2. Type designation

N JBK 7 - 800 □ □ / □

- Rated current:5,10,40,100,400,800
- None:communication interface is not available
  T:RS485 interface
- None:4mA~20mA analog transformation is not available
  M:4mA~20mA analog transmission
- Specification code
- Design sequence No.
- Motor protection relay
- Company code

NJBK7 Series Motor Protection Relays

1. General

NJBK7-800 motor protector (hereinafter referred to as the protector) is applicable to the protection of overload, blocking, phase failure, three-phase current unbalance, undercurrent, grounding, PTC temperature and communication failure of none-stop or intermittent duty AC motors with AC frequency 50Hz, rated insulation voltage below AC690V and rated operating current 1A~800A. Equipped with RS485 interface and 4mA ~ 20mA analog transmission interface, the protector can achieve network communication. The remote monitoring, control, fault inquiry and other functions of the motor are realized through the upper computer. The large current specification uses a flexible Rogowski coil to collect current, which has the advantages of wide range of setting current, high precision and convenient installation. The protector is generally used in conjunction with an AC contactor.

Standards:IEC/EN 60947-4-1

3.Key Technical Parameters

Table 1 Ambient Conditions

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

Table 2 Product Specifications and Main Technical Parameters

Model	**NJBK7-800/5 NJBK7-800M/5 NJBK7-800T/5 NJBK7-800MT/5**	**NJBK7-800/10 NJBK7-800M/10 NJBK7-800T/10 NJBK7-800MT/10**	**NJBK7-800/40 NJBK7-800M/40 NJBK7-800T/40 NJBK7-800MT/40**	**NJBK7-800/100 NJBK7-800M/100 NJBK7-800T/100 NJBK7-800MT/100**	**NJBK7-800/400 NJBK7-800M/400 NJBK7-800T/400 NJBK7-800MT/400**	**NJBK7-800/800 NJBK7-800M/800 NJBK7-800T/800 NJBK7-800MT/800**
Display method	Nixie tube and indicator light.					
Protection function	Overload, blocking, loss of phase, three-phase current unbalance, undercurrent, grounding, PTC temperature and communication failure.					
Number of contacts	1 group of change-over (protective), 1 group of normally on (auxiliary).					

Table 3 Main Circuit Technical Parameters

Product Model	NJBK7-800 □□ /5	NJBK7-800 □□ /10	NJBK7-800 □□ /40	NJBK7-800 □□ /100	NJBK7-800 □□ /400	NJBK7-800 □□ /800
Rated insulation voltage	AC690V					
Rated control supply voltage Us , frequency	85%Us~110%Us ,AC220V, AC230V, AC240V, AC380V, AC400V, AC415V, 50Hz					
Rated impulse withstand voltage Uimp	4kV					
Rated conditional short-circuit current	10kA				30kA	
Enclosure protection class (if applicable)	IP20					
Pollution class	Class 3					
Rated duty	8h duty or non-stop duty					
Electromagnetic environment	B					

Table 4 Auxiliary Circuit Technical Parameters

	NJBK7 Series
Rated insulation voltage (V)	AC480
Rated impulse withstand voltage Uimp (kV)	2.5
Contact capacity	Ue/Ie:480V/0.75A,240V/1.5A;Ith:5A

5. Trip characteristic

5.1 Trip characteristic of inverse time lag: When the current value exceeds 1.05 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.

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

5.2 Trip characteristic of blocking protection: When the maximum phase current ≥ the setting current value × the set blocking ratio, the protector motions, and the motion time is the set blocking motion time.

5.3 Trip characteristic of phase loss protection:When any one of the three-phase currents in the main circuit is zero, the protector will act within 3 seconds.

