



Instruction manual

Industrial PCs

MES9000 series

Read these instructions carefully before using and store for future reference.

These instructions contain important information about the product, in particular about its intended use, safety, installation, utilisation, maintenance and disposal.

Hand over the instructions to the user following installation of the product, and pass the manual on to the new user if the product is resold.

These instructions can be downloaded from: www.ads-tec-iit.com in the download area.

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1 General information about documentation

1.1 General information

The purpose of this instruction manual is to ensure the safe and efficient use of type MES9000– industrial PCs, hereinafter referred to as the "device".

All of the safety instructions and handling instructions given in the manual must be obeyed in order to ensure that work is carried out safely.

All users must read this instruction manual and have access to it at all times.

The original version of this instruction manual was written in German. All non-German versions of this instruction manual are translations of the German instruction manual.

1.2 Explanation of safety instructions

1.2.1 Structure of safety instructions

The signal word classifies the hazard.

Reference to the type/consequences and source of the hazard is made underneath the signal word.

Instructions for preventing the hazard are identified by an arrow (➔).

DANGER



Type and source of the hazard!

Possible consequences if the hazard is disregarded

➔ Measures for avoiding the hazard

1.2.2 Explanation of signal words

DANGER



Indicates an imminent danger. If not avoided, death or severe injury will result.

WARNING



Indicates a possible danger. If not avoided, death or severe injury could result.

CAUTION



Indicates a possible danger. If not avoided, light or minor injuries could result.

ATTENTION

Indicates a possibly damaging situation. If not avoided, the system or something in its surroundings could be damaged.



Recommendation for use:





Indicates terms and/or conditions that strictly need to be observed to ensure optimised and/or zero-defect operation. Tips and suggestions for the efficient use of the device and software optimisation are also provided.

1.3 Relevant device documentation

The following documents are decisive to device setup and operation:

- This instruction manual:
contains information for installation, commissioning and operation of the device along with technical data.
- Website:
You can download the instruction manual as well as drivers, software, user manuals, leaflets and flyers from the Download area of our website www.ads-tec.com.

1.4 Symbols

Symbol	Meaning
	Label on batteries and electronic devices. They may not be disposed of with household waste, but must rather be disposed of separately. Used batteries and electronic devices must be returned to the point of sale or a disposal system.
	Symbol for the protective earth connection (PE)
	Symbol for the functional earth connection (FE)
	Symbol for hot surface

1.5 Data, figures and modifications

All data, text and figures were prepared to the best of our knowledge. They do not represent any assurance for the properties themselves. Despite taking utmost care, no liability can be assumed for accuracy, completeness and actuality of the information. Subject to changes.

1.6 Trademarks

It is noted that any software and/or hardware trademarks and any company brand names mentioned in this documentation are all subject to the general trademark protection rights.

Big-LinX® and X-Remote® are registered trademarks of ADS-TEC.

All other used third-party trademarks are hereby acknowledged.

In the case of trademark infringement, ADS-TEC reserves the right to exercise all rights.

1.7 Copyright

This instruction manual is protected by copyright. For the authorised user, simple usage rights are granted within the scope of the intent of the contract. Any modified use or exploitation of the provided content, particularly duplication, modification or publishing in whatever form is permitted only with the prior consent of ADS-TEC. In the case of copyright infringement, ADS-TEC reserves the right to exercise all rights.

2 General device information

2.1 Manufacturer and contact details

The manufacturer of the device is ads-tec Industrial IT GmbH. The company is referred to in the following as ADS-TEC.

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72622 Nürtingen
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2.2 Intended use

The device is used for the visualisation and control of a wide range of processes on systems and machines in various application environments.

In combination with the optional IP65 kit or the also optional support arm adapter, the device can also be used in wet and dusty production environments.

The operator alone shall be responsible for ensuring that all **operator obligations** are observed and for complying with any technical or statutory amendments that may arise.

Installation, commissioning and operation may only be performed by **qualified and trained personnel**.

Intervention by the user is required only for performing the actions described in this document. Should any further modifications be required, it is necessary to consult either with the manufacturer directly or with service personnel authorised by the manufacturer.

The device must be **de-energised** during service work. Appropriate measures must be taken to prevent **electrostatic discharges** on components.

The device is **only** to be assembled, installed and operated **within the permissible specifications**. Use in non-specified environments is prohibited.

2.3 Improper use

Operation other than or beyond that described for the device shall be deemed improper use.

The device is not allowed to be used to control vehicles or for applications for which further approvals beyond the manufacturer's declaration are necessary, e.g. applications with explosion hazard, medical technology and shipping industry.

The device does not support any safety functions of functional safety. Do not use the device to evaluate safety-relevant data in order to bring a system to a safe state.

The device must not be put into operation in the case of transport damage or nonconformity with the specifications and must be taken out of operation in the case of changing conditions.

In the case of improper use, ADS-TEC shall not accept responsibility or liability for injury or damage that is directly or indirectly attributable to the handling of the device.

If the device is opened up by an unauthorised person, the user may be subject to hazards and the warranty is invalidated.

Should the device have evident signs of damages caused, e.g., by improper operation or storage conditions or due to improper use or handling, it must be shut down immediately. Ensure that it is secured against being started up accidentally.

The device can be damaged as a result of unauthorised mechanical modifications. Make sure that the device is not drilled, chiselled or perforated and its exterior shape and design is not modified in any way!

2.4 Environmental conditions

ATTENTION

Damage caused by heat!

If the device is exposed to sunlight or any other light or heat source, it can overheat and suffer damage.

- ➡ Do not expose the device to direct radiation by sunlight or any other light or heat source!

ATTENTION

Damage caused by condensation!

If a cold device comes into contact with warm ambient air, condensation may form.

- ➡ Switch on the device only after it has acclimated to the ambient temperature.

The device must be operated under the environmental conditions specified in the **technical data**. Failure to observe any one of these conditions will invalidate the warranty of the device. ADS-TEC cannot be held liable for any damages arising from improper use and handling.

2.4.1 Vibration/shock resistance

The vibration/shock resistance tests were performed as follows:

Vibration near machines or conveyor belts

- DUT: functional device
- Test standard: EN 60068-2-6
- Mode of vibration: Sine
- Test axes: X / Y / Z
- Frequency: 5...200 Hz
- Change in frequency: + 1 octave/min
- Deflection: 3 mm
- Amplitude: 10 m/s²
- Test duration: 2 h per axis
- DUT status: DUT electrically in operation
- Test criterion: Visual inspection after the test and functionality of the DUT during and after the test

Shock resistance near machines or conveyor belts

- DUT: functional device
- Test standard: EN 60068-2-27
- Shock form: semi-sinusoidal
- Test axes: +X / -X / +Y / -Y / +Z / -Z
- Amplitude: 250 m/s²
- Duration: 11 ms
- Pre-/Post-compensation: 7%
- Test duration: 10 shocks per direction and axis
- DUT status: DUT electrically in operation
- Test criterion: Visual inspection after the test and functionality of the DUT during and after the test

2.5 Conformity

The manufacturer hereby declares that the product described in this instruction manual complies with all relevant stipulations of the following European directives:

- 2011/65/EU RoHS Directive
- 2014/30/EU EMC Directive (only devices without WLAN)
- 2014/53/EU RED Directive (only devices with WLAN)
- EC 1907/2006 REACH Regulation



The device is a Class A device (industrial sector). Class A may cause interference when used in residential environments.

The EU conformity declaration is available for download at

<https://www.ads-tec-iit.com/en/support/eu-conformity>



Recommendation for use:

For full compliance with the EMC legislation, all components and cables used for device connection must also be compliant with these requirements. It is therefore necessary to employ Bus and LAN cables with shielded connectors and these must be installed as per the instructions contained in the respective instruction manuals.

2.6 Warranty / repairs

During the device warranty period, any repairs must only be performed by the manufacturer or by service personnel that has been authorised by the manufacturer.

2.7 Limitation of liability

ADS-TEC shall not be liable for personal injury, property damage or damage caused to the device as well as consequential damage that is/was the result of non-compliance with this instruction manual, improper use of the device, repairs and other actions on the device by unqualified electricians and electricians not certified by ADS-TEC, or that is/was the result of using unapproved replacement parts. Failure to observe the maintenance intervals shall also result in exclusion from liability. Furthermore, it is strictly forbidden to make any unauthorised alterations or technical modifications to the device.

2.8 Treatment and disposal of batteries

This device contains a lithium battery for supplying the system clock with power as long as the supply voltage is not connected. The battery has a life cycle of 3-5 years depending on which load is applied.

**Recommendation for use:**

To prevent unexpected plant downtime, as a precaution the CMOS battery should be replaced within the scope of the maintenance plan (e.g. every 3 years).

- For more information, see section 10.2 Replacing the CMOS battery

The used battery should be disposed of in accordance with local legal regulations.

WARNING

**Hazard due to explosion**

Danger of explosion if using incorrect battery types.

- ➔ Use the battery type recommended by the manufacturer.

ATTENTION

Damage to the battery

Incorrect handling of the battery can cause it to be damaged or destroyed.

- ➔ Lithium batteries should not be exposed to fire, soldered, recharged, opened, short-circuited, reversed or heated above 100 °C and they should be disposed of properly as well as protected against sunlight, humidity and condensation!

ATTENTION

Hazard due to thermal loads

The more the battery is exposed to higher temperatures, the faster it ages.

- ➔ Operate the device within its specifications.

3 Scope of delivery

Check that the contents of the package are intact: If there are signs of damage, please contact the manufacturer immediately. The device must not be put into operation.

Check that the contents of the package are complete and match your order:

- 1 x device
- 1 x 5-pin connector for power supply and for digital input/output on DC devices
- 1 x power supply cable with 2-pin connector for power supply on AC devices
- 1 x 2-pin connector for digital input on AC devices
- Quick-start guide
- Accessories according to order/delivery note, e.g. an IP65 kit or a tube adapter

4 Mechanical installation

4.1 Requirements



The **external device dimensions** are given in Section 11 **Dimensional drawings**.

4.2 Attaching to a VESA 100 interface

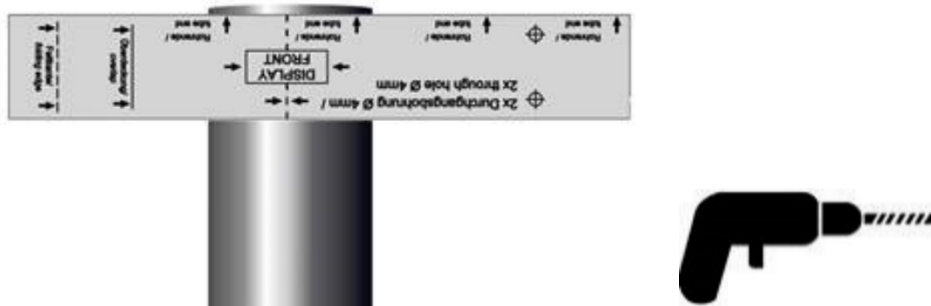
The device can be attached to the VESA 100 interface on the rear side.

