SIEMENS

SIMATIC

Industrial PC
SIMATIC IPC227D

Operating Instructions

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Legal information

Warning notice system

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

⚠ DANGER

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

⚠ 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.

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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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Preface

Preface

These operating instructions contain all the information you need for commissioning and operating the SIMATIC IPC227D.

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 IPC227D.

For a detailed description of the PCIe DIO4 card of the IPC227D IO device, please refer to the "SIMATIC PCIe DIO4" Compact Operating Instructions on the "Documentation and Drivers" CD/DVD.

Scope of this documentation

The documentation for the SIMATIC IPC227D consists of:

- Product information, e.g. "Important notes on your device"
- Quick Install Guide SIMATIC IPC227D
- SIMATIC IPC227D 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 IPC227D product in this documentation.

In these operating instructions, the term "Windows Embedded Standard" is used consistently as a substitute for the terms "Windows Embedded Standard 2009" and "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
07/2011	First edition, valid for the first delivery stage
11/2011	Second edition, valid for all delivery stages
02/2012	Third edition, corrections
03/2013	Fourth edition, corrections
06/2013	Fifth edition, corrections
12/2016	Fifth edition with corrections

Guideline to the operating instructions

Content structure	Contents
Preface	Purpose, layout and description of the important topics
Table of contents	Detailed organization of the documentation, including the index of pages and chapters
Overview	• Description of the product: Characteristics and field of application • Product package • Structure of the product/system: Operator control and connection elements • Accessories
Safety instructions	All generally valid safety aspects: • Legal requirements • Product/system view during installation • General information on commissioning • Notes on operation
Installing and connecting the device	• Application planning: Aspects of storage, transport, environmental and EMC conditions to be considered in the preparatory stage. • Installation: Product installation options and installation instructions • Connection: Options of connecting the product and wiring instructions • Integration: Options of integrating the product into existing or planned automation systems and networks.
Commissioning the device	Commissioning the product/system
Extended device functions	Monitoring and display functions
Expanding and assigning parameters to the device	Procedure for installing device expansions (modules, drives)

Content structure	Contents
Device maintenance and repair	• Replacing hardware components • Restoring and setting up the operating system and BIOS (Recovery) • Installing drivers and software • Service and spare parts • Recycling and disposal
Technical specifications	• General specifications in compliance with relevant standards and current/voltage values • Guidelines and certifications, ESD guidelines, notes on retrofitting • Dimension drawings: Dimensions of the device and of modules • Detailed descriptions of boards and system resources
Technical support	• Service and support • Troubleshooting: Problems, causes, remedy • BIOS Setup
Abbreviations	Abbreviations of the technical terms used

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Overview

1

1.1 Product description



The SIMATIC IPC227D provides high-level industrial performance.

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

Basic data

Power supply	24 VDC (19.2 to 28.8 V), max. 1.8 A
Conditions of use	Operation without fan

Monitoring and safety functions

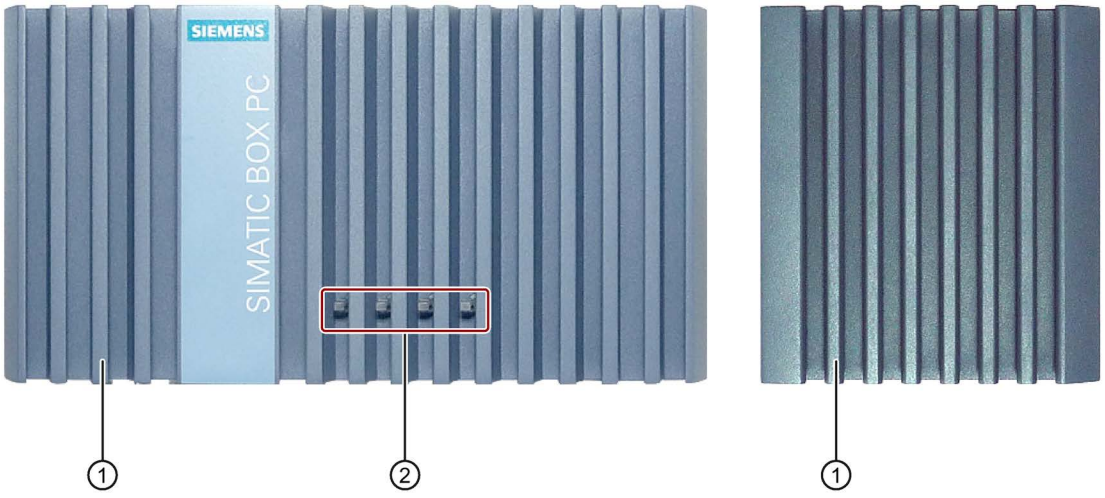
Watchdog	• Monitoring function for program execution • Restart can be parameterized in the event of a fault
LED display	4 LEDs for displaying system status, 2 of these can be programmed by the user
Voltage drop	Up to 15 ms buffer time at full load
Buffer memory	512 KB MRAM

1.2 Structure of the devices

1.2.1 Views of the IPC227D Basic, COM and IO

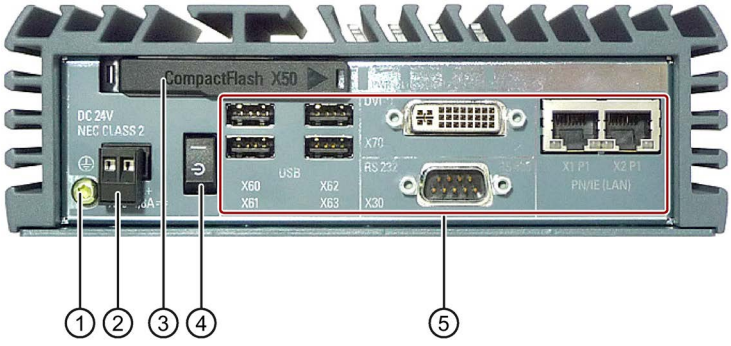
Front view and side view

The front view left is the standard mounting position. The side view right shows the IPC227D COM and IO. The IPC227D Basic is narrower.



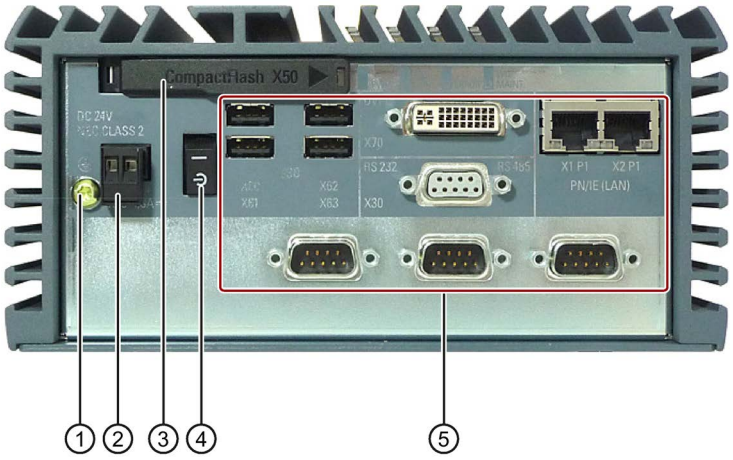
① Cooling fins
② LED display

Bottom view of the IPC227D Basic



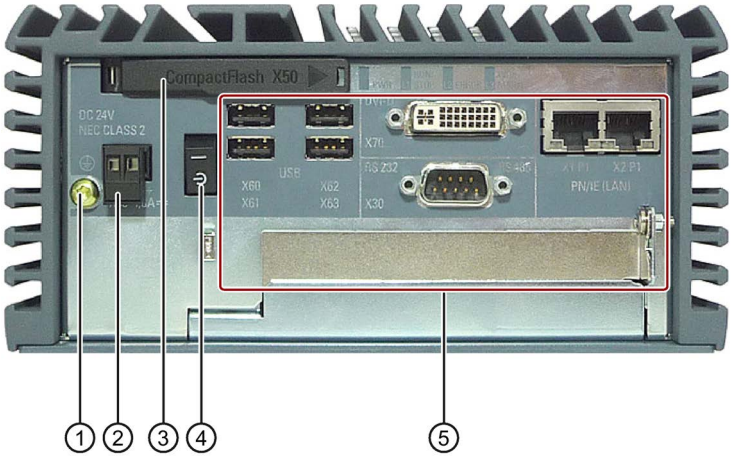
① Protective conductor connection
② Terminal for the power supply, in delivered condition this is already inserted
③ Memory card slot
④ On/off switch
⑤ Ports

Bottom view of the IPC227D COM



① Protective conductor connection
② Terminal for the power supply, in delivered condition this is already inserted
③ Memory card slot
④ On/off switch
⑤ Ports

Bottom view of the IPC227D IO

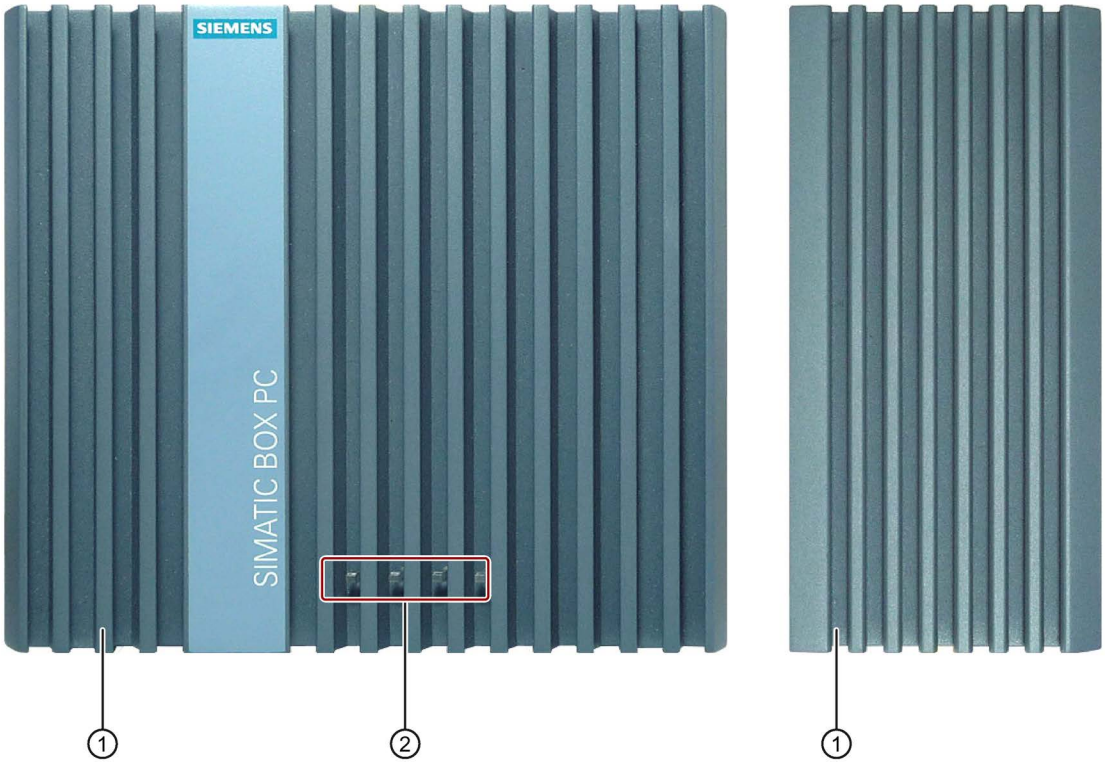


① Protective conductor connection
② Terminal for the power supply, in delivered condition this is already inserted
③ Memory card slot
④ On/off switch
⑤ Ports

1.2.2 Views of the IPC227D PCIe

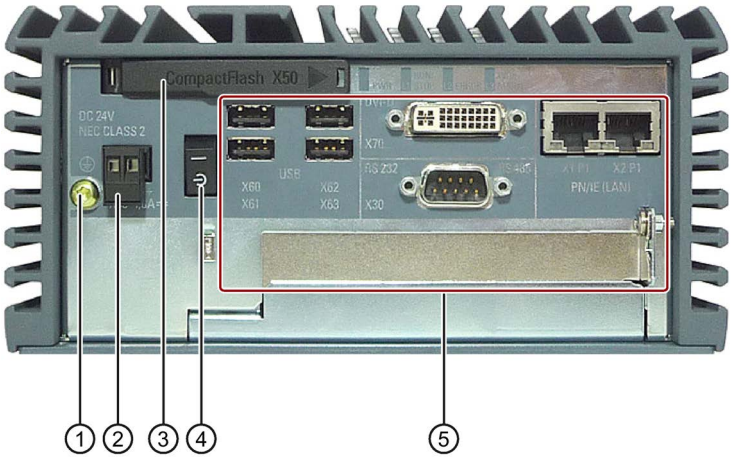
Front view and side view

The front view left is the standard mounting position. The side view right shows the IPC227D COM and IO. The side view of the IPC227D Basic is narrower.



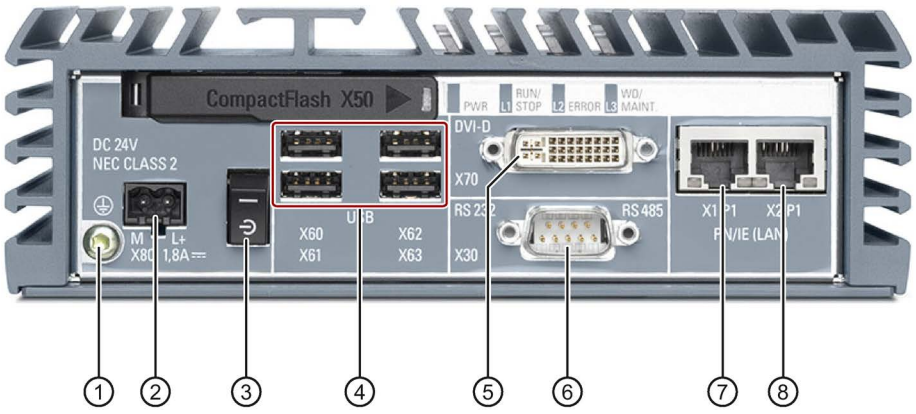
① Cooling fins
② LED display

Bottom view



① Protective conductor connection
② Terminal for the power supply, in delivered condition this is already inserted
③ Memory card slot
④ On/off switch
⑤ Ports

1.2.3 IPC227D Basic interfaces and operator controls



① Protective conductor connection

② Connection for a 24 VDC power supply

③ On/off switch

④ USB 2.0 port, high speed
Two USB ports can be used simultaneously in high-current operation.

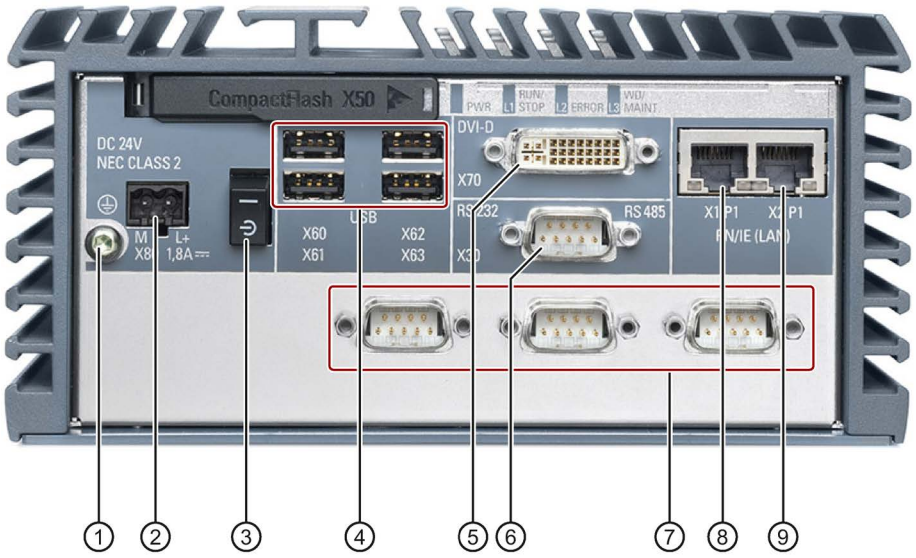
⑤ DVI-D connection

⑥ Serial interface, 9-pin
- As D-sub connector: RS-232 or CAN
- As D-sub socket: RS-485

⑦ RJ45 Ethernet connection 1 for 10/100/1000 Mbps

⑧ RJ45 Ethernet connection 2 for 10/100/1000 Mbps

1.2.4 IPC227D COM interfaces and operator controls



① Protective conductor connection

② Connection for a 24 VDC power supply

③ On/off switch

④ USB 2.0 port, high speed

Two USB ports can be used simultaneously in high-current operation.

⑤ DVI-D connection

⑥ Serial interface, 9-pin

- As D-sub connector: RS-232 or CAN
- As D-sub socket: RS-485

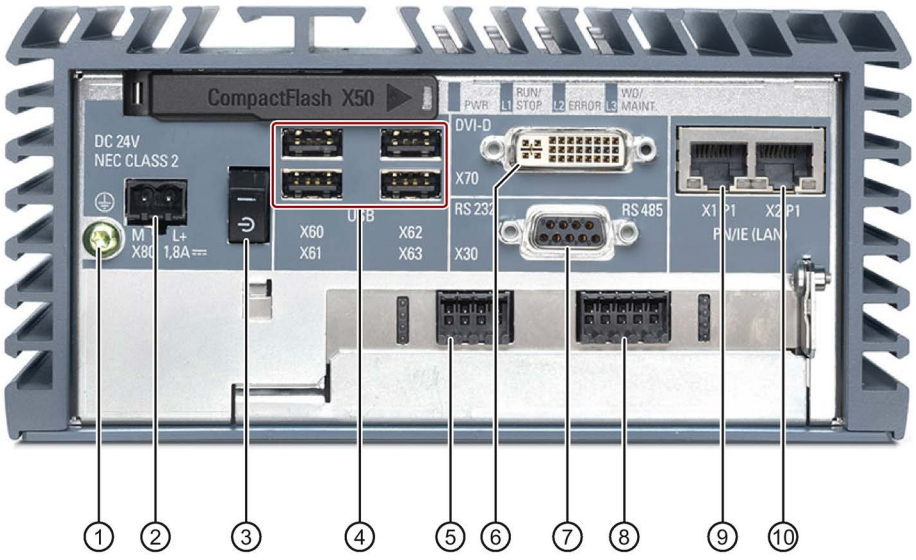
⑦ Serial interface, 9-pin

Only transmit and receive data lines are connected to this interface - no control signal lines.

⑧ RJ45 Ethernet connection 1 for 10/100/1000 Mbps

⑨ RJ45 Ethernet connection 2 for 10/100/1000 Mbps

1.2.5 IPC227D IO interfaces and operator controls



① Protective conductor connection

② Connection for a 24 VDC power supply

③ On/off switch

④ USB 2.0 port, high speed
Two USB ports can be used simultaneously in high-current operation.

⑤ 4 digital inputs

⑥ DVI-D connection

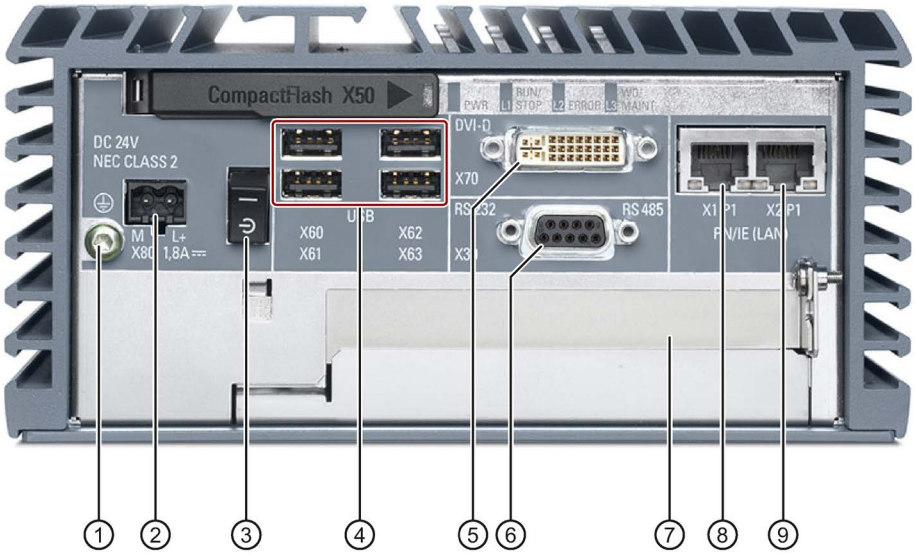
⑦ Serial interface, 9-pin
- As D-sub connector: RS-232 or CAN
- As D-sub socket: RS-485

⑧ 4 digital outputs

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

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

1.2.6 IPC227D PCIe interfaces and operator controls



① Protective conductor connection

② Connection for a 24 VDC power supply

③ On/off switch

④ USB 2.0 port, high speed
Two USB ports can be used simultaneously in high-current operation.

⑤ DVI-D connection

⑥ Serial interface, 9-pin
- As D-sub connector: RS-232 or CAN
- As D-sub socket: RS-485

⑦ Slot for a PCIe x1 card

⑧ RJ45 Ethernet connection 1 for 10/100/1000 Mbps

⑨ RJ45 Ethernet connection 2 for 10/100/1000 Mbps

1.2.7 Status displays



LED	Meaning	LED	Description
PWR	Power supply	Off Orange Green	No power supply Standby mode Supply voltage is on
RUN/STOP	User LED L1 RUN STOP	Off Orange Green	Controlled by user program [1]
ERROR	User LED L2	Off Orange Red	Controlled by user program [1]
WD/MAINT	User LED L3 Watchdog status	Orange Off Green Red	If watchdog is deactivated, LED 3 can be controlled by the program (WinAC) [1] Watchdog disabled Watchdog enabled, monitoring time not expired Watchdog enabled, monitoring time expired

[1] You can find additional information about addressing the LEDs or the MRAM under a Windows operating system in the section "Output register of user LED L1, L2 (Page 131)" in the operating instructions.

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 (http://mall.automation.siemens.com)

CompactFlash cards

Note

Replace CompactFlash cards only with replacement cards of the same product versions

Only SIMATIC PC CompactFlash cards with product version number 03 (ES03 or higher) can be used for this device.

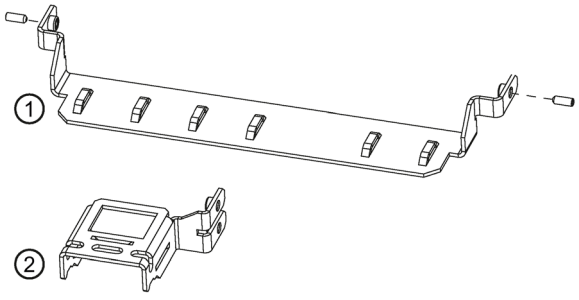
The following CompactFlash cards can be ordered:

- CompactFlash card, 2 GB
- CompactFlash card, 4 GB
- CompactFlash card, 8 GB
- CompactFlash card, 16 GB

Strain relief

The cable strain relief set SIMATIC IPC227D 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

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 96).

