ZUBR | Technical data sheet and installation and operation manual

D6

Overvoltage protection for professionals

Web manual version for browser translation into your native language

Voltage relay ZUBR D6 red (hereinafter referred to as the device) designed to protect domestic and industrial electrical equipment (including three-phase electric motors). During operation, it measures and displays the current voltage value on each phase.

Device can operate in 2 modes: a single-phase or a three-phase load. The device is powered from the measured phases and a neutral conductor.

IN THE BOX

Voltage relay	1 piece
Technical data sheet and installation and operation manual and warranty card	1 piece
The packing box	1 piece

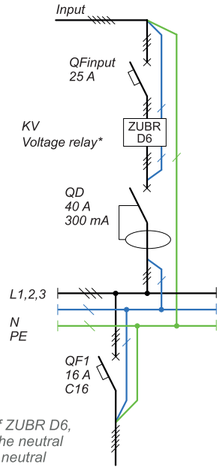
TECHNICAL DATA

Model	D6-40 red	D6-50 red	D6-63 red
Rated load current (for category AC-1)	3 x 40 A	3 x 50 A	3 x 63 A
max. within 10 min.	3 x 50 A	3 x 60 A	3 x 80 A
Rated load power (for category AC-1)	3 x 9,2 kVA	3 x 11,5 kVA	3 x 14,4 kVA
Voltage limits		upper 230–280 V lower 100–210 V	
Switch-off time when overvoltage occurs		not more than 0,04 s	
Switch-off time when undervoltage occurs	> 100 V < 100 V	0,1–10 s not more than 0,04 s	
Supply voltage		not less than 100 V not more than 420 V	
The number of operating cycles under load		10 000 cycles	
The number of operating cycles without load		500 000 cycles	
Relay type		polarized	
Phase imbalance		10–80 V	
Device weight		0,43 kg ±10 %	
Overall dimensions		106 x 85 x 66 mm	
IP to GOST 14254		IP20	

CONNECTION SCHEMES

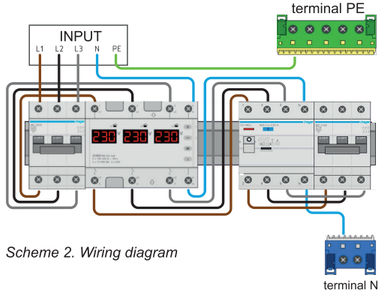
Important! Before the installation and operation of the device, please read by the end of this document. This will help to avoid possible danger, mistakes, and misunderstandings.

The phases and a neutral conductor for measurement and power supply are determined by an indicator and supplied to the device. The connecting wires of the load phases are connected to the corresponding terminals 5–7 (L1–L3), and the neutral conductor (N) to terminal 8.

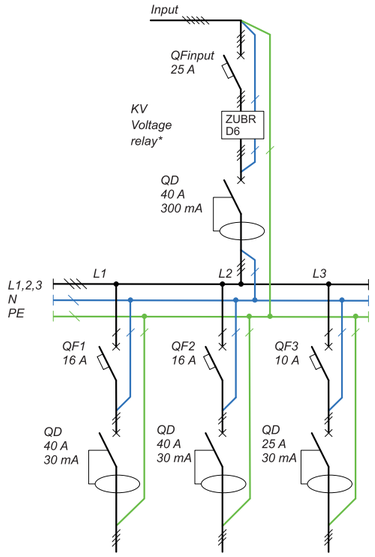


**For correct operation of ZUBR D6, it is enough to connect the neutral conductor to one of the neutral bypass (4 or 8).*

Scheme 1. Option for connecting an RCD, a circuit breaker with a neutral bypass through the device to a three-phase load.



Scheme 2. Wiring diagram



Scheme 3. Option for connecting an RCD, a circuit breaker with a neutral bypass through the device to three single-phase loads.

INSTALLATION

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 two standard module on 18 mm. The height of the appliance should be in the range 0,5...1,7 m from the floor.

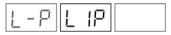
For protection against short circuit and excess capacity in circuit load necessarily need to set in front of the appliance, the automatic circuit-breaker (QF). The automatic switch off is established in the open-phase fault wire, as shown at the schemes 1, 2. To protect person from electric shock leak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

EXPLOITATION

The device can operate in two modes: single-phase or three-phase load. To select a mode, hold down "≡" for 6 s, use "+" or "–" to select a desired mode. When the mode is changed, the event log is automatically cleared.

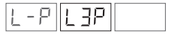
The single-phase load mode (asynchronous mode)



The device is capable of perfo-rming the functions of three single-phase relays.

Settings and control are separate for each power relay, while the device protects the equipment from voltage going beyond the permissible limits.

