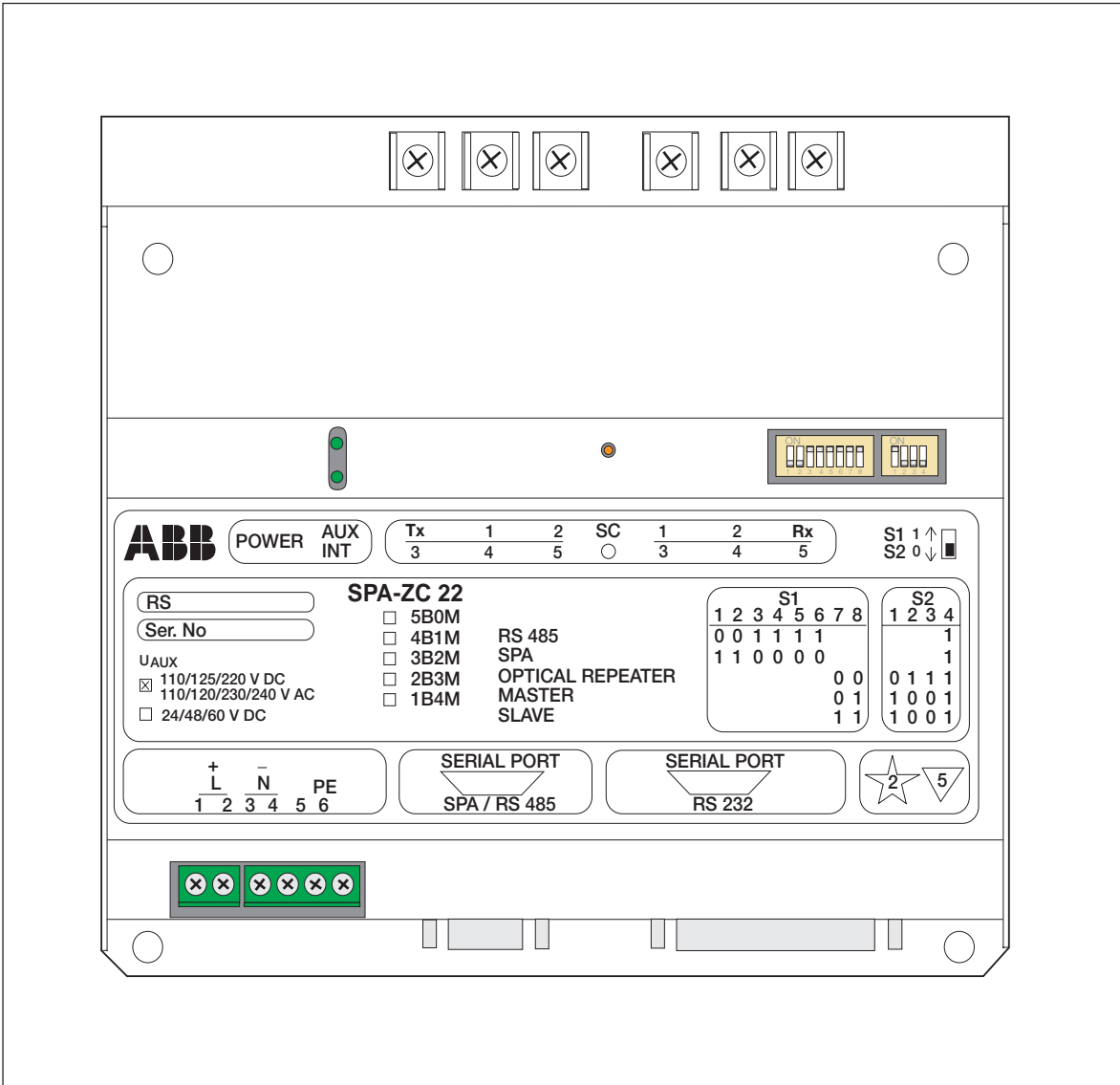


SPA-ZC22

Bus connection module

User's manual and Technical description



Features

The SPACOM devices, e.g. the relays and the annunciator units are connected to the fibre-optical SPA bus by means of bus connection modules. The bus connection module SPA-ZC22 converts the optical signals of the SPA bus to RS 485, SPA (+5 V) or RS 232 signals and vice versa. The bus connection module is provided with a built-in power unit allowing the SPACOM device to be disconnected from the bus connection module, for instance, for service without interrupting the data communication over the optical loop.

