



# NXA Series Air Circuit Breaker

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# User Instruction

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## Safety Warning

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- ① Only professional technicians are allowed for installation and maintenance.
- ② It is strictly prohibited to install in the environment containing inflammable, explosive gas moist condensation.
- ③ Power must be turned off when the product is installed or maintained.
- ④ Please do not touch the conductive part of the product during working.



# Catalog

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## 1 Scope of Application

The NXA series air circuit breaker (hereinafter referred to as the "breaker") is suitable for power distribution networks of AC50/60Hz power supply, AC690V and lower rated operating voltage and 6300A and lower rated operating current. It is used to distribute power and protect the line and power equipment from overload, undervoltage, short circuit, single-phase grounding and other faults. It has an intelligent protection function with accurate selective protection and can improve power supply reliability to avoid unnecessary power outage.

The breaker can be widely used for power distribution systems of power stations, factories, mines (600V in particular) and modern high-rise buildings, especially those of smart buildings, as well as for green energy projects such as wind and solar power generation.

## 2 Model Specifications

Frame size (A): 1600, 2000, 3200, 4000, 6300

Breaking capacity: N,S,H

Rated operational voltage Ue (VAC): 380/400/415, 440/525/690

Number of poles: 3P, 4P

Installation method: draw-out type, fixed type



Frame size	Rated current Breaking capacity	400	630	800	1000	1250	1600	2000	2500	3200	3600	4000	5000	6300
1600A	N	■	■	■	■	■	■							
	S	■	■	■	■	■	■							
	H	■	■	■	■	■	■							
2000A	N		■	■	■	■	■	■						
	S		■	■	■	■	■	■						
	H		■	■	■	■	■	■						
3200A	N						■	■	■	■				
	S						■	■	■	■				
	H						■	■	■	■				
4000A	N									■	■	■		
	S									■	■	■		
	H									■	■	■		
6300A	H											■	■	■

## 3 Conditions for Normal Application, Installation, Transportation and Storage

### 3.1 Conditions for normal Application

3.1.1 The electrical and mechanical characteristics are suitable for ambient temperatures between -5°C and +40°C. The M and A type intelligent controller can also be used in ambient temperatures between -45°C and +70°C, and the P, H type intelligent controller can be used in ambient temperatures between -20°C and +70°C. The specific derating factor is given in section 4.1.2.

3.1.2 The installation location should not exceed 2,000 m. If the breaker is used above an altitude of 2,000 m, the air cooling effect and the dielectric strength degradation should be considered. The breaker should be derated as shown in section 4.1.3 when it is operated under the above conditions.

3.1.3 The relative humidity of the atmosphere should not exceed 50% at a maximum temperature of +40°C, and a higher relative humidity is allowed at a lower temperature, such as 90% at 20°C. Special measures should be taken for condensation that occasionally occurs due to temperature changes.

3.1.4 The pollution level is level 3.

3.1.5 The utilization category is B.

3.1.6 The installation category of the breaker is IV. When the rated operating voltage of the main circuits is  $\leq AC415V$ , the installation category on the control circuits and the auxiliary circuit is III except the undervoltage release coil and the primary coil of the power transformer of the intelligent control, whose installation category is the same as the breaker. When the rated operating voltage of the main circuits  $> AC415V$  and  $\leq AC690V$ , if the control circuits and the auxiliary circuit need to take power from the main circuits, they must be isolated from the main circuits by an isolating transformer; the capacity of the isolating transformer should  $\geq 2kVA$  and the maximum operating voltage of the control circuits and the auxiliary circuit should be  $AC415V$ . The installation category of the control circuits and the auxiliary circuit should be III.

### 3.2 Installation Conditions

Installation conditions: The breaker should be installed in accordance with the installation requirements of this manual, and the vertical inclination should not exceed  $5^\circ$ .

**3.3 Protection level:** IP20 on the front and IP00 on the other sides.

### 3.4 Conditions for Transportation and Storage

Unless otherwise specified, the following temperature scope applies to transportation and storage:  $-35^\circ C$  -  $+70^\circ C$ , and up to  $+70^\circ C$  within a short period (24 h).

## 4 Main Technical Parameters

### 4.1 Technical Parameters of Main Circuit

**Table 1 Specification**

Number of poles	3/4 (6300A only 3P)	
Rated operational voltage $U_e$ (V)	AC 380/400/415 , AC 440/525/690	
Rated insulation voltage $U_i$ (V)	1000	
Rated impulse withstand voltage $U_{imp}$ (kV)	12	
Rated frequency (Hz)	50/60	
Flashover distance (mm)	0	
Applicable to isolation	IEC/EN 60947-2	Applicable
Pollution grade	IEC 60664-1	N:3

Table 2 Technical parameters of main circuit

Frame size			1600A					
Rated current (A)			400	630	800	1000	1250	1600
Rated current of the fourth pole (A)			400	630	800	1000	1250	1600
Type of the circuit breaker			N	S	H			
Rated ultimate short circuit breaking capacity (kA rms) VAC 50/60Hz	Icu	380/400/415V	50	42	50			
		440/525/690V	30	36	36			
Rated service short circuit breaking capacity (kA rms) VAC 50/60Hz	Ics	380/400/415V	42	42	50			
		440/525/690V	30	36	36			
Utilization category			B					
Rated short-time withstand current (kA rms) VAC 50/60Hz	Icw 1s	380/400/415V	42	42	42			
		440/525/690V	30	36	36			
	Icw 3s	380/400/415V	20	25	25			
		440/525/690V	-	-	-			
Closed capacity (kA peak) VAC 50/60Hz	Icm	380/400/415V	105	88.2	105			
		440/525/690V	63	75.6	75.6			
Making current tripping protection function (MCR kA rms)			10	16	16			
Breaking time (ms)			≤28					
Closing time (ms)			≤50					
Installation, connection and service life								
Service life C/O cycle	Mechanical	Without maintenance	15000					
	Electrical	Without maintenance	AC415V: 8000; AC690V: 5000					
Connection		Horizontal	■					
Size (width × depth × height)	Fixed type	3P	254×243.5×318.5					
		4P	324×243.5×318.5					
	Draw-out type	3P	308×331.5×351					
		4P	378×331.5×351					

#### 4.1.1 Power Loss and Output Resistance

The power loss and output resistance are shown in Table 3.

The power loss is the power consumption per pole measured at  $I_n$  and 50/60 Hz, and the input/output resistance is the DC resistance value in the cold state of each pole.

	2000A						3200A				4000A			6300A		
	630	800	1000	1250	1600	2000	1600	2000	2500	3200	3200	3600	4000	4000	5000	6300
	630	800	1000	1250	1600	2000	1600	2000	2500	3200	3200	3600	4000	2000	2500	-
	N	S	H				N	S	H		N	S	H	H		
	80	65	80				80	80	100		80	85	100	120		
	50	55	55				65	70	70		65	75	75	85		
	50	65	65				80	80	85		80	85	85	120		
	50	55	55				65	70	70		65	75	75	85		
	B						B				B			B		
	50	65	65				65	80	85		65	85	85	100		
	50	55	55				65	70	70		65	75	75	75		
	37	42	42				37	50	50		37	50	50	-		
	-	-	-				-	-	-		-	-	-	-		
	176	143	176				176	176	220		176	187	220	264		
	105	121	121				143	154	154		143	165	165	187		
	16	16	16				26	26	26		26	26	26	26		
	≤28						≤28				≤28			≤28		
	≤50						≤50				≤50			≤50		
	15000 AC415V: 8000; AC690V: 5000						10000 AC415V: 7000; AC690V: 5000				10000 AC415V: 5000; AC690V: 3000			2000 1500		
	■						■				■			■		
	374×344×400 469×344×400 403×430×438.5 498×430×438.5						439×373.5×400 554×373.5×400 463×499.5×438.5 578×499.5×438.5				550×337.5×400 700×337.5×400 569×416×438.5 719×416×438.5			897×435.5×399 897×435.5×399 923×500×435.5 923×500×435.5		

Table 3 Power loss and output resistance

Frame	Rated current (A)	Drawer type		Fixed type	
		Power loss (W)	Input/output resistance ( $\mu\Omega$ )	Power loss (W)	Input/output resistance ( $\mu\Omega$ )
1600A	400	30.5	63.6	15.6	32.4
	630	75.7	63.6	38.6	32.4
	800	99.1	51.6	54.1	28.2
	1000	154.8	51.6	84.6	28.2
	1250	241.9	51.6	132.2	28.2
	1600	262.7	34.2	138.2	18.0
2000A	630	58.6	49.2	26.4	22.2
	800	73.7	38.4	36.6	19.1
	1000	115.2	38.4	57.2	19.1
	1250	180	38.4	89.4	19.1
	1600	294.9	38.4	146.5	19.1
	2000	388.8	32.4	204.5	17.0
3200A	1600	127.2	16.6	60.1	7.8
	2000	198.7	16.6	93.9	7.8
	2500	310.5	16.6	146.7	7.8
	3200	479.2	15.6	206.4	6.8
4000A	3200	435	14.1	239.6	7.8
	3600	690.5	17.7	272.9	7.0
	4000	852.5	17.7	337	7.0
6300A	4000	403.2	9.0	230.4	7.0
	5000	630	9.0	360	7.0
	6300	1000.2	8.8	571	6.4

#### 4.1.2 Derating of Circuit Breaker

The temperature derating of the fixed breaker is shown in Table 4-Table 8:

Table 4 1600 frame temperature derating

Ambient temperature Connection method	400A		630A		800A		1000A		1250A		1600A	
	Level	Vertical	Level	Vertical	Level	Vertical	Level	Vertical	Level	Vertical	Level	Vertical
40°C	—	—	—	—	—	—	—	—	—	—	—	—
45°C	—	—	—	—	—	—	—	—	—	—	—	—
50°C	—	—	—	—	—	—	—	—	—	—	1550	1600
55°C	—	—	—	—	—	—	—	—	1150	1200	1500	1550
60°C	—	—	550	580	—	—	—	—	1050	1100	1450	1500

Note: "—" means no derating is required, the same below.

**Table 5 2000 frame temperature derating**

Ambient temperature	630A		800A		1000A		1250A		1600A		2000A	
Connection method	Level	Vertical	Level	Vertical	Level	Vertical	Level	Vertical	Level	Vertical	Level	Vertical
40°C	—	—	—	—	—	—	—	—	—	—	—	—
45°C	—	—	—	—	—	—	—	—	1550	—	1900	—
50°C	—	—	—	—	—	—	—	—	1500	1500	1850	1900
55°C	—	—	—	—	—	—	—	—	1400	1450	1800	1800
60°C	—	—	—	—	—	—	—	—	1300	1350	1700	1700

**Table 6 3200 frame temperature derating**

Ambient temperature	1600A		2000A		2500A		3200A	
Connection method	Level	Vertical	Level	Vertical	Level	Vertical	Level	Vertical
40°C	—	—	—	—	—	—	—	—
45°C	—	—	—	—	—	—	—	—
50°C	—	—	—	—	—	—	3100	—
55°C	—	—	—	—	2450	—	3000	3050
60°C	—	—	—	—	2350	2400	2900	2950

**Table 7 4000 frame temperature derating**

Ambient temperature	3200A		3600A		4000A	
Connection method	Level	Vertical	Level	Vertical	Level	Vertical
40°C	—	—	—	—	—	—
45°C	3100	—	—	—	3800	3850
50°C	3000	—	—	—	3600	3650
55°C	3000	3050	3400	3450	3400	3450
60°C	2900	2900	3200	3250	3200	3250

**Table 8 6300 frame temperature derating**

Ambient temperature	4000A		5000A		6300A	
Connection method	Level	Vertical	Level	Vertical	Level	Vertical
40°C	—		—		—	
45°C	—		—		—	
50°C	—		—		5600	
55°C	—		4800		5400	
60°C	—		4800		5200	

The temperature derating of the drawer breaker is shown in Table 9-Table 13:

**Table 9 1600 frame temperature derating**

Ambient temperature	400A		630A		800A		1000A		1250A		1600A	
Connection method	Level	Vertical	Level	Vertical	Level	Vertical	Level	Vertical	Level	Vertical	Level	Vertical
40°C	—	—	—	—	—	—	—	—	—	—	—	—
45°C	—	—	—	—	—	—	—	—	—	—	—	—
50°C	—	—	—	—	—	—	—	—	—	—	1550	1600
55°C	—	—	—	—	—	—	—	—	1150	1200	1500	1550
60°C	—	—	550	580	—	—	—	—	1050	1100	1450	1500

**Table 10 2000 frame temperature derating**

Ambient temperature	630A		800A		1000A		1250A		1600A		2000A	
Connection method	Level	Vertical	Level	Vertical	Level	Vertical	Level	Vertical	Level	Vertical	Level	Vertical
40°C	—	—	—	—	—	—	—	—	—	—	—	—
45°C	—	—	—	—	—	—	—	—	1550	—	1900	—
50°C	—	—	—	—	—	—	—	—	1500	1550	1850	1900
55°C	—	—	—	—	—	—	—	—	1400	1450	1800	1800
60°C	600	—	—	—	—	—	—	—	1300	1350	1700	1700

**Table 11 3200 frame temperature derating**

Ambient temperature	1600A		2000A		2500A		3200A	
Connection method	Level	Vertical	Level	Vertical	Level	Vertical	Level	Vertical
40°C	—	—	—	—	—	—	—	—
45°C	—	—	—	—	—	—	—	—
50°C	—	—	—	—	—	—	3100	—
55°C	—	—	—	—	2450	—	3000	3050
60°C	—	—	—	—	2350	2400	2900	2950

**Table 12 4000 frame temperature derating**

Ambient temperature	3200A		3600A		4000A	
Connection method	Level	Vertical	Level	Vertical	Level	Vertical
40°C	—	—	—	—	—	—
45°C	3100	—	—	—	3800	3850
50°C	3000	—	—	—	3600	3650
55°C	3000	3050	3400	3450	3400	3450
60°C	2900	2900	3200	3250	3200	3250

**Table 13 6300 frame temperature derating**

Ambient temperature	4000A		5000A		6300A	
Connection method	Level	Vertical	Level	Vertical	Level	Vertical
40°C	—		—		—	
45°C	—		—		—	
50°C	—		—		5600	
55°C	—		4800		5400	
60°C	—		4800		5200	



### 4.1.3 Altitude derating factor

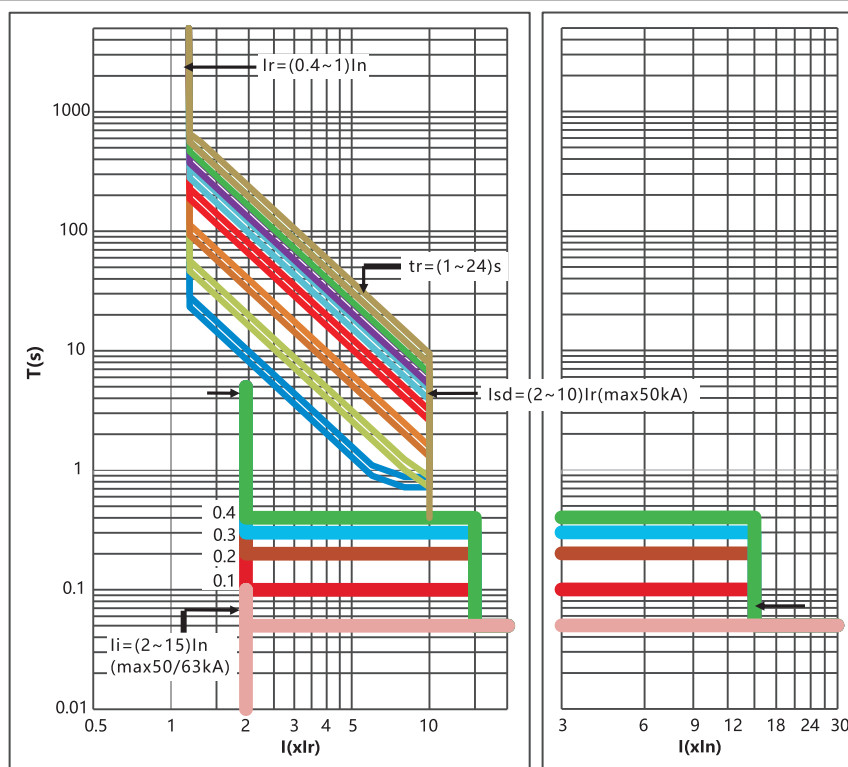
When the altitude exceeds 2,000 m, the insulation performance, cooling performance, pressure, etc. in the atmosphere will change. The performance can be corrected by referring to Table 14.

**Table 14 High altitude derating factor**

Altitude (m)	2000	2500	3000	3500	4000	4500	5000
Rated impulse withstand voltage $U_{imp}$ (kV)	12	12	12	12	11	10	8
Average insulation voltage $U_i$ (V)	1000	1000	1000	1000	917	833	800
Maximum operating voltage $U_e$ (V) (50/60Hz)	690	690	690	690	690	690	560
Average hot operating current (40)°C	1.0Ie	0.93Ie	0.88Ie	0.83Ie	0.78Ie	0.73Ie	Contact the factory
Power frequency withstand voltage (V)	3500	3500	3500	3250	3000	2500	2200

## 4.2 Protection Characteristics of Intelligent Controller

### 4.2.1 Overcurrent Protection Characteristic Curve



**Figure 1 Overcurrent protection characteristic curve**

### 4.2.2 Overload long-delay protection action characteristics

< 1.05Ir: > 2h Non-trip

≥ 1.3Ir: 1h Trip

Ir current setting value range: 0.4In, 0.5In, 0.6In, 0.7In, 0.8In, 0.9In, 1.0In+OFF (M type and A type);

0.4In-1.0In+OFF (P type and H type)

Inverse time action characteristics  $I^2t: t = (6/N)^2 \cdot t_r$

**Table 15 Ir protection action time**

Setting current multiple	Trip Time							
1.5Ir	16	32	64	128	192	256	320	384
2Ir	9	18	36	72	108	144	180	216
6Ir	1	2	4	8	12	16	20	24

**Note:** Ir -- long-delay current set value

N -- fault current divided by a multiple of set current I/Ir

t -- fault action delay time

tr -- long delay time set value

Action allowed time tolerance  $\pm 15\%$

Regular factory setting: Ir=1.0In

Regular factory setting: tr=2s(@6Ir)

#### 4.2.3 Short-circuit Short-delay Protection Action Characteristics

Short-circuit short-delay protection action threshold

< 0.85I<sub>sd</sub>: Non-trip;

> 1.15I<sub>sd</sub>: Trip

I<sub>sd</sub> current setting value range: 2Ir, 3Ir, 4Ir, 5Ir, 6Ir, 8Ir, 10Ir+OFF (max50kA, M type and A type); 2Ir-10Ir+OFF (max50kA, P type and H type)

**Table 16 I<sub>sd</sub> protection action time**

Current	Action Time		Remarks
I <sub>sd</sub> < I ≤ 10Ir	Inverse time	Action characteristic $I^2t = (10Ir)^2 t_{sd}$	P、H
		Setting time (s) 0.1, 0.2, 0.3, 0.4	
I ≥ 1.1I <sub>sd</sub>	Definite time	Setting time (s) 0.1, 0.2, 0.3, 0.4	M、A、P、H
		Minimum (s) 0.06, 0.16, 0.255, 0.34	
		Maximum (s) 0.14, 0.24, 0.345, 0.46	
	Return time (s)	0.05, 0.14, 0.25, 0.33	

**Note:** I<sub>sd</sub> -- short-delay current set value

I -- fault current value

Ir -- long-delay set value.

t -- fault action current delay time

t<sub>sd</sub> -- short-delay time set value

Action allowed time tolerance  $\pm 15\%$

Regular factory setting: I<sub>sd</sub>=8Ir (Ir < 6250A) I<sub>sd</sub>=50kA (Ir ≥ 6250A)

Regular factory setting: t<sub>sd</sub>=0.4s

#### 4.2.4 Short-circuit Instantaneous Protection Action Characteristics

Short-circuit instantaneous protection action threshold

< 0.85I<sub>i</sub>: Non-trip;

> 1.15I<sub>i</sub>: fast type ≤ 30ms, standard type ≤ 50ms trip

Current setting value of instantaneous action: 2In, 4In, 6In, 8In, 10In, 12In, 15In+OFF (NXA40 max50kA, NXA63 max63kA, M type, A type); 2In-15In+OFF (NXA40 max50kA, NXA63 max63kA, P type, H type)

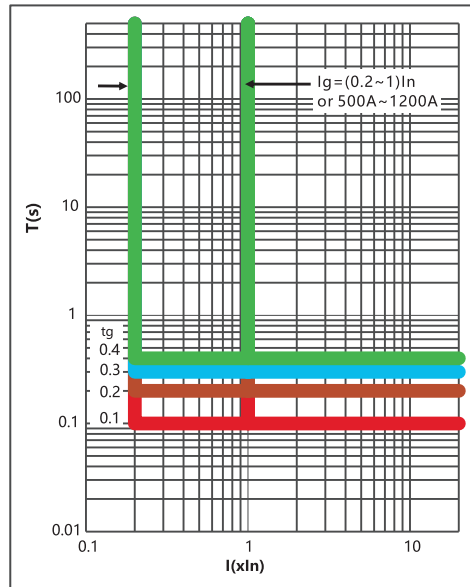
**Note:** I<sub>i</sub> -- short-circuit instantaneous set value

Regular factory setting: I<sub>i</sub>=12In (In=400A-5000A)

I<sub>i</sub>=63kA (In=6300A)

#### 4.2.5 Ground Protection

4.2.5.1 Ground protection has the definite time protection characteristics (M type and A type), and definite time + inverse time protection characteristics (P and H types). See Figure 2.



**Figure 2 Asymmetric ground protection characteristic curve**

#### 4.2.5.2 Ground Protection Current Set Value $I_g$

**Table 17 Protection current setting value  $I_g$**

Ground current setting range		A	B	C	D	E	F	G	OFF	Default	Accuracy
M type, A type	$0.2I_n - 1.0I_n + \text{OFF}(\text{NXA16}, 20)$	$0.2I_n$	$0.3I_n$	$0.4I_n$	$0.5I_n$	$0.6I_n$	$0.8I_n$	$I_n$	—	$0.5I_n$	$\pm 10\%$
	$500\text{A} - 1200\text{A} + \text{OFF}(\text{NXA32}, 40, 63)$	500A	640A	800A	960A	1040A	1120A	1200A	—	800A	
P type, H type	$0.2I_n - 1.0I_n + \text{OFF}(\text{NXA16}, 20)$	Step size 1A							—	$0.5I_n$	
	$500\text{A} - 1200\text{A} + \text{OFF}(\text{NXA32}, 40, 63)$								—	800A	

Note: When  $I_n \geq 1250\text{A}$ ,  $I_{g\max} = 1200\text{A}$

#### 4.2.5.3 Ground Protection Delay Time Set Value $t_g$

**Table 18 Ground protection action time  $t_g$**

Fault Current		Set time (s)	0.1	0.2	0.3	0.4	Default
M type, A type	I>1.1I <sub>g</sub>	Minimum (s)	0.06	0.16	0.255	0.34	OFF
		Maximum (s)	0.14	0.24	0.345	0.46	
P type, H type	I>1.1I <sub>g</sub> and I≥0.8I <sub>n</sub> or 1200A	Minimum (s)	0.06	0.16	0.255	0.34	
		Maximum (s)	0.14	0.24	0.345	0.46	
	I>1.1I <sub>g</sub> and I<0.8I <sub>n</sub> or 1200A	Inverse time delay	t = $\frac{(1.0I_n)^2}{I^2} \times t_g$ or t = $\frac{(1200)^2}{I^2} \times t_g$ (error±15%)				
		Return time	0.05	0.14	0.25	0.33	

Note: I -- fault current value; t -- fault action delay time

4.2.5.4 Ground Fault Protection Action Threshold

- I < 0.9I<sub>g</sub>: Non-trip within 2t<sub>g</sub>;
- I > 1.1I<sub>g</sub>: Trip within t<sub>g</sub>±0.040s or (1±15%)t<sub>g</sub>

4.3 CT power supply

Single phase of CT not less than 0.4I<sub>n</sub>, or three phases of CT not below 0.2I<sub>n</sub>, the intelligent controller can work normally.

Table 19 Controller minimum display current

Frame	I <sub>n</sub>	Minimum display value (A)
1600	400 ~ 1600	60
2000	630 ~ 2000	60
≥3200	≥1600	120

5 Structure

5.1 Product Structure

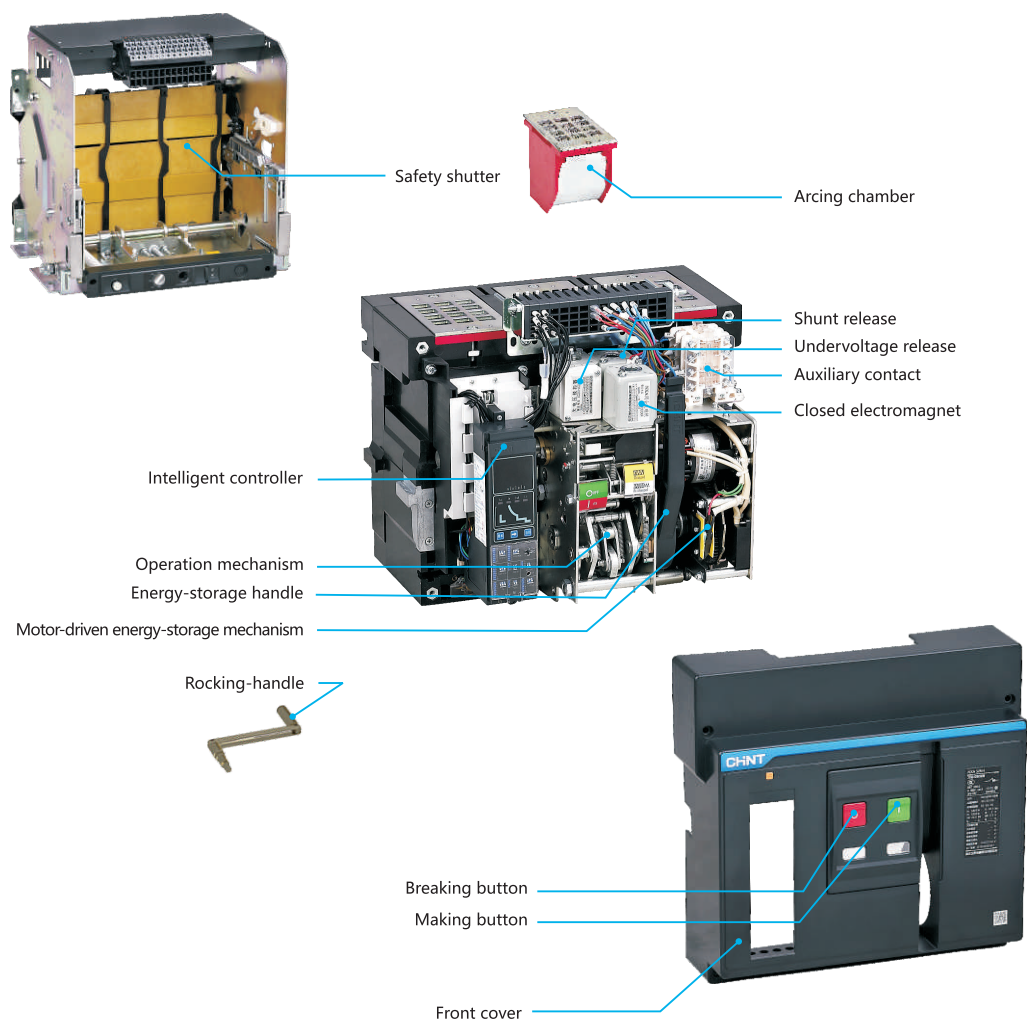


Figure 3 Drawer type product structure

## 5.2 Breaker Identification Panel

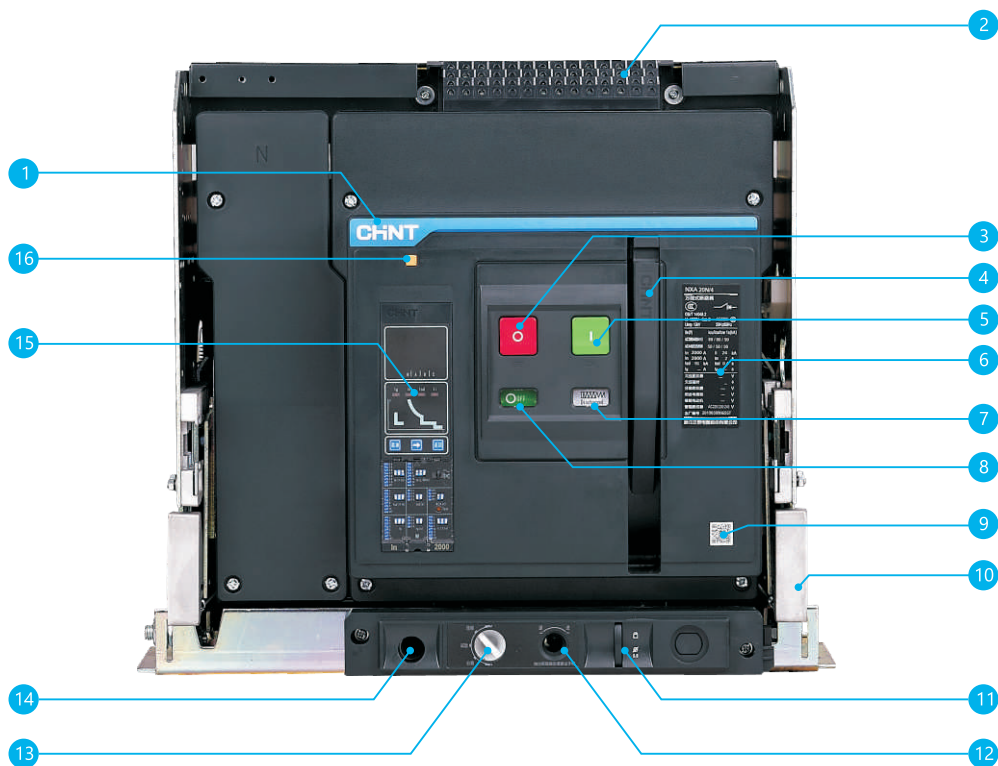


Figure 4 Drawer type product front

1 Trademark	9 QR code
2 Secondary wiring terminal	10 Extraction draw plate (only applicable to draw-out type)
3 Breaking button	11 "Disconnected" position locking (only applicable to draw-out type)
4 Energy-storage handle	12 Rocking-handle entry (only applicable to draw-out type)
5 Making button	13 Position indication (only applicable to draw-out type)
6 Nameplate	14 Rocking-handle storage (only applicable to draw-out type)
7 Energy-storage/release indicator	15 Intelligent controller
8 Breaking/making indicator	16 Fault-breaking indicator reset button

