ETAS

DRIVING EMBEDDED EXCELLENCE

ES583.1

FlexRay Bus Interface USB Module

User's Guide

Contents

1   About this Document

1.1   Classification of Safety Messages

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

> ⚠️ **DANGER**
>
> indicates a hazardous situation with a high risk of death or serious injury if not avoided

> ⚠️ **WARNING**
>
> indicates a hazardous situation of medium risk which could result in death or serious injury if not avoided.

> ⚠️ **CAUTION**
>
> indicates a hazardous situation of low risk which may result in minor or moder-ate injury if not avoided.

> *NOTICE*
>
> indicates a situation which may result in damage to property if not avoided.

1.2   Presentation of Instructions

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

Target definition

1. Step 1
2. Step 2
3. Step 3
> Result

1.3   Typographical Conventions

Hardware

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

1.4   Presentation of Supporting Information

> **ⓘ NOTE**
>
> Contains additional supporting information.

2 General

The introductory chapter provides information about the basic safety notices, product return and recycling, use of this manual, system requirements for operating the module, scope of supply and additional information.

2.1 Basic safety notices

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.

2.1.1 Intended use

This product was developed and approved for automotive applications. For use in other application areas, please contact your ETAS contact partner.

Requirements for operation

> ⚠️ **WARNING**
>
> This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

The following requirements are necessary for safe operation of the module:

- Observe the notes for the ambient conditions (see chapter 6.1.2 on page 23).
- Ensure compliance with the connection and settings values (see chapter 6.2.1 on page 24).
- Use the product only according to the specifications ion the corresponding user's guide. For any other use, the product safety is not ensured.
- Observe the regulations concerning electrical safety and the laws and regulations concerning occupational safety applicable at the application site!
- Do not use the product in a potentially explosive atmosphere.

Opening the module

> ⚠ **CAUTION**
>
> **Loss of Features as defined by IP30!**
>
> Do not open or change the module housing!
>
> Works on the module housing may be executed only by qualified technical personnel.

> ⚠ **CAUTION**
>
> **Damage or destruction of module is possible!**
>
> Do not open or change the module housing!
>
> Work on the module housing may only be performed by qualified personnel.

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.

Maintenance and cleaning

The product is maintenance-free. For cleaning, use a clean and dry cloth.

2.2   RoHS conformity

European Union

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

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

China

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

2.3   CE marking

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

2.4   Product return and recycling

The European Union (EU) released the Directive for Waste Electrical and Electronic Equipment - WEEE to ensure the setup of systems for collecting, treating and recycling electronic waste in all countries of the EU.

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

Fig. 2-1   WEEE symbol

The WEEE symbol (see Fig. 2-1 on page 9) on the product or its packaging identifies that the product may not be disposed of together with the remaining trash.

The user is obligated to separately collect old devices and provide them to the WEEE return system for recycling.

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

Additional information about the recycling program of ETAS GmbH is available from the ETAS sales and service locations (see chapter 9 on page 32).

2.5   Identifications on the product

The following symbols are used for identifying the product:

Symbol	Description
⚠	The User's Guide must be read prior to the startup of the product!
1:NC 2:FLX 1 B-minus 3:GND 4:FLX 2 B-minus 5:GND 6:NC 7:FLX 1 B-plus 8:FLX 2 B-plus 9:NC	Terminal assignment (see chapter "Terminal assignment" on page 27)
4.5 - 5.5 VDC	Operating voltage range (DC voltage)
CE	Marking for CE conformity, see chapter 2.3 on page 8
🗑	Marking for RoHS, see chapter on page 8

Please observe the information in the chapter "Technical Data" on page 23.

2.6   About this manual

2.7   Scope of supply

Prior to the initial commissioning of your ES583.1, please check whether the module was delivered with all required components (see chapter 8.1 on page 31).

Additional cables and adapters can be obtained separately from ETAS. A list of available accessories and their order designation is located in chapter 8.2 on page 31 of this manual or in the ETAS product catalog.

2.8   Additional information

The configuration instructions for the ES583.1 under INCA can be found in the corresponding software documentation.

3   Hardware description

The "Hardware description" chapter provides an overview of the ES583.1 module, the LEDs, the block diagram, the power supply, the interfaces and the firmware update.

3.1   Overview

The ES58x series consists of a series of compact ECU and bus interface module to cost-efficiently connect vehicle buses with the PC.

The compact ES583.1 module is equipped with a FlexRay interface at a DSUB9 plug connector and with a USB port for connection to the PC. The Y-shaped cable CBCF100 connects the SUB-D plug connector of the module with the FlexRay channels.