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 for specific permitted mounting positions (see corresponding section) is a prerequisite for approval or operation in accordance with UL508.

⚠ 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.

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.: A5E00331143).
- 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.

High frequency radiation

NOTICE

Unintentional operating situations

High frequency radiation, e g. from a cellular phone, interferes with device functions and can result in malfunctioning of the device.

Persons are injured and the plant is damaged.

Avoid high-frequency radiation:

- Remove radiation sources from the environment of the device.
- Switch off radiating devices.
- Reduce the radio output of radiating devices.
- Observe the information on electromagnetic compatibility (Page 96).

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 97).

Industrial Security

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

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

Customer is responsible to prevent unauthorized access to its plants, systems, machines and networks. Systems, machines and components should only be connected to the enterprise network or the internet if and to the extent necessary and with appropriate security measures (e.g. use of firewalls and network segmentation) in place.

Additionally, Siemens' guidance on appropriate security measures should be taken into account. For more information about industrial security, please visit (http://www.siemens.com/industrialsecurity).

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

To stay informed about product updates, subscribe to the Siemens Industrial Security RSS Feed under (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/en/software-update-service/Pages/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.

NOTICE

Rack-mount instructions

A) Elevated Operating Ambient - If installed in a closed or multi-unit rack, the operating ambient temperature of the rack environment may be greater than the room ambient. Therefore consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (Tma) specified by the manufacturer.

B) Reduced Air Flow - Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.

C) Mechanical Loading - Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.

D) Circuit Overloading - Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

E) Reliable Earthing - Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e. g. use of power strips).

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.

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 can result in short-circuits in electrical circuits and damage 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.

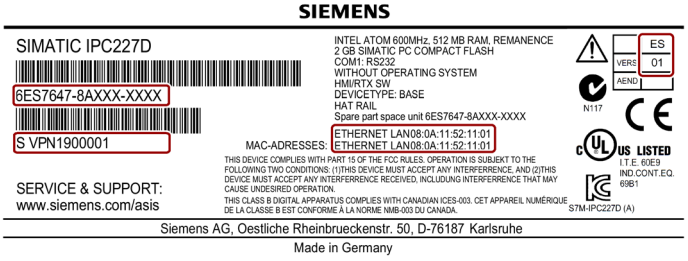
Enter the identification data in the following table:

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. In the standard mounting position, the rating plate is located on top of the device cover. 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 (F2 key) under "Main > Advanced > Peripheral Configuration".

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, such as SSD, CompactFlash card, from your device. Insert the storage media into the replacement device.

2. Transfer the Windows "Product Key" from the COA label. Example Windows XP Pro:



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 116)" section.

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

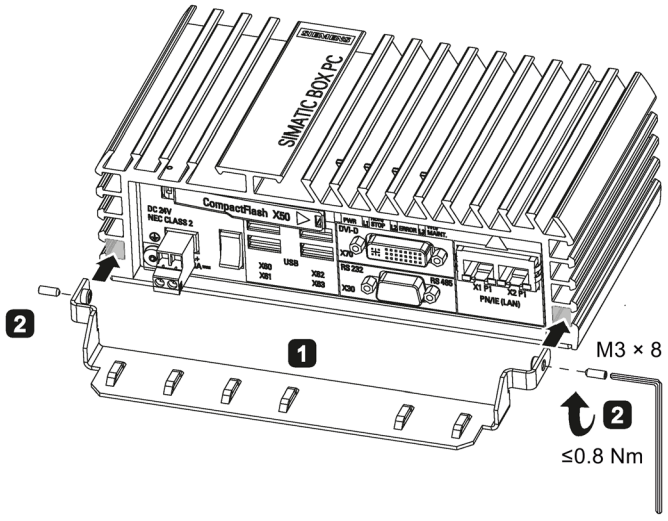
- Below the IPC227D: ≥ 100 mm
- Above the IPC227D: ≥ 50 mm

3.1.4 Installing the cable strain relief

This chapter applies to all device versions with the exception of IP227D IO.

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 cable strain relief between the lower two cooling fins.
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.

See also

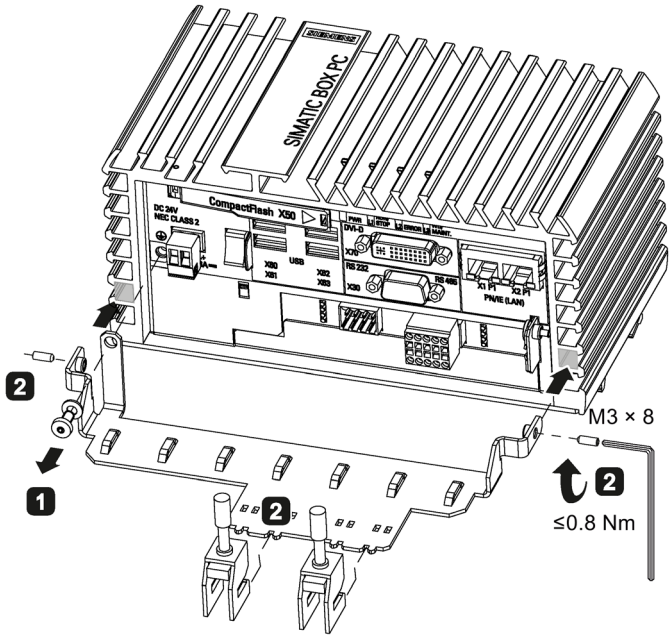
Accessories (Page 22)

3.1.5 Mount cable strain relief IPC227D IO

A plate for cable strain relief and shield terminals is required to protect the IPC227D IO device from electrostatic discharge and ensure proper functioning of the device. This plate and the shield terminal are included in the scope of delivery of the IPC227D IO.

Procedure

1. Loosen the screw for the protective conductor connection with a T20 screwdriver; it is located next to the power supply connection.

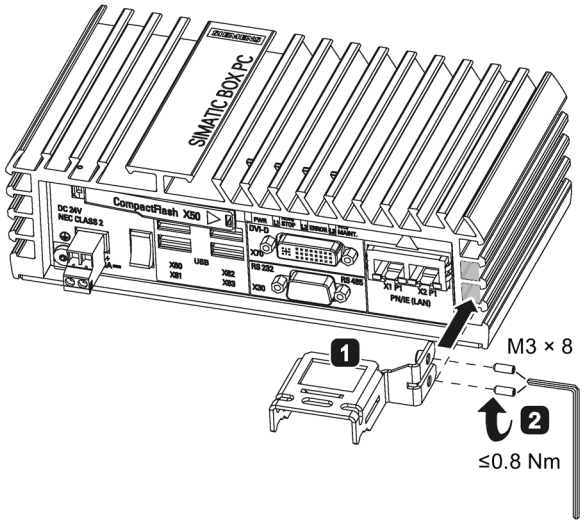


2. Install the cable strain relief plate with the supplied wrench and fasten the two shield terminals.
3. Bond the plate and protective conductor by using the screw for the protective conductor connection on the device.

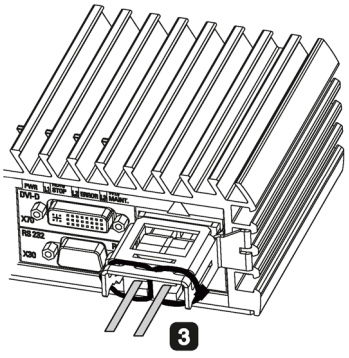
3.1.6 Installing Ethernet connector strain relief

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 Ethernet connector strain relief between the lower two cooling fins.
2. Fasten the Ethernet connector strain relief with 2 setscrews.



3. Secure the Ethernet connector with cable ties.

See also

Accessories (Page 22)

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



Side mounting



The mounting types are described in the following chapters using the IPC227D Basic as an example.

Position of the interfaces

In the case of standard rail or side mounting, 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, upright and side mounting does not have sufficient load carrying capability, the device may fall down and may become 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, upright and side 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	8 mm, 40 mm deep	• Anchor, ∅ 6 mm, 40 mm long • Screw, ∅ 4-5 mm, 40 mm long
Plasterboard, min. 13 mm thick	14 mm	Toggle plug, ∅ 12 mm, 50 mm long
Metal, min. 2 mm thick	5 mm	• 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.

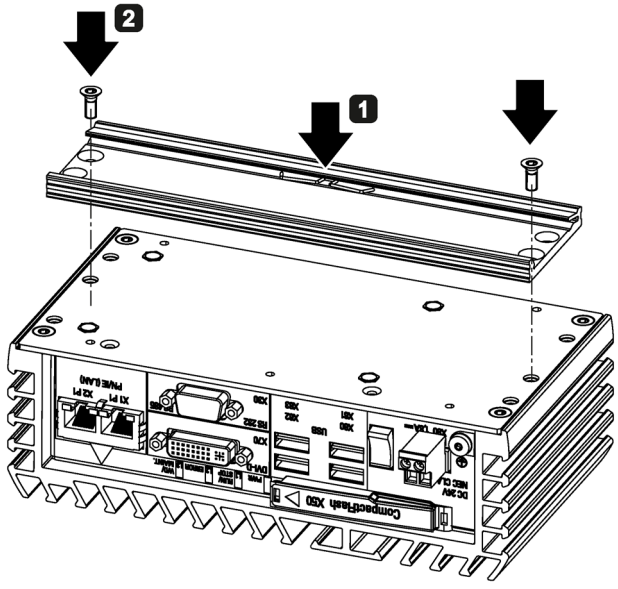
Requirement

- 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

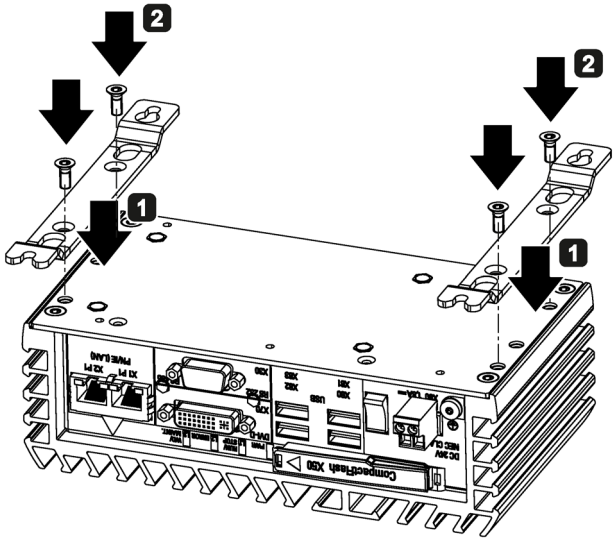
Wall mounting is suitable for horizontal mounting of the device.

Requirement

- Two mounting brackets

  The mounting brackets are available in two versions - for the device versions Basic, COM and IO and for the device version PCIe. 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

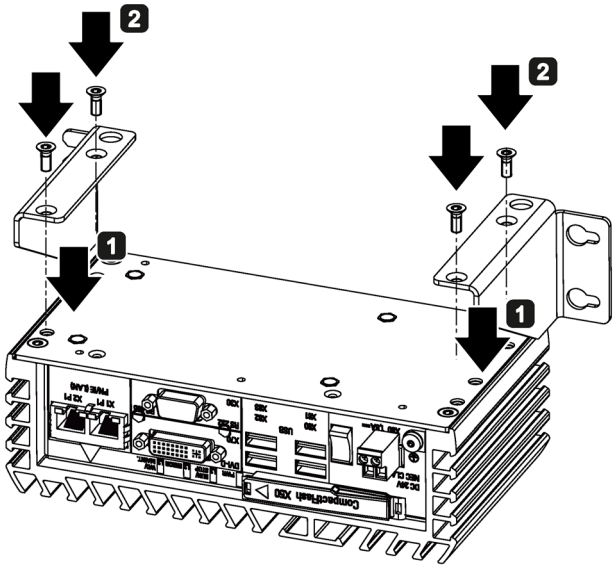
Upright mounting is suitable for vertical mounting of the device. The corresponding mounting bracket allows mounting that requires less space than standard rail mounting and wall mounting.

Requirement

- Two mounting brackets

  The mounting brackets are available in two versions - for the device version Basic and for the device versions COM, IO and PCIe. 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.

3.2.5 Side mounting

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

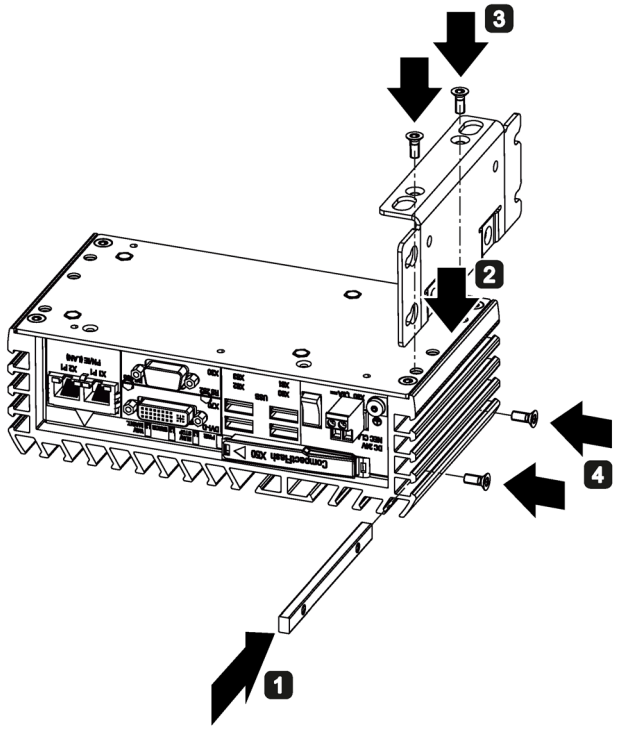
The mounting bracket can be fixed to both sides of the device.

Requirement

- A mounting bracket

  The mounting bracket is available in three versions - for the device version Basic, for the device versions COM and IO and for the device version PCIe. The mounting bracket, a sliding block and four screws are included in the order variant "Side mounting".
- A T20 screwdriver
- Four anchors and four screws

Procedure for mounting



1. Insert the sliding block between the two lower cooling fins.
2. Place the mounting bracket on the rear of the device.
3. Secure the mounting bracket with 2 screws.
4. Secure the sliding block with 2 screws.
5. Place the device with the mounting bracket onto the mounting surface.
6. Mark the fixing holes.
7. Drill the fixing holes.
8. Insert the anchors in the drilled holes.
9. 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.

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 isolating switch in the case of 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

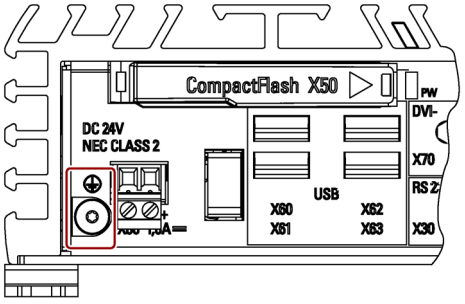
The protective conductor discharges dangerous currents, triggering a surge protection switch. The protective conductor also discharges any interference transmitted from external power supply cables, signal cables or cables to the I/O devices. The protective conductor is labeled with the following symbol:



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.

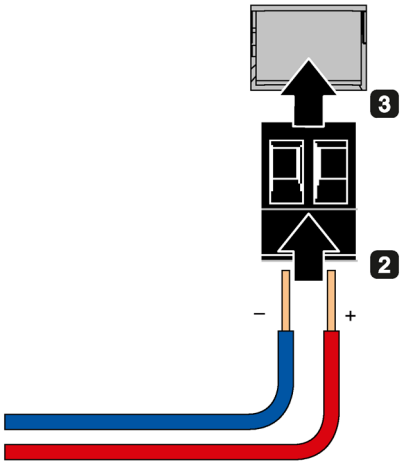
Note

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

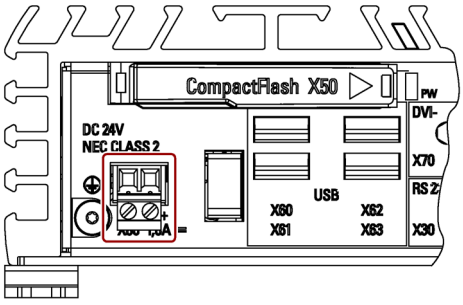
Requirement

- 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)

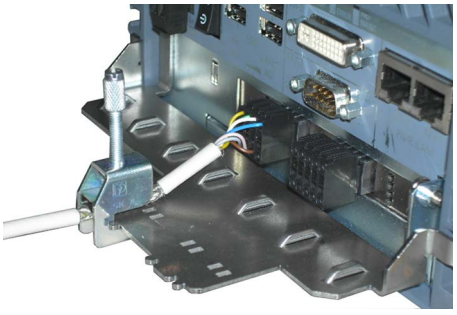
3.3.5 Connect IPC227D IO input and output lines

Requirement

The strain relief plate with shield terminals is mounted.

Procedure

1. Connect the connection cable with the connectors for the digital inputs and outputs. Use the shielded connection cables.
2. Bond the cable shield and the plate by means of the shield terminal, as shown in the following figure.



See also

Mount cable strain relief IPC227D IO (Page 33)

Commissioning the device

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 2009 / Windows Embedded Standard 7

Observe EWF and FBWF information
Two configurable write filters (Enhanced Write Filter and File Based Write Filter) are available with Windows Embedded Standard 2009 and Windows Embedded Standard 7. 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 Initial commissioning

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.

Device power on procedure

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

   The "PWR" LED lights up. The module carries out a self-test. During the self-test, the following message appears:

   ```
   Press <F2> to go to Setup Utility

   Press <F12> to go to Boot Manager
   ```

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

   If you want your system language to be international, select English. Information about changing the region and language settings is available in the section "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 on the "Certificate of Authentication", in the "Product Key" line.

Result

The interface of the operating system is displayed every time you turn on the device and after the startup routine. The screen resolution is set as follows:

- Windows XP: 800x600 pixels is set in Mini setup and after initial commissioning. Adapt the screen resolution to suit your monitor.

  Screen resolution is set to 1024x768 when you boot up without a monitor.
- Windows Embedded Standard 2009: The screen resolution is set to 1024x768.
- Windows 7 and Windows Embedded Standard 7: The values transmitted by the monitor are set.

Device power off procedure

Always use the function "Start > Shutdown" to switch off the device.

The green "POWER" LED goes out.

Set the On/Off switch to "OFF" position if the powered off device is not going to be used for a longer period of time.

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.

Advanced device functions

5

5.1 Monitoring functions

5.1.1 Overview of the monitoring functions

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

- Temperature monitoring (overtemperature, 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.

5.1.2 Temperature monitoring/display

Temperature monitoring

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

- Processor temperature
- Temperature close to the RAM ICs/chips
- 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

5.1.3 Watchdog (WD) with LED

Function

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

The watchdog is in idle state during power on of the device, or after a HW-RESET (cold restart). A WD reaction is not triggered while it is in idle state. However, an active watchdog interrupt remains after a restart and its active state is still indicated by the LED.

Watchdog reactions

The following reactions may be triggered if the watchdog is not retriggered within the set time:

Reaction	Option
Switch watchdog LED to red	None
Trigger a PC reset	Configurable
Output of DiagBase alarm messages	None

Note

For more information on the watchdog functions, contact Customer Support.

WD monitoring times

Set the monitoring times in SIMATIC Diagnostics Management as integer values in the range from 4 to 255 seconds.

Note

The watchdog will be retriggered if you change the watchdog time after the WD has been activated.

5.1.4 Battery monitoring

The installed backup battery has a limited service life, see section "Replace the backup battery (Page 75)". A two-tier battery monitoring checks the status of the backup battery. The SIMATIC DiagBase and SIMATIC DiagMonitor diagnostic software determines the status of the backup battery.

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

5.2 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 CompactFlash cards, for example).

EWF can be used to minimize write access to CompactFlash cards. This is important because the number of write cycles on CompactFlash cards is limited for technical reasons. We therefore recommend that you enable EWF if you work with CompactFlash 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 in combination with the `-Live` option (invalid entry, for example: `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 files in the EWF RAM overlay to the CompactFlash 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 2009 makes a registry entry noting that the changeover to daylight saving time has occurred. Since this file is also protected against modification by the EWF, the marker is lost during the boot sequence and the adjustment is made again.

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

Follow these steps:

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

5.3 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)

5.4 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 base address is initialized by the BIOS.

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

Expanding and assigning parameters to the device 6

6.1 Open the device

Note the information in Chapter "ESD guideline (Page 97)".

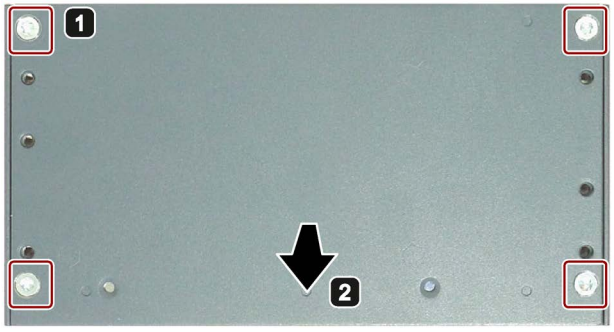
Requirement

- 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

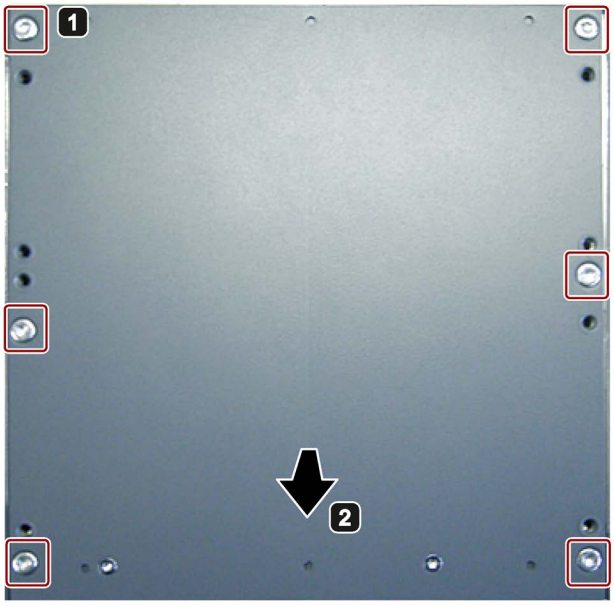
The rear panel of the device versions Basic, COM and IO can only be removed after a cable has been removed. Note the information in Chapter "Replacing drives for IPC227D Basic, COM and IO (Page 71)".



1 Remove the marked screws.

There are 4 screws on the IPC227D Basic, COM and IO devices.

There are 6 screws on the device IPC227D PCIe.



2 Carefully remove the rear panel.

Procedure - closing the device

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

6.2 Installing a PCIe module

A PCIe x1 module can only be installed in the IPC227D PCIe.

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.

