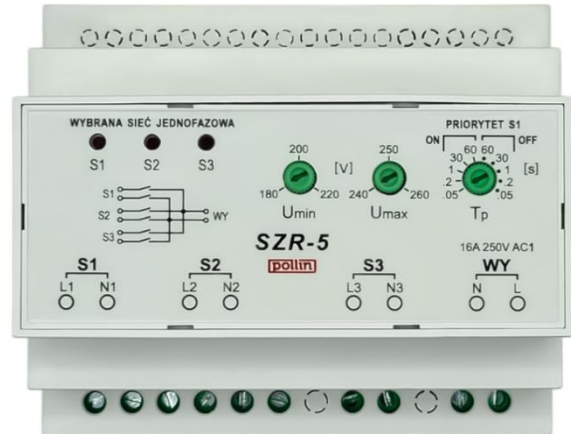


1-phase automatic transfer switch controller SZR-5

Description

- 5 controller is **designed for use in automatic transfer switch systems with three 230 V AC power sources, with or without a common neutral conductor (N)**. Its purpose is to eliminate power outages caused by incorrect grid parameters by automatically switching loads between the primary and backup sources. The ATS - 5 controller is easy to use and reliable, and can operate with or without S1 source priority, allowing the operating logic to be tailored to the facility's requirements. The device works with a generator, provided the correct power is selected and AVR voltage stabilization is used, ensuring the voltage remains within the permissible range. Voltage measurement is performed using the TRMS method, with sufficient accuracy to control operating thresholds, and the operating frequency is within the 47–52 Hz range, ensuring proper response to typical 50 Hz grid fluctuations.



SZR-5 enables direct power supply to receivers with the following parameters: 16 A 250 V AC AC-1 (2.5 A 250 V AC AC-15).

The modular housing (6 DIN modules) is made of self-extinguishing plastic and is designed for mounting on a TH35 rail.

Principle of operation

- 5 controller controls the parameters of three single-phase power sources. **The device is fed separately from the L phase and N neutral wire from each source, so the sources do not need to share a common N.** The L and N wires of only one currently selected source appear at the output.

The front panel features LEDs indicating which source is currently selected (only one LED is lit), two knobs for setting the lower and upper voltage thresholds, and separate knobs for adjusting the transfer time. **The time adjustment knob also serves as an operating mode switch: with or without priority for source S1 (terminals L1, N1)**. Selecting a position on the left scale indicates priority mode, while the right scale indicates non-priority mode.

- 5 controller continuously monitors the voltage level at each source. If the voltage drops below the set lower threshold (U_{min}) for longer than 10 seconds, switching to another source occurs, provided its voltage is within the user-set range. If the voltage increases above the set upper threshold (U_{max}), switching occurs after 200 ms of this increase. Threshold adjustment range: lower 180–220 V AC, upper 240–260 V AC. Voltage hysteresis is approximately 7 V for the lower threshold and 3 V for the upper threshold, ensuring a stable return without accidental switching.

The switching process itself lasts according to the setting of the step knob: 50 ms, 200 ms, 1 s, 30 s, 60 s. The countdown time is signaled by the flashing of the LED.

In S1 source priority mode, after the correct parameters are restored on S1, the controller counts down the recovery time, set on the same scale as the interruption time, and automatically switches the load back to S1. In non-priority mode, it maintains power from the current stable source and does not force a return to S1.

The load is switched to a different source only when it is stable – a source is considered stable if its voltage does not exceed the set thresholds for the last 10 seconds. The controller uses TRMS measurement and accepts frequencies in the 47–52 Hz range, allowing it to respond to both slow voltage fluctuations and rapid overloads.

LED signaling

- **Red source LEDs (S1, S2, S3)** – only one LED lights up, indicating the currently selected power source (the one supplied to the device output).
- **The selected source diode flashes** – occurs during the countdown of the switching break time to the S1 source (in priority mode).

Cooperation of the SZR-5 controller with a power generator or energy storage

The SZR-5 controller can operate with a single-phase generator as a backup power source, provided that the generator is properly matched to the load and has an appropriate power reserve and an AVR (Automatic Voltage Regulator). Regulation), thus keeping the voltage at a stable level.

Why is this so important?

The SZR-5 controller monitors the power source voltage and, provided it is within the acceptable range, allows the load circuits to be powered from that source. However, if the voltage exceeds the limit values (either over or under), the controller recognizes it as abnormal. This can occur when the generator is unable to maintain stable speed, causing the voltage to "fluctuate." The controller interprets this as an anomaly and shuts down the unstable power source. In such a situation, the controller operates correctly, but a user (unaware of its operating principles) may mistakenly consider it to be faulty.

