



NXZ(H)B, NXZ(H)M Series ATS

1. General

1.1 Scope of Application

1.1.1 NXZ(H)B/NXZ(H)M Series Automatic Transfer Switching

Equipment is applicable to three-phase four-wire duplicate supply grid of AC 50/60Hz, rated voltage 400V/415V and below, rated current 800A, and can switch one or several load circuits from one power source to the other to ensure the normal power supply of the load circuit.

1.1.2 This product is applicable to industrial and commercial power use places, high-rise buildings, and residential houses.

1.2 Applicable standards

1.2.1 Product standard

IEC 60947-1.

IEC 60947-6-1.

1.2.2 Standards for use in extreme environment

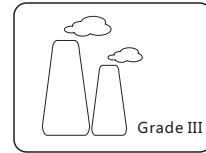
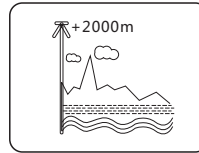
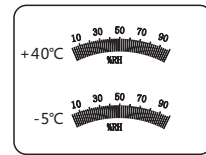
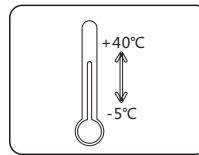
IEC 60068-2-1. (Low Temperature)

IEC 60068-2-2. (High Temperature)

IEC 60068-2-30. (Cyclic Damp Heat)

IEC 60068-2-11. (Salt mist)

1.3 Normal working conditions



1.3.1 Ambient temperature

-5°C~+40°C; Users can custom-tailor relevant product to be used in the environment of -25°C~+70°C, and use the product according to the temperature compensation table.

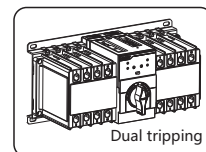
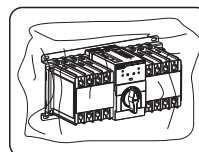
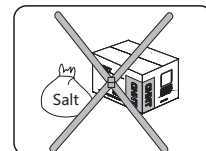
1.3.2 Sea level elevation

Equal to 2000m or below; if it needs to work above 2000m altitude, it shall be used according to the table of capacity reduction of different altitudes.

1.3.3 Atmospheric conditions

The relative humidity shall not exceed 50% when the surrounding air temperature is +40°C; the relative humidity can be higher when the temperature is lower; the average monthly maximum relative humidity in the wettest month is 90%, and the average monthly minimum temperature shall be +20°C. Special measures may be necessary in cases of occasional condensation due to variations in temperature.

1.3.4 Pollution degree: class 3



1.3.5 Installation category

Installation category of the switching equipment of main circuit is category IV.

Installation category of auxiliary circuit is category III.

Installation category of conversion controller is category II.

1.3.6 Utilization category:

NXZB: AC-33iB

NXZ (H) B: AC-33B

NXZ (H) M: AC-33B

1.3.7 Electromagnetic compatibility (EMC)

Electrostatic discharge (IEC 61000-4-2) Level 2

Radio-frequency electromagnetic field-radiated

electromagnetic field immunity (IEC 61000-4-3) Level 3,

Fast transient bursts (IEC 61000-4-4) Level 3,

Surges (IEC 61000-4-5) Level 3, Radio-frequency

electromagnetic field-conducted immunity (IEC 61000-4-6)

Level 3, Radiation grade (CISPR11) grade B,

2. Model definition and description

NXZB-63 (Class CB)

NXZB	-	63	H	/	4	A	T	C	63	
										Rated current code: 10A, 16A, 20A, 25A, 32A, 40A, 50A, 63A
										Tripping type code: C: C type D: D type
										Function code: Empty: no communication function T: communication function
										Controller code: A: standard type C: intelligent type
										Pole: 3: 3 poles 4: 4 poles
										Breaking capacity code: S : 6kA H : 10kA
										Frame current code: 63A
										Product code: NXZB: series automatic transfer switching equipment

NXZM (Class CB)

NXZM	-	250	H	/	4	A	2	160A	
									Rated current code: 10A~800A
									Function code: Empty: power distribution protection 2: generator protection
									Controller code: A: standard type B: intelligent type
									Pole : 3: 3 poles 4: 4 poles
									Breaking capacity code: S: standard H: higher
									Frame current code: 63A, 125A, 160A, 250A, 320A, 400A, 630A, 800A
									Product code: NXZM: automatic transfer switching equipment

Type selection example:

NXZB-63H/4C C63: To order a class CB automatic transfer switching equipment, the frame current is 63A, number of poles is 4P, the breaking capability is 10kA, rated current is 63A, the tripping type is C type, with an intelligent controller (C type).

