SIEMENS

SIMATIC

Industrial PC
SIMATIC IPC547J

Operating Instructions

09/2021
A5E43920357-AB

Legal information

Warning notice system

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

⚠ DANGER

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

⚠ WARNING

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

⚠ CAUTION

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

NOTICE

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

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

Qualified Personnel

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

Proper use of Siemens products

Note the following:

⚠ WARNING

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

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Disclaimer of Liability

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

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Ⓟ 09/2021 Subject to change

Preface

Purpose of the operating instructions

These operating instructions contain all the information you need for the installation, electrical connection, commissioning and expansion of the SIMATIC IPC547J and to maintain and repair the device. They are intended for the following qualified specialist personnel:

- Fitters
- Commissioning engineers
- IT administrators
- Service and maintenance personnel

Basic knowledge required

A solid background in electrical installation, personal computers, Microsoft operating systems and network technology is required to understand this manual. 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 IPC547J.

History

Currently released versions of these operating instructions:

Version	Comments
01/2021	First edition
09/2021	Addition: Single power supply (850 W) Addition: Optional NVIDIA Quadro RTX4000 graphics card

Security information

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

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

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

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

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

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

Disclaimer for third-party software updates

This product includes third-party software. Siemens AG only provides a warranty for updates/patches of the third-party software, if these have been distributed as part of a Siemens software update service contract or officially released by Siemens AG. Otherwise, updates/patches are undertaken at your own risk. You can find more information about our Software Update Service offer on the Internet at OSD: Software Update Service (SUS) (https://support.industry.siemens.com/cs/ww/en/view/109759444).

Table of contents

Product description

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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	• Supplied data storage medium • 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 • Steps for connecting the device to the power supply • Connecting I/O devices • Switching the device on	• Supplied in printed form with the device • Supplied data storage medium
User manual (UM) for the motherboard	Information on: • Firmware description • Description of the motherboard • Description of the interfaces on the motherboard	• Files on supplied data storage medium: SMS-H410_UM SMS-W480_UM • Online at: Operating instructions, motherboard SMS-H410 (https://support.industry.siemens.com/cs/ww/en/view/109802249) Operating instructions, motherboard SMS-W480 (https://support.industry.siemens.com/cs/ww/en/view/109802250)

Documentation	Contents	Source
Windows® operating system	Information on: • Commissioning the operating system • Restoring the operating system • Configuration of the operating system	• Supplied data storage medium • Online at: Microsoft® Windows® 10 (https://support.industry.siemens.com/cs/ww/en/view/109749498) Microsoft® Windows® Server 2019 (https://support.industry.siemens.com/cs/ww/en/view/109773882)
SIMATIC IPC DiagBase	Information on: • Temperature monitoring • Fan monitoring • Monitoring drives • Watchdog • Operating hours counter • Battery monitoring	• Supplied data storage medium • Online at: SIMATIC IPC DiagBase (https://support.industry.siemens.com/cs/ww/en/view/109749690)
SIMATIC IPC DiagMonitor	Monitoring functions such as with SIMATIC IPC DiagBase with additional extended functions	• Online at: SIMATIC IPC DiagMonitor (https://support.industry.siemens.com/cs/ww/en/view/39129913)
SIMATIC IPC Image & Partition Creator	Information on: • Backup and recovery of files, directories, drive partitions	• Online at: SIMATIC IPC Image Partition Creator (https://support.industry.siemens.com/cs/de/en/view/109780775)
SIMATIC NET	Industrial communication	• Online at: SIMATIC NET (http://w3.siemens.com/mcms/automation/en/industrial-communications/Pages/Default.aspx)

1.2 Product highlights

The SIMATIC IPC547J is a high-performance industrial PC in 19" installation format (4 HM). It is perfectly suited for high-performance industrial PC applications.

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

- Independent product design with a user-friendly enclosure concept and front design
- Rugged all-metal enclosure, coated over its entire surface (blue chromated) and/or enameled on the outside to protect against corrosion and dirt
- High EM compatibility for use in industrial, business and commercial areas
- Maximum processor performance (in full configuration) without loss of performance (throttling) at up to 40 °C ambient temperature
- Dust protection through overpressure venting concept with front-side fan and dust filter
- Low noise impact thanks to closed-loop fan
- Protection against vibration and shock through corresponding drive cage (type B) and card retainer

High productivity through fast data processing

- 10th generation Intel® processors: Xeon, Core i9, Core i7, Core i5 or Core i3 up to 10 cores / 20 threads
- Graphics controller (630) integrated in the CPU up to 4K Ultra HD resolution
- Maximum performance, e.g. through Intel W480E chipset, DDR4 memory with support of dual channel technology
- High data transfer rates, e.g. via PCI Express Technology Gen 3, USB 3.1 Gen 2 SuperSpeed + (10 Gbps), M.2 NVME SSD
- Modern hard drives with a capacity of up to 2 TB for the storage of larger data volumes and greater reliability
- Solid-state drive with up to 1024 GB as a fast replacement for hard disk drives for increased data security

Reduction in standstill times thanks to high system availability and security

- Secure 24h operation (high MTBF, speed-controlled fans)
- RAID1 configuration: Data mirroring on two drives (HDD or SSD), also in removable trays (hot-swap) and optionally with additional SSD (for operating system) or hot-spare drive
- RAID5 configuration: Stripping with parity on three drives (HDD) for increased storage capacity in removable trays (hot-swap), optionally with additional hot-spare hard disk
- "Hot Swap" in RAID configurations: Replacing the drive (HDD) during operation
- "Hot spare" in RAID configurations: Rebuild process starts automatically on the reserve drive ("hot spare" drive; HDD)
- 3.5" HDD/HDD Enterprise or 2.5" SSD as RAID configurations
- Rapid identification and replacement of the drive in the event of a fault thanks to alarm displays for RAID configurations and unique numbering
- Efficient self-diagnostics using SIMATIC IPC DiagBase or DiagMonitor software (optional) for temperature, fans, program run (watchdog), battery, drives
- Status display (front LEDs) for Ethernet; alarm display for fan, temperature, watchdog and drives in RAID1 and RAID5 configurations
- Remote control and remote maintenance through iAMT (Intel® Active Management Technology)
- Redundant AC power supply with "hot swap" functionality (optional): Replacement of power supply module during operation
- Access protection for the front removable trays, control elements (power, reset), USB interfaces, dust filter and front fan by means of locked fan cover and lockable front door
- The enclosure cover can only be opened when the front door is open
- Up to two secured internal USB slots in the device, for software dongle, for example
- Service-friendly device configuration (modifications, service), e.g. installation of drives, replacement of filter or front fan without tools

Time savings due to high flexibility in commissioning, use and service

- High expandability through integrated interfaces:
  - 3 x Intel® Gbit Ethernet
  - 2 x USB 3.1 Gen 1 (Front)
  - 4 x USB 3.1 Gen 2 (rear of device): 2 x Type A and 2 x Type C
  - 2 x USB 2.0 (internal)
  - 3 x graphic interfaces
  - Audio
  - 7 x slots for PCI and PCI-Express
- Multi Monitoring: up to 6 x DisplayPort or 7 x DVI-D via onboard graphics and optional graphics card (partly via adapter) or 6 x VGA via adapter
- optional graphics card for high-performance graphics processing (2D, 3D) as well as for AI applications.
- Suitable for installation in space-saving control cabinets with a depth of only 400 mm (devices with short enclosure)
- Can be used in different positions with telescopic rails or as an industrial tower PC (tower kit optional)
- Universal use as industrial workstation or industrial server
- Pre-installed and activated operating systems:
  - Windows 10 Enterprise 2019 LTSC (64-bit)
  - Windows Server 2019 (64-bit) incl. 5 clients
- Fast restoration of the delivery state by restoring from USB stick

1.3 Scope of application

The SIMATIC IPC offers system integrators, cabinet designers, system engineers and machine designers a 19" rack PC platform for high-performance applications and IT applications on the control and cell level for:

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

The SIMATIC IPC has CE certification for use in the industrial sector as well as in residential and commercial areas and small businesses. In addition to the industrial applications, therefore, it can also be used in building automation or in public facilities.

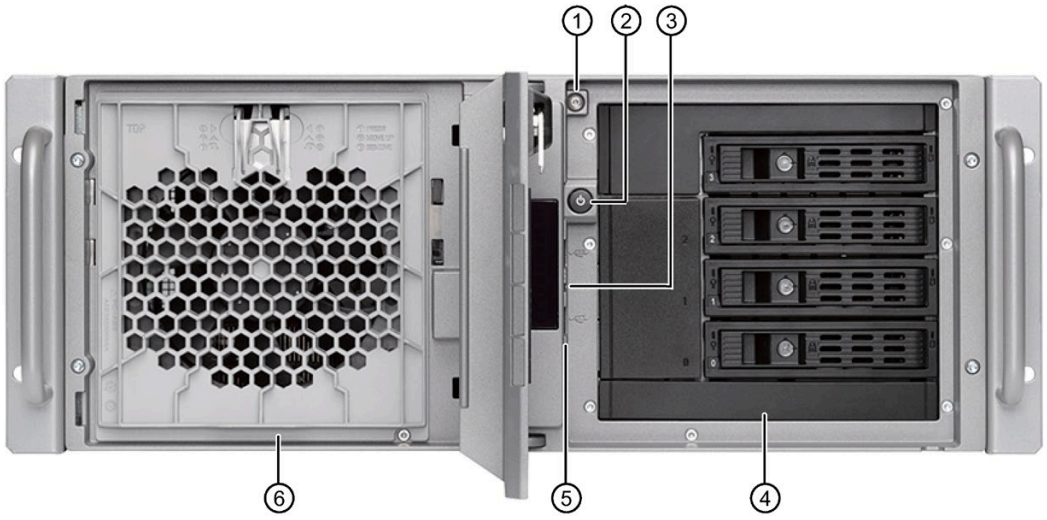
1.4 External design of the device

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 30)
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 Operator controls (Page 28)
③	Rese pushbutton, see Operator controls (Page 28)
④	Drive cage (in this case type A); depending on the expansion variant, see: • Drive cage type A (Page 18) • Drive cage type B (Page 20) • Drive cage type C (Page 21)
⑤	Interfaces on the front of the device, see Device ports (Page 24)
⑥	Front fan support

1.4.2 Drive cage type A

Drives and mounting locations in the drive cage type A

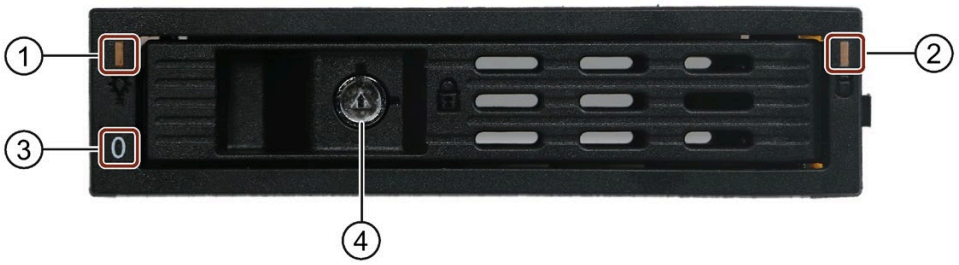
The drive cage type A can only be installed in devices with a standard enclosure and is located behind the front door.

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.

(0)	Mounting location 0 for: • 2.5" drive in removable tray • 3.5" drive in removable tray
(1)	Mounting location 1 for: • 2.5" drive in removable tray • 3.5" drive in removable tray
(2)	Mounting location 2 for: • 2.5" drive in removable tray • 3.5" drive in removable tray
(3)	Mounting location 3 (5.25" tray) for: • 5.25" mounting frame with removable tray for 2.5" and 3.5" drives • 5.25" drive or 5.25" component
(A)	Cover of the mounting frame for removable tray (Page 108)
(B)	Cover
(C)	Removable tray
(D)	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

See also

Installation conditions for drives in drive cage type A (Page 104)

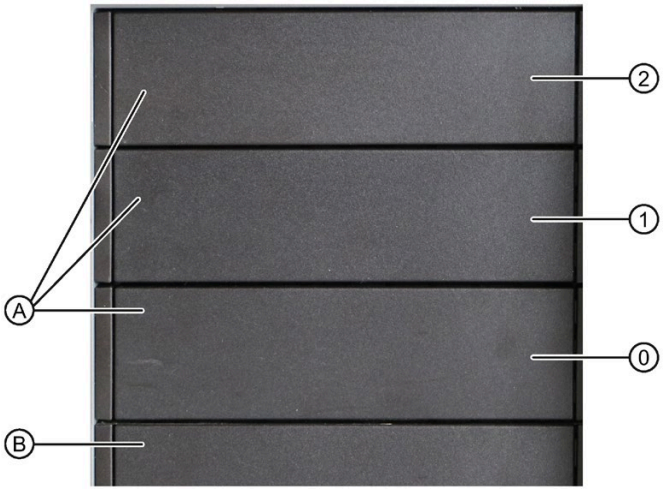
1.4.3 Drive cage type B

Drives and mounting locations in the drive cage type B

The drive cage type B can only be installed in devices with a standard enclosure and is located behind the front door.

In the drive cage type B, drives are permanently installed internally and are provided with a drive bezel from the outside and are therefore not accessible.

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



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

See also

Installation conditions for drives in drive cage type B (Page 114)

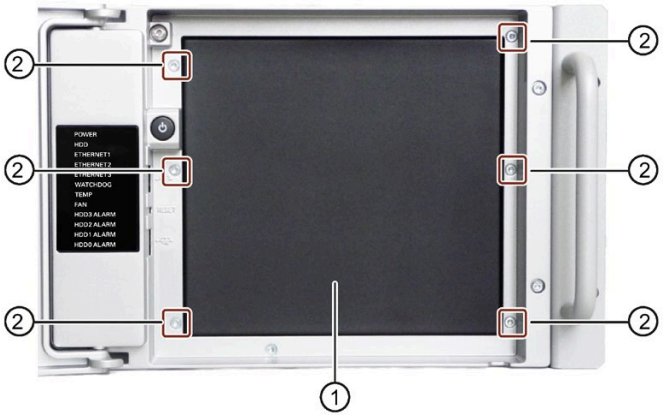
1.4.4 Drive cage type C

Drives and mounting locations in the drive cage type C

The drive cage type C can only be installed in devices with a short enclosure and is located behind the front door.

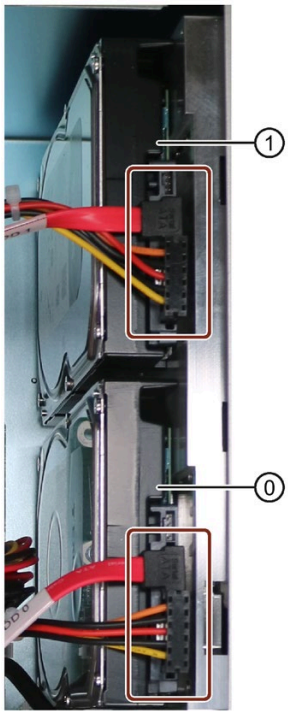
The drive cage type C consists of a design cover and a drive bay plate.

The drive bay plate is accessible after the design cover has been removed. You can mount 2.5" and 3.5" drives (HDD or SSD) on the drive bay plate.



①	Design cover (mounted on the drive bay plate) • 2.5" drive on the drive bay plate • 3.5" drive on drive bay plate
②	Six screws for attaching or loosening the drive bay plate with attached design cover (with T10 screwdriver)

Numbering of mounting locations



(0)	Mounting location 0
(1)	Mounting location 1

See also

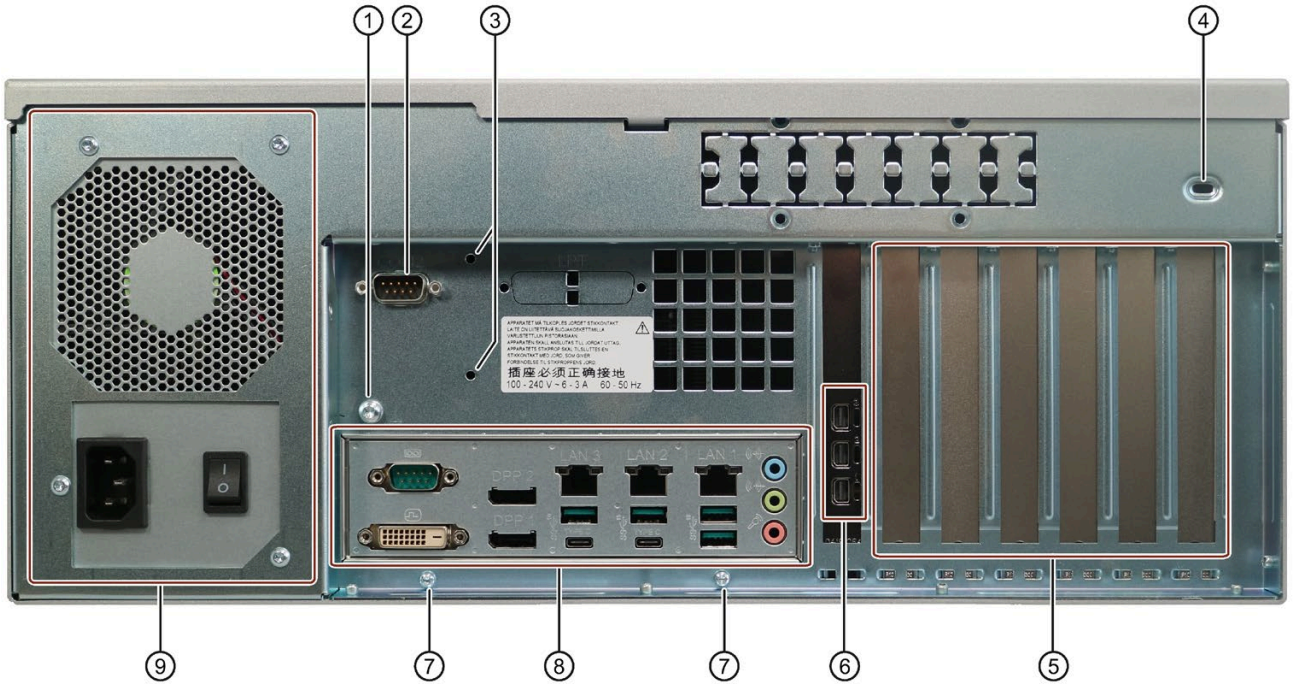
Installation conditions for drives in the drive cage type C (Page 123)

Safety instructions on device and system extensions (Page 48)

Open the device (Page 93)

Switching off the device (Page 72)

1.4.5 Rear of the device



①	Connection for functional earthing, see "Connection of equipotential bonding line (Page 58)"
②	COM2 (optional)
③	Holes for attaching the retainer for the internal USB stick
④	Opening, prepared for Kensington lock
⑤	Slot brackets or connections of inserted expansion cards
⑥	Connections of the optional graphics card (here: NVIDIA Quadro P400 graphics card) (Page 24)
⑦	Fixing screws for strain relief (Page 69)
⑧	Device ports (Page 24)
⑨	Power supply (Page 28) (here: Single power supply)

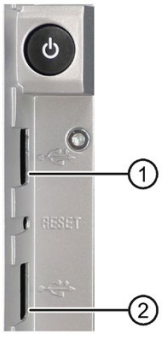
1.4.6 Connections

1.4.6.1 Device ports

Connections on the front of the device

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

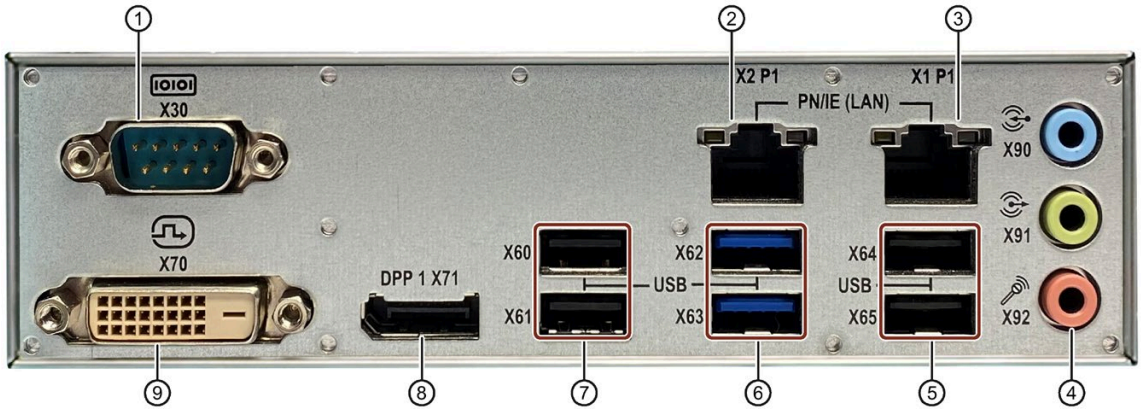
Note the technical specifications of the interfaces (Page 158).



No.	Connection socket
①	USB 3.1 Gen 1; Type A (X66) SuperSpeed backwards compatible to USB 3.0 / 2.0 / 1.1; each 900 mA / high current[1]
②	USB 3.1 Gen 1; 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

Connections on the rear of the device with SMS-H410 motherboard



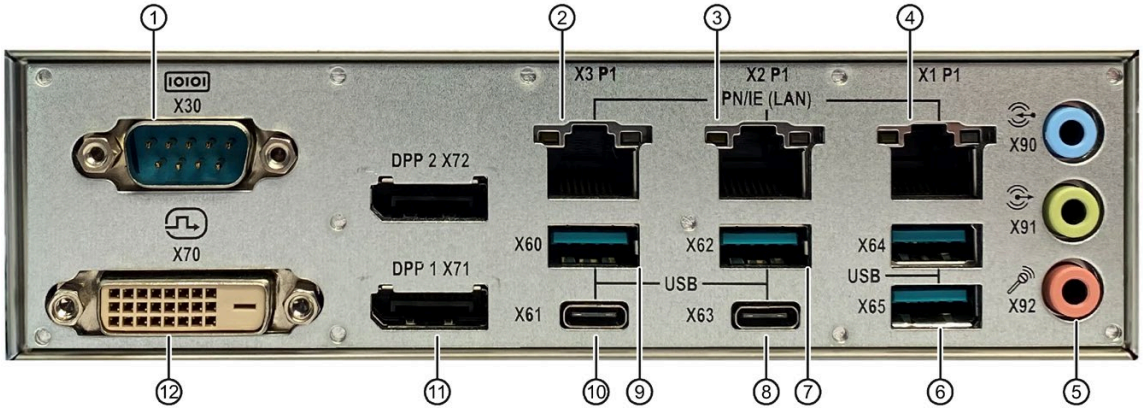
Note the technical specifications of the interfaces (Page 158).

No.	Connection socket
①	COM1 (X30)
②	LAN 2 (X2 P1) Intel® Jacksonville I219-V
③	LAN 1 (X1 P1) Intel® Springville i210-AT
④	Audio • Line IN (X90) • Headphone OUT (X91) • Microphone IN (X92)
⑤	2 x USB 2.0; Type A backwards compatible to USB 1.1; each 500 mA / high current[1] • (X64) • (X65)
⑥	2 x USB 3.1 Gen 1; Type A SuperSpeed; backwards compatible to USB 3.0 / 2.0 / 1.1; each 900 mA / high current[1] • (X62) • (X63)
⑦	2 x USB 2.0; Type A backwards compatible to USB 1.1; each 500 mA / high current[1] • (X60) • (X61)
⑧	DisplayPort (labeling on the device: DPP), for connecting monitors to internal graphics card DPP1 (X71)
⑨	DVI-D (X70), for connecting monitors to internal graphics card

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

Connections on the rear of the device with SMS-W480 motherboard

Note the technical specifications of the interfaces (Page 158).



No.	Connection socket
①	COM1 (X30)
②	LAN 3 (X3 P1) Intel® Springville i210-AT
③	LAN 2 (X2 P1) Intel® Springville i210-AT
④	LAN 1 (X1 P1) Intel® Jacksonville i219-LM; AMT-capable iAMT and teaming cannot be used simultaneously on the LAN interface. The following teaming modes are supported: • Adapter Fault Tolerance (AFT) • Adaptive Load Balancing (ALB) • IEEE 802.3ad Dynamic Link Aggregation (DLA) • Static Link Aggregation (SLA) • Switch Fault Tolerance (SFT)
⑤	Audio • Line IN (X90) • Headphone OUT (X91) • Microphone IN (X92)
⑥	2 x USB 3.1 Gen 2; Type A SuperSpeed; backwards compatible to USB 3.0 / 2.0 / 1.1; each 900 mA / high current[1] • (X64) • (X65)
⑦	USB 3.1 Gen 2; Type A SuperSpeed; backwards compatible to USB 3.0 / 2.0 / 1.1; each 900 mA / high current[1] • (X62)

No.	Connection socket
⑧	USB 3.1 Gen 2; Type C[2] backwards compatible to USB 3.0 / 2.0 / 1.1; each 1500 mA / high current[1] • (X63)
⑨	USB 3.1 Gen 2; Type A SuperSpeed; backwards compatible to USB 3.0 / 2.0 / 1.1; each 900 mA / high current[1] • (X60)
⑩	USB 3.1 Gen 2; Type C[2] backwards compatible to USB 3.0 / 2.0 / 1.1; each 1500 mA / high current[1] • (X61)
⑪	DisplayPort (labeling on the device: DPP), for connecting monitors to internal graphics card • DPP 2 (X72) • DPP 1 (X71)
⑫	DVI-D (X70), for connecting monitors to internal graphics card

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

2 Maximum cable length: max3 m; depending on the attenuation of the cable and the 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 optional graphics cards

Optional graphics cards are expansion cards. After installing an optional graphics card, the following connections are available on the back of the device (Page 23) in the vicinity of the expansion cards for connecting monitors.

- NVIDIA Quadro P400 graphics card: 3 x Mini Display Port
- NVIDIA Quadro P2200 graphics card: 4 x DisplayPort
- NVIDIA Quadro RTX4000 graphics card: 3 x DisplayPort, 1 x USB type C with VirtualLink™ support

For information on how to connect monitors with adapters to these ports, see "Hardware accessories (Page 34)".

You can find information on the optional graphics cards under "Technical specifications of graphic (Page 155)".

1.4.6.2 Power supply connections

Sockets for power plugs with single and redundant power supply

Single power supply (400 W)

Single power supply (850 W)

Redundant power supply (350 W)

1.4.7 Operator controls

WARNING

Risk of electric shock

The buttons and switches described in the following do not fully disconnect the device from the line voltage.

You also need to the notes and information under "Switching off the device (Page 72)".

On-off switch with single and redundant power supply

The following figures show the location of the on/off switch on the rear of the device for devices with simple or redundant power supply.

Single power supply (400 W)

Single power supply (850 W)

Redundant power supply (350 W)

On/off button and Reset button with a single power supply

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
② Reset button

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

  For information on switching the device on and off, see "Switching on the device (Page 71)" and "Switching off the device (Page 72)".

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

  Information on the hardware reset can be found under "Switching off the device (Page 72)".

