ZUBR | Technical data sheet, installation and operation manual

S6

Phase selector switch for professionals

Phase selector switch ZUBR S6 red (hereinafter referred to as the device) is used for the automatic selection of the more stable phase in a three-phase power network and for supplying single-phase loads (230 V) from it, while protecting equipment from overvoltage and undervoltage. This ensures the uninterrupted operation of especially critical equipment.

TECHNICAL DATA

Model	S6-40	S6-50	S6-63
Rated load current (for category AC-1)	3×40 A	3×50 A	3×63 A
no longer than 10 min	3×50 A	3×60 A	3×80 A
Rated load power (for category AC-1)	3×9,2 kVA	3×11,5 kVA	3×14,4 kVA
Voltage limits	upper 230–280 V, lower 100–210 V		
Switch-off time when overvoltage occurs	not more than 0,03 sec		
Switch-off time when undervoltage occurs > 100 V / < 100 V	0,1 –10 sec (par. "Lut") / no more than 0,03 sec		
Time delay before the load is switched on	3–999 sec		
Priority phase selection	123, 132, 213, 231, 312, 321, oFF (auto mode)		
Delay time for returning to the priority phase	3–600 sec		
Phase switching speed: on threshold violation, on phase loss	not more than 0,1 sec		
Relay type	polarized		
Power relay output monitoring (welded contact detection)	presence		
Supply voltage	at least 100 V, no more than 420 V		
The number of operating cycles under load	not less 10 000 cycles		
The number of operating cycles without load	not less 500 000 cycles		
Device weight	0,45 kg ±10%		
Overall dimensions (w x h x d)	106 × 90 × 66 mm		
IP to GOST 14254	IP20		

IN THE BOX

Phase selector switch	1 piece
Installation and Operating Manual	1 piece
The packing box	1 piece

INSTALLATION

Important! Before the installation and operation of the device, please read by the end of this document. This will help to avoid possible danger, mistakes, and misunderstandings.

The appliance is intended for installation inside residences. The risk of moisture or humidity in the installation site should be minimal. The ambient temperature during the installation should be within –5...+45 °C.

The appliance is installed in a special box, which allows to conduct the easy installation and operation. Cabinet should be equipped with standard mounting rail 35 mm width (DIN rail). The appliance takes in width of six standard module on 18 mm. The height of the appliance should be in the range 0,5...1,7 m from the floor.

For protection against short circuit and excess capacity in circuit load necessarily need to set in front of the appliance, the automatic circuit-breaker (QF). The automatic switch off is established in the open-phase fault wire, as shown at the schemes 1, 2. To protect person from electric shock leak is set safety shutdown device.

Terminals of the device designed for wire cross section 2 up to 16 mm². It is advisable to use a soft wire, which is tightened in the terminals with a screwdriver with a tip width of no more than 6 mm with a torque of 2,4 N·m. A screwdriver with a blade more than 6 mm wide can cause mechanical damage to the terminals. Doing so will void your warranty claim.

The bus is an integral part of the device — do not use the device without the bus!

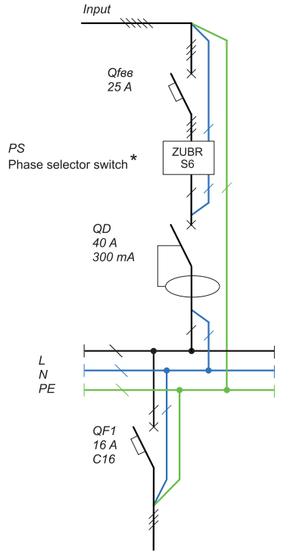


CONNECTION SCHEMES

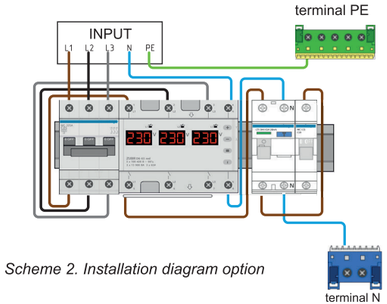
Phases (L1–L3) for switching and powering the phase selector (100–420 V, 50 Hz) are identified via the indicator and connected to terminals 1, 2, and 3; the neutral conductor (N) is connected to terminal 4.

The load phase conductor is connected to one of the terminals 5, 6, or 7, which are interconnected by a busbar (included in the set).

The total load current must not exceed the current rating of a single channel.



Scheme 1. Electrical wiring diagram option



Scheme 2. Installation diagram option

EXPLOITATION

The phase selector is powered from the monitored phases and the neutral conductor. If the voltage is within the permissible limits, after the load connection delay time (ton) has elapsed, the load is connected to the priority phase.

