SIEMENS

SIMATIC

Industrial PC
Workstation SIMATIC IPC RW-548A

Operating Instructions

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04/2025
A5E53924456-AA

Legal information

Warning notice system

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

⚠ DANGER

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

⚠ WARNING

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

⚠ CAUTION

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

NOTICE

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

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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.

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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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A5E53924456-AA
℗ 04/2025 Subject to change

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Preface

Technical knowledge required for using these operating instructions

These operating instructions contain all the information you need for the installation, electrical connection, commissioning and expansion of the SIMATIC RACK PC and for maintaining and repairing the device.

The information in these operating instructions is intended for persons with qualified expertise in the following areas:

- Mounting of industrial PCs and accessories
- Electrical installation
- Commissioning of industrial PCs
- Microsoft operating systems
- IT administration and network engineering
- Service and maintenance of industrial PCs

General knowledge in the field automation control engineering is recommended.

Range of validity of these operating instructions

These operating instructions are valid for all order versions of the SIMATIC IPC RW-548A.

History

Currently released versions of these operating instructions:

Version	Comments
04/2025	First edition

Cybersecurity information

Siemens provides products and solutions with industrial cybersecurity 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 cybersecurity concept. Siemens' products and solutions constitute one element of such a concept.

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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 at all times, subscribe to the Siemens Industrial Cybersecurity RSS Feed under (https://www.siemens.com/global/en/products/automation/topic-areas/industrial-cybersecurity.html).

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Product description

1

1.1 Important instructions and manuals for operating the device

Documentation	Contents	Source
Operating instructions	• Product description • Technical specifications • Installation of the device • Operation of the device • Installing and removing hardware • Dimension drawings	• Online in the "Rack PC" section under: Documentation for SIMATIC Industrial PC (http://www.siemens.com/simatic-ipc-doku-portal)
Quick Install Guide	Information on: • Link and QR code to the online form for the quality control notification in the SIEMENS After Sales Information System (ASIS) • Operating Instructions of the device • Installation of the device • Connecting the device to the power supply unit • Connecting I/O devices • Switching the device on	• Supplied in printed form with the device
Firmware/BIOS description	Information on: • Important firmware settings • Firmware settings in the delivery state • Boot modes	• Online at: Firmware/BIOS description for SIMATIC IPC RW-528A, IPC RW-548A (https://support.industry.siemens.com/cs/ww/en/view/109983834)
Windows® operating system	Information on: • Commissioning the operating system • Restoring the operating system • Configuration of the operating system	• Online at: Microsoft® Windows® 11 (https://support.industry.siemens.com/cs/ww/en/view/109817190)
SIMATIC IPC Creating a bootable USB flash drive	Information on: • Creating a bootable USB flash drive for recovery of operating system, software and drivers	• Online at: SIMATIC IPC Creating a bootable USB flash drive (https://support.industry.siemens.com/cs/ww/en/view/109811224)
SIMATIC NET	Industrial communication	• Online at: SIMATIC NET (http://w3.siemens.com/mcms/automation/en/industrielle-kommunikation/Seiten/Default.aspx)

1.2 Product highlights

The SIMATIC IPC RW-548A is a high-performance industrial PC as workstation in 19" rack format (4 U). It is perfectly suited for PC applications with high-level industry functionality.

Device view



Note

Depending on the configuration ordered the features and illustrations described in this manual may differ from the features of your device.

Maximum industrial compatiblity for 24-hour continuous use in industrial environments

- Maximum processor performance (in full configuration) without loss of performance (throttling) at up to 50 °C ambient temperature
- User-friendly standalone enclosure concept
- Rugged all-metal enclosure, fully coated (blue chromated) and enameled on the outside to protect against corrosion and dirt with high electromagnetic compatibility
- Suitable for installation in space-saving control cabinets with a depth of only 500 mm
- Dust protection through overpressure venting concept with front-side fan and dust filter
- Low noise output thanks to regulated fans
- Special hard disk mounts and card retainers for protection against vibration and shock

High productivity through fast data processing

- 13th generation Intel® processors: Core i9, Core i7, Core i5 or Core i3 up to 24 cores (8 Performance cores - 16 Efficient cores) / 32 threads
- Processor-integrated graphics controller (UHD Graphics 770) with up to 8K Ultra HD resolution for outstanding graphics performance
- Maximum performance (e.g. Intel R680E chipset, DDR5 memory with support of dual channel technology)
- High data transfer rates (e.g. M.2 NVMe SSD, PCI Express technology Gen 4, USB 3.2 Gen 2 SuperSpeed)
- Modern NVIDIA PCIe x16 graphics cards (optional) for image processing and AI applications

High system availability through minimization of downtimes (available depending on configuration)

- Reliable 24-hour operation (high MTBF, speed-controlled fan) up to an ambient temperature of 50 °C
- High data security through RAID configurations: Onboard RAID controller
- RAID1 configuration: Data mirroring on two SATA or NVMe drives, including in hot swap removable trays and, optionally, with additional hot spare hard drive
- "Hot Swap" HDD/SSD in removable trays in RAID configurations (hard drive swapping during operation)
- "Hot Spare" HDD in removable trays in RAID configurations (rebuild process starts automatically on the standby "Hot Spare" drive)
- ECC memory (optional)
- Redundant power supply AC with "Hot Swap" functionality (power supply module swapping during operation), optional
- Redundant Gbit LAN connections (teaming-capable)

High investment protection

- Platform with embedded Intel components for long-term stability
- Availability: 3 to 6 years
- Assured spare parts availability: 5 years after product phase-out
- System-tested with SIMATIC components
- Certified for worldwide marketing (cULus)
- Support of legacy interfaces (COM)
- Compatible installation across device generations
- Worldwide service and support

User-friendly application scenarios for commissioning, use and service

- High flexibility and expandability thanks to integrated interfaces and up to 10 slots (PCI and PCI Express) and 2x M.2 Key M
- Service-friendly device configuration (modifications, service), e.g. replacement of filter or front fan without tools
- Fast identification and replacement of a hard disk with error with HDD alarm LEDs for RAID configurations and unique numbering
- Status display (front LEDs) for Ethernet; alarm display for fan, temperature, watchdog and hard disks in RAID configurations
- Remote control and maintenance through iAMT (Intel® Active Management Technology)
- Pre-installed and activated operating system
- Quick restoration of the HDD/SSD delivery state using a Restore USB flash drive (optional)
- 4 x LAN 10/100/1000/2500 Mbps connections onboard

Differentiated security concepts

- Lockable front door secures components against unauthorized access, e.g.
  - Enclosure cover can only be opened when the front door is open
  - Lockable door secures removable front components (e.g. USB software dongle) against unauthorized access
  - Locked fan cover: Filter mat and front fan can only be removed when the front door is open
  - Secured internal USB slot in the device, e.g. for a software dongle
  - TPM 2.0 module - security hardware onboard (Trusted Platform Module)
- Device monitoring through operating displays on the front for Ethernet; alarms for fans, temperature, watchdog and drives in RAID1 systems

1.3 Scope of application

In support of system integration of panel, plant and machine operation, this SIMATIC Industrial PC Workstation offers a 19" rack PC platform for high-performance applications and IT applications at the control level and cell level for:

- Industrial image processing and AI applications
- Process, visualization and simulation applications
- Quality assurance and monitoring tasks
- Measurement, control and rule-based tasks
- Data acquisition and management

This SIMATIC Rack IPC bears the CE mark for use in industrial environments as well as in residential, business and commercial environments. In addition to industrial applications, therefore, it can also be used in building automation or public facilities.

1.4 External design of the device

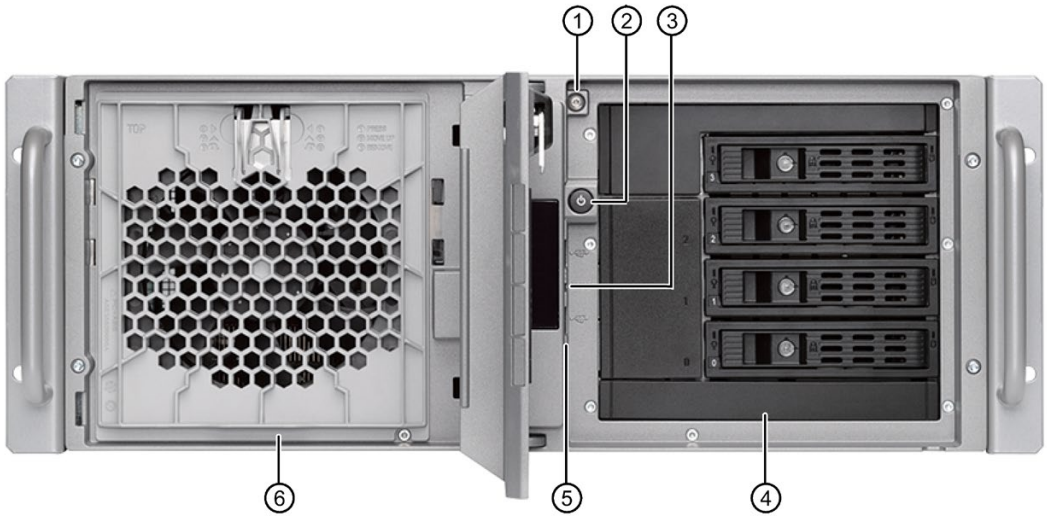
1.4.1 Front panel

Front: Front door is closed



① 19" mounting bracket with handle
② Fan cover of front fan with openings for ventilation of the device (locked by front door)
③ System status displays (Page 29)
④ Front door: lockable, protection against unauthorized access
⑤ Lock
- Key vertical: open
- Key horizontal: closed

Front: Front door is open



① Locking screw of the enclosure cover
② On-off button, see On-off button and reset button (Page 26)
③ Rese pushbutton, see On-off button and reset button (Page 26)
④ Drive cage (in this case type A); depending on the expansion version, see:
- Drive cage (Page 17)

⑤ Interfaces on the front of the device, see Connections on the device (Page 21)
⑥ Front fan support

1.4.2 Drive cage

1.4.2.1 Drive cage type A

Drives and mounting locations in the drive cage type A

The drive cage type A is located behind the front door.

You can install drives in removable trays, in which the drives are easily accessible from the outside without opening the device.

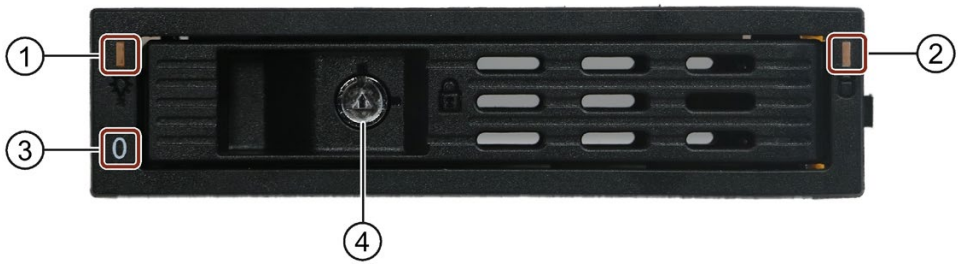
The removable trays can be locked, thus protecting the drives from unauthorized access.

You can also install 5.25" drives or 5.25" components in the slot ③.



(0)	**Slot 0 for:** • 2.5" drive in removable tray • 3.5" drive in removable tray
(1)	**Slot 1 for:** • 2.5" drive in removable tray • 3.5" drive in removable tray
(2)	**Slot 2 for**: • 2.5" drive in removable tray • 3.5" drive in removable tray
(3)	**Slot 3 (5.25" slot) for:** • 2.5" drive or 3.5" drive in the 5.25" mounting frame with removable tray • 5.25" drive or 5.25" component
(A)	5.25" mounting frame with removable tray
(B)	Cover
(C)	Cover

Components of the removable tray



(1)	Status display (Page 32)
(2)	Status display (Page 32)
(3)	Number of the mounting location (here: Mounting location 0)
(4)	Lock

1.4.2.2 Drive cage type B

Drives and mounting locations in the drive cage type B

The drive cage type B is located behind the front door.

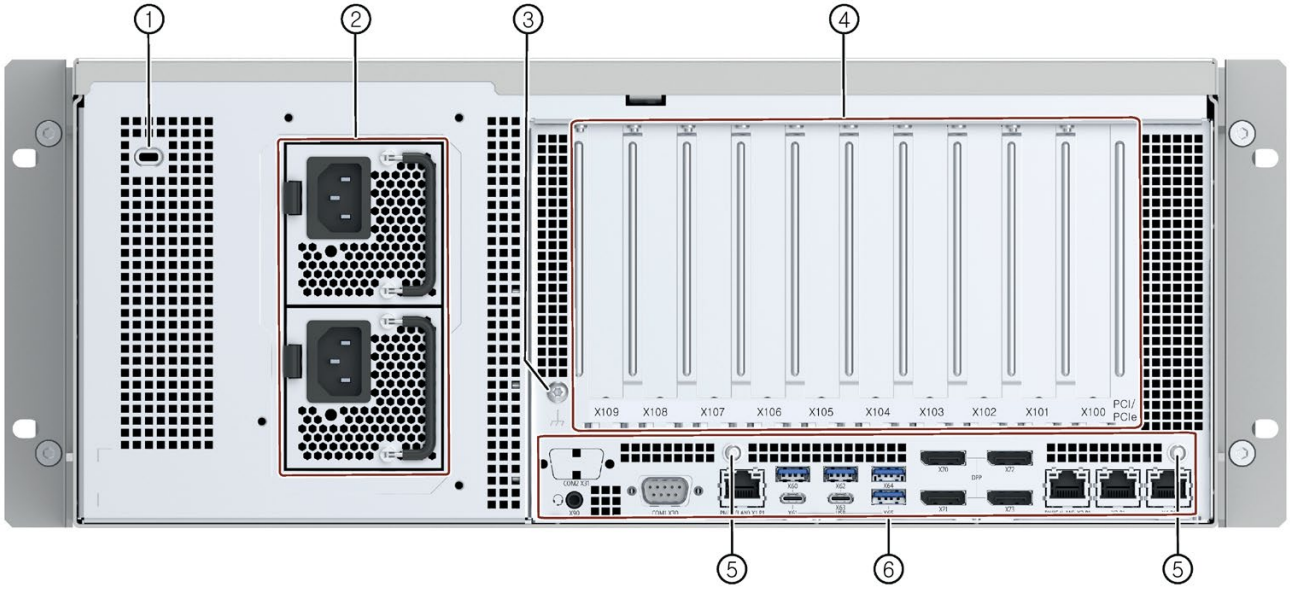
In drive cage type B, drives are fixed-mounted internally and provided with a drive cover on the outside to prevent access.

The drives are particularly well protected against vibration and oscillation ("vibration-dampened drive cage").



(0)	**Slot 0 (5.25" tray) for:** • 2.5" drive in the assembly kit for 5.25" tray • 3.5" drive in the assembly kit for 5.25" tray • 5.25" drive or 5.25" component
(1)	**Slot 1 (5.25" tray) for:** • 2.5" drive in the assembly kit for 5.25" tray • 3.5" drive in the assembly kit for 5.25" tray • 5.25" drive or 5.25" component
(2)	**Slot 2 (5.25" tray) for:** • 2.5" drive in the assembly kit for 5.25" tray • 3.5" drive in the assembly kit for 5.25" tray • 5.25" drive or 5.25" component
(A)	Cover (if no drive is installed) or drive cover (if drive is installed)
(B)	Cover

1.4.3 Rear of the device



① Opening, prepared for Kensington lock
② Power supply unit, here power supply unit 700 W (2 modules, each 700 W)
See also:
- "Connection of power supply unit 550 W (Page 25)"
- "Connection of power supply unit 850 W (Page 25)"
- "Connection of power supply unit 700 W (2 modules, each 700 W, redundant) (Page 25)"

③ Connection for functional grounding, see "Connection of equipotential bonding line (Page 58)"
④ Slot covers or connections of inserted expansion cards
⑤ 2 x fixing screws for strain relief (Page 72)
⑥ Connections on the rear of the device (Page 22)

See also

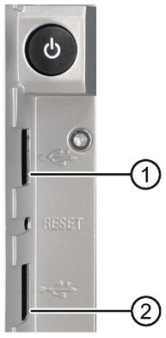
Technical specifications of the slots for expansion cards (Page 164)

1.4.4 Connections on the device

1.4.4.1 Connections on the front of the device

There are two USB connection sockets on the front of the device behind the front panel.

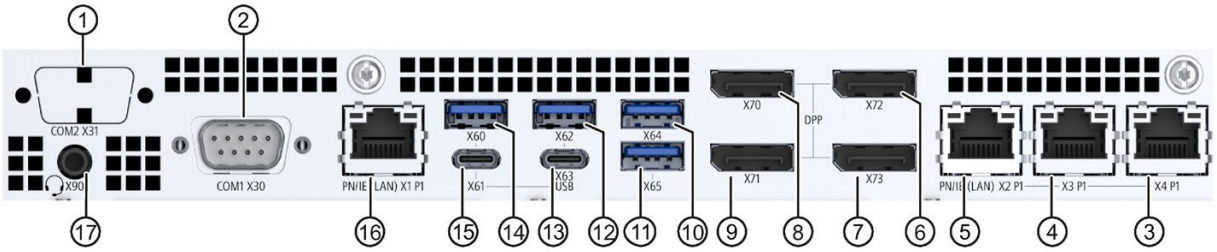
Observe the technical specifications of the connections on the device (Page 173).



No.	Connection socket
①	USB 3.2 Gen 2; Type A (X66) SuperSpeed backwards compatible to USB 3.0 / 2.0 / 1.1; each 900 mA / high current[1]
②	USB 3.2 Gen 2; Type A (X67) SuperSpeed backwards compatible to USB 3.0 / 2.0 / 1.1; each 900 mA / high current[1]

[1] Sum of the currents on the USB interfaces of the device (including the internal USB interfaces) ≤ 3 A

1.4.4.2 Connections on the rear of the device



Note

Note the information in "Technical specifications of the connections on the device (Page 173)".

No.	Connection socket
①	COM2 ; (X31)
②	COM1 ; (X30)
③	LAN 4 ; (X4 P1)
④	LAN 3 ; (X3 P1)
⑤	LAN 2 ; (X2 P1)
⑥	DisplayPort (labeling on the device: DPP), for connection of monitors; (X72)
⑦	DisplayPort (labeling on the device: DPP), for connection of monitors; (X73)
⑧	DisplayPort (labeling on the device: DPP), for connection of monitors; (X70)
⑨	DisplayPort (labeling on the device: DPP), for connection of monitors; (X71)
⑩	USB 3.2 Gen2 Type A (10 Gbps) Backwards compatible with USB 3.0 / 2.0 / 1.1; each 900 mA / high current[1] ; (X64)
⑪	USB 3.2 Gen2 Type A (10 Gbps) Backwards compatible with USB 3.0 / 2.0 / 1.1; each 900 mA / high current[1] ; (X65)
⑫	USB 3.2 Gen2 Type A (10 Gbps) SuperSpeed; backwards compatible with USB 3.0 / 2.0 / 1.1; each 900 mA / high current[1] ; (X62)
⑬	USB 3.2 Gen2x2 Type C (20 Gbps)[2] Backwards compatible with USB 3.0 / 2.0 / 1.1; each 1500 mA / high current[1] ; (X63)
⑭	USB 3.2 Gen2 Type A (10 Gbps) Backwards compatible with USB 3.0 / 2.0 / 1.1; each 900 mA / high current[1] ; (X60)
⑮	USB 3.2 Gen2x2 Type C (20 Gbps)[2] Backwards compatible with USB 3.0 / 2.0 / 1.1; each 1500 mA / high current[1] ; (X61)
⑯	LAN 1 ; (X1 P1)
⑰	Audio

[1] Sum of the currents on the USB interfaces of the device (including the internal USB interfaces) ≤ 3 A

[2] Maximum cable length: 3 m; depending on attenuation of the cable and maximum data rate of the connection.

Use the original connection technology of the I/O devices to be connected without adapters and without extensions.

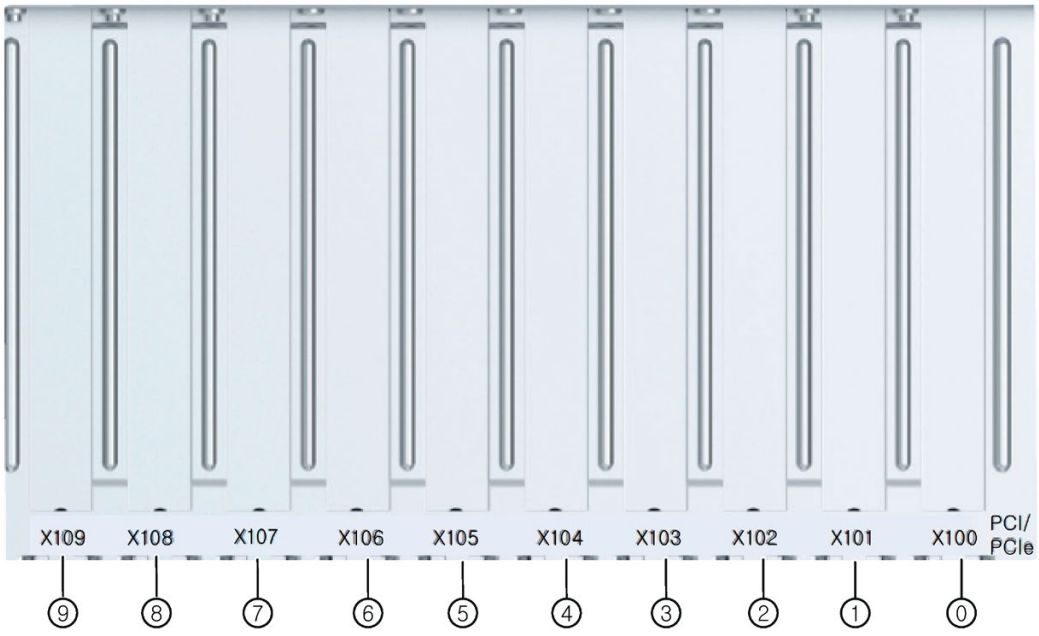
Connections of graphics cards

Graphics cards are expansion cards. After installing a graphics card, additional connections are available on the back of the device in the vicinity of the expansion cards for connecting monitors.

You can find information on these connections and connection options for monitors with adapters under "Connecting several monitors (multi-monitoring) (Page 63)".

You can find information on the graphics cards under "Technical specifications of graphic (Page 169)".

1.4.4.3 Connections of inserted expansion cards



Note

You can find detailed specifications for the slots for expansion cards in "Technical specifications of the slots for expansion cards (Page 164)".

Number in the figure above	Slot number on the enclosure TIA Portal port
(0)	X100
(1)	X101
(2)	X102
(3)	X103
(4)	X104
(5)	X105
(6)	X106
(7)	X107
(8)	X108
(9)	X109

1.4.4.4 Connection of power supply unit 550 W

Socket for power plug



1.4.4.5 Connection of power supply unit 850 W

Socket for power plug



1.4.4.6 Connection of power supply unit 700 W (2 modules, each 700 W, redundant)

Sockets for power plug



1.4.5 Operator controls

1.4.5.1 On-off button and reset button

WARNING

Risk of electric shock

The on-off button and on-off switch do not fully disconnect the device from the electricity grid.

You also need to observe the notes and information under "Switching off the device (Page 74)".

The on-off button ① and the reset button ② are located on the front of the device behind the front door.



① **On-off button**

The on-off button starts and shuts down the operating system.

You can find information on switching the device on and off under "Switching on the device (Page 73)" and "Switching off the device (Page 74)".

② **Reset button**

The reset button is for the emergency when the device can no longer be operated.

You can find information on the hardware reset under "Switching off the device (Page 74)"

1.4.5.2 Alarm reset button for power supply unit 700 W (2 modules, each 700 W, redundant)

The alarm reset button is only available for devices with redundant power supply unit (700 W) and it is simultaneously the status display of the redundant power supply unit.

Use the alarm reset button to switch off the signal tone of the power supply unit in the event of an error.



See also

Switching off the device (Page 74)

1.4.5.3 On-off switch for power supply unit 550 W

WARNING

Risk of electric shock

The on-off switch does not fully disconnect the device from the line voltage.

You also need to observe the notes and information under "Switching off the device (Page 74)".

On-off switch



1.4.5.4 On-off switch for power supply unit 850 W

WARNING

Risk of electric shock

The on-off switch does not fully disconnect the device from the line voltage.

You also need to observe the notes and information under "Switching off the device (Page 74)".

On-off switch



1.4.5.5 Switching off the power supply unit 700 W (2 modules, each 700 W, redundant)

Note

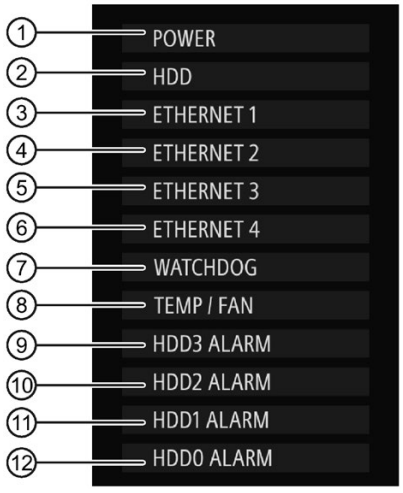
The redundant power supply unit 700 W does not have an on-off switch.

To completely disconnect the device from the mains voltage, follow the instructions under "Switching off the device (Page 74)".

1.4.6 Status displays

1.4.6.1 System status displays

The status displays for the system are located on the front of the device. They provide information on the status of the device components.



No.	Status display	Meaning	Status	Meaning of the status
①	POWER	Operating mode of the PC	OFF	Switched off or disconnected from the mains
			YELLOW	"Hibernate" or "Shut down" energy saving mode
			GREEN	PC in operation
②	HDD	Access to drive (HDD, SSD or M.2 NVMe)	OFF	No access
			GREEN	Access
③ ④ ⑤ ⑥	ETHERNET 1 ETHERNET 2 ETHERNET 3 ETHERNET 4	Ethernet status display (see also Status displays of the LAN ports (Page 30))	OFF	• No connection • No data traffic
			GREEN	Data traffic
⑦	WATCHDOG	Watchdog status	OFF	Not activated
			GREEN	Activated
			RED	Expired
⑧	TEMP	Temperature status	OFF	No error
			RED	Possible causes: • CPU temperature is critical • Device temperature is critical
	FAN	Fan status	OFF	No error
			RED	Possible causes: • Front fan faulty • Fan on drive cage type A faulty • Fan of the power supply unit 550 W faulty • Fan of the power supply unit 700 W (2 modules, each 700 W, redundant) faulty

No.	Status display	Meaning	Status	Meaning of the status
⑨ ⑩ ⑪ ⑫	HDD3 ALARM HDD2 ALARM HDD1 ALARM HDD0 ALARM	HDD alarm in connection with RAID and monitoring software. The number of the HDD alarm corresponds to the number of mounting locations of drives, see "Drive cage type A (Page 17)" and "Drive cage type B (Page 19)". The numbering of the drives with the "Intel® Optane™ Memory and Storage Management" software differs from this numbering. See important note on this under "Display of a defective drive of an onboard RAID system (Page 78)".	OFF	RAID is OK
			A RED LED is lit up	Associated drive is not OK
			All RED LEDs are flashing	RAID synchronization running, RAID is not OK In case of error, the newly mounted drive is synchronized with an existing drive.
			All RED LEDs are lit up	RAID is not OK The faulty drive could not be located by the monitoring software. It may be possible to determine the defective drive with the RAID software. You can find information under "RAID1 system (Page 77)", "Hot-spare drive in RAID1 systems (Page 77)"

1.4.6.2 Status displays of the LAN ports

The LAN ports are numbered on the enclosure to identify them clearly.

The numbering by the operating system may differ from this.

You can find information on the position of the LAN ports under: Connections on the rear of the device (Page 22)

You can find technical information on the LAN ports under: Technical specifications of the connections on the device (Page 173)

Status display LAN 1 (X1P1)



Status display	Meaning	Status	Meaning of the status
LED 1	Connection status	OFF	• No cable connected • Cable not active • Interface disabled
		YELLOW ON	• Active cable connected
		YELLOW flashing	• Data transfer active
		YELLOW flashing or ON	• Wake on LAN from S5 mode possible
LED 2	Data transmission rate	OFF	• 10/100 Mbps
		ORANGE	• 100 Mbps
		GREEN	• 1000 Mbps

Status display LAN 2 (X2P1), LAN3 (X3P1), LAN 4 (X4P1)



Status display	Meaning	Status	Meaning of the status
LED 1	Connection status	OFF	• No cable connected • Cable not active • Interface disabled
		YELLOW ON	• Active cable connected
		YELLOW flashing	• Data transfer active
		YELLOW flashing or ON	• Wake on LAN from S5 mode possible
LED 2	Data transmission rate	OFF	• 10/100 Mbps
		ORANGE	• 1000 Mbps
		GREEN	• 2500 Mbps

1.4.6.3 Status displays of power supply unit 700 W (2 modules, each 700 W, redundant)



Status display	Meaning	Status	Meaning of the status
Module of the power supply unit 700 W (2 modules, each 700 W, redundant)	Status of the power supply unit	OFF	• Module is out of service, no redundancy in effect.
		GREEN	• The module is in operation and functioning. • Redundancy is in effect when both modules are operating.
		RED	• Module failed, no redundancy in effect. See also information in "Alarm reset button for power supply unit 700 W (2 modules, each 700 W, redundant) (Page 27)" for this.

1.4.6.4 Status displays on removable tray for drives



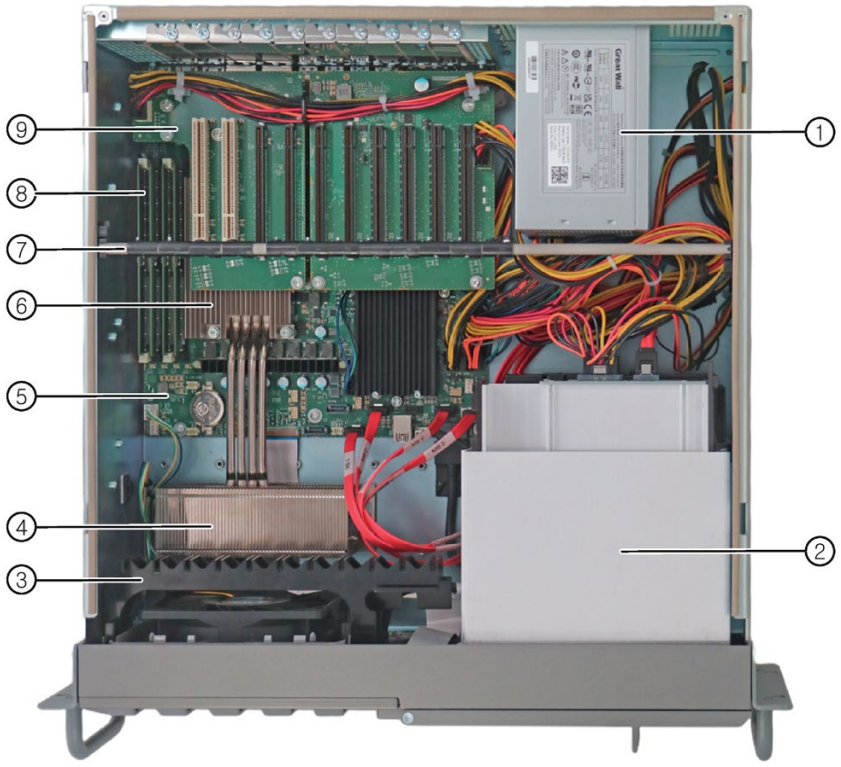
No.	Status display	Meaning	Status	Meaning of the status
①	Power	Status of the removable tray	OFF	• Device switched off • Power supply not connected • No drive installed
			GREEN	• Device is switched on and a drive is installed
②	Activity	Status of the drive	ORANGE	• Drive is active
			OFF	• Drive is not active

See also

Drive cage type A (Page 17)

1.5 Internal construction of the device

The motherboard shown is an example. Details may differ from the motherboard of your device version.



①	Power supply, single or redundant (here in the example: Single power supply)
②	Drive cage
③	Guide rail for stabilization of long expansion cards
④	Heat sink; connected to heat transport via heat pipes with heat sink of the processor ⑦
⑤	Motherboard
⑥	Processor heat sink
⑦	Rod with card holders for expansion cards
⑧	Slots for memory modules
⑨	Bus board with expansion card slots (marked here: right bus board; viewed from the rear of the device)

1.6 Accessories and spare parts

1.6.1 Hardware accessories

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

Obtaining accessories from the SIEMENS Industry Mall

You can find additional information in the online ordering system Industry Mall (https://mall.industry.siemens.com).

First select your region here and then navigate to the desired topic area.

Accessories available for order

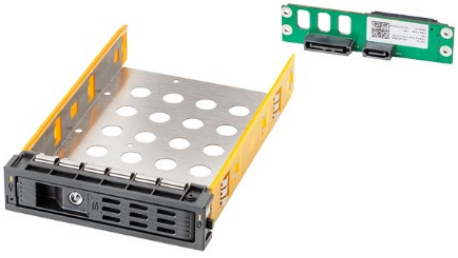
Name	Description	Article number
Tower JIT for SIMATIC IPCs	You can use the Tower Kit to convert the device into an industrial Tower PC. This step expands the operating range beyond the control cabinet. Components of the Tower Kit: • Cover • Feet • Accessories: Screws and rubber feet	6ES7648-1AA01-0XC0 
Retainer for locking the internal USB interface	The retainer is a mechanical safety device for the internal USB interface. It optimizes the protection of an internal USB memory stick against loads caused by vibration and shock during transportation or operation. This increases the reliability and operational safety of the device.	6ES7648-1AA00-0XK0 

Name	Description	Article number
Mini DisplayPort adapter Connection of monitors with the following adapters possible to: • NVIDIA RTX A400 graphics card • NVIDIA RTX 2000 Ada graphics card	• mDP-VGA adapter Mini DisplayPort to VGA	6ES7648-3AL00-0XA0 
	• mDP-DVI-D adapter Mini DisplayPort to DVI-D available as single-pack or 3-pack	1 adapter 6ES7648-3AK00-0XA0 3 adapters 6ES7648-3AK00-1XA0 
	• mDP-DP adapter Mini DisplayPort to DisplayPort Available as single-pack or 3-pack*	1 adapter 6ES7648-3AJ00-0XA0 3 adapters 6ES7648-3AJ00-1XA0* 
DisplayPort (DP) adapter Connection of monitors with the following adapters possible to: • Integrated graphics interfaces • NVIDIA RTX 4000 Ada graphics card • NVIDIA RTX 5000 Ada graphics card	• DP-VGA adapter DisplayPort to VGA	6ES7648-3AG00-0XA0 
	• DP-DVI-D adapter DisplayPort to DVI-D	6ES7648-3AF00-0XA0 

* Included in scope of delivery of NVIDIA RTX A400 and NVIDIA RTX 2000 Ada graphics cards.

SIEMENS spare parts services

Information on ordering, the provision and delivery of spare parts can be found under "Industry Online Support: Spare parts services (http://support.automation.siemens.com/WW/view/en/16611927)".

