

## 7XV5461 two-channel serial optical repeater (for 1 mono-mode FO cable)



**Fig. 13/44** Optical repeater with integrated 1300 nm/1550 nm wavelength multiplexer for one single mono-mode FO-cable

### Function overview

- Two independent multiplexed 820 nm Ports 1/2 with ST connectors for max. 1.5 km via 50/125  $\mu\text{m}$  and 62.5/125  $\mu\text{m}$  multi-mode FO cable.
- Data rate of serial Ports 1/2 from 300 bit/s – 4.096 Mbit/s. Automatic baud rate adjustments to synchronous and asynchronous serial signals; no settings necessary.
- Powerful 1300 nm/1550 nm port with LC-single connector for distances up to 40 km via one 9/125  $\mu\text{m}$  mono-mode FO cable
- DC 24 to 250 V and AC 115/230 V wide-range power supply with alarm relay.
- Data exchange display by LED
- Integrated commissioning support

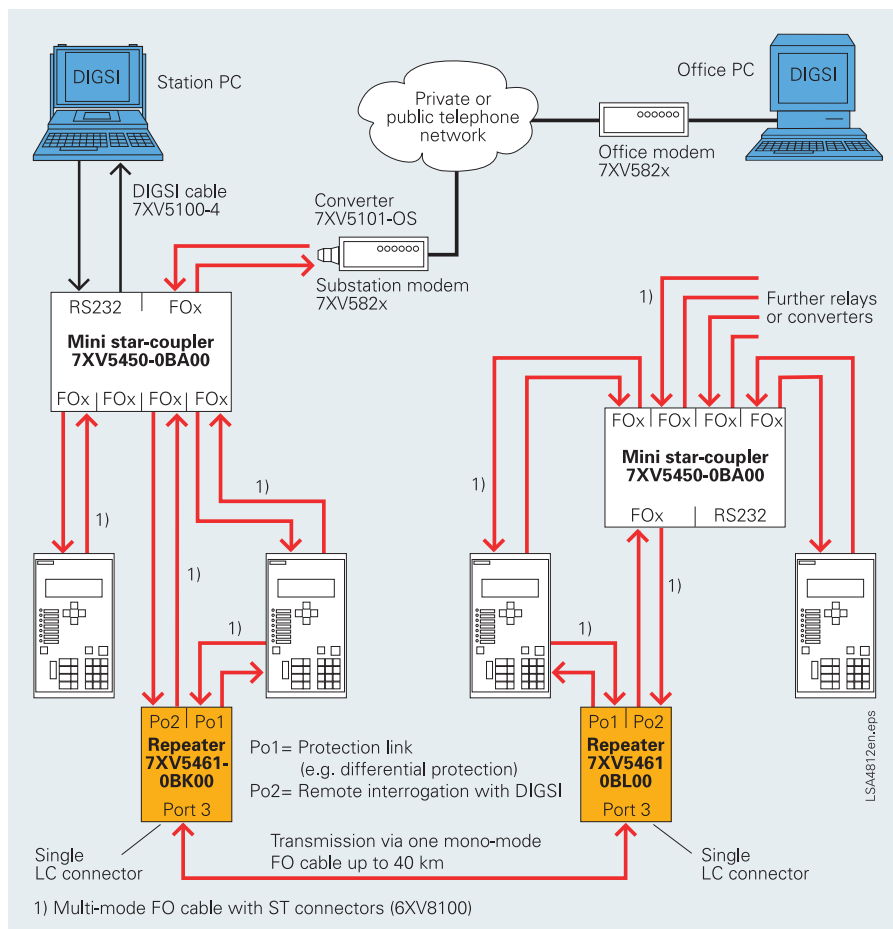
### Description

The optical repeater exchanges serial optical signals over long distances via only one single mono-mode FO cable. It converts serial optical 820 nm signals at Port 1 and Port 2 in the range 300 bit/s – 4.096 Mbit/s to 1300/1550 nm for one mono-mode FO cable. Both synchronous and asynchronous signals can be connected at Port 1/2. Two independent, serial 820 nm inputs with ST connectors are available, which are multiplexed to Port 3. Two devices with an optical 820 nm interface, for example the 7SD5/7SD610 line differential protection relay or the RS232/820 nm 7XV5652 converter, can be connected to Ports 1 and 2 via multi-mode FO cables for distances of up to 1.5 km. Signal transmission at Port 3 is achieved via the single LC connector at wavelengths of 1300 nm/1550 nm for connection of mono-mode FO cable up to 40 km. The device can be connected to DC battery voltages and AC supply sources. Loops can be activated for Port 1/2 for commissioning purposes, so that the input signals can be mirrored at each port to support commissioning of the fiber optical links.

