# **SIEMENS**

# **SIMATIC**

# Industrial PC SIMATIC IPC477E

**Operating Instructions** 

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### Legal information

#### Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

#### DANGER

indicates that death or severe personal injury will result if proper precautions are not taken.

# **A**WARNING

indicates that death or severe personal injury may result if proper precautions are not taken.

# **A**CAUTION

indicates that minor personal injury can result if proper precautions are not taken.

#### NOTICE

indicates that property damage can result if proper precautions are not taken.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

#### **Qualified Personnel**

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

#### **Proper use of Siemens products**

Note the following:

# **A**WARNING

Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

#### **Trademarks**

All names identified by <sup>®</sup> are registered trademarks of Siemens Aktiengesellschaft. The remaining trademarks in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

#### **Disclaimer of Liability**

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

# **Preface**

### **Purpose of the Operating Instructions**

These operating instructions contain all the information you need for commissioning and operating the SIMATIC IPC477E.

It is intended both for programming and testing personnel who commission the device and connect it with other units (automation systems, programming devices), as well as for service and maintenance personnel who install add-ons or carry out fault/error analyses.

#### Basic knowledge required

A solid background in personal computers and Microsoft operating systems is required to understand this manual. General knowledge in the field automation control engineering is recommended.

#### Scope of the operating instructions

These operating instructions apply to "SIMATIC IPC477E" industrial PCs with article numbers 6AV7241... (built-in unit).

Changes and additions to the manuals are documented in the product information. Therefore, regularly check whether product information has been (<a href="https://support.industry.siemens.com/cs/ww/en/view/109744171">https://support.industry.siemens.com/cs/ww/en/view/109744171</a>) made available for your product.

#### Scope of this documentation

The documentation for the IPC includes the following:

- Product information, e.g. "Important notes on your device"
- Quick Install Guide SIMATIC IPC477E
- SIMATIC IPC477E Operating Instructions

The documentation is supplied with the IPC in multiple languages as PDF on the USB stick supplied in the documentation package.

#### Conventions

In these operating instructions, "device" is used as the standard term for "SIMATIC IPC477E" (built-in unit).

In these operating instructions, the terms "Windows Embedded Standard 7 P" and "Windows Embedded Standard 7 E" are also abbreviated with the term "Windows Embedded Standard". "Windows 7" is used as an abbreviation for "Windows 7 Ultimate".

A touch device generally refers to a device with a capacitive multi-touch screen or a resistive single-touch screen. Touch screen is the general term for a resistive single-touch screen or a capacitive multi-touch screen.

#### Note

A note is important information about the product, handling the product or a reference to specific sections of the documentation that require special consideration.

### History

The following editions of these operating instructions have already been published:

Edition	Comment				
10/2016	First edition				
12/2016	Amendment to the multi-touch devices				
10/2017	Addition of the 24" multi-touch device				
	Amendment regarding Windows 10				
07/2020	Conversion to IEC/UL/EN/DIN-EN 61010-2-201				
11/2020	Approval for the hazardous area				
02/2021	Sixth edition:				
	<ul> <li>Approval for the hazardous area was removed from these operating instructions and documented in a product information.</li> </ul>				
08/2024	Seventh edition:				
	Update				

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Overview

# 1.1 Product description



Figure 1-1 Device with resistive single-touch screen

#### 1.1 Product description



Figure 1-2 Device with capacitive multi-touch screen

#### **Features**

The SIMATIC IPC477E provides high-level industrial functionality.

- · Compact design
- Maintenance-free operation
- Rugged

#### **Device variants**

The delivery note contains information on the precise scope of functions and product package for your device.

The SIMATIC IPC477E is available in the following device variants, which differ in regard to the display size, operating method and optional expansions:

#### Devices with resistive single-touch screens

- Display:
  - 15" display, resolution: 1280 x 800 pixels
  - 19" display, resolution: 1366 x 768 pixels
  - 22" display, resolution: 1920 x 1080 pixels
- · with PCIe slot

# 1.1 Product description

# Devices with capacitive multi-touch screens

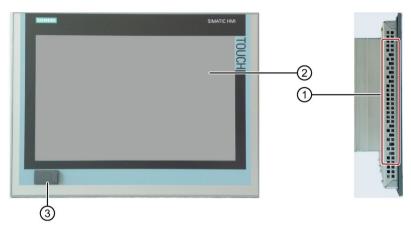
- Display:
  - 15.6" display, resolution: 1366 x 768 pixels
  - 19" display, resolution: 1366 x 768 pixels
  - 19" display, resolution 1920 x 1080 pixels
  - 22" display, resolution: 1920 x 1080 pixels
  - 24" display, resolution: 1920 x 1080 pixels
- With PCIe slot

# 1.2 Layout of the devices

# 1.2 Layout of the devices

# 1.2.1 Devices with resistive single-touch screens

#### Front and side views



- 1 Cutouts for mounting clips
- 2 Display with touch screen
- (3) USB socket

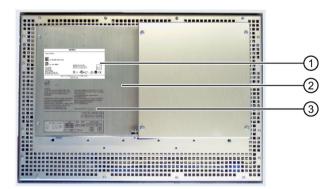
#### **Bottom view**

The bottom view shows a device with 24 V DC power supply and PCIe extension.



Cutouts for mounting clips

#### **Rear view**



- Rating plate
- 2 Rear panel / rear panel of expansion
- 3 Labeling for the interface arrangement

# 1.2.2 Devices with capacitive multi-touch screens

The following figures show the 19" device without PCIe card as an example.

#### Front and side views



- Cutouts for mounting clips
- 2 Display with touch screen

#### **Bottom view**



① Cutouts for mounting clips

#### **Rear view**



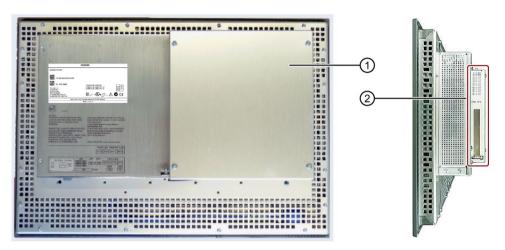
- Rating plate
- 2 Rear panel
- 3 Labeling for the interfaces

# 1.2 Layout of the devices

# 1.2.3 Device with PCIe slot

The following figures show the 15" device with resistive single-touch screen and PCIe extension as an example.

#### Rear view and side view

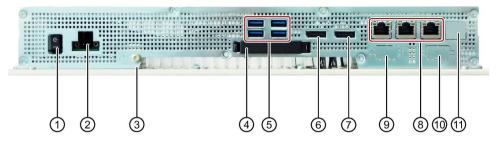


- 1 Rear panel
- 2 PCle slot

#### **Bottom view**



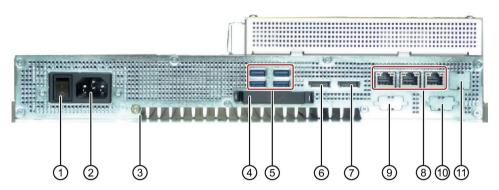
# 1.2.4 Interfaces and operator controls for devices with 24 V DC power supply



- (1) On/Off switch
- 2 24 V DC power supply (X80)
- (3) Protective conductor connection
- (4) Slot (X50) for external CFast card With cover
- (5) 4 × USB interface (X60), (X61), (X62), USB 3.0 high speed/high current (X63)
- 6 DisplayPort (X70)
- 7 DisplayPort (X71)
- (8) 3 × Ethernet interface (X1) P1, (X2) 3 x RJ45 (10/100/1000 Mbps) P1, (X3) P1
- (9) COM1 port (optional) (X30)
   (10) Serial interface, 9-pin D-Sub pin
   (10) COM2 port (optional) (X31)
   (11) Serial interface, 9-pin D-Sub pin
- (11) Reserved

# 1.2 Layout of the devices

# 1.2.5 Interfaces and operator controls for devices with 100-240 V AC power supply



- (1) On/Off switch
- (2) 100 V AC to 240 V AC power supply (X80)
- (3) Protective conductor connection
- (4) Slot (X50) for external CFast card With cover
- (5)  $4 \times USB$  interface (X60), (X61), USB 3.0 high speed/high current (X62), (X63)
- 6 DisplayPort (X70)
- 7 DisplayPort (X71)
- (8) 3 × Ethernet interface (X1) P1, (X2) 3 x RJ45 (10/100/1000 Mbps) P1, (X3) P1
- Gomman (optional) (X 30)
   Gomman (optional) (X 31)
   Serial interface, 9-pin D-Sub pin
   Serial interface, 9-pin D-Sub pin
- (11) Reserved

# 1.3 Accessories

Accessories are available for your device. These are not included in the product package. You can find Information on available accessories on the Internet at:

Industry Mall (https://mall.industry.siemens.com)

Expansion components and accessories (https://mall.industry.siemens.com/mall/en/WW/Catalog/Products/10144445)

#### **SIMATIC IPC CFast cards**

- 2 GB optional or
- 4 GB optional or
- 8 GB optional or
- 16 GB optional or
- ≥ 30 GB optional





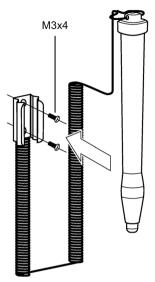
# **Memory modules**

- SO-DIMM module 4096 MB DDR4-SDRAM
- SO-DIMM module 8192 MB DDR4-SDRAM
- SO-DIMM module 16384 MB DDR4-SDRAM
- SO-DIMM module 8192 MB DDR4-SDRAM ECC
- SO-DIMM module 16384 MB DDR4-SDRAM ECC

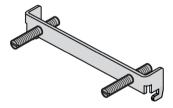
#### 1.3 Accessories

#### Other accessories

• Touch stylus, only for devices with resistive single-touch screens



Mounting bracket, only for devices with resistive single-touch screens
 If there are higher requirements for the front seal, fasten the device with mounting brackets in a control cabinet.



Safety instructions 2

# 2.1 General safety instructions



#### Life-threatening voltages are present with an open control cabinet

When you install the device in a control cabinet, some areas or components in the open control cabinet may be carrying life-threatening voltages.

If you touch these areas or components, you may be killed by electric shock.

Switch off the power supply to the cabinet before opening it.



The installer of the system is responsible for the safety of a system in which the device is integrated.

There is a risk of malfunction which could result in death or serious injury.

• Ensure that only suitably qualified personnel perform the work.

#### System expansions

#### NOTICE

#### Damage through system expansions

Device and system expansions may be faulty and can affect the entire machine or plant.

The installation of expansions can damage the device, machine or plant. Device and system expansions may violate safety rules and regulations regarding radio interference suppression. If you install or exchange system expansions and damage your device, the warranty becomes void.

Note the following for system expansions:

- Only install system expansion devices designed for this device. Contact your technical support team or where you purchased your PC to find out which system expansion devices may safely be installed.
- Read the information on electromagnetic compatibility (Page 100).

#### 2.1 General safety instructions

# Battery and rechargeable battery



#### Risk of explosion and release of harmful substances

Improper handling of lithium batteries can result in an explosion of the batteries.

Explosion of the batteries and the released pollutants can cause severe physical injury. Worn batteries jeopardize the function of the device.

Note the following when handling lithium batteries:

- Replace spent batteries promptly. You can find information on installing and removing the backup battery in the Operating Instructions.
- Replace the lithium battery only with an identical battery or types recommended by the manufacturer.
- Do not throw lithium batteries into fire, do not solder on the cell body, do not recharge, do not open, do not short-circuit, do not reverse polarity, do not heat above 100°C and protect from direct sunlight, moisture and condensation.

### Strong high-frequency radiation

#### **NOTICE**

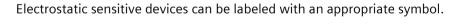
#### Observe immunity to RF radiation

The device has an increased immunity to RF radiation according to the specifications on electromagnetic compatibility in the technical specifications.

Radiation exposure in excess of the specified immunity limits can impair device functions, result in malfunctions and therefore injuries or damages.

Read the information on immunity to RF radiation in the technical specifications.

#### **ESD Guideline**





#### NOTICE

#### Electrostatic sensitive devices (ESD)

When you touch electrostatic sensitive components, you can destroy them through voltages that are far below the human perception threshold.

If you work with components that can be destroyed by electrostatic discharge, observe the ESD Guideline (Page 102).

# 2.2 Industrial Security

#### **Industrial Security**

Siemens Aktiengesellschaft provides products and solutions with industrial security functions that support the secure operation of plants, systems, machines and networks.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. The products and solutions of Siemens Aktiengesellschaft form a part of such a concept.

Customers are responsible for preventing unauthorized access to their plants, systems, machines and networks. Such systems, machines and components should only be connected to an enterprise network or the internet if and to the extent such a connection is necessary and only when appropriate security measures (e.g. firewalls and/or network segmentation) are in place.

For additional information on industrial security measures that may be implemented, please visit (https://www.siemens.com/industrialsecurity).

The products and solutions of Siemens Aktiengesellschaft undergo continuous development to make them more secure. Siemens strongly recommends that product updates are applied as soon as they are available and that the latest product versions are used. Use of product versions that are no longer supported, and failure to apply latest updates may increase customer's exposure to cyber threats.

To stay informed about product updates, subscribe to the Siemens Industrial Security RSS Feed under (https://www.siemens.com/industrialsecurity).

#### Disclaimer for third-party software updates

This product includes third-party software. Siemens Aktiengesellschaft only provides a warranty for updates/patches for the third-party software if such updates/patches have been distributed as part of a Siemens software update service contract or officially released by Siemens Aktiengesellschaft. Otherwise, updates/patches are undertaken at your own risk. You can find more information about our Software Update Service offer on the Internet.

# Notes on protecting administrator accounts

A user with administrator privileges has extensive access and manipulation options in the system.

Therefore, ensure there are adequate safeguards for protecting the administrator accounts to prevent unauthorized changes. To do this, use secure passwords and a standard user account for normal operation. Other measures, such as the use of security policies, should be applied as needed.

# 2.3 Notes on usage



#### Risks associated with the unprotected machine or plant

According to the results of a risk analysis, certain hazard potentials associated with the unprotected machine exist. These hazards could lead to personal injury.

Avoid such hazards by taking the following precautions in accordance with the risk analysis:

- Installation of additional safety equipment on the machine or plant. In particular, the programming, parameter assignment and wiring of the inserted I/O modules must be executed in accordance with the safety performance identified by the necessary risk analysis (SIL, PL or Cat.).
- Use as intended must be validated for the device by means of a function test on the plant. These tests help you to identify programming, parameter assignment and wiring errors.
- Documentation of the test results that you can enter in the relevant safety verification documents, if necessary.

#### **Environment**

#### NOTICE

#### Ambient conditions and chemical resistance

Unsuitable environmental conditions can cause faults or damage the device. Failure to comply voids the warranty and the approvals in accordance with IEC/EN/UL 61010-2-201.

For this reason, please observe the following precautions:

- Always operate the device in closed rooms.
- Operate the device only in accordance with the ambient conditions specified in the technical specifications.
- Protect the device against dust, moisture and heat.
- Do not expose the device to direct sunlight or to other strong sources of light.
- Without additional safety measures, such as a supply of clean air, the device may not be used in locations with harsh operating conditions caused by acidic vapors or gases.
- Observe the permitted mounting positions of the device.
- Do not obstruct the venting slots of the device.
- Clean the enclosure surface with a damp cloth and make sure that no water enters the device.

# LCD display

#### NOTICE

#### "Image Sticking" and backlighting

Despite the use of modern LCD technologies, the "Image Sticking" effect can occur if the LCD display is used unfavorably. Image Sticking, also known as "Image Retention" or "ghost image", is a phenomenon in which a faint outline of the previous screen content remains visible after the content has changed.

The long-term display of static screen content at high brightness can lead to "Image Sticking". High ambient temperatures can accelerate this effect.

Observe the following information to maximize the technical service life of the LCD display and ensure an optimal viewing experience:

- Prevention: Avoid displaying static screen content.
- Color management: Use low-contrast colors for symbols, texts and backgrounds. For intense colors, use a color gradient (grayscales/pastel colors). Avoid border lines.
- Brightness control: Dim the LCD brightness during periods of inactivity to reduce power consumption and extend the service life of the LCD display.
- Screen saver: Activate the screen saver for longer periods of inactivity.
- After longer operating time > 8 hrs: Switch off the LCD display for at least 20% of the active time or activate the screen saver.
- Ambient temperature: At high ambient temperatures, it is advisable to switch off the LCD display more frequently or to use a screen saver.

#### SIMATIC screen saver "Anti Image Sticking"

The SIMATIC screen saver "Anti Image Sticking" is a standalone software component that is installed automatically with the new configuration tool SIMATIC IPC Panel Drivers and Tools (PDT) V1.7, or higher. SIMATIC IPC Panel Drivers and Tools (PDT) V1.7, or higher, differs from the previous version only with respect to the SIMATIC screen saver, which you configure using the IPC Configuration Center.

#### NOTICE

#### Intended use

PDT V1.7, or higher, can only be used for devices intended for it. You can find information on valid devices and the corresponding software versions in the associated documentation at (<a href="https://support.industry.siemens.com/cs/ww/de/view/109964184/en">https://support.industry.siemens.com/cs/ww/de/view/109964184/en</a>).

# Defective pixels in the display

The manufacturing process of modern displays does not currently guarantee that all pixels of the display are perfect. It is therefore inevitable that the display will contain a small number of defective pixels. This does not limit the function in any way provided the defective pixels are not all in one location.

You can find additional information in the section "General technical specifications (Page 119)".

Mounting and connecting the device

3

# 3.1 Preparing for mounting

# 3.1.1 Checking the delivery package

#### **Procedure**

- 1. When accepting a delivery, please check the packaging for visible transport damage.
- 2. If any transport damage is present at the time of delivery, lodge a complaint at the shipping company in charge. Have the shipper confirm the transport damage immediately.
- 3. Unpack the device at its installation location.
- 4. Keep the original packaging in case you have to transport the unit again.

#### Note

#### Damage to the device during transport and storage

If a device is transported or stored without packaging, shocks, vibrations, pressure and moisture may impact the unprotected unit. Damaged packaging indicates that ambient conditions have already had a massive impact on the device and it may be damaged.

This may cause the device, machine or plant to malfunction.

- Keep the original packaging.
- Pack the device in the original packaging for transportation and storage.
- 5. Check the contents of the packaging and any accessories you may have ordered for completeness and damage.

6. If the contents of the package are incomplete, damaged or do not correspond to your order, you can use the online form After Sales Information System (ASIS) (https://siemens.com/asis) to provide feedback on product deliveries and repairs.

Complete the online form for product delivery (quality control notification) under the heading "Product delivery: Feedback on quality control and repairs".

# DANGER

#### Electric shock and fire hazard due to damaged device

A damaged device can be under hazardous voltage and trigger a fire in the machine or plant.

A damaged device has unpredictable properties and states.

Death or serious injury could occur.

- Avoid installing and commissioning a damaged device.
- Label the damaged device and keep it locked away.
- Send off the device for immediate repair.

#### NOTICE

#### Damage from condensation

If the device is subjected to low temperatures or extreme fluctuations in temperature during transportation, as is the case in cold weather, for example, moisture can build up on or inside the device (condensation).

Moisture causes a short circuit in electrical circuits and damages the device.

In order to prevent damage to the device, proceed as follows:

- Store the device in a dry place.
- Bring the device to room temperature before starting it up.
- Do not expose the device to direct heat radiation from a heating device.
- If condensation develops, wait approximately 12 hours or until the device is completely dry before switching it on.
- 7. Please keep the enclosed documentation in a safe place. It belongs to the device. You need the documentation when you commission the device for the first time.
- 8. Write down the identification data of the device.

#### 3.1 Preparing for mounting

#### 3.1.2 Device identification data

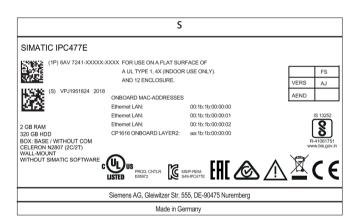
#### Unpacking the device

The device can be clearly identified with the help of this identification data in case of repairs or theft.

Enter the identification data in the table below:

Identification date	Source	Value
Serial number	Rating plate	S VP
Article number of the device	Rating plate	6AV7241 (SIMATIC IPC477E)
Microsoft Windows Product Key	Back of the device	Only devices with preinstalled
Certificate of Authenticity (COA)		Windows operating systems have the COA label
Ethernet address 1 (X1) P1	BIOS setup, "Ad-	
Ethernet address 2 (X2) P1	vanced" menu	
Ethernet address 3 (X3) P1		

#### **Example of rating plate on SIMATIC IPC477E**



#### **COA label**

Microsoft Windows "Product Key" from the "Certificate of Authenticity" (COA):

The COA label is present only when Windows Embedded Standard 7 or Windows 7 is installed.

COA label of a device with the Windows Embedded Standard 7 operating system



• COA label of a device with Windows 7 operating system



COA label of a device with Windows 10 operating system



#### Note

The COA labels shown are shown by way of example and may differ on the device.

The Windows 10 COA label has an additional security feature which conceals part of the product key.

The scratch-off panel consists of a small transparent label with a silver-colored scratch coating, which was applied to conceal part of the 25-character product key. This scratch-off panel is designed to protect the product key from being obtained and used by unauthorized third parties.

You usually do not need this product key for commissioning because a valid product key has already been integrated into the pre-installed operating system.

# 3.1.3 Permitted mounting positions

The mounting positions described below are permitted for the device. For information on the maximum permissible ambient temperatures during operation, refer to section "Environmental conditions (Page 124)".



#### Danger from high enclosure temperature if device is touched

Self-heating can cause the temperature of the device to exceed 70  $^{\circ}$ C during operation at an ambient temperature > 40  $^{\circ}$ C.

If you want to operate the built-in device at an ambient temperature > 40 °C, you will have to install it into an enclosure, such as a lockable control cabinet.

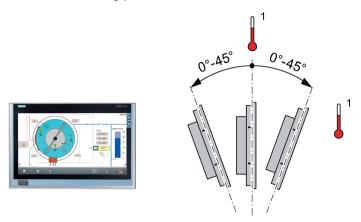
#### Note

#### Operation with hard disk

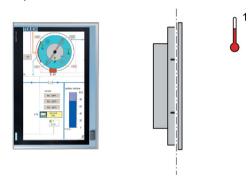
Operation with hard disk is only permitted in standard mounting position "Vertical installation in horizontal format".

#### 3.1 Preparing for mounting

Standard mounting position: Vertical installation in horizontal format



- <sup>1</sup> For temperature specifications, see section "Environmental conditions (Page 124)".
- Inclined installation in horizontal format with a vertical inclination of maximum ±45°
- Upright mounting in vertical format
   Display rotated 90° vertical from the standard position. The power supply is located at the top.



<sup>&</sup>lt;sup>1</sup> For temperature specifications, see section "Environmental conditions (Page 124)".

# 3.1.4 Preparing the mounting cutout

#### Note

## Stability of the mounting cutout

The material in the area of the mounting cutout must provide sufficient strength to quarantee the enduring and safe mounting of the HMI device.

The force of the clamps or operation of the device must not lead to deformation of the material in order to achieve the degrees of protection described below.

#### Note

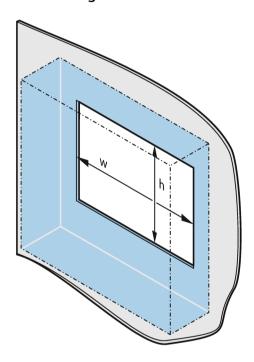
Read the information in the section "Installation guidelines (Page 30)".

