ES5300.1-B Housing

User's Guide

Copyright

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1 Introduction

This chapter contains information about the following topics:

- "Basic safety notices" on page 5
- "Identifications on the product" on page 9
- "CE mark" on page 9
- "RoHS conformity" on page 9
- "Product return and recycling" on page 10
- "About this manual" on page 11

1.1 Basic safety notices

Please observe the following safety notices to avoid health issues or damage to the device.

1.1.1 Identification of safety notices

The safety notices contained in this manual are identified with the danger symbol shown below:

The safety notices shown below are used for this purpose. They provide notes to extremely important information. Please read this information carefully.

CAUTION!

identifies a hazard with low risk that could result in minor or medium physical injuries or property damages if not avoided.

WARNING!

indicates a possible danger with moderate risk of death or (serious) injury, if not avoided.

DANGER!

indicates an immediate danger with a high risk of death or serious injury, if not avoided.

1.1.2 General safety information

Please observe the Product Safety Notice ("ES5300 Housing Safety Notice") and the following safety notices to avoid health issues or damage to the device.

Note

Carefully read the documentation ("ES5300 Product Safety Notice" and this User's Guide) that belongs to the product prior to the startup.

ETAS GmbH does not assume any liability for damages resulting from improper handling, unintended use or non-observance of the safety precautions.

1.1.3 Connecting/disconnecting devices

To avoid injuries and hardware damages, please observe the following precautionary measures:

- Do not apply any voltages to the connections of the ES5300.1-B Housing that do not correspond to the specifications of the respective connection. The exact specification of the I/O hardware is located in the manuals of the corresponding cards.
- Do not connect or disconnect any devices while the ES5300.1-B Housing or external devices are switched on.
  First, switch off the ES5300.1-B Housing by shutting down the real-time PC and pressing the On/Off switch at the rear and unplugging the power cord.
- When plugging in connectors, ensure that they are inserted straight and no pins are bent.

1.1.4 Opening the housing

The ES5300.1-B Housing may be opened only by qualified technical personnel!

DANGER!

As long as the ES5300.1-B Housing is not completely disconnected from the supply system, there is a risk of electric shock!
Disconnect the connection to the supply system by removing the power cord – wait a few minutes afterwards until all components (e.g. power supply, capacitors) are completely discharged.

1.1.5 Requirements for users and duties for operators

The product may be assembled, operated and maintained only if you have the necessary qualification and experience for this product. Improper use or use by a user without sufficient qualification can lead to damages or injuries to one's health or damages to property.

Note

The safety of the system, in which the ES5300.1-B Housing has been installed, is the responsibility of the person who installed the system!

General safety at work

The existing regulations for work safety and accident prevention must be followed.

1.1.6 Intended use

The ES5300.1-B Housing is a system housing for expanding a hardware-in-the-loop test system that contains an ES5300.1-A Housing. The ES5300.1-B Housing consists of the following:

- Digital and analog interfaces to the ECU, that can be installed in the form of PCI Express, SPI or I^2C-based cards in the ES5300.1-B Housing
- Load simulation for connecting to ECU output stages, that can be installed in the form of SPI or I^2C-based cards in the ES5300.1-B Housing
- Battery node simulation (e.g. K15, K30, …) for connecting to the ECU, that can be installed in the form of SPI or I^2C-based cards in the ES5300.1-B Housing
  - The simulation of the vehicle battery itself is not part of the ES5300.1-B Housing and cannot be installed here.

The ES5300.1-B Housing is always installed as an expansion for a ES5300.1-A Housing and delivered/installed in an enclosure (19" rack system). The ES5300.1-B Housing may not be operated as "standalone" unit

The ES5300.1-B Housing has the following intended use:

- Use in industrial lab facilities or workplaces
- Use as hardware interface for ECUs in a hardware-in-the-loop test system
- In conjunction with ETAS software that supports the ES5300.1-B Housing
- As interface together with software programs that operate the standardized, documented and open APIs of ETAS software products.

The ES5300.1-B Housing is not intended for the following use:

- Use within a vehicle on the road.
- Use as part of a life support system.
- Use as part of a medical application
- Use in applications where misuse can lead to injuries or damages
- Use in environments in which conditions prevail that fall outside the specified ranges (see "Ambient conditions" on page 60).

Requirements for operation

The following requirements are necessary for safe operation:

- Use the product only according to the specifications in the corresponding User's Guide. With any deviating operation, the product safety is no longer ensured.
- Observe the regulations applicable at the operating location concerning electrical safety as well as the laws and regulations concerning work safety!
- Do not use the product in a wet or damp environment.
- Do not use the product in potentially explosive atmospheres.
- Keep the surfaces of the product clean and dry.

Requirements for the technical state of the product

The product is designed in accordance with state-of-the-art technology and recognized safety rules. The product may be operated only in a technically flawless condition and according to the intended purpose and with regard to safety and dangers as stated in the respective product documentation. If the product is not used according to its intended purpose, the protection of the product may be impaired.

For the safe operation of the ES5300.1-B Housing, it is absolutely necessary to observe the section "Safety precautions" on page 27.

Maintenance and cleaning

For external cleaning, use a clean and dry cloth.

1.2 Identifications on the product

The following symbols are used for product labeling:

Symbol	Description
	The User's Guide must be read prior to the startup of the product!
	Marking for CE conformity (see "CE mark" on page 9)
	Marking for China RoHS (see "RoHS conformity" on page 9)
	Marking for conformity with WEEE directive (see "Product return and recycling" on page 10)

Please observe the information in the chapter "Technical data" on page 59.

1.3 CE mark

With the CE mark attached to the product or its packaging, ETAS confirms that the product corresponds to the product-specific, applicable European Directives. The CE Declaration of Conformity for the product is available upon request.

1.4 RoHS conformity

1.4.1 European Union

The EU directive 2011/65/EU limits the use of certain dangerous materials for electric and electronic devices (RoHS conformity).

ETAS confirms that the product meets this directive applicable in the European Union.

1.4.2 China

ETAS confirms that the product meets the "China RoHS" (Management Methods for Controlling Pollution Caused by Electronic Information Products Regulation) guidelines applicable to the People's Republic of China with a China RoHS label attached to the product or its packaging.

1.5 Product return and recycling

The European Union (EU) has issued the guideline on waste electric and electronic equipment (Waste Electrical and Electronic Equipment - WEEE) in order to ensure the institution of systems for collection, handling, and disposal of all electronic scrap.

This ensures that the devices are recycled in a resource-friendly way that does not represent any risk to personal health and the environment.

Fig. 1-1 WEEE symbol

The WEEE symbol on the product or its packaging identifies that the product may not be disposed of together with the remaining trash.

The user is obligated to separate the waste equipment and to provide it to the WEEE return system for reuse.

The WEEE Directive applies to all ETAS devices, but not to external cables or batteries.

Additional information about the recycling program of ETAS GmbH is available from the ETAS sales and service locations (see "ETAS Contact Addresses" on page 63).

1.6 About this manual

This manual consists of the following chapters:

- "Introduction" on page 5

  This chapter
- "Properties and Functions" on page 13

  This chapter contains a description of the properties and functions of the components of the ES5300.1-B Housing.
- "Configuration and Operation" on page 27

  This chapter contains information about the connection, configuration and operation of the ES5300.1-B Housing.
- "Connections and plug connections" on page 53

  This section provides a description of the different connections of the ES5300.1-B Housing.
- "Technical Data and Standards, Order Numbers" on page 59

  This chapter contains the technical data of the ES5300.1-B Housing and the order numbers.

1.6.1 Working with this manual

Presentation of information

All activities to be performed by the user are presented in a "Use Case" format. That is, the goal to be accomplished is briefly defined in the heading, and the respective steps required for reaching this goal are then presented in a list. The presentation looks as follows:

Target definition

Any advance information...

- Step 1

  Any explanation for step 1...
- Step 2

  Any explanation for step 2...

Any concluding comments...

Specific example:

Creating a new file

Before creating a new file, no other file may be open.

- Select **File** → **New**.

  The "Create File" dialog box appears.
- Enter the name for the file in the "File Name" field.

  The file name may not have more than 8 characters.
- Click on **OK**.

The new file is being created and saved under the name you specified. You can now work with the file.

Typographical conventions

The following typographical conventions are used:

Select **File** → **Open**.	Menu commands are displayed in bold/ blue.
Click on **OK**.	Buttons are displayed in bold/blue.
Press <ENTER>.	Keyboard commands are presented in angled brackets starting with capital letter.
The "Open file" dialog window appears.	Names of program windows, dialog windows, fields and similar are set in quotation marks.
Select the `setup.exe` file.	Text in selection lists, program code, as well as path and file names are displayed using the `Courier` font.
A conversion between the logical and arithmetic data types is *not* possible.	Content-based highlights and newly introduced terms are placed in *italics*.

Important notes for the user are presented as follows:

Note

Important note for the user.

2 Properties and Functions

This chapter contains a description of the properties and functions of the components of the ES5300.1-B Housing.

Specifically, these are:

- "Overview" on page 14
- "Front plate" on page 15
  - "Connecting modules to the breakout box" on page 17
  - "Control panel on the ES5300.1-A Housing" on page 17
- "Backplane" on page 18
  - "Supported interfaces" on page 18
  - "Backplane connections" on page 18
  - "Connection of backplane to Real-time PC" on page 19
- "Slots for I/O cards" on page 20
  - "Supported PCI Express cards" on page 21
  - "Integrating the ES4440 Compact Failure Simulation module" on page 22
- "Power supply" on page 22
- "Fan" on page 24
- "Voltage supply" on page 25
  - "Specifications" on page 25
  - "Safety concept" on page 25

2.1 Overview

The following figures show the ES5300.1-B Housing in different views. The numbering of the slots is indicated in the lower part.

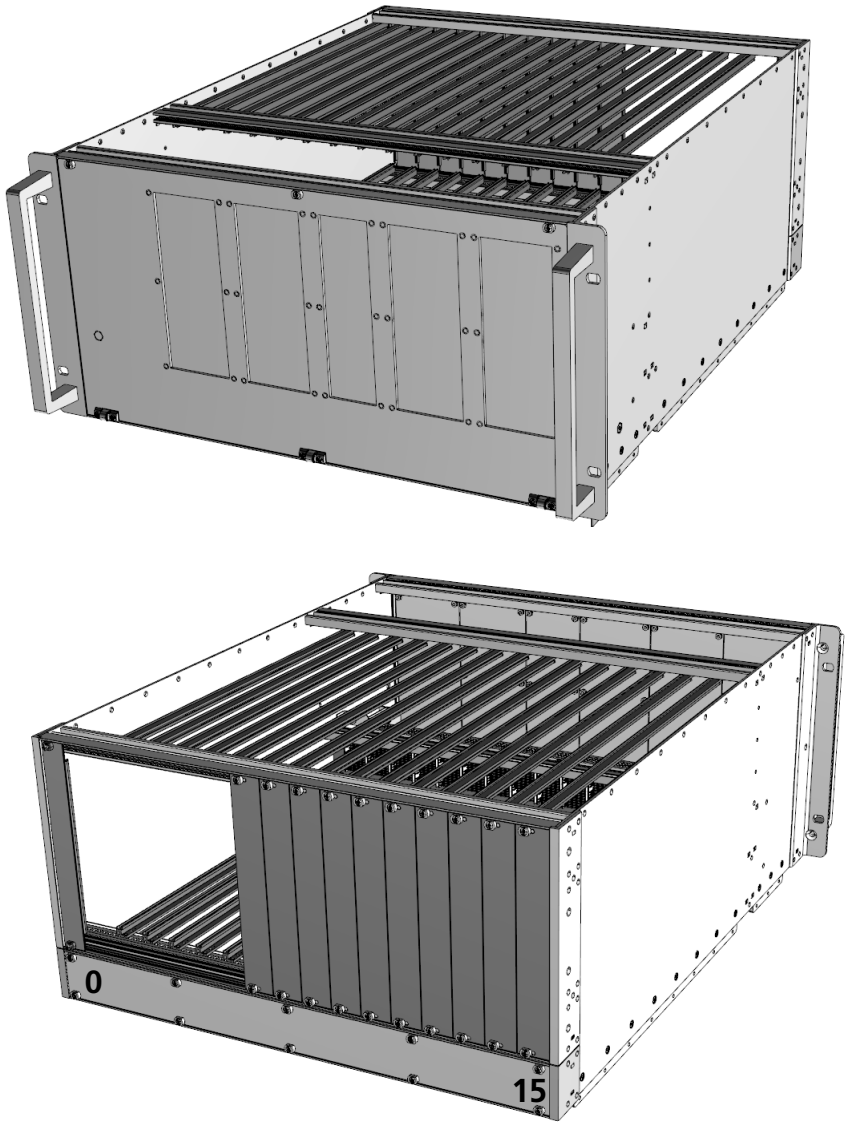


Fig. 2-1 Front (top) and rear side (bottom) of the ES5300.1-B Housing

WARNING!

The ES5300.1-B Housing may be used only together with the ES5300.1-A Housing. The ES5300.1-B Housing must be mechanically and electrically connected with the ES5300.1-A Housing according to the chapters "Cabling the ES5300.1-B Housing with the ES5300.1-A Housing" on page 38, and "Grounding contact" on page 28.

The housing essentially consists of the following:

- A rear side with 16 slots of hight 6 U with the corresponding backplane – see "Slots for I/O cards" on page 20 and "Backplane" on page 18.
- A front plate with possible access to the signals of the I/O cards - see "Front plate" on page 15.

2.2 Front plate

The front plate of the ES5300.1-B Housing features five recesses for the customer-specific connections of the internal cards to the ECU or a breakout box.

