

NJYB3
Voltage Protection Relay

User Instruction

Safety Warning

- ① Only professional technicians are allowed for installation and maintenance.
- ② Installation in any damp, condensed-phase environment with inflammable and explosive gas is forbidden.
- ③ When the product is being installed or maintained, the power must be switched off.
- ④ You are prohibited from touching the conductive part when the product is operating.
- ⑤ The product shall be stored, installed and used in accordance with the rated control power supply voltage and specified conditions indicated in the user instructions.

1 Use Purpose

NJYB3 voltage protection relay (hereinafter referred to as the relay) is mainly used in control circuit with AC frequency of 50Hz/60Hz and rated supply control voltage of AC380V (Three-phase three-wire) and of AC220V (Three-phase four-wire) as protector of open phase, phase sequence, three-phase voltage imbalance, overvoltage, undervoltage, PTC temperature protection and load terminal, making or breaking circuits.

2 Key Technical Parameters

Table 1 Ambient Conditions

Normal use conditions	Ambient temp.: -5°C~+40°C; average value within 24h not exceeding +35°C; altitude not exceeding 2,000m.
Atmospheric conditions	RH shall not exceed 50% when maximum temperature is +40°C; in case of lower temperature, higher RH is allowed. Measures should be taken against occasional condensation due to temperature change.
Installation category	II
Transport and storage conditions	-25°C~+55°C

Table 2 Specifications and Main Technical Parameters

Model	NJYB3-1 ~ 16, NJYB3-18, NJYB3-1P, NJYB3-6P ~ 8P, NJYB3-13P ~ 17P
Number of contacts	1 group of change-over
Indicator method	Indicator light
Mounting method	Rail mounting, Equipped
Protection function	See Table 3 for details
Protection performance and parameters	See Table 4 for details

2.1 Protection Features

2.1.1 Overvoltage protection (model with the function)

In case any phase voltage is greater than the overvoltage operate value, the overvoltage (over-/undervoltage) indicator will be on. After the delay

time is due, the operate indicator will go off, and the NO contact of the relay becomes disconnected; when the maximum voltage value is smaller than reset voltage value, the overvoltage (over-/undervoltage) indicator will be off, the operate indicator will be on, the NO contact of the relay closed.

2.1.2 Undervoltage protection (model with the function)

In case any phase voltage is smaller than the undervoltage operate value, the undervoltage (over-/undervoltage) indicator will be on. After the delay time is due, the operate indicator will go off, and the NO contact of the relay becomes disconnected; when the minimum voltage value is greater than reset voltage value, the undervoltage (over-/undervoltage) indicator will be off, the operate indicator will be on, the NO contact of the relay closed.

2.1.3 Three-phase imbalance protection (including load terminal)

The imbalance voltage value refers to the maximum voltage value minus the minimum voltage value; when the imbalance voltage is greater than the imbalance operate value, the imbalance indicator will be on. After the delay time is due, the operate indicator will go off, and the NO contact of the relay becomes disconnected.

2.1.4 Phase sequence protection

L1-L2-L3 is the positive sequence, while L1-L3-L2 is the negative sequence. When input voltage phase sequence is faulty, the faulty phase indicator will be on, and the operate indicator will be off, the NO contact of the relay disconnected; when the phase sequence returns to the positive sequence, the faulty phase indicator will go off, and the operate indicator will be on, the NO contact of relay closed.

2.1.5 Open-phase protection (including load terminal)

When any phase voltage input breaks or is lower than 60%Us, open-phase protection will occur, during which the open-phase indicator will be on, the operate indicator will be off, and the NO contact of the relay becomes disconnected; when open-phase returns to normal and any phase voltage is not lower than 60%Us, the open-phase indicator will be off, the operate indicator will be on, and the NO contact of the relay is closed. (Note: For relay with load terminal protection, if there is no voltage on the three phases of the load terminal, it will not be deemed as open-phase fault.)

2.1.6 PTC temperature protection

When R1 and R2 resistance is greater than the operate value, the operate indicator will flash with a 1s interval. When the delay time is due, the NO contact of the relay will be disconnected; if the resistance value is smaller than the restore value, the operate indicator remains on, and the NO contact of the relay is closed.

