SB485,SB485L,SB232

USB to RS485, RS422 and RS232

industrial converters

With galvanic isolation

SB485,SB485L,SB232

Datasheet

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CONTENT

ABOUT DEVICE

The SB485, SB485L and SB232 converters have been designed to convert USB to RS485, RS422 or RS232 serial lines. These are suitable to solve all communication situations and cover virtually any serial line use.

A virtual serial port is created in the PC to access the serial line. The properties of the RS4xx lines on SB485S and SB485C are configurable by switches on the converter.
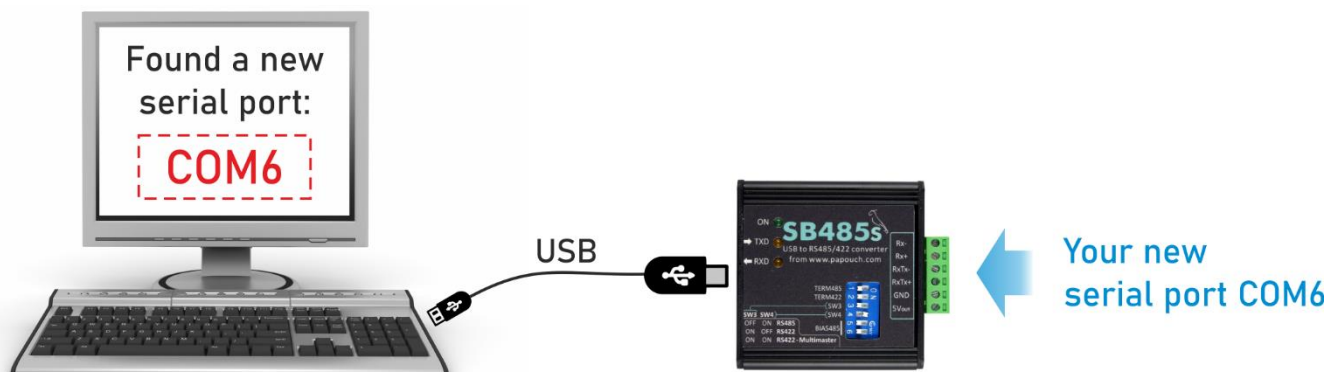

Fig. 1 – Once connected, a new "virtual serial port" is created on your PC.
This port is visible in the list of standard serial ports of your computer.

Application

- Communication with RS485 and RS422 device and a PC
- RS232 serial port for laptops
- PC protection against overvoltage
- Interruption of ground loops

Features

	SB232	**SB485S SB485C**	**SB485L**
USB interface (1.1, 2.0, 3.0)	✓	✓	✓
Galvanic isolation of USB from the serial line	✓	✓	✓
Serial line type	**RS232** (COM port)	**RS485, RS422**, RS422 Multimaster	**RS485**
Max. data transfer rate	500 kb/s	3 Mb/s	230 kb/s
Virtual serial port	✓	✓	✓
RS4xx configuration		✓	no
RS4xx idle state definition configuration		✓	no
RS4xx termination configuration		✓	no
DIN rail mount option	✓	✓	no
Wall mount option	✓	✓	no

Tab 1 – Comparison of all variants

- Conversion of USB to RS232 (all signals according to the RS232 9-pin specification), RS485, RS422 and RS422 Multimaster industrial lines

- Drivers for Windows 32bit / 64bit, Linux, MAC OS and Android.

- Virtual serial port

- Automatic RS485 data flow switching without delay

- A unique serial number that allows the user – via USB-HUB – to connect multiple converters together with other USB devices

- 5 V power supply from the USB interface

- Temperature range -40 to +85 °C (-40 to 185 F)

Available designs

Serial line

- **RS485/RS422** with a slip-on terminal: SB485S

Fig. 2 – Design with RS485/422 serial bus (SB485S)

- **RS485** with a slip-on terminal: SB485L

Fig. 3 – Simple version with RS485 only (SB485L)

- **RS485/RS422** with D-SUB 9M connector SB485C

Fig. 4 – Design with RS485/422 serial bus (SB485C)

- Serial port RS232: SB232

Fig. 5 – Design with RS232 serial line (SB232)

Assembly

- No mounting clip (*standard design*)