Name	Description	Article number
Rack PC 4HM filter set	Filter mat for fan cover on front of device, pack of 10 filter mats	A5E37019277
Removable tray 3.5" drive (SATA/SAS) or 2.5" SSD (SATA), (without drive)	The removable tray makes for quick and simple replacement of a 2.5" or 3.5" drive without having to open the device or remove it from the control cabinet. The result is the following advantages for service and maintenance, data backup and data transfer: • Replacement of a failed hard disk during operation ("hot-swap") • Downloading different system states or operating systems from different hard drives during a short period of time. • Simplified data backup by copying, for example, to a backup hard drive. • Simple transportation of backup data • Separate data storage and archiving possible	6ES7648-0EH00-1BA0 
Removable drive bay kit HDD / SSD for drive cage type A	Removable tray with backplane, key, data cable, screws, numbers for drive numbering on the front	A5E37754868 
5.25" mounting frame for HDD/SSD removable tray	5.25" mounting frame with removable tray You can use a 2.5 "or a 3.5" drive in the removable tray.	A5E35804114 

Name	Description	Article number
Assembly kit HDD / SSD for 5.25" tray	Assembly kit for 2.5" and 3.5" drives, can be inserted in the 5.25" tray of the drive cage type B	A5E39679590 
Assembly kit HDD / SSD internal, side panel	Assembly kit with drive bay plate for the internal installation of drives (3.5 "HDD or 2.5" SSD)	A5E38368482
M.2 NVMe SSD spare part kit; 1 TB	M.2 NVMe SSD with accessories (thermal pads, heat sink, fixing screws, etc.) for installing an M.2 NVMe SSD; 1 TB.	A5E54316803
M.2 NVMe SSD spare part kit; 512 GB	M.2 NVMe SSD with accessories (thermal pads, heat sink, fixing screws, etc.) for installing an M.2 NVMe SSD; 512 GB.	A5E54316794

1.6.2 Software accessories

You can find information on software products for SIMATIC IPCs here:

- Catalog and ordering system for Automation and Drives: Industry Mall (https://mall.industry.siemens.com).

  First select your Region and then navigate to the desired topic area.
- Industrial automation technology portfolio: Products & Services (https://www.siemens.com/global/en/products/automation/pc-based.html)

  Area: "SIMATIC IPC software and accessories".
- Portal for software download: "Online Software Delivery Portal (OSD) (https://www.automation.siemens.com/swdl/register/ipc)"

Safety instructions

2

2.1 General safety instructions

Danger if work is performed incorrectly

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 if work on the device is carried out incorrectly, if the device is faulty, or if it is integrated incorrectly into a system.

Death or serious bodily injury can result.

- Make sure that only appropriately qualified personnel work on the device or on a system.

Danger to life when the control cabinet is open

WARNING

Electrocution risk when control cabinet is open

When you open the control cabinet, there may be a dangerous voltage at certain areas or components.

Touching these areas or components can cause death or serious physical injury.

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

Risk of electric shock when working on the device

⚠ WARNING

Risk of electric shock from mains voltage

The on-off button and on-off switch do not fully disconnect the device from the mains voltage.

There is also a risk of fire if the device or connecting lines are damaged.

- Always fully disconnect the device from the mains voltage before performing work on the device or when the device will not be used over an extended period of time.

  Shut down the operating system.

  Then pull out the power plug or operate the central AC circuit breaker if installed in a control cabinet.

  Therefore, when installing the device in a control cabinet, ensure that the AC circuit breaker is easily accessible.

Risk due to strong high-frequency radiation

NOTICE

Observe immunity to RF radiation

The device has increased immunity to high-frequency radiation in accordance with the information on electromagnetic compatibility (Page 161).

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

- Note the information on immunity to high-frequency radiation.

Danger in case of lightning strike

⚠ DANGER

Danger in case of lightning strike

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

Death, serious injury and burns may result.

- In the event of an approaching thunderstorm, completely disconnect the device from the mains voltage in good time, see "Switching off the device (Page 74)".
- Do not touch power cables and data transmission cables during a thunderstorm.
- Keep sufficient distance from electric cables, distributors, systems, etc.

Danger when working on electrostatically sensitive components (ESD)



Electrostatic sensitive devices can be labeled with an appropriate symbol.

NOTICE

Electrostatic sensitive devices (ESD)

The device contains electrostatically sensitive components that can be destroyed by voltages that are far below human perception.

This can result in malfunctions and damage to the machine or plant.

- If you are working with electrostatically sensitive components, take appropriate precautions when opening the device and observe the ESD guidelines.

Risk due to device overheating

When setting up and installing the device, observe the important information in section:

- "Safety instructions on ambient and environmental conditions (Page 45)

Danger when changing the battery

WARNING

Risk of explosion and release of harmful substances

Improper use and handling of the backup battery can result in an explosion of the battery.

Harmful substances released by an explosion can cause serious physical injury.

Damaged batteries jeopardize the functioning of the device.

- Replace spent batteries promptly, see information under "Changing the backup battery (Page 134)".
- Replace the battery only with an identical battery or types recommended by the manufacturer.
- Do not throw the battery into a fire.
- Do not perform soldering work on the cell body of the battery.
- Do not recharge the battery.
- Do not open the battery.
- Do not short-circuit the battery.
- Do not reverse the polarity of the battery.
- Do not heat the battery over 100 °C.
- Protect the battery from direct sunlight, moisture and condensation.

Avoiding functional restrictions

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.

Use in industrial environments

Note

Use in an industrial environment without additional protective measures

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

2.2 Safety instructions on transport and storage

Danger when carrying and lifting the device

⚠ CAUTION

Risk of physical injury

The device is heavy and may injure persons and be damaged if it falls.

- Use the handles on the front panel of the device to carry and lift the device.

Risk during transport and storage

NOTICE

Damage to the device during transport and storage

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

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

- Keep the original packaging.
- Pack the device in the original packaging for transportation and storage.

Danger due to damage to the device

⚠ 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.

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

Risk due to condensation

NOTICE

Damage from condensation

If the device is subjected to low temperatures or extreme fluctuations in temperature during transportation, moisture could occur on or inside the HMI device (condensation).

Moisture can cause a short-circuit in electrical circuits and damage the device.

- Store the device in a dry place.
- Allow the device to warm up to room temperature before commissioning.
- 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.

2.3 Safety instructions for assembly

Fire protection enclosure

Note

The device meets the requirements for fire protection enclosures in accordance with IEC/EN/UL/CAN/CSA-C22.2 No. 61010-2-201. It can therefore be installed without an additional fire protection cover.

Approvals expire if the instructions are not observed

WARNING

Approvals expire if the instructions are not observed

If the ambient and environmental conditions are not complied with during installation and operation of the device or system, the approvals according to IEC/EN/UL/CAN/CSA-C22.2 No. 61010-2-201 are voided.

There is a risk of overheating and personal injury.

Note the following instructions and information under:

- "Climatic and mechanical environmental conditions (Page 162)"
- "Safety instructions on ambient and environmental conditions (Page 45)"

Important notes on rack assembly

Note

- **Higher operating temperature**

  If installed in a closed unit or a multi-unit rack, the ambient operating temperature may be greater than the room temperature. Install the device in an environment recommended by the manufacturer, see notes under "Climatic and mechanical environmental conditions (Page 162)"
- **Reduced air flow**

  When installing the device in a rack, ensure that the air flow required for safe operation of the device is guaranteed, see instructions under "Climatic and mechanical environmental conditions (Page 162)".
- **Mechanical load**

  Mounting of the equipment in the rack should be such that a hazardous condition is not caused due to an uneven mechanical load, see notes under "Climatic and mechanical environmental conditions (Page 162)"
- **Circuit overload**

  When connecting the device, observe the information on the power supply unit on the information label on the rear of the device.
- **Reliable grounding**

  Ensure that the equipment installed in the rack is safely grounded, see the notes under "Connection of equipotential bonding line (Page 58)"

Danger to life when the control cabinet is open

WARNING

Electrocution risk when control cabinet is open

When you open the control cabinet, there may be a dangerous voltage at certain areas or components.

Touching these areas or components can cause death or serious physical injury.

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

2.4 Safety instructions on ambient and environmental conditions

Approvals expire if the instructions are not observed

⚠ WARNING

Approvals expire if the instructions are not observed

If the ambient and environmental conditions are not complied with during installation and operation of the device or system, the approvals according to IEC/EN/UL/CAN/CSA-C22.2 No. 61010-2-201 are voided.

There is a risk of overheating and personal injury.

Danger if ambient conditions are unsuitable

NOTICE

Ambient conditions and chemical resistance

Unsuitable ambient conditions may cause faults or damage the device.
Failure to comply will void the warranty and approval in accordance with IEC/EN/UL/CAN/CSA-C22.2 No. 61010-2-201.

- When the device is operated in severe environments which are subject to caustic vapors or gases, ensure sufficient clean air is provided.
- Clean the enclosure surface with a damp cloth.
- Make sure that no water gets inside the device.

Notes on the suitable location of the device

Note

When you plan your project, you should make allowances for:

- Install the device in such a way that it poses no danger, e.g. by falling over.
- Only operate the device in a suitable environment, see information under "Climatic and mechanical environmental conditions (Page 162)".
  - Avoid extreme ambient conditions such as heat.
  - Do not expose the device to direct sunlight or powerful light sources.
- Observe the permitted mounting positions of the device.
- This device was designed for use in a normal industrial environment.
- When using the device in locations with difficult operating conditions due to corrosive vapors or gases, special additional protective measures are necessary, such as the supply of clean air.
- Ensure adequate ventilation of the device:
  - Do not obstruct the venting slots of the device.
  - Always maintain a minimum clearance of 50 mm to the area of the ventilation slots.
- The device meets the requirements for fire protection enclosures in accordance with IEC/EN/UL/CAN/CSA-C22.2 No. 61010-2-201. You can therefore install it without an additional fire protection enclosure.

High frequency radiation

CAUTION

Immunity to RF interference

The device has increased immunity to high-frequency radiation, see information under "Electromagnetic compatibility (Page 161)".

High frequency radiation above the specified immunity limits can result in malfunctioning of the device.

Persons are injured and the plant is damaged.

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

2.5 Safety instructions for I/O devices

Risk of damage to the device from connecting I/O devices

⚠ CAUTION

Fault caused by I/O devices

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

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

- 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 unit.

Danger due to regenerative feedback

NOTICE

Damage to the device due to regenerative feedback

A connected or installed component can cause voltage to be fed back to ground in the device.

This can damage the device.

- Do not introduce voltage into the device through connected or built-in I/O devices that are operated with their own power supply unit (e.g. a USB drive with an external power supply unit).

Note on measuring the counter voltage

Note

Note the following when measuring the counter voltage:

- Switch off the affected device and then insert the power plug.
- Connect all cables from the system to the device and switch all components of the system to active before starting the measurement.

Risk of electric shock from mains voltage

⚠ WARNING

Risk of electric shock

The on-off button and on-off switch do not fully disconnect the device from the mains voltage.

There is also a risk of fire if the device or connecting lines are damaged.

- Always fully disconnect the device from the mains voltage before performing work on the device or when the device will not be used over an extended period of time.
- For control cabinet mounting: Use a central, easily accessible AC circuit breaker, especially when close to the device.
- When you install the device, ensure that the power supply plug is easily accessible.

2.6 Safety instructions on device and system extensions

Contact your technical support team or the point of sale to find out which device and system expansions are suitable for installation.

Risk due to device and system expansions

NOTICE

Damage caused by device and system expansions

Device and system expansions may contain faults and affect the entire device, machine or plant.

Device and system expansions may violate safety rules and regulations regarding radio interference suppression.

If you install or replace device or system expansions and damage your device, the warranty is voided.

- Disconnect the device completely from the line voltage before opening the device. (Page 74)
- Only install device or system expansions designed for this device.

  Contact your technical support team (Page 196) or the point of sale to find out which device and system expansions are suitable for installation.
- Note the Information on electromagnetic compatibility (Page 184).

Risk of electric shock when working on the device

WARNING

Risk of electric shock from mains voltage

The on-off button and on-off switch do not fully disconnect the device from the mains voltage.

There is also a risk of fire if the device or connecting lines are damaged.

- Always fully disconnect the device from the mains voltage before performing work on the device or when the device will not be used over an extended period, see information under "Switching off the device (Page 74)"
- For control cabinet mounting: Use a central, easily accessible AC circuit breaker, especially when close to the device.
- When you install the device, ensure that the power supply plug is easily accessible.

Risk when opening the device

⚠ WARNING

Risk of malfunctions and electric shock

Improper intervention in the device endangers operational reliability and may damage the device.

The results are personal injuries and damage to the plant.

Take the following precautions:

- Disconnect the power plug before you open the device.
- Close the device after every intervention.

NOTICE

Electrostatic sensitive devices (ESD)

The device contains electronic components which may be destroyed by electrostatic charge.

Malfunctions and damage to the machine or system can result.

Take corresponding precautionary measures when you open the device.

⚠ WARNING

Risk due to unauthorized opening and improper repairs or expansions

Improper procedures when carrying out expansions may result in damage to equipment or endanger the users.

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

It is therefore essential that you observe the information under "Open the device (Page 93)".

Danger from unauthorized or improperly performed repairs

⚠ WARNING

Danger due to unauthorized opening or improperly carried out repairs or extensions

Improperly carried out repairs or extensions to the device can lead to property damage or danger to the users.

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

Risk of overheating when using expansion cards

⚠ CAUTION

Fire hazard due to overheating of the device

Expansion cards generate additional heat. The device can overheat or cause a fire.

- Observe the safety and installation instructions for the expansion cards.
- Note the maximum power consumption permitted for the device, see "General technical specifications (Page 155)".

⚠ CAUTION

Danger of burns from the hot blanking plates on the rear of the device

If expansion cards that generate a lot of heat are fitted, high temperatures can be present on the rear of the device in the vicinity of the perforated blanking plates.

Observe the danger symbol "Warning of hot surface (Page 200)" on the rear of the device.

Observe the Notes on the suitable location of the device (Page 45).

Limitation of liability

Note

- All technical specifications and approvals of the device only apply if you use expansion components that have a valid CE approval (CE mark).
- Observe the installation instructions for expansion components in the associated documentation.
- 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.

Unpacking and installing the device 3

3.1 Unpacking the device

3.1.1 Scope of delivery

Device and hardware for the device

- IPC in the "Rack" device version
- Power supply unit cable with power plug interlock *
- Strain relief for USB and LAN ports, 2 detachable cable ties
- 2 keys for front door
- For device with drive cage type A:
  2 keys for removable drive bay
- 4 self-adhesive enclosure feet
- USB flash drive* with:
  - Software and tools to restore the installed Microsoft® Windows® operating system
  - Device driver
  - Quick Install Guide for the device
  - Operating Instructions of the device
  - Product Information
  - Firmware/BIOS description
  - Operating instructions for the ordered Microsoft® Windows® operating system on this device

* (optional, if ordered)

Operating system

Depending on the ordered device configuration, the device is equipped **with** or **without** an installed operating system.

You can find information on ordered Microsoft® Windows® operating systems under: Important instructions and manuals for operating the device (Page 11) or Technical specifications of the operating systems (Page 175).

Installed software

You will find the information on more software for your device under: Software accessories (Page 37).

Printed documents

- Quick Install Guide for the device with link and QR code to the online form for quality control (quality control notification) in the SIEMENS After Sales Information System (ASIS)
- Product Information "Important notes on your device"

3.1.2 Checking the delivery package

⚠ WARNING

Electric shock and fire hazard due to damaged device

Improper storage or shipping can damage equipment. This may result in personal injury and/or property damage.

You must follow the instructions under "Safety instructions on transport and storage (Page 42)".

Procedure

1. Check the delivery unit for any signs of visible transport damage.

   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.

2. Unpack the device at its installation location.
3. Keep the original packaging in case you have to transport the unit again.
4. Check the scope of delivery (Page 51) and any accessories (Page 34) you may have ordered for completeness and damage.

   If the contents of the package are incomplete, damaged or do not correspond to your order, you can use the After Sales Information System (ASIS) to provide feedback on product deliveries and repairs.

   Complete the online form for quality control (quality control notification).

5. Please keep the documentation in a safe place. It is required for initial commissioning and is part of the device.
6. Note down the Device identification data (Page 53).

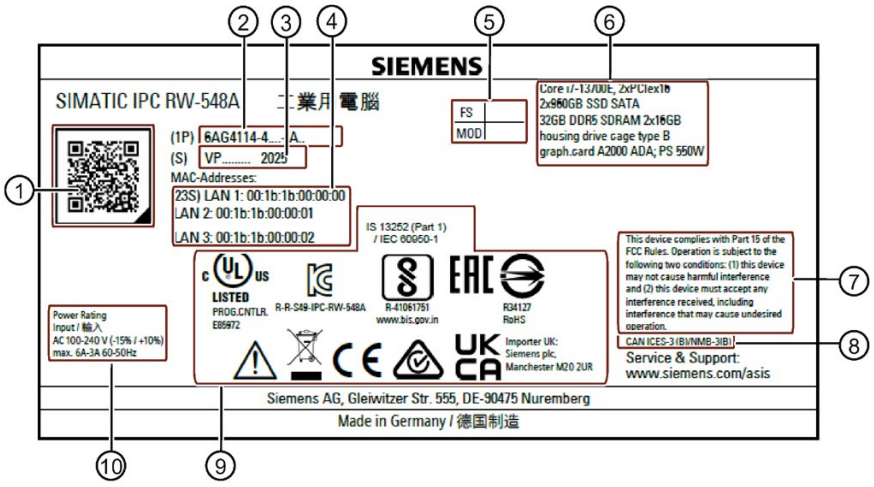
3.1.3 Device identification data

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

The following illustrations are examples. The data of your device may differ from the data in these examples.

Nameplate

The nameplate is located inside the front door.



Example: SIMATIC IPC RW-548A nameplate (information on the nameplate is device-specific)

Identification data of the device

①	QR code for information about the device
②	Item number of the device (device-specific)
③	Serial number of the device (device-specific)
④	MAC-Addresses (Media Access Control Addresses): MAC address of the device's LAN ports (device-specific)
⑤	FS (Functional State): Functional state of the device
⑥	Information on the device equipment (device-specific)
⑦	FCC (USA) (Page 181)
⑧	ICES Compliance (Canada) (Page 181)
⑨	Symbols of certificates and approvals (Page 201) Symbols for safe use and disposal (Page 200) **Note:** The nameplate of your device contains only symbols of the certificates and approvals (Page 179) of the device at the time of delivery.
⑩	Information on the connected load of the device

COA label

The COA label (Certificate of Authenticity) is located inside the front door.

Note

The COA label is only available for devices delivered with Microsoft® Windows® operating system installed.



Example: COA label for the Microsoft® Windows® 11 operating system

(the data of the product key are grayed out in the figure)

3.2 Mounting the device

3.2.1 Mounting types

Note

If the device is permanently installed, mounted on telescopic rails or set up as a tower, it must not be subjected to vibration loads during operation. In these cases, use only SSDs and not HDDs as drives.

Horizontal: Mounting with cabinet brackets

The device can be installed horizontally in control cabinets and 19" rack systems.

This installation type meets the requirements in accordance with IEC60297-3-100.

Horizontal: Mounting on telescopic rails

The device can be installed horizontally in control cabinets and 19" rack systems.

When telescopic rails are used for mounting, the device can be withdrawn fully from the cabinet or rack. Note the information in "Technical specifications of the telescopic rails (Page 175)".

Horizontal: Mounting on device base

This installation type meets the requirements in accordance with IEC60297-3-100.

Vertical: Mounting on device base

For vertical operation, mount the device on a horizontal base made of metal and secure it against falling.

The following device bases are available from Rittal (https://www.rittal.com/de-de/product/list.action?categoryPath=/PG0001/) for this purpose (Rittal Type TE 7000.620, Rittal Type VR 5501.655, Rittal Type DK 5501.655). You should also observe the information of the manufacturer of the device bases.

Vertical: with tower kit

For the vertical operation of the device with a tower kit, the device has a cover and feet. The tower kit can be ordered as an option, see "Hardware accessories (Page 34)".

More information

More information can be found in the Quick Installation Guide (QIG) that is enclosed with the device.

3.2.2 Securing the device

⚠ WARNING

Dangerous voltage and fire hazard

Improper actions during installation and assembly may lead to personal injury and/or damage to equipment.

It is essential that you follow the installation and mounting instructions under:

- Safety instructions for assembly (Page 43)
- Safety instructions on ambient and environmental conditions (Page 45)

⚠ DANGER

Electrocution risk when control cabinet is open

When you open the control cabinet, there may be a dangerous voltage at certain areas or components.

Touching these areas or components can cause death or serious physical injury.

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

⚠ CAUTION

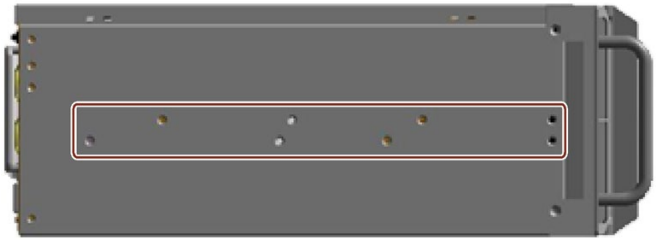
Risk of physical injury

The device is too heavy to be mounted exclusively with the 19" brackets of the front panel.

The device may fall down, injure people and get damaged.

- Secure the device using additional measures. The mounting screws of the telescopic rails may not protrude more than 5 mm into the device.
- Use handles attached to the front to carry and lift the device.

Drill holes for telescopic rails



You can find the dimensions for the drill holes under "Dimension drawing for drill holes for telescopic rails (Page 178)".

You can find detailed information on the telescopic rails under: "Technical specifications of the telescopic rails (Page 175)".

Connecting the device

4

4.1 Country-specific information on supply voltage

Country-specific information on supply voltage in USA and Canada

Supply voltage 120 V / 230 V / 240 V

Ensure that the power supply cables used are rated for the maximum current consumption and maximum ambient temperature of the device and that they meet the requirements of the following standards:

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

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

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

Country-specific information on supply voltage outside of USA and Canada

Supply voltage 230 V AC

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

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

Power supply cables and device plugs must bear the prescribed markings.

4.2 Connection of equipotential bonding line

A low-resistance ground connection ensures that interference signals generated by external power supply cables, signal cables or other cables to the I/O devices are safely discharged to earth.

The connection for functional earthing on a device has a large surface, makes contact over a large area and is marked with the following symbol.



You can find information on the position of the functional earthing connection under "Rear of the device (Page 20)".

Requirement

- Screwdriver TORX T20
- Equipotential bonding conductor with a minimum cross section of 2.5 mm^2

Procedure

1. Make the connection for functional ground via an equipotential bonding line to the equipotential bonding rail or grounding bar of the control cabinet in which the device is installed.

4.3 Connecting power supply units

4.3.1 Connecting the power supply unit 550 W

WARNING

Injury to persons or damage to property when operated on an incorrect power supply system

If you connect the device to an unsuitable power supply, the device receives voltages and currents that are too high or too low.

Injuries to persons, malfunctions or a damage to the device can result.

- The permissible nominal voltage of the device must match the local mains voltage.
- Operate the device only in grounded electricity grids (TN networks in accordance with VDE 0100 Part 100 or IEC 60364-1).
- Operation via non-grounded or impedance-grounded grids is prohibited.

⚠ WARNING

Risk of electric shock

The on-off button and on-off switch do not fully disconnect the device from the mains voltage.

There is also a risk of fire if the device or connecting lines are damaged.

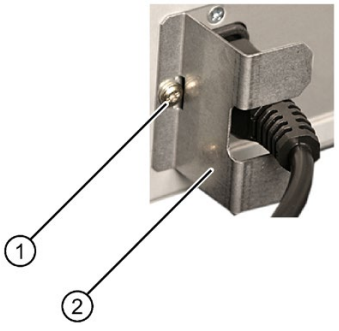
- Always fully disconnect the device from the mains voltage before performing work on the device or when the device will not be used over an extended period of time.
- For control cabinet mounting: Use a central and easily accessible AC circuit breaker near the device.

Requirement

- You have observed the information under "Country-specific information on supply voltage (Page 57)".
- Screwdriver TORX T10

Procedure

1. Ensure that the on-off switch is in position '0' (off). You can find information on the position of the on-off switch under "On-off switch for power supply unit 550 W (Page 27)".
2. Connect the power plug to the corresponding socket. Information on the position of the socket is available in "Connection of power supply unit 550 W (Page 25)".
3. Plug the power supply cable into the power outlet.
4. Switch on the device at the on-off switch (position |).
5. To prevent unintentional removal of the power plug, secure the power plug on the device.
6. Remove the retaining screw ①.



7. Screw on the power plug latch ② with the fixing screw ①.

4.3.2 Connecting the power supply unit 850 W

WARNING

Injury to persons or damage to property when operated on an incorrect power supply system

If you connect the device to an unsuitable power supply, the device receives voltages and currents that are too high or too low.

Injuries to persons, malfunctions or a damage to the device can result.

- The permissible rated voltage of the device must match the local mains voltage.
- Operate the device only in grounded electricity grids (TN networks in accordance with VDE 0100 Part 100 or IEC 60364-1).
- Operation via non-grounded or impedance-grounded grids is prohibited.

WARNING

Risk of electric shock

The on-off button and on-off switch do not fully disconnect the device from the mains voltage.

There is also a risk of fire if the device or connecting lines are damaged.

- Always fully disconnect the device from the mains voltage before performing work on the device or when the device will not be used over an extended period of time.
- For control cabinet mounting: Use a central and easily accessible AC circuit breaker near the device.

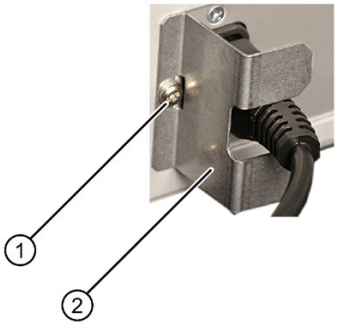
Requirement

- You have observed the information under "Country-specific information on supply voltage (Page 57)".
- Screwdriver TORX T10

Procedure

1. Ensure that the on-off switch is in position '0' (off). You can find information on the position of the on-off switch under "On-off switch for power supply unit 850 W (Page 28)".
2. Connect the power plug to the corresponding socket. Information on the position of the socket is available in "Connection of power supply unit 850 W (Page 25)".
3. Insert the power cable in the electrical socket.
4. Switch on the device at the on-off switch (position |).
5. To prevent unintentional removal of the power plug, secure the power plug on the device.

6. Remove the retaining screw ①.



7. Screw on the power plug latch ② with the fixing screw ①.

4.3.3 Connecting the power supply unit 700 W (2 modules, each 700 W, redundant)

⚠ WARNING

Injury to persons or damage to property when operated on an incorrect power supply system

If you connect the device to an unsuitable power supply, the device receives voltages and currents that are too high or too low.

Injuries to persons, malfunctions or a damage to the device can result.

- The permissible rated voltage of the device must match the local mains voltage.
- Operate the device only in grounded electricity grids (TN networks in accordance with VDE 0100 Part 100 or IEC 60364-1).
- Operation via non-grounded or impedance-grounded grids is prohibited.

⚠ WARNING

Risk of electric shock

The on-off button does not fully disconnect the device from the electricity grid.

There is also a risk of fire if the device or connecting lines are damaged.

- Always fully disconnect the device from the mains voltage before performing work on the device or when the device will not be used over an extended period of time.
- For control cabinet mounting: Use a central, easily accessible AC circuit breaker close to the device, if possible.

Requirement

- You have observed the information under "Country-specific information on supply voltage (Page 57)".
- Screwdriver TORX T10

Procedure

1. Connect the power plug to both sockets. Information on the position of the sockets is available in "Connection of power supply unit 700 W (2 modules, each 700 W, redundant) (Page 25)".
2. Connect the power cable to the sockets.

   The status display on the modules of the redundant power supply unit lights up green.

Note

If only one of the modules of the redundant power supply unit works, a warning signal sounds. The warning signal goes off by pressing the alarm reset button on the working module of the redundant power supply unit. You can find information on the position of the alarm reset button under "Alarm reset button for power supply unit 700 W (2 modules, each 700 W, redundant) (Page 27)".

4.4 Connecting I/O devices

4.4.1 Connecting external devices

CAUTION

Fault caused by I/O devices

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

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

Be sure to follow the Instructions for connecting I/O devices (Page 47).

Procedure

Note

Use the original connections of the I/O to be connected without adapters or extensions.

1. Connect the I/O devices to the respective interfaces. Information on the position of the interfaces is available in "Connections on the device (Page 21)".
2. Secure the cables (Page 72) with a strain relief.

4.4.2 Connecting audio devices

Requirement

- You have observed the information under "Connecting external devices (Page 62)" and under "Technical specifications of the connections on the device (Page 173)"

Procedure

Note

Use the original connection technology of the audio devices to be connected without adapters and extensions.

1. Connect the I/O devices to the respective interfaces. Information on the position of the interfaces is available in "Connections on the device (Page 21)".
2. Secure the cables (Page 72) with a strain relief.

4.4.3 Connecting several monitors (multi-monitoring)

4.4.3.1 Connection of monitors when using the NVIDIA RTX A400 graphics card

Power supply units

The NVIDIA RTX A400 graphics card can be operated with the following power supply units:

- Power supply unit 550 W
- Power supply unit 850 W
- Power supply unit 700 W (2 modules, each 700 W, redundant)

Connection sockets on the rear of the device

You will find four connection sockets on the rear of the device for connecting monitors at the integrated graphics interfaces.

- 4 x DP (DisplayPort; labeling on the device: DPP1, DPP2, DPP3, DPP4)

  You can find information about these connection sockets under: "Connections on the rear of the device (Page 22)".

You will find 3 additional connection sockets on the rear of the device for connecting monitors to the NVIDIA RTX A400 graphics card.

- 4 x mDP (Mini DisplayPort)

  At these connection sockets, you can use adapters to connect monitors to other graphics ports.

  You can find information on the adapters under "Hardware accessories (Page 34)".

Connection socket on monitor		**Connection socket on the integrated graphics interfaces**				**Connection socket on the NVIDIA RTX A400 graphics card**			
		DP (DPP1; X70)[1]	**DP (DPP2; X71)[1]**	**DP (DPP3; X72)[1]**	**DP (DPP4; X73)[1]**	**mDP1**	**mDP2**	**mDP3**	**mDP4**
Monitor 1	DP (DisplayPort)	X							
	DVI	X [2)]							
	VGA	X [2)]							
Monitor 2	DP (DisplayPort)		X						
	DVI		X [2)]						
	VGA		X [2)]						
Monitor 3	DP (DisplayPort)			X					
	DVI			X [2)]					
	VGA			X [2)]					
Monitor 4	DP (DisplayPort)				X				
	DVI				X [2)]				
	VGA				X [2)]				
Monitor 5	DP (DisplayPort)					X [2)]			
	DVI					X [2)]			
	VGA					X [2)]			
Monitor 6	DP (DisplayPort)						X [2)]		
	DVI						X [2)]		
	VGA						X [2)]		
Monitor 7	DP (DisplayPort)							X [2)]	
	DVI							X [2)]	
	VGA							X [2)]	
Monitor 8	DP (DisplayPort)								X [2)]
	DVI								X [2)]
	VGA								X [2)]

[1)] Labeling on the device

[2)] via adapter, see "Hardware accessories (Page 34)"

Requirement

- You have read the information in the following section: "Connecting external devices (Page 62)".

Procedure

1. Connect the monitors to the rear of the device (Page 22).

   For information on connecting monitors with adapters, see "Hardware accessories (Page 34)".

2. On delivery the device is set for multi-monitoring.

   If the delivery state settings have been changed, configure the multi-monitoring function in the firmware settings, see "Installing a graphics card (Page 104)".

See also

Technical specifications of graphic (Page 169)

4.4.3.2 Connection of monitors when using the NVIDIA RTX 2000 Ada graphics card

Power supply units

The NVIDIA RTX 2000 Ada graphics card can be operated with the following power supply units:

- Power supply unit 550 W
- Power supply unit 850 W
- Power supply unit 700 W (2 modules, each 700 W, redundant)

Connection sockets on the rear of the device

You will find four connection sockets on the rear of the device for connecting monitors at the integrated graphics interfaces.

- 4 x DP (DisplayPort; labeling on the device: DPP1, DPP2, DPP3, DPP4)

  You can find information about these connection sockets under: "Connections on the rear of the device (Page 22)".

You will find 4 additional connection sockets on the rear of the device for connecting monitors to the NVIDIA RTX 2000 Ada graphics card.

- 4 x mDP (Mini DisplayPort)

  At these connection sockets, you can use adapters to connect monitors to other graphics ports.

  You can find information on the adapters under "Hardware accessories (Page 34)".

Connection socket on monitor		**Connection socket on the integrated graphics interfaces**				**Connection sockets on NVIDIA RTX 2000 Ada graphics card**			
		DP (DPP1; X70)[1]	**DP (DPP2; X71)[1]**	**DP (DPP3; X72)[1]**	**DP (DPP4; X73)[1]**	**mDP1**	**mDP2**	**mDP3**	**mDP4**
Monitor 1	DP (DisplayPort)	X							
	DVI	X [2)]							
	VGA	X [2)]							
Monitor 2	DP (DisplayPort)		X						
	DVI		X [2)]						
	VGA		X [2)]						
Monitor 3	DP (DisplayPort)			X					
	DVI			X [2)]					
	VGA			X [2)]					
Monitor 4	DP (DisplayPort)				X				
	DVI				X [2)]				
	VGA				X [2)]				
Monitor 5	DP (DisplayPort)					X [2)]			
	DVI					X [2)]			
	VGA					X [2)]			
Monitor 6	DP (DisplayPort)						X [2)]		
	DVI						X [2)]		
	VGA						X [2)]		
Monitor 7	DP (DisplayPort)							X [2)]	
	DVI							X [2)]	
	VGA							X [2)]	
Monitor 8	DP (DisplayPort)								X [2)]
	DVI								X [2)]
	VGA								X [2)]

[1)] Labeling on the device

[2)] via adapter, see "Hardware accessories (Page 34)"

Requirement

- You have read the information in the following section: "Connecting external devices (Page 62)".

Procedure

1. Connect the monitors to the rear of the device (Page 22).

   For information on connecting monitors with adapters, see "Hardware accessories (Page 34)".

2. On delivery the device is set for multi-monitoring.

   If the delivery state settings have been changed, configure the multi-monitoring function in the firmware settings, see "Installing a graphics card (Page 104)".

See also

Technical specifications of graphic (Page 169)

4.4.3.3 Connection of monitors when using the NVIDIA RTX 4000 Ada graphics card

Power supply unit

The NVIDIA RTX 4000 Ada graphics card can be operated with the following power supply units:

- Power supply unit 850 W

Connection sockets on the rear of the device

You will find four connection sockets on the rear of the device for connecting monitors at the integrated graphics interfaces.

- 4 x DP (DisplayPort; labeling on the device: DPP1, DPP2, DPP3, DPP4)

  You can find information about these connection sockets under: "Connections on the rear of the device (Page 22)".

You will find 4 additional connection sockets on the rear of the device for connecting monitors to the NVIDIA RTX 4000 Ada graphics card.

- 4 x DP (DisplayPort)

  At these connection sockets, you can use adapters to connect monitors to other graphics ports.