#### Requirements for complying with degree of protection

The degree of protection of the HMI device can only be guaranteed if the following requirements are met:

- Material thickness at the mounting cutout with IP65 degree of protection or Enclosure Type 4X / 12 (indoor use only): 2 mm to 6 mm
- Permitted deviation from plane at the mounting cutout: ≤ 0.5 mm This condition must be fulfilled for the mounted HMI device.
- Permissible surface roughness in the area of the mounting seal: ≤ 120 μm (R₂ 120)

#### Dimensions of the mounting cutout



#### Mounting cutout of touch devices

Mounting cutout	Single-touch device <sup>2</sup>			Multi-touch device <sup>3</sup>			
	15"	19"	22"	15"	19" (HD / FHD)	22"	24"
Width w <sup>1</sup>	396 <sup>+1</sup> m m	465 <sup>+1</sup> m m	542 <sup>+1</sup> m m	382 <sup>+1</sup> m m	448 <sup>+1</sup> m m	513 <sup>+1</sup> m m	569 <sup>+1</sup> mm
Height h <sup>1</sup>	291 <sup>+1</sup> m m	319 <sup>+1</sup> m m	362 <sup>+1</sup> m m	241 <sup>+1</sup> m m	278 <sup>+1</sup> m m	315 <sup>+1</sup> m m	347 <sup>+1</sup> mm

- 1 Width and height must be interchanged for mounting in vertical format.
- Device with resistive single-touch screen
- 3 Device with capacitive multi-touch screen

#### Installation depth

Information on the overall depth is available in the section "Dimension drawings (Page 105)".

#### 3.2 Mounting the device

# 3.2 Mounting the device

# 3.2.1 Installation guidelines



#### WARNING

#### Danger, high voltage

A high voltage may be present in the control cabinet and could cause a dangerous electric shock.

It may result in death or serious physical injury.

Isolate the power supply to the control cabinet before opening it. Ensure that the power to the control cabinet cannot be turned on accidentally.



#### WARNING

#### Risk of fire

If you install the device in an unapproved mounting position or if you do not observe the ambient conditions, the device can overheat.

Overheating can cause a fire. Proper functioning of the device is no longer guaranteed.

Before you install the device, note the following general installation information.

#### Note

#### Permissible mounting positions

For information on the mounting positions, refer to section "Permitted mounting positions (Page 27)".

- Install the device only in one of the permitted mounting positions.
- For installation in control cabinets, note the SIMATIC setup guidelines as well as the relevant DIN/VDE requirements or the country-specific regulations.
- Provide adequate volume in the control cabinet for air circulation and heat transport. Keep at least 5 cm distance between the device and control cabinet.
- The ventilation slots of the device may not be covered or obstructed.
- Ensure there is enough clearance in the control cabinet to allow the backplane cover to be removed.
- Equip the control cabinet with struts for stabilizing the mounting cut-out. Install struts where necessary.

#### See also

Dimension drawings (Page 105)

Technical specifications (Page 119)

# 3.2.2 Mounting the device with mounting clips (single-touch device)

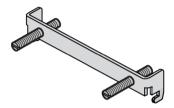
#### Types of mounting clips and mounting brackets

You can mount the device as follows:

• With 12 mounting clips, steel (included in the product package)



• With 6 mounting clips (available as accessory for devices with resistive single-touch screen)



#### Positions of the mounting clips

To achieve the degree of protection for the device, the positions for the mounting clips shown below must be adhered to.

The positions of the mounting clips are marked by stamps on the cutouts. Fit the mounting clips in all the stamped cutouts.

#### Requirement

- All packaging components and protective films have been removed from the device.
- To install the device, you need the mounting clips from the accessory kit.
- The mounting seal on the front of the device is not managed.

#### **Procedure**

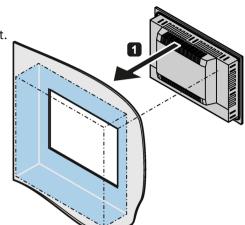
#### Note

If the mounting seal is damaged or protrudes from the device, the guaranteed degree of protection is not ensured.

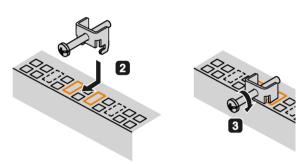
It is prohibited from mounting the device if the mounting seal is damaged.

#### 3.2 Mounting the device

- 1. Working from the front, insert the device into the mounting cut-out. Secure the device to prevent it from falling out.
- 2. Insert a mounting clip into the cutout provided on the device.
- 3. Tighten the threaded pin to secure the mounting clip. The maximum torque when tightening the threaded pins of the mounting clips is 0.5 Nm.
- 4. Repeat steps 2 and 3 for all mounting clips.



5. Check the fit of the mounting seal.



#### Mounting the device with mounting brackets

If there are strict requirements for the front seal, it might be necessary to fasten the device with mounting brackets in a cabinet. You can secure each device with 6 mounting brackets.

The mounting brackets are available as accessories.

#### Requirement

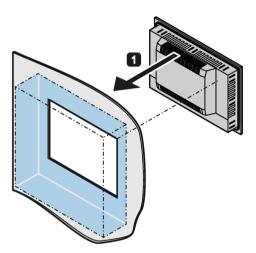
- All packaging components and protective films have been removed from the device.
- The accessory mounting brackets are available.
- 2.5 mm hexagonal spanner

#### **Procedure**

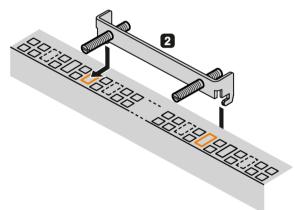
#### Note

If the mounting seal is damaged or protrudes over the device, the degree of protection is not guaranteed.

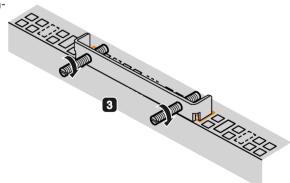
1. Working from the front, insert the device into the mounting cut-out.



2. Insert the mounting clamp into the recesses on the device. Make sure it is in the correct position.



3. Secure the mounting bracket by tightening the threaded pins. The maximum permissible torque is 0.5 Nm.

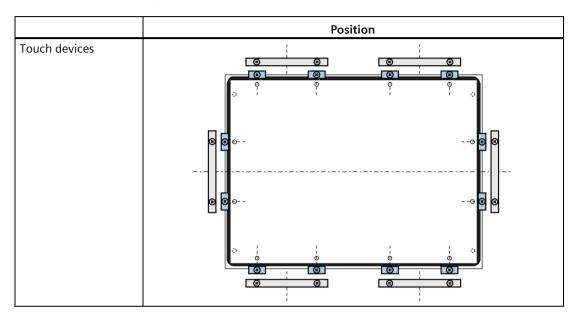


#### 3.2 Mounting the device

- 4. Repeat steps 2 and 3 until all mounting brackets are attached.
- 5. Check the fit of the mounting seal.

#### Positions of the mounting clips or mounting brackets for IP65

To achieve IP65 degree of protection for the device, the mounting clips or mounting brackets must be installed at the positions shown below.



# Positions of the mounting clips or mounting brackets for 22" devices

Attach the mounting clips or mounting brackets to the 22" device at the positions displayed in the graphic.

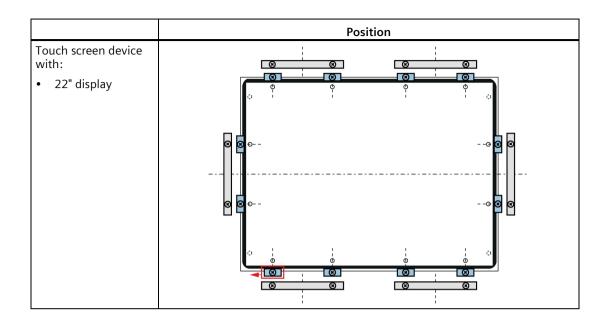
#### **NOTICE**

#### 22" devices

The mounting clip marked in red must be shifted to the left on 22" devices to account for a cutout.

The degree of protection IP65 is not affected by the offset.

The position can be retained when using the mounting brackets.



### IP65 degree of protection

The installer of the plant is responsible for proper installation of the device.



#### Risk of electric shock

The degree of protection cannot be guaranteed if the device is not correctly installed. Moisture or water can penetrate and cause electric shock or plant damage.

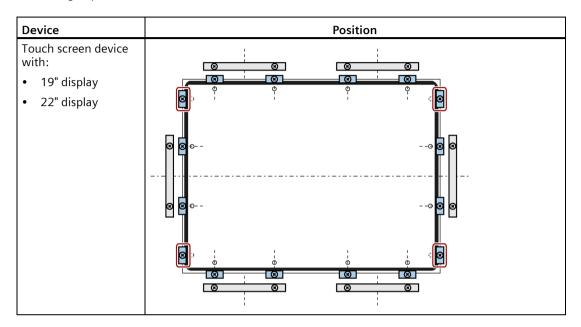
The IP65 degree of protection is ensured for the front of the device only if you observe the following:

- Installation with mounting clamps
- The circumferential seal is properly attached to a correctly sized cutout.
- Follow the instructions when measuring the dimensions as shown in the section "Preparing the mounting cutout (Page 28)".

#### 3.2 Mounting the device

#### Position of the mounting clips for IP66-complaint installation

To achieve IP66 degree of protection instead of IP65, fasten 4 additional mounting clips at the positions marked by the red boxes. The 15" display meets IP66 even without additional mounting clips.



# 3.2.3 Mounting the device with mounting clips (multi-touch device)

#### Positions of the mounting clips

To achieve the degree of protection for the device, the positions for the mounting clips shown below must be adhered to.

#### Requirement

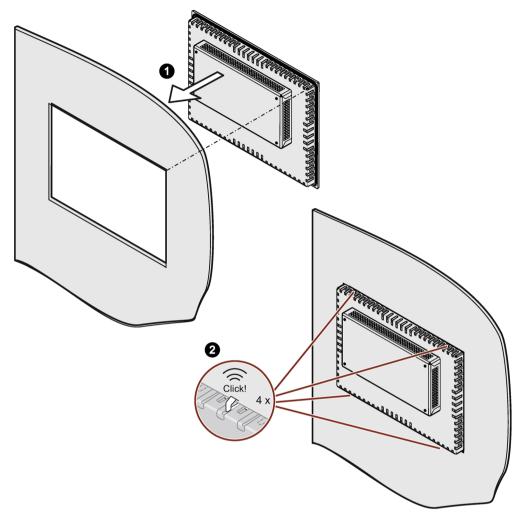
- All packaging components and protective films have been removed from the device.
- To install the device, you need the mounting clips from the accessory kit.
- The mounting seal on the front of the device is not managed.

#### **Procedure**

#### Note

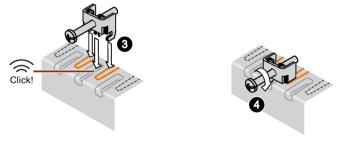
If the mounting seal is damaged or protrudes from the device, the guaranteed degree of protection is not ensured.

It is prohibited from mounting the device if the mounting seal is damaged.



1. Working from the front, insert the device into the mounting cut-out.

- 2. Make sure that all four spring fasteners latch fully into place on the upper and lower side of the device. If necessary, press the device again carefully into the mounting slot at the place that is not fully latched into position.
- Insert a mounting clip into the cutout provided on the device.
   Make sure it is in the correct position, see the section "AUTOHOTSPOT".



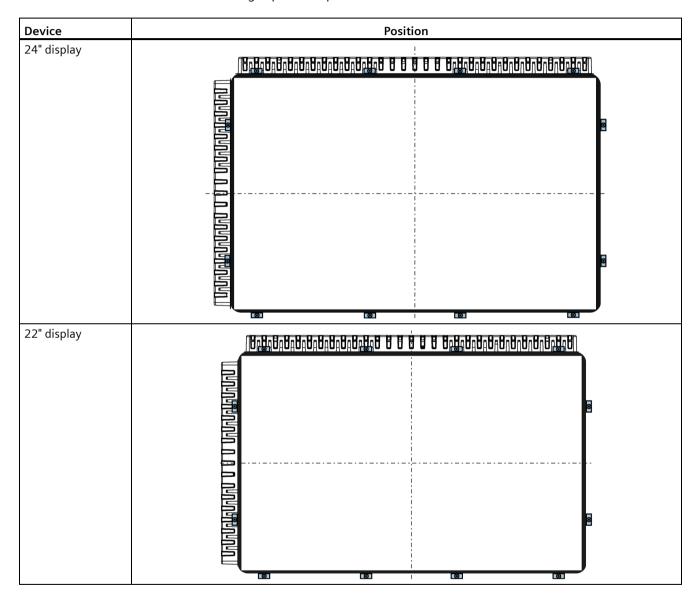
4. To secure the mounting clip, tighten the grub screw with the slot screwdriver, torque 0.5 Nm.

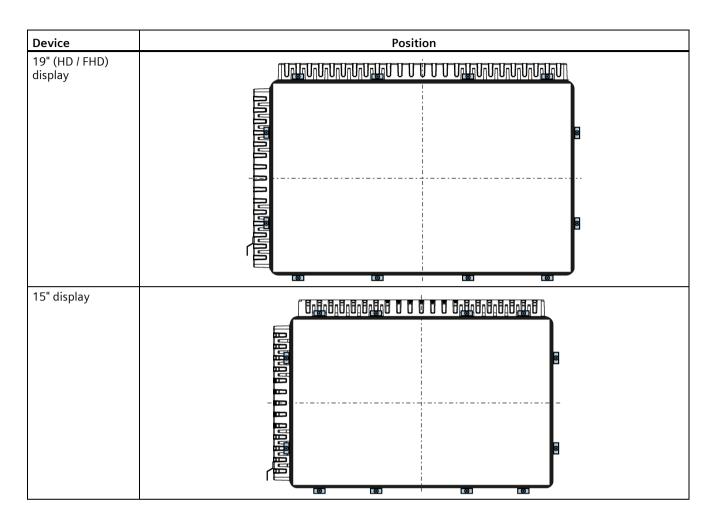
## 3.2 Mounting the device

- 5. Repeat steps 3 and 4 until all mounting clips are securely fastened.
- 6. Check the fit of the mounting seal.

# Position of the mounting clips for multi-touch devices

Fasten the mounting clips to the positions as illustrated.





### 3.2 Mounting the device

## 3.2.4 Fastening a device using a VESA adapter

You can also fasten the SIMATIC IPC477E up to a display size of 24" using a  $100 \times 100 \text{ mm}$  VESA adapter.

Different models of VESA adapters are offered by third-party manufacturers.

#### NOTICE

### Degree of protection for overall device

If you are fastening the device via a VESA adapter, degree of protection IP65 of the device is lost.

Spray and water jets as well as penetrating substances can then damage the device.

It is not permitted to use device with VESA adapter in the scope of UL61010-2-201.

#### NOTICE

## Dimensioning of the VESA adapter

When selecting the VESA adapter, make sure that it is designed for at least four times the weight of the device.



## The device must be mounted securely

Inadequately dimensioned fastening material may cause the device to fall down. Serious bodily injury may result.

Make sure that fasteners are adequately dimensioned during installation of the device. Make sure to consider the weight of the device and the forces acting on the device when dimensioning the fasteners. This applies in particular to dynamic load of the device. All fasteners including mounting surfaces, support arm systems, and fastening elements such as screws must be able to carry at least four times the weight of the device.

Observe any further statutory specifications applying at the location of use of the device and further applicable regulations with regard to the fastening of the device.

## **Procedure**

Remove the indicated screws and fasten the  $100 \times 100$  mm VESA adapter at these points. To do this, use M4x10 screws with property class 8.8 and tighten these with a torque of 3 Nm.



# 3.3 Connecting the device

# 3.3.1 Notes on connecting



#### Risk of fire and electric shock

The on/off switch does not isolate the device from the power supply. Risk of electric shock if the device is opened incorrectly or defective. There is also a risk of fire if the device or connecting lines are damaged.

You should therefore protect the device as follows:

- Always pull out the power plug when you are not using the device or if the device is defective. The power plug must be freely accessible.
- Connect the device to a protective conductor as instructed, see section "Connecting the protective conductor".
- For control cabinet mounting: Use a central, easily accessible AC circuit breaker close to the device, if possible.



### Risk of lightning strikes

A lightning flash may enter the mains cables and data transmission cables and jump to a person.

Death, serious injury and burns can be caused by lightning.

Take the following precautions:

- Disconnect the device from the power supply in good time when a thunderstorm is approaching.
- Do not touch mains cables and data transmission cables during a thunderstorm.
- Keep a sufficient distance from electric cables, distributors, systems, etc.

#### NOTICE

#### Fault caused by I/O devices

The connection of I/O devices can cause faults in the device.

The result may be personal injury and damage to the machine or plant.

Note the following when connecting I/O devices:

- Read the documentation of the I/O devices. Follow all instructions in the documentation.
- Only connect I/O devices which are approved for industrial applications in accordance with EN 61000-6-2 and IEC 61000-6-2.
- I/O devices that are not hotplug-capable may only be connected after the device has been disconnected from the power supply.

#### **NOTICE**

## Damage through regenerative feedback

Regenerative feedback of voltage to ground by a connected or installed component can damage the device.

Connected or built-in I/Os, for example, a USB drive, are not permitted to supply any voltage to the device. Regenerative feedback is generally not permitted.

## 3.3.2 Power supply

## 3.3.2.1 Connecting the protective earth

A connected protective conductor conducts dangerous electrical charges away from the metal enclosure. The current flowing through the protective conductor when such a fault occurs triggers a primary fuse that disconnects the device from the power supply.

The protective conductor also improves the discharge of interference generated by external power cables, signal cables or cables for I/O devices to ground.

The connection for the protective conductor is labeled with the following symbol:





## WARNING

#### Electric shock and risk of fire

High voltage may be present in a defective device, which can cause fire or an electric shock if touched. Death and serious bodily injury can result.

- Connect the device to the protective conductor before you put it into operation.
- The protective conductor connection on the device must be connected to the protective conductor of the control cabinet or system in which the device is installed.
- Never operate the device without protective conductor.
- If a device is defective, decommission it without delay and mark it accordingly.

## Requirement

- The device is installed
- 1 protective conductor, minimum cross section 2.5 mm<sup>2</sup> = AWG14
- 1 T20 screwdriver
- 1 cable lug for M4

#### **Procedure**

The procedure is the same for all device variants and is described here as an example.

- 1. Clamp the cable lug onto the protective conductor.
- 2. Connect the cable lug to the screw at the designated protective conductor connection



3. Connect the protective conductor to the protective conductor connection of the control cabinet in which the device is installed.

## 3.3.2.2 Connect 100-240 VAC power supply

The following procedure applies to a device that is connected to a 100 V AC - 240 V AC (-15% I + 10%) power supply system, 50 - 60 Hz.

## **General connection information**

Note the following in order to operate the device safely and according to regulation:

#### Note

The wide-range power supply is designed for 100 to 240 VAC power supply systems. It is not necessary to adjust the voltage range. The permitted nominal voltage of the device must conform with local mains voltage.

#### Note

Do not connect or disconnect power and data cables during thunderstorms.



### Power supply system

The device is intended for operation on grounded power supply systems (TN systems according to VDE 0100, Part 300, or IEC 60364-3).

It is not designed for operation on ungrounded or impedance-grounded power networks (IT networks).

#### Note

#### Power disconnection

The power plug must be unplugged to fully isolate the device from mains. This location must be easy to access. There must be a central disconnector switch if the device is mounted in a control cabinet.

Always ensure that the socket on the device is freely accessible or that the grounding-type receptacle of the building installation is freely accessible and located as close as possible to the device.

#### Note

The power supply contains an active PFC (Power Factor Correction) circuit to conform to the EMC guidelines.

Uninterruptible AC power supplies (UPS) must supply a sinusoidal output voltage in the normal and buffered mode when used with SIMATIC IPCs with an active PFC.

UPS characteristics are described and classified in the standards EN 50091-3 and IEC 62040-3. Devices with sinusoidal output voltage in the normal and buffered mode are identified with the classification "VFI-SS-...." or "VI-SS-....".

#### **USA** and Canada

#### Supply voltage 120 V / 230 V / 240 V AC

Ensure that the power cords used are rated for the maximum current input and ambient temperature of the device and meet the requirements of the following standards:

- ANSI/UL 817
- CSA C22.2 No. 21

Ensure that the device connectors, connector sockets and connection materials are rated for the maximum current input and ambient temperature of the device and meet the requirements of the following standards:

- ANSI/UL 498 and CSA C22.2 No. 42
- CSA C22.2 No. 182.1
- CSA C22.2 No. 182.2
- CSA C22.2 No. 182.3

#### For countries other than the USA and Canada

### Supply voltage 230 V AC

This device is supplied with a safety-tested power cord and may only be connected to a grounded SCHUKO socket outlet.

If you do not use the power cord, use a flexible cable that is rated for the maximum current input and ambient temperature of the device and complies with the safety regulations of the country in which the device is installed.

Power cords and device connectors must be certified or approved by a recognized testing authority in the respective country and must bear the corresponding prescribed markings.

## Requirement

- The device is installed.
- The protective conductor is connected, see the section "Connecting the protective earth (Page 43)".

## **Procedure**

## Connecting the power supply cord

- 1. Set the switch to the "Off" position, as shown.
- 2. Remove the marked screw of the power plug fastener.



3. Insert the power cable into the socket and fasten the power plug fastener with the marked screw.





### Unplugging the power supply cord



## Risk of electric shock

The on/off switch does not disconnect the device from the power supply system.

Always unplug the power plug to disconnect the device from the power supply system.

Perform the steps for connecting the power supply cord in reverse order.

## 3.3.2.3 Connecting the 24 V DC power supply

Please note the following:



#### Electric shock and risk of fire

Voltages that exceed an extra-low voltage can cause electric shock or fire. Death or serious bodily injury can result.

 The device may only be connected to a 24 V DC power supply which meets the requirements of a safe extra-low voltage (SELV/PELV) in accordance with the standard IEC/EN/DIN EN/UL 61010-2-201.

#### Note

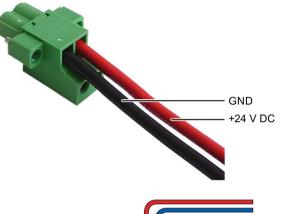
## Safety extra-low voltage (SELV)

- The device may only be connected to a 24 V DC power supply which meets the requirements of safe extra-low voltage (SELV) according to IEC/EN/DIN EN/UL 61010-2-201. A protective conductor must also be used.
- The cable cross-section must withstand the short-circuit current of the 24 V DC power source, so that a short-circuit will not damage the cable.
- Only connect cables with a cross-section of  $\geq 0.5 \text{ mm}^2$  (= AWG20).

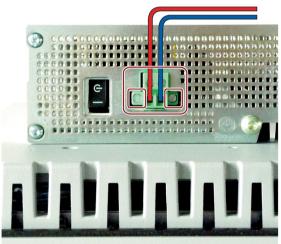
## Requirements

- The device is installed.
- The protective conductor is connected.
- The connection terminal is wired.
- The corresponding 24 V DC power supply is switched off.

#### **Procedure**



- Switch off the 24 V DC power supply.
- 2 Connect the wires of the power supply.



- Connect the connection terminal at the marked position.
- Secure the connection terminal with the marked screws.

  Secure the connection cable to the nearest attachment eyelet with a cable tie.

### Note

## Reverse polarity protection

The 24 V DC power supply is protected against polarity reversal. If you mix up the 24 V DC connecting cables and ground, the device is not damaged but does not switch on. After the power supply has been connected correctly, the device will again be ready to operate.