The bus connection module is provided with one 9-pin D type subminiature connector for RS 485 or SPA connections, one 25-pin D type connector for RS 232 connections and, according

to order, two or five opto-connector couples for fibre-optical cables. The fibre-optical links can be based on glass fibre cables, plastic core cables or both types mixed.

The bus connection module is mounted in a suitable place in the apparatus cabinet and the connection cable of the module is plugged to the D-type connector on the rear panel of the SPACOM device. The bus connection module type SPA-ZC22 connects to any SPACOM device provided with a D-type connector. The bus connection module can also be connected to the master units, such as substation level units SACO 148D4 and SRIO 1000M, of the communication system.

Function

The bus connection module is provided with a built-in power unit, which is to be supplied from an external power source. The auxiliary supply is galvanically isolated from the electronic circuits of the module. The auxiliary supply for those modules, which have only two opto-connector couples, can be taken from the SPACOM device alone.

Note! The auxiliary supply for the bus connection modules provided with five opto-connector couples must be taken from an external power source.

The required data communication mode is selected with the DIP switches on the front panel of the bus connection module:

| Switchgroup | S1 | | | | | | | | S2 | | | |
|---------------------|----|---|---|---|---|---|---|---|----|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 1 | 2 | 3 | 4 |
| Serial mode RS 485 | 0 | 0 | 1 | 1 | 1 | 1 | | | | | | |
| SPA-protocol mode | 1 | 1 | 0 | 0 | 0 | 0 | | | | | | |
| Optical repeater | | | | | | | 0 | 0 | 0 | 1 | 1 | 1 |
| Master device mode | | | | | | | 0 | 1 | 1 | 0 | 0 | 1 |
| Slave device mode | | | | | | | 1 | 1 | 1 | 0 | 0 | 1 |
| RS 232 DTR, delayed | | | | | | | | | | | | 0 |

Switches S1/1...S1/6 are used for determining the communication mode RS 485 or SPA for the 9-pin connector. The communication mode of the protection relays is stated in the general part of the relay manual in section "Connections".

Switches S1/7, S1/8 and S2/1...S2/3 are used for selecting the function of the bus connection module:

- Master device function:

The master device mode is used when the bus connection module is connected to a device functioning as a master in the system.

- Slave device function:

The slave device mode is used when the bus connection module is connected to a device functioning as a slave in the system.

- Optical repeater

An optical repeater is a system where a master device is connected to the system by means of an optical connection. In this case, the master device must be connected to Tx1/Rx1. The slaves are connected to Tx2/Rx2, Tx3/Rx3, etc.

Switch S2/4 is used for selecting a special function for the DTR signal of the RS 232 port. Normally switch S2/4 is to be in position 1. When S2/4 is in position 1, the DTR signal is permanently active and the serial interface works in the normal way. When S2/4 is in position 0, a time delay function is activated which, if the communication through the bus communication module is interrupted, inhibits the DTR signal after about 15 minutes. As soon as the data communication starts again, the DTR signal is activated again. This function can be used in applications involving the disturbance recorder module SPCR 8C 27.

The bus connection module SPA-ZC22 is provided with diagnostic LED's. The LED marked "POWER AUX" indicates that the auxiliary voltage is supplied by an external power source and that the power unit is operating properly. The LED marked "POWER INT" is lit when the auxiliary voltage is supplied by the host device and the power unit is operating properly. The LED(s) marked "SC" flashes at the rate of the data communication.

Mechanical construction

The bus connection module comprises one or two circuit boards, depending on the number of opto-connector couples included. The module is usually mounted on the wall inside the apparatus cabinet by means of two M4 screws. The optical fibres are anchored to the plastic clip at the upper edge of the bus connection module and connected

to the transmitter terminals Tx and the receiver terminals Rx. The specific features of the fibre-optic cables must be noted, when the cables are being handled, mounted and connected. Detailed information is given in the user's manual 34 SPA 13 EN1 A "Plastic-core fibre optic cables. Features and instructions for mounting".

