

### 3F

## Overtoltage protection for professionals

Voltage relay ZUBR 3F is intended to protect industrial and household three-phase electrical equipment (including three-phase electric motors) from blackout, exceeding of permissible voltage limits, phase (voltage) unbalance.

The voltage relay also monitors the order of the phase sequence and has an adjustable tripping time for phase (voltage) unbalance.

### SUPPLY PACKAGE

Voltage relay ZUBR 3F	1 piece
Guarantee card, technical passport and manual	1 piece
Shipping box	1 piece

### TECHNICAL DATA

Maximum load current	5 A
Maximum load power	1 000 VA
A skew (asymmetry) phases	10–80 V
Voltage limit	upper 220–280 V lower 120–210 V
Break-time at increasing	not more then 0,04 sec
Break-time at lower:	> 120 V not more then 1 sec < 120 V not more then 0,04 sec
Power Volt	not less then 100 V not more then 420 V
Load switch-on delay	3–600 sec
The number of operating cycles under load of	not less cycles 50 000 cycles
The number of operating cycles without load of	not less cycles 20 000 000 cycles
Relay type	electromagnetic
Connection	not more then 2,5 mm <sup>2</sup>
Mass	0,15 kg ±10 %
Overall dimensions (w x h x d)	52 x 67 x 90 mm
IP to GOST 14254	IP20

READ BY THE END OF THIS DOCUMENT, before the installation and operation of the device. This will help to avoid possible danger, mistakes and misunderstandings.

IT IS NECESSARY TO USE A CONTACTOR (not included in the scope of supply) for switching three-phase equipment.

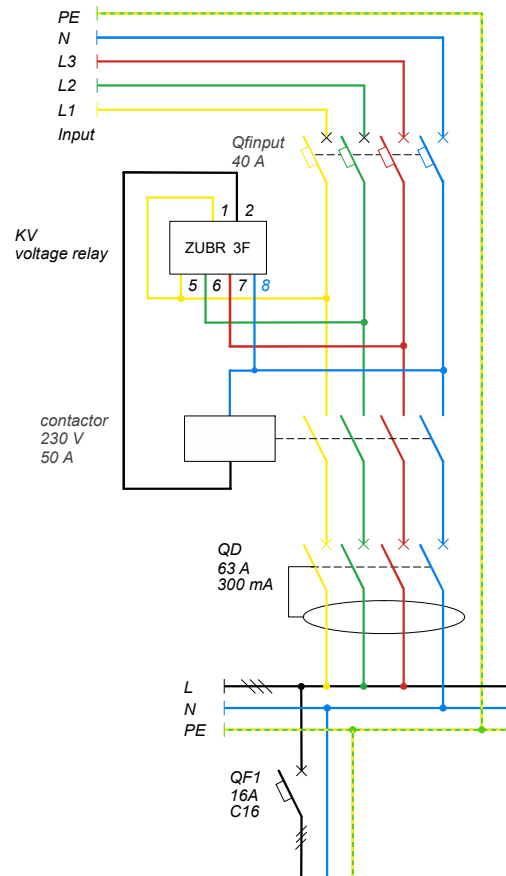
RELAY CAN BE USED AS A FULL-FLEDGED SINGLE-PHASE PROTECTION then for the normal operation of the relay, one phase and zero is enough.

