RJ45, already installed
- 1 operating instructions
- 1 DIN rail mounting kit for controller
- 2 mounting adapters for table/wall mounting

▶ Carefully remove the components of the measuring system from the packaging and ensure that the goods are forwarded in such a way that no damage can occur.

▶ Check the delivery for completeness and shipping damage immediately after unpacking.

▶ If there is damage or parts are missing, immediately contact the manufacturer or supplier.

3.2 Storage

Humidity: 20 ... 95% (non-condensing)

Temperature range (storage)

Sensor: -10 ... +50 °C

Controller: -40 ... +85 °C

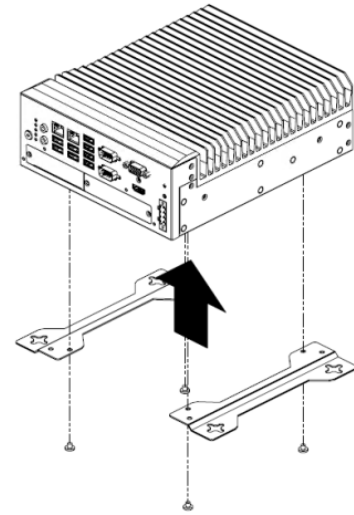
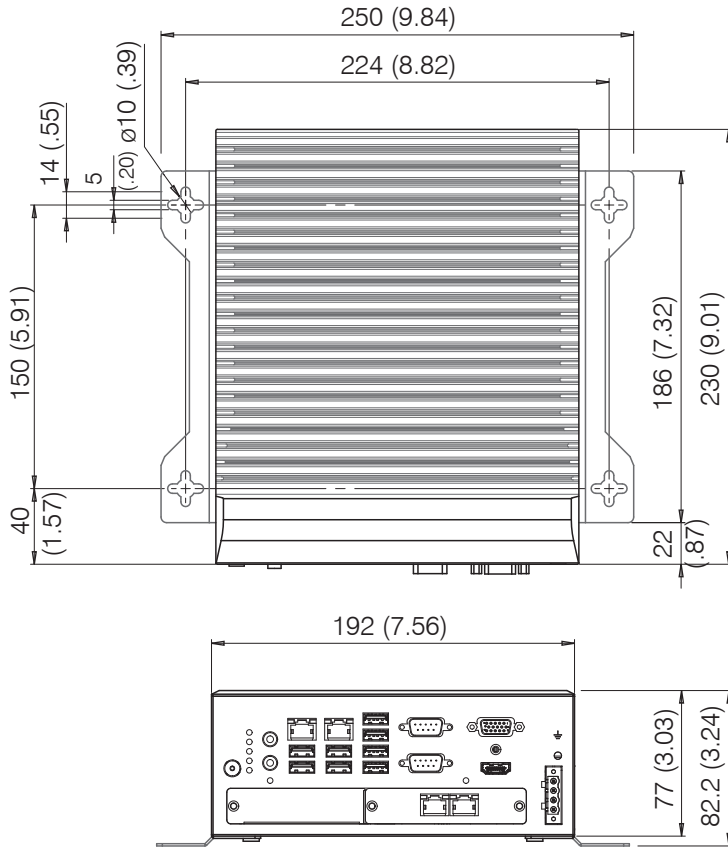
4. Installation and Assembly

4.1 Controller

The mounting adapters included in the scope of delivery allow the controller to be mounted on a table or wall. A mounting adapter for DIN rail installation is also included.

CAUTION

Ensure careful handling during installation and operation.
Damage to or destruction of the controller possible.



Dimensions in mm (inches)

Fig. 3 Dimensional drawing of SC2500 controller with mounting adapter

- ▶ Remove the four plastic covers on the underside of the controller.

