Control and Measuring Units

SPOC 110 C
SPOC 111 C
SPOC 112 C

Product Guide

ABB

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SPOC 112 C

1MRS750392-MBG

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Features

- Remote control interface for distribution substations
- Sixteen binary inputs for reading circuit breaker positions, circuit breaker truck positions, disconnector positions, contact alarm signals, impulse transmitters, etc.
- Two analog inputs for measuring standardized mA signals
- One analog 5 A input for phase current measurement
- Four output relays for the control of circuit breakers, disconnectors, etc.
- Serial interface for extensive two-way data communication including measured values, event reporting, status data, control commands, setting values, configuration parameters, etc.
- Sophisticated internal self-supervision system for maximum system reliability
- High immunity to electrical and electromagnetic interference
- Compact and robust mechanical design in a flush-mounting aluminium case
- Continuous self-supervision of hardware and software
- Powerful software support for parameterization of the relay and for reading and recording of measured values, events, etc.
- Member of the SPACOM product family and ABB's Distribution Automation system
- CE marking according to the EC directive for EMC

Application

The SPOC 100 Series control and measuring units are designed to be used as cubicle-oriented remote control interface units in switchgear. The units allow control signals for the circuit breakers, binary signals from the switchgear and analog signals from transducers and measuring transformers to be transmitted to the substation level system and further to the remote control system. The binary signal inputs are used for reading status information from circuit breakers and disconnectors as well as start and alarm signals from the protection relays of the switchgear cubicle. Two of the binary signal inputs can be configured as pulse counter inputs, which can be used for reading energy meters with pulse outputs.

The control and measuring unit is available in three versions, i.e. SPOC 110 C, SPOC 111 C and SPOC 112 C, with identical functions but different control voltage ranges of the binary signal inputs.

Design

The control and measuring unit is equipped with one 5 A measuring input, two 5 mA/20 mA analog measuring inputs, sixteen binary signal inputs, four output relays and a serial interface for connection of the unit to substation-level data acquisition and reporting systems and further to remote control systems.

The control and measuring unit functions as an interfacing device between the switchgear cubicle and the control system of the substation. It collects information from the switchgear cubicle for transfer to the higher-level system and receives control signals from the higher-level system and outputs control signals for the circuit breaker of the switchgear cubicle.

The binary signal inputs can be configured to operate in three ways: as single contact inputs, as four-pole inputs for circuit breaker status information or as pulse counter inputs. A four-pole input is formed by two adjacent inputs. The inputs 13…16 can also be used as pulse counter inputs. The rated current of the current measuring input is 5 A. The measuring ranges for the two mA inputs can separately be selected to be 0…5 mA or 0…20 mA. The relay outputs can be configured to operate as single outputs or as double outputs. When the outputs operate as single outputs the output relays can be controlled independently of each other. Two adjacent outputs can be configured to operate as double outputs. Double outputs may be used for the control of a circuit breaker.

The inputs and outputs of the control and measuring unit are configured via the serial interface and the SPA bus.

Data communication

The unit is provided with a serial interface on the front panel. By means of a bus connection module type SPA-ZC 21 or SPA-ZC 17 the unit can be connected to the fibre-optic SPA bus. The bus connection module SPA-ZC 21 is powered from the host unit, whereas the bus connection module type SPA-ZC 17 is provided with a built-in power unit, which can be fed from an external secured power source. Via the SPA bus the unit communicates with higher-level data acquisition and control systems.

Self-supervision

The unit incorporates a sophisticated self-supervision system, which increases the availability of the unit and the reliability of the system. The self-supervision system continuously monitors the hardware and the software of the device. The system also supervises the operation of the auxiliary supply module and the secondary voltages generated by the module.

When a permanent internal fault is detected, the IRF indicator on the unit's front panel is lit. The operation of the data communication system is indicated by the SCF indicator on the front panel.

Auxiliary supply voltage

The auxiliary supply of the generator protection relays is obtained via an internal plug-in type power module. Two power supply module types are available: type SPGU 240A1 for ac or dc supply within the input voltage range 80…265 V and type SPGU 48B2 for dc supply within the input voltage range 18…80 V.