- Horizontal and vertical distance between the screw holes: 100 mm
- Thread: M6, torque: 3.5 Nm (recommended)
- Screw-in depth in the threaded bushings: max. 7 mm



4.3 Attaching using a tube adapter

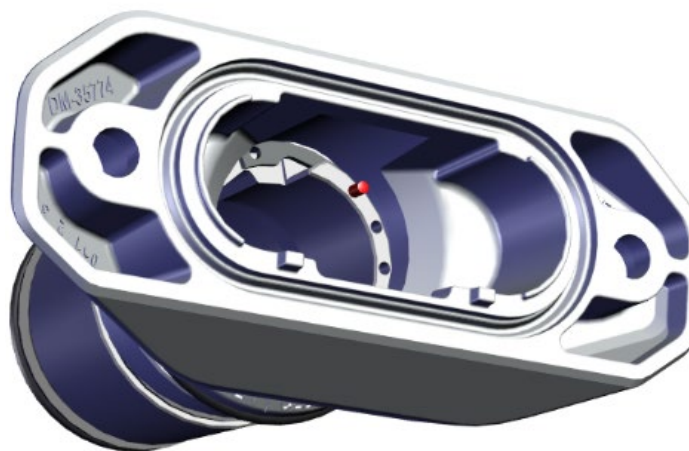
1. **Deburr** the end of your support tube (diameter 48.3 mm).
2. Stick the **drilling template** around the end of the support tube so that the holes to be drilled are located on the rear side of the tube. Next, drill two **4-mm holes**:



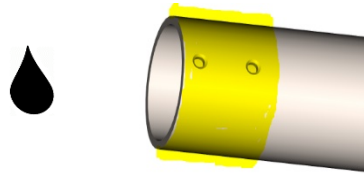
3. Twist off the sealing sleeve:



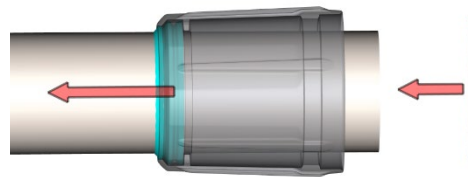
4. If necessary: Insert one or two cylindrical pins from the scope of delivery into the holes in the tube stub to limit the swivel angle. See section 4.3.1 Swivel angle limitation.



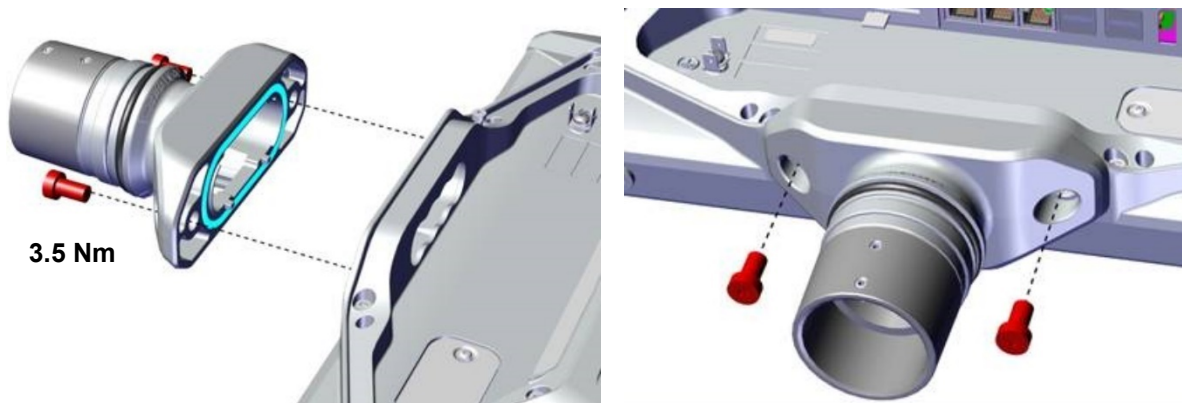
5. Apply a suitable **lubricant** to the seal and the tube end to make it easier to slide on the sealing sleeve (e.g. penetrating oil, soap or fitting grease, depending on the application type).



6. Slide the sealing sleeve onto the tube and check again that the **seal** is seated correctly. Then, add the **spacer ring**.



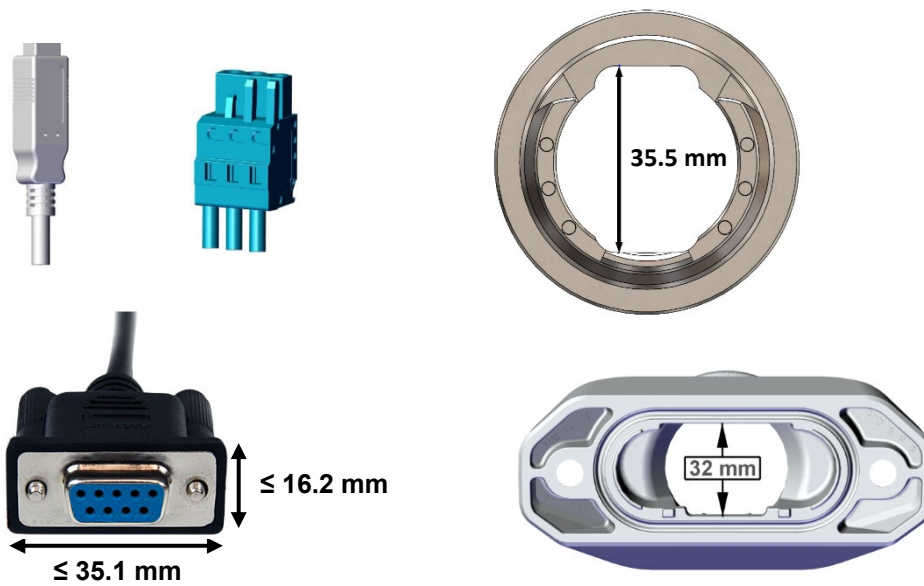
7. Check that the **seal**, which is marked in turquoise in the figure, is seated correctly. Next, screw the flange onto the device:



8. Remove the threaded pins:



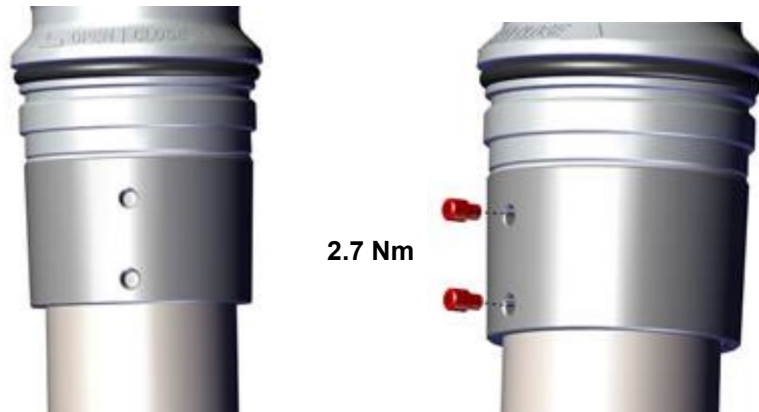
9. Route all of the required cable lines through the tube adapter and the tube.



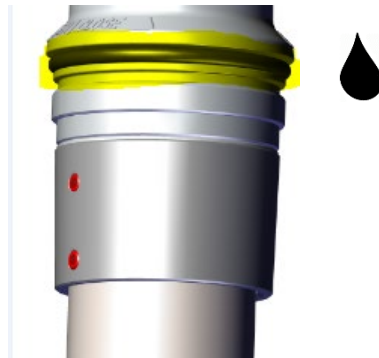
10. Attach the tube adapter to the tube:



11. Align all of the parts so that the holes in the tube and in the tube adapter are positioned on top of one another and the threaded pins can be screwed in again.



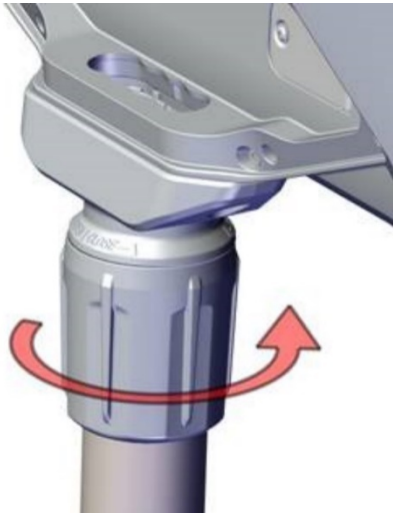
12. Lubricate the upper seal with a thin layer of a suitable **lubricant** (e.g. penetrating oil, soap or fitting grease, depending on the application).



13. Slide on the sealing sleeve:



... and turn it until it is sufficiently tight:



Recommendation:

In the first step, the nut is used to eliminate any remaining play (looseness). It is turned until the tube adapter sits on the device **without any play**.

The nut can then be turned further to adjust the **turning resistance**.



The process for attaching the **service slot cover** is described in section 10.1.

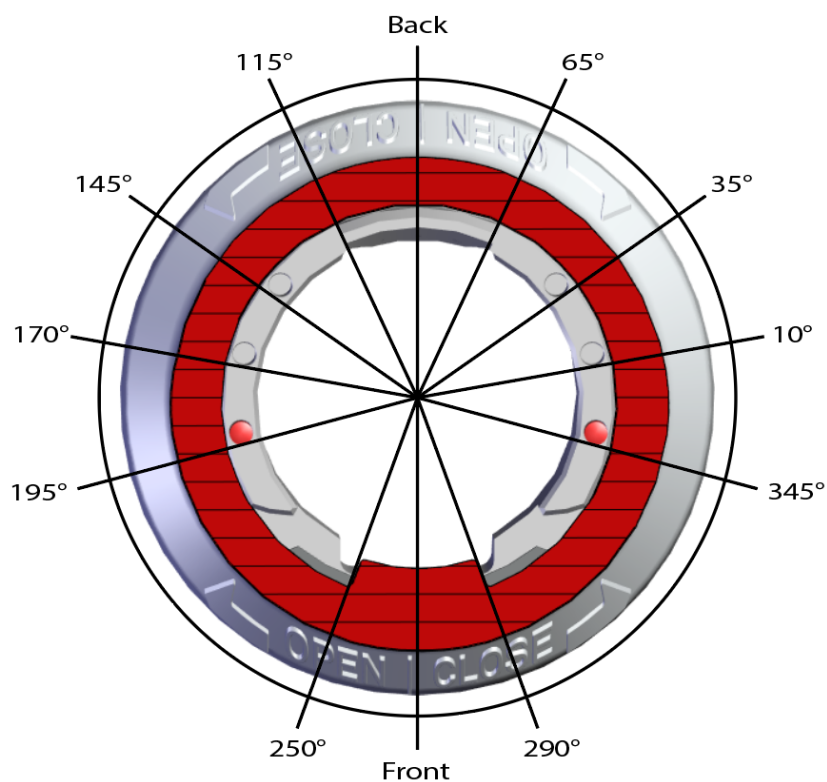
4.3.1 Swivel angle limitation

Without pins, the screen can be swivelled by 270°.