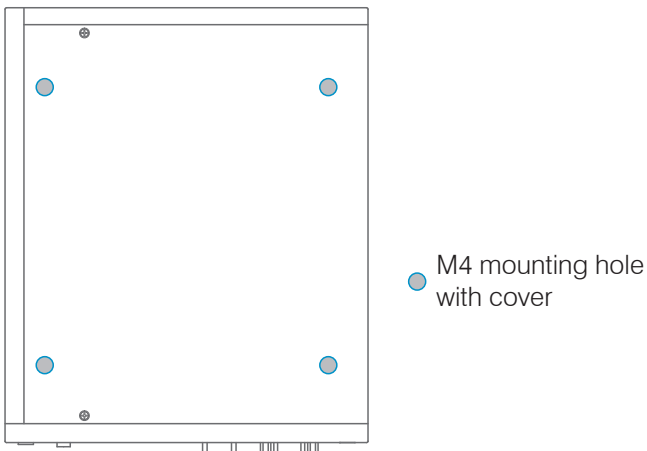


Fig. 4 Reference points for wall and table mounting

- ▶ Fasten the mounting adapters to the controller using the four enclosed screws.
- ▶ Fasten the controller to the wall or table via the cross openings in the mounting adapter.

4.2 Electrical Connections

4.2.1 Connection Diagram

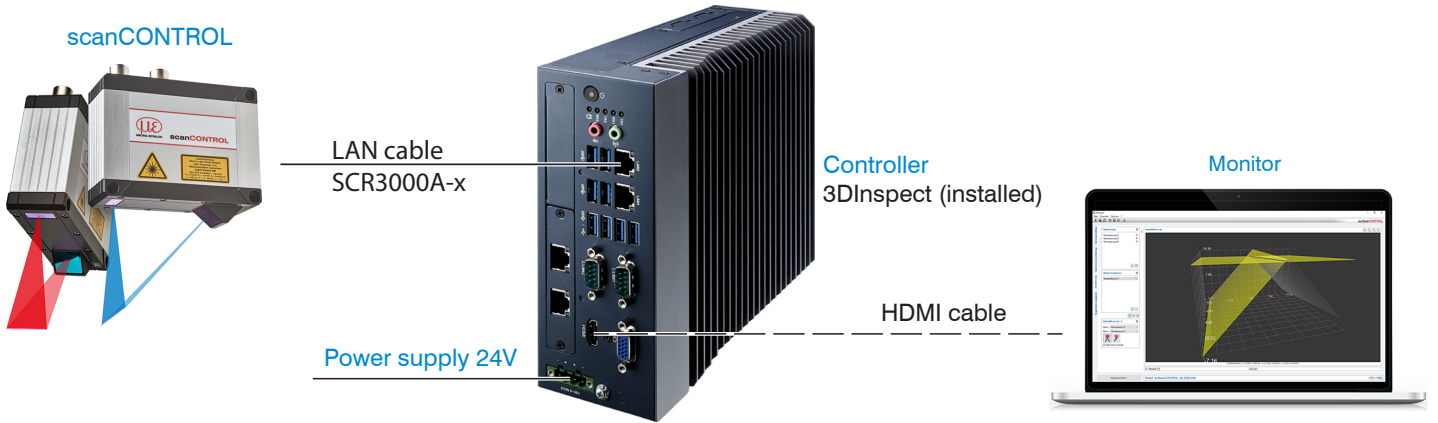


Fig. 5 Connecting the scanCONTROL

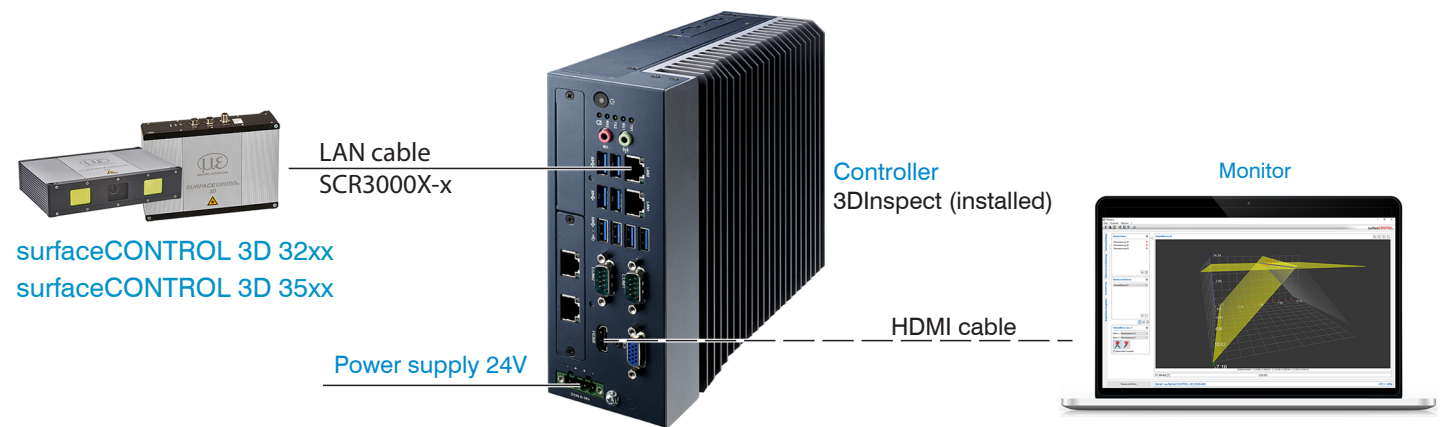


Fig. 6 Connecting the surfaceCONTROL 3D 32xx and surfaceCONTROL 3D 35xx

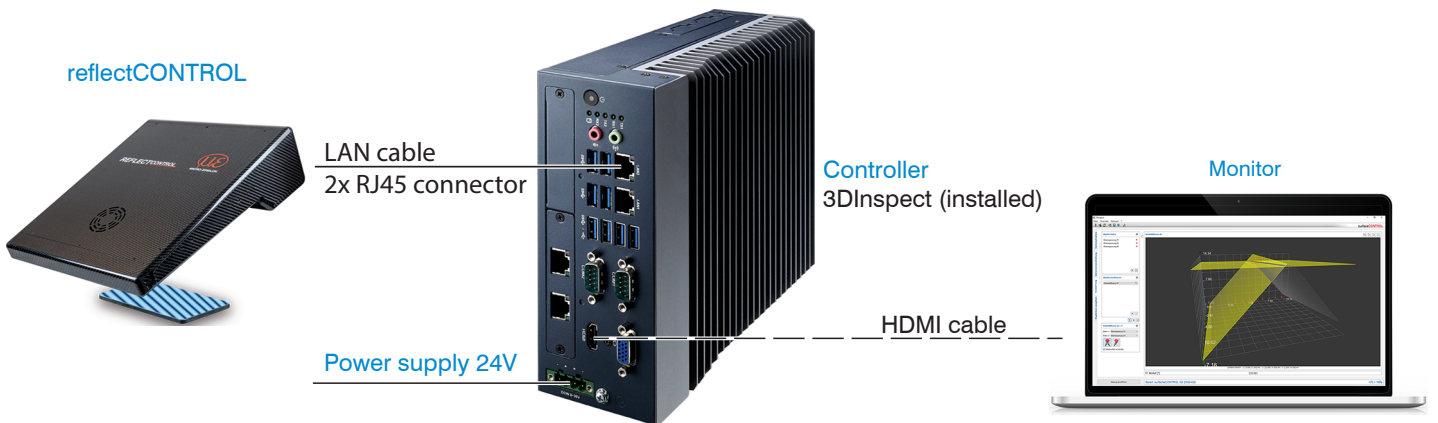


Fig. 7 Connecting the reflectCONTROL

4.2.2 Interfaces

All connections for the controller are located on the front.

