

SIEMENS

Communication Cable and Adapter 7XV5 and more

(Cable, Adapter, Converter, Special cable e.g.)

Application / Pin assignment



04/2009

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www.siprotec.com

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General Instructions

The description of the accessories in this manual includes the information required for the normal use of the products described therein. It is intended for technically qualified personnel that has been specially trained or has special knowledge in the fields of protection-, instrumentation-, control-, and automatic control engineering (called automation in the following). The knowledge and the technically correct implementation of the safety instructions and warnings included in this manual are a prerequisite for the safe installation and commissioning, as well as for safety during operation and maintenance, of the product described. Only qualified personnel, as defined earlier, has the necessary expertise for the specific implementation in all eventualities, of the safety instructions and warnings in a generally accepted manner.

This manual is not an integral part of the scope of delivery. For reasons of transparency it does not contain all details with respect to all configurations of the described products and can also not cover every conceivable implementation with regard to operation or maintenance. If further information is desired or in case special problems should arise, which are not treated adequately in this document, it is possible to obtain additional details from the local Siemens office or from the addresses stated in the back of this manual.

Additionally, we point out that the content of this product documentation is not part of or modifies any previous or existing agreement, promise, or legal relationship. All obligations by Siemens result from the respective purchase order which also includes the complete and exclusively valid warranty provision. The contractual warranty regulations are neither extended nor limited by the statements in this document

Liability Statement

We have compared the text of this manual with the hardware and software described. Omissions and deviations cannot be ruled out; we accept no liability for lack of total conformity.

The information in this manual is checked periodically, and necessary corrections will be included in future editions. We appreciate any suggested improvements. We reserve the right to make technical improvements without notice. Any suggestions for improvements are welcome.

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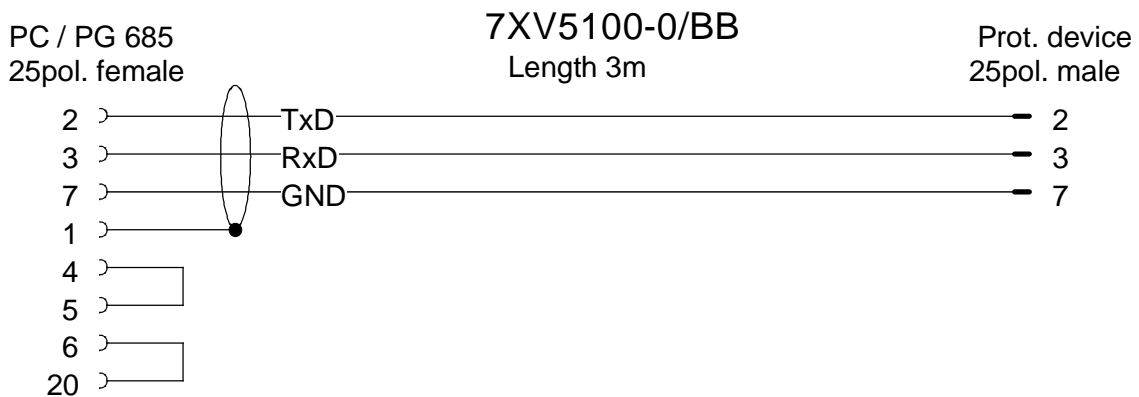
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1 Communication cable for the operation of protection devices with PC

1.1 7XV5100 Serial RS232-communication cable (wire / FO)

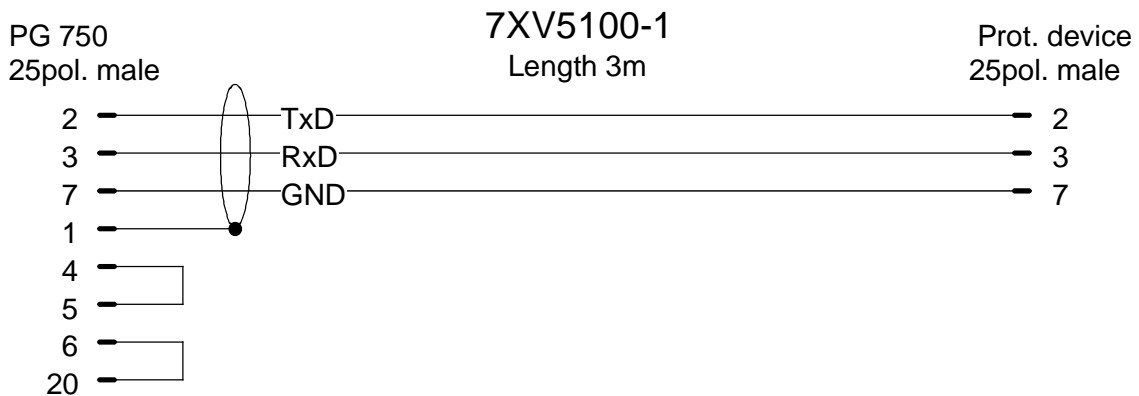
1.1.1 7XV5100-0/BB PC/PG 25-pole to the protection device 25-pole

The serial patch cable establishes the connection of a serial 25-pole interface (e.g. COM 1) or PG 685-interface to a protection device with a 25-pole service interface.



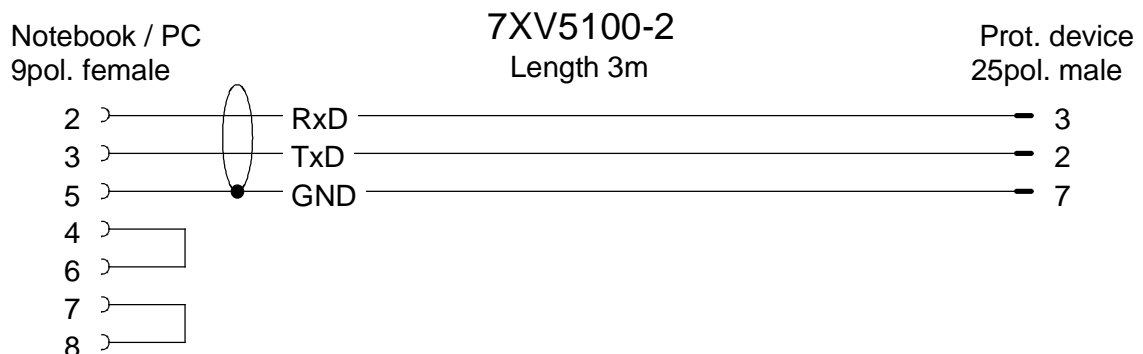
1.1.2 7XV5100-1 PG 750 to protection device 25-pole

The serial patch cable establishes the connection of the serial 25-pole PG-750 interface with a socket plug and a protection device with a 25-pole service interface.



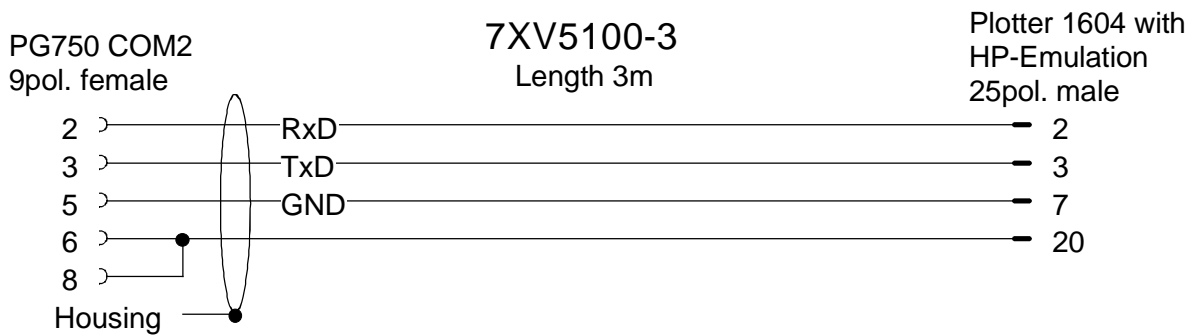
1.1.3 7XV5100-2 PC / PG to protection device 25-pole

The serial patch cable establishes the connection of the serial 9-pole PC interface with male plug (e.g. COM 1) or PG-interface with a protection device with 25-pole service interface.



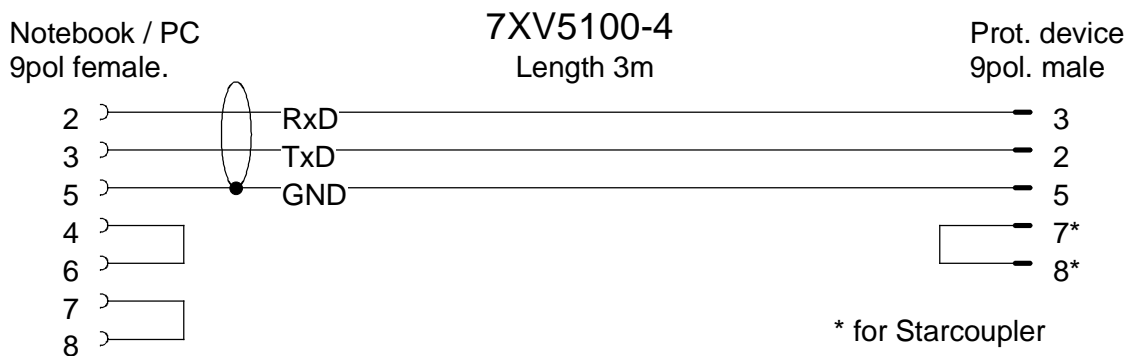
1.1.4 7XV5100-3 PG 750 (COM2) to Plotter 1604

The serial patch cable establishes the connection of the serial 9-pole PG 750-interface COM2 to a plotter 1604 with HP-Emulation by means of a 25-pole socket plug.