Table 3 Model and Main Functions

Model	Wiring method	Overvoltage protection	Undervoltage protection	Imbalance protection	Phase sequence protection	Open-phase protection	PTC temp. protection	Load terminal protection
NJYB3-1	Three-phase three-wire	—	—	—	●	●	○	—
NJYB3-2		Adjustable	—	—	—	●	—	—
NJYB3-3		—	Adjustable	—	—	●	—	—
NJYB3-4		Adjustable	Adjustable	—	—	●	—	—
NJYB3-5		Adjustable	Adjustable	—	●	●	—	—
NJYB3-6		Adjustable	Adjustable	Fixed 20%	●	●	○	—
NJYB3-7		Fixed 120%	Fixed 80%	Adjustable	●	●	○	—
NJYB3-8		Adjustable	Adjustable	Adjustable	●	●	○	—
NJYB3-9	Three-phase four-wire , Two-phase, Single-phase	Adjustable	—	—	—	●	—	—
NJYB3-10		—	Adjustable	—	—	●	—	—
NJYB3-11		Adjustable	Adjustable	—	—	●	—	—
NJYB3-12	Three-phase four-wire	Adjustable	Adjustable	—	●	●	—	—
NJYB3-13		Adjustable	Adjustable	Fixed 20%	●	●	○	—
NJYB3-14		Fixed 120%	Fixed 80%	Adjustable	●	●	○	—
NJYB3-15		Adjustable	Adjustable	Adjustable	●	●	○	—
NJYB3-16		—	—	—	●	●	○	—
NJYB3-17P	Three-phase three-wire	—	—	—	—	●	●	—
NJYB3-18		Adjustable	Adjustable	Fixed 20%	●	●	—	●

Note: ● indicates it has the function; — indicates it does not have the function; ○ indicates the function is optional.

Table 4 Protection Properties & Parameters

No.	Product model	NJYB3-1~16, NJYB3-18, NJYB3-1P, NJYB3-6P~8P, NJYB3-13P~17P	
1	Phase sequence, open-phase (including open-phase at the load terminal)	Operate time ≤1s	
2	Overvoltage protection setting	Scope	knob adjustment: 1.05~1.30; fixed: 1.20
		Operate voltage value	Set value ×Us
		Delay time	knob adjustment: 0.1s~10s; fixed: 2s
		Reset voltage value	Three-phase three-wire Overvoltage operate value -6V Three-phase four-wire Overvoltage operate value -3.5V
3	Undervoltage protection setting	Scope	knob adjustment: 0.70~0.95; fixed: 0.80
		Operate voltage value	Set value ×Us
		Delay time	knob adjustment: 0.1s~10s; fixed: 2s
		Reset voltage value	Three-phase three-wire Undervoltage operate value +6V Three-phase four-wire Undervoltage operate value +3.5V
4	Three -phase imbalance protection setting (including load terminal)	Scope	knob adjustment: 5%~15%; fixed: 20%
		Operate voltage value	Set value ×Us
		Delay time	knob adjustment: 0.1s~10s; fixed: 2s
		Reset voltage value	Imbalance operate value ×75%
5	PTC temperature protection setting	Protection value	Terminal R1,R2 resistance ≥1.5kΩ
		Restore value	Terminal R1,R2 resistance ≤500Ω
		Delay time	≤1s
6	Time delay error	Time delay error of the relay is ±10% of the set value, minimum error 0.1s	
7	Operate precision	±3% of the rated operating voltage	

Table 5 Main Circuit and Auxiliary Circuit Technical Parameters

No.	Product model	NJYB3-1~16, NJYB3-18, NJYB3-1P, NJYB3-6P~8P, NJYB3-13P~17P	
1	Rated control supply voltage U_s (V), f_R (Hz)	AC220V (Three-phase four-wire), AC380V(Three-phase three-wire), 50Hz/60Hz	
2	Conventional free air heating current I_{th} (A)	3	
3	Rated operational voltage U_e (V)	AC240V	AC415V
4	Utilization category and rated operational current I_e (A) under rated operating voltage	AC-15	AC-15
		0.75A	0.47A
5	Rated duty	Uninterrupted duty or 8h duty	
6	Rated insulation voltage U_i (V)	415V	
7	Rated impulse withstand voltage U_{imp} (kV)	4	
8	Enclosure protection class (if applicable)	IP20	
9	Pollution class	Class 3	
10	Type and maximum value of short-circuit protection electric appliance	RT36-00/4A	
11	Size of terminal tightening screw (or nut)	M2.5	
12	Torque of terminal tightening screw (N·m)	0.5	
13	Electrical life/mechanical life (10,000 times)	10/100	

Table 6 Immunity to Interference

No.	Test type	Test level
1	Electrostatic discharge immunity test	8kV (air discharge)
2	RF electromagnetic field immunity test	10V/m
3	Electrical fast transient/burst immunity test	2kV/5kHz on the power supply side
4	Surge immunity test	1kV (wire to wire)