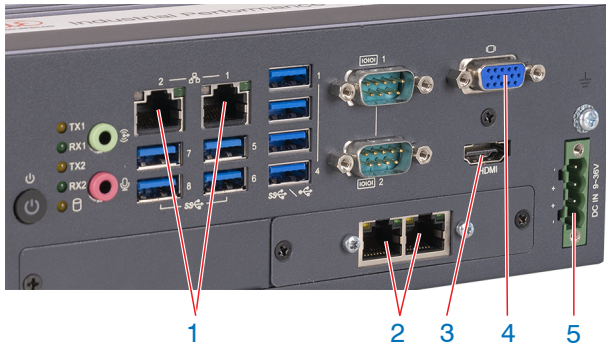


Fig. 8 Controller with connections

1	Ethernet socket, 3D sensor
2	Fieldbus
3	HDMI, connection for monitor
4	VGA, connection for monitor
5	Power supply

4.2.3 Supply Voltage (Power)

The power supply connection is a 4-pin plug connector.

Pin/Designation	Comments
+	9 V ... 36 V DC (nominal value 24 V, max. power consumption 112 W)
-	0 V

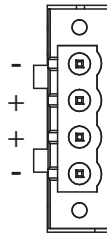


Fig. 9 Pin assignment of the power supply connection, view: Plug on housing side

The operating voltage is protected against polarity reversal. Use only shielded lines or original cables from the accessories program for the power supply connection or the outputs.

