

ES720.1
Drive Recorder
User's Guide



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1 **About this Manual**

This chapter contains information about the following topics:

- "Identification of Safety Notices" on page 7,
- "Presentation of Information" on page 7,
- "Scope of Supply" on page 8,
- "Additional Information" on page 8.

1.1 Identification of Safety Notices

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



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



DANGER!

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



WARNING!

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



CAUTION!

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

1.2 Presentation of Information

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

Goal definition:

any advance information...

- Step 1
Any explanation for step 1...
- Step 2
Any explanation for step 2...
- Step 3
Any explanation for step 3...

Any concluding comments...

Typographical conventions

The following typographical conventions are used:

Bold	Labels of the device
<i>Italic</i>	Particularly important text passages

Important notes for the user are presented as follows:

Note

Important note for the user.

1.3 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 10 on page 83).

Additional cables and adapters can be obtained separately from ETAS. A list of available accessories and their order designation is located in chapter "Accessoires" on page 87 of this manual or in the ETAS product catalog.

1.4 Additional Information

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

2 Basic Safety Notices

This chapter contains information about the following topics:

- "General Safety Information" on page 9,
- "Requirements for Users and Duties for Operators" on page 9,
- "Intended Use" on page 9.

2.1 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.

2.2 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.

2.3 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. For use in other application areas, please contact your ETAS contact partner.

At ambient temperatures between 55 °C and 70 °C, the module may be used only at an operating facility with restricted access. The following must be ensured at this operating facility:

1. Access to the operating facility:
 - For maintenance personnel only, and
 - For users only who have been informed about the access restriction to the operating facility and about all precautionary measures to be observed
2. Securing the operating facility:
 - Access to the operating facility is secured by means of a tool or lock and key or some other way and is monitored by the persons in charge of the operating facility.

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.



CAUTION!

Risk of burns on hot surfaces of the module!

Avoid touching the surfaces of the module during operation at high ambient temperatures.

During its use in the vehicle and at an ambient temperature of 70 °C, the module may reach surface temperatures of up to 90 °C.

ES720.1 in combination with ETK



WARNING!

Inadvertent reset of ECU can cause engine shutdown!

If you operate the ES720.1 in combination with an ETK, new experiments with ETK may be loaded onto the ES720.1 only with the vehicle at standstill!

*It is absolutely necessary to wait before the drive until the **MEAS** LED at the ES720.1 module is permanently lit.*

Any change of the hardware setup from ES720.1 and ETK or a software update of the ES720.1 can cause a reset of the ECU.

WLAN Functionality

Note

The Drive Recorder variants ES720.1-8W and ES720.1-16W are approved only in the European Union (EU), the United States, Canada and India.

Note

The use of the WLAN functionality of the ES720.1-8W and the ES720.1-16W Drive Recorder variants is intended for indoor only.

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 use 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 IP20.

The complete ambient conditions of the module can be found in the chapter 8.2 on page 63.

Opening the module



CAUTION!

Damage to the module and loss of properties based on IP20!

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.

3 Hardware Description

This chapter provides an overview of the ES720.1 and information about product variants, housing, serial number, connections and LEDs.

3.1 Overview

The universal Drive Recorder ES720.1 can be used for a variety of measurement tasks in the development, application and validation of electronic vehicle systems.

The Drive Recorder ES720.1 is based on an embedded PC with the Windows XP Embedded operating system and replaces the PC of the measuring setup. Once the easy-to-use Drive Recorder has been configured, the ES720.1 automatically records data of connected modules.



Fig. 3-1 ES720.1

With one Ethernet connection and four USB ports, the ES720.1 module can easily be integrated in measuring setups of ETAS modules with Ethernet or USB interfaces.

ECU and bus interface modules of the ES59x series as well as measuring modules of the product families ES400 and ES600 are networked with each other via Ethernet and connected with the Drive Recorder. A single ECU with an XETK XCP-on-Ethernet interface can be directly connected with the Drive Recorder. With the ES581 module, the CAN bus of the vehicle network can be connected with the ES720.1 at the USB ports.

In addition, the ES720.1 module is equipped with four digital TTL-compatible inputs and outputs each.

The Drive Recorder ES720.1 is compatible with INCA, the standard tool for measurement, calibration and diagnostics of ECUs. The selection of measuring signals, setting of data acquisition rates as well as configuration of triggers, communication and diagnostic protocols are handled directly by INCA.

3.1.1 Product Variants

The ES720.1 Drive Recorder is available in four variants.

- Drive Recorder without WLAN module
 - ES720.1-8 (8-GB internal storage)
 - ES720.1-16 (16-GB internal storage)
- Drive Recorder with WLAN module
 - ES720.1-8W (8-GB internal storage)
 - ES720.1-16W (16-GB internal storage)

Note

The ES720.1-8W and ES720.1-16W Drive Recorder variants are certificated only in the European Community (EU), U.S.A., Canada, and India.

3.1.2 Properties

Overview of the most important properties of ES720.1:

- PC-based module with Windows XP Embedded operating system
- Standard PC ports (USB, Ethernet, VGA)
- 4 independent USB ports for external expansion of the module, e.g. with
 - Flash memory (standard USB stick)
 - Keyboard
 - Mouse
 - GPS receiver
- Integrated input/output functions (4 digital inputs, 4 digital outputs)
- WLAN (optional)
- Expandable with ECU, bus interface and measuring modules
- Precise synchronization of all connected modules and their measuring channels
- Minimal delay to the start of the recording (Fast Boot; in conjunction with the ES593-D module)
- Options of the energy management (Wake-Up, Standby)
- Automatic standby function
- Support of diagnostics data via ODX
- Execution of different experiments in a specified order
- Module suitable for use in automotive applications; suitable for use in the development environment and in the vehicle on test drives.
 - Insensitivity to environmental conditions (temperature, EMC)
 - Wide supply voltage range
 - High mechanical stability and robustness
- Part of the ETAS Tool Suite

The complete technical data of the ES720.1 can be found in the chapter "Technical Data" on page 57.

3.2 Housing

3.2.1 Properties

A housing with connections at the front and rear side of the device is used for the ES720.1. The robust metal housing of the ES720.1 is equipped with non-skid plastic feet.

To secure it in a vehicle or the lab, it can be bolted onto a support system without any effort. The housings of this device family can also be connected with each other, quickly and easily (see chapter 5.1 on page 35).

The ES720.1 module is designed for use in the lab, on the test bench and in the passenger cell of motor vehicles.

3.2.2 MAC Address of the Ethernet Adapter

The MAC address of the Ethernet adapter is located on the bottom panel of the device. This address is required for the software licensing.


3.2.3 MAC Address of the WLAN Adapter (Drive Recorder with WLAN Module)

The MAC address of the WLAN adapter is located on the bottom panel of the devices that are equipped with an internal WLAN module.

3.3 Connections

3.3.1 Front Side of the Device

The following connections are located on the front side of the ES720.1:

- **ETH** (Ethernet, SYNC-OUT)
-  (4 USB ports)

The "Power" button to the right of the USB sockets can be used to switch the Drive Recorder on or off.

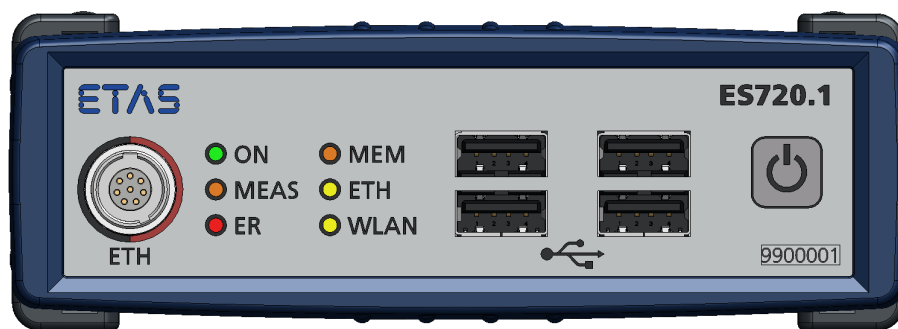


Fig. 3-2 Front side of the device

3.3.2 Rear Side of the Device

The following connections are located on the rear side of the ES720.1:

- **7-29V** (operating voltage)
- **I/O** (digital inputs and outputs)
- **VGA** (VGA port [for monitors with analog interface])
- **ANT** (WLAN antenna)

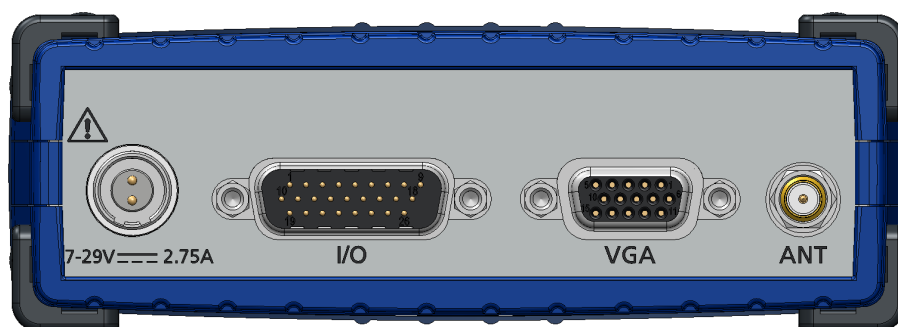


Fig. 3-3 Rear side of the device

3.4 LEDs

3.4.1 Flashing Codes

The ES720.1 is equipped with light-emitting diodes to display the operating state of the module, the function of individual connections and information about the measurement. The LEDs are using the following flashing codes:

Flashing code	Constant On	Constant Off
Flashing code 1	500 ms	500 ms
Flashing code 2	100 ms	1900 ms

3.4.2 Operating State of the Module

On the front side of the device are three light-emitting diodes for the display of the operating state of the module (see Fig. 3-2 on page 18):

- **ON**: power supply and operating mode
- **ETH**: function state at "ETH" port
- **WLAN**: function state at "WLAN" port

The LEDs **ETH** and **WLAN** show the function states at the assigned connection in the enabled state of the ES720.1 (operating state "On"). The **WLAN** LED is enabled only in versions with WLAN module.

LED	Display	Description
ON	Green	Power supply present, module in operating mode "On"
	Flashing green (flashing code 1)	Module is booting, being shut down, changing to the state "Standby" or "Off"
	Flashing green (flashing code 2)	Module is in operating mode "Standby", minimal current consumption. A wake-up event is required to change to the "On" state.
	Off	No power supply
ETH	Off	No Ethernet connection
	Yellow	Ethernet connection has been established
	Flashing yellow (code 1)	Communication at the ETH interface
WLAN	Off	No WLAN connection
	Yellow	WLAN connection has been established
	Flashing yellow (code 1)	Communication at the WLAN interface

3.4.3 Error and Measuring State of the Module

On the front side of the device are three light-emitting diodes for the display of the error and measuring state of the module (see Fig. 3-2 on page 18):

- **MEAS**: state of measurement
- **ER**: error state of module
- **MEM**: memory state and memory access

For the display of some states, two or four LEDs are used at the same time (see table). Fields in the table highlighted with a gray background identify displays of the LEDs that are not relevant for the description of the respective state.

ON	MEAS	MEM	ER	Description
			On	The ES720.1 booted, no valid license is available.
Flashing green (code 1)	Flashing orange (code 1)	Flashing orange (code 1)	Flashing red	Power fail restart. The ES720.1 configuration files and the data of the last recording job can be damaged.
		Off		Sufficient storage space (internal storage/CF card)
		On	On	Insufficient storage space (internal storage/CF card)
		On	Off	Warning threshold storage capacity reached (adjustable in the configuration program), available storage space will be filled shortly
		On	Flashing	Connected hardware not initialised
	Off			No measurement
	Orange			Measurement, data recording
	Flashing orange (code 1)			Module ready for measurement, waiting for trigger event
	On	Flashing orange (code 1)		Measured variables are written to the storage connected to the USB
	Off	Flashing orange (code 1)		Other data is written to the storage connected to the USB (e.g. file transfer)

3.4.4 State of other Connections

The function state of the USB, I/O and VGA ports is not displayed on the module.

