

**ES4408.1 Load Chassis**  
User's Guide



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## 1 Introduction

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This User's Guide describes the ES4408.1 Load Chassis. It consists of the following chapters:

- "Introduction" on page 5  
This chapter. Here you will find general information on the ES4408.1 Load Chassis and other system components.
- "Getting Started" on page 15  
This section describes general safety measures which you must adhere to when setting up and operating ES4408.1 Load Chassis.
- "Hardware" on page 19  
This chapter contains an overview of boards available for the ES4408.1 Load Chassis and further information on the housing.
- "Pin Assignment and Display Elements" on page 25  
This chapter contains a description of the connectors and LEDs of the ES4408.1 Load Chassis.
- "Accessories" on page 37  
This chapter contains a description and order data of ETAS accessories for the ES4408.1 Load Chassis.
- "Technical Data" on page 47  
This chapter contains the technical data of the ES4408.1 Load Chassis.

User's Guides are available for the various boards. These are supplied with the products when you purchase them.

### **Note**

*Before operating the ES4408.1 Load Chassis and its components, first read the chapter "Getting Started" on page 15!*

## 1.1 Features

---

The ES4408.1 Load Chassis is a 19"/4 U housing for creating a system to simulate electric loads.

Using various boards makes it possible to simulate various loads to test the behavior of ECUs in an HIL system. These particularly include pull-up/pull-down loads with currents up to 150 mA and the simulation of electromagnetic injectors up to 20 A.

The ES4408.1 Load Chassis can hold up to 12 boards which enables very flexible, customized configuration.

The ES4408CON.1 Communication Interface both monitors internal functions and enables communication with the environment. Addressing takes place directly from the test system (e.g. LABCAR-OPERATOR) via an Ethernet interface with standard connectors.

In detail, the ES4408.1 Load Chassis has the following features:

### 1.1.1 General Features

---

- Customized configuration thanks to modular structure
- Can be used in all standard test systems
- Can be used in many applications worldwide thanks to a wide-range power supply of 100 - 230 VAC
- Minimal cabling necessary thanks to standardized connections
- Easy to expand thanks to modular system architecture
- Simple integration into the ETAS HIL system LABCAR thanks to a standardized dummy load concept
- Complete integration into the LABCAR-OPERATOR software (from V4.1)
- Other technical features;
  - Dimensions: 4 U x 19" x 480 mm (height x width x depth)
  - Power supply: wide-range power supply unit (secondary  $\pm 12$  V, +5 V, +3.3 V, +24 V, GND)
  - Active housing ventilation with six cooling vents

### 1.1.2 Slots

---

The ES4408.1 Load Chassis has slots with the following dimensions (see Fig. 1-1 on page 9):

- Five 3 U slots for high current loads of which:
  - Three (14 HP) for injection loads (slot 0...slot 2)
  - One 6 HP and one 4 HP slot for loads with position feedback, such as the throttle valve, EGAS, etc. (slot 3 and slot 4)
- Seven 3 U slots (of 4 HP each) for low current loads (slot 5...slot 11)

For more details of the loads available for these slots, refer to the section "The System Components" on page 7.

### 1.1.3 Control Unit

The ES4408.1 Load Chassis has one further slot on the rear for the optional ES4408CON.1 Communication Interface for the following functions:

- Master controller for all boards in the ES4408.1 Load Chassis
- Ethernet interface
  - for communication with LABCAR-RTPC (and also with LABCAR-OPERATOR)

*or*

- for controlling the ES4408.1 Load Chassis with SCPI commands

For more details, refer to the ES4408CON.1 Communication Interface User's Guide.

### 1.1.4 The System Components

In addition to the ES4408.1 Load Chassis and the optional ES4408CON.1 Communication Interface, the following boards are also available for the load system:

- ES4434.1 Configurable Load Board  
The ES4434.1 is a manually configurable board with 24 channels for pull-up/pull-down loads (equipped with 24 510  $\Omega$ /3 W resistors).
- ES4435.1 Current Source Load Board  
The ES4435.1 is a board with 24 current sources up to 150 mA which can be controlled using software
- ES4455.1 Load Board  
The ES4455.1 is a carrier board with four channels for piggybacks with ohmic, capacitive and inductive loads to 90 V and to 20 A (with battery voltage).

The following piggybacks are currently available

- PB4451CR Piggyback for 2 RB CRS Injectors
- PB4451GDI Piggyback for 2 RB GDI Injectors

The ES4455.1 Load Board can also be supplied as an assembled version with these modules:

- ES4450.2 Load Board for 4 RB CRS Injectors

The ES4450.2 enables the simulation of four injectors of the Bosch Common Rail System (CRS). It consists of the ES4455.1 Load Board and two piggybacks of the type "PB4451CR Piggyback for 2 RB CRS Injectors".

- ES4451.3 Load Board for 4 RB GDI Injectors

The ES4451.3 enables the simulation of four injectors of the Bosch gasoline direct injection system. It consists of the ES4455.1 Load Board and two piggybacks of the type "PB4451GDI Piggyback for 2 RB GDI Injectors".

The relevant User's Guides contain detailed descriptions of the individual components.

### 1.1.5 Connectors

---

The ES4408.1 Load Chassis has various connectors on the back (see Fig. 1-1 on page 9) for the following purposes:

- for connecting the various loads
- for the measure signals of the high current loads
- for the measure values of the position feedback for slot 3 and slot 4
- for supplying battery voltage
- for the Ethernet connection (with an ES4408CON.1 Communication Interface)
- for the battery node control signals of the ES1391.1 Power Supply Controller Board (with an ES4408CON.1 Communication Interface)

For a detailed description of the connectors, refer to the chapter "Pin Assignment and Display Elements" on page 25 – the cables obtainable from ETAS for connecting the loads to the PT-LABCAR are described in the chapter "Accessories" on page 37.



The following figure shows the front and rear of the ES4408.1 Load Chassis.

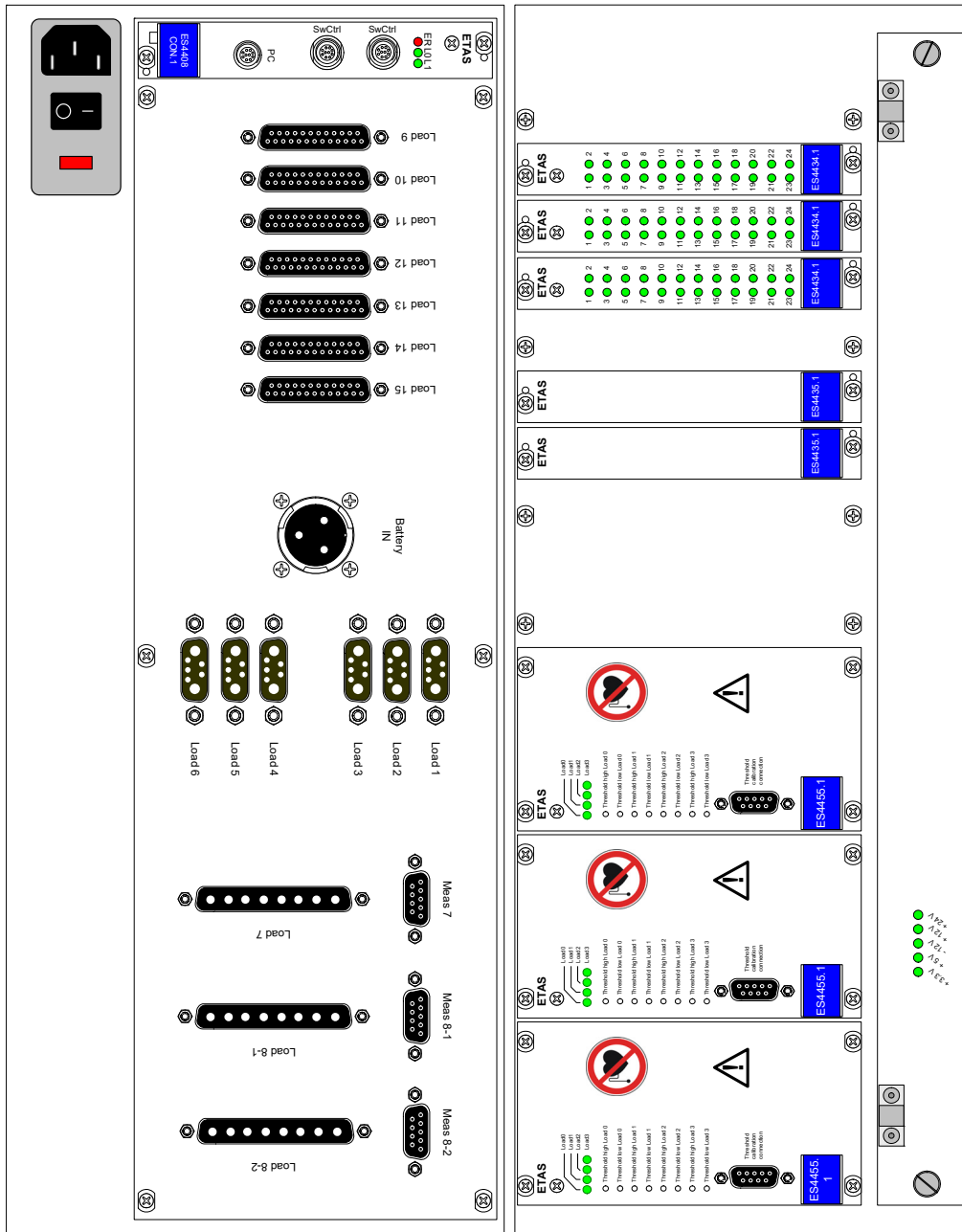


Fig. 1-1 Front (Right) and Rear (Left) of the ES4408.1 Load Chassis

## 1.2 Basic Safety Instructions

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Please adhere to the safety instructions in this manual to avoid injury to yourself and others as well as damage to the device.

