

PCAN-USB X6

CAN FD Interface
for High-Speed USB 2.0

User Manual



Document version 1.3.0 (2019-03-05)



Relevant products

Product name	Model	Part number
PCAN-USB X6 with D-Sub connectors	Red corners	IPEH-004062
PCAN-USB X6 with D-Sub connectors galv. Isolated	Gray corners	IPEH-004064
PCAN-USB X6 with M12 circular connectors galv. Isolated	Gray corners	IPEH-004063

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1 Introduction

The PCAN-USB X6 is a CAN FD adapter for the USB port which allows the connection of up to 6 CAN FD or CAN buses. The device is therefore best suited for working with multiple CAN networks like the use in test benches with hardware-in-the-loop (HIL) simulations for motor vehicles or in the product line testing of CAN-based products.

The PCAN-USB X6 is installed in an aluminum profile casing and is shipped in versions with D-Sub connectors or M12 circular connectors. Especially the M12 version is suitable for use in harsh environments. In addition, a galvanic isolation of up to 300 Volts between the PC and the CAN side is guaranteed for the decoupled versions.

The new CAN FD standard (CAN with Flexible Data rate) is primarily characterized by higher bandwidth for data transfer. The maximum of 64 data bytes per CAN FD frame (instead of 8 so far) can be transmitted with bit rates up to 12 Mbit/s. CAN FD is downward-compatible to the CAN 2.0 A/B standard, thus CAN FD nodes can be used in existing CAN networks. However, in this case the CAN FD extensions are not applicable.

The monitor software PCAN-View and the programming interface PCAN-Basic for the development of applications with CAN connection are included in the scope of supply and support the new standard CAN FD.




Tip: At the end of this manual (Appendix C) you can find a Quick Reference with brief information about the installation and operation of the PCAN-USB X6 adapter.

1.1 Properties at a Glance


- └ Adapter for High-speed USB 2.0
(compatible to USB 1.1 and USB 3.0)
- └ 6 High-speed CAN channels (ISO 11898-2)
- └ Galvanic isolation on the CAN connection up to 300 V
(only for IPEH-004063 and IPEH-004064)
- └ Complies with CAN specifications 2.0 A/B and FD
- └ CAN FD support for ISO and Non-ISO standard switchable
- └ CAN FD bit rates for the data field (64 bytes max.) from 25 kbit/s
up to 12 Mbit/s
- └ CAN bit rates from 25 kbit/s up to 1 Mbit/s
- └ Time stamp resolution 1 μ s
- └ FPGA implementation of the CAN FD controller
- └ NXP TJA1044GT CAN transceiver
- └ Status LEDs for CAN channels, USB upstream, and power
supply
- └ CAN connection via D-Sub, 9-pin or M12 circular connectors,
5 pin (pin assignment of both connectors in accordance with
CiA[®] 303-1)
- └ Aluminum casing with increased Ingress Protection IP64
(only for IPEH-004063)
- └ High-speed USB 2.0 downstream port
- └ CAN termination can be activated through a solder jumper,
separately for each CAN channel
- └ Measurement of bus load including error frames and overload
frames on the physical bus
- └ Induced error generation for incoming and outgoing CAN
messages

- Voltage supply from 8 to 30 V
- Extended operating temperature range from -40 to 85 °C (-40 to 185 °F)

 **Note:** This manual describes the use of PCAN-USB X6 adapter with **Windows**. You can find device drivers for **Linux** and the corresponding application information on the provided DVD in the directory branch `Develop` and on our website under www.peak-system.com/linux.

1.2 System Requirements

- Power supply in the range of 8 to 30 V DC
- A vacant USB port (USB 1.1, USB 2.0 or USB 3.0) at the computer or at a self-powered USB hub connected to the computer
- Operating system Windows 10, 8.1, 7 (32/64-bit) or Linux (32/64-bit)

 **Note:** Do not use a USB extension cable to connect the PCAN-USB X6 adapter to the computer. The use of an extension cable does not comply with the USB specification and can lead to malfunction of the adapter.

1.3 Scope of supply

- PCAN-USB X6 in aluminum casing
- IPEH-004062 and IPEH-004063: Mating connector for power supply
- IPEH-004063: Cables for power supply and USB connection
- Device drivers for Windows 10, 8.1, 7 and Linux (32/64-bit)
- CAN monitor PCAN-View for Windows

- └ Programming interface PCAN-Basic for developing applications with CAN connection
- └ Programming interfaces for standardized protocols from the automotive sector
- └ Manual in PDF format





Note: The scope of supply does not contain a power supply unit for the device. There is no supply via the USB connection to the PC.

2 Installing the Software and the Adapter

This chapter covers the software setup for the PCAN-USB X6 adapter under Windows and its connection to the computer.

Install the driver before you connect the adapter to the computer.

 **Important note:** For the correct operation and full scope of service of the PCAN-USB X6, install the driver from the supplied DVD (from edition 10/2016).

 Do the following to install the driver:

1. Start `Intro.exe` from the supplied DVD.

The navigation program starts.

2. Select in the main menu **Drivers** and click on **Install now**.

3. Confirm the message of the User Account Control related to "Installer database of PEAK Drivers".

The driver setup starts.

4. Follow the program instructions.

 Do the following to connect the adapter:

1. Connect the adapter to a USB port of the computer or of a connected USB hub.

Windows detects the new hardware and completes the driver installation.

2. Check the LEDs of the CAN channels on the adapter. If the LEDs are green, then the driver was initialized successfully.



Note: Do not use a USB extension cable to connect the PCAN-USB X6 adapter to the computer. The use of an extension cable does not comply with the USB specification and can lead to malfunction of the adapter.

3 Connectors

This chapter describes the connectors on the front side of the PCAN-USB X6 with D-Sub connectors and the PCAN-USB X6 with M12 circular connectors.