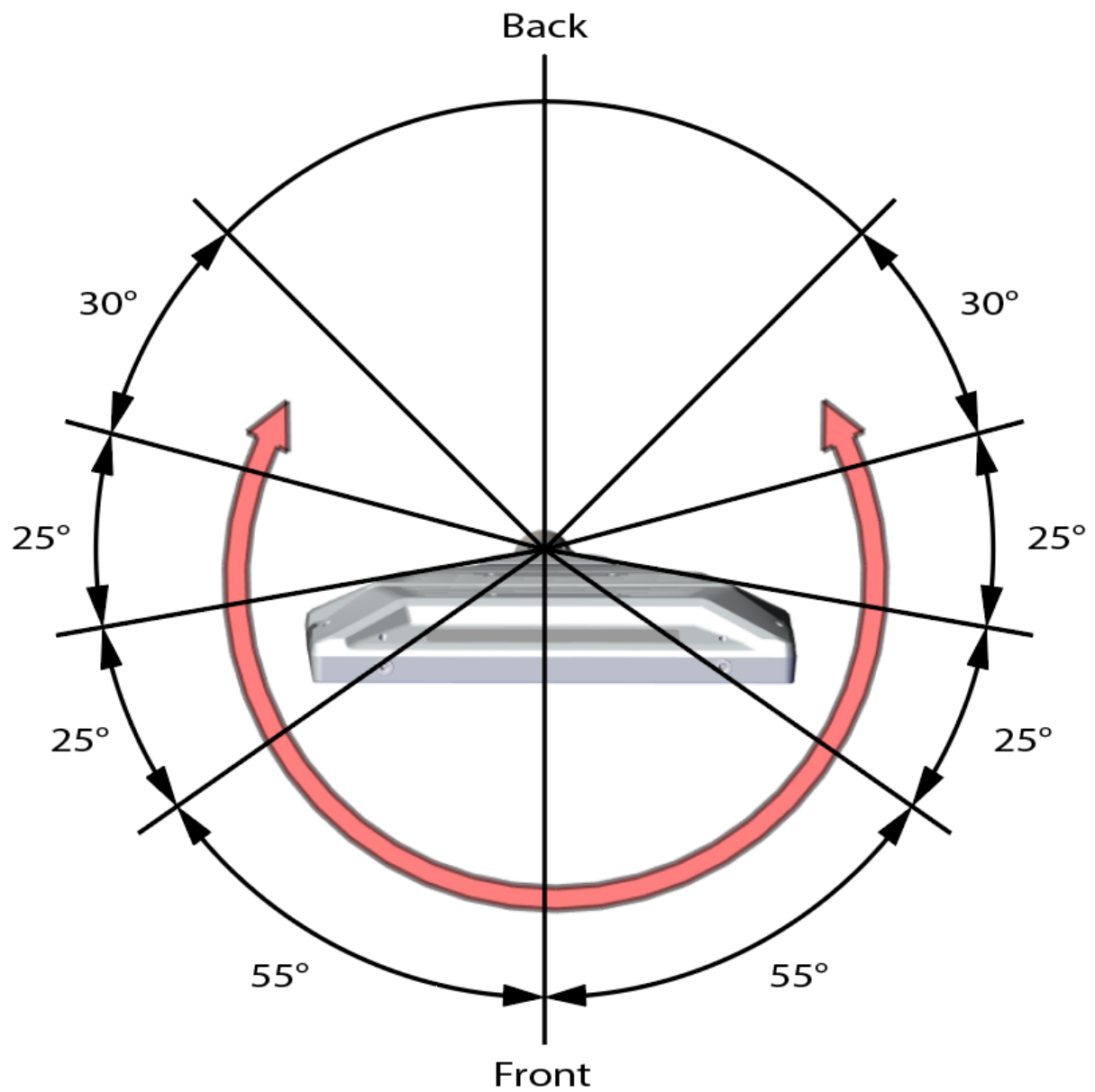
With the cylindrical pins (2.5 x 10 mm) from the scope of delivery, this angle can be limited.



The following graphic shows the positions of the cylindrical pins and the internally specified angles:



This results in the following **swivel angles** for the monitor:

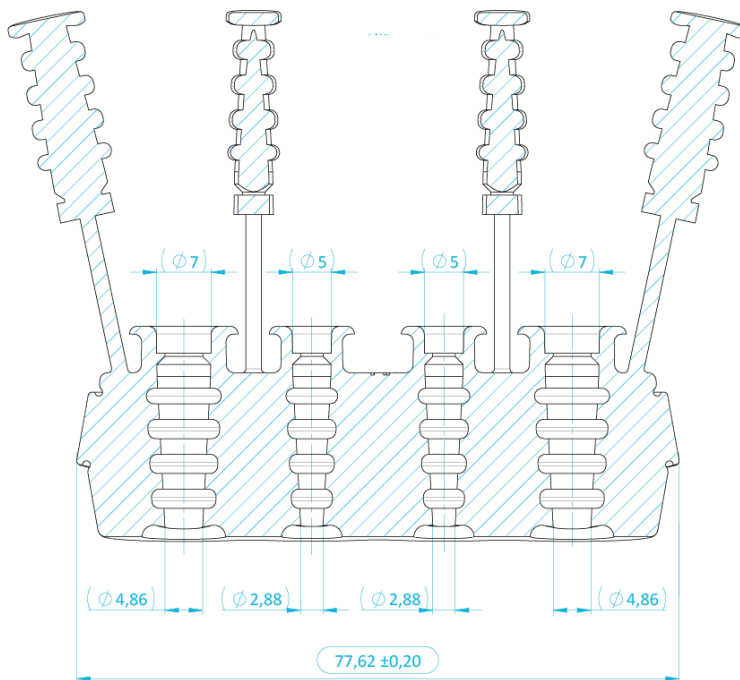


4.4 Attaching the IP65 kit

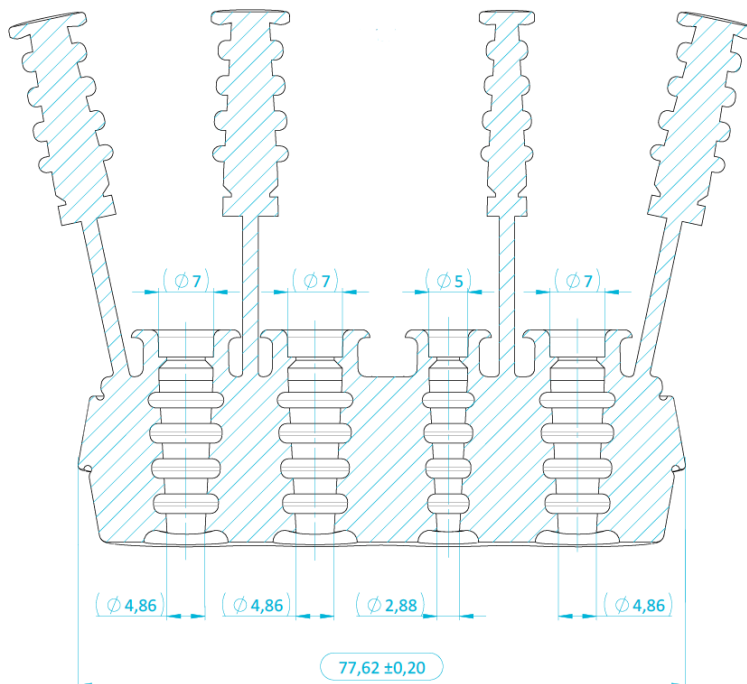
4.4.1 Dimensions of the grommets

The IP65 kit includes two grommets through which cables can be routed. The grommets have different hole diameters and should be used as required.

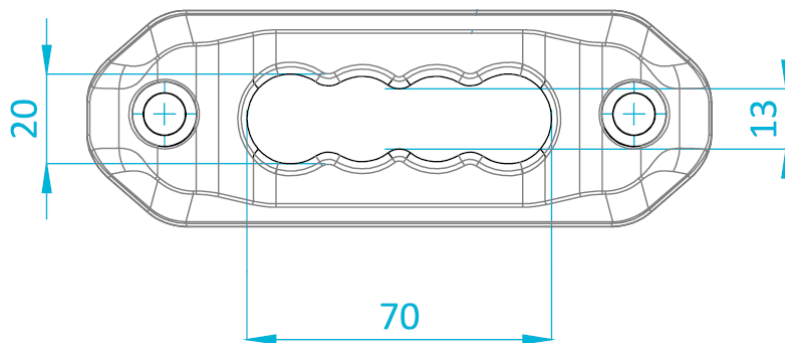
Type 1: 2 x hole 5...7 mm; 2 x hole 3...5 mm



Type 2: 3 x hole 5...7 mm; 1 x hole 3...5 mm

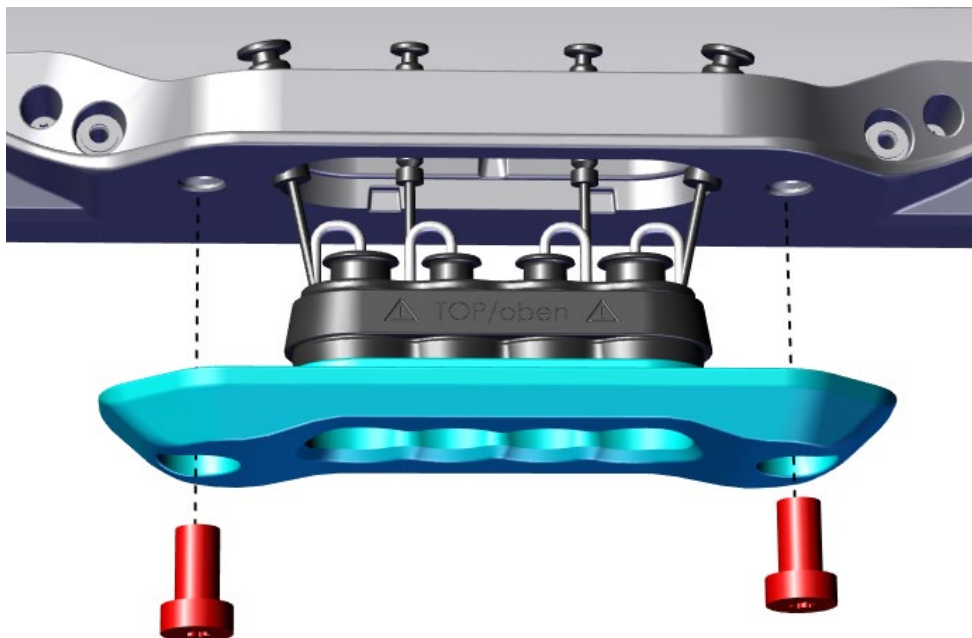


4.4.2 Dimensions of the retainer

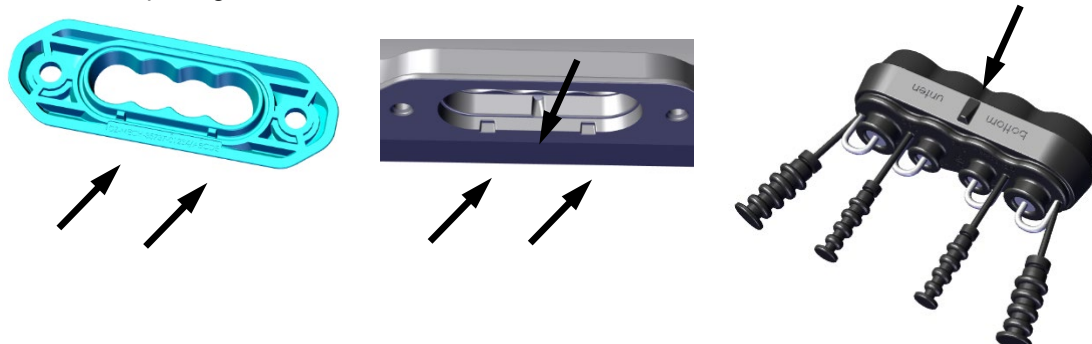


4.4.3 Attaching the grommets

- 1.) Route all of the required cable lines through the opening in the device, the cable grommet and the retainer.



- 2.) When doing so, pay attention to
 - the different hole diameters in the supplied grommets as specified in section 4.4.1,
 - the **top/bottom** marking on the grommets,
 - the correct alignment of the retainer and the grommets: the **protrusions** must sit in the **grooves** of the device opening.



- 3.) Insert the appropriate **rubber plugs** into any holes that are not required.
- 4.) Press the grommet into the opening in the device.
- 5.) Press the retainer against the grommet and tighten the two screws.