ETAS GmbH cannot be made liable for damage which is caused by incorrect use and not adhering to the safety instructions.

### 1.2.1 Correct Use

---

The ES4408.1 Load Chassis is a system housing for creating a hardware-in-the-loop test system. The ES4408.1 based hardware-in-the-loop test system consists of:

- A dummy load simulation for connecting to ECU final stages. The dummy load simulation can be installed in the ES4408.1 Load Chassis in the form of SPI or I<sup>2</sup>C based boards.

The ES4408.1 Load Chassis is always delivered/installed in a casing (19" rack system) and must not be operated as a standalone unit.

The use of the ES4408.1 Load Chassis is as follows:

- In industrial lab facilities or at industrial workplaces,
- As a hardware interface for ECUs in a hardware-in-the-loop test system,
- In conjunction with ETAS software which supports the ES4408.1 Load Chassis,
- As an interface together with software programs that serve the standardized, documented and open APIs of ETAS software products.

The ES4408.1 Load Chassis is not intended to be used as follows:

- In a vehicle on the road,
- As part of a life support system,
- As part of a medical application,
- In applications in which misuse can lead to injury or damage,
- In environments with conditions outside the specified ranges -> see the section Environmental Conditions.

#### *Demands made of Operation*

---

The following requirements are made to ensure safe operation:

- Only use the product in accordance with the specifications in the relevant User's Guide. Product safety is not guaranteed if the device is used other than intended.
- Observe all applicable regulations on site concerning electrical safety as well as the rules and regulations on occupational health and safety!
- Never use the product in a wet or damp environment.
- Never use the product in areas subject to explosions.
- Make sure you keep the surface of the product clean and dry.

#### *Demands made re the Technical State of the Product*

---

This state-of-the-art product adheres to all recognized safety-related regulations. The product must only be used if it is in full working order, with the relevant personal only using the device as it was intended, taking all security issues and

risks into account as well as taking into consideration the relevant documentation at all times. If the product is not used correctly, the protection of the product may be impaired.

To ensure safe operation of the ES4408.1 Load Chassis, ensure you read and follow the guidelines set out in the section "General Safety Instructions for Operating ES4408.1 Load Chassis" on page 15.

#### *Maintenance and Cleaning*

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To clean the outside of the device, use a clean, dry cloth. To clean the inside and the air filter, see the section on "Cleaning" on page 15.

### 1.2.2 Labeling of Safety Instructions

---

The safety instructions contained in this manual are shown with the standard danger symbol shown below:



The following safety instructions are used. They provide extremely important information. Please read this information carefully.

**CAUTION!**

*indicates a low-risk danger which could result in minor or less serious injury or damage if not avoided.*

**WARNING!**

*indicates a possible medium-risk danger which could lead to serious or even fatal injuries if not avoided.*

**DANGER!**

*indicates a high-risk, immediate danger which could lead to serious or even fatal injuries if not avoided.*





### 1.2.3 Demands made regarding the Technical State of the Product

---

To ensure safe operation of the ES4408.1 Load Chassis, read and adhere to the information in the chapter "Getting Started" on page 15.

### 1.3 Identifications on the Product

The following symbols are used for identifying the product:

Symbol	Description
	Before using the product, carefully read the user's guide!
	Identification for CE (see "CE Marking" on page 12)
	Identification for China RoHS (see "RoHS Conformity" on page 12)
	Identification for WEEE directive (see "Taking the Product Back and Recycling" on page 13)

Observe the information in chapter "Technical Data" on page 47.

### 1.4 CE Marking

ETAS confirms that the product meets the product-specific applicable European Directives with the CE marking affixed to the product or its packaging. The CE Declaration of Conformity for the product is available upon request.

### 1.5 RoHS Conformity

#### 1.5.1 European Union

The EU Directive 2002/95/EU limits the use of certain dangerous materials for electrical and electronic devices (RoHS conformity).

ETAS confirms that the product corresponds to this directive which is applicable in the European Union.

#### 1.5.2 China

ETAS confirms that the product meets the product-specific applicable guidelines of the China RoHS (Management Methods for Controlling Pollution Caused by Electronic Information Products Regulation) applicable in China with the China RoHS marking affixed to the product or its packaging.

## 1.6 Taking the Product Back and Recycling

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The European Union has passed a directive called Waste Electrical and Electronic Equipment, or WEEE for short, to ensure that systems are setup throughout the EU for the collection, treating and recycling of electronic waste.

This ensures that the devices are recycled in a resource-saving way representing no danger to health or the environment.



**Fig. 1-2** WEEE Symbol

The WEEE symbol on the product or its packaging shows that the product must not be disposed of as residual garbage.

The user is obliged to collect the old devices separately and return them to the WEEE take-back system for recycling.

The WEEE directive concerns all ETAS devices but not external cables or batteries.

For more information on the ETAS GmbH Recycling Program, contact the ETAS sales and service locations (see "ETAS Contact Addresses" on page 49).



## 2 **Getting Started**

---

This section describes general safety measures which you must adhere to when setting up and operating ES4408.1 Load Chassis.

Before you start the set-up procedure, read the following sections carefully, paying particular attention to all notes and warnings.

### 2.1 **General Safety Instructions for Operating ES4408.1 Load Chassis**

---

Before you launch the ES4408.1 Load Chassis, please read this section carefully.

#### 2.1.1 **Installation and Positioning in 19" Rack**

---

When choosing a place to set-up the ES4408.1 Load Chassis, please take the following into consideration:

- Only operate the ES4408.1 Load Chassis if it has been integrated in a 19" rack or in the ETAS casing specially designed for this purpose (ES4015.2 Housing 9U, F-00K-107-884). During operation, particularly heed the safety instructions on "Ventilation" on page 15.
- Also make sure that there are no heat sources in the vicinity, e.g. radiators or other heat-producing devices.
- The ES4408.1 Load Chassis and its components are not waterproof. Avoid contact with water and any other liquids.
- Lay cables so that nobody can step on them or trip over them and make sure that they cannot be jammed or caught up in any other way.

#### 2.1.2 **Ventilation**

---

When the ES4408.1 Load Chassis is being operated in a 19" rack, make sure you observe the following points:

Never block the cooling vents – these are absolutely necessary to ensure sufficient ventilation inside the housing. Make sure there is a space of at least 15 cm between the ES4408.1 Load Chassis and walls or any other objects.

#### 2.1.3 **Connecting Cables**

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When creating wiring harnesses (e.g. when connecting the ECU and external loads) only use permissible cables (UL-certified).

#### 2.1.4 **Ground Connection/Protective Contact**

---

The ground connection of the overall system is ensured via the protective earth conductor of the power cable. Avoid electric shocks when touching housing parts by ensuring that the mains socket used has correctly connected protective contacts.

#### **Note**

*During a thunderstorm, disconnect the ES4408.1 Load Chassis from the power supply or install corresponding safety devices.*

#### 2.1.5 **Cleaning**

---

Before cleaning the housing parts, remove the power cable. Only clean the device with a damp cloth. Never use detergents or solvents.

For details of how to clean the cooling vent filter mat, refer to the section "To clean the filter mat" on page 24.

## 2.2 Connecting/Removing Devices

---

To avoid injury and damage to the hardware, please observe the following precautionary measures:

- Do not apply any voltages to the connectors of the ES4408.1 Load Chassis which do not correspond to the specification of the relevant connector. For details of the exact specification of the I/O hardware, consult the manual of the relevant board.
- Please observe the maximum permissible currents of the individual signal lines.
- Do not connect or remove any devices when the ES4408.1 Load Chassis or external devices are powered on.
- Make sure that all connectors are inserted straight to ensure that the pins are not bent.

### 2.2.1 Opening the Rear of the Housing

---

The rear of the ES4408.1 Load Chassis must only be opened by qualified technical personnel!