5.4 Trip characteristic of three-phase unbalance protection: When the three-phase current of the main circuit conforms to the following formula, the protector motions, and the motion time ≤3s.

$$\frac{M^3ax \mid Ii\text{-}Iavg \mid}{Iavg} \times 100\% \geq \text{Set current unbalancerate}$$

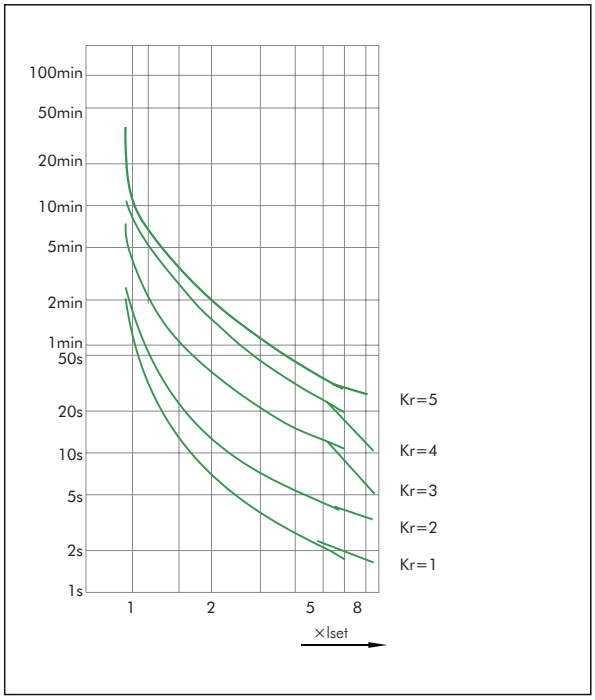
Where: I_i——Effective current value of each phase.

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

5.5 Trip characteristic of undercurrent protection: When the minimum phase current ≤ the set current value × the set undercurrent percentage, the protector motions, and the motion time is the set undercurrent motion time.

5.6 Trip characteristic of grounding protection: The ground fault protection of the protector is realized by an external zero-sequence current transformer. When the current passing through the primary side of the zero-sequence current transformer is within (0.9-1.1) times of the motion current range, the protector motions, and the motion time ≤1s.

Tripping characteristic curve



5.7 Characteristic of temperature protection: The overheat protection function of the protector is realized by detecting the resistance value of the PTC thermistor embedded in the stator winding of the motor. When the resistance value of the PTC thermistor ≤ 750 Ω, the protector will not motion; when the resistance value of the PTC thermistor is in the range of 1650 Ω ~ 4000 Ω, the protector will motion for ≤ 1s; when the resistance value of the PTC thermistor is in the range of 750 Ω ~ 1650 Ω, the protector can be reset; When the user does not select the temperature protection function, terminals T1 and T2 must be short circuited.

5.8 Characteristic of communication failure: The protector and the transformer are connected through a dedicated cable, and when the cable is broken or damaged, the protector motions, and the motion 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

Figure 1 Wiring Diagram of Direct Start-up(Use the START button function on the panel)

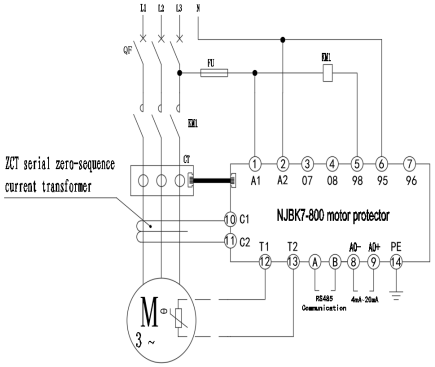


Figure 2 Wiring Diagram of Direct Start-up(Cancel the START button function on the panel)

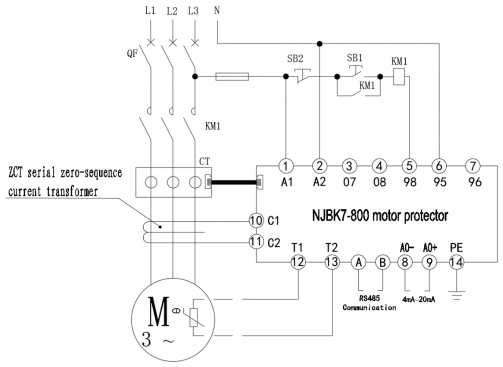


Figure 3 Wiring Diagram of Secondary Direct Start-up(Use the START button function on the panel)

