ETAS

DRIVING EMBEDDED EXCELLENCE

ETAS ES600.2 Synchronization and Power Management Module

User Guide

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ES600.2 - User Guide R06 EN - 05.2021

Contents

1 About this Document

1.1 Classification of Safety Messages

The safety messages used here warn of dangers that can lead to personal injury or damage to property:

DANGER

indicates a hazardous situation with a high risk of death or serious injury if not avoided.

WARNING

indicates a hazardous situation of medium risk, which could result in death or serious injury if not avoided.

CAUTION

indicates a hazardous situation of low risk, which may result in minor or moderate injury if not avoided.

NOTICE

indicates a situation, which may result in damage to property if not avoided.

1.2 Presentation of Instructions

The target to be achieved is defined in the heading. The necessary steps for his are in a step-by-step guide:

Target definition

1. Step 1
2. Step 2
3. Step 3

> Result

1.3 Typographical Conventions

Hardware

Bold	Menu commands, buttons, labels of the product
Italic	Emphasis on content and newly introduced terms

1.4 Presentation of Supporting Information

NOTE

Contains additional supporting information.

2 About this Manual

This chapter contains information about the following topics:

2.1 Scope of Supply

Prior to the initial commissioning of the module, please check whether the module was delivered with all required components and cables (see chapter 9.1 on page 44).

Additional cables and adapters can be obtained separately from ETAS. A list of available accessories and their order designation is located in chapter “Accessories” on page 44 of this manual or in the ETAS product catalog.

2.2 Additional Information

The configuration instructions for the module under INCA can be found in the corresponding software documentation.

3 Basic Safety Notices

This chapter contains information about the following topics:

3.1 General Safety Information

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

NOTE

Carefully read the documentation (Product Safety Advice 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.

3.2 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.

General safety at work

The existing regulations for safety at work and accident prevention must be followed. All applicable regulations and statutes regarding operation must be strictly followed when using this product.

3.3 Intended Use

Application area of the product

This product was developed and approved for applications in the automotive sector. The module is suitable for use in interiors, in the passenger cell or in the trunk of vehicles. The module is not suitable for installation in the engine compartment and similar environments. For use in other application areas, please contact your ETAS contact partner.

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.

Requirements for 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 requirements on the ambient conditions.
- Do not use the product in a wet or damp environment.
- Do not use the product in potentially explosive atmospheres.

Electrical safety and power supply

- Observe the regulations applicable at the operating location concerning electrical safety as well as the laws and regulations concerning work safety!
- Connect only current circuits with safety extra-low voltage in accordance with EN 61140 (degree of protection III) to the connections of the module.
- Ensure that the connection and setting values are being followed (see the information in the chapter "Technical data").
- Do not apply any voltages to the connections of the module that do not correspond to the specifications of the respective connection.

Power supply

- The power supply for the product must be safely disconnected from the supply voltage. For example, use a car battery or a suitable lab power supply.
- Use only lab power supplies with double protection to the supply network (with double insulation/reinforced insulation (DI/ RI)).
- The lab power supply must be approved for an operating altitude of 5000 m and for an ambient temperature of up to 70 °C.
- In regular operation of the modules as well as very long standby operation, a discharge of the vehicle battery is possible.

Connection to the power supply

- The power cable must not be connected directly to the vehicle battery or lab power supply, but via a fuse of up to 20 A.
- Ensure that the connections of the lab power supply, the power supply at the module and the vehicle battery are easily accessible!
- Route the power cord in such a way that it is protected against abrasion, damages, deformation and kinking. Do not place any objects on the power cord!

DANGER

Dangerous electrical voltage!
Connect the power cable only with a suitable vehicle battery or with a suitable lab power supply! The connection to power outlets is not allowed!
To prevent an inadvertent insertion in power outlets, ETAS recommends to equip the power cables with safety banana plugs in areas with power outlets.

Disconnecting from the power supply

The module does not have an operating voltage switch. The module can be de-energized as follows:

- Disconnecting the module from the lab power supply
  - Separating device is the lab plug of the power cord or
  - Separating device is the plug of the power cord at the connection of the module
- Disconnecting the module from the vehicle battery
  - Separating device is the lab plug of the power cord or
  - Separating device is the plug of the power cord at the connection of the module
- Disconnecting the vehicle battery.

Approved cables

- Use exclusively ETAS cables at the connections of the module!
- Adhere to the maximum permissible cable lengths!
- Do not use any damaged cables! Cables may be repaired only by ETAS!
- Never apply force to insert a plug into a socket. Ensure that there is no contamination in and on the connection, that the plug fits the socket, and that you correctly aligned the plugs with the connection.

Requirements for the location

- Position the module or the module stack on a smooth, level and solid underground.
- The module or the module stack must always be securely fastened.

Fixing the modules on a carrier system

- When selecting the carrier system, observe the static and dynamic forces that could be created by the module or the module stack on the carrier system.

Requirements on the ventilation

- Keep the module away from heat sources and protect it against direct exposure to the sun.
- The free space above and behind the module must be selected so that sufficient air circulation is ensured.

Assembling (interconnecting) the modules

- Prior to assembling (interconnecting) or separating a module stack, the modules must be disconnected from the supply voltage or they have to be in the standby operating mode.

Transport

- Stack and connect the modules only at the location of the startup!
- Do not transport the modules at the cable of the module or any other cables.

Maintenance

The product is maintenance-free.

Repair

If an ETAS hardware product should require a repair, return the product to ETAS.

Cleaning the module housing

- Use a dry or lightly moistened, soft, lint-free cloth for cleaning the module housing.
- Do not user any sprays, solvents or abrasive cleaners which could damage the housing.
- Ensure that no moisture enters the housing. Never spray cleaning agents directly onto the module.

Ambient conditions

The housing and the connectors of the module as well as the plug connectors of the cables meet the degree of protection IP40.

Opening the module

CAUTION

Damage to the module and loss of properties based on IP40!
Do not open or change the module housing!
Work on the module housing may only be performed by ETAS.

Potential equalization

CAUTION

Potential equalization in the vehicle is possible via the shield of the connecting cables of the modules!
Install the modules only at locations with the same electrical potential or isolate the modules from the installation location.

Cabling

For detailed information about cabling, see the User's Guide of the module.

4 Hardware Description

This chapter contains information about the following topics:

4.1 Overview

The ES600.2 Synchronization and Power Management Module is an Ethernet switch with integrated voltage supply and time synchronization for connecting several data acquisition or interface modules to a host PC. The ES600.2 modules can be cascaded so that you can also build larger module blocks.

Fig. 4-1 ES600.2 Synchronization and Power Management Module

The ES600.2 module is equipped with two upstream Ethernet connections (one Gigabit Ethernet and one Fast Ethernet connection) for the data exchange with the host PC or a drive recorder.

NOTE

The host PC can be connected either with the "GE-HOST" or "FE-HOST" connection.
The drive recorder ES720.1 can be connected with the "FE-HOST" connection.