**DANGER!**

*As long as the ES4408.1 Load Chassis is connected to the power supply, you risk getting an electric shock!*

Disconnect from the power supply by removing the power cable; then wait a few minutes until all components (e.g. power supply unit, capacitors) are discharged.

### 2.2.2 Installing and Removing Hardware

---

To avoid the hardware being damaged by electrostatic discharge, please observe the following precautionary measures:

- The boards in the ES4408.1 Load Chassis can be damaged or even destroyed by electrostatic discharge.
- Boards should only be taken from their package, configured and installed at a working place that is protected against static discharge. Avoid touching the board's connectors and any conductors on it.

**CAUTION!**

*If cards are unlocked (e.g. during setup or calibration) but not completely removed from the housing, they nevertheless have to be pulled out of the housing so that the distance between the card and the backplane of the housing is at least 1 cm! Otherwise there could be contacts between the cards which could then be destroyed as a result.*



## 2.3 Power Supply

The ES4408.1 Load Chassis can be operated between 100 V and 230 V at 50 Hz - 60 Hz; the maximum current consumption is 3,15 A.



### **DANGER!**

*Before you open the device, disconnect it from the power supply by unplugging it.*

### 2.3.1 Power Cables

Due to regional differences in the power supply, ETAS does not supply power cord cables with the ES4408.1 Load Chassis. The following table contains details of the relevant requirements and the ETAS order numbers.

Region	Description	Order Number
General	AC supply cable with IEC 60320 C13 plug on one end and a non-locking plug approved by the national safety standards (with earth contacts) on the other end. Plugs and cable must be rated for min. 250 VAC/10 A or 125 VAC/15 A.	
China	AC supply cable China for various ETAS devices with PRC/3 and IEC 60320 C13 plug. Rated for 250 VAC/10 A, 2.50 m length	F-04A-109-512
Europe	AC supply cable Europe for various ETAS devices with CEE7/7 and IEC_60320 C13 plug. Rated for 250 VAC/10 A, 2.50 m length	F-04A-109-513
India	AC supply cable India for various ETAS devices with IS 1293 (D) and IEC 60320 C13 plug. Rated for 250 VAC/10 A, 2.50 m length	F-04A-109-514
Japan	AC supply cable Japan for various ETAS devices with JIS C 8303 and IEC 60320 (C)13V plug. Rated for 125 VAC/15 A, 2.50 m length	F-04A-109-515
North America	AC supply cable North America for various ETAS devices with NEMA 5/15 - IEC 60320 C13M plug. Rated for 125 VAC/15 A, 2.50 m length	F-04A- 109-445
United Kingdom	Power cord cable UK for various ETAS devices with BS 1363/A and IEC 60320 C13 plug. Rated for 250 VAC/10 A, 2.50 m length	F-04A-109-516

## 2.4 Environmental Conditions

---

Only operate the ES4408.1 Load Chassis under the following environmental conditions:

Environment	Only use indoors
Operating temperature	5 °C to 35 °C (41 °F to 95 °F)
Relative humidity	0 to 95% (non-condensing)
Power supply	100 - 240 V/50 - 60 Hz, 3 A

### 3 Hardware

---

This chapter contains an overview of boards available for the ES4408.1 Load Chassis and further information on the housing.

These are:

- "The Boards for the ES4408.1 Load Chassis" on page 20  
This section contains an overview of the boards which can be used in the ES4408.1 Load Chassis for controlling and load simulation.
  - "ES4408CON.1 Communication Interface" on page 20
  - "ES4434.1 Configurable Load Board" on page 20
  - "ES4435.1 Current Source Load Board" on page 21
  - "ES4450.2 Load Board for 4 RB CRS Injectors and ES4451.3 Load Board for 4 RB GDI Injectors" on page 21
- "The Backplane of the ES4408.1 Load Chassis" on page 22  
This section describes the backplane of the ES4408.1 Load Chassis.
- "The Power Supply of the ES4408.1 Load Chassis" on page 23
- "Ventilation of the ES4408.1 Load Chassis" on page 24

For more detailed information, refer to the User's Guides for the relevant boards.

### 3.1 The Boards for the ES4408.1 Load Chassis

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This section contains an overview of the boards which can be used in the ES4408.1 Load Chassis for controlling and load simulation.

#### 3.1.1 ES4408CON.1 Communication Interface

---

The ES4408CON.1 Communication Interface is used in the ES4408.1 Load Chassis to communicate with the boards in the chassis.

##### *Features*

---

Via the 100-MBit Ethernet interface, the ES4408.1 Load Chassis can be integrated into the HIL system with the LABCAR-OPERATOR software, the simulation target with LABCAR-RTPC and the relevant hardware. The Ethernet interface can also be used to control a standalone ES4408.1 Load Chassis with SCPI commands.

The status signals of the battery nodes can be supplied (from the ES1391.1 Power Supply Controller Board) and led through again (to the ES1392.2 High Current Switch Board) at the ES4408CON.1 Communication Interface. These signals are routed to the backplane of the ES4408.1 Load Chassis and used there for the ES4434.1 Configurable Load Board to switch battery nodes or on the ES4435.1 Current Source Load Board to activate current sources.

##### *Place of Installation and Connections*

---

The slot for the ES4408CON.1 Communication Interface is on the rear of the housing, on the left (see Fig. 3-1 on page 22).

The Ethernet cable and the cables for the status signals of the battery nodes must be connected.

##### *Configuration*

---

The configuration is taken care of in the software (in LABCAR-RTC) and primarily concerns communication settings such as the Ethernet address, the Ethernet adapter used on the Real-Time PC etc.

#### 3.1.2 ES4434.1 Configurable Load Board

---

The ES4434.1 Configurable Load Board is used to simulate low current loads in the ES4408.1 Load Chassis. It is equipped with 24 configurable loads: Each one can be configured to a specific battery node.

A total of seven boards of the type ES4434.1 Configurable Load Board or ES4435.1 Current Source Load Board can be used in an ES4408.1 Load Chassis.

##### *Place of Installation and Connections*

---

The ES4434.1 Configurable Load Boards are installed (mixed with ES4435.1 Current Source Load Boards – see section 3.1.3 on page 21) in slot 5 - slot 11 of the ES4408.1 Load Chassis (see "The Slots of the ES4408.1 Load Chassis (View from the Front)" on page 22).

The channels of the boards can be accessed at connectors "Load 9" ... "Load 15" on the rear of the ES4408.1 Load Chassis.

### *Configuration*

---

Configuration takes place on the board and concerns the use of loads, the pull-up/pull-down setting of the loads against specific battery nodes and configuration of the ground.

#### 3.1.3 ES4435.1 Current Source Load Board

---

The ES4435.1 Current Source Load Board is used to simulate low current loads in the ES4408.1 Load Chassis. It has 24 voltage-controlled, regulated current sources which are used as pull resistances. Each of these current sources can drive currents of 5...150 mA (with 6 V...20 V battery voltage) – the current sources are enabled/disabled depending on the state of a specific battery node.

A total of seven boards of the type ES4435.1 Current Source Load Board or ES4434.1 Configurable Load Board can be used in an ES4408.1 Load Chassis.

#### *Place of Installation and Connections*

---

The ES4435.1 Current Source Load Boards are installed (mixed with ES4434.1 Configurable Load Boards – see section 3.1.2 on page 20) in slot 5...slot 11 of the ES4408.1 Load Chassis (see "The Slots of the ES4408.1 Load Chassis (View from the Front)" on page 22).

The channels of the boards can be accessed at connectors "Load 9" ... "Load 15" on the rear of the ES4408.1 Load Chassis.

### *Configuration*

---

The configuration is taken care of in the software (in LABCAR-RTC) and concerns the operating mode (pull-up/pull-down) of the individual channels, the battery nodes and the current.

#### 3.1.4 ES4450.2 Load Board for 4 RB CRS Injectors and ES4451.3 Load Board for 4 RB GDI Injectors

---

The ES4450.2 Load Board for 4 RB CRS Injectors contains four loads for simulating Common Rail injectors; the ES4451.3 Load Board for 4 RB GDI Injectors contains four loads for simulating injectors for gasoline direct injection.

The board's channels are designed for 90 V/20 A. There are four galvanically isolated, either analog or digital, channels available for measuring currents over the loads and four galvanically isolated analog channels for measuring voltages.

In addition to these two boards, the carrier board (ES4455.1 Load Board) and the loads (two each in the form of a piggyback) can be obtained separately.

#### *Place of Installation and Connections*

---

The injector loads are installed in slot 0...slot 2 of the ES4408.1 Load Chassis (see "The Slots of the ES4408.1 Load Chassis (View from the Front)" on page 22).

The channels of the boards are made accessible at connectors "Load 8-1", "Load 8-2" and "Load 7" on the rear of the ES4408.1 Load Chassis. Corresponding connectors for measuring currents, "Meas 8-1", "Meas 8-2" and "Meas 7", are next to them.

