

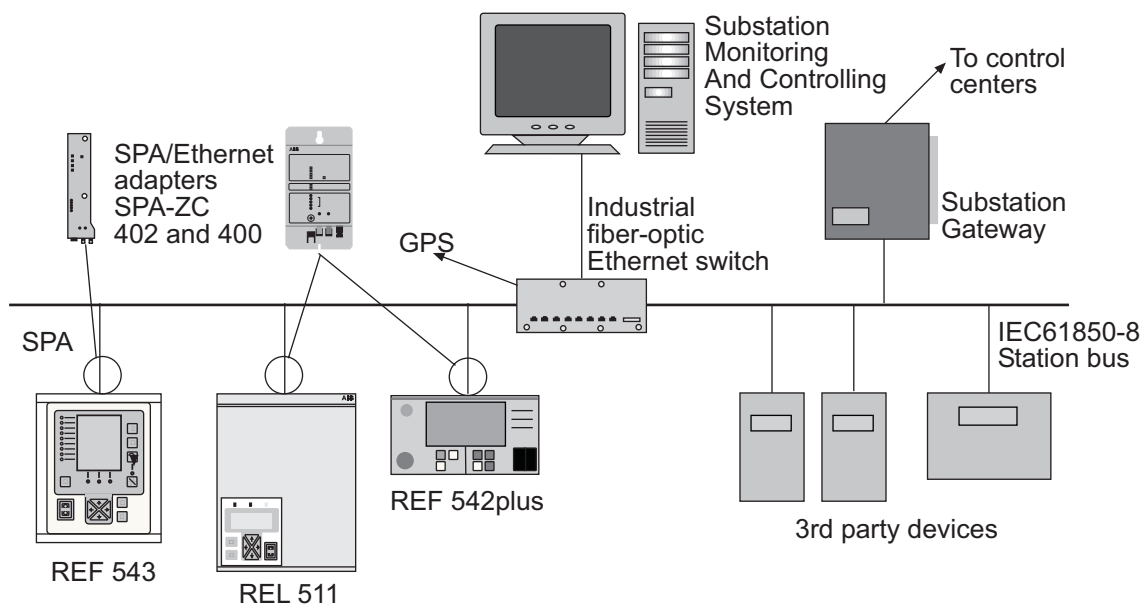
Ethernet Adapter

Installation and Commissioning Manual

2. Introduction

2.1. SPA-ZC 400 Product Overview

SPA-ZC 400 is used to connect one REF 541/3/5 or REM 543/5 device to the IEC 61850-8-1 Station bus. The IEC 61850 standard defines the IEC 61850 communication and engineering specifications. In addition to the IEC 61850-8 communication, SPA-ZC400EMP and SPA-ZC400EMG versions provide the simultaneous dual port communication for fibre-optic SPA and LON[®]. SPA-ZC 400 offers also possibility to access the device with the SPA protocol over TCP/IP using the same Ethernet link.



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Fig. 2.1.-1 Conceptual picture of a typical system setup

The mechanical and electrical connection of Ethernet adapter to a REF 541/3/5 or REM 543/5 interface is described in Chapter 3. Installation. The Ethernet adapter programming is described in Chapter 4. Engineering.

As a prerequisite, you should understand the communication properties of Intelligent Electronic Devices (IED) that is to be connected to Ethernet adapter. This information is available in the manual for the protection relay in question. It is also necessary to have basic understanding of the IEC 61850 system, in which IED is going to be connected to.

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2.2. Introduction to IEC 61850 standard

The IEC 61850 standard defines the communication between IEDs in substations.

IEDs support the following functions:

- Protection and control
- Integration of innovative sensor and switch technologies
- Metering, supervisory control and data acquisition (SCADA)
- Remote monitoring and fault diagnostics
- Automated dispatch and control
- Asset management
- Condition monitoring and diagnostics

IEC 61850 provides:

- Standardized information models for all kind of protection relays, controllers, circuit-breakers, transformers, etc.
- Information exchange methods to access the information models' data: report sequences-of-events, log historical data, control devices, sampled value distribution, fast peer-to-peer process data exchange, etc.
- A unified system configuration language (XML based) and device on-line self-description.

