

## 7 Structural Features

### 7.1 Basic Inspections and Technical Requirements for Installation

#### 7.1.1 Inspections before installation:

- a. Check your order to see whether it is consistent with the parameters on the nameplate of the circuit breaker, check for the following items:
  - (1) Rated current, setting current; (2) Main circuit voltage; (3) Installation method, operation method; (4) intelligent controller voltage, shunt release voltage, undervoltage release voltage and delay time, making electromagnet voltage, energy storage motor voltage; (5) Other special order requirements;
- b. Check the contents according to the configuration described in this instruction;
- c. Before installing, operating, maintaining and repairing the product, read this instruction carefully to avoid manual damage to the circuit breaker and any unnecessary problems;

#### 7.1.2 Preparation before installation:

- a. Unpack according to the order described on the top of the package, do not use brutal force;
- b. Remove the circuit breaker from the base plate of the package, if the circuit breaker is withdrawable type, remove the circuit breaker body out of the drawer seat according to 7.6.1.2 and clean up the drawer seat;

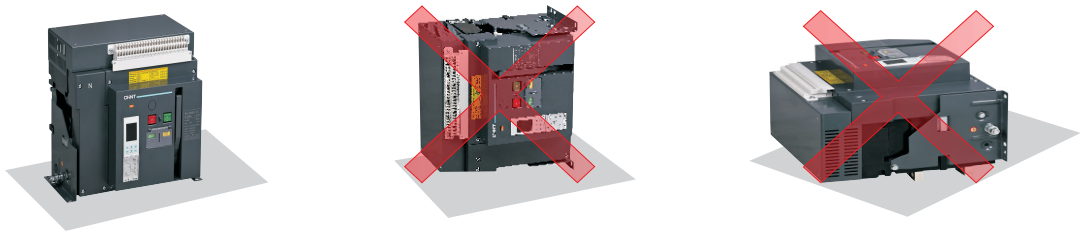


Figure 20.Placement of circuit breaker

- c. Use 500V megameter to test the insulation resistance of the circuit breaker. The insulation resistance shall not be lower than 20 MΩ under ambient temperature of 25°C±5°C and relative humidity of 50-70%, otherwise dry the circuit breaker.

#### 7.1.3 Busbar recommendations

Table 9 Busbar recommendations

Inm(A)	NA1-1000X					NA1-2000X					NA1-3200X		NA1-4000X/3	NA1-6300X					
In(A)	200	400	630	800	1000	630	800	1000	1250	1600	2000	2000	2500	3200	4000/3P	4000	5000	6300	
Busbar	Thickness (mm)	5	5	5	6	8	5	6	8	10	12	10	8	10	10	10	10	10	
	Width (mm)	30	30	40	50	50	60	60	60	60	60	60	100	100	100	120	100	100	100
	Number	1	2	2	2	2	2	2	2	2	3	2	2	2	4	4	5	7	8

- Note:**
- a. The busbar specifications in the table above are applicable to open-type installed circuit breakers under ambient temperature of 40°C and comply with the conventional thermal conditions specified in IEC/EN 60947-2.
  - b. If the busbar selected by user does not match with the terminals of circuit breaker, an extended busbar is needed for transfer. The extended busbar should be provided by user itself, with cross section area not smaller than the requirement in the table above. The clearance of extended busbar should not be smaller than that of circuit breaker terminals.
  - c. After installing the busbar according to the table above, make sure the electric clearance between the poles is not less than 18mm
  - d. If silicon controlled electrical elements (such as high frequency induction heating furnace (medium frequency furnace for steelmaking), solid state high frequency welder (such as submerged arc welder), vacuum heating melting equipment (such as single crystal silicon growth furnace)) are used for three phase rectification and high frequency inversion in loading equipment, user should consider the impact of ambient temperature and altitude as well as higher harmonic generated by silicon controlled electrical elements when selecting circuit breaker. In such cases, the circuit breaker must be derated, the recommend derating factor is 0.5-0.8.
  - e. After the circuit breaker is installed, the safety clearance between live parts of different potentials and the safety clearance between live parts and ground should not be smaller than 18mm.

## 7.2 Installation of withdrawable circuit breaker

7.2.1 Install the drawer seat of NA1-1000X on the mounting plate in the cabinet. Use four M8 bolts (with gasket) to secure the drawer seat, with installation torque of  $(10.3\sim 14.4)\text{N}\cdot\text{m}$ ; install the drawer seat of NA1-2000X~6300X on the mounting plate in the cabinet; use four M10 bolts (with gasket) to secure the drawer seat, with installation torque of  $(20\sim 28)\text{N}\cdot\text{m}$ , see Figure 21 (You can use special bracket to install the withdrawable circuit breaker vertically).



Mounted on vertical bracket

**Figure 21. Installation of drawer type circuit breaker**

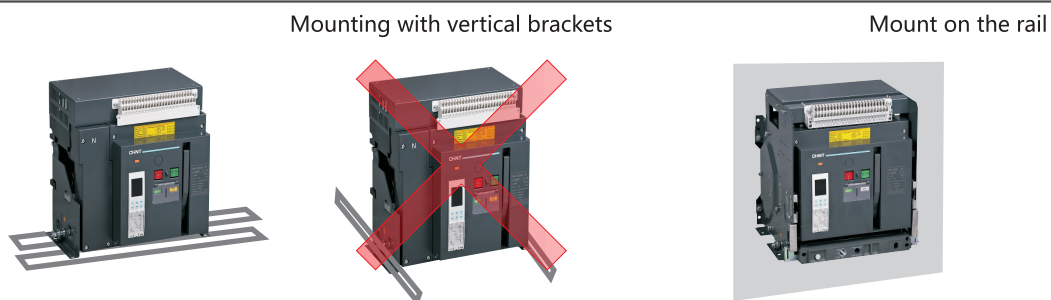
7.2.2 For NA1-1000X type circuit breaker, put the body directly on the rail of drawer seat and push the body into the drawer seat until it meets resistance; for NA1-2000X~6300X type, pull out the rail and put the body on the rail as shown in the figure. Remember to put the two bracket holder into the slots of the rail, then push the body into the drawer seat until it meets resistance.

7.2.3 Draw out the handle and insert the hexagon head fully into the handle hole of the drawer seat. Rotate the handle clockwise until the position indicator switches to "Connect" position. For NA1-1000X type, the secondary circuit is fully engaged without any clearance; for NA1-2000X~6300X type, stop rotating the handle when you hear a click, then pull out the handle and put it back.

- Note:**
1. Before putting the body into the drawer seat, check if the rated current of the body is consistent with that of the drawer seat, otherwise the product might be damaged.
  2. When rotating from "Test" position to "Connect" position, you must break the circuit breaker first to avoid any possible accident.

## 7.3 Installation of fixed type circuit breaker

Put the circuit breaker (fixed type) on the mounting bracket, secure the circuit breaker and connect the main circuit busbar directly with the busbar of the fixed type circuit breaker.



**Figure 22. Installation of fixed type circuit breaker**

**Note:** It is very important to distribute the weight of the circuit breaker evenly on the rigid mounting surface (for example, mounting on rail or baseplate). The mount surface should be level (tolerance: 2mm) to avoid deformation that may impact the normal operation of the circuit breaker.

## 7.4 Connection of main circuit

7.4.1 Incoming power line



Figure 23. Incoming line options from top and bottom

7.4.2 Partitions

Leave sufficient space for good ventilation. The partitions for top and bottom connectors of circuit breaker must be made of non-magnetic material. For circuit breakers with current of 2500A and above, avoid magnet loop when there is conductor passing through the metal partition.