The phase priority order can be set manually or disabled. If priority is disabled, the phase selector automatically determines which phase is currently the most stable and, in the event of a fault condition, switches the load to that phase.

If the voltage goes beyond the permissible limits, the load is transferred to the next phase in the priority order whose voltage is within normal limits. After the voltage on a higher-priority phase is restored, the load will be reconnected to that phase only after the configured return delay time (tr) to the priority phase has elapsed.

Each switching operation is continuously monitored for the condition of the power relay contacts. If a power relay malfunction is detected, further switching of the load to the phase controlled by that relay is disabled.

The phase selector allows faster transfer of the load from one available phase to another phase on which a fault was previously detected, while the return delay time to the priority phase (tr) has not yet expired. In this case, the phase with the shortest remaining (tr) time is selected.

Please note that the device measures voltage using a True RMS algorithm. This algorithm reduces the impact of power-line interference on measurement accuracy when the waveform deviates from a sine wave. Therefore, device readings should be verified using a True RMS voltmeter.

Setting voltage limits

(factory setting is 253 V / 198 V)

To set the upper limit U ¯ ¯, click "+"; to set the lower limit U_ _, click "–". Use "+" and "–" to change the selected limit. Examples of the screens for setting the upper and lower limits are shown below.



IMPORTANT! During voltage limits settings use technical documentation for protected equipment.

All settings are stored in non-volatile memory.

Locking the controls

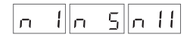
To lock (unlock) the device, press and hold "+" and "–" simultaneously for 6 seconds until "Loc" ("unLoc") appears on the display.

The Log of events

The Log of events is intended for analyzing the quality of the power supply network by reviewing recorded fault events. It can be used to make appropriate adjustments to the device settings.



Press the "i" button to enter



The screen displays the total number of recorded events in the log for each phase.

The log can store up to 99 fault events in non-volatile memory, where "n1" is the most recent event and "n99" is the oldest. If the number of events is exceeded, the counters are redistributed across phases so that the total number does not exceed 99.

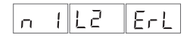


To view faults separately for each phase, use the "≡" button.

Use the "+" and "–" buttons to browse all events in the Log of events.

Examples of displayed fault events are shown below:

Event №1—Incorrect relay state on the second phase "ErL" (relay error).



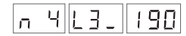
Event №2—Overheating inside the housing; thermal protection activation temperature 75 °C "oht" — overheating.



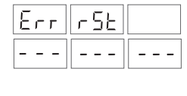
Event №3—Voltage on the first phase exceeded the configured upper limit; fault voltage value 263 V.



Event №4—Voltage on the third phase dropped below the configured lower limit; fault voltage value 190 V.

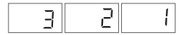


Resetting the event log



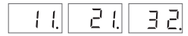
While viewing the log, press and hold the "≡" button for 3 seconds until "Err rSt" appears. After releasing the button, the log will be cleared.

Current phase priority



To view, press and hold the "i" button for 3 sec. Phase priority settings are described in the table in the menu item "Pri".

Relay switching counter



To view, press and hold the "i" button for 6 sec.

The counter shows how many times the load has been powered from each phase. The maximum counter value is 999.

To reset the statistics, enter the counter menu, then press and hold the "≡" button for 3 seconds until "rSt" appears on the display.

Firmware version view

Press and hold the "i" button for 9 seconds. The manufacturer reserves the right to make changes to the firmware to improve the device's performance characteristics.

WARRANTY TERMS

The warranty for ZUBR devices is valid for 60 months from the date of sale, provided that the instructions are followed. The warranty period for products without a warranty certificate is counted from the date of production.

If your device is not working properly, we recommend you to read the section "Possible problems" firstly. If you can not find an answer, contact Service Center. In most cases, these actions resolve all issues.

If you continue to have issues with the device, please send it to a Service Center or to the store where you purchased the device. If your device is defective due to our fault, we will repair or replace it under warranty terms within 14 business days.

Please look through the full text of the warranty and the data you need to send to your Service Center on the website https://www.ds-electronics.company. If you have a warranty case, please, contact the General distributor in your area.

ZUBR

SERVICE CENTER CONTACT:
+38 (091) 481-91-81
Viber WhatsApp Telegram
support@dse.com.ua

WARRANTY CARD

serial №:

date of sale:

a seller, a seal:

place of a seal

an owner contact
for a service center:

MENU — Use "≡" to select a menu option

Use the "+" and "–" buttons to change the parameters. After pressing the button for the first time, the parameter will flash, after pressing it for the second time the parameter will change. After 10 s after pressing — return to the previous state or menu level.

