SPA-ZC 102
LON®/SPA gateway

Installation manual

ABB

SPA-ZC 102
LON®/SPA gateway

Data subject to change without notice

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Features

LONWORKS® connection module for devices including SPA-bus interface.

Polling of measured values, indications and events from SPA-bus slave modules to the local database.

Spontaneous sending of updated values, indications and events to LONWORKS devices.

Transparent transfer of settings and other parameter data messages in SPA-bus format.

Configuration/programming via LONWORKS interface.

SPA-bus interface using a 9-pin D-connector with RS-485, RS-232 or logic/TTL-level signalling, max. data transfer rate 19200 bits/s.

LONWORKS interface using glass or plastic fibre cables with a max. communication rate of 1.25 Mbits/s.

1.0   Introduction

This manual describes the mechanical and electrical connection of the SPA-ZC 102 module to a device containing the SPA-bus interface. The programming of the module is described in the SPA-ZC 100/102 Programming manual (1MRS750743-MUM) and is out of scope of this document.

The SPA-ZC 102 is a LON/SPA gateway module which is provided with its own power supply. It operates in the same way as the SPA-ZC 100 module, but can also be used with a fibre-optic converter, e.g. SPA-ZC 21.

The SPA-bus device to which this module is connected can be any protection relay, control module or alarm annunciator, which has an interface for the SPA bus (RS-485, RS-232 or logic/TTL interface). The SPA interface type is selected with the DIP switches located between the D9 connector and the fibre-optic connectors. The SPA-ZC 102 module contains a power supply and it is capable of supplying the SPA-ZC 21 converter.

The first section of this document describes the mechanical installation illustrated by some examples. The second section describes the electrical configuration of the SPA-ZC 102 module for various SPA-bus types and supply voltages. Additional information such as technical data, data for fault diagnosis and ordering information is given in the subsequent sections.

1.1   Contents of delivery

SPA-ZC 102

Installation manual

Optional: Connection cable (1MRS120518)

2.0   Instructions

2.1   Mechanical installation

The SPA-ZC 102 module can be connected to a SPACOM device by using either the D-connector cable e.g. 1MRS120518 or by using SPA-ZC 21 fibre-optic converters.

The backplane of the module contains screw holes to be used when the device mounted on a wall.

CAUTION ! Before connecting the power to the SPA-ZC 102 device, check the connection cable between the SPA device and the SPA-ZC 102 and ensure that the DIP switch configuration of the module is correct. See section 2.2 Electrical installation.

The SPA-ZC 102 module is connected with a cable to the SPA bus female D-connector on the back of the SPACOM device. To ensure the correct operation, the connection cable between the SPA-ZC 102 and the SPA-bus device has to be carefully chosen (see tables below and ordering information section).

The fibre-optic cable connectors will be attached to the optic transceiver and receiver of the SPA-ZC 102. The other end of the cable is attached to an RER 111 (LON star-coupler) or a similar device, so that the fibre connected to the transceiver of the SPA-ZC 102 is connected to the receiver of the RER 111 and vice versa. Do not bend the fibre-optic cable more than permitted, minimum bending radius ~ 50 mm. For additional information, see the manual "Plastic-core fibre-optic cables. Features and instructions for mounting".
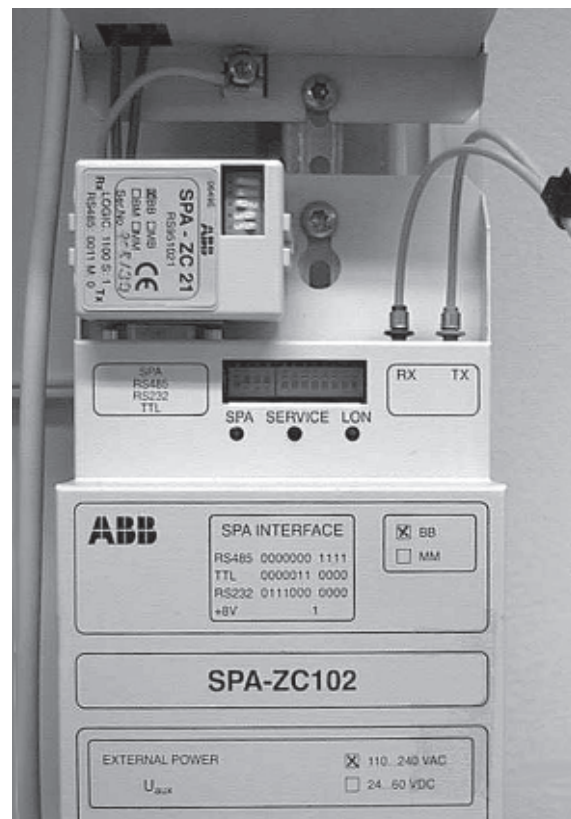
The SPA-ZC 102 module can be used together with one SPA-ZC 21 module. No connection cable is required inbetween, the SPA-ZC 21 is fastened directly to the D-connector of the SPA-ZC 102. Before connecting the power to the module, check the SPA interface settings on both modules. The power for the SPA-ZC 21 converter is obtained from the SPA-ZC 102 module.

