ZUBR | Technical data sheet, installation and operation manual

3F

Overvoltage protection for professionals

Voltage relay ZUBR 3F (hereinafter referred to as the device) is designed to protect domestic and industrial three-phase electrical equipment (including three-phase electric motors) against loss of voltage, voltage outside the permissible limits and phase-voltage imbalance.

IN THE BOX

Voltage monitoring relay	1 piece
Installation and operating manual	1 piece
The packing box	1 piece

TECHNICAL DATA

Maximum load current (for category AC-1)	5 A
Maximum power load (for category AC-1)	1000 VA
Phase imbalance	10–80 V
Voltage limits	upper 230–280 V lower 120–210 V
Maximum disconnection time	not more than 0,04 s
Switch-off time when overvoltage occurs 230–280 V	0–5 s
Switch-off time when undervoltage occurs 0–230 V	0,1–10 s
Supply voltage	at least 100 V not more than 420 V
Time delay before the load is switched on	3–999 s
The number of operating cycles under load	50 000 cycles
The number of operating cycles without load	20 000 000 cycles
Relay type	electromagnetic
Connection	no more than 2.5 mm²
Weight	0,15 kg ±10 %
Overall dimensions (w x h x d)	52 x 90 x 67 mm
IP to GOST 14254	IP20

CONNECTION SCHEMES

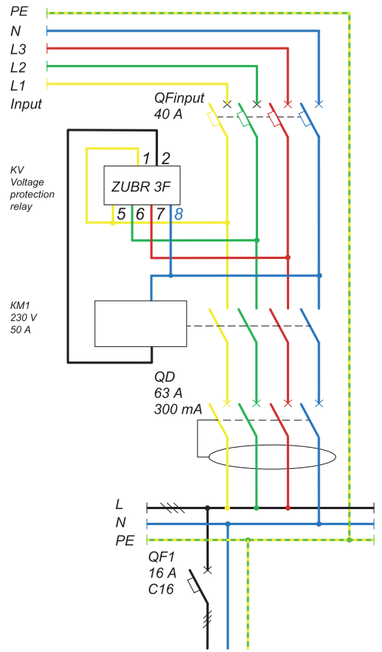
Important! Read this entire manual before installing and operating the device. This will help prevent potential hazards, errors and misunderstandings.

Use a contactor to switch the load (not included in the package).

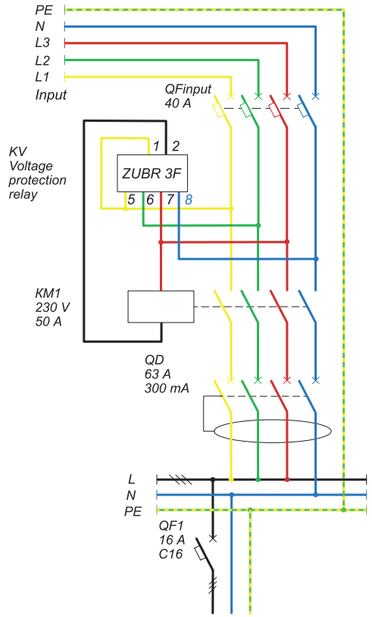
The phases used for measurement and power supply are indicated by the indicator and connected to the device.

Terminals 1–2 or 3–4 are used to control the three-phase contactor.

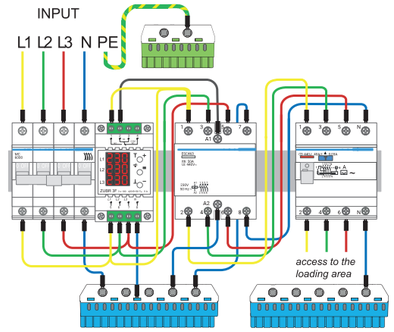
The device will not operate without a neutral (N) connection.



Scheme1. Example electrical circuit with ZUBR 3F and a contactor with a 230 V coil



Scheme 2. Example electrical circuit with ZUBR 3F and a contactor with a 400 V coil



Scheme 3. Example wiring diagram with ZUBR 3F and a contactor with a 230 V coil

INSTALLATION

The device is intended for indoor installation. Minimize the risk of moisture or liquid ingress at the installation site. The ambient temperature during installation must be between −5 and +45 °C.

Install the device in an electrical enclosure on a standard 35 mm DIN rail. It occupies three standard 18 mm modules. The device must be installed 0.5–1.7 m above floor level. Install and connect the device only after the load has been installed and checked.

To protect the load circuit against short circuits and overload, a circuit breaker (QF) must be installed upstream of the device in the phase conductors (see Diagrams 1 and 2). To protect people against electric shock caused by leakage current, install a residual current device (RCD).

The device terminals accommodate conductors with a cross-sectional area of no more than 2.5 mm². Strip 8 ± 0.5 mm of insulation from the wire ends.