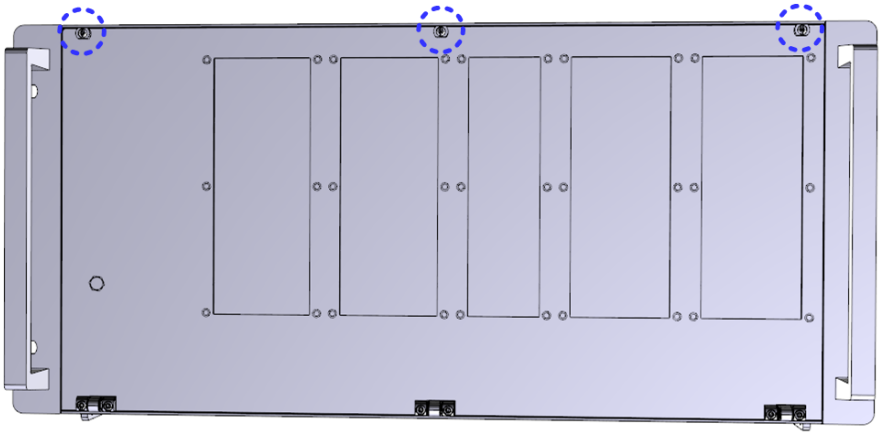


Fig. 2-2 The front plate of the ES5300.1-B Housing

After opening the three screws at the top edge, the front plate can be opened up.

2.3 Accessories

The following components are supplied as accessories for the ES5300.1-B Housing:

- ES5305.1 PCI Express GEN2 x4 cable adapter for ES5300 Housing and PCIe x4 Molex cable
- Flat ribbon cable for the angle cycle bus (sync and trigger)
- 2 covers for modules 2 and modules 3, prepared for ODU connector frame
- 2 edge protection elements for the top cable bushing

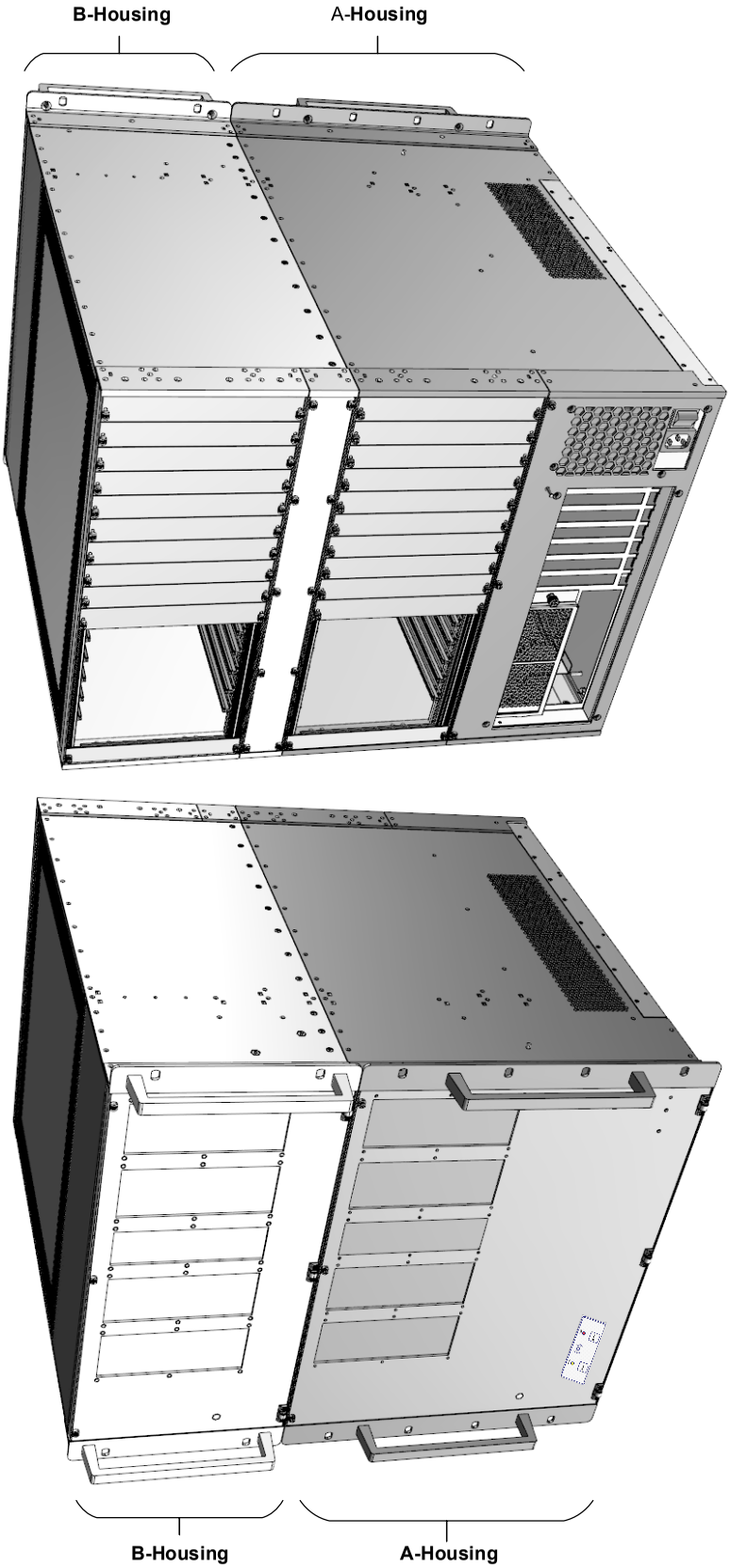


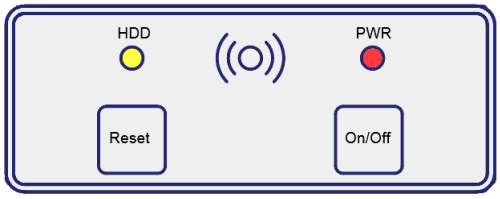
Fig. 2-3 ES5300.1-B Housing installed on ES5300.1-A Housing

2.3.1 Connecting modules to the breakout box

The connections for connecting the installed cards with the ECU or an inserted breakout box are designed by ETAS on a project-specific basis.

2.3.2 Control panel on the ES5300.1-A Housing

At the bottom left on the ES5300.1-A Housing is the control panel of the Real-time PC.



The buttons and LEDs have the following function/action:

- On/Off

  Switching on/booting the Real-time PC.

  Note

  Before switching on the Real-time PC, the power supply of the ES5300.1-A Housing (at the bottom right on the rear side) must be switched on. Afterwards, the green LED next to the switch must be lit.

- Reset

  Performs a reset of the Real-time PC.

- PWR

  Lights when the Real-time PC is running

- HDD

  Shows the activity of the hard disk

Between both LEDs is a small loudspeaker.

2.3.3 Interfaces of the ES5300.1-B Housing to the ES5300.1-A Housing

The ES5300.1-B Housing has the following mechanical and electrical interfaces to the ES5300.1-A Housing:

- Mechanical connection
- Voltage supply
- PCI Express interface
- Grounding (PE)
- Angle cycle bus

These interfaces are described in more detail in chapter 3 "Configuration and Operation".

2.4 Backplane

The PCI Express-based backplane of the ES5300.1-B Housing is identical with that of the ES5300.1-A Housing. It offers 16 identical slots that are connected with the Real-time PC via a PCI Express interface.

2.4.1 Supported interfaces

The individual slots of the ES5300.1-A and ES5300.1-B are connected to a GEN2 x4 PCI Express slot of the Real-time PC via a PCI Express switch. A standard PCI Express x4 cable is used for the connection, which is part of the scope of delivery of the ES5300.1-A Housing and the ES5300.1-B Housing.

- **PCI Express GEN2 x1**
  - GEN2 x1 interface (uses x16 plugs)
  - Switch latency ~200 ns
- **Battery node control**

  With the signals for the battery node control, it is possible to control six battery nodes [BN5..0] per slot. The battery node signals [BN5..0] are switched synchronously for all slots.
- **Angle cycle bus**

  For the synchronization between different ETAS cards and ES5300 housings.

Note

The maximum number of angle cycle bus nodes is 32! If ES5370.1 Carrier Boards are being used, the maximum number is 7, for ES5300.1-A Housing and ES5300.1-B Housing together!

- **Gigabit link**

  By connecting the master and slave card via the gigabit link, it is possible to address inputs and outputs of a slave card from the respective master card with the typically low latencies (< 1 µs).
- The gigabit link is always possible between pairs neighboring boards (0-1, 2-3, …, 15-16). The master board is inserted in the odd slot and the slave board in the even slot.

2.4.2 Backplane connections

The pin assignment of the backplane connections is located in the section "Backplane connections" on page 53.

2.4.3 Connection of backplane to Real-time PC

The connection between backplane and Real-time PC is done via a PCI Express adapter (ES5305.1 PCI Express GEN2 x4 cable adapter for ES5300 Housing). The PCI express adapter is inserted in an x4 PCI Express slot of the Real-time PC in the ES5300.1-A Housing and connected with the ES5300.1-A / ES5300.1-B backplane using a standard PCI Express cable.

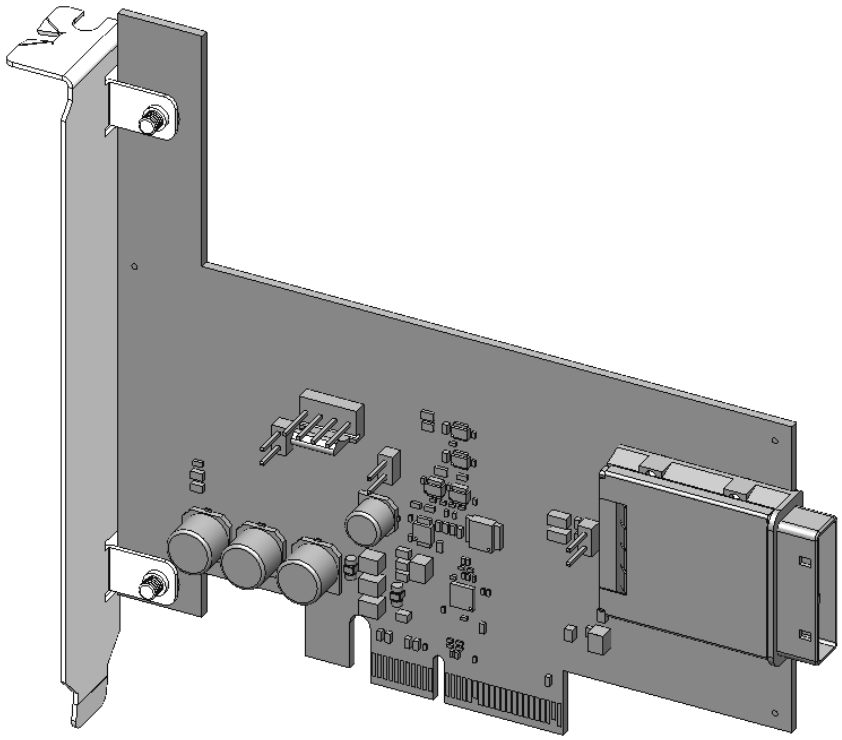


Fig. 2-4 ES5305.1 PCI Express GEN2 x4 cable adapter for ES5300 Housing

Note

The connections and jumpers of the ES5305.1 are for internal purposes and cannot be used by the customer. The card does not require any configuration!

Note

One ES5305.1 each is required for the control via PCIe for the ES5300.1-A Housing and the ES5300.1-B Housing. For this purpose, 2 PCIe slots on the RTPC main board are each occupied with an ES5305.1.

2.5 Slots for I/O cards

The ES5300.1-B Housing features 16 slots that accept different cards for signal I/O, load emulation and serial buses (see "Supported interfaces" on page 18). Some of the cards can be inserted directly, others have to be installed on adapters.

Overall, there are 32 slots available in combination with the ES5300.1-A Housing.

The slots are accessible from the rear side of the housings.The numbering of the slots is indicated in the upper part of Fig. 2-5.

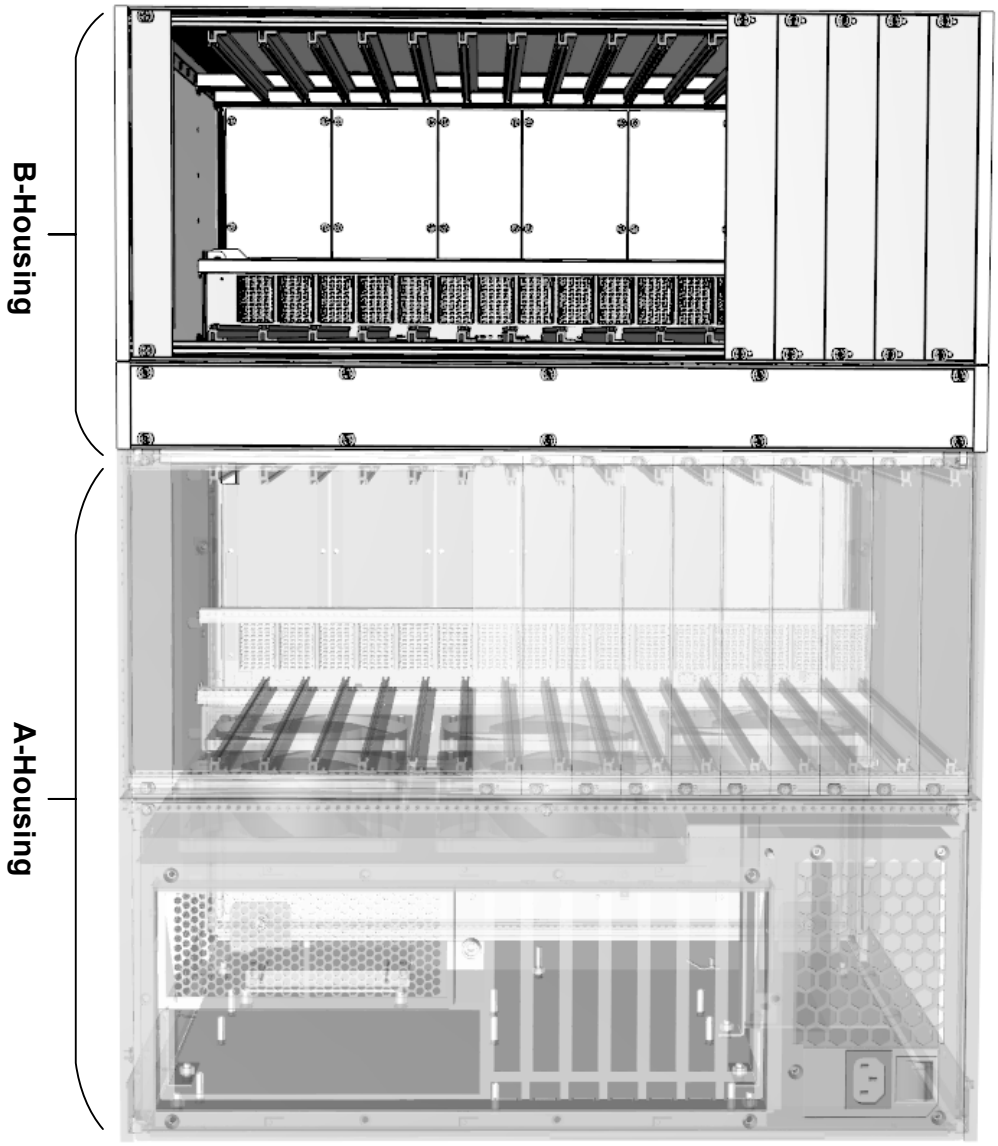


Fig. 2-5 Slots for the plug-in cards

2.5.1 Supported PCI Express cards

The following PCI Express cards from ETAS are supported, other cards are added on a regular basis:

- ES5321.1 PWM I/O Board
- ES5335.1 Arbitrary Signal Generator PCIe Board
- ES5338.1 Wheel Speed Sensor Simulation Board
- ES5340.1/.2-M Electric Drive Simulation Board
- ES5340.2-ICE Internal Combustion Application Board
- ES5340.1-S Electric Drive Slave Board (Multi I/O)
- ES5350.1 Analog Board
- ES5352.1 Signal Conditioning Board
- ES5370.1 Carrier board PCI Express x16 socket, GEN1/2 x1 link
- ES5371.1 Carrier Board for ES4435 Load Boards
- ES5372.1 Carrier Board for ES4455 Load Boards
- ES5385.1 Carrier Board for Resistor Cascade
- ES5392.1 High Current Switch Board

The ES5370 Carrier Board PCI Express x16 socket, GEN1/2 x1 link is required to operate the boards in one of the 16 PCIe slots.