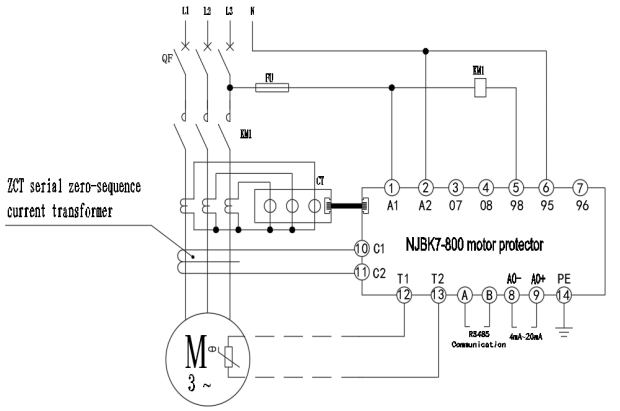


Figure 4 Wiring Diagram of Secondary Direct Start-up(Cancel the START button function on the panel)

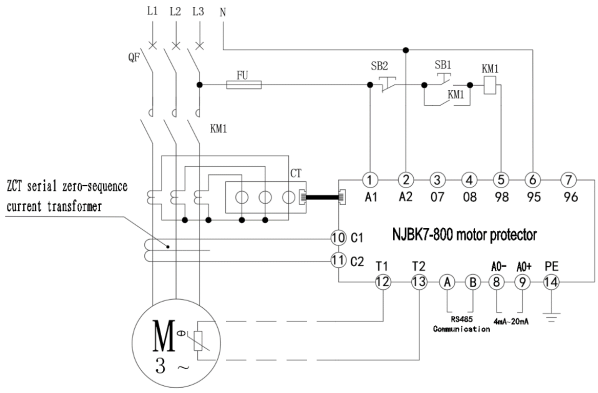


Figure 5 Wiring Diagram of Star-delta Start-up(Use the START button function on the panel)

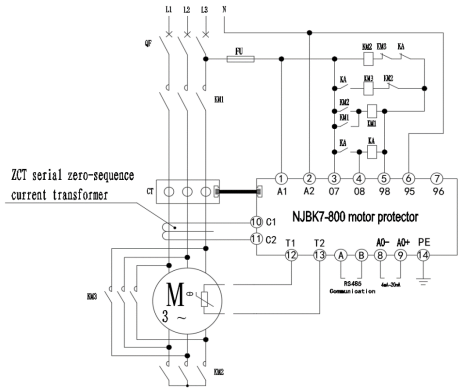


Figure 6 Wiring Diagram of Self-coupling Buck Start-up(Use the START button function on the panel)

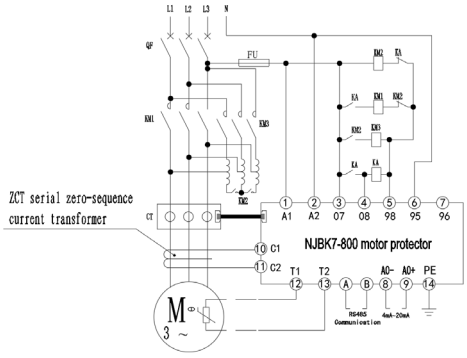


Figure 7 Outline and Installation Size of the Protector with Rated Current of 5A, 10A, 40A

