Instruction manual

Industrial PCs
OPC9000 series

adstec

Industrial IT

Last changed: 2023-06-13

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.com in the download area.

Publisher

ads-tec Industrial IT GmbH

Heinrich-Hertz-Straße 1

72622 Nürtingen

Phone: +49 7022 2522-0

Internet:　　　www.ads-tec.com

E-mail:　　　　mailbox@ads-tec.de

Contents

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 OPC9000– 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.
Information on how to avoid the hazard is indicated 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. The batteries may not be disposed of with household waste, but must rather be disposed of separately. Used batteries must be returned to the point of sale or a disposal system.
	Label on electrical and electronic devices. Electrical and electronic devices must not be disposed of with household waste, but must rather be taken to a collection point for waste electrical equipment.
	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.

ads-tec Industrial IT GmbH

Heinrich-Hertz-Str.1

72622 Nürtingen

Germany

Phone: +49 7022 2522-0

Email: mailbox@ads-tec.de

Web: www.ads-tec.com

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.

The device is intended to be installed in a recess in a wall or cabinet. Its IP protection class permits only indoor installation.

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 product does not support any safety functions of functional safety. Do not use the product 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 heat!

If the device is installed in a panel, casing or similar, heat accumulation can occur.

➡ Make sure that heat can be dissipated from the device.

ATTENTION

Damage caused by condensation!

If the temperature of the device is different to that of the environment in which it is located, condensation can 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
- Deflection shape: sinusoidal
- Test axes: X / Y / Z
- Frequency: 2-9/9-200
- 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 / +Y / +Z
- Amplitude: 250 m/s²
- Duration: 11 ms
- 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

CE

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

The EU conformity declaration can be requested at http://www.ads-tec.de/support/support-anfrage.html and is available for download at http://www.ads-tec.de/support/download/eg-konformitaetserklaerung.html.

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 lithium 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.

The battery type to be used is:

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

The used lithium 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

Hazard due to thermal loads

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

➡ Operate the device within its specifications.

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!

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

- Accessories according to order/delivery note

4 Mechanical installation

4.1 Requirements

- The device is intended to be installed in a recess in a wall or cabinet.

- The installation site must be accessible from the rear.

- The wall can be between **1.5 and 6 mm** thick.

- The operating company must ensure that the wall can support the weight of the device.