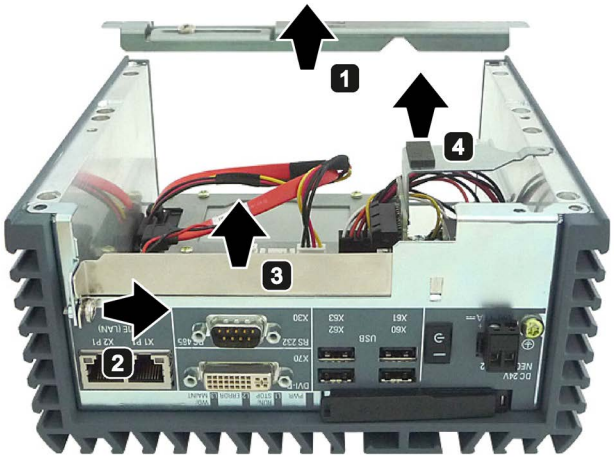
Make sure that the maximum permissible ambient temperature of the PCIe-x1 module is specified accordingly.

Requirement

- The device is opened.

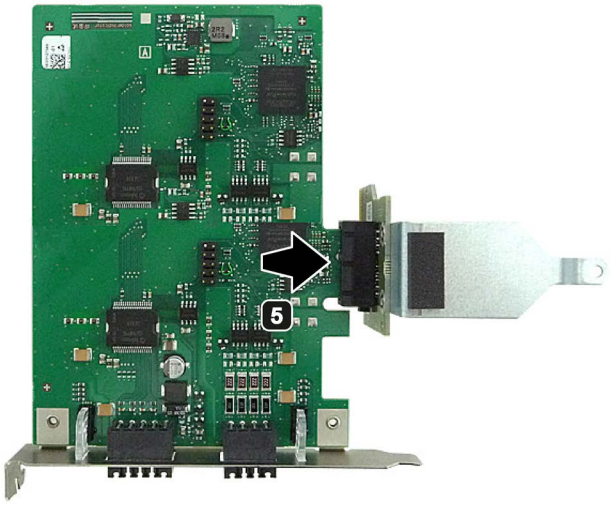
  See chapter "Open the device (Page 61)".
- A plug-in card
- A T10 screwdriver

Procedure

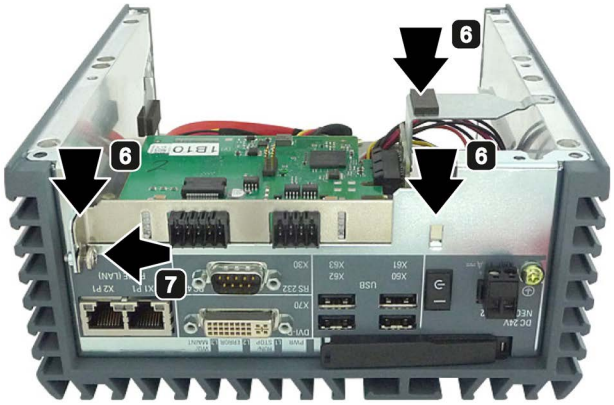


1. Take the plug-in card holder out of the housing.
2. Loosen the screw at the slot plate.

   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.

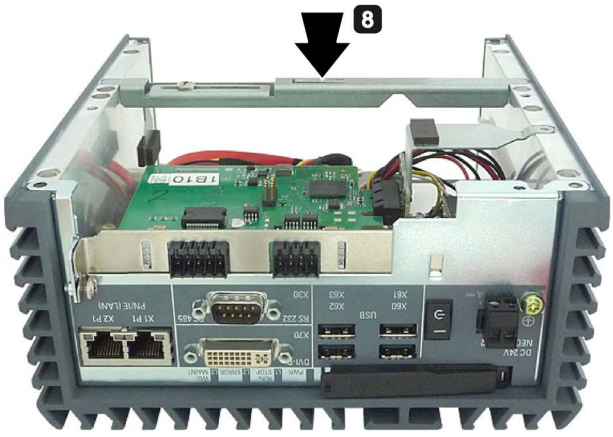


5. Place the plug-in card onto the the plug-in card adapter.

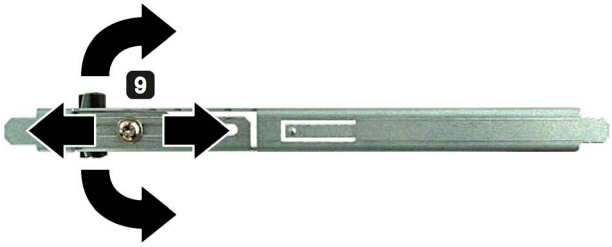


6. Insert the plug-in card.

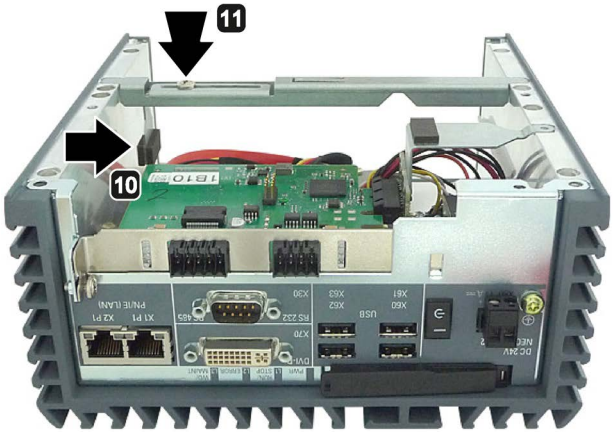
   Ensure that the connector of the plug-in card has been inserted correctly into the slot on the main board.
7. Tighten the screw.



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



9 Fasten the pressure piece at the plug-in card holder, if necessary.



10 Push the pressure piece against the plug-in card

11 Tighten the screw

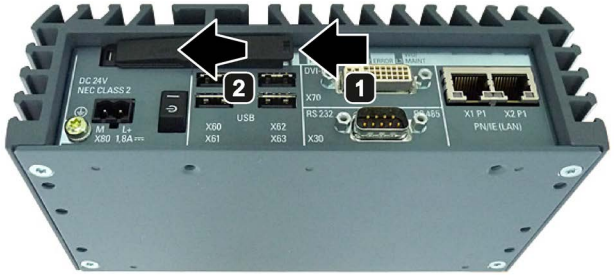
6.3 Installing and removing the CompactFlash memory card

The device features a slot for CF memory cards (types I / II).

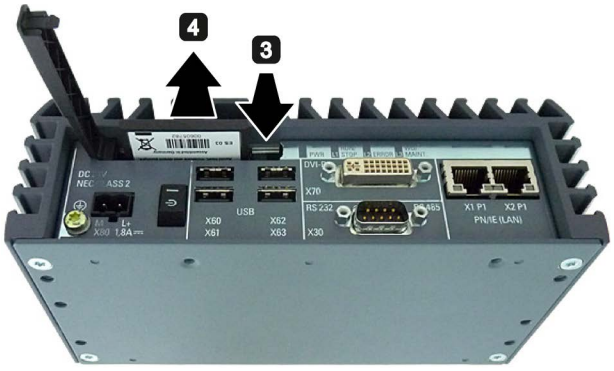
Requirement - Removing CF memory card

- The device is switched off.

Procedure



1. Loosen the latch of the cover.
   Grasp behind the cover in the direction of the arrow.
2. Fully open the cover.



3. Press the ejection button.
   The memory card is pushed out of the slot.
4. Remove the memory card from the memory card slot.
   Grip the on the bar on the underside of the memory card.

Requirement - Inserting CF memory card

- A CF memory card approved for industrial use.
  Only CF memory cards as of product version 03 can be used with this device.

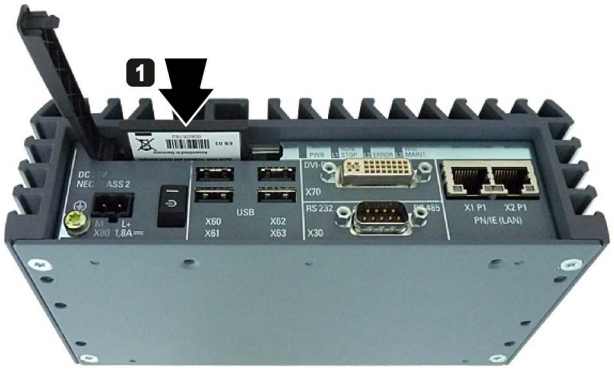
Note

Replace the CF memory card only with a CF memory card of the same product version.

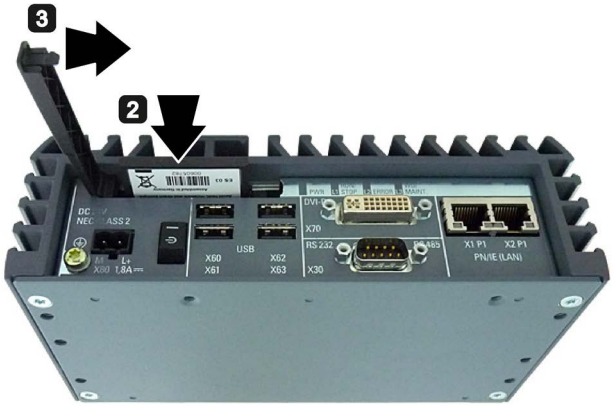
Procedure

Note

Insert the CF memory card in the memory card slot without force.



1. Insert the memory card into the memory card slot as shown.



2. Press the memory card into the memory card slot.

   The memory card is inserted correctly when the cover closes without resistance.

3. Close the cover.

Maintaining and repairing the device 7

7.1 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	4 years

7.2 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 97)"

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

See also

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

7.3 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.

7.4 Installing and removing hardware

7.4.1 Replacing drives for IPC227D Basic, COM and IO

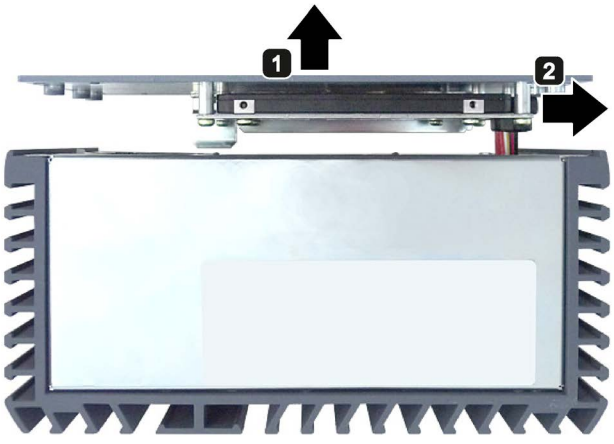
The procedure applies for device versions Basic, COM and IO. Carry out the procedure if you want to replace the hard disk drive with an SSD and vice versa or in the case of a fault.

Note the information in Chapter "Repair information (Page 69)".

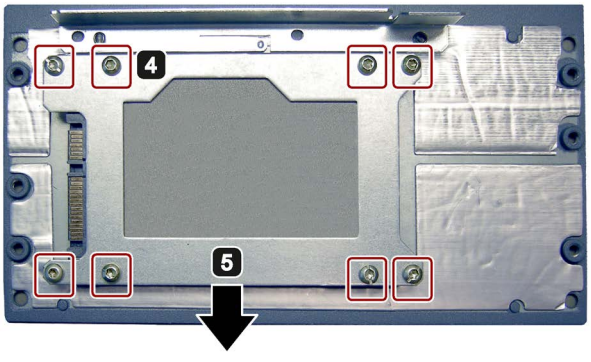
Requirement

- The device is open - see Chapter "Open the device (Page 61)".
- A hard disk drive or an SSD
- A T10 screwdriver

Procedure - removing



1. Remove the rear panel.
2. Pull off the connector.
3. Lay down the rear panel including drive.

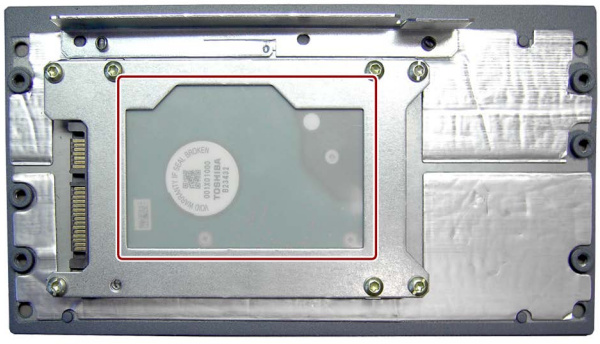


4. Remove the marked screws.
5. Remove the drive rack and take out the SSD.

Procedure - installation

For installation, follow the steps for removal in the reverse order.

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.



7.4.2 Replacing a drive for IPC227D PCIe

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.

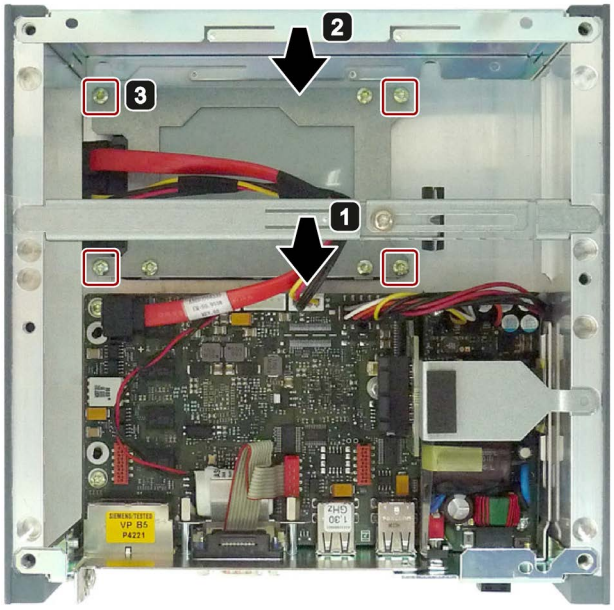
Note the information in Chapter "Repair information (Page 69)".

Requirement

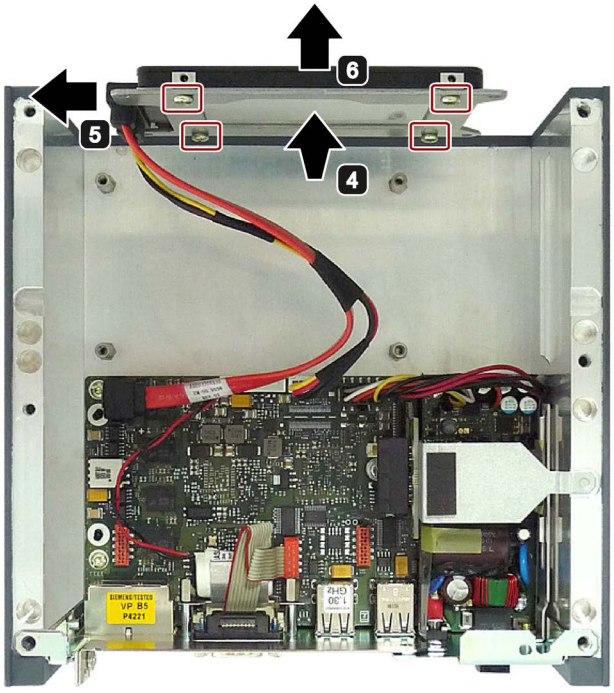
- The device is opened.

  See chapter "Open the device (Page 61)".
- A T10 screwdriver

Procedure - removing



1. Take the plug-in card holder out of the housing.
2. Remove the cover of the device.
3. Remove the marked screws.



4. Fold the drive away to the side.
5. Pull off the connector.
6. Remove the drive rack and set it down.
7. Loosen the four marked screws of the drive on the support plate.
8. Remove the drive with insulating film (only for HDD) from the support plate.

Procedure - installation

For installation, follow the steps for removal in the reverse order.

7.4.3 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 4 years.
- Replace the lithium battery only with the type recommended by the manufacturer.
  The order number is A5E30314053.
- 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:

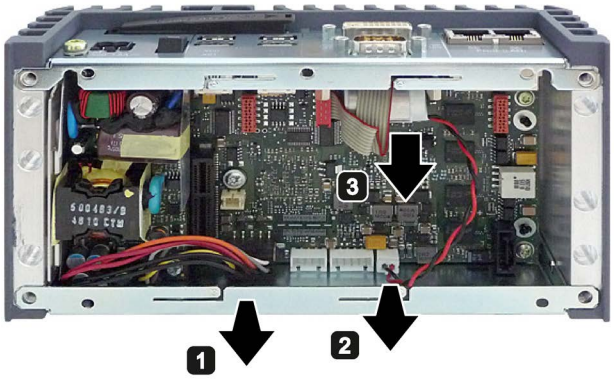
- Dispose of used batteries and rechargeable batteries separately as hazardous waste in accordance with local regulations.
- You can return used batteries and rechargeable batteries to public collection points and wherever batteries or rechargeable batteries of the type in question are sold.
- Label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

Requirement

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

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.



1. Remove the cover sheet from its guide.
2. Remove the connector.
3. Remove the battery.

Procedure - installation

To install the replacement battery, follow the steps for removing the battery in the reverse order.

See also

BIOS Setup default settings (Page 151)

Open the device (Page 61)

7.5 Installing the software

7.5.1 Reinstalling the operating system

7.5.1.1 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.

7.5.1.2 Restoring the factory state

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 drive of your device. Restoration of the entire C drives: (system) and D: or only drive C: is possible. This allows you to retain any user data on drive D:.

Retrieving authorization or license

- Check whether you can retrieve your authorization or license key from the disk and perform this procedure if possible.
- If backup is not possible, please contact Customer Support. There you can obtain information necessary for software authorization.

Procedure

NOTICE
Data loss If "Restore system partition only" is set all data on drive C: (system partition) will be deleted. All data, user settings and all authorizations or license keys on drive C: are lost! All data on drive C: will be completely deleted, reformatted and overwritten with the original factory software. The "Restore entire hard disk" option deletes all data, user settings, authorizations and license keys on the entire drive.

1. Enable "USB Boot" in the BIOS setup.
2. Connect a DVD drive to the USB interface.
3. Insert the Restore DVD into the DVD drive.
4. Reboot the device.
5. Press the <F12> key when the following BIOS message appears:

   ```
   Press <F2> to go to Setup Utility

   Press <F12> to go to Boot Manager
   ```

   After initialization, a boot menu is displayed.
6. Select the optical drive using the cursor keys.

   Example:

   ```
   USB-ODD : Optical Disk Drive
   ```
7. Follow the on-screen instructions.

7.5.1.3 Installing Windows XP

Note

Specific information on the use of the Windows XP Professional operating system is available in the following manual (not included in the scope of delivery):

Microsoft Windows XP Professional, Technical Reference (MSPress No. 934)

Requirement

You need the following hardware and software:

- A USB DVD-ROM drive
- A USB disk drive
- Driver disk for the AHCI controller

  You will find information on setting up the driver disk on the "Documentation and Drivers" CD/DVD.
- Recovery DVD for the operating system you want to install, which is included in the scope of delivery.

Procedure

1. Enable "USB Boot" in the BIOS setup.
2. Connect the disk drive to the USB port.
3. Insert the driver disk into the disk drive.
4. Connect the DVD drive to the USB port.
5. Insert the recovery DVD into the DVD drive.
6. Reboot the device.
7. Press the <F12> key when the following BIOS message appears.

   ```
   Press F2 to go to Setup Ulility

   Press F12 to go to Boot Manager
   ```

   After initialization, a boot menu is displayed.
8. In the boot menu, select the optical drive using the cursor keys.

   Example:

   ```
   USB-ODD : Optical Disk Drive
   ```
9. Confirm the selection by pressing ENTER.

10. **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 ..
    ```

    A blue background followed by the Windows XP installation program appears after a few seconds.

11. Press the <F6> key repeatedly as soon as the blue background appears.

    The dialog box for installing data carrier controllers will be displayed in a few seconds.

12. Select the driver for the AHCI controller on the driver disk.

13. Follow the instructions of the Windows XP installation program.

Windows XP installation program

The language of the installation program and the Windows XP Professional operating system is preset to English. You can change the language of Windows XP Professional once you have installed it. You can find information on this in section: Setting up the language selection by means of the Multilanguage User Interface (MUI) (Page 85).

Partitions in the delivery state for Windows XP

The recommended minimum size of the partition on which you want to install Windows XP varies depending on how much work memory and which additional software you want to use. Information on partitioning of the data carrier in the delivery state is provided in the following table.

Partition	Name	Size	File system
First	SYSTEM	25 GB	NTFS not compressed
Second	DATA	Remainder	NTFS not compressed

7.5.1.4 Installation of Windows 7

Note

Specific information on the use of the Windows 7 operating system can be found in the following manual (not included in the scope of delivery):

- Windows 7 Technical Reference (MS Press No. 5913)

Requirement

- A USB DVD-ROM drive
- The Windows 7 recovery DVD, which is included in the scope of delivery.

Procedure

1. If necessary, connect a DVD drive to the USB interface.
2. Insert the Recovery DVD into the DVD drive.
3. Reboot the device.
4. Press the <F12> key when the following BIOS message appears.

   ```
   Press F2 to go to Setup Ulility

   Press F12 to go to Boot Manager
   ```

   After initialization, a boot menu is displayed.
5. In the boot menu, select the optical drive using the cursor keys. It is identified by a "P" in front of the SATA port number.

   Example:

   ```
   P3 - OPTIARC DVD-ROM DDU1681S
   ```
6. Confirm the selection by pressing ENTER.
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.
8. Now follow the instructions in the installation program. You can find additional information on this in the section: "Install Windows" installation program.

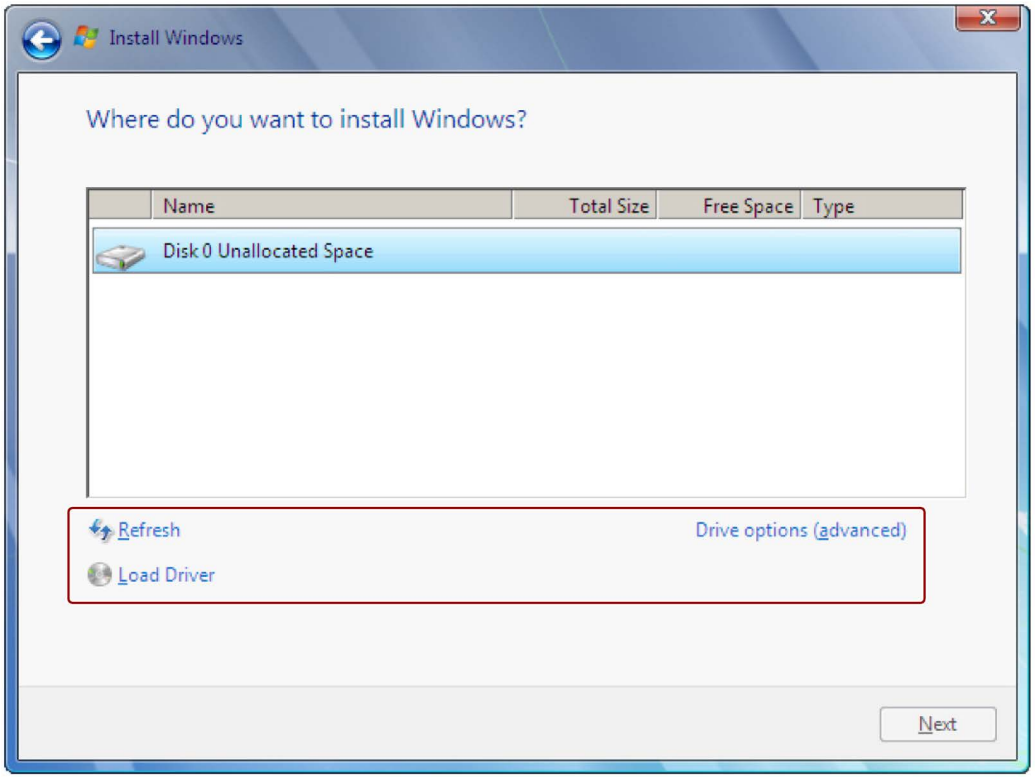
"Install Windows" installation program

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 85)".