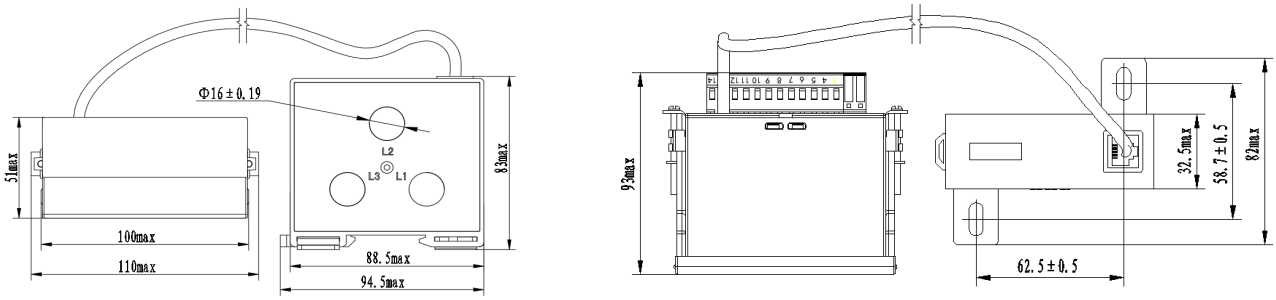


Figure 8 Outline and Installation Size of the Protector with Rated Current of 100A

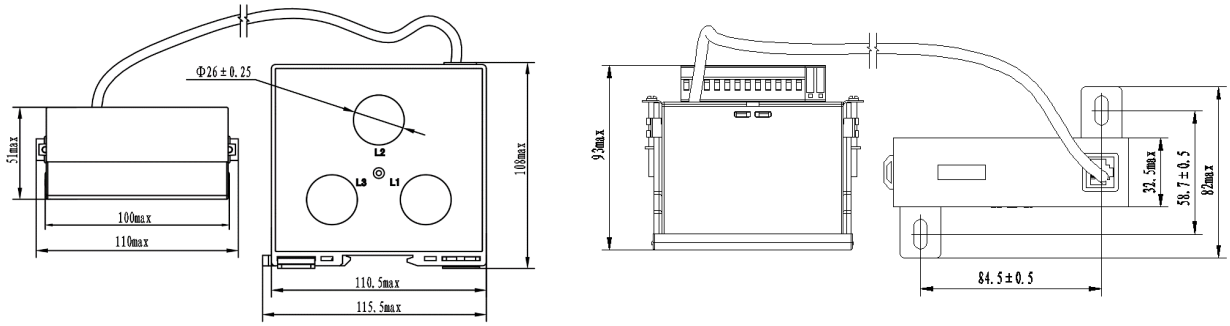
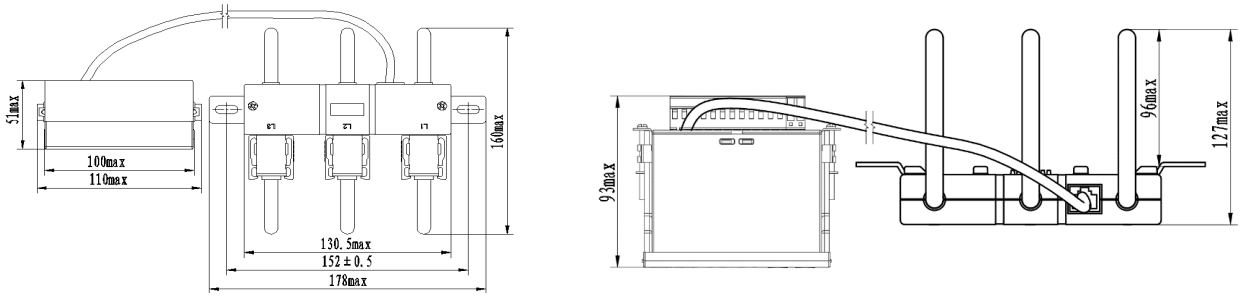


Figure 9 Outline and Installation Size of the Protector with Rated Current of 400A, 800A