The following (by LABCAR-OPERATOR supported) cards can be used:

- Elektrobit EB5100/EB5200 PCIe FlexRay
- IXXAT CAN-IB600/PCIe (CAN und CAN-FD)
- IXXAT CAN-IB200/PCIe (CAN und LIN)

In addition, it is possible to use cards that meet the PCI Express specification and can be operated with a Gen 1/Gen 2 x1 link.

Note

A detailed list of the usable cards is available from ETAS Support or ETAS Sales (see "ETAS Contact Addresses" on page 63).

2.5.2 Integrating the ES4440 Compact Failure Simulation module

The Ethernet interface "ETH1" (see ES5300.1-A User's Guide) allows integrating the ES4440 in the system.

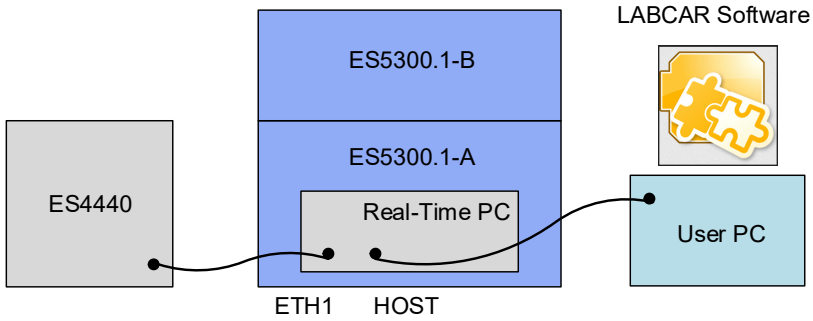


Fig. 2-6 Connection of ES4440 to ETH1

Note

To connect additional ES4100 housings or other ETAS devices (e.g. ES4408, …), the TP_4LAN_3U (LABCAR RTPC 3U 4-port Ethernet adapter, F-00K-106-345) can be used.

2.5.3 Power supply

The power supply is used for the voltage supply of the Real-time PC as well as the voltage supply of the backplane of the ES5300.1-A Housing and the ES5300.1-B Housing and consequently the cards located in the slots.

Details about the voltage supply are located under "Voltage supply" on page 25.

Note

If the power supply is defective, you can uninstall the Real-time PC insert (see "Opening/removing the Real-time PC insert" on page 47) and send it to ETAS for repair.

Power cord

Due to regional differences in the power supply, no power cords are provided for the ES5300.1-A Housing. The respective requirements and the ETAS order number are located in the following table.

Region	Description	Order number
General	Voltage supply cables with a IEC 60320 C13 plug at one end and a non-locking plug that meets the national safety requirements (equipped with grounding contacts) at the other end. Plugs and cable must be dimensioned at least for 250 VAC/10 A or 125 VAC/15 A.	-
China	Voltage supply cables for China for various ETAS devices with PRC/3 and IEC 60320 C13 plugs. Rating of 250 VAC/10 A, 2.50 m long	F-04A-109-512
Europe / Korea	Voltage supply cables for Europe and Korea for various ETAS devices with CEE7/7 and IEC 60320 C13 plugs. Rating of 250 VAC/ 10 A, 2.50 m long	F-04A-109-513
India	Voltage supply cables for India for various ETAS devices with IS 1293 (D) and IEC 60320 C13 plugs. Rating of 250 VAC/ 10 A, 2.50 m long	F-04A-109-514
Japan	Voltage supply cables for Japan for various ETAS devices with JIS C 8303 and IEC 60320 (C)13V plugs. Rating of 125 VAC/15 A, 2.50 m long	F-04A-109-515
North America	Voltage supply cables for North America for various ETAS devices with NEMA 5/15 - IEC 60320 C13M plugs. Rating of 125 VAC/ 15 A, 2.50 m long	F-04A-109-445
United Kingdom	Voltage supply cables for the UK for various ETAS devices with BS 1363/A and IEC 60320 C13 plugs. Rating of 250 VAC/ 10 A, 2.50 m long	F-04A-109-516

2.6 Fan

The ES5300.1-B Housing is ventilated via the fan unit of the ES5300.1-A Housing. The ventilation of the ES5300.1-A Housing consists of five individual fans and is located between the card slots and the Real-time PC insert. The air-flow is indicated by blue arrows in Fig. 2-7.

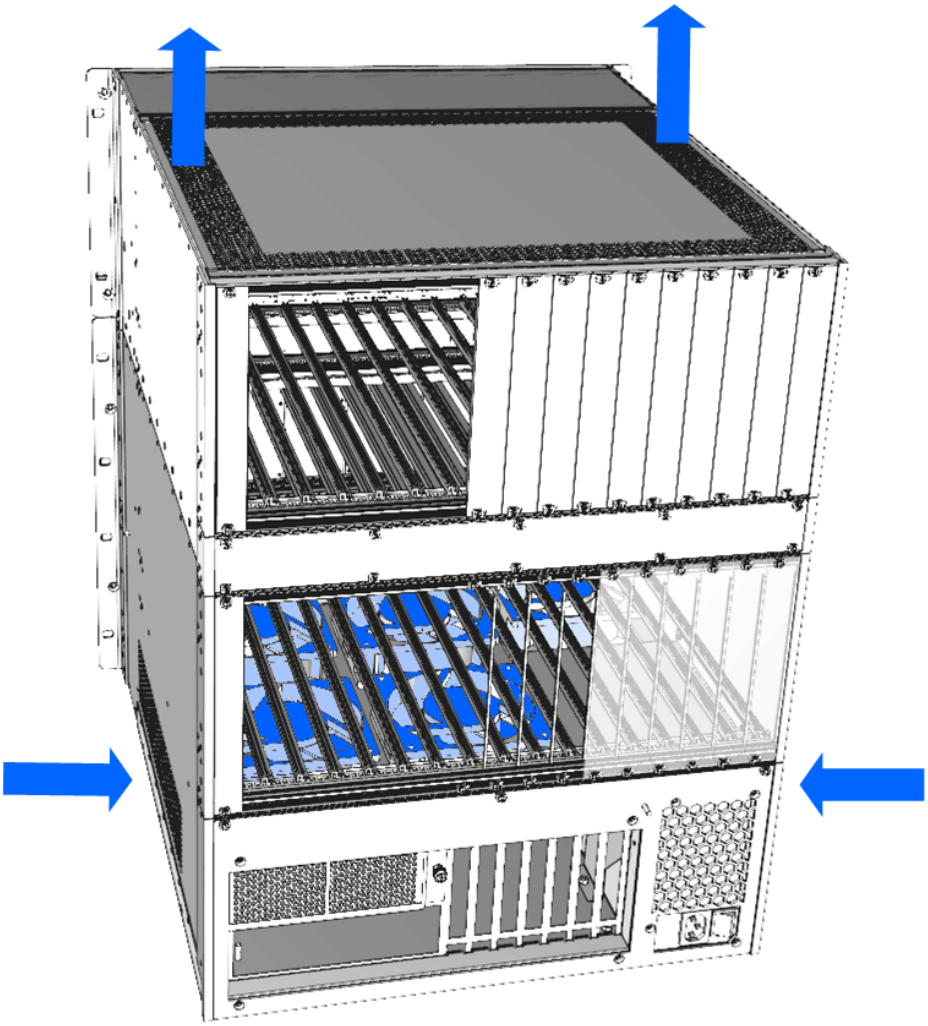


Fig. 2-7 The fan unit of the ES5300.1-A Housing (blue)

The technical data for the fan unit is located under "Fan unit" on page 60.

CAUTION!

*The six right-side slots (above the PC power supply) are cooled by only **one** fan. Do not insert any cards in these slots that develop a high amount of heat!*

CAUTION!

Unused slots must be fitted with covers during operation to ensure optimal air circulation. Failure to comply can lead to overheating, malfunctions or fire.

Monitoring the temperature and fan control

While booting the Real-time PC, the fans run at a speed of 1000 rpm for some time, then the automatic speed control takes over. The fans cannot be switched off.

2.7 Voltage supply

The voltage supply of the Real-time PC as well as the slots (backplane) is handled by the power supply of the Real-time PC. A high-performance power supply with an ETAS-specific cable harness is being used.

2.7.1 Specifications

The specifications of the power supply are located in the technical data in the ES5300.1-A Housing User's Guide. The line assignment is described under "Voltage supply connections" on page 55.

2.7.2 Safety concept

The power supply features protective functions against short circuit, overload, overvoltage and overcurrent. In addition, it features an internal fuse cut-out, which cannot be replaced by the user.

Note

In case of a defect of the power supply, the "Real-Time PC" component can be uninstalled (see "Opening/removing the Real-time PC insert" on page 47).

3 Configuration and Operation

This chapter contains information about the connection, configuration and operation of the ES5300.1-B Housing.

Specifically, these are:

- "Before you begin" on page 27
  - "Safety precautions" on page 27
- "Assembly of the ES5300.1-B Housing on the ES5300.1-A Housing" on page 32
- "Cabling the ES5300.1-B Housing with the ES5300.1-A Housing" on page 38
- "Preparing the connections" on page 42
  - "Installation of connecting modules" on page 42
  - "Open the cable duct" on page 42
  - "Cable routing" on page 44
- "Installing cards" on page 45
  - "Preparations" on page 45
  - "Wait a few minutes for the components (capacitors, etc.) to be discharged." on page 45
- "Control PC" on page 45
  - "Connecting the control computer" on page 46
  - "Configuring the RTIO" on page 46
- "Switching on ES5300.1-A" on page 46
- "Opening/removing the Real-time PC insert" on page 47
- "Maintenance" on page 52
  - "Cleaning" on page 52

3.1 Before you begin

Before you begin with the startup, carefully read the following sections and, in particular, observe all notes and warnings.

3.1.1 Safety precautions

This section describes the safety precautions that have to be observed during the setup and operation of the ES5300.1-B Housing.

Transport/installation

The ES5300.1-B Housing, together with the ES5300.1-A Housing, weighs at least 30 kg without plug-in boards. Only lift and carry the transport box with two persons or a lifting device.

CAUTION!

When installing the bolted combination of ES5300.1-A Housing and ES5300.1-B Housing, it must be observed that no cables are pinched or sheared.
All network lines in the rack or enclosure must be de-energized during installation. Before switching on the complete supply, all country-specific measures for startup and assurance of safety precautions for electrical resources must be taken to ensure that no parts are under voltage or that no risk of fire can occur.

CAUTION!

The insert rails of the 19" rack must be specified for twice the total weight (A and B Housing + populated boards). If the insert rails are dimensioned for a weight that is too low, they can deform or break apart.

Operation only in the enclosure or 19" rack

Start up the ES5300.1-B Housing only if it is installed in a 19" rack. During operation, it is absolutely necessary to observe the safety notices for ventilation (see "Ventilation" on page 31).

CAUTION!

Danger caused by dropping parts
The rails of the 19" rack must be specified for double total weight (A-Housing + populated boards)
If the rails are designed for a smaller weight, they might deform or break.
Only use rails that are designed for at least 100 kg per pair.

Grounding contact

The grounding of the complete system is done via the grounding conductor of the power cord. Avoid the risk of electric shock when touching housing components by ensuring that the power connection used features correctly connected grounding contacts.

DANGER!

Danger of electrocution
If no proper grounding exists via the grounding conductor, housing components that can be touched may be energized. This can lead to serious injuries or death!
For this reason, it is absolutely necessary to ensure that the power cord is equipped with correctly connected grounding contacts!
If this cannot be ensured, connect an additional grounding to the PE terminal (Fig. 3-4 on page 30).

CAUTION!

The PE star point for the ES5300.1-A / ES5300.1-B Housing is in the insert of the ES5300.1-A Housing. The PE star point must be fastened with a torque of 0.8 Nm.
If the PE star point is fastened too loosely, there is no guarantee for a reliable protection through grounding.

A block diagram for the cabling of the PE connections of the ES5300.1-A Housing and ES5300.1-B Housing is shown in Fig. 3-1 on page 29.

