7XV5662-0AC00/7XV5662-0AC01
Communication Converter for Pilot Wires

Fig. 13/42
Communication converter for pilot wires

Description

The communication converter copper (CC-CO) is a peripheral device linked to the protection device which enables serial data exchange between two protection relays. It uses a single pair of copper wires (pilot wire) that may be part of a telecommunications cable or of any other suitable symmetrical communications cable (no Pupin cable). At the opposite side, the data are converted by a second communication converter so that they can be read by the second protection device. The communication converters (master/slave) thus allow two protection devices to communicate synchronously and to exchange large data volumes over considerable distances. Typical applications are the protection interfaces of differential protection and distance protection of the devices 7SD5, 7SD6, 7SA52 and 7SA6, where 7XV5662-0AC00 must be used (synchronous connection with 128 kbit/s). Should asynchronous serial data of differential protection 7SD5 or of the binary signal transducer 7XV5653 be transmitted, the device 7XV5662-0AC01 must be used (asynchronous from 300 bit/s to 38.2 kbit/s).

Interference-free connection to the protection device is achieved by means of a multi-mode fiber-optic cable, with ST connectors at the CC-CO. The maximum optical transmission distance is 1.5 km (0.93 mile). The data transfer between the protection devices is realized as a point-to-point connection that is bit-transparent. Data must be exchanged via dedicated pilot wires, not via switching points.

Function overview

- Optical interface with ST connector for connection to the protection unit
- Distance: 1.5 km with 62.5/125 µm multi-mode FO cable between CC-CO and the protection unit
- Electrical interface to the pilot wire (line) with 2 screw-type terminals. 5 kV isolated
- Synchronous data exchange for 7SD52, 7SD6, 7SA6 and 7SA52 via pilot wire (typ. 15 km) (CC-CO version -0AA00)
- Asynchronous data exchange for 7SD51, 7XV5653 or other units with asynchronous interface (CC-CO version -0AA01) (typ. 15 km)
- Loop test function selectable by jumpers in CC-CO
- Master or slave mode of the CC-CO selectable by jumper (one master and one slave device required at the end of the pilot wire, factory presetting: master mode)
- Wide-range power supply with self-supervision function and alarm contact

Application

The CC - CO can be used for two applications.
One application is the synchronous serial data exchange (converter version – 0AA00) between SIPROTEC 4 differential relays (7SD52, 7SD6) and/or the serial teleprotection between distance relays (7SA6 and 7SA52). The relays have to be equipped with an optical 820 nm plug-in module "FO5".

Another application is the transmission of asynchronous serial data via pilot wires to the line differential protection relay 7SD51 or the binary signal transmitter 7XV5653. Other serial devices may also be used.

If the maximum distance between the protection units is longer than spanned by two CC-CO, the converters can be cascaded (see Fig. 13/44). A power supply between the two master units is required. If the isolation level is higher than 5 kV (provided by the pilot wire inputs of the units), external isolation transformers (barrier transformers) can be used on both sides. These transformers offer 20 kV isolation voltage and thus help to avoid hazardous high voltages at the inputs of the CC-CO, which might be induced by a short-circuit from a parallel power line or cable.

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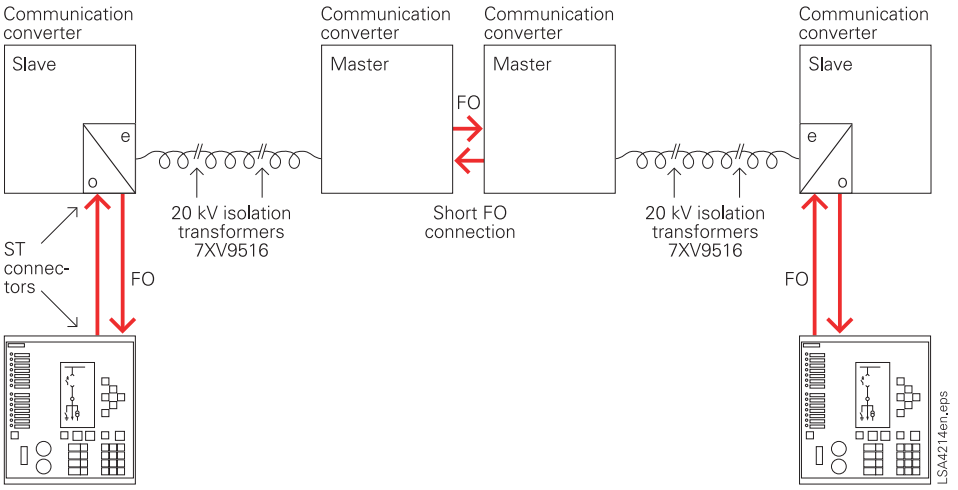

