SIEMENS

SIMATIC

Industrial PC SIMATIC IPC847E

Operating Instructions

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06/2023
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⚠ WARNING

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

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

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

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Preface

Purpose of the operating instructions

These operating instructions contain all the information you need for the installation, electrical connection, commissioning, expansion of the SIMATIC IPC847E and to maintain and repair the device. They are intended for the following qualified specialist personnel:

- Installation personnel
- 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 supplied versions of the SIMATIC IPC847E.

History

Currently released versions of these operating instructions:

Version	Comments
10/2018	First edition
06/2023	Addition: • Single power supply (850 W) • Optional graphics card NVIDIA T400 • Microsoft® Windows® 10 Enterprise 2021 LTSC • Microsoft® Windows® Server 2022

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Product description

1

1.1 Important instructions and manuals for operating the device

Documentation	Contents	Source
Operating instructions	• Product description • Technical specifications • Installation of the device • Operation of the device • Installing and removing hardware • Dimension drawings	• Supplied data storage medium • Online at: Microsoft® Windows® Server 2019 (https://support.industry.siemens.com/cs/ww/en/view/109773882)
Quick Install Guide	Information on: • 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
Current product information	• Current notes on the device • Changes compared with these operating instructions	• Online at: SIMATIC IPC Documentation (http://www.siemens.com/simatic-ipc-doku-portal)
Firmware/BIOs description	Information on: • Important firmware settings • Firmware settings in the factory state • Boot modes	• Supplied data storage medium • Online at: Firmware/BIOS description (https://support.industry.siemens.com/cs/ww/en/view/109760621)
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 2016 (https://support.industry.siemens.com/cs/ww/de/view/109760563) Microsoft® Windows® Server 2019 (https://support.industry.siemens.com/cs/ww/en/view/109773882) Microsoft® Windows® Server 2022 (https://support.industry.siemens.com/cs/ww/de/view/109817286)

Documentation	Contents	Source
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 Remote Manager	Information on: • Remote maintenance of SIMATIC industrial PCs (IPCs) via a management PC • Using Intel ®Active Management Technology (Intel® AMT)	• Online at: SIMATIC IPC Remote Manager (http://support.automation.siemens.com/WW/view/en/48707158)
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/21766418)
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 IPC847E is a powerful industrial PC in 19" rack format design (4 HE). It is perfectly suited for PC applications with high-level industry functionality.

Device view



NOTE

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

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

- Maximum processor performance (in full configuration) without loss of performance (throttling) at up to 50 °C ambient temperature
- Fully coated surfaces that repel dirt and corrosion
- Rugged all-metal housing, coated over its entire surface (blue chromated) and enameled on the outside to protect against corrosion and dirt with high EMC compatibility
- Suitable for installation in space-saving control cabinets with a depth of only 500 mm
- Dust protection through overpressure venting concept with front-side fan and dust filter
- Protection against vibration and shock through corresponding hard drive retainer and card hold-down mechanism

High productivity through fast data processing

- 8th generation Intel® processors: Xeon, Core i7, Core i5 or Core i3 up to 6 cores / 12 threads
- Graphics controller (630/P630) integrated in the processor up to 4 K Ultra HD resolution
- Maximum performance, e.g. through Intel C246 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
- Low noise level due to variable-speed fans

High system availability thanks to minimization of standstill times

- High data security through RAID systems: Onboard RAID system or hardware RAID system
- RAID1 system: Data mirroring onto two SATA or SAS drives, including in removable drive bays, and optionally with additional SDD (for operating system) or hot-spare drive
- RAID5 system: Striping with parity onto three SATA or SAS drives for increased memory capacity in removable drive bays, optionally with additional hot-spare drive
- Hot swap (swapping of drive during operation) in removable drive bays in RAID systems
- Hot-spare drive in removable drive bays in RAID systems: The rebuild process onto the hot-spare drive starts automatically
- Fast identification and swapping of drives under error conditions through alarm LEDs for RAID systems
- Efficient event diagnostics through the SIMATIC IPC DiagBase or DiagMonitor monitoring software (optional)
- Remote control and remote maintenance of the device through iAMT (Intel® Active Management Technology)
- SSD as 2.5" SATA or M.2 NVMe and ECC memory (optional)
- Replacement of the redundant power supply module during operation

Differentiated safety concepts

- Lockable front door for component protection against unauthorized access, e.g.
  - Software dongle in USB connection behind the front door
  - Front fan can only be replaced when front door is open
  - All components inside the device can only be accessed when front door is open
- Device monitoring through operating displays on the front for Ethernet; alarms for fan, temperature, watchdog and drives in RAID1 or RAID5 systems

High investment protection

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

User-friendly application scenarios for commissioning, use and service

- High flexibility and expandability through integrated interfaces and up to 11 slots (PCI and PCI Express)
- Pre-installed and activated operating system
- Fast restoration of delivery state of the operating system (with supplied data storage medium)
- Universal use as industrial workstation or industrial server
- Gbit LAN with teaming capability (3 x LAN 10/100/1000 Mbps connections)
- Service-friendly device configuration (modifications, service), e.g. replacement of filter or front fan without tools
- Can be used flexibly in different positions with telescopic guide support or as an industrial tower PC

1.3 Scope of application

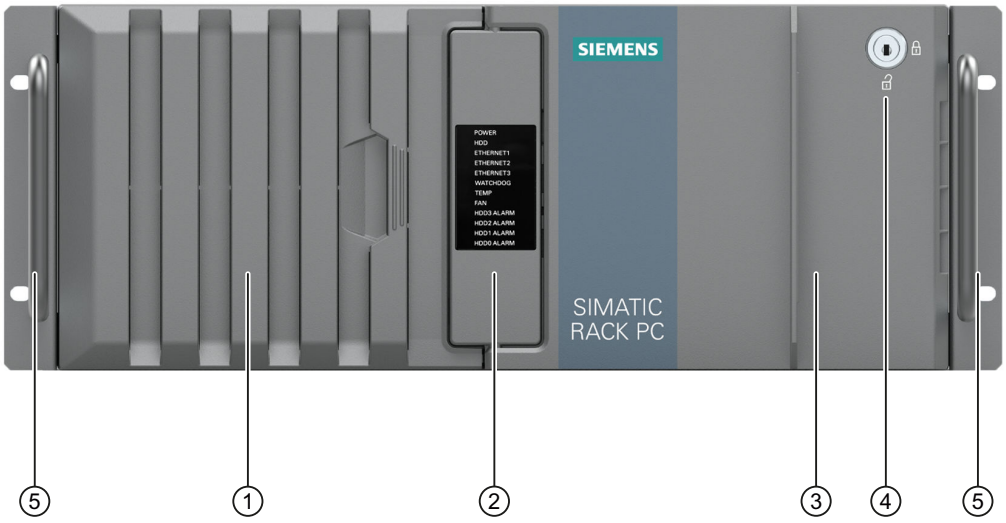
The SIMATIC IPC offers system integrators, cabinet designers, system engineers and machine designers a 19" rack PC platform for high-performance applications and IT applications on the control and cell level for:

- Process and visualization applications
- Industrial image processing
- 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



① Fan cover of front fan with openings for ventilation of the device (locked by front door)
② System status displays (Page 25)
③ Front door: lockable, protection against unauthorized access
④ Lock
- Key vertical: open
- Key horizontal: closed

⑤ 19" mounting bracket



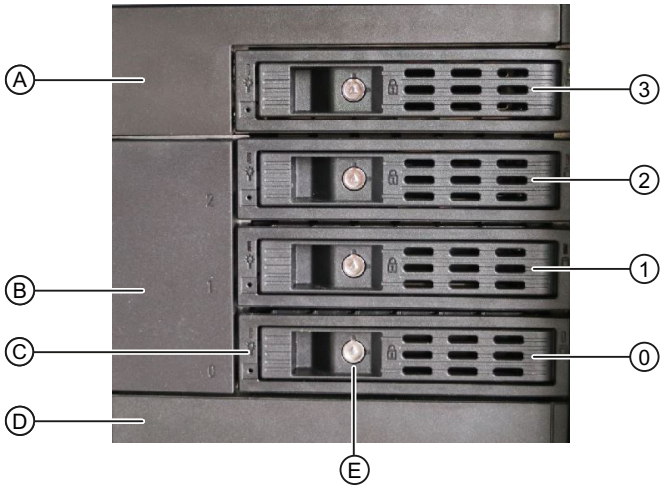
① USB ports
② Reset button
③ On/off button
④ Locking screw of the enclosure cover
⑤ Removable drive bays
⑥ Drive bays

See also

Interfaces (Page 20)
Operator controls (Page 23)

1.4.2 Drive cage type A

The drive cage type A is located behind the front door.
Drives can be installed here in removable trays and are therefore easily accessible from the outside, without opening the device.
The removable trays can be locked, thus protecting the drives from unauthorized access.



Mounting locations

(0)	Mounting location 0	Mounting location for 3.5" or 2.5" drive in the removable tray or for 5.25" drive or components
(1)	Mounting location 1	Mounting location for 3.5" or 2.5" drive in the removable tray
(2)	Mounting location 2	Mounting location for 3.5" or 2.5" drive in the removable tray
(3)	Mounting location 3	Mounting location for 3.5" or 2.5" drive in the removable tray

Components

(A) Cover or drive cover
(B) Blanking plate
(C) Removable tray
(D) Cover
(E) Lock of the removable tray

Additional information

Technical notes and information on the rated conditions are available in the section Drives in drive cage type A / side panel (Page 89).

1.4.3 Drive cage type B

The drive cage type B is located behind the front door.
In drive cage type B, drives are permanently installed inside and cannot be accessed externally.
The drives are very well protected against vibration and oscillation ("vibration-damped drive cage") in this drive cage.



Drive bays

(0)	Mounting location 0	Mounting location for 3.5" or 2.5" drive in a shock-proof/vibration-proof fixture or for 5.25" drive or components
(1)	Mounting location 1	Mounting location for 3.5" or 2.5" drive in a shock-proof/vibration-proof fixture or for 5.25" drive or components
(2)	Mounting location 2	Mounting location for 3.5" or 2.5" drive in a shock-proof/vibration-proof fixture or for 5.25" drive or components

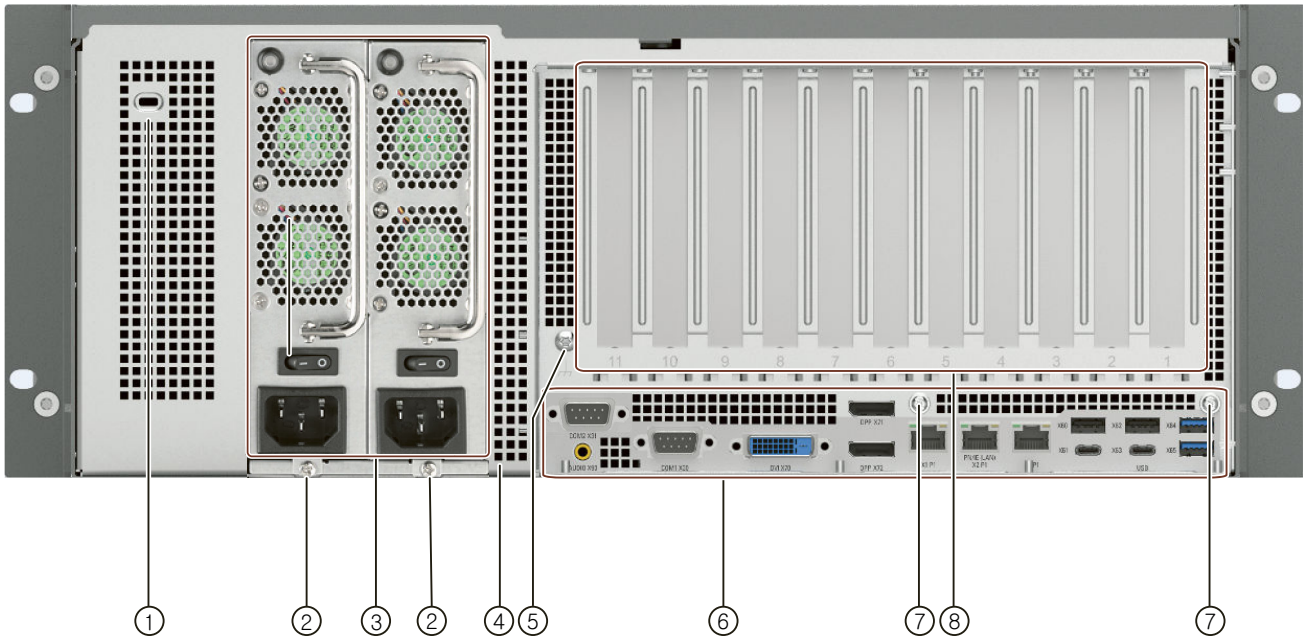
Components

(A) Cover or drive cover
(B) Cover

Additional information

Technical notes and information on the rated conditions are available in the section Drives in drive cage type B / side panel (Page 98).

1.4.4 Rear of the device



① Opening, prepared for Kensington lock
② Fixing screws for strain reliefs
③ Power supply connections (Page 22) (here: redundant power supply)
④ Air outlet
⑤ Connection for functional ground, see "Connection of equipotential bonding line (Page 46)"
⑥ Interfaces (Page 20)
⑦ Fixing screws for strain relief (here: redundant power supply)
⑧ Slots for expansion cards on the bus board (Page 160)

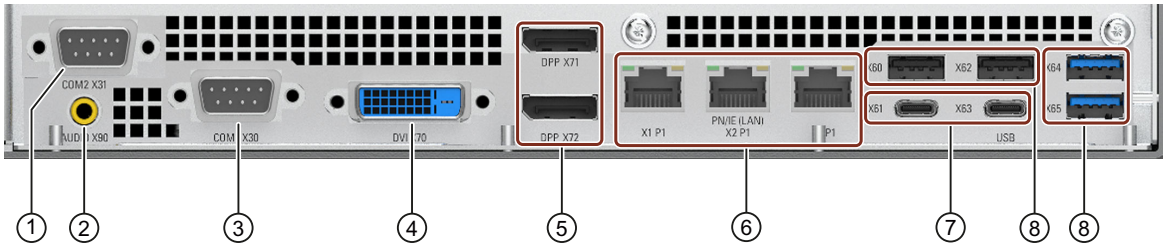
1.4.5 Interfaces and connections

1.4.5.1 Interfaces

NOTE

You can find detailed information on interfaces under "External interfaces (Page 165)".

Interfaces at rear of device Interfaces



①	COM2 X31 (optional)	Serial interface 2 (V.24), 9-pin D-sub socket (optional)
②	Audio X90	UAJ connector for audio devices, 2.5 mm jack socket
③	COM1 X30	Serial interface 1 (V.24), 9-pin D-sub socketCOM1
④	DVI X70	Connection for monitor with DVI-D interface
⑤	2 x DPP X71/X72 DisplayPort	Connections for DisplayPort: • Connection for monitors with DisplayPort interface • Connection for monitors with VGA interface via DP to VGA adapter, see Hardware accessories (Page 29) • Connector for monitors with DVI interface via DP-DVI-D adapter, see Hardware accessories (Page 29)
⑥	3 x Ethernet Ethernet	Connections for Ethernet RJ45 for 10/100/1000 Mbps Ethernet X1/P1 is iAMT-capable The Ethernet interfaces are numbered on the enclosure. The numbering by the operating system can differ.
⑦	2 x USB X61/X63	USB 3.1 GEN 2 Type C high current, backwards compatible with USB 3.0/2.0/1.1
⑧	2 x 2 USB X60/X62/X64/X65	USB 3.1 GEN 2 Typ A high current, backwards compatible with USB 3.0/2.0/1.1

Interfaces of the optional graphics card



① 3 x Mini DisplayPort

You can find information about the optional graphics card under "Technical specifications of graphic (Page 136)".
Further connection options for monitors to this interface:

- Hardware accessories (Page 29)

Interfaces at front of device

The interfaces at the front of device are located behind the front door.



①	2 × USB 3.1 Gen 1	Connections for USB devices, backward compatible with USB 3.0/2.0/1.1

1.4.5.2 Power supply connections

Single power supply (400 W)

Socket for power plug



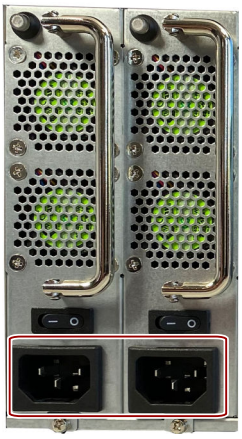
Single power supply (850 W)

Socket for power plug



Redundant power supply (350 W)

Sockets for power plugs



1.4.6 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 55)".

On/Off switch

Single power supply (400 W): On/off switch



Single power supply (850 W): On/off switch

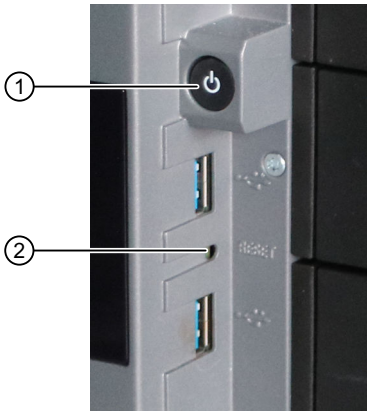


Redundant power supply (350 W): On/off switch



On/off switch and reset button

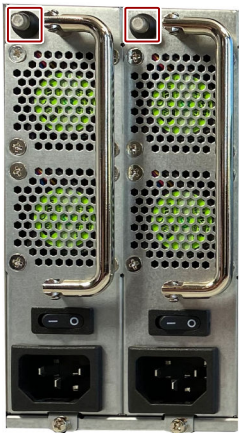
The On/off button ① and the reset button ② are located on the front of the device behind the front door. The On/off button starts and shuts down the operating system. The reset button is for the emergency when the device can no longer be operated.
Additional information is available in "Switching on the device (Page 54)" and "Switching off the device (Page 55)".



① On/off button
② Reset button for emergencies

Alarm reset button (redundant power supply)

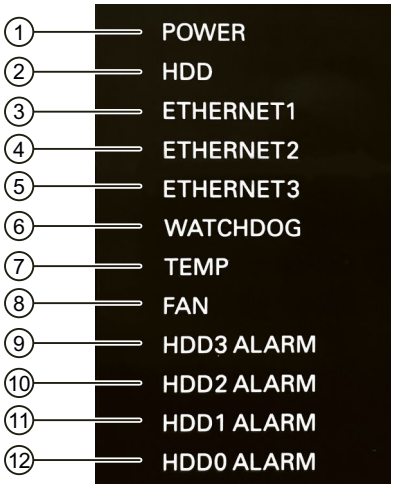
The alarm reset button is only available for devices with redundant power supply.
Use the alarm reset button to switch off the signal tone of the redundant power supply in the event of an error.



1.4.7 Status displays

1.4.7.1 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.Status displays

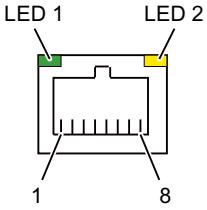


Item	Status display	Meaning	Color	Description
①	POWER	Operating mode of the PC	OFF	Switched off or disconnected from the mains
			YELLOW	Idle state or shut down

①	POWER	Operating mode of the PC	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 • Fan on drive cage type A faulty • Fan of single power supply (400 W) defective
⑨ ⑩ ⑪ ⑫	HDD3 ALARM HDD2 ALARM HDD1 ALARM HDD0 ALARM	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 17)" and "Drive cage type B (Page 18)".	OFF	RAID is OK
			A RED LED is lit up	The associated hard disk 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 hard disk could not be localized by the monitoring software. It may be possible to detect the defective hard disk with the RAID software. Information is available at "RAID1 system (Page 58)", "RAID5 system (Page 59)" or "Hot-spare drive in RAID1 or RAID5 systems (Page 60)".

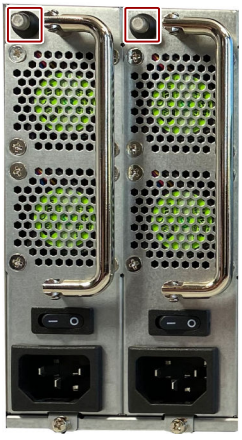
1.4.7.2 Status display of the Ethernet interface

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
		GREEN	• Active cable connected
		GREEN flashing	• Data transfer active
LED 2	Data transmission rate	OFF	• 10 Mbps
		GREEN	• 100 Mbps
		YELLOW	• 1000 Mbps

1.4.7.3 Status display of redundant power supply



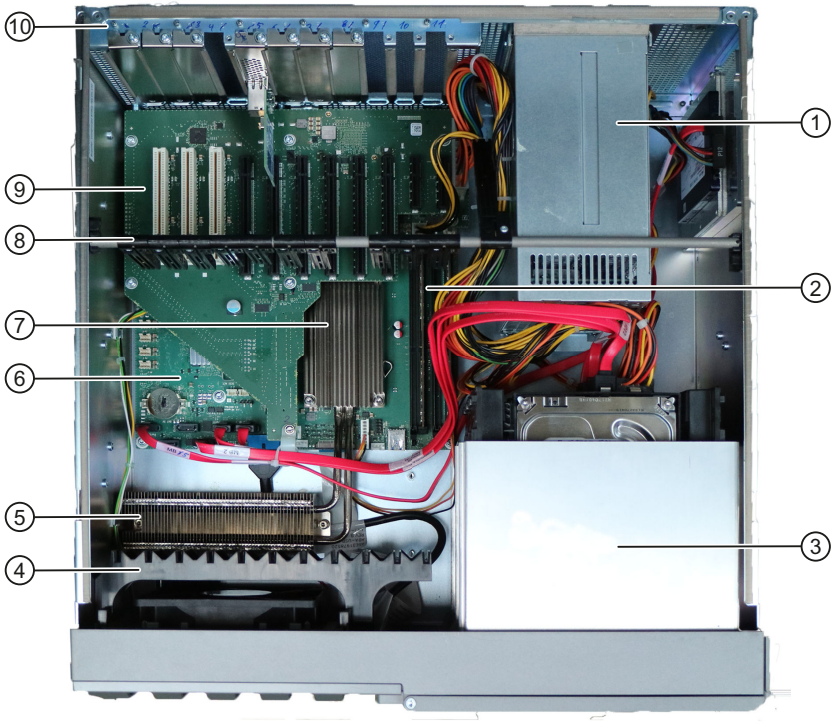
Status display	Meaning	Status	Meaning of the status
Status LED (see marking)	Status of the power supply module	OFF	• Module is out of service, no redundancy in effect.
		GREEN	• The module is in operation and functioning. • Redundancy is in effect when both modules are operating.
		RED	• Module failed, no redundancy in effect.

1.4.7.4 Status displays on removable tray for drives



Item	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
			Lit	• Device is switched on and a drive is installed
②	Activity	Status of the drive	Flashes	• Drive is active
			OFF	• Drive is not active

1.5 Internal construction of the device



① Power supply, single or redundant
② Motherboard with slots for memory modules
③ Drive cage

④ Guide rail for long expansion cards
⑤ Heat sink; connected via 2 heat pipes to the heat sink of the processor ⑦ for heat transfer
⑥ Motherboard
⑦ Heat sink of the processor
⑧ Rod with card holders for expansion cards
⑨ Bus board with slots for expansion cards
⑩ On the enclosure: Numbering of slots for expansion cards

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.

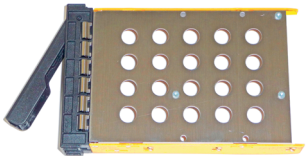
Obtaining accessories from the SIEMENS Industry Mall

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

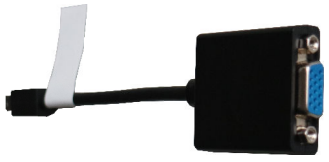
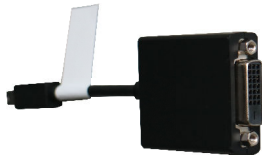
Accessories available for order

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 

* Component of the optional graphics card

Name	Description	Article number
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	6ES7648-1AA01-0XC0 
Low profile removable rack unit	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 in 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 
Filter pad	Filter pad for fan cover on the device front, package with 10 filter pads	A5E37019277
DP to DVI-D adapter	Graphics adapter cable, DisplayPort to DVI	6ES7648-3AF00-0XA0 
DP to VGA adapter	Graphics adapter cable, DisplayPort to VGA	6ES7648-3AG00-0XA0 
mDP adapter	Connection of dual-head adapter to the optional graphics card possible with the following adapters:	

* Component of the optional graphics card

Name	Description	Article number
mDP adapter	• mDP to VGA adapter Mini DisplayPort to VGA	6ES7648-3AL00-0XA0 
	• mDP to DVI-D adapter Mini DisplayPort to DVI, 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 

* Component of the optional graphics card

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)".

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.

Software	Description
SIMATIC IPC Remote Manager	The SIMATIC IPC Remote Manager enables the use of Intel® Active Management Technology (Intel AMT). By using remote access to SIMATIC IPCs, system or program errors can be corrected from a control room (without on-site presence), for example, and program updates and firmware/BIOS settings can be performed. Access is possible even if the operating system no longer starts.

You can find more detailed information on the software products as well as links to the online catalog and the online ordering system (Industry Mall (https://mall.industry.siemens.com)) on the home page of SIMATIC IPC Software (http://www.automation.siemens.com/mcms/pc-based-automation/en/industrial-pc/expansion_components_accessories).

Safety instructions

2

2.1 General safety instructions

⚠ WARNING

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

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

- Ensure that only suitably qualified personnel perform the work.

Risk of physical injury

⚠ CAUTION

Risk of physical injury

The device is heavy, may fall down, injure persons and be damaged.

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

Risk due to electric shock

⚠ 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.

Risk of lightning strikes

⚠ DANGER

Risk of lightning strikes

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

Death, serious injury and burns may result.

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

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.

ESD directive

Electrostatic sensitive devices can be labeled with an appropriate symbol.



NOTICE

Electrostatic sensitive devices (ESD)

The device contains electronic components that may be destroyed by electrostatic charges. This can result in malfunctions and damage to the machine or plant.

Take corresponding precautionary measures before you open the device.

2.2 Note on transport and storage

Damage caused by transportation 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.

⚠ 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.

Damage from 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.
- Bring the device to room temperature before starting it up.
- Do not expose the device to direct heat radiation from a heating device.
- If condensation develops, wait approximately 12 hours or until the device is completely dry before switching it on.

2.3 Notes on mounting

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.

Rack mounting

NOTE

Rack-mount instructions

- Elevated operating temperature
  If installed in a closed or multi-unit rack, the operating ambient temperature may be greater than the room temperature. Install the device in an environment recommended by the manufacturer.
- Reduced air flow
  When installing the device in a rack, ensure that the air flow required for safe operation of the device is guaranteed.
- 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.
- Circuit overload
  When connecting the devices to the power supply, observe the rated values specified on the nameplate of the devices.
- Reliable grounding
  Reliable grounding of rack-mounted equipment should be ensured.

Device in the control cabinet

⚠ DANGER

Electrocution risk when control cabinet is open

When you open the control cabinet, there may be dangerous voltages at certain areas or components possibly caused by other devices.

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.

2.4 Notes on ambient and environmental conditions

Approvals

⚠ WARNING

Voided approvals

If the following conditions are not met when installing the system, the UL 61010-2-201, EN 61010-2-201 approvals are voided and there is a risk of overheating and personal injury.

- You should observe the following information on ambient and environmental conditions.

Ambient and environmental conditions

NOTICE

Ambient conditions and chemical resistance

Unsuitable environmental conditions can cause faults or damage the device.
Failure to comply nullifies the warranty in accordance with IEC/EN/UL 61010-2-201.

- Operate the device only in closed rooms.
- Only operate the device in the ambient conditions specified in the technical specifications.
- Observe the permitted mounting positions of the device.
- Do not obstruct the venting slots of the device.
- 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 and make sure that no water enters the device.

