SIEMENS

SIMATIC

Industrial PC SIMATIC IPC327G

Operating Instructions

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07/2022

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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 operation of the SIMATIC IPC327G.

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.

Validity of the operating instructions

These operating instructions are valid for all versions of the SIMATIC IPC327G.

The updates of the document will be published on the Siemens Industry Online Support (https://support.industry.siemens.com/cs/ww/en/view/109744171).

Scope of this documentation

The documentation for the SIMATIC IPC327G consists of:

- Product information "Important notes on your device"
- SIMATIC IPC327G Quick Install Guide
- SIMATIC IPC327G Operating Instructions in English, German, Chinese and Japanese

If you ordered the device with an operating system, the documentation is supplied on the USB stick in PDF format (in multiple languages).

Conventions

The terms "PC" and "device" are sometimes used to refer to the SIMATIC IPC327G in this documentation.

Instead of the specific names of the operating system, we are using the abbreviation "Windows 10" throughout.

History

The following editions of these operating instructions have been published:

Edition	Comment
09/2021	First edition
07/2022	Add the UKCA certification

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Overview

1

1.1 Product description

1.1.1 Overview



SIMATIC IPC327G provides high-level industrial functionality:

- Compact design
- Scalability
- High degree of ruggedness
- Various interfaces
- Maintenance-free operation possibility

1.1.2 Configuration plan

Mounting	The device supports the following two mounting types: • Standard (Wall mounting) • Mounting on a standard rail
Chipset	• Intel Atom® x6000E series

Processor	• Intel Atom® x6413E Processor (up to 3.0 GHz)
Main memory	Memory expansion up to 16 GB with the following memory modules: • 4G DDR4 SDRAM • 8G DDR4 SDRAM • 16G DDR4 SDRAM The max speed of memory is up to 3200 MT/s. The processor supports IBECC (In-Band-Error-Correction-Code), and its default value in BIOS is "Disable".
Expandability	• 2 × M.2 Key B connector
Graphics	• Intel® UHD Graphics
Power supply	• 24 V DC (19.2 to 28.8 V)
Trusted Platform Module (TPM)	• Without TPM • TPM 2.0
Drives and storage media	
M.2 NVMe/SATA SSD	• Without drive • 256GB Eco SSD • 512GB Eco SSD
M.2 Module	• Support 2 × M.2 Module on the motherboard
Interfaces	
Ethernet	• 2 × RJ45 Ethernet 10/100/1000 Mbps
COM	• 2 × RS232/RS422/RS485 [1] (switchable), D-sub connector, 9-pin
COM (optional)	• 2× RS232 (optional), max. 115 Kbps, D-sub connector, 9-pin
USB (external)	• 4 × USB 3.1 Gen2 (up to 10 Gb/s)
USB (internal)	• 1 × USB pin header (2 USB 2.0 ports)
USB dongle (internal)	• 1 × USB 2.0 type A connector
DisplayPort	• Connection of a digital monitor, support DisplayPort Standard Version 1.4 • 2 × DP++ [2], support resolution up to 4096 × 2160 pixels at 60 Hz
SIM card slot (internal)	• 1 × SIM card slot
Keyboard, mouse	Connection through USB port
Audio (optional)	Connection for analog audio source and speaker
Operating systems	
Operation Systems	• Without OS • Windows 10 Enterprise 2019 LTSC (Long Term Servicing Channel) 64-bit (MUI) [3]

[1] In the BIOS setup, you can configure support of RS232/RS422/RS485 for each COM port.

[2] DP++ is a DisplayPort Dual-Mode, and it supports HDMI/DP signal output.

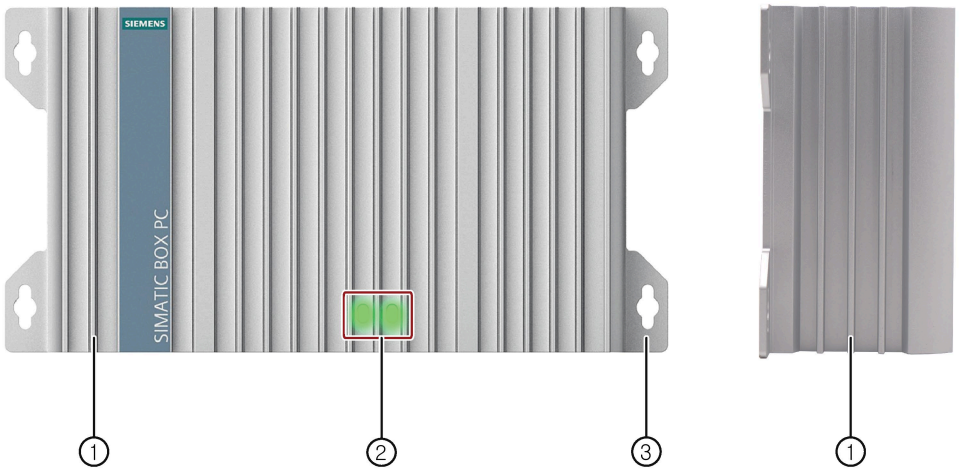
[3] MUI: Multi-language user interface; More language packages are available on the USB stick. You can install them according to your request.

1.2 Structure of the devices

1.2.1 Views of the device

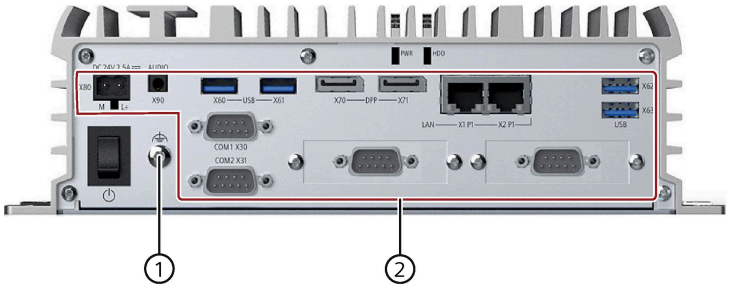
Front view and side view

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



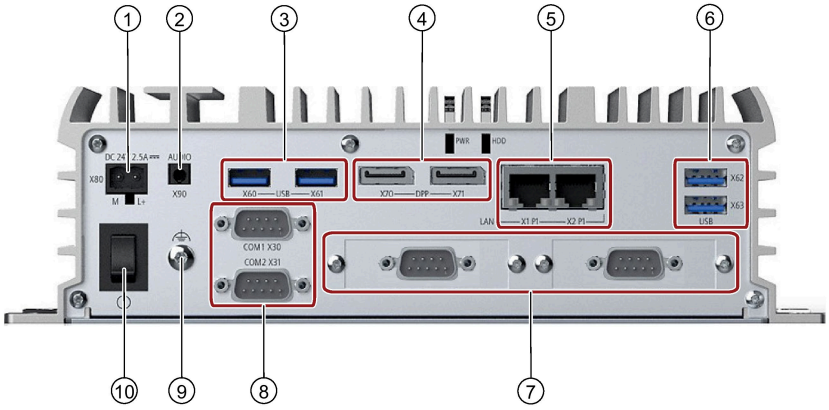
① Cooling fins
② LED displays
③ Mounting holes for wall mounting

Bottom view



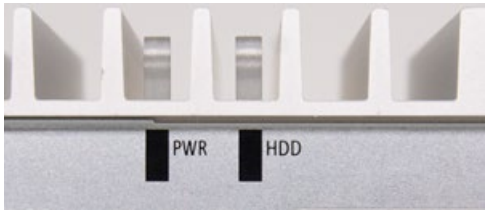
① Function earth connection
② Interfaces

1.2.2 Interfaces of the device



①	Power supply	Connection for a 24 V DC power supply
②	Audio (optional)	Connection for analog audio source and speaker
③	USB 3.1 port (X60/X61)	2 × USB 3.1 port, high current
④	DPP (X70/X71)	2 × DisplayPort connection
⑤	LAN (X1P1/X2P1)	2 × RJ45 Ethernet connections for 10/100/1000 Mbps
⑥	USB 3.1 port (X62/X63)	2 × USB 3.1 port, high current
⑦	COM (Optional)	2 × Serial interface, 9-pin RS232 D-sub connector
⑧	COM (X30/X31)	2 × Serial interface, 9-pin RS232/RS422/RS485 D-sub connector
⑨	Function earth	Connection for function earth
⑩	On/Off switch	Switch on; Switch off

1.2.3 Status displays



LED	State	Description
PWR	Off	Unplugged
	Green	BIOS ready to boot
	Flashing green/yellow (1 Hz)	BIOS in POST, power switch on
	Orange	Switched off or in S4/S5 state
	Flashing red (1 Hz)	Watchdog is active
HDD	Off	Not accessing data
	Green flashing	Accessing data

Example programs for controlling the LEDs on Windows operating systems are available on the Siemens Industry Automation and Drive Technology (https://support.industry.siemens.com/cs/us/en/)

1.3 Accessories

Accessories from Siemens are available for your device. These are not included in the scope of delivery.

Additional accessories can be found on the Internet:

- Industry Mall (https://mall.industry.siemens.com)
- Expansion components and accessories (https://w3.siemens.com/mcms/pc-based-automation/en/industrial-pc/expansion_components_accessories)

Accessories available for order

Accessories	Article number
M.2 Key B to Key E adapter	6ES7648-1AA50-0XR0
Dust protection set	6ES7648-1AA50-0XG0
Lithium battery	A5E48370874

Dust protection set

The Dust protection set interfaces contains:

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

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 might be carrying life-threatening voltages.

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

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

⚠ WARNING

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

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

- Ensure that only suitably qualified personnel perform the work.

⚠ WARNING

The equipment is designed for operation with Safety Extra-Low Voltage (SELV) or Protective Extra-Low Voltage (PELV).

This means that electrical circuit in which the voltage cannot exceed 30 V AC (RMS), 42.4 V AC peak or 60 V DC under NORMAL CONDITIONS and CONDITIONS OF A SINGLE FAULT, including ground faults in other circuits.

System expansions

NOTICE

Damage through system expansions

Device and system expansions might 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 can 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 can safely be installed.
- Comply with the Electromagnetic compatibility, Industrial and Residential Areas (Page 54) requirements.

⚠ WARNING

Risk of fire through expansion cards

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

Note the following:

- Observe the safety and installation instructions for the expansion cards.
- Install the device in an enclosure that meets the requirements of paragraph 9.3.2 of the IEC/UL/EN/DIN-EN 61010-2-201 standard.

NOTICE

Open Equipment

When the device is used in the area of Industrial Control Equipment in accordance with UL61010-2-201, the device is classified as "Open equipment".

Open equipment must be installed within an enclosure which protects you from hazards, including mechanical hazards, electrical shock and spread of fire.

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 (Page 41)" in the operating instructions.
- Replace the lithium battery only with an identical battery or types recommended by SIEMENS (article number: A5E48370874).
- For any requirements on product maintenance, contact Siemens Service and support (Page 79).
- 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

Observe immunity to radio frequency (RF) radiation

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

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

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

Unintentional operating situations

High frequency radiation, for example, from a cellular phone, may interfere with device functions and can cause malfunctions resulting in personal injury or material damage.

Avoid high-frequency radiation:

- Remove radiation sources from the environment of the device.
- Switch off radiating devices.
- Reduce the radio output of radiating devices.
- Please observe the information on electromagnetic compatibility in the technical specifications.

ESD Guideline

Label electrostatic sensitive devices with the ESD 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 55).

2.2 Security information

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 constitute one element of such a concept.

Customers are responsible for preventing unauthorized access to their plants, systems, machines and networks. Such systems, machines and components should only be connected to an enterprise network or the internet if and to the extent such a connection is necessary

and only when appropriate security measures (e.g. firewalls and/or network segmentation) are in place.