The six downstream Ethernet connections of the module can be connected with network, measuring, calibration and rapid prototyping modules. ECUs that are equipped with an XETK or feature a separate Ethernet interface, can be connected directly to these Ethernet connections.

The ES600.2 supplies connected measuring modules of the series ES4xx / ES6xx with current and carries out the data exchange with the modules using a common cable. The integrated power management function sequentially switches in the connected modules This allows preventing high start-up peaks.

The ES600.2 module synchronizes all connected modules and their measuring channels. Such a system offers a high time stability with the support of INCA. A phase shift of the signals is ruled out and a time-synchronous scanning of the measuring channels of the connected modules and module arrangements is ensured.

The ES600.2 module and the corresponding cables are designed for use in the lab, at the test bench and in the passenger cell of motor vehicles.

Properties

The most important properties of the ES600.2 at a glance:

- Ethernet switch with 10/100/1000 Mbit/s data rate
- A host connection (upstream, Gigabit Ethernet)
- A host connection (upstream, Fast Ethernet)
- Six connections for compatible modules (downstream, Fast Ethernet)
- Status indicator for every connection
- Sequential switch-on of the connected modules to avoid high start-up peaks
- Automatic standby function for the connected modules
- Precise synchronization of all connected modules and their measuring channels
- Automotive-capable module that is suitable for use in the development environment and in the vehicle on test courses.
  - Electrical isolation of the channels from each other, from device ground and from the supply voltage
  - Immune to ambient conditions (temperature, EMC)
  - Wide supply voltage range
  - High level of mechanical stability and robustness

The complete technical data of the ES600.2 are located in the chapter “Technical Data” on page 30.

4.2 Housing

For the ES600.2, a housing with connections on the device front side and the device rear side is used. The robust metal housing of the ES600.2 is fitted with non-slip plastic feet.

It can easily be screwed onto a carrier system for fastening in a vehicle or lab. The housings of this device family can also be connected with each other quickly and easily (see chapter 6.1 on page 23).

4.3 Connections

4.3.1 Front side

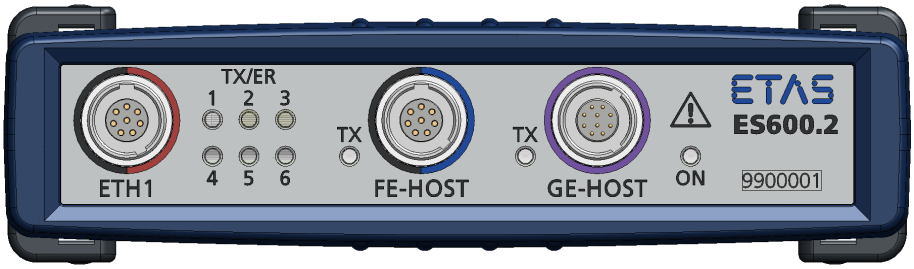


Fig. 4-2 ES600.2 front side of device

The front side of the ES600.2 features the following connections:

- ETH1 (Fast Ethernet, downstream, SYNC-OUT)
- FE-HOST (Fast Ethernet, upstream, SYNC-IN)
- GE-HOST (Gigabit Ethernet, upstream)

The ETH1 connection is a combined Ethernet/power supply connection.

4.3.2 Rear side

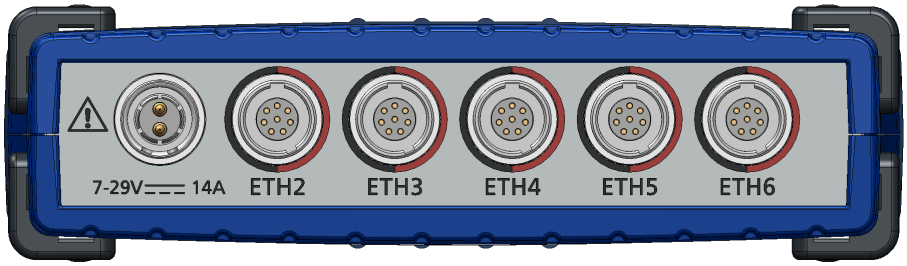


Fig. 4-3 ES600.2 rear side of device

The rear side of the ES600.2 features the following connections:

- 7-29 V DC (operating voltage)
- ETH2 (Fast Ethernet, downstream, SYNC-OUT)
- ETH3 (Fast Ethernet, downstream, SYNC-OUT)
- ETH4 (Fast Ethernet, downstream, SYNC-OUT)
- ETH5 (Fast Ethernet, downstream, SYNC-OUT)
- ETH6 (Fast Ethernet, downstream, SYNC-OUT)

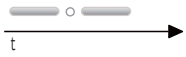
The connections ETH2 to ETH6 are combined Ethernet/power supply connections.

4.4 Indicators

The front side of the module features LEDs for indicating the operating, error and synchronization state of the module (see Fig. 4-2 on page 16.

NOTE

The flashing of the LED is differentiated in slow (3 times per second), medium (6 times per second) and fast (12 times per second).

LED	Indication	Operating state
ON	Off	No power supply
	Flashing green (0.1 s on, 1.9 s off)	Module in operating mode "Standby", minimum current consumption. Changing to the "Normal" state requires a Wake-Up event (see chapter 5.5 on page 21).
	Green	Module in operating mode "Normal"
	Green (briefly flashing brighter) 	Module is synchronization master, module is not externally synchronized
	Green (briefly flashing darker) 	Module is synchronization slave, module is externally synchronized: at FE-HOST connection
	Flashing red	Firmware update is being performed
	Red	Error

The FE-HOST connection is assigned a **TX** LED.

LED	Indication	Operating state
TX	Off	No Ethernet connection
	Green	Ethernet connection (upstream) active
	Flashing green (slow)	Data transfer with 10 Mbit/s
	Flashing green (medium)	Data transfer with 100 Mbit/s

The GE-HOST connection is assigned a **TX** LED.

LED	Indication	Operating state
TX	Off	No Ethernet connection
	Green	Ethernet connection (upstream) active
	Flashing green (slow)	Data transfer with 10 Mbit/s
	Flashing green (medium)	Data transfer with 100 Mbit/s
	Flashing green (fast)	Data transfer with 1000 Mbit/s

The connections ETH1 to ETH6 are each assigned an LED (**TX/ER1** to **TX/ER6**).

LED	Indication	Operating state
TX/ER	Off	No Ethernet connection
	Green	Ethernet connection (downstream) active
	Flashing green (slow)	Data transfer with 10 Mbit/s
	Flashing green (medium)	Data transfer with 100 Mbit/s
	Red	Current overload by the connected module

All LEDs light up briefly when switching on the ES600.2.