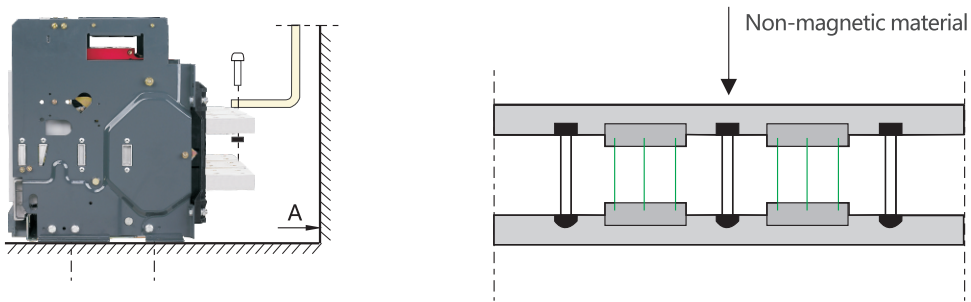


Figure 24. Metal support or partition is made of non-magnetic material

7.4.3 Busbar connection

Before inserting bolt B into the busbar, adjust and locate the support busbar properly. The support busbar should be fixed to the frame of the cabinet so that the circuit breaker terminal is free from weight C (the support bar should be installed near the terminal)

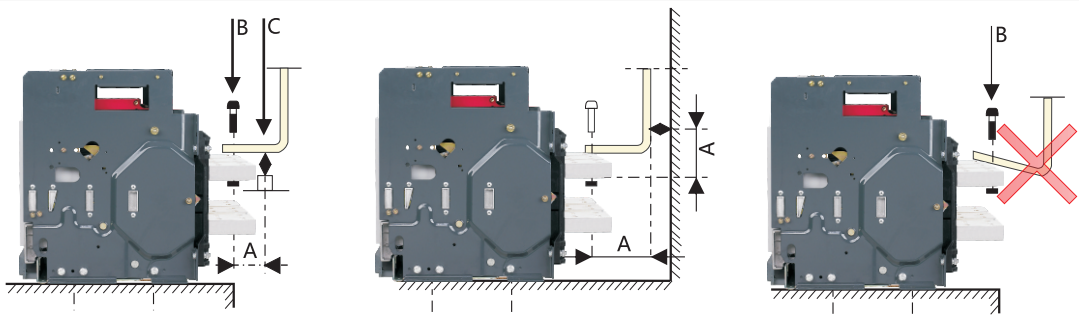


Figure 25. Circuit breaker busbar connection

Dynamically stable: The distance between the first support bar and the circuit breaker connecting point should not exceed the specified maximum distance (see Table 11). To avoid interphase short circuit, such distance should always meet the requirement of being dynamically stable.

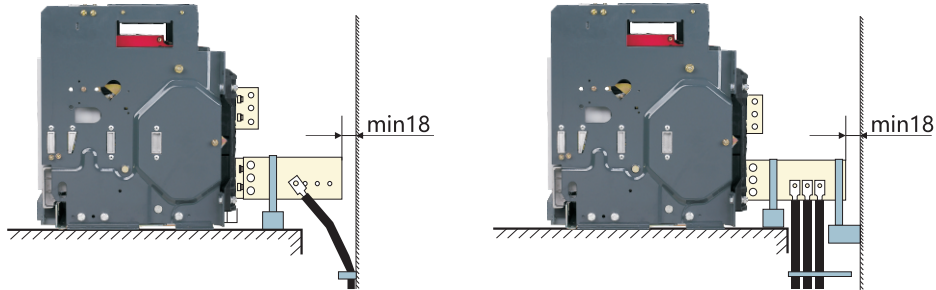
**Table 10 Maximum distance between support bar and circuit breaker connecting point**

I <sub>cs</sub> (kA)	≤30	40	50	75	80	100
Distance A(mm)	350	320	300	200	150	150

7.4.4 Cable connection

When using cable connection, user should make sure that the circuit breaker terminal does not bear too much mechanical force. User can extend the connecting terminal of the circuit breaker by using power connection busbar. Single core cable and multi-core cable are both available. Follow the steps below when connecting with busbar:

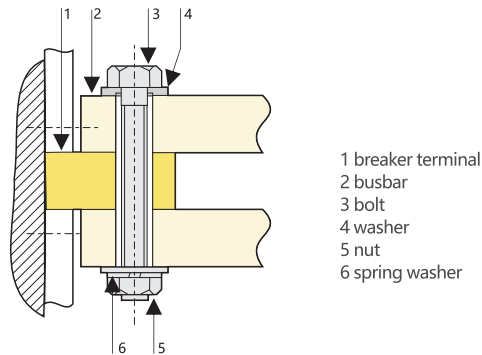
- (1) Locate the terminal lug before inserting the bolt
- (2) Fix the cable on the cabinet frame securely



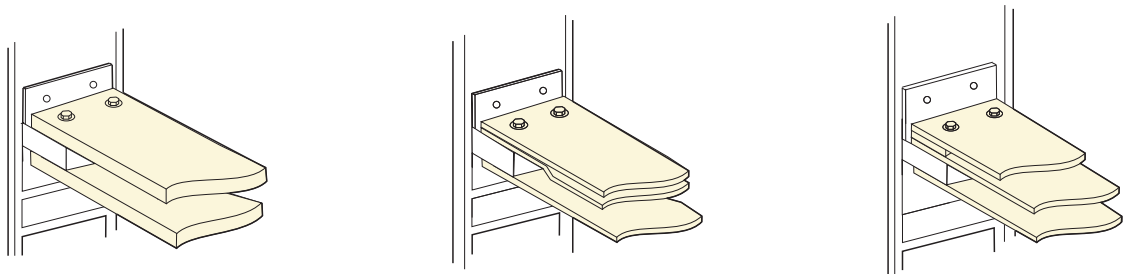
**Figure 26. Circuit breaker cable connection**

7.4.5 Clamping

The busbar must be fixed with proper torque by using bolts and nuts. Neither too big nor too small torque is allowed. Too big torque may cause bolts to slip which makes it difficult to tighten the bolts; too small torque may lead to poor fastening and may cause excessive temperature rise. Please refer to the Table 12 for tightening torque of circuit breaker connections: These data are applicable to copper busbar and steel bolts and nuts, with grade≥8.8. The same torque can be applied to aluminum busbar.



**Figure 27. Busbar clamping diagram**

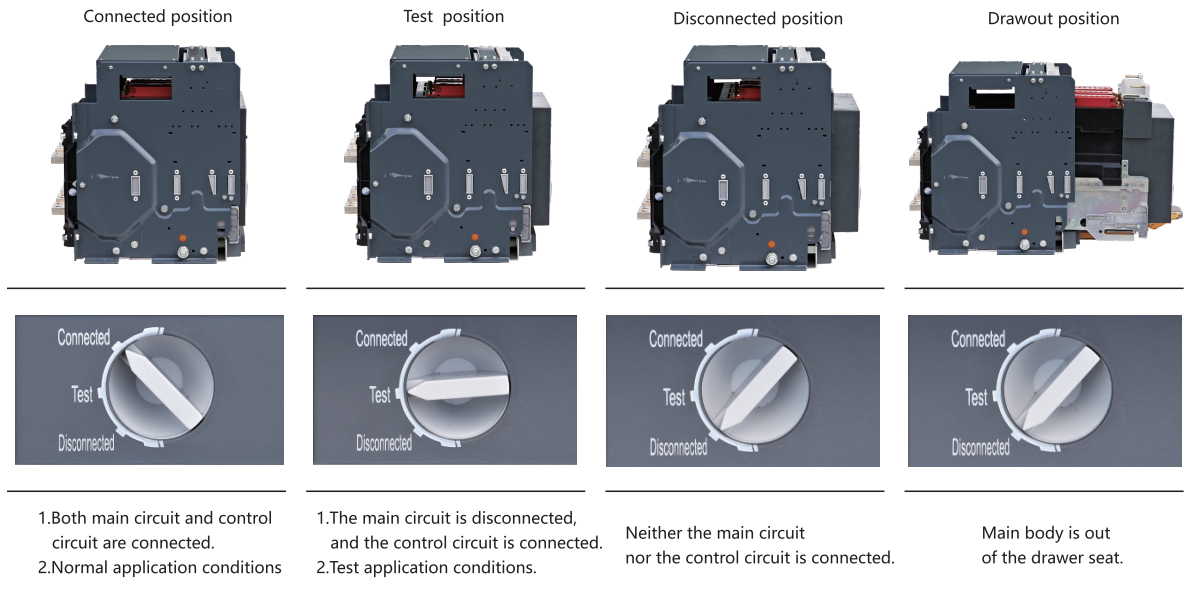


**Figure 28. Recommended installation method**



**Table 11 Tightening torque**

Bolt type	Application	Torque (N·m)
M3	Secure secondary connection terminal	0.4~0.5
M10	Secure busbar	36~52
M12	Secure busbar	61~94