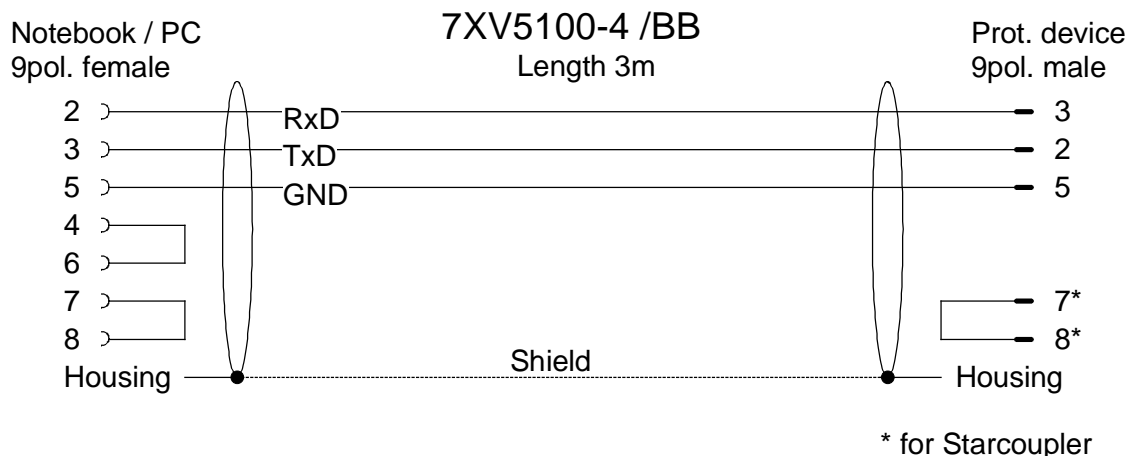


1.1.5 7XV5100-4 (/BB) PC/PG 9-pole to protection device 9-pole (DIGSI-cable)

The serial patch cable (DIGSI-cable) establishes the connection of the serial 9-pole PC interface with male plug (e.g. COM1) or PG interface to a protection device with 9-pole service interface. The following devices have such an interface: 7SJ531, 7SJ602 and all SIPROTEC 4 devices, e.g. 7SA522, 7SA6x, 7SJ61/62/63, 6MD6x, etc.



In the case of cable **7XV5100-0 Version /BB** the shielding was changed. The cable shield is no longer connected with "GND", but has plug housings at both ends.



1.1.5.1 7XV5100-4 (/BB) Additional applications

The following devices have the same allocation as the protection devices with 9-pole interfaces and can also be connected to a PC or notebook with this cable.

(Mini-) Star coupler	7XV5300, 7XV5450
Active Mini-Star coupler	7XV5550
RS232-FO Converter	7XV5652

With this cable and the 9/25-pole adapter 7XV5100-8H, protection devices with 25-pole interfaces can also be connected.

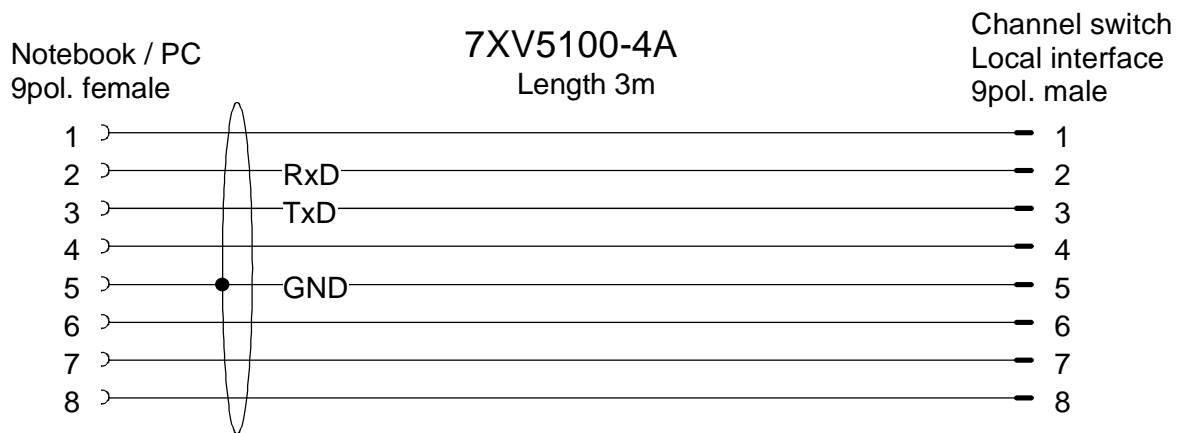
1.1.5.2 7XV5100-8H 9/25-pol. Adapter for cable 7XV5100-4

7XV5100-4 (/BB) 9pol. female	7XV5100-8H Plug housing	Prot. device 25pol. male
2 ⤴	RxD	— 2
3 ⤴	TxD	— 3
5 ⤴	GND	— 7

If this 9/25-pole adapter is connected with the 9-pole male plug of the cable 7XV5100-4 (/BB), protection devices with a 25-pole service interface can also be connected to the PC or notebook with this cable.

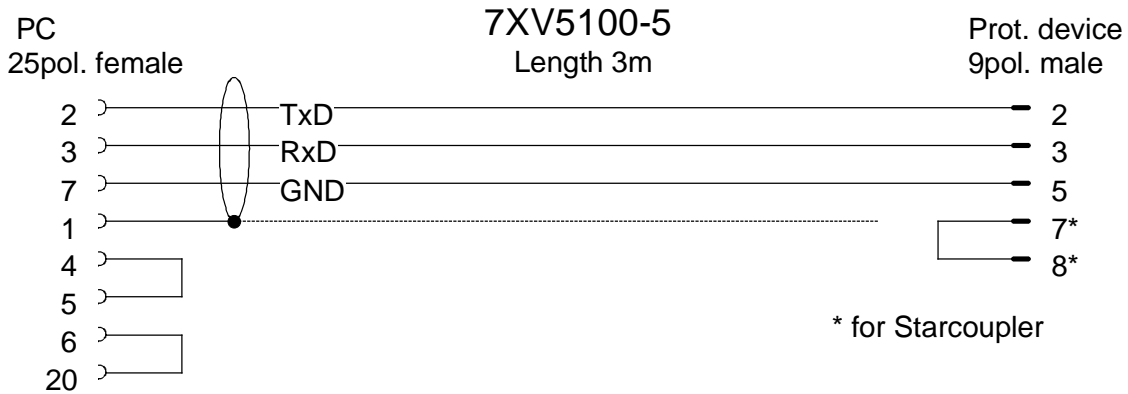
1.1.6 7XV5100-4A PC/PG 9-pole to the local interface of the channel switch 7XV5500

The serial patch cable establishes the connection between the PC and the local interface of the channel switch 7XV5500.



1.1.7 7XV5100-5 PC / PG 25-pol. to protection device 9-pole

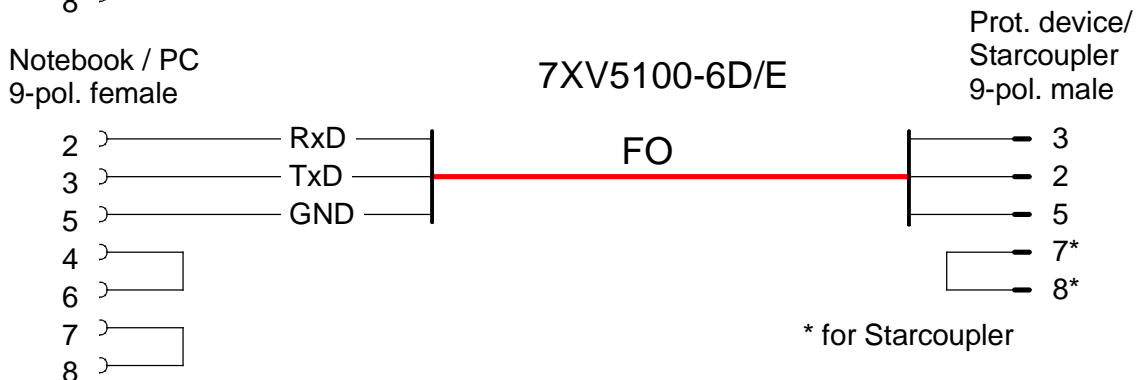
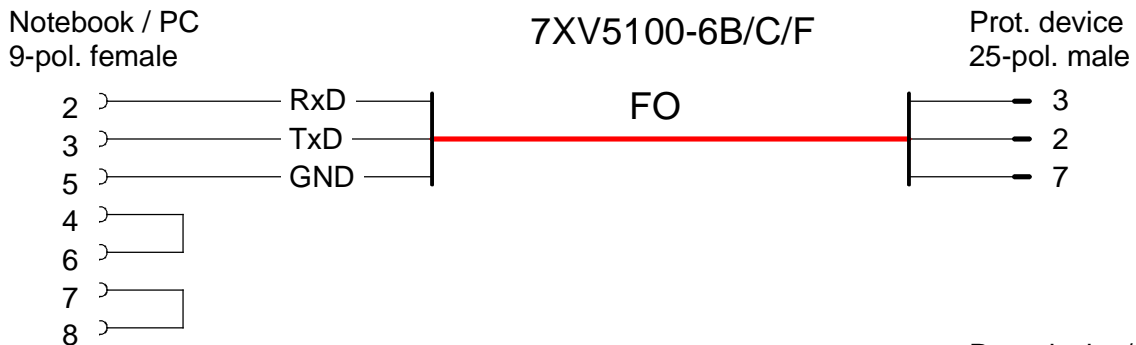
The serial patch cable establishes the connection of the serial 25-pole PC interface with male plug (e.g. COM 1) with a protection device having a 9-pole service interface. The following devices have such an interface: 7SJ531, 7SJ602 and all SIPROTEC 4 devices, e.g. 7SA522, 7SA6x, 7SJ61/62/63, 6MD6x, etc.



1.1.8 7XV5100-6 Serial RS232 cable with galvanic separation via FO cable

These cables connect the PC to the protection device, with galvanic separation, and as a result extremely secure against interference, via FO cable. The conversion of RS232-level to light takes place in so-called "self-supplying devices" without additional power supply, by utilisation of the signalling voltage from the data signals. To do this, the interface of the connected device (including a note-book running on batteries) must supply at least +/- 5V-signals. Baud rates of up to 115kB are then possible.