## 6 Appearance, Installation Dimensions and Weight

### 1600A fixed type

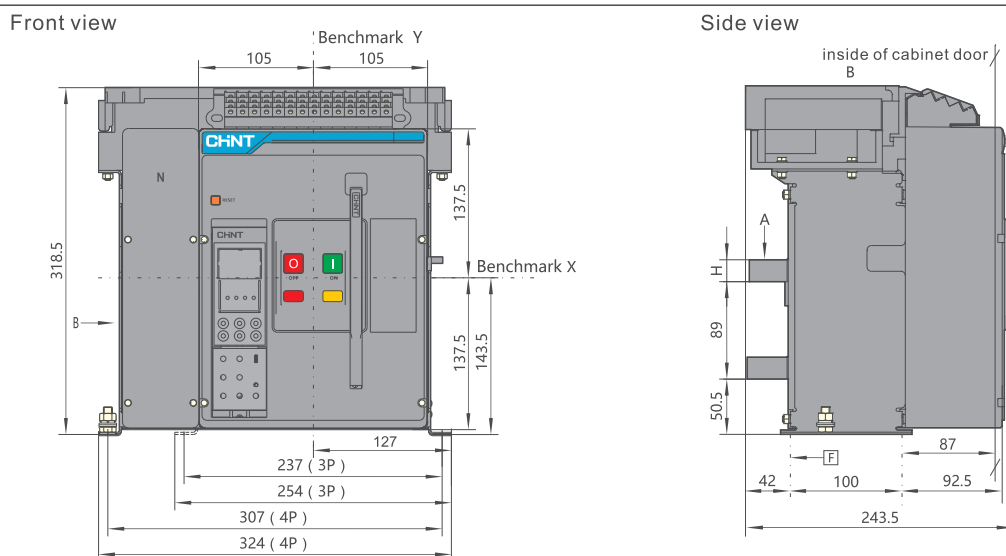


Figure 5 Product size of NXA16 fixed type

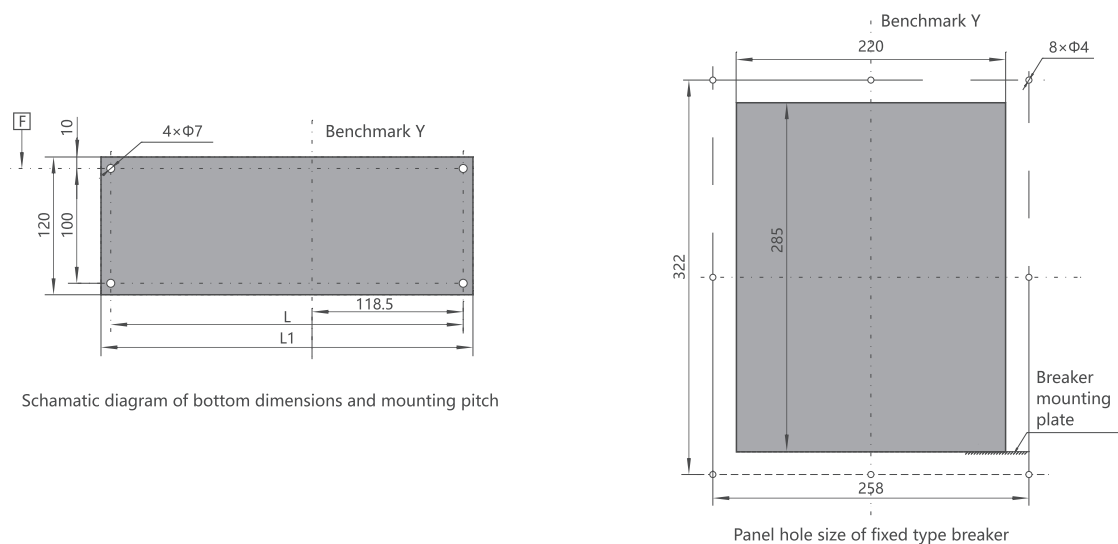
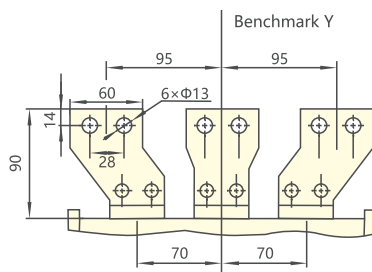
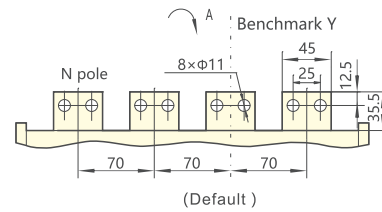
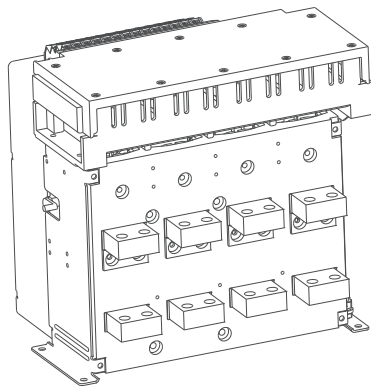


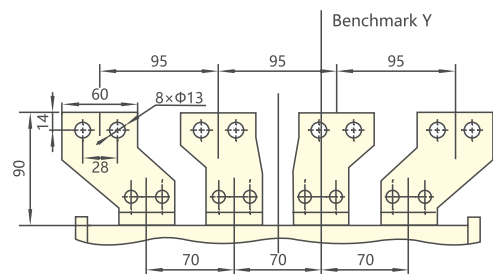
Figure 6 Installation dimensions of NXA16 fixed type

Table 20 NXA16 busbar and installation dimensions (fixed type)

H	L	L1	Remarks
5	237	254	In=400A-630A, fixed type, 3p
8	237	254	In=800A-1250A, fixed type, 3p
20	237	254	In=1600A, fixed type, 3p
5	307	324	In=400A-630A, fixed type, 4p
8	307	324	In=800A-1250A, fixed type, 4p
20	307	324	In=1600A, fixed type, 4p



Three-pole extended busbar



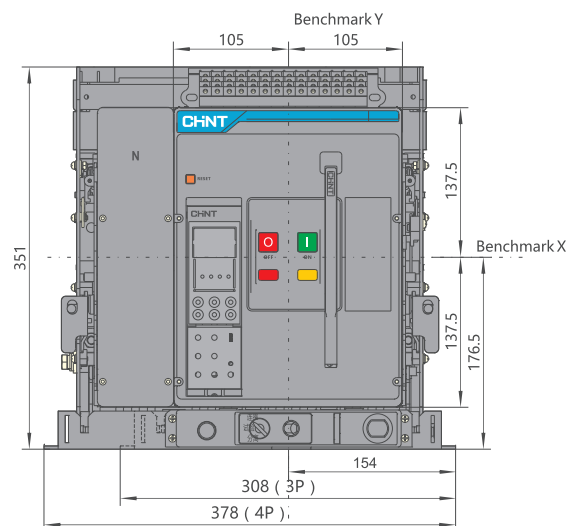
Four-pole extended busbar

Note: See Table 22 on Page 16 for the number of extended busbars

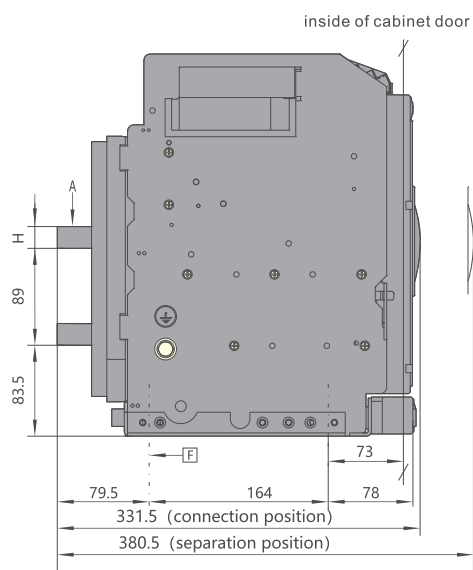
**Figure 7 NXA16 fixed type busbar size (horizontally connected)**

## 1600A drawer type

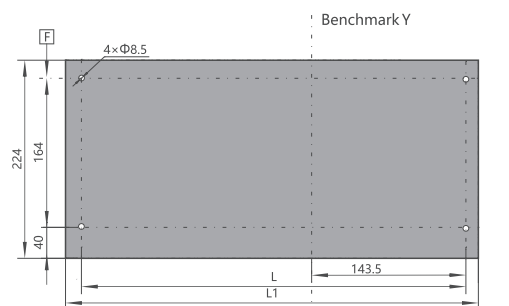
Front view



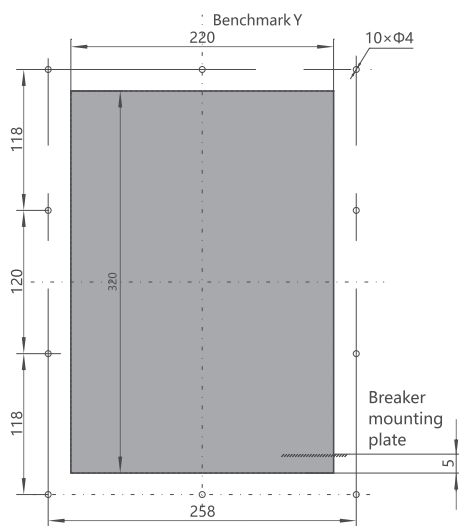
Side view



**Figure 8 Product size of NXA16 drawer type**



Schematic diagram of bottom dimensions and mounting pitch



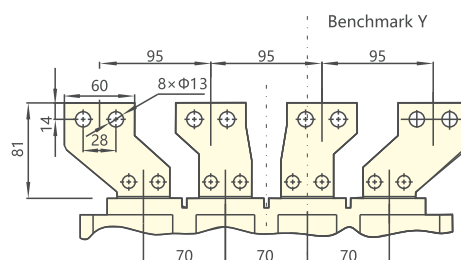
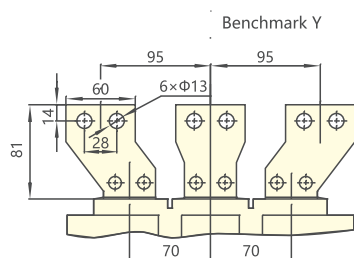
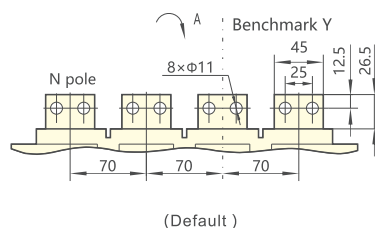
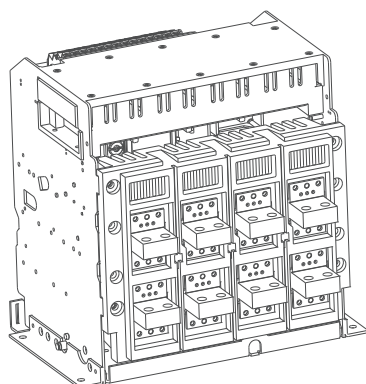
Panel hole size of drawer type breaker

**Figure 9 Installation dimensions of NXA16 drawer type**

**Table 21 NXA16 busbar and installation dimensions (drawer type)**

H	L	L1	Remarks
5	287	308	In=400A-630A, 3P
8	287	308	In=800A-1250A, 3P
20	287	308	In=1600A, 3P
5	357	378	In=400A-630A, 4P
8	357	378	In=800A-1250A, 4P
20	357	378	In=1600A, 4P





**Note:** See Table 22 for the number of extended busbars.

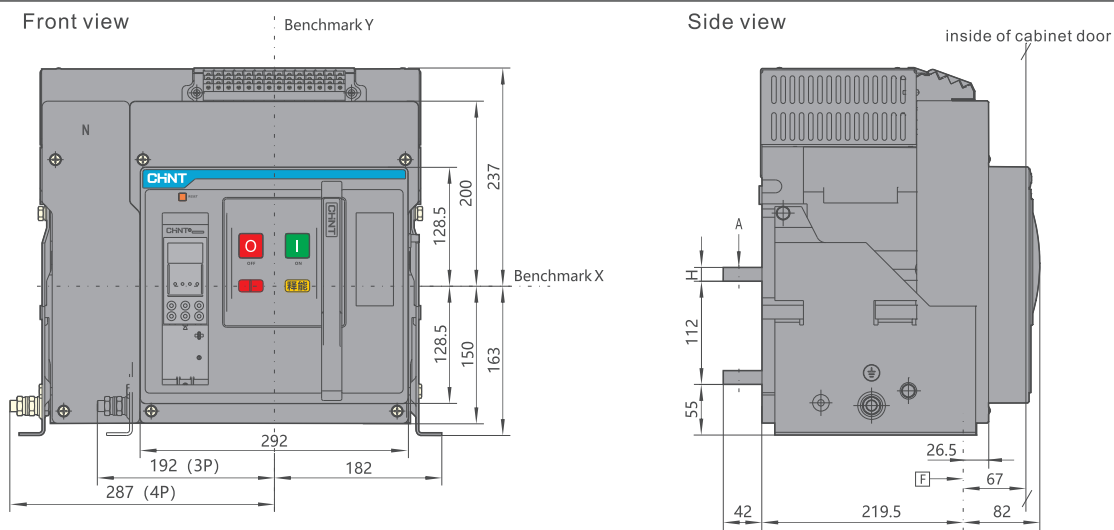
**Figure 10 NXA16 drawer type busbar size (horizontal connection)**

**Table 22 Number of extended busbars**

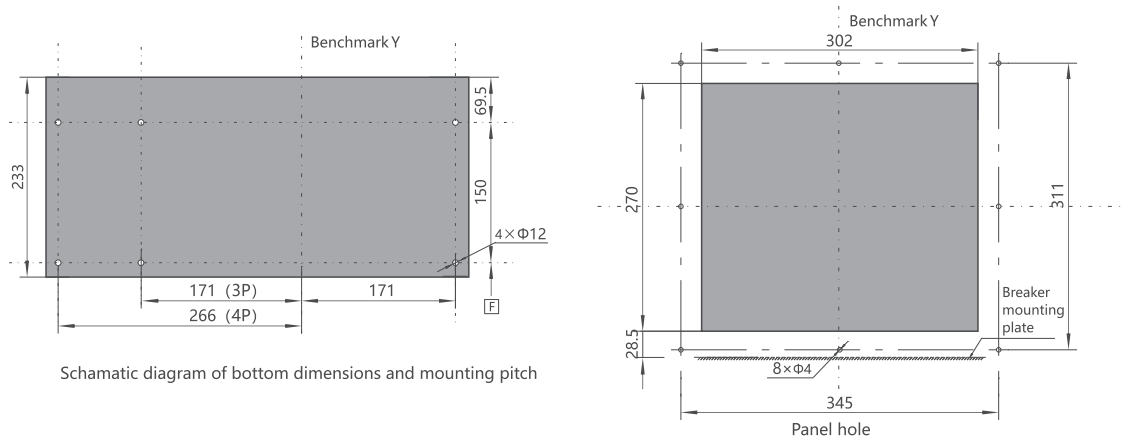
In(A)	Number of extended busbars			
	3P		4P	
	Phase A + Phase C	Phase B	Phase A + Phase B	Phase N + Phase C
400, 630	4	2	4	4
800 ~ 1250	4	2	4	4
1600	8	4	8	8

**Note:** For example, the number for (Phase A + Phase C) is 4, which means that Phase A and Phase C have the same number of extended busbars, two for Phase A and two for Phase C, a total of 4.

## 2000A fixed type



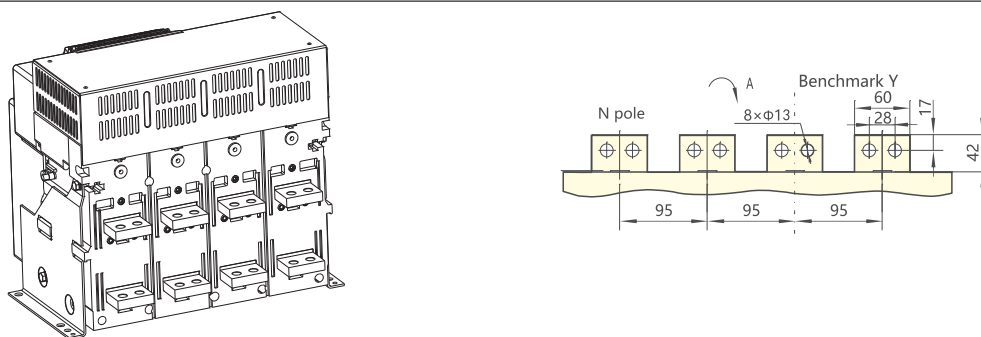
**Figure 11 Product size of NXA20 fixed type**



**Figure 12 Installation dimensions of NXA20 fixed type**

**Table 23 NXA20 busbar size (fixed type)**

H	Remarks
10	In=630A
15	In=800A ~ 1600A
20	In=2000A



**Figure 13 Installation dimensions of NXA20 fixed type (horizontally connected)**

## 2000A drawer type

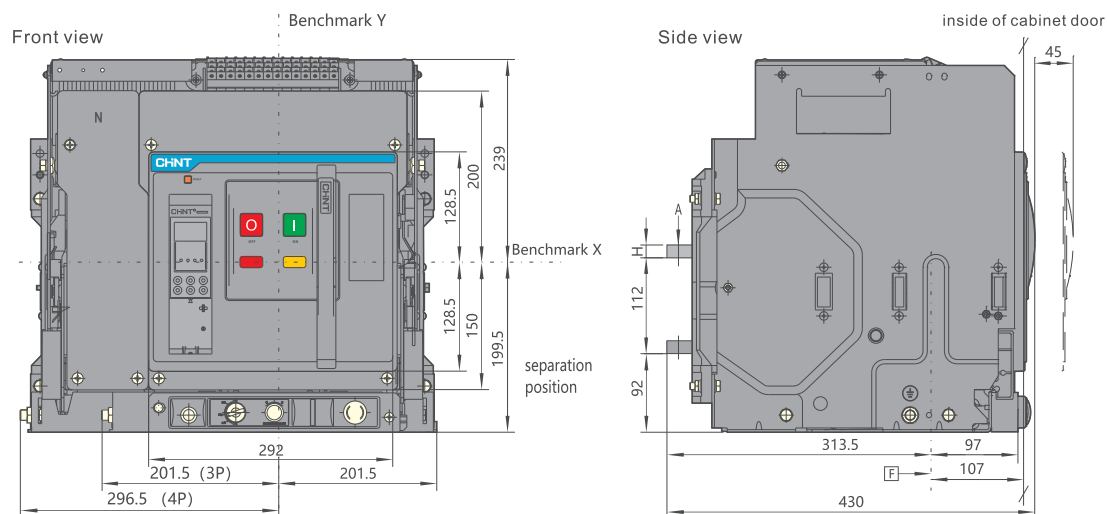


Figure 14 Product size of NXA20 drawer type

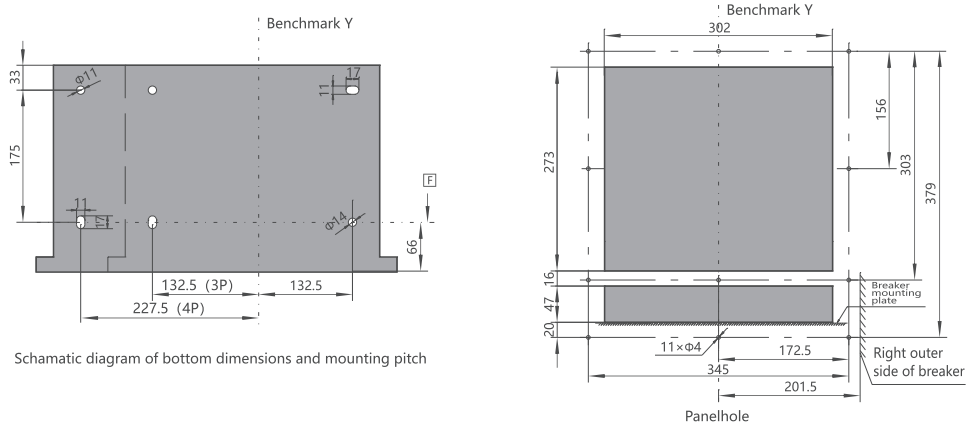


Figure 15 Installation dimensions of NXA20 drawer type

Table 24 NXA20 busbar size (drawer type)

H	Remarks
10	$I_n=630A$
15	$I_n=800A \sim 1600A$
20	$I_n=2000A$

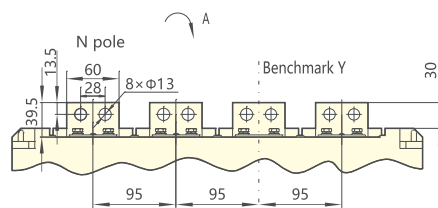
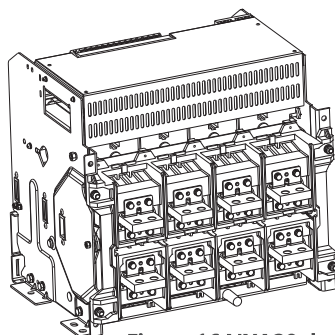


Figure 16 NXA20 drawer type busbar size (horizontally connected)

### 3200A fixed type

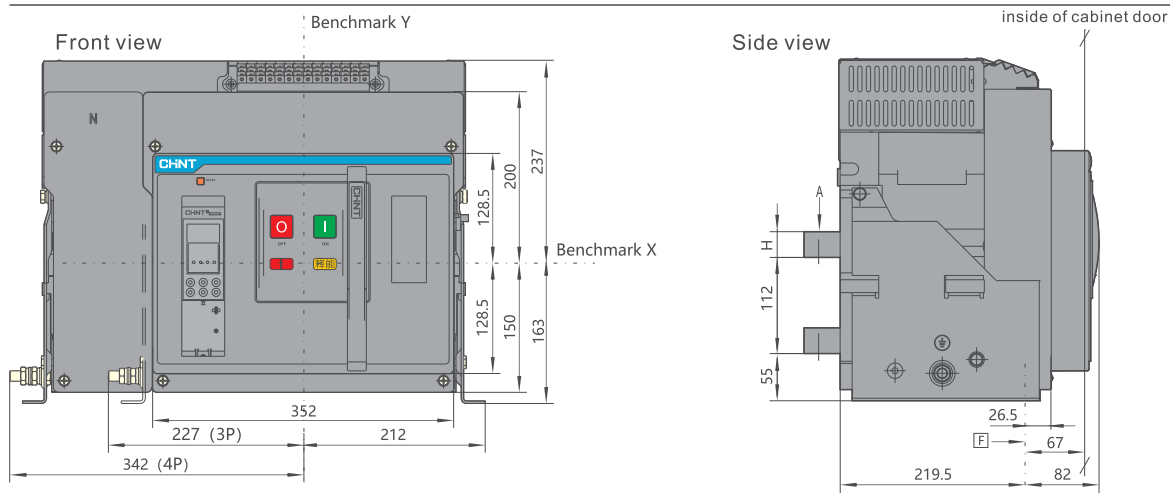


Figure 17 Product size of NXA32 fixed type

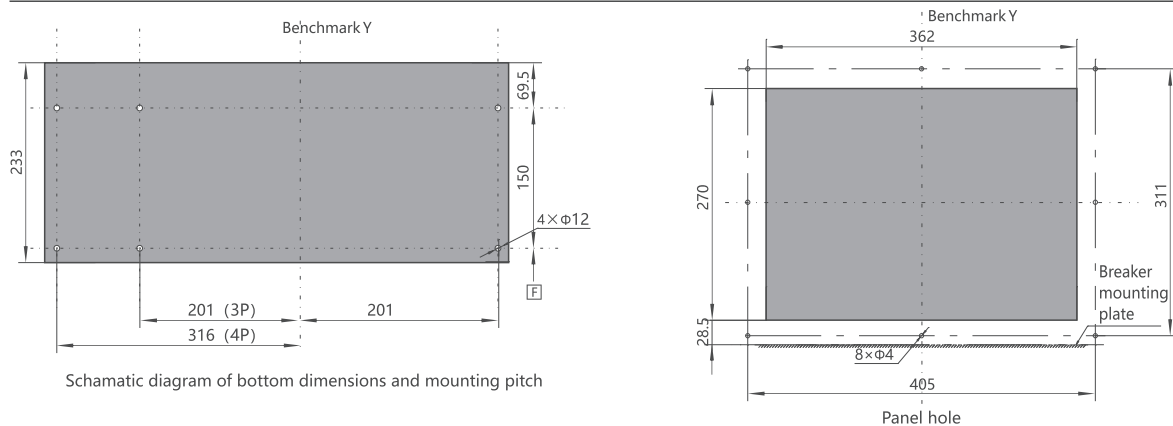


Figure 18 Installation dimensions of NXA32 fixed type

Table 25 NXA32 busbar size (fixed type)

H	Remarks
20	In=1600A ~ 2500A
30	In=3200A

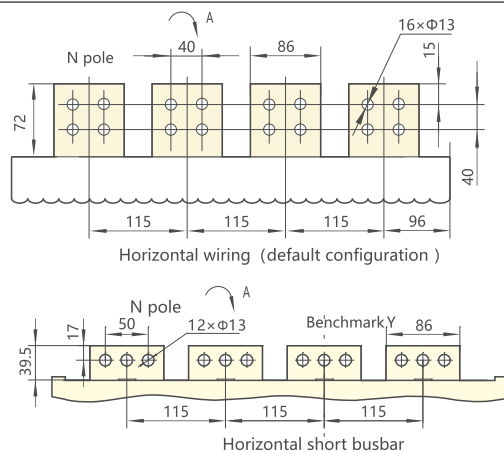
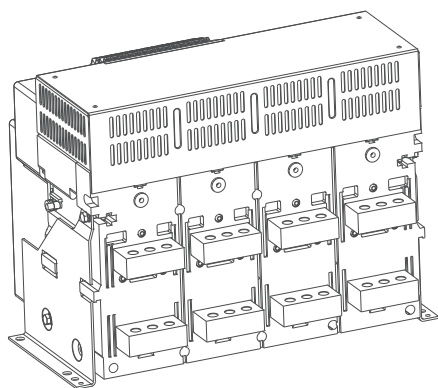
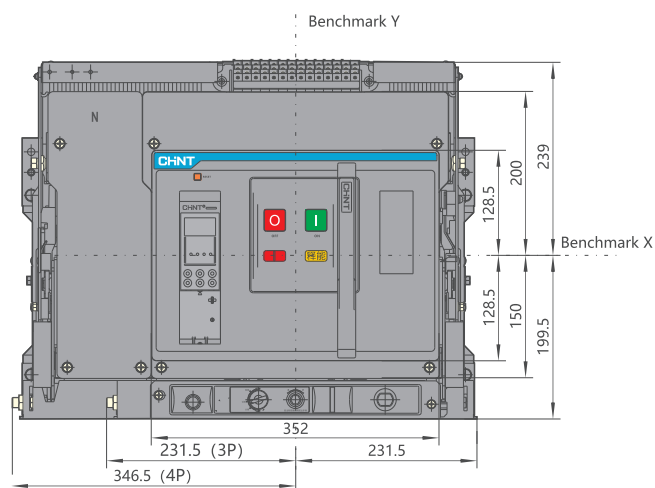