5 Functional Description

This chapter contains information about the following topics:

5.1 Block diagram

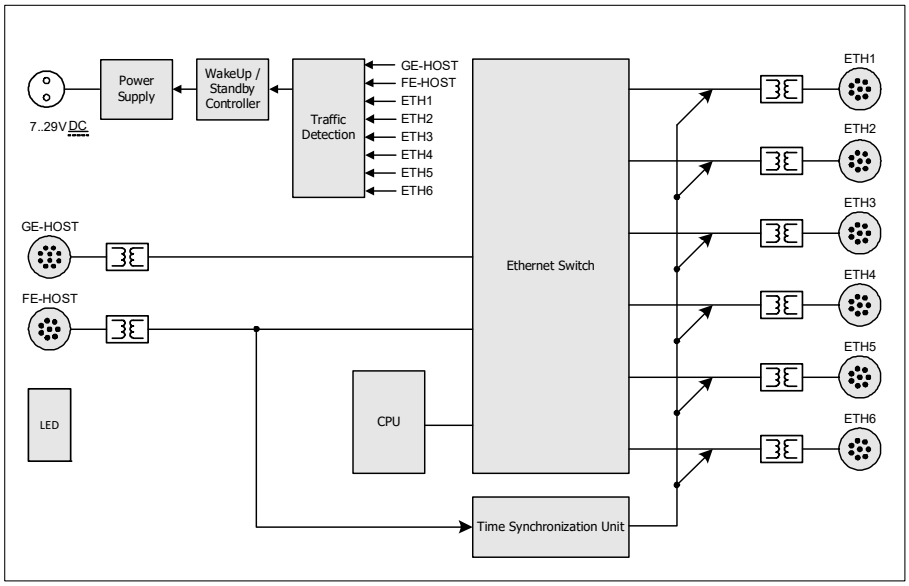


Fig. 5-1 Block diagram

To meet the requirements for operation in the vehicle, the connections of the ES600.2 are each routed to a Lemo socket.

5.2 Power supply

The power supply connection "7-29 V DC" is routed to a 2-pin plug connector (Lemo socket) to the rear side of the module. An external power supply or the vehicle battery supply the module with current.

NOTE

The ES600.2 must physically be isolated from all supply voltages so that the module does not consume any current.

When connecting the ES600.2 with operating voltage and an active Ethernet connection to HOST, the module boots. If the Ethernet connection does not exist, the module changes to the "Standby" operating state.

5.3 Ethernet switch

The integrated Ethernet switch is used for connecting the ES600.2 module and additional measuring or interface modules to a user PC. The data acquisition of the connected modules is done synchronized (ETAS device synchronization, see chapter 5.4 on page 21). The Ethernet switch can be cascaded with additional network modules so that you can also build larger blocks of measuring and interface modules.

The switch is equipped with a host connection (Fast Ethernet), a host connection (Gigabit Ethernet) and six Ethernet connections (10/100BaseT Ethernet).

All connections of the switch, except for the Ethernet connections "ETH1" to "ETH6", are electrically isolated from each other and from the power supply.

5.3.1 "FE-HOST" host connection

The upstream "FE-HOST" Ethernet interface connects the ES600.2 module with the user PC or the downstream Ethernet interface of another module. This interface enables the ETAS software tools to access the connected modules.

"Wake-Up" function

The "FE-HOST" Ethernet interface supports the "Wake-Up" function (see chapter 5.5 on page 21).

Compatible modules

A list of the compatible modules is located in chapter 7.10.3 on page 35.

5.3.2 "GE-HOST" host connection

The upstream "GE-HOST" Ethernet interface connects the ES600.2 module with the user PC or the downstream Ethernet interface of another module. This interface enables the ETAS software tools to access the connected modules.

"Wake-Up" function

The "GE-HOST" Ethernet interface supports the "Wake-Up" function (see chapter 5.5 on page 21).

Compatible modules

A list of the compatible modules is located in chapter 7.10.2 on page 35.

5.3.3 Ethernet connections "ETH1" to "ETH6"

The ES600.2 module provides six downstream Ethernet interfaces for additional modules. The Ethernet interfaces "ETH1" to "ETH6" based on the 10/100BaseT standard can be operated either with 10 or 100 Mbit/s, half or full duplex. The switchover is done automatically to the highest possible connection speed.

ECUs that are equipped with an XETK or feature a separate Ethernet interface, can be connected directly to the module and communicate with the application software via XCP-on-Ethernet.

Module compound

The connections "ETH1" to "ETH6" connect the ES600.2 module with additional ES600 modules, measuring, calibration and rapid prototyping modules. The cascadability also allows implementing larger blocks of measuring and interface modules.

Power supply of connected modules

The ES600.2 can also take on the power supply of connected ES4xx modules and ES6xx modules via the Ethernet connecting cable. Observe the maximum output current at the Ethernet interfaces when cascading the modules.

Other modules connected via Ethernet cable must be cabled separately with the power supply.

"Wake-Up" function

The Ethernet interfaces "ETH1" to "ETH6" support the "Wake-Up" function (see chapter 5.5 on page 21).

Compatible modules

A list of the compatible modules is located in chapter 7.10.4 on page 36.

5.4 Time synchronization

To synchronize the measuring channels in a module compound, the modules of the system provide a global time clock.

Modules connected to the "FE-HOST" interface can synchronize the ES600.2 (SYNC-IN). If no synchronization signal is received at the "FE-HOST" connection, the ES600.2 automatically takes over the function of the master module for the synchronization.

The time synchronization unit of the ES600.2 master synchronizes the connected modules via Ethernet lines. At the connections "ETH1" to "ETH6", the synchronization signal is passed on to connected modules (SYNC-OUT). The slave modules adjust to the cycle specified by the master module.

A phase shift of the individual measuring signals to each other is ruled out, even if the measured values are acquired from different modules.

The data of all connected modules of the series ES4xx, ES51x, ES6xx and the XETK are acquired synchronously (ETAS device synchronization).

5.5 "Wake-Up" function

If the system is used in a vehicle, the energy consumption must be as low as possible since the measuring setup is supplied by a battery. For this reason, the ES600.2 module is equipped with a link signal detector at all connections for automatic power-save function.

With the "Wake-Up" function, the module can automatically switch between the operating states "Standby" and "On".

The ES600.2 and modules connected to it automatically switch to the "Standby" operating state if no connection receives any link signals any longer or the host computer is switched off or disconnected. As soon as at least one of these connections receives link signals or the host computer is activated again, the module automatically changes to the "On" operating state ("Wake-Up" function) and automatically switches on all ETAS modules connected in the measuring system.

NOTE

The automatic switch-on of the ES600.2 via the "Wake-Up" function is possible at all Ethernet connections.

NOTE

For a connected PC to send link pulses, its Ethernet adapter must be configured accordingly.

5.6 Firmware update

The firmware of the ES600.2 can be updated by the user so that future versions of the module can also be used. The firmware update is done with the help of the service software "Hardware Service Pack" (HSP) from the connected PC.

NOTE

During a firmware update, neither the voltage supply nor the Ethernet connection may be interrupted!