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

- The climatic and mechanical environmental conditions specified in the operating instructions.
- Do not operate the device in severe environments which are subject to caustic vapors or gases.
- Avoid extreme ambient conditions such as heat.
- Do not expose the device to direct sunlight or other powerful light sources.
- Install the device in such a way that it poses no danger.
- Always maintain a minimum clearance of 50 mm to the area of the ventilation slots and do not cover the ventilation slots of the enclosure.
- Ensure that there is a distance of at least 50 cm at the back of the device, depending on wiring.
- You can install the device without an additional fire protection enclosure. It meets the requirements for fire protection enclosures in accordance with IEC/EN/UL 61010-2-201.
- The device conforms to IP 41 degree of protection on the front. Ensure that the installation opening for the device is splash-proof in areas which may be subject to splash water.

High frequency radiation

⚠ CAUTION

Immunity to RF interference

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

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 Information on 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.

NOTICE

Damage through regenerative feedback

Regenerative feedback of voltage to ground by a connected or installed component can damage the device.

Connected or built-in I/Os, for example, a USB drive, are not permitted to supply any voltage to the device.

Regenerative feedback is generally not permitted.

NOTE

When measuring the counter emf, remember the following:

- The IPC in question must be turned off and the power supply connector must be plugged in.
- During the measurement, all cables from the plant to the IPC should be connected.
- All other components in the plant must be active.

2.6 Notes on device and system extensions

Device and system extensions

⚠ 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.
- Observe the max. permissible power consumption values.

NOTICE

Damage caused by device and system extensions

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

- Always disconnect the power plug before you open the device.
- Only install device or system expansions designed for this device.
- Observe the information on "Electromagnetic compatibility" provided in the technical specifications.

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

Warning of hot surface

Risk of burns may be marked with the corresponding symbol.



DANGER

Risk of burns

High temperatures can occur on the rear of the device in the vicinity of the perforated slot brackets.

To protect against burns, observe the hazard symbol "Warning of hot surface" on the rear of the device and the safety instructions.

Limitation of liability

- All technical specifications and approvals of the device only apply if you use expansion components that have a valid CE approval (CE mark).
- 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 IPC847E
- Power supply cable (country-specific): 1 power supply cable *
  For redundant power supply: 2 power supply cables *
- Strain reliefs: 1 strain relief for USB and LAN interfaces, 2 removable cable ties
- Power supply connector lock:
  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
- SIMATIC IPC847E Quick Install Guide
- SIMATIC IPC847E Operating Instructions
- Product information
- Firmware/BIOS description
- 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 one of the following installed operating systems.

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 140).

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 31)

Printed documents

- SIMATIC IPC847E Quick Install Guide
- Product Information "Important notes on your device"
- SIMATIC IPC/PG Quality Control Report

3.1.2 Checking the delivery package

⚠ WARNING

Electric shock and fire hazard due to damaged device

Damaged devices due to improper storage or transport may lead to personal injury and/or substantial damage to equipment.

You should observe the warnings in "Note on transport and storage (Page 35)".

Procedure

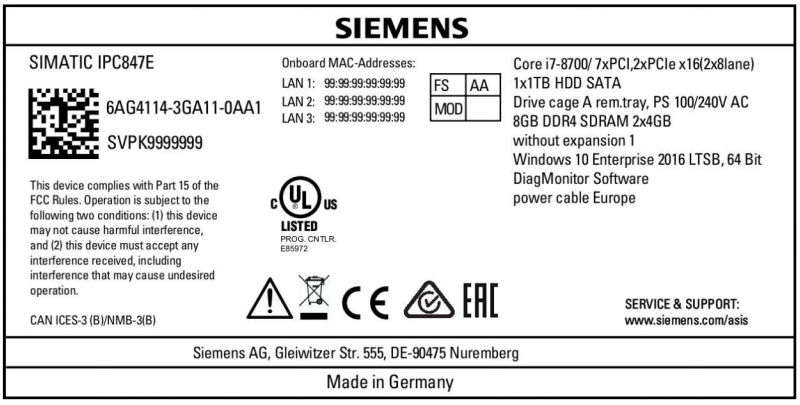
1. Check the delivery unit for any signs of visible transport damage.
   If any transport damage is present at the time of delivery, lodge a complaint at the shipping company in charge. Have the shipper confirm the transport damage immediately.
2. Unpack the device at its installation location.
   Remove the transport lock in the door of the type A drive cage.
3. Keep the original packaging in case you have to transport the unit again.
4. Check the scope of delivery (Page 41) and any accessories (Page 29) you may have ordered for completeness and damage.
   Please inform the delivery service immediately if the package contents are incomplete or damaged or do not correspond with your order. Fax the enclosed form "SIMATIC IPC/PG Quality Control Report".
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 43).

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 nameplate is located on the inside of the front door.



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:



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 operated as tower, it must not be subjected to vibration stress 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 140)".

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 29)".

Additional information

You can also find additional information in the QIG (Quick Installation Guide), which comes with your 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.

You should observe the installation and assembly notes under:

- Notes on mounting (Page 36)
- Notes on ambient and environmental conditions (Page 37)

⚠ 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

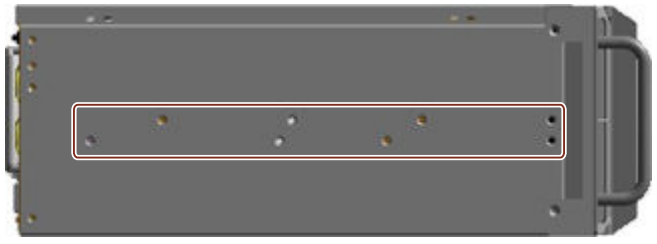
The device is too heavy to be mounted exclusively with the 19-inch brackets of the front panel.

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.

Mounting holes

Detailed information on the position of the mounting holes for angle brackets or telescopic rails can be found here: Dimension drawing of the telescope rails (Page 143) and Technical specifications of the telescopic rails (Page 140).



3.3 Connecting the device

3.3.1 Country-specific information on supply voltage

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

For countries other than the 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 19)".

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 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 46)".

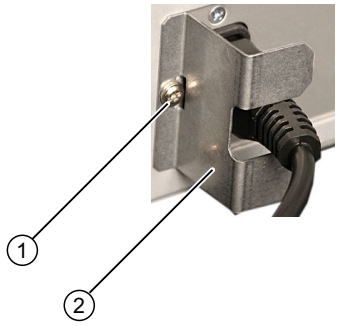
Procedure

1. Turn the on-off switch off (position "0"). Information on the position of the on/off switch is available in "Operator controls (Page 23)".
2. Insert the power cable in the corresponding electrical socket. Information on the position of the socket is available in "Power supply connections (Page 22)".
3. Insert the power cable in the electrical socket.
4. Switch the on/off switch to on (position |).

Attach latch for power plug

To prevent unintentional removal of the power cable, you secure the plug as follows:

1. Remove the retaining screw ①.
2. Screw on the latch for the power plug ②.



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 46)".

Procedure

1. Switch the on/off switch off (position 0). Information on the position of the on-off switch is available under "Operator controls (Page 23)".
2. Connect the power cable to the two sockets. Information on the position of the sockets is available in "Power supply connections (Page 22)".
3. Connect the power cable to the sockets.
4. Switch the on/off switch to on (position |).
   The status display on the power supply modules light up green.

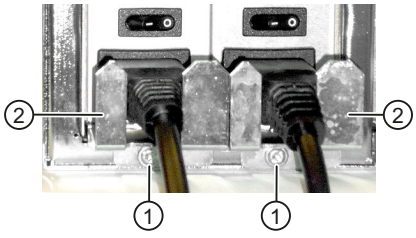
NOTE

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 23)".

Attach latch for power plug

To prevent unintentional removal of the power cable, you secure the plug on the device as follows:

1. Remove the two retaining screws ①.
2. Screw the power plug latches ② using the two fixing screws ①.



3.3.4 Connecting I/O 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.

You should observe the warnings relating to the connection of I/O devices in "Information on I/O devices (Page 38)".

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 "Interfaces and connections (Page 20)".
2. Secure the cables (Page 53) with strain relief if needed.

Connecting audio devices

Depending on the function, a UAJ connector has 2-4 contact surfaces.
Depending on the function or standard, the assignment of the contacts varies.
The audio controller of the device recognizes the assignments of the contacts of the UAJ connector in accordance with the connected audio device and is automatically configured.
You can connect the following audio devices to the UAJ connection:

- Audio device with line out
- Audio device with line in
- Headphones
- Microphone
- Headset (with headphones and microphone) with the following standards:
  - OMTP: Standard for audio devices from Nokia, etc.
  - CTIA: Standard for audio devices from Apple®

NOTE

When using the audio interface in the DVI video output mode, the user must ensure that a ferrite (type: 742 716 33, Manufacturer: Würth) is attached with one coil.

Connecting several monitors (multi-monitoring)

You will find up to six ports on the rear of the device for connecting monitors. Three of these interfaces are connected to the motherboard. When an optional graphics card is installed, the other three interfaces are connected to the graphics card. Parameter assignment is performed by means of the Control Panel in Windows®.
The IPC is factory set for multi-monitoring. If needed, you can configure the multi-monitoring function and the output of the boot screen in the firmware settings, see "Multi-monitoring (Page 58) ".
The following table shows the various connection options of the monitors to the interfaces of the device.

		Motherboard			Graphics card (optional)		
		DPP1	**DPP2**	**DVI-D**	**mDPP1**	**mDPP2**	**mDPP3**
Monitor 1	DP	X	-	-	-	-	-
	DVI	X 1)	-	-	-	-	-
	VGA	X 2)	-	-	-	-	-
Monitor 2	DP	-	X	-	-	-	-
	DVI	-	X 1)	-	-	-	-
	VGA	-	X 2)	-	-	-	-
Monitor 3	DP	-	-	-	-	-	-
	DVI	-	-	X	-	-	-
	VGA	-	-	-	-	-	-
Monitor 4	DP	-	-	-	X 3)	-	-
	DVI	-	-	-	X 4)	-	-
	VGA	-	-	-	X 5)	-	-
Monitor 5	DP	-	-	-	-	X 3)	-
	DVI	-	-	-	-	X 4)	-
	VGA	-	-	-	-	X 5)	-
Monitor 6	DP	-	-	-	-	-	X 3)
	DVI	-	-	-	-	-	X 4)
	VGA	-	-	-	-	-	X 5)

1) - via DP to DVI-D adapter

2) - via DP to VGA adapter

3) - via mDP to DP adapter

4) - via mDP to DVI-D adapter

5) - via mDP to VGA adapter

You can find additional information about the optional graphics card under "Technical specifications of graphic (Page 136)".

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

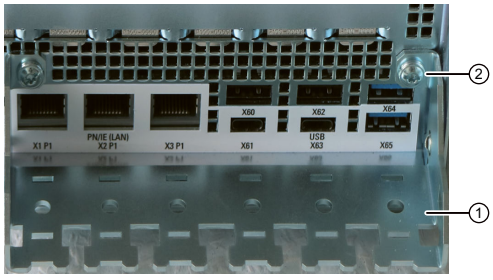
The strain relief provided is used to prevent accidental loosening of the interface cables from the device.

Requirement

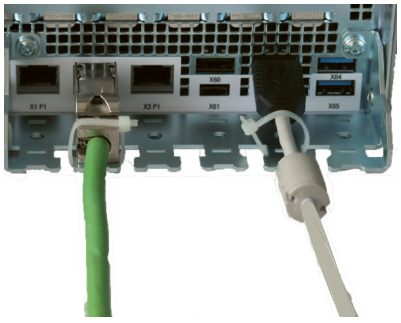
- I/O devices are connected to the respective interfaces.
- TORX T10 screwdriver

Procedure

1. Screw the strain relief ① onto the device with the fastening screw ②.



2. Insert the detachable cable ties in the respective openings of the strain relief and fasten the cables with the cable ties.



Commissioning the device

4

4.1 Switching on the device

Requirement

- The power supply is connected. (Page 47)

Procedure

1. Toggle the on-off switch (for 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 button can be found at "Operator controls (Page 23)".

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)" for more on this.

4.2 Configuring automatic switch-on of device

In the firmware settings you can specify that the device automatically starts up again after a separation from the mains voltage of at least 20 ms as soon as the mains voltage is available again.
Configure this function with the firmware setting:

- State After G3

You can find information on this in the detailed firmware/BIOS description, see "Important instructions and manuals for operating the device (Page 11)".
The exact minimum required downtime of the mains voltage is dependent on the device equipment and the application.

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 23)".

Result

The "POWER" operating display is lit yellow.
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

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.

- Shut down the operating system and unplug the power plug from the rear of the device, see "Power supply connections (Page 22)".

The device is switched off and fully disconnected from the mains voltage. No trickle current is flowing.

Hardware reset Hardware reset

With the hardware reset, you can restart the device if it does not respond to keyboard or mouse input. Any running operating system will not shut down safely.

NOTICE

Data loss

If a hardware reset is performed, the device undergoes a hard reboot.

- 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.
  - Press the power button again to turn the device back on.

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 23)".

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.



See also

Notes on device and system extensions (Page 39)

5.2 Multi-monitoring

You can operate several monitors on one device at the same time. Read the information in the corresponding section under "Connecting I/O devices (Page 50)".

NOTE

Information on graphics cards which support multi-monitoring can be obtained from your local representative, see "Service and support (Page 171)".

Procedure

1. Install a suitable graphics card, see "Graphics card (Page 88)".
2. Configure the function "Multi-monitoring" in the firmware settings of the device. You can find information on this in the detailed firmware/BIOS description, see "Important instructions and manuals for operating the device (Page 11)".

5.3 Drive configurations

5.3.1 RAID1 system

You can operate two drives of the same capacity and type independently of one another as a RAID1 system or as a "system with 2 drives" (see "System with 2 drives (Page 60)").
An RAID1 system works on the principle of "data mirroring on two drives". If a drive is defective, the RAID1 system can continue to work on the remaining drive and thus achieve high availability.

RAID1 system with associated software

If you have ordered a RAID1 system with a pre-installed operating system, your device will be monitored with the installed diagnostics software, SIMATIC IPC DiagBase or DiagMonitor.
The following software is available to monitor the RAID1 system:

- With an onboard RAID system:
  Intel® Optane™ Memory and Storage Management (Page 63)
- With a hardware RAID system:
  maxView Storage Manager (Page 72)

Slots for drives in the onboard RAID system

The 2 hard disks required for an onboard RAID system can be installed in the following locations:

- Internally on the side panel of the device (Page 106)
- Drive cage type A (Page 17)
- Drive cage type B (Page 18)

Slots for drives in the hardware RAID system

The 2 hard disks required for a hardware RAID system can be installed in the following locations:

- Drive cage type A (Page 17)

Display of a faulty drive in a RAID1 system

A faulty drive is displayed in connection with a RAID1 system in the following locations:
Onboard RAID system

- System status displays (Page 25) On the front of the device

- Monitoring software SIMATIC IPC DiagBase or SIMATIC IPC DiagMonitor
- With an onboard RAID system:
  "Intel® Optane™ Memory and Storage Management (Page 63)"
- With a hardware RAID system:
  "maxView Storage Manager (Page 72)"

5.3.2 RAID5 system

A RAID5 system works on the principle of "striping with parity".
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:

- With an onboard RAID system:
  Intel® Optane™ Memory and Storage Management (Page 63)
- With a hardware RAID system:
  maxView Storage Manager (Page 72)

Slots for drives in the onboard RAID system

The 2 hard disks required for an onboard RAID system can be installed in the following locations:

- Internally on the side panel of the device (Page 106)
- Drive cage type A (Page 17)
- Drive cage type B (Page 18)

Slots for drives in the hardware RAID system

The 2 hard disks required for a hardware RAID system can be installed in the following locations:

- Drive cage type A (Page 17)

Display of faulty drive in a RAID5 system

A faulty drive is displayed in connection with a RAID5 system in the following locations:
Onboard RAID system

- System status displays (Page 25) On the front of the device

- Monitoring software SIMATIC IPC DiagBase or SIMATIC IPC DiagMonitor
- With an onboard RAID system:
  "Intel® Optane™ Memory and Storage Management (Page 63)"
- With a hardware RAID system:
  "maxView Storage Manager (Page 72)"

See also

System with 2 drives (Page 60)

5.3.3 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.

5.3.4 System with 2 drives

You can operate two drives of the same capacity and of the same type independently of one another as "System with 2 drives" or as a RAID1 system (see "RAID1 system (Page 58)").
Information on the capacity of the drives can be found in the order documents.
In a system with 2 independently operated drives, the second drive is connected to SATA port 1 and not yet set up in the delivery state. The drive can be set up with the pre-installed operating system.
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 RAID systems

5.4.1 Onboard RAID system

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

If you ordered a device with an onboard RAID system, the onboard RAID system is pre-configured by default.
The subsequent setup of an onboard RAID system is carried out in the firmware under "Create Volume".
After setting up the onboard RAID system, it can be configured using the "Intel® Optane™ Memory and Storage Management" software.

Requirement

- The drives required for the onboard RAID system are built into the device, see: "RAID1 system (Page 58)" and "RAID5 system (Page 59)"

Procedure

1. Switch on the device or restart it.
2. To access the user interface of the firmware, press <Esc> and hold it down immediately after switching on the device when the message "`Press ESC for boot options`" appears.
   The firmware user interface opens. Here you have the following keys available for navigation:

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

3. Use the arrow keys of the keyboard to select "Device Management" from the firmware selection menu and confirm your selection.
   To select and save settings, refer to the information on navigating in the firmware, see above.
4. From the "Device List", select the entry "Intel <R> Rapid Storage Technology".
5. Select "Create RAID Volume".
6. In the next window, enter a name for the RAID system.
7. Select "RAID Level" and select the entry "RAID1" or "RAID5" in the following selection window.
   A list of available drives is displayed.

8. Select "Select Disks".
   A list of available drives is displayed.
9. Select the drives ① from the list that you want to integrate into your RAID system and press the **Space** key.
   You can find information on the mounting locations of the drives in the device under "RAID1 system (Page 58)".
   - In the list, the mounted drive is marked with an "X" ②.
   - You can find the assignment of the drive to the mounting location in the device ③ in front of the drive model designation.



10. Select "Create Volume".
    The following window now displays the details of the RAID system (RAID Volume) that has just been set up.
    The onboard RAID system is set up.
11. To exit the firmware settings, press the <F10> key (Save & Exit) and confirm the subsequent dialog with <Y>.

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

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

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

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

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

Open "Intel® Optane™ Memory and Storage Management"

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

Display status of the onboard RAID system (faulty drive)

1. Select the "Manage" tab.
   In the right area of the window, a list of the drives mounted in the onboard RAID is displayed under "Storage System View".
2. Right-click on a drive from the list or on "Volume".
   Status displays are shown for functions and components of the drives or the onboard RAID system.

See also

RAID1 system (Page 58)

5.4.1.3 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® Optane™ Memory and Storage Management".
2. Select "Settings".
3. Set the "Auto-rebuild on hot plug" option to "Enabled".

Configure the mounted drive under "Create Raid Volume".

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

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

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

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

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

Configure the mounted drive under "Create Raid Volume".

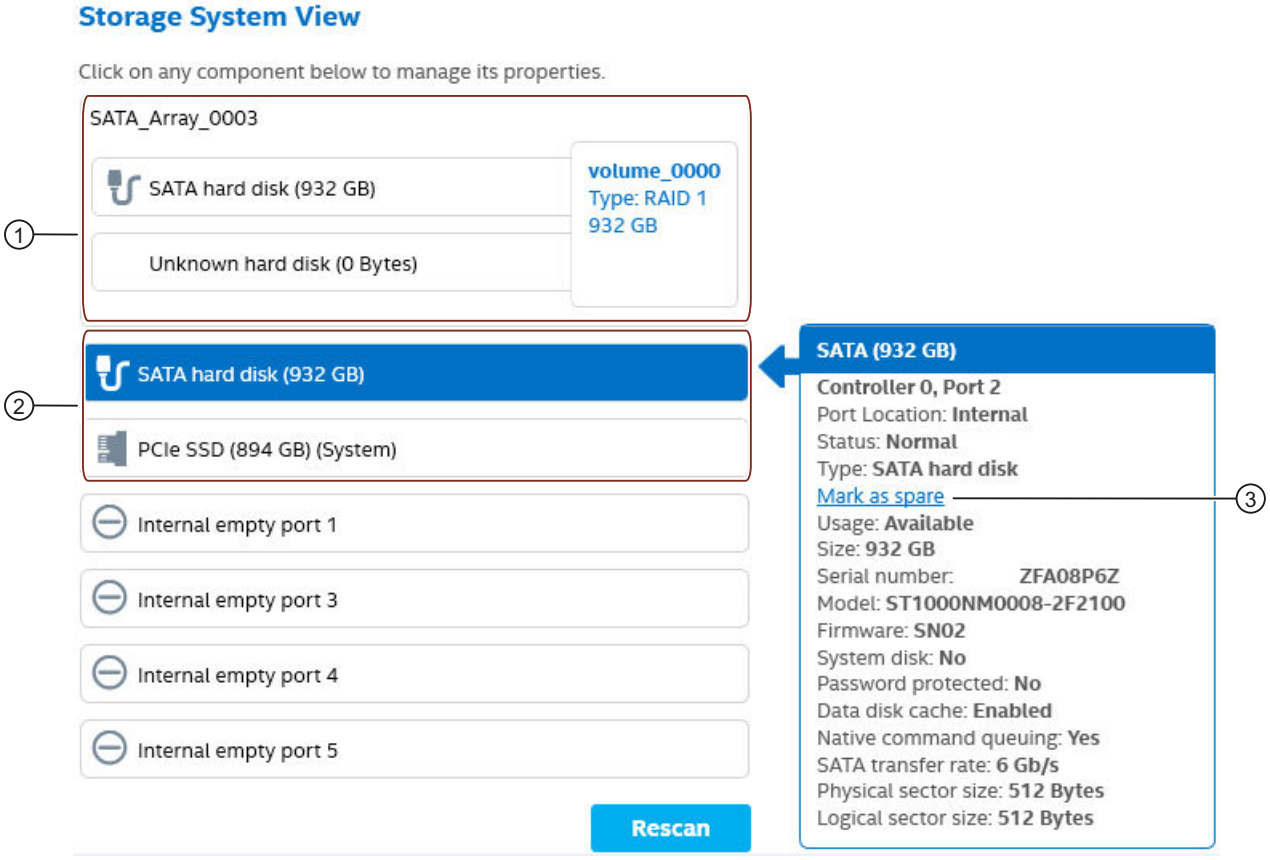
Mount new drive during operation in the onboard RAID system (after an error has occurred)

Requirements

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

Procedure

1. Select "Start" > "Intel® Optane™ Memory and Storage Management".
2. Select the "Manage" menu.
   You will find the following components in the "Storage System View" area:
   ① The drives mounted in the onboard RAID system with the information that a drive is not yet mounted (Unknown hard disk).
   ② List of available drives and systems. The new drive is placed at the top of this list.



3. Right-click on the new drive.
4. From the drive information, select the "Mark as spare" function ③.
   The drive is mounted to the onboard RAID system and appears in the mounted drives area.

5.4.2 Hardware RAID system

5.4.2.1 Software and documentation for the hardware RAID system

When ordering a device with hardware RAID system, all required software is already installed on your device when it is delivered.
You can find the following in the "Drivers\RAID-AHCI\Adaptec" directory of the supplied data storage medium:

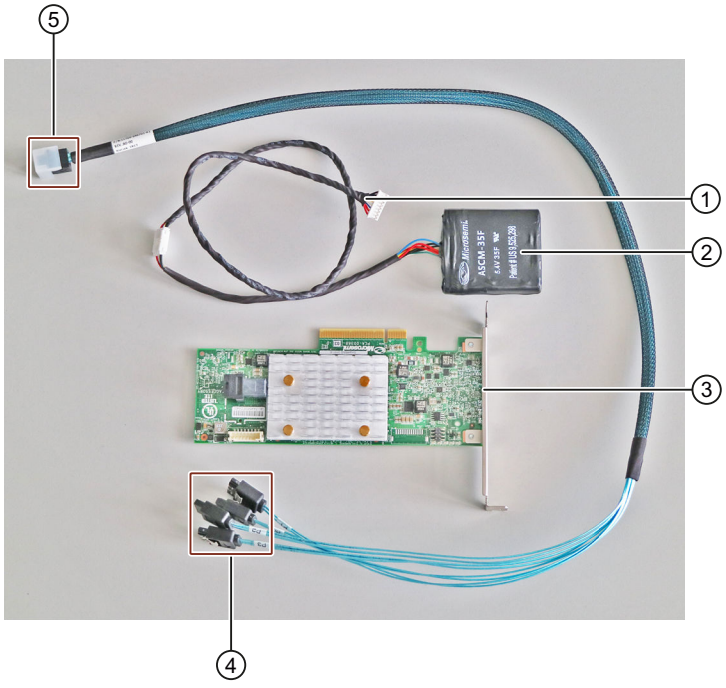
- "Microsemi Smart Storage Controllers User Guide / maxView Storage Manager" with comprehensive information on installing and configuring the hardware RAID adapter card
- "maxView Storage Manager" software and the corresponding User's Guide
- in the "cmdline" folder a readme file "README.TXT" with information about the command line tool "arcconf.exe", with which you can configure the hardware RAID adapter card

5.4.2.2 Installing the hardware RAID adapter card

If you have ordered a device with hardware RAID system, the hardware RAID adapter card is already installed in the delivery state.
If you want to subsequently operate your device as a hardware RAID system, you need to install a hardware RAID adapter card.

Requirement

- 4 GB main memory
- T10 screwdriver
- Components for installing the hardware RAID adapter card. Information on these components can be obtained from your local SIEMENS representative.



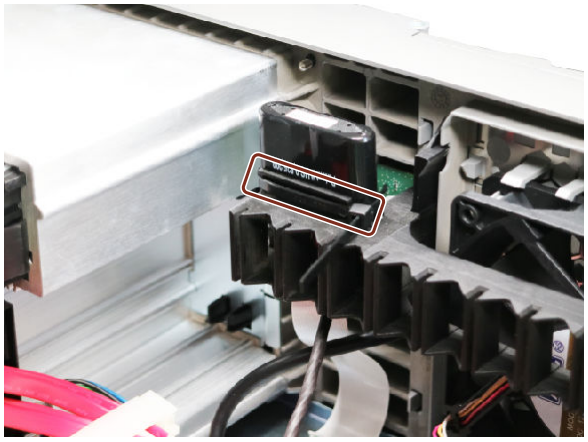
① Capacitor block cable with plug
② Capacitor block
③ Hardware RAID adapter card
"Microsemi Adaptec SmartRAID 3151-4i ("Controller", "Host Bus Adapter")"
④ Adapter cable: Numbered connections to the drives
⑤ Adapter cable: Connection to the hardware RAID adapter card

NOTICE
Capacitor block must be discharged The original Siemens spare part is supplied with discharged capacitor block. When you remove or install a charged capacitor block, the Hardware RAID adapter card may be damaged. Data loss may result. Remove or install a capacitor block only in completely discharged condition. Discharge an installed capacitor block as follows: 1. Shut down the operating system properly. 2. Fully disconnect the device from the line voltage, see "Switching off the device (Page 55)". 3. Wait at least 10 minutes. If the capacitor is not discharged, a yellow LED close to the connector lights up. 4. Only remove the connector when the yellow LED is extinguished.