Figure 19 NXA32 fixed busbar size (horizontally connected)

### 3200 drawer type (default configuration)

Front view



Side view

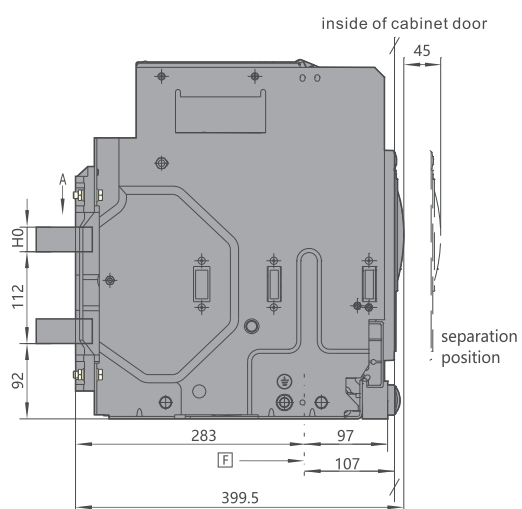
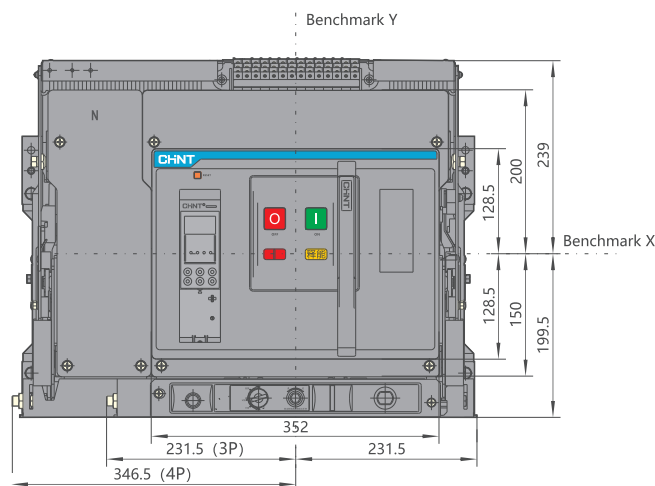


Figure 20 Product size of NXA32 drawer type (default configuration)

### 3200A drawer type (horizontal short busbar)

Front view



Side view

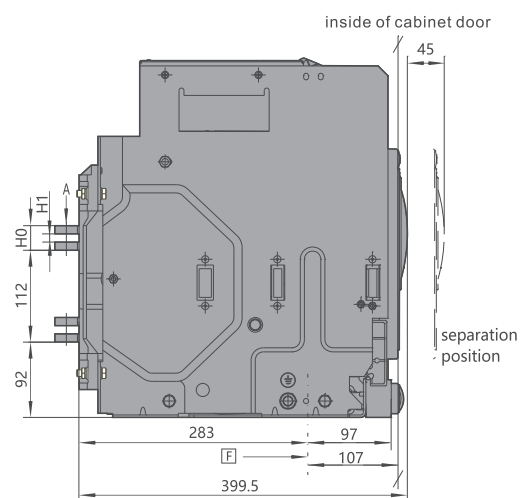
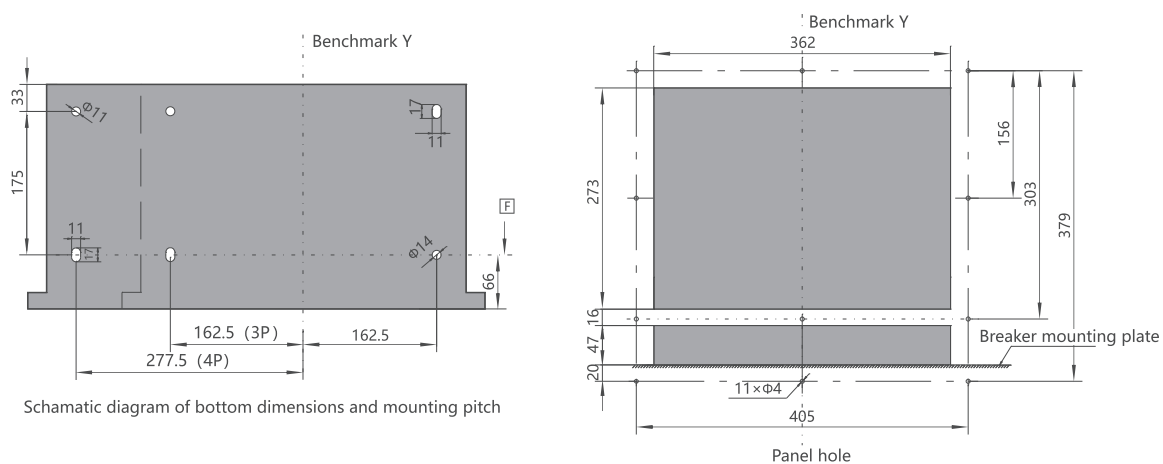


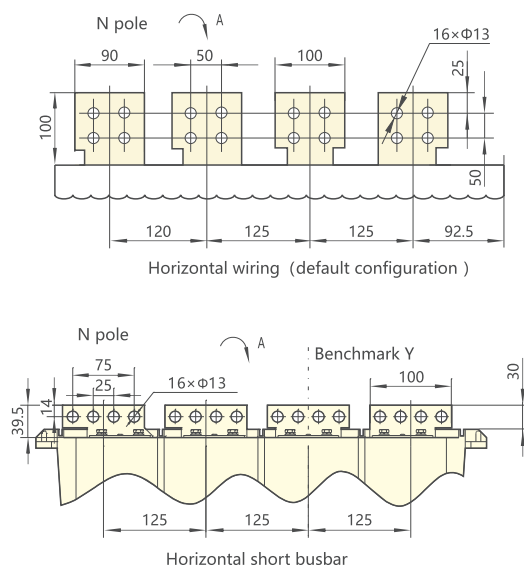
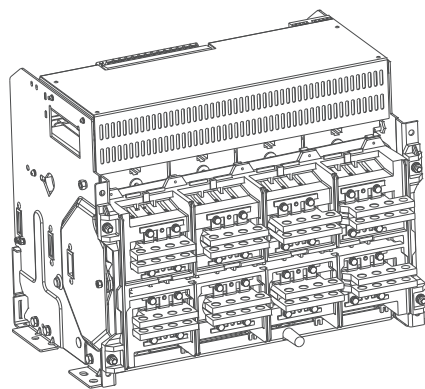
Figure 21 Product size of NXA32 drawer type (horizontal short busbar)



**Figure 22 Installation dimensions of NXA32 drawer type**

**Table 26 NXA32 busbar size (drawer type)**

H0	H1	Remarks
20	0	In=1600A ~ 2500A
30	10	In=3200A



**Figure 23 NXA32 drawer type busbar size (horizontally connected)**

## 4000A fixed type

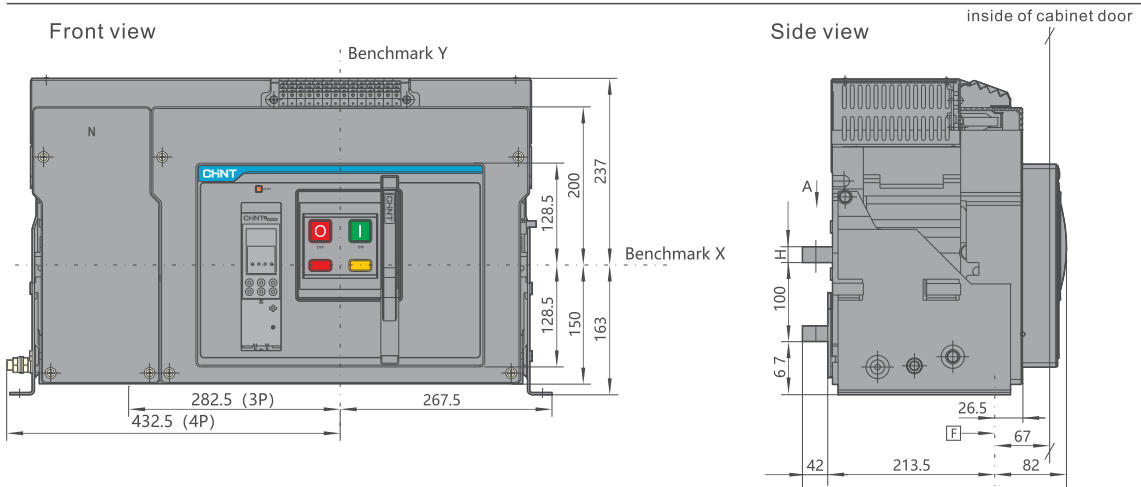


Figure 24 Product size of NXA40 fixed type

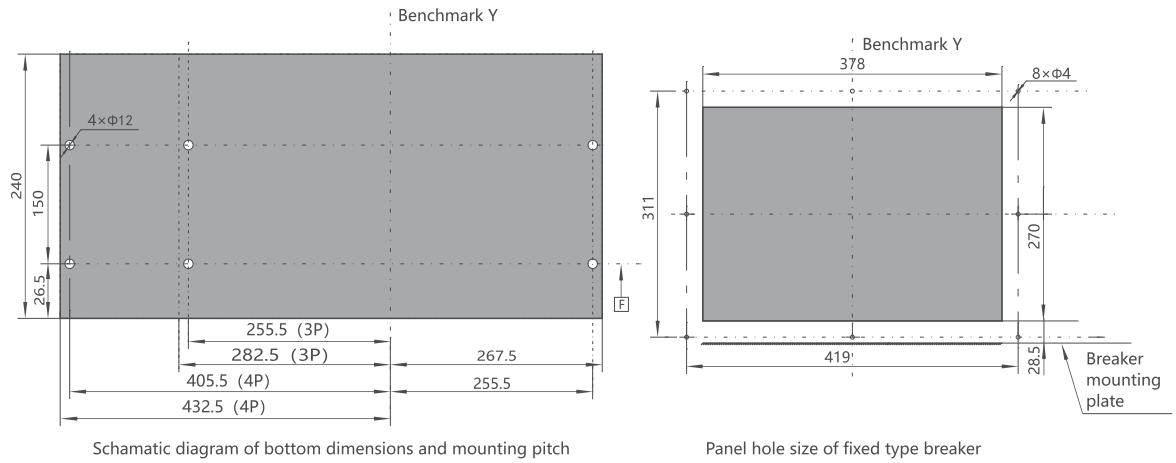


Figure 25 Installation dimensions of NXA40 fixed type

Table 27 NXA40 busbar size (fixed type)

H	Remarks
16	In=3200A
20	In=3600A~4000A

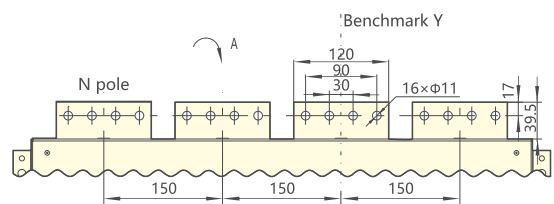
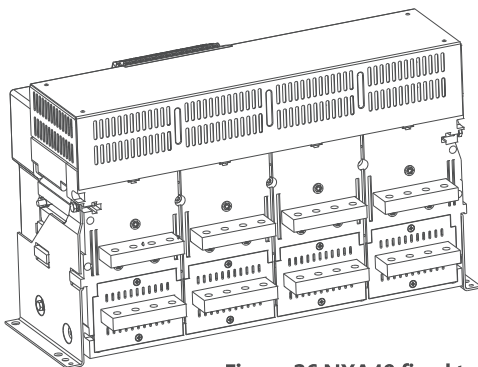


Figure 26 NXA40 fixed type busbar size (horizontally connected)

4000A drawer type

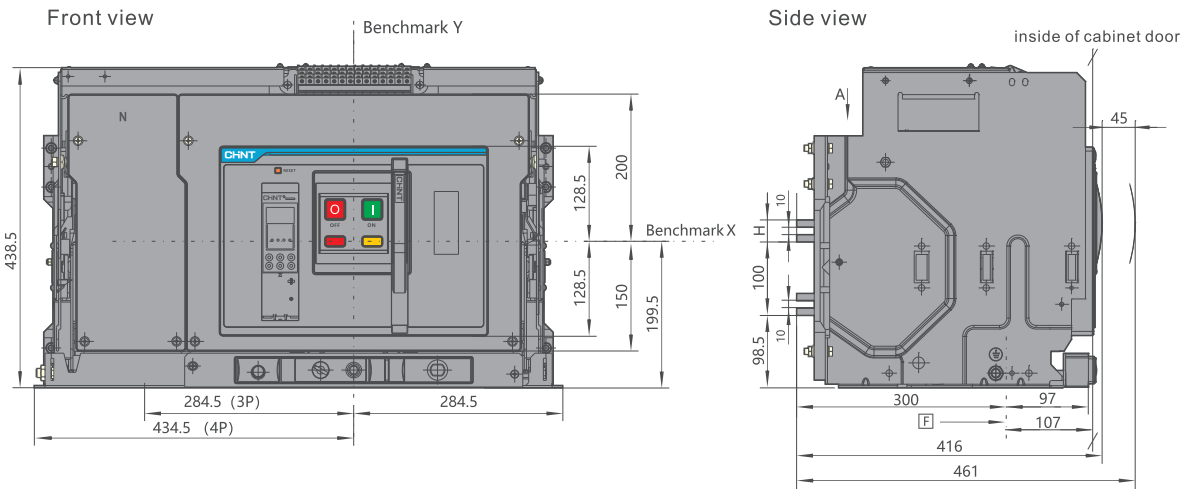


Figure 27 Product size of NXA40 drawer type

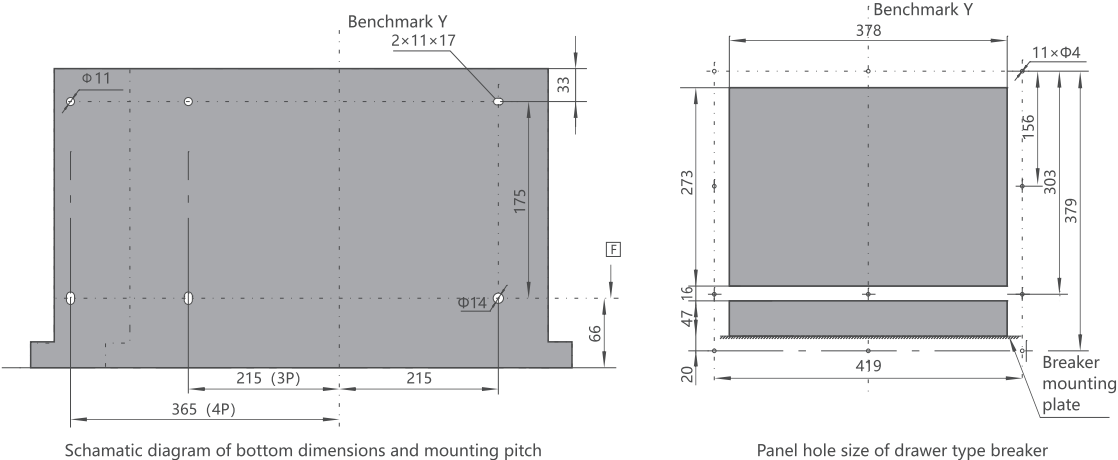


Figure 28 Installation dimensions of NXA40 drawer type

Table 28 NXA40 busbar size (drawer type)

H	Remarks
26	In=3200A
30	In=3600~4000A

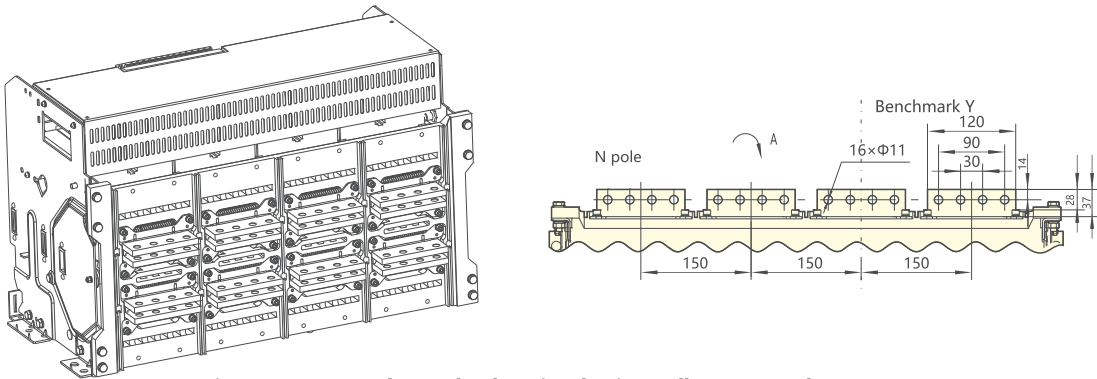


Figure 29 NXA40 drawer busbar size (horizontally connected)



## 6300 fixed type

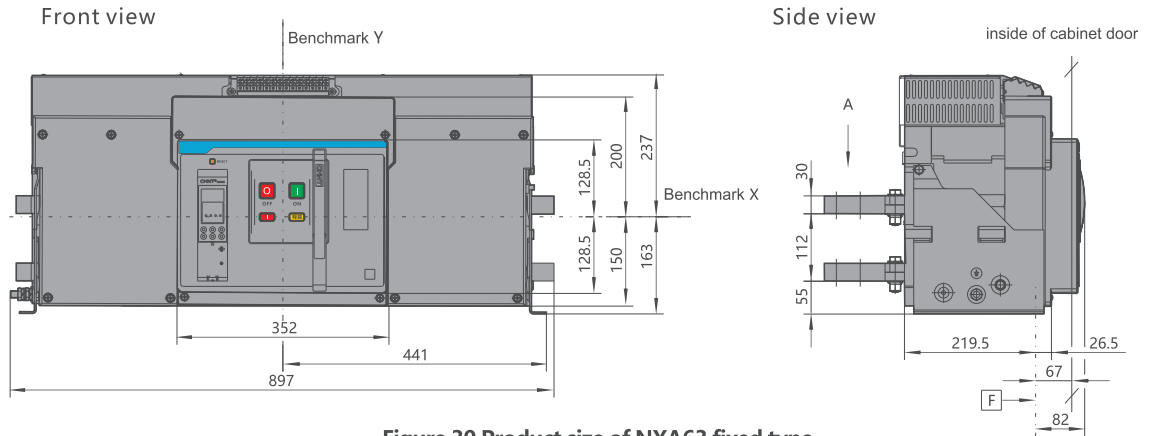


Figure 30 Product size of NXA63 fixed type

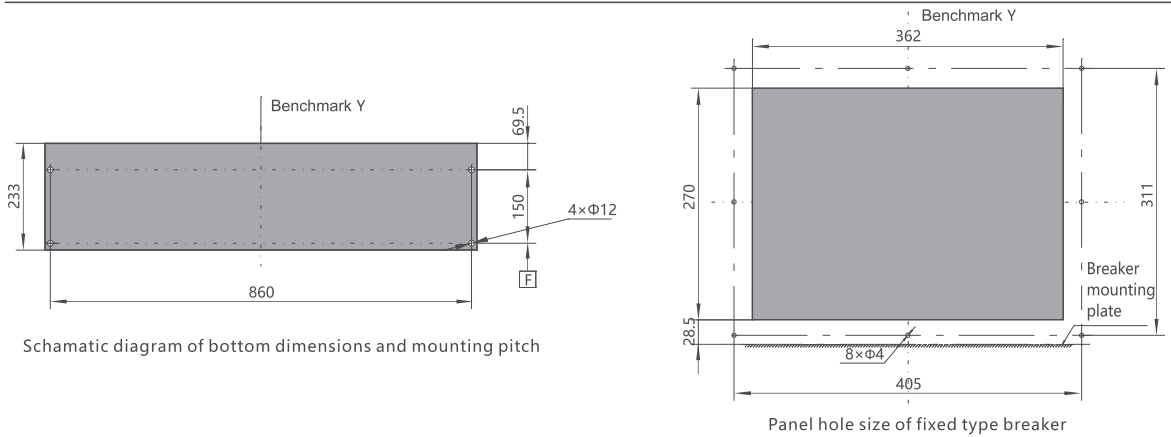


Figure 31 Installation dimensions of NXA63 fixed type

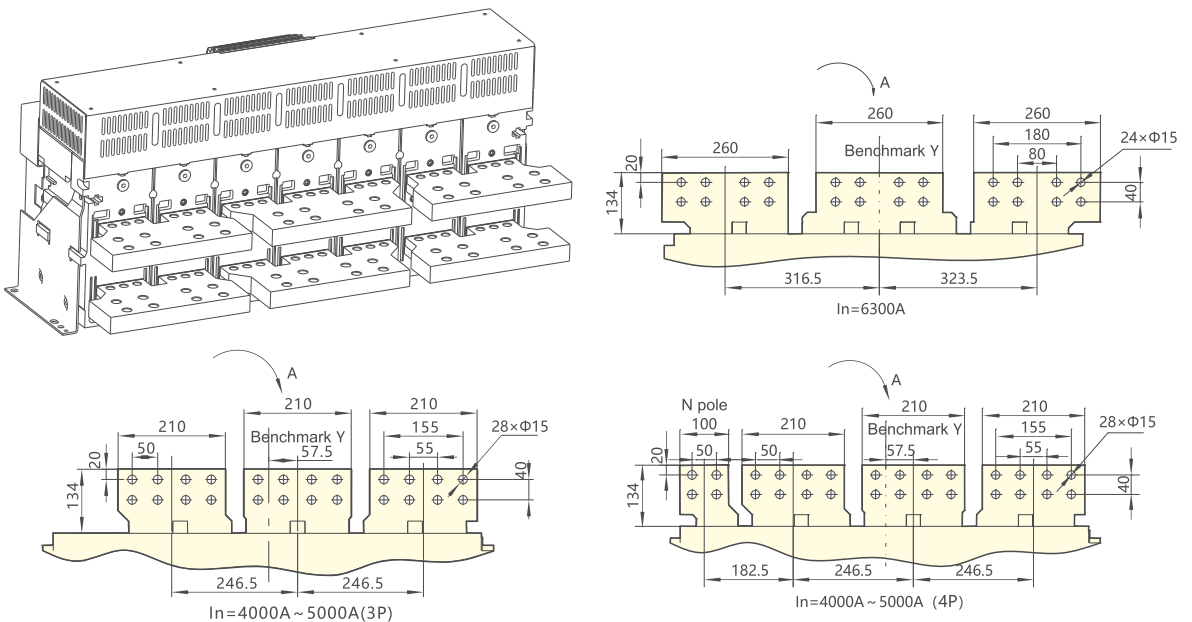


Figure 32 NXA63 fixed type busbar size (horizontally connected)

### 6300A drawer type



**Figure 33 Product size of NXA63 drawer type**



**Figure 34 Installation dimensions of NXA63 drawer type**



**Table 29 Single product weight (net weight)**

Model specification Weight (kg) Installation method	NXA16/NE(3/4)			NXA20/NE(3/4)			NXA32/NE(3/4)		NXA40/NE(3/4)		NXA63/NE(3/4)	
	400 ~630	800~ 1250	1600	630	800~ 1600	2000	1600 ~2500	3200	3200	3600 ~4000	4000 ~5000	6300
Fixed type	18/22	18/22	20/24	44/53	45/55	46/55	57/69	59/72	53/67	56/71	127/136	138/-
Drawer type	34/40	34/40	38/46	67/82	71/85	75/91	96/118	106/130	101/121	103/127	211/229	231/-

## 7 Installation, Commissioning and Operation

### 7.1 Basic Inspection and Technical Requirements for Installation

#### 7.1.1 Inspection items before installation

a. Check that your order matches the nameplate parameters on this breaker:

- (1) Rated current, setting current;
- (2) Main circuits voltage;
- (3) Installation mode , operation mode;
- (4) Intelligent controller voltage, shunt release voltage, under-voltage release voltage and delay time, closed

electromagnet voltage, and energy storage motor voltage;

(5) Other special ordering requirements.

b. Check the packing contents according to the configuration instructions in the manual;

c. Be sure to read this manual before installation, operation, maintenance and overhaul to avoid human damage to the breaker and unnecessary trouble;

#### 7.1.2 Preparation before installation

a. Unpack according to the unpacking order on the top cover of the packaging box. Do not use barbaric means;

b. Remove the breaker from the fixed bottom plate of the packaging box. If it is a drawer type breaker, remove the body out of the drawer seat after removing the bottom plate, and clean foreign objects in the drawer seat;

c. Check the insulation resistance of the breaker with a 500V megohmmeter. When the ambient temperature is  $20^{\circ}\text{C}\pm 5^{\circ}\text{C}$  and the relative humidity is 50%-70%, the insulation resistance should not be less than  $20\text{M}\Omega$ , otherwise the isolating switch should be dried.

#### 7.1.3 Recommendations for Busbar Installation by User

The maximum allowable temperature of the busbar:  $100^{\circ}\text{C}$ ; the busbar material is bare copper

**Table 30 Recommendations for busbar installation by user**

Frame	Rated current (A)	Ambient temperature (-45-40)°C				Ambient temperature 50°C				Ambient temperature 60°C			
		5mm thick busbar		10mm thick busbar		5mm thick busbar		10mm thick busbar		5mm thick busbar		10mm thick busbar	
		Number of pieces	Specification	Number of pieces	Specification	Number of pieces	Specification	Number of pieces	Specification	Number of pieces	Specification	Number of pieces	Specification
1600A	400	2	50*5	1	50*10	2	50*5	1	50*10	2	50*5	1	50*10
	630	2	50*5	1	50*10	2	50*5	1	50*10	2	50*5	1	50*10
	800	2	50*5	1	50*10	2	50*5	1	50*10	2	50*5	1	50*10
	1000	3	50*5	2	50*10	3	50*5	2	50*10	3	50*5	2	50*10
	1250	4	50*5	2	50*10	4	50*5	2	50*10	4	50*5	2	50*10
	1600	4	50*5	2	50*10	4	50*5	2	50*10	4	50*5	2	50*10
2000A	630	2	50*5	1	50*10	2	50*5	1	50*10	2	60*5	1	60*10
	800	2	50*5	1	50*10	2	50*5	1	50*10	2	60*5	1	60*10
	1000	3	50*5	2	50*10	3	50*5	2	50*10	3	60*5	2	50*10
	1250	3	60*5	2	50*10	3	60*5	2	50*10	3	60*5	2	50*10
	1600	4	60*5	2	60*10	4	60*5	2	60*10	4	60*5	2	60*10
	2000	6	60*5	3	60*10	6	60*5	3	60*10	6	60*5	3	60*10
3200A	1600	2	100*5	1	100*10	2	100*5	1	100*10	2	100*5	1	100*10
	2000	4	100*5	2	100*10	4	100*5	2	100*10	4	100*5	2	100*10
	2500	4	100*5	2	100*10	4	100*5	2	100*10	4	100*5	2	100*10
	3200	8	100*5	4	100*10	8	100*5	4	100*10	8	100*5	4	100*10
4000A	3200	8	100*5	4	100*10	8	100*5	4	100*10	8	100*5	4	100*10
	3600	7	120*5	3	120*12	7	120*5	3	120*12	7	120*5	3	120*12
	4000	8	120*5	4	120*10	8	120*5	4	125*10	8	125*5	4	125*10
6300A	4000	12	100*5	6	100*10	12	100*5	6	100*10	14	100*5	7	100*10
	5000	14	100*5	7	100*10	14	100*5	7	100*10	16	100*5	8	100*10
	6300	16	100*5	8	100*10	16	100*5	8	100*10	18	100*5	9	100*10

**Note:** a. When the copper bars selected by the user do not match the terminal block of the breaker, it is necessary to design and process extended bus for transfer, which should be designed by the user. The cross-sectional area of the extended bus should not be less than the requirements in the table above, and the gap between extended busbar should not be less than the gap between the terminal blocks of the breaker.

b. After the isolating switch is installed with the busbar recommended in the above table, it should be ensured that the clearance between adjacent phases of the breaker is not less than 18 mm.

c. When the breaker is selected for the electrical components in the load device that use thyristor for three-phase rectification and high-frequency inverter, such as the high-frequency induction heating furnace (medium frequency furnace steelmaking equipment), solid-state high-frequency welding machine (such as submerged arc welding machine) and vacuum heating melting equipment (such as monocrystalline silicon growth furnace), if it is necessary to consider the influence of the higher harmonics generated by the thyristor on the breaker in addition to the influence of ambient temperature and altitude, the breaker must be derated with a recommended derating factor of 0.5-0.8.

d. After the user installs the busbar, the clearance between the upper and lower busbar fastening bolts must not be less than 20 mm.

e. After the breaker is installed, the safety distance between the charged bodies of different potentials and between the charged body and the ground should not be less than 18 mm.

