SIEMENS

SIMATIC

Industrial PC SIMATIC IPC227E

Operating Instructions

06/2015

A5E35782395-AA

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.

⚠ WARNING

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

⚠ 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:

⚠ 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 ® are registered trademarks of Siemens AG. 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.

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A5E35782395-AA
℗ 05/2015 Subject to change

Preface

These operating instructions contain all the information you need for commissioning and operation of the SIMATIC IPC227E.

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 requirements

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 validity of this document

These operating instructions are valid for all versions of the SIMATIC IPC227E.

Scope of this documentation

The documentation for the SIMATIC IPC227E consists of:

- Product information, e.g. "Important notes on your device"
- Quick Install Guide SIMATIC IPC227E
- SIMATIC IPC227E operating instructions in English and German

The PDF version of the documentation is supplied with the device on the "Documentation and Drivers" CD/DVD.

Conventions

The terms "PC" and "device" are sometimes used to refer to the SIMATIC IPC227E in this documentation.

In these operating instructions, "Windows Embedded Standard" is also used as a standard term for "Windows Embedded Standard 7". The abbreviation "Windows 7" denotes the term "Windows 7 Ultimate".

History

The following editions of these operating instructions have been published:

Edition	Comment
06/2015	First edition

Table of contents

Overview

1

1.1 Product description

SIMATIC IPC227E provides high-level industrial functionality.

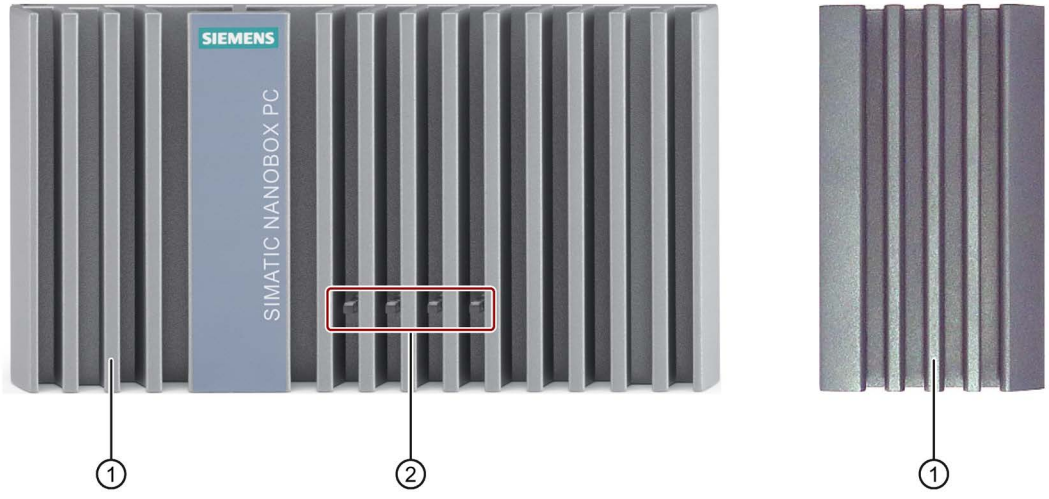
- Compact design
- High degree of ruggedness
- Maintenance-free operation possible

1.2 Structure of the devices

1.2.1 Views of the basic device

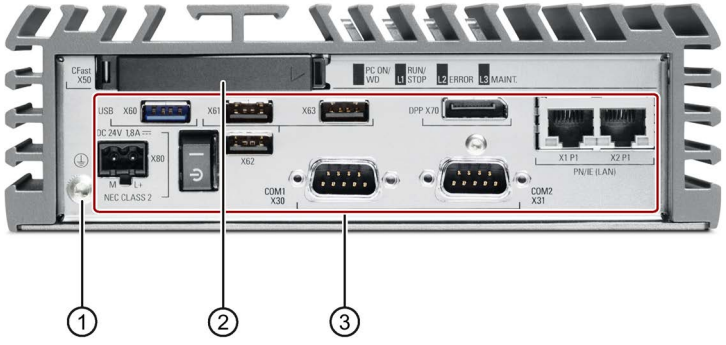
Front view and side view

The front view on the left is the standard mounting position, side view on the right.



① Cooling fins
② LED display

Bottom view

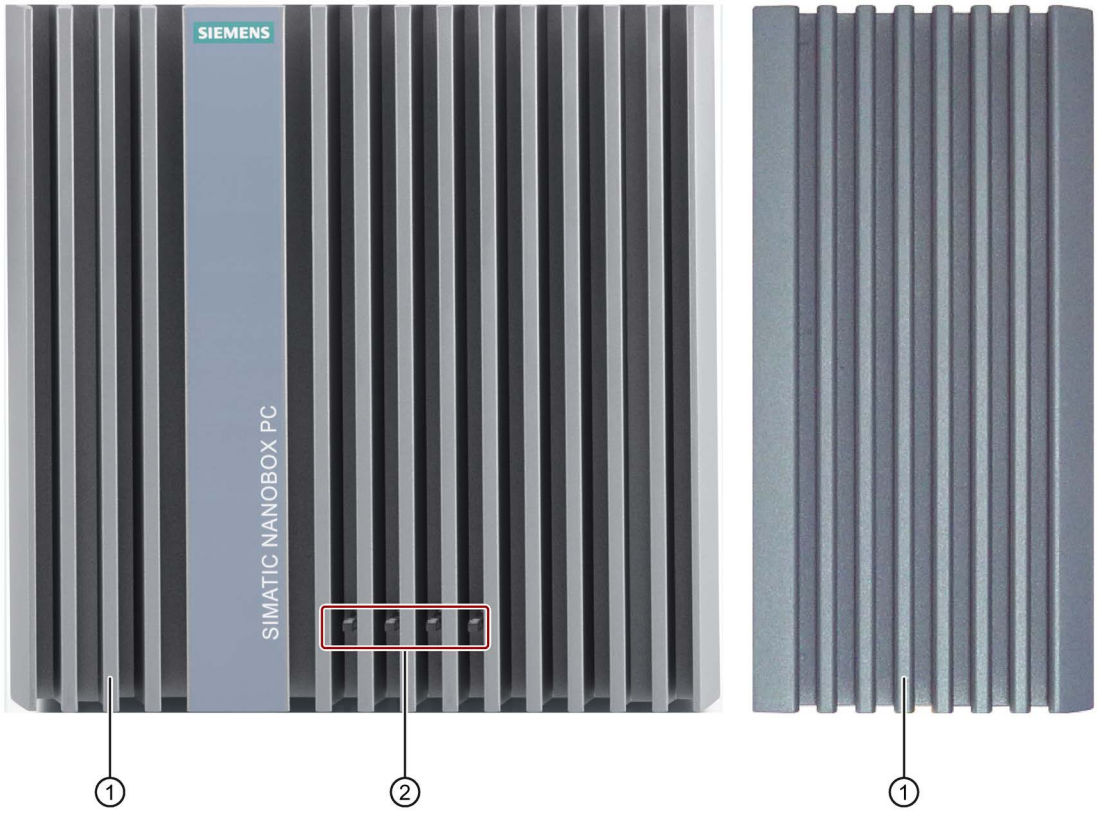


① Protective conductor connection
② Memory card slot
③ Ports

1.2.2 Views of the PCIe device version

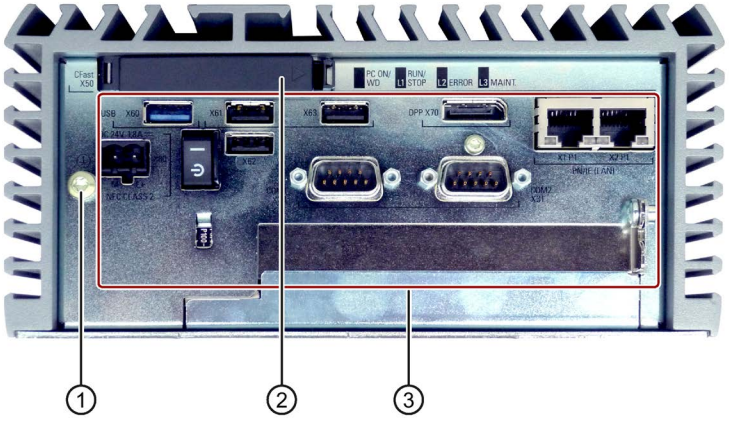
Front view and side view

The front view on the left is the standard mounting position, side view on the right.



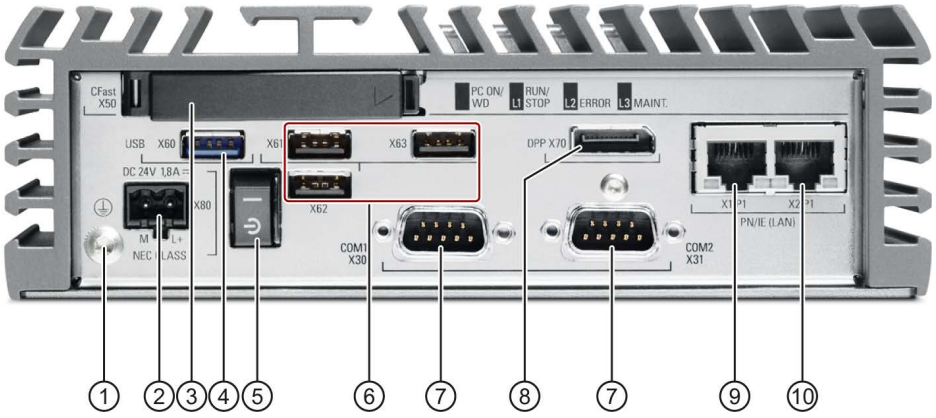
① Cooling fins
② LED display

Bottom view



① Protective conductor connection
② Memory card slot
③ Ports

1.2.3 Interfaces and operator controls of the basic device



① Protective conductor connection

② Connection for a 24 VDC power supply

③ Memory card slot

④ USB 3.0 port, high current

⑤ On/off switch. OFF position, when the symbol "C-" is pressed in.

⑥ USB 2.0 port, high current

⑦ Serial interface, 9-pin (optional)

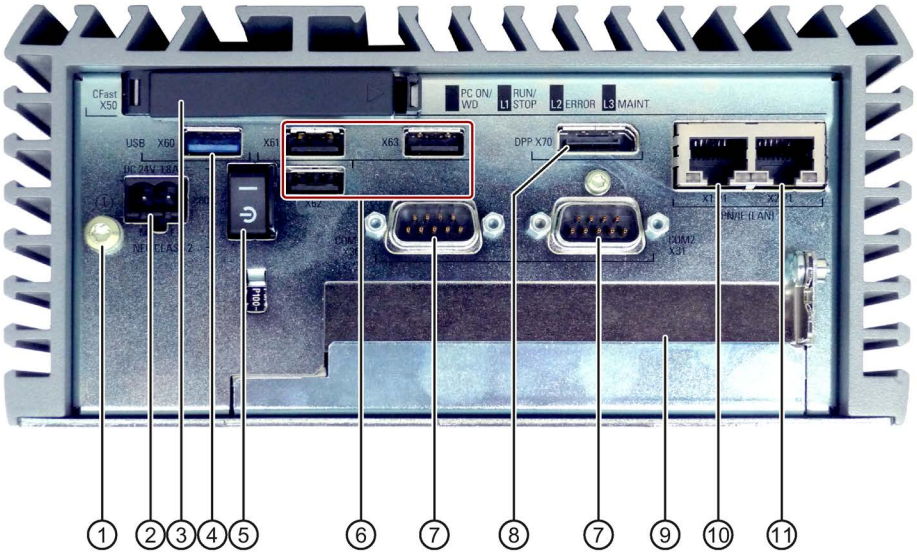
- RS 232
- RS 422
- RS-485

⑧ DisplayPort connection

⑨ RJ45 Ethernet connection 1 for 10/100/1000 Mbps

⑩ RJ45 Ethernet connection 2 for 10/100/1000 Mbps

1.2.4 Interfaces and operator controls PCIe device version



① Protective conductor connection

② Connection for a 24 VDC power supply

③ Memory card slot

④ USB 3.0 port, high current

⑤ On/off switch. OFF position, when the symbol "C-" is pressed in.

⑥ USB 2.0 port, high current

⑦ Serial interface, 9-pin

- RS 232
- RS 422
- RS-485

⑧ DisplayPort connection

⑨ Slot for a PCIe x1 card

⑩ RJ45 Ethernet connection 1 for 10/100/1000 Mbps

⑪ RJ45 Ethernet connection 2 for 10/100/1000 Mbps

1.2.5 Status displays

LED	State	Description
PC ON/WD	Off	-
	Green	BIOS ready to boot
	Flashing green/yellow (1 Hz)	BIOS in POST, power switch on
	Yellow	Idle state
	Flashing red (1 Hz)	Watchdog status display: active
RUN/STOP / L1	Off	-
	Green	Can be controlled by user program / control program (e.g. WinAC)
	Yellow	
ERROR / L2	Off	-
	Red	Can be controlled by user program / control program (e.g. WinAC)
	Yellow	
MAINT / L3	Off	-
	Yellow	Can be controlled by user program / control program (e.g. WinAC)
	Red	

You can find information on the individual LEDs in the section Output register user LED L1/L2/L3 (read/write, address 404Eh) (Page 96). Example programs for controlling the LEDs on Windows operating systems are available on the Customer Support page of Siemens Industry Automation and Drive Technologies.
(http://www.siemens.com/automation/service&support)

1.3 Accessories

This chapter contains the scope of accessories valid at the time these operating instructions were written. Additional accessories can be found on the Internet at:

- Expansion components and accessories (http://www.automation.siemens.com/mcms/pc-based-automation/en/industrial-pc/expansion_components_accessories)
- Industry Mall (https://mall.industry.siemens.com)

CFast cards

Note

CFast cards can only be replaced with cards of the same manufacturing versions

This device supports only SIMATIC IPC CFast cards with version 02 or higher.

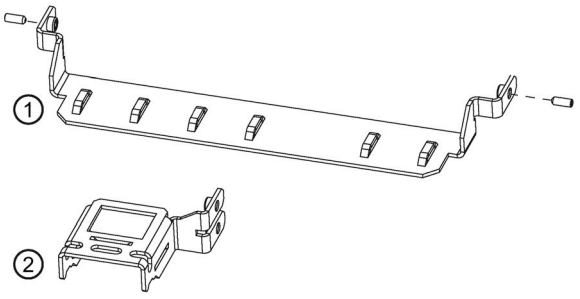
The following CFast cards can be ordered:

- CFast card, 4 GB
- CFast card, 8 GB
- CFast card, 16 GB

Strain relief

The cable strain relief set contains:

- 5 pieces cable strain relief ①
- 5 pieces Ethernet connector strain relief ②
- Setscrews M3x8
- Allen key
- Cable ties



Dust protection set

The Dust protection set interfaces contains:

- 40 pieces covers for USB interface
- 20 pieces covers for RJ45 Ethernet connection
- 20 pieces DisplayPort cover

Graphics adapter

- DisplayPort DVI adapter
- DisplayPort VGA adapter

Safety instructions

2

2.1 General safety instructions

⚠ WARNING

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.

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.
- Observe the information on electromagnetic compatibility (Page 73).

⚠ WARNING

Risk of fire through expansion cards

Expansion cards generate additional heat. The device may overheat and cause a fire.

Please note the following:

- Observe the safety and installation instructions for the expansion cards.
- If in doubt, install the device in an enclosure that is compliant with sections 4.6 and 4.7.3 of the IEC/UL/EN/DIN-EN 60950-1 standard.

NOTICE

"Open Type" UL508

Note that the device is classified as "Open Type" for use in the area of Industrial Control Equipment (UL508). Installation of the device in an enclosure complying with UL508 is a prerequisite for approval or operation in accordance with UL508.

Battery and rechargeable battery

⚠ WARNING

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 used batteries in good time; see the section "Replacing the backup battery" in the operating instructions.
- Replace the lithium battery only with an identical battery or types recommended by the manufacturer (order no.: A5E34345932).
- 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

Electrostatic sensitive devices can be labeled with an appropriate symbol.

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 74).

Industrial Security

Siemens offers products and solutions with Industrial Security functions that support the safe operation of equipment, solutions, machines, devices and/or networks. They are important components in a comprehensive Industrial Security concept. As a result the products and solutions from Siemens are constantly evolving. Siemens recommends obtaining regular information regarding product updates.

For safe operation of Siemens products and solutions appropriate protective measures (e.g., cell protection concept) must be taken and each component must be integrated in a comprehensive Industrial Security concept, which corresponds with the current state of technology. The products of other manufacturers need to be taken into consideration if they are also used. You can find addition information on Industrial Security under (http://www.siemens.de/industrialsecurity).