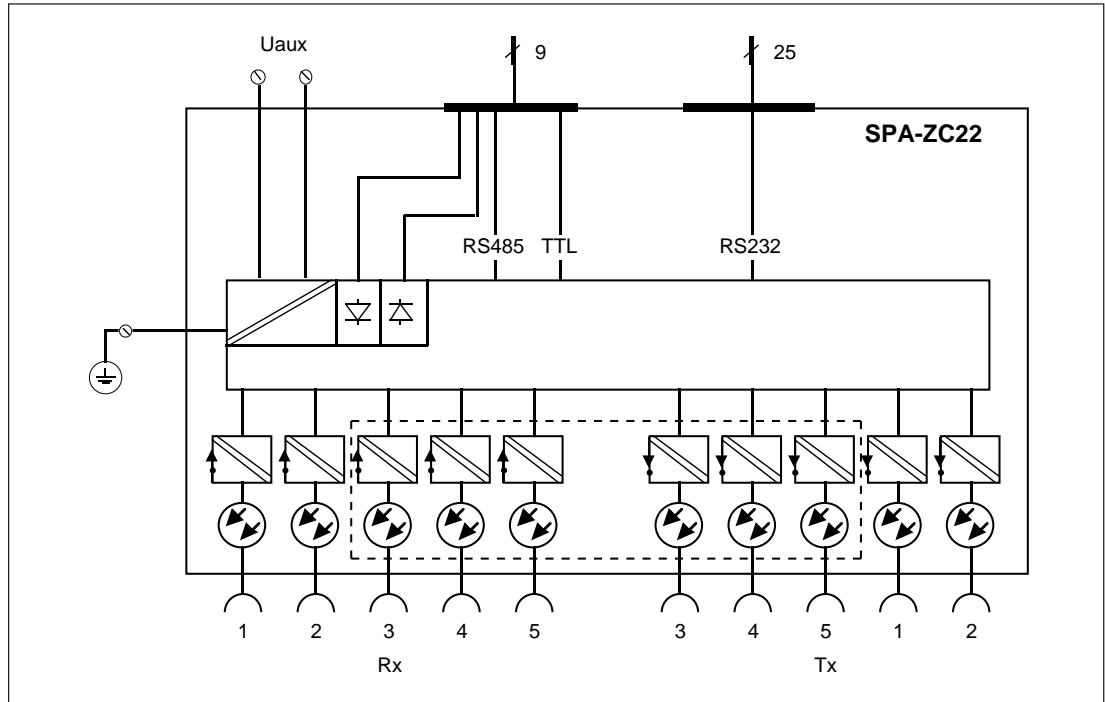


Fig. 1. Block diagram of the bus connection module SPA-ZC 22. The opto-connector couples within the area defined by the dashed line are included in some types only.

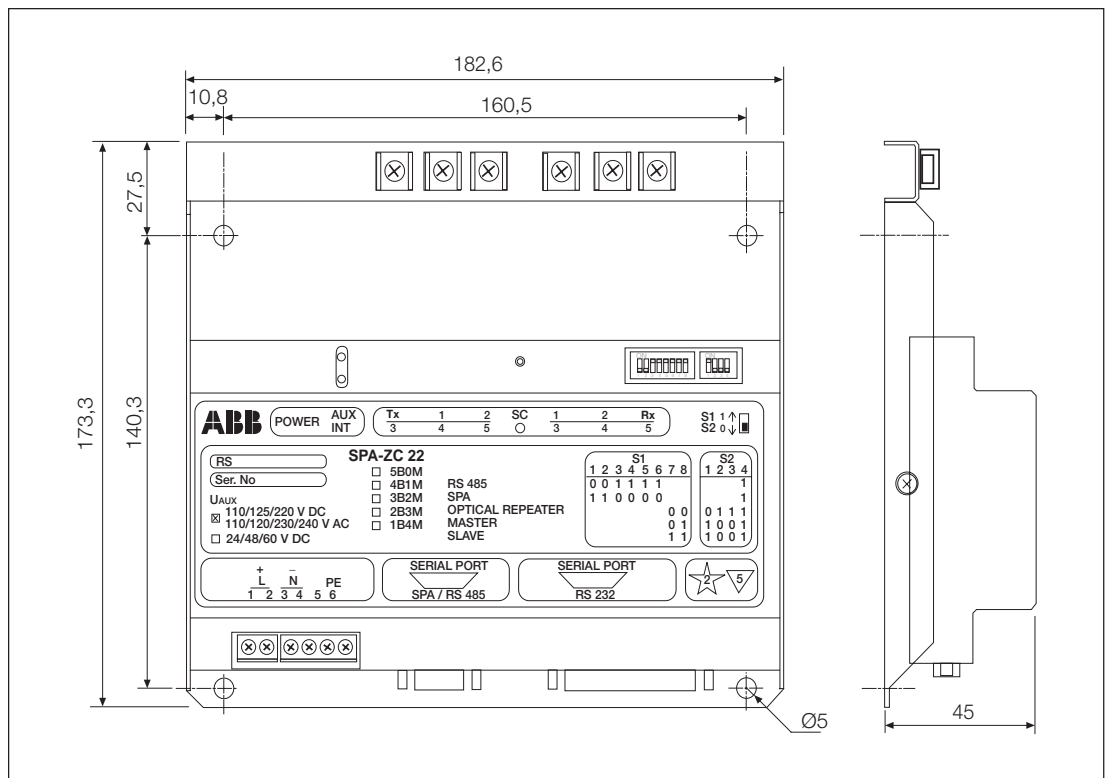


Fig. 2. Dimensional drawing of the bus connection module SPA-ZC22.