### Configuration

You define whether the current measure signals are output as analog or digital values via a jumper strip on the carrier board; further settings such as the thresholds for the LED display etc. are made in the software (in LABCAR-RTC).

## 3.2 Connecting the Battery Voltage

The battery voltage is connected at the "Battery\_IN" connector (see "Battery IN" Connector" on page 35). The correct cable ("CBAV300.1-2") can be obtained from ETAS (see "CBAV300.1-2" Cable" on page 38).

The battery node status signals from the ES1391.1 Power Supply Controller Board (and possibly back to the ES1392.2 High Current Switch Board) are connected at the ES4408CON.1 Communication Interface. (For more details, refer to the User's Guide of the ES4408CON.1 Communication Interface).

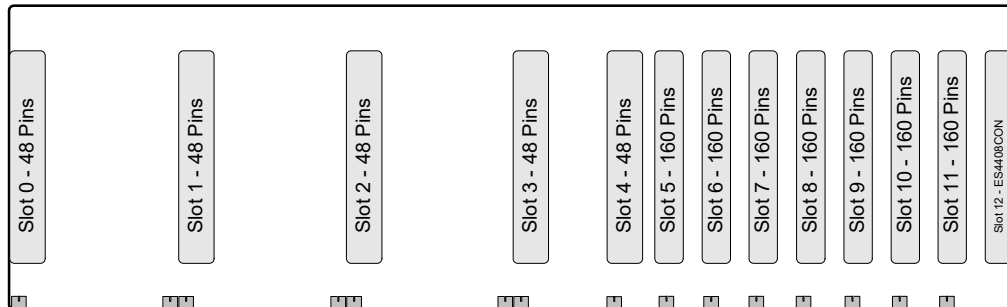
## 3.3 The Backplane of the ES4408.1 Load Chassis

This section describes the backplane of the ES4408.1 Load Chassis.

The backplane (see Fig. 3-1) is intended for

- Five slots (3 U) for high current loads
  - of which
    - 3 x 14 HP for injector loads (slot 0..2)
    - 1 x 6 HP (slot 3) and 1 x 4 HP (slot 4) for loads with position feedback (throttle valve, EGAS. etc)
- Seven 4 HP slots (3 U) for low current loads (slot 5...slot 11).

Fig. 3-1 shows the arrangement of the above-mentioned slots in the ES4408.1 Load Chassis.



**Fig. 3-1** The Slots of the ES4408.1 Load Chassis (View from the Front)

### High Current Connectors

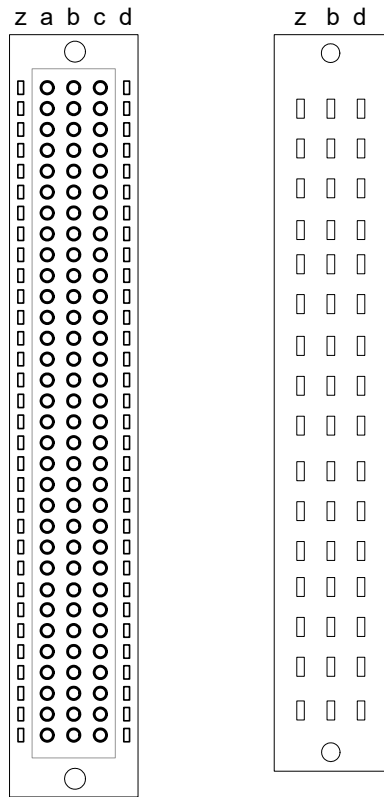
The connectors for the high current loads (slot 0...slot 4) are of the type "DIN 41612 - Type F" and have three rows of 16 pins each (see Fig. 3-2 on page 23).

The permanent rating per pin/backplane channel is 7.5 A/90 V – the high current signals specified with a maximum continuous current of 20 A are therefore always routed via three pins/backplane channels.

### Low Current Connectors

The connectors for the low current loads (slot 5...slot 11) are of the type "DIN 41612 - Type C x" and have five rows of 32 pins each (see Fig. 3-2 on page 23).

The permanent rating per pin/backplane channel is 1 A/60 V.



**Fig. 3-2** Backplane Connectors for Low Current Loads (left) and High Current Loads (Right)

Which backplane channels are used by which plug-in boards is described in the relevant User's Guides or in the pin assignment of the relevant connector (see "Pin Assignment and Display Elements" on page 25).

### 3.4 The Power Supply of the ES4408.1 Load Chassis

Power is supplied to the ES4408.1 Load Chassis with a wide-range power supply unit with input voltages between 100 V and 240 V with mains frequencies between 50 Hz and 60 Hz; the maximum current consumption is 3 A. Correspondingly, there two 3.15 A fuses (5 mm x 20 mm) in the power supply connector.

The following voltages are made available internally for supplying power to the boards: +3.3 V, +5 V, +12 V, - 12 V and +24 V. The state of these voltages is indicated on the front panel via the LEDs (see "LEDs" on page 35).

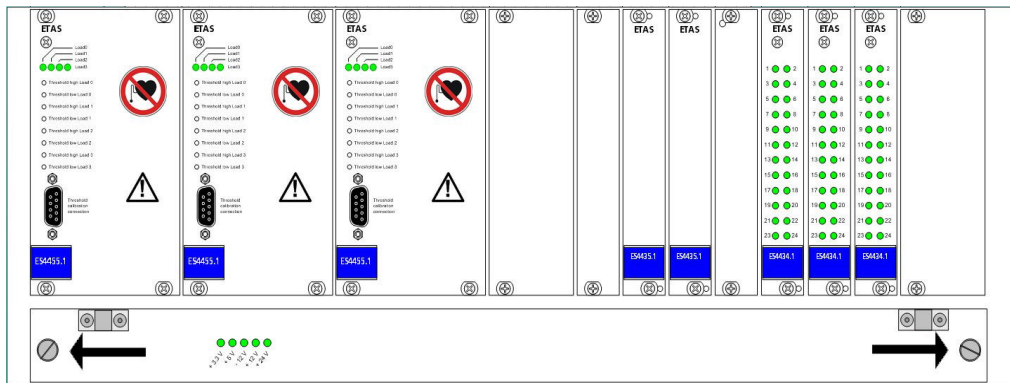
### 3.5 Ventilation of the ES4408.1 Load Chassis

For cooling the loads, the ES4408.1 Load Chassis has a total of six cooling vents on the bottom of the device.

The filter mat in the ventilation unit has to be cleaned or replaced from time to time. To do this, proceed as follows:

#### To clean the filter mat

- Power off the device.
- Open the two screws on the bottom left and right (see arrows in the figure).



- Open the front panel and pull out the filter mat.
- Clean with a vacuum cleaner.

If the filter mat is too dirty to be cleaned, replace with a new mat.



## 4 Pin Assignment and Display Elements

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This chapter contains a description of the connectors and LEDs of the ES4408.1 Load Chassis.

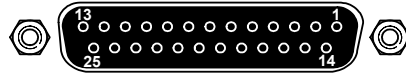
These are:

- "Load 9" ... "Load 15" Connectors" on page 26  
This is where the connection to the pull-up/pull-down loads of the "ES4434.1 Configurable Load Board" and "ES4435.1 Current Source Load Board" boards in slots 5 - 11 takes place.
- "Load 1" ... "Load 6" Connectors" on page 27  
The connection to the special loads for simulating actuators with position feedback in slot 3 ("Load 1"..."Load 3") and slot 4 ("Load 4"..."Load 5") takes place at these connectors.
- "Load 7" Connector" on page 30  
The loads at slot 2 are made accessible at the "Load 7" connector.
- "Load 8-1" and "Load 8-2" Connectors" on page 31  
The injection loads in slot 0 ("Load 8-2") and slot 1 ("Load 8-1") are made accessible at the "Load 8-1" and "Load 8-2" connectors.
- "Connector "Meas 7"" on page 33  
The measure signals from the load in slot 2 (connected to "Load 7") are output at the "Meas 7" connector.
- "Meas 8-1" and "Meas 8-2" Connectors" on page 34  
The measure signals of the loads in slot 0 ("Meas 8-2") or slot 1 ("Meas 8-1") are output at the "Meas 8-1" and "Meas 8-2" connectors.
- "Battery IN" Connector" on page 35  
The battery voltage from the power supply unit is supplied at the "Battery\_IN" connector.
- "LEDs" on page 35  
There are five LEDs on the front panel of the ES4408.1 Load Chassis which indicate the state of the five supply voltages.

#### 4.1 "Load 9" ... "Load 15" Connectors

This is where the connection to the pull-up/pull-down loads of the "ES4434.1 Configurable Load Board" and "ES4435.1 Current Source Load Board" boards in slots 5 - 11 takes place.

Type: 25-pin DSUB (female).