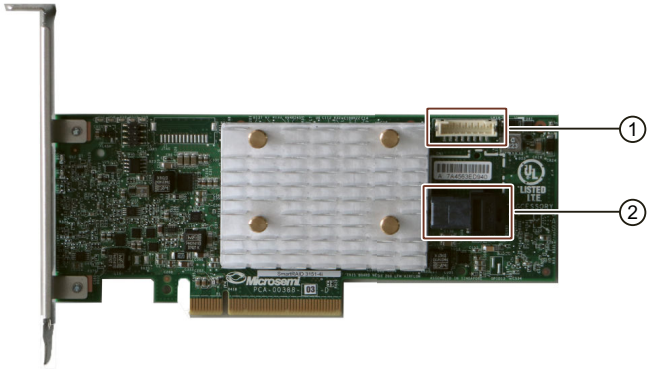
Procedure

1. Open the device, read the important information on this under "Open the device (Page 79)".
2. Follow the instructions under "Installing expansion cards (Page 81)".
   Note the following:
   – You can find information on the slot of the hardware RAID adapter card under "Slots for expansion cards on the bus board (Page 160)".
   – Leave the slot in front of the hardware RAID adapter card free.
3. Connect the numbered connectors of the adapter cable ④ to the corresponding drives available.
   The numbers of the connections correspond to the numbers of the drive mounting locations, see "Drive cage type A (Page 17)".
   Loosen the screw connection of the power supply unit, if necessary, and ensure that the connector lock engages.
4. Run the connection of the adapter cable ⑤ to the front of the device and from there to the hardware RAID adapter card.

5. Insert the capacitor block into the appropriate holder on the guide rail for long expansion cards and fasten it with a cable tie as shown (see also "Internal construction of the device (Page 28)").



6. Insert the connector of the capacitor block cable at the marked position ①.



7. Insert the adapter cable at the marked position ②.
   Make sure that the connector latch audibly engages.
8. Close the device.
9. Configure the installed hardware RAID adapter card.

5.4.2.3 Configuring the hardware RAID system

If you ordered a device with hardware RAID system, the hardware RAID adapter card is already installed and configured in the delivery state.
If you subsequently install a hardware RAID adapter card, you then need to configure the hardware RAID system. Proceed as follows for this:

- First set up a RAID system in the firmware of the hardware RAID adapter card (Array Configuration).
- Then configure the settings of the hardware RAID adapter card (Configure Controller Settings)

Requirement

NOTE

For a hardware RAID system, integrate only drives of the type A drive bay.

- The drives required for the RAID system are installed in the device, see:
  - RAID1 system (Page 58)
  - RAID5 system (Page 59)
- A hardware RAID adapter card is installed, see "Installing the hardware RAID adapter card (Page 67)".

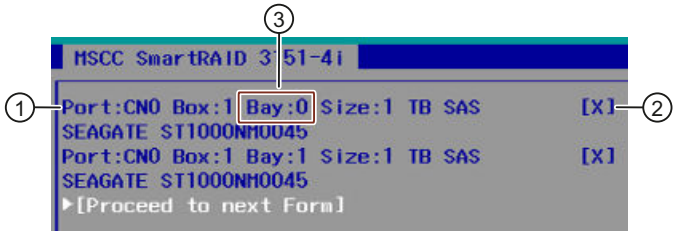
Navigation in the firmware of the hardware RAID adapter card

Action	Key
• Select entry	• Arrow keys on the keyboard
• Confirm selection **Exception:** – Confirm selection when integrating drives:	• <Return> key **Exception:** – <Space> keyboard
• Back to previous window	• <Esc> key

Setting up the hardware RAID system (Array Configuration)

1. Switch on the device or restart the device.
2. After starting the device, immediately press the <Esc> key and keep it pressed as soon as the message "`Press ESC for boot options`" appears.
3. Use the arrow keys of the keyboard to select "Device Management" from the firmware selection menu and confirm your selection.
4. Select the hardware RAID adapter card "MSCC Smart RAID 3151-4i" in the "Devices List".
   The firmware of the hardware RAID adapter card is open.
   Refer to the previous section, "Navigation in the firmware of the hardware RAID adapter card" for information on selecting and saving settings.
5. Select "Array Configuration".

6. Select "Create Array".
   A list of available drives is displayed.
7. Select the drives ① from the list that you want to integrate into your RAID system and press the **Space** key.
   You can find information on the mounting locations of the drives under "Permissible expansion for temperature range 0 to 40 °C (Page 89)".



   – 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 the entry "Bay:..." ③.
8. Select [Proceed to next Form].
9. Select "RAID Level" and select "RAID1" or "RAID5" in the following selection window, depending on which RAID system you want to set up.
10. Select [Proceed to next Form].
11. Under "Logical Drive Label", enter a name for your RAID system.
12. Select [Submit Changes] to save your settings.
    The message "Logical Drive Creation Successful" is displayed in the next window.
13. Select [Back to Main Menu].

Configuring hardware RAID adapter card settings (Configure Controller Settings)

1. After setting up the RAID system, select "Configure Controller Settings" from the main menu.
2. Select "Modify Controller Settings".
   Check or change the value of the following firmware entry:

Firmware entry	Value
Configured Physical Drive Write Cache State	<Disabled>

3. Press the <Esc> key twice.
4. Select "Array Configuration".
5. Select "Manage Arrays" and then select the desired Array.
6. Select "List Logical Drives" and then select the desired Logical Drive.
7. Select "Edit Logical Drive".
   Check or change the value of the following firmware entry:

Firmware entry	Value
Acceleration Method	<Controller Cache>

8. Select [Submit Changes] to save your settings.
9. Select [Back to Main Menu].
10. Finish the process by pressing the <ESC> key repeatedly.

5.4.2.4 Monitor hardware RAID system with "maxView Storage Manager".

With the " maxView Storage Manager" software, you can monitor your hardware RAID system and display important information to diagnose the system.
The first time you call "maxView Storage Manager", Microsoft Edge opens and displays a warning message.
Then install the website security certificate.

Requirement

- 4 GB main memory
- The operating system is restarted.
- The operating system is protected with a user name and password
- You have administrator rights

Operating system

- Microsoft® Windows® 10
- Microsoft® Windows® 10 Enterprise 2021 LTSC
- Microsoft® Windows® Server 2019
- Microsoft® Windows® Server 2022

Warning message during the first launch of "maxView storage manager"

1. Open Microsoft Edge.
2. Open "maxView Storage Manager" with the link on your desktop.



A warning message about the security certificate of the website appears.

- First, export and save the security certificate.
- Then install the security certificate with the previously exported file.

Export and save the security certificate from Microsoft Edge

1. Open Microsoft Edge.
2. At the top of the Microsoft Edge address bar, click the icon to the left of the "https// address".
3. From the list, select the entry "The connection to this website (is not secure)".
4. In the following window, click the "Display certificate" icon in the top right.
5. Select the "Details" tab.
6. Select "Copy to file ..."
   The Certificate Export wizard opens.
7. Select "Next".
8. In the following window, the desired format is "DER-coded...".
   Do not change this setting.
9. Select "Next".
10. Assign a name and save the security certificate.

Installing the security certificate

1. Open the previously exported security certificate.
2. Select "Install certificate...".
3. Select "Local Computer" as storage location and confirm your selection with "Next".
4. Confirm the subsequent warning.
5. Select the option "Save all certificates in the following storage location" and define the storage location for the certificate.
6. Select the "Trusted master certification bodies" option and click "OK"; then click "Next" and "Finish".
7. Close Microsoft Edge and then open Microsoft Edge again.
   The security certificate is installed and "maxView Storage Manager" is set up.
   The user interface of "maxView Storage Manager" is now available in Microsoft Edge.

Monitor hardware RAID system with "maxView Storage Manager"

You can find detailed information on the use of "maxView Storage Manager" in the user guide to the software, see "Software and documentation for the hardware RAID system (Page 66)".

5.4.3 Data synchronization in the RAID system

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

Duration of data synchronization

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

Guide value for the duration of data synchronization:

- < 3h at 90% HDD system load

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

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 25)" • 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	• Status display "FAN (Page 25)" • Fan alarm is output.

Monitoring	Description	Status display and actions
	The operation of the fan is monitored at the following positions: • Front panel • Processor • Triple head graphics card • Single power supply (400 W) • Drive cage type A	
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 25)" Depending on the setting, the following actions are initiated: • Reset on: A hardware reset is carried out • Reset off: No action is carried out • The device is restarted. • The device is shut down.
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. • For the redundant power supply, monitoring is performed to check whether both power inputs are active and the power supply fans are operating.	• If a critical or error status occurs, an alarm is output. • Acoustic alarm for the redundant power supply
Drive monitoring	• Determination of the status of the drives (HDD and SSD) with SMART functionality even in RAID systems (RAID status) • The status of an inactive hot swap drive is not displayed.	• Status display "HDDx ALARM (Page 25)" • SMART status of the hard disks • 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) does not report a fan error.

If the fan fails or is defective, no fan alarm is output.

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 76) for monitoring and alarm output locally on the device
- SIMATIC IPC DiagMonitor (Page 76) 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 25).

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:

- SIMATIC IPC DiagBase (https://support.industry.siemens.com/cs/ww/en/view/109749690)
- 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:

- SIMATIC IPC DiagMonitor (https://support.industry.siemens.com/cs/ww/en/view/39129913)
- Important instructions and manuals for operating the device (Page 11)

NOTE

SIMATIC IPC DiagMonitor only supports the device hardware as of version 5.1.0.

Older versions do not support the device hardware.

See also

Software accessories (Page 31)

5.6 Remote maintenance of the device

5.6.1 Remote maintenance functions

Remote maintenance of the devices is carried out using Intel® Active Management Technology (iAMT), which is integrated in the hardware and firmware of the computer, and with the SIMATIC IPC Remote Manager software.

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.

Function	Description
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.

Requirement

The following requirements must be met for use of the remote maintenance functions:

- A device with a processor with iAMT technology
- A configured management engine (ME)
- The computer must be connected to the power supply system and the network

Configuring iAMT

You configure iAMT with Intel® Management Engine BIOS Extension (MEBx) in the firmware. You can find information on this in the detailed firmware/BIOS description, see Important instructions and manuals for operating the device (Page 11).

Software for remote maintenance of the device

You can find information about the software for remote maintenance of the device and its documentation under:

- SIMATIC IPC Remote Manager (Page 77)

5.6.2 SIMATIC IPC Remote Manager

The software for remote maintenance of your SIMATIC IPC Remote Manager device can be ordered as an option.
You can find information on the software and documentation of SIMATIC IPC Remote Manager under:

- SIMATIC IPC Remote Manager (http://support.automation.siemens.com/WW/view/en/48707158)
- Important instructions and manuals for operating the device (Page 11)

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.Trusted Platform Module

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.

Activate Trusted Platform Modules

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

⚠ WARNING

Risk due to unauthorized opening and improper repairs or expansions

Improper procedure when carrying out expansions may result in substantial damage to equipment or endanger the user.

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

For this reason, please observe the information in "Notes on device and system extensions (Page 39)".

⚠ WARNING

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:

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

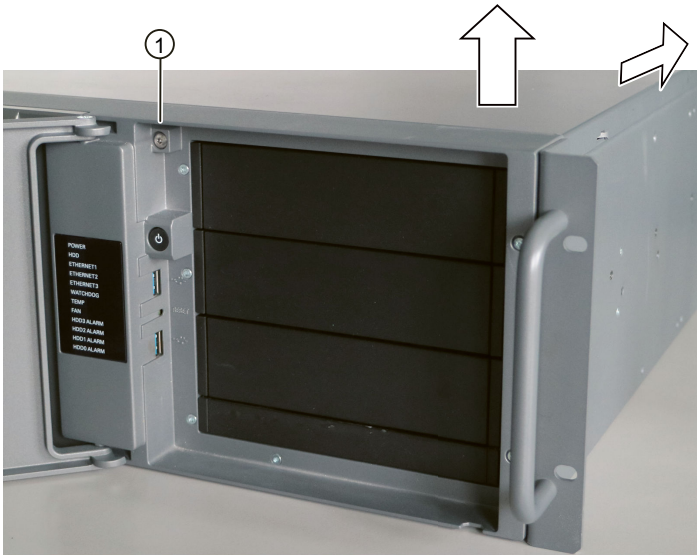
Take corresponding precautionary measures before you open the device.

Requirement

- The front door is open; see "Opening the front door (Page 57)".
- The device is fully disconnected from the line voltage, see "Switching off the device (Page 55)".
- All connection cables are unplugged.
- T10 screwdriver

Procedure

1. Remove the captive screw ①.
2. Push the enclosure cover back.
3. Lift up and remove the enclosure cover.



6.2 Expansion cards

6.2.1 Usable expansion cards

Expansion cards that comply with the following standards are supported:

- PCI; Rev 2.3
  Expansion cards with 3.3 V and 5 V supply voltage can be operated
- PCIe; Gen. 1, Gen. 2, Gen. 3

See also

Slots for expansion cards on the bus board (Page 160)

6.2.2 Installing expansion cards

NOTE

Requirements for expansion cards

- You can find the permitted dimensions for expansion cards under "Dimension drawing of the expansion cards (Page 142)". If the permissible height is exceeded, contact problems, malfunctions and installation difficulties cannot be ruled out.
- The accessory pack of the device includes three long card retainers for expansion cards with low overall height. Use these instead of the card retainers installed in the device.
- Long PCI/PCIe expansion cards must be equipped with an extender so that they can be introduced into the guide rails.

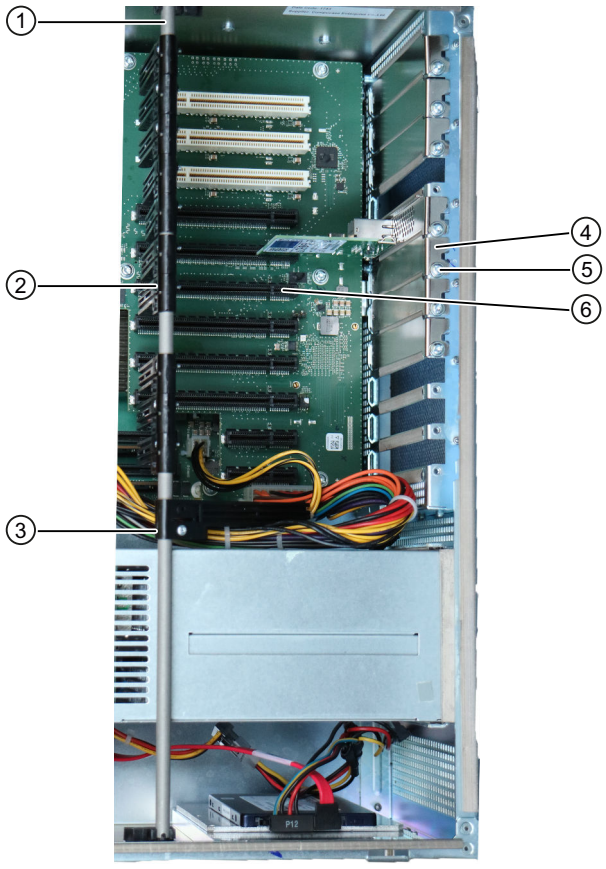
  Long expansion cards are only supported in a device with a standard enclosure.
- You can find information on which expansion card you can install in a given slot under "Slots for expansion cards on the bus board (Page 160)".

Requirement

- You are familiar with the information on expansion cards and the conditions of use of expansion cards, see "Useable expansion cards (Page 80)".
- The device is open, see important information in "Open the device (Page 79)".

Procedure

1. Loosen the cable holder ③.
2. Hold the bar with the card retainer ① on both ends and remove it by pulling it upwards. The bar is latched on both ends.
3. Remove the slot bracket ④ for the required slot.
4. Insert the expansion card into the free slot ⑥.
5. Secure the expansion card with the screw ⑤.
6. Reinstall the rod with the card retainer ①.
7. Detach the card retainer in question and place it on the expansion card in the slo ⑥.
8. Secure the card retainer with the locking screw ②.
   If you are installing a short expansion card, remove the locking screw from the card retainer and install it in the opposite hole.
   If you are installing a low-profile expansion card, use the longer card holder for mounting (included in product package).
9. Secure the cables with the cable holder ③.
10. Close the device.



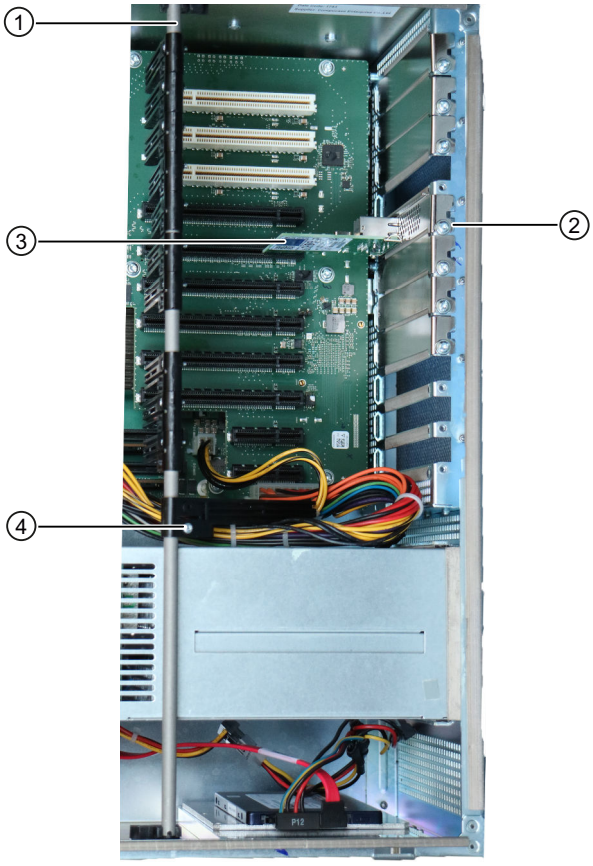
6.2.3 Removing expansion cards

Requirement

- The device is open, see important information in "Open the device (Page 79)".

Procedure

1. Loosen the cable holder ④.
2. Hold the latched bar with the card retainer ① on both ends and remove it by pulling it upwards.
3. Disconnect all cables and the screw ② of the expansion card you wish to remove.
4. Remove the expansion card from the slot ③.
5. If you do not wish to install a new expansion card, install the corresponding slot bracket with the screw ②.



6.3 Memory modules

6.3.1 Usable memory modules

Combination options for memory modules

You can equip each device with 1, 2 or 4 memory modules of the same capacity. It is not allowed to combine three different memory modules or mix of memory capacities.

This allows you to expand Rack PC memory up to 64 GB, of which you can use approx. 3.2 GB for the operating system and applications in case of 32-bit operating systems.

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
	Slot X19 DIMM1-1	Slot X190 DIMM1-2	Slot X20 DIMM2-1	Slot X200 DIMM2-2	
Combination 1			4 GB / 8 GB / 16 GB		16 GB
Combination 2	4 GB / 8 GB / 16 GB		4 GB / 8 GB / 16 GB		32 GB
Combination 3	Combinations of three memory modules are not permitted				
Combination 4	4 GB / 8 GB / 16 GB	4 GB / 8 GB / 16 GB	4 GB / 8 GB / 16 GB	4 GB / 8 GB / 16 GB	64 GB

Usable memory modules

- DIMM DDR4 memory modules
- Memory transaction rate 2666 MT/sec "unbuffered"
- "without ECC" or "with ECC"

Conditions of use of memory modules

- Memory is operated in dual-channel mode if two modules are installed.
- Only modules of the same module organization 2Rx8 or 1Rx8 may be used per channel.
- If expansion cards with their own memory, such as graphics cards, with 256 MB or more are used, the memory that can be used for an operating system or applications may be less than 64 GB.
- Memory modules with ECC and without ECC may not be used in mixed operation.
- Memory module with ECC can only be used in connection with Xeon processor.
- 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.

See also

Open the device (Page 79)

6.3.2 Removing memory modules

Requirement

- The device is open, see important information in "Open the device (Page 79)".
- If necessary, the expansion cards may be removed for easier access to the memory modules, see "Replacing the bus board (Page 122)".

Procedure

1. If you remove several memory modules, remove them one after the other in the following order:
   - Memory module 1: Slot DIMM 1-2
   - Memory module 2: Slot DIMM 1-1
   - Memory module 3: Slot DIMM 2-2
   - Memory module 4: Slot DIMM 2-1

   The slots of the memory modules are labeled on the motherboard.
2. Open the two latches at the sides of the memory module evenly. Remove the memory module from the slot.



3. Close the device.

Display of a changed memory configuration

A new memory configuration is detected automatically. The allocation of the "base memory and extended memory" is automatically displayed when you switch on the device.

6.3.3 Installing memory modules

Requirement

- You have noted the information on combination options and the conditions of use of memory modules under "Usable memory modules (Page 84)".
- The device is open, see important information in "Open the device (Page 79)".
- If necessary, the expansion cards may be removed for easier access to the memory modules, see "Replacing the bus board (Page 122)".

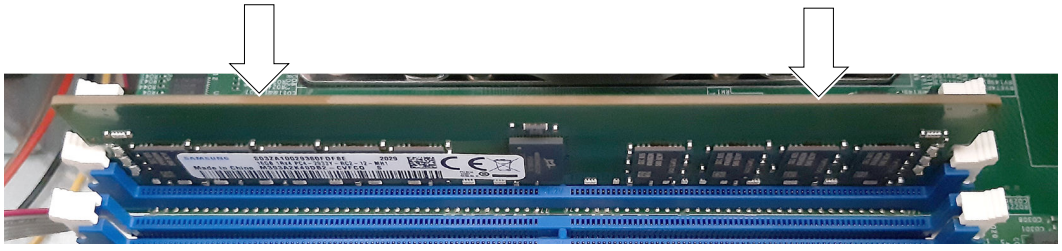
Procedure

1. If you install several memory modules, install them one after the other in the following order:
   - Memory module 1: Slot DIMM 2-1
   - Memory module 2: Slot DIMM 1-1
   - Memory module 3: Slot DIMM 2-2
   - Memory module 4: Slot DIMM 1-2

   The slots of the memory modules are labeled on the motherboard.
2. Remove the memory module from its packaging.
   Hold it by the upper edges only.
   When inserting the base, note the marked cutout must match up with the coding of the base.



3. Open the two locks on the left and right of the slot.
4. Insert the memory module in the slot perpendicular to the motherboard.



5. Evenly press on both sides of the memory module to avoid tilting until the two locks audibly engage.
   The memory module is inserted correctly if less than 1 mm of the gold contacts is visible evenly across the entire length of the module.
6. Close the device.

Display of a changed memory configuration

A new memory configuration is detected automatically. The allocation of the "base memory and extended memory" is automatically displayed when you switch on the device.

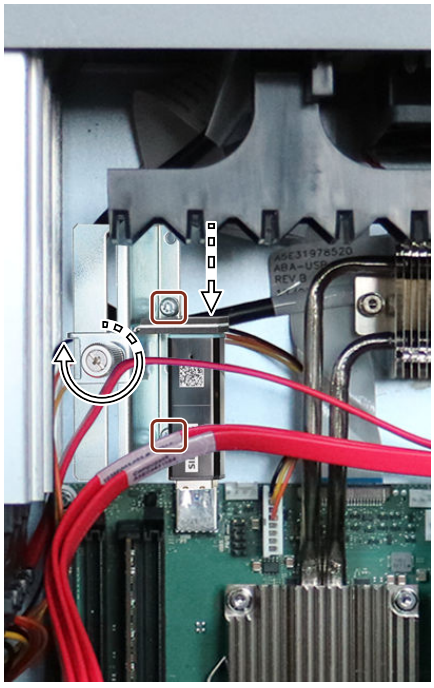
6.4 Internal USB interface

Requirement

- The device is open, see important information regarding this under Open the device (Page 79).
- Optional retainer for locking the internal USB interface, see "Hardware accessories (Page 29)".
- Screwdriver TX10

Procedure

1. Screw the guide rail of the retainer into place in the enclosure as shown in the figure.
2. Connect the USB stick.
3. Slide the retainer in the direction of the USB stick.
4. Secure the retainer by turning the screw on the guide rail.



6.5 Graphics card

You can find information on the requirements of a graphics card under "Technical specifications of graphic (Page 136)".
You can find information on the slot of the graphics card under "Slots for expansion cards on the bus board (Page 160)".
Information on graphics cards which support multi-monitoring can be obtained from your local representative, see "Service and support (Page 171)".

Requirement

- An original spare part
- You have noted down the firmware/BIOS settings, since the configuration data of the device can be deleted if the expansion card is changed.
  You can find information on this in the detailed firmware/BIOS description, see "Important instructions and manuals for operating the device (Page 11)".

Removing the graphics card

You can find information on removing the graphics card under "Removing expansion cards (Page 83)".

Installing the graphics card

You can find information on installing the graphics card under "Installing expansion cards (Page 81)".

6.6 Drives

6.6.1 Drives in drive cage type A / side panel

6.6.1.1 Permissible expansion for temperature range 0 to 40 °C

NOTE

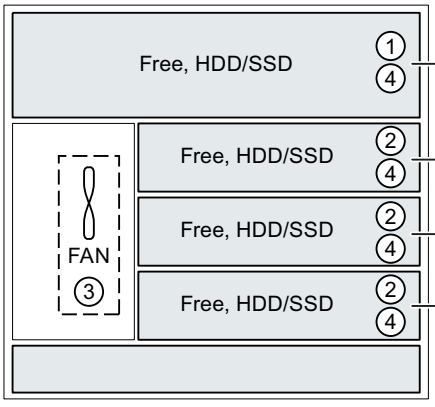
Also read the information in Mounting types (Page 44).

You can install the following drives in the Type A drive cage at various mounting locations. You can find information on the mounting locations under:

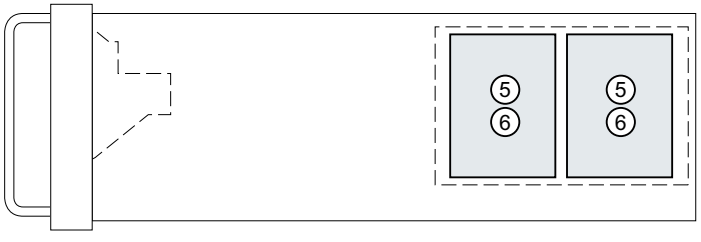
- Drive cage type A (Page 17)

Installation options

The following representations give you an overview of the installation options for drives.



① Drive in removable tray via 5.25" adapter
② Drive in removable tray
③ Fan on drive cage type A. The fan is only required when more than two drives are installed.
④ Drive type "SATA, SATA Enterprise and SAS Enterprise" is possible



⑤ Additional drive mounted on the right side panel on the drive bay plate.
⑥ Drive type "SATA, SATA-Enterprise" is possible

Ambient temperature	**0 - 40 °C**
Drive configuration	**Mode**
Non-RAID system	X
RAID1 system	X

Ambient temperature	**0 - 40 °C**
Drive configuration	**Mode**
RAID5 system	X
RAID1 system with hot spare drive	X
RAID5 system with hot spare drive	X

Maximum number of drives per drive type
(in the removable tray or internally on the side panel of the device)

Ambient temperature	**0 * - 40 °C**	
Drive type	**Front**	**Side panel**
SATA (2.5" and 3.5" size)	4	2
SATA Enterprise (2.5" and 3.5" size)	4	2
SAS Enterprise (3.5" size)	4	2

* 0 °C minimum permissible temperature for SATA hard disk drive
5°C minimum permissible temperature for SATA Enterprise hard disk drives

6.6.1.2 Permissible expansion for temperature range 0 to 50 °C

NOTE

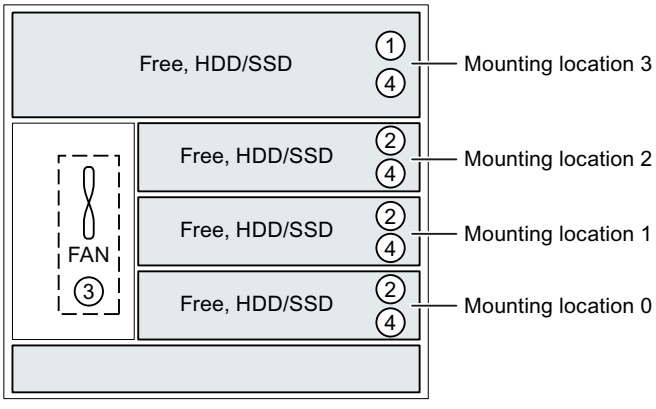
Also read the information in Mounting types (Page 44).