Type selection example:

NXZM-250H/4A 160A: To order a class CB automatic transfer switching equipment, the frame current is 250A, number of poles is 4P, H breaking capability, rated current is 160A, with a standard controller (A type) and generator protection.

Comparison Table of Frame Current and Rated Current

Rated current (A)	10	16	25	32	40	50	63	80	100	125	160	180	200	225	250	315	320	350	400	500	630	700	800
63	■	■	■	■	■	■	■																
125							■	■	■	■													
160										■	■												
250											■	■	■	■	■								
320															■		■						
400															■	■		■	■				
630																		■	■	■			
800																				■	■	■	■

NXZHB-63 (Class PC)

NXZHB	-	63	/	4	A	T	63A
							Rated current code: 16A, 32A, 63A
							Function code: Empty: no communication function T: communication function
							Controller code: A: standard type C: intelligent type
							Pole : 3: 3 poles 4: 4 poles
							Frame current code: 63A
							Product code: NXZHB: automatic transfer switching equipment

NXZHM (Class PC)

NXZHM	-	250	/	4	A	160A
						Rated current code: 10A~800A
						Controller code: A: standard type B: intelligent type
						Pole: 3: 3 poles 4: 4 poles
						Frame current code: 63A, 125A, 160A, 250A, 320A, 400A, 630A, 800A
						Product code: NXZHM: automatic transfer switching equipment

P

Type selection example:

NXZHB-63/4A 63A: To order a PC grade automatic transfer switching equipment, the frame current is 63A, number of poles is 4P, rated current is 63A, with a standard controller (A type).

Type selection example:

NXZHM-250/4A 250A: To order a PC grade automatic transfer switching equipment, the frame current is 250A, number of poles is 4P, rated current is 250A, with a standard controller (A type)

Comparison Table of Frame Current and Rated Current

Rated current (A)	10	16	25	32	40	50	63	80	100	125	160	180	200	225	250	315	320	350	400	500	630	700	800
63	■	■	■	■	■	■	■																
125							■	■	■	■													
160										■	■												
250											■	■	■	■	■								
320															■		■						
400															■	■		■	■				
630																			■	■	■		
800																					■	■	■

3. Functions and characteristics

Technical parameters of NXZB-63 (class CB)

Model	NXZB-63S	NXZB-63H
Electrical characteristics		
Execution body	NXB-63	NXB-63H
Frame current (A)	63	63
Rated current (A)	10, 16, 20, 25, 32, 40, 50, 63	10, 16, 20, 25, 32, 40, 50, 63
Rated operational voltage Ue (V)	400	400
Rated insulation voltage Ui (V)	500	500
Rated impulse voltage Uimp (kV)	4	4
Utilization category	AC-33iB	AC-33iB
Number of poles	3P, 4P	3P, 4P
Rated short-circuit making capacity Icm (kA)	9	17
Rated short-circuit breaking capacity Icn (kA)	6	10
Tripping curve type	C, D	C, D
Mechanical endurance (times)	10000	10000
Electrical endurance (times)	3000	3000
Controller characteristics		
Controller model	A type (standard), C type (intelligent)	
Operating transfer time (s)	1.4 × (1 ± 10%)	
Controller installation mode	Built in	
Rated control power source voltage Us(V)	230 50Hz	
Control voltage range	85%Ue~110%Ue	

Technical parameters of NXZM (class CB)

Model	NXZM-63	NXZM-125	NXZM-160	NXZM-250	NXZM-320	NXZM-400	NXZM-630	NXZM-800
Electrical characteristics								
Execution body	NXM-63	NXM-125	NXM-160	NXM-250	NXM-320	NXM-400	NXM-630	NXM-800
Frame current (A)	63	125	160	250	320	400	630	800
Rated current (A)	10 , 16 , 25 , 32 , 40 , 50 , 63	63 , 80 , 100 , 125	125 , 160	160 , 180 , 200 , 225 , 250	160 , 180 , 200 , 225 , 250 , 320	250 , 315 , 350 , 400	400 , 500 , 630	630 , 700 , 800
Rated operational voltage Ue (V)	400/415 50Hz							
Rated insulation voltage Ui (V)	AC800	AC800	AC800	AC1000	AC1000	AC1000	AC1000	AC1000
Rated impulse voltage Uimp (kV)	8					12		
Use type	AC-33B							
Number of poles	3P、 4P							
Rated short-circuit making capacity Icm (kA)	S : 52.5 H : 105	S : 52.5 H : 105	S : 73.5 H : 105	S : 73.5 H : 105	S : 73.5 H : 105	S : 105 H : 143	S : 105 H : 143	S : 105 H : 165
Rated short-circuit breaking capacity Icn (kA)	S : 25 H : 50	S : 25 H : 50	S : 35 H : 50	S : 35 H : 50	S : 35 H : 50	S : 50 H : 65	S : 50 H : 65	S : 50 H : 75
Mechanical endurance (times)	10000	10000	8000	6000	6000	4000	4000	4000
Electrical endurance (times)	2000	2000	2000	2000	2000	1500	1500	1000
Controller characteristics								
Controller model	A type (standard), B type (intelligent)							
Operating transfer (s)	2.8 × (1±10%)	2.8 × (1±10%)	3.3 × (1±10%)	3.3 × (1±10%)	3.3 × (1±10%)	3.5 × (1±10%)	3.5 × (1±10%)	4 × (1±10%)
Installation mode	Integrated, split							
Rated control power source voltage Ue(V)	230/240 50Hz							
Control voltage range	85%~110%Ue							