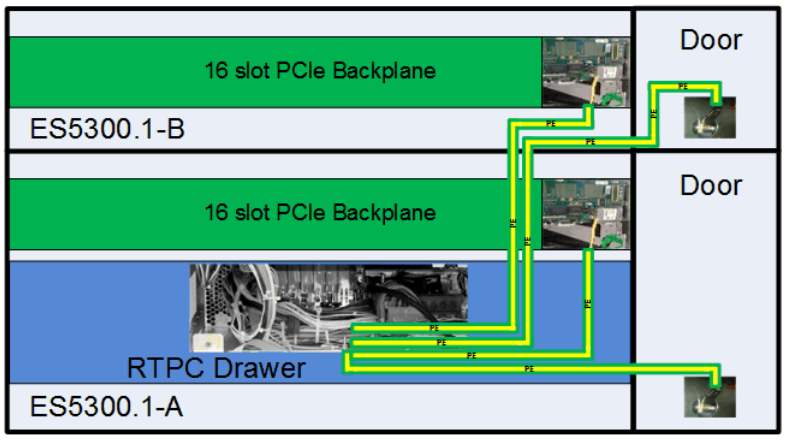


Fig. 3-1 Block diagram for internal cabling of the PE connections

The ES5300.1-B Housing is delivered with PE connection for connecting to the PE star point (yellow-green cable) and must be connected with the PE star point in the RTPC drawer of the ES5300.1-A Housing (see Fig. 3-2 on page 29).

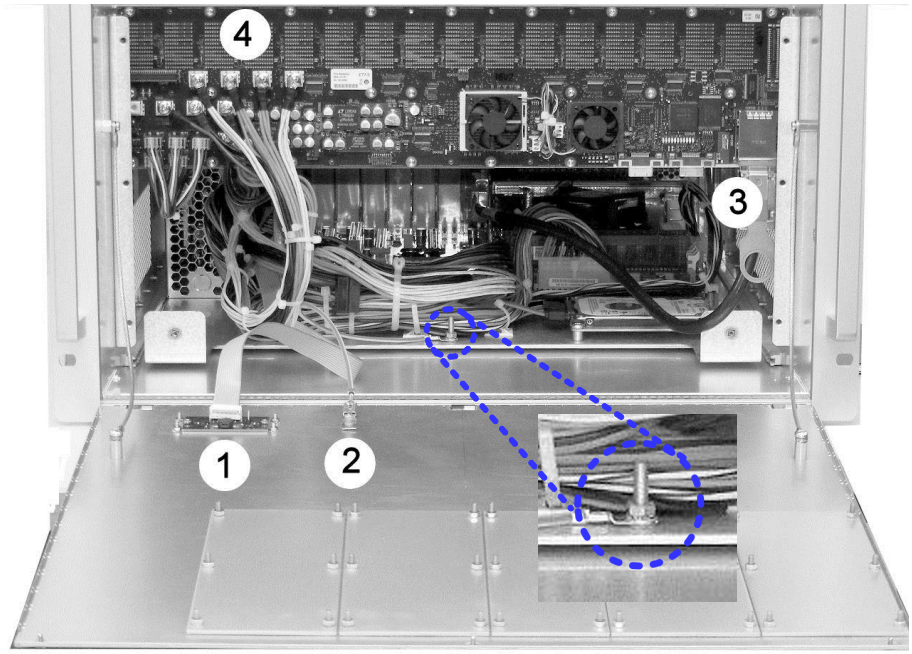


Fig. 3-2 PE star point in the RTPC drawer of the ES5300.1-A Housing

An additional cable for connecting the front door to the PE contact is included. A PE contact is located on the inside of the front door of the ES5300.1-A Housing and the ES5300.1-B Housing (see Fig. 3-3)

Fig. 3-3 PE contact on the inside of the front door of the ES5300.1-A Housing and the ES5300.1-B Housing

The PE terminal of the housing is shown in the following figure.

Fig. 3-4 PE terminal at the ES5300.1-A Housing

Checking the connections of the protective conductors

DANGER!

If no proper grounding exists via the grounding conductor, housing components that can be touched may be energized. This can lead to serious injuries or death!

1. After assembly of both housings check all electrical connections of all protective conductors between the PE star point and the PE contacts on the inside of the front doors of the ES5300.1-A Housing and the ES5300.1-B Housing.
2. Check the mechanical connections and routing of all protective conductors (visual inspection).
3. Document the test result.

Line disconnecter

The switch next to the power supply plug on the ES5300.1-A Housing serves as line disconnecter.

Note

Disconnect the ES5300.1-A Housing from the supply system during a thunderstorm or install corresponding protection devices!

Ventilation

If the ES5300.1-A Housing together with ES5300.1-B Housing is being operated in the enclosure (see "Operation only in the enclosure or 19“ rack" on page 28), please observe the following points:

- The enclosure and particularly the ventilation openings must have a minimum distance of 15 cm to walls or objects in the environment.
- Leave the enclosure open at the rear.

If the ES5300.1-A Housing mit ES5300.1-B Housing is being operated in the 19“ rack, please observe the following points:

- The ventilation openings must have a minimum distance of 15 cm to walls or other objects in the environment. Keep a minimum distance of 1 U at the top to the next component.
- The ambient temperature in the rack must not exceed the permissible maximum value (see "Ambient conditions" on page 60) of 40 °C/104 °F.

CAUTION!

Unused slots of the ES5300.1-A Housing and the ES5300.1-B Housing must be fitted with the supplied covers to ensure an optimal air circulation. Failure to comply can lead to overheating, malfunctions or fire.

CAUTION!

The front doors must be closed during operation to ensure optimal air circulation. Failure to comply can lead to overheating, malfunctions or fire.

Note

If you install plug-in cards, please note that a reduced air circulation exists above the power supply (i.e. for the six slots on the right) (see "Fan" on page 24).

Connecting cable

Use only approved cables for creating cable assemblies (e.g. for connecting the ECU and external loads).

Note

The cables used must be suitable particularly for occurring currents, voltages and temperatures and flame-retardant in accordance with one of the following standards IEC 60332-1-2, IEC 60332-2-2, UL 2556/UL1581VW-1!

Cleaning

Before cleaning housing parts, remove the power cord. Clean the device with a dry cloth only. Do not use any cleaning agents and solvents!

Clean the filter of the rear ventilation opening once a year (see "Cleaning" on page 52).

Connecting/disconnecting devices

See "Connecting/disconnecting devices" on page 6.

Opening the housing

The ES5300.1-B Housing may be opened only by qualified technical personnel!

DANGER!

As long as the ES5300.1-B Housing is not completely disconnected from the supply system, there is a risk of electric shock!
Disconnect the connection to the supply system by switching off (see "Line disconnecter" on page 31) and removing the power cord – wait a few minutes afterwards until all components (e.g. power supply, capacitors) are completely discharged.

3.2 Assembly of the ES5300.1-B Housing on the ES5300.1-A Housing

The assembly of the ES5300.1-B Housing on the ES5300.1-A Housing is described below.

CAUTION!

The guide rail in the 19" rack must be suitable for twice the weight of the ES5300.1-A Housing, the ES5300.1-B Housing and the plug-in boards altogether.

CAUTION!

The ES5300.1-B Housing may be operated only in combination with the ES5300.1-A Housing in a 19" rack. It must be firmly connected with the ES5300.1-A Housing mechanically and electrically.

CAUTION!

At least one height unit must be kept open above the ES5300.1-B Housing for ventilation purposes. It is recommended to separate air duct devices into inlet air and exhaust air and to promote the air exchange.
If the ES5300.1-B Housing is not sufficiently ventilated, it may lead to overheating, malfunctions and fire.

CAUTION!

To install the combination of ES5300.1-A Housing and ES5300.1-B Housing in a 19" rack, it must be lifted with two persons or a lifting device.

CAUTION!

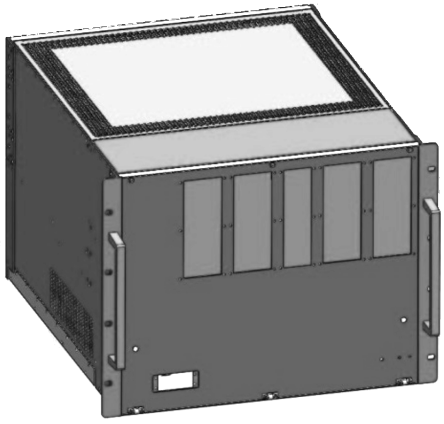
When assembling the ES5300.1-B Housing on the ES5300.1-A Housing, ensure that no cables are damaged. Damaged cables can lead to malfunctions or fire.

CAUTION!

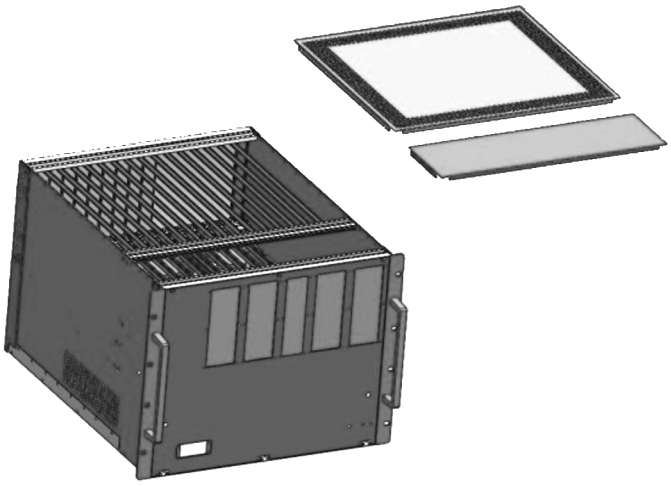
When assembling the ES5300.1-B Housing on the ES5300.1-A Housing, note that the EMC seals and springs of the card slot have sharp edges. To avoid injuries to the hands, it is recommended to wear safety gloves.

Assembly of the ES5300.1-B Housing on the ES5300.1-A Housing

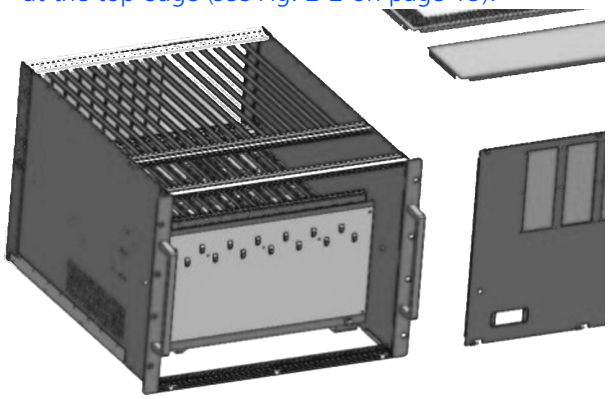
4. Provide a ES5300.1-A Housing on a non-slip and level ground.



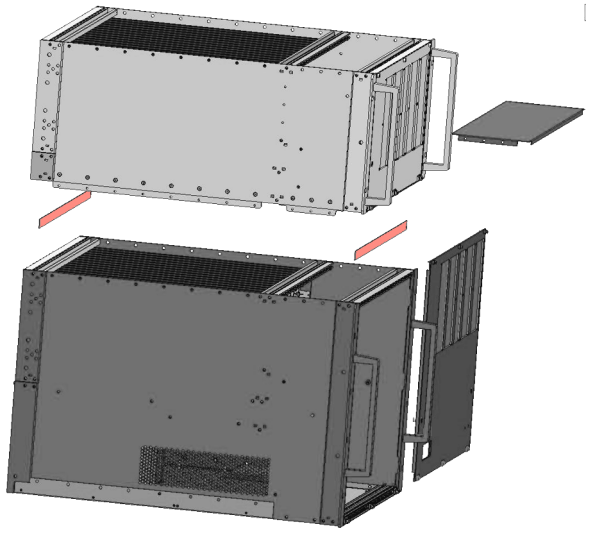
5. Remove the front and rear cover plate



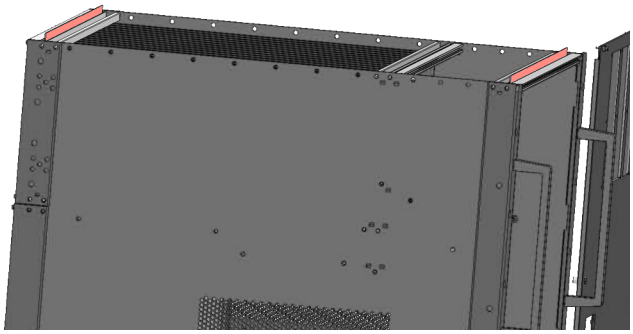
6. Open the front door by loosening the three screws at the top edge (see Fig. 2-2 on page 15).



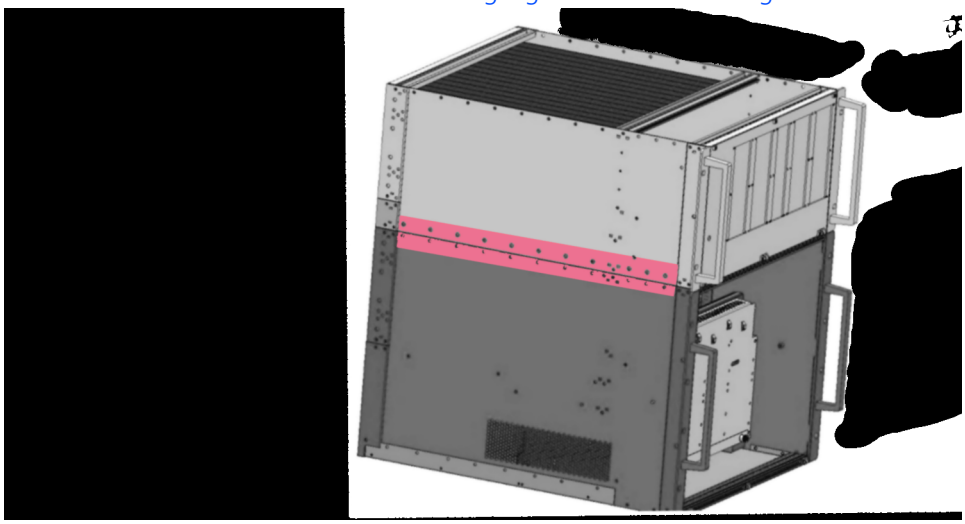
7. Place the supplied EMC sheet metal strips in the front and rear module rail of the ES5300.1-A Housing.