6 Commissioning

This chapter contains information about the following topics:

6.1 Assembly and Interlocking

6.1.1 General installation recommendations

CAUTION

Damage or destruction of module is possible.
The modules are approved only for the installation and operation on components or at locations that ensure that the technical data of the modules are maintained during its operation (see chapter 7 on page 30).

6.1.2 Fastening the module on a carrier system

The ES600.2 has a robust metal housing that is fitted with non-slip plastic feet. The module can easily be screwed onto a carrier system for fastening in a vehicle or lab. The screw threads for fixing the module are already part of the housing and easily accessible.

Fixing the housing of the ES600.2:

4. Remove the plastic feet at the underside of the module. To do so, push a blunt screwdriver between housing bottom and plastic foot.
5. Pry off the plastic foot.

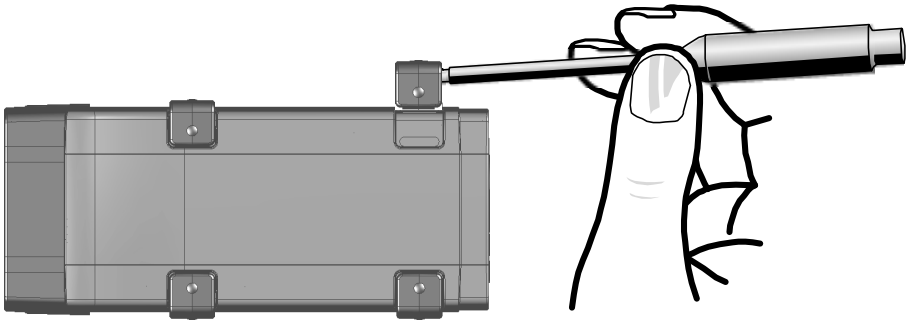


Fig. 6-1 Prying off the plastic foot

A screw thread becomes visible under the plastic foot. The threads for fixing the module are located at the underside of the housing.

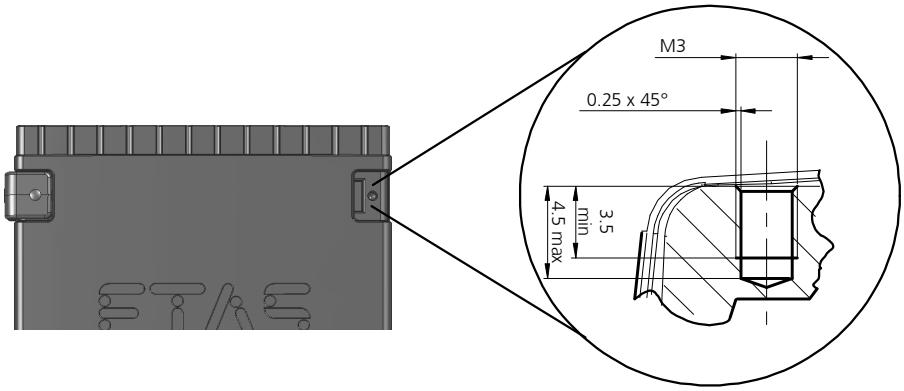


Fig. 6-2 Blind hole with thread

CAUTION

Possible damage or destruction of electronics!
Do not process the existing tapped hole.

NOTE

Screw the module onto your carrier system using **exclusively** M3 cylinder screws and a max. torque of 0.8 Nm.
The screw-in depth in the blind hole of the housing measures max. 3 mm (see Fig. 6-2 on page 24).

6.1.3 Mechanically connecting several modules

Because of the use of ETAS system housings, the Synchronization and Power Management Module can also be connected with modules of the ETAS compact series (ES59x, ES6xx, ES910). They can easily be combined into larger blocks using the supplied T-connectors.

Underneath the ES600.2, you can attach an additional module of the ETAS compact series. To do so, remove the four plastic feet each at the corresponding side of the device and install the supplied T-connectors in their place.

Mechanically connecting several modules:

1. Remove the four plastic feet at the underside of the ES600.2 to be able to fasten an additional module.

   This exposes the installation openings for the T-connectors.

   You can attach an additional module underneath the ES600.2.
2. Remove the four plastic feet on the corresponding side of the second module.
3. Turn the locks of the T-connectors crosswise to the longitudinal axis of the connectors
4. Click two connectors into the installation openings at one longitudinal side of the first module.
5. Click the second module into the two T-connectors.

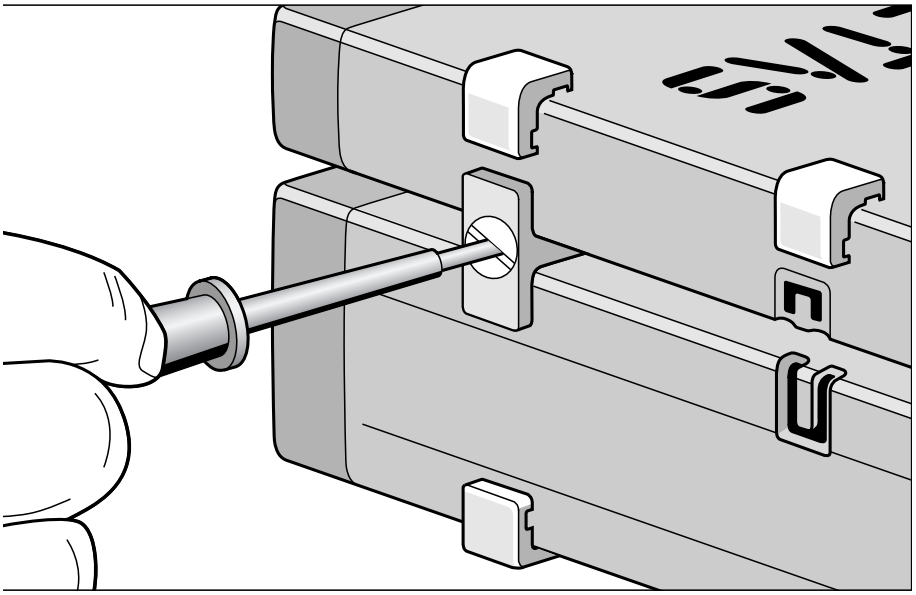


Fig. 6-3 Connecting the ES600.2 with another module

6. Turn the locks of the T-connectors a quarter turn. This locks the connection of the two modules.
7. Click the two other T-connectors into the installation openings at the opposite longitudinal side of the device
8. Lock these connectors, too.
9. If you want to stack additional modules and fasten them above each other, repeat the process with the next module.