## 3.3.2.4 Connecting the terminal

The connection terminal for connecting the power supply is fitted to the device. The connection terminal is designed for wires with a cross-section of between 0.25 mm<sup>2</sup> and 2.5 mm<sup>2</sup>. Only connect cores with a cross-section of  $\geq$  0.5 mm<sup>2</sup>.

You can use either semi-rigid or flexible cables. You do not need to use end sleeves.

## Requirements

- 1 connection terminal
- 1 0.5 x 3 Philips screwdriver

#### **Procedure**

#### NOTICE

## Damage to the device

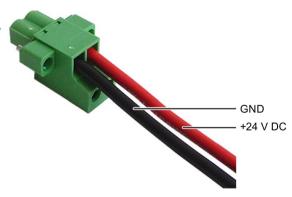
Do not adjust the screws in the connection terminal when it is plugged into the device. The pressure of the screwdriver on the connection terminal and the socket can damage the device.

Connect the wires to the connection terminal when it is not plugged in.

#### Note

Make sure that the cores are connected to the correct terminals. Observe the labeling for the contacts on the cover of the device.

1. Connect the lines as shown. Make sure the connection terminal is in the correct position as shown.



## 3.3.3 Connecting peripheral equipment

#### Note

## Ensure suitability for industrial applications

Connect only I/O devices approved for industrial applications according to EN IEC 61000-6-2.

#### Note

## I/O devices capable of hot-plugging (USB)

I/O devices capable of hot-plugging (USB) may also be connected while the IPC is in operation.

#### NOTICE

## I/O devices incapable of hot-plugging

I/O devices incapable of hot-plugging may only be connected after the device has been disconnected from the power supply. Strictly adhere to the specifications for peripheral equipment.

#### Note

Wait at least ten seconds between removing and reinserting USB devices.

When using standard USB devices, bear in mind that their EMC immunity level is frequently designed only for office environments. These USB devices are adequate for commissioning and servicing purposes. Only industrial grade USB devices are permitted for use in industrial environments. The USB devices are developed and marketed by the respective provider. The product supplier in each case provides support for the USB devices. Moreover, the terms of liability of the individual vendors or suppliers apply here.

## 3.3.4 Connecting the device to networks

The following options are available for integrating the device in existing or planned system environments and networks.

#### **Ethernet**

You can use the integrated Ethernet interfaces (10/100/1000 Mbps) for communication and data exchange with automation devices, e.g. SIMATIC S7.

You need a suitable software to use this functionality: TIA Portal, STEP 7, WinCC, WinAC, SIMATIC NET.

## **Industrial Ethernet**

You can establish a network between the device and other computers via Industrial Ethernet. The on-board LAN interfaces are twisted-pair TP interfaces that support data transmission rates of 10/100/1000 Mbps.

#### Note

You need a category 6 Ethernet cable for operation at 1000 Mbps.

## SIMATIC NET

Use this software package to create, operate and configure an innovative network for Field & Control level.

The current documentation for SIMATIC NET is available on the Industry Online Support under:

- SIMATIC NET: PC Software Commissioning PC Stations Manual and Quick Start (https://support.industry.siemens.com/cs/us/en/view/77377601)
- SIMATIC NET PC software SIMATIC NET PC Software V19 (https://support.industry.siemens.com/cs/ww/en/view/109826907).

The software package and the documentation are not included in the product package.

#### Additional information

You can find more information in the catalog and on the Internet at Industry Mall, the ordering system for automation and drive technology (<a href="https://mall.industry.siemens.com">https://mall.industry.siemens.com</a>).

# 3.3.5 Installing the strain relief

An accessories package with the following strain reliefs and the associated screws is included in the scope of delivery:

- Strain relief for general use
- Strain relief for LAN RJ45 cable
- Strain relief for USB and DisplayPort cable

#### Note

## Observe the order when installing the strain reliefs

Mount the strain reliefs in the order shown above.

## Requirement

- Strain reliefs
- Screws
- T10 screwdriver

## **Procedure**

1. Fasten the strain relief for general use to the device using the supplied screws.



Figure 3-1 Connecting IPC477E 1

2. Fasten the strain relief for LAN RJ45 cables to the device using the supplied screws.



Figure 3-2 Connecting IPC477E 2

3. Fasten the strain relief for USB and DisplayPort cables to the device using the supplied screws.



Figure 3-3 Connecting IPC477E 3

## 3.3.6 Securing cables on the device

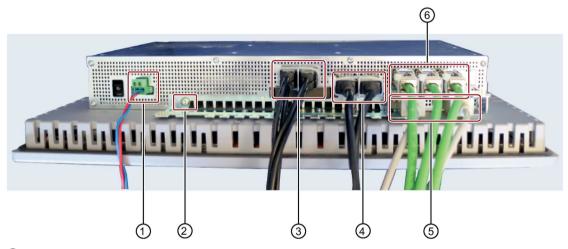
After the various strain reliefs have been installed on the device, the cables are also secured to the device with screws or cable ties.

## Requirement

- Installed strain reliefs
- Cable ties (not included in the scope of delivery.)
- Screws
- Cutting tool

## **Procedure**

1. Pass the cable tie around the respective strain relief bar and secure the cables as shown.



1 24 V DC (X80) Fasten the 24 V DC input connector with two integrated screws.

(2) GND Protective conductor connection: Conductor with min. 2.5 mm<sup>2</sup> (= AWG14)

3 4 x USB interface (X60), Secure the USB connectors with a cable tie.

4 2 x DisplayPort V1.2 Secure all Display Port connectors with a cable tie. (X70), (X71)

(5) 2 x COM: Fasten each COM connector with two integrated screws. COM 1 (X30),

COM 1 (X30), COM 2 (X31)

(X61), (X62), (X63)

6 3 x LAN RJ45 Secure each LAN connector with a cable tie. (X1) P1, (X2) P1, (X3) P1

2. Cut off the protruding ends of the cable ties.

Commissioning the device

# 4.1 Notes on commissioning and operation



### Danger of burns

The surface of the device can reach temperatures of over 70 °C. Any unprotected contact may cause burns.

Avoid direct contact during operation of the device. Touch the device only with appropriate protective gloves.

#### Note

#### Windows 10 - Read the UWF information

The configurable write filter (Unified Write Filter) is available with Windows 10.

Read the UWF information if you activate and use it, otherwise you may experience data loss.

#### Note

### Windows Embedded Standard 7 - Note the EWF and FBWF information

Two configurable write filters (Enhanced Write Filter and File Based Write Filter) are provided with Windows Embedded Standard. Read the EWF/FBWF information if you activate and use them, otherwise you may experience data loss.

- Enhanced Write Filter (EWF) (Page 69)
- File Based Write Filter (FBWF) (Page 71)

#### Note

#### Configuring memory cards in the device

Memory cards used in a device need to be configured on that device. Memory cards configured on other devices will not boot as the drive parameters will be different.

4.1 Notes on commissioning and operation

## LCD displays

#### Note

## "Image Sticking" and backlighting

The brightness of the backlighting deteriorates over the course of the screen's service life. A permanent picture with bright screen objects leads to a burn-in effect.

• Use a screen saver to extend the service life of the screen and the backlighting and to prevent the "Image Sticking" effect.

You can find additional information in the section Notes on usage (Page 22).

## Notes on operation

#### Note

### During the startup procedure...

- Make sure that there are no conductive liquids on the touch screen during startup.
- Do not touch the touch screen during startup.
   The device automatically calibrates the touch screen during startup.

## Requirement

- The device is connected to the power supply.
- The protective conductor is connected.
- The connection cables are plugged in correctly.
- The following hardware is available for initial commissioning:
  - One USB keyboard
  - One USB mouse

# 4.2 Initial commissioning

Following the initial switch-on, the operating system pre-installed on the device is set up automatically on the device.

#### NOTICE

## **Faulty installation**

If you change the default values in the BIOS setup or if you turn off the device during installation, you disrupt the installation and the operating system is not installed correctly. The operating safety of the device and the plant is at risk.

Do not switch off the device during the entire installation process. Do not change the default values in the BIOS setup.

## Procedure - Switching on the device

1. Set the on/off switch to the "ON" position.

The module carries out a self-test. During the self-test, the following message appears:

Press ESC for boot options

- 2. Wait for the message to disappear.
- 3. Follow the instructions on the screen.
- 4. Make the region and language settings.

If you want your system language to be international, select English. Information about changing the region and language settings subsequently can be found in the section "Installing the software" under "Maintaining and servicing your device".

#### Note

Once the operating system has been set up, the device may restart.

5. Type in the product key as required.

The product key is located on the "Certificate of Authentication", in the "Product Key" line.

#### Result

The interface of the operating system is displayed every time you turn on the device and after the startup routine.

## 4.2 Initial commissioning

## Procedure - Switching off the device

To turn off the device, always select "Start > Shutdown".

If the device is not going to be used for a long period of time after shutdown, set the on/off switch to the exposition.

## **NOTICE**

## Disconnecting the device from the power supply

The on/off switch does not separate the device from the mains. To de-energize the device, remove the power supply terminal.

## Additional information

Information on your operating system can be found on the Internet:

- Microsoft® Windows® 7
   (https://support.industry.siemens.com/cs/ww/de/view/109749497/en?dl=en)
- Microsoft® Windows® 10 (https://support.industry.siemens.com/cs/ww/de/view/109749498/en?dl=en)
- Microsoft® Windows Embedded Standard® 7
   (https://support.industry.siemens.com/cs/ww/de/view/109749499/en?dl=en)

## 4.3 Windows Action Center

## **Warning from the Windows Action Center**

The Action Center checks the status of the device with regard to the important safety aspects listed below. If a problem is found, the Action Center provides recommendations on how you can better protect the device.

- **Firewall**: The Windows Firewall adds protection to the device by blocking network or Internet access to the device by unauthorized users. The firewall is enabled in the delivery state.
- Antivirus software: Antivirus programs add protection to the device by searching for and eliminating viruses and other security threats. No antivirus software is installed in the delivery state.
- Automatic updates: Using the Automatic Update feature allows Windows to regularly search for the latest critical updates for the device and to install them automatically.
  - This option is enabled in the delivery state for Windows 7 and Windows 10.
- **User Account Control:** User Account Control issues a warning when programs attempt to modify important Windows settings. You can then either acknowledge this warning or prevent the program from changing the Windows settings.
  - This option is enabled in the delivery state.

Operating the device and device functions

5

# 5.1 Operator input options

Depending on your device and the connected I/O devices, the following operator input options are available:

- Touch screen for touch device
- · Screen keyboard for touch device
- External keyboard, connected via USB
- External mouse, connected via USB



## CAUTION

## Unintentional actions with touch screen operation

If you touch the touch screen while system-internal processes are running, unintended reactions of the device might be triggered.

Do not touch the screen in the following situations:

- During the boot process
- When plugging or unplugging USB components
- While Scandisk is running
- During a BIOS update

#### **NOTICE**

## Damage to the touch screen

Impact with hard objects as well as touching the touch screen with pointed or sharp objects can damage it and lead to a significant reduction in service life or even total failure of the touch screen.

Never touch the touch screen with pointed or sharp objects. Only touch the touch screen with your fingers, a touch stylus or an approved touch glove.



## Personal injury or property damage due to incorrect operation

Incorrect operation of devices with a touch screen can occur. This can result in personal injury or property damage.

Take the following precautions:

- Configure the plant so that safety-related functions are not operated with the touch screen.
- Switch off the device for cleaning and maintenance.
- · Make sure that the touch screen is kept free of dirt.

For resistive single-touch screen:

- Always touch only a single point on the touch screen.
- Calibrate the touch screen regularly, at the latest when the touch screen becomes inaccurate or does not respond despite repeated touches.

# 5.2 Operating a device with resistive single-touch screen

When you touch an object on the single-touch screen, the corresponding function is performed.

#### Note

## Appearance of blisters under extreme ambient conditions

Under extreme environmental conditions such as high atmospheric humidity and temperature, bubbles can form on the touch surface in rare cases. This only affects the appearance and does not represent any functional restriction.

5.3 Operating a device with capacitive multi-touch screen

# 5.3 Operating a device with capacitive multi-touch screen

You operate the multi-touch screen with one or multiple fingers. You can also operate it using gestures with up to five fingers at a time.



### Danger of malfunction due to improper execution of gestures on the touch screen

If gestures are executed incorrectly on the touch screen with multi-touch function, these gestures might not be recognized or could be recognized incorrectly. The entries made are then not implemented by the device or are implemented incorrectly or in an unintended manner.

Incorrect execution of multi-touch functions can lead to errors in the operation of the plant and thus to physical injury.

Note the following when operating the touch screen with multi-touch function:

- The touch screen reacts to contact on its surface, not to pressure.
- When using a touch pen: Operate the touch screen only with a touch pen for capacitive touch.
- Avoid unintended multiple touches, for example, with your knuckles.

Before you start to operate the device, make sure you are familiar with the multi-touch functions of the Windows operating system, as well as with the application to be used and its functions. Ensure that the gestures which the user executes on the multi-touch display are recognized by the application. It is possible that certain gestures need to be trained beforehand.



#### Personal injury or property damage due to no protective conductor

An inadequate protective conductor or the lack of one might cause malfunction of the capacitive touch screen. Functions may not work properly. This can result in personal injury or property damage.

- Always connect the device to a protective conductor.
- Additional information on connecting the protective conductor can be found in the section "Connecting the protective earth (Page 43)."

## Notes on operation

Note when operating the multi-touch screen:

- Surface contact with a diameter of about 5 to 20 mm is required for an operator action to be detected.
- An operation with gloves with a material thickness of <2 mm is detected in most cases. However, check the usefulness of the gloves you are using.
- To avoid incorrect operation, certain inputs are ignored and blocked from further entry:
  - Simultaneous operation with more than 5 fingers.
  - Surface contact with a diameter of > 3 cm, for example, resting the palm of the hand on the touch screen
  - As soon as the touch screen is no longer touched, input is possible again.

### Functions of the multi-touch screen

#### **General functions**

- Detection of up to 5 finger touches at a time.
- Detection of gestures that are supported by the operating system or the software installed on the device.

#### Note

Multi-touch operation can provide advanced features or pose limitations depending on the operating system and the software installed on the device. Read the corresponding documentation.

 You do not need to calibrate the touch screen. Some operating systems do offer touch calibration. However, this calibration does not lead to improved accuracy.

#### Security functions in an industrial environment

The touch screen is locked for security reasons when the following happens:

- There is a conductive liquid on the touch screen with ground contact via the enclosure or the operator, for example.
- Electromagnetic interference is present that exceeds the specification according to EN 61000-4-2.

Once the interference is over, the touch screen is no longer locked.

## 5.4 Panel Drivers and Tools software

## Panel description - Panel Drivers and Tools software

The SIMATIC IPC PDT software installs the "IPC Configuration Center" and, optionally, the "IFP Ethernet Monitor" software.

The existing hardware components are automatically detected by the associated software.

The most important features of the software are:

- Easy dialog-guided installation
- Simple configuration via the IPC Configuration Center of:
  - Brightness
  - Information
  - Screen saver
  - Tools
  - Touch settings

All other functions are described in the IPC Panel Driver and Tools operating manual.

#### SIMATIC IPC Panel Drivers and Tools software

The software SIMATIC IPC Panel Drivers and Tools as well as the complete description of the functions for your device are available for you in the Industry Online Support.

- Download the software PDT V1.7 or higher from the Internet at: (https://support.industry.siemens.com/cs/ww/en/view/109792891)
- The complete description of the functions for your device can be found along with the corresponding download file on the Internet at (https://support.industry.siemens.com/cs/ww/de/view/109974159/en).

## 5.5 Extended device functions

## 5.5.1 Monitoring functions

## 5.5.1.1 Overview of the monitoring functions

The basic version of the device also provides monitoring functions. The following display, monitoring and control functions are available when the appropriate software is used:

- Temperature monitoring: Overtemperature, undertemperature, or cable break at a temperature sensor
- Monitoring of drives with S.M.A.R.T. functionality
- Watchdog: Hardware or software reset of the computer
- Operating hours counter: Information about total time of operation
- Battery monitoring: The charge level of the battery is monitored.

## SIMATIC IPC DiagBase

If you have ordered your device with a Microsoft® Windows® operating system, the SIMATIC IPC DiagBase monitoring software is installed.

Information on the software and documentation of SIMATIC IPC DiagBase can be found under:

 SIMATIC IPC DiagBase (https://support.industry.siemens.com/cs/ww/de/view/109749690/en)

## SIMATIC IPC DiagMonitor

The SIMATIC IPC DiagMonitor monitoring software can be ordered optionally.

If a device is ordered with SIMATIC IPC DiagMonitor, the monitoring software SIMATIC IPC DiagMonitor is included with the device in the delivery state.

Information on the software and documentation of SIMATIC IPC DiagMonitor can be found under:

 SIMATIC IPC DiagMonitor (https://support.industry.siemens.com/cs/ww/de/view/39129913/en)

#### 5.5 Extended device functions

## 5.5.1.2 Temperature monitoring/display

Three temperature sensors monitor the temperature of the device at several positions:

- Processor temperature
- Temperature close to the RAM ICs/chips
- Temperature in proximity of the air inlet

A temperature error is triggered under these circumstances:

- The configured low threshold for the temperature has been violated.
- The configured high threshold for the temperature has been violated.

A temperature error causes the following reaction:

Reaction	Option
Alarm window of the DiagBase or DiagMonitor software alerts the user.	None

The temperature error is saved until the temperatures have fallen below the thresholds and it is reset by one of the following measures:

- Acknowledgment of the error message by the user with DiagBase or DiagMonitor software
- Restart of the device

## 5.5.1.3 Watchdog (WD)

## Configuration

You configure the watchdog with the DiagBase or DiagMonitor software.

## **Function**

The watchdog is able to monitor system runtime and informs the user about the different reactions that are triggered if the system does not respond to the watchdog within the specified monitoring time.

A watchdog alarm is retained after a restart and is reset and logged by the DiagBase or DiagMonitor software. The watchdog configuration is retained in the process.

## Watchdog reactions

The following reactions can occur if the watchdog is not addressed within the set time:

Option	Reaction
Reset on	Executes a hardware reset when the watchdog expires
Reset off <sup>1</sup>	Executes no action when the watchdog expires
Restart <sup>1</sup>	Restarts the operating system when the watchdog expires
Shutdown 1	Shuts down the operating system when the watchdog expires

<sup>&</sup>lt;sup>1</sup> Option is device-specific.

#### NOTICE

## "Reset on" option

The "Reset on" option immediately triggers a hardware reset that may result in loss of data under Windows and damage to the installation.

## Watchdog monitoring times

The monitoring time can be configured with the DiagBase or DiagMonitor software.

#### Note

When you change the monitoring time, the change becomes effective immediately.

## 5.5.1.4 Battery monitoring

The installed backup battery has a limited service life, see section "Replacing the backup battery (Page 85)". A two-tier battery monitoring checks the status of the backup battery. The SIMATIC DiagBase and SIMATIC DiagMonitor diagnostic software determines the status of the backup battery.

When the first warning level is reached, the battery for buffering CMOS data still has a remaining service life of at least one month.

## 5.5.1.5 Mass storage monitoring

The state of HDD, SSD and CFast cards is monitored via SMART bit and reported by DiagBase or DiagMonitor.

#### 5.5 Extended device functions

## 5.5.2 Unified Write Filter (UWF)

The Unified Write Filter is a configurable write filter that makes it possible to assign write-protection to data storage media, such as hard disks, CFast cards, SSDs, internal USB drives, or external SATA drives.

External removable data storage media such as USB sticks and other flash drives, which are recognized by the operating system as a removable data storage medium, are not supported.

UWF combines the advantages of older write filters such as EWF and FBWF. It prevents all write access to protected media and transfers the data to buffer memory (overlay). This increases the reliability and stability of the system as well as the service life of write-sensitive media such as SSDs and CFast cards.

#### Note

UWF is disabled in the delivery state.

Note that memory is reduced when UWF is enabled.

## **NOTICE**

#### Risk of data loss with enabled UWF

When UWF is enabled, all changes made to storage media with a UWF write protection after booting can be lost when the device is shut down. Proceed as follows to prevent this situation:

• Make changes to storage media only when UWF is disabled.

#### See also

SIMATIC IPC Windows 10 User Manual

(https://support.industry.siemens.com/cs/ww/de/view/109749498/en?dl=en)

## 5.5.3 Enhanced Write Filter (EWF)

## Purpose and function

The Enhanced Write Filter (EWF) is a function that is only available for Windows Embedded operating systems. EWF is a write filter that can be configured by the user.

You can use the Enhanced Write Filter to boot Windows Embedded Standard from read-only media, for example, memory cards or Solid State Drives (SSD), or provide individual partitions with write protection.

EWF can be used to minimize write access to storage media. This is important because the write cycles are limited due to technical reasons. We therefore recommend using EWF if you work with these storage media.

If you use HORM or compressed NTFS, EWF is indispensable.

#### NOTICE

#### Data loss with several write filters

Both EWF and FBWF are preinstalled in the SIMATIC IPC images. If several writer filters are active on one partition at the same time, you may experience data loss. This may damage the machine or plant.

Make sure that you only activate one write filter for each partition.

#### Note

#### Windows Embedded Standard

The Enhanced Write Filter is deactivated in the Windows Embedded Standard default state.

- Back up your data after installation of the operating system and programs.
- · Activate the EWF.

## **Setting EWF**

The following programs can be used to install, enable or disable the EWF:

- EWFMGR.EXE
- SIMATIC IPC EWF Manager.

The SIMATIC IPC EWF Manager is preinstalled and included on the supplied USB stick (DocuAndDrivers\Drivers).

Start the SIMATIC IPC EWF Manager as follows:

- "Start > All Programs > Siemens Automation > SIMATIC > EWF Manager > EWF Manager" Configure the SIMATIC IPC EWF Manager as follows:
- "Start > All Programs > Siemens Automation > SIMATIC > EWF Manager > EWF Settings"
   or
- Click the "SIMATIC IPC EWF Manager" icon in the system tray.

#### 5.5 Extended device functions

The following functions are available:

Function	Command
Write-protect drive C: Power on	ewfmgr c: -enable
Write-protect drive C: disable: the modified data are applied	ewfmgr c: -commitanddisable
Modified data on drive C: apply	ewfmgr c: -commit
Display information about the EWF drive	ewfmgr c:
Display help	ewfmgr /h

#### Note

The EWF commands affecting the write protection do not become active until after the next booting process.

#### Note

The EWF command ewfmgr c: -commitanddisable may not be used with the option -live.

## Special notes for use

If EWF is enabled, when the PC shuts down all changes made on drive C: after the boot process are lost.

These changes are only retained on the PC in the following cases:

- EWF is disabled when you make changes.
- EWF is enabled and you save the changes before shutting down the device using the following command on C: drive:

ewfmgr c: -commit

#### Note

When the system is set to automatically adjust the clock for daylight saving time adjustment, systems without central time management and with activated EWF set the clock forward or backward by one hour in the daylight saving time or standard time period each time the system boots.

The reason for this behavior is that Windows Embedded Standard 7 makes a registry entry that the changeover to daylight saving time has occurred. Since this file is also protected against modification by the EWF, the marker is lost during the boot sequence and the adjustment is made again.

We therefore recommend that you deactivate the automatic adjustment and change the clock manually.

