



NS2 Manual Motor Starter

1. General

1.1 Certificates: SEMKO, CE, UkrSEPRO, EAC, RCC, UL;

1.2 Electric ratings: AC690V, 25A, 32A, 80A;

1.3 Standard: IEC/EN 60947-2, IEC60947-4-1

2. Type designation

NS2-□□/□

	Rated current of release
0.1	0.1
0.2	0.2
0.3	0.3
0.4	0.4
0.5	0.5
0.6	0.6
0.7	0.7
0.8	0.8
0.9	0.9
1.0	1.0
1.1	1.1
1.2	1.2
1.3	1.3
1.4	1.4
1.5	1.5
1.6	1.6
1.7	1.7
1.8	1.8
1.9	1.9
2.0	2.0
2.1	2.1
2.2	2.2
2.3	2.3
2.4	2.4
2.5	2.5
2.6	2.6
2.7	2.7
2.8	2.8
2.9	2.9
3.0	3.0
3.1	3.1
3.2	3.2
3.3	3.3
3.4	3.4
3.5	3.5
3.6	3.6
3.7	3.7
3.8	3.8
3.9	3.9
4.0	4.0
4.1	4.1
4.2	4.2
4.3	4.3
4.4	4.4
4.5	4.5
4.6	4.6
4.7	4.7
4.8	4.8
4.9	4.9
5.0	5.0
5.1	5.1
5.2	5.2
5.3	5.3
5.4	5.4
5.5	5.5
5.6	5.6
5.7	5.7
5.8	5.8
5.9	5.9
6.0	6.0
6.1	6.1
6.2	6.2
6.3	6.3
6.4	6.4
6.5	6.5
6.6	6.6
6.7	6.7
6.8	6.8
6.9	6.9
7.0	7.0
7.1	7.1
7.2	7.2
7.3	7.3
7.4	7.4
7.5	7.5
7.6	7.6
7.7	7.7
7.8	7.8
7.9	7.9
8.0	8.0
8.1	8.1
8.2	8.2
8.3	8.3
8.4	8.4
8.5	8.5
8.6	8.6
8.7	8.7
8.8	8.8
8.9	8.9
9.0	9.0
9.1	9.1
9.2	9.2
9.3	9.3
9.4	9.4
9.5	9.5
9.6	9.6
9.7	9.7
9.8	9.8
9.9	9.9
10.0	10.0

Code of structural modification

Frame size rated current (A)

Design sequence No.

AC motor starter

Company code

3. Operating conditions

3.1 Temperature: $-5^{\circ}\text{C} \sim +40^{\circ}\text{C}$,
average temperature in 24 hours not exceed $+35^{\circ}\text{C}$

3.2 Altitude: not exceed 2000m

3.3 Air conditions:

At mounting site, relative humidity not exceed 50% at the max temperature of +40°C, higher relative humidity is allowable under lower temperature, for example, RH could be 90% at +20°C

3.4 Pollution grade: Grade III

3.5 Trip class:

10A(NS2-25, NS2-25X, NS2-32, NS2-32X,NS2-32H)

10 (NS2-80, NS2-80B)

3.6 Rated operational system:

Continuous operational system

3.7 Mounting conditions:

The inclination between the mounting plane and the vertical plane shall not exceed 5°

The product shall be installed and operated at a place without obvious shake, impact and vibration.

4. Technical data

4.1 Protection properties

Over-load Protection Properties

Series No.	Multiple of setting current	Initial status	Time	Expected results	Ambient temperature
1	1.05	Cold status	$t \geq 2h$	Non-tripping	$+20^{\circ}\text{C} \pm 2^{\circ}\text{C}$
2	1.20	Heat status (right after test.1)	$t < 2h$	Tripping	$+20^{\circ}\text{C} \pm 2^{\circ}\text{C}$
3	1.50	Heat status (right after test.1)	Tripping class 10A $t < 2\text{min}$ 10 $t < 4\text{min}$	Tripping	$+20^{\circ}\text{C} \pm 2^{\circ}\text{C}$
4	7.20	Cold status	Tripping class 10A $2s < t \leq 10s$ 10 $4s < t \leq 10s$	Tripping	$+20^{\circ}\text{C} \pm 2^{\circ}\text{C}$


Phase failure protection properties

Series No.	Multiple of setting current		Initial status	Time	Expected results	Ambient temperature
	Any 2 phases	The other phase				
1	1.0	0.9	Cold status	$t \geq 2h$	Non-tripping	$+20^{\circ}\text{C} \pm 2^{\circ}\text{C}$
2	1.15	0	Heat status (right after test.1)	$t < 2h$	Tripping	$+20^{\circ}\text{C} \pm 2^{\circ}\text{C}$

Temperature compensation properties

Series No.	Multiple of setting current	Initial status	Time	Expected results	Ambient temperature
1	1.0	Cold status	$t \geq 2h$	Non-tripping	$+40^{\circ}\text{C} \pm 2^{\circ}\text{C}$
2	1.2	Heat status (right after test.1)	$t < 2h$	Tripping	$+40^{\circ}\text{C} \pm 2^{\circ}\text{C}$
3	1.5	Heat status (through 1.0 times rated current ,after thermal equilibrium is reached)	$t < 2\text{min}$	Tripping	$+40^{\circ}\text{C} \pm 2^{\circ}\text{C}$
4	1.05	Cold status	$t \geq 2h$	Non-tripping	$-5^{\circ}\text{C} \pm 2^{\circ}\text{C}$
5	1.3	Heat status (right after test.3)	$t < 2h$	Tripping	$-5^{\circ}\text{C} \pm 2^{\circ}\text{C}$
6	1.5	Heat status (through 1.0 times rated current ,after thermal equilibrium is reached)	$t < 4\text{min}$	Tripping	$-5^{\circ}\text{C} \pm 2^{\circ}\text{C}$


4.2 Technical parameters

Model			NS2-25, NS2-25X, NS2-32,NS2-32X,NS2-32H			
Picture						
Rated insulation voltage Ui(V)			690			
Rated operational voltage Ue(V)			230/240, 400/415, 440, 500, 690			
Rated impulse withstand voltage Uimp(V)			8000			
Regulating rang of setting current (A)			0.1~0.16	0.16~0.25	0.25~0.4	0.4~0.63
Rated current of release			0.16	0.25	0.4	0.63
Rated ultimate short-circuit breaking capacity Icu(kA)	400/415V		100	100	100	100
	660/690V		100	100	100	100
Rated service short-circuit breaking capacity Ics(kA)	400/415V		100	100	100	100
	660/690V		100	100	100	100
Arcing distance (mm)			40	40	40	40
Standard rated power of three-phase motor (kW)	230/240V		-	-	-	-
	400V		-	-	-	-
	415V		-	-	-	-
	440V		-	-	-	-
	500V		-	-	-	-
	660/690V		-	-	-	0.37
Current setting value of instantaneous electromagnetic release Ir(A)			1.5	2.4	5	8
Current rating of fuse-link of back-up fuse, which is only needed in case of Icc > Icu (Icc: prospective short-circuit breaking current)	230/240V	aM A	★	★	★	★
		gl/gG A	★	★	★	★
	400/415V	aM A	★	★	★	★
		gl/gG A	★	★	★	★
	440V	aM A	★	★	★	★
		gl/gG A	★	★	★	★
	500V	aM A	★	★	★	★
		gl/gG A	★	★	★	★
★: fuse is not required	690V	aM A	★	★	★	★
		gl/gG A	★	★	★	★
Degree of protection			IP2L0	IP2L0	IP2L0	IP2L0

NS2-25, NS2-25X, NS2-32, NS2-32X, NS2-32H



690					
230/240, 400/415, 440, 500, 690					
8000					
0.63~1	1~1.6	1.6~2.5	2.5~4	4~6.3	6~10
1	1.6	2.5	4	6.3	10
100	100	100	100	100	100
100	100	3 (NS2-32H: 4)	3 (NS2-32H: 4)	3 (NS2-32H: 4)	3 (NS2-32H: 4)
100	100	100	100	100	100
100	100	2.25 (NS2-32H: 4)	2.25 (NS2-32H: 4)	2.25 (NS2-32H: 4)	2.25 (NS2-32H: 4)
40	40	40	40	40	40
-	-	0.37	0.75	1.1	2.2
-	0.37	0.75	1.5	2.2	4
-	-	0.75	1.5	2.2	4
0.37	0.55	1.1	1.5	3	4
0.37	0.75	1.1	2.2	3.7	5.5
0.55	1.1	1.5	3	4	7.5
13	22.5	33.5	51	78	138
★	★	★	★	★	★
★	★	★	★	★	★
★	★	★	★	★	★
★	★	★	★	★	★
★	★	★	★	50 (NS2-32H: ★)	50 (NS2-32H: ★)
★	★	★	★	63 (NS2-32H: ★)	63 (NS2-32H: ★)
★	★	★	★	50 (NS2-32H: ★)	50
★	★	★	★	63 (NS2-32H: ★)	63
★	★	16 (NS2-32H: 20)	25	32 (NS2-32H: 40)	32 (NS2-32H: 40)
★	★	20 (NS2-32H: 25)	32	40 (NS2-32H: 50)	40 (NS2-32H: 50)
IP2L0	IP2L0	IP2L0	IP2L0	IP2L0	IP2L0

Model			NS2-25, NS2-25X, NS2-32, NS2-32X				
Picture							
Rated insulation voltage Ui(V)			690				
Rated operational voltage Ue(V)			230/240, 400/415, 440, 500, 690				
Rated impulse withstand voltage Uimp(V)			8000				
Regulating rang of setting current (A)			9~14	13~18	17~23	20~25	24~32
Rated current of release			14	18	23	25	32
Rated ultimate short-circuit breaking capacity Icu(kA)	400/415V		15 (NS2-32H: 50)	15 (NS2-32H: 50)	15 (NS2-32H: 50)	15 (NS2-32H: 50)	15 (NS2-32H: 50)
	660/690V		3 (NS2-32H: 4)	3 (NS2-32H: 4)	3 (NS2-32H: 4)	3 (NS2-32H: 4)	3 (NS2-32H: 4)
Rated service short-circuit breaking capacity Ics(kA)	400/415V		7.5 (NS2-32H: 25)	7.5 (NS2-32H: 25)	7.5 (NS2-32H: 25)	7.5 (NS2-32H: 25)	7.5 (NS2-32H: 25)
	660/690V		2.25 (NS2-32H: 4)	2.25 (NS2-32H: 4)	2.25 (NS2-32H: 4)	2.25 (NS2-32H: 4)	2.25 (NS2-32H: 4)
Arcing distance (mm)			40	40	40	40	40
Standard rated power of three-phase motor (kW)	230/240V		3	4	5.5	5.5	7.5
	400V		5.5	7.5	11	11	15
	415V		5.5	9	11	11	15
	440V		7.5	9	11	11	15
	500V		7.5	9	11	15	18.5
	660/690V		9	11	15	18.5	25
Current setting value of instantaneous electromagnetic release Ir(A)			170	223	327	327	416
Current rating of fuse-link of back-up fuse, which is only needed in case of Icc > Icu (Icc: prospective short-circuit breaking current)	230/240V	aM A	★	★	80 (NS2-32H: ★)	80 (NS2-32H: ★)	80 (NS2-32H: ★)
		gl/gG A	★	★	100 (NS2-32H: ★)	100 (NS2-32H: ★)	100 (NS2-32H: ★)
	400/415V	aM A	63 (NS2-32H: ★)	63 (NS2-32H: 100)	80 (NS2-32H: 100)	80 (NS2-32H: 100)	80 (NS2-32H: 100)
		gl/gG A	80 (NS2-32H: ★)	80 (NS2-32H: 125)	100 (NS2-32H: 125)	100 (NS2-32H: 125)	100 (NS2-32H: 125)
	440V	aM A	50	50 (NS2-32H: 63)	63 (NS2-32H: 80)	63 (NS2-32H: 80)	63 (NS2-32H: 80)
		gl/gG A	63	63 (NS2-32H: 80)	80 (NS2-32H: 100)	80 (NS2-32H: 100)	80 (NS2-32H: 100)
	500V	aM A	50	50	50	50	50
		gl/gG A	63	63	63	63	63
★: fuse is not required	690V	aM A	40 (NS2-32H: 50)	40 (NS2-32H: 50)	40 (NS2-32H: 50)	40 (NS2-32H: 50)	40 (NS2-32H: 50)
		gl/gG A	50 (NS2-32H: 63)	50 (NS2-32H: 63)	50 (NS2-32H: 63)	50 (NS2-32H: 63)	50 (NS2-32H: 63)
Degree of protection			IP2L0	IP2L0	IP2L0	IP2L0	IP2L0