## 7.2 Installation of Circuit Breaker

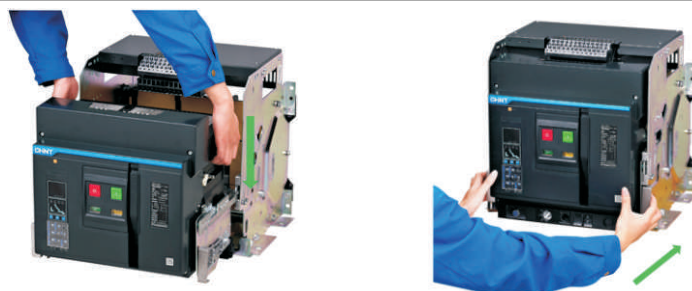
### 7.2.1 Installation of Drawer Circuit Breaker

For the NXA16 model, fix the drawer seat on the mounting plate of the power distribution cabinet and fasten with 4 M8 bolts (with washers), with a mounting torque of (10.3-14.4) N · m; for the NXA20-63 model, fix the drawer seat on the mounting plate of the power distribution cabinet and fasten with 4 M10 bolts (with washers), with a mounting torque of (20-28) N · m, as shown in Figure 36 (the drawer breaker can be installed vertically with the special bracket).



**Figure 36 Installation of drawer circuit breaker**

In the NXA16 model, the breaker body is directly placed on the drawer seat rail and pushed into the drawer seat until it cannot be pushed. In the NXA20-63 model, the rail is pulled out and the breaker body is placed on the rail as shown in the figure. Note that the two protruding brackets of the breaker should be stuck in the groove of the rail and the breaker body should be pushed inward until it cannot be pushed.



**Figure 37 Installing the body into the drawer seat**

Pull out the handle and fully insert the hex head of the handle into the handle hole of the drawer seat. Turn the handle clockwise until the position indicator reaches the "connected" position. When the secondary circuit of the NXA16 model is tightly joined without gaps or clicks are heard on both sides inside the drawer seat of the NXA20-63 model, immediately stop cranking inward and pull out the handle and put it in its original place.

**Note:** 1. Before placing the body into the drawer seat, check whether the rated current of the body is consistent with that of the drawer seat, otherwise the product may be damaged.

2. When cranking inward from the "test" position to the "connected" position, the breaker must be opened first to avoid accidents.

### 7.2.2 Installation of Fixed type Breaker

Place the breaker (fixed type) on the mounting bracket and tighten it, and connect the main circuit bus directly to the fixed breaker bus.



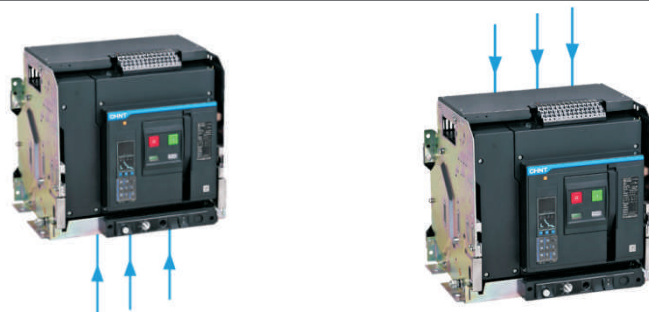
**Figure 38 Installation of fixed breaker**

**Note:** It is very important to evenly distribute the weight of the breaker on the hard mounting surface, such as installing on a rail or substrate. The mounting surface should be flat (with a tolerance of 2 mm) to prevent deformation that will affect the normal operation of the breaker.

### 7.3 Connection of Main Circuit

#### 7.3.1 Power Supply Incoming Line

The NXA series air circuit breaker can be equipped with either upper incoming line or lower incoming line without affecting the performance of the breaker, for easy installation in the power distribution cabinet.

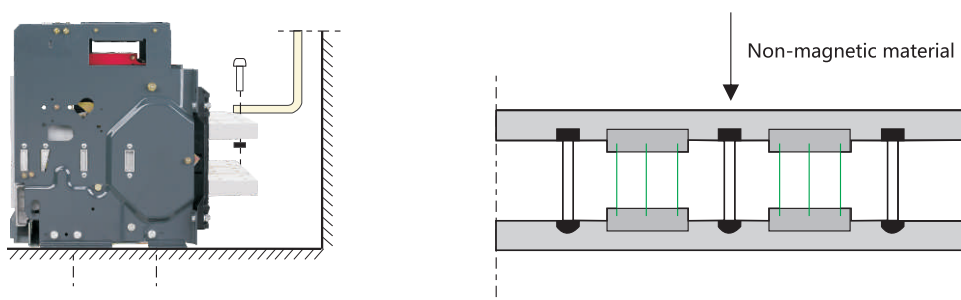


**Figure 39 Incoming mode of breaker**

#### 7.3.2 Spacing

Sufficient space must be provided to ensure good air circulation. The spacer between the upper and lower ends of the breaker must be non-magnetic.

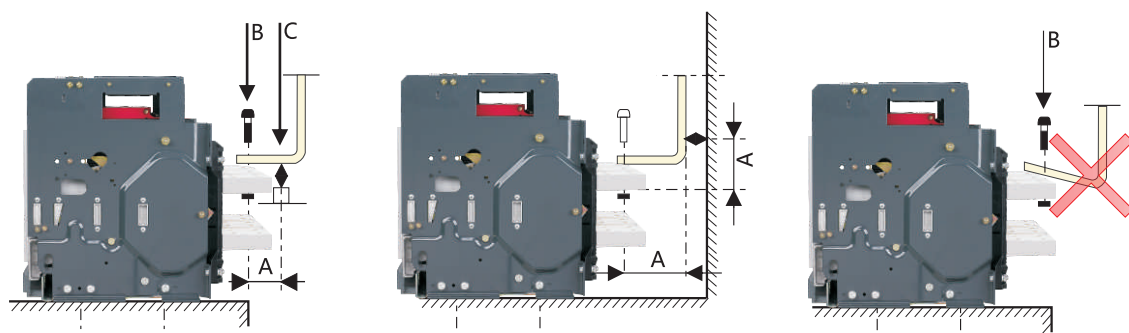
For the breaker with a current of 2500A or more, no magnetic circuit is formed when the metal separator has a current.



**Figure 40 The metal support or separator is non-magnetic**

#### 7.3.3 Busbar Connection

Before the bolt B is inserted into the bus and busbar, the position of the support rod and the busbar should be adjusted and positioned. The support rod should be fixed on the power distribution cabinet frame so that the breaker terminal does not have to bear its weight C (the support should be installed near the terminal).



**Figure 41 Breaker busbar connection**

Dynamic stability: The first support rod should be kept within the maximum distance from the breaker connection point (see Table 31). In order to prevent phase-to-phase short-circuit faults, this distance must meet the requirements of dynamic stability.

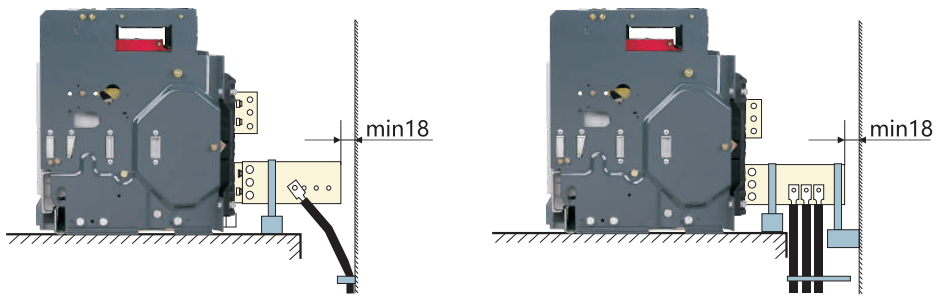
**Table 31 Maximum distance between the support rod and the breaker connection point**

Ics(kA)	≤30	40	50	75	80	100
distance(mm)	350	320	300	200	150	150

#### 7.3.4 Cable Connection

The cable connection should ensure that there is no excessive mechanical force on the breaker terminals. The user can use the power supply busbar to extend the terminal of the breaker. The cable can be either a single-core cable or a multi-core cable. The cable can usually be connected to the busbar according to the following rules:

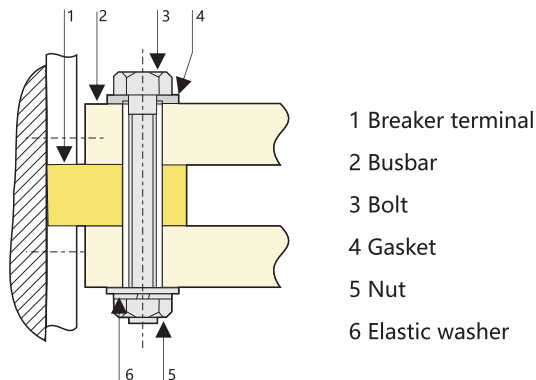
- (1) Position the cable lug before inserting the bolt;
- (2) Firmly fix the cable on the power distribution cabinet frame.



**Figure 42 Breaker cable connection**

#### 7.3.5 Fixing

The correct fixing of the busbar depends on the appropriate torque of the bolt and nut. Too large or too small a torque is not allowed. If the torque is too large, the bolts are easy to slide and the fastening effect is not achieved; if the torque is too small, the bolts and nuts are not fastened enough and the fastening effect is not achieved. Too high temperature rise will be caused in both of the circumstances. For the connection of the breaker, the tightening torque is shown in the table below. These data are suitable for copper busbars and steel bolts and nuts, and the level is  $\geq 8.8$ . The same torque can be used for aluminum busbars.



**Figure 43 Busbar fixing diagram**

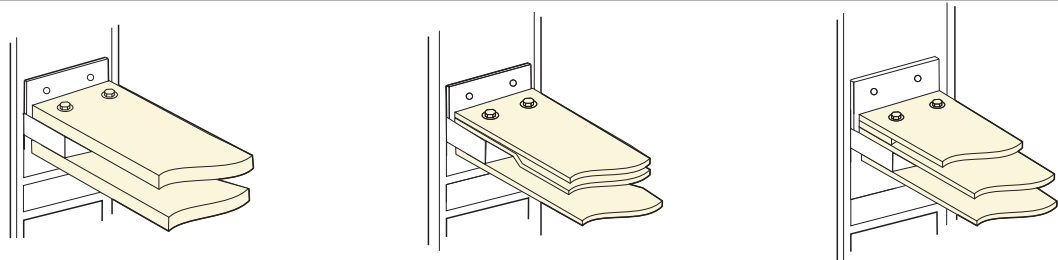


Figure 44 Recommended installation

Table 32 Bolt Configuration

Bolt type	Application	Preferred fixed torque
NXA16、NXA40:M10	Fastening the busbar	(36~52)N·m
NXA20、NXA32、NXA63:M12	Fastening the busbar	(61~94)N·m
NXA16~NXA63:M3	Fastening the secondary wiring wire	(0.4~0.5)N·m

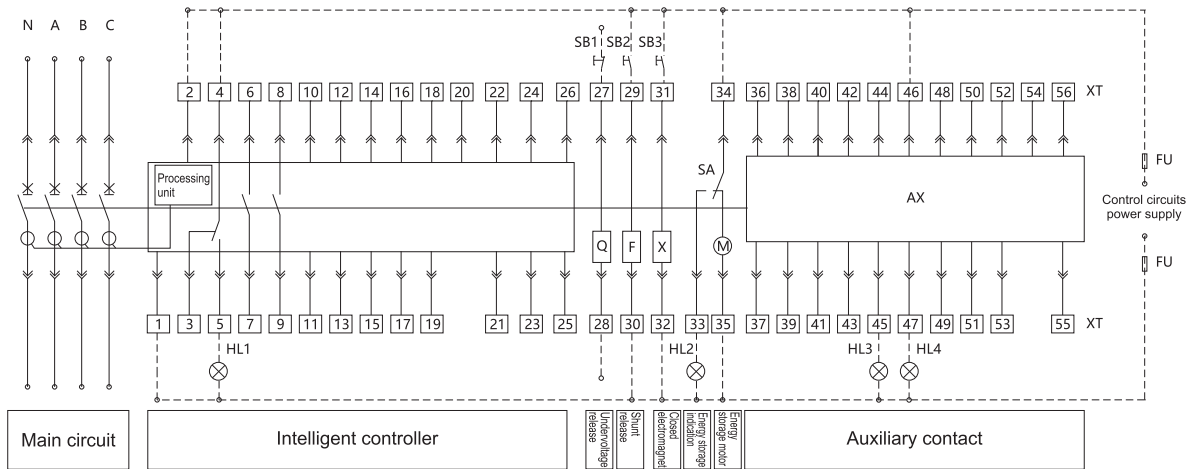
Table 33 Busbar opening hole size and mounting torque

Drilling Φ(mm)	Bolt diameter	Tightening torque
NXA16、NXA40:Φ11	M10	(36~52)N·m
NXA20、NXA32、NXA63:Φ13	M12	(61~94)N·m



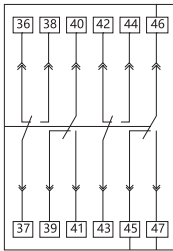
### 7.3.6 Secondary Circuit Wiring Diagram

#### 1600 frame M/A control unit

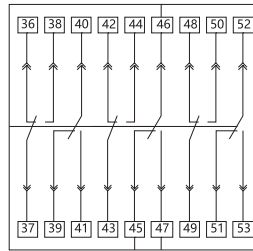


#### AX auxiliary contact type

Four sets of conversion auxiliary contacts (default)



Six sets of conversion auxiliary contacts



Q -- under-voltage releases

F -- shunt release

X -- closed electromagnet

M -- electric operating mechanism

SA -- stroke switch

XT -- terminal block

AX -- auxiliary contact

SB1 -- emergency stop button

SB2 -- opening button

SB3 -- closing button

HL1 -- fault indicator

HL2 -- energy storage indicator

HL3 -- opening indicator

HL4 -- closing indicator

FU -- fuse (6A)

1# and 2#: Intelligent controller power supply

3#-5#: Trip alarm contact (4 is common point)

6#-9#: Auxiliary contacts (normally open contacts)

10#-11#: Empty

12#-19#: Empty

20#: Empty

21#-24#: Empty

25#-26#: Input signal contact for external N-phase transformer, blank for regular products, to be specially ordered by the user;

or signal input contact for the external transformer which may be required by the user.

27# and 28#: Under-voltage release (should be connected in the main circuits);

29# and 30#: Shunt release. 31# and 32#: Closed electromagnet.

33# and 34#: Energy storage indication; 34# and 35#: Electric operating mechanism.

36#-56#: Auxiliary contacts. The six-set conversion auxiliary contacts are only suitable AC.

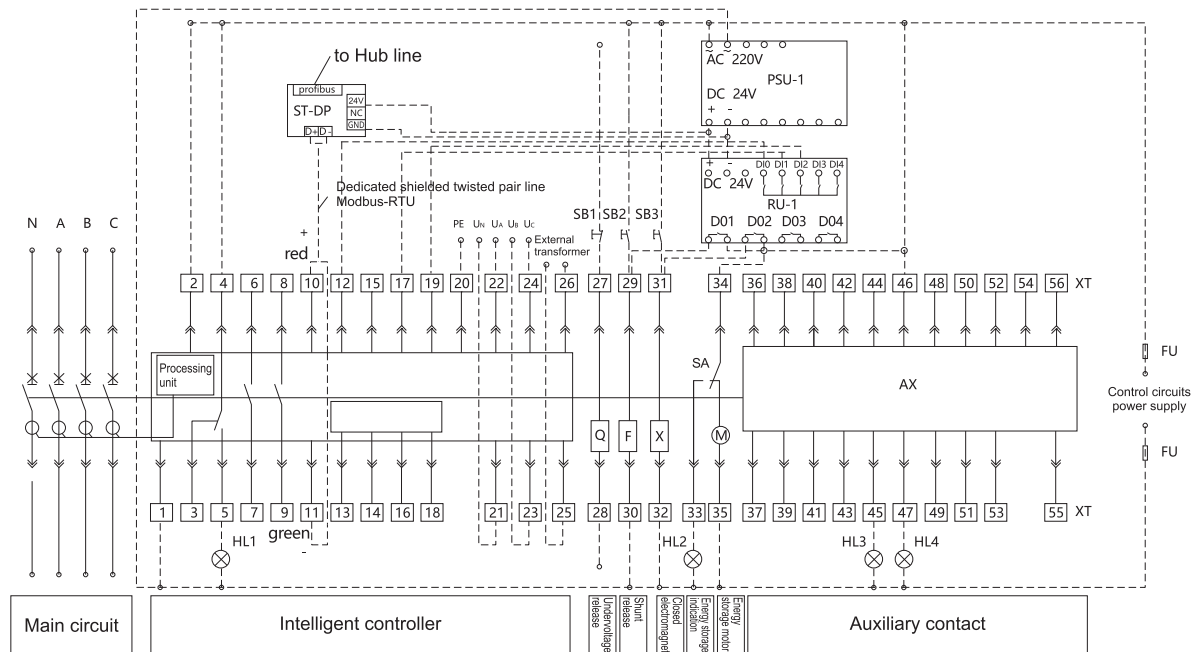
The regular products have four sets of conversion auxiliary contacts. Six sets of conversion auxiliary contacts may be provided for special orders.

Note: 1. The solid line part has been connected at the factory, and the dotted line part is to be wired by the user.

2. If 33# is required for use, please connect the indicator in series.

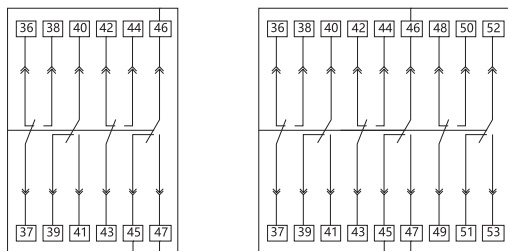
3. wiring diagram shows :the circuit no power, ACB is opening and in connection location, the operating mechanism has no power.

## 1600 frame P/H control unit



### AX auxiliary contact type

Four sets of conversion auxiliary contacts (default) Six sets of conversion auxiliary contacts



- Q -- under-voltage releases F -- shunt release  
X -- closed electromagnet M -- electric operating mechanism  
SA -- stroke switch XT -- terminal block AX -- auxiliary contact  
SBI -- emergency stop button SB2 -- opening close  
SB3 -- closing button HL1 -- fault indicator  
HL2 -- energy storage indicator HL3 -- opening indicator  
HL4 -- closing indicator FU -- fuse (6A) PSU-1 -- power unit  
1# and 2#: Intelligent controller power supply  
3#-5#: Trip alarm contact (4 is common point)  
6#-9#: Auxiliary contacts (normally open contacts)  
10#-11#: Default communication output contact of H-type intelligent controller; P-type is empty  
12#-19#: 4 sets of programmable output signals, must be connected to an external RU-1 relay unit.  
12#: COM, 13#: DO1, 15#: DO2, 17#: DO3, 19#: DO4

When the H-type intelligent controller comes with the programmable output signal, it has default outputs: 12# and 13#: load 1 alarm; 12# and 15#: load 2 alarm; 12# and 17#: opening signal output; 12# and 19#: closing signal output.

When the P-type intelligent controller comes with the programmable output signal, it has default outputs: 12# and 13#: load 1 alarm; 12# and 15#: load 2 alarm; 12# and 17#: self-diagnosis alarm; 12# and 19#: fault trip, and 20#: PE line.

21#-24#: Voltage display input signal contacts.

P/H intelligent controller: 21#: N-phase voltage signal, 22#: A-phase voltage signal, 23#: B-phase voltage signal, 24#: C-phase voltage signal

25#-26#: Input signal contacts for external N-phase transformer or external ground current transformer, blank for regular products, to be specially ordered by the user; or signal input contact for the external transformer which may be required by the user.

27# and 28#: Under-voltage release (should be connected in the main circuits); 29# and 30#: Shunt release;

31# and 32#: Closed electromagnet; 33# and 34#: Energy storage indication; 34# and 35#: Electric operating mechanism; 36#-56#: Auxiliary contacts.

The regular products have four sets of conversion auxiliary contacts. Six sets of conversion auxiliary contacts may be provided for special orders. The six-set conversion is only suitable for AC.

ST-DP: DP protocol module. When the host machine communication protocol is Modbus-RTU, the ST-DP protocol module is not required; When the host machine communication protocol is Profibus-DP, the ST-DP protocol module is used to convert the Modbus-RTU protocol into the Profibus-DP protocol, and the cost is extra.

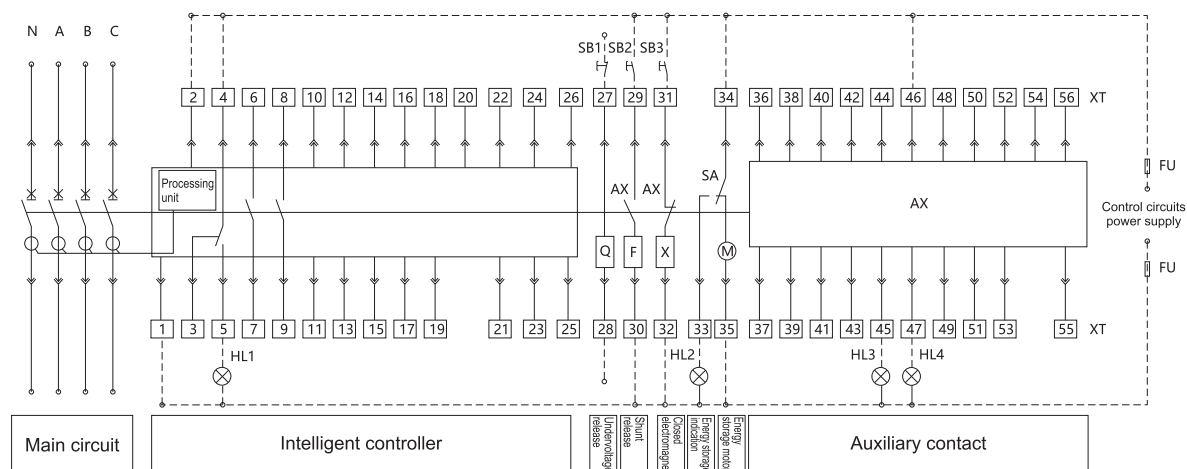
RU-1: Relay unit. The host machine opens and closes the breaker through remote control, and is used to amplify the opening and closing signal, and the cost is extra.

Note: 1. The solid line part has been connected at the factory, and the dotted line part is to be wired by the user.

2. If 33# is required for use, please connect the indicator in series.

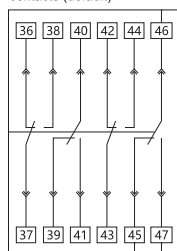
3. wiring diagram shows :the circuit circuits no power, ACB is opening and in connection location, the operating mechanism has no power.

## 2000-6300 frame M/A type control unit

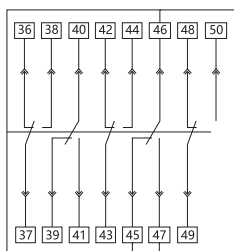


### AX auxiliary contact type

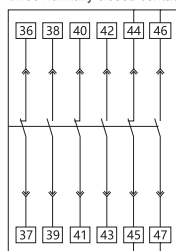
Four sets of conversion auxiliary contacts (default)



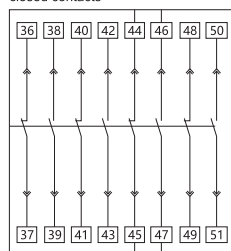
Five sets of conversion auxiliary contacts



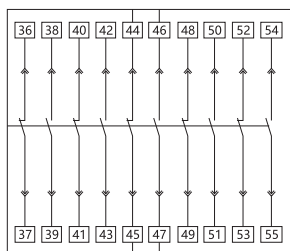
Three normally open and three normally closed contacts



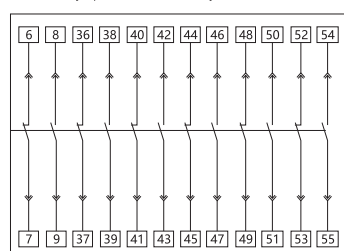
Four normally open and four normally closed contacts



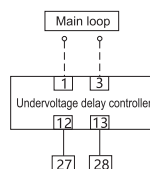
Five normally open and five normally closed contacts



Six normally open and six normally closed contacts



### Undervoltage delay controller wiring

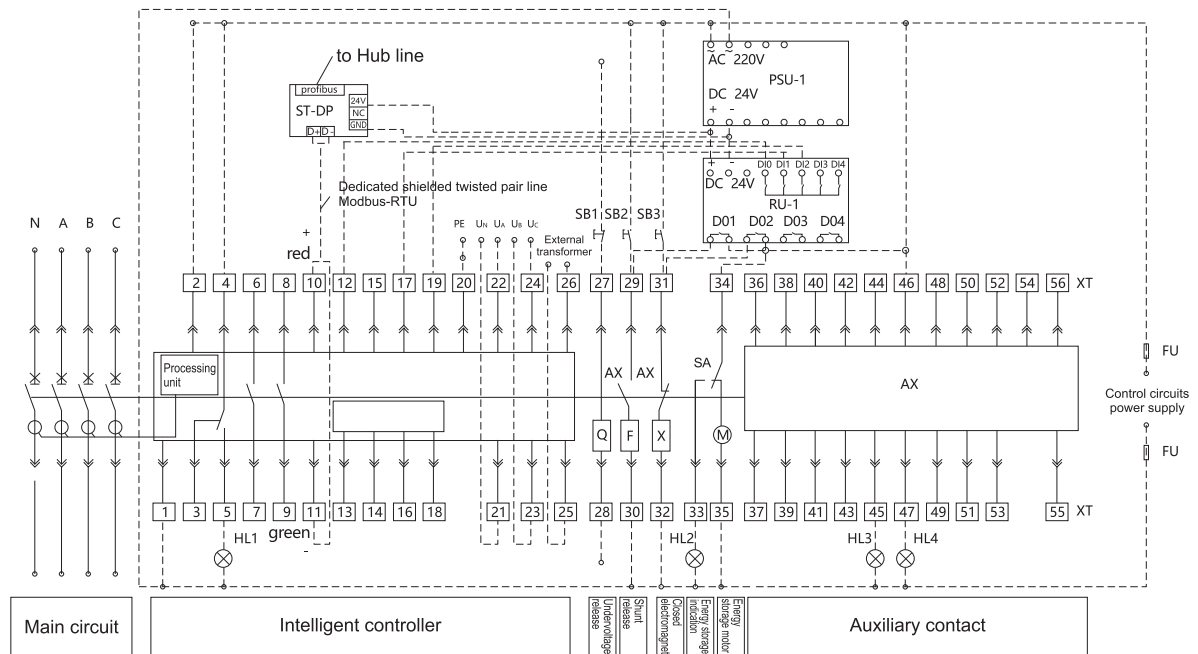


#### Note:

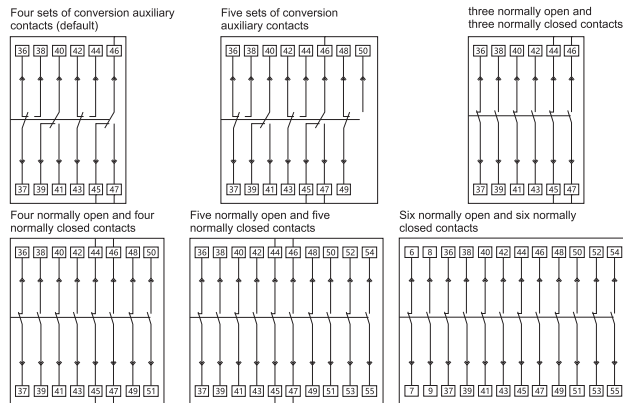
1. The solid line part has been connected at the factory, and the dotted line part is to be wired by the user.
2. When configuring the undervoltage delay release (helped priming type), please connect the control circuits to the input of the external undervoltage delay controller. At this time, the input of the controller is connected to the 27# and 28# ports of the product.
3. When the product is equipped with six open and six closed auxiliary contacts, the 6#-7# ports in the above wiring diagram are changed from normally open to normally closed and form one open and one closed auxiliary contacts with the 8#-9# ports. At this time, please use the 6#-9# ports for opening and closing indication of the control circuits.
4. wiring diagram shows :the circuit no power, ACB is opening and in connection location, the operating mechanism has no power.

Q -- undervoltage releases F -- shunt release  
X -- closed electromagnet M -- electric operating mechanism  
SA -- stroke switch XT -- terminal block  
AX -- auxiliary contact SB1 -- emergency stop button  
SB2 -- opening button SB3 -- closing button  
HL1 -- fault indicator HL2 -- energy storage indicator  
HL3 -- opening indicator HL4 -- closing indicator  
FU -- fuse (6A)  
1# and 2#: Intelligent controller power supply  
3#-5#: Trip alarm contact (4 is common point)  
6#-9#: Auxiliary contacts (normally open contacts)  
10#-11#: empty; 12#-19#: empty; 20#: empty  
21#-24#: Empty  
25#-26#: Input signal contacts for external N-phase transformer, blank for regular products, to be specially ordered by the user; or signal input contact for the external transformer which may be required by the user.  
27# and 28#: Undervoltage release (should be connected in the main circuits);  
29# and 30#: Shunt release.  
31# and 32#: Closed electromagnet;  
33# and 34#: Energy storage indication;  
34# and 35#: Electric operating mechanism;  
36#-56#: Auxiliary contacts.  
The regular products have four sets of conversion auxiliary contacts.  
The user may require three open and three closed auxiliary contacts, four open and four closed auxiliary contacts, five open and five closed auxiliary contacts, six open and six closed auxiliary contacts, and five sets of conversion contacts by special orders.