3.1 PCAN-USB X6 with D-Sub Connectors

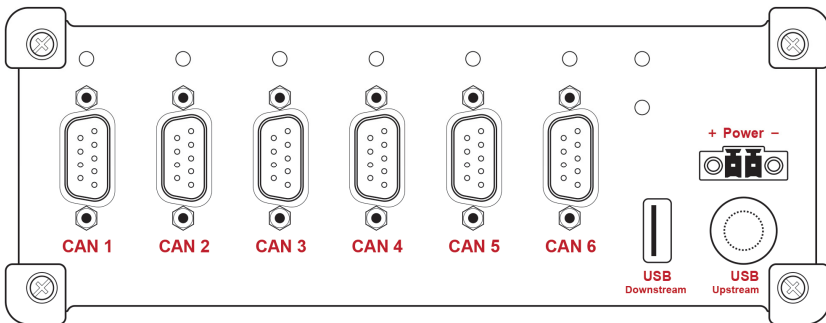


Figure 1: Connectors on the front side of the PCAN-USB X6 with D-Sub connectors

3.1.1 CAN Connection over D-Sub Connectors

A High-speed CAN bus (ISO 11898-2) is connected to the 9-pin D-Sub connector. The pin assignment for CAN corresponds to the specification CiA® 303-1.

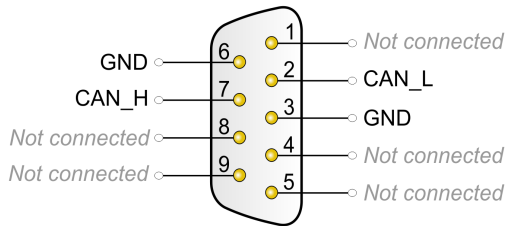


Figure 2: Pin assignment High-speed CAN
(view onto D-Sub connector of the PCAN-USB X6 adapter)

3.1.2 High-speed USB 2.0 Upstream

The USB upstream port is used to connect to a computer. This connection allows the linking of the PCAN-USB X6 to programs like PCAN-View.

Note: During a High-speed USB connection (USB 2.0) with a computer, the LED of the upstream port lights. In case of a Full-speed USB connection (USB 1.1), the LED remains off.

3.1.3 High-speed USB 2.0 Downstream

The USB downstream port is used to connect other USB devices to a computer.

Note: The connection of a further PCAN-USB X6 via the USB downstream port is not intended.

3.1.4 Power Supply over Mating Connector

The operation of the PCAN-USB X6 with D-Sub connectors requires a voltage source with a nominal 12 V direct current voltage, 8 to 30 V are possible. The input is electronically protected against reverse polarity and overvoltage.

The connection is done with the supplied mating connector, where you can fasten wires. The polarity is as follows:

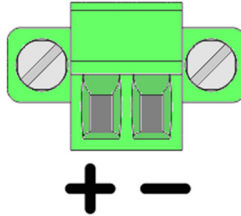



Figure 3: Mating connector for power supply on the front side of the case

 **Note:** The scope of supply does not contain a power supply unit for the device. There is no supply via the USB connection to the PC.

3.2 PCAN-USB X6 with M12 Connectors

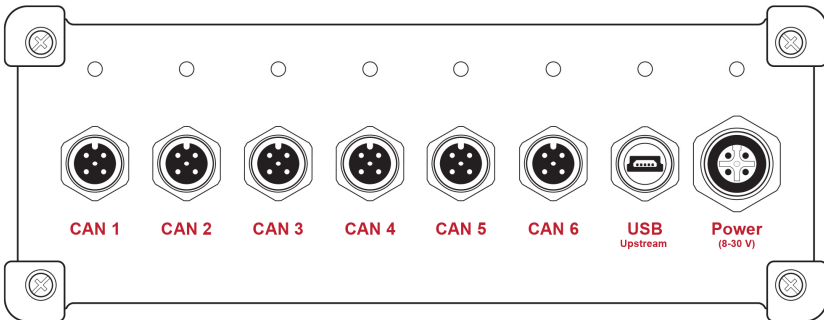


Figure 4: Connectors on the front side of the PCAN-USB X6 with M12 circular connectors

3.2.1 CAN Connection over M12 Connectors

A High-speed CAN bus (ISO 11898-2) is connected to the 5-pin M12 circular connector. The pin assignment for CAN corresponds to the specification CiA® 303-1.

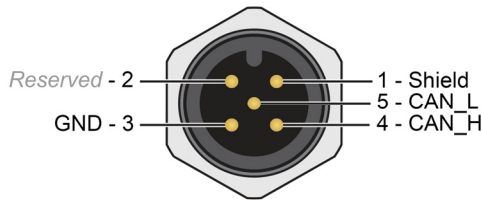


Figure 5: Pin assignment High-speed CAN
(view onto M12 connector of the PCAN-USB X6 adapter)

Note: A full occupancy (CAN 1 to 6) is only possible with 14.5 mm connector housings. For larger connector housings, not all CAN connectors can be used simultaneously.

3.2.2 High-speed USB 2.0 Upstream

The USB upstream port is used to connect to a computer. This connection allows the linking of the PCAN-USB X6 to programs like PCAN-View.

Note: During a High-speed USB connection (USB 2.0) with a computer, the LED of the upstream port lights. In case of a Full-speed USB connection (USB 1.1), the LED remains off.

3.2.3 Power Supply over M12 Circular Connector

The operation of the PCAN-USB X6 with M12 circular connectors requires a voltage source with a nominal 12 V direct current voltage, 8 to 30 V are possible. The input is electronically protected against reverse polarity and overvoltage.

The polarity of the female connector is as follows:

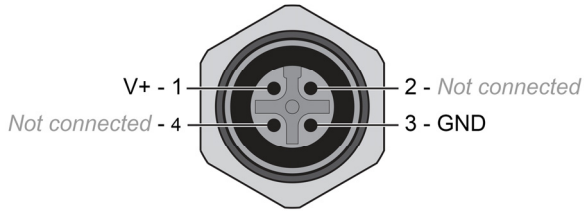
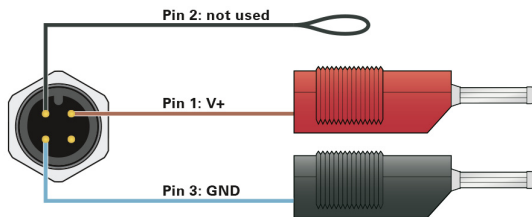


Figure 6: Power supply on the front side of the case
(view onto a female M12 connector of the PCAN-USB X6 adapter)

The connection is done with the supplied cable:



Note: The scope of supply does not contain a power supply unit for the device. There is no supply via the USB connection to the PC.

3.3 Activating the Internal Termination

The internal termination can be activated for each CAN channel by solder jumpers on the board, to terminate one end of the CAN bus with 120 Ohms. A High-speed CAN bus (ISO 11898-2) must be terminated on both ends with 120 Ohms. Otherwise, disturbances may arise. At delivery the termination is not activated.