Alarm reset button with a redundant power supply

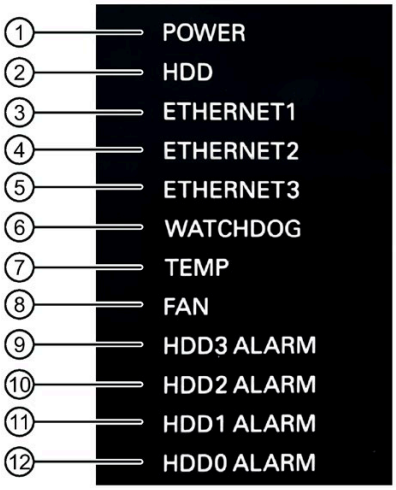
The alarm reset button is only available for devices with redundant power supply and it is simultaneously the operation indicator of the redundant power supply (Page 32).

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

1.4.8 Status displays

1.4.8.1 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.

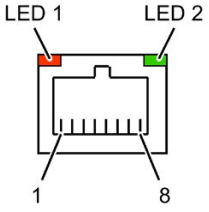


No.	Status display	Meaning	Status	Meaning of the status
①	POWER	Operating mode of the PC	OFF	Switched off or disconnected from the mains
			YELLOW	"Hibernate" or "Shut down" energy saving mode
			Flashing YELLOW	"Standby" energy saving mode
			GREEN	PC in operation
②	HDD	Access to hard disk	OFF	No access
			GREEN	Access
③ ④ ⑤	ETHERNET 1 ETHERNET 2 ETHERNET 3	Ethernet status display	OFF	• No connection • No data traffic
			GREEN	Data traffic
⑥	WATCHDOG	Watchdog status	OFF	Not activated
			GREEN	Activated
			RED	Expired
⑦	TEMP	Temperature status	OFF	No error
			RED	Possible causes: • CPU temperature is critical • Device temperature is critical

⑧	FAN	Fan status	OFF	No error
			RED	Possible causes: • Front fan faulty • The fan on the processor heat sink is faulty • Fan on drive cage type A faulty • Fault in fan of the single power supply (400 W)
⑨ ⑩ ⑪ ⑫	HDD3 ALARM HDD2 ALARM HDD1 ALARM HDD0 ALARM	For devices with SMS-W480 motherboard: HDD alarm in combination 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 18)" and "Drive cage type B (Page 20)".	OFF	RAID is OK
			A RED LED is lit up	The associated drive is not OK
			All RED LEDs are flashing	RAID synchronization running, RAID is not OK The hard disk newly integrated in case of error is synchronized with an existing hard disk.
			All RED LEDs are lit up	RAID is not OK The faulty drive could not be localized by the monitoring software. It may be possible to detect the defective drive with the RAID software. Information is available at "RAID1 system (Page 76)", "RAID5 system (Page 76)" or "Hot-spare drive in RAID1 or RAID5 systems (Page 77)".

1.4.8.2 Status display of the Ethernet interface

The Ethernet interfaces are numbered on the enclosure to identify them clearly. The numbering by the operating system can differ.



Status display	Meaning	Status	Meaning of the status
LED 1	Connection status	OFF	• No cable connected • Cable disabled • Interface disabled
		ORANGE	• Active cable connected
		ORANGE flashing	• Data transfer active
LED 2	Data transmission rate	OFF	• 10 Mbps
		ORANGE	• 100 Mbps
		GREEN	• 1000 Mbps

1.4.8.3 Status display of redundant power supply

Status display	Meaning	Status	Meaning of the status
Power supply module	Status of the power supply module	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.

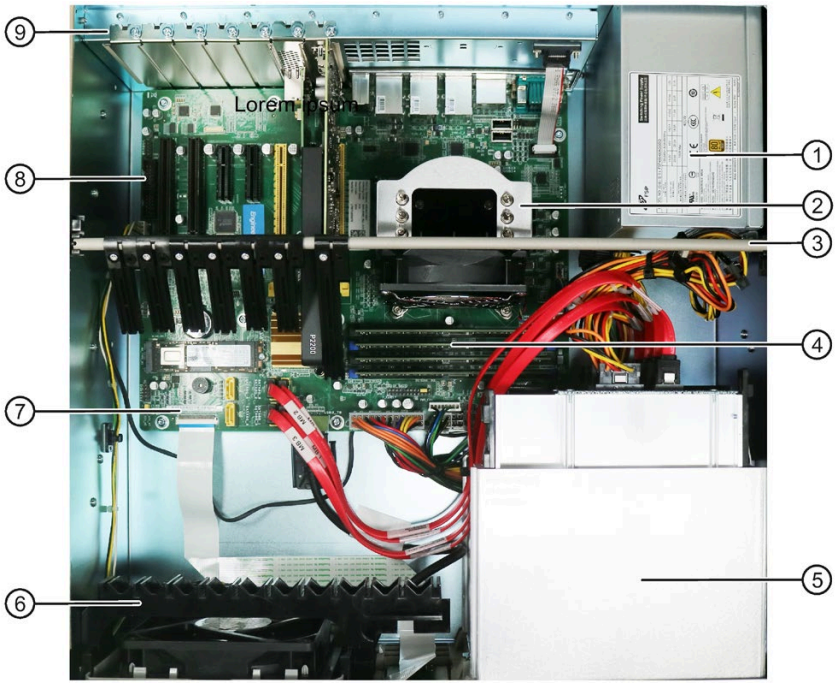
1.4.8.4 Status displays on removable tray for drives

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 18)

1.5 Internal construction of the device



①	Power supply, single or redundant (here in the example: single power supply 400 W)
②	Heat sink of the processor
③	Rod with card holders for expansion cards
④	Slots for memory modules
⑤	Drive cage (here in the example: Drive cage type A or type B)
⑥	Guide rail for long expansion cards
⑦	Motherboard
⑧	Expansion card slots
⑨	Slot brackets (numbering of the slots for expansion cards on the enclosure)

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).

Accessories available for order

Name	Description	Article number
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 
Tower Kit 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	For device with standard enclosure: 6ES7648-1AA01-0XC0 For device with short enclosure: 6ES7648-1AA01-0XE0 

Name	Description	Article number
DisplayPort adapter Connection of monitors with the following adapters possible to: • integrated graphics interfaces • optional graphics card P2200 • optional graphics card RTX 4000	• DP to DVI-D adapter DisplayPort to DVI-D	6ES7648-3AF00-0XA0 
	• DP to VGA adapter DisplayPort to VGA	6ES7648-3AG00-0XA0 
Mini-DisplayPort adapter Connection of monitors with the following adapters possible to: • optional graphics card P400	• mDP to VGA adapter Mini DisplayPort to VGA	6ES7648-3AL00-0XA0 
	• mDP to 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* 

* Part of the optional graphics card P400

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 for 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, standard enclosure, side panel	Assembly kit with drive bay plate for the internal installation of drives (3.5 "HDD or 2.5" SSD)	A5E38368482

1.6.2 Software accessories

The following software products, among others, can be additionally ordered for your device:

Software	Description
SIMATIC IPC Image & Partition Creator	SIMATIC IPC Image & Partition Creator enables easy backup and quick recovery of individual data and files, complete hard disks and other data storage media. The intuitive user interface provides disk and partition management functions.
SIMATIC IPC DiagMonitor	In addition to the local monitoring options, SIMATIC IPC DiagMonitor offers options for remote monitoring of IPCs, communication with other systems, worldwide alerts and creation of custom monitoring applications.

Further information on the software products and references to the online catalog and ordering system (Industry Mall (https://mall.industry.siemens.com)) can be found on the SIMATIC IPC software (http://www.automation.siemens.com/mcms/pc-based-automation/en/industrial-pc/expansion_components_accessories) homepage.

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.

- Always disconnect the cabinet from the mains 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.

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 mains plug or operate the central AC circuit breaker when installing 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 149).

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 72)".
- 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

When changing the battery, note the important information in the section:

- "Changing the backup battery (Page 133)"

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 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 observed when installing and operating the device or the system, the approvals according to IEC/EN/UL/CSA 61010-2-201 will become void.

There is a risk of overheating and personal injury.

Note the following instructions and information under:

- "Climatic and mechanical and ambient conditions (Page 149)"
- "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 and ambient conditions (Page 149)"
- **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 and ambient conditions (Page 149)".
- **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 and ambient conditions (Page 149)"
- **Circuit overload**

  When connecting the device, observe the information on the power supply 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.

- Always disconnect the cabinet from the mains 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 observed when installing and operating the device or the system, the approvals according to IEC/EN/UL/CSA 61010-2-201 will become void.

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.
In the event of non-compliance, the warranty and approval expire according to IEC/EN/UL/CSA 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:

- Operate the device only in closed rooms.
- 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 and ambient conditions (Page 149)".
  - 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/CSA 61010-2-201. You can therefore install it without an additional fire protection enclosure.
- The connected or built-in peripherals should not introduce a counter emf in excess of 0.5 V into the device.

High frequency radiation

⚠ CAUTION

Immunity to RF interference

The device has increased immunity to high-frequency radiation, see information under "Electromagnetic compatibility (Page 149)".

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.

Danger due to regenerative feedback

NOTICE

Damage through 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 supply voltage into the device through connected or installed I/O devices, such as a USB drive.
- Prevent regenerative feedback.

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.

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, make sure that the power supply connector 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 72)
- Only install device or system expansions designed for this device.

  Contact your technical support team or the point of sale (Page 187) to find out which device and system expansions are suitable for installation.
- Note the Information on electromagnetic compatibility (Page 171).

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.

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 72)"
- For control cabinet mounting: Use a central, easily accessible AC circuit breaker, especially when close to the device.
- When you install the device, make sure that the power supply connector 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 143)".

⚠ CAUTION

Danger of burns from the hot slot brackets on the rear side 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 slot brackets.

Observe the danger symbol "Warning of hot surface" (Page 193)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.

Installing and connecting the device

3

3.1 Preparing for mounting

3.1.1 Scope of delivery

Device and hardware for the device

- Rack PC SIMATIC IPC547J
- Power cable (country-specific): 1 power cable*

  For redundant power supply: 2 power cable*
- Strain reliefs: 1 strain relief for USB and LAN interfaces, 2 removable cable ties
- Power plug latch:

  1 strain relief if AC power supply was ordered

  2 strain reliefs if redundant power supply was ordered
- Keys for front door: 2 keys
- For device with drive cage type A:

  2 keys for removable trays
- Self-adhesive enclosure feet: 4 units

(* if ordered with power supply cable)

Supplied data storage medium

On the supplied data storage medium (read only) you will find:

- Software and tools to recover your ordered Microsoft® Windows® operating system
- Device drivers for installation in operating systems
- Quick Install Guide SIMATIC IPC547J
- SIMATIC IPC547J operating instructions
- Product information
- User manual (UM) for the motherboard with firmware/BIOS description and hardware description of the interfaces
- Operating instructions for your ordered Microsoft® Windows® operating system on this device

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 161).

Installed software

- Monitoring software SIMATIC IPC DiagBase (only with installed Microsoft® Windows® operating system)

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

Printed documents

- Quick Install Guide SIMATIC IPC547J 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

Devices damaged by incorrect storage or transport can cause personal injury and/or damage to property.

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

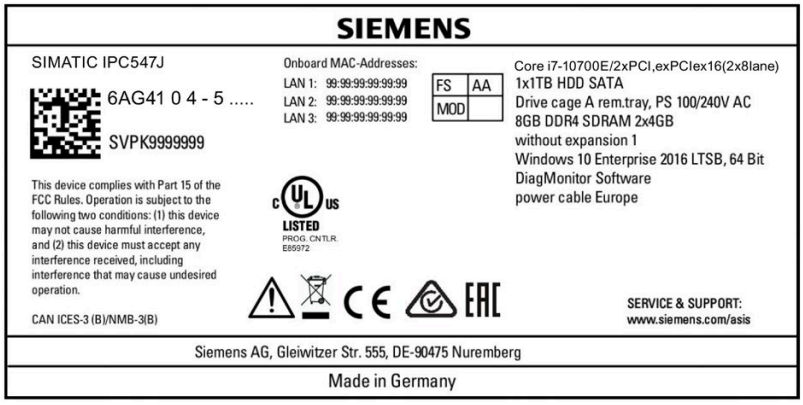
3.1.3 Device identification data

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.

Rating plate

The rating plate is located inside the front door.



Example: SIMATIC IPC547J nameplate (the information on the nameplate is device-specific)

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® 10 operating system

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

See also

Important instructions and manuals for operating the device (Page 11)

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 160)".

Installation in the control cabinet

When installing the device in a control cabinet, use a central and easily accessible AC circuit breaker as close as possible to the device.

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 are available from Rittal device bases (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)".

Additional information

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

3.2.2 Securing device

⚠ WARNING

Dangerous voltage and fire hazard

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

It is essential that you follow the installation and assembly 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 bodily injury.

- Always disconnect the cabinet from the mains before opening it.
- Ensure that the power to the control cabinet cannot be turned on accidentally.

CAUTION

Risk of physical injury

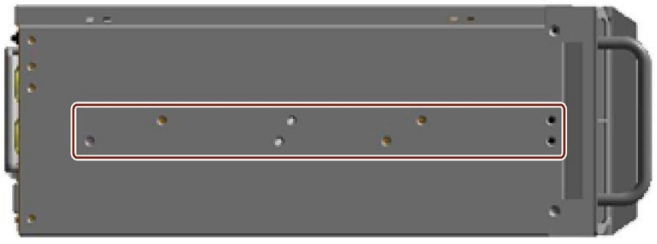
The device is too heavy to be mounted exclusively with the 19-inch brackets of the front panel.

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

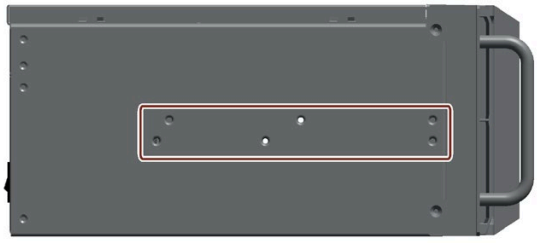
- Secure the device using additional measures. The mounting screws of the telescopic rails may not protrude more than 5 mm into the device.
- Use the brackets on the front panel to carry and lift the unit.

Bore holes for telescopic rails

Holes for standard enclosure



Holes for short enclosure



The dimensions for the holes can be found under: "Dimension drawing of the telescope rails (Page 167)".

Detailed information on the drives can be found under: "Technical specifications of the telescopic rails (Page 160)".

3.3 Connecting the device

3.3.1 Country-specific information on supply voltage

Country-specific information on supply voltage for USA and Canada

Supply voltage 120 V / 230 V / 240 V

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

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

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

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

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

Supply voltage 230 V AC

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

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

The power supply cord and the plug connector must bear the prescribed markings.

3.3.2 Connection of equipotential bonding line

A low-impedance earth 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 23)".

Requirement

- T20 screwdriver
- 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.

3.3.3 Connecting the power supply

3.3.3.1 Connect single power supply (AC)

⚠ 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 supply voltage.
- Operate the device only in grounded power supply networks (TN networks in accordance with VDE 0100 Part 100 or IEC 60364-1).
- Operation via non-grounded or impedance-earthed networks is prohibited.

⚠ WARNING

Risk of electric shock

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

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

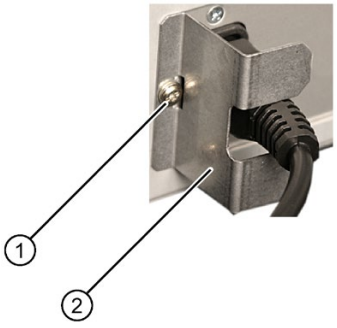
- Always fully disconnect the device from the mains voltage before performing work on the device or when the device will not be used over an extended period of time.
- For control cabinet mounting: Use a central and easily accessible AC circuit breaker near the device.

Requirement

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

Procedure

1. Make sure that the on/off switch ① is in the '0 '(off) position. Information on the position of the on/off switch is available in "Operator controls (Page 28)".
2. Connect the power plug to the corresponding socket. Information on the position of the socket is available in "Power supply connections (Page 28)".
3. Insert the power cable in the electrical socket.
4. Switch the device on using 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.

3.3.3.2 Connecting a redundant power supply (AC)

⚠ 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 supply voltage.
- Operate the device only in grounded power supply networks (TN networks in accordance with VDE 0100 Part 100 or IEC 60364-1).
- Operation in non-grounded or impedance-grounded networks is not permitted.

⚠ WARNING

Risk of electric shock

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

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)".

Procedure

1. Make sure that both on/off switches ② are in the '0' position. Information on the position of the on-off switch is available under "Operator controls (Page 28)".
2. Connect the power plug to both sockets. Information on the position of the sockets is available in "Power supply connections (Page 28)".
3. Connect the power cable to the sockets.

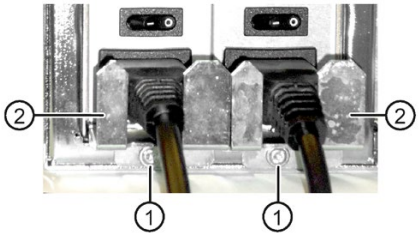
4. Switch the device on using the on/off switch (position |).

   The status display on the power supply modules light up green.

   Note

   If only one of the power supply modules works, a warning signal sounds. You turn off the warning signal by pressing the alarm reset button on the working power supply module. You can find information on the position of the alarm reset button under "Operator controls (Page 28)".

5. To prevent unintentional disconnection of the power plug, secure the power plug on the device.
6. Remove the two retaining screws ①.



7. Screw on the power plug latches ② with the two fixing screws ①.

3.3.4 Connecting I/O devices

3.3.4.1 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 "Device ports (Page 24)".
2. Secure the cables (Page 69) with a strain relief.

3.3.4.2 Connecting audio devices

Requirement

- You have observed the information under "Connecting external devices (Page 61)" and under "Technical specifications of the connections on the device (Page 158)"

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 "Device ports (Page 24)".
2. Secure the cables (Page 69) with a strain relief.

3.3.4.3 Connecting several monitors (multi-monitoring)

Connection of monitors for devices with SMS-H410 motherboard and optional NVIDIA Quadro P400 graphics card

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

- DP (DisplayPort; labeling on the device: DPP1)
- DVI-D

You will find three additional connection sockets on the rear of the device for connecting monitors to the optional NVIDIA Quadro P400 graphics card.

- 3 x mDP

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

You can find information on the connection sockets on the rear of the device under: "Device ports (Page 24)".

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

Connection socket on monitor		Connection socket on the internal graphics interfaces		Connection socket, graphics card NVIDIA Quadro P400		
		DP (DPP1; X71)[2]	DVI-D (X70)[2]	mDPP1	mDPP2	mDPP3
Monitor 1	DP (DisplayPort)	X				
	DVI	X [1]				
	VGA	X [1]				
Monitor 2	DP (DisplayPort)					
	DVI		X			
	VGA					
Monitor 3	DP (DisplayPort)			X [1]		
	DVI			X [1]		
	VGA			X [1]		
Monitor 4	DP (DisplayPort)				X [1]	
	DVI				X [1]	
	VGA				X [1]	
Monitor 5	DP (DisplayPort)					X [1]
	DVI					X [1]
	VGA					X [1]

[1] via adapter, see "Hardware accessories"
[2] Labeling on the device

Connection of monitors for devices with SMS-H410 motherboard and optional NVIDIA Quadro P2200 graphics card

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

- DP (DisplayPort; labeling on the device: DPP1)
- DVI-D

You will find four additional connection sockets on the rear of the device for connecting monitors to the optional NVIDIA Quadro P2200 graphics card.

- 4 x DisplayPort

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

You can find information on the connection sockets on the rear of the device under: "Device ports (Page 24)".

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

Connection socket on monitor		**Connection socket on the internal graphics interfaces**		**Connection socket on optional graphics card NVIDIA Quadro P2200**			
		DP (DPP1; X71)[2]	**DVI-D (X70)[2]**	**DP1 (DisplayPort)**	**DP2 (DisplayPort)**	**DP3 (DisplayPort)**	DP4 (DisplayPort)
Monitor 1	DP (DisplayPort)	X					
	DVI	X [1]					
	VGA	X [1]					
Monitor 2	DP (DisplayPort)						
	DVI		X				
	VGA						
Monitor 3	DP (DisplayPort)			X			
	DVI			X [1]			
	VGA			X [1]			
Monitor 4	DP (DisplayPort)				X		
	DVI				X [1]		
	VGA				X [1]		
Monitor 5	DP (DisplayPort)					X	
	DVI					X [1]	
	VGA					X [1]	
Monitor 6	DP (DisplayPort)						X
	DVI						X [1]
	VGA						X [1]

[1] via adapter, see "Hardware accessories"
[2] Labeling on the device

Connection of monitors for devices with SMS-W480 motherboard and optional NVIDIA Quadro P400 graphics card

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

- 2 x DP (DisplayPort; labeling on the device: DPP1, DPP2)
- DVI-D

You will find three additional connection sockets on the rear of the device for connecting monitors to the optional NVIDIA Quadro P400 graphics card.

- 3 x mDP

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

  You can find information on the connection sockets on the rear of the device under: "Device ports (Page 24)".

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

Connection socket on monitor		Connection socket on the internal graphics interfaces			Connection socket on optional graphics card NVIDIA Quadro P400		
		DP (DPP1; X71)[2]	**DP (DPP2; X72)[2]**	**DVI-D (X70)[2]**	**mDPP1**	**mDPP2**	**mDPP3**
Monitor 1	DP (DisplayPort)	X					
	DVI	X [1)]					
	VGA	X [1)]					
Monitor 2	DP (DisplayPort)		X				
	DVI		X [1)]				
	VGA		X [1)]				
Monitor 3	DP (DisplayPort)						
	DVI			X			
	VGA						
Monitor 4	DP (DisplayPort)				X [1)]		
	DVI				X [1)]		
	VGA				X [1)]		
Monitor 5	DP (DisplayPort)					X [1)]	
	DVI					X [1)]	
	VGA					X [1)]	
Monitor 6	DP (DisplayPort)						X [1)]
	DVI						X [1)]
	VGA						X [1)]

1) via adapter, see "Hardware accessories"
2) Labeling on the device

Connection of monitors for devices with SMS-W480 motherboard and optional NVIDIA Quadro P2200 graphics card

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

- 2 x DP (DisplayPort; labeling on the device: DPP1, DPP2)
- DVI-D

You will find four additional connection sockets on the rear of the device for connecting monitors to the optional NVIDIA Quadro P2200 graphics card.

- 4 x DisplayPort

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

You can find information on the connection sockets on the rear of the device under: "Device ports (Page 24)".

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

Connection socket on monitor		Connection socket on the internal graphics interfaces			Connection socket on optional graphics card NVIDIA Quadro P2200			
		DP (DPP1; X71)[2]	DP (DPP2; X72)[2]	DVI-D (X70)[2]	DP1 (DisplayPort)	DP2 (DisplayPort)	DP3 (DisplayPort)	DP4 (DisplayPort)
Monitor 1	DP (DisplayPort)	X						
	DVI	X [1]						
	VGA	X [1]						
Monitor 2	DP (DisplayPort)		X					
	DVI		X [1]					
	VGA		X [1]					
Monitor 3	DP (DisplayPort)							
	DVI			X				
	VGA							
Monitor 4	DP (DisplayPort)				X			
	DVI				X [1]			
	VGA				X [1]			
Monitor 5	DP (DisplayPort)					X		
	DVI					X [1]		
	VGA					X [1]		
Monitor 6	DP (DisplayPort)						X	
	DVI						X [1]	
	VGA						X [1]	
Monitor 7	DP (DisplayPort)							X
	DVI							X [1]
	VGA							X [1]

[1] via adapter, see "Hardware accessories"
[2] Labeling on the device

Connection of monitors for devices with SMS-W480 motherboard and optional NVIDIA Quadro RTX4000 graphics card

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

- 2 x DP (DisplayPort; labeling on the device: DPP1, DPP2)
- DVI-D

You will find four additional connection sockets on the rear of the device for connecting monitors to the optional NVIDIA Quadro RTX4000 graphics card.

- 3 x DisplayPort
- 1 x USB Type C, with VirtualLink™ support

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

ports.

You can find information on the connection sockets on the rear of the device under: "Device ports (Page 24)".

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

Connection socket on monitor		**Connection socket on the internal graphics interfaces**			**Connection socket on optional graphics card NVIDIA Quadro RTX4000**			
		DP (DPP1; X71)[2]	**DP (DPP2; X72)[2]**	**DVI-D (X70)[2]**	**DP1 (DisplayPort)**	**DP2 (DisplayPort)**	**DP3 (DisplayPort)**	**USB Type C[3]**
Monitor 1	DP (DisplayPort)	X						
	DVI	X [1)]						
	VGA	X [1)]						
Monitor 2	DP (DisplayPort)		X					
	DVI		X [1)]					
	VGA		X [1)]					
Monitor 3	DP (DisplayPort)							
	DVI			X				
	VGA							
Monitor 4	DP (DisplayPort)				X			
	DVI				X [1)]			
	VGA				X [1)]			
Monitor 5	DP (DisplayPort)					X		
	DVI					X [1)]		
	VGA					X [1)]		
Monitor 6	DP (DisplayPort)						X	
	DVI						X [1)]	
	VGA						X [1)]	
Monitor 7	DP (DisplayPort)							X [4)]
	DVI							X [4)]
	VGA							X [4)]

1) via adapter, see "Hardware accessories"
2) Labeling on the device
3) with VirtualLink™ support
4) possible with a suitable adapter

Requirement

- You have observed the information in the following sections:

  "Connecting external devices (Page 61)"

Procedure

1. Connect the monitors to the rear of the device (Page 24).

   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 the optional graphics card (Page 102)".

See also

Technical specifications of graphic (Page 155)

Technical specifications of the connections on the device (Page 158)

3.3.5 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 (10/100/1000 Mbps) for communication and data exchange with automation devices, such as SIMATIC S7.

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

PROFINET

PROFINET can be operated via:

- Standard Ethernet interfaces (RT)

SIMATIC NET

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

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

Additional information

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

3.3.6 Securing the cables

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

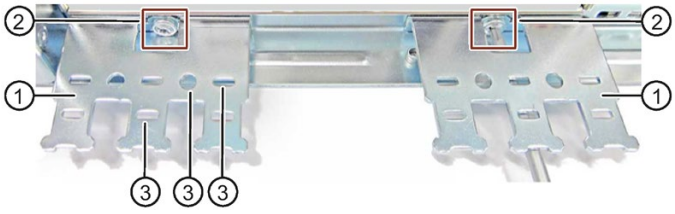
You can mount two strain-relief assemblies.

Requirement

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

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 "Device ports (Page 24)".
2. Screw the desired strain relief ① with the fixing screw ② on the left and/or right of the device.



3. Insert the detachable cable ties in the respective openings of the strain relief ③ and fasten the cables with the cable ties.
4. Fasten the cables to the corresponding openings in the strain relief ④ using simple cable ties.

