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USB – RS485 Converter Cable for SIPROTEC-devices　　7XV5710

Areas of application

The USB converter cable with its specialised pin allocation allows a temporary connection of up to 31 Siemens protection devices with an electrical RS 485 interface to a PC with a USB-interface for direct or central control with DIGSI 4. Several PowerQuality products and the communication accessories 7XV5 using the same pinning of the RS485 interface can also be connected.

The converter is connected directly to the PC via a standard USB plug (Type A). The RS485 plug connector (9-pol. Sub-D male) may be used for direct connection to SIPROTEC 4-devices with -interface modules. To connect individual compact devices with -interface on terminals e.g. 7SJ600, 7SD600, 7RW600, etc. the adapter 7XV5103-2AA00 or -3AA00 is required. Using the included Gender-Changer (Female-Female) the converter may also be connected to the bus system 7XV5103 which facilitates communication with all the devices connected to the bus. By means of the switchable bus termination it may be applied at one of the bus terminals or alternatively in the middle of the bus. Power supply of the converter is solely derived via the USB interface of the PC.

Features:

- Compact plug housing
- USB 2.0 / 1.1 interface Type A
- RS485-interface 9-pol. Sub-D
- Max. bus length 800 m
- Termination resistances switchable
- Baudrates 300 - 115000 Baud
- Indicated data transfer (Data-LED)
- Protocol transparency
  (not for PROFIBUS)
- Power supply via USB plug
  (no galvanic separation)
- Compatible with bus system 7XV5103
  (with Gender-Changer 9-pol. Fe/Fe)

Data transfer

Prior to the initial application of the converter cable, a USB driver must be installed from the supplied CD. The driver creates a new virtual COM port, which may then be selected by the application e.g. DIGSI 4.
The converter works according to the Master/Slave-principle in half duplex mode.
In the quiescent state the USB interface is inactive and the RS-485 interface is ready to receive. For communication, the PC, as Master, sends its data to the USB interface, which in turn forwards the data from the converter at the RS-485 interface to the protection device (Slave). Following this, the RS-485 interface is again switched over to receive. Data coming from the protection is now sent back to the USB interface and PC by the converter. A data LED indicates the active data transfer.

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

A two-core twisted and screened cable must be used for the -bus.
The conductor cross-section must be suitable for termination with ring-lugs or sub-D plugs. The protection devices are connected in sequence (not in star or ring configuration) to the bus. The core ends protruding from the screen should be kept as short as possible. The screen must be connected to the housing earth at both ends. At the last protection device, a terminating resistance of 220 Ohm is connected between the data cores A and B.

Termination of the RS485-bus

The RS485-bus is a two core bus (half duplex) over which the maximum 32 participants exchange their data according to the Master/Slave mode. All participants are connected in sequence (not in star or ring configuration) to the bus. At the first and last participant, a bus terminating resistance (termination) of 220 Ohms is connected between pin 3 (A) and pin 8 (B). Thereby it is of no consequence whether it is a Master or Slave participant.
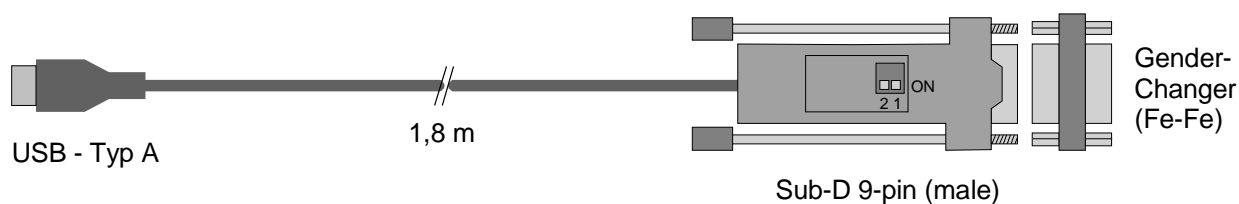The SIPROTEC-protection devices are preferably connected behind the Master e.g. -converter 7XV5710 or 7XV5650/51, as Slave to the bus. In these converters (1st participant) the terminating resistance may be implemented by additional pull-up/pull-down resistances via DIL-switch (S1, S2). The "low-resistance" pull-up/pull-down resistances are essential in various SIPROTEC-bus applications, i.e. the use of other converters may result in problems.
In the protection devices, the terminating resistance may only be activated at the last device on the bus with the corresponding jumpers. If this is not possible in the device, an external terminating resistance e.g. 7XV5103-5AA00 must be applied behind the last device. (see figure below).