3 Installation

3.1 Overall and installation size: see Figure 1, unit: mm.

3.2 Wiring diagram: see Figure 2~ Figure 7, panel diagram: see Figure 8.

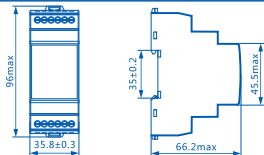


Figure 1 Overall and installation size of NJYB3

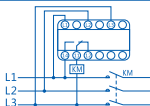


Figure 2 NJYB3-1~8 wiring diagram

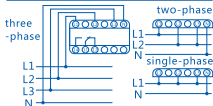


Figure 3 NJYB3-9~11 wiring diagram

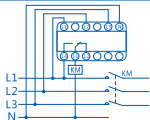


Figure 4 NJYB3-12~16 wiring diagram

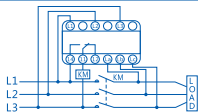


Figure 5 NJYB3-18 wiring diagram

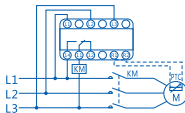


Figure 6 wiring diagram of NJYB3-1P, NJYB3-6P~8P, NJYB3-17P

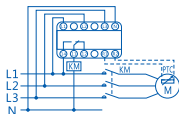


Figure 7 NJYB3-13P~16P wiring diagram



Figure 8 panel diagram

Panel description – function indicator:

- a) Pwr: power supply indicator.
- b) Out: Operate indicator of the relay is on in case of no fault; in case of PTC temperature fault, the indicator flashes intermittently with a 1s interval (only for model with PTC temperature protection function).
- c) > U: overvoltage fault indicator.
- d) < U: undervoltage fault indicator.
- e) Phs.fail.(phs.seq.): faulty phase indicator.
- f) > U / < U: overvoltage or undervoltage fault indicator.
- g) Phs.fail.: open-phase fault indicator.
- h) Asm: voltage imbalance fault indicator.

Panel description – knob:

- a) Overvoltage adjustment knob: overvoltage value adjustment range 1.05~1.30.
- b) Undervoltage adjustment knob: undervoltage value adjustment range 0.70~0.95.
- c) Imbalance ratio adjustment knob: imbalance voltage value adjustment range 5%~15%.
- d) Time delay adjustment knob: time delay knob adjustment range 0.1s~10s.

Notes:

- 1) Time delay of overvoltage, undervoltage and imbalance protection of NJYB3-8, NJYB3-15, NJYB3-8P, NJYB3-15P all use the same time delay adjustment knob.
- 2) The nameplate of the relay gives schematic scale, when use, you should verify the protection operate value.
- 3) If the relay is wired into the circuit according to the wiring diagram, and the load cannot be started, it may due to the phase sequence identification function of the relay; swap any of the two wires at the relay' s input terminal L1, L2, L3, the load will be started as normal, the phase sequence already identified. Later, when you change any phase of the voltage, the relay will fulfill its protection function.
- 4) During the process of operate protection, if you rotate the knob or change

the set status of the switch, the time delay of such operation will prove to be incorrect. You should complete the setting in normal operating state, or before connection to the power supply.

- 5) When use, the interval between power cut-off and re-application of voltage shall be longer than 1s, otherwise unreliable reset may occur.
- 6) The auxiliary power of the product: L1, N phase (Three-phase four-wire); L1, L3 phase (Three-phase three-wire); if loss of any of the phases occurs, the indicators will be all off, and the NO contact of the relay will become disconnected.
- 7) Do not place the power input cord among other strong electricity cords or bind it with other cords. Please use shield wire when necessary; wiring should be short enough to prevent interference with the operation of the relay.

4 Maintenance

4.1 The terminal of the relay should be tightened on a regular basis.

4.2 Avoid squeezing the product; the product should be stored in a well-ventilated place.

Table 7 Fault Analysis and Troubleshooting

Symptoms	Cause analysis	Troubleshooting method
Overvoltage indicator is on	Overvoltage fault has occurred.	First, check whether the voltage is too high, if not, adjust the overvoltage knob on the panel to the appropriate value.
Undervoltage indicator is on	Undervoltage fault has occurred.	First, check whether the voltage is too low, if not, adjust the undervoltage knob on the panel to the appropriate value.
Open-phase/ faulty phase indicator is on, and the relay does not change over	Open-phase or phase sequence fault of the relay.	Check whether the input voltage is normal, and the phase sequence is correct. Try to swap any two wires at the input terminal 1, 2, 3 of the relay.
Imbalance indicator is on	Relay imbalance fault has occurred.	Check whether the power supply is normal, and whether the imbalance knob has been set to the correct parameter.
Operate indicator flashes	PTC overheat protection.	Check whether the product has been connected with PTC temperature sensor, the sensor model complies with the requirement, and the load side is overheated.

5 Environmental Protection

In order to protect the environment, the product or product parts should be disposed of according to the industrial waste treatment process, or be sent to the recycling station for assortment, dismantling and recycling according to local regulations.

CHINT

QC PASS

NJYB3

Voltage Protection Relay

IEC/EN 60947-5-1

JDQ Check 10

Test date: Please see the packing

ZHEJIANG CHINT ELECTRICS CO., LTD.

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NJYB3 Voltage Protection Relay User Instruction

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