The three-phase load mode (synchronous mode)

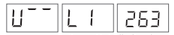


Settings and control are shared for all power relays, while the device protects the equipment from voltage going beyond the permissible limits and monitors phase asymmetry, phase sequence, and phase loss (these functions can be disabled).

Setting voltage limits

(factory setting 253 V / 198 V)

To view the upper limit of each phase, press "+", and the lower limit — "–". To change the selected limit, press "+" and "–".



upper limit | phase №1 | limit value

In single-phase mode, first press "≡" to select the desired phase.



lower limit | limit value for three phases

If you are using the ZUBR in three-phase mode, the upper and lower limit settings are the same for all three phases.

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

All settings are stored in non-volatile memory.

Counter of operation cycles



To view hold the button "i" for 12 sec. Do not discharged.

Locking the buttons

To lock (unlock), hold down the "+" and "–" buttons for more than 6 seconds until the message "Loc" ("unLoc") appears on the screen.

Factory reset



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.

Log of events for 100 notes

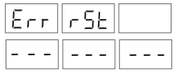


To enter the log, press "i". The screen will display the total number of event records in the log.

To view faults separately for each phase, press "≡".

Use "+" and "–" to navigate through the log.
The log can store up to 99 faults in non-volatile memory, where "n 1" is the most recent and "n99" is the oldest.

To reset the log

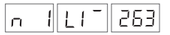


Enter the Log and hold down "≡" for 3 sec until "Err rSt" appears. After releasing the button, the log will be cleared.

The log will be automatically reset when switching between single-phase and three-phase load modes.

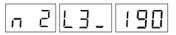
Examples of notes for different events:

Upper limit events



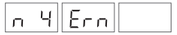
entry №1 | phase №1 | upper limit | significance events

Lower limit events



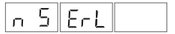
entry №2 | phase №3 | lower limit | significance events

An events due to break of the neutral conductor



entry №4 | break of the neutral conductor

An events as a result of incorrect relay status



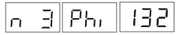
entry №5 | relay error

Overheating events



entry №3 | overheat | thermal protection response temperature

Accident due to violation of phase sequence **(three-phase mode only)**



entry №3 | sticking, phase sequence disturbance | phases order during events

Phase imbalance events **(three-phase mode only)**

Initially, the screens display for 3 sec: the log entry number, the numbers of the phases between which the skew imbalance, and the skew value. For the next 3 sec, the screens show the voltage values on the phases between which there was an skew.



entry №1 | № of phases between which there is a skew | voltage skew

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 °C 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.

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 have not been able to fix the problem on your own, send the device to the importing company in your country (contact details are indicated on the packaging). If a defect caused by our fault is found, we will carry out warranty repair or replacement of the device within 14 working 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 item

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 factory setting 3 s, range of change 3–999 s, step 3 s	ton ton L1 3 ton L2 3 ton L3 3 **Three-phase mode only** ton 3 SEC	**In single-phase mode**, set a separate delay for each phase. To start editing, press "+" or "–", then select the phase using the "≡" button and set the desired delay time. To return to the menu, press "≡" three times. After the end of a fault condition, the device does not immediately supply power to the connected equipment but does so after the preset load activation delay. For refrigeration equipment, it is recommended to set the load activation delay to 120–180 seconds to extend the compressor’s service life.
Selecting the type of Time delay (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.
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 is off**: Upper voltage limit 230–280 V 0,04 s; Lower voltage limit 100–210 V **0,1...10 s**, < 100 V 0,04 s **Pro Mode is on**: Upper voltage limit > 276 V 0,04 s, 230–276 V 0,5 s; Lower voltage limit 184–210 V 10 s, 161–184 V **0,1...10 s**, < 161 V 0,04 s
Maximum continious numbers of relay operations for voltage, current, power events (factory setting 5 operations, a range of change 1–5 operations, to disable this function, select "oFF")	rEP 5	The function limits the number of repeated trippings of the device due to exceeding the limit or phase imbalance. A repeated tripping is considered to occur if less than 20 s have passed between switching on the load and disconnecting due to the limit. Note that the relay provides for automatic unlocking 1 hour after a "rEP" tripping; this measure will ensure partial operation of your equipment until the problem in the network is resolved.
ADVANCED SETTINGS: TO ENTER HOLD "≡" FOR 3 S		
Phase imbalance voltage (factory setting 20 V, a range of change 10–80 V, to disable, increase the skew value until "oFF" appears)	**Three-phase mode only** PHb 20	This is permissible voltage difference between the two phases. If the load is switched off due to a violation of the phase imbalance voltage limit, will alternate on the screen: PHb 44 1-3 → 185 220 229 the skew value / phases between which the skew imbalance
The phase imbalance disconnection time (factory setting 1 sec, a range of change 0–30 sec)	**Three-phase mode only** PHb 1 SEC	Available only when "Phase imbalance voltage" is on. Setting the protection reaction time to phase imbalance.
Enable / disable display in the Standby mode (factory setting "on")	dSP on dSP oFF	Turns off the screen after 20 sec after the last interaction with the device and in the absence of an emergency situation. In the event of an emergency situation on any of the phases, the corresponding screen will flash.