## 2000-6300 frame P/H type control unit



### AX auxiliary contact type



Q -- undervoltage release F -- shunt release X -- closed electromagnet  
M -- electric operating mechanism SA -- stroke switch XT -- terminal block  
AX -- auxiliary contact SB1 -- emergency stop button  
SB2 -- opening button SB3 -- closing button HL1 -- fault indicator  
HL2 -- energy storage indicator HL3 -- opening indicator  
HL4 -- closing indicator FU -- fuse (6A) PSU-1 -- power module  
1# and 2#: intelligent controller power supply; 3#-5#: Trip alarm contact  
(4 is common point)

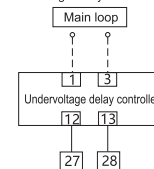
6#-9#: auxiliary contacts (normally open contacts); 10#-11#: default communication output contact of H-type intelligent controller, P-type being empty; 12#-19#: four sets of programmable output signals, must be connected to an external RU-1 relay unit; 12#: COM, 13#: DO1, 15#: DO2, 17#: DO3, 19#: DO4

Default output when the H-type intelligent controller has programmable output signals:

12# and 13#: load 1 alarm; 12# and 15#: load 2 alarm;

12# and 17#: opening signal output; 12# and 19#: closing signal output.

Undervoltage delay controller wiring



When the P-type intelligent controller comes with the programmable output signal, it has default outputs:

12# and 13#: load 1 alarm; 12# and 15#: load 2 alarm;

12# and 17#: self-diagnosis alarm; 12# and 19#: fault trip; and 20#: PE line.

21#-24#: Voltage display input signal contacts.

P/H intelligent controller: 21#: N-phase voltage signal, 22#: A-phase voltage signal, 23#: B-phase voltage signal, 24#: C-phase voltage signal

25#-26#: Input signal contacts for external N-phase transformer or external ground current transformer, blank for regular products, or signal input contact for the external transformer which may be required by the user.

27# and 28#: Undervoltage release (should be connected in the main circuits);

29# and 30#: Shunt release; 31# and 32#: closed electromagnet;

33# and 34#: Energy storage indication; 34# and 35#: Electric operating mechanism;

36#-56#: Auxiliary contacts.

The regular products have four sets of conversion auxiliary contacts. The user may require three open and three closed auxiliary contacts, four open and four closed auxiliary contacts, five open and five closed auxiliary contacts, six open and six closed auxiliary contacts, and five sets of conversion contacts by special orders.

ST-DP: DP protocol module. When the host machine communication protocol is Modbus-RTU, the ST-DP protocol module is not required; When the host machine communication protocol is Profibus-DP, the ST-DP protocol module is used to convert the Modbus-RTU protocol into the Profibus-DP protocol, and the cost is extra.

RU-1: Relay unit. The host machine opens and closes the breaker through remote control, and is used to amplify the opening and closing signal, and the cost is extra.

Note: 1. The solid line part has been connected at the factory, and the dotted line part is to be wired by the user.

2. When configuring the undervoltage delay release (helped priming type), please connect the control circuits to the input of the external undervoltage delay controller. At this time, the input of the controller is connected to the 27# and 28# ports of the product.

3. When the product is equipped with six open and six closed auxiliary contacts, the 6#-7# ports in the wiring diagram above are changed from normally open to normally closed and form one open and one closed auxiliary contacts with the 8#-9# ports. At this time, please use the 6#-9# ports for opening and closing indication of the control circuits.

4. If 33# is required for use, please connect the indicator in series.

5. wiring diagram shows :the circuit no power, ACB is opening and in connection location, the operating mechanism has no power.

## 7.3.7 Wiring Diagram of Position Signal Device of Drawer Seat type

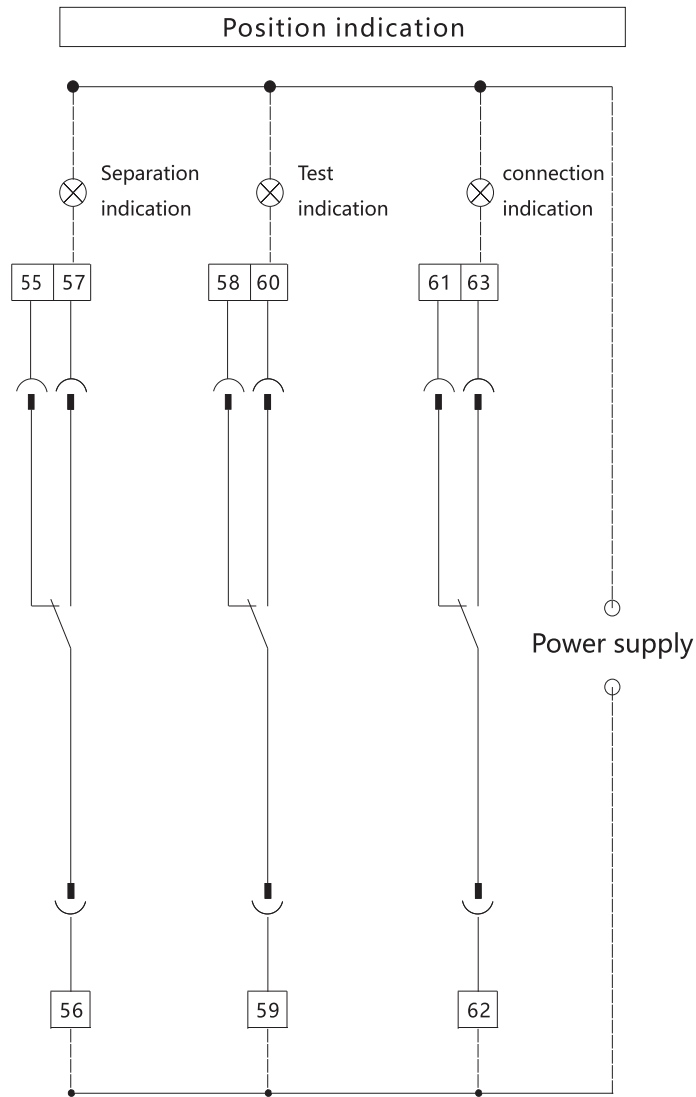


Figure 45 Position signal wiring

Operational requirements:

1. The drawer seat position indicating device can indicate the "separated", "test" and "connected" positions, which can be selected fully or partially according to the order requirements.
2. When the body of the drawer breaker is pushed from the "pulled" position to the "separated" position, the 55# and 56# terminals should be switched from on to off, and the 56# and 57# terminals should be switched from off to on.
3. When the body of the drawer breaker is cranked from the "separated" position to the "test" position, the 58# and 59# terminals should be switched from on to off, and the 59# and 60# terminals should be switched from off to on; there should be a sufficient safety distance between the breaker body bus and the drawer seat bridge contact, and the opening and closing operation can be reliably performed.

4. When the body of the drawer breaker is cranked from the "test" position to the "connected" position, do not continue cranking until when there is no gap in the secondary circuit for the NXA16 model or the drawer seat clatters for the NXA20-40 model. It is required that the 61# and 62# terminals should be switched from on to off and the 62# and 63# terminals should be switched from off to on within 1.5 rounds of the rocker handle of the drawer seat, and it is required that the bus of the breaker body is reliably inserted into the bridge contact of the drawer seat and can reliably carry the main circuit current for operation.
5. When the body of the drawer breaker is cranked from the "connected" position to the "test" position, the 58# and 59# terminals should be switched from on to off, and the 59# and 60# terminals should be switched from off to on; there should be a sufficient safety distance between the breaker body bus and the drawer seat bridge contact, and the opening and closing operation can be reliably performed.
6. When the body of the drawer breaker is cranked from the "test" position to the "separated" position, the 55# and 56# terminals should be switched from on to off, and the 56# and 57# terminals should be switched from off to on. At this time, the breaker body still cannot be pulled out. It is necessary to continue to crank to the "separated" position until the handle cannot be cranked any longer, and then the breaker body can be pulled out after the handle is pulled out. After the drawer breaker body is pulled out, the 55# and 56# terminals should be switched from off to on, and the 56# and 57# terminals should be switched from on to off.
7. During the drawer seat position switching operation, the pointer must be pointed to the "separated", "test" and "connected" positions before stopping cranking, otherwise the position indicating device will not correctly indicate the position of the breaker body in the drawer seat.
8. The above terminal numbers are all position signal specific numbers (55#-63#), which are not compatible with secondary circuit terminal numbers.



Figure 46 Position signal

Table 34 Position signal contact capacity

Rated voltage (V)	Rated heating current I <sub>th</sub> (A)	Rated operating current I <sub>e</sub> (A)	Rated control capacity
AC230	5	1.3	300VA
AC400	5	0.75	300VA
DC220	5	0.25	60W
DC110	5	0.55	60W

Drawer circuit breaker position signal: Installed on the drawer seat to indicate the position of the drawer circuit breaker body in the drawer seat. The positions that can be indicated are "separation", "test" and "connection".

## 7.4 Use of Circuit Breaker

### 7.4.1 Operation of Drawer Circuit Breaker

#### 7.4.1.1 Breaker Body Insertion Operation

- a. Pull out the rail;
- b. Place the breaker body on the drawer seat rail as shown in the figure. Note that the two protruding brackets of the NXA20-63 breaker should be stuck in the groove of the rail.
- c. Hold the handles on both sides of the breaker, lift the breaker slightly upwards, and push the body inward on both sides at the same time until it cannot be pushed, as shown in Figure 46.



**Figure 47 Push the body into the drawer seat (NXA20-63)**

- d. Pull out the handle and fully insert the hex head of the handle into the handle hole of the drawer seat, as shown in Figure 48.
- e. Turn the handle of the NXA16 model clockwise until the position indicator reaches the "connected" position, and when the secondary circuit is tightly joined without gaps, immediately stop cranking inward and pull out the handle and put it in its original place; Turn the handle of the NXA20-63 model clockwise until the position indicator reaches the "connected" position, and when clicks are heard on both sides inside the drawer seat, immediately stop cranking inward and pull out the handle and put it in its original place, as shown in Figure 49.



**Figure 48 Pulling out the handle**



**Figure 49 Cranking the breaker inward**

**Note:** 1. When operating the breaker, be sure to close the power distribution cabinet door to prevent accidents;  
2. When cranking inward from the "test" position to the "connected" position, the breaker must be opened first to avoid accidents.

#### 7.4.1.2 Breaker Body Pull out Operation

- a. First, move the breaker body from the "connected" position to the "separated" position (turn the handle counter clockwise), as shown in Figure 50.
- b. After pulling out the handle, pull out the breaker body (for the NXA16 model, press the button first), as shown in Figure 51. Be careful not to tilt or drop the breaker when pulling out the breaker body because the center of gravity moves forward.





**Figure 50 Turning the handle counter clockwise**

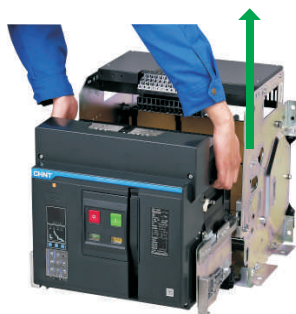


**Figure 51 Pulling out breaker body**

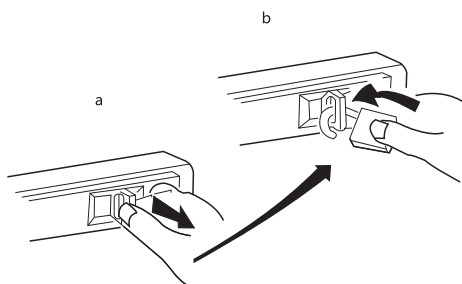
c. Remove the breaker body from inside the drawer as shown in Figure 52, and then push the extracted rail back to its original places

**Note:** 1. When operating the breaker, be sure to close the power distribution cabinet door to prevent accidents;

2. When cranking outward from the "connected" position to the "test" position, the breaker must be opened first to avoid accidents.



**Figure 52 Taking out the breaker body**



**Figure 53 Drawer padlock**



**Figure 54 Manual energy storage operation**

#### 7.4.1.3 Locking of "Separated" Position of Drawer Breaker (padlock to be purchased by the user)

Pull out the lock lever and thread it into the padlock, as shown in figure 53. At this point, the breaker cannot be cranked from the "separated" position to the "test" or "connected" position.

#### 7.4.2 Energy Storage Operation

7.4.2.1 Manual energy storage: When storing energy, move the energy storage handle up and down repeatedly six to seven times until a click is heard. When the hand does not feel the reaction force and the energy storage indicators indicates "energy stored", the energy storage ends, as shown in Figure 54.

7.4.2.2 Electric energy storage: After the control circuit is energized, the electric energy storage mechanism immediately performs energy storage automatically (when the control circuit has connected to the automatic pre-storage form).

#### 7.4.3 Opening and Closing Operations

##### 7.4.3.1 Manual Opening and Closing Operations

a. Closing: When the breaker is storing energy and in the off state, press the green "I" button and the breaker closes, and the "opening/closing" indicator switches from "o" to "I", and the "energy storage/release" indicator switches from "energy storage" to "energy release" state, as shown in Figure 55.

b. Opening: When the breaker is in the closed state, press the red "o" button and the breaker opens, and the "opening/closing" indicator switches from "I" to "o", as shown in Figure 56.





**Figure 55 Manual closing operation**



**Figure 56 Manual opening operation**

**Note:** When operating the isolating switch, be sure to close the power distribution cabinet door to prevent accidents.

When the product is equipped with an undervoltage release, it cannot be closed until the undervoltage release is energized.

#### 7.4.3.2 Electric Opening and Closing Operations

- a. Closing: When the breaker is storing energy and is in the off state (ensure that undervoltage has been sucked), apply the rated voltage to the closing electromagnet to close the breaker.
- b. Opening: When the breaker is in the closed state, applying the rated voltage to the shunt release can open the breaker.

## 7.5 Selective protection between NM8 and NXA

Table 35 Selective protection between NM8 and NXA

Selective protection between NM8 and NXA			Upstream	Frame size rated current		NXA16						NXA20			
Downstream				Rated current (A)		400	630	800	1000	1250	1600	630	800		
				Default setting ratings of short time-delay 8In (kA)		3.2	5.04	6.4	8	10	12.8	5.04	6.4		
				Setting ratings (kA)		0.8~4	1.26~6.3	1.6~8	2~10	2.5~12.5	3.2~16	1.26~6.3	1.6~8		
				Delayed tripping time (s)		0.1, 0.2, 0.3, 0.4									
				Returnable time		0.05, 0.14, 0.25, 0.33									
Frame size rated current	Rated current (A)	Instantaneous setting ratings (kA)													
NM8-100 NM8S-100	16	0.16			0.8~4	1.26~6.3	1.6~8	2~10	2.5~12.5	3.2~16	1.26~6.3	1.6~8			
		0.19 (Motor)			0.8~4	1.26~6.3	1.6~8	2~10	2.5~12.5	3.2~16	1.26~6.3	1.6~8			
	20	0.2			0.8~4	1.26~6.3	1.6~8	2~10	2.5~12.5	3.2~16	1.26~6.3	1.6~8			
		0.24 (Motor)			0.8~4	1.26~6.3	1.6~8	2~10	2.5~12.5	3.2~16	1.26~6.3	1.6~8			
	25	0.25			0.8~4	1.26~6.3	1.6~8	2~10	2.5~12.5	3.2~16	1.26~6.3	1.6~8			
		0.30 (Motor)			0.8~4	1.26~6.3	1.6~8	2~10	2.5~12.5	3.2~16	1.26~6.3	1.6~8			
	32	0.32			0.8~4	1.26~6.3	1.6~8	2~10	2.5~12.5	3.2~16	1.26~6.3	1.6~8			
		0.38 (Motor)			0.8~4	1.26~6.3	1.6~8	2~10	2.5~12.5	3.2~16	1.26~6.3	1.6~8			
	40	0.4			0.8~4	1.26~6.3	1.6~8	2~10	2.5~12.5	3.2~16	1.26~6.3	1.6~8			
		0.48 (Motor)			0.8~4	1.26~6.3	1.6~8	2~10	2.5~12.5	3.2~16	1.26~6.3	1.6~8			
	50	0.5			0.8~4	1.26~6.3	1.6~8	2~10	2.5~12.5	3.2~16	1.26~6.3	1.6~8			
		0.60 (Motor)			0.828~4	1.26~6.3	1.6~8	2~10	2.5~12.5	3.2~16	1.26~6.3	1.6~8			
	63	0.63			0.869~4	1.26~6.3	1.6~8	2~10	2.5~12.5	3.2~16	1.26~6.3	1.6~8			
		0.75 (Motor)			1.035~4	1.26~6.3	1.6~8	2~10	2.5~12.5	3.2~16	1.26~6.3	1.6~8			
	80	0.8			1.104~4	1.26~6.3	1.6~8	2~10	2.5~12.5	3.2~16	1.26~6.3	1.6~8			
		0.96 (Motor)			1.325~4	1.324~6.3	1.6~8	2~10	2.5~12.5	3.2~16	1.324~6.3	1.6~8			
	100	1			1.380~4	1.380~6.3	1.6~8	2~10	2.5~12.5	3.2~16	1.380~6.3	1.6~8			
		1.20 (Motor)			1.656~4	1.656~6.3	1.656~8	2~10	2.5~12.5	3.2~16	1.656~6.3	1.656~8			
NM8-250 NM8S-250	100	1			1.380~4	1.380~6.3	1.6~8	2~10	2.5~12.5	3.2~16	1.380~6.3	1.6~8			
		1.20 (Motor)			1.656~4	1.656~6.3	1.656~8	2~10	2.5~12.5	3.2~16	1.656~6.3	1.656~8			
	125	1.25			1.725~4	1.725~6.3	1.725~8	2~10	2.5~12.5	3.2~16	1.725~6.3	1.725~8			
		1.5 (Motor)			2.070~4	2.070~6.3	2.070~8	2.070~10	2.5~12.5	3.2~16	2.070~6.3	2.070~8			
	160	1.6			2.208~4	2.208~6.3	2.208~8	2.208~10	2.5~12.5	3.2~16	2.208~6.3	2.208~8			
		1.92 (Motor)			2.650~4	2.649~6.3	2.649~8	2.649~10	2.649~12.5	3.2~16	2.649~6.3	2.649~8			
	180	1.8			2.484~4	2.484~6.3	2.484~8	2.484~10	2.500~12.5	3.2~16	2.484~6.3	2.484~8			
		2.16 (Motor)			2.981~4	2.980~6.3	2.980~8	2.980~10	2.980~12.5	3.2~16	2.980~6.3	2.980~8			
	200	2			2.760~4	2.760~6.3	2.760~8	2.760~10	2.760~12.5	3.2~16	2.760~6.3	2.760~8			
		2.4 (Motor)			3.312~4	3.312~6.3	3.312~8	3.312~10	3.312~12.5	3.312~16	3.312~6.3	3.312~8			
	225	2.25			3.105~4	3.105~6.3	3.105~8	3.105~10	3.105~12.5	3.200~16	3.105~6.3	3.105~8			
		2.7 (Motor)			3.726~4	3.726~6.3	3.726~8	3.726~10	3.726~12.5	3.720~16	3.726~6.3	3.726~8			
	250	2.5			3.450~4	3.450~6.3	3.450~8	3.450~10	3.450~12.5	3.450~16	3.450~6.3	3.450~8			
		3.0 (Motor)			/	4.140~6.3	4.140~8	4.140~10	4.140~12.5	4.140~16	4.140~6.3	4.140~8			
	NM8-630 NM8S-630	250	2.5			3.450~4	3.450~6.3	3.450~8	3.450~10	3.450~12.5	3.450~16	3.450~6.3	3.450~8		
			3.0 (Motor)			/	4.140~6.3	4.140~8	4.140~10	4.140~12.5	4.140~16	4.140~6.3	4.140~8		
315		3.15			/	4.347~6.3	4.347~8	4.347~10	4.347~12.5	4.347~16	4.347~6.3	4.347~8			
		3.78 (Motor)			/	5.216~6.3	5.216~8	5.216~10	5.216~12.5	5.216~16	5.216~6.3	5.216~8			
350		3.5			/	4.830~6.3	4.830~8	4.830~10	4.830~12.5	4.830~16	4.830~6.3	4.830~8			
		4.2 (Motor)			/	5.796~6.3	5.796~8	5.796~10	5.796~12.5	5.796~16	5.796~6.3	5.796~8			
400		4			/	5.520~6.3	5.520~8	5.520~10	5.520~12.5	5.520~16	5.520~6.3	5.520~8			
		4.8 (Motor)			/	/	6.624~8	6.624~10	6.624~12.5	6.624~16	/	6.624~8			
500		5			/	/	6.900~8	6.900~10	6.900~12.5	6.900~16	/	6.900~8			
		6.0 (Motor)			/	/	/	8.280~10	8.280~12.5	8.280~16	/	/			
NM8-1250 NM8S-1250	630	6.3			/	/	/	8.694~10	8.694~12.5	8.694~16	/	/			
		7.56 (Motor)			/	/	/	/	10.43~12.5	10.43~16	/	/			
	700	7			/	/	/	9.660~10	9.660~12.5	9.660~16	/	/			
		8.4 (Motor)			/	/	/	/	11.59~12.5	11.59~16	/	/			
	800	8			/	/	/	/	11.04~12.5	11.04~16	/	/			
		9.6 (Motor)			/	/	/	/	/	13.24~16	/	/			
	1000	10			/	/	/	/	/	13.80~16	/	/			
		12 (Motor)			/	/	/	/	/	/	/	/			
	1250	12.5			/	/	/	/	/	/	/	/			
		15.0 (Motor)			/	/	/	/	/	/	/	/			

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8 Maintenance, Handling and Storage Precautions

8.1 Safety Precautions

The following operations must be performed in sequence before the maintenance and overhaul of the circuit breaker:

- a. Open the circuit breaker to ensure that the circuit breaker is in the open state;
- b. Disconnect the upper level knife switch to ensure that the main circuit and the secondary circuit are not energized;
- c. Energy release and open the circuit breaker to ensure that the circuit breaker is in the energy release and open state;
- d. All components that may be touched by the staff must be unpowered.



Be careful

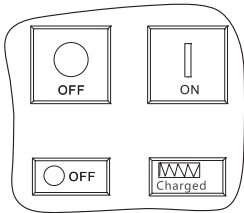
8.2 Maintenance and Overhaul Cycle Shown in Table 36

Table 36 Maintenance and overhaul cycle

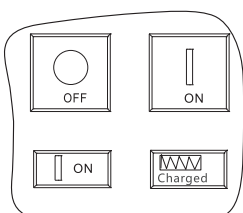
Conditions	Environment	Maintenance cycle	Overhaul cycle	Remarks
General environment	The air is kept clean and dry without corrosive gases, the temperature is between -5°C and +40°C, and the humidity meets 3.1.3 operating conditions in the manual.	Once every six months	Once a year (once every six months if installed for more than three years)	In line with IEC/EN 60947-2 General environmental conditions requirements
Harsh environment	-5°C to -40°C or 40°C-65°C, or humidity≥90%	Once every three months	Once every six months (once every three months if installed for more than three years)	
	A place with much dust and corrosive gases	Once a month	Once every three months	

8.3 Maintenance of Circuit Breaker

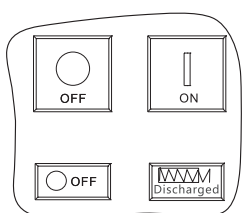
- 8.3.1 Regularly remove foreign objects (such as tools, wire ends or debris, metal foreign objects, etc.) from the power distribution cabinet.
- 8.3.2 Regularly remove dust from the circuit breaker to keep the circuit breaker well insulated.
- 8.3.3 Check whether the spring washer of the connecting bolt and grounding bolt of the main circuit is flattened and the connection is firm.
- 8.3.4 Check whether the opening and closing indications are correct and reliable.



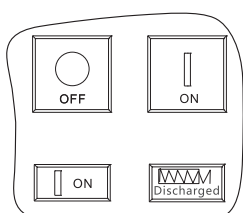
57-a Opening energy storage



57-b Closing energy storage



57-c Opening energy release



57-d Closing energy release

Figure 57 Opening and closing indications

8.4 Overhaul of Circuit Breaker

8.4.1 Connection and Installation Inspection

**Table 37 Torque Force Requirements of Main Circuit and Secondary Circuit**

Fastener specifications	Torque requirements (N · m)
M3	0.4 ~ 0.5
M4	1.2 ~ 1.7
M8	16 ~ 26
M10	36 ~ 52
M12	61 ~ 94

#### 8.4.2 Insulation Performance Testing

The insulation resistance between phases and between a phase and the ground is required to be 20MΩ or greater.

The insulation resistance test must be performed before power is applied again after overhaul and a long period of power off ( $\geq 7$  days).

#### 8.4.3 Operational Characteristic Inspection

Connect the accessories to the corresponding rated voltage according to the nameplate on the mask and perform the following operations:

Electric energy storage, closing and opening operations, cycled 5 times;

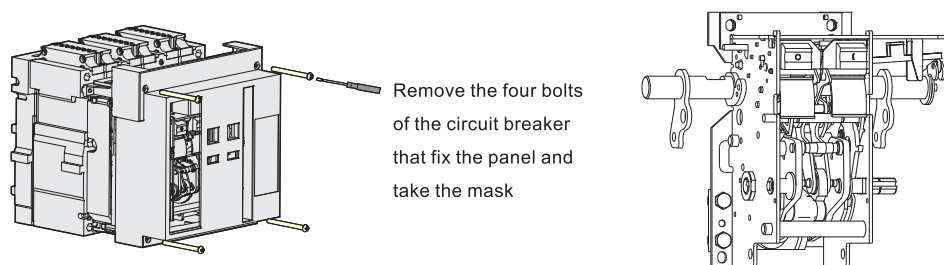
Manual energy storage, closing and opening operations, cycled 5 times;

The circuit breaker is required to store, close and open normally.

**Note:** The main circuit must be unpowered; if there is an undervoltage release, it must be applied with a rated voltage first.

#### 8.4.4 Circuit Breaker Component Inspection

##### 8.4.3.1 Mask Removal

**Figure 58 Inspection of Operating Mechanism**

##### 8.4.3.2 Operating Mechanism Inspection

Check the parts of the mechanism for breakage and whether the fasteners are tight.

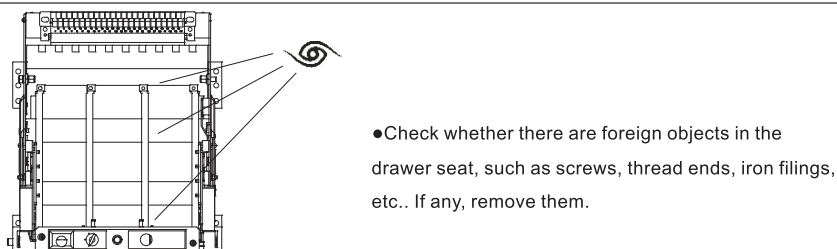
Remove dust, and evenly apply oil (7012 low-temperature grease or similar solid grease) to each rotating part.

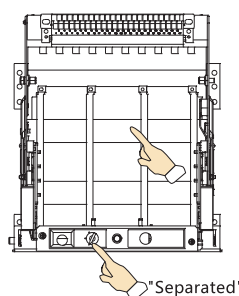
##### 8.4.3.3 Inspection of intelligent Controller

View the details of each protection parameter setting.

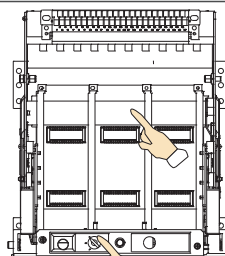
Simulate the trip test using the "TEST" button.

##### 8.4.3.4 Inspection of Drawer Seat (tested after removing the body, taking the NXA20 type as an example)

**Figure 59 Check whether there are foreign objects inside drawer seat**



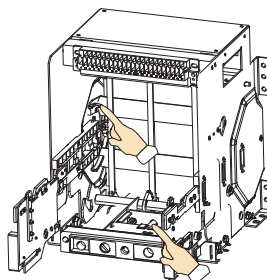
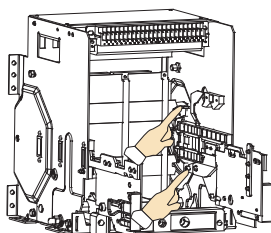
●Empty crank to the separated position. The arc-proof plate is shown as the left figure



"Connected"

●For the NXA20-63 model, crank it in empty to the connected position; for the NXA16 model, press the partition and open the connecting rod, the arcing plate being shown on the left. Check if there are deformation, misalignment or oxidation in the bridge contacts of each phase. If so, replace them.