**Fig. 4-1** "Load 9" ... "Load 15" Connectors

The pin assignment is as follows:

Pin	Slot:Signal	Slot:Backplane Connector
1	Slot n:Load 1	Slot n:a11
2	Slot n:Load 2	Slot n:b11
3	Slot n:Load 3	Slot n:c11
4	Slot n:Load 4	Slot n:a12
5	Slot n:Load 5	Slot n:b12
6	Slot n:Load 6	Slot n:c12
7	Slot n:Load 7	Slot n:a13
8	Slot n:Load 8	Slot n:b13
9	Slot n:Load 9	Slot n:c13
10	Slot n:Load 10	Slot n:a14
11	Slot n:Load 11	Slot n:b14
12	Slot n:Load 12	Slot n:c14
13	Slot n:Load 13	Slot n:a15
14	Slot n:Load 14	Slot n:b15
15	Slot n:Load 15	Slot n:c15
16	Slot n:Load 16	Slot n:a16
17	Slot n:Load 17	Slot n:b16
18	Slot n:Load 18	Slot n:c16
19	Slot n:Load 19	Slot n:c17
20	Slot n:Load 20	Slot n:c17
21	Slot n:Load 21	Slot n:c17
22	Slot n:Load 22	Slot n:a18
23	Slot n:Load 23	Slot n:b18
24	Slot n:Load 24	Slot n:c18
25	GND board	Slot n:c10
Housing	ES4408 protective earth	

**Tab. 4-1** Pin Assignment of "Load 9" ... "Load 15" (n = 11...5) and Backplane Connectors

**Note**

Please note that the connector numbering does not correspond to the slot numbering (see the following table)!

Slot	5	6	7	8	9	10	11
Connector	Load 15	Load 14	Load 13	Load 12	Load 11	Load 10	Load 9

**Tab. 4-2** Assignment: Slot → “Load *n*” Connector

To connect these loads to the PT-LABCAR, use the existing PT-LABCAR cables “AS41LC1..3”. If to date you have simulated loads with the AS\_41LC, these are connected to the front-panel connectors of the corresponding AS\_41LC.

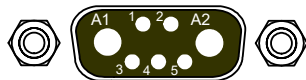
*Current Rating of the Connectors*

Please note the maximum admissible current of 1 A (60 V) per pin.

## 4.2 “Load 1” ... “Load 6” Connectors

The connection to the special loads for simulating actuators with position feedback in slot 3 (“Load 1”...“Load 3”) and slot 4 (“Load 4”...“Load 5”) takes place at these connectors.

Type: Hybrid DSUB 7W2 (male)



**Fig. 4-2** “Load 1” ... “Load 6” Connectors

For details of the pin assignment with the backplane signals, refer to Tab. 4-3 on page 28 and Tab. 4-4 on page 29.

A special cable is available for connecting the loads to the PT-LABCAR (connectors “Load1” ... “Load6”). See ““CBAV340.1-1” Cable” on page 39.

*Current Rating of the Connectors*

Please note the maximum admissible current of 7.5 A (90 V) for pins A1 and A2, and 1 A (90 V) for pins 1...5.

Connector:Pin	Signal	Slot:Backplane Connector
Load 1:A1	Load 1+	Slot 3:z22 Slot 3:b22 Slot 3:d22
Load 1:A2	Load 1-	Slot 3:z24 Slot 3:b24 Slot 3:d24
Load 1:1	Measure signal 1-1	Slot 3:d10
Load 1:2	Measure signal 1-2	Slot 3:z12
Load 1:3	Measure signal 1-3	Slot 3:b12
Load 1:4	Measure signal 1-4	Slot 3:d12
Load 1:5	Measure signal 1-5	Slot 3:z14
Load 2:A1	Load 2+	Slot 3:z26 Slot 3:b26 Slot 3:d26
Load 2:A2	Load 2-	Slot 3:z28 Slot 3:b28 Slot 3:d28
Load 2:1	Measure signal 2-1	Slot 3:b14
Load 2:2	Measure signal 2-2	Slot 3:d14
Load 2:3	Measure signal 2-3	Slot 3:z16
Load 2:4	Measure signal 2-4	Slot 3:b16
Load 2:5	Measure signal 2-5	Slot 3:d16
Load 3:A1	Load 3+	Slot 3:z30 Slot 3:b30 Slot 3:d30
Load 3:A2	Load 3-	Slot 3:z32 Slot 3:b32 Slot 3:d32
Load 3:1	Measure signal 3-1	Slot 3:z18
Load 3:2	Measure signal 3-2	Slot 3:b18
Load 3:3	Measure signal 3-3	Slot 3:d18
Load 3:4	Measure signal 3-4	Slot 3:z20
Load 3:5	Measure signal 3-5	Slot 3:b20
Housing	ES4408 protective earth	

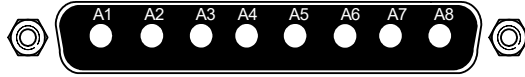
**Tab. 4-3** Pin Assignment: "Load 1" ... "Load 3"

Connector:Pin	Signal	Slot:Backplane Connector
Load 4:A1	Load 4+	Slot 4:z22 Slot 4:b22 Slot 4:d22
Load 4:A2	Load 4-	Slot 4:z24 Slot 4:b24 Slot 4:d24
Load 4:1	Measure signal 4-1	Slot 4:d10
Load 4:2	Measure signal 4-2	Slot 4:z12
Load 4:3	Measure signal 4-3	Slot 4:b12
Load 4:4	Measure signal 4-4	Slot 4:d12
Load 4:5	Measure signal 4-5	Slot 4:z14
Load 5:A1	Load 5+	Slot 4:z26 Slot 4:b26 Slot 4:d26
Load 5:A2	Load 5-	Slot 4:z28 Slot 4:b28 Slot 4:d28
Load 5:1	Measuer signal 5-1	Slot 4:b14
Load 5:2	Measure signal 5-2	Slot 4:d14
Load 5:3	Measure signal 5-3	Slot 4:z16
Load 5:4	Measure signal 5-4	Slot 4:b16
Load 5:5	Measure signal 5-5	Slot 4:d16
Load 6:A1	Load 6+	Slot 4:z30 Slot 4:b30 Slot 4:d30
Load 6:A2	Load 6-	Slot 4:z32 Slot 4:b32 Slot 4:d32
Load 6:1	Measure signal 6-1	Slot 4:z18
Load 6:2	Measure signal 6-2	Slot 4:b18
Load 6:3	Measure signal 6-3	Slot 4:d18
Load 6:4	Measure signal 6-4	Slot 4:z20
Load 6:5	Measure signal 6-5	Slot 4:b20
Housing	ES4408 protective earth	

**Tab. 4-4** Pin Assignment: "Load 4" ... "Load 6"

### 4.3 "Load 7" Connector

The loads at slot 2 are made accessible at the "Load 7" connector.



**Fig. 4-3** "Load7" Connector

Type: Hybrid DSUB 8W8 (male)

The pin assignment is as follows:

Pin	Signal	Backplane Connector
A1	Load 1+	Slot 2:z18 Slot 2:b18 Slot 2:d18
A2	Load 1-	Slot 2:z20 Slot 2:b20 Slot 2:d20
A3	Load 2+	Slot 2:z22 Slot 2:b22 Slot 2:d22
A4	Load 2-	Slot 2:z24 Slot 2:b24 Slot 2:d24
A5	Load 3+	Slot 2:z26 Slot 2:b26 Slot 2:d26
A6	Load 3-	Slot 2:z28 Slot 2:b28 Slot 2:d28
A7	Load 4+	Slot 2:z30 Slot 2:b30 Slot 2:d30
A8	Load 4-	Slot 2:z32 Slot 2:b32 Slot 2:d32
Housing	ES4408 protective earth	

**Tab. 4-5** Pin Assignment: "Load 7"

A special cable is available for connecting the loads to the PT-LABCAR ("Load7" connector) (see "CBAV343.1-1" Cable" on page 44).

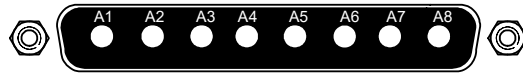
Which signals of the relevant load are connected to which signals of the PT-LABCAR is also described in the description of the cable.

#### *Current Rating of the Backplane Pins*

Please note the maximum admissible current of 7.5 A (90 V) per backplane pin.

#### 4.4 "Load 8-1" and "Load 8-2" Connectors

The injection loads in slot 0 ("Load 8-2") and slot 1 ("Load 8-1") are made accessible at the "Load 8-1" and "Load 8-2" connectors.