Technical data

Table 1: Energizing inputs

Rated current I_n		5 A
Thermal withstand capability	continuously	15 A
	for 1 s	300 A
Input impedance		<20 mΩ
Measurement range		0…1.2 x I_n
Measuring accuracy		±1% of rated value
Operating modes		instantaneous value measurement, 1…60 min average value measurement
Rated frequency f_n, according to order		50 Hz or 60 Hz

Table 2: mA inputs

Number of inputs	2
Measurement ranges	0…5 mA or 0…20 mA
Measuring accuracy	±1% of max. value of measurement range
Operating modes	instantaneous value measurement, 1…60 min average value measurement

Table 3: Binary inputs

Number of inputs	16; divided in groups of 6 + 6 + 2 + 1 + 1 so that each group has a common minus terminal
Input voltage range	40…130 V dc, SPOC 110 C 20…40 V dc, SPOC 111 C 190…240 V dc, SPOC 112 C
Typical current drain	2…5 mA
Programming alternatives	Single relay input, max. 16 inputs Four-pole input, max. 8 Pulse counter inputs, max. 4 Counting range 0…29999 pulses, triggering to be selected for rising or falling edge or any change in the state. The pulse counters are battery backed up. D/A converter operation, max. 4, allowing on/off status readout as a decimal number

Table 4: Contact outputs

Number of inputs	4 separate NO contacts
Rated voltage	250 V dc
Carry continuously	5 A
Make and carry for 0.5 s	30 A
Make and carry for 3 s	15 A
Breaking capacity for dc when the control circuit time constant L/R < 40 ms at 48/110/220 V dc	5/3/1 A
Operating mode	pulse-shaped control signal, pulse length to be programmed in the range of 0.1…100 s
Programming alternatives	single relay output, double relay output consisting of two contacts

Technical data (cont´d)

Table 5: Communication and power supply

Data communication	Transmission mode		Fibre-optic serial bus
	Data code		ASCII
	Selectable data transfer rates		300, 1200, 2400, 4800 or 9600 Bd
	Fibre-optic bus connection module, powered from the host relay	for plastic fibre cables	SPA-ZC 21BB
		for glass fibre cables	SPA-ZC 21MM
	Fibre-optic bus connection module with a built-in power supply unit	for plastic fibre cables	SPA-ZC 17BB
		for glass fibre cables	SPA-ZC 17MM
Auxiliary supply modules	Power supply and I/O modules and voltage ranges	SPGU 240A1	80…265 V ac/dc
		SPGU 48B2	18…80 V dc
	Power consumption		~10 W

Table 6: Tests and standards

Test voltages	Dielectric test voltage (IEC 60255-5)	2 kV, 50 Hz, 1 min
	Impulse test voltage (IEC 60255-5)	5 kV, 1.2/50 μs, 0.5 J
Disturbance tests	HF disturbance test (IEC 60255-6)	2.5 kV, 1 MHz
	Spark interference test (SS 436 15 03)	4…8 kV
Environmental conditions	Specified ambient service temperature range	-10…+55°C
	Transport and storage temperature range	-40…+70°C
	Long term damp heat withstand (IEC 60068-2-3)	<95%, +40°C, 56 d/a
	Degree of protection by enclosure of the device case	IP 20
	Weight	~2.5 kg