**Figure 29.Three position for drawer type**

7.4.6 Wiring the secondary circuit according to electric principle diagram.

Note: Bolts, nuts, gaskets shouldn't be left inside the drawer seat to avoid being blocked.

7.4.7 Operation

Check the rated voltage of the following components whether conforms to the power voltage .Such as under voltage release, shunt release, closing electromagnet, motor-driven mechanism and intelligent controller.

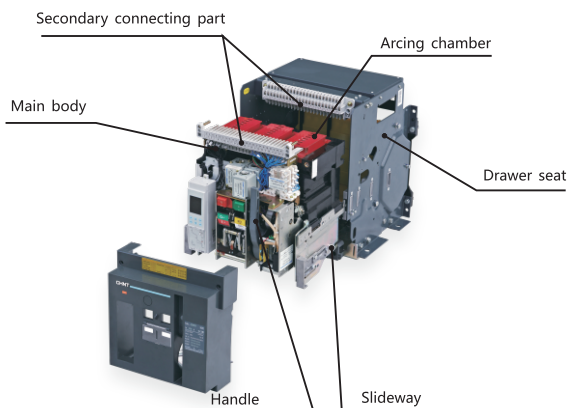
7.4.8 Maintenance

Check the technical parameters in time or add some lubricating oil, etc. This breaker structure is arranged vertically and modularized composition with each functioncell separated, which make the maintenance easy.

It has compact structure, reliable operation and strong free maintenance capability. Please check the technical parameters on the nameplate in accordance with the requirements of order before installation. See figure 30.

7.4.9 Manual energy-storage

Making the secondary circuit power, the motor-driven mechanism can store energy automatically until hearing the click and energy stored indicating on the panel. Otherwise press the storage handle for 6~7 times until hearing the click and the indicator display energy stored and the closing operation can be realized either by closing electromagnet or manual button. See figure 31.



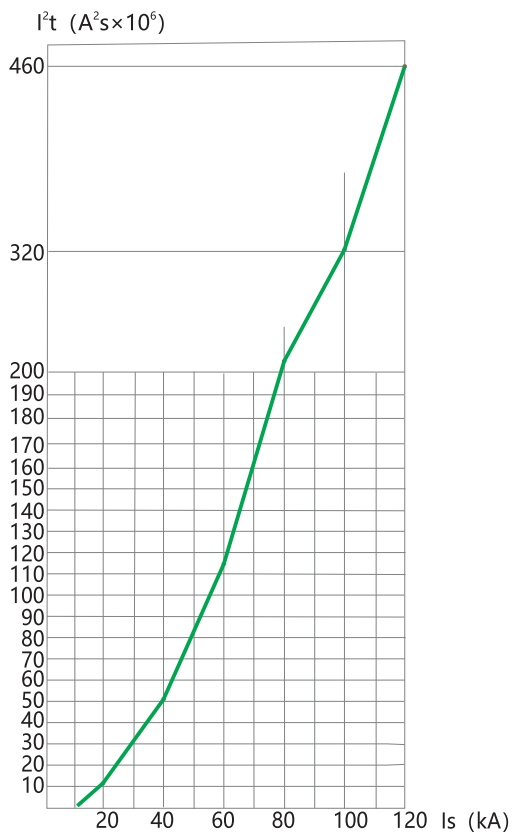
**Figure 30. breaker structure**



Shake with the manual energy-storage handle up and down about six times to "click".

**Figure 31. Manual energy-storage**

7.4.10  $A^2 S$  curve



Is: prospective symmetrical current (of an a.c. circuit)

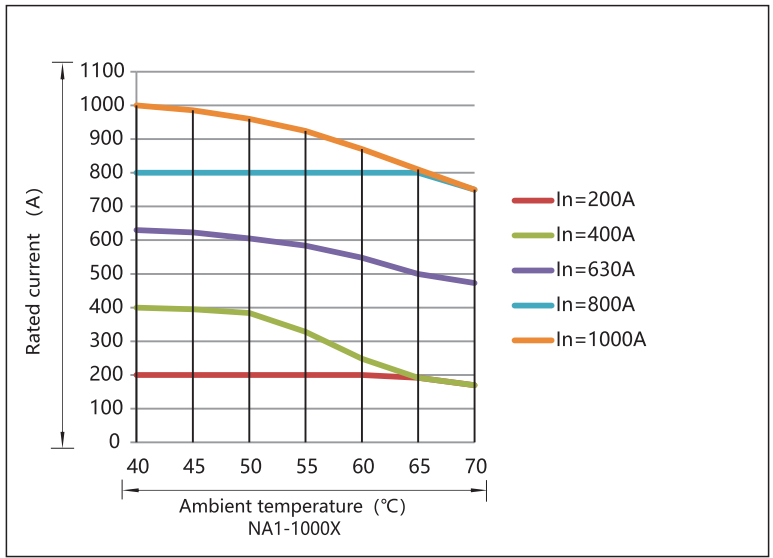
**Figure 32. A²S curve**

7.4.11 Temperature derating

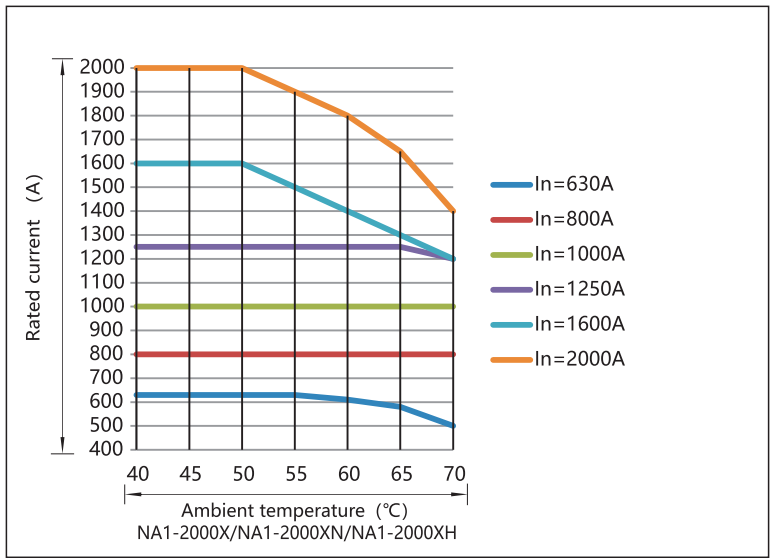
Table 12 Temperature derating

Standard	Ambient temperature	NA1-1000X					NA1-2000X/NA1-2000XN/NA1-2000XH						NA1-3200X/NA1-3200XN/NA1-4000X				NA1-6300X/NA1-6300XN		
		200	400	630	800	1000	630	800	1000	1250	1600	2000	2000	2500	3200	4000	4000	5000	6300
IEC/EN60947-2	40°C	200	400	630	800	1000	630	800	1000	1250	1600	2000	2000	2500	3200	4000	4000	5000	6300
	45°C	200	395	623	800	985	630	800	1000	1250	1600	2000	2000	2500	3200	3800	4000	5000	6000
	50°C	200	384	605	800	960	630	800	1000	1250	1600	2000	2000	2500	3200	3600	4000	5000	5600
	55°C	200	328	584	800	924	630	800	1000	1250	1500	1900	2000	2300	3000	3400	4000	4800	5400
	60°C	200	248	548	800	870	610	800	1000	1250	1300	1800	2000	2200	2800	3200	4000	4800	5200
	65°C	192	192	500	800	810	610	800	1000	1250	1300	1650	2000	2200	2600	3000	4000	4600	5100
	70°C	170	170	473	750	750	473	800	1000	1200	1200	1400	2000	2000	2200	2520	4000	4000	4200