  You can find information on the adapters under "Hardware accessories (Page 34)".

Connection socket on monitor		**Connection socket on the integrated graphics interfaces**				**Connection sockets on NVIDIA RTX 4000 Ada graphics card**			
		DP (DPP1; X70)[1]	**DP (DPP2; X71)[1]**	**DP (DPP3; X72)[1]**	**DP (DPP4; X73)[1]**	**DP1 (DisplayPort)**	**DP2 (DisplayPort)**	**DP3 (DisplayPort)**	**DP4 (DisplayPort)**
Monitor 1	DP (DisplayPort)	X							
	DVI	X [2]							
	VGA	X [2]							
Monitor 2	DP (DisplayPort)		X						
	DVI		X [2]						
	VGA		X [2]						
Monitor 3	DP (DisplayPort)			X					
	DVI			X [2]					
	VGA			X [2]					
Monitor 4	DP (DisplayPort)				X				
	DVI				X [2]				
	VGA				X [2]				
Monitor 5	DP (DisplayPort)					X			
	DVI					X [2]			
	VGA					X [2]			
Monitor 6	DP (DisplayPort)						X		
	DVI						X [2]		
	VGA						X [2]		
Monitor 7	DP (DisplayPort)							X	
	DVI							X [2]	
	VGA							X [2]	
Monitor 8	DP (DisplayPort)								X
	DVI								X [2]
	VGA								X [2]

[1] Labeling on the device

[2] via adapter, see "Hardware accessories (Page 34)"

Requirement

- You have read the information in the following section: "Connecting external devices (Page 62)".

Procedure

1. Connect the monitors to the rear of the device (Page 22).

   For information on connecting monitors with adapters, see "Hardware accessories (Page 34)".

2. On delivery the device is set for multi-monitoring.

   If the delivery state settings have been changed, configure the multi-monitoring function in the firmware settings, see "Installing a graphics card (Page 104)".

See also

Technical specifications of graphic (Page 169)

4.4.3.4 Connection of monitors when using the NVIDIA RTX 5000 Ada graphics card

Power supply unit

The NVIDIA RTX 5000 Ada graphics card can be operated with the following power supply units:

- Power supply unit 850 W

Connection sockets on the rear of the device

You will find four connection sockets on the rear of the device for connecting monitors at the integrated graphics interfaces.

- 4 x DP (DisplayPort; labeling on the device: DPP1, DPP2, DPP3, DPP4)

  You can find information about these connection sockets under: "Connections on the rear of the device (Page 22)".

You will find 4 additional connection sockets on the rear of the device for connecting monitors to the NVIDIA RTX 5000 Ada graphics card.

- 4 x DP (DisplayPort)

  At these connection sockets, you can use adapters to connect monitors to other graphics ports.

  You can find information on the adapters under "Hardware accessories (Page 34)".

Connection socket on monitor		**Connection socket on the integrated graphics interfaces**				**Connection sockets on NVIDIA RTX 5000 Ada graphics card**			
		DP (DPP1; X70)[1)]	**DP (DPP2; X71)[1)]**	**DP (DPP3; X72)[1)]**	**DP (DPP4; X73)[1)]**	**DP1 (DisplayPort)**	**DP2 (DisplayPort)**	**DP3 (DisplayPort)**	**DP4 (DisplayPort)**
Monitor 1	DP (DisplayPort)	X							
	DVI	X [2)]							
	VGA	X [2)]							
Monitor 2	DP (DisplayPort)		X						
	DVI		X [2)]						
	VGA		X [2)]						
Monitor 3	DP (DisplayPort)			X					
	DVI			X [2)]					
	VGA			X [2)]					
Monitor 4	DP (DisplayPort)				X				
	DVI				X [2)]				
	VGA				X [2)]				
Monitor 5	DP (DisplayPort)					X			
	DVI					X [2)]			
	VGA					X [2)]			
Monitor 6	DP (DisplayPort)						X		
	DVI						X [2)]		
	VGA						X [2)]		
Monitor 7	DP (DisplayPort)							X	
	DVI							X [2)]	
	VGA							X [2)]	
Monitor 8	DP (DisplayPort)								X
	DVI								X [2)]
	VGA								X [2)]

[1)] Labeling on the device

[2)] via adapter, see "Hardware accessories (Page 34)"

Requirement

- You have read the information in the following section: "Connecting external devices (Page 62)".

Procedure

1. Connect the monitors to the rear of the device (Page 21).

   For information on connecting monitors with adapters, see "Hardware accessories (Page 34)".

2. On delivery the device is set for multi-monitoring.

   If the delivery state settings have been changed, configure the multi-monitoring function in the firmware settings, see "Installing a graphics card (Page 104)".

See also

Technical specifications of graphic (Page 169)

4.5 Connecting the device to networks

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

Ethernet

Wake on LAN and Remote Boot are supported.

You can use the integrated Ethernet interfaces for communication and data exchange with automation devices, e.g. SIMATIC S7.

You need the "SOFTNET S7" software package for this.

PROFINET

PROFINET can be operated via:

- All Ethernet interfaces on the device (RT)

SIMATIC NET

Use this software package to create, operate and configure an innovative network for Field & Control level. Additional information is available under SIMATIC NET (http://w3.siemens.com/mcms/automation/en/industrielle-kommunikation/Seiten/Default.aspx).

The software package and the documentation are not included in the scope of supply.

More information

You can find additional information on the Internet at: Technical support (https://support.industry.siemens.com)

4.6 Securing the cables

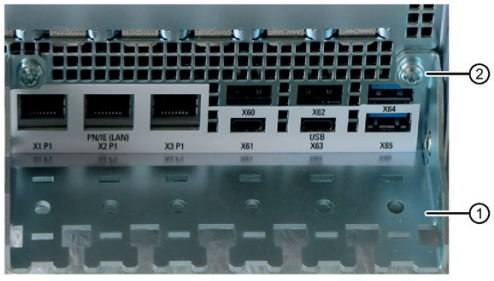
The strain relief is used to prevent accidental loosening of cables.

Requirement

- I/O devices are connected to the respective connections.
- Screwdriver TORX T10

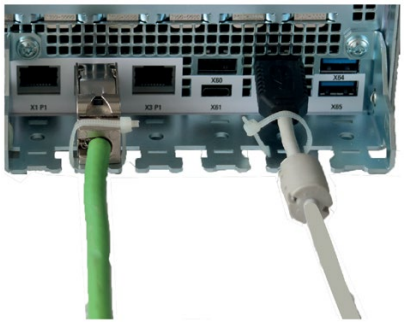
Procedure

1. Connect I/O devices to the corresponding sockets on the rear of the device. Information on the position of the sockets is available in "Connections on the device (Page 21)".
2. Screw the strain relief ① to the device with the fixing screws ②.



3. Insert detachable cable ties into the corresponding openings of the strain relief and secure the cables with the cable ties.

   Secure the cables at the corresponding openings of the strain relief using single cable ties.



Commissioning the device

5

5.1 Switching on the device

Requirement

- The power supply unit is connected. (Page 58)

Procedure

1. For devices with power supply unit 550 W and power supply unit 850 W:

   Switch on the on-off switch on the rear of the device (position |).

2. Press the on-off button on the front side of the device behind the front door.

   Information on the position of the switch and the button is available under "Operator controls (Page 26)".

Commissioning the installed Windows® operating system

You can find information on the first switch on of the device and on commissioning the installed Windows® operating system in the documentation of your operating system, see "Important instructions and manuals for operating the device (Page 11)".

5.2 Configuring automatic switch-on of device

In the firmware settings, you can specify that the device will switch on automatically after disconnection from the line voltage as soon as the line voltage is available again.

The minimum necessary outage time of the line voltage depends on the device configuration.

Configure this function in the firmware settings:

You can find information on this in the firmware/BIOS description, see "Important instructions and manuals for operating the device (Page 11)".

5.3 Switching off the device

Shutting down the operating system

For active operating system:

- Shut down the operating system properly.

For inactive operating system

- Briefly press the on-off button. Information on the position of the button is available under "On-off button and reset button (Page 26)".

Result

The "POWER" status display on the front (Page 29) indicates the corresponding energy-saving mode ("Shut down") of the device.

The device is switched off but not fully disconnected from the line voltage.

Fully disconnecting the device from the line voltage

⚠ WARNING

Risk of electric shock from line voltage

The on-off button and on-off switch do not fully disconnect the device from the line voltage.

There is also a risk of fire if the device or the connecting cables lines are damaged.

Always fully disconnect the device from the line voltage before performing work on the device or when the device will not be used over an extended period of time.

- Shut down the operating system.

  The "POWER" status indicator on the front (Page 29) indicates the corresponding energy-saving mode ("Shut down").
- Then pull out the power plug or operate the central AC circuit breaker if installed in a control cabinet.

  Therefore, when installing the device in a control cabinet, ensure that the AC circuit breaker is easily accessible.
- After unplugging the power plug, wait until all status displays are OFF (approximately 10 to 20 seconds). Only then is the device fully de-energized.

Hardware reset

If the device does not respond to input from the keyboard or mouse, restart it with the hardware reset. A started operating system will not hereby shut down safely.

NOTICE
Data loss With a hardware reset, the device is switched off and restarted. • Data in the main memory is deleted. • Data on the data storage media may be lost. • The device may be damaged. Perform a hardware reset only in the case of an emergency.

Hardware reset with on-off button:

- Press the on-off button for more than 4 seconds:
  - The device switches off.
  - To switch on the device again, press the on-off button again.

Hardware reset with reset button:

- Press the reset button.
  - The device switches off and on again.

Information on the position of the buttons is available under "On-off button and reset button (Page 26)".

Operating the device

6

6.1 Opening the front door

Procedure

1. Open the front door with the key.
2. Pull the front door to the side.



6.2 Multi-monitoring

In its delivery state, the device is equipped with integrated graphics interfaces.

You will find the various standard connection sockets on the rear of the device for connecting monitors to these graphics interfaces.

You can find information on the position of the connection sockets and the labeling on the device here: "Connections on the rear of the device (Page 22)".

To connect additional monitors to the device at the same time (multi-monitoring), you can install a graphics card.

You can find information on this here:

- Connecting several monitors (multi-monitoring) (Page 63)
- Installing a graphics card (Page 104)

6.3 Drive configurations

6.3.1 RAID1 system

RAID1 systems work on the principle of "data mirroring on two drives".

In the event of a defective drive, the RAID1 system can continue to work on the remaining drive and thus achieves a high level of availability.

- You can find information on operating a RAID1 system here:

  Onboard RAID system (Page 78)

Possible drive combinations for a RAID1 system

- 2 x SATA drives
  - 2 x 2.5" SSD

    or
  - 2 x 3.5" HDD

or

- 2 x NVMe drives
  - 2 x M.2 NVMe SSD

6.3.2 Hot-spare drive in RAID1 systems

A hot spare drive is a drive included in the device as spare.

If you have ordered a device with a hot-spare drive, your device is equipped with this hot-spare drive in the factory state.

If a defective drive is detected in the RAID1 system, the hot-spare drive is automatically mounted during operation in place of the defective drive, whose function it assumes.

Data synchronization to the hot-spare drive starts automatically.

Note

Hot spare only in systems with SATA drives

Hot spare drives can only be used with RAID systems that run exclusively with SATA drives.

See also

Integrating a hot-spare drive into an onboard RAID system (Page 85)

Data synchronization in the RAID system (Page 85)

6.3.3 System with multiple drives

Drives which do not have an operating system installed have not yet been set up when delivered.
The drives can be set up with the preinstalled operating system.

You have the option of backing up your data to these drives.

6.4 Onboard RAID system

6.4.1 Display of a defective drive of an onboard RAID system

A defective drive is displayed in conjunction with onboard RAID at the following locations:

- For SATA drives and M.2 NVMe drives:
  - On the front of the device, see "System status displays (Page 29)".
  - In the software for monitoring the onboard RAID system "Intel® Optane™ Memory and Storage Management (Page 82)"
- For M.2 NVMe drives:
  - An LED is lit on the motherboard next to the connection of the faulty M.2 NVMe SSD.

    Information about the location of this connection can be found under "Layout of the motherboard (Page 185)".

Display of SATA drives in "Intel® Optane™ Memory and Storage Management" and the device

Note

Different numbering of the drives

Note the different numbering of the drives for "Intel® Optane™ Memory and Storage Management" and the device.

"Intel® Optane™ Memory and Storage Management"	Status display for the system (Page 29) on the front of the device	Mounting location for drive cage type A and drive cage type B (Page 17)	SATA ports on the motherboard (Page 186)
Port 7	HDD0 ALARM	Mounting location 0	PORT0
Port 6	HDD1 ALARM	Mounting location 1	PORT1
Port 5	HDD2 ALARM	Mounting location 2	PORT2
Port 4	HDD3 ALARM	Mounting location 3	PORT3

Display of a faulty M.2 NVMe SSD in "Intel® Optane™ Memory and Storage Management" and on the motherboard

In "Intel® Optane™ Memory and Storage Management," a faulty M.2 NVMe SSD is designated as "**PCIe SSD**".

If a faulty M.2 NVMe has been detected, an LED is lit on the motherboard directly next to the connection of the M.2 NVMe SSD.

Information about the location of this connection can be found under "Layout of the motherboard (Page 185)".

6.4.2 Onboard RAID1 system: Drive installation options

An onboard RAID1 system can be implemented either with SATA drives or with M.2 NVMe drives.

A combination of both types of drives within a RAID1 system is not supported.

The device can be ordered with multiple RAID1 systems.

RAID1 system with SATA drives (2.5" SSD or 3.5" HDD)

The 2 SATA drives required for an onboard RAID1 system may be installed at the following locations:

- Drive cage type A (Page 17)
- Drive cage type B (Page 19)

RAID1 system with M.2 NVMe drives (M.2 NVMe SSD)

The two M.2 NVMe drives needed for an onboard RAID1 system can be installed at the following location:

- Motherboard (Page 185)

6.4.3 Operating onboard RAID system

6.4.3.1 Setting up the onboard RAID system in the firmware (Create RAID Volume)

If you have ordered a device with an onboard RAID system, the RAID system is already configured on delivery.

Subsequent setup of an onboard RAID system is done in the firmware.

Once the onboard RAID system has been set up, it can be configured with the "Intel® Optane™ Memory and Storage Management" software.

Requirement

- The drives required for the onboard RAID system are built into the device, see information under:
  - Onboard RAID1 system: Drive installation options (Page 79)

Procedure

1. Switch on the device or restart it.
2. To access the user interface of the firmware, press <Esc> and hold it down immediately after switching on the device when the message "`Press <ESC> to enter setup`" appears.

   The firmware user interface opens. Here you have the following keys available for navigation:

Navigation in the firmware	
Action	**Key**
• Select entry (then confirm selection)	• Arrow keys on the keyboard
• Confirm selection **Exception:** Confirm selection when integrating drives	• <Enter> key **Exception:** – <Space> keyboard
• Back to previous window	• <Esc> key

3. Select: "Chipset > System Agent (SA) Configuration > VMD setup menu".
4. Assign the value "Enable" to the firmware setting "Enable VMD Controller".
5. Save the settings and restart the device.
6. Reopen the user interface of the firmware.
7. Go to "Advanced".
8. Select "Intel (R) Rapid Storage Technology".
9. Select "Create RAID Volume".
10. On the next screen, assign a name for the RAID system.
11. Select "RAID Level" and select the entry "RAID1 (Mirror)" in the following selection window.

    A list of available drives is displayed.

12. Select the drives ① from the list that you want to integrate into your RAID system and press the **Space** key.

    You can find information on the mounting locations of the drives in the device under "Onboard RAID1 system: Drive installation options (Page 79)".

    – In the list, the mounted drive is marked with an "X" ②.

    – You can find the assignment of the drive to the mounting location in the device ③ in front of the drive model designation.

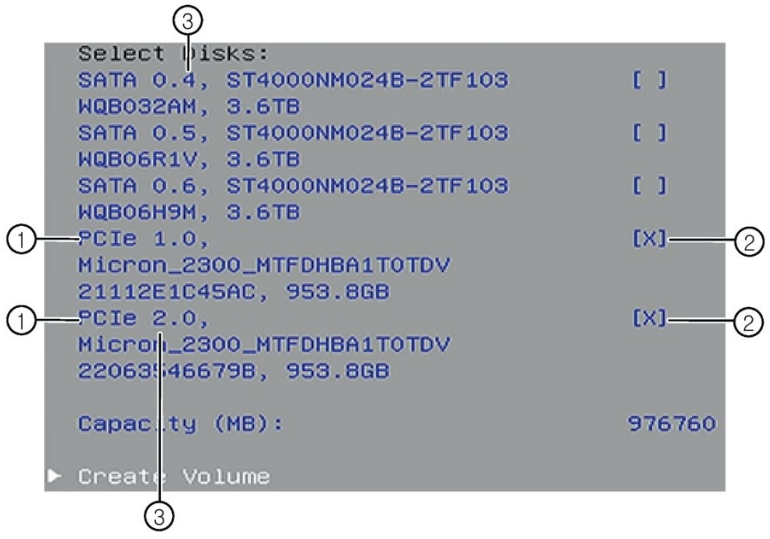


Figure 6-1 *Example in the figure: Two M.2 NVMe SSDs have been selected here*

13. Select "Create Volume".

    The following window now displays the details of the RAID system (RAID Volume) that has just been set up.

    The onboard RAID system is set up.

14. To exit the firmware settings, press the <F4> button (Save & Exit) and confirm the subsequent dialog with <Yes>.

Configuring onboard RAID system with "Intel® Optane™ Memory and Storage Management"

1. Select "Start" > "Intel® Optane™ Memory and Storage Management".
2. Select the "Manage" tab.

You can find information on configuring a RAID system with "Intel® Optane™ Memory and Storage Management" in the documentation or in the help for the software.

6.4.3.2 Monitoring the onboard RAID system with "Intel® Optane™ Memory and Storage Management"

Use the Intel® Optane™ Memory and Storage Management software to monitor the onboard RAID system.

You can find information on monitoring a RAID system with "Intel® Optane™ Memory and Storage Management" in the documentation or help for the software.

Open "Intel® Optane™ Memory and Storage Management"

1. Select Start > Intel® Optane™ Memory and Storage Management.

Display status of the onboard RAID system (faulty drive)

1. Select the "Manage" tab.

   In the right area of the window, a list of the drives mounted in the onboard RAID is displayed under "Storage System View".

   Note

   Different numbering of the drives

   Note the different numbering of the drives for "Intel® Optane™ Memory and Storage Management" and the device. See important note under "Display of a defective drive of an onboard RAID system (Page 78)".

2. Right-click on a drive from the list or on "Volume".

   Status displays are shown for functions and components of the drives or the onboard RAID system.

6.4.3.3 Integrating a new drive into an onboard RAID system

The onboard RAID system is configured in the delivery state so that a new drive must be integrated manually when a defective drive was replaced.

You can also configure the onboard RAID system in such a way that the new drive is automatically mounted when the defective drive is replaced.

Onboard RAID systems with a hot-spare drive are configured so that the hot-spare drive is automatically integrated in the event of an error.

Configure "Automatic integration of a new drive" (before replacing a defective drive)

NOTICE
Risk of data loss If a new drive is automatically integrated, the new drive is not checked for partition information or existing data. All partitions and data of the new drive are deleted without warning. • Insert only a brand new drive or a drive that is configured as a replacement drive.

1. Select "Start" > "Intel® Optane™ Memory and Storage Management".
2. Select the "Manage" menu.
3. Select "Settings".
4. Set the "Auto-rebuild on hot plug" option to "Enabled".

Configure the mounted drive under "Create Raid Volume".

Configure "Manual integration of a new drive" (before replacing a defective drive)

The onboard RAID system is configured in the delivery state so that a new drive must be integrated manually when a defective drive was replaced.

You can configure the manual integration of the drive or check the settings yourself.

To do this, disable the function to automatically mount a new drive.

1. Select "Start" > "Intel® Optane™ Memory and Storage Management".
2. Select the "Manage" menu.
3. Select "Settings".
4. Set the "Auto-rebuild on hot plug" option to "Disabled".

Configure the mounted drive under "Create Raid Volume".

Mount new drive during operation in the onboard RAID system (after an error has occurred)

Requirement

The system is configured to mount new drives manually (not automatically), see above.

Procedure

1. Select "Start" > "Intel® Optane™ Memory and Storage Management".
2. Select the "Manage" menu.

   You will find the following components in the "Storage System View" area:

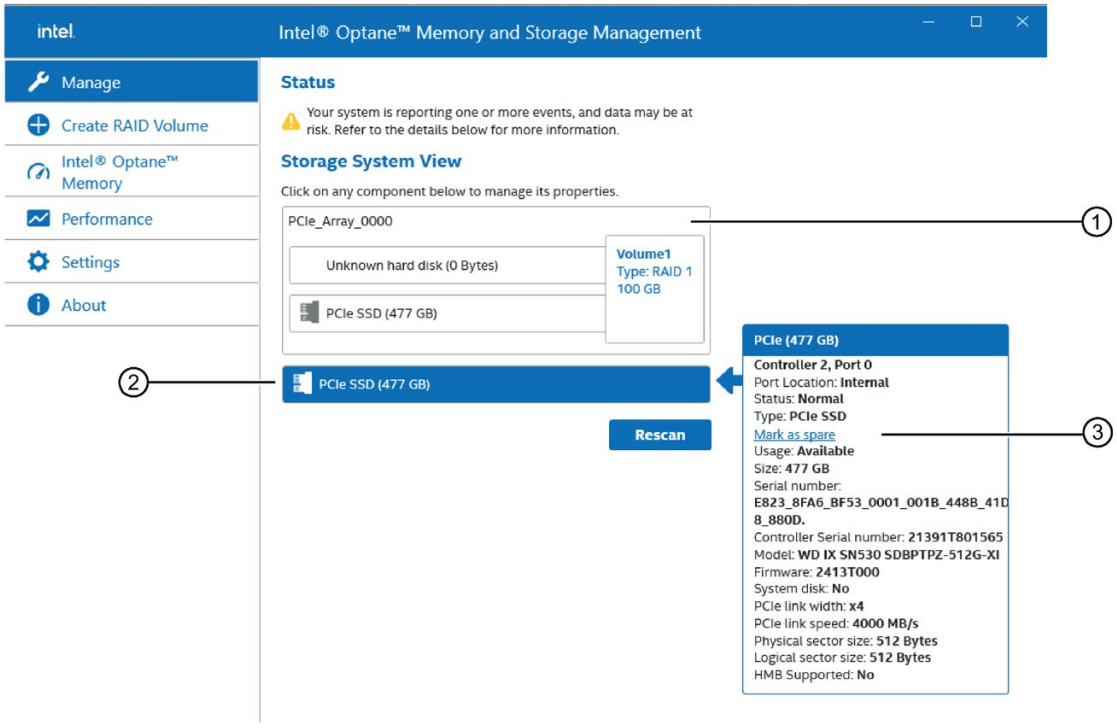
   ① The drives mounted in the onboard RAID system with the information that a drive is not yet mounted (Unknown hard disk).

   ② List of available drives and systems.

Note

Different numbering of the drives

Note the different numbering of the drives for "Intel® Optane™ Memory and Storage Management" and the device. See important note under "Display of a defective drive of an onboard RAID system (Page 78)".



3. Right-click on the new drive.
4. From the drive information, select the function "Mark as spare" ③.

   The drive is mounted to the onboard RAID system and appears in the mounted drives area.

See also

Data synchronization in the RAID system (Page 85)

6.4.3.4 Integrating a hot-spare drive into an onboard RAID system

The onboard RAID system is configured in the delivery state in such a way that a new hot-spare drive is automatically integrated.

If the automatic integration of a drive in the onboard RAID system has been deactivated (Page 82) or the hot spare drive has been replaced in an onboard RAID system, then you must integrate the new drive manually.

Requirement

A new drive was used in the onboard RAID system.

Procedure

1. Select "Start" > "Intel" > "Intel Rapid Storage Technology".
2. Click "Rescan".

   The new drive is found and displayed.
3. Under "Storage system view", select the new drive and select the "Mark as Spare" option.
4. Confirm the warning message in the "Mark as Spare" window with "Yes".

6.4.4 Data synchronization in the RAID system

NOTICE
Danger of incorrect operations on machine and plant: delayed system reaction during data synchronization Data is synchronized if a drive fails. The system can respond with a delay depending on the size of the drive and system load. In extreme cases, the execution of keyboard, mouse or touch screen commands may be briefly delayed. The result may be faulty operations of the machine or plant. • Do not operate safety-critical functions during synchronization of a drive. Stable system statuses are only achieved after successful completion of synchronization.

Duration of data synchronization

The synchronization process may take quite some time, e.g. several hours, with extremely high drive load even days.

Guide value for the duration of data synchronization:

- < 3h at 90% HDD system load

In addition, system performance may be limited in the case of a manually started maintenance operation until completion of the maintenance phase.

6.5 Monitoring of the device

6.5.1 Monitoring functions

Note

No support of monitoring functions by SIMATIC DiagBase or SIMATIC DiagMonitor

The SIMATIC DiagBase and SIMATIC DiagMonitor software do not support the monitoring functions of this device.

Monitored device functions IPC

Monitoring	Description	Status display and actions
Temperature monitoring	• Monitoring of high and low temperature limits and cable break of the temperature sensors • For this, temperature sensors record the temperature at critical points of the device, e.g. at the processor. • The temperature thresholds are defined for the individual temperature sensors.	• Status display "TEMP (Page 29)" • Temperature alarm is output.
Fan monitoring	• Monitoring of underspeed and failure of a fan as well as cable break of the tachometer cable The operation of the fan is monitored at the following positions: • Front panel • Processor • Drive cage type A • Power supply unit fan • Graphics card • Fan	• Status display "FAN (Page 29)" • Fan alarm is output.
Drive monitoring	• Determination of the status of the drives (HDD and SSD) with SMART functionality (SMART: Self-Monitoring, Analysis and Reporting Technology) also in RAID systems (RAID state) • The status of an inactive hot swap drive is not displayed.	• Status display "HDDx ALARM (Page 29)" • SMART status of the hard drives • The following statuses, for example, are displayed in a RAID system: "Normal", "OK", "Degraded", error "Rebuild", rebuilding

6.6 Remote maintenance of the device

6.6.1 Remote maintenance functions

Remote maintenance of the devices is performed using Intel® Active Management Technology (iAMT), which is integrated into the hardware and firmware of the computer.

Through remote access to SIMATIC IPCs, system or program errors can be eliminated, program updates can be performed and firmware/BIOS settings can be made from a control room (without on-site presence). Access is possible even if the operating system no longer starts.

Several remote maintenance functions of iAMT are listed as examples below:

Function	Description
Remote operation (keyboard video mouse redirection)	With KVM Redirection, you can control SIMATIC IPCs remotely even if they have no operating system or a defective operating system. A KVM remote session is always possible with the KVM server integrated in the firmware. This allows you to restart the IPC and change firmware/BIOS settings remotely.
Remote power management	SIMATIC IPCs can be turned on and off and restarted from another PC.
IDE redirection	An ISO file on the Help Desk PC can be integrated and used on the SIMATIC IPC as a DVD drive. An ISO file contains a memory image of the content of a CD or DVD structured in the ISO 9660 format.
Remote booting	A SIMATIC IPC can be booted remotely from a bootable ISO file made available by another PC.

6.6.2 Remote maintenance with Intel® AMT

6.6.2.1 Procedure for using Intel® AMT

To make use of "Intel® Active Management Technology ", proceed as follows:

1. Note the information on the device requirements for Intel® AMT. (Page 87)
2. First, enable the Intel® AMT functions (Page 88) and then start the device again.
3. Log in to MEBx. (Page 89)
4. Then configure the Intel® AMT functions in the Options of the MEBx (Page 90).

6.6.2.2 Device requirements for remote maintenance with Intel® AMT

The following device requirements must be met for using Intel® Active Management Technology (iAMT):

- Processor that supports iAMT technology (Page 163)
- Can be connected to the network via LAN port X2 P1 (Page 22)

6.6.2.3 Enabling firmware settings for Intel® AMT

Note

You can find information on the firmware settings in the firmware/BIOS description, see "Important instructions and manuals for operating the device (Page 11)".

Requirement

- The device meets the requirements for remote maintenance with Intel® AMT (Page 87)

Procedure

1. Switch on the device or restart it.
2. To access the user interface of the firmware, press <Esc> and hold it down immediately after switching on the device when the message "`Press <ESC> to enter setup`" appears.

   The firmware user interface opens. Here you have the following keys available for navigation:

Navigation in the firmware	
Action	**Key**
• Select entry (then confirm selection)	• Arrow keys on the keyboard
• Confirm selection	• <Enter> key
• Back to previous window	• <Esc> key

3. Select "Advanced" > "PCH-FW Configuration".
4. Assign the "Enabled" value to the firmware setting "AMT BIOS Features".
5. Press the <F4> key (Save & Exit) and confirm the subsequent dialog with <Y>.
6. Switch off the device or restart it.

6.6.2.4 Logging into MEBx (assigning password) and enabling Intel® AMT

Note

You can find information on the firmware settings in the firmware/BIOS description, see "Important instructions and manuals for operating the device (Page 11)".

Requirement

- The firmware settings for iAMT have been enabled. (Page 88)
- The device was switched off or restarted after enabling the firmware settings for iAMT.

Procedure

1. Switch on the device or restart it.
2. Immediately press and hold down the <Esc> key after switching on the device when the message "`Press <ESC> to enter setup`" appears.

   The firmware user interface opens. Here you have the following keys available for navigation:

Action	Key
• Select entry (then confirm selection)	• Arrow keys on the keyboard
• Confirm selection	• <Enter> key
• Back to previous window	• <Esc> key

3. Select the "MEBx " option.
4. Confirm your selection with the <Return> key.
5. Enter the following "Intel(R) ME Password" when logging in for the first time: **admin**
6. Afterwards, change the password immediately.

   The new password must contain the following characters:

   – A total of at least eight characters
   – An upper case letter
   – A lower case letter
   – A number
   – A special character . ! @ # $ % ^ & *

   Note

   The underscore and blank space are valid password characters but do not increase password complexity.

7. Now configure the Intel® AMT functions in the Options of the MEBx (Page 90).
8. Assign the "Network Access State" value to the firmware setting "Network Active".
9. Press the <F4> key (Save & Exit Setup) and confirm the subsequent dialog with <Y>.

6.6.2.5 Configuring the AMT functions in the options of the MEBx

Use "Intel® Management Engine BIOS Extension" (MEBx) to configure important firmware settings of your device to use Intel® AMT functions and the Intel® Management Engine (ME). The following options are available for Intel® AMT-enabled devices:

- Redirection features
- User Consent

  Password Policy
- Network Setup

  Network Access State
- Remote Setup And Configuration
- Power Control

Requirement for the use of "Intel® Management Engine BIOS Extension" (MEBx)

- The device is logged into MEBx (Page 89)

Procedure

You can find information on configuring the Intel® AMT functions in the options of the MEBx in the firmware/BIOS description, see "Important instructions and manuals for operating the device (Page 11)".

6.6.2.6 Resetting Intel® AMT functions to default settings

1. Switch on the device or restart it.
2. Immediately press and hold down the <Esc> key after switching on the device when the message "`Press <ESC> to enter setup`" appears.

   The firmware user interface opens. Here you have the following keys available for navigation:

Action	Key
• Select entry (then confirm selection)	• Arrow keys on the keyboard
• Confirm selection	• <Enter> key
• Back to previous window	• <Esc> key

3. Select "MEBx" and confirm your selection.
4. Enter your current MEBx password in the "Enter Current Password" box.
5. Select "Intel(R) AMT Configuration" and confirm your selection.
6. Select the option "Full Unprovision" in the "Network Access State" selection box and confirm your selection.
7. Press the <F4> key (Save & Exit Setup) and confirm the subsequent dialog with <Y>.
8. Switch off the device or restart it.

Enabling Intel® AMT again after a reset to default settings

1. Switch on the device or restart it.
2. Immediately press and hold down the <Esc> key after switching on the device when the message "`Press <ESC> to enter setup`" appears.
3. Select "MEBx" and confirm your selection.
4. Enter your current MEBx password in the "Enter Current Password" box.

   Note: The previously set password is retained after a reset to default settings.
5. Select "Intel(R) AMT Configuration" and confirm your selection.
6. Select the option "Network Active" in the "Network Access State" selection box and confirm your selection.
7. Press the <F4> key (Save & Exit Setup) and confirm the subsequent dialog with <Y>.
8. Switch off the device or restart it.

6.6.2.7 Disabling access to the firmware settings for Intel® AMT

You can prevent access to firmware/BIOS settings with Intel® AMT

This may be necessary, for example, in the following cases:

- When you are no longer using Intel® AMT.
- You want to ensure that Intel® AMT is not used without authorization.

All Intel® AMT functions are thereby reset to default settings.

Procedure

1. Switch on the device or restart it.
2. Immediately press and hold down the <Esc> key after switching on the device when the message "`Press <ESC> to enter setup`" appears.

   The firmware user interface opens. Here you have the following keys available for navigation:

Action	Key
• Select entry (then confirm selection)	• Arrow keys on the keyboard
• Confirm selection	• <Enter> key
• Back to previous window	• <Esc> key

3. Select "MEBx" and confirm your selection.
4. Enter your current MEBx password in the "Enter Current Password" box.
5. Assign the value "Disabled" to the firmware setting "Intel(R) AMT".
6. Press the <F4> key (Save & Exit Setup) and confirm the subsequent dialog with <Y>.
7. Switch off the device or restart it.

6.7 Trusted Platform Module (TPM)

Your device has a Trusted Platform Module (TPM) conforming to the TPM V2.0 standard. The Trusted Platform Module (TPM)is a chip that adds security functions to your device. This provides an improved protection from manipulation of the device. The Trusted Platform Module (TPM) function is enabled in the delivered device.

NOTICE
Import restrictions for the Trusted Platform Module (TPM) Use of the Trusted Platform Module (TPM) is subject to legal restrictions in some countries and is not permitted there. • Always observe the respective import restrictions of the country in which the device will be used.

Enabling/disabling Trusted Platform Module (TPM)

You can find information on enabling/disabling the Trusted Platform Module (TPM) in the detailed Firmware/BIOS description, see "Important instructions and manuals for operating the device (Page 11)".