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

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

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

2.3 Data protection

Siemens observes the data protection guidelines, especially the requirements regarding data minimization (privacy by design). This means the following for this SIMATIC product: The product does not process / save any personal information, but only technical functional data (e.g. time stamps). If the user links this data to other data (e.g. shift plans) or if the user saves personal information on the same medium (e.g. hard disk) and therefore creates a personal reference in the process, the user has to ensure meeting the guidelines regarding data protection.

2.4 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 (https://new.siemens.com/us/en.html).

2.5 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.

Installing and connecting the device

3

3.1 Preparing for installation

3.1.1 Checking the delivery package

Procedure

1. When accepting a delivery, 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.
5. Check the contents of the packaging and any accessories you ordered for completeness and damage.

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 an impact on the device.

The device might be damaged.

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

6. If the contents of the packaging are incomplete, damaged or do not match your order, inform the responsible delivery service immediately.

⚠ 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 installed or 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 device.

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

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

- Operate and store the device in a dry location.
- 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. Keep the enclosed documentation in a safe place. You need the documentation when you commission the device for the first time or meet other problems in the later work.
8. Record 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.

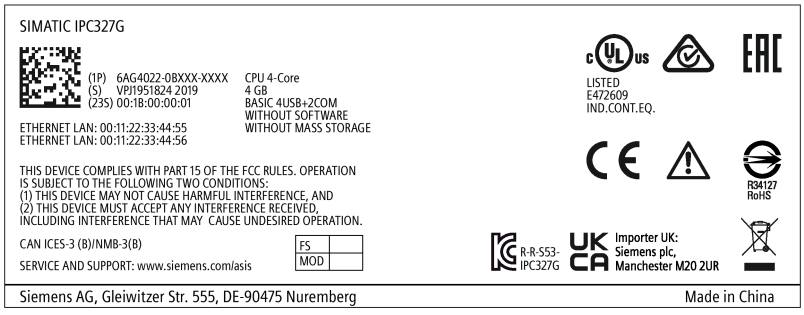
Enter the identification data in the following table:

Identification data	Source	Value
Serial number	Product label	S VP ...
Order number	Product label	6AG4022-0B...
Production version	Product label	FS

Identification data	Source	Value
Microsoft Windows Product Key Certificate of Authenticity (COA)	Back of the device	Only devices with preinstalled Windows operating systems have COA labels
Ethernet address 1 (MAC)	Product label	
Ethernet address 2 (MAC)		

Product label

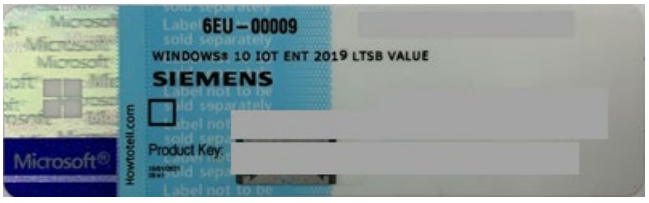
The following image shows the product label on the SIMATIC IPC327G as an example.



COA label

Microsoft Windows "Product Key" on the "Certificate Of Authenticity" (COA):
The COA label is only attached to the rear of the device containing a preinstalled and activated Windows operating system.

- COA label of a device with Windows operating system



3.1.3 Permitted mounting positions

The horizontal mounting position is permitted.



Take into account the permitted temperature range for operation that depends on the mounting position in accordance with the "Technical specifications (Page 60)" section.

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

- Underneath of the device at least 100 mm
- Above the device at least 50 mm

3.2 Mounting the device

3.2.1 Mounting instructions

Note

If the equipment is used in a manner not specified by the manufacture, the protection provided by the equipment might be impaired.

Note the following:

- The device is approved for indoor operation only.
- When the device is used in the area of Industrial Control Equipment in accordance with IEC/EN/DIN EN/UL61010-2-201, the device is classified as "Open equipment". Open equipment must be installed within an enclosure which protects you from hazards, including mechanical hazards, electrical shock and spread of fire.
- Install the device only as one of the described permitted mounting positions.
- For installation of control cabinet, observe the country-specific regulations.

- All the external circuit of the device must be safe extra low voltage (SELV) or protective extra-low voltage (PELV) circuit.
- This device is designed for use in a normal industrial environment. Without additional protective measures (such as the provision of clean air), SIMATIC Box PCs may not be operated in harsh environments that are subject to caustic vapors or gases.

Possible mounting types of the device:

Mounting on a standard rail



Wall mounting



Position of the interfaces

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

Fasten securely

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

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

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

WARNING
Personal injuries or material damage in the case of insufficient load-bearing capacity of wall The device could fall if the wall to which it is mounted has insufficient load-bearing capacity. This can result in personal injuries or material damage. Ensure that the wall is capable of bearing four times the total weight of the device (including the brackets and expansion modules). The total weight of the device is approximately 1.8 kg.

3.2.2 Mounting on a standard rail

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

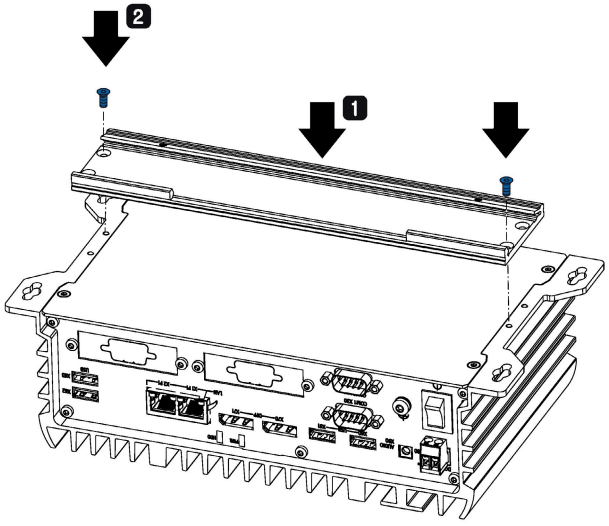
Requirements

- 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 T10 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.

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 rail from the device.

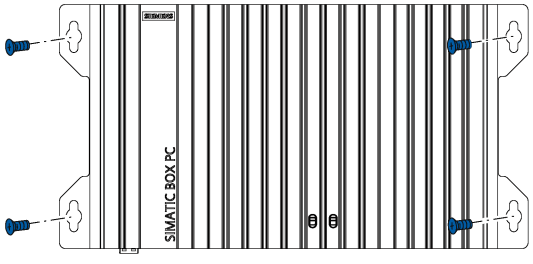
3.2.3 Wall mounting

Wall mounting is one of the horizontal mounting types.

Requirements

- A screwdriver
- Four anchors and four M4 screws

Procedure for mounting



1. Place the device onto the mounting surface.
2. Mark the fixing holes.
3. Drill the fixing holes.
4. Insert the anchors in the drilled holes.
5. 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 exists if the device is opened incorrectly or defective. There is also a risk of fire if the device or connecting lines are damaged. This can result in death and serious injury.

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.
- Use a central power isolating switch for cabinet installation.

⚠ WARNING

Risk of lightning strikes

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

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

Take the following precautions:

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

NOTICE

Fault caused by I/O devices

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

The result might 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.

CAUTION

Use copper cables at connectors with terminal connections

Use copper (Cu) cables for all supply lines that are connected to the device with terminals, e.g. 24 V DC power supply cables to the 24 V DC power supply connectors.

Utiliser des câbles en cuivre sur les connexions à bornes

Utilisez des câbles en cuivre (Cu) pour tous les câbles d'alimentation qui sont raccordés à l'appareil par des bornes, par exemple les câbles d'alimentation 24 V CC sur le connecteur d'alimentation 24 V CC.

3.3.2 Connecting the function earth

A connected function earth discharges dangerous electrical charges from the metal enclosure. The current flowing through the function earth when such a fault occurs triggers an upstream protective device that disconnects the machine from the power supply.

The function earth also improves the discharge of interference generated by external power cables, signal cables or cables for I/O modules to ground.

The connection for the function earth is labeled with the following symbol:



Note

Do not connect function earth to hazardous live parts.

WARNING

Electric shock and risk of fire

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

- Connect the device to the function earth before you put it into operation.
- The FE terminal on the device must be connected to the protective conductor of the control cabinet or system in which the device is installed.
- Never operate the device without function earth.
- If a device is defective, remove it from operation without delay and label it accordingly.

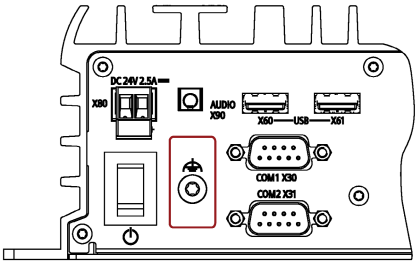
Note

The external bonding facility should provide effective connection of a conductor with a cross sectional area of at least 4 mm^2.

Requirements

- T20 screwdriver
- Tightening torque: 1 Nm
- Cable lug for M4
- Protective conductor with minimum cross-section of 2.5 mm^2 (AWG14)

Procedure



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

3.3.3 Connecting the power supply

Note

The equipment is designed for operation with Safety Extra-Low Voltage (SELV) or Protective Extra-Low Voltage (PELV).

Note

The 24 V DC power supply must be adapted to the input data of the device (see Technical data (Page 60)).

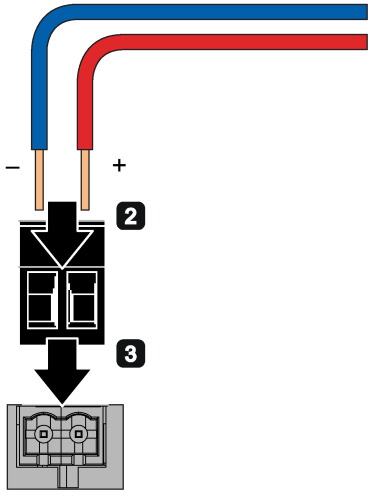
Note

Terminal blocks do not accommodate more than one individual conductor in a clamping point.

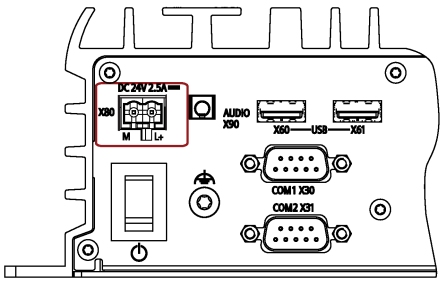
Requirements

- The function earth is connected.
- You are using the supplied terminal.
- A two-core cable meet the following requirements:
  - a copper (Cu) cable cross-section of 0.75 mm^2 to 2.5 mm^2
  - rated temperature 75 °C
- Tightening torque: 0.56 Nm.
- A slotted screwdriver with approximate 3 mm blade.

Procedure



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



3 Connect the connection terminal at the marked 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, for example SIMATIC S7.

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

Industrial Ethernet

You can establish a network between the device and other computers through 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 in Technical support. (Page 79)

Commissioning the device and device functions 4

4.1 General information on commissioning

CAUTION

Danger of burns

The surface of the device can reach temperatures of over 65 °C. Any unprotected contact may cause burns.

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

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.

Requirements

- The device is connected to the power supply.
- The function earth is connected.
- The connection cables are plugged in correctly.
- The following hardware is available for initial commissioning:
  - One USB keyboard
  - One USB mouse
  - A monitor/display

4.2 Switching the device on/off

For the configuration with operating system pre-installed, the operating system is set up automatically on the device after the initial switch-on. The commissioning procedure in this chapter is only applicable to the IPCs with operating system.

For the configurations without operating system pre-installed, contact the operating system provider to install the operating system first.