3.5 Acoustic Signal

The ES720.1 features an acoustic signal generator. The acoustic signal can be activated and deactivated in the configuration program.

Number of signals	Duration of signal [s]	Action/function state
1	0.5	"Power" button is pressed
2	0.5	Ready for measurement
3	0.5	Measurement finished
1	2	Error

3.6 "Power" Button

By pressing the "Power" button on the front side of the device, the ES720.1 changes between the operating states "On" and "Off".

The function of the "Power" button can be taken over by a remote connection ("I/O" port), if necessary (see chapter 4.9.3 on page 31).

4 Description of Functions

The chapter "Description of Functions" describes the block diagram, power supply, interfaces, operating states and their changes, the data transfer and the internal monitoring of the module.

4.1 Block diagram

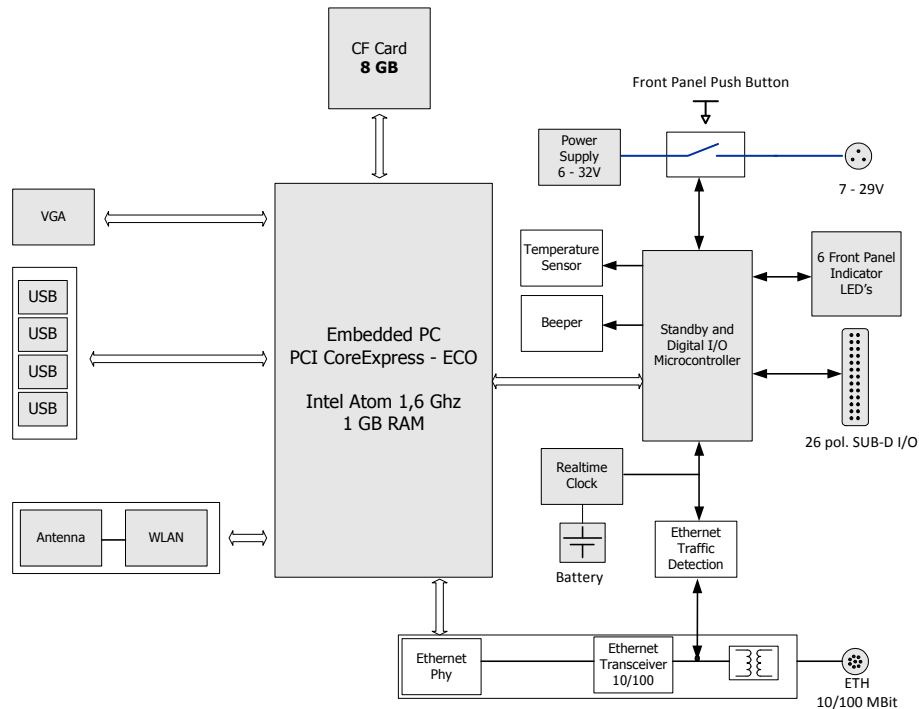


Fig. 4-1 Block diagram

4.2 Power Supply ("7-29V" Port)

The power supply interface (7-29V) of ES720.1 feeds a 2-pole plug connector (Lemo socket) at the rear of the device. An external power supply or the vehicle battery supply the module with current.

Note

The ES720.1 must be physically separated from all supply voltages so that the module will not consume any current.

When the ES720.1 is initially connected with operating voltage, the module switches on for a few seconds. During this period, the ES720.1 is being initialized and configured. The module acknowledges the operation with a brief acoustic signal and waits in the operating state "Low Power Standby".

4.3 "ETH" Interface

The "ETH" interface connects the ES720.1 with ES600 modules, measuring, calibrating and rapid-prototyping modules of the measuring setup or the host PC.

The Ethernet interface meets the 10/100BaseT standard and can be operated either with 10 or 100 Mbit/s, half or full-duplex. The switching is done automatically.

The data acquisition of the connected modules is not done synchronized (ETAS device synchronization).

The "ETH" interface is galvanically isolated from the other interfaces of the ES720.1 and from the power supply.

Note

The power supply of external modules is not handled by the ES720.1.

Functions of the Ethernet Interface

- Connection to the host PC
- Downloading the configuration
- Uploading the measured variables
- Access to connected measuring or interface modules
- Support of the "Wake-Up" function (see chapter 4.9 on page 29)
- Update of the firmware/configuration software of the Drive Recorder

4.4 "USB" Port

The ES720.1 is equipped with four independent USB ports to expand the module with external devices.

Only devices whose software/driver is compatible with Windows XP Embedded are supported. Basic functions of the devices connected to the USB ports are immediately usable without the prior installation of a specific driver. Manufacturer-specific expansions that require additional software or their own driver must be installed by the user.

For example, a keyboard, mouse or a storage media (USB stick, hard disk) can be connected.

4.4.1 External Expansions

Storage Expansions

The USB storage medium may be formatted only with the FAT32 file management system. A subdividing into several partitions is not supported.

Note

Preinstalled software and other data on the USB storage medium must be uninstalled or removed before using it on the ES720.1.

To uninstall preinstalled software, use the current version of the special uninstallation software of the USB storage manufacturer. The software can be found on the Internet pages of the manufacturer of the USB storage medium.

**CAUTION!****Possible data loss!**

Do not disconnect the USB storage medium from the ES720.1 during the data transfer.

Additional notes and a list of USB sticks recommended by ETAS as storage expansion of the ES720.1 can be found in chapter 8.5.4 on page 68.

GPS

The ES720.1 can be expanded by connecting a GPS receiver at the USB ports.

Access to the ECU Bus

The connection of the ES581 CAN bus interface USB module allows accessing the CAN bus. Dependent on the INCA version used, the ES581 may require the installation of an INCA Add-On.

4.4.2 Maximum Output Current

Each of the four USB ports can provide a maximum output current of 500 mA as specified in the USB standard.

The maximum total of the output currents of the 4 USB ports of the ES720.1 is **less** than four times the maximum output current of a single USB port.

Note

The total of the output currents of the 4 USB ports must not exceed 1.2 A.

For this condition to be met, the loading of the four USB output stages must be distributed by the external expansions, e.g. 2 x 500 mA and 2 x 100 mA.

4.4.3 Overload and Emergency-Off

If the output stage of a single USB port is overloaded due to a short circuit or if the total of the output currents of the 4 USB ports exceeds 1.2 A, the following steps are automatically carried out:

1. Switching off all USB ports
2. Aborting the experiment
3. Saving the measured variables (internal storage)
4. Emergency-off of the ES720.1 to protect the hardware
5. Display of an error condition.

Note

If the external storage medium used for storing the measured variables is formatted with the NTFS file system, its file system and the measured variables stored on it can be damaged or deleted during an emergency-off of the ES720.1.

4.5 "I/O" Port

4.5.1 Overview and Functions

At the "I/O" port, a 26-pin HD Sub-D socket, digital inputs and outputs are provided with different functions:

Pin at "I/O"	Number of I/O	Type	Description
1-4	4	Output	TTL-compatible, can be used as INCA signal
9	1	Output	TTL-compatible, corresponds to operating state of the ES720.1, can be used to switch on the operating voltage of additional measuring modules: High = ES720.1 is switched on, Low = ES720.1 is in standby
11	1	Input	TTL-compatible, for connecting an external "Remote Power" button to ground; function of external "Remote Power" button and "Power" button on the module is identical
12	1	Input	TTL-compatible, terminal 15 (TI.15)
13-16	4	Input	TTL-compatible, can be used for INCA signals (signal status, trigger); max. sample rate 10 Hz
19-24	6	Output	Status of outputs corresponds to the status of the LED assigned in each case on the front of the module

The ES720.1 can record the signals of digital inputs and control the digital outputs. The inputs and outputs are protected against overvoltages.

4.5.2 Application Examples

Digital Inputs

The digital inputs can be used for:

- Monitoring terminal 15 (TI. 15, ignition on)
 - Booting the module with the rising edge at TI. 15
 - Shutting down the module with the falling edge at TI. 15
- Controlling the module through manual activation
 - Starting the recording with the manual trigger
 - Selecting the configuration
 - Manually starting the data upload
- Measuring digital signals
 - Recording status signals together with other signals
 - Recording events (marks)

Digital Outputs

The digital outputs can be used for:

- Signaling the system status
 - Module is booting
 - Recording is on
- Activating/deactivating connected modules
 - Application for modules that do not support the "Wake-Up" function
 - Application for measuring setups with several masters to avoid Ethernet conflicts
- Output of measuring signals
 - Monitoring measuring signals and displaying range violations
 - Displaying the state of the ECU

4.6 "VGA" Port

The "VGA" port is a standard VGA port for transferring analog image signals of the graphics unit of the embedded PC to a monitor with a VGA port. The following status information of the Drive Recorder can be displayed on the monitor connected to "VGA":

- Information during the start process
- Status of the recording
- Disk consumption rate, storage utilization
- PC system performance and resource utilization
- Status of remote interface ("I/O" port)
- Data transfer.

4.7 "WLAN" Port

The "WLAN" port for connecting a WLAN antenna is available for all product variants of the ES720.1.

The "WLAN" port can be used only for the product variants ES720.1-8W and ES720.1-16W. Only these product variants are fitted with an internal WLAN module and connected with the "WLAN" port.

The WLAN module supports the WPA2 encryption for a secure data communication.

4.8 Operating States

Possible operating states of the Drive Recorder ES720.1 are "Off", "Low Power Standby", "Fast Boot Standby" and "On".

4.8.1 Operating State "Off"

The ES720.1 is not connected with the external power supply and completely switched off. The embedded PC of the module is shut down and all interfaces are deactivated. The "Wake-Up" function (see chapter 4.9 on page 29) is deactivated.

4.8.2 Operating State "Standby"

The ES720.1 is connected with the external power supply and is in one of the two "Standby" operating states of the ES720.1:

- Operating state "Low Power Standby" and
- Operating state "Fast Boot Standby".

The module waits for a "Wake-Up" event; its occurrence changes the module from the operating state "Low Power Standby" or "Fast Boot Standby" to "On" and automatically starts the measurement.

Operating State "Low Power Standby"

In the operating state "Low Power Standby", the embedded PC of the Drive Recorder is in the hibernating state ("Hibernate", "Suspend-To-Disk"). The current consumption of the ES720.1 is relatively low in this operating state.

In the operating state "Low Power Standby", the current state is stored in the hibernation file and the available settings are also saved.

The "Wake-Up" function is activated and the ES720.1 changes to a different operating state dependent on the configured event.

If the operating state "Low Power Standby" is selected in the ES720.1 configuration program, the Drive Recorder can start the recording of the measured variables with a median delay.

Operating State "Fast Boot Standby"

In the operating state "Fast Boot Standby", the embedded PC of the Drive Recorder is in the hibernating state ("Standby Mode", "Suspend-To-RAM"). The current consumption of the ES720.1 is relatively high in this operating state.

The functions "Wake-Up" and "Sleep" are activated and the ES720.1 changes to a different operating state dependent on the configured event.

If the operating state "Fast Boot Standby" is selected in the ES720.1 configuration program, the Drive Recorder can start the recording of the measured variables with a minimum delay.

4.8.3 Operating State "On"

In the operating state "On", all modules and interfaces of the embedded PC of the Drive Recorder are activated. The module is ready for recording measurements.

4.9 Changing between Operating States

4.9.1 Status Diagram

The change between the operating states can be represented in a status diagram (see Fig. 4-2).

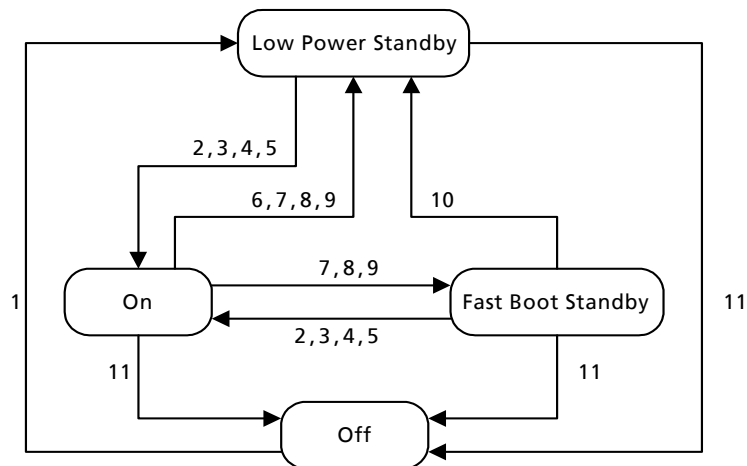


Fig. 4-2 Change between the operating states of the ES720.1 (simplified)

The digits in the status diagram correspond to the possible operating state changes of the ES720.1, initiated by events (trigger or timer) of the functions "Wake-Up" and "Sleep" (see chapter 4.9.2 on page 29).

