

SIEMENS

SIMATIC

Industrial PC SIMATIC IPC647E

Operating Instructions



Preface

Product description

1

Safety instructions

2

Installing and connecting the device

3

Commissioning the device

4

Operating the device

5

Expanding and assigning parameters to the device

6

Device maintenance and repair

7

Technical specifications

8

Dimension drawings

9

Standards and approvals

10

Hardware description

A

Technical support

B

Markings and symbols

C

List of abbreviations

D

Legal information

Warning notice system

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

⚠ DANGER
indicates that death or severe personal injury will result if proper precautions are not taken.
⚠ WARNING
indicates that death or severe personal injury may result if proper precautions are not taken.
⚠ CAUTION
indicates that minor personal injury can result if proper precautions are not taken.
NOTICE
indicates that property damage can result if proper precautions are not taken.

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

Qualified Personnel

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

Proper use of Siemens products

Note the following:

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

Trademarks

All names identified by ® are registered trademarks of Siemens AG. The remaining trademarks in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

Disclaimer of Liability

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

Preface

Purpose of the operating instructions

These operating instructions contain all information required to install, electrically connect and commission the SIMATIC IPC647E, to perform device expansions and to service 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 order versions of the SIMATIC IPC647E.

History

Currently released versions of these operating instructions:

Version	Comments
11/2018	First edition

Security information

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

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

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

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

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

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

Disclaimer for third-party software updates

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

Table of contents

	Preface	3
1	Product description	11
1.1	Important instructions and manuals for operating the device	11
1.2	Product highlights	13
1.3	Scope of application.....	15
1.4	External design of the device.....	16
1.4.1	Front panel.....	16
1.4.2	Drive cage type A.....	17
1.4.3	Drive cage type B.....	18
1.4.4	Rear of the device.....	19
1.4.5	Interfaces and connections.....	20
1.4.5.1	Interfaces	20
1.4.5.2	Power supply connections	21
1.4.6	Operator controls	22
1.4.7	Status displays.....	24
1.4.7.1	System status displays	24
1.4.7.2	Status display of the Ethernet interface	26
1.4.7.3	Status display of redundant power supply	26
1.4.7.4	Status displays on removable tray for drives	27
1.5	Internal construction of the device	28
1.6	Accessories and spare parts	29
1.6.1	Hardware accessories	29
1.6.2	Software accessories.....	31
2	Safety instructions	33
2.1	General safety instructions	33
2.2	Note on transport and storage	35
2.3	Notes on mounting.....	36
2.4	Notes on ambient and environmental conditions.....	37
2.5	Information on I/O devices.....	39
2.6	Notes on device and system extensions	40

3	Installing and connecting the device	41
3.1	Preparing for mounting	41
3.1.1	Scope of delivery	41
3.1.2	Checking the delivery package	43
3.1.3	Device identification data	44
3.2	Mounting the device	45
3.2.1	Mounting types	45
3.2.2	Securing device	46
3.3	Connecting the device	47
3.3.1	Country-specific information on supply voltage	47
3.3.2	Connection of equipotential bonding line	48
3.3.3	Connecting the power supply	49
3.3.3.1	Connect single power supply (AC)	49
3.3.3.2	Connecting a redundant power supply (AC)	51
3.3.4	Connecting I/O devices	53
3.3.5	Connecting the device to networks	55
3.3.6	Securing the cables	56
4	Commissioning the device	57
4.1	Switching on the device	57
4.2	Configuring automatic switch-on of device	57
4.3	Switching off the device	58
5	Operating the device	61
5.1	Opening the front door	61
5.2	Multi-monitoring	61
5.3	Drive configurations	62
5.3.1	RAID systems	62
5.3.1.1	RAID1 system	62
5.4	Operating RAID systems	63
5.4.1	Display of a defective drive of a RAID system	63
5.4.2	RAID1 system: Installation options for drives	63
5.4.3	Operating onboard RAID system	64
5.4.3.1	Configure the onboard RAID system	64
5.4.3.2	Monitoring the onboard RAID system with "Intel® Rapid Storage Technology"	66
5.4.3.3	Integrating a new drive into the onboard RAID system	67
5.4.4	Operating the hardware RAID system	69
5.4.4.1	Software and documentation for the hardware RAID system	69
5.4.4.2	Installing the hardware RAID adapter card	70
5.4.4.3	Configuring the hardware RAID system	73
5.4.4.4	Monitor hardware RAID system with "maxView Storage Manager".	76
5.4.5	Data synchronization in the RAID system	78
5.5	Monitoring of the device	79
5.5.1	Monitoring functions	79
5.5.2	SIMATIC IPC DiagBase	81
5.5.3	SIMATIC IPC DiagMonitor	81

5.6	Remote maintenance of the device	82
5.6.1	Remote maintenance functions	82
5.6.2	SIMATIC IPC Remote Manager	83
5.7	Trusted Platform Module (TPM)	84
6	Expanding and assigning parameters to the device.....	85
6.1	Open the device.....	85
6.2	Expansion cards	87
6.2.1	Usable expansion cards	87
6.2.2	Removing/installing the bus frame.....	87
6.2.3	Installing/removing expansion cards.....	90
6.3	Memory modules	94
6.3.1	Usable memory modules	94
6.3.2	Removing memory modules	96
6.3.3	Installing memory modules	97
6.4	Internal USB interface.....	99
6.5	Graphics card.....	100
6.6	Drives.....	101
6.6.1	Drives in drive cage type A.....	101
6.6.1.1	Permissible expansion for temperature range 0 to 35 °C.....	101
6.6.1.2	Permissible expansion for temperature range 0 to 40 °C.....	102
6.6.1.3	Permissible expansion for temperature range 0 to 50 °C.....	103
6.6.1.4	Change 2.5" and 3.5" drive in removable tray	104
6.6.1.5	Changing a backplane for removable tray.....	106
6.6.1.6	Replacing 2.5" drives in type A drive cage	109
6.6.2	Drives in drive cage type B.....	110
6.6.2.1	Permissible expansion for temperature range 0 to 35 °C.....	110
6.6.2.2	Permissible expansion for temperature range 0 °C to 45 °C.....	112
6.6.2.3	Permissible expansion for temperature range 0 to 50 °C.....	114
6.6.2.4	Replace 2.5" and 3.5" drive in drive cage Type B	115
6.6.3	Replacing M.2 NVMe SSD (optional)	119
7	Device maintenance and repair	121
7.1	Repair information.....	121
7.2	Maintenance intervals.....	121
7.3	Removing and installing hardware.....	122
7.3.1	Changing the filter pad.....	122
7.3.2	Replacing device fans.....	123
7.3.2.1	Remove the fan cover.....	123
7.3.2.2	Changing the front fan	124
7.3.3	Changing the backup battery.....	126
7.3.4	Changing a single power supply (AC)	128
7.3.5	Replacing redundant power supply (AC) module.....	130
7.3.6	Changing the enclosure of the redundant power supply (AC).....	131
7.3.7	Removing/installing the bus frame.....	133
7.3.8	Replacing the processor	135
7.3.9	Replacing the motherboard	137

7.4	Installing operating system, software and drivers.....	139
7.4.1	Restoring or installing the operating system.....	139
7.4.2	Installing software and drivers	139
7.5	Configuring firmware/BIOS	139
7.6	Backing up data and changing partitions.....	140
7.7	Recycling and disposal	140
8	Technical specifications	141
8.1	Applicability of technical specifications	141
8.2	General technical specifications	141
8.3	Current/power requirements and power supply.....	143
8.3.1	Current and power requirements of the system components.....	143
8.3.2	Technical specifications of single power supply (AC).....	145
8.3.3	Technical specifications of redundant power supply (AC).....	146
8.4	Electromagnetic compatibility	147
8.5	Ambient conditions.....	148
8.6	Technical specifications of the drives	149
8.7	Technical specifications of the motherboard	149
8.8	Technical specifications of the hardware RAID adapter card.....	151
8.9	Technical specifications of graphic	151
8.10	Technical specifications of the interfaces	152
8.11	Technical specifications of the telescopic rails	153
8.12	Technical specifications of the operating systems.....	153
9	Dimension drawings	155
9.1	Dimension drawing of the device	155
9.2	Dimension drawing of the expansion cards	156
9.3	Dimension drawing of the telescope rails	157
10	Standards and approvals	159
10.1	CE marking	159
10.2	DIN ISO 9001 certificate and software license agreements	160
10.3	UL approval.....	160
10.4	FCC (USA).....	160
10.5	Canada.....	162
10.6	Australia / New Zealand.....	162
10.7	Eurasion Customs Union EAC.....	162
10.8	Korea.....	162

A	Hardware description	163
A.1	Motherboard.....	163
A.1.1	Layout of the motherboard.....	163
A.1.2	Position of the interfaces on the motherboard.....	164
A.2	Internal interfaces	165
A.2.1	Pin assignment of the internal interfaces.....	165
A.2.2	SCSI activity connector.....	166
A.2.3	Reset.....	166
A.2.4	Power button.....	166
A.2.5	Internal interface connector (USB 2.0)	167
A.2.6	Internal interface connector (USB 3.0/USB 2.0).....	167
A.2.7	Power supply fan monitoring	168
A.2.8	Fan port.....	168
A.2.9	Supply for the serial ATA drives	168
A.2.10	PEG interface (PCIe x16 socket).....	169
A.2.11	PCIe + special signal interface (PCIe x16 socket)	171
A.3	Bus board.....	173
A.3.1	Expansion card slots on the bus board.....	173
A.3.2	Interrupt assignment of expansion card slots on the bus board.....	175
A.3.3	Exclusive PCI hardware interrupt	177
A.4	External interfaces	178
A.5	System resources	179
A.5.1	Currently allocated system resources.....	179
A.5.2	I/O address allocation	179
A.5.3	Interrupt assignments	181
A.5.4	Memory address assignments.....	182
A.6	Assignment of expansion interfaces to the software in the TIA Portal (CP assignment)	183
B	Technical support	185
B.1	Service and support.....	185
B.2	Troubleshooting	186
B.2.1	Problems with device functions	186
B.2.2	Problems when booting the device.....	188
B.2.3	Problems with RAID systems	189
B.2.4	Problems when using expansion cards	189
C	Markings and symbols	191
C.1	Overview	191
C.2	Safety	191
C.3	Operator controls	191
C.4	Certificates, approvals and markings.....	192
C.5	Interfaces	193
D	List of abbreviations	195
D.1	Abbreviations	195
	Index	197

Product description

1.1 Important instructions and manuals for operating the device

Documentation	Contents	Source
Operating instructions	<ul style="list-style-type: none"> Product description Technical specifications Installation of the device Operation of the device Installing and removing hardware Dimension drawings 	<ul style="list-style-type: none"> Supplied data storage medium Online at: SIMATIC IPC Documentation (http://www.siemens.com/simatic-ipc-doku-portal)
Quick Install Guide	Information on: <ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> Supplied in printed form with the device Supplied data storage medium
Current product information	<ul style="list-style-type: none"> Current notes on the device Changes compared with these operating instructions 	<ul style="list-style-type: none"> Online at: SIMATIC IPC Documentation (http://www.siemens.com/simatic-ipc-doku-portal)
Firmware/BIOS description	Information on: <ul style="list-style-type: none"> Important firmware settings Firmware settings in the factory state Boot modes 	<ul style="list-style-type: none"> Supplied data storage medium Online at: Firmware/BIOS description (https://support.industry.siemens.com/cs/ww/en/view/109760621)
Windows® operating system	Information on: <ul style="list-style-type: none"> Commissioning the operating system Restoring the operating system Configuration of the operating system 	<ul style="list-style-type: none"> 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/en/view/109760563)

1.1 Important instructions and manuals for operating the device

Documentation	Contents	Source
SIMATIC IPC DiagBase	Information on: <ul style="list-style-type: none"> • Temperature monitoring • Fan monitoring • Monitoring drives • Watchdog • Operating hours counter • Battery monitoring 	<ul style="list-style-type: none"> • Supplied data storage medium • Online at: SIMATIC IPC DiagBase (https://support.industry.siemens.com/cs/ww/en/view/109749690)
SIMATIC IPC Diag-Monitor	Monitoring functions such as with SIMATIC IPC DiagBase with additional extended functions	<ul style="list-style-type: none"> • Online at: SIMATIC IPC DiagMonitor (https://support.industry.siemens.com/cs/ww/en/view/39129913)
SIMATIC IPC Remote Manager	Information on: <ul style="list-style-type: none"> • Remote maintenance of SIMATIC industrial PCs (IPCs) via a management PC • Using Intel®Active Management Technology (Intel® AMT) 	<ul style="list-style-type: none"> • Online at: SIMATIC IPC Remote Manager (http://support.automation.siemens.com/WW/view/en/48707158)
SIMATIC IPC Image & Partition Creator	Information on: <ul style="list-style-type: none"> • Backup and restore of files, directories, drive partitions 	<ul style="list-style-type: none"> • Online at: • SIMATIC IPC Image Partition Creator (https://support.industry.siemens.com/cs/de/en/view/21766418)
SIMATIC NET	Industrial communication	<ul style="list-style-type: none"> • Online at: SIMATIC NET (http://w3.siemens.com/mcms/automation/en/industrial-communications/Pages/Default.aspx)

1.2 Product highlights

The SIMATIC IPC647E is a high-performance industrial PC in 19" installation format (2 U). It is perfectly suited for PC applications with high-level industry functionality.

Device view



Note

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

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

- Maximum processor performance (in full version) without loss of performance (throttling) at up to 50° C ambient temperature
- Fully coated surfaces that repel dirt and corrosion
- Rugged all-metal enclosure, fully coated (blue-chromed) and painted on the outside to protect from corrosion and dirt with high EMC
- Suitable for installation in space-saving switchgear cabinet measuring only 500 mm in depth
- 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 with 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 impact thanks to closed-loop fan

High system availability thanks to minimization of standstill times (availability depending on configuration)

- High data security through RAID systems: Onboard RAID system or hardware RAID system
- RAID1 system: Data mirroring on two SATA or SAS drives, including in removable racks, and optionally with additional SSD (for operating system)
- Hot swap (swapping of drive during operation) in removable drive bays in RAID systems
- 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 power supply module for redundant power supply in runtime

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 fans, temperature, Watchdog and drives in RAID1 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 phase-out
- Certified for worldwide marketing (cULus)
- Support of legacy interfaces (COM)
- Compatible installation across device generations
- Worldwide service and support

User-friendly application scenarios for commissioning, use and service

- High flexibility and expandability thanks to integrated interfaces and up to 4 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
- Flexible usage options with telescopic rails

1.3 Scope of application

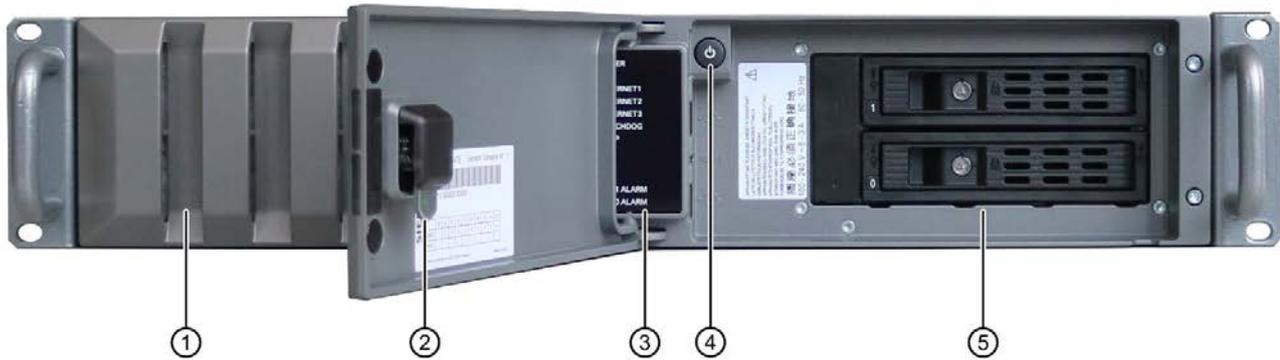
The SIMATIC IPC offers system integrators, cabinet designers, system engineers and machine designers a 19" rack PC platform for high-performance applications and IT applications on the control and cell level for:

- 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 on front fan with openings to ventilate the device (locked with front door)
- ② Front door: lockable, protection against unauthorized access
Lock
 - Key vertical: open
 - Key horizontal: closed
- ③ System status displays (Page 24)
- ④ On-off button
- ⑤ Mounting spaces for drives

See also

Interfaces (Page 20)

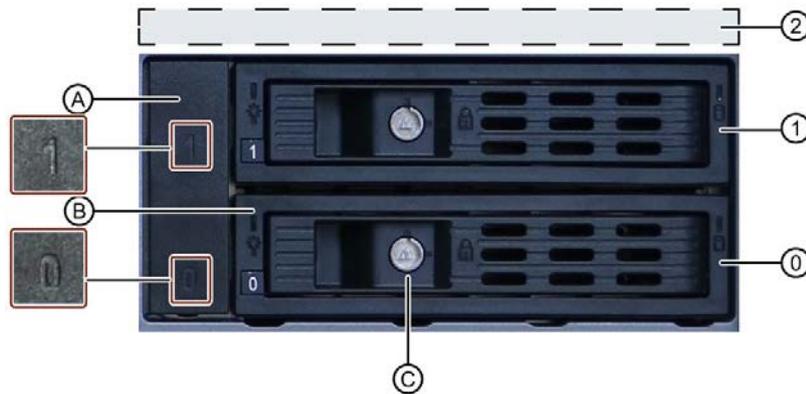
Operator controls (Page 22)

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; this way, the drives are protected from unauthorized access.



Mounting locations

- (0) Mounting location 0 Mounting space for 3.5" or 2.5" drive in removable tray
- (1) Mounting location 1 Mounting space for 3.5" or 2.5" drive in removable tray
- (2) Mounting location internally Mounting space for 2.5" drive internally (see Drives in drive cage type A (Page 101))

Components

- (A) Blanking plate
- (B) Removable tray
- (C) Removable tray lock

Additional information

Technical notes and information on the conditions of usage are available in the section Drives in drive cage type A (Page 101).

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 particularly well protected in the drive cage against vibrations ("vibration-dampened drive cage").

Changing the drives for maintenance purposes can be done through the front opening after the front panel has been unlatched.



Drive bays

- (0) Mounting location 0 Mounting space for 3.5" drive in a shock/vibration-damped system
- (1) Mounting location 1 Mounting space for 3.5" drive in a shock/vibration-damped system
- (2) Mounting location internally Mounting space for 2 x 2.5" drive internally (see Drives in drive cage type B (Page 110))

Components

- (A) Cover

Additional information

Technical notes and information on the conditions of usage are available in the section Drives in drive cage type B (Page 110).

1.4.4 Rear of the device

Device with redundant AC power supply



- ① Power supply connections (Page 21)
- ② Connection for functional earthing, see "Connection of equipotential bonding line (Page 48)"
- ③ Interfaces (Page 20)
- ④ Expansion card slots on the bus board (Page 173)
- ⑤ Air outlet
- ⑥ Fixing screws for strain relief

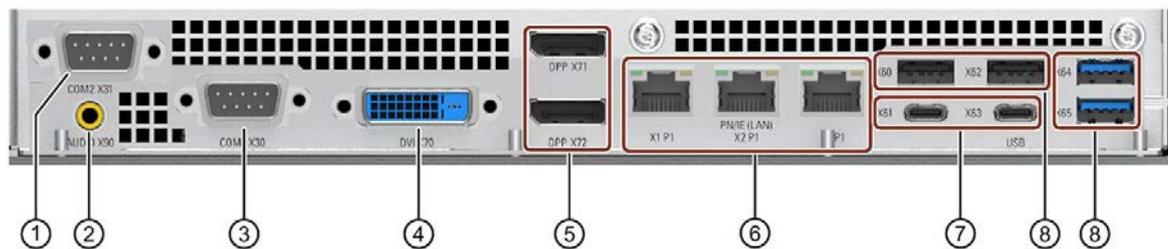
1.4.5 Interfaces and connections

1.4.5.1 Interfaces

Note

You can find detailed information on interfaces under "External interfaces (Page 178)".