- [With a clip for DIN 35 mm rail](). (SB485L does not support DIN rail mount.)
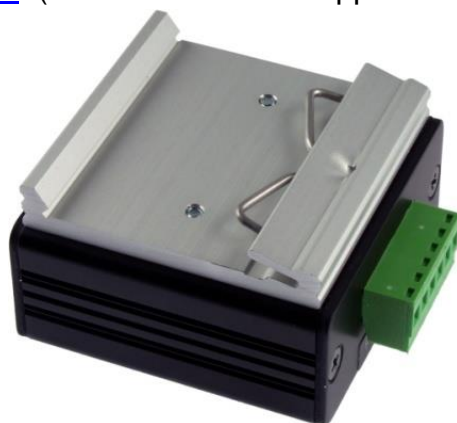

Fig. 6 – SBxxx with a clip for DIN 35 mm rail

- [With a wall mounting bracket](). Mounting holes with a diameter of 4.5 mm and a spacing of 64 mm. The total width of the bracket is 71 mm. (SB485L does not support Wall mount.)

Fig. 7 – SBxxx with a wall mounting bracket

Do not hesitate to contact us in case of any other requirements concerning the design and functions of the SB485 and SB232 modules.

CONNECTION

USB is connected to the PC via the supplied A-B cable terminated with a USB connector. In the case of SB485L it is a USB mini cable.

SB485S: The **RS485/422** line is connected via a slip-on bus bar located on the side of the device. The connection of the bus bar is illustrated in Fig. 8.

Fig. 8 – bus bar on SB485S

SB485C: The **RS485/422** line is connected via a D-SUB 9M connector (Cannon 9 male plug). The connection is illustrated in Fig. 9.
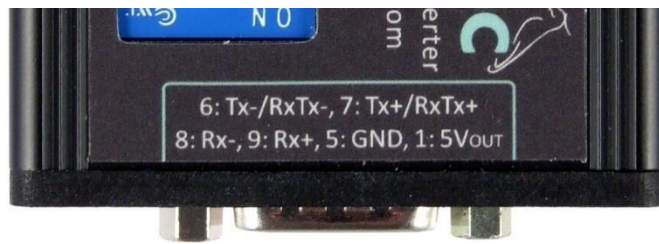

Fig. 9 – connector on SB485C

SB485L: RS485 line ins connected via a slip-on terminal at the side of the device. Connections can be seen in Fig. 10.

Fig. 10 – terminal on SB485L

SB232: The **RS232** line is connected via a D-SUB 9M connector (Cannon 9 male plug). The connection is illustrated in Fig. 11. (The connection is the same as on a PC.)
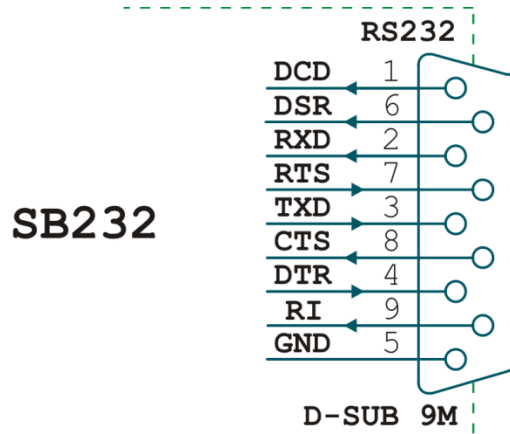

Fig. 11 – connection of the RS232 connector

SB485L: Installation for RS485

Installation of the SB485 converter for communication via RS485:

1) Connect the converter to the PC and check if a new port has been installed in the system (see page 9).

2) Connect the RS485 wires as illustrated in Table 1.

Wire	Note
RxTx+ (A)	bi-directional data ⇔
RxTx- (B)	bi-directional data ⇔
GND	signal ground – possible connection of shielding

Tab. 1 – Connection of RS485

3) If you use the converter at the very end of your line, connect 680 Ω resistor on terminals RxTx+ and RxTx- as a termination.

SB485S, SB485C: Installation for RS485

Installation of the SB485 converter for communication via RS485:

1) Connect the converter to the PC and check if a new port has been installed in the system (see page 9).

2) Move the **SW3** switch to position **OFF** and **SW4** to position **ON**.

3) Connect the RS485 wires as illustrated in Table 2.