Block diagram

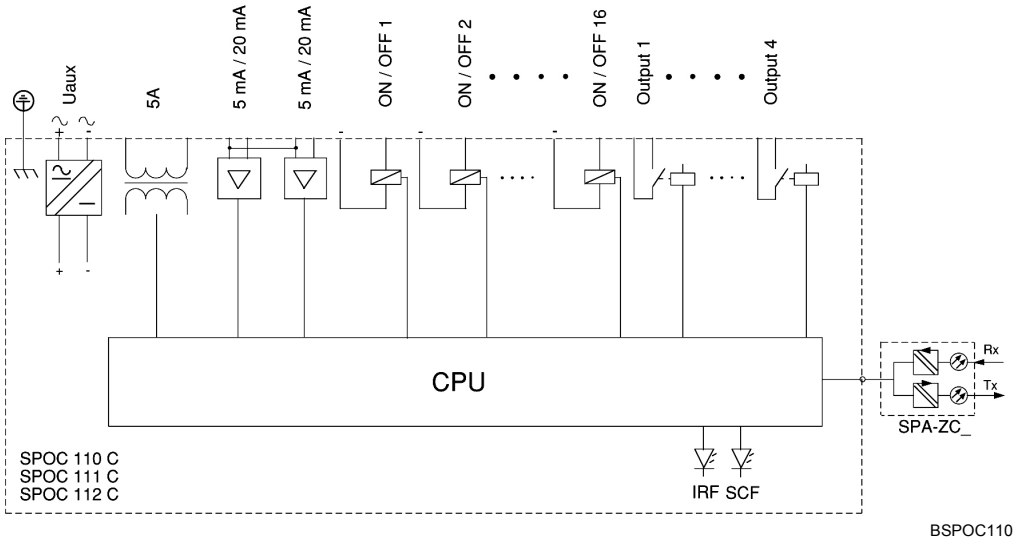

Fig. 1 Block diagram

Mounting and dimensions

Flush mounting

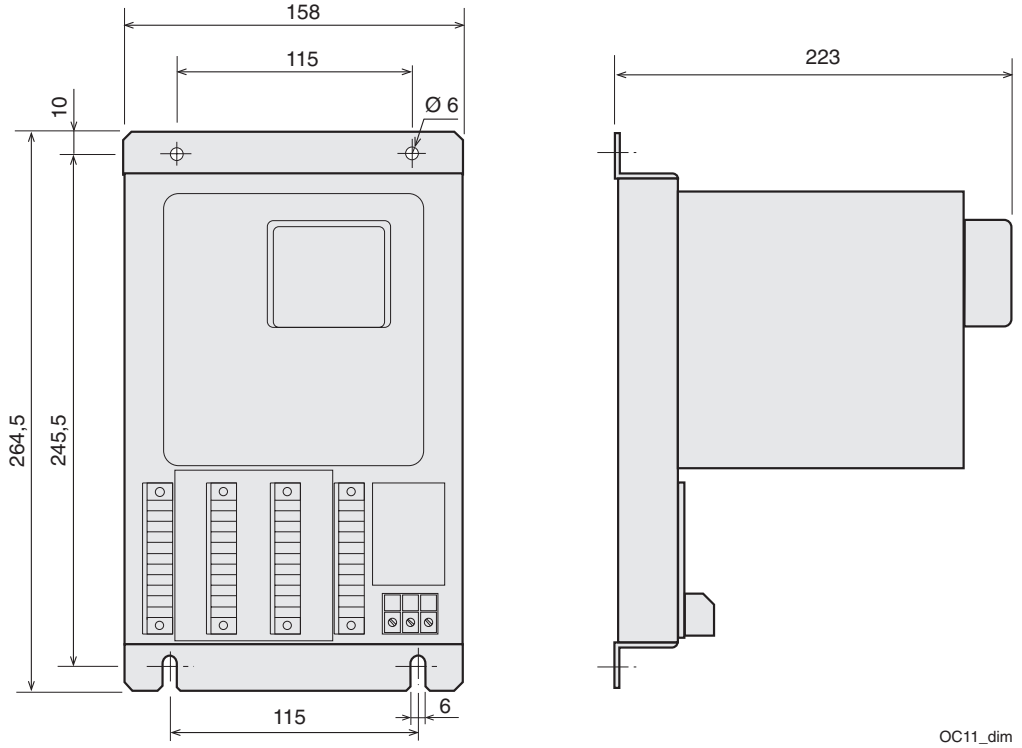

Fig. 2 Flush-mounted measuring and control unit (dimensions in mm)

The control and measuring units of the SPOC 100 series are designed for flush mounting. The units are bolted to the mounting panel by means of four screws. Machine screws M5 x 10/10 or corresponding steel screws are recommended to be used.

The units are normally mounted in a vertical position as shown in the figure above. Unless there is enough space on the rear wall, the units can be mounted on the bottom of the switchgear or inside the door.

Ordering

When ordering, please specify:

Ordering information	Ordering example
1. Type designation and quantity	SPOC 110 C, 5 pieces
2. Order number	RS 823 001-AA
3. Rated frequency	f_n=50 Hz
4. Auxiliary voltage	U_{aux} = 110 V dc
5. Accessories	-
6. Special requirements	-

Order numbers

SPOC 110 C, control voltage 40…130 V dc	RS 823 001-AA, CA
SPOC 111 C, control voltage 20…40 V dc	RS 823 003-AA, CA
SPOC 112 C, control voltage 190…240 V dc	RS 823 002-AA, CA
The last two letters of the order number indicate the rated frequency f_n and the auxiliary voltage U_{aux} of the relay as follows:	AA equals f_n = 50 Hz and U_{aux} = 80…265 V ac/dc
	CA equals f_n = 50 Hz and U_{aux} = 18…80 V dc

References

Additional information

Manual “Control and measuring units SPOC 110 C, SPOC 111 C, SPOC 112 C”	1MRS750964-MUM

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