You can install the following drives in the Type A drive cage at various mounting locations.
You can find information on the mounting locations under:

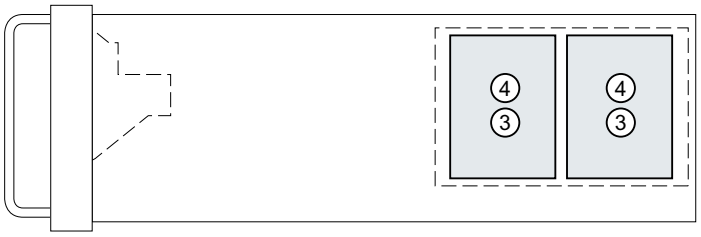
- Drive cage type A (Page 17)

Installation options

The following representations give you an overview of the installation options for drives.



① Drive in removable tray via 5.25" adapter
② Drive in removable tray
③ Fan on drive cage type A. The fan is only required when more than two drives are installed.
④ Drive type "SATA" is possible



④ Drive type "SATA" is possible

⑤ Additional drive mounted on the right side panel on the drive bay plate.

Ambient temperature	**0 - 50 °C**
Drive configuration	**Mode**
Non-RAID system	X
RAID1 system	X
RAID5 system	X
RAID1 system with hot spare drive	X
RAID5 system with hot spare drive	X

Maximum number of drives per drive type
(in the removable tray or internally on the side panel of the device)

Ambient temperature	**0 - 50 °C**	
Drive type	**Front**	**Side panel**
SATA (2.5" and 3.5" size)	4	2
SATA Enterprise (2.5" and 3.5" size)	-	-
SAS Enterprise (3.5" size)	-	-

6.6.1.3 Change 2.5" and 3.5" drive in removable tray

You can find information on the correct mounting location for 2.5" drives and 3.5" drives in the drive cage in "Permissible expansion for temperature range 0 to 40 °C (Page 89)" and "Permissible expansion for temperature range 0 to 50 °C (Page 90)".

NOTICE
Risk of damaging the drive and data loss Drives in the removable drive bays can only be replaced during operation in connection with RAID1 and RAID5 (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 28)". • Observe the ESD guidelines.

Requirement

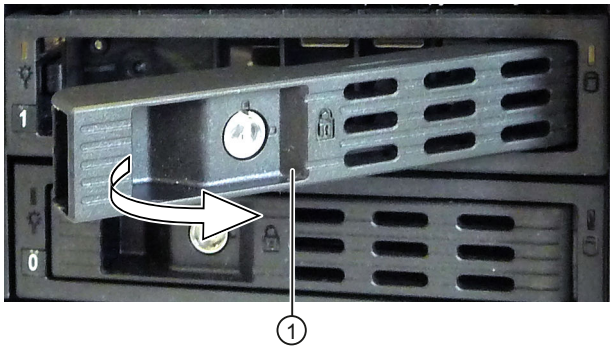
- The device is equipped with the drive cage type A.
- An original spare part, i.e. a drive approved for this device, see notes under "Hardware accessories (Page 29)".
- If there is no RAID system: The device is fully disconnected from the line voltage, see "Switching off the device (Page 55)".
- The device you wish to replace is inactive.
- When replacing an HD: T10 screwdriver
- When replacing an SSD: T8 screwdriver

Procedure

1. Open the front panel (Page 57).
2. Open the lock of the removable tray with the appropriate key.

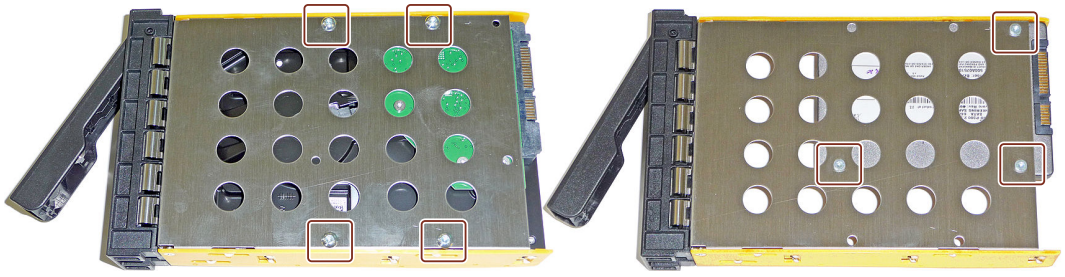


3. Reach into the notch ① in the bracket of the removable tray and pull out the bracket in the direction of the arrow up to a slight resistance.



The removable tray is pushed out of the drive cage slightly levering.

4. Now grip the removable tray from the front in the middle at the top and bottom, and pull the removable tray completely out of the device.
5. Loosen the highlighted screws on the bottom of the removable tray and remove the drive.
The figure on the left shows an HDD as the drive and the figure on the right shows an SSD.



6. Carefully insert the new drive into the removable tray.
Take care not to touch the contacts of the drive when you do this.
7. Fasten the new drive with the screws to the base of the removable tray.
Only use the original screws.

8. Carefully insert the removable tray into the drive cage of the device again.
9. Fold the tray bracket out of the removable tray as far as it will go and slide the removable tray fully into the drive cage.
   Ensure that the removable tray fits tightly in the drive cage.
10. Close the tray bracket.
11. Lock the removable tray with the key.

NOTE

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

6.6.1.4 Installing a 5.25" adapter module for removable trays

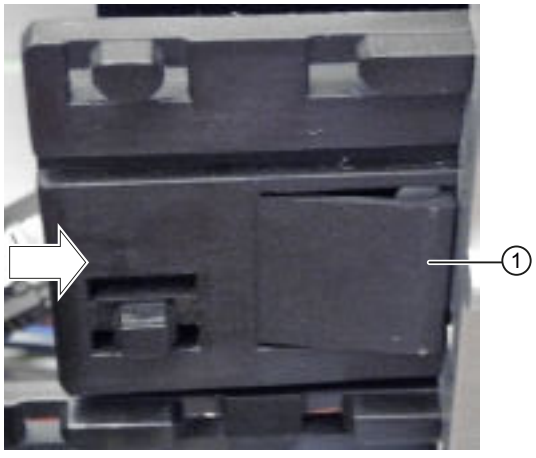
You can find information on the correct mounting location for this adapter module can be found in "Permissible expansion for temperature range 0 to 40 °C (Page 89)" and "Permissible expansion for temperature range 0 to 50 °C (Page 90)".

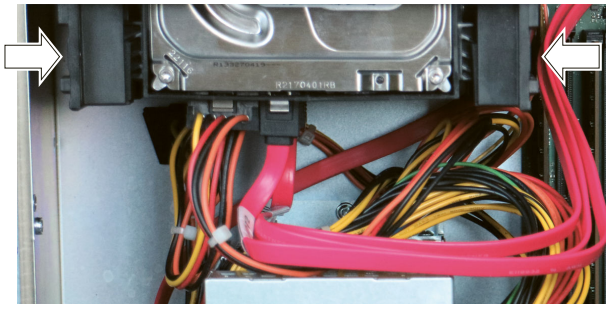
Requirement

- The device is equipped with the drive cage type A.
- There is no drive or any other component in the mounting location for 5.25" components.
- An original spare part, that is a 5.25" adapter module approved for this device, see notes in "Hardware accessories (Page 29)".
- The device is fully disconnected from the line voltage, see "Switching off the device (Page 55)".
- The device is open, see important information in "Open the device (Page 79)".

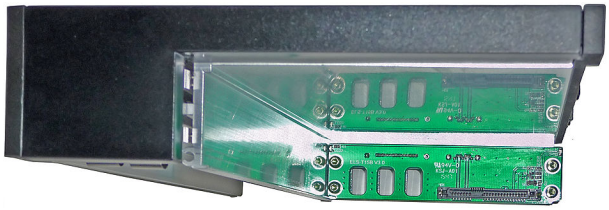
Procedure

1. Unlock the drive mounting bar together with the blanking plate by pressing laterally against the surfaces ① and push the drive mounting bar forward from the device in the direction of the arrow.





2. Remove the blanking plate.
3. Push the 5.25" adapter for the removable racks from the front into the drive cage.



4. Attach the data cables to the desired connectors on the motherboard or the hardware RAID controller and to the adapter module.
5. Connect the power supply.
6. Close the device.

6.6.1.5 Installing a backplane for removable tray

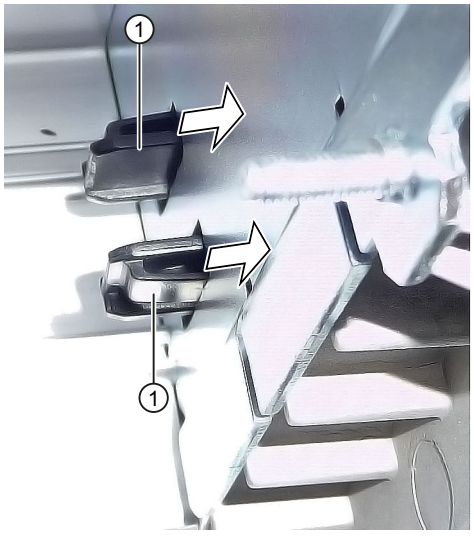
The backplane is installed from inside at the back end of the drive cage type A and is equipped with interfaces for data cable to the motherboard.
This enables the convenient connection of the data cables from the motherboard to the drive in the removable tray at these interfaces.

Requirement

- The device is equipped with the type A drive cage, see "Permissible expansion for temperature range 0 to 40 °C (Page 89)" and "Permissible expansion for temperature range 0 to 50 °C (Page 90)".
- An original spare part, that is a backplane approved for this device, see notes in "Hardware accessories (Page 29)".
- The device is fully disconnected from the line voltage, see "Switching off the device (Page 55)".
- The device is open, see important information in "Open the device (Page 79)".

Procedure

1. Press the locks ① of the cover ② together inside the device and keep them pressed.

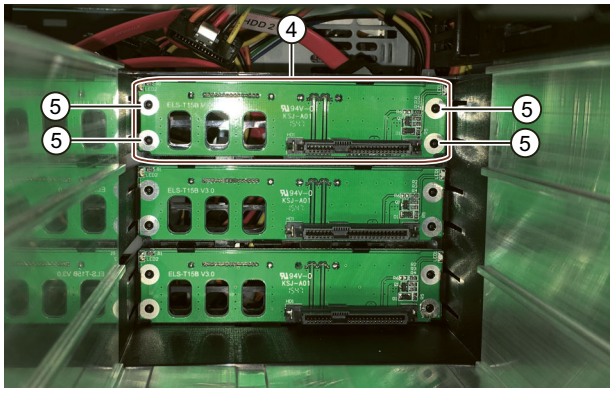


2. Push the locks to the front in the direction of the arrow.
3. Remove the cover ② upwards at an angle at the front of the device.



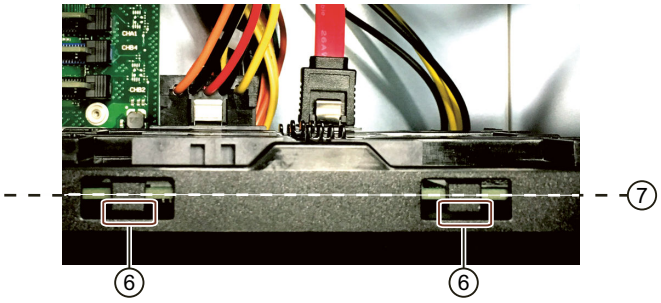
4. Remove the blanking plates ③ which may be located to the right of the cover at the front of the drive cage.
5. Remove all existing removable trays until the drive cage is freely accessible.

6. 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.



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

6.6.1.6 Changing a backplane for removable tray

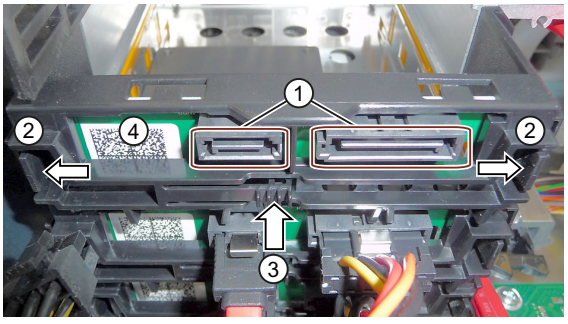
The backplane is installed from inside at the back end of the drive cage type A and is equipped with interfaces for data cable to the motherboard.
This enables the convenient connection of the data cables from the motherboard to the drive in the removable tray at these interfaces.

Requirement

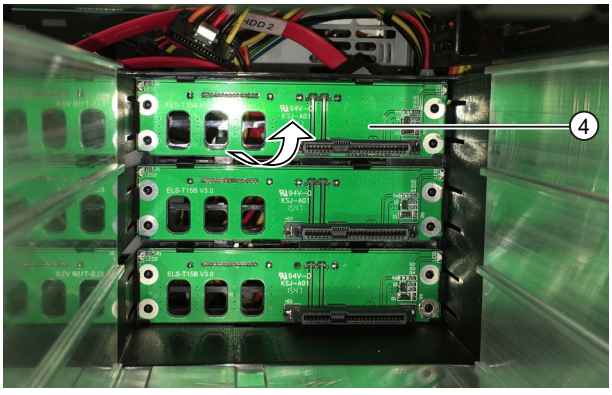
- The device is equipped with the type A drive cage, see "Permissible expansion for temperature range 0 to 40 °C (Page 89)" and "Permissible expansion for temperature range 0 to 50 °C (Page 90)".
- An original spare part, that is a backplane approved for this device, see notes in "Hardware accessories (Page 29)".
- The device is fully disconnected from the line voltage, see "Switching off the device (Page 55)".
- The device is open, see important information in "Open the device (Page 79)".

Procedure

1. Note the assignment of all data cables to the motherboard and disconnect all data cables ①.



2. Unlock the backplane by pressing firmly in the direction of the arrow on the latching lugs ② and press the ejector ③.
3. Remove the unlatched backplane board ④ by turning it upwards from the brackets and removing it from the drive cage.



See also

Installing a backplane for removable tray (Page 94)

6.6.2 Drives in drive cage type B / side panel

6.6.2.1 Permissible expansion for temperature range 0 to 40 °C

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.

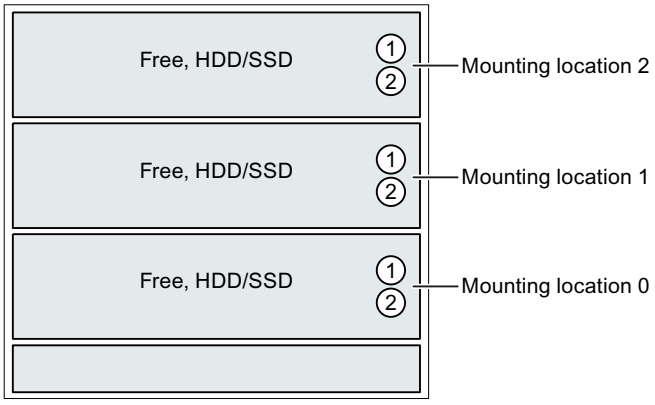
The maximum permitted power loss of the expansion cards is 80 W.

You can install the following drives in the Type B drive cage at various mounting locations.
You can find information on the mounting locations under:

- Drive cage type B (Page 18)

Installation options

The following representations give you an overview of the installation options for drives.

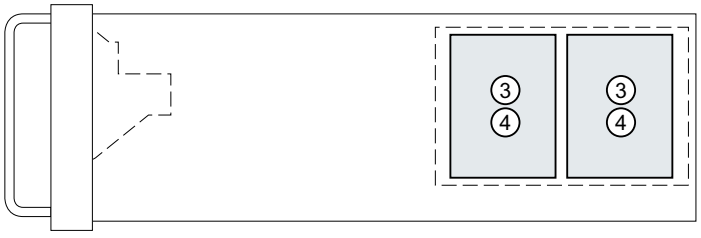


① Drive in drive bay for internal rugged installation
② Drive type "SATA, SATA-Enterprise" is possible

If drives are installed in one of the mounting locations, these may be exposed to the following vibration stresses during operation:

- 10 ... 58 Hz: 0.075 mm
- 58 ... 500 Hz: 5 m/s²

Vibrations above 500 Hz are not permitted.



③ Additional drive mounted on the side panel on the drive bay plate.
④ Drive type "SATA, SATA Enterprise" is possible

If drives are mounted on the side panel, these may be exposed to the following vibration stresses during operation:

- 10 .... 58 Hz: 0.045 mm
- 58 ... 300 Hz: 3 m/s^2

Ambient temperature	**0 - 40 °C**
Drive configuration	**Mode**
Non-RAID system	X
RAID1 system	X
RAID5 system	X
RAID1 system with hot spare drive	X
RAID5 system with hot spare drive	X

Maximum number of drives per drive type
(in drive cage type B or internally on the side panel of the device)

Ambient temperature	**0 * - 40 °C**	
Drive type	**Front**	**Side panel**
SATA	3	2
SATA Enterprise	2	2

* 0 °C minimum permissible temperature for SATA hard disk drive
5°C minimum permissible temperature for SATA Enterprise hard disk drives

6.6.2.2 Permissible expansion for temperature range 0 to 50 °C

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.

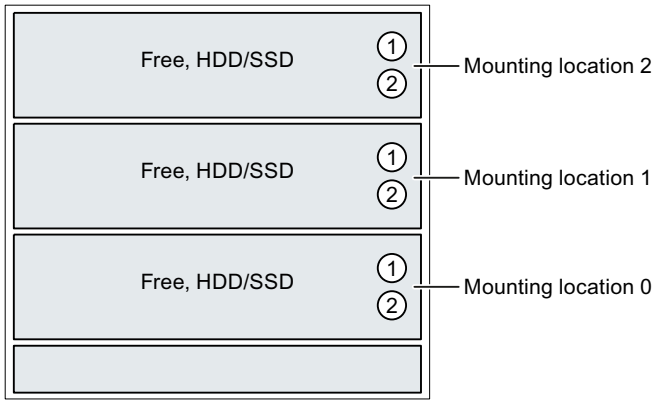
The maximum permitted power loss of the expansion cards is 80 W.

You can install the following drives in the Type B drive cage at various mounting locations.
You can find information on the mounting locations under:

- Drive cage type B (Page 18)

Installation options

The following representations give you an overview of the installation options for drives.

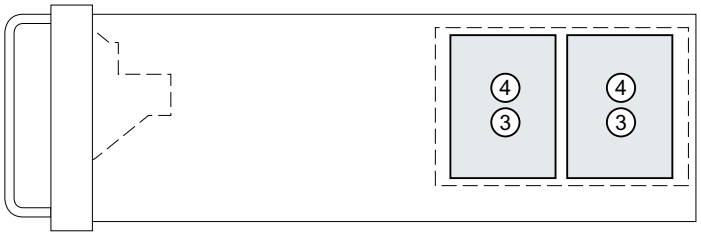


① Drive in drive bay for internal rugged installation
② Drive type "SATA" is possible

If drives are installed in one of the mounting locations, these may be exposed to the following vibration stresses during operation:

- 10 ... 58 Hz: 0.075 mm
- 58 ... 500 Hz: 5 m/s²

Vibrations above 500 Hz are not permitted.



③ Additional drive mounted on the side panel on the drive bay plate.
④ Drive type "SATA" is possible

If drives are mounted on the side panel, these may be exposed to the following vibration stresses during operation:

- 10 ... 58 Hz: 0.045 mm
- 58 ... 300 Hz: 3 m/s²

Ambient temperature	**0 - 50 °C**
Drive configuration	**Mode**
Non-RAID system	X
RAID1 system	X
RAID5 system	X
RAID1 system with hot spare drive	X
RAID5 system with hot spare drive	-

Maximum number of drives per drive type

(in drive cage type B or internally on the side panel of the device)

Ambient temperature	**0 - 50 °C**	
Drive type	**Front**	**Side panel**
SATA	3	2
SATA Enterprise	-	-

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

You can find information on the correct mounting location for drives with a assembly kit for type A drive cage in "Permissible expansion for temperature range 0 to 40 °C (Page 89)" and "Permissible expansion for temperature range 0 to 50 °C (Page 90)", for type B drive cage under "Permissible expansion for temperature range 0 to 40 °C (Page 98)" and "Permissible expansion for temperature range 0 to 50 °C (Page 99)".

NOTICE

Risk of damaging the drive and data loss

When you remove the drive while data is being written to it, you may damage the drive and destroy data.

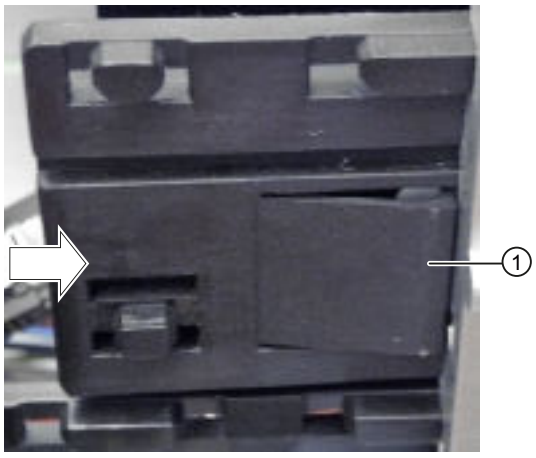
- Only remove the removable tray from the device when the drive is inactive, see "Status displays on removable tray for drives (Page 28)".
- Observe the ESD guidelines.

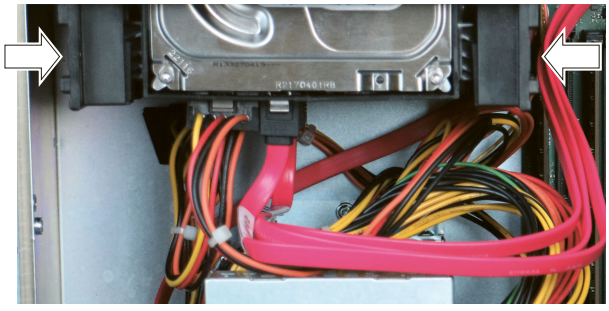
Requirement

- An original spare part, i.e. an "Assembly Kit HDD/SDD for 5.25" tray" approved for this device.
- If there is no RAID system: The device is fully disconnected from the line voltage, see "Switching off the device (Page 55)".
- The device is open, see important information in "Open the device (Page 79)".
- When replacing an HD: T10 screwdriver
- When replacing an SSD: T8 screwdriver

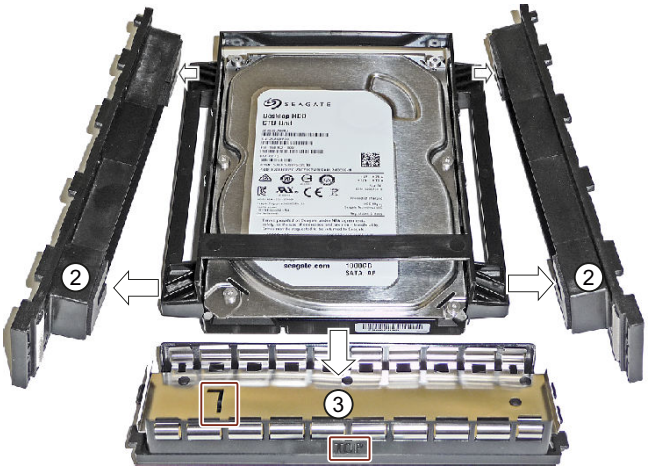
Procedure

1. Remove all power supply and data cables from the drive.
2. Unlock the drive mounting bar ② together with the drive cover ③ by pressing sideways against the surfaces ① and push the drive mounting bar forward out of the device in the direction of the arrow.





3. Remove the left and right drive mounting bars ② and the drive bay cover ③ from the drive.
   Note:
   The drive mounting bars are labeled with "L" and "R" and must be remounted in the same way on the "left" and "right", see corresponding marking on drive bay cover ③.



4. Loosen the four screws ④ and remove the drive from the drive bay ⑤.



Figure 6-1 Drive bay with HDD

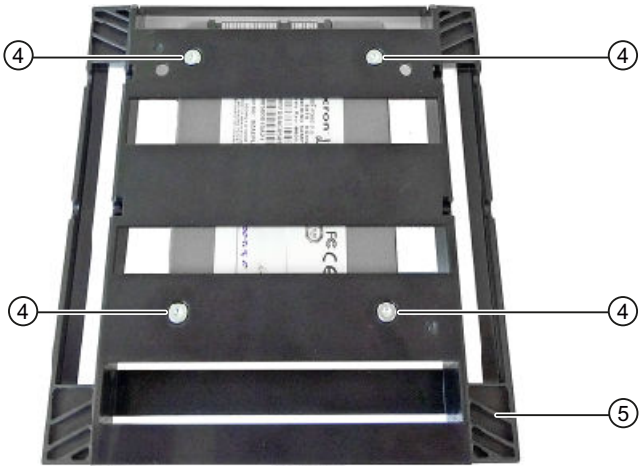


Figure 6-2 Drive bay with SSD

5. Install the new drive in the drive bay ⑤. Ensure that the new drive faces upwards.
6. Fasten the new drive with four screws ④. Start at the hole marked with "1" on the drive bay.
7. Attach the left and right drive mounting bars ②.



8. Slide the drive bay evenly into the guide rail of the drive cage 3/4 to the rear without tilting it left or right.
9. Insert the drive bay cover ③ between the drive mounting bars ②. The pins must lock into the openings on the left and right.



10. Push the drive bay in fully and evenly on the left and the right until you hear it click into the drive cage.
11. Connect the power and data cables to the drive.

6.6.4 Installing a 5.25" drive

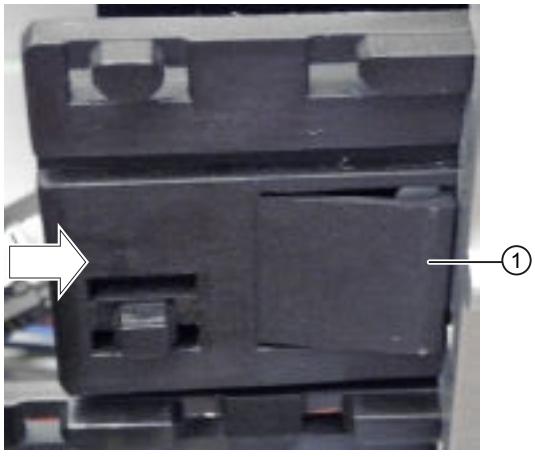
You can find information on the correct mounting location for 5.25" drives in a type A drive cage under "Permissible expansion for temperature range 0 to 40 °C (Page 89)" and "Permissible expansion for temperature range 0 to 50 °C (Page 90)", for type B drive cage in "Permissible expansion for temperature range 0 to 40 °C (Page 98)" and "Permissible expansion for temperature range 0 to 50 °C (Page 99)".