Wire	Note
RxTx+ (A)	bi-directional data ⇔
RxTx- (B)	bi-directional data ⇔
GND	signal ground – possible connection of shielding

Tab. 2 – Connection of RS485

4) In case the convertor is located at the end of the line, connect terminating resistors using the TERM485 connector. Consider the connection of resistors defining the idle state.

SB485S, SB485C: Installation for RS422

Installation of the SB485 converter for communication via RS422:

1) Connect the converter to the PC and check if a new port has been installed in the system (see page 9).

2) Move the **SW3** switch to position **ON**.

3) Move the **SW4** switch according to the method of using the RS422 line. If the RS422 line is only used to interconnect two devices or if all connected devices transmit data only in the direction to the SB485 converter, move the SW4 switch to position **OFF**. This setting is **standard** – the RS422 line driver in the SB485 converter is permanently on making the line more resistant to interference

If another device is to transmit via the line together with the SB485 converter ("**Multimaster**" mode), the driver in the converter must be switched off. The "Multimaster" mode is enabled by moving the SW4 switch to position **ON**.

4) Connect the RS485 wires as illustrated in Table 2.

Wire	Note
RxTx+ (A)	⇨ data from the SB485 converter (or from the PC)
RxTx- (B)	⇨ data from the SB485 converter (or from the PC)
Rx+ (A')	⇦ data into the SB485 converter (or into the PC)
Rx- (B')	⇦ data into the SB485 converter (or into the PC)
GND	signal ground – possible connection of shielding

Tab. 3 – Connection of RS422

5) In case the convertor is located at the end of the line, connect terminating resistors using the TERM422 connector. For "Multimaster" mode, consider the connection of resistors defining the idle state.

USB INSTALLATION

In Linux

In most standard distributions, the driver is included in the kernel.

- The device is available between USB devices, i.e., for example at `/dev/ttyUSB0`

- Details of the connected USB device can be found out, for example, by using the `lsusb -v` command. The following lines, among others, are in the listing:

```
idVendor         0x0403 Future Technology Devices International, Ltd
idProduct        0x6001 FT232 Serial (UART) IC
iManufacturer         1 Papouch s.r.o.
iProduct              2 Papouch USB - RS232
iSerial               3 PPUMAUEE
```

In Windows

In Windows 10 and Windows 11, you don't need to manually install any drivers. When you connect Quido, drivers are installed automatically. [1]
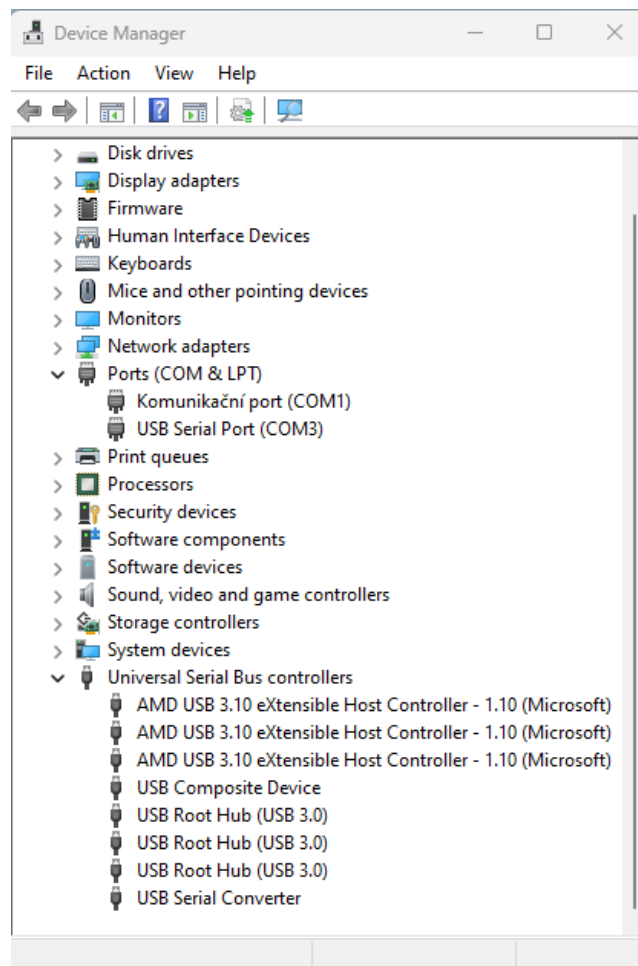

fig. 12 - Device Manager with connected converter: USB Serial Port COM3 and USB Serial Converter

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[1] If you are using a system that does not include drivers, download drivers from our website. They can be downloaded from the converter product page. Installation instructions are included with the drivers.

