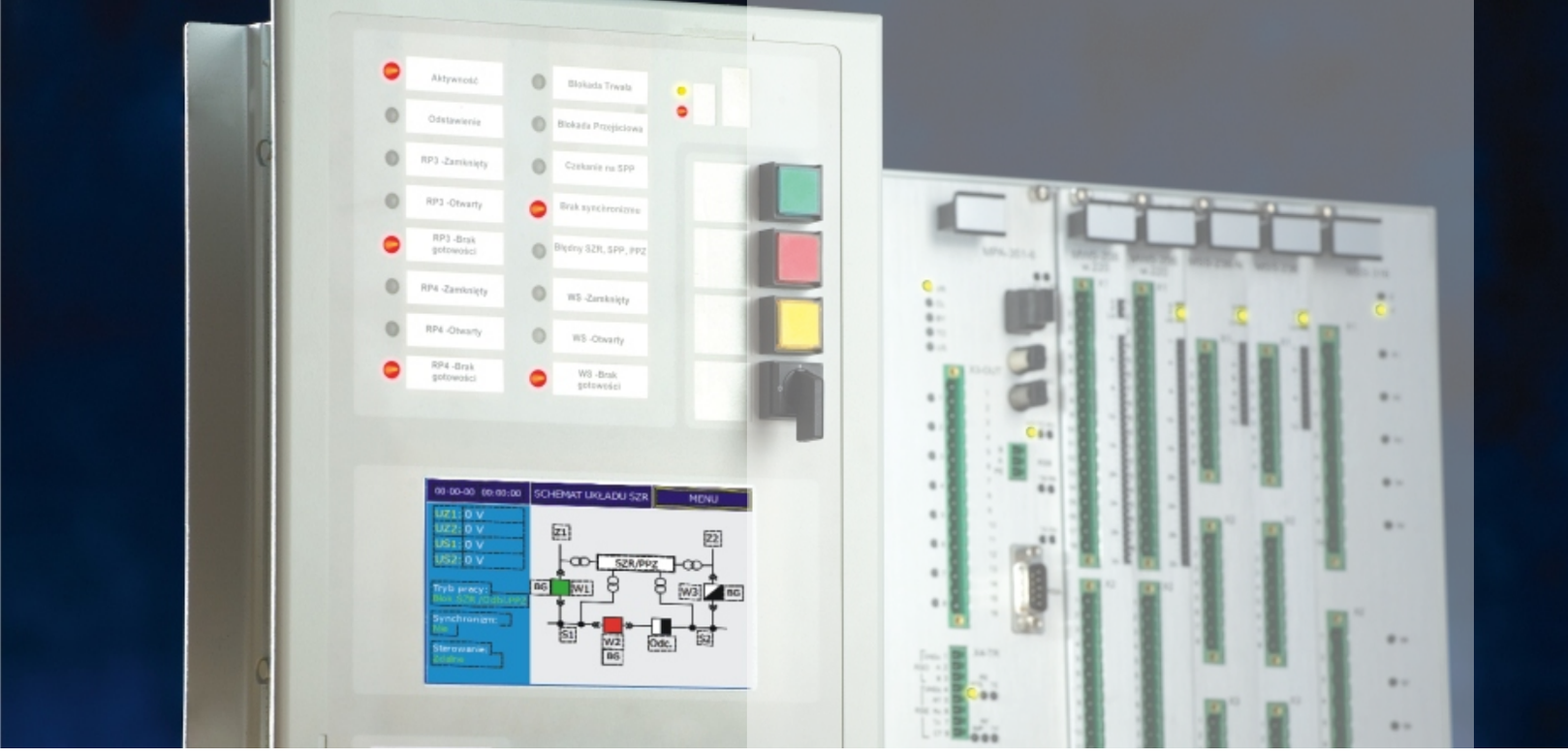


SO-52v11-eMSZR

ATS automation control unit

The device increases the quality and security of supplying important customers. Due to active controlling of supply sources, parameters of supplying network operation are improved too.

The SO-52v11-eMSZR control unit for ATS automation is a specialized version of the SO-52v11 control unit, designed to control supply reserve systems. It enables to limit areas affected by voltage drops caused by short-circuits and shorten significantly supply breaks while switching the basic supply into the reserve supply and reversely. Parameters of synchronism are monitored in the on-line mode what enables uninterruptible switching.