6.2 Applications

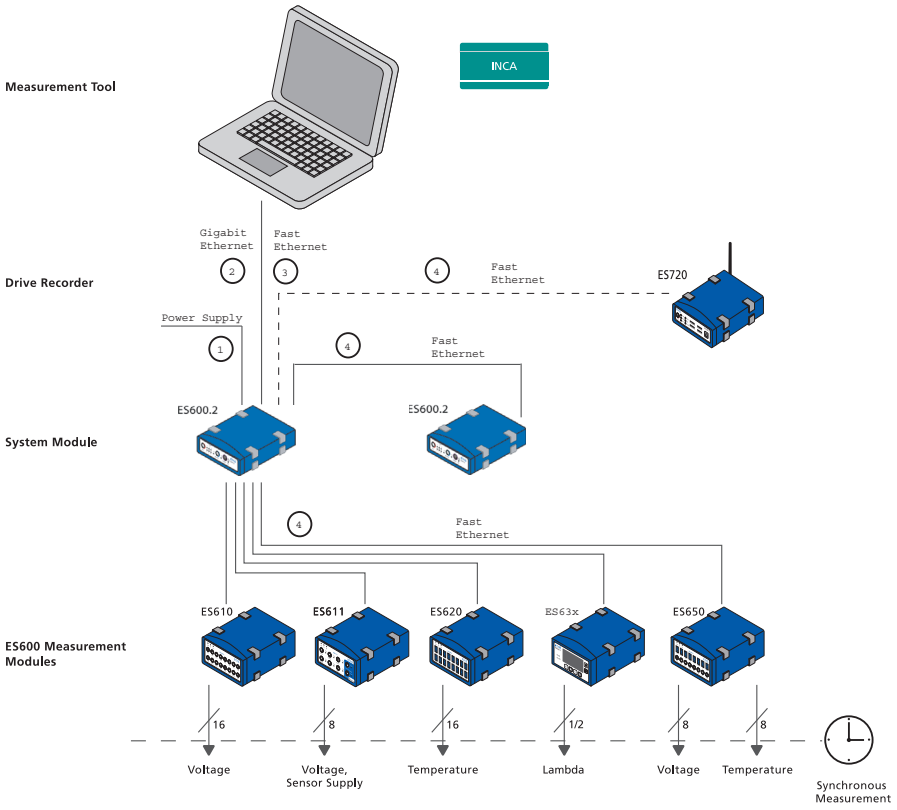


Fig. 6-4 Cabling of ES600.2 with ETAS modules (MC application)

Cables in Fig. 6-4	Function	Short name
1	Cable for the "7-29 V DC" connection	CBP120, CBP1205
2	Cable for the "GE-HOST" connection	CBE250
3	Cable for the "FE-HOST" connection	CBE100
4	Cable for the connections "ETH1" to "ETH6"	CBE130, CBE140

NOTE

The host (PC or drive recorder) can be connected either with the "GE-HOST" or "FE-HOST" connection.

6.3 Cabling

This section describes how to connect additional modules from the ES6xx series, the power supply and the host PC to your ES600.2 Synchronization and Power Management Module.

NOTE

The connections of the ES600.2 and the transducers can also feature dangerous voltages when the device is switched off. Ensure that the connections are de-energized before you start the cabling.

First, connect the modules mechanically before performing the cabling. The pertinent notes are located in the chapter “Assembly and Interlocking” on page 23.

The order of the cabling of the connections of the ES600.2 module is random. There are several special connecting cables available for connecting the modules that can be ordered separately. An overview is located in the chapter “Accessories” on page 44.

6.3.1 Putting a simple module compound in operation

To put a simple module compound in operation, the cables CBE100 or CBE250, CBE130 or CBE140 and CBP120 or CBP1205 are required.

Connecting with the PC:

1. Connect the PC and the FE-HOST connection of the ES600.2 module placed highest in the hierarchy with the cable CBE100. Connect the RJ-45 plug connector with the open Ethernet interface of your PC.

or

2. Connect the PC and the GE-HOST connection of the ES600.2 module placed highest in the hierarchy with the cable CBE250. Connect the RJ-45 plug connector with the open Ethernet interface of your PC.

Connecting with the measuring modules:

1. Connect the HOST connections of your data acquisition and interface modules from the ES6xx series with one unused connection ETH1 to ETH6 each of the ES600.2. Use a cable of type CBE130 or CBE140 for this purpose. Insert the ends marked in blue into the HOST connections of the data acquisition and interface modules and the ends marked in red into the connections ETH1 to ETH6 of the ES600.2.

Connecting with the sensors:

1. Connect the sensors with the inputs of the data acquisition modules. Relevant notes are in the User's Guides of the individual modules.

Connecting with the power supply:

1. Connect the cable CBP120 or the cable CBP1205 for the power supply with the connections 7-29 V of the ES600.2 and with the desired power supply. In the process, observe the current consumption of the ES600.2, the data acquisition and interface modules connected to it and their supply voltage range. The permissible values are listed in the section “Technical Data” on page 30 and in the User's Guides of the individual modules.

Starting the application program:

1. Start INCA. The information for the configuration and measured value acquisition is located in the INCA online help.

6.3.2 Putting a complex module compound in operation

For larger module compounds, it is meaningful to create a drawing of the planned compound. Figure Fig. 6-4 on page 26 shows an example for a module compound with two cascaded ES600.2 modules and additional ES6xx measuring modules.

To put a complex module compound in operation, the cables CBE100 or CBE250, CBE130 or CBE140 and CBP120 or CBP1205 are required.

Connecting with the PC:

1. Connect the PC and the FE-HOST connection of the ES600.2 module placed highest in the hierarchy with the cable CBE100. Connect the RJ-45 plug connector with the open Ethernet interface of your PC.

or

2. Connect the PC and the GE-HOST connection of the ES600.2 module placed highest in the hierarchy with the cable CBE250. Connect the RJ-45 plug connector with the open Ethernet interface of your PC.

Connecting with additional ES600.2 modules:

1. To cascade the ES600.2, connect the FE-HOST connection of the lower-level ES600.2 with one of the connections ETH1 to ETH6 of the higher-level ES600.2. Use a cable of type CBE130 or CBE140 for this purpose.

   In the hierarchy, the higher-level ES600.2 is located closer to the host PC.

Connecting with the measuring modules:

1. Connect the HOST connections of your data acquisition and interface modules from the ES6xx series with one unused connection ETH1 to ETH6 of the ES600.2. Use a cable of type CBE130 or CBE140 for this purpose. Insert the ends marked in blue into the HOST connections of the data acquisition and interface modules and the ends marked in red into the connections ETH1 to ETH6 of the ES600.2.

Connecting with the sensors:

1. Connect the sensors with the inputs of the data acquisition modules. Relevant notes are in the User's Guides of the individual modules.

Connecting with the power supply:

1. Connect the cable CBP120 or the cable CBP1205 for the power supply with the connections 7-29 V of the ES600.2 and with the desired power supply. In the process, observe the current consumption of the ES600.2, the data acquisition and interface modules connected to it and their supply voltage range. The permissible values are listed in the section “Technical Data” on page 30 and in the User's Guides of the individual modules.