Changing COM port number

During installation, the device is assigned the next unoccupied port number in the range of 1 to 255. Sometimes the port number may need to be changed. The procedure is shown on fig. 13.
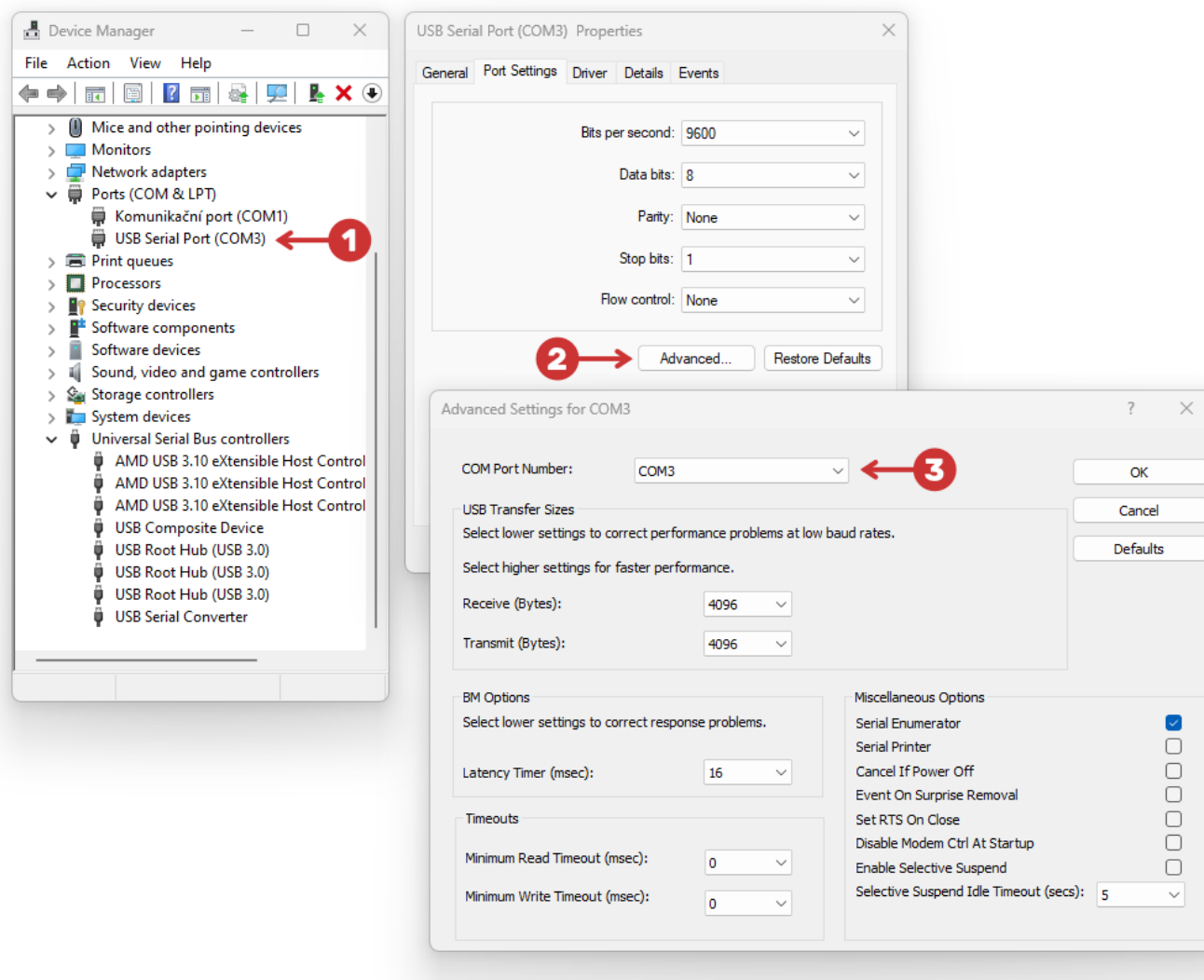

fig. 13 - Changing COM port number in Windows 11

- Administrator permissions are required to change this setting.