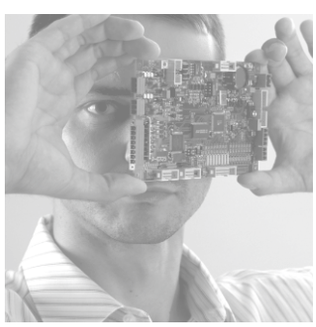
The device is intended to operate in MV and LV switchgears. It is adapted to be applied in objects requiring complex algorithms and high reliability of operation, such as switching substations:

- of power plant and power and heat plant auxiliaries
- supplying hospital equipment
- supplying technological lines
- city substations of high reliability

The unit realizes the stand-by and hidden reserve in 2, 3, 4, and 5-circuit-breaker systems, preforming all essential functions, i.e.:

- ATS automation - Automatic Transfer Switching
- ARS automation - Automatic Return Switching
- PSS automation - Planned Power Supply Switching

The controller is equipped with an integrated multi-channel disturbance recorder with archives for measurements, binary signals, controls and internal logic signals. The recorder saves up to a few hundred disturbances. The device is delivered with configuration software which enables to parameterize it and change its configuration and software for viewing and analyzing records.



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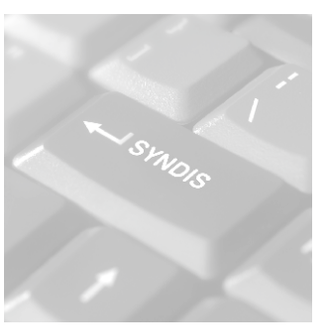
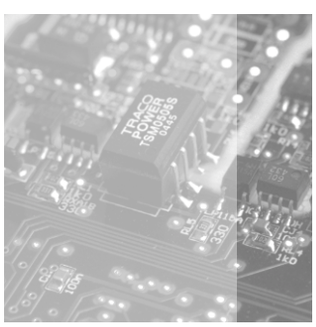




Operation

The SO-52v11-eMSZR device is manufactured in several basic versions, dependent on requirements stated by the user.

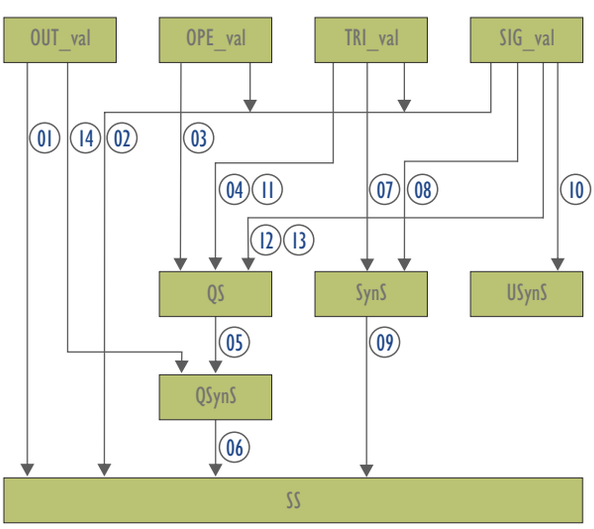
- version v1 - simplified (with an external bay readiness signal)
- version v2 - extended (with bay readiness signal developed by the controller)
- version v3 - with accelerated operation in the case of detecting a short-circuit and voltage hike decrease

The device performs voltage measurements (the version v3 also current measurements) and calculates values important in making decisions i.e.: differential voltage, frequency and voltage phase differences of both sources. The unit applies the prediction rule, calculating tendencies of voltage changes on busbars and adapts the switching type to the pace of voltage changes and moves to other acceptable switchings in the case of lack of appropriate conditions.