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

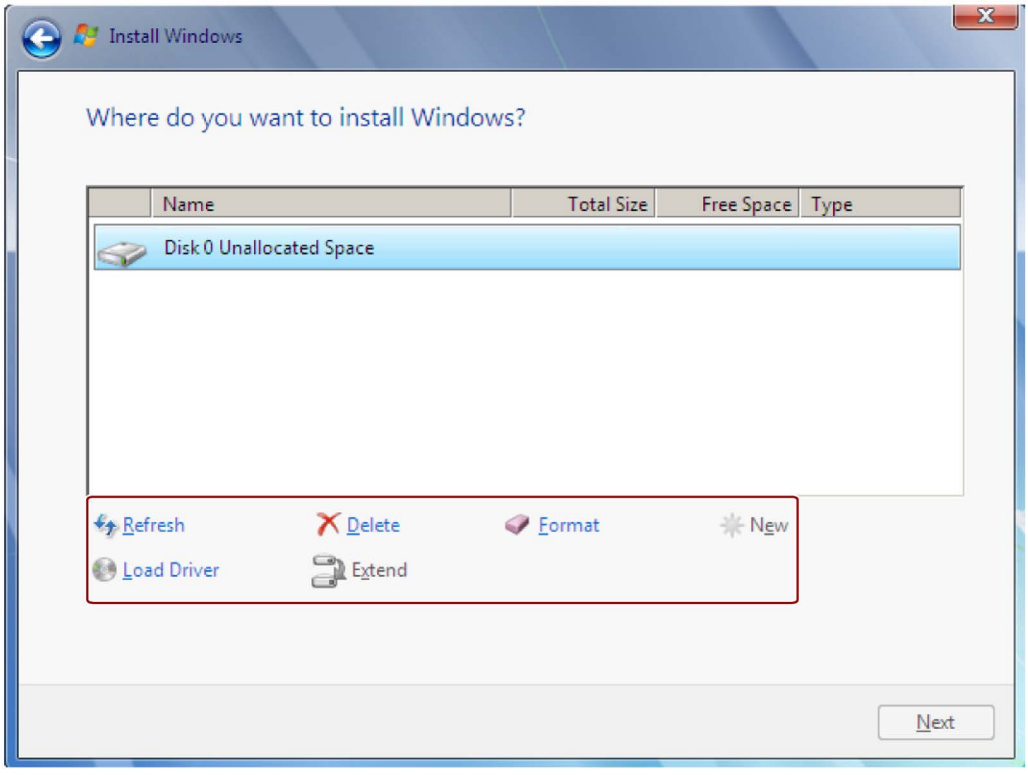
You can set up partitions during the installation process and integrate data carrier controllers that are unknown to the operating system. To do so, select "Custom (advanced)" when prompted for the installation type in the "Install Windows" installation program.

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. Note the information in Section "Information for systems with RAID, AHCI, or SAS controllers (optional)".
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. Note the information in Section "Information for systems with RAID, AHCI, or SAS controllers (optional)".
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	25 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.

7.5.1.5 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 for Windows XP Professional

Note

Specific information on setting up the language selection for Windows XP Professional can be found in Manual "Microsoft Windows XP Professional, Technical Reference (MSPress No. 934)", not included in the scope of delivery.

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

1. Choose:

   "Start > Control Panel > Regional and Language"

2. You can make the desired changes in the "Regional Settings", "Languages" and "Advanced" tabs.

Installing new language packages

1. Start the "MUISETUP.EXE" program in the "MUI" folder from the Recovery DVD.

   All languages that can be installed are displayed.

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 Manual "Windows 7, Technical Reference (MSPress No. 5913)", not included in the scope of delivery.

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" and "Location und Keyboards and Languages" tabs.

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

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

1. Choose:

   "Start > Control Panel > Clock, Language, and Region > Regional and Language Options"

2. You can make the required changes in the "Administrative" tab. You copy the settings by clicking the respective button.

Installing new language packages

Some language packages are available on the Recovery 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.

7.5.2 Partitioning data media

7.5.2.1 Partitions in Windows Embedded Standard 2009 and Windows Embedded Standard 7

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 CompactFlash card

The CompactFlash card has the following partitions in the as-delivered condition:

Partition	Name	Card size				File system
		2 GB	4 GB	8 GB	16 GB	
1. Partition	SYSTEM	1536 MB	2560 MB (WES2009) 3690 MB (WES7)	5120 MB (WES2009) 6150 MB (WES7)	10240 MB	NTFS (compressed)
2. Partition	DATA	Remainder	Remainder	Remainder	Remainder	NTFS (compressed)
3. Partition	WinCCNB	32 MB [1]	32 MB [1]	32 MB [1]	32 MB [1]	NTFS (compressed)

[1] Only for devices with software bundle

Partitioning the hard disk

The hard disk has the following partitions in the as-delivered condition:

Partition	Name	Size	File system
1. Partition	SYSTEM	25 GB	NTFS (not compressed)
2. Partition	DATA	Remainder	NTFS (not compressed)

Partitioning the SSD

In the factory state, the following partitions are set up on the SSD:

Partition	Name	Size	File system
1. Partition	SYSTEM	25 GB	NTFS (compressed)
2. Partition	DATA	Remainder	NTFS (compressed)
3. Partition	WinCCNB	32 MB [1)]	NTFS (compressed)

[1] Only for devices with software bundle

To restore the original partition of the delivery state, we recommend you use the software tool **SIMATIC IPC Image & Partition Creator**.

7.5.2.2 Partitions under Windows 7 Ultimate and Windows XP Professional

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

For the Windows 7 Ultimate operating system, the following partitions are set up on the hard disk in the as-delivered condition:

Partition	Name	Size	File system
1. Partition	SYSTEM	25 GB	NTFS (not compressed)
2. Partition	DATA	Remainder	NTFS (not compressed)

Partitioning the SSD

For the Windows 7 Ultimate operating system, the following partitions are set up on the SSD in the as-delivered condition:

Partition	Name	Size	File system
1. Partition	SYSTEM	25 GB	NTFS (not compressed)
2. 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.

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

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

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

Note

Data lost in the case of deleting a partition!

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

Back up your data before you change partitions.

Requirement

You are logged on as an administrator.

Reduce partition

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 data system or the partition must be formatted with an "NTFS" data system.

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

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

7.5.2.4 Adapting partitions in Windows XP and Windows Embedded Standard 2009

In order to adapt partitions, we recommend you use the software tool SIMATIC IPC Image & Partition Creator. Detailed information about using this tool is available in the manufacturer documentation.

7.5.3 Drivers and software

7.5.3.1 Driver installation for Windows Embedded Standard 7 and 2009

The drivers for Windows Embedded Standard are installed as in Windows XP Professional. Pay attention to the installation instructions of the driver manufacturer.

Procedure

If the message "Windows XP installation CD required" appears when you install drivers, proceed as follows:

1. If your device has no CD/DVD drive, connect an external USB CD/DVD drive to a USB port.
2. Insert the recovery CD/DVD.
3. The necessary ".cab" files can be found in the "\Drivers_WES" folder. Unpack the ".cab" files to a folder on the local hard disk.
4. Disable the Enhanced Write Filter before installing drivers and enable it again when you are finished.

7.5.3.2 Installing drivers and software

Introduction

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.

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 "Driverpath".
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.

7.5.4 Installing updates

7.5.4.1 Updating the operating system

Windows

The latest updates for the Windows operating system are available on the Internet at Microsoft (http://www.microsoft.com).

Note

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

other operating systems

Contact the corresponding manufacturer.

7.5.4.2 Installing or updating application programs and drivers

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.

Data backup under Windows Embedded Standard 2009 and Windows Embedded 7 / Windows XP Professional / Windows 7 Ultimate

We recommend you use the **SIMATIC IPC Image & Partition Creator** software tool (V3.2 or higher) for data backups in Windows Embedded Standard / Windows XP Professional / Windows 7 Ultimate. This tool provides comfortable and efficient functions for backup and restoring the full content of CompactFlash cards, hard disks, and of 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 (http://www.siemens.com/automation/mall). For more information about SIMATIC IPC Image & Partition Creator, refer to its product documentation.

Note

The SIMATIC Image & Partition Creator only supports the LAN 2 interface (Intel® 82574L Gigabit Network Connection).

Technical specifications

8

8.1 Certificates and approvals

CE marking



The device meets the requirements and safety specifications of the EMC Directive 2004/108/EC "Electromagnetic Compatibility".

EC Declaration of Conformity

The corresponding documentation is available on the Internet at: 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.

8.1.1 UL60950, UL508

UL approval



The following approvals are available for the device:

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

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 A digital apparatus complies with Canadian ICES-003.
Avis Canadien	Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

Device version IO

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

Australia and 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.

Exception: Device version IO

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

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

KOREA



This product meets the requirements of Korean certification.

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

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

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)

Marine approvals

Acceptance procedures for shipping and offshore applications:

- 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)

8.2 Directives and declarations

8.2.1 Electromagnetic compatibility, Industrial and Residential Areas

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	EN 61000-6-2:2005
Residential and commercial areas and small businesses	EN 61000-6-3:2007	EN 61000-6-1:2007

Exception: Device version IO

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

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

8.2.2 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.

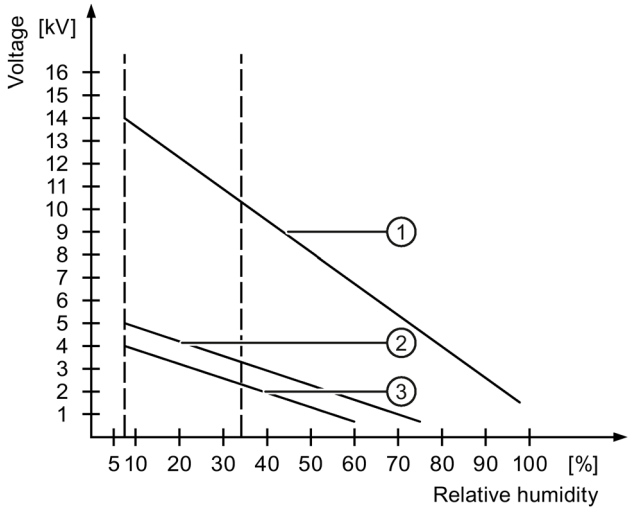
The damage to a module by an overvoltage can often not be immediately detected and only becomes evident after an extended period of operation. The consequences are incalculable and range from unforeseeable malfunctions to a total failure of the machine or system.

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

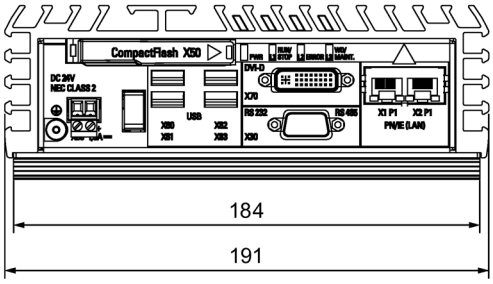
- Disconnect the power supply before you install or remove modules which are sensitive to ESD.
- Pay attention to good grounding:
  - When handling electrostatical sensitive devices, make sure that persons, the workstation and devices, tools and packaging used are properly grounded. This way you avoid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

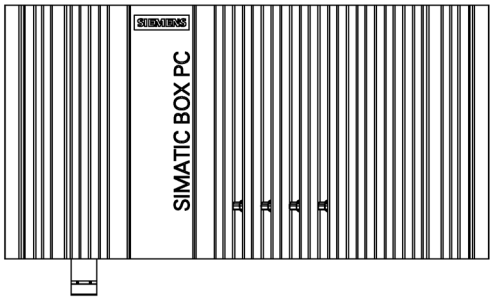
8.3 Dimension drawings

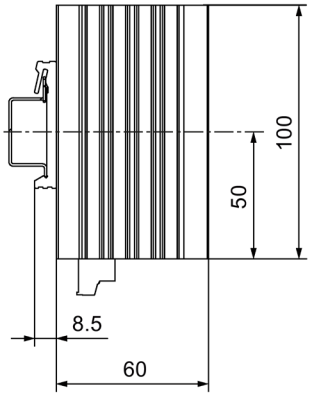
8.3.1 Dimension drawing IPC227D Basic

Mounting on a standard rail

All dimensions in mm.

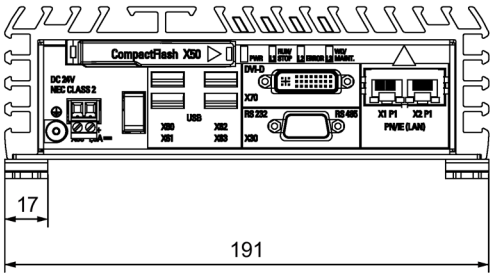


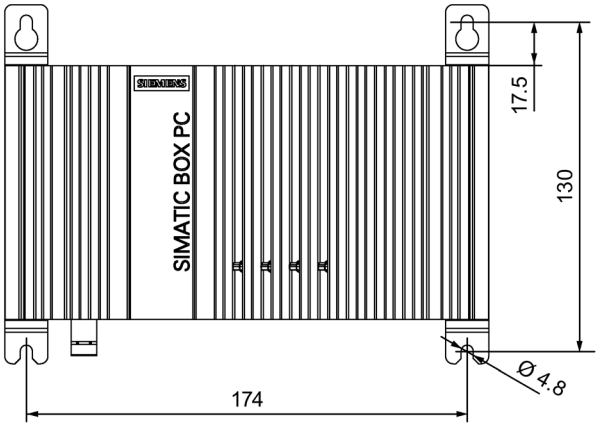


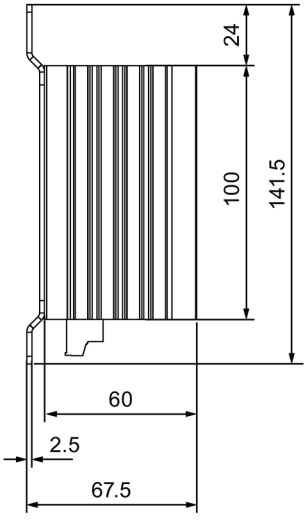


Wall mounting

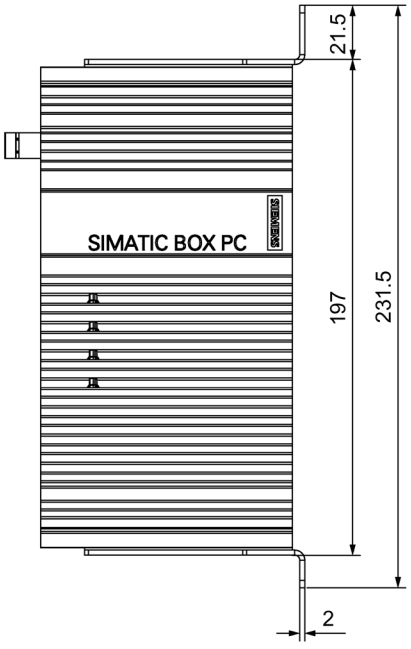
All dimensions in mm.

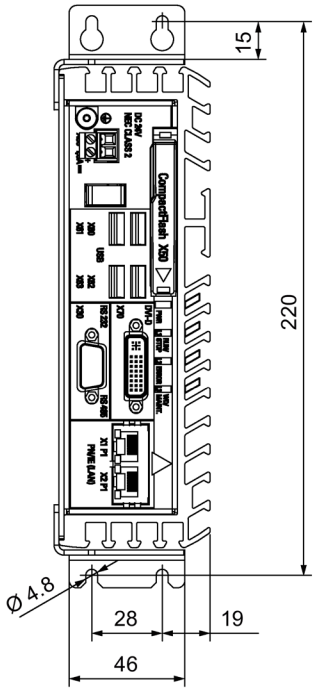




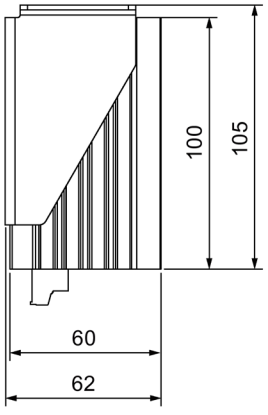


Upright mounting

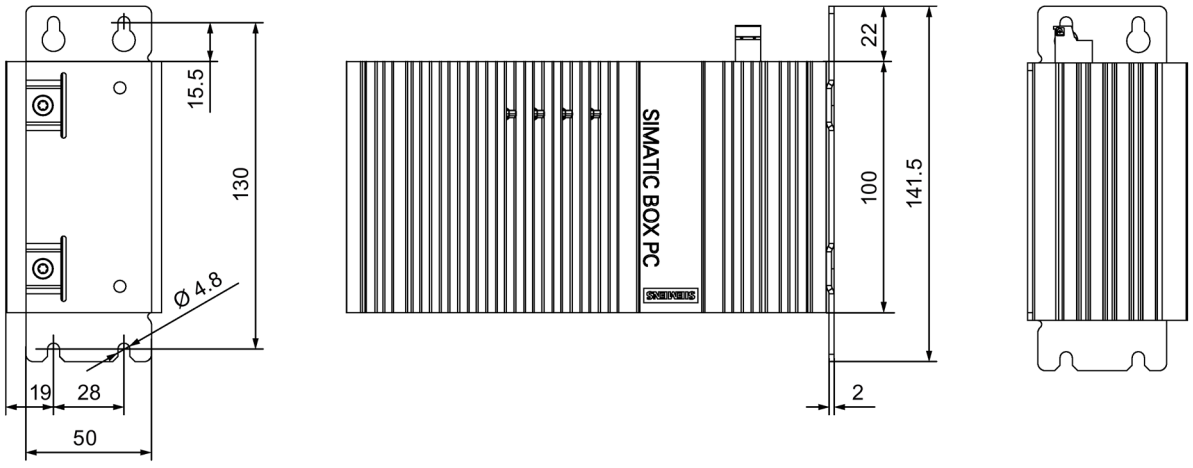




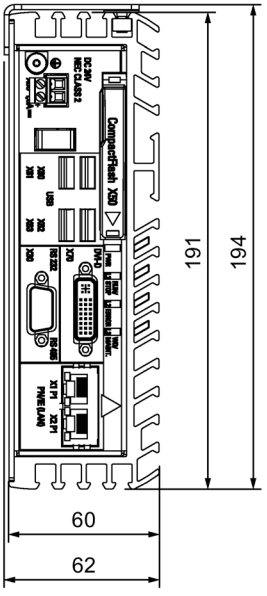
All dimensions in mm.



Side mounting

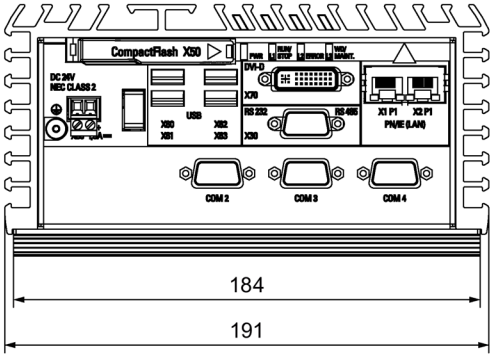


All dimensions in mm.

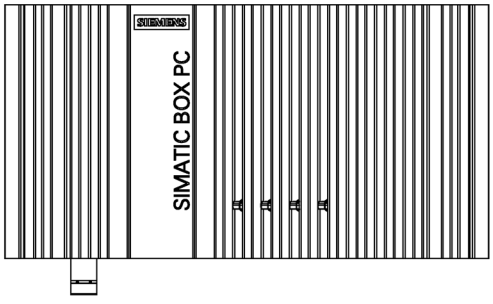


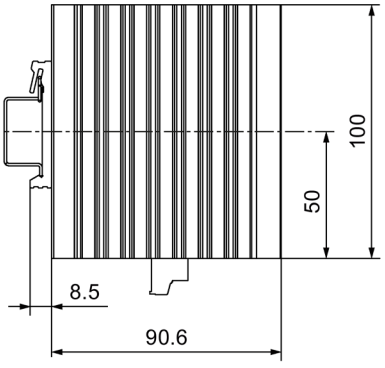
8.3.2 Dimension drawing IPC227D COM

Mounting on a standard rail

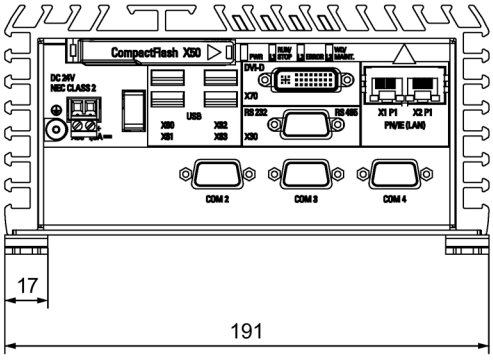


All dimensions in mm.