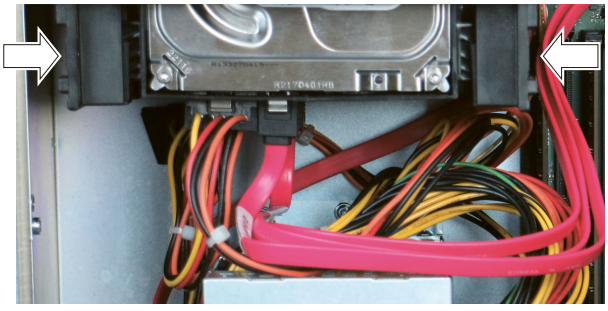
Requirement

- There is no drive or any other component in the mounting location for 5.25" components.
- The device is fully disconnected from the line voltage, see "Switching off the device (Page 55)".
- The device is open, see important information in "Open the device (Page 79)".
- T10 screwdriver

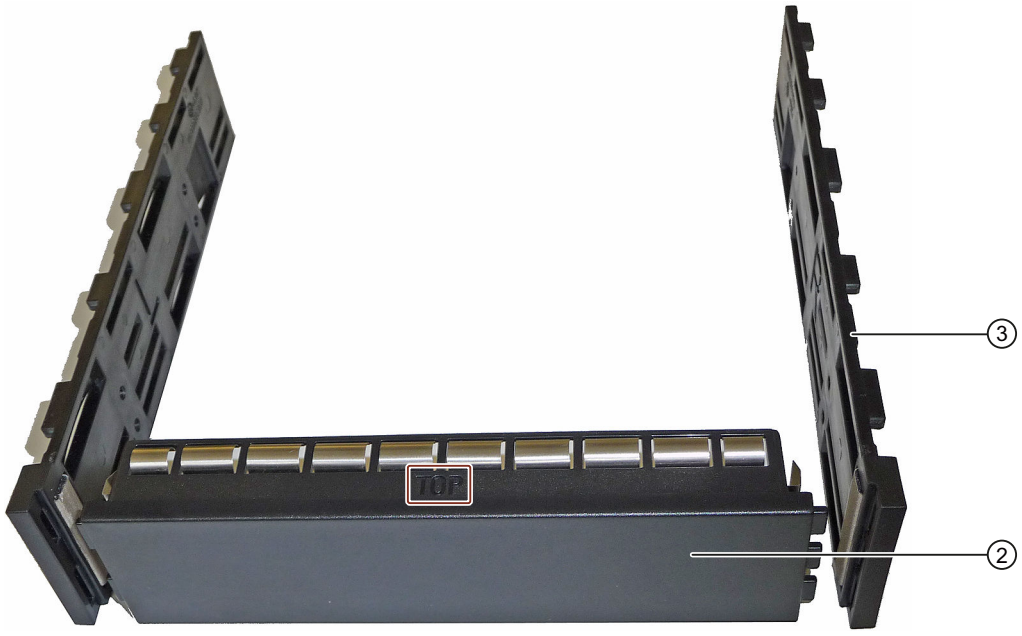
Procedure

1. Unlock the drive mounting bar together with the blanking plate by pressing laterally against the surfaces ① and push the drive mounting bar forward from the device in the direction of the arrow.





2. Remove the drive mounting bars ③ together with the blanking plate ② from the front from the mounting location.



3. Remove the left and right drive mounting bars ③ and the blanking plate ②.
   Note:
   The drive mounting bars are labeled "L" and "R" and have to be installed in the same way again on the "left" and "right".
4. Screw the right and left drive mounting bars to the new drive.
   Take care not to touch the contacts of the drive when you do this. The blanking plate is no longer required.
5. Push the new drive with the drive mounting bars in the guide rail on the left and right into the drive cage evenly at the back without tilting until it snaps into place.

6.6.5 Installing drives inside on the side wall of the device

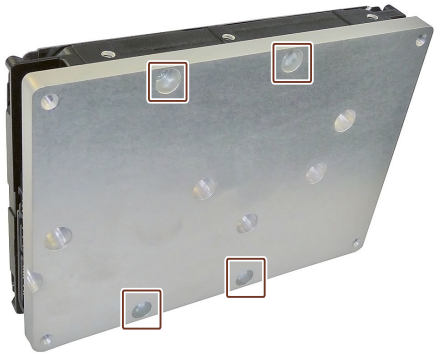
You can internally mount up to two drives (2.5" and 3.5") on one drive bay plate on the right side panel of the device (viewed from the front panel).

Requirement

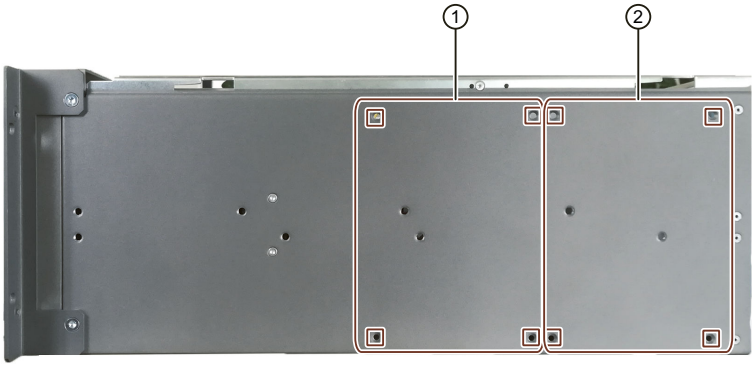
- An original spare part, i.e. a drive bay plate approved for this device with an appropriate drive.
- The device is fully disconnected from the line voltage, see "Switching off the device (Page 55)".
- The device is open, see important information in "Open the device (Page 79)".

Procedure

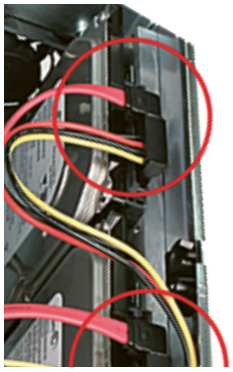
1. Screw the drive to the drive bay plate at the highlighted holes.



2. Hold the drive support base at the position ① or at the position ② inside on the side panel of the enclosure.
   Then tighten the drive support base from the outside at the marked points.



   The SATA connectors are always located at the top ③.



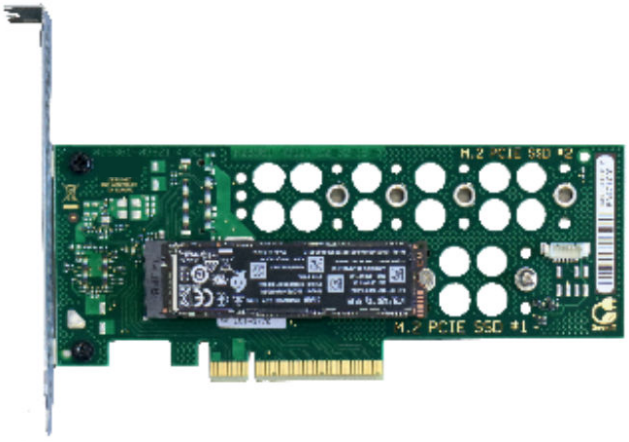
3. Connect the data cables to the desired connectors on the motherboard and on the drive (position ③).
4. Connect the power supply.
5. Close the device.

6.6.6 Install M.2 NVMe SSD

NOTE

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

The M.2 NVMe SSD is plugged onto a PCIe adapter card and then onto the bus board using this adapter card.



Requirement

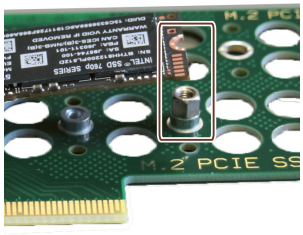
- M.2 NVMe SSDs key M with a max. length of 110 mm
- PCIe adapter card
- Cross-tip screwdriver P1

Procedure

1. Plug the M.2 NVMe SSD at a slight angle from above (see figure) into the direct plug socket of the PCIe adapter card provided for it.



2. Carefully press down the M.2 NVMe SSD and secure it on the PCIe adapter card with the screw.



3. Install the PCIe adapter card in the corresponding slot on the bus board.
   – Read the information under "Slots for expansion cards on the bus board (Page 160)" and "Installing expansion cards (Page 81)".

Device maintenance and repair

7

7.1 Repair information

⚠ WARNING

Risk due to unauthorized opening and improper repairs or expansions

Improper procedure when carrying out expansions may result in substantial damage to equipment or endanger the user.

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

For this reason, please observe the information in "Notes on device and system extensions (Page 39)".

7.2 Maintenance intervals

To maintain high system availability, we recommend the preventative replacement of those PC components that are subject to wear. The table below indicates the intervals for this replacement.

Component	Replacement interval
Drives	3 years
Backup battery	5 years
Fan	3 years
Filter pad	Depending on the degree of soiling

NOTE

All drives are monitored with the SIMATIC DiagBase or SIMATIC DiagMonitor software on the basis of their SMART status.

As soon as the Smart status of the SSD goes to "Not OK", a message is generated in SIMATIC DiagBase or SIMATIC DiagMonitor or during a system start of the device. You should then back up your data and replace the drive.

7.3 Removing and installing hardware

7.3.1 Changing the filter pad

RequirementDevice fan

- The device is fully disconnected from the line voltage, see "Switching off the device (Page 55)".
- The fan cover has been removed; see "Remove the fan cover (Page 112)".
- An original spare part, i.e. a filter pad of the same type.

Procedure

1. Remove the filter pad from the fan cover.
2. Insert the new filter pad into the fan cover. It is inserted loosely in the fan cover. When you insert the filter pad, make sure it lies evenly in the fan cover.
3. Replace the fan cover.

See also

Maintenance intervals (Page 110)

7.3.2 Replacing device fans

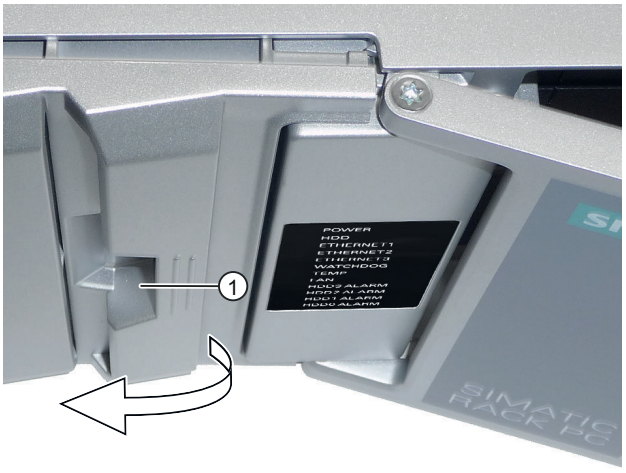
7.3.2.1 Remove the fan cover

Requirement

- The front door is open. Read the information under "Opening the front door (Page 57)".
- Information on the position of the fan cover of the front fan is available under "Front panel (Page 16)".

Procedure Fan cover

1. Open the front door at least at 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.



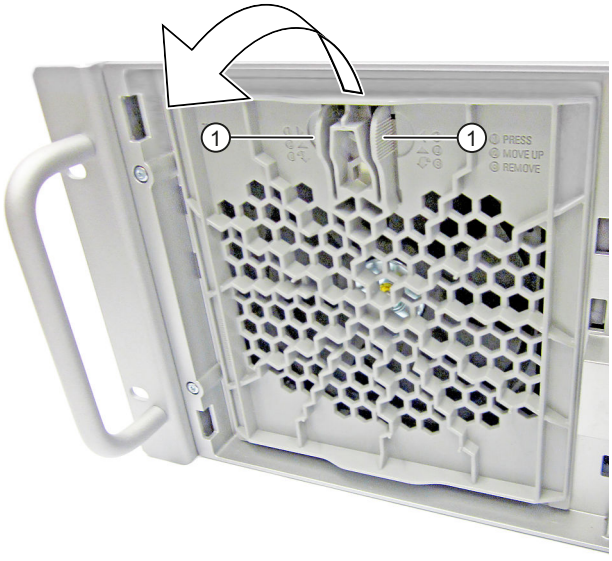
7.3.2.2 Changing the front fan

RequirementDevice fan

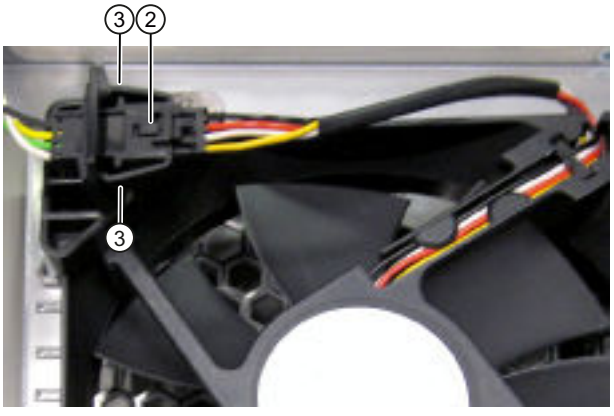
- The device is fully disconnected from the line voltage, see "Switching off the device (Page 55)".
- The fan cover has been removed; see "Remove the fan cover (Page 112)".
- An original spare part, that is a front fan of the same type.

Procedure

1. Press the locks ① together and keep them pressed.
2. Lift the fan support slightly upwards and remove it to the front from the front of the enclosure.

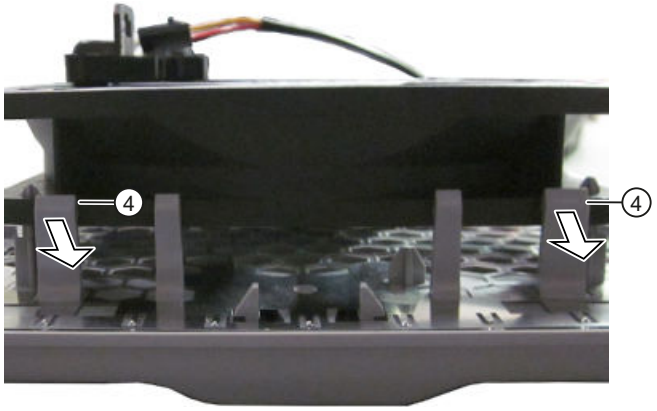


3. Put down the fan support with the openings facing down (fan is above).
4. Press on the clip on the small fan cable plug connector ② and remove the connector from the larger adapter plug,

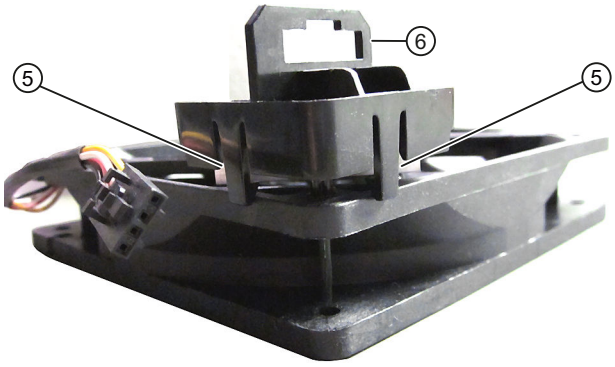


5. Press on the side of the clips ③ and loosen the adapter plug from the cable holder.

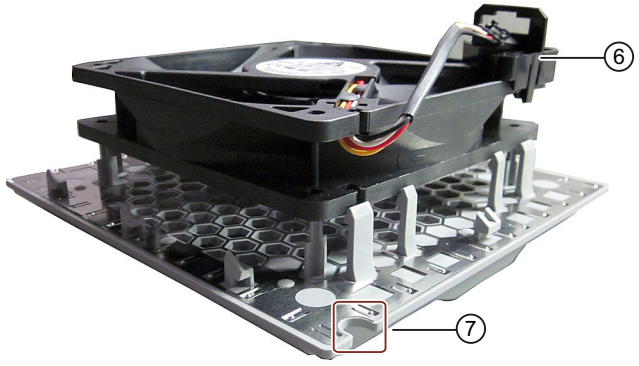
6. Loosen the locking latches ④ of the fan support one after the other at the front and rear and remove the fan.



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



8. 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.



9. 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.
10. Snap the fan into place at the locking latches of the fan support ④.
11. 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.

12. Insert the small fan cable connector ② in the larger adapter connector again.
13. Place the fan support with the new fan on the front of the device.

See also

Maintenance intervals (Page 110)

7.3.2.3 Change the fan on drive cage type A

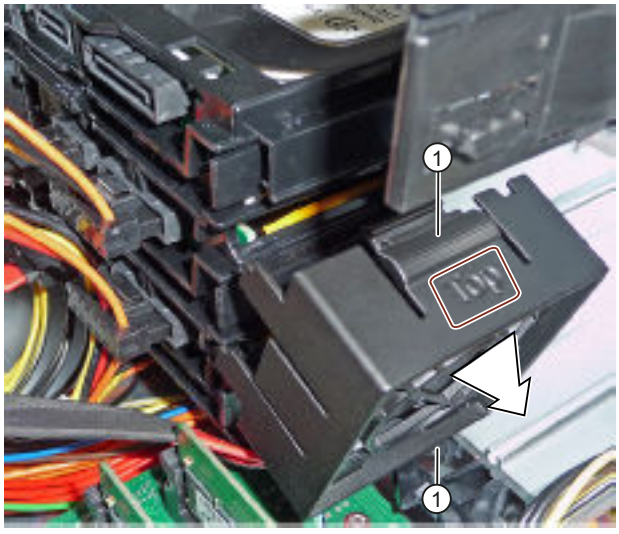
This fan is only installed in the removable tray (drive cage type A) for configurations with RAID and the hard disk type "Enterprise".

RequirementDevice fan

- The device is fully disconnected from the line voltage, see "Switching off the device (Page 55)".
- The device is open, see important information in "Open the device (Page 79)".
- The adapter module removable trays is removed, see "Installing a 5.25" adapter module for removable trays (Page 93)".
- An original spare part, i.e. a fan of the same type.

Procedure

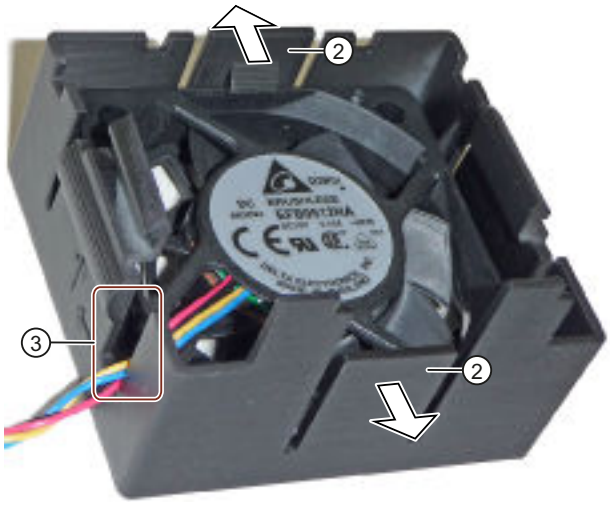
1. Detach the fan cable from the motherboard.
2. Press the upper and lower lock ① on the fan support and remove the fan support from the drive cage.



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.

3. Put down the fan support as shown.



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

See also

Maintenance intervals (Page 110)

7.3.3 Changing the backup battery

⚠ WARNING

Risk of explosion and release of harmful substances

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

Explosion of the lithium batteries and the resulting release of harmful substances can cause severe physical injury. Damaged batteries jeopardize the function of the device.

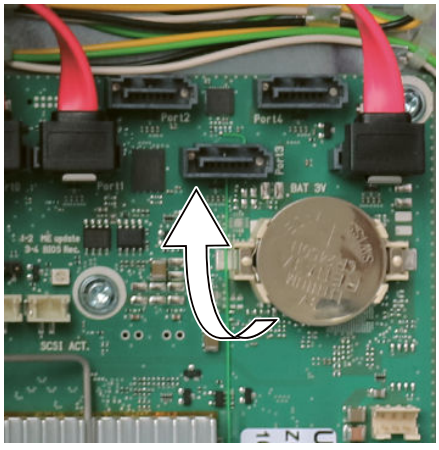
- Replace spent batteries promptly. See information in "Maintenance intervals (Page 110)".
- Replace the lithium battery only with an identical battery or types recommended by the manufacturer.
- Do not throw lithium batteries into fire, do not solder on the cell body, do not recharge, do not open, do not short-circuit, do not reverse polarity, do not heat above 100 °C and protect from direct sunlight, moisture and condensation.

Requirement

- An original spare part, i.e. a backup battery of the same type (article number of lithium battery: A5E00047601 CR2450-N)
- You have noted the firmware settings as the configuration data of the device is deleted when the battery is replaced
  You can find information on this in the detailed firmware/BIOS description, see "Important instructions and manuals for operating the device (Page 11)".
- The device is open, see important information in "Open the device (Page 79)".
- You have observed the local regulations relating to the disposal of used batteries.

Procedure

1. Remove the expansion cards, if necessary. You can find information on this under "Removing expansion cards (Page 83)".
2. Remove the battery from socket.



3. Press the new battery into the socket applying slight pressure.
4. Close the device.
5. Check the firmware settings.

See also

Hardware accessories (Page 29)

7.3.4 Changing a single power supply (AC)

NOTE

Conversion from a single power supply (AC) to a redundant power supply (AC) and vice versa is not possible.

Requirement

- The device is fully disconnected from the line voltage, see "Switching off the device (Page 55)".
- The device is open, see important information in "Open the device (Page 79)".
- An original spare part, i.e. a single power supply of the same type.
- T10 screwdriver
- Diagonal cutter

Procedure

1. Disconnect the cables from the drives and the motherboard.
2. Remove the cable ties securing the power cables in the enclosure.
3. Remove the four fixing screws that are marked in the figure below.



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

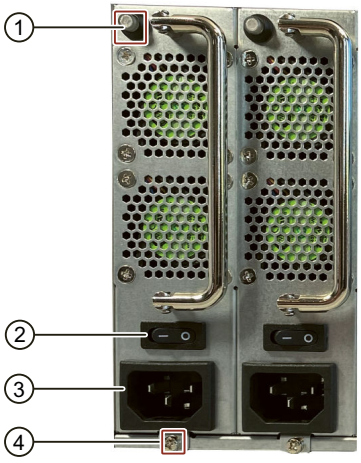
7.3.5 Replacing redundant power supply (AC) module

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.
- Cross-tip screwdriver P1

Procedure



1. Use the status display ① to determine which module is defective (status display at the top of the module is lit red or is not lit).
2. Switch off the defective module using the on/off switch ②.
3. Disconnect the defective module from the line voltage, see "Switching off the device (Page 55)".
   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 on the module again with the on/off switch ② (status display on top of module is lit green).

7.3.6 Changing the enclosure of the redundant power supply (AC)

NOTE

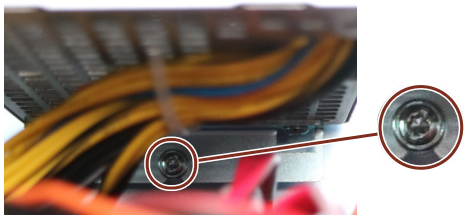
Conversion from a single power supply (AC) to a redundant power supply (AC) and vice versa is not possible.

Requirement

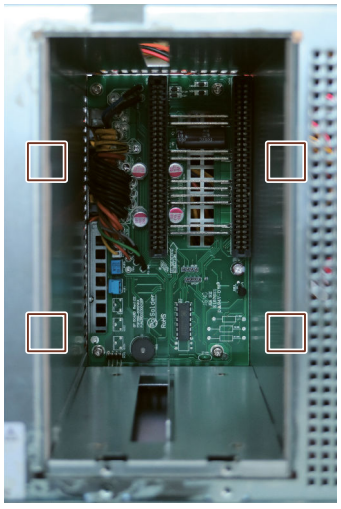
- The device is fully disconnected from the line voltage, see "Switching off the device (Page 55)".
- The device is open, see important information regarding this under "Open the device (Page 79)".
- An original replacement part, i.e. the enclosure of a redundant power supply of the same type.
- Both modules of the redundant power supply are removed, see "Replacing redundant power supply (AC) module (Page 119)".
- Short Phillips screwdriver P1

Procedure

1. Remove the cable ties securing the power cables in the enclosure.
2. Disconnect the cables from the drives and the motherboard.
3. Unscrew the marked screw ① inside the device enclosure.



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



5. Remove the housing of the redundant power supply from the back of the device.
6. Install the new enclosure and secure it at the appropriate places.
7. Re-insert the two modules of the redundant power supply and close the device.

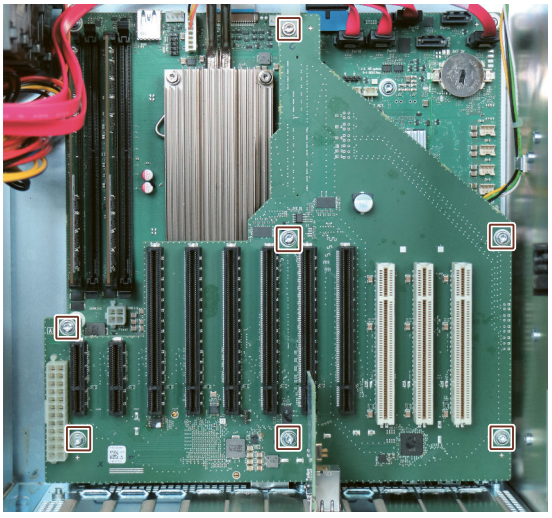
7.3.7 Replacing the bus board

Requirement

- The device is fully disconnected from the line voltage, see "Switching off the device (Page 55)".
- The device is open, see important information in "Open the device (Page 79)".
- T10 screwdriver

Procedure - Removal

1. Remove the expansion cards from the slots, see "Removing expansion cards (Page 83)".
2. Pull all connectors out of the bus board.
3. Remove the screws marked in the figure.
4. Pull the bus board from the motherboard.



Procedure - Installation

Proceed in the reverse order for the installation.

See also

Bus board (Page 160)

7.3.8 Replacing the processor

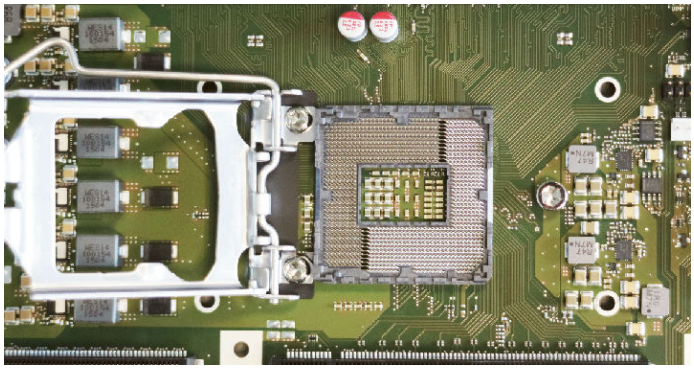
Requirement

- The device is fully disconnected from the line voltage, see "Switching off the device (Page 55)".
- The device is open, see important information in "Open the device (Page 79)".
- An original spare part, i.e. a processor of the same type.
  Only an approved processor is permitted to be installed on the motherboard.

NOTICE
Damage to the processor If the processor is operated with a higher clock frequency than permitted, it can be destroyed or cause loss of data. – Operate the processor only at a clock frequency that is equal to or less than the permitted clock frequency.

Procedure

1. Remove the bus board, see "Replacing the bus board (Page 122)".
2. Remove the heat sink of the processor.
3. Unlock the socket and lift the socket cover.



4. Remove the processor.
5. Place the new processor in the socket.
   During positioning, make sure to take the highlighted arrow on the processor into consideration.
6. Lock the processor in place.
7. Install the heat sink of the processor again.
8. Install the bus board again.