### CONNECTION SCHEME

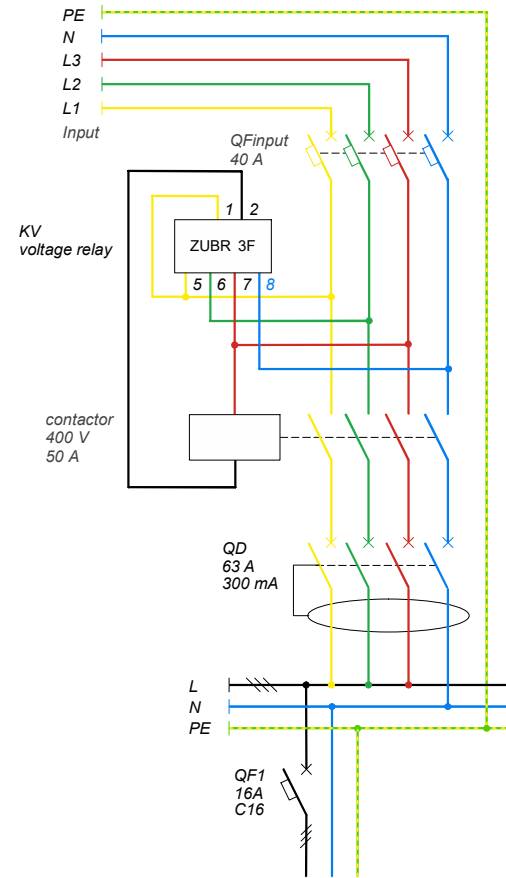
The phases for measurement and supply are determined by the indicator and fed to the relay.

Terminals 1, 2 or 3, 4 are required to control a three-phase contactor.

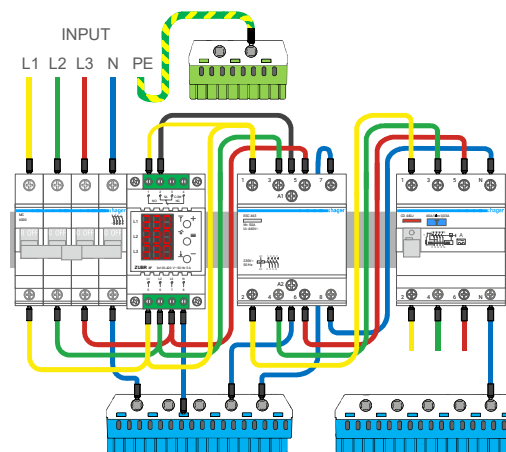
No zero voltage relay will not work.



Scheme 1. Option of wiring diagram of ZUBR 3F and contactor with 230 V winding



Scheme 2. Option of wiring diagram of ZUBR 3F and contactor with 400 V winding



Scheme 3. Option of the connection diagram of ZUBR 3F and contactor with 230 V winding

### 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  $-5...+45\text{ }^{\circ}\text{C}$ .

The appliance is installed in a special box with standard mounting rail 35 mm film (DIN rail) and takes in width of three standard module on 18 mm. The height of a device has to be in the range from 0,5 to 1,7 m from the floor. The appliance is installed and activated after installation and inspection of the voltage.

For protection against short circuit and abuse power load in the chain must always be in front of the appliance set the automatic circuit-breaker (QF) (scheme 1, 2). To protect person from electric shock leak is set safety shutdown device (QD).

Terminals of the device designed for wire cross section up to 2,5 mm<sup>2</sup>. Clean the end wires of  $8 \pm 0,5$  mm. It is advisable to use a soft wire. Tighten terminal with derived average 0,5 H·m. Wires protracted in terminals with a screwdriver with a shank width not more than 3 mm. Screw with shank width more than 3 mm may apply mechanical damage to terminals. This could result in loss of warranty.

### GUARANTEE 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 that you first read the section «Possible problems». If you cannot 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 within 14 business days.

Please see the full text of the warranty and the data you need to send to your Service Center. The website address can be found in the instructions in the Contacts section.



### GUARANTEE CARD

serial number:	date of purchase agreements:
seller stamp:	
an owner contact for a service center:	

## EXPLOITATION

3F will immediately begin to display the voltage in three phases. If the voltage is normal, the voltage will be applied to the load after the set time and the red indicator will light up.

Use the middle button to navigate through the menu (table 1). 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. In 5 sec after the button was pressed the indicator will return to displaying the system voltage.

All settings are stored in NON-VOLATILE MEMORY.

When setting the voltage limits USE THE PROTECTED EQUIPMENT TECHNICAL DOCUMENTATION.

