

7XV5710 USB – RS485 Converter Cable



Fig. 13/65 USB – RS485 converter cable

Function overview

- Compact connector housing
- USB 2.0 / 1.1 interface Type A
- RS485 interface 9-pin SUB-D
- Max. bus length 800 m
- Termination resistances switchable
- Baudrates 300 to 115000 baud
- Indicated data transfer (data LED)
- Protocol transparency (not only for PROFIBUS)
- Power supply via USB connector (no galvanic separation)
- Compatible with 7XV5103 bus system (with gender changer 9-pin female/female)

Description

The USB converter cable with its special pin assignment allows temporary connection of up to 31 Siemens protection devices having an electrical RS 485 interface to a PC with a USB interface for direct or central control with DIGSI 4.

The converter is connected directly to the PC via a standard USB connector (type A). The RS485 connector (9-pin SUB-D male) may be used for direct connection to SIPROTEC 4 devices with RS485 interface modules. To connect individual compact devices with an RS485 interface on terminals, e.g. 7SJ600, 7SD600, 7RW600, etc., the 7XV5103-2AA00 or -3AA00 adapter is required. Using the gender changer (female-female), which is included, the converter may also be connected to the 7XV5103 bus system, which enables communication with all the devices connected to the bus. Because the cable includes a switchable bus termination, it may be connected at either end or in the middle of the bus. The converter draws all the power it needs via the USB interface of the PC.

Application

Data transfer

Before the converter cable is first used, a USB driver must be installed from the CD supplied. The driver creates a new virtual COM port, which may then be selected by the application, e.g. DIGSI 4. The converter works in half-duplex mode on the master/slave principle.

In the quiescent state, the USB interface is inactive and the RS485 interface is ready to receive. For communication, the PC, acting as the master, transmits its data to the USB interface, which in turn forwards the data from the converter at the RS485 interface to the protection device (slave). Following this, the RS485 interface is switched back to receive. Data coming from the protection is now transmitted in the other direction to the USB interface and PC by the converter. A data LED indicates when data transfer is active.

Connection of the compact devices, e.g. 7SJ600 with terminals (without bus cables 7XV5103)

A shielded twisted pair (STP) cable must be used for the RS485 bus. The conductor cross-section must be suitable for termination with ring lugs or SUB-D connectors. The protection devices are connected to the bus in line (not in star or ring topology). The core ends protruding from the shield should be kept as short as possible.

The shield must be connected to the housing ground at both ends. At the last protection device, a 220-Ω terminating resistor is connected between data cores A and B.

Termination of the RS485 bus

The RS485 bus is a two-wire bus (half duplex) over which up to 32 devices (participants) can exchange their data on the master/slave principle. All devices are connected to the bus in line (not in star or ring topology). At the first and last devices, a 220-Ω bus terminating resistor is connected between pin 3 (A) and pin 8 (B), irrespective of whether this is a master or slave device.

The SIPROTEC protection devices are preferably connected to the bus as a slave behind a master, e.g. 7XV5710 or 7XV5650/51 RS484 converter. In these converters (1st device) the terminating resistor may be implemented by additional pull-up/pull-down resistors via DIL switches (S1, S2). The “low-resistance” pull-up/pull-down resistors are essential in various SIPROTEC bus applications, i.e. the use of other converters may result in problems.

In the protection devices, the terminating resistor must only be activated at the last device on the bus using the jumpers provided for that purpose. If this is not possible in the device, an external terminating resistor, e.g. 7XV5103-5AA00 must be applied behind the last device (see Fig. 13/66).

In this example, the terminating resistors of the converter cable are active (default), the terminating resistors that are available at some of the protection devices remain inactive. The bus is terminated after the last device with the 7XV5103-5AA00 bus terminating connector or an external resistor (220 Ω). If the last protection device has a switchable terminating resistor, this may also be activated to ensure termination.