NS2-80B



690			
230/240, 400/415			
8000			
16~25	25~40	40~63	56~80
25	40	63	80
15	15	15	15
-	-	-	-
7.5	7.5	7.5	7.5
-	-	-	-
50	50	50	50
5.5	11	15	22
11	18.5	30	40
11	22	33	45
-	-	-	-
-	-	-	-
-	-	-	-
327	480	756	960
★	★	★	★
★	★	★	★
250	250	315	315
315	315	400	400
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
IP2L0	IP2L0	IP2L0	IP2L0

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پیمان تابلو
صفر تا صد تابلو برق

Model			NS2-80					
Picture								
Rated insulation voltage U_i (V)			690					
Rated operational voltage U_e (V)			400/415 660/690					
Rated impulse withstand voltage U_{imp} (V)			8000					
Regulating rang of setting current (A)			20-25	23-32	30-40	37-50	48-65	63-80
Rated current of release			25	32	40	50	65	80
Rated ultimate short-circuit breaking capacity I_{cu} (kA)	400/415V		50	50	50	50	50	50
	660/690V		4	4	4	4	4	4
Rated service short-circuit breaking capacity I_{cs} (kA)	400/415V		17.5	17.5	17.5	17.5	17.5	17.5
	660/690V		2	2	2	2	2	2
Arcing distance (mm)			50	50	50	50	50	50
Standard rated power of three-phase motor (kW)	400V		11	15	18.5	22	30	37
	415V		11	15	18.5	22	30	37
	660/690V		18.5	22	37	45	55	63
Current setting value of instantaneous electromagnetic release I_r (A)			350	448	560	700	910	1120
Current rating of fuse-link of back-up fuse, which is only needed in case of $I_{cc} > I_{cu}$ (I_{cc} : prospective short-circuit breaking current)	400/415V	aM A	250	250	250	315	315	315
		gl/gG A	315	315	315	400	400	400
	690V	aM A	160	160	160	200	200	200
		gl/gG A	200	200	200	250	250	250
Degree of protection			IP2L0					

5. Other

5.1 Starters accessories

5.1.1 Type, model and specifications of accessories (see Table 10).

Table 10

Description of accessories	Accessories Model					Accessories Specifications
	NS2-25, NS2-32 applies	NS2-25X, NS2-32X applies	NS2-32H applies	NS2-80 applies	NS2-80B applies	
Undervoltage release	NS2-UV110	NS2-UV110	NS2-UV110	NS2-UV110	-	110~115V, 50Hz ; 127V,60Hz
	NS2-UV220	NS2-UV220	NS2-UV220	NS2-UV220	-	220~240V, 50Hz
	NS2-UV380	NS2-UV380	NS2-UV380	NS2-UV380	-	380~400V, 50Hz ; 440V,60Hz
Shunt release	NS2-SH110	NS2-SH110	NS2-SH110	NS2-SH110	-	110~115V, 50Hz ; 127V,60Hz
	NS2-SH220	NS2-SH220	NS2-SH220	NS2-SH220	-	220~240V, 50Hz
	NS2-SH380	NS2-SH380	NS2-SH380	NS2-SH380	-	380~400V, 50Hz ; 440V,60Hz
Instantaneous auxiliary contact (front hanging)	NS2-AE20	NS2-AE20	NS2-AE20	NS2-AE20	-	2NO
	NS2-AE11	NS2-AE11	NS2-AE11	NS2-AE11	-	1NO+1NC
Instantaneous auxiliary contact (side hanging)	NS2-AU20	NS2-AU20	NS2-AU20	NS2-AU20(NS2-80)	NS2-AU20(NS2-80B)	2NO
	NS2-AU11	NS2-AU11	NS2-AU11	NS2-AU11(NS2-80)	NS2-AU11(NS2-80B)	1NO+1NC
Fault signal contact and instantaneous auxiliary contact	NS2-FA0110	NS2-FA0110	NS2-FA0110	-	-	1NC+1NO
	NS2-FA0101	NS2-FA0101	NS2-FA0101	-	-	1NC+1NC
	NS2-FA1010	NS2-FA1010	NS2-FA1010	-	-	1NO+1NO
	NS2-FA1001	NS2-FA1001	NS2-FA1001	-	-	1NO+1NC
Waterproof mounting box	NS2-MC	WPB-1	-	-	-	-
Mounting box with emergency stop button	NS2-MC01	-	-	-	-	-

5.1.2 Undervoltage trip device

NS2-UV110, UV220, UV380'S, performance:

- Rated insulation voltage U_i (V): 690.
- Operating characteristics: When the voltage drops to 70% and 35% of the rated voltage range, undervoltage trip device shall act;
Undervoltage trip device in the power supply voltage is less than 35% of the rated voltage of the trip device, the undervoltage trip device should be able to prevent the starter from closing;
when the power supply voltage is equal to or greater than 85% of the rated voltage of the trip device, the undervoltage trip device should guarantee closure of the starter.

NS2-UV



5.1.3 The characteristics of the shunt trip

NS2-SH110, SH220, SH380:

- Rated insulation voltage U_i (V): 690.
- Operating characteristics: the operating voltage range of the shunt trip device is rated working voltage of 70% ~ 110%.

NS2-SH



5.1.4 Characteristics of the instantaneous auxiliary contact NS2-

Ae20, AE11 (front hanging)

- rated insulation voltage U_i (V): 250;
- agreed thermal current I_{th} (A): 2.5;
- type, rated voltage and rated operating current (see Table 11) of instantaneous auxiliary contacts.

NS2-AE



Table 11

Utilization category	AC-15				DC-13		
Rated operating voltage U_e (V)	24	48	110/127	230/240	24	48	60
Rated operating current I_e (A)	2	1.25	1	0.5	1	0.3	0.15
Normal operating power P (W)	48	60	127	120	24	15	9

5.1.5 Instantaneous auxiliary contact NS2-AU20, AU11

performance (side hanging):

- rated insulation voltage U_i (V): 690;
- agreed thermal current I_{th} (A): 6;
- type, rated voltage and rated operating current of the instantaneous auxiliary contacts (see Table 12).



NS2-AU

Table 12

Utilization category	AC-15								DC-13				
Rated operating voltage U_e (V)	48	110/127	230/240	380/415	440	500	690		24	48	60	110	220
Rated operating current I_e (A)	6	4.5	3.3	2.2	1.5	1	0.6		6	5	3	1.3	0.5
Normal operating power P (W)	300	500	720	850	650	500	400		140	240	180	140	120

5.1.6 Characteristics of the fault signal contact and instantaneous auxiliary contact NS2-FA:

instantaneous auxiliary contact NS2-FA:

Fault signal contact and instantaneous auxiliary contact NS2-FA, consist of the fault signal contact and instantaneous auxiliary contact. They have different use types and characteristics.

- rated insulation voltage U_i (V): 690;
- agreed thermal currents of instantaneous auxiliary contacts: 6, agreed thermal current of fault signal contacts I_{th} (A): 2.5;
- the use type, rated voltage and rated work current (see Table 12) of the instantaneous auxiliary contact same as the NS2-AU instantaneous auxiliary contact; the use type, rated voltage and rated operating current (see Table 13) of the fault signal contacts.



NS2-FA

Table 13

Utilization category	AC-14				DC-13			
Rated operating voltage U_e (V)	24	48	110/127	230/240	24	48	60	
Rated operating current I_e (A)	1.5	1	0.5	0.3	1	0.3	0.15	
Normal operating power P (W)	36	48	72	72	24	15	9	
Operating performance (time)	1000	1000	1000	1000	1000	1000	1000	

5.1.7 Non-normal making and breaking capacity (see Table 14) of fault signal contact and instantaneous auxiliary contact.

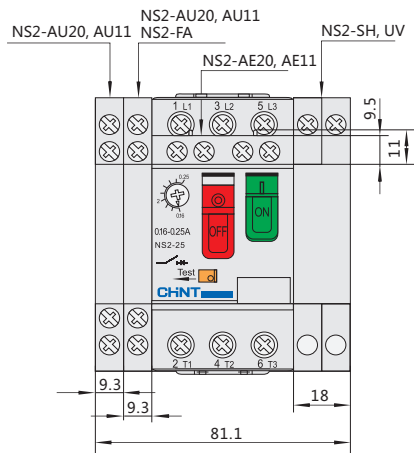
Table 14

Use type	Connection		Disconnection				On-off operation cycles and operating frequency		
	I/I_e	U/U_e	$\cos\Phi$ or $T_{0.95}$	I/I_e	U/U_e	$\cos\Phi$ or $T_{0.95}$	Operating cycles	Operating cycles per minutes	Energize Time
AC-14	6	1.1	0.7	6	1.1	0.7	10	2	0.05
AC-15	10	1.1	0.3	10	1.1	0.3	10	2	0.05
DC-13	1.1	1.1	6Pe	1.1	1.1	6Pe	10	2	0.05

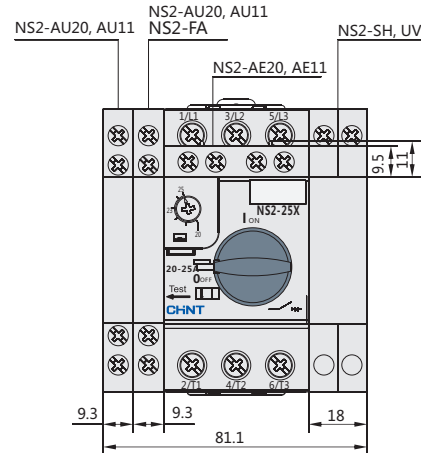
Note: $P_e \geq 50W$, $T_{0.95}$ upper limit $\approx 6P_e \leq 300ms$.