Starting the application program:

1. Start INCA. The information for the configuration and measured value acquisition is located in the INCA online help.

7 Technical Data

This chapter contains information about the following topics:

7.1 General data

7.1.1 Identifications on the product

The following symbols are used for identifying the product:

Symbol	Description
	The User's Guide must be read prior to the startup of the product!
SN: 1234567	Serial number (7-digit)
Vx.yz	Hardware version of the product
F 00K 123 456	Order number of the product (see chapter 9.1 on page 44)
7-29V ⎓	Operating voltage range (DC voltage)
xy A	Current consumption, max.
	Marking for CE conformity (Chapter 7.3 on page 32)
	Marking for UKCA conformity (Chapter 7.4 on page 32)
	Marking for KCC conformity (Chapter 7.5 on page 32)
	Marking for WEEE, see chapter 7.6 on page 32
	Marking for China RoHS, see chapter on page 32

7.1.2 Standards met

The module meets the following standards:

Standard	Test
EN 61326-1	Electrical equipment for measurement, control and laboratory use - EMC requirements
EN 61000-6-2	Immunity for industrial environments
EN 61000-6-3	Interference emissions (living area, business and commercial areas as well as small enterprises)
EN 60 529	Degree of protection through housing (IP code)
EN 60 068-2-31	Fundamental environmental testing - Part 2: Tests; Test ed: free falling

7.1.3 Ambient conditions

Operating temperature range	-40 °C to +70 °C
	-40 °F to +158 °F
Storage temperature range (module without packaging)	-40 °C to +85 °C
	-40 °F to +185 °F
Relative humidity (non-condensing)	0 to 85% (operation)
	0 to 95% (storage)
Operating altitude	max. 5,000 m / 16,400 ft
Degree of protection	IP40
Contamination level	2 (acc. to IEC 60664-1 and IEC 61010-1)

NOTE

The module is suitable for use in interiors, in the passenger cell or in the trunk of vehicles. The module is **not** suitable for installation in the engine compartment and similar environments.

7.1.4 Maintenance of the product

Do not open or change the module housing! Work on the module housing may be performed only by qualified technical personnel. Return defective modules to ETAS for repair.

7.1.5 Cleaning the product

We recommend cleaning the product with a dry cloth.

7.1.6 Mechanical data

Dimensions (H x W x D)	36 mm x 127 mm x 160 mm
	1.42 in x 5.0 in x 6.3 in
Weight	approx. 0.64 kg / 1.42 lb

7.2 RoHS conformity

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.

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.

7.3 CE conformity

With the CE mark attached to the product or its packaging, ETAS confirms that the product corresponds to the product-specific, applicable directives of the European Union.

The CE Declaration of Conformity for the product is available upon request.

7.4 UKCA conformity

With the UKCA mark attached to the product or its packaging, ETAS confirms that the product corresponds to the product-specific, applicable standards and directives of Great Britain.

The UKCA declaration of conformity for the product is available on request.

7.5 KCC conformity

With the KC mark attached to the product and its packaging, ETAS confirms that the product has been registered in accordance with the product-specific KCC guidelines of the Republic of Korea.

7.6 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. 7-1 WEEE symbol

The WEEE symbol (see Fig. 7-1 on page 32) 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 chapter 10 on page 46).

7.7 Declarable Substances

European Union

Some products from ETAS GmbH (e.g. modules, boards, cables) use components with substances that are subject to declaration in accordance with the REACH regulation (EU) no.1907/2006.
Detailed information is located in the ETAS download center in the customer information "REACH Declaration" (www.etas.com/Reach). This information is continuously being updated.

7.8 Use of Open Source software

The product uses Open Source Software (OSS). This software is installed in the product at the time of delivery and does not have to be installed or updated by the user. Reference shall be made to the use of the software in order to fulfill OSS licensing terms. Additional information is available in the document "OSS Attributions List" at the ETAS website www.etas.com.

7.9 System requirements

7.9.1 Hardware

Operating the ES600.2 requires a DC voltage supply of 7 V to 29 V DC.

PC with an Ethernet interface

Operating the modules requires a PC with an open Ethernet interface (100 Mbit/s for connection to the FE-HOST or 1000 Mbit/s for connection to the GE-HOST, full duplex) with RJ-45 connection.

Prerequisite for successful initialization of the module

NOTE

It is absolutely necessary to deactivate the function for automatic switching to power-save mode of your PC network adapter if there is no data traffic at the Ethernet interface!

Deactivating the power-save mode

In Control Panel / Device Manager / Network Adapter, select the network adapter used with a double-click. On the "Power Management" tab, deactivate the option "Allow the computer to turn off this device to save power“. Confirm your configuration.

The manufacturers of the network adapters provide different names for this function.

Example:

- "Link down Power saving"
- "Allow the computer to turn off this device to save power."

7.9.2 Supported applications and software prerequisites

The firmware of the ES600.2 can be updated by the user so that future versions of the module can also be used. The firmware update is done with the help of the service software "Hardware Service Pack" (HSP) from the connected PC.

NOTE

During a firmware update, neither the voltage supply nor the Ethernet connection may be interrupted!

7.10 Electrical data

7.10.1 Voltage supply

Operating voltage	7 V to 29 V DC
Current consumption, operation [1)]	Typ. 210 mA at 14.4 V DC
Current consumption, standby [1)]	Typ. 60 mA at 14.4 V DC
Current consumption, maximum	14 A
Power supply of connected modules	Each "ETH" connection: nom. max. 2 A
Energy management	On/Off with Start/Stop of Ethernet data transfer (On/Off upstream module)
Protection	Reverse polarity-protected and load dump protection in accordance with ISO 16750-2 Test B (central load dump protection required)
Overvoltage category (AC mains supply)	II

1): without power supply of connected modules

7.10.2 "GE-HOST" connection

Connection type	Upstream
Number	1 (GE-HOST)
Connection	10Base-T/100Base-TX/1000Base-T Ethernet
Synchronization	IEEE1588-2008 synchronization
Compatibility [1)]	PC
	ES8xx modules

1): Support of ES800 modules functionality "Wake-Up" / "Sleep"

NOTE

For the successful initialization of the network card of your PC, observe chapter 7.9.1 on page 33.

7.10.3 "FE-HOST" connection

Connection type	Upstream
Number	1 (FE-HOST)
Connection	10Base-T/100Base-TX Ethernet
Synchronization	ETAS synchronization mechanism
	IEEE1588-2008: no synchronization, no forwarding of synchronization signals

Synchronization resolution	1 µs
Compatibility [1)]	PC
	ES720 Drive Recorder
	Network and interface modules: ES51x, ES592, ES593-D, ES595, ES600.1, ES600.2, ES8xx, ES910

1): Support of ETAS synchronization mechanism

NOTE

For the successful initialization of the network card of your PC, observe chapter 7.9.1 on page 33.