RS485-Bus with USB-Converter cable 7XV5710 and several SIPROTEC-devices (Connection diagram)
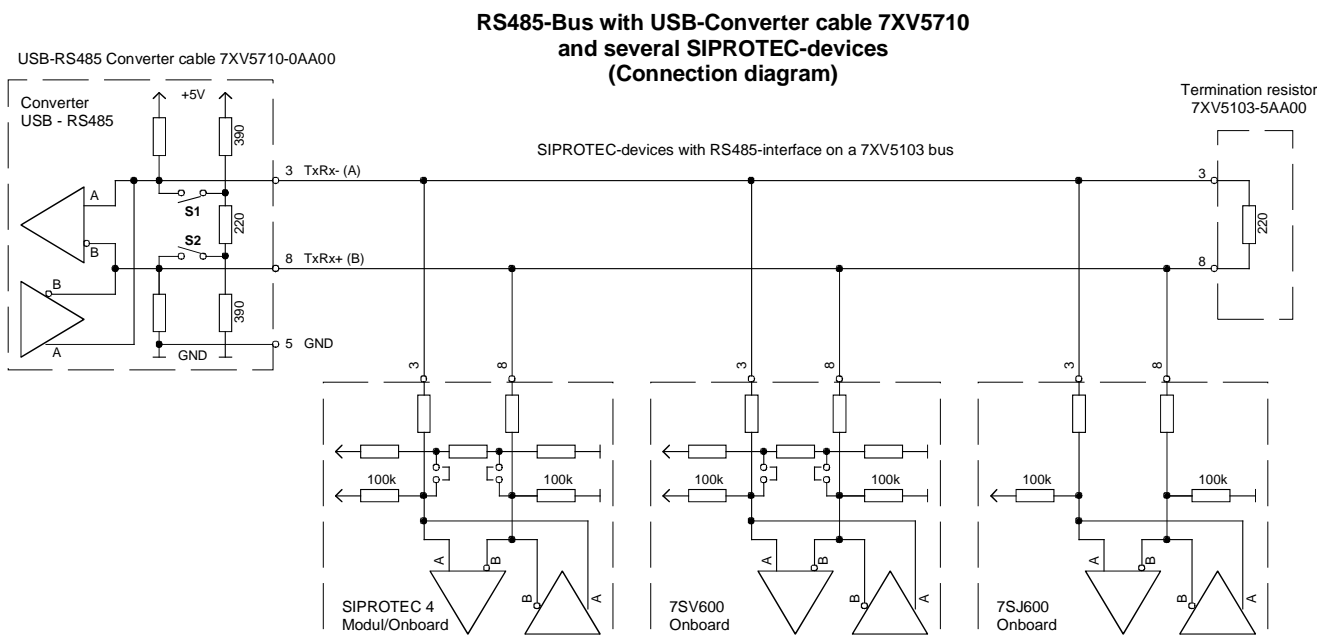
In this example the terminating resistances of the converter cable are in service (pre-setting), the terminating resistances which are available at some of the protection devices remain out of service. The bus is terminated after the last device with the bus termination plug 7XV5103-5AA00 or an external resistance (220 Ohm). If the last protection device has a terminating resistance option, this may also be activated for the termination.

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Pre-setting switch: S1+S2 ON = terminating resistance in service
Dimensions: 75 x 32 x 15 (l x w x h)

USB - Typ A   1,8 m   Sub-D 9-pin (male)   Gender-Changer (Fe-Fe)

Technical data

Product:	USB - converter cable 7XV5710-0AA00
Driver:	Included on CD or in the Internet at: www.siprotec.com -> accessories -> 7XV5710
Installation:	Plug & Play
Cable length:	1,8 m
USB-Interface:	virtual COM-Port
Connection 1:	USB2.0 (1.1) plug type A
Connection 1 pin allocation:	Pin 1 - Vcc Pin 2 - D- Pin 3 - D+ Pin 4 - GND
Connection 2:	SUB-D 9-pol. plug (male) with securing screws
Connection 2 pin allocation:	Pin 3 - Tx/Rx- (A) Pin 5 - GND Pin 8 - Tx/Rx+ (B) All other pins are not connected (nc)
Terminating resistances:	selectable (S1, S2 ON = terminating resistance selected) +5 V - Pin 3 = 390 Ohm Pin 3 - Pin 8 = 220 Ohm Pin 8 - Pin 5 = 390 Ohm
Connection 2 protection:	RS485-Receiver: +/- 15 kV Human Body Model +/- 6 kV IEC 1000-4-2, Contact Discharge +/- 12 kV IEC 1000-4-2, Air-Gap Discharge Allow Up to 128 Receivers on the Bus True-Fail-Safe Receiver -7V .. +12V Common-Mode Range Thermal Protection Against Output Short Circuit Driver: +/- 9 kV Human Body Model Slew-Rate Limited for errorless data transmission -7V .. +12V Common-Mode Range Current Limiting Thermal Shutdown for Driver-Overload Protection
Handshake:	none
TX/RX switch-over:	automatic
Serial data transmission channels:	RS485 half-duplex 2 core
Power supply:	+5V 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 - 3mm 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 No administrator rights required.
Certification	CE-conform / RoHS-conform
Application	Non-permanent installation with SIPROTEC - devices