Sign up for our product-specific newsletter to receive the latest information on product updates. For more information, see under (http://www.siemens.de/automation/csi_en_WW).

Disclaimer for third-party software updates

This product includes third-party software. Siemens AG only provides a warranty for updates/patches of the third-party software, if these have been distributed as part of a Siemens software update service contract or officially released by Siemens AG. Otherwise, updates/patches are undertaken at your own risk. You can find more information about our Software Update Service offer on the Internet at Software Update Service (http://www.automation.siemens.com/mcms/automation-software/de/software-update-service/Seiten/Default.aspx).

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.

2.2 Notes on use

NOTICE
Possible functional restrictions in case of non-validated plant operation The device is tested and certified on the basis of the technical standards. In rare cases, functional restrictions can occur during plant operation. Validate the correct functioning of the plant to avoid functional restrictions.

Note

Use in an industrial environment without additional protective measures

This device was designed for use in a normal industrial environment according to IEC 60721-3-3.

Installing and connecting the device 3

3.1 Preparing for installation

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. A damaged packaging indicates that ambient conditions have already had a massive impact on the device.

The device may be damaged.

Do not dispose of the original packaging. Pack the device during transportation and storage.

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5. Check the contents of the packaging and any accessories you may have ordered for completeness and damage.
6. If the contents of the packaging are incomplete, damaged or do not match your order, inform the responsible delivery service immediately. Fax the enclosed form "SIMATIC IPC/PG Quality Control Report".

⚠ WARNING

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.

Make sure that the damaged device is not inadvertently installed and put into operation. 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, for example in cold weather, moisture could build up on or inside the HMI device. 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.

3.1.2 Identification data of the device

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

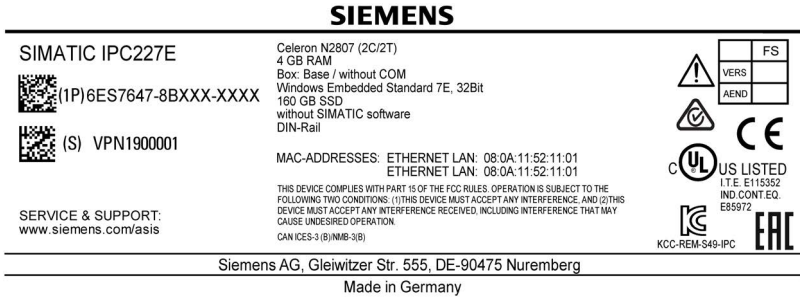
Enter the identification data in the following table:

Order number	6ES ...
Serial number	S VP
Production version	FS
Windows "Product Key"	
Ethernet address 1 (MAC)	
Ethernet address 2 (MAC)	

Obtain the data from the rating plate and COA label. The rating plate is located on the back panel of the device. The COA label is only available in pre-installed Windows operating systems and is affixed to the rear of the device.

Procedure

1. Transfer order number, serial number, production version (FS), and Ethernet addresses from the rating plate.



The Ethernet addresses can also be found in the BIOS Setup under "Main > Advanced > Peripheral Configuration" (see section "Technical Specifications").

Replacement device: On the rating plate, the order number of a replacement device which is available from stock at short notice is listed under "Spare Part Space Units". The replacement device is always supplied without storage media.

Note

Replacement device without storage media

When you order a replacement device, remove all the storage media from your device, for example SSD. Insert the storage media into the replacement device.

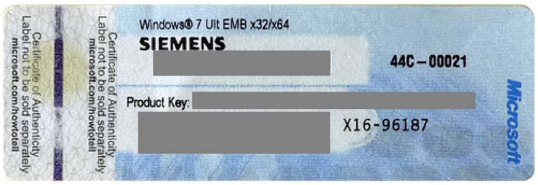
2. Transfer the Windows "Product Key" from the COA label.

Example of a COA label

Microsoft Windows "Product Key" on the "Certificate of Authenticity" (COA):
The COA label is only attached to the rear of the device containing a Windows Embedded Standard 7 or Windows 7 operating system.

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

- COA label of a device with Windows 7 operating system



3.1.3 Permitted mounting positions

The following mounting positions are permitted:

- Horizontal mounting position

  The horizontal mounting position is the preferred position.

- Vertical mounting position – upright mounting

Take into account the permitted temperature range for operation that depends on the mounting position in accordance with the "Technical specifications (Page 82)" section.

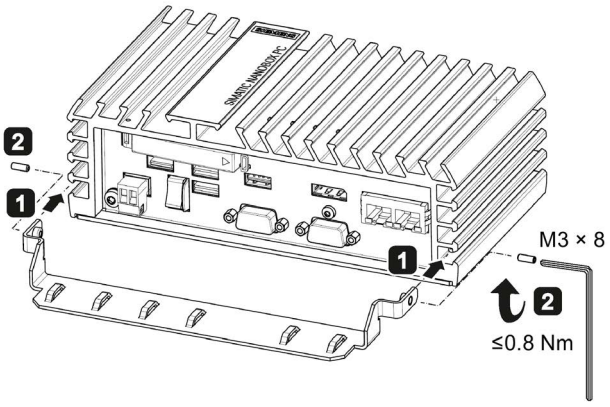
Ensure that the following clearances measurements to another component or to a wall of a housing are complied with:

- Below the device: ≥ 100 mm
- Above the device: ≥ 50 mm

3.1.4 Installing the cable strain relief

The cable strain relief plate carries the cables and prevents unintentional loosening of the connector from the device. The cable strain relief is available as an accessory.

Procedure



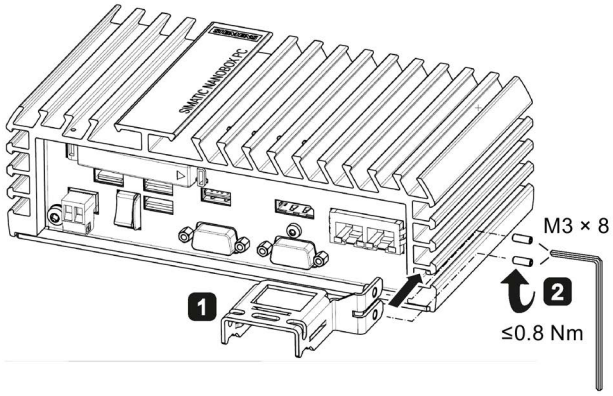
1. Insert the metal plate of the strain relief into the last notch left and right.
2. Secure the strain relief on the left and right respectively with an M3x8 setscrew.

   Secure the connection cables with cable ties to the cable strain relief.

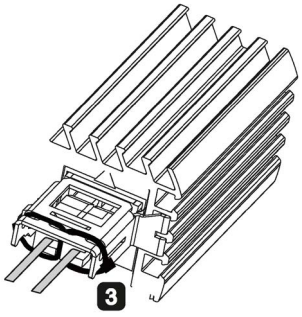
3.1.5 Installing Ethernet connector strain relief

The Ethernet connector strain relief prevents accidental loosening of the Ethernet connector from the device. The Ethernet connector strain relief is available as an accessory.

Procedure



1. Insert the metal plate of the Ethernet connector strain relief into the second and third to the last notch.
2. Fasten the Ethernet connector strain relief with 2 setscrews.



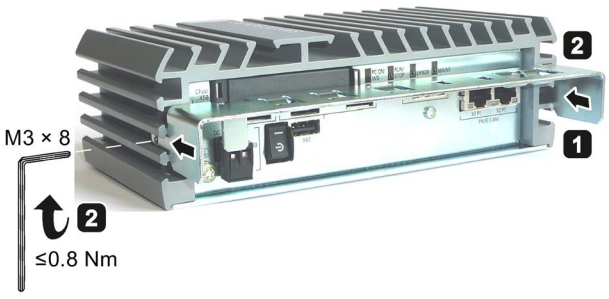
3. Secure the Ethernet connector with cable ties.

3.1.6 Installing the ATEX cable strain relief

The special plate supports the cables for ATEX hazardous zones and prevents unintentional loosening of the connector from the device. The ATEX cable strain relief is included as an accessory for devices with ATEX approval.

NOTICE
Enclosure / control cabinet required The device must comply with enclosure IP54 for ATEX approval. You must install the device in a protective enclosure / control cabinet to achieve this.

Procedure



1. Insert the metal plate of the strain relief left and right into the second to the last notch left and right.
2. Secure the strain relief on the left and right respectively with an M3x8 setscrew.

   Secure the connection cables with cable ties to the cable strain relief.

3.2 Mounting the device

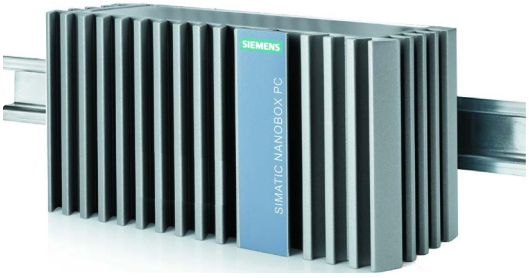
3.2.1 Mounting instructions

Note the following:

- The device is approved for operation in closed rooms only.
- For installation in a cabinet, observe the SIMATIC setup guidelines (http://support.automation.siemens.com/WW/view/de/1064706) as well as the relevant DIN/VDE requirements or the applicable country-specific regulations.
- When the device is used in the area of Industrial Control Equipment in accordance with UL508, note that the device is classified as "Open Type". The installation of the device in a housing conforming to UL508 is therefore a mandatory requirement for approval or operation in accordance with UL508.

Possible mounting types of the device:

Mounting on a standard rail



Wall mounting

Upright mounting

The mounting types are described in the following sections using the basic device as an example.

Position of the interfaces

For standard rails, the interface side of the device can point either up or down. In the case of wall mounting, the interface side of the device can point up, down, to the left or to the right. The position of the interface side is determined by the mounting of the mounting bracket.

Fasten securely

NOTICE
Insufficient load carrying capacity If the mounting surface for wall and vertical mounting does not have sufficient load carrying capability, the device may fall down and be damaged. Ensure that the mounting surface on the wall can bear four times the total weight of the device, including fixing elements.

NOTICE
Incorrect fixing elements If you use anchors and screws other than those specified below for wall and vertical mounting, safe mounting is not guaranteed. The device can fall and may be damaged. Use only the anchors and screws specified in the following table.

Material	Bore diameter	Fixing element
Concrete	Select according to the specification of the mounting elements used	• Anchor, ∅ 6 mm, 40 mm long • Screw, ∅ 4-5 mm, 40 mm long
Plasterboard, min. 13 mm thick		Toggle plug, ∅ 12 mm, 50 mm long
Metal, min. 2 mm thick		• Screw M4 × 15 • M4 nut

3.2.2 Mounting on a standard rail

Mounting on a standard rail is suitable for horizontal and vertical mounting of the device.

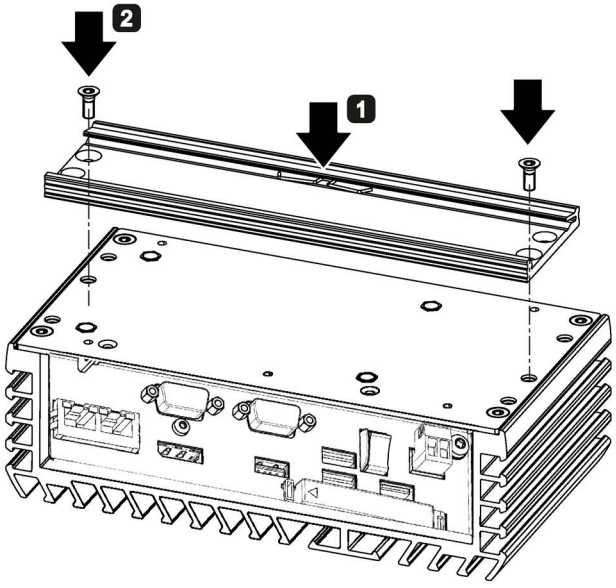
Requirement

- A SIEMENS 35 mm standard rail TH35-15 conforming to EN 60715:2001

  The standard rail is mounted.
- A standard rail bracket

  The standard rail bracket and two screws are included in the order variant "Standard rail mounting".
- A T20 screwdriver

Procedure for mounting



1. Lay the standard rail bracket on the rear of the device.
2. Fasten the standard rail bracket with 2 screws.
3. Place the device with the standard rail bracket onto the mounting rail from above.

   If the device is tilted when you place it down, the standard rail bracket does not grip.
4. Press the device down and toward the standard rail until the standard rail bracket engages.
5. Check whether the device is seated firmly on the standard rail 。
6. Applies to vertical standard rail mounting:

   Fasten a standard rail ground terminal below the device。

Procedure for dismantling

1. Press the device down until the lower rail guide frees the device.
2. Swing the device out of the rails.
3. Remove the device from the rail.

3.2.3 Wall mounting

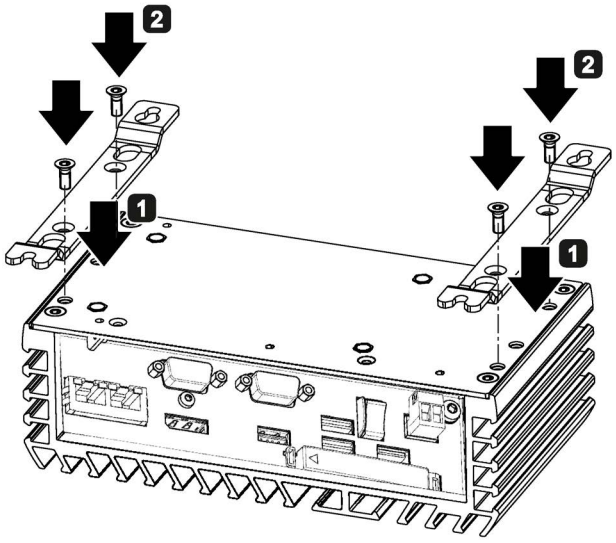
Wall mounting is suitable for horizontal mounting of the device.

Requirement

- Two mounting brackets

  The mounting brackets are available in two versions - for the basic device versions and for the PCIe device version. The mounting bracket and four screws are included in the order variant "Wall mounting".
- A T20 screwdriver
- Four anchors and four screws

Procedure for mounting



1. Place the mounting bracket on the rear of the device.
2. Secure the mounting bracket with 2 screws.
3. Place the device with the mounting brackets onto the mounting surface.
4. Mark the fixing holes.
5. Drill the fixing holes.
6. Insert the anchors in the drilled holes.
7. Screw on the device.

3.2.4 Upright mounting

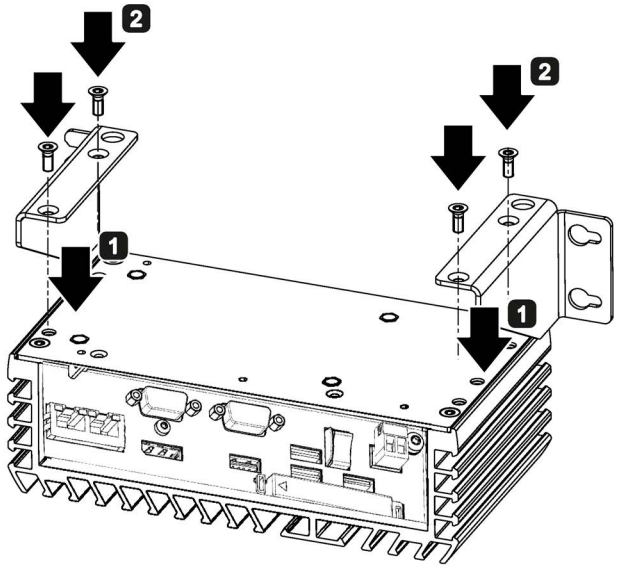
Upright mounting is suitable for vertical mounting of the device. The corresponding mounting bracket allows mounting that requires less space than standard rail mounting and wall mounting.

Requirement

- Two mounting brackets

  The mounting brackets are available in two versions - for the basic device version and for the PCIe device versions. The mounting bracket and four screws are included in the order variant "Upright mounting".
- A T20 screwdriver
- Four anchors and four screws

Procedure for mounting



1. Place the mounting bracket on the rear of the device.
2. Secure the mounting bracket with 2 screws.
3. Place the device with the mounting brackets onto the mounting surface.
4. Mark the fixing holes.
5. Drill the fixing holes.
6. Insert the anchors in the drilled holes.
7. Screw on the device.

3.3 Connecting the device

3.3.1 Notes on connecting

⚠ WARNING

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. Death or serious bodily injury can result.