Technical parameters of NXZHB-63 (class PC)

Model	NXZHB-63
Electrical characteristics	
Frame current (A)	63
Rated current (A)	16 , 32 , 63A
Rated operational voltage Ue (V)	400
Rated insulation voltage Ui (V)	500
Rated impulse voltage Uimp (kV)	4
Utilization category	AC-33B
Number of poles	3P, 4P
Rated conditional short-circuit current Iq (kA)	100
Mechanical endurance (times)	10000
Electrical endurance (times)	1500
Controller characteristics	
Controller model	A type (standard), C type (intelligent)
Operating transfer (s)	1.4× (1±10%)
Controller installation mode	Built in
Rated control power source voltage Ue(V)	230 50Hz
Control voltage range	85%Ue~110%Ue

Technical parameters of NXZHM (class PC)

Model	NXZHM-63	NXZHM-125	NXZHM-160	NXZHM-250	NXZHM-320	NXZHM-400	NXZHM-630	NXZHM-800
Electrical characteristics								
Execution body	NXHM-63	NXHM-125	NXHM-160	NXHM-250	NXHM-320	NXHM-400	NXHM-630	NXHM-800
Frame current (A)	63	125	160	250	320	400	630	800
Rated current (A)	10 , 16 , 25 , 32 , 40 , 50 , 63	63 , 80 , 100 , 125	125 , 160	160 , 180 , 200 , 225 , 250	160 , 180 , 200 , 225 , 250 , 320	250 , 315 , 350 , 400	400 , 500 , 630	630 , 700 , 800
Rated operational voltage Ue (V)	400/415 50Hz							
Rated insulation voltage Ui (V)	AC800	AC800	AC800	AC1000	AC1000	AC1000	AC1000	AC1000
Rated impulse voltage Uimp (kV)	8					12		
Utilization category	AC-33E							
Number of poles	3P、4P	3P、4P	3P、4P	3P、4P	3P、4P	3P、4P	3P、4P	3P、4P
Rated conditional short-circuit current Iq (kA)	100	100	100	100	100	100	100	100
Mechanical endurance (times)	10000	10000	8000	6000	6000	4000	4000	4000
Electrical endurance (times)	2000	2000	2000	2000	2000	1500	1500	1000
Controller characteristics								
Controller model	A type (standard), B type (intelligent)							
Operating transfer (s)	2.8 × (1±10%)	2.8 × (1±10%)	3.3 × (1±10%)	3.3 × (1±10%)	3.3 × (1±10%)	3.5 × (1±10%)	3.5 × (1±10%)	4 × (1±10%)
Installation mode	Integrated, split							
Rated control power source voltage Us(V)	230/240 50Hz							
Control voltage range	85%~110%Ue							

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4. Functions and characteristics

Functional parameters of NXZ (H) B controller

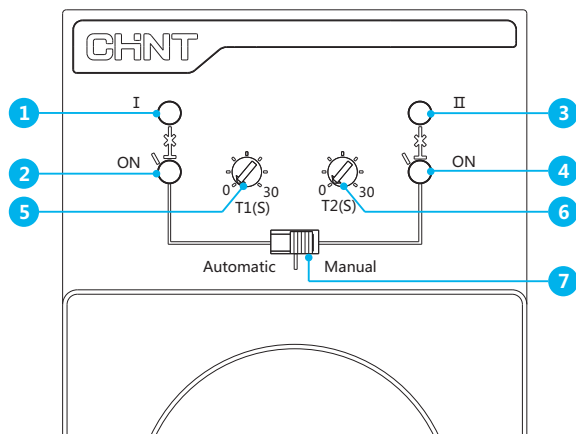
Function	Model	A type (standard)	C型 (智能型)
Manual/automatic transfer		■	■
Main contact positions			
Normal position		■	■
Alternative position		■	■
Off-position		■	■
Automatic control			
Normal supply of monitoring		■ Phase failure/loss of voltage, undervoltage, overvoltage fault	■ Phase failure/loss of voltage, undervoltage, overvoltage fault
Alternative supply of monitoring		■ Phase failure/loss of voltage, undervoltage, overvoltage fault	■ Phase failure/loss of voltage, undervoltage, overvoltage fault
Automatically transfer and restore operation		■	■
Grid-grid		■	■
Phase failure/loss of voltage transfer		■	■
Undervoltage transfer		■	■
Delay adjustable		■	■
Transfer delay		0s~30s adjustable	0s~30s adjustable
Return delay		0s~30s adjustable	0s~30s adjustable
Generator control		-	Optional
Fire control linkage		■	■
Fire control feedback		■	■
Indication			
Switching-on/switching-off/dual tripping indication		■	■
Normal/alternative supply indication		■	■
Parameter setting indication			
Others			
Communication function		Optional	Optional