**Fig. 4-4** "Load 8-1" and "Load 8-2" Connectors

Type: Hybrid DSUB 8W8 (male)

The pin assignment is as follows:

Pin	Slot:Signal	Backplane Connector
A1	Slot 1:Load 1+	Slot 1:z18 Slot 1:b18 Slot 1:d18
A2	Slot 1:Load 1-	Slot 1:z20 Slot 1:b20 Slot 1:d20
A3	Slot 1:Load 2+	Slot 1:z22 Slot 1:b22 Slot 1:d22
A4	Slot 1:Load 2-	Slot 1:z24 Slot 1:b24 Slot 1:d24
A5	Slot 1:Load 3+	Slot 1:z26 Slot 1:b26 Slot 1:d26
A6	Slot 1:Load 3-	Slot 1:z28 Slot 1:b28 Slot 1:d28
A7	Slot 1:Load 4+	Slot 1:z30 Slot 1:b30 Slot 1:d30
A8	Slot 1:Load 4-	Slot 1:z32 Slot 1:b32 Slot 1:d32
Housing	ES4408 protective earth	

**Tab. 4-6** Pin Assignment: "Load 8-1" (Slot 1)

Pin	Slot:Signal	Backplane Connector
A1	Slot 0:Load 1+	Slot 0:z18 Slot 0:b18 Slot 0:d18
A2	Slot 0:Load 1-	Slot 0:z20 Slot 0:b20 Slot 0:d20
A3	Slot 0:Load 2+	Slot 0:z22 Slot 0:b22 Slot 0:d22
A4	Slot 0:Load 2-	Slot 0:z24 Slot 0:b24 Slot 0:d24
A5	Slot 0:Load 3+	Slot 0:z26 Slot 0:b26 Slot 0:d26
A6	Slot 0:Load 3-	Slot 0:z28 Slot 0:b28 Slot 0:d28
A7	Slot 0:Load 4+	Slot 0:z30 Slot 0:b30 Slot 0:d30
A8	Slot 0:Load 4-	Slot 0:z32 Slot 0:b32 Slot 0:d32
Housing	ES4408 protective earth	

**Tab. 4-7** Pin Assignment: "Load 8-2" (Slot 0)

A special cable is available for connecting the loads to the PT-LABCAR ("Load8" connector) (see "CBAV341.1-1" Cable" on page 40).

Which signals of the relevant load are connected to which signals of the PT-LABCAR is also described in the description of the cable.

#### *Current Rating of the Backplane Pins*

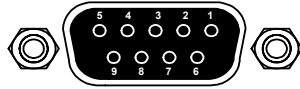
Please note the maximum admissible current of 7.5 A (90 V) per backplane pin.



## 4.5 Connector "Meas 7"

The measure signals from the load in slot 2 (connected to "Load 7") are output at the "Meas 7" connector.

Type: 9-pin DSUB (female)



**Fig. 4-5** "Meas 7" Connector

The pin assignment is as follows:

Connector:Pin	Backplane Connector
Meas 7:1	Slot 2:d10
Meas 7:2	Slot 2:z12
Meas 7:3	Slot 2:b12
Meas 7:4	Slot 2:d12
Meas 7:5	Slot 2:z14
Meas 7:6	Slot 2:b14
Meas 7:7	Slot 2:d14
Meas 7:8	Slot 2:z16
Meas 7:9	Slot 2:b16
Housing	

**Tab. 4-8** Pin Assignment: "Meas 7"

There is a special cable available for connecting the measure signals from "Meas 7", "Meas 8-1" and "Meas 8-2" to the "Measure" connector of the PT-LABCAR (see "CBAV343.1-1" Cable" on page 44).

Which signals of the relevant load are connected to which signals of the PT-LABCAR is also described in the description of the cable.

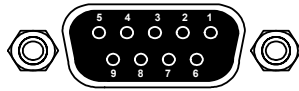
### *Current Rating of the Connectors*

Please note the maximum admissible current of 1 A (60 V) per pin/backplane channel.

#### 4.6 "Meas 8-1" and "Meas 8-2" Connectors

The measure signals of the loads in slot 0 ("Meas 8-2") or slot 1 ("Meas 8-1") are output at the "Meas 8-1" and "Meas 8-2" connectors.

Type: 9-pin DSUB (female)



**Fig. 4-6** "Meas 8-1" and "Meas 8-2" Connectors

The pin assignment is as follows:

Connector:Pin	Backplane Connector
Meas 8-1:1	Slot 1:d10
Meas 8-1:2	Slot 1:z12
Meas 8-1:3	Slot 1:b12
Meas 8-1:4	Slot 1:d12
Meas 8-1:5	Slot 1:z14
Meas 8-1:6	Slot 1:b14
Meas 8-1:7	Slot 1:d14
Meas 8-1:8	Slot 1:z16
Meas 8-1:9	Slot 1:b16
Housing	

**Tab. 4-9** Pin Assignment: "Meas 8-1"

Connector:Pin	Backplane Connector
Meas 8-2:1	Slot 0:d10
Meas 8-2:2	Slot 0:z12
Meas 8-2:3	Slot 0:b12
Meas 8-2:4	Slot 0:d12
Meas 8-2:5	Slot 0:z14
Meas 8-2:6	Slot 0:b14
Meas 8-2:7	Slot 0:d14
Meas 8-2:8	Slot 0:z16
Meas 8-2:9	Slot 0:b16
Housing	

**Tab. 4-10** Pin Assignment: "Meas 8-2"

There is a special cable available for connecting the measure signals from "Meas 7", "Meas 8-1" and "Meas 8-2" to the "Measure" connector of the PT-LABCAR (see "CBAV343.1-1" Cable" on page 44).

Which signals of the relevant load are connected to which signals of the PT-LABCAR is also described in the description of the cable.

*Current Rating of the Connectors*

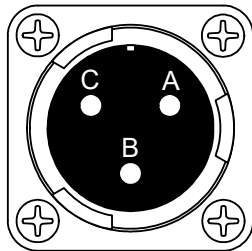
Please note the maximum admissible current of 1 A (60 V) per pin/backplane channel.

4.7 "Battery IN" Connector

The battery voltage from the power supply unit is supplied at the "Battery\_IN" connector.

Type: ITT Cannon CA02COM-E16-10PB

The mating connector is a ITT Cannon CA06COM-E16-10SB.



**Fig. 4-7** "Battery\_IN" Connector

The pin assignment is as follows:

Pin	Signal
A	+UBatt
B	-UBatt
C	+UBatt
Housing	ES4408 protective earth

**Tab. 4-11** Pin Assignment: "BatteryIN"

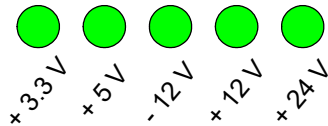
A special cable is available for supplying the battery voltages from the power supply unit (see "CBAV300.1-2" Cable" on page 38).

*Current Rating of the Connectors*

Please note the maximum admissible total current rating of 20 A (90 V) per pin.

4.8 LEDs

There are five LEDs on the front panel of the ES4408.1 Load Chassis which indicate the state of the five supply voltages.



**Fig. 4-8** LEDs Showing the State of the Supply Voltages

An LED which is on indicates that the relevant supply voltage is okay – otherwise, the power supply unit has a defect.



## 5 Accessories

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This chapter contains a description and order data of ETAS accessories for the ES4408.1 Load Chassis.

### 5.1 Cables

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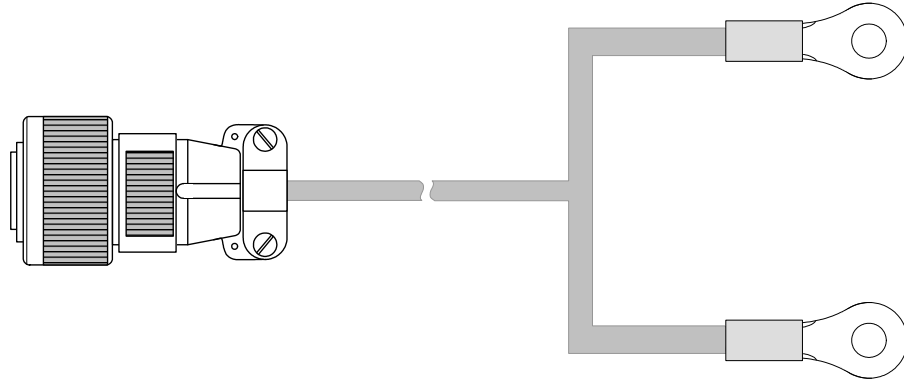
A number of cables are available from ETAS for integrating the ES4408.1 Load Chassis into the LABCAR environment.