Interfaces at rear of device



- | | | |
|---|--------------------------------|--|
| ① | COM2 X31
(optional) | Serial port 2 (V.24), 9-pin SUB-D socket (optional) |
| ② | Audio X90 | UAJ connector for audio devices, 2.5 mm jack socket |
| ③ | CCOM1 X30 | Serial port 1 (V.24), 9-pin SUB-D socket |
| ④ | DVI X70 | Connection for monitor with DVI-D interface |
| ⑤ | 2 x DPP X71/X72 | Connections for DisplayPort: <ul style="list-style-type: none">• Connection for monitors with DisplayPort• Connector for monitor with VGA interface via DP/VGA adapter, see Hardware accessories (Page 29)• Connector for monitors with DVI interface via DP/DPI adapter, see Hardware accessories (Page 29) |
| ⑥ | 3 x Ethernet
X1P1/X2P1/X3P1 | Connections for Ethernet RJ45 for 10/100/1000 Mbps, Ethernet X1P1 is iAMT-capable
Ethernet ports are numbered on the enclosure. The numbering by the operating system may differ from this. |
| ⑦ | 2 x USB
X61/X63 | USB 3.1 GEN 2 Type C high current, backward 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, backward compatible with USB 3.0/2.0/1.1 |

Interfaces on the optional graphics card



① 3 x Mini Display Port

You can find information on the optional graphics card under "Technical specifications of graphic (Page 151)".

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 x USB 3.1 Gen 1

Connectors for USB devices, backwards compatible with USB 3.0/2.0/1.1

1.4.5.2 Power supply connections

Socket for power plug
Simple power supply



Sockets for power plug
Redundant power supply



1.4.6 Operator controls

<p>⚠ WARNING</p> <p>Risk of electric shock</p> <p>The buttons and switches described in the following do not fully disconnect the device from the line voltage.</p> <p>You also need to the notes and information under "Switching off the device (Page 58)".</p>

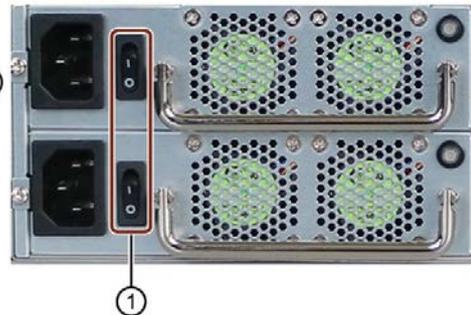
On/Off switch

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

On/Off switch
Single power supply



On/Off switch
Redundant power supply

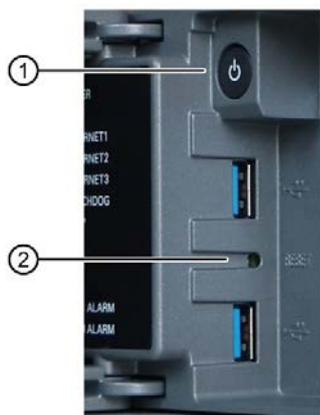


① On/Off switch

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 57)" and "Switching off the device (Page 58)".



- 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 Alarm reset button

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.

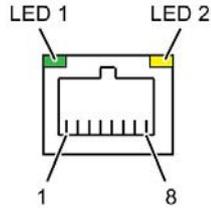


Item	Status display	Meaning	Color	Description
①	POWER	Operating mode of the PC	OFF	Switched off or disconnected from the mains
			YELLOW	Idle state or shut down
			GREEN	PC in operation
②	HDD	Access to hard disk	OFF	No access
			GREEN	Access
③ ④ ⑤	ETHERNET 1 ETHERNET 2 ETHERNET 3	Ethernet status display	OFF	<ul style="list-style-type: none"> 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: <ul style="list-style-type: none"> CPU temperature is critical Device temperature is critical
⑧	FAN	Fan status	OFF	No error
			RED	Possible causes: <ul style="list-style-type: none"> Front fan faulty Fan of simple power supply faulty (non-redundant power supply)

Item	Status display	Meaning	Color	Description
⑨	HDD1 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
⑩	HDD0 ALARM		A RED LED is lit up	The associated drive is not OK
			All RED LEDs are flashing	RAID synchronization running, RAID is not OK The hard disk newly integrated in case of error is synchronized with an existing hard disk.
			All RED LEDs are lit up	RAID is not OK The faulty drive could not be localized by the monitoring software. It may be possible to detect the defective drive with the RAID software. You can find information under "RAID1 system (Page 62)".

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	<ul style="list-style-type: none"> No cable connected Cable disabled Interface disabled
		GREEN	<ul style="list-style-type: none"> Active cable connected
		GREEN flashing	<ul style="list-style-type: none"> Data transfer active
LED 2	Data transmission rate	OFF	<ul style="list-style-type: none"> 10 Mbps
		GREEN	<ul style="list-style-type: none"> 100 Mbps
		YELLOW	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Module is out of service, no redundancy in effect.
		GREEN	<ul style="list-style-type: none"> The module is in operation and functioning. Redundancy is in effect when both modules are operating.
		RED	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> • Device switched off • Power supply not connected • No drive installed
			Lit	<ul style="list-style-type: none"> • Device is switched on and a drive is installed
②	Activity	Status of the drive	Flashes	<ul style="list-style-type: none"> • Drive is active
			OFF	<ul style="list-style-type: none"> • Drive is not active

1.5 Internal construction of the device



- ① Power supply, single or redundant
- ② 4 x memory module slots
- ③ Drive cage
- ④ Guide rail for long expansion cards
- ⑤ Heat sink; connected to heat transport via 2 heat pipes with heat sink of the processor ⑦
- ⑥ Motherboard
- ⑦ Retainer for expansion modules
- ⑧ Heat exchanger of the processor
- ⑨ Bus board with expansion card slots

1.6 Accessories and spare parts

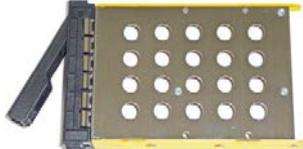
1.6.1 Hardware accessories

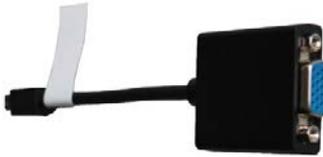
Accessories from Siemens are available for your device that are not included in the scope of delivery.

Obtaining accessories from the SIEMENS Industry Mall

You can find more 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	<p>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.</p> <p>This increases the reliability and operational safety of the device.</p>	<p>6ES7648-1AA00-0XK0</p> 
Low profile removable rack unit	<p>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:</p> <ul style="list-style-type: none"> • 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 	<p>6ES7648-0EH00-1BA0</p> 

Name	Description	Article number
Filter mat	Filter mat for fan cover on front of device, pack of 10 filter mats	A5E37019277
DP to DVI-D adapter	Graphics adapter cable, DisplayPort to DVI	6ES7648-3AF00-0XA0 
DP / 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:	
	<ul style="list-style-type: none"> mDP VGA adapter Mini DisplayPort according to VGA 	1 unit 6ES7648-3AL00-0XA0 
	<ul style="list-style-type: none"> mDP-DVI-D adapter Mini DisplayPort to DVI, available as single-pack or 3-pack 	1 unit 6ES7648-3AK00-0XA0 3 units 6ES7648-3AK00-1XA0 
<ul style="list-style-type: none"> mDP-DP adapter * Mini DisplayPort to DisplayPort, available as single-pack or 3-pack 	1 unit 6ES7648-3AJ00-0XA0 3 units 6ES7648-3AJ00-1XA0 	

* Part 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	SIMATIC IPC DiagMonitor also offers, in addition to local monitoring functions, options to remotely monitor IPCs, to communicate with other systems, to alarm worldwide and to create proprietary monitoring applications.
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.

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

Safety instructions

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 handles attached to the front 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 an easily accessible central mains circuit breaker located as close to the device as 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.
<ul style="list-style-type: none">• 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. <ul style="list-style-type: none">• 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. <ul style="list-style-type: none">• 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. <ul style="list-style-type: none">• 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, some areas or components may, possibly due to other devices, be under life-threatening voltage.

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. <ul style="list-style-type: none">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. <ul style="list-style-type: none">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, e.g. 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.

2.4 Notes on ambient and environmental conditions

- 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 meets IP 41 degree of protection on the front panel. 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 outside the specified interference immunity ranges can result in device malfunctions. Persons are injured and the plant is damaged. <ul style="list-style-type: none">• 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.

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 computer 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 computer 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.

Limitation of liability

- All technical specifications and approvals for the device are only valid 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

3.1 Preparing for mounting

3.1.1 Scope of delivery

Device and hardware for the device

- PC Rack SIMATIC IPC647E
 - Power cable (length-specific): 1 power cable *
With redundant power supply: 2 power cables *
 - Strain relief: 1 strain relief for USB and LAN interfaces, 2 detachable cable ties
 - Lock for power plug:
 - 1 strain relief when AC power is ordered
 - 2 strain reliefs if redundant power supply has been ordered
 - Key for front door: 2 key
 - For device with drive cage type A:
 - 2 keys for removable drive bay
 - Self-adhesive enclosure feet: 4 pieces
- * If ordered with power supply cable.

Supplied data medium

On the supplied data medium (read-only), you can find:

- Software and tools to restore your ordered Microsoft® Windows® operating system.
- Device drivers for installation in operating systems
- Quick Install Guide for SIMATIC IPC647E
- Operating instructions for SIMATIC IPC647E
- Product information
- Firmware/BIOS description
- Operating instructions for your ordered Microsoft® Windows® on this device

3.1 Preparing for mounting

Operating system

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

You can find information on ordering Microsoft® Windows® operating system under: Important instructions and manuals for operating the device (Page 11).

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

- Quick Install Guide for SIMATIC IPC647E
- 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 44).

3.1 Preparing for mounting

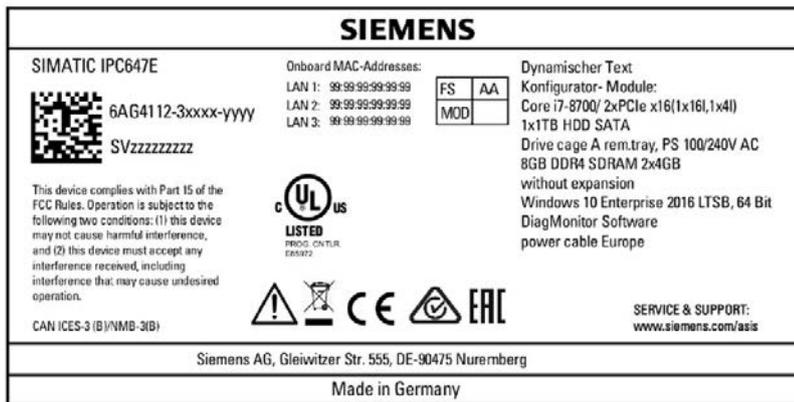
3.1.3 Device identification data

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

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

Rating plate

The rating plate is located inside the front door.



COA label

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

Note

The COA label is only available on devices shipped with an installed Microsoft® Windows® operating system.

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 or mounted on telescopic rails, 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 153)".

Horizontal: Mounting on device base

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

Additional information

You can find more information on this in the QIG (Quick Installation Guide) that came 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:
<ul style="list-style-type: none">• 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.
<ul style="list-style-type: none">• 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.
<ul style="list-style-type: none">• 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 157) and Technical specifications of the telescopic rails (Page 153).



See also

Hardware accessories (Page 29)

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 cable, use a flexible cable which is rated for maximum current consumption and for maximum ambient temperature of the device and also 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 mm²

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.
<ul style="list-style-type: none">• 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.
<ul style="list-style-type: none">• 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 47)".
- Screwdriver T10

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 22)".
2. Insert the power cable in the corresponding electrical socket. Information on the position of the socket is available in "Power supply connections (Page 21)".
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 47)".
- Screwdriver T10

Procedure

1. Switch off the ON/OFF switch (position 0). Information on the location of the ON/OFF switch can be found under "Operator controls (Page 22)".
2. Connect the power cable to the two sockets. Information on the position of the sockets is available in "Power supply connections (Page 21)".
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.

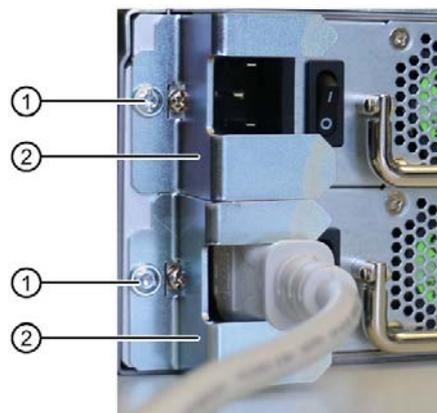
Note

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 22)".

Attach power plug latch

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 on the power plug latches ② with 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 39)".

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 56) with strain relief if needed.

Connecting audio devices

A voltage rise connector has, depending on function, 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

In the operating mode DVI video output and usage of the audio interface the user has to ensure that a ferrite (type: 742 716 33, manufacturer: Würth) is mounted with a winding at the audio cable at the exit point of the IPC.

Connecting several monitors (multi-monitoring)

You will find up to six ports on the rear of the device for connecting monitors. Of these, three ports are connected to the motherboard. When installing an optional graphics card, the other three ports are connected to the graphics card. Parameter assignment is performed by means of the Control Panel in Windows®.

You can configure the multi-monitoring function and the output of the boot screen in the firmware settings, see "Multi-monitoring (Page 61)".

The following table shows the various connection options for the monitors on the device interfaces.

		Motherboard			Graphics card (optional)		
		DPP1	DPP2	DVI	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-VGA adapter
- 3) - via mDP-DP adapter
- 4) - via mDP to DVI-D adapter
- 5) - via mDP-VGA adapter

You can find information on the optional graphics card under "Technical specifications of graphic (Page 151)".

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/ww/en/>)

3.3.6 Securing the cables

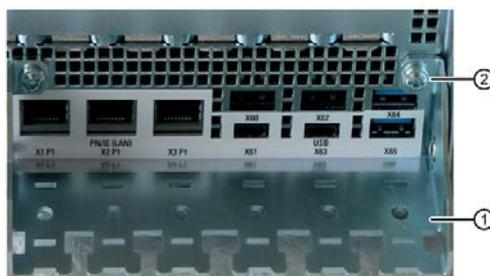
The strain relief provided is used to prevent accidental loosening of the interface cables from the device.

Requirement

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

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

4.1 Switching on the device

Requirement

- The power supply is connected. (Page 49)

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 22)".

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 22)".

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 line voltage.

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

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

- Shut down the operating system and unplug the power plug from the rear of the device, see "Power supply connections (Page 21)".

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

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.

Only perform a hardware reset in 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 22)".

Operating the device

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 40)

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 53)".

Note

Information on graphics cards which support multi-monitoring can be obtained from your local representative, see "Service and support (Page 185)".

Procedure

1. Install a suitable graphics card, see "Graphics card (Page 100)".
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 RAID systems

5.3.1.1 RAID1 system

An RAID1 system works on the principle of "data mirroring on two drives".

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

RAID1 system with associated software

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

The following software is available to monitor the RAID1 system:

- Onboard RAID system:
Intel® Rapid Storage Technology
- Hardware RAID system:
maxView Storage Manager

See also

Drive cage type A (Page 17)

Operating onboard RAID system (Page 64)

Operating the hardware RAID system (Page 69)

5.4 Operating RAID systems

5.4.1 Display of a defective drive of a RAID system

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

- System status displays (Page 24) on the front of the device
- SIMATIC IPC DiagBase or SIMATIC IPC DiagMonitor monitoring software
- For onboard RAID system:
 - "Intel® Rapid Storage Technology", see "Monitoring the onboard RAID system with "Intel® Rapid Storage Technology" (Page 66)".
- For hardware RAID system:
 - "maxView Storage Manager", see "Monitor hardware RAID system with "maxView Storage Manager". (Page 76)".

5.4.2 RAID1 system: Installation options for drives

The two hard drives required for a RAID1 system can be installed in SIMATIC IPC647E in the following locations.

- For onboard RAID system:
 - Drive cage type A, see "Drives in drive cage type A (Page 101)"
 - Drive cage type B, see "Drives in drive cage type B (Page 110)"
- For hardware RAID system:
 - Drive cage type A, see "Drives in drive cage type A (Page 101)"

5.4.3 Operating onboard RAID system

5.4.3.1 Configure the onboard RAID system

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

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

Requirement

- The drives required for the onboard RAID system are built into the device, see:
 - RAID1 system: Installation options for drives (Page 63)

Navigation in the firmware of the onboard RAID system

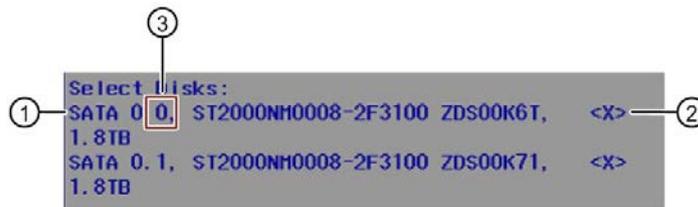
Action	Button
<ul style="list-style-type: none">• Select entry (then confirm selection)	<ul style="list-style-type: none">• Arrow buttons on the keyboard
<ul style="list-style-type: none">• Confirm selection	<ul style="list-style-type: none">• <Return> button
<ul style="list-style-type: none">• Back to the previous screen	<ul style="list-style-type: none">• <Esc> button

Set up the onboard RAID system (Create Volume)

1. Switch on the device or restart it.
2. Immediately after turning on the device, as soon as the message "Press `ESC` for boot options" appears, press and hold the <Esc> button.
3. From the firmware selection menu, using the arrow keys, select the entry "Device Management" and confirm your selection.
4. From the "Devices List", select the entry "Intel <R> Rapid Storage Technology".
5. Select "Create RAID Volume".
6. On the next screen, assign a name for the RAID system.
7. Select "RAID Level" and select the entry "RAID1" in the following selection window.
8. Select "Select Disc".

A list of the available drives is displayed.

9. Select ① from the list of drives you wish to install in your system and confirm your selection.



- The mounted drive is provided with a check mark in the list ②.
- You will find the assignment of the drive to the installation location in the drive cage after the drive name, see ③.

10. Select "Create Volume".

The following screen shows the details on the RAID system just set up (RAID Volume).

The onboard RAID system is set up.

11. Press the <Esc> multiple times in succession until you reach the "Main Page" of the firmware/BIOS menu.

Note

Confirm "Exit Discarding Changes" message with "YES"

If when exiting the firmware/BIOS menu with the <Esc> button, the warning message "Exit Discarding Changes" is displayed, confirm this message with "Yes".

The prenumbered settings are saved nonetheless and you can leave the firmware/BIOS menu.

12. In the Main Page of the firmware/BIOS menu, select "Continue".

Your device continues the boot operation and switches on.