The ES583.1 supports a FlexRay node with two redundantly usable FlexRay channels and can be used in a variety of applications for analyzing the communication on the FlexRay bus.

With the efficient data transmission to the HOST PC, the module is suitable for the calibration as well as flashing of FlexRay ECUs.

Fig. 3-1   ES583.1 module (top view)

The ES583.1 is integrated in the ETAS application software INCA and supports the protocols XCP and UDS.

The installation and configuration effort is minimal, an external voltage supply is not required.

The ES583.1 module and the corresponding CBF100 cable are designed for use in the lab, at the test bench and in the passenger cell of motor vehicles.

3.2   Properties

- HOST interface
  - USB 2.0 high-speed port
- FlexRay interface
  - Connection via standard 9-pin SUB-D plug connector in accordance with FlexRay EPL specification V2.1 Rev. A
  - 1 x FlexRay Bus (channel A + B), in accordance with FlexRay protocol specification V 2.1 Rev. A
  - Electrical isolation to HOST interface
- 1 FlexRay node with two redundantly usable FlexRay channels

- – BOSCH E-Ray-based FlexRay communication controller, compatible with the FlexRay protocol specification V2.1
- – Support of future FlexRay versions through firmware update
- – Configuration of the FlexRay node in the application software, e.g. in INCA, by importing the Fibex file
- 1 internal FlexRay node for the synchronization of both FlexRay channels:
  - – Exclusive use as FlexRay synchronization node is possible
  - – Individual FlexRay nodes/ECUs that are not located on a FlexRay bus can be synchronized automatically with this node (e.g. for flashing ECUs)
- Automotive-capable module that is suitable for use in the development environment and in the vehicle on test courses.
  - – Compact dimensions (approx. 100 mm x 40 mm x 20 mm)
  - – Immune to ambient conditions (temperature, EMC)
  - – High level of mechanical stability and robustness
- Part of the ETAS Tool Suite

Complete technical data for the ES583.1 module can be found in the chapter "Technical Data" on page 23.

3.3 Housing

The compact plastic housing offers not only high mechanical stability, but also a non-slip surface for safe handling.

Connections

A USB cable with connector is permanently attached at the rear for the connection to the HOST PC. The SUB-D plug connector for connection to the FlexRay bus is located at the front.

Serial number

The serial number of the module is located at the bottom of the device.

3.4 LEDs

The ES583.1 is equipped with an LED to display the operating state of the module and with two LEDs to display the function of both FlexRay channels FLX1 and FLX2. The following flashing codes are used for the LEDs:
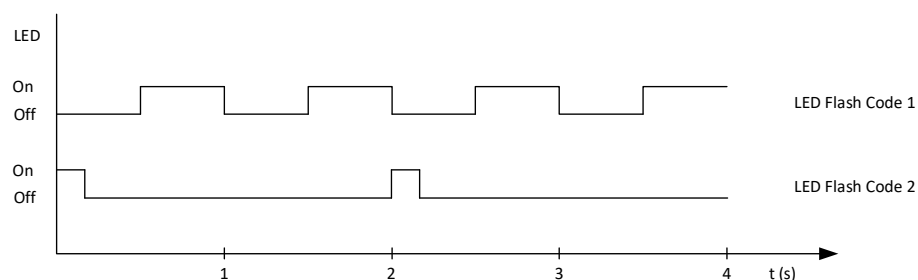
Fig. 3-2   LED flashing codes

3.4.1   Operating state of the module

At the top of the module is the LED ON/ER to display the operating and error state of the module (see Fig. 3-1 on page 11).

- Operating state
- Error states or firmware update of the module
- Overtemperature inside the housing

Functional states of the module (LED "ON/ER")

The LED ON/ER is used to indicate the following functional states:

Meaning	LED ON/ER	State	Description
Power	Off	Off	Switched off
	Green	Normal operating mode	Active, operational
Error	Off	No error	Error-free function
	Red	Functional error	Return the module to ETAS for repair.
	Flashing red (code 2)	Critical operating state / software update is active	Firmware update is being performed. Do not disconnect the module from the PC!
			Temperature in the module is too high, function is disabled.