6. Overall and mounting dimension (mm)

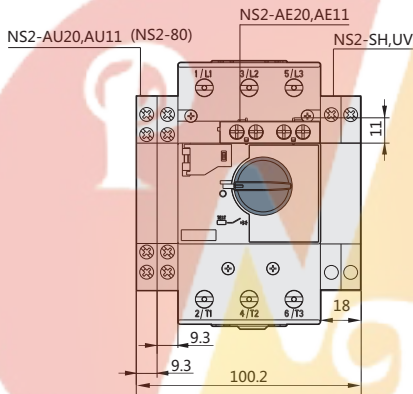
NS2-25, NS2-32



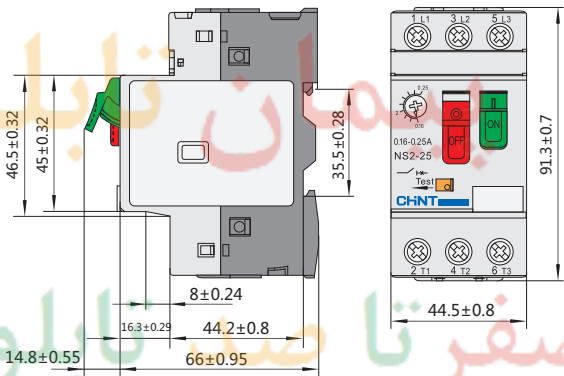
NS2-25X, NS2-32X, NS2-32H



NS2-80

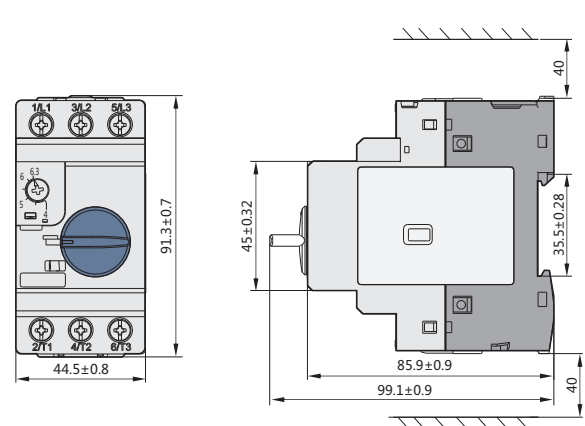
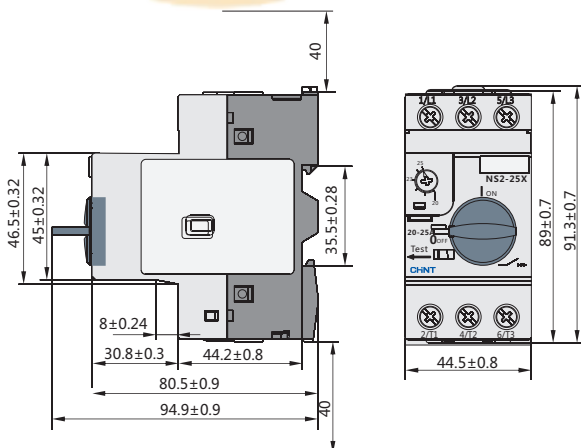


NS2-25, NS2-32

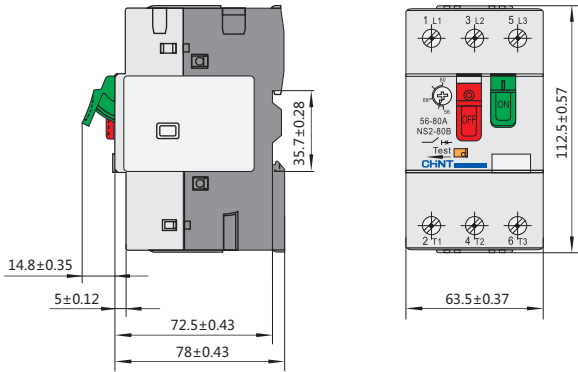


NS2-25X, NS2-32X

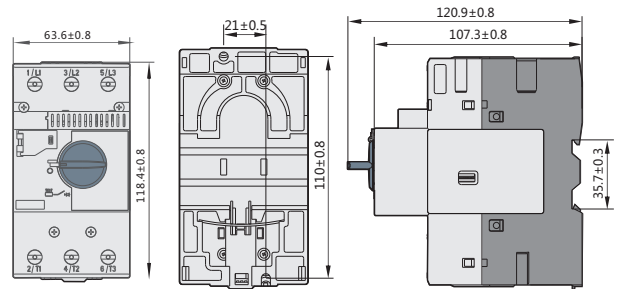
NS2-32H



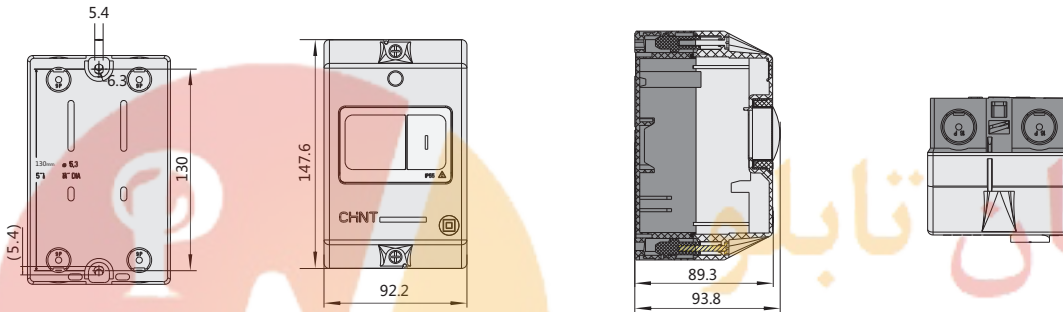
NS2-80B



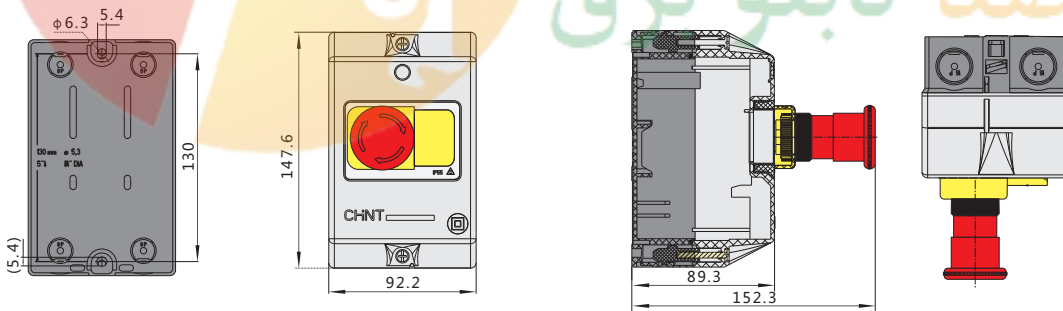
NS2-80



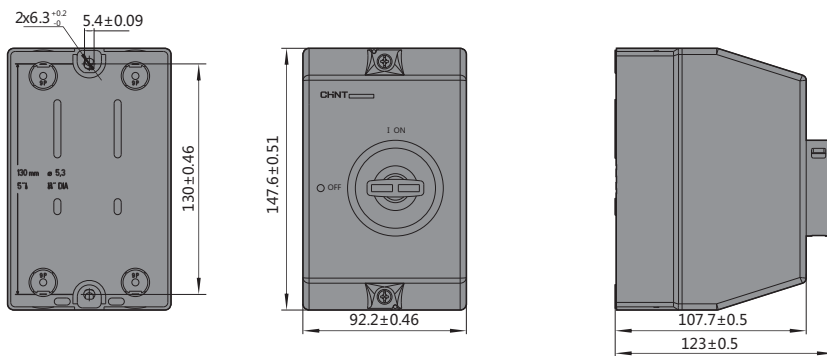
NS2-MC

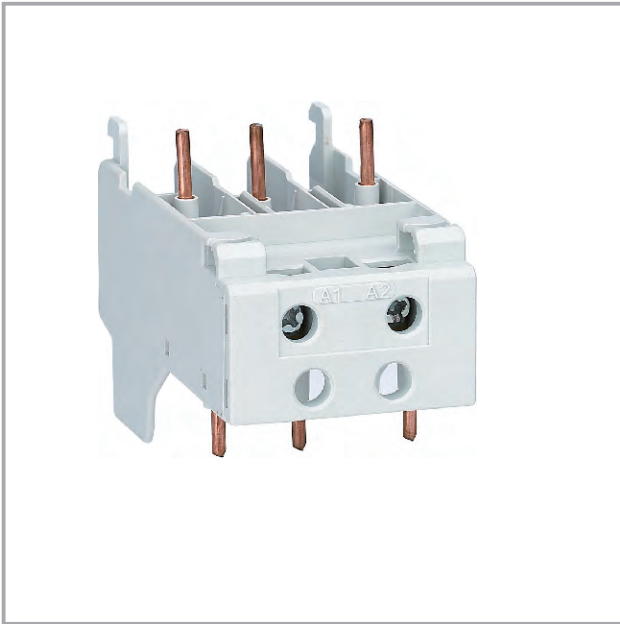


NS2-MC01



WPB-1





CC Conversion Connectors

1. General

CC conversion connectors are used to connect AC contactor and starter to be a composite apparatus, for the circuits with AC current frequency 50HZ and rated operating voltage up to 690V.

CC-2 (NS2) conversion connector is used for NC8-38 AC contactor and NS2-32H starter, and CC-3 (NS2) conversion connector is used for NC8-65 AC contactor and NS2-80 starter.

After connecting the AC contactor and starter as a composite apparatus, CC connectors are applicable for various power distribution systems or motor protection and control systems.

Conformed standards: IEC60947-1 Low-voltage Switchgear and Controlgear - Part 1: General rules.

2. Product Features

CC connectors combine AC contactor and starter as a composite apparatus, can reduce the wiring and improve the system operation reliability.

CC connectors are composed of shell, main circuit connection and auxiliary circuit connection, can connect the circuits well.

The connector leads the coil terminals of AC contactor to the above of the product, and reliable cable trough is designed to facilitate the customers' wiring.

3. Type designation

CC	-	□	(NS2)
			Suitable for NS2 starter
			Design sequence No.
			Company code

4. Operating Conditions

- 4.1 Ambient air temperature: $-5^{\circ}\text{C} \sim +40^{\circ}\text{C}$, daily average not more than $+35^{\circ}\text{C}$.
- 4.2 Altitude: Not exceed 2000m. If it exceeds 2000m, the product should be used with reduced capacity. It is proposed that the altitude increased by each 1000m, the capacity should be reduced by 10%.
- 4.3 Humidity: When the ambient air temperature is $+40^{\circ}\text{C}$, the air relative humidity doesn't exceed 50%; at a lower temperature, the humidity could be higher. When the average minimum temperature is $+25^{\circ}\text{C}$, the average maximum relative humidity is 90%, considering the product surface condensation resulting from the temperature variation.
- 4.4 Pollution grade: 3.
- 4.5 Installation category: III.
- 4.6 The external magnetic field of mounting place should not exceed 5 times earth magnetism at any direction; it should have no explosive or corrosive gas; no rain or snow attack; and should be dry and ventilated.