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

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

1. Select "Start > Programs > Intel Rapid Storage Technology".

Display status of the onboard RAID system (faulty drive)

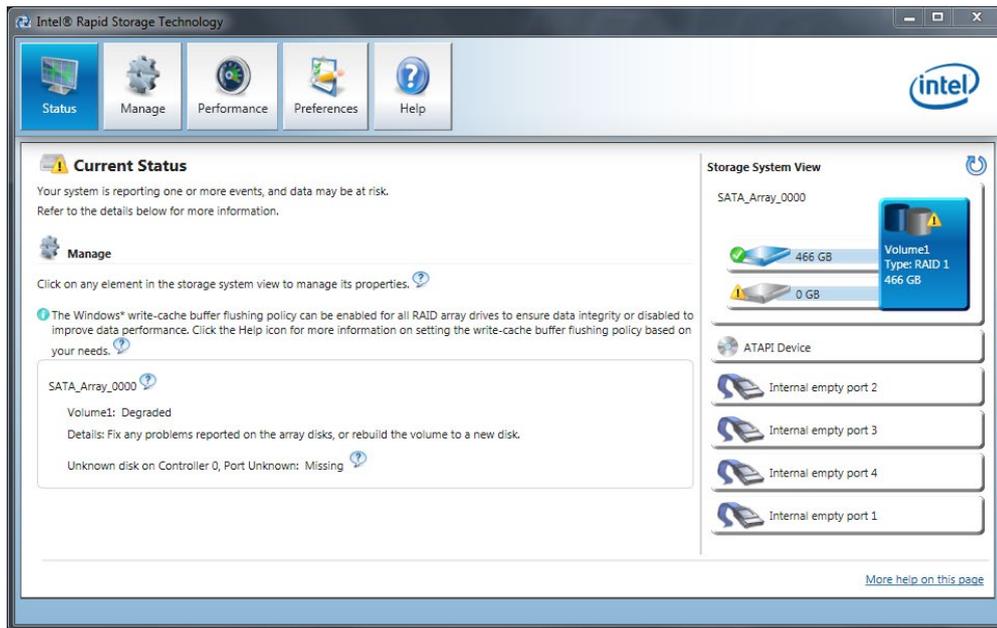
1. Select the "Status" tab.

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

- A defective drive (for RAID1)

The functioning drive is indicated with "Device Port No.".

Example display status of a RAID1 system:



Displaying details on the onboard RAID system

1. Select the "Manage" tab.

Details on your onboard RAID system are displayed in the "Advanced" area.

Creating a report on the onboard RAID system

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

5.4.3.3 Integrating a new drive into the onboard RAID system

The 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 RAID system in such a way that the new drive is automatically mounted when the defective drive is replaced.

Configuring "Automatic mounting 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. <ul style="list-style-type: none">• Only use a brand new drive or a drive that has been set up as a replacement drive.• You can find notes on setting replacement drives in the controller documentation.

1. Select "Start" > "Intel" > "Intel Rapid Storage Technology".
2. Select the "Preferences" menu.
3. In the area "Automatic Rebuild", enable the option "Auto-rebuild on hot plug".

Configuring "Manual mounting of a new drive " (before replacing a defective drive)

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

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

1. Select "Start" > "Intel" > "Intel Rapid Storage Technology".
2. Select the "Preferences" menu.
3. In the area "Automatic Rebuild", enable the option "Auto-rebuild on hot plug".

Manually install a replaced drive (after a fault).

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

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

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

1. Select "Start" > "Intel" > "Intel Rapid Storage Technology".

2. Select the menu "Status".

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

If the new drive is not shown, click the "Run Hardware Scan now" icon.

3. Click on the RAID volume in the "Storage System View" area on the right-hand side of the program window.

4. Click on the link "Rebuild to another Disk in the "Manage" menu.

5. In the following dialog, select the newly installed drive and click on "Rebuild".

The RAID system data synchronization (Page 78) is started.

5.4.4 Operating the hardware RAID system

5.4.4.1 Software and documentation for the hardware RAID system

Note

Hardware RAID

The "Hardware RAID" function described below is only available as of a later stage of delivery.

Contact your local SIEMENS representative.

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 Adaptec Smart HBA & RAID - Installation And User's Guide" with comprehensive information on installing and configuring the hardware RAID adapter card
- "Adaptec maxView Storage Manager" software and the corresponding User's Guide
- "ARCCONF Command Line Utility User's Guide" with information on the "ARCCONF" tool, which you can use to configure the hardware RAID adapter card on the command line level

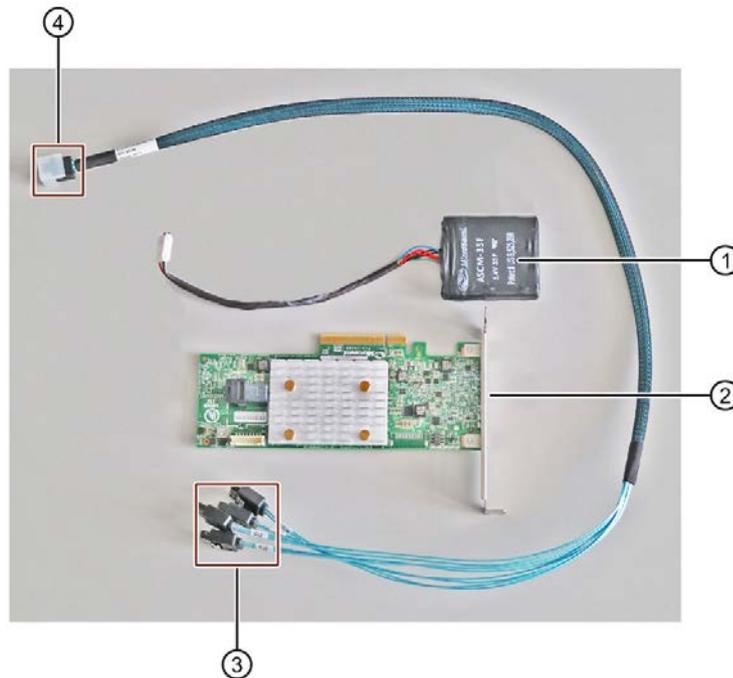
5.4.4.2 Installing the hardware RAID adapter card

If you ordered a device with a RAID system, the hardware RAID adapter card is already built in on delivery.

If you would like to subsequently operate your device as a hardware RAID system, you must also install a hardware RAID adapter card.

Requirement

- 4 GB main memory
- T10 screwdriver
- Components for installing the hardware RAID adapter card. Your local SIEMENS contact person will provide you with information on these components.



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

NOTICE

Capacitor block must be discharged

The original SIEMENS replacement part is supplied with a 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 58)".

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, see important information on this in "Open the device (Page 85)".
2. Follow the instructions in "Installing/removing expansion cards (Page 90)".

When doing so, please pay attention to the following:

- You can find information on the hardware RAID adapter card under "Expansion card slots on the bus board (Page 173)".
- Do not leave the slot in front of the hardware RAID adapter card empty.

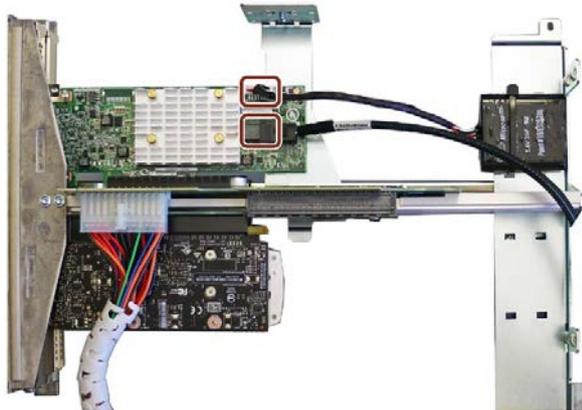
3. Connect the numbered connections of the adapter cable ④ to the corresponding available drives.

The number of the connections here correspond to the number of the drive slots, 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. Route the connection of the adapter cable ⑤ to the front of the device and from there to the hardware RAID adapter card.
5. Fasten the capacitor block ② as displayed with the cable tie, see "Internal construction of the device (Page 28)".

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



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

5.4.4.3 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: Installation options for drives (Page 63)
- A hardware RAID adapter card is installed, see "Installing the hardware RAID adapter card (Page 70)".

Navigation in the firmware of the hardware RAID adapter card

Action	Key
<ul style="list-style-type: none">• Select entry	<ul style="list-style-type: none">• Arrow keys on the keyboard
<ul style="list-style-type: none">• Confirm selection <p>Exception:</p> <ul style="list-style-type: none">– Confirm selection when integrating drives:	<ul style="list-style-type: none">• <Return> key <p>Exception:</p> <ul style="list-style-type: none">– <Space> keyboard
<ul style="list-style-type: none">• Back to previous window	<ul style="list-style-type: none">• <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.

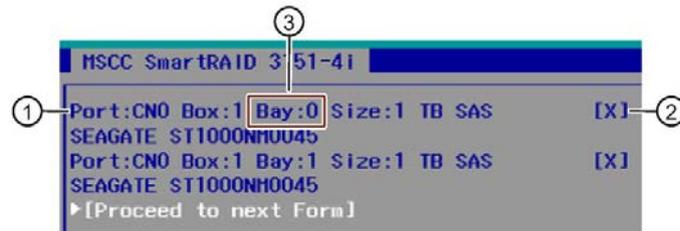
Refer to the previous section, "Navigation in the firmware of the hardware RAID adapter card" for information on selecting and saving settings.

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 102)".



- 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 the entry "RAID1" in the following selection window.
 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 values of the following firmware entries:

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

3. Select [Submit Changes] to save your settings.
4. Select [Back to Main Menu].
5. Finish the process by pressing the <Return> key repeatedly.
6. Select [Exit Discarding Changes]: Yes

5.4.4.4 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.

When first calling up "maxView Storage Manager", Internet Explorer opens and a warning message is displayed.

Then install the website security certificate.

Requirement

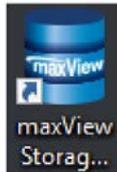
- 4 GB main memory
- The operating system is restarted.
- The operating system is protected with a user name and password
- You have administrator rights

Operating system

- Microsoft® Windows® Server 2016
- Microsoft® Windows®10

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

1. Open Internet Explorer.
2. Open "maxView Storage Manager" with the link on your desktop.



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

Install the security certificate.

Installing the security certificate

1. When the warning message appears, select the option:
"Continue loading this website (not recommended)".
2. In the logon dialog of "maxView storage manager", enter the user name and password for your windows logon.

"maxView Storage Manager" is open in Internet Explorer.

In the Internet Explorer address line, the warning symbol and information on the certificate error appear.

3. Click the warning icon.



4. In the warning message "Certificate is invalid," click on "Show certificates".
5. In the "General tab", click on "Install certificate...".
6. Select "Local Computer" as storage location and confirm your selection with "Next".
7. Confirm the subsequent warning.
8. Select the option "Save all certificates in the following storage location" and define the storage location for the certificate.
9. Select the option "Trusted master certification bodies" and then click on "OK" > "Next" > "Finish".
10. Close Internet Explorer and open it again.

This installs the certificate and configures the "maxView Storage Manager".

The user interface for "maxView Storage Manager" is now available in Internet Explorer.

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 69)".

5.4.5 Data synchronization in the RAID system

NOTICE
Danger of incorrect operations on machine and plant: delayed system reaction during data synchronization
Data is synchronized if a drive fails.
The system can respond with a delay depending on the size of the drive and system load. In extreme cases, the execution of keyboard, mouse or touch screen commands may be briefly delayed.
The result may be faulty operations of the machine or plant.
<ul style="list-style-type: none">• 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.

See also

Change 2.5" and 3.5" drive in removable tray (Page 104)

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 displays and actions
Temperature monitoring	<ul style="list-style-type: none"> • Monitoring for temperature high and low limits as well as cable breaks of the temperature sensors • Temperature sensors record the temperature at critical device points, 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. 	<ul style="list-style-type: none"> • Status display "TEMP (Page 24)" • Speed control of the device fans, the power supply fan and the fan of the optional graphics card • Temperature alarm is generated.
Fan monitoring	<ul style="list-style-type: none"> • Monitoring for underspeed and fan failure as well as cable breaks of the speedometer cable <p>The fans are monitored at the following positions:</p> <ul style="list-style-type: none"> • Front panel • Processor • Triple Head graphics card • Power supply (non-redundant) • Drive cage type A 	<ul style="list-style-type: none"> • Status display "FAN (Page 24)" • Fan alarm is output.
Watchdog	<ul style="list-style-type: none"> • Monitoring of the system status and message to determine if a station is still operational • If the watchdog is not addressed within a configured monitoring time, a watchdog alarm is output. • A change to the monitoring time is effective immediately. 	<ul style="list-style-type: none"> • Status display "WATCHDOG (Page 24)" <p>Depending on the setting, the following actions are triggered:</p> <ul style="list-style-type: none"> • Reset on: Hardware reset is performed • Reset off: No action is performed • The device is restarted. • The device is shut down.

Monitoring	Description	Status displays and actions
Voltage monitoring	<ul style="list-style-type: none"> • Monitoring the charge status of the backup battery (CMOS) • When the first warning threshold is reached, the backup battery will run for at least one more month. • The redundant power supply monitors whether both current inputs are active and the power supply fans are in operation. 	<ul style="list-style-type: none"> • An alarm is generated in the event of a critical or faulty state. • Acoustic alarm for redundant power supply
Drive monitoring	<ul style="list-style-type: none"> • Determination of the status of the drives (HDD and SSD) with SMART functionality, also in RAID systems (RAID status) • The status of an inactive hot swap drive is not displayed. 	<ul style="list-style-type: none"> • Status display "HDDx ALARM (Page 24)" • SMART status of the hard disks • For example, the following states are displayed in a RAID group: "Normal", "OK", "Degraded", error "Rebuild", rebuilding

Software for device monitoring

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

- SIMATIC IPC DiagBase (Page 81) for monitoring and alarming locally on the device
- SIMATIC IPC DiagMonitor (Page 81) for monitoring and alarming via network

SIMATIC DiagBase or SIMATIC DiagMonitor also control the status displays of the IPC, see: System status displays (Page 24).

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/de/view/109749690/en>)
- 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 performed using Intel® Active Management Technology (iAMT), which is integrated in the hardware and firmware of the computer, and the SIMATIC IPC Remote Manager software.

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.

Some examples of iAMT's remote maintenance functions are listed below:

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

Requirement

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

- A device with a processor using iAMT technology
- A configured management engine (ME)
- The computer must be connected to the power grid 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 83)

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.

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.
<ul style="list-style-type: none">• Be sure to observe the respective import restrictions of the country in which the device will be used.

Activating the Trusted Platform Module

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

Expanding and assigning parameters to the device

6.1 Open the device

<p>! WARNING</p> <p>Risk due to unauthorized opening and improper repairs or expansions</p> <p>Improper procedure when carrying out expansions may result in substantial damage to equipment or endanger the user.</p> <p>If you install or exchange system expansions and damage your device, the warranty becomes void.</p> <p>For this reason, please observe the information in "Notes on device and system extensions (Page 40)".</p>
--

<p>! WARNING</p> <p>Malfunctions and electric shock</p> <p>Improper intervention in the device endangers operational reliability and may damage the device.</p> <p>The results are personal injuries and damage to the plant.</p> <p>Take the following precautions:</p> <ul style="list-style-type: none"> • Always disconnect the power plug before you open the device. • Close the device after every intervention.

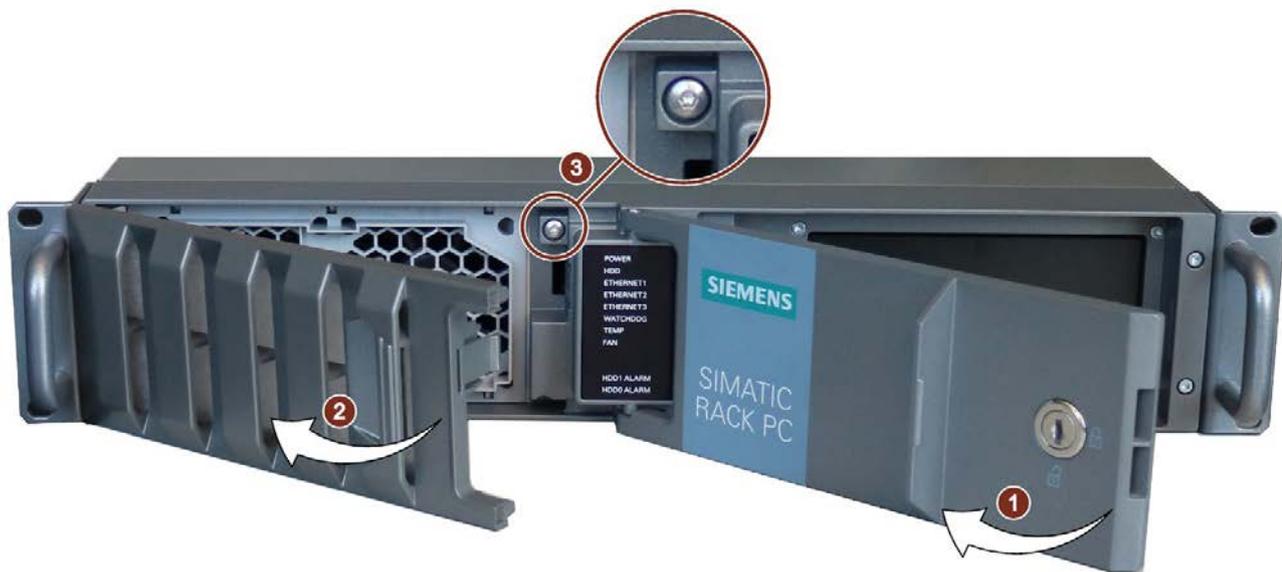
<p>NOTICE</p> <p>Electrostatic sensitive devices (ESD)</p> <p>The device contains electronic components that may be destroyed by electrostatic charges. This can result in malfunctions and damage to the machine or plant.</p> <p>Take corresponding precautionary measures before you open the device.</p>
--

Requirement

- The front door is open; see "Opening the front door (Page 61)" (approx. 45°).
- The device is fully disconnected from the line voltage, see "Switching off the device (Page 58)".
- All connection cables are unplugged.
- T10 screwdriver

Procedure

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



6.2 Expansion cards

6.2.1 Usable expansion cards

Expansion cards compliant with the following standards are supported

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

See also

Expansion card slots on the bus board (Page 173)

6.2.2 Removing/installing the bus frame

Requirement

- The device is open as described in the section "Open the device (Page 85)".
- Screwdriver T10

Procedure - Removal

Note

Observe the ESD guidelines

See General safety instructions (Page 33).

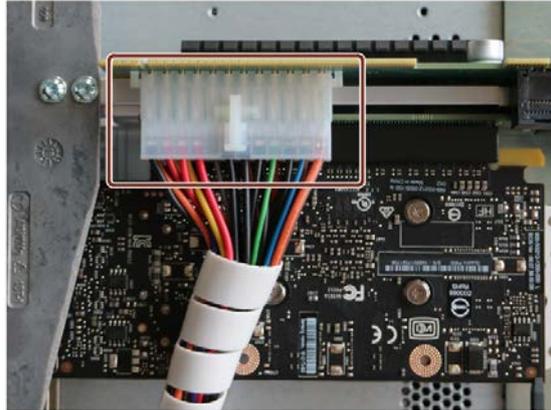
1. Remove the marked screws and grip the bus frame at the marked positions.



2. Careful and evenly pull the bus frame towards the top out of the device.
When doing this, do not tilt the bus frame.
3. Set aside the bus frame



4. Unlock the marked connector and pull it out.



Procedure - Installation

Proceed in the opposite direction to install the bus board.

6.2.3 Installing/removing expansion cards

Note

Card retainers are included with the device for expansion cards with a low height.

You can find information on the specification of the expansion cards under "Usable expansion cards (Page 87)".