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

4.2 Installation recess OPC9016
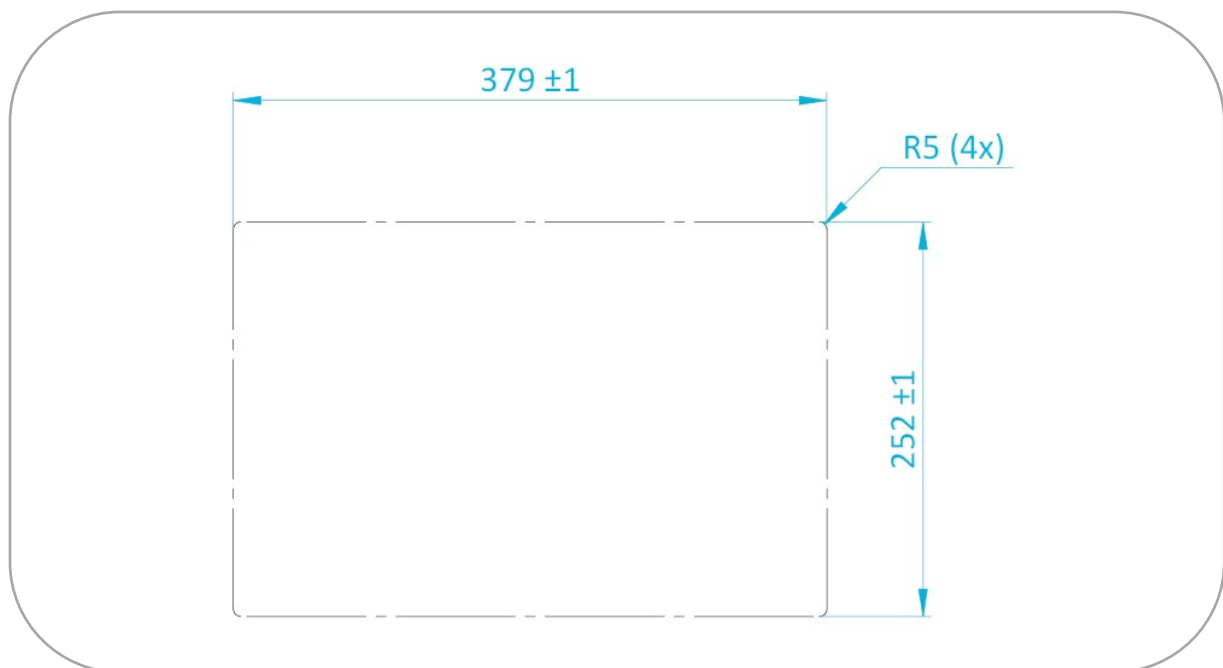
4.3 Installation recess OPC9019

4.4 Installation recess OPC9024

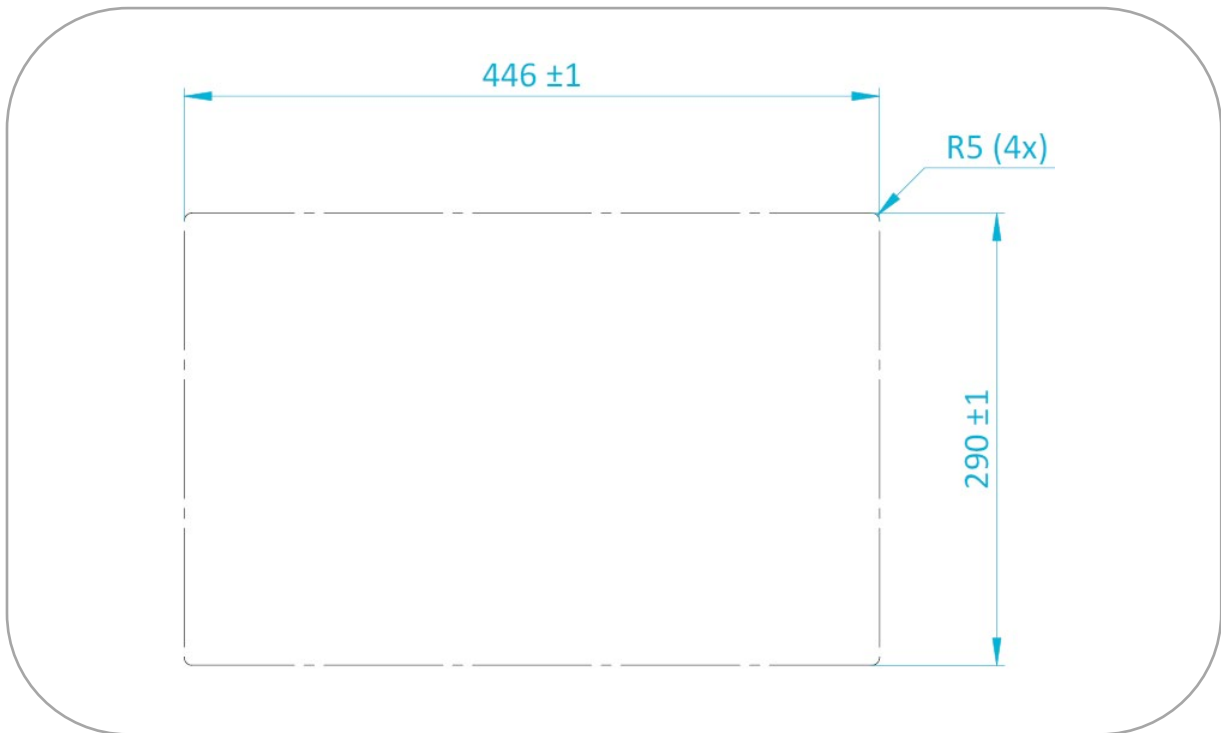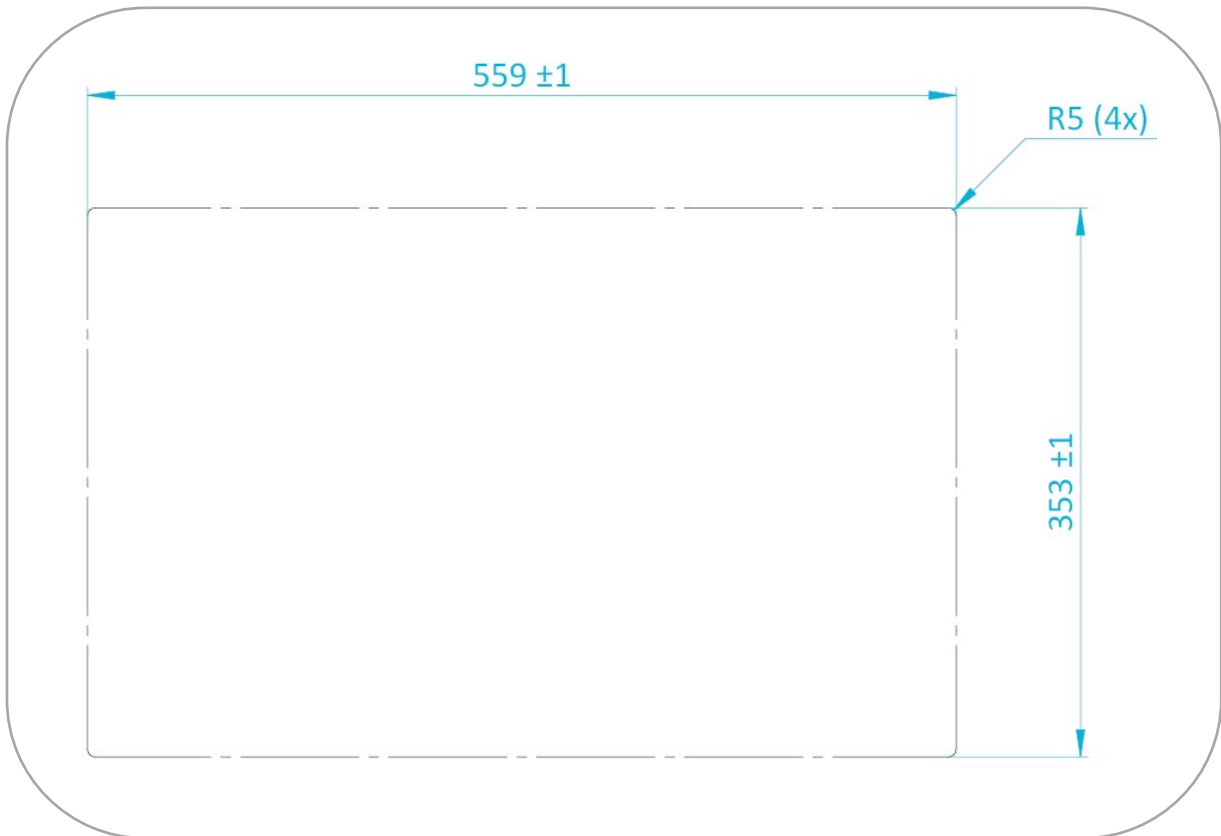## 4.5 Device installation – Sequence

1. Depending on the orientation of the device, loosen, for example, the left and right clamp by <u>turning the clamping screws clockwise</u> (5 mm hex socket).
The clamps will protrude slightly from the housing due to spring pressure.

> ### CAUTION
>
> **Personal injuries and damage to property due to the unit falling down**
>
> ⚠️ If the clamps protrude more than 5 mm (e.g. 15 mm), they are disengaged and can no longer bear mechanical loads.
>
> - Make sure that the clamps do not protrude more than 5 mm.
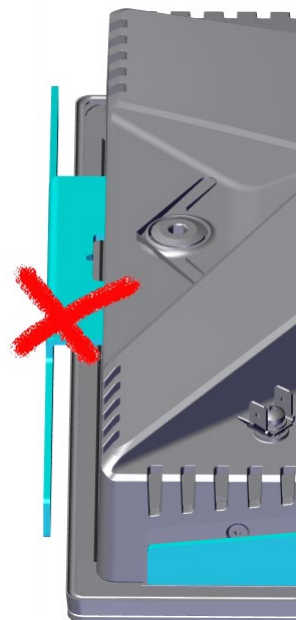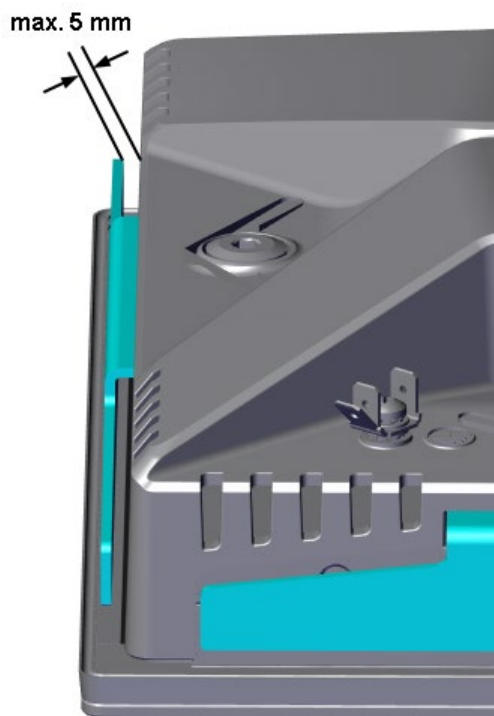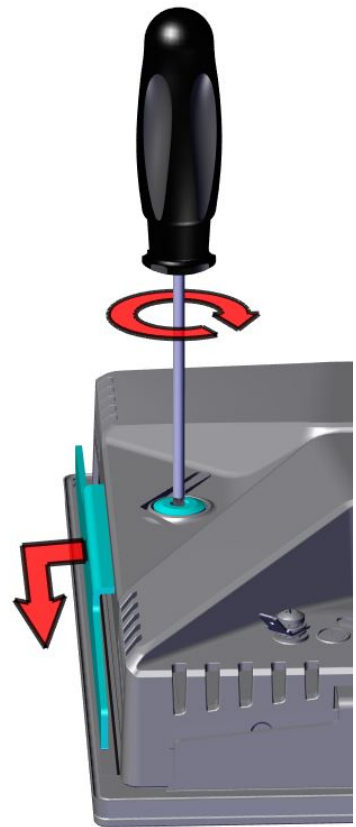
2. Press the loosened clamps in, and insert the device into the wall recess from the front.

3. Once the device is in place, the spring tension should cause the clamps to snap over the inner edge of the wall recess.

4. Also loosen the remaining clamps.
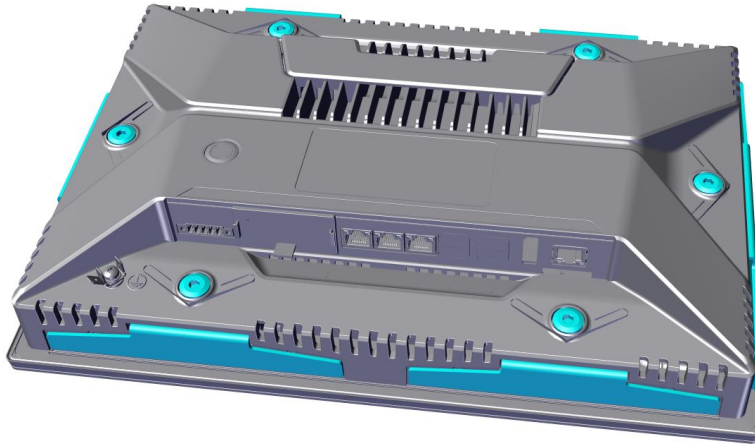
5. Make sure that all clamps are fully in contact with the rear side of the recess.