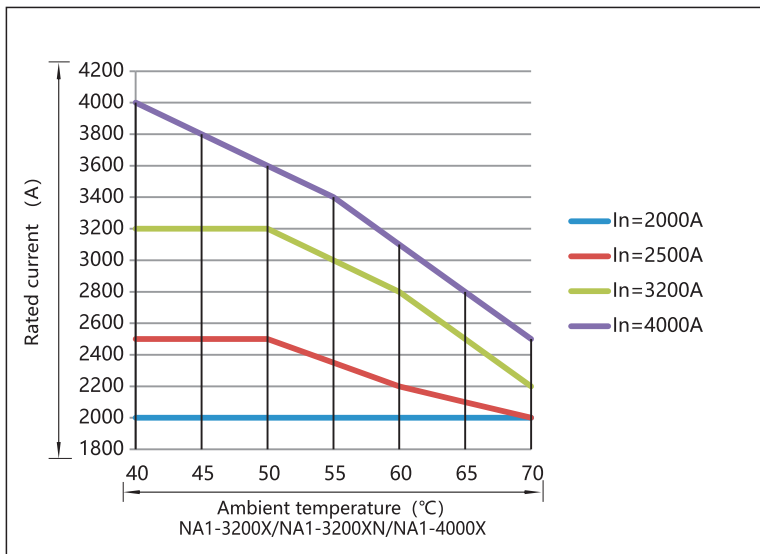
Note: The ACB is to calibrated at 40°C, special application please refer to the table above and the curve below.



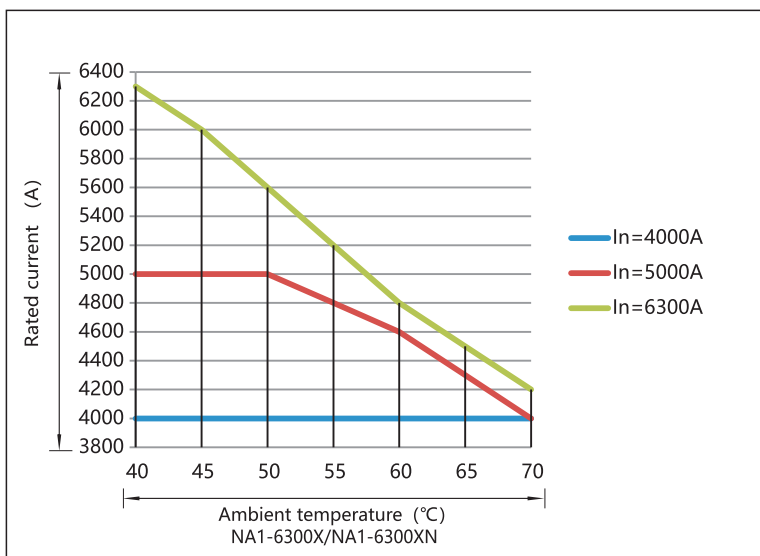
33-a



33-b



33-c



33-d

Figure 33. Temperature compensation correction

7.4.12 Coordination recommendations

**Table 13 Coordination recommendations**

Capacity of transformer (kVA) & parallelly connected number	Rated current of transformer In(A)	Short circuit current of main circuit (kA)	Breaking capacity of air circuit breaker for main circuit (kA)
1×250	360	9	9
2×250	360	9	9
3×250	360	9	18.5
1×315	455	11.4	11.4
2×315	455	11.4	11.4
3×315	455	11.4	22.7
1×400	578	14.4	14.4
2×400	578	14.4	14.4
3×400	578	14.4	28.8
1×500	722	18	18
2×500	722	18	18
3×500	722	18	36.1
1×630	910	22.7	22.7
2×630	910	22.7	22.7
3×630	910	22.7	44.5
1×800	1154	19.3	19.3
2×800	1154	19.3	19.3
3×800	1154	19.3	38.5
1×1000	1444	24	24
2×1000	1444	24	24
3×1000	1444	24	48.1
1×1250	1805	30	30
2×1250	1805	30	30
3×1250	1805	30	60.1
1×1600	2310	36.5	36.5
2×1600	2310	36.5	36.5
3×1600	2310	36.5	73
1×2000	2887	48.2	48.2
2×2000	2887	48.2	48.2
3×2000	2887	48.2	96.3
1×2500	3608	60	60
2×2500	3608	60	60
1×3150	4550	75.8	75.8
2×3150	4550	75.8	75.8

Continued table 13

Type of air circuit breaker for main circuit	Number and area of the busbar for main circuit (n×W×T)	Breaking capacity of air circuit breaker for branch circuit (kA)	Air circuit breaker for branch circuit
NA1-1000X-400		9	
NA1-1000X-400	2×(5×30)	18.5	NA1, NM8
NA1-1000X-400		27.5	
NA1-1000X-630		11.4	
NA1-1000X-630	2×(5×40)	22.7	NA1, NM8
NA1-1000X-630		34.1	
NA1-1000X-630		14.4	
NA1-1000X-630	2×(5×40)	28.8	NA1, NM8
NA1-1000X-630		43.2	
NA1-1000X-800		18	
NA1-1000X-800	2×(6×50)	36.1	NA1, NM8
NA1-1000X-800		54.1	
NA1-1000X-1000		22.7	
NA1-1000X-1000	2×(8×50)	44.5	NA1, NM8
NA1-2000X-1000		67.2	
NA1-2000X-1250		19.3	
NA1-2000X-1250	2×(10×60)	38.5	NA1, NM8
NA1-2000X-1250		57.8	
NA1-2000X-1600		24	
NA1-2000X-1600	2×(12×60)	48.1	NA1, NM8
NA1-2000X-1600		72.1	
NA1-2000X-2000		30	
NA1-2000X-2000	3×(10×60)	60.1	NA1, NM8
NA1-2000X-2000		90.1	
NA1-3200X-2500		36.5	
NA1-3200X-2500	2×(10×100)	73	NA1, NM8
NA1-3200X-2500		109.5	
NA1-3200X-3200		48.2	
NA1-3200X-3200	4×(10×100)	96.3	NA1, NM8
NA1-3200X-3200		144.5	
NA1-6300X-4000		60	
NA1-6300X-4000	4×(10×120)	120	NA1, NM8
NA1-6300X-5000		75.8	
NA1-6300X-5000	7×(10×100)	151.6	NA1, NM8