4.3 Installation instructions

For all connection cables, use only the appropriate cables from the optional accessories.

Lay all connection cables in accordance with the generally applicable measurement technology regulations, i.e. for example not directly next to pulse-carrying lines, preferably in a separate cable duct.

The minimum bending radii are three times the cable diameter and must not be less than this.

4.4 Initial Operation

NOTICE

The controller may only be connected to peripherals when it does not carry power, that is, only when the supply voltage has been switched off.

- ▶ Install the controller as per the installation instructions, see [Chap. 4.1](#).
- ▶ Connect the 3D sensor to the controller.
- ▶ Connect the controller to the PC. For this, use a conventional Ethernet cable of category CAT5e or higher.
- ▶ Connect the 3D sensor to the power supply.
- ▶ Connect the controller to the power supply, see [Chap. 4.2.3](#).

5. Operating System

The operating system Windows 10 IoT Enterprise by Microsoft is pre-installed on the Industrial Performance Unit. This is third-party software for which Microsoft license terms apply; see D:\Support\EULA. The user is required to comply with these license terms.

Microsoft provides the required updates for the operating system (see table below). At the time of delivery, all required troubleshooting and security updates published by Microsoft will have been carried out by Micro-Epsilon.

After the Industrial Performance Unit has been delivered, the user is responsible for carrying out security updates. For this purpose and for setting up the fieldbus connection for the Industrial Performance Unit, a user account with administrator rights is set up for the user. The user is required to use these rights in a responsible manner and may only use this method of access for the aforementioned purposes. Any use that extends beyond this, in particular any use that endangers operational safety, is prohibited.

Micro-Epsilon is not liable for any performance impairment, damage or failures caused by the user neglecting to carry out security updates after delivery. Warranty claims cannot be asserted, in particular, if the user does not follow operating or maintenance instructions or makes changes to the delivered components (hardware or software components).

Furthermore, Micro-Epsilon accepts no liability for performance impairment, damage or failures caused by changes to the operating system or by installation/uninstallation of application programs on the part of the user or their agents. This applies, in particular, to virus scanners and firewall programs.

Installed operating system	End of main support for troubleshooting	End of extended support for security updates
Windows 10 IOT Enterprise LTSC 2019 ¹	2024-01-09	2029-01-09

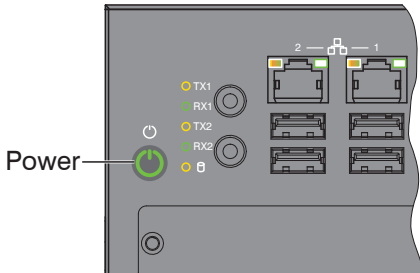
1) Source: <https://docs.microsoft.com/en-us/lifecycle/products/windows-10-enterprise-ltsc-2019>

6. Operation

6.1 Turning On

Once the supply voltage has been applied, the controller will start up automatically and enter measurement mode.

- ▶ When Windows has been shut down, press the `Power` switch on the controller. The controller will start up and enter measurement mode.



The `Power` LED on the controller lights up red when a sufficient supply voltage is applied, and green during measurement mode.

Measurement mode is started when the supply voltage is applied to the 3D sensor.

- Adhere to the required warm-up times for the 3D sensors. They are required for precise measurements. You can find details on this in the respective operating and assembly instructions.
- If 3DInspect is not automatically visible on your monitor after start-up, you will have to change the screen settings. To do this, press the key combination `Windows` and `P`.

6.2 System Start-Up

The controller is configured to be used as a measuring system straight away. After the supply voltage has been applied:

- The controller starts up.
- The operating system is loaded.
- The user `Operator` is logged in without having to enter a password.
- 3DInspect starts up in the mode that was used last (measurement mode) and tries to connect to the last connected sensor.
- The measuring system can be immediately operated via the corresponding protocol (fieldbus or Industrial Ethernet) without further user intervention if the appropriate settings have been applied.

6.3 Users and Passwords

Two users are set up for the Windows operating system. When the controller is started up, the operator is automatically logged in (without having to enter a password), and 3DInspect is started up.

User	Password	Type of Windows account
Administrator	master	Administrator
Operator	operator	Standard user

The user `Operator` has sufficient rights for setting up and operating 3DInspect.