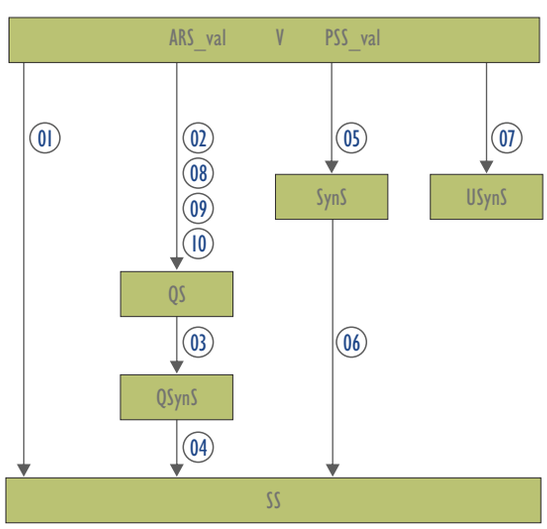
The device realizes switchings according to settings and current conditions as:

- SS - slow switching, performed when the residual voltage on busbars is lower than the maximal threshold value
- QS - quick switching, performed when the differential voltage is lower than the maximal threshold value
- SynS - synchronous switchings with break, performed when synchronism conditions are met
- USynS - uninterrupted synchronous switching, performed when synchronism conditions are met - short simultaneous operation of both sources is acceptable
- QSynS - synchronized quick switching (quasi synchronous), performed when the differential voltage is lower than the maximal threshold value and the threshold condition concerning the frequency is met

ATS diagram



PSS/ARS diagram



Description:

1. Reasons for ATS:

- OUT - voltage outage (dip)
- SIG - external signal
- TRI - electric tripping from bay
- OPE - mechanical opening

2. Conditions enabling to perform ATS:

- 01..14 - switching cycles dependent on conditions and settings

3. Reasons for PSS/ARS:

- PSS - operation activity
- ARS - voltage return

4. Conditions enabling to perform PSS/ARS:

- 01..10 - switching cycles dependent on conditions and settings

Structure

The SO-52v11-eMSZR device is manufactured in the standard version as a 12-inch subrack equipped with sockets (locations) which enables to easily set modules (packages) essential for a given object and a separately installed KWG-301 dispatcher's panel.

The controller is equipped with a multi-channel disturbance recorder with archives for analog signals, digital binary signals, controls and internal logic signals. The additional memory card enables to save up to a few hundred of disturbances. The device is delivered with utility software which enables to parameterize it and change its configuration and a program for viewing and analyzing disturbances.

The table below presents a list of modules included in 2, 3, 4 and 5-circuit-breaker devices. Their selection depends on requirements of a given object, number of in-out signals control voltage groups and additional functions.

List of modules included in 2, 3, 4 and 5-circuit-breaker devices

MODULE	ATS 2-CB	ATS 3-CB	ATS 3-CB Ver.230V AC	ATS 4-CB	ATS 5-CB
MZA-205	1	1	-	1	1
MZA-210	-	-	1	-	-
MPA-351-6	1	1	1	1	1
MWS-206 w220	2	2	-	2	3
MWS-206 w230	-	-	2	-	-
MSS-236	1	1	-	1	-
MSS-246	-	-	2	-	-
MSS-236N	1	1	-	1	1
MSS-246N	-	-	1	-	-
MSS-326 (high current)	1	1	-	2	2

The KWG-301 panel (installed separately and connected to the sub-rack via RS-485) enables to display full synoptics of a bay and control primary equipment directly. The controller is equipped with a set of communication connectors (USB, RS-232-opto, Ethernet-opto, RS-485-wire, RS-232-wire), therefore it may be easily connected to any existing superior SCADA system applying various communication protocols, e.g. DNP 3.0, IEC 61850, IEC 60870-5-103, Modbus. The SO-52v11-eMSZR controller supports transmission according to PRP (Parallel Redundancy Protocol).

Application

The SO-52v11-eMSZR controller is a multi-function device and may operate as:

- ATS/PSS/ARS automat
- object control unit
- multi-channel disturbance recorder

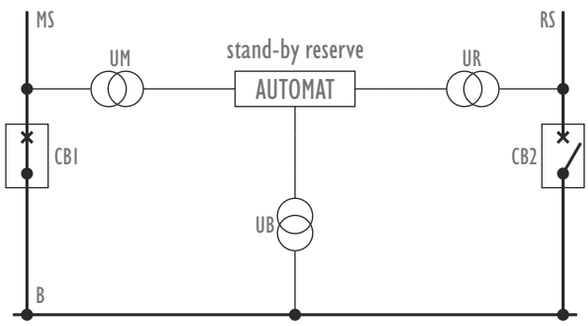
Advantages of the SO-52v11-eMSZR unit:

- integration of the functionalities of ATS automation, object control unit and multi-channel recorder
- compact structure with the reading panel installed anywhere
- large, clear dispatcher's panel with 16 signalling and alarm LEDs, full bay synoptics and key-selected control location
- increasable number of inputs and outputs, according to requirements of a given object
- option of two automations operating independently in one sub-rack, supplied redundantly from two separated sources (feature useful in 4 and 5-circuit-breaker switching substations)
- higher reliability in controlling by direct controlling of circuit-breaker coils in direct current circuits up to 6,0A if U = 220V DC and L/R = 40ms, or 8A – 230V AC
- possibility to measure and visualize values of currents from switchgear bays

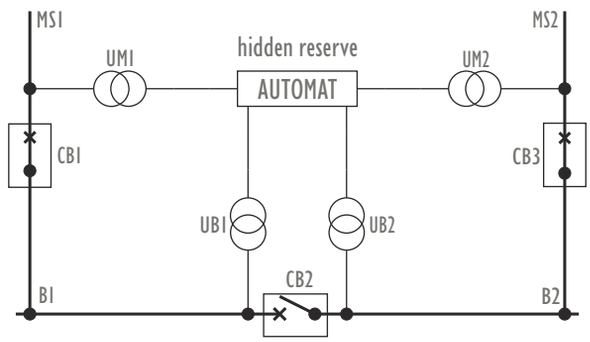
Technical data

PARAMETER	VALUE
Supply voltage	110 ÷ 260V AC; 88 ÷ 253V DC
Binary input nominal voltage	24/48/110/220V DC, 230V AC (agreed with the user)
Voltage module starting value errors	< 2,5 %
Time meter starting value errors	< 0,1 %
Insulation strength - alternating voltage	3 kV, 50 Hz, 1 min
Insulation strength - surge voltage	5 kV, 1,2/5 µs
Ambient temperature	-20…+55°C
Relative humidity	90%
Casing protection level	IP51

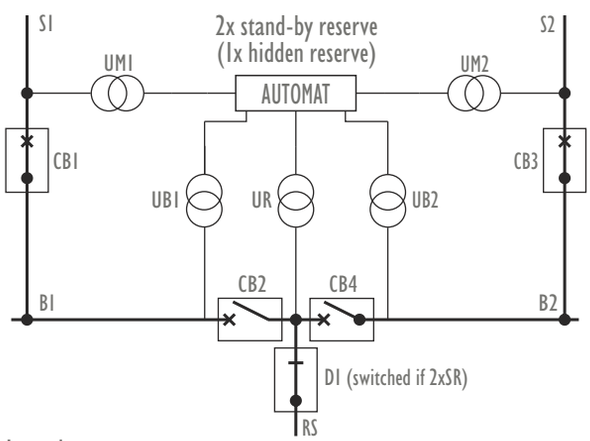
ATS 2-circuit-breaker (SR)



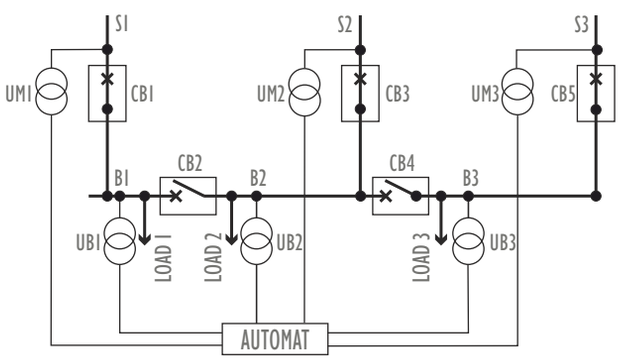
ATS 3-circuit-breaker (HR)



ATS 4-circuit-breaker (2xSR lub HR)



ATS 5-circuit-breaker (2xHR)



Legend:

- D - disconnector or cutting switch (not controlled from ATS/PSS)
- SR - stand-by reserve
- HR - hidden reserve
- B, B1, B2, B3 - switchgear busbars
- UR - reserve supply voltage measurement
- UB - voltage measurement on busbar
- UM - main supply voltage measurement
- CB - circuit-breaker bay (controlled from ATS/PSS)
- MS - main supply
- RS - reserve supply
- S - supply

DP/F/SOSZ v1 eMszr/EN/0717/4.4