These cables are described below, and listed with their ordering information:

- "CBAV300.1-2" Cable" on page 38  
This cable supplies the battery voltage from the power supply unit at the "Battery\_IN" connector.
- "CBAV340.1-1" Cable" on page 39  
This cable is used to connect the loads accessible at "Load 1" ... "Load 6" and their measure signals to the corresponding connectors "Load1" ... "Load6" of the PT-LABCAR.
- "CBAV341.1-1" Cable" on page 40  
This cable is used to connect the loads made available at "Load 8-1" and "Load 8-2" to the corresponding "Load8" connector of the PT-LABCAR.
- "CBAV342.1-1" Cable" on page 43  
This cable is used to connect the loads made available at "Load 7" to the corresponding "Load7" connector of the PT-LABCAR.
- "CBAV343.1-1" Cable" on page 44  
This cable is used to connect the measure signals made available at "Meas 7", "Meas 8-1" and "Meas 8-1" to the corresponding "Measure" connector of the PT-LABCAR.
- "Order Data" on page 46

### 5.1.1 "CBAV300.1-2" Cable

This cable supplies the battery voltage from the power supply unit at the "Battery\_IN" connector.



**Fig. 5-1** "CBAV300.1-2" Cable

*Connectors and Wiring*

ES4408.1 side: ITT Cannon CA06COM-E16-10S-B

Power supply side: 2 x ring terminal

The signals between the two connectors are assigned as follows:

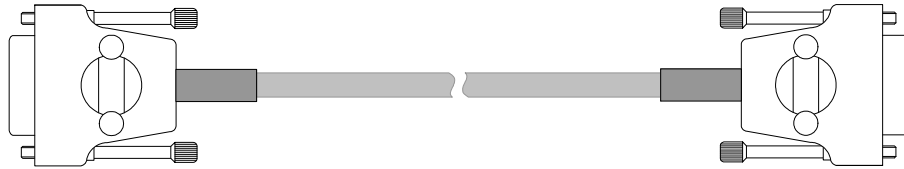
Signal	Pin	Ring Terminal	Signal
+UBatt	A, C	Red	+
-UBatt	B	Black	-

**Tab. 5-1** Pin Assignment of the "CBAV300.1-2" Cable

For information on ordering this cable, refer to the section "Order Data" on page 46.

### 5.1.2 "CBAV340.1-1" Cable

This cable is used to connect the loads accessible at "Load 1" ... "Load 6" and their measure signals to the corresponding connectors "Load1" ... "Load6" of the PT-LABCAR.



**Fig. 5-2** "CBAV340.1-1" Cable

#### *Connectors and Wiring*

ES4408.1 side: Hybrid DSUB 7W2 (female)

PT-LABCAR side: Hybrid DSUB 7W2 (male)

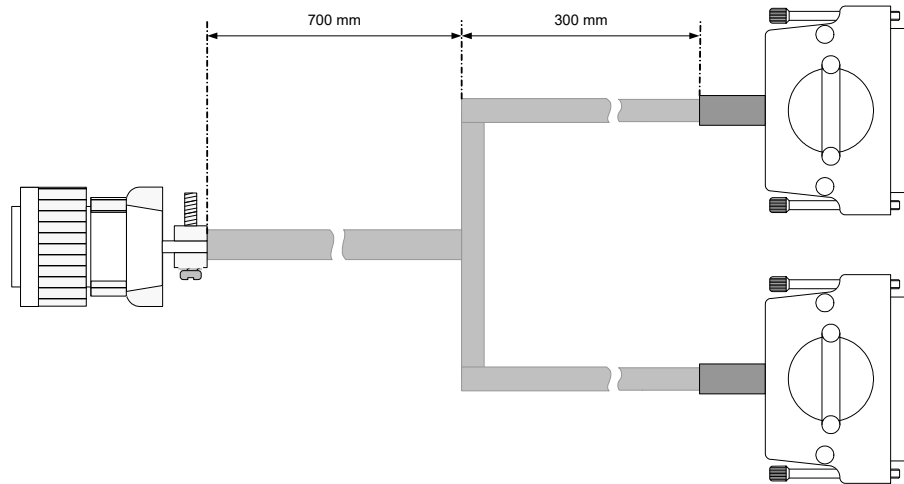
The assignment of the corresponding connectors on the ES4408.1 is described in the section " "Load 1" ... "Load 6" Connectors" on page 27; for that of the connectors of the PT-LABCAR, refer to the PT-LABCAR User's Guide.

The wiring is 1:1 – the wires between pins A1 and A2 have a cross-section of 1.5 mm<sup>2</sup>, the others of 0.14 mm<sup>2</sup>.

For information on ordering this cable, refer to the section "Order Data" on page 46.

### 5.1.3 "CBAV341.1-1" Cable

This cable is used to connect the loads made available at "Load 8-1" and "Load 8-2" to the corresponding "Load8" connector of the PT-LABCAR.



**Fig. 5-3** "CBAV341.1-1" Cable

#### Connectors and Wiring

ES4408.1 side: 2 x Hybrid-DSUB 8W8 (female)

PT-LABCAR side: ITT Cannon CA06COM-E20-29P-B (male)

The assignment of the corresponding connectors on the ES4408.1 is described in the section "Load 8-1" and "Load 8-2" Connectors" on page 31; for that of the connectors of the PT-LABCAR, refer to the PT-LABCAR User's Guide.

The wires have a cross-section of 1.5 mm<sup>2</sup>.

The assignment of the signals between these two connectors is shown in Tab. 5-2 on page 42.

For information on ordering this cable, refer to the section "Order Data" on page 46.



ES4408 ("Load 8-1", "Load 8-2")			PT-LABCAR ("Load8")		
Backplane Connector	Slot: Signal Name	Connector: Pin*	Pin**	Signal Name	Signal (LED)
Slot 0:z18 Slot 0:b18 Slot 0:d18	Slot 0:Load 1+	Load 8-2:A1	A	Inj_Ch0	Inj 1
Slot 0:z20 Slot 0:b20 Slot 0:d20	Slot 0:Load 1-	Load 8-2:A2	C	Inj_Ch2	Inj 1
Slot 0:z28 Slot 0:b28 Slot 0:d28	Slot 0:Load 3-	Load 8-2:A6	E	Inj_Ch4	Inj 2
Slot 0:z26 Slot 0:b26 Slot 0:d26	Slot 0:Load 3+	Load 8-2:A5	G	Inj_Ch6	Inj 2
Slot 0:z22 Slot 0:b22 Slot 0:d22	Slot 0:Load 2+	Load 8-2:A3	B	Inj_Ch1	Inj 3
Slot 0:z24 Slot 0:b24 Slot 0:d24	Slot 0:Load 2-	Load 8-2:A4	D	Inj_Ch3	Inj 3
Slot 0:z32 Slot 0:b32 Slot 0:d32	Slot 0:Load 4-	Load 8-2:A8	F	Inj_Ch5	Inj 4
Slot 0:z30 Slot 0:b30 Slot 0:d30	Slot 0:Load 4+	Load 8-2:A7	H	Inj_Ch7	Inj 4
Slot 1:z18 Slot 1:b18 Slot 1:d18	Slot 1:Load 1+	Load 8-1:A1	J	Inj_Ch8	Inj 5
Slot 1:z20 Slot 1:b20 Slot 1:d20	Slot 1:Load 1-	Load 8-1:A2	L	Inj_Ch10	Inj 5
Slot 1:z28 Slot 1:b28 Slot 1:d28	Slot 1:Load 3-	Load 8-1:A6	N	Inj_Ch12	Inj 6
Slot 1:z26 Slot 1:b26 Slot 1:d26	Slot 1:Load 3+	Load 8-1:A5	R	Inj_Ch14	Inj 6
Slot 1:z22 Slot 1:b22 Slot 1:d22	Slot 1:Load 2+	Load 8-1:A3	K	Inj_Ch9	Inj 7
Slot 1:z24 Slot 1:b24 Slot 1:d24	Slot 1:Load 2-	Load 8-1:A4	M	Inj_Ch11	Inj 7
Slot 1:z32 Slot 1:b32 Slot 1:d32	Slot 1:Load 4-	Load 8-1:A8	P	Inj_Ch13	Inj 8

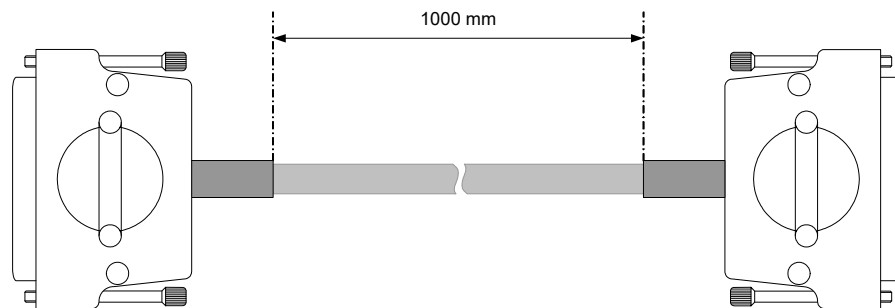
ES4408 ("Load 8-1", "Load 8-2")			PT-LABCAR ("Load8")		
Backplane Connector	Slot: Signal Name	Connector: Pin*	Pin**	Signal Name	Signal (LED)
Slot 1:z30 Slot 1:b30 Slot 1:d30	Slot 1:Load 4+	Load 8-1:A7	S	Inj_Ch15	Inj 8
			T	Inj_Ch16	-

\* see " "Load 8-1" and "Load 8-2" Connectors" on page 31  
\*\* see documentation on PT-LABCAR

**Tab. 5-2** Pin Assignment of the "CBAV341.1-1" Cable (in gray) and the Further Environment of the Signals

#### 5.1.4 "CBAV342.1-1" Cable

This cable is used to connect the loads made available at "Load 7" to the corresponding "Load7" connector of the PT-LABCAR.



