7XV5664-0 /7XV5654 GPS/DCF77 time synchronization system

GPS-time signal receiver

7XV5654 time synchronization unit (sync.-transceiver)

Fig. 13/124 GPS/DFC77 time synchronization system

Description

With the GPS-time signal receiver 7XV5664-0 and additional components wide-range power supply 7XV5810, mini star-coupler 7XV5450 and sync-transceiver 7XV5654, a comprehensive solution for time synchronization of any number of SIPROTEC protection devices is possible. A simple PC-Software (included in the scope of delivery) facilitates the setting of the receiver via a RS232 interface. The transmission of the time signals (telegrams or impulses) takes place, immune to disturbances, via a FO cable to the protection cubicles, where the time signals are electrically converted with the Sync-Transceiver. The standard version can, with the output of special protocols, also be used for the synchronisation of further devices, e.g. Reyrolle ARGUS 1 or SIMEAS Q80. For the SIPROTEC line differential protection 7SD52 or for SIMEAS R-PMU, the special version provides a highly accurate pulse per second. The GPS antenna with 25 m cable to the receiver is included in the scope of delivery. Lightning protection is optionally available.

Function overview

- GPS exterior antenna with wall mounting and 25 m cable RG59, lightning protection is optional GPS-antenna input (BNC-plug)
- PC-input, RS232 (9-pol. Sub-D plug) with operating program and 1m connection cable
- 2 optical signal outputs FL1/2 for FO cable 62,5/125 µm and ST-plug for disturbance free transmission of the signals
- Auxiliary voltage DC 18-60 V/optionally with wide-range power supply 7XV5810-0BA00, DC 24-250 V/AC 100 – 230 V.
- Aluminium housing for rail mounting.

Standard Version 7XV5664-0CA00:

- Signal outputs FL1/2: telegrams selectable IRIG-B, DCF77-, NMEA, IEC60870-5-103, second or minute impulses.
- 3D-mode with at least 4 satellites or
- Fix-mode with at least 1 satellite.

Special Version 7XV5664-0AA00:

- Signal outputs FL1/2: fixed telegrams
  FL 1 = highly accurate second impulse
  FL 2 = IRIG-B or DCF77
- Only 3D-mode with at least 4 satellites.

Application

Application

The "Normal Time" standard application

With the GPS-time signal receiver 7XV5664-0CA00 all connected protection devices are synchronized to "Normal Time". In this way, the internal clock of the protection devices is synchronized by a standardized telegram e.g. IRIG-B, DCF77, IEC60870-5-103, NMEA or a minute impulse.

For this purpose the protection devices provide suitable interfaces e.g. SIPROTEC 4 provides Port A.

The antenna is mounted to an outside wall with free sight to the sky and the optional lighting protection is looped into the antenna cable.

The GPS-time signal receiver is mounted close to the antenna, and is either supplied with auxiliary voltage via the optional wide-range power supply from the AC mains, or the substation battery.

The transmission of the time telegrams or synchronizing impulses takes place, immune to interference, with FO cable to the protection devices distributed in the plant. An extension of the optical star structure can be implemented with the mini star-coupler 7XV5450. For the conversion of the FO signals to 24 V signals as required by the SIPROTEC 4 time synchronization interfaces (Port A), sync-transceivers 7XV5654 are implemented.

Detailed application examples may be found in the manual of the sync-transceivers 7XV5654.

The SIPROTEC 4 protection devices are connected to the sync-transceiver 7XV5654 via "Port A" with the specially designed bus cable system 7XV5104 (see Fig.13/125). Note: No bus termination resistance is required here.

All SIPROTEC protection devices with internal clock

may be synchronized with the minute impulse from the GPS receiver via a binary input. For this purpose the internal clock of the protection device is set at each full minute to the exact beginning of the new minute. A pre-condition for this method is that the internal clock of the protection device is set correctly once, and the auxiliary voltage is buffered against failure. If the time tracking fails for a longer period, the difference between the internal clock of the protection device and the normal time must be smaller than one minute. Daylight saving time must, if desired, be set manually.