If the measurement is complete, the measured variables are safely stored. Dependent on the configuration, the ES720.1 remain switched on or changes to the operating state "Fast Boot Standby" or "Low Power Standby".

4.9.2 Events and Timers

The changes of the ES720.1 between operating states are triggered by events. These events can be activated and deactivated in the configuration software and combined with timers for an additional delay of the event.

The operating state changes in Fig. 4-2 on page 29 are each linked with a selection of the events and timers listed here.

General events

Event		Description
No. in Fig. 4-2	Abbrevia- tion	
1	PWR On	Power supply On
11	PWR Off	Power supply Off

Available "Wake-Up" Events

Event		Description
No. in Fig. 4-2	Abbreviation	
2	PBP	Briefly pressing the "Power" button on the module
3	On Pin	External "Power" remote button or trigger event at digital input ("PSCI" pin, "I/O" port), Low to High
4	On Time	Start at a specific point in time (configurable timer)
5	On ETH	Communication at the "ETH" interface (PC or measuring module)

Available "Shutdown" Events

Event		Description
No. in Fig. 4-2	Abbreviation	
6	PBP	Pressing the "Power" button on the module
	PBPE	Pressing the "Power" button on the module for more than five seconds ("Emergency-Off")
7	On Pin	External "Power" remote button or trigger event at digital input ("PSCI" pin, "I/O" port), High to Low
9	On Time	End at a specific point in time (configurable timer)
8	Auto	Measurement finished, no additional tasks
10	Timer	Change from "Fast Boot Standby" to "Low Power Standby" after timer is expired

Available Timers

Configurable timers allow delaying events that are intended to trigger a change of the operating state of the ES720.1. If necessary, a new hibernation file is being created.

Shutdown/Standby Delay Timer: The counter can be used to define the time period in the configuration program by which all events that are intended to trigger a change of the operating state of the ES720.1 are delayed. Pressing the "Power" button on the module and specific events of the INCA experiment are not affected or delayed by this timer.

Fast Boot to Shutdown Timer: The counter can be used to define the time period in the configuration program after whose expiration the ES720.1 changes from the operating state "Fast Boot Standby" to the operating state "Low Power Standby". This counter is activated when changing to the operating state "Fast Boot Standby".

4.9.3 Function of the "Power" Button

The "Power" button features the Master Function for controlling the change between the operating states of the ES720.1.

Note

*During the update of the firmware or the configuration software of the ES720.1 and during the installation, the "Power" button or the external remote button must **not** be activated.*

Power-on

Briefly pressing the "Power" button (at the front side of the device) or an external "Power" remote button (connected with "RPBI" pin at the "I/O" port, see chapter 4.5 on page 26) switches the ES720.1 on.

At the same time, all other configured trigger events for the "Wake-Up" function are suppressed for the next 15 seconds.

Power-off

Briefly pressing the "Power" button (on the front side of the device) or an external remote "Power" button (connected with the "RPBI" pin at the "I/O" port) switches the ES720.1 off.

At the same time, all other configured trigger events for the "Wake-Up" function are suppressed for the next 15 seconds.

Power-off ("Emergency-Off")

The Drive Recorder is switched off if the "Power" button (on the front side of the device) or an external remote button (connected with the "RPBI" pin at the "I/O" port) is pressed for at least five seconds.

This powering off corresponds to the "Hard Shutdown" function of a standard PC. In this case, the processes of the system and the measurements are canceled without being completed and data are not stored or only incomplete.

Canceling a preconfigured Measurement

A preconfigured measurement is exited if the **ON** LED is constantly on, the module acknowledges the state with two acoustic signals and the "Power" button (on the front side of the device) or an external remote "Power" button (connected with the "RPBI" pin at the "I/O" port) is briefly pressed.

4.9.4 Powering off the Module

Power-off Process

Powering off the ES720.1 is carried out from all operating states in a defined sequence:

1. Stopping the on-going measurement
2. Waiting until the completion of the data recording
3. Waiting until the completion of the data transfer at the ports "USB", "ETH", "WLAN" (at the port in use)
4. Shutting down the ES720.1 module

Error Handling

If errors occur while saving the data during the power-off process, it is indicated by the **ER** LED, and the power-off process continues.

With a restart of the ES720.1, the data of the file is restored by means of a restore mechanism.

4.10 Data Transfer

4.10.1 Data Transfer Options

Manual Data Transfer (Direct Access)

The exchange of configuration data (configuration settings) and the recorded data is triggered by the user in the "ES720.1 Configurator" program. The data can be transferred via cable or wireless (see chapter 4.10.2 on page 32).

Automatic Data Transfer (Remote Access)

If "Automatic Data Transfer" is selected in the configuration data of the ES720.1, the module checks during the upload of the recorded data to the PC or server whether a new configuration assigned to the module is available on the PC or server. If a new configuration exists, ES720.1 uses this configuration for the next data recording. The data can be transferred via cable or wireless (see chapter 4.10.2 on page 32). The remote access allows operating the Drive Recorder automatically without user interaction.

4.10.2 Media for Data Transfer

Dependent on the variant of the Drive Recorder and the add-on modules used, several options are available for the exchange of configuration data and recorded data.

- Cable-based data transfer
 - LAN
The configuration data, experiments and recorded data are exchanged via Ethernet using a cable between the ES720.1 and the PC.
 - USB
The configuration data, experiments and files with the measured variables are exchanged directly and automatically between the ES720.1 and the connected USB storage.
- Wireless data transfer
 - WLAN
The optionally integrated WLAN module of the ES720.1 can be connected with the access point of a company or a public hotspot to exchange data.

4.11 Monitoring the Temperature of the Module

The temperature of the module is being monitored. If the temperature inside the housing exceeds the critical value, it triggers an overtemperature event and the module is being shut down. This emergency-off is carried out according to the same mechanisms as a sudden interruption of the power supply.

If the temperature inside the housing returns to the normal range, the ES720.1 can be restarted. The data of the interrupted recording are being restored.

4.12 Monitoring the Embedded PC

The ES720.1 monitors the following parameters and states of the embedded PC:

- Temperature
- CPU load
- Available RAM
- Battery charge
- Real-time clock (date and time)

The monitored internal variables can be assigned to the measurements.

5 Getting Started

The “Getting Started” chapter includes general installation recommendations, a description of the assembly, as well as notes on cabling of the ES720.1.

5.1 Assembly and Locking

5.1.1 General Installation Recommendations



CAUTION!

The module can be damaged or destroyed.

The modules are only admissible for assembly and operation on components or in locations which guarantee adherence to the technical data of the modules during operation (see chapter 8 on page 57).

5.1.2 Fixing a Module onto a Carrier System

The ES720.1 has a rugged metal housing with nonskid plastic feet. The unit can easily be screwed onto a carrier system for installation in a vehicle or in the lab. The screw thread for attaching your device is already contained in the housing and is easily accessible.

To fasten the ES720.1 housing:

- Remove the plastic feet from the bottom of the module by pushing a minus screwdriver between the housing bottom and the plastic foot. Lifting off the plastic foot using the screwdriver as a lever.

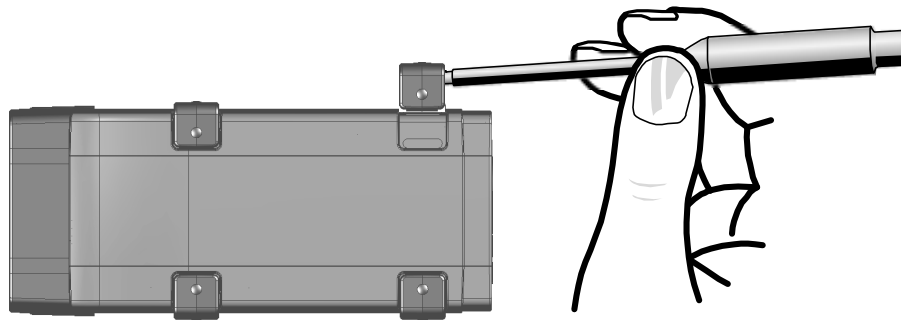


Fig. 5-1 Levering Off the Plastic Foot

- A threaded hole will become visible under the plastic foot. The threads for fastening the module are located both on the bottom of the ES720.1 housing.

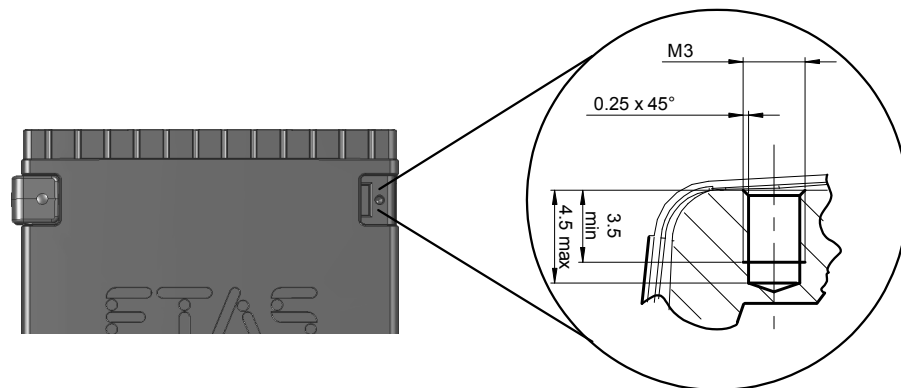


Fig. 5-2 Tapped blind hole



CAUTION!

The electronic can be damaged or destroyed!

Do not rework the threaded hole.

Note

Use **excluding** M3 cylinder screws and fastening the module onto your carrier system with a max. torque of 0.8 Nm.

The max. length of engagement into the tapped blind hole of housing is 3 mm (see Fig. 5-2 on page 36).

5.1.3 Connecting Several Modules Mechanically

As ETAS system housing was used, the ES720.1 can also be connected to modules of the ETAS compact line (ES59x, ES6xx, ES910). These can be combined easily using the T-Brackets provided to form larger blocks.

You can attach a further module of the ETAS compact line under the ES720.1. Just remove the four plastic feet on each of the relevant device sides and attach the T-Brackets provided in their place.

To connect modules mechanically:

- Remove the four plastic feet from the bottom of the ES720.1 so a further module can be attached.
This makes the assembly slits for the T Brackets accessible.
You can attach a further module under the ES720.1.
- Remove the four plastic feet on the relevant side of the second module.
- Turn the seals of the T-Brackets so they are at a right angle to the longitudinal axis of the brackets and click two brackets into the assembly slits on one long side of the first module.
- Click the second module into the two T-Brackets.

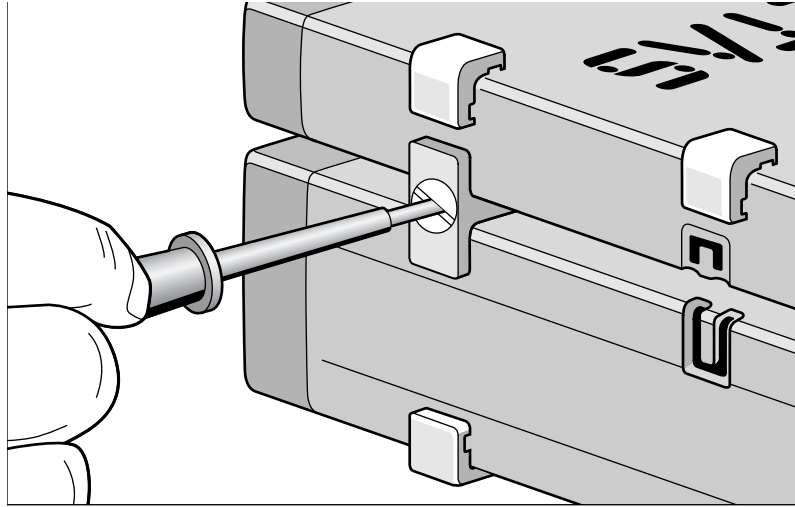


Fig. 5-3 Connecting the ES720.1 to Another Module

- Quarter-turn the seals of the T-Brackets. This locks the connection of the two modules.
- Click the other two T-Brackets into the assembly slits on the opposite long side of the device and lock these brackets too.
- If you would like to stack further modules, repeat this procedure with the next module.