Compared to other communication standards for substation automation, the IEC 61850 standard defines data modeling and communication services for this specific domain. Data modeling is mapped to a communication protocol, Manufacturing Message Specification (MMS, ISO 9506 protocol), which uses TCP/IP and Ethernet. In addition to the communication specifications, engineering information exchange is defined in SCL, which is a XML based language. For more information on the IEC 61850 standard documentation, see Section 1.8. Related documents.

2.3. SPA-ZC400EMP and SPA-ZC400EMG Product Overview

SPA-ZC400EMP and SPA-ZC400EMG versions have the same IEC 61850 functionality as described in Section 2.1. SPA-ZC 400 Product Overview. In addition, these versions include an optional fibre optic interface.

This optional interface provides connection between the REF 541/3/5 or REM 543/5 device and the fibre-optic SPA and LON[®]. The bus connection module converts incoming optical signals from the SPA and LON[®] bus to electrical RS-485 signals for the REF 541/3/5 and REM 543/5 devices and vice versa. It contains a service pin for LON[®] nodes.

The optional interface can be used in the Loop and Star type bus topologies. Also the module's line idle state is selectable. The light can be turn on or off. The jumpers select the bus topology (Loop or Star) depending on whether the light is turned on/off.

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In the Loop topology, the interface receives the message from the fibre-optic interface and passes it both to the fibre-optic transmitter and to the RS-485 interface. In the Star topology, the interface receives the message from the fibre-optic receiver and passes it only to the RS-485 interface. If the message is received from the RS-485 interface, it is passed to the fibre-optic transmitter in both bus topologies.

The SPA bus communication uses Loop and light off modes, when the module jumpers are in the Loop and light off positions. The LON[®] bus communication uses Star and light off modes, when the module jumpers are in the Star and light off positions.

In the LON[®] bus communication the optional interface supports collision detection. The Service Pin is connected via the RS-485 interface to the device's Neuron[®] chip, which is connected to the interface.

Table 2.3.-1 Settings of the jumper

Topology	Light on/off	Protocol
Star	Light off	LON
Star	Light on	Not supported
Loop	Light off	SPA
Loop	Light on	Not supported

2.4.

SPA-ZC 400 Features

- IEC 61850 connectivity for REF 541/3/5 and REM 543/5
- Internal power supply
- Easy-to-use configuration tool for the IEC 61850 data mapping
- Simultaneous dual port communication (SPA-ZC400EMP and SPA-ZC400EMG versions) for LON[®] and SPA
- Support of SPA communication over TCP/IP

All relay data can be routed through SPA-ZC 400. It is intended to route the process data (status, measurements and commands) through the IEC 61850-8-1 bus and the rest of the available data can be routed through SPA over TCP/IP.

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Module parts

1. 100BaseFX connector
2. LON/ SPA bus connector (optional)
3. LON/ SPA Rx LED
4. LON/ LAN service pin
5. LAN and diagnostics LEDs

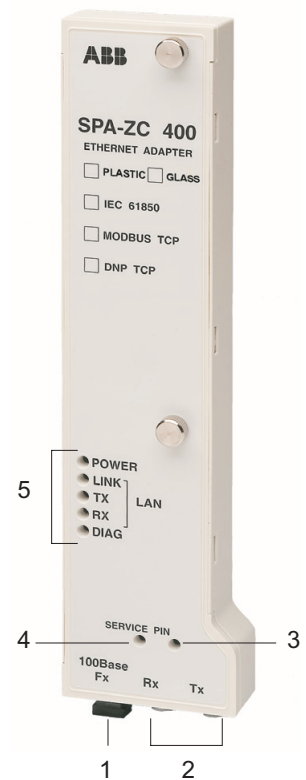


Fig. 2.4.-1 Parts of SPA-ZC 400

2.5.

Ordering information

2.5.1.

SPA-ZC 400 product package

SPA-ZC400EM

- SPA-ZC 400 module
- SPA-ZC 400 Installation and Commissioning Manual

SPA-ZC400EMG

- SPA-ZC 400 module with simultaneous dual port communication
 - ST connectors for glass fibre
- SPA-ZC 400 Installation and Commissioning Manual