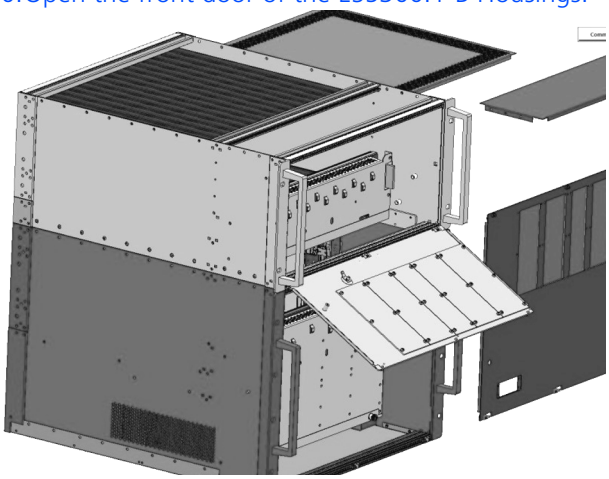
8. The ES5300.1-A Housing is now ready for flanging the ES5300.1-B Housing.



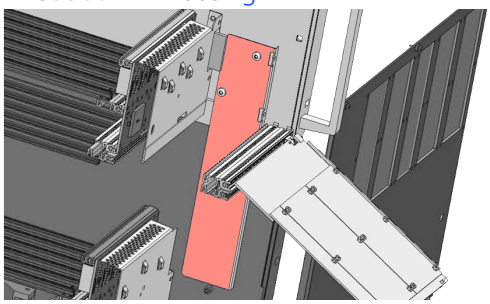
9. Place the ES5300.1-B Housing on the ES5300.1-A Housing. The EMC sheet metal strips must engage in the upper and lower module rails. Screw the ES5300.1-A Housing and the ES5300.1-B Housing together at the two side walls by fastening the screws highlighted in red in the figure below.



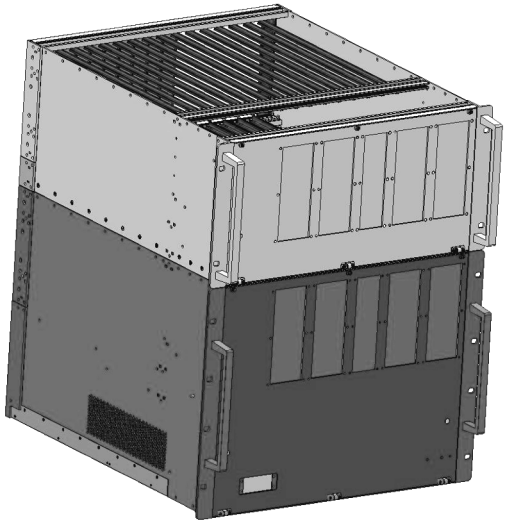
10. Open the front door of the ES5300.1-B Housings.



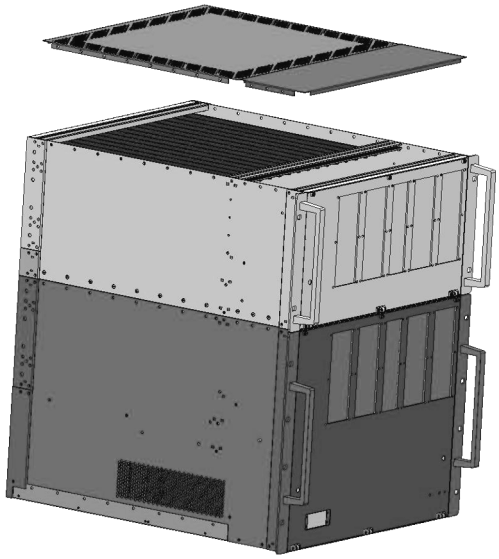
11. Remove the red colored cable duct. Connect the angle cycle bus flat ribbon cable (see also Fig. 3-8 on page 41). Install the cable duct for the angle cycle bus flat ribbon cable on the right side of the ES5300.1-B Housing.



12. Close the front door of the ES5300.1-A Housing by fastening the three screws at the top edge of the front door.



13. Reinstall the front and the rear cover plate (see also 2.) on the ES5300.1-B Housing.



3.3 Cabling the ES5300.1-B Housing with the ES5300.1-A Housing

The ES5300.1-B Housing is connected with the ES5300.1-A Housing using cables (power supply cable, PCIe cable, PE and angle cycle bus flat ribbon cable) and plug connectors.

The ES5300.1-B Housing is delivered with the following cables:

- Prefabricated cable for voltage supply and PE connection of the backplane
- Cable for connecting the front door to the PE
- Standard PCI Express cable for connecting the backplane
- Flat ribbon cable for angle cycle bus for the connection from the ES5300.1-B Housing with the ES5300.1-A Housing

The cables and plug connectors are described below.

DANGER!

The cabling of the ES5300.1-B Housing with the ES5300.1-A Housing and the components it contains is generally performed by ETAS personnel. The cabling may be performed only by an electrician. Incorrect cabling can lead to malfunctions, fires, serious injuries or death.

3.3.1 Voltage supply with Molex power plug connector

In the lower part of the RTPC drawer of the ES5300.1-A Housing, the cable strand of the power supply features 4 Molex plug connectors for the voltage supply of the backplane of the ES5300.1-A Housing and the ES5300.1-B Housing. The cable strands of the backplanes for the ES5300.1-A and ES5300.1-B Housings are prefabricated with the counterplugs. Fig. 3-5 shows 2 pairs of plugs for connecting a backplane. The figure shows the position of the plug connectors.

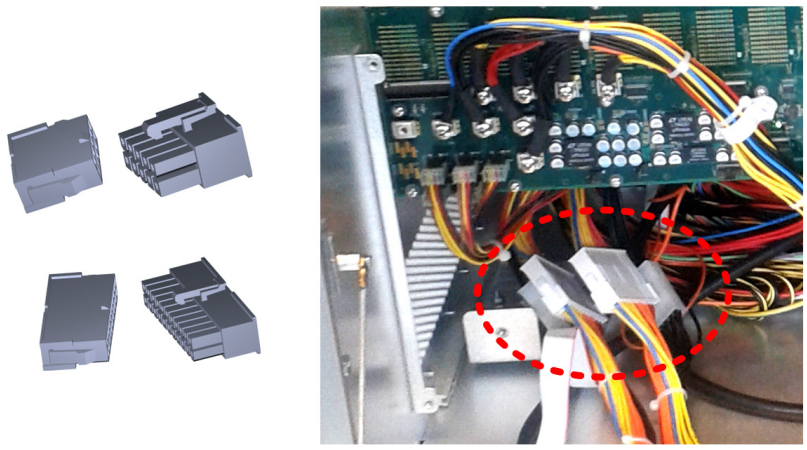


Fig. 3-5 Pairs of Molex plug connectors for connecting the voltage supply of the backplane

The cables for the voltage supply of the ES5300.1-B backplane must be routed behind the backplane cover of the ES5300.1-A.

In the chapter Connections and plug connections, Fig. 4-4 on page 57 presents a schematic representation of the cabling for the voltage supply of the ES5300.1-A and ES5300.1-B backplanes.

3.3.2 Connection to the RTPC via ES5305.1 and PCI Express cable

For the connection to the RTPC via PCI Express, the supplied ES5305.1 PCI Express GEN2 x4 cable adapter for ES5300 Housing must be inserted in a PCIe slot of the RTPC main board in the ES5300.1-A Housing. Read "Opening/removing the Real-time PC insert" on page 47 for this purpose.

Fig. 3-6 shows a schematic representation of the connection with the PCI Express cable.

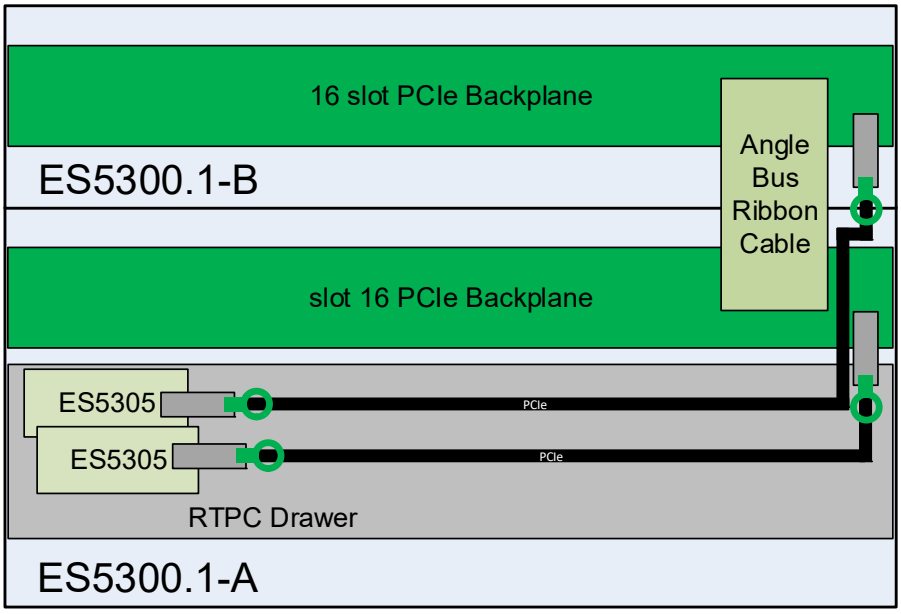


Fig. 3-6 Block diagram for connecting the flat ribbon cable for angle cycle bus signals and the X4 PCI Express cable (black)

The connection of the ES5305.1 with the backplane of the ES5300.1-B Housing is done with the supplied PCI Express cable (see Fig. 3-7).

The PCIe cable is connected to the CO4500 plug connectors at the backplanes of the ES5300.1-A Housing and the ES5300.1-B Housing. The CO4500 plug connector is located at the bottom right of the respective backplane.

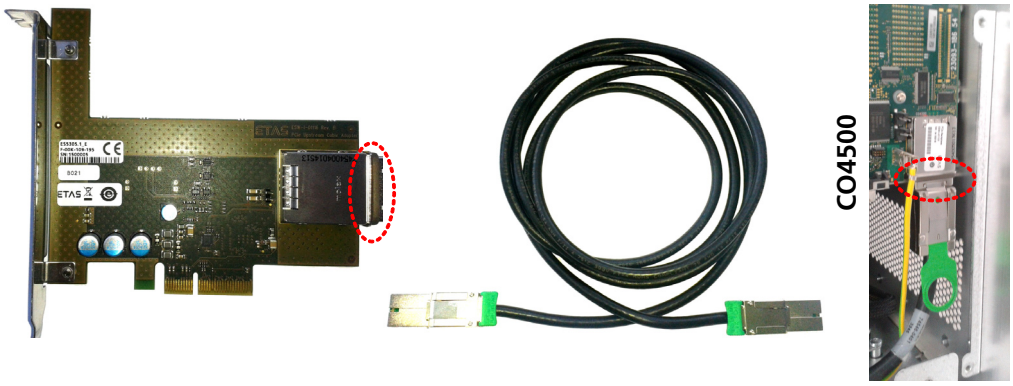


Fig. 3-7 ES5305.1, X4 PCI Express cable and PCIe plug connector at the ES5300.1-B Housing

Note

Slightly pulling on the green ring makes it possible to easily pull out the X4 plug. Do not apply any great forces in order to insert or disconnect the plug.

3.3.3 Connecting the angle cycle bus interface (sync and trigger) with flat ribbon cable

The supplied flat ribbon cable for transferring the angle cycle bus signals (sync and trigger) is used to connect the backplane of the ES5300.1-A Housing with that of the ES5300.1-B Housing according to Fig. 3-6 and Fig. 3-8.

The counterplugs for the flat ribbon cable are each located at the top right on the backplane of the ES5300.1-A Housing and the ES5300.1-B Housing.

The flat ribbon cable is used to install the cable duct.

Note

When installing the cable duct, ensure that the flat ribbon cable is not being damaged, pinched or jammed.

Fig. 3-8 Connecting the flat ribbon cable with the backplane. The counterplug is circled in red.

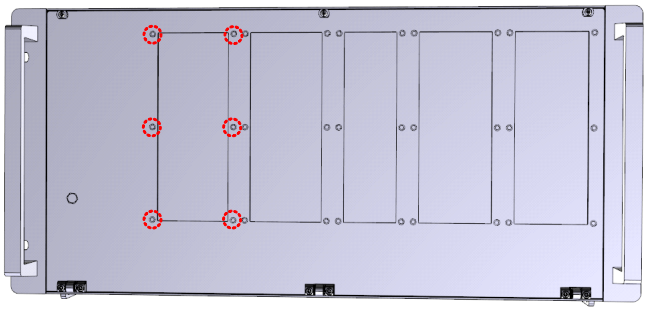
3.4 Preparing the connections

The connection of the installed cards can be done either via special plug connectors on the front plate (modules) or the connecting lines are routed via the cable duct (front third of the housing ceiling) to a breakout box, etc.

3.4.1 Installation of connecting modules

Proceed as follows to install connecting modules:

- Loosen six nuts (5.5 hex head) at the existing dummy plates (inside at the front plate) and remove them.



- Insert the connecting module and reattach the nuts.