Example: Cable fastened to strain relief with cable ties

Commissioning the device

4

4.1 Switching on the device

Requirement

- The power supply is connected. (Page 58)

Procedure

1. Switch the on/off switch (in case of redundant power supply: both on/off switches) on the rear of the device (position |).
2. Press the on/off button at the front of the device behind the front panel door. Information on the position of the switch and the button is available under "Operator controls (Page 28)".

Commissioning the installed Windows® operating system

You can find information on first startup of the device and commissioning the installed Windows® operating system in the documentation on the supplied data storage medium.

See also

Important instructions and manuals for operating the device (Page 11)

4.2 Configuring automatic switch-on of device

In the firmware settings, you can specify that the device starts up again automatically after being disconnected from the supply voltage for up to two minutes as soon as the supply voltage is available again.

The minimum downtime required for the supply voltage depends on the configuration of the device.

Configure this function in the firmware settings:

1. Select: "Advanced > Power > Restore AC Power Loss".
2. Assign the "Always on" value to the firmware setting "Restore AC Power Loss".

See also

Important instructions and manuals for operating the device (Page 11)

4.3 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 "Operator controls (Page 28)".

Result

The "POWER" status indicator on the front (Page 30) 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 mains voltage

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

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.
  The "POWER" status indicator on the front (Page 30) indicates the corresponding energy-saving mode ("Shut down").
- Then pull out the mains plug or operate the central AC circuit breaker when installing in a control cabinet.
  Therefore, when installing the device in a control cabinet, ensure that the AC circuit breaker is easily accessible.

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 unit switches off.
  - To switch the device on 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 "Operator controls (Page 28)".

Operating the device

5

5.1 Opening the front door

Procedure

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

5.2 Multi-monitoring

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

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

Information on the position of the connection sockets and the labeling on the device can be found in section "Device ports (Page 24)".

Connection sockets for devices with motherboard SMS-H410

- DP (DisplayPort: labeling on the device: DPP)
- DVI-D

Connection sockets for devices with motherboard SMS-W480

- 2 x DP (DisplayPort: labeling on the device: DPP)
- DVI-D

To connect several monitors to the device at the same time (Page 62)(multi-monitoring), you can install a so-called "optional graphics card" (Page 102).

Note

Information on graphics cards which support multi-monitoring can be obtained from your local representative, see "Service and support (Page 187)".

5.3 Drive configurations

5.3.1 RAID systems

5.3.1.1 RAID1 system

An RAID1 system works 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.

RAID1 system with associated software

If you have ordered a RAID1 system with pre-installed operating system, the RAID1 system is monitored with the installed diagnostics software SIMATIC IPC DiagBase or DiagMonitor.

The following software is available to monitor the RAID1 system:

- Onboard RAID system (Page 78):

  Intel® Rapid Storage Technology

See also

Install drives on the drive bay plate (Page 123)

Drive cage type A (Page 18)

5.3.1.2 RAID5 system

A RAID5 system works according to the "stripping with parity" principle.

In the event of a defective drive or cable problems the RAID5 system can continue to work on the remaining drives and thus achieves a high level of availability.

RAID5 system with associated software

If you have ordered a RAID5 system with pre-installed operating system, the RAID5 system is monitored with the installed diagnostics software SIMATIC IPC DiagBase or DiagMonitor.

The following software is available to monitor the RAID5 system:

- Onboard RAID system (Page 78):

  Intel® Rapid Storage Technology

See also

Drive cage type A (Page 18)

Install drives on the drive bay plate (Page 123)

5.3.1.3 Hot-spare drive in RAID1 or RAID5 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 or RAID5 system, the hot-spare drive is automatically integrated instead of the defective drive during operation and assumes its function.

Data synchronization to the hot-spare drive starts automatically.

See also

Integrating a hot-spare drive into an onboard RAID system (Page 82)

Data synchronization in the RAID system (Page 83)

5.3.2 System with 2 drives

You can order the device as a system with two drives. For information on hard disk capacity, refer to your order documentation.

When the device ships, the second drive is then connected to SATA port 1 and not yet set up. You have the option of backing up your data to this drive.

You can find information on how to boot the device from the second drive in the detailed firmware/BIOS description, see "Important instructions and manuals for operating the device (Page 11)".

5.4 Onboard RAID system

5.4.1 Display of a defective drive of an onboard RAID system

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

- System status displays (Page 30) on the front of the device
- SIMATIC IPC DiagBase or SIMATIC IPC DiagMonitor monitoring software
- "Intel® Rapid Storage Technology", see "Monitoring the onboard RAID system with "Intel® Rapid Storage Technology" (Page 80)"

5.4.2 Onboard RAID1 system: Installation options for drives

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

- Drive cage type A (Page 104)
- Drive cage type B (Page 114)

5.4.3 Onboard RAID5 system: Installation options for drives

The hard disks required for an onboard RAID5 system may be installed at the following locations:

- Drive cage type A (Page 104)
- Drive cage type B (Page 114)

5.4.4 Operating onboard RAID system

5.4.4.1 Configuring the onboard RAID system

If you ordered a device with an onboard RAID system, the onboard RAID system is pre-configured by default.

If you subsequently set up an onboard RAID system, you still have to configure it.

Requirement

- The drives required for the onboard RAID system are installed in the device, see:
  - Onboard RAID1 system: Installation options for drives (Page 78)
  - Onboard RAID5 system: Installation options for drives (Page 78)

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

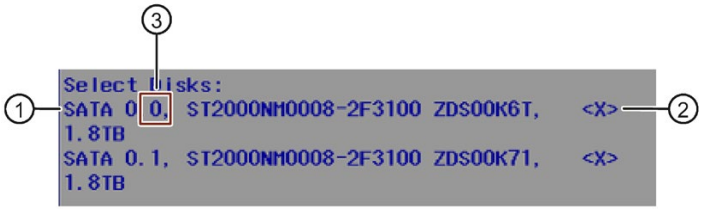
1. Switch on the device or restart it.
2. Immediately after turning on the device, as soon as the message "`Press <DEL> or <ESC> to enter setup`" appears, press and hold the <Del> or <Esc> button.

   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. From the firmware selection menu, using the arrow keys, select the entry "Intel <R> Rapid Storage Technology" and confirm your selection.
4. Select "Create RAID Volume".
5. In the next window, enter a name for the RAID system.
6. Select "RAID Level" and select "RAID1" or "RAID5" in the following selection window, depending on which RAID system you want to set up.

   A list of available drives is displayed.
7. Under "Select Disks" select the drives ① that you want to integrate into your RAID system and confirm your selection.



   – The integrated drive is given a check mark in the list ②.
   – You can find the assignment of the drive to the mounting location in the drive bay in front of the drive model designation, see ③.
8. Select "Create Volume".

   In the next window, the details of the RAID system (RAID volume) that you have just set up are displayed.

   The onboard RAID system is set up.
9. To exit the firmware settings, press the <F4> button (Save & Exit) and confirm the subsequent dialog with <Y>.

Setting up Onboard RAID system "Intel® Rapid Storage Technology"

1. Select "Start > Programs > Start > Intel".
2. Select the "Manage" tab.

   Information on setting up a RAID system with "Intel® Rapid Storage Technology" is available in the documentation or software help.

5.4.4.2 Monitoring the onboard RAID system with "Intel® Rapid Storage Technology"

Open software for monitoring the "Intel® Rapid Storage Technology" onboard RAID system

1. Select "Start > Programs > Start > Intel".

Display status of the onboard RAID system (faulty drive)

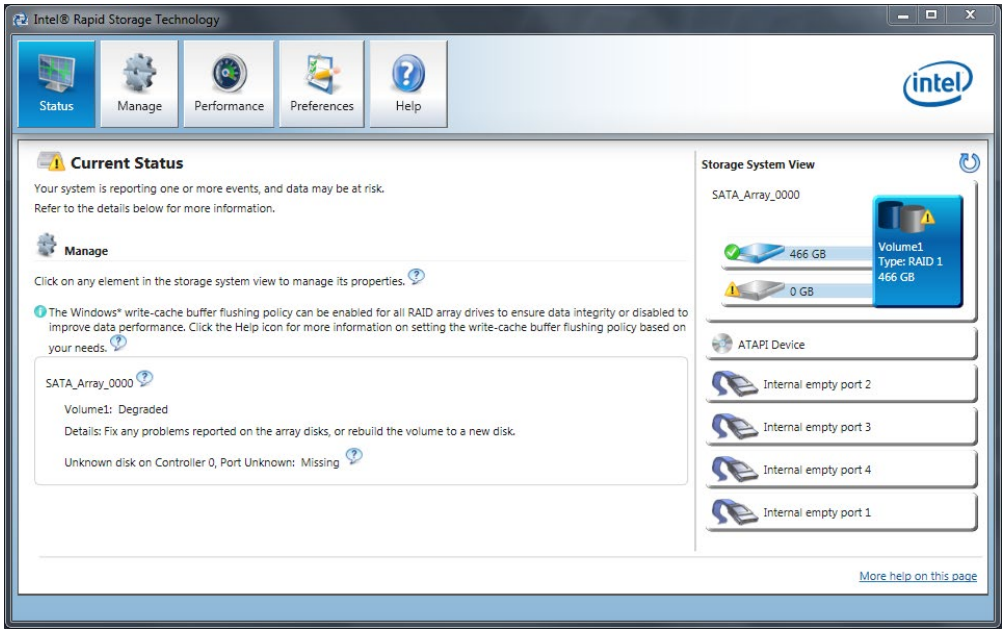
1. Select the "Status" tab.

   In the "Storage System View" area on the right side of the window, you will find information on:

   – a defective drive

   – a/the functioning drives

Example display status of an onboard RAID1 system:



Creating a report on the onboard RAID system

1. Select the "Help" tab.
2. Select "System Report" > "Save".

5.4.4.3 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. • Refer to the controller documentation for instructions on setting up replacement drives.

1. Select "Start" > "Intel" > "Intel Rapid Storage Technology".
2. Select the "Preferences" menu.
3. Go to the "Automatic Rebuild" area and **activate** the "Auto-rebuild on hot plug" option.

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.

1. Select "Start" > "Intel" > "Intel Rapid Storage Technology".
2. Select the "Preferences" menu.
3. Go to the "Automatic Rebuild" area and **deactivate** the "Auto-rebuild on hot plug" option.

Manual integration of the replaced drive (in the event of an error)

You can manually integrate a replaced drive in the onboard RAID system as follows:

- In the running system (without restarting the device)
- After switching off the device

Integrating a replaced drive in the running system (without restarting the device):

1. Select "Start" > "Intel" > "Intel Rapid Storage Technology".
2. Select the "Status" menu.

   The new drive is displayed on the right-hand side of the program window in the "Storage System View" area.

   If the new drive is not displayed, click the icon "Run Hardware Scan now".
3. Click on the RAID volume in the "Storage System View" area on the right-hand side of the program window.
4. In the "Manage" menu, click on the link "Rebuild to another Disk".
5. Select the newly integrated drive in the next dialog and click "Rebuild".

   The data synchronization of the onboard RAID system (Page 83) is started.

5.4.4.4 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 81)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 "Run Hardware Scan now".

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

5.4.5 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:

- < 3 h with 90% HDD system load and RAID5 with HDD 1 TB.

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

5.5 Monitoring of the device

5.5.1 Monitoring functions

You can monitor the following device functions with the SIMATIC DiagBase or SIMATIC DiagMonitor software:

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. • With SIMATIC IPC DiagBase or SIMATIC IPC DiagMonitor, actions are triggered when the temperature thresholds are exceeded.	• Status display "TEMP (Page 30)" • Closed-loop speed control of the device fans, the power supply fan and the fan of the optional graphics card • 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 • Optional graphics card • Single power supply (400 W) • Drive cage type A	• Status display "FAN (Page 30)" • Fan alarm is output.
Watchdog	• Monitoring of the system status and message as to whether a station is still operational. • If the watchdog is not operated within a configured monitoring time, a watchdog alarm is output. • A change to the monitoring time is effective immediately.	• Status display "WATCHDOG (Page 30)" Depending on the setting, the following actions are initiated: • Reset on: A hardware reset is carried out
Monitoring of the voltages	• Monitoring of the charge status of the buffer battery (CMOS) • When the first warning threshold is reached, the backup battery will run for at least 1 more month.	• If a critical or error status occurs, an 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 30)" • SMART status of the hard drives • The following statuses, for example, are displayed in a RAID system: "Normal", "OK", "Degraded", error "Rebuild", rebuilding

NOTICE
Fan monitoring restricted The single power supply (850 W) and the redundant power supply (350 W) do not signal a fan fault. If the fan fails or is defective, there is no fan alarm. The device switches off automatically to protect against overheating.

Software for device monitoring

You can find information on the monitoring software and its documentation under:

- SIMATIC IPC DiagBase (Page 85) for monitoring and alarm output locally on the device
- SIMATIC IPC DiagMonitor (Page 85) for monitoring and alarm output via the network

SIMATIC DiagBase or SIMATIC DiagMonitor also controls the status displays of the IPC, see: System status displays (Page 30).

5.5.2 SIMATIC IPC DiagBase

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

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

- Important instructions and manuals for operating the device (Page 11)

5.5.3 SIMATIC IPC DiagMonitor

The SIMATIC IPC DiagMonitor monitoring software can be ordered optionally.

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

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

- Important instructions and manuals for operating the device (Page 11)

Note

SIMATIC IPC DiagMonitor only supports the device hardware as of version 5.1.5.

Older versions do not support the device hardware.

See also

Software accessories (Page 37)

5.6 Remote maintenance of the device

5.6.1 Remote maintenance functions and device requirements for remote maintenance

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.

Device requirements for remote maintenance

The following requirements must be fulfilled in order to use the remote maintenance:

- Processor that supports iAMT technology
- Motherboard SMS-W480
- Connection to the network

5.6.2 Remote maintenance with iAMT

5.6.2.1 Enable Intel® AMT control on the device

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

- Note the information on the device requirements for Intel® AMT. (Page 86)
- First, enable the Intel® AMT functions (Page 87).
- Then configure the Intel® AMT functions. (Page 87)

Note

You can find information on the firmware settings in the user manual (UM) for the SMS-W480 motherboard, see "Important instructions and manuals for operating the device (Page 11)".

5.6.2.2 Activate Intel® AMT

1. Switch on the device or restart it.
2. Immediately after turning on the device, as soon as the message "`Press <DEL> or <ESC> to enter setup`" appears, press and hold the <Del> or <Esc> button.

   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 "Advanced" > "AMT Configuration".
4. Assign the "Enabled" value to the firmware setting "AMT BIOS Features".
5. Press the button <F4> (Save & Exit) and confirm the subsequent dialogue with <Y>.
6. Switch off the device and then configure the Intel® AMT functions (Page 87).

5.6.2.3 Configuring Intel® AMT

Requirements and procedure for using Intel® AMT

Requirement

- The Intel® AMT functions are enabled. (Page 87)
- The device was switched off or restarted after activating the Intel® AMT functions.

Procedure

1. Immediately after switching on the device, press the keyboard shortcut <Ctrl + P> as soon as the message "Press <Ctrl + P > to enter MEBx" appears.

   MEBx ("Intel® Management Engine BIOS Extension") is open.
2. Log in to MEBx and assign a password. (Page 87)
3. Configure the Intel® AMT functions in the Options of the MEBx (Page 88).

Logging onto MEBx (assigning password)

1. Select the "Intel(R) Management Engine BIOS Extension" option on the "Main Page" with the arrow keys.
2. Select the "MEBx Login" option.
3. Confirm your selection with the <Return> key.

4. Enter the following "**Intel(R) ME Password**" when logging on the first time:

   admin

5. 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
   – Eine Zahl
   – A special character . ! @ # $ % ^ & *

   Note

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

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:

- Intel(R) ME General Settings
- Intel(R) AMT
- Intel(R) AMT Configuration
- MEBx Exit

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

- Intel® AMT functions are enabled, i.e. the firmware setting "AMT BIOS" is assigned the value "Enabled". You can find information on this under "Activate Intel® AMT (Page 87)".
- A device with the SMS-W480 motherboard.

Note

The MEBx setting options depend on whether or not your device supports Intel® AMT.

Intel(R) ME General Settings

MEBx setting	Meaning
Change ME Passwort	Here, you can change the current password for logging onto MEBx.
FW Update	Firmware updates of the "Intel® Management Engine" (ME) can be installed, not installed or only installed after entering the password.

Intel(R) AMT

MEBx setting	Meaning
Intel(R) AMT	When Intel® Active Management Technology (iAMT) is disabled, all network settings are reset to the settings in the delivery state.

Intel(R) AMT Configuration

MEBx setting	Meaning
Manageability Feature Selection	Intel® AMT functions are enabled or disabled. In the delivery state, "Manageability Feature Selection" = Disabled.
SOL/Storage Redirection/KVM (only if "Manageability Feature Selection" = Enabled)	Enabling and disabling of the Intel® AMT functions: • SOL • Storage Redirection • KVM Feature Selection
User Consent (only if "Manageability Feature Selection" = Enabled)	User Consent settings. Forces the following additional security behavior: When a user attempts to establish a KVM connection remotely, a six-digit number is displayed on the AMT PC. The remote user must enter this number on the help desk PC before the KVM connection can be opened.
Password Policy (only if "Manageability Feature Selection" = Enabled)	Password policy that specifies the conditions under which the password is permitted to be changed remotely. The following options can be selected: • Default Password Only • During Setup And Configuration • Anytime
Network Setup (only if "Manageability Feature Selection" = Enabled)	The following network settings can be configured: Intel(R) ME Network Name Settings • Host Name • Domain Name • Shared/Dedicated FQDN • Dynamic DNS Update TCP/IP Settings > Wired LAN IPV4 Configuration • DHCP mode
Activate Network Access (only if "Manageability Feature Selection" = Enabled)	Enables the network interface. This MEBx setting is only available when the network is not enabled.
Unconfigure Network Access (only if "Manageability Feature Selection" = Enabled)	Disables the network interface and resets the network settings to their default values.
Remote Setup And Configuration (only if "Manageability Feature Selection" = Enabled)	Displays the current provisioning settings.
Power Control (only if "Manageability Feature Selection" = Enabled)	Specifies the power states (S0, S3, S4, S5) of the computer in which MEBx is enabled.

MEBx Exit

Exiting MEBx. The changes are saved.

Further information

More information about MEBx can be found here: Intel® website (https://www.intel.com).

5.6.2.4 Reset Intel® AMT functions to default settings and disabling iAMT

One effect of resetting to the default settings is that Intel® AMT is disabled.

1. Switch on the device or restart it.
2. Immediately after turning on the device, as soon as the message "`Press <DEL> or <ESC> to enter setup`" appears, press and hold the <Del> or <Esc> button.

   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 "Advanced" > "AMT Configuration".
4. Assign the "Enabled" value to the firmware setting "Unconfigure ME".
5. Press the button <F4> (Save & Exit) and confirm the subsequent dialogue with <Y>.
6. Switch off the device or restart the device.
7. At the next start-up, a confirmation message appears to perform the "Unconfigure ME" operation.

   If you perform this action, all values of the Intel® Management Engine BIOS Extension (MEBx) including the MEBx password are reset to default values.

5.6.2.5 Disabling Intel® AMT access to the firmware/BIOS settings

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 after turning on the device, as soon as the message "`Press <DEL> or <ESC> to enter setup`" appears, press and hold the <Del> or <Esc> button.

   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 "Advanced" > "AMT Configuration".
4. Assign the "Disabled" value to the firmware setting "AMT BIOS Features".
5. Press the button <F4> (Save & Exit) and confirm the subsequent dialog with <Yes>.
6. Switch off the device and then configure the Intel® AMT functions.

5.7 Trusted Platform Module (TPM)

Depending on the ordered configuration of your device, a Trusted Platform Module according to Standard TPM V2.0 may be available. The Trusted Platform Module is a chip that enhances your device with security functions. This provides an improved protection from manipulation of the device.

NOTICE
Import restrictions for the Trusted Platform Module Use of the Trusted Platform Module 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.

Activating the Trusted Platform Module

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

Expanding and assigning parameters to the device

6

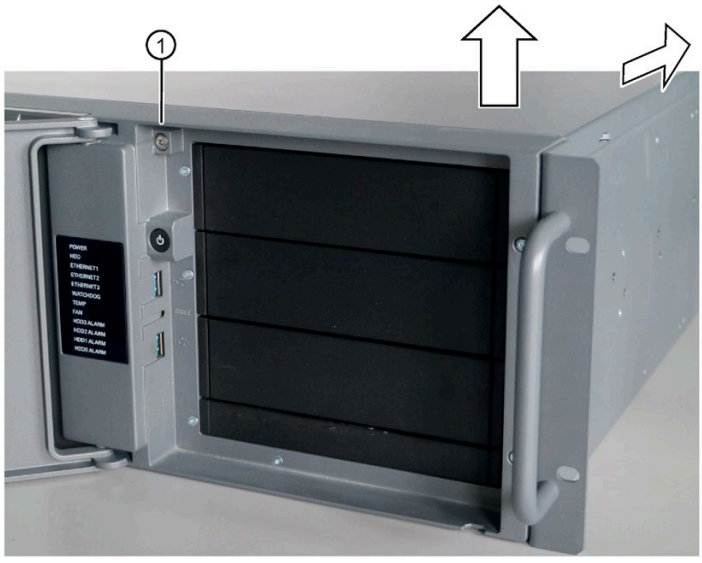
6.1 Open the device

Requirement

- You know the important safety instructions under "Safety instructions on device and system extensions (Page 48)".
- T10 screwdriver

Procedure

1. Fully disconnect the device from the line voltage, see "Switching off the device (Page 72)".
2. Unplug all connecting cables.
3. Open the front panel. (Page 75)
4. Unscrew the locking screw of the enclosure cover ①.



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

6.2 Installing and removing expansion cards

6.2.1 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 expansion card slots (Page 152)".

Requirements for expansion cards

- You can find the permitted dimensions for expansion cards under "Dimension drawing of the expansion cards (Page 166)". To rule out contact problems and malfunctions, do not use any expansion cards that exceed the maximum permissible height.
- For expansion cards with a lower mounting height (low-profile expansion card), three long card retainers are enclosed with the device. Use these instead of the long card retainers installed in the device.
- Long PCI/PCIe expansion cards must be equipped with an extender so that they can be introduced into the guide rails.

  Long expansion cards are only supported in a device with a standard enclosure.

6.2.2 Installing expansion cards

Requirement

- You know the important safety instructions under "Safety instructions on device and system extensions (Page 48)".
- You know the Information on using expansion cards. (Page 94)

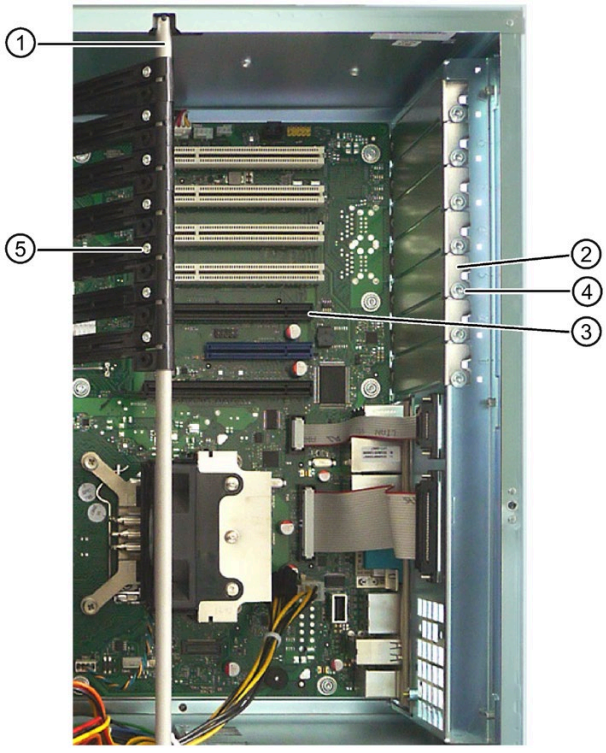
Procedure

1. Fully disconnect the device from the line voltage, see "Switching off the device (Page 72)".
2. Open the device. Be sure to follow the important instructions under "Open the device (Page 93)".
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 ② for the required slot.
5. Insert the expansion card into the free slot ③ on the motherboard.
6. Secure the expansion card with the screw ④.
7. Re-insert the bar ① with the card retainers.
8. Detach the card retainer in question and place it on the expansion card in the slot ③.
9. Secure the card retainer with the locking screw ⑤.

   If you are installing a short expansion card, remove the locking screw ⑤ from 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. Close the device.



6.2.3 Removing expansion cards

Requirement

- You know the important safety instructions under "Safety instructions on device and system extensions (Page 48)".
- You can find Information on the components described in the procedure under "Installing expansion cards (Page 95)".

Procedure

1. Fully disconnect the device from the line voltage, see "Switching off the device (Page 72)".
2. Open the device. Be sure to follow the important instructions under "Open the device (Page 93)".
3. Hold the bar with the card retainer at both ends and remove it by pulling it upwards.

   The bar is latched on both ends.
4. Disconnect all cables and the screw of the expansion card that you wish to remove.
5. Remove the expansion card from the slot.

   If you do not wish to install a new expansion card, install the corresponding slot bracket with the screw.
6. Close the device.

6.3 Installing and removing memory modules

6.3.1 Information on using memory modules

Usable memory modules

You can operate the device with the following memory modules:

- DIMM DDR4 memory modules
- Memory transaction rate 2933 MT/sec "unbuffered"
- "without ECC"

Slots for memory modules

Information on the slots of the memory modules can be found under "Layout of the motherboard (Page 173)".

Combination options for memory modules with motherboard SMS-H410

You can equip each device with one or two memory modules of the same capacity. Mixing of memory capacities is not permitted.

Use the modules to expand the memory capacity of your device to a maximum of 64 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_A1*	DIMM_B1*	
Combination 1		4 GB / 8 GB / 16 GB / 32 GB	32 GB
Combination 2	4 GB / 8 GB / 16 GB / 32 GB	4 GB / 8 GB / 16 GB / 32 GB	64 GB

Combination options for memory modules with SMS-W480 motherboard

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_A1*	DIMM_A2	DIMM_B1*	DIMM_B2	
Combination 1			4 GB / 8 GB / 16 GB / 32 GB		32 GB
Combination 2	4 GB / 8 GB / 16 GB / 32 GB		4 GB / 8 GB / 16 GB / 32 GB		64 GB
Combination 3	Combinations of three memory modules are not permitted				
Combination 4	4 GB / 8 GB / 16 GB / 32 GB	4 GB / 8 GB / 16 GB / 32 GB	4 GB / 8 GB / 16 GB / 32 GB	4 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.