## Application, technical data

### Application

Until now, two FO cables are required for the bidirectional transmission of protection signals. With the repeater with integrated wavelength multiplexer one FO cable is sufficient: Two protection relays e.g. 7SD52/7SD610 differential protection or 7SA52/7SA6 distance protection, exchange information via Port 1 (po1). Interference-free data exchange is performed via one optical mono-mode FO cable up to a max. distance of 40 km. Protection remote control with DIGSI is connected to Port 2 of the repeater via a 7XV5450 mini star-coupler. This port provides the serial connection to the other substation with a PC on which DIGSI is installed. In this way, the remote protection devices can be remotely interrogated via Port 2. The baud rate is optimally set to 57.6 kbit/s so that there is no difference from local operation. The data of the devices on the other substation can be changed or read out during commissioning and operation. Alternatively, it is possible to connect substation control devices, RTU or additional protection data transmission to Port 2. This makes for optimum use of the long-distance optical cable for two separate serial connections for transmitting serial data between 300 bit/s and 4.096 Mbit/s.



**Fig. 13/45** Transfer of protection data signals and remote control/integration via one mono-mode FO cable  
(Note: Devices 7XV5461-0BK00 and 7XV5461-0BL00 must be used in pairs)

### Technical data

#### Connections

Ports 1 / 2	ST connector for 820 nm for 50/125 $\mu\text{m}$ and 62.5/125 $\mu\text{m}$ multi-mode FO cable
Port 3	LC-single connector for 1300 nm/1550 nm for 9/125 $\mu\text{m}$ mono-mode FO cable
Screw-type terminals	2-pole screw-type terminals for auxiliary voltage supply 3-pole make/break contact for alarm relay

#### Housing

Interference-free 188 x 56 x 120 mm metal housing for mounting on 35 mm DIN rail to EN 50032.  
Weight 0.8 kg. Degree of protection acc. to EN 60529: IP41

#### Power supply

Wide range DC 24 to 250 V or AC 115/230 V

#### Displays

4 LEDs	
Green	Power supply
Red	Alarm relays
2 yellow	Data exchange indication

Description	Order No.
<b>Two-channel serial optical repeater with integrated wavelength multiplexer</b>	7XV5461 - 0B□00
Connection of two serial optical inputs with ST connector for 62.5/125 µm multi-mode FO cable up to 1.5 km, from 300 bit/s – 4.096 Mbit/s 24 – 250 V DC, 115/230 V AC wide-range power supply Alarm relay and LED for operational and fault display Optical 1550 nm output with LC-single connector for 9/125 µm mono-mode FO cable for distances up to 40 km (permissible path attenuation 25 dB)	K
Optical 1300 nm output with LC-single connector for 9/125 µm mono-mode FO cable for distances up to 40 km (permissible path attenuation 25 dB)	L



## 7XV5461 two-channel serial optical repeater (for duplex-mono-mode FO cables)



Fig. 13/46 Optical repeater with wide-range power supply

### Function overview

- Two independent multiplexed 820 nm ports with ST connectors for max. 1.5 km via 50/125  $\mu\text{m}$  and 62.5/125  $\mu\text{m}$  duplex-multi-mode FO cable.
- Data rate of serial ports 1/2 from 300 bit/s – 4.096 Mbit/s. Automatic baud rate adjustment to synchronous and asynchronous serial signals; no settings necessary.
- Powerful 1300 nm/1550 nm port with LC-Duplex connector for distances up to 24 km / 60 km / 100 km / 170 km via 9/125 mm duplex-mono-mode FO cable
- DC 24 to 250 V and AC 115/230 V wide-range power supply with alarm relay.
- Data exchange display by LED
- Integrated commissioning support