3.4.2   Function state of FlexRay interface

Function states of FlexRay channels (LEDs FLX1 and FLX2)

To display the function state of the FlexRay node, one LED is assigned to each of the two FlexRay channels:

- LED **FLX1**: FlexRay channel A
- LED **FLX2**: FlexRay channel B

LED FLX1	LED FLX2	Function state
Off	Off	FlexRay node inactive, (FlexRay controller is not configured)
Flashing yellow (code 1)	Off	FlexRay channel A active, waiting for synchronization
Yellow	Off	FlexRay channel A active, synchronized, ready for data exchange
Off	Flashing yellow (code 1)	FlexRay channel B active, waiting for synchronization

LED FLX1	LED FLX2	Function state
Off	Yellow	FlexRay channel B active, synchronized, ready for data exchange
Flashing yellow (code 1)	Flashing yellow (code 1)	FlexRay node active (channel A and channel B), waiting for synchronization
Yellow	Yellow	FlexRay node active (channel A and channel B), synchronized, ready for data exchange

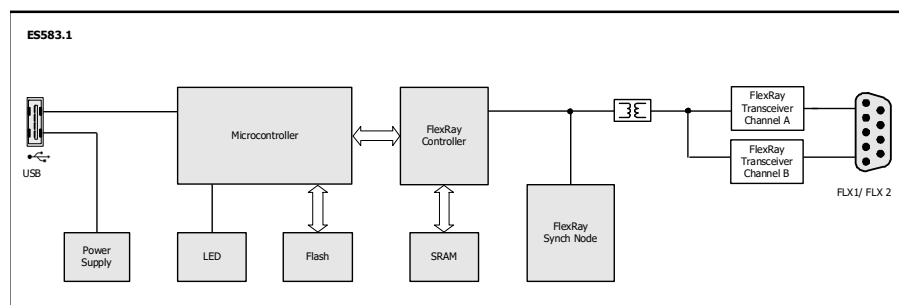## 3.5   Block diagram

Fig. 3-3   Block diagram

3.6   USB port

The ES583.1 must be connected to a USB 2.0 high-speed port (480 Mbit/s). Since the module is supplied with power via the USB port, it must provide an output current of 500 mA (USB 2.0 high power).

USB ports that can provide only a current of 100 mA are not being supported (USB 2.0 low power). In case of insufficient current supply, the ES583.1 does not boot and is not recognized as a USB device by the PC.

3.7   FlexRay interface (FLX1, FLX2)

The ES583.1 features a FlexRay interface with two channels (channel A and channel B) that are routed to a 9-pin DSUB plug connector FLX1/FLX2. The FlexRay channels A (FLX1) and B (FLX2) are completely independent channels with separate connections.

The FlexRay interface is electrically isolated from the USB port. No electrical decoupling exists between the FlexRay channels.

Operation of the module at USB 1.0 interfaces is not supported.

The module must be directly connected to the USB port of your PC. The use of USB-cables extending the connection between the ES583.1 and the PC is not allowed.

3.7.1   Properties

The FlexRay applications supported by the ES583.1 are listed in an overview in chapter on page 25.

3.7.2   Bus termination resistor

The FlexRay specification allows the design of different bus topologies, such as passive bus, passive star or active star.

Each of the topologies requires a corresponding bus termination. The FlexRay termination selected by ETAS in the context of the FlexRay specification measures 100 ohm. To support the design in FlexRay networks, ETAS offers FlexRay cables and matching FlexRay terminations. The terminations must be connected to the cable or the plug.

3.7.3   Synchronization nodes

After the start of a FlexRay network, the local clock generators of all nodes of the network must be synchronized. Prerequisites for the synchronization process are at least two nodes that can send sync frames (synchronization nodes). The other nodes of the network synchronize themselves by analyzing the occurrence of the sync frame and adjusting their local clock generator.

The FlexRay interface of the ES583.1 is equipped with an additional internal synchronization node. The synchronization node can take over only synchronization functions and is internally connected with the FlexRay channels FLX1 and FLX2.

If this synchronization node sends Start-up/Sync messages as the second node of the FlexRay network, then FlexRay networks in which no other nodes with synchronization module exist can be started and synchronized with a single ES583.1 module.

Application examples
- Testing/starting up FlexRay ECUs outside of FlexRay networks
- Flashing ECUs via FlexRay

3.8   Firmware update

The firmware of the ES583.1 can be updated by the user so that future versions of the module can also be used. The firmware update is done with the help of the service software "Hardware Service Pack" (HSP) from the connected PC.

> **ℹ NOTE**
>
> During a firmware update, the USB connection to the PC must not be disconnected!

4   Startup

The "Startup" chapter describes the preparation of the installation, the Installation, the uninstallation as well as checking the installation of the USB drivers for the ES583.1.

4.1   Preparing the installation

4.1.1   USB driver

> ℹ️ **NOTE**
>
> A specific USB driver must be installed on the PC for operating the ES583.1 module.