- Settings and parameters in 3DInspect only apply to the user who is currently logged in. Therefore, it is recommended that the user operates 3DInspect as an `Operator`.

As an operator, it is also possible to connect to the controller via a remote desktop connection.

6.4 Setting Up for Initial Use

3DInspect is not ready for measuring tasks when used for the first time. The following steps are required:

- ▶ Establish the connection to the sensor.
- ▶ Switch to the `Raw data/Display Image Data` view. Using this view, align the sensor with the target as best as possible.
- ▶ Optimize the sensor parameters so that you get an ideal point cloud.
- ▶ Set the evaluation parameters according to the measuring task at hand.
- ▶ Set the output parameters. You can find details about control/output via fieldbus in the “Setting Up Fieldbus Operation” section, see [Chap. 7](#).
- ▶ Save the parameters in a parameter set.

You can find more details in the software manual for 3DInspect.

7. Setting Up Fieldbus Operation

7.1 General

The controller offers the possibility of control and transmission of measured values computed in 3DInspect via fieldbus. For this purpose, the respective fieldbus must be set in the `Output` tab in 3DInspect.

If the error message `Input/Output: Error fieldbus startup` appears after confirming with `OK`, the correct firmware must still be installed on the fieldbus card. You can find details on this in the “Running Firmware on the Fieldbus Card” section, see [Chap. 7.2](#).

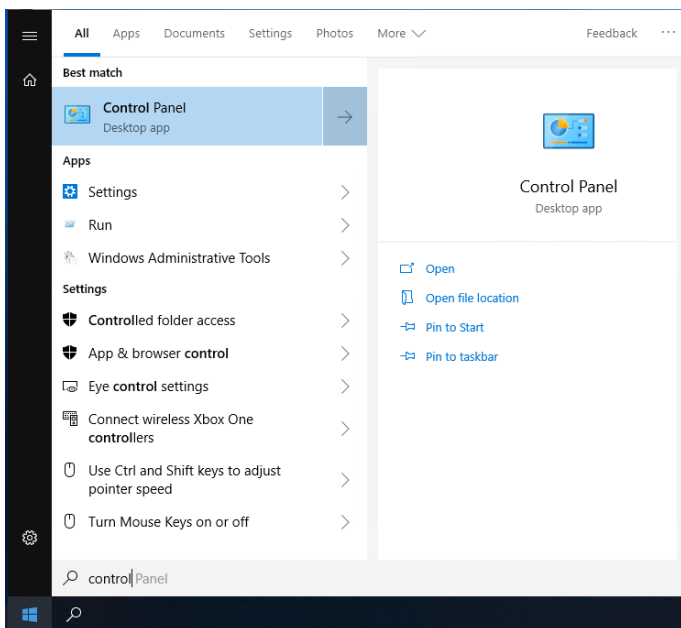
If no error message appears or if a different 3DInspect error message appears after confirming with `OK`, the correct firmware is already installed on the fieldbus card. The steps from the following chapter no longer have to be carried out.

7.2 Running Firmware on the Fieldbus Card

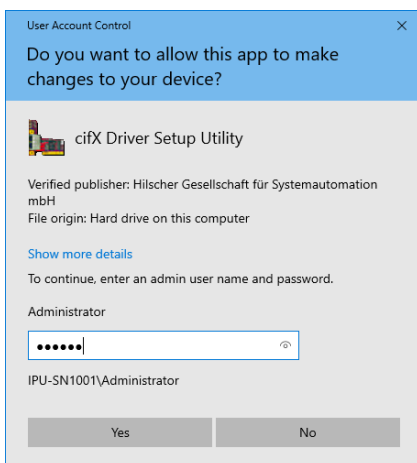
The following steps must be carried out in sequential order for the correct firmware to be stored for the fieldbus card:

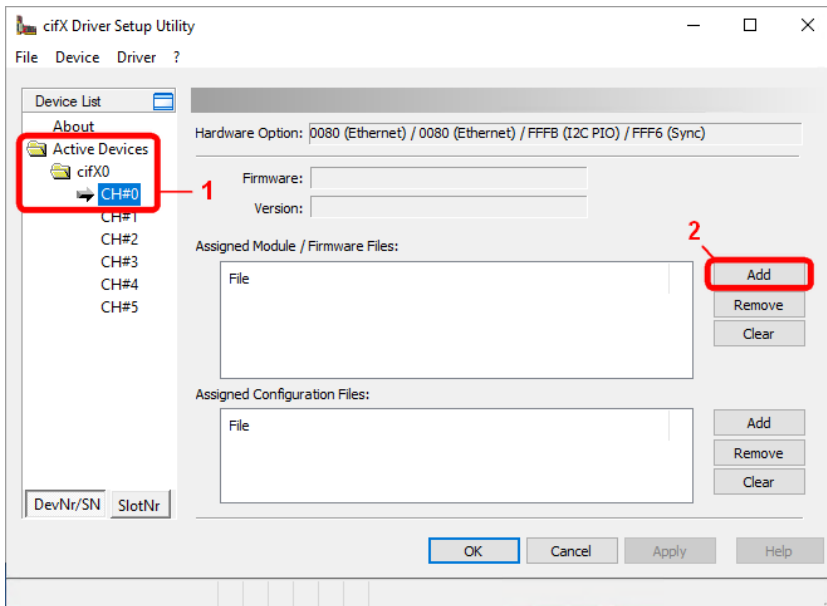
➤ Exit 3DInspect if you haven't already.

➤ Open the control panel. To do this, click on the Windows icon and click on `Control Panel`.

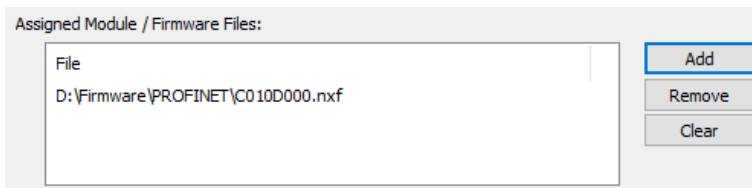


➤ Open `ciFX Setup`. This step requires authentication with the created administrator account.



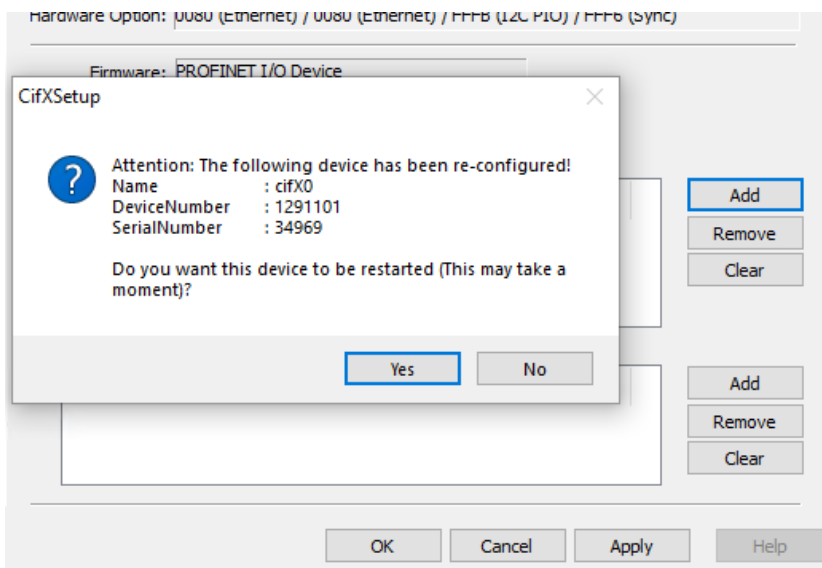


- Select `Active Devices > cifX0 > CH#0` (1).
- Click on the `Add` button in the `Assigned Module / Firmware Files:` section (2).
- Select the firmware. You can find the corresponding firmware file in the `Firmware` folder, which is located on the `D` drive. You can access it via the shortcut on the desktop of the user `Administrator`.
- Click the `OK` button.



The path to the firmware is displayed in the `Assigned Module / Firmware Files:` section.

- Click the `OK` or `Apply` button. A dialog with a prompt to restart the fieldbus card will appear. Confirm this by clicking the `Yes` button.



- Exit the `cifX` setup. The firmware has now been installed.

After restarting `3DInspect`, the error message `Input/Output: Error fieldbus startup` should no longer be displayed.

7.3 Operating Program

The program `3DInspect` is available for operating the 3D sensor. It performs industrial 3D measuring tasks and is already installed on the controller.