7.3.9 Replacing the motherboard

Requirement

- The device is fully disconnected from the line voltage, see "Switching off the device (Page 55)".
- The device is open, see important information in "Open the device (Page 79)".
- An original spare part, that is a motherboard of the same type, see notes in "Hardware accessories (Page 29)".
  The motherboard as spare part is supplied without processor and memory modules.
- You have noted the firmware settings as the configuration data of the device is deleted when the motherboard is replaced.
  You can find information on this in the detailed firmware/BIOS description, see "Important instructions and manuals for operating the device (Page 11)".
- Hexagon bolt screwdriver for COM1 interface and DVI-D interface
- Hexagon bolt screwdrivers (5 mm and 5.5 mm) for hexagon bolts on which the bus board is placed and fastened
- Screwdriver T10 for fixing screws of the motherboard

Procedure

1. Remove the following components one after the other:
   – The expansion cards from the slots, see "Removing expansion cards (Page 83)".
   – The bus board, see "Replacing the bus board (Page 122)".
   – The heat sink of the processor, see "Replacing the processor (Page 123)".
2. Note the assignment of all lines to the motherboard, and then remove all cables from the motherboard.
3. Unscrew the hexagon bolts of the COM1 port and the DVI-D port on the back of the device, see "Interfaces (Page 20)".
4. Unscrew the hexagon bolts on which the bus board was placed and fastened, and remove the other fixing screws of the motherboard.
5. Remove the motherboard and insert a new one.
6. Fasten the COM1 interface and the DVI-D interface with the previously released hexagon bolts.
7. Fasten the new motherboard with the previously loosened hexagon bolts and fixing screws.
8. Reconnect the cables at the correct positions on the motherboard.
9. Install the following components one after the other:
   – Heat sink of the processor
   – Bus board
   – Expansion cards, see "Installing expansion cards (Page 81)".
10. Update the firmware settings to match the version of the motherboard. 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. Start the "Documentation and Drivers" suite from the USB flash drive by executing the "START_DocuAndDrivers.CMD" file.
3. Install the desired software and drivers.

7.5 Configuring firmware/BIOS

You can find information on configuring firmware/BIOS and on the firmware settings in the delivery state in the "Firmware/BIOS description (https://support.industry.siemens.com/cs/ww/en/view/109760621)".

NOTE

If your IPC does not boot, for example because a BIOS update crashed, contact your local SIEMENS representative.

You can find information on "BIOS Recovery" and "ME Update" under "Pin assignment of the internal interfaces (Page 152)".

7.6 Backing up data and changing partitions

We recommend the "SIMATIC IPC Image & Partition Creator" software to back up data under Windows®, which supports the hardware of the device as of version
3.5.3. Image & Partition Creator
You will find detailed information on this software in: "SIMATIC IPC Image & Partition Creator (https://support.industry.siemens.com/cs/ww/en/view/21766418)".

See also

Technical specifications of the operating systems (Page 140)

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 127)".

Article number	6AG4114-3...-.... (for details, refer to the ordering documentation)
Dimensions	481.4 x 176.6 x 446.6 (W × H × D in mm)
	Detailed dimensional specifications can be found in "Dimension drawing of the device (Page 141)".
Weight	15 up to 23 kg; depending on the equipment
Supply voltage (U_N)	Single power supply (400 W): 100 V AC to 240 V AC (-15%; +10%)
	Single power supply (850 W): 100 V AC to 240 V AC (-10%; +10%)
	Redundant power supply: 2 × 100 V AC to 240 V AC (-15%; +10%)
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 100V: ≤ 12 A • Continuous current at 240 V: ≤ 6 A • At startup 25°C (cold restart): 115 - 230 V ≤ 180 A
	Redundant power supply: • 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

Input current	**Dimensioning of fuses in higher-level system circuits with a single power supply (400 W) or redundant power supply** A fuse is integrated in the power supply unit of the device, which is designed for a tripping current of typically 6.3 A. 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. It is recommended that a fuse of at least 6.3 A, plus the power demand of the other devices that are also supplied via this circuit, be used for protection of the higher-level power supply circuit. The tripping characteristic of the higher-level protection must take into account both the starting currents of the device and those of the other devices.
	Dimensioning of fuses in higher-level system circuits with a single power supply (850 W) A fuse is integrated in the power supply unit of the device, which is designed for a tripping current of typically 15 A. The pulse currents during startup are also taken into account by the "time lag" type. If a fault occurs, this fuse ensures the correct disconnection of the device from the power supply network. It is recommended to use a fuse of at least 15 A for the protection of the higher-level power supply circuit in addition to the power requirement of the additional devices that are also supplied through this circuit. The tripping characteristic of the higher-level protection must take into account both the starting currents of the device and those of the other devices.
Frequency of the supply voltage	50 to 60 Hz, min. 47 Hz to max. 63 Hz, sinusoidal
Power consumption with maximum configuration and 255 W secondary	Single power supply (400 W): ≤ 290 W with 89% efficiency Redundant power supply (350W): ≤ 290W with 88% efficiency
Power consumption with maximum configuration and 520 W secondary	Single power supply (850 W): ≤ 600 W with 87% efficiency
Power loss, heat emission	Single power supply (400 W): 290 W = 290 J/s = 0.27 BTU/s
	Single power supply (850 W): 600 W = 600 J/s = 0.57 BTU/s
	Redundant power supply: 290 W = 290 J/s = 0.27 BTU/s
Current output (DC)	• Technical specifications of the single power supply (AC, 400 W) (Page 131) • Technical specifications of the single power supply (AC, 850 W) (Page 131) • Technical specifications of the redundant power supply (AC, 350 W) (Page 132)
Noise emission	• < 55 dB(A) at 25 °C according to DIN EN ISO 7779 all drives in operation, high load on CPU • < 45 dB(A) at 25 °C according to DIN EN ISO 7779 all drives in operation, low load on CPU • < 35 dB(A) at 25 °C according to DIN EN ISO 7779 Fan profile silent, idle desktop, drives are not active, standard AC power supply
Degree of protection	• IP 41 (front) with closed front door [1] • IP 20 on the rear according to EN 60529
Dust protection	With closed front door Filter class G2 EN 779; particles > 0.5 mm are 99% retained
Safety	
Protection class	Protection class I compliant with IEC 61140
Degree of pollution	Device is designed for environments with pollution degree 2
Transient overvoltage	Device is designed for connection to supply with overvoltage category II (transient overvoltages up to 2500 V)

Safety regulations	• IEC 61010-2-201 • EN 61010-2-201 • UL 61010-2-201 • CSA C22.2 No 61010-2-201

[1] Only with protected installation, see "Notes on ambient and environmental conditions (Page 37)"

8.3 Current/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 processor with cooling [1]	1.53 A	3.44 A	1.3 A	3.3 A	0 A	0.28 A
Motherboard Core i5 /i7 processor with cooling [1]	1.53 A	3.44 A	1.3 A	5 A	0 A	0.28 A
Motherboard Xeon processor with cooling [1]	1.53 A	3.44 A	1.3 A	7.5 A	0 A	0.28 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			
Triple Head graphics card	3.3 A		1.5 A			
T400	3.1 A		1.7 A			
RTX4000	0.4 A		13.4 A			
RTXA4000	0.4 A		11.6 A			
Individual currents AC 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 AC max. permissible; single power supply (850 W)	20 A	35 A	70 A		0.3 A	3 A

[1] Depends on the selected device configuration

[2] 2.5 A for 10 seconds

[3] In total, 200 W is the maximum permitted

Component	Voltage					
	+3.3 V	**+5 V**	**+12 V**	**+12 V2**	**-12 V**	**5 V_{aux}**
Individual currents AC max. permissible; redundant power supply	20 A [2]	20 A [2]	16 A	16 A	0.5 A	3.0 A
Efficiency of the single power supply [1]	Approx. 88% (230 V AC), approx. 88% (120 V AC)					
Efficiency of the redundant power supply [1]	Approx. 89% (230 V AC), approx. 87% (120 V AC)					

[1] Depends on the selected device configuration

[2] 2.5 A for 10 seconds

[3] In total, 200 W is the maximum permitted

Typical power values

Component	Current consumption (AC-SV, U=230 V)	Power consumption
Base device Core i3	0.39 A	89 W
Base device Core i3 SATA Enterprise	0.43 A	97 W
Base device Core i5/i7	0.46 A	103 W
Base device Core i5/i7 SATA Enterprise	0.48 A	109 W
Base device Xeon	0.53 A	120 W
Base device Xeon SATA Enterprise	0.56 A	126 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/SAS type Enterprise	0.05 A	12.1 W
2 × hard disk drives SATA/SAS type Enterprise	0.11 A	24.2 W
3 × hard disk drives SATA/SAS 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
Triple Head graphics card	0.14 A	32.8 W
Hardware RAID controller	0.07 A	15 W

See also

Technical specifications of the single power supply (AC, 400 W) (Page 131)
Technical specifications of the single power supply (AC, 850 W) (Page 131)
Technical specifications of the redundant power supply (AC, 350 W) (Page 132)

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

Output voltage

Voltage	Maximum current	Voltage stability
+12 V	11 A	± 5%
+12 V	14 A	± 5%
–12 V	0.1 A	± 10%
+5 V	25 A [1]	± 5%
+3.3 V	20 A [1]	± 5%
+5 V_{aux}	2 A [2]	+5%, -3%

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

2 2.5 A for 10 seconds

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

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

Output voltage

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%

1 The total power of the voltages +5 V and +3.3 V must be ≤ 200 W.

The total power of all voltages is a maximum of 850 W and depends on the temperature of the intake air:

- Up to 40 °C 100% of 850 W, (derating 1% / K)
- From 50 °C: 90% of 850 W, (derating 2% / K)
- From 60 °C: 70% of 850 W, (derating 1% / K)
- From 70 °C: no operation permitted

Power requirements of the system components

Performance of the expansion cards	The maximum power loss of the expansion cards is 80 W. It may be increased by 265 W if the power is drawn from an actively cooled expansion card (e.g. high-end graphics card) that emits its waste heat directly to the ambient air and not to the interior of the device. The requirements of the expansion card for the temperature of the intake air (inside the device) must be observed.
Total power, permissible,	The total power of all voltages is 255 W max. It may be increased by 265 W if the power is drawn from an actively cooled expansion card (e.g. high-end graphics card) that emits its waste heat directly to the ambient air and not to the interior of the device. The requirements of the expansion card for the temperature of the intake air (inside the device) must be observed.

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

Output voltage

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 127)".

Interference emission	EN 61000-6-3; EN 61000-6-4 CAN/CSA CISPR22 Class B, EN 55032 Class B; FCC Class A; KN 32 Class B 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 > 3 m ± 1 kV; according to IEC 61000-4-4; burst; length < 3 m ± 2 kV; according to IEC 61000-4-5; burst; length > 30 m
Immunity to discharges of static electricity	± 6 kV contact discharge (according to IEC 61000-4-2) ± 8 kV air discharge; (according to IEC 61000-4-2)
Immunity to RF interference	• 10 V/m; 80 up to 2700 MHz 80% AM to IEC 61000-4-3 • 3 V/m; 2.7 to 6 GHz 80% AM to IEC 61000-4-3 • 10 V; 10 kHz up to 80 MHz 80% AM to IEC 61000-4-6
Immunity to magnetic field	100 A/m; 50 Hz; 60 Hz (according to IEC 61000-4-8)

8.5 Ambient conditions

See the note in "Applicability of technical specifications (Page 127)".

Climatic ambient conditions	
Temperature	Tested according to IEC 60068-2-2; IEC 60068-2-1; IEC 60068-2-14
Operation	+0 °C up to +50 °C [1] Gradient: ≤ 10 K/h; no condensation
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	5% up to 85% at 30 °C; no condensation Gradient: ≤ 10 K/h; no condensation
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]	10 to 58 Hz: 0.0375 mm, 58 Hz to 500 Hz: 4.9 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 [3]	Half-sine: 50 m/s2, 30 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 Limits depend on the device equipment:
At +5 °C up to +40 °C without restriction; for information for extended ambient temperature for type A drive cages see "Permissible expansion for temperature range 0 to 40 °C (Page 89)" and "Permissible expansion for temperature range 0 to 50 °C (Page 90)" and for type B drive cages see "Permissible expansion for temperature range 0 to 40 °C (Page 98)" and "Permissible expansion for temperature range 0 to 50 °C (Page 99)".

2 Operation with graphics card RTX4000 at +0 °C to +45 °C

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

8.6 Technical specifications of the drives

See the note in "Applicability of technical specifications (Page 127)".
Information on the drives is available in your order documents.

Maximum number	6 (depends on the selected configuration)
HDD	HDD types (Native Command Queuing is supported): • 3.5" SATA, 6 GB/s; 1000 GB • 3.5" SATA, Enterprise, 6 GB/s; 1000 GB, 2000 GB and 4000 GB • 3.5" SAS, Enterprise, 6 GB/s; 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 x4 *; 512 GB and 1024 GB

* 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

See the note in "Applicability of technical specifications (Page 127)".

Chipset	Intel® GL82 C246 PCH
Processor	• Intel® Core i3-8100 * 4C/4T, 3.6 GHz, 6 MB cache • Intel® Core™ i5-8500 6C/6T, 3.0 (4.1) GHz, 9 MB cache, iAMT • Intel® Core™ i7-8700 6C/12T, 3.2 (4.6) GHz, 12 MB cache, iAMT • Intel® Xeon® Processor E-2176G 6C/12T, 3.7 (4.7) GHz, 12 MB cache, iAMT

* Main memory interface 2400 MT/s

RAID (on-board)	Intel® PCH with Intel® Rapid Storage Technology
Slots for memory modules	4 x DIMM slots for DDR4 2666, expandable to 64 GB
Main memory	4 up to 64 GB, DDR4 SDRAM PC4-2666T
	Max. of 3.2 GB can be used for 32-bit versions of operating system and applications; see order documents for equipment
Power consumption per PCI slot, maximum permitted	• 5 V / 5 A or 3.3 V / 7 A • 12 V / 0.5 A • 3.3 V_{aux} / 0.4 A
Power consumption per PCIe slot with x4 expansion card, maximum permitted	• 3.3 V / 3 A • 12 V / 2.1 A • 3.3 V_{aux} / 0.4 A
Power consumption per PCIe slot with x16 expansion cards, max. permissible	• 3.3 V / 3 A • 12 V / 2.1 A • 3.3 V_{aux} / 0.4 A
Power loss per slot with max. ambient air temperature 50 °C, permissible	≤ 30 W
Power loss of all slots with max. ambient air temperature 50 °C, permissible	≤ 80 W In sum, the current for 3.3 V_{aux} may not exceed 1.2 A.

* Main memory interface 2400 MT/s

Expansion cards

Expansion card slots	Bus board variant 1 with 9 expansion slots: • 7 × PCI • 2 × PCIe x16 (8 lanes); Gen 3.0
	Bus board variant 2 with 11 expansion slots: • 3 × PCI • 1 × PCIe x16 (8 lanes); Gen 3.0* • 2 × PCIe x16 (4 lanes); Gen 3.0* • 1 x PCIe x16 (4 lanes); Gen 3.0** • 2 × PCIe x16 (4 lanes, via PCIe switch); Gen 3.0** • 2 x PCIe x4 (4 lane, via PCIe switch); Gen 3.0**
	Bus board variant 3 with 11 expansion slots: • 3 × PCI • 1 × PCIe x16 (16 lanes); Gen 3.0* • 1 x PCIe x16 (4 lanes); Gen 3.0** • 2 x PCIe x16 (1 lane); Gen 3.0** • 2 × PCIe x16 (4 lanes, via PCIe switch); Gen 3.0** • 2 x PCIe x4 (1 lane); Gen 3.0**
	* PCIe bus of the CPU ** PCIe bus of the PCH

For information on this, see "Slots for expansion cards on the bus board (Page 160)".

8.8 Technical specification of the hardware RAID adapter card

See the note in "Applicability of technical specifications (Page 127)".

Controller	• SAS Hardware RAID Controller, PCIe x8, RAID 1, 5 • Type: Microsemi ASR3151-4i (independent processor, 1024 MB DDR3 cache)
Adapter	• 1 × Mini SAS HD adapter (SFF-8643 for 4 drives)
Maximum theoretical controller data rate	• 12 Gbps per port
Memory	• Maintenance-free buffer unit for onboard cache memory

8.9 Technical specifications of graphic

See the note in "Applicability of technical specifications (Page 127)".

Technical specifications of the internal graphics cardInternal graphics card

Graphics controller	• Intel® UHD Graphics 630 (GT2) integrated in processor: Intel® Core™ i3-8100 Intel® Core™ i5-8500 Intel® Core™ i7-8700 • Intel® UHD Graphics P630 (GT2) integrated in processor: Intel® Xeon® Processor E-2176G
Graphics memory	Dynamic video memory technology uses at least 32 MB in main memory
Resolutions/frequencies/colors	• DVI up to 1920 × 1200 pixels at 60 Hz; color depth up to 32-bit/pixel • DisplayPort up to 4096 × 2304 pixels at 60 Hz; color depth up to 32-bit/pixel • VGA (VGA via DP to VGA adapter) up to 2560 × 1600 pixels at 60 Hz; color depth up to 32 bits/pixel
Graphics card (optional)	PCIe x16; triple head You can find information on connection options for monitors with adapters under "Connecting I/O devices (Page 50)". • Type: Quadro P400, 2 GB graphics memory • Maximum resolution: – 3x DisplayPort 4096 x 2160 at 60 Hz; 32-bit color depth or – 1x DisplayPort 5120 × 2880 at 60 Hz; 32-bit color depth – DVI 1920 × 1200 at 60 Hz; 32-bit color depth – VGA 2048 × 1536 at 60 Hz; 32-bit color depth

Technical specifications of optional graphics card NVIDIA T400

PCIe x16; Triple Head
You can find information on connection options for monitors with adapters under "Hardware accessories (Page 29)".

Graphics controller	Type TU 117 and 384 NVIDIA CUDA cores
Graphics memory	2 GB
Resolutions/frequencies/colors (without adapter)	• 3x Mini DisplayPort: 4096 × 2160 at 60 Hz; 32-bit color depth • 1x Mini DisplayPort: 5120 × 2880 at 60 Hz; 32-bit color depth
Resolutions/frequencies/colors (with adapter)	• up to 3x DisplayPort: 4096 × 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 optional graphics card NVIDIA Quadro RTX4000 and RTXA4000

RTX4000

The graphics card is equipped with the following connections for monitors:

- 3 × DisplayPort, Rev.1.2, prepared for Rev.1.3 or 1.4
- 1 × USB Type C, with VirtualLink™ support, e.g. for connecting VR glasses
  - As of Windows 10 Version 1803: All functions of the USB Type C connection available
  - With earlier versions of Windows, DisplayPort output is supported

Maximum resolution when using multiple monitors at the same time:

- Maximum resolution when using multiple monitors at the same time:
- 4x DisplayPort 5120 × 2880 at 60 Hz
- 2x DisplayPort 7680 × 4320 at 60 Hz (2 connections of the graphics card are occupied per monitor)
- Color depth 24-bit or 36-bit, for details see the manufacturer's information on the RTX4000 graphics card

RTXA4000

The graphics card is equipped with the following connections for monitors:

- 3 × DisplayPort, Rev.1.2, prepared for Rev.1.3 or 1.4

Maximum resolution when using multiple monitors at the same time:

- Maximum resolution when using multiple monitors at the same time:
- 3x DisplayPort 5120 × 2880 at 60 Hz
- 2x DisplayPort 7680 × 4320 at 60 Hz (2 connections of the graphics card are occupied per monitor)
- Color depth 24-bit or 36-bit, for details see the manufacturer's information on the RTXA4000 graphics card

Slots for the optional NVIDIA Quadro graphics card

You can use the RTX4000 and RTXA4000 graphics cards in the following slots on the bus board:

- Bus board variant 1: Slot 4
- Bus board variant 2: Slot 6
- Bus board variant 3: Slot 4

Power supply of the optional NVIDIA Quadro RTX4000 and RTXA4000 graphics card

The **RTX4000** graphics card is supplied with a voltage of 12 V via the slot on the bus board and via an 8-pin connector. All 8 pins must be connected to ensure trouble-free operation.

The **RTXA4000** graphics card is supplied with a voltage of 12 V via the slot on the bus board and via a 6-pin connector. All 6 pins must be connected to ensure trouble-free operation. The 8-pin plug connector must be modified accordingly for this purpose. The part of the connector with Pin 4 – Pin 8 must be cut off.

Power requirements of the graphics card

The average power consumption (total graphic power) of all supply voltages is a maximum of 125 W for **RTX4000** and 140 W for **RTXA4000**.

The pulse power consumption can be significantly higher, see the information of the manufacturer.

NOTE

Requirements for using graphics card RTX4000

The graphics card RTX4000 and RTXA4000 can only be connected, operated and configured on devices with a single power supply (850 W).

Cooling of the optional graphics card NVIDIA Quadro RTX4000 and RTXA4000

The graphics card is actively cooled by a fan. Heated air is released into the interior of the device via ventilation openings on the graphics card. The active cooling of the device then conveys 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. In addition, another perforated slot bracket must be used to the left of the graphics card (as seen from the inside of the device).

NOTE

Risk of burns

The fan profile of the "Enhanced" graphics card is mandatory for the device.

In the delivery state, the fan profile of the graphics card is set to "Enhanced mode" and must not be changed.

8.10 Technical specifications of the interfaces

Observe the information in "Applicability of technical specifications (Page 127)" and use only original connections of the I/O to be connected.

COM 1	Serial interface 1 (V.24); 9-pin SUB-D socket
COM 2 (optional)	Serial port 2 (V.24), 9-pin SUB-D socket
DisplayPort V1.2 [1]	2 x connection of a digital monitor
DVI-D	Connection of a digital monitor with DVI interface
3 × Mini DisplayPort with triple head graphics card (optional)	Connection of three digital or analog monitors using adapter cable for DPP, DVI or VGA
USB 3.1 Gen 2, Type A	USB 3.1 SuperSpeed+ backward compatible with USB 3.0/2.0/1.1 • Back of device: 4 × 900 mA / high current [2]
USB 3.1 Gen 2, Type C [3]	USB 3.1 Gen 2 / Gen 1, 3.0/2.0/1.1 • Back of device: 2 × 1500 mA / high current [2]
USB 3.1 Gen 1 (USB 3.0 old), Type A	USB 3.1 SuperSpeed backward compatible with USB 3.0/2.0/1.1 • Front of device: 2 × 900 mA / high current [2]
Ethernet	3 × Ethernet interface (RJ45), 10/100/1000 Mbps
	1 x Ethernet 1: Intel® Jacksonville i219-LM
	• AMT-capable[4]
	2 x Ethernet 2, 3: Intel® Springville i210-AT
	Wake on LAN, Remote Boot and the 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)
Audio	Realtek ALC255, 6-channel DAC support • Micro • Line In • Line out: 2 W at 4 Ω

[1] An analog monitor can be used with an adapter cable (optional).

[2] In total ≤ 3 A

[3] Maximum cable length must be less than 3 m.

[4] AMT and teaming cannot be used simultaneously on the Ethernet interface.

See also

Dimension drawing of the device (Page 141)

8.11 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 143)

8.12 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**
  - Microsoft® Windows® 10 Enterprise 2016 LTSB, 64-bit, Multi-Language*
  - Microsoft® Windows® 10 Enterprise 2019 LTSC, 64-bit, Multi-Language*
  - Microsoft® Windows® 10 Enterprise 2021 LTSC, 64-bit, Multi-Language*
- **Microsoft® Windows® Server**
  - Microsoft® Windows® Server 2016 Standard Edition, including 5 Clients, 64-bit, Multi-Language*
  - Microsoft® Windows® Server 2019 Standard Edition, including 5 Clients, 64-bit, Multi-Language*
  - Microsoft® Windows® Server 2022 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 2016

In the delivery state, Windows® 10 and Windows® Server 2016 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

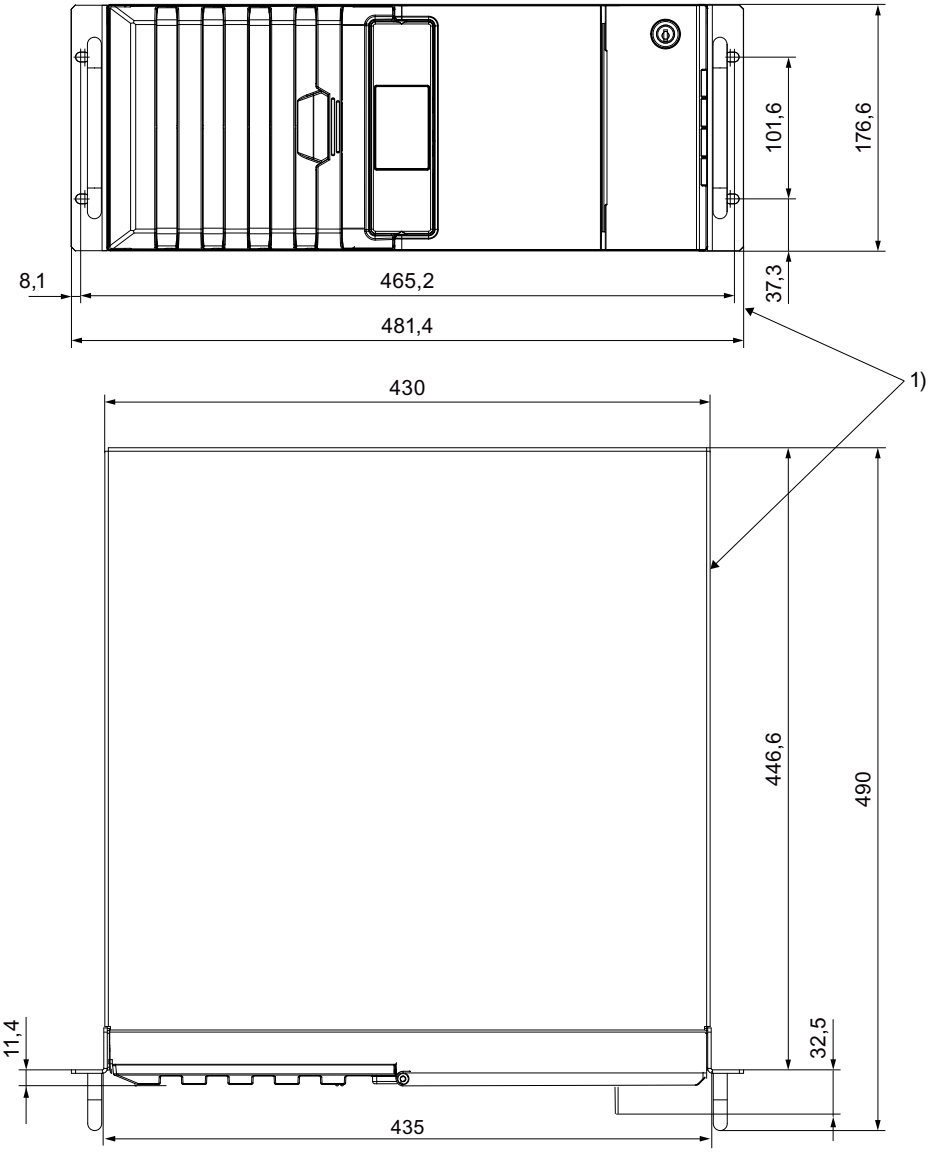
9.1 Dimension drawing of the device

NOTE

IEC 60297-3-100

The systems meets the requirements for 4 HE according to IEC 60297-3-100.