5.2 Wiring

5.2.1 Overview

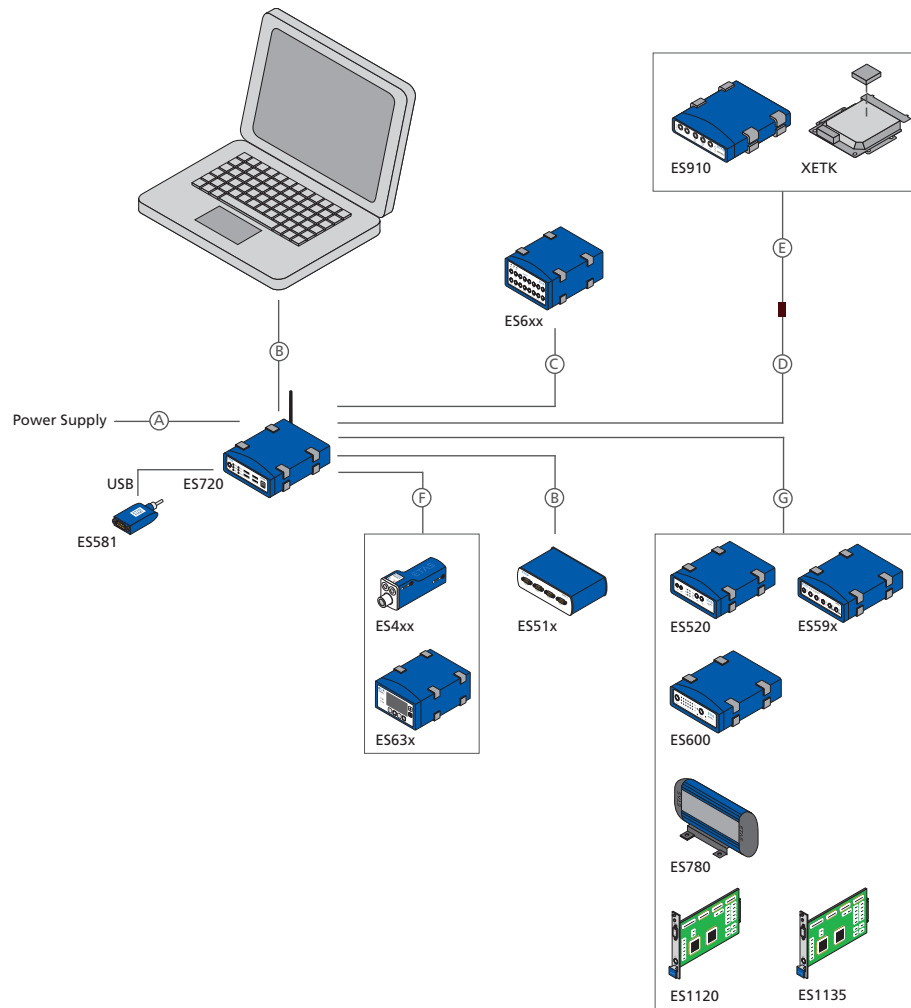


Fig. 5-4 Wiring the ES720.1 with ETAS Modules

Cable in Fig. 5-4	Function	Short Name
A	Power supply cable	CBP120, CBP1205
B	PC or ES51x Ethernet cable	CBE100
C	ES6xx Ethernet cable	CBEP120
D	Ethernet cable adapter (100 MBit/s); [connected to cable E]	CBAE330

Cable in Fig. 5-4	Function	Short Name
E	Ethernet cable (1 GBit/s); [connected to cable E]	CBAE230
F	Combined power supply and Ethernet cable	CBEP420
G	ES520, ES59x, ES6xx, ES1120 or ES1135 Ethernet cable	CBE130, CBE140

The ports of the ES720.1 may be wired in any order.

For order information on other cables which can be supplied separately, refer to the chapter "Cable and Accessoires" on page 75.

Note

Be sure to check that the ports carry no voltage, before starting the cabling.

Note

Make sure you carefully check the names of the cables used. Using the wrong cables can keep your ES720.1 from functioning properly or damage the ES720.1 and any devices connected to it.

5.2.2 "ETH" Port

Connection to the PC

To connect the ES720.1 module with the PC ("ETH" port), you require the CBE100 cable provided.

To connect the ES720.1 with the PC

- Connect the "ETH" port of the ES720.1 with the PC interface cable CBE100.
- Connect the cable's RJ-45 connector with the free Ethernet interface of your PC.

Connection to other ETAS Modules

In order to connect the ES720.1 module ("ETH" port) to the desired module, a matching cable is required (see Fig. 5-4 on page 38 with table)

To connect the ES720.1 with other ETAS modules

- Connect the "ETH" port of the ES720.1 to the matching interface cable.
- Connect the free connector of the cable to the Ethernet interface of the other module.

5.2.3 "7-29V" Port

**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.

To connect the ES720.1 module with the power supply, you require the CBP120 cable or the CBP1205 cable provided.

To connect the ES720.1 with the power supply

- Connect the cable CBP120 or the cable CBP1205 for the power supply with the „7-29V“ port of the ES720.1.
- Connect the supply voltage pins of the cable with the required power supply.

Note the color coding of the connectors.

Note the current consumption of the ES720.1 and its supply voltage range. The admissible values are listed in section 8.5.2 on page 66.

6 Configurations and Applications

This chapter provides an overview of the configuration concept, IP address management, licensing of the software and the "ES720 Configurator" program.

6.1 Configuration Concept

6.1.1 Configuration Files and Configuration Program

The configuration of the Drive Recorder requires an INCA export file and two ES720.1 configuration files. To be able to start an experiment and the recording of data, all three files must be stored on the Drive Recorder.

The INCA export file contains a preconfigured INCA workspace with the hardware configuration of connected modules, the settings of the experiment (recordings, signals, etc.), the A2L file and additional information. The INCA export file is created in INCA.

The first ES720.1 configuration file contains information about the Drive Recorder (e.g. network settings of the module, static settings and settings for recording, information about the file transfer).

The second ES720.1 configuration file contains information about the recording job (e.g. settings for functions, such as "Wake-Up", control of the sequence of experiments and their recording). The two ES720.1 configuration files are created with the stand-alone "ES720 Configurator" program.

The "ES720 Configurator" program is preinstalled on the Drive Recorder in the delivery state. It can also be installed on the INCA PC.

6.1.2 Online and offline Configuration

The stand-alone "ES720 Configurator" program can be used to configure settings and parameters of the ES720.1 online or offline.

Online Configuration

For the online configuration, the ES720.1 module is connected with the PC. There are two options for creating the ES720.1 configuration files:

- The "ES720 Configurator" program is installed on the connected PC. The ES720.1 configuration files can be created on the PC and directly transferred to the Drive Recorder.
- The "ES720 Configurator" program is not installed on the connected PC. From the PC, the Drive Recorder is being accessed via remote desktop. The ES720.1 configuration files can be created with the preinstalled "ES720 Configurator" and stored on the Drive Recorder.

Offline Configuration

For the offline configuration, the ES720.1 module is not connected with the PC. The "ES720 Configurator" program is installed on the PC, the ES720.1 configuration files are created on the PC, stored in an XML file, and later transferred to one or several Drive Recorders.

Disadvantages of the offline configuration are the missing status display, the missing option for interacting with the ES720.1 and necessity to buffer the created configuration.

6.1.3 Status Monitoring

The "ES720 Configurator" program displays status information during an ongoing recording:

- an overview of the preconfigured settings and
- the current status of the recording of the ongoing measurement.

6.1.4 Interactions of the User

The "ES720 Configurator" program allows direct interaction of the user, e.g. manual downloading of data or manual start of an experiment.

6.2 IP Address Management

6.2.1 ES720.1 and Configuration in INCA

For the INCA installed on the PC to be able to communicate with the ES720.1, the Ethernet interface of the PC must be assigned a fixed IP address. The communication is carried out directly between PC and ES720.1 or via modules (ES600, ES592, ES593-D, ES595) connected to the Ethernet interface of the ES720.1. Instructions for the configuration of the Ethernet interface with a fixed IP address can be found in the document "INCA Quick Entry" or in the section Network configuration in the user documentation of the operating system.

6.2.2 ES720.1 Machine Settings

In the ES720 Configurator, general parameters can be set in the "Machine Settings" window, such as host name, IP addresses and DHCP activation as well as date and time.

6.2.3 ES720.1 IP Address

The standard ETAS network, which is also used by the ES720.1, is a class 'C' IP address of 192.168.40.xxx with the values 0 to 255 for xxx.

The ES720.1 is delivered with the IP address 192.168.40.228 (or 192.168.41.228 for the optional WLAN module) to remain compatible with other ETAS modules.

6.2.4 Several ES720.1 in a Network at the same Time

If several ES720.1 are to be used in a single network at the same time, the standard IP address, but not the Network Identifier, must be adjusted. To be able to communicate with INCA and with other Ethernet modules of the ETAS standard Ethernet network, the Network Identifier must contain 192.168.40.xxx.

6.2.5 Using the Remote Desktop

Access to the Windows XP Embedded operating system of the Drive Recorder is possible via Remote Desktop with the following access data:

Account	DriveRecorder
Password	etases720dr

Next, the ES720 Configurator can be started.

6.3 Licensing of the Software

To be able to work with an ETAS software product, you will need a license. Basic information about this topic can be found below:

- "ETAS License Model" on page 43
- "How do I obtain a License?" on page 43
- "The License File" on page 44

Details about the scope of the licenses and legal aspects can be found in the general terms and conditions.

6.3.1 ETAS License Model

The license model "Computer-based license" ("Machine Named", local) is intended for licensing your ETAS software installed on the ES720.1:

- A license of this type is managed by the user himself.
- Since the license is tied to the respective ES720.1 (better: to the MAC address of the Ethernet adapter), it is valid anywhere the ES720.1 is being used.
- You need a separate license for every ES720.1 Drive Recorder.

6.3.2 How do I obtain a License?

You obtain your computer-based license via the ETAS license portal (the URL is located on your Entitlement Certificate).

The start page offers three ways of logging in:

- **Activation ID**
After logging in, a certain activation¹ is visible and can be managed – the activation ID is located on the Entitlement Certificate.
- **Entitlement ID**
Here, you can view all the activations of the entitlement² and manage them (e.g. for a company with only one entitlement).
- **E-mail and Password**
All activations of entitlements that are assigned to the user account are visible and can be managed (e.g. for a tool coordinator with responsibility for several entitlements)

For help in the portal, click on the link [Help](#).

¹. The activations refer to a certain product, its license conditions, the available number of licenses and further details that are required for creating a license. Activations are uniquely identified by activation IDs.

². An entitlement indicates which permissions you have as a user; it represents the right to obtain one or several licenses for a product. It is a type of account of usage privileges for software from which you can retrieve licenses as needed.

Which Pieces of information are required?

To activate licenses, information about the hosts must be entered:

- Computer-based license
This entry requires the MAC address of the Ethernet adapter to which the license should be tied.

Note

The MAC address of the Ethernet adapter can be found on a label at the underside of the module.

License File

The result of your activities is the provisioning of a file `<name>.lic` with which you can license your respective software in the ETAS License Manager.