6. Tighten the clamping screws, turning alternately by uniform increments in a <u>clockwise</u> direction (max. 4 Nm).

5 Electrical connections

5.1 Requirements

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:

- **FE** connection in power supply connector as **EMC filter reference potential**

ATTENTION

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

- 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.
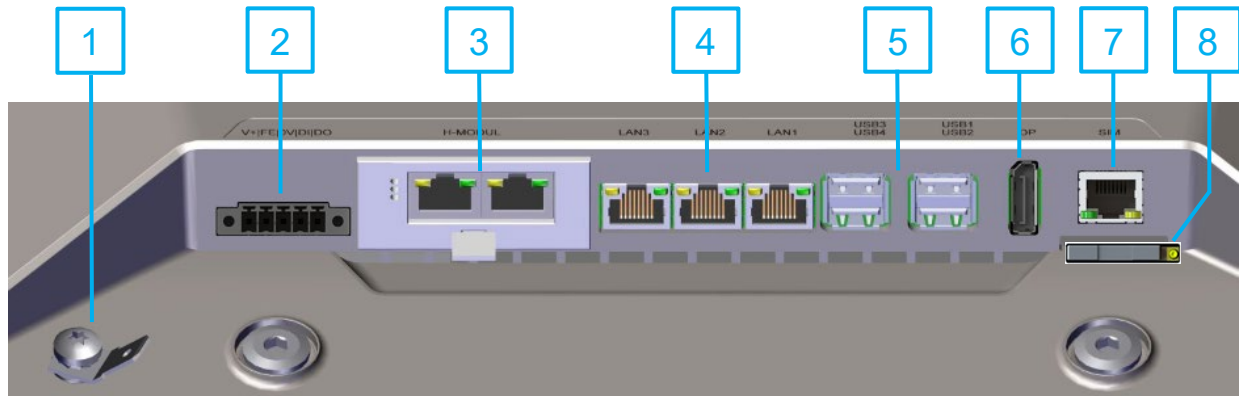

Conductor cross sections:

- **PE**: ≥ AWG 16 (≙ 1.5 mm^2), optimal: AWG 13 (≙ 2.5 mm^2). The cable colour must be green-yellow.
- **FE**: AWG 18 (≙ 0.75 mm^2). The cable colour must <u>not</u> be green-yellow.

5.3 Interfaces

5.3.1 Overview

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 digital input/output, see section 5.3.2
3	Options at this position: – 2 x WLAN antenna connections (Bluetooth at EXT WLAN2), see sections 7.6 and 7.7 – Hilscher netJACK for fieldbus and real-time Ethernet systems, see section 7.8 – 2 x CAN FD, see sections 5.3.4 and 7.4 – RS232, see section 7.9
4	3 x LAN (RJ45). Controllers used: LAN 1: i219-V / LAN2 & LAN3: i210 For "Wake on LAN": see section 7.10
5	4 x USB 3.1 gen. 2
6	DisplayPort++™ (1.2)
7	Option at this position: – HDBaseT (RJ45), see section 7.2
8	Slot for Big-LinX® smart card, see section 7.3

5.3.2 Power supply

DO	Digital output 24 VDC		
DI	Digital input 24 VDC		DO DI 0V FE V+
0V	Reference potential GND		
FE	Functional earth		(The figure shows the socket inside the device)
V+	+24 VDC ± 20%		

Conductor cross sections: V+ / FE / 0V: AWG 18 ($\triangleq$ 0.75 mm^2)

> ➔ The permissible voltage ranges and the maximum values for the power consumption can be found in Section **12 Technical Data**.

5.3.3 Digital input and output

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 the moment the unit is switched 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
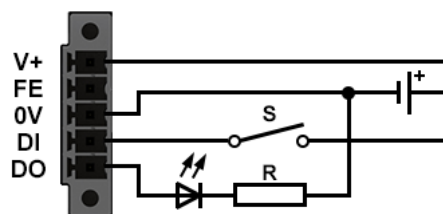
> The digital input and output can be configured in the **Configuration Center** and read in or out using the program library **adsXtern.dll** (ads-tec External User Library) in order to integrate them in user programs.
>
> • For this purpose, please contact the support of ADS-TEC.

5.3.4 CAN interface

The optional CAN bus card features two separate CAN buses connected together via a 9-pin Sub-D connector.

The connector on the power supply line assembled by the customer must have the following pin assignment:

Pin	Signal
1	n.c.
2	**CAN1-L**
3	**CAN1-GND**
4	CAN2-L
5	n.c.
6	CAN2-GND
7	**CAN1-H**
8	n.c.
9	CAN2-H
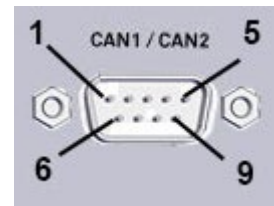
(The figure shows the socket inside the device)

Recommendation for use:

Each CAN bus must be terminated at both ends with a 120 Ω terminating resistor.

If the OPC9000 is on one bus end, the corresponding resistors must be integrated in the customer's connector.

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

5.5 Operation of multiple monitors on one OPC9

5.5.1 Quantity

Up to three monitors can be operated in parallel:

- the integrated display of the OPC9,

- a FullHD monitor at the DP port of the OPC9,

- a FullHD monitor via HDBaseT.

> **→**   **Tip:** With the help of the **X-Remote**® software from ADS-TEC, you can clone a desktop onto up to 8 computers and, thanks to clearly regulated access rights, operate it from all computers in turn.

5.5.2 Windows Display Settings

Possible display arrangements using Windows' built-in "Display settings":

a)   Extend desktop to all three displays (not clone).

b)   Duplicate desktop to 1 and 2 (desktop clone); monitor 3 as extended desktop.

c)   Duplicate desktop to 1 and 3 (desktop clone); monitor 2 as extended desktop.

Notes:

- You open the Windows display settings via:
  Desktop -> right mouse button -> Display settings

- The settings on the Display Settings page always refer to the screen or screens selected above.

- The arrangement of the screens can be adjusted to the requirements by dragging and dropping.

- Switching from one clone mode to the other (b->c or c->b) is done in a roundabout way via the triple extended display.

5.5.3 Screen resolution for cloned displays

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

> → **Recommendation:** Only use FullHD monitors with 1920 x 1080 px for the parallel connection.

5.5.4 Display of a start screen

Regarding the display of a **boot screen**:

- A boot screen is displayed – except on the integrated screen – exclusively on monitors connected via DisplayPort.

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

- The login screen is only displayed on the integrated display of the OPC9 and on an additional monitor configured as a clone.
- Monitors configured as extended desktop are supplied with an image signal by the operating system only after successful login.

6 Commissioning

6.1 Requirements

| 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

The device can be started using the **button on the rear side of the device**:

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

- LED illuminated: device is on.

- LED flashing: device is in an energy-saving state.

Alternatively, the device can be started using the capacitive button on the front side of the device:
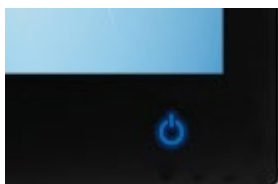

This button can be activated and deactivated in the **Configuration Center**.