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 "Connecting the protective conductor").
- Use a central power isolating switch for cabinet installation.

⚠ WARNING

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 Connecting the protective conductor

A connected protective conductor discharges dangerous electrical charges from the metal enclosure. The current flowing through the protective conductor when such a fault occurs triggers an upstream protective device that disconnects the machine 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 modules to ground.

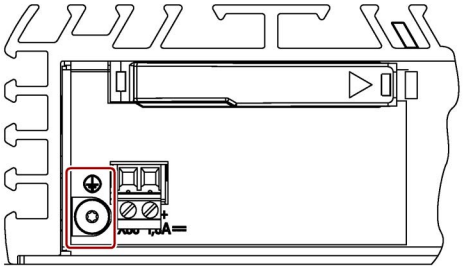
The connection for the protective conductor is labeled with the following symbol:

⚠ 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 PE terminal 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, remove it from operation without delay and label it accordingly.

Requirement

- T20 screwdriver
- Cable lug for M4
- Protective conductor with minimum cross-section of 2.5 mm^2

Procedure



1. Clamp the cable lug on the protective conductor.
2. Firmly attach the cable lug to the protective conductor connection on the device using the M4 thread (see part labeled).
3. Connect the protective conductor to the protective conductor connection of the cabinet or the plant in which the device is installed.

3.3.3 Connecting the power supply

Note

The device should only be connected to a 24 VDC power supply which satisfies the requirements of safe extra low voltage (SELV) according to IEC/EN/DIN EN/UL 60950-1.

The power supply must meet the requirement NEC Class 2 or LPS according to the IEC/EN/DIN EN/UL 60950-1.

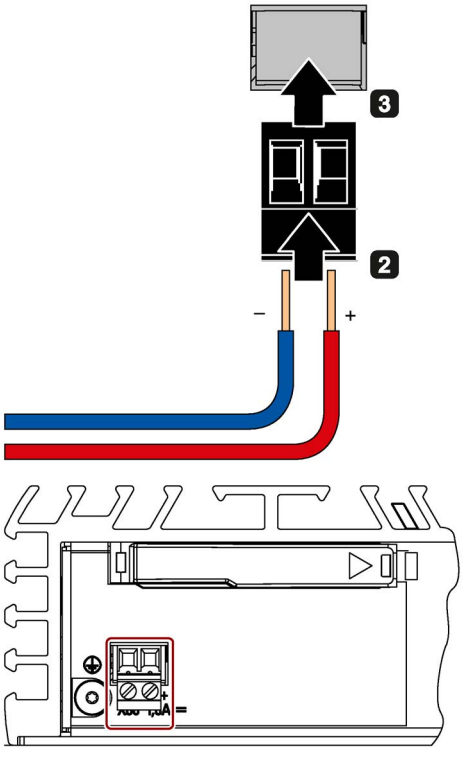
Note

The 24 VDC power supply must be adapted to the input data of the device (see the technical specifications in the operating instructions).

Requirement

- The protective conductor is connected.
- You are using the supplied terminal.
- A two-core cable with a cable cross-section of 0.75 mm^2 to 2.5 mm^2 for the 24 VDC connection.
- A slotted screwdriver with a 3mm blade.

Procedure



1. Switch off the 24 VDC power supply.
2. Connect the cores of the power supply.

3. Insert the terminal at the indicated position.

3.3.4 Connect 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: 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.

PROFINET

PROFINET can be operated via:

- Standard Ethernet interfaces (RT)

SIMATIC NET

Use this software package to create, operate and configure an innovative network for Field & Control level. Information on this can be found on the SIMATIC NET Manual Collection CD. The software package and the documentation are not included in the product package.

Additional information

You can find additional information on the Internet at: Technical Support (http://www.siemens.de/automation/csi_en_WW)

Commissioning the device and device functions 4

4.1 General information on commissioning

⚠ CAUTION

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 Embedded Standard 7

Read 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.

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.

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
  - A monitor/display

4.2 Switching on the device

Following the initial startup, the operating system preinstalled on the drive is automatically configured 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

1. Set the On/Off switch to "ON" position.

   The "PC ON/WD" LED lights up. The device 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.

   The following steps are required only when switching on the device for the first time after delivery:

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 is available in the chapter "Servicing and maintaining the device", under "Installing software".

   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 below the identification data of the device on the "Certificate of Authentication" COA label, in the "Product Key" line.

6. If the device is connected with a SIMATIC Industrial Flat Panel, the setup of the SIMATIC IPC Wizard is started automatically after operating system installation (see next chapter).

The installation of the operating system is complete.

4.3 Windows Security Center

Warning from the Windows Security Center

A warning from the Windows Security Center is displayed the first time you switch on your device. The Security Center checks the status of the device in regard to the three important security aspects listed below. If a problem is detected (an outdated antivirus program, for example), the Security Center issues a warning and makes 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. Windows checks if the device is protected by a software firewall.
  The firewall is enabled by default in the delivery state.
- **Antivirus software**: Antivirus programs add protection to the device by searching for and eliminating viruses and other security threats. Windows checks if a full-range, up-to-date antivirus program is running on the device.
  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 feature is disabled in the delivery state.
- **Real-time protection (Windows 7 only):** Windows Defender displays warnings if spyware or possibly unwanted software is installed or executed on the computer. You will also receive a warning if programs attempt to modify important Windows settings.

Configure the Security Center according to your requirements.

4.4 Advanced device functions

4.4.1 Monitoring functions

4.4.1.1 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, low temperature, 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 meter (information on total runtime)

SIMATIC IPC DiagBase software

Use the functions of the SIMATIC IPC DiagBase software included in the scope of delivery for local monitoring. Use the "DiagBase Management Explorer" application to obtain a clear overview of the controls. Use the DiagBase Alarm Manager to receive notifications about individual alarms.

Note

For more information on SIMATIC IPC DiagBase software functionality, please refer to the relevant Online Help.

SIMATIC IPC DiagMonitor software

SIMATIC IPC DiagMonitor is available on CD (not included in the scope of delivery). This monitoring software comprises:

- The software for the stations to be monitored.
- A library for creating user-specific applications.

4.4.1.2 Temperature monitoring/display

Temperature monitoring

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

- Processor temperature
- Temperature in proximity to the RAM ICs/blocks
- Temperature of the basic module

A temperature error is triggered when one of the three temperature values exceeds the set temperature threshold and the following reaction is initiated:

Reaction	Option
The DiagBase or DiagMonitor software is enabled	None

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

- Acknowledgment of the error message by the monitoring software
- Restart of the device

4.4.1.3 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	Executes no action when the watchdog expires
Restart	Restarts the operating system when the watchdog expires
Shutdown	Shuts down the operating system when the watchdog expires

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 hardware supports the following times:

- Normal mode: 94 ms, 210 ms, 340 ms, 460 ms, 590 ms, 710 ms, 840 ms and 960 ms.
- Macro mode: 2s, 4s, 6s, 8s, 16s, 32s, 48s and 64s.

Set the monitoring times in SIMATIC Diagnostics Management as integer in the range from 4 to 64 seconds.

Note

Contact Customer Support for a detailed description of the Watchdog functions.

4.4.1.4 Battery monitoring

The installed backup battery has a limited service life, see section "Replace the backup battery (Page 54)". 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.

4.4.2 Enhanced Write Filter

Purpose and function

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

The Enhanced Write Filter enables you to 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 meet user requirements (when using memory cards, for example).

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

EWF is indispensable when HORM or compressed NTFS is used.

NOTICE
Activate only one write filter per partition - otherwise you risk data loss!
EWF and FBWF are preinstalled in the SIMATIC IPC images.
Ensure that only one write filter is enabled on a partition, otherwise you risk data loss!

Note

In Windows Embedded Standard, the Enhanced Write Filter is disabled by default. After the operating system has been set up, you should back up your date and then enable the EWF.

Set 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 "Documentation and Drivers" CD/DVD. The SIMATIC EWF Manager can be started with an icon in the system tray on the task bar.

EWFMGR.EXE is called with the command prompt. The following functions are available:

Function	Command
Write-protect drive C: enable	`ewfmgr c: -enable`
Write-protect drive C: disable (modified files are transferred)	`ewfmgr c: -commitanddisable`
Modified files on drive C: Accept	`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` cannot be used with the `-Live` options (i.e. not like this: `ewfmgr c: -commitanddisable -live`).

Special features for the use of Enhanced Write Filters (EWF)