Follow these steps:

- 1. Deactivate automatic adjustment in the Control Panel: In the "Time Zone" tab opened with the menu command "Start > Control Panel > Date and Time", remove the check mark from the "Automatically adjust clock for daylight saving changes" check box.
- 2. Save the change you have made with <code>ewfmgr c: -commit and</code> then reboot the system.

## 5.5.4 File Based Write Filter (FBWF)

## **Purpose and function**

With the Feature Pack 2007 for Windows XP Embedded Standard 7, Microsoft introduced a second write filter, File Based Write Filter (FBWF).

In contrast to EWF, which protects partitions based on sectors, FBWF works on the file level. When FBWF is enabled, all files and folders of a partition are protected unless they are included in an exception list.

FBWF is disabled by factory default in the operating system images for SIMATIC IPC and must be enabled and configured by the user.

When you enable FBWF, the folders C:\FBWF and D:\FBWF are authorized for writing by default.

## Comparison between EWF and FBWF

- You should prefer FBWF, because it is more flexible in its configuration and allows immediate writing without rebooting.
- If you use HORM or compressed NTFS, EWF is indispensable.



#### Data loss with several write filters

Both EWF and FBWF are preinstalled in the SIMATIC IPC images. If several writer filters are active on one partition at the same time, you may experience data loss. This may damage the machine or plant.

Make sure that you only activate one write filter for each partition.

## **Configuring FBWF**

FBWF can be configured in command console using the program FBWFMGR.EXE.

#### Note

- Observe the following syntax: Enter a **space** after the drive designation colon.
- Changes for direct write access only take effect after rebooting.
- Only existing files and folders can be entered in the exception list.

Function	Command
Display the current FBWF status	fbwfmgr /displayconfig
Enable FBWF after the next startup	fbwfmgr /enable
Write to protected files	fbwfmgr /commit c: \Test.txt

## 5.5 Extended device functions

Adding/removing elements in the exception list:	
Add file	fbwfmgr /addexclusion C: \Test.txt
Add folder	fbwfmgr /addexclusion C: \Test folder
Remove file	<pre>fbwfmgr /removeexclusion C: \Test.txt</pre>
Remove folder	fbwfmgr /removeexclusion C: \Test folder
Call up the help function	fbwfmgr /?

Detailed instructions on FBWF are available on the Internet (<a href="https://msdn.microsoft.com/en-us/library/aa940926">https://msdn.microsoft.com/en-us/library/aa940926</a>(WinEmbedded.5).aspx).

# 5.5.5 Buffer memory NVRAM

Depending on the configuration you ordered, the motherboard is equipped with a non-volatile memory (NVRAM) that applications can use to back up data in the event of a power failure. Failure of the supply voltage for a duration longer than 5 ms is indicated by the DC FAIL signal.

Depending on the system utilization, up to 512 KB can be saved in the NVRAM.

A memory window with a maximum size of 512 KB can be displayed by means of PCI address register. The base address is initialized by the BIOS.

A corresponding function is implemented there for using the NVRAM under WinAC RTX and for using the CPU150xS SW controller.

## 5.5.6 Trusted Platform Modul (TPM)

Depending on the ordered configuration, the motherboard contains a Trusted Platform Module (TPM). A TPM is a chip that adds important security functions to your device, such as enhanced protection of the PC against unauthorized manipulation by third parties. The current operating systems, for example, Windows 7 or Windows 10, support these security functions.

#### NOTICE

## Import restrictions

TPM technology is subject to legal restrictions in some regions and may not be used there. You could commit a crime by importing or exporting the device in certain countries.

Note the respective import provisions for the TPM module.

## **Activating the Trusted Platform Module**

The TPM can be activated under "Security" in the BIOS setup. Please follow the instructions in the BIOS setup.

## **Using the Trusted Platform Module**

The TPM can be used in Windows with the "BitLocker" drive encrypter.

The Windows operating system is installed in UEFI mode in the delivery state for this purpose. It is not possible to use BitLocker under Window Embedded operating systems because these are installed in MBR mode.

To use BitLocker, follow the relevant instructions in the operating system.

#### Note

#### Risk of data loss

If you lose the password for the drive encryption, you will not be able to restore the data. You will then lose accesss to the encrypted drive.

The warranty does not cover a reset of the hardware in the event of a loss of a password.

Please store the password carefully and make sure it is protected against unauthorized access.

# Expanding the device and assigning device parameters

# 6.1 Open the device.

The device must be opened in order to install a memory expansion. Read the information in the section "ESD guideline (Page 102)" when doing this.

## Opening device with expansions

To open devices with the PCIe card expansion, you first have to dismantle this expansion. You can find additional information on this in the following section:

• Install and remove PCIe card (devices with PCIe card) (Page 77)

## Opening device without expansions

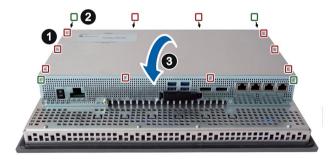
For devices without expansions, only the rear panel of the device is removed.

#### Requirement

- The device is disconnected from the power supply.
- All cables are removed from the device.
- The device is removed.
- T10 screwdriver

#### **Procedure**

- 1. Remove the screws marked in red.
- 2. Loosen the screws marked in green.



3. Remove the rear panel of the device.

# 6.2 Installing and removing a memory module

The procedures for installing and removing the memory module are the same for all device variants.

The motherboard is equipped with one slot for an SO-DIMM DDR4 memory module. You can use it to expand the memory capacity of the device to a maximum of 16 GB.

#### Note

Use only the memory modules recommended by Siemens AG. You can find additional information in the section "Accessories (Page 17)".

## Requirements

- The device is disconnected from the power supply.
- The device is open.

## **Procedure**

## NOTICE

Note the protective measures required when working with ESD in the section "ESD guideline (Page 102)".

#### Removal

- 1. Press the marked latches towards the outside.
  - The memory module tilts forward.
- 2. Pull the memory module out of the slot in the direction of the arrow.



6.2 Installing and removing a memory module

## Installation

- 1. Insert the memory module into the marked slot at an incline with the contact side toward the motherboard.
- 2. Carefully press the memory module into the contact strip until the latches engage.



# 6.3 Install and remove PCIe card (devices with PCIe card)

The following section describes the installation and removal of a PCIe card with devices that are expanded with a PCIe card.

## Requirements

- The device is disconnected from the power supply.
- The device is removed.
- 1 PCIe card
- 1 T10 screwdriver

## **Procedure**

## NOTICE

Note the protective measures required when working with ESD in the section "ESD guideline (Page 102)".

## Installation

1. Remove the marked screws and take off the rear panel of the of the enclosure.



2. Remove the marked screws and pull out the blanking plate.



## 6.3 Install and remove PCIe card (devices with PCIe card)

3. Remove the highlighted screw of the PCle card holder.



4. Insert the PCIe card in the direction of the arrow and secure this with the marked screw.



5. Push the PCIe card holder in the direction of the PCIe card and secure this with the marked screw.



6. Close the device.

## Removal

Follow the steps for installation in reverse order.

# 6.4 Inserting and removing a CFast card (external slot) (X50)

A slot (X50) for a CFast card is located on the bottom of the device. Installing and removing the CFast card is the same for all device variants.

Use only SIMATIC IPC CFast cards for industrial applications.

## Requirement

#### NOTICE

#### Note the following points:

- Use the slot (X50) described here exclusively for a CFast card.
- Do not insert CompactFlash cards (CF cards) into the slot (X50) for the CFast card.
- Always replace the SIMATIC IPC CFast card with a SIMATIC IPC CFast card of the same output version or higher. For the SIMATIC IPC477, only SIMATIC CFast cards with output version 02 or higher may be used.

The output version can be found on the SIMATIC IPC CFast card, see the section "Accessories (Page 17)".

- The device is disconnected from the power supply.
- SIMATIC IPC CFast card that is approved for industrial applications.

#### **Procedure**

The procedure for inserting and removing the CFast card in an external slot (X50) is the same for all device variants.

#### Installation

#### NOTICE

#### Inserting a memory card

If you are using the memory card in a device installed in a system, you must observe the safety regulations for work on electrical systems.

#### Note

Carefully insert the CFast card into the slot (X50) without applying excess force.

## 6.5 Assigning CPU power consumption parameters

Release the lock of the cover.
 Push against the cover in the direction indicated. Open the cover completely.



 Insert the CFast card into the external slot (X50) as shown in the figure.
 Push the CFast card (X50) into the slot until it clicks into place (ballpoint pen mechanics).



3. Close and lock the cover.

#### Removal

Perform the steps in reverse order.

# 6.5 Assigning CPU power consumption parameters

The CPU can be switched to one of the following modes via a BIOS Setup setting (BIOS setup > Menu "Power" > "Power&Performance" > "CPU Power Management Control" > "CPU Power Level"):

Operating mode	Description
Standard	Default setting
	The CPU clock is dynamically limited with maximum 3D graphics performance.
	The maximum CPU power consumption is 17 W.
Performance	Setting the high performance for CPU and Graphics at the same time.
optimized	The maximum CPU power consumption is 25 W.
	Note: The maximum ambient temperature must be reduced by 9 $^{\circ}$ C when installed inclined and 5 $^{\circ}$ C in all other mounting positions.
Determinism optimized	Same as standard, but additionally optimized for deterministic operation with constant CPU frequency.
Temperature	Setting for lowest power consumption.
optimized	The CPU clock is limited at a higher load.
	The maximum power consumption of the CPU is 12 W.

Maintaining and servicing your device

## 7.1 Maintenance

To maintain high system availability, we recommend the preventative replacement of those PC components that are subject to wear. The table below indicates the intervals for this replacement.

Component	Replacement interval:
Hard disk drive	3 years
CMOS backup battery	5 years
SSD / CFast card	Depends on the type of use 1

The interval for replacement depends greatly on the type of use. A specific interval cannot be given.

All drives are monitored with the software tools DiagBase or DiagMonitor on the basis of their SMART status. As soon the SMART status of the HDD or SSD switches to "Not OK", a message is sent in DiagBase or DiagMonitor, or when you start up the PC. You should then back up your data and replace the drive.

# 7.2 Repair information

## Making repairs

Install only system expansions approved for this device. If you install other expansion devices, you may damage the device or violate the safety requirements and regulations on RF suppression. Contact your technical support team or where you purchased your PC to find out which system expansion devices may safely be installed.



## Opening the device

Unauthorized opening and improper repairs on the device may result in substantial damage to equipment or endanger the user. If you install or replace a system expansion and damage your device, the warranty will become void.

The device may only be repaired by qualified personnel.

#### 7.2 Repair information

## Safety when working in and on electrical systems

Work in or on electrical systems may only be carried out by authorized persons. The following safety regulations apply in Germany for the prevention of electric shock and electrocution:

- 1. Switch off the system
- 2. Secure the system to prevent it switching back on
- 3. Check the system to ensure it is de-energized
- 4. Ground and short the system
- 5. Cover or shield adjacent live parts

These safety rules are based on the DIN VDE 0105 standard.

#### Note

These safety steps must always be taken in the above order before any work on electrical systems. Once work on an electrical system is finished, cancel the safety steps starting with the last and finishing with the first.

In accordance with the applicable safety regulations, clearly indicate on an electrical system that work on it is underway.

Observe the safety regulations applicable in the country of operation.



## **Electrostatic-sensitive components**

The device contains electronic components which are destroyed by electrostatic charges. This can result in malfunctions and damage to the machine or plant.

Make sure you take precautionary measures even when you open the device, for example, when opening device doors, device covers or the housing cover. For more information, refer to the section "ESD Guideline (Page 102)"



#### Risk of explosion and release of harmful substances

Improper handling of lithium batteries can result in an explosion of the batteries. Explosion of the batteries and the released pollutants can cause severe physical injury.

Observe all safety and handling instructions for lithium batteries. Do not expose lithium batteries to flames and do not solder the battery cell. Do not recharge, open, or short lithium batteries. Do not reverse lithium battery polarity or heat the batteries to over 100°C. Keep lithium batteries out of direct sunlight and protect them from moisture and condensation.

Note the following when handling lithium batteries:

- A worn battery jeopardizes the function of the device. Change the battery in good time.
- Replace the lithium battery only with batteries of the same type or a type recommended by SIEMENS.

The article number for the replacement part kit with lithium battery is A5E34345932.

#### NOTICE

#### Batteries and rechargeables pollute the environment

Do not dispose of used batteries or rechargeables in household waste. Users are obliged by law to return used batteries and rechargeable batteries. You as the user are legally responsible disposing used batteries or rechargeables in a correct manner.

Observe the following rules for the disposal of batteries and rechargeables:

- Dispose of used batteries and rechargeable batteries separately as hazardous waste in accordance with local regulations.
- You can return used batteries and rechargeable batteries free of charge to public collection points and wherever batteries and rechargeable batteries of the type in question are sold.
- Mark used battery containers as "Used batteries".

## Safety assessment

Carry out a safety inspection for functions relevant to safety on the entire system, including all safety-related components.

#### Limitation of liability

All technical specifications and approvals for the device apply only if you use expansion components that have a valid CE marking. The installation instructions for expansion components in the associated documentation must be observed.

UL approval of the device only applies when the UL-approved components are used according to their "Conditions of Acceptability".

We are not liable for functional limitations caused by the use of third-party devices or components.

## See also

Spare parts and repairs (https://support.automation.siemens.com/WW/view/en/16611927)

# 7.3 Cleaning the Device Front

The device is designed for low-maintenance operation. You should still clean the device front regularly, however.



## Unwanted reactions when cleaning the device

You risk unintentional actuation of control elements if you clean the device while it is switched on.

You may possibly trigger unwanted actions of the device or controller that are liable to cause personal injury or damage to the machinery.

Always switch off the device before you clean it.

## **Cleaning Agents**

#### **NOTICE**

## Damage to the HMI device caused by impermissible cleaning agents

Impermissible and unsuitable cleaning agents may cause damage to the HMI device.

Clean the enclosure surface with a damp cloth and make sure that no water enters the device.

# 7.4 Installing and removing hardware

## 7.4.1 Replacing the backup battery

## Requirements

- The device is disconnected from the power supply.
- The device is open, see the section "Open the device. (Page 74)".
- · Replacement battery

## **Procedure**

#### Removal

#### NOTICE

## Time setting is lost

The time and the setup settings are deleted if it takes longer than 30 seconds to replace the battery. The device time may no longer be synchronized. Time-controlled programs will no longer run or will run at the wrong time. This may damage the plant.

Set the device time again.

#### Note

## Writing down the BIOS settings

Make a note of the current BIOS setup settings or save them as a user profile in the BIOS setup Exit menu. You will find a list for noting the settings in the BIOS description.

# 7.4 Installing and removing hardware

- 1. Remove the marked battery connector.
- 2. Grip the marked battery and pull it up and out of its holder.



## Installation

For installation, follow the removal steps in reverse order and close the device.

## See also

General safety instructions (Page 19)

Repair information (Page 81)

# 7.4.2 Replacing the SSD

# Requirement

- The device is disconnected from the power supply.
- The device is open, see the section "Open the device. (Page 74)".
- T10 screwdriver

## **Procedure**

#### Removal

- 1. Remove the marked screws.
- 2. Remove the SSD from the mounting plate.
  - To do this, remove the screws that connect the SSD to the mounting plate.
- 3. Pull out the connector from the interface.



## 7.4 Installing and removing hardware

#### Installation

#### Note

## Screws in various lengths

This procedure involves screws of various lengths:

- Screws to fasten the SSD to the hard disk holder (short screws)
- Screws to fasten the hard disk holder to the device (long screws)

Make sure you use the correct screws for each operation.

For installation, follow the removal steps in reverse order and close the device again.

## See also

Repair information (Page 81)

## 7.4.3 Replacing HDD

This chapter applies to devices with hard disk drive.

## Requirement

- The device is disconnected from the power supply.
- The device is open, see the section "Open the device. (Page 74)".
- T10 screwdriver

## **Procedure**

#### Removal

- 1. Remove the marked screws.
- 2. Carefully remove the base plate with the hard disk fastened to it.
- 3. Remove the connector in the direction of the arrow.



4. Detach the hard disk from the base plate. Remove the four screws that connect the hard disk and the base plate.

## 7.4 Installing and removing hardware

#### Installation

#### Note

## Screws in various lengths

This procedure involves screws of various lengths:

- Screws to fasten the SSD to the hard disk holder (short screws)
- Screws to fasten the hard disk holder to the device (long screws)

Make sure you use the correct screws for each operation.

For installation, follow these steps in reverse and close the device.

# 7.5 Installing the software

## 7.5.1 Reinstalling the operating system

#### Note

Further information on the delivered operating system can be found on the USB stick provided.

#### See also

Windows® 7 operating instructions on the supplied USB stick (https://support.industry.siemens.com/cs/ww/de/view/109749497/en)

Windows® 10 operating instructions on the supplied USB stick (https://support.industry.siemens.com/cs/ww/de/view/109749498/en)

## 7.5.1.1 General installation procedure

If your operating system is no longer functioning correctly, you can reinstall it from the supplied USB stick:

- With the recovery function of the supplied USB stick
- With the restore function of the supplied USB stick

For these functions, set up the USB stick as bootable. For this purpose, "USB Boot" must be set to "enabled" in the BIOS Setup.

#### Note

## Installing the operating system in UEFI mode

To install an operating system in UEFI mode, the USB stick must also be booted in UEFI mode. Since Windows Embedded operating systems are installed in MBR mode, the USB stick boots automatically for the Restore function in MBR mode (Legacy mode).

## **GPT partitioning with Windows 10**

Please note that GPT partitioning should be selected for Windows 10 (GPT: GUID Partition Table).

## 7.5 Installing the software

#### Recovery function (only with Windows 7 Ultimate and Windows 10)

#### NOTICE

#### Windows Embedded

The Recovery function is not available for Windows Embedded operating systems.

The supplied USB contains the installation program with tools for configuring the drives and installing the operating system with the supported languages.

The basic language of the installed operating system is English. To add other languages, install these languages from the supplied USB stick (Documentation and Drivers).

## Contents of the "DocuAndDrivers" directory

The supplied USB stick contains the documentation, hardware drivers and updates.

In Windows, these contents are available via a menu.

#### **Restore function**

If you have ordered IPC477E with operating system, the supplied USB stick contains the Restore function.

## Information on your operating system can be found on the Internet:

- Microsoft® Windows® 7
   (https://support.industry.siemens.com/cs/ww/de/view/109749497/en?dl=en)
- Microsoft® Windows Embedded Standard® 7
   (https://support.industry.siemens.com/cs/ww/de/view/109749499/en?dl=en)
- Microsoft® Windows® 10 (https://support.industry.siemens.com/cs/ww/de/view/109749498/en?dl=en)

## 7.5.2 Partitioning data media

## 7.5.2.1 Partitioning in Windows Embedded Standard 7

You will need to reconfigure the partitions after installing a new drive, to repair corrupt partitions or to change the partitioning.

## Partitioning of the SIMATIC IPC CFast card

The SIMATIC IPC CFast card for Windows Embedded Standard 7 comes configured with the following default partitions:

Table 7-1 32-bit versions of the operating system

Partition	Name	Size of the card			File system
		8 GB	16 GB	≥ 30 GB	
First	SYSTEM	6 GB	12 GB	25 GB	NTFS (not compressed)
Second	DATA	Remainder	Remainder	Remain- der	NTFS (not compressed)

<sup>\*</sup> Due to partitioning/formatting, the actual CFast capacity does not correspond to the memory size specified on the SIMATIC IPC CFast card.

Table 7-2 64-bit versions of the operating system

Partition	Name	Size of the card		File system
		16 GB	≥ 30 GB	
First	SYSTEM	13 GB	25 GB	NTFS (compressed)
Second	DATA	Remainder	Remainder	NTFS (compressed)

<sup>\*</sup> Due to partitioning/formatting, the actual CFast capacity does not correspond to the memory size specified on the SIMATIC IPC CFast card.

## Partitioning of the HDD or SSD

In the delivery state, the following partitions are configured on the HDD or SSD drive with the Windows Embedded Standard 7 operating system:

Partition	Name	Partition size		File system
		< 100 GB > 100 GB		
Primary	System	60 GB	100 GB	NTFS not compressed
Second	Data	Remainder	Remainder	NTFS not compressed

To restore the partitions to their original delivery state, we recommend the software **SIMATIC IPC Image & Partition Creator.** Additional information is available in the accompanying documentation.

## 7.5.2.2 Setting up the partitions under Windows 7 Ultimate and Windows 10

You will need to reconfigure the partitions after installing a new drive, to repair corrupt partitions or to change the partitioning.

## Partitioning of the HDD or SSD

In the factory state, the following partitions are set up on the HDD or SSD for the Windows 7 x64 UEFI operating system:

Partition	Name	Partition size		File system
		SSD: > 60 GB	SSD/HDD: > 100 GB	
First	Boot		260 MB	FAT32
Second	MSR		128 MB	None
Third	System	60 GB	100 GB	NTFS, not compressed
Fourth	Data	R	emainder	NTFS, not compressed

In the factory state, the following partitions are set up on the HDD or SSD for the Windows 10 UEFI operating system:

Partition	Name	Partition size		File system
		SSD: > 60 GB	SSD/HDD: > 100 GB	
First	Boot		260 MB	FAT32
Second	MSR		128 MB	None
Third	System	60 GB	100 GB	NTFS, not compressed
Fourth	WinRE		500 MB	NTFS, not compressed
Fifth	Data		Remainder	NTFS, not compressed

## 7.5.2.3 Adapting partitions in Windows 7 Ultimate and Windows Embedded Standard 7

With the disk management, you can adapt the partitioning of your drives.

You can reduce or delete an available partition to acquire unassigned memory space, which you can use to set up a new partition or to increase an existing partition.

#### Note

## Data lost in the case of deleting a partition!

If you delete a partition, all the data on this partition is lost.

Back up your data before you change partitions.

## Requirement

You are logged on as an administrator.

## **Procedure - Reduce partition**

A partition can only be reduced if sufficient space is available.

- 1. Click with the right mouse button on the partition to be reduced and click on "Reduce size".
- 2. Follow the instructions.

## **Procedure - Increase partition**

#### Note

To increase a partition, this partition must not be formatted with a file system or the partition must be formatted with an "NTFS" file system.

- 1. Click in the partition manager with the right mouse button on the partition to be increased and click on "Increase size".
- 2. Follow the instructions on the screen.

Additional information is available in the "Help" menu under "Help topics" and "Search".

## 7.5 Installing the software

## 7.5.3 Installing drivers and software

#### Note

In the case of multilingual operating systems (MUI versions), you must set the menus and dialogs and the default language to English (US) in the regional settings before new drivers and operating system updates are installed.

You can install a second language package for service purposes at a later time with the supplied USB stick under Windows Embedded Standard 7.

#### **Procedure**

- 1. Connect the supplied USB stick to the USB port.
- 2. Start the program "START\_DocuAndDrivers".
- 3. Select "Drivers" in the index.
- 4. Select the device and operating system.
- 5. Select the required driver.
- 6. Open the folder with the driver data by clicking on the link next to "Driver path".
- 7. Start the setup program in this folder.

#### Note

For a new installation of Windows operating systems, the chipset driver must be installed before all other drivers, if required.

## 7.5.4 Update installation

## 7.5.4.1 Updating the operating system

#### Windows

The latest updates for the Windows operating system are available on the Internet at Microsoft and on the device in the Start menu "Start > Settings > Update & Security > Windows Update > Search for updates".

#### Note

Before you install new drivers or operating system updates for Windows MUI versions, configure the regional menu and dialog settings and the default English (US) language.

## other operating systems

Contact the corresponding manufacturer.