6.3.2 Installing memory modules

Requirement

- You know the important safety instructions under "Safety instructions on device and system extensions (Page 48)".
- You know the Information on using memory modules. (Page 96)

Order when installing multiple memory modules

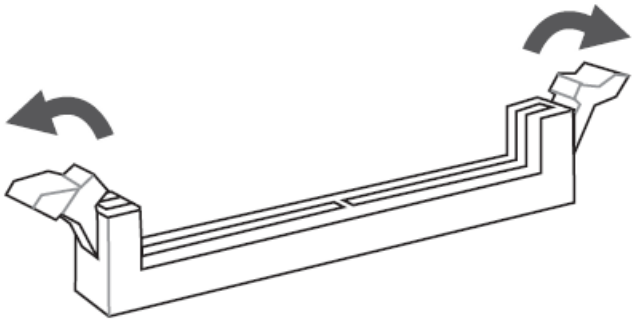
If you install several memory modules, install them one after the other in the following order:

- Memory module 1: DIMM_A1* slot
- Memory module 2: DIMM_A2 slot
- Memory module 3: DIMM_B1* slot
- Memory module 4: DIMM_B2 slot

The slots of the memory modules are labeled on the motherboard.

Procedure

1. Fully disconnect the device from the line voltage, see "Switching off the device (Page 72)".
2. Open the device. Be sure to follow the important instructions under "Open the device (Page 93)".
3. To obtain better access to the memory modules, remove expansion cards (Page 96) if required.
4. Open the two locks to the left and right of the slot.

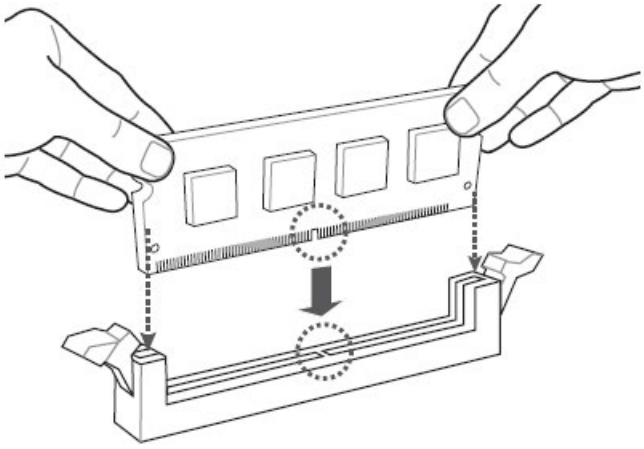


5. Remove the memory module from its packaging.

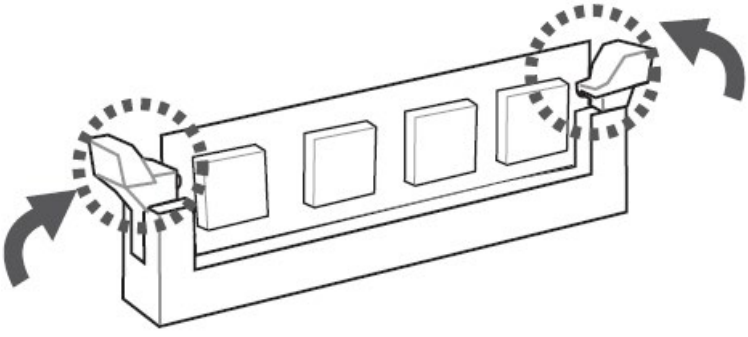
   Hold it by the upper edges only.

   when inserting, pay attention to the cutout (see figure), which must be in line with the coding of the base.

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



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



8. Close the device.

Display of a changed memory configuration

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

6.3.3 Removing memory modules

Requirement

- You know the important safety instructions under "Safety instructions on device and system extensions (Page 48)".

Order when removing multiple memory modules

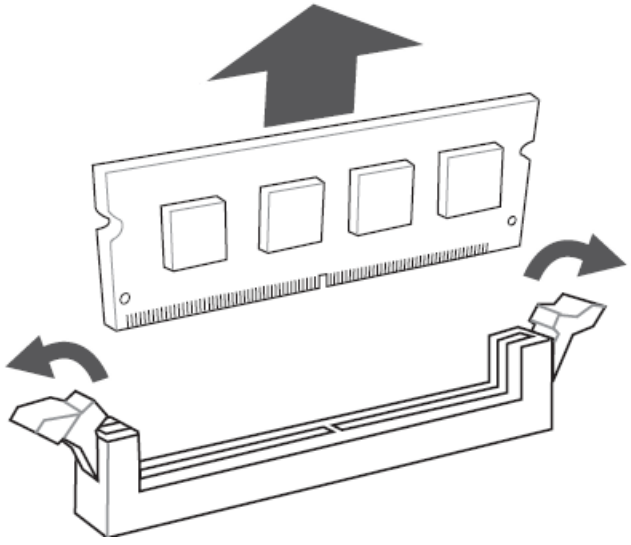
If you remove several memory modules, remove them one after the other in the following order:

- Memory module 1: DIMM_B2 slot
- Memory module 2: DIMM_B1* slot
- Memory module 3: DIMM_A2 slot
- Memory module 4: DIMM_A1* slot

The slots of the memory modules are labeled on the motherboard.

Procedure

1. Fully disconnect the device from the line voltage, see "Switching off the device (Page 72)".
2. Open the device. Be sure to follow the important instructions under "Open the device (Page 93)".
3. To obtain better access to the memory modules, remove expansion cards (Page 96) if required.
4. Open the two latches at the sides of the memory module evenly. Remove the memory module from the slot.



5. Close the device.

Display of a changed memory configuration

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

6.4 Connecting a USB stick to the internal interface

The device has one or two internal USB ports to which you can connect a USB stick.

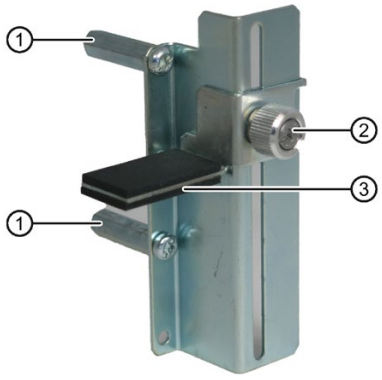
You will find this interface on the motherboard (Page 173) at the rear of the device.

Requirement

- You know the important safety instructions under "Safety instructions on device and system extensions (Page 48)".
- Retainer for locking the internal USB interface, see "Hardware accessories (Page 34)".
- Screwdriver TX10

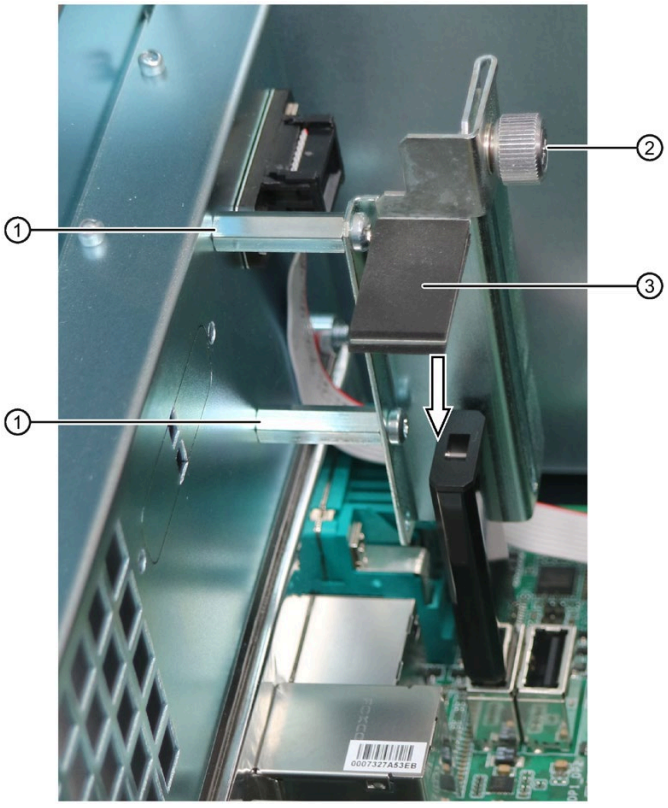
Procedure

1. Fully disconnect the device from the line voltage, see "Switching off the device (Page 72)".
2. Open the device. Be sure to follow the important instructions under "Open the device (Page 93)".
3. Insert the USB stick into the socket of the internal USB interface on the motherboard (Page 173).
4. Screw the two hexagon bolts ① with two of the enclosed screws into the first and third holes of the retainer.



5. Hold the retainer from the inside with the hexagon bolts on the rear panel of the device and fasten the retainer from the outside with the remaining screws on the rear panel of the device. Information on the position of the holes is available in section "Rear of the device (Page 23)".
6. Slide the bar of the retainer ③ onto the USB stick.

7. Fix the retainer by turning the screw ② on the guide rail.



8. Close the device.

6.5 Installing and removing an optional graphics card

6.5.1 Installing the optional graphics card

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

For connecting monitors to these graphics interfaces, two or three connection sockets are available as standard on the rear of the device, depending on the type of motherboard.

Information on the position of the connection sockets and the labeling on the device can be found in section "Device ports (Page 24)".

To connect additional monitors to the device (multi-monitoring), you can install a so-called "optional graphics card".

Requirement

- You know the important safety instructions under "Safety instructions on device and system extensions (Page 48)".
- You know the important information about installing expansion cards. (Page 94)

- A graphics card suitable for this device that supports multi-monitoring.

  You can obtain information on this from your local contact person, see "Service and support (Page 187)".

- You have made a note of the firmware settings because the firmware settings of the device can be deleted when an optional 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. The optional graphics card is an expansion card.

   Install the optional graphics card.

   Note the information under "Installing expansion cards (Page 95)".

   Note

   Graphics cards with external power supply

   Connect graphics cards that require an external power supply with the 6-pin or 8-pin connector of the power supply. You can find information on this in the section "Technical specifications of the connectors for the power supply of optional graphics cards (Page 160)".

   The technical conditions of the power supply must be complied with.

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

   Note the following information.

Display message about opening firmware settings on the monitor of the optional graphics card

To configure the firmware, press the <Del> or <Esc> key when the boot message appears during the boot phase of the device to access the firmware settings.

In delivery state the device is configured so that this message is only displayed on a monitor that is connected to a DPP connection or DVI-D connection on the rear of the device, see section "Device ports (Page 24)".

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

1. Connect a monitor to the DPP port or the DVI-D port.
2. During the boot phase, when a boot message appears, press the <Del> or <Esc> button.
3. Select "Chipset" > "System Agent (SA) Configuration".
4. Assign the "Auto" value to the firmware setting "Primary Display".

See also

Connecting several monitors (multi-monitoring) (Page 62)

6.5.2 Removing the optional 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 optional 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. The optional graphics card is an expansion card.

   Remove the optional graphics card.

   Note the information under "Removing expansion cards (Page 96)".
2. Check the firmware settings.

6.6 Installing and removing drives

6.6.1 Installing drives in drive cage type A

6.6.1.1 Installation conditions for drives in 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 numbering of the mounting locations in the drive cage type A. (Page 18)

Number of drives per system	Mounting location in drive cage type A	Installation option
1	Drive cage type A: • Mounting location 0	• 2.5" drive or 3.5" drive in removable tray (Page 106)
2	Drive cage type A: • Mounting location 0 • Mounting location 1	• 2.5" drive or 3.5" drive in removable tray (Page 106)

Number of drives per system	Mounting location in drive cage type A	Installation option
3	Drive cage type A: • Mounting location 0 • Mounting location 1 • Mounting location 2	• 2.5" drive or 3.5" drive in removable tray (Page 106)
4	Drive cage type A: • Mounting location 0 • Mounting location 1 • Mounting location 2	• 2.5" drive or 3.5" drive in removable tray (Page 106)
	Drive cage type A: • Mounting location 3	• 2.5" drive or 3.5" drive in removable tray (with 5.25" mounting frame) (Page 108) • 5.25" drive or 5.25" component (Page 119)
5	Drive cage type A: • Mounting location 0 • Mounting location 1 • Mounting location 2	• 2.5" drive or 3.5" drive in removable tray (Page 106)
	• Mounting location 3	• 2.5" drive or 3.5" drive in removable tray (with 5.25" mounting frame) (Page 108) • 5.25" drive or 5.25" component (Page 119)
	1 x internal in the device	• 1 x HDD inside on the side panel of the device (Page 119)
6	Drive cage type A: • Mounting location 0 • Mounting location 1 • Mounting location 2	• 2.5" drive or 3.5" drive in removable tray (Page 106) • 3.5" drive in removable tray (Page 106)
	• Mounting location 3	• 2.5" drive or 3.5" drive in removable tray (with 5.25" mounting frame) (Page 108) • 5.25" drive or 5.25" component (Page 119)
	• 2 x internal in the device	• 2 x HDD inside on the side panel of the device (Page 121)

Possible drive configurations in drive cage type A

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

- Non-RAID system
- Onboard RAID1 system
- Onboard RAID5 system
- Onboard RAID1 system with hot-spare drive
- Onboard RAID5 system with hot-spare drive

6.6.1.2 Change 2.5" and 3.5" drive in removable tray

Requirement

- You know the important safety instructions under "Safety instructions on device and system extensions (Page 48)".
- An original spare part, that is, a drive approved for this device.
- You can find information on the removable tray as a replacement part under "Hardware accessories (Page 34)".
- The device is equipped with the drive cage type A.
- You know the information under "Installation conditions for drives in drive cage type A (Page 104)".
- When replacing an HD: T10 screwdriver
- When replacing an SSD: T8 screwdriver
- The device you wish to replace is inactive.

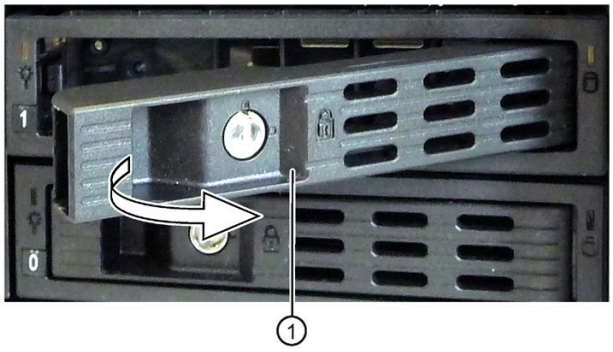
NOTICE
Risk of damaging the drive and data loss Drives in removable trays can only be exchanged in conjunction with RAID1 and RAID5 during operation (hot swap). When you remove the drive while data is being written to it, you may damage the drive and destroy data. • Only remove the removable tray from the device when the drive is inactive, see "Status displays on removable tray for drives (Page 32)".

Procedure

1. If there is no RAID system:

   Fully disconnect the device from the line voltage, see "Switching off the device (Page 72)".
2. Open the front panel (Page 75).
3. Open the lock of the removable tray with the appropriate key.

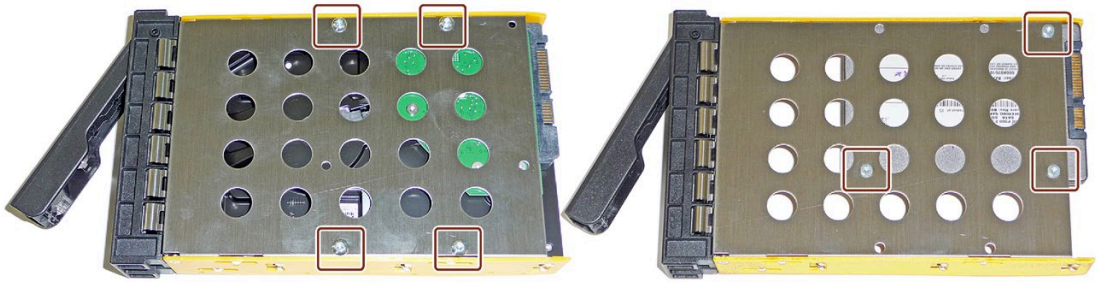
4. Reach into the notch ① in the bracket of the removable tray and pull out the bracket in the direction of the arrow up to a slight resistance.



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

5. 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.
6. 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.



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

   Take care not to touch the contacts of the drive when you do this.

8. Fasten the new drive with the screws to the base of the removable tray.

   Only use the original screws.

9. Carefully insert the removable tray into the drive cage of the device again.
10. 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.

11. Close the tray bracket.
12. Lock the removable tray with the key.

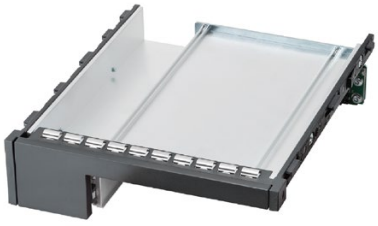
Note

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

6.6.1.3 Installing a 5.25" mounting frame for removable tray

You can install a 5.25" mounting frame for removable trays in the drive cage type A.

You can then use a 2.5 "or a 3.5" drive in the removable tray.



5.25" mounting frame with removable tray

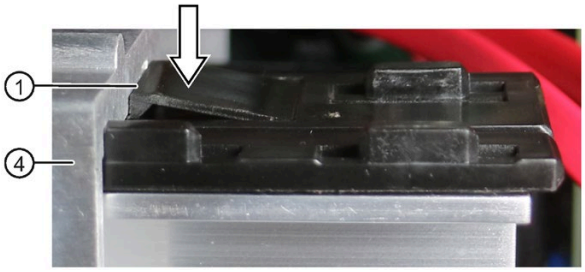
Requirement

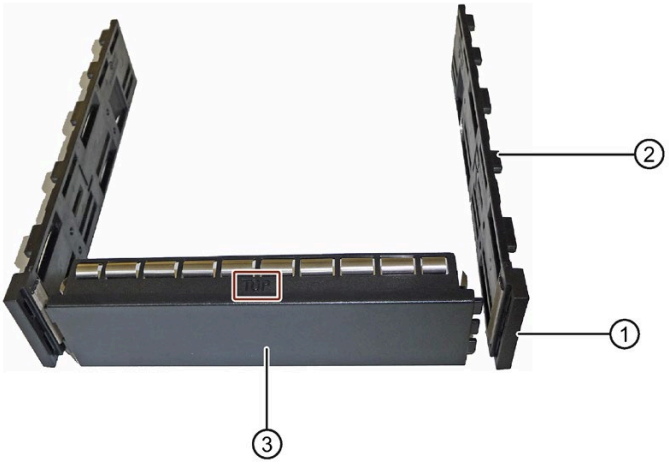
- You know the important safety instructions under "Safety instructions on device and system extensions (Page 48)".
- The device is equipped with the drive cage type A.
- You know the information under: Installation conditions for drives in drive cage type A (Page 104)
- An original replacement part. For information on replacement parts, refer to "Hardware accessories (Page 34)".
- T10 screwdriver

Procedure

1. Fully disconnect the device from the line voltage, see "Switching off the device (Page 72)".
2. Open the device. Be sure to follow the important instructions under "Open the device (Page 93)".

3. 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.





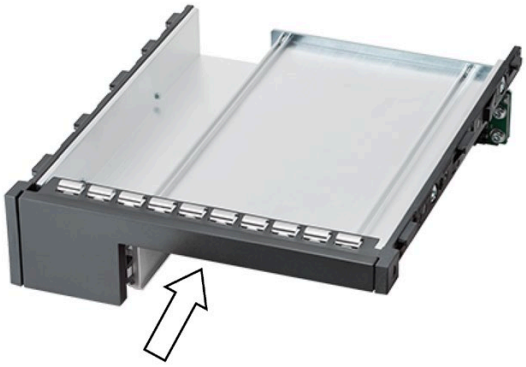
4. Remove the left and right mounting bars ② from the cover ③.

Note

Reinstalling an empty 5.25" component

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

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

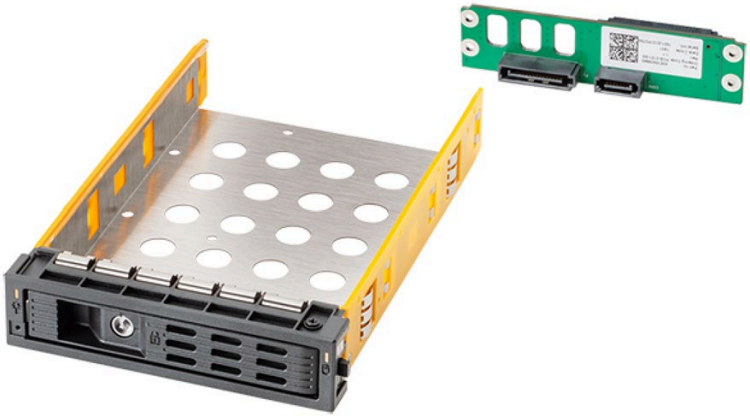


6. Connect the data cables to the 5.25" mounting frame.
7. Carefully insert the removable tray into the 5.25" mounting frame.
8. Fold the bracket out completely and slide the removable tray on the bracket completely into the 5.25" mounting frame.
9. Make sure that the removable tray is firmly seated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

6.6.1.4 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.



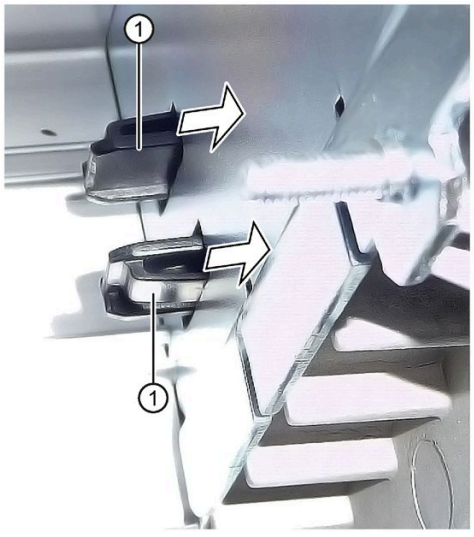
Removable tray with backplane

Requirement

- You know the important safety instructions under "Safety instructions on device and system extensions (Page 48)".
- An original replacement part. For information on replacement parts, refer to "Hardware accessories (Page 34)".
- The device is equipped with the drive cage type A.

Procedure

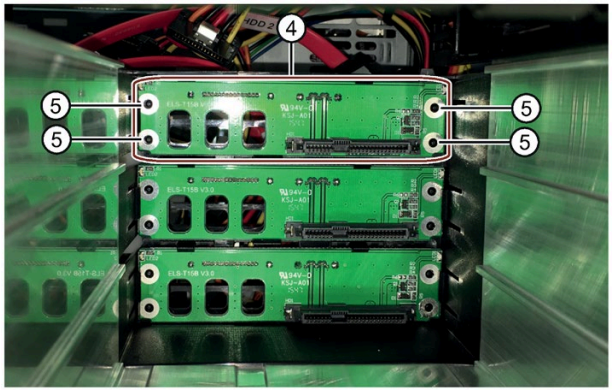
1. Fully disconnect the device from the line voltage, see "Switching off the device (Page 72)".
2. Open the device. Be sure to follow the important instructions under "Open the device (Page 93)".
3. Press the locks ① of the cover ② together inside the device and keep them pressed.



4. Push the locks to the front in the direction of the arrow.
5. Remove the cover ② upwards at an angle at the front of the device.

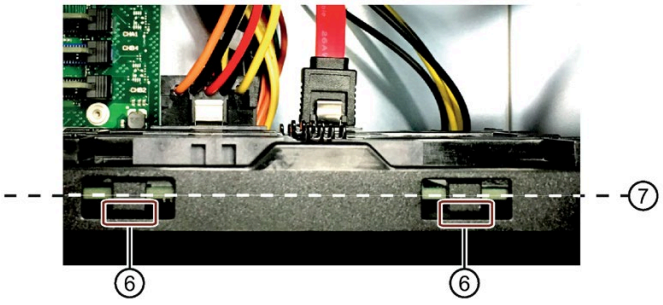
6. On the front of the drive cage, remove the cover of the mounting locations ③, which may be located to the right of the cover ②.
7. Remove all existing removable trays until the drive cage is freely accessible.

8. Insert the backplane ④ into the drive bay from the front 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.



9. Reinstall the required blanking plates or removable trays.
10. Insert the cover ② into the front of the device.
11. At the backplane, connect the data cables with the corresponding interfaces on the motherboard or the hardware RAID controller.
12. Connect the power supply.
13. Close the device.

6.6.1.5 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.

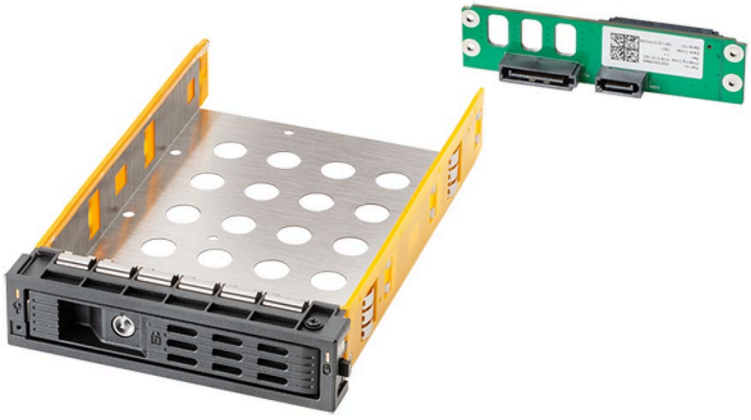


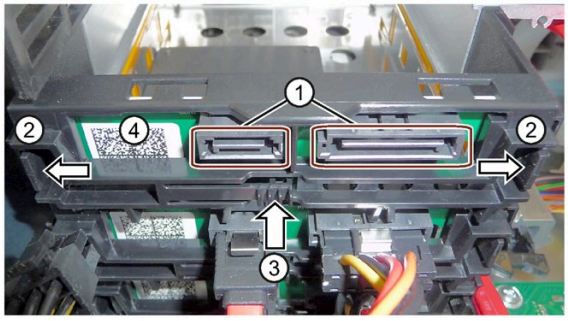
Figure 6-1 Removable tray with backplane

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 72)".
- The device is equipped with the drive cage type A.

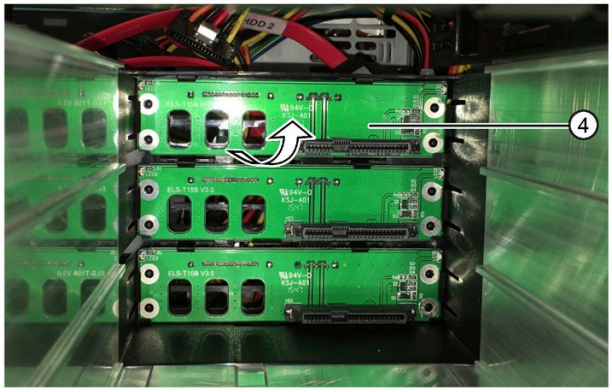
Procedure

1. Open the device. Be sure to follow the important instructions under "Open the device (Page 93)".
2. Note the assignment of all data cables to the motherboard and disconnect all data cables ①.



3. Unlock the backplane by pressing firmly in the direction of the arrow on the latching lugs ② and press the ejector ③.

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



5. Close the device.

See also

Installing a backplane for removable tray (Page 110)

6.6.2 Installing drives in the drive cage type B

6.6.2.1 Installation conditions for drives in 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 described below during operation.