- 7XV5100-6B PC 9-pole for protection 25-pole (2m)
- 7XV5100-6C PC 9 pole for protection 25-pole (5m)
- 7XV5100-6F PC 9-pole for protection 25-pole (3m)
- 7XV5100-6D PC 9-pole for protection/star-coupler 9-pole (2m)
- 7XV5100-6E PC 9-pole for protection/star-coupler 9-pole (5m)



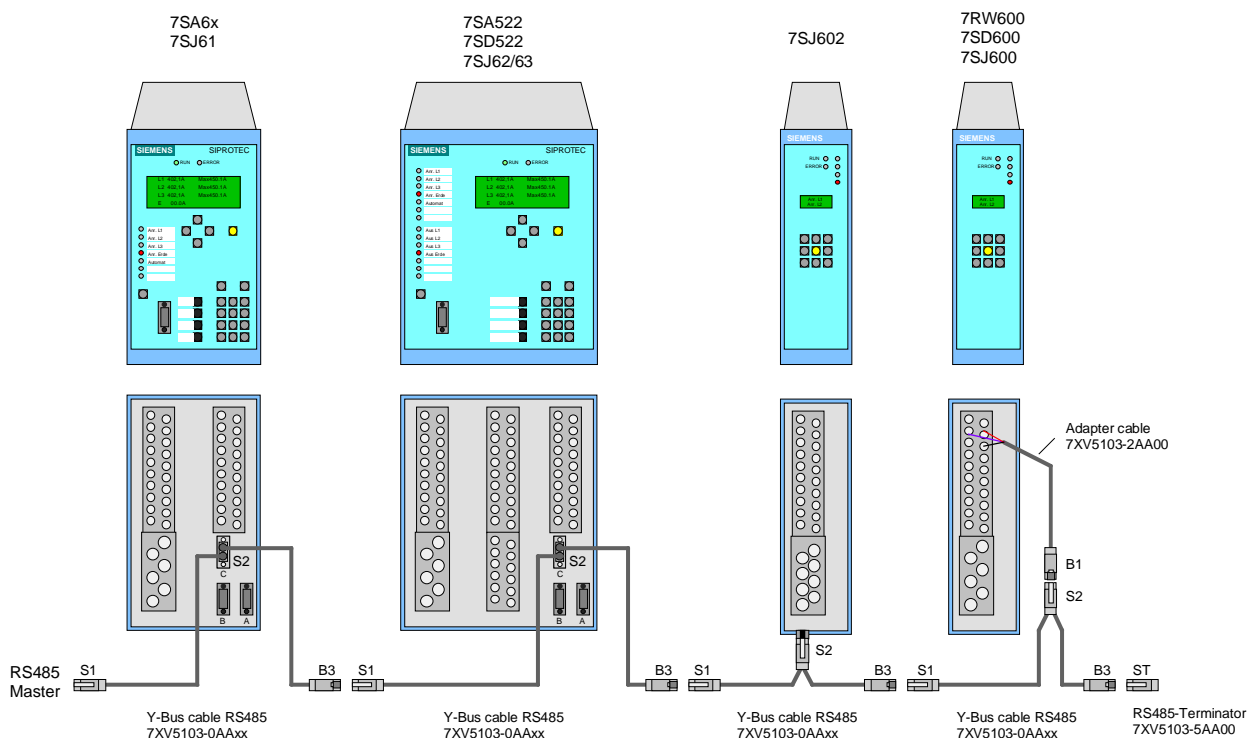
2 RS485-Bus system for DIGSI- / IEC- / VDEW-communication

2.1 RS485-Bus with 9-pole Sub-D plug

The bus system with 9-pole sub-D plugs has been used in systems with SIPROTEC 4 protection devices, the converters 7XV5 and Siemens control devices for a considerable period of time. The connection of individual devices is done directly via special Y-cables, or via the corresponding adapter cables to devices with different connection technologies. The bus is terminated with a 9-pole sub-D bus termination plug with integrated 220 OHM resistance.

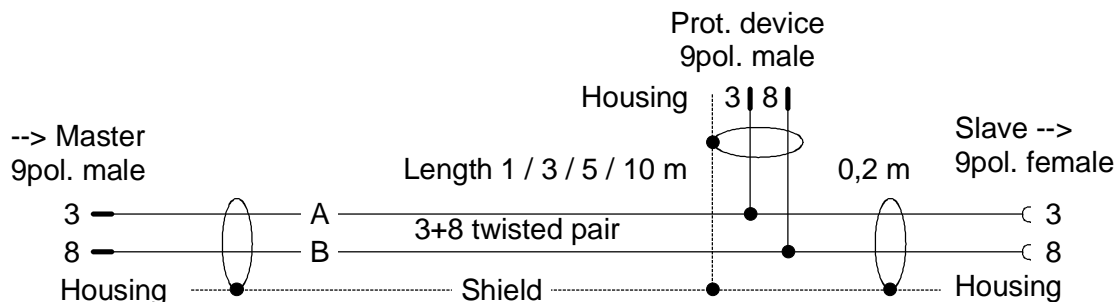
These cables are not suitable for PROFIBUS.

Note: The baud rate and the data format of all devices connected to the bus must be set the same. The devices addresses (1-254) must differ.

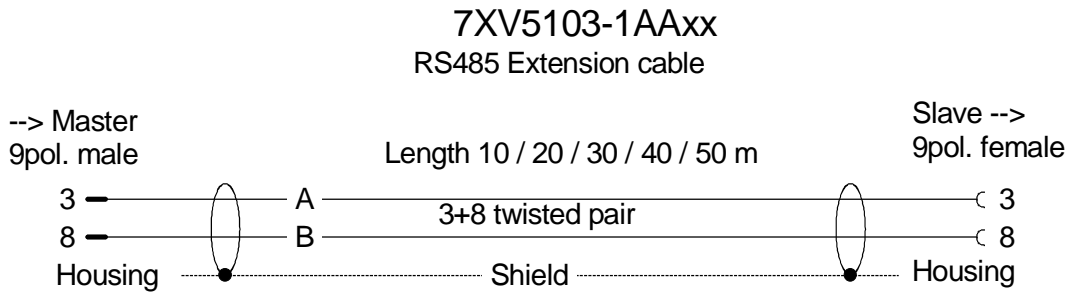


2.1.1 7XV5103-0AAxx Y-Bus cable for RS485-Bus with 9-pole plug

7XV5103-0AAxx
RS485 Y-Bus cable

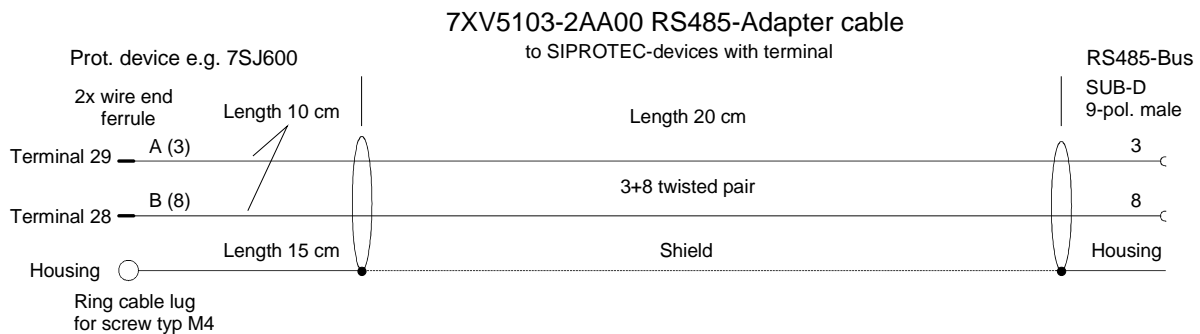


2.1.2 7XV5103-1AAxx Extension bus cable for RS485-Bus with 9-pole plug



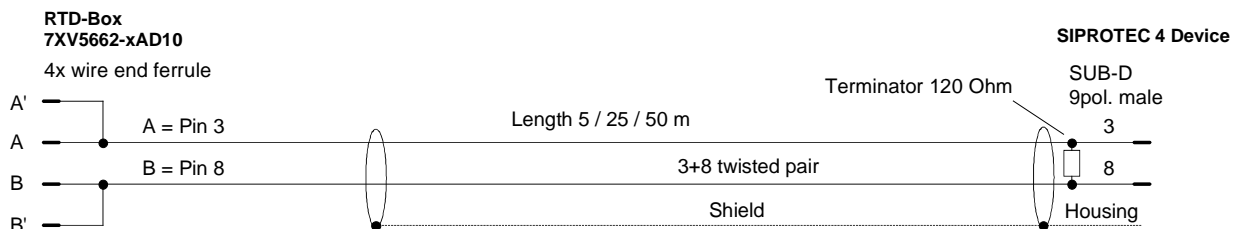
2.1.3 7XV5103-2AA00 adapter cable for devices with RS485-bus on terminals

This adapter cable enables the connection of devices which have a RS485 interface on terminals, e.g. 7SJ600, 7SD600, 7RW600, 7SS600 and SIPROTEC 4 surface mounting devices, to the RS485-bus.



2.1.4 7XV5103-7AAxx RS485 adapter cable from the RTD-Box to SIPROTEC 4

This adapter cable allows for the connection of an RTD-Box via the open cable ends directly to a SIPROTEC device with a 9-pole sub D plug. Using the connections A' and B' the application of the termination resistances or the connection of a second RTD-Box is possible. The termination resistance is integrated in the sub-D plug to the SIPROTEC device.