**Fig. 5-4** "CBAV342.1-1" Cable

#### *Connectors and Wiring*

ES4408.1 side: Hybrid DSUB 8W8 (female)

PT-LABCAR side: Hybrid DSUB 8W8 (male)

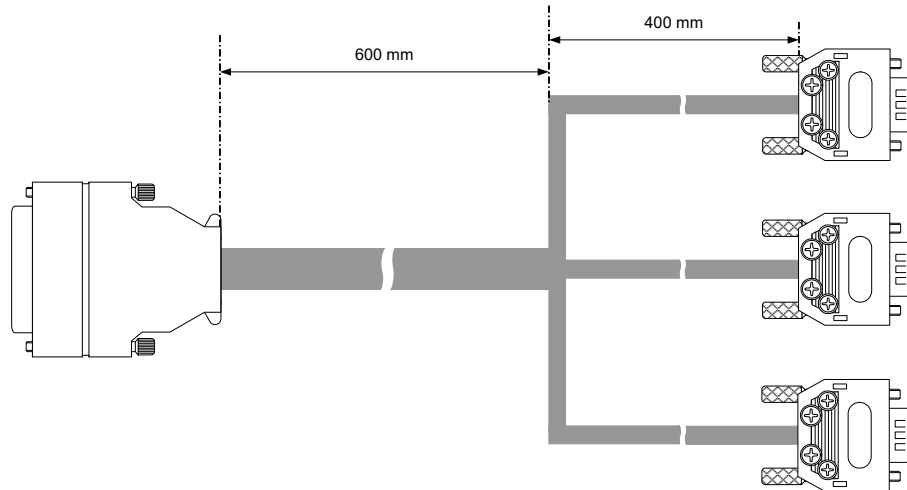
The assignment of the corresponding connectors on the ES4408.1 is described in the section "Load 7" Connector" on page 30; for that of the connectors of the PT-LABCAR, refer to the PT-LABCAR User's Guide.

The wiring is 1:1 – the wires have a cross-section of 1.5 mm<sup>2</sup>.

For information on ordering this cable, refer to the section "Order Data" on page 46.

### 5.1.5 "CBAV343.1-1" Cable

This cable is used to connect the measure signals made available at "Meas 7", "Meas 8-1" and "Meas 8-2" to the corresponding "Measure" connector of the PT-LABCAR.



**Fig. 5-5** "CBAV343.1-1" Cable

#### Connectors and Wiring

ES4408.1 side: 3 x DSUB9 (male)

PT-LABCAR side: DSUB25 (female)

The assignment of the corresponding connectors on the ES4408.1 is described in the sections "Connector "Meas 7"" on page 33 and "Meas 8-1" and "Meas 8-2" Connectors" on page 34; for that of the connectors of the PT-LABCAR, refer to the PT-LABCAR User's Guide.

The assignment of the signals between these connectors is shown in Tab. 5-3 on page 45.

For information on ordering this cable, refer to the section "Order Data" on page 46.

ES4408 (3 x DSUB9)			PT-LABCAR (DSUB25)	
Slot:Signal Name	DSUB9*:Connector:Pin		Pin	ES1336:Signal Name
Slot 0:Current 1	ES4408_1:Meas 8-2:1		1	In_CH0
Slot 0:Current 2	ES4408_1:Meas 8-2:2		2	In_CH1
Slot 0:Current 3	ES4408_1:Meas 8-2:3		3	In_CH2
Slot 0:Current 4	ES4408_1:Meas 8-2:4		4	In_CH3
Slot 1:Current 1	ES4408_2:Meas 8-1:1		5	In_CH4
Slot 1:Current 2	ES4408_2:Meas 8-1:2		6	In_CH5
Slot 1:Current 3	ES4408_2:Meas 8-1:3		7	In_CH6
Slot 1:Current 4	ES4408_2:Meas 8-1:4		8	In_CH7
	n.c.		9	In_CH8
	n.c.		10	In_CH9
	n.c.		11	In_CH10
	n.c.		12	In_CH11
	n.c.		13	IN_CH12
	n.c.		14	In_CH13
	n.c.		15	In_CH14
	n.c.		16	In_CH15
Slot 2:Current 1	ES4408_3:Meas 7:1		17	In_CH16
	n.c.		18	In_CH16
Slot 2:Current 2	ES4408_3:Meas 7:2		19	In_CH17
	n.c.		20	In_CH17
Slot 2:Current 3	ES4408_3:Meas 7:3		21	In_CH18
	n.c.		22	In_CH18
Slot 2:Current 4	ES4408_3:Meas 7:4		23	In_CH19
	n.c.		24	In_CH19
Slot 0:GND	ES4408_1:Meas 8-2:9		25	n.c.
Slot 1:GND	ES4408_2:Meas 8-1:9		25	n.c.
Slot 2:GND	ES4408_3:Meas 7:9		25	n.c.

\* Make sure you allocate the DSUB9 connector correctly to the connectors of the ES4408.1 Load Chassis.

**Tab. 5-3** Pin Assignment of the "CBAV343.1-1" Cable (in gray) and the Further Environment of the Signals

## 5.1.6 Order Data

<b>Order Name</b>	<b>Short Name</b>	<b>Order Number</b>
Cable ITT CA06COM - Ring Tongue (3fc - 2xM8)	CBAV300.1-2	F-00K-103-223
Connection Cable (ES4408/ES4640), 7W2 - 7W2, 1m	CBAV340.1-1	F-00K-106-179
Connection Y-Cable (ES4408/ES4640), 8W8 - 8W8 - Round Connector (8mc-8mc+17mc), 1m	CBAV341.1-1	F-00K-106-180
High Current Connection Cable (ES4640), 8W8 - 8W8, 1m	CBAV342.1-1	F-00K-106-181
Connection Cable (ES4640), DSUB - 3xDSUB, 1m	CBAV343.1-1	F-00K-106-322

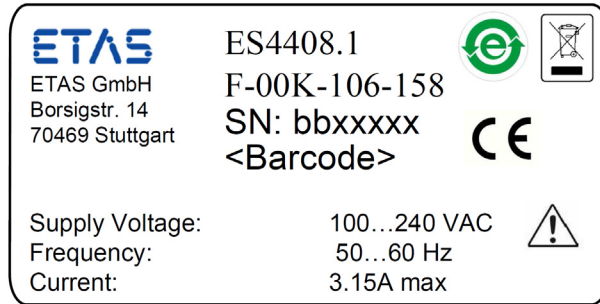
**Tab. 5-4** Order Data for Cables

## 6 Technical Data

This chapter contains the technical data of the ES4408.1 Load Chassis.

### *Labeling of the product*

The nameplate is on the rear of the device.



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 (with the corresponding input voltage)
- China RoHS
- WEEE Symbol
- CE marking
- A warning symbol that indicates that the User's Guide must be read before operating and opening the ES5300.1-A!

### *Slots*

Height	3 U
Width	84 HP
Depth	340 mm

*Supply Voltages*

Current consumption	+ 3.3 V: 25 A + 5 V: 10 A +12 V: 20 A -12 V: 5 A +24 V: 7 A
Max. power consumption	350 W
Status display	On front panel

*Ventilation*

No. of cooling vents	6
Max. throughput per cooling vent	170 m <sup>3</sup> /h
Temperature sensor	Near the slots

*Power Supply Unit*

Input voltage	100 - 240 VAC
Mains frequency	50 - 60 Hz
Fuses	2x T3.15 A/250 V (5 mm x 20 mm)
Connector	IEC 60320 C14 chassis plug

*Dimensions*

Height	4 U
Width	482 mm
Depth	475 mm

*Environmental Conditions*

Operating temperature	5 °C to 35 °C (41 °F to 95 °F)
Relative humidity	0 to 95% (non-condensing)



## 7 **ETAS Contact Addresses**

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### *ETAS HQ*

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ETAS GmbH

Borsigstraße 24

70469 Stuttgart

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Phone: +49 711 3423-0

Fax: +49 711 3423-2106

WWW: [www.etas.com](http://www.etas.com)

### *ETAS Subsidiaries and Technical Support*

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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](http://www.etas.com/en/contact.php)

ETAS technical support WWW: [www.etas.com/en/hotlines.php](http://www.etas.com/en/hotlines.php)



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