4.1.2   Checking system requirements

Verify that your PC meets the system requirements.

To install the USB driver on the PC, you require the user rights of an administrator. If necessary, contact your system administrator.

4.1.3   CD-ROM

The supplied CD-ROM includes:

- USB driver for the ES583.1 with installation wizard
- Hardware Service Pack (HSP) for updating the firmware
- Documentation: ES583.1 User's Guide (this document)

The application for installing the USB driver is in the root directory of the CD-ROM as executable **autostart.exe** file.

Or you can install the driver via the supplement contained in the HSP (HSP V10.1.1 and higher).

4.2   Installing the USB driver

> ⚠️ **CAUTION**
>
> The USB driver must be installed on the PC first before you connect the ES583.1 to the USB port of the PC.

Regardless of whether you install the USB driver from the CD-ROM or a network drive, the procedure is identical.

<u>Installing the USB driver:</u>

1. In the main window, select the **Drivers** option.
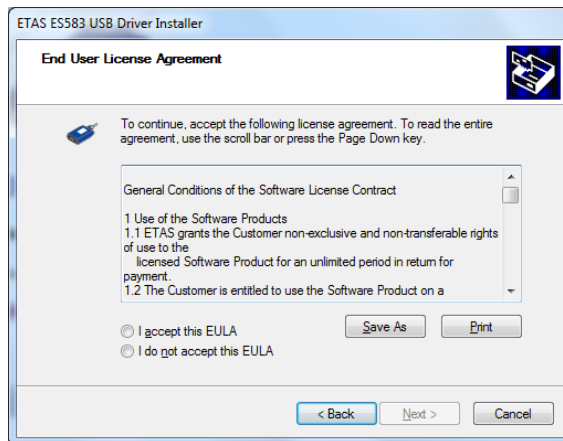
   The Drivers window opens.

2. Select Install ES583.1 - USB Drivers.

   The ETAS program for installing the USB drivers for the ES583.1 is started.
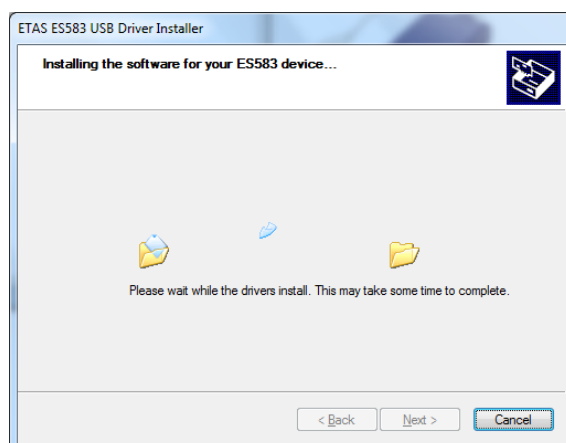
3. Click on **Next** and follow the instructions of the installation program.

4. Accept the general terms of the software licensing agreement.
5. Click the **Continue** button.

   The installation of the USB driver starts.

6. Wait until the driver is installed.

7. Click on **Finish**.

   The installation of the USB driver is finished.

4.3   Uninstalling the USB driver

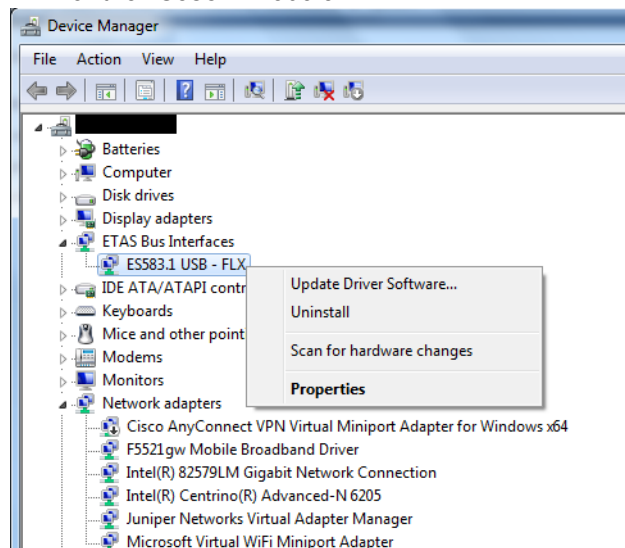The USB driver for the ES583.1 can be uninstalled in the Device Manager of Windows.

<u>Uninstalling the USB driver:</u>

1. Select **Start** → **Control Panel** → **Device Manager** to start the Windows Device Manager.

   The **Device Manager** window opens.