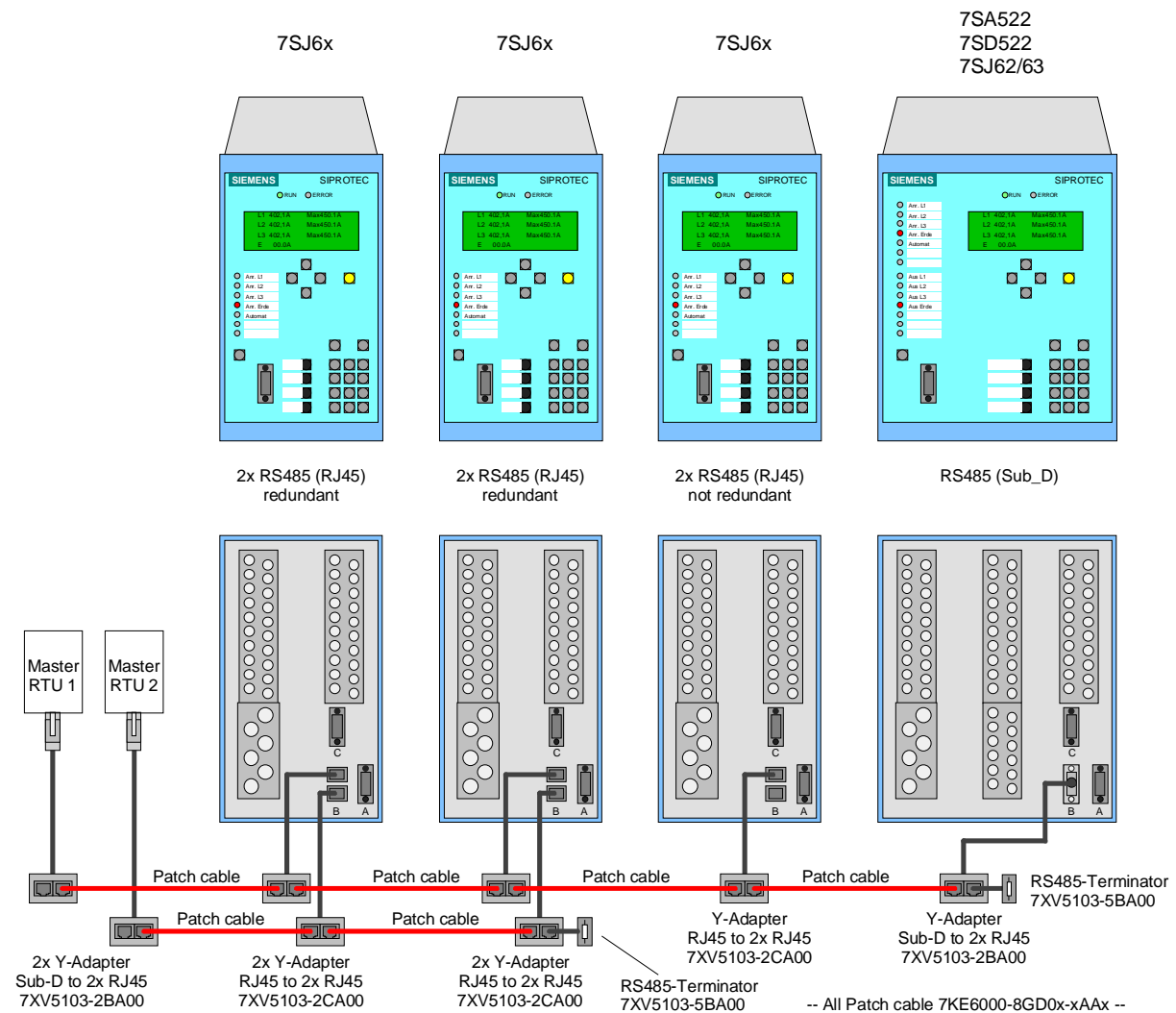
2.2 RS485-Bus system with RJ45-plug

In the case of the serial bus system with RJ45 sockets on the device, the bus connection is established with cost-effective, double-screened CAT 5 patch cables. This technology is used in the case of redundant IEC 60870-5-103 system interfaces on the device. The connection of the individual devices to the two redundant busses is in each case done via two special Y adapter cables. The busses each terminate at a RJ45 bus termination plug with integrated 120 Ohm resistance.

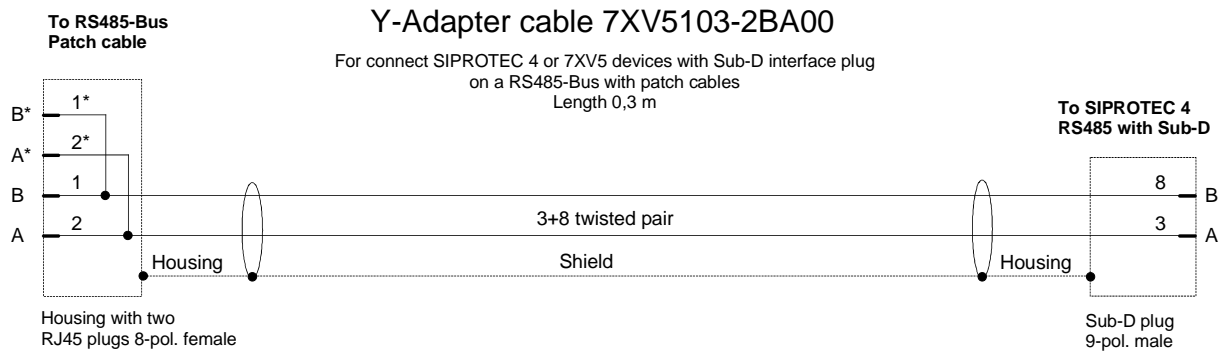
For the connection of SIPROTEC-devices with 9-pole sub-D plugs, or for connection to the bus system with 9-pole sub-D plugs, a special adapter is available (see catalog sheet).

These cables are not suitable for PROFIBUS.

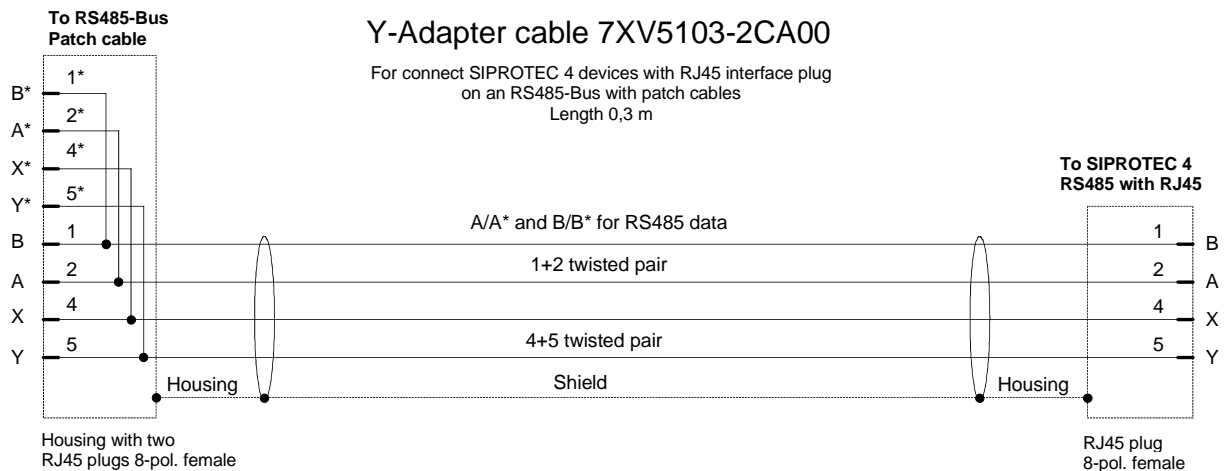
Note: The baud rate and the data format of all devices connected to the bus must be set the same. The device addresses (1-254) must be different.



2.2.1 7XV5103-2BA00 Adapter cable for devices with RS485-Bus on 9-pol. Sub-D plug



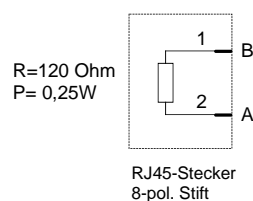
2.2.2 7XV5103-2CA00 Adapter cable for devices with RS485-Bus on 8-pol. RJ45 plug



2.2.3 7XV5103-5BA00 RS485-Terminator with RJ45 plug

Termination resistance, 120 Ohm integrated in 8-pole RJ45 plug for one-sided termination of a RS485-Bus.

Terminator plug 7XV5103-5BA00



2.2.4 7KE6000-8GDxx Ethernet patch cable CAT5 with RJ45 plugs

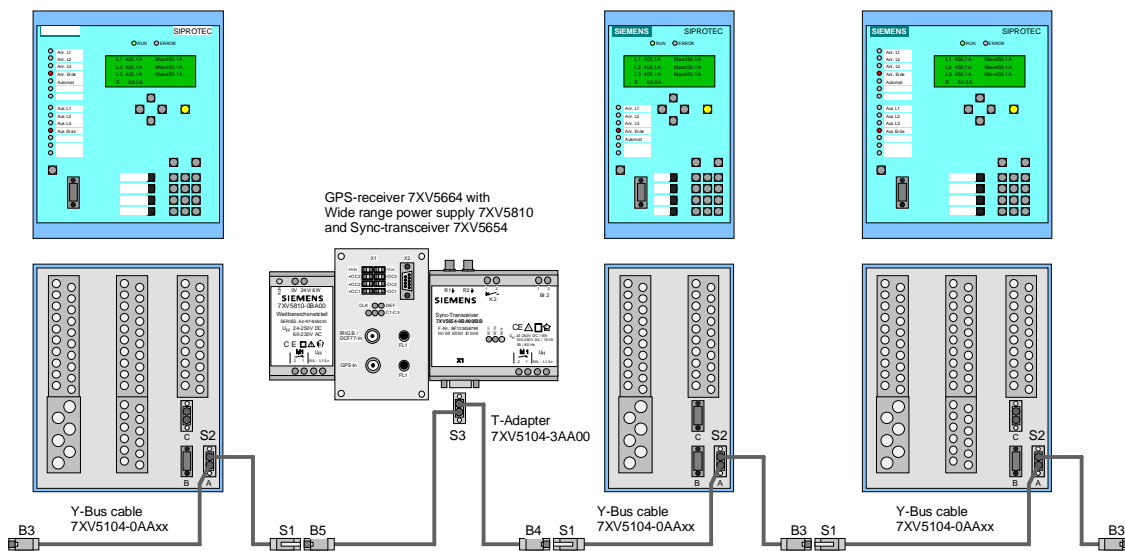
Only double-screened CAT 5 patch cables, SFTP 1:1 connection (e.g. 7KE6000) may be used as bus cables. The maximum bus length may not exceed 800m.

3 Bus cable for time synchronisation of SIPROTEC protection devices

3.1 7XV5104 Bus cable for synchronization for standard time only

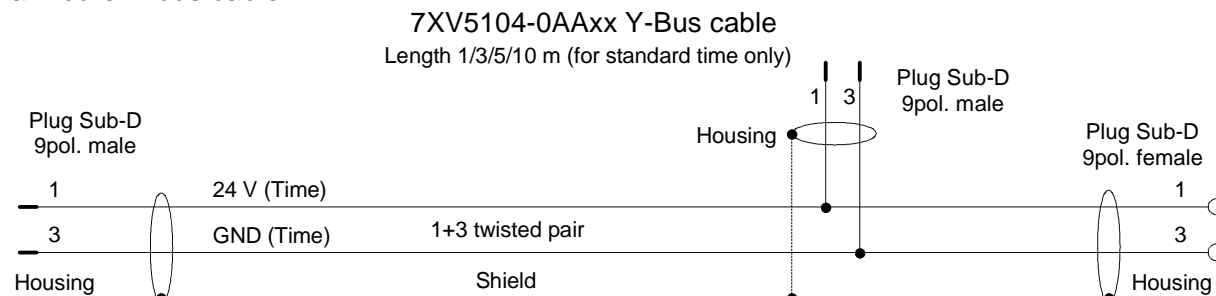
These “bus cables” are intended for the distribution of IRIG-B signals (GPS), DCF77 signals or minute impulses to port A of SIPROTEC devices. The 2-core cables 7XV5104 transmit only the normal time, the 4-core cables 7XV5105 additionally transmit the highly accurate second impulse for differential protection devices. The source of the signals is the GPS-receiver 7XV5664 and the Sync-transceiver 7XV5654 with 24 V voltage level. The entire bus length should not exceed 20m (do not use a termination resistance).