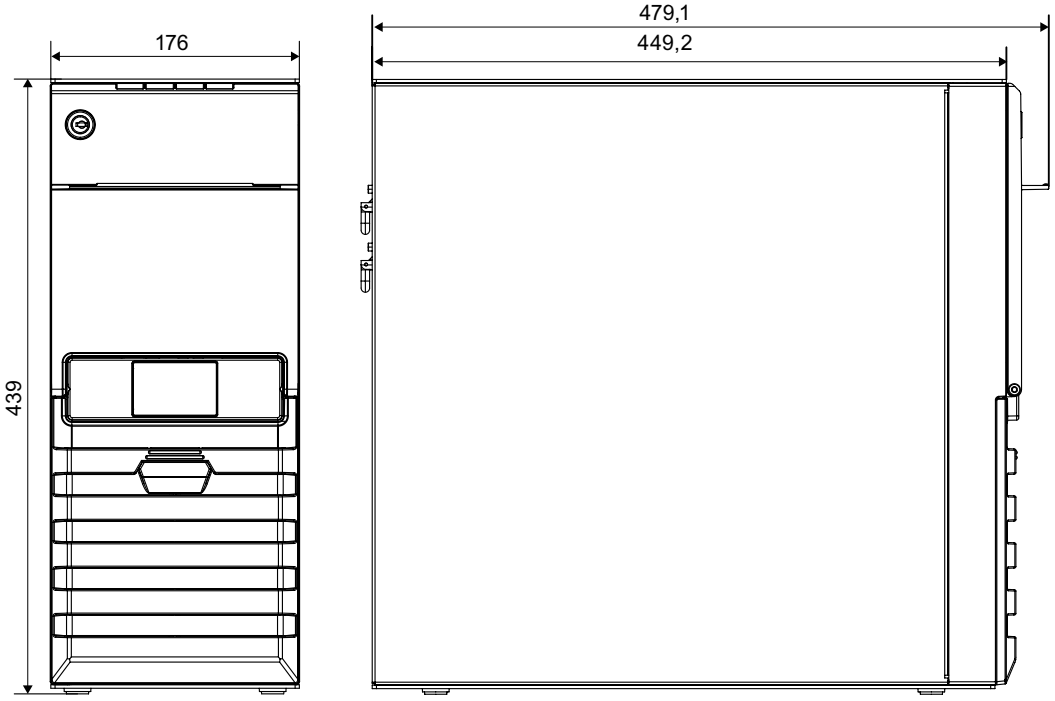
Front view and top view



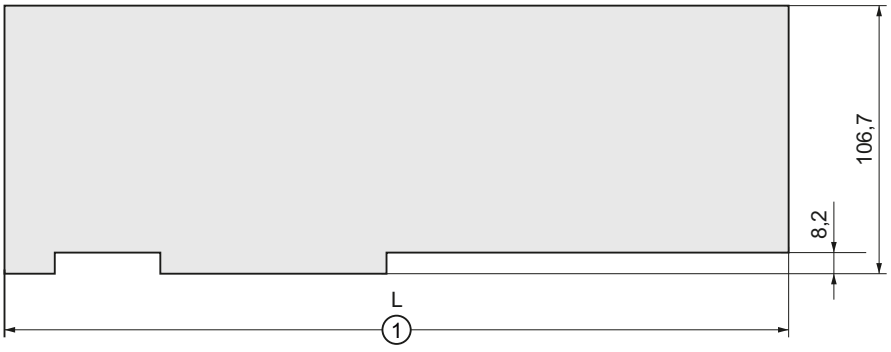
1) At top when installed vertically. All dimensions in mm.

9.2 Dimension drawing of the Tower Kit

Front view and top view



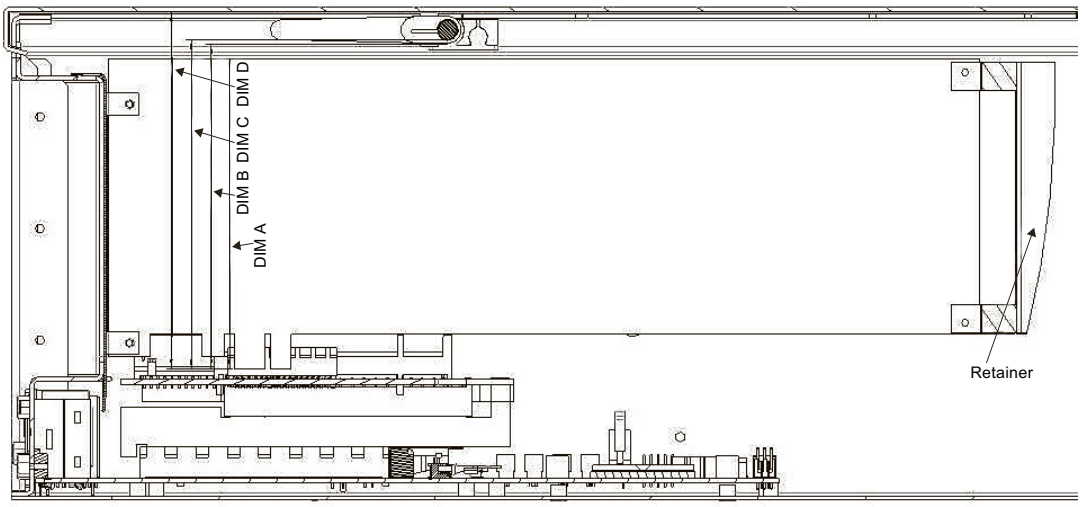
9.3 Dimension drawing of the expansion cards



① L Length of expansion card
Device with standard enclosure: 312

All dimensions in mm

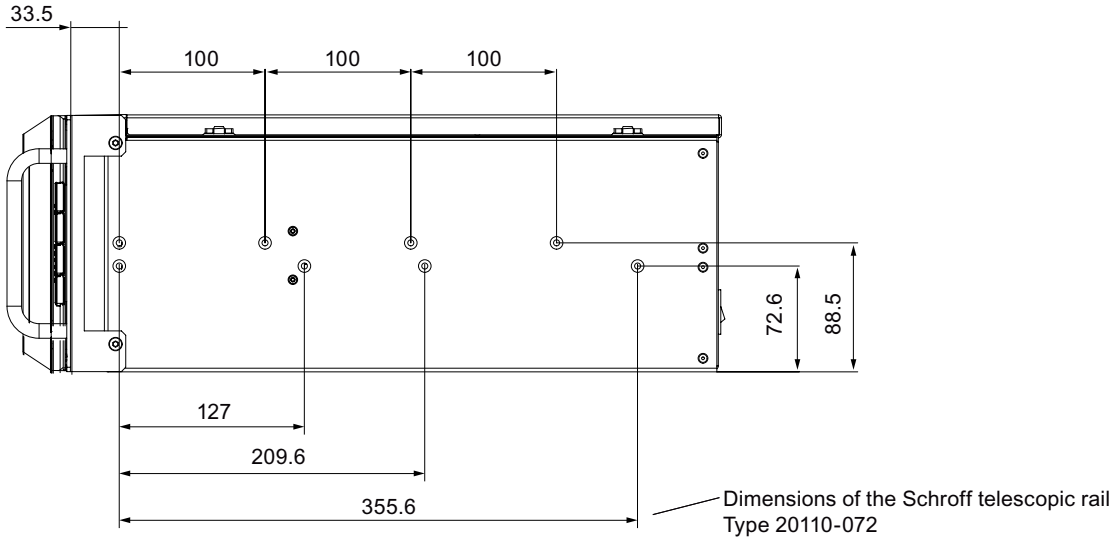
The figure below shows the maximum size of the PCI/PCI Express expansion card that can be installed, without slot bracket and retainer.



	PCI	PCIe	Meaning
DIM A	106.68 mm	111.15 mm	Lower edge of expansion card to upper edge of module
DIM B	111.94 mm	116.4 mm	Lower edge of expansion card to lower edge of retainer
DIM C	113.44 mm	117.9 mm	Lower edge of expansion card to retainer
DIM D	123.54 mm	128.0 mm	Lower edge of expansion card to bottom of device cover

9.4 Dimension drawing of the telescope rails

Dimensions for bore holes for telescopic rails



All dimensions in mm.

Dimensions of telescopic rails from Rittal, Type 3659
TS 3659.181 for 600 mm cabinet
TS 3659.191 for 800 mm cabinet

NOTE

Note the information from Rittal and Schroff in the corresponding data sheets and specifications.

10

Standards and approvals

10.1 CE marking

CE

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:

- 2014/30/EU "Electromagnetic Compatibility Directive" (EMC Directive)
  The device is designed for the following areas of application corresponding to the CE marking:

Area of application	Requirement for	
	Interference emission	Immunity to interference
Industry	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 (Transient currents) and EN 61000-3-3 (Voltage fluctuation and Flicker).
- 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)

EC 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 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).

10.3 Software license agreements

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

10.4 UL approval



The following approvals are available for the device:

- Underwriters Laboratories (UL) according to Standard UL 61010-2-201 Second Edition, File E85972 (PROG.CNTLR.)
- Canadian National Standard CAN/CSA-C22.2 No. 61010-2-201 Second Edition

10.5 UKCA marking



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

- Electromagnetic Compatibility Regulations 2016 (EMC)
- Equipment and Protective Systems Intended for use in Potentially Explosive Atmospheres Regulations 2016 (Explosion Protection) [1]
- Regulations on the restriction of the use of certain hazardous substances in electrical and electronic equipment 2012 (RoHS)

[1] : Marking on nameplate, if applicable

UKCA Declaration of Conformity

The associated declaration of conformity is available on the Internet at the following address:

- EU/UK Declaration of Conformity for SIMATIC IPC (https://support.industry.siemens.com/cs/ww/en/view/37369031)

10.6 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.

Responsible party for Supplier's Declaration of Conformity

Siemens Industry, Inc.
Digital Factory - Factory Automation
5300 Triangle Parkway, Suite 100
Norcross, GA 30092
USA
mail to: amps.automation@siemens.com (mailto: amps.automation@siemens.com)

10.7 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.

10.8 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.

10.9 EAC (Eurasian Conformity)



Identification for Eurasion Customs Union

- EAC (Eurasian Conformity)
- Declaration of conformity according to Technical Regulations of the Customs Union (TR CU)

10.10 KC Mark (Korea)

This product meets the requirements of Korean certification.
Registration No.: R-R-S49-IPC647E
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.

See also

KC, Registration of Broadcasting and Communication Equipments, SIMATIC IPC847E (https://support.industry.siemens.com/cs/document/109764933/general-product-approval-kc?dti=0&lc=en-WW)

10.11 BIS (India)

This product meets the requirements of the Bureau of Indian Standard (BIS).
Tested according to IS 13252(Part 1):2010/ IEC 60950-1 : 2005.
Reference number: R-41061751

10.12 BSMI (Taiwan)

This product meets the requirements of CNS15936, CNS15598-1 generic standard.
This product meets the requirements of CNS15936, CNS15598-1 generic standard.

⚠ WARNING

警告
為避免電磁干擾，本產品不應安裝或使用於住宅環境。

限用物質含有情況標示聲明

單元Unit	限用物質及其化學符號 Restricted substances and its chemical symbols					
	铅Lead (Pb)	汞Mercury (Hg)	鎘Cadmium (Cd)	六價鉻Hexa-valent chromi-um(Cr^{+6})	多溴聯苯Polybrom-inated biphenyls(PBB)	多溴二苯醚Poly-brominated diphenyl ethers (PBDE)
外殼	○	○	○	○	○	○
電路板	超出0.1 wt %	○	○	○	○	○
硬碟	超出0.1 wt %	○	○	○	○	○
線材	○	○	○	○	○	○

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

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

備考2. “○”係指該項限用物質之百分比含量未超出百分比含量基準值。

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

備考3. “ - ”係指該項限用物質為排除項目。

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

電池和蓄電池

WARNING
警告 — 置換可能影響安全防護的錯誤型式的電池（例：在某些鋰電池類型的情形下）； — 電池丟入火焰或烤箱中，或將電池作可能導致爆炸的機械擠壓或切割； — 電池置於可能導致爆炸或可燃性液體或氣體洩漏的高溫環境中；且 — 電池承受可能導致爆炸或可燃性液體或氣體洩漏的極度低氣壓。

Responsible party for Supplier's Decalation of Conformity / 供應商符合性聲明的責任方
西門子股份有限公司
臺北市11503南港區園區街3號8樓
電子郵件信箱：Adscs.taiwan@siemens.com

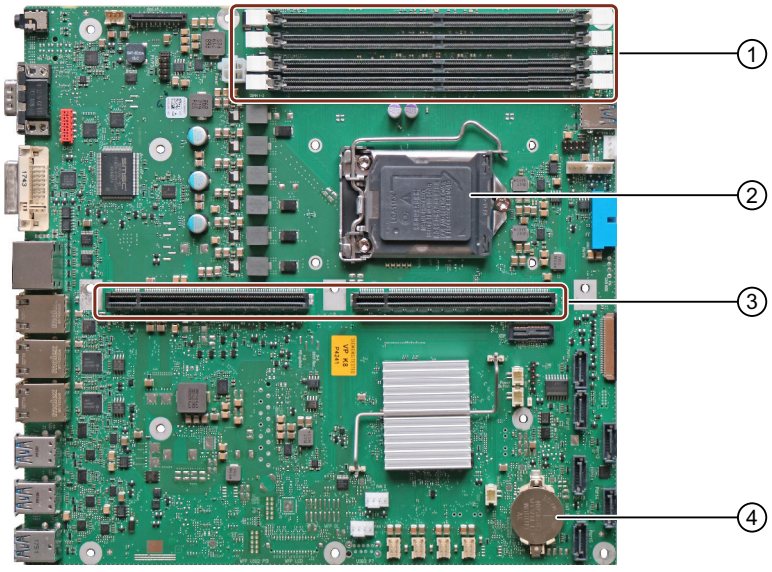
Hardware description

A

A.1 Motherboard

A.1.1 Layout of the motherboard

The motherboard consists of these main components: Processor and chipset, four slots for memory modules, internal and external interfaces, Flash BIOS and the backup battery.

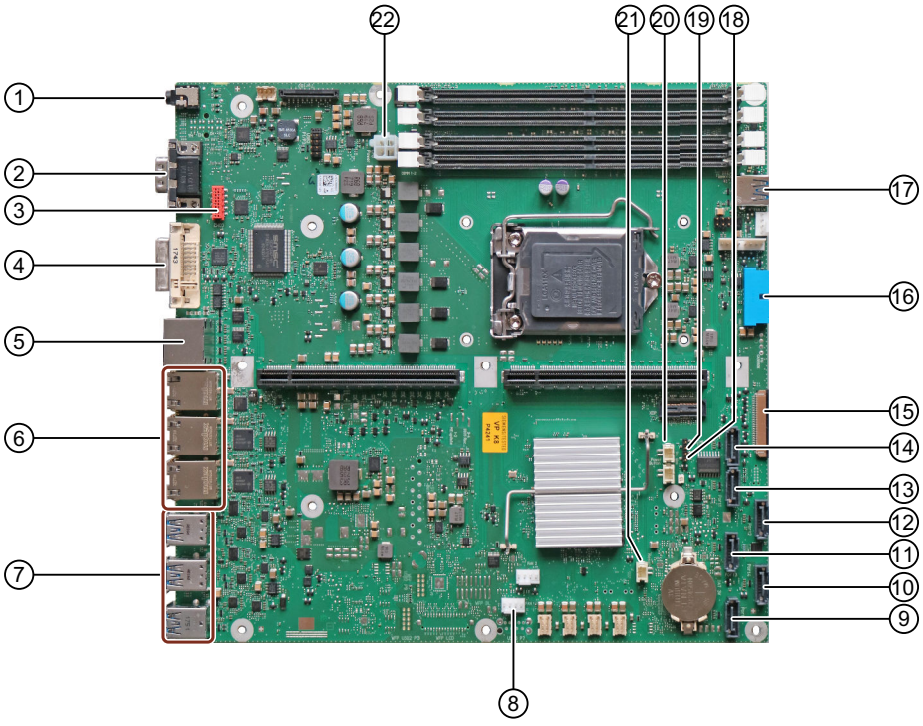


① Slots for memory modules
② Processor
③ Slot for the bus board
④ Backup battery

Technical features of the motherboard

Technical features of the motherboard can be found under "Technical specifications of the motherboard (Page 134)".

A.1.2 Position of the interfaces on the motherboard



1	Audio UAJ (X90)	8	Front fan	17	USB 3.0 (internal) 1x type A
2	COM1 (X30)	9	SATA 5 (Port 5)	18	Unlock ME
3	COM2 (X31)	10	SATA 4 (Port 4)	19	BIOS Recovery
4	DVI-D (X70)	11	SATA 3 (Port 3)	20	On-off button
5	DPP (X71/X72)	12	SATA 2 (Port 2)	21	Reset button
6	LAN 1 (X1 P1) LAN 2 (X2 P1) LAN 3 (X3 P1)	13	SATA 1 (Port 1)	22	CPU Power
		14	SATA 0 (Port 0)		
		15	Status indicator on front On-off button Reset button		
7	USB 3.1 (X60-X65) 4x type A 2x type C	16	USB 3.0 behind front door 2x type A		

A.2 Internal interfaces

A.2.1 Pin assignment of the internal interfaces

Interface	Position	Description
Memory	Internal	DIMM socket, 64-/ 72-bit
Bus expansion	Internal	Bus expansion socket, used by PCIe bus and special signals
Power supply	Internal	4-pin 12 V ATX power connector (CPU-VRM supply)
BIOS Recovery [1]	Internal	Replace jumper on pins 3-4 to run BIOS Recovery
Unlock ME [1]	Internal	Replace jumper on pins 1-2 to change locked ME
Fan monitoring	Internal	Monitoring of power supply fan, 8-pin, pin header
SATA	Internal, e.g., hard disk	7-pin SATA connector
Connection for PS serial ATA	Internal	Voltage supply for serial ATA
Connection for device fan	Internal	Power supply, device fan monitoring (controlled), 4-pin, pin header
Connection of SCSI activity LED	Internal	SCSI activity connector Type JST B2B-PH-SM3-TB Input for SCSI drive activity display
Internal USB3/USB2 interface	Internal	For connecting the USB cable to the front panel of the computer
Internal USB2 interface	Internal	Connection for USB interfaces on slot cover
Port 80 connector	Internal	Connection for Port 80 / mode switch
COM2	Internal	Connection for COM2 on slot cover (see external interfaces)
Reset		Type JST B2B-PH-SM3-TB
Power button		Type JST B2B-PH-SM3-TB
PEG interface (PCIe x16 socket)		Transfer interface between motherboard and bus board
PCIe+special signal interface (PCIe x16 socket)		

[1] A special USB stick is required (not included in scope of delivery; contact your local SIEMENS representative).

A.2.2 SCSI activity connector

Type JST B2B-PH-SM3-TB

Pin	Name	Meaning
1	NC	-
2	SCSI HD_N	0-V level means that the SCSI interface is active

A.2.3 Reset

Type JST B2B-PH-SM3-TB

NOTICE
Observe safety information Only use this interface for maintenance purposes. You should observe the warnings in "Open the device (Page 79)".

Pin	Name	Meaning
1	GND	Ground
2	Reset	Input, 0 V level means reset

A.2.4 Power button

Type JST B2B-PH-SM3-TB

NOTICE
Observe safety information Only use this interface for maintenance purposes. You should observe the warnings in "Open the device (Page 79)".

Pin	Name	Meaning
1	EXT_PWRBTN	Input, 0 V level means Power button pressed
2	GND	Ground

A.2.5 Internal interface connector (USB 2.0)

Pin	Name	Meaning
1	VCC	+ 5 V (fused)
2	VCC	+ 5 V (fused)
3	-Data USB1	Data channel, bidirectional
4	-Data USB3	Data channel, bidirectional
5	+Data USB1	Data channel, bidirectional
6	+Data USB3	Data channel, bidirectional
7	GND	Ground
8	GND	Ground
9	GND	Ground
10	Key	–

A.2.6 Internal interface connector (USB 3.0/USB 2.0)

Pin	Name	Meaning
USB3 (USB3/USB 2.0 contacts)		
A1	VCC	+ 5 V (fused)
A2	SSRX-	Data input USB3
A3	SSRX+	Data input USB3
A4	GND	Ground
A5	SSTX-	Data output USB3
A6	SSTX+	Data output USB3
A7	GND	Ground
A8	-Data	Data channel USB2, bidirectional
A9	+Data	Data channel USB2, bidirectional
A10	Reserved	+ 5 V (fused) or ground
USB2 (USB 2.0 contacts)		
B1	-Data	Data channel USB2
B2	+Data	Data channel USB2
B3	GND	Ground
B4, 5	NC	Open
B6	GND	Ground
B7, 8	NC	Open
B9	VCC	+ 5 V (fused)
B10	NC	Open

A.2.7 Power supply fan monitoring

Pin	Name	Meaning
1	Reserved	-
2	Reserved	PWM, speed setting ATX AC-SV
3	Reserved	-
4	Tacho signal	Input monitoring signal
5	PS_Status	Input status of redundant PS
6	Reserved	Reserved for fan failure of redundant PS
7	Quittung_Status	Output; Acknowledgment of acoustic alarm signal of redundant power supply (signal is open when module is switched on)
8	Ground	-

A.2.8 Fan port

Pin	Name	Meaning
1	GND	Ground
2	VCC	+12 V fused
3	Tacho signal	Input monitoring signal
4	PWM	Output speed setting

A.2.9 Supply for the serial ATA drives

Pin	Name	Meaning
1	+12 V	Output power supply
2	GND	Ground
3	GND	Ground
4	+5 V	Output power supply
5	+3.3 V	Output power supply

A.2.10 PEG interface (PCIe x16 socket)

Signal	Pin	Pin	Signal
P12V	B1	A1	P12V
P12V	B2	A2	P12V
P12V	B3	A3	P12V
GND	B4	A4	GND
SMB_CLK2	B5	A5	n.c.
SMB_DATA2	B6	A6	n.c.
GND	B7	A7	n.c.
P3V3	B8	A8	n.c.
n.c.	B9	A9	P3V3
AUX_3V	B10	A10	P3V3
WAKE2	B11	A11	PCIE_RESET_L
n.c.	B12	A12	GND
GND	B13	A13	PCIE0_ECLK
PCIEX16_TX_P(15)	B14	A14	PCIE0_ECLK_N
PCIEX16_TX_N(15)	B15	A15	GND
GND	B16	A16	PCIEX16_RX_P(15)
SDVO_CTRLCLK	B17	A17	PCIEX16_RX_N(15)
GND	B18	A18	GND
PCIEX16_TX_P(14)	B19	A19	n.c.

Signal	Pin	Pin	Signal
PCIEX16_TX_N(14)	B20	A20	GND
GND	B21	O21	PCIEX16_RX_P(14)
GND	B22	A22	PCIEX16_RX_N(14)
PCIEX16_TX_P(13)	B23	A23	GND
PCIEX16_TX_N(13)	B24	A24	GND
GND	B25	A25	PCIEX16_RX_P(13)
GND	B26	A26	PCIEX16_RX_N(13)
PCIEX16_TX_P(12)	B27	A27	GND
PCIEX16_TX_N(12)	B28	A28	GND
GND	B29	A29	PCIEX16_RX_P(12)
n.c.	B30	A30	PCIEX16_RX_N(12)
SDVO_CTRLDATA	B31	A31	GND
GND	B32	A32	n.c.
PCIEX16_TX_P(11)	B33	A33	n.c.
PCIEX16_TX_N(11)	B34	A34	GND
GND	B35	A35	PCIEX16_RX_P(11)
GND	B36	A36	PCIEX16_RX_N(11)
PCIEX16_TX_P(10)	B37	A37	GND
PCIEX16_TX_N(10)	B38	A38	GND
GND	B39	A39	PCIEX16_RX_P(10)
GND	B40	A40	PCIEX16_RX_N(10)
PCIEX16_TX_P(9)	B41	A41	GND
PCIEX16_TX_N(9)	B42	A42	GND
GND	B43	A43	PCIEX16_RX_P(9)
GND	B44	A44	PCIEX16_RX_N(9)
PCIEX16_TX_P(8)	B45	A45	GND
PCIEX16_TX_N(8)	B46	A46	GND
GND	B47	A47	PCIEX16_RX_P(8)
MCH_CFG_20	B48	A48	PCIEX16_RX_N(8)
GND	B49	A49	GND
PCIEX16_TX_P(7)	B50	A50	n.c.
PCIEX16_TX_N(7)	B51	A51	GND
GND	B52	A52	PCIEX16_RX_P(7)
GND	B53	A53	PCIEX16_RX_N(7)
PCIEX16_TX_P(6)	B54	A54	GND
PCIEX16_TX_N(6)	B55	A55	GND
GND	B56	A56	PCIEX16_RX_P(6)
GND	B57	A57	PCIEX16_RX_N(6)
PCIEX16_TX_P(5)	B58	A58	GND

Signal	Pin	Pin	Signal
PCIEX16_TX_N(5)	B59	A59	GND
GND	B60	A60	PCIEX16_RX_P(5)
GND	B61	A61	PCIEX16_RX_N(5)
PCIEX16_TX_P(4)	B62	A62	GND
PCIEX16_TX_N(4)	B63	A63	GND
GND	B64	A64	PCIEX16_RX_P(4)
GND	B65	A65	PCIEX16_RX_N(4)
PCIEX16_TX_P(3)	B66	A66	GND
PCIEX16_TX_N(3)	B67	A67	GND
GND	B68	A68	PCIEX16_RX_P(3)
GND	B69	A69	PCIEX16_RX_N(3)
PCIEX16_TX_P(2)	B70	A70	GND
PCIEX16_TX_N(2)	B71	A71	GND
GND	B72	A72	PCIEX16_RX_P(2)
GND	B73	A73	PCIEX16_RX_N(2)
PCIEX16_TX_P(1)	B74	A74	GND
PCIEX16_TX_N(1)	B75	A75	GND
GND	B76	A76	PCIEX16_RX_P(1)
GND	B77	A77	PCIEX16_RX_N(1)
PCIEX16_TX_P(0)	B78	A78	GND
PCIEX16_TX_N(0)	B79	A79	GND
GND	B80	A80	PCIEX16_RX_P(0)
n.c.	B81	A81	PCIEX16_RX_N(0)
n.c.	B82	A82	GND

A.2.11 PCIe + special signal interface (PCIe x16 socket)

Signal	Pin	Pin	Signal
N12V	B1	A1	AUX_5V
P12V	B2	A2	P12V
P12V	B3	A3	P12V
GND	B4	A4	GND
PCI_INT_N(7)	B5	A5	PCI_INT_N(6)
PCI_INT_N(5)	B6	A6	PCI_INT_N(8)
P5V	B7	A7	P5V
PCI_REQ_N(4)	B8	A8	P5V
PCI_REQ_N(3)	B9	A9	PCI_GNT_N(4)
GND	B10	A10	PCI_GNT_N(3)
PCI0_PCLK	B11	A11	AUX_3V

Signal	Pin	Pin	Signal
GND	B12	A12	PLT_RST_N_BUFF
PCI1_PCLK	B13	A13	GND
GND	B14	A14	PCI_GNT_N(1)
PCI_REQ_N(1)	B15	A15	PCI_GNT_N(2)
PCI_REQ_N(2)	B16	A16	GND
P5V	B17	A17	PME
PCI_AD(31)	B18	A18	PCI_AD(30)
PCI_AD(29)	B19	A19	P3V3
GND	B20	A20	PCI_AD(28)
PCI_AD(27)	B21	O21	PCI_AD(26)
PCI_AD(25)	B22	A22	GND
P3V3	B23	A23	PCI_AD(24)
PCI_CBE_N(3)	B24	A24	n.c.
PCI_AD(23)	B25	A25	P3V3
GND	B26	A26	PCI_AD(22)
PCI_AD(21)	B27	A27	PCI_AD(20)
PCI_AD(19)	B28	A28	GND
P3V3	B29	A29	PCI_AD(18)
PCI_AD(17)	B30	A30	PCI_AD(16)
PCI_CBE_N(2)	B31	A31	P3V3
GND	B32	A32	FRAME
IRDY	B33	A33	GND
P3V3	B34	A34	TRDY
DEVSEL	B35	A35	GND
GND	B36	A36	STOP
PLOCK	B37	A37	P3V3
PERR	B38	A38	SMB_CLK1
P3V3	B39	A39	SMB_DAT1
SERR	B40	A40	GND
P3V3	B41	A41	PAR
PCI_CBE_N(1)	B42	A42	PCI_AD(15)
PCI_AD(14)	B43	A43	P3V3
GND	B44	A44	PCI_AD(13)
PCI_AD(12)	B45	A45	PCI_AD(11)
PCI_AD(10)	B46	A46	GND
GND	B47	A47	PCI_AD(9)
PCI_AD(8)	B48	A48	PCI_CBE_N(0)
PCI_AD(7)	B49	A49	P3V3
P3V3	B50	A50	PCI_AD(6)

Signal	Pin	Pin	Signal
PCI_AD(5)	B51	A51	PCI_AD(4)
PCI_AD(3)	B52	A52	GND
GND	B53	A53	PCI_AD(2)
PCI_AD(1)	B54	A54	PCI_AD(0)
P5V	B55	A55	P5V
P5V	B56	A56	P5V
P5V	B57	A57	PCIE_1X4X
AUX_5V	B58	A58	GND
WAKE1	B59	A59	PLT_RST_N_PCIE4X
GND	B60	A60	PS_ON
GND	B61	A61	PS_PWRGD
n.c.	B62	A62	GND
n.c.	B63	A63	GND
GND	B64	A64	PCIE_TX_P(1)
GND	B65	A65	PCIE_TX_N(1)
PCIE_RX_P(1)	B66	A66	GND
PCIE_RX_N(1)	B67	A67	GND
GND	B68	A68	PCIE1_ECLK
GND	B69	A69	PCIE1_ECLK_N
PCIE_TX_P(2)	B70	A70	GND
PCIE_TX_N(2)	B71	A71	GND
GND	B72	A72	PCIE_RX_P(2)
GND	B73	A73	PCIE_RX_N(2)
PCIE_TX_P(3)	B74	A74	GND
PCIE_TX_N(3)	B75	A75	GND
GND	B76	A76	PCIE_RX_P(3)
GND	B77	A77	PCIE_RX_N(3)
PCIE_TX_P(4)	B78	A78	GND
PCIE_TX_N(4)	B79	A79	GND
GND	B80	A80	PCIE_RX_P(4)
RESERVE1 *)	B81	A81	PCIE_RX_N(4)
RESERVE2 *)	B82	A82	GND

NOTICE

Note for bus modules with PCIe switch

As long as no modules are plugged into the PCIe slots behind a PCIe switch, the IRQs are not used by the PCIe switch, but the display only shows that these IRQs would be used if modules were plugged in.