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 the numbering of the mounting locations in the drive bay type B. (Page 20)

Number of drives per system	Mounting location	Installation option
1	Drive cage type B: • Mounting location 0	• 2.5" drive or 3.5" drive in the assembly kit (Page 116) • 5.25" drive or 5.25" component (Page 119)
2	Drive cage type B: • Mounting location 0 • Mounting location 1	• 2.5" drive or 3.5" drive in the assembly kit (Page 116) • 5.25" drive or 5.25" component (Page 119)

Number of drives per system	Mounting location	Installation option
3	Drive cage type B: • Mounting location 0 • Mounting location 1 • Mounting location 2	• 2.5" drive or 3.5" drive in the assembly kit (Page 116) • 5.25" drive or 5.25" component (Page 119)
4	Drive cage type B: • Mounting location 0 • Mounting location 1 • Mounting location 2	• 2.5" drive or 3.5" drive in the assembly kit (Page 116) • 5.25" drive or 5.25" component (Page 119)
	1 x internal in the device	• 1 x HDD inside on the side panel of the device (Page 121)
5	Drive cage type B: • Mounting location 0 • Mounting location 1 • Mounting location 2	• 2.5" drive or 3.5" drive in the assembly kit (Page 116) • 5.25" drive or 5.25" component (Page 119)
	2 x internal in the device	• 2 x HDD inside on the side panel of the device (Page 121)

Maximum number of drives per drive type and mounting locations in drive cage type B

Drive type	Drive cage	Side panel
SATA[1]	3	2
SATA Enterprise	2[1]	2

[1] Installed in mounting location 0 and 2

Maximum vibration load for drives in the respective installation location

Note

If the device is permanently installed, mounted on telescopic rails or operated as a tower, it may only be exposed to the following vibration loads during operation.

The restrictions do not apply to the use of SSD.

Drives in drive cage type B

Drives in drive cage type B may be exposed to the following maximum vibration loads during operation:

- 10 ... 58 Hz: 0.015 mm
- 58 Hz to 500 Hz: 2 m/s^2

Vibrations must not exceed 500 Hz.

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
- RAID5 system
- RAID1 system with hot spare drive
- RAID5 system with hot spare drive

6.6.2.2 Change 2.5" and 3.5" drive in assembly kit for 5.25" tray

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

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

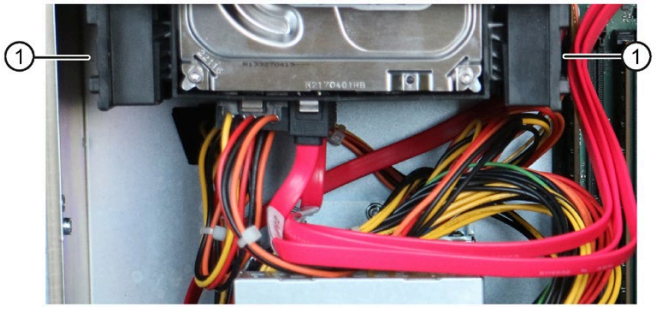
Assembly kit HDD/SSD for 5.25" tray

Requirement

- You know the important safety instructions under "Safety instructions on device and system extensions (Page 48)".
- The device is equipped with a drive cage type B.
- You know the information under:
  - Installation conditions for drives in drive cage type B (Page 114)
- An original spare part, that is, an HDD/SDD assembly kit for 5.25" tray approved for this device. For information on replacement parts, refer to "Hardware accessories (Page 34)".
- When replacing a 3.5" HDD: T10 screwdriver
- When replacing a 2.5" SSD: T8 screwdriver

Procedure

1. Fully disconnect the device from the line voltage, see "Switching off the device (Page 72)".
2. Open the device. Be sure to follow the important instructions under "Open the device (Page 93)".
3. Remove all power supply and data cables from the drive.
4. Press the sides against the surfaces ① of the drive mounting bars ②.



The assembly kit is unlocked.

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

6. Remove the left and right drive mounting bars ② and the drive bay cover ③ from the drive.

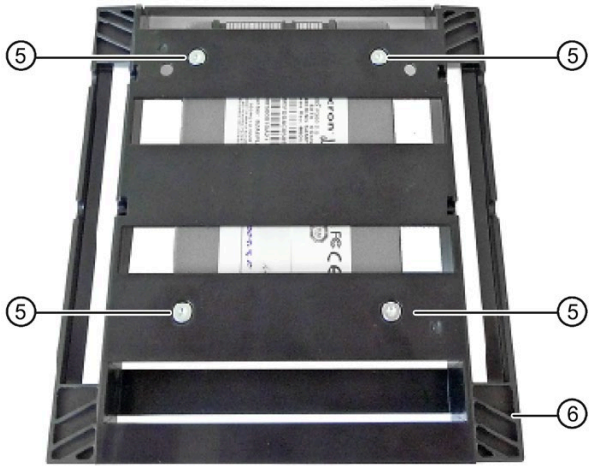
Note:

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

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

7. 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

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

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

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

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

6.6.3 Installing a 5.25" drive

You can install 5.25" drives in the drive cage type A and drive cage type B.

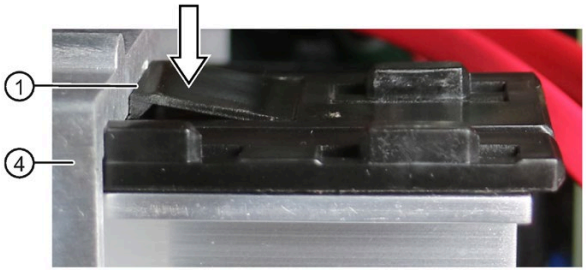
Requirement

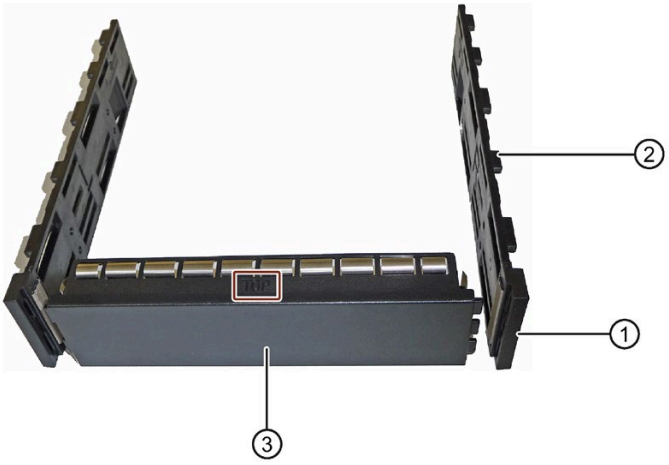
- You know the important safety instructions under "Safety instructions on device and system extensions (Page 48)".
- The device is equipped with a drive cage type A or type B.
- You know the information under:
  - Installation conditions for drives in drive cage type A (Page 104)
  - Installation conditions for drives in drive cage type B (Page 114)
- An original spare part, that is, a 5.25" drive approved for this device. For information on replacement parts, refer to "Hardware accessories (Page 34)".
- T10 screwdriver

Procedure

1. Fully disconnect the device from the line voltage, see "Switching off the device (Page 72)".
2. Open the device. Be sure to follow the important instructions under "Open the device (Page 93)".

3. 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.





4. Remove the left and right mounting bars ② from the cover ③.

Note

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

5. 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.

6. 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.
7. Close the device.

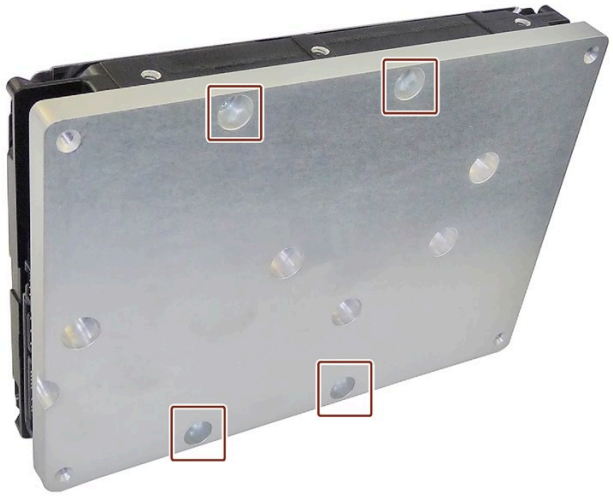
6.6.4 Install the internal drive on the side panel of the device

Requirement

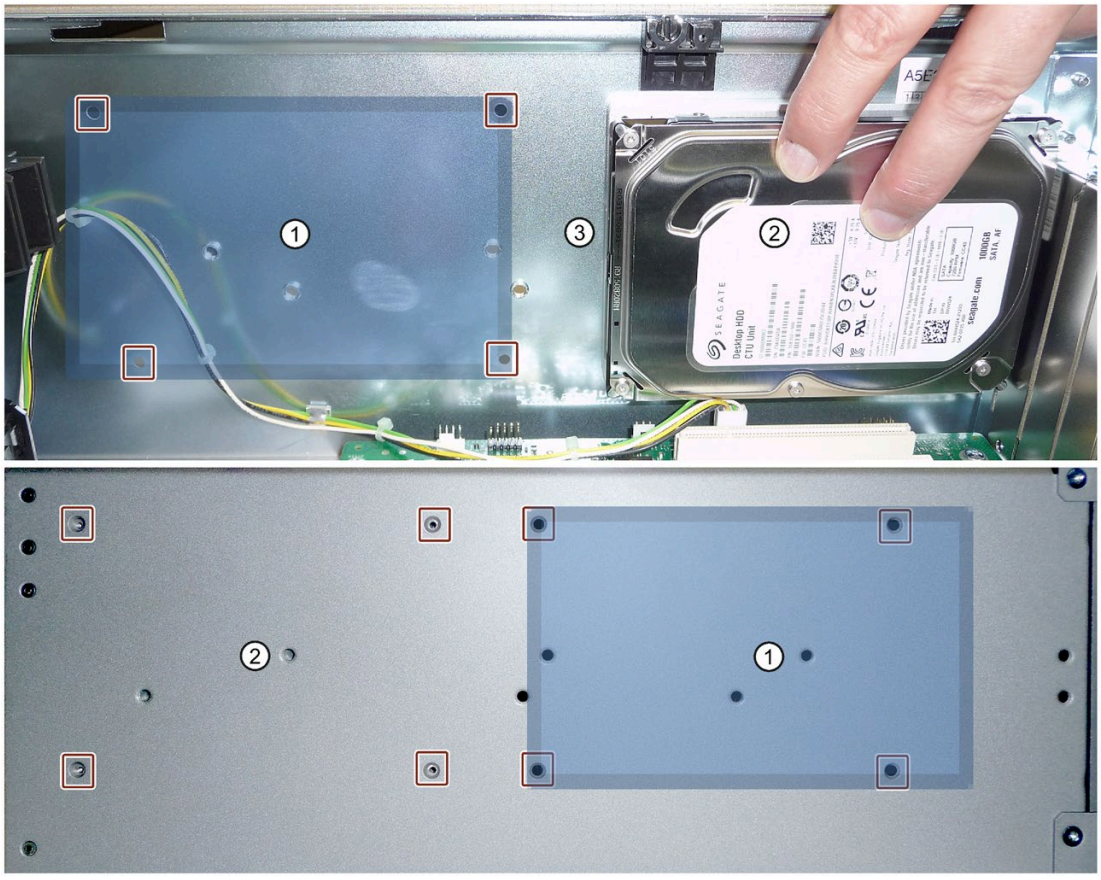
- You know the important safety instructions under "Safety instructions on device and system extensions (Page 48)".
- The device is equipped with a drive cage type A or type B.
- A device with standard enclosure.
- You know the information under:
  - Installation conditions for drives in drive cage type A (Page 104)
  - Installation conditions for drives in drive cage type B (Page 114)
- A drive bay plate with a corresponding drive (HDD) approved for this device. For information on replacement parts, refer to "Hardware accessories (Page 34)".
- T10 screwdriver

Procedure

1. Screw the drive to the drive bay plate (available as option, not included in scope of delivery) at the marked holes.



2. 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 each lie in the middle ③.



3. Connect the SATA cables to the required SATA connectors of the motherboard and to the drive (position ③).
4. Close the device.
5. Connect the power supply.

6.6.5 Installing drives in drive cage type C

6.6.5.1 Installation conditions for drives in the drive cage type C

Installation options for drives in the drive cage type C

You can mount drives in the following combination on the drive bay plate of the drive cage type C:

- 1 x 3.5" HDD
- 2 x 3.5" HDDs
- 1 x 2.5" SSD
- 2 x 2.5" SSDs
- 1 x 3.5" HDD and 1 x 2.5" SSD

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

- You can find information on the mounting locations under "Drive cage type C (Page 21)"
- You can find information on the procedure under "Install drives on the drive bay plate (Page 123)".

6.6.5.2 Install drives on the drive bay plate

Requirement

- You know the important safety instructions under "Safety instructions on device and system extensions (Page 48)".
- The device is equipped with a drive cage type C.
- You know the information under:
  - Installation conditions for drives in the drive cage type C (Page 123)
- Original replacement parts, that is, drives approved for this device, see "Hardware accessories (Page 34)".
- When installing 3.5" HDDs: T10 screwdriver
- When installing 2.5" SSDs: T8 screwdriver

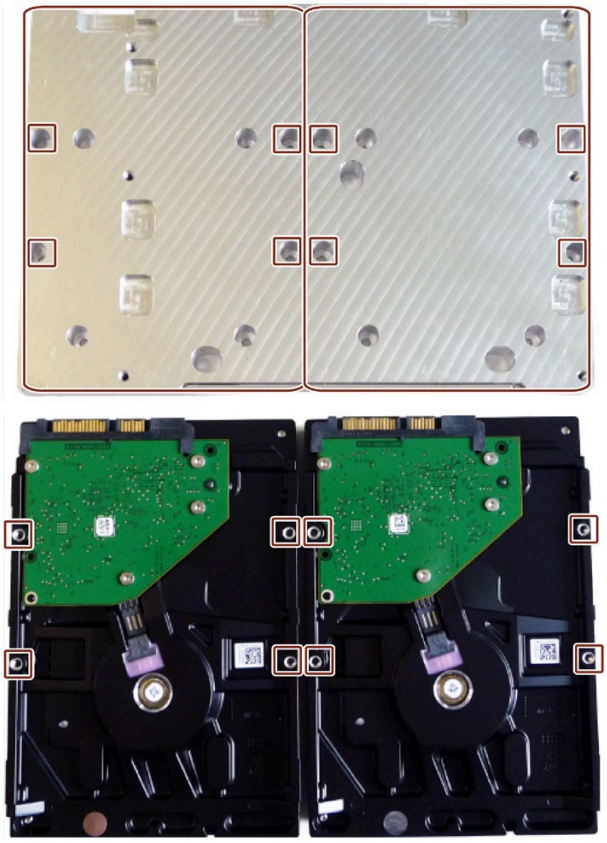
Procedure

1. Fully disconnect the device from the line voltage, see "Switching off the device (Page 72)".
2. Open the device. Be sure to follow the important instructions under "Open the device (Page 93)".
3. Remove the six screws for attaching or loosening the drive bay plate (see "Drive cage type C (Page 21)") while holding the drive bay plate from the inside so that it does not fall into the device when loosened.

4. Inside the device, remove the drive bay plate with the attached design cover.
5. Remove the design cover from the front of the drive bay plate.
6. Mount one or more drives on the rear of the drive bay plate. Note the holes:

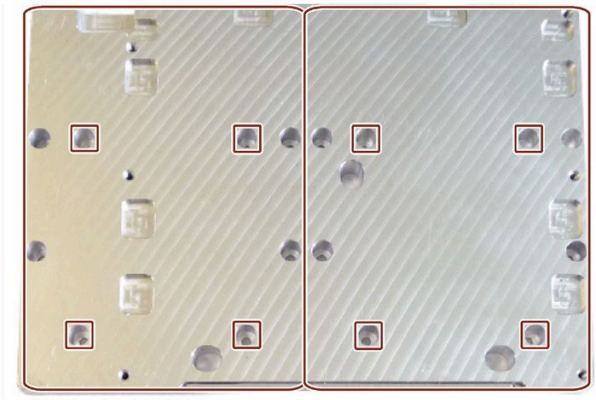
3.5" HDDs:

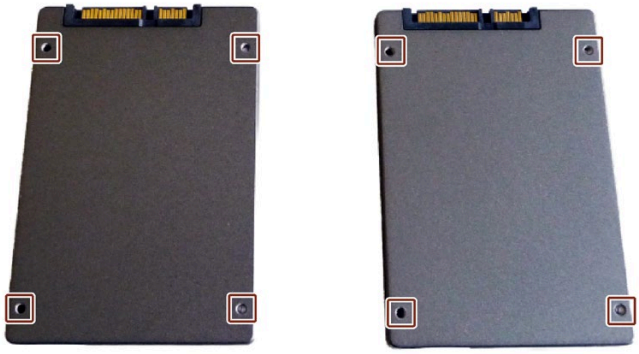
Holes on the front of the drive bay plate and on the HDDs



2.5" SSDs:

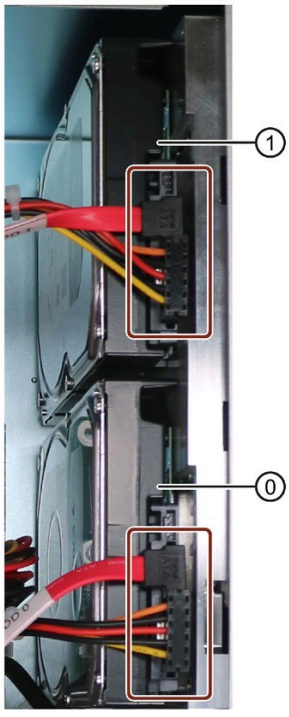
Holes on the front of the drive bay plate and on the SSDs





7. Mount the design cover back onto the drive bay plate.
8. Reinsert the drive bay plate and screw the drive bay plate back on from the outside.

   The SATA connections are at the top.



(0) Mounting location 0
(1) Mounting location 1

9. Connect the data cables to the desired connector on the motherboard and on the drive.
10. Close the device.
11. Connect the power supply.

6.6.6 Install M.2 NVMe SSD

Note

An M.2 NVMe SSD cannot be operated in a RAID system.

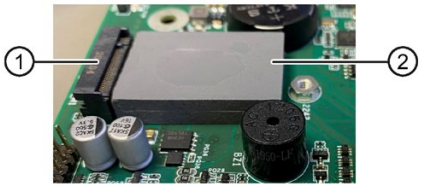
Requirement

- You know the important safety instructions under "Safety instructions on device and system extensions (Page 48)".
- Your device is equipped with an SMS-W480 motherboard.
- Original replacement part, i.e. M.2 NVMe SSD with thermal pad approved for this device.
- T10 screwdriver

Procedure

1. Fully disconnect the device from the line voltage, see "Switching off the device (Page 72)".
2. Open the device. Be sure to follow the important instructions under "Open the device (Page 93)".
3. Attach the thermal pad ② to the direct connector for M.2 NVMe SSD ① as shown.

   You can find information on the position of the direct plug socket ① under "Layout of the motherboard (Page 173)".



4. Insert the M.2 NVMe SSD ③ slightly inclined from above into the direct socket parallel to the motherboard.

5. Carefully press down M.2 NVMe SSD.
6. Fix the end of the M.2 NVMe SSD to the motherboard with a screw.
7. Close the device.

Device maintenance and repair 7

7.1 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 systems.

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

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

7.2 Maintenance intervals

To maintain a high level of system availability, replace PC components that are subject to wear as a preventive measure according to the recommended replacement interval.

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

7.3 Removing and installing hardware

7.3.1 Front fan maintenance

7.3.1.1 Removing the fan cover from the front fan

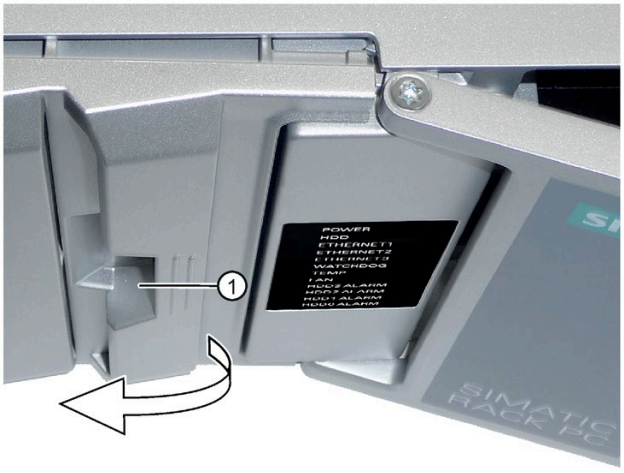
Information on the position of the fan cover of the front fan is available under "Front panel (Page 16)".

Requirement

- The front door is open. (Page 75)

Procedure

1. Open the front door 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.



7.3.1.2 Change the filter pad of the front fan

Requirement

- The device is fully disconnected from the line voltage, see "Switching off the device (Page 72)".
- The fan cover has been removed; see "Removing the fan cover from the front fan (Page 127)".
- An original spare part, i.e. a filter pad of the same type. For information on replacement parts, refer to "Hardware accessories (Page 34)".

Procedure

1. Remove the filter pad from the fan cover.
2. Insert the new filter pad loosely into the fan cover. Place the filter mat evenly in the fan cover.
3. Replace the fan cover.

See also

Maintenance intervals (Page 127)

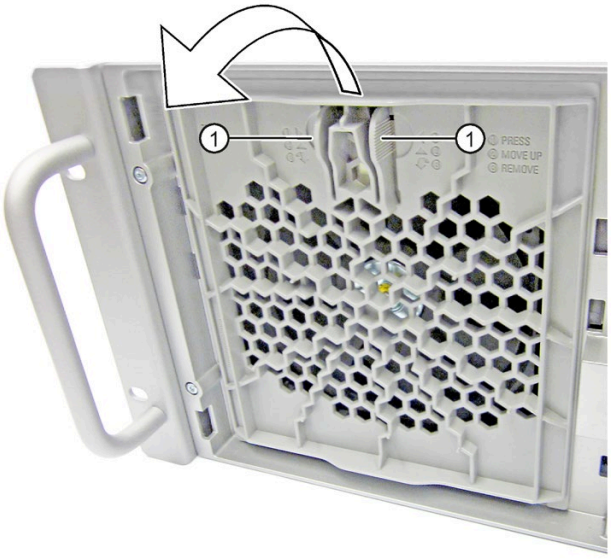
7.3.1.3 Changing the front fan

Requirement

- You know the important safety instructions under "Safety instructions on device and system extensions (Page 48)".
- An original spare part, that is a front fan of the same type. For information on replacement parts, refer to "Hardware accessories (Page 34)".

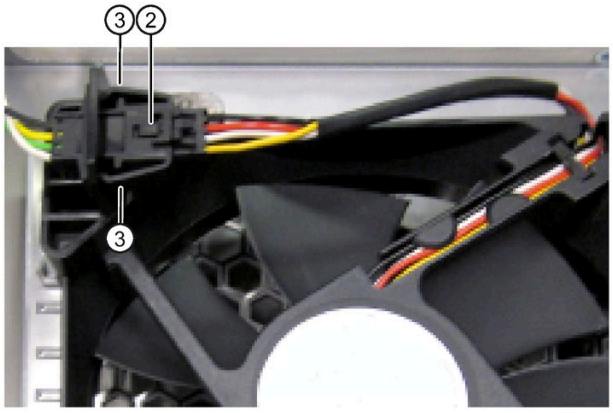
Procedure

1. Fully disconnect the device from the line voltage, see "Switching off the device (Page 72)".
2. Remove the front fan cover. (Page 127)
3. Press the locks ① together and keep them pressed.
4. Lift the fan support slightly upwards and remove it to the front from the front of the enclosure.

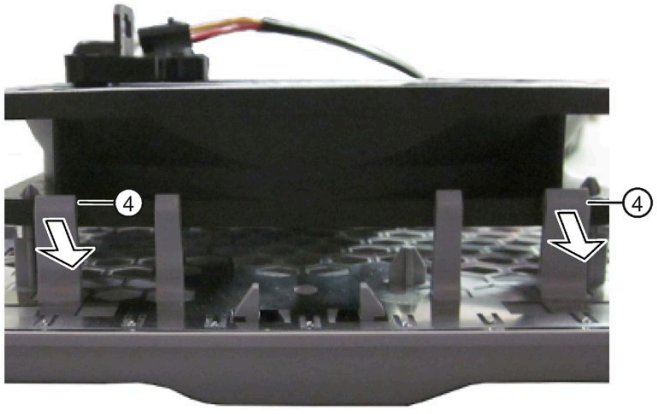


5. Put down the fan support with the openings facing down (fan is above).

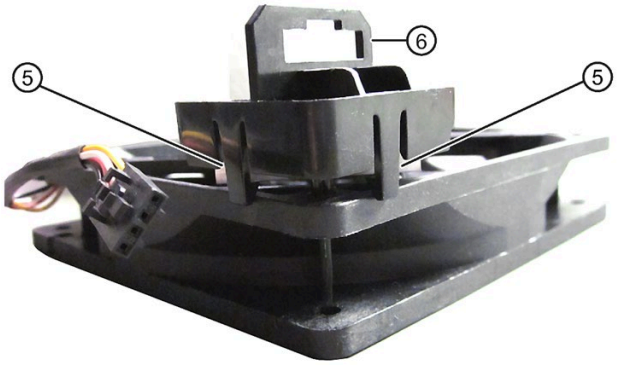
6. Press on the clip on the small fan cable plug connector ② and remove the connector from the larger adapter plug,



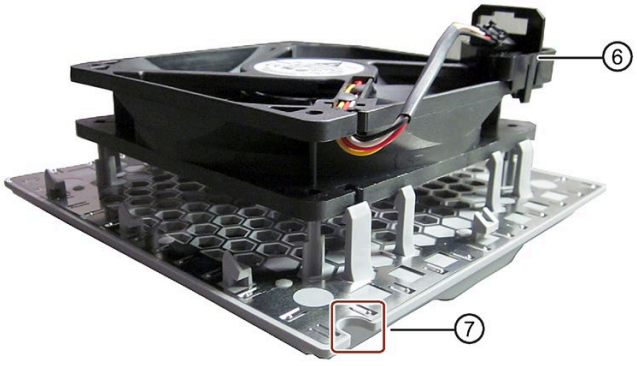
7. Press on the side of the clips ③ and loosen the adapter plug from the cable holder.
8. Loosen the locking latches ④ of the fan support one after the other at the front and rear and remove the fan.



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



10. 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.



11. 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.

12. Snap the fan into place at the locking latches of the fan support ④.
13. 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.
14. Insert the small fan cable connector ② in the larger adapter connector again.
15. Place the fan support with the new fan on the front of the device.

