

AVR (Automatic Voltage Regulator)

We supply the automatic voltage regulator of synchronous generators as a solution for all types of excitation systems, from basic design through implementation at the customer to warranty and post-warranty service. Our offer also includes phasing equipment and supplies of LV and MV electrical.

1) AVR Power – designed excitation solution according to specific requirements to customers who operate or supply generators of higher power.

- System for brushless and static excitations with a transformer
- Implementation of the controller on the SandRA Z110 platform
- Single-channel and redundant design
- Visualization and connection to the SCADA system of the power plant
- Optional function - automatic generator synchronizer on SandRA Z100's own platform

2) AVR Compact – compact repeatable solution designed primarily for ringless excitations or excitations of the smallest generators.

- System for brushless and static excitations of small generators with excitation transformer
- Implementation of the controller on the SandRA Z110 platform
- Single-channel and redundant design
- Visualization and connection to the SCADA system of the power plant
- Optional function - automatic generator synchronizer on SandRA Z100's own platform



The AVR Z110 automatic voltage regulator is designed as a single-board module and contains:

- Phase control of thyristors
- Programmable arrays
- Two single-chip microcomputers of the ARM architecture
- CAN, USB, RS232 and Ethernet communication adapters

The controller board equipped with connectors and terminal blocks is placed in a tin cabinet, which allows mounting in a switchboard cabinet.

The control panel of the controller is built into the cabinet door together with the keyboard. There are several types of screens

on the computer that provide all the information about the status of the excitation set and the measured quantities of the generator. Contains command buttons for local excitation control. We also offer a similar control panel for managing from the control room of the block.

Voltage regulator function:

- Voltage and reactive power regulation, accuracy of voltage regulation at generator terminals in steady state better than 0.5%
- Voltage equalizer before phasing the generator to the network
- Setting of zero reactive power before switching off the generator from the network
- Regulation of excitation current during tests and in case of stator voltage measurement failure
- Inverter operation of a thyristor rectifier for operational excitation of a generator



- Stator and rotor current limiters with variable overcurrent depending on the size of overcurrent, voltage limiter and V / f limiter
- Underexcitation limit monitor
- PSS system stabilizer
- Generator phasor
- Sequential control of the excitation set, fault diagnostics and automatic transitions between channels

3) DSD – compact repeatable solution primarily designed for ringless excitation or excitation of the smallest generators.

- System for phasing generators and lines (max. 3 phasing points)
- Implementation of a synchronizer on the SandRA Z110 platform
- Possibility of delivery as a control circuit in combination with the AVR Z110 controller
- Optional functions - visualization and connection to the power plant SCADA system

The DSD Z110 is designed as a single-board module and includes:

- Analog measuring inputs
- Programmable arrays
- Two single-chip microcomputers of the ARM architecture
- USB, RS485 / 422 and Ethernet communication adapters

The board with connectors and terminal blocks is placed in a metal cabinet suitable for installation in a switchboard cabinet or on a mounting panel.

Applications and uses:

- Automatic closing of the generator power switch
- Monitoring and control of switching

To ensure full control and maximum switching security, the device is used in a two-channel arrangement - two ZAT DSD 110 devices, one of which performs automatic switching and the other control and monitoring.

In the case of using the ZAT AVR 110 excitation controller, the excitation controller performs automatic switching and control with monitoring is provided by the ZAT DSD 110 device.

Advantages of the ZAT DSD Z110 synchronization device:

- Less electronic components and interconnections
- Easier commissioning and service, easy configuration using tools running on a Windows PCS
- Adaptation for a specific application by configuring the device application software, programmable inputs and outputs

4) Automatic secondary voltage regulation (ASVR)

The ZAT solution provides functions:

- Maintaining the required voltage in individual network nodes
- Balancing of the reactive power balance in individual nodes depending on the required voltage in the regulated node
- Optimization of the operation of the technology of individual units



- Communication according to standard protocols with the electrical system and at the same time with the power plant system
- Redundant system in terms of processor cards, communication and power supply
- To control ASVR use of SandRA Z200 process stations, visualization is optional according to customer preference

Advantages of ASVR ZAT:

- The guarantee of accuracy and speed of regulation is ensured by the basic features of the SandRA Z200 system
- Optional visualization according to customer preferences
- Easy connection to DCS process stations via internal Pernet communication