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 turn off the device during the installation, the operating system cannot be installed correctly. The operating safety of the device and the plant is at risk. Do not switch off the device during the entire installation process. Do not change the default values in the BIOS setup.

Procedure - Switching on the device

1. Press the on/off switch.

   The "PWR" LED lights up. The device carries out a self-test.

2. Follow the instructions on the screen.

   Set the region and language. If you want your system language to be international, select English. For information on changing the region and language settings, refer to the section Reinstalling the operating system (Page 46).

Procedure - Switching off the device

To turn off the device, always select the function "Start" > "Shut down".

Additional information

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

- Microsoft® Windows® 10 (https://support.industry.siemens.com/cs/ww/en/view/109749498)

Expanding and assigning parameters to the device 5

5.1 Open the device

Requirements

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

Procedure - opening the device



1 Remove the marked four screws on the rear panel of the device.



2 Lift up the device's rear panel.

Procedure - closing the device

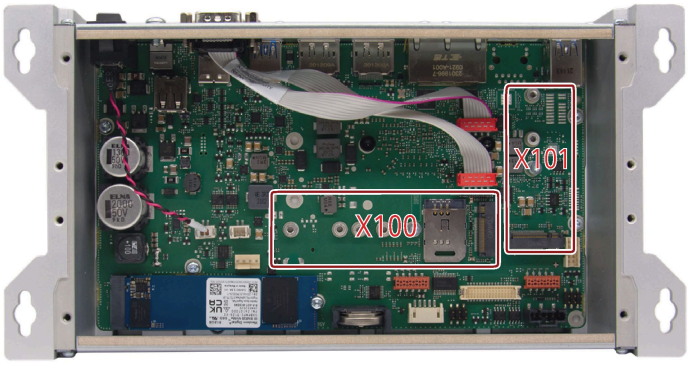
To close the device, carry out the steps for opening the device in the reverse order.

5.2 Installing the M.2 Module

Introduction to the M.2 Module

Siemens uses the M.2 Module to extend the Siemens IPC. It can be produced by Siemens or other third-party suppliers. Our device provides one or several M.2 Key B interfaces and mounting positions. M.2 key B modules (or Key B+M) can be connected to the interfaces slot X100 or X101 on the motherboard.

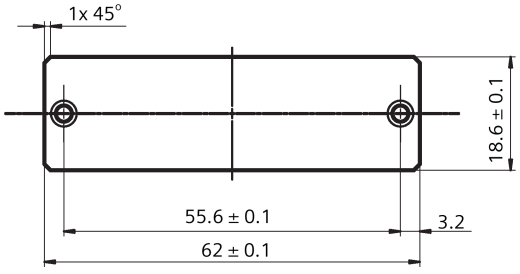
The position of each slot is marked in the following image.



Siemens IPCs provide the standardized openings in the housing to extend the devices with additional external interfaces.

The M.2 Module can go to the housing opening through a cable or with an additional interface-card. The connection to the IPC-housing for additional interfaces going outside is done with an "adapter plate" that fits to the standardized openings in the IPC-housings. The adapter plate is part of a complete M.2 Module solution. The IPC products are delivered with a closed adapter plate/COM interface to cover the opening on IPC housing.

The following image shows the dimension requirements of the closed adapter plate.



Installation of the M.2 Module in our device should not exceed the specified maximum outline or the maximum allowed power dissipation. The following table contains the detailed features and functions of the M.2 Module:

Module **Features and function**	**M.2 Module 1** **(Slot X100)**	**M.2 Module 2** **(Slot X101)**
Size	2230, 2242, 2260, 2280, 3030, 3042, 3052	2230, 2242, 2260, 3030, 3042
Interface	Key B/Key B+M	
Channel	1 × PCIe 3.0 (2 lanes) + 1 × USB2.0	
Support WLAN module [1], like Wi-Fi	Yes	Yes
Support WWAN module [2], like LTE/ 5G	Yes	No
Support Field Bus	Yes	Yes
Support 2nd NVMe SSD	Yes	Yes
Support AI	Yes	Yes
Support Special (DIO)	Yes	Yes

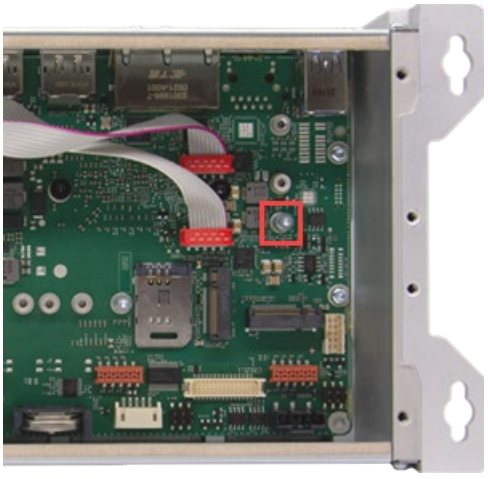
[1] Our device supports Key E and Key A+E module through "M.2 Key E to Key B adapter" in the Accessories (Page 13) .

[2] You can install 4G/5G SIM card through SIM card slot to connect to network. But SIM card function has not been certified in both ordinary location and hazardous location.

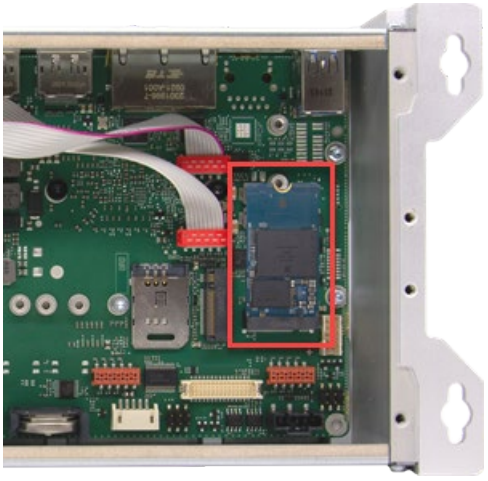
Requirements

- The device is opened.
- A T8 screwdriver

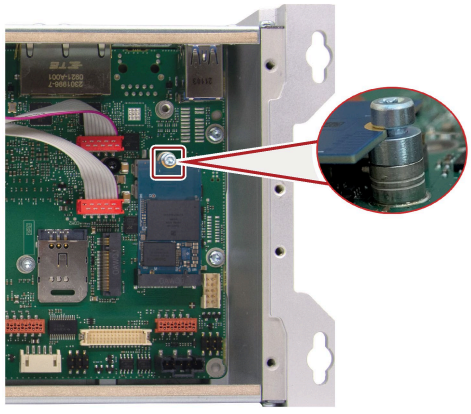
Procedure - Installing the M.2 Module



1. Unscrew the marked screw.



2. Align the golden finger on the M.2 Module on your motherboard, and then press firmly until the M.2 Module is completely seated on the slot.



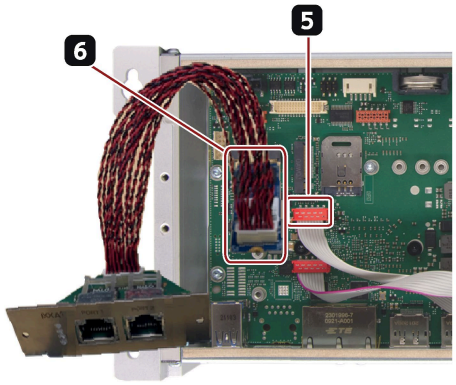
3. Secure the M.2 Module with the screw which is unscrewed in the first step.

   Note: Make sure the M.2 Module board is located between head and spacer of assembly screw.

If the M.2 Module has a cable with an additional interface-card connected to the housing opening, you need to do the following procedures:



4 Unscrew either one set of the marked screws for fixing the COM interface.



5 Remove the COM interface and its jumpers on the motherboard.

6 Follow above steps to install the M.2 Module with an additional interface-card on the X100 or X101 interfaces slot.

Note: The cable length of the M.2 Module should not be shorter than 100 mm and no longer than 200 mm.



7 Secure the additional interface-card in the position of the COM interface with screws.

Procedure - Removing the M.2 Module

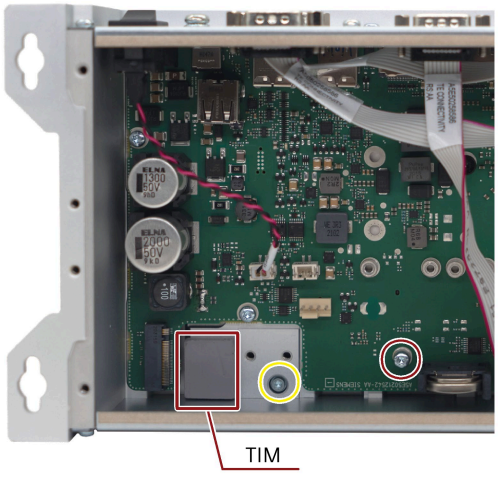
Follow above steps in reverse order to remove the M.2 Module.

5.3 Installing and removing M.2 NVMe/ SATA SSD

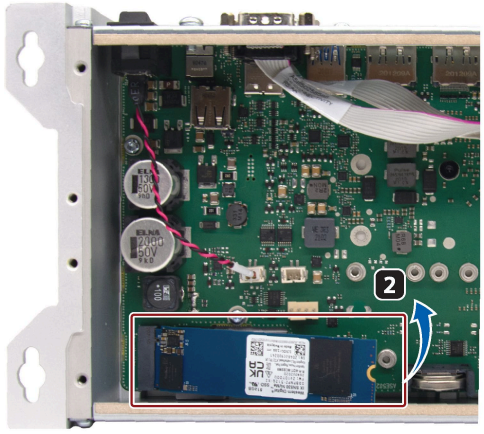
Requirements

- The device is disconnected from the power supply.
- The device is opened.
- A M.2 NVMe/SATA SSD that is approved for industrial applications.
- A T10 screwdriver

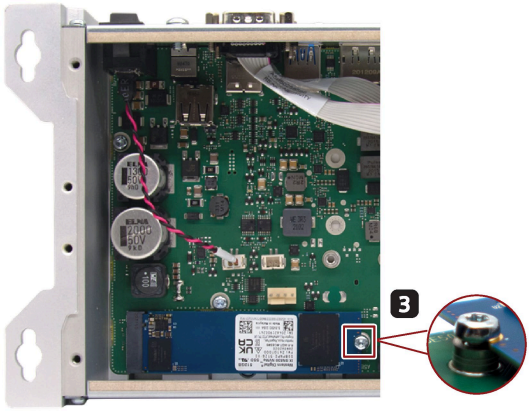
Procedure - installing the M.2 NVMe/SATA SSD



1. To install M.2 NVMe/SATA SSD with form factor 2280, remove the screw marked in red.
   To install M.2 NVMe/SATA SSD with form factor 2230/2242, remove the screw marked in yellow.
   Note: Do not touch or remove the SSD Thermal Interface Material (TIM) when installing the M.2 NVMe/SATA SSD. Otherwise, it may result in the M.2 NVMe/SATA SSD malfunction.



2. Align the golden finger on the M.2 NVMe/SATA SSD to the motherboard, then press firmly until the M.2 NVMe/SATA SSD is completely seated on the slot.



3. Secure the M.2 NVMe/SATA SSD with the screw which is unscrewed in the first step.

Procedure - removing the M.2 NVMe/SATA SSD

To remove the M.2 NVMe/SATA SSD, carry out the steps for installing the M.2 NVMe/SATA SSD in the reverse order.

Maintaining and repairing the device

6

6.1 Maintenance intervals

To maintain high system availability, Siemens recommends you replace some of the PC components that subject to wear in according with the replacement intervals indicated in the table below.