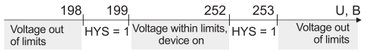
MAIN SETTINGS	Screen	Notes
Time delay before the load is switched on — [time on] (factory setting 3 s, range of change 3—999 s, step 3 s)	ton 3 SEC	This is the adjustable switch-on delay time after a fault if the load was de-energized. The countdown will be displayed for the phase from which the load will be connected. If the delay time exceeds 100 s, a blinking dot will be shown on the display. When less than 100 s remains, the countdown will be displayed in seconds.
Return delay to the priority phase — [time return] (factory setting 3 s, range of change 3— 600 s, step 3 s)	tr 3 SEC	This is the adjustable return delay time to the priority phase, during which the device analyzes the suitability of the phase for reconnecting the load. Increase the delay if the voltage quality is unstable.
Phase priority selection (factory setting "oFF", range of change: 321, 312, 231, 213, 132, 123)	PrI oFF L3 L2 L1 L3 L1 L2 L2 L3 L1	Manually select the required phase priority order or disable it. When set to "oFF", the device automatically determines the stability of each phase and, in the event of a fault, switches the load to the most stable phase. The active phase is indicated by a green LED.
Repeated load reconnection limit from the priority phase — [repeat] (factory setting — 5 times, adjustment range — 1–5 times or "oFF") Useful when the connected load is too powerful for the selected phase.	rEP 5	This function limits the number of repeated load reconnections from the current priority phase if the load was powered from it for no more than 20 sec. If protection is triggered, the device switches the load to the next phase according to the priority order and blocks the faulty phase until one of the buttons is pressed or 1 hour has elapsed.
ADVANCED SETTINGS: TO ENTER HOLD "≡" FOR 3 S		
Display (factory setting "on", range of change "oFF")	dSP on dSP oFF	To put the display into sleep mode, select the "oFF" value. In this mode, the indicators turn off 20 sec after the last interaction with the device and automatically turn on when any button is pressed or when a fault occurs.
Voltage correction — [correction] (factory setting 0 V, range of change ±20 V)	Cor Cor L1U 0 Cor L2U 0 Cor L3U 0	You can apply a correction factor if the voltage reading on the device display differs from the reading of your reference instrument. To select a phase, press "+" or "–". When the required phase is selected, press "≡". To change the parameter, use the "+" or "–" buttons. To return to the menu, press the "≡" button three times.
Pro mode of Switch-off time when undervoltage and overvoltage occurs (factory setting "oFF"). Does not switch off the protected equipment during voltage deviations that are safe in magnitude and duration. For more details, see the models of disconnection time when the voltage goes out of range described in the Table — Load disconnection time when the voltage goes out of range.	PrO oFF PrO on	Pro Mode **disabled**: Upper voltage limit 230–280 V, 0,03 s; Lower voltage limit 100–210 V **0,1...10 s**, < 100 V 0,03 s Pro Mode **enabled**: Upper voltage limit > 276 V 0,03 s, 230–276 V 0,5 s; Lower voltage limit 184–210 V 10 s, 161–184 V **0,1...10 s**, < 161 V 0,03 s

Continued Advanced settings

Hysteresis
(factory setting 1 V, a range of change 0–5 V)
Required to reduce the number of device switching operations when the mains voltage is close to the fault threshold and unstable.

HYS 1

The device switches the load to another phase if the voltage exceeds the configured lower or upper limit. If the voltage goes beyond the permissible limits on all phases, the load will be disconnected.



Phase switching delay during voltage sag
(factory setting 1 s, range of change 0,1–10 s)

LUt 10 SEC

For finer adjustment of the protection response time to voltage dips.
It is necessary to fine-tune the response time of the protection to power failures. More details in the Table 1: the Pro mode is enabled: 161–184 V, the Pro mode off: 100–210 V.

Selecting the type of Time delay
during the first power-up or after complete load de-energization
(factory setting "tAr")

odt tAr
odt tAo

"tAr" time after voltage recovery — delay is counted from the moment of voltage recovery.
"tAo" time after switching off — the delay (ton) is counted from the moment of switching off the device load and includes the time of accident action in the total delay time.

Voltage protection trip counter

roF 100

To view, press and hold the "i" button for 15 seconds.

Displays the number of times the voltage relay entered protection mode with load disconnection due to overvoltage, overload, or short circuit. The counter cannot be reset.

Temperature of the internal overheating sensor

To view, press and hold the "i" button for 18 seconds. This function is useful, for example, for estimating the temperature inside the enclosure and preventing overheating in advance.

int 30 °C

Calculated linear stresses

Hold the button "i" for 24 sec. At the corresponding screens, the phase numbers will appear, between which linear voltages are calculated. When releasing the screens for 30 sec calculated linear voltages will be displayed with an accuracy of 2-5 V.