7.10.4 Ethernet connections "ETH1" to "ETH6"

Connection type	Downstream
Number	6 (ETH1, ETH2, ETH3, ETH4, ETH5, ETH6)
Connection	10Base-T/100Base-TX Ethernet
Synchronization	ETAS synchronization mechanism
	IEEE1588-2008: no synchronization, no forwarding of synchronization signals
Synchronization resolution	1 µs
Nom. max. output current for each "ETH" connection	2 A
Power supply of connected modules	ES4xx and ES6xx measuring modules
Compatibility [1)]	Network module: ES600
	Network and interface modules: ES51x, ES592, ES593-D, ES595
	Measuring modules: ES4xx, ES6xx, ES930.1
	Prototyping and interface module: ES910.3
	ECUs with XETK, ECUs with Ethernet interface
	Ethernet devices from third parties [2)]

1): Support of ETAS synchronization mechanism
2): No support of ETAS synchronization mechanism

7.11 Terminal assignment

NOTE

All connections are represented with view onto the interfaces of the ES600.2.
All shields are on housing potential.

7.11.1 Connection "7-29 V"

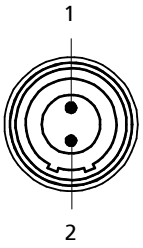


Fig. 7-2 Connection "7-29 V"

Pin	Signal	Meaning
1	UBATT+	Supply voltage, positive
2	Ground	Ground

7.11.2 "FE-HOST" connection

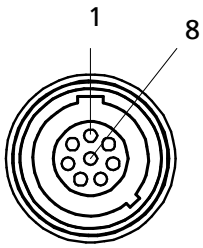


Fig. 7-3 "FE-HOST" connection

Pin	Signal	Meaning
1	-	Reserved
2	-	Reserved
3	-	Reserved
4	RX+	Receiving data, positive
5	TX-	Transmitting data, negative
6	RX-	Receiving data, negative
7	-	Reserved
8	TX+	Transmitting data, positive

7.11.3 "GE-HOST" connection

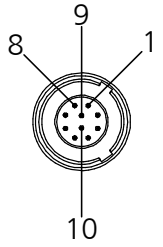


Fig. 7-4 "GE-HOST" connection

Pin	Signal	Meaning
1	BI_DA+	
2	BI_DA-	
3	BI_DB+	
4	BI_DC+	
5	BI_DC-	
6	BI_DB-	
7	BI_DD+	
8	BI_DD-	
9	N.C.	Not connected
10	N.C.	Not connected

7.11.4 Connections "ETH1" to "ETH6"

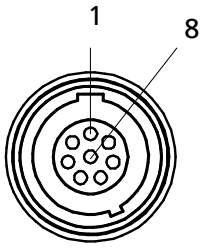


Fig. 7-5 Connections "ETH1" to "ETH6"

Pin	Signal	Meaning
1	UBATT+	Supply voltage, positive
2	UBATT+	Supply voltage, positive
3	UBATT-	Supply voltage, negative
4	RX+	Receiving data, positive
5	TX-	Transmitting data, negative
6	RX-	Receiving data, negative
7	UBATT-	Supply voltage, negative
8	TX+	Transmitting data, positive

8 Cables and Accessories

The "Cables and Accessories" chapter provides an overview of available cables and accessories.

NOTE

Only the ETAS cables listed in this User's Guide may be used at the interfaces of the ES600.2. The maximum permissible cable lengths must be maintained.

NOTE

If you need customized cables, please contact your ETAS contact partner or sales.de@etas.com.

8.1 Cable for the "7-29 V DC" connection

DANGER

Dangerous electrical voltage!
Connect the power cable only with a suitable vehicle battery or with a suitable lab power supply! The connection to power outlets is not allowed!
To prevent an inadvertent insertion in power outlets, ETAS recommends to equip the power cables with safety banana plugs CBP1205 in areas with power outlets.

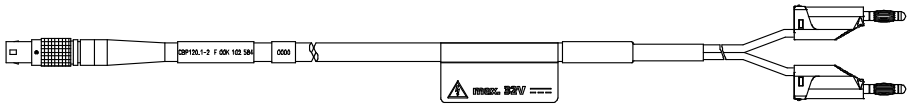
Power supply cables suitable for the ES600.2 module can be delivered in two designs:

- power supply cable CBP120 with standard banana plugs (current design) and
- power supply cable CBP1205 with safety banana plugs (new design).

NOTE

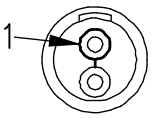
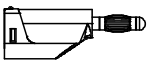
Application, permissible voltages and all the other technical data of the power supply cables are identical for both designs.

8.1.1 CBP120 Cable



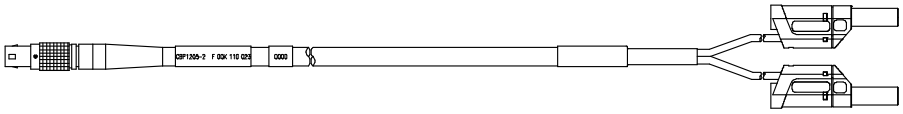
Side A Side B

Fig. 8-1 Cable CBP120-2 (power supply cable with standard banana plugs)

Side A		Side B	
			
Pin	Signal	Plug	Signal
1	UBATT-	Red	UBATT-
2	Ground	Black	Ground

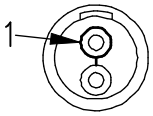
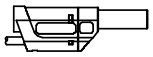
Order name	Short name	Order number
Power Supply Cable, Lemo 1B FGJ Banana (2fc-2mc), 2 m	CBP120-2	F 00K 102 584

8.1.2 CBP1205 Cable



Side A Side B

Fig. 8-2 Cable CBP1205 (power supply cable with safety banana plugs)

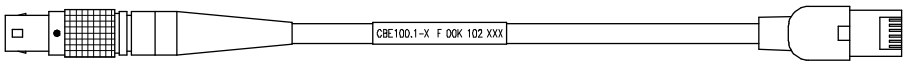
Side A		Side B	
			
Pin	**Signal**	**Plug**	**Signal**
1	UBATT	Red	UBATT
2	Ground	Black	Ground

Order Name	Short name	Order Number
Power Supply Cable, Lemo 1B FGJ – Safety Banana (2fc-2mc), 2 m	CBP1205-2	F 00K 110 023

NOTE

Power supply cables with safety banana plug are suitable only for connection to voltage sources with safety socket.