▶ Do the following to activate the internal termination:



Risk of short circuit! Solder with great care to avoid unwanted short circuits on the card.



Attention! Electrostatic discharge (ESD) can damage or destroy components on the card. Take precautions to avoid ESD.

1. Loosen the four Torx screws of the front panel of the case.
2. Remove the front panel.
3. Pull out the board carefully.
4. Remove the transceiver module(s) to reach the desired solder field(s). Loosen the screw and pull off the transceiver module.

Figure 7 shows the position of the transceiver modules.

5. Set the solder bridge(s) according to the desired settings.

Figure 7 shows the position of the solder field(s).

The following table contains the possible settings.

6. Plug the transceiver module(s) back to their initial position and fasten the module(s) with the removed screw.
7. Insert the board carefully back into the case.
8. Press the front panel at the front of the casing.
9. Screw the four Torx screws back into the front panel.

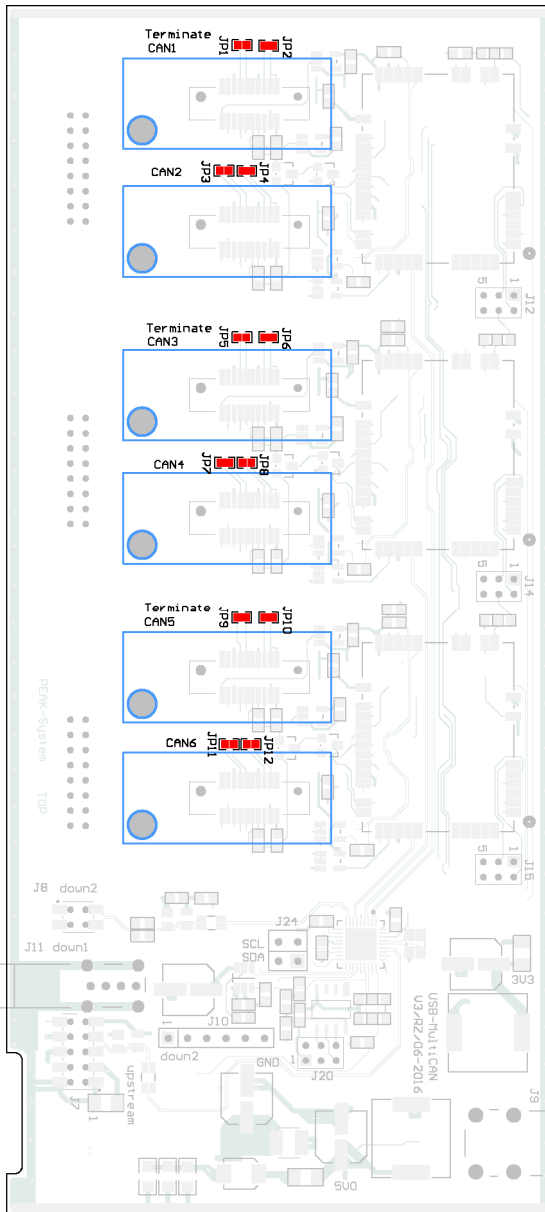


Figure 7: Top view on the solder fields (red) and transceiver modules (blue) of the PCAN-USB X6 mainboard

Solder fields:

- CAN1: JP1, JP2
- CAN2: JP3, JP4
- CAN3: JP5, JP6
- CAN4: JP7, JP8
- CAN5: JP9, JP10
- CAN6: JP11, JP12

D-Sub /M12 connectors	Solder fields	Internal termination	
		Without (standard)	Active
CAN 1	JP1 and JP2		
CAN 2	JP3 and JP4		
CAN 3	JP5 and JP6		
CAN 4	JP7 and JP8		
CAN 5	JP9 and JP10		
CAN 6	JP11 and JP12		

3.4 Cabling

3.4.1 Termination

The High-speed CAN bus (ISO 11898-2) must be terminated with 120 ohms on both ends. The termination prevents interfering signal reflections and ensures the proper operation of the transceivers of the connected CAN nodes (CAN interfaces, control devices).

The PCAN-USB X6 adapter has an optional internal termination with 120 ohms. How you activate the internal termination, see chapter 3.3.

3.4.2 Example of a Connection

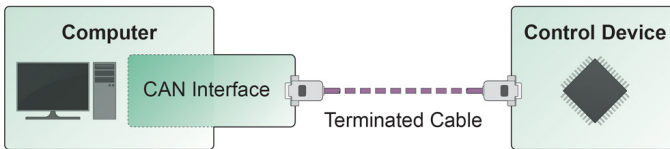


Figure 8: Simple CAN connection

This example shows a connection between the PCAN-USB X6 adapter and a control unit. The connection cable is terminated with 120 ohms on both ends.


3.4.3 Maximum Bus Length

High-Speed CAN networks may have bit rates of up to 1 Mbit/s. The maximum bus length depends primarily on the bit rate.

The following table shows the maximum possible CAN bus length at different bit rates:

Bit rate	Bus length
1 Mbit/s	40 m
500 kbit/s	110 m
250 kbit/s	240 m
125 kbit/s	500 m
50 kbit/s	1.3 km
25 kbit/s	2.5 km

The listed values have been calculated on the basis of an idealized system and can differ from reality.

 **Note:** Despite the higher data bit rate of CAN FD, the maximum bus lengths remain the same.

The dependency is based on the bit rate during the arbitration, called nominal bit rate. The nominal bite rate at CAN FD can be up to 1 Mbit/s.

4 Operation

4.1 Status LEDs

4.1.1 CAN channels

The status LEDs of the six CAN channels of the PCAN-USB X6 can be in one of the following conditions:

Status	Meaning
Green on	There's a connection to a driver of the operating system.
Green slow blinking	A software application is connected to the CAN channel.
Green quick blinking	Data is transmitted via the connected CAN bus.
Red blinking	An error is occurring during the transmission of CAN data.
Orange quick blinking	Identification of a channel when multiple adapters are plugged (see chapter 5.1.3 page 28).

4.1.2 USB Upstream

The status LED of the USB upstream of the PCAN-USB X6 can be in one of the following conditions:

Status	Meaning
Green on	A power supply and a connection via the USB upstream exist. The device is ready for use.
Orange on	There is only a connection via the USB upstream. The device is <u>not</u> ready for use.