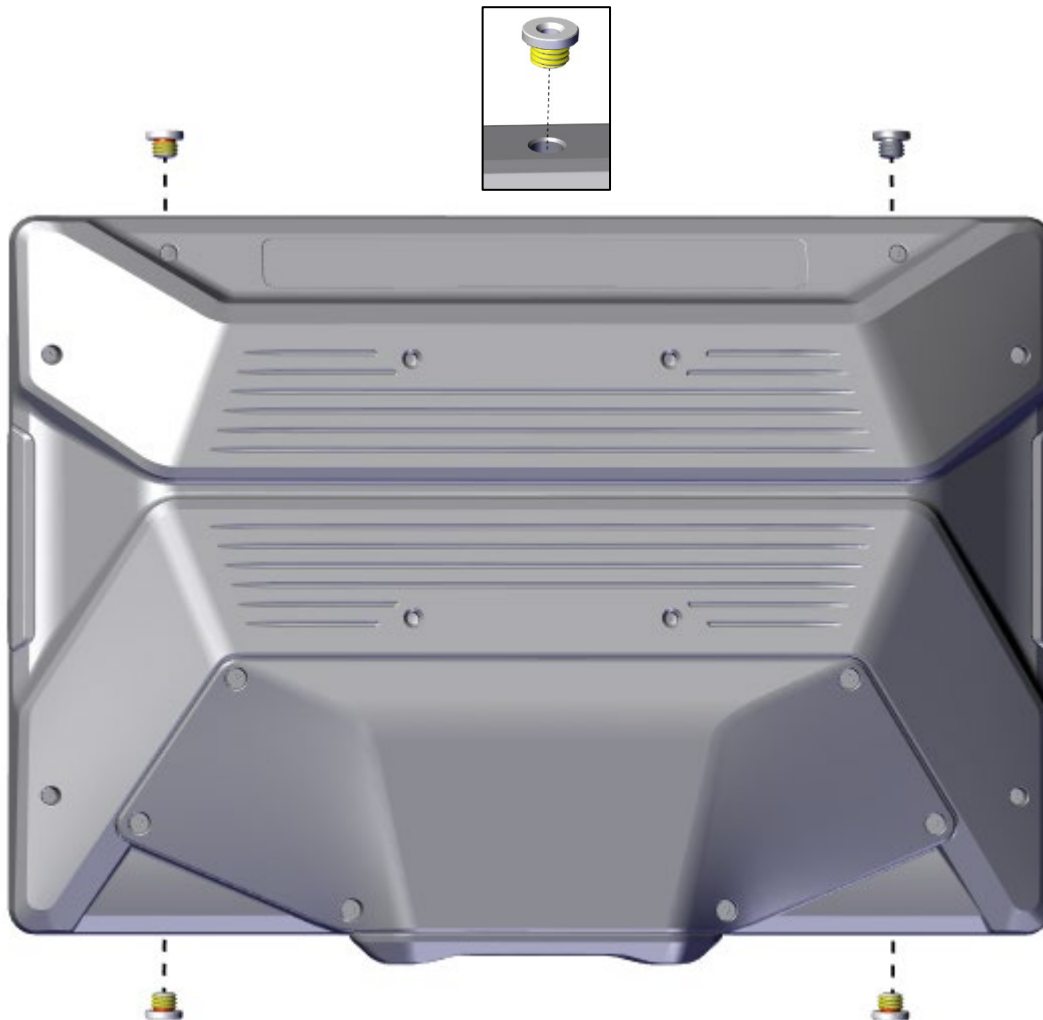
Torque **M = 3,5 Nm**



The process for attaching the **service slot cover** is described in section 10.1.

4.5 Attaching accessories

On the top and bottom of the device, there are threaded holes into which the optional screw-in sleeves can be screwed if required.



Installing the screw-in sleeves:

The sleeves must be screwed into the housing with a torque of **$M = 8.5 \pm 0.5 \text{ Nm}$** . The external thread has an encapsulated adhesive coating that ensures lasting hold. Once the adhesive has cured, the part is not intended to be removed.

Using the internal thread of the sleeves to attach accessories:

- Internal diameter: M6
- Max. screw-in depth in the sleeve: 7 mm
- Torque: **$M = 8 \text{ Nm}$**

5 Electrical connections

5.1 Requirements

WARNING

**Hazard due to electric shock with fatal consequences**

With device variants with an **AC voltage supply**, the electrical connection must be performed by a specialist electrical engineer.

Before commissioning, a **protective earth conductor test** must be carried out **according to VDE 0701/0702** to ensure that the protective earth is functioning optimally.

ATTENTION

Damage due to electrostatic discharge!

Damage to the device can be caused by electrostatic discharge.

- Always adhere to the safety measures applicable when handling components at risk of being damaged by electrostatic discharge.

ATTENTION

Damage to the electronics!

The electronics can be damaged if connectors are connected or disconnected while power is still being applied.

- Make sure that no power is being applied when connecting and disconnecting connectors.

5.2 Earthing concept

The earthing concept essentially depends on the installation site and must be planned and implemented by a specialist electrical engineer.

The following are provided on the device:

- only on 24-VDC devices: An **FE** connection in the power supply connector as **EMC filter reference potential**,

ATTENTION

This connection is necessary in order to comply with **EMC** requirements.

- on 24-VDC and AC devices: A **PE** earthing lug **in the service slot**.



Recommendation for use:

When possible, FE and PE should be connected to the central earthing rail via **separate** cable lines.

Conductor cross sections for single-wire cable lines:

- **PE**: Up to a maximum cable line length of 5 m: \geq AWG 17 (\triangleq 1 mm²). Optimal: AWG 13 (\triangleq 2.5 mm²).

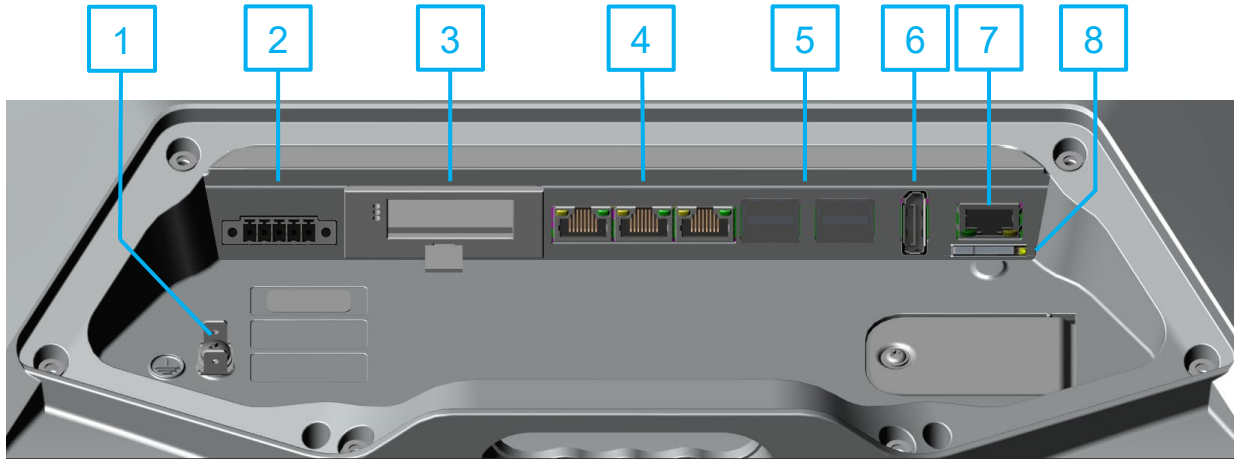
The cable colour must be green-yellow and the effectiveness of the protective earthing must be confirmed by carrying out a **protective earth conductor test according to VDE 0701/0702**.

- **FE**: AWG 18 (\triangleq 0.75 mm²). The cable colour must not be green-yellow.

5.3 Interfaces

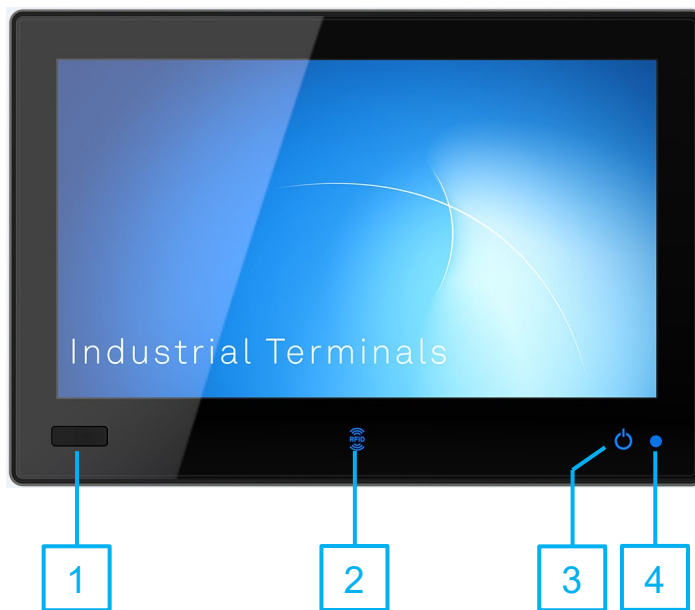
5.3.1 Overview of the rear side (service slot)

Example illustration. Position assignments may differ depending on the version:





No.	Description
1	Protective earth (PE) connection, see section 5.2
2	Power supply and, depending on the device variant, digital input/output, ⇒ On 24-VDC devices: See sections 5.3.3 and 5.3.5 ⇒ On AC devices: See sections 5.3.4 and 5.3.6
3	Options at this position: – Hilscher netJACK for fieldbus and real-time Ethernet systems, see section 7.7 – RS232, see section 7.8
4	3 x LAN (RJ45). Controllers used: LAN 1: i219-V / LAN2 & LAN3: i210 For "Wake on LAN": see section 7.9
5	4 x USB gen. 3.2
6	DisplayPort++™ (1.2)
7	Optional in this position: HDBaseT transmitter (RJ45), see section 7.2
8	Slot for Big-LinX® smart card, see section 7.3

5.3.2 Overview of the front side



No.	Description
1	Optional: USB slot
2	Optional: RFID reader
3	ON/OFF button (can be enabled and disabled in the <i>Configuration Center</i>)
4	SYS LED (only visible with the ON/OFF button disabled)

5.3.3 Devices with 24 VDC power supply


DO	Digital output 24 VDC	 <p>(The figure shows the socket inside the device)</p>
DI	Digital input 24 VDC	
0V	Reference potential	
FE	Functional earth 	
V+	+24 VDC \pm 20%	

Conductor cross sections: V+ / FE / 0V: AWG 18 ($\approx 0.75 \text{ mm}^2$)



The permissible voltage tolerances and the maximum values for the power consumption can be found in section 12 **Technical data**.

5.3.4 Devices with an AC voltage supply

N / L	AC voltage	 <p>(The figure shows the socket inside the device)</p>
0V	Reference potential of the digital input	
DI	Digital input +24 VDC \pm 20 %	



The permissible voltages and the maximum values for the power consumption can be found in section 12 **Technical data**.

A supply line with conductor cross sections of 1 mm^2 is provided and can be used for the power supply.

If you assemble your own cable, we recommend the following:

- Cable end sleeves: 8 mm in length with approval corresponding to the area of application.
Examples: Panduit FSD77-8-D or Klauke 4708
- Blade terminal for PE wires: 6.3 x 0.8 mm without junction with approval corresponding to the area of application. Examples: JST FVDDF1.25-250A or Klauke 720

5.3.5 Digital input and output on 24-VDC devices

Digital output

Type 3 according to IEC61131 (no self-diagnostic function)

0 signal = 0 V (high impedance) / 1 signal = 24 VDC, max. 30 mA.

Reverse voltage polarity protection.