7.4.13 Selectivity protection

7.4.13.1 Selective protection between NM8 and NA1

			Circuit breaker	NA1-2000X/NA1-2000XN/NA1-2000XH			
Downstream		Upstream	Rated current (A)	630	800	1000	1250
			Default setting ratings of short time-delay 8In (kA)	5.04	6.4	8	10
			Setting range (kA)	0.63~9.45	0.8~12	1~15	1.25~18.75
			Delayed tripping time (s)	0.1, 0.2, 0.3, 0.4			
			Returnable time	0.06, 0.14, 0.23, 0.35			
Frame size rated current	Rated current (A)	Instantaneous setting ratings (kA)					
NM8-125 NM8S-125	16	0.16 0.19(motor)		0.63~9.45 0.63~9.45	0.8~12 0.8~12	1~15 1~15	1.25~18.75 1.25~18.75
	20	0.2 0.24(motor)		0.63~9.45 0.63~9.45	0.8~12 0.8~12	1~15 1~15	1.25~18.75 1.25~18.75
	25	0.25 0.30(motor)		0.63~9.45 0.63~9.45	0.8~12 0.8~12	1~15 1~15	1.25~18.75 1.25~18.75
	32	0.32 0.38(motor)		0.63~9.45 0.63~9.45	0.8~12 0.8~12	1~15 1~15	1.25~18.75 1.25~18.75
	40	0.40 0.48(motor)		0.63~9.45 0.6624~9.45	0.8~12 0.8~12	1~15 1~15	1.25~18.75 1.25~18.75
	50	0.50 0.60(motor)		0.69~9.45 0.828~9.45	0.8~12 0.828~12	1~15 1~15	1.25~18.75 1.25~18.75
	63	0.63 0.75(motor)		0.8694~9.45 1.035~9.45	0.8694~12 1.035~12	1~15 1.035~15	1.25~18.75 1.25~18.75
	80	0.80 0.96(motor)		1.104~9.45 1.325~9.45	1.104~12 1.325~12	1.104~15 1.325~15	1.25~18.75 1.325~18.75
	100	1.0 1.20(motor)		1.38~9.45 1.656~9.45	1.38~12 1.656~12	1.38~15 1.656~15	1.38~18.75 1.656~18.75
	125	1.25 1.5(motor)		1.725~9.45 2.07~9.45	1.725~12 2.07~12	1.725~15 2.07~15	1.725~18.75 2.07~18.75
NM8-250 NM8S-250	100	1.0 1.2(motor)		1.38~9.45 1.656~9.45	1.38~12 1.656~12	1.38~15 1.656~15	1.38~18.75 1.656~18.75
	160	1.6 1.92(motor)		2.208~9.45 2.65~9.45	2.208~12 2.65~12	2.208~15 2.65~15	2.208~18.75 2.65~18.75
	200	2.0 2.4(motor)		2.76~9.45 3.312~9.45	2.76~12 3.312~12	2.76~15 3.312~15	2.76~18.75 3.312~18.75
	250	2.5 3.0(motor)		3.45~9.45 4.14~9.45	3.45~12 4.14~12	3.45~15 4.14~15	3.45~18.75 4.14~18.75

		NA1-3200X/NA1-3200XN			NA1-4000X	NA1-6300X/NA1-6300XN		
1600	2000	2000	2500	3200	4000	4000	5000	6300
12.8	16	16	20	25.6	32	32	40	50.4
1.6~24	2~30	2~30	2.5~37.7	3.2~48	4~60	4~60	5~75	6.3~94.5
0.1, 0.2, 0.3, 0.4								
0.06, 0.14, 0.23, 0.35								
1.6~24	2~30	2~30	2.5~37.7	3.2~48	4~60	4~60	5~75	6.3~94.5
1.6~24	2~30	2~30	2.5~37.7	3.2~48	4~60	4~60	5~75	6.3~94.5
1.6~24	2~30	2~30	2.5~37.7	3.2~48	4~60	4~60	5~75	6.3~94.5
1.6~24	2~30	2~30	2.5~37.7	3.2~48	4~60	4~60	5~75	6.3~94.5
1.6~24	2~30	2~30	2.5~37.7	3.2~48	4~60	4~60	5~75	6.3~94.5
1.6~24	2~30	2~30	2.5~37.7	3.2~48	4~60	4~60	5~75	6.3~94.5
1.6~24	2~30	2~30	2.5~37.7	3.2~48	4~60	4~60	5~75	6.3~94.5
1.6~24	2~30	2~30	2.5~37.7	3.2~48	4~60	4~60	5~75	6.3~94.5
1.6~24	2~30	2~30	2.5~37.7	3.2~48	4~60	4~60	5~75	6.3~94.5
1.6~24	2~30	2~30	2.5~37.7	3.2~48	4~60	4~60	5~75	6.3~94.5
1.6~24	2~30	2~30	2.5~37.7	3.2~48	4~60	4~60	5~75	6.3~94.5
1.6~24	2~30	2~30	2.5~37.7	3.2~48	4~60	4~60	5~75	6.3~94.5
1.6~24	2~30	2~30	2.5~37.7	3.2~48	4~60	4~60	5~75	6.3~94.5
1.6~24	2~30	2~30	2.5~37.7	3.2~48	4~60	4~60	5~75	6.3~94.5
1.656~24	2~30	2~30	2.5~37.7	3.2~48	4~60	4~60	5~75	6.3~94.5
1.725~24	1.725~30	1.725~30	1.725~37.7	1.725~48	1.725~60	1.725~60	1.725~75	1.725~94.5
2.07~24	2.07~30	2.07~30	2.07~37.7	2.07~48	2.07~60	2.07~60	2.07~75	2.07~94.5
1.6~24	2~30	2~30	2.5~37.7	3.2~48	4~60	4~60	5~75	6.3~94.5
1.656~24	2~30	2~30	2.5~37.7	3.2~48	4~60	4~60	5~75	6.3~94.5
2.208~24	2.208~30	2.208~30	2.5~37.7	3.2~48	4~60	4~60	5~75	6.3~94.5
2.65~24	2.65~30	2.65~30	2.65~37.7	3.2~48	4~60	4~60	5~75	6.3~94.5
2.76~24	2.76~30	2.76~30	2.76~37.7	3.2~48	4~60	4~60	5~75	6.3~94.5
3.312~24	3.312~30	3.312~30	3.312~37.7	3.312~48	4~60	4~60	5~75	6.3~94.5
3.45~24	3.45~30	3.45~30	3.45~37.7	3.45~48	4~60	4~60	5~75	6.3~94.5
4.14~24	4.14~30	4.14~30	4.14~37.7	4.14~48	4.14~60	4.14~60	5~75	6.3~94.5

			Circuit breaker	NA1-2000X/NA1-2000XN/NA1-2000XH				
Downstream		Upstream	Rated current (A)	630	800	1000	1250	
			Default setting ratings of short time-delay $8I_n$ (kA)	5.04	6.4	8	10	
			Setting range (kA)	0.63~9.45	0.8~12	1~15	1.25~18.75	
			Delayed tripping time (s)	0.1, 0.2, 0.3, 0.4				
			Returnable time	0.06, 0.14, 0.23, 0.35				
Frame size rated current	Rated current (A)	Instantaneous setting ratings (kA)						
NM8-630 NM8S-630	250	2.5 3.0(motor)			3.45~9.45 4.14~9.45	3.45~12 4.14~12	3.45~15 4.14~15	3.45~18.75 4.14~18.75
	315	3.15 3.78(motor)			4.347~9.45 5.216~9.45	4.347~12 5.216~12	4.347~15 5.216~15	4.347~18.75 5.216~18.75
	350	3.5 4.2(motor)			4.83~9.45 5.796~9.45	4.83~12 5.796~12	4.83~15 5.796~15	4.83~18.75 5.796~18.75
	400	4.0 4.8(motor)			5.52~9.45 6.624~9.45	5.52~12 6.624~12	5.52~15 6.624~15	5.52~18.75 6.624~18.75
	500	5.0 6.0(motor)			6.9~9.45 8.28~9.45	6.9~12 8.28~12	6.9~15 8.28~15	6.9~18.75 8.28~18.75
NM8S-630	630	6.3 7.56(motor)			8.694~9.45	8.694~12 10.44~12	8.694~15 10.44~15	8.694~18.75 10.44~18.75
	630	6.3 7.56(motor)			8.694~9.45	8.694~12 10.44~12	8.694~15 10.44~15	8.694~18.75 10.44~18.75
	700	7.0 8.4(motor)				9.66~12 11.59~12	9.66~15 11.59~15	9.66~18.75 11.59~18.75
NM8-1250 NM8S-1250	800	8.0 9.6(motor)				11.04~12	11.04~15 13.25~15	11.04~18.75 13.25~18.75
	1000	10 12(motor)					13.8~15	13.8~18.75 16.56~18.75
	1250	12.5 15.0(motor)						17.25~18.75