5. Main Technical Parameters

Table 1 Main Circuit Parameters

Model	CC -2 (NS 2)	CC -3(NS 2)
Rated operating voltage U_e (V)	690	690
Rated insulation voltage U_i (V)	690 and below	690 and below
Rated impulse withstand voltage U_{imp} (kV)	6	6
Rated operating current I_e max (A)	32	65
Number of poles	3P	3P

6. Installation

Fig.1 Outline and Installing Dimensions of CC-2(NS2)

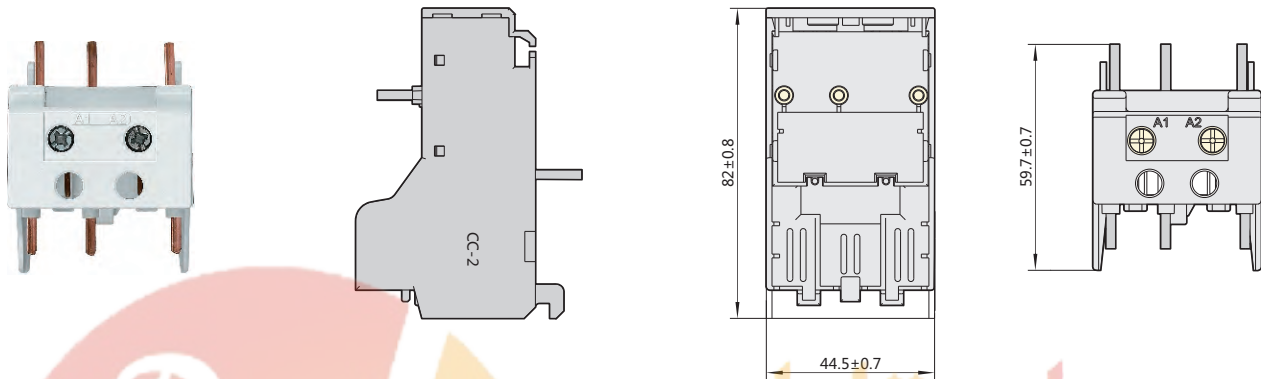


Fig.2 Outline and Installing Dimensions of CC-3(NS2)

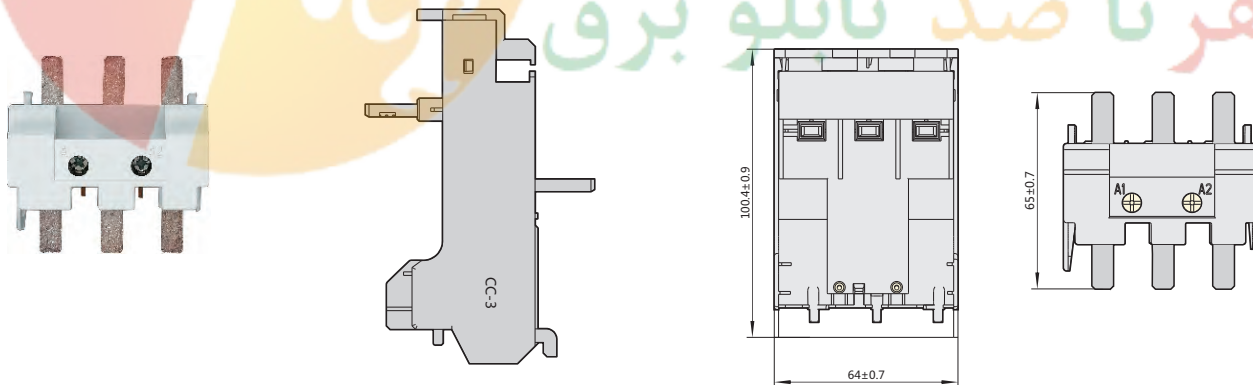


Fig.3 Outline and Installing Dimensions of CC-2(NS2) after assembly with the starter and contactor

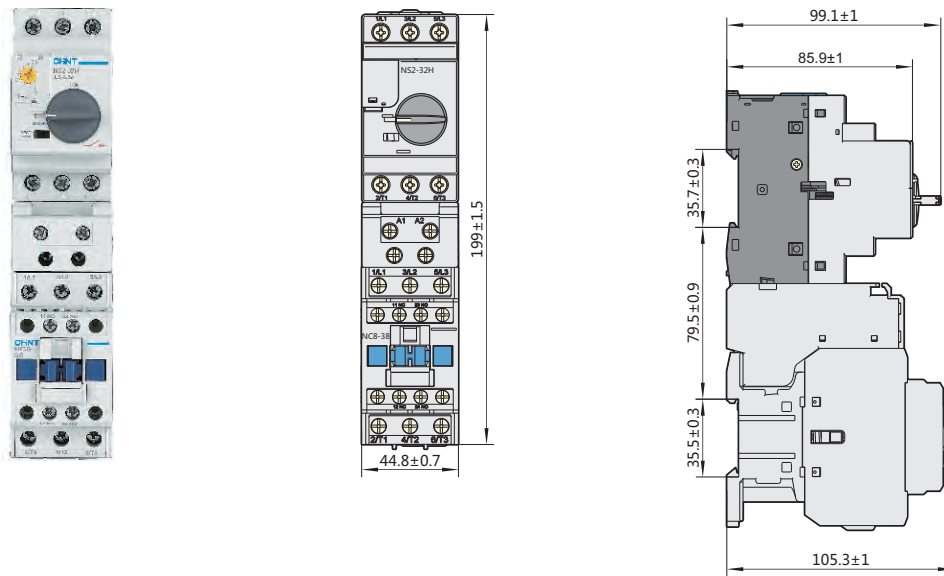
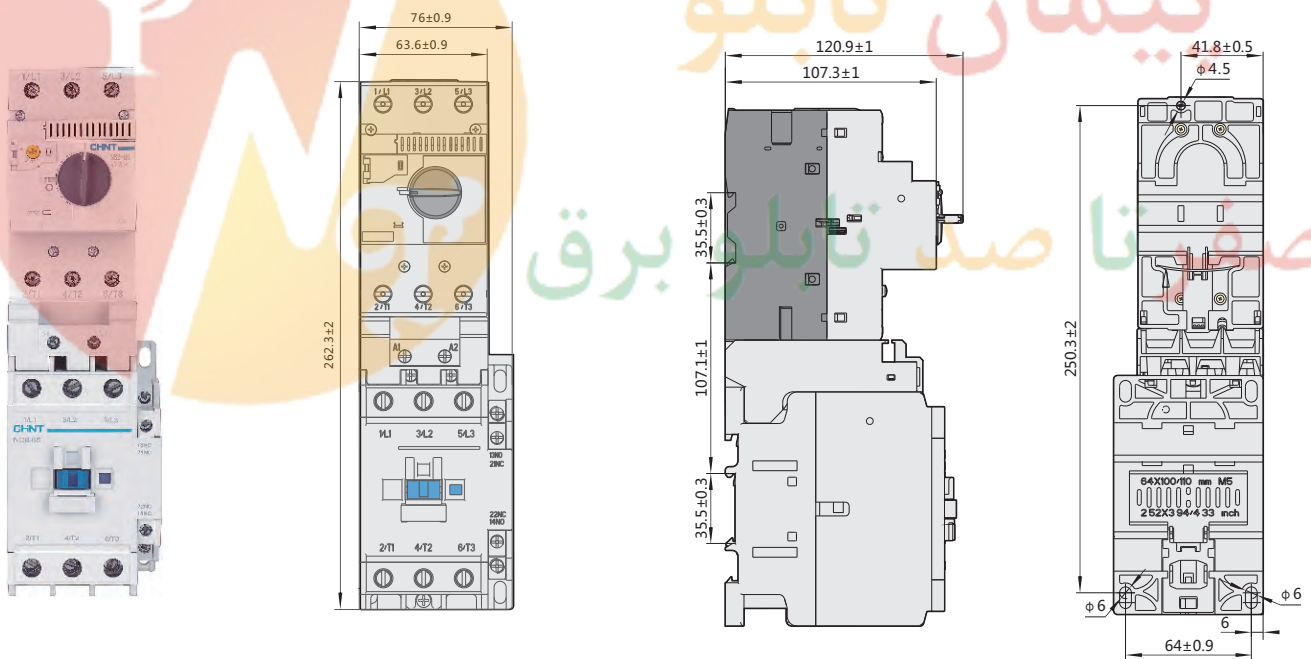


Fig.4 Outline and Installing Dimensions of CC-3(NS2) after assembly with the starter and contactor





NQ2 Direct On-line Starter

1. General

1.1 NQ2 series electromagnetic starter
 ("starter" for short hereinafter) applies mainly to circuit with AC current of 50Hz (or 60Hz), rated operational voltage of 660V and rated controlled power up to 33kW (current up to 68A) for using to control the direct start and halt of the electromotor to protect the motor from overload and phase failure.

1.2 The starter conforms to standards IEC/EN60947-4-1

2. Type designation

N Q 2-□ □/□

Rated control power code (AC-3, 380V): 1~4

Structure code:

Blank: non-reversing type without pushbutton

P: with pushbutton

N: reversing type

NB: reversing type without thermal relay

Frame level power code

Design sequence No.

Starter

Company code



صفر تا صد تابلو برق

Model	Conventional heating current I _{th} (A)	Rated operational current I _e (A)	Rated power (AC-3)			Model of matched contactor	Model of matched relay	Model of matched pushbutton	Range of setting current (A)
			(kW)						
			660V	380V	220V				
NQ2-15P/1	13	12	7.5	5.5	3	NC1-1210	NR2-25	Start: NP2-EA31 Stop: NP2-EA42	0.1~0.16
									0.16~0.25
									0.25~0.4
									0.4~0.63
									0.63~1
									1~1.6
									1.25~2
									1.6~2.5
									2.5~4
									4~6
NQ2-15P/2	18	18	10	7.5	4	NC1-1810	NR2-25	NP2-EA42	5.5~8
									7~10
									9~13
NQ2-15P/3	25	25	15	11	5.5	NC1-2510	NR2-25	NP2-EA42	12~18
NQ2-15P/4	36	32	18.5	15	7.5	NC1-3210	NR2-36	NP2-EA42	17~25
									23~32
									28~36
NQ2-33P/1	52	52	33	25	15	NC1-6511	NR2-93	NP2-EA42	23~32
									30~40
									37~50
									48~65
NQ2-33P/2	68	68	37	33	25	NC1-9511	NR2-93	NP2-EA42	55~70
									63~80
									80~93

3.3 NQ2-15 N

Model	Conventional heating current I _{th} (A)	Rated operational current I _e (A)	Rated power (AC-3)			Model of matched contactor	Model of matched relay	Range of setting current (A)
			(kW)					
			660V	380V	220V			
NQ2-15N/1	13	12	7.5	5.5	3	NC1-1210	NR2-25	0.1~0.16
								0.16~0.25
								0.25~0.4
								0.4~0.63
								0.63~1
								1~1.6
								1.25~2
								1.6~2.5
								2.5~4
								4~6
NQ2-15N/2	18	18	10	7.5	4	NC1-1810	NR2-36	5.5~8
NQ2-15N/3	25	25	15	11	5.5	NC1-2510		7~10
NQ2-15N/4	36	32	18.5	15	7.5	NC1-3210		9~13
								12~18
								17~25
								23~32
								28~36