Confectioned Timesync bus cable for SIPROTEC 4 time synchronization



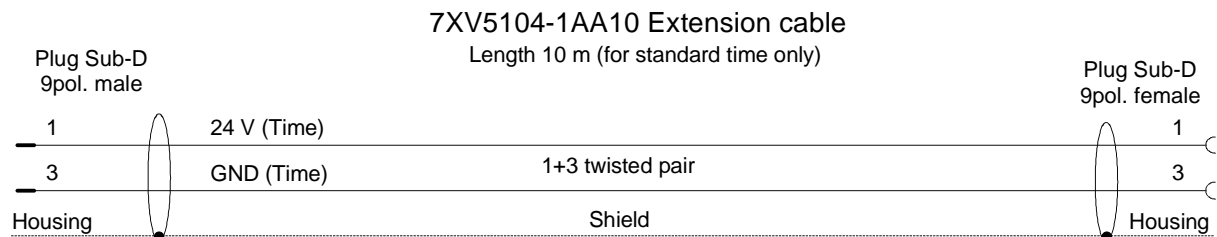
3.1.1 7XV5104-0AAxx Y-Bus cable for standard time only

The SIPROTEC devices are connected directly via their TimeSync interface to the bus with a 2-core Y-bus cable.



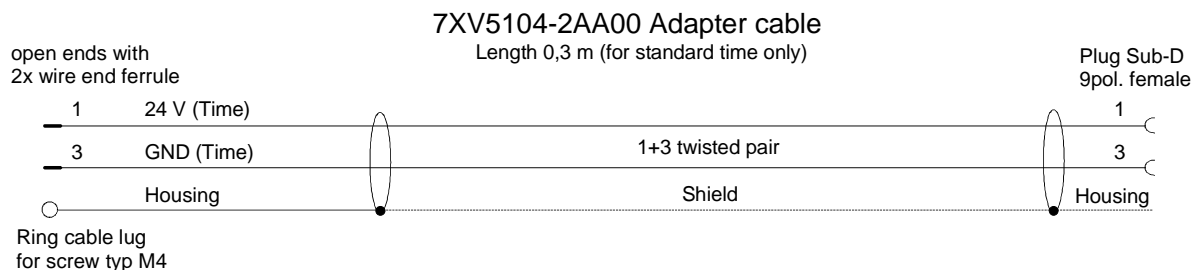
3.1.2 XV5104-1AA10 Extension cable for standard time only

The 2-core extension cable extends the bus by 10m (without second pulse).
The total length of the bus should not exceed 20 m



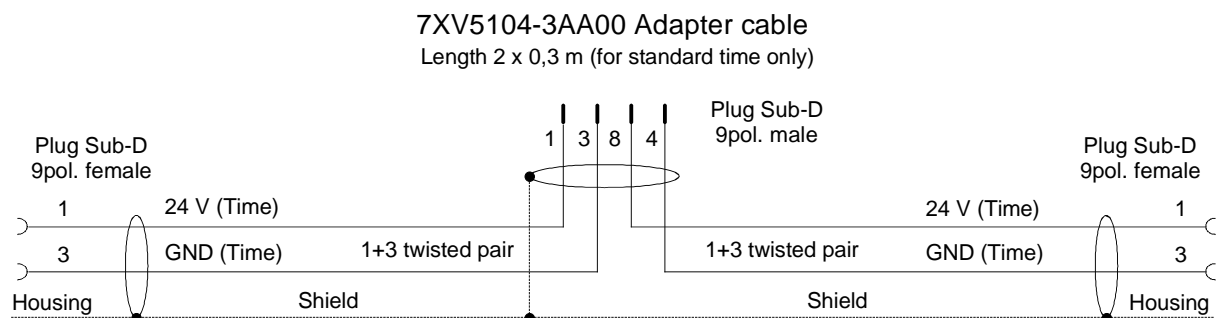
3.1.3 7XV5104-2AA00 Adapter cable with open ends for standard time only

The 2-core adapter cable with open ends facilitates the connection of the bus to the GPS-receiver with connection terminals (without second pulse).



3.1.4 7XV5104-3AA00 T-Adapter cable (2 Busses) for standard time only

With this T-adapter cable, both channels of the Synch-transceiver 7XV5654 can be used (without second pulse).

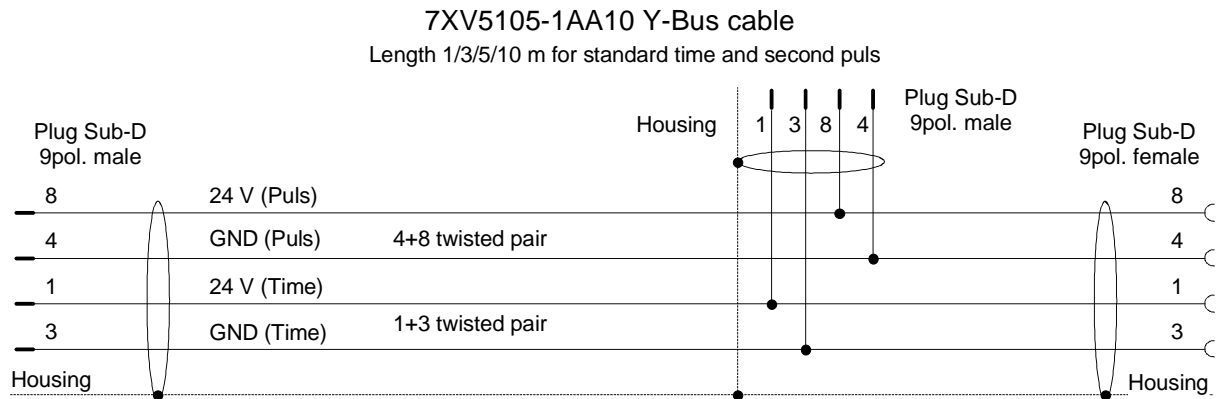


3.2 7XV5105 Bus cable for synchronization for standard time and second puls

7XV5105 is a 4-core screened bus system for synchronization of the normal time with second impulse at Port A (24V connection) in SIPROTEC-protection devices. The additional highly accurate second impulse is exclusively required for the synchronisation of two line differential protection devices via GPS. The entire bus length should not exceed 20m (do not use a termination resistance).

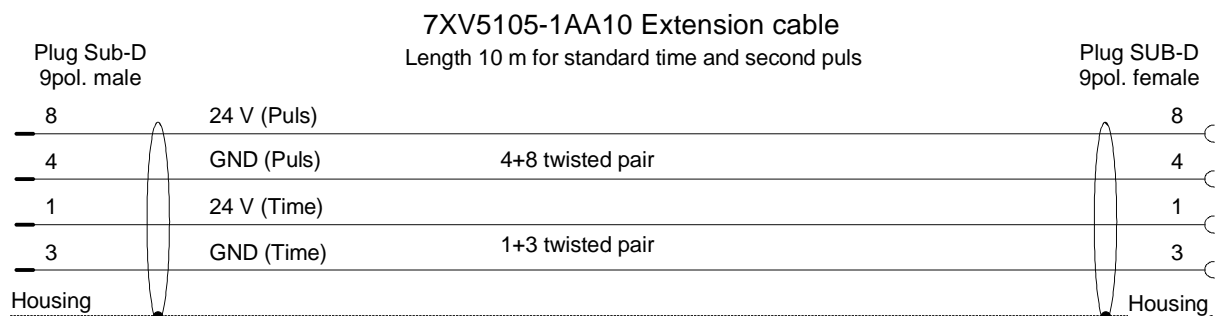
3.2.1 7XV5105-0AAxx Y-Bus cable for standard time and second puls

Using a 4-core Y bus cable, the SIPROTEC-devices are directly connected to the bus via their Time Sync interface. The IRIG-B telegrams for normal time and the second impulse are transmitted in parallel.



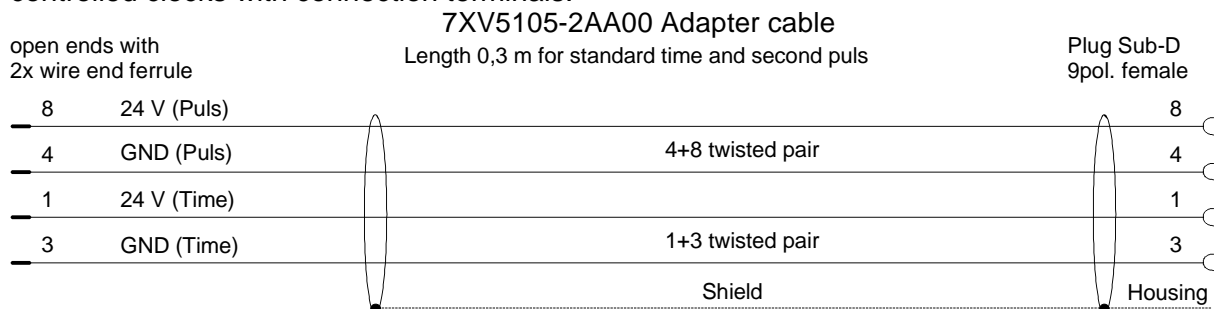
3.2.2 7XV5105-1AA10 Extension cable for standard time and second puls

The 4-core adapter cable extends the bus by 10m. The total length of the bus should not exceed 20m.



3.2.3 7XV5105-2AA00 Adapter cable with open ends for standard time and second puls

The 4-core adapter cable with open ends enables the connection of the bus to radio controlled clocks with connection terminals.



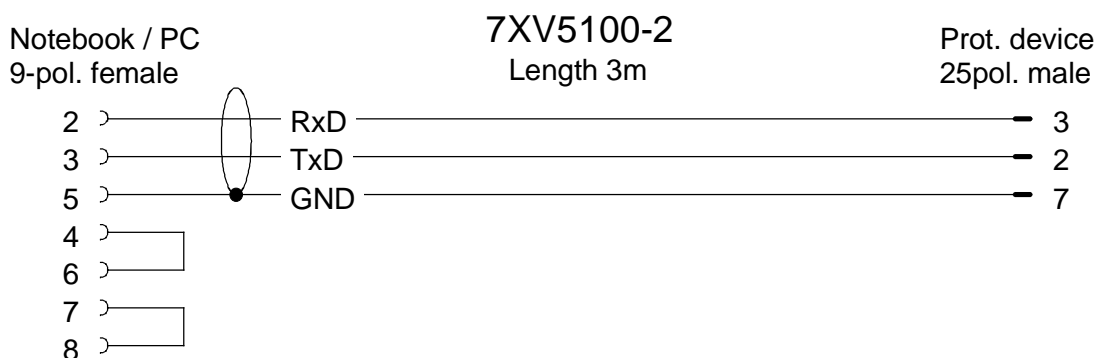
4 Cable for converter 7XV5700 (RS232 - RS485)

4.1 7XV5700 RS232-interface to the PC

NOTE! Depending on the order number 7XV5700-xx the cable 7XV5100-2 and the RS232-interface adapter may or may not be contained in the scope of delivery.