			NA1-3200X/NA1-3200XN			NA1-4000X	NA1-6300X/NA1-6300XN		
	1600	2000	2000	2500	3200	4000	4000	5000	6300
	12.8	16	16	20	25.6	32	32	40	50.4
	1.6~24	2~30	2~30	2.5~37.7	3.2~48	4~60	4~60	5~75	6.3~94.5
0.1, 0.2, 0.3, 0.4									
0.06, 0.14, 0.23, 0.35									
	3.45~24 4.14~24	3.45~30 4.14~30	3.45~30 4.14~30	3.45~37.7 4.14~37.7	3.45~48 4.14~48	4~60 4.14~60	4~60 4.14~60	5~75 5~75	6.3~94.5 6.3~94.5
	4.347~24 5.216~24	4.347~30 5.216~30	4.347~30 5.216~30	4.347~37.7 5.216~37.7	4.347~48 5.216~48	4.347~60 5.216~60	4.347~60 5.216~60	5~75 5.216~75	6.3~94.5 6.3~94.5
	4.83~24 5.796~24	4.83~30 5.796~30	4.83~30 5.796~30	4.83~37.7 5.796~37.7	4.83~48 5.796~48	4.83~60 5.796~60	4.83~60 5.796~60	5~75 5.796~75	6.3~94.5 6.3~94.5
	5.52~24 6.624~24	5.52~30 6.624~30	5.52~30 6.624~30	5.52~37.7 6.624~37.7	5.52~48 6.624~48	5.52~60 6.624~60	5.52~60 6.624~60	5.52~75 6.624~75	6.3~94.5 6.624~94.5
	6.9~24 8.28~24	6.9~30 8.28~30	6.9~30 8.28~30	6.9~37.7 8.28~37.7	6.9~48 8.28~48	6.9~60 8.28~60	6.9~60 8.28~60	6.9~75 8.28~75	6.9~94.5 8.28~94.5
	8.694~24 10.44~24	8.694~30 10.44~30	8.694~30 10.44~30	8.694~37.7 10.44~37.7	8.694~48 10.44~48	8.694~60 10.44~60	8.694~60 10.44~60	8.694~75 10.44~75	8.694~94.5 10.44~94.5
	8.694~24 10.44~24	8.694~30 10.44~30	8.694~30 10.44~30	8.694~37.7 10.44~37.7	8.694~48 10.44~48	8.694~60 10.44~60	8.694~60 10.44~60	8.694~75 10.44~75	8.694~94.5 10.44~94.5
	9.66~24 11.59~24	9.66~30 11.59~30	9.66~30 11.59~30	9.66~37.7 11.59~37.7	9.66~48 11.59~48	9.66~60 11.59~60	9.66~60 11.59~60	9.66~75 11.59~75	9.66~94.5 11.59~94.5
	11.04~24 13.25~24	11.04~30 13.25~30	11.04~30 13.25~30	11.04~37.7 13.25~37.7	11.04~48 13.25~48	11.04~60 13.25~60	11.04~60 13.25~60	11.04~75 13.25~75	11.04~94.5 13.25~94.5
	13.8~24 16.56~24	13.8~30 16.56~30	13.8~30 16.56~30	13.8~37.7 16.56~37.7	13.8~48 16.56~48	13.8~60 16.56~60	13.8~60 16.56~60	13.8~75 16.56~75	13.8~94.5 16.56~94.5
	17.25~24 20.7~24	17.25~30 20.7~30	17.25~30 20.7~30	17.25~37.7 20.7~37.7	17.25~48 20.7~48	17.25~60 20.7~60	17.25~60 20.7~60	17.25~75 20.7~75	17.25~94.5 20.7~94.5

7.4.13 .2 Selective protection in NA1

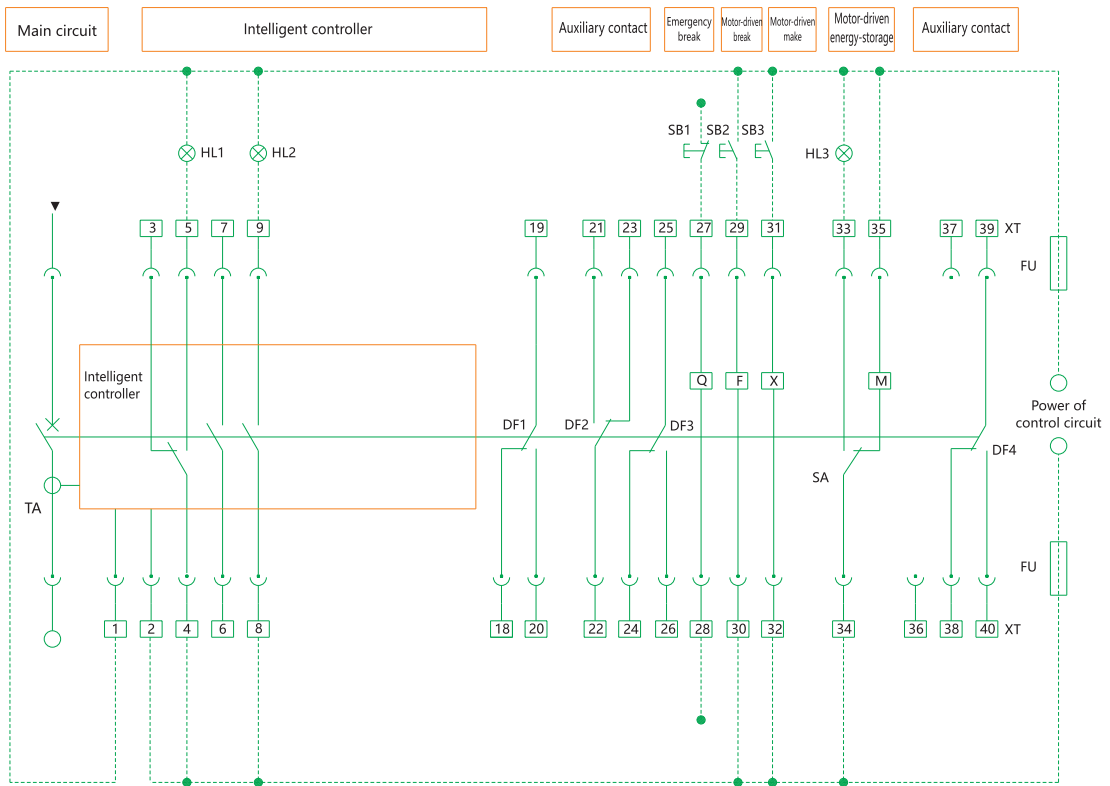
			Circuit breaker	NA1-2000X/NA1-2000XN/NA1-2000XH			
Downstream		Upstream	Rated current (A)	630	800	1000	1250
			Default setting ratings of short time-delay 8In (kA)	5.04	6.4	8	10
			Setting range (kA)	0.63~9.45	0.8~12	1~15	1.25~18.75
			Delayed tripping time (s)	0.1, 0.2, 0.3, 0.4			
			Returnable time	0.06, 0.14, 0.23, 0.35			
Frame size rated current	Rated current (A)	Default instantaneous setting ratings 12In (kA)					
NA1-2000X	400	4.8		6.348~9.45	6.348~12	6.348~15	6.348~18.75
	630	7.56			9.998~12	9.998~15	9.998~18.75
	800	9.6				12.696~15	12.696~18.75
	1000	12					15.87~18.75
	1250	15					
NA1-3200X	1600	19.2					
	2000	24					
	2000	24					
NA1-4000X	2500	30					
	3200	38.4					
NA1-4000X	3200	38.4					
	4000	48					
NA1-6300X	4000	48					
	5000	60					
	6300	75					

Note: It can satisfy the selective protection if only the short time-delay setting value of the superior breaker 1.32 times more than the subordinate breaker, when the instantaneous setting value is adjustable.