Figure 2.1

2.2   Electrical installation

The SPA-ZC 102 module can be connected directly to the SPACOM device by using the connection cable with male D-connectors at both ends. The interface type is selected according to the interface of the SPACOM device. The connection is shown in section 2.2.2.

Several SPA devices can be connected to the SPA-ZC 102 module by using the fibre-optic converter SPA-ZC 21 as an interface to the fibre-optic SPA bus (figure 2.2). The SPA-ZC 102 has to be configured to supply power to the SPA-ZC 21 converter. The SPA bus devices connected to one gateway may include a total of 8 SPA-bus slave units. This kind of arrangement is useful with small SPA-bus devices such as single-function relays or small control and measuring units.

It must be noted that, in the described application, one gateway can handle max. 16 analog inputs, 16 digital inputs (16 x 16 bits) and 16 digital outputs.
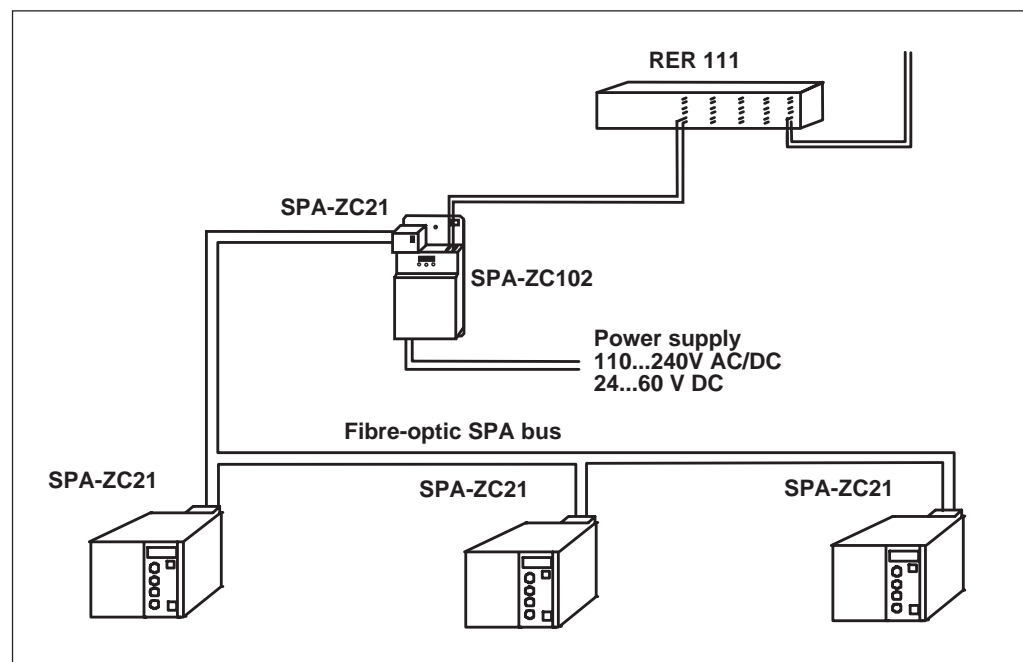

Figure 2.2   System structure with a fibre-optic SPA-bus loop.

When the SPA-ZC 102 module is used with an SPA-ZC 21 converter, the interface type can be configured for either logic/TTL or RS 485. Interface type logic/TTL is recommended. The SPA-ZC 102 has to be configured to supply +8 V output voltage to the SPA-ZC 21 converter. See chapter 2.2.2 for details. The converter connected to the SPA-ZC 102 has to be configured as the master and other SPA-ZC 21 modules as slaves.

2.2.1   Fibre-optic LonWorks interface

For a LonWorks interface, the device includes a fibre-optic transmitter and receiver for glass-core or plastic-core fibre-optic cables.