6.3.3 The License File

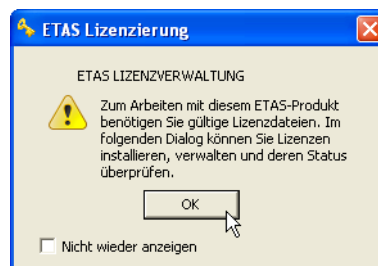
Viewing the License Status

Viewing the license status

- On the ES720.1, use Remote Desktop to go to the Windows Start menu and select **Programs** → **ETAS** → **License Management** → **ETAS License Manager**

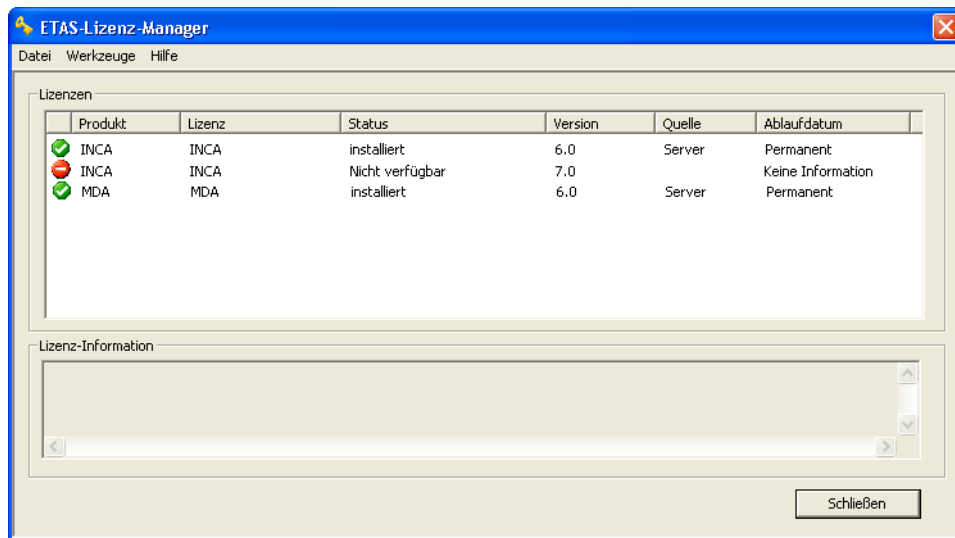
or

- In the ES720 Configurator, select **Tools** → **License manager**.



- Click on **OK**.

The ETAS License Manager contains an entry for every installed product. The icon in front of an entry and the "Status" column show whether a valid license is already present or not.



Adding a License

Three methods are available to add a new license to the ES720.1:

- Manually adding a license
- Automatically adding a license (file transfer via USB) and
- Automatically adding a license (automatic file transfer).

Manually adding a license

- Copy the license file to the directory `D:\EtasData\ ES720_DriversAnd-Tools1.0\Licenses` on your PC.
The path can be changed while the installation.
- Open the ES720 Configurator.
- Select **Tools** → **File Transfer (FTP)**.
The "File Transfer" window opens.
- In the window area of the local files (PC), open the "[Licenses]" node.
- The `ES720.lic` license file is displayed.
- Select the license file.
- Click on " → " between the two window areas.
The license file from the local file directory (PC) was automatically moved to the license directory of the ES720.1.
- Select **Tools** → **File Persist current system configuration**.
The ES720.1 is rebooting.

Automatically adding a license (file transfer via USB)

- Connect a USB memory stick with the PC.

- In the root directory of the USB memory stick, create a `Licenses` directory (`RootFolder\Licenses`).
- Copy the license file to the `Licenses` directory.
- In the ES720 Configurator, open the "Hardware Configuration" window.
- Open the "File transfer settings" node.
- Open "USB settings".
- Activate **Enable automatic transfer**.
- Connect the USB memory stick with the ES720.1.
- Select **Tools** → **File Persist current system configuration**.

The ES720.1 is rebooting.

Automatically adding a license (automatic file transfer).

- In the root directory of the PC, create a `Licenses` directory (`RootFolder\Licenses`).
 - Copy the license file to the `Licenses` directory.
 - In the ES720 Configurator, open the "Hardware Configuration" window.
 - Open the "File transfer settings" node.
 - Open the "File exchange configuration" node.
 - Open "Automatic transfer settings".
 - Activate **Enable automatic transfer**.
- The license file will be transferred to the ES720.1 with the next synchronization.
- Select **Tools** → **File Persist current system configuration**.

The ES720.1 is rebooting.

6.4 Preparing the ES720.1 for Operation

The ES720.1 module must be prepared for operation in four steps:

- Starting the ES720.1 (first booting).
- Adding a license manually.
- Setting date, time and time zone to your local time.
- Rebooting the ES720.1

Starting the ES720.1

- Press the "Power" button on the front side of the module to start the ES720.1.

The ES720.1 is booting with an error message that no valid license is available. After booting the LED **ER** is on.

Manually adding a license

- Copy the license file to the directory
D:\EtasData\ ES720_DriversAnd-
Tools1.0\Licenses on your PC.
The path can be changed while the installation.
- Open the ES720 Configurator.
- Select **Tools** → **File Transfer (FTP)**.
The "File Transfer" window opens.
- In the window area of the local files (PC), open the "[Licenses]" node.
- The ES720.lic license file is displayed.
- Select the license file.
- Click on " → " between the two window areas.
The license file from the local file directory (PC) was automatically moved to the license directory of the ES720.1.

Adjust Date, Time and Time Zone to your local Time

- Select **File** → **Open Options from Device**.
The "Hardware Configuration" window opens.
- Open "Machine Settings".
- Deactivate "Exclude Settings from the configuration".
- Activate "Save Date/time to device" in the "Date/Time settings" window area.
- Setting Date, Time and ES720 time zone.
- Click "Apply on ES720".
- Click "Close".

Rebooting the ES720.1

- Select **Tools** → **File Persist current system configuration**.
The ES720.1 is rebooting. This will need up to 5 minutes.
After rebooting the ES720.1 is prepared for operation.

6.5 ES720.1 Configuration

Take a look at the following documentation for details of how to configure the ES720.1 Drive Recorder:

- ES720 Configurator Tutorial
- ES720 Configurator Online help

After working through the tutorial, you are in a position to use the ES720 Configurator to set up the device, recorder and network configuration of an ES720 Drive Recorder in such a way that it can be used in a test arrangement.

7 Troubleshooting Problems

This chapter gives some information of what you can do when problems arise with the ES720.1 and problems that are not specific to an individual software or hardware product.

7.1 Error LEDs

Please observe the LED which provides information on the functions of the interface and the ES720.1 (see the chapter "LEDs" on page 19) to be able to judge the operational state of the ES720.1 as well as troubleshooting measures.

7.2 Troubleshooting ES720.1 Problems

The following table lists some of the possible problems with a remedy.

If you have any further questions, please contact our Customer Support (see chapter 11 on page 89).

Problem	Diagnostic Questions	Possible Solutions
The ES720.1 is not found by the ES720.1 Configuration Tool.	Did you configure the network card correctly?	INCA, Config Tool and HSP operation: Check that your network card has been configured in accordance with section 8.4.1 on page 65.
	Is the hardware on the PC connected?	Check that the connection is undamaged.
Measurement does not start.	Is there no data from the module?	Check that your power supply and test setup correspond to the requirements. Check that the wiring of the hardware to the PC is correct/intact.
	Are you using WLAN in your test setup?	WLAN is not permissible within this ETAS network. Wire your test setup (ETAS modules and their connection to the PC) with ETAS cables only.
Data is lost during data transfer.	Are you using the correct type of network card in your laptop?	Check whether you are using a PCMCIA network card in your laptop. PCMCIA cards with an 8- or 16-bit data bus are not suitable. Only use PCMCIA cards with a 32-bit data bus, mini-PCI or ExpressCards.

7.3 Problems and Solutions

7.3.1 Connecting Hardware fails

Cause: Personal Firewall blocks Communication

For a detailed description on problems caused by personal firewalls and possible solutions see "Personal Firewall blocks Communication" on page 51.

Cause: Client Software for Remote Access blocks Communication

PCs or notebooks which are used outside the ETAS hardware network sometimes use a client software for remote access which might block communication to the ETAS hardware. This can have the following causes:

- A firewall which is blocking Ethernet messages is being used (see „Cause: Personal Firewall blocks Communication“ on page50)
- By mistake, the VPN client software used for tunneling filters messages. As an example, Cisco VPN clients with versions before V4.0.x in some cases erroneously filtered certain UDP broadcasts.

If this might be the case, please update the software of your VPN client.

Cause: ETAS Hardware hangs

Occasionally the ETAS hardware might hang. In this case switch the hardware off, then switch it on again to re-initialize it.

Cause: Network Adapter temporarily has no IP Address

Whenever you switch from a DHCP company LAN to the ETAS hardware network, it takes at least 60 seconds until ETAS hardware can be found. This is caused by the operating system's switching from the DHCP protocol to APIPA, which is being used by the ETAS hardware.

Cause: ETAS Hardware had been connected to another Logical Network

If you use more than one PC or notebook for accessing the same ETAS hardware, the network adapters used must be configured to use the same logical network. If this is not possible, it is necessary to switch the ETAS hardware off and on again between different sessions (repowering).

Cause: Device driver for network card not in operation

It is possible that the device driver of a network card is not running. In this case you will have to deactivate and then reactivate the network card.

To deactivate and reactivate the network card:

- To deactivate the network card first select in the Windows start menu the following item:
 - Windows XP:
Control Panel → **Network Connections**
 - Windows Vista:
Control Panel → **Network and Internet** → **Network and Sharing Center** → **Manage Network Connections**

- Right click on the used network adapter and select **Disable** in the context menu.
- In order to reactivate the network adapter right click on it again and select **Enable**.

Cause: Laptop power management deactivates the network card

The power management of a laptop computer can deactivate the network card. Therefore you should turn off power monitoring on the laptop.

To switch off power monitoring on the laptop:

- From the Windows Start Menu, select
 - Windows XP:
Control Panel → **System**.
Then select the **Hardware** tab and click on **Device Manager**.
 - Windows Vista:
Control Panel → **System and Maintenance** → **Device Manager**.
- In the Device Manager open the tree structure of the entry **Network Adapters**.
- Right click on the used network adapter and select **Properties** in the context menu.
- Select the **Power Management** tab and deactivate the **Allow the computer to turn off this device to save power** option.
- Select the **Advanced** tab. If the property **Auto-sense** is included, deactivate it also.
- Click **OK** to apply the settings.

Cause: Automatic disruption of network connection

It is possible after a certain period of time without data traffic that the network card automatically interrupts the Ethernet connection. This can be prevented by setting the registry key `autodisconnect`.

To set the registry key `autodisconnect`:

- Open the Registry Editor.
- Select under `HKEY_LOCAL_MACHINE\SYSTEM\ControlSet001\Services\lanmanserver\parameters` the Registry Key `autodisconnect` and change its value to `0xffffffff`.

7.3.2 Personal Firewall blocks Communication

Cause: Permissions given through the firewall block ETAS hardware

Personal firewalls may interfere with access to ETAS Ethernet hardware. The automatic search for hardware typically cannot find any Ethernet hardware at all, although the configuration parameters are correct.

Certain actions in ETAS products may lead to some trouble if the firewall is not properly parameterized, e.g. upon opening an experiment in ASCET or searching for hardware from within INCA or HSP.

If a firewall is blocking communication to ETAS hardware, you must either disable the firewall software while working with ETAS software, or the firewall must be configured to give the following permissions:

- Outgoing limited IP broadcasts via UDP (destination address 255.255.255.255) for destination port 18001
- Incoming limited IP broadcasts via UDP (destination IP 255.255.255.255, originating from source IP 0.0.0.0) for destination port 18001
- Directed IP broadcasts via UDP to the network configured for the ETAS application, destination port 18001
- Outgoing IP unicasts via UDP to any IP in network configured for the ETAS application, destination ports 69, 18001, 18017 or 49152 to 50175
- Incoming IP unicasts via UDP originating from any IP in the network configured for the ETAS application, source ports 69, 18001, 18017 or 49152 to 50175

Note

The ports that have to be used in concrete use cases depend on the hardware used. For more precise information on the port numbers that can be used please refer to your hardware documentation.

Windows XP and Vista come with a built-in personal firewall. On many other systems it is very common to have personal firewall software from third party vendors, such as Symantec, McAfee or BlackIce installed. The proceedings in configuring the ports might differ for each personal firewall software used. Therefore please refer to the user documentation of your personal firewall software for further details.