8. Limitation of Liability

All components of the device have been checked and tested for functionality in the factory. However, should any defects occur despite careful quality control, these shall be reported immediately to MICRO-EPSILON or to your distributor/retailer.

MICRO-EPSILON undertakes no liability whatsoever for damage, loss or costs caused by or related in any way to the product, in particular consequential damage, e.g., due to

- non-observance of these instructions/this manual,
- improper use or improper handling (in particular due to improper installation, commissioning, operation and maintenance) of the product,
- repairs or modifications by third parties,
- the use of force or other handling by unqualified persons.

This limitation of liability also applies to defects resulting from normal wear and tear (e.g., to wearing parts) and in the event of non-compliance with the specified maintenance intervals (if applicable).

MICRO-EPSILON is exclusively responsible for repairs.

It is not permitted to make unauthorized structural and/or technical modifications or alterations to the product.

In the interest of further development, MICRO-EPSILON reserves the right to modify the design.

In addition, the General Terms of Business of MICRO-EPSILON shall apply, which can be accessed under Legal details | Micro-Epsilon <https://www.micro-epsilon.com/impressum/>. For translations into other languages, the German version shall prevail.

9. Service, Repair

If the controller is defective:

- If possible, save the current settings in a parameter set to reload them into the controller after the repair.
- Please send us the affected parts for repair or exchange.

If the cause of a fault cannot be clearly identified, please send the entire measuring system to:

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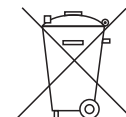
10. Decommissioning, Disposal

In order to avoid the release of environmentally harmful substances and to ensure the reuse of valuable raw materials, we draw your attention to the following regulations and obligations:

- Remove all cables from the sensor and/or controller.
- Dispose of the sensor and/or controller, its components and accessories, as well as the packaging materials in compliance with the country-specific waste treatment and disposal regulations of the region of use.
- You are obliged to comply with all relevant national laws and regulations

For Germany / the EU, the following (disposal) instructions apply in particular:

- Waste equipment marked with a crossed garbage can must not be disposed of with normal industrial waste (e.g. residual waste can or the yellow recycling bin) and must be disposed of separately. This avoids hazards to the environment due to incorrect disposal and ensures proper recycling of the old appliances.
- A list of national laws and contacts in the EU member states can be found at https://ec.europa.eu/environment/topics/waste-and-recycling/waste-electrical-and-electronic-equipment-weee_en. Here you can inform yourself about the respective national collection and return points.
- Old devices can also be returned for disposal to MICRO-EPSILON at the address given in the imprint at <https://www.micro-epsilon.de/impressum/>.
- We would like to point out that you are responsible for deleting the measurement-specific and personal data on the old devices to be disposed of.
- Under the registration number WEEE-Reg.-Nr. DE28605721, we are registered at the foundation Elektro-Altgeräte Register, Nordostpark 72, 90411 Nuremberg, as a manufacturer of electrical and/or electronic equipment.



Appendix

A 1 Further Literature

- The user manual for the MIC-770, contains details about the CPU. You can find the user manual on the D drive of the IPU.
- You can find the operating instructions for the 3DInspect software among the documentation for the 3DInspect software.