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Application example

A number of SIPROTEC 3 and 4 protection devices can be centrally operated via their interface with DIGSI via the USB- converter cable 7XV5710. Suitable cables and adapters are available for the various connection types of the SIPROTEC devices. Further information is available in the catalogue sheet 7XV5103.
SIPROTEC 4 devices with -interface may be directly connected and operated with DIGSI 4.
For the connection of individual compact protection devices with the -interface on terminals e.g. 7SJ600, 7SD600, 7RW600, etc.., the adapter cable 7XV5103-2AA00 or the adapter 7XV5103-3AA00 is required (see Figure).
The converter cable may 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 under:
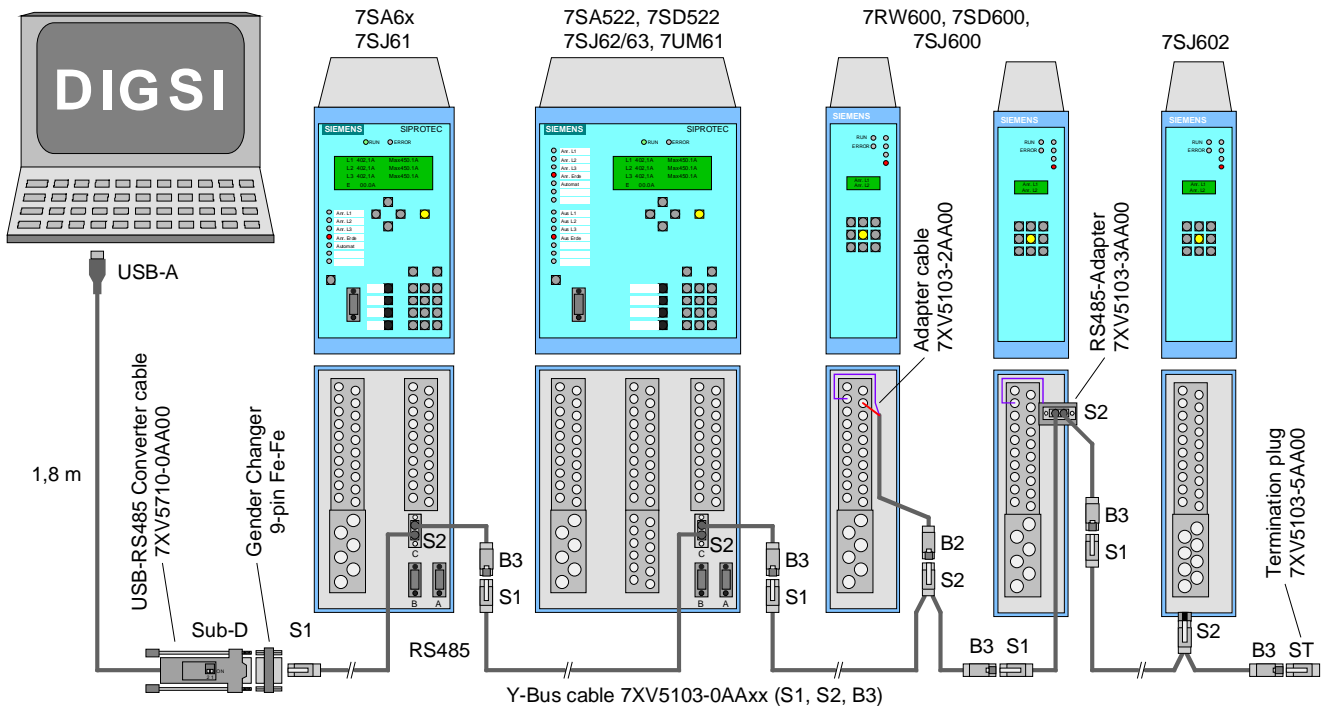
www.siprotec.com -> accessories -> 7XV56…

Figure: Central operation via the RS485-Bus   * The Gender-Changer is included in the scope of delivery.

Selection and Order data

Name	Order No.:
USB – RS485 converter cable	**7 X V 5 7 1 0 - 0 A A 0 0**
USB 2.0 /1.1 interface with plug type A to RS485-interface with Sub-D pin plug 9-pol. with pin allocation for SIPROTEC 4, SIMEAS P and 7XV5 Bus-termination switchable Power supply via USB-interface Incl. Gender-Changer 9-pol. Fe-Fe and driver CD For the connection of individual compact protection devices with the interface on terminals e.g.. 7SJ600, 7SD600, 7RW600, etc.., the adapter cable 7XV5103-2AA00 or the adapter 7XV5103-3AA00 is required.	

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