Requirement

- The bus frame has been removed as described in the section "Removing/installing the bus frame (Page 87)".
- Screwdriver T10
- Diagonal cutter
- Retainer from the included accessory kit.
Only identical types of retainers may be used.
Latching retainers are available under article number A5E02719654.

Note

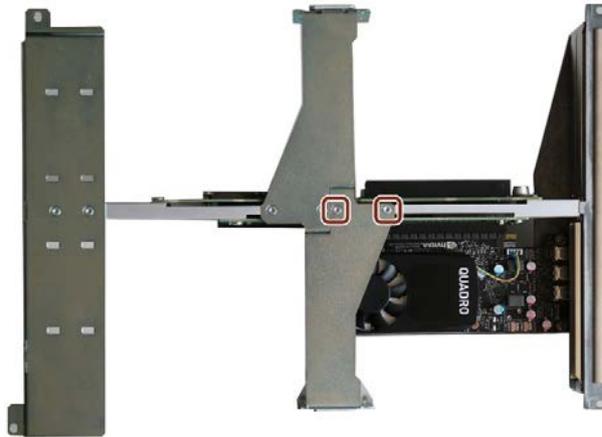
Mounting bracket for low expansion cards

To guarantee the stable installation of a low expansion card, you need an additional mounting bracket for latching retainers. The mounting bracket may have to be removed when you replace the low expansion card with a high one.

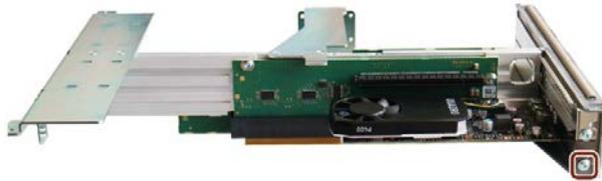
At very low cards the latching retainer can be stabilized by using a guide rail.

Procedure - Removal

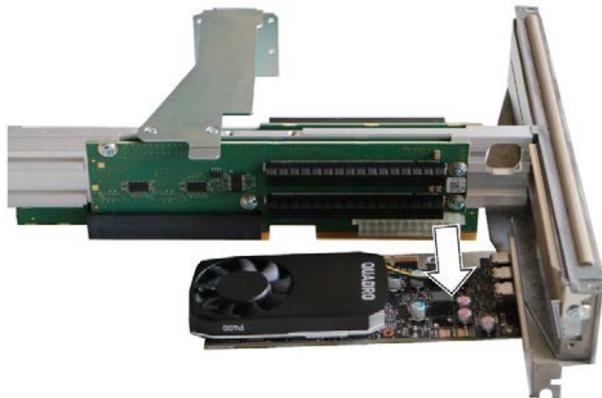
1. Remove the marked screws.



2. Remove the marked screws.



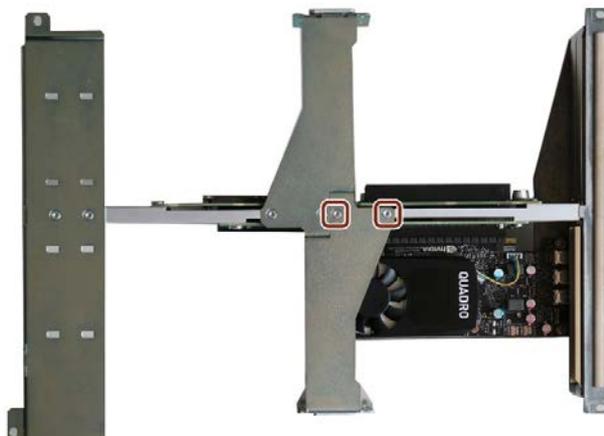
3. Remove the expansion cards without tilting from the slot



4. If necessary, mount a slot blank at the removal location.

Procedure - Installation

1. Remove the marked screws.



2. Remove the marked screw.



3. Remove the slot blanking panel.
4. Mount the parts of the retainer according to the desired mounting position of the expansion card.

Press the plastic rivets completely into the rivet body.



5. Insert the expansion card without tilting in the slot and fix it with a screw (see 2).

6. Run the retainer ① through one of the marked guide notches ② until the retainer touches and does not damage the expansion card. While doing this, adjust the expansion card so that it fits into the slot of the retainer.

**Note:**

The retainer can only be moved in the direction of the expansion card and snaps into the selected position.

To remove the retainer you have to push it through until it no longer latches in and then take it out.

7. Cut off the protruding part of the retainer as shown. Do not leave any remnants jutting out.



8. If you want to change the position later, you must open the top of the bus frame.
9. Install the bus frame as described in section "Removing/installing the bus frame (Page 87)" in the device.

See also

Expansion card slots on the bus board (Page 173)

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. Combinations of three memory modules or the mixing of memory capacities is not permitted.

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 inserted in defined slots on the motherboard.

The slots are inscribed 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 storage, e.g. graphics cards, with 256 MB and more are used, the memory available 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 modules with ECC can only be used in combination with the Xeon processor.
- In faults occur, it may be enough to remove one or two memory modules or use a memory module with less capacity so that the physical memory set up on the motherboard and the reserved memory on the expansion card do not overlap.

See also

Open the device (Page 85)

6.3.2 Removing memory modules

Requirement

- The device is open, see important information in "Open the device (Page 85)".
- If necessary, remove the bus frame to better reach the memory modules, see "Removing/installing the bus frame (Page 87)".

Procedure

1. If you remove several memory modules, remove them one after another in the following order:
 - 1st memory module: DIMM 1-2 slot
 - 2nd memory module: DIMM 1-1 slot
 - 3rd memory module: DIMM 2-2 slot
 - 4th memory module: DIMM 2-1 slot

The slots on the memory module are inscribed 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.

See also

Removing/installing the bus frame (Page 133)

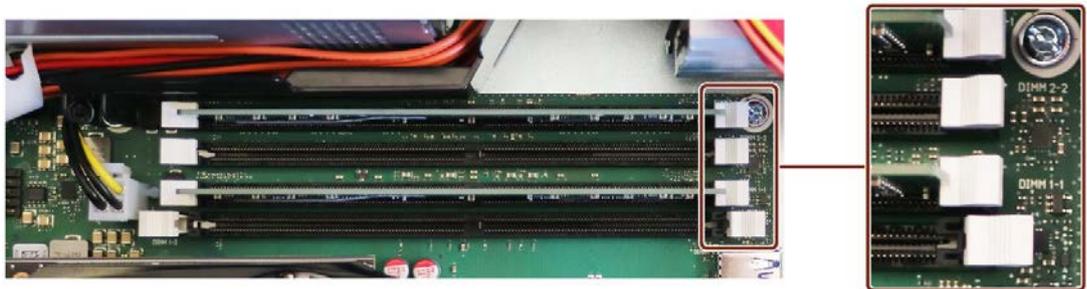
6.3.3 Installing memory modules

Requirement

- You have noted the information on combination options and the conditions of use of memory modules under "Usable memory modules (Page 94)".
- The device is open, see important information in "Open the device (Page 85)".
- If necessary, remove the bus frame to better reach the memory modules, see "Removing/installing the bus frame (Page 87)".

Procedure

1. If you insert several memory modules, insert them one after another in the following order:
 - 1st memory module: DIMM 2-1 slot
 - 2nd memory module: DIMM 1-1 slot
 - 3rd memory module: DIMM 2-2 slot
 - 4th memory module: DIMM 1-2 slot



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

2. Remove the memory module from its packaging.

Hold it by the upper edges only.

When inserting the base, take into account the marked cutout that must match up with the coding of the base.



3. Open the two locks to the left and right of the slot.

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



5. Press evenly on both sides of the memory module in order to prevent tilting until both interlocks 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.

See also

Removing/installing the bus frame (Page 133)

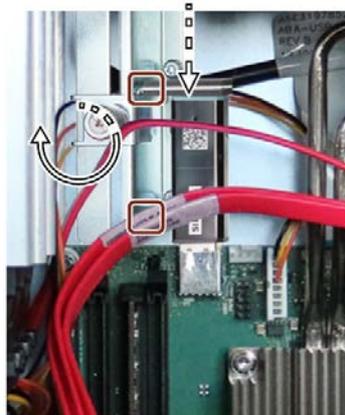
6.4 Internal USB interface

Requirement

- The device is open, see important information regarding this under Open the device (Page 85).
- Retainer for locking the internal USB interface, see "Hardware accessories (Page 29)".
- Screwdriver TX10

Procedure

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



6.5 Graphics card

You can find information on installing a graphics card under "Technical specifications of graphic (Page 151)".

You can find information on the graphics card slot under "Expansion card slots on the bus board (Page 173)".

You can obtain information on graphics cards that support multi-monitoring from your local contact person, see "Service and support (Page 185)".

Requirement

- An original replacement 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 graphics card removal under "Installing/removing expansion cards (Page 90)".

Installing the graphics card

You can find information on graphics card installation under "Installing/removing expansion cards (Page 90)".

6.6 Drives

6.6.1 Drives in drive cage type A

6.6.1.1 Permissible expansion for temperature range 0 to 35 °C

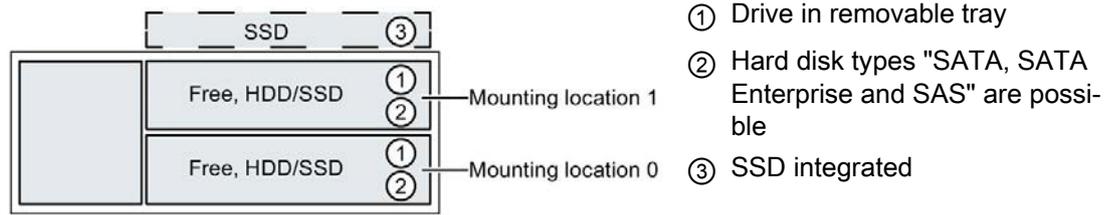
You can install the following drives in the Type A drive cage at various mounting locations.

You can find information on the mounting locations under:

- Drive cage type A (Page 17)

Installation options

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



The maximum permitted power loss of the expansion cards amounts to 75 W.

If the device is permanently installed or mounted on telescopic rails, it must not be subjected to vibration stress during operation. The restrictions do not apply for the use of SSD.

Ambient temperature	0 °C - 35 °C
Drive configuration	Mode
Non-RAID system	X
RAID1 system	X

Maximum number of drives per drive type (alternative)

(in removable tray)

Ambient temperature	0 °C* - 35 °C
Drive cage type	Front
SATA (2.5" and 3.5" size)	2
Enterprise (3.5" size)	2
SAS Enterprise (3.5" size)	2

- * 0 °C minimum allowable temperature for SATA hard drives
 5°C minimum allowable temperature for SATA Enterprise hard drives

6.6.1.2 Permissible expansion for temperature range 0 to 40 °C

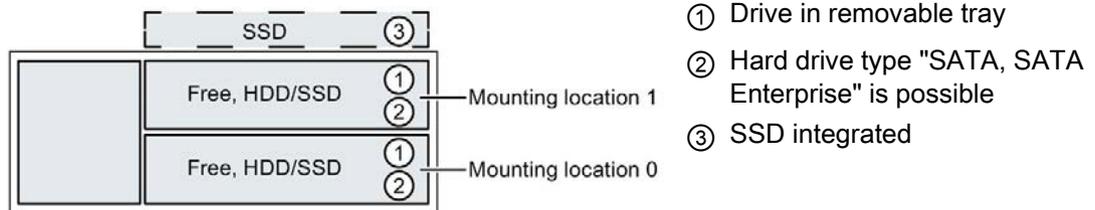
You can install the following drives in the Type A drive cage at various mounting locations.

You can find information on the mounting locations under:

- Drive cage type A (Page 17)

Installation options

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



The maximum permitted power loss of the expansion cards amounts to 55 W.

If the device is permanently installed or mounted on telescopic rails, it must not be subjected to vibration stress during operation. The restrictions do not apply for the use of SSD.

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

Maximum number of drives per drive type (alternative)

(in removable tray)

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

- * 0 °C minimum allowable temperature for SATA hard drives
- 5°C minimum allowable temperature for SATA Enterprise hard drives

6.6.1.3 Permissible expansion for temperature range 0 to 50 °C

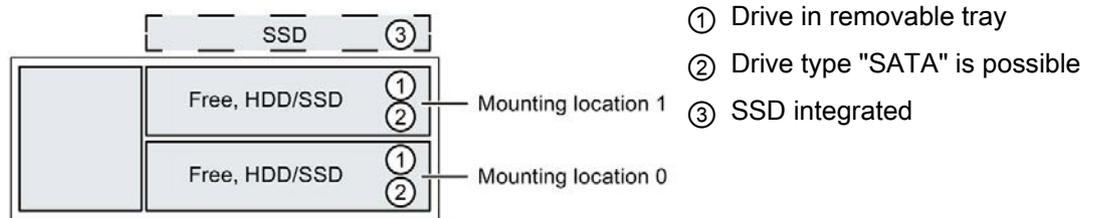
You can install the following drives in the Type A drive cage at various mounting locations.

You can find information on the mounting locations under:

- Drive cage type A (Page 17)

Installation options

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



The maximum permitted power loss of the expansion cards amounts to 55 W.

If the device is permanently installed or mounted on telescopic rails, it must not be subjected to vibration stress during operation. The restrictions do not apply for the use of SSD.

Ambient temperature	0 - 50 °C
Drive configuration	Mode
Non-RAID system	X
RAID1 system	X

Maximum number of drives per drive type (alternative)

(in removable tray)

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

6.6.1.4 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 102)" and "Permissible expansion for temperature range 0 to 50 °C".

NOTICE

Risk of damaging the drive and data loss

You can only swap drives in removable racks in connection with RAID1 while the system is running (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 27)".
- Observe the ESD guidelines.

Requirement

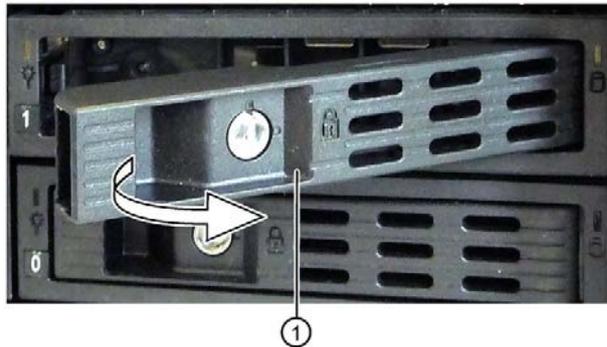
- The device is equipped with the drive cage type A.
- An original spare part, i.e. a drive approved for this device, see notes under "Hardware accessories (Page 29)".
- If there is no RAID system: The device is fully disconnected from the line voltage, see "Switching off the device (Page 58)".
- The 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 61).
2. Open the lock of the removable tray with the appropriate key.



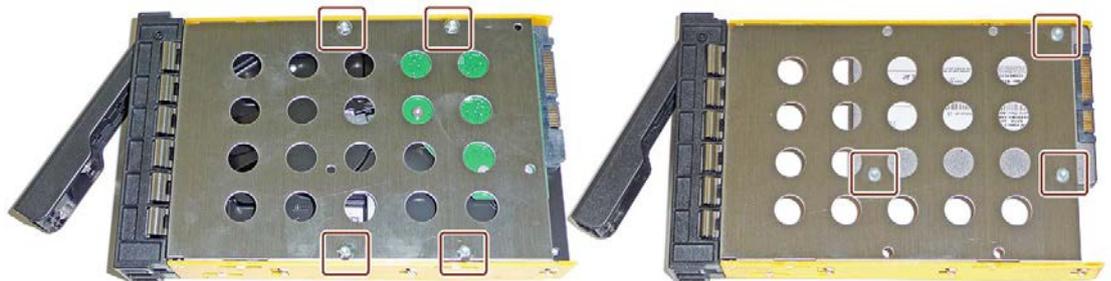
3. Reach into the notch ① in the bracket of the removable tray and pull out the bracket in the direction of the arrow up to a slight resistance.



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.

6.6.1.5 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.

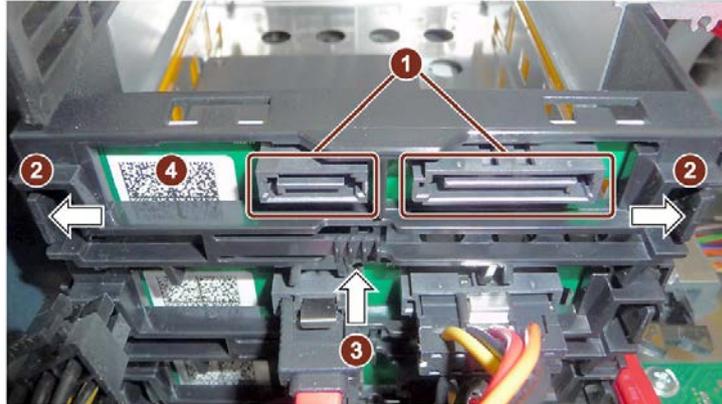
This enables the convenient connection of the data cables from the motherboard to the drive in the removable tray at these interfaces.

Requirement

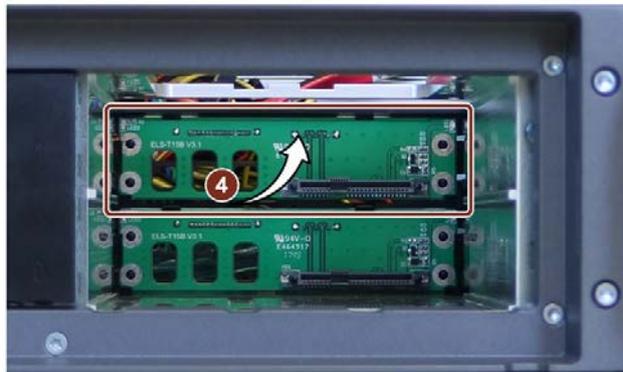
- The device is equipped with the Type A drive cage, see Type A drive cages see "Drives in drive cage type A (Page 101)" and for Type B drive cages see "Drives in drive cage type B (Page 110)".
- An original spare part, that is a backplane approved for this device, see notes in "Hardware accessories (Page 29)".
- The device is fully disconnected from the line voltage, see "Switching off the device (Page 58)".
- The device is open, see important information in "Open the device (Page 85)".
- The drives have been removed, see "Change 2.5" and 3.5" drive in removable tray (Page 104)".

Procedure - Removal

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

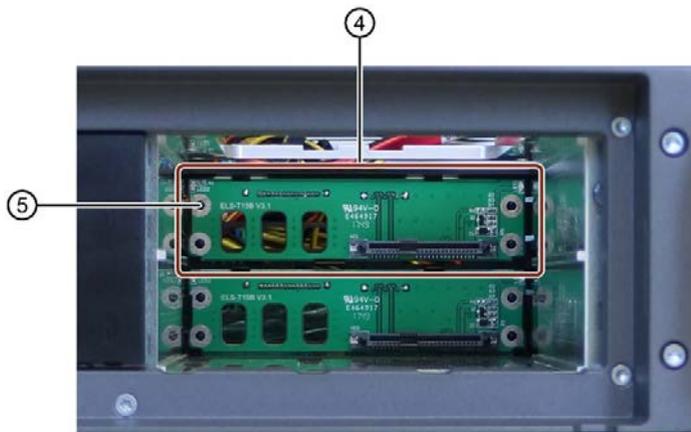


2. Unlock the backplane by pressing firmly in the direction of the arrow on the latching lugs ② and press the ejector ③.
3. Detach the unlocked backplanes ④ upwards from the holders and remove them from the drive cage.