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).
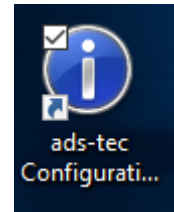
The **Configuration Center** from ADS-TEC can be used to make a number of settings, e.g.:

   – Behaviour of the ON/OFF pushbutton

   – Disabling of the USB interfaces

   – Write-protection of the mass storage or parts of it

   – Soft keyboard

   – Wireless devices

   – Many other modules are in preparation

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.
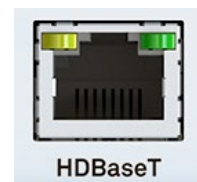
7.2 HDBaseT™

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®

Big-LinX is a versatile and scalable platform for different IoT applications. The secure connection of decentralised systems, the management of distributed gateways as well as comprehensive services for data collection, forwarding and monitoring make a major contribution to the implementation of complex Industry 4.0 projects.

- 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.
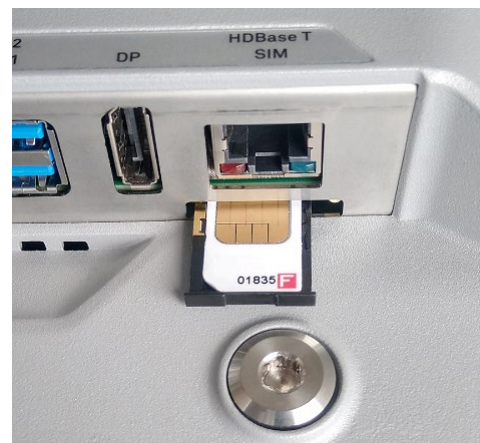
7.4 CAN card

The optional CAN bus card from PEAK features two separate CAN buses connected together via a 9-pin Sub-D connector. The two buses are galvanically isolated from each other and from the device's electrical system.

Standards: the card supports CAN FD and is backwards compatible with the CAN standard 2.0 A/B.

Transmission rate: max. 1 Mbit/s per bus.

Please note that the maximum bus length depends on the set transmission rate. Typical values with correct termination:

Transmission rate	Bus length
1 Mbit/s	40 m
500 kbit/s	110 m
250 kbit/s	240 m
125 kbit/s	500 m
50 kbit/s	1.3 km
25 kbit/s	2.5 km
15 kbit/s	5 km

Devices delivered ex factory with the Windows operating system and CAN card already include the appropriate drivers pre-installed.

For other cases, and if special configuration or programming software is required for the fieldbus nodes, see https://www.peak-system.com/

Connector pin assignment and termination information is available in section 5.3.4.

7.5 Mass storage devices

Information on how to install or remove SSD cards is available in section 10.4.

7.5.1 With 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 <u>cannot</u> 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.

7.5.2 Without RAID system

The devices can also be ordered with two SSD mass storage devices, but without a RAID system.

By default, the operating system is then located on the mass storage device next to the CMOS battery. The second mass storage serves as a data partition.

7.6 WLAN/Wi-Fi

This optional function uses the resources provided by the operating system.

External WLAN antennas can be connected to the connectors (RP-SMA) on the front panel. The **EXT WLAN1** connector is used to connect the first antenna (MAIN) and **EXT WLAN2** is used to connect the second antenna (AUX). The device automatically uses the connection with the better signal.

7.7 Bluetooth™

Devices with WLAN also have Bluetooth. This function uses the resources provided by the operating system.

EXT WLAN2 must be used as the connection.

7.8 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 10.5.
> Information on how to install the drivers can be found in sec. 8.3.
> Detailed information, manuals and software for the individual modules are available at www.hilscher.com

7.9 RS232

Hardware configuration
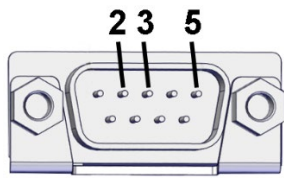
(figure shows socket in the device)

				Seen from the IPC9:
Pin 2	RxD	Receive Data		Input
Pin 3	TxD	Transmit Data		Output
Pin 5	GND	Ground – Reference potential		

Configuration of the driver "WhlHsUart"

The following IOCTLs are implemented in the driver for the RS232 interface as of 12/2021:

- 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

Since the IOCTL´s *IOCTL_SERIAL_SET_WAIT_MASK* and *IOCTL_SERIAL_ WAIT_MASK* are not implemented in this version, the **events** (such as RXCHAR, RXFLAG, TXEMPTY, CTS, DSR, RLSD, BREAK, ERR, RING, PERR) will not be generated by the driver.
Applications should not wait for an event. Instead, they can directly **poll** or receive the data via Read operations.
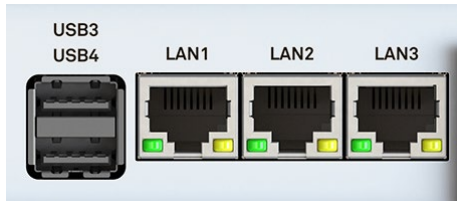
> Detailed instructions for the "WhlHsUart" driver are available on request from ADS-TEC support.

7.10 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

7.10.1   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
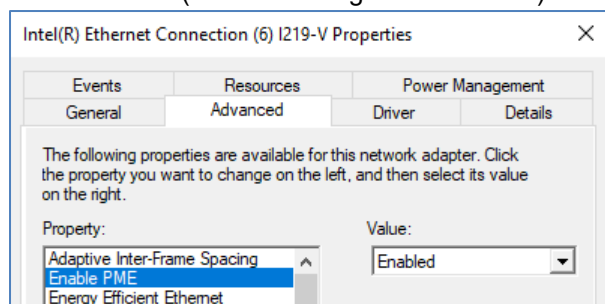
7.10.2   Settings in the operating system (Windows 10)

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):
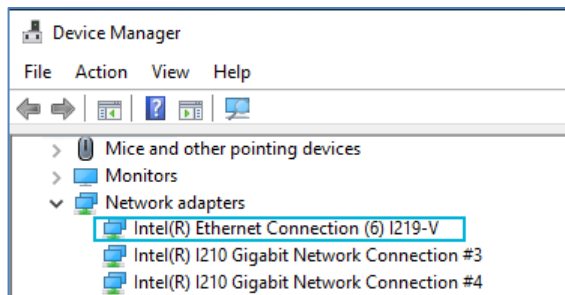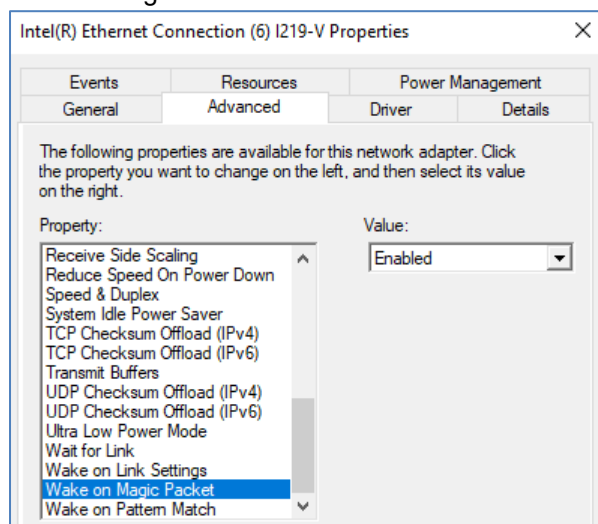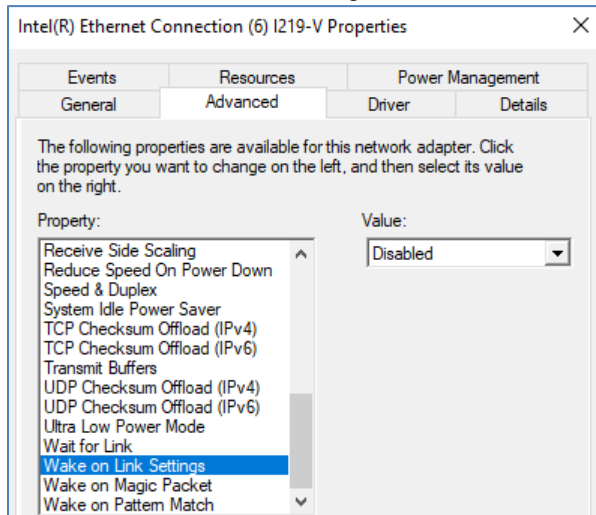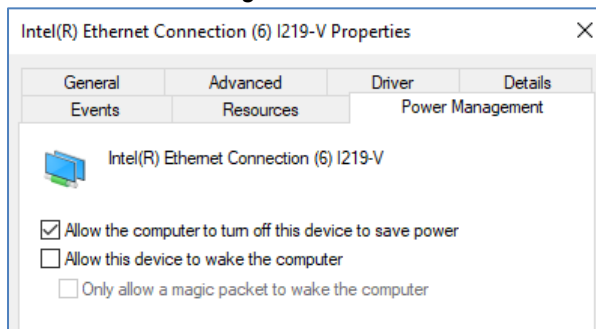