## 7.5.4.2 Installing or updating application programs and drivers

Drivers for USB sticks are included in the operating system and do not have to be installed separately.

For information about installation of SIMATIC software packages, refer to the corresponding manufacturer documentation.

For updates of third-party drivers and application programs, contact the respective manufacturer.

## 7.5.5 Backing up data

We recommend the software tool **SIMATIC IPC Image & Partition Creator** (as of V3.4) to back up data under Windows. This tool provides convenient and efficient functions for backing up and restoring the full content of memory cards, hard disks and individual partitions (images).

The **SIMATIC IPC Image & Partition Creator** can be ordered using the Siemens online ordering system (<a href="https://mall.industry.siemens.com">https://mall.industry.siemens.com</a>). For more information about SIMATIC IPC Image & Partition Creator, refer to its product documentation.

# 7.6 Recycling and disposal

Due to the low levels of pollutants in the HMI devices described in these operating instructions, they can be recycled.

Contact a certified disposal service company for electronic scrap for environmentally sustainable recycling and waste disposal of your old devices and dispose of the device according to the relevant regulations in your country.

Technical information

# 8.1 Certificates and approvals

## ISO 9001 certificate

The Siemens quality management system for our entire product creation process (development, production and sales) meets the requirements of ISO 9001:2008.

This has been certified by DQS (the German society for the certification of quality management systems).

Certificate no.: 001323 QM08

## **Software license agreements**

If the device is supplied with preinstalled software, you must observe the corresponding license agreements.

## **UL** approval



- Underwriters Laboratories (UL) according to standard UL 61010-2-201 (PROG.CNTLR.)
   Second Edition, File E85972
- Canadian National Standard CAN/CSA-C22.2 No. 61010-2-201 Second Edition

## FCC (USA) and ICES (Canada) Compliance

USA	
Federal Communi- cations Commis- sion Radio Frequency Interference Statement	This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.
Shielded Cables	Shielded cables must be used with this equipment to maintain compliance with FCC regulations.
Modifications	Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.
Conditions of Operations	This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

CANADA	
Canadian Notice	This Class A digital apparatus complies with Canadian ICES-003 (A).
Avis Canadien	Cet appareil numérique de la classe A est conforme à la norme NMB- 003 (A) du Canada.

#### RCM AUSTRALIA/NEW ZEALAND



This product meets the requirements of EN 61000-6-4:2007 Generic standards - Emission standard for industrial environments.

This product meets the requirements of the standard EN 61000-6-4:2007 Generic standards – Emission standard for industrial environments.

## **KOREA**



This product meets the requirements of Korean certification.

This product satisfies the requirement of the Korean Certification (KC Mark).

이 기기는 업무용(A급) 전자파 적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며 가정 외의 지역에서 사용하는 것을 목적으로 합니다.

#### **Taiwan**



This product meets the requirements of the CNS14336-1(099/09/30), generic standard CNS13438(095/06/01).

#### BIS (India)



This product meets the requirements of the Bureau of Indian Standard (BIS).

Tested according to IS 13252(Part 1):2010/ IEC 60950-1:2005.

## Ambient conditions for use of the devices in shipbuilding

The device is also suitable for use in shipping and offshore applications.

The installation and attachment conditions are the same as those for industrial applications.

For the admissible environmental conditions, the requirements set out in the certificates must be taken into account.

## Marine approvals

#### Acceptance procedures for shipping and offshore applications

The following marine approvals are provided for the device.

- ABS American Bureau of Shipping (USA)
- BV Bureau Vertias (France)
- DNV GL (Norway/Germany)
- LR Lloyds Register of Shipping
- Class NK Nippon Kaiji Kyokai (Japan)
- China Classification Society (CCS)
- Korean Certification (KC Mark)

#### NOTICE

## Ambient conditions and installation guidelines

The admissible environmental conditions and installation guidelines can be found in the certificates issued by the individual shipbuilding companies. After acceptance, the certificates will be made available on the Internet

(https://support.industry.siemens.com/cs/products?pnid=23704&dtp=Certificate&ct=446).

# 8.2 Declaration of Conformity

## 8.2.1 CE marking



#### Note

## Possible approvals

The following overview provides information on possible approvals. Only the approvals indicated on the device apply to the specific device.

## **EU Declaration of Conformity**

The associated declaration of conformity is available on the Internet at the following address: Panel PC certificates (https://support.industry.siemens.com/cs/ww/en/view/37369031).

## 8.2.2 Electromagnetic compatibility

## **Electromagnetic compatibility**

This product meets the requirements of EU Directive 2014/30/EU "Electromagnetic Compatibility".

The device is designed for the following areas of application corresponding to the CE marking:

Scope of application	Requirements for		
	Interference emission	Immunity to interference	
Industrial area	EN 61000-6-4	EN 61000-6-2	

The devices with AC power supply comply with the standards EN 61000-3-2 (harmonic currents) and EN 61000-3-3 (voltage fluctuations and flicker).

## Low-voltage directive

The device with AC power supply complies with the requirements of the EU Directive 2014/35/EU "Low Voltage Directive". Conformance with this standard has been verified according to EN 61010-2-201.

#### **RoHs directive**

This product meets the requirements stated in the RoHS directive (Restriction of Hazardous Materials): 2011/65/EU

Compliance with the directive has been reviewed according to the following standard: EN IEC 63000

## 8.2.3 UKCA marking

# UKCA marking

The device complies with the designated British standards (BS) for electrical equipment published in the official consolidated list of the British Government. The device meets the requirements and protection targets of the following regulations and related amendments:

- Electromagnetic Compatibility Regulations 2016 (EMC)
- Equipment and Protective Systems Intended for use in Potentially Explosive Atmospheres Regulations 2016 (Explosion Protection)
- Regulations on the restriction of the use of certain hazardous substances in electrical and electronic equipment 2012 (RoHS)
- <sup>1</sup>: Marking on nameplate, if applicable

#### **UKCA Declaration of Conformity**

The associated declaration of conformity is available on the Internet at the following address:

• Panel PC certificates (https://support.industry.siemens.com/cs/ww/en/view/37369031)

## 8.3 Directives and declarations

## 8.3.1 ESD guideline

#### What does ESD mean?

An electronic module is equipped with highly integrated components. Due to their design, electronic components are highly sensitive to overvoltage and thus to the discharge of static electricity. Such electronic components or modules are labeled as electrostatic sensitive devices.

The following abbreviations are commonly used for electrostatic sensitive devices:

- ESD Electrostatic sensitive device
- ESD Electrostatic Sensitive Device as a common international designation

Electrostatic sensitive devices can be labeled with an appropriate symbol.



#### **NOTICE**

## Damage to ESD from touch

Electrostatic sensitive devices, ESD, can be destroyed by voltages which are far below the human perception limit. If you touch a component or electrical connections of a module without discharging any electrostatic energy, these voltages may arise.

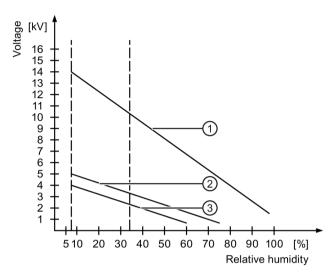
The damage to a module by an overvoltage can often not be immediately detected and only becomes evident after an extended period of operation. The consequences are incalculable and range from unforeseeable malfunctions to a total failure of the machine or system.

Avoid touching components directly. Make sure that persons, the workstation and the packaging are properly grounded.

## Charge

Every person without a conductive connection to the electrical potential of his/her surroundings can be electrostatically charged.

The material with which this person comes into contact is of particular significance. The figure shows the maximum electrostatic voltages with which a person is charged, depending on humidity and material. These values conform to the specifications of IEC 61000-4-2.



- 1 Synthetic materials
- (2) Wool
- (3) Antistatic materials such as wood or concrete

#### NOTICE

## **Grounding measures**

There is no equipotential bonding without grounding. An electrostatic charge is not discharged and may damage the ESD.

Protect yourself against discharge of static electricity. When working with electrostatic sensitive devices, make sure that the person and the workplace are properly grounded.

## 8.3 Directives and declarations

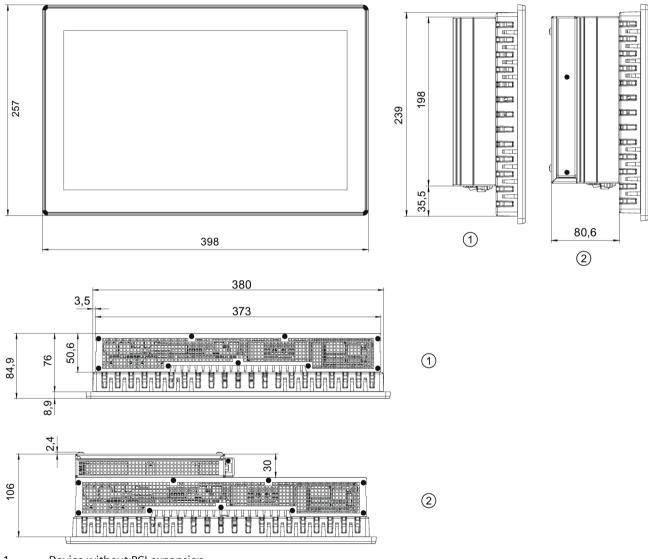
## Protective measures against discharge of static electricity

- Disconnect the power supply before you install or remove modules which are sensitive to ESD.
- Pay attention to good grounding:
  - When handling electrostatical sensitive devices, make sure that persons, the workstation and devices, tools and packaging used are properly grounded. This way you avoid static discharge.
- Avoid direct contact:
  - As a general rule, do not touch electrostatic sensitive devices, except in the case of unavoidable maintenance work.
  - Hold the modules at their edge so that you do not touch the connector pins or conductor paths. This way, the discharge energy does not reach and damage the sensitive components.
  - Discharge your body electrostatically before you take a measurement at a module. Do so by touching grounded metallic parts. Always use grounded measuring instruments.

# 8.4 Dimension drawings

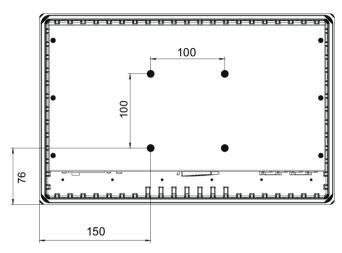
# 8.4.1 Dimension drawing of 15" device with capacitive multi-touch screen

The figure shows the front view and directly associated side view and top view of a device without PCI expansion. The side view and top view of a device with PCI expansion are shown beyond at a distance.



- 1 Device without PCI expansion
- 2 Device with PCI expansion

# 8.4 Dimension drawings



All dimensions in mm.

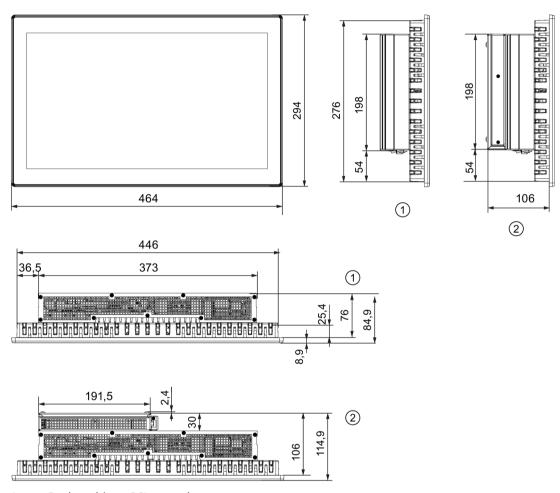
# **Device depths**

• Without expansion cards: 75.5 mm

• With PCIe card: 102.5 mm

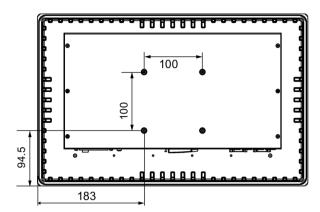
# 8.4.2 Dimension drawing 19" (HD) or 19" (FHD) device with capacitive multi-touch screen

The figure shows the front view and directly associated side view and top view of a device without PCI expansion. The side view and top view of a device with PCI expansion are shown beyond at a distance.



- 1 Device without PCI expansion
- 2 Device with PCI expansion

# 8.4 Dimension drawings



All dimensions in mm.

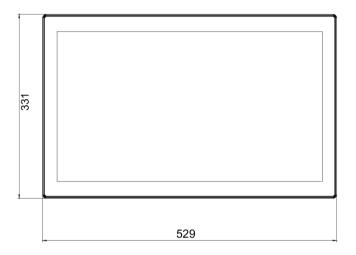
# **Device depths**

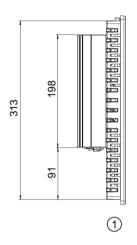
Without expansion cards: 75.5 mm

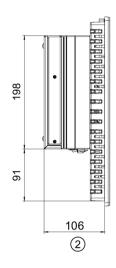
With PCIe card: 102.5 mm

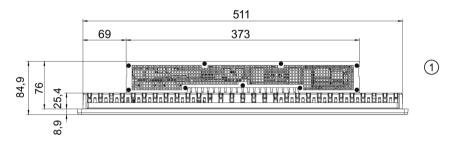
### 8.4.3 Dimension drawing of 22" device with capacitive multi-touch screen

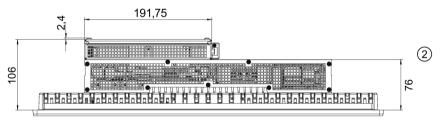
The figure shows the front view and directly associated side view and top view of a device without PCI expansion. The side view and top view of a device with PCI expansion are shown beyond at a distance.





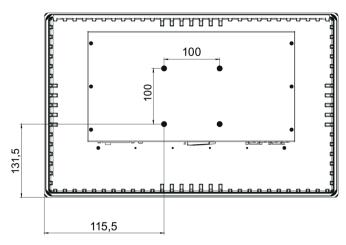






- 1 Device without PCI expansion
- 2 Device with PCI expansion

# 8.4 Dimension drawings



All dimensions in mm.

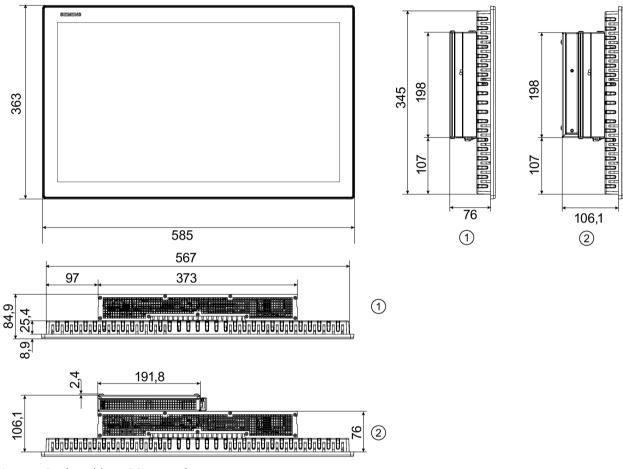
# **Device depths**

Without expansion cards: 75.4 mm

• With PCIe card: 102.5 mm

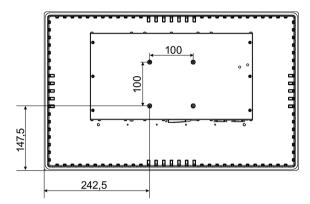
# 8.4.4 Dimension drawing of 24" device with capacitive multi-touch screen

The figure shows the front view and directly associated side view and top view of a device without PCI expansion. The side view and top view of a device with PCI expansion are shown beyond at a distance.



- 1 Device without PCI expansion
- 2 Device with PCI expansion

# 8.4 Dimension drawings



All dimensions in mm.

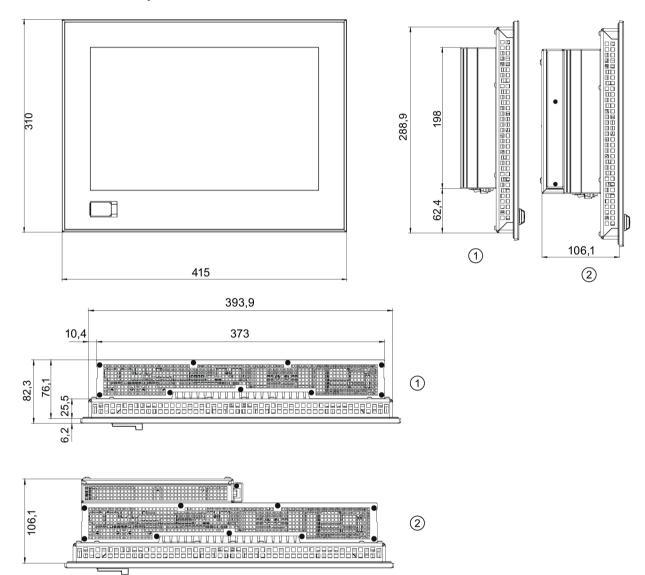
# **Device depths**

• Without expansion cards: 75.4 mm

• With PCle card: 102.5 mm

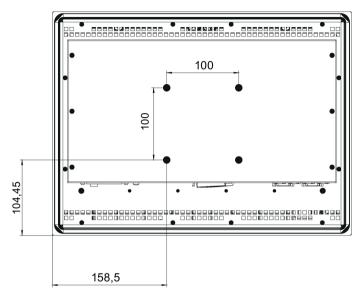
# 8.4.5 Dimension drawing of 15" device with resistive single-touch screen

The figure shows the front view and directly associated side view and top view of a device without PCI expansion. The side view and top view of a device with PCI expansion are shown beyond at a distance.



- Device without PCI expansion
- 2 Device with PCI expansion

# 8.4 Dimension drawings



All dimensions in mm.

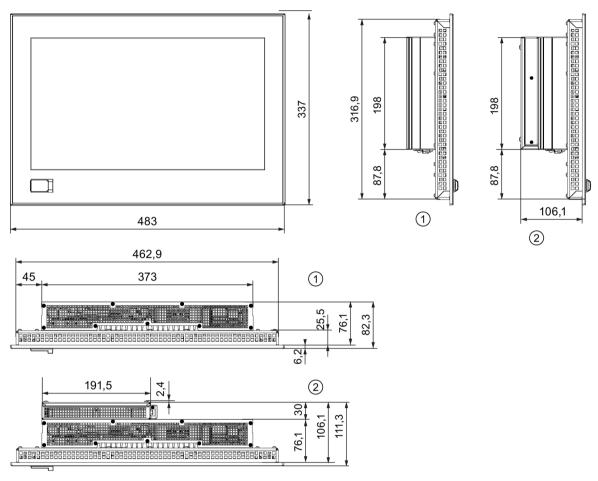
# **Device depths**

• Without expansion cards: 75.5 mm

With PCIe card: 106.1 mm

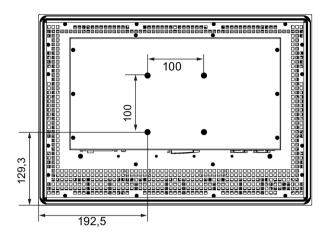
# 8.4.6 Dimension drawing of 19" device with resistive single-touch screen

The figure shows the front view and directly associated side view and top view of a device without PCI expansion. The side view and top view of a device with PCI expansion are shown beyond at a distance.



- 1 Device without PCI expansion
- 2 Device with PCI expansion

# 8.4 Dimension drawings



All dimensions in mm.

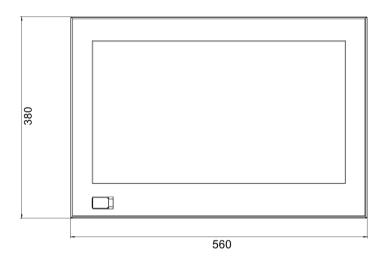
# **Device depths**

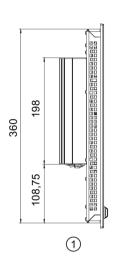
Without expansion cards: 76.1 mm

• With PCle card: 106.1 mm

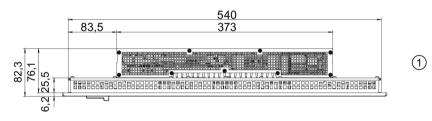
### 8.4.7 Dimension drawing of 22" device with resistive single-touch screen

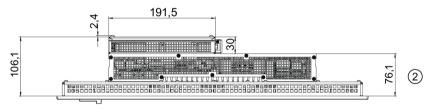
The figure shows the front view and directly associated side view and top view of a device without PCI expansion. The side view and top view of a device with PCI expansion are shown beyond at a distance.





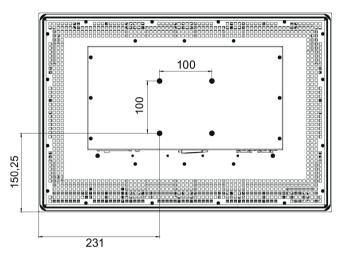






- 1 Device without PCI expansion
- 2 Device with PCI expansion

# 8.4 Dimension drawings



All dimensions in mm.

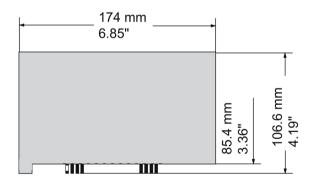
# **Device depths**

• Without expansion cards: 75.5 mm

• With PCIe card: 106.1 mm

# 8.4.8 Dimension drawing for the installation of expansion cards

Short PCI or PCIe expansion card



# 8.5 Technical specifications

# 8.5.1 General technical specifications

Weight of touch device (without expansions):	Resistive single-touch screen Capacitive multi-touch screen	
Touch screen device, 15" display	• Approx. 6900 g	
Touch screen device, 19" display	<ul> <li>Approx. 8250 g</li> </ul>	• Approx. 7800 g
Touch screen device, 22" display	• Approx. 8950 g	• Approx. 9420 g
Touch screen device, 24" display	•	Approximately 10600     g
For device with expansion cards, the weight increases accordingly:		
Expansion: PCle card	Approximately 150 g	
Supply voltage	• 24 V DC (-20 % / +20 %	) 1
	• 100 - 240 V AC (-15 % / +10 %); 50 - 60 Hz <sup>3</sup>	
Input current 24 V DC	• 5 A DC	
Input current 100 - 240 V AC	t current 100 - 240 V AC • 1.1 A AC	
Short-term voltage interruption according to Namur	Min. 20 ms (DC) Min. 20 ms (AC); max. 10 events per hour; min. 1 s recovery time	
Degree of protection	IP 20 to IEC 60529 (end)	closure) <sup>2</sup>
• IP 65 (front) <sup>2</sup>		
Protection class	Protection class I according	g to IEC 61140
Safety specifications	EN 61010-1; EN 61010-2-201; UL 61010-1; UL 61010-2-201; CAN/CSA-C22.2 No. 61010-1; CAN/CSA-C22.2 No. 61010-2-201	
Quality assurance	In accordance with ISO 9001	
Degree of pollution	Device is designed for environments with pollution degree 2	
Transient overvoltages	Device is designed for connection to supply with overvoltage category II (transient overvoltages up to 2500 V)	

The device may only be connected to a 24 V DC power supply which meets the requirements of a safe extra-low voltage (SELV/PELV) in accordance with the standard IEC/EN/DIN EN/UL 61010-2-201

- <sup>2</sup> not evaluated by UL
- <sup>3</sup> Inrush current AC max. 50 A for a period of < 1ms

At least 5 A inrush current for 15 ms is required for device startup. The peak value of the starting current depends on the input voltage and the impedance of the 24 V DC power supply. Peak currents greater than 6.5 A are possible. This will not have a negative impact on device functionality.

# 8.5 Technical specifications

# Power consumption (typical)

The table below shows the maximum power consumption of the devices with and without expansion.