4.1.1 7XV5100-2 RS232-cable from 7XV5700 to PC

The socket plug of the 25-pole RS232-interface of the converter 7XV5700 may be attached directly to the serial 25-pole interface of the PC. If the PC only has a 9-pole interface, the conversion is done via a standard adapter from the Sub-D 9-pole plug socket to the 25 pole male plug or the DIGSI cable 7XV5100-2. The adapter and the DIGSI cable swap the connections of the pins 2 and 3.

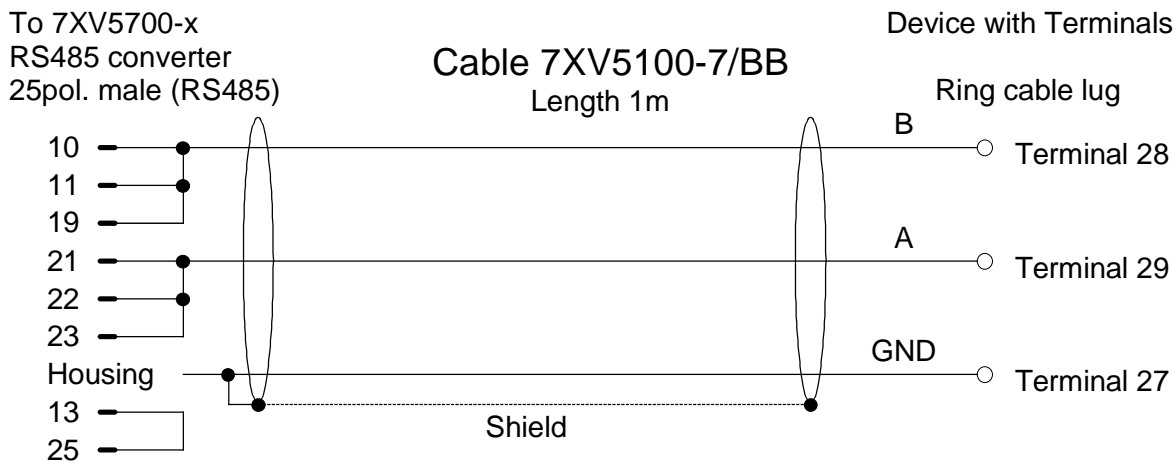


4.2 7XV5700 RS485-Bus-Interface

Note! The cables 7XV5100-7 /BB or 7XV5100-7B to the RS485-interface are, depending on the order number 7XV5700-xx, included in the scope of delivery.

4.2.1 7XV5100-7/BB RS485-cable from 7XV5700 to the first protection device with terminals

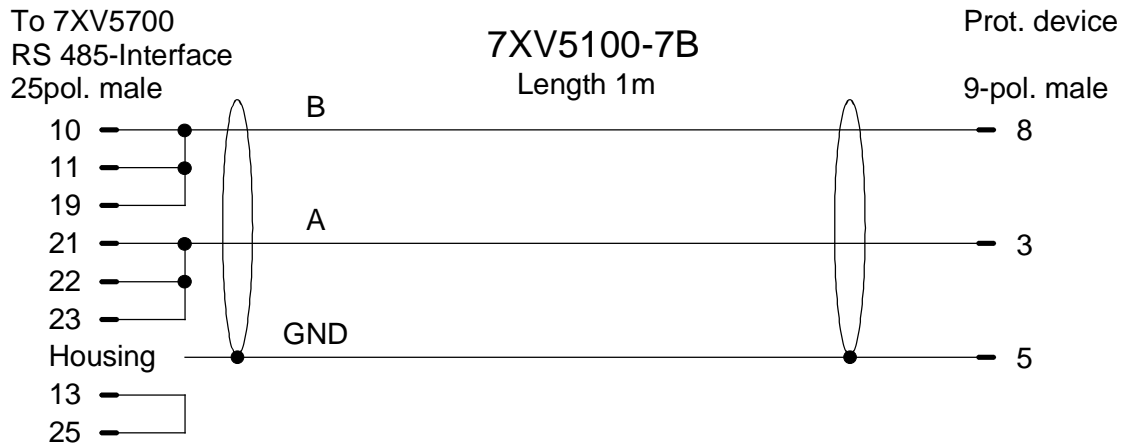
The cable connects the RS485-converter to the first protection device with RS485-interface on terminals with ring lugs, e.g. 7SJ600, 7SD600, 7RW600 etc. If further devices (maximally 31) are to be connected, the RS485 bus can be extended.



4.2.2 7XV5100-7B RS485-cable from 7XV5700 to protection device with 9-pole RS485 plug.

The cable connects the RS485-converter 7XV5700 with one protection device with 9-pole RS485-interface, e.g. 7SA522, 7SA6x, 7SJ602, 7SJ61/62/63, 7SD522, 6MD6x etc.

If further devices (maximally 31) are to be connected, the RS485-Bus can be extended with the Y bus cables 7XV5103-0AAxx and a standard 9-pole "Gender Changer" (socket, socket) (also see 7XV5103-xx).



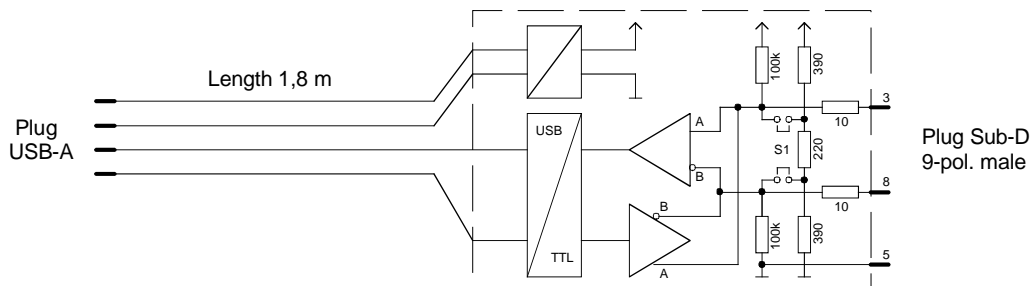
NOTE! The mode of operation in the RS485-converter is set with the jumpers in the 25-pole plug of the cables 7XV5100-7.

5 7XV5710 Converter cable USB 2.0 to RS485 with Sub-D plug

The USB - RS485 converter cable with it's specific pin allocation enables a temporary connection of up to 31 Siemens protection devices with electric RS485 interface to a PC with USB interface, for direct or central operation with DIGSI 4.

Converter cable 7XV5710-0AA00

Converter cable USB 2.0 (1.1) to RS485

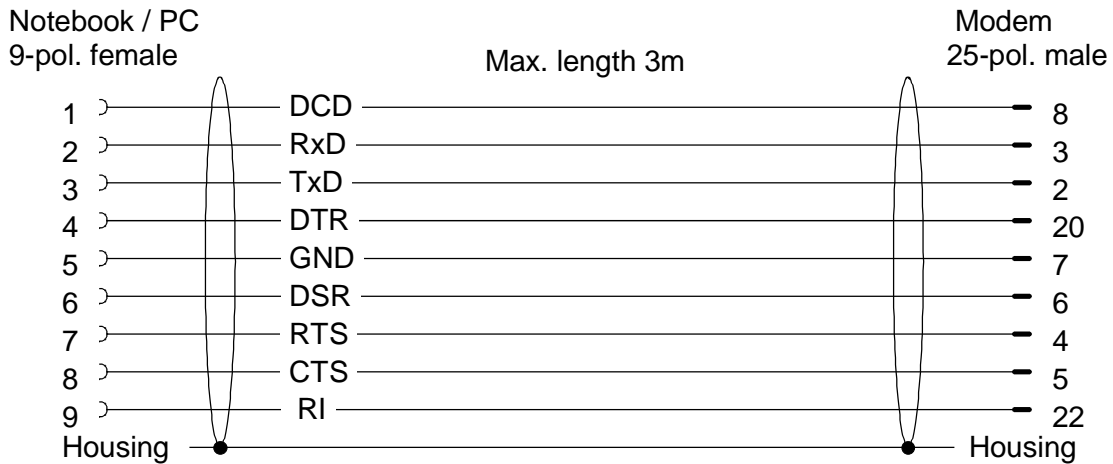


6 Cable for remote operation of the protection devices via modem

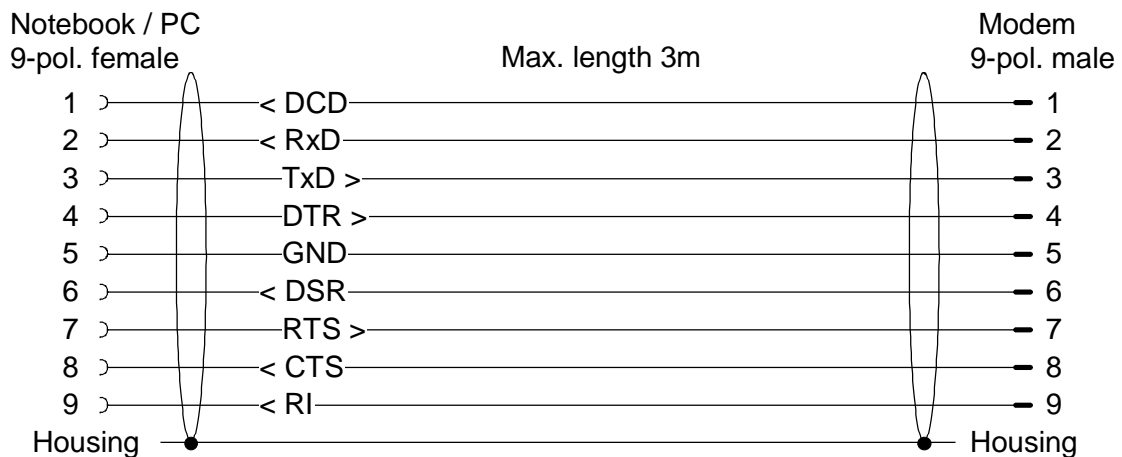
6.1 Cable from PC to "Office modem"

The standard modem cables connect the office modem with the PC or notebook. These cables are not contained in the scope of delivery of each order, are however available as a standard article by mail order or from specialised dealers.