Specification of the fibre-optic connections:

	Glass fibre	Plastic fibre
Cable connector	ST connector	Snap-in connector
Cable diameter	62.5/125 µm	1 mm
Max. cable length	1000 m	20 m
Wavelength	820-900 nm	660 nm
Transmitted power	-13 dBm (HFBR-1414)	-13 dBm (HFBR-1521)
Receiver sensitivity	-24 dBm (HFBR-2412)	-20 dBm (HFBR-2521)

2.2.2   SPA-bus interface

For an SPA-bus interface, the module includes a 9-pin female D-connector. The interface types used are RS-232, RS-485 or logic/TTL. The DIP switches located on the connector board between the fibre-optic connectors and the D-connector are used to select signal types and output voltage for the SPA-ZC 21 converter at pin 9.

The picture 2.2.2-1 and the table below show how to select interface type and power supply on the SPA-bus interface:

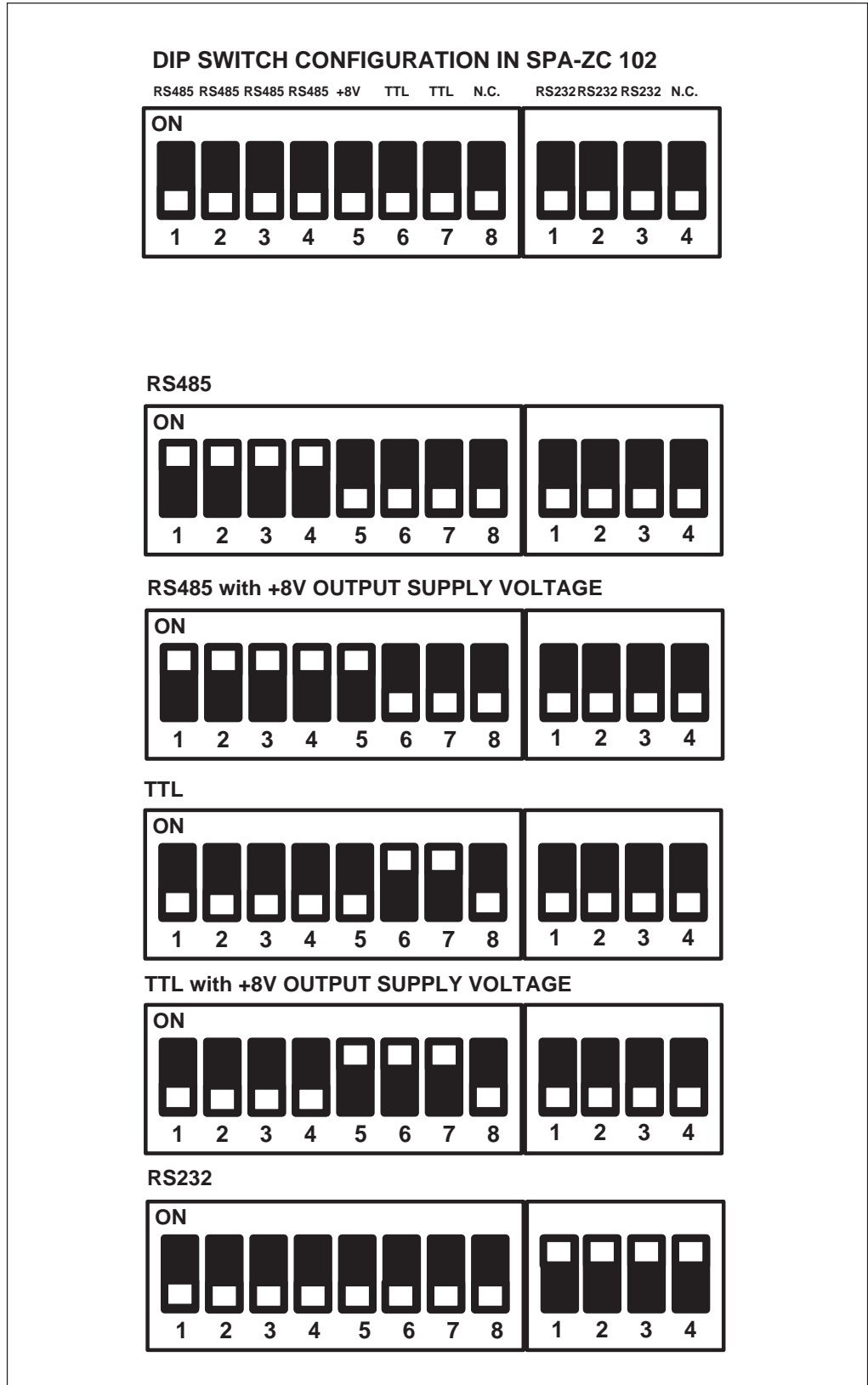| Interface type	DIP Switch positions
RS-485	1.1 - 1.4 ON 1.6 - 1.8 OFF 2.1 - 2.4 OFF
Logic/TTL	1.1 - 1.4 OFF 1.6 - 1.7 ON 1.8 OFF 2.1 - 2.4 OFF
RS-232	1.1 - 1.4 OFF 1.6 - 1.8 OFF 2.1 - 2.4 ON
Output voltage for SPA-ZC 21 (+8 V pin 9, GND pins 5,7)	1.5 ON