Table of main functional parameters of NXZ (H) M controller

Function	Model	A type (standard)	B type (intelligent)
Manual/automatic transfer		■	■
Main contact positions			
Normal position		■	■
Alternative position		■	■
Off-position		■	■
Automatic control			
Normal supply of monitoring		■ Phase failure/loss of voltage, undervoltage, overvoltage fault	■ Phase failure/loss of voltage, undervoltage, overvoltage fault
Alternative supply of monitoring		■ Phase failure/loss of voltage, undervoltage, overvoltage fault	■ Phase failure/loss of voltage, undervoltage, overvoltage fault
Automatically transfer and restore operation		■	■
Automatically transfer and nonautomatically restore operation			■
Grid-grid		■	■
Grid-generator		-	-
Phase failure/loss of voltage transfer		■	■
Undervoltage transfer		■	■
Overvoltage transfer		■	■
Delay adjustable		■	■
Transfer delay		0s~180s adjustable	0s~180s adjustable
Return delay		0s~180s adjustable	0s~180s adjustable
Generator control		-	■
Fire control linkage		■	■
Fire control feedback		■	■
Indication			
Switching-on/switching-off/off-position		■	■
Normal/alternative supply indication		■	■
Parameter setting indication		■	■
Fault tripping indication		■	■
Others			
Communication function		Optional	Optional
Display module		■ LED	■ LED

Functional description of NXZ (H) B

Figure 1



- 1 Normal supply (red)
- 2 Normal switching-on (green)
- 3 Alternative supply (red)
- 4 Alternative switching-on (green)
- 5 Transfer delay time setting (normal to alternative)
- 6 Return time delay setting (alternative to normal)
- 7 Automatic/manual switching

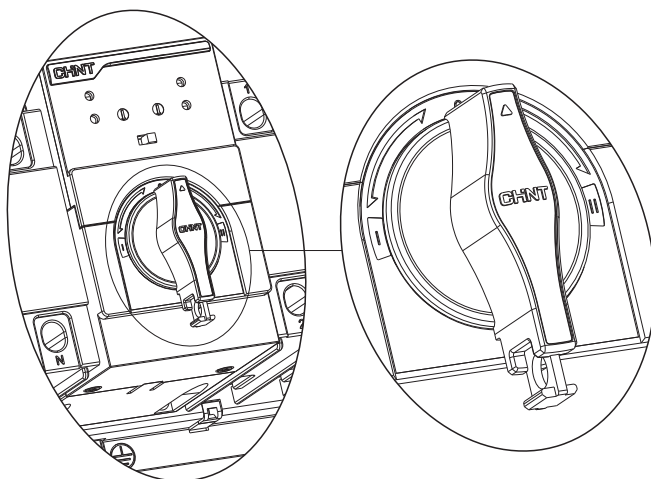
Indicator light information

Product status	①	②	③	④
Normal supply normal	Normal on			
Normal circuit breaker switched on		Normal on		
Alternative supply normal			Normal on	
Alternative breaker switched on				Normal on
Transfer delay				Flash
Return delay		Flash		
Normal circuit breaker tripped	Flash	Flash		
Alternative breaker tripped			Flash	Flash
Product transfer fault	Flash		Flash	
Fire control linkage		Flash		Flash

Lock system

During line repair or fault-based maintenance, put the product on off-position, and then pull out the locking system of the handle, then lock it. The lock hole diameter is $\Phi 5.5$.