6.1.1 Office modem cable from PC 9-pol. to modem 25-pol.



6.1.2 Office modem cable from PC 9-pol. to modem 9-pol.

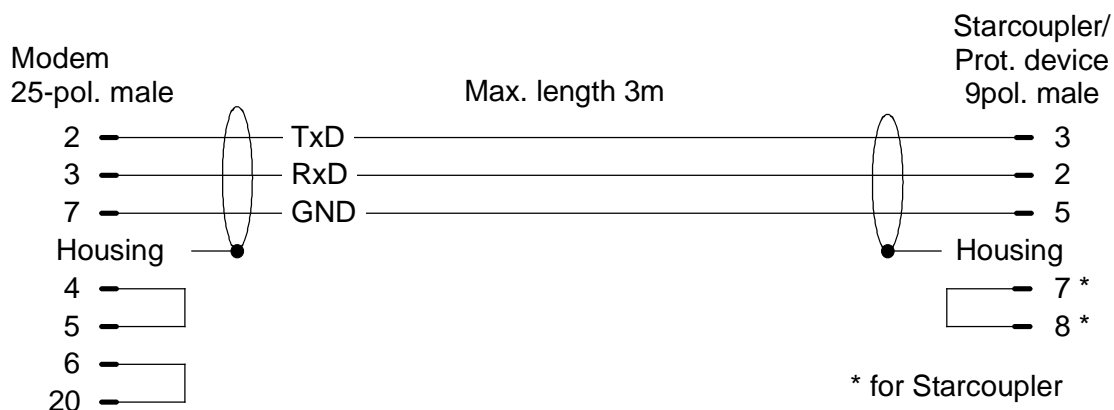


6.2 Cable from "Substation modem" to converters or Prot. devices

A direct connection from the modem to the protection devices is generally not advisable, as induced over-voltages (e.g. lighting strike or inadequate earthing conditions) may destroy non-isolated interfaces of the protection devices.

Note: A galvanic separation between modem and protection device via RS232-FO converter e.g. 7XV5101 or 7XV5652-0BA00 is strongly recommended.

6.2.1 7XV5810-0AA10 Substation modem 25-pol. to Prot. device with 9-pol. interface



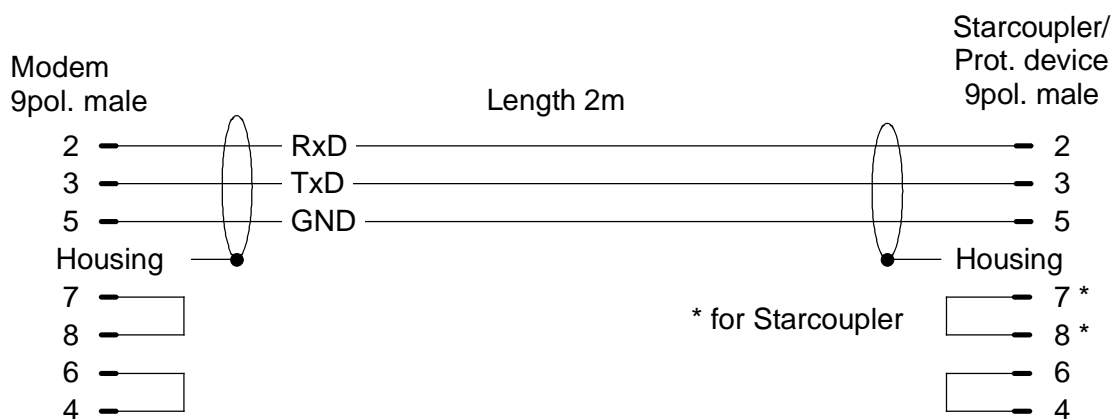
6.2.1.1 7XV5810-0AA10 Additional Application

The following devices have the same pin allocation as the protection devices with 9-pole interface and can also be connected to a modem with a 9-pole interface with this cable.

(Mini-) Star coupler	7XV5300, 7XV5450
Active Mini-Star coupler	7XV5550
RS232-FO Converter	7XV5652

With this cable and the 9/25-pole adapter 7XV5100-8H, protection devices with 25-pole interface can also be connected.

6.2.2 7XV5820-0AA10 Substation modem 9-pol. to Prot. device with 9-pol. interface



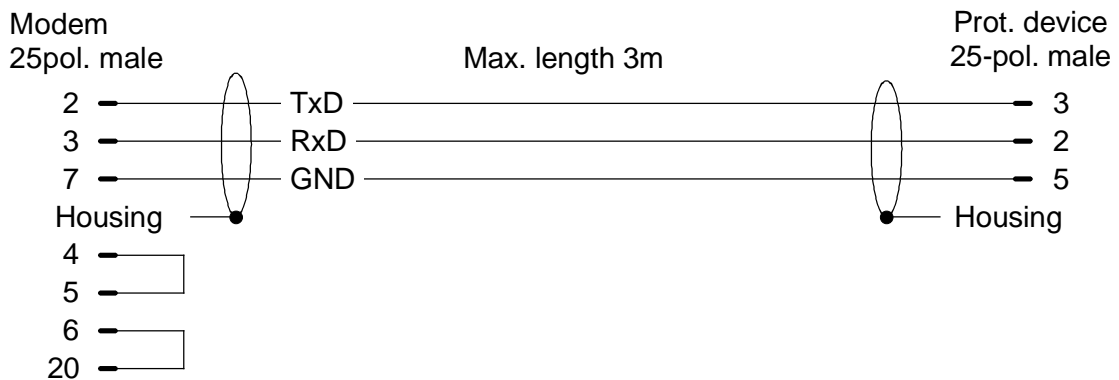
6.2.2.1 7XV5820-0AA10 Additional Application

The following devices have the same pin allocation as the protection devices with 9-pole interface and can also be connected to a modem with a 9-pole interface with this cable.

(Mini-) Star coupler	7XV5300, 7XV5450
Active Mini-Star coupler	7XV5550
RS232-FO Converter	7XV5652

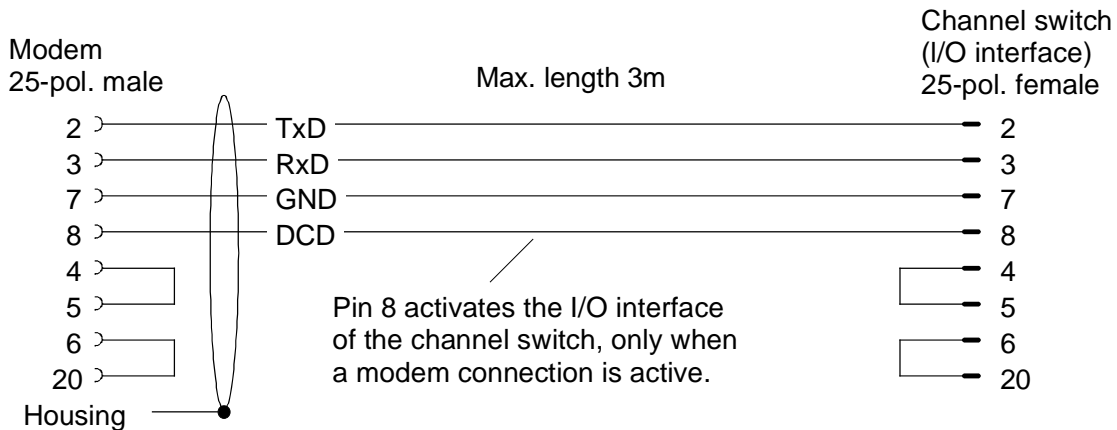
With this cable and the 9/25-pole adapter 7XV5100-8H, protection devices with 25-pole interface can also be connected.

6.2.3 Substation modem 25-pol. to Prot. device with 25-pol. front interface



6.2.4 Substation modem 25-pol. to I/O on Channel switch 7XV5500

The 25-pole modem interface of the channel switch can be directly connected to the modem, if all protection devices are connected via FO-converter.



7 RS232 - FO Converter with accessories

The RS232 – FO plug modules enable the optical connection of protection devices with electrical (also non-isolated) RS232 interface to e.g. a star coupler for central operation. Further devices such as a PC, notebook, modem, or channel switch can be protected from electro-magnetic interference in this way. A suitable plug module is available for each of the listed applications.

The RS232 – FO plug modules are supplied in Sub-D plug housings and may be plugged directly onto the interface of the corresponding devices. If the plug modules are applied correctly, no additional settings need to be made.

The quiescent state of the optical interface is generally light OFF. Data transmission takes place full-duplex and is transparent up to 115 kBaud. The optical interface with FSMA plug operates at 850nm and has a typical reach of 1500m with 62,5µm fibre optic cable.

The various versions have the following differences: number of pins (9 or 25-pole), the plug design (male or socket) and the auxiliary voltage supply (pin 9 or power supply plug). More information regarding application and type can be found in the following individual descriptions, the technical data and the order information.

7.1 7XV5101 RS232 - FO Converter

7.1.1 7XV5101-0A For Prot. device with 25pol. interface

The RS232 - FO Converter 7XV5101-0A may be directly plugged onto the 25-pole front interface of the numerical protection devices. The RS232 signals are transparently converted into light signals. The control wires are bypassed and are not supported. The module is supplied via the protection device interface (Pin 9) and accordingly does not require additional power supply. After opening the housing, the plug allocation DCE/DTE may be converted for other applications. The default setting is DCE and quiescent state light "OFF". The quiescent state of the light cannot be changed.

7.1.2 7XV5101-0B For modem with 25pol. interface

The RS232 - FO plug module 7XV5101-0B may be directly plugged onto the 25-pole modem interface. The RS232 signals are transparently converted into light signals. The control wires are bypassed and are not supported.

The module is supplied via a binder socket by an external power supply (not included in the scope of delivery). The plug allocation DCE/DTE may be converted for applications after opening of the housing. The default setting is DCE and the quiescent state light OFF. The quiescent state of the light cannot be changed.

A standard mouse adapter (9-pole male to 25-pole socket) can be used between the modem and the plug module in the case of a modem with a 9-pole connection.

7.1.3 7XV5101-1A For Channel switch (I/O-interface)

The RS232 – FO plug module 7XV5101-1A may be plugged directly onto the rear 25-pole I/O-interface of the active channel switch 7XV55. Die RS232 signals are transparently converted into light signals. Die control wires are bypassed and are not supported. The module is supplied via the I/O interface (Pin 9), and accordingly requires no additional power supply. The plug allocation DCE/DTE may be converted for applications after opening of the housing. The default setting is DTE and quiescent state light OFF. The quiescent state of the light cannot be changed.

7.1.4 7XV5101-1B For PC (Desktop) with 25pol. interface

The RS232 - FO plug module 7XV5101-1B may be directly plugged onto the 25-pole PC interface. The RS232 signals are transparently converted into light signals. The control wires are bypassed and are not supported.