### Description

The optical repeater transmits serial optical signals over long distances via duplex-mono-mode FO cables. It converts serial optical 820 nm signals at Port 1 and Port 2 in the range of 300 bit/s to 4.096 Mbit/s. Both synchronous and asynchronous signals can be connected. Two independent, serial 820 nm inputs with ST connectors are available, which are multiplexed to Port 3. Two devices with an optical 820 nm interface, for example the 7SD5 / 7SD6 line differential protection relay or the RS232/ 820 nm 7XV5652 converter, can be connected to Ports 1 and 2 via duplex-multi-mode FO cables for distances of up to 1.5 km. Signal transmission at Port 3 is achieved via the LC-Duplex connector at wavelengths of 1300 nm/1550 nm for connection of a duplex-mono-mode FO cable. For Port 3 there are three options for max. 25 km (1300 nm) / 60 km (1300 nm) and 100 km / 170 km (1550 nm) optical fiber lengths. The device can be connected to all battery voltages and AC supply sources. Loops can be activated for Ports 1/2 for commissioning purposes, so that the input signals can be mirrored at the port in question.



Description	Order No.
<b>7XV5461 two-channel serial optical repeater (for duplex-mono-mode FO cables)</b>	<b>7XV5461 - 0B□00</b>
Connection of two serial optical inputs with ST connector for 62.5/125 µm multi-mode FO cable up to 1.5 km, from 300 bit/s to 4.096 Mbit/s 24 to 250 V DC, 115/230 V AC wide-range power supply Fault relay and LED for operational and fault display	
Optical 1300 nm output with LC-Duplex connector for 9/125 µm mono-mode FO cable for distances up to 24 km (permissible path attenuation 13 dB)	<b>G</b>
Optical 1300 nm output with LC-Duplex connector for 9/125 µm mono-mode FO cable for distances up to 60 km (permissible path attenuation 29 dB)	<b>H</b> <sup>1)</sup>
Optical 1550 nm output with LC-Duplex connector for 9/125 µm mono-mode FO cable for distances up to 100 km (permissible path attenuation 29 dB)	<b>J</b> <sup>1)</sup>
Optical 1550 nm output with LC-Duplex connector for 9/125 µm mono-mode FO cable for distances up to 170 km (permissible path attenuation 43 dB)	<b>M</b>
1) When ordering options H/J an additional attenuator is required if the devices are used for distances < 20 km	





## 7XV5461 two-channel serial optical repeater (for duplex-multi-mode FO cables)



Fig. 13/48 Optical repeater with wide-range power supply

### Description

The optical repeater transmits serial optical signals over long distances via duplex-multi-mode FO cables. It converts serial optical 820 nm signals at Port 1 and Port 2 in the range 300 bit/s – 1.5 Mbit/s to 1300 nm for duplex-multi-mode fiber cables. Both synchronous and asynchronous signals can be connected. Two independent, serial 820 nm inputs with ST connectors are available, which are multiplexed to Port 3. One transmit (Tx) and one receive (Rx) signal is supported (no RTS/CTS handshake signals). Two devices with an optical 820 nm interface, for example the 7SD52/7SD610 line differential protection relay or the RS232/820 nm 7XV5652 converter, can be connected to Ports 1 and 2 via duplex-multi-mode FO cables for distances of up to 1.5 km. Signal transmission at Port 3 is achieved via the LC-Duplex connector at wavelengths of 1300 nm for connection of a duplex-multi-mode FO cable. For Port 3 there are two options for a max. of 4 km (1300 nm) and 8 km (1300 nm) optical fiber lengths. The device can be connected to all battery voltages and AC supply sources. Loops can be activated for Ports 1/2 for commissioning purposes, so that the input signals can be mirrored at the port in question.

### Function overview

- Two independent multiplexed 820 nm ports with ST connectors for a max. of 1.5 km via 50/125  $\mu\text{m}$  and 62.5/125  $\mu\text{m}$  duplex-multi-mode FO cable.
- Data rate of serial Ports 1/2 from 300 bit/s – 1.5 Mbit/s. Automatic baud rate adjustment to synchronous and asynchronous serial signals; no settings necessary.
- Powerful 1300 nm port with LC-Duplex connector for distances up to 4 km/8 km via 50/125 mm / 62.5/125 mm duplex-multi-mode FO cable
- DC 24 to 250 V and AC 115/230 V wide-range power supply with alarm relay.
- Data exchange display by LED
- Integrated commissioning support with test loop feature

### Typical applications

Two protection relays (for example 7SD52/7SD610 differential protection or 7SA52/7SA6 distance protection) exchange information via Port 1. Interference-free data exchange is performed via optical duplex-multi-mode FO cable up to a distance of 4/8 km. Protection remote control with DIGSI is connected to Port 2 of the repeater via 7XV5450 mini star-coupler. This port provides the serial connection to the other substation with a PC where DIGSI is installed. The protection relays on the remote substation can be interrogated remotely via Port 2. The baud rate is optimally set to 57.6 kbit/s so that there is no difference from local operation. During commissioning and operation, the data of the device in the other substation can be changed and read out. Alternatively, it is possible to connect a substation control system or additional protection data transmission to Port 2. This makes for optimum use of the long-distance optical fiber for two separate serial connections for transmitting data between 300 bit/s and 4.096 Mbit/s.