2. Under **ETAS Bus Interfaces**, select the entry **ES583.1 USB - FLX** for the ES583.1 module.

3. Right-click and select **Uninstall**.

4. Select **Delete the driver software for this device** and click on
OK.

The system uninstalls the USB drivers for ES583.1.

4.4   Verifying the installation of the USB driver

In the Device Manager of Windows, you can check which hardware drivers are
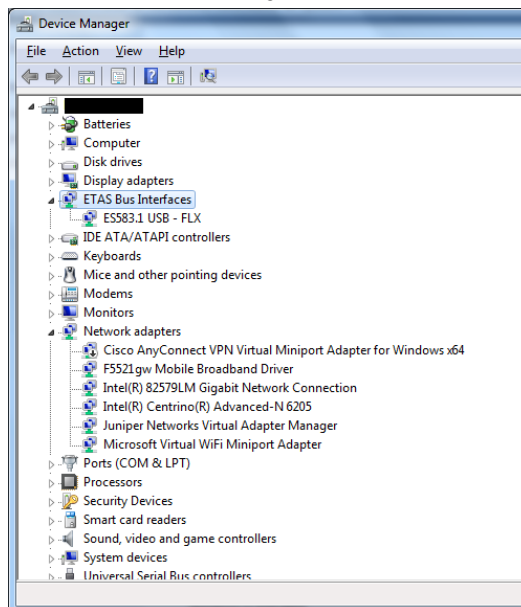installed and which status they have.

Verifying the USB driver installation:

1. Select **Start** → **Control Panel** → **Device Manager** to start the
Device Manager of Windows.

The **Device Manager** window opens.

2. Select **ETAS Bus Interfaces**.

3. Verify that the ES583.1 module features the new entry
ES583.1 USB - FLX.

The figure below identifies the entry with a red arrow.

Fig. 4-1   Windows Device Manager

When Windows detects the ES583.1 module at the USB port, but the USB driver
for the module was not installed, then an exclamation mark ( ) appears next
to the entry for the module.

Execute the program for installing the USB driver again to remedy this problem.

4.5 Connection to the PC

After successful driver installation, the ES583.1 module can be connected to the PC. Windows should recognize the module and install (enable) the corresponding driver. Windows displays an information note in the start bar (see Fig. 4-2 on page 20).
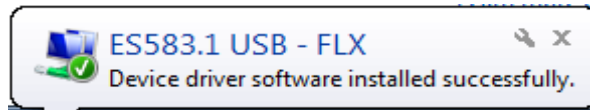
Fig. 4-2 Windows information note

5 Troubleshooting Problems

This chapter gives some information of what you can do when problems arise with the ES583.1 and when general problems arise that are not specific to an individual software or hardware product.

5.1 Displays of the LEDs

For assessing the operating states and for removing errors of the ES583.1, observe the display of the LEDs which provide information about the function of the interfaces and the ES583.1 (see chapter 3.4 on page 12).

5.2 Problems with the ES583.1

The following table lists some of the possible problems together with a possible solution. In case of further questions, please contact our technical service (see chapter 5 on page 21).

Problem	Diagnostics questions	Possible solutions
The computer does not install the drivers when the module is connected for the first time.	Has the USB driver already been installed?	Check whether the module is listed in the Windows Device Manager. It may already be installed, or it was installed by the operating system. Additional information concerning the Device Manager settings is located in chapter 4.4 on page 19.
	Is the USB port of the PC defective?	Try using a different USB port of the computer.
		Restart the PC.
The USB driver is not being installed.		Ensure that you are logged in with the required authorizations for installing the driver (administrator rights).

Problem	Diagnostics questions	Possible solutions
The ES583.1 module is not found using "Search for hardware".	Did you install INCA with the required version?	Check whether the INCA version installed on your PC meets the requirements in chapter 6.2.2 on page 25.
	Did you install INCA ES5xx Add-On with the required version?	Check whether the INCA ES5xx Add-On version installed on your PC meets the requirements in chapter 6.2.2 on page 25.
	Did you install the required firmware on the module?	Check with HSP whether the required firmware is installed on the module.
	Is the hardware connected to the PC?	Check whether the cabling is intact.
The measurements are not being started.	Does the INCA monitor log ask you to perform an update?	Update the firmware of the module with HSP.
	Does the module provide no data?	Check whether your measurement setup meets the requirements.
		Check whether the cabling of the hardware to the PC is correct and intact.
Data losses occur during the transmission.	Are you using WLAN in your measurement setup?	WLAN is not allowed within this ETAS network. Connect the module directly with the PC or with an active USB hub connected to the PC.

