

POWER SUPPLY SWITCHING AUTOMATIC

SPIE ENERGETEST



APZplus
technological installations
in industry multi-switch systems



EPROTECT SZR
distribution



AZRS
synchronous and
quasi-synchronous switching



APZmini
simple switchgears

APZplus



Power plants



Industry

APZplus is the newest device realizing supply changeover automatics produced by Energotest. It is dedicated for MV and LV switchgears supplying power to technological installations in industry.

It can handle standard systems (open and hidden reserve) and non-standard systems with up to 10 circuit breakers. It has the ability to control a generator.

Configuration of automatic unit for needs of particular switchgear system is performed by producer on production stage of automatic unit. On customer's request, it is possible to add additional functions and logic in relatively simple way.

User on the object has possibility to set the way of operation of automatic unit by blocking or activating particular switching.

It has voltage inputs 57,7/100V and optional current inputs 5A (current measurement is realized by external current to voltage converter).

EPROTECT



Up to 10 CB



Advanced reliability improvement algorithms



Cybersecurity



Standardized schemas for industry

EPROTECT SZR



MV, HV
distribution

EPROTECT SZR automatic control is based on hardware platform of EPROTECT protection and controllers of MV fields offered by Energotest. This device is dedicated to energy distribution market (distribution plants).

Two versions of the device are available:

- ▶ for MV switchgears operating in the hidden reserve system (optionally they may also operate in other systems) with the possibility of controlling circuit breakers on the MV side of the 110kV/SN transformer. They can work in switchgears with loads with generation,
- ▶ for MV switchgears operating in H5 or H3 systems (optionally they may operate also in other systems) by making switches between 110kV lines supplying a given switchgear and the coupling.

The diagrams of external connections consider possibility of connecting field signals (voltage measurements, circuit breakers position states, bays readiness, interlocks) according to standards used in power plants. On customer's request, it is possible to add additional functions and logic in relatively simple way.



Common features of APZ plus and EPROTECT SZR

The equipment uses an HMI with a color LCD display and a membrane keypad. The individual screens provide information about the causes of possible abnormalities, display events and show messages about completed switchovers. The devices have a built-in fault recorder and meet cyber security requirements. They can communicate using communication protocols such as Modbus RTU, IEC103, DNP3, IEC61-850.



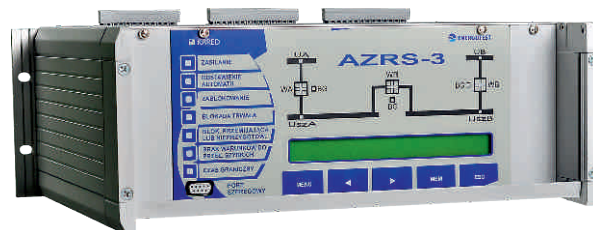
Power plants Industry

AZRS

Manufactured since 1995 and used in all large power plants and large industrial plants. Dedicated to MV and LV switchgears supplying technological installations in the industry particularly sensitive to disturbances in the supply voltage. It can perform ATS changeovers in synchronous and quasi-synchronous cycle.

Designed for switchgears operating in the open reserve system and the hidden reserve system.

It has voltage inputs 57,7/100V. It is equipped with a front panel, on which the switchgear synoptics is placed. The LCD display shows the voltage parameters in the switchgear and messages about the performed switching.



Synchronous and quasi-synchronous switching



Standardized schemas for industry

AZRS automaton performs switching in the following cycles:

- ▶ ATS in fast mode (required for switchgears supplying motor loads) synchronous uninterruptible and synchronous with short interruption,
- ▶ ATS in quasi-synchronous mode,
- ▶ Slow-mode ATS,
- ▶ ATS in all directions,
- ▶ RTS is realized automatically after realization of voltage-stimulated ATS and restoration of the switchgear primary supply voltage,
- ▶ PTS in uninterruptible mode,
- ▶ PTS in synchronous mode with short-term power interruption,
- ▶ PTS in quasi-synchronous mode,
- ▶ PTS in slow mode.

TU-2



TU-2 type voltage transformer is commonly used with automatic power supply switching machines. It adjusts the supply voltage level to the level required by various devices.

The device is dedicated to simple MV and LV switchgears. It can operate in 7 most commonly used switchgear systems. It has a distributed structure consisting of:

- ▶ one automatic unit APZmini, whose task is to control the ATS automatics,
- ▶ several (up to 5 pieces) PB (or PB-04) relays, whose task is to collect information from a given bay (including control of voltage presence). They also play the role of executive elements of power supply switching automatics. They can cooperate with circuit breakers or contactors.

APZ MINI



Automatic version		APZplus	EPROTECT SZR	AZRS	APZmini
Switchgear	switchgear configuration	Any	Any	stand-by / hidden	one of 7
	amount of CB	2...10	2...10	2 or 3	2...4
Performed change-over ATS (automatic transfer of reserve)	synchronous without interruption	—	—	●	—
	synchronous with short interval	—	—	●	—
	quasi-synchronous	—	—	●	—
	slow	●	●	●	●
Executed change-over PTS (planned change-over of supply) ARS (automatic change-over)	synchronous without interruption	●	—	●	—
	synchronous with short interval	—	—	●	—
	quasi-synchronous	—	—	●	—
	slow	●	●	●	●
ATS initiation	voltage dip	●	●	●	●
	mechanical breaker opening	●	●	●	●
	electrical breaker opening	—	—	●	—
	external signal	—	—	●	—
Minimum time of switching	ATS from CB opening	200	300	<100	500
	ATS from voltage dip	300	500	200	1000
	PTS i RTS	uninterruptible	500	uninterruptible	1000
Additional functions	cooperation with power generator	●	●	●	●
	residual voltage control on rails	●	●	●	—
	event recorder	●	●	●	●
	fault recorder	●	●	—	—
	LCD synoptic display	●	●	—	—
	switchgear diagram on frontpanel	●	●	●	●
	user login	●	●	—	—
	current measurement	optional	optional	—	—
	power restoration automation for unmanned facilities	●	●	—	●
Communication ports	Modbus-RTU			●	●
	IEC103	optional	optional	optional	—
	DNP3	optional	optional	—	—
	IEC61850	●	●	optional	
Measurement of voltage from reactance insulators	—	—	—	●	
Distributed construction	—	—	—	●	
Environmental conditions	Storage temperature range		-25 ÷ 70 °C		
	Operation temperature range		-10 ÷ 55 °C		
	Humidity		5% ÷ 95%		
	Atmospheric pressure		86 ÷ 106 kPa		
	Degree of protection	IP 20 from connectors side / IP 40 up to 54 from the front		IP40	IP54

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