A similar situation can occur when the power source connected to the SZR-5 controller is an emergency power supply system with an inverter (e.g., energy storage, UPS). The quality of the voltage generated by the inverter is crucial – a waveform with low harmonic distortion (THD < 3%, full sine wave) is required.

Some inverters generate voltages with significant distortion, which results in higher harmonics. This can lead to incorrect interpretation of power supply parameters by the controller's measurement systems, preventing proper switching to the secondary source or incorrectly switching to it.

Power sources that do not generate a "clean" sine wave or do not provide a stable voltage value are not suitable for use with the SZR-5 controller, and their use may lead to unexpected switching or a complete power failure.

It's also worth remembering that implementing automation that automatically starts and stops a generator requires the use of additional devices working in conjunction with the controller. The design of such a system should be carried out by an experienced designer or automation technician with the appropriate knowledge and qualifications.

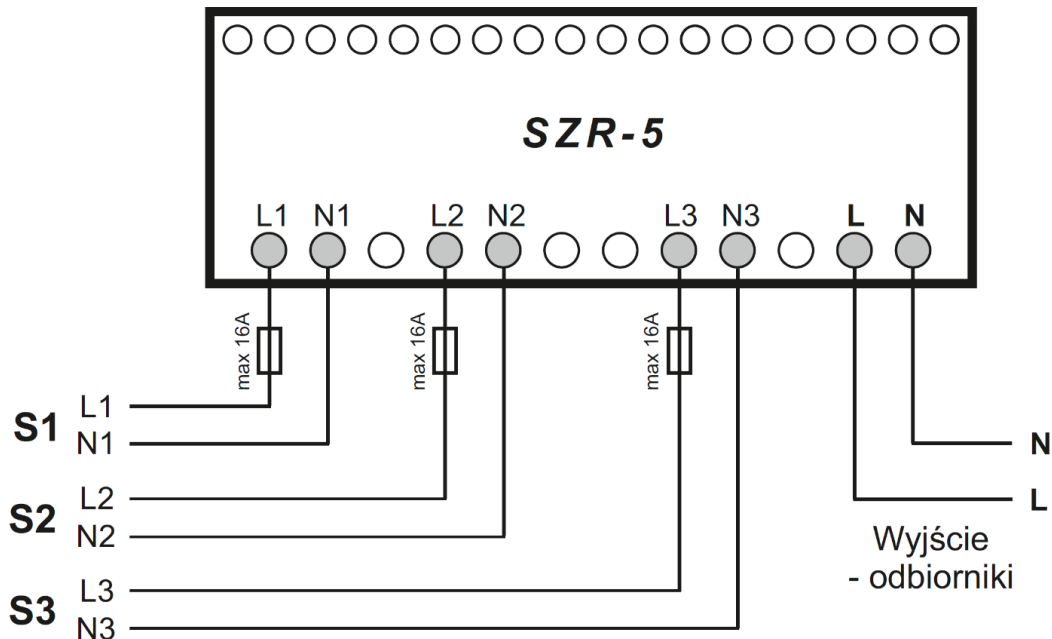
Pollin is not responsible for the selection or operation of generators or other power sources compatible with the SZR-5 controller. Pollin does not provide consulting services regarding generator selection. Selection of the appropriate device should be entrusted to a qualified specialist who will take into account the nature of the load, voltage stability requirements, and compatibility with the SZR-5 controller.

Technical data

Parameter name	Value	Parameter name	Value
Rated supply voltage	3 x 230 V AC + N1, N2, N3 (3 voltage sources without common neutral N)	Measurement accuracy	± 1 %
Operating supply voltages	150 to 265 VAC	Delay in response to "<" / ">" U power supply	For the lower threshold 8 s; for the upper threshold 200 ms
Power supply operating frequency	47 to 52 Hz	Switch return response delay	For the lower threshold 8 s; for the upper threshold 8 s
Operating temperature range	-20 to 50 °C	Case	Modular housing (6 DIN modules)
Max power consumption	6.7 VA	Degree of protection	IP20
Operating mode	Possibility to select the operating mode with source priority S1 (L1, N1) or without priority	Installation	TH35 rail
Cooperation with power generators	Yes	Delayed response to power asymmetry	-
Number of relay outputs	1	Switching break time	Adjustable (5 positions): 50 ms, 200 ms, 1 s, 30 s, 60 s
Contact arrangement	Voltage output	Reaction to incorrect phase sequence	-
Maximum load current AC-1	16A / 250V AC	Clamp type	Elevator
Maximum load current AC-15	2.5A / 250V AC	Wire stripping length	9 mm
Measurement of U power supply from 47 to 52 Hz	150 to 265 VAC	Single-wire conductor	0.5 to 2.5 mm ²
Upper threshold U of the power switch L1 L2 L3	Adjustable in range 240 to 260 VAC	Multi-stranded conductor (stranded wire) without ferrule	0.5 to 2.5 mm ²
Lower threshold U of the power switch L1 L2 L3	Adjustable in range 180 to 220 VAC	Stranded wire with square crimp sleeve	0.5 to 2.5 mm ²
Hysteresis U when switching power supply	Lower switching threshold 7V; upper switching threshold 3V	Tighten to maximum torque	0.5 Nm

Full technical specifications are available on the website www.pollin.pl/do-pobrania or by scanning the QR code provided in the warranty and guarantee section.