**Figure 60 Check whether the arc-proof plate opens and closes normally and whether the insulation contact has deformation or oxidation**



●Evenly apply low-temperature grease or similar solid grease in the position as indicated in the left figure for lubrication

**Figure 61 Evenly oil rotating and sliding parts**

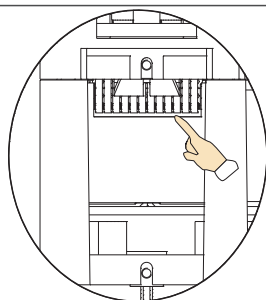
#### 8.4.3.5 Inspection of Arc Extinguishing Chamber (taking the NXA20-63 type as an example)

Check grid pieces and arc-lead pieces for defects, and check the arc chute for breakage. If any, timely replace and remove dust, corrosion layer and arcing point in the room. If corrosion and rust are serious, replace in time

Note: The circuit breaker must be checked after breaking the short-circuit current.

#### 8.4.3.6 Inspection of Main Contact (taking the NXA20-63 type as an example)

##### a. The over travel $\geq 2$ mm

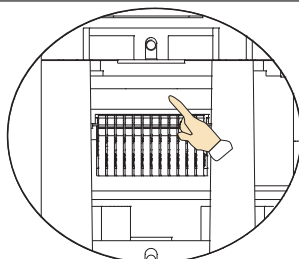


●Manually close the product and observe the main contact stroke

Note: Replace the contact when the shown position is reached

**Figure 62 Check over-travel**

##### b. Remove dust, corrosive layer and particular burnt materials



●Close the product , when the main contact is in the shown position, check whether there is dust, granular burnt materials or oxidized corrosion layer on the dynamic and static contacts. If any, remove them timely

**Figure 63 Remove dust and foreign matter**

Note: The circuit breaker must be checked after breaking the short-circuit current.

#### 8.4.3.7 Inspection of Secondary Circuit

Check the casing for damage

Use the universal meter to check the contact between the secondary circuit of the drawer bod and the secondary circuit of the drawer seat, and whether the contacts are in good contact at the "test" and "connection" positions and whether the wiring screws are tight and the wire insulation is damaged.

### 8.5 Replacement of Undervoltage Release, Shunt Release and Closed Electromagnet Accessories

The following operations must be performed before replacing the accessories:

Cut off all power and ensure that the power to the main circuit and secondary circuit is dead.

The circuit breaker is in the energy release opening state

#### 8.5.1 Replacement of Fixed Accessories

Remove the penal fixing bolts and remove the penal

Untie the cable tie and remove the wiring wires

Remove the fixed accessory mounting screws

Remove and replace the accessory

#### 8.5.2 Replacement of Drawer Accessories

Shake out the body to the separation position and remove the body

Remove the penal fixing bolts and remove the penal

Untie the cable tie and remove the wiring wires

Remove the fixed accessory mounting screws

Remove and replace the accessory

## 9 Analysis and Elimination of Faults

### 9.1 Troubleshooting Logic

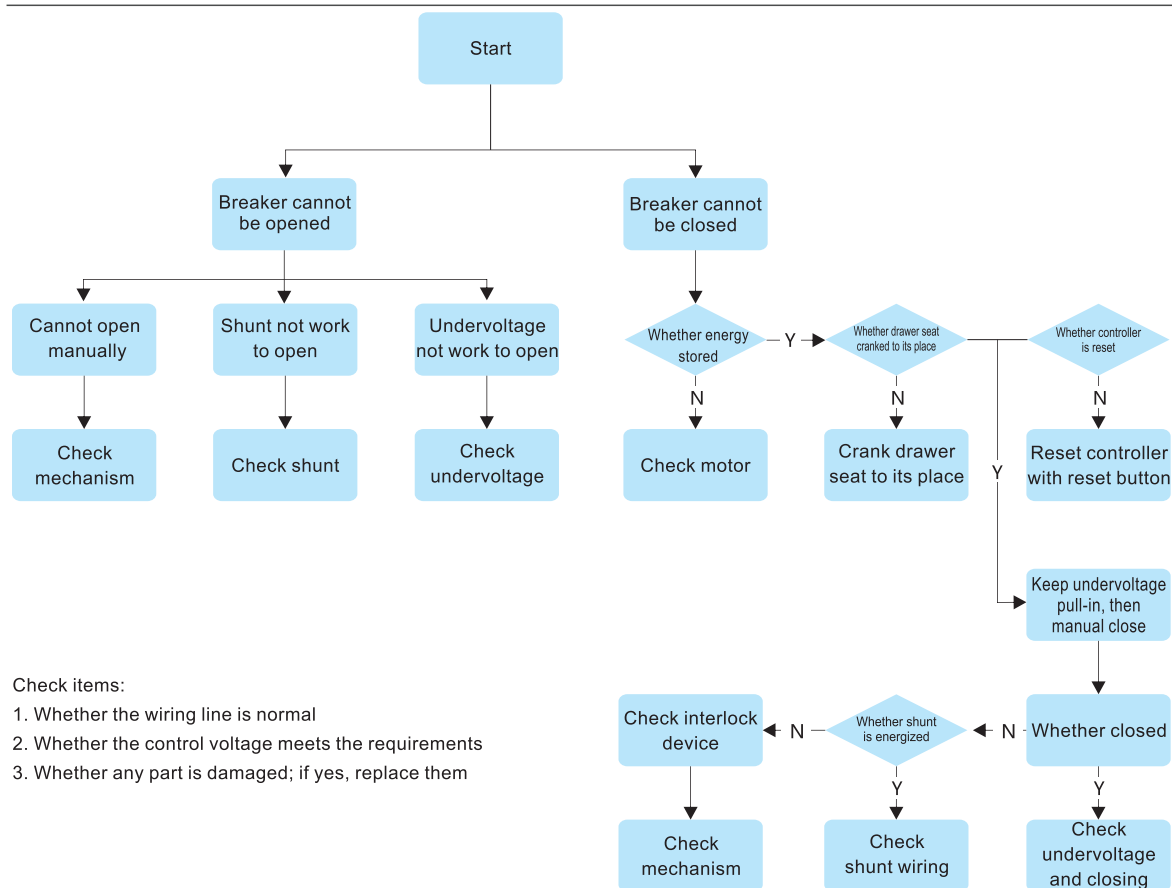


Figure 64 Fault logic analysis

### 9.2 Fault Trip Analysis

Identification of fault causes

Fault identification through intelligent controller indication

**Note:** The operation is shown in section 12.2.2. Live closing operation is prohibited before the fault is eliminated.



### 9.3 Common Fault Causes and Solutions

**Table 38 Common Fault Causes and Solutions**

Problem	Cause	Solution
Circuit breaker trip	Overload fault trip (Ir indicator on)	<ol style="list-style-type: none"> <li>1. Check the breaking current value and operation time on the intelligent controller;</li> <li>2. Analyze the conditions of the load and grid;</li> <li>3. If there is overload, eliminate the overload fault;</li> <li>4. If the actual running current does not match the long delay operation current setting value, modify the long delay operation current setting value according to the actual running current to achieve appropriate matching protection;</li> <li>5. Press the Reset button and reclose the circuit breaker.</li> </ol>
	Short circuit fault trip (Isd or Ii indicator on)	<ol style="list-style-type: none"> <li>1. Check the breaking current value and operation time on the intelligent controller;</li> <li>2. If there is short circuit, find and eliminate short circuit fault;</li> <li>3. Check the setting value of the intelligent controller;</li> <li>4. Check the integrity of the circuit breaker;</li> <li>5. Press the Reset button and reclose the circuit breaker.</li> </ol>
	Ground fault trip (Ig indicator on)	<ol style="list-style-type: none"> <li>1. Check the breaking current value and operation time on the intelligent controller;</li> <li>2. If there is ground fault, find and eliminate the ground fault;</li> <li>3. Modify the ground fault current setting value of the intelligent controller;</li> <li>4. If there is no ground fault, check whether the fault current setting value matches the actual protection;</li> <li>5. Press the Reset button. Reclose the circuit breaker.</li> </ol>
	Mechanical interlocking operation	Check the working status of the two circuit breakers with mechanical interlocks.
	Undervoltage release is faulty: a. The rated operating voltage is less than 70% $U_e$ ; b. The undervoltage release control unit is faulty.	<ol style="list-style-type: none"> <li>1. Check whether the undervoltage release is powered on;</li> <li>2. The power supply voltage of the undervoltage release must be 85% <math>U_e</math> or higher;</li> <li>3. Change the control unit of the undervoltage release.</li> </ol>
The circuit breaker cannot be closed	The intelligent controller is not reset	Press the Reset button (on the raised panel) and reclose the circuit breaker.
	Poor contact in the secondary circuit of the drawer circuit breaker	Shake the drawer circuit breaker to the "on" position (clattering is heard).
	The circuit breaker has not stored energy	<p>Check whether the secondary circuit is connected:</p> <ol style="list-style-type: none"> <li>1. The motor control power supply voltage must be 85% <math>U_e</math> or higher;</li> <li>2. Check the motor energy storage mechanism. If there is any fault, contact the manufacturer to replace the motor operating mechanism.</li> </ol>
	Mechanical interlocking operation; the circuit breaker has been locked	Check the working status of the two circuit breakers with mechanical interlocks.
	Closed electromagnet: a. The rated control voltage is less than 85% $U_s$ ; b. The closed electromagnet is faulty and damaged.	<ol style="list-style-type: none"> <li>1. The power supply voltage of the closed electromagnet must be 85% <math>U_s</math> or higher;</li> <li>2. Replace the closed electromagnet.</li> </ol>

Problem	Cause	Solution
Trip after the circuit breaker is closed (fault indicator is on)	1. Trip immediately: The short circuit current is closed; 2. Delayed trip: The overload current is closed.	1. Check the breaking current value and operation time on the intelligent controller; 2. If there is short circuit, find and eliminate short circuit fault; 3. If there is overload, find and eliminate the overload fault; 4. Check the integrity of the circuit breaker; 5. Modify the current setting value of the intelligent controller; 6. Press the Reset button and reclose the circuit breaker.
The circuit breaker cannot be disconnected	1. The circuit breaker cannot be manually disconnected locally: The mechanical operating mechanism is faulty; 2. The circuit breaker cannot be electrically disconnected remotely: a. The mechanical operating mechanism is faulty; b. The shunt release power voltage is less than 70% Us; c. The shunt release is damaged.	1. Check the mechanical operating mechanism. If there is any fault such as a stuck, contact the manufacturer. 1.a. Check the mechanical operating mechanism. If there is any fault such as a stuck, contact the manufacturer; b. Check whether the shunt release power voltage is less than 70% Us; c. Replace the shunt release.
The circuit breaker cannot store energy	1. Cannot store energy manually; 2. Cannot store energy electrically: a. The control power voltage of the rated control electric energy storage device is less than 80% Us; b. The energy storage device has a mechanical failure.	1. The energy storage device has a mechanical failure. Contact the manufacturer. 2.a. Check whether the control power supply of the electric energy storage device is 85% Us or higher; b. Check the energy storage device machinery and contact the manufacturer.
Drawer circuit breaker The handle cannot be inserted Shake in and out the circuit breaker	1. There is a padlock in the off position. 2. The plugging rail or the circuit breaker body is not fully inserted	1. Remove the padlock 2. Push the rail or circuit breaker to the end.
The drawer circuit breaker cannot be pulled out in the "off" position	1. The handle is not pulled out. 2. The circuit breaker does not fully reach the "off" position.	1. Pull out the handle. 2. Fully shake the circuit breaker to the "off" position.
The drawer circuit breaker cannot be shaken to the "on" position	There is a problem such as some foreign objects fall into the drawer seat and stick the shake mechanism or the shake mechanism jump over teeth.	Check and remove foreign objects. If the circuit breaker still cannot be shaken in, contact the manufacturer.
	The frame rated current of the circuit breaker body does not match that of the drawer seat.	Select the circuit breaker body and drawer seat with the same frame rated current.
The intelligent controller screen has no display	1. The intelligent controller is not connected to the power supply. 2. The intelligent controller is faulty. 3. The rated control power supply voltage is less than 85% Us.	1. Check whether the intelligent controller has been connected to the power supply. If not, connect to the power supply immediately. 2. Turn off the control power of the intelligent controller and then send power. If the fault persists, contact the manufacturer. 3. The power supply voltage of the intelligent controller must be 85% Us or higher.
The fault indicator of the intelligent controller is on and is still on after pressing the "Back" button.	The intelligent controller is faulty	Turn off the control power of the intelligent controller and then send power. If the fault persists contact the manufacturer.

## 10 Environmental Protection

In order to protect the environment, when this product or its components are scrapped, please dispose of them as industrial waste, or hand them over to the recycling station for classified disassembly, recycling and reuse according to the relevant local regulations.

## 11 Ordering specification and model definition and description

### 11.1 Ordering specification

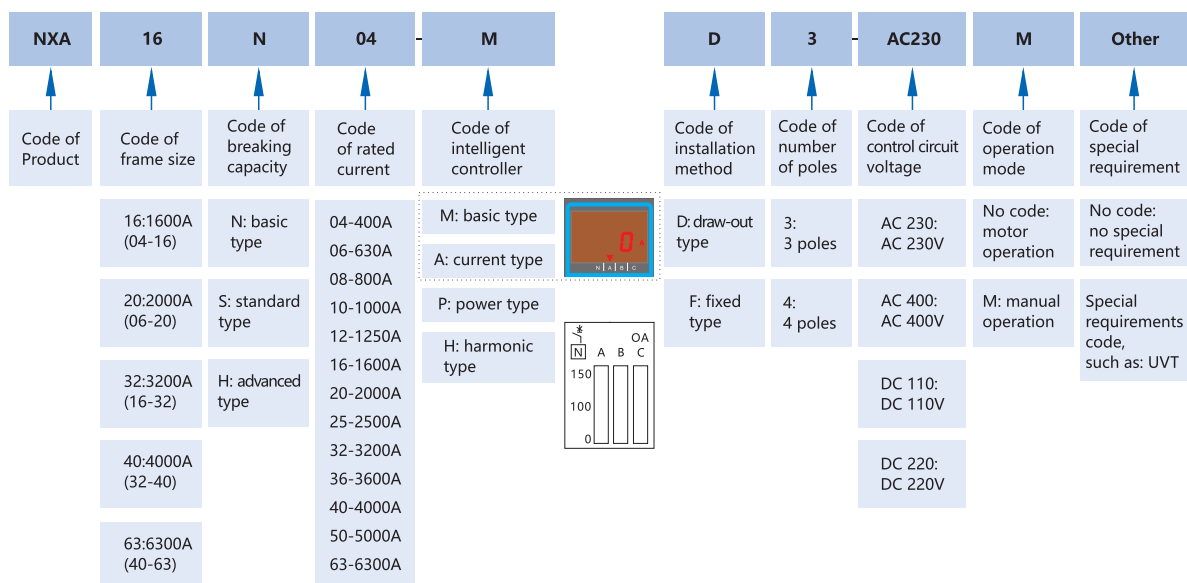
Table 39 Ordering specification

Frame size	1600A			2000A			3200A			4000A			6300A
Circuit breaker	N <input type="checkbox"/>	S <input type="checkbox"/>	H <input type="checkbox"/>	N <input type="checkbox"/>	S <input type="checkbox"/>	H <input type="checkbox"/>	N <input type="checkbox"/>	S <input type="checkbox"/>	H <input type="checkbox"/>	N <input type="checkbox"/>	S <input type="checkbox"/>	H <input type="checkbox"/>	H <input type="checkbox"/>
Rated current	400A <input type="checkbox"/>			630A <input type="checkbox"/>			1600A <input type="checkbox"/>			3200A <input type="checkbox"/>			4000A <input type="checkbox"/>
	630A <input type="checkbox"/>			800A <input type="checkbox"/>			2000A <input type="checkbox"/>			3600A <input type="checkbox"/>			5000A <input type="checkbox"/>
	800A <input type="checkbox"/>			1000A <input type="checkbox"/>			2500A <input type="checkbox"/>			4000A <input type="checkbox"/>			6300A <input type="checkbox"/>
	1000A <input type="checkbox"/>			1250A <input type="checkbox"/>			3200A <input type="checkbox"/>						
	1250A <input type="checkbox"/>			1600A <input type="checkbox"/>									
	1600A <input type="checkbox"/>			2000A <input type="checkbox"/>									
Number of poles	3 pole <input type="checkbox"/> 4 pole <input type="checkbox"/> (While In=6300A, no four poles)												
Installation modes	Horizontal draw-out <input type="checkbox"/> Fixed and horizontal <input type="checkbox"/>												
Intelligent controller	M type <input type="checkbox"/>			A type <input type="checkbox"/>			P type <input type="checkbox"/>			H type <input type="checkbox"/>			
	AC110V <input type="checkbox"/>			AC220/230/240V <input type="checkbox"/>			AC 380/400/415V <input type="checkbox"/>			DC110V <input type="checkbox"/>			DC220V <input type="checkbox"/>
Electric accessories (no AC110V for NXA16)	Under-voltage release (no DC)( Optional)			AC110V <input type="checkbox"/>			AC220/230/240V <input type="checkbox"/>			AC 380/400/415V <input type="checkbox"/>			Order____V <input type="checkbox"/>
							helped & instantaneous <input type="checkbox"/> helped & delay (Inm≥2000A ,delay time:1s,3s,5s, non-adjustable). <input type="checkbox"/>						
							self-priming & instantaneous <input type="checkbox"/> self-priming & delay (Inm≥2000A,delay time:0.3~7.5s, adjustable) <input type="checkbox"/>						
							Note:NXA16 don't have helped type, delay time:1s,3s,5s,7s, non-adjustable. <input type="checkbox"/>						
	shunt release (default in motor operation)			Intermittent (only for Inm≥2000A, by default in motor operation) <input type="checkbox"/>			AC 110V <input type="checkbox"/> AC220/230/240V <input type="checkbox"/> AC380/400/415V <input type="checkbox"/>			DC110V <input type="checkbox"/> DC220V <input type="checkbox"/>			
	closed electromagnet (default in motor operation)			pulse (must select pulse type in the automatic control system) <input type="checkbox"/>			AC110V <input type="checkbox"/> AC220/230/240V <input type="checkbox"/> AC380/400/415V <input type="checkbox"/>			DC110V <input type="checkbox"/> DC220V <input type="checkbox"/>			
	Motor			AC110V <input type="checkbox"/> AC220/230/240V <input type="checkbox"/> AC380/400/415V <input type="checkbox"/>			DC110V <input type="checkbox"/> DC220V <input type="checkbox"/>						
Auxiliary contact	NXA16: C04 <input type="checkbox"/> C06 <input type="checkbox"/> (C06 only for AC) NXA20~63: N3 <input type="checkbox"/> N4 <input type="checkbox"/> N5 <input type="checkbox"/> C03 <input type="checkbox"/> C04 <input type="checkbox"/> C05 <input type="checkbox"/>												
Connection accessories	Interphase barrise <input type="checkbox"/>												
Controller accessories (Match)	External transformer: Earth current transformer <input type="checkbox"/> External transformer (Neutral CT) <input type="checkbox"/>												
	Note: <sup>1)</sup> Neutral CT is only applicable to 3P+N <sup>2)</sup> The earth current transformer should be selected when customers select earth current return type earthing protection.												
Lock mechanism (Match)	Pushbutton lock <input type="checkbox"/>			Safety shutters padlock <input type="checkbox"/>			Body lock <input type="checkbox"/>			One-lock one-key <input type="checkbox"/>			Two-locks one-key <input type="checkbox"/>
	Three-locks two-keys <input type="checkbox"/>			"Disconnected" position padlock <input type="checkbox"/>			Door interlock (Body) <input type="checkbox"/>			Door interlock (chassis) <input type="checkbox"/>			
Mechanical interlock (Match)	MI-3(2on+1off) <input type="checkbox"/> MI-4 (1on+2off) <input type="checkbox"/> ILK2 <input type="checkbox"/>												
Source-changeover controller (Match)	1 "Normal" and 1 "Replacement" <input type="checkbox"/> 2 "Incoming" and 1 "Busbar" <input type="checkbox"/>												



## 11.2 Model definition and description

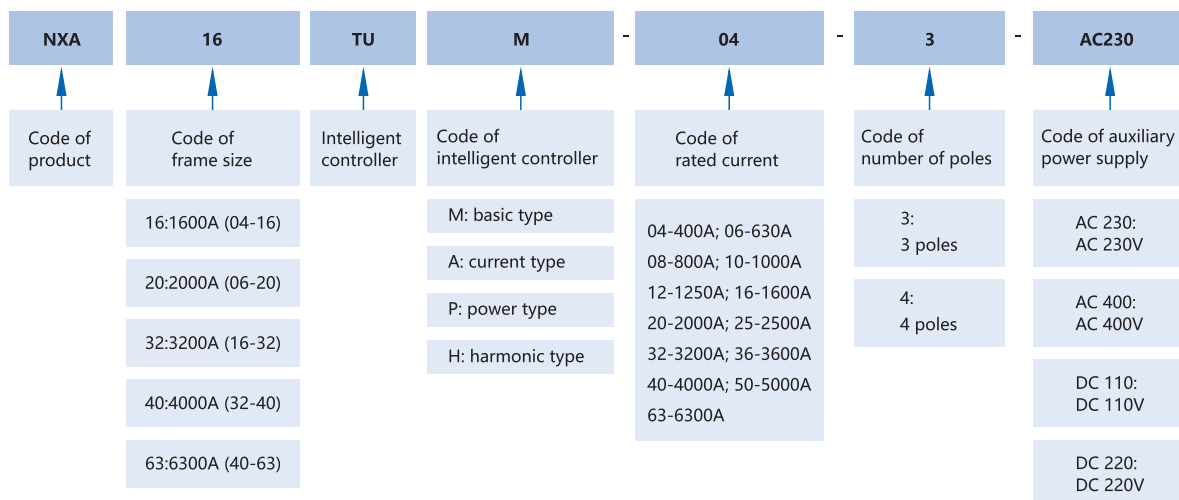
### Model definition and description



**Note:** <sup>1)</sup> Manual operation does not contain motor-driven mechanism, closing electromagnet and shunt release. Motor operation contains all standard accessories of remote operation.

<sup>2)</sup> NXA16N10-AD3-AC230: frame size is 1600A, N type breaking capacity, rated current is 1000A, A type intelligent controller, draw-out type and 3 poles, control voltage is AC 230V motor operation.

### Model definition and description-intelligent controller



## Model definition and description-accessories

NXA	16	CC	230VAC
Code of product	Frame size	Code of accessories	Code of rated voltage
	16:1600A	CC: Closed electromagnet	230VAC: AC230V
	20:2000A	ST: Shunt tripper	400VAC: AC400V
	32:3200A	MO: Motor	110VDC: DC110V
	40:4000A	UVT: Undervoltage tripper	220VDC: DC220V
	63:6300A	ASUVT:Self-priming undervoltage tripper	Rated voltage+delay time (1s, 3s, 5s, 7s)
	20/40:2000A-4000A	UVTD:UVT delay unit	
	20/32:2000A-3200A	ASUVTD: ASUVT delay unit	
	20/63:2000A-6300A		

## Model definition and description-accessories

NXA	16	OF	C04
Code of product	Frame size	Code of accessories	Specification of accessories
	16:1600A	OF: Auxiliary contact	C04: Four groups of contacts
	20:2000A		C05: Five groups of contacts
	32:3200A		C06: Six groups of contacts
	40:4000A		N3: Three normally open and three normally closed
	63:6300A		N4: Four normally open and four normally closed
	20/40:2000A-4000A	KL: Key lock	N5: Five normally open and five normally closed
	20/32:2000A-3200A		1S1S: One lock and one key
	20/63:2000A-6300A		2S1S: Two locks and one key
		FCDP: Fixed type door frame	3S2S: Three locks and two keys
		DCDP: Draw-out type door frame	
		FD: Fixed type interphased partition	
		DD: Draw-out type interphased partition	
		CE-CD-CT: Position signal	
		ILK2: Mechanical interlocking two interlocking steel cables	
		MI-3: Triple mechanical interlock ( 2on+1off )	
		MI-4: Triple mechanical interlock ( 1on+2off )	

## 12 Product Addendum

### 12.1 Breaker Configuration

Table 40 Product default accessories

Standard accessories	1600 frame		2000 frame		3200 frame		4000 frame		6300 frame	
	Fixed type	Drawer type	Fixed type	Drawer type	Fixed type	Drawer type	Fixed type	Drawer type	Fixed type	Drawer type
Breaker body	■	■	■	■	■	■	■	■	■	■
Drawer seat	--	■	--	■	--	■	--	■	--	■
Intelligent controller	■	■	■	■	■	■	■	■	■	■
Upper and lower horizontal connection	■	■	■	■	■	■	■	■	■	■
Auxiliary contact 4CO	■	■	■	■	■	■	■	■	■	■
Fault trip indication contact	■	■	■	■	■	■	■	■	■	■
Electric operating mechanism	■	■	■	■	■	■	■	■	■	■
Closed electromagnet	■	■	■	■	■	■	■	■	■	■
Shunt release	■	■	■	■	■	■	■	■	■	■
Door frame	■	■	■	■	■	■	■	■	■	■

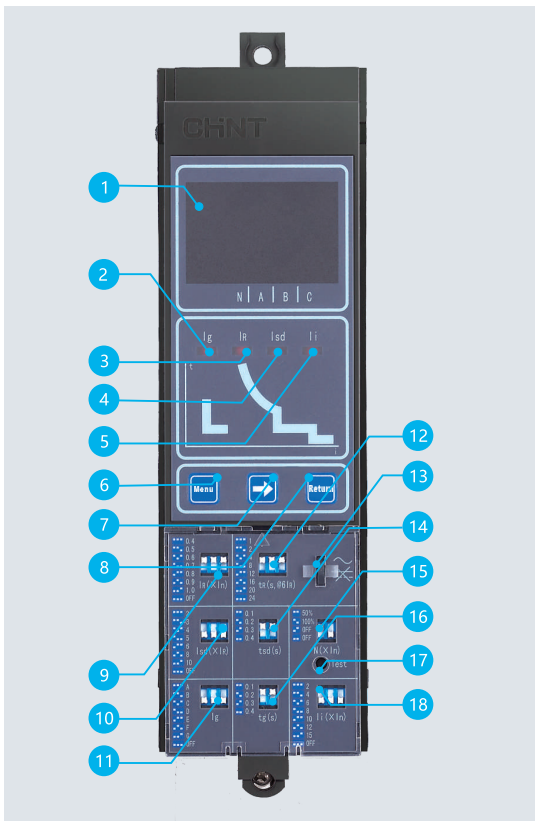
Table 41 Optional accessories

Optional accessories	1600 frame		2000 frame		3200 frame		4000 frame		6300 frame	
	Fixed type	Drawer type	Fixed type	Drawer type	Fixed type	Drawer type	Fixed type	Drawer type	Fixed type	Drawer type
Standard undervoltage release	■	■	■	■	■	■	■	■	■	■
Adjustable delay-type undervoltage release	■	■	■	■	■	■	■	■	■	■
Opening and closing twistlock	■	■	■	■	■	■	■	■	■	■
Rack position padlock	--	■	--	■	--	■	--	■	--	■
Rack safety shield padlock	--	■	--	■	--	■	--	■	--	■
Body key lock	■	■	■	■	■	■	■	■	■	■
Position door interlock	--	--	--	■	--	■	--	■	--	■
State door interlock	--	--	■	■	■	■	■	■	■	■
Auxiliary contact 6CO	■	■	--	--	--	--	--	--	--	--
Auxiliary contact 5NO+5NC	--	--	■	■	■	■	■	■	■	■
Auxiliary contact 3NO+3NC	--	--	■	■	■	■	■	■	■	■
Auxiliary contact 4NO+4NC	--	--	■	■	■	■	■	■	■	■
Auxiliary contact 5CO	--	--	■	■	■	■	■	■	■	■
Rack position indication contact	--	■	--	■	--	■	--	■	--	■
Double Mechanical interlock	■	■	■	■	■	■	■	■	■	■
External neutral line transformer	■	■	■	■	■	■	■	■	■	■
Ground current transformer and its accessories	■	■	■	■	■	■	■	■	■	■
Phase spacer	■	■	■	■	■	■	■	■	■	■
Triple Mechanical lock	--	--	■	■	■	■	■	■	■	■

Note: "■" means that this accessory is available; "--" means that this accessory is not available.

## 12.2 Intelligent Controller

### 12.2.1 Controller Model



**Figure 65 M/A-type intelligent controller**

1. Display window: display current value, setting parameter, fault current, trip time, etc.
2. Ig indicator: This light is on after ground fault trip
3. Ir indicator: This light is on after overload long-delay trip
4. Isd indicator: This light is on after short-circuit short-delay trip
5. Ii indicator: This light is on after short-circuit instantaneous trip.
6. Menu button: Query the DIP position and fault record
7. Right button: Switch to the next state when querying the DIP position
8. Return button: Return to the previous level, or reset
9. Overload long-delay current multiple setting switch
10. Short-circuit short-delay current multiple setting switch
11. Ground fault current multiple setting switch
12. Overload long-delay time setting switch
13. Mask keyhole
14. Short-circuit short-delay time setting switch
15. N-pole protection setting switch
16. Ground fault delay time setting switch
17. Ground fault delay time setting switch
18. Short-circuit instantaneous current multiple setting switch

#### M-type intelligent controller (basic protection)

##### Protection

The setting of all protected thresholds and DIP switches for delay. The setting value can be displayed in the display window.