Automatic restart after fault state (e.g. after short circuit at output).

Initialisation time: 150 ms from device switch-on

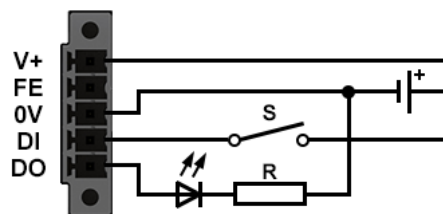
Digital input

Type 3 according to IEC61131

0 signal: < 8.7 VDC / 1 signal: > 10.95 VDC / 8.7...10.95 VDC = undefined (hysteresis)

Current: Max. 2.7 mA

Schematic circuit diagram



The digital inputs and outputs can be configured in the **Configuration Center**, and can be read in or out and integrated into user programs using the program library **adsXtern.dll** (ADS-TEC External User Library).

- Contact ADS-TEC support for further information.

5.3.6 Digital input on AC devices

Type 3 according to IEC61131

0 signal: < 8.7 VDC / 1 signal: > 10.95 VDC / 8.7...10.95 VDC = undefined (hysteresis)

Current: Max. 2.7 mA

Electrically isolated from the rest of the electronics



The digital input can be configured in the **Configuration Center**, and can be read in or out and integrated into user programs using the program library **adsXtern.dll** (ADS-TEC External User Library).

- Contact ADS-TEC support for further information.

5.4 Maximum cable lengths

**Recommendation for use:**

Note the maximum cable lengths for the respective application type.

The maximum length of cables which can be used to connect the monitor and computer is:

- HDMI up to max. 15 m
- DisplayPort up to max. 10 m
- USB 2.0 up to max. 15 m (with active hubs, otherwise 5 m)

For long distances between the display and the computer, you will need the HDBaseT version:

- HDBaseT™ up to max. 100 m, see also Section 7.2

6 Commissioning

6.1 Requirements

WARNING

**Hazard due to electric shock with fatal consequences**

Before commissioning a device with an **AC voltage supply**, a **protective earth conductor test** must be carried out **according to VDE 0701/0702** to ensure that the protective earth is functioning optimally.

ATTENTION

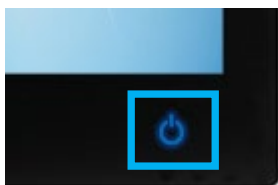
Hazard due to condensation

Damage to electronic components caused by condensation resulting from temperature fluctuations.

- Switch on the device only after it has acclimated to the ambient temperature.

6.2 Switching the device on

By default, the device can be started using the **capacitive button** on the front side of the device. To do so, the button must be pressed and held for **at least 1 s**, depending on the configuration in the *Configuration Center*:



The button has a blue-grey LED and indicates the following states:

- LED lights up grey: Device is being supplied with power but is switched off.
- LED lights up blue: Device is on.
- LED flashes blue-grey: Device is in an energy-saving state.

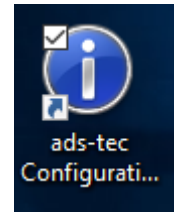
This button can be activated and deactivated in the *Configuration Center*.

Alternatively, the device starts when the power supply is switched on. For this to happen, the "Autostart" function must have been enabled in the *Configuration Center* (see the following section).

6.3 Configuring the device

After start-up there is an icon on the Windows Desktop that can be used to call up the **ADS-TEC Configuration Center**.

Important: To be able to configure settings, you will need to start the Configuration Center **with administrator rights** (right-click with mouse and select "Run as administrator" from the context menu).



The **Configuration Center** can be used to make a number of settings, e.g.:

- Behaviour of the ON/OFF pushbutton
- Disabling of the USB interfaces
- Write-protection of the mass storage or parts of it
- Configuring a soft keyboard
- Enabling or disabling radio modules (= wireless devices)
- Many other modules that are already available or in preparation

6.4 Operating multiple monitors on an MES9000

6.4.1 Number

Up to three monitors can be operated in parallel:

- the integrated display of the MES9000,
- a full HD monitor on the DP connection of the MES9000,
- a full HD monitor via HDBaseT.



Tip: Using the **X-Remote®** software from ADS-TEC, you can clone a desktop to up to 8 computers and, thanks to clearly regulated access rights, operate it alternately from each of the computers.

6.4.2 Windows display settings

Possible display arrangements when using the "Display settings" integrated in Windows:

- Extend the desktop to all three displays (no cloning).
- Duplicate the desktop on 1 and 2 (desktop clone); have monitor 3 as an extended desktop.
- Duplicate the desktop on 1 and 3 (desktop clone); have monitor 2 as an extended desktop.

Notes:

- Open the Windows display settings via:
Desktop -> right mouse-key -> Display settings
- The settings on the "Display settings" page always relate to the monitor(s) selected above.



- You can adjust the arrangement of the monitors to meet your requirements by dragging and dropping.



- To switch from one clone mode to the other (b->c or c->b), you must first switch to the display extended across three monitors.

6.4.3 Screen resolution on cloned displays

When clones are created, the operating system automatically uses the lowest common value for the screen resolution.



Recommendation for use: For connection in parallel, only use full HD monitors with 1920 x 1080 px.

6.4.4 Displaying a start screen

Regarding the display of a **boot screen**, the following applies:

- Aside from on the integrated screen, a boot screen is only shown on monitors that are connected via DisplayPort.

Regarding the display of the **login screen**, the following applies:

- The login screen is only displayed on the integrated display of the MES9000 and on other monitors that have been configured as clones.
- Monitors that are configured as an extended desktop are supplied with a picture signal by the operating system only once you have logged in successfully.

7 Features (some optional)

7.1 DisplayPort™

The devices have a DisplayPort connection in version DisplayPort++™ (1.2) as standard for data transmission to a monitor.





7.2 HDBaseT™

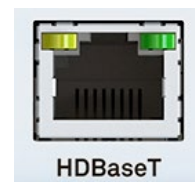
With HDBaseT™, the connection between the computer and monitor is established using a LAN cable with RJ45 plugs. The distances that can be bridged depend on the network infrastructure used:

- with a CAT6a patch cable without sockets etc.: max. 70 m
- with a Cat. 7 or 7a LAN installation cable + sockets + two 1 m patch cables: max. 100 m

Status indicators of the transmitter module

The two LEDs in the connector indicate various system states:

LED signal		Action
HDCP	 Flashing red	No active encryption
	 Illuminates red	Encryption active
HDBT	 On	Connection present
	 Off	No connection present



HDCP = High-bandwidth Digital Content Protection; HDBT = HDBaseT™

7.3 Big-LinX® (IoT platform)

Big-LinX is a versatile and scalable platform for different IoT applications.

- To establish a connection to the Big-LinX cloud, insert the Big-LinX smart card into the slot labelled **SIM**.

To pull the drawer out: press the yellow button with a ballpoint pen or the like.



You can obtain Big-LinX here:

www.ads-tec-iit.com/en/reliable-remote-access/biglinx

7.4 RAID system

The device supports two separate SSD mass storage devices that can be used together with the help of RAID technology (RAID = redundant array of independent disks).

To use this function, two type **M.2 2242 Key M** SSD cards with a **SATA** interface are required. NVMe cards with a PCIe interface cannot be used.

Supported options:

- **RAID level 0 striping:** this RAID variant is recommended when a large data storage system with high data access speeds is required. Since the data are not stored redundantly, this level is only recommended if data loss will not result in serious consequences, e.g. because the data can be recovered easily if a storage medium fails.
- **RAID level 1 mirroring:** both mass storage devices redundantly store the same data in this case. If a mass storage device fails, usually no data is lost and the defective mass storage device can easily be replaced. The total storage size corresponds to the smallest of the individual storage devices used.



The desired RAID level must be specified when placing the order.

7.5 WLAN/Wi-Fi

This optional function uses the resources provided by the respective operating system and an internal antenna.

7.6 Bluetooth™

Devices with WLAN also have Bluetooth, which allows e.g. the connection of a mouse or headphones.

This function uses the resources provided by the respective operating system and an internal antenna.

7.7 netJACK plug-in modules

The netJACK plug-in modules from **Hilscher** make it possible to connect the device with all common fieldbus and real-time Ethernet systems, such as PROFIBUS® DP, PROFINET® IO, CANopen®, EtherCAT®, EtherNet/IP™, POWERLINK, Sercos® and many more.

Connection to the device (i.e. the host system) is provided by **PCI Express**.



Manufacturer's model number:

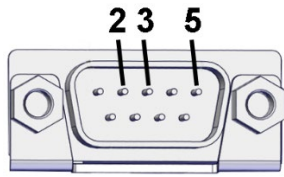
Type	Protocols
NJ 100EN-DN	DeviceNet
NJ 100EN-CO	CANopen
NJ 100EN-DP	PROFIBUS
NJ 100EN-RE	EtherCAT, EtherNet/IP, Open Modbus/TCP, POWERLINK, PROFINET, VARAN, Sercos



Information on installing and removing the modules can be found in section 10.3. The procedure for installing the drivers is described in section 8.3. Detailed information, manuals and software for the individual modules are available at www.hilscher.com

7.8 RS232

Hardware configuration



(The figure shows the socket inside the device)

			From the perspective of the device:
Pin 2	RxD	Receive Data - Data reception cable line	Input
Pin 3	TxD	Transmit Data - Transmission cable line	Output
Pin 5	GND	Ground - Reference potential	

Configuration of the "WhlHsUart" driver

As of 12/2021, the following IOCTLs are implemented in the driver for the RS232 interface:

- IOCTL_UARTTESTTOOL_OPEN
- IOCTL_UARTTESTTOOL_CLOSE
- IOCTL_SERIAL_SET_BAUD_RATE
- IOCTL_SERIAL_GET_BAUD_RATE
- IOCTL_SERIAL_SET_MODEM_CONTROL
- IOCTL_SERIAL_GET_MODEM_CONTROL
- IOCTL_SERIAL_SET_LINE_CONTROL
- IOCTL_SERIAL_GET_LINE_CONTROL
- IOCTL_SERIAL_SET_CHARS
- IOCTL_SERIAL_GET_CHARS
- IOCTL_SERIAL_SET_HANDFLOW
- IOCTL_SERIAL_GET_HANDFLOW
- IOCTL_SERIAL_GET_MODEMSTATUS
- IOCTL_SERIAL_GET_DTRRTS
- IOCTL_SERIAL_GET_MODEMSTATUS
- IOCTL_SERIAL_GET_COMMSTATUS
- IOCTL_SERIAL_GET_PROPERTIES
- IOCTL_SERIAL_SET_FIFO_CONTROL
- IOCTL_SERIAL_GET_STATS
- IOCTL_SERIAL_CLEAR_STATS
- IOCTL_SERIAL_PURGE
- IOCTL_SERIAL_SET_TIMEOUTS

As the IOCTLs *IOCTL_SERIAL_SET_WAIT_MASK* and *IOCTL_SERIAL_WAIT_MASK* have not been implemented in this version of the driver, it does **not** generate **events** such as RXCHAR, RXFLAG, TXEMPTY, CTS, DSR, RLSD, BREAK, ERR, RING, PERR.

For this reason, user programs should not wait for events; instead, they should **poll** the **data via read operations**.

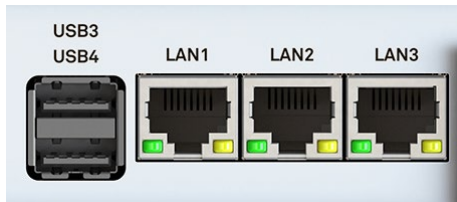


Detailed instructions for the driver "**WhlHsUart**" can be requested from ADS-TEC support.