Upgrading the device and assigning device parameters

7

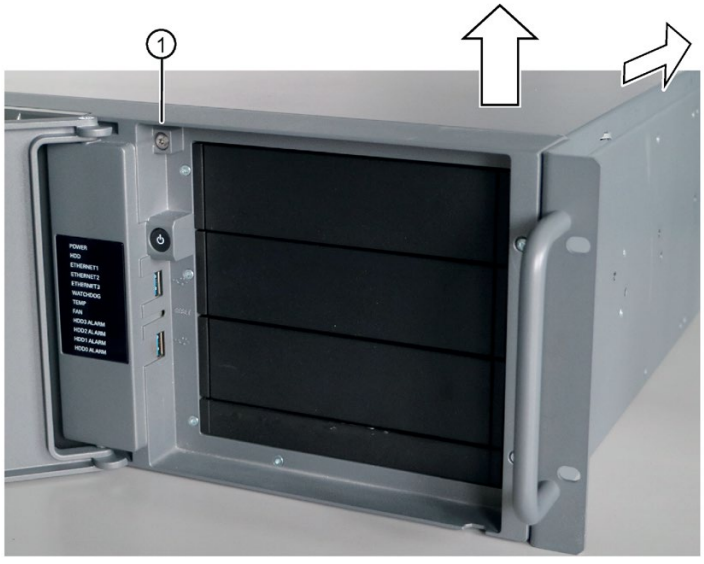
7.1 Open the device

Requirement

- You know the important safety instructions under "Safety instructions on device and system extensions (Page 48)".
- The device has been fully disconnected from the line voltage. Observe the important warning under "Safety instructions on device and system extensions (Page 48)".
- Screwdriver TORX T10

Procedure

1. After unplugging all connecting cables, wait until all status displays are OFF (approximately 10 to 20 seconds). Only then is the device fully de-energized.
2. Open the front panel. (Page 76)
3. Unscrew the locking screw of the enclosure cover ①.



4. Push the enclosure cover back.
5. Lift up and remove the enclosure cover.

See also

Switching off the device (Page 74)

7.2 Installing and removing expansion cards

7.2.1 Information on using expansion cards

Slots for expansion cards

You can find information on which expansion card you can install in a given slot under "Technical specifications of the slots for expansion cards (Page 164)".

Requirements for expansion cards

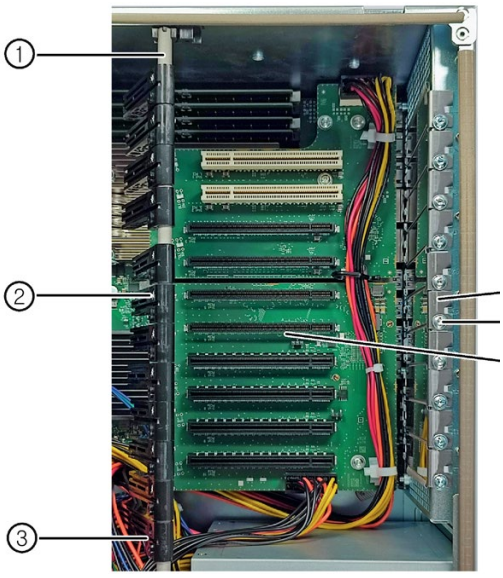
- You can find the permitted dimensions for expansion cards under "Dimension drawing of the expansion cards (Page 177)". To rule out contact problems and malfunctions, do not use any expansion cards that exceed the maximum permissible height.
- The accessory pack of the device includes three long card retainers for expansion cards with low overall height. Use these instead of the card retainers installed in the device.
- For long PCI/PCIe expansion cards, use an extender so that these expansion cards can be introduced into the guide rails.

7.2.2 Installing expansion cards

Requirement

- You know the important safety instructions under "Safety instructions on device and system extensions (Page 48)".
- You are familiar with the Information on using expansion cards. (Page 94)
- The device has been fully disconnected from the line voltage, see "Switching off the device (Page 74)".
- Screwdriver TORX T10

Procedure



1. Open the device. See the notes under "Open the device (Page 93)".
2. Loosen the cable holder ③.
3. Hold the bar ① with the card retainer on both ends and remove it by pulling it upwards.

   The bar is latched on both ends.
4. Remove the slot bracket ④ for the required slot.
5. Insert the expansion card into the free slot ⑥ on the bus board.
6. Secure the expansion card with the screw ⑤ of slot bracket.
7. Reinstall the rod with the card retainer ①.
8. Detach the card retainer ② in question and place it on the inserted expansion card.
9. Secure the card retainer ② with the small screw on the card retainer.

   If you are installing a short expansion card, remove the small screw on the card retainer and install it in the opposite hole.

   If you are installing a low-profile expansion card, use one of the longer card holders that are shipped with the device for mounting.
10. Secure the cables with the cable holder ③.
11. Close the device.

See also

Dimension drawing of the expansion cards (Page 177)

7.2.3 Removing expansion cards

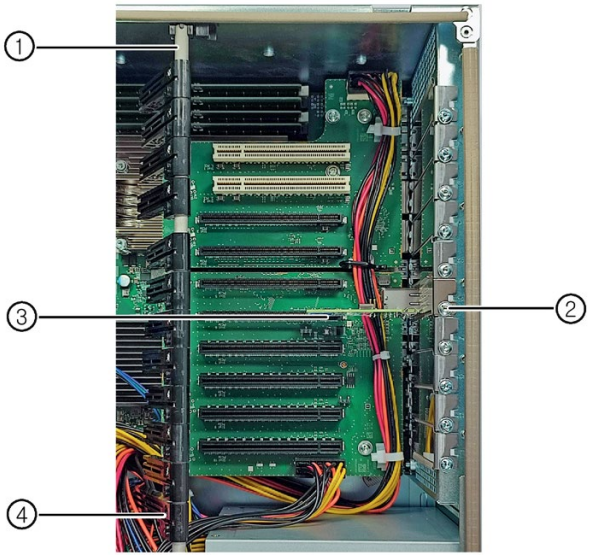
Requirement

- You know the important safety instructions under "Safety instructions on device and system extensions (Page 48)".
- The device has been fully disconnected from the line voltage, see "Switching off the device (Page 74)".
- Screwdriver TORX T10

Procedure

1. Open the device. See the notes under "Open the device (Page 93)".
2. Loosen the cable holder ④.
3. Hold the bar ① with the card retainer on both ends and remove it by pulling it upwards.

   The bar is latched on both ends.
4. Disconnect all cables and the screw ② of the expansion card you wish to remove.
5. Remove the expansion card from the slot ③.
6. If you do not wish to install a new expansion card, install the corresponding slot bracket with the screw ②.
7. Close the device.



7.3 Installing and removing memory modules

7.3.1 Information on using memory modules

Usable memory modules

You can operate the device with DIMM DDR5 memory modules with the following specifications:

- "without ECC"
- Memory transaction rate at least 4400 MT/sec "unbuffered"

  The memory transaction rate depends on the combination of memory modules used.

  Depending on the combination of memory modules used, the actual memory transaction rate can take the following values due to the system:

  – 4400 MT/Sec.

  – 4000 MT/Sec.

  – 3600 MT/Sec.

Slots for memory modules

Information on the slots of the memory modules can be found under "Layout of the motherboard (Page 185)".

Combination options for memory modules

You can equip each device with 1, 2, 3 or 4 memory modules of the same capacity. Combinations of three memory modules and the mixing of memory capacities are not permitted.

Use the modules to expand the memory capacity of your device to a maximum of 128 GB.

Depending on the number of memory modules used, these are plugged into defined slots on the motherboard.

The slots are labeled on the motherboard.

Combination option	Channel A (external)		Channel B		Maximum expansion
	DIMM 1-1	DIMM 1-2	DIMM 2-1	DIMM 2-2	
Combination 1		8 GB / 16 GB / 32 GB			32 GB
Combination 2		8 GB / 16 GB / 32 GB		8 GB / 16 GB / 32 GB	64 GB
Combination 3	Combinations of three memory modules are not permitted				
Combination 4	8 GB / 16 GB / 32 GB	8 GB / 16 GB / 32 GB	8 GB / 16 GB / 32 GB	8 GB / 16 GB / 32 GB	128 GB

Conditions of use of memory modules

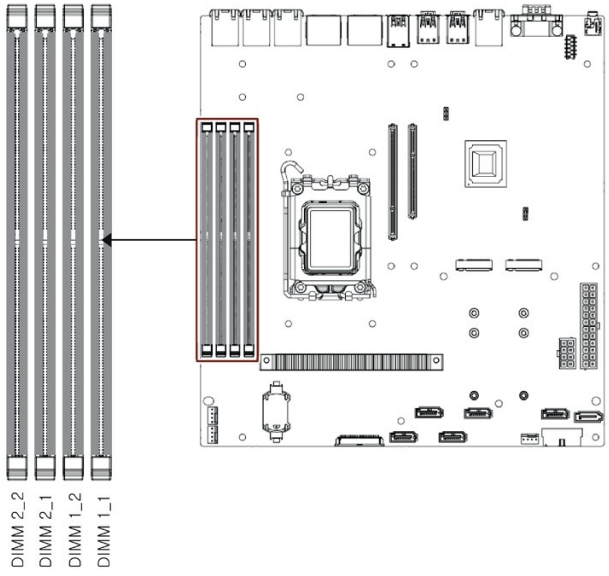
- When two identical memory modules are installed, memory is operated in dual-channel mode.
- If expansion cards with their own memory, such as graphics cards with 256 MB or more are used, the usable memory for an operating system or applications may be less than 128 GB.
- In case of operating errors, it may be sufficient to remove one or two memory modules or to use a memory module with lower capacity so that the physical memory expansion on the motherboard and the reserved memory of the expansion card do not overlap.

7.3.2 Installing memory modules

Requirement

- You know the important safety instructions under "Safety instructions on device and system extensions (Page 48)".
- You are familiar with the information under "Information on using memory modules (Page 97)".
- The device has been fully disconnected from the line voltage, see "Switching off the device (Page 74)".
- Screwdriver TORX T10

Position of the memory modules on the motherboard



Order when installing multiple memory modules



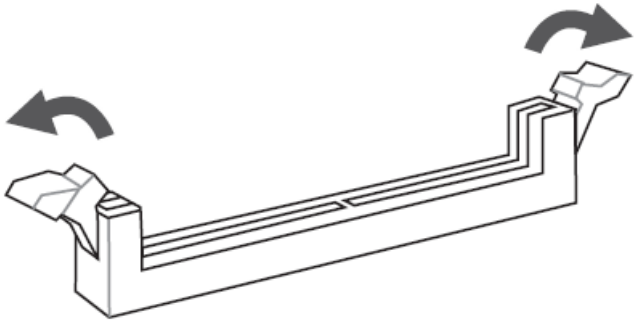
If you insert several memory modules, insert them one after another in the following order.

- 1st memory module: DIMM 2-1 slot (black)
- 2nd memory module: DIMM 1-1 slot (black)
- 3rd memory module: DIMM 2-2 slot (white)
- 4th memory module: DIMM 1-2 slot (white)

The slots on the memory module are inscribed on the motherboard.

Procedure

1. Open the device. See the notes under "Open the device (Page 93)".
2. Open the two locks to the left and right of the slot.

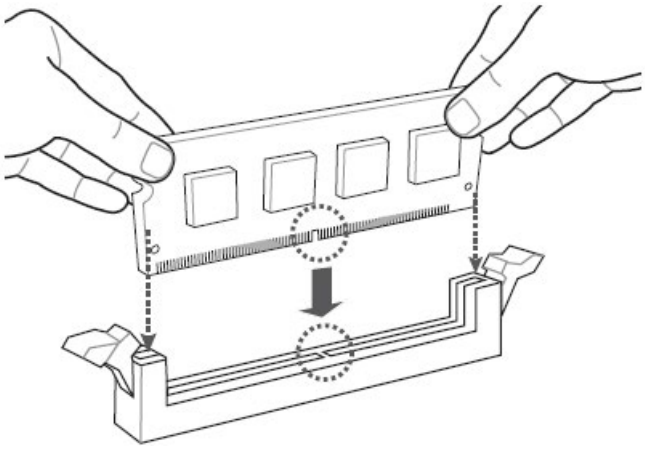


3. Remove the memory module from its packaging.

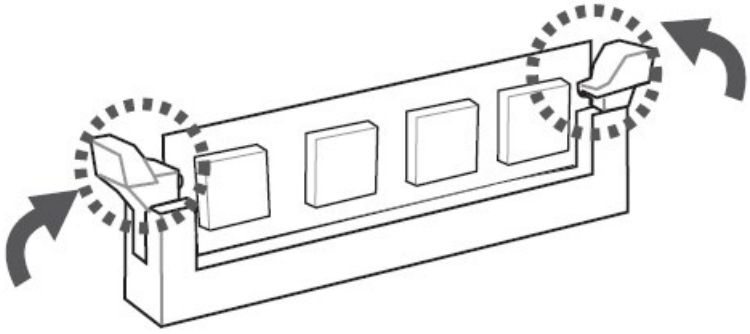
   Hold it by the upper edges only.

4. Insert the memory module in the slot perpendicular to the motherboard.

   When inserting, pay attention to the notch on the memory module, which must correspond to the coding of the base.



5. To prevent tilting, press evenly on both sides of the memory module until both interlocks audibly engage.



6. Close the device.

Display of a changed memory configuration

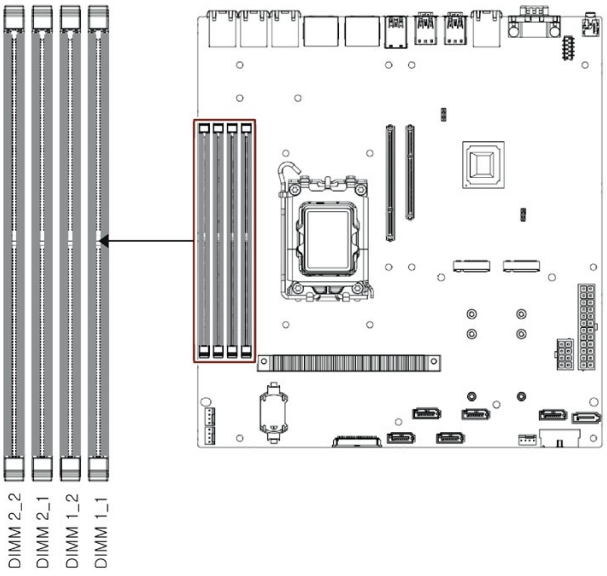
A changed memory allocation is automatically recognized when the device is switched on.

7.3.3 Removing memory modules

Requirement

- You know the important safety instructions under "Safety instructions on device and system extensions (Page 48)".
- The device has been fully disconnected from the line voltage, see "Switching off the device (Page 74)".

Position of the memory modules on the motherboard



Order when removing multiple memory modules

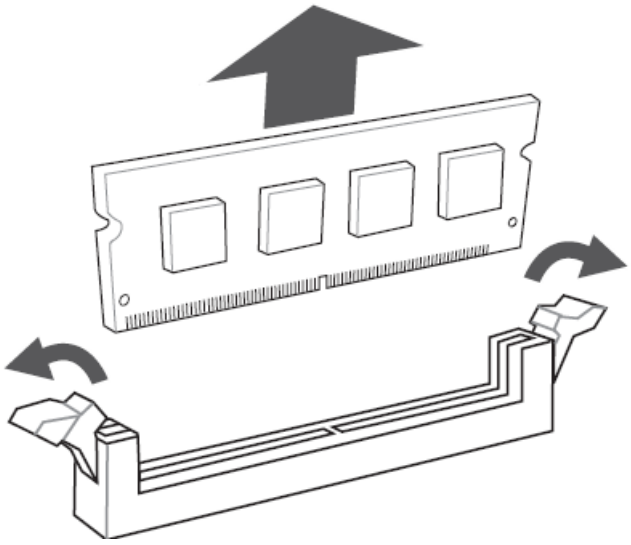
If you remove several memory modules, remove them one after another in the following order.

- 1st memory module: DIMM 1-2 slot (white)
- 2nd memory module: DIMM 2-2 slot (white)
- 3rd memory module: DIMM 1-1 slot (black)
- 4th memory module: DIMM 2-1 slot (black)

The slots on the memory module are inscribed on the motherboard.

Procedure

1. Open the device. Observe the information under "Open the device (Page 93)".
2. Open the two locking mechanisms at the sides of the memory module.
   Remove the memory module from the slot.
   To avoid tilting, pull the memory module out of the slot evenly on both sides.



3. Close the device.

Display of a changed memory configuration

A changed memory allocation is automatically recognized when the device is switched on.

7.4 Connecting a USB stick to the internal interface

You can connect one or two USB flash drives internally in the device. You can find the interfaces for this on the motherboard (Page 186) near the rear of the device.

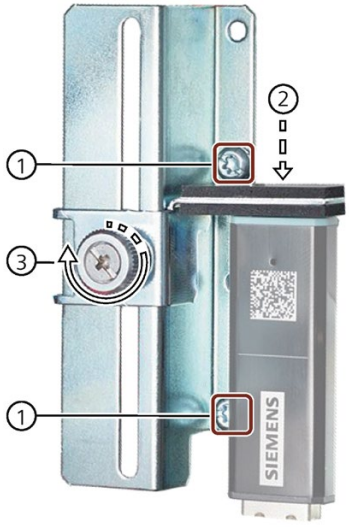
For this, you will need a retainer for locking the internal USB interface.

Only use original spare parts or components approved for this device. You can find information on this under "Hardware accessories (Page 34)".

Requirement

- You know the important safety instructions under "Safety instructions on device and system extensions (Page 48)".
- The device has been fully disconnected from the line voltage, see "Switching off the device (Page 74)".
- Screwdriver TORX T10

Procedure



1. Open the device. Observe the information under "Open the device (Page 93)".
2. Screw down the guide rail of the retainer in the enclosure with the two screws ① on the device base.
3. Insert the USB flash drive into the socket of the internal USB interface on the motherboard (Page 186).
4. Push the bar of the retainer ② onto the USB flash drive.
5. Secure the retainer by tightening the screw ③ on the guide rail.
6. Close the device.

7.5 Installing and removing a graphics card

7.5.1 Installing a graphics card

In its delivery state, the device is equipped with integrated graphics interfaces.

You will find several connection sockets on the rear of the device for connecting monitors to these graphics interfaces.

You can find information on the position of the connection sockets and the labeling on the device in section "Connections on the rear of the device (Page 22)".

To connect additional monitors to the device (multi-monitoring) (Page 63), you can install a graphics card.

Requirement

- You know the important safety instructions under "Safety instructions on device and system extensions (Page 48)".
- A graphics card suitable for this device that supports multi-monitoring, see "Connecting several monitors (multi-monitoring) (Page 63)".
- You know the information about the power supply of the graphics card, see "Technical specifications of the plug connectors for the power supply of bus boards (Page 174)"
- You have made a note of the firmware settings because the firmware settings of the device can be deleted when a graphics card is installed.

  You can find information on this in the firmware description of the device, see "Important instructions and manuals for operating the device (Page 11)".

Procedure

1. Install the graphics card.

   The graphics card is an expansion card. See the information under "Installing expansion cards (Page 94)" for installing the graphics card.

   You can find notes on the specified mounting position under "Technical specifications of the slots for expansion cards (Page 164)".

   Note

   Graphics cards with external power supply

   Connect graphics cards that require an external power supply with the 14-pin connector of the power supply unit.

   You can find information on this in the section "Technical specifications of the plug connectors for the power supply of bus boards (Page 174)".

   The technical conditions of the power supply unit must be observed.

2. Check the firmware settings.
3. Configure the function "Multi-monitoring" in the firmware settings of the device.

   Note the following information.

Displaying a message about opening firmware settings on the monitor of the graphics card

In the delivery state, the device is configured so that the message to open the firmware settings is displayed only on a monitor connected to a DisplayPort connection (DPP) on the rear of the device, see section "Connections on the rear of the device (Page 22)".

If you want to display this message on a monitor that is connected to a connection of a graphics card, follow these steps.

1. Connect a monitor to the DPP connection.
2. To access the firmware settings, immediately press and hold down the <Esc> key after switching on the device when the message "`Press <ESC> to enter setup`" appears.
3. Select "Advanced" > "Graphics Configuration".
4. Assign the "Primary Display" value to the firmware setting "Auto".

7.5.2 Removing a graphics card

Requirement

- You know the important safety instructions under "Safety instructions on device and system extensions (Page 48)".
- You have made a note of the firmware settings because the firmware settings of the device can be deleted when the graphics card is removed.

  You can find information on this in the firmware description of the device, see "Important instructions and manuals for operating the device (Page 11)".

Procedure

1. Remove the graphics card.

   The graphics card is an expansion card. Note the information under "Removing expansion cards (Page 96)".
2. Check the firmware settings.

7.6 Installing and removing drives in drive cages

7.6.1 Drives in the drive cage type A

7.6.1.1 Installation options for drives with drive cage type A

Number of drives per system and their mounting locations

You can install up to six drives at the following bays in the drive cage type A and on the side panel of the device.

Note

The six SATA connectors on the motherboard of the device support the use of six drives.

Note

Note the numbering of the mounting locations in the type A drive cage (Page 17).

Number of drives per system	Mounting location	Notes on installation options
1	Drive cage type A: • Mounting location 0	**Drive cage; slots 0, 1, and 2:** • Drive cage type A (Page 17) • 2.5" drive or 3.5" drive in removable tray (Page 110) **Drive cage; slot 3:** • Drive cage type A (Page 17) • 2.5" drive or 3.5" drive in the 5.25" mounting frame with removable tray (Page 116) • 5.25" drive or 5.25" component (Page 122) **Inside the device:** • 2.5" or 3.5" drive inside on the side panel of the device (Page 124)
2	Drive cage type A: • Mounting location 0 • Mounting location 1	
3	Drive cage type A: • Mounting location 0 • Mounting location 1 • Mounting location 2	
4	Drive cage type A: • Mounting location 0 • Mounting location 1 • Mounting location 2	
	Drive cage type A: • Mounting location 3	
5	Drive cage type A: • Mounting location 0 • Mounting location 1 • Mounting location 2	
	Drive cage type A: • Mounting location 3	
	1 x internal in the device	
6	Drive cage type A: • Mounting location 0 • Mounting location 1 • Mounting location 2	
	Drive cage type A: • Mounting location 3	
	• 2 x internal in the device	

Possible drive configurations in drive cage type A

You can implement the following drive configurations using drives in the drive cage type A and on the side panel of the device.

- Non-RAID system
- Onboard RAID1 system
- Onboard RAID1 system with hot-spare drive

7.6.2 Drives in the drive cage type B

7.6.2.1 Installation options for drives with drive cage type B

Note

If the device is permanently installed, mounted on telescopic rails or operated as tower, it can only be subjected to the vibration stresses during operation described in the following.

The restrictions do not apply to the use of SSD.

Number of drives per system and their mounting locations

You can install up to five drives in the drive cage type B and on the side panel of the device at the following mounting locations.

Note

Note the numbering of the mounting locations in the type B drive cage (Page 19).

Number of drives per system	Mounting location	Notes on installation options
1	Drive cage type B: • Mounting location 0	**Drive cage; slots 0, 1, and 2:** • Drive cage type B (Page 19) • 2.5" drive or 3.5" drive in assembly kit for 5.25" tray (Page 119) • 5.25" drive or 5.25" component (Page 122) **Inside the device:** • 2.5" or 3.5" drive inside on the side panel of the device (Page 124)
2	Drive cage type B: • Mounting location 0 • Mounting location 1	
3	Drive cage type B: • Mounting location 0 • Mounting location 1 • Mounting location 2	
4	Drive cage type B: • Mounting location 0 • Mounting location 1 • Mounting location 2	
	• 1 x internal in the device	
5 [1]	Drive cage type B: • Mounting location 0 • Mounting location 1 • Mounting location 2	
	2 x internal in the device	

[1] If more than 4 drives are used, an additional controller is required

Possible drive configurations

You can implement the following drive configurations in the drive cage type B and on the side panel of the device.

- Non-RAID system
- RAID1 system
- RAID1 system with hot spare drive

7.6.2.2 Maximum vibration loads for drives in the drive cage type B

NOTICE
Risk of drive damage and data loss If the device is permanently installed or is mounted on telescopic rails, drives (HDD) in the type B drive cage may only be subjected to the following maximum vibration loads during operation. • 10 ... 58 Hz: 0.015 mm • 58 ... 500 Hz: 2 m/s^2 Only operate the device with vibration loads within these ranges. Vibrations over 500 Hz can damage drives and result in data loss or further device damage and are therefore not permitted. **These restrictions do not apply to the use of SSD.**

7.6.2.3 Possible drive configurations

Possible drive configurations

You can implement the following drive configurations in the drive cage type B and on the side panel of the device.

- Non-RAID system
- RAID1 system
- RAID1 system with hot spare drive

7.6.3 Drives in the removable tray

7.6.3.1 Changing a 2.5" drive or 3.5" drive in a removable tray

You can install 2.5" or 3.5" drives in the removable tray with drive cage type A.

You can find notes on the mounting locations here:

- "Drive cage type A (Page 17)"
- "Installation options for drives with drive cage type A (Page 106)"

Only use original spare parts or components approved for this device. You can find information on this under "Hardware accessories (Page 34)".

Requirement

- You are familiar with the important safety instructions under "Safety instructions on device and system extensions (Page 48)".
- The device is fully disconnected from the mains voltage, see "Switching off the device (Page 74)".
- When changing a 3.5" drive (HDD): Screwdriver TORX T10
- When changing a 2.5" drive (SSD): Screwdriver TORX T8
- The device you wish to replace is inactive.

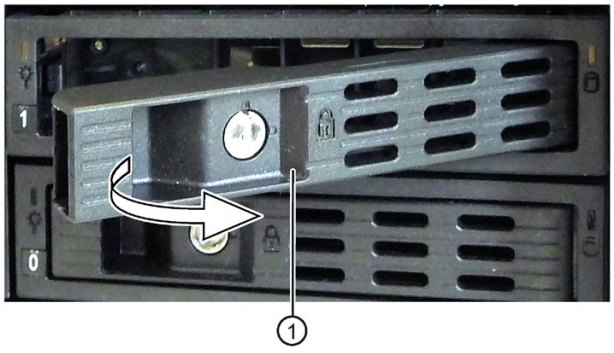
NOTICE
Risk of damaging the drive and data loss Drives in removable trays cannot be replaced during operation (hot swap). When you remove the drive while data is being written to it, you may damage the drive and destroy data. • Only take out the removable tray when the device is switched off.

Procedure

1. Open the front door. (Page 76)
2. Open the lock of the removable tray with the appropriate key.



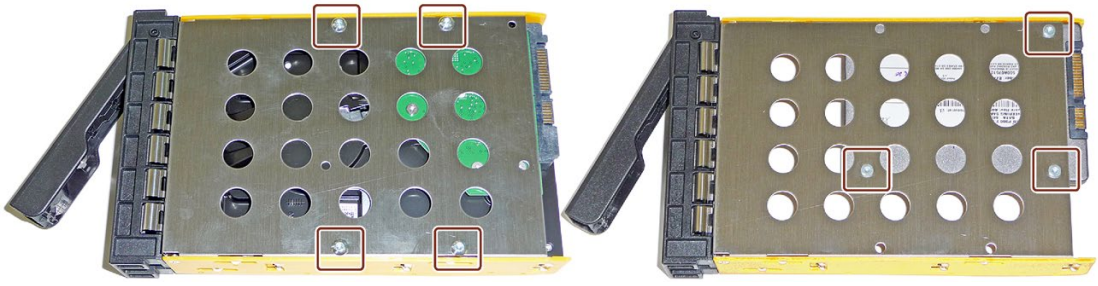
3. Reach into the notch ① in the bracket of the removable tray and pull out the bracket in the direction of the arrow up to a slight resistance.



   The removable tray is pushed out of the drive cage by leverage.

4. Grip the removable tray from the front in the middle at the top and bottom and pull the removable tray completely out of the device.
5. Loosen the highlighted screws on the bottom of the removable tray and remove the drive.

   The left figure shows as drive a 3.5" HDD, the right figure a 2.5" SSD.



6. Carefully insert the new drive into the removable tray.

   Take care not to touch the contacts of the drive when you do this.
7. Fasten the new drive with the screws to the base of the removable tray.

   Only use the original screws.
8. Carefully insert the removable tray into the drive cage of the device again.
9. Fold the tray bracket out of the removable tray as far as it will go and slide the removable tray fully into the drive cage.

   Ensure that the removable tray fits tightly in the drive cage.
10. Close the tray bracket.
11. Lock the removable tray with the key.

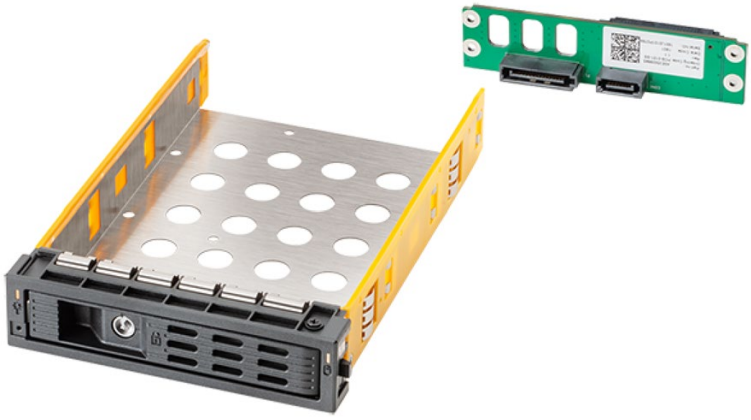
Note

The removable tray must always be locked to ensure reliable operation of the devices with removable trays.

7.6.3.2 Removing a backplane for removable tray

The backplane of the removable tray is installed from inside at the back end of the drive cage type A and is equipped with interfaces for data cables to the motherboard.

This enables the convenient connection of the data cables from the motherboard to the drive in the removable tray at these interfaces.

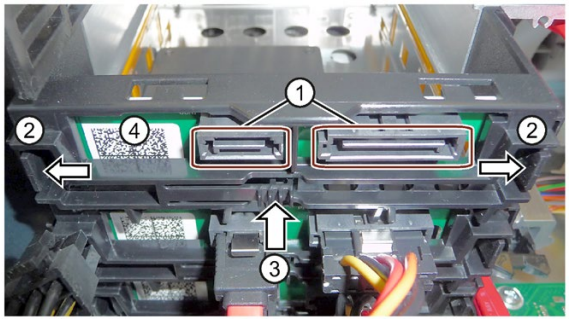


Requirement

- You are familiar with the important safety instructions under "Safety instructions on device and system extensions (Page 48)".
- The device is fully disconnected from the mains voltage, see "Switching off the device (Page 74)".

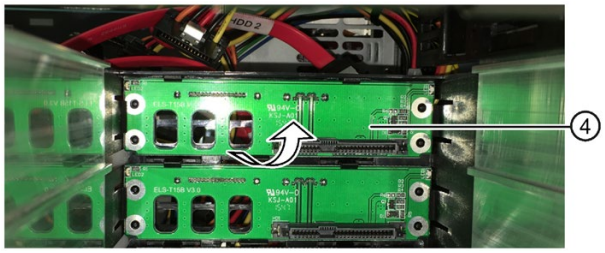
Procedure

1. Open the device. See the notes under "Open the device (Page 93)".
2. Pull out both plugs ①.



3. Unlatch the backplane by firmly pressing on the latches ② in the direction of the arrow and simultaneously pressing on the ejector ③.

4. Remove the unlatched backplane ④ from the brackets by turning it upwards and removing it from the drive cage.

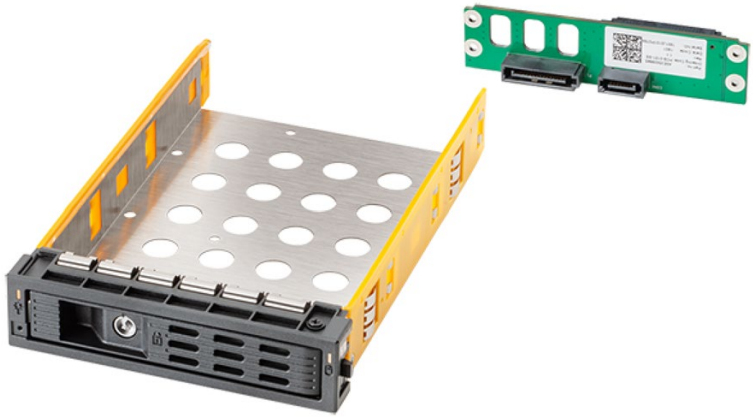


5. Close the device.

7.6.3.3 Installing a backplane for removable tray

The backplane of the removable tray is installed from inside at the back end of the drive cage type A and is equipped with interfaces for data cables to the motherboard.

This enables the convenient connection of the data cables from the motherboard to the drive in the removable tray at these interfaces.



Only use original spare parts or components approved for this device. You can find information on this under "Hardware accessories (Page 34)".

Requirement

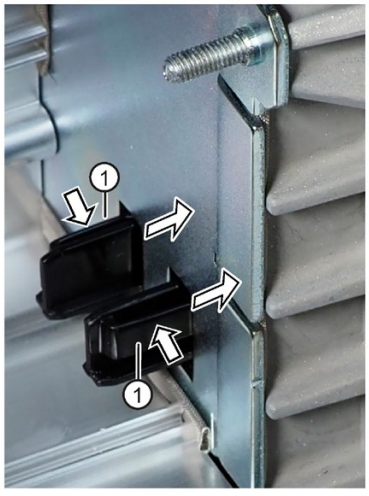
- You are familiar with the important safety instructions under "Safety instructions on device and system extensions (Page 48)".
- The device is fully disconnected from the mains voltage, see "Switching off the device (Page 74)".

Procedure

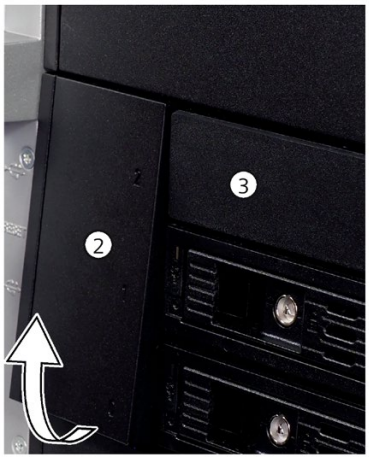
1. Open the device. See the notes under "Open the device (Page 93)".
2. First remove the cover ② located on the front of the type A drive cage to the left of the removable trays.

   To do this, press the locks ① of the cover ② together inside the device and keep them pressed.

   Then push the locks to the front in the direction of the arrow.

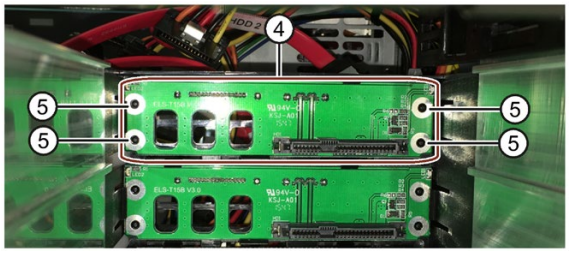


3. Remove the cover ② upwards at an angle at the front of the device.



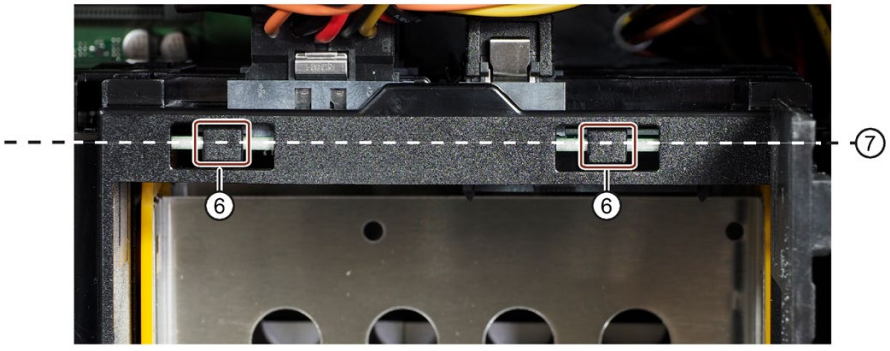
4. On the front of the drive cage, remove the cover ③, which may be located to the right of the cover ②.
5. Remove all existing removable trays until the drive cage is freely accessible.