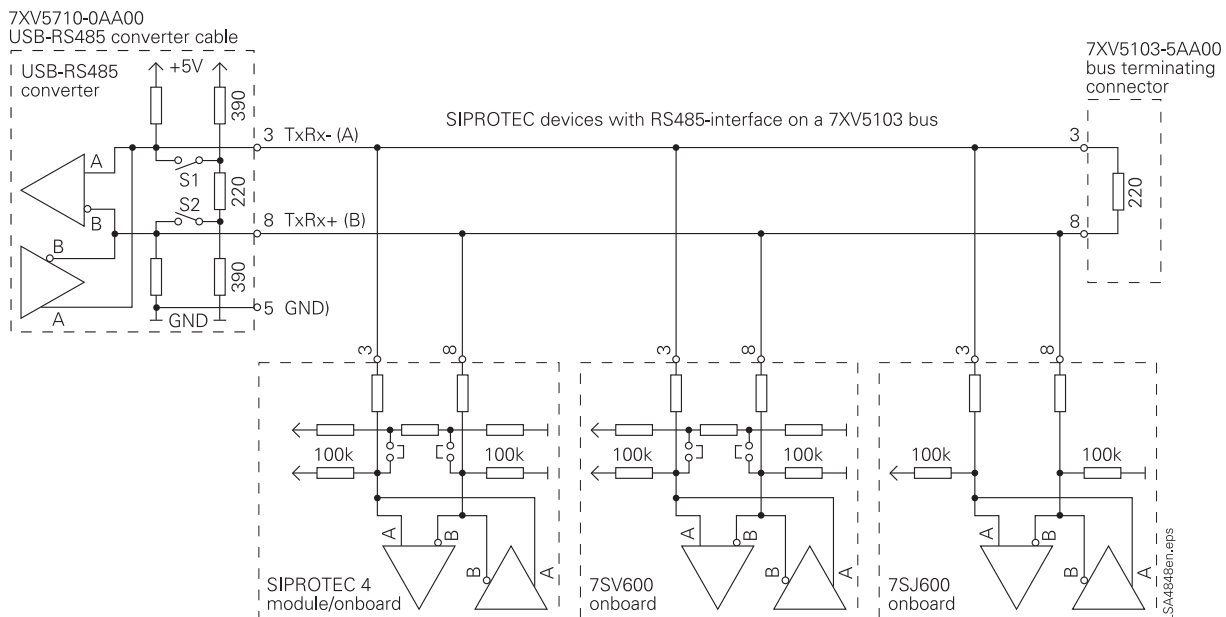


Fig. 13/66
RS485 bus with USB converter cable 7XV5710 and several SIPROTEC devices (connection diagram)

Application

Application example

A number of SIPROTEC 3 and 4 protection devices can be centrally operated via their interface with DIGSI via the 7XV5710 USB converter cable. Suitable cables and adapters are available for the various connection types of the SIPROTEC devices. For more information, please refer to catalog sheet 7XV5103. SIPROTEC 4 devices with an RS485 interface may be directly connected and operated with DIGSI 4.

For the connection of individual compact protection devices with the RS485 interface on terminals e.g. 7SJ600, 7SD600, 7RW600, etc., the adapter cable 7XV5103-2AA00 or the adapter 7XV5103-3AA00 is required (see Fig. 13/67).

The converter cable must only be used on a non-permanent basis because of the lack of galvanic separation. For permanent operation, the FO converters 7XV5652 and 7XV5650/51 should be used. The FO conductor ensures complete galvanic separation between PC and SIPROTEC devices. Corresponding applications may be found at: www.siprotec.com/accessories/7XV56...