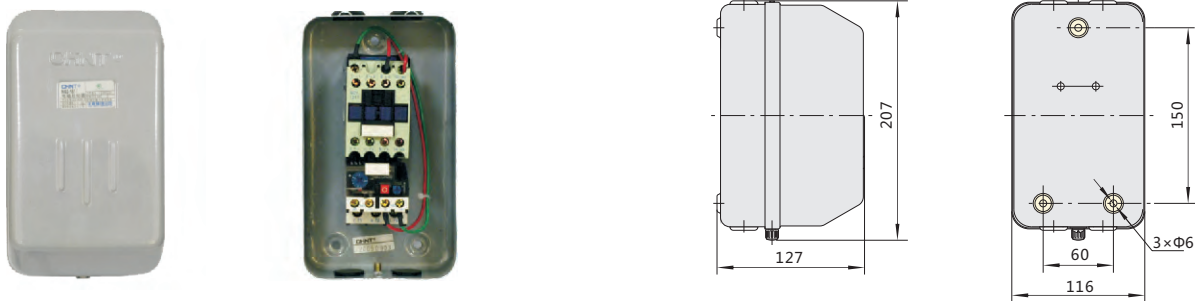
3.4 NQ2-15NB

Model	Conventional heating current I _{th} (A)	Rated operational current I _e (A)	Rated power (AC-3)			Model of matched contactor
			(kW)			
			660V	380V	220V	
NQ2-15NB/1	13	12	7.5	5.5	3	NC1-1201N
NQ2-15NB/2	18	18	10	7.5	4	NC1-1801N
NQ2-15NB/3	25	25	15	11	5.5	NC1-2501N
NQ2-15NB/4	36	32	18.5	15	7.5	NC1-3201N

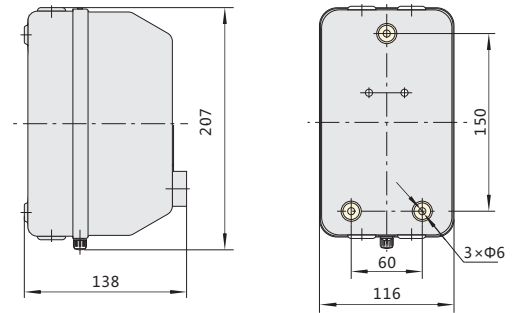
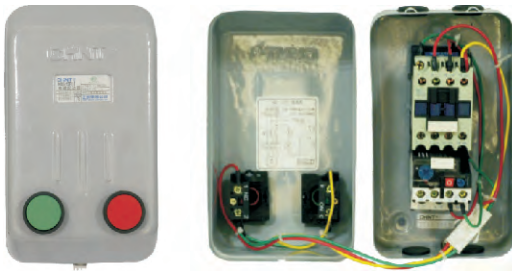
Altitude: not exceeding 2000m; Temperature of ambient air: -5°C~+40°C
 Rated control supply voltage (AC 50Hz): 24V, 36V, 48V, 110V, 127V, 220V, 380V, 415V
 Mechanical life: 1,000,000 circles; Electric life: 500,000 circles; IP40

4. Overall and mounting dimensions (mm)

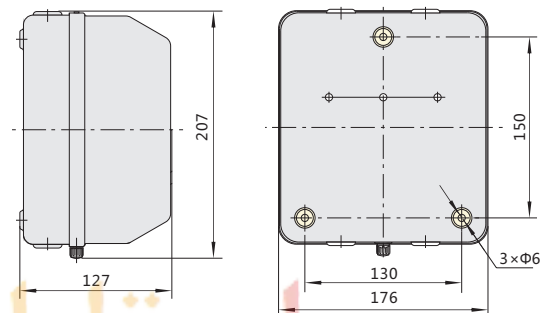
NQ2-15



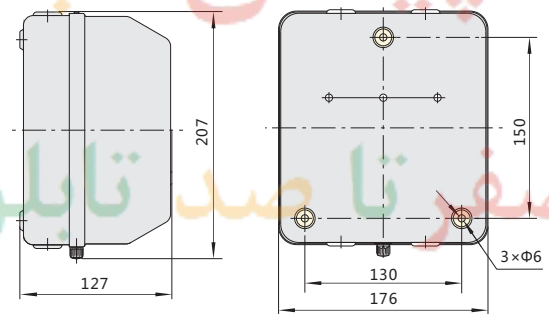
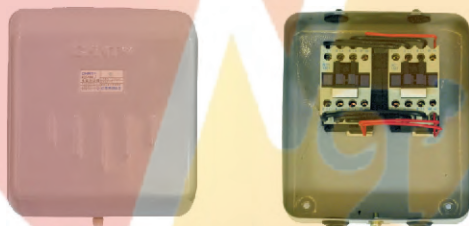
NQ2-15P



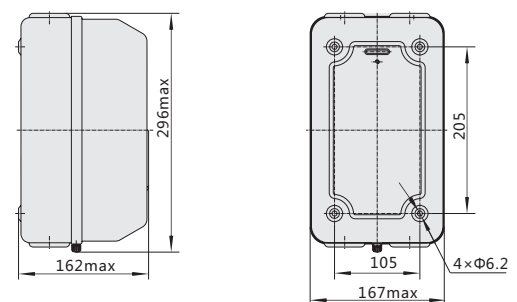
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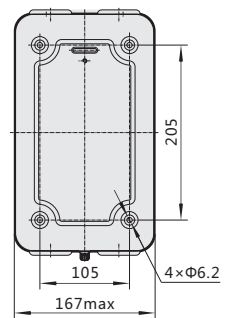
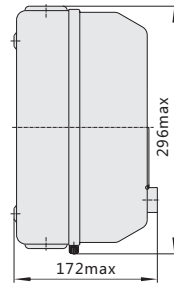
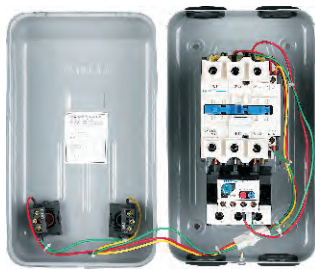


NQ2-15NB

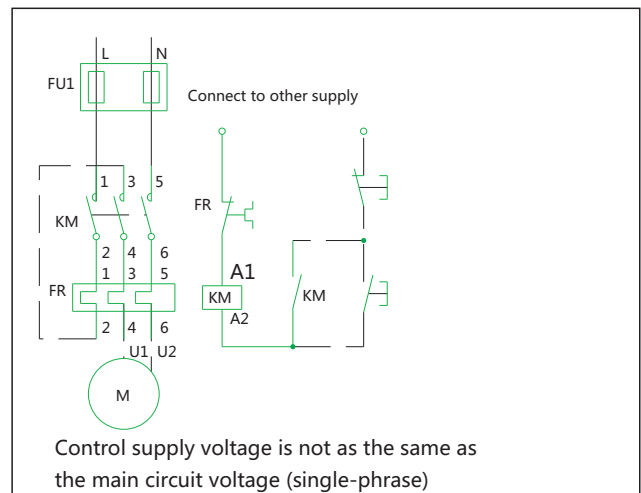
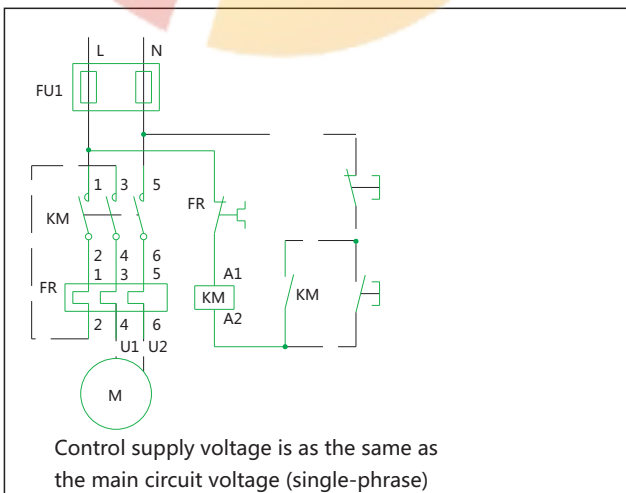
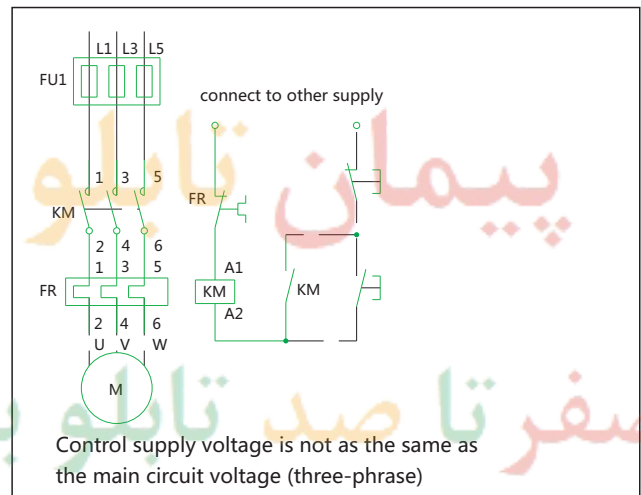
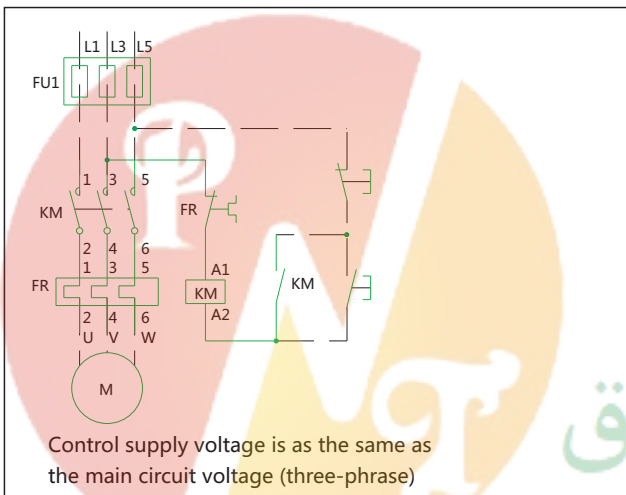


NQ2-33





5. Wiring Diagram





NQ3 Series DOL Electromagnetic Starter

1. General

1.1 NQ3 series electromagnetic starter ("starter" for short hereinafter) applies mainly to circuit with AC current of 50Hz (or 60Hz), rated operational voltage of 660V and rated controlled power up to 11kW (current up to 22A) for using to control the direct start and halt of the electromotor to protect the motor from overload and phase failure.