As an example for a firewall configuration, you will find below a description on how to configure the widely used Windows XP firewall if the hardware access is prohibited under Windows XP with Service Pack 2.

Solution for Windows XP Firewall, Users with Administrator Privileges

If you have administrator privileges on your PC, the following dialog window opens if the firewall blocks an ETAS product.



To unblock a product:

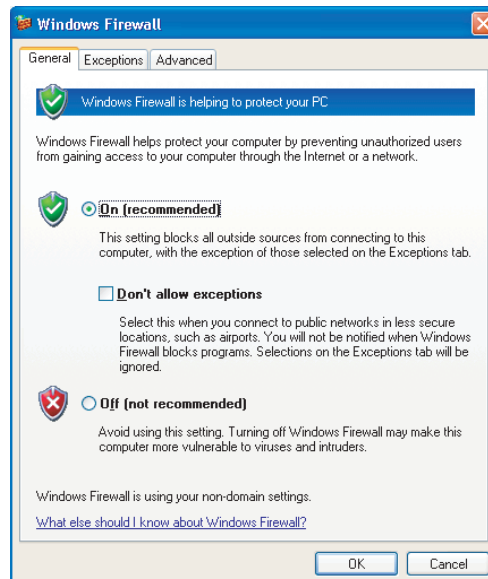
- In the "Windows Security Alert" dialog window, click on **Unblock**.

The firewall no longer blocks the ETAS product in question (in the example: ASCET). This decision survives a restart of the program, or even the PC.

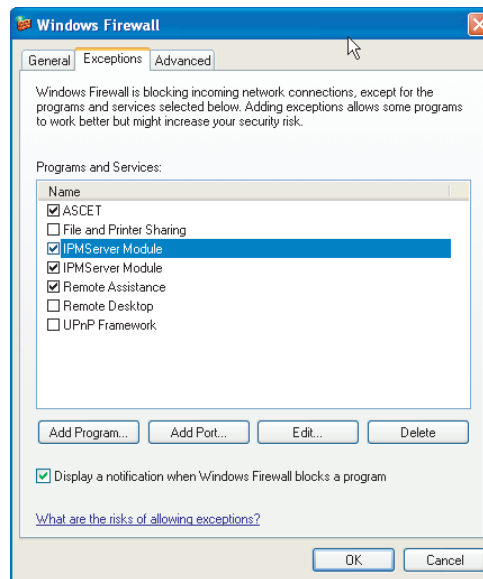
Instead of waiting for the "Windows Security Alert" dialog window, you can unblock ETAS products in advance.

To unblock ETAS products in the firewall control:

- From the Windows Start Menu, select **Settings** → **Control Panel**.
- In the control panel, double-click the **Windows Firewall** icon to open the "Windows Firewall" dialog window.

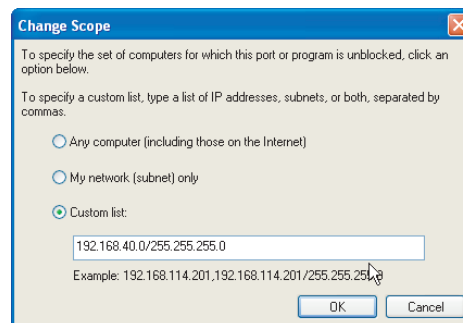


- In the "Windows Firewall" dialog window, open the "Exceptions" tab.



This tab lists the exceptions not blocked by the firewall. Use **Add Program** or **Edit** to add new programs, or edit existing ones.

- Make sure that the ETAS products and services you want to use are properly configured exceptions.
 - Open the "Change Setup" window.



- To ensure proper ETAS hardware access, make sure that at least the IP addresses 192.168.40.xxx are unblocked.
- Close the "Change Setup" window with **OK**.

- Close the "Windows Firewall" dialog window with **OK**.

The firewall no longer blocks the ETAS product in question. This decision survives a restart of the PC.

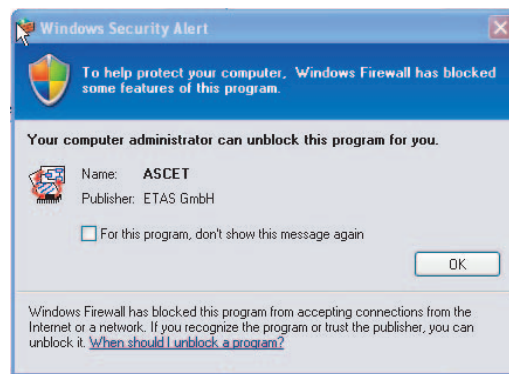
Solution for Windows XP Firewall, Users without Administrator Privileges

This section addresses users with restricted privileges, e.g., no system changes, write restrictions, local login.

Working with an ETAS software product requires "Write" and "Modify" privileges within the `ETAS`, `ETASData`, and ETAS temporary directories. Otherwise, an error message opens if the product is started, and a database is opened. In that case, no correct operation of the ETAS product is possible because the database file and some `*.ini` files are modified during operation.

The ETAS software has to be installed by an administrator anyway. It is recommended that the administrator assures that the ETAS program/processes are added to the list of the Windows XP firewall exceptions, and selected in that list, after the installation. If this is omitted, the following will happen:

- The "Windows Security Alert" window opens when one of the actions conflicting with a restrictive firewall configuration is executed.



To unblock a program (no Admin privileges):

- In the "Windows Security Alert" dialog window, activate the option **For this program, don't show this message again**.
- Click **OK** to close the window.

An administrator has to select the respective ETAS software in the "Exceptions" tab of the "Windows Firewall" dialog window to avoid further problems regarding hardware access with that ETAS product.

8 Technical Data

This chapter describes the fulfilled standards and norms, the environmental conditions, mechanical data, system requirements for operating the ES720.1, electrical data and the pin assignment.






Note




The ES720.1-8W and ES720.1-16W Drive Recorder variants are certificated only in the European Community (EU), U.S.A., Canada, and India.

8.1 General Data

8.1.1 Product labeling

The following symbols are used for product labeling:

Symbol	Description
	Prior to operating the product, be sure to read the user's guide!
	Risk of burns on hot surfaces of the module! Avoid touching the surfaces of the module during operation at high ambient temperatures. During its use in the vehicle and at an ambient temperature of 70 °C, the module may reach surface temperatures of up to 90 °C.
	Labeling for "Power" button
	Labeling for USB port
SN: 1234567	Serial number (seven-digit)
Vx.y.z	Hardware version of the product
F 00K 123 456	Ordering number of the product, see chapter 10 on page 83
7-29V ===	Operating voltage range (DC)
xy A	Current consumption, max.
	Labeling for RoHS (EU), see chapter on page 61

Symbol	Description
	Labeling for CE conformity, see chapter 8.1.4 on page 61
	Labeling for RoHS (China), see chapter on page 61
	Labeling for radio communication units (ES720.1-8W and ES720.1-16W Drive Recorder variants only)
FCC ID	Federal Communications Commission Identification Number (FCC, U.S.A.), (ES720.1-8W and ES720.1-16W Drive Recorder variants only)
IC	Industry Canada Identification Number (ES720.1-8W and ES720.1-16W Drive Recorder variants only)

Please observe the information in chapter "Technical Data" on page 57.

8.1.2 Standards and Norms

Drive Recorder ES720.1

The module adheres to the following standards and norms:

Norm	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	Emission standard (residential, commercial and light-industrial environments)
IEC 60950-1:2014-08	Information technology equipment - Safety

WLAN Module

WLAN standard	IEEE 802.11 b/g/n ¹⁾
WLAN safety	IEEE 802.11i/D3.0 (WPA), IEEE 802.11i/D9.0 (WPA2) [default]
WLAN antenna	max. 1; only for antennas of type WRR2400-RPSMA (Centurion)

¹⁾: IEEE 802.11 n: connection only established in the frequency range of 2,4 GHz

For the WLAN module, the following remarks on the accordance with instructions apply:

*Regulatory Compliance Notices***USA - Federal Communications Commission (FCC)**

FCC Radio-Frequency Exposure & Approval Conditions: FCC ID: PD962205 ANH.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy. If not installed and used in accordance with the instructions, it may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by tuning the equipment off and on, the user is encouraged to try and correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the distance between the equipment and the receiver.
- Connect the equipment to outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

**CAUTION!*****Exposure to Radio Frequency Radiation.***

To comply with FCC RF exposure compliance requirements, a separation distance of at least 20 cm must be maintained between the antenna of this device and all persons. This device must not be co-located or operating in conjunction with any other antenna or transmitter.

Canada - Industry Canada (IC)

This device complies with RSS 210 of Industry Canada 1000M-62205 ANH.

Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of this device."

L' utilisation de ce dispositif est autorisée seulement aux conditions suivantes: (1) il ne doit pas produire de brouillage et (2) l' utilisateur du dispositif doit être prêt à accepter tout brouillage radioélectrique reçu, même si ce brouillage est susceptible de compromettre le fonctionnement du dispositif.

To prevent radio interference to the licensed service, this device is intended to be operated indoors and away from windows to provide maximum shielding. Equipment (or its transmit antenna) that is installed outdoors is subject to licensing.

Pour empêcher que cet appareil cause du brouillage au service faisant l'objet d'être utilisé à l'intérieur et devrait être placé loin des fenêtres afin de fournir un écran de blindage maximal. Si le matériel (ou son antenne d'émission) est installé à l'extérieur, il doit faire l'objet d'une licence.

**CAUTION!****Exposure to Radio Frequency Radiation.**

The installer of this radio equipment must ensure that the antenna is located or pointed such that it does not emit RF field in excess of Health Canada limits for the general population; consult Safety Code 6, obtainable from Health Canada's website www.hc-sc.gc.ca/rpb.

European Community - CE Notice

The CE ! mark indicates compliance with the essential requirements of Directive

- EN 300 328
- EN 301 489-1
- EN 301 489-17.

This device is intended for indoor use.

8.1.3 RoHS Conformity

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.

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.

8.1.4 CE Labeling

ETAS confirms that the product meets the product-specific, applicable European guideline with a CE label on the product or its packaging. CE conformity declaration for the product is available upon request.

8.1.5 Taking the Product Back and Recycling

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. 8-1 WEEE Symbol

The WEEE symbol (see Fig. 8-1 on page 61) 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 chapter 11 on page 89).

8.1.6 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.

8.1.7 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.

8.1.8 Maintenance of the product

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

8.1.9 Cleaning the product

We recommend to clean the product with a dry cloth.

8.2 Environmental Conditions

Note

The use of the WLAN functionality of the ES720.1-8W and the ES720.1-16W Drive Recorder variants is intended for indoor only.

Note

The operating temperature range of all variants of ES720.1 is limited when using the VGA output.

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.*

8.2.1 Use in the lab area

Temperature range (operation) ¹⁾	-40 °C to +55 °C -40 °F to +131 °F
Temperature range (operation) ²⁾	-20 °C to +55 °C -4 °F to +131 °F
Temperature range (storage) (module without packaging)	-40 °C to +85 °C -40 °F to +185 °F
Implementation altitude	max. 5000 m/ 16400 ft
Contamination level	2
Degree of protection	IP20

¹⁾: Drive Recorder without use of the VGA output

²⁾: Drive Recorder with use of the VGA output

8.2.2 Use in the passenger cell or in the trunk of vehicles

Temperature range (operation) ¹⁾	-40 °C to +70 °C -40 °F to +158 °F
Temperature range (operation) ²⁾	-20 °C to +70 °C -4 °F to +158 °F
Temperature range (storage) (module without packaging)	-40 °C to +85 °C -40 °F to +185 °F
Implementation altitude	max. 5000 m/ 16400 ft

Contamination level	2
Degree of protection	IP20

1): Drive Recorder without use of the VGA output

2): Drive Recorder with use of the VGA output

8.3 Mechanical Data

Dimensions (H x W x D)	45 mm x 127 mm x 160 mm
	1.75 in x 5.0 in x 6.3 in
Weight	Approx. 0.8 kg/ 1.8 lbs

8.4 System Requirements

8.4.1 Hardware

Power Supply

Operation of the ES720.1 requires a power supply voltage of 7 V to 29 V DC.

PC with one Ethernet interface

A PC with one open Ethernet interface (100 Mbit/s, full duplex) with RJ-45 connection is required. Ethernet interfaces that are implemented with an additional network card in the PC must feature a 32-bit data bus.