- Overload protection.

True RMS long delay protection

Thermal memory: Accumulation of heat before and after tripping.

- Short-circuit protection

Short delay (RMS) and instantaneous protection

4-speed definite time is optional in terms of delay.

- Ground fault protection

4-speed definite time is optional in terms of delay.

- Neutral line overcurrent protection

The neutral line protection threshold can be adjusted to 50%, 100% and off for 4P products.

- Test function

Simulate 6Ir test current for test tripping

- Trip record function

Trip reason display function

- Ammeter

The M-type intelligent controller measures the true current rms between 40% and 150% with an accuracy of 2%.

#### A-type intelligent controller (current type)

##### Protection

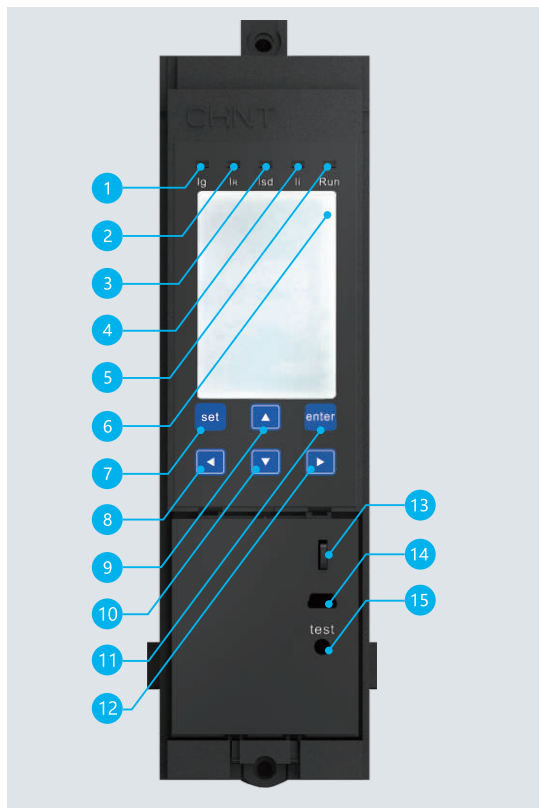
The setting of all protected thresholds and DIP switches for delay. The setting value can be displayed in the display window.

● In addition to the protection and extended functions of all M-type control units, the A-type control unit also includes

- Voltage imbalance protection

The main circuits current phase failure or three phase current imbalance can be protected.





**Figure 66 P-type intelligent controller**

- 1.Ig indicator: This light is on after ground fault trip
- 2.Ir indicator: This light is on after overload long-delay trip
- 3.Isd indicator: This light is on after short-circuit short-delay trip
- 4.Ii indicator: This light is on after short-circuit instantaneous trip.
- 5.Running indicator: This light flashes during normal operation.
- 6.LED screen: Tri-color backlight, green during normal operation, yellow upon an alarm, and red after tripping.
- 7.Setting button
- 8.Left button
- 9.Up button
- 10.Down button
- 11.OK button
- 12.Right button
- 13.Mask keyhole
- 14.miniUSB interface
- 15.Test button: trip test

### **P-type intelligent controller (power type)**

#### **Protection**

The setting of all protected thresholds and buttons for delay.

- Include the protection functions of all A-type control units

- Ground current protection function (optional)

Equipped with a dedicated external transformer and disconnection protector for power grounding protection

- Advanced protection function

Voltage imbalance protection

Overvoltage and undervoltage protection

Over-frequency and under-frequency protection

Phase sequence protection

Reverse power protection function

Required value protection function

The required value of the true RMS of each phase current is calculated in a measurement window, and the protection works when the required value exceeds the limit.

When the execution mode is an alarm, the action is in principle the same as the grounding alarm. The settings for the sliding time window are in the "measurement table settings" menu. The required value protection is set for each item:

- Maximum required current value of phase A;
- Maximum required current value of phase B;
- Maximum required current value of phase C;
- Maximum required current value of phase N; (not affected by neutral line protection setting)

- Extended functions

Intelligent controller self-diagnosis

Recording function of the number of operations / fault trip / alarm / displacement: providing the last 8 records

Main contact wear display function: The contact wear degree is evaluated according to the mechanical life, electrical life and breaking capacity of different frames.

Internal clock function

Mini-USB interface: Connected to PC to realize protection setting, fault record downloading, full power detection and breaker parameter reading functions.

Button Trip-test function

- Electric energy meter

Current measurement

Voltage measurement

Frequency measurement

Required value measurement

Power (active, reactive, apparent) measurement

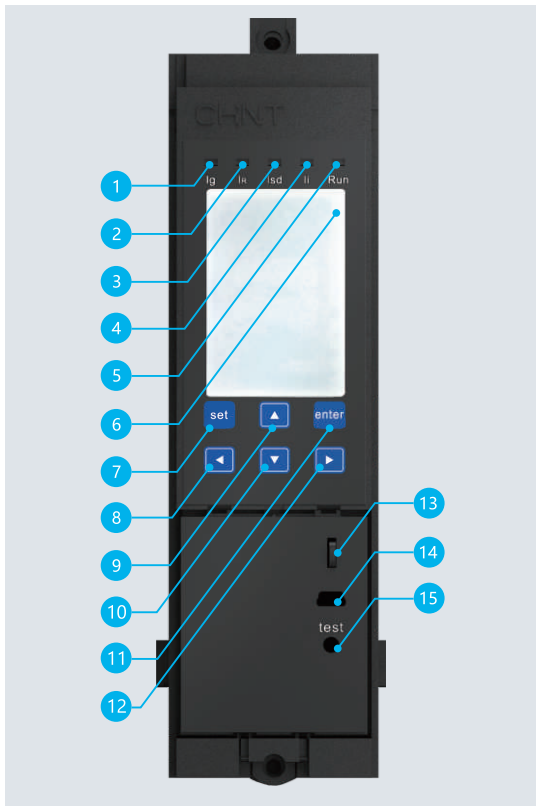
Electric energy (active, reactive, apparent) measurement

Power factor measurement

- LCD tri-color backlight

Green during normal operation, yellow upon an alarm, and red after tripping.





**Figure 67 H-type intelligent controller**

- 1.Ig indicator: This light is on after ground fault trip
- 2.Ir indicator: This light is on after overload long-delay trip
- 3.Isd indicator: This light is on after short-circuit short-delay trip
- 4.Ii indicator: This light is on after short-circuit instantaneous trip.
- 5.Running indicator: This light flashes during normal operation.
- 6.LCD screen: Three-color backlight, green during normal operation, yellow during an alarm, and red after tripping.
- 7.Setting button
- 8.Left button
- 9.Up button
- 10.Down button
- 11.OK button
- 12.Right button
- 13.Mask keyhole
- 14.miniUSB interface
- 15.Test button: trip test

### H-type intelligent controller (harmonic type)

#### Protection

The setting of all protected thresholds and buttons for delay.

● In addition to the protection and extended functions of all P-type control units, the H-type control unit also includes

- Load monitoring function
- Zone selective interlock
- Communication function  
Modbus-RTU communication protocol

#### ● Input/output function

2DI, 2DO or 4DO.

DI signal: AC230V (standard, other optional); DC110V;  
DO requires a power unit (24VDC output) and a relay unit

#### ● Harmonic analysis function

Measure the fundamental current, fundamental line voltage, fundamental phase voltage, fundamental power and 3-31 odd-order harmonic current content (HRIh), harmonic voltage content (HRUh), total harmonic current distortion rate [THDi, thdi], total harmonic voltage distortion rate [THDu, thdu].

Harmonic content (HR): The ratio of the square root mean of the hth harmonic component contained in the periodic AC amount to the square root mean of the fundamental component (expressed as a percentage).

12.2.2 Intelligent Controller Operation Description

Table 42 Minimum display current of the controller at the factory

Frame	Rated current	Minimum display value
1600	400 ~ 1600	60
2000	630 ~ 2000	60
≥3200	≥1600	120

12.2.2.1 M/A-type Intelligent Controller

The status of the M/A intelligent controller can be divided into default status, setting status, query status, and trip status.

① Default status: The default status is the measurement status where all the fault indicators are off and the controller has no button operations and shows the maximum current.

In the default status, if you press "→", the L1, L2, L3(LN) and Lg current values are displayed cyclically. Figure below is an example figure.

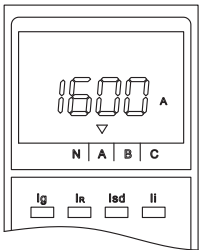


Figure 68 A phase current display interface

② Setting status: The four-stage protection setting value is set by DIP adjustment. Adjusting the DIP up and down according to the shape on the left can change the corresponding parameter, as shown in figures below. Changing the protection parameters must be done on the default interface, otherwise the set value must be realized by pressing the "return" button after changing.

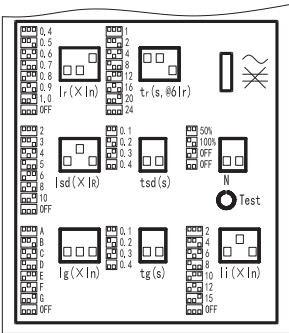


Figure 69 Four-stage protection adjustment DIP

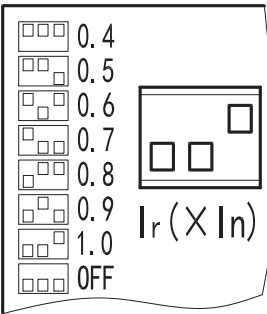


Figure 70 Ir=1.0In

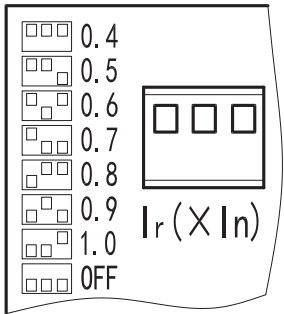


Figure 71 Ir=0.4In

③ Query states: In the default interface, press the "menu" button once to enter the setting value query status, and then press the "→" button to query other parameter setting values one by one. See figures below for details

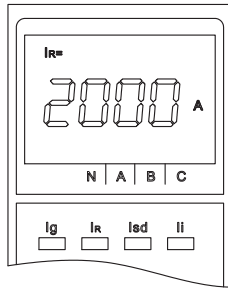


Figure 72 Ir set value

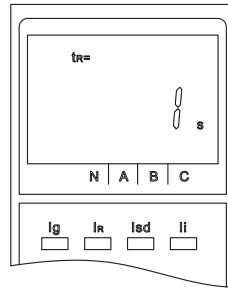


Figure 73 tr set value

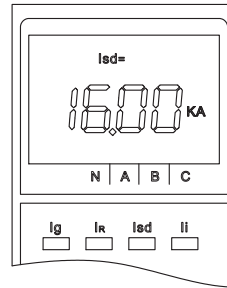


Figure 74 Isd set value

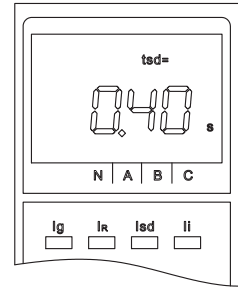


Figure 75 tsd set value

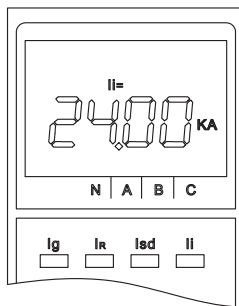


Figure 76 Ii set value

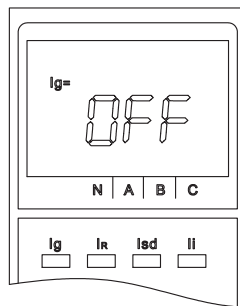


Figure 77 Ig set value

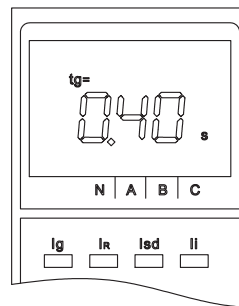


Figure 78 tg set value

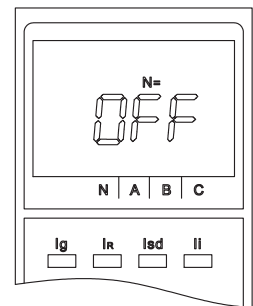


Figure 79 N-phase current value

④ Trip status: When the controller is running normally, press the "menu" button and the the last trip information will be displayed and the controller will enter the normal running state within 1 min, or press the "return" button and the controller will be reset. See Figure below for details.

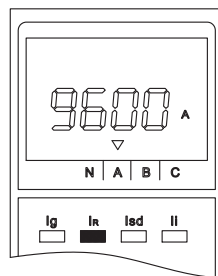


Figure 80 Trip current

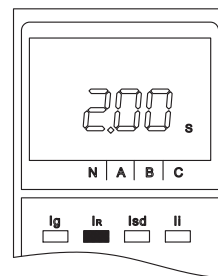


Figure 81 Trip time

#### 12.2.2.2 P/H-type Intelligent Controller

The P/H intelligent controller provides four theme menus and one main interface. The theme menus are system settings, protection settings, measurement, and records.

① Main interface: The main interface is the measurement status where all the fault indicators are off and the controller has no button operations, and the phase currents are displayed in a column.

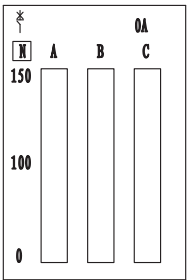


Figure 82 Current display interface

② System settings: Long press the "menu" button on the main interface to enter the theme menu, press the "enter" button to enter the system settings interface, press the "↑" and "↓" buttons to select the option to be set, and press "enter" to enter the option. An example is shown in Figure below (clock settings)

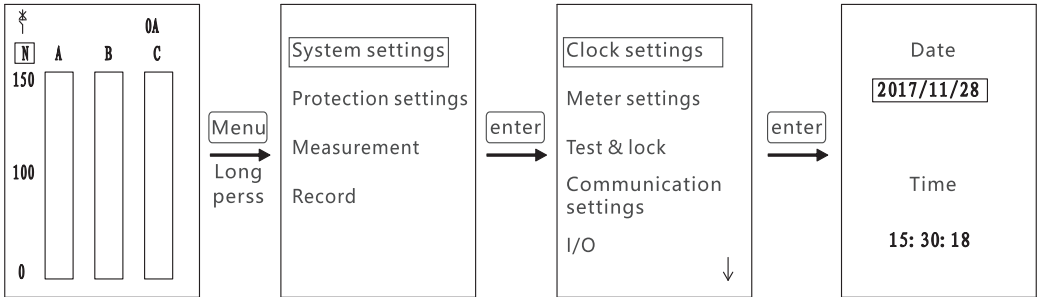


Figure 83 Clock setting steps

③ Protection settings: Long press the "menu" button on the main interface to enter the theme menu, and press the "↓" and "enter" buttons to enter the protection settings interface.

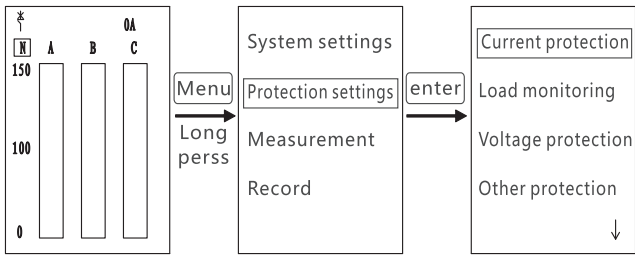


Figure 84 Protection setting interface

④ Measurement: Long press the "menu" button on the main interface to enter the theme menu, and press the "↓" and "enter" buttons to enter the protection measurement interface.

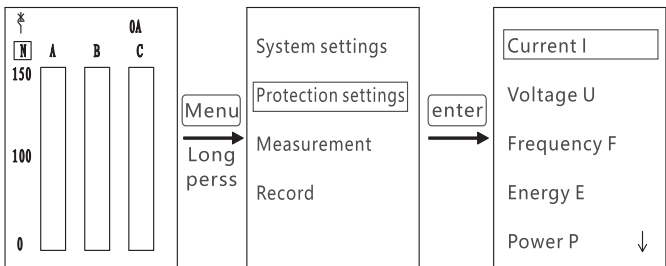
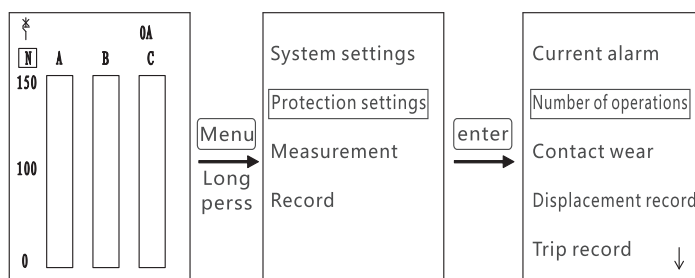


Figure 85 Measurement interface

⑤ Records: Long press the "menu" button on the main interface to enter the theme menu, and press the "↓" and "enter" buttons to enter the protection records interface.



**Figure 86 Records interface**

### 12.2.3 Intelligent Controller Measurement Accuracy

**Table 43 Intelligent Controller measurement accuracy**

<b>Current measurement</b>	
<b>Measuring range</b>	Ia, Ib, Ic and In, not less than 15In (breaker rated current)
<b>Measurement accuracy</b>	Not accurate below 0.1In
	accuracy varying linearly from 5% to 2% between 0.1In and 0.4In
	accuracy is 2% between 0.4In and 1.5In
	accuracy varying linearly from 2% to 15% above 1.5In
	accuracy is 10% for ground current
<b>Voltage measurement</b>	
<b>Measuring range</b>	Linear voltage: 0-600V
	Phase voltage: 0-300V
<b>Measurement accuracy</b>	Tolerance: $\pm 1\%$
<b>Frequency</b>	
<b>Measuring range</b>	40Hz-70Hz
<b>Tolerance</b>	Tolerance: $\pm 0.1\text{Hz}$
<b>Power</b>	
<b>Measurement method</b>	RMS mode
<b>Measurement content</b>	3P-type: total active power, total reactive power, total apparent power
	4P-type: split-phase active power, split-phase reactive power, split-phase apparent power, total active power, total reactive power, total apparent power
<b>Measuring range</b>	Active power: -32768kW-+32767kW
	Reactive power: -32768 kvar-+32767 kvar
	Apparent power: 0kVA-65535kVA
	Tolerance: $\pm 2.5\%$
<b>Power factor</b>	
<b>Measurement content</b>	total power factor, split-phase power factor
<b>Measuring range</b>	-1.00-+1.00
<b>Electric energy</b>	
<b>Measurement content</b>	Input reactive energy (EQin), output reactive energy (EQout)
	Input active energy (EPin), output active energy (EPout)
	Total active energy (EPtotal), total reactive energy (EQtotal), total apparent energy (ESTotal)
<b>Measuring range</b>	Active energy: -32768kWh-+32767kWh
	Reactive energy: -32768kvarh-+32767kvarh
	Apparent energy: 0-65535kVAh
<b>Measurement accuracy</b>	$\pm 2.5\%$
<b>Harmonic measurement</b>	
<b>Fundamental measurement</b>	Current: Ia, Ib, Ic
	Fundamental measurement voltage: Uab, Ubc, Uca
<b>Total harmonic distortion</b>	THD: total distortion rate of harmonic relative to fundamental wave
	Thd: total distortion rate of harmonic relative to RMS
<b>Amplitude spectrum of harmonics</b>	The Controller can display the FFT amplitude of 3-31 odd-order harmonics and display as a percentage
<b>Control unit measurement accuracy</b>	$\pm 2\%$

### 12.3 Shunt Release

The power-on time cannot be greater than 2 seconds / time, and the power-on frequency cannot be greater than 5 times / minute.

- The shunt release should be used except for special products where the circuit breaker must be directly disconnected manually;
- The shunt release could operated within 10 meters to break the circuit breaker.

**Table 44 Characteristics of shunt release**

Rated control power supply voltage $U_s(V)$			AC220/230/240	AC380/400/415	DC220	DC110	AC110 ( not available for NXA16 )
Operating voltage (V)			(0.7~1.1) $U_s$				
Break time (ms)			$\leq 28$				
Power consumption (VA/W)	NXA16	pulse	56	56	250	250	-
	NXA20~63	intermittent	300	300	132	70	300
		pulse	880	1800	880	850	850

Note:

- It must select pulse type in the automatic control system.
- power-on time of the intermittent type cannot be greater than 2 s, pulse frequency of the pulse type cannot be more than 5 times/min, or the components are easily burnt;
- If the circuit breaker is not break by a single power-on of 15 s, must disconnect the power on the shunt release immediately.



**Figure 87 Shunt Release**

### 12.4 Closed electromagnet

After the energy storage of the motor is completed, the closed electromagnet can be operated and controlled within a range of 10 meters to instantaneously release the energy storage spring force of the operating mechanism to close the circuit breaker.

**Table 45 Characteristics of closed electromagnet**

Rated control power supply voltage $U_s(V)$			AC220/230/240	AC380/400/415	DC220	DC110	AC110 ( not available for NXA16 )
Operating voltage (V)			(0.85~1.1) $U_s$				
Close time (ms)			$\leq 50$				
Power consumption (VA/W)	NXA16	pulse	56	56	250	250	-
	NXA20~63	intermittent	300	300	132	70	300
		pulse	880	1800	880	850	850

Note:

- It must select pulse type in the automatic control system.
- power-on time of the intermittent type cannot be greater than 2 s, pulse frequency of the pulse type cannot be more than 5 times/min, or the components are easily burnt;
- Ensure that the product is in the energy storage state so that the closed electromagnet may be energized;
- If the product is not closed after a single power-on for 15s, must disconnect the power on the closed electromagnet immediately.



Figure 88 Closed electromagnet

12.5 Undervoltage release (Optional, The power must be turned on before the circuit breaker is closed)

12.5.1 The under-voltage release has instantaneous operation and delayed operation:

Table 46 Operation types of each frame under-voltage release

	Self-priming	Helped priming
Under-voltage instantaneous release	Inm=1600A, 6300A	Inm=2000A, 3200A, 4000A
Under-voltage delay release	Inm=1600A, 6300A	Inm=2000A, 3200A, 4000A

**Note:** 1. Inm=1600A under-voltage delay does not require an external delay controller. The power-off operation is an instantaneous operation. There is no zero voltage delay function;

2. Inm=6300A under-voltage delay does not require an external under-voltage delay controller. There is a delay function for low voltage and power off;

3. Inm=2000A~4000A under-voltage delay requires an external delay controller. There is a delay operation when the power is off. There is a zero voltage delay function.

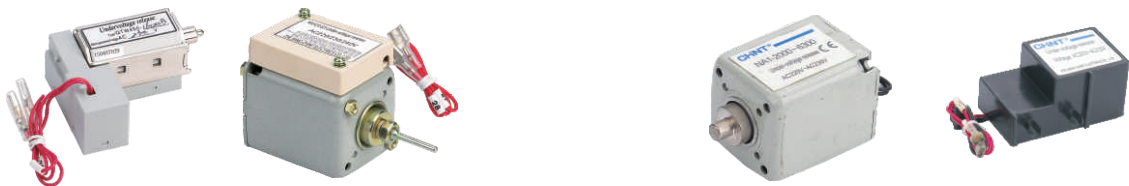


Figure 89 Undervoltage release

Table 47 Delay time of under-voltage release

	Delay time (optional)	Accuracy
Inm=1600A	1 s, 3 s, 5 s, 7 s (not adjustable)	± 15%
Inm=2000A~4000A	1 s, 3 s, 5 s (not adjustable)	± 1s
Inm=6300A	0.3 s~7.5 s (adjustable)	± 15%
The under-voltage will not operate when the voltage returns to 85% Ue and higher,, within 1/2 delay time.		

**Note:** A self-priming under-voltage delay release may be provided for special orders of NXA20~63. There is no external under-voltage delay controller, and the delay time is 0.3s~7.5s, selectable and adjustable with an accuracy of ±15%.



Figure 90 Undervoltage delay controller



12.5.2 When the under-voltage release is not powered, the circuit breaker cannot be closed either electrically or manually.

**Table 48 Characteristics of under-voltage release**

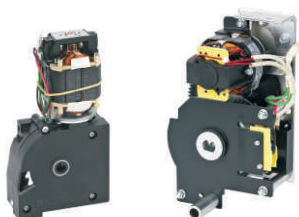
<b>Rated control power supply voltage <math>U_e(V)</math></b>	AC110, AC220/230/240, AC380/400/415
<b>Operating voltage (V)</b>	$(0.35 \sim 0.7)U_e$
<b>Reliable closing voltage (V)</b>	$(0.85 \sim 1.1)U_e$
<b>Reliable not-closing voltage (V)</b>	$\leq 0.35U_e$
<b>Power consumption (<math>I_{nm}=1600A/I_{nm}=2000A \sim 6300A</math>)</b>	20VA/48VA (W)

12.6 Electric Energy Storage Mechanism (the power-on time cannot be greater than 5 seconds / time, and the power-on frequency cannot be greater than 3 times/min) has an automatic re-energy storage function to facilitate dual power switching.

**Table 49 Characteristics of electric energy storage mechanism**

<b>Rated control power supply voltage <math>U_s(V)</math></b>	AC380/400/415 AC220/230/240	DC220, DC110
<b>Operating voltage (V)</b>	$(0.85 \sim 1.1) U_s$	$(0.85 \sim 1.1) U_s$
<b>Power consumption (<math>I_{nm}=1600A</math>)</b>	90W	90W
<b>Power consumption (<math>I_{nm}=2000A</math>)</b>	85W	85W
<b>Power consumption (<math>I_{nm}=3200A, 4000A</math>)</b>	110W	110W
<b>Power consumption (<math>I_{nm}=6300A</math>)</b>	150W	150W
<b>Energy storage time</b>	$\leq 5s$	$\leq 5s$

Note: The single power-time time must not exceed 7s to avoid damage.



**Figure 91 Motor**

## 12.7 Auxiliary Contacts

Standard type: Provides users with 4 sets of conversion contacts (default configuration);

Special type: 6 sets of NXA16 conversion contacts (for AC only);

NXA20-63 model: 3 normally open and 3 normally closed contacts, 4 normally open and 4 normally closed contacts, 5 normally open and 5 normally closed contacts,

3 sets of conversion contacts, 4 sets of conversion contacts, and 5 sets of conversion contacts.

Table 50 Auxiliary contact capacity

Rated voltage (V)	Rated heating current Ith (A)	Rated control capacity
AC230	10/6	300VA
AC400	6	100VA/300VA
DC220(Inm=1600A/Inm=2000-6300A)	0.5/6	60W

Table 51 Auxiliary rated operating current

Category	Voltage	Current
AC-15	AC240V	1.3A
(Inm=1600A/Inm=2000-6300A)	AC415V	0.25A/0.75A
DC-13	DC110V	0.55A
	DC220V	0.27A

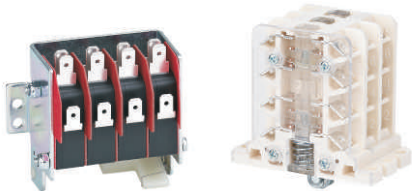


Figure 92 Auxiliary Contacts

12.8 Door Frame and Pad (fixed and drawer types)

The door frame and pad are installed on the door of the power distribution cabinet for sealing, and the protection level reaches IP40.

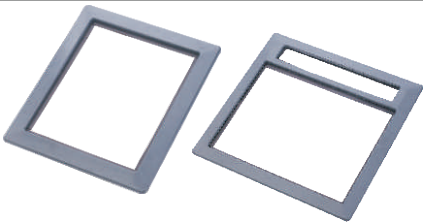


Figure 93 Door Frame and Pad

12.9 Inter phased partition

Inter phased partition are installed between the terminal blocks to increase the phase insulation of the circuit breaker.

**Note:** 1. The fixed and drawer type products have different phase spacers;  
2. NXA16 and NXA20-63 products have different phase spacers;  
3. Three-pole products use two phase spacers, and four-pole products use three phase spacers.



Figure 94 Inter phased partition

12.10 "Separated" Position Locking Device

When the drawer type circuit breaker is in the "separated" position, the lock lever can be pulled out and locked with the padlock. The circuit breaker cannot be shaken to the "test" or "connected" position (self-supplied by the padlock user).



Figure 95 "Separated" Position Locking Device

12.11 Keys and locks

12.11.1 The separation button of the circuit breaker can be locked in the pressed position. At this time, the circuit breaker cannot perform the closing operation.

12.11.2 After the user has selected the product, the factory provides the lock and key.

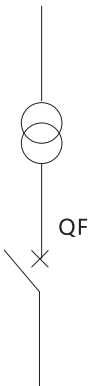


Figure 96 Keys and locks

12.11.3 The user purchases the key lock separately. When installing, it is recommended that the panel be opened with a hole opener. The hole opener has a diameter of  $\Phi 28\text{mm}$  for NXA20-63 and  $\Phi 21\text{mm}$  for NXA16. The hole opener is provided by the user.