Make the following settings on the "Advanced" tab:

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 <u>before</u> 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 the netJACK modules at a later stage

If these modules are installed later, a driver must be installed, which is located in the following directory: *C:\Drivers\Fieldbus\Hilscher*

Start the **cifX Device Driver Setup**.

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

9 Cleaning

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

10 Maintenance

> **CAUTION**
>
> ⚠️ **Burns and scaring due to hot surfaces**
>
> Touching hot surfaces can cause burns. In addition, unexpected contact can lead to uncontrolled movements due to startling.
>
> - Allow the unit to cool down before servicing.
> - Wear suitable gloves if necessary.

> **CAUTION**
>
> ⚠️ **Personal injuries and damage to property through improper use**
>
> All installation and service work performed on the device must be performed only under safe, secure and de-energised conditions!

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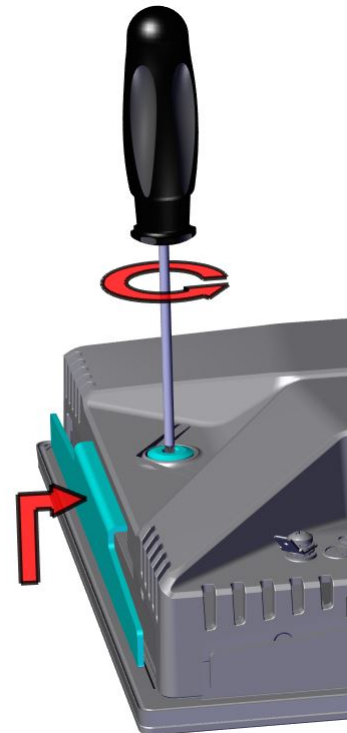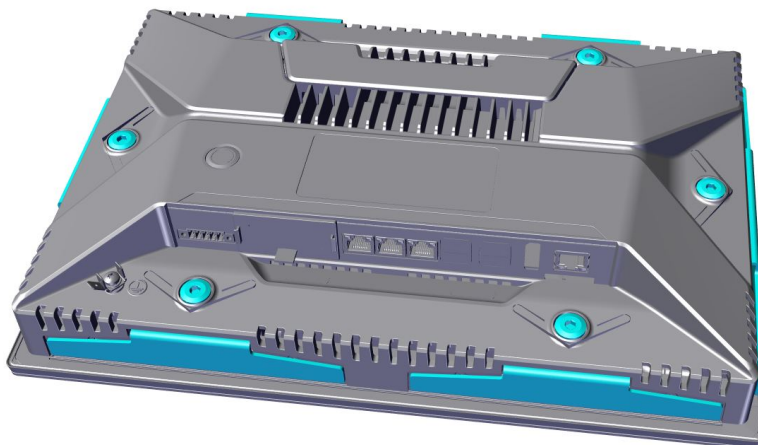> **Damage to the device due to electrostatic discharges**
>
> Always adhere to the safety measures applicable when handling components at risk of being damaged by electrostatic discharges in accordance with EN 61340-5-1/-2.

10.1 Removing the device

> **ATTENTION**
>
> Depending on the installation situation, have a person hold the front of the device, if needed to prevent it from falling down after the clamps are loosened.

1. Loosen the clamping screws by turning counter-clockwise (5 mm hex socket).

2. Push the **clamps completely into the housing** against the spring pressure.

3. Tighten the clamping screws counter-clockwise as far as they will go, so that the **clamps are fixed in the housing** and do not prevent the device from being removed from the wall recess.

4. Remove device from the wall recess.

10.2 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.

To open the service slot, prise the cover open on the bottom, and to close it again, simply press on the cover:
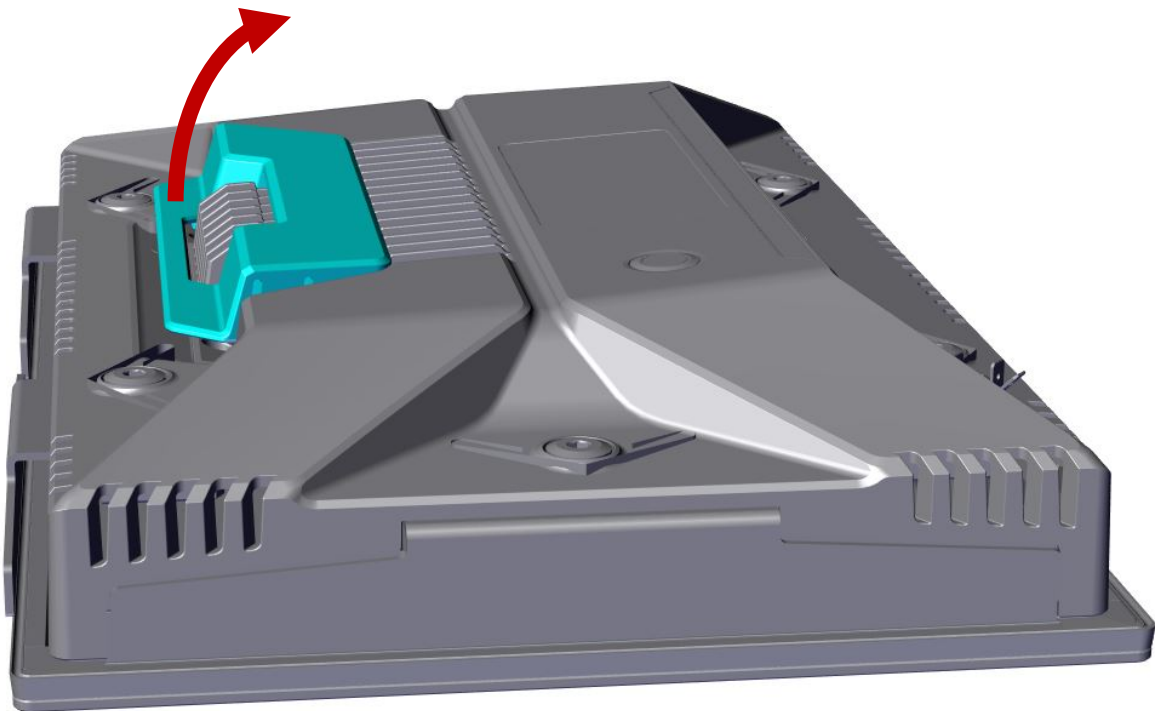
10.3 Replacing the CMOS battery

The CMOS battery (aka BIOS 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).
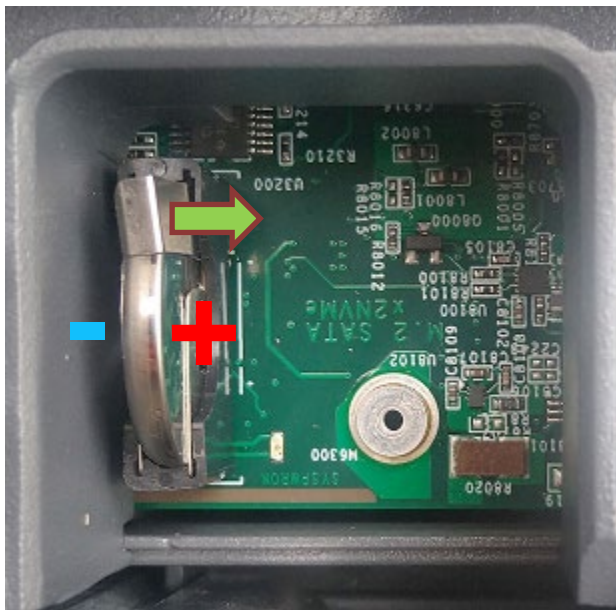
1. Pull off the service slot cover as specified in section 10.2.