Continued Advanced settings

Correction of screen reading (factory setting 0 V, range of change ±20 V)	Cor Cor L1U 0 Cor L2U 0 Cor L3U 0	You can use correction if voltage indications on the screen of the device and your reference device differ. • To change the delay time, press "+" or "–". • To select a phase, press "≡". • To return to the menu, press "≡" three times.
Switch-off time in case of voltage failure (factory setting 1,0 sec, a range of change 0,1–10 sec)	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.
Hysteresis (factory setting 1 V, a range of change 0–5 V)	HYS 1	It is necessary to reduce the number of the device operations by the limit, when the voltage in the network is close to the limit and is not stable. 198 199 252 253 U, V Disconnect the device at the bottom limit / HYS = 1 / Voltage is satisfactorily, the device is on / HYS = 1 / Disable the device at highlimit
Neutral conductor failure control (factory setting "oFF", setting range of permissible deviation between phase angles in percentage 10-35 %, step 5 %)	Crn oFF	In a three-phase circuit, the phase angle is 120°, but in case of a neutral conductor failure, the phase angles are imbalance. Set the permissible percentage of phase angle imbalance if you want to enable neutral conductor failure control.
ADDITIONAL FOR THREE-PHASE MODE: TO ENTER, HOLD "≡" FOR 9 S		
Phase sequence (factory setting "on")	**Three-phase mode only** PHn on PHn oFF	If the phase sequence is violated, the current phase sequence and the voltage across them will alternate on the screen. The phase sequence is always determined relative to phase L1.
No-phase control (factory setting "on") Possible when the Phase Imbalance Voltagemenu is oFF	**Three-phase mode only** PLo on PLo oFF	No-phase control is only possible when the Phase Imbalance Voltage menu is off. When the function is disabled, the device will not disconnect the load if there is no voltage on the phase(s).

Viewing temperature of the internal overheating sensor

int 25 °C Hold the button "i" for 18 sec.

Viewing of firmware version

Hold the button "i" for 6 sec. The manufacturer reserves the right to modify the firmware to enhance the device technical characteristics.

Viewing of calculated linear stresses

Hold the button "i" for 3 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.

1-2 2-3 1-3 → 400 399 399

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.

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.

After turning on on the screen normal voltage level, but load is not turning on

Possible cause: the current voltage in the network is close to the established limits and not stable.

It is necessary to: check the values of the limits; increase their values so that the protected equipment is tolerated to them. In other cases, address to a Service centre.

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

The temperature inside the housing exceeded 70 °C and triggered protection against internal overheating.

oht 71 °C

When the temperature drops below 60 °C, the unit will resume operation.

oht 52 °C

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 overheating 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.

Every 5 seconds the screen displays "Ern"

Ern

Possible cause: The device detected a neutral wire break.

It is necessary to: check the three-phase network on your own or consult a relevant expert, adjust the device settings according to the specifics of your network.

The load is disabled, the screen displays "rPF"

rEP The relay was locked to draw attention to the dangerous situation and protect the equipment.

Cause: The maximum number of frequent operations in case of unstable network has been exceeded.

It is necessary to: unlock the relay by pressing any button, then press "i" to find out the cause of tripping in the Alarm log. Take steps to correct the problem, if possible. Note that the relay will unlock automatically 1 hour after the "rEP" is triggered, this measure will keep your equipment partially operational until the network problem is corrected.

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 screen of one of the phases

ErL

Possible cause: The state of the power relay on one of the phases does not correspond to the operating logic.

According to the device's logic, it constantly monitors the status of three power relays. If the relay is functioning normally on the respective phase, the green LED will be lit.

If the state of the power relay deviates from the operating logic, the device will attempt to:

- In single-phase load mode, change the state of the power relay.
- In three-phase load mode, disconnect all power relays.

If the device fails to determine the relay's state, it will periodically attempt to disconnect it. In this case, the green LED will blink on the respective phase.

It is necessary to: Clear the "ErL" error by restarting the device. To do this, turn off and then turn on the power. If the error persists, contact the Service center.

Technical Support Chat

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

@dselectronics_bot

version: d6.0.76.3.4

RoHS Directive 2011/65/EU

Low Voltage Directive 2014/35/EU, EMC Directive 2014/30/EU

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