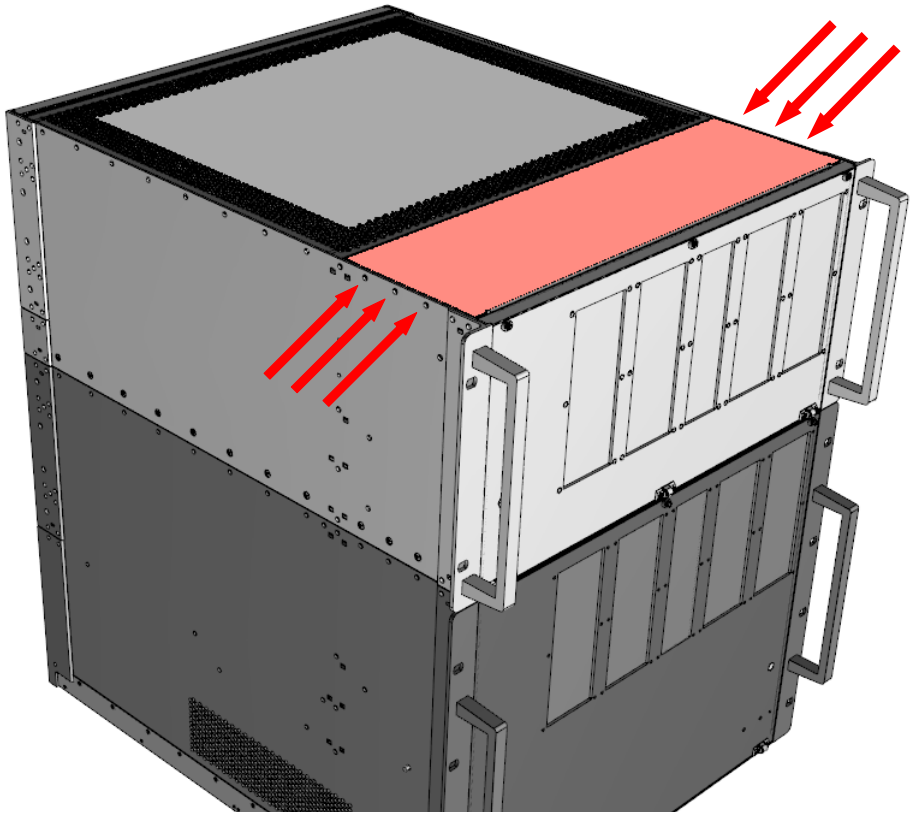
Note

The scope of delivery also includes two support frames for modules.

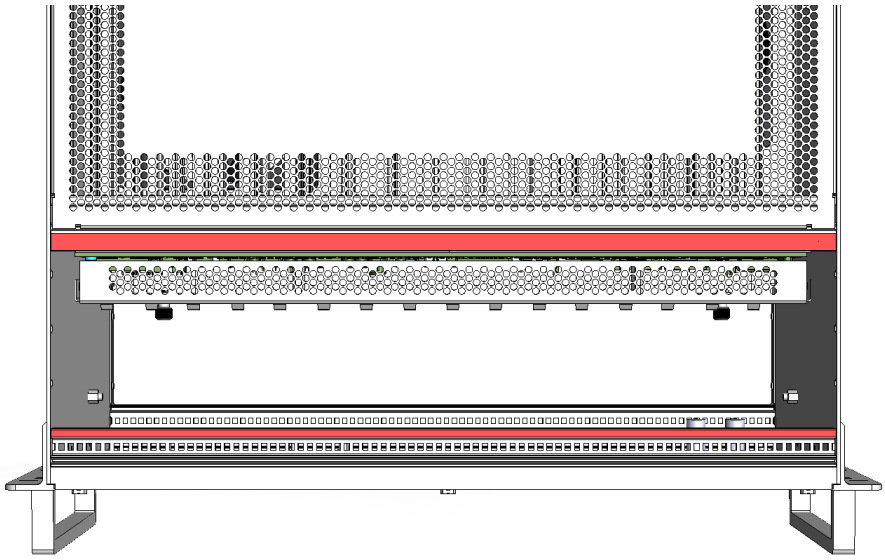
3.4.2 Open the cable duct

If you want to route the connecting lines out via the cable shaft, the cover plate of the cable shaft needs to be removed.

- Open the six screws (Torx T20), with which the cover is fastened, and remove them.

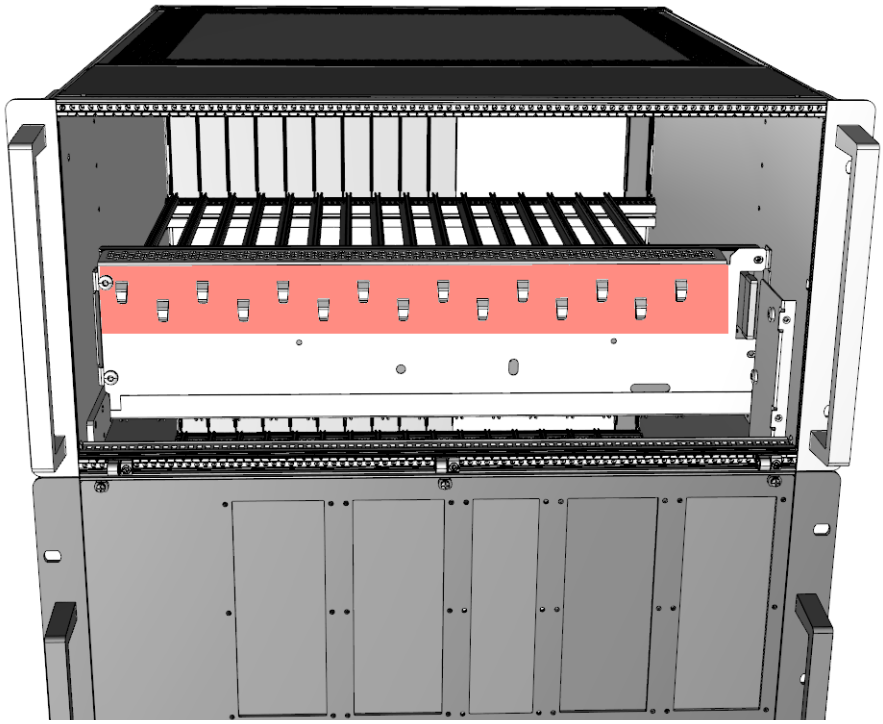


- Attach the supplied edge protection profiles (marked in red) to the two longitudinal edges.



3.4.3 Cable routing

For safe routing and for strain relief of the connecting lines, the backplane cover features 16 grommets in which lines can be fixed with cable ties.



CAUTION!

With improper routing of the lines, they can be damaged when opening or closing the front door. This can lead to short circuits and the damage or destruction of electronic components.
Route the lines so that the front door can be opened unobstructed and that no cables can be jammed when closing the front door!

CAUTION!

Before the front doors may be opened, installed plugs and cables must be removed. Otherwise, the door springs open too fast. This can lead to personal injuries or damage to the door, holding ropes or cables.

CAUTION!

The front doors must be closed during operation to ensure optimal air circulation. Failure to comply can lead to overheating, malfunctions or fire.

3.5 Installing cards

This section describes how to install cards (on the carrier board) in the ES5300.1-A.

3.5.1 Preparations

Before you start, create ESD-compliant conditions at your workplace.

CAUTION!

The plug-in cards of the ES5300.1-A Housing can be damaged or destroyed by electrostatic discharges. Plug-in cards may be removed from the transport packaging, configured and installed only at a workplace that is secured against electrostatic discharges. Avoid any contact with the connections of the plug-in card or with conductor paths on the card.

CAUTION!

Do not install any adapters while the ES5300.1-A Housing is switched on.
First, switch off the ES5300.1-A Housing by shutting down the real-time PC and pressing the On/Off switch at the rear.

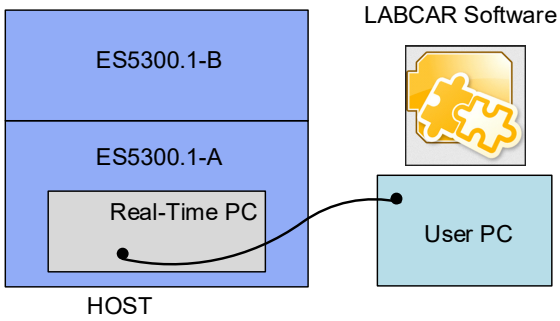
- Shut down the Real-time PC and switch off the power supply of the ES5300.1-A using the switch at the rear of the housing.
- Wait a few minutes for the components (capacitors, etc.) to be discharged.

3.6 Control PC

The control PC (not part of the scope of delivery of the ES5300.1-A Housing) contains the LABCAR software with which the projects are created and executed – in addition, the Real-time PC can be configured and controlled on the control PC using a web interface.

3.6.1 Connecting the control computer

- Connect the control PC to the Real-time PC of the ES5300.1-A using the "HOST" Ethernet port.



After the Real-time PC has been started up, its availability can be tested using a `ping` (see "Checking the availability of the Real-time PC" on page 47).

3.6.2 Configuring the RTIO

The configuration of the cards in the ES5300.1-A is done (if required) with LABCAR-RTC (LABCAR Real-Time Execution Connector). Relevant information is located in the LABCAR-RTC User's Guide, which is part of the documentation packet of LABCAR-OPERATOR.

Note

The support of the ES5300.1-A Housing is done by LABCAR-OPERATOR starting with version 5.2.1. The ES5300.1-B Housing is supported starting with LCO5.4.1.

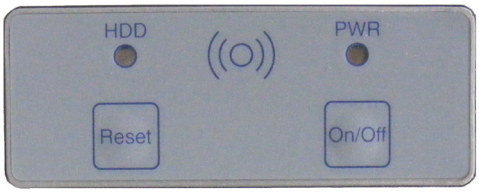
3.7 Switching on ES5300.1-A

Powering on and booting the Real-time PC

- Switch on the power supply (on the rear side at the bottom right).

The green LED lights up.

- Switch on the Real-time PC with **On/Off**.



The Real-time PC boots.

Note

For information about configuration and operation of LABCAR-RTPC, please see the LABCAR-RTPC - User's Guide.

After booting the PC, you will hear an ascending sound sequence.

Checking the availability of the Real-time PC

- Change to the host.
- Select **Run** from the start menu.
- Enter "cmd".

  The input prompt opens.
- Enter the following:

  `ping 192.168.40.14`

```
U:\>ping 192.168.40.14

Ping wird ausgeführt für 192.168.40.14 mit 32 Bytes Daten:

Antwort von 192.168.40.14: Bytes=32 Zeit=4ms TTL=64
Antwort von 192.168.40.14: Bytes=32 Zeit<10ms TTL=64
Antwort von 192.168.40.14: Bytes=32 Zeit<10ms TTL=64
Antwort von 192.168.40.14: Bytes=32 Zeit<10ms TTL=64

Ping-Statistik für 192.168.40.14:
    Pakete: Gesendet = 4, Empfangen = 4, Verloren = 0 (0% Verlust),
Ca. Zeitangaben in Millisek.:
    Minimum = 0ms, Maximum =  4ms, Mittelwert =  1ms
```

- As an alternative, you can also open the web interface (http://192.168.40.14) in your browser.

3.8 Opening/removing the Real-time PC insert

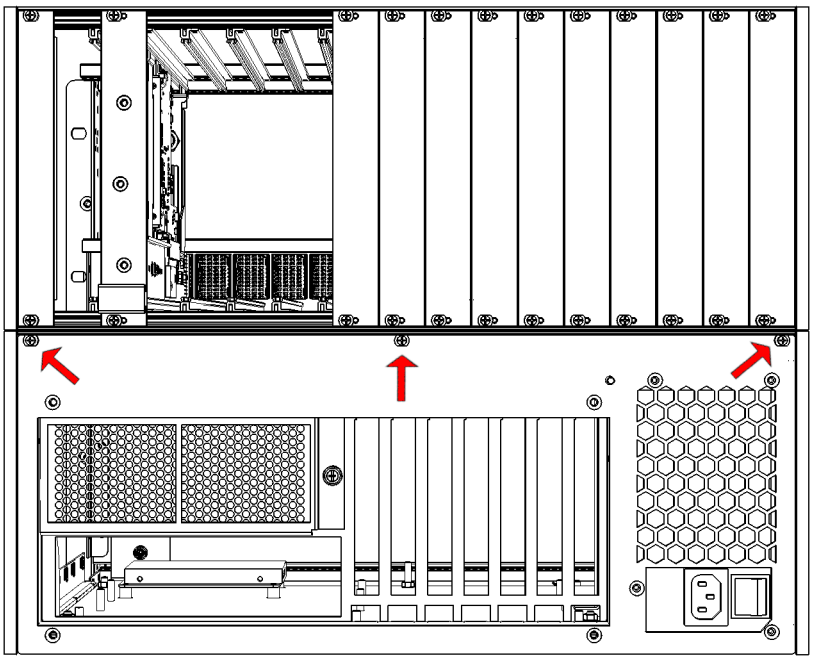
The Real-time PC can be opened to install hardware inside of it – if the power supply is defective, the Real-time PC can be completely removed without any trouble and sent in to ETAS for repair.

CAUTION!

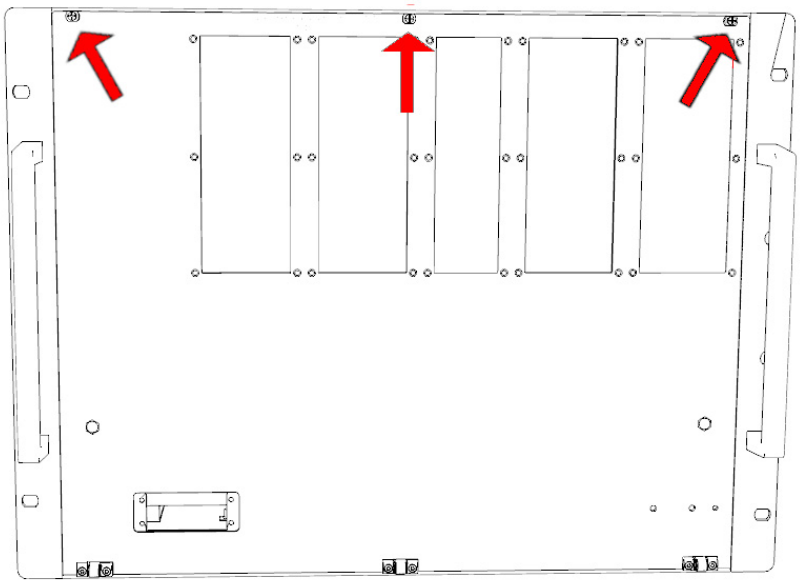
To avoid property damages and personal injuries, the removal may be performed only by technical personnel which has previously been instructed by ETAS! It is absolutely necessary to observe the safety notices in section 3.1 on page 27.