Component	Replacement interval:
CMOS backup battery	5 years

6.2 Repair information

Carrying out repairs

Only qualified personnel are permitted to repair the device.

⚠ WARNING

Unauthorized opening and improper repairs on the device might 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 should be installed.

Note

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 can be destroyed by electrostatic charges. This can result in malfunctions and damage to the machine or plant.

Make sure you take precautionary measures when you open the device. For more information, refer to the chapter "ESD Guideline (Page 55)"

Cleaning the device

If you need to clean the device, use dry ESD cleaning cloths (observing the ESD protective measures).

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

For tools to open the device, see section "Open the device (Page 33)". You can make repairs on the device with the following tools:

- T20 screwdriver for function earth connection
- T8 screwdriver for spring screw and M.2 Module on the motherboard
- T10 screwdriver for all the remaining screws

6.3 Installing and removing hardware

6.3.1 Replacing the backup battery

Prior to replacement

⚠ WARNING

Risk of explosion and release of harmful substances

An explosion or fire HAZARD could occur through fitting a battery of the wrong type.

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

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

Note the following when handling lithium batteries:

- Replace the battery every 5 years.
- Replace the lithium battery only with the type recommended by the manufacturer. The new lithium battery must be certificated by UL and meet the following requirements:
  - Type: CR2050W
  - Rated voltage: 3 V DC
  - Max abnormal charging current: 10 mA
- For any requirements on product maintenance, contact Siemens Technical support (Page 79).
- 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.

WARNING

Risque d'explosion et d'émission de substances nocives

l'installation d'une pile ou d'un accumulateur de type inadéquat peut provoquer un DANGER d'explosion ou d'incendie.

Une manipulation non conforme des piles au lithium peut conduire à leur explosion.

L'explosion des piles et l'émission de polluants qui en résulte peuvent entraîner de graves lésions corporelles. Des piles usagées constituent un danger pour le fonctionnement de l'appareil.

Observez les remarques suivantes lorsque vous manipulez des piles au lithium :

- Remplacez la pile tous les 5 ans.
- Remplacez la pile au lithium uniquement par une pile du type recommandé par le constructeur. La nouvelle pile au lithium doit avoir une certification UL et satisfaire aux exigences suivantes :
  - Type : CR2050W
  - Tension nominale : 3 V CC
  - Courant de charge anormal max. : 10 mA
- Pour toute demande concernant la maintenance du produit, contactez le support technique (Page 79) Siemens.
- Ne jetez pas au feu des piles au lithium, n'effectuez pas de soudage sur la pile, ne la rechargez pas, ne l'ouvrez pas, ne la court-circuitez pas, n'intervertissez pas les pôles, ne la chauffez pas à plus de 100 °C et protégez-la de l'ensoleillement direct, de l'humidité et de la condensation.

NOTICE

Disposal of batteries

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

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

Observe the following when disposing of batteries:

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

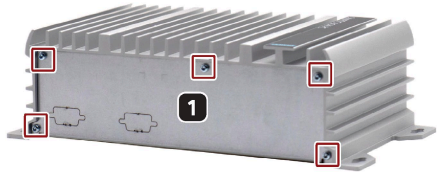
Note

Replace batteries only in non-hazardous area.

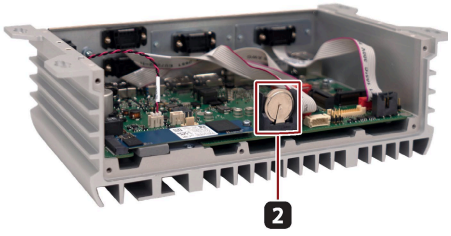
Requirements

- The device is disconnected from the power supply.
- The device is opened.
- A T10 screwdriver.

Procedure



1 Unscrew the marked five screws on the back side of the device and remove the cover.



2 Slide the battery out 45 degrees from the upper left, pull the battery out gently and insert a new battery.

Note: The positive electrode (+) of the battery should be positioned toward the outside of the device.

6.3.2 Replacing the memory module

Single channel memory

The motherboard provides one DDR4 memory sockets. The memory capacity of the device can be upgraded to a maximum of 16 GB.

The table below shows the supported memory types of motherboard.

Module type	Module Size	Description
DDR4-SDRAM	16GB	DDR4 up to 3200MT/S SODIMM 260pin
DDR4-SDRAM	8GB	DDR4 up to 3200MT/S SODIMM 260pin
DDR4-SDRAM	4GB	DDR4 up to 3200MT/S SODIMM 260pin

Requirements

- The device is disconnected from the power supply.
- All connecting cables on the device are unplugged.
- The device is opened.
- T8, T10 and T20 screwdrivers

NOTICE
Electrostatic discharge The electronic components on the PCBs are highly sensitive to electrostatic discharge. Always take appropriate precautionary measures when handling these components. Refer to the ESD directives on handling electrostatic sensitive components.

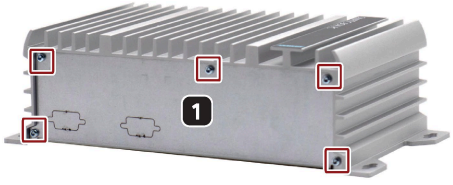
Note

Siemens strongly recommends that you use only memory modules approved by Siemens. Siemens disclaims any liability for impairment of functions caused by the use of third-party memory modules.

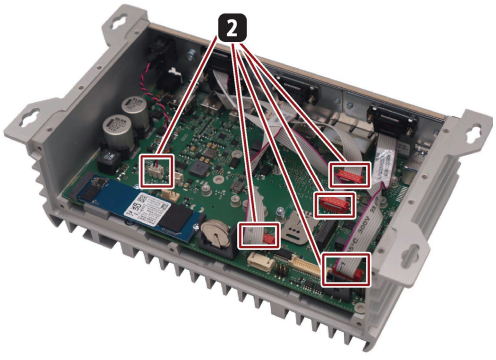
Procedure-Removing the memory module

CAUTION
• A memory module can be installed only when the direction is correct. Make sure you insert the memory card in the correct direction. • Make sure the memory module you insert is DDR4 memory module. DDR2 and DDR3 memory modules are not compatible with the motherboard.

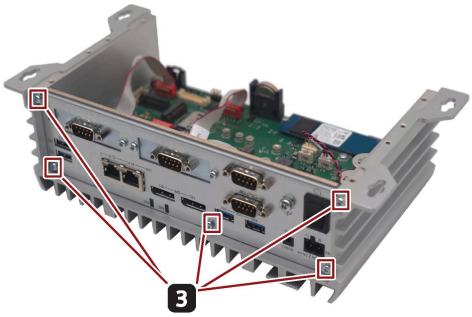
Follow the steps below to install memory module on motherboard memory sockets:



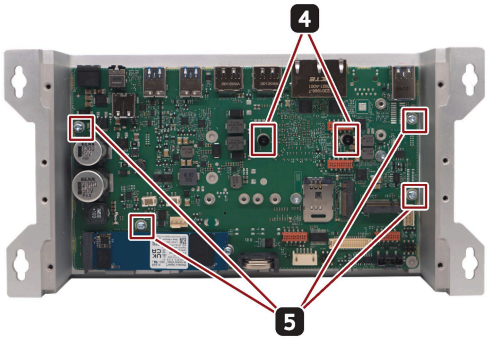
1 Unscrew the marked five screws with a T10 screwdriver on the back side of the device and remove the cover.



2 Unplug the marked jumpers from the motherboard.

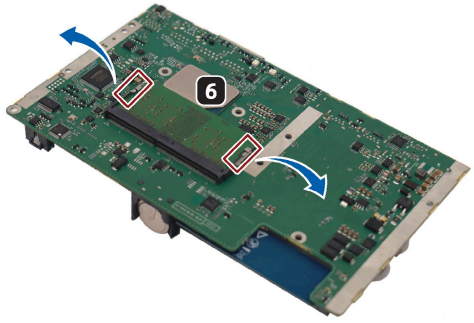


3 Unscrew the marked five screws with a T10 screwdriver on the interface panel of the device and remove the cover.

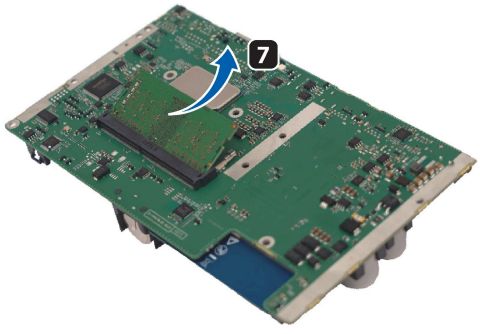


4 Unscrew the marked two spring screws with a T8 screwdriver on the motherboard.

5 Unscrew the marked four screws with a T10 screwdriver on the motherboard, then take out the whole motherboard.



6 Press the retaining clips outward in the direction of the arrows to unlock the memory socket.



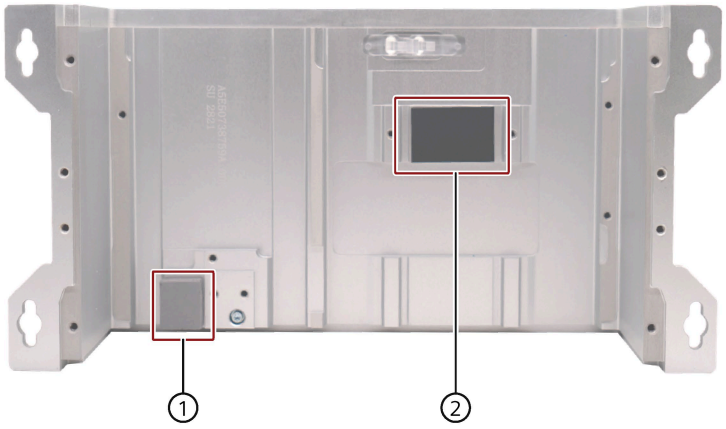
7 Pull out the memory module from the socket.

Procedure-Installing the memory module

Follow above steps in reverse order to install the memory module.

Note

Do not touch or remove the CPU TIM on the inside of the housing when installing the motherboard back into it. Otherwise, it may result in CPU malfunction.



① M.2 NVMe/ SATA SSD TIM
② CPU TIM

6.4 Reinstalling the operating system

Information on installation of the operating system is available on the Internet:

- Microsoft® Windows® 10 (https://support.industry.siemens.com/cs/ww/en/view/109749498)

6.4.1 Installing the drivers and software

Requirements

- Windows 10 operating system is installed in your IPC.
- You need to connect a mouse, a monitor and a keyboard to your PC.
- You also need the supplied USB stick to your PC.

Drivers and software list

The following drivers and software need to be installed on Windows 10:

Operating system	Drivers and software needed
Windows 10	• Step1: Intel® Chipset Device Software • Step2: Intel® Converged Security Engine • Step3: Intel® HECI Controller Driver • Step4: Intel® Gigabit Ethernet Driver • Step5: Intel® UHD Graphics Driver • Step6: Intel® Serial I/O Driver • Step7: Intel® Graphics Command Center • Step8: Realtek High Definition Audio Driver

Procedure

1. Connect the supplied USB stick to the USB port.
2. Start the program "START_DocuAndDrivers".
3. Select "Drivers" in the index.
4. Select the device and operating system.
5. Select the required driver.
6. Follow the below steps and click the icon  to install the required driver.

Note

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

Step 1: install the chipset driver

1. Click **Step1: Intel® Chipset Device Software.**
2. Click  to install the chipset driver.
3. Click **Next** to continue.
4. Click **Accept** to accept the license agreement.
5. Click **Install** to allow the computer to start the installation.

   The installation starts.
6. Click **Yes** to confirm the user account control question.
7. Click **Finish.**

   The installation is completed.