- In the event of a power failure, if the EWF is enabled changes made after the boot sequence on drive C: are lost.
  To prevent data loss in the event of a power failure, the use of a UPS is recommended.
- You can save the data in the EWF RAM overlay to the memory card or the hard disk before you shut down the device. To do so, enter the following command in the command prompt:

```
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 has a registry entry that detects whether the clock has been adjusted for daylight saving time. 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 `ewfmgr c: -commit` and then reboot the system.

4.4.3 File-Based Write Filter

Purpose and function

Microsoft introduced a second write filter with Feature Pack 2007 for Windows XP Embedded, namely the 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 included in an exception list.

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

When you enable FBWF, the write access to the C:\FBWF and D:\FBWF folders is enabled by default.

Comparison between EWF and FBWF

- You should preferably use FBWF, as this allows a more flexible configuration and immediate writing without rebooting.
- EWF is indispensable when HORM or compressed NTFS is used.

NOTICE
Activate only one write filter per partition - otherwise you risk data loss!
EWF and FBWF are preinstalled in the SIMATIC IPC images.
Ensure that only one write filter is enabled on a partition, otherwise you risk data loss!

Configuring the FBWF

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

Note

- Observe the following syntax: You must always append a **space** character to the colon following the drive letter.
- You must restart the system to activate the changes for direct write access.
- Only existing files and folders can be included 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`
Adding/removing elements in the exception list:	
• Add file	`fbwfmgr /addexclusion C: \Test.txt`
• Add folder	`fbwfmgr /addexclusion C: \Test folder`
• Remove file	`fbwfmgr /removeexclusion C: \Test.txt`
• Remove folder	`fbwfmgr /removeexclusion C: \Test folder`
Call up the help function	`fbwfmgr /?`

See also

Instructions on FBWF (http://msdn.microsoft.com/en-us/library/aa940926(WinEmbedded.5).aspx)

4.4.4 Buffer memory MRAM

The motherboard is equipped with an MRAM 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.

At least enough time is provided for copying data to the MRAM that 128 kB can be saved with the full configuration.

A memory window with a maximum size of 512 KB can be displayed by means of PCI address register. The start address is initialized by the BIOS (see "Hardware descriptions, input/output address areas").

A corresponding function is implemented in BIOS to enable the use of MRAM in WinAC RTX.

Expanding and assigning parameters to the device 5

5.1 Open the device

Requirement

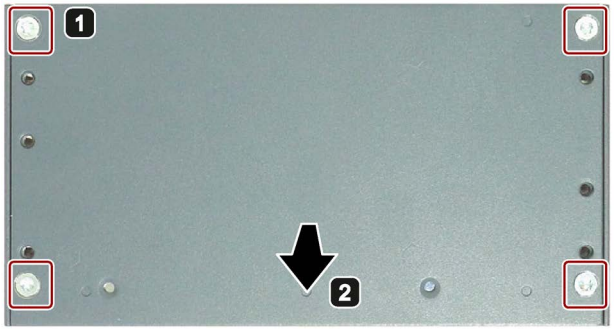
- The device is disconnected from the power supply.
- All connecting cables on the device have been removed.
- The device has been removed from the cabinet.
- A T20 screwdriver

Procedure - opening the device

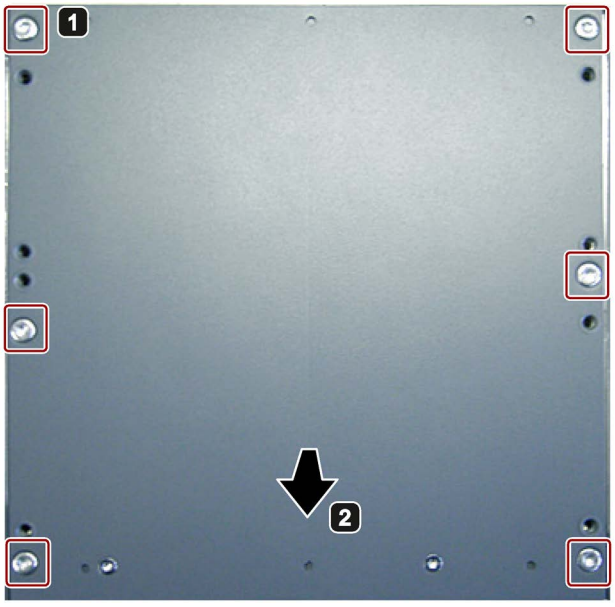
Note

On the basic device the drive is located on the underside of the rear panel.

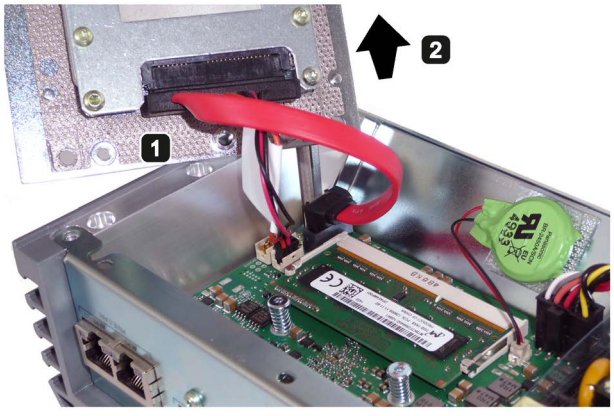
- Carefully open the device.
- You can not lay down the rear panel because of the drive's connecting cable.
- The rear panel can only be completely removed after disconnecting the connection plug.
- Read the information in section "Replacing the drive of a basic device (Page 57)".



1 Remove the marked screws.
There are 4 screws on the basic device.
There are 6 screws on the PCIe device version.



2 Carefully remove the device's rear panel.



2 Applies only to the basic device: Set the rear panel with the drive vertically against the device's side panel and prop it up.

Notice: Connection plug and board can be damaged.

- Ensure that the rear panel does not fall.
- Remove the connection plug from the drive.

Procedure - closing the device

To close the device, carry out the steps for opening the device in the reverse order.

5.2 Installing a PCIe module

A PCIe x1 module can only be installed in the PCIe device version.

Note

Power consumption

If the power consumption of the PCIe x1 module is too high, the device will be damaged.

Ensure that the power consumption amounts to a maximum of 5 W.

Ambient temperature

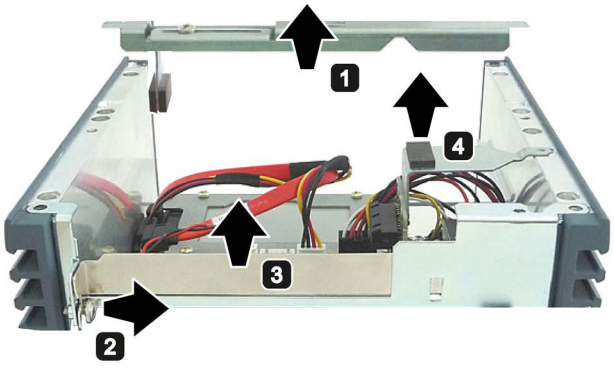
The temperature in the enclosure of the IPC can be up to 30 °C above the maximum permissible ambient temperature of the device.

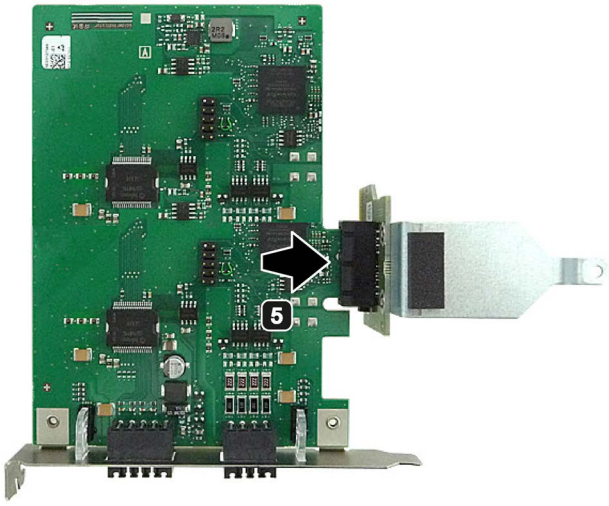
Make sure that the maximum permissible ambient temperature of the PCIe-x1 module is specified accordingly.

Requirement

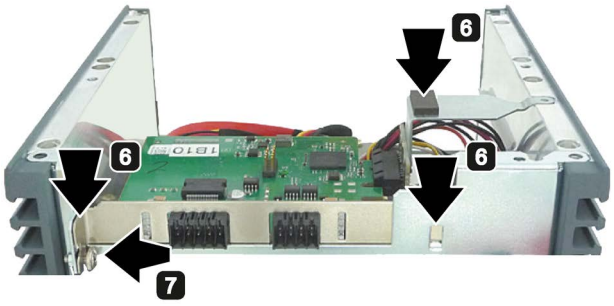
- The device is opened.
- A plug-in card
- A T10 screwdriver

Procedure





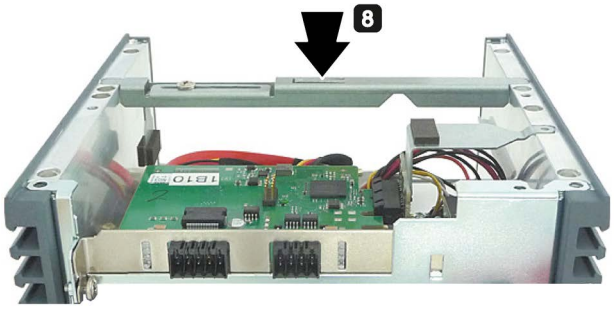
1. Take the plug-in card holder out of the housing.
2. Loosen the screw at the slot plate.
   Do not remove the screw completely.
3. Remove the slot plate by pulling it upwards.
4. Pull the plug-in card adapter from the motherboard.
5. Place the plug-in card onto the the plug-in card adapter.



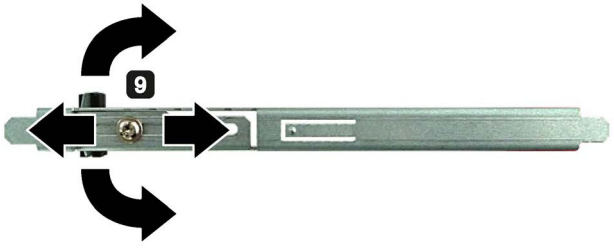
6 Insert the plug-in card.

Ensure that the connector of the plug-in card adapter has been inserted correctly into the slot on the motherboard.

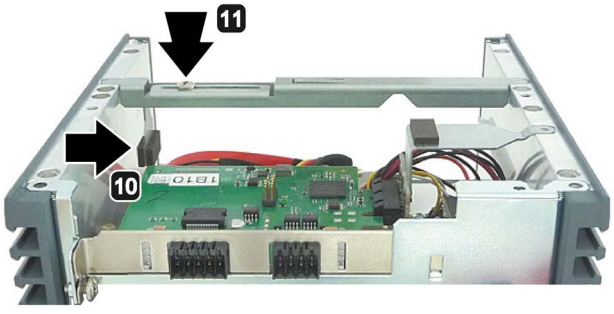
7 Tighten the screw.



8 Insert the plug-in card holder into the housing.



9 Turn the pressure piece on card holder if necessary to adjust the bracket to the height of the plug-in card.



10 Push the pressure piece against the plug-in card

11 Tighten the screw

5.3 Installing and removing CFast cards

The device has a slot for a CFast card on the side with the interfaces. Always use SIMATIC IPC CFast cards for industrial applications.

NOTICE
Damage to the device
The CFast and CompactFlash connections are not compatible. The device is damaged.
Use the slot described here exclusively for a CFast card.

Note

Note the following:

- Always insert a CFast card version 02 or higher.
- Always replace a CFast card with a card of the same or higher version.
- The production version can be found on the CFast card (see marking).

Requirement

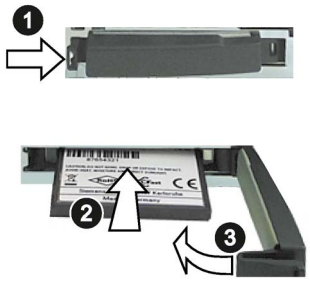
- The device is switched off.
- SIMATIC IPC CFast card that is approved for industrial applications.

Procedure

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. Insert the CFast card into the slot, working carefully and without applying excess force.

1. Release the lock of the cover.
   Push against the cover in the direction indicated. Open the cover completely.
2. Insert the CFast card into the slot as shown in the figure.
   Push CFast card into the slot until it snaps into place (ball-point pen mechanism).



Similar to figure

3. Close and lock the cover.

Removal

Remove the CFast card from the memory slot by pushing it in until it is ejected by about 5 mm (ball-point pen mechanism).

Proceed in reverse order.

Maintaining and repairing the device

6

6.1 Maintenance

To maintain high system availability, we recommend the preventative replacement of those PC components that are subject to wear in accordance with the intervals for replacement indicated in the table below.

Component	Replacement interval:
HDD drive	3 years
CMOS backup battery	5 years

6.2 Repair information

Carrying out repairs

Only qualified personnel are permitted to repair the device.

⚠ WARNING

Unauthorized opening and improper repairs on the device may result in substantial damage to equipment or endanger the user.

- Always disconnect the power plug before you open the device.
- Only install system expansion devices designed 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 be installed.

If you install or exchange system expansions and damage your device, the warranty becomes void.

⚠ CAUTION

Electrostatic sensitive devices (ESD)

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 chapter "ESD Guideline (Page 74)"

Limitation of liability

All technical specifications and approvals of the device only apply if you use expansion components that have a valid CE approval (CE mark). 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.

Tools

Tools to open the device, see section "Opening the device". You can make repairs on the device with the following tools:

- T20 screwdriver for protective conductor connection and enclosure
- T10 screwdriver for all of the remaining screws

6.3 Recycling and disposal

The devices described in these operating instructions can be recycled thanks to their low level of pollutants. Contact a certified disposal service company for environmentally sound recycling and disposal of your old devices.

6.4 Installing and removing hardware

6.4.1 Replace the backup battery

Prior to replacement

⚠ WARNING

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 the battery every 5 years.
- Replace the lithium battery only with the type recommended by the manufacturer.
  The order number is A5E34345932.
- 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.

NOTICE

Disposal of batteries and rechargeable batteries

Batteries and rechargeable batteries do not belong in domestic garbage. The user is legally obliged to return used batteries and rechargeable batteries.

Used batteries and rechargeable batteries pollute the environment as special waste. You as a user are liable to prosecution if you do not properly dispose of batteries and rechargeable batteries.

Please observe the following when disposing of batteries and rechargeable batteries:

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

Requirement

- The device is disconnected from the power supply.
- The device is opened.
- The drive has been removed, see section "Replacing the drive".

Procedure - removing

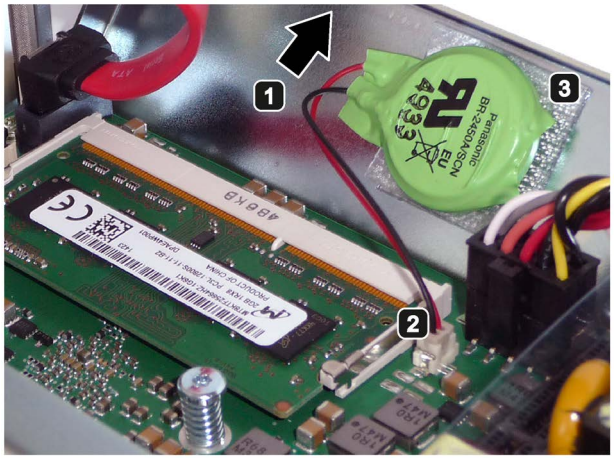
NOTICE

Time may be deleted

The time will be deleted if it takes you longer than 30 seconds to replace the battery. The device is no longer synchronous. Time-controlled programs will no longer run or will run at the wrong time. This may damage the plant.

Reset the time for the device.

Basic device



1. Lift up the cover slightly and open it carefully.

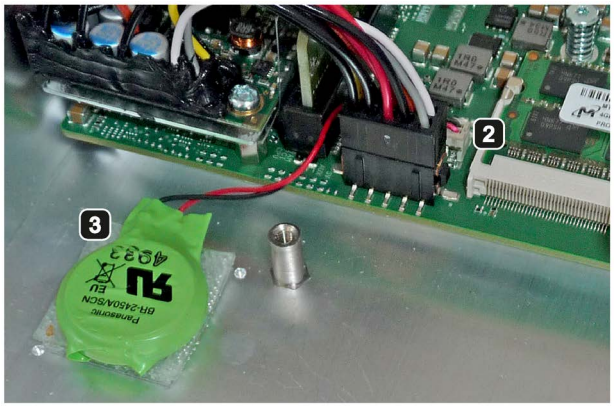
   Do not damage the seal in the process.

   Lay the cover aside next to the device.

   The battery cables should not be subjected to any pressure in doing so.
2. Pull out the connection plug of the battery cable.
3. Remove the battery with the attached Velcro from the Velcro fastener on the cover.

   Remove also the Velcro fastener on the cover.

PCIe device version



2. Pull out the connector.
3. Remove the battery with the attached Velcro from the Velcro fastener on the enclosure.

   Remove also the Velcro fastener on the enclosure.

Procedure - installation

1. To install the replacement battery, follow the steps for removing the battery in the reverse order. A Velcro fastener is provided with the replacement battery.
2. Stick a Velcro fastener on the battery.
3. Replace the Velcro on the cover/enclosure. When sticking on the new Velcro, pay attention to the position mark on the enclosure.
4. Attach the replacement battery with the Velcro to the Velcro on the cover/enclosure.

6.4.2 Replacing the drive of a basic device

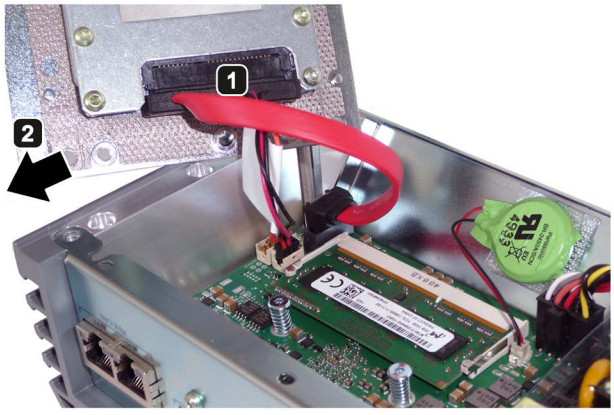
The procedure only applies to the basic device: Carry out the procedure if you want to replace the hard disk drive with an SSD and vice versa or in the case of a fault.

Read the information in section "Repair information (Page 53)".

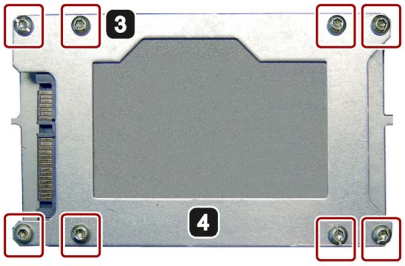
Requirement

- The device is open.
- A hard disk drive or an SSD
- A T10 screwdriver

Procedure - removing



1. Pull out the connection plug.
2. Lay down the device's rear panel including the drive.



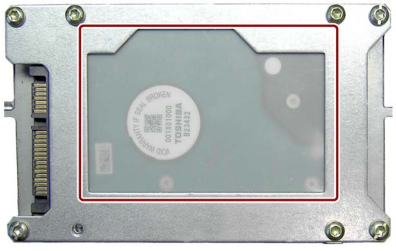
3. Remove the indicated screws.
4. Remove the drive rack and take out the SSD.

Procedure - installation

Proceed in reverse order.

When you mount the cover in step 1, make sure that the seal does not become pinched and thereby damaged.

If you install a hard disk drive instead of the SSD, you will need to use insulating film between the hard disk drive and drive rack, as indicated in the following figure.



6.4.3 Replacing a drive for the PCIe device version

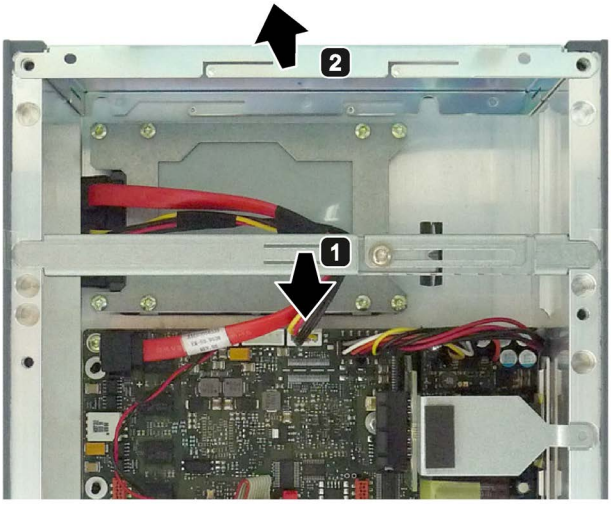
The procedure applies for the device version PCIe. Carry out the procedure if you want to replace the hard disk drive with an SSD and vice versa or in the case of a fault.

Read the information in section "Repair information (Page 53)".

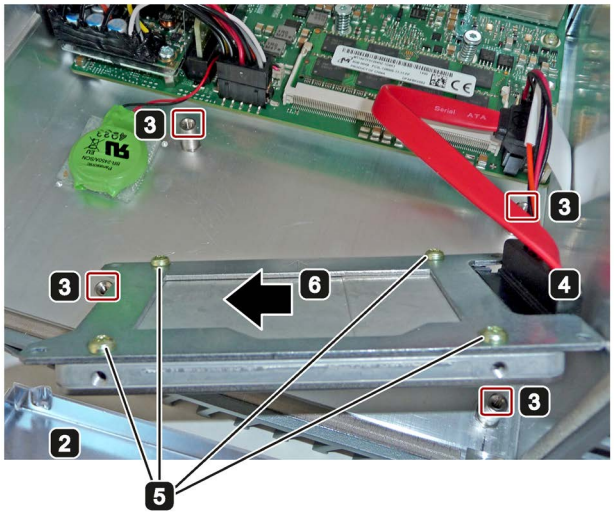
Requirement

- The device is opened.
- A T10 screwdriver

Procedure - removing



1. Take the plug-in card holder out of the housing.
