NJBK7 Motor Protection Relay

1. General

NJBK7-800 series motor protection relay (hereinafter referred to as "Protector") is applicable for overload protection,locked rotor protection,phase failure protection, three-phase imbalance protection,undercurrent protection,grounding protection , PTC temperature protection and communication failure protection for AC electromotors of a frequency of 50Hz with a rated insulation voltage of up to 690V and a rated operating current of 1A ~ 800A during long-term and discontinuous operation, This protector is provided with RS485 interface and 4mA ~ 20mA current loop transmitter interface for network communication and performs remote monitor control on the motor and fault query through opper computer. This protector is usually used to combine with AC contactor.
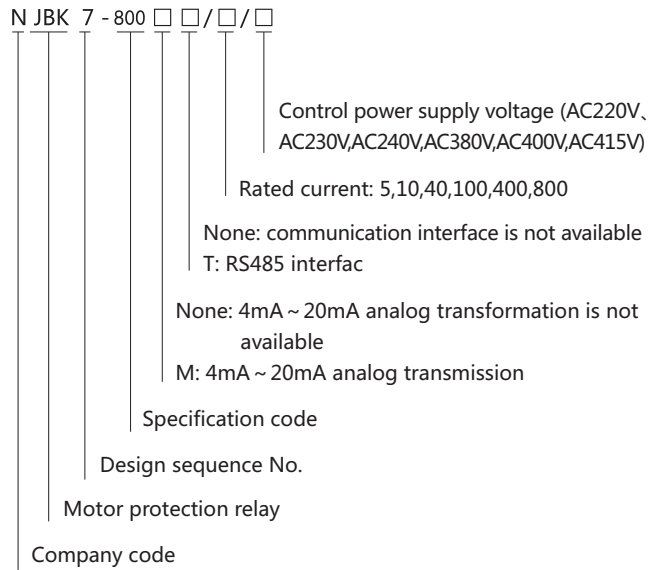This product conforms to IEC60947-4-1.

CE

2. Type designation

N JBK 7 - 800 □ □ / □ / □

Control power supply voltage (AC220V、AC230V,AC240V,AC380V,AC400V,AC415V)

Rated current: 5,10,40,100,400,800

None: communication interface is not available
T: RS485 interfac

None: 4mA ~ 20mA analog transformation is not available
M: 4mA ~ 20mA analog transmission

Specification code

Design sequence No.

Motor protection relay

Company code

3. Operating conditions

3.1 Altitude: Not more than 2000m.

3.2 Ambient air condition: -5℃ ~ +40℃, and the average value in 24 hours shall not exceed +35℃.

3.3 When the maximum temperature is +40℃, the relative humidity of air shall not exceed 50% and higher relative humidity is allowable at lower temperature comparatively (e.g the air humidity may reach 90% when the temperature is +20℃). Special measures shall be taken to deal with occasianal condensation caused by variation in temperature.

3.4 Pollution class: 3.

3.5 The slope degree between installing and verical plane shall not exceed ±5°.

3.6 Explosion hazard-free media, in which there are no gasses that are capable of corroding metals and damage the insulation and not conducting dust.

3.7 Areas with rain-and-snow-proof equipment and without water vapor.

3.8 Areas without noticeable shaking, impact and vibration.

3.9 Installation class: Ⅲ.

3.10 Enclosure protection class:IP20.

4. Technical data

4.1 Main circuit: Rated insulatin voltage AC690V and rated frequency is 50Hz, rated impulse withstand voltage 1.2/50μs、4kV , rated current 1A ~ 800A.

Model	rated current (A)	current setting range (A)	Appropriate motor power (kW)
NJBK7-800□□/5/□	5	1 ~ 5	0.5 ~ 2.5
NJBK7-800□□/10/□	10	2 ~ 10	1 ~ 5
NJBK7-800□□/40/□	40	8 ~ 40	4 ~ 20
NJBK7-800□□/100/□	100	20 ~ 100	10 ~ 50
NJBK7-800□□/400/□	400	80 ~ 400	40 ~ 200
NJBK7-800□□/800/□	800	200 ~ 800	100 ~ 400

4.2 Auxiliary circuit: Rated insulation voltage is AC480V,and the rated frequency is 50Hz,rated impulse withstand voltage 1.2/50μs、2.5kV.