Optical /electrical connection

The optical connections are based on plastic core or glass fibre cables or on both cable types mixed as required.

The SPA-, RS 485- and RS 232 modes are used for communication between the SPACOM devices and the bus connection module. From one bus connection module to the other the information is routed via the fibre-optical cables.

The connection cable is provided with male D type connectors in both ends. One end is further provided with an earthing wire, which is connected with a 6 mm M3 screw to the fixing hole close to the D type connector on the rear panel of the device, see Fig. 3.

The cable delivery set includes a screw, a contact washer and a nut. The nut is not needed if the earthing wire is connected to the earthing hole.

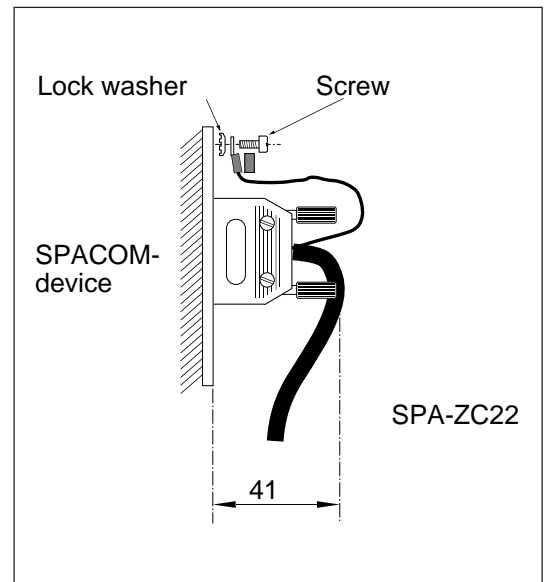


Fig. 3. Earthing of the connection cable.

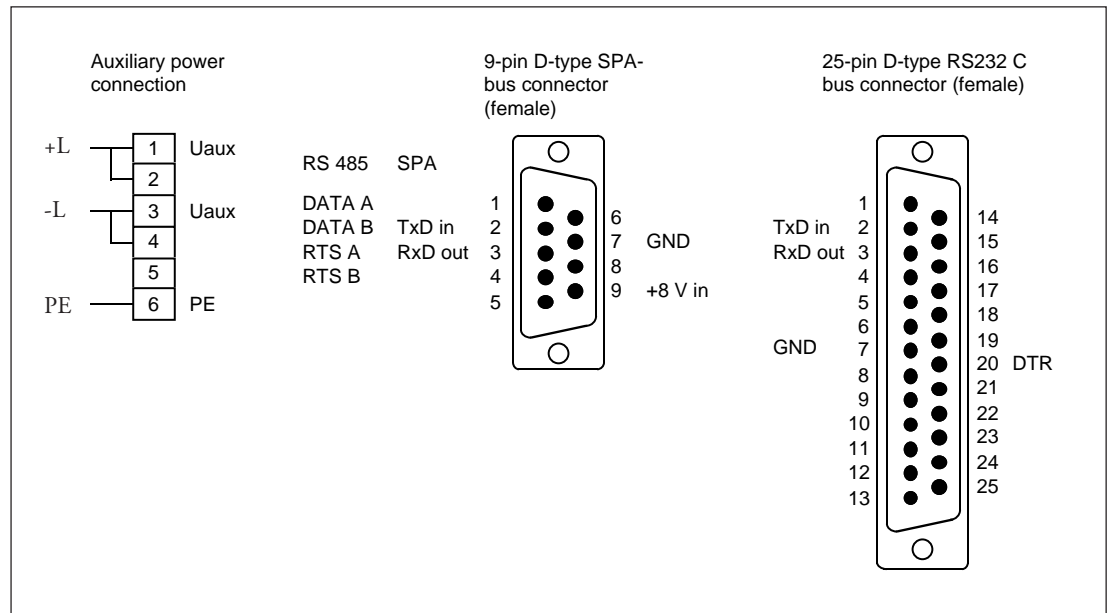
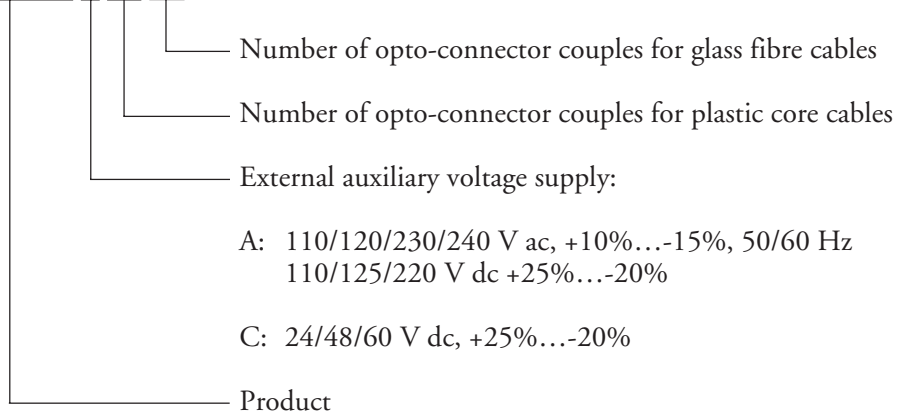