See also

Maintenance intervals (Page 127)

7.3.2 Change the fan on drive cage type A

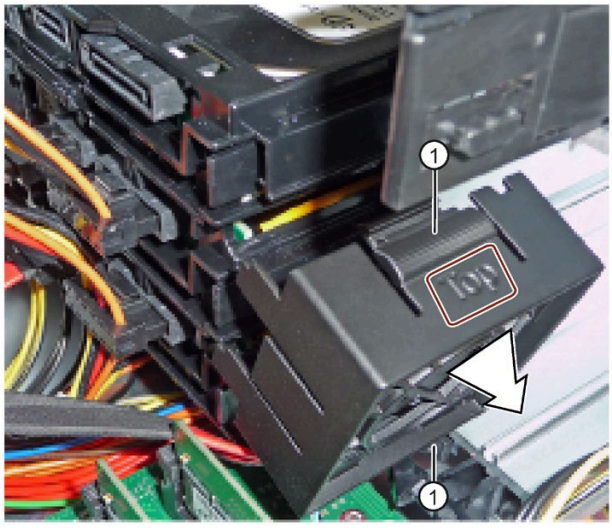
This fan is only installed in the removable tray (drive cage type A) for configurations with RAID and the hard disk type "Enterprise".

Requirement

- You know the important safety instructions under "Safety instructions on device and system extensions (Page 48)".
- The device is equipped with the drive cage type A.
- An original spare part, i.e. a fan of the same type. For information on replacement parts, refer to "Hardware accessories (Page 34)".
- There is no 5.25" component in the corresponding mounting location, see information under "Installation conditions for drives in drive cage type A (Page 104)".

Procedure

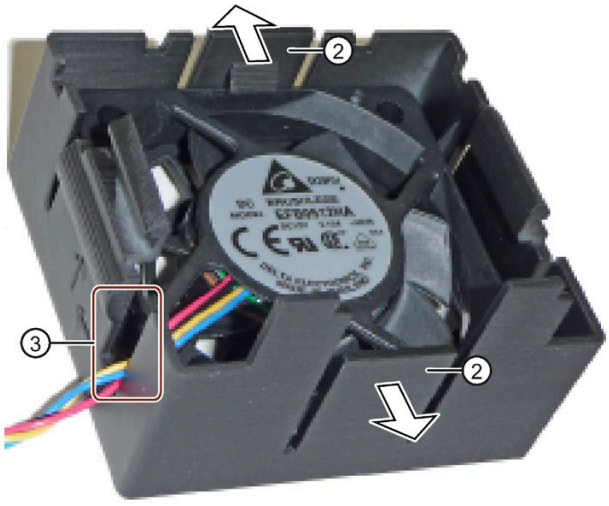
1. Fully disconnect the device from the line voltage, see "Switching off the device (Page 72)".
2. Open the device. Be sure to follow the important instructions under "Open the device (Page 93)".
3. Detach the fan cable from the motherboard.
4. Press the upper and lower lock ① on the fan support and 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.

5. Put down the fan support as shown.



6. Bend the locking latches ② of the fan support slightly outwards and remove the fan from the fan support.

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

See also

Maintenance intervals (Page 127)

7.3.3 Changing the backup 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.

Pollutants released by an explosion can cause serious physical injury.

Damaged batteries jeopardize the function of the device.

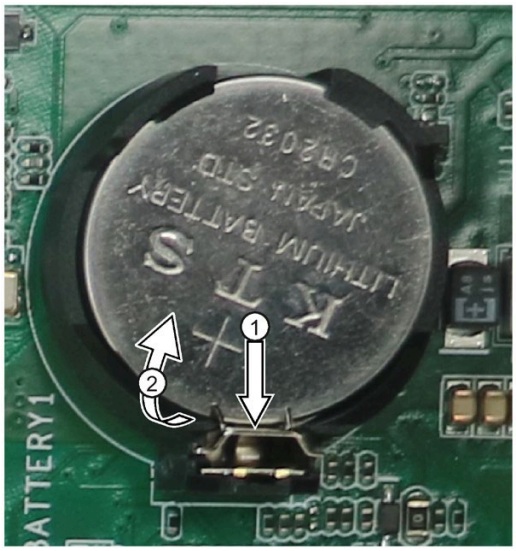
- Replace spent batteries promptly, see information under "Maintenance intervals (Page 127)".
- Replace the battery only with an identical battery or types recommended by the manufacturer.
- Do not throw the battery into a fire.
- Do not perform soldering work on the cell body of the battery.
- Do not 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.

Requirement

- You know the important safety instructions under "Safety instructions on device and system extensions (Page 48)".
- An original spare part, that is, a backup battery of the same type (article number of lithium battery: A5E00369854 type CR2032)
- You have observed the local regulations relating to the disposal of used batteries.

Procedure

1. Fully disconnect the device from the line voltage, see "Switching off the device (Page 72)".
2. Open the device. Be sure to follow the important instructions under "Open the device (Page 93)".
3. Remove the expansion cards, if necessary, see "Removing expansion cards (Page 96)".
4. Press a thin, blunt object parallel to the battery on the area marked in the figure with ①.



   The battery is unlocked and disengages from the socket.
5. Remove the battery from socket.
6. Insert the new battery into the socket with slight pressure and lock it into place.
7. Close the device.
8. Check the firmware settings.

7.3.4 Replacing the single power supply

Note

Converting from a single power supply (400 W or 850 W) to redundant power supply and vice versa is not possible.

Requirement

- You know the important safety instructions under "Safety instructions on device and system extensions (Page 48)".
- An original spare part, i.e. a single power supply of the same type. For information on replacement parts, refer to "Hardware accessories (Page 34)".
- T10 screwdriver
- Diagonal cutter

Procedure

1. Fully disconnect the device from the line voltage, see "Switching off the device (Page 72)".
2. Open the device. Be sure to follow the important instructions under "Open the device (Page 93)".
3. Disconnect the cables from the drives and the motherboard.
4. Remove the cable ties securing the power cables in the enclosure.
5. Remove the four fixing screws that are marked in the figure below.

Single power supply (400 W): Fixing screws	**Single power supply (850 W): Fixing screws**
	

6. Pull the power supply upward and out of the housing.
7. Install the new power supply.
8. Fasten the power supply with the screws shown.
9. Connect the cables to the drives and the motherboard.
10. Use cable ties to reattach the power supply cables to the enclosure.
11. Close the device.
12. Check the safe state of the device.
13. Switch on the power supply.

7.3.5 Changing the module of the redundant power supply

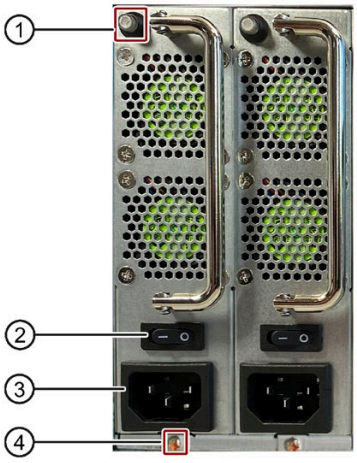
If a module of the redundant power supply is defective, you can continue to operate the device until the device can be shut down in a controlled manner.

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

Requirement

- An original spare part, i.e. a module of the redundant power supply of the same type. For information on replacement parts, refer to "Hardware accessories (Page 34)".
- Cross-tip screwdriver P1

Procedure



1. Use the status indicator ① to determine which module is defective, see "Status display of redundant power supply (Page 32)".
2. Switch off the defective module using the on/off switch ②.
3. Disconnect the defective module from the line voltage.

   To do so, unplug the power cord from the socket ③ of the defective module.
4. Remove the highlighted screw of the defective module ④.
5. Pull out the defective module at the handle.
6. Install the new module and fasten it with the previously loosened screw.
7. Plug the power cord into the socket of the newly inserted module ③.
8. Check the safe state of the device.
9. Switch the module on again using the on/off switch ② and make sure that the status display is working correctly.

7.3.6 Changing the module of the redundant power supply

Note

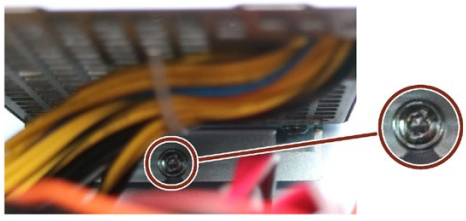
Converting from a single power supply to redundant power supply and vice versa is not possible.

Requirement

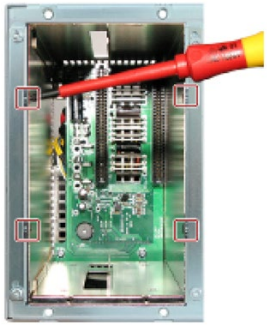
- You know the important safety instructions under "Safety instructions on device and system extensions (Page 48)".
- An original replacement part, i.e. the enclosure of a redundant power supply of the same type. For information on replacement parts, refer to "
- Hardware accessories (Page 34)".
- T10 screwdriver

Procedure

1. Fully disconnect the device from the line voltage, see "Switching off the device (Page 72)".
2. Open the device. Be sure to follow the important instructions under "Open the device (Page 93)".
3. Remove the two modules of the redundant power supply. (Page 136)
4. Remove the cable ties securing the power cables in the enclosure.
5. Disconnect the cables from the drives and the motherboard.
6. Unscrew the marked screw ① inside the device enclosure.



7. Unscrew the screws at the 4 marked positions on the inside of the redundant power supply enclosure.



8. Remove the housing of the redundant power supply from the back of the device.
9. Install the new enclosure and secure it at the appropriate places.
10. Re-insert the two modules of the redundant power supply.
11. Close the device.

7.3.7 Replacing the processor

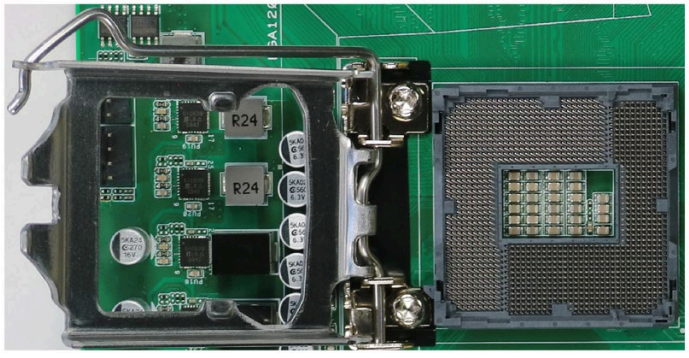
Requirement

- You know the important safety instructions under "Safety instructions on device and system extensions (Page 48)".
- An original spare part, i.e. a processor of the same type. For information on replacement parts, refer to "Hardware accessories (Page 34)".
- Cross-tip screwdriver: PH1

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.

Procedure

1. Fully disconnect the device from the line voltage, see "Switching off the device (Page 72)".
2. Open the device. Be sure to follow the important instructions under "Open the device (Page 93)".
3. Remove the heat sink of the processor.
4. Unlock the socket and lift the socket cover.



5. Remove the processor.
6. Place the new processor in the socket.

   During positioning, make sure to take the highlighted arrow on the processor into consideration.
7. Lock the processor in place.
8. Install the heat sink of the processor again.
9. Close the device.

7.3.8 Replacing the motherboard

Requirement

- You know the important safety instructions under "Safety instructions on device and system extensions (Page 48)".
- An original spare part, that is, a motherboard of the same type. For information on replacement parts, refer to "Hardware accessories (Page 34)".

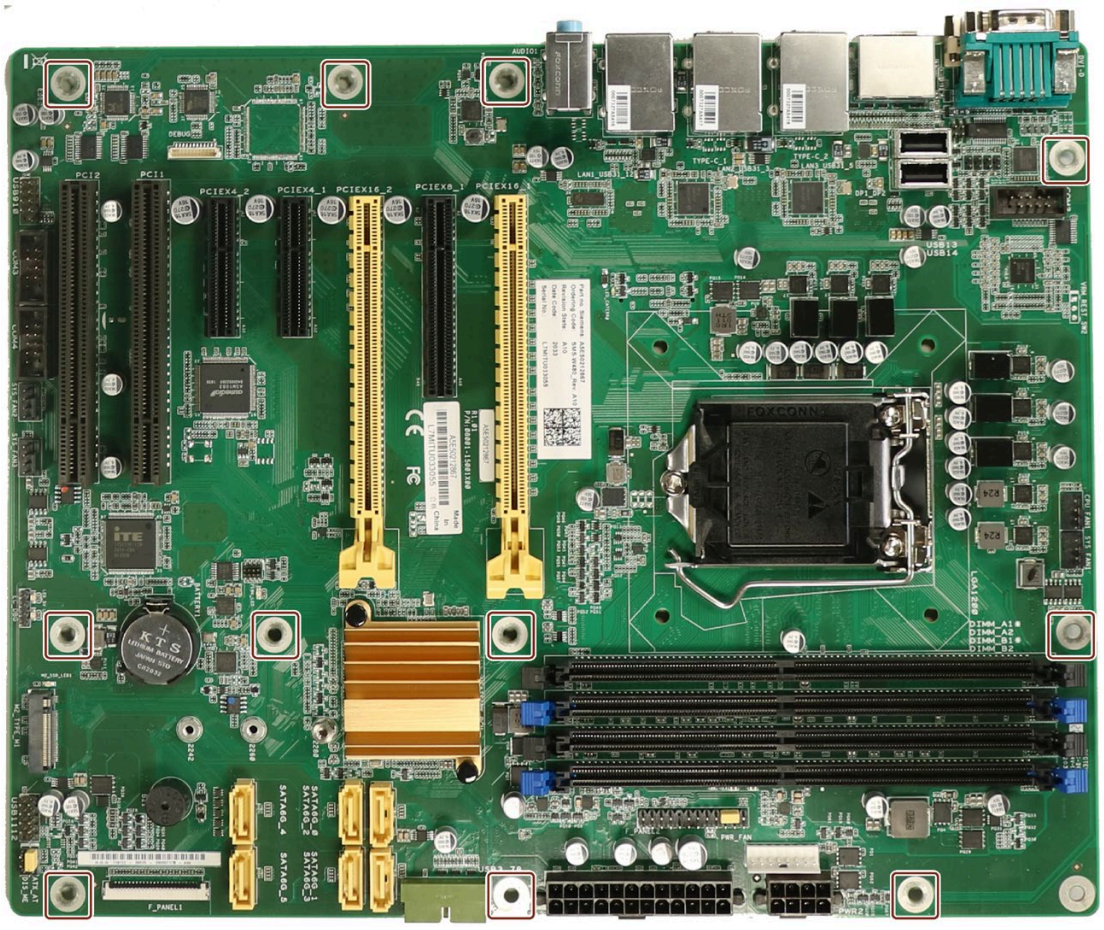
  The motherboard as spare part is supplied without processor and memory modules.
- You have noted the firmware settings because the configuration data of the device are deleted when the motherboard is replaced.

  You can find information on this in the firmware description of the device, see "Important instructions and manuals for operating the device (Page 11)".
- T10 screwdriver

Procedure

1. Fully disconnect the device from the line voltage, see "Switching off the device (Page 72)".
2. Open the device. Be sure to follow the important instructions under "Open the device (Page 93)".
3. Remove the expansion cards from the slots. (Page 96)
4. If necessary, remove the M.2NVMe SSD. (Page 126)
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 CPU. (Page 138)

9. Remove the screws that are marked in the figure below.



10. Remove the motherboard.
11. Carefully insert the new motherboard into the device and fasten the motherboard with the screws.
12. Install the CPU.
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 the slots.
16. Close the device.
17. Reconnect the device to the mains voltage and switch on the device.
18. 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.

7.4 Installing operating system, software and drivers

7.4.1 Restoring or installing the operating system

Information on restoring or reinstalling the operating system you ordered with the device can be found in the detailed operating system description, see "Important instructions and manuals for operating the device (Page 11)".

7.4.2 Installing software and drivers

On the supplied USB stick (read only), you will find the "Documentation and Drivers" suite which you can use to install all supplied software and drivers.

Procedure

1. Insert the provided USB stick into the device.
2. Run the file "START_DocuAndDrivers.CMD".

   The "Documentation and Drivers" suite opens.
3. Install the components you want.

7.5 Configuring firmware/BIOS

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

Note

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

7.6 Backing up data and changing partitions

Use the "SIMATIC IPC Image & Partition Creator" software to back up data under Windows®, see "Important instructions and manuals for operating the device (Page 11)".

7.7 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

8

8.1 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 pad 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).

8.2 General technical specifications

See the note in "Applicability of technical specifications (Page 143)".

	Device with standard enclosure	**Device with short enclosure**
Article number	6AG4104 -5....-.... (for details, refer to the ordering documentation)	
Dimensions	481.4 x 176.6 x 446.6 (W× H × D in mm)	481.4 x 176.6 x 356.6 (W × H × D in mm)
	Detailed dimensional specifications can be found in "Dimension drawing of the device (Page 163)".	
Weight	15 up to 23 kg; depending on the equipment	
Supply voltage (U_N; AC)	Single power supply (400 W; AC): • 100 V to 240 V AC (-15%; +10%)	
	Single power supply (850 W; AC): • 100 V to 240 V AC (-10%; +10%)	–
	Redundant power supply (350 W, 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)	

	Device with standard enclosure	**Device with short enclosure**
Input current	Single power supply (400 W): • Continuous current at 100 V: ≤ 6 A • Continuous current at 230 V: ≤ 3 A • At startup ≤ 80 A for 3.6 ms	
	Single power supply (850 W) • Continuous current at 100 V: ≤ 12 A • Continuous current at 230 V: ≤ 6 A • at startup ≤ 180 A for 3.6 ms	–
	Redundant power supply (350 W): • Continuous current at 100 V: ≤ 5 A • Continuous current at 230 V: ≤ 2.5 A • At startup ≤ 80 A for 3.6 ms for each module	–
	Information on the dimensioning of fuses in higher-level system circuits A fuse that is designed for the following tripping current is integrated in the power supply unit of the IPC. • typical 6.3 A (with a single power supply 400 W and redundant power supply 350 W) • typically 15 A (with single power supply 850 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: • > 6.3 A (with a single power supply 400 W and redundant power supply 350 W) • > 15 A (with single power supply 850 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	Single power supply (400 W): 20 ms for 255 W ≤ 10 events/h; recovery time ≥ 1 s	
	Single power supply (850 W): 20 ms for 415 W ≤ 10 events/h; recovery time ≥ 1 s	–
	Redundant power supply (350 W): 20 ms for 255 W ≤ 10 events/h; recovery time ≥ 1 s	–
Power consumption	Single power supply (400 W), with maximum configuration and 255 W secondary: • ≤ 260 W; with 90% efficiency	
	Single power supply (850 W), with maximum configuration and 415 W secondary: • ≤ 600 W with 87% efficiency	–
	Redundant power supply (350 W), with maximum configuration and 255 W secondary: • ≤ 270 W with 85% efficiency	–

	Device with standard enclosure	**Device with short enclosure**
Power loss, heat emission	Single power supply (400 W): • 260 W = 260 J/s = 0.25 BTU/s	
	Single power supply (850 W): • 600 W = 600 J/s = 0.57 BTU/s	–
	Redundant power supply (350 W): • 270 W = 270 J/s = 0.26 BTU/s	–
Current output (DC)	Single power supply (400 W): • +5 V/25 A; +3.3 V/20 A; in total, 190 W are allowed • +12 V_1/14 A; +12 V_2/11 A • –12 V/0.1 A; +5 V_{aux}/2 A The total output of all voltages amounts to a max. of 255 W.	
	Single power supply (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. 415 W.	
	Redundant power supply (350 W): • +5 V/20 A, +3.3 V/20 A; in total 100 W are permitted • +12 V_1/16 A; +12 V_2/16 A • –12 V/0.3 A; +5 V_{aux}/3 A The total output of all voltages amounts to a max. of 255 W.	–
Noise emission	< 45 dB (A) according to DIN 45635 At 20 °C and in Windows idle mode, the result is 40 dB (A).	
Pollution degree	Device is designed for environments with pollution degree 2	
Degree of protection [1]	• IP 30 (front) with closed front door • IP 20 on the rear according to EN 60529	
Dust protection	With front door closed: Filter class G2 EN 779; particles > 0.5 mm are 99% retained	
Safety		
Protection class[1]	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] not evaluated by UL

See also

Safety instructions on ambient and environmental conditions (Page 45)

8.3 Current and power requirements and power supply

8.3.1 Current and power requirements of the system components

Maximum current values

Component	Voltage					
	+3.3 V	+5 V	+12 V	+12 V2	-12 V	5 V_{aux}
Motherboard Core i3 / i5 / i7 / i9 CPU with cooling [1]	0.7 A	4.5 A	1.3 A	6.0 A	0 A	0.5 A
Motherboard Xeon processor with cooling [1]	0.7 A	7.0 A	1.3 A	6.7 A	0 A	0.5 A
SSD SATA (typical)		0.8 A				
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	2.24 A					
Internal fan			0.25 A			
Optional graphics card: NVIDIA Quadro P400	3.3 A		1.5 A			
Optional graphics card: NVIDIA Quadro P2200	0.4 A		6.3 A			
Optional graphics card: NVIDIA Quadro RTX4000[5]	0.4 A		13.4 A			
Individual currents, max. permissible, single power supply (400 W)	20 A [2]	25 A [2]	14 A	11 A	0.1 A	2.0 A [3]
Individual currents, max. permissible, redundant power supply (350 W)	20 A [2]	20 A [2]	16 A	16 A	0.5 A	3.0 A
Total power, permissible, single power supply (400 W) or redundant power supply (350 W), (at 40 °C ambient temperature)	255 W					
Individual currents, max. permissible, single power supply (850 W)	20 A [2]	35 A [2]	70 A		0.3 A	3.0 A
Total power, permissible, single power supply (850 W), (at 40 °C ambient temperature)	255 to 415 W [4]					
Efficiency of the single power supply (400 W) [1]	Ca. 88% (230 V; AC) / ca. 88% (120 V; AC)					
Efficiency of the single power supply (850 W) [1]	Ca. 87% (230 V; AC) / ca. 87% (120 V; AC)					
Efficiency of the redundant power supply (350 W) [1]	Ca. 89% (230 V; AC) / ca. 87% (120 V; AC)					

1 Depends on the selected device configuration

2 The accumulated power of the +5 V and + 3.3 V voltage may be max. 190 W with a single power supply (400 W), max. 100 W with the redundant power supply (350 W), and max. 200 W with the single power supply (850 W).

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.

5 Operation only permissible in conjunction with single power supply (850 W)

Typical power values

Component	Current consumption (U = 230 V; AC)	Power consumption
Basic device Core i3 / i5 / i7 / i9	0.55 A	127 W
Base device Xeon	0.58 A	133.4 W
1 × hard disk drive SATA	0.03 A	7.3 W
2 × hard disk drives SATA	0.07 A	14.7 W
3 × hard disk drives SATA	0.1 A	22.0 W
1 × hard disk drive SATA type Enterprise	0.05 A	12.1 W
2 × hard disk drives SATA type Enterprise	0.11 A	24.2 W
3 × hard disk drives SATA type Enterprise	0.16 A	36.3 W
1 × SSD 2.5" drive SATA	0.02 A	3.6 W
1 x M.2 NVMe SSD	0.03 A	5.9 W
Optional graphics card: NVIDIA Quadro P400	0.14 A	32.8 W
Optional graphics card: NVIDIA Quadro P2200	0.36 A	83.0 W
Optional graphics card: NVIDIA Quadro RTX4000	0.78 A	178.0 W

8.3.2 Technical specifications of the single power supply (400 W)

Output voltage and maximum current

Voltage	Maximum current	Voltage stability
+12 V	10 A	± 5%
+12 V	13 A	± 5%
−12 V	0.3 A	± 10%
+5 V	25 A [1]	± 5%
+3.3 V	20 A [1]	± 5%
+5 V_{aux}	2.5 A	+5%, -3%

[1] The total output of the +5 V and +3.3 V voltage must be ≤ 190 W.

The total output of all voltages is max. 400 W.

8.3.3 Technical specifications of the single power supply (850 W)

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.

8.3.4 Technical specifications of the redundant power supply (350 W)

Output voltage and maximum current

Voltage	Maximum current	Voltage stability
+12 V	16 A [2]	± 5%
+12 V	16 A [2]	± 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 ≤ 100 W.

[2] The total current of the +12 V voltage must be ≤ 25 A.

The total power of all voltages is max. 350 W.

8.4 Electromagnetic compatibility

See the note in "Applicability of technical specifications (Page 143)".

Interference emission	EN 61000-6-3; EN 61000-6-4; CISPR 32, EN 55032 Class B; FCC Class A EN 61000-3-2 class D, EN 61000-3-3
Immunity to interference	EN 61000-6-1; EN 61000-6-2; KN 35
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	± 4 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	30 A/m; 50 Hz; 60 Hz (according to IEC 61000-4-8)

8.5 Climatic and mechanical and ambient conditions

See the note in "Applicability of technical specifications (Page 143)".

Climatic ambient conditions	
Temperature	Tested according to IEC 60068-2-2; IEC 60068-2-1; IEC 60068-2-14
Operation	+0 °C up to +40 °C [1] Gradient: ≤ 10 K/h; no condensation The maximum permitted power loss of the expansion cards is: • with single power supply (400 W): 80 W • with redundant power supply (350 W): 80 W • with single power supply (850 W) up to 240 W [2] This information relates exclusively to the additional power loss of the expansion cards.
Storage/transport	–20 °C up to +60 °C Gradient: ≤ 20 K/h; no condensation
Relative humidity	Tested according to IEC 60068-2-78; IEC 60068-2-30
Operation	0 to 31 °C: 5-85 %; decreasing linearly to 5-50 % at 40° C
Storage/transport	5% up to 95% at 25 °C to 55 °C; no condensation Gradient: ≤ 20 K/h; no condensation

Atmospheric pressure	
Operation	1080 up to 689 hPa, corresponds to an altitude of –1000 m to 3000 m
Storage/transport	1080 up 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 [3]	20 to 58 Hz, Amplitude 0.015 mm; 58 to 200 Hz: 2 m/s2
Storage/transport	5 up to 8.51 Hz; amplitude 3.5 mm; 8.51 up to 500 Hz: 9.8 m/s2
Resistance to shock	Tested in accordance with IEC 60068-2-27
Operation [2]	Half-sine; 9.8 m/s2, 20 ms; 100 shocks per axis
Storage/transport	Half-sine; 250 m/s2; 6 ms; 1000 shocks per axis
Special features	
Quality assurance	In accordance with ISO 9001

[1] Limit values depend on the type of drive, see information under:
- Installation conditions for drives in drive cage type A (Page 104)
- Installation conditions for drives in drive cage type B (Page 114)

[2] For single power supply (850 W) the power loss of the expansion cards may be increased from 80 W to 240 W if the additional power loss of 160 W 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.

[3] The device must be free of any mechanical faults when disk drives are installed in the removable trays.

8.6 Technical specifications of the drives

See the note in "Applicability of technical specifications (Page 143)".

Information on the drives is available in your order documents.

Maximum number	6 (depends on the selected configuration) • Device with SMS-W480 motherboard 6 SATA ports: HDD / SSD / M.2 NVMe SSD • Device with SMS-H410 motherboard 4 SATA ports: HDD / SSD
HDD	HDD types (Native Command Queuing is supported): • 3.5" SATA; 6 GB/s; 7200 rpm; 1000 GB • 3.5" SATA, Enterprise, 6 GB/s; 7200 rpm; 1000 GB and 2000 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	M.2-2280 key M, PCIe Gen3 x2 *; 512 GB and 1024 GB; length: Max. 80 mm

* You can find the maximum theoretical data rate of a PCIe lane in the technical specifications of the device

8.7 Technical specifications of the motherboard

8.7.1 General technical specifications of the motherboard

See the note in "Applicability of technical specifications (Page 143)".