NJBK7	-	800	M	T	/	800	/	AC220V	200A-800A
Product Series		**Frame size**	**Analog transmission function**	**Communication function**		**Maximum setting current**		**Control voltage**	**Setting current range**
		800	Blank: no such function M: with analog transmission function	Blank: no communication T: RS485 interface		5: 5A 10: 10A 40: 40A 100: 100A 400: 400A 800: 800A		AC220V AC380V	1A-5A 2A-10A 8A-40A 20A-100A 80A-400A 200A-800A

Functional selection table

Model	Overload	Phase failure	Ground protection	Undercurrent	Three-phase unbalance	Communication fault protection	PTC	Communication	4-20mA	Split type
NJBK7-800	●	●	●	●	●	●	●			●
NJBK7-800M	●	●	●	●	●	●	●		●	●
NJBK7-800T	●	●	●	●	●	●	●	●		●
NJBK7-800MT	●	●	●	●	●	●	●	●	●	●

Setting current	Matched motor power	Control voltage	Contact ability	Description	Code
1A-5A	0.5~2.5kW	AC220V	240V/0.75A,Ith:5A	NJBK7-800/5/AC220V 1A-5A	107396
1A-5A	0.5~2.5kW	AC380V	240V/0.75A,Ith:5A	NJBK7-800/5/AC380V 1A-5A	107397
2A-10A	1~5kW	AC220V	240V/0.75A,Ith:5A	NJBK7-800/10/AC220V 2A-10A	107398
2A-10A	1~5kW	AC380V	240V/0.75A,Ith:5A	NJBK7-800/10/AC380V 2A-10A	107399
8A-40A	4~20kW	AC220V	240V/0.75A,Ith:5A	NJBK7-800/40/AC220V 8A-40A	107400
8A-40A	4~20kW	AC380V	240V/0.75A,Ith:5A	NJBK7-800/40/AC380V 8A-40A	107401
20A-100A	10~50kW	AC220V	240V/0.75A,Ith:5A	NJBK7-800/100/AC220V 20A-100A	107402
20A-100A	10~50kW	AC380V	240V/0.75A,Ith:5A	NJBK7-800/100/AC380V 20A-100A	107403
80A-400A	40~200kW	AC220V	240V/0.75A,Ith:5A	NJBK7-800/400/AC220V 80A-400A	107404
80A-400A	40~200kW	AC380V	240V/0.75A,Ith:5A	NJBK7-800/400/AC380V 80A-400A	107405
200A-800A	100~400kW	AC220V	240V/0.75A,Ith:5A	NJBK7-800/800/AC220V 200A-800A	107406
200A-800A	100~400kW	AC380V	240V/0.75A,Ith:5A	NJBK7-800/800/AC380V 200A-800A	107407
1A-5A	0.5~2.5kW	AC220V	240V/0.75A,Ith:5A	NJBK7-800M/5/AC220V 1A-5A	107408
1A-5A	0.5~2.5kW	AC380V	240V/0.75A,Ith:5A	NJBK7-800M/5/AC380V 1A-5A	107409
2A-10A	1~5kW	AC220V	240V/0.75A,Ith:5A	NJBK7-800M/10/AC220V 2A-10A	107410
2A-10A	1~5kW	AC380V	240V/0.75A,Ith:5A	NJBK7-800M/10/AC380V 2A-10A	107411
8A-40A	4~20kW	AC220V	240V/0.75A,Ith:5A	NJBK7-800M/40/AC220V 8A-40A	107412
8A-40A	4~20kW	AC380V	240V/0.75A,Ith:5A	NJBK7-800M/40/AC380V 8A-40A	107413
20A-100A	10~50kW	AC220V	240V/0.75A,Ith:5A	NJBK7-800M/100/AC220V 20A-100A	107414
20A-100A	10~50kW	AC380V	240V/0.75A,Ith:5A	NJBK7-800M/100/AC380V 20A-100A	107415