- If you want to assign a port that is used by another device, the change will be made and another port will be assigned to the original device.

- Sometimes you may need to restart your computer after making a change.

SETUP OF SB485

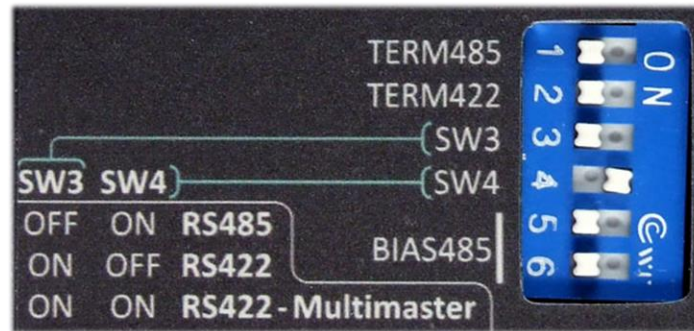The SB485 converter is set using six switches on the front panel (Fig. 14).

Fig. 14 – switches on the front panel

The type of the required communication line is set by switches SW3 and SW4 according to the following table:

SW3	SW4	line
OFF	ON	RS485
ON	OFF	RS422
ON	ON	RS422 – Multimaster

Line termination and idle mode

TERM485

This device connects the impedance termination of RS485 or RS422 on the transmitter's side. It prevents signal from bouncing at the line ends. These resistors should be connected at both ends of the communication line.

TERM422

This device connects the impedance termination of RS422 on the receiver's side. It prevents signal from bouncing at the line ends. These resistors should be connected at both ends of the communication line.

BIAS485

This device connects the resistors which define the idle mode of RS485 or RS422 on the transmitter's side. They determine the idle-status levels of the communication line. (More detailed information can be found in the section "Idle mode" on page 12.)

Idle mode

When communicating on RS485 or RS422 multimaster, there may be a no-transmission status (all lines are in the receiving mode). If this is the case, the status of the line is undefined and it is extremely sensitive to any induced voltage (interference), which is deemed incoming signals. Therefore, an idle mode should be defined by connecting suitable resistors to a line point. If the line is long, the best point is at the SB485 end-of-line modules or equipment.
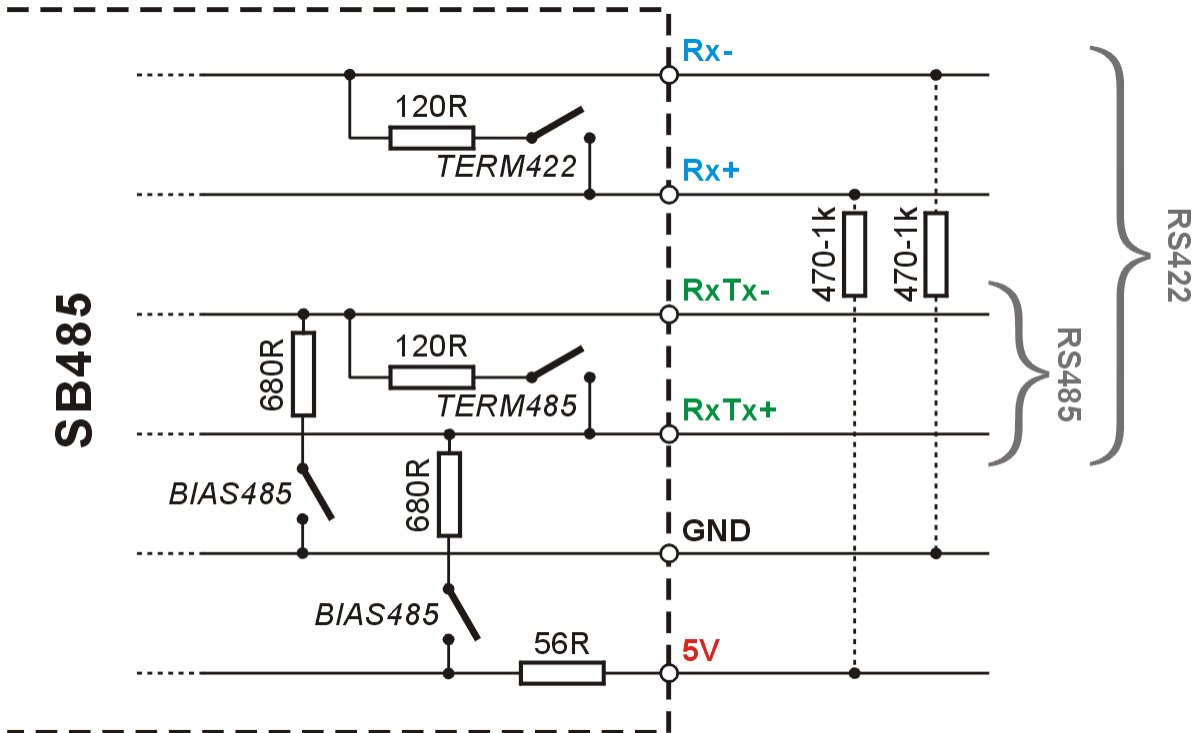