Application class	AC-15	
Rated operating voltage Ue (V)	240	480
Rated operating current Ie (A)	1.5	0.75
Rated thermal current Ith (A)	5	

4.3 Structural features

4.3.1 Set the parameters by button with current、trip level、locked rotor 、start delay ,etc.

4.3.2 Show the information by LED display with current、setting parameters、malfunction ,etc.

4.3.3 Show the current status (running、malfunction、stop、set) by LED display.

4.3.4 Start、stop、star delta can be controlled by one key.

4.3.5 Overload protection,locked rotor protection,phase failure protection, three-phase imbalance protection,undercurrent protection, grounding protection , PTC temperature protection and communication failure protection are available.

4.3.6 The host adopted panel installation while the transformer is rail installation or by screw.

4.3.7 The terminals are pluggable that is easy for connecting.

4.3.8 Abundant current specification , suit for motors with different power.

4.3.9 4mA ~ 20mA current loop transmitter interface.

4.3.10 Modbus communication function , monitor and control in long distance.

4.3.11 Power consumption: ≤3VA.

5. Protection charactersitics

5.1 Operating characteristics of overload protection

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

5.2 Rotor locking operation characteristic

If the maximum current ≥ setting current value × set multiplying factor for rotor locking, the protector will operate, and the actuation time will be the set actuation time for rotor locking.

5.3 Phase failure operation characteristic

If the current value of any phase of the three phases is 25% lower than the current that is setting,the protector will operate with the actuation time ≤3s.

5.4 Current imbalance operation characteristic

If the three-phase current value of main loop conforms to following formula, the protector will operate, with the actuation time≤3s.

$$\frac{\overset{3}{\underset{i=1}{Max}}|I_i - I_{avg}|}{I_{avg}} \times 100\% \geq \text{Set current unbalancerate}$$

Hereinto: I_i- Effective value per phase current

I_{avg}- Mean value of the three phases of currents

5.5 Undercurrent protection characteristic

If the minimum current ≤ setting current value × set multiplying factor for undercurrent, the protector will operate, and the actuation time will be the set actuation time for undercurrent.

5.6 Ground protection operation characteristic

The protector performs ground fault protection through the external zero-sequence transducer. When the zero-sequence current is in range of (0.9 ~ 1.1)set current , the protector will operate, with the actuation time ≤1s.

Tripping characteristic curve
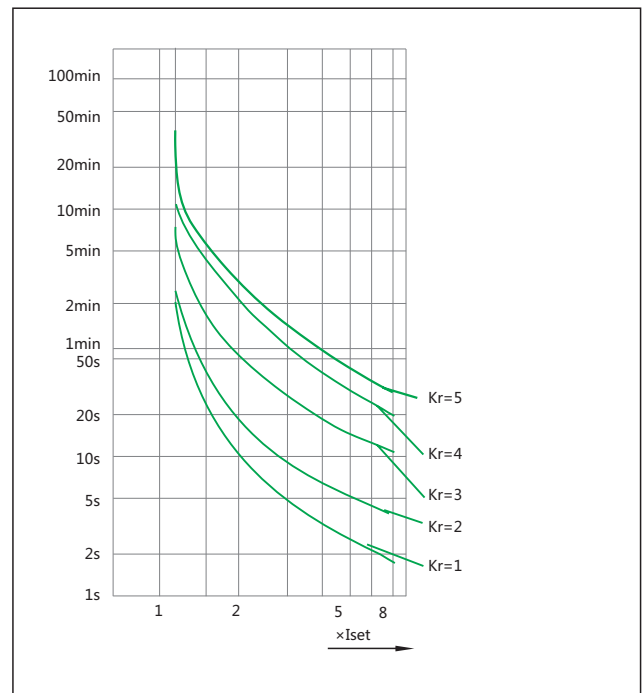
5.7 Temperature protection feature

The protector performs overheating protection by detecting the resistance of PTC thermal resister built in stator winding of the motor. If the resistance of PTC thermal resister is ≤750Ω , the protector will not actuate. If the resistance of PTC thermal is rising from 1650Ω to 4000Ω , the protector will actuate,with the actuation time≤1s. If the resistance of PTC thermal is from 750Ω to 1650Ω,the protector can be reset.If you do not want to use this function , the terminals T1、T2 should be short linked.

5.8 Communication failure protection characteristic

The protector is connected with transformer by cable , if the cable drop off or damaged , the protector will protect ,action time ≤3s.

5.9 Communication. the protector is provided with RS485 interface supporting Modbus protocol. If the communication network is required, please contact us, and we'll provide you with detailed communication specification for protector.