		NA1-3200X/NA1-3200XN			NA1-4000X	NA1-6300X/NA1-6300XN		
1600	2000	2000	2500	3200	4000	4000	5000	6300
12.8	16	16	20	25.6	32	32	40	50.4
1.6~24	2~30	2~30	2.5~37.7	3.2~48	4~60	4~60	5~75	6.3~94.5
0.1, 0.2, 0.3, 0.4								
0.06, 0.14, 0.23, 0.35								
6.348~24	6.348~30	6.348~30	6.348~37.7	6.348~48	6.348~60	6.348~60	6.348~75	6.348~94.5
9.998~24	9.998~30	9.998~30	9.998~37.7	9.998~48	9.998~60	9.998~60	9.998~75	9.998~94.5
12.696~24	12.696~30	12.696~30	12.696~37.7	12.696~48	12.696~60	12.696~60	12.696~75	12.696~94.5
15.87~24	15.87~30	15.87~30	15.87~37.7	15.87~48	15.87~60	15.87~60	15.87~75	15.87~94.5
19.837~24	19.837~30	19.837~30	19.837~37.7	19.837~48	19.837~60	19.837~60	19.837~75	19.837~94.5
	25.392~30	25.392~30	25.392~37.7	25.392~48	25.392~60	25.392~60	25.392~75	25.392~94.5
			31.74~37.7	31.74~48	31.74~60	31.74~60	31.74~75	31.74~94.5
			31.74~37.7	31.74~48	31.74~60	31.74~60	31.74~75	31.74~94.5
				39.675~48	39.675~60	39.675~60	39.675~75	39.675~94.5
					50.784~60	50.784~60	50.784~75	50.784~94.5
					50.784~60	50.784~60	50.784~75	50.784~94.5
							63.48~75	63.48~94.5
							63.48~75	63.48~94.5
								79.35~94.5



7.5 Secondary Circuit Wiring Diagram



HL1: Failure indicator

HL2: Close indicator

HL3: Energy storage indicator

SB1: Under-voltage button

SB2: Shunt button

SB3: Close button

Q: Under-voltage release

F: Shunt release

X: Close electromagnet

M: Energy storage motor

DF1-DF4: Auxiliary switch

1<sup>#</sup>, 2<sup>#</sup>: Auxiliary power input

3<sup>#</sup>, 4<sup>#</sup>, 5<sup>#</sup>: Fault trip contact output(4<sup>#</sup> common terminal, contact capacity AC230V,5A

6<sup>#</sup>, 7<sup>#</sup>: external transformer input (a group of auxiliary NO contacts if no external transformer, contact capacity AC 230V, 2A)

8<sup>#</sup>, 9<sup>#</sup>: Making indicator (capacity AC400V,1A)

27<sup>#</sup>, 28<sup>#</sup>: Under-voltage release(Connected to the main circuit)

29<sup>#</sup>, 30<sup>#</sup>: Shunt release

31<sup>#</sup>, 32<sup>#</sup>: Closing electromagnet

33<sup>#</sup>, 34<sup>#</sup>, 35<sup>#</sup>: Energy storage motor

18<sup>#</sup>~26<sup>#</sup>, 38<sup>#</sup>~40<sup>#</sup>: Auxiliary contact

(auxiliary contact capacity: AC230V,5A)

**Note:** 1. The lines in red should be connected by user. Add fuse to protect control circuit (6A fuse is recommended).

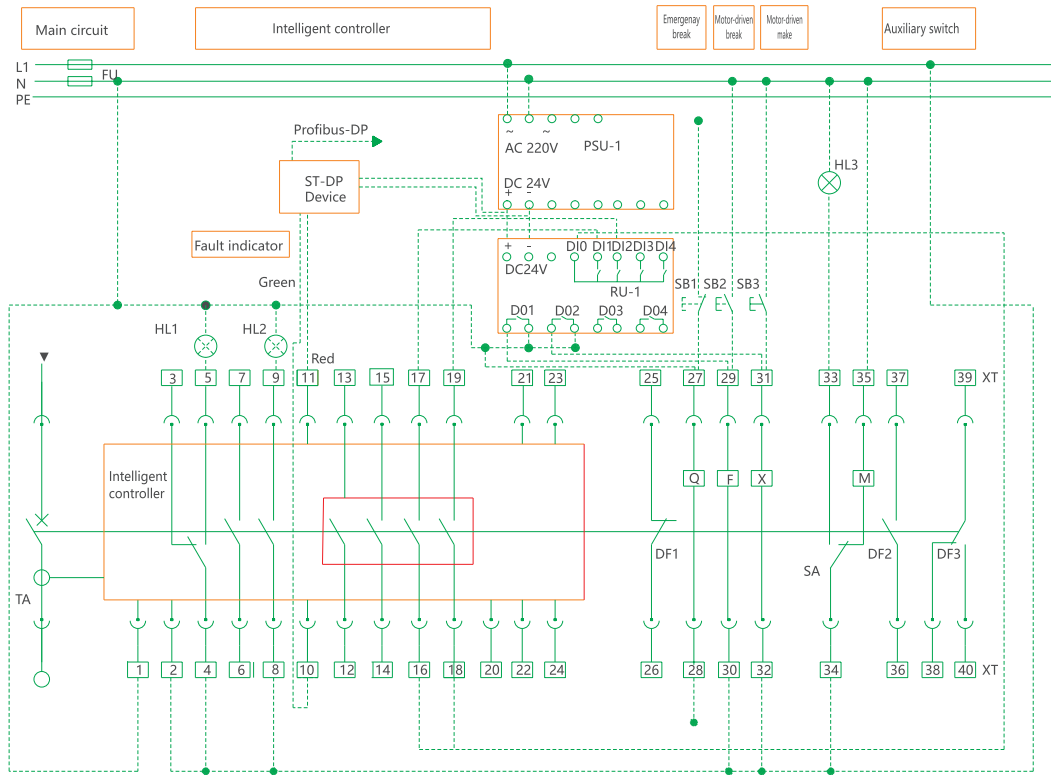
2. Terminal 35# can be directly connected to power (to automatically store energy in advance).

If 33# is needed, connect it with indicator in series, otherwise the micro-switch inside the motor might be damaged.

3. If 3M type controller with voltage measurement function is used, 21#-24# are used for voltage signal input of phase N, A, B, C, with maximum voltage of AC400V. In this case, 25#-26# is a group of NC contacts.