Fig. 13/44

Functions

The protection unit is optically linked to the CC-CO, which makes interference-free data transfer between the CC-CO and the protection unit possible. The communication converter is located close to the pilot wire. It converts serial data of the protection unit into a frequency-modulated signal. This signal is transmitted via one pair of copper wires of a pilot wire/communication line (bi-directional, full duplex operation).

By means of jumpers, one unit is defined as "master" and the other unit as "slave". In a "training" during commissioning, the electrical characteristics of the pilot wire are measured by pressing a pushbutton, and the CC-COs are tuned to these characteristics.

The measured characteristics are used as parameters that will be adhered to for optimal data transfer. Digital data transfer makes a low insulation level of the pilot wire possible, because no high voltages are produced on the pilot wire during short-circuit conditions.

Data transfer between the protection units is effected on the basis of a point-to-point connection, furthermore it is a synchronous, bit-transparent transmission. Due to the telegram-backed data exchange, mal-operation is ruled out.

Technical data

Rated auxiliary voltage	
24 to 250 V DC	± 20 %
115/230 V AC	± 20 % without switchover
LEDs	
4 LEDs	
LED 1	Red: Line activation
LED 2	Yellow: Line transparent
LED 3	Yellow: Data transfer
LED 5	Green: Power ON
Connectors	
Power supply	2-pole screw-type terminal
Alarm/ready contact	3-pole make/break contact
Pilot wire	2-pole for pilot-wire connection 5-kV isolated inputs
FO cable	820 nm, 2 ST connectors for TxD and RxD for 62.5/125 µm multi-mode FO (max. distance to protection unit 1.5 km)
Pushbutton	
Measuring and training of parameters of the pilot wire	
Housing	
Aluminum die-cast housing	Dimensions 188 x 56 x 120 mm (WxHxD)
Weight	Approx. 0.8 kg
Degree of protection	According to EN 60529: IP41
For snap-on mounting onto 35 mm	EN 50022 rail
Operating mode	
Synchronous operation with	7XV5662-0AC00 for 7SD52, 7SD6, 75A52 and 7SA6 Setting in the protection unit: 128 kbit/s per parameter Setting in CC - CO: 128 kbit/s. No setting required
Asynchronous operation with	7XV5662-0AC01 for 7SD51, 7XV5653 and units with asynchronous serial interface (no handshake supported, only serial TxD and RxD signals are supported) Max. baud rate for protection unit: 38.4 kbit/s Max. baud rate for CC - CO 128 kbit/s. No setting required
Max. distance with pilot wire	AWG 22 / 0.33 mm^2 / 51.7 Ω/km: max. 11 km AWG 26 / 0.13 mm^2 / 137 Ω/km: max. 4.5 km Shielded twisted pair (STP) recommended. Max. loop resistance: 1400 Ω Attenuation < 40 dB at 80 kHz

Selection and ordering data

Description	Order No.
Communication converter for pilot wires	*7XV5662 - 0AC0☐*
Converter for synchronous or asynchronous serial coupling of protection units with optical inputs/outputs with ST connector to conventional pilot wires. 5-kV isolation of unit analog inputs towards the pilot wires. Connection to protection unit via FO cable for 62.5/125 µm and 820 nm wavelength, max. distance 1.5 km, ST connectors Synchronous serial data 128 kbit/s Asynchronous serial data rate max. 57.2 kbit/s	
For synchronous operation with 7SD52, 7SD6, 7SA6, 7SA52	*0*
For asynchronous operation with 7SD51, 7XV5653 for other units	*1*

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