2. Bend the top panel retainer clip slightly to the right (see green arrow in figure below) and pull out 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.

10.4 Installing or removing SSD cards

Format: SSD cards with the format **M.2 2242 Key M** can be used.

Interface: depending on the slot, **SATA** or **NVMe cards** can be used (see figure below).
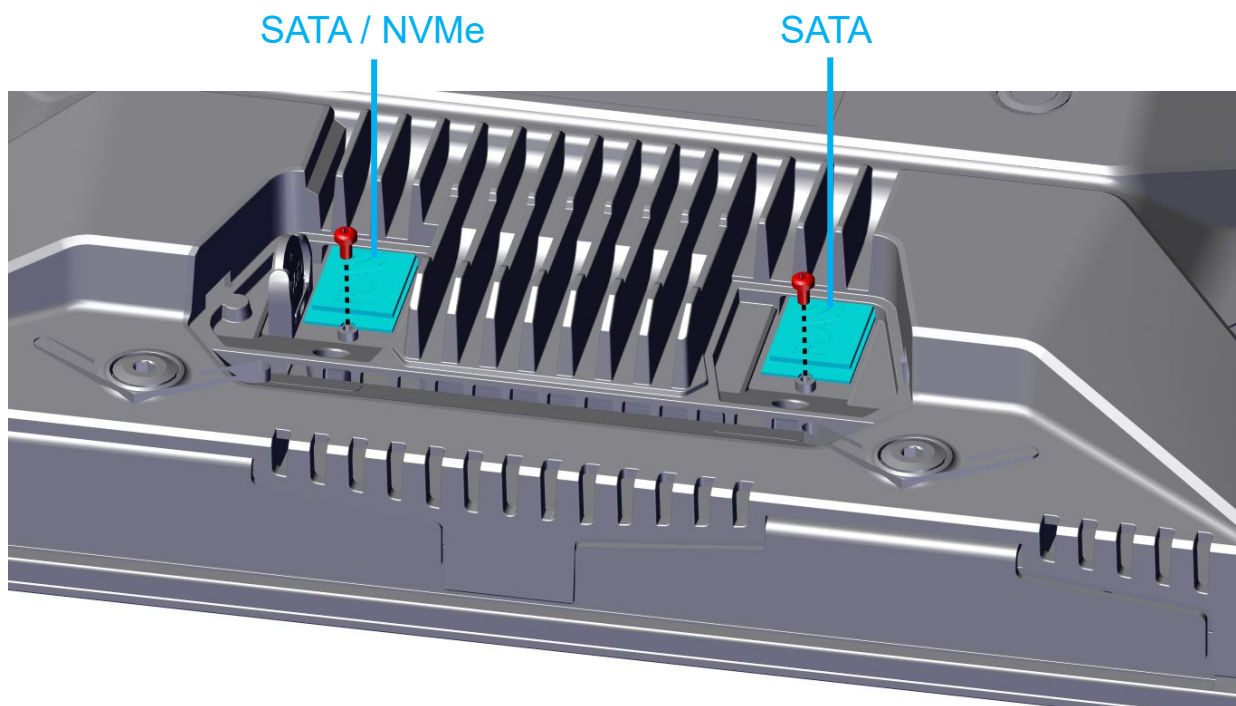
Compatible mass storage cards can be obtained from ADS-TEC if required.

Removal:

1. Pull off the service slot cover as specified in section 10.2.

2. Remove the retaining screw, lift the SSD card slightly and pull it out.
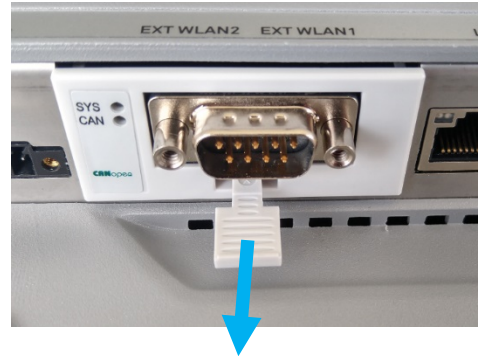
Installation:

1. Insert the new card into the slot from above at a slanting angle.

2. Press the card down and fix it with the screw (M3x6) provided.

SATA / NVMe   SATA

10.5 Removing and installing the Hilscher netJACK module

10.5.1   Removal

Fully pull the **pull tab** out using a tool such as a flat-nose pliers.

Pull the module out approx. 5 mm.

Then, **lift the module a bit** to lift the metal brackets out of the circuit board.
FYI: Section 10.5.3 shows how the metal brackets are inserted into the circuit board.

10.5.2   Installation

- For modules in their original packaging:
  Remove the ESD protective cardboard packaging.
  Never touch the contacts!

- Move the pull-out tab to a middle 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**.
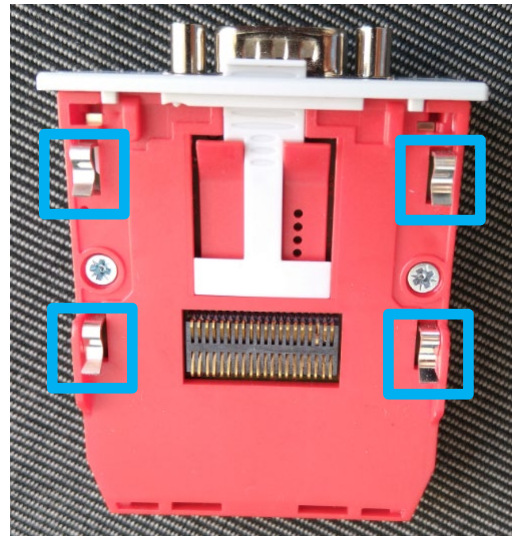 FYI: Section 10.5.3 shows how the metal brackets are inserted into the circuit board.