Fig. 4. Auxiliary supply terminals and pin configuration of the connectors.

Type designation key

SPA-ZC 22 A 3B 2M



Selection table

| Type designation | Tx1/Rx1 | Tx2/Rx2 | Tx3/Rx3 | Tx4/Rx4 | Tx5/Rx5 | Aux. volt. |
|------------------|-----------------|-----------------|-----------------|-----------------|-----------------|------------|
| SPA-ZC22C2B0M | Plastic/Plastic | Plastic/Plastic | | | | C |
| SPA-ZC22C1B1M | Glass/Glass | Plastic/Plastic | | | | C |
| SPA-ZC22C1B1M/B | Plastic/Glass | Plastic/Glass | | | | C |
| SPA-ZC22C1B1M/M | Glass/Plastic | Glass/Plastic | | | | C |
| SPA-ZC22C0B2M | Glass/Glass | Glass/Glass | | | | C |
| SPA-ZC22A2B0M | Plastic/Plastic | Plastic/Plastic | | | | A |
| SPA-ZC22A1B1M | Glass/Glass | Plastic/Plastic | | | | A |
| SPA-ZC22A1B1M/B | Plastic/Glass | Plastic/Glass | | | | A |
| SPA-ZC22A1B1M/M | Glass/Plastic | Glass/Plastic | | | | A |
| SPA-ZC22A0B2M | Glass/Glass | Glass/Glass | | | | A |
| SPA-ZC22C5B0M | Plastic/Plastic | Plastic/Plastic | Plastic/Plastic | Plastic/Plastic | Plastic/Plastic | C |
| SPA-ZC22C4B1M | Glass/Glass | Plastic/Plastic | Plastic/Plastic | Plastic/Plastic | Plastic/Plastic | C |
| SPA-ZC22C3B2M | Glass/Glass | Glass/Glass | Plastic/Plastic | Plastic/Plastic | Plastic/Plastic | C |
| SPA-ZC22C2B3M | Plastic/Plastic | Plastic/Plastic | Glass/Glass | Glass/Glass | Glass/Glass | C |
| SPA-ZC22C1B4M | Glass/Glass | Plastic/Plastic | Glass/Glass | Glass/Glass | Glass/Glass | C |
| SPA-ZC22C0B5M | Glass/Glass | Glass/Glass | Glass/Glass | Glass/Glass | Glass/Glass | C |
| SPA-ZC22A5B0M | Plastic/Plastic | Plastic/Plastic | Plastic/Plastic | Plastic/Plastic | Plastic/Plastic | A |
| SPA-ZC22A4B1M | Glass/Glass | Plastic/Plastic | Plastic/Plastic | Plastic/Plastic | Plastic/Plastic | A |
| SPA-ZC22A3B2M | Glass/Glass | Glass/Glass | Plastic/Plastic | Plastic/Plastic | Plastic/Plastic | A |
| SPA-ZC22A2B3M | Plastic/Plastic | Plastic/Plastic | Glass/Glass | Glass/Glass | Glass/Glass | A |
| SPA-ZC22A1B4M | Glass/Glass | Plastic/Plastic | Glass/Glass | Glass/Glass | Glass/Glass | A |
| SPA-ZC22A0B5M | Glass/Glass | Glass/Glass | Glass/Glass | Glass/Glass | Glass/Glass | A |



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