Device type	Without expansion	With PCle
15" Touch	70 W	77 W
19" Touch	78 W	85 W
22" Touch	75 W	82 W
24" Touch	75 W	90 W

# **Electromagnetic compatibility**

Interference emission	EN 61000-6-4; CAN CSA CISPR 32 Class A; EN 55032 Class A; FCC Class A; KS C 9832
Immunity with regard to conducted interference on the supply lines	± 2 kV according to IEC 61000-4-4; burst ± 1 kV according to IEC 61000-4-5; symmetrical surge ± 2 kV according to IEC 61000-4-5; asymmetrical surge
Noise immunity on signal lines	± 2 kV according to IEC 61000-4-4; Burst; Length > 3 m ± 1 kV according to IEC 61000-4-4; Burst; length < 3 m ± 2 kV according to IEC 61000-4-5; Surge, symmetric, length > 30 m
Immunity to electrostatic discharge	± 6 kV contact discharge in accordance with IEC 61000-4-2 ± 8 kV air discharge in accordance with IEC 61000-4-2
Immunity to RF interference	10 V/m, 80 – 2700 MHz 80% AM according to IEC 61000-4-3 3 V/m, 2.7 – 6 GHz 10 V, 10 kHz – 80 MHz according to IEC 61000-4-6
Immunity to magnetic fields	100 A/m, 50/60 Hz according to IEC 61000-4-8

### Motherboard

Depending on the device variants, the device features the following components:

Processor	Intel® Celeron® Processor G3902E     (2 MB cache, 1.6 GHz)
	<ul> <li>Intel® Core™ i3-6102E Processor</li> <li>(3 MB cache, 1.9 GHz)</li> </ul>
	<ul> <li>Intel® Core™ i5-6442EQ Processor</li> <li>(6 MB cache, up to 2.7 GHz)</li> </ul>
	<ul> <li>Intel® Xeon® Processor E3-1505L v5 (8 MB cache, up to 2.8 GHz)</li> </ul>
Main memory	Memory modules without ECC:
	4 GB DDR4-SDRAM SODIMM
	8 GB DDR4-SDRAM SODIMM
	• 16 GB DDR4-SDRAM SODIMM
	Memory module with ECC (not combinable with i5 CPU):
	8 GB DDR4-SDRAM SODIMM
	• 16 GB DDR4 SDRAM SODIMM
Backup memory <sup>1</sup>	512 kB NVRAM optional

<sup>&</sup>lt;sup>1</sup> For devices with retentivity

# Drive and memory media

Depending on the device variants, the device features the following components:

SATA drive	1 slot	
	2.5", ≥ 240 GB, SATA (optional) and 480 GB SATA (optional)	
Hard disk drive, HDD	2.5", ≥ 320 GB, SATA	
CFast card	2 GB optional or	
	4 GB optional or	
	8 GB optional or	
	16 GB optional or	
	• ≥ 30 GB	

### 8.5 Technical specifications

### Display

	15"4	15" <sup>1</sup>	19" (HD) <sup>1,</sup>	19" (FHD) <sup>4</sup>	22" <sup>1, 4</sup>	24" <sup>4</sup>
Display type	LCD with extended viewing angle	LCD with extended viewing angle	LCD	LCD	LCD with extended viewing angle	LCD with extended viewing angle
Active display area	344 x 194 mm	331 x 207 mm	410 x 230 mm	410 x 230 mm	475 x 267 mm	527 x 296. 5 mm
Resolution	1366 x 768 pixels	1280 x 800 pixels	1366 x 768 pixels	1920 x 1080 pixels	1920 x 1080 pixels	1920 x 1080 pixels
Possible colors		Up to 16.7 million				
Brightness control	Yes, from 0 to 99 <sup>2</sup> , 0 = backlight off					
Backlighting	LED	LED	LED	LED	LED	LED
Half Brightness Life Time (MTBF <sup>2</sup> <sup>3</sup> )	50000 h	50000 h	50000 h	50000 h	30000 h	30000 h
Pixel error class in accordance with ISO 9241-307			II			
Touch force resistive touch screen	With test pen, 2 mm diameter: 5 N					

- <sup>1</sup> Resistive touch screen
- Via SetBrightness dialog: 9 to 99 ( 10 to 100%), via SetBrightness command line call: 0 to 99
- <sup>3</sup> MTBF: Operating hours after which the maximum brightness is reduced by half compared to the original value. MTBF is increased by using the integrated dimming function, for example, time-controlled via screensaver or centrally via PROFlenergy.
- <sup>4</sup> Multi-touch screen

### LCD displays

#### Note

### "Image Sticking" and backlighting

The brightness of the backlighting deteriorates over the course of the screen's service life. A permanent picture with bright screen objects leads to a burn-in effect.

• Use a screen saver to extend the service life of the screen and the backlighting and to prevent the "Image Sticking" effect.

You can find additional information in the section Notes on usage (Page 22).

# Graphics

Graphics controller	Intel® HD Graphics 510 / 530 / P530 (depending on CPU type)
Graphics memory	32 to 512 MB shared memory
External interfaces	DP (DisplayPort): 1920 × 1200, 60 Hz

### Interfaces

COM 1 (X30), COM 2 (X31) (optional)	RS232/RS422/RS485, max. 115 kbps, 9-pin, D-Sub pin (+-12 V)	
2 x DisplayPort (DPP) <sup>3</sup>	Connection of display devices with DisplayPort connection (per	
• 2 x DisplayPort (X70), (X71)	interface: 3.3 V / 500 mA)	
Keyboard	Connection via USB port	
Mouse	Connection via USB port	
USB	Back of device:	
• 4 x USB interface: (X60), (X61), (X62), (X63)	• 4 x USB 3.0 (+ 5.0 V), max. 2 high current (0.9 A each) can be operated simultaneously	
	Front of device (only for devices with resistive touch screen with 15", 19" and 22" display):	
	• 1 × USB 3.0, high current	
Ethernet <sup>1</sup>	3 × RJ45 connection, Intel 1 x I219LM, 2 x I210	
• 3 x Ethernet interface: (X1) P1, (X2) P1, (X3) P1	10/100/1000 Mbps, electrically isolated, teaming-capable <sup>2</sup>	
Slot for PCIe expansion cards	Only for device with expansions:	
	1 × PCIe-x4 expansion card can be used	
	Max. permissible power loss: 8 W	

For unique labeling, the Ethernet ports (X1) P1, (X2) P1, (X3) P1 are numbered on the enclosure. The numbering by the operating system can differ.

<sup>&</sup>lt;sup>2</sup> Teaming can be set and initiated in the configuration interface. In teaming operation, jumbo frames, e.g. for the camera application, are not supported.

The DisplayPort interfaces (X70), (X71) are compatible with DisplayPort V1.2.

# 8.5.2 Environmental conditions

# **Climatic ambient conditions**

Permitted am	bient temperature during operation				
Temperature,	tested according to IEC 60068-2-1, IEC 60068-2-2				
15" display	At an ambient temperature $>$ 40 °C, the device must be operated in an operating area in accordance with RAL.				
	When installed vertically in horizontal format	With HDD:	+5 to +35 °C		
		With SSD:	+0 to +45 °C		
		With CFast:	+0 to +50 °C		
	When installed inclined in horizontal format,	With SSD:	+0 to +45 °C		
	Vertical inclination max. ± 45°	With CFast:	+0 to +50 °C		
	When installed upright in vertical format,	With CFast or	+0 to +40 °C		
	Display rotated 90° vertical from the standard position	SSD:			
	(Power supply is located at the top)				
19" display 22" display	L DAL		accordance with		
24" display	When installed vertically in horizontal format	With HDD:	+5 to +35 °C		
. ,		With CFast or SSD:	+0 to +45 °C		
	When installed inclined in horizontal format,	With CFast or	+0 to +40 °C		
	Vertical inclination max. ± 45°	SSD:			
	When installed upright in vertical format,	With CFast or	+0 to +40 °C		
	Display rotated 90° vertical from the standard position	SSD:			
	(Power supply is located at the top)				
All touch	Temperature during storage/transport	-20 °C to +60 °C			
devices	Gradient	Operation: Max. densation	Operation: Max. 10 K/h; no condensation		
		Storage/transpo condensation	rt: Max. 20 K/h; no		
	<b>Note</b> : For the "Performance Optimized" setting (see Assigning (Page 80)), the ambient temperature must be reduced by 9 °C mounting positions.				

Relative humidity, tested in accordance with IEC 60068-2-78, IEC 60068-2-30		
Operation	0 to 30 °C: 5-80%; decreasing linearly to 5-25% at 50° C	
Storage/transport	5 to 95 % at 25/55 °C, no condensation	
Air pressure, in accordance with IEC 60068-2-13		
Operation	1080 hPa to 795 hPa, corresponds to an elevation of 1000 m to 2000 m	
Storage/transport	1080 hPa to 660 hPa, corresponds to an elevation of 1000 m to 3500 m	

# Protection against foreign objects and water

Degree of protection	Explanation
Front	When mounted:
	IP65 according to IEC 60529 <sup>1</sup>
	Front face only Type 4X/Type 12 (indoor use only) according to UL50
Rear panel	IP20 <sup>1</sup>
	Touch protection test with standard test probes. There is no protection against ingress by water.

<sup>&</sup>lt;sup>1</sup> not evaluated by UL

The degree of protection of the device front can only be guaranteed if the mounting seal is intact and lies flush against the mounting cutout.

### **Mechanical ambient conditions**

Vibration, tested according	Vibration, tested according to DIN IEC 60068-2-6		
Operation with HDD	10 Hz to 58 Hz: 0.0375 mm		
	58 Hz to 200 Hz: 4.9 m/s <sup>2</sup>		
Operation with CFast and	5 Hz to 8.4 Hz: 3.5 mm		
SSD	8.4 to 200 Hz: 9.8 m/s <sup>2</sup>		
	10 Hz to 58 Hz: 0.0375 mm		
Operation with CFast and SSD with VESA adapter up	58 Hz to 200 Hz: 4.9 m/s <sup>2</sup>		
to 22"			
Storage/transport	5 to 8.4 Hz: 3.5 mm		
	8.4 Hz to 500 Hz: 9.8 m/s <sup>2</sup>		
Shock resistance, tested in accordance with IEC 60068-2-27, IEC 60068-2-29			
Operation	50 m/s <sup>2</sup> , 30 ms		
Storage/transport	250 m/s <sup>2</sup> , 6 ms		

### See also

Permitted mounting positions (Page 27)

# 8.5.3 Power requirements of the components

### Maximum power consumption of the auxiliary components

Auxiliary components		Maximum permitted power consumption		power	Max. total power
		+5 V	+3.3 V	+12 V	
USB device High current		1 A	-	-	10 W (for all USB devices)
Display port		-	500 mA	-	
PCIe module		-	1.5 A	0.5 A	8 W (for the whole device)

<sup>&</sup>lt;sup>1</sup> The permissible total power for PCIe and USB cards may not exceed max. 15 W

#### Note

#### Device can overheat!

To avoid overheating, the power loss per PCIe slot should not exceed 8 watts.

### 8.5.4 Integrated DC power supply

Input voltage	24 V DC (-20%/+20%)
Output power of the power supply	Max. 80 W
Power failure buffering	Hold-up time ≥20 ms with 20.4 V (DC_FAIL is active after > 5 ms)
Efficiency	>85 %

#### Note

### Inrush current

At least 5 A inrush current for 15 ms is required for device startup.

The peak value of the starting current depends on the input voltage and the impedance of the 24 V DC power supply. Peak currents greater than 6.5 A are possible. This will not have a negative impact on device functionality.

### 8.5.5 AC voltage supply

Input voltage	100 - 240 V AC (-15% / +10%); 50 - 60 Hz
Output power of the power supply	Max. 80 W
Power failure buffering	"AC FAIL" becomes active after >= 20 ms, The power supply continues to buffer for >= 20 ms at >= 93 V
Efficiency	>85 %

#### Note

#### Inrush current

The power consumption of the device is dependent on the device configuration and can be up to 1.1 A.

The peak value of the starting current depends on the input voltage and the impedance of the power supply, and can be up to 50 A for < 1 ms. This will not have a negative impact on device functionality.

### 8.5.6 Restoring the delivery state

You can restore the original factory software using the Restore function. The USB stick contains the necessary images and tools for transferring the factory software to the hard disk/SSD or memory card of your PC. The following options are available for restoring software:

- Restore the entire hard disk / SSD or memory card with drive C: (system) and drive D: Use the "Restore entire hard disk" option.
- Restore drive C: only This allows you to retain any user data on drive D: Use the "Restore system partition only" option.

### NOTICE

#### Data are deleted

When you select the "Restore entire hard disk" option, all data, user settings and authorizations or license keys on the hard disk are lost. The hard disk is reset to the delivery state with partitions "C:" and "D:".

If the "Restore system partition only" option is set, all files on drive C: (System) are deleted. All data, user settings and existing authorizations or license keys on drive "C:" will be lost. Drive "C:" on the hard drive is completely erased, reformatted and the original software is written to it.

### 8.5 Technical specifications

#### **Procedure**

#### Note

The "USB Boot" option has to be set to "Enabled" in the BIOS menu "Boot" so that the device can boot from the USB stick.

- 1. Connect the USB stick to the device.
- 2. Restart the device.
- 3. Press <ESC> when the following BIOS message appears:

```
Press Esc for Boot Options
```

The BIOS selection menu is displayed when initialization is completed.

- 4. To boot from the USB stick, select the Boot Manager.
- 5. Select the USB stick in the Boot Manager and confirm the entry.
- 6. Select the Restore function and confirm the entry.
- 7. Follow the on-screen instructions.

### 8.5.7 Windows 7 / Windows 10

### 8.5.7.1 Installing Windows

#### Note

#### Windows 10

Specific information on using the Windows operating systems is available in the following manuals (not included in the scope of delivery):

- Windows 10 Step by Step (MS Press No. 324)
- Windows 10 Plain and Simple (MS Press No. 422)
- Windows 10 Inside Out (MS Press No. 325 / MS Press No. 418)

#### Windows 7

Specific information on using the Windows operating systems is available in the following manual (not included in the product package):

Microsoft Windows 7 - Technical Reference (MS Press No. 5927).

### Requirement

- · USB keyboard and monitor
- Supplied USB stick with Recovery function

#### **Procedure**

#### Note

The "USB Boot" option has to be set to "Enabled" in the BIOS menu "Boot" so that the device can boot from the USB stick.

- 1. Connect the USB stick to the device.
- 2. Restart the device.
- 3. Press <ESC> when the following BIOS message appears:

Press Esc for Boot Options

The BIOS selection menu is displayed when initialization is completed.

- 4. To boot from the USB stick, select the Boot Manager.
- 5. Select the USB stick in the Boot Manager and confirm the entry.
- 6. Select the Recovery function and confirm the entry.

#### 8.5 Technical specifications

7. Follow the on-screen instructions.

After a few seconds, you will see the "Install Windows" installation program.

#### NOTICE

#### Data deleted

All data, user settings and existing authorizations or license keys are deleted during the installation of Windows 7 and Windows 10.

- Back up all data.
- Check the data and time in the BIOS setup, "Main" menu and correct the displayed time if necessary.
- 8. Now follow the instructions of the installation program "Install Windows". You will find additional information in the operating system manual.

### "Install Windows" installation program

The language of the installation program and the operating system you want to install has been preset to English. You can change the language of the operating system after the installation. You can find information on this in section: "Setting up the language selection by means of the Multilanguage User Interface (MUI) (Page 131)".

### 8.5.7.2 Setting up partitions under Windows

You can set up partitions during the installation process.

The recommended minimum size for Windows system partition varies, depending on the amount of RAM and additional software that you are going to use. Information about the partitioning of the data volume in the delivery state is available in section Setting up the partitions under Windows 7 Ultimate and Windows 10 (Page 94).

# 8.5.7.3 Setting up the language selection by means of the Multilanguage User Interface (MUI)

You can set the display of menus, dialogs or other information, such as date and time, to a different language. For this purpose, you can either select one of the preinstalled languages or install a new language package.

The following command sequences are described in English. Depending on the default setting, they can be displayed in another language.

### Setting up language selection

### Changing the settings for language, region and formats of a registered user account

- 1. Choose:
  - "Start > Control Panel > Clock, Language, and Region > Regional and Language Options"
- 2. You can make the desired changes in the "Formats", "Location" and "Keyboards and Languages" tabs.

# Changing the settings for language, region and formats of the system account and the standard user account

You can change the settings for language, region and formats of the system account (for example, the language in the user login dialog) and the settings of the standard user account (standard setting for new users). The settings of the registered user are copied to the system account and the standard user account for this purpose.

- 1. Choose:
  - "Start > Control Panel > Clock, Language, and Region > Regional and Language Options"
- 2. You can make the required changes in the "Administrative" tab. You copy the settings by clicking the respective button.

### Installing new language packages

Some language packages are available on the Recovery section of the USB stick in the "Language packs" folder.

- 1. Choose:
  - "Start > Control Panel > Clock, Language, and Region > Regional and Language Options"
- 2. Select the "Keyboards and Languages" tab.
- 3. Click the "Install/uninstall languages" button and make the required changes.

### See also

Windows® 7 operating instructions on the supplied USB stick (https://support.industry.siemens.com/cs/ww/de/view/109749497/en)

Windows® 10 operating instructions on the supplied USB stick (https://support.industry.siemens.com/cs/ww/de/view/109749498/en)

### 8.5 Technical specifications

#### 8.5.8 Windows Embedded Standard

### 8.5.8.1 General installation procedure

If your software becomes corrupt for any reason, you can reinstall it using the supplied USB stick. The USB stick contains an image file for the device memory with the original software package (operating system with installed hardware drivers).

#### Note

You require a USB keyboard and the supplied USB stick to reinstall the operating system. Before performing the new installation, you should check the date and time set in the BIOS Setup, "Main" menu, and correct these if necessary.

To be able to use the Enhanced Write Filter (EWF), the operating system must be installed in MBR mode.

### 8.5.8.2 Language selection in Windows Embedded Standard 7

You can change the language using the supplied USB stick. The USB stick contains the required language packages and help for changing the system language.

#### Note

#### Note the license terms of Windows Embedded Standard 7

Note the license terms for Windows Embedded Standard 7 and especially the extended software terms of the Siemens AG.

You can find the license terms in the delivered document "MICROSOFT SOFTWARE LICENSE TERMS for Windows Embedded Standard 7" and in the system drive under \Windows\System32\license.rtf.

### **Procedure - Change system language**

- 1. Connect the supplied USB stick to a free USB port of the device.
- 2. Restart the device and press "ESC" to access the BIOS.
- 3. Switch to the "Boot" menu and select the setting "USB Boot" = "Enabled".
- 4. Switch to the "Exit" menu and select "Exit Saving Changes".
- 5. Restart the device and press the "ESC" key and then enter the "Boot Manager" menu.
- 6. Select the USB stick and press "Enter" to boot from this.

- 7. Follow the instructions on the screen.
- 8. After selecting the menu dialog language, select the menu entry "Manage language packages".

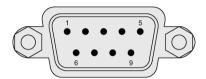
Depending on the current language setup, you have the following options in the "Manage language packages" menu:

- Display language settings
- Install language
- Change language
- Uninstall installed language

# 8.6 Hardware descriptions

# 8.6.1 External ports

# 8.6.1.1 Serial interface (X30), (X31)



RS232 RS422 RS485

# RS-232 assignment

Pin	Short description	Meaning
1	DCD	Data carrier detect (I)
2	RxD	Received data (I)
3	TxD	Transmitted data (O)
4	DTR	Data terminal ready (O)
5	М	Ground
6	DSR	Data set ready (I)
7	RTS	Request to send (O)
8	CTS	Clear to send (I)
9	RI	Incoming call (I)

# Pin assignment RS422

Pin	Short description	Meaning
1	TX-	Transmit data - (O) for full-duplex mode
2	TX+	Transmit data + (O) for full-duplex mode
3	RX+	Receive data + (I) for full-duplex mode
4	RX-	Receive data - (I) for full-duplex mode
5	М	Signal ground
6	nc	
7	nc	
8	nc	
9	nc	

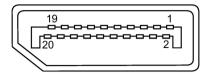
# Pin assignment RS485

Pin	Short description	Meaning
1	Data-	Transmit / receive data - (I/O) for half-duplex mode
2	Data+	Transmit / receive data+ (I/O) for half-duplex mode
3	nc	
4	nc	
5	M	Signal ground
6	nc	
7	nc	
8	nc	
9	nc	

# 8.6.1.2 CFast (X50)

Pin	Short name	Meaning
S1	SGND	Signal GND (ground for signal integrity)
S2	A+	SATA differential
S3	A-	SATA differential
S4	SGND	Signal GND (ground for signal integrity)
S5	B-	SATA differential
S6	B+	SATA differential
S7	SGND	Signal GND (ground for signal integrity)
PC1	CDI	Card Detect In
PC2	GND	Device GND
PC3	TBD	TBD (not connected)
PC4	TBD	TBD (not connected)
PC5	TBD	TBD (not connected)
PC6	TBD	TBD (not connected)
PC7	GND	Device GND
PC8	LED1	LED Output (not connected)
PC9	LED2	LED Output (not connected)
PC10	IO1	Reserved Input/Output (not connected)
PC11	102	Reserved Input/Output (not connected)
PC12	103	Reserved Input/Output (not connected)
PC13	PWR	Device Power (3.3V)
PC14	PWR	Device Power (3.3V)
PC15	GND	Device GND
PC16	GND	Device GND
PC17	CDO	Card Detect Out

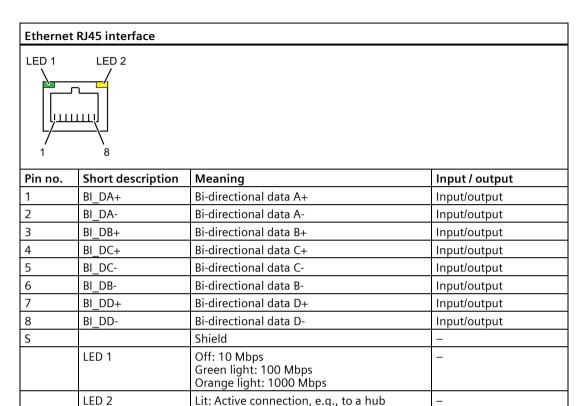
# 8.6.1.3 DisplayPort (X70), (X71)



The DisplayPort interfaces (X70) and (X71) available on the device are compatible with the DisplayPort V1.2 specification.