Note: The status LED of the USB upstream is only lit, when it is connected to a USB 2.0 port or higher.

4.1.3 Power Supply

The status LED of the power supply can be in the following condition:

Status	Meaning
Green on	A power supply is connected.

4.2 Unplugging the USB Connection

On Windows, the icon for removing hardware safely is not used with the PCAN-USB X6 adapter. You can unplug the adapter from the computer without any preparation.

4.3 Distinguishing Several PCAN-USB X6 Adapters

You can operate several PCAN-USB X6 adapters on a single computer at the same time. The supplied program PCAN-View allows the assignment of device IDs in order to distinguish the adapters in a software environment. For more information, see section 5.1.3.

5 software and API

This chapter covers the provided software PCAN-View and the programming interface PCAN-Basic.

5.1 Monitor Software PCAN-View

PCAN-View is a simple Windows software for viewing, transmitting, and logging CAN and CAN FD messages.



Note: This chapter describes the use of PCAN-View with a CAN-FD adapter.

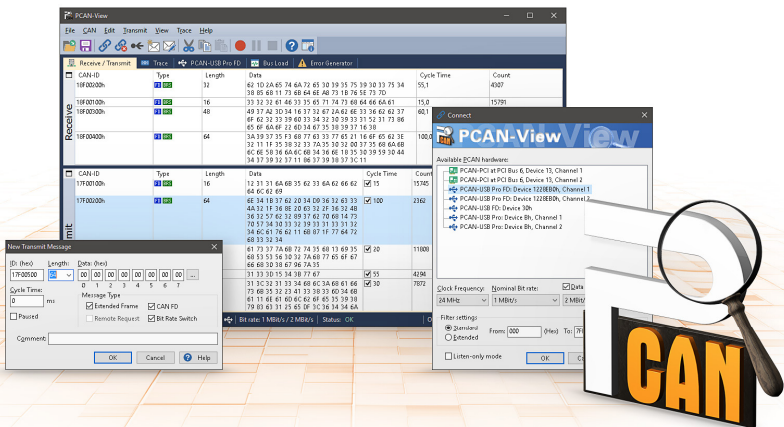


Figure 9: PCAN-View for Windows

▶ Do the following to start and initialize PCAN-View:

1. Open the Windows Start menu and select **PCAN-View**.

The **Connect** dialog box appears.

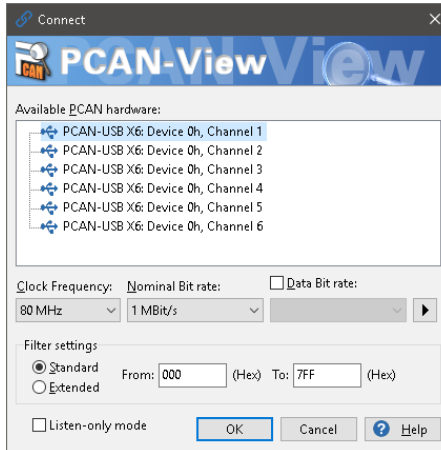


Figure 10: Selection of the specific hardware and parameters

2. Select an interface from the list.
3. From the drop-down menu, choose a **Clock Frequency**. The selectable bit rates in the following are based on this setting.
4. From the drop-down list, select a **Nominal Bit rate**, which is used for the arbitration phase (max. 1Mbit/s).
5. Enable the **Data Bit rate** checkbox.
6. From the drop-down menu, choose an additional **Data Bit rate** for the CAN FD bus. The bit rate selected here is used to transfer the data fields of a CAN FD frame with a higher bit rate.



Note: Both transmission rates must match those which are used by all nodes on the CAN bus.



Tip: You can create custom bit rates by using the button (▶).

7. Under **Filter settings** you can limit the range of CAN IDs to be received, either for standard frames (11-bit IDs) or for extended frames (29-bit IDs).
8. Activate the **Listen-only mode** if you do not actively participate in the CAN traffic and just want to observe. This also avoids an unintended disruption of an unknown CAN environment (e.g. due to different bit rates).
9. Confirm the settings in the dialog box with **OK**. The main window of PCAN-View appears (see 5.1.1).

5.1.1 Receive/Transmit Tab

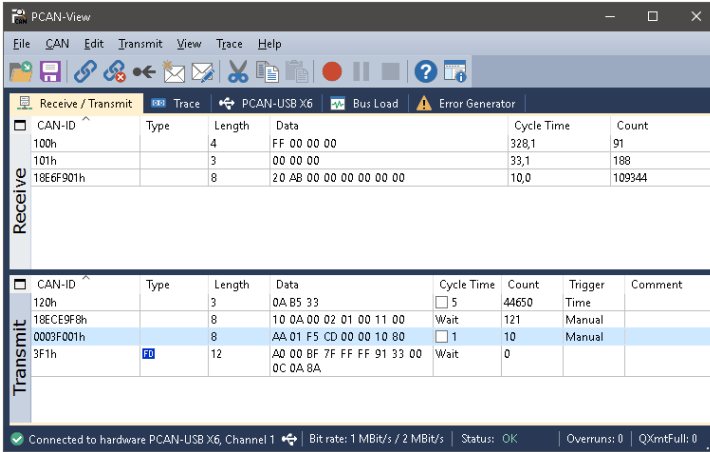


Figure 11: Receive/Transmit tab

The **Receive/Transmit** tab is the main element of PCAN-View. It contains two lists, one for received messages and one for the transmit messages. The CAN data format is hexadecimal by default.

▶ Do the following to transmit a CAN FD message:

1. Select the menu command **Transmit > New Message** (alternatively or **Ins**).

The **New Transmit Message** dialog box appears.

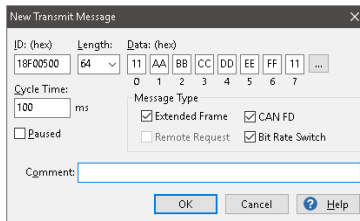


Figure 12: Dialog box new transmit message

2. Enable the **CAN FD** checkbox to define a CAN FD message with maximum **Length** of 64 data bytes.
3. Enter the **ID**, the data **Length** and the CAN message **Data**. With a length of more than 8 bytes, click on and enter the data bytes into the editor.



Note: With the program version 4 of PCAN-View, the DLC field was renamed to **Length**. Latter reflects the actual data length.