6   Technical Data

The "Technical Data" chapter contains a summary of the technical data and the terminal assignments of the ES583.1 module.

6.1   General data

6.1.1   Standards

The module meets the following standards:

Standard	Test
EN 61326-1	Electrical equipment for measurement, control and laboratory use - EMC requirements
EN 61000-6-2	Immunity (for industrial environments)
EN 60529	Degree of protection through housing (IP code)
EN 60068-2-32	Environmental testing - Part 2: Tests; Test ed: free falling

The module is designed only for use in industrial environments in accordance with EN 61000-6-4. When using the module outside of industrial environments avoid possible radio disturbances by additional shielding measures!

> ⚠ **WARNING**
>
> This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

6.1.2   Ambient conditions

|	
Operating temperature range	-40 °C to +70 °C
	-40 °F to +158 °F
Storage temperature range	-40 °C to +85 °C
	-40 °F to +185 °F
Operating altitude	max. 5,000 m / 16,400 ft
Degree of protection	IP40

6.1.3   Maintenance of the product

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

6.1.4   Cleaning the product

We recommend cleaning the product with a dry cloth.

6.1.5   Mechanical data
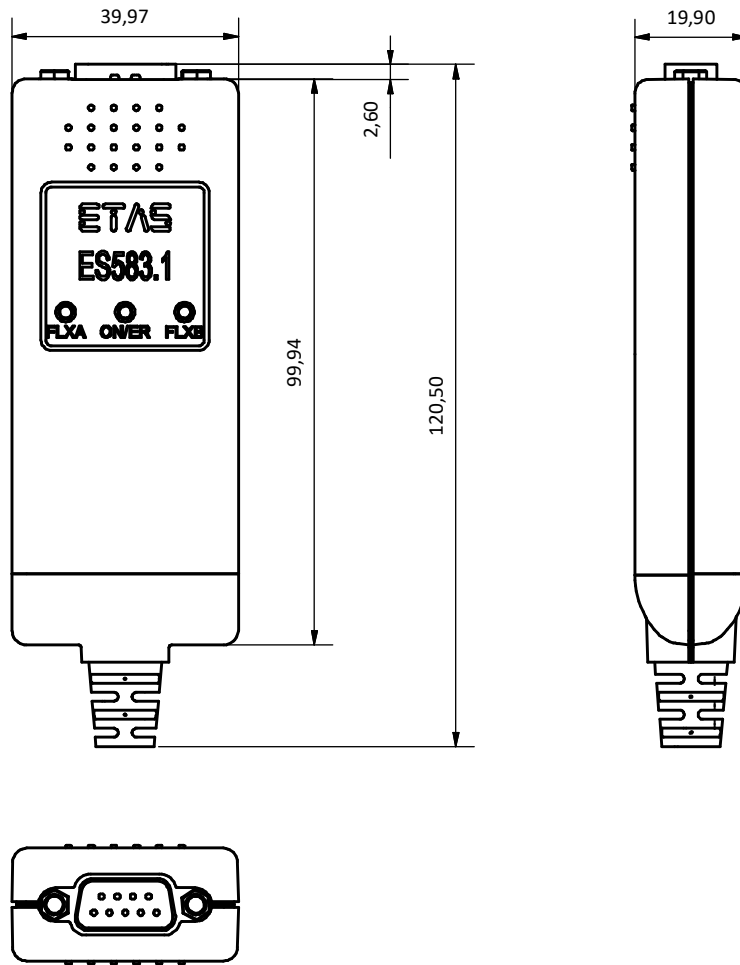
Fig. 6-1   Dimensions

Length (housing with cable)	approx. 1.5 m
Weight	120 g

6.2   System requirements

6.2.1   Hardware

PC with USB port

PC	IBM-compatible PC
USB port	USB 2.0 High Speed (480 Mbit/s)
	USB 2.0 High Power (500 mA)
	USB socket type A
Operating system	Windows Vista (32 bit)
	Windows 7 (32 bit, 64 bit)
	Windows 8.x (32 bit, 64 bit)
Driver	ES583.1 USB driver
Configuration	Plug & Play

The ES583.1 module may be operated only directly on the PC or on an active hub whose USB port meets the requirements listed in the table.

The module must be directly connected to the USB port of your PC. The use of USB-cables extending the connection between the ES583.1 and the PC is not allowed.

Operation of the module at USB 1.0 interfaces is not supported.