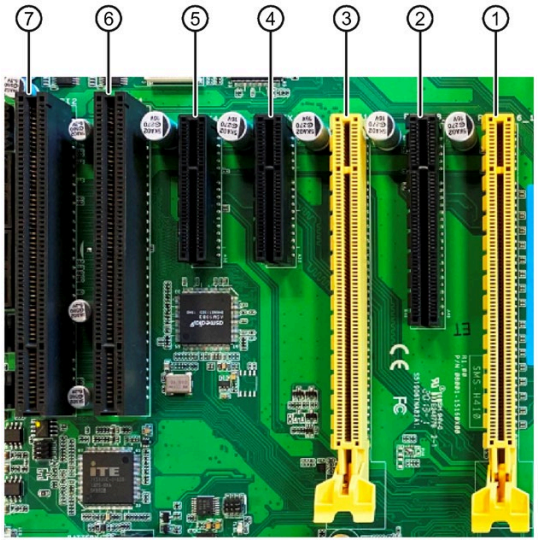
	Device with SMS-W480 motherboard	Device with SMS-H410 motherboard
Chipset	Intel® W480E PCH	Intel® H410 PCH
Processor	• Intel® Core™ i3-10100E 4C/8T, 3.2 (3.8) GHz, 6 MB cache • Intel® Core™ i5-10500E 6C/12T, 3.1 (4.2) GHz, 12 MB cache, iAMT • Intel® Core™ i7-10700E 8C/16T, 2.9 (4.5) GHz, 16 MB cache, iAMT • Intel® Core™ i9-10900E 10C/20T, 2.8 (4.7) GHz, 20 MB cache, iAMT • Intel® Xeon W-1270E 8C/16T, 3.4 (4.8) GHz, 16 MB cache, iAMT	• Intel® Core™ i3-10100E 4C/8T, 3.2 (3.8) GHz, 6 MB cache • Intel® Core™ i5-10500E 6C/12T, 3.1 (4.2) GHz, 12 MB cache • Intel® Core™ i7-10700E 8C/16T, 2.9 (4.5) GHz, 16 MB cache • Intel® Core™ i9-10900E 10C/20T, 2.8 (4.7) GHz, 20 MB cache
RAID (on-board)	Intel® PCH with Intel® Rapid Storage Technology	-
Slots for memory modules	4 x DIMM sockets for DDR4 2933 MHz, expandable to 128 GB	2 x DIMM sockets for DDR4 2666 MHz, expandable to 64 GB
Main memory	4 to 128 GB, DDR4 SDRAM PC4-2933	4 to 64 GB, DDR4 SDRAM PC4-2933

See also

Technical specifications of the expansion card slots (Page 152)

8.7.2 Technical specifications of the expansion card slots

Slots for expansion cards on the motherboard



Technical specifications of the slots on the SMS-H410 motherboard

Slot Number on the enclosure	Designation on the motherboard	Specification	Maximum current consumption
①	PCIEX16_1	**PCIe x16**[1] • Gen. 3.0 • Active lanes: 16	• 3.3 V; 3 A • 12 V; 5.5 A • 3.3 V_{aux}; 0.4 A Power loss of the slot, permitted: ≤ 75 W
②	PCIEX8_1	**PCIe x8**[2] • Gen 3.0 • Active lanes: 1 • Open slot	• 3.3 V; 3 A • 12 V; 2.1 A • 3.3 V_{aux}; 0.4 A Power loss per slot, permitted: ≤ 25 W
③	PCIEX16_2	**PCIe x16**[2] • Gen 3.0 • Active lanes: 1	
④	PCIEX4_1	**PCIe x4**[2] • Gen 3.0 • Active lanes: 1 • Open slot	
⑤	PCIEX4_2	**PCIe x4**[2] • Gen 3.0 • Active lanes: 1 • Open slot	
⑥	PCI1	**PCI** • 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 V_{aux}; 0.2 A Power loss per slot, permitted: ≤ 25 W
⑦	PCI2		

[1] PCIe-Bus CPU
[2] PCIe-Bus PCH

Note

In sum, the current for 3.3 V_{aux} must not exceed the value 1.2 A.

Technical specifications of the slots on the SMS-W480 motherboard

Slot Number on the enclosure	Designation on the motherboard	Specification	Maximum current consumption
①	PCIEX16_1	**PCIe x16**[1] • Gen. 3.0 • Active lanes: 16	• 3.3 V; 3 A • 12 V; 5.5 A • 3.3 V_{aux}; 0.4 A Power loss of the slot, permitted: ≤ 75 W
②	PCIEX8_1	**PCIe x8**[2] • Gen 3.0 • Active lanes: 1 • Open slot	• 3.3 V; 3 A • 12 V; 2.1 A • 3.3 V_{aux}; 0.4 A Power loss per slot, permitted: ≤ 25 W
③	PCIEX16_2	**PCIe x16**[2] • Gen. 3.0 • Active lanes: 4	
④	PCIEX4_1	**PCIe x4**[2] • Gen. 3.0 • Active lanes: 1 • Open slot	
⑤	PCIEX4_2	**PCIe x4**[2] • Gen. 3.0 • Active lanes: 4 • Open slot	
⑥	PCI1	**PCI** • 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
⑦	PCI2		

[1] PCIe-Bus CPU
[2] PCIe-Bus PCH

Note

In sum, the current for 3.3 V_{aux} must not exceed 1.2 A.

See also

Layout of the motherboard (Page 173)

8.8 Technical specifications of graphic

See the note in "Applicability of technical specifications (Page 143)".

Technical specifications of the internal graphics card

Graphics controller	• Intel® UHD-Grafics 630 integrated in processor: – Intel® Core™ i3-10100E – Intel® Core™ i5-10500E – Intel® Core™ i7-10700E – Intel® Core™ i9-10900E – Intel® Xeon® W-1270E
Graphics memory	Dynamic Video Memory Technology, uses at least 64 MB in main memory
Resolutions/frequencies/colors	• DVI: 1920 × 1200 at 60 Hz; 32-bit color depth • DisplayPort: 4096 × 2304 at 60 Hz; 32-bit color depth • VGA (via DP-VGA adapter): 2560 × 1600 at 60 Hz; 32-bit color depth

Technical specifications of the optional Nvidia Quadro P400 graphics card

PCIe x16; Triple Head

You can find information on connection options for monitors with adapters under "Hardware accessories (Page 34)".

- Type: NVIDIA Quadro P400, 2 GB graphics memory
- Maximum resolution without adapter:
  - 3x Mini DisplayPort

    4096 x 2160 at 60 Hz; 32-bit color depth
  - 1x Mini DisplayPort

    5120 × 2880 at 60 Hz; 32-bit color depth
- Maximum resolution with adapter:
  - up to 3x DisplayPort:

    4096 x 2160 at 60 Hz; 32-bit color depth
  - 1x DisplayPort:

    5120 × 2880 at 60 Hz; 32-bit color depth
  - up to 3x DVI:

    1920 × 1200 at 60 Hz; 32-bit color depth
  - up to 3x VGA:

    2048 × 1536 at 60 Hz; 32-bit color depth

Technical specifications of the optional Nvidia Quadro P2200 graphics card

PCIe x16; Quad Head

You can find information on connection options for monitors with adapters under "Hardware accessories (Page 34)".

- Type: NVIDIA Quadro P2200, 5 GB graphics memory
- Maximum resolution without adapter:
  - 4x DisplayPort:

    5120 × 2880 at 60 Hz; 32-bit color depth
- Maximum resolution with adapter:
  - up to 4x DVI:

    1920 × 1200 at 60 Hz; 32-bit color depth
  - up to 4x VGA:

    2048 × 1536 at 60 Hz; 32-bit color depth

Technical specifications of the optional Nvidia Quadro RTX4000 graphics card

PCIe x16; Quad Head

You can find information on connection options for monitors with adapters under "Hardware accessories (Page 34)".

- Type: NVIDIA Quadro RTX 4000, 8 GB graphics memory
- Maximum resolution without adapter:
  - 3x DisplayPort:

    5120 × 2880 at 60 Hz; 32-bit color depth
  - 1x USB type C with VirtualLink™ support:

    5120 × 2880 at 60 Hz; 32-bit color depth
  - 2x DisplayPort:

    (two ports of the graphics card are occupied per monitor)

    7680 x 4320 at 60 Hz
- Maximum resolution with adapter:
  - up to 3x DVI:

    1920 × 1200 at 60 Hz; 32-bit color depth
  - up to 3x VGA:

    2048 × 1536 at 60 Hz; 32-bit color depth

Power supply of the optional NVIDIA Quadro RTX4000 graphics card

The NVIDIA Quadro RTX4000 graphics card can only be connected, operated and configured for SIMATIC IPC547J in devices with a single power supply (850 W).

The RTX4000 graphics card is then supplied with a voltage of 12 V via the slot on the motherboard and via an 8-pin plug connector. In this situation, all 8 pins of the connector must be connected for problem-free operation.

You can find information on the 8-pin connector in the section "Technical specifications of the connectors for the power supply of optional graphics cards (Page 160)".

Cooling of the optional NVIDIA Quadro RTX4000 graphics card

The graphics card has 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.

The perforated slot bracket of the graphics card has ventilation holes.

- Insert the graphics card on the motherboard only into the "PCIEX16_1" slot. (Page 152)
- In addition, insert another perforated slot bracket to the left of the graphics card (when viewed from the inside of the device).

Note

The "Performance" fan profile of the graphics card is mandatory for the SIMATIC IPC547J device.

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 62)

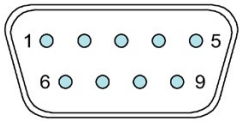
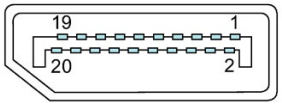
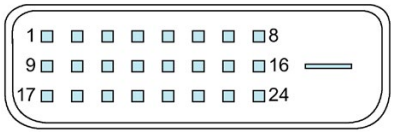
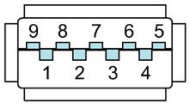
8.9 Technical specifications of the interfaces

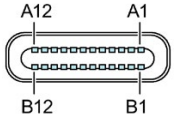
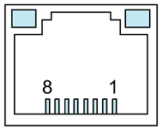
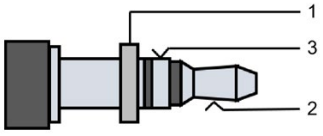
8.9.1 Technical specifications of the connections on the device

See the note in "Applicability of technical specifications (Page 143)".

Note

Detailed information on the position of the connections is available in "Device ports (Page 24)".

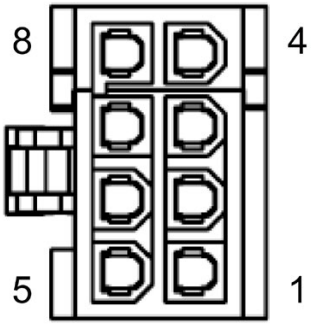
Connection socket	Description	Assignment
COM1 COM2	COM: • Serial interface (standard: RS-232) • Sub-D socket • V.24	 9-pin (±12 V)
DP	DisplayPort (labeling on the device: DPP) An analog monitor can be used with an adapter cable (optional). • Connection for monitors with DisplayPort connector • Connection 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 (3.3 V; 500 mA)
DVI-D	DVI-D: • Connection for monitors with DVI-D connector Monitors with a DVI-D connector can also be connected to the DPP connection socket using an adapter.	 24-pin (5 V; 500 mA)
USB Type A	USB Type A: • High-current	 5 V

Connection socket	Description	Assignment
USB Type C	USB Type C: • High-current	 5 V; 1.5 A; up to 10 Gbps
LAN 1 LAN 2 LAN 3	LAN: • Connection for Ethernet with RJ45 connector • The LAN ports are numbered on the enclosure. The numbering by the operating system may differ from this. • Data transmission rate: 10/100/1000 Mbps • Wake on LAN, remote boot	 8-pin RJ45 (up to 1 Gbps)
Audio	• Connection for 3.5 mm audio stereo jack: Realtek ALC887, 8-channel DAC support – Line IN (light blue) – Headphone OUT (lime) (max. 2 W at 4 Ω) – Microphone IN (pink)	 1: Ground 2: Audio links 3: Audio right

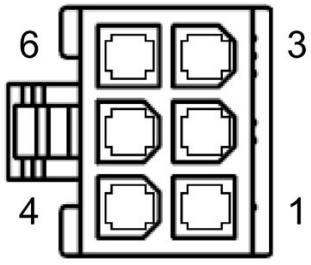
8.9.2 Technical specifications of the connectors for the power supply of optional graphics cards

See the note in "Applicability of technical specifications (Page 143)".

8-pin connector for optional graphics cards

Description	Assignment	
Connector on the single power supply wiring harness (850 W)	1 = +12 V 2 = +12 V 3 = +12 V 4 = GND 5 = GND 6 = GND 7 = GND 8 = GND	

6-pin connector for optional graphics cards

Description	Assignment	
Connector on the wiring harness of the single power supply (400 W) and the redundant power supply (350 W)	1 = +12 V 2 = +12 V 3 = +12 V 4 = GND 5 = GND 6 = GND	

8.10 Technical specifications of the telescopic rails

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 of the telescope rails (Page 167)

8.11 Technical specifications of the operating systems

Depending on the ordered device configuration, the device is equipped **with** or **without** one of the following installed operating systems.

- Microsoft® Windows® 10 Enterprise 2019 LTSC, 64-bit, Multi-Language*
- Microsoft® Windows® Server 2019 Standard Edition including 5 Clients, 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® 10 and Windows® Server 2019

In the delivery state, Windows® 10 and Windows® Server 2019 boot in UEFI mode.

The following table lists the partitioning for data storage media ≥ 200 GB in GPT mode:

Partition	Name	Size	File system
First	Boot	260 MB	FAT32
Second	MSR	128 MB	None
Third	System	160 GB	NTFS, not compressed
Fourth	WinRE	500 MB	NTFS, not compressed
Fifth	Data	Remainder	NTFS, not compressed

Dimension drawings

9

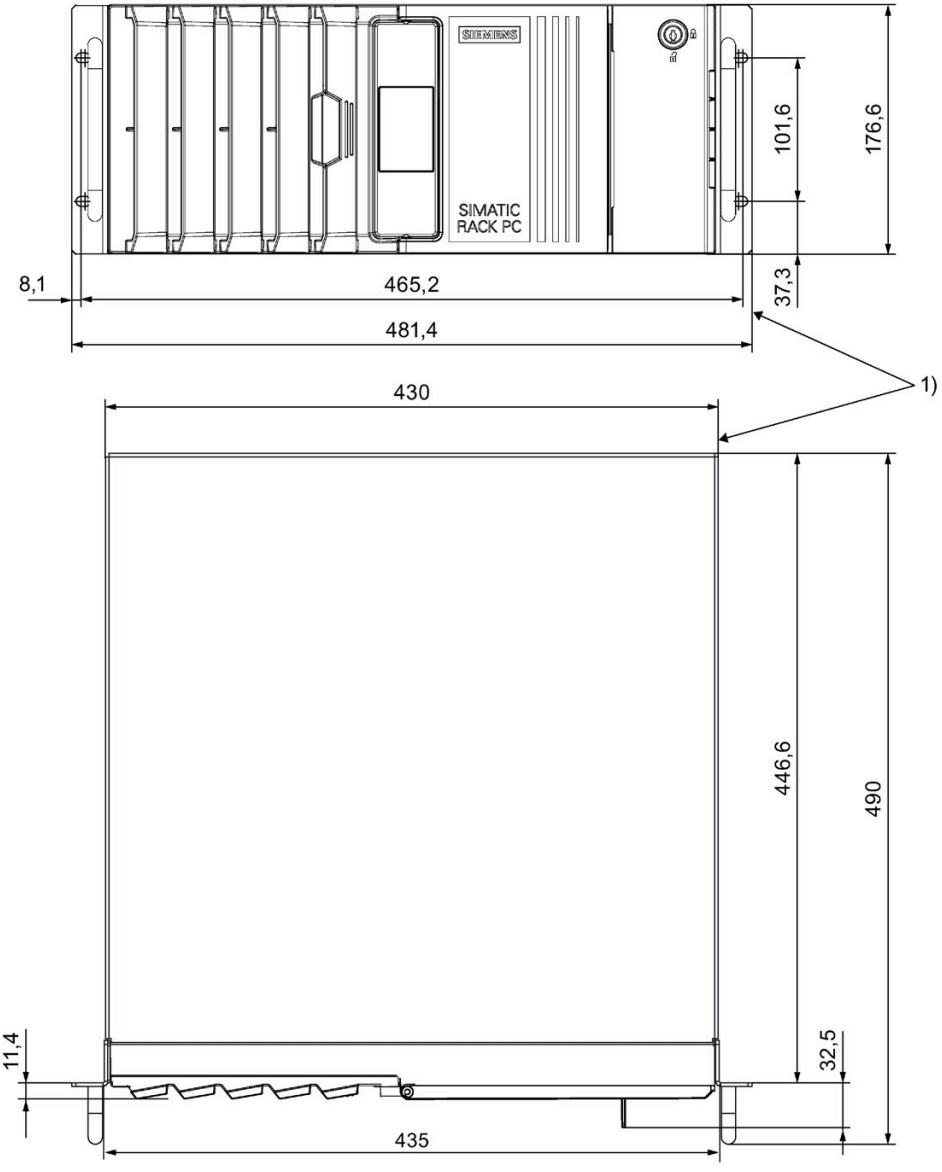
9.1 Dimension drawing of the device

Note

IEC60297_3_100

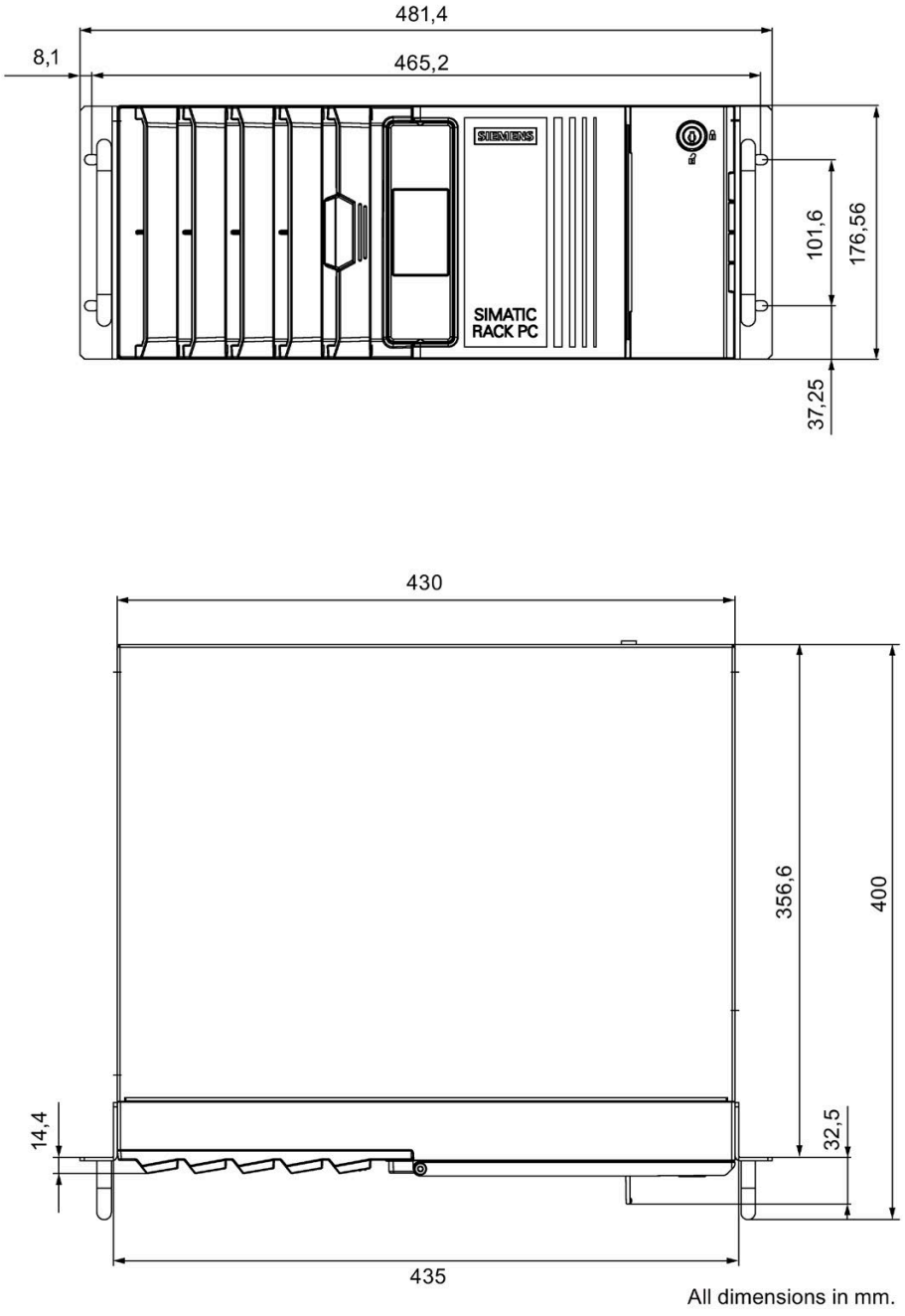
The systems meets the requirements for 4 HUaccording to IEC60297_3_100.

Device with standard enclosure: Front view and top view



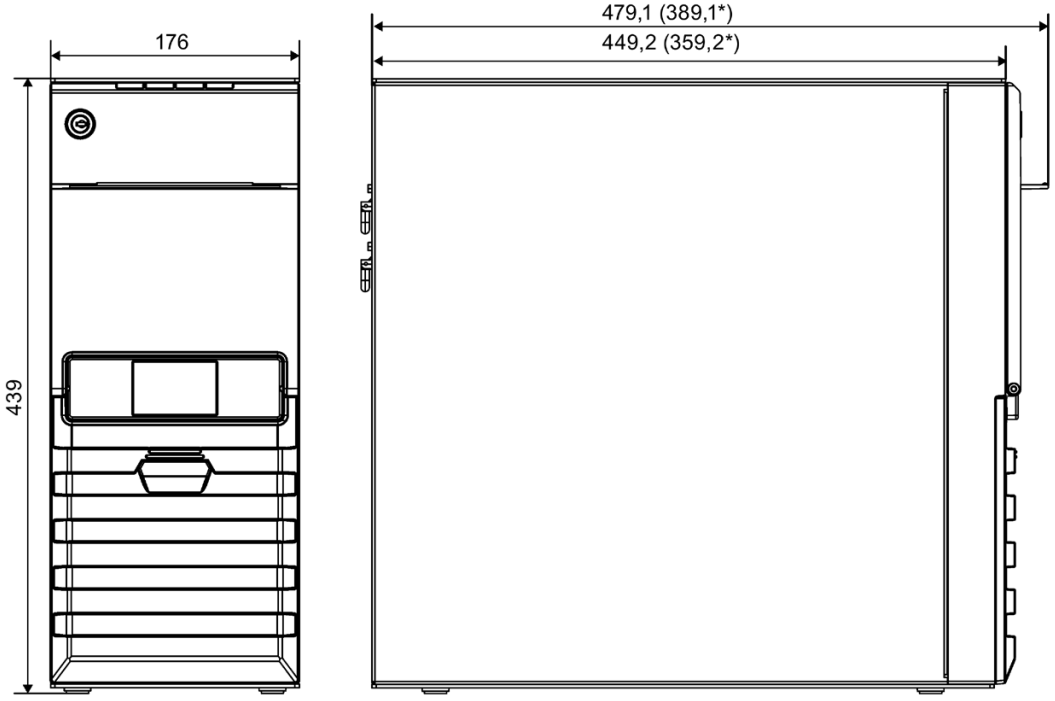
1) At top when installed vertically. All dimensions in mm.

