



NJBK10 Series
Motor Protector

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

NJBK10 series motor protector (hereinafter referred to as the protector) is applicable to the protection of overload, loss of phase and three-phase current unbalance of none-stop or intermittent duty AC motors with AC frequency of 50Hz, rated insulation voltage below 690V and rated operating current 1A~200A.

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 Product Specifications and Main Technical Parameters

Model	NJBK10-10	NJBK10-50	NJBK10-200
Setting current (A)	10	50	200
Current setting range (A)	1~10	5~50	20~200
Motor power (kW)	0.5~5	2.5~25	10~100
Installation method	Equipment type		
Setting method	Buttons		
Display method	Nixie tube and indicator light		
Protection function	Overload, loss of phase, three-phase current unbalance		
Number of contacts	1 group of change-over		

Table 3 Main Circuit Technical Parameters

No.	Product Model	NJBK10-10	NJBK10-50	NJBK10-200
1	Rated insulation voltage (V)	690		
2	Rated control supply voltage U_s (V), frequency (Hz)	AC220V, AC380V, 50Hz		
3	Allowable fluctuation range of rated control power supply voltage	85% U_s ~110% U_s		
4	Rated impulse withstand voltage U_{imp} (kV)	4		
5	Rated conditional short-circuit current (kA)	10		
6	CPD type	Type 2		
7	SCPD model	RT36-0/10	RT36-0/50	RT36-1/200
8	Enclosure protection class (if applicable)	IP20		
9	Size of terminal tightening screw (or nut)	M3		
10	Torque of terminal tightening screw (N·m)	0.5		
11	Pollution class	Class 3		
12	Rated duty	8h duty or uninterrupted duty		
13	Electromagnetic environment	Environment A		

Table 4 Auxiliary Circuit Technical Parameters

No.	Product model	NJBK10-10, NJBK10-50, NJBK10-200	
1	Rated insulation U_i (V)	380	
2	Rated impulse withstand voltage U_{imp} (kV)	2.5	
3	Agreed free air heating current I_{th} (A)	5	
4	Rated operating voltage U_e (V)	240	380
5	Use type under rated operating voltage and rated operating current I_e (A)	AC-15	
		1.5	0.95
6	SCPD model	RT36-0/6A	

2.1 Motion characteristic

2.1.1 Motion characteristic of inverse time lag (overload)

When the current value exceeds 1.1 times of the setting current value, the protector will start the inverse time lag overload protection function. The protector will simulate and calculate the thermal accumulation and motion time of the motor according to the overload multiple of the overload current. When the thermal accumulation reaches a certain value, the protector will motion and cut off the AC contactor to protect the motor. For the relationship between overload current and time, please refer to Figure 1 and Table 5.

Table 5 Motion Characteristic of Inverse Time Lag (Overload)

Overload curve Motion time (s)	Overload multiple							Note
	1.05	1.2	1.5	2	5	6	7.2	
Kr=1	No motion	63	40	22	3.6	2.5	1.8	Meet Level 5
Kr=2		125	80	45	7.2	5	3.5	Meet Level 10A
Kr=3		250	160	90	14	10	6.9	Meet Level 10
Kr=4		500	320	180	29	20	14	Meet Level 20
Kr=5		750	480	270	43	30	21	Meet Level 30

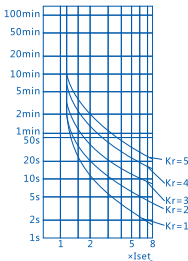


Figure 1 Time-current Characteristic Curve

2.1.2 Motion characteristic of constant time-lag

When the constant time-lag function is enabled, the constant time-lag overload ratio and constant time-lag time can be set. If the running current \geq the set current \times the overload ratio and exceeds the set constant time-lag time, the protector will motion, as shown in Figure 2.

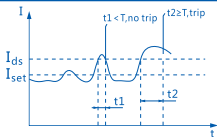


Figure 2 Characteristic of Constant Time-lag

Notes: I_{set} —set current; $I_{ds}=I_{set}\times$ constant time-lag ratio; T —constant time-lag time.

2.1.3 Motion characteristic of constant time-lag

The motion time of phase loss and three-phase unbalance is 3s, with a relative error of $\pm 10\%$. The unbalance rate can be set, which is calculated based on the following formula

$$\text{Unbalance rate} = \frac{\sum_{i=1}^3 |I_i - I_{avg}|}{I_{avg}} \times 100\% \geq \text{Set value}\%$$

Where:

I_i ——Effective current value of each phase.

I_{avg} ——Mean value of effective three-phase current values.