Pin	Short name	Meaning	Input / output
1	ML_Lane0+	DP data 0+	Output
2	GND	Ground	-
3	ML_Lane0-	DP data 0-	Output
4	ML_Lane1+	DP data 1+	Output
5	GND	Ground	-
6	ML_Lane1-	DP data 1-	Output
7	ML_Lane2+	DP data 2+	Output
8	GND	Ground	-
9	ML_Lane2-	DP data 2-	Output
10	ML_Lane3+	DP data 3+	Output
11	GND	Ground	-
12	ML_Lane3-	DP data 3-	Output
13	CONFIG1 CAD	Cable Adapter Detect	Input
14	CONFIG2	Ground (PullDown)	-
15	AUX_CH+	Auxiliary channel+	Bidirectional
16	GND	Ground	-
17	AUX_CH-	Auxiliary channel-	Bidirectional
18	HPD	Hot Plug Detect	Input
19	GND	Ground -	
20	DP_PWR	+3.3V (fused)	Output

### 8.6.1.4 Ethernet (X1) P1, (X2) P1, (X3) P1



Flashing: Activity

### 8.6.1.5 USB 3.0 (X60), (X61), (X62), (X63)



Pin	Short name	Meaning	Input / output
1	VBUS	+ 5 V (fused)	Output
2	D-	Data channel USB2	Input / output
3	D+	Data channel USB2	Input / output
4	GND	Ground	-
5	RX-	Data channel USB3	Input
6	RX+	Data channel USB3	Input
7	GND	Ground	-
8	TX-	Data channel USB3	Output
9	TX+	Data channel USB3	Output

# 8.6.2 Internal ports

# 8.6.2.1 PCle card

Pin no.	Side B		Side A	
	Name	Description	Name	Description
1	+12 V	12 V power	PRSNT1#	Hot-plug presence detect
2	+12 V	12 V power	+12 V	12 V power
3	+12 V	12 V power	+12 V	12 V power
4	GND	Ground	GND	Ground
5	SMCLK	SMBUS (System Management Bus) clock	JTAG2	TCK (Test Clock), clock input for JTAG interface
				(not connected)
6	SMDAT	SMBus (System Management Bus) data	JTAG3	TDI (Test Data Input)
		,		(not connected)
7	GND	Ground	JTAG4	TDO (Test Data Output)
				(not connected)
8	+3.3 V	3.3 V power	JTAG5	TMS (Test Mode Select)
				(not connected)
9	JTAG1	TRST# (Test Reset) resets the JTAG interface	+3.3 V	3.3 V power
10	2.2.1/	(not connected)	+3.3 V	2.2.1/
11	3.3 Vaux WAKE#	3.3 V auxiliary power Signal for link reactivation	PERST#	3.3 V power Fundamental reset
12	RSVD	Reserved	GND	Ground
13	GND	Ground	REFCLK+	Reference clock (dif- ferential pair)
14	РЕТр0	Transmitter differential pair,	REFCLK-	Reference clock (dif- ferential pair)
15	PETn0	Transmitter differential pair, Lane 0	GND	Ground
16	GND	Ground	PERp0	Receiver differential pair, Lane 0
17	PRSNT2#	Hot-plug presence detect (not connected)	PERn0	Receiver differential pair, Lane 0
18	GND	Ground	GND	Ground
19	PETp1	Transmitter differential pair, Lane1	RSVD	Reserved
20	PETn1	Transmitter differential pair, Lane1	GND	Ground
21	GND	Ground	PERp1	Receiver differential pair, Lane1
22	GND	Ground	PERn1	Receiver differential pair, Lane1

# 8.6 Hardware descriptions

Pin assi	gnment for the	PCIe-x4 card interface		
23	PETp2	Transmitter differential pair, Lane2	GND	Ground
24	PETn2	Transmitter differential pair, Lane2	GND	Ground
25	GND	Ground	PERp2	Receiver differential pair, Lane2
26	GND	Ground	PERn2	Receiver differential pair, Lane2
27	PETp3	Transmitter differential pair, Lane3	GND	Ground
28	PETn3	Transmitter differential pair, Lane3		Ground
29	GND	Ground	PERp3	Receiver differential pair, Lane3
30	RSVD	Reserved	PERn3	Receiver differential pair, Lane3
31	PRSNT2#	Hot-plug presence detect	GND	Ground
32	GND	Ground	RSVD	Reserved

### 8.6.3 System resources

### 8.6.3.1 Currently allocated system resources

All system resources (hardware addresses, memory configuration, allocation of interrupts, DMA channels) are assigned dynamically by the Windows OS, depending on the hardware configuration, drivers and connected external devices. You can view the current configuration of system resources or possible conflicts with the following operating systems:

Windows Embedded Standard and	Start menu "Start": Enter "msinfo32" in the search field and press "Return" to confirm.
Windows 7 Ultimate	

### 8.6.3.2 Assignment of system resources

The following tables and images describe the system resources available in the delivery state of the device.

The interrupts are assigned to devices by BIOS. Only non-shared interrupts are available for the first Ethernet interface.

This means that applications or realtime operating system expansions can operate these devices exclusively and with high-performance without having to share the interrupt with other devices.

Interrupt sharing in APIC mode:

Interrupt		Interrupt type
IRQ0	HPET (High Precision Event Timer), when HPET is enabled in the BIOS "Advanced" menu.	ISA exclusive
	System Timer, when HPET is disabled.	
IRQ1	Free	
IRQ2	Interrupt controller 2	ISA exclusive
IRQ3	Com Port 2 (COM2)	ISA exclusive
IRQ4	Com Port 1 (COM1)	ISA exclusive
IRQ5	CAN (optional)	ISA exclusive (CAN)
IRQ6	Free	
IRQ7	Free	
IRQ8	System CMOS / real-time clock	ISA exclusive
IRQ9	ACPI-SCI (system control interrupt)	
IRQ10	Free	
IRQ11	Free	
IRQ12	Free	
IRQ13	Numeric data processor	ISA exclusive
IRQ14	Free	
IRQ15	Free	

# 8.6 Hardware descriptions

Interrupt		Interrupt type
IRQ16	High Definition Audio Controller	PCI shared
	SATA AHCI Controller	
	LAN1 (I219-LM)	
	Graphics Management Engine Interface	
	USB XHCI Controller	
IRQ17	PCIe-x4 slot on Riser	PCI exclusive
IRQ18	PCIe-x4 slot on Riser	PCI shared
	LAN2 (I210)	
IRQ19	LAN3 (I210) (optional)	PCI exclusive
IRQ20	Free	
IRQ21	Free	
IRQ22	Free	
IRQ23	Free	

### 8.6.4 I/O Address Areas

# 8.6.4.1 Overview of the internal module registers

The following addresses are used for the internal registers:

Addresses	Input/output unit
Addresses	Impuroutput unit
I/O 062h	Watchdog enable register / 066h select register (read/write, address 062h) (Page 142)
I/O 066h	Watchdog trigger register (read only, address 066h) (Page 143)
I/O 404Eh	Output register user LED L1/L2/L3 (read/write, address 404Eh) (Page 143)
I/O 50Ch	Battery status register (read-only, address 404Dh) (Page 143)

# 8.6.4.2 Watchdog enable register / 066h select register (read/write, address 062h)

# Meaning of the bits

Bit								Meaning of the bits		
7	6	5	4	3	2	1	0			
								Watchdog enable bit (WDE)		
							0	Watchdog circuit disabled		
							1	Watchdog circuit enabled		
								Watchdog Mode		
						0		Standard		
						1		Macro		
								066h select register selection		
					0			Reserved		
					1					
								Scaler watchdog time (Normal/Macro)		
		0	0	0				94 ms / 2 s (default)		
		0	0	1				210 ms / 4 s		
		0	1	0				340 ms / 6 s		
		0	1	1				460 ms / 8 s		
		1	0	0				590 ms / 16 s		
		1	0	1				710 ms / 32 s		
		1	1	0				840 ms / 48 s		
		1	1	1				960 ms / 64 s		
								Trigger red Watchdog LED		
	0							Red LED (WD) off		
	1							Red LED (WD) on		
	1		1					Watchdog error / Display and reset		
0								WD inactive		
1								WD triggered Reset LED after watchdog alarm (Bit 7 = write 1)		

### 8.6.4.3 Watchdog trigger register (read only, address 066h)

### Watchdog trigger register

The watchdog is triggered by a read action (address 066h) by this register. The result of the read access can be disregarded (i.e., dummy read).

### 8.6.4.4 Output register user LED L1/L2/L3 (read/write, address 404Eh)

### Meaning of the bits

The "PC ON/WD" LED flashes yellow to indicate the progress of the BIOS self-test during device startup. After the BIOS self-test has been completed, the "PC ON/WD" LED lights up continuously green.

Outp	Output register L1/L2/L3 (read/write, address 404Eh)								
Bits									
15	14	13	12-8	7	6	5	4-0		
1				1				LED L1 / Run/Stop dark (default)	
1				0				LED L1 / Run/Stop lit yellow	
0				Х				LED L1 / Run/Stop lit green	
	1				1			LED L2 / SF dark (default)	
	0				Х			LED L2 / SF lit red	
	1				0			LED L2 / SF lit yellow	
		1				1		LED L3 / Maint dark (default)	
		0				Х		LED L3 / Maint lit red	
		1				0		LED L3 / Maint lit yellow	
		xxxx xx				xxxx		Reserved (read/write)	

### 8.6.4.5 Battery status register (read-only, address 404Dh)

To monitor the status of the CMOS battery, the battery monitoring must be switched on via a special GPIO register.

The status of the CMOS battery (two-tier) can be read out via the battery status register.

### Meaning of the bits

Bat	Battery status register (read-only, address 404Dh)							
Bit	Bit							Meaning
7	6	5	4	3	2	1	0	
0	0							CMOS battery capacity is still sufficient.
0	1							CMOS battery capacity is exhausted (remaining capacity is sufficient for approx. one month)
1	1							CMOS battery is empty

8.6 Hardware descriptions

# 8.6.4.6 NVRAM address register

NVRAM occupies a 512 KB memory address area that can be read via PCI registers.

# Meaning of the bits

NVRAM address register							
PCI register address:	PCI register content:	Length of the memory area					
NVRAM base address register	NVRAM memory address (default)						
E300 0000	Address is assigned dynamically (depending on device configuration)	80000 h					

## 8.7 BIOS description

## 8.7.1 Overview

Parameterize your device in the BIOS Setup.

## **BIOS Setup program**

The BIOS Setup program, or BIOS Setup for short, is located, together with the setup parameters, in a FLASH block on the motherboard.

Change the setup parameters of the device in the BIOS Setup, e.g. system time or boot sequence.

## Changing the device configuration

Your device configuration is preset for operating with the included software. You should only change the default setup parameters if technical modifications to your device require different parameters.

#### NOTICE

### Malfunctions can occur with running software CPU

If a BIOS update of the PC is performed while SIMATIC software controller, a SIMATIC WinAC for example, is running, the software CPU can malfunction, resulting in communication interruptions or failures, for example. Other actions that put a heavy load on the PC hardware, for example, running hardware tests such as benchmarks, can result in malfunctions of the software CPU.

Do not run a BIOS update or other actions that would put a heavy load on the hardware during operation of a software CPU.

Switch the software CPU to "STOP" before you run a BIOS update or perform other critical actions.

#### Note

#### **Documentation**

BIOS Setup is described for all devices and device configurations. Some BIOS submenus or Setup parameters may not be included, depending on your order. The interface of your BIOS Setup can deviate from the figures in this document.

You can find a detailed description of the BIOS on the Support website under Entry ID 109781666 (https://support.industry.siemens.com/cs/ww/de/view/109781666/en).

## 8.7.2 Opening the BIOS selection menu

### **Procedure**

- 1. Switch on the device or restart the device.
- 2. Immediately after switching on the device, press the "Esc" button and keep it pressed.

### Note

The following message appears briefly after the device is switched on:

Press ESC for boot options

The BIOS selection setup appears:



The number of buttons in the BIOS selection setup depends on your device version.

	ΤI	ne fo	ı	lowing	buttons	are	avai	lal	bl	e:
--	----	-------	---	--------	---------	-----	------	-----	----	----

Buttons	Function	
Continue	Exit selection menu, continue start sequence	
Boot Manager	Specify the boot media from which to start, for example:	
	Hard disk drive	
	USB device	
Device Management	Start device manager for UEFI boot media	
Boot From File	Boot Maintenance Manager:	
	Boot Options: Set boot order	
	Driver Options: Configure drivers	
	Console Options: Configure connected input device	
	Boot from File: Start from an ".EFI" file	
	Reset System: Restoring factory settings	
Secure Boot Option <sup>1</sup>	Configuration settings to start the device in Secure Boot mode. The only software modules loaded are those that are known to be safe for the BIOS of the operating system.	
SCU	Setup Configuration Utility: The BIOS Setup	
BIOS Update	Update BIOS from USB memory stick	
MEBx <sup>2</sup>	Intel Management Engine BIOS Extension from Active Management Technology Support (AMT)	

<sup>&</sup>lt;sup>1</sup> Available as of Windows 8, if supported by device

## 8.7.3 Structure of the BIOS Setup menu

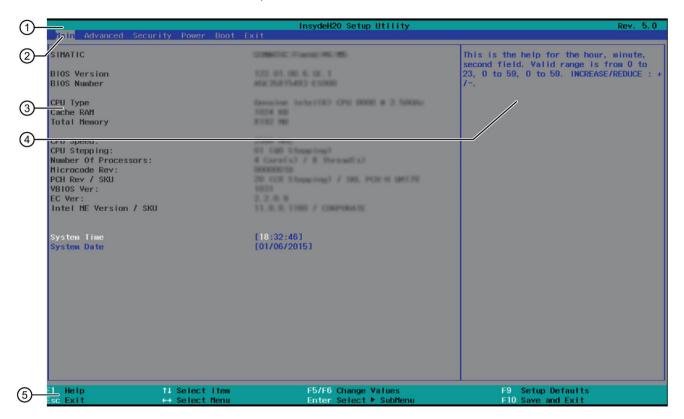
The individual setup parameters are distributed between different menus and submenus. Not all menus are included in each supplied device configuration. The following table shows the menus.

Menu	Meaning	
Main	Display system information, for example, BIOS version, processor and memory	
Advanced	Configure hardware using different submenus	
Security	Security functions, e.g., setting a password	
Power	Power Specify power management of CPU and the device	
Boot Determine boot options, e.g., boot order		
Exit Save and exit (see Exit menu)		

Only if the hardware supports AMT

## 8.7 BIOS description

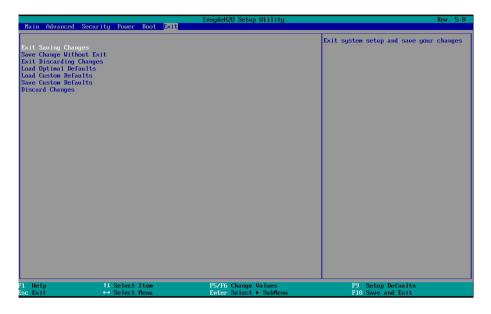
The menus always have the same structure. The figure below shows an example for the "Main" menu. Device-specific information is shown blurred.



1	Header	The current version of the selected BIOS Setup is displayed in the header.
2	Menu bar	Switch between the various menus "Main", "Advanced", etc. in the menu bar at the top.
3	Settings, submenus and device-specific information	Information about your device is displayed in the center left-hand area; here you can edit settings which are partly in submenus.
4	Help area	Short help texts on the currently selected setup parameters are displayed in the center right-hand area.
5	Key assignment	The key assignment for navigation in the BIOS Setup is found in the footer.

## 8.7.4 Exit menu

You always exit BIOS Setup in this menu.



Exit Saving Changes	All changes are saved and the system is restarted with the new Setup parameters.			
Save Change Without Exit	Il changes are saved			
Exit Discarding Changes	All changes are discarded and the system is restarted with the old Setup parameters.			
Load Optimal Defaults	All setup parameters are reset to the safe default values.			
	Notice: The existing Setup parameters are overwritten by this.			
Load Custom Defaults	The profile must be loaded with the custom Setup parameters.			
	Requirement: The parameters are saved prior to this with "Save Custom Defaults".			
	<b>Notice</b> : All existing Setup parameters are overwritten during loading.			
	Write down the BIOS Setup settings beforehand			
	Save the BIOS Setup settings as user-specific profile.			
Save Custom Defaults	The currently configured Setup parameters are saved as a custom profile (see also "Load Custom Defaults").			
Discard Changes	All changes are discarded.			

## See also

SIMATIC IPC after-sales information system (https://www.siemens.com/asis)

## 8.7.5 BIOS update

Check regularly if updates are available for download (https://support.industry.siemens.com/cs/ww/en/view/109763408) to your device.

Additional information can be found on the Internet at the following address: After-sales information system for SIMATIC PC/PG (https://www.siemens.com/asis).

## Noting down and restoring BIOS Setup settings

#### NOTICE

#### Irretrievable loss of data

All BIOS Setup settings are deleted after the BIOS update. This can put the system in an undefined state. This may damage the device and the plant.

- 1. Make a note of your specific BIOS Setup settings before the BIOS update.
- 2. Start BIOS Setup after the BIOS update.
- 3. Load the BIOS Setup default settings with <F9> "Setup Defaults". Or use the BIOS Setup command "Load Optimal Defaults" in the "Exit" menu.
- 4. Make your own Setup settings based on the table you have printed out.
- 5. Save the BIOS Setup settings with <F10> "Save and Exit".

## Performing a BIOS update

## **NOTICE**

#### Damage to the device

If you switch off the device during the update, the BIOS will be incomplete and corrupt. This may result in malfunctions.

Leave the device switched on during the update.

If you have purchased a new BIOS update for your device, follow these steps to install the update:

- 1. Connect the device to the power supply.
- 2. Copy the update to a USB memory stick.
- 3. Reset the device (warm or cold restart).

The following message appears briefly on the display at the end of the self-test:

Press ESC for boot options

- 4. Press <ESC> to open the BIOS selection menu.
- 5. Click the "BIOS Update" button.
- 6. Follow the instructions on the screen.

#### Reboots

There may be several reboots after a BIOS update. These reboots are initiated by the Management Engine (ME). The reboots are required by the ME to adapt itself to the changes of the BIOS update.

## 8.7.6 Alarm, error and system messages

During startup (the boot process), the BIOS first performs a **Power On Self Test** (POST) and checks whether certain functional units of the PC are operating error-free. The boot sequence is immediately interrupted if critical errors occur.

BIOS initializes and tests further functional units if the POST does not return any errors. In this startup phase, the graphics controller is initialized and any error messages are output to the screen.

The error messages output by system BIOS are listed below. For information on error messages output by the operating system or application programs, refer to the corresponding manuals.

## On-screen error messages

On-screen error message	Meaning / tip		
Operating system not found	Possible causes:		
	No operating system installed		
	Incorrect active boot partition		
	Wrong boot drive settings in SETUP		
SMART failure detected on HDD	Hard disk reports pending failure through S.M.A.R.T.		
CMOS battery failed	CMOS battery is empty or not connected.		
Real-time clock has lost power	The CMOS clock was operated without battery or with a battery that was too weak, during battery change, for example. Check the CMOS clock.		
Keyboard controller error or no keyboard present	Keyboard defective or not connected		

# 8.8 Scope of functions in Windows Embedded Standard 7

The overview shows the most important device functions under Windows Embedded Standard 7:

Function	HDD / SSD version	Memory card version
.Net Framework	Available, V3.5	Available, V3.5
Accessories	Available	Available
Aero background	Available	Available
Backup and Restore	Available	Available
Bluetooth	Available	Available
Dialog box filter	Available	Available
DirectX and Windows Device Experience	Available, V11	Available, V11
Domain services	Available	Available
Driver database	Available	Not available
Driver frameworks	Available	Available
Encrypted File System (EFS)	Available	Available
Enhanced Write Filter	Available	Available
Fax and Scan	Available	Available
File Based Write Filter (FBWF)	Available	Available
Fonts	134	48
Help and Support Engine	Available	Available
Hibernate Once Resume Many (HORM)	Available	Available
Image Mastering API V2	Available	Available
IME Base Components	Available	Available
Internet Explorer	Available, IE 11	Available, IE 11
Internet Information Server (IIS)	Available, V7.0	Available, V7.0
Language (Standard)	English <sup>1</sup>	English <sup>1</sup>
Mobility Center	Available	Available
Network and Sharing Center	Available	Available
Network Diagnostics	Available	Available
Pagefile	Available	Available
Printing Utilities and Management	Available	Available
Registry Filter	Available	Available
Remote Assistance	Available	Available
Remote Client	Available	Available
Remote Desktop	Available	Available
SIMATIC IPC DiagBase	Available	Available
Speech	Available	Not available
System Management Administrative Tools	Available	Available
Telnet Server	Available	Available
User Account Control	Available	Available
Windows Explorer Shell	Available	Available
Windows Firewall	Available	Available
Windows Installer	Available	Available
Windows Media Player	Available, V12	Available, V12
Windows PowerShell 2.0	Available	Available

## 8.8 Scope of functions in Windows Embedded Standard 7

Function	HDD / SSD version	Memory card version	
Windows Search and Natural Language 6	Available	Available	
Windows Security Center	Available	Available	
Windows Update	Available	Available	
Wireless Networking	Available	Available	

Note the licensing agreements for Windows Embedded Standard 7.

Additional information on language selection is available in the section "Setting up the language selection by means of the Multilanguage User Interface (MUI) (Page 131)".

Technical support

## A.1 Service and support

You can find additional information and support for the products described on the Internet at the following addresses:

- Technical support (https://www.siemens.com/industrialsecurity)
- Support request form (https://www.siemens.com/supportrequest)
- After Sales Information System SIMATIC IPC/PG (https://www.siemens.com/asis)
- SIMATIC Documentation Collection (https://www.siemens.com/simatic-tech-doku-portal)
- Your local representative (https://www.automation.siemens.com/aspa\_app)
- Training center (https://siemens.com/sitrain)
- Industry Mall (https://mall.industry.siemens.com)

When contacting your local representative or Technical Support, please have the following information at hand:

- MLFB of the device
- BIOS version for industrial PC or image version of the device
- · Other installed hardware
- Other installed software

#### **Current documentation**

Always use the current documentation available for your product. You can find the latest edition of this manual and other important documents by entering the article number of your device on the Internet (<a href="https://support.industry.siemens.com/cs/ww/en/ps/23704">https://support.industry.siemens.com/cs/ww/en/ps/23704</a>). If necessary, filter the comments for the entry type "Manual".

#### **Tools & downloads**

Please check regularly if updates and hotfixes are available for download to your device. The download area is available on the Internet at the following link:

After Sales Information System SIMATIC IPC/PG (https://www.siemens.com/asis)

# A.2 Problem solving

This section provides you with tips on how to locate and/or troubleshoot problems which occur.

Problem	Possible cause	Possible remedy
The device is not operational	No power supply	Check the power supply, the power cord and the power plug.
		• Check if the On/Off switch is in the correct position.
	Device is being operated outside the	Check the ambient conditions.
	specified ambient conditions	After transport in cold weather, wait approximately 12 hours before switching on the device.
The monitor remains dark	The brightness button has been set to dark	Increase brightness using the brightness button. For detailed information, refer to the monitor operating instructions.
	Power cord is not connected	Check whether the power cord has been properly connected to the monitor and to the system unit or to the grounded shockproof outlet.
		If the monitor screen still remains dark after you have performed these checks and measures, contact your technical support team.
The mouse pointer does not appear on the screen	The mouse driver is not loaded	Check whether the mouse driver is properly installed and available when you start the user program. Detailed information about the mouse driver is available in the corresponding documentation.
	Mouse not connected.	Check whether the mouse cord is properly connected to the system unit.
		If you use an adapter or expansion for the mouse cable, also check these connectors.
		If the mouse pointer still does not appear on the screen after you have performed these checks and actions, contact your technical support team.
Wrong time and/or date on the PC		Press <f2> during the booting process to open the BIOS Setup.</f2>
		2. Set the time and date in the setup menu.
Although the BIOS setting is OK, the time and data are still wrong.	The backup battery is dead.	Replace the backup battery.
USB device not respond-	The USB ports are disabled in BIOS.	Use a different USB port or enable the port.
ing.	The operating system does not support the USB ports.	Turn on USB Legacy Support for mouse and key- board.
		For other devices, you need the USB device drivers for the required operating system.
"chkdsk" is not function- ing	EWF (Enhanced Write Filter) has been activated. The "chkdsk" command is not supported if the EWF has been activated.	Deactivate the EWF or use an alternative method to "chkdsk".