2. Lift up and remove the cover.



3. Remove the marked screws.
4. Pull out the connector. Remove the drive rack and set it aside.
5. Loosen the 4 marked screws of the drive on the support plate.
6. Remove the drive with insulating film (only for HDD) from the support plate.

Procedure - installation

Proceed in reverse order.

6.5 Installing the software

6.5.1 Reinstalling the operating system

6.5.1.1 General installation procedure

If your operating system is no longer functioning correctly, you can reinstall it in one of two ways:

- With the recovery DVD and "Documentation and Drivers" CD/DVD
- With the Restore DVD

Recovery DVD

NOTICE
Windows Embedded
The Recovery DVD is not available for Windows Embedded operating systems.

The Recovery DVD contains the installation program with tools for configuring the drives and installing the operating system and the supported languages (MUI package).

The basic language of the installed operating system is English. To add other languages, install these languages from the Recovery DVD at a later time.

"Documentation and Drivers" CD/DVD

The "Documentation and Drivers" CD/DVD contains the documentation and the hardware drivers.

Restore DVD

The Restore DVD is included in the product package when you have ordered a device with operating system. The DVD contains an image file with the original software package: Operating system with installed hardware drivers and monitoring software, e.g. DiagBase.

6.5.1.2 Restoring the factory state of the software using the Restore DVD

You can restore the original factory software using the Restore DVD. The DVD 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.

Restoring the factory state

1. If the device is not equipped with a DVD drive, connect a USB DVD ROM drive to the device.
2. Insert the Restore DVD into the drive.
3. Restart the device.
4. Press <ESC> when the following BIOS message appears:

   ```
   Press Esc for Boot Options
   ```

   The BIOS selection menu is displayed when initialization is completed.
5. To boot from the Restore DVD, select the Boot Manager.
6. Select the CD/DVD drive from the Boot Manager and confirm the entry.
7. **Immediately** press any key when you see the following prompt to install the operating system from the Restore DVD.

   ```
   Press any key to boot from CD or DVD ..
   ```

   After a few seconds, you will see the installation program.
8. Follow the on-screen instructions.

Note

The "USB Boot" option has to be set to "Enabled" in the BIOS menu "Boot" so that the device can address a USB DVD-ROM drive.

6.5.1.3 Installation of Windows 7

Note

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
- Internal or external DVD ROM drive
- Recovery DVD for the operating system you want to install, which is included in the product package.

Procedure

1. Enable "USB Boot" in the BIOS setup.
2. Insert the Recovery DVD into the DVD drive.
3. Restart the device.
4. Press <ESC> when the following BIOS message appears:

   ```
   Press Esc for Boot Options
   ```

   The BIOS selection menu is displayed when initialization is completed.
5. To boot from the Recovery DVD, select the Boot Manager.
6. Select the CD/DVD drive from the Boot Manager and confirm the entry.
7. **Immediately** press any key when you see the following prompt to install the operating system from the Recovery DVD.

   ```
   Press any key to boot from CD or DVD ..
   ```

   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 on drive C: are deleted during the installation of Windows 7.
   - Back up all data.
   - Check the data and time in the BIOS setup, "Main" menu and correct the displayed time if necessary.
8. Follow the instructions in the installation program "Install Windows". You will find additional information in the operating system manual.

"Install Windows" installation program

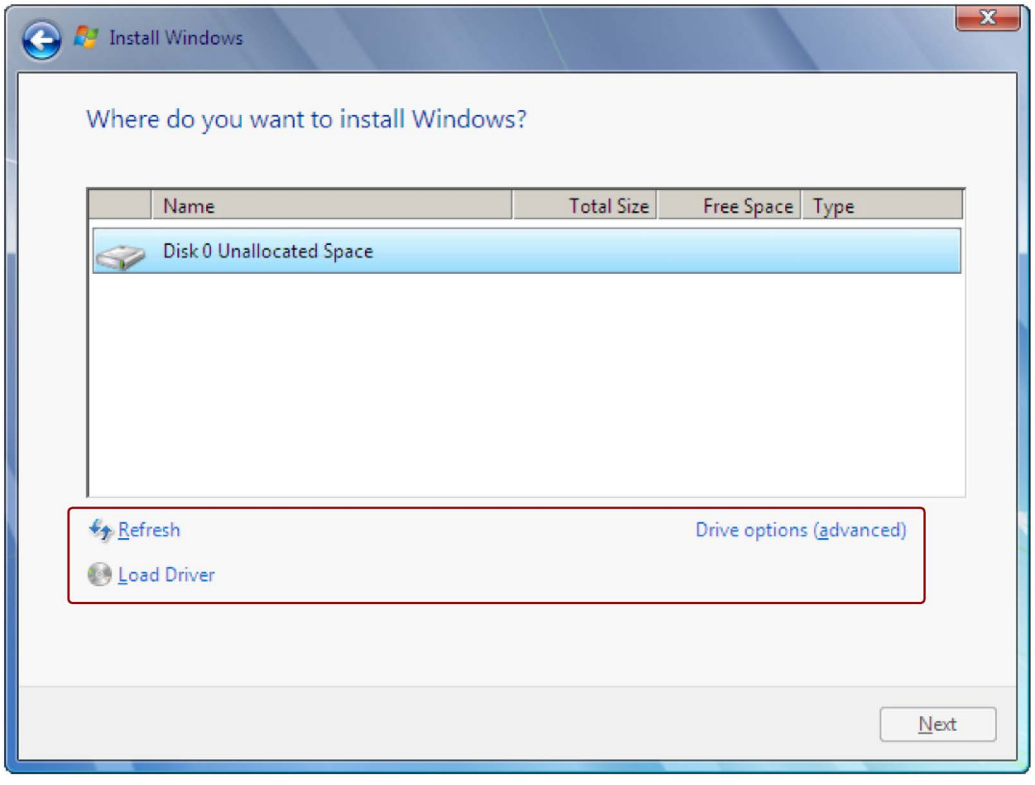
The language of the installation program and the operating system you want to install has been preset to English. You can change the language of the operating system after the installation. You can find information on this in section: "Setting up the language selection by means of the Multilanguage User Interface (MUI) (Page 65)".

6.5.1.4 Windows with AHCI Controller

Setting up partitions and integrating unknown data carrier controllers into the operating system

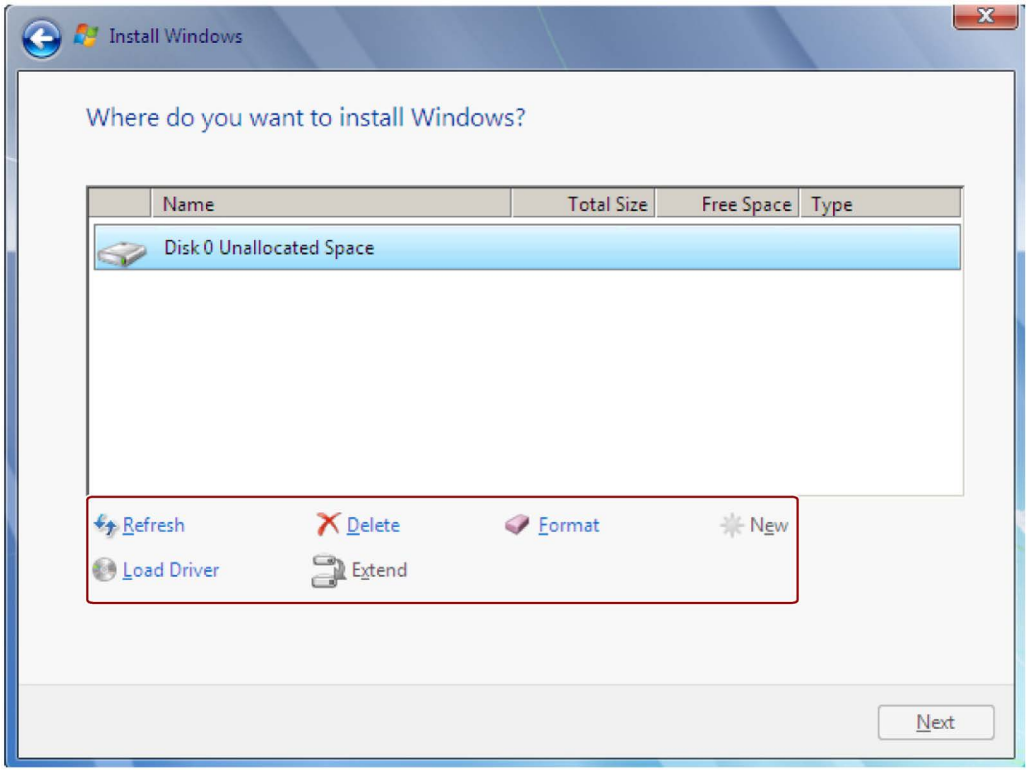
You can set up partitions during the installation process and integrate data carrier controllers that are unknown to the operating system. To do so, select "Custom (advanced)" when prompted for the installation type in the "Install Windows" installation program.

The following dialog windows are then available (example):



Refresh	Update
Load Driver	Integration of controller drivers unknown to the operating system and required for installation. Read the information in the section "Information for systems with data storage medium controller".
Drive options (advanced)	For display of additional functions that you can use to set up the data carriers, see figure "Windows installation window "Drive options (advanced)"".

Windows installation window "Drive options (advanced)":



Refresh	Update
Load Driver	Integration of controller drivers unknown to the operating system and required for installation. Read the information in the section "Information for systems with data storage medium controller".
Delete	Deleting a partition
Extend	Changing the partition size
Format	Formatting a partition
New	Creating new partitions
⚠	Identification for error messages, for example, if the data carrier was not formatted in the required "NTFS" format.

Procedure

Note

If you want to install the operating system on a data carrier connected to a data carrier controller unknown to the operating system, you have to integrate the driver of the data carrier controller. Integrate this driver before starting the partitioning of the data carrier and installing the operating system, see Section "Information for systems with data carrier controller".

1. Make sure that the partition on which you want to install the operating system is large enough and is set up with a NTFS file system.

   The recommended minimum size of this partition varies, depending on the operating system, how much RAM you have available and how much additional software you want to use. Information on how the data carrier is partitioned in its factory state is available in the following tables.

2. Select the partition on which you want to install the operating system.
3. Click "Next".

Installation is started.

Examples of partitions in the factory state

Windows 7 32 bit:

Partition	Name	Size	File system
First	SYSTEM	50 GB	NTFS not compressed
Second	DATA	Remainder	NTFS not compressed

Information for systems with data carrier controller

Data carrier controllers unknown to the operating system must be made known to the operating system prior to installation in the "Install Windows" installation program.

Requirement

You have copied the relevant controller driver to a USB stick.

Procedure

1. Connect the USB stick with the controller driver to the device.
2. Start the "Install Windows" installation program as described above.
3. Select "Load Drivers" in the Windows installation window.
4. Select the respective driver on the USB stick.

6.5.1.5 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 the language selection in Windows 7

Note

Specific information on setting up the language selection for Windows operating systems can be found in the manual "Microsoft Windows 7, Technical Reference (MS Press No. 5927)", not included in the product package.

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

The available language packages are described in the section "Configuration of the device". Some language packages are available on the Recovery DVD in the "Languagepacks" 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.

6.5.2 Partitioning data media

6.5.2.1 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:

Partition	Name	Size of the card		File system
		8 GB	16 GB	
1st Partition	SYSTEM	7 GB	12 GB	NTFS (compressed)
2nd Partition	DATA	Remainder	Remainder	NTFS (compressed)

* 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	Size of data medium		File system
		>64 GB	>100 GB	
Primary	System	50 GB	100 GB	NTFS not compressed
Second	Data	Remainder	Remainder	NTFS not compressed

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

6.5.2.2 Partitions under Windows 7 Ultimate

If partitions become corrupted or partitioning has to be changed after the installation of a new drive, it is necessary to set up the partitions again.

Partitioning the hard disk or SSD drive

The following partitions are configured in the delivery state for the Windows 7 Ultimate operating system:

Partition	Name	Size	File system
1st Partition	SYSTEM	depending on capacity of the HDD / SSD, no difference between HDD and SSD	NTFS (not compressed)
2nd Partition	DATA	Remainder	NTFS (not compressed)

To restore the original partition of the delivery state, we recommend you use the software tool **SIMATIC IPC Image & Partition Creator.** For more information on using this tool, refer to the manufacturer's documentation.

6.5.2.3 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.

Reduce partition

A partition can only reduced when 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.

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".

6.5.3 Installing drivers and software

Note

In the case of multilingual operating systems (MUI versions), you have to set the regional settings for menus and dialogs and the default language to English (US) before you install new drivers or operating system updates.

You can install an additional language package for service purposes at a later time with the Restore DVD under Windows Embedded Standard 7.

Procedure

1. If your device has no CD/DVD drive, connect an external USB CD/DVD drive to a USB port.
2. Insert the "Documentation and Drivers" CD/DVD provided.
3. Start the "START" program.
4. Select "Drivers" from the index.
5. Select the device and operating system.
6. Select the desired driver
7. Open the folder with the driver data by clicking on the link next to "Driver path".
8. 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.

6.5.4 Installing updates

6.5.4.1 Updating the operating system

Windows

The latest updates for the Windows operating system are available on the Internet at Microsoft (http://www.microsoft.com) and on the device in the Start menu "Start > All Programs > Windows Update > Check 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.

6.5.4.2 Installing or updating application programs and drivers

To install software from a CD and/or floppy disk in a Windows operating system, you must connect a suitable external USB drive to the computer.

The drivers for USB floppy drives and USB CD-R drives 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.

6.5.5 Backing up data

We recommend that you use the **SIMATIC IPC Image & Partition Creator** software tool for data backups in Windows Embedded Standard 7 and Windows 7 (as of V3.4). This tool provides convenient and efficient functions for backing up and restoring the full content of memory cards, hard disks and individual partitions (images).

SIMATIC IPC Image & Partition Creator supports the burning of DVD media only. You can order the tool using the Siemens online ordering system (https://mall.industry.siemens.com). For more information about SIMATIC IPC Image & Partition Creator, refer to its product documentation.

Technical specifications

7

7.1 Certificates and approvals

The device meets the guidelines listed in the following sections.

EC Declaration of Conformity

The associated declaration of conformity is available on the Internet at the following address: EC declaration of conformity, UL approval for Canada/USA (http://support.automation.siemens.com/WW/view/en/48958203).

DIN ISO 9001 certificate

The Siemens quality management system for all production processes (development, production and sales) meets the requirements of DIN ISO 9001:2000.

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

Certificate registration no. DE-000656 QM08

Software license agreements

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

UL approval

The following approvals are available for the device:

- Underwriters Laboratories (UL) in accordance with Standard UL 60950-1 Second Edition, File E115352 (I.T.E)
- Underwriters Laboratories (UL) in accordance with Standard UL508 (IND.CONT.EQ), File E85972
- Canadian National Standard CAN/CSA-C22.2 No. 60950-1-07
- Canadian National Standard CAN/CSA-C22.2 No. 142

cULus HAZ. LOC. approval in file E223122

The following approvals are available for the device if specified on the rating plate:

Underwriters Laboratories Inc. according to

- ISA 12.12.01 (Hazardous Location)
- CSA C22.2 No. 213 (Hazardous Location)

APPROVED for use in

- Class I, Division 2, Group A, B, C, D Tx
- Class I, Zone 2, Group IIC Tx

Note the following information:

Note

This product must be installed according to the NEC (National Electric Code) stipulations.

When used in environments according to class I, division 2 (see above), the device must be mounted in an enclosure that corresponds to at least IP54 according to EN 60529.

ATEX and IECEx

Devices of Cat3G for use in Zone 2.

FCC and Canada

USA	
Federal Communications Commission 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 B digital apparatus complies with Canadian ICES-003 (B).
Avis Canadien	Cet appareil numérique de la classe B est conforme à la norme NMB-003 (B) du Canada.

AUSTRALIA / NEW ZEALAND

This product meets the requirements of the standard EN 61000-6-3:2007 Generic standards - Emission standard for residential, commercial and light-industrial environments.

This product meets the requirements of the standard EN 61000-6-3:2007 Generic standards - Emission standard for residential, commercial and light-industrial environments.

Identification for Eurasion Customs Union

- EAC (Eurasian Conformity)
- Customs union of Russia, Belarus and Kazakhstan
- Declaration of conformity according to Technical Regulations of the Customs Union (TR CU)

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.

Marine approvals

Acceptance procedures for shipping and offshore applications in preparation:

- ABS American Bureau of Shipping (USA)
- BV Bureau Vertias (France)
- DNV Det Norske Veritas (Norway)
- GL Germanische Lloyd
- LR Lloyds Register of Shipping
- Class NK Nippon Kaiji Kyokai (Japan)

7.2 Directives and declarations

7.2.1 Electromagnetic compatibility, Industrial and Residential Areas

Electromagnetic compatibility

This product meets the requirements of EC Directive 2004/108/EC "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 61000-6-4:2007 +A1:2011	EN 61000-6-2:2005
Residential and commercial areas and small businesses	EN 61000-6-3:2007 +A1:2011	EN 61000-6-1:2007

7.2.2 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

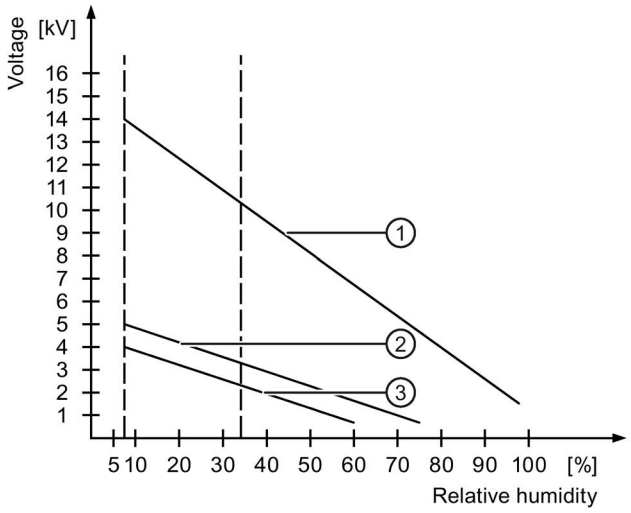
Electrostatic sensitive devices can be labeled with an appropriate symbol.

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.

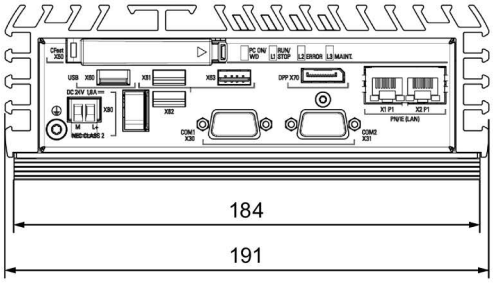
Protective measures against discharge of static electricity

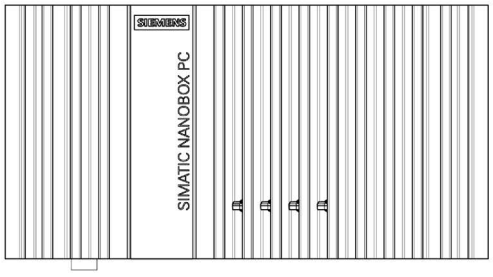
- Disconnect the power supply before you install or remove modules which are sensitive to ESD.
- Pay attention to good grounding:
  - When handling electrostatical sensitive devices, make sure that persons, the workstation and devices, tools and packaging used are properly grounded. This way you avoid 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.

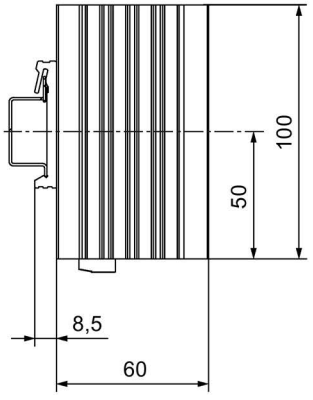
7.3 Dimension drawings

7.3.1 Dimension drawing basic device

Mounting on a standard rail

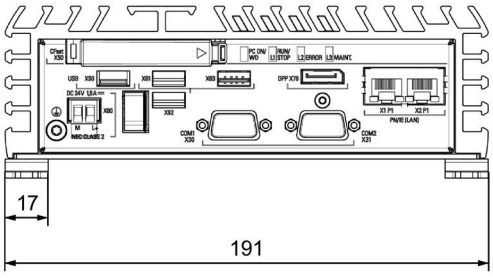


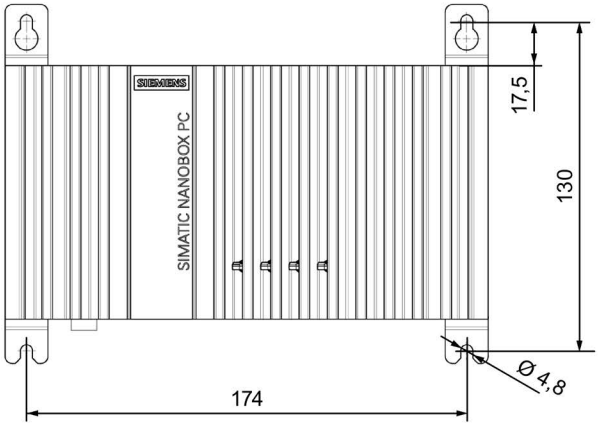


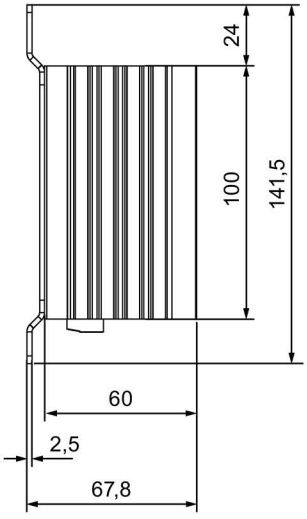


all dimensions in mm

Wall mounting

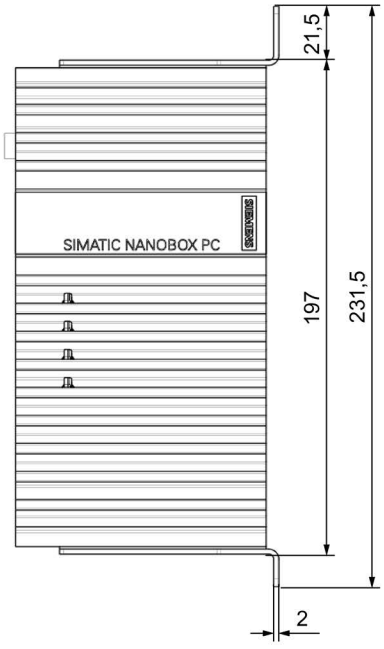


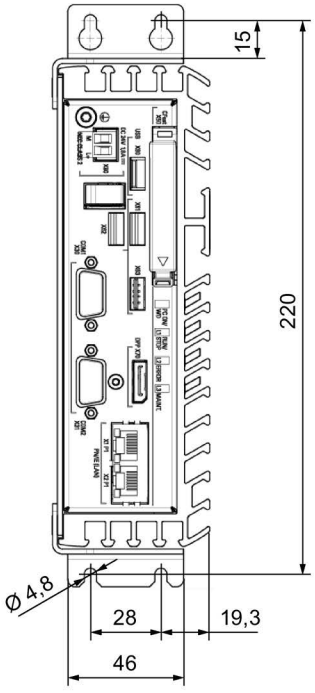


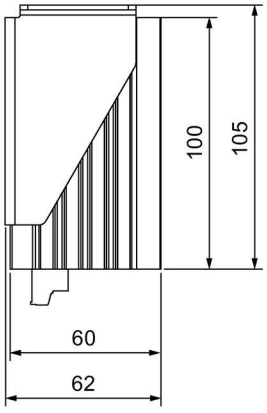


all dimensions in mm

Upright mounting



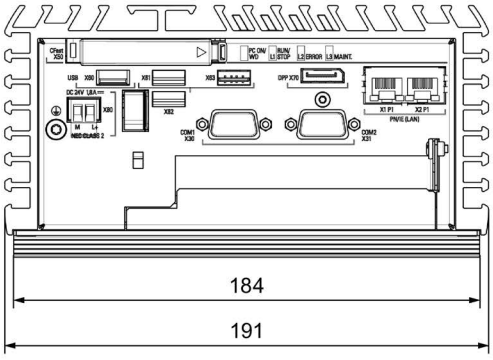


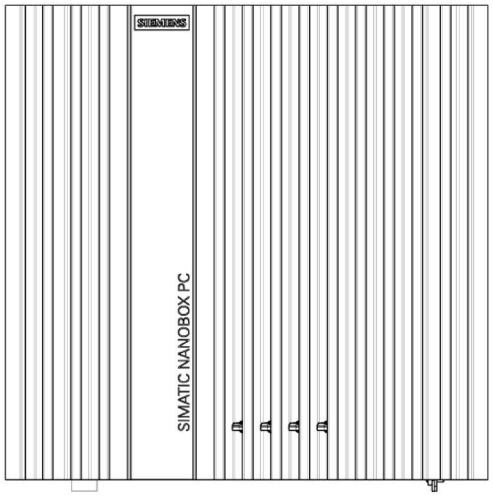


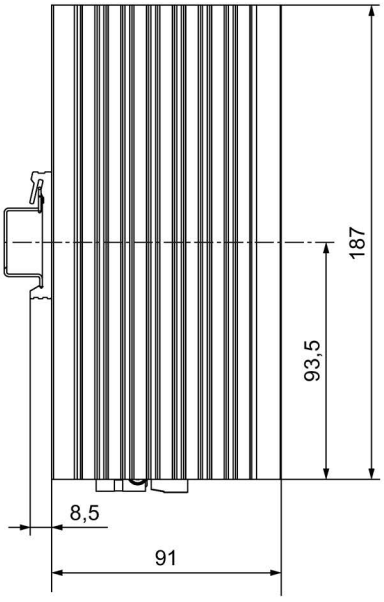
all dimensions in mm

7.3.2 Dimension drawing PCIe device version

Mounting on a standard rail

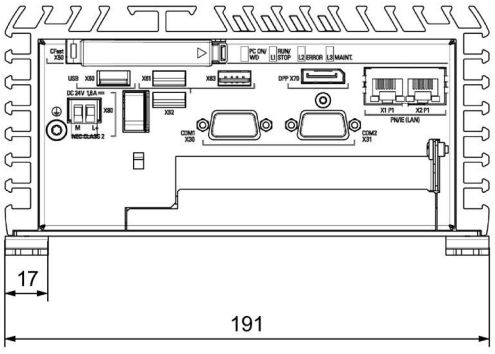


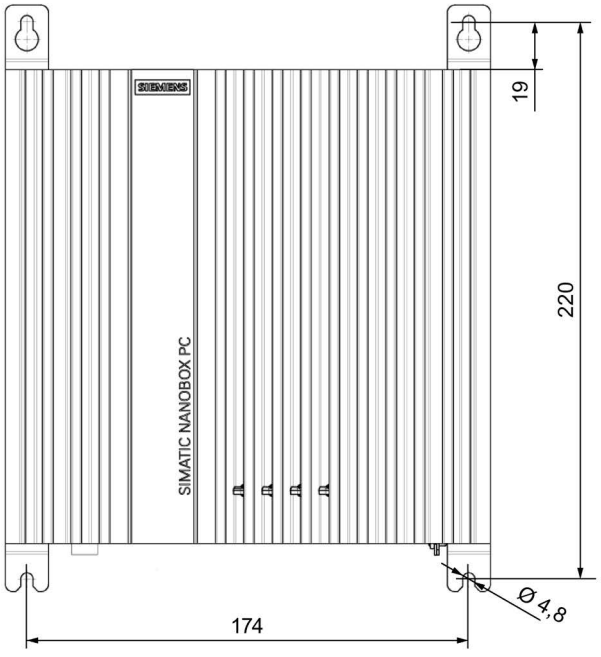


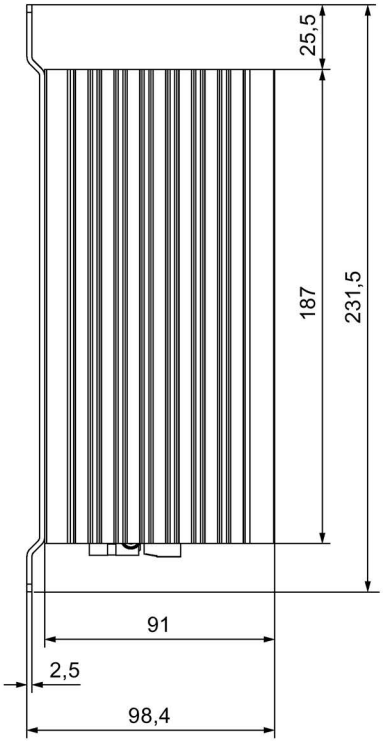


all dimensions in mm

Wall mounting

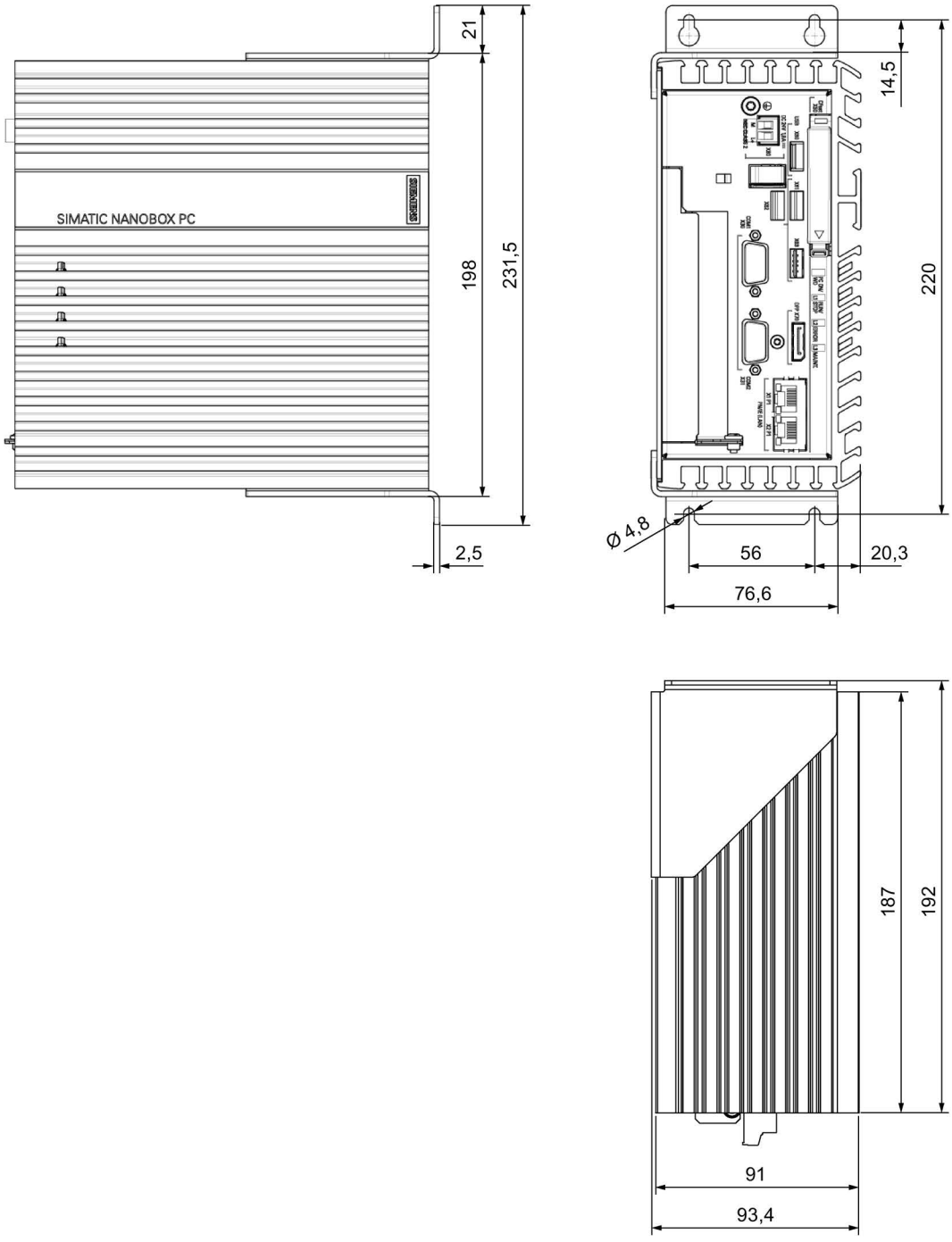






all dimensions in mm

Upright mounting



all dimensions in mm

7.4 Technical data

7.4.1 General technical specifications

General technical specifications

Order number	See order documents
Weight with hard disk drive, without mounting brackets	• Basic: Approx. 1.4 kg • PCIe: Approx. 2.4 kg
Power supply [1]	24 VDC (19.2 to 28.8 V)
Brief voltage interruption in accordance with Namur	Up to 20 ms buffer time at full load Max. 10 events per hour; recovery time at least 1 s
Current consumption	max. 1.8 A at 24 V
Noise emission	< 40 dB(A) according to DIN 45635-1
Degree of protection	IP 40 in accordance with IEC 60529
Protection class	Protection class I in accordance with IEC 61140
Quality assurance	In accordance with ISO 9001

[1] The device should only be connected to a 24 VDC power supply which meets the requirements of safe extra low voltage (SELV) according to IEC/EN/DIN EN/UL 60950-1. The power supply must fulfill the requirement NEC Class 2 or LPS according to IEC/EN/DINEN/UL 60950-1.

Electromagnetic compatibility

Immunity with regard to conducted interference on the supply lines	± 2 kV in accordance with IEC 61000-4-4; Burst ± 1 kV in accordance with IEC 61000-4-5; symmetrical surge ± 2 kV in accordance with IEC 61000-4-5; asymmetrical surge
Noise immunity on signal lines	± 1 kV to IEC 61000-4-4; Burst; Length < 3 m ± 2 kV in accordance with IEC 61000-4-4; Burst; length > 3 m ± 2 kV in accordance with IEC 61000-4-5; Surge; length > 30 m
Immunity to discharges of static electricity	± 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 … 2 GHz, 80 % AM according to IEC 61000-4-3 3 V/m, 2 … 2.7 GHz, 80 % AM according to IEC 61000-4-3 10 V, 10 KHz … 80 MHz, 80 % AM according to IEC 61000-4-6
Magnetic field	100 A/m, RMS value 50/60 Hz in accordance with IEC 61000-4-8

Main circuit board

Processor	• Intel Celeron N2807: Dual Core, 1.58 GHz, burst frequency 2.16 GHz, 1 MB 2nd level cache, 4.3W TDP • Intel Celeron N2930: Quad Core, 1.83 GHz, burst frequency 2.16 GHz, 2 MB 2nd level cache, 7.5W TDP
RAM	DDR3L memory up to 8 GB, 1× SODIMM modules / non-ECC
Buffer memory	512 KB MRAM 128 KB of this can be backed up at full load in the buffer time of the power supply.
Expansion slots	1 x PCIe x1 for PCIe x1 cards up to a length of 175 mm The PCIe slot supports the "PCI Express 2.0" specification. You can find additional information in the section "Power requirements of the components".

Drive, memory medium

Hard disk drive, optional	≥ 320 GB, 2.5" HDD
Solid-state drive, optional	≥ 80 GB, 2.5" SATA SSD ≥ 160 GB, 2.5" SATA SSD
CFast memory card, optional	• 4 GB or • 8 GB or • 16 GB
Floppy and CD-ROM drive	External, can be connected via USB port [1]
USB stick	External, can be connected via USB port

[1] Only to device USB port, not via USB hub

Graphics

Graphics controller	Integrated Graphic Controller
Graphics memory	Up to 512 MB, shared memory
Resolution, graphics memory	• DisplayPort resolution: 640 × 480 pixels to 2560 × 1600 pixels • up to 512 MB, graphics memory is taken from the main memory, dynamic UMA

Ports

COM	• RS 232 [1], max. 115 Kbps, D-sub connector, 9-pin • RS 485 [1] [2]/RS 422 [1] (optional), max. 115 Kbps, D-sub connector, 9-pin
USB	3 × USB 2.0, high speed/high current, maximum of 2 can be operated in high-current mode at the same time, max. 6 W 1 × USB 3.0, high current You can find additional information in the section "Power requirements of the components".
LAN interface X1 P1, RJ45 [3]	Intel LAN Controller Springville i210 10, 100, 1000 Mbps, teaming [4]
LAN interface X2 P1, RJ45 [3]	Intel LAN Controller Springville i210 10, 100, 1000 Mbps, teaming [4]
Keyboard, mouse	Connection via USB port

[1] In BIOS Setup, you can configure support for RS 232 or RS 422 / RS 485 for each COM port. Available parameters:
- Autodirection
- Onboard termination
- Half-duplex or Full-duplex

[2] Termination can be set in BIOS.

[3] For unique labeling, the LAN interfaces are numbered on the enclosure. The numbering by the operating system can differ.

[4] Teaming can be set and initiated in the configuration interface. In teaming operation, jumbo frames, e.g. for the camera application, are not supported.

See also

Permitted mounting positions (Page 24)

7.4.2 Ambient conditions

Climatic ambient conditions

The temperature values have been checked in accordance with IEC 60068-2-1, IEC 60068-2-2 and IEC 60068-2-14. For permitted mounting positions, see section "Preparing installation".

Note

Installation with temperatures > 50 °C only in RAL

If you want to operate the device at an ambient temperature of > +50 °C, you need to install it in a Restricted Access Location (RAL), for example in a locked control cabinet.

All device versions with HDD USB load max. 6 W	+5 … +40 °C, horizontal and vertical installation
Operation, USB load max. 6 W: • Basic device • PCIe device version, load max. 5 W	0 … +50 °C applies to device with: • CFast card, SSD • horizontal and vertical installation
Operation, USB load max. 6 W: • Basic device • PCIe device version, load max. 3 W	0 … +60 °C applies to device with: • CFast memory card • horizontal installation only
Storage/transport	-20 … +70 °C
Gradient	• Operation: Max. 10 °C/h • Storage: 20 °C/h, no condensation
Relative humidity • Operation • Storage/transport	Tested in accordance with IEC 60068-2-78, IEC 60068-2-30 5 … 85 % at 30 °C, no condensation 5 … 95 % at 25/55 °C, no condensation
Barometric pressure • Operation • Storage/transport	 1080 to 795 hPa, corresponds to an elevation of -1000 to 2000 m 1080 to 660 hPa, corresponds to an elevation of -1000 to 3500 m

Mechanical ambient conditions

Vibration resistance	Tested in accordance with IEC 60068-2-6
Operation	With CFast card or SSD: • 5 to 9 Hz: 3.5 mm • 9 to 500 Hz: 9.8 m/s^2 With CFast card or SSD and standard rail: • 10 ... 58 Hz: 0.075 mm • 58 ... 200 Hz: 4.9 m/s^2 With hard disk and wall or upright mounting: • 10 to 58 Hz: 0.0375 mm • 58 to 200 Hz: 4.9 m/s² With hard disk and standard rail mounting: No excitation allowed
Storage/transport	• 5 to 9 Hz: 3.5 mm • 9 to 500 Hz: 9.8 m/s^2
Impact resistance	Tested in accordance with IEC 60068-2-27
Operation	• Without hard drive: 150 m/s^2, 11 ms • With hard disk: 50 m/s^2, 30 ms
Storage/transport	250 m/s^2, 6 ms

7.4.3 Shipbuilding

Ambient conditions for use of the devices in shipbuilding

The device is suitable for shipping and offshore applications. The installation and attachment conditions are the same as those for industrial applications.

See the shipbuilding approvals of the individual shipbuilding companies in the section "Certificates and approvals" to learn about the required ambient conditions.

NOTICE
Ambient conditions and installation guidelines The permissible ambient conditions and installation guidelines can be found in the certificates of the individual shipbuilding companies.

7.4.4 Power demand of the components

Maximum power consumption of the auxiliary components

Auxiliary components		Maximum permitted power consumption			Max. total power
		+5 V	+3.3 V	+12 V	
USB device 3.0	High current	900 mA	--	--	6 W (for all USB devices)
USB Device 2.0	High current	500 mA	--	--	
PCIe module	Per slot	--	1.5 A [1]	0.3 A [2]	5 W in total

[1] May amount to maximum 3.0 A for up to 100 ms at start-stop torque of device
[2] May amount to maximum 1.2 A for up to 100 ms at start-stop torque of device

Note
Device can overheat!

The power supply cannot make unlimited power available. The auxiliary components consume energy and produce heat.

The device may overheat. The auxiliary components will be damaged.

7.4.5 Direct current supply (DC)

Technical specifications

Input voltage	24 VDC (19.2 to 28.8 VDC)
Power consumption	Max. 32 W
Buffering upon power failure	Hold-up time > 15 ms (after > 5 ms, DC_FAIL becomes active)
Maximum continuous output power [1]	27 W
Protection class	Safety class I (A protective conductor must be connected to the device)

[1] The power specifications apply to the power supply component not to the device.

Note

Inrush current

The requirements in accordance with NAMUR NE21, Section 4.5 are complied with. The maximum inrush current does not exceed 4 A. Typical value with an input voltage of 24 V is 2 A for 25 ms. A 24 V power source with a limit current lower than 2.0 A is not permitted. A voltage drop under 18.0 V during booting of the device is not permitted.

Typical power consumption

	Power consumption (at 24 V rated voltage)
Basic device with Intel Celeron N2807	13 W
Basic device with Intel Celeron N2930	15 W
USB expansion	See section "Power requirements of the components"
Expansion PCIe	

7.5 Hardware descriptions

7.5.1 Technical features of the motherboard

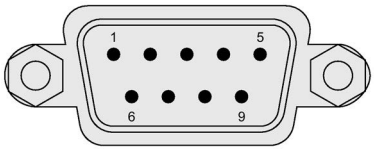
Component / port	Description	Parameters
Chipset	integrated in CPU	
BIOS	Core, Video, ACPI	
CPU	Intel Celeron N2930 / N2807	
Memory	DDR3L SODIMM	2 GB, 4 GB and 8 GB
Graphics	Integrated graphics	up to 512 MB graphics memory taken dynamically from RAM

7.5.2 External interfaces