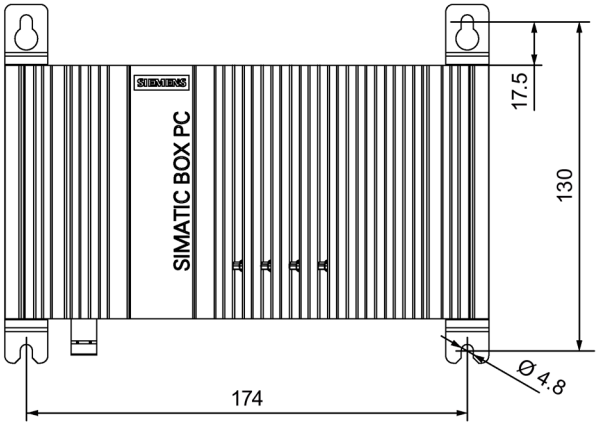


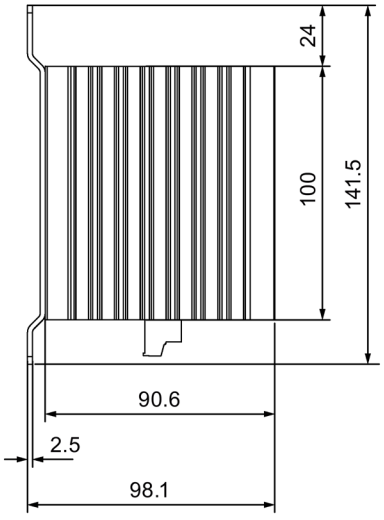


Wall mounting

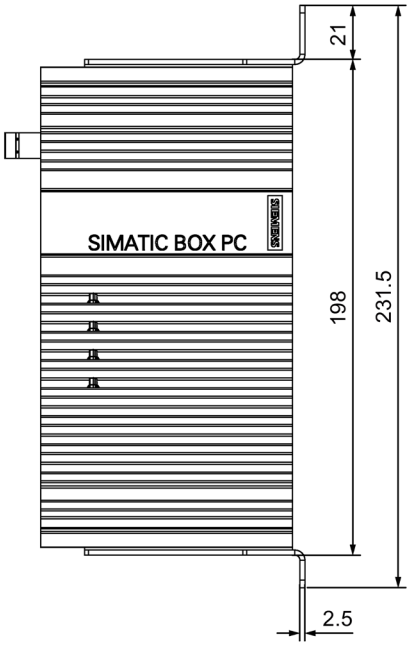


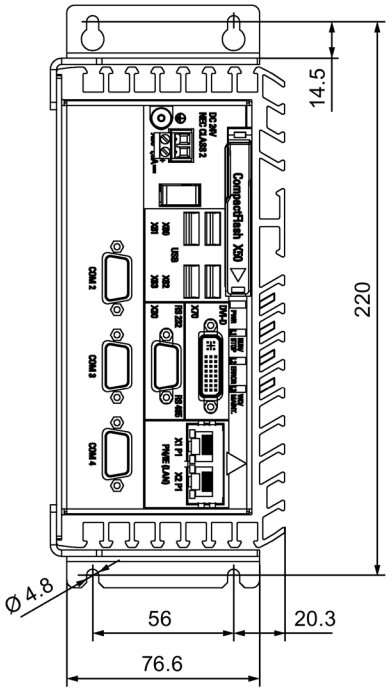
All dimensions in mm.



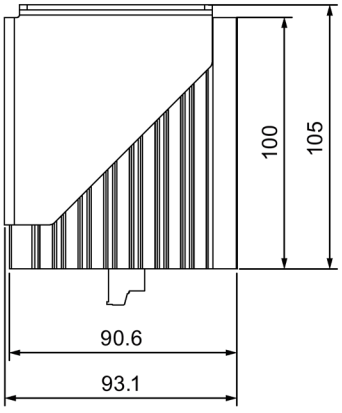


Upright mounting

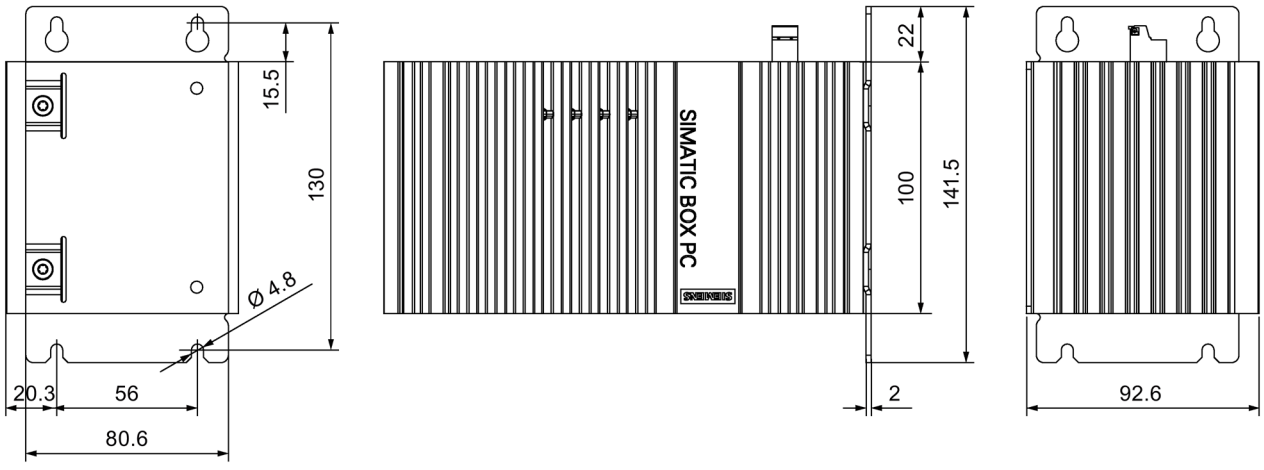




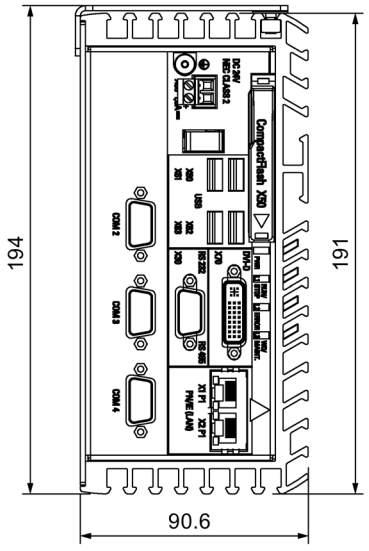
All dimensions in mm.



Side mounting

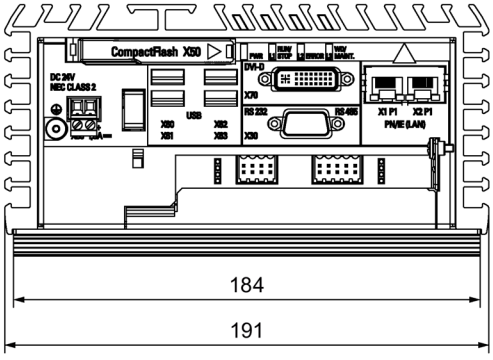


All dimensions in mm.

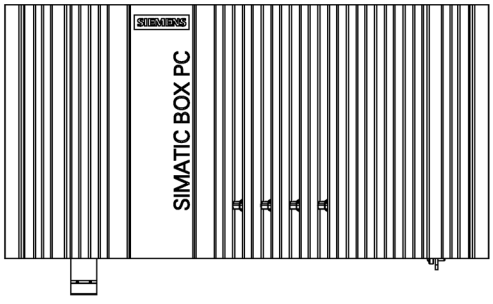


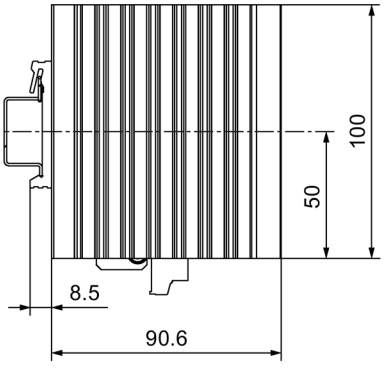
8.3.3 Dimension drawing IPC227D IO

Mounting on a standard rail

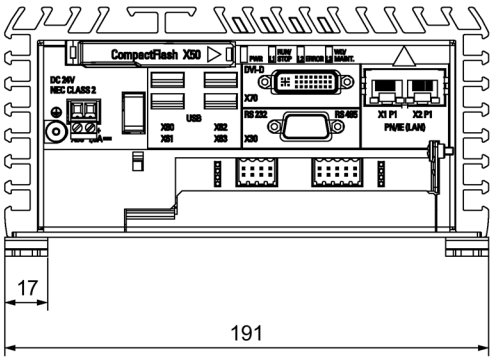


All dimensions in mm.

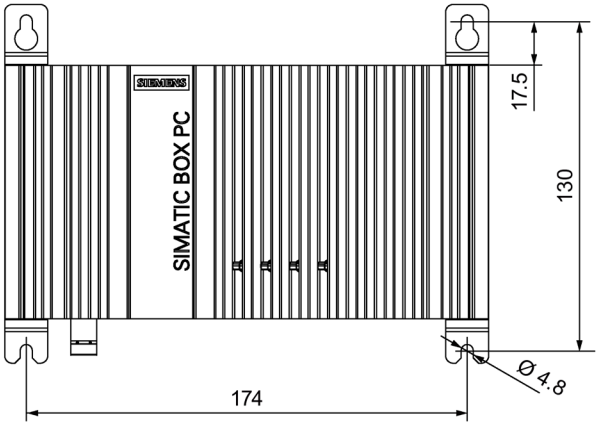


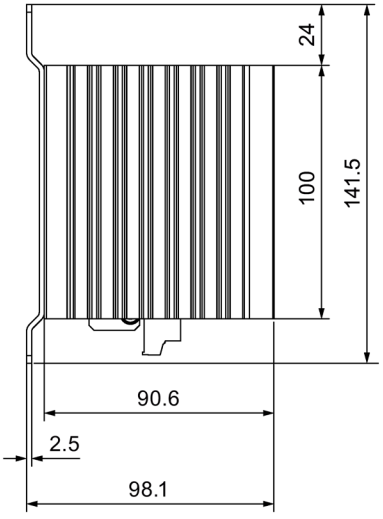


Wall mounting

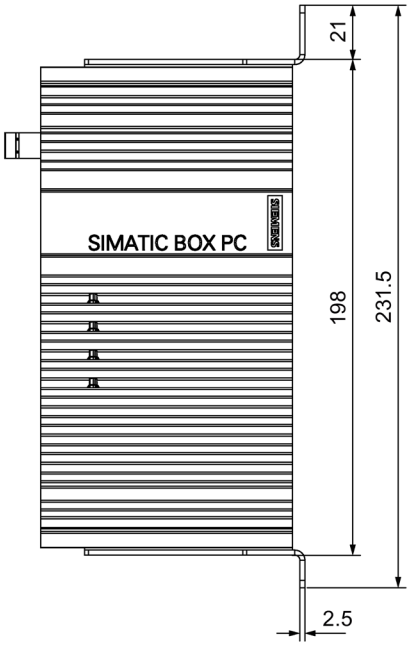


All dimensions in mm.

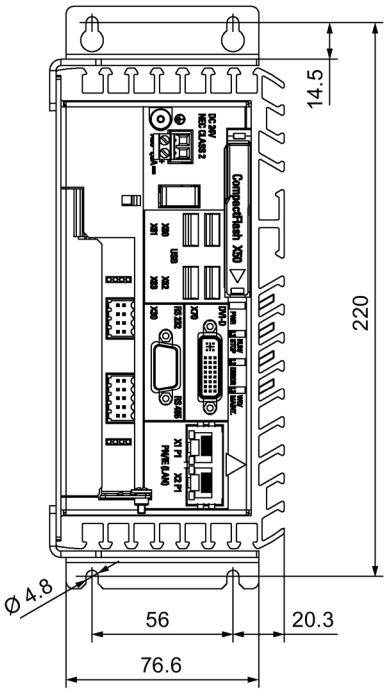


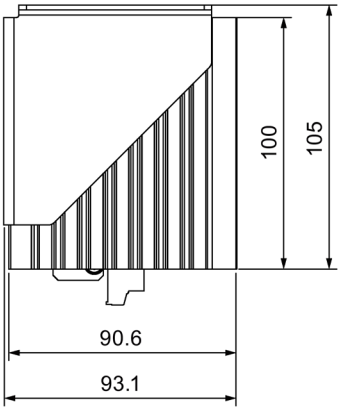


Upright mounting

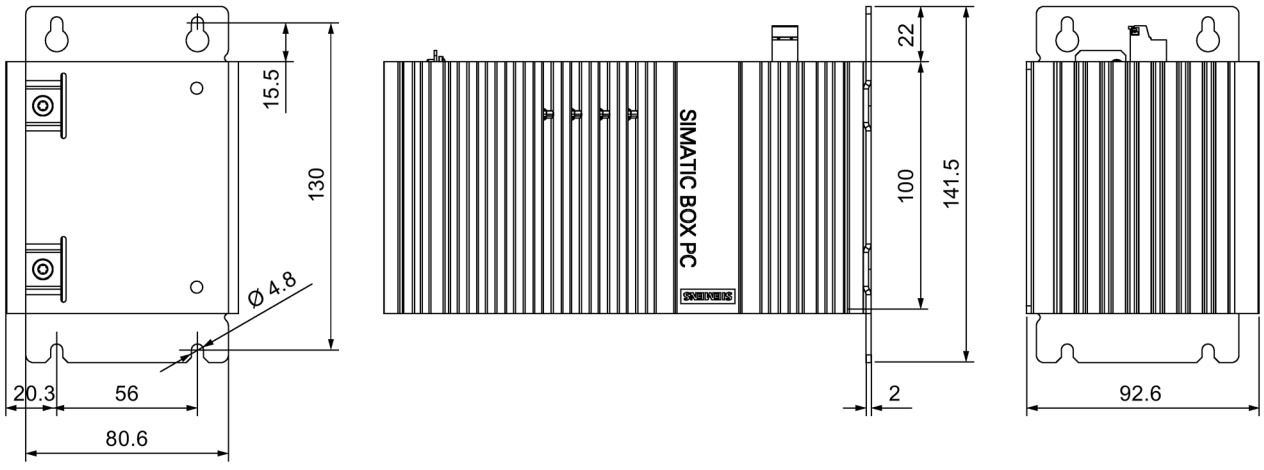


All dimensions in mm.

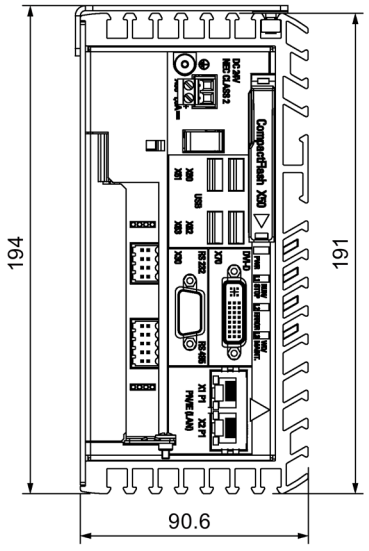




Side mounting



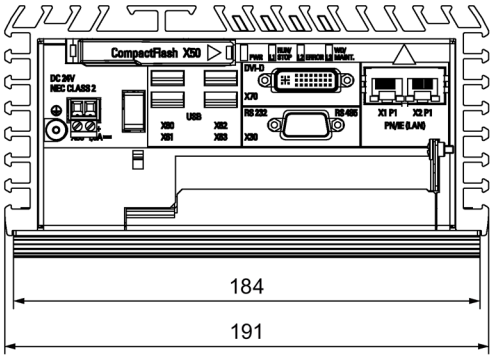
All dimensions in mm.

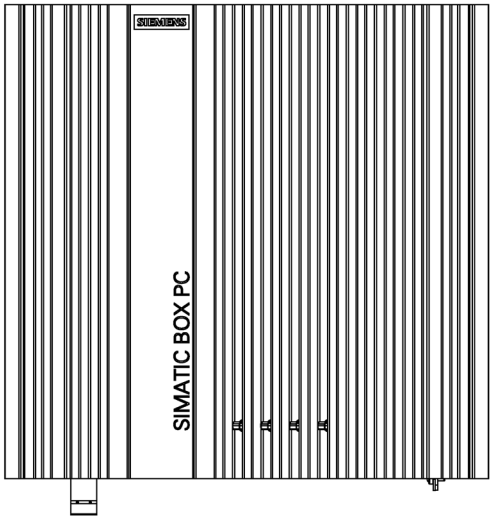


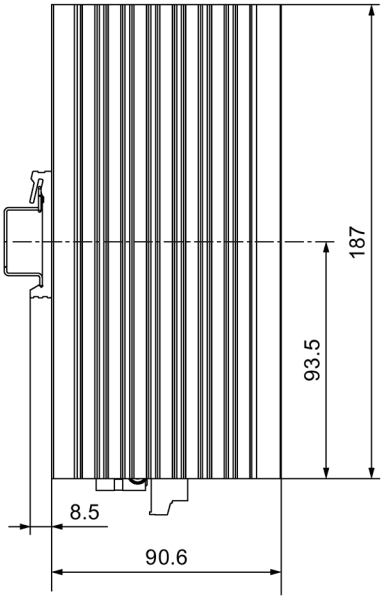
8.3.4 Dimension drawing IPC227D PCIe

Mounting on a standard rail

All dimensions in mm.

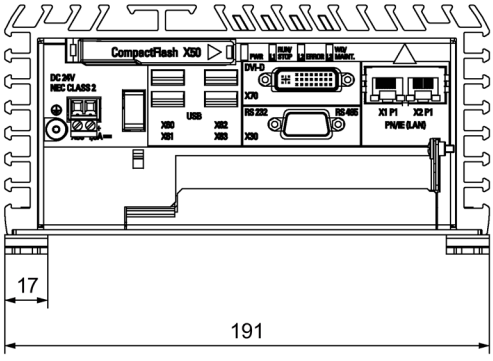


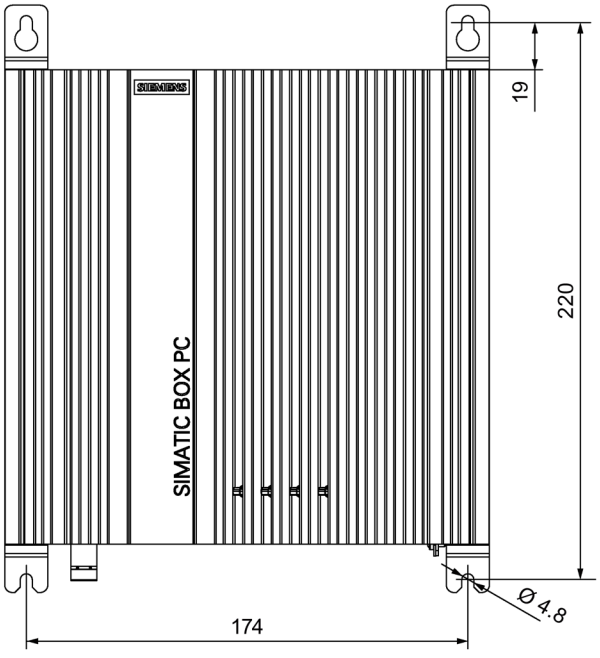


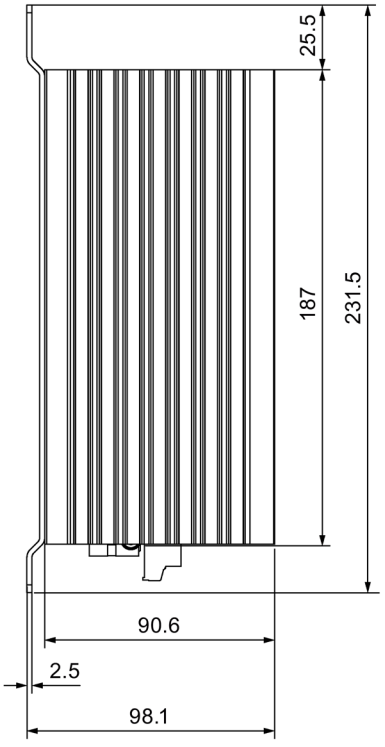


Wall mounting

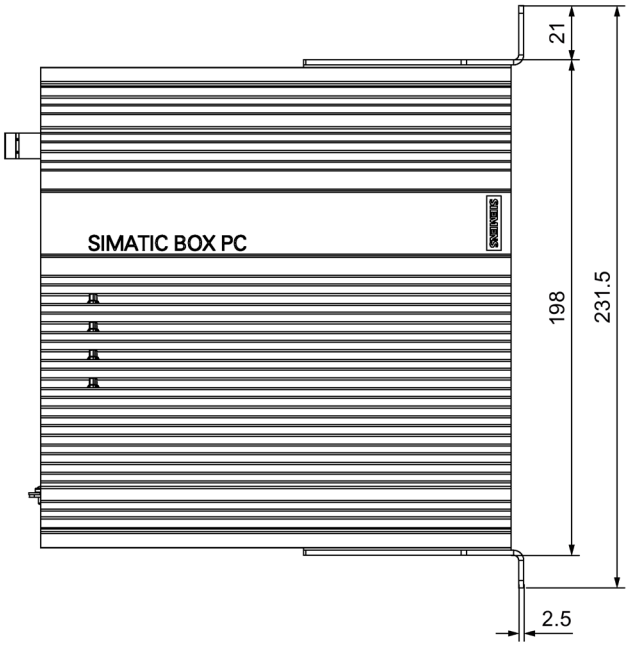
All dimensions in mm.