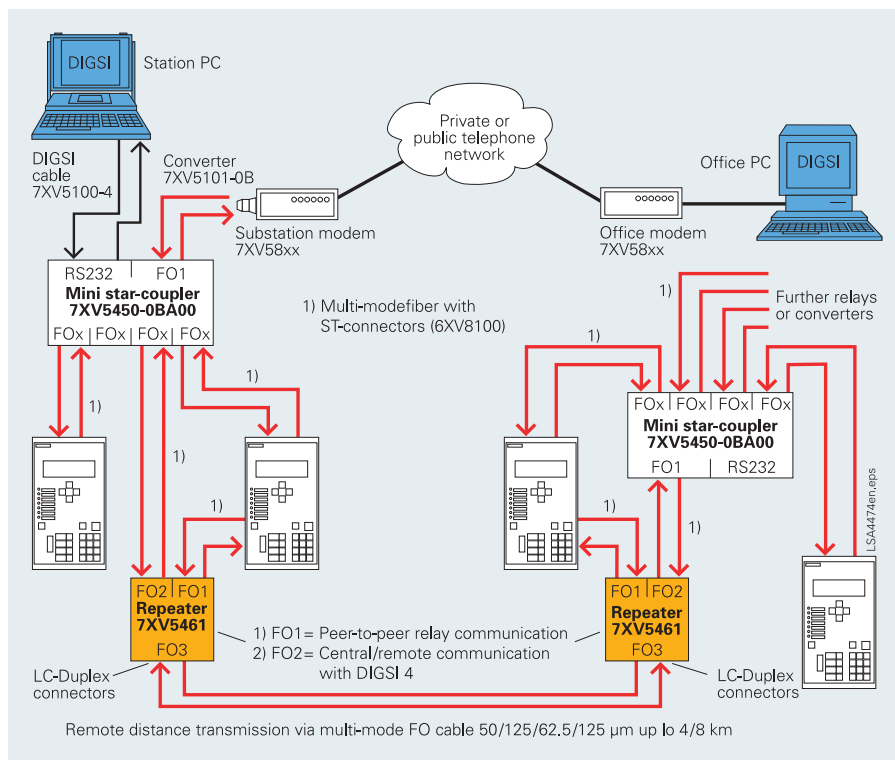


Fig. 13/49 Transfer of protection data and remote control of a substation via an optical long-distance connection

### Technical data

#### Connections

Ports 1/2	ST connector for 820 nm for 50/125 μm and 62.5/125 μm multi-mode FO cable
Port 3	LC-Duplex connector for 1300 nm for 50/125 μm / 62.5/125 μm multi-mode FO cable
Screw-type terminals	2-pole screw-type terminals for auxiliary voltage supply 3-pole make/break contact for alarm relay

#### Housing

188 × 56 × 100 mm aluminum housing for mounting on 35 mm DIN rail to EN 50032. Weight 0.8 kg.  
Degree of protection acc. to EN 60529: IP41

#### Power supply

Wide range 24 to 250 V DC without connector jumpers, AC 115/230 V

#### Displays

4 LEDs	
Green	Power supply
Red	Alarm relays
2 yellow	Data exchange

Description	Order No.
<b>Two-channel serial optical repeater (for duplex multi-mode FO cables)</b>	7XV5461 - 0B□00
Connection of two serial optical inputs with ST connector for 62.5/125 µm multi-mode FO cable up to 1.5 km, from 300 bit/s to 1.5 Mbit/s DC 24 to 250 V, AC 115/230 V wide-range power supply Fault relay and LED for operational and fault display Optical 1300 nm output with LC-Duplex connector for 50/125 µm / 62.5/125 µm multi-mode FO cable for distances up to 4 km (permissible path attenuation 13 dB)	F
Optical 1300 nm output with LC-Duplex connector for 50/125 µm / 62.5/125 µm multi-mode FO cable for distances up to 8 km (permissible path attenuation 29 dB)	E