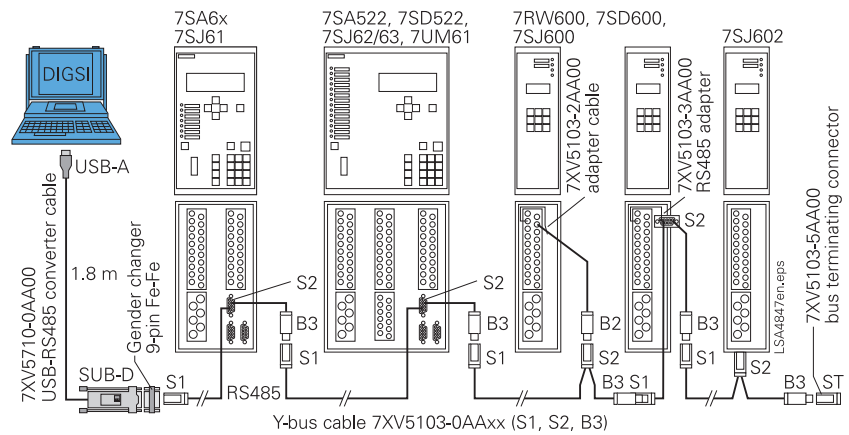


Fig. 13/67 Central operation via the RS485 bus

Technical data

Product	USB converter cable 7XV5710-0AA00	
Driver	Included on CD or on the Internet at: www.siprotec.com/accessories/7XV5710	
Installation	Plug & Play	
Cable length	1.8 m	
USB interface	Virtual COM port	
Connection 1	USB 2.0 (1.1) connector type A	
Connection 1 pin assignment	Pin 1 – Vcc Pin 2 – D- Pin 3 – D+ Pin 4 – GND	
Connection 2	SUB-D 9-pin connector (male) with securing screws	
Connection 2 pin assignment	Pin 3 – Tx/Rx- (A) Pin 5 – GND Pin 8 – Tx/Rx+ (B) All other pins are not connected (nc)	
Terminating resistors	Selectable (S1, S2 ON = terminating resistor selected) +5 V – Pin 3 = 390 Ω Pin 3 – Pin 8 = 220 Ω Pin 8 – Pin 5 = 390 Ω	
Connection 2 protection	Receiver: +/- 15 kV human body model +/- 6 kV IEC 1000-4-2, contact discharge +/- 12 kV IEC 1000-4-2, air-gap discharge Permitted: up to 128 receivers on the bus True-fail-safe receiver -7 V ... +12 V Common-mode range Thermal protection against output short circuit Driver: +/- 9 kV human body model Slew-rate limited for errorless data transmission -7 V ... +12 V common-mode range Current limiting Thermal shutdown for driver-overload protection	
Handshake	None	
TX/RX switchover	Automatic	
Serial data transmission channels	Half-duplex 2-wire	
Power supply	+5 V via USB (max. 80 mA) Module logs on with 96 mA at the USB Max. 38 mA ready (converter on, no data transmission) Max. 80 mA full-duplex 4-core operation, (max. data rate)	
Serial transmission rates	300, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bits/s	
Status indication	Tx and Rx - 3 mm LED red	
Operating temperature	-5 up to +70°C	
Driver software	Windows 98, Windows 98 SE, Windows 2000, ME, XP, Vista 32/64, Windows 7 32/64. No administrator rights required.	
Certification	CE-compliant / RoHS-compliant	
Application	Non-permanent installation with SIPROTEC – devices	

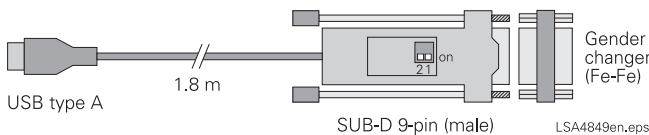


Fig. 13/68 USB converter cable with connector.
Default switch position:
S1+S2 ON = terminating resistor active
Dimensions: 75 x 32 x 15 (l x w x h)

Selection and ordering data

Description	Order No.
USB – RS485 converter cable	7XV5710-0AA00
<p>USB 2.0 /1.1 with connector type A to RS485 with 9-pin SUB-D male connector, pin assignment for SIPROTEC 4 and SIMEAS Q, bus termination switchable, power supply via USB interface, incl. 9-pin female-female gender changer and driver CD For the connection of individual compact protection devices with the RS485 interface on terminals, e.g.. 7SJ600, 7SD600, 7RW600, etc., the 7XV5103-2AA00 adapter cable or the 7XV5103-3AA00 adapter is required</p>	