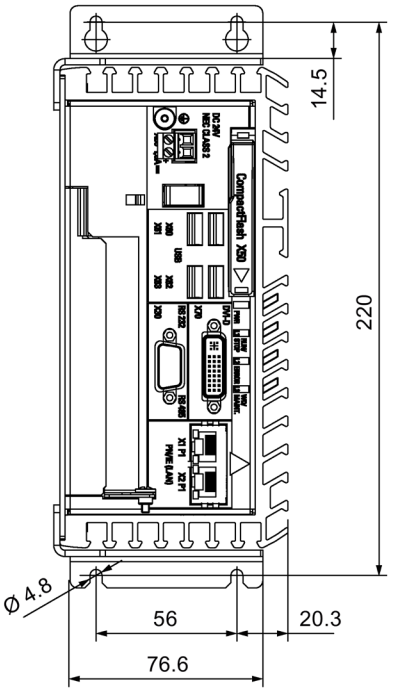




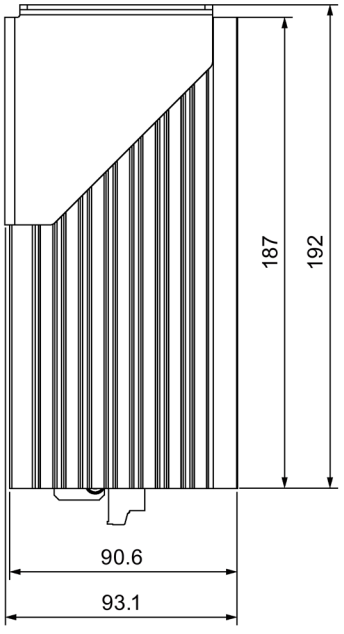


Upright mounting

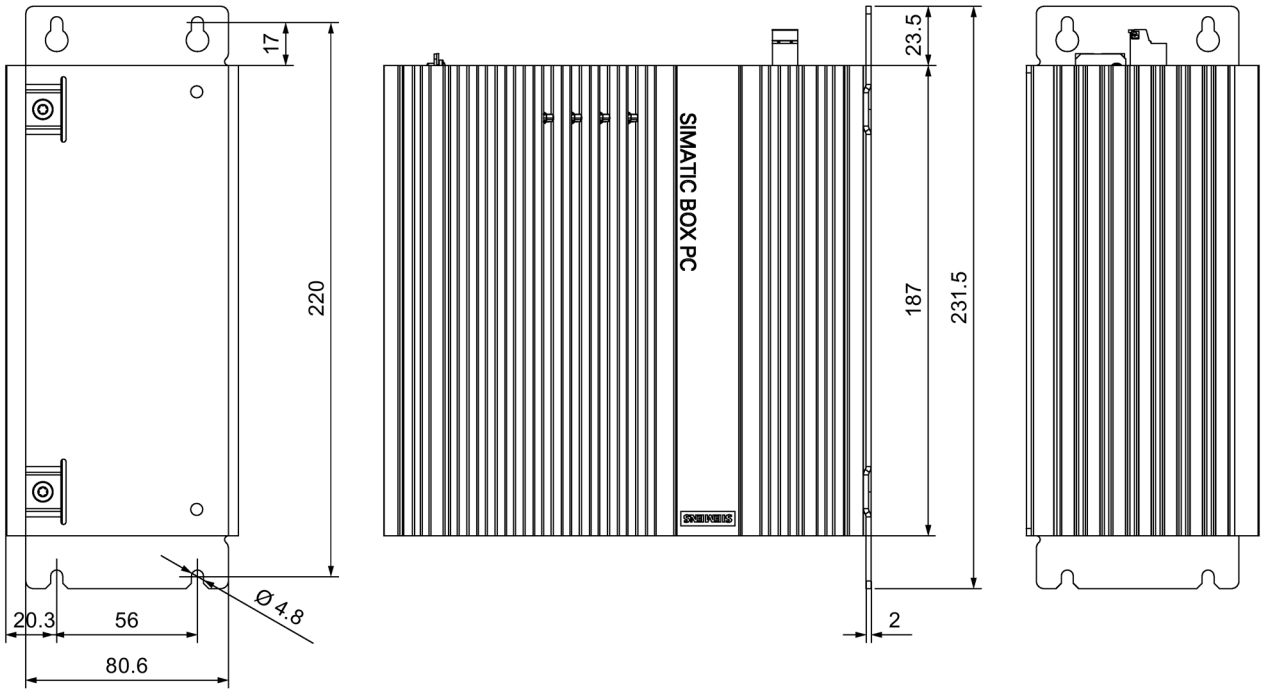




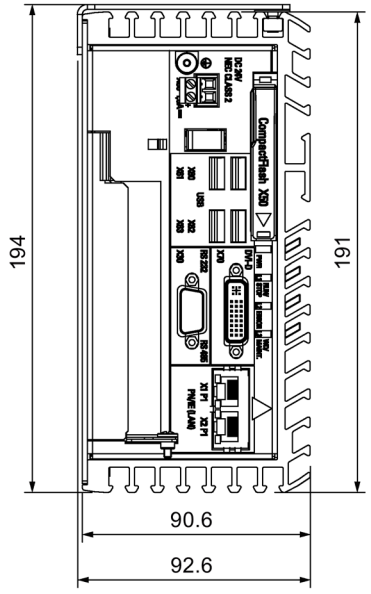
All dimensions in mm.



Side mounting



All dimensions in mm.



8.4 Technical data

8.4.1 General technical specifications

General technical specifications

Order number	See order documents
Weight With hard disk drive, without fixing brackets	• Basic: Approx. 1.4 kg • COM: Approx. 1.6 kg • IO: Approx. 1.7 kg • PCIe: 2.4 kg
Power supply [1]	24 VDC (19.2 to 28.8 V)
Brief voltage interruption in accordance with Namur	Up to 15 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
Current consumption for digital outputs (IO)	max. 2.5 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 generation of the supply voltage by the upstream power supply has to be implemented as safety extra-low voltage with safe electrical isolation, isolated in accordance with IEC 60364-4-41, or as SELV in accordance with EN 60950-1:2006, DIN EN 60950-1:2006-11 and LPS/NEC Class 2.

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 to 1000 MHz and 1.4 to 2 GHz, 80% AM in accordance with IEC 61000-4-3 3 V/m, 2 to 2.7 GHz, 80% AM in accordance with IEC 61000-4-3 10 V, 10 KHz to 80 MHz, 80% AM in accordance with IEC 61000-4-6
Magnetic field	100 A/m, RMS value 50/60 Hz in accordance with IEC 61000-4-8

Note

Protective elements

Protective elements are required for the IO device version. Observe the "SIMATIC PCIe DIO4" documentation.

Main circuit board

Processor	• Intel Atom 600 MHz or • Intel Atom 1.0 GHz or • Intel Atom 1.3 GHz
RAM	• 512 MB DDR2 SDRAM for CPU 600 MHz with/without retentivity • 1 GB DDR2-SDRAM for CPU 1.0 GHz with/without retentivity • 2 GB DDR2-SDRAM for CPU 1.3 GHz with/without retentivity
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 1.0a" specification.

Drive, memory medium

Hard disk drive, optional	≥ 250 GB, 2.5" HDD
Solid-state drive, optional	≥ 50 GB, 2.5"-SATA-SSD (SLC) ≥ 80 GB, 2.5"-SATA-SSD (MLC)
CompactFlash memory card, optional	• 2 GB or • 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	32 to 256 MB shared memory
Resolution, graphics memory	• DVI resolution: 640 × 480 pixels up to 1920 × 1080 pixels • 32 to 256 MB graphics memory is taken from main memory, UMA, dynamic

Ports

COM	• RS-232, max. 115 kbps, D-sub connector, 9-pin • RS-485 [1]/RS-422, max. 115 kbps, D-sub socket, 9-pin • CAN interface, Philips, SAEJ2411, D-sub connector, 9-pin The RS-485 and CAN ports are electrically isolated.
USB	4 × USB 2.0, high-speed/high current, a maximum of 2 high current can be operated at the same time
LAN interface X1 P1, RJ45 [2]	Intel Platform Controller Hub EG20T Gigabit Ethernet 10, 100, 1000 Mbps
LAN interface X2 P1, RJ45 [2]	Intel 82574L Gigabit Ethernet Controller 10, 100, 1000 Mbps, teaming is supported [3]
Keyboard, mouse	Connection via USB port

[1] The scheduling of the RS-485 signals must take place in the connector. Connect an 120Ω terminating resistor between the pins 3 and 8, and between pins 4 and 9.

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

[3] 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 31)

8.4.2 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

Vertical installation at > 45 °C in RAL only

If you wish to install the device vertically for operation at an ambient temperature of > +45 °C, you will have have to install it in a Restricted Access Location (RAL) such as a lockable control cabinet.

All device variants with HDD	0 to +40 °C, horizontal and vertical installation
Operation of the: • IPC227D Basic • IPC227D COM • IPC227D IO • IPC227D PCIe Load: Max. 2.5 W	0 to +50 °C Applies to device with: • CompactFlash memory card, SSD • Horizontal and vertical installation
Operation of the: • IPC227D PCIe Load: Max. 5 W	0 to +45 °C Applies to device with: • CompactFlash memory card, SSD • Horizontal and vertical installation
Storage/transport	-40 to +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 to 80% at 25 °C (no condensation) 5 to 95% at 25 °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 CompactFlash card or SSD: • 5 to 9 Hz: 3.5 mm • 9 to 500 Hz: 9.8 m/s^2 With CompactFlash card or SSD and standard mounting 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/s^2 With hard disk and standard rail or side mounting: Excitation not permitted
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

8.4.3 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.

The following ambient conditions are permitted:

ENV1 and ENV2 in accordance with "Lloyd's Register Type Approval System, Test Specification Number 1-2002".

NOTICE
Filter upstream If the device is used in shipbuilding, a Corcom 6FC10 filter type from the Corcom company must be connected upstream, in the 24 V DC supply line of the device.

8.4.4 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	High current	500 mA	--	--	6 W (for all USB devices)
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 additional components consume energy and produce heat.

The device may overheat. The additional components are damaged.

8.4.5 Direct current supply (DC)

Technical data

Input voltage	24 VDC (19.2 to 28.8 VDC)
Power consumption [1]	Max. 32 W
Buffering upon power failure	Hold-up time > 15 ms (after > 5 ms, DC_FAIL becomes active)
Maximum continuous output power [1]	25 W
Degree of protection	IP 20
Protection class	Safety class I (A protective conductor must be connected to the device)

[1] The performance specifications apply to the power supply component, but not to the IPC227D 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 ATOM processor 0.6 GHz/512 MB RAM	13 W
Basic device with ATOM processor 1.0 GHz / 1 GB RAM	15 W
Basic device with ATOM processor 1.3 GHz / 2 GB RAM	18 W
USB expansion	See section "Power requirements of the components"
Expansion PCIe	

8.5 Hardware descriptions

8.5.1 Technical features of the motherboard

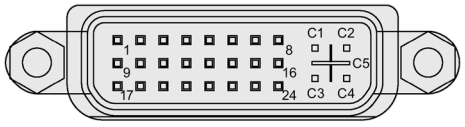
Component / port	Description	Parameters
Chipset	Intel EG20T	
BIOS	Core, Video, ACPI	
CPU	Intel Atom E6x0	
Memory	DDR 2 onboard	512 MB, 1 GB, and 2 GB
Graphics	Intel Embedded Media Graphic Device (IEMGD)	32 - 256 MB graphics memory taken dynamically from RAM

8.5.2 External interfaces

8.5.2.1 Overview of interfaces

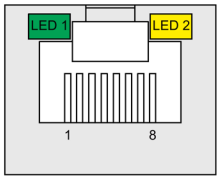
Interface	Position	Description	
COM	External	9-pin D-sub, either: • RS-232 (pin) • RS-485/RS-422 (socket) • CAN (pin)	
CompactFlash	External	CompactFlash card	
USB	External	4 USB channels 2 x high current	USB 1.1 USB 2.0
Ethernet	External	2 x RJ45	10/100/1000 Mbps
DVI-D	External	DVI-D	

8.5.2.2 DVI-D interface



Pin	Short description	Meaning
1	TMDS data2–	DVI data channel (O)
2	TMDS data2+	DVI data channel (O)
3	TMDS Data2/4 shield	Cable shield
4	NC*	–
5	NC	–
6	DDC clock (SCL)	Display data channel – clock (I/O)
7	DDC data (SDA)	Display data channel – data (I/O)
8	Analog vertical sync, V_{SYNC}	Analog vertical sync signal (O)
9	TMDS data1–	DVI data channel (O)
10	TMDS data1+	DVI data channel (O)
11	TMDS Data1/3 shield	Cable shield
12	NC	–
13	NC	–
14	+5 V power, VCC	+5 V power for DCC (O)
15	Ground return for +5 V, H_{sync} and V_{sync}, GND	Analog ground
16	Hot Plug Detect	–
17	TMDS data 0–	DVI data channel (O)
18	TMDS data 0+	DVI data channel (O)
19	TMDS data 0/5 shield	Cable shield
20	NC	–
21	NC	–
22	TMDS clock shield	Cable shield
23	TMDS clock+	DVI clock channel (O)
24	TMDS clock–	DVI clock channel (O)
C1	NC	–
C2	NC	–
C3	NC	–
C4	NC	–
C5	Analog ground, analog R, G, & return, GND	Analog ground

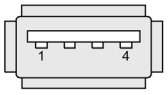
8.5.2.3 Ethernet port



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

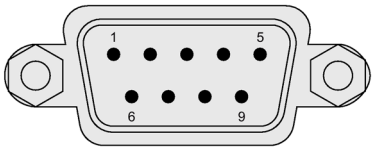
LED	Short description	Meaning
1	LED 1	Off: 10 Mbps Lit green: 100 Mbps Lit orange: 1000 Mbps
2	LED 2	Lit orange: Connection established Flashes: Activity

8.5.2.4 USB 2.0 port

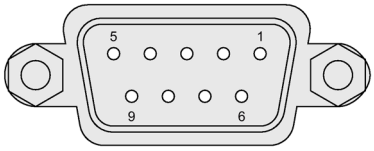


Pin	Short description	Meaning
1	USB_P5V_fused (O)	+5 V, fused
2	USB_D0M (I/O)	Data+
3	USB_D0P (I/O)	Data–
4	USB_GND	GND

8.5.2.5 Serial interface



RS232 connector, CAN Bus



RS485 socket

RS-232 pin-out

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	GND	Ground
6	DSR	Data set ready (I)
7	RTS	Request to send (O)
8	CTS	Clear to send (I)
9	RI	Incoming call (I)

CAN bus pin-out

Pin	Short description	Meaning
1	–	Reserved
2	CAN_L	CAN bus signal (L active)
3	CAN_GND	CAN station ground
4	–	Reserved
5	–	Reserved
6	–	Reserved
7	CAN H	CAN bus signal (H active)
8	–	Reserved
9	–	Reserved

Note

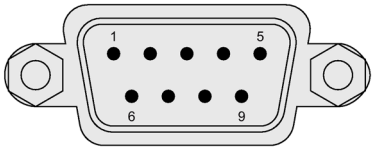
The permitted maximum length of CAN bus cables is 30 meters.

Assignment RS-485/RS-422

Pin	Short description	Meaning
1	nc	
2	nc	
3	A-	Signal line A- for half-duplex mode
4	B-	Signal line B- for full-duplex mode
5	GND	Signal ground
6	nc	
7	nc	
8	A+	Signal line A+ for half-duplex mode
9	B+	Signal line B+ for full-duplex mode

Applies to RS-485: The scheduling of the RS-485 signals must take place in the connector. Connect an 120Ω terminating resistor between the pins 3 and 8, and between pins 4 and 9. Use the software option "Set RTS high while sending".

8.5.2.6 Extended COM ports



Pin	Short description	3 extended COM ports [1]	Meaning
1	DCD	Not linked	
2	RxD	Rx	Received data (I)
3	TxD	Tx	Transmitted data (O)
4	DTR	Not linked	
5	GND	GND	Ground
6	DSR	Not linked	
7	RTS	Not linked	
8	CTS	Not linked	
9	RI	Not linked	

[1] For device variant COM only

8.5.3 Internal interfaces

8.5.3.1 Overview of internal interfaces

Interface	Position	Connector	Description
PCIe x1	Internal		PCIe x1 interface

8.5.3.2 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

8.5.4 System resources

8.5.4.1 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 as follows:

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".

8.5.4.2 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 real-time operating system extensions 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	Free	
IRQ4	Free	
IRQ5	Free	
IRQ6	Reserved	
IRQ7	Free	
IRQ8	Realtime clock	ISA exclusive
IRQ9	ACPI-SCI (system control interrupt)	
IRQ10		ISA exclusive (CAN)
IRQ11	Free	
IRQ12	PS/2 mouse controller emulation	ISA exclusive

Interrupt		Interrupt type
IRQ13	Coprocessor	ISA exclusive
IRQ14		ISA exclusive
IRQ15		ISA exclusive
IRQ16	PCI Express Port 1 General Purpose I/O Controller USB OHCI Controller 1, 2, 3 USB EHCI Controller 1 LAN1	PCI shared [1)]
IRQ17	LAN2 Gigabit Network Connection PCI Express Port 2 SATA AHCI Controller	PCI shared [1)]
IRQ18	PCI Express Port 3 CAN Controller I2C Controller IEEE 1588 Hardware Assist SDIO Controller Serial Peripheral Interface Bus	PCI shared [1)]
IRQ19	PCI Express Port 4 DMA Controller USB Client Controller USB OHCI Controller 4, 5, 6 USB EHCI Controller 2 UART Controller 1 (COM3) UART Controller 2 (COM4) UART Controller 3 (COM5) UART Controller 4 (COM6)	PCI shared [1)]
IRQ20	Embedded media and graphics	PCI shared [1)]

8.5.5 Input/output address areas

8.5.5.1 Overview of the internal module registers

The following addresses are used for the internal registers:

Register type	Addresses
Watchdog register	See Intel Atom E6xx data sheet (http://www.intel.com/content/www/us/en/intelligent-systems/medical-applications/atom-e6xx-series-datasheet.html)
Output register LED 1/2 and SF LED / RUN/STOP LED (Page 131)	I/O 404Eh - 404Fh
Battery status register (read only) (Page 131)	RTC_low: GPIO_BAR(D31:F0 offset 44-47h) + offset 08h bit 1 RTC_fail: GPIO_BAR(D31:F0 offset 44-47h) + offset 08h bit 2

8.5.5.2 CAN register

The CAN controller integrated in the chipset is used. You can obtain details on its interface from the chipset manufacturer.

8.5.5.3 Output register of the user LEDs

The bits in the output register of the three LEDs (read/write, address 404Eh) have the following meaning:

User LED	I/O address bit [1]
Yellow USER LED (dual color LED1)	404Fh Bit 7
Yellow USER LED (dual color LED2)	404Fh Bit 6
Yellow USER LED (dual color LED3)	404Fh Bit 5
Green USER LED (dual color LED1)	404Eh Bit 7
Red USER LED (dual color LED2)	404Eh Bit 6
Red USER LED (dual color LED3)	404Eh Bit 5

[1] The bits are low-active

LED1 and LED2 indicate the progress of the BIOS self-test during the device startup by alternately flashing (yellow). When the BIOS self-test is complete, the LEDs switch off.

8.5.5.4 Battery status register (read only)

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

Meaning of the bits

Battery status register (read only, address 50Fh)								
Bit								Meaning
7	6	5	4	3	2	1	0	
x	x	x	x	x	0	0	x	CMOS battery capacity is still sufficient.
x	x	x	x	x	1	0	x	CMOS battery capacity is exhausted (remaining capacity is sufficient for approx. one month)
x	x	x	x	x	1	1	x	CMOS battery is empty

8.5.5.5 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
8010 2010h	9040 0000h Address is assigned dynamically (depending on device configuration)	80000 h

8.6 BIOS description

8.6.1 Overview

BIOS Setup program

BIOS Setup program is stored in ROM BIOS. System configuration data are stored in battery-backed RAM of the device.

SETUP can be used to define the hardware configuration (for example, the drive type) and system properties. The BIOS Setup is also used to set the time and date of the realtime clock.

Changing the device configuration

Your device configuration is preset for operating with the included software. You should only change the default values if you have modified the technical configuration your device, or if a fault occurs when the unit is powered up.

8.6.2 Starting BIOS Setup

Starting BIOS Setup

Start the setup program as follows:

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

   In the figures shown, the default settings differ based on the device versions. With the default setting of the device, the example display shown below appears following startup:



   On completion of the POST, the BIOS gives you the opportunity of starting the SETUP program. The following message appears:

   `PRESS F2 go to Setup Utility, Press F12 go to Boot Manager`

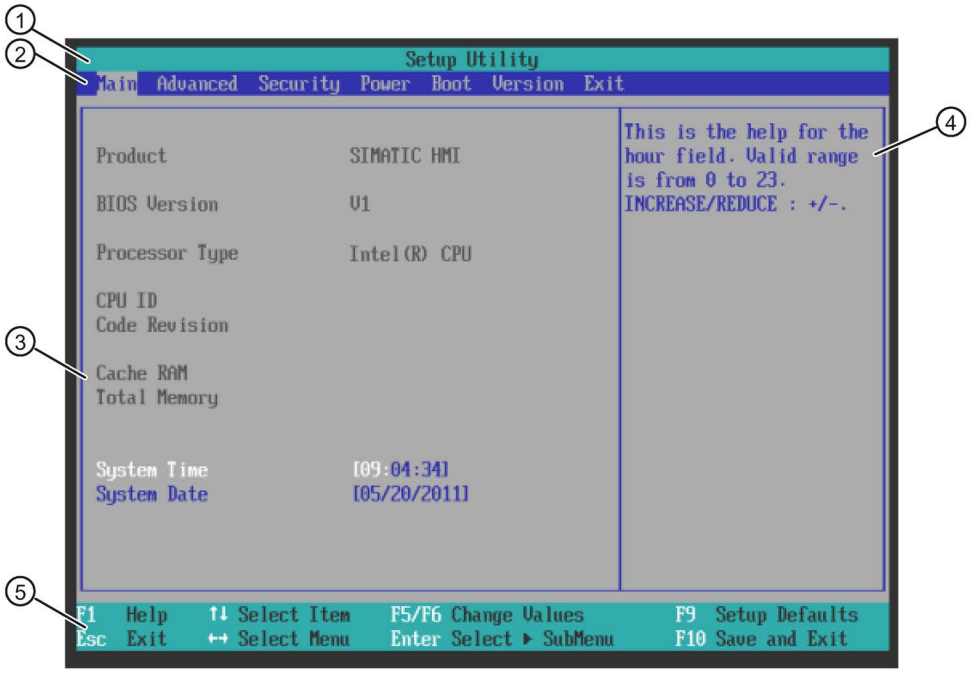
2. Press the <F2> key as long as the BIOS prompt appears on the screen.

8.6.3 BIOS Setup menus

8.6.3.1 BIOS Setup overview

The various menus and submenus are listed on the next pages. You can obtain information on the selected SETUP item from the "Item-specific help" part of the respective menu.

Example of the BIOS SETUP menu



① Header
② Menu bar
③ Selectable submenu
④ Help window
⑤ Command line

Menu layout

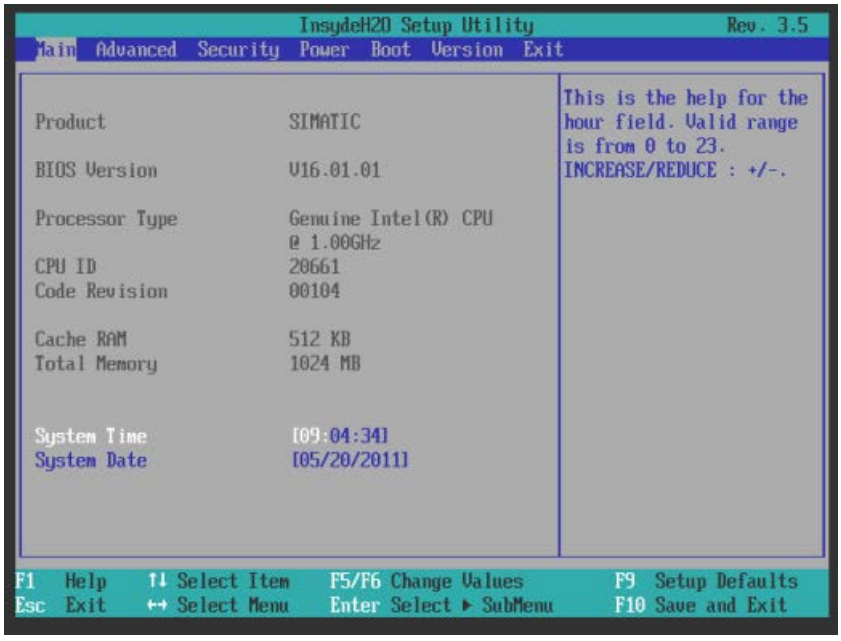
The screen is divided into four sections. In the top section ②, you can select the submenus [Main], [Advanced], [Security], [Power], [Boot], [Version], [Exit]. You can select various settings or submenus in the left middle section ③. Short help texts are displayed on the right ④ for currently selected menu entries; the bottom section contains information for operator input.

The following figures represent examples of specific device configurations. The screen content may deviate slightly depending on the equipment actually supplied.

You can move between the menu forms using the cursor keys [←] left and [→] right.