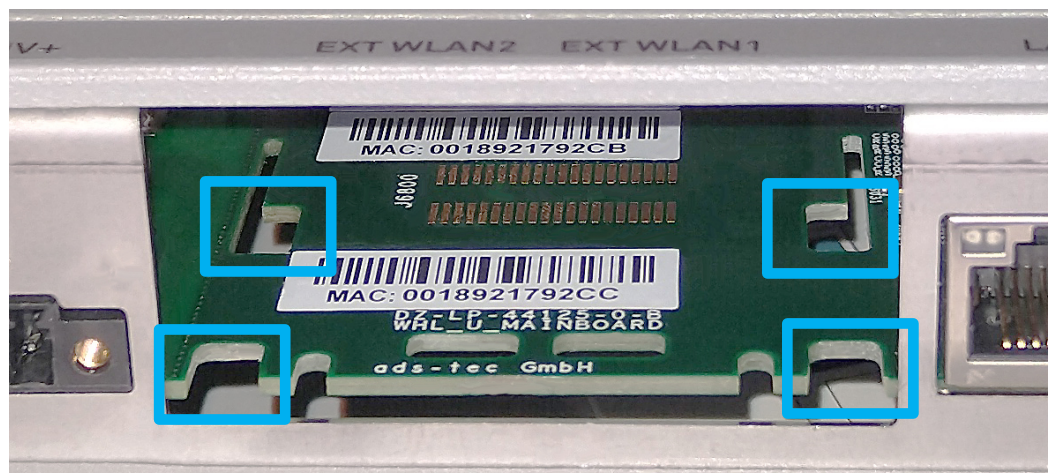

- Push the module in all the way with a slight pressure.

ads·tec

10.5.3   FYI: Fixing the module to the circuit board

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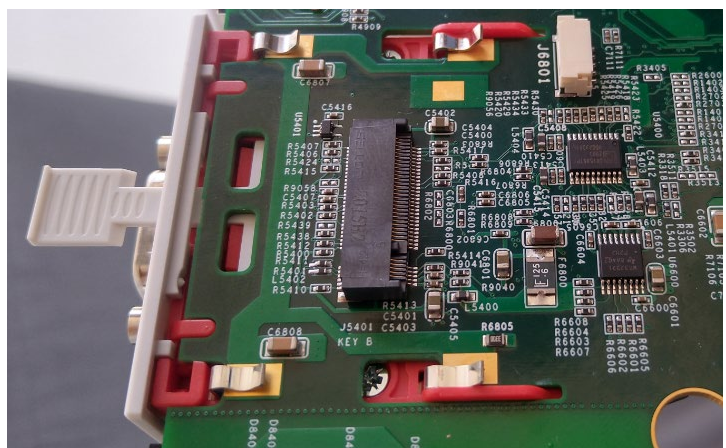

The metal brackets must be inserted into the **recesses** in the circuit board:

... 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:
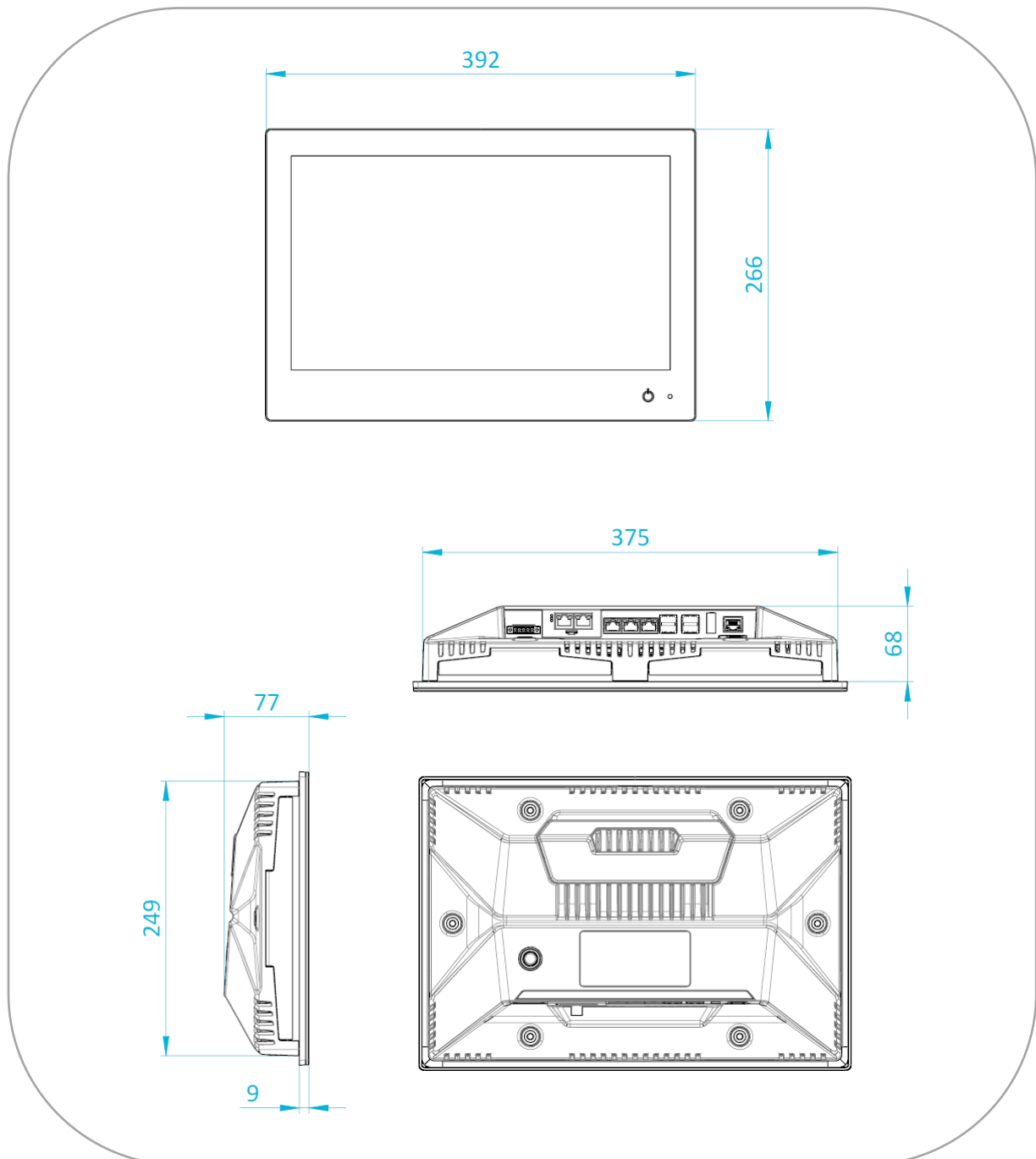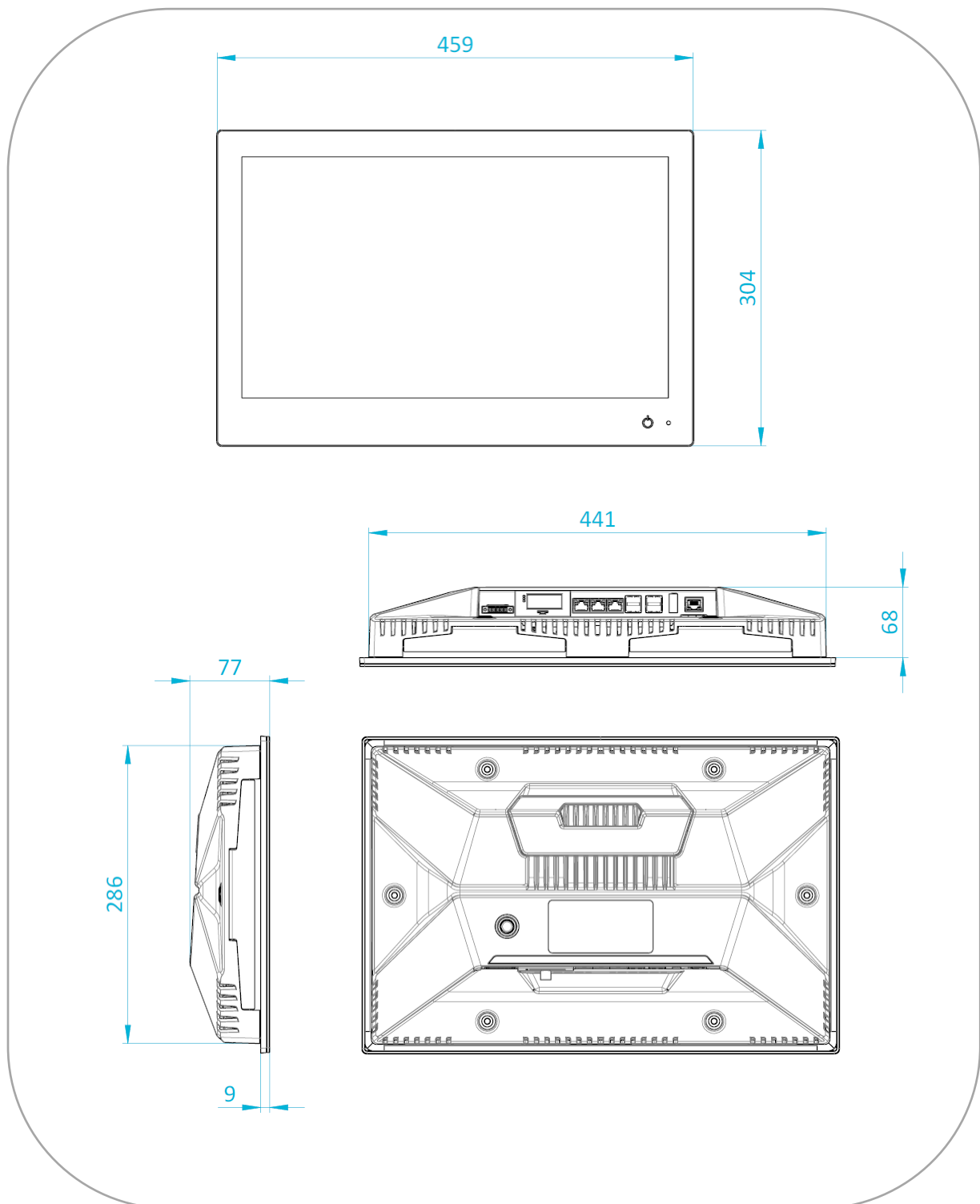
11 Dimensional drawings