Step 2: install the Converged Security Engine

1. Click **Step2: Intel® Converged Security Engine.**
2. Click  to install the Converged Security Engine.
3. Click **Yes** to confirm the user account control question.
4. Click **Next** to continue.
5. Select the radio button before "**I have read and accept the license terms**", and click **Install** to allow the computer to start the installation.
6. Click **Finish**.

   The installation is completed.

Step 3: install the HECI Controller Driver

1. Click **Step3: Intel® HECI Controller Driver.**
2. Click  to install the HECI Controller driver.
3. Click **Yes** to confirm the user account control question.
4. Click **Next** to continue.
5. Click **Finish**.

   The installation is completed.

Step 4: install the Gigabit Ethernet driver

1. Click **Step4: Intel® Gigabit Ethernet Driver**.
2. Click  to install the Gigabit Ethernet driver.
3. Click **Yes** to confirm the user account control question.
4. Click **Next** to continue.
5. Click **Finish**.

   The installation is completed.

Step 5: install the UHD Graphics Driver

1. Click **Step5: Intel® UHD Graphics Driver.**
2. Click  to install the Intel® UHD Graphics driver.
3. Click **Yes** to confirm the user account control question.
4. Click **Next** to continue.
5. Click **Yes** to accept license agreement.
6. Click **Next** to confirm the *Readme File Information* and move on.

   The installation starts.

7. Click **Next** to continue.
8. Select the radio button next to "**Yes, I want to restart my computer now**." and click **OK** to restart the computer for the changes to take effect.

   The installation is completed.

Step 6: install the Serial I/O driver

1. Click **Step6: Intel® Serial I/O Driver**.
2. Click  to install the Serial I/O driver.
3. Click **Yes** to confirm the user account control question.
4. Click **Yes** to continue.
5. Click **Finish**.

   The installation is completed.

Step 7: install the Graphics Command Center

1. Click **Step7: Intel® Graphics Command Center**.
2. Click  to install the Intel® Graphics Command Center.
3. Click **Yes** to confirm the user account control question.
4. Click **Yes** to continue.
5. Click **Finish**.

   The installation is completed.

Step 8: install the Realtek High Definition Audio Driver

1. Click **Step8: Realtek High Definition Audio Driver.**
2. Click  to install the audio driver.
3. Click **Next** to continue.
4. Click **Install** to allow the computer to start the installation.
5. Click **Finish.**

   The installation is completed.

6.5 Recycling and disposal

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

Technical specifications

7

7.1 Certificates and approvals

Note

Applicability

The following shows the approvals that may be available. For the device itself, it is certificated as shown on the product label and package label.

ISO 9001 certificate

The Siemens quality management system for all production processes (Development, Production, Sales and Service of Automation Products, -Systems and -Solutions) meets the requirements of ISO 9001:2015

Certificate registration no. 01 100 1430201.

Software license agreements

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

CE marking

CE

EMC Directive:

2014/30/EU Directive of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility; Official Journal of the EU L96, 29/03/2014, p. 79–106

RoHS Directive:

2011/65/EU Directive of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment; Official Journal of the EU L174, 1/07/2011, p.88–110

EMC EN 61000-6-2; EN 61000-6-4
RoHS EN IEC 63000:2018

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 Canadian	Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

Responsible party for Supplier's Declaration of Conformity

Siemens Industry, Inc.

Digital Factory - Factory Automation

5300 Triangle Parkway, Suite 100

Norcross, GA 30092

USA

Mail to: (amps.automation@siemens.com)

UL approval

The following approvals are available for the device:

- Underwriters Laboratories (UL) in accordance with Standard UL61010-1 and UL61010-2-201, File E472609
- Canadian National Standard CAN/CSA No.61010-1-12 and CAN/CSA C22.2 No.61010-2-201

Identification for Eurasian 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)

RCM (Australia / New Zealand)

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

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

Korea Certificate

This product meets the requirements of Korean certification.

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

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

BSMI

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

警告使用者：

此為甲類資訊技術設備，於居住環境中使用時，可能會造成射頻擾動，在此種情況下，使用者會被要求採取某些適當的對策。

Table 7- 1　限用物質含有情況標示聲明

單元 Unit	限用物質及其化學符號 Restricted substances and its chemical symbols					
	铅 Lead (Pb)	汞 Mercury (Hg)	鎘 Cadmium (Cd)	六價鉻 Hexavalent chromium(Cr^{+6})	多溴聯苯 Polybrominated biphenyls(PBB)	多溴二苯醚 Polybrominated diphenyl ethers (PBDE)
外殼	○	○	○	○	○	○
電路板	○	○	○	○	○	○
硬碟	-	○	○	○	○	○
線材	○	○	○	○	○	○

備考 1. “超出 0.1 wt %”及“超出 0.01 wt %”係指限用物質之百分比含量超出百分比含量基準值。

Note 1： "Exceeding 0.1 wt %" and "exceeding 0.01 wt %" indicate that the percentage content of the restricted substance exceeds the reference percentage value of presence condition.

備考 2. “○”係指該項限用物質之百分比含量未超出百分比含量基準值。

Note 2： "○" indicates that the percentage content of the restricted substance does not exceed the percentage of reference value of presence.

備考 3. “－”係指該項限用物質為排除項目。

Note 3：The "–" indicates that the restricted substance corresponds to the exemption.

Responsible party for Supplier's Declaration of Conformity

西門子股份有限公司

臺北市 11503 南港區園區街 3 號 8 樓

電子郵件信箱: (Adscs.taiwan@siemens.com)

UKCA

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

- Electromagnetic Compatibility Regulations 2016 (EMC)
- Regulations on the restriction of the use of certain hazardous substances in electrical and electronic equipment 2012 (RoHS).

UK Declarations of Conformity for the respective authorities are available from:

Siemens AG
Digital Industries
Factory Automation
DI FA TI COS TT
P.O. Box 1963
D-92209 Amberg

The UK Declaration of Conformity is also available for download from the Siemens Industry Online Support website under the keyword "Declaration of Conformity".

WEEE label (European Union)



Disposal instructions, observe the local regulations and the section "Recycling and disposal (Page 49) ".

7.2 Directives and declarations

7.2.1 Electromagnetic compatibility, Industrial and Residential Areas

Electromagnetic compatibility

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

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

Scope of application	Requirements for	
	Interference emission	Immunity to interference
Industrial area	EN 61000-6-4 +A1, CAN/CSA-CISPR 22:10	EN 61000-6-2, NAMUR NE 21

7.2.2 RoHS directive

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

Compliance with the directive has been reviewed according to the following standard: EN IEC63000

7.2.3 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.

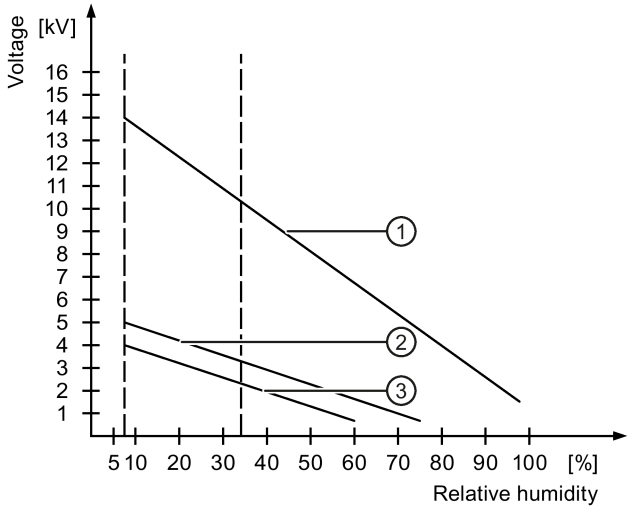
The damage to a module by an overvoltage can often not be immediately detected and only becomes evident after an extended period of operation. The consequences are incalculable and range from unforeseeable malfunctions to a total failure of the machine or system.

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 an electrostatically-charged 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

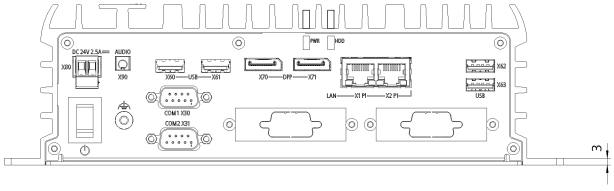
- Disconnect the power supply before you install or remove modules which are sensitive to ESD.
- Pay attention to good grounding:

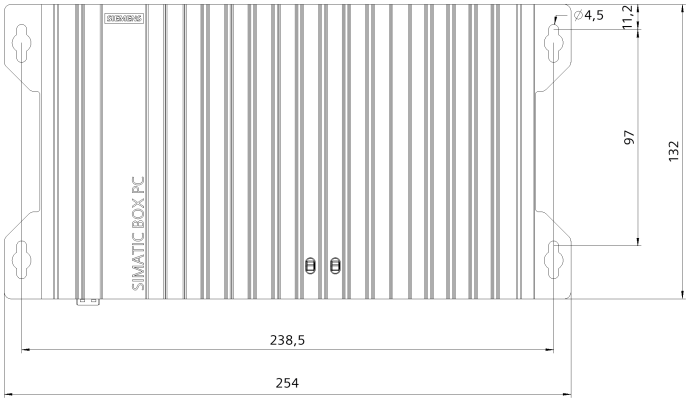
  When handling electrostatical sensitive devices, make sure that persons, the workstation and devices, tools and packaging used are properly grounded. This way you avoid static discharge.
- Avoid direct contact:
  - As a general rule, do not touch electrostatic sensitive devices, except in the case of 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 by touching grounded metallic parts before you take a measurement at a module. Always use grounded measuring instruments.

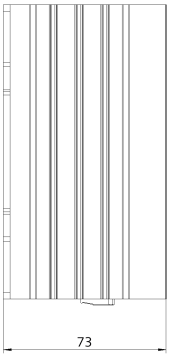
7.3 Dimension drawings

7.3.1 Dimension drawing of device

Wall mounting

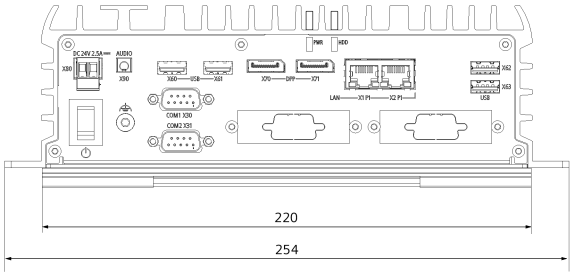


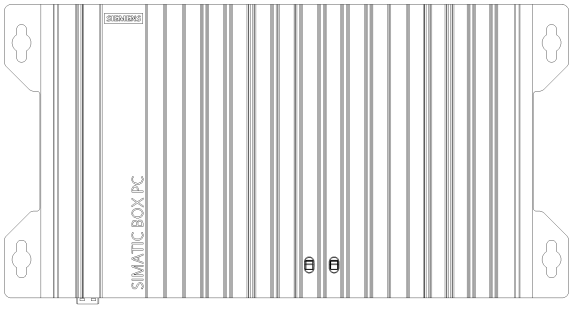


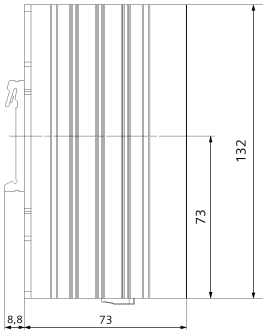


all dimensions in mm

Mounting on a standard rail







all dimensions in mm

7.4 Technical data

7.4.1 General technical specifications

General technical specifications

Weight	Approx. 1.8 kg
Power supply [1]	• 24 V DC (19.2 to 28.8V)
Power consumption (DC)	• 40%~60% full load, 24 V DC at 85% efficiency • Pout ≥ 6W, 24 V DC at 70% efficiency • Pout < 6W, 24 V DC at 50% efficiency
Current consumption	• Max. 2.5 A at 24 V
Noise emission	< 55 dB(A) according to DIN 45635-1
Degree of protection	IP40 in accordance with IEC 60529
Protection class	Class III
Overvoltage Category	II
Pollution Degree	2
Quality assurance	In accordance with ISO 9001