Menu	Meaning
Main	Setting system functions
Advanced	Advanced system configuration
Security	Security functions, e.g. setting a password
Power	Specify startup characteristics of the device, e.g. in response to specific events, in case of power failure, or in power saving mode.
Boot	Set boot options, e.g. the boot priority.
Version	Device-specific information (e.g. product version)
Exit	Close and save

8.6.3.2 Main menu



Main menu settings

In the main menu, you can move up and down to select the following system configuration boxes by means of the [↑] up and [↓] down cursor keys:

Field	Meaning
System Time	For viewing and setting the current time
System Date	For viewing and setting the current date

System time and date

System Time and System Date indicate the current values. Once you have selected the appropriate option, you can use the [+] and [–] keys to modify the time setting

Hour: Minute: Second

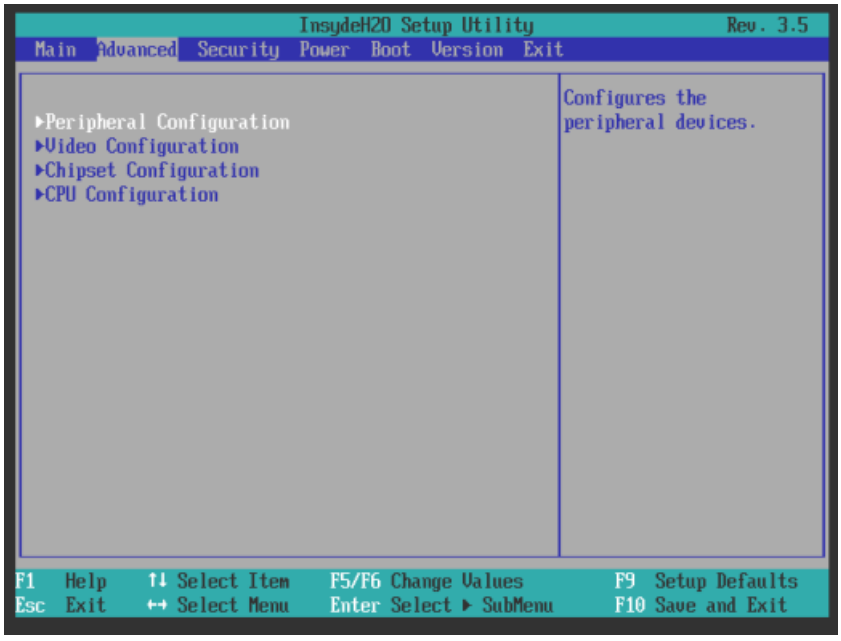
and for the date

Month/Day/Year

.

You can navigate through the entries within the date and time fields (for example, from hour to minute) using the Enter key.

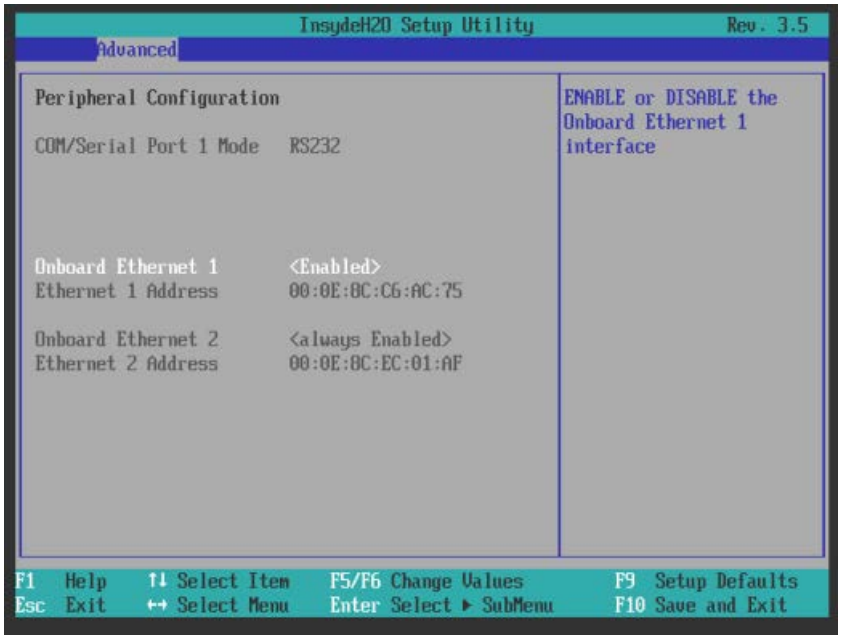
8.6.3.3 Advanced menu



Advanced menu settings

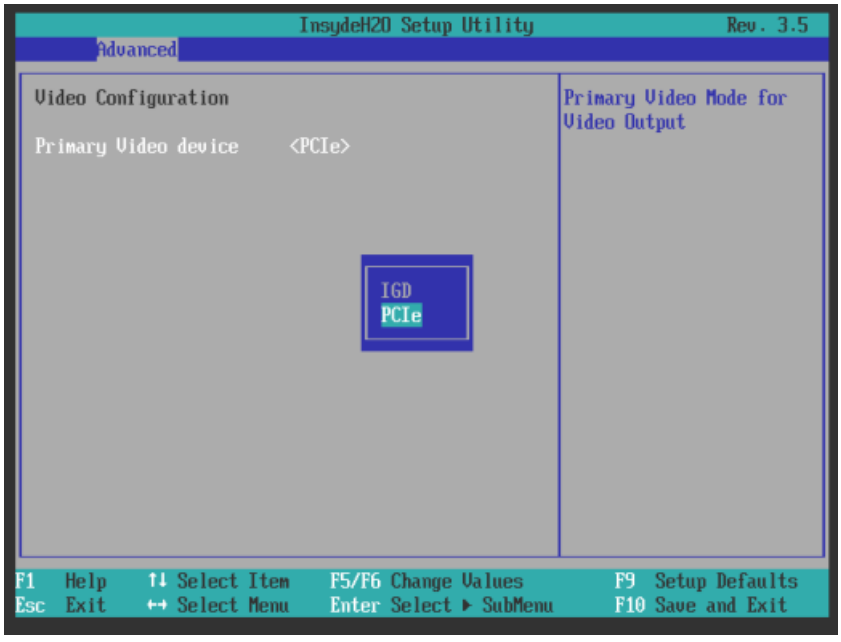
Entry	Meaning
Peripheral Configuration	Configuration of components on the mother-board.
Video Configuration	Configuration of the graphics interface
Chipset Configuration	Extended chipset configuration.
CPU Configuration	Configuration of CPU parameters

Advanced menu > "Peripheral Configuration" submenu



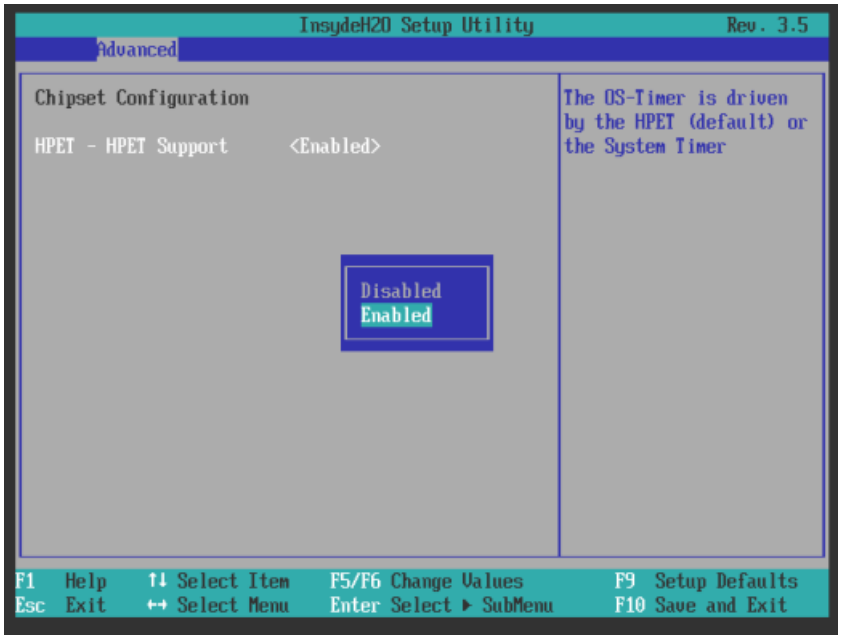
Entry	Meaning
COM/Serial Port 1 Mode	The displayed Port 1 Mode RS-232, RS-485, RS-422, CAN depends on the device configuration you ordered.
Onboard Ethernet 1	Enable the onboard Ethernet 1 interface.
Ethernet 1 address	Display the MAC address of Ethernet 1
Onboard Ethernet 2	Enable the onboard Ethernet 2 interface.
Ethernet 2 address	Display the MAC address of Ethernet 2
COM Port 2 COM Port 3 COM Port 4	Additional COM ports with status <available> are available with the COM device version.

Advanced menu > "Video Configuration" submenu



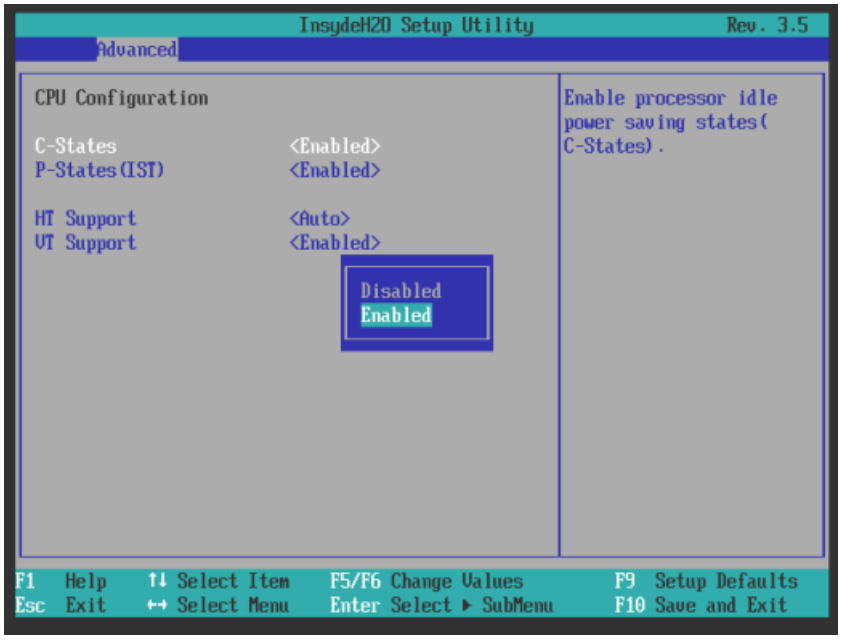
Entry	Meaning
Primary video device	Selection of the primary video interface to which the boot messages are to be output: • IGD: Internal onboard graphics • PCIe: PCIExpress graphics (internal graphics is deactivated)

Advanced menu > "Chipset Configuration" submenu



Entry	Meaning
HPET - HPET Support	Enable High Precision Event Timer.

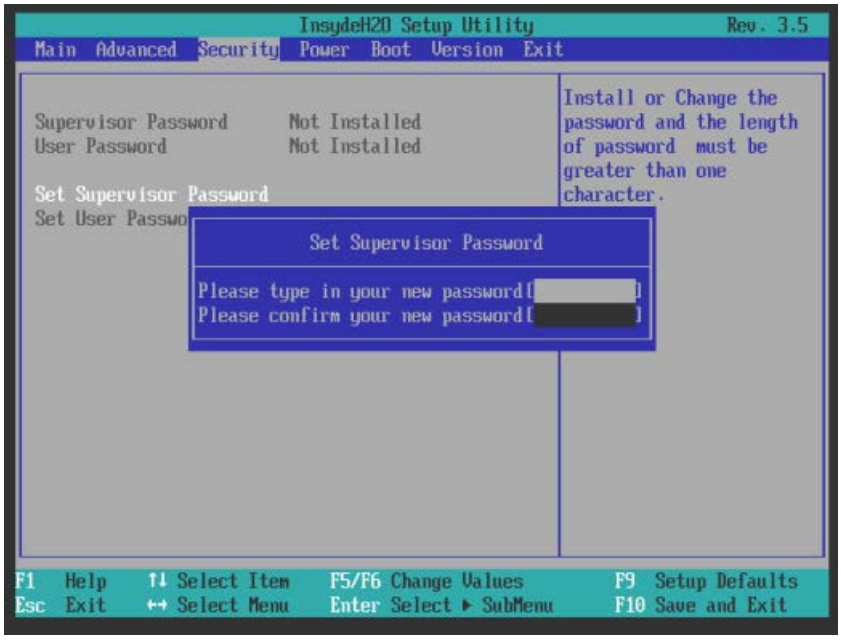
Advanced menu > "CPU Configuration" submenu



Entry	Meaning
C-States	Enable the power saving modes of the processor.
P-States (ACT)	Enable the performance modes of the processor.
HT Support	• Auto: Use hyperthreading, if available. • Disabled: Hyperthreading disabled.
VT Support	Enable or disable virtualization functionality "Vanderpool Technology".

8.6.3.4 Security menu

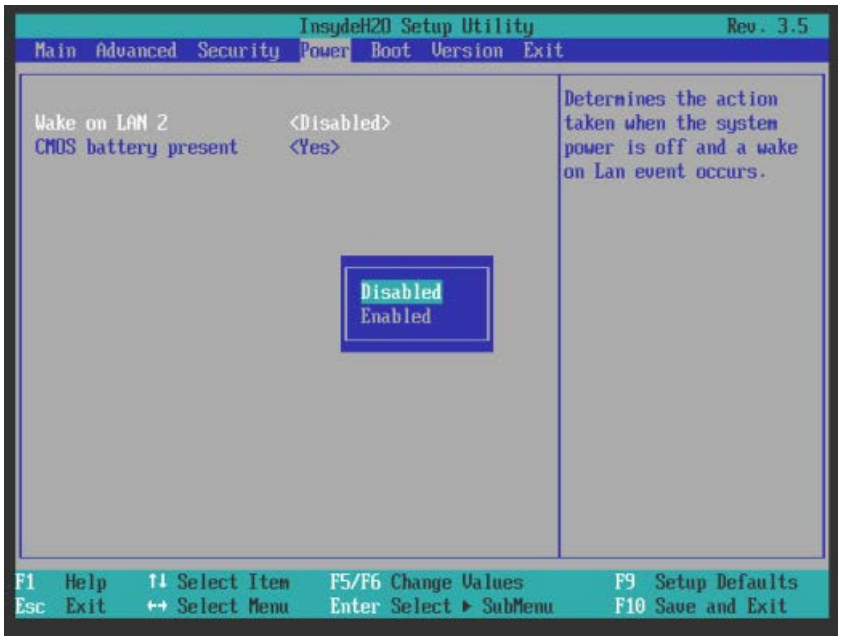
You can only edit the fields enclosed in square brackets. Two passwords can be assigned to protect your PC from unauthorized use. The supervisor password can be used to restrict access to the drives.



Supervisor Password	Installed	Certain setup fields can be customized, including the supervisor and user passwords.
	Not installed	The password is disabled.
User password	Installed	Certain setup fields can be changed by the user, including the user password.
	Not installed	The password is disabled.
Set Supervisor Password	This field opens the password input dialog. After having entered the supervisor password, you can enter a new password or clear and deactivate it by pressing "Return".	
Set User Password	This field opens the password input dialog. Logged on users can change the password, or clear and deactivate it by pressing "Return".	
Power on password	Disabled	The password is queried during startup.
	Enabled	The password is not queried during startup.
User Access Level	View only	Read access only to all fields of the InsydeH20 Setup.
	Limited	Only certain fields can be edited.
	Full	All fields can be edited, with the exception of the "Supervisor password".
Clear user password		Deletes the user password.

8.6.3.5 Power menu

The reaction of the device to a power failure and after wake events is specified in this menu.

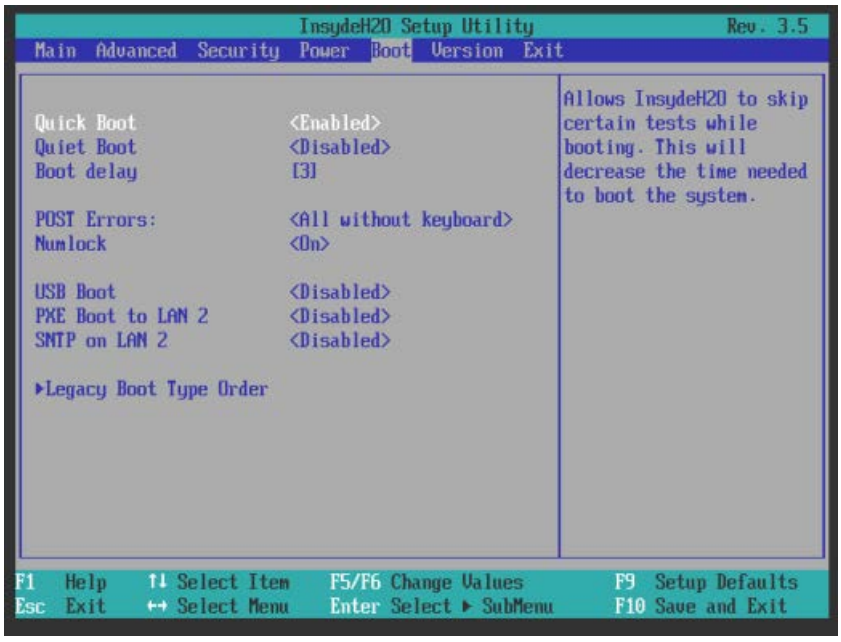


Entry in the Power menu

Entry	Meaning
Wake on LAN 2	If activated <Enabled>, the device powers on when a wake event occurs. Otherwise, the device remains switched off.
CMOS battery present	This function indicates to the system whether a CMOS battery is being used. Enable this function with "Yes" if a CMOS battery has been installed. Disable this function with "No" if no CMOS battery has been installed.

8.6.3.6 Boot menu

In this menu this booting behavior of the device is specified and the boot medium or sequence of the boot media is determined.

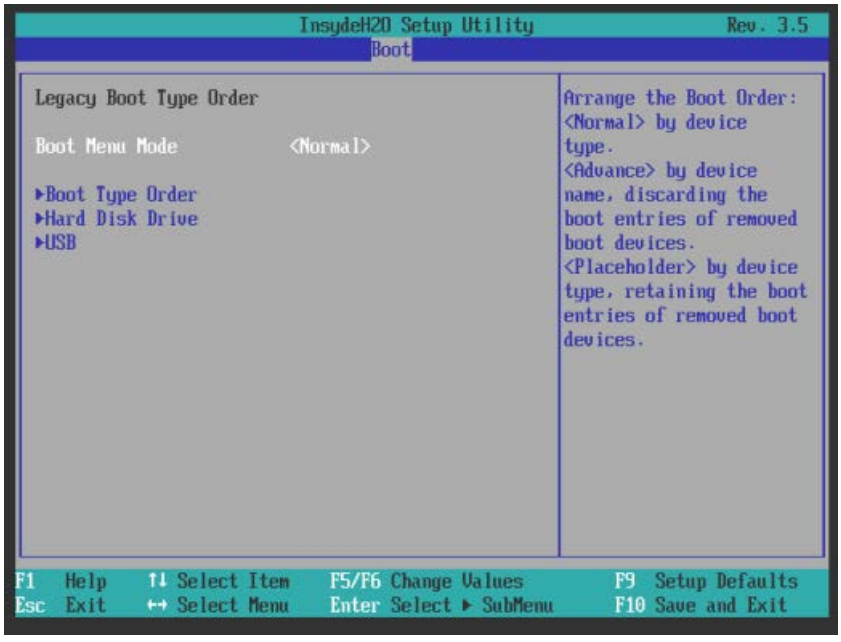


Entries in the boot menu

Entry	Meaning
Quick Boot	Enable or disable If enabled, the device starts faster because various hardware function tests are skipped.
Quiet Boot	If disabled, the device boots in text mode. If enabled, a splash screen with logo is output.
Boot delay	Delays the boot sequence by n seconds.
POST errors	Specification of the boot reaction when faults are detected. • Never halt on errors: Continue the booting process when errors occur. • Halt on all errors: Interrupt the booting process when errors occur. • All without keyboard: Interrupt the booting process when errors occur, except for keyboard errors. • All without kb/smart: Interrupt the booting process when errors occur, except for keyboard and S.M.A.R.T errors. (SMART: Self-Monitoring, Analysis and Reporting Technology)
Numlock	On = Enable numeric keypad on right Off = Disable numeric keypad on right (= navigation)
USB Boot	Allow/Do not allow booting of inserted USB devices.
PXE Boot to LAN 2	Enable or disable booting of the LAN2 via PXE.

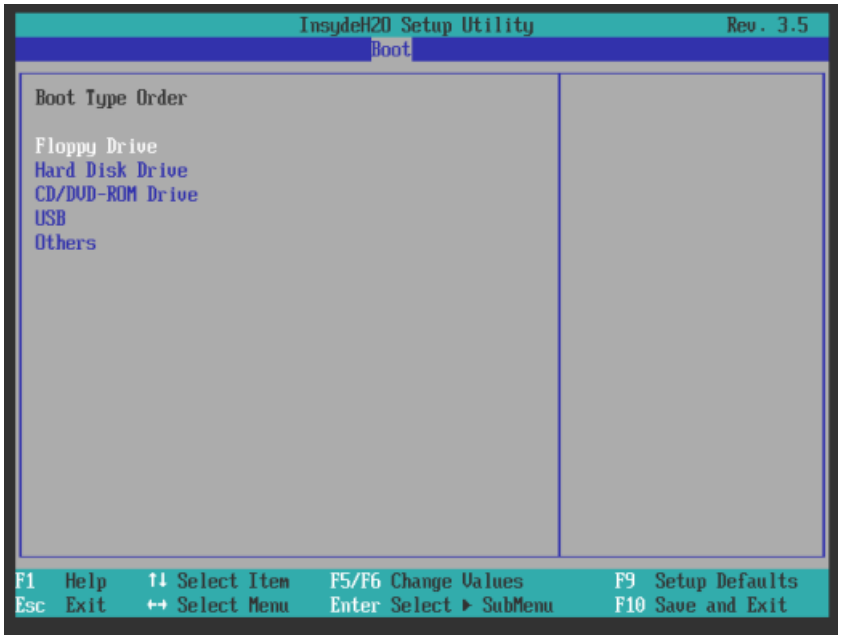
Entry	Meaning
SNTP on LAN 2	Enable or disable booting of the LAN2 via SNTP.
Legacy Boot Type Order	Set the traditional boot order (Normal, Advanced, Placeholder).