4. Enter a value into the **Cycle Time** field to choose manually or periodically message transmission. Enter a value greater than 0 to transmit periodically. Enter the value 0 to transmit only manually.
5. Enable the **Bit Rate Switch** checkbox, that the data of a CAN FD message is transmitted with the selected **Data Bit rate**.
6. Confirm the entries with **OK**.
The created transmit message appears on the **Receive/Transmit** tab.
7. Trigger selected transmit messages manually with the menu command **Transmit > Send** (alternatively bar). The manual transmission for messages being transmitted periodically is carried out additionally.



Tip: Under the menu command **File > Save**, you can save the current transmit messages into a transmit list. Saved transmit lists are available for reuse.

5.1.2 Trace Tab

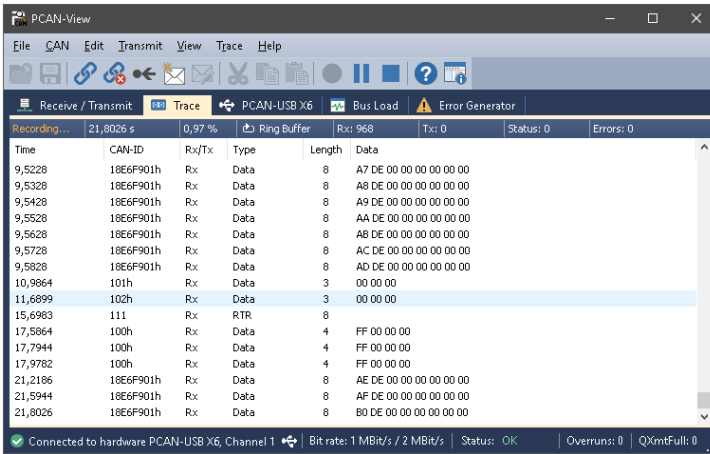


Figure 13: Trace tab

On the **Trace** tab, the data tracer (data logger) of PCAN-View is used for logging the communication on a CAN bus. During this process the messages are cached in the working memory of the PC. Afterwards, they can be saved to a file.

The Tracer runs either in linear or in ring buffer mode. The linear buffer mode stops the Tracer as soon as the buffer is full. The ring buffer mode overwrites the oldest messages by new ones as soon as the buffer is full.

5.1.3 PCAN-USB X6 Tab

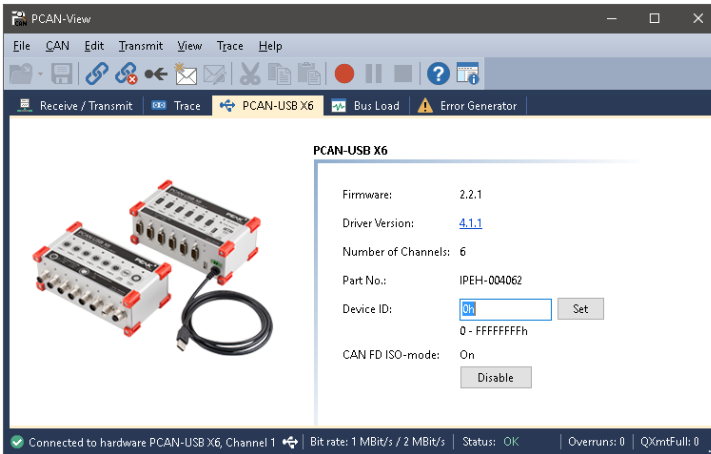


Figure 14: PCAN-USB X6 tab

The **PCAN-USB X6** tab contains some detailed information about the hardware like the current driver version.

In addition, you can assign a **Device ID** to the adapter. Thus, it can be uniquely identified while operating several USB adapters of PEAK-System on a computer at the same time.

To identify a PCAN-USB X6 adapter, you first go to the dialog box for selecting the hardware of PCAN-View (Figure 10 on page 23). In the list **Available PCAN hardware** and **PCAN-nets**, you can perform a right-click on every USB adapter and execute the command **identify**. Thereby, the LED of the corresponding adapter flashes shortly.

CAN FD ISO-mode

The defined ISO 11898-1 standard is not compatible with the former protocol. PEAK-System takes this into account by supporting both protocol versions with their CAN FD interfaces.

Over the **Enable / Disable** button, you can switch to the CAN FD protocol (**Non-ISO** and **ISO**) used in the environment.

5.1.4 Bus Load Tab

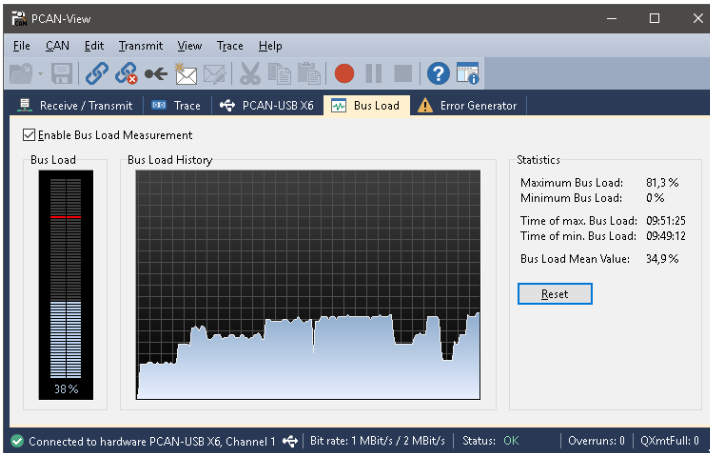


Figure 15: Bus Load tab

On the **Bus Load** tab, the current bus load, time course, and statistical information of the CAN channel are displayed. The CAN bus load reflects the utilization of transmission capacity.

5.1.5 Error Generator Tab

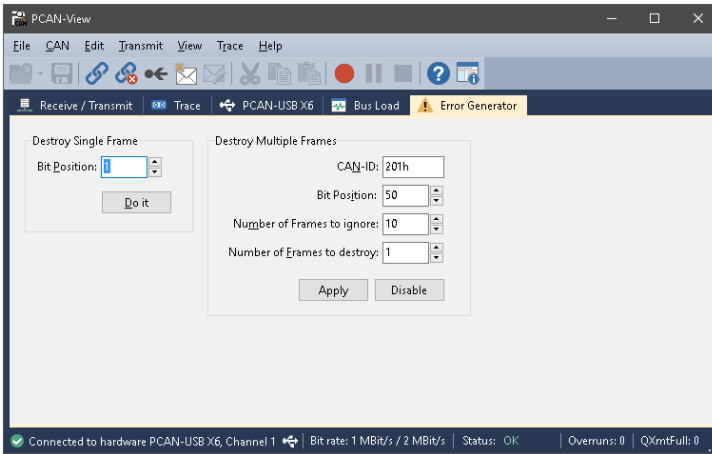


Figure 16: Error Generator tab

On the **Error Generator** tab, the communication on the CAN bus can be disturbed for testing purposes by 6 consecutive dominant bits. This is a violation of the CAN protocol on the CAN bus which must be recognized as an error by the connected CAN nodes.