Figure 2

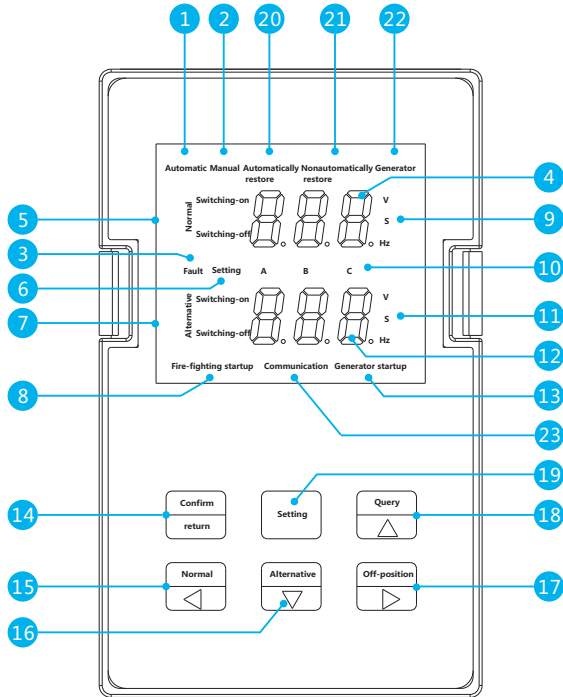


5. Functions and characteristics

Functional description of NXZ (H) M

Operation interface of the display module of controller

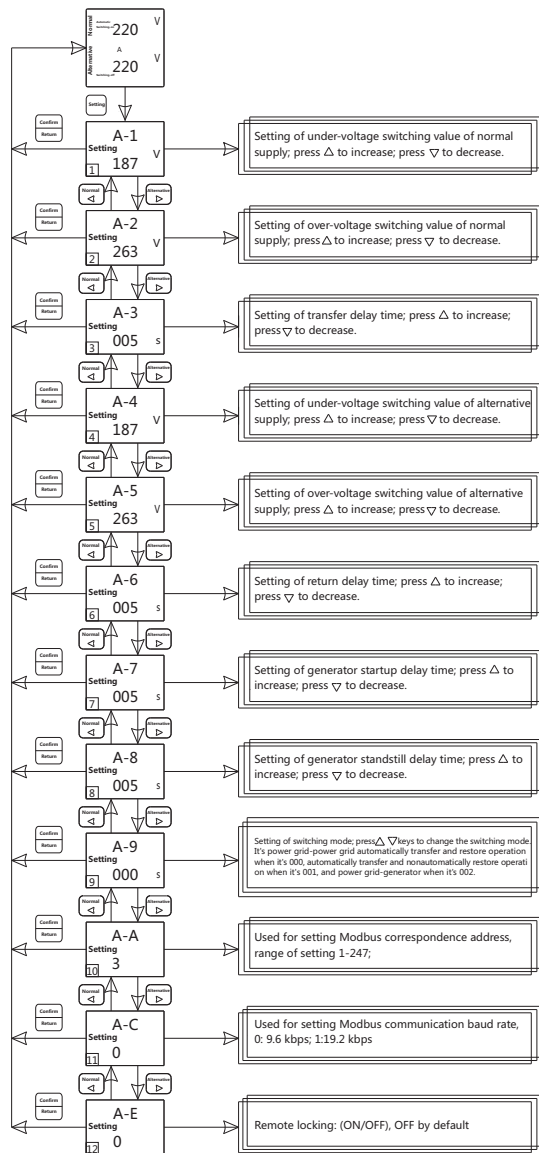
Figure 3



- 1 Indication of automatic operation mode;
- 2 Indication of manual operation mode;
- 3 Fault indication: This light will be on when switch fault or breaker tripping caused by load short circuit (class PC controller doesn't have such function);
- 4 The display area of voltage parameters of normal supply shows the voltage parameters of normal supply and the transfer delay time during working, and shows the symbol in setting mode;
- 5 Indication of switching-on, switching-off for the normal supply; when normal supply is failure, indicator light of "normal" flash;
- 6 Setting status indication;
- 7 Indication of switching-on, switching-off for the alternative supply; when alternative is failure, indicator light of "alternative" flash;
- 8 Indication of startup of fire control linkage;
- 9 Voltage, time, and frequency unit for the normal supply ;
- 10 A, B, C phase;
- 11 Voltage, time, and frequency unit for the alternative supply;
- 12 The display area of voltage parameters of alternative supply shows the voltage parameters of alternative supply and the transfer delay time during working, and shows the symbol in setting mode;
- 13 Indication of generator startup;
- 14 Confirm/return button: It means saving and exit in setting mode; It means returning to the normal working state in fire control linkage mode;
- 15 Normal supply switching button: On the manual control mode, if the normal supply is normal, press this button to compulsorily switch to normal supply; On setting mode, this button is used for paging up;
- 16 Alternative supply switching button: On the manual control mode, if the alternative supply is normal, press this button to compulsorily switch to alternative supply; On setting mode, this button is used for paging down;
- 17 Trip button: On the manual control mode, if any one of the two power sources is normal, press this button to switch to the switching-off position; On setting mode, this button is used to decrease value in parameter setting;
- 18 Fault query button: when there is fault indication on the display screen, press this button to query the fault code ; On setting state, this button is used to increase value in parameter setting;
- 19 Setting button: press this button to enter the parameter setting menu of the controller;
- 20 Indication of automatically transfer and restore operation mode;
- 21 Indication of automatically transfer and nonautomatically restore operation mode;
- 22 Indication of generator (automatically transfer and restore operation);
- 23 Indication of communication state.