Opening the Real-time PC insert

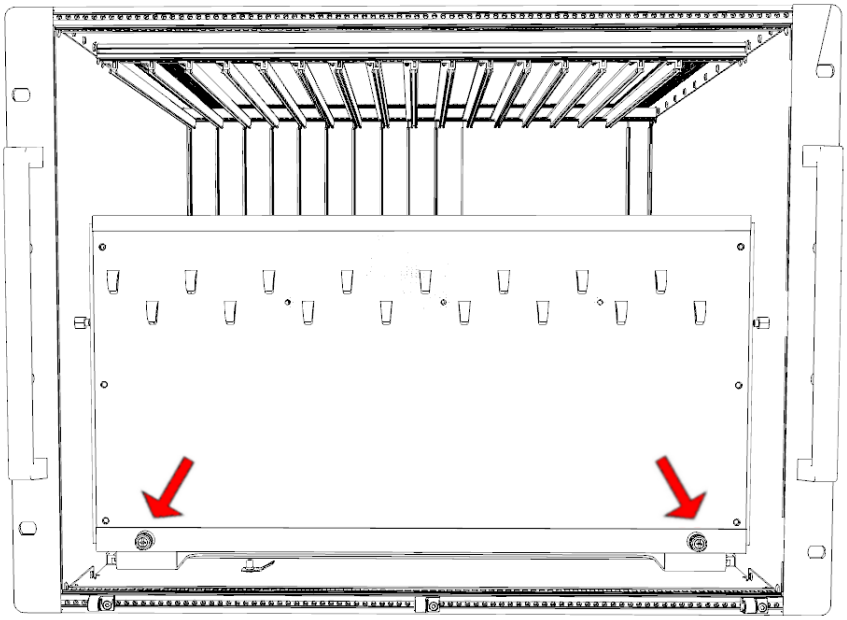
- Shut down the Real-time PC with the switch on the front plate.
- Switch off the power supply with the power supply switch (bottom right on the rear side of the housing).
- Remove the power cord.
- Remove all cables that may be attached to cards in the slots of the Real-time PC, such as the Ethernet cable for connecting the control computer.
- Open the three screws at the top side of the insert (rear side).



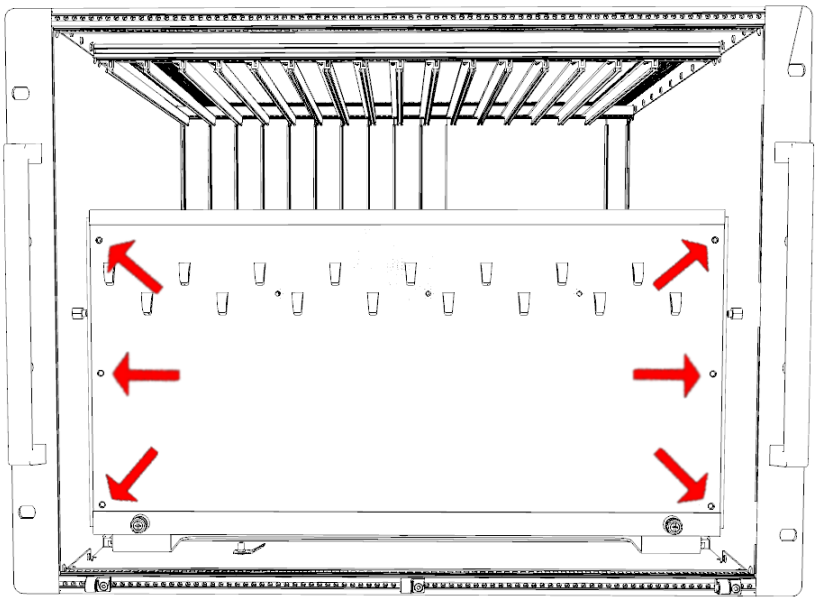
- Loosen the screws that secure the front plate and fold it open.



- Loosen the two knurled screws that secure the insert.



- Loosen the 6 Torx screws (T20) that secure the cover plate of the backplane and carefully remove it. For this purpose, the cover plate must be pulled out sloping to the front above the door support points.



The Real-time PC can now be pulled out up to the locking mechanism.

Note

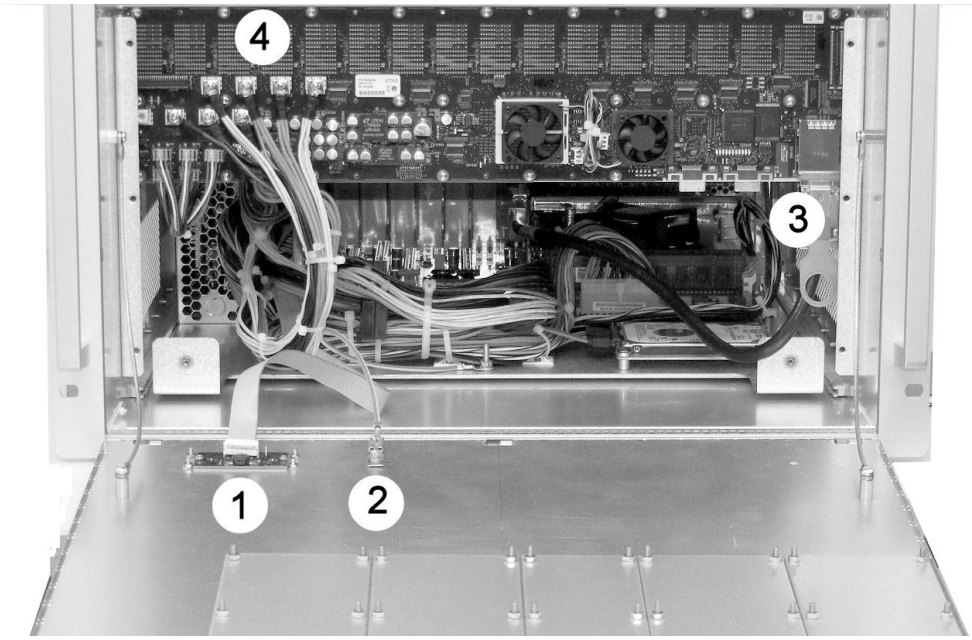
When pulling out or pushing in the Real-time PC, ensure that the lines are not subjected to mechanical stress!

Note

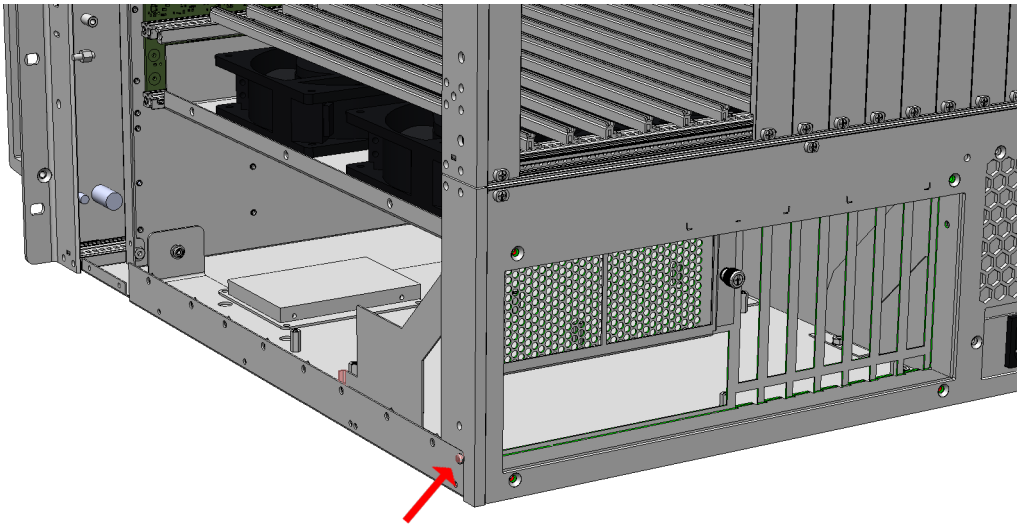
Ensure that the partially pulled out Real-time PC does not hang freely, but is instead being supported!

Completely removing the Real-time PC insert

- Loosen the following connections:
  - Plug for the control/display panel (**1**)
  - Grounding contact from Real-time PC to the front plate (**2**)
  - PCI Express connecting cable (**3**)
  - Cable for the voltage supply of the backplane (**4**)



- Remove the screws that restricts the further pullout (see figure).



- The re-installation of the Real-time PC is done in reverse order.

CAUTION!

It must be ensured that the voltage supply (see "Connection of the voltage supply of the backplane" on page 57) and all other connections (particularly the grounding contact connection of the door) is correctly reconnected to the backplane!

3.9 Maintenance

Note

The ES5300.1-A Housing does not contain any parts that can be maintained or repaired by the customer. In case of a malfunction or defect, contact ETAS (see "ETAS Contact Addresses" on page 63).

3.9.1 Cleaning

Use a dry cloth for cleaning the housing. Once a year, open the housing and carefully vacuum the inside.

A ventilation grid with a filter mat is located on the rear side of the ES5300.1-A (left to the slots of the Real-time PC). It can be taken out for cleaning after removing the support frame (see Fig. 3-9).

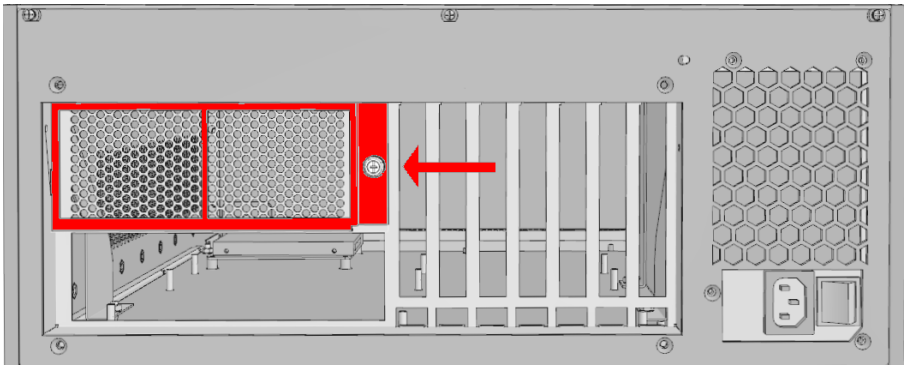


Fig. 3-9 Support frame for filter mat

Note

Clean this filter mat once a year!

4 Connections and plug connections

This section provides a description of the different connections of the ES5300.1-B Housing.

- "Backplane connections" on page 53
- "Voltage supply connections" on page 55
- "Connections of the voltages to the backplanes" on page 58

4.1 Backplane connections

The 16 connections of the backplane are specified as follows:

Type: ERNI ERMet ZD 4-pair straight male multipoint connector (4-12) (order no. 973096)

Counterplug: ERNI ERMet ZD 4-pair angled female multipoint connector (4-12) (order no. 973099)

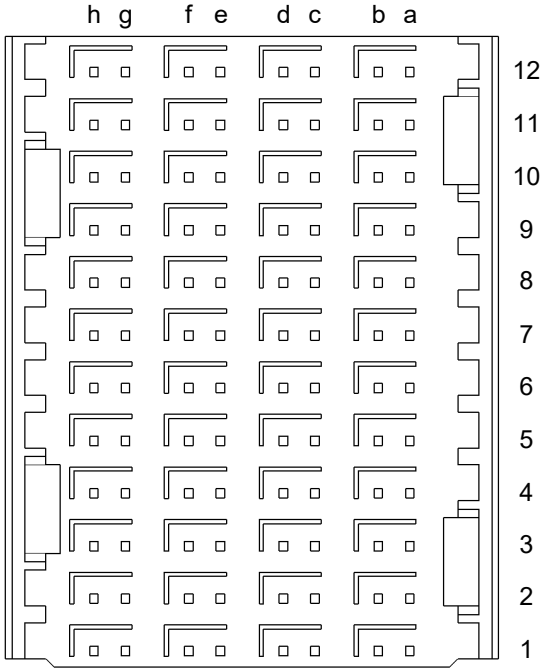


Fig. 4-1 Plug connectors on the backplane (plug side)

The pin assignment is as follows:

	h	g	f	e	d	c	e	a
12	GBLI_TX_n_0	GBLI_TX_p_0	GBLI_RX_n_0	GBLI_RX_p_0	M_LVDS_n_7	M_LVDS_p_7	BN_5	BN_4
12-shield	GND		GND		GND		GND	
11	GBLI_TX_n_1	GBLI_TX_p_1	GBLI_RX_n_1	GBLI_RX_p_1	M_LVDS_n_6	M_LVDS_p_6	SPI_CS_B_n	SPI_CS_A_n
11-shield	GND		GND		GND		GND	
10	GBLI_TX_n_2	GBLI_TX_p_2	GBLI_RX_n_2	GBLI_RX_p_2	M_LVDS_n_5	M_LVDS_p_5	SPI_MOSI	SPI_CLK
10-shield	GND		GND		GND		GND	
9	GBLI_TX_n_3	GBLI_TX_p_3	GBLI_RX_n_3	GBLI_RX_p_3	M_LVDS_n_4	M_LVDS_p_4	PCIE_WAKEn	SPI_MISO
9-shield	GND		GND		GND		GND	
8	GBLI_PRESENT_n	GEO_ADDR_4	PCIE_REFCLK_n	PCIE_REFCLK_p	M_LVDS_n_3	M_LVDS_p_3	n.c.	n.c.
8-shield	GND		GND		GND		GND	
7	PCIE_RX_n_0	PCIE_RX_p_0	PCIE_TX_n_0	PCIE_TX_p_0	M_LVDS_n_2	M_LVDS_p_2	n.c.	n.c.
7-shield	GND		GND		GND		GND	
6	*Assigned internally*	*Assigned internally*	*Assigned internally*	*Assigned internally*	M_LVDS_n_1	M_LVDS_p_1	PCIE_JTAG_TCK	PCIE_JTAG_TDI
6-shield	GND		GND		GND		GND	
5	*Assigned internally*	*Assigned internally*	*Assigned internally*	*Assigned internally*	M_LVDS_n_0	M_LVDS_p_0	PCIE_JTAG_TDO	PCIE_JTAG_TMS
5-shield	GND		GND		GND		GND	
4	*Assigned internally*	*Assigned internally*	*Assigned internally*	*Assigned internally*	GEO_ADDR_1	GEO_ADDR_0	BN_3	BN_2
4-shield	GND		GND		GND		GND	
3	VCC24	VCC24	GEO_ADDR_3	GEO_ADDR_2	PCIE_SMBDAT	PCIE_SMBCLK	BN_1	BN_0
3-shield	VCC3_3		VCC3_3		VCC3_3		VCC3_3	
2	VSS12	VSS12	VCC3_3	VCC5	PCIE_PERSTn	PCIE_PRSNT1n	PCIE_PRSNT2n_X1	PCIE_PRSNT2n_X4
2-shield	VCC12		VCC12		VCC12		VCC12	
1	VCC3_3	VCC3_3	VCC5	VCC5	VCC12	VCC12	VCC12	VCC12
1-shield	VCC12		VCC12		VCC12		VCC12	

4.2 Voltage supply connections

The voltage supply of the ES5300.1-B Housing is provided via the power supply of the ES5300.1-A Housing. The power supply is used for the voltage supply of the Real-time PC in the ES5300.1-A Housing as well as the backplane of the ES5300.1-A Housing and the ES5300.1-B Housing. This supplies the cards in the slots with voltage.