Fig. 15 – Connection of external resistors

With the SB485 converter, build-in resistors can be used, connected by the BIAS485 switches; if a definition of idle mode of RS422 receiver's side is required, external resistors may be connected directly to the RS485 connector Fig. 18. For long lines, the resistor values should be larger and the termination should be connected simultaneously. GND can also be used for connection of the cable shielding contact.

INDICATION

Following indicators are on **SB232**, **SB485S** and **SB485C** converters:

ON (green) .... lit when power supply voltage is detected.

TXD (yellow) .... indicates data transmission from USB to RSxxx

RXD (yellow) .... indicates data transmission from RSxxx to USB

SB485L features two indicators at the side around the USB connector. Each indicates one direction of the data transfer. These are lit if idle and flash when data is transferred.

TECHNICAL PARAMETERS

USB

Specification .... USB 1.1, 2.0, 3.0 compatible

Connector (SB485S, SB485C, SB232) .... type B

Connector (SB485L) .... type Mini-B (miniUSB)

RS485/422 – SB485

Modes... RS485, RS422, RS422 Multimaster

Maximum speed .... 3 Mb/s

Terminating resistors .... 120 Ω (connected via switch on the converter)

Resistors defining the idle state.................... 680 Ω (connected via switch on the converter)

Maximum number of connected devices .... 31 (according to the standard of RS485)

Overvoltage protection.................................. yes, 6.5 V transils

5 V output .... yes, to connect external resistors;
maximum load: 10 mA

Connector – SB485**S**.................................. slip-on bus bar

Connector – SB485**C**.................................. D-SUB 9M (Cannon 9; male plug)

SB485L: RS485

Mode.. RS485

Maximum speed .... 230 kb/s

Terminating resistors .... none

Resistors defining the idle state.................... 22 kΩ (connected at all times)

Maximum number of connected devices .... 31 (according to the standard of RS485)

Overvoltage protection.................................. yes, 6.5 V transils

5 V output .... no

Connector... slip-on bus bar

RS232 – SB232

Signals of RS232.. all according to the specifications of RS232:
TxD, RxD, RTS, CTS, DTR, DSR, DCD, RI

Maximum input voltage at the interface of RS232 ..±30 V

Short-circuit protection of RS232................... typically for 25 mA

Maximum speed .... 500 kbps

Connector... D-SUB 9M (Cannon 9; male; like on a PC) [2]

Other parameters

Galvanic isolation of serial line .... yes

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[2] The connection is illustrated in Figure 4 on page 5.

Supply voltage ....5 V from USB

Current consumption from USB ....typically 45 mA

Degree of protection.....................................IP 30

Weight (SB232, SB485S, SB485C) ....75 g

Weight (SB485L)..40 g

Box material ....anodized aluminium

Temperature range ....-40 to +85 °C

Dimensions (without connector) SB232, SB485S, SB485C.............54 × 62 (55) × 24 mm

Dimensions (without connector) SB485L ....33 × 63 (56) × 16 mm

Papouch s.r.o.

Data transmission in industry, line and protocol conversions, RS232/485/422/USB/Ethernet/GPRS/ WiFi, measurement modules, intelligent temperature sensors, I/O modules, and custom-made electronic applications.

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