Figure 2.2.2-1. DIP Switch configuration in the SPA-ZC 102 module. The uppermost picture contains a description of all the DIP switches. The lower pictures illustrate different configuration examples.

The pin numbers of the SPA-bus/RS-485 connection are:

Pin	Use
1	DATA A, data signal pair, signal A (+)
2	DATA B, data signal pair, signal B (-)
3	RTS A, request to send signal pair, signal A (+)
4	RTS B, request to send signal pair, signal B (-)
7	GND, signal ground
9	+8V, optional power supply from the SPA-ZC 102

The pin numbers of the SPA-bus/TTL connection are as follows:

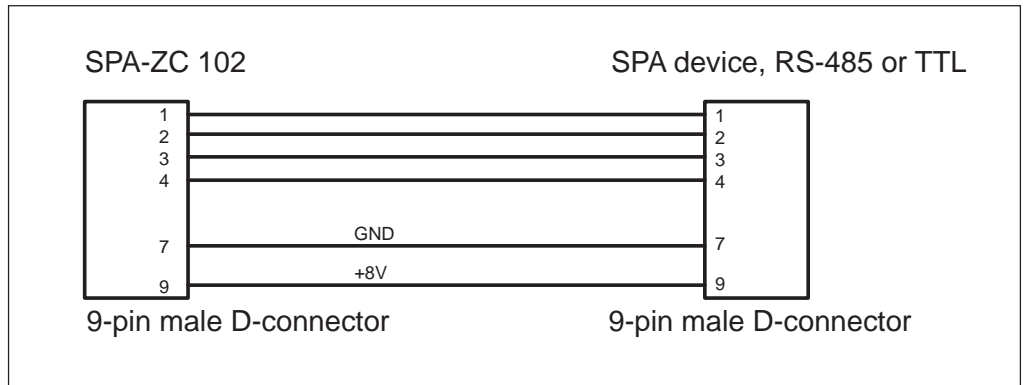| Pin	Use
2	RXD, data from SPA-bus device
3	TXD, data to SPA-bus device
7	GND, signal ground
9	+8V, power supply from the SPA-ZC 102

Figure 2.2.2-2. Connection of SPA-ZC 102 module to SPA-bus device with RS-485 or TTL/Logic interface.

The pin numbers of the SPA-bus/RS-232 connection are as follows:

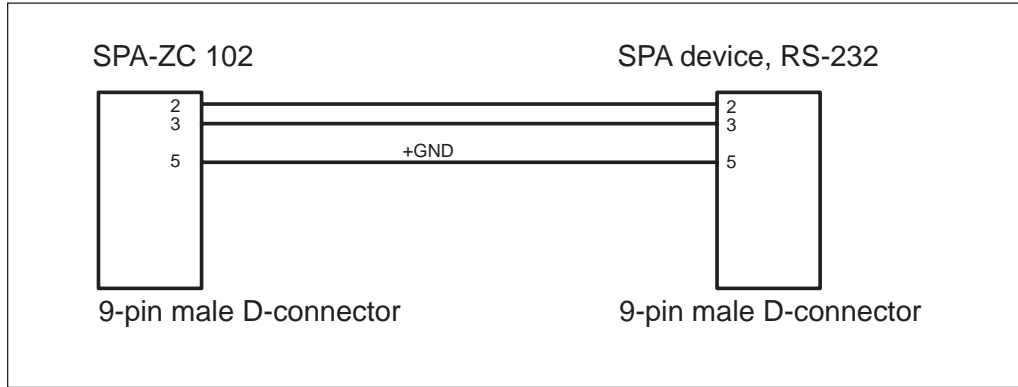| Pin	Use
2	TXD, data to SPA-bus device
3	RXD, data from SPA-bus device
5	GND, signal ground

Figure 2.2.2-3. Connection of SPA-ZC 102 module to SPA-bus device with RS-232.