# A.3 Notes on the use of third-party modules

Problem	Possible cause	Possible remedy
The PC crashes during startup.	<ul> <li>I/O addresses are assigned twice.</li> <li>Hardware interrupts and/or DMA channels are assigned twice</li> <li>Signal frequencies or signal levels are not adhered to</li> <li>Different connector pin assignments</li> </ul>	<ul> <li>Check your computer configuration:</li> <li>If the computer configuration corresponds with factory state, please contact your technical support team.</li> <li>If the computer configuration has changed, restore the original factory settings. Remove all third-party expansion cards, then restart the PC. If the error no longer occurs, the third-party expansion card was the cause of the fault. Replace this expansion card with a Siemens card or contact the card supplier.</li> </ul>
	behave according to specification.	<ol> <li>If the PC still crashes, contact your technical support team.</li> <li>Remove the expansion card.</li> <li>Set the respective setup parameter "PCIe Speed" permanently to "Gen1" in the "Advanced &gt; PCI Express Configuration" menu, submenu "PCI Express Root Port #" of the BIOS Setup.</li> <li>Set the respective setup parameter "PEG# - Gen X" perma-</li> </ol>
		nently to "Gen1" in the "Advanced > Video Configuration" menu, submenu "Pci Expess Graphic" of the BIOS Setup.  4. Install the expansion card again.

Markings and symbols

## B.1 Overview

The following tables show all the symbols which may be found on your SIMATIC IPC in addition to the symbols which are explained in the operating instructions.

The symbols on your device may vary in some details from the symbols shown in the following tables.

# B.2 Safety

Symbol	Meaning	Symbol	Meaning
$\triangle$	Warning, observe the supplied documentation.	1	Lock is closed
(!)	Attention, radio equipment	1	Lock is open
	Disconnect the power plug before opening	R	Opening for Kensington lock
	Attention ESD (Electrostatic sensitive device)		Warning of hot surface

# **B.3** Operator controls

Symbol	Meaning	Symbol	Meaning
0 I U = 0	On/off switch, without electrical isolation		Eject CD/DVD
Ф	On/off switch, without electrical isolation		

# B.4 Certificates, approvals and markings

The following table shows symbols relating to certificates, approvals and markings which may be on the device. You can find more information in the operating instructions for your device:

Symbol	Meaning	Symbol	Meaning
	Approved for Australia and New Zealand	ERC	Marking for the Eurasian Customs Union
<b>(W)</b>	Approved for China	FM	Test mark of Factory Mutual Research
CE	CE markings for European countries	F©	Marking of Federal Communications Commission for the USA
10	EFUP (Environment Friendly Use Period) marking for China		Approved for Korea
c UL us	Test mark of the Underwriters Laboratories	CA	UKCA marking for Great Britain
8	Approval for India		Disposal information, observe the local regulations.

## **B.5** Interfaces

The following table shows symbols relating to ports that may be available on the device. You can find more information in the operating instructions for your device:

Symbol	Meaning	S	ymbol		Meaning
===	Connection to the power supply		<b>—</b>		PS/2 mouse interface
<b>(±</b> )	Protective conductor terminal				PS/2 keyboard-interface
<b>₩</b>	Connection for functional earthing (equipotential bonding line)				Multimedia Card Reader
DPP	DisplayPort interface	[	•		Smart Card Reader
4	DVI-D interface	+	((v))		Line In
LAN PP	LAN interface, not approved for connecting WAN or telephone	(	(́+)}+		Line Out
	Serial port	4	λ <sub>jj</sub>		Microphone input
•~•	USB port	6	7	I	Universal Audio Jack
<b>●</b> ✓•+	USB 2.0 high-speed port	(			Headphone output
SS	USB 3.0 super-speed port				

List of abbreviations

Abbreviation	Term	Meaning
AC	Alternating current	Alternating current
ACPI	Advanced Configuration and Power Interface	
PLC	Programmable controller	
AGP	Accelerated Graphics Port	High speed bus system
AHCI	Advanced Host Controller Interface	Standardized controller interface for SATA devices. This is supported in Microsoft Windows XP as of SP1 and IAA driver.
APIC	Advanced Programmable Interrupt Controller	Extended programmable interrupt controller
APM	Advanced Power Management	Tool for monitoring and reducing power consumption of the PC
AS	Automation system	
ASIS	After Sales Information System	
AT	Advanced Technology	
ATA	Advanced Technology Attachment	
ATX	AT-Bus-Extended	
AWG	American Wire Gauge	US standard for the cable diameter
BIOS	Basic Input Output System	Basic Input Output System
CAN	Controller Area Network	
CD-ROM	Compact Disc – Read Only Memory	Removable storage medium for large data volumes
CD-RW	Compact Disc – Rewritable	Rewritable CD
CE	Communauté Européenne (CE symbol)	The product is in conformance with all applicable EC directives
CFast	CF + AST	The acronym CFast is the combination of CF (CompactFlash) and AST (ATA Serial Transport).
CGA	Color Graphics Adapter	Standard monitor interface
CLK	Clock pulse	Clock signal for controllers
CMOS	Complementary Metal Oxide Semiconductors	Complementary metal oxide semiconductors
COA	Certificate of authentication	Microsoft Windows Product Key
CoL	Certificate of License	License authorization
COM	Communications Port	Term for the serial interface
СР	Communication Processor	Communication computer
CPU	Central Processing Unit	CPU
CRT	Cathode Ray Tube	
CSA	Canadian Standards Association	Canadian organization for tests and certifications according to own or binational standards (with UL / USA) standards

Abbreviation	Term	Meaning
CTS	Clear To Send	Clear to send
DRAM	Dynamic Random Access Memory	
DC	Direct Current	DC current
DCD	Data Carrier Detect	Data carrier signal detection
DMA	Direct Memory Access	Direct memory access
DOS	Disk Operating System	Operating system without GUI
DPP	DisplayPort	New powerful digital monitor port
DQS	Deutsche Gesellschaft zur Zertifizierung von Qualitätsmanagement mBH	
DDRAM	Double Data Random Access Memory	Memory chip with high-speed interface
DSR	Data Set Ready	Ready for operation
DTR	Data Terminal Ready	Data terminal is ready
DVD	Digital Versatile Disk	Digital versatile disk
DVI	Digital Visual Interface	Digital display interface
DVI-I	Digital Visual Interface	Digital display interface with digital and VGA signals
ECC	Error checking and correction	Error correction code
ECP	Extended capability port	Extended parallel port
EFI	Extensible Firmware Interface	
EGA	Enhanced Graphics Adapter	PC to monitor interface
ESD	Electrostatic-sensitive components	
DM	Electronic Manual	
EIDE	Enhanced Integrated Drive Electronics	An enhancement of the IDE standard
EISA	Extended Industry Standard Architecture	Extended ISA standard
EMM	Expanded Memory Manager	Manages memory expansions
EM64T	Extended Memory 64 technology	
EN	European standard	
EPROM / EEPROM	Erasable Programmable Read-Only Memory / Electrically Erasable Programmable Read- Only Memory	Plug-in submodules with EPROM/EEPROM chips
EPP	Enhanced Parallel Port	Bi-directional Centronics interface
ESC	Escape character	Control character
EWF	Enhanced Write Filter	
FAQ	Frequently Asked Questions	FAQs
FAT 32	File Allocation Table 32-bit	32-bit file allocation table
FBWF	File Based Write Filter	
FD	Floppy disk	Disk drive, 3.5"
FSB	Front Side Bus	
GND	Ground	Chassis ground
HD	Hard disk	Hard disk
HDA	High Definition Audio	
HDD	Hard Disk Drive	Hard disk drive
HU	Height unit	
НМІ	Human Machine Interface	User interface
HORM	Hibernate Once - Resume Many	

Abbreviation	Term	Meaning
HT	Hyper-Threading	
HTML	Hyper Text Markup Language	Script language for creating Internet pages.
HTTP	Hypertext Transfer Protocol	Protocol for data transfer on the Internet
Hardware	Hardware	
I/O	Input/Output	Data input/output on computers
IAA	Intel Application Accelerator	
IDE	Integrated Device Electronics	
IEC	International Electronical Commission	
IGD	Integrated Graphics Device	
IP	Ingress Protection	Degree of protection
IR	Infrared	Infrared
IRDA	Infrared Data Association	Standard for data transfer via IR module
IRQ	Interrupt Request	Interrupt request
ISA	Industry Standard Architecture	Bus for expansion modules
ITE	Information Technology Equipment	
L2C	Level 2 cache	
LAN	Local Area Network	Computer network that is limited to a local area.
LCD	Liquid Crystal Display	Liquid crystal display
LED	Light Emitting Diode	Light emitting diode
LPT	Line Printer	Printer port
LVDS	Low Voltage Differential Signaling	
LW	Drive	
MAC	Media access control	Media access control
MC	Memory Card	Memory card in credit card format
MLFB	Machine-readable product designation	
MMC	Micro Memory Card	Memory card of the format 32 mm x 24.5 mm
MPI	Multipoint-capable interface for programming devices	
MS-DOS	Microsoft Disc Operating System	
MTBF	Mean Time Between Failures	
MUI	Multilanguage User Interface	Multilanguage operating system with Windows with language toggling; 5 languages: German, English, French, Spanish and Italian
NA	Not Applicable	
NAMUR	Normenarbeitsgemeinschaft for Mess- und Regelungstechnik in der chemischen Indus- trie (standardization body for instrumenta- tion and control technology in the chemicals industry)	
NC	Not Connected	Not connected
NCQ	Native Command Queuing	Automatic re-sorting of the file and disk access, for increased performance
NEMA	National Electrical Manufacturers Association	Syndicate of manufacturers of electrical components in the USA
NMI	Non Maskable Interrupt	Interrupt the processor can not reject
NTFS	New Techniques File System	Secure file system for Windows versions (2000, XP, 7)

Abbreviation	Term	Meaning
NVRAM	Non Volatile Random Access Memory	Non-volatile data memory. Data memory is retained without external power supply.
ODD	Optical Disk Drive	
OPC	OLE for Process Control	Standardized interface for industrial processes
PATA	Parallel ATA	
PC	Personal computer	
PCI	Peripheral Component Interconnect	High-speed expansion bus
PCle	Peripheral Component Interconnect express	High-speed serial, differential full-duplex PtP interface with high data rate.
PCMCIA	Personal Computer Memory Card International Association	
PI	Protective Earth	Protective conductor
PEG	PCI Express Graphics	
PG	Programming device	
PIC	Programmable Interrupt Controller	Programmable interrupt controller
PIC-E	Peripheral Component Interconnect Express	
POST	Power On Self Test	
PXE	Preboot Execution Environment	Software for running new PCs without hard disk data via the network
RAID	Redundant Array of Independent Disks	Redundant hard disk array
RAL	Restricted Access Location	Installation of device in operating facilities with restricted access - for example, a locked switch-gear cabinet
RAM	Random Access Memory	
RI	Ring Input	Incoming call
ROM	Read-Only Memory	
RS 485	Reconciliation Sublayer 485	Bi-directional bus system designed for up to 32 nodes
RTC	Real Time Clock	Real-time clock
RTS	Reliable Transfer Service	Request to send
RxD	Receive Data	Data transfer signal
SATA	Serial Advanced Technology Attachment	
SCSI	Small Computer System Interface	
SDRAM	Synchronous DRAM	
SELV	Safety Extra Low Voltage	Safety extra low voltage
SLC	Second Level Cache	
SMART	Self Monitoring Analysis and Reporting Technology	Hard disk error diagnostics program
SMS	Short Message Service	Short message via telecommunication network
SNMP	Simple Network Management Protocol	Network protocol
SO-DIMM	Small Outline Dual Inline Memory Module	
SOM	SafeCard on Motherboard (SOM)	
SPP	Standard Parallel Port	Synonym for parallel port
SRAM	Static Random Access Memory	Static RAM
SSD	Solid State Drive	
SVGA	Super Video Graphics Array	Enhanced VGA standard with at least 256 colors
SVP	Serial number of the device	

Abbreviation	Term	Meaning
SW	Software	
TCO	Total Cost of Ownership	
TFT	Thin-Film-Transistor	Type of LCD flat-screen
TPM	Trusted Platform Module	Chip with security functions
TTY	Tele Type	Asynchronous data transfer
TxD	Transmit Data	Data transfer signal
TXT	Trusted Execution Technology	Hardware implementation
TWD	Watchdog Time	Watchdog monitoring time
UEFI	Unified Extensible Firmware Interface	
UL	Underwriters Laboratories Inc.	US organization for tests and certifications according to own or binational standards (with CSA / Canada) standards.
UMA	Unified Memory Architecture	Video memory
URL	Uniform Resource Locator	Designation of the full address of an Internet page
USB	Universal Serial Bus	
UWF	Unified Write Filter	
UXGA	Ultra Extended Graphics Array	Graphic standard, maximum resolution 1600x1200 pixels.
V.24		ITU-T standardized recommendation for data transfer via serial ports
VCC		Positive supply voltage of integrated circuits
VDE	Verein deutscher Elektrotechniker (Union of German Electrical Engineers)	
VGA	Video Graphics Array	Video adapter which meets industrial standard
VRM	Voltage Regulator Module	
VT	Virtualization Technology	Intel technology with which a virtually closed environment can be made available.
VT-D	Virtualization Technology for Directed I/O	Enables the direct assignment of a device (e.g. network adapter) to a virtual device.
W2k	Windows 2000	
WAN	Wide Area Network	
WAV	Wave Length Encoding	Loss-free file format for audio data
WD	Watchdog	Program monitoring with error detection and alarming.
WLAN	Wireless LAN	Wireless local area network
WoL	Wake on Local Area Network	
WWW	World Wide Web	
XD	Execute Disable Capability	Hardware implementation
XGA	Extended Graphics Array	Graphic standard, maximum resolution 1024x768 pixels.

# Glossary

## **AHCI** mode

AHCI is a standardized method to address the SATA controller. AHCI describes a structure in the RAM, which contains a general area for control and status, as well as a command list.

## **APIC** mode

Advanced peripheral interrupt controller. 24 interrupt lines are available.

## **Automation system**

A programmable controller (PLC) of the SIMATIC S7 system consist of a central controller, one or several CPUs, and various I/O modules.

## **Backup**

Duplicate of a program, data medium or database, used either for archiving purposes or for the protection of vital and non-replaceable data against loss when the working copy is corrupted. Certain applications automatically generate backup copies of data files, and manage both the current and the previous versions on the hard disk.

## **Baud**

Physical unit for the step speed in signal transmission. Defines the number of transferred signal states per second. With only two states, one baud is equivalent to a transmission rate of 1 bps.

## **Boot disk**

A boot disk is a disk with a "Boot" sector. This can be used to load the operating system from the disk.

#### Cache

High-speed access buffer for interim storage (buffering) of requested data.

## **CE** marking

Communauté Européene The CE mark confirms compliance of the product with corresponding EC Directives, for example, with the EMC Directive.

#### **CFast card**

CFast is a digital storage medium in card form without moving parts. A CFast card uses the SATA protocol and its connectors are not compatible with a classic CompactFlash card.

## Chipset

Located on the motherboard, connects the processor with the PCI or PCIe bus and the external interfaces.

#### Cold restart

A start sequence, starting when the computer is switched on. The system usually performs some basic hardware checks within the cold start sequence, and then loads the operating system from the hard disk to work memory -> boot

#### **COM** interface

The COM interface is a serial V.24 interface. The interface is suitable for asynchronous data transfer.

## **Configuration files**

These are files containing data which define the configuration after restart. Examples of such files are CONFIG.SYS, AUTOEXEC.BAT and the registry files .

## Configuration software

The configuration software updates the device configuration when new modules are installed . This is done either by copying the configuration files supplied with the module or by manual configuration using the configuration utility.

### Controller

Integrated hardware and software controllers that control the functions of certain internal or peripheral devices (for example, the keyboard controller).

## **Device configuration**

The configuration of a PC or programming device contains information on hardware and device options, such as memory configuration, drive types, monitor, network address, etc. The data are stored in a configuration file and enable the operating system to load the correct device drivers and configure the correct device parameters. If changes are made to the hardware configuration, the user can change entries in the configuration file using the SETUP program.

#### **Drivers**

Program parts of the operating system. They adapt user program data to the specific formats required by I/O devices such as hard disk, printers, and monitors.

#### **EMC** directive

Directive concerning **E**lectro**m**agnetic **C**ompatibility. Compliance is confirmed by the CE symbol and the EC certificate of conformity.

## **Energy management**

The energy management functions of a modern PC allow individual control over the current consumption of vital computer components (e.g. of the monitor, hard disk and CPU), by restricting their activity based on the current system or component load. Energy management is of particular importance for mobile PCs.

## **Energy options**

The energy options can be used to reduce energy consumption of the computer, while keeping it ready for immediate use. This can be configured in Windows by selecting Settings > Control Panel > Energy options.

#### **Enhanced Write Filter**

Configurable write filter that allows you to, for example, boot Windows Embedded Standard from write-protected media (e.g., CD-ROM), set write protection for individual partitions, and adapt the file system performance to user requirements (when using memory cards, for example).

## **ESD Guideline**

Guideline for using electrostatic sensitive components.

#### Ethernet

Local network (bus structure) for text and data communication with a transfer rate of 10/100/1000 Mbps.

## **Execute Disable Capability**

Hardware implementation that prevents mutual memory accesses by programs and applications. It is only effective when all relevant system components, such as processors, operating systems and applications are supported.

#### **Extensible Firmware Interface**

Refers to the central interface between the firmware, the individual components of a computer and the operating system. EFI is located logically beneath the operating system and represents the successor to PC BIOS, focusing on 64-bit systems.

#### File Based Write Filter

Configurable write filter to protect individual files from write access.

## **Formatting**

Basic partitioning of memory space on a magnetic data medium into tracks and segments. Formatting deletes all data on a data medium. All data media must be formatted prior to their first use.

#### **HORM**

Hibernate once, resume many is a method for fast booting from a single Hibernate file that only needs to be created once. HORM ensures restoration of a uniform, saved system state when booting. This minimizes write access, for example to a CompactFlash medium, when you start up and shut down Windows Embedded Standard 7.

#### Hub

A term in network technology. In a network, a device joining communication lines at a central location, providing a common connection to all devices on the network.

#### **Hyper Threading**

HT technology (multi-threading) enables the parallel computing of processes. HT is only effective when all relevant system components, such as processors, operating systems and applications are supported.

#### **IGD**

Integrated Graphics Device. Graphics interface integrated in the chipset.

#### **Image**

This refers to the image, for example, of hard disk partitions saved to a file in order to restore them when necessary.

### Intel Active Management Technology

This technology permits the diagnostics, management and remote control of PCs. It is only effective when all relevant system components, such as processors, operating systems and applications are supported.

#### Intel VT

The Intel Virtualization Technology (IVT) is the implementation of a secure closed environment for applications. Special (visualization) software an a VT-capable processor is required for its use.

#### Interface

- Physical interconnection (cable) of hardware elements such as PLCs, PCs, programming devices, printers or monitors.
- Interface for interactive software applications.

#### LAN

Local Area Network: LAN is a local network that consists of a group of computers and other devices that are distributed across a relatively restricted range and are linked with communication cables. The devices connected to a LAN are called nodes. The purpose of networks is the mutual use of files, printers or other resources.

## **Legacy Boot Device**

Conventional drives can be used as USB devices.

## License key

The license key represents the electronic license stamp of a license. Siemens provides the license keys for protected software.

### License key disk

The license key disk contains the authorizations or license keys required to enable protected SIMATIC software.

#### Low-voltage directive

EC Product Safety Directive relating to the safety of products which are operated on low voltage (50 V AC to 1000 V AC, 70 V DC to 1500 V DC) and not specified in other directives. Compliance is confirmed by the CE symbol and the EC certificate of conformity.

#### Module

Modules are plug-in units for PLCs, programming devices or PCs. They are available as local modules, expansion modules, interfaces or mass storage (Mass storage module).

#### Motherboard

The motherboard is the core of the computer. Here, data are processed and stored, and interfaces and device I/Os are controlled and managed.

## **Operating system**

Generic term which describes all functions for controlling and monitoring user program execution, distribution of system resources to the user programs and the operating mode in cooperation with the hardware (for example, Windows 7 Ultimate).

#### **Pixel**

The pixel represents the smallest element that can be reproduced on-screen or on a printer.

## Plug&Play

Generally, a reference to the ability of a computer to automatically configure the system for communication with peripheral devices (for example monitors, modems or printers). The user can plug in a peripheral and "play" it at once without manually configuring the system. A Plug&Play PC requires both a BIOS that supports Plug&Play and a Plug&Play expansion card.

## **POST**

Self-test performed by the BIOS after the computer is switched on. Performs a RAM test and a graphics controller test, for example. The system outputs audible signals (beep codes) if the BIOS detects any errors; the relevant message indicating cause of error is output on the screen.

## Programmable controller

The programmable controllers of the SIMATIC S5 system consist of a central controller, one or several CPUs and various other modules (for example, I/O modules).

#### **PXE** server

A Preboot Execution Environment server is part of a network environment and can provide software to connected computers even before they boot. This can involve operating system installations or servicing tools, for example.

#### **RAL**

Restricted Access Location: Installation of the device in a production facility with restricted access, for example, a locked control cabinet.

## Recovery function of the USB stick

Contains the tools for configuring hard disks and the Windows operating system.

#### Reset

Hardware reset: Reset/restart of the PC using a button/switch.

#### Restart

Warm restart of a computer without switching the power off (Ctrl + Alt + Del)

#### Restore function of the USB stick

The restore function is used to restore the system partition or the entire hard disk to factory state if the system has crashed. The USB stick contains all the necessary image files and is bootable.

#### **ROM**

Read-Only Memory ROM is a read-only memory in which every memory location can be addressed individually. The programs or data are permanently stored and are not lost in the event of a power failure.

#### S.M.A.R.T

The Self-Monitoring, Analysis and Reporting Technology (SMART or S.M.A.R.T.) is an industry standard integrated in storage media. It makes for permanent monitoring of important parameters and early detection of imminent problems.

#### **SATA**

Serial ATA Interface for hard disk drives and optical drives with serial data transmission rates of up to 300 Mbps.

#### **SETUP (BIOS Setup)**

A program in which information about the device configuration (that is the configuration of the hardware on the PC/PG) is defined. The device configuration of the PC/PG is preset with defaults. Changes must therefore be entered in the SETUP if a memory expansion, new modules or a new drive are added to the hardware configuration.

#### SSD (Solid State Drive)

A Solid State Drive is a drive that can be installed like any other drive; it does not contain a rotating disk or other moving parts because only semiconductor memory chips of similar capacity will be used. This design makes SSDs more rugged, provides shorter access times, low energy consumption and rapid data transfer.

#### STEP 7

Programming software for the creation of user programs for SIMATIC S7 controllers.

## **Troubleshooting**

Error cause, cause analysis, remedy

## **Trusted Execution Technology**

Hardware implementation that allows secured execution of programs and applications. It is only effective when all relevant system components, such as processors, operating systems and applications are supported.

## **Unified Write Filter**

The Unified Write Filter is a configurable write filter that makes it possible to assign write protection to data storage media.

### Wake on LAN

Wake on Local area network. This function allows the PC to be started via the LAN interface.

#### Warm restart

The restart of a computer after a program was aborted. The operating system is loaded and restarted again. The CTRL+ ALT+ DEL hotkey can be used to initiate a warm restart.

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