1.2 The starter conforms to standards IEC/EN60947-4-1

2. Type designation

N Q 3 - □ P

Code of structure characteristic:
P means with buttons
Code of power grade of the bracket
Design code name
Electromagnetic starter
Characteristic code of the enterprise

3. Technical data

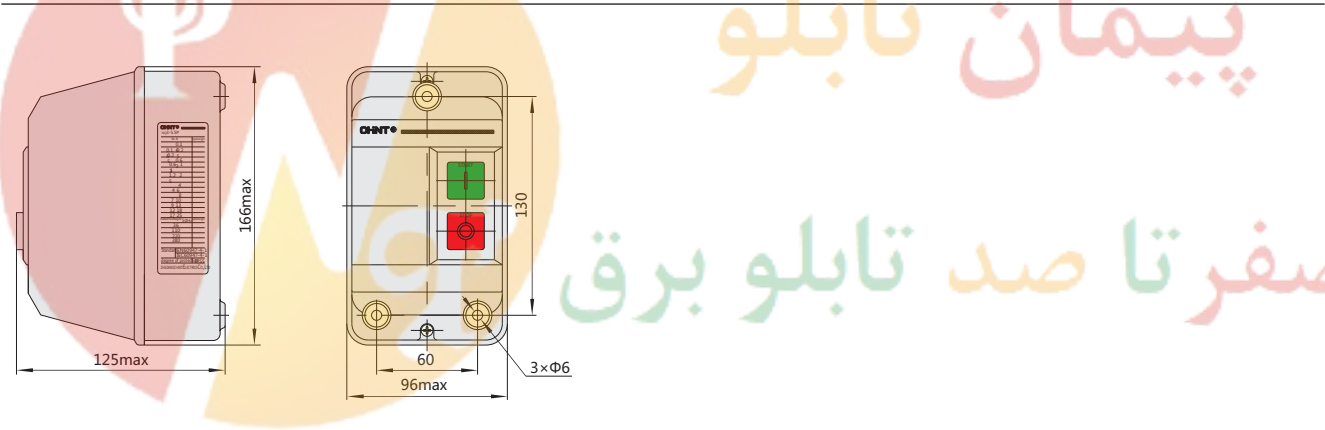
Altitude: not exceeding 2000m;
Temperature of ambient air: -5°C~+40°C
Rated control supply voltage (AC 50Hz):
24V, 36V, 48V, 110V, 127V, 220V, 380V, 415V
Mechanical life: 1,000,000 circles;
Electric life: 500,000 circles;
IP55

Table 1 Basic Model and main technical parameter of the starter

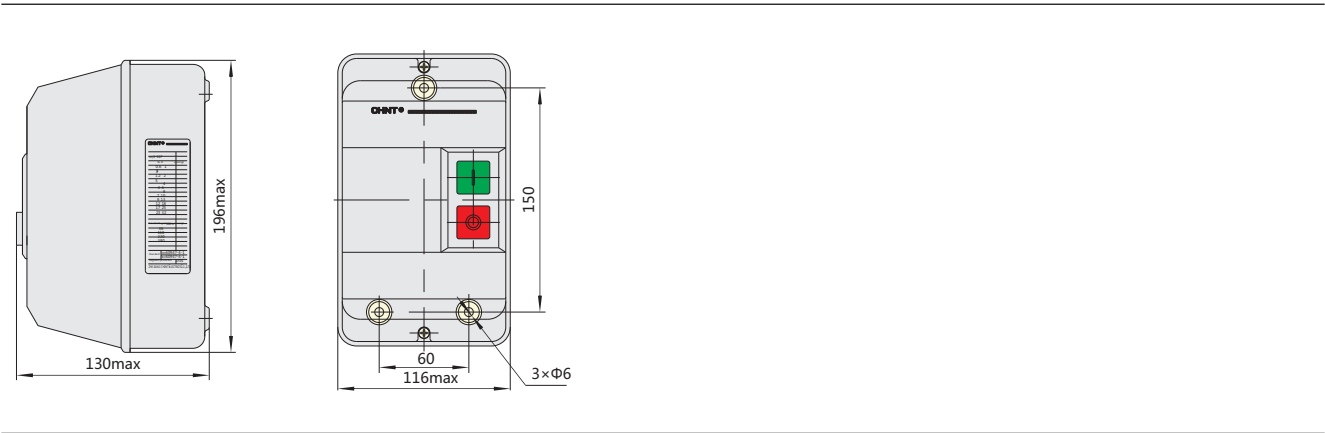
Model	Rated working current (A)	Maximum rated Power (kW)			Model of equipped AC contactor	TOR matched	Range of setting current A
		AC-3					
		660V	380V	220V			
NQ3-5.5P	12	7.5	5.5	3	NC1-1810	NR2-25	0.1~0.16
							0.16~0.25
							0.25~0.4
							0.4~0.63
							0.63~1
							1~1.6
							1.25~2
							1.6~2.5
							2.5~4
							4~6
							5.5~8
							7~10
NQ3-11P	22	15	11	5.5	NC1-3210		9~13
							12~18
							17~25

4. Overall and mounting dimension (mm)

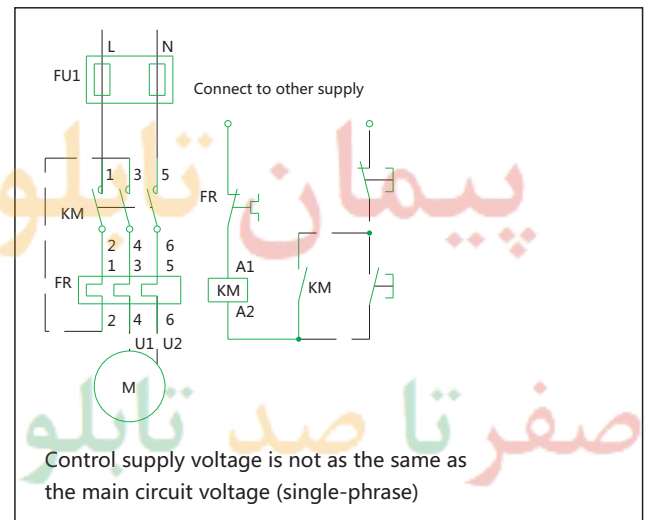
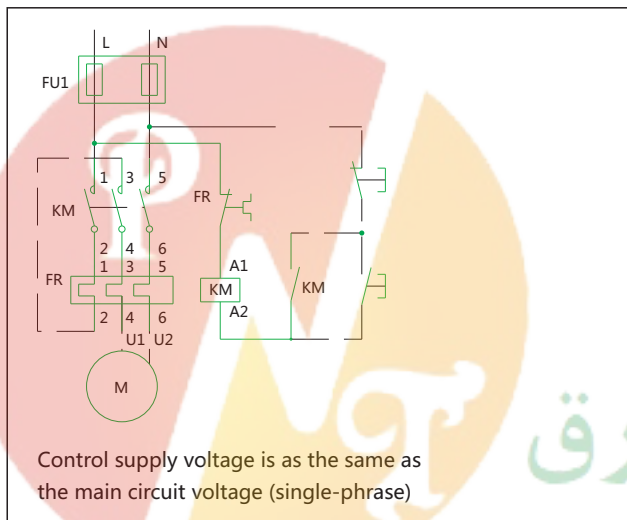
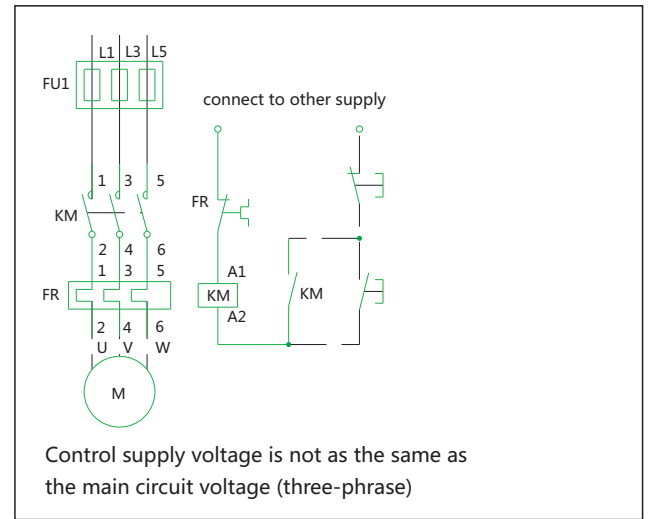
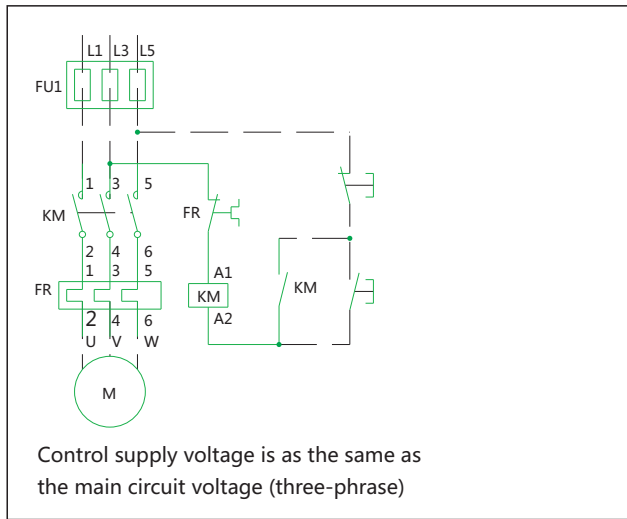
NQ3-5.5P



NQ3-11P



5. Wiring Diagram



6. Picture

NQ3-5.5P



NQ3-11P





NQB1 Series Protection Starter

1. Application scope

NQB1 series protection starter (starter for short hereinafter) applies mainly to the power system with AC current of 50Hz, rated operational voltage of 690V and rated operational current up to 18A for the direct start, running and breaking of the three-phase squirrel cage induction motor, with the functions of frequent switching and breaking circuit, and short circuit protection, overload, phase failure, temperature compensation and other line protection. NQB1 series starter breaks the traditional decentralized model of components of low-voltage products and integrates all functions, with the internal system coordinating by itself. The compact structure not only saves space and is suitable for the new busbar wiring system, but also reduces inventory, makes it easy for users to select models and decreases the workload and improper model selection. Thus, it is with strong economy and practicability.

The starter conforms to standards GB 14048.4 and IEC 60947-4-1.

2. Model and meanings

N QB 1 - 18/ □ □

Accessory code:

J0 - economical without base;

J1 - economical with base; B0 - standard

Frame Level rated current

Design sequence No.

Protection Starter

Characteristic code of the enterprise

3. Normal operating conditions and mounting conditions

3.1 Normal operating conditions

- Frequency: AC frequency of the power supply of 50Hz;
- Ambient temperature: -5 °C ~ +40 °C, average temperature in 24 hours not exceed +35 °C;
- Altitude: not exceed 2000m;
- Humidity: The relative humidity not exceed 50% at the maximum temperature of +40 °C, and the relative humidity not more than 90% at room temperature (at 25°C + 5 °C);
- Pollution grade: Grade III.

3.2 Mounting conditions

3.2.1 Mounting methods

- Use rail for mounting: 35mm standard mounting rail, with the input terminal of the product up;
- The inclination between the mounting plane and the vertical plane shall not exceed $\pm 5^\circ$.

3.2.2 Mounting overvoltage category Mounting overvoltage category: II, III.

3.2.3 Impact and vibration

The product shall be installed and operated at a place without obvious shake, impact and vibration.