Boot menu > "Legacy Boot Type Order (normal)" submenu



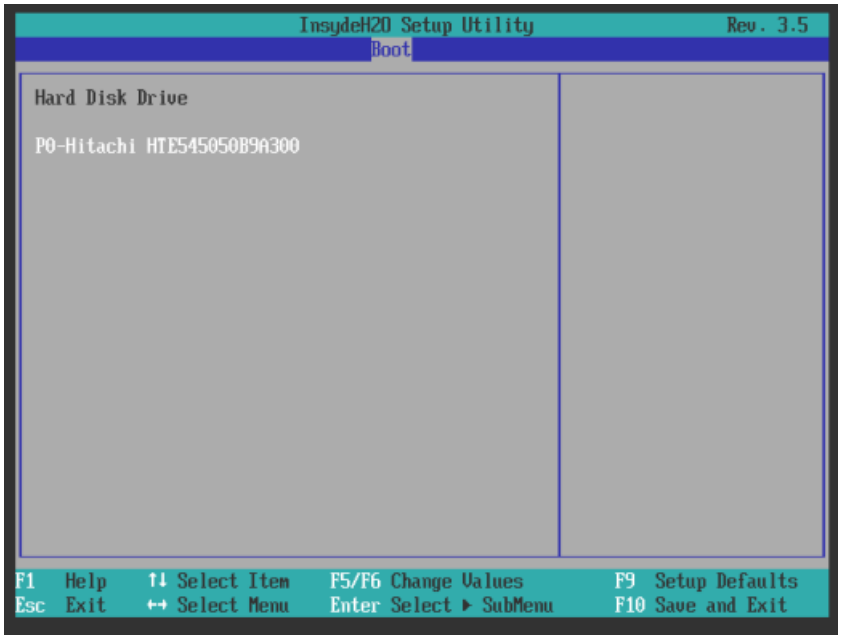
Entry	Meaning
Entry	Meaning
Boot menu mode	• Normal = Boot order based on component type • Advance = Customized boot order of all components • Placeholder = individual, fixed boot sequence that is not changed automatically
Boot Type Order (for Boot menu mode "Normal" only)	Submenu for setting the boot order of component groups relative to one another
Hard disk drive (for Boot menu mode "Normal" only)	Submenu for setting the boot order within the group of drives

Boot menu > "Boot Type Order" sub-submenu



Entry	Meaning
Entry	Meaning
Floppy drive	Setting the boot order within the group of magnetic card drives
Hard disk drive	Setting the boot order within the group of drives
CD/DVD ROM Drive	Setting the boot order within the group of optical drives
USB	Setting the boot order within the group of USB drives
Others	Setting the boot order within the Others group, for example, Remote Boot device

"Hard Disc Drive" sub-submenu



Boot menu > "Legacy Boot Type Order (Advance) and (Placeholder)" submenu

In this menu all the connected bootable components and their booting position are displayed. The booting position of the component can be moved freely.

During booting the component at the first position (highest booting priority) is used. If the component is not available, booting is carried out from the next component in the list.

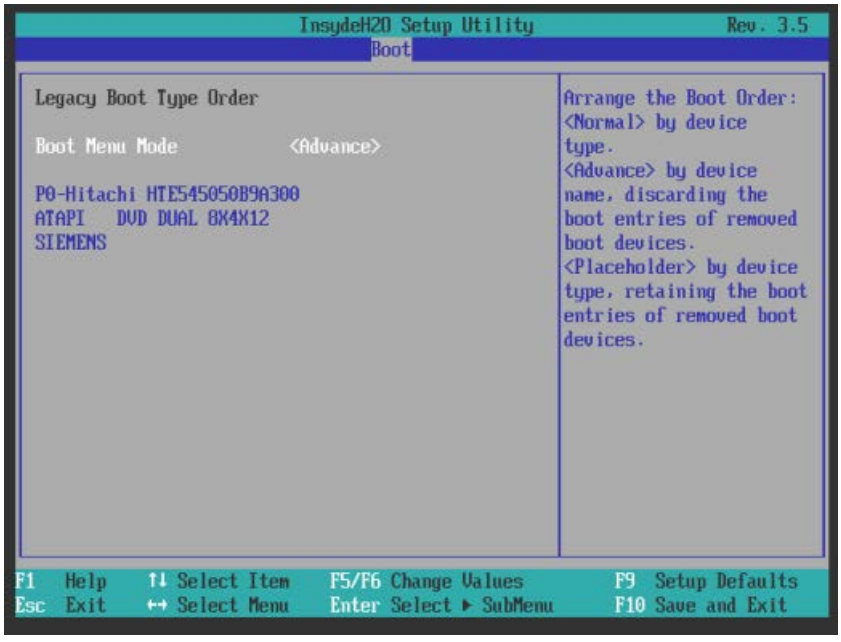
The boot sequence is changed as follows:

Select the boot component with the ↑ ↓ keys, move to the desired position with + or -.

Note

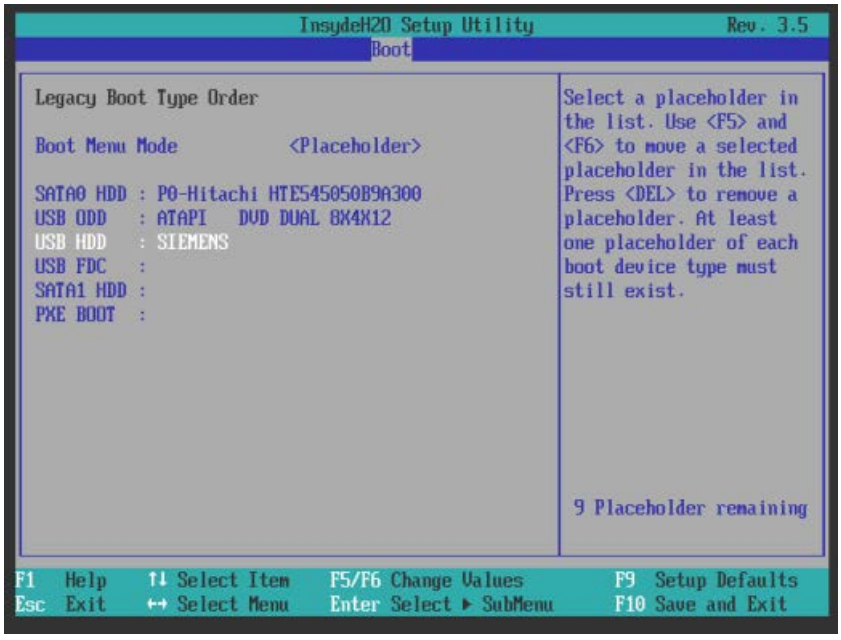
During the booting process the boot manager can be started by using the F12 key. The boot manager displays all the available boot components and boots the device selected by the user.

"Legacy Boot Type Order (Advance)" submenu



BIOS sets bootable components that are disconnected and reconnected on the PC between the boot processes to the first position in the "Advance" setting.

"Legacy Boot Type Order (Placeholder)" submenu

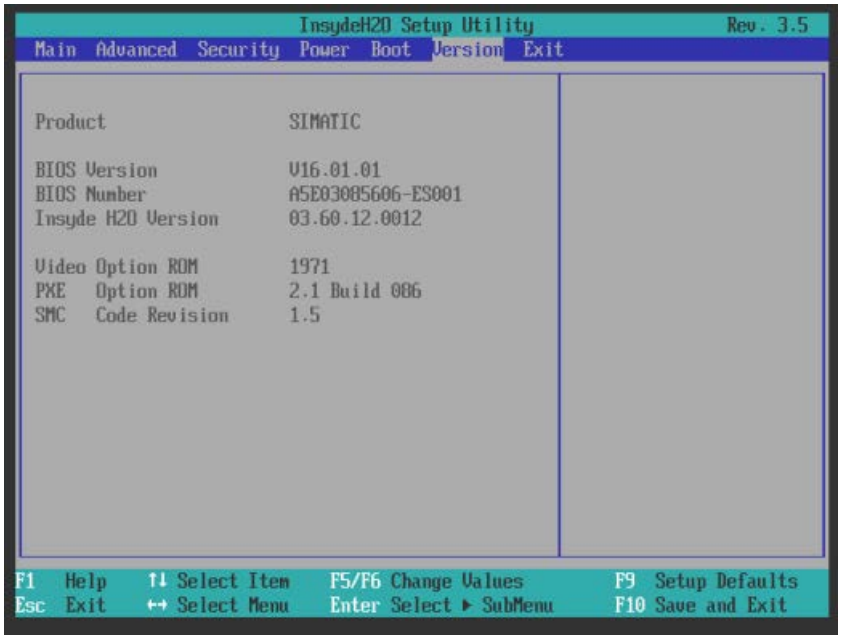


BIOS sets bootable components that are disconnected and reconnected on the PC between the boot processes to their original boot position in the "Placeholder" setting (Placeholder Boot).

8.6.3.7 Version menu

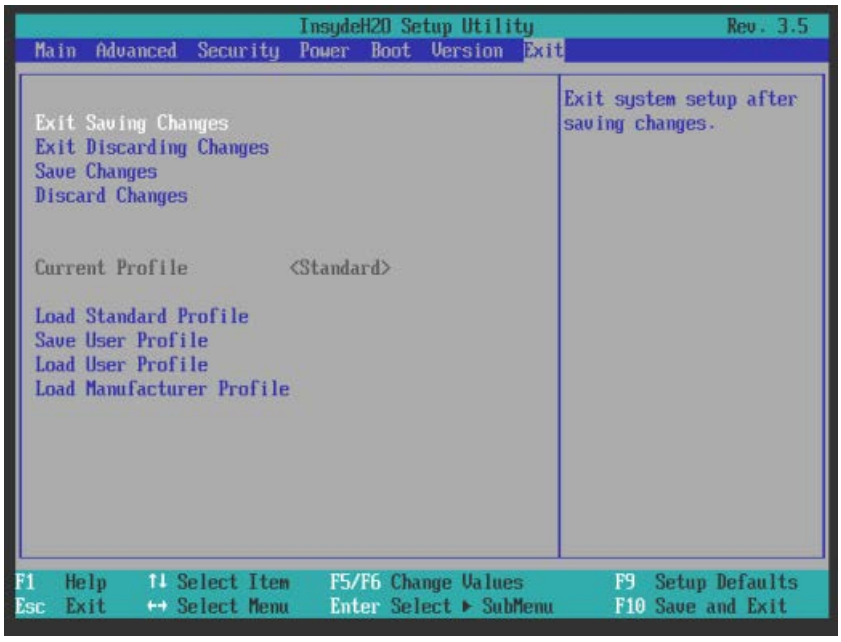
The menu shows the versions of important device-specific functions, for example, Option ROM. Keep this information at hand if customer support has technical questions about your system.

Example



8.6.3.8 Exit menu

You always exit BIOS Setup in this menu.



Settings in the Exit menu

Exit Saving Changes	All changes are saved and the system is restarted with the new parameters.	
Exit Discarding Changes	All changes are discarded and the system is restarted with the old parameters.	
Save Changes	All changes are saved.	
Discard Changes	All changes are discarded.	
Current profile	Standard	The BIOS settings are saved in the Flash memory.
	User	The BIOS settings are retained with <F9> "load defaults".
	Manufacturer	This setting is only used for production purposes. Do not use.
Load <Standard|User|Manufacturer> profile	Loads the values of the respective profile.	
Save user profile	Saves the user profile values.	

8.6.4 BIOS Setup default settings

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.

Note

The default setup settings vary depending on the ordered 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.

BIOS Setup default settings

System parameters	Default settings	Local settings
Main		
System Time	hh:mm:ss	
System Date	MM/DD/YYYY	

System parameters	Default settings	Local settings
Advanced>Peripheral Configuration		
Onboard Ethernet 2	Enabled	

System parameters	Default settings	Local settings
Advanced>Video Configuration		
Primary video device	PCIe	

System parameters	Default settings	Local settings
Advanced>Chipset Configura-tion		
HPET - HPET Support	Enabled	

System parameters	Default settings	Local settings
Advanced>CPU Configuration		
C-States	Disabled	
P-States (ACT)	Disabled	
HT Support	Auto	
VT Support	Enabled	

System parameters	Default settings	Local settings
Security		
Supervisor Password	Not installed	
User password	Not installed	
Set Supervisor Password	Inactive (no password assigned)	
Set User Password	Inactive (no password assigned)	

System parameters	Default settings	Local settings
Power		
Wake on LAN 2	Disabled	
CMOS battery present	Yes	

System parameters	Default settings	Local settings
Boot		
Quick Boot	Enabled	
Quiet Boot	Disabled	
Boot delay	3	
POST errors	All without keyboard	
Numlock	On	
USB Boot	Disabled	
PXE Boot to LAN 2	Disabled	

System parameters	Default settings	Local settings
Boot > Legacy Boot Type Order		
Boot menu mode	Placeholder	
USB FDC		
USB ODD		
USB HDD		
SATA0 HDD		
SATA1 HDD		
PXE Boot		

System parameters	Default settings	Local settings
Exit		
Current profile	Standard	

8.6.5 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 • Operating system available, but the partition is not active
Keyboard controller error	Controller error. Contact your technical support team.
SMART error	Hard disk reports pending failure through S.M.A.R.T.
Real-time clock error	Battery is weak
Real-time clock has lost power	Time corrupt due to discharged battery
CMOS battery error	Battery exhausted
CMOS battery failed	Battery empty or not inserted

8.7 Functional scope in Windows

8.7.1 Windows Embedded Standard 2009

The overview below shows the most important device functions in Windows Embedded Standard 2009:

Function	HDD/SDD/CompactFlash card version
Enhanced Write Filter (EWF)	In RAM RAM(REG)
SIMATIC IPC DiagBase	Available
Pagefile	Deactivated in favor of the EWF
System Restore Core	Deactivated in favor of the EWF
File based Writefilter (FBWF)	Available
Registryfilter	Available
Device Update Agent (DUA)	Available
HORM	Available
Telnet Server	Available
Windows Backup	Available
User Mode Driver Framework (UMDF)	Available
MUI	GER default language: English
Administrator Account	Available
User Account	Available
Explorer Shell	Available
Internet Explorer (IE)	Available, IE7
Internet Information Server (IIS)	Available V5.1
Terminal Services	Available
Bluetooth	Available
Wireless Network Support	Available
Windows Firewall	Available
Windows Security Center	Available
MSN Explorer	Not available
Outlook Express	Available
Administrative Tools	Available
SMS Advanced Client	Not available
Remote Desktop	Available V6.0
Remote Assistance	Available
.NET Framework	Not available
ASP.NET	Not available
Windows .NET Messenger	Available V4.7
Code pages/User Location/Keyboard	Selection available

Function	HDD/SDD/CompactFlash card version
Disk Management Services	Available
Windows Installer Service	Available V 3.1
Class Installer	Available
CoDevice Installer	Available
Windows Movie Maker	Not available
Media Player	Available, V11.0
Windows Media Player Tour	Not available
DirectX	V9.0c
Accessories	Available
Help files for all components	Not available
Games	Not available
Fonts	118
Windows XP Tour	Not available
Microsoft Silverlight	Available V 1.0
NetMeeting	Available V 3.1

Note

Activation of "HORM" and creation of a "Hibernate File"

Activate "HORM" as follows to use the "Hibernate" function:

```
EWFMGR C: /activatehorm
```

"Hibernate" is activated following a restart. The system then always boots from this file.

8.7.2 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, V1.4	Available, V1.4
Speech	Available	Not available
System Management Administrative Tools	Available	Available
Telnet Server	Available	Available
User Account Control	Available	Available

Function	HDD / SSD version	Memory card version
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 85)".

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 for SIMATIC PC / 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 (http://mall.automation.siemens.com)

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

- Order number of the device (MLFB)
- BIOS version (industry PC) or image version (HMI device)
- Installed additional hardware
- Installed additional software

Tools & downloads

Please check regularly if updates and hotfixes are available for download to your device. The downloads are available on the Internet under "After Sales Information System SIMATIC PC/PG" (see above).

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 to see 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. Press <F2> during the booting process to open the BIOS Setup. 2. Set the time and date in the setup menu.
Although the BIOS setting is OK, the time and data are still wrong	The backup battery is dead.	Replace the backup battery.

Problem	Possible cause	Possible remedy
USB device not responding	The operating system does not support the USB ports.	• 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".
Communications Port (COM1) with exclamation mark in the device manager.	This device is available once Windows XP has been installed from the recovery DVD.	Uninstall the device in the device manager. It will then no longer be found.

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. • In the case of a change in the configuration, restore the delivery 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. • so that only the PC voltage supply or external voltage supply is used"

Markings and symbols

B

B.1 Overview

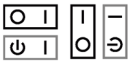
The following tables show all the symbols which may be found on your SIMATIC industrial PC, SIMATIC industrial monitor or SIMATIC Field PG in addition to the symbols which are explained in the operating instructions.

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

B.2 Safety

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

B.3 Operator controls

Symbol	Meaning		Symbol	Meaning
	On/off switch, without electrical isolation			Eject CD/DVD
	On/off switch, without electrical isolation			

B.4 Certificates, approvals and markings

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

Symbol	Meaning		Symbol	Meaning
	Approved for Australia and New Zealand			Marking for the Eurasian Customs Union
	Approved for China			Test mark of Factory Mutual Research
	CE markings for European countries			Marking of Federal Communications Commission for the USA
	EFUP (Environment Friendly Use Period) marking for China			Approved for Korea
	Test mark of the Underwriters Laboratories			Disposal information, observe the local regulations.

B.5 Interfaces

Symbol	Meaning		Symbol	Meaning
⎓	Connection to the power supply			PS/2 mouse interface
⏚	Protective conductor terminal			PS/2 keyboard-interface
⏚ ⏚	Connection for functional earthing (equipotential bonding line)			Multimedia Card Reader
DPP	DisplayPort interface			Smart Card Reader
	DVI-D interface			Line In
LAN	LAN interface, not approved for connecting WAN or telephone			Line Out
	Serial port			Microphone input
	USB port			Universal Audio Jack
	USB 2.0 high-speed port			Headphone output
SS	USB 3.0 super-speed port			

List of abbreviations

C

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	
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	Electrostatic Sensitive Devices	

EN	European standard	
EEPROM	Electrically Eraseable Programmable Read-Only Memory	
ESD	Electrostatic Sensitive Device	Electrostatic Sensitive Device
	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	Ingress Protection	Degree of 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	
MS	Microsoft	
MTBF	Mean Time Between Failures	
MUI	Multilanguage User Interface	Language localization in Windows
NTFS	New Techniques 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	Reliable Transfer Service	Request to send
RxD	Receive Data	Data transfer signal
SATA	Serial Advanced Technology Attachment	
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	Verein deutscher Elektrotechniker (Union of German Electrical Engineers)	
VT	Virtualization Technology	Intel technology which makes available 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.

Boot disk

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

Cache

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

CE marking

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

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 beneath the operating system and represents the successor to PC BIOS, focusing on 64-bit systems.

File Based Write Filter

Configurable write filter to protect individual files from write access.

Formatting

Basic partitioning of memory space on a magnetic data medium into tracks and segments. Formatting deletes all data on a data medium. All data media must be formatted prior to their first use.

HORM

Hibernate once, resume many is a method for fast booting from a single Hibernate file that only needs to be created once. HORM ensures restoration of a uniform, saved system state when booting. This minimizes write access, for example to a CompactFlash medium, when you start up and shut down Windows Embedded Standard 7.

Hub

A term in network technology. In a network, a device joining communication lines at a central location, providing a common connection to all devices on the network.

Hyper Threading

HT technology (multi-threading) enables the parallel computing of processes. HT is only effective when all relevant system components, such as processors, operating systems and applications are supported.

IGD

Integrated Graphics Device. Graphics interface integrated in the chipset.

Image

This refers to the image, for example, of hard disk partitions saved to a file in order to restore them when necessary.

Intel Active Management Technology

This technology permits the diagnostics, management and remote control of PCs. It is only effective when all relevant system components, such as processors, operating systems and applications are supported.

Intel VT

The Intel Virtualization Technology (IVT) is the implementation of a secure closed environment for applications. Special (visualization) software an a VT-capable processor is required for its use.

Interface

- Physical interconnection (cable) of hardware elements such as PLCs, PCs, programming devices, printers or monitors.
- Interface for interactive software applications.

LAN

Local **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 provides the license keys for protected software.

License key disk

The license key disk contains the authorizations or license keys required to enable protected SIMATIC software.

Low-voltage directive

EC Product Safety Directive relating to the safety of products which are operated on low voltage (50 V AC to 1000 V AC, 70 V DC to 1500 V DC) and not specified in other directives. Compliance is confirmed by the CE symbol and the EC certificate of conformity.

Module

Modules are plug-in units for PLCs, programming devices or PCs. They are available as local modules, expansion modules, interfaces or mass storage (Mass storage module).

Motherboard

The motherboard is the core of the computer. Here, data are processed and stored, and interfaces and device I/Os are controlled and managed.

Operating system

Generic term which describes all functions for controlling and monitoring user program execution, distribution of system resources to the user programs and the operating mode in cooperation with the hardware (for example, Windows 7 Ultimate).

Pixel

The pixel represents the smallest element that can be reproduced on-screen or on a printer.

Plug&Play

Generally, a reference to the ability of a computer to automatically configure the system for communication with peripheral devices (for example monitors, modems or printers). The user can plug in a peripheral and "play" it at once without manually configuring the system. A Plug&Play PC requires both a BIOS that supports Plug&Play and a Plug&Play expansion card.

POST

Self-test performed by the BIOS after the computer is switched on. Performs a RAM test and a graphics controller test, for example. The system outputs audible signals (beep codes) if the BIOS detects any errors; the relevant message indicating cause of error is output on the screen.

Programmable controller

The programmable controllers of the SIMATIC S5 system consist of a central controller, one or several CPUs and various other modules (for example, I/O modules).

PXE server

A **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 factory state if the system has crashed. The bootable DVD contains all the necessary image files. You can also create a boot disk allowing restoration via the network.

ROM

Read-Only Memory ROM is a read-only memory in which every memory location can be addressed individually. The programs or data are permanently stored and are not lost in the event of a power failure.

S.M.A.R.T

The Self-Monitoring, Analysis and Reporting Technology (SMART or S.M.A.R.T.) is an industry standard integrated in storage media. It makes for permanent monitoring of important parameters and early detection of imminent problems.

SATA

Serial ATA Interface for hard disk drives and optical drives with serial data transmission rates of up to 300 Mbps.

SETUP (BIOS Setup)

A program in which information about the device configuration (that is the configuration of the hardware on the PC/PG) is defined. The device configuration of the PC/PG is preset with defaults. Changes must therefore be entered in the SETUP if a memory expansion, new modules or a new drive are added to the hardware configuration.

SSD (Solid State Drive)

A Solid State Drive is a drive that can be installed like any other drive; it does not contain a rotating disk or other moving parts because only semiconductor memory chips of similar capacity will be used. This design makes SSDs more rugged, provides shorter access times, low energy consumption and rapid data transfer.

STEP 7

Programming software for the creation of user programs for SIMATIC S7 controllers.

Troubleshooting

Error cause, cause analysis, remedy

Trusted Execution Technology

Hardware implementation that allows secured execution of programs and applications. It is only effective when all relevant system components, such as processors, operating systems and applications are supported.

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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