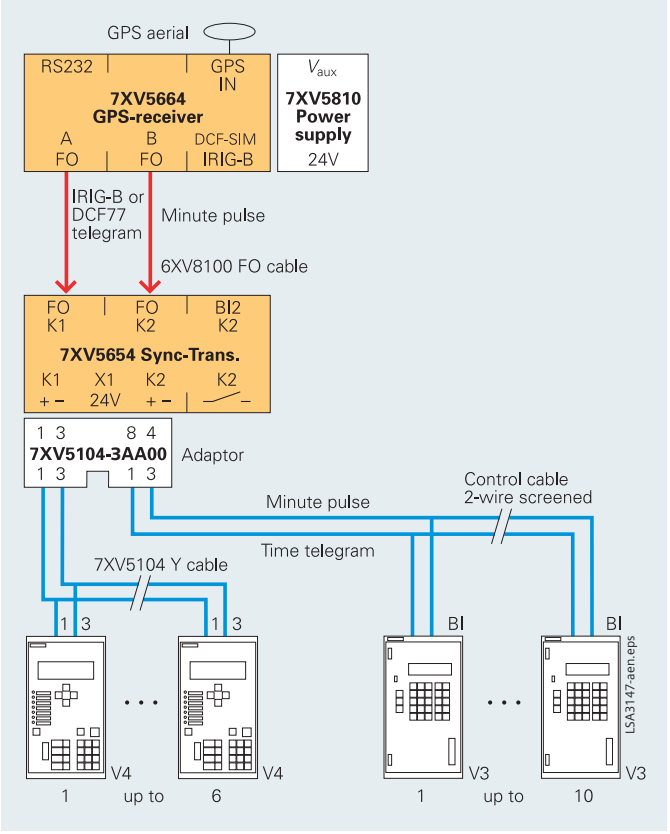

Fig. 13/125 SIPROTEC 4 protection unit with GPS-time synchronization

Protection devices are fitted with a binary input, which captures the minute impulse using a corresponding voltage (24 – 60 or wide range DC 24 – 250 V) and provides this to the internal clock. The distribution of the impulse to the protection devices takes place via a 2-wire bus, which must consist of a screened twisted pair. All devices must be located in the same grounded system, the cable screens must be connected to the housing on both sides.

If both channels of the GPS-receiver are set to the minute impulse, up to 20 SIPROTEC 3 devices may be connected. Alternatively, a coupling of both output channels of the sync-transceivers with the DIL-switches S1/3 is possible.

Selection and ordering data

Description	Order No.
GPS-time signal receiver	**7XV5664-0□A00**
GPS-timing signal receiver "Special Version" for the time synchronization of SIPROTEC 4 differential prot. devices or SIMEAS R-PMU (Phasor Measurement Unit), with 25 m coaxial cable, PC software with cable (without wide-range power supply unit 7XV5810-0BA00)	**A**
GPS-timing signal receiver "Standard-Version" for the time synchronization of SIPROTEC 4 protection devices, with 25 m coaxial cable, PC software with cable (without wide range power supply unit 7XV5810-0BA00)	**C**
Lightning protection with plugs for connection to the antenna cable	**L**
Additional accessories for time synchronization	
Wide-range power supply (universal) Universal supply voltage (DC 48...250 V ± 20 %, AC 60...230 V ± 20 %) Output voltage DC 24 V / 6 W, short-circuit proof, alarm contact	**7XV5810-0BA00**
Sync-transceiver Sync-transceiver for conversion of 2 optical timing signals to DC 24 V for the time synchronizing interface of SIPROTEC 4 (Port A) 2 optical inputs with ST-plugs and 2 electrical outputs for max. 12 SIPROTEC4 relays or 20 SIPROTEC 3 relays. Minute or second pulse for special applications is also supported.	**7XV5654-0BA00**
Y-bus cable for time synchronizing SIPROTEC 4 (standard)	**7XV5104-0AA□□**
Y-bus cable 2-core screened with 9 pole sub-D connector and metallic housing for clock synchronization SIPROTEC 4 Length 1 m	**0 1**
Length 3 m	**0 3**
Length 5 m	**0 5**
Length 10 m	**1 0**
Bus length extension cable (standard) Cable for the bus length extension. Copper cable with 2-wires, shielded with 9-pole sub-D plugs. Length 10 m	**7XV5104-1AA10**
Adapter cable to sync.-transceiver 7KE6000-8 (standard) Adapter cable to sync.-transceiver 7KE6000-8Ax. Length 0,3 m. Shielded, 2-wires with crimp lugs to 9-pole sub-D plug (female)	**7XV5104-2AA00**
Adapter cable for 2 busses (standard) Adapter cable 2 core screened for sync-transceiver 7XV5654-0BA00 for distribution of 2 busses for each 6 SIPROTEC 4 relays	**7XV5104-3AA00**
Y-bus cable for time synchronizing SIPROTEC4 Diff.-protection and SIMEAS R-PMU (special)	**7XV5105-0AA□□**
Y-bus cable 2-core screened with 9 pole sub-D connector and metallic housing for clock synchronization SIPROTEC 4, e.g. 7SD5 Length 1 m	**0 1**
Length 3 m	**0 3**
Length 5 m	**0 5**
Length 10 m	**1 0**
Bus length extension cable (special) Cable for the bus length extension. Copper cable with 4-wires, shielded with 9-pole sub-D plugs. Length 10 m	**XV5105-1AA10**