Parameter setting of the display module of controller

Figure 4



Operation interface for parameter setting of controller

- Setting of under-voltage switching value: Default to 187V ;user-settable 160V-200V;
- Setting of over-voltage switching value: Default to 263V ; user-settable 240V-290V;
- Transfer delay setting: Default to 5s; user-settable 0s-180s;
- Return delay setting: Default to 5s; user-settable 0s-180s;
- Generator startup delay setting: Default to 5s; user-settable 0s-180s;
- Generator standstill delay setting: Default to 5s; user-settable 0s-180s;

■ Note of buttons:

Pressure setup key when the controller is working, and the screen shows the parameter setting menu. Press " Δ " " ∇ " in the setting menu to turn up or down.
Press "Confirm/return" key to exit from menu setting; press " ∇ " " Δ " to revise parameter.

6. Mode of connection of the main part and controller

Mode of connection of NXZB and NXZHB

Product wiring

The incoming line is connected from the top of product; the outgoing line is connected from the bottom of product; the product can be installed vertically or horizontally.

Wiring as follows. The power phase sequence shall be correct; in particular, N pole shall not be wrongly connected.

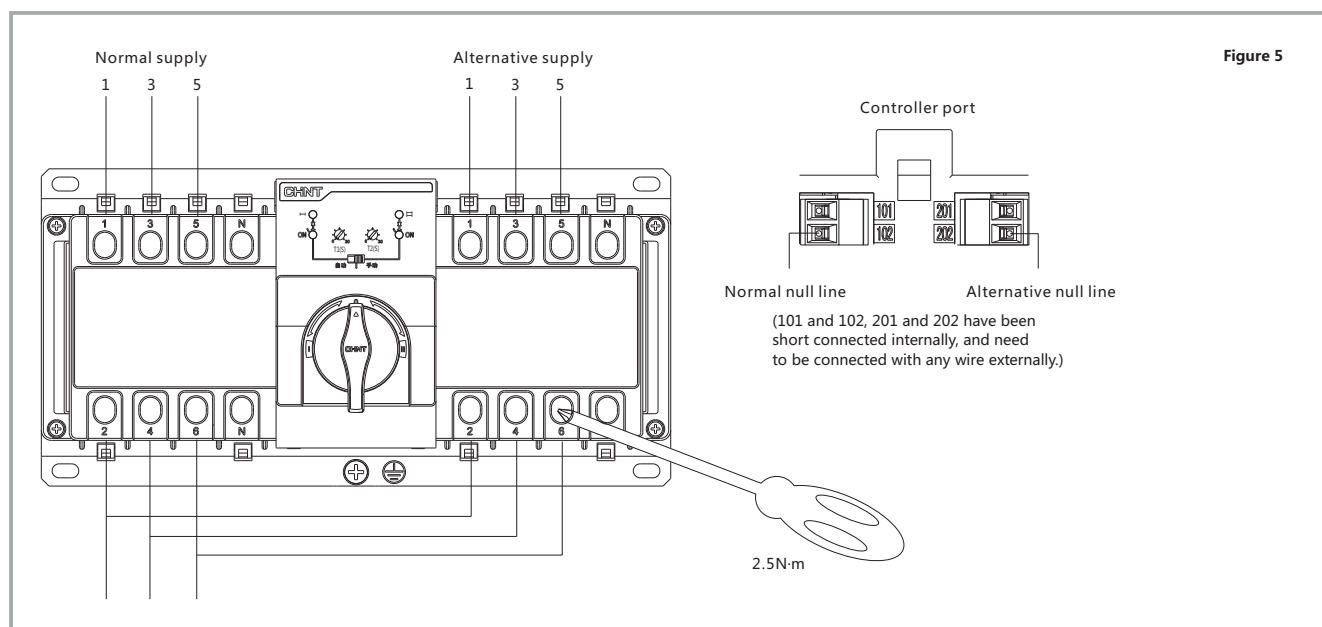
The connecting wire (electric cable) adopts single core Polyvinyl chloride (PVC) insulated conductor or copper bar of the equivalent effect.