6. Typical wiring

Figure1 Wiring diagram for direct start
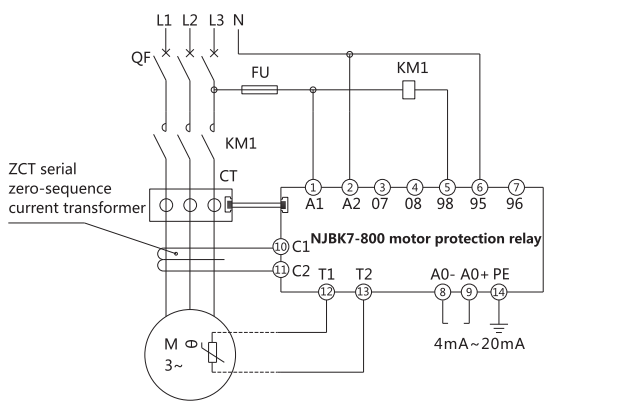
Figure2 Wiring diagram for secondary-current direct start
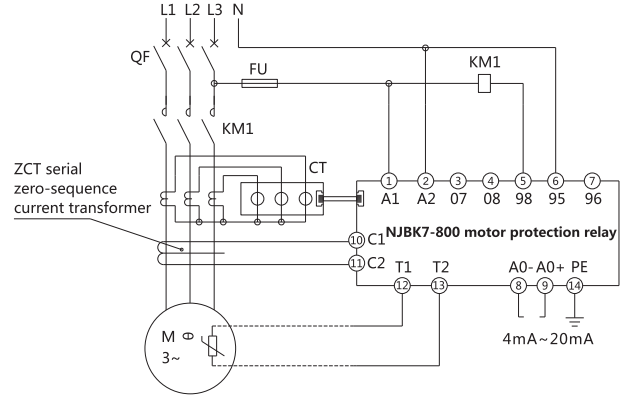
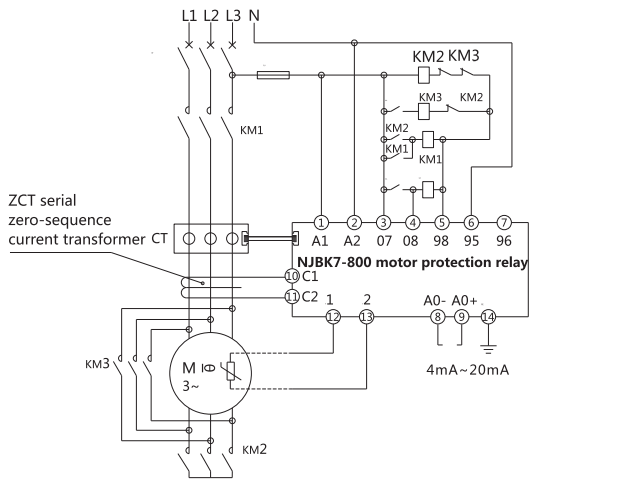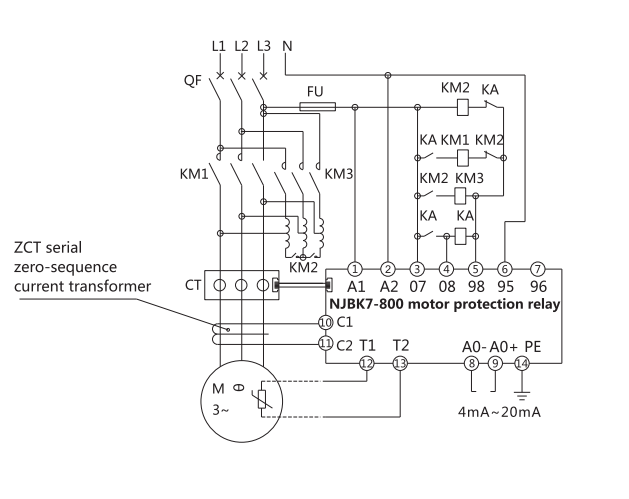Figure3 Wiring diagram for star delta start

Figure4 Wiring diagram for auto voltage-reduction start

7. Outline drawing

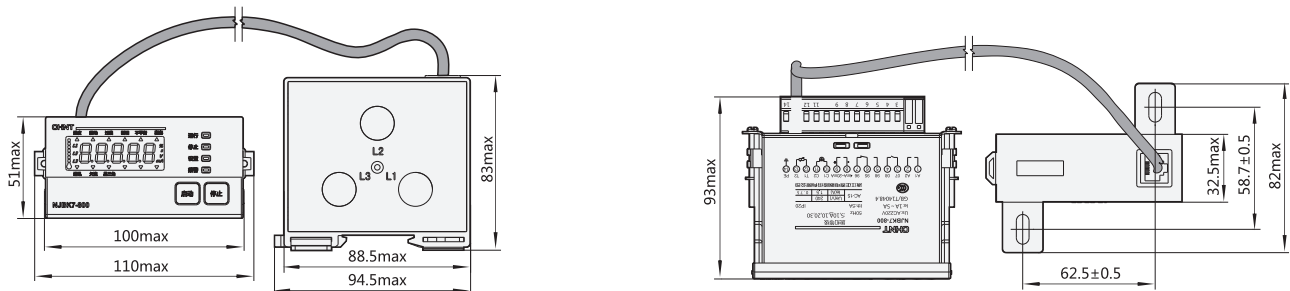Figure5 Outline drawing of current specification with 5A,10A,40A