Flexible wire is recommended. Tighten the terminal screws to a torque of 0.5 N·m using a screwdriver with a blade width not exceeding 3 mm. A screwdriver blade wider than 3 mm may mechanically damage the terminals and void the warranty.

EXPLOITATION

After the device is powered on, if the voltages are within the permissible limits and the phase sequence is correct, the load is connected and the red indicator lights up. The displays show the voltages of all three phases.

Setting the voltage limits

(factory settings: 253 V / 198 V)

Press "+" to view the upper limit or "–" to view the lower limit. Use "+" and "–" to adjust the limits.

upper limit *lower limit*





Important! When setting voltage limits, follow the specifications in the technical documentation for the equipment being protected.

Non-volatile memory retains all settings in the event of a power failure.

Log of events

The device stores the voltage readings at which the load was disconnected in non-volatile memory. Fault events are displayed from newest to oldest: "n 0" is the most recent trip and "n99" is the oldest.

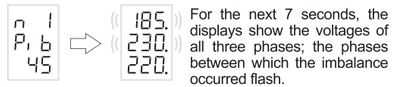
Press the "≡" button to open the event log.

Use the "+" or "–" buttons to browse the log. The device displays the event number and fault code. If you pause on an individual log entry, the device also displays the voltage of each phase at the time of the fault.

Examples of fault event indications

n1 — Phase-voltage imbalance "Pib"

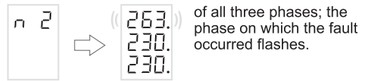
For the first 3 seconds, the displays show the log entry number, fault code and imbalance value.



For the next 7 seconds, the displays show the voltages of all three phases; the phases between which the imbalance occurred flash.

n2 — Voltage outside the set limits

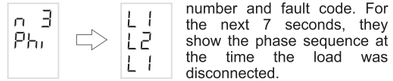
For the first 3 seconds, the displays show the log entry number. For the next 7 seconds, they show the voltages



of all three phases; the phase on which the fault occurred flashes.

n3 — Incorrect phase sequence "Phi"

For the first 3 seconds, the displays show the log entry



number and fault code. For the next 7 seconds, they show the phase sequence at the time the load was disconnected.

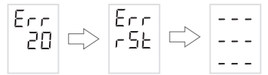
n4 — Loss of power supply "PoL"

For the first 3 seconds, the displays show the log entry number and fault code. For the next 7 seconds, "U_ _" flashes alternately with "0".



To clear the log, press and hold the "≡" button for 3 seconds until "Err" appears. Keep holding the center button until "Err rSt" is displayed.

Release the button to clear the log. When the log is empty, pressing "≡" displays dashes.



Viewing calculated line-to-line voltages

Press and hold the "≡" button for 3 seconds. The corresponding displays show the numbers of the phases used to calculate each line-to-line voltage. After releasing the button, the displays show the calculated line-to-line voltages with an accuracy of 2–3 V for 30 seconds or until "≡" is pressed. This function is available only when the three-phase sequence is correct.



Viewing the firmware version



Press and hold the "≡" button for 12 seconds. The manufacturer reserves the right to modify the firmware to improve the device performance.

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 broken due to a manufacturer's fault, it will be repair 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
@dselectronics_bot

WARRANTY CARD

serial №: date of sale:

a seller, a seal:

place of a seal

an owner contact
for a service center:

SETTINGS MENU: SELECT A PARAMETER USING THE "≡" BUTTON

Press "≡" once to open the fault event log; press it again to open the settings menu. Use the "+" and "–" buttons to change a parameter. The first press enters edit mode (the value flashes); subsequent presses adjust the value. The device exits the menu 10 seconds after the last button press and returns to the mains-voltage display after another 10 seconds.

Menu parameters	Display	Notes
Load reconnection delay — [time on] (factory setting: 3 s; range: 3–999 s; step: 3 s) To protect refrigeration equipment and extend compressor service life, a load reconnection delay of 120–180 s is recommended.		This is the adjustable delay before the load is reconnected after a fault. During the countdown, the device displays the voltage of each phase in turn.  *phase voltage* *time remaining before load reconnection, in seconds* *phase whose voltage is currently displayed*
Phase-voltage imbalance threshold (factory setting: 20 V; setting range: 10–80 V). To disable this function, increase the imbalance threshold until "oFF" appears.		If the load is shut off due to the phase imbalance exceeding the limit, the screen will alternately display the current voltage on the phases and:  *the magnitude of the imbalance;* *the phase numbers between which it was detected*
Disconnection delay for phase-voltage imbalance (factory setting: 1 s; range: 0–30 s) Available only when the "Phase-voltage imbalance threshold" function is enabled.		If protection trips frequently, increase this delay or the permissible phase-voltage imbalance threshold in accordance with the requirements of the protected equipment.
Phase sequence monitoring (factory setting: "on")		 If the phase sequence is incorrect, the displays alternate between the current phase sequence and the phase voltages. The phase sequence is always determined relative to phase L1.
Phase-loss monitoring (factory setting: "on") Available only when the "Phase-voltage imbalance threshold" function is disabled		When this function is set to "oFF", the device will not disconnect the load if voltage is absent on any phase.
Professional disconnection-time mode for out-of-range voltage (factory setting: "oFF") When "Pro" mode is disabled, the disconnection delay for overvoltage (undervoltage) is set using the hUt (LUt) parameters. This allows fine adjustment to suit specific equipment.		When "Pro" mode is enabled, the device does not disconnect the protected equipment during voltage deviations that are safe in magnitude and duration.