Advice as follows:

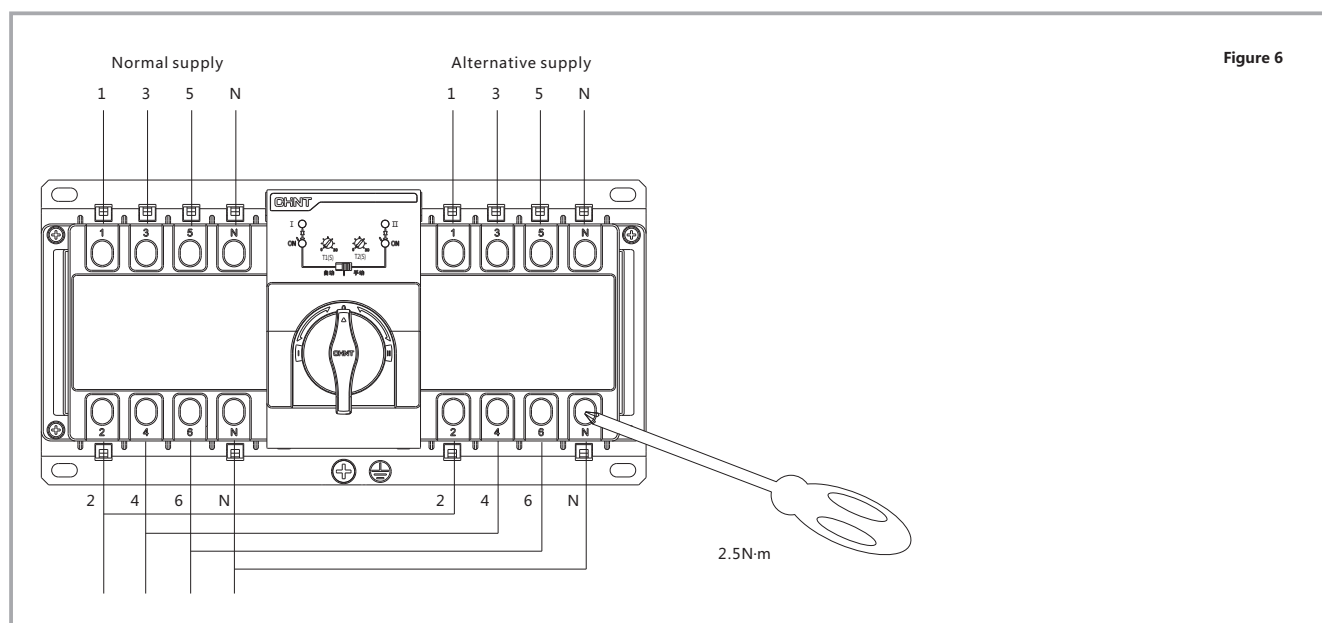
Cross-sectional area of copper conductor

Safe ampacity (A)	20	25	32	40	50	63
Cross-sectional area of copper conductor (mm ²)	2.5	4	6	10	10	16