4. Main parameters and technical performance

4.1 See the main parameters and technical performance indicators in the table below:

Table 1 Main Parameters and Technical Performance Indicators

Model	Rated insulation voltage (Ui V)	Rated frequency Hz	Rated operational current Ie A	Range of setting current of thermal overload releaser A	Conventional heating current Ith A	Current setting value of instantaneous releaser Ir A	Rated operational voltage Ue V	Rated limited short circuit current Iq kA	Expected current r kA	Matched type r kA	Power of controlled three-phase squirrel cage motor kW	Arcing distance mm
NQ81-18	690	50	0.16	0.1-0.16	0.16	1.5	380(400) 660(690)	50	1	2	-	40
			0.25	0.16-0.25	0.25	2.4	380(400) 660(690)				-	
			0.4	0.25-0.4	0.4	5	380(400) 660(690)				-	
			0.63	0.4-0.63	0.63	8	380(400) 660(690)				-	
			1	0.63-1	1	13	380(400) 660(690)				0.37	
			1.6	1-1.6	1.6	22.5	380(400) 660(690)	50 2.25			- 1.1	
			2.5	1.6-2.5	2.5	33.5	380(400) 660(690)	50 2.25	1	1	0.75 1.5	
			4	2.5-4	4	51	380(400) 660(690)	50 2.25			1.5 3	
			6.3	4-6.3	6.3	78	380(400) 660(690)	50 2.25			2.2 4	
			10	6-10	10	138	380(400) 660(690)	50 2.25			4 5.5	
			14	9-14	14	170	380(400) 660(690)	7.5 2.25			5.5 9	
			18	13-18	18	223	380(400)	7.5	3		7.5	

4.2 Coil voltage Us(~/V):110, 220, 380, 50Hz.

5 Structural characteristics

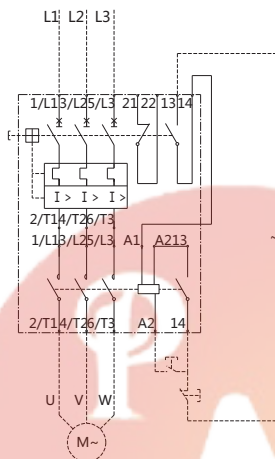
The starter is a compact product mainly made up of the mass-produced single electrical component AC contactor NC1 and motor starter NS2 plus the intermediate connection module and optional base through performance coordination and matching.

Main characteristics: Control and protection of system coordination, ensuring the safety of electrical equipment compared with the traditional system; Reducing the wiring workload, required mounting time and mounting area; Standard components can meet requirements of most applications and reduce inventory; applicable to new mounting applications and busbar wiring system;

Facilitating users' model selection and reducing the workload and improper model selection; thereby being novel, economical and practical.

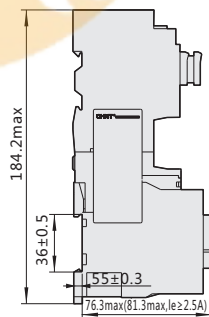
6 Wiring diagram of starter application circuit (see Figure 1)

Figure 1

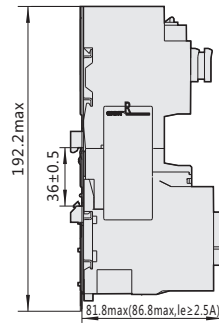


7 Overall and mounting dimension

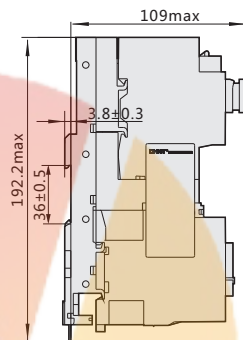
NQB1-18/JO economical without base



NQB1-18/J1 economical with base



NQB1-18/BO standard



8 Ordering instructions

8.1 Before placing an order, the main parameters and technical performance indicators can be used as a reference.

8.2 When placing an order, the following must be described:

- Protector's model, specifications, rated operational current and coil control voltage
- Order quantity

8.3 Starters needing special uses, starters with technical conditions negotiated by the supplier and demander and starters exceeding the normal operating range specified in this technical specification shall be regarded as special orders.



NKB1 Control & Protective Switching Device

1. General

NKB1 series control & protective switching device (CPS) is mainly applied to circuit with AC current frequency of 50 Hz or 60Hz, rated operational voltage up to 690V and rated operational current from 1A to 125A used for it is making, carrying and breaking currents under normal conditions, including specified overload conditions and for making, carrying for a specified time and breaking currents under specified abnormal conditions such as those of short-circuits.

NKB1 series CPS is applied to power distribution and motor protection & control of various occasions or systems, e.g. infrastructure, buildings, communications, etc.

Standard: IEC60947-6-2 Multiple function equipment- Control and protective switching devices (or equipment) (CPS).

Symbol: 

2. Features

NKB1 series CPS adopts the integrated modular structure, integrating the main functions of circuit breaker, contactor, over load relay, starter, disconnecter, and so on.

With small volume and high reliability, it consists of the advantages of high short current breaking capacity and short flashover distance. It can provide inverse time delay protection, short circuit short time delay protection, instantaneous short circuit protection, and fast short circuit protection. Once function selected according to requirements, it can provide protection for various motor starting, control circuits and distribution circuits with accurate and reliable performance.

NKB1 series product consists of enclosure, electromagnetic transmission mechanism, operation mechanism, main circuit contacts sets, intelligent trip unit and auxiliary contacts, and can control the making and breaking of the circuit locally or remotely.

The CPS has a variety of circuit protection functions: start delay, phase failure, three phases unbalance, under current, over voltage, under voltage, etc.

The CPS has different types for choice: basic type, fire-fighting type, leakage type, communication type. The whole series products have isolation function.

The CPS has the one key recovery function and self-setting function, to meet the different needs of the users.

The CPS has two control modes: remote automatic control & local manual control. It has panel indication & electromechanical signal alarm function.

3. Operating conditions

Ambient temperature: $-5^{\circ}\text{C} \sim +40^{\circ}\text{C}$, average day temperature value $\leq +35^{\circ}\text{C}$. It can operate reliably at $-25^{\circ}\text{C} \sim +70^{\circ}\text{C}$ for a short period.

Altitude: $\leq 2000\text{m}$, derating by 10% every 1000m when higher than 2000m.

Humidity: When ambient air temperature is $+40^{\circ}\text{C}$, the relative humidity $\leq 50\%$; Higher relative humidity is allowed at lower temperatures.

The average maximum relative humidity of the month is 90% when the minimum monthly average temperature is $+25^{\circ}\text{C}$, and the condensation occurring on the surface of the product due to temperature variation is taken into account.

Pollution degree: 3

Installation category: III

Installation site requirement: The external magnetic field of the installation site shall not exceed 5 times of the geomagnetism in any direction. No explosive gas, no corrosive gas; no rain or snow invasion; dry and ventilated.

4. Type & designation

N KB 1 - □□/□□/□□□

Additional function code:

Basic type: blank

Fire-fighting type: F

Leakage type: L

Communication type: T

Isolation type: G

Control supply voltage code: M-230V, Q-400V

Auxiliary contacts set code: 06-3NO 2NC+1 fault release+1 fault alarm

Rated operational current Ie(A): 1, 3, 6, 12, 16, 25, 32, 45, 63, 80, 100, 125

Load type code: M-motor protection, L- distribution protection

Breaking capacity code: C-15kA, Y-35kA

Frame size (A): 45, 125

Serial number

Control & Protective Switching Device (CPS)

Enterprise code

5. Technical parameter

Table 1 Main circuit technical parameter

Type	NKB1-45	NKB1-125
Rated operational voltage Ue(V)	400,690/50Hz	
Rated insulation voltage Ui(V)	690	800
Rated impulse withstand voltage Uimp(kV)	4	6
Conventional free air thermal current Ith(A)	16	80
Rated operational current Ie(A)	1 3 6 12 16 25 32 45	63 80 100 125
Utilization categories	AC-43,AC-44	
Number of poles	3P	

Table 2 Setting current of the controller

Frame size	Rated operational current Ie (A)	Controller rated current Iet (A)	Overload setting current range Ir1 (A)	Controllable motor power Pe (kW) (400V)
45	1	1	0.4~1	0.12~0.3
	3	3	1.2~3	0.37~1.2
	6	6	2.4~6	1.0~2.7
	12	12	4.8~12	2.2~5.5
	16	16	6.4~16	3.0~7.5
	25	25	10~25	5.0~12
	32	32	12.8~32	6.5~15
	45	45	18~45	9.0~22
125	63	63	25~63	12~30
	80	80	32~80	15~37
	100	100	40~100	22~45
	125	125	50~125	27~55

Table 3 Operating conditions for controlling electromagnet

Rated control supply voltage	Conventional operation	Operation voltage range
M : AC230V	CPS reliable close	(85%~110%)Us
Q : AC400V	CPS open or trip	(20%~75%)Us

Table 4 Electrical life

Type		NKB1-45	NKB1-125
Electrical life (10 ⁴)	AC-43	120	100
	AC-44	3	2
Mechanical life (10 ⁴)		1000	500
Duties: Intermittent duty		300 Loading factor 40%	120 Loading factor 25%

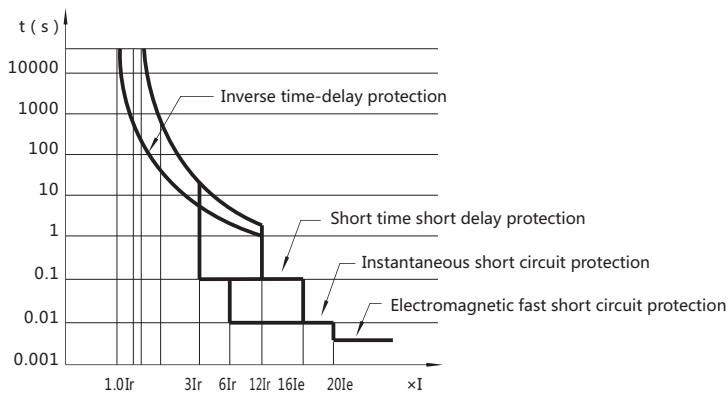


Figure 1 NKB1 time-current characteristics

6. Controller technical parameter

Function		Parameter setting	Delay setting	Factory defaults	Setting parameters	Fault status output	
						Basic type	Fire-fighting type
Overload protection		(0.4 ~ 1)Ie	Protection curve	F1	(0.4 ~ 1)Ie	Delay tripping	Delay alarm
Short circuit short time delay protection		(3 ~ 12)Ir+OFF	0.1 ~ 0.4s	8Ir/0.2s	(3 ~ 12)Ir+OFF	Delay tripping	Delay alarm
Instantaneous short circuit protection		(6 ~ 16)Ie	<50ms	14Ie	(8 ~ 16)Ie	Instantaneous tripping	Tripping + alarm
Phase unbalance (phase failure, phase lose) protection		(20% ~ 80%)+OFF	1 ~ 40s	30%/10s	(20% ~ 80%)+OFF	Delay tripping	Delay alarm (tripping)
Under-current protection		(0 ~ 0.8)Ir+OFF	1 ~ 60s	OFF	(0 ~ 0.8)Ir+OFF	Delay tripping	Delay alarm (tripping)
Under-voltage protection	Us230V	(154V ~ 198V)+OFF	1 ~ 30s	176V/10s	(154V ~ 198V)+OFF	Delay tripping	Delay alarm (tripping)
	Us400V	(266V ~ 342V)+OFF	1 ~ 30s	304V/10s	(266V ~ 342V)+OFF		
Over-voltage protection	Us230V	(230V ~ 286V)+OFF	1 ~ 30s	264V/10s	(230V ~ 286V)+OFF	Delay tripping	Delay alarm
	Us400V	(400V ~ 494V)+OFF	1 ~ 30s	456V/10s	(400V ~ 494V)+OFF		
Start delay protection		(0 ~ 99s)+OFF	0 ~ 99s	3s	(0 ~ 99s)+OFF	During the start delay, shield certain protection function, e.g. instantaneous short circuit tripping.	
Locked rotor protection		(5 ~ 9)Ir+OFF	0 ~ 50s	OFF	Hidden menu	Delay tripping	Delay alarm (tripping)
Residual current protection		(30 ~ 500mA)+OFF	0.1 ~ 1s	100mA	(30 ~ 500mA)+OFF	Tripping	Alarm

Notes: Communication and leakage protection are optional function; communication type product adopts RS485, RJ45 interface, Modbus protocol.