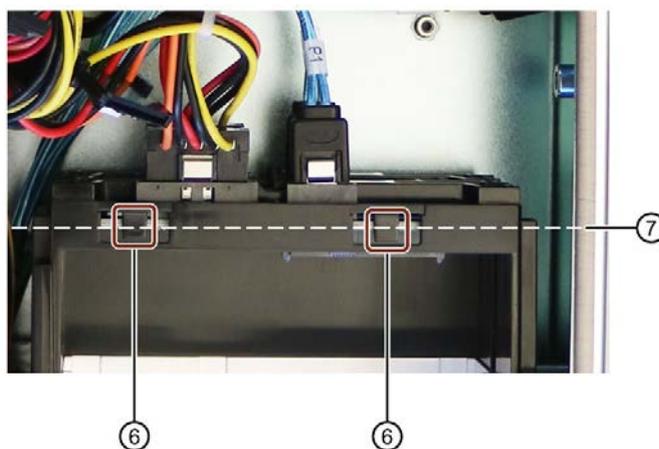
Procedure - Installation

Insert the backplane ④ from the front into the drive cage and snap it into the back.



When doing so, check the following:

- The backplane lies flat in the drive cage.
- All centering openings in the ⑤ backplane are in the centering pins.
- The backplane is snapped in on top behind the detent lug ⑥.
- All backplanes lie precisely under one another in vertical alignment when viewed from above.



6.6.1.6 Replacing 2.5" drives in type A drive cage

Requirement

- The device is fully disconnected from the mains power supply, see "Switching off the device (Page 58)".
- The device is open, see important information under "Open the device (Page 85)".
- An original spare part, i.e. a drive approved for this device, see notes under "Hardware accessories (Page 29)".
- T10 screwdriver

Removal procedure - Drive on the frame

1. Remove the marked screws.



2. Remove the drive.
3. Remove the mounting bracket.
4. Pull off the cables from the drive as shown.

Installation procedure - Drive on the frame

Pay attention to the following when attaching the mounting bracket:

- The groove shown is visible on the top of the drive.
- Tighten the marked screw **last** (tolerance compensation).



Proceed in the opposite direction to install the drive.

6.6.2 Drives in drive cage type B

6.6.2.1 Permissible expansion for temperature range 0 to 35 °C

Note

If the device is permanently installed or mounted on telescopic rails, it may only be subjected to vibration stress during operation as described below:

The restrictions do not apply for the use of SSD.

The maximum permitted power loss of the expansion cards amounts to 75 W.

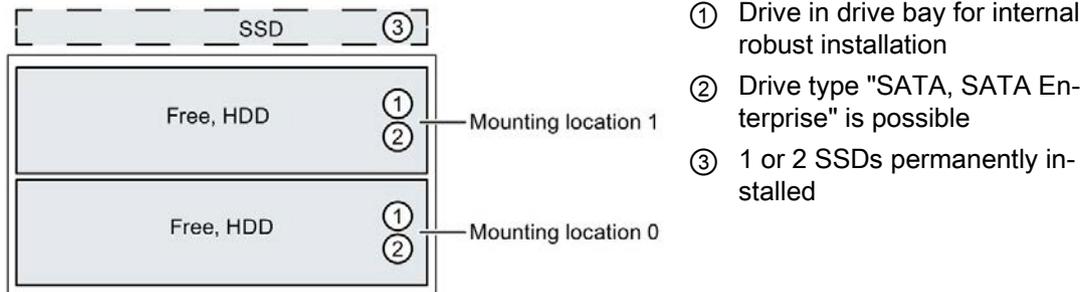
You can install the following drives in the Type B drive cage at various mounting locations.

You can find information on the mounting locations under:

- Drive cage type B (Page 18)

Installation options

The following figure gives you an overview of the installation options for drives.



The maximum permitted power loss of the expansion cards is 75 W for SATA, 55 W for SATA Enterprise SSD is not permitted.

- 10 Hz to 58 Hz: 0,0375 mm
- 58 Hz to 500 Hz: 5 m/s²

Vibrations may not exceed 500 Hz.

Ambient temperature	0 °C - 35 °C
Drive configuration	Mode
Non-RAID system	X
RAID1 system	X

Maximum number of drives per drive type (alternative)

Ambient temperature	0 °C * - 35 °C
Drive cage type	Front
SATA (3.5" format)	2
SATA Enterprise (3.5" size)	2

- * 0 °C minimum allowable temperature for SATA hard drives
5°C minimum allowable temperature for SATA Enterprise hard drives

See also

Replacing 2.5" drives in type A drive cage (Page 109)

6.6.2.2 Permissible expansion for temperature range 0 °C to 45 °C

Note

If the device is permanently installed or mounted on telescopic rails, or operated as a tower, it may only be subjected to vibration stress during operation as described below:

The restrictions do not apply for the use of SSD.

The maximum permitted power loss of the expansion cards amounts to 55 W.

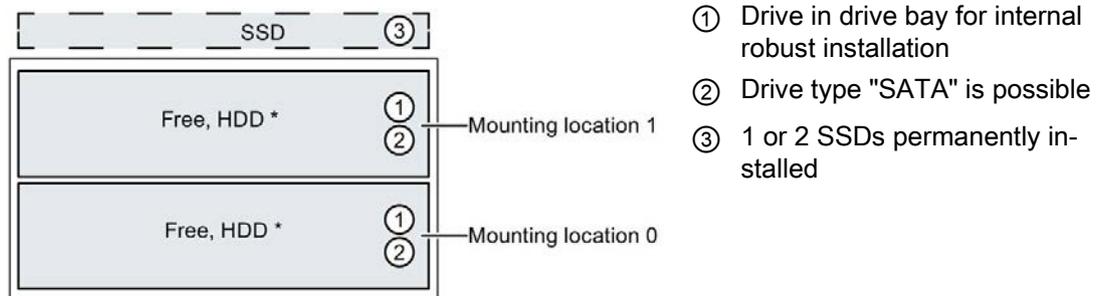
You can install the following drives in the Type B drive cage at various mounting locations.

You can find information on the mounting locations under:

- Drive cage type B (Page 18)

Installation options

The following system figure gives you an overview of the installation options for drives.



* Only SATA 3.5"

The maximum permitted power loss of the expansion cards amounts to 55 W.

- 10 Hz to 58 Hz: 0,0375 mm
- 58 Hz to 500 Hz: 5 m/s²

Vibrations may not exceed 500 Hz.

Ambient temperature	0 °C - 45 °C
Drive configuration	Mode
Non-RAID system	X
RAID1 system	X

Maximum number of drives per drive type (alternative)

(in removable tray)

Ambient temperature	0 °C - 45 °C
Drive cage type	Front
SATA (3.5" format)	2
SATA Enterprise (3.5" size)	-

6.6.2.3 Permissible expansion for temperature range 0 to 50 °C

Note

If the device is permanently installed or mounted on telescopic rails, or operated as a tower, it may only be subjected to vibration stress during operation as described below:

The restrictions do not apply for the use of SSD.

The maximum permitted power loss of the expansion cards is 30 W.

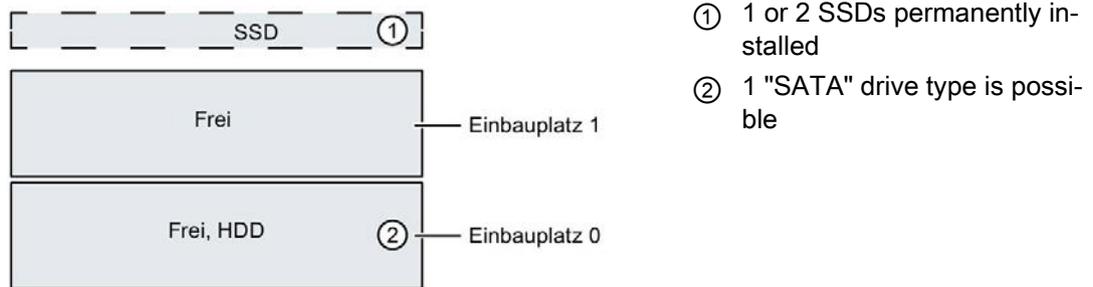
You can install the following drives in the Type B drive cage at various mounting locations.

You can find information on the mounting locations under:

- Drive cage type B (Page 18)

Installation options

The following figure gives you an overview of the installation options for drives.



The maximum permitted power loss of the expansion cards is 30 W. When installing a SATA HDD, no additional power loss of the expansion cards is permitted.

- 10 Hz to 58 Hz: 0,0375 mm
- 58 Hz to 500 Hz: 5 m/s²

Vibrations may not exceed 500 Hz.

Ambient temperature	0 - 50 °C
Drive configuration	Mode
Non-RAID system	X
RAID1 system	X

Maximum number of drives per drive type (alternative)

(in removable tray)

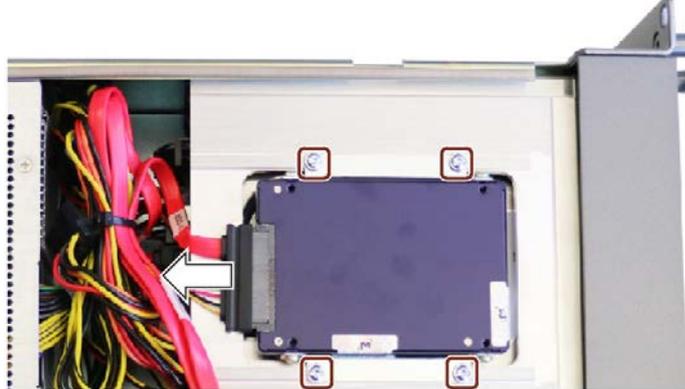
Ambient temperature	0 - 50 °C
Drive type	Front
SATA (2.5" format)	2
SATA (3.5" format)	1

6.6.2.4 Replace 2.5" and 3.5" drive in drive cage Type B

Replacing the 2.5" type B drive cage corresponds to that for type A.

Removal procedure - Two drives on the frame

1. First disconnect the cables from the upper drive as shown.

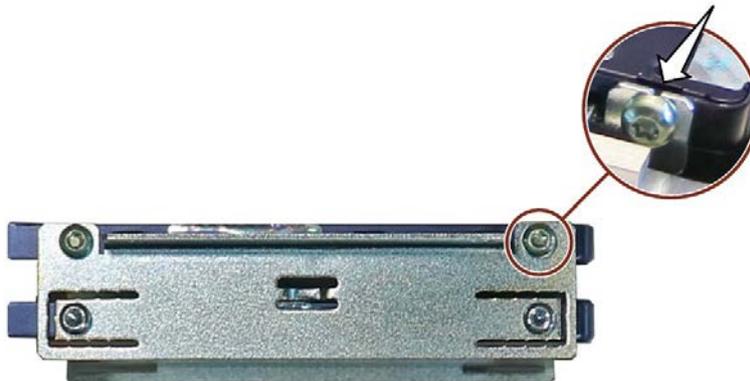


2. Remove the marked screws.
3. Now carefully pull out the two drives and disconnect the cables of the lower drive.
4. Remove the drives.
5. Remove the mounting bracket.

Installation procedure - 2 drive on the frames

Pay attention to the following when attaching the mounting bracket:

- That the groove shown is visible on the top of the drive.
- That you tightly screw on the side with the elongated hole (tolerance compensation).



1. Attach the mounting bar to the SSD drive.
2. Place the drives on the frame.
3. Connect the cables (SATA and power separated ②) to the lower drive.

6.6 Drives

4. Connect the cables (SATA and power in one plug ①) to the upper drive. The cables are inserted as shown.



5. Fasten the hard drives on the frame with 4 screws.

Removal procedure - Drive in the frame

1. Remove the drive from the frame.
2. Press down the marked location with a suitable object (e.g. a screwdriver) until the drive faceplate is audibly released.



3. Remove the drive panel.
4. Unlock the marked connector and pull it out.



5. Press both clips inward at the same time; the drive automatically slides out.



6.6 Drives

6. Pull the drive forward out of the frame.
7. Remove both drive mounting bars.



Installation procedure - Drive in the frame

Proceed in the opposite direction.

Ensure that the mounting bars noticeably engage when the drive is inserted.

6.6.3 Replacing M.2 NVMe SSD (optional)

Note

An M.2 NVMe SSD cannot be operating in a RAID-System.

Requirement

Note**Observe ESD guidelines**

Observe the ESD guidelines.

- M.2 NVMe SSDs with a length of up to 110 mm including thermal pad
- Phillips screwdriver P1
- Screwdriver T10
- The bus frame has been removed Removing/installing the bus frame (Page 87)
- The bus board has been removed

Procedure

1. Place the bus board on a suitable surface so that it lies flat.
2. Remove the marked screws and the spacer.



Note

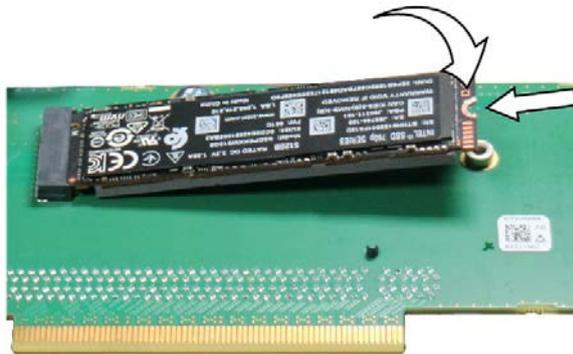
The position of the spacer varies depending on the size of the M.2 NVMe SSD.

The spacer for the longest M.2 NVMe SSD is installed fixed.

3. Lift the M.2 NVMe SSD slightly as shown and pull it from the direct female connector.



4. Place the thermal pad under the M.2 NVMe SSD and insert the M.2 NVMe SSD slightly inclined from above into the provided direct connector socket.



5. Place the spacer back in, carefully push the M.2 NVMe SSD down and secure it with the screw.



6. Install the bus board again and then the bus frame; see Removing/installing the bus frame (Page 133).

Device maintenance and repair

7.1 Repair information

<p> WARNING</p> <p>Risk due to unauthorized opening and improper repairs or expansions</p> <p>Improper procedure when carrying out expansions may result in substantial damage to equipment or endanger the user.</p> <p>If you install or exchange system expansions and damage your device, the warranty becomes void.</p> <p>For this reason, please observe the information in "Notes on device and system extensions (Page 40)".</p>
--

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
HDD drives	3 years
SSD drive	depending on the type of use *
Backup battery	5 years
Fan	3 years
Filter pad	Depending on the degree of soiling

* The interval for replacement of the flash drives (SSD) depends greatly on the type of use. A specific interval cannot be given.

Note

All drives are monitored by SIMATIC DiagBase or SIMATIC DiagMonitor software via Smart status.

As soon as the Smart status of the data medium goes to "Not OK", a message is generated in SIMATIC DiagBase or SIMATIC DiagMonitor or also during a system start of the device. At this time, a data backup should be performed and the drive replaced.

7.3 Removing and installing hardware

7.3.1 Changing the filter pad

Requirement

- The device is fully disconnected from the line voltage, see "Switching off the device (Page 58)".
- The fan cover has been removed; see "Remove the fan cover (Page 123)".
- An original spare part, i.e. a fan 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. The special outline of the filter ensures that it cannot be inserted contrary to the direction of flow.
3. Replace the fan cover.

See also

Maintenance intervals (Page 121)

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 61)".
- Information on the position of the fan cover of the front fan is available under "Front panel (Page 16)".

Procedure

1. Open the front door at least at an angle of approx. 45°.
2. Grasp the recessed grip of the fan cover.
3. Open the fan cover in the direction of the arrow and remove it.



7.3.2.2 Changing the front fan

Requirement

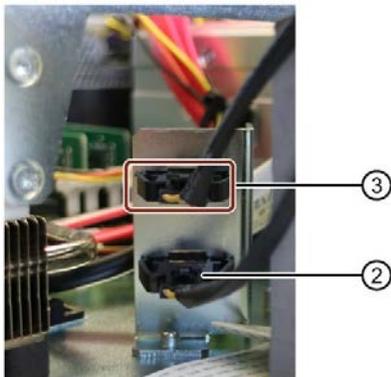
- The device is fully disconnected from the line voltage, see "Switching off the device (Page 58)".
- The fan cover has been removed; see "Remove the fan cover (Page 123)".
- An original spare part, which means a front fan of the same type.

Procedure

1. Press and hold the locks together.
2. Slide the fan support a bit to the left and move it forward from the front of the enclosure.

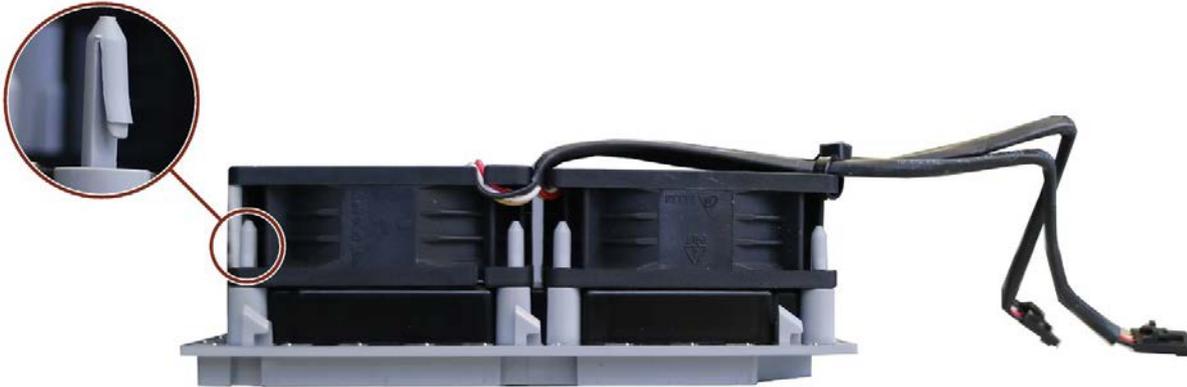


3. Set aside the fan support with the openings facing down right in front of the device. The fans are on top.
4. Press on the clip of the small fan cable plug connector ② and remove the connector from the larger adapter plug ③. Repeat this step for the second fan cable plug as well.



5. Loosen the cable tie with which the two fan cables are fastened to the fan housing.

6. Press the four clips of the fan support and remove the first fan upwards.
Repeat this step as well with the second fan.



7. Place the new fan on the clips and press the fan down until all latches lock.
Repeat the process for the second fan as well.
8. Fasten the two fan cables with a cable tie to the fan housing.
9. Re-insert the small fan cable plug ② in the larger adapter plug-in connector ③ until it latches in.
10. Place the fan support with the new fan on the front of the device.

See also

Hardware accessories (Page 29)

Maintenance intervals (Page 121)

7.3.3 Changing the backup battery

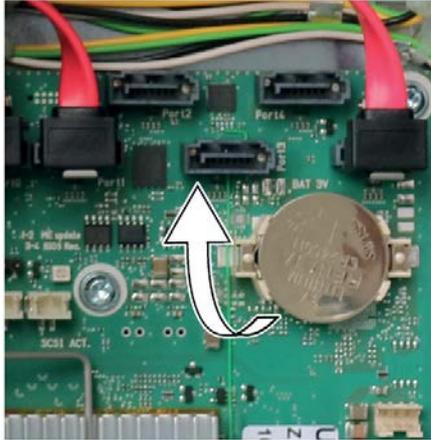
 WARNING
Risk of explosion and release of harmful substances
Improper use and handling of lithium batteries can result in an explosion of the batteries.
Explosion of the lithium batteries and the resulting release of harmful substances can cause severe physical injury. Damaged batteries jeopardize the function of the device.
<ul style="list-style-type: none">• Replace spent batteries promptly. See information in "Maintenance intervals (Page 121)".• 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, that is 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 85)".
 - 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 "Installing/removing expansion cards (Page 90)".
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 58)".
- The device is open, see important information in "Open the device (Page 85)".
- An original spare part, i.e. a single power supply of the same type
- T10 screwdriver
- Diagonal cutter
- Cable ties used to fix the power supply lines in the enclosure.