Requirement to ensure successful initialization of the module

Note

It is imperative you disable the function which automatically switches to power-saving mode on your PC network adapter when there is no data traffic on the Ethernet interface!

To deactivate the power saving mode:

Choose in System Control Center / Device Manager / Network Adapter the used network adapter by double-click. Deactivate the "Allow the computer to turn off this device to save power" option in the "Power Management" register. Confirm your configuration.

The manufacturers of network adapter have different names for this function.

Example:

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

8.4.2 Software

To configure the ES720.1 and for control and data acquisition, you need software in the following versions and higher:

- ES720 Configuration Tool V1.0.0
and
- INCA V7.0.0 with INCA Add-On ES720 V1.0.0
or
- INCA V6.2.1 with INCA Add-On ES720 V1.0.0.

Note

Operating the ES720.1 with older versions of software is not possible.

8.5 Electrical Data

8.5.1 Network

ES720.1 IP Address	IP Address (default)	192.168.40.228
	Subnet Mask (default)	255.255.255
Remote Desktop	Account	DriveRecorder
	Passwort	etases720dr

8.5.2 Interface „7-29V“

Pin Assignment

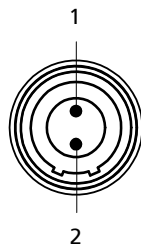


Fig. 8-2 Interface „7-29V“

Pin	Signal	Meaning
1	UBATT+	Power supply, plus
2	Ground	Ground

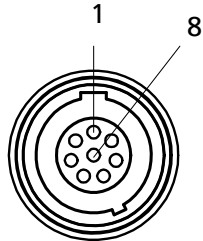
Technical Data

Operating voltage (max.)	7 V to 29 V DC $\pm 10\%$; Load Dump protected, reverse-polarity protected
Current consumption (operation)	max. 2,75 A
Power consumption (at 13,5 V)	Typ. 100 mW (Low Power Standby)
	Typ. 550 mW (Fast Boot Standby)
	Typ. 5 W (normal mode) ¹⁾
	Typ. 6 W (normal mode) ²⁾
Energy management	Wake-Up, standby

¹⁾: Measurement mode with INCA, CPU load normal, WLAN off

²⁾: Measurement mode with INCA, CPU load normal, WLAN on

8.5.3 Interface „ETH“

Pin Assignment**Fig. 8-3** Interface „ETH“

Pin	Signal	Meaning
1	N.C.	Reserved
2	N.C.	Reserved
3	N.C.	Reserved
4	RX+	Received data, plus
5	TX-	Send data, minus
6	RX-	Received data, minus
7	N.C.	Reserved
8	TX+	Send data, plus

Technical Data

Connection	10/100Base-T Ethernet
Protocoll	TCP/IP
Synchronization	No support of ETAS synchronization mechanism
Power supply of connected modules	No

8.5.4 Interface „USB“

Pin Assignment

The four USB ports on the front panel of the ES720.1 are standard USB sockets of type A.

Output Current

Output current of each USB port	500 mA (max.)
Total of the output currents of the 4 USB ports	1.2 A (max.)

Note

Please refer to the notes in chapter "Maximum Output Current" on page 25 and "Overload and Emergency-Off" on page 25.

External Storage Expansions

File system	FAT32 required
Number of partitions	1

Note

Preinstalled software and other data on the USB storage medium must be uninstalled or removed before using it on the ES720.1.



CAUTION!

Possible data loss!

Do not disconnect the USB storage medium from the ES720.1 during the data transfer.

Recommended USB Sticks as Storage Expansion

Note

When using USB sticks, please refer to the technical data and environmental conditions supplied by the manufacturer. You could restrict the operating range of the ES720.1

The function "Storage expansion of the ES720.1" was **tested** with USB sticks of the following product family (see table).

Manufacturer	Product	Product Nb.
Hama	FlashPen "Smartly" 8/16 GB USB 100x	00094168 , 00094169
	FlashPen „Fancy“ 2/4/8/16 GB USB Stick 40x	00055615 , 00055616, 00055617, 00090894
Kingston	DataTraveler DT101 2/4/8/16 GB, cyan	DT101C/2GB, DT101C/4GB, DT101C/8GB, DT101C/16GB
	DataTraveler DT101 2/4/8/16 GB, gelb	DT101Y/2GB, DT101Y/4GB, DT101Y/8GB, DT101Y/16GB
	DataTraveler DT101 2/4/8/16 GB, pink	DT101N/2GB, DT101N/4GB, DT101N/8GB, DT101N/16GB

8.5.5 Interface „VGA“

The "VGA" port is a standard port which allows to transfer analog image signals to a monitor with VGA port.

8.5.6 Interface „WLAN“

Note

Please refer to the "Regulatory Compliance Notices" on page 59.

WLAN Ports and WLAN Antenna

All product variants of the ES720.1 are equipped with a "WLAN" port for the WLAN antenna. At the "WLAN" port the WLAN antenna is installed (Drive Recorder variants with WLAN module).

ES720.1 Product Variants

Only the product variants ES720.1-8W and ES720.1-16W have an internal WLAN module. It is connected to the "WLAN" port.

WLAN Standards

WLAN standard	IEEE 802.11 b/g/n ¹⁾
WLAN safety	IEEE 802.11i/D3.0 (WPA), IEEE 802.11i/D9.0 (WPA2) [default]
WLAN antenna	max. 1

¹⁾: IEEE 802.11 n: connection only established in the frequency range of 2,4 GHz

8.5.7 Interface „I/O“

Pin Assignment and Technical Data

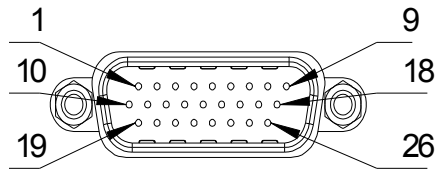


Fig. 8-4 Interface „I/O“

All inputs and outputs of the „I/O“ interface are protected against overvoltages until +/- 32 V.

Pin	Signal	Type	Logic	I max. [mA]	Meaning
1	OUT_1	Output	5 V	10	TTL-compatible, max. 0.5 V @ 0 mA, min. 2.5 V @ 10 mA, can be used as INCA signal
2	OUT_2	Output	5 V	10	TTL-compatible, max. 0.5 V @ 0 mA, min. 2.5 V @ 10 mA, can be used as INCA signal
3	OUT_3	Output	5 V	10	TTL-compatible, max. 0.5 V @ 0 mA, min. 2.5 V @ 10 mA, can be used as INCA signal
4	OUT_4	Output	5 V	10	TTL-compatible, max. 0.5 V @ 0 mA, min. 2.5 V @ 10 mA, can be used as INCA signal
5	GND	-	-	-	Ground
6	GND	-	-	-	Ground
7	GND	-	-	-	Ground
8	GND	-	-	-	Ground

Pin	Signal	Type	Logic	I max. [mA]	Meaning
9	EN_PWR	Output	5 V	state	TTL-compatible, corresponds to operating state of the ES720.1, can be used to switch on the operating voltage of additional measuring modules: High = ES720.1 is switched on, Low = ES720.1 is in standby
11	/RPBI	Input	3.3 V	-	TTL-compatible, for connecting an external "Remote Power" button to ground; function of external "Remote Power" button and "Power" button on the module is identical
12	PSCI	Input	-	-	TTL-compatible, terminal 15 (Kl.15)
13	IN1	Input	-	-	TTL-compatible, can be used for INCA signals (signal state, trigger) and for ES720.1 recording jobs; sample rate max. 10 Hz
14	IN2	Input	-	-	TTL-compatible, can be used for INCA signals (signal state, trigger); sample rate max. 10 Hz
15	IN3	Input	-	-	TTL-compatible, can be used for INCA signals (signal state, trigger); sample rate max. 10 Hz
16	IN4	Input	-	-	TTL-compatible, can be used for INCA signals (signal state, trigger); sample rate max. 10 Hz
17	GND	-	-	-	Ground
18	GND	-	-	-	Ground
19	LED_ETH	Output	5 V		Status corresponds to the status of the LED ETH , dimensioned for direct connecting Low Current LEDs to ground
20	LED_WLAN	Output	5 V		Status corresponds to the status of the LED WLAN , dimensioned for direct connecting Low Current LEDs to ground
21	LED_PWR	Output	5 V		Status corresponds to the status of the LED ON , dimensioned for direct connecting Low Current LEDs to ground
22	LED_MEAS	Output	5 V		Status corresponds to the status of the LED MEAS , dimensioned for direct connecting Low Current LEDs to ground

Pin	Signal	Type	Logic	I max. [mA]	Meaning
23	LED_ERR	Output	5 V		Status corresponds to the status of the LED ER , o Low Current LEDs to ground
24	LED_MEM	Output	5 V		Status corresponds to the status of the LED MEM ing Low Current LEDs to ground
5	GND	-	-	-	Ground
6	GND	-	-	-	Ground

8.5.8 Boot times of the module

Operating state	Boot time/measuring readiness of ES720.1 ¹⁾
„On“	Immediate recording, no delay
„Fast Boot Standby“ (Suspend to RAM)	approx. 10 s
Low Power Standby (Suspend to Disk)	approx. 60 s
„Off“	approx. 60 s

¹⁾: dependent on the boot time of the connected modules and the scope of the experiment

9 Cable and Accessoires

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

Note

Only use the ETAS cables named in this User's Guide at the interfaces of the ES720.1. The maximum admissible cable lengths must be adhered to.

Note

Custom cables can be produced according to your specifications. For more information on custom cables, please contact your local ETAS sales representative.

9.1 Power Supply Cable



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.

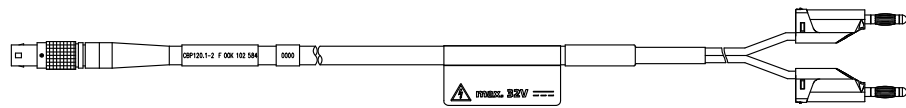
Power supply cables suitable for the ES720.1 module can be delivered in two designs:

- 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.

9.1.1 CBP120 Cable



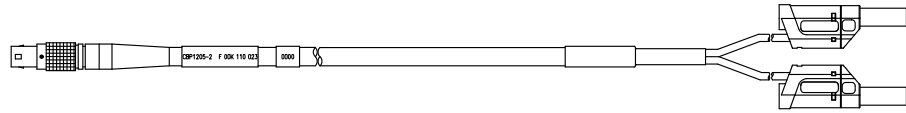
Side A

Side B

Fig. 9-1 CBP120-2 cable (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

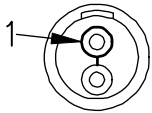
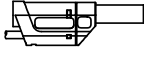
9.1.2 CBP1205 Cable



Side A

Side B

Fig. 9-2 CBP1205 cable (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.