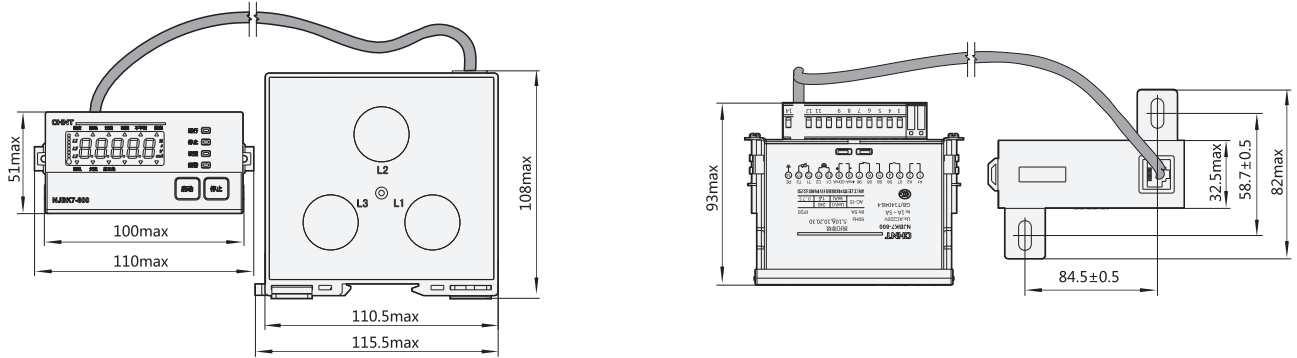Figure6 Outline drawing of current specification with 100A

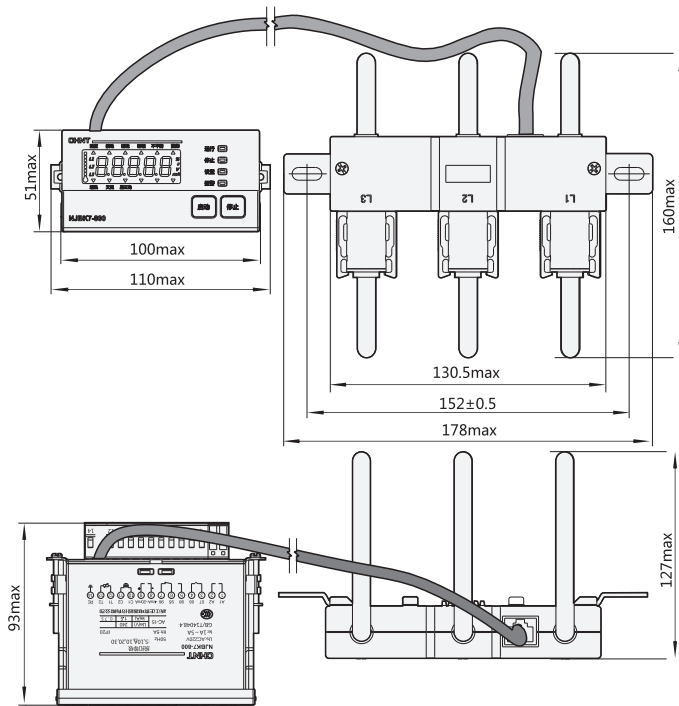Figure7 Outline drawing of current specification with 400A,800A

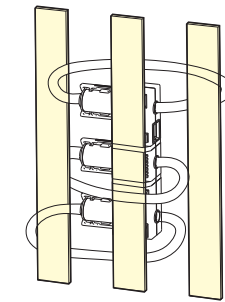Figure8 Installation method 1 for Rogowski coil
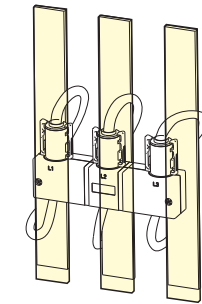

Figure9 Installation method 2 for Rogowski coil

Figure10 Opening size

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