6. At the appropriate position, insert the backplane ④ from the front into the drive cage and snap it into place at the back.



Check the following:

- The backplane lies flat at the back in the drive cage.
- All centering openings ⑤ of the backplane lie in the centering pins.
- The backplane is clipped in behind the latches ⑥.
- All backplanes lie exactly underneath each other, vertically aligned, when viewed from above ⑦.

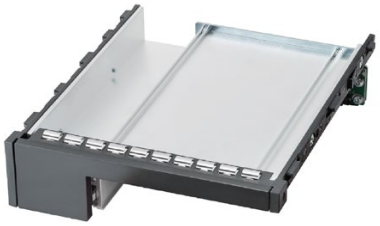


7. Replace the required covers or removable trays on the front of the type A drive cage.
8. Insert the cover ② into the front of the device.
9. At the backplane, connect the data cables with the corresponding interfaces on the motherboard.
10. Connect the power supply.
11. Close the device.

7.6.4 Drives in 5.25" slots of drive cages

7.6.4.1 2.5" drive or 3.5" drive in the 5.25" mounting frame with removable tray

You can install 2.5" or 3.5" drives in the 5.25" mounting frame for removable trays with drive cage type A.



5.25" mounting frame with removable tray

You can find information on the slot here:

- Drive cage type A (Page 17)
- Installation options for drives with drive cage type A (Page 106)

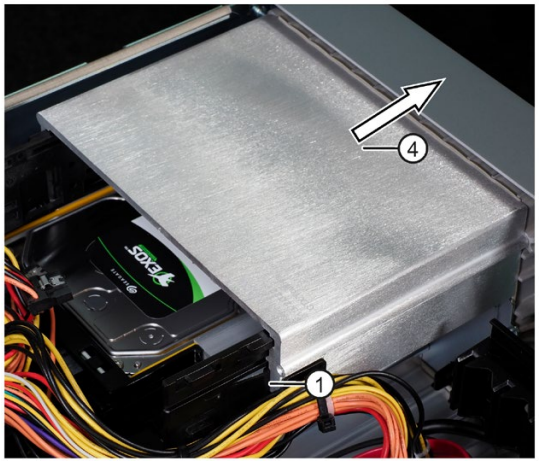
Only use original spare parts or components approved for this device. You can find information on this under "Hardware accessories (Page 34)".

Requirement

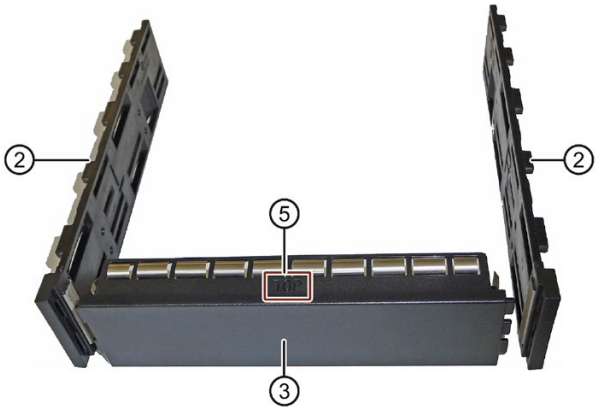
- You are familiar with the important safety instructions under "Safety instructions on device and system extensions (Page 48)".
- The device is fully disconnected from the mains voltage, see "Switching off the device (Page 74)".
- Screwdriver TORX T10

Procedure

1. Open the device. See the notes under "Open the device (Page 93)".
2. Remove the installed empty 5.25" component from the corresponding mounting location:
   - If available: Disconnect all data cables from the 5.25" component.
   - Press on the surfaces ① on the two side mounting bars ② of the 5.25" component.
   - Press and hold surface ① to push the 5.25" component forward out of the drive holder ④.



3. Remove the left and right mounting bars ② from the blanking plate ③.

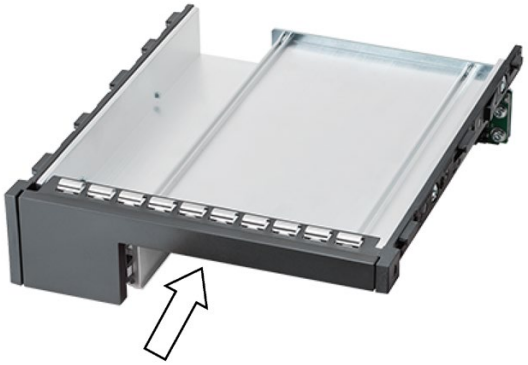


Note

Reinstalling an empty 5.25" component

The mounting rails are labeled with "L" and "R" and can be re-installed on the blanking plate in the same way if necessary. The top of the blanking plate ⑤ is also labeled.

4. Slide the 5.25" mounting frame into the drive cage from the front.



5. Connect the data cables to the 5.25" mounting frame.
6. Carefully insert the removable tray into the 5.25" mounting frame.
7. Fold the bracket out completely and slide the removable tray on the bracket completely into the 5.25" mounting frame.
8. Make sure that the removable tray is firmly seated in the 5.25" mounting frame.
9. Close the tray bracket.
10. Lock the removable tray with the key.
11. Close the device.
12. Connect the power supply.

7.6.4.2 Changing a 2.5" or drive 3.5" drive in the assembly kit for a 5.25" tray

You can install 2.5" or 3.5" drives in an assembly kit for the 5.25" tray in the drive cage type A and drive cage type B.



Assembly kit HDD/SSD for 5.25" tray

In this assembly kit, the drive is shock and vibration dampened.

You can find notes on the mounting locations here:

- Drive cage type B (Page 19)
- Installation options for drives with drive cage type B (Page 108)

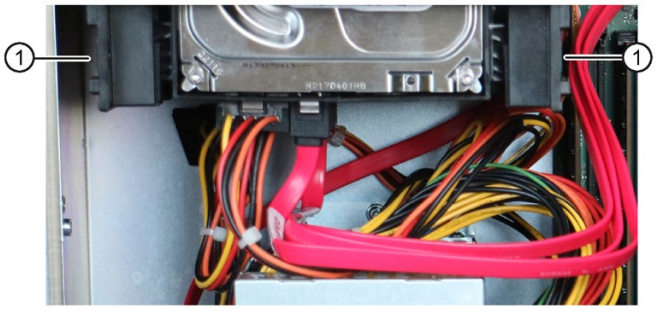
Only use original spare parts or components approved for this device. You can find information on this under "Hardware accessories (Page 34)".

Requirement

- You are familiar with the important safety instructions under "Safety instructions on device and system extensions (Page 48)".
- The device is fully disconnected from the mains voltage, see "Switching off the device (Page 74)".
- When replacing a 3.5" HDD: Screwdriver TORX T10
- When replacing a 2.5" SSD: Screwdriver TORX T8

Procedure

1. Open the device. See the notes under "Open the device (Page 93)".
2. Remove all power supply and data cables from the drive.
3. Press the sides against the surfaces ① of the drive mounting bars ②.



The assembly kit is unlocked.

4. Slide the assembly kit on the drive mounting bars ② forward out of the device and set it aside.



5. Remove the left and right drive mounting bars ② and the drive cover③ from the drive.

Note:

The drive cover is labeled "L" ④ and "TOP" ⑤.

The drive mounting bars are labeled "L" and "R" respectively.

6. Loosen the four screws ⑤ and remove the drive from the drive bay ⑥.



Drive cage with 3.5" HDD

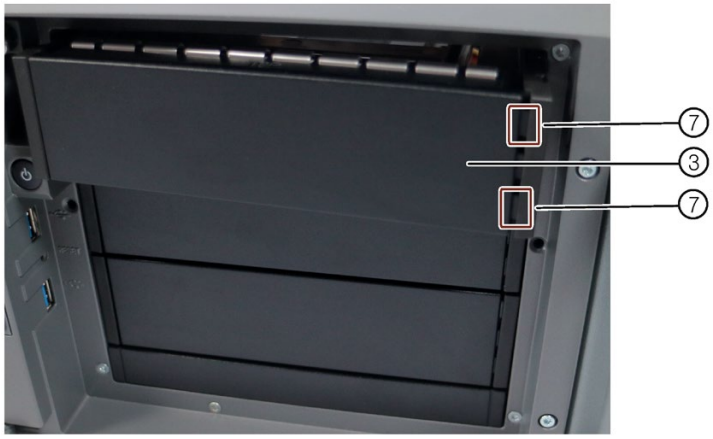


Drive bay with 2.5" SSD

7. Install the new drive in the drive bay ⑥. Ensure that the new drive faces upwards.
8. Fasten the new drive using four screws ⑤.

   Start at the hole marked with "1" on the drive bay.
9. Attach the left and right drive mounting bars ② on the drive bay ⑥.
10. Slide the drive bay evenly and without tilting 3/4 (not completely) into the guide rail of the drive cage.

11. Insert the drive cover ③ between the drive mounting bars ②. Ensure that the pins engage in the openings on the left and right ⑦.



12. Push the drive bay in fully and evenly until you hear it click into the drive cage.
13. Connect the power and data cables to the drive.
14. Close the device.

7.6.4.3 Installing a 5.25" drive or 5.25" component

You can install 5.25" drives or other 5.25" components in type A and type B drive cages.

You can find notes on the mounting locations here:

- Drive cage type A (Page 17)
- Installation options for drives with drive cage type A (Page 106)
- Drive cage type B (Page 19)
- Installation options for drives with drive cage type B (Page 108)

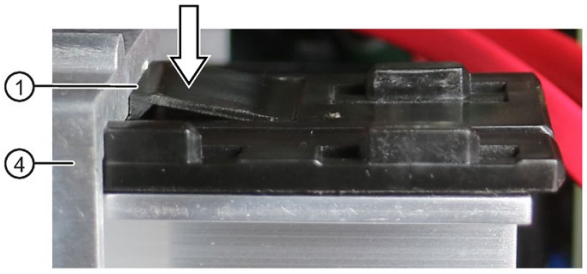
Only use original spare parts or components approved for this device. You can find information on this under "Hardware accessories (Page 34)".

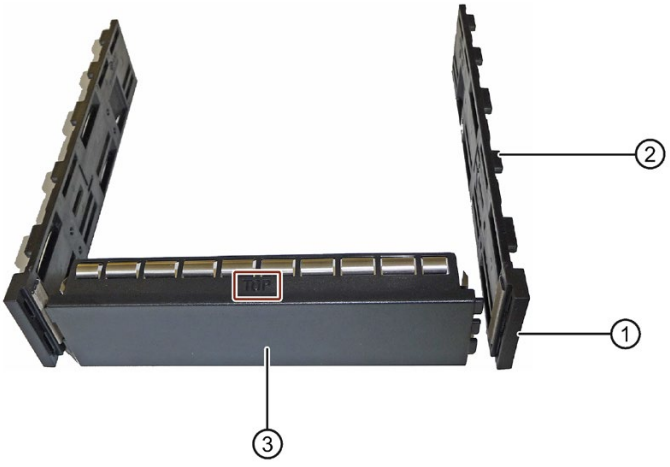
Requirement

- You are familiar with the important safety instructions under "Safety instructions on device and system extensions (Page 48)".
- The device is fully disconnected from the mains voltage, see "Switching off the device (Page 74)".
- Screwdriver TORX T10

Procedure

1. Open the device. See the notes under "Open the device (Page 93)".
2. Remove the installed empty 5.25" component from the corresponding mounting location:
   - If available: Disconnect all data cables from the 5.25" component.
   - Press on the surfaces ① on the two side mounting bars ② of the 5.25" component.
   - Press and hold surface ① to push the 5.25" component forward out of the drive holder ④.





3. Remove the left and right mounting bars ② from the blanking plate ③.

Note

The mounting bars are labeled "L" and "R". The top of the blanking plate is also marked.

4. Screw the right and left drive mounting bars to the new drive.

   Take care not to touch the contacts of the drive when you do this. The blanking plate is no longer required.
5. Slide the new drive with the drive mounting bars evenly backwards into the guide rails of the drive cage and without tilting, until it clicks into place.
6. Close the device.

7.7 Installing and removing drives in the device

7.7.1 Installing drives inside on the side wall of the device

You can install up to two 2.5" or 3.5" drives internally on the right side panel of the device (viewed from the front of the device). You will need one drive bay plate per drive.

These drives are then built into the device and are not accessible from the outside.

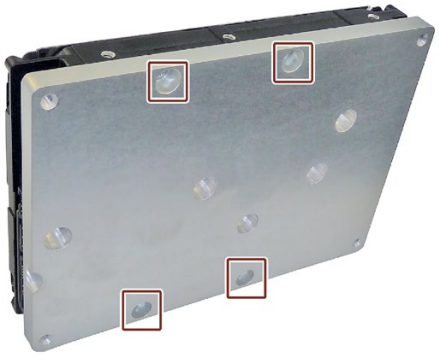
Only use original spare parts or components approved for this device. You can find information on this under "Hardware accessories (Page 34)".

Requirement

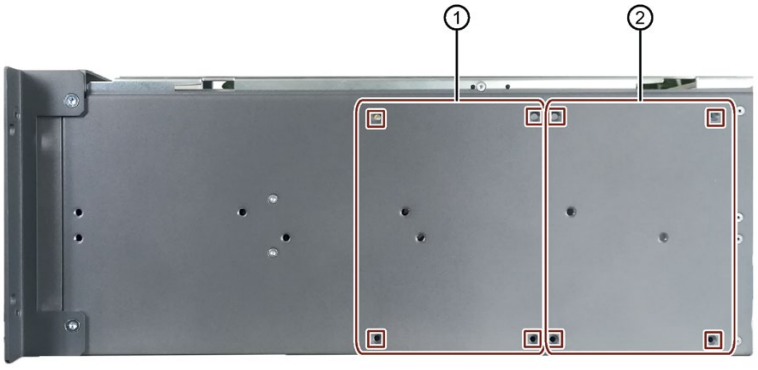
- You know the important safety instructions under "Safety instructions on device and system extensions (Page 48)".
- The device has been fully disconnected from the line voltage, see "Switching off the device (Page 74)".
- Screwdriver TORX T10

Procedure

1. Open the device. See the notes under "Open the device (Page 93)".
2. Screw the drive to the drive bay plate at the highlighted holes.



3. Screw from outside the drive bay plate on the inside to the side panel of the enclosure, at position ① or position ②.



The SATA connections are at the top.



4. Connect the SATA cables to the SATA connectors of the motherboard (Page 186) and to the drive.
5. Close the device.
6. Connect the power supply unit.

7.7.2 Install M.2 NVMe SSD

You can install one or two M.2 NVMe SSDs on the motherboard of the device. The M.2 NVMe SSD is inserted into its designated slot parallel to the motherboard.

You can find information on the position of the slot under "Layout of the motherboard (Page 185)".

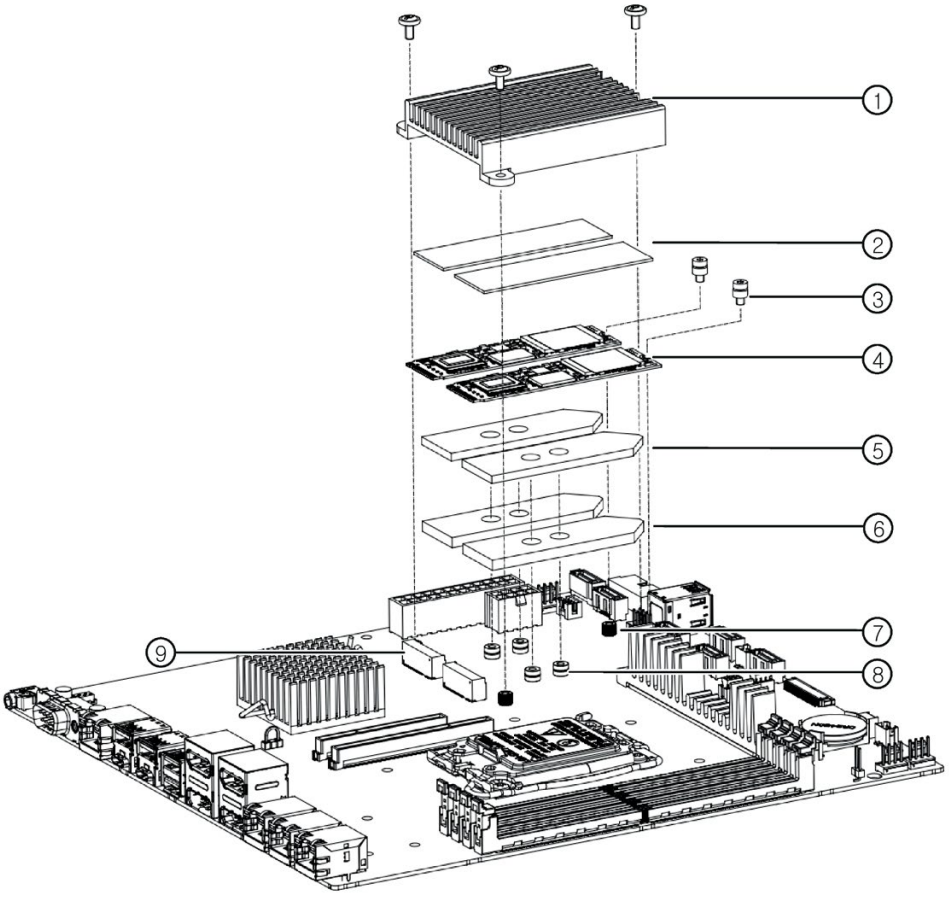
Only use original spare parts or components approved for this device. You can find information on this under "Hardware accessories (Page 34)".

Requirement

- You know the important safety instructions under "Safety instructions on device and system extensions (Page 48)".
- The device has been fully disconnected from the line voltage, see "Switching off the device (Page 74)".
- Screwdriver TORX T10

Procedure

①	Heat sink
②	2 x square thermal pad, 1 mm
③	2 x fixing screw with spacer for M.2 NVMe SSD
④	2 x M.2 NVMe SSD
⑤	2 x thermal pad with round cutouts, 3 mm
⑥	2 x thermal pad with round cutouts, 4 mm
⑦	3 x fastening threads for heat sink
⑧	6 x fastening threads for M.2 NVMe SSD
⑨	2x slot for M.2 NVMe SSD



1. Open the device. See the notes under "Open the device (Page 93)".
2. If an inserted graphics card or other expansion card covers up the slots for the M.2 NVMe SSDs, remove it.

   You can find information on this here:

   – Removing a graphics card (Page 106)
   – Removing expansion cards (Page 96)
3. For each M.2 NVMe SSD, place one thermal pad with round cutouts, 3 mm ⑤ onto a thermal pad with round cutouts, 4 mm ⑥.
4. Place the stacked thermal pads on the motherboard over the two fastening threads ⑧.
5. Insert the M.2 NVMe SSD ④ into the slot ⑨ at a slight angle from above parallel to the motherboard.
6. Carefully press down M.2 NVMe SSD.
7. Secure the end of the M.2 NVMe SSD to the appropriate fastening thread ⑧ on the motherboard with a fixing screw ③.

   Note

   Ensure that the M.2 NVMe SSD is clamped between the upper and lower part of the fixing screw.
8. Place the square thermal pad ② onto the M.2 NVMe SSD so that it completely covers the M.2 NVMe SSD.
9. Put on the heat sink ① and screw it onto the 3 fastening threads ⑦ on the motherboard.
10. Reinstall all previously removed components. You can find information on this here:

    – Installing a graphics card (Page 104)
    – Installing expansion cards (Page 94)
11. Close the device.

Device maintenance and repair

8

8.1 Safety instructions for repairs

Danger from unauthorized or improperly performed repairs

⚠ WARNING

Danger due to unauthorized opening of the device and improperly performed repairs

Improper procedures when performing repairs can lead to material damage to the device or the system.

If you cause defects in the device by installing or replacing system extensions, this can result in serious hazards for users of the device or system and the warranty may expire.

- For this reason, please observe the information in "Safety instructions on device and system extensions (Page 48)".

8.2 Maintenance intervals

To maintain high system availability, replace device components that are subject to wear as a preventive measure according to the recommended replacement intervals.

Component	Replacement interval
Drives	3 years
Backup battery	5 years
Fan	3 years
Filter mat of the fan (front fan)	Depending on the degree of soiling

8.3 Removing and installing hardware

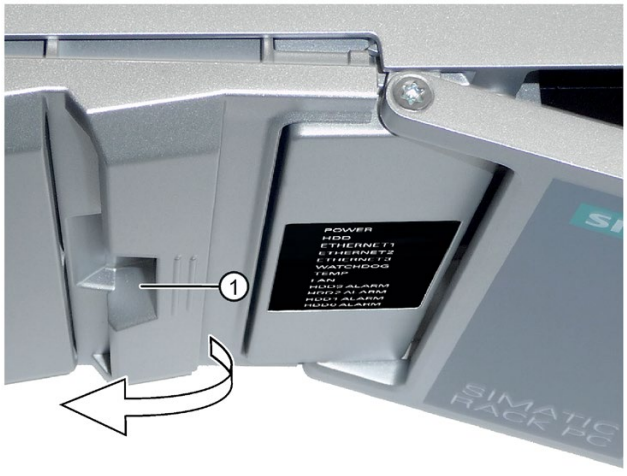
8.3.1 Front fan maintenance

8.3.1.1 Removing the fan cover from the front fan

Information on the position of the fan cover of the front fan is available under "Front panel (Page 15)".

Procedure

1. Open the front door (Page 76) to at least an angle of approx. 45°
2. Take hold of the recessed grip of the fan cover ①.
3. Open the fan cover in the direction of the arrow and remove it.



8.3.1.2 Changing the filter mat of the front fan

Replace or clean the filter mat of the front fan at regular intervals. You can find information on this under "Maintenance intervals (Page 128)".

Only use original spare parts or components approved for this device. You can find information on this under "Hardware accessories (Page 34).

Procedure

1. Remove the fan cover (Page 129).
2. Remove the filter mat from the fan cover.
3. Insert the new filter mat loosely into the fan cover. Place the filter mat evenly in the fan cover.
4. Replace the fan cover.

8.3.1.3 Changing the front fan

A front fan is located on a fan support on the front of the device behind the fan cover.

Replace the front fan at regular intervals. You can find information on this under "Maintenance intervals (Page 128)".

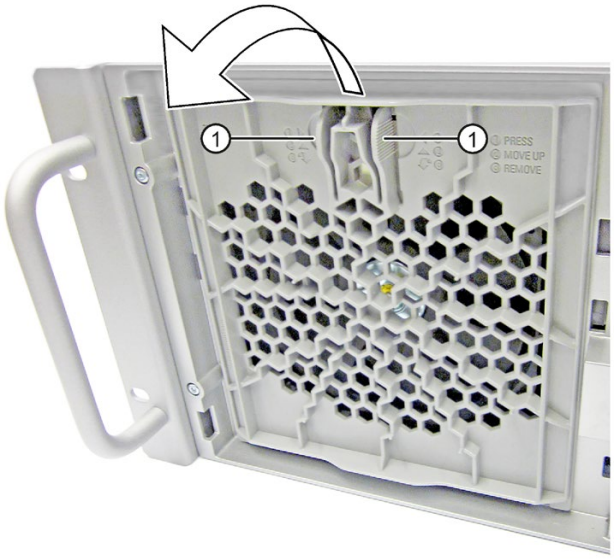
Only use original spare parts or components approved for this device. You can find information on this under "Hardware accessories (Page 34)".

Requirement

- You are familiar with the important safety instructions under "Safety instructions on device and system extensions (Page 48)".
- The device is fully disconnected from the mains voltage, see "Switching off the device (Page 74)".

Procedure

1. Remove the front fan cover. (Page 129)
2. Press the locks ① together and keep them pressed.
3. Lift the fan support slightly upwards and remove it to the front from the front of the enclosure.

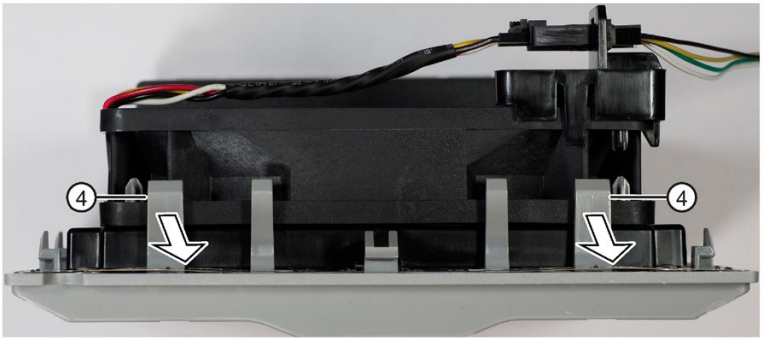


4. Put down the fan support with the openings facing down (fan is above).

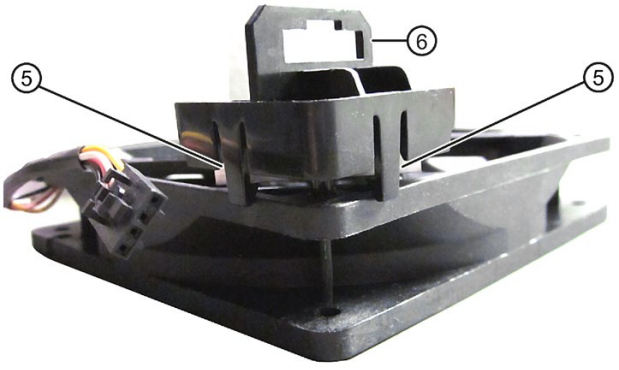
5. Press on the clip on the small fan cable plug connector ② and remove the connector from the larger adapter plug,



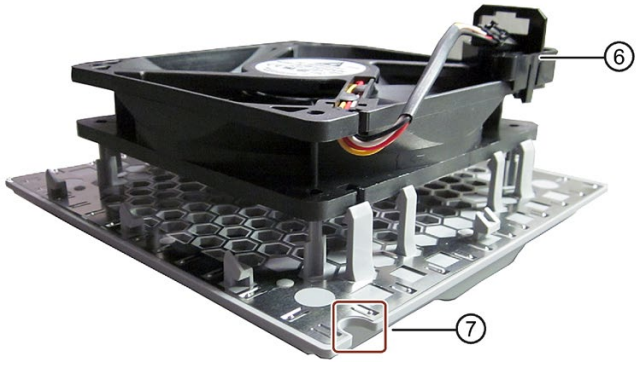
6. Press on the side of the clips ③ and loosen the adapter plug from the cable holder.
7. Release the locking latches ④ on the fan support at the rear and front in turn and remove the fan from the fan support.



8. Loosen the locking latches ⑤ of the holder for the adapter plugs ⑥ and remove the holder.



9. Take the new fan and place the holder for the adapter plug ⑥ on the new fan as seen in the figure and snap the holder into place.



10. Then place the new fan on the fan support.

    Use the highlighted positions as a guide. Notch in fan support ⑦ and holder for adapter plug ⑥.

11. Snap the fan into place at the locking latches of the fan support ④.
12. Install the larger adapter plug in the holder for the adapter plug ⑥. Press on the side of the clips ③ of the larger adapter plug.
13. Insert the small fan cable connector ② in the larger adapter connector again.
14. Place the fan support with the new fan on the front of the device.
15. Replace the fan cover.

8.3.2 Change the fan on drive cage type A

This fan is only installed if the following drive configuration is available:

- RAID system in conjunction with three or more drives in removable tray drive cage type A
- "Enterprise" type drives

Replace or clean the fan at regular intervals. You can find information on this under "Maintenance intervals (Page 128)".

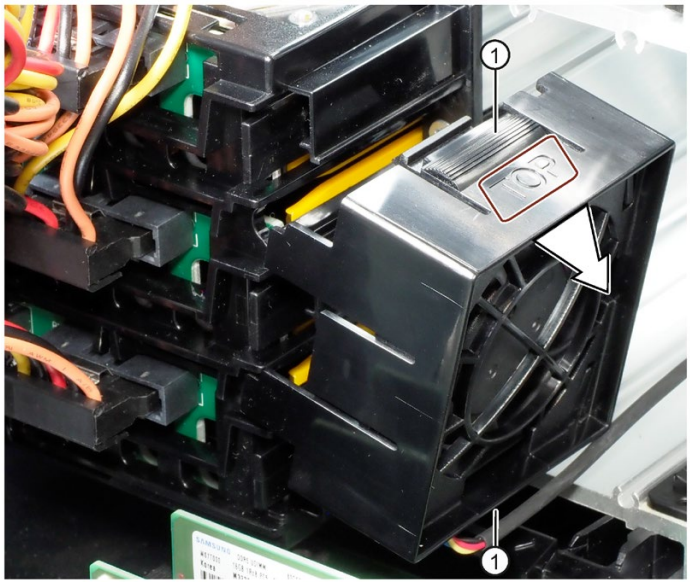
Only use original spare parts or components approved for this device. You can find information on this under "Hardware accessories (Page 34)".

Requirement

- You know the important safety instructions under "Safety instructions on device and system extensions (Page 48)".
- The device is fully disconnected from the line voltage, see "Switching off the device (Page 74)".
- There is no 5.25" component in the corresponding mounting location, see information under "Installation options for drives with drive cage type A (Page 106)".
- Screwdriver TORX T10

Procedure

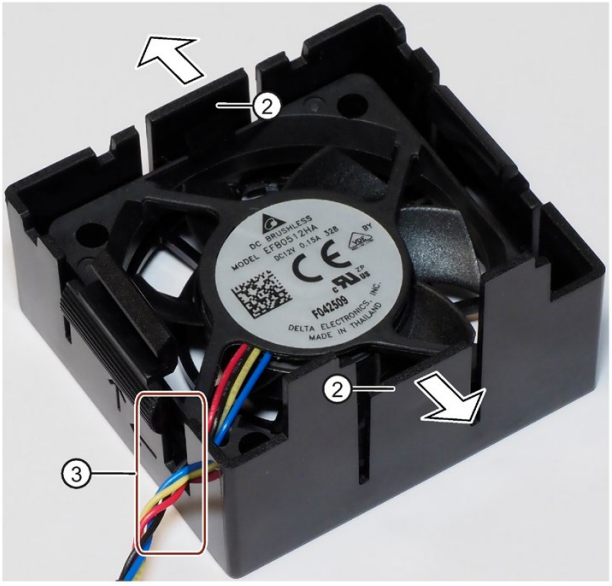
1. Open the device. See the notes under "Open the device (Page 93)".
2. Detach the fan cable from the motherboard.
3. Press the upper and lower lock ① on the fan support and remove the fan support from the drive cage.



The fan holder is labeled as follows:

- At the top with "Top"
- At the bottom with arrows which indicate the direction of rotation and air flow of the fan.

4. Put down the fan support as shown.



5. Bend the locking latches ② of the fan support slightly outwards and remove the fan from the fan support.
6. Place the new fan in the fan support as shown.
7. Guide the fan cable through the cable outlet ③.
8. Finally, snap the new fan completely into place in the locking latches ②.
9. Mount the fan support on the drive cage (see above).
10. Connect the fan cable to the motherboard.
11. Close the device.

8.3.3 Changing the backup battery

Change the backup battery in good time. See information under "Maintenance intervals (Page 128)".

Only use original spare parts, e.g. a backup battery of the same type (article number of lithium battery: A5E00047601 CR2450-N).

⚠ WARNING

Risk of explosion and release of harmful substances

Before replacing the backup battery, take note of the important safety instructions regarding battery replacement under "General safety instructions (Page 38)".

Comply with local regulations when disposing of used batteries.

Requirement

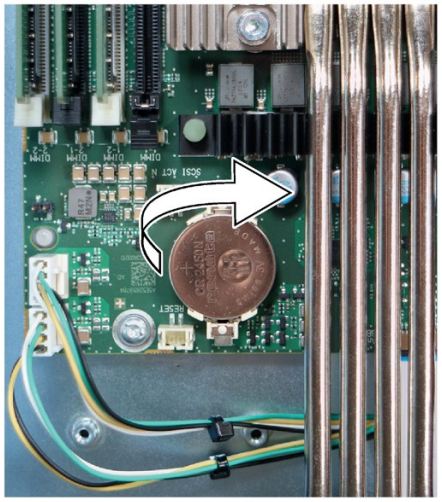
- You know the important safety instructions under "Safety instructions on device and system extensions (Page 48)".
- You have made a note of the firmware settings because the configuration data of the device can be deleted when the backup battery is changed.

  You can find information on the firmware settings in the firmware/BIOS description, see "Important instructions and manuals for operating the device (Page 11)".
- The device has been fully disconnected from the line voltage, see "Switching off the device (Page 74)".

Procedure

1. Open the device. Observe the information under "Open the device (Page 93)".
2. Remove the expansion cards, if necessary, see "Removing expansion cards (Page 96)".

3. Remove the battery from socket.



4. Gently press the new battery into the socket.
5. Close the device.
6. Check the firmware settings.

8.3.4 Replacing the power supply unit

8.3.4.1 Replacing the power supply unit 550 W

Only use original spare parts or components approved for this device. You can find more information under "Hardware accessories (Page 34)".

Requirement

- You are familiar with the important safety instructions under "Safety instructions on device and system extensions (Page 48)".
- The device is fully disconnected from the mains voltage, see "Switching off the device (Page 74)".
- Screwdriver TORX T10
- Diagonal cutter

Procedure

1. Open the device. See the notes under "Open the device (Page 93)".
2. Disconnect the power cables from the drives and the motherboard.
3. Remove the cable ties securing the power cables in the device.
4. Remove the four fixing screws that are marked in the figure below.



5. Pull the power supply unit upward and out of the device.
6. Install the power supply unit.
7. Secure the power supply unit with the screws shown.
8. Connect the cables to the drives and the motherboard.
9. Secure the power supply unit cables in the device again using cable ties.
10. Close the device.
11. Check the safe state of the device.
12. Switch on the power supply unit.

8.3.4.2 Replacing the power supply unit 850 W

Only use original spare parts or components approved for this device. You can find information on this under "Hardware accessories (Page 34)".

Requirement

- You know the important safety instructions under "Safety instructions on device and system extensions (Page 48)".
- The device has been fully disconnected from the line voltage, see "Switching off the device (Page 74)".
- Screwdriver TORX T10
- Diagonal cutter

Procedure

1. Open the device. See the notes under "Open the device (Page 93)".
2. Disconnect the power cables from the drives and the motherboard.
3. Remove the cable ties securing the power cables in the device.
4. Remove the four fixing screws that are marked in the figure below.



5. Pull the power supply unit upward and out of the device.
6. Install the power supply unit.
7. Secure the power supply unit with the screws shown.
8. Connect the cables to the drives and the motherboard.
9. Secure the power supply unit cables in the device again using cable ties.
10. Close the device.
11. Check the safe state of the device.
12. Switch on the power supply unit.

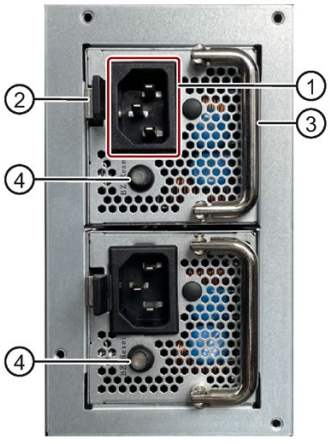
8.3.4.3 Replacing the module of the redundant power supply unit 700 W

If a module of the redundant power supply unit is defective, you can continue to operate the device until the device can be shut down in a controlled manner.