Programming of SPA-ZC 102 for LONWORKS

The configuration of the SPA-ZC 102 module is described in the SPA-ZC 100/102 Programming Manual (1MRS750743-MUM).

3.0 Technical data

Interfaces   LONWORKS interface
- Type SPA-ZC 102 MM:
  Optical glass fibre transmitter and receiver with ST connectors.
  Optical fibre sizes to be used: 62.5/125 μm.
  Emission wavelength 820 nm.

- Type SPA-ZC 102 BB:
  Optical plastic fibre transmitter and receiver with snap-in connectors.

- Max. communication rate 1.25 Mbits/s

SPA-bus interface
- RS-232, RS-485 or logic/TTL
- 9-pin, female D-connector
- max. communication rate 19200 bits/s

Dimensions   197 x 107 x 50 mm

Weight   530 g

Power supply   Input: 24 V ... 60 V DC or 110 V ... 240 V AC/DC
Output (configuration with DIP switch 1.5):
+8 V DC unregulated from pin 9 (RS 485, logic/TTL)

Supply current consumption   24 V ... 60 V DC: <60 mA
110 V - 240 V AC/DC: <40 mA

Environmental conditions   Service temperature 0...+55 °C
Storage temperature   -40...+70°C
Max. relative humidity (without condensation) 95%

4.0   Maintenance and service

4.1   Self-diagnostics

4.1.1   SPA indicator

The SPA indicator is lit whenever the SPA-ZC 102 module is sending a message to the SPA bus.

If the self-supervision system of the SPA-ZC 102 detects a fault in the SPA-bus communication, the SPA indicator remains lit.

4.1.2   LONWORKS indicator

The LONWORKS indicator has two functions. On one hand it operates as a Service LED indicating the status of the Neuron chip and, on the other hand, it indicates that an application of SPA-ZC 102 is sending messages to the LON network.

In a start-up situation, the LONWORKS indicator is normally lit once and then it turns off.

Pressing of the service pin turns on the LONWORKS indicator.

The LONWORKS indicator is lit when a "Wink" message is received from the LON network.

The LONWORKS indicator is lit whenever the SPA-ZC 102 application is sending a message to the LON network. The LED is off when network management messages are being sent or received.

Normally, the LONWORKS indicator is lit only when the SPA-ZC 102 module is sending data to the LON network.

4.2   Trouble shooting

The table below can be used to localize a fault and take corrective actions:

Problem	Fault type	Repair
SPA and LONWORKS indicator not lit on start up. (Power supply through the connection cable) SPA indicator off. LONWORKS indicator off.	Supply failing	Check if the SPA-bus device has power. Check that the SPA-ZC 102 is properly connected to the device. Check the DIP-switch settings for SPA-bus interface type and supply voltage.
SPA-ZC 102 does not respond to LONWORKS messages.	LONWORKS fault	Check the data transfer rate of devices using the same communication channel.
LONWORKS indicator is blinking	LONWORKS fault	Check that the SPA-ZC 102 is properly connected to the device. Check the fibre-optic connections. Check that the master address of the SPA-ZC 102 is correct.
SPA-ZC 102 does not work properly or it gives varying results to the same query.	LONWORKS fault	Ensure that the LONWORKS address of the SPA-ZC 102 is unique in the communication network.
No response from SPA device. SPA indicator is continuously on, and occasionally blinking.	SPA-bus fault	Check that the SPA-ZC 102 is properly connected to the device. Check the operation of the SPA-bus device. Check the DIP-switch settings of the SPA-bus interface type. Check the configuration of the SPA bus (SP command): SPA-bus bit rate, parity, unit list definition. (See the SPA-ZC 100/102 Programming Manual for details).

4.3   General about service

If the SPA-ZC 102 module, or some part of it, is not operating correctly the normal service operation is to replace the whole module. Please refer to ordering information.

5.0   Ordering information

When ordering a SPA-ZC 102 module, please state the following information:

Ordering number 1MRS090705-xx ;where xx stands for:
AA : plastic fibre optic connectors, 110 V ... 240 V AC/110…220 V DC
AC : plastic fibre optic connectors, 24 V ... 60 V DC
DA : glass fibre optic connectors, 110 V ... 240 V AC/110…220 V DC
DC : glass fibre optic connectors, 24 V ... 60 V DC

Optionally, a connection cable of 1.2 m can be ordered: 1MRS120518.

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