Procedure

1. Disconnect the cables from the drives and the motherboard.
2. Remove the cable ties securing the power cables in the enclosure.
3. Loosen the screws marked in the following picture at the enclosure bottom.



4. Remove the screws marked in the following picture.



5. Pull the power supply upward and out of the housing.
6. Remove the mounting bracket from the enclosure of the old power supply.

7. Mount the mounting bracket as shown on the enclosure of the new power supply.



8. Install the new power supply.
9. Fasten the power supply with the screws at the enclosure front.
10. Connect the cables to the drives and the motherboard.
11. Use cable ties to reattach the power supply cables to the enclosure.
12. Close the device.
13. Check the safe state of the device.
14. Switch on the power supply.

See also

Hardware accessories (Page 29)

7.3.5 Replacing redundant power supply (AC) module

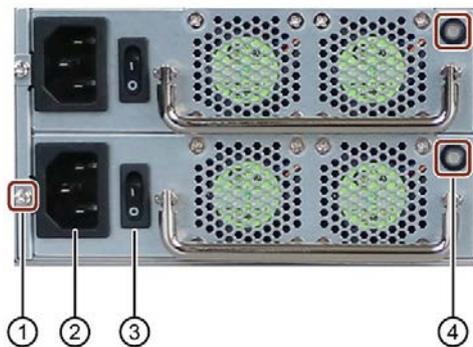
If a module of the redundant power supply is defective, you can continue to operate the device until the device can be shut down in a controlled manner.

The replacement of one of the two modules of the redundant power supply can be performed without shutting down the device. The redundancy does not exist during the change.

Requirement

- An original spare part, i.e. a module of the redundant power supply of the same type
- Cross-tip screwdriver P1

Procedure



1. Using the status display ④, determine which module is defective (status display lights on the module up red or not at all).
2. Turn off the defective module using the On/Off switch ③.
3. Disconnect the defective module from the line voltage, see "Switching off the device (Page 58)".
Pull the mains plug from the socket ② of the defective module.
4. Loosen the marked screw ① of the defective module.
5. Pull out the defective module at the handle.
6. Install the new module and fasten it with the previously loosened screw ①.
7. Re-insert the mains plug into the socket ② of the newly inserted module.
8. Check the safe state of the device.
9. Switch on the new module again using the on-off switch ③ a (status indicator ④ of the module lights up green).

See also

Hardware accessories (Page 29)

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

Note

Converting from simple power supply (AC) to redundant power supply and vice-versa is not possible.

Requirement

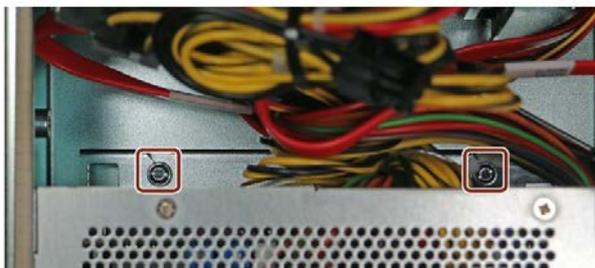
- The device is fully disconnected from the line voltage, see "Switching off the device (Page 58)".
- The device is open, see important information regarding this under "Open the device (Page 85)".
- An original replacement part, i.e. the enclosure of a redundant power supply of the same type
- Both modules of the redundant power supply are removed, see "Replacing redundant power supply (AC) module (Page 130)".
- Short Phillips screwdriver P1

Procedure

1. Turn the screws on the marked positions with the short Phillips screwdriver.



2. Loosen the screws marked in the following picture at the enclosure bottom.



3. Pull the enclosure a bit towards the front so the cables can be accessed.



4. Remove the cable ties securing the power cables in the enclosure.
5. **Note:**
If additional expansion cards are installed, first remove them, see "Installing/removing expansion cards (Page 90)".
6. Remove the cables from the drives, the motherboard and the bus board. If necessary, note their assignment.
7. Fully pull the enclosure of the redundant power supply backwards out of the device.
8. Remove the mounting bracket from the enclosure of the old power supply.
9. Mount the mounting bracket again as shown on the enclosure of the new power supply.
10. Install the new enclosure, do not however slide it all the way to the back, so that there is enough space to connect the cables.
11. Reconnect the cables to the drives, motherboard and bus board.
12. **Note:**
If expansion cards need to be re-installed, re-install them, see "Installing/removing expansion cards (Page 90)".
13. Fasten the cables with cable ties.
14. Now, slide the enclosure all the way to the back and fix it in the appropriate locations with the screws.
15. Re-insert the two modules of the redundant power supply and close the device.

See also

Hardware accessories (Page 29)

7.3.7 Removing/installing the bus frame

Requirement

- The device is fully disconnected from the line voltage, see "Switching off the device (Page 58)".
- The device is open, see important information in "Open the device (Page 85)".
- The bus frame has been removed, see "Removing/installing the bus frame (Page 87)".
- The expansion cards have been removed, see "Installing/removing expansion cards (Page 90)".
- T10 screwdriver

Procedure - Removal

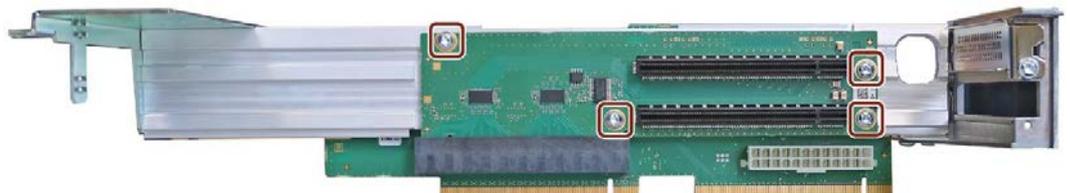
1. Remove the marked screws on the center rail of the bus frame.

Note

If you have not installed any expansion cards, also remove the screws from the right central support.



2. Remove the marked screws with which the piggyback is fixed to the center rail.



3. Detach the piggyback from the plug-in connector and remove the piggyback upwards.
4. Remove the marked screws on the center rail of the bus frame.



Procedure - Installation

Proceed in the opposite direction to install the bus board.

7.3.8 Replacing the processor

Requirement

- The device is fully disconnected from the line voltage, see "Switching off the device (Page 58)".
- The device is open, see important information in "Open the device (Page 85)".
- The bus frame has been removed, see "Removing/installing the bus frame (Page 87)".
- 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 heat sink of the processor.
2. Unlock the socket and lift the socket cover.
3. Remove the processor.



Note: The contact springs of the socket are highly sensitive to mechanical damage, e.g. caused by an incorrectly inserted CPU or foreign objects, and their entire surface may only touch the contact side of the processor flat.

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

See also

Removing/installing the bus frame (Page 133)

Hardware accessories (Page 29)

7.3.9 Replacing the motherboard

Requirement

- The device is fully disconnected from the line voltage, see "Switching off the device (Page 58)".
- The device is open, see important information in "Open the device (Page 85)".
- 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 (5 mm and 5.5 mm) for COM1 port and DVI-D port.
- Screwdriver T10 for fixing screws on the motherboard.

Procedure

1. Remove the following components one after another:
 - The bus frame, see "Removing/installing the bus frame (Page 87)"
 - The heat sink of the processor, see "Replacing the processor (Page 135)"
2. Note the assignment of all data cables to the motherboard and disconnect all data cables.
3. Unscrew the hexagon bolts of the COM1 port and the DVI-D port on the rear of the device, see "Interfaces (Page 20)".

4. Remove the motherboard fixing screws.



5. Remove the motherboard, install a new one and fasten it.
6. Reconnect the cables at the respective positions on the motherboard.
7. Reinstall the following components one after another:
 - The heat sink of the processor
 - The bus frame (Page 133)
8. Update the firmware updates accordingly to the motherboard version. Please note during the update whether you are operating a device with or without a RAID system.

See also

Installing/removing expansion cards (Page 90)

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 flash drive (read only), you can find the "Documentation and Drivers" suite, using which you can install all supplied software and drivers.

Procedure

1. Connect the supplied USB flash drive.
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 the firmware settings on delivery in the "Firmware/BIOS description (<https://support.industry.siemens.com/cs/de/de/view/109760621/en>)".

Note

If your PC no longer boots, e.g. due to a crash during a BIOS update, contact your local SIEMENS contact person.

You can find information on "BIOS Recovery" and "ME update" under "Pin assignment of the internal interfaces (Page 165)".

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.

You will find detailed information on this software in: "SIMATIC IPC Image & Partition Creator (<https://support.industry.siemens.com/cs/ww/de/view/21766418/en>)".

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

8.1 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.
-

8.2 General technical specifications

See the note in "Applicability of technical specifications (Page 141)".

Article number	6AG4112-3...-.... (for details, refer to the ordering documentation)
Dimensions	481.4 x 88.1 x 446.6 (W x H x D in mm)
	Detailed dimensional specifications can be found in "Dimension drawing of the device (Page 155)".
Weight	10 up to 14 kg; depending on the equipment
Supply voltage (V _N)	Single power supply: 100 V AC to 240 V AC (-15%; +10%)
	Redundant power supply: 2 x 100 V AC to 240 V AC (-15%; +10%)
Input current	Single power supply: <ul style="list-style-type: none"> • Continuous current at 100 V: ≤ 6 A • Continuous current at 230 V: ≤ 3 A • At startup ≤ 80 A for 3.6 ms
	Redundant power supply: <ul style="list-style-type: none"> • Continuous current at 100 V: ≤ 5 A • Continuous current at 230 V: ≤ 2.5 A • at startup ≤ 210 A for 1.65 ms for each module
	<p>Information on the dimensioning of the fuses in the higher-level plant circuits</p> <p>A fuse, which is designed for a tripping current of typical 6.3 A, is integrated in the power supply of the IPC. Pulse current are also taken into consideration by the "time lag" type. In the case of fault, this fuse ensure the correct separation of the device from the power supply.</p> <p>It is recommended to use a fuse of at least 6.3 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 hereby take into consideration the starting currents of the IPC and those of the other devices.</p>

8.2 General technical specifications

Frequency	50 to 60 Hz, min. 47 Hz to max. 63 Hz, sinusoidal
Power consumption with maximum configuration and 230 W secondary	Single power supply ≤ 260 W with 88% efficiency
	Redundant power supply ≤ 260 W with 88% efficiency
Power loss, heat emission	Single power supply: 260 W = 260 J/s = 0.25 BTU/s
	Redundant power supply: 270 W = 270 J/s = 0.26 BTU/s
Current output (DC)	Single power supply: <ul style="list-style-type: none"> +5 V/25 A, +3.3 V/20 A 190 W permitted in total <ul style="list-style-type: none"> +12 V1/14 A, +12 V2/11 A -12 V/0.1 A, +5 V_{aux}; 2 A
	Redundant power supply: <ul style="list-style-type: none"> +5 V/20 A, +3.3 V/20 A 100 W permitted in total <ul style="list-style-type: none"> +12 V1/16 A, +12 V2/16 A -12 V/0.5 A, +5 V_{aux}; 3 A
	The total sum of all voltages is max. 230 W.
Noise emission	<ul style="list-style-type: none"> < 55 dB(A) at 25°C according to DIN EN ISO 7779 all drives in operation, CPU under heavy load < 45 dB(A) at 25°C according to DIN EN ISO 7779 all drives in operation, CPU under light load < 35 dB(A) at 25°C according to DIN EN ISO 7779 silent fan profile, stationary desktop, drives are not active, standard AC power supply
Degree of protection	<ul style="list-style-type: none"> Degree of protection 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	<ul style="list-style-type: none"> 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					
Front fan			1.4 A			
Triple Head graphics card	3.3 A		1.5 A			
Single currents AC, max. permitted	20 A ²	25 A ²	14 A	11 A	0.1 A	2.0 A ³
Single currents AC redundant, max. permitted	20 A ²	20 A ²	16 A	16 A	0.5 A	3.0 A
Total power consumption, permissible	255 W					
Efficiency of the simple power supply ¹	Approx. 90% (230 V AC) / approx. 90% (120 V AC)					
Efficiency of the redundant power supply ¹	Approx. 85% (230 V AC) / approx. 85% (120 V AC)					

¹ Depends on the selected device configuration

² The accumulated power of the +5 V and + 3.3 V voltage may not exceed 190 W with ATX power supply and 100 W with ATX redundant.

³ 3 A for 10 seconds

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
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
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

Note

Dimensioning of the fuses in the higher-level plant circuits

A fuse, which is designed for a tripping current of typical 6.3 A, is integrated in the power supply of the IPC. Pulse current are also taken into consideration by the "time lag" type. In the case of fault, this fuse ensure the correct separation of the device from the power supply.

It is recommended to use a fuse of at least 6.3 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 hereby take into consideration the starting currents of the IPC and those of the other devices.

8.3.2 Technical specifications of single power supply (AC)

Output voltage/current

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 sum of all voltages amounts to a max. of 230 W.

The inrush current is:

- ≤ 80 A for 3.6 ms

Transient voltage interruption

- 20 ms
- ≤ 10 events/h; recovery time ≥ 1 s

8.3.3 Technical specifications of redundant power supply (AC)

Output voltage/current

Voltage	Maximum current	Voltage stability
+12 V	16 A ²	±5 %
+12 V	16 A ²	±5 %
-12 V	0.5 A	±10 %
+5 V	20 A ¹	±5 %
+3.3 V	20 A ¹	±5 %
+5 V _{aux}	3.0 A	+5 %, -3 %

¹ The total output of the +5 V and +3.3 V voltage must be ≤ 100 W.

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

The total sum of all voltages amounts to a max. of 230 W.

The inrush current of a plug-in module is:

- ≤ 210 A for 1.65 ms

Transient voltage interruption

- 20 ms
- ≤ 10 events/h; recovery time ≥ 1 s

8.4 Electromagnetic compatibility

See the note in "Applicability of technical specifications (Page 141)".

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
Interference immunity	EN 61000-6-1; EN 61000-6-2; KN 35
Noise immunity: interference conducted on the power supply 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; per IEC 61000-4-4; burst; length < 3 m ± 1 kV; per 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	<ul style="list-style-type: none"> • 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
Magnetic field	100 A/m; 50 Hz; 60 Hz (according to IEC 61000-4-8)

See also

Permissible expansion for temperature range 0 to 50 °C (Page 103)

8.5 Ambient conditions

See the note in "Applicability of technical specifications (Page 141)".

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 ²	10 to 58 Hz: 0.0375 mm, 58 Hz to 500 Hz: 4.9 m/s ²
Storage/transport	5 up to 8.51 Hz; amplitude 3.5 mm; 8.51 up to 500 Hz: 9.8 m/s ²
Resistance to shock	Tested in accordance with IEC 60068-2-27
Operation ²	Half-sine: 50 m/s ² , 30 ms, 100 shocks per axis
Storage/transport	Half-sine; 250 m/s ² ; 6 ms; 1000 shocks per axis
Special features	
Quality assurance	In accordance with ISO 9001

- ¹ Limits depend on the device equipment:

At +5 °C up to +35 °C without restriction. For information for extended ambient temperature for Type A drive cages see "Drives in drive cage type A (Page 101)" and for Type B drive cages see "Drives in drive cage type B (Page 110)".

- ² The device must be free of any mechanical faults when HDD disk drives are installed in the removable tray.

8.6 Technical specifications of the drives

See the note in "Applicability of technical specifications (Page 141)".

Information on the drives is available in your order documents.

Maximum number	4 (depends on the selected configuration)
HDD	HDD types (Native Command Queuing is supported): <ul style="list-style-type: none"> • 3.5" SATA, 6 GB/s; 1000 GB • 3.5" SATA, Enterprise, 6 GB/s; 1000 GB and 2000 GB • 3.5" SAS, Enterprise, 6 GB/s; 2000 GB
SSD	SSD types (flash memory): <ul style="list-style-type: none"> • 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

8.7 Technical specifications of the motherboard

See the note in "Applicability of technical specifications (Page 141)".

Chipset	Intel® GL82 C246 PCH
Processor	<ul style="list-style-type: none"> • 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
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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 3.3 V / 3 A • 12 V / 2.1 A • 3.3 V_{aux} / 0.4 A

8.7 Technical specifications of the motherboard

Power consumption per PCIe slot with x16 expansion cards, max. permissible	<ul style="list-style-type: none"> • 3.3 V / 3 A • 12 V / 2.1 A • 3.3 V_{aux} / 0.4 A
Power loss per slot at max. ambient air temperature 50 °C, permissible	≤ 30 W
Power loss of all slots at max. ambient air temperature 50 °C, permissible	≤ 80 W In total, the power must not exceed 3.3 V _{aux} / 1.2 A.

* Main memory interface 2400 MT/s

Expansion card slots

Expansion card slots	Bus board variant 1: 2 x PCI with piggyback 2 x PCIe / 4-slot <ul style="list-style-type: none"> • 1 x PCI slot; slot 1 • 1 x PCI slot; slot 4 • 1 x PCIe x16 (8 lanes) slot; slot 3 • 1 x PCIe x16 (8 lanes) slot; slot 2
	Bus board variant 2: 2 x PCIe with piggyback 2 x PCIe / 4-slot <ul style="list-style-type: none"> • 1 x PCIe x16 (8 lanes) slot; slot 2 • 1 x PCIe x16 (8 lanes) slot; slot 3 • 1 x PCIe x16 (4 lanes) slot; slot 1 • 1 x PCIe x16 (1 lanes) slot; slot 4
	Bus board variant 3: Without piggyback 2 x PCIe / 2-slot <ul style="list-style-type: none"> • 1 x PCIe x16 (16 lanes) slot; slot 4 • 1 x PCIe x16 (4 lanes) slot; slot 1

Expansion cards

For details, see "Expansion card slots on the bus board (Page 173)".

8.8 Technical specifications of the hardware RAID adapter card

See the note in "Applicability of technical specifications (Page 141)".

Controller	<ul style="list-style-type: none"> SAS Hardware RAID Controller, PCIe x8, RAID 0, 1 Type: Microsemi ASR3151-4i (independent processor, 1024 MB DDR3 cache)
Adapter	<ul style="list-style-type: none"> 1 × Mini SAS HD adapter (SFF-8643 for 4 drives)
Maximum theoretical controller data rate	<ul style="list-style-type: none"> 12 Gbps per port
Memory	<ul style="list-style-type: none"> Maintenance-free buffer unit for onboard cache memory

8.9 Technical specifications of graphic

See the note in "Applicability of technical specifications (Page 141)".

Graphic controller	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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-VGA adapter) up to 2560 × 1600 pixels at 60 Hz; color depth up to 32-bit/pixel
Graphics card (optional)	<p>PCIe x16; Triple Head</p> <p>For details on connection options for monitors with adapters, see "Connecting I/O devices (Page 53)".</p> <ul style="list-style-type: none"> Type: Quadro P400, 2 GB graphics memory Maximum resolution: <ul style="list-style-type: none"> 3x DisplayPort 4096 × 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

8.10 Technical specifications of the interfaces

Observe the information in "Applicability of technical specifications (Page 141)" and use only original connections of the I/O to be connected.