Device with short enclosure: Front view and top view



9.2 Dimension drawing of the Tower Kit

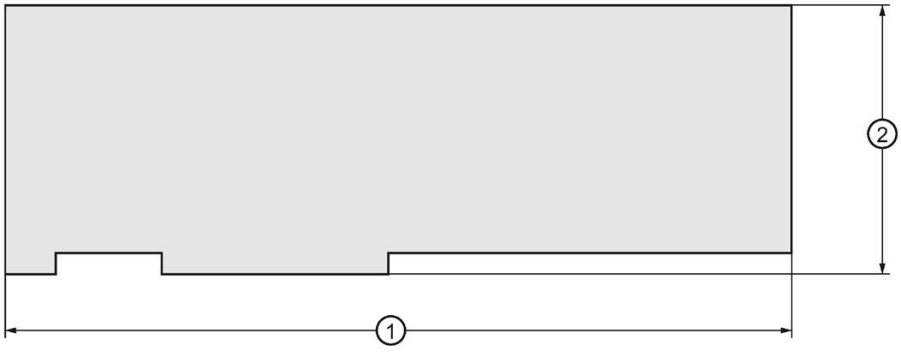
Front view and top view



* For device with short enclosure

All dimensions in mm

9.3 Dimension drawing of the expansion cards



① Length of the expansion car (PCI or PCIe)

- Device with standard enclosure:

  without extender: up to 312 mm

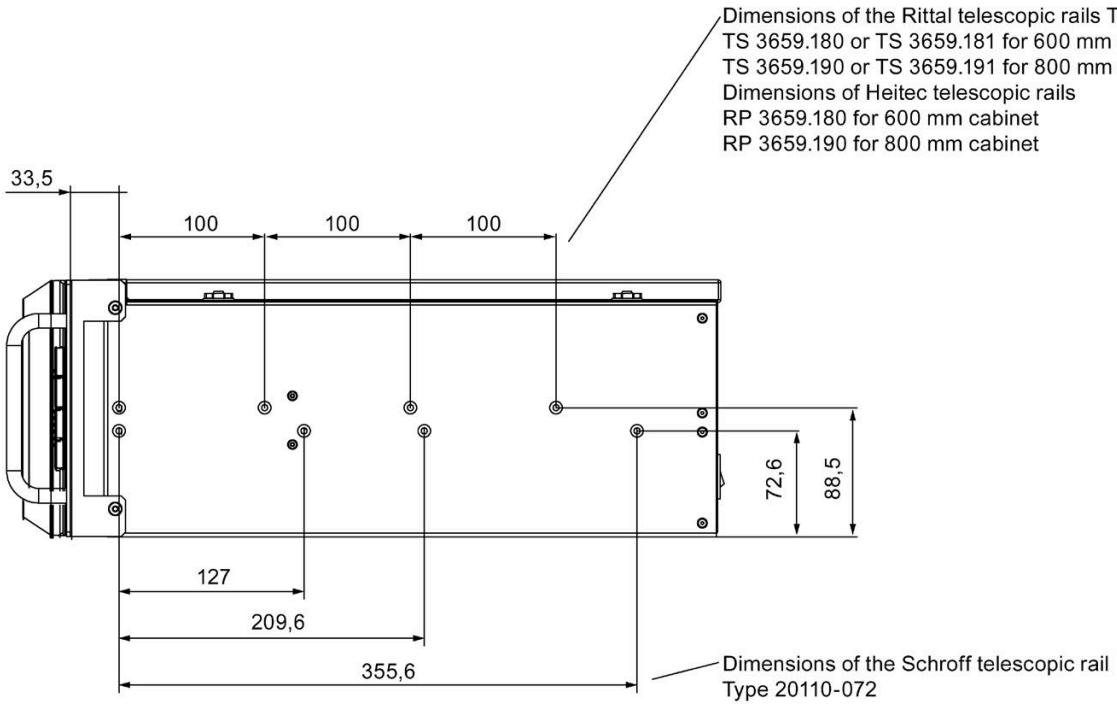
  with extender: 339 mm
- Device with short enclosure:

  up to 260 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)

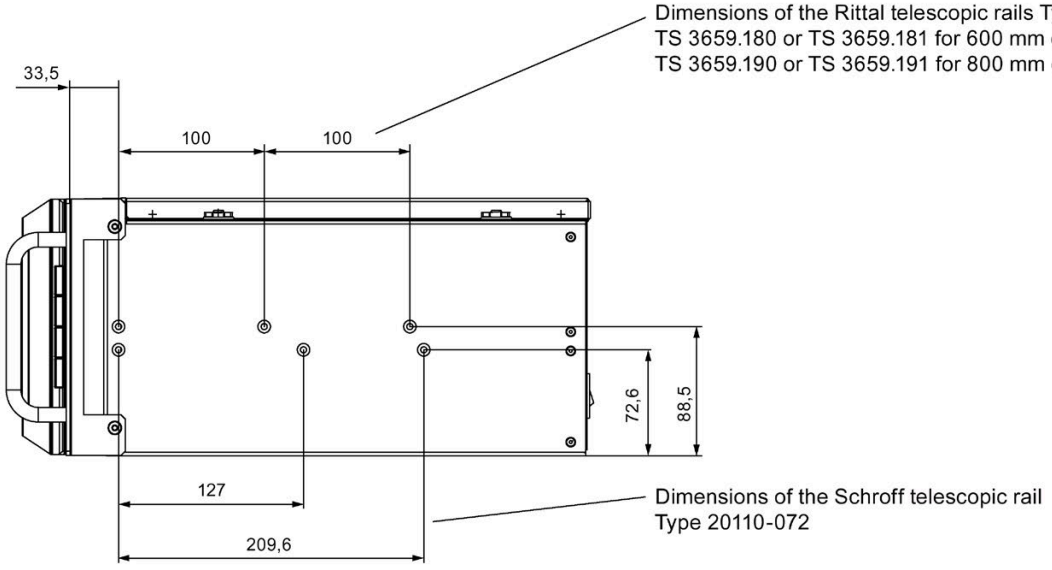
9.4 Dimension drawing of the telescope rails

Device with standard enclosure: Dimensions for bore holes for telescopic rails



All dimensions in mm.

Device with short enclosure: Dimensions for bore holes for telescopic rails



All dimensions in mm.

Standards and approvals

10

10.1 Certificates and approvals

10.1.1 ISO 9001 certificate

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).

10.1.2 Software license agreements

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

10.1.3 UL approval

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

10.1.4 FCC Rules (USA)

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

10.1.5 ICES Compliance (Canada)

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.

10.1.6 RCM (Australia / New Zealand)

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.

10.1.7 EAC (Eurasian Conformity)

Identification for Eurasion Customs Union

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

10.1.8 KC Mark (Korea)

This product meets the requirements of Korean certification.

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

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

10.2 Directives and declarations

10.2.1 CE marking

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).

10.2.2 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).

10.2.3 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.

- 2011/65/EU "Restriction of the use of certain hazardous substances in electrical and electronic equipment" (RoHS Directive)

Hardware description

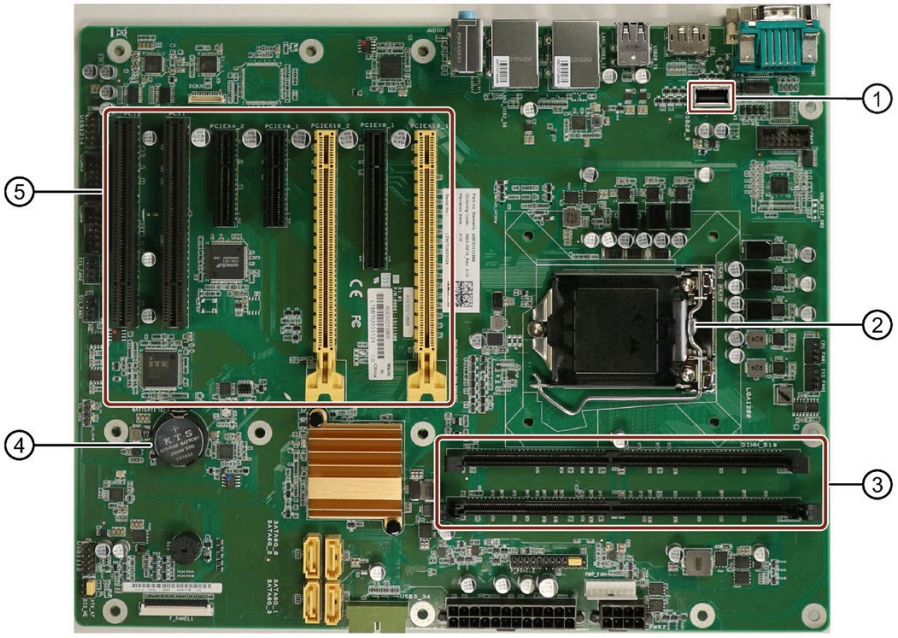
A

A.1 Motherboard

A.1.1 Layout of the motherboard

You can find a detailed description of the motherboards and the interfaces on the motherboards on the supplied data storage medium, see "Important instructions and manuals for operating the device (Page 11)".

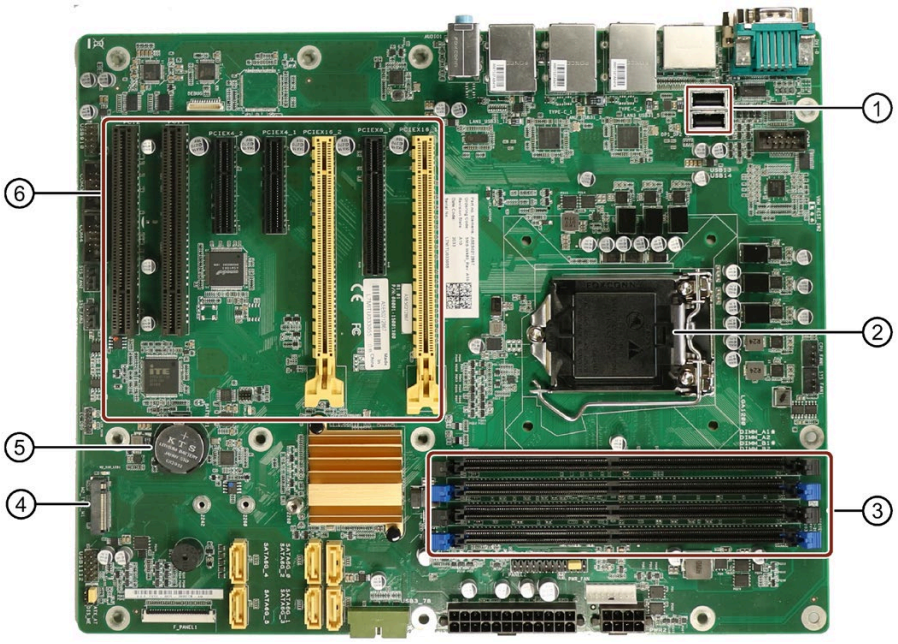
Layout of the SMS-H410 motherboard



①	Socket of the internal USB interface (X68) USB 2.0, Type A Vertical backwards compatible to USB 1.1; 500 mA / high current[1]
②	Processor socket
③	Two slots for memory modules
④	Backup battery
⑤	Slots for expansion cards, see "Technical specifications of the expansion card slots (Page 152)".

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

Layout of the SMS-W480 motherboard



①	Two sockets of the internal USB interfaces • (X68) • (X69) USB 2.0, Type A Vertical backwards compatible to USB 1.1; each 500 mA / high current[1]
②	Processor socket
③	Four slots for memory modules
④	Direct plug socket for M.2 NVMe SSD
⑤	Backup battery
⑥	Slots for expansion cards, see "Technical specifications of the expansion card slots (Page 152)".

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

Technical features of the motherboard

Technical features of the motherboard can be found under "General technical specifications of the motherboard (Page 151)".

A.2 Expansion cards

A.2.1 Interrupt assignment of the slots for expansion cards

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 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.

Motherboard SMS-H410

Information on the slots can be found under "Technical specifications of the expansion card slots (Page 152)".

Slot	PCI1	PCI2	PCIEX16_1	PCIEX16_2	PCIEX8_1	PCIEX4_1	PCIEX4_2
Host Device	PCH Port 7 PCI Dev0	PCH Port 7 PCI Dev1	PEG 0:1:0	PCH Port 5	PCH Port 8	PCH Port 11	PCH Port 12
Bus APIC Interrupt							
INT A	PIRQ A	PIRQ B	PIRQ A	PIRQ A	PIRQ D	PIRQ C	PIRQ D
INT B	PIRQ B	PIRQ C	PIRQ B	PIRQ B	PIRQ A	PIRQ D	PIRQ A
INT C	PIRQ C	PIRQ D	PIRQ C	PIRQ C	PIRQ B	PIRQ A	PIRQ B
INT D	PIRQ D	PIRQ A	PIRQ D	PIRQ D	PIRQ C	PIRQ B	PIRQ C
Organizational Pins							
Request	REQ0	REQ1					
Grant	GNT0	GNT1					
ID	AD16	AD17					

Motherboard SMS-W480

Information on the slots can be found under "Technical specifications of the expansion card slots (Page 152)".

Slot	PCI1	PCI2	PCIEX16_1	PCIEX16_2	PCIEX8_1	PCIEX4_1	PCIEX4_2	M.2 connector
Host Device	PCH Port 4 PCI Dev0	PCH Port 4 PCI Dev1	PEG 0:1:0	PCH Port 9-12	PCH Port 8	PCH Port 3	PCH Port 21-24	PCH Port 19-20
Bus APIC Interrupt								
INT A	PIRQ A	PIRQ B	PIRQ A	PIRQ A	PIRQ D	PIRQ C	PIRQ A	PIRQ C
INT B	PIRQ B	PIRQ C	PIRQ B	PIRQ B	PIRQ A	PIRQ D	PIRQ B	PIRQ D
INT C	PIRQ C	PIRQ D	PIRQ C	PIRQ C	PIRQ B	PIRQ A	PIRQ C	PIRQ A
INT D	PIRQ D	PIRQ A	PIRQ D	PIRQ D	PIRQ C	PIRQ B	PIRQ D	PIRQ B
Organizational Pins								
Request	REQ0	REQ1						
Grant	GNT0	GNT1						
ID	AD16	AD17						

A.2.2 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 tables describe the assigned I/O addresses in the delivery state of the device.

Motherboard SMS-H410

I/O address (hex)		Size(bytes)	Description of the basic function	Possible alternative function
from	to			
0000 0000	0000 0CF7	415	PCI Express Root Complex	
0000 0020	0000 0021	2	Programmable Interrupt Controller	
0000 0024	0000 0025	2	Programmable Interrupt Controller	
0000 0028	0000 0029	2	Programmable Interrupt Controller	
0000 002C	0000 002D	2	Programmable Interrupt Controller	
0000 002E	0000 002F	2	Motherboard resources	
0000 0030	0000 0031	2	Programmable Interrupt Controller	
0000 0034	0000 0035	2	Programmable Interrupt Controller	
0000 0038	0000 0039	2	Programmable Interrupt Controller	
0000 003C	0000 003D	2	Programmable Interrupt Controller	
0000 0040	0000 0043	4	System timer	
0000 004E	0000 004F	2	Motherboard resources	

0000 0050	0000 0053	4	System timer	
0000 0061	0000 0061	1	Motherboard resources	
0000 0062	0000 0062	1	Microsoft ACPI-Compliant Embedded Controller	
0000 0063	0000 0063	1	Motherboard resources	
0000 0065	0000 0065	1	Motherboard resources	
0000 0066	0000 0066	1	Microsoft ACPI-Compliant Embedded Controller	
0000 0067	0000 0067	1	Motherboard resources	
0000 0070	0000 0070	1	Motherboard resources	
0000 0080	0000 0080	1	Motherboard resources	
0000 0092	0000 0092	1	Motherboard resources	
0000 00A0	0000 00A1	2	Programmable Interrupt Controller	
0000 00A4	0000 00A5	2	Programmable Interrupt Controller	
0000 00A8	0000 00A9	2	Programmable Interrupt Controller	
0000 00AC	0000 00AD	2	Programmable Interrupt Controller	
0000 00B0	0000 00B1	2	Programmable Interrupt Controller	
0000 00B2	0000 00B3	2	Motherboard resources	
0000 00B4	0000 00B5	2	Programmable Interrupt Controller	
0000 00B8	0000 00B9	2	Programmable Interrupt Controller	
0000 00BC	0000 00BD	2	Programmable Interrupt Controller	
0000 00F0	0000 00F0	1	Numeric data processor	
0000 0240	0000 0247	8	Fintek Communications Port (COM1)	
0000 0248	0000 024F	8	Fintek Communications Port (COM2)	
0000 0250	0000 0257	8	Fintek Communications Port (COM3)	
0000 0258	0000 025F	8	Fintek Communications Port (COM4)	
0000 04D0	0000 04D1	2	Programmable Interrupt Controller	
0000 0580	0000 05BF	64	Microsoft ACPI-Compliant Embedded Controller	
0000 0680	0000 069F	32	Motherboard resources	

0000 0D00	0000 FFFF	62208	PCI Express Root Complex	
0000 164E	0000 164F	2	Motherboard resources	
0000 1854	0000 1857	4	Motherboard resources	
0000 2000	0000 20FE	255	Motherboard resources	
0000 3000	0000 3FFF	4096	PCI Express Root Port	
0000 4000	0000 4FFF	4096	Intel® UHD Graphics 630	
0000 4060	0000 407F	32	Standard SATA AHCI Controller	
0000 4080	0000 4083	4	Standard SATA AHCI Controller	
0000 4090	0000 4097	8	Standard SATA AHCI Controller	
0000 EFA0	0000 EFBF	32	Intel® Smbus - A3A3	

Motherboard SMS-W480

I/O address (hex)		Size(bytes)	Description of the basic function	Possible alternative function
from	to			
0000 0000	0000 0CF7	415	PCI Express Root Complex	
0000 0020	0000 0021	2	Programmable Interrupt Controller	
0000 0024	0000 0025	2	Programmable Interrupt Controller	
0000 0028	0000 0029	2	Programmable Interrupt Controller	
0000 002C	0000 002D	2	Programmable Interrupt Controller	
0000 002E	0000 002F	2	Motherboard resources	
0000 0030	0000 0031	2	Programmable Interrupt Controller	
0000 0034	0000 0035	2	Programmable Interrupt Controller	
0000 0038	0000 0039	2	Programmable Interrupt Controller	
0000 003C	0000 003D	2	Programmable Interrupt Controller	
0000 0040	0000 0043	4	System timer	
0000 004E	0000 004F	2	Motherboard resources	
0000 0050	0000 0053	4	System timer	

0000 0061	0000 0061	1	Motherboard resources	
0000 0062	0000 0062	1	Microsoft ACPI-Compliant Embedded Controller	
0000 0063	0000 0063	1	Motherboard resources	
0000 0065	0000 0065	1	Motherboard resources	
0000 0066	0000 0066	1	Microsoft ACPI-Compliant Embedded Controller	
0000 0067	0000 0067	1	Motherboard resources	
0000 0070	0000 0070	1	Motherboard resources	
0000 0080	0000 0080	1	Motherboard resources	
0000 0092	0000 0092	1	Motherboard resources	
0000 00A0	0000 00A1	2	Programmable Interrupt Controller	
0000 00A4	0000 00A5	2	Programmable Interrupt Controller	
0000 00A8	0000 00A9	2	Programmable Interrupt Controller	
0000 00AC	0000 00AD	2	Programmable Interrupt Controller	
0000 00B0	0000 00B1	2	Programmable Interrupt Controller	
0000 00B2	0000 00B3	2	Motherboard resources	
0000 00B4	0000 00B5	2	Programmable Interrupt Controller	
0000 00B8	0000 00B9	2	Programmable Interrupt Controller	
0000 00BC	0000 00BD	2	Programmable Interrupt Controller	
0000 00F0	0000 00F0	1	Numeric data processor	
0000 0240	0000 0247	8	Fintek Communications Port (COM1)	
0000 0248	0000 024F	8	Fintek Communications Port (COM2)	
0000 0250	0000 0257	8	Fintek Communications Port (COM3)	
0000 0258	0000 025F	8	Fintek Communications Port (COM4)	
0000 04D0	0000 04D1	2	Programmable Interrupt Controller	
0000 0580	0000 05BF	64	Microsoft ACPI-Compliant Embedded Controller	
0000 0680	0000 069F	32	Motherboard resources	
0000 0D00	0000 FFFF	62208	PCI Express Root Complex	

0000 164E	0000 164F	2	Motherboard resources	
0000 1800	0000 18FE	255	Motherboard resources	
0000 1854	0000 1857	4	Motherboard resources	
0000 2000	0000 20FE	255	Motherboard resources	
0000 3000	0000 3FFF	4096	PCI Express Root Port	
0000 4000	0000 4FFF	4096	PCI Express Root Port	
0000 5000	0000 503F	64	Intel® UHD Graphics 630	
0000 5060	0000 507F	32	Standard SATA AHCI Controller	
0000 5080	0000 5083	4	Standard SATA AHCI Controller	
0000 5090	0000 5097	8	Standard SATA AHCI Controller	
0000 EFA0	0000 EFBF	32	Intel® Smbus - 06A3	

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 channels. These interrupt channels can be shared and are plug-and-play compatible. That is, several devices can share the same interrupt. The IRQ is assigned automatically.

The tables describe the assignment of the interrupts in the delivery state of the device.

Motherboard SMS-H410

	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	
Function																									
System timer	X																								Fixed
Communications port (COM1)												X													Can be deactivated
Communications port (COM2)												X													Can be deactivated
Communications port (COM3)												X													Can be deactivated
Communications port (COM4)												X													Can be deactivated

Numeric data processor													X										Fixed
Intel® Serial IO GPIO Host Controller - INT3451														X									Can be deactivated
High Definition Audio Controller																X							Can be deactivated

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.

Motherboard SMS-W480

	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	
Function																									
System timer	X																								Fixed
Communications port (COM1)												X													Can be deactivated
Communications port (COM2)												X													Can be deactivated
Communications port (COM3)												X													Can be deactivated
Communications port (COM4)												X													Can be deactivated
Numeric data processor														X											Fixed
Intel® Serial IO GPIO Host Controller - INT3450															X										Can be deactivated
High Definition Audio Controller																	X								Can be deactivated
Ethernet 3																									Can be deactivated
Graphic																									Ethernet 3
Audio																									Can be deactivated

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.

Motherboard SMS-H410

Address (hex)		Description of the basic function	Possible alternative function
from	to		
FED1 0000	FED1 7FFF	Motherboard resources	
FED1 1800	FED1 18FF	Motherboard resources	
FED1 1900	FED1 19FF	Motherboard resources	
E000 0000	EFFF FFFF	Motherboard resources	
FED2 0000	FED3 FFFF	Motherboard resources	
FED9 0000	FED9 3FFF	Motherboard resources	
FED4 5000	FED8 FFFF	Motherboard resources	
FEE0 0000	FEEF FFFF	Motherboard resources	
FE03 8000	FE03 8FFF	Motherboard resources	
B113 0000	B113 FFFF	Intel® USB3.1 eXtensible Host Controller 1.10 (Microsoft)	
B114 A000	B114 A0FF	Intel® Smbus - A3A3	
B108 0000	B10F FFFF	Intel® I210 Gigabit Network Connection	
B107 C000	B107 FFFF	Intel® I210 Gigabit Network Connection	
FED0 0000	FED0 03FF	High Precision Event Timer	
B110 0000	B111 FFFF	Intel® Ethernet Connection (12) I219-V	
FDAF 0000	FDAF FFFF	Intel® Serial IO GPIO Host Controller - INT3450	
FDAE 0000	FDAE FFFF	Intel® Serial IO GPIO Host Controller - INT3450	
FDAC 0000	FDAC FFFF	Intel® Serial IO GPIO Host Controller - INT3450	
FE03 0000	FE03 3FFF	High Definition Audio Controller	
FE40 0000	FE40 FFFF	High Definition Audio Controller	
FE03 C000	FE03 CFFF	Intel® Management Engine Interface	
FD00 0000	FDAB FFFF	Motherboard resources	

FDAD 0000	FDAD FFFF	Motherboard resources	
FDB0 0000	FDFF FFFF	Motherboard resources	
FE00 0000	FE01 FFFF	Motherboard resources	
FE03 6000	FE03 BFFF	Motherboard resources	
FE03 D000	FE3F FFFF	Motherboard resources	
FE41 0000	FE7F FFFF	Motherboard resources	
9F80 0000	DFFF FFFF	PCI Express Root Complex	
FC80 0000	FE7F FFFF	PCI Express Root Complex	
B100 0000	B10F FFFF	Intel® PCI Express Root Port #6 - A395	
B000 0000	B0FF FFFF	Intel® UHD Graphics 630	
A000 0000	AFFF FFFF	Intel® UHD Graphics 630	
B114 8000	B114 9FFF	Standard SATA AHCI Controller	
B114 C000	B114 C0FF	Standard SATA AHCI Controller	
B114 B000	B114 B7FF	Standard SATA AHCI Controller	
A0000	BFFFF	PCI Express Root Complex	

Motherboard SMS-W480

Address (hex)		Description of the basic function	Possible alternative function
from	to		
FED1 0000	FED1 7FFF	Motherboard resources	
FED1 1800	FED1 18FF	Motherboard resources	
FED1 1900	FED1 19FF	Motherboard resources	
E000 0000	EFFF FFFF	Motherboard resources	
FED2 0000	FED3 FFFF	Motherboard resources	
FED9 0000	FED9 3FFF	Motherboard resources	
FED4 5000	FED8 FFFF	Motherboard resources	
FEE0 0000	FEEF FFFF	Motherboard resources	
FE03 8000	FE03 8FFF	Motherboard resources	

B128 C000	B12F FFFF	Intel® I210 Gigabit Network Connection	
B127 C000	B127 FFFF	Intel® I210 Gigabit Network Connection	
B118 0000	B11F FFFF	Intel® I210 Gigabit Network Connection #2	
B117 C000	B117 FFFF	Intel® I210 Gigabit Network Connection #2	
FE0F C000	FE0F FFFF	High Definition Audio Controller	
FE10 0000	FE1F FFFF	High Definition Audio Controller	
B133 8000	B133 80FF	Intel® Smbus - 06A3	
FED0 0000	FED0 03FF	High Precision Event Timer	
FD00 0000	FD69 FFFF	Motherboard resources	
FD6C 0000	FD6C FFFF	Motherboard resources	
FD6F 0000	FDFF FFFF	Motherboard resources	
FE00 0000	FE01 FFFF	Motherboard resources	
FE20 0000	FE7F FFFF	Motherboard resources	
FF00 0000	FFFF FFFF	Motherboard resources	
9F80 0000	DFFF FFFF	PCI Express Root Complex	
FC80 0000	FE7F FFFF	PCI Express Root Complex	
B110 0000	B11F FFFF	Intel® PCI Express Root Port #7 - 06BE	
B132 0000	B132 FFFF	Intel® USB3.1 eXtensible Host Controller 1.10 (Microsoft)	
B130 0000	B131 FFFF	Intel® Ethernet Connection (11) I219-LM	
B000 0000	B0FF FFFF	Intel® UHD Graphics 630	
A000 0000	AFFF FFFF	Intel® UHD Graphics 630	
FD6E 0000	FD6E FFFF	Intel® Serial IO GPIO Host Controller - INT3450	
FD6D 0000	FD6D FFFF	Intel® Serial IO GPIO Host Controller - INT3450	
FD6B 0000	FD6B FFFF	Intel® Serial IO GPIO Host Controller - INT3450	
FD6A 0000	FD6A FFFF	Intel® Serial IO GPIO Host Controller - INT3450	
B133 4000	B133 5FFF	Standard SATA AHCI Controller	
B133 A000	B133 A0FF	Standard SATA AHCI Controller	

B133 9000	B133 97FF	Standard SATA AHCI Controller	
FE01 0000	FE01 0FFF	Intel® SPI (flash) controller - 06A4	
B120 0000	B12F FFFF	Intel® PCI Express Root Port #6 - 06BD	
FE0F B000	FE0F BFFF	Intel® Management Engine Interface	
A0000	BFFFF	PCI Express Root Complex	

A.4 Assignment of expansion interfaces to the software in the TIA Portal (CP assignment)

The table below shows the correlation between enclosure labeling of the IPC expansion slots and the designation that is used during assignment of interfaces to the software in the TIA Portal.

Slot Number on the enclosure	Designation on the motherboard	TIA Portal
1	PCIEX16_1	X100
2	PCIEX8_1	X101
3	PCIEX16_2	X102
4	PCIEX4_1	X103
5	PCIEX4_2	X104
6	PCI1	X105
7	PCI2	X106

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/cs/us/en/)
- Support request form (https://www.siemens.com/automation/support-request)
- After Sales Information System SIMATIC IPC/PG (https://www.siemens.com/asis)
- SIMATIC Documentation Collection (https://www.siemens.com/simatic-tech-doku-portal)
- Your local representative (https://www.automation.siemens.com/aspa_app)
- Training center (https://siemens.com/sitrain)
- Industry Mall (https://mall.industry.siemens.com)

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

- 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 (https://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.

Problem	Cause	Remedy
Time and date are wrong even after correctly setting them in the firmware (BIOS)	The backup battery is dead.	Replace the backup battery.
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.
	Insufficient output of an external power supply, e.g. UPS	Use a powerful power supply.

Problem	Cause	Remedy
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

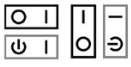
The following tables show all the symbols which may be found on your SIMATIC industrial PC, SIMATIC industrial monitor or SIMATIC Field PG in addition to the symbols which are explained in the operating instructions.

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

C.2 Safety

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

C.3 Operator controls

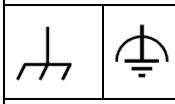
Symbol	Meaning		Symbol	Meaning
	On/off switch, without electrical isolation			
	On/off switch, without electrical isolation			

C.4 Certificates, approvals and markings

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

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

C.5 Interfaces

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		
	USB 3.1 Gen 2 SuperSpeedPlus port		

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