7.5.2.1 Overview of interfaces

Interface	Position	Description	
COM	External	9-pin D-sub, either: • RS 232 • RS 485/RS 422	configurable in BIOS Setup
CFast	External	CFast card	
USB	External	4 USB channels	3 × USB 2.0 1 × USB 3.0
Ethernet	External	2 x RJ45	10/100/1000 Mbps
DisplayPort	External	DP	

7.5.2.2 Serial interface



RS 232
RS 422
RS 485

Pin assignment RS232

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	M	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	M	Signal ground
6	nc	
7	nc	
8	nc	
9	nc	

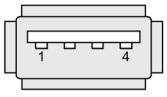
Pin assignment RS485

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	

7.5.2.3 CFast

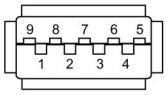
Pin	Short name	Meaning
S1	SGND	Signal GND (ground for signal integrity)
S2	A+	SATA differential
S3	A-	SATA differential
S4	SGND	Signal GND (ground for signal integrity)
S5	B-	SATA differential
S6	B+	SATA differential
S7	SGND	Signal GND (ground for signal integrity)
PC1	CDI	Card Detect In
PC2	GND	Device 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	IO2	Reserved Input/Output (not connected)
PC12	IO3	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

7.5.2.4 USB 2.0 port



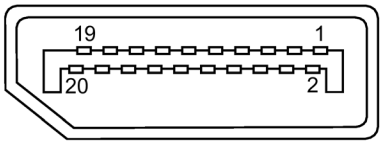
Pin	Short description	Meaning
1	USB_P5V_fused (O)	+5 V, fused
2	USB_D0M (I/O)	Data–
3	USB_D0P (I/O)	Data+
4	USB_GND	GND

7.5.2.5 USB 3.0 port



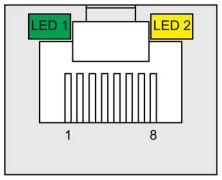
Pin	Short name	Meaning	Input / output
1	VBUS	+ 5 V (fused)	Output
2	D-	Data channel USB2	Input / output
3	D+	Data channel USB2	Input / output
4	GND	Ground	–
5	RX-	Data channel USB3	Input
6	RX+	Data channel USB3	Input
7	GND	Ground	–
8	TX-	Data channel USB3	Output
9	TX+	Data channel USB3	Output

7.5.2.6 DisplayPort



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

7.5.2.7 Ethernet port



Pin	Short description	Meaning
1	BI_DA+	Bidirectional data A+, input/output
2	BI_DA–	Bidirectional data A–, input/output
3	BI_DB+	Bidirectional data B+, input/output
4	BI_DC+	Bidirectional data C+, input/output
5	BI_DC–	Bidirectional data C–, input/output
6	BI_DB–	Bidirectional data B–, input/output
7	BI_DD+	Bidirectional data D+, input/output
8	BI_DD–	Bidirectional data D–, input/output

LED	Short description	Meaning
1	LED 1	Off: 10 Mbps Lit green: 100 Mbps Lit orange: 1000 Mbps
2	LED 2	Lit orange: Connection established Flashes: Activity

7.5.3 Internal interfaces

7.5.3.1 Overview of internal interfaces

Interface	Position	Connector	Description
PCIe x1	Internal		PCIe x1 interface

7.5.3.2 PCIe interface

Assignment of the PCIe x1 interface				
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
6	SMDAT	SMBus (System Management Bus) data	JTAG3	TDI (Test Data Input)
7	GND	Ground	JTAG4	TDO (Test Data Output)
8	+3.3 V	3.3 V power	JTAG5	TMS (Test Mode Select)
9	JTAG1	TRST# (Test Reset) resets the JTAG interface	+3.3 V	3.3 V power
10	3.3 Vaux	3.3 V auxiliary power	+3.3 V	3.3 V power
11	WAKE#	Signal for link reactivation	PERST#	Fundamental reset
12	RSVD	Reserved	GND	Ground
13	GND	Ground	REFCLK+	Reference clock (differential pair)
14	PETp0	Transmitter differential pair, Lane 0	REFCLK-	Reference clock (differential 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	PERn0	Receiver differential pair, Lane 0
18	GND	Ground	GND	Ground

7.5.4 System resources

7.5.4.1 Currently allocated system resources

All system resources (hardware addresses, memory utilization, interrupt assignment, DMA channels) are assigned dynamically by the Windows operating system, depending on the hardware equipment, drivers and connected external devices. You can view the current allocation of system resources or possible conflicts in the Control Panel.

Procedure

To view the system resources, proceed as follows:

1. In the Windows Start menu, select "Start -> Run".
2. Enter "msinfo32" in the command prompt and confirm your entry with "OK".

7.5.4.2 System resources used by the BIOS/DOS

The following tables and pictures describe the system resources for the factory state of the device.

Interrupt channels

The interrupts are assigned to devices by BIOS. An exclusive non-shared interrupt for Windows Embedded Standard 7 and Windows 7 is available for the primary 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.

The following table shows the interrupt sharing in APIC mode:

Interrupt		Interrupt type
IRQ0	System Timer / HPET	ISA exclusive
IRQ1	PS/2 keyboard controller emulation	ISA exclusive
IRQ2	Interrupt controller 2	ISA exclusive
IRQ3	COM2	
IRQ4	COM1	
IRQ5	Free	
IRQ6	Reserved	
IRQ7	Free	
IRQ8	Realtime clock	ISA exclusive
IRQ9	ACPI-SCI (system control interrupt)	
IRQ10		ISA exclusive
IRQ11	Free	
IRQ12	PS/2 mouse controller emulation	ISA exclusive
IRQ13	Free	ISA exclusive
IRQ14		ISA exclusive
IRQ15		ISA exclusive
IRQ16	PCIe Bridge 1/2/3/4 Graphics controller SMBus port PCI Standard RAM controller	PCI shared
IRQ17	LAN1 Gigabit Network Controller	PCI exclusive
IRQ18	LAN2 Gigabit Network Controller	PCI exclusive
IRQ19	PCI Express Port 4	PCI exclusive
IRQ20	USB EHCI controller USB XHCI controller	PCI shared
IRQ21	Trusted Execution Engine	PCI exclusive
IRQ22	SATA AHCI controller	PCI exclusive
IRQ23	HD audio controller	PCI exclusive

7.5.5 Input/output address areas

7.5.5.1 Overview of the internal module registers

The following addresses are used for the internal registers:

Addresses	Input/output unit
I/O 062h	Watchdog enable register / 066h select register (Page 95)
I/O 066h	Watchdog trigger register (read only, address 066h) (Page 96)
I/O 404Eh - 404Fh	Output register LED 1/2/3 and SF LED / RUN/STOP LED (Page 96)
I/O 404Dh	Battery status register (read-only) (Page 96)

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

Meaning of the bits

Watchdog enable register / 066h select register (r/w address 062h)								
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
								Watchdog error / Display and reset
0								WD inactive
1								WD triggered Reset LED after watchdog alarm (Bit 7 = write 1)

7.5.5.3 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).

7.5.5.4 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.

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				x				LED L1 / Run/Stop lit green
	1				1			LED L2 / SF dark (default)
	0				x			LED L2 / SF lit red
	1				0			LED L2 / SF lit yellow
		1				1		LED L3 / Maint dark (default)
		0				x		LED L3 / Maint lit red
		1				0		LED L3 / Maint lit yellow
		xxxx xx				xxxx xx		Reserved (read/write)

7.5.5.5 Battery status register (read-only, address 50Ch)

The status of the CMOS battery is monitored; the status (two-tier) can be read from the battery status register.

Meaning of the bits

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

7.5.5.6 MRAM address register

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

Meaning of the bits

MRAM address register		
PCI register address: MRAM base address register	PCI register content: MRAM memory address (default)	Length of the memory area
9060 0000h	Address is assigned dynamically (depending on device configuration)	80000 h

7.6 BIOS description

7.6.1 Overview

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.

You change the setup parameters of the device in the BIOS Setup. Examples: System time, hard disks or boot order.

Changing the device configuration

Your device configuration is preset for operating with the included software. You should only change the default setup parameters if you have made technical changes to your device, or if a fault occurs when the device is switched on.

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 92189185 (http://support.automation.siemens.com/WW/view/en/92189185).

7.6.2 Opening the BIOS selection menu

Procedure

1. Reset the device (warm or cold restart).

   Depending on the device version, the default settings can differ from the figures shown.

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

   ```
   Press ESC for boot options
   ```

2. Press <ESC> to open the BIOS selection menu:

The following keys are available in the BIOS selection menu:

Buttons	Function
Continue	Exit selection menu, continue start sequence
Boot Manager	Specify the boot media from which to boot: • Hard disk drive • CD-ROM drive • USB drive
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 [1]	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 or the operating system.
SCU	Start BIOS Setup via Setup Configuration Utility
BIOS Update	Update BIOS from USB memory stick

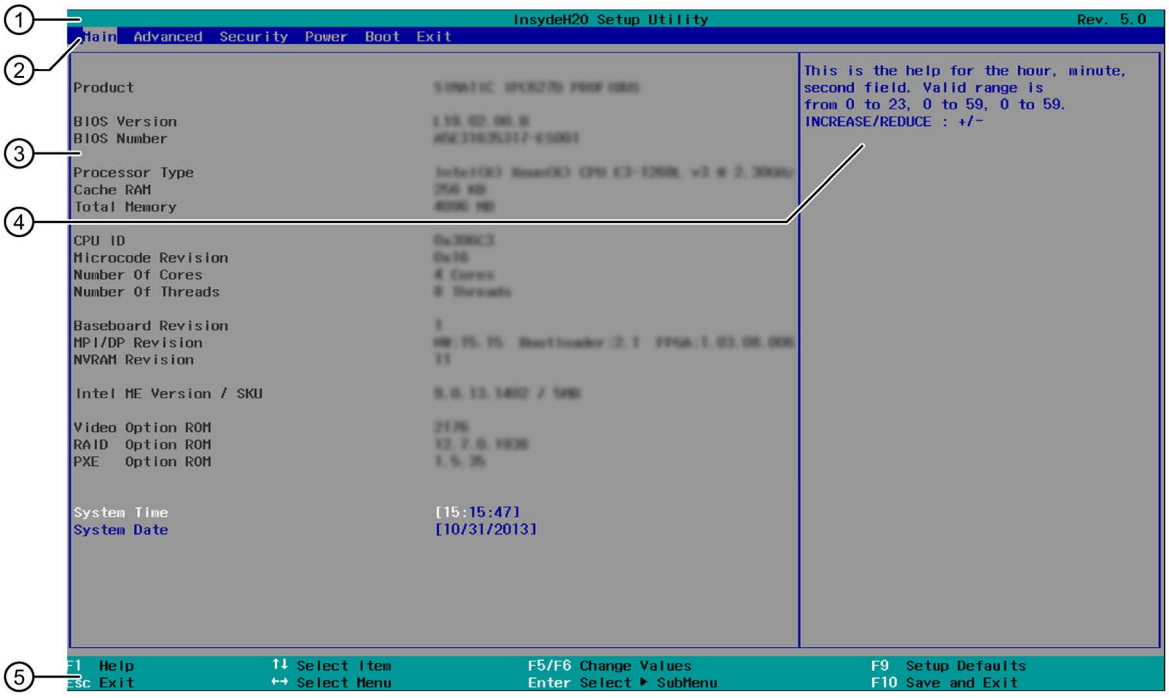
[1] Available as of Windows 8 or later

7.6.3 Configuration

The individual setup parameters are distributed between different menus and submenus. The menus always have the same layout.

Menu layout

The following figure is an example for the main menu. Device-specific information is shown as blurred.



① Header
② Menu bar
③ Settings, submenus and device-specific information
④ Help area
⑤ Key assignment

A menu is divided into four areas:

- In the menu bar ② on top, you select from the different menus "Main", "Advanced", etc.
- The center left area ③ includes information on your device and you can edit settings that are partly available in submenus.
- The center right area ④ displays short help texts for the currently selected setup parameters.
- The key assignment ⑤ at the bottom shows the function keys and control keys available in BIOS Setup.

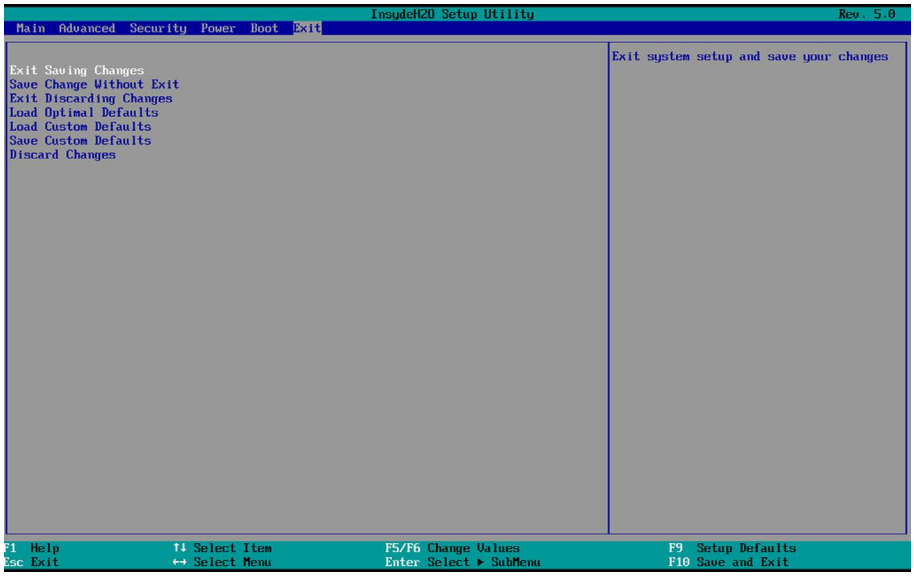
  You can toggle between the menus with the "←" left and "→" right cursor keys.

The following table shows the standard menus. Not all menus are included in each supplied device configuration.

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	Specify CPU settings and switch-on functions.
Boot	Determine boot options, e.g., boot order
Exit	Save and exit (see Exit menu)

7.6.4 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	All 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".
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.

7.6.5 Default BIOS Setup entries

Documenting your device configuration

If you have changed any default settings in Setup, you can enter them in the following table. You can then refer to these entries for any future hardware modifications.

Note

Print out the table below and keep the pages in a safe place once you made your entries.

BIOS Setup default settings

System parameters	Defaults	Custom entries
Main		
System Time	hh:mm:sss	
System Date	MM/DD/YYYY	

Boot configuration		
Numlock	On	
POST errors	All without keyboard	

Peripheral Configuration		
Internal COM 1	Enabled	
Base I/O address	3F8	
Interrupt	IRQ4	
Transceiver Mode	RS232	
Internal COM2 [1]	Enabled	
Base I/O address [1]	2F8	
Interrupt [1]	IRQ3	
Transceiver Mode [1]	RS232	
On-board Ethernet 1	Enabled	
Ethernet 1 Address	00:1B:1B:41:42:7B (example)	
On-board Ethernet 2	Enabled	
Ethernet 2 Address	00:1B:1B:0A:85:10 (example)	

[1)] Only for devices with COM2

USB Configuration		
USB BIOS Support	Enabled	
xHCI Mode	Auto	
USB Per-Port Control	Enabled	
USB Port#	Enabled	

Video Configuration		
HPET – HPET support	Enabled	
PCI MMIO Size	1GB	
Primary Display	Auto	
IGD Boot Type	Auto	

SATA Configuration		
SATA Controller	Enabled	
Chipset SATA Mode	AHCI	

Security		
Supervisor Password	Not installed	
User password	Not installed	
Power on password	Disabled	
User Access Level	Full	

Power		
Wake on LAN	Enabled	
USB Port1 Wake Capability	Disabled	
USB Port2 Wake Capability	Disabled	
USB Port3/4 Wake Capability	Disabled	

Advanced CPU Control		
Use XD Capability	Enable	
VTX-2	Enabled	
AESNI Feature	Enabled	
P-states (ACTUAL)	Enabled	
Turbo Mode	Auto	
C-states	Enabled	
Max C-States	C7	

Boot		
Boot Type	Dual Boot Type	
Quick Boot	Enabled	
Quiet Boot	Enabled	
Network Stack	Disabled	
PXE Boot to LAN	Disabled	
Add Boot Options	Auto	
USB Boot	Enabled	
EFI Device First	Disabled	

Legacy / Boot Device Priority		
Normal Boot Menu	Standard	

7.6.6 BIOS update

Check regularly if updates are available for download to your device.

Additional information can be found on the Internet at the following address:SIMATIC IPC after-sales information system (http://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. Print out the table in the next section "General BIOS Setup settings". 2. Enter your specific BIOS Setup setting in this table before you run a BIOS update. 3. Start BIOS Setup after the BIOS update. 4. Load the BIOS Setup default settings with <F9> "Setup Defaults". Or use the BIOS Setup command "Load Optimal Defaults" in the "Exit" menu. 5. Make your own Setup settings based on the table you have printed out. 6. 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. Copy the update to a USB memory stick.
2. 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
   ```
3. Press <ESC> to open the BIOS selection menu.
4. Click the "BIOS Update" button.
5. 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.