The PCIe switch is displayed in Windows® Device Management as "PCI standard PCI-to-PCI bridge".

A.3 Bus board

A.3.1 Slots for expansion cards on the bus board

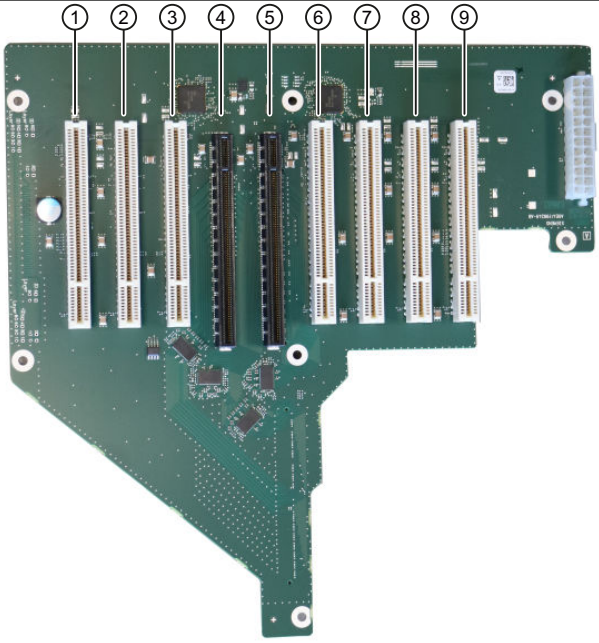
The bus board is designed as a link between the motherboard and the expansion cards. It is mounted using six screws.
Power is directly supplied to the expansion cards via the bus board connection.

NOTE

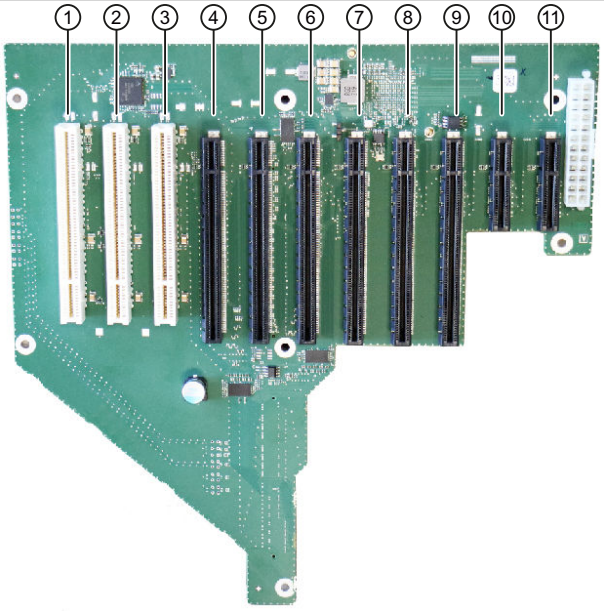
The maximum permitted power loss of the expansion cards is 80 W.

The bus board is available in three versions.

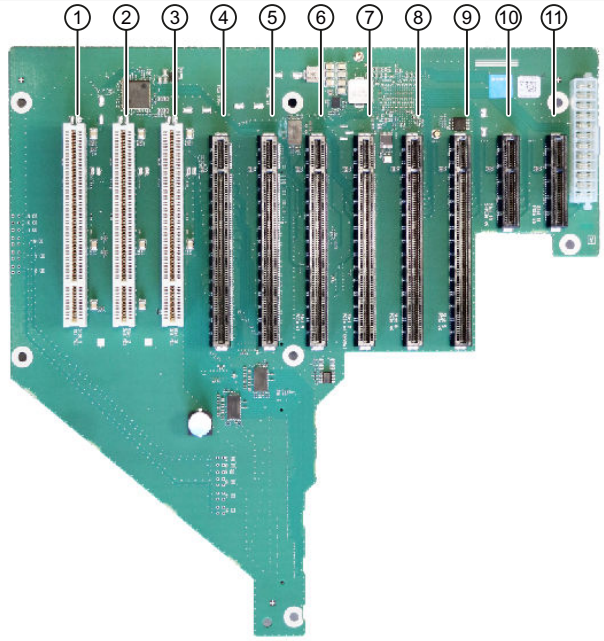
Variant 1: 9 slots

Bus board	Slot	Specification
	①	**PCI** • Rev. 2.3 • PCI bus primary • Master-capable
	②	
	③	
	④	**PCIe x16** • Gen. 3 • Active lanes: 8
	⑤	
	⑥	**PCI** • Rev. 2.3 • PCI bus primary • Master-capable
	⑦	
	⑧	
	⑨	

Variant 2: 11 slots

Bus board	Slot	Specification
 Figure	①	**PCI** • Rev. 2.3 • PCI bus primary • Master-capable
	②	
	③	
	④	**PCIe x16** • Gen. 3 • Active lanes: 4
	⑤	
	⑥	**PCIe x16** • Gen. 3 • Active lanes: 8
	⑦	**PCIe x16** • Gen. 3 • Active lanes: 4
	⑧	
	⑨	
	⑩	**PCIe x4** • Gen. 3 • Active lanes: 4
	⑪	

Variant 3: 11 slots

Bus board	Slot	Specification
	①	**PCI** • Rev. 2.3 • PCI bus primary • Master-capable
	②	
	③	
	④	**PCIe x16** • Gen. 3 • Active lanes: 16
	⑤	**PCIe x16** • Gen. 3 • Active lanes: 1
	⑥	
	⑦	**PCIe x16** • Gen. 3 • Active lanes: 4
	⑧	
	⑨	
	⑩	**PCIe x4** • Gen. 3 • Active lanes: 4
	⑪	

PCIe slots of the optional expansion cards

You can use optionally available expansions in the following slots.
Abbreviations of the optional expansion cards

- **Graphics**: Graphics card
- **HWR**: Hardware RAID adapter card
- **M.2**: Adapter card for M.2 NVMe SSD modules

Bus board	Combination option	Identification number	Number of the slot					
Variant 1		A5E42684818	4	5	6	7	8	9
	Graphics			Graph-ics				
	M.2		M.2					
	HWR		HWR					
	Graphics + M.2		M.2	Graph-ics				
	Graphics + HWR		HWR	Graph-ics				
	HWR + M.2		M.2	HWR				
Variant 2		A5E42684838						
	Graphics + M.2 + HWR (up to 3 expansion cards can be inserted simultaneously)				Graph-ics	M.2		HWR
Variant 3		A5E42684848						
	Graphics + M.2 + HWR (up to 3 expansion cards can be inserted simultaneously)		Graph-ics			M.2		HWR

A.3.2 Interrupt assignment of the slots for expansion cards on the backplane

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.

Variant 1: 9 slots (2 x PEG / 7 x PCI)

You can find information about this bus board version under "Slots for expansion cards on the bus board (Page 160)".

Slot Connector Type	Slot 1 PCI	Slot 2 PCI	Slot 3 PCI	Slot 4 PEG Gen3 8 Lane	Slot 5 PEG Gen3 8 Lane	Slot 6 PCI	Slot 7 PCI	Slot 8 PCI	Slot 9 PCI	Slot 10 Not used	Slot 11 Not used
Host Device	PCH Port 8 PCI Dev 0	PCH Port 8 PCI Dev 1	PCH Port 8 PCI Dev 2	PEG 0:1:1	PEG 0:1:0	PCH Port 20 PCI Dev 12	PCH Port 20 PCI Dev 13	PCH Port 20 PCI Dev 14	PCH Port 20 PCI Dev 15		
Bus APIC Interrupt	Primary A					Primary B					
INT A	PIRQ D	PIRQ A	PIRQ B	PIRQ B	PIRQ A	PIRQ D	PIRQ A	PIRQ B	PIRQ C		
INT B	PIRQ A	PIRQ B	PIRQ C	PIRQ C	PIRQ B	PIRQ A	PIRQ B	PIRQ C	PIRQ D		
INT C	PIRQ B	PIRQ C	PIRQ D	PIRQ D	PIRQ C	PIRQ B	PIRQ C	PIRQ D	PIRQ A		
INT D	PIRQ C	PIRQ D	PIRQ A	PIRQ A	PIRQ D	PIRQ C	PIRQ D	PIRQ A	PIRQ B		
Organizational Pins											
Request (B18)	Req0	Req1	Req2			Req0	Req1	Req2	Req3		
Grant (A17)	Gnt0	Gnt1	Gnt2			Gnt0	Gnt1	Gnt2	Gnt3		
ID (A26)	AD16	AD17	AD18			AD28	AD29	AD30	AD31		

Variant 2: 11 slots (3 x PEG / 5 x PCI / 3 x PCI)

You can find information about this bus board version under "Slots for expansion cards on the bus board (Page 160)".

Slot Connector Type	Slot 1 PCI	Slot 2 PCI	Slot 3 PCI	Slot 4 PEG Gen3 4 Lane	Slot 5 PEG Gen3 4 Lane	Slot 6 PEG Gen3 8 Lane	Slot 7 PCIe Gen3 4 Lane	Slot 8 PCIe Gen3 4 Lane*	Slot 9 PCIe Gen3 4 Lane*	Slot 10 PCIe Gen3 4 Lane*	Slot 11 PCIe Gen3 4 Lane*
Host Device	PCH Port 8 PCI Dev 0	PCH Port 8 PCI Dev 1	PCH Port 8 PCI Dev 2	PEG 0:1:2	PEG 0:1:1	PEG 0:1:0	PCH Port 21 (0:1B.04-)	PCH Port 9 Packet Switch Dev 0 (0:1D.0)	PCH Port 9 Packet Switch Dev 1 (0:1D.1)	PCH Port 9 Packet Switch Dev 2 (0:1D.2)	PCH Port 9 Packet Switch Dev 3 (0:1D.3)
Bus APIC Interrupt	Primary A										
INT A	PIRQ D	PIRQ A	PIRQ B	PIRQ B	PIRQ C	PIRQ A	PIRQ A	PIRQ D	PIRQ C	PIRQ B	PIRQ A
INT B	PIRQ A	PIRQ B	PIRQ C	PIRQ C	PIRQ D	PIRQ B	PIRQ B	PIRQ A	PIRQ D	PIRQ C	PIRQ B
INT C	PIRQ B	PIRQ C	PIRQ D	PIRQ D	PIRQ A	PIRQ C	PIRQ C	PIRQ B	PIRQ A	PIRQ D	PIRQ C
INT D	PIRQ C	PIRQ D	PIRQ A	PIRQ A	PIRQ B	PIRQ D	PIRQ D	PIRQ C	PIRQ B	PIRQ A	PIRQ D

Organizational Pins											
Request (B18)	Req0	Req1	Req2								
Grant (A17)	Gnt0	Gnt1	Gnt2								
ID (A26)	AD16	AD17	AD18								

*Slot is connected via PCIe Gen3 PCIe2PCIe switch to the PCH.
These slots only support Auto mode, i.e. plugged modules and PCe2PCIe switch negotiate the PCIe type Gen1, 2 or 3.

Variant 3: 11 slots (1 x PEG / 7 x PCI / 3 x PCI)

Slot Connector Type	Slot 1 PCI	Slot 2 PCI	Slot 3 PCI	Slot 4 PEG Gen3 16 Lane	Slot 5 PCIe Gen3 1 Lane	Slot 6 PCIe Gen3 1 Lane	Slot 7 PCIe Gen3 4 Lane	Slot 8 PCIe Gen3 4 Lane*	Slot 9 PCIe Gen3 4 Lane*	Slot 10 PCIe Gen3 4 Lane*	Slot 11 PCIe Gen3 4 Lane*
Host Device	PCH Port 8 PCI Dev 0	PCH Port 8 PCI Dev 1	PCH Port 8 PCI Dev 2	PEG 0:1:0	PCH Port 19 (0:1B.2)	PCH Port 20 (0:1B.03-)	PCH Port 21 (0:1B.0-4)	PCH Port 9 Packet Switch Dev 0 (0:1D.0)	PCH Port 9 Packet Switch Dev 1 (0:1D.1)	PCH Port 9 Packet Switch Dev 2 (0:1D.2)	PCH Port 9 Packet Switch Dev 3 (0:1D.3)
Bus APIC Interrupt	Primary A										
INT A	PIRQ D	PIRQ A	PIRQ B	PIRQ A	PIRQ C	PIRQ D	PIRQ A	PIRQ D	PIRQ C	PIRQ B	PIRQ A
INT B	PIRQ A	PIRQ B	PIRQ C	PIRQ B	PIRQ D	PIRQ A	PIRQ B	PIRQ A	PIRQ D	PIRQ C	PIRQ B
INT C	PIRQ B	PIRQ C	PIRQ D	PIRQ C	PIRQ A	PIRQ B	PIRQ C	PIRQ B	PIRQ A	PIRQ D	PIRQ C
INT D	PIRQ C	PIRQ D	PIRQ A	PIRQ D	PIRQ B	PIRQ C	PIRQ D	PIRQ C	PIRQ B	PIRQ A	PIRQ D
Organizational Pins											
Request (B18)	Req0	Req1	Req2								
Grant (A17)	Gnt0	Gnt1	Gnt2								
ID (A26)	AD16	AD17	AD18								

*Slot is connected to the PCH via PCIe Gen3 PCIe2PCIe switch.
These slots only support Auto mode, i.e. plugged modules and PCe2PCIe switch negotiate the PCIe type Gen1, 2 or 3.

A.3.3 Exclusive PCI hardware interrupt

Applications demanding a high-performance interrupt require a high-speed hardware interrupt reaction. The PCI hardware interrupt should be used only by one resource in order to ensure high-speed reaction of the hardware.

Setting an exclusive interrupt on the device

All system resources (hardware addresses, memory allocation, interrupt allocation, DMA channels) are dynamically assigned by the firmware or the operating system based on the hardware equipment, drivers, installed expansion cards and connected external devices.

The assignment is made automatically and depends on the requested resources of the connected devices and installed components. Due to this configuration dependency, clear statements can only be made by determining them in relation to the system in the final configuration.

The resources can be viewed in Windows as follows:

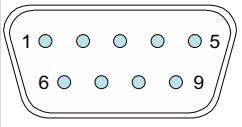
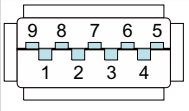
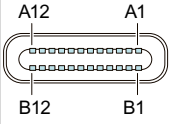
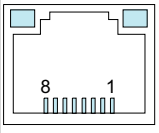
1. Press the "Windows® key" and "R" simultaneously.
2. Enter the "msinfo32" command in the "Open" field.
3. Click "OK" to confirm.

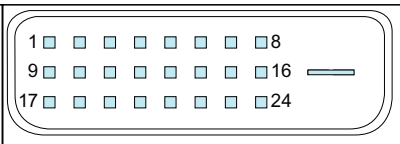
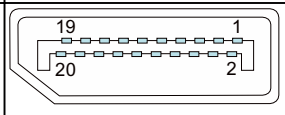
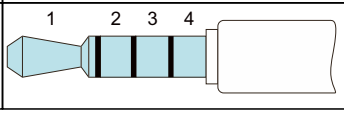
A.4 External interfaces

NOTE

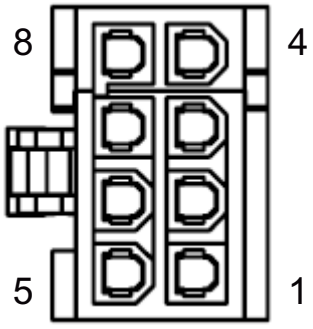
Interface specification

The data of all external interfaces listed below correspond to the respective interface specifications and the intended use.

Interface	Connector	Description	Assignment
COM	X30, X31	9-pin standard plug (±12 V)	
USB 3.1 Type A	X60, X62, X64, X65	USB3 Port 0, 1; USB2 Port 0, 1 interface side (3.3 V; 900 mA; up to 10 Gbps)	
USB 3.1 Type C	X61, X63	USB3 Port 0, 1; USB2 Port 0, 1 interface side (5 V; 1.5 A to 3.0 A; up to 10 Gbps)	
Ethernet 1, 2 and 3	X4, X2, X3	RJ45 (up to 1 Gbps)	

DVI-D	X70	24-pin DVI-D female connector (3.3 V; 500 mA)	
DPP	X71, X72	20-pin DisplayPort connector	
Audio	X90 (bottom)	4-pin 3.5 mm UAJ jack	

8-pin plug-in connectors for optional graphics cards

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

A.5 System resources

A.5.1 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.5.2 I/O address allocation

The table describes the assignment of the I/O addresses in the delivery state of the device.

I/O address (hex)		Size (bytes)	Description of the basic function	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	1	Motherboard resources	
0000 0050	0000 0053	4	System timer	
0000 0061	0000 0061	1	Motherboard resources	
0000 0063	0000 0063	1	Motherboard resources	
0000 0065	0000 0065	1	Motherboard resources	
0000 0067	0000 0067	1	Motherboard resources	
0000 0070	0000 0070	1	Motherboard resources	
0000 0070	0000 0070	1	System CMOS/real time clock	
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	2	Numeric data processor	
0000 02F8	0000 02FF	8	COM 2	
0000 03F8	0000 03FF	8	COM 1	
0000 04D0	0000 04D1	2	Programmable Interrupt Controller	
0000 0680	0000 069F	32	Motherboard resources	

I/O address (hex)		Size (bytes)	Description of the basic function	Possible alternative function
from	**to**			
0000 0D00	0000 FFFF	768	PCI Express Root Complex	
0000 164E	0000 164F	255	Motherboard resources	
0000 1800	0000 18FE	255	Motherboard resources	
0000 1854	0000 1857	2	Motherboard resources	
0000 2000	0000 20FE	255	Motherboard resources	

A.5.3 Interrupt assignments

The functions are assigned different interrupts, depending on the operating system. APIC mode is used.

The table describes the assignment of the interrupts in the delivery state of the device.

	IRQ number																							Comment
IRQ (ACPI mode)	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
Host PCI IRQ Line																	A	B	C	D	E	F	G	H	[1]
Function																									Fixed
Timer Output 0	X																								
Serial Interface 2				X																					Can be deactivated
Serial Interface 1					X																				Can be deactivated
Numeric Processor														X											Fixed
SATA																	X								Can be deactivated
USB 3.0 Controller																	X								Can be deactivated
Ethernet 1																	X								Can be deactivated
Ethernet 2																		X							Can be deactivated
Ethernet 3																			X						Can be deactivated
Graphics																	X								Option, can be deactivated
Audio																	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.

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.

A.5.4 Memory address assignments

The table describes the assignment of the memory addresses in the delivery state of the device.

Address		Size (bytes)	Description of the basic function	Possible alternative function
from	to			
FED1 0000	FED1 7FFF	4k	Motherboard resources	
FED8 0000	FED1 8FFF	4k	Motherboard resources	
FED9 0000	FED1 9FFF	5k	Motherboard resources	
E000 0000	EFFF FFFF	8k	Motherboard resources	
FED2 0000	FED3 FFFF	8k	Motherboard resources	
FED9 0000	FED9 3FFF	2k	Motherboard resources	
FED4 5000	FED8 FFFF	5k	Motherboard resources	
FEE0 0000	FEEF FFFF	8k	Motherboard resources	
FED0 0000	FED0 03FF		High precision event timer	
D000 0000	FD69 FFFF	1k	Motherboard resources	
FD60 0000	FD6C FFFF	1.7 GB	Motherboard resources	
FD6F 0000	FDFF FFFF	2 GB	Motherboard resources	
FE00 0000	FE01 FFFF	1 GB	Motherboard resources	
FE20 0000	FE07 FFFF	3 GB	Motherboard resources	
FF00 0000	FFFF FFFF	8 GB	Motherboard resources	
FE01 0000	FE01 0FFF	4k	SPI flash Controller	

A.6 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 labeling that is used during assignment of interfaces to the software in the TIA Portal.

Enclosure labeling	TIA Portal
1	X100
2	X101
3	X102
4	X103
5	X104
6	X105
7	X106
8	X107
9	X108
10	X109
11	X110

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.

Problem	Cause	Remedy
The monitor remains dark	The brightness button has been set to dark	Increase brightness using the brightness button. Detailed information can be found in the operating manual for the monitor.
	The power cord or the monitor cable is not connected.	• Check if the power cord is properly connected to the monitor and to the system unit or to the grounded shockproof power outlet. • Check to make sure the monitor cable is properly connected to the system unit and the monitor.
		Contact your technical support team if the screen still remains dark after all these controls and measures.
The mouse pointer does not appear on the screen	The mouse driver is not loaded	Check whether the mouse driver is properly installed and available when you start the user program. Detailed information about the mouse driver is available in the corresponding documentation.
	Mouse not connected	• Check to make sure that the mouse cable is properly connected to the system unit. • If you use an adapter or extension cable for the mouse cable make sure to check these connections as well.
		Contact your technical support team if the mouse pointer still does not appear on the screen after these controls and measures.
Time and/or date of the PC is not correct		1. Open the firmware configuration menu. To do this, press the <F2> key during the boot operation. 2. Set the date and the time in the "Main" tab.
Time and date are wrong even after correctly setting them in the firmware (BIOS)	The backup battery is dead.	Replace the backup battery.
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 start-up	• 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.
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.

Markings and symbols

C

C.1 Overview

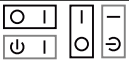
The following tables show all the symbols which may be found on your SIMATIC industrial PC, SIMATIC industrial monitor or SIMATIC Field PG in addition to the symbols which are explained in the operating instructions.

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		FM APPROVED	Test mark of Factory Mutual Research
CE	CE markings for European countries			Marking of Federal Communications Commission for the USA
10	EFUP (Environment Friendly Use Period) marking for China			Approved for Korea
c UL us	Test mark of the Underwriters Laboratories			Disposal information, observe the local regulations.
	Approval for India		UK CA	Approval for the UK

Figure

C.5 Interfaces

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

Symbol	Meaning		Symbol	Meaning
	USB 2.0 high-speed port			Headphone output
	USB 3.0 super-speed port			
	USB 3.1 SuperSpeedPlus interface			

List of abbreviations

D

D.1 Abbreviations

Abbreviation	Term	Meaning
AC	Alternating current	Alternating current
AHCI	Advanced Host Controller Interface	Standardized controller interface for SATA devices. This is supported in Microsoft Windows XP as of SP1 and IAA driver.
APIC	Advanced Programmable Interrupt Controller	Extended programmable interrupt controller
AWG	American Wire Gauge	US standard for the cable diameter
CE	Communauté Européenne (CE symbol)	The product is in conformance with all applicable EC directives
CLK	Clock pulse	Clock signal for controllers
CMOS	Complementary Metal Oxide Semiconductors	Complementary metal oxide semiconductors
COA	Certificate of authentication	Microsoft Windows Product Key
COM	Communications Port	Term for the serial interface
CP	Communication Processor	Communication computer
CPU	Central Processing Unit	CPU
CSA	Canadian Standards Association	Canadian organization for tests and certifications according to own or binational standards (with UL / USA) standards
DC	Direct Current	DC current
DRAM	Dynamic Random Access Memory	
DMA	Direct Memory Access	Direct memory access
DOS	Disk Operating System	Operating system without GUI
DPP	DisplayPort	New powerful digital monitor port
DQS	Deutsche Gesellschaft zur Zertifizierung von Qualitätsmanagement mBH	
DVI / DVI-D	Digital Visual Interface	Digital display interface without VGA signals
DVI-I	Digital Visual Interface	Digital display interface with digital and VGA signals
ECP	Extended capability port	Extended parallel port
EFI	Extensible Firmware Interface	
ESD	Components sensitive to electrostatic charge	
EN	European standard	

Abbreviation	Term	Meaning
HDD	Hard Disk Drive	Hard disk drive
HU	Height unit	
I/O	Input/Output	Data input/output on computers
iAMT	Intel® Active Management Technology	
IEC	International Electrotechnical Commission	
IP	Ingress Protection	Degree of protection
IRQ	Interrupt Request	Interrupt request
KVM	Keyboard Video Mouse	Keyboard video mouse redirection
LPT	Line Printer	Printer port
mDPP	mini DisplayPort	Digital monitor interface
MUI	Multilanguage User Interface	Language localization in Windows
NEMA	National Electrical Manufacturers Association	Syndicate of manufacturers of electrical components in the USA
NTFS	New Technology File System	Secure file system for Windows versions (2000, XP, 7)
OPC	OLE for Process Control	Standardized interface for industrial processes
PCI	Peripheral Component Interconnect	High-speed expansion bus
PCIe	Peripheral Component Interconnect express	High-speed serial, differential full-duplex PtP interface with high data rate.
PFC	Power Factor Correction	Harmonic suppression for operation on public networks.
PIC	Programmable Interrupt Controller	Programmable interrupt controller
PXE	Preboot Execution Environment	Software for running new PCs without hard disk data via the network
RAID	Redundant Array of Independent Disks	Redundant hard disk array
SATA	Serial Advanced Technology Attachment	
SDRAM	Synchronous DRAM	
SMART	Self Monitoring Analysis and Reporting Technology	Hard disk error diagnostics program
SJT	Service [Grade] Junior (Hard Service) Thermoplastic	PVC armored cable
SNMP	Simple Network Management Protocol	Network protocol
SSD	Solid State Drive	
TPM	Trusted Platform Module	
UEFI	Unified Extensible Firmware Interface	
UL	Underwriters Laboratories Inc.	US organization for tests and certifications according to own or binational standards (with CSA / Canada) standards.
USB	Universal Serial Bus	
V.24		ITU-T standardized recommendation for data transfer via serial ports

Abbreviation	Term	Meaning
VCC		Positive supply voltage of integrated circuits
VGA	Video Graphics Array	Video adapter which meets industrial standard
WD	Watchdog	Program monitoring with error detection and alarming.

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