The replacement of one of the two modules of the redundant power supply unit can be performed without shutting down the device.

Only use original spare parts or components approved for this device. You can find information on this under "Hardware accessories (Page 34)".

Procedure



1. Use the status display ④ to determine which module is defective, see "Status displays of power supply unit 700 W (2 modules, each 700 W, redundant) (Page 31)".
2. Disconnect the defective module from the line voltage.

   Pull the power plug from the socket ① of the defective module.
3. Open the locking clip② and pull out the module by the handle ③.
4. Insert the new module and push it to the rear edge of the enclosure until it clicks into place there.
5. Re-insert the power plug into the socket ① of the newly inserted module.
6. Check the safe state of the device. Check the correct function on the status display.

8.3.4.4 Changing the enclosure of the redundant power supply unit 700 W

Only use original spare parts or components approved for this device. You can find information on this under "Hardware accessories (Page 34)".

Requirement

- You know the important safety instructions under "Safety instructions on device and system extensions (Page 48)".
- The device is fully disconnected from the line voltage, see "Switching off the device (Page 74)".
- Screwdriver TORX T10
- Diagonal cutter

Procedure

1. Remove both modules of the redundant power supply unit (Page 138).
2. Open the device. See the notes under "Open the device (Page 93)".
3. Disconnect the power cables from the drives and the motherboard.
4. Remove the cable ties securing the power cables in the enclosure of the device.
5. Remove the four fixing screws that are marked in the figure below.



6. Pull the enclosure of the redundant power supply unit upward and out of the device.
7. Install the new enclosure.
8. Secure the enclosure with the screws shown.
9. Connect the cables to the drives and the motherboard.
10. Replace the two modules of the redundant power supply unit and push them to the rear edge of the enclosure until they click into place.
11. Insert the power plugs into the sockets of the inserted modules.
12. Check the safe state of the device.

8.3.5 Installing and removing the heat sink of the processor

8.3.5.1 Installing the heat sink of the processor

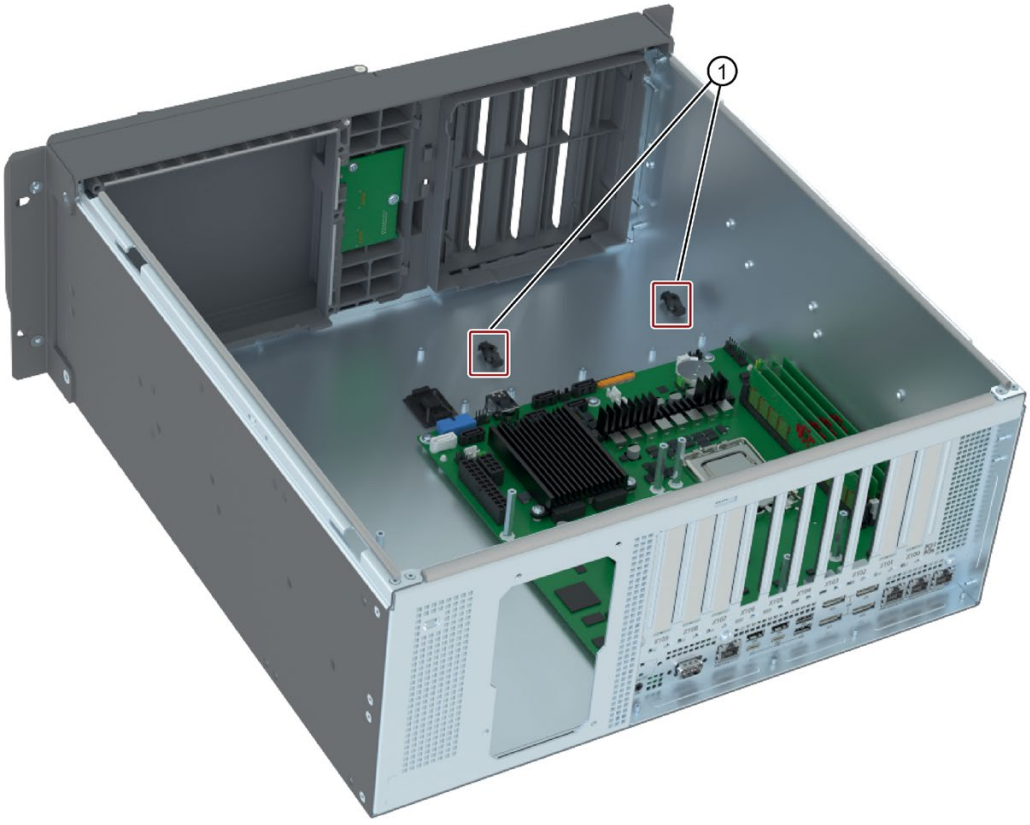
Only use original spare parts or components approved for this device. You can find information on this under "Accessories and spare parts (Page 34)".

Requirement

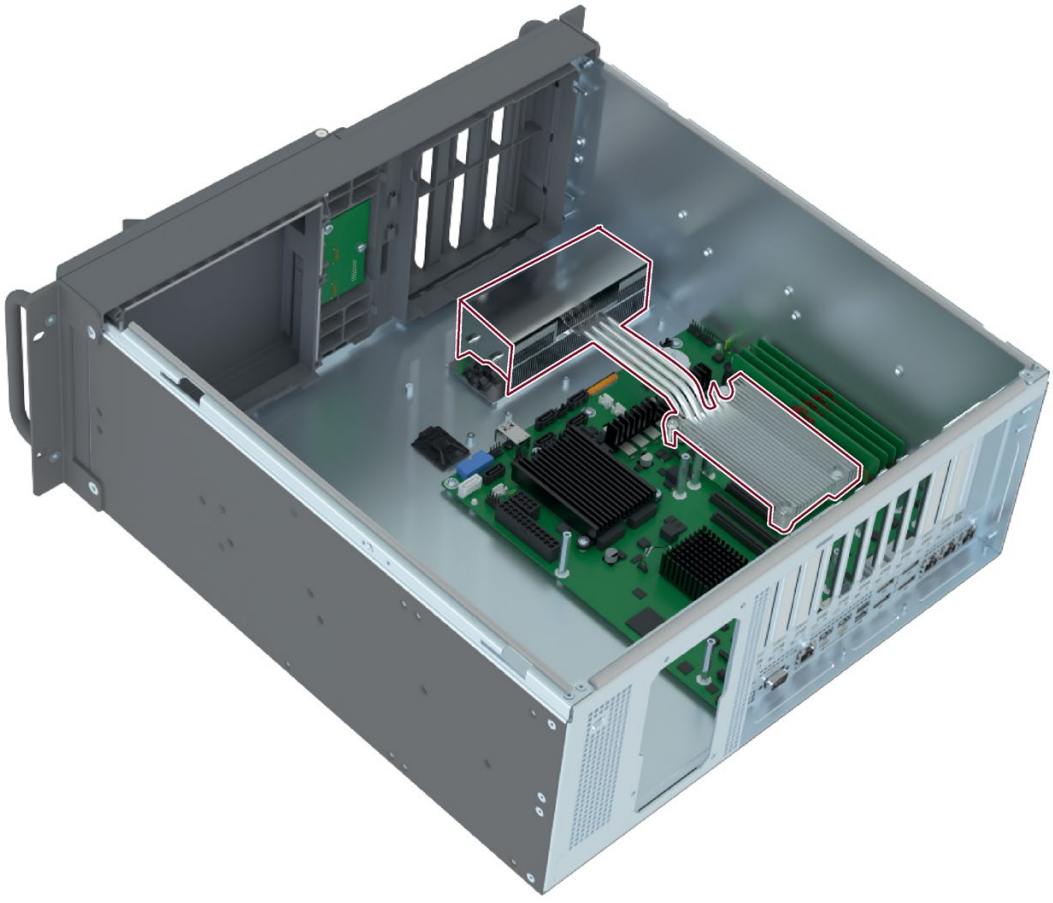
- You know the important safety instructions under "Safety instructions on device and system extensions (Page 48)".
- The device is fully disconnected from the line voltage, see "Switching off the device (Page 74)".

Procedure

1. Open the device. Observe the information under "Open the device (Page 93)".
2. Place the expanding sleeves onto the spacer bolts pressed into the base plate ①. Ensure the correct orientation, see figure.



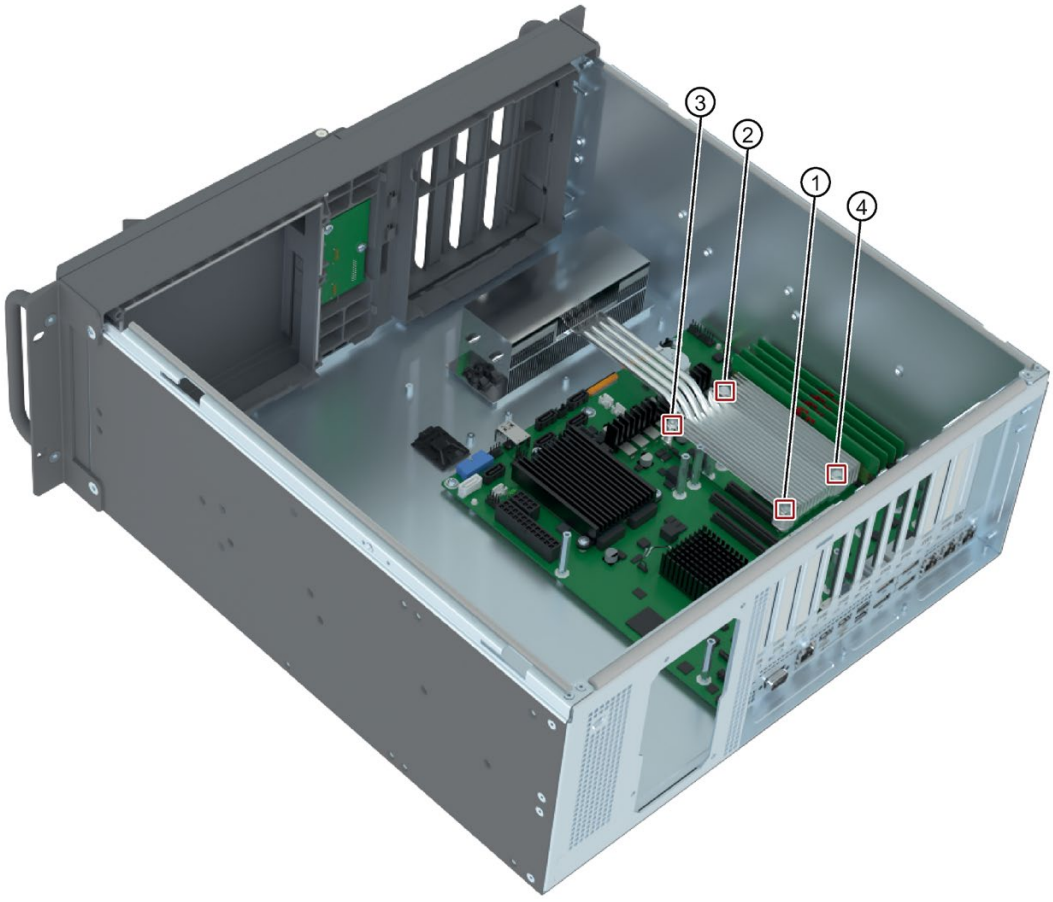
3. Set the heat sink into the device.



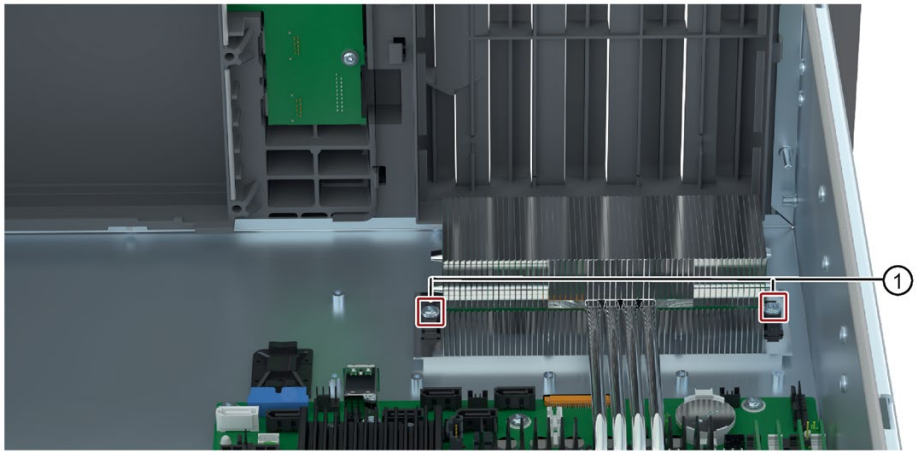
4. Slide the heat sink over the expanding sleeves. Ensure that the heat sink snaps into both expanding sleeves.



5. To fasten the heat sink, tighten the four fastening screws marked in the figure below crosswise on the CPU side with a torque of 0.6 Nm.



6. To fasten the expanding sleeves, tighten the two fastening screws marked in the figure below ① with a torque of 0.6 Nm.



8.3.5.2 Removing the heat sink of the processor

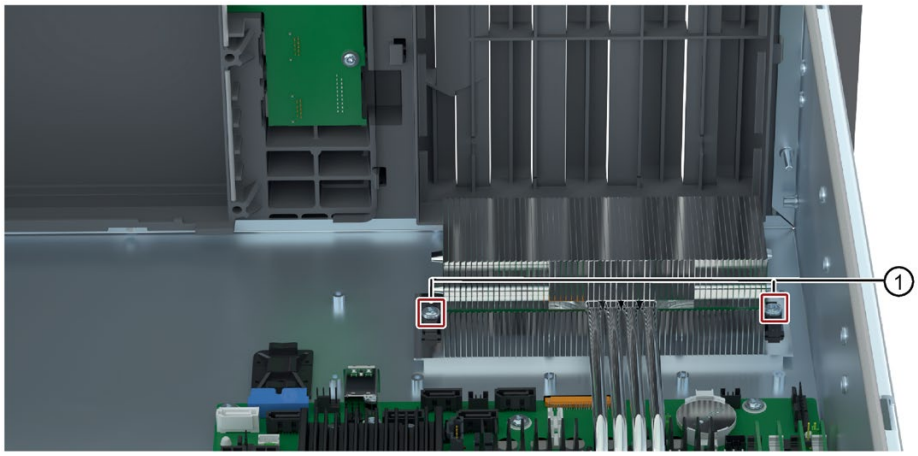
Only use original spare parts or components approved for this device. You can find information on this under "Accessories and spare parts (Page 34)".

Requirement

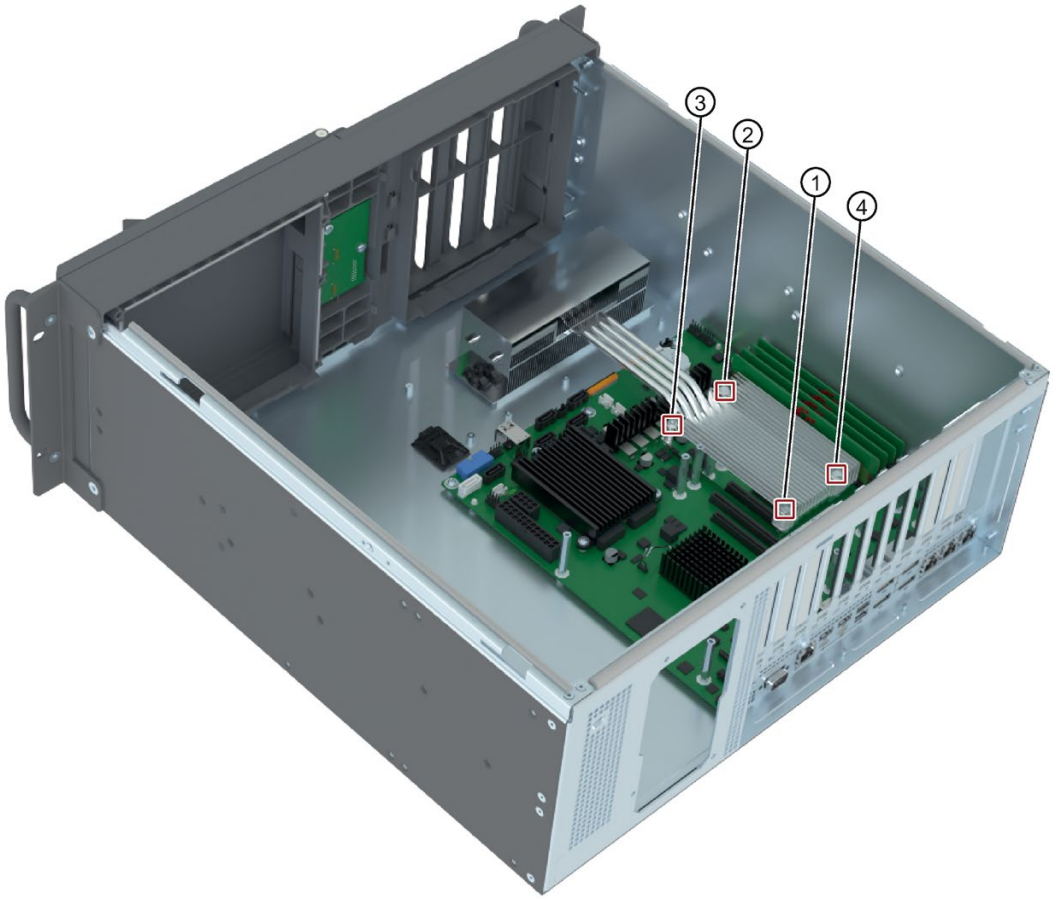
- You know the important safety instructions under "Safety instructions on device and system extensions (Page 48)".
- The device is fully disconnected from the line voltage, see "Switching off the device (Page 74)".

Procedure

1. Open the device. Observe the information under "Open the device (Page 93)".
2. Remove the two fixing screws marked in the figure below ①.



3. Remove the four fixing screws marked in the figure below.



4. Slide the heat sink back over the expanding sleeves. Ensure that the heat sink detaches from the expanding sleeves on both sides when sliding it back.



5. Remove the heat sink up and out of the device.

8.3.6 Replacing the processor

Only use original spare parts or components approved for this device. You can find information on this under "Hardware accessories (Page 34)".

NOTICE
Damage to the processor If the CPU is operated with a higher clock frequency than permitted, it can be destroyed. This leads to data loss. • Operate the processor only at a clock frequency that is equal to or less than the permitted clock frequency. • You should therefore only install an approved processor.

Requirement

- You know the important safety instructions under "Safety instructions on device and system extensions (Page 48)".
- The device has been fully disconnected from the line voltage, see "Switching off the device (Page 74)".
- Crosshead screwdriver Philips PH1

Procedure

1. Open the device. Observe the information under "Open the device (Page 93)".
2. Remove the heat sink of the processor, see "Removing the heat sink of the processor (Page 144)".
3. Clean the heat sink of the processor. Remove residues of the originally applied thermal paste.
4. Lift the release lever ④ and release the processor bracket ①.
5. Carefully lift the release lever ④ upwards. When doing so, ensure that you do not let go of the release lever.

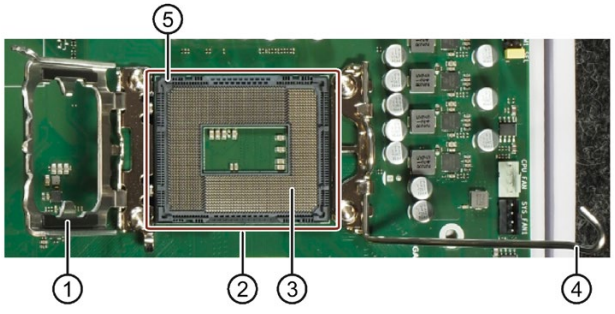


Illustration of processor socket without processor

6. Carefully remove the processor.

Note

The contact springs ③ of the processor socket ② are very sensitive.

Take care not to damage these contact springs both when removing and inserting the processor.

Always touch the contact springs with the contact side of the processor only flat.

7. Place the new processor in the processor socket.

   Pay attention to the correct positioning of the processor in the processor socket at the points marked in red in the following figure.

   Insert the processor so that the arrow ⑥ on one corner of the processor is positioned at the location marked with the number ⑤ in the previous figure.



8. Apply sufficient thermal paste to the new processor.
9. Fold the processor bracket ① down again at the release lever ④ and lock the release lever so that the processor bracket is firmly closed.
10. Reinstall the processor heat sink. See Installing the heat sink of the processor (Page 140)
11. Close the device.

8.3.7 Replacing the bus boards

Note

You can find all the technical information needed for this under "Bus boards: Components, layout and function (Page 187)".

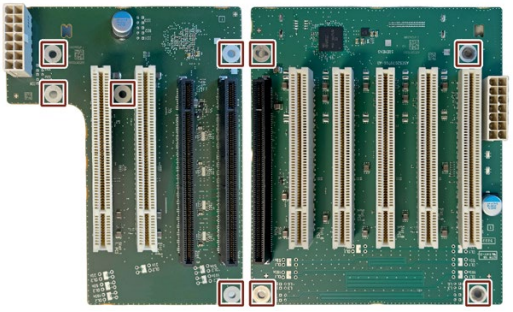
Only use original spare parts or components approved for this device. You can find information on this under "Hardware accessories (Page 34)".

Requirement

- You know the important safety instructions under "Safety instructions on device and system extensions (Page 48)".
- The device is fully disconnected from the line voltage, see "Switching off the device (Page 74)".
- Screwdriver TORX T10

Procedure - Removal

1. Open the device. See the notes under "Open the device (Page 93)".
2. Remove the expansion cards from the slots, see "Removing expansion cards (Page 96)".
3. Pull all connectors out of the bus board.
4. Remove the screws marked in the figure and put them in a safe place.



5. Pull the bus board from the motherboard.
6. Make sure the connection card (Page 187) is inserted into the appropriate slot on the motherboard. If the connection card has been removed from the bus board, reinsert the connection card into the appropriate slot on the motherboard (Page 185).
7. Insert the new bus board.
8. Secure the new bus board with the screws you removed earlier.
9. Plug in the previously detached plugs.
10. If necessary, install the expansion cards again. (Page 94)
11. Close the device.

8.3.8 Replacing the motherboard

Only use original spare parts or components approved for this device. You can find information on this under "Hardware accessories (Page 34)".

The motherboard is supplied as a spare part without a processor and without memory modules.

Requirement

- You know the important safety instructions under "Safety instructions on device and system extensions (Page 48)".
- You have noted the firmware settings because the configuration data of the device are deleted when the motherboard is replaced.

  You can find information on the firmware settings in the firmware/BIOS description, see "Important instructions and manuals for operating the device (Page 11)".
- The device has been fully disconnected from the line voltage, see "Switching off the device (Page 74)".
- Screwdriver TORX T10

Procedure

1. Open the device. Observe the information under "Open the device (Page 93)".
2. Remove the bus board (Page 149).
3. If necessary, remove the M.2 NVMe SSD (Page 125).
4. Remove the heat sink of the processor and the processor (Page 147).
5. Slide installed 5.25" components forward.
6. Note the assignment of all cables to the motherboard.
7. Disconnect all cables from the motherboard.
8. Remove the connection socket COM1 at the rear of the device (Page 22).

   Unscrew the hexagon bolts of the COM1 interface on the rear of the device.
9. Unscrew the fixing screws that secure the motherboard in the device. You can find information on the location of the screws under "Layout of the motherboard (Page 185)".
10. Remove the motherboard.
11. Carefully place the new motherboard into the device and secure it with the fixing screws.
12. Install the processor and the heat sink of the processor (Page 147).

    The processor bracket of the new motherboard contains a plastic cover to protect the contact springs. This is released when the processor bracket is opened for the first time.
13. Reconnect all cables to the corresponding points.
14. Put the 5.25" components back in the correct position.
15. Reinsert all previously removed expansion cards into their slots.

16. Re-install the M.2 NVMe SSD. (Page 125)
17. Install the bus board again (Page 149).
18. Close the device.
19. Reconnect the device to the mains voltage and switch on the device.
20. Update the firmware settings to match the new motherboard version.

    Please note during the update whether you are operating a device with or without a RAID system.

8.4 Installing the operating system, software and driver

8.4.1 Restoring the operating system and partitions with the SIMATIC IPC USB flash drive

For information on restoring the operating system you ordered with the device in the detailed description of the operating system, see "Important instructions and manuals for operating the device (Page 11)".

8.4.2 Installing a new Microsoft® Windows® operating system

The Intel® RST storage driver that supports the Intel CPU platform of the 13th generation and higher is not yet available in the Windows® operating system. In order for all available drives (SATA and/or M.2 NVMe) to be recognized, the driver must be installed during the installation process.

Requirement

- USB flash drive (supplied if ordered) with software and tools to restore the installed Microsoft® Windows® operating system

Procedure

1. Connect the USB flash drive with software and tool for restoring the installed Microsoft® Windows® operating system to the device.
2. Navigate to DocuAndDrivers > Drivers > RST > F6.
3. Copy the "VMD" folder to the connected USB flash drive.
4. Start the installation process.
5. As soon as a message appears stating that no drives were found, click "Load driver".
6. When you are asked for the installation medium, select the "VMD" folder that you previously copied to the connected USB flash drive.
7. Select the driver "VMD\iaStorVD.inf" (Controller or Manager).
8. Select the drive for installing the operating system and complete the installation process.

8.4.3 Installing software and drivers

Requirement

- All files for installing software and drivers are on a bootable USB flash drive.

  The following methods can be used to obtain a bootable USB flash drive containing these files:

  – You have ordered a bootable USB flash drive to accompany the delivery of the device.

  – You create this bootable USB flash drive yourself.

Creating a bootable USB flash drive yourself

Requirement

You know the serial number and article number of the device for which you want to install software or drivers. You can find information on this under "Device identification data (Page 53)".

1. On the Internet, go to "Online Service Delivery Portal (https://www.automation.siemens.com/swdl/register/ipc)".
2. Log in with your credentials or register.
3. Enter the serial number and article number of the device for which you want to install software or drivers.
4. Download the ISO file appropriate for your device locally.
5. Follow the instructions to create a bootable USB flash drive. For instructions on how to do this, see "Important instructions and manuals for operating the device (Page 11)".

Installing software and drivers from the bootable USB flash drive

1. In the firmware settings, set the device to boot from the USB flash drive at the next startup.
2. You can find information on this in the user manual for the motherboard. See "Important instructions and manuals for operating the device (Page 11)".
3. Insert the provided USB stick into the device.
4. Run the file "START_DocuAndDrivers.CMD".

   The "Documentation and Drivers" suite opens.
5. Install the required components.

8.5 Configuring firmware/BIOS

You can find information on the firmware settings in the firmware/BIOS description, see "Important instructions and manuals for operating the device (Page 11)".

Note

Assign a BIOS password

Assign a "User Password" in the "Security" menu immediately after opening the BIOS-Setup. You can find information on this in the firmware/BIOS description.

Note

If your device no longer boots, for example, after operating system crash during a firmware update, contact your local SIEMENS contact person.

8.6 Recycling and disposal

The devices described in these operating instructions can be recycled thanks to their low level of pollutants. Contact a certified disposal service company for electronic scrap for environmentally sound recycling and disposal of your old device, and dispose of it according to the relevant regulations in your country.

Technical specifications

9

9.1 Applicability of technical specifications

Note

The following technical specifications only apply under the following conditions:

- The device is in good working order.
- The fan cover and filter mat are installed.
- The device is closed.
- The connected I/O devices meet the requirements for the respective area of application (interference emission according to EN 61000-6-3 / IEC 61000-6-3, immunity to interference according to EN 61000-6-2 / IEC 61000-6-2).

9.2 General technical specifications

See the note in "Applicability of technical specifications (Page 155)".

Article number	6AG4114-4.....-.... (for details, refer to the ordering documentation)
Dimensions	481.4 x 176.6 x 446.6 (W× H × D in mm)
	Detailed dimensional specifications can be found in "Dimension drawing of the device (Page 176)".
Weight	15 up to 23 kg; depending on the equipment
Supply voltage (U_N; AC)	Power supply unit 550 W; (AC): • 100 V to 240 V AC (-15%; +10%)
	Power supply unit 850 W; (AC): • 100 V to 240 V AC (-10%; +10%)
	Power supply unit 700 W (2 modules, each 700 W, redundant; AC): • 2 × 100 V to 240 V (-15%; +10%)
Transient overvoltages	Device is designed for connection to supply with overvoltage category II (Transient overvoltages up to 2500 V)
Input current	Power supply unit 550 W: • Continuous current at 100 V: ≤ 8 A • Continuous current at 230 V: ≤ 4 A • At startup ≤ 80 A for 3.6 ms
	Power supply unit 850 W: • Continuous current at 100 V: ≤ 12 A • Continuous current at 230 V: ≤ 6 A • at startup ≤ 180 A for 3.6 ms

Input current	Power supply unit 700 W (2 modules, each 700 W, redundant): • Continuous current at 100 V: ≤ 10 A • Continuous current at 230 V: ≤ 5 A • At startup ≤ 80 A for 3.6 ms for each module
	Information on the dimensioning of the fuses in the higher-level plant circuits A fuse that is designed for the following tripping current is integrated in the power supply unit of the IPC. • Typical 8 A (for power supply unit 550 W) • Typical 12 A (for power supply unit 850 W) • Typical 10 A (for redundant power supply unit 700 W). The pulse currents during startup are also taken into account by the "time lag" type. In the case of a fault, this fuse ensures the correct disconnection of the device from the power supply system. If you connect additional devices to the higher-level power supply circuit, use the following fuses: • > 8 A (for power supply unit 550 W). • > 12 A (for power supply unit 850 W). • > 10 A (for redundant power supply unit 700 W). The tripping characteristic of the higher-level protection must take into account the starting currents of both the IPC and the other devices.
Frequency of the supply voltage	50 to 60 Hz, min. 47 Hz to max. 63 Hz, sinusoidal
Transient voltage interruption	Power supply unit 550 W: 20 ms for 300 W ≤ 10 events/h; recovery time ≥ 1 s
	Power supply unit 850 W: 20 ms for 460 W ≤ 10 events/h; recovery time ≥ 1 s
	Power supply unit 700 W (2 modules, each 700 W, redundant): 20 ms for 300 W ≤ 10 events/h; recovery time ≥ 1 s
Power consumption	Power supply unit 550 W, with maximum configuration and 300 W secondary: • ≤ 260 W; with 90% efficiency
	Power supply unit 850 W, with maximum configuration and 460 W secondary: • ≤ 600 W with 87% efficiency
	Power supply unit 700 W (2 modules, each 700 W, redundant), with maximum configuration and 300 W secondary: • ≤ 270 W with 85% efficiency

Power loss, heat emission	Power supply unit 550 W: • 300 W = 300 J/s = 0.28 BTU/s
	Power supply unit 850 W: • 460 W = 460 J/s = 0.44 BTU/s
	Power supply unit 700 W (2 modules, each 700 W, redundant): • 300 W = 300 J/s = 0.28 BTU/s
Current output (DC)	Power supply unit 550 W: • +5 V/22 A; +3.3 V/25 A; 150 W are permitted in total • +12 V_1/26 A; +12 V_2/15 A • −12 V/0.1 A; +5 V_{aux}/2 A The total output of all voltages is max. 550 W.
	Power supply unit 850 W: • +5 V/35 A; +3.3 V/20 A; in total, 200 W are allowed • +12 V/70 A • −12 V/0.1 A; +5 V_{aux}/2 A The total output of all voltages is max. 850 W.
	Power supply unit 700 W (2 modules, each 700 W, redundant): • +5 V/20 A, +3.3 V/20 A; 130 W are permitted in total • +12 V_1/58.3 A • -12 V/0.5 A; +5 V_{aux}/3 A The total output of all voltages is max. 700 W.
Noise emission	• < 60 dB(A) at 25 °C in accordance with ISO 7779
Pollution degree	Device is designed for environments with pollution degree 2
Degree of protection	• IP41 (front) with closed front door [1] • IP20 (rear) in accordance with IEC 60529
Dust protection	With front door closed: Filter class G2 EN 779; particles > 0.5 mm are 99% retained
Safety	
Protection class	Protection class I compliant with IEC 61140
Safety regulations	• IEC 61010-2-201 • EN 61010-2-201 • UL 61010-2-201 • CAN/CSA C22.2 No 61010-2-201

[1] Only with protected installation. Ensure that the installation opening for the device is protected against splashing water in environments exposed to splashing water.

9.3 Current and power requirements and power supply units

9.3.1 Current and power requirements of the system components

See the note in "Applicability of technical specifications (Page 155)".

Maximum current values

Component	Voltage						Power
	+3.3 V	+5 V	+12 V_1	+12 V_2	-12 V	5 V_{aux}	
Motherboard processor with fan[1] • Core i3-13100E • Core i5-13500E • Core i7-13700E • Core i9-13900E	2.2 A	5.2 A	1.0 A	11.2 A		0.7 A	176 W
SSD SATA (typical)		0.8 A					4.0 W
Hard disk drive [1] SATA (typical values)		0.6 A	0.3 A				
Hard disk drive [1] SATA type Enterprise (typical values)		0.5 A	0.7 A				
M.2 NVMe SSD	1.5 A						4.9 W
Internal fan			0.25 A				
NVIDIA RTX A400	3.0 A		5.5 A				
NVIDIA RTX 2000 Ada	3.0 A		5.5 A				
NVIDIA RTX 4000 Ada	3.0 A		10.8 A				
NVIDIA RTX 5000 Ada	3.0 A		20.8 A				
Individual currents, max. permissible, Power supply unit 550 W	25 A [2]	22 A [2]	26 A		15 A	0.1 A	2.0 A [3]
Individual currents, max. permissible, Power supply unit 850 W	20 A [2]	35 A [2]	70 A		0.3 A	3.0 A	
Individual currents, max. permissible, Power supply unit 700 W (2 modules, each 700 W, redundant)	20 A [2]	20 A [2]	58.3 A		0.5 A	3.0 A	
Power consumption, Power supply unit 550 W or Power supply unit 850 W or Power supply unit 700 W (2 modules, each 700 W, redundant),	Maximum power consumption 380 W Power consumption in no-load state: 56 W Power consumption in idle state: 2.5 W Power consumption in off state: 2.3 W						

Component	Voltage						Power
	+3.3 V	+5 V	+12 V_1	+12 V_2	-12 V	5 V_{aux}	
Efficiency of the 550 W power supply unit	at 20% rated power: • 87% (120 V; 60 Hz / 230 V; 50 Hz)						
	at 50% rated power: • 90% (120 V; 60 Hz / 230 V; 50 Hz)						
	at 100% rated power: • 87% (120 V; 60 Hz / 230 V; 50 Hz)						
Efficiency of the 850 W power supply unit	at 20% rated power: • 89% (120 V; 60 Hz / 230 V; 50 Hz)						
	at 50% rated power: • 90% (120 V; 60 Hz / 230 V; 50 Hz)						
	at 100% rated power: • 88% (120 V; 60 Hz / 230 V; 50 Hz)						
Efficiency of the 700 W power supply unit (2 modules, each 700 W, redundant)	at 20% rated power: • 88% (120 V; 60 Hz / 230 V; 50 Hz)						
	at 50% rated power: • 92% (120 V; 60 Hz / 230 V; 50 Hz)						
	at 100% rated power: • 88% (120 V; 60 Hz / 230 V; 50 Hz)						

[1] Depends on the selected device configuration

[2] The total power of the voltages +5 V and +3.3 V may be max. 150 W for the 550 W power supply unit and max. 130 W for the 700 W redundant power supply unit.