The module obtains its power (5V) from an external power supply via a binding socket (contained in the scope of delivery).

The plug allocation DCE/DTE may be converted for applications after opening of the housing. The default setting is DTE and quiescent state light OFF. The quiescent state of the light cannot be changed.

For a notebook with a 9-pole connection, a standard mouse adapter (9-pole male to 25-pole socket) can be used between modem and plug module.

7.1.5 7XV5101-3A For Channel switch (Prot. device interface)

The RS232 - FO plug module 7XV5101-3A may directly be plugged into one of the up to 32 rear 9-pole interfaces of the active channel switch 7XV5500. The RS232 signals are transparently converted into light signals. The control wires are bypassed and are not supported.

The module obtains its power via the interface of the active channel switch (Pin 9), and accordingly does not require additional power supply. The default setting is DTE and quiescent state light OFF. The quiescent state of the light cannot be changed.

7.1.6 7XV5101-3C For Notebook with 9pol. interface

The RS232 – FO plug module 7XV5101-3C may be directly plugged onto the 9-pole serial interface of the notebook.

The RS232 signals are transparently converted into light signals. The control wires are bypassed and are not supported.

The module obtains its power via a cable from the keyboard DIN interface or the mouse DIN interface of the notebook.

The default setting is DTE and quiescent state light OFF. The quiescent state of the light cannot be changed.

7.2 Designs and Pin Configurations

7.2.1 Tabular representation

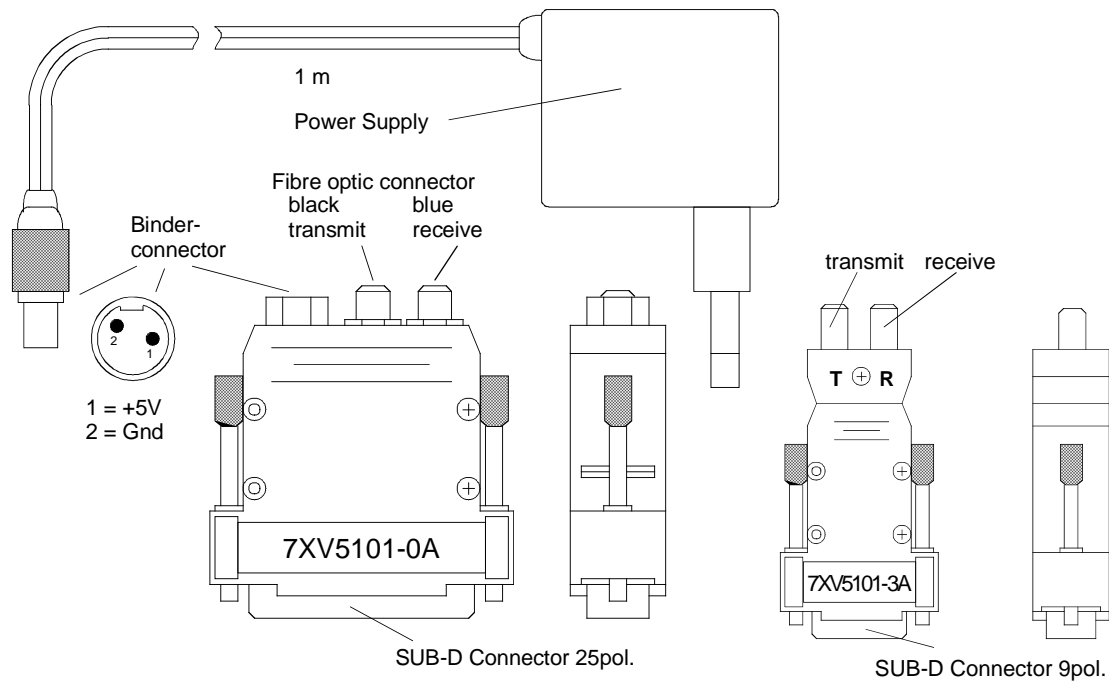
	7XV5101-	0A	0B	1A	1B	3A	3C
Housing:	Plastics , metal-plated	X	X	X	X	X	X
	Dimensions 58 x 53 x 17	X	X	X	X		
	Dimensions 72 x 32 x 17					X	X
Power supply	+5V via pin 9	X	1)	X	1)	X	
	+5V via female connector	2)	X	2)	X		
	Plug-in PSU 220V/50Hz (included in delivery)		X		X		
	via keyboard connector of the notebook						X
Electrical interfaces	V.24 / RS232 DCE (steady light OFF)	X	X				
	V.24 / RS232 DTE (steady light OFF)			X	X	X	
	DTE / DCE switchable	X	X	X	X		
	Assignment: 2 TxD, 3 RxD, 5 GND					X	
	Assignment: 3 TxD, 2 RxD, 5 GND						
	Assignment: 2 TxD, 3 RxD, 7 GND			X	X		
	Assignment: 2 RxD, 3 TxD, 7 GND	X	X				
	Assignment: 9 +5V	X	X	X	X	X	
	Bridge contact: 4-5, 6-8-20 (25-pin)	X	X	X	X		
	Bridge contact: 7-8, 1-4-6 (9-pin)					X	X
Optical interfaces	Plug-in connection FSMA black = transmit blue = receive	X	X	X	X		
	Plug-in connection FSMA T = transmit R = receive					X	X
	Optical Power	27μW (-5,7dBm)*	X	X	X	X	X
	Sensitivity	1μW (-30dBm)*	X	X	X	X	X
	Optical Budget	7dB (+3dB Res.)*	X	X	X	X	X
	Wavelength	850nm	X	X	X	X	X
	Transmission Distance	1500m / 62,5μm 800m / 50μm	X	X	X	X	X

* Valid for 62,5μm glass fibre cable

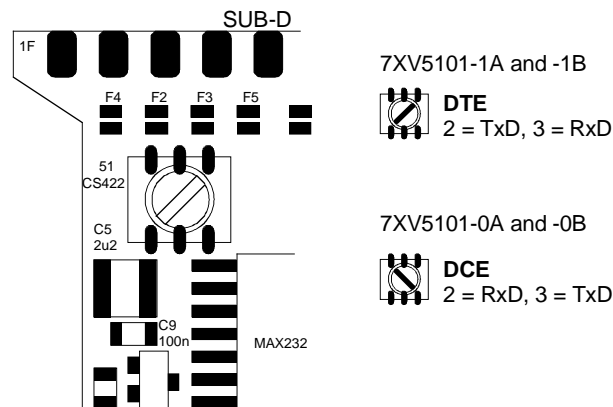
1) Only for 7XV5101-xB (not for 7XV5101-xB /B)

2) Pin 9 may not be allocated

7.2.2 Graphical Outline



7.2.3 Switching DTE / DCE in the 7XV5101-0x and -1x



7.3 Ordering data (MLFB)

Description

RS232 - LWL plug modules

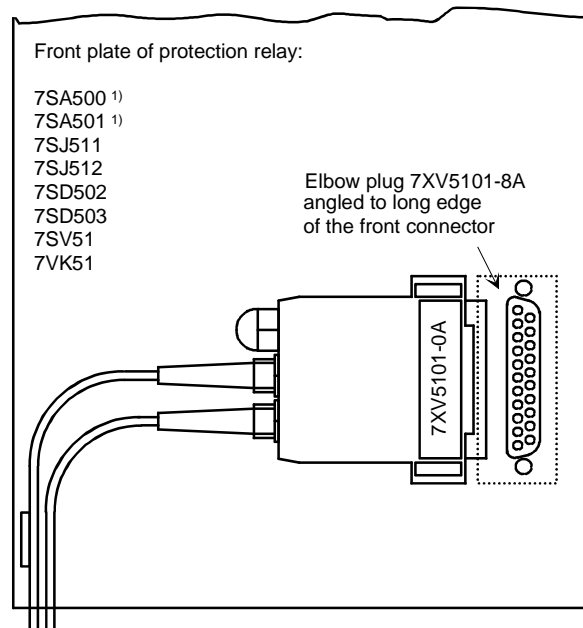
for Protection device 25-pol. male	U_H +5V on Pin 9
for Modem 25-pol. male	U_H 220V AC
for 7XV5500 I/O 25-pol. female	U_H +5V on Pin 9
for PC 25-pol. female	U_H 220V AC
for 7XV5500 to Prot. device 9-pol. female	U_H +5V on Pin 9
for Notebook 9-pol. female	U_H +5V (DIN-plug)

7XV5101 -	
0	A
0	B
1	A
1	B
3	A
3	C

7.4 Elbow plug for 25-pol. front interface on prot. device V3

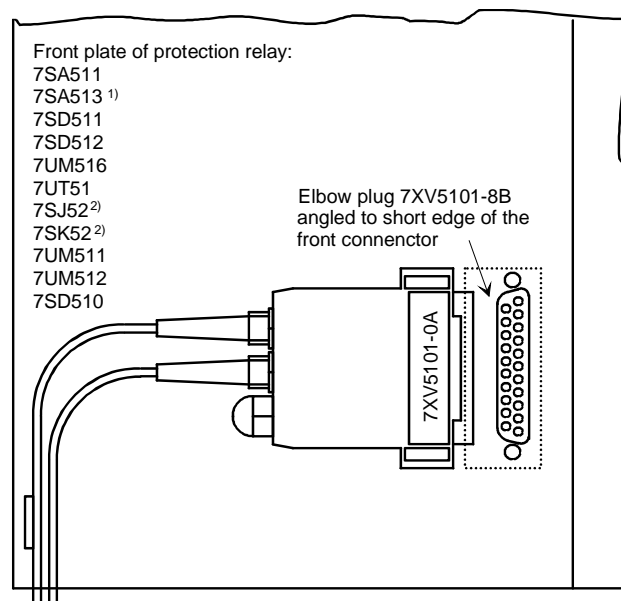
If FO plug converters 7XV5101-0A are to be plugged onto the front interface under the cover of the protection devices, the elbow plug 7XV5101-8x must be used. Two outlets have to be applied at a suitable place on the front frame for the FO cables. As the protection devices V3 have differing interfaces, the elbow plugs are available in two variants.

7.4.1 7XV5101-8A (angled towards long edge of relay connector)



1) Connector on the left; fibre-optic outlet down to the right.

7.4.2 7XV5101-8B (angled towards short edge of relay connector)



1) Connector on the left; fibre-optic outlet down to the right.

2) Connector on the right; fibre-optic outlet on the left passing through the cover.

Suggestions and questions regarding this product are to be addressed to:

Siemens AG

Sector:
Energy Sector
Energy Automation

P.O. Box 4806
D-90026 Nürnberg

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E-Mail: support.energy@siemens.com

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