SVR™ – Smart Voltage Regulator

Automatic, localised voltage control exactly where problems occur

SVR (Smart Voltage Regulator) is a novel technology developed and designed by Energrid. These units provide **dynamic, per-phase regulation** on long or heavily loaded LV feeders. They mitigate voltage drops, phase imbalance, and localised instability conditions typically invisible to transformer-level control.

SVRs operate in harmony with SOLTC to ensure stable voltage along the entire feeder length, improving service quality even at the farthest customer endpoints.

+36 30 575 7267 www.energridsmart.com 1026 Budapest, Frankel Leó út.45.

SVR – Technical Specifications

General Technical Specifications

- Max. weight: 70 kg
- Max. front dimensions: 750 mm (H) × 500 mm (W)
- Power supply: 184–265 Veff, 50 Hz
- Standby power consumption (max.): 30–55 W
- Max. operating current: 100 A
- Voltage regulation range (3 steps):
  - +10 V / 0 V / −10 V or
  - +15 V / 0 V / −15 V or
  - +20 V / 0 V / −20 V
- Intervention voltage levels: on any phase above 248 V and below 214 V
- Operation per phase: always intervenes on the phase where the limit value is reached

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Additional features

- Harmonic distortion: THD ≤ 8% up to the 40th harmonic (at any point in the grid)
- Built-in protection: integrated fuse + lightning/overvoltage protection with optical status indicator and remote warning

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Basic operating functions

- Operates even in the event of 1- or 2-phase failure, with interference-free power supply transfer

- Overcurrent protection/shutdown:
  - the SVR measures the current flowing through
  - when the adjustable limit is reached (adjustable on SMA/SCADA, default value: max. operating current), the control module is shut down
  - the SVR remains in standby mode until the current falls below the limit
- Intervention time logic:
  - if the voltage exceeds the adjustable range (default: 248/214 V) for more than 30 seconds, the SVR steps 1 level in the appropriate direction

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SVR control parameters and signals

- Symmetrising control: approximation of 3-phase voltage based on SCADA command
- Self-test / diagnostics: continuous monitoring, recording of errors, and internal module errors
- Local LED status indication (min. 3 cm)

Stored and remotely query-able information (SMA/SCADA):

- Operating status + fault location/fault type
- Current stage position + triggering voltage value (1F/3F)
- Inertia signal (persistent limit value exceedance, no further stage)
- Set voltage limit values
- Set overcurrent limit value (controller inactive)
- Protective functions (overcurrent, overvoltage) characteristic data
- Power supply failure/restoration (in the case of 3F, 1-2 phase failure)
- Data reading error (SMA/SCADA command reception failure)

- Internal clock: synchronised, max. daily inaccuracy of 0.1 s
- Event storage: in non-volatile memory, with time stamp min. 30 days
- Protective earthing: connection point with 8 mm hole for conductive enclosure

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SVR cabinet features

- Transportability: equipped with crane lugs
- Protection: IP44
- Insulation strength: 2.5 kVeff
- EPH connection: with 12 mm hole for conductive parts
- Humidity resistance: 80% RH, 0…35°C
- Operating temperature: −25…+60°C
- Neutral conductor earthing: via PEN busbar
- Lockability: 10.5 mm diameter padlock or K8 cylinder half insert

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Communication and remote control

- Remote signaling to SMA and SCADA
- Remote control: master SMA/SCADA – slave SVR
- Interface: RS485 + Ethernet

Protocols (even in parallel):

- Modbus RTU
- Modbus TCP (SMA)
- Time synchronisation: SNTP Modbus
- Remote query: by specifying duration and signal type

- Connection restoration: automatic reconnection after network failure; error storage and transmission after 5 minutes of unsuccessful attempts
- Internal fault signal: stored without delay
- Transmission of protection signals: overvoltage/overcurrent events to SMA/SCADA
- Data transmission: distortion- and damage-free, in compliance with standard data rates and response times
- Time stamp: 0.1 s resolution

Power failure management

- All settings/data/signals are retained in the event of a failure
- Automatic restart upon return: no separate commissioning or data entry required, based on the last status
- Storage of queryable events:
- fact and cause of power failure (in the case of 3F, 1-2 phase failure is also an event)
- return of power supply