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

Electromagnetic compatibility

Radiation Emission (Enclosure port) in accordance with IEC 61000-6-4 + A1/ CAN/CSA-CISPR 22:10	• 30 to 230 MHz: 40 dB(µV/m) Quasi-peak (10 m distance) • 230 to 1000 MHz: 47 dB (µV/m) Quasi-peak (10 m distance) • 1 to 3 GHz: 70 dB (µV/m) Peak; 56 dB (µV/m) Average (3 m distance) • 3 to 6 GHz: 80 dB (µV/m) Peak; 60 dB (µV/m) Average (3 m distance)
Immunity with regard to conducted interference on the supply lines	• ± 2 kV (5 kHz /100 kHz) in accordance with IEC 61000-4-4; Burst • ± 1kV line to line, ±2 kV line to earth in accordance with IEC 61000-4-5; Surge

Noise immunity on signal lines	Burst: • ± 1 kV (5 kHz /100 kHz) in accordance with IEC 61000-4-4; Length of signal port extension cable < 30 m; • ± 2 kV (5 kHz /100 kHz) in accordance with IEC 61000-4-4; Length of signal port extension cable ≥ 30 m Surge: • ± 1 kV line-to-line; ± 2 kV line-to-earth in accordance with IEC 61000-4-5; Length of signal port extension cable ≥ 30 m
Immunity to discharges of static electricity	± 4 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	Radiation Immunity (according to IEC 61000-6-2) • 80 MHz to 1GHz 10 V/m, 80 % AM (1 kHz) • 1.4 GHz to 2 GHz 3 V/m, 80 % AM (1 kHz) • 2 GHz to 6 GHz 1 V/m, 80 % AM (1 kHz) Conducted Immunity (according to IEC 61000-4-6) • 10 kHz to 80MHz: 10 V, 80% AM (1kHz)
Conducted Emission (Low voltage DC mains port), in accordance with IEC 61000-6-4 + A1	• 0.15 to 0.5 MHz / 79 dB (µV) Q, 66 dB (µV) M • 0.5 to 30 MHz / 73 dB (µV) Q, 60 dB (µV) M
Conducted Emission (Telecommunications/Network Port), in accordance with IEC 61000-6-4 + A1	0.15 to 0.5 MHz: 97 dB(µV) to 87 dB(µV) Q 84 dB(µV) to 74 dB(µV) M
	0.5 MHz to 30 MHz: 87 dB(µV) Q / 74 dB(µV) M

Main circuit board

Processor	• Intel Atom® x6413E: Quad Core, 1.5 GHz, burst frequency 3.0 GHz, 9W TDP
Main memory	Memory expansion up to 16 GB with the following memory modules: • 4G DDR4 SDRAM • 8G DDR4 SDRAM • 16G DDR4 SDRAM The max speed of memory is up to 3200 MT/s. The memory module supports IBECC function, and its default value in BIOS is "Disable".

M.2 Module	• Slot X100: support NGFF M.2 2230/2242/2260/2280/3030/3042/3052 with Key B/Key B+M • Slot X101: support NGFF M.2 2230/2242/2260/3030/3042 with Key B/Key B+M
Max. permitted totally power loss for each M.2 B key module	2.5 W

Drive, memory medium

M.2 NVMe/SATA SSD	Slot X103: support NGFF M.2 2230/2242/2280 with Key M/Key B+M • Without drive • 256 GB EcoSSD • 512GB Eco SSD
USB stick	External, can be connected via USB port

Graphics

Graphics controller	Intel® Integrated UHD Graphic Controller
Resolution, graphics memory	• 2 × DP++, support resolution up to 4096 × 2160 pixel at 60Hz

Interfaces

Ethernet	2 × Gigabit Ethernet interface (two RJ45) electrically isolated, Wake on LAN and Remote Boot are supported: • X1P1: Marwell 88E1512 • X2P1: Marwell 88E1512
COM1/2/3/4	• COM1/2: RS232/RS422/RS485 [1] (switchable), D-sub connector, 9-pin • COM3/4: RS232 (optional), max. 115 Kbps, D-sub connector, 9-pin
USB	On the interface panel: • 4 × USB 3.1 (900mA) On the Motherboard: • 1 × USB pin header (2 USB 2.0 ports) • 1 × USB 2.0 type A connector (USB dongle) You can find additional information in the section "Power demand of the components (Page 64)".
DisplayPort	• Connection of a digital monitor, support DisplayPort Standard Version 1.4 • 2 × DP++ 2, support resolution up to 4096 × 2160 pixels at 60 Hz
Keyboard, mouse	Connection via USB port
Audio (optional)	Connection for analog audio source and speaker

[1] In BIOS Setup, you can configure support for RS232/RS422/RS485 for COM1 and COM2 ports.

7.4.2 Ambient conditions

Climatic ambient conditions

For permitted mounting positions, see section Preparing for installation (Page 19).

Temperature, tested in accordance with IEC 60068-2-1, IEC 60068-2-2 and IEC 60068-2-14	
Operation, x6413E, without M.2 Module	0 °C to +55 °C applies to device for horizontal mounting positions
Operation, x6413E, M.2 Module load max. 5W	0 °C to +50 °C applies to device for horizontal mounting positions
Temperature during storage/transport	-20 °C to +70 °C
Gradient	• Operation: Max. 10 °C/h • Storage: 20 °C/h, no condensation
Relative humidity, tested in accordance with IEC 60068-2-78, IEC 60068-2-30	
Operation	8% to 85%, no condensation Gradient ≤ 10°C/h
Storage/transport	8% to 95% at 25/55 °C, no condensation Gradient ≤ 20°C/h
Atmospheric pressure	
Operation	1139 to 700 hPa, corresponds to an altitude of -1000 to 3000 m
Storage/transport	1139 to 660 hPa, corresponds to an altitude of -1000 to 3500 m

Multiplication factors for equipment ambient temperature of operation at altitudes up to 3000m, tested in accordance with IEC 61131-2:2017	
Altitude	**Derating ratio for temperature** [1]
0 to 2000 m [2]	1.0
3000 m	0.9

[1] Equipment ambient temperature rating at 2000 m.

[2] Atmospheric pressure and air density increases with decreasing altitude. Therefore utilization of the derating factor for 0 m to 2000 m for altitudes below sea level is considered conservative.

Mechanical ambient conditions

Vibration resistance, tested in accordance with IEC 60068-2-6	
Operation	Except DIN-Rail: • 5 to 8.4 Hz: 3.5 mm • 8.4 to 500 Hz: 9.8 m/s² DIN-Rail: • 10 to 58 Hz: 0.0375 mm • 58 to 200 Hz: 4.9 m/s²

Storage/transport	• 5 to 8.4 Hz: 3.5 mm • 8.4 to 500 Hz: 9.8 m/s²
Shock resistance, tested in accordance with IEC 60068-2-27	
Operation	With SSD: • 150 m/s², 11 ms • 5g, 30 ms
Storage/transport	• 250 m/s², 6 ms

7.4.3 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	
USB device 3.1	High current	900 mA	--	6 W (for all USB devices)
USB device 2.0	High current	500 mA	--	
M.2 Module (slot X100)	Per slot	--	1.5 A	5 W in total
M.2 Module (slot X101)	Per slot	--	1.5 A	

Note

Device may overheat!

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

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

7.4.4 Direct current supply (DC)

Technical specifications

Input voltage	24 V DC (19.2 to 28.8 V DC)
Power consumption	Max. 32 W
Maximum input current	2.5 A at 24 V
Buffering upon power failure	Hold-up time > 20 ms (after > 5 ms, DC_FAIL becomes active)
Protection class	Class III (A function earth must be connected to the device)

Note

Inrush current

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

7.5 Hardware descriptions

7.5.1 Technical features of the motherboard

Component / port	Description	Parameters
Chipset	Integrated in CPU	• Intel Atom® x6000E series
CPU	Intel Processor	• Intel Atom® x6413E Processor (up to 3.0 GHz)
Memory	DDR4 SDRAM	Memory expansion up to 16 GB with the following memory modules: • 4G DDR4 SDRAM • 8G DDR4 SDRAM • 16G DDR4 SDRAM
Graphics	Integrated graphics	• Intel® UHD Graphics

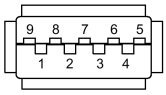
7.5.2 External interfaces

7.5.2.1 Overview of external interfaces

Interface	Position	Description
USB	External	• 4 × USB 3.1 Gen2 (up to 10Gb/s)
Ethernet port	External	• 2 × RJ45 Ethernet 10/100/1000 Mbps
DisplayPort	External	• 2 × DP++
COM1/2/3/4	External	9-pin D-sub, either: • COM1/2: 2 × RS232/RS485/RS422 [1] (switchable) • COM3/4: 2 × RS232 (optional)
Audio (optional)	External	Connection for analog audio source and speaker

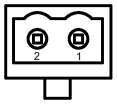
[1] In BIOS Setup, you can configure support for RS232/RS422/RS485 for COM1 and COM2 ports.

7.5.2.2 USB 3.1 port



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

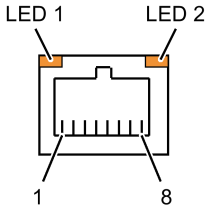
7.5.2.3 DC in connector



Pin	Short description
1	+24V
2	GND

7.5.2.4 Ethernet port

Ethernet RJ45 interface



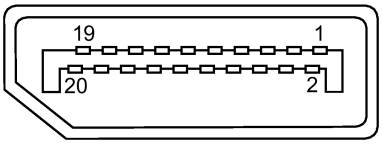
Pin no.	Short description	Meaning	Input / output
1	BI_DA+	Bi-directional data A+	Input/output
2	BI_DA-	Bi-directional data A-	Input/output
3	BI_DB+	Bi-directional data B+	Input/output
4	BI_DC+	Bi-directional data C+	Input/output
5	BI_DC-	Bi-directional data C-	Input/output
6	BI_DB-	Bi-directional data B-	Input/output

Ethernet RJ45 interface			
7	BI_DD+	Bi-directional data D+	Input/output
8	BI_DD-	Bi-directional data D-	Input/output
S		Shield	–
	LED 1	Orange light:1000 Mbps Off: Port is not active	–
	LED 2	Orange light: Port is active but without data activity Orange Blink: Port is active and there is data activity Off: Port is not active	–

The Ethernet interface supports MDXI (auto crossover) for all transmission rates.