> ➡ The dimensions of the wall recesses for installation can be found in
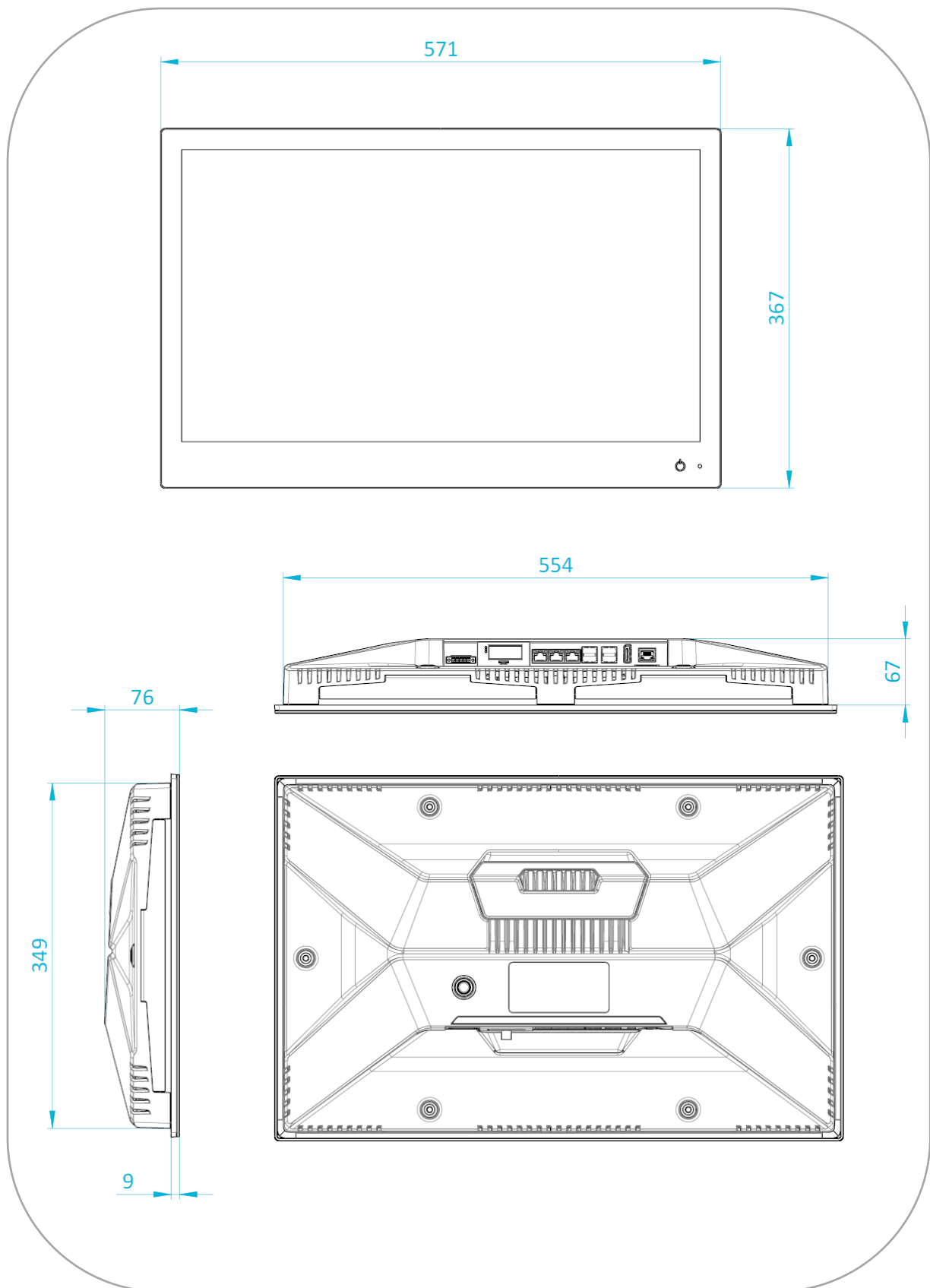> Section **4 Mechanical installation**.

11.1 OPC9016

11.2 OPC9019

11.3 OPC9024

12 Technical data

	OPC9016	OPC9019	OPC9024
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 Mio.	16.7 Mio.	16.7 Mio.
LED backlight	50 000 h	50 000 h	30 000 h
Touch	PCAP multi-touch (can be operated with gloves)		
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. additionally implemented security functions of the SSD manufacturer, the freely available capacity of the mass storage may be slightly reduced.		
Interfaces	4 x USB 3.1 gen. 2 (max. 1 A per connection) 3 x Ethernet (10 / 100 / 1000 Mbit/s) DisplayPort++™ (1.2) 5-pin supply connector with 2 digital I/Os (1 x IN / 1 x OUT) Smart card reader for ADS-TEC Big-LinX®		
Optional interfaces	CAN bus card with 2 separate channels: standard CAN FD, backwards compatible with CAN 2.0 A/B, max. transmission rate of 1 Mbit/s HDBaseT™ transmitter (excludes second display port) Second DisplayPort++™ (1.2) (excludes HDBaseT) WLAN IEEE 802. 11a/b/g/n/ac (excludes netJACK) Hilscher netJACK (excludes WLAN; system connection via PCI Express)		
Button	Front side: capacitative ON/OFF-button (can be disabled using software) Rear side: mechanical ON/OFF button		
Power supply	24 VDC ± 20% max. 135 W max. 7 A	24 VDC ± 20% max. 150 W max. 7.5 A	24 VDC ± 20% max. 140 W max. 7A
Permiss. ambient temperature	In operation: 0 to +45°C For storage: -25 to +70°C		

ads·tec

	OPC9016	**OPC9019**	**OPC9024**
Protection class	IP65 (front) / IP20 (rear side) 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 Enterprise 2021 LTSC		
Weight	Approx. 5.0 kg	Approx. 5.8 kg	Approx. 8.1 kg

ads-tec

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, fax or e-mail:

Phone: +49 7022 2522-202

Email: 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

Email: mailbox@ads-tec.de

Web: www.ads-tec.com