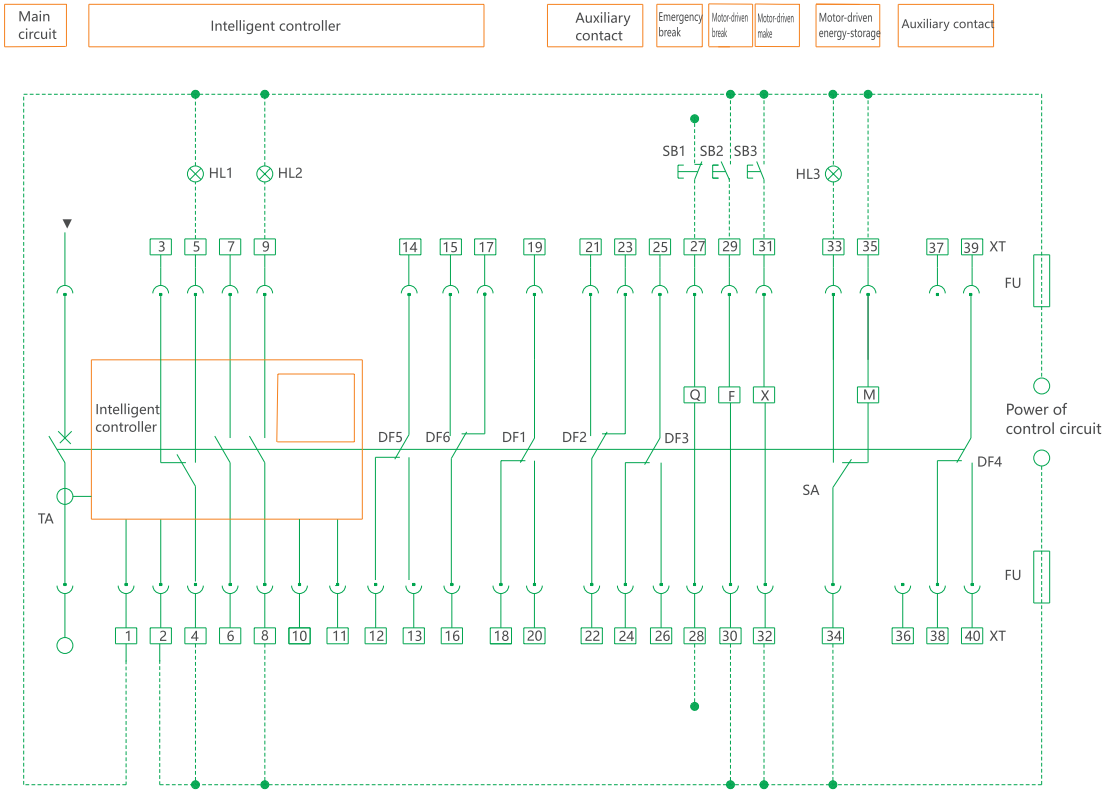
4. Wiring diagram shows: the circuit loop no power, ACB is opening and in connection location, the operating mechanism has no power.

Figure 34.NA1-1000X standard type, type(M/3M)



- HL1: Failure indicator
  - HL2: Close indicator
  - HL3: Energy storage indicator
  - SB1: Under-voltage button
  - SB2: Shunt button
  - SB3: Close button
  - Q: Under-voltage release
  - F: Shunt release
  - X: Close electromagnet
  - M: Energy storage motor
  - DF1-DF3: Auxiliary switch
  - 1<sup>#</sup>, 2<sup>#</sup>: Auxiliary power input(DC24)
  - 3<sup>#</sup>,4<sup>#</sup>,5<sup>#</sup>: Fault trip contact output(4<sup>#</sup> common terminal, contact capacity AC230V,5A
  - 6<sup>#</sup>, 7<sup>#</sup>: external transformer input (a group of auxiliary NO contacts if no external transformer, contact capacity AC 230V, 2A)
  - 8<sup>#</sup>,9<sup>#</sup>: Making indicator(capacity AC400V,1A)
  - 10<sup>#</sup>, 11<sup>#</sup>: communication output
  - 12<sup>#</sup>, 13<sup>#</sup>: Signal alarm of load 1 output
  - 14<sup>#</sup>, 15<sup>#</sup>: Signal alarm of load 2 output
  - 16<sup>#</sup>, 17<sup>#</sup>: Making signal output
  - 18<sup>#</sup>, 19<sup>#</sup>: Closing signal output
  - 20<sup>#</sup>: Communication shield ground line
  - 21<sup>#</sup>~24<sup>#</sup>: Voltage signal input of phase N,A,B,C (With voltage measurement); 21<sup>#</sup>~23<sup>#</sup> is a set of auxiliary switches (Without voltage measurement) 22<sup>#</sup> common terminal,contact capacity AC230V,5A
  - 25<sup>#</sup>, 26<sup>#</sup>: Auxiliary contact (capacity:AC230V,5A)
  - 27<sup>#</sup>,28<sup>#</sup>: Under-voltage release(Connected to the main circuit)
  - 29<sup>#</sup>,30<sup>#</sup>: Shunt release
  - 31<sup>#</sup>,32<sup>#</sup>: Closing electromagnet
  - 33<sup>#</sup>,34<sup>#</sup>,35<sup>#</sup>: Energy storage motor
  - 36<sup>#</sup>~40<sup>#</sup>: Auxiliary contact (capacity:AC230V,5A)
- Note:** 1. The lines in red should be connected by user. Add fuse to protect control circuit.  
 2. Terminal 35# can be directly connected to power (automatically store energy in advance). If 33# is needed, connect it with indicator in series, otherwise the microswitch inside the motor might be damaged.  
 3. Wiring diagram shows: the circuit loop no power, ACB is opening and in connection location, the operating mechanism has no power.

Figure 35.NA1-1000X Communication type ,type(H/3H)



- HL1: Failure indicator
- HL2: Close indicator
- HL3: Energy storage indicator
- SB1: Under-voltage button
- SB2: Shunt button
- SB3: Close button
- Q: Under-voltage release
- F: Shunt release
- X: Close release
- M: Energy storage motor
- DF1-DF6: Auxiliary switch
- 1<sup>#</sup>, 2<sup>#</sup>: Auxiliary power input
- 3<sup>#</sup>,4<sup>#</sup>,5<sup>#</sup>: Fault trip contact output(4<sup>#</sup> common terminal,contact capacity AC230V,5A
- 6<sup>#</sup>,7<sup>#</sup>: external transformer input (a group of auxiliary NO contacts if no external transformer, contact capacity AC 230V, 2A)
- 8<sup>#</sup>,9<sup>#</sup>: Making indicator (capacity AC400V,1A)
- 12<sup>#</sup>~26<sup>#</sup>: Auxiliary contact(auxiliary contact capacity: AC230V,1A)
- 27<sup>#</sup>,28<sup>#</sup>: Under-voltage release(Connected to the main circuit)
- 29<sup>#</sup>,30<sup>#</sup>: Shunt release
- 31<sup>#</sup>,32<sup>#</sup>: Closing release
- 33<sup>#</sup>,34<sup>#</sup>:Energy storage indicator
- 34<sup>#</sup>,35<sup>#</sup>: Energy storage motor
- 38<sup>#</sup>~40<sup>#</sup>: Auxiliary contact(auxiliary contact capacity: AC230V,1A)

- Note: 1. The lines in red should be connected by user. Add fuse to protect control circuit (6A fuse is recommended).
2. Terminal 35<sup>#</sup> can be directly connected to power (automatically store energy in advance). If 33<sup>#</sup> is needed, connect it with indicator in series, otherwise the microswitch inside the motor might be damaged.
3. If 3M type controller with voltage measurement function is used, 21<sup>#</sup>-24<sup>#</sup> are used for voltage signal input of phase N, A, B, C, with maximum voltage of AC400V. In this case, 25<sup>#</sup>-26<sup>#</sup> is a group of NC contacts.
4. Wiring diagram shows: the circuit loop no power, ACB is opening and in connection location, the operating mechanism has no power.

Figure 36.NA1-1000X six pairs change-over contacts standard type, type(M/3M)