### Setting trip limits

(factory setting 242 V / 198 V)

To view the upper limit, press the «+» button, lower — «-». To change the limit as necessary use the «+» and «-».

L1 -  
242  
U

upper limit

L1 -  
198  
U

lower limit

### Delay in the load starting after a failure (control is described in table 1)

During a short-time voltage jump before the countdown for 2 sec, an emergency situation will be displayed, then for 2 seconds the current and remaining time before the load is switched on. Screen during the delay countdown:

220  
12  
L2

current phase voltage

time to turn on the voltage in seconds

current phase number

FOR PROTECTION OF REFRIGERATION EQUIPMENT, where there is a compressor, it is recommended to set a delay of turning on load 120–180 sec. It will allow to increase the service life of the compressor.

### Factory reset

Hold the three buttons at the same time until «dEF» message appears. After releasing the buttons, the settings will be reset and the device will restart.

dEF

### Log for 100 accidents

The device stores in non-volatile memory the voltage values at which the load was interrupted.

To enter the log, press the «≡» button. Log entries are displayed in order from the last to the oldest («n 0» is the last entry, «n99» is the oldest).

To move through the log and view previous alarms, use the «+» or «-» buttons. In the first 2 seconds, the relay will display the number and type of the alarm. In the next 2 seconds, it will display the value.

#### Examples of alarms log entries:

**Phase unbalance alarm.** The imbalanced phases will blin.

n 1  
P, b  
45

the record №1

voltage imbalance

imbalance value: — 45 V

(185.)

voltage in the first phase.

(230.)

voltage in the second phase

(220.)

voltage in the third phase

#### Upper limit alarm.

n 2  
L1

the record №2

exceeding the limit

(240)

the voltage value that has exceeded the limit will flash alternating with — if the lower limit is exceeded, and with ---, if the upper limit is exceeded.

#### Phase sequence failure alarm.

n 3  
Ph,

the record №3

sticking, phase sequence disturbance

L1  
L2  
L1

phase sequence at the time of power cut.

To clear the log file, enter it by pressing the middle button once. Then hold the middle button for 3 seconds until the message appears «Err». Keep holding the middle button until the message appears «Err rSt». After releasing the button, the log file will be cleared. If the log file is empty, after pressing the middle button, the relay screen will display «≡≡≡».

Err  
20

number of log entries

Err  
rSt

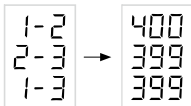
---

Table 1. FUNCTION MENU	Press «≡»	Screen	Notes
<b>View the log for 100 accidents</b>	1 time		The log stores the cause of the load shedding. If several faults occur simultaneously, the log entries will be made according to the following priority: 1. Three-phase fault or incorrect phase sequence. 2. Voltage imbalance. 3. Exceeding the upper or lower limit.
<b>Delay in the load starting after a failure</b> (factory setting 3 sec, a range of change 3–600 sec)	2 times	ton 3 SEC	It is used to protect compressor equipment. It is recommended to set a delay of turning on load 120–180 sec. It will allow to increase the service life of the compressor.
<b>Phase unbalance voltage</b> (factory setting 20 V, a range of change 10–80 V)	3 times	P, b 20 U	To disable, increase the unbalance value until the «OFF» message appears. If the load is switched off due to a violation of the phase unbalance voltage limit, the current phase voltages will alternate on the screen and P, b 31 1-2 current phase unbalance in volts numbers of the phases with unbalance
<b>The phase unbalance disconnection time</b> (factory setting 1 sec, a range of change 0–30 sec)	4 times	P, b 1 SEC	Permissible time of excessive voltage imbalance. If the protection trips frequently, increase the time or the value of the phase-alteration voltage so that the protected equipment is tolerant.
<b>Phase sequence</b> (factory setting «on»)	5 times (4 times, if «Phase unbalance voltage» is off)	Ph, on	L1 L3 L2 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.
<b>No-phase control</b> (factory setting «on»)	6 times (5 times, if «Phase unbalance voltage» is off)	PLo on	No-phase control is only possible when the «Phase Unbalance Voltage» menu is off. When the function is disabled, the device will not interrupt the load when there is no voltage on the phase(s).
<b>Professional model of the tripping time when the voltage goes beyond the limits</b> (factory setting «OFF»)	7 times (6 times, if «Phase unbalance voltage» is off)	Pro off	Does not disable the protected equipment at safe voltage deviations in value and duration. More details about the tripping time model when the voltage is out of range see Table 2.
<b>Correction of voltage</b> (factory setting 0 V, a range of change ±20 V)	8 times (7 times, if «Phase unbalance voltage» is off)	Cor	You can use correction if voltage indications on the screen of the device and your reference device differ. To switch between the corrections for each phase, use the «≡» button, the fourth press brings you back to the function menu Cor L1 0 number of the current phase correction in volts
<b>Hysteresis</b> (factory setting 1 V, a range of change 0–5 V)	9 times (8 times, if «Phase unbalance voltage» is off)	H, S 1 U	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, 241, 242, U, B Disconnect the device at the bottom limit. his = 1 Voltage is satisfactorily, the device is on. his = 1 Disable the device at high limit