7.6.7 Alarm, error and system messages

During startup (the boot process), the BIOS first performs a **P**ower **O**n **S**elf **T**est (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
Keyboard controller error	Controller error. Contact your technical support team.
SMART failure detected on HDD	Hard disk reports pending failure through S.M.A.R.T.
CMOS battery failed	CMOS battery is not connected.
CMOS battery weak	CMOS battery is weak
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 error	No keyboard inserted.
PLD configuration failed	Programming of the PLC on the motherboard has failed.

7.7 Functional scope in Windows

7.7.1 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-EEF)	Available	Available
Image Mastering API V2	Available	Available
IME Base Components	Available	Available
Internet Explorer	Available, IE 8	Available, IE 8
Internet Information Server (IIS)	Available,V7.0	Available, V7.0
Language (Standard)	English [1]	English [1]
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, V1.5	Available, V1.5
Speech	Available	Not available

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

[1] 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 65)".

Technical support

A

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 (http://www.siemens.de/automation/csi_en_WW)
- Support request form (http://www.siemens.com/automation/support-request)
- After Sales Information System SIMATIC IPC/PG (http://www.siemens.com/asis)
- SIMATIC Documentation Collection (http://www.siemens.com/simatic-tech-doku-portal)
- Your local representative (http://www.automation.siemens.com/mcms/aspa-db/en/Pages/default.aspx)
- Training center (http://sitrain.automation.siemens.com/sitrainworld/?AppLang=en)
- 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

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 (http://www.siemens.com/asis)

A.2 Troubleshooting

This chapter 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 specified ambient conditions	• Check the ambient conditions. • After transport in cold weather, wait approximately 12 hours before switching on the device.
The monitor remains dark	The monitor is switched off	Switch on the monitor.
	The monitor is in "power save" mode	Press any key on the keyboard.
	The brightness button has been set to dark	Increase brightness using the brightness button. For detailed information, refer to the monitor operating instructions.
	The power cord or the monitor cable 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. • Check whether the monitor cable has been properly connected to the system unit and to the monitor.
		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 extension 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		1. Open the BIOS Setup. 2. Set the time or date.
Although the BIOS setting is OK, the time and data are still wrong	The backup battery is dead.	Replace the backup battery.

Problem	Possible cause	Possible remedy
USB device not responding	The USB ports are not correctly supported.	• Turn on USB Legacy Support for mouse and keyboard. • For other devices, you need the USB device drivers for the required operating system.
DVD/CD drive door, if present, does not open	The device is switched off or the open/close button is disabled by a software application.	Emergency removal of the data medium: 1. Switch off the device. 2. Insert a pointed object, for example, an opened paper clip, into the emergency extraction opening of the drive. Apply pressure carefully until the door opens. 3. Pull the door out further with your hand.
"chkdsk" is not functioning	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 device crashes during startup	• Redundant I/O addresses • Redundant hardware interrupts and/or DMA channels • Fluctuation of signal frequencies or levels • Different pin assignment	Check your computer configuration: • If the computer configuration corresponds to the delivery state, contact your technical support team. • If the configuration has changed, restore the factory state. To do this, remove the third-party modules and restart the device. If the error no longer occurs, the third-party module being used was the cause of the fault. Replace the thrid-party module with a Siemens module or contact the module supplier.
		If the device still crashes, contact your technical support team.
	• Insufficient output of an external power supply, e.g. UPS	• Use a higher capacity power supply
The device does not start up or switches off immediately	• A counter voltage is fed into the device by connected or installed third-party components	Clarify the following with the supplier of the component: • The component can be operated without an external power supply. • The component can be reconfigured so that it only uses the external power supply or that of the device.

List of abbreviations

B

AC	Alternating current	Alternating current
ACPI	Advanced Configuration and Power Interface	
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	
AT	Advanced Technology	
ATA	Advanced Technology Attachment	
AWG	American Wire Gauge	Unit of measurement for wire diameter. Used in North America and Canada.
BIOS	Basic Input Output System	
CAN	Controller Area Network	
CD-ROM	Compact Disc – Read Only Memory	
CE	Communauté Européenne	
CF	CompactFlash	
CMOS	Complementary Metal Oxide Semiconductors	
COA	Certificate of authentication	
COM	Communications Port	Term for the serial interface
CPU	Central Processing Unit	CPU
CSA	Canadian Standards Association	Canadian organization for tests and certifications according to national or binational standards
CTS	Clear To Send	Clear to send
DC	Direct Current	DC current
DCD	Data Carrier Detect	Data carrier signal detection
DMA	Direct Memory Access	
DOS	Disk Operating System	
DP	DisplayPort	
DQS	Deutsche Gesellschaft zur Zertifizierung von Qualitätsmanagement mBH	
DSR	Data Set Ready	Ready for operation
DTR	Data Terminal Ready	Data terminal is ready
DVD	Digital Versatile Disk	
ESD	Components sensitive to electrostatic charge	
EN	European standard	
EEPROM	Electrically Erasable Programmable Read-Only Memory	

ESD	Electrostatic Sensitive Device	Electrostatic Sensitive Devices
	Electrostatic discharge	Electrostatic discharge
EWF	Enhanced Write Filter	
FBWF	File Based Write Filter	
GND	Ground	Chassis ground
HD	Hard disk	Hard disk
HDD	Hard Disk Drive	HDD
HMI	Human Machine Interface	User interface
HORM	Hibernate Once - Resume Many	
HT	Hyper Threading	
I/O	Input/Output	Data input/output for computers
IDE	Integrated Device Electronics	
IEC	International Electronical Commission	
IGD	Integrated Graphics Device	
IP	International Protection	Degree of protection
	in English-speaking countries: Ingress Protection	
IRQ	Interrupt Request	
ISA	Industry Standard Architecture	Bus for expansion modules
LAN	Local Area Network	Computer network that is limited to a local area.
LEDs	Light Emitting Diode	Light emitting diode
LPS	Limited Power Source	
MAC	Media access control	Media access control
MLFB	Machine-readable product designation	
MRAM	Magnetoresistive random-access memory	Backup memory
MS	Microsoft	
MTBF	Mean Time Between Failures	
MUI	Multilanguage User Interface	Language localization in Windows
NTFS	New Technology File System	
NVRAM	Non Volatile Random Access Memory	Non-volatile data memory. Data memory is retained without external power supply.
ODD	Optical Disk Drive	
PC	Personal computer	
PCI	Peripheral Component Interconnect	High-speed expansion bus
PCIe	Peripheral Component Interconnect express	High-speed serial, differential full-duplex PtP interface with high data rate.
PG	Programming device	
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	

RAM	Random Access Memory	
RI	Ring Input	Incoming call
ROM	Read-Only Memory	
RS 485	Reconciliation Sublayer 485	Bidirectional bus system
RTC	Real Time Clock	Real-time clock
RTS	Request to send	Request to send
RxD	Receive Data	Data transfer signal
SATA	Serial Advanced Technology Attachment	
SCU	Setup Configuration Utility	
SELV	Safety Extra Low Voltage	Safety extra low voltage
SMART	Self Monitoring Analysis and Reporting Technology	Hard disk error diagnostics program
SRAM	Static Random Access Memory	Static RAM
SSD	Solid State Drive	
TFT	Thin-Film-Transistor	
TxD	Transmit Data	Data transfer signal
UEFI	Unified Extensible Firmware Interface	
UL	Underwriters Laboratories Inc.	US organization for testing and certification according to national or binational standards.
USB	Universal Serial Bus	
VDE	Verband der Elektrotechnik, Elektronik und Informationstechnik e.V (Association for Electrical, Electronic and Information Technologies)	
VT	Virtualization Technology	Intel technology which provides a virtual, closed environment.
VT-d	Virtualization Technology for Directed I/O	Enables the direct assignment of a device (e.g. network adapter) to a virtual device.
WD	Watchdog	Program monitoring with error detection and alarming.

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.

Cache

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

CE marking

Communauté **E**uropéene: The CE symbol confirms the conformity of the product with all applicable EC directives such as the EMC Directive.

CFast

The faster SATA protocol is used with the CFast standard for memory cards based on CompactFlash. The connectors on these cards 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.

CompactFlash card

CompactFlash is a digital storage medium in card format and without moving parts. The CF card contains the non-volatile memory and the controller. The interface of the CF card corresponds with the IDE interface. CF cards can be operated without additional electronics on PCMCIA or IDE hard disk controllers using a plug and socket adapter. There are two design forms: CF-I (42.6 x 36.4 x 3.3 mm) and CF-II (42.8 x 36.4 x 5 mm).

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 below 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 memory card, 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 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 **A**rea **N**etwork: 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 AG issues a license key for each software that is protected by a license.

License key USB flash drive

The license key USB flash drive 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 S7 system consist of a central controller, one or more CPUs, and various other modules (e.g. I/O modules).

PXE server

A **P**reboot E**x**ecution **E**nvironment 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 **A**ccess **L**ocation: Installation of the device in a production facility with restricted access, for example, a locked control cabinet.

Recovery CD

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 DVD

The Restore DVD is used to restore the system partition or the entire hard disk to delivery state if the system has crashed. The DVD 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

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.

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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