9.2 ETH Interface Cable

9.2.1 CBE100 Cable

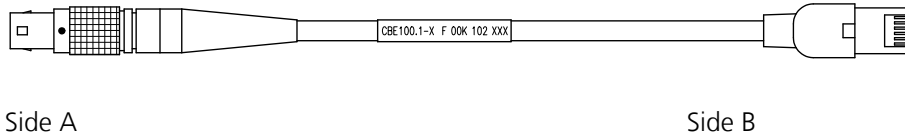


Fig. 9-3 CBE100-x Cable

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

9.2.2 CBE130 Cable

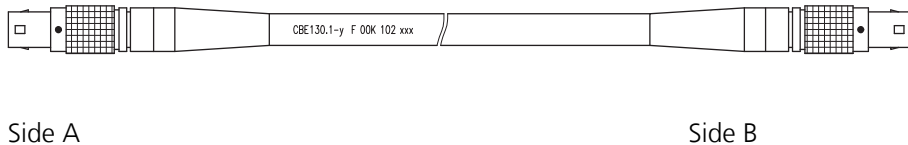


Fig. 9-4 CBE130-x Cable

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

9.2.3 CBE140 Cable

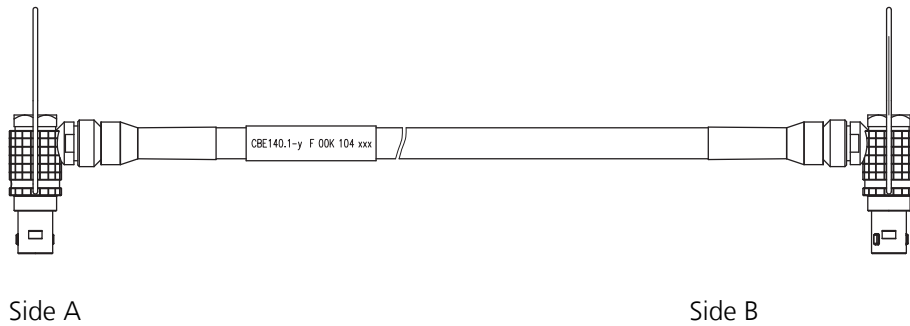


Fig. 9-5 CBE140-0m45 Cable

Order Name	Short name	Order Number
Ethernet Connection and Power Supply Cable with Angular Connectors, Lemo 1B FMF Lemo 1B FMD (8mc-8mc), 0m45	CBE140-0m45	F 00K 104 153

9.2.4 CBEP420.1 Cable

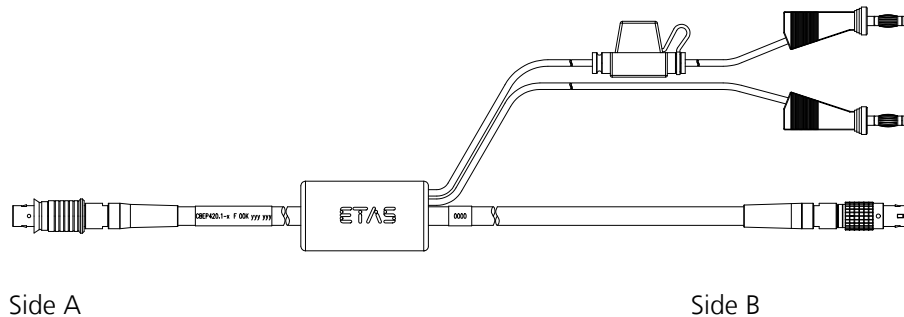
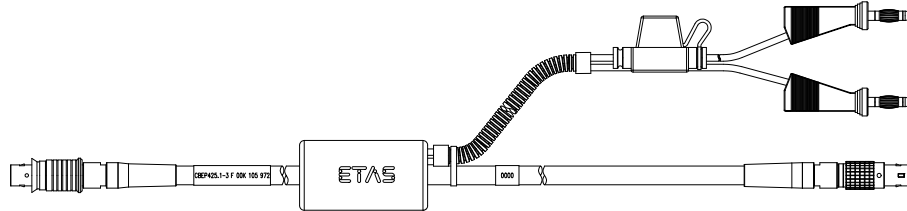


Fig. 9-6 CBEP420.1 Cable

Order Name	Short name	Order Number
Ethernet Connection and Power Supply Cable, Lemo 1B FGF Lemo 1B FGL Banana (8mc-8fc+2mc), 3 m	CBEP420.1-3	F 00K 105 292

9.2.5 CBEP425.1 Cable



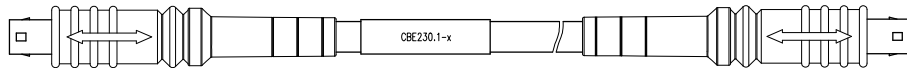
Side A

Side B

Fig. 9-7 CBEP425.1 Cable

Order Name	Short name	Order Number
Ethernet Connection and Power Supply Cable, Lemo 1B FGF Lemo 1B FGL Banana (8mc-8fc+2mc), 3 m	CBEP425.1-3	F 00K 105 972

9.2.6 CBE230.1 Cable



Side A

Side B

Fig. 9-8 CBE230.1 Cable

Order Name	Short name	Order Number
Ethernet Connection Cable 1 GBit/s, Lemo 1B FGE - Lemo 1B FGE (10mc- 10mc), 3 m	CBE230.1-3	F 00K 105 757
Ethernet Connection Cable 1 GBit/s, Lemo 1B FGE - Lemo 1B FGE (10mc- 10mc), 8 m	CBE230.1-8	F 00K 105 758

9.2.7 CBAE330 Adapter Cable

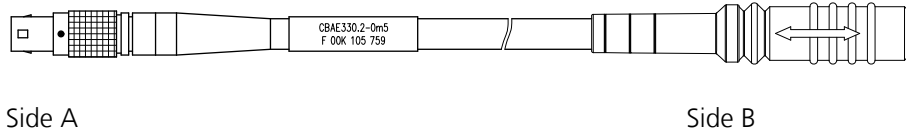


Fig. 9-9 CBAE330.2 Cable

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

10 Ordering Information

10.1 ES720.1 Ordering Variants

The ES720.1 Drive Recorder is available with power supply cable CBP120 or with power supply cable CBP1205 (refer to chapter 9.1 on page 75).

Note

To prevent an inadvertent insertion in power outlets, ETAS recommends to equip the power cables with safety banana plugs in areas with power outlets.

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

10.2 ES720.1 without WLAN Module

10.2.1 ES720.1-8 (8 GByte internal Memory)

Module with CBP120 Power Supply Cable

Order Name	Short Name	Order Number
ES720.1-8 Drive Recorder (8 GB internal memory)	ES720.1-8	F 00K 107 105

Package Contents

ES720.1-8 Drive Recorder (8 GB internal memory),
 cable CBP120-2, cable CBE100-3,
 T-Bracket for Housing,
 CDROM INCA_ADD-ON_ES720_CD,
 List "Content of this Package",
 ES720_SAV,
 China-RoHS-leaflet_Compact_green_cn

Module with CBP1205 Power Supply Cable

Order Name	Short Name	Order Number
ES720.1-8 Drive Recorder (8 GB internal memory)	ES720.1-8-S	F 00K 110 462

Package Contents

ES720.1-8 Drive Recorder (8 GB internal memory),
 cable CBP1205-2, cable CBE100-3,
 T-Bracket for Housing,
 CDROM INCA_ADD-ON_ES720_CD,
 List "Content of this Package",
 ES720_SAV,
 China-RoHS-leaflet_Compact_green_cn

10.2.2 ES720.1-16 (16 GByte internal Memory)

Module with CBP120 Power Supply Cable

Order Name	Short Name	Order Number
ES720.1-16 Drive Recorder (16 GB internal memory)	ES720.1-16	F 00K 107 107

Package Contents

ES720.1-16 Drive Recorder (16 GB internal memory),
 cable CBP120-2, cable CBE100-3,
 T-Bracket for Housing,
 CDROM INCA_ADD-ON_ES720_CD,
 List "Content of this Package",
 ES720_SAV,
 China-RoHS-leaflet_Compact_green_cn

Module with CBP1205 Power Supply Cable

Order Name	Short Name	Order Number
ES720.1-16 Drive Recorder (16 GB internal memory)	ES720.1-16-S	F 00K 110 463

Package Contents

ES720.1-16 Drive Recorder (16 GB internal memory),
 cable CBP1205-2, cable CBE100-3,
 T-Bracket for Housing,
 CDROM INCA_ADD-ON_ES720_CD,
 List "Content of this Package",
 ES720_SAV,
 China-RoHS-leaflet_Compact_green_cn

10.3 ES720.1 with WLAN Module

Note

The ES720.1-8W and ES720.1-16W Drive Recorder variants are certificated only in the European Community (EU), U.S.A., Canada, and India.

10.3.1 ES720.1-8W (8 GByte internal Memory)

Module with CBP120 Power Supply Cable

Order Name	Short Name	Order Number
ES720.1-8W Drive Recorder (WLAN, 8 GB internal memory)	ES720.1-8W	F 00K 107 108

Package Contents

ES720.1-8W Drive Recorder (WLAN, 8 GB internal memory),
 cable CBP120-2, cable CBE100-3,
 T-Bracket for Housing,
 CDROM INCA_ADD-ON_ES720_CD,
 List "Content of this Package",
 ES720_SAV,
 China-RoHS-leaflet_Compact_green_cn

Module with CBP1205 Power Supply Cable

Order Name	Short Name	Order Number
ES720.1-8W Drive Recorder (WLAN, 8 GB internal memory)	ES720.1-8W-S	F 00K 110 481

Package Contents

ES720.1-8W Drive Recorder (WLAN, 8 GB internal memory),
 cable CBP1205-2, cable CBE100-3,
 T-Bracket for Housing,
 CDROM INCA_ADD-ON_ES720_CD,
 List "Content of this Package",
 ES720_SAV,
 China-RoHS-leaflet_Compact_green_cn

10.3.2 ES720.1-16W (16 GByte internal Memory)

Module with CBP120 Power Supply Cable

Order Name	Short Name	Order Number
ES720.1-16W Drive Recorder (WLAN, 16 GB internal memory)	ES720.1-16W	F 00K 107 109

Package Contents

ES720.1-16W Drive Recorder (16 GB internal memory),
 cable CBP120-2, cable CBE100-3,
 T-Bracket for Housing,
 CDROM INCA_ADD-ON_ES720_CD,
 List "Content of this Package",
 ES720_SAV,
 China-RoHS-leaflet_Compact_green_cn

Module with CBP1205 Power Supply Cable

Order Name	Short Name	Order Number
ES720.1-16W Drive Recorder (WLAN, 16 GB internal memory)	ES720.1-16W-S	F 00K 110 482

Package Contents

ES720.1-16W Drive Recorder (WLAN, 16 GB internal memory),
 cable CBP1205-2, cable CBE100-3,
 T-Bracket for Housing,
 CDROM INCA_ADD-ON_ES720_CD,
 List "Content of this Package",
 ES720_SAV,
 China-RoHS-leaflet_Compact_green_cn

10.4 Accessoires

10.4.1 Machine-named Licenses

Order Name	Short Name	Order Number
Service Contract for a machine-named license for ES720 Drive Recorder	ES720.1_SRV-ME52	F 00K 107 114
Machine-named license for ES720 ODX-LINK add-on	ISW_ES720_ODX-LINK_LIC-MP	F 00K 107 147
Service contract for machine-named license for ES720 ODX-LINK add-on	ISW_ES720_ODX-LINK_SRV-ME52	F 00K 107 150
Machine named license for ES720 Experimental Target Integration Package	ISW_ES720_EIP_LIC-MP	F 00K 107 196

10.4.2 Cable

„7-29V“ Interface Cable

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

„ETH“ Interface Cable

Order Name	Short Name	Order Number
Ethernet PC Connection Cable, Lemo 1B FGJ - RJ45 (8mc-8mc), 3 m	CBE100-3	F 00K 102 559
Ethernet PC Connection Cable, Lemo 1B FGJ - RJ45 (8mc-8mc), 8 m	CBE100-8	F 00K 102 571
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 with Angular Connectors, Lemo 1B FMF Lemo 1B FMD (8mc-8mc), 0m45	CBE140-0m45	F 00K 104 153
Ethernet Connection and Power Supply Cable, Lemo 1B FGF Lemo 1B FGL Banana (8mc-8fc+2mc), 3 m	CBEP420.1-3	F 00K 105 292

Order Name	Short Name	Order Number
Ethernet Connection and Power Supply Cable, Lemo 1B FGF Lemo 1B FGL Banana (8mc-8fc+2mc), 3 m	CBEP425.1-3	F 00K 105 972
Ethernet Connection Cable 1 GBit/s, Lemo 1B FGE - Lemo 1B FGE (10mc- 10mc), 3 m	CBE230.1-3	F 00K 105 757
Ethernet Connection Cable 1 GBit/s, Lemo 1B FGE - Lemo 1B FGE (10mc- 10mc), 8 m	CBE230.1-8	F 00K 105 758
Ethernet Connection Adapter Cable 1 GBit/s to 100 MBit/s, Lemo 1B PHE - Lemo 1B FGF (10fc-8mc), 0m5	CBAE330-0m5	F00K 105 709

10.4.3 Housing Accessoires

Order Name	Short Name	Order Number
T-Bracket for ES600 Housing	ES600_H_TB	F 00K 001 925

11 ETAS Contact Addresses

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ETAS Subsidiaries and Technical Support

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

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

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

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