Table 1. FUNCTION MENU	Press «≡»	Screen	Notes
<b>Maximum number of protection operations in sequence</b> (factory setting 3 operations, a range of change 1–5)	10 times (9 times, if «Phase unbalance voltage» is off)		Limits the number of repeated trips of the device by the limit, if no more than 20 seconds have elapsed between shutdown at the limit and turn on the load. To disable this function, select «OFF».
<b>Enable/disable the screen in the standby mode</b> (factory setting «on»)	11 times (10 times, if «Phase unbalance voltage» is off)		To disable this function, select «OFF». Turns off the screen after 30 seconds after the last interaction with the device and in the absence of an emergency situation. In the event of an emergency situation the screen will flash. To exit the sleep mode, press one of the buttons once.
<b>Type of voltage on-delay</b> (factory setting «tAr»)	12 times (11 times, if «Phase unbalance voltage» is off)		«tAr» time after voltage recovery — delay is counted from the moment of voltage recovery. «tAo» time after switching off — delay is counted from the moment the relay is turned off. This type of delay takes into account response time of the emergency in the total on-delay time.

### Viewing of calculated linear stresses

Hold the button «≡» 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 2-3 V.



### A tripping counter

(not discharged)

Hold the button «≡» for 15 sec



### Viewing of firmware version

Hold the button «≡» for 12 sec. The manufacturer reserves the right to modify the firmware to enhance the device technical characteristics.

Table 2. Models shutdown exit time voltage beyond			
The usual default <b>PrO oFF</b>	Upper limit	220–280 V	0,04 sec
	Lower limit	120–210 V	1 sec
		< 120 V	0,04 sec
Professional <b>PrO on</b>	Upper limit	> 264 V	0,04 sec
		220–264 V	0,5 sec
	Lower limit	176–210 V	10 sec
		154–176 V	0,5 sec
		< 154 V	0,04 sec

### POSSIBLE PROBLEMS, CAUSES AND WAYS TO OVERCOME THEM

#### At turning on neither indicator nor screendo not shine

*Possible cause:* there is no power supply voltage.

*It is necessary to:* ensure supply voltage presence.

#### After turning on on the screennormal 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, please, address to a service centre.

#### Frequent load trip

*Possible cause:* underestimated (overestimated) value of the upper (lower) limit.

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

### 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.

### 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 °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

vF34\_220613



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

Manufacturer and vendor: DS ELECTRONICS, LTD  
 04136, Ukraine, Kyiv region, Kyiv, 1–3 Pivnichno-Syretska str.  
 +38 (044) 228-73-46, service center: +38 (050) 450-30-15  
 support@dse.com.ua www.ds-electronics.com.ua/en/