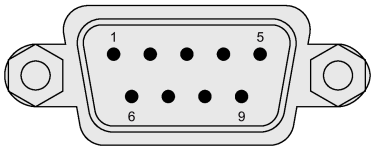
7.5.2.5 DisplayPort

DisplayPort interface



Pin no.	Abbreviation	Meaning	Input/output
1	ML_Lane 0+	DP data 0+	Output
2	GND	Ground	-
3	ML_Lane 0+	DP data 0+	Output
4	ML_Lane 1+	DP data 1+	Output
5	GND	Ground	-
6	ML_Lane 1-	DP data 1-	Output
7	ML_Lane 2+	DP data 2+	Output
8	GND	Ground	-
9	ML_Lane 2-	DP data 2-	Output
10	ML_Lane 3+	DP data 3+	Output
11	GND	Ground	-
12	ML_Lane 3-	DP data 3-	Output
13	CONFIG 1	CONFIG 1	-
14	CONFIG 2	CONFIG 2	-
15	AUX_CH+	Auxiliary channel+	Bidirectional
16	GND	Ground	-
17	AUX_CH-	Auxiliary channel-	Bidirectional
18	HPD	Hot Plug Detect	Input
19	GND	Ground	-
20	DP_PWR	+3.3 V (Power switch)	power out

7.5.2.6 Serial interface



RS232
RS422
RS485

Pin assignment RS232

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

Pin assignment RS422

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

Pin assignment RS485

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

Pin	Short description	Meaning
8	nc	
9	nc	

7.5.3 Internal interfaces

7.5.3.1 Overview of internal interfaces

Interface	Position	Description
USB 2.0	Internal	• 2 × USB 2.0 pin header
M.2	Internal	• PCIe × 2 lane + USB 2.0
USB dongle	Internal	• 1 × USB 2.0 type A connector
SIM card slot	Internal	• 1 × SIM card slot

7.5.3.2 M.2 interface

M.2 Module (X100)

Pin no.	Signal	Signal	Pin no.
		NC	75
74	3.3V	GND	73
72	3.3V	GND	71
70	3.3V	NC	69
68	SUSCLK	RESET#	67
66	SIM DETECT	ANTCTL3	65
64	COEX_RXD(I)	ANTCTL2	63
62	COEX_TXD(O)	ANTCTL1	61
60	COEX3(I/O)	ANTCTL0	59
58	NC	GND	57
56	NC	REFCLKp	55
54	PEWAKE#	REFCLKn	53
52	CLKREQ#	GND	51
50	PERST#	PETp0	49
48	NC	PETn0	47
46	NC	GND	45
44	ALERT#	PERp0	43
42	SMB_DATA	PERn0	41
40	SMB_CLK	GND	39
38	DEVSLP	PETp1	37
36	UIM-PWR	PETn1	35

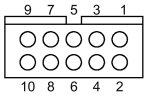
34	UIM-DATA	GND	33
32	UIM-CLK	PERp1	31
30	UIM-RESET	PERn1	29
28	NC	GND	27
26	NC	NC	25
24	NC	NC	23
22	NC	NC	21
20	NC	CONNECTOR KEY B	19
18	CONNECTOR KEY B	CONNECTOR KEY B	17
16	CONNECTOR KEY B	CONNECTOR KEY B	15
14	CONNECTOR KEY B	CONNECTOR KEY B	13
12	CONNECTOR KEY B	GND	11
10	NC	USB_D-	9
8	W_DISABLE#	USB_D+	7
6	WWAN_PWR_OFF_N	GND	5
4	3.3V	GND	3
2	3.3V	NC	1

M.2 Module (X101)

Pin no.	Signal	Signal	Pin no.
		NC	75
74	3.3V	GND	73
72	3.3V	GND	71
70	3.3V	CFG1	69
68	SUSCLK	RESET#	67
66	NC	ANTCTL3	65
64	COEX_RXD	ANTCTL2	63
62	COEX_TXD	ANTCTL1	61
60	COEX_NC	ANTCTL0	59
58	NC	GND	57
56	NC	REFCLKp	55
54	PEWAKE#	REFCLKn	53
52	CLKREQ#	GND	51
50	PERST#	PETp0	49
48	COEX_TXD(O)	PETn0	47
46	COEX_RXD(I)	GND	45
44	COEX3(I/O)	PERp0	43
42	SMB_DATA	PERn0	41
40	SMB_CLK	GND	39
38	DEVSLP	PETp1	37
36	NC	PETn1	35
34	NC	GND	33
32	NC	PERp1	31
30	NC	PERn1	29
28	NC	GND	27

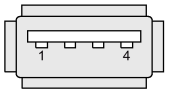
26	NC	NC	25
24	NC	NC	23
22	NC	NC	21
20	NC	CONNECTOR KEY B	19
18	CONNECTOR KEY B	CONNECTOR KEY B	17
16	CONNECTOR KEY B	CONNECTOR KEY B	15
14	CONNECTOR KEY B	CONNECTOR KEY B	13
12	CONNECTOR KEY B	GND	11
10	NC	USB_D-	9
8	W_DISABLE#	USB_D+	7
6	NC	GND	5
4	3.3V	GND	3
2	3.3V	NC	1

7.5.3.3 USB 2.0 pin header



Pin	Signal
1	VBUS_USB1
2	VBUS_USB2
3	USB1_D-
4	USB2_D-
5	USB1_D+
6	USB2_D+
7	GND
8	GND
9	GND
10	GND

7.5.3.4 USB 2.0 port



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

7.5.4 System resources

7.5.4.1 Currently allocated system resources

Currently allocated system resources

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

Procedure

To view the system resources, proceed as follows:

1. Right-click the Windows Start menu and select "Device Manager".
2. Click on the **View** menu and turn on " Resources by type" or "Resources by connection".

   All the interrupts show under the Interrupt request (IRQ) catalog.

7.5.5 Input/output address areas

7.5.5.1 Overview of the internal module registers

The following addresses are used for the internal registers:

Addresses	Input/output unit
SIO logic device 8 CR F0h	Watchdog control register (Page 72)
SIO logic device 8 CR F1h	Watchdog counter register (Page 73)
SIO logic device 8 CR F2h	Watchdog state register (Page 73)
SIO logic device 7 CR FDh	Battery status register (Page 73)

For more information and reference code for accessing to Super IO, contact Siemens Technical support.

7.5.5.2 Watchdog control register

Bit	Read/Write state	Meaning of the bits
0	Read/Write	Watchdog Timer I Pulse or Level mode select: • 0: Pulse mode • 1: Level mode
1	Read/Write	Not used for watchdog
2	Read/Write	Not used for watchdog

Bit	Read/Write state	Meaning of the bits
3	Read/Write	Select Watchdog Timer I count mode. • 0: Second Mode. • 1: Minute Mode.
4 to 7		Reserved

7.5.5.3 Watchdog counter register

Bit	Read/Write state	Meaning of the bits
0 to 7	Read/Write	Watch Dog Timer I Time-out value. Writing a non-zero value to the register causes the counter to load the value into the Watch Dog Counter and start counting down. The accuracy of watchdog timer I about one cycle deviation. Non-zero value will be reloaded to the Watch Dog Counter and the countdown resumes. Reading the register returns the current value in the Watch Dog Counter but not the Watch Dog Timer Time-out value. • 00h: Time-out Disable • 01h: Time-out occurs after one cycle time, the cycle time is based on LD8 CRF0, bit[3], by analogy.

7.5.5.4 Watchdog state register

Bit	Read/Write state	Meaning of the bits
7	Read/Write	Not used for watchdog
6	Read/Write	Not used for watchdog
5	Write "1" Only	Trigger Watchdog Timer I event. This bit is self-clearing.
4	Read/Write	Watchdog Timer I status bit: • 0: Watchdog Timer I is running. • 1: Watchdog Timer I issues time-out event.
3 to 0	Read/Write	Not used for watchdog

7.5.5.5 Battery status register

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

Meaning of the bits

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

7.6 BIOS description

7.6.1 Overview

Parameterize your device in the BIOS Setup.

BIOS Setup program

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

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

Changing the device configuration

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

NOTICE
Malfunctions can occur with running software CPU If a BIOS update of the PC is performed while a SIMATIC software controller is running, the software CPU can malfunction, resulting in communication interruptions or failures, for example. Other actions that put a heavy load on the PC hardware, for example, running hardware tests such as benchmarks, can result in malfunctions of the software CPU. Do not run a BIOS update or other actions that would put a heavy load on the hardware during operation of a software CPU. Switch the software CPU to "STOP" before you run a BIOS update or perform other critical actions.

Note

Documentation

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

You can find a detailed description on Firmware/BIOS description(SIMATIC IPC2x7G, IPC3x7G) Operating Instructions (https://support.industry.siemens.com/cs/ww/en/view/109797240).

7.6.2 BIOS update

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

You can find additional information on the Internet at the following address: After-sales information system for SIMATIC PC/PG (http://www.siemens.com/asis)

Noting down and restoring BIOS Setup settings

NOTICE

Irretrievable loss of data

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

1. Print out the table in the next section "General BIOS Setup settings".
2. Enter your specific BIOS Setup setting in this table before you run a BIOS update.
3. Start BIOS Setup after the BIOS update.
4. Load the BIOS Setup default settings with <F9> "Setup Defaults". Or use the BIOS Setup command "Load Optimal Defaults" in the "Exit" menu.
5. Make your own Setup settings based on the table you have printed out.
6. Save the BIOS Setup settings with <F10> "Save and Exit".

Performing a BIOS update

NOTICE

Damage to the device

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

Leave the device switched on during the update.

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

1. Connect the device to the power supply.
2. Take the BIOS update you downloaded from the Siemens Industry Online Support (https://support.industry.siemens.com/cs/ww/en/view/75852684)page and place it on the USB stick.
3. Plug a USB stick with FAT/FAT32 file format to the device.
4. Double-click the "BIOS2USB.exe" in the BIOS update folder and wait for the transfer has been completed.
5. Reset the device (warm or cold restart).
6. Press <ESC> to open the BIOS selection menu.
7. Click the "BIOS Update" button.
8. Follow the instructions on the screen.

Reboots

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

7.6.3 Alarm, error and system messages

During startup (the boot process), the BIOS first performs a **P**ower **O**n **S**elf **T**est (POST) and checks whether certain functional units of the PC are operating error-free. The boot sequence is immediately interrupted if critical errors occur.

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

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

On-screen error messages

On-screen error message	Meaning / tip
Operating system not found	Possible causes: • No operating system installed • Incorrect active boot partition • Wrong boot drive settings in SETUP
Keyboard controller error	Controller error. Contact your technical support team.

On-screen error message	Meaning / tip
SMART failure detected on SSD	SSD reports pending failure through S.M.A.R.T.
CMOS battery failed	CMOS battery is not connected.
CMOS battery weak	CMOS battery is weak
Real-time clock has lost power	The CMOS clock was operated without battery or with a battery that was too weak, during battery change, for example. Check the CMOS clock.
Keyboard error	• Field PG: Internal keyboard defective and no external keyboard connected • Other devices: Keyboard defective or not connected

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

  (https://support.industry.siemens.com/cs/ww/en/)
- Support request form
  (https://support.industry.siemens.com/My/ww/en/requests#createRequest)
- After Sales Information System SIMATIC IPC/PG

  (http://www.siemens.com/asis)
- SIMATIC Documentation Collection
  (https://support.industry.siemens.com/cs/us/en/view/109744171)
- Your local representative

  (http://w3.siemens.com/aspa_app/)
- Training center

  (https://www.sitrain-learning.siemens.com/PLG/?AppLang=en)
- Industry Mall

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

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

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

Tools & downloads

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

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

A.2 Troubleshooting

This chapter provides you with tips on how to locate and/or troubleshoot problems.