COM 1	Serial port 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	Connecting a digital monitor with DVI port
3 x Mini DisplayPort with Triple Head graphics card (optional)	Connection of three digital or analog monitors via 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 <ul style="list-style-type: none"> Back of device: <ul style="list-style-type: none"> 4 x 900 mA / high current²
USB 3.1 Gen 2, Type C ³	USB 3.1 Gen 2 / Gen 1, 3.0/2.0/1.1 <ul style="list-style-type: none"> Back of device: <ul style="list-style-type: none"> 2 x 1500 mA / high current²
USB 3.1 Gen 1 (USB 3.0 old), Type A	USB 3.1 SuperSpeed backwards compatible with USB 3.0/2.0/1.1 <ul style="list-style-type: none"> Front of device: <ul style="list-style-type: none"> 2 x 900 mA / high current²
Ethernet	3 x Ethernet interface (RJ45), 10/100/1000 Mbps
	1 x Ethernet 1: Intel® Jacksonville i219-LM <ul style="list-style-type: none"> AMT-capable⁴
	2 x Ethernet 2, 3: Intel® Springville i210-AT
	Wake on LAN, Remote Boot and the Teaming modes are supported: <ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> 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.

The maximum cable length is determined by the attenuation of the cable and the maximum data rate of the connection. Use the original connections of the I/O to be connected without adapters or extensions.

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

See also

Dimension drawing of the device (Page 155)

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 157)

8.12 Technical specifications of the operating systems

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

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

*Multi-Language User Interface (MUI): 5 languages (German, English, French, Spanish, Italian)

You can find information on ordering Microsoft® Windows® operating system 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 disks ≥ 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

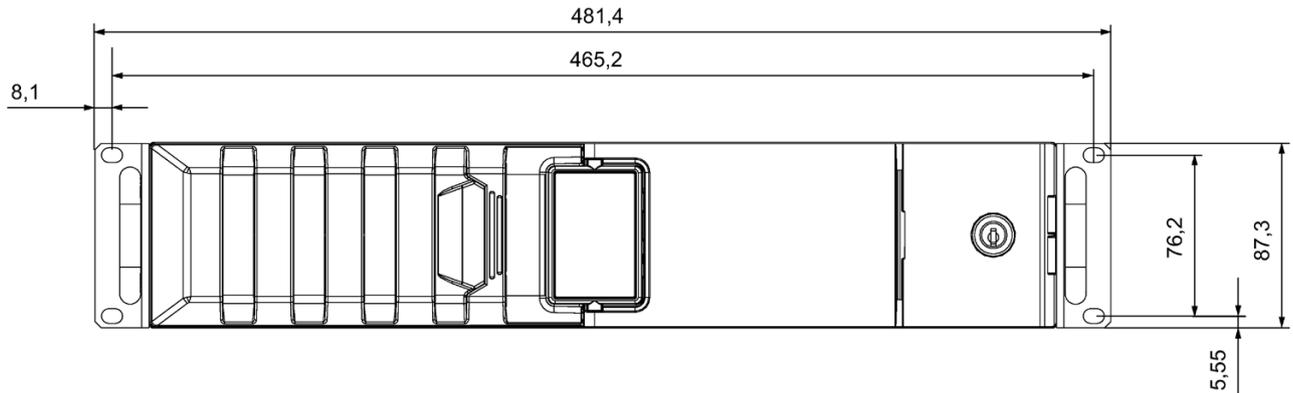
9.1 Dimension drawing of the device

Note

IEC 60297-3-100

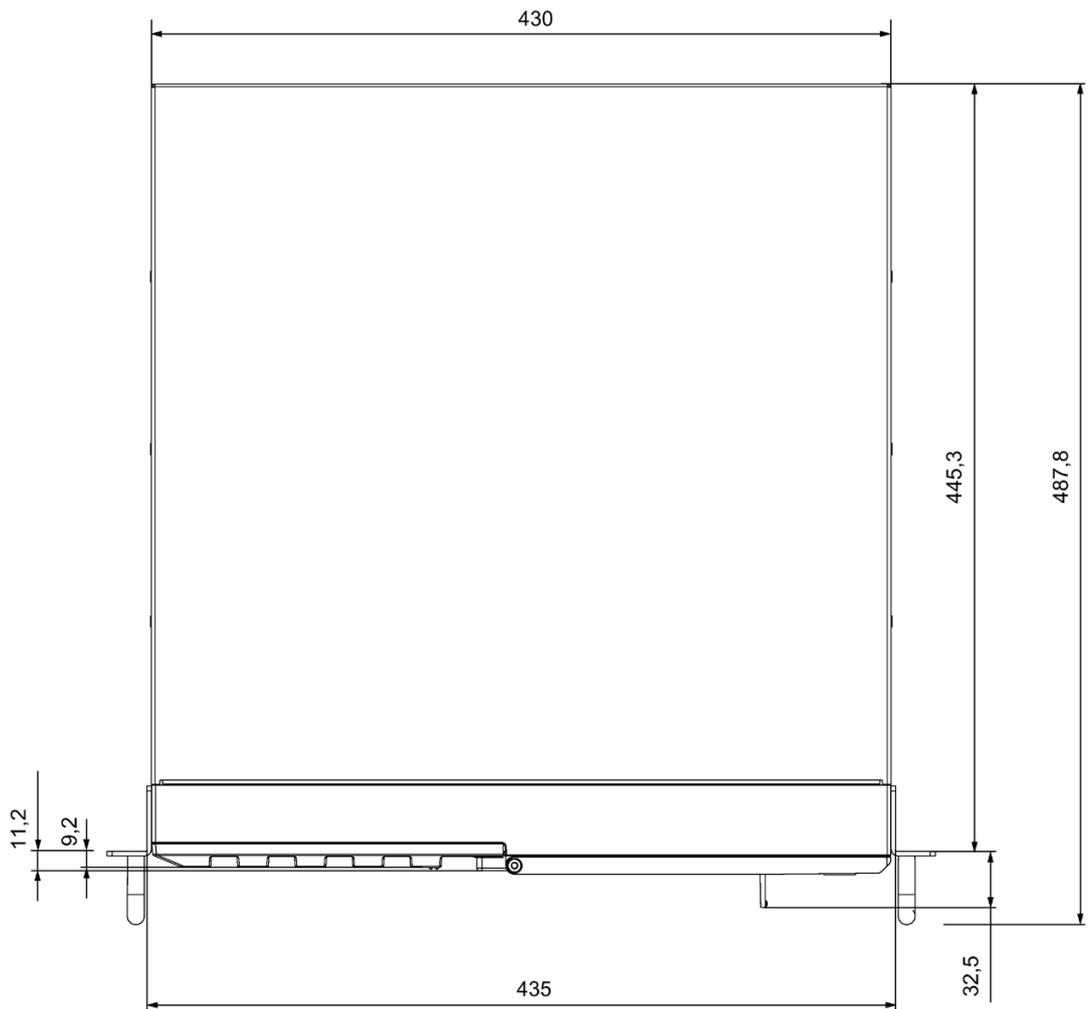
The system meets the requirements for 2U according to IEC 60297-3-100.

Front view and top view



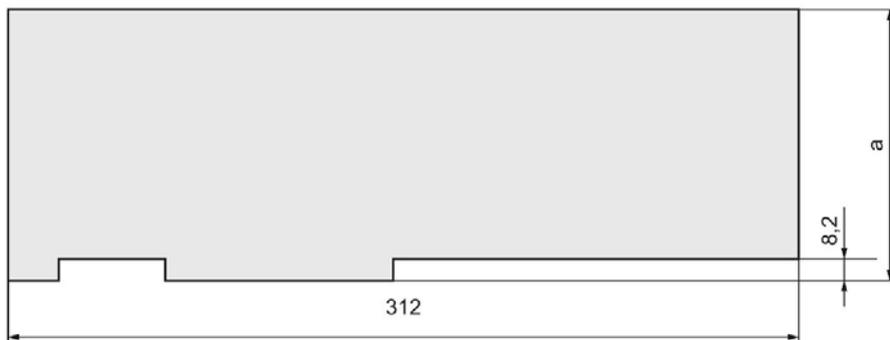
All dimensions in mm

9.2 Dimension drawing of the expansion cards



All dimensions in mm

9.2 Dimension drawing of the expansion cards

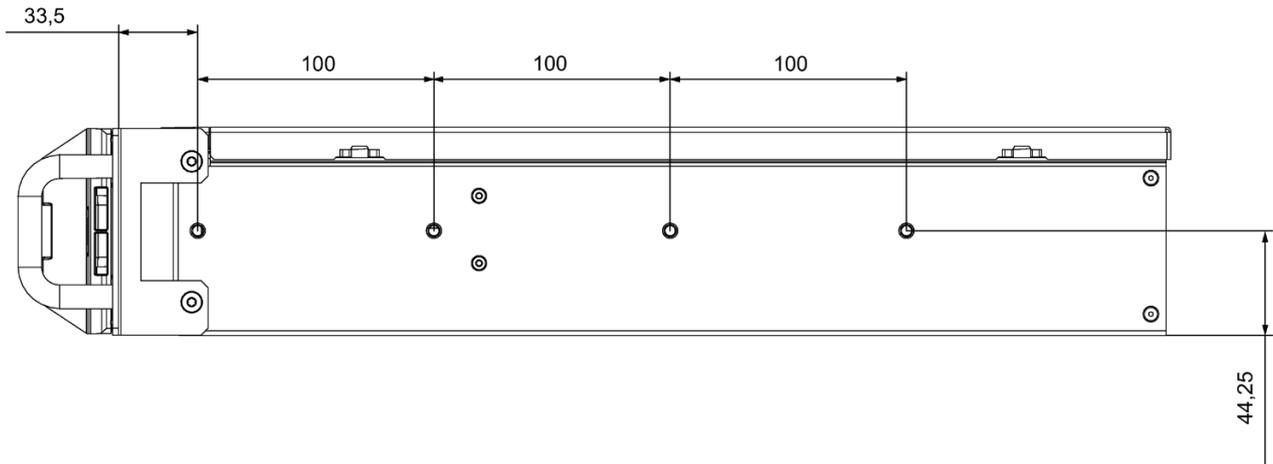


	PCI	PCIe
a	106.7 mm	111.2 mm

All dimensions in mm

9.3 Dimension drawing of the telescope rails

Dimensions for bore holes for telescopic rails



All dimensions in mm

T1 = 0.1 mm

T1 = 0.3 mm

T1 = 0.5 mm

Dimensions of telescopic rails from the Rittal Type company, Type 3659

TS 3659.180 for 600 mm cabinet

TS 3659.190 for 600 mm cabinet

Dimensions of telescopic rails from the Heitec company

RP 3659.180 for 600 mm cabinet

RP 3659.190 for 600 mm cabinet

Standards and approvals

10.1 CE marking



The device meets the general and safety-related requirements of the following directives and conforms to the harmonized European standards (EN) published in the official gazettes of the European Union:

- 2014/30/EU "Electromagnetic Compatibility Directive" (EMC Directive)

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

Scope 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 DIN ISO 9001 certificate and software license agreements

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).

Software license agreements

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

10.3 UL approval



The following approvals are available for the device:

- Underwriters Laboratories (UL) in accordance with Standard UL 61010-2-201 Second Edition, File E115352 (I.T.E)
- Canadian National Standard CAN/CSA-C22.2 No. 61010-2-201 Second Edition

10.4 FCC (USA)

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](mailto:amps.automation@siemens.com))

10.5 Canada

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.

10.6 Australia / New Zealand

AUSTRALIA / NEW ZEALAND



This product meets the requirements of the standard 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.

10.7 Eurasian Customs Union EAC

Identification for Eurasian Customs Union



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

10.8 Korea

KOREA



This product meets the requirements of Korean certification.

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

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

Hardware description

A.1 Motherboard

A.1.1 Layout of the motherboard

The motherboard consists of these main components: CPU and chipset, four slots for memory modules, internal and external interfaces, FLASH BIOS and buffer battery

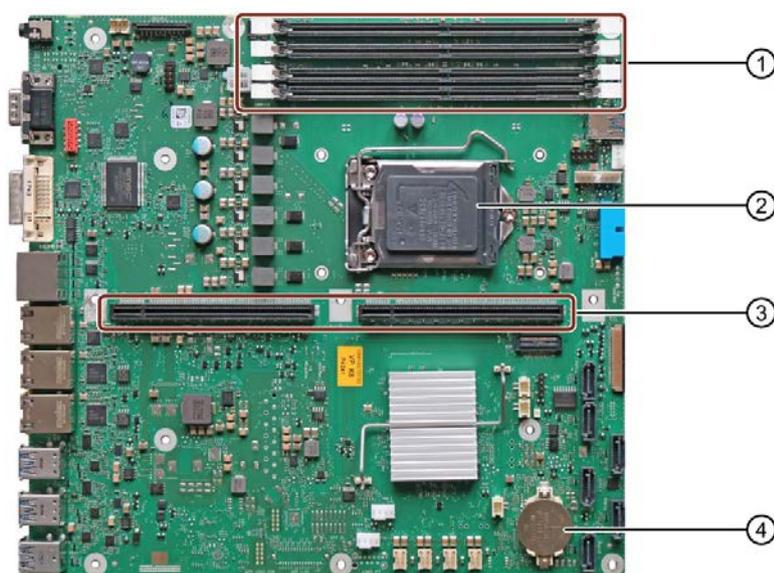


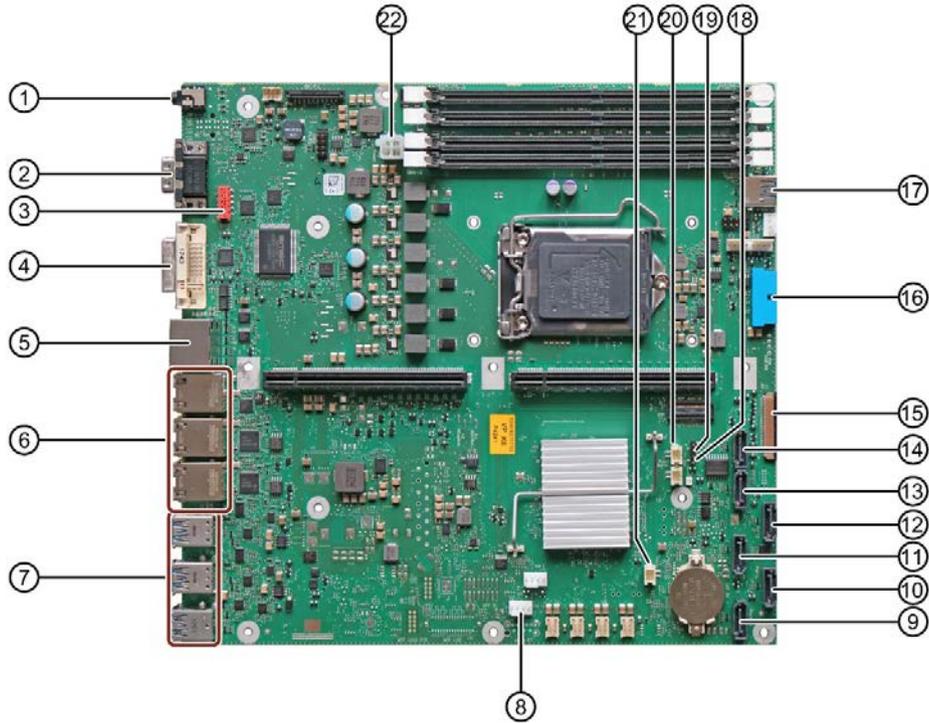
Figure A-1 ??? Preliminary image -> Remove motherboard and photograph it

- 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 149)".

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)	13	SATA 1 (Port 1)	22	CPU Power
	LAN 2 (X2 P1)	14	SATA 0 (Port 0)		
	LAN 3 (X3 P1)	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 ports on slot plate
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 flash drive is required for this, (not included; contact your local SIEMENS contact person).

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 85)".

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 85)".

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.
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)

Signal	Pin	Pin	Signal
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
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
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

Signal	Pin	Pin	Signal
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)
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

A.3 Bus board

A.3.1 Expansion card slots on the bus board

The bus boards are designed as riser cards. The function of these rise cards is spatial deflection of the plug-in connectors between the motherboard and expansion cards. Thus, the bus boards are vertically arranged, and the expansion cards are arranged parallel to the motherboard.

For identification the slots are numbered consecutively and visibly from 1 - 4 on the device rear panel, see Rear of the device (Page 19).

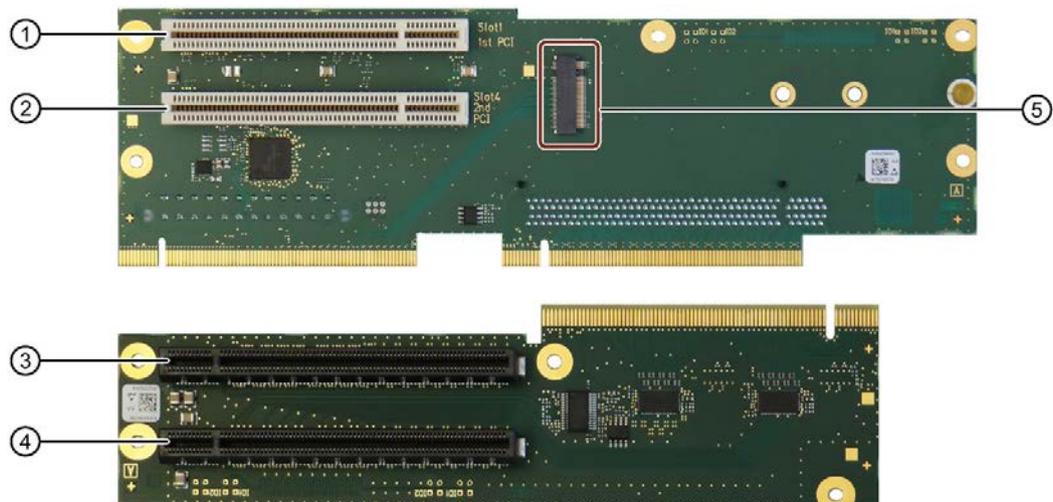
Depending on your device configuration, one of the following bus board versions is built into your device.

When inserting PCI/PCIe cards, adhere to the slot specification. 3rd generation PCIe slots (Gen 3) are, with the same number of lanes, nearly twice as powerful as 2nd generation slots (Gen. 2).

Bus boards are available in three versions.

Variant 1: 4-slot, 2 x PCI, 2 x PCIe / with piggyback

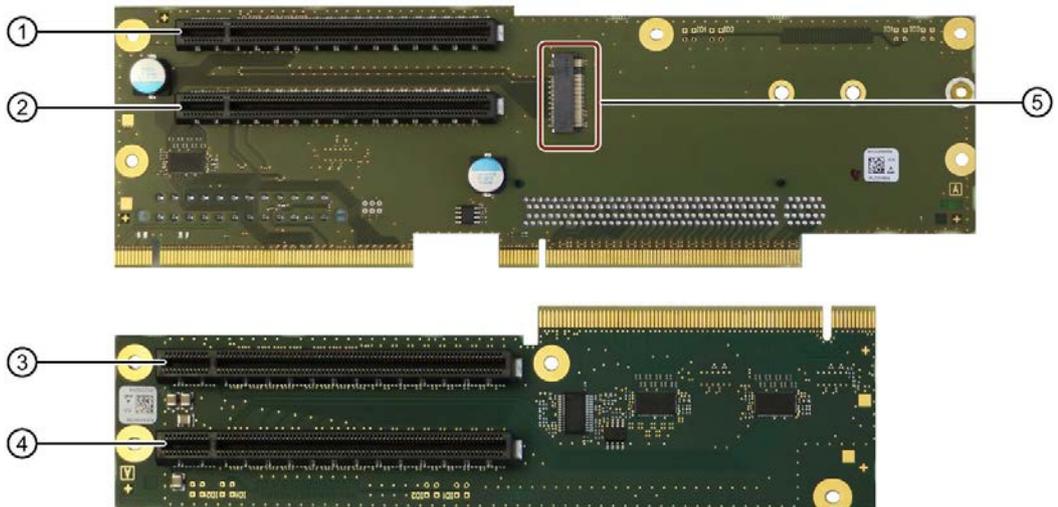
The following figure shows the bus board on top and the piggyback on the bottom.