Setting current	Matched motor power	Control voltage	Contact ability	Description	Code
80A-400A	40~200kW	AC220V	240V/0.75A,Ith:5A	NJBK7-800M/400/AC220V 80A-400A	107416
80A-400A	40~200kW	AC380V	240V/0.75A,Ith:5A	NJBK7-800M/400/AC380V 80A-400A	107417
200A-800A	100~400kW	AC220V	240V/0.75A,Ith:5A	NJBK7-800M/800/AC220V 200A-800A	107418
200A-800A	100~400kW	AC380V	240V/0.75A,Ith:5A	NJBK7-800M/800/AC380V 200A-800A	107419
1A-5A	0.5~2.5kW	AC220V	240V/0.75A,Ith:5A	NJBK7-800T/5/AC220V 1A-5A	107420
1A-5A	0.5~2.5kW	AC380V	240V/0.75A,Ith:5A	NJBK7-800T/5/AC380V 1A-5A	107421
2A-10A	1~5kW	AC220V	240V/0.75A,Ith:5A	NJBK7-800T/10/AC220V 2A-10A	107422
2A-10A	1~5kW	AC380V	240V/0.75A,Ith:5A	NJBK7-800T/10/AC380V 2A-10A	107423
8A-40A	4~20kW	AC220V	240V/0.75A,Ith:5A	NJBK7-800T/40/AC220V 8A-40A	107424
8A-40A	4~20kW	AC380V	240V/0.75A,Ith:5A	NJBK7-800T/40/AC380V 8A-40A	107425
20A-100A	10~50kW	AC220V	240V/0.75A,Ith:5A	NJBK7-800T/100/AC220V 20A-100A	107426
20A-100A	10~50kW	AC380V	240V/0.75A,Ith:5A	NJBK7-800T/100/AC380V 20A-100A	107427
80A-400A	40~200kW	AC220V	240V/0.75A,Ith:5A	NJBK7-800T/400/AC220V 80A-400A	107428
80A-400A	40~200kW	AC380V	240V/0.75A,Ith:5A	NJBK7-800T/400/AC380V 80A-400A	107429
200A-800A	100~400kW	AC220V	240V/0.75A,Ith:5A	NJBK7-800T/800/AC220V 200A-800A	107430
200A-800A	100~400kW	AC380V	240V/0.75A,Ith:5A	NJBK7-800T/800/AC380V 200A-800A	107431
1A-5A	0.5~2.5kW	AC220V	240V/0.75A,Ith:5A	NJBK7-800MT/5/AC220V 1A-5A	107432
1A-5A	0.5~2.5kW	AC380V	240V/0.75A,Ith:5A	NJBK7-800MT/5/AC380V 1A-5A	107433
2A-10A	1~5kW	AC220V	240V/0.75A,Ith:5A	NJBK7-800MT/10/AC220V 2A-10A	107434
2A-10A	1~5kW	AC380V	240V/0.75A,Ith:5A	NJBK7-800MT/10/AC380V 2A-10A	107435
8A-40A	4~20kW	AC220V	240V/0.75A,Ith:5A	NJBK7-800MT/40/AC220V 8A-40A	107436
8A-40A	4~20kW	AC380V	240V/0.75A,Ith:5A	NJBK7-800MT/40/AC380V 8A-40A	107437
20A-100A	10~50kW	AC220V	240V/0.75A,Ith:5A	NJBK7-800MT/100/AC220V 20A-100A	107438
20A-100A	10~50kW	AC380V	240V/0.75A,Ith:5A	NJBK7-800MT/100/AC380V 20A-100A	107439
80A-400A	40~200kW	AC220V	240V/0.75A,Ith:5A	NJBK7-800MT/400/AC220V 80A-400A	107440
80A-400A	40~200kW	AC380V	240V/0.75A,Ith:5A	NJBK7-800MT/400/AC380V 80A-400A	107441
200A-800A	100~400kW	AC220V	240V/0.75A,Ith:5A	NJBK7-800MT/800/AC220V 200A-800A	107442
200A-800A	100~400kW	AC380V	240V/0.75A,Ith:5A	NJBK7-800MT/800/AC380V 200A-800A	107443