You can destroy CAN frames with the error generator by one of two methods:

- once after activation
- repeatedly at specific intervals related to a CAN ID

The **Destroy Single Frame** area refers to the next CAN frame that is recognized by the adapter after activation.

▶ Do the following to destroy a single CAN frame:

1. Enter the **Bit Position** where in the CAN frame the error is to be generated. The count includes the stuff bits.
2. Execute the destroy action with **Do it**.

The next received or transmitted CAN frame will be destroyed at the selected bit position.

The **Destroy Multiple Frames** area refers to a CAN ID whose frames are to be destroyed in specific intervals.

▶ Do the following to destroy multiple CAN frames:

1. Enter the **CAN ID** of the frame to be destroyed.
2. Enter the **Bit Position** where in the CAN frame the error is to be generated. The count includes the stuff bits.
3. The **Number of Frames to ignore** field specifies the number of CAN frames with the given ID that are ignored before a frame is destroyed.
4. The **Number of Frames to destroy** field specifies the number of CAN frames with the given ID that are destroyed consecutively.
5. Confirm the entries with **Apply** to activate the error generator.
6. Stop destroying further CAN frames with **Disable**.

5.1.6 Status Bar



Figure 17: Display of the status bar

The status bar shows information about the current CAN connection, about error counters (Overruns, QXmtFull) and shows error messages.

You can find further information about the use of PCAN-View in the help which you can invoke in the program via the **Help** menu or with the **F1** key.

5.2 Linking Own Programs with PCAN-Basic Version 4 or Higher

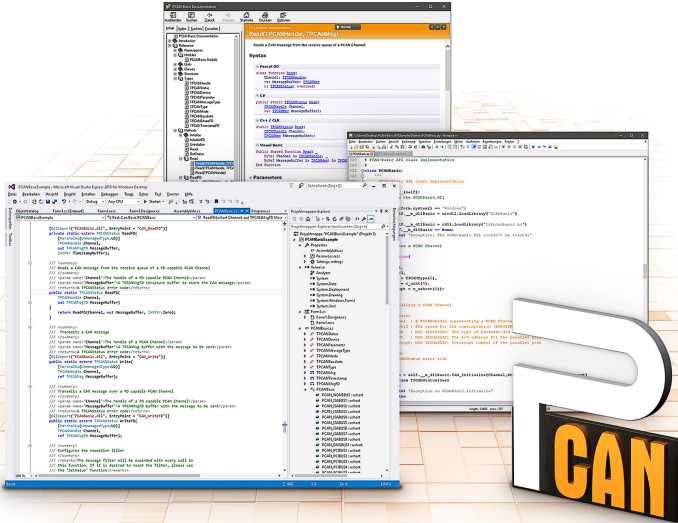


Figure 18: PCAN-Basic

On the provided DVD, you can find files of the PCAN-Basic programming interface in the directory branch `Develop`. This API provides basic functions for linking own programs to CAN and CAN FD interfaces by PEAK-System and can be used for the following operating systems:

- └ Windows 10, 8.1, 7 (32/64-bit)
- └ Windows CE 6.x (x86/ARMv4)
- └ Linux (32/64-bit)

The API is designed for cross-platform use. Therefore, software projects can easily be ported between platforms with low efforts. For all common programming languages, examples are available.

Beginning with version 4, PCAN-Basic supports the new CAN FD standard (CAN with Flexible Data Rate) which is primarily characterized by higher bandwidth for data transfer.

5.2.1 Features of PCAN-Basic

- └ API for developing applications with CAN and CAN FD connection
- └ Access to the CAN channels of a PCAN-Gateway via the new PCAN-LAN device type
- └ Supports the operating systems Windows 10, 8.1, 7 (32/64-bit), Windows CE 6.x, and Linux (32/64-bit)
- └ Multiple PEAK-System applications and your own can be operated on a physical channel at the same time
- └ Use of a single DLL for all supported hardware types
- └ Use of up to 16 channels for each hardware unit (depending on the PEAK CAN interface used)
- └ Simple switching between the channels of a PEAK CAN interface
- └ Driver-internal buffer for 32,768 messages per CAN channel
- └ Precision of time stamps on received messages up to 1 μ s (depending on the PEAK CAN interface used)
- └ Supports PEAK-System's trace formats version 1.1 and 2.0 (for CAN FD applications)
- └ Access to specific hardware parameters, such as listen-only mode
- └ Notification of the application through Windows events when a message is received

- └ Extended system for debugging operations
- └ Multilingual debugging output
- └ Output language depends on operating systems
- └ Debugging information can be defined individually
- └ Thread-safe API



Tip: An overview of the API functions is located in the header files. You can find detailed information about the PCAN-Basic API on the provided DVD in the text and help files (file name extensions `.txt` and `.chm`).

5.2.2 Principle Description of the API

The PCAN-Basic API is the interface between the user application and device driver. In Windows operating systems this is a DLL (Dynamic Link Library).

The sequence of accessing the CAN interface is divided into three phases:

1. Initialization
2. Interaction
3. Completion

Initialization

A channel must be initialized before using it. This is done by the simple call of the function `CAN_Initialize` for CAN and `CAN_InitializeFD` for CAN FD. Depending on the type of the CAN hardware, up to 16 CAN channels can be opened at the same time. After a successful initialization, the CAN channel is ready. No further configuration steps are required.

Interaction

For receiving and transmitting messages, the functions `CAN_Read` and `CAN_Write` as well as `CAN_ReadFD` and `CAN_WriteFD` are available.

Additional settings can be made, e.g. setting up message filters for specific CAN IDs or the listen-only mode for the CAN controller.

When receiving CAN messages, events are used for an automatic notification of an application (client). This offers the following advantages:

- └ The application no longer needs to check for received messages periodically (no polling).
- └ The response time at reception is reduced.