8.2 Cable for the "FE-HOST" connection



Side A Side B

Fig. 8-3 Cable CBE100-x

Order name	Short name	Order number
Ethernet PC Connection Cable, Lemo 1B FGG - RJ45 (8mc-8mc), 3 m	CBE100-3	F 00K 102 559
Ethernet PC Connection Cable, Lemo 1B FGG - RJ45 (8mc-8mc), 8 m	CBE100-8	F 00K 102 571

8.3 Cable for the "GE-HOST" connection

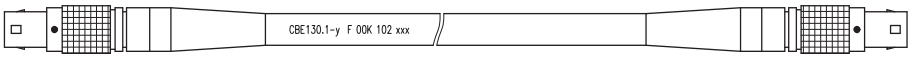
Side A Side B

Fig. 8-4 Cable CBE250

Order name	Short name	Order number
Ethernet PC Connection Cable 1 Gbit/s, Lemo 1B FGM – RJ45 (10fc-8mc), 3 m	CBE250-3	F 00K 109 469
Ethernet PC Connection Cable 1 Gbit/s, Lemo 1B FGM – RJ45 (10fc-8mc), 5 m	CBE250-5	F 00K 109 470
Ethernet PC Connection Cable 1 Gbit/s, Lemo 1B FGM – RJ45 (10fc-8mc), 8 m	CBE250-8	F 00K 109 471

8.4 Cable for the connections "ETH1" to "ETH6"

8.4.1 Cable CBE130-x

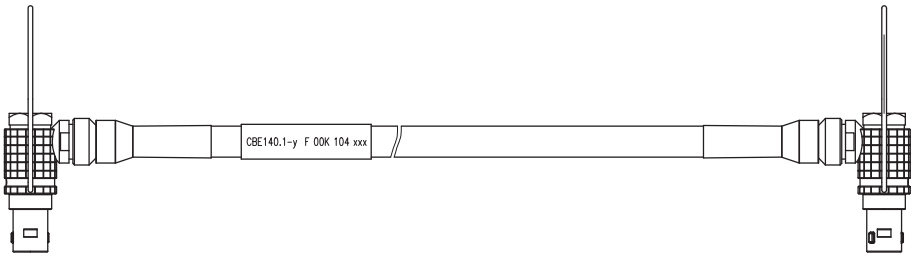


Side A Side B

Fig. 8-5 Cable CBE130-x

Order name	Short name	Order number
Ethernet Connection and Power Supply Cable, Lemo 1B FGF Lemo 1B FGD (8mc-8mc), 0m45	CBE130-0m45	F 00K 102 748
Ethernet Connection and Power Supply Cable, Lemo 1B FGF Lemo 1B FGD (8mc-8mc), 3 m	CBE130-3	F 00K 102 587

8.4.2 Cable CBE140

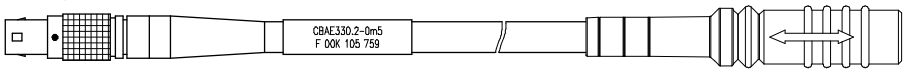


Side A Side B

Fig. 8-6 Cable CBE140-0m45

Order name	Short name	Order number
Ethernet Connection and Power Supply Cable, Lemo 1B FGF Lemo 1B FGD (8mc-8mc), 0m45	CBE140-0m45	F 00K 104 153

8.4.3 Adapter cable



Side A Side B

Fig. 8-7 Cable CBAE330.2

Order name	Short name	Order number
Ethernet Connection Adapter Cable 1 Gbit/s to 100 Mbit/s, Lemo 1B PHE - Lemo 1B FGF (10fc-8mc), 0m5	CBAE330-0m5	F 00K 105 759

9 Order Information

9.1 ES600.2

9.1.1 ES600.2 with CBP120 Power Supply Cable

Order Name	Short Name	Order Number
ES600.2 Synchronization and Power Management Module	ES600.2	F 00K 109 493
Package Contents		
ES600.2 Synchronization and Power Management Module, Cable CBE100-3, CBP120-2, T-Bracket for Housing, ES523_CD, List "Content of this Package", QNX Licence with AP for ES5xx, ES5xx Premium Line Safety Advice, China-RoHS-leaflet_Compact_green_cn		

9.1.2 ES600.2 with CBP1205 Power Supply Cable

Order Name	Short Name	Order Number
ES600.2 Synchronization and Power Management Module with Safety Cable	ES600.2-S	F 00K 110 453
Package Contents		
ES600.2 Synchronization and Power Management Module, Cable CBE100-3, CBP1205-2, T-Bracket for Housing, ES523_CD, List "Content of this Package", QNX Licence with AP for ES5xx, ES5xx Premium Line Safety Advice, China-RoHS-leaflet_Compact_green_cn		

9.2 Accessories

9.2.1 Cable

NOTE

If you need customized cables, please contact your ETAS contact partner or sales.de@etas.com.

Cable for the "7-29 V DC" connection

Order Name	Short Name	Order Number
Power Supply Cable, Lemo 1B FGJ Banana (2fc-2mc), 2 m	CBP120-2	F 00K 102 584
Power Supply Cable, Lemo 1B FGJ – Safety Banana (2fc-2mc), 2 m	CBP1205-2	F 00K 110 023

Cable for the "FE-HOST" connection

Order Name	Short Name	Order Number
Ethernet PC Connection Cable, Lemo 1B FGG - RJ45 (8mc-8mc), 3 m	CBE100-3	F 00K 102 559
Ethernet PC Connection Cable, Lemo 1B FGG - RJ45 (8mc-8mc), 8 m	CBE100-8	F 00K 102 571

Cable for the "GE-HOST" connection

Order Name	Short Name	Order Number
Ethernet PC Connection Cable 1 Gbit/s, Lemo 1B FGM – RJ45 (10fc-8mc), 3 m	CBE250-3	F 00K 109 469
Ethernet PC Connection Cable 1 Gbit/s, Lemo 1B FGM – RJ45 (10fc-8mc), 5 m	CBE250-5	F 00K 109 470
Ethernet PC Connection Cable 1 Gbit/s, Lemo 1B FGM – RJ45 (10fc-8mc), 8 m	CBE250-8	F 00K 109 471

Cable for the connections "ETH1" to "ETH6"

Order Name	Short Name	Order Number
Ethernet Connection and Power Supply Cable, Lemo 1B FGF Lemo 1B FGD (8mc-8mc), 0m45	CBE130-0m45	F 00K 102 748
Ethernet Connection and Power Supply Cable, Lemo 1B FGF Lemo 1B FGD (8mc-8mc), 3 m	CBE130-3	F 00K 102 587
Ethernet Connection and Power Supply Cable, Lemo 1B FGF Lemo 1B FGD (8mc-8mc), 0m45	CBE140-0m45	F 00K 104 153
Ethernet Connection Adapter Cable 1 Gbit/s to 100 Mbit/s, Lemo 1B PHE - Lemo 1B FGF (10fc-8mc), 0m5	CBAE330-0m5	F 00K 105 759

9.2.2 Housing accessories

Order Name	Short Name	Order Number
T-connector for ES600 housing	ES600_H_TB	F-00K-001-925
Device feet	ES600_H_F	F-00K-001-924

10 Contact Information

ETAS Headquarters

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70469 Stuttgart	Fax:	+49 711 3423-2106
Germany	Internet:	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	Internet:	www.etas.com/en/contact.php
ETAS technical support	Internet:	www.etas.com/en/hotlines.php

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