1-3 2-1 3-2 → 400 397 395

Factory reset

dEF

To reset the factory settings, hold the three buttons "+", "–" and "≡" at the same time for more than 12 sec until "dEF" message appears on the screen. After release, reset to factory settings and reboot will take place, the events log is cleared.

POSSIBLE PROBLEMS, CAUSES AND WAYS TO OVERCOME THEM

At turning on neither indicator nor screen do not shine
Possible cause: There is no power supply voltage.
It is necessary to: Ensure supply voltage presence.

The load is disabled, "oht" flashes on the screen

oht 71 °C
oht 52 °C

The temperature inside the housing exceeded 70 °C and triggered protection against internal overheating.
When the temperature drops below 60 °C, the unit will resume operation.

If the protection trips more than 5 times within 24 hours, the voltage relay is blocked until the temperature inside the case drops to 52 °C and one of the buttons is pressed.

Possible cause: inner overheating of the device to which can lead: bad contact in the terminals of the device, high ambient temperature, overwhelming power output or incorrectly selected cross-section of wires for connecting.
It is necessary to: check tension of power wires in the device terminals, make sure that the switching load does not exceed the permissible and that the cross section of the wires is selected correctly.

Every 5 seconds, the screen displays "Ert"

Ert

Possible cause: open or short circuit of the internal over-heating sensor. Control over inner overheating will not be done.
It is necessary to: Send the device to the Service center. Otherwise, control over inner overheating will not be done.

Every 10 seconds on the screen "Erb", the device does not respond to button presses

Erb

Possible cause: the device detects button presses longer than 2 minutes.
It is necessary to: restart the device by switching off and on the power supply. Ensure that the buttons are not stuck during operation; otherwise, contact the Service center.

No load supply on one of the phases; "rEP" flashes on the display.

245 rEP 235

When protection is triggered, the device switches the load to the next phase according to the priority order and blocks the phase on which the voltage protection event was detected.
Cause: the limit of consecutive repeated switching operations on the current phase has been exceeded.
Required action: unlock the device by pressing any button, then press "i" to view the cause of the trip in the Log of events. Take corrective action if possible. Please note that the device provides automatic unlocking 1 hour after the "rEP" event is triggered.

Frequent load trip
Possible cause:
- underestimated (overestimated) value of the upper (lower) limit;
- low hysteresis value set.

It is necessary to:
- increase the value of the limits so that the protected equipment is tolerant of their values;
- increase the hysteresis value.

"ErL" — [Error relay] flashes on the display of one of the phases

ErL

The load is disconnected or cannot be switched to the current phase.

Possible cause: the power relay on the current phase is faulty.
According to the operating logic, the device continuously monitors the condition of all three power relays. If a relay operates normally, the corresponding phase green indicator remains ON.
If the condition of a power relay does not correspond to the operating logic, the device will attempt the following:
- if welded relay contacts are detected, the load will not be switched to another phase;
- if the relay contacts do not close or their condition cannot be determined, the load will be switched to other phases, and the faulty relay will be excluded from further switching operations.

If the device cannot determine the relay condition, it will periodically attempt to disconnect it. In this case, the green indicator of the corresponding phase will flash.
Required action: reset the "ErL" error by restarting the device. To do this, switch the power OFF and then ON again. If the error remains, contact the Service center.

Technical Support Chat

If you haven't found the answer, please contact our technical support engineer
@dselectronics_bot

SAFETY INSTRUCTIONS

Carefully read and become aware of these instructions.
Connection of the device must be done by a qualified electrician.
Before the installation (dismantling) and connection (disconnection) of the device, turn off voltage supply and also act according to the "Rules of an arrangement of electric installations".
Turning on and off, configure the device should be with dry hands.
Do not connect the device to the network disassembled.
Avoid hitting of water or moisture to the device.
Do not expose the device to extreme temperatures (higher than 40 ºC or below –5 °C) and high humidity.
Never clean the device with the use of chemicals such as benzene, solvents.
Do not store the device and do not use it in areas with the dust.
Do not attempt to disassemble and repair the device.
Do not exceed the landmarks value adaptor and power.
To protect against overvoltage caused by lightning discharges, use a lightning protector.
Protect the children from games with the working device, it is dangerous.

ADDITIONAL INFORMATION

Do not fire and do not throw away the device with the household waste.
After the end of its service life, the product must be disposed of in accordance with applicable law.
Transportation of goods carried in the package, ensuring the safety of the product.
The deive is transported by any kind of transport (rail, sea, motor, air transportation).
Date of manufacture is on the back side of device. Application time is unlimited.
The device does not contain harmful substances.
If you have any questions or you something will not clear, call the Service centre the telephone number listed below.

version: d6.2.76.04.6.

RoHS Directive 2011/65/EU
Low Voltage Directive 2014/35/EU, EMC Directive 2014/30/EU

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