- | | | |
|---|---|---|
| ① | PCI slot | Associated name on the rear of the device: Slot 1 |
| ② | PCI slot | Associated name on the rear of the device: Slot 4 |
| ③ | 8 x PCIe x16 (8 lanes) slot; piggy-back | Associated name on the rear of the device: Slot 3 |
| ④ | 8 x PCIe x16 (8 lanes) slot; piggy-back | Associated name on the rear of the device: Slot 2 |
| ⑤ | Slot M.2 NVMe PCIe Key M x4 (4 lane) | Slot 5; internal |

Variant 2: 4-slot, 2 x PCIe, 2 x PCIe / with piggyback

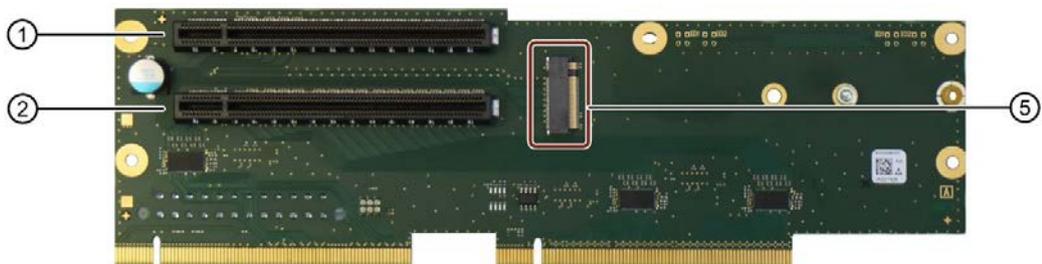
The following figure shows the bus board on top and the piggyback on the bottom.



- | | | |
|---|---|---|
| ① | 1 x PCIe x16 (4 lanes) | Associated name on the rear of the device: Slot 1 |
| ② | Slot PCIe x16 (1 lane) | Associated name on the rear of the device: Slot 4 |
| ③ | 8 x PCIe x16 (8 lanes) slot; piggy-back | Associated name on the rear of the device: Slot 3 |
| ④ | 8 x PCIe x16 (8 lanes) slot; piggy-back | Associated name on the rear of the device: Slot 2 |
| ⑤ | Slot M.2 NVMe PCIe Key M x4 (4 lane) | Slot 5; internal |

Variant 3: 2-slot, 2 x PCIe / without piggyback

The following figure shows the bus board.



- | | | |
|---|--------------------------------------|---|
| ① | 1 x PCIe x16 (4 lanes) | Associated name on the rear of the device: Slot 4 |
| ② | Slot PCIe x16 (16 lanes) | Associated name on the rear of the device: Slot 1 |
| ⑤ | Slot M.2 NVMe PCIe Key M x4 (4 lane) | Slot 5; internal |

See also

Technical specifications (Page 141)

A.3.2 Interrupt assignment of expansion card slots on the bus board

Note

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

Assignment is performed automatically and is independent of the resources required by the connected devices and inserted components. Due to this configuration dependency, clear statements can only be made by determining them in relation to the system in the final configuration.

Resources may be viewed as follows under Windows:

1. Press the "Windows® key" and "R" simultaneously.
2. Enter "msinfo32" in the "Open" field.
3. Confirm your entry with "OK".

Applications which place high demands on interrupt performance require a fast interrupt hardware response time. In order to enable fast hardware response time, the PCI hardware interrupt may only be allocated to one resource.

Variant 1: 4-slot, 2 x PCI, 2 x PCIe / with piggyback

For details on this bus board version, see "Expansion card slots on the bus board (Page 173)".

Slot Connector Type	Slot 1 PCI	Slot 4 PCI	Slot 3 PEG Gen3 8 lane	Slot 2 PEG Gen3 8 lane	M.2 PCIe Gen3 4 lane
Host Device	PCH Port 8 Dev 13	PCH Port 8 Dev 14	PEG 0:1:0	PEG 0:1:1	PCH Port 21
Bus APIC Interrupt	Primary A				
INT A	PIRQ D	PIRQ A	PIRQ A	PIRQ B	PIRQ A
INT B	PIRQ A	PIRQ B	PIRQ B	PIRQ C	PIRQ B
INT C	PIRQ B	PIRQ C	PIRQ C	PIRQ D	PIRQ C
INT D	PIRQ C	PIRQ D	PIRQ D	PIRQ A	PIRQ D
B18	Req0	Req1	n.a.	n.a.	n.a.
A17	Gnt0	Gnt1	n.a.	n.a.	n.a.
A26	AD29	AD30	n.a.	n.a.	n.a.

Variant 2: 4-slot, 2 x PCIe, 2 x PCIe / with piggyback

For details on this bus board version, see "Expansion card slots on the bus board (Page 173)".

Slot Connector Type	Slot 1 PCIe Gen3 4 lane	Slot 4 PCIe Gen3 1 lane	Slot 3 PEG Gen3 8 lane	Slot 2 PEG Gen3 8 lane	M.2 PCIe Gen3 4 lane
Host Device	PCH Port 9 (0:1B.00)	PCH Port 19 (1:1B.01)	PEG 0:1:0	PEG 0:1:1	PCH Port 21
Bus APIC Interrupt					
INT A	PIRQ A	PIRQ C	PIRQ A	PIRQ B	PIRQ A
INT B	PIRQ B	PIRQ D	PIRQ B	PIRQ C	PIRQ B
INT C	PIRQ C	PIRQ A	PIRQ C	PIRQ D	PIRQ C
INTD	PIRQ D	PIRQ B	PIRQ D	PIRQ A	PIRQ D

Variant 3: 2-slot, 2 x PCIe / without piggyback

For details on this bus board version, see "Expansion card slots on the bus board (Page 173)".

Slot Connector Type	Slot 1 PCIe Gen3 4 lane	Slot 4 PEG Gen3 16 lane	M.2 PCIe Gen3 4 lane
Host Device	PCH Port 9 (1:1B.0)	PEG 0:1:0	PCH Port 21
Bus APIC Interrupt			
INT A	PIRQ B	PIRQ A	PIRQ A
INT B	PIRQ C	PIRQ B	PIRQ B
INT C	PIRQ D	PIRQ C	PIRQ C
INT D	PIRQ A	PIRQ D	PIRQ D

See also

Interrupt assignments (Page 181)

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.

Resources may be viewed as follows under Windows:

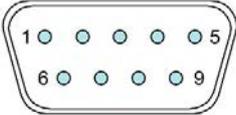
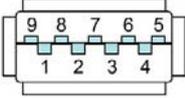
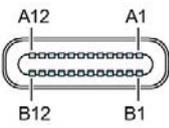
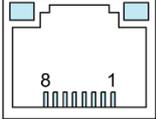
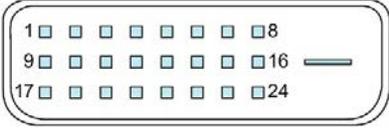
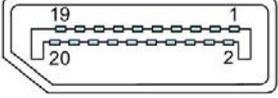
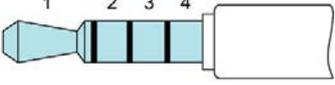
1. Press the "Windows® key" and "R" simultaneously.
2. Enter "msinfo32" in the "Open" field.
3. Click "OK" to confirm.

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	

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 assigned 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	

I/O address (hex)		Size (bytes)	Description of the basic function	Possible alternative function
from	to			
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	
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. The APIC mode is used.

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

Function	IRQ number																Comment									
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		16	17	18	19	20	21	22	23	
IRQ (ACPI mode)	X																									
Host PCI IRQ Line																										1
Function																										
Timer Output 0	X																									Fixed
Serial port 2			X																							Can be deactivated
Serial port 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																										Option, can be deactivated
Audio																										Can be deactivated

- X Interrupt in APIC mode
- 1 Host PCI-IRQ A to H is assigned to IRQ 16 to 23 permanently in APIC mode. A specific assignment cannot be forced.

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	FFFF 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

Technical support

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/ww/en/>)
- Support request form (<http://www.siemens.com/automation/support-request>)
- After Sales Information System SIMATIC IPC/PG (<http://www.siemens.com/asis>)
- SIMATIC Documentation Collection (<http://www.siemens.com/simatic-tech-doku-portal>)
- Your local representative (<http://www.automation.siemens.com/mcms/aspa-db/en/Pages/default.aspx>)
- Training center (<http://sitrain.automation.siemens.com/sitrainworld/?AppLang=en>)
- Industry Mall (<https://mall.industry.siemens.com>)

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

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

Tools & downloads

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

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

B.2 Troubleshooting

B.2.1 Problems with device functions

Problem	Cause	Remedy
The device is not operational	No power supply	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Check the ambient conditions. • After transport in cold weather do not turn the power on until after a waiting period of approximately 12 hours.
The monitor remains dark	The monitor is switched off	Switch on the monitor.
	The monitor is in "power save" mode	Press any key on the keyboard.
	The brightness button has been set to dark	Increase brightness using the brightness button. Detailed information can be found in the operating manual for the monitor.
	The power cord or the monitor cable is not connected.	<ul style="list-style-type: none"> • 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.
BIOS configuration error	Multi-monitoring in BIOS is not correctly activated / configured.	
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	<ul style="list-style-type: none"> • 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.		

Problem	Cause	Remedy
Time and/or date of the PC is not correct		<ol style="list-style-type: none"> 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 still incorrect even after correct setting 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	<ul style="list-style-type: none"> • 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". <ul style="list-style-type: none"> • 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
<p>The RAID software reports the following errors:</p> <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> – A plug-in did not provide a page for the selected device – A plug-in failed to load 	RAID is not activated	<p>The messages have no negative effect on the operation of the device and can be ignored.</p> <p>Acknowledge the messages.</p>
	RAID is activated	<p>Install the software again with the help of the supplied data storage medium.</p>

B.2.4 Problems when using expansion cards

Problem	Cause	Remedy
<p>The device crashes during startup</p>	<ul style="list-style-type: none"> • Redundant I/O addresses • Redundant hardware interrupts and/or DMA channels • Signal frequencies or signal levels are not adhered to • Different pin assignment 	<p>Check your computer configuration:</p> <ul style="list-style-type: none"> • 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.
		<p>If the device still crashes, contact your technical support team.</p>
	<p>Insufficient output of an external power supply, e.g. UPS</p>	<p>Use a powerful power supply.</p>
<p>The device does not start up or switches off immediately</p>	<p>A counter voltage is fed into the device by connected or installed expansion cards</p>	<p>Clarify the following with the supplier of the component:</p> <ul style="list-style-type: none"> • 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.1 Overview

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

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

C.2 Safety

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

C.3 Operator controls

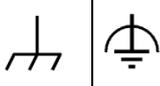
Symbol	Meaning	Symbol	Meaning
	On/off switch, without electrical isolation		
	On/off switch, without electrical isolation		

C.4 Certificates, approvals and markings

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

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

C.5 Interfaces

Symbol	Meaning	Symbol	Meaning
	Connection to the power supply		PS/2 mouse interface
	Protective conductor terminal		PS/2 keyboard-interface
	Connection for functional earthing (equipotential bonding line)		Multimedia Card Reader
DPP	DisplayPort interface		Smart Card Reader
	DVI port		Line In
LAN 	LAN interface, not approved for connecting WAN or telephone		Line Out
	Serial port		Microphone input
	USB port		Universal Audio Jack
	USB 2.0 high-speed port		Headphone output
	USB 3.0 super-speed port		
	USB 3.1 SuperSpeedPlus port		

List of abbreviations

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	
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	

List of abbreviations

D.1 Abbreviations

Abbreviation	Term	Meaning
IP	Ingress Protection	Degree of protection
IRQ	Interrupt Request	Interrupt request
KVM	Keyboard Video Mouse	Keyboard video mouse bypass
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 drive 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	
UAJ	Universal audio jack	Audio socket
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
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.

Index

A

- Accessories
 - Hardware, 29
 - Software, 31
- Alarm reset button, 23
- Ambient and environmental conditions, 37
- Angle brackets
 - Mounting holes, 46
- APIC mode, 181
- Approval, (EAC)
- Approvals, 37
- Assignment
 - I/O addresses, 179
 - Memory addresses, 182
- Audio devices
 - Connecting, 53
- Australia, 162

B

- Backup battery
 - Maintenance interval, 121
- Bus board
 - Removing, 133
 - Versions, 173

C

- Canada, 162
- CE marking, 159
- Certificates, 159
 - Approvals, 160
- COA label, 44
- COM interface
 - Technical specifications, 152
- COM2
 - Location of the interface, 20
- Condensation, 35
- Connect monitor, 54
- Connection of equipotential bonding, 48
- Connections, (Interfaces)

D

- Data backup, 140
- Data exchange, 55
- Degree of protection, 142
- Device fan, 122, 124
 - Maintenance interval, 121
 - Removing and installing, 122, 124
- DiagBase, (SIMATIC IPC DiagBase)
- DiagMonitor, (SIMATIC IPC DiagMonitor)
- Dimension drawings, 155
- DisplayPort
 - Position of the interface, 20
- Documentation, 11
- DPP, (DisplayPort)
- Drive
 - drive in the removable tray, 104
 - Replace in drive cage type B, 109
- Drive cage type A
 - Drive slots, 101, 102, 103
 - Slot numbering, 17
- Drive cage type B
 - Drive slots, 110, 112, 114
 - Slot numbering, 18
- Drives
 - Installation in drive cage type A, 101, 102, 103
 - Installation in drive cage type B, 110, 112, 114
 - Maintenance interval, 121
- Dust protection, 142
- DVI-D
 - Position of the interface, 20

E

- EAC, 162
- EC Declaration of Conformity, 159
- Electrostatic sensitive devices, 34
- Ethernet, 55
 - Position of the interface on the device, 20
- Expansion card, 91
- Expansion cards
 - Slots on motherboard, 150
 - usable expansion cards, 87

F

- Fan, (Device fan), (Device fan)
- Fan cover
 - Acceptance, 123
 - Front fan, 16
- FCC, 160
- Filter pad
 - Maintenance interval, 121
- Fire protection enclosure, 36
- Front door, (Fan cover)
 - Opening, 61
- Functional ground
 - Equipotential bonding, 48

G

- Graphic controller, 151
- Graphics card, 151
- Graphics memory, 151

H

- Hardware interrupt
 - Assigning, 177
- Hardware reset, 59
- Headphones
 - Connecting, 53
- Headset
 - Connecting, 53
- High frequency radiation
 - Immunity to interference, 38
- Hot swap
 - Changing the drive in the removable tray, 104

I

- I/O addresses
 - Assignment, 179
- I/O devices
 - Connecting, 53
 - Safety instructions, 39
- Identification data, 44, 44
- Image & Partition Creator, 140
- Immunity to interference, 38
- Industry Mall, 29
- Inrush current
 - Redundant power supply, 146
 - Single power supply, 145
- Installation
 - Expansion cards, 91

Interfaces

- at the front of the device, 21
 - On the device rear, 20
- Interrupt, 175
- IRQ assignment, 182
- IT communication, 55

L

- Labeling, 162
 - Korea, 162
- LAN, (Ethernet)
- LEDs, (Status displays)
- Limitation of liability, 40

M

- Main memory, 149
- Manuals, 11
- Marking
 - EC Declaration of Conformity, 159
- Memory addresses
 - Assignment, 182
- Memory modules
 - Combination options, 94
 - Conditions of use, 95
 - Installing, 97
 - Removing, 96
 - Slots on motherboard, 149
 - usable memory modules, 94
- Microphone
 - Connecting, 53
- Monitoring software, (SIMATIC IPC DiagBase), (SIMATIC IPC DiagMonitor)
- Motherboard
 - Changing, 137
- Mounting
 - horizontally on device base, 45
 - with cabinet brackets, 45
 - with telescopic rails, 45
- Mounting holes, 46
- Multi-monitoring, 54, 61

N

- NCQ, 149
- New Zealand, 162

O

- On/off button, 23
- On/Off switch, 22
- Onboard RAID system
 - Displaying details on the onboard RAID system, 66
 - Show faulty drive, 66
- Open
 - Device, 86
- Open the device, 86
- Operating system
 - Initial commissioning, 57
 - Installed on delivery, 42, 153
 - Shutdown, 58
- Output voltage
 - Redundant power supply, 146
 - Single power supply, 145

P

- Packaging
 - Checking, 43
- PCI hardware interrupt, 175
- PIC mode, 181
- Power plug latch
 - Redundant power supply, 52
 - Single power supply, 50
- Power requirements, 143
- Power supply
 - Connecting a redundant power supply, 51
 - Connecting a single power supply, 49
- Processor, 149
 - Changing, 135
- PROFINET, 55
- Protection class, 142

R

- RAID, 188, 189
- RAID system
 - Automatically integrating a new drive, 67
 - Data synchronization, 78
 - Display of the defective drive, 63
 - Integrating a new drive manually, 68
 - Manually install new drive, 67
- RAID1 system, 62, 62
 - Installation options for drives, 63
- Rear of the device, 19
- Redundant power supply
 - Inrush current, 146
 - Lock for power plug, 52
 - Output voltage, 146

- Sockets for power plug, 21
 - Voltage interruption, transient, 146
- Redundant power supply (AC)
 - Changing, 131
- Remote maintenance software, (SIMATIC IPC Remote Manager)
- Remote Manager, (SIMATIC IPC Remote Manager)
- Removable tray
 - Changing the backplane board, 106
- Removal
 - Device fan, 122, 124
- Reset button, 23
- RS232, (COM1)

S

- Safety instructions
 - Ambient and environmental conditions, 37
 - Device and system extensions, 40
 - General, 33
 - I/O devices, 39
 - Mounting, 36
 - Transportation and storage, 35
- Scope of delivery, 41
 - Checking, 43
- SCSI interface, 166, 166
- Securing the cables, 56
- SIMATIC IPC DiagBase, 81
- SIMATIC IPC DiagMonitor, 81
- SIMATIC IPC Image & Partition Creator, (Image & Partition Creator)
- SIMATIC IPC Remote Manager, 83
- SIMATIC NET, 55
- SIMATIC S7, 55
- Single power supply
 - Inrush current, 145
 - Lock for power plug, 50
 - Output voltage, 145
 - Socket for power plug, 21
 - Voltage interruption, transient, 145
- Single power supply (AC)
 - Changing, 128
- Software products, 31
 - Installed on delivery, 42
- Spare parts, 29
- Spare parts services, 30
- Status displays
 - for the system, 24
- Storage, 35
- Strain relief, 56

Supply voltage

- For countries other than the USA and Canada, 47
- USA and Canada, 47

Switching off

- Disconnecting the device from the line voltage, 58
- Forced shutdown, (Hardware reset)
- Hardware reset, 59
- Shutting down the operating system, 58

Switching on

- Configure automatic startup, 57
- Switching on the device, 57

System resources, 179

- I/O address allocation, 179

T

Telescopic rails

- Mounting holes, 46
- Technical specifications (basic configuration), 153

TPM, (Trusted Platform Module)

Transportation, 35

Trusted Platform Module, 84

U

Uninterruptible power supply

- Changing the module of the redundant power supply, 130

USB 3.1

- Position of the interfaces, 20, 20

V

Vibration-damped drive cage, 18

Voltage interruption

- Redundant power supply, 146
- Single power supply, 145