**Note:** After the circuit breaker is locked with the key lock, the circuit breaker cannot be closed either manually or electrically. To remove the key, press the opening button, turn the key counterclockwise, and then pull out the key.

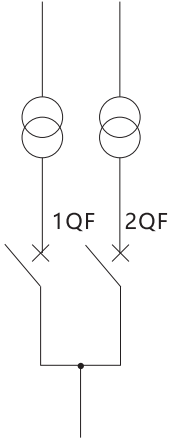
Circuit diagram



Possible mode of operation

QF
0
1

Circuit diagram



Possible mode of operation

1QF	2QF
0	0
0	1
1	0

97-a One lock and one key: One circuit breaker is equipped with one separate lock and one key

97-b Two locks and one key: Two circuit breakers are equipped with two identical locks and one key

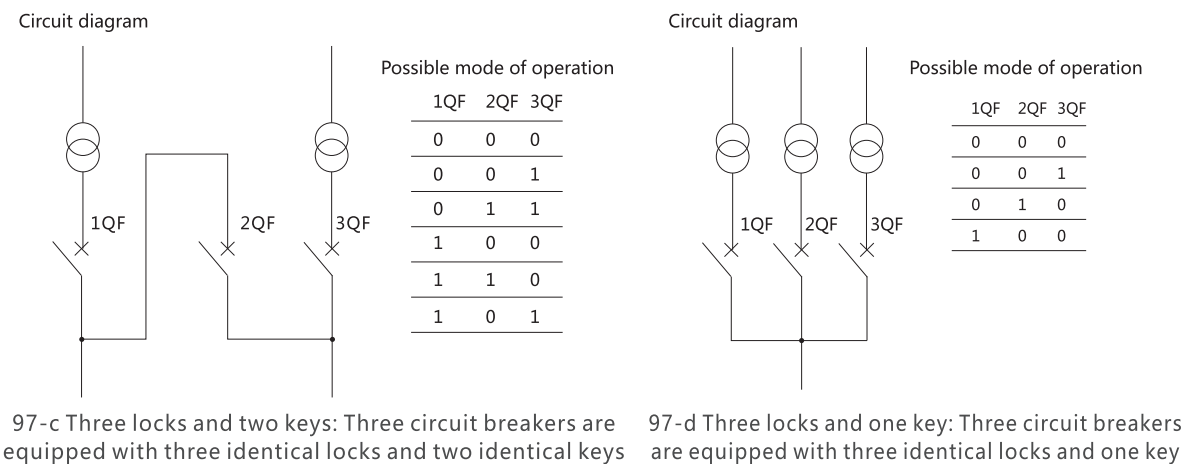


Figure 97 Operation mode of circuit breaker equipped with locks and keys

12.12 Transparent Protective Cover (only available for NXA20 drawer type)

The transparent protective cover is installed on the door frame of the cabinet door to achieve IP54 protection.

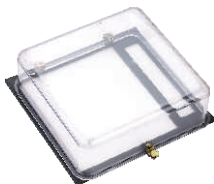


Figure 98 Transparent protective cover

12.13 Door Interlock (only available for NXA20-63 model)

a. Circuit breaker status door interlock: The cabinet door is forbidden to open when the circuit breaker is closed and is allowed to open when the circuit breaker is disconnected.

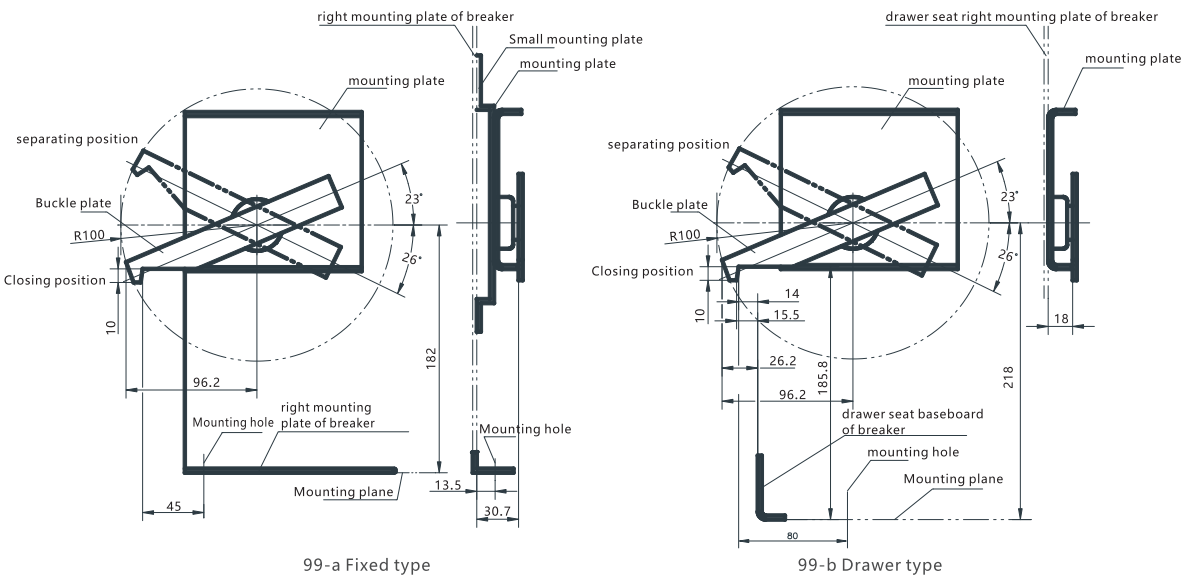


Figure 99 Installation dimension drawing of NXA20-63 air circuit breaker status door interlock

b. Circuit breaker position door interlock: The cabinet door is forbidden to open when the circuit breaker is in the connection and test positions and is allowed to open when the circuit breaker is in the separation position.

### 12.14 Steel Cable Interlock (see Appendix 12.23 for installation method)

#### 12.14.1 Double Interlock (can realize interlocking of two horizontal three-pole or four-pole circuit breakers)

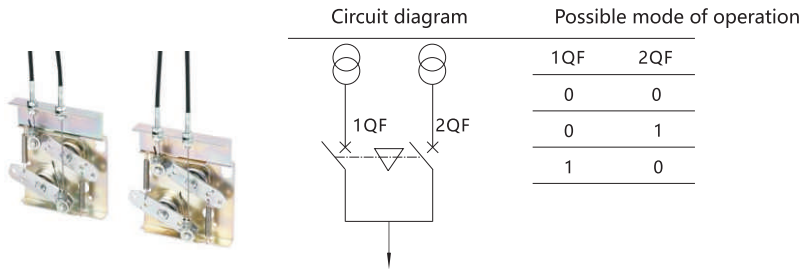


Figure 100 Steel cable interlock

#### 12.14.2 Triple Interlock (can realize interlocking of three horizontal three-pole or four-pole circuit breakers)

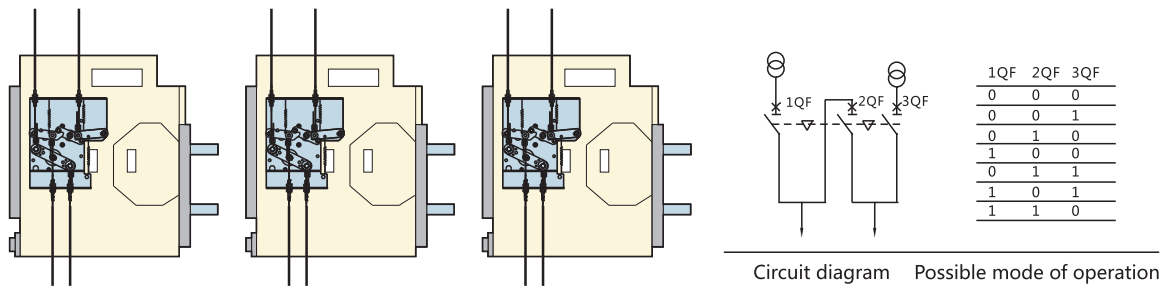


Figure 101 Steel cable triple interlock

### 12.15 Connecting Rod Interlock (available for NXA20-63 products, not for NXA16 products)

For two vertically mounted three-pole or four-pole circuit breakers, the interlock can be realized when one is closed and the other is opened.

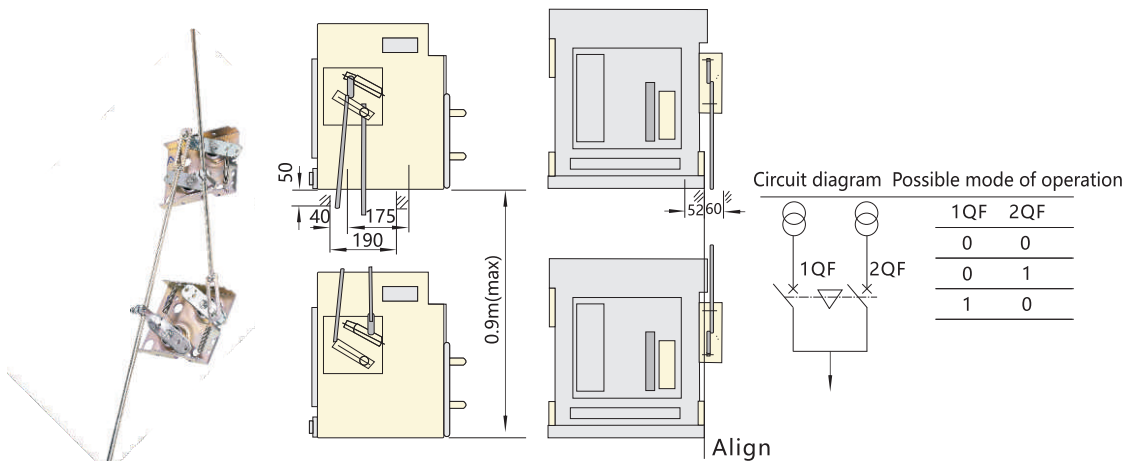


Figure 102 Connecting rod interlock

### 12.16 External Leakage Transformer (E Mode)

The external leakage transformer is suitable for leakage faults caused by equipment insulation damage or by human body exposure to exposed conductive parts. The leakage trip value  $I_{\Delta n}$  is directly expressed in amperes, irrelevant to the rated current of the circuit breaker. The signal is taken in a zero-sequence sampling mode, and a rectangular transformer is required. This sampling has high precision and high sensitivity and is suitable for protection of a small current.

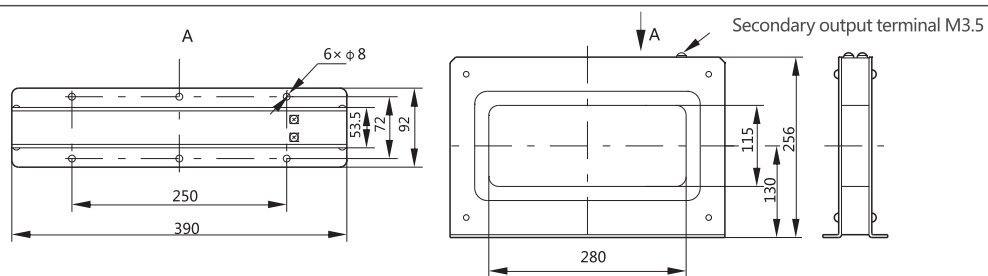


Figure 103 ZCT1: rectangular leakage transformer

Note: ZCT1 provides the bus pass-through method for NXA16 (3P/4P) and NXA20(3P) products, not for NXA20(4P) and NXA32-63 products.

12.16.1 Leakage Protection Related Setting Parameters

Table 52 grounding protection parameter setting

Parameter name	Setting range	Setting step
Operating current setting value $I\Delta n$	(0.5-30.0)A	Step size 0.1 A
Delay time $T\Delta n$ (S)	Instantaneous, 0.06, 0.08, 0.17, 0.25, 0.33, 0.42, 0.5, 0.58, 0.67, 0.75, 0.83	
Execution mode	trip / close	

12.16.2 Leakage Protection Action Characteristics

Table 53 Leakage protection action characteristics

Characteristics	Current multiple ( $I/I\Delta n$ )	Appointed trip time	Delay tolerance
Non-action characteristics	<0.8	Non-action	
Action characteristics	> 1.0	Action	
Action characteristics	$\geq 1.0$	See Table 54	$\pm 10\%$ (inherent absolute tolerance $\pm 40\text{ms}$ )

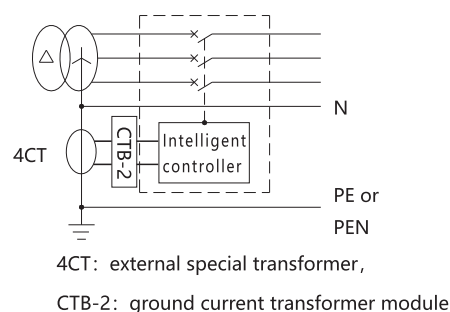
Table 54 Leakage protection action delay

Maximum disconnection time(s) Setting time(s) Fault current	0.06	0.08	0.17	0.25	0.33	0.42	0.5	0.58	0.67	0.75	0.83	Instantaneous
$I\Delta n$	0.36	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	0.04
$2I\Delta n$	0.18	0.25	0.5	0.75	1	1.25	1.5	1.75	2	2.25	2.5	0.04
$5I\Delta n$	0.072	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1	0.04
$10I\Delta n$												

12.16.3 Leakage protection detection principle shown in Figure 103

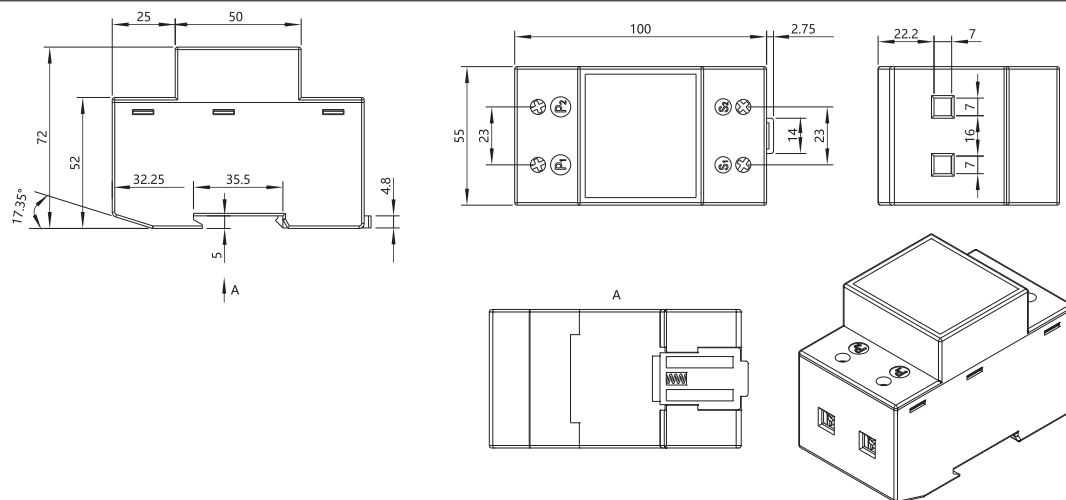


### 12.17 External Ground Current Transformer (W Mode)



### Figure 106 Ground current protection principle

Structure size of external ground current transformer (W Mode)



**Figure 107 CTB-2 ground current transformer module**

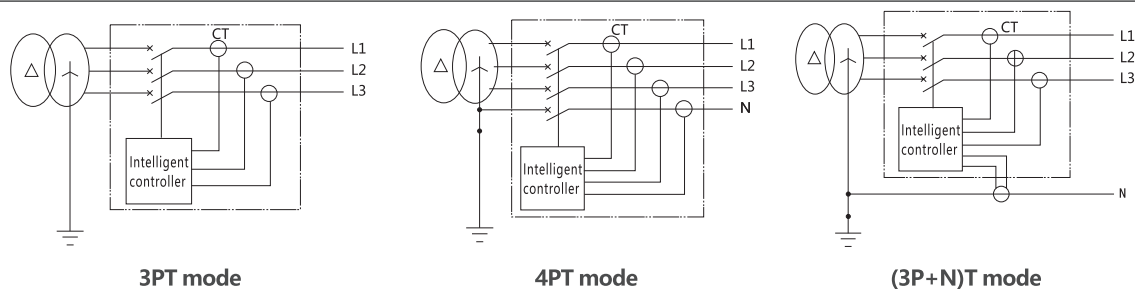
## 12.18 Grounding Protection Principle

Metal grounding protection with single-phase grounding protection fault current of several hundred amperes is generally used for neutral point direct ground system. The controller has two different protection modes: one is the vector sum mode, and the other is the external transformers mode. As shown in Figure 109

a、 In the three-phase three-wire system, the three-pole circuit breaker is selected without a transformer, the ground fault signal only takes the vector sum of the three-phase current, and the protection characteristic is the time-limited protection. (See Figure 108-a 3PT mode)

b、 In the three-phase four-wire system, the four-pole circuit breaker is selected without a transformer, the ground fault signal only takes the vector sum of the three-phase current and the N pole current, and the protection characteristic is the time-limited protection. (See Figure 108-b 4PT mode)

c、 In the three-phase four-wire system, the three-pole circuit breaker is selected with an external neutral pole N current transformer for grounding protection (the NXA16 model is connected to 6# and 7# terminal blocks and NXA20-63 models connected to 25# and 26# terminal blocks), the ground fault signal takes the vector sum of the three-phase current and the N pole current, and the protection characteristic is the time-limited protection. (See Figure 108-c (3P+N)T mode)

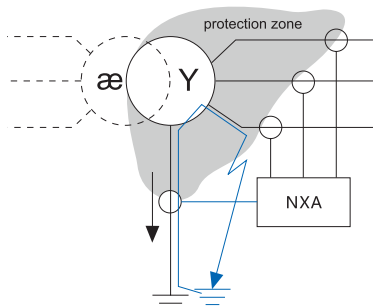


**Figure 108 grounding protection modes**

**Note:** (1) The external N-phase current transformer is a specially configured transformer of the company. The lead length is 2 m by default;

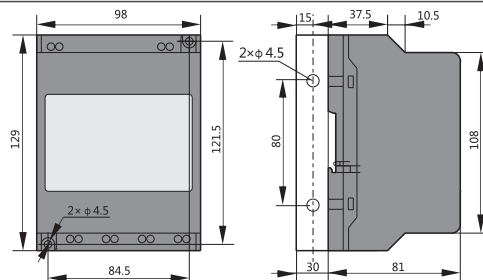
(2) In the 3PT mode, the grounding protection can only be used for balanced loads. For unbalanced loads, this function should be turned off or the set value should be set above the allowable current; otherwise, the intelligent controller may be activated;

(3) In the (3P+N)T mode, the maximum distance between the transformer and the circuit breaker should not exceed 5 m. When the lead length of the transformer exceeds 2 m, it must be specified when ordering. The P/H type controller has a unique feature. It allows two independent ground fault protection curves to be set so that two configurations can be managed simultaneously. Due to this feature, the trip can distinguish between ground faults in an unlimited area (command the breaker to open) and ground faults in a limited area (command the medium voltage breaker to open).



**Figure 109 Double ground protection**

## 12.19 Installation Dimensions of Undervoltage Delay Controller



**Figure 110 Undervoltage delay controller**



## 12.20 External N phase current transformer (3P+N Mode)

If a 3P+N controller is selected, for the overall and mounting dimensions of the external N phase transformer, please refer to the figure below.

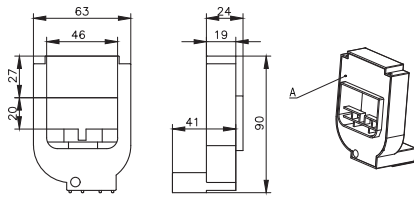


Figure 111-a NXA16 external N phase transformer

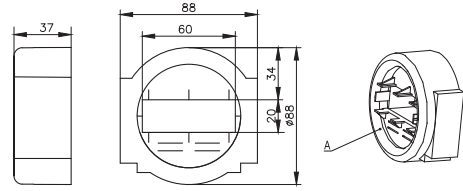


Figure 111-b NXA20 external N phase transformer

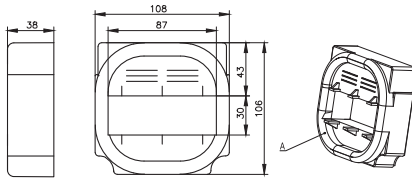


Figure 111-c NXA32, NXA63 external N phase transformer

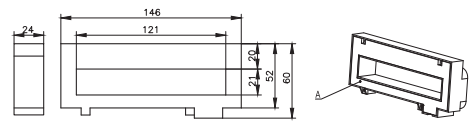


Figure 111-d NXA40 external N phase transformer

Figure 111 External N phase transformer

**Note:** If the ACB is up lead connection, side A should face the load side. If the ACB is down lead connection, side A should face the power supply side.

## 12.21 NXA Mechanical Interlock Installation Method

The following precautions should be considered before installing the mechanical interlock:

- When the steel cable needs to be bent, there should be enough transition arc (greater than R120 mm) at the bend to ensure flexible movement of the steel cable;
- Check the steel cable and ensure that there is enough oil in the cable to ensure flexible movement of the cable;
- Add low temperature grease to the steel cable at both ends and the roller;
- The length of the steel cable is 2 m by default. The recommended installation distance is no more than 1.5 meters.

### 12.21.1 NXA Drawer type Mechanical Interlock Installation Method

#### a. Mechanical interlock components

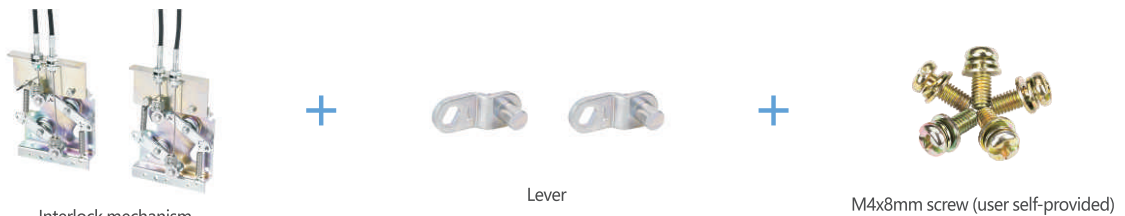


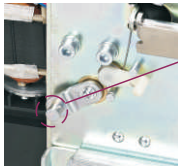
Figure 112 NXA16 Mechanical interlock components



Figure 113 NXA20-63 Mechanical interlock components

b. Installation steps

Install the lever on the spindle on the right side of the body, and secure it with the M4x10mm screw.



Secure the mechanical interlock to the right side of the drawer seat with 4 M4x8mm screws. Note that the steel cable should have a reasonable arc and the interlocking mechanism is reliable.






Figure 114 NXA16 Mechanical interlock installation

Remove the cover and pry off the edge here.



Install the lever on the spindle on the right side of the body, and secure it with the M4x10mm screw.



Place the steel cable down when installing the interlocking mechanism. Secure the interlocking mechanism to the right side of the drawer seat with 4 M5x8mm screws. Note that the steel cable should have a reasonable arc to ensure that the interlocking mechanism is reliable.

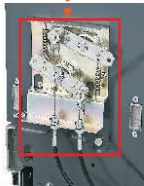



Figure 115 NXA20-63 Mechanical interlock installation


12.21.2 NXA Fixed type Mechanical Interlock Installation Method

a. Mechanical interlock components




Interlock mechanism

+




Special mounting plate for fixed type mechanical interlock

+



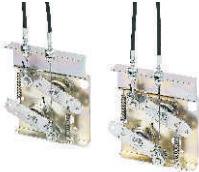
Lever

+




M4x8mm screw (user self-provided)

Figure 116 NXA16 Mechanical interlock components




Interlock mechanism

+




Special mounting plate for fixed type mechanical interlock

+



Lever

+



M5x10mm and M5x8mm screw (user self-provided)

Figure 117 NXA20-63 Mechanical interlock components

**Note:** The fixed special interlocking mechanism installation board needs to be purchased separately, and the cost is extra.

b. Installation steps

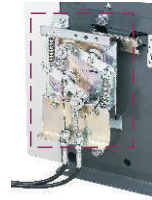
Install the lever on the spindle on the right side of the body, and secure it with the M4x10mm screws.



Secure the mounting plate of the fixed mechanical interlock on the right side of the breaker and secure it with 3 M4x8mm screws.



Secure the mechanical interlock to the right side of the mounting plate of the breaker with 4 M4x8mm screws. Note that the steel cable should have a reasonable arc to ensure that the interlocking mechanism is reliable.

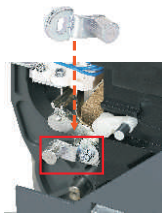


**Figure 118 NXA16 Mechanical interlock installation**

Remove the cover and pry off the edge here.



Install the lever on the right spindle of the body and secure it with the M5x10mm screw.



Secure the mounting plate of the interlocking mechanism on the right side of the breaker and secure it with 4 M5x10mm screws.



Place the steel cable down when installing the interlocking mechanism. Secure the interlocking mechanism to the right side of the drawer seat with 4 M5x8mm screws. Note that the steel cable should have a reasonable arc to ensure that the interlocking mechanism is reliable.



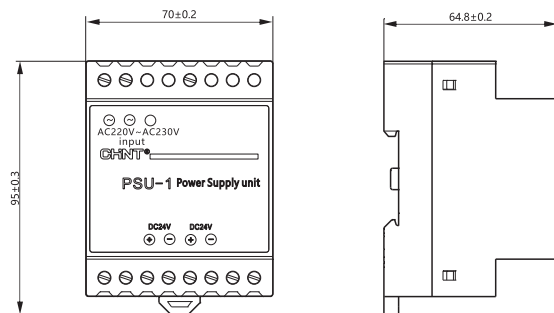
**Figure 119 NXA20-63 Mechanical interlock installation**

## 12.22 PSU-1 Power Supply Unit

The PSU-1 power supply unit can provide DC 24 V power with a power not less than 9.6 W. It can output two sets of terminals, input AC (AC220V, AC400V) or DC (DC110V, AC220V) power. It can be used as the power supply for the RU-1 relay unit. The product adopts the 35 mm standard rail mounting method. The shape and installation dimensions are shown in Figure 120.



**Figure 120 PSU-1 power supply unit**



**Figure 121 PSU-1 power supply unit installation structure**

## 12.23 RU-1 Power Relay Unit

The signal unit output by the controller is generally used for fault alarm or indication. When it is used to control the opening and closing of the circuit breaker or the load capacity is large, it needs to be controlled after converted by the RU-1 relay unit. The capacity of the RU-1 contact is AC250V, 10A; DC28V, 10A. Its shape and installation dimensions are the same as those of the PSU-1 power module.

### 12.23 RU-1 Power Module

The signal unit output by the controller is generally used for fault alarm or indication. When it is used to control the opening and closing of the circuit breaker or the load capacity is large, it needs to be controlled after converted by the RU-1 relay module. The capacity of the RU-1 contact is AC250V, 10A; DC28V, 10A. Its shape and installation dimensions are the same as those of the PSU-1 power unit.



Figure 122 RU-1 Relay Unit

### 12.24 Mechanical interlock baseplate bore hole dimensions

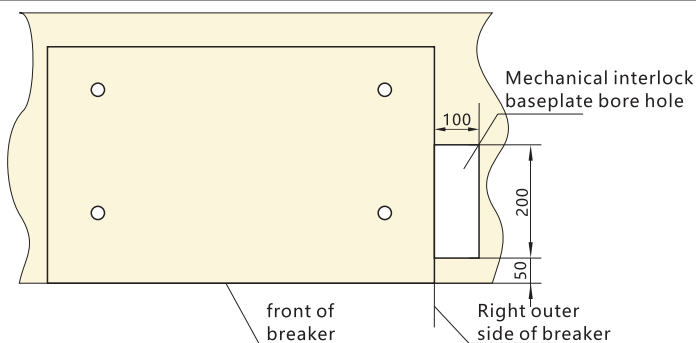


Figure 123 Mechanical interlock baseplate bore hole dimensions

### 12.25 Push button lock

The pushbutton lock is to lock the circuit breaker by a transperant conver blocks so as to prevent the breaking button and the making button of the circuit breaker from misoperation and guarantee the reliable running of the circuit breaker.



Figure 124 Push button lock

12.26 other accessories

Table 55 Alarming contact

Standard configuration		1CO
Breaking capacity		Current (A) / Voltage (V)
Utilization category	VAC(AC-15)	1.3/240, 0.75/415
	VDC(DC-13)	0.55/110, 0.27/220

Table 56 Spring charging indication contact

Standard configuration		1NO
Breaking capacity		Current (A)/ Voltage (V)
Utilization category	VAC(AC-15)	1.3/240, 0.75/415
	VDC(DC-13)	0.55/110, 0.27/220

**Note:** <sup>1</sup> CO refers to a switch contact, and a one-normally-open and one-normally-closed contact is matched with a common terminal.  
<sup>2</sup> NO refers to a normally open contact. NC refers to a normally closed contact.



Secondary wiring terminal-drawout type



Secondary wiring terminal-fixed type



N pole CT

Figure 125 other accessories





**CHNT**

CHINT ELECTRICS

# NXA Series Air Circuit Breaker User Instruction

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