Prerequisite for successful initialization of the module

> **ⓘ NOTE**
>
> A specific USB driver must be installed on the PC for operating the ES583.1 module (see chapter 4.2 on page 16).

Windows user rights

Ensure that you have the required Windows user rights for installing the USB driver (administrator rights).

Additional requirements

The PC must also meet the minimum requirements of the application program used (e.g. INCA). For the minimum requirements for INCA, please see the corresponding software documentation.

General notes

The INCA application software supports up to four ES583.1 modules at the same time.

6.2.2   Software

Supported applications and software prerequisites

For the configuration of the ES583.1 as well as the control and data acquisition, you need software in the following versions (or higher):

Inter-face	Application / Protocol	Classifi-cation [1]	Support in the application software
FlexRay	XCP on FlexRay	MC [1]	INCA V7.1.4 SP4 [3], [4]
	FlexRay Monitoring	MC [1]	INCA V7.1.4 SP4 [3], [4]
	UDS on FlexRay	D [2]	INCA V7.1.4 SP4 [3], [4]

[1]: MC: Measurement and Calibration
[2]: Diagnostic
[3]: additionally INCA-ES5xx Add-On V7.1.4 and higher
[4]: additionally INCA-FlexRay Add-On V7.1.4 and higher

General

- HSP V10.4.1
- ES583.1 USB driver

Supported software interfaces

ETAS provides the Software Development Kit "ECU Bus Interfaces and Integration - Package" (EBI-IP). Using this SDK, customers can develop drivers for the hardware access to integrate the ES583.1 module in their own application software.

> **ⓘ NOTE**
>
> Operating the ES583.1 with older software versions is not possible.

6.3   Electrical data

6.3.1   Voltage supply

Operating voltage	4.5 V to 5.5 V DC
	Supply via the USB port (see chapter 6.2.1 on page 24)
Current consumption, typ. (operation)	300 mA at 5.0 V DC

6.3.2   FlexRay interface (FLX1 and FLX2)

Designation and mapping of FlexRay channels

FLX1	FlexRay channel A
FLX2	FlexRay channel B

FlexRay Controller

Communication controller	Bosch E-Ray
Number of nodes/channels	1 node with 2 channels
FlexRay specification	FlexRay protocol V2.1 Rev. A
FlexRay conformance test	In accordance with ISO 9646
Payload	max. 254 bytes
Hardware-based filtering	Slot counter, Cycle counter and channel

Physical layer

Transceiver	Philips TJA 1080A
Termination	100 ohm
Transmission speed, max.	10 Mbaud / channel

Other

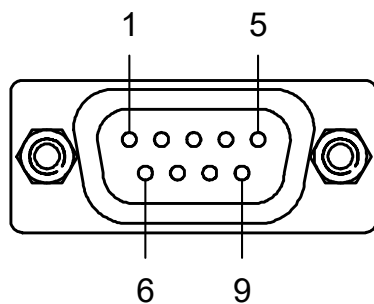|	
Boot time	< 1 s
Timestamp	1 µs 64 bit

Electrical isolation

Electrical isolation	FlexRay interface electrically isolated from the USB port; no electrical decoupling between the FlexRay channels

6.4   Terminal assignment

> **ⓘ NOTE**
>
> All connections are represented with view onto the interfaces of the module.

Fig. 6-2   FlexRay "FLX1/ FLX2" plug connector

Pin	Signal	Meaning
1	NC	Not connected
2	FLX1 B-minus	FlexRay 1 (channel A), bus minus
3	GND	Ground
4	FLX2 B-minus	FlexRay 2 (channel B), bus minus
5	GND	Ground
6	NC	Not connected
7	FLX1 B-plus	FlexRay 1 (channel A), bus plus
8	FLX2 B-plus	FlexRay 2 (channel B), bus plus
9	NC	Not connected

A 9-pin DSUB plug is connected to the "FLX1/ FLX2" socket.