Connection diagram



Installation

The SZR-5 controller must be installed in accordance with applicable electrical installation standards and regulations. The following guidelines are intended to ensure the installer's safety and the proper operation of the device:

1. **Authorizations** - The device may only be installed by a person with appropriate qualifications and authorizations to work on electrical installations.
2. **Disconnecting the power supply** - Before starting any work, it is essential to disconnect the power supply at the distribution board and make sure that the circuit is voltage-free (e.g. using a voltage indicator).
3. **Personal Protection** - The installer should use personal protective equipment such as electrically insulating gloves and safety glasses.
4. **Mechanical installation** - The device should be mounted on a standard TH35 rail in the distribution board, ensuring stable mounting and adequate ventilation space.
5. **Wiring** - Connections should be made according to the wiring diagram provided by the manufacturer. Ensure that the terminals are tightened with the correct torque and that wires of the appropriate cross-section are used. Only one wire may be inserted into each terminal – regardless of whether it is solid or stranded with a crimped ferrule. NOTE! The bottom of the SZR-5 controller contains two output terminals marked "L" and "N" – these terminals carry 230 V AC.
6. **Checking the connections** - After completing the installation, carefully check the correctness of all connections, make sure that the terminals are securely tightened and that there are no exposed wires that could cause a short circuit or a shock hazard.
7. **Restoring Power** - After completing the installation and inspection, turn on the power and check the operation of the device according to the instructions.
8. **Tests** - After completing the assembly, check the correct operation of the device.

Sequence of assembly steps :

1. Turn off the power to two or three power sources, which may be three independent sources or different phases of the same system.
2. Attach the SZR-5 controller.
3. Connect the wires according to the diagram.
4. Turn on the power.
5. Check the correct operation of the controller (perform the following steps separately for S1, S2 and S3)

S1 source priority mode

1. Turn off the power source connected to the input terminals being tested, for example, L1 and N1. The controller should switch the loads to the next available stable backup source. The LED on the appropriate source should be continuously lit.
2. Reconnect the voltage to source S1. After the set recovery time has elapsed, the controller should automatically switch the receivers back to S1. The S1 LED should be continuously lit.

S1 source priority-free operation mode

1. Turn off the source connected to the input terminals being tested, for example L1 and N1. The controller should switch the loads to another available and stable backup source.
2. Reconnect the voltage to S1. The controller should not switch the receivers to S1. The receivers remain powered from the currently stable source as long as its parameters are correct.

Warranty and guarantee – short information

The warranty applies to every purchaser, including consumers. Warranty claims should be directed to the seller from whom the purchase was made.

If a defect is found in the device, the customer has the right to choose: he or she can use the statutory warranty (in accordance with the provisions of the Civil Code) or the manufacturer's warranty.



Pollin Guarantee



Pollin devices are covered by a 10-year manufacturer's warranty – Zakład Elektroniczny POLLIN Wojciech Polak. The warranty applies only to devices purchased by businesses and covers material and manufacturing defects.

Warranty claims should be submitted by e-mail to: pollin@pollin.pl, in accordance with the procedure described in the full version of the document.

The warranty does not cover, among other things, mechanical damage, unauthorized modifications, installation by unqualified persons and natural wear and tear of consumables.

The full text of the warranty terms is available at: <https://pollin.pl/do-pobrania> or via the attached QR code.

Markings



This symbol on a device indicates that the used equipment should not be disposed of with other household waste. Used equipment should be taken to one of the designated electronic waste collection points or returned to the store when purchasing new equipment. Improper disposal of electronic waste poses a threat to the environment and human health.



The CE marking confirms that the product meets the essential requirements of all applicable European Union directives and regulations.



This marking indicates that installation, connection and all servicing of the device may only be performed by qualified personnel with electrical qualifications.

Technical support – the fastest help from Pollin experts

If you have any questions regarding the operation, configuration or installation of the device, **please contact us by email – this is the fastest way to obtain technical support**.

Send a message to: support@pollin.pl, describe the problem in detail and leave your contact number and the hours when we can call you.

Our engineers will review your request and make every effort to provide you with professional assistance as quickly as possible.



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