Completion

To end the communication, the function `CAN_Uninitialize` is called in order to release the reserved resources for the CAN channel, among others. In addition the CAN channel is marked as "Free" and is available to other applications.

5.2.3 Notes about the License

Device drivers, the interface DLL, and further files needed for linking are property of the PEAK-System Technik GmbH and may be used only in connection with a hardware component purchased from PEAK-System or one of its partners. If a CAN hardware component of third-party suppliers should be compatible to one of PEAK-System, then you are not allowed to use or to pass on the driver software of PEAK-System.

If a third-party supplier develops software based on the PCAN-Basic and problems occur during the use of this software, consult the software provider.

6 Technical specifications

Connectors (IPEH-004062 and IPEH-004064)

CAN	6 x D-Sub (m), 9 pins Pin assignment according to specification CiA® 303-1 Galvanic isolation up to 300 V (only IPEH-004064)
USB upstream	USB plug type A High-speed USB 2.0 upstream (compatible with USB 1.1 and USB 3.0)
USB downstream	USB port type A High-speed USB 2.0 downstream (compatible with USB 1.1 and USB 3.0) max. current output 500 mA
Power	Phoenix mating connector, 2-pole, pitch 3,81 mm (Phoenix Contact MC1,5/2-STF-3.81 – 1827703)

Connectors (IPEH-004063)

CAN	6 x M12 (m) circular connectors, 5 pins Pin assignment according to specification CiA® 303-1 Connection distance requires 14.5 mm connector housings Galvanic isolation up to 300 V
USB upstream	Phoenix M12 Mini-B USB port High-speed USB 2.0 upstream (compatible with USB 1.1 and USB 3.0)
Power	Phoenix M12 connector, 4-pole, a-coded

CAN

Protocols	CAN FD ISO 11898-1:2015, CAN FD non-ISO, CAN 2.0 A/B
Physical transmission	ISO 11898-2 (High-speed CAN)
CAN bit rates	25 kbit/s - 1 Mbit/s
CAN FD bit rates	25 kbit/s - 12 Mbit/s
Controller	FPGA implementation
Time stamp resolution	1 μ s
Transceiver	NXP TJA1044GT
Internal termination	via solder bridges, disabled at delivery

Power supply

Supply voltage	12 V DC, 8 up to 30 V DC possible
Power consumption	without USB device on the USB downstream: max. 350 mA at 12 V DC via power supply connector, 0 mA via USB upstream

Environment

Operating temperature	-40 - 85 °C (-40 - 185 °F)
Temperature for storage and transport	-40 - 100 °C (-40 - 212 °F)
Relative humidity	15 - 90 %, not condensing
Ingress protection (IEC 60529)	IP20 for IPEH-004062 and IPEH-004064 IP64 for IPEH-004063

Measures

Size (w/o cable)	170 x 93 x 65 mm (see also Dimension Drawings on page 39)
Weight (w/o cable)	550 g
USB upstream cable length	1,5 m (IPEH-004062 and IPEH-004064) 2 m (IPEH-004063)
Power supply cable length (only IPEH-004063)	5 m

Conformity

EMV	Directive 2014/30/EU DIN EN 55024:2016-05 DIN EN 55032:2016-02
RoHS 2	Directive 2011/65/EU DIN EN 50581 VDE 0042-12:2013-02


Appendix A CE Certificate

EU Declaration of Conformity



This declaration applies to the following product:

Product name: PCAN-USB X6
Item number(s): IPEH-004062/63/64
Manufacturer: PEAK-System Technik GmbH
Otto-Roehm-Strasse 69
64293 Darmstadt
Germany

 We declare under our sole responsibility that the mentioned product is in conformity with the following directives and the affiliated harmonized standards:

EU Directive 2011/65/EU (RoHS 2)

DIN EN 50581 VDE 0042-12:2013-02

Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances;
German version EN 50581:2012

EU Directive 2014/30/EU (Electromagnetic Compatibility)

DIN EN 55024:2016-05

Information technology equipment – Immunity characteristics – Limits and methods of measurement (CISPR 24:2010 + Cor.:2011 + A1:2015);
German version EN 55024:2010 + A1:2015

DIN EN 55032:2016-02

Electromagnetic compatibility of multimedia equipment - Emission Requirements (CISPR 32:2015);
German version EN 55032:2015

Darmstadt, 22 February 2019

A handwritten signature in black ink, appearing to read "Uwe Wilhelm".

Uwe Wilhelm, Managing Director

Appendix B Dimension Drawings

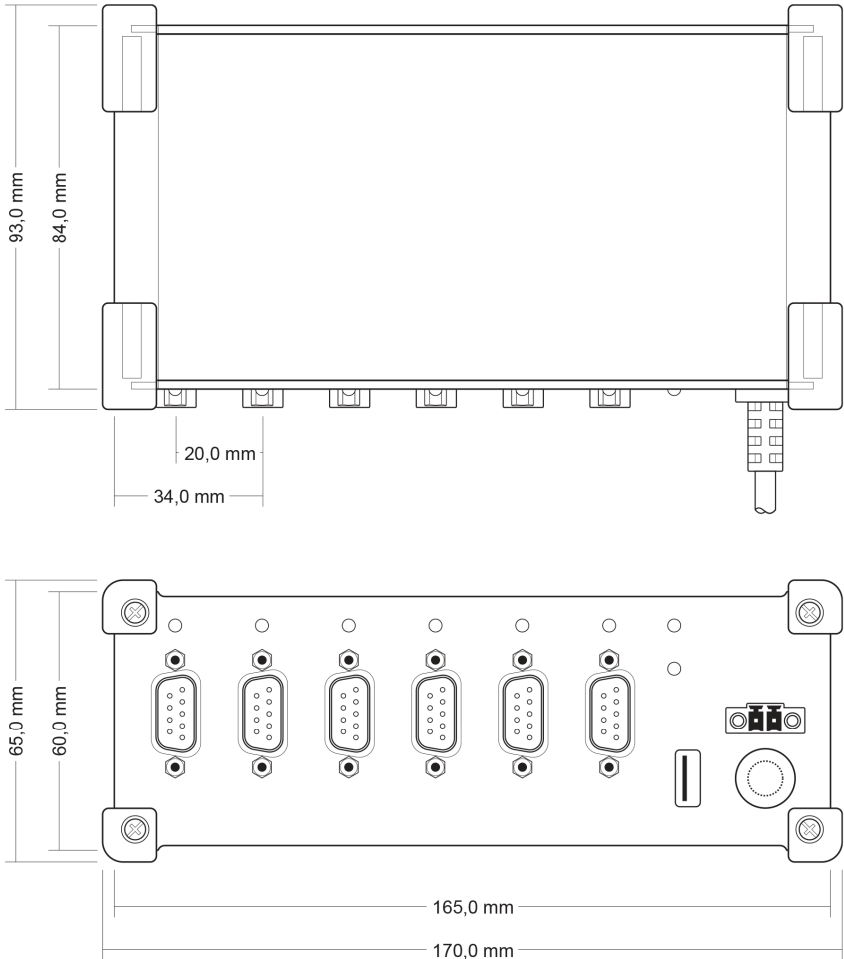


Figure 19: View PCAN-USB X6 with D-Sub.
The figures don't show the actual size of the product.