4.2.1 Cable harness

Fig. 4-2 shows the connections for the voltage supply of the ES5300.1-A Housing and the ES5300.1-B Housing. There are cables for the power supply of two backplanes.

The ES5300.1-A Housing and the ES5300.1-B Housing are delivered with pre-manufactured and connected cables.

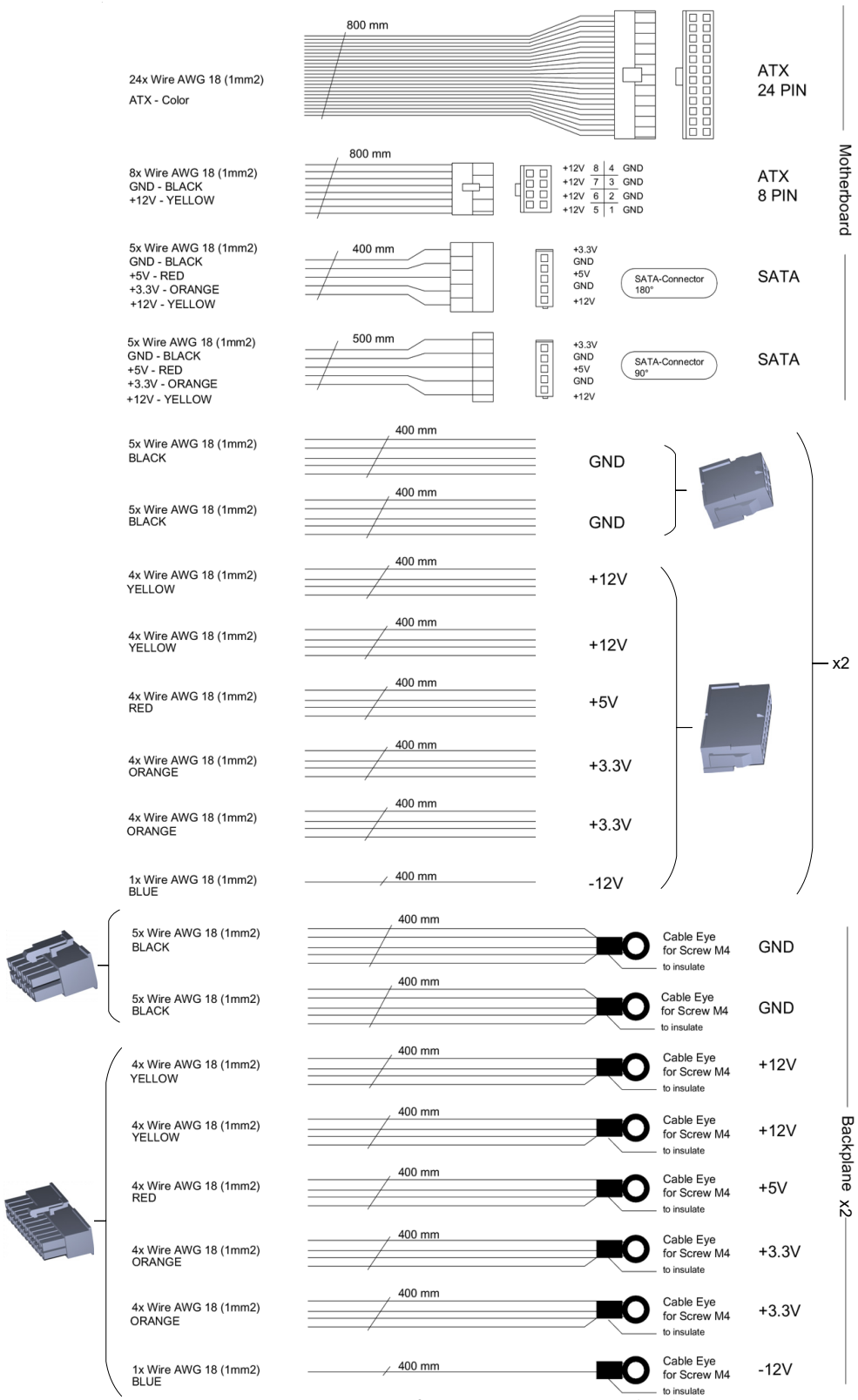


Fig. 4-2 Cable harness specification power supply (top) and backplane (bottom)

4.2.2 Connection of the voltage supply of the backplane

After opening the front plate and removing the protective cover by loosening the marked screws (see Fig. 4-3), the rear side of the backplane is freely accessible (Fig. 4-5).

Note

The cable strand for connecting the backplane of the ES5300.1-B Housing to the ES5300.1-A Housing power supply is pre-installed and ready-made.

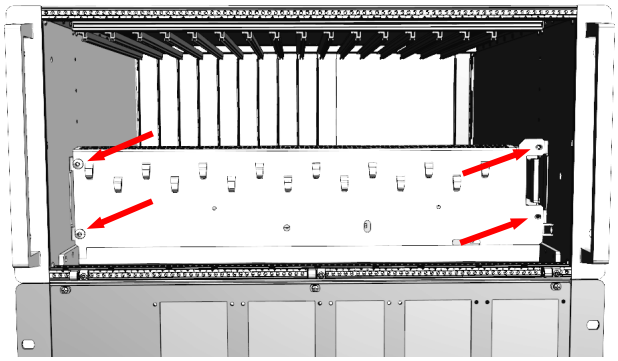


Fig. 4-3 Opened front door

Fig. 4-4 shows a schematic representation of the cabling for the voltage supply of the ES5300.1-A and ES5300.1-B backplane.

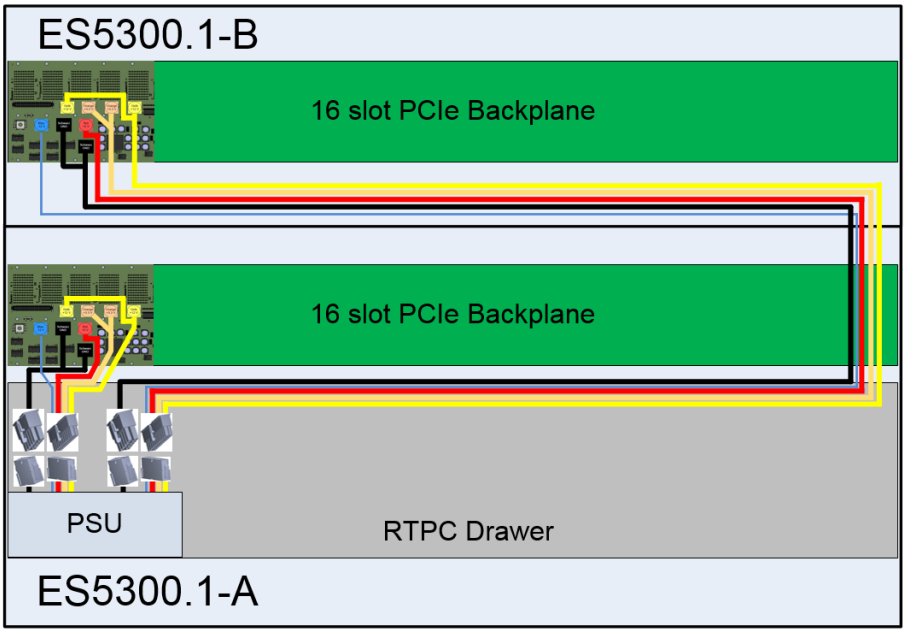


Fig. 4-4 Block diagram for the voltage supply of the backplanes

Fig. 4-5 shows details of the connections of the voltages to the ES5300.1-A and ES5300.1-B backplanes. The color-coding corresponds to the color of the connecting cable.

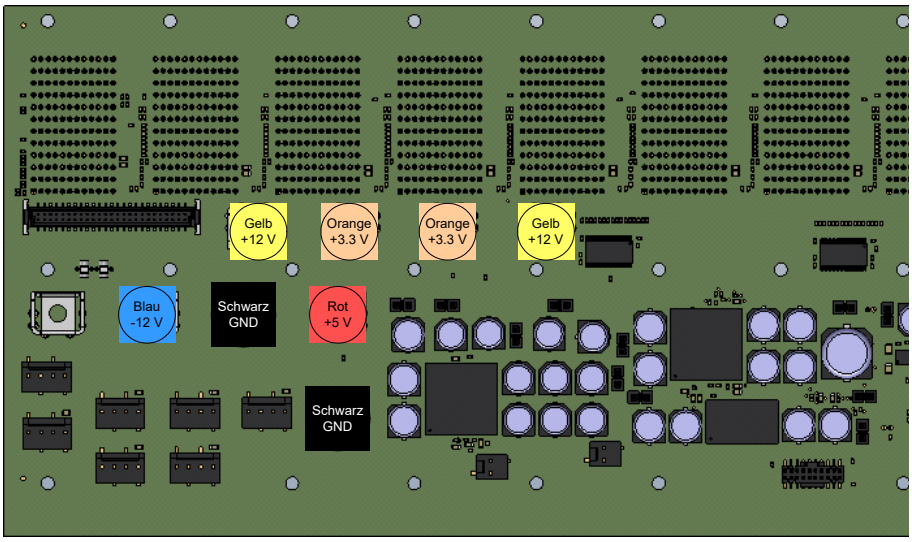


Fig. 4-5 Connections of the voltages to the backplanes

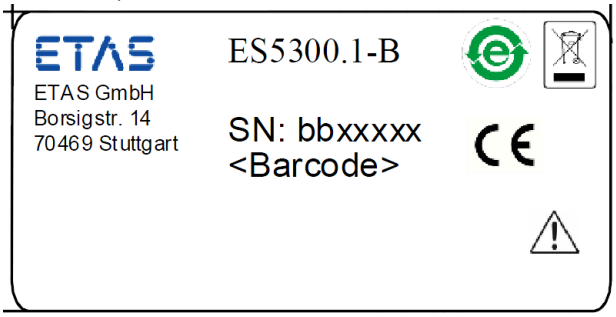
5 Technical Data and Standards, Order Numbers

This chapter contains the technical data of the ES5300.1-B Housing and the order numbers.

5.1 Technical data

Product labeling

The nameplate is located on the rear side of the housing.



It contains the following information:

- ETAS logo
- Product name
- Type part number
- Serial number
- Barcode for serial number
- Permissible input voltage range
- Permissible input voltage frequency
- Max. current consumption (for the corresponding input voltage)
- China RoHS
- WEEE symbol
- CE mark
- A warning symbol that indicates that the User's Guide must be read before startup and before opening the ES5300.1-B!

Mechanical data

Mechanical design	19" component carrier for rack installation
Slots	16 slots in 5 HP grid
Width	19" (482.6 mm)
Height	6 U (= 266.7 mm)
Depth	540 mm
Weight (empty slots)	9.5 kg / 20.9 lbs
Suitable for continuous operation	Yes

Fan unit

The ES5300.1-B Housing is ventilated via the fan unit of the ES5300.1-A Housing.

Power supply/voltage supply

The ES5300.1-B Housing is supplied by the power supply of the ES5300.1-A Housing.

Ambient conditions

Environment	To be used only within closed and dry rooms
Max. contamination level	2
Permissible ambient temperature during operation	5 °C to 40 °C (41 °F to 104 °F)
Permissible storage temperature	-20 °C to +65 °C (-4 °F to 149 °F)
Relative humidity	0 to 95% (non-condensing)
Operating altitude	max. 2000 m / 6500 ft

5.2 Norms and standards met

The ES5300.1-A Housing meets the following standards:

Standard	**Test**
IEC 61326-1	Electrical equipment for measurement, control and laboratory use – EMC requirements (industrial setting)
IEC 61010-1	Safety requirements for electrical equipment for measurement, control and laboratory use – Part 1: General requirements

The module is only intended for use in industrial settings in accordance with EN 61326-1. Avoid potential radio interference when using the module outside of the industrial settings with additional shielding measures!

WARNING!

This is class A equipment. This equipment can cause radio interference in residential areas. In this case, the operator may be required to institute reasonable measures.

5.3 Ordering data

The ordering data for the ES5300.1-B Housing and the Calibration Service are as follows:

F number	Short name	Long name
F-00K-110-421	ES5300.1-B	ES5300.1-B Expansion Housing (19", 6U, 16 Slot, PCI Express GEN2 x1 link)
F-00K-110-423	K_ES5300.1-B	Calibration Service for ES5300.1-B

6 ETAS Contact Addresses

ETAS HQ

ETAS GmbH

Borsigstraße 24 Phone: +49 711 3423-0

70469 Stuttgart Fax: +49 711 3423-2106

Germany WWW: www.etas.com

ETAS Subsidiaries and Technical Support

For details of your local sales office as well as your local technical support team and product hotlines, take a look at the ETAS website:

ETAS subsidiaries	WWW:	www.etas.com/en/contact.php
ETAS technical support	WWW:	www.etas.com/en/hotlines.php

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