A 2 Accessories

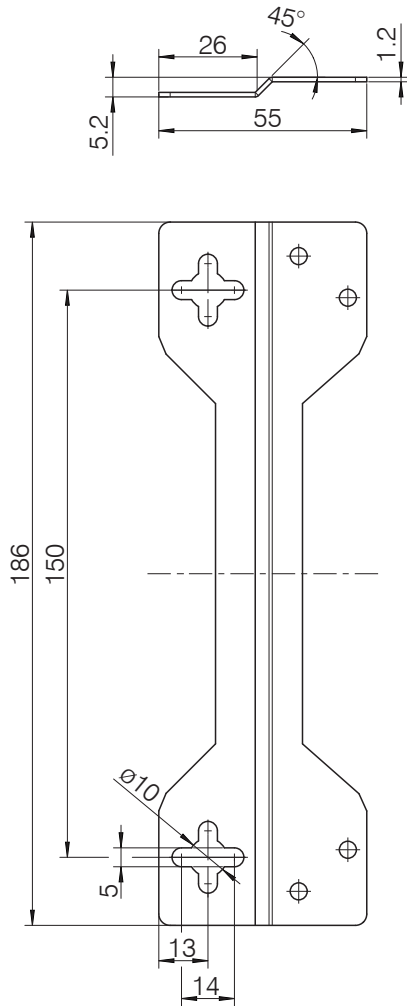


Fig. 10 Mounting rail dimensional drawing

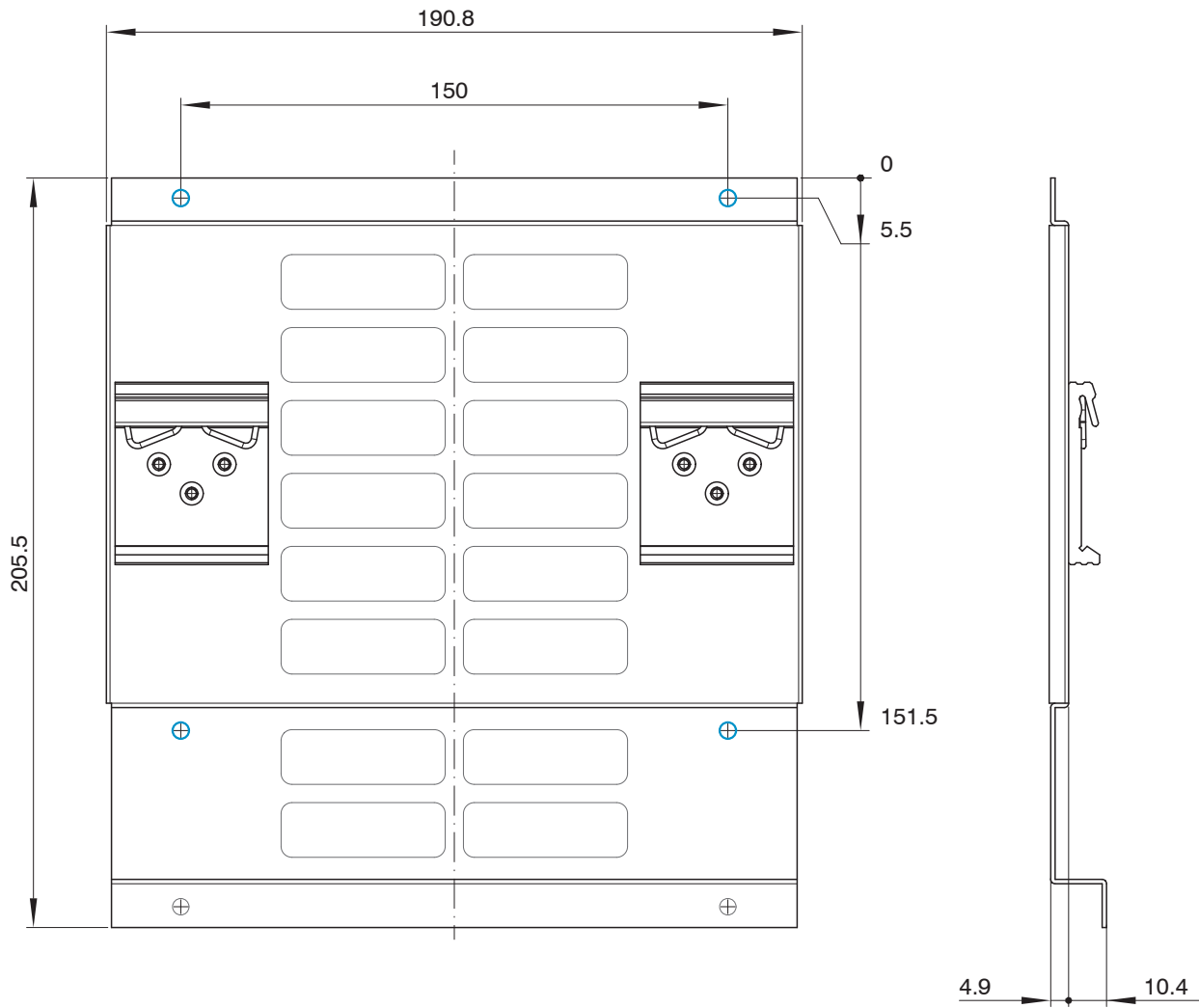


Fig. 11 Dimensions mounting plate for DIN rail mounting



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