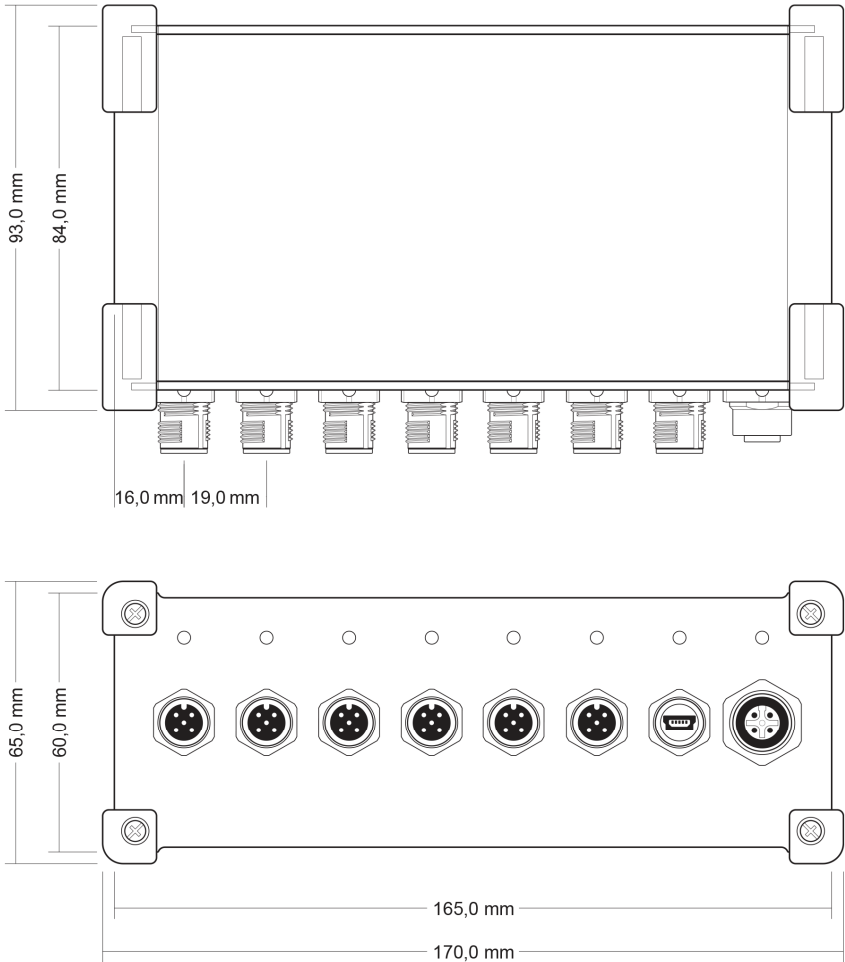


Figure 20: View PCAN-USB X6 with M12 circular connectors.
The figures don't show the actual size of the product.

Appendix C Quick Reference

Software/Hardware Installation under windows

Install the driver from the supplied DVD, before you connect the PCAN-USB X6 adapter to the computer. After that, you connect the adapter to a power supply and to a USB port of the computer. Windows detects the new hardware and initializes the driver. The CAN LEDs of the adapter light green now.



Note: Do not use a USB extension cable to connect the PCAN-USB X6 adapter to the computer.

Getting started under windows

Run the CAN monitor PCAN-View from the Windows Start menu as a sample application for accessing the adapter. For initialization of the adapter select the desired CAN interface and the CAN bit rate.

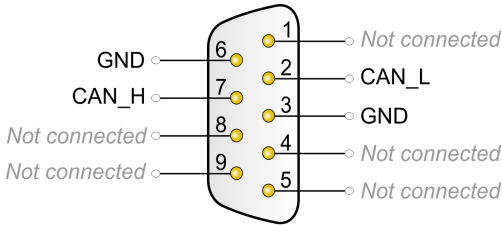
CAN status	Meaning
Green on	There's a connection to a driver of the operating system.
Green slow blinking	A software application is connected to the CAN channel.
Green quick blinking	Data is transmitted via the connected CAN bus.
Red blinking	An error is occurring during the transmission of CAN data.
Orange quick blinking	Identification of a channel when multiple adapters are plugged (see chapter 5.1.3 page 28).

USB upstream status	Meaning
Green on	A power supply and a connection via the USB upstream exist. The device is ready for use.
Orange on	There is only a connection via the USB upstream. The device is <u>not</u> ready for use.

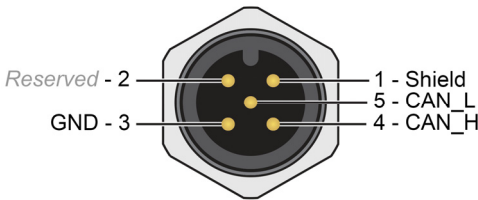


Note: The status LED of the USB upstream is only lit, when it is connected to a USB 2.0 port or higher.

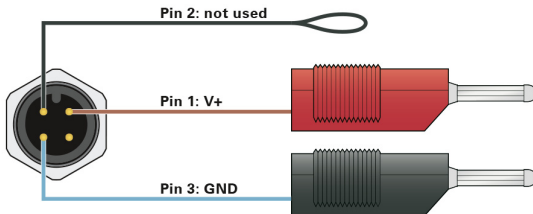
High-speed CAN connector (D-Sub, 9 pins)



High Speed CAN connector (M12, 5 pins)



Supplied cable for power supply:



Note: The scope of supply does not contain a power supply unit for the device. There is no supply via the USB connection to the PC.