7.9 Wake on LAN (WoL)

This function can be used for event-driven start-up of "sleeping" computers on the local network, such as for running updates at night.

The interfaces **LAN1 ... LAN 3** are available for this purpose:



The computer must be in one of the following ACPI states^{*)} in order to wake up via WoL:

- State S5: computer is shut down, voltage is present
- State S3: energy-saving ("sleep") state
- State S4: hibernate state

^{*)} Advanced Configuration and Power Interface

7.9.1 Settings in BIOS

The following setting must be active to enable the use of WoL:

In the **standard BIOS** (press the [Del] key several times when starting):

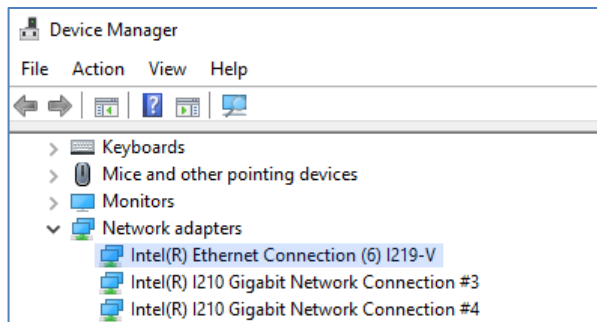
- *ads-tec Settings / LAN1 (i219) Wake on LAN Enable / **Enabled***

If the **network stack** has been activated, the following settings are also required:

- ads-tec Settings / Intel® I210 Gigabit Network Connection [MAC1] / NIC Configuration / Wake on LAN: Enabled
- ads-tec Settings / Intel® I210 Gigabit Network Connection [MAC2] / NIC Configuration / Wake on LAN: Enabled

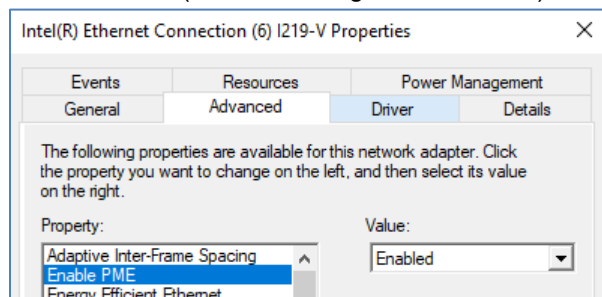
7.9.2 Settings in the operating system (Windows 10)

In **Device Manager** under "Network adapters", open the properties dialogue box of the Ethernet controller for the LAN connector being used (the example here is for LAN1):

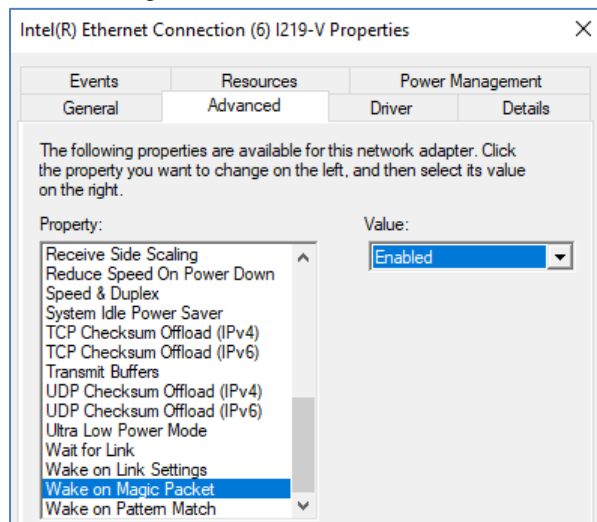


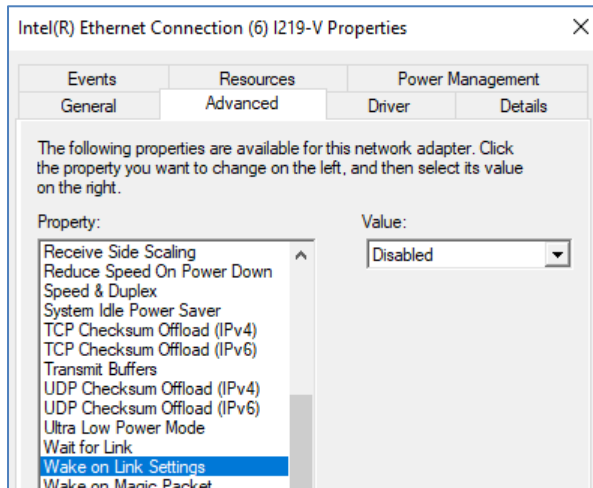
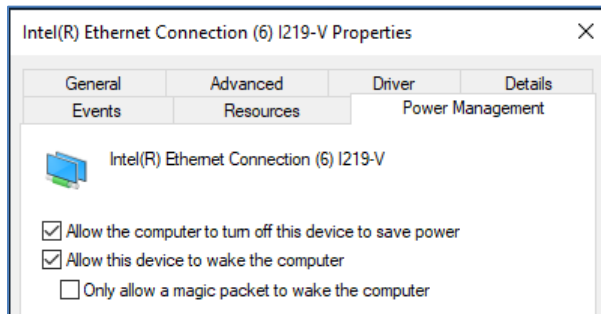
Make the following settings on the "Advanced" tab:

1. Enable "PME" ("Power Management Events"):



2. Enable "Magic Packet":



3. Disable "Wake on Link Settings":4. On the *Power Management* tab: "Allow the device to wake the computer":

8 Software / driver installation

8.1 Initial installation of the operating system

The devices are delivered with a pre-installed operating system depending on the client's specifications. If the mass storage has been reformatted, the operating system can be reinstalled by using one of the existing interfaces (alternatively via USB or PXE).

The files required for this (image, driver and firmware), along with a detailed description of the procedure, can be obtained from ADS-TEC support on request.

8.2 Write protection

If the mass storage or parts of it have been write-protected in the **Configuration Center**, this write protection must be removed again before changes are made to the software installation. ⇒ Unified Write Filter

After the software installation has been changed, the write protection must be set again and the device restarted.

8.3 Installing Hilscher netJACK modules at a later date

If these modules are installed at a later date, a driver must be installed and can be found in the following directory: *C:\Drivers\Fielfbus\Hilscher*

From there, start the **cifX Device Driver Setup**.

After successful installation, the device will appear in the device manager as **cifX Communication Interface**.

9 Cleaning

Clean the device using some glass cleaner on a soft cloth.

10 Maintenance

WARNING

**Hazard due to electric shock with fatal consequences**

Before performing maintenance work on device variants with an AC voltage supply,

- the power supply must be switched off and
- secured to prevent it being accidentally switched back on.

When doing so, comply with the five safety rules of electrical engineering according to DIN VDE 0105-100 or corresponding national regulations and laws.

CAUTION

**Burns and shock caused by hot surfaces**

Touching hot surfaces can cause burns. In addition, unexpected contact can cause uncontrolled movements as a result of shock.

- Allow the device to cool down before performing service work.
- Wear suitable gloves as required.

CAUTION

**Personal injuries and damage to property through improper use**

All service work performed on the device must be performed only under safe, secure and de-energised conditions!

ATTENTION

Damage to device caused by electrostatic discharge

Always adhere to the safety measures applicable when handling components at risk of being damaged by electrostatic discharges in accordance with EN 61340-5-1/-2.

10.1 Opening and closing the service slot

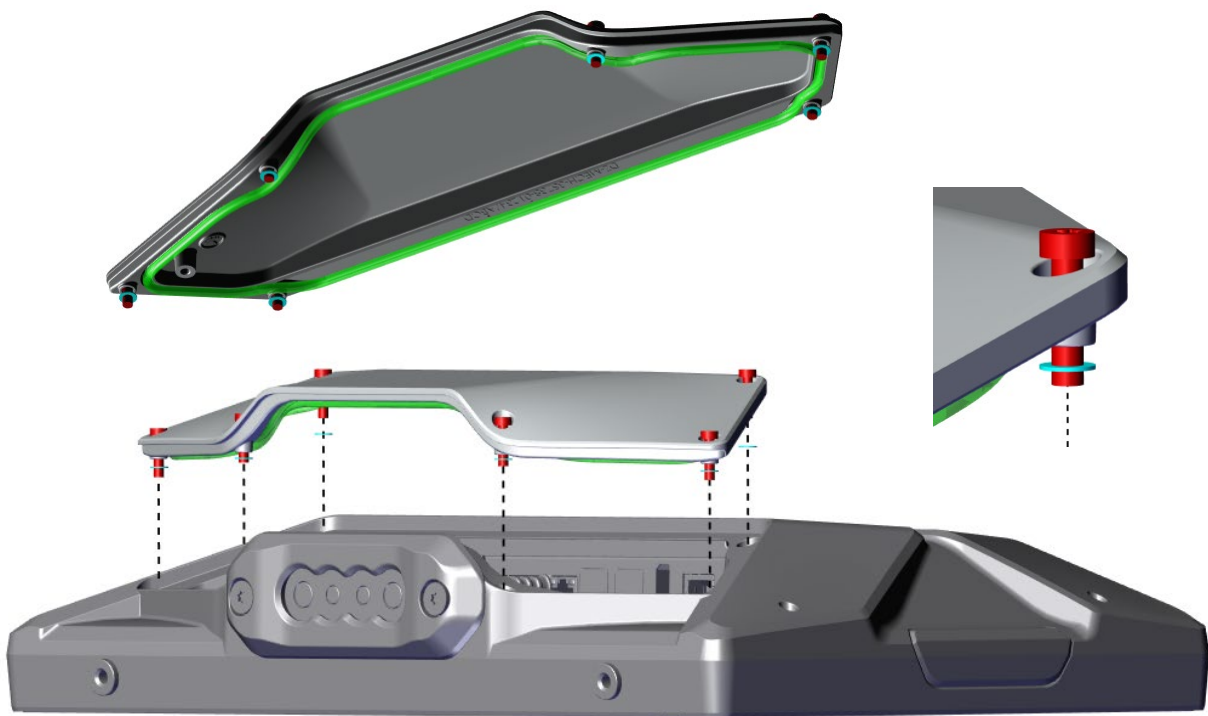
ATTENTION

Damage due to electrostatic discharge!

Damage to the device can be caused by electrostatic discharge.

- Always adhere to the safety measures applicable when handling components at risk of being damaged by electrostatic discharge.

On devices with a service slot cover, the cover is removed and attached as follows:



Notes:

- The plastic washers (turquoise in the figure) act as a loss-prevention device for the screws.
- The seal (green in the figure) must be inserted levelly into the groove around the edge of the service slot cover.

Torque for the screws: **M = 2 Nm**

The retainer and the cable grommet are removed as described in section 4.4.

10.2 Replacing the CMOS battery

The CMOS battery has a life cycle of 3-5 years depending on the load applied.



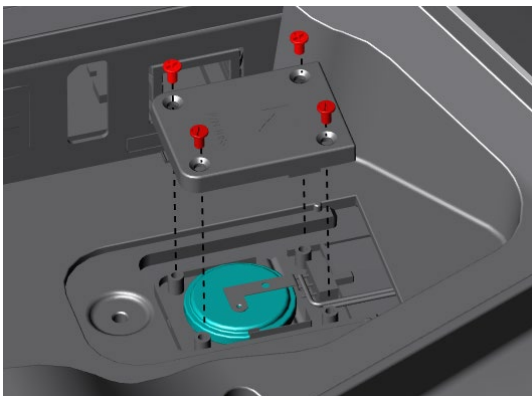
Recommendation for use:

To prevent unexpected plant downtime, as a precaution the CMOS battery should be replaced within the scope of the maintenance plan (e.g. every 3 years).