Problem	Possible cause	Possible remedy
The device is not operational	No power supply	• Check the power supply, the power cord and the power plug. • Check if the On/Off switch is in the correct position.
	Device is being operated outside the specified ambient conditions	• Check the ambient conditions. • After transport in cold weather, wait approximately 12 hours before switching on the device.
The monitor remains dark	The monitor is switched off	Switch on the monitor.
	The monitor is in "power save" mode	Press any key on the keyboard.
	The brightness button has been set to dark	Increase brightness using the brightness button. For detailed information, refer to the monitor operating instructions.
	The power cord or the monitor cable is not connected.	• Check whether the power cord has been properly connected to the monitor and to the system unit or to the grounded shockproof outlet. • Check whether the monitor cable has been properly connected to the system unit and to the monitor.
		If the monitor screen still remains dark after you have performed these checks and measures, contact your technical support team.
The mouse pointer does not appear on the screen	The mouse driver is not loaded	Check whether the mouse driver is properly installed and available when you start the user program. Detailed information about the mouse driver is available in the corresponding documentation.
	Mouse not connected	• Check whether the mouse cord is properly connected to the system unit. • If you use an adapter or extension for the mouse cable, also check these connectors.
		If the mouse pointer still does not appear on the screen after you have performed these checks and actions, contact your technical support team.
Wrong time and/or date on the PC		1. Open the BIOS Setup. 2. Set the time or date.
Although the BIOS setting is OK, the time and data are still wrong	The backup battery is dead.	Replace the backup battery.
USB device does not respond	The USB ports are not correctly supported.	You need to install the USB device drivers for the required operating system.
The pop-up message "Windows boot manager	The M.2 NVMe/SATA SSD card is changed to another boot device.	Press Enter to continue the boot.

Problem	Possible cause	Possible remedy
failed" shows when you install the operating system in the M.2 NVMe/SATA SSD card and boot to OS.	The M.2 NVMe/SATA SSD card lost the boot image or broken.	Reinstall the operating system or change another M.2 NVMe/SATA SSD card.
The 1000M full duplex mode cannot run at full speed on all onboard LAN ports.	Time Coordinated Computing can result in Giga Band Ethernet workloads.	Open firmware selection menu, select: "Setup Utility" > "Power" > "Advanced CPU Control" > "C-States", and change its value from "Enabled" to "Disable".
Ethernet port bridge connection error while bridge function is enabled.		Right-click the Windows Start menu and select "Device Manager" > "Network adapters" > "Interl EC* *GbE Connection" > "Properties" > "Advanced" > "Promiscuous Mode", and change its value to "Enabled".

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

Problem	Possible cause	Possible remedy
The device crashes during startup	• Redundant I/O addresses • Redundant hardware interrupts and/or DMA channels • Fluctuation of signal frequencies or levels • Different pin assignment	Check your computer configuration: • If the computer configuration corresponds to the delivery state, contact your technical support team. • If the configuration has changed, restore the factory state. To do this, remove the third-party modules and restart the device. If the error no longer occurs, the third-party module being used was the cause of the fault. Replace the third-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.

Markings and symbols

B

B.1 Overview

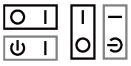
The following tables show all the symbols which may be found on your SIMATIC industrial PC, SIMATIC industrial monitor or SIMATIC Field PG in addition to the symbols which are explained in the operating instructions.

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

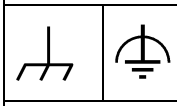
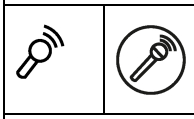
Symbol	Meaning		Symbol	Meaning
	On/off switch, without electrical isolation			Eject CD/DVD
	On/off switch, without electrical isolation			

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
	USB 3.0 super-speed port			

List of abbreviations

C

C.1 Abbreviations

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

EN	European standard	
EEPROM	Electrically Erasable Programmable Read-Only Memory	
ESD	Electrostatic Sensitive Device	Electrostatic Sensitive Devices
	Electrostatic discharge	Electrostatic discharge
EWF	Enhanced Write Filter	
FBWF	File Based Write Filter	
GND	Ground	Chassis ground
HD	Hard disk	Hard disk
HMI	Human Machine Interface	User interface
HORM	Hibernate Once - Resume Many	
HT	Hyper Threading	
I/O	Input/Output	Data input/output for computers
IBECC	In-Band Error Correction Code	The IBECC improves accuracy and reliability by providing error check and correct protection to all or specific regions of the physical memory space.
IDE	Integrated Device Electronics	
IEC	International Electronical Commission	
IGD	Integrated Graphics Device	
IP	International Protection	Degree of protection
	in English-speaking countries: Ingress Protection	
IRQ	Interrupt Request	
ISA	Industry Standard Architecture	Bus for expansion modules
LAN	Local Area Network	Computer network that is limited to a local area.
LEDs	Light Emitting Diode	Light emitting diode
LPS	Limited Power Source	
MAC	Media access control	Media access control
MLFB	Machine-readable product designation	
MRAM	Magnetoresistive random-access memory	Backup memory
MS	Microsoft	
MTBF	Mean Time Between Failures	
MUI	Multilanguage User Interface	Language localization in Windows
NEMA	National Electrical Manufacturers Association	
NTFS	New Technology File System	
NVMe	Non-Volatile Memory Express	
NVRAM	Non Volatile Random Access Memory	Non-volatile data memory. Data memory is retained without external power supply.
ODD	Optical Disk Drive	
PC	Personal computer	

PCI	Peripheral Component Interconnect	High-speed expansion bus
PCIe	Peripheral Component Interconnect express	High-speed serial, differential full-duplex PtP interface with high data rate.
PG	Programming device	
POST	Power On Self Test	
PXE	Preboot Execution Environment	Software for running new PCs without hard disk data via the network
RAID	Redundant Array of Independent Disks	Redundant hard disk array
RAL	Restricted Access Location	
RAM	Random Access Memory	
RI	Ring Input	Incoming call
ROM	Read-Only Memory	
RS 485	Reconciliation Sublayer 485	Bidirectional bus system
RTC	Real Time Clock	Real-time clock
RTS	Request to send	Request to send
RxD	Receive Data	Data transfer signal
SATA	Serial Advanced Technology Attachment	
SCU	Setup Configuration Utility	
SELV	Safety Extra Low Voltage	Safety extra low voltage
SMART	Self Monitoring Analysis and Reporting Technology	Hard disk error diagnostics program
SRAM	Static Random Access Memory	Static RAM
SSD	Solid State Drive	
TFT	Thin-Film-Transistor	
TxD	Transmit Data	Data transfer signal
UEFI	Unified Extensible Firmware Interface	
UL	Underwriters Laboratories Inc.	US organization for testing and certification according to national or binational standards.
USB	Universal Serial Bus	
VDE	Verband der Elektrotechnik, Elektronik und Informationstechnik e.V (Association for Electrical, Electronic and Information Technologies)	
VT	Virtualization Technology	Intel technology which provides a virtual, closed environment.
VT-d	Virtualization Technology for Directed I/O	Enables the direct assignment of a device (e.g. network adapter) to a virtual device.
WD	Watchdog	Program monitoring with error detection and alarming.

Glossary

AHCI mode

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

APIC mode

Advanced peripheral interrupt controller. 24 interrupt lines are available.

Automation system

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

Backup

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

Baud

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

Cache

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

CE marking

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

Chipset

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

Cold restart

A start sequence, starting when the computer is switched on. The system usually performs some basic hardware checks within the cold start sequence, and then loads the operating system from the hard disk to work memory -> boot

COM interface

The COM interface is a serial V.24 interface. The interface is suitable for asynchronous data transfer.

Configuration files

These are files containing data which define the configuration after restart. Examples of such files are CONFIG.SYS, AUTOEXEC.BAT and the registry files.

Configuration software

The configuration software updates the device configuration when new modules are installed. This is done either by copying the configuration files supplied with the module or by manual configuration using the configuration utility.

Controller

Integrated hardware and software controllers that control the functions of certain internal or peripheral devices (for example, the keyboard controller).

Device configuration

The configuration of a PC or programming device contains information on hardware and device options, such as memory configuration, drive types, monitor, network address, etc. The data are stored in a configuration file and enable the operating system to load the correct device drivers and configure the correct device parameters. . If changes are made to the hardware configuration, the user can change entries in the configuration file using the SETUP program. .

DisplayPort

DisplayPort is a VESA standardized, universal and license-free connection standard for the transmission of image and sound signals. Areas of application are mainly the connection of screens and TVs to computers, DVD players and similar devices.

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.

ECC

Error checking and correction is a method for detecting and correcting errors when saving and transferring data, frequently used in conjunction with RAM modules with and without ECC.

EMC directive

Directive concerning **E**lectro**m**agnetic **C**ompatibility. Compliance is confirmed by the CE symbol and the EC certificate of conformity.

Energy management

The energy management functions of a modern PC allow individual control over the current consumption of vital computer components (e.g. of the monitor, hard disk and CPU), by restricting their activity based on the current system or component load. Energy management is of particular importance for mobile PCs.

Energy options

The energy options can be used to reduce energy consumption of the computer, while keeping it ready for immediate use. This can be configured in Windows by selecting Settings > Control Panel > Energy options.

Enhanced Write Filter

Configurable write filter that allows you to, for example, boot Windows Embedded Standard from write-protected media (e.g., CD-ROM), set write protection for individual partitions, and adapt the file system performance to user requirements (when using memory cards, for example).

ESD Guideline

Guideline for using electrostatic sensitive components.

Ethernet

Local network (bus structure) for text and data communication with a transfer rate of 10/100/1000 Mbps.

Execute Disable Capability

Hardware implementation that prevents mutual memory accesses by programs and applications. It is only effective when all relevant system components, such as processors, operating systems and applications are supported.

Extensible Firmware Interface

Refers to the central interface between the firmware, the individual components of a computer and the operating system. EFI is located logically below the operating system and represents the successor to PC BIOS, focusing on 64-bit systems.

File Based Write Filter

Configurable write filter to protect individual files from write access.

Formatting

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

HORM

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

Hub

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

Hyper Threading

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

IGD

Integrated Graphics Device. Graphics interface integrated in the chipset.

Image

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

Intel Active Management Technology

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

Intel VT

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

Interface

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

LAN

Local **A**rea **N**etwork: LAN is a local network that consists of a group of computers and other devices that are distributed across a relatively restricted range and are linked with communication cables. The devices connected to a LAN are called nodes. The purpose of networks is the mutual use of files, printers or other resources.

Legacy Boot Device

Conventional drives can be used as USB devices.

License key

The license key represents the electronic license stamp of a license. Siemens AG issues a license key for each software that is protected by a license.

License key USB flash drive

The license key USB flash drive contains the authorizations or license keys required to enable protected SIMATIC software.

Low-voltage directive

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

Memory card

Memory cards in credit card format. Memory for user programs and parameters, for example, for programmable modules and CPs.

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).

PCIe

PCI-Express (Peripheral Component Interconnect Express) is an extension standard for connection of I/O devices with the chipset of a main processor. PCIe is the successor of PCI, PCI-X and AGP and offers a higher data transmission rate in comparison to its predecessors.

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.

PROFINET

PROFINET is the name of the standard for Industrial Ethernet developed and maintained by the PROFIBUS user organization. PROFINET unites protocols and specifications with which Industrial Ethernet meets the requirements of industrial automation technology.

Programmable controller

The programmable controllers of the SIMATIC S7 system consist of a central controller, one or more CPUs, and various other modules (e.g. I/O modules).

PXE server

A **P**reboot E**x**ecution **E**nvironment server is part of a network environment and can provide software to connected computers even before they boot. This can involve operating system installations or servicing tools, for example.

RAL

Restricted **A**ccess **L**ocation: Installation of the device in a production facility with restricted access, for example, a locked control cabinet.

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)

ROM

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

S.M.A.R.T

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

SATA

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

SETUP (BIOS Setup)

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

SSD (Solid State Drive)

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

STEP 7

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

Troubleshooting

Error cause, cause analysis, remedy

Trusted Execution Technology

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

Wake on LAN

Wake on Local area network. This function allows the PC to be started via the LAN interface.

Warm restart

The restart of a computer after a program was aborted. The operating system is loaded and restarted again. The CTRL+ ALT+ DEL hotkey can be used to initiate a warm restart.

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