[3] 2.5 A for 10 seconds

[4] If the power is drawn from an actively cooled expansion card (for example: High-end graphics card) that emits its waste heat directly into the ambient air and not into the interior of the device. The requirements of the expansion card for the temperature of the intake air (inside the device) must be observed.

9.3.2 Technical specifications of the 550 W power supply unit

See the note in "Applicability of technical specifications (Page 155)".

Output voltage and maximum current

Voltage	Maximum current	Voltage stability
+12 V1	26 A	± 5%
+12 V2	15 A	± 5%
–12 V	0.1 A	± 10%
+5 V	22 A [1]	± 5%
+3.3 V	25 A [1]	± 5%
+5 V_{aux}	2 A	+5%, -3%

[1] The total output of the +5 V and +3.3 V voltage must be ≤ 150 W.

The total output of all voltages is max. 550 W.

9.3.3 Technical specifications of the 850 W power supply unit

See the note in "Applicability of technical specifications (Page 155)".

Output voltage and maximum current

Voltage	Maximum current	Voltage stability
+12 V	70 A	± 5%
-12 V	0.3 A	± 10%
+5 V	35 A [1]	± 5%
+3.3 V	20 A [1]	± 5%
+5 V_{aux}	3 A	+5%, -3%

[1] The total output of the +5 V and +3.3 V voltage must be ≤ 200 W.

The total output of all voltages is max. 850 W.

9.3.4 Technical specifications of the 700 W power supply unit (2 modules, each 700 W, redundant)

See the note in "Applicability of technical specifications (Page 155)".

Output voltage and maximum current

Voltage	Maximum current	Voltage stability
+12 V	58.3 A	± 5%
–12 V	0.5 A	± 10%
+5 V	20 A [1]	± 5%
+3.3 V	20 A [1]	± 5%
+5 V_{aux}	3.0 A	+5%, -3%

[1] The total output of the +5 V and +3.3 V voltage must be ≤ 130 W.

The total output of all voltages is max. 700 W.

9.4 Electromagnetic compatibility

See the note in "Applicability of technical specifications (Page 155)".

Interference emission	EN 61000-6-3; EN 61000-6-4; CAN/CSA-CISPR 32, EN 55032 Class B; FCC Class A; KS C 9832 EN 61000-3-2 class D, EN 61000-3-3
Immunity to interference	EN 61000-6-1; EN 61000-6-2; EN 55035; KS C 9835
Interference immunity on power lines	± 2 kV; according to IEC 61000-4-4; burst ± 1 kV; according to IEC 61000-4-5; surge symm ± 2 kV; according to IEC 61000-4-5; surge symm
Noise immunity on signal lines	± 2 kV; according to IEC 61000-4-4; burst; length > 30 m ± 1 kV; according to IEC 61000-4-4; burst; length < 30 m ± 2 kV; according to IEC 61000-4-5; burst; length > 30 m
Immunity to discharges of static electricity	± 6 kV contact discharge; (according to IEC 61000-4-2) ± 8 kV air discharge; (according to IEC 61000-4-2)
Immunity to RF interference	• 10 V/m; 80 up to 2700 MHz 80% AM to IEC 61000-4-3 • 3 V/m; 2.7 to 6 GHz 80% AM to IEC 61000-4-3 • 10 V; 10 kHz up to 80 MHz 80% AM to IEC 61000-4-6
Immunity to magnetic fields	100 A/m; 50 Hz; 60 Hz (according to IEC 61000-4-8)

9.5 Climatic and mechanical environmental conditions

See the note in "Applicability of technical specifications (Page 155)".

Climatic ambient conditions	
Temperature	Tested according to IEC 60068-2-2; IEC 60068-2-1; IEC 60068-2-14
Operation[1]	
• With HDD • with RTX A4000 ADA • with RTX A5000 ADA	+0 °C to +40 °C +0 °C to +40 °C +0 °C to +40 °C Gradient: ≤ 10 K/h; no condensation
• Without HDD	+0 °C to +50 °C Gradient: ≤ 10 K/h; no condensation
Storage/transport	–20 °C to +60 °C Gradient: ≤ 20 K/h; no condensation
Relative humidity	Tested according to IEC 60068-2-78; IEC 60068-2-30
Operation	5% to 85% at 30 °C; no condensation Gradient: ≤ 10 K/h; no condensation
Storage/transport	5% to 95% at 25 °C to 55 °C; no condensation Gradient: ≤ 20 K/h; no condensation
Atmospheric pressure	
Operation	1080 to 689 hPa, corresponds to an altitude of –1000 m to 3000 m
Storage/transport	1080 to 660 hPa, Corresponds to an altitude of -1000 m to 3500 m
Mechanical ambient conditions	
Vibration	Tested according to IEC 60068-2-6; 10 cycles
Operation [2]	10 to 58 Hz: 0.0375 mm, 58 to 500 Hz: 4.9 m/s^2
Storage/transport	5 to 8.51 Hz; amplitude 3.5 mm; 8.51 to 500 Hz: 9.8 m/s^2
Resistance to shock	Tested in accordance with IEC 60068-2-27
Operation [2]	Half-sine: 50 m/s2, 30 ms, 100 shocks per axis
Storage/transport	Half-sine; 250 m/s^2; 6 ms; 1000 shocks per axis
Special features	
Quality assurance	In accordance with ISO 9001

[1] The power loss of the expansion cards for the power supply unit 850 W may be increased from 70 W to 320 W if the additional power loss of 250 W is drawn from an actively cooled expansion card (e.g.: high-end graphics card) that emits its waste heat directly into the ambient air and not into the interior of the device.

The power loss of the expansion cards for the power supply unit 550 W and power supply unit 700 W (2 modules, each 700 W, redundant) may be increased from 70 W to 140 W if the additional power loss of 140 W is drawn from an actively cooled expansion card (e.g.: high-end graphics card) that emits its waste heat directly into the ambient air and not into the interior of the device.

Note:

Operation up to max. 40 °C is permissible in this case.

[2] The device must be free of any mechanical faults when disk drives are installed in the removable trays.

9.6 Technical specifications of the drives

See the note in "Applicability of technical specifications (Page 155)".

Information on the drives is available in your order documents.

Maximum number	• 6 SATA ports: HDD / SSD • see: "Installation options for drives with drive cage type A (Page 106)" and "Installation options for drives with drive cage type B (Page 108)"
HDD	HDD types (Native Command Queuing is supported): • 3.5" SATA; 6 GB/s; 7200 rpm; 2000 GB • 3.5" SATA, Enterprise, 6 GB/s; 7200 rpm; 2000 GB and 4000 GB
SSD	SSD types (flash memory): • 2.5" SATA, 6 GB/s; 480 GB • 2.5" SATA, 6 GB/s; 960 GB
M.2 NVMe SSD	• 2x M.2-2280 Key M, PCIe Gen4 x4 • 1024 GB and 1920 GB; length: Max. 80 mm

9.7 Technical specifications of the motherboard

See the note in "Applicability of technical specifications (Page 155)".

Chipset	Intel® R680E PCH
Processor	• Core i3-13100E 4C(4P)/8T, 3.3 (4.4) GHz, 12 MB Cache, iAMT • Core i5-13500E 14C(6P+8E)/20T, 2.4 (4.6) GHz, 24 MB Cache, iAMT • Core i7-13700E 16C(8P+8E)/24T, 1.9 (5.1) GHz, 30 MB Cache, iAMT • Core i9-13900E 24C(8P+16E)/32T, 1.8 (5.2) GHz, 36 MB Cache, iAMT
RAID (onboard)	Intel® PCH with Intel® Rapid Storage Technology
Slots for memory modules	4 x DIMM socket for DDR5 4800 MHz, expandable to 128 GB
Main memory	8 to 128 GB, DDR5, ECC

See also

Technical specifications of the slots for expansion cards (Page 164)

9.8 Technical specifications of the slots for expansion cards

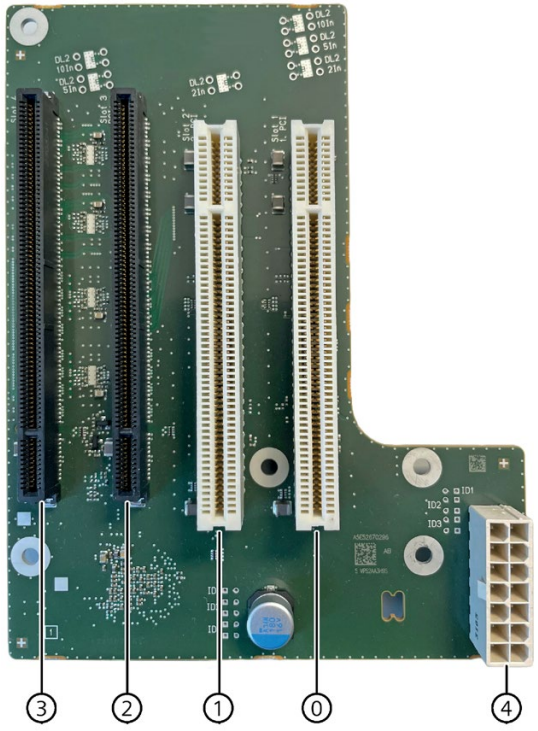
See the note in "Applicability of technical specifications (Page 155)".

You can find information on the function of the bus boards under "Bus boards: Components, layout and function (Page 187)".

Depending on the device configuration, your device may have two bus boards installed, one version of the right bus board and one version of the left bus board. Check your order documents for information regarding this.

The slots for expansion cards are located on the bus boards.

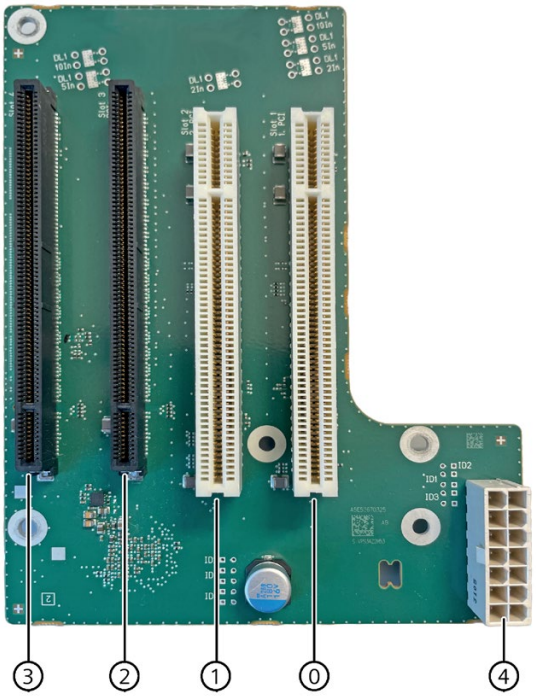
Version 1: Right bus board (2x PCIe; Gen. 4 + 2x PCI)



Technical specifications of the slots			
Number in the figure above	**Slot number on the enclosure (Page 20)**	**Specification[2]**	**Maximum current consumption**
(0)	X100	**PCI**[1] • Rev. 2.3 • PCI bus primary	• 5 V; 5 A or 3.3 V; 7 A • 12 V; 0.5 A • 12 V; 0.05 A • 3.3 Vaux; 0.2 A
(1)	X101		
(2)	X102	**PCIe x16** • Gen. 4 • Active lanes: 8	• 3.3 V; 3 A • 12 V; 5.5 A • 3.3 V_{aux}; 0.4 A Power loss of the slot, permissible: ≤ 75 W
(3)	X103	**PCIe x16** • Gen. 4 • Active lanes: 16 (if slot 2 is occupied: Active lanes: 8)	• 3.3 V; 3 A • 12 V; 5.5 A • 3.3 V_{aux}; 0.4 A Power loss of the slot, permissible: ≤ 75 W
(4)	Socket for plug connector for the power supply of the bus board		

[1] PCI bus PCH

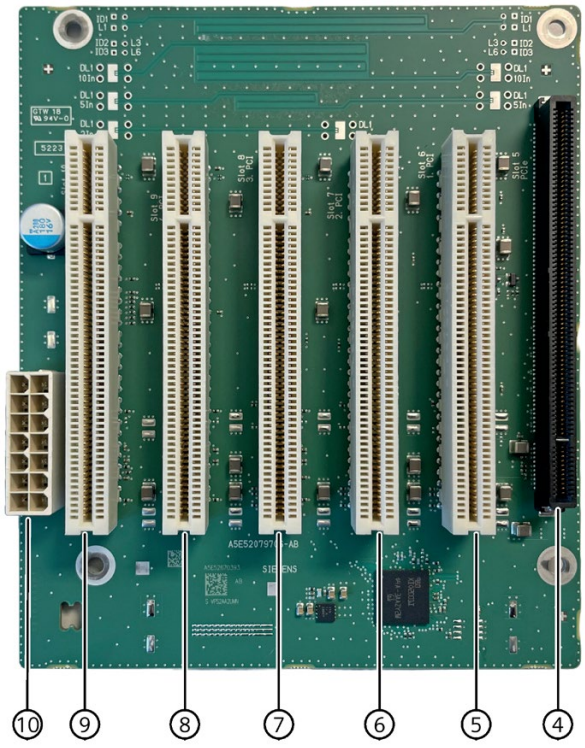
Variant 2: Right bus board (2x PCIe; Gen. 4 + 2x PCI)



Technical specifications of the slots			
Number in the figure above	**Slot number on the enclosure (Page 20)**	**Specification[2]**	**Maximum current consumption**
(0)	X100	**PCI**[1] • Rev. 2.3 • PCI bus primary	• 5 V; 5 A or 3.3 V; 7 A • 12 V; 0.5 A • 12 V; 0.05 A • 3.3 Vaux; 0.2 A
(1)	X101		
(2)	X102	**PCIe x16** • Gen. 4 • Active lanes: 8	• 3.3 V; 3 A • 12 V; 5.5 A • 3.3 V_{aux}; 0.4 A Power loss of the slot, permissible: ≤ 75 W
(3)	X103		
(4)	Socket for plug connector for the power supply of the bus board (Page 174)		

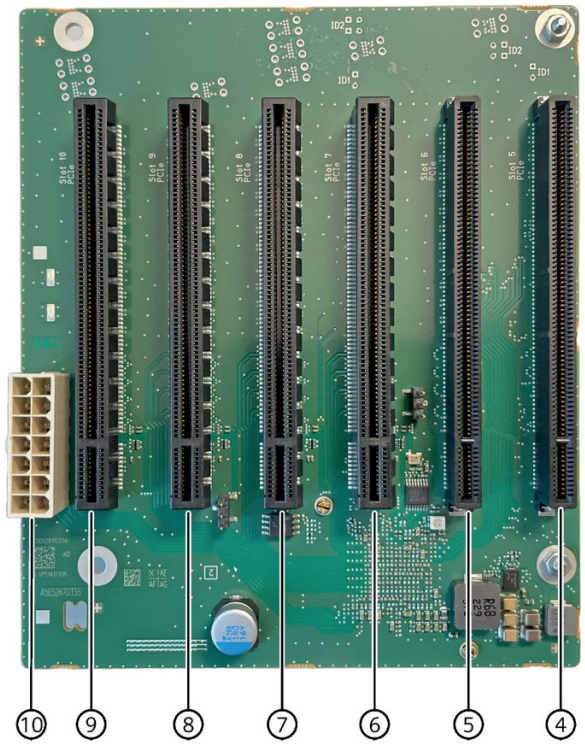
[1] PCI bus PCH

Variant 3: Left bus board (5x PCI + 1x PCIe, Gen. 4)



Technical specifications of the slots			
Number in the figure above	**Slot number on the enclosure (Page 20)**	**Specification**	**Maximum current consumption**
(4)	X104	**PCIe x16**[2] • Gen. 4 • Active lanes: 4	• 3.3 V; 3 A • 12 V; 5.5 A • 3.3 V_{aux}; 0.4 A Power loss of the slot, permissible: ≤ 75 W
(5)	X105	**PCI**[,2] • Rev. 2.3 • PCI bus primary	• 5 V; 5 A or 3.3 V; 7 A • 12 V; 0.5 A • 12 V; 0.05 A • 3.3 Vaux; 0.2 A Power loss of the slot, permissible: ≤ 25 W
(6)	X106		
(7)	X107		
(8)	X108		
(9)	X109		
(10)	Socket for plug connector for the power supply of the bus board (Page 174)		

Variant 4: Left bus board (4x PCIe; Gen. 3 + 2x PCIe, Gen. 4)



Technical specifications of the slots			
Number in the figure above	**Slot number on the enclosure**	**Specification**	**Maximum current consumption**
(4)	X104	**PCIe x16**[2] • Gen. 4 • Active lanes: 4	• 3.3 V; 3 A • 12 V; 5.5 A • 3.3 V_{aux}; 0.4 A Power loss of the slot, permissible: ≤ 75 W
(5)	X105		
(6)	X106	**PCIe x16**[2] • Gen. 3 • Active lanes: 4	• 3.3 V; 3 A • 12 V; 5.5 A • 3.3 V_{aux}; 0.4 A Power loss of the slot, permissible: ≤ 75 W
(7)	X107		
(8)	X108		
(9)	X109		
(10)	Socket for plug connector for the power supply of the bus board		

9.9 Technical specifications of graphic

See the note in "Applicability of technical specifications (Page 155)".

Technical specifications of the integrated graphics interfaces

Graphics controller	• Intel® UHD Graphics 730 integrated in processor: – Core i3-13100E • Intel® UHD Graphics 770 integrated in processor: – Core i5-13500E – Core i7-13700E – Core i9-13900E
Graphics memory	Dynamic Video Memory Technology, uses at least 64 MB in main memory
Resolutions/frequencies/colors	• DVI (via DP-DVI adapter): 1920 × 1200 at 60 Hz; 32-bit color depth • DisplayPort: 7680 x 4320 at 30 Hz; 32-bit color depth • VGA (via DP-VGA adapter): 2048 × 1536 at 60 Hz; 32-bit color depth

Technical specifications of the NVIDIA RTX A400 graphics card

You can find information on connection options for monitors with adapters under "Hardware accessories (Page 34)".

Type	NVIDIA RTX A400, 4 GB graphics memory PCIe x8, Gen. 4, 4x Mini DisplayPort	
Maximum resolution without adapter	• 4x monitor with 1 connecting cable each per monitor 7680 x 4320 at 30 Hz; 32-bit color depth • 2x monitor with 2 connecting cables each per monitor 7680 x 4320 at 120 Hz; 32-bit color depth	
Maximum resolution with adapter	mDP-VGA adapter	• 4x monitor with 1 connecting cable each per monitor 2048 × 1536 at 60 Hz; 32-bit color depth
	mDP-DVI-D adapter	• 4x monitor with 1 connecting cable each per monitor 1920 × 1200 at 60 Hz; 32-bit color depth ->
	mDP-DP adapter	• 4x monitor with 1 connecting cable each per monitor 7680 x 4320 at 30 Hz; 32-bit color depth => 4x monitor
		• 2x monitor with 2 connecting cables each per monitor 7680 x 4320 at 120 Hz; 32-bit color depth

Technical specifications of the NVIDIA RTX 2000 Ada graphics card

You can find information on connection options for monitors with adapters under "Hardware accessories (Page 34)".

Type	NVIDIA RTX 2000 Ada, 16 GB graphics memory PCIe x16; Gen. 4, 4x Mini DisplayPort	
Maximum resolution without adapter	• 4x monitor with 1 connecting cable each per monitor 7680 x 4320 at 30 Hz; 32-bit color depth • 2x monitor with 2 connecting cables each per monitor 7680 x 4320 at 120 Hz; 32-bit color depth	
Maximum resolution with adapter	mDP-VGA adapter	• 4x monitor with 1 connecting cable each per monitor 2048 × 1536 at 60 Hz; 32-bit color depth
	mDP-DVI-D adapter	• 4x monitor with 1 connecting cable each per monitor 1920 × 1200 at 60 Hz; 32-bit color depth ->
	mDP-DP adapter	• 4x monitor with 1 connecting cable each per monitor 7680 x 4320 at 30 Hz; 32-bit color depth => 4x monitor
		• 2x monitor with 2 connecting cables each per monitor 7680 x 4320 at 120 Hz; 32-bit color depth

Technical specifications of the NVIDIA RTX 4000 Ada graphics card

You can find information on connection options for monitors with adapters under "Hardware accessories (Page 34)".

Type	NVIDIA RTX 4000 Ada, 16 GB graphics memory PCIe x16; 4x VESA DisplayPort	
Maximum resolution without adapter	• 4x monitor with 1 connecting cable each per monitor 7680 x 4320 at 30 Hz; 32-bit color depth • 2x monitor with 2 connecting cables each per monitor 7680 x 4320 at 120 Hz; 32-bit color depth	
Maximum resolution with adapter	DP-DVI-D adapter	• 4x monitor with 1 connecting cable each per monitor 1920 × 1200 at 60 Hz; 32-bit color depth
	DP-VGA adapter	• 4x monitor with 1 connecting cable each per monitor 2048 × 1536 at 60 Hz; 32-bit color depth

Note

When the NVIDIA RTX 4000 Ada is used with the power supply unit 850 W, the maximum clock speed of the CPU (TurboMode) is reduced to prevent overloading the power supply unit.

Technical specifications of the NVIDIA RTX 5000 Ada graphics card

You can find information on connection options for monitors with adapters under "Hardware accessories (Page 34)".

Type	NVIDIA RTX 5000 Ada, 32 GB graphics memory PCIe x16; 4x VESA DisplayPort	
Maximum resolution without adapter	• 4x monitor with 1 connecting cable each per monitor 7680 x 4320 at 30 Hz; 32-bit color depth • 2x monitor with 2 connecting cables each per monitor 7680 x 4320 at 120 Hz; 32-bit color depth	
Maximum resolution with adapter	DP-VGA adapter	• 4x monitor with 1 connecting cable each per monitor 2048 × 1536 at 60 Hz; 32-bit color depth
	DP-DVI-D adapter	• 4x monitor with 1 connecting cable each per monitor 1920 × 1200 at 60 Hz; 32-bit color depth

Note

When the NVIDIA RTX 5000 Ada is used with the power supply unit 850 W, the maximum clock speed of the CPU (TurboMode) is reduced to prevent overloading the power supply unit.

Power supply of the NVIDIA RTX A4000 Ada and NVIDIA RTX 5000 Ada graphics cards

The NVIDIA RTX 4000 Ada and NVIDIA RTX 5000 Ada graphics cards can only be connected, operated and configured for devices with power supply unit 850 W.

The NVIDIA RTX 4000 Ada and NVIDIA RTX 5000 Ada graphics cards are then supplied with a voltage of 12 V via their slot and via a 14-pin plug connector. In this situation, all pins of the connector must always be connected for trouble-free operation.

You can find information on the 14-pin plug connector in section "Technical specifications of the plug connectors for the power supply of bus boards (Page 174)".

Cooling of the NVIDIA RTX 4000 Ada and NVIDIA RTX 5000 Ada graphics cards

The graphics cards feature active cooling that is provided by a fan. Heated air is dissipated via ventilation openings on the graphics card into the inside of the device. The active cooling of the device then transports this heated air directly out of the device via the holes in the perforated slot brackets on the rear of the device.

- Only insert the graphics cards in the "PCIe x16" slot. (Page 164)

Note

For cooling of the NVIDIA RTX 4000 Ada and NVIDIA RTX 5000 Ada graphics cards, the "Performance" fan profile of the graphics cards is required.

In the delivery state, the fan profile of the graphics card is set to "Performance" and must not be changed.

Observe the safety instructions regarding the risk of overheating when using expansion cards, see the section "Safety instructions on device and system extensions (Page 48)".

See also

Connecting several monitors (multi-monitoring) (Page 63)

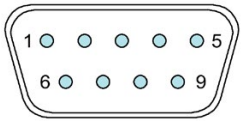
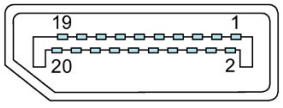
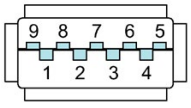
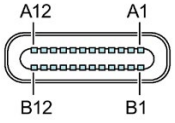
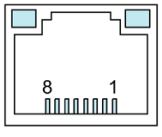
9.10 Technical specifications of the connections

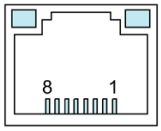
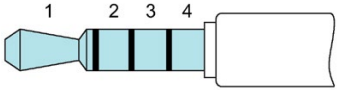
9.10.1 Technical specifications of the connections on the device

See the note in "Applicability of technical specifications (Page 155)".

Note

Detailed information on the position of the connections is available in "Connections on the device (Page 21)".

Connection socket	Description	Assignment
COM1 COM2	COM: • Serial interface (standard: RS-232) • Sub-D socket • V.24 • ±12 V	 9-pin
DP	DisplayPort (labeling on the device: DPP) An analog monitor can be operated via an adapter cable (optional). • 3.3 V; 500 mA • Connection for monitors with DisplayPort connector • Connection for monitors with VGA connector via DP-VGA adapter, See Hardware accessories (Page 34) • Connection for monitors with DVI connector via DP-DVI-D adapter, See Hardware accessories (Page 34)	 20-pin
USB Type A	USB Type A: • 5 V; 1 A • USB 3.2 Gen 2x1; to 10 Gbps	
USB Type C	USB Type C: • 5 V; 1.5 A • USB 3.2 Gen 2x2; to 20 Gbps	
LAN 1	Intel® I210-IT • The LAN ports are numbered on the enclosure. The numbering by the operating system may differ from this. • Connection for Ethernet with RJ45 connector • Data transmission rate: 10/100/1000 Mbps • Support for jumbo frames up to 9 KB • Wake on LAN, remote boot	 8-pin, RJ45

Connection socket	Description	Assignment
LAN 2* LAN 3 LAN 4	Intel® I226-IT • The LAN ports are numbered on the enclosure. The numbering by the operating system may differ from this. • Connection for Ethernet with RJ45 connector • Data transmission rate: 10/100/1000/2500 Mbps • Support for jumbo frames up to 9 KB • Wake on LAN, remote boot • * LAN 2: AMT-capable	 8-pin, RJ45
Audio	• Connection for 2.5 mm UAJ stereo jack: Realtek ALC256, 6-channel DAC support • Micro • Line In • Line Out: 2 W at 4 Ω	

9.10.2 Technical specifications of the plug connectors for the power supply of bus boards

See the note in "Applicability of technical specifications (Page 155)".

The bus boards need their own power supply. For this, 14-pin plug connectors are available in the wiring harness of the power supply unit.

Assignment of the pins		Position of the pins on the plug connector
• 1 = GND • 2 = P5V • 3 = P3V3 • 4 = GND • 5 = P3V3 • 6 = GND • 7 = P12V	• 8 = GND • 9 = P5V • 10 = GND • 11 = P3V3 • 12 = GND • 13 = P12V • 14 = P12V	

9.11 Technical specifications of the telescopic rails

See the note in "Applicability of technical specifications (Page 155)".

Ultimate load per pair	≥ 30 kg
Full extraction length	≥ 470 mm
Rail thickness	≤ 9.7 mm
Mounting screws	M5 x 6 mm The mounting screws of the telescopic rails may not protrude by more than 5 mm into the enclosure.

See also

Dimension drawing for drill holes for telescopic rails (Page 178)

9.12 Technical specifications of the operating systems

Depending on the device configuration ordered, the device comes with or **without** the following operating system.

- Microsoft® Windows® 11
  - Microsoft® Windows® 11 IoT Enterprise LTSC 2024, 64 bit, Multi-Language*

*Multi-Language User Interface (MUI): 5 languages (English, German, French, Spanish, Italian)

You can find information on ordered Microsoft® Windows® operating systems under: Important instructions and manuals for operating the device (Page 11).

Boot mode and partitions in the delivery state

Delivery state for Windows® 11

Windows® 11 operating systems boot in UEFI mode in the delivery state.

The following table lists the partitioning for data storage media in GPT mode:

Partition				Memory capacity					
Partition	**Name**	**Letter of the drive**	**File system**	**≥ 64 GB**	**≥ 128 GB**	**≥ 256 GB**	**≥ 512 GB**	**≥ 1000 GB**	**≥ 2000 GB**
System	Boot	-	FAT32	260 MB	260 MB	260 MB	260 MB	260 MB	260 MB
Windows	System	C:	FAT32 or NTFS	40 GB	60 GB	120 GB	240 GB	300 GB	400 GB
Data	Data	D:	NTFS	Remainder	Remainder	Remainder	Remainder	Remainder	Remainder

Dimension drawings

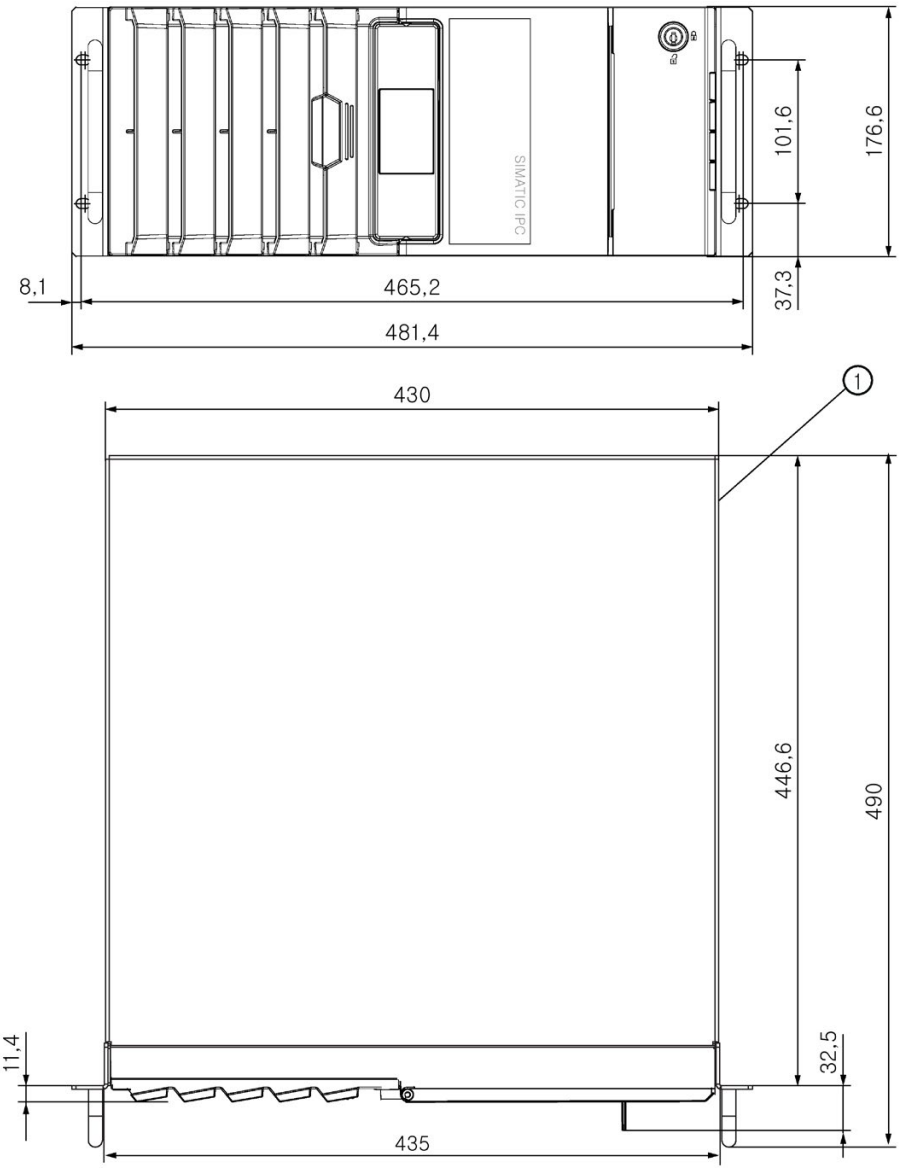
10

10.1 Dimension drawing of the device

Note

IEC 60297-3-100

The system meets the requirements for 4 U according to IEC60297-3-100.

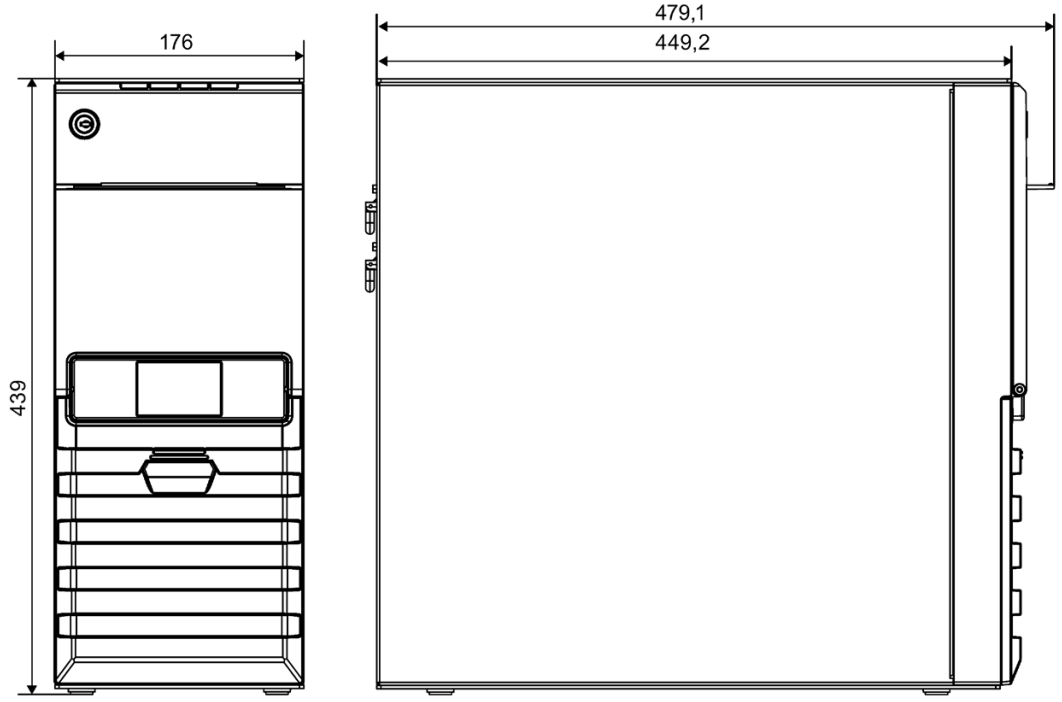


All dimensions in mm.