2.2 Reset characteristic

After the protector motions, the protector's reset mode is manual reset when the control power supply voltage is normal; the protector is immediately reset when the control power supply voltage is disconnected.

3 Installation

3.1 See Figure 3 for the outline and installation size of the protector, unit: mm.

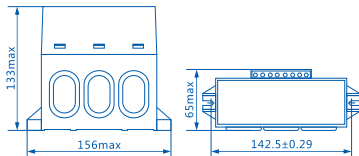


Figure 3 Outline and Installation Size of the Protector

3.2 Terminal definition: see Figure 4; wiring diagram: see Figure 5~ Figure 6.

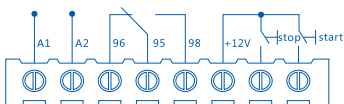


Figure 4 Terminal Definition

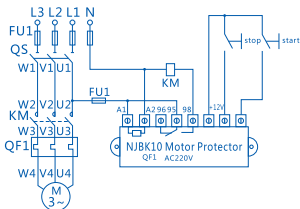


Figure 5 Wiring Diagram of the Protector with Control Power Supply Voltage of AC220V

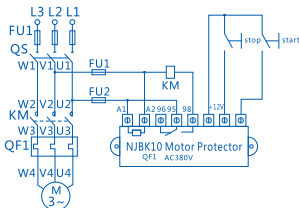
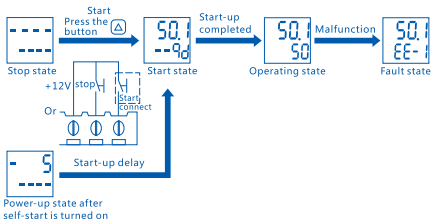


Figure 6 Wiring Diagram of the Protector with Control Power Supply Voltage of AC380V

Notes: if no external start-stop button is connected, please turn on the self-start function. When the protector resumes power supply after power failure, it will automatically start according to the set self-start delay.

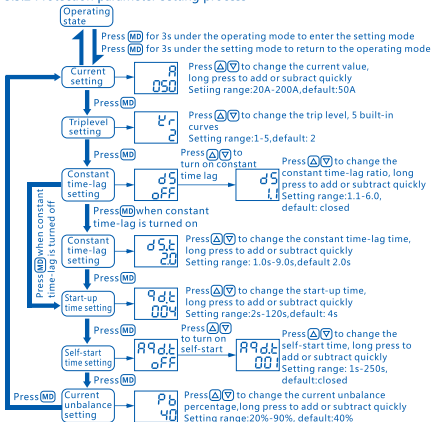
3.3 Operating instructions

3.3.1 Start-up process of the protector



Note: during normal operation, the upper row of Nixie tube displays the maximum three-phase current value, and the lower row of nixie tube displays the setting current value.

3.3.2 Protection parameter setting process





3.4 Fault memory and its indication

In case of malfunction of the motor, the indicator shows the fault type, while the lower row of LED flashes and displays the fault code. The fault codes are shown in Table 6.

Table 6 Fault Code Table

Fault display	Fault type
50.1 EE-1	Inverse time delay overload
50.1 EE-2	Constant time-lag overload

Table 6 (continued)

Fault display	Fault type
	Phase loss
	Unbalance

Notes: in case of fault, the upper row of nixie tube displays the maximum value of three-phase current in case of fault and flashes to indicate the fault, and the lower row of nixie tube displays the error code.

3.5 Self-start function

The user may turn on the self-start function and set up the self-start delay time; the protector will start automatically according to the set self-start delay after power recovery or reset without manual intervention.

Notes:

- 1) The installation and commissioning must be carried out by professionals. Nonprofessionals are not allowed to disassemble the protector without permission, so as to avoid danger or affecting the normal operation of the protector.
- 2) The external start-stop line should be as short as possible. Do not use the same cabling pipe of strong current so as to avoid interference. Please use a shielded wire if the line is too long.
- 3) When the start-stop function is used for long distance control (> 10m), it is recommended to use wires above 1mm² (the longest wire is 200m) or intermediate relays for control.
- 4) The use environment should meet the environmental requirements of the protector. Avoid using it in the environment with vibration, impact, corrosion, dust, static electricity, high temperature, high humidity and direct sunlight.

4 Maintenance

4.1 The terminal of the protector 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
The nixie tube does not display.	Whether the wire and the terminal are in reliable contact, and whether the power terminal is correctly wired.	Connect wires reliably according to the user instructions.

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

NJBK10 Series
Motor Protector
IEC/EN 60947-4-1

JDQ Check 10

Test date: Please see the packing

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NJBK10 Series Motor Protector User Instruction

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