1. Remove the service slot cover (if present) as described in section 10.1.
2. First, remove the upper cover:



3. ... and then the lower cover:



4. Carefully remove the battery.

CAUTION



Risk of short circuit!

Do not use **metal** pliers or tweezers to remove or insert the battery.

Re-installation is performed in the reverse order of removal. The battery type to be used is:

- Lithium battery CR2032
- ADS-TEC part number: DZ-SONS-04075-1

Pay attention to the polarity when inserting the battery.

Please also note the general information on batteries in section 2.8.

10.3 Removing and installing the Hilscher netJACK module

10.3.1 Removal

Fully pull the **pull tab** out (e.g. using flat-nose pliers).



Pull the module out approx. 5 mm.

5 mm



Then, **lift the module a bit** to lift the metal brackets out of the circuit board.

FYI: Section 10.3.3 shows how the metal brackets are inserted into the circuit board.



10.3.2 Installation

- For modules in their original packaging:
Remove the ESD protective cardboard packaging.
Do **not** touch the contacts!



- Move the pull tab into a central position.



- Insert the module so that the contacts point towards the circuit board.



- Lower the module approx. 5 mm from the edge of the housing so that **the metal brackets come to rest in the recesses in the circuit board**.

FYI: Section 10.3.3 shows how the metal brackets are inserted into the circuit board.

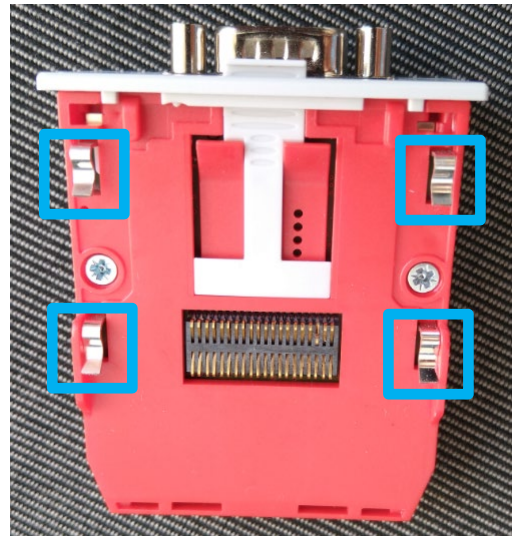


- Push the module in all the way with a slight pressure.
Then, push the pull tab in all the way.

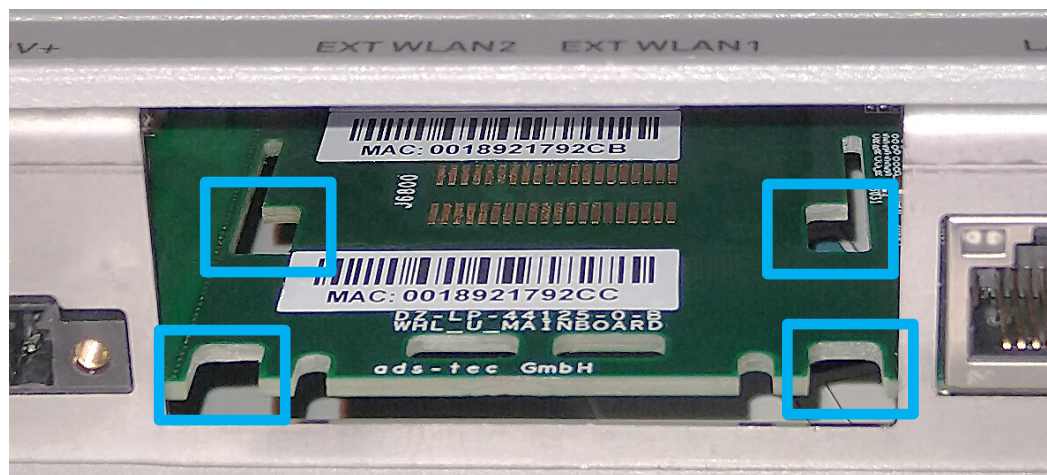


10.3.3 FYI: Fixing the module to the circuit board

The module is clamped onto the circuit board with **four metal brackets**.

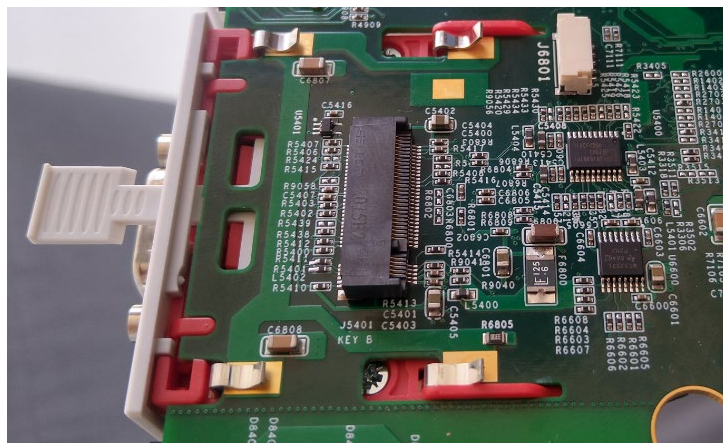


The metal brackets must be inserted into the **recesses** in the circuit board:



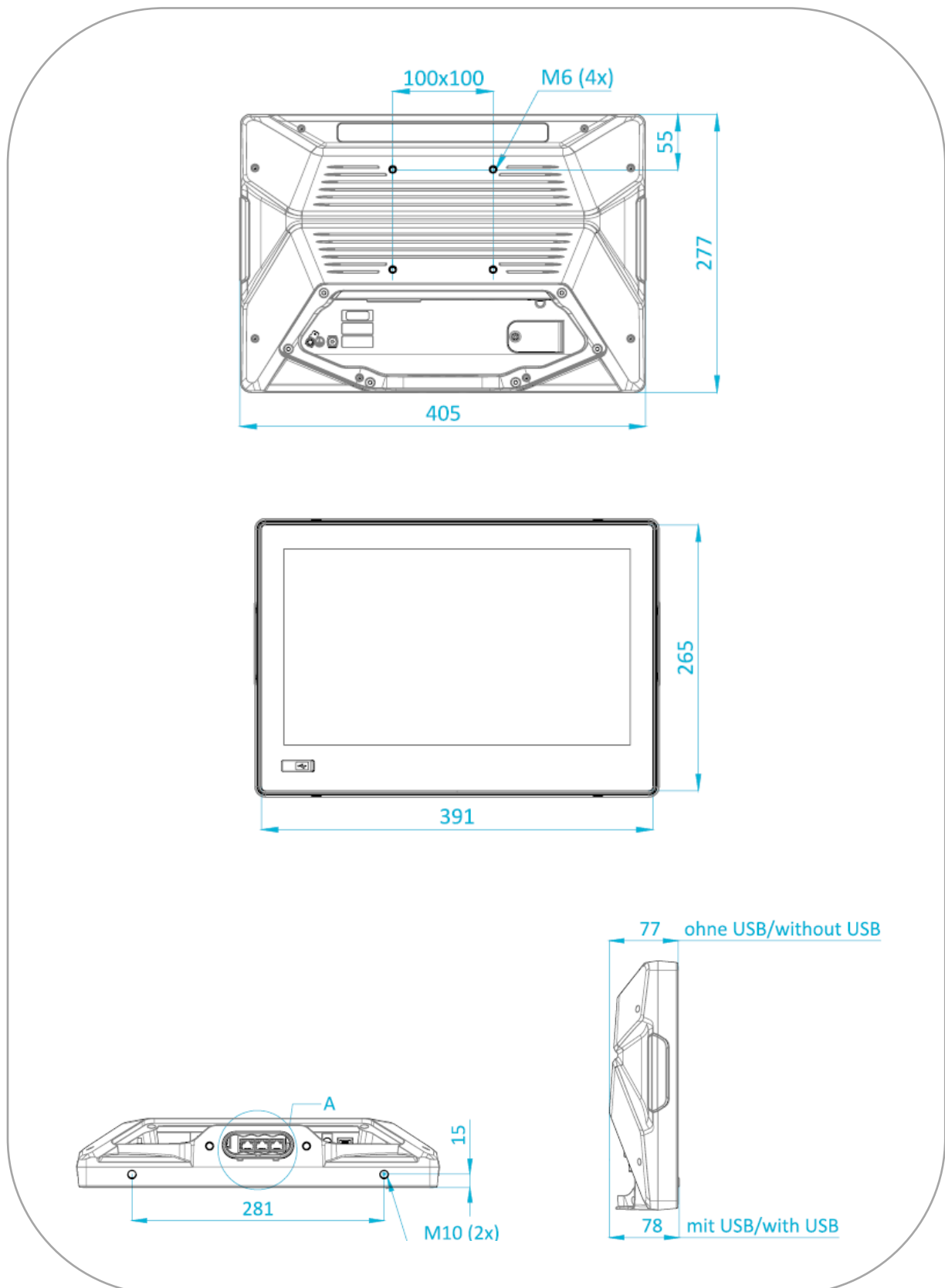
... and finally, **pushed onto the circuit board**, where they will click into place with a slight pressure.

For the purposes of illustration, this image shows the back of the circuit board (usually not visible) with the metal brackets fully inserted:

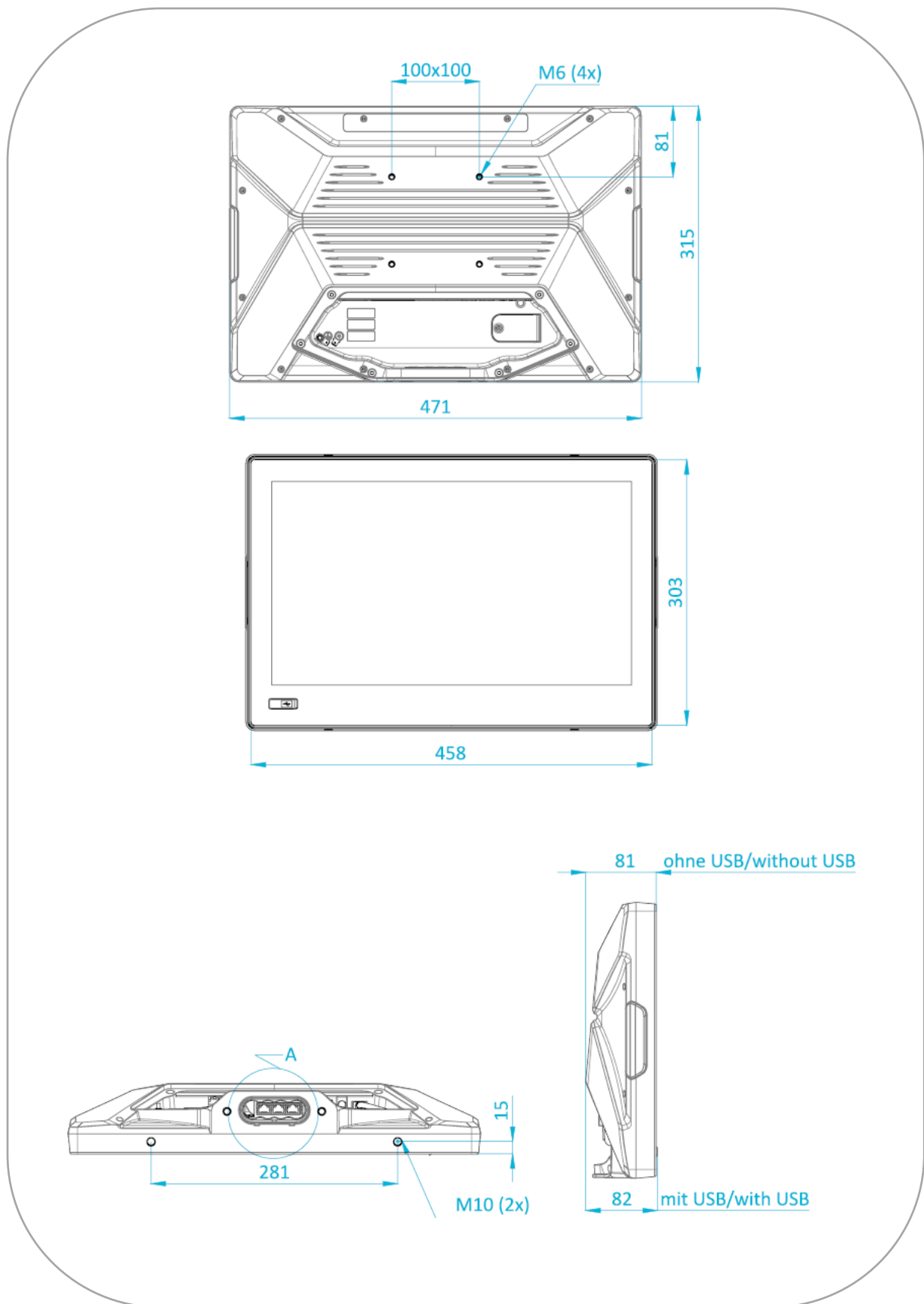


11 Dimensional drawings

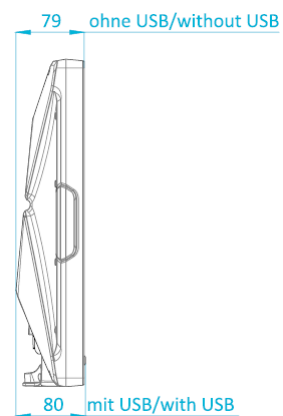
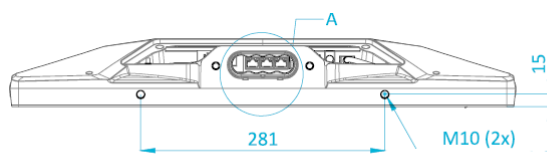
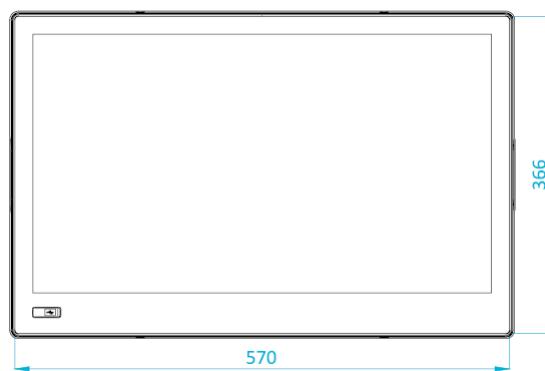
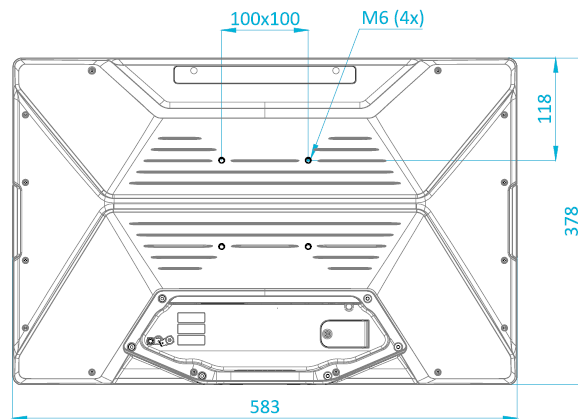
11.1 MES9016



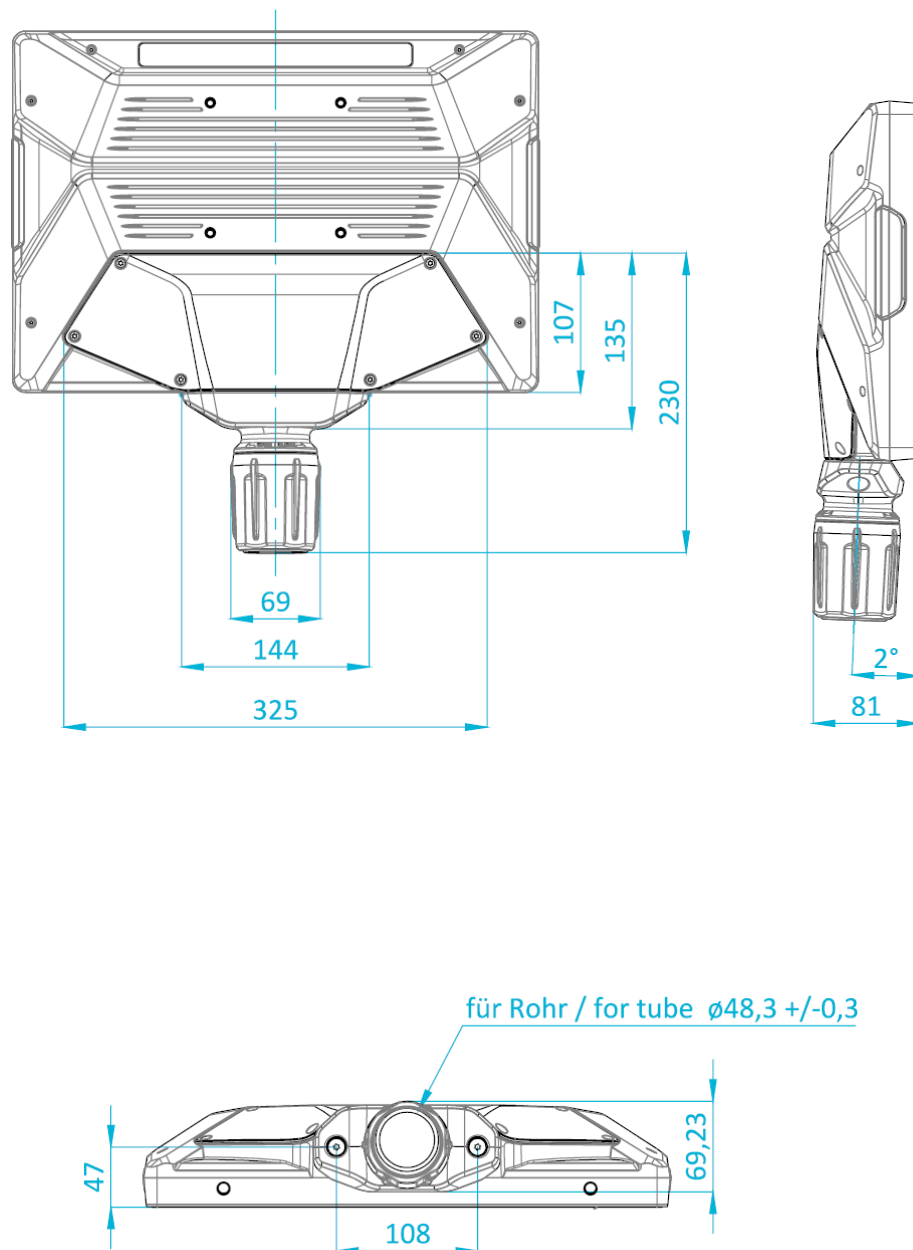
11.2 MES9019



11.3 MES9024



11.4 Support arm



12 Technical data

	MES9016	MES9019	MES9024
Display	15.6" TFT full HD	18.5" TFT full HD	23.8" TFT full HD
- Brightness	450 nits (typ.)	500 nits (typ.)	250 nits (typ.)
- Contrast ratio	800:1 (typ.)	1000:1 (typ.)	1000:1 (typ.)
- Colours	16.2 million	16.7 million	16.7 million
- LED backlight	50,000 h	50,000 h	30,000 h
Touch	PCAP multi-touch		
Housing	Die-casting aluminium, powder-coated		
Cooling	Passive Cooling, fanless		
Processors	Intel® Celeron® 4305UE 2.0 GHz Dual Core Intel® Core™ i5 8365UE 1.6 GHz Quad Core		
RAM	Up to 32 GB DDR4 RAM		
Mass storage *)	1 x 128 GB M.2 SSD 1 x 256 GB M.2 SSD 2 x 128 GB M.2 SSD, optionally configurable as RAID 2 x 256 GB M.2 SSD, optionally configurable as RAID *) Due to e.g. additional safety functions implemented by the SSD manufacturer, the available capacity of the mass storage may be slightly reduced.		
Interfaces	4 x USB gen. 3.1 2 (max. 1 A per connection) 3 x Ethernet (10 / 100 / 1000 Mbit/s) DisplayPort++™ (1.2) On 24-VDC devices: 1 x digital input, 1 x digital output On 230-VAC devices: 1 x digital input Smart card reader for ADS-TEC Big-LinX®		
Interfaces optional	HDBaseT™ transmitter Hilscher netJACK (excludes WLAN) WLAN/BT (excluding netJACK): Wi-Fi 6E 802.11ax and Bluetooth v5.3 with integrated antennas		
Interfaces on the front side	Capacitive ON/OFF button (can be disabled using software) / SYS LED / RFID (optional)		
Power supply DC variants	24 VDC ± 20% Celeron: max. 75 W Core i5: max. 120 W	24 VDC ± 20% Celeron: max. 85 W Core i5: max. 140 W	24 VDC ± 20% Celeron: max. 70 W Core i5: max. 125 W
Power supply AC variants	94...264 VAC Celeron: max. 75 W Core i5: max. 120 W	94...264 VAC Celeron: max. 85 W Core i5: max. 140 W	94...264 VAC Celeron: max. 70 W Core i5: max. 125 W

	MES9016	MES9019	MES9024
Perm. ambient temperature	In operation: 0 to +40°C For storage: -25 to +70°C		
Protection class	Front side: IP65/rear side: IP20 or IP65 (with IP65 kit or tube adapter) Humidity: 5 to 95% non-condensing		
Vibration/shock resistance	See Section 2.4.1 "Environmental conditions"		
EMC	Class A (industrial sector) as per EN 61000-6-2/4		
Dimensions	See section 11 "Dimensional drawings"		
Operating system	Windows 10 IoT Enterprise 2021 LTSC IGEL Linux		
Weight	Approx. 5 kg	Approx. 6 kg	Approx. 8 kg

13 Service & support

ADS-TEC and its partner companies offer you comprehensive maintenance and support services, ensuring quick and competent support should you have any questions or concerns with regard to ADS-TEC products and equipment.

Because ADS-TEC products are also used by partner companies, these devices may have customised configurations. Should any questions arise with regard to these specific configurations and software installations, please contact them as ads-tec will not be able to answer such questions.

ADS-TEC does not provide support services for any device that was not purchased directly from ADS-TEC. In this case, maintenance and support is provided by the partner company.

13.1 ADS-TEC support

The ADS-TEC support team is available for inquiries from direct customers between

8:30am and 5:00pm, Monday to Friday. The support team can be reached via phone or e-mail:

Phone: +49 7022 2522-202

E-mail: support.iit@ads-tec.de

Alternatively, you can contact us by completing a support form on our website www.ads-tec.com. Our Support team will then get in touch with you as soon as possible.

13.2 Company address

ads-tec Industrial IT GmbH

Heinrich-Hertz-Str.1

72622 Nürtingen

Germany

Phone: +49 7022 2522-0

E-mail: mailbox@ads-tec.de

Home: www.ads-tec-iit.com