3P product

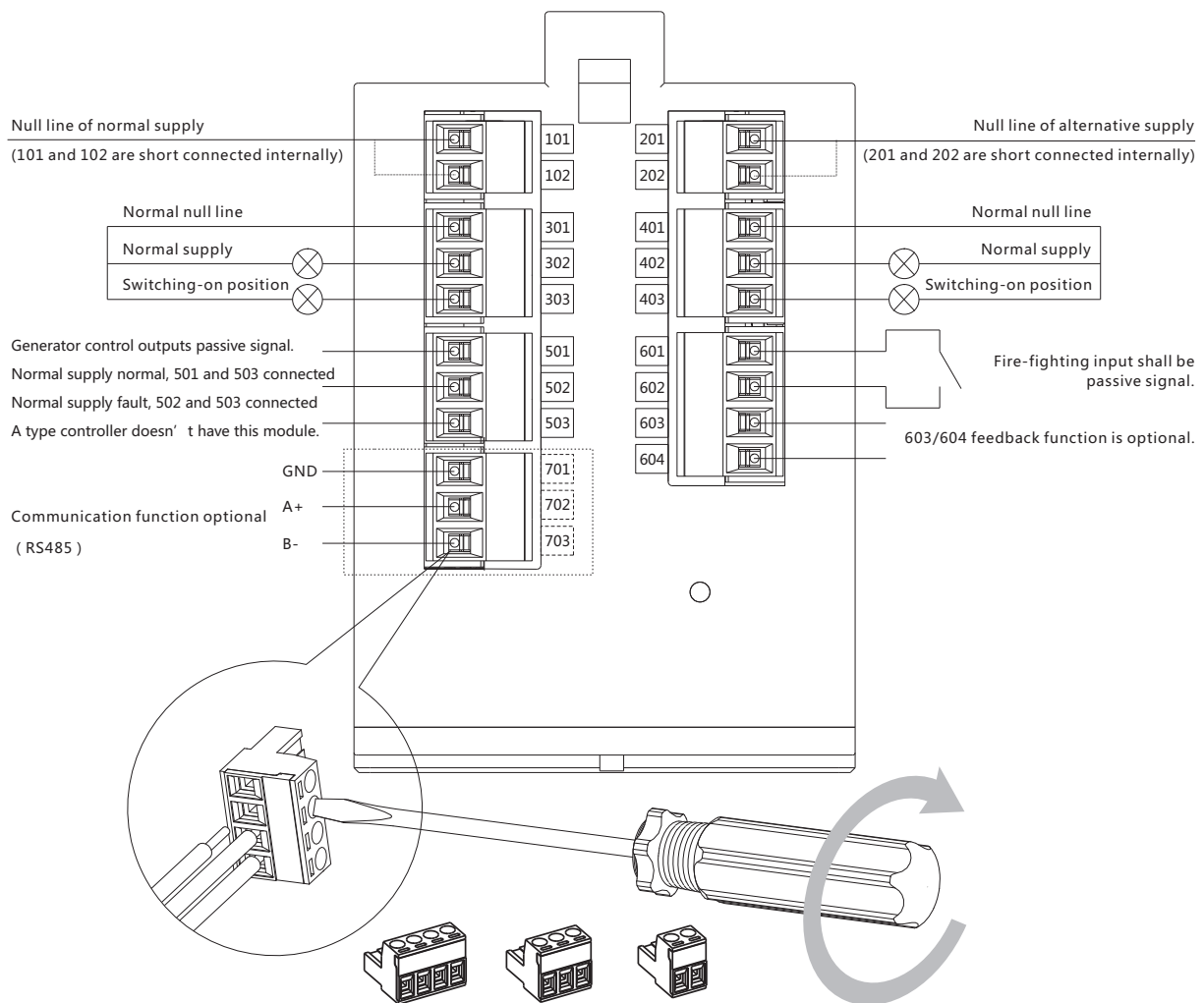


4P product



Signal and control terminal wiring

Figure 7

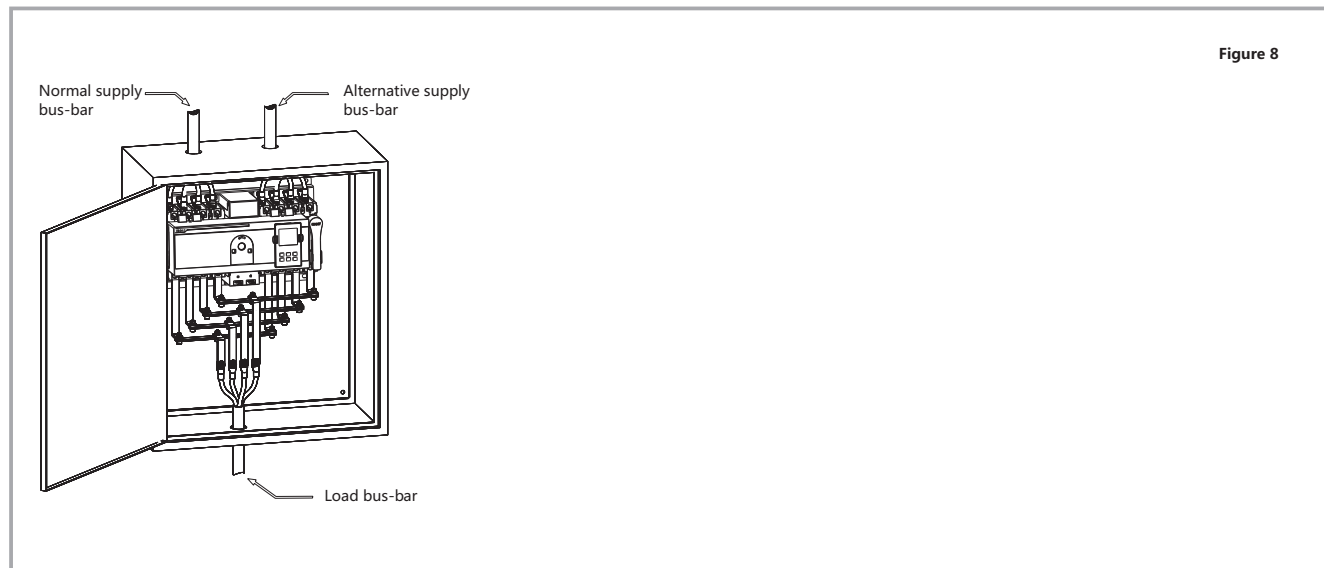


7. Mode of connection of the main part and controller

Mode of connection of NXZM and NXZHM