① at top when installed vertically

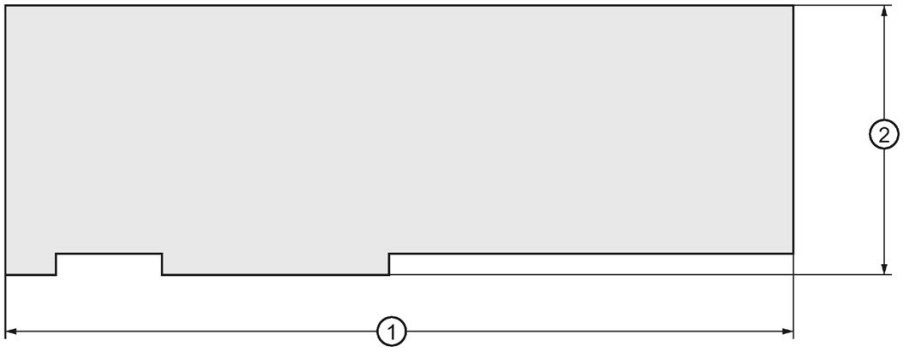
10.2 Dimension drawing of the Tower Kit

Front view and top view



All dimensions in mm.

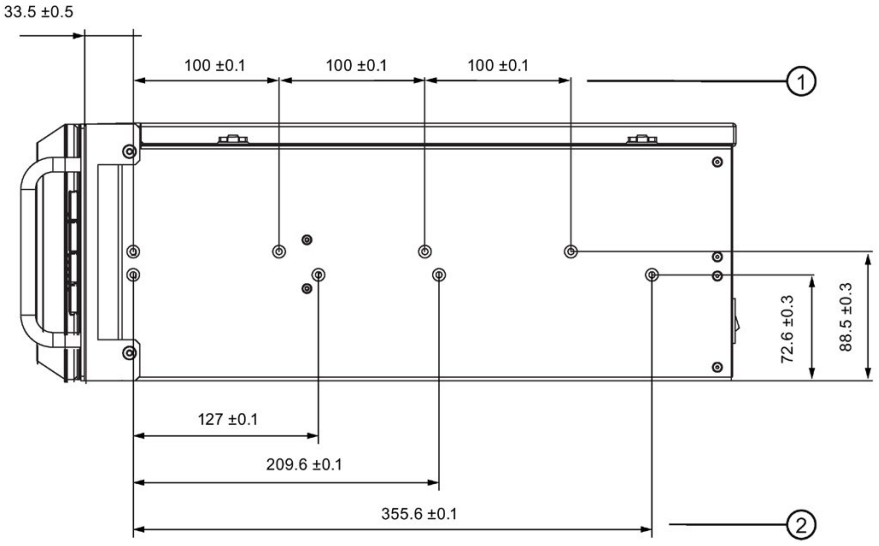
10.3 Dimension drawing of the expansion cards



① Length of the expansion car (PCI or PCIe)
- Device without extender: up to 312 mm
- Device with extender: 339 mm

② Height of the expansion card
PCI: 106.7 mm (free space via expansion card: 38.3 mm)
PCIe: 111.2 mm (free space via expansion card: 33.8 mm)

10.4 Dimension drawing for drill holes for telescopic rails



All dimensions in mm

① **Dimensions of the Rittal telescopic rails Type 3659**

- for 600 mm cabinet; TS 3659.181
- for 800 mm cabinet; TS 3659.191

② **Dimensions of Schroff telescopic rails**

- Type 20110-072

Standards and approvals

11

11.1 Certificates and approvals

11.1.1 ISO 9001 certificate

Note

Check validity of the certificate for the device on the nameplate

This certificate is only valid for your device if it is indicated on the nameplate (Page 53).

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

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

11.1.2 Software license agreements

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

11.1.3 UL approval

Note

Check validity of the approval for the device on the nameplate

This approval is only valid for your device if it is indicated on the nameplate (Page 53).

The following approvals are available for the device:

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

11.1.4 UKCA marking

Note

Check validity of the marking for the device on the nameplate

This marking is only valid for your device if it is indicated on the nameplate (Page 53).

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

- S.I. 2016 No. 1091

  Electromagnetic Compatibility Regulations 2016 (S.I. 2016 No. 1091), and related amendments

- S.I. 2012 No. 3032

  Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012 (S.I. 2012 No. 3032), and related amendments

- S.I. 2016 No. 1101

  The Electrical Equipment (Safety) Regulations 2016 (S.I. 2016 No. 1101), and related amendments

UKCA Declaration of Conformity

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

- EU/UK Declaration of Conformity for SIMATIC IPC (https://support.industry.siemens.com/cs/ww/en/view/37369031)

11.1.5 FCC (USA)

Note

Check validity of the certificate for the device on the nameplate

This certificate is only valid for your device if it is indicated on the nameplate (Page 53).

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.

Responsible party for Supplier's Declaration of Conformity

Siemens Industry, Inc.

Digital Factory – Factory Automation

5300 Triangle Parkway, Suite 100

Norcross, GA 30092

USA

mailto: amps.automation@siemens.com (mailto: amps.automation@siemens.com)

11.1.6 ICES Compliance (Canada)

Note

Check validity of the certificate for the device on the nameplate

This certificate is only valid for your device if it is indicated on the nameplate (Page 53).

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

11.1.7 RCM (Australia / New Zealand)

Note

Check validity of the certificate for the device on the nameplate

This certificate is only valid for your device if it is indicated on the nameplate (Page 53).

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

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

11.1.8 Eurasion Customs Union EAC

Note

Check validity of the certificate for the device on the nameplate

This certificate is only valid for your device if it is indicated on the nameplate (Page 53).

Identification for Eurasion Customs Union

- EAC (Eurasian Conformity)
- Declaration of conformity according to Technical Regulations of the Customs Union (TR CU)

11.1.9 KC Mark (Korea)

Note

Check validity of the certificate for the device on the nameplate

This certificate is only valid for your device if it is indicated on the nameplate (Page 53).

This product meets the requirements of Korean certification.

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

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

11.1.10 BIS (India)

Note

Check validity of the certificate for the device on the nameplate

This certificate is only valid for your device if it is indicated on the nameplate (Page 53).

BIS (India)



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

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

11.2 Directives and declarations

11.2.1 CE marking

Note

Check validity of the marking for the device on the nameplate

This marking is only valid for your device if it is indicated on the nameplate.



The device meets the general and safety-related requirements of the following directives and conforms to the harmonized European standards (EN) published in the official gazettes of the European Union:

EU Declaration of Conformity

The associated declaration of conformity is available on the Internet at the following address: Rack PC certificates (http://support.automation.siemens.com/WW/view/en/10805674/134200).

See also

Device identification data (Page 53)

11.2.2 EMC directive: Electromagnetic compatibility

2014/30/EU "Electromagnetic Compatibility Directive" (EMC Directive)

Scope of application	Requirements for	
	Interference emission	Immunity to interference
Industrial area	EN 61000-6-4	EN 61000-6-2
Residential and commercial areas and small businesses	EN 61000-6-3	EN 61000-6-1

The devices are compliant with EN 61000-3-2 (harmonic currents) and EN 61000-3-3 (voltage fluctuations and flicker).

11.2.3 Low-voltage guideline

2014/35/EU "Electrical equipment for use within specific voltage limits" (Low-Voltage Directive).

Conformance with this standard has been verified according to EN 61010-2-201.

11.2.4 RoHS directive

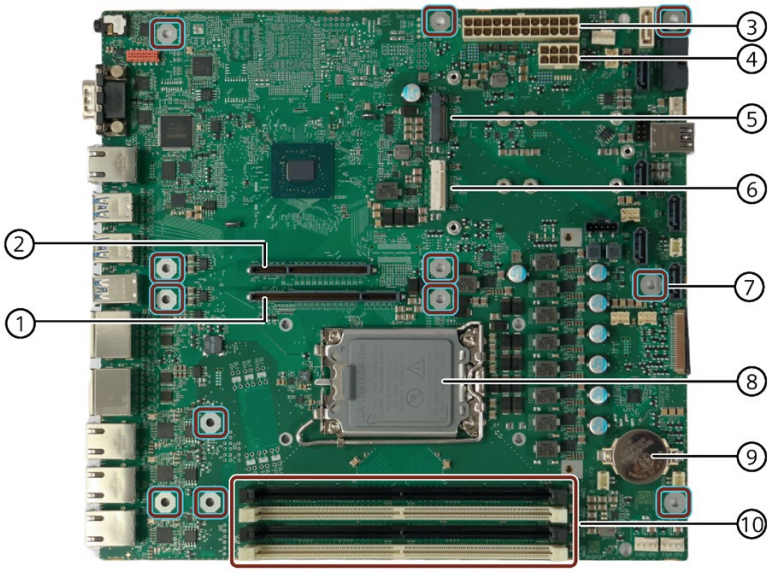
2011/65/EU "Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment" (RoHS Directive).

Hardware description

A

A.1 Motherboard

A.1.1 Layout of the motherboard



① Slot for connection with left bus board
② Slot for connection with right bus board
③ ATX power
④ CPU power
⑤ Slot for M.2 NVMe SSD: PCH
⑥ Slot for M.2 NVMe SSD: CPU
⑦ 12 fixing screws of the motherboard
⑧ Processor socket
⑨ Backup battery
⑩ Four slots for memory modules

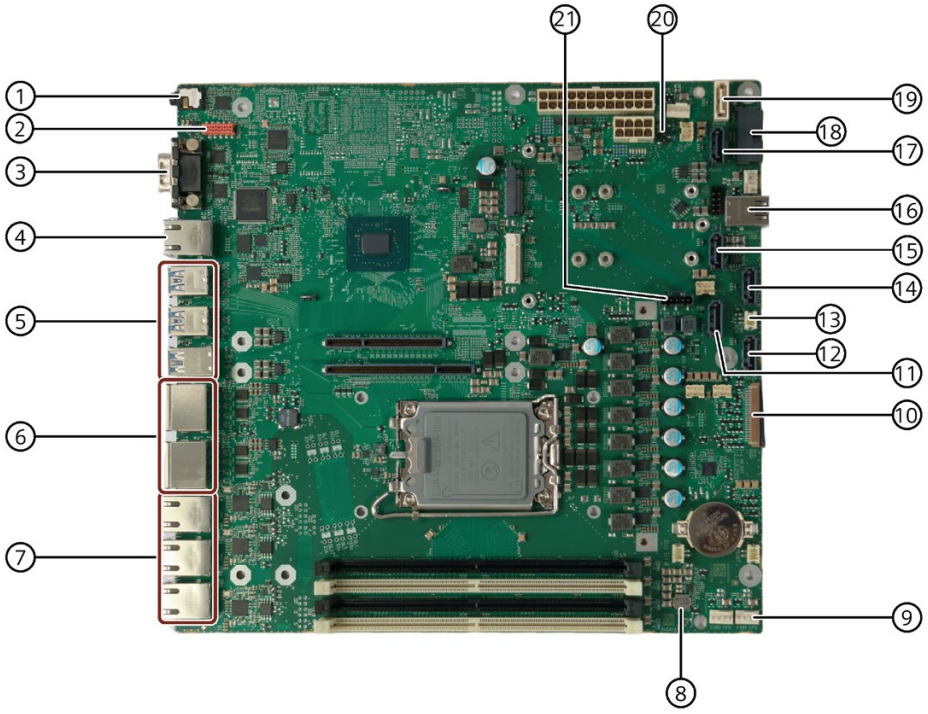
Technical features of the motherboard

Technical features of the motherboard can be found under "Technical specifications of the motherboard (Page 163)".

See also

Technical specifications of the slots for expansion cards (Page 164)

A.1.2 Position of the interfaces on the motherboard



(1) Audio (X90)

(2) COM2, optional (X31)

(3) COM1 (X30)

(4) LAN 1 (X1 P1)

(5) USB 3.2 (X60-X65)
4 x Type-A
2 x Type-C

(6) 4x DPP (X70-X73)

(7) LAN 2 (X2 P1)
LAN 3 (X3 P1)
LAN 4 (X4 P1)

(8) PCH NVME / 6x SATA

(9) Front fan
FAN 1
FAN 2

(10) Status display at the front
On-off button
Reset button

(11) SATA 4 (Port 4)

(12) SATA 5 (Port 5)

(13) On-off button

(14) SATA 3 (Port 3)

(15) SATA 2 (Port 2)

(16) USB 3.0 (internal)
1x Type-A

(17) SATA 1 (Port 1)

(18) USB 3.0
behind front door
2 x Type-A

(19) SATA 0 (Port 0)

(20) Unlock ME
BIOS Recovery

(21) PSU (PM bus)

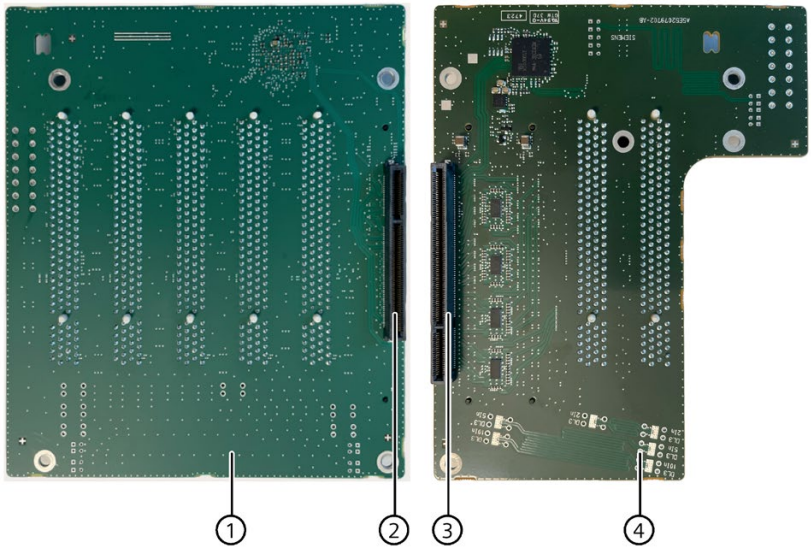
A.2 expansion cards

A.2.1 Bus boards: Components, layout and function

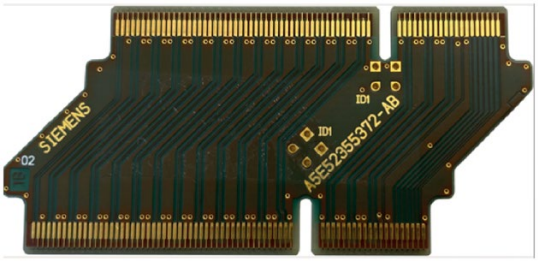
Your device may have **two bus boards**, one version of the **left bus board**① and one version of the **right bus board**①.

Each bus board has a slot on the rear (② and ③) for connecting the bus board to the motherboard. This connection is made using a "connection card".

- For the location of the slots for this connection card on the motherboard, see "Layout of the motherboard (Page 185)".
- For the location of the slots for this connection card on the motherboard, see ② and ③ in the following figure.



The underside of the right and left bus boards with the locations of the slots for the connection cards to the motherboard.



Connection card from bus board to motherboard

The two bus boards are arranged parallel to the motherboard.

The **slots for expansion cards** are located on the bus boards.

The inserted expansion cards are therefore arranged perpendicular to the motherboard.

You can find figures showing the bus boards and **specifications for the expansion card slots** under "Technical specifications of the slots for expansion cards (Page 164)".

At the rear of the device, there are 10 numbered areas where the connections of a plug-in expansion card are routed out of the device, see "Rear of the device (Page 20)".

A.2.2 Interrupt assignment of the slots for expansion cards on the bus boards

Note

All system resources (hardware addresses, memory allocation, interrupt allocation, DMA channels) are dynamically assigned by the firmware or the operating system based on the hardware equipment, drivers, installed expansion cards and connected external devices.

The assignment is made automatically and is dependent on the required resources of the connected devices and plugged components. Due to this configuration dependency, clear statements can only be made by determining them in relation to the system in the final configuration.

The resources can be viewed in Windows as follows:

1. Press the "Windows® key" and "R" simultaneously.
2. Enter the "msinfo32" command in the "Open" field.
3. Confirm your entry with "OK".

Version 1: Right bus board

You can find information about this bus board version under "Technical specifications of the slots for expansion cards (Page 164)".

Slot **Type**	X103 PCIe	X102 PCIe	X101 PCI	X100 PCI
Slot Capability	PEG Gen4 16 Lane	PEG Gen4 8 Lane	32 bits; 33 MHz	32 bits; 33 MHz
Host Device	PEG 0:1:0	PEG 0:1:1	PCH Port 10	PCH Port 10
Bus **APIC interrupt**				
INT A	PIRQ A	PIRQ B	PIRQ C	PIRQ B
INT B	PIRQ B	PIRQ C	PIRQ D	PIRQ C
INT C	PIRQ C	PIRQ D	PIRQ A	PIRQ D
INT D	PIRQ D	PIRQ A	PIRQ B	PIRQ A
Request			REQ2	REQ1
Grant			GNT2	GNT1
ID			AD18	AD17

Variant 2: Right bus board

You can find information about this bus board version under "Technical specifications of the slots for expansion cards (Page 164)".

Slot **Type**	X103 PCIe	X102 PCIe	X101 PCI	X100 PCI
Slot Capability	PEG Gen4; 8Lane *	PEG Gen4; 8Lane *	32 bits; 33 MHz	32 bits; 33 MHz
Host Device	PEG 0:1:0	PEG 0:1:1	PCH Port 10	PCH Port 10
Bus **APIC interrupt**				
INT A	PIRQ A	PIRQ B	PIRQ C	PIRQ B
INT B	PIRQ B	PIRQ C	PIRQ D	PIRQ C
INT C	PIRQ C	PIRQ D	PIRQ A	PIRQ D
INT D	PIRQ D	PIRQ A	PIRQ B	PIRQ A
Request			REQ2	REQ1
Grant			GNT2	GNT1
ID			AD18	AD17

* Slot X103 only used: 16Lanes

Slot X103 and X102 both used: 8Lanes each

Variant 3: Left bus board

You can find information about this bus board version under "Technical specifications of the slots for expansion cards (Page 164)".

Slot **Type**	X109 PCI	X108 PCI	X107 PCI	X106 PCI	X105 PCI	X104 PCIe
Slot Capability	32 bits; 33 MHz	32 bits; 33 MHz	32 bits; 33 MHz	32 bits; 33 MHz	32 bits; 33 MHz	PCIe Gen4; 4Lane
Host Device	PCH Port 5	PCH Port 5	PCH Port 5	PCH Port 5	PCH Port 5	PCH Port 25...28
Bus **APIC interrupt**						
INT A	PIRQ A	PIRQ A	PIRQ B	PIRQ C	PIRQ D	PIRQ A
INT B	PIRQ B	PIRQ B	PIRQ C	PIRQ D	PIRQ A	PIRQ B
INT C	PIRQ C	PIRQ C	PIRQ D	PIRQ A	PIRQ B	PIRQ C
INT D	PIRQ D	PIRQ D	PIRQ A	PIRQ B	PIRQ C	PIRQ D
Request	REQ4	REQ0	REQ1	REQ2	REQ3	
Grant	GNT4	GNT0	GNT1	GNT2	GNT3	
ID	AD20	AD16	AD17	AD18	AD19	

Variant 4: Left bus board

You can find information about this bus board version under "Technical specifications of the slots for expansion cards (Page 164)".

Slot **Type**	X109 PCIe	X108 PCIe	X107 PCIe	X106 PCIe	X105 PCIe	X104 PCIe
Slot Capability	PCIe Gen3; 4Lane *	PCIe Gen3; 4Lane *	PCIe Gen3; 4Lane *	PCIe Gen3; 4Lane *	PCIe Gen4; 4Lane	PCIe Gen4; 4Lane
Host Device	PCH Port 1...4	PCH Port 1...4	PCH Port 1...4	PCH Port 1...4	PCH Port 21...24	PCH Port 25...28
Bus **APIC interrupt**						
INT A	PIRQ A	PIRQ B	PIRQ C	PIRQ D	PIRQ A	PIRQ A
INT B	PIRQ B	PIRQ C	PIRQ D	PIRQ A	PIRQ B	PIRQ B
INT C	PIRQ C	PIRQ D	PIRQ A	PIRQ B	PIRQ C	PIRQ C
INT D	PIRQ D	PIRQ A	PIRQ B	PIRQ C	PIRQ D	PIRQ D
Request						
Grant						
ID						

* Slot connected to PCH via PCIe-Gen3 PCIe2PCIe switch

A.2.3 Exclusive PCI hardware interrupt

Applications demanding a high-performance interrupt require a high-speed hardware interrupt reaction. The PCI hardware interrupt should be used only by one resource in order to ensure high-speed reaction of the hardware.

Setting an exclusive interrupt on the device

All system resources (hardware addresses, memory allocation, interrupt allocation, DMA channels) are dynamically assigned by the firmware or the operating system based on the hardware equipment, drivers, installed expansion cards and connected external devices.

The assignment is made automatically and depends on the requested resources of the connected devices and installed components. Due to this configuration dependency, clear statements can only be made by determining them in relation to the system in the final configuration.

The resources can be viewed in Windows as follows:

1. Press the "Windows® key" and "R" simultaneously.
2. Enter the "msinfo32" command in the "Open" field.
3. Click "OK" to confirm.

A.3 System resources

A.3.1 Currently allocated system resources

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

1. Press the "Windows® key" and "R" simultaneously.

   The "Run" dialog box opens.

2. Enter "msinfo32" in the "Open" field.
3. Confirm your entry with "OK".

A.3.2 I/O address allocation

The table describes the assignment of the I/O addresses in the delivery state of the device.

I/O address (hex)		Size (bytes)	Description of the basic function
from	to		
0x00000000	0x00000CF7	415	Root complex for PCI Express
0x00000020	0x00000021	2	Programmable interrupt controller
0x00000024	0x00000025	2	Programmable interrupt controller
0x00000028	0x00000029	2	Programmable interrupt controller
0x0000002C	0x0000002D	2	Programmable interrupt controller
0x0000002E	0x0000002F	2	Motherboard resources
0x00000030	0x00000031	2	Programmable interrupt controller
0x00000034	0x00000035	2	Programmable interrupt controller
0x00000038	0x00000039	2	Programmable interrupt controller
0x0000003C	0x0000003D	2	Programmable interrupt controller
0x00000040	0x00000043	4	System timer
0x0000004E	0x0000004F	2	Motherboard resources
0x00000050	0x00000053	4	System timer
0x00000061	0x00000061	1	Motherboard resources
0x00000063	0x00000063	1	Motherboard resources
0x00000065	0x00000065	1	Motherboard resources
0x00000067	0x00000067	1	Motherboard resources
0x00000070	0x00000070	1	Motherboard resources
0x00000080	0x00000080	1	Motherboard resources
0x00000092	0x00000092	1	Motherboard resources

I/O address (hex)		Size (bytes)	Description of the basic function
from	to		
0x000000A0	0x000000A1	2	Programmable interrupt controller
0x000000A4	0x000000A5	2	Programmable interrupt controller
0x000000A8	0x000000A9	2	Programmable interrupt controller
0x000000AC	0x000000AD	2	Programmable interrupt controller
0x000000B0	0x000000B1	2	Programmable interrupt controller
0x000000B2	0x000000B3	2	Motherboard resources
0x000000B4	0x000000B5	2	Programmable interrupt controller
0x000000B8	0x000000B9	2	Programmable interrupt controller
0x000000BC	0x000000BD	2	Programmable interrupt controller
0x000002F8	0x000002FF	8	Communications Port (COM2)
0x000003F8	0x000003FF	8	Communications Port (COM1)
0x000004D0	0x000004D1	2	Programmable interrupt controller
0x00000680	0x0000069F	32	Motherboard resources
0x00000A00	0x00000A0F	16	Motherboard resources
0x00000A10	0x00000A1F	16	Motherboard resources
0x00000A20	0x00000A2F	16	Motherboard resources
0x00000A30	0x00000A3F	16	Motherboard resources
0x00000A40	0x00000A4F	16	Motherboard resources
0x00000D00	0x0000FFFF	62208	Root complex for PCI Express
0x0000164E	0x0000164F	2	Motherboard resources
0x00001854	0x00001857	4	Motherboard resources
0x00002000	0x000020FE	255	Motherboard resources
0x00003000	0x00003FFF	4096	Intel(R) PCI Express Root Port #7 - 7ABE
0x00004000	0x0000403F	64	Intel(R) UHD Graphics 770
0x0000EFA0	0x0000EFBF	32	Intel(R) SMBus - 7AA3
0x0000FFF8	0x0000FFFF	8	Intel(R) Active Management Technology - SOL (COM3)

A.3.3 Interrupt assignments

The functions are assigned different interrupts, depending on the operating system. APIC mode is used.

PCI / PCIe cards and the on-board PCI / PCIe devices require PCI interrupt lines. These interrupt lines can be shared and are plug-and-play compatible. In other words, several devices can share one interrupt. The IRQ is assigned automatically.

The table describes the assignment of the interrupts in the delivery state of the device.

	IRQ number																							Comment
IRQ (ACPI mode)	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	IRQ(ACPI mode)
Host PCI IRQ Line [1]																	A	B	C	D	E	F	G	H	1
Function																									
System timer	X																								Fixed
Communications Port (COM1)					X																				Fixed
Communications Port (COM2)				X																					Fixed
Intel® Serial IO GPIO Host Controller - INTC1056															X										Fixed
High Definition Audio Controller																		X							Can be deactivated
Intel Active Management Technology SOL (COM3)																				X					

X: Interrupt in APIC mode

[1] : Host PCI-IRQ A to H is assigned to IRQ 16 to 23 permanently in APIC mode. A specific assignment cannot be forced.

A.3.4 Memory address assignments

The table describes the assignment of the memory addresses in the delivery state of the device.

Address (hex)		Description of the basic function
from	to	
0x000A0000	0x000BFFFF	Root complex for PCI Express
0x000E0000	0x000E3FFF	Root complex for PCI Express
0x000E4000	0x000E7FFF	Root complex for PCI Express
0x000E8000	0x000EBFFF	Root complex for PCI Express
0x000EC000	0x000EFFFF	Root complex for PCI Express
0x000F0000	0x000FFFFF	Root complex for PCI Express
0x80400000	0xBFFFFFFF	Root complex for PCI Express
0x82000000	0x83FFFFFF	Intel RST VMD Controller A77F
0x84000000	0x842FFFFF	Intel(R) PCI Express Root Port #12 - 7AB3
0x84100000	0x841FFFFF	Intel(R) Ethernet Controller I226-IT #3
0x84200000	0x84203FFF	Intel(R) Ethernet Controller I226-IT #3
0x84300000	0x845FFFFF	Intel(R) PCI Express Root Port #11 - 7AB2
0x84400000	0x844FFFFF	Intel(R) Ethernet Controller I226-IT #2
0x84500000	0x84503FFF	Intel(R) Ethernet Controller I226-IT #2
0x84600000	0x848FFFFF	Intel(R) PCI Express Root Port #8 - 7ABF
0x84700000	0x847FFFFF	Intel(R) Ethernet Controller I226-IT
0x84800000	0x84803FFF	Intel(R) Ethernet Controller I226-IT
0x84900000	0x8497FFFF	Intel(R) I210 Gigabit Network Connection
0x84900000	0x8497FFFF	Intel(R) PCI Express Root Port #7 - 7ABE
0x84980000	0x84983FFF	Intel(R) I210 Gigabit Network Connection
0xBFFFF000	0xBFFFFFFF	Intel(R) Active Management Technology - SOL (COM3)
0xC0000000	0xCFFFFFFF	Motherboard resources
0xE0690000	0xE069FFFF	Intel(R) Serial IO GPIO Host Controller - INTC1056
0xE06A0000	0xE06AFFFF	Intel(R) Serial IO GPIO Host Controller - INTC1056
0xE06B0000	0xE06BFFFF	Intel(R) Serial IO GPIO Host Controller - INTC1056
0xE06D0000	0xE06DFFFF	Intel(R) Serial IO GPIO Host Controller - INTC1056
0xE06E0000	0xE06EFFFF	Intel(R) Serial IO GPIO Host Controller - INTC1056
0xFE010000	0xFE010FFF	Intel(R) SPI (flash) Controller - 7AA4
0xFED00000	0xFED003FF	High Precision Event Timer
0xFED20000	0xFED7FFFF	Motherboard resources
0xFED40000	0xFED44FFF	Trusted Platform Module 2.0
0xFED45000	0xFED8FFFF	Motherboard resources
0xFED90000	0xFED93FFF	Motherboard resources
0xFEDA0000	0xFEDA0FFF	Motherboard resources
0xFEDA1000	0xFEDA1FFF	Motherboard resources
0xFEDC0000	0xFEDC7FFF	Motherboard resources
0xFEE00000	0xFEEFFFFF	Motherboard resources

Address (hex)		Description of the basic function
from	to	
0x4000000000	0x400FFFFFFF	Intel(R) UHD Graphics 770
0x60E0000000	0x60E1FFFFFF	Intel RST VMD Controller A77F
0x60E9000000	0x60E9FFFFFF	Intel(R) UHD Graphics 770
0x60EA100000	0x60EA1FFFFF	Intel RST VMD Controller A77F
0x60EA200000	0x60EA20FFFF	Intel(R) USB 3.20 eXtensible Host Controller – 1.20 (Microsoft)
0x7FFFEF9000	0x7FFFEF9FFF	Intel(R) Management Engine Interface #1
0x7FFFEFA000	0x7FFFEFAFFF	Intel(R) Serial IO I2C Host Controller - 7ACC
0x7FFFEFB000	0x7FFFEFBFFF	Intel(R) GNA Scoring Accelerator module
0x7FFFEFC000	0x7FFFEFFFFF	High Definition Audio Controller
0x7FFFF00000	0x7FFFFFFFFF	High Definition Audio Controller

Technical support

B

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

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

- Article number of the device (MLFB)
- 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)

B.2 Troubleshooting

B.2.1 Problems with device functions

Problem	Cause	Remedy
The device is not operational	No power supply	• Check the power supply, the power cable and the power plug. • Check to see if the on-off switch is in the correct position.
	Device is being operated outside the specified ambient conditions	• Check the ambient conditions. • After transport in cold weather do not turn the power on until after a waiting period of approximately 12 hours.
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. Detailed information can be found in the operating manual for the monitor.
	The power cord or the monitor cable is not connected.	• Check if the power cord is properly connected to the monitor and to the system unit or to the grounded shockproof power outlet. • Check to make sure the monitor cable is properly connected to the system unit and the monitor.
		Contact your technical support team if the screen still remains dark after all these controls and measures.
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 to make sure that the mouse cable is properly connected to the system unit. • If you use an adapter or extension cable for the mouse cable make sure to check these connections as well.
		Contact your technical support team if the mouse pointer still does not appear on the screen after these controls and measures.
Time and/or date of the PC is not correct		1. Open the firmware configuration menu. To do this, press the <F2> key during the boot operation. 2. Set the date and the time in the "Main" tab.
Time and date are wrong even after correctly setting them in the firmware (BIOS)	The backup battery is dead.	Replace the backup battery.

Problem	Cause	Remedy
USB device not responding	USB ports are deactivated in the firmware (BIOS)	Use a different USB port or activate the port.
	Operating system does not support XHCI	Activate the firmware setting "PS/2 Emulation" in the firmware (BIOS) under "Advanced > USB Configuration".
	USB-2.0/3.0 device connected although USB-2.0/3.0 is deactivated	Activate the USB.
	Operating system does not support the USB interfaces	• Activate the firmware setting "Legacy USB Support" in the firmware (BIOS) under "Advanced > USB Configuration". • For other devices, you need the USB device drivers for the required operating system.

B.2.2 Problems when booting the device

Problem	Cause	Remedy
After changing the hard disk, the system does not boot from the RAID system	RAID system does not have highest boot priority	Change the boot priority in the firmware (BIOS) under "Boot > Boot device". • Permit RAID system in the boot priority • Give RAID system top boot priority
After changing the hard disk, "Unused" is indicated for the relevant SATA port.	System was booted without functioning drive. The removable tray might not be fully pushed in.	Reboot the system with a functioning hard disk.
Computer does not boot or "Boot device not found" is displayed.	The boot medium is not approved	Set the boot priority to "Enabled" in the firmware (BIOS) under "Boot > Boot device".
	The boot device is not in first place of the boot priority in the BIOS setup	Change the boot priority in the firmware (BIOS) under "Boot > Boot device".
	The boot data storage medium is set up with GPT, and UEFI boot is deactivated in the firmware (BIOS)	Activate UEFI mode in the firmware (BIOS).
The startup of a Windows operating system located on a GPT data storage medium is aborted with the following error message: "Status: 0xc0000225 Info: The boot selection failed because a required device is inaccessible"	The settings in the boot loader file "BCD" are incorrect or damaged.	Restore the Windows® operating system. You can find the files and descriptions needed for this on the supplied data storage medium.

B.2.3 Problems with RAID systems

Problem	Cause	Remedy
The RAID software reports the following errors: • The RAID plug-in failed to load, because the drive is not installed. • The Serial ATA plug-in failed to load, because the driver is not installed correctly. • The Intel® Storage Console was unable to load a page for the following reason: – A plug-in did not provide a page for the selected device – A plug-in failed to load	RAID is not activated	The messages have no negative effect on the operation of the device and can be ignored. Acknowledge the messages.
	RAID is activated	Install the software again with the help of the supplied data storage medium.

B.2.4 Problems when using expansion cards

Problem	Cause	Remedy
The device crashes during startup	• Redundant I/O addresses • Redundant hardware interrupts and/or DMA channels • Signal frequencies or signal levels are not adhered to • Different pin assignment	Check your computer configuration: • If the computer configuration corresponds to the delivery state, contact your technical support team. • In the case of a change in the configuration, restore the delivery state. To do this, remove the expansion card and restart the device. If the error no longer occurs, the expansion card was the cause of the fault. Replace this with a Siemens expansion card or contact the supplier of the expansion card.
		If the device still crashes, contact your technical support team.
The device does not start up or switches off immediately	A counter voltage is fed into the device by connected or installed expansion cards	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.
The device does not operate normally if an expansion card is integrated. Examples: • The operating system does not boot. • The expansion card is not detected	Contact problem on the contacts of the expansion card or on the connector	Check the plug-in connection • Remove the installed expansion card and reinsert it. • Clean the contact surface of the expansion card with pure ethanol.

Markings and symbols

C

C.1 Overview

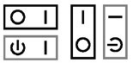
The following tables show all the symbols which may be found on your SIMATIC industrial PC, SIMATIC industrial monitor or SIMATIC Field PG in addition to the symbols which are explained in the operating instructions.

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

C.2 Symbols for safe use and disposal

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
	Disposal information, observe the local regulations.			

C.3 Symbols for operator controls

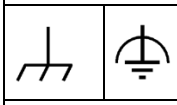
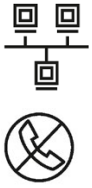
Symbol	Meaning		Symbol	Meaning
	On-off switch, without electrical isolation			
	On-off button, without electrical isolation			

C.4 Symbols of certificates and approvals

The following table shows symbols relating to certificates, approvals and markings which may be on the device. You can find detailed 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			Approval for United Kingdom
	Approval for India			

C.5 Interface icons

Symbol	Meaning		Symbol	Meaning
	Protective conductor terminal			Line In
	Connection for functional grounding (Equipotential-bonding cable)			Line Out
DPP	DisplayPort interface			Microphone input
	DVI port			
LAN 	LAN interface, not approved for connecting WAN or telephone			
	Serial port			
	USB 2.0 high-speed port			
	USB 3.0 Gen 1 SuperSpeed port			

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