Pro Mode **OFF**	Upper voltage limit	230–280 V	0–5 s
		> 280 V	0,04 s
	Lower voltage limit	0–210 V	0,1–10 s
Pro Mode **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	0,5 s
		< 161 V	0,04 s

Continued menu

Voltage correction — [correction]
(factory setting: 0 V; setting range: ±20 V)
Use voltage correction if the voltage displayed by the device differs from the reading of a reference measuring instrument.



Press "+" or "–" to select correction for the first phase. After adjusting the first phase, press "≡" to move to the second phase and press it again for the third. Press "≡" once more to complete the correction settings.

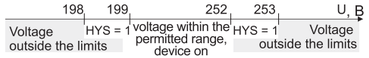


current phase number
correction value in volts

Hysteresis — [hysteresis]
(factory setting: 1 V; setting range: 0–5 V)



This is necessary to reduce the number of times the device switches when the line voltage is close to the trip threshold and unstable.



Maximum number of consecutive protection trips — [repeat]
(factory setting: 3; setting range: 1–5; "oFF" to disable). A trip is considered consecutive if no more than 20 s elapses between load reconnection and disconnection due to an out-of-range voltage or phase imbalance.



This function limits consecutive trips caused by out-of-range voltage or phase-voltage imbalance.
Please note that the relay automatically unlocks one hour after an "rEP" trip. This allows some operation of the equipment until the mains problem is resolved.

Display on/off in standby mode
(factory setting: "on")



Turns the display off 30 s after the last interaction with the device. The display turns on automatically when any button is pressed or a fault occurs.

Overvoltage disconnection delay
(factory setting: 0.0 s; range: 0–5 s; step: 0.1 s)



Fine adjustment of the overvoltage protection response time. With "Pro" mode disabled, this parameter sets the load disconnection delay for voltages in the range 230–280 V. See the "Pro" menu item for details.

Undervoltage disconnection delay
(factory setting: 1.0 s; range: 0.1–10 s; step: 0.1 s)



Fine adjustment of the undervoltage protection response time. With "Pro" mode disabled, this parameter sets the load disconnection delay for voltages in the range 0–210 V. See the "Pro" menu item for details.

Load reconnection delay timing mode
(factory setting: "tAr")



"tAr" — time after voltage recovery: the delay is counted from the moment the voltage returns to normal and is reset if the voltage reaches a fault value.
"tAo" — time after switching off: the delay is counted from the moment the load is disconnected and includes the duration of the fault condition in the total delay time.

Protection trip counter "roF"



Press and hold "≡" for 16 s to view the counter. It shows the number of times the voltage relay has disconnected the load due to fault conditions. The counter cannot be reset.

Factory reset "dEF"



Press and hold all three buttons simultaneously until "dEF" appears on the display. Release the buttons; the device will restart and restore its factory settings.

POSSIBLE PROBLEMS, CAUSES AND WAYS TO OVERCOME THEM

The load is disconnected, and the display and indicator are off

Possible cause: no supply voltage.

It is necessary to: check that supply voltage is present.

The device has disconnected the load, but the display shows a normal voltage level

Possible cause: the current mains voltage is unstable and close to the set limits.

It is necessary to: adjust the disconnection limits to values permitted for the protected equipment.

In other cases, contact the service centre.

The load disconnects frequently, and the countdown resets and starts again.

Possible cause:

- the upper (lower) voltage limit is set too low (too high);
- the permissible phase-voltage imbalance threshold is too low;
- brief voltage surges.

During brief voltage surges, the device briefly displays the fault voltage and then the current voltage. The previous post-fault delay countdown is reset and starts again.

It is necessary to: adjust the disconnection limits according to the permissible operating parameters of the protected equipment.

The load is disconnected; "rEP" is displayed



The relay has locked to draw attention to a potentially hazardous condition and protect the equipment. The display alternates between the current voltage readings and "rEP".

Possible cause: the maximum number of consecutive protection trips has been exceeded.

It is necessary to: press any button to unlock the relay. Open the event log to determine the cause of the trip.

SAFETY INSTRUCTIONS

Carefully read and become aware of yourself 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 or and 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.

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 device 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 center the telephone number listed below.

Technical Support Chat

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

@dselectronics_bot

version: 3F.G3.4.1

RoHS Directive 2011/65/EU

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

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