Overload protection setting curve (1.5 I_r operation times): F0 (overload protection close), F1(51), F2(98), F3(144), F4(200)

The power signal of under/over voltage protection of the controller is taken from the control terminal Us(A1--A2).

6.1 Controller menu

Controller menu grading: open setup menu, hide setup menu, calibration menu;

Open the setup menu: the user can set functional parameters as required;

One key recovery operation: perform a one key recovery operation when parameter setting problem occurs, and the controller will restore the factory settings (factory defaults);

Self-setting operation: when the load operation is stable, perform this self-setting operation, the controller will set the setting current according to the circuit parameters automatically.

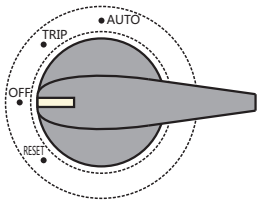
6.2 Controller display

When NKB1 is connected to the working power supply, the LED displays the voltage value, and this can be used as a voltmeter, with the last three figures display the voltage value;

NBK1 can be used as an ammeter at runtime, and circularly displays three phase alternating current running condition;

Troubleshooting: no-load runs NKB1, and press "data" key to view the last fault type.

7. Operating instruction (handle)



Connect AUTO: (automatic control position) the CPS controls the connection of the electromagnet coil, and realizes remote automatic control by making & breaking the control power supply.

Trip: when there's fault tripping, the mechanism of the switch trips, the main contacts open, and the electromagnet coil circuit is disconnected.

OFF: manual operation, the electromagnet coil circuit is disconnected, the main contacts of the switch remains in the open position.

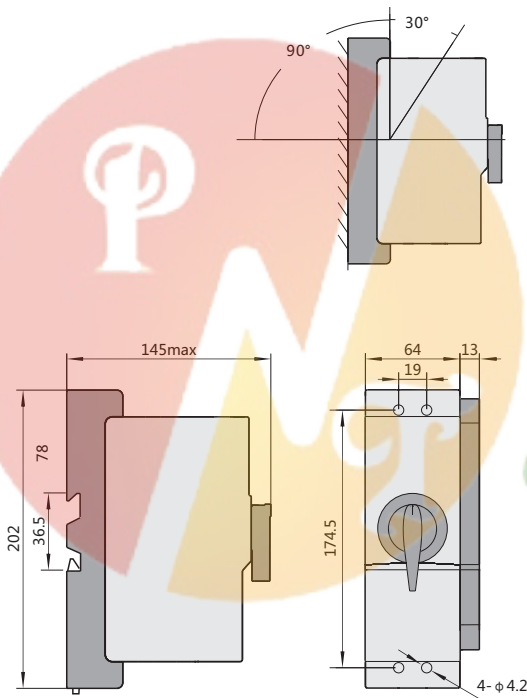
RESET: turn the operation knob, to reset and switch on the tripped switch mechanism.

Isolation status: When the switch is in the OFF position, pull out the isolation strip and lock it, the switch will be on the disconnected isolation status, and the handle is not operational.

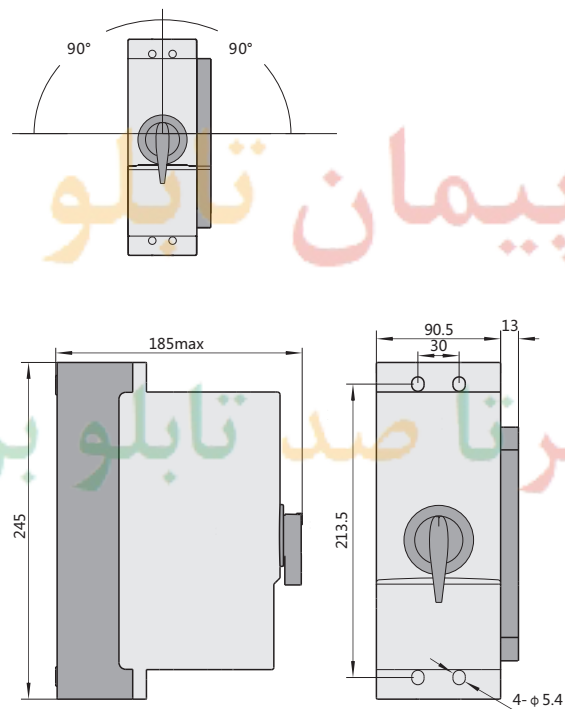
Notes: The isolation type CPS has isolation handle and isolation strip.

8. Installation

NKB1 Installation dimensions



NKB1-45 Control & protective switching device

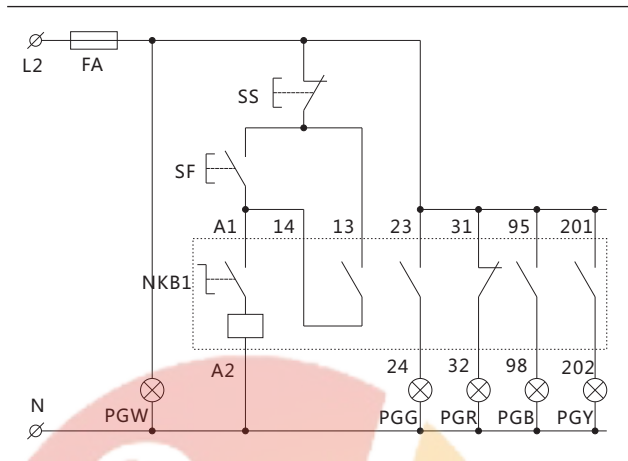


NKB1-125 Control & protective switching device

9. Basic electric control chart

9.1 Manual panel + local control

Secondary power supply protection	Power supply protection	Power supply signal	Local manual control		Auxiliary signal			Fault signal	
			Start	Stop	Self-lock	Run	Stop	Stop	Alarm



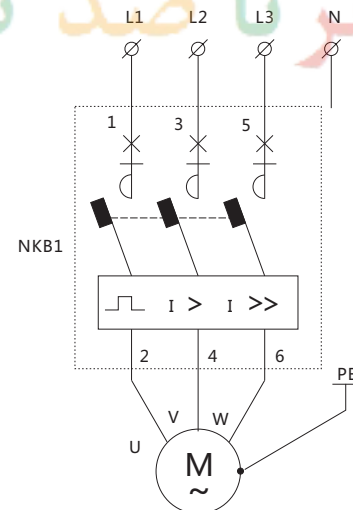
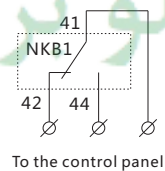
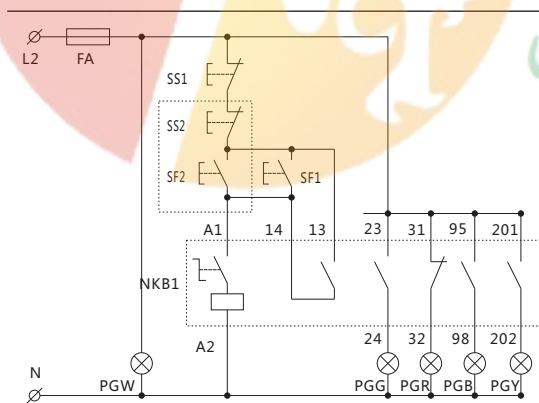
NKB1 Auxiliary contacts instruction (06 auxiliary)

Auxiliaries	NO	NC	NC	NO	NC	a	b
	13 14	23 24	31 32	41 44	41 42	95 98	201 202
AC-15 Ie:5A Ue:400V				AC-15 Ie:3A Ue:230V			

Notes: auxiliary a(95/98): fault tripping signal port;
Auxiliary b (201/202): fire-fighting type fault alarm signal port.

9.2 Manual panel + local control+ remote control

Secondary power supply protection	Power supply protection	Power supply signal	Local & remote manual control	Auxiliary signal			Fault signal		External signal		Signal
				Self-lock	Run	Stop	Stop	Alarm	Stop	Run	Power supply



Notes: This diagram is applicable to all kinds of motor when single equipment is in normal operation and adopts simultaneous local and remote control.

10. Attention

- 10.1 Before installing the CPS, make sure that the operation knob can work normally and is on the OFF position; "AUTO" indicates the connection status of the main circuit;; "TRIP" indicates the free tripping position that caused by circuit fault, and the circuit fault must be removed by the responsible person before one operates the switch; "OFF" indicates the main circuit open position; the free tripped switch can only be reset and switched on by turning the operation knob to "RESET" .
- 10.2 Before installing the switch, make sure that the power supply of the coil and auxiliaries comply with the product instruction as well as with the actual control circuit.
- 10.3 Energizing (85% ~ 110%)Us to the coil, the electromagnet closes reliably when the knob is on "AUTO" position, and the electromagnet releases reliably when the knob is on "OFF" position. The current setting has been set up before leaving the factory, and users can adjust it according to actual needs.
- 10.4 NKB1 can continue to run after breaking short circuit current, but it need checking and confirmation of its operation status before continue operation.
- 10.5 In high power motor controlling application (above 11kW), when choosing the starting mode, the user shall take starting torque, current multiple, voltage drop, circuit capacity into consideration. According to general requirements, to start normally with proper load and satisfy the reliable operation of NKB1 electromagnet, the voltage reduction limit shall not exceed 80% of the rated value, and the starting current multiple shall not exceed(4~5) times.
- 10.6 The exposed part of the external connecting wire of the incoming and outgoing terminal of the switch shall be wrapped with insulator.
- 10.7 In the process of transportation and storage, the products shall be protected from rain and snow. The storage environment shall meet the following conditions: daily average temperature shall be +25°C, relative humidity shall be less than 90%, the environment temperature shall be no higher than +40°C and no less than -5°C.

11. Ordering instructions

During product selection, the user shall specify the following contents, if necessary, application conditions or requirements shall be further specified:

Product name & type;

Rated current of the switch, intelligent controller type & rated current;

Control power supply voltage of the electromagnet coil;

Additional functions required.

پیمان تابلو
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