7   Cables and Accessories

7.1   Cable CBF100
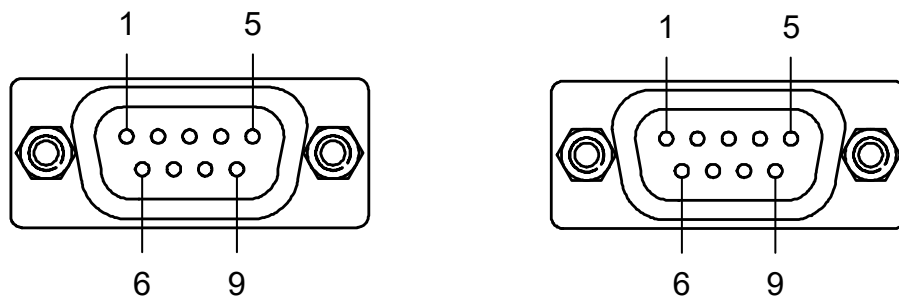

Fig. 7-1   Cable CBCF100.1

Fig. 7-2   Cable CBCF100: DSUB plug "1" and "2"

Mapping of DSUB socket-plug combinations of the cable

The 9-pin DSUB socket of the CBCF100 cable is connected to the FLX1/FLX2 interface of the ES583.1 module. The other end of the CBCF100 cable features two 9-pin DSUB plug connectors:

- a DSUB plug connector (side A) marked with "1" for connection to the FlexRay channel FLX1 (channel A)
- a DSUB plug connector (side B) marked with "2" for connection to the FlexRay channel FLX2 (channel B)

Mapping of DSUB plug connectors "1" and "2" to the ES583.1

If a CBF100 cable is used at the FLX1/FLX2 interface of the ES583.1, these interfaces are mapped as follows to the DSUB plug connectors "1" and "2" of the cable:

| ES583.1	CBCF100 cable in Fig. 7-1	
Connection	Plug connector "1"	Plug connector "2"
FLX1/FLX2	FLX1	FLX2

Pin assignments of the cable at the FLX1/FLX2 interface

The signals of the FLX1/FLX2 interface of the ES583.1 are assigned as follows to the DSUB plug connectors "1" and "2" of the CBCF100 cable:

DSUB socket [ES583.1 connection]			DSUB plug connector "1" [FLX1]	
Pin	Signal		Pin	Signal
1	NC		1	NC
2	FLX1 B-minus		2	FLX1 B-minus
3	GND		3	GND
4	FLX2 B-minus		4	N.C.
5	GND		5	N.C.
6	NC		6	GND2
7	FLX1 B-plus		7	FLX1 B-plus
8	FLX2 B-plus		8	NC
9	NC		9	NC
Housing	Shield		Housing	Shield

DSUB plug connector "2" [FLX2]	
Pin	Signal
1	NC
2	FLX2 B-minus
3	GND
4	NC
5	NC
6	GND
7	FLX2 B-plus
8	NC
9	NC
Housing	Shield

Order name	Short name	Order number
CAN and FlexRay Interface Y-Cable, DSUB – 2 x DSUB (9fc-9mc+9mc), 0m3	CBCF100.1-0m3	F 00K 107 939

7.2   FlexRay termination resistor
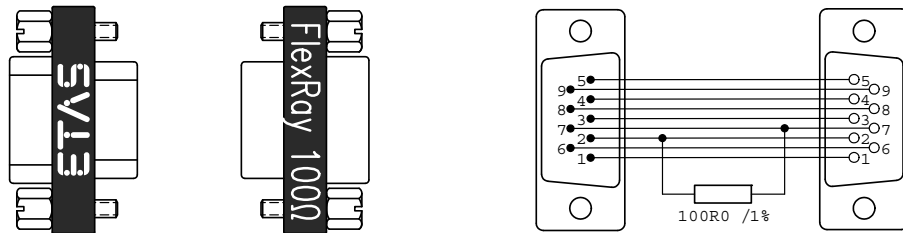
Fig. 7-3   Termination resistor CBFX131-0

Order name	Short name	Order number
FlexRay termination resistor 100 ohm, 2xDSUB (9fc-9mc), 0 m	CBFX131-0	F 00K 104 689

8   Order Information

8.1   ES583.1

Order name	Short name	Order number
ES583.1 FlexRay Bus Interface USB Module	ES583.1	F 00K 107 805
Package Contents		
ES583.1 FlexRay Bus Interface USB Module (2 channels), including CD-ROM ES583.1_CD (CD with drivers and manuals for ES583.1)		

> ### 🛈 NOTE
>
> Cables are not part of the package contents of the module and must be ordered separately (see chapter 8.2.1 on page 31).

8.2   Accessories

8.2.1   FlexRay interface cable

Order name	Short name	Order number
CAN and FlexRay Interface Y-Cable, DSUB – 2 x DSUB (9fc-9mc+9mc), 0m3	CBCF100.1-0m3	F 00K 107 939

8.2.2   FlexRay termination resistor

Order name	Short name	Order number
FlexRay termination resistor 100 ohm, 2xDSUB (9fc-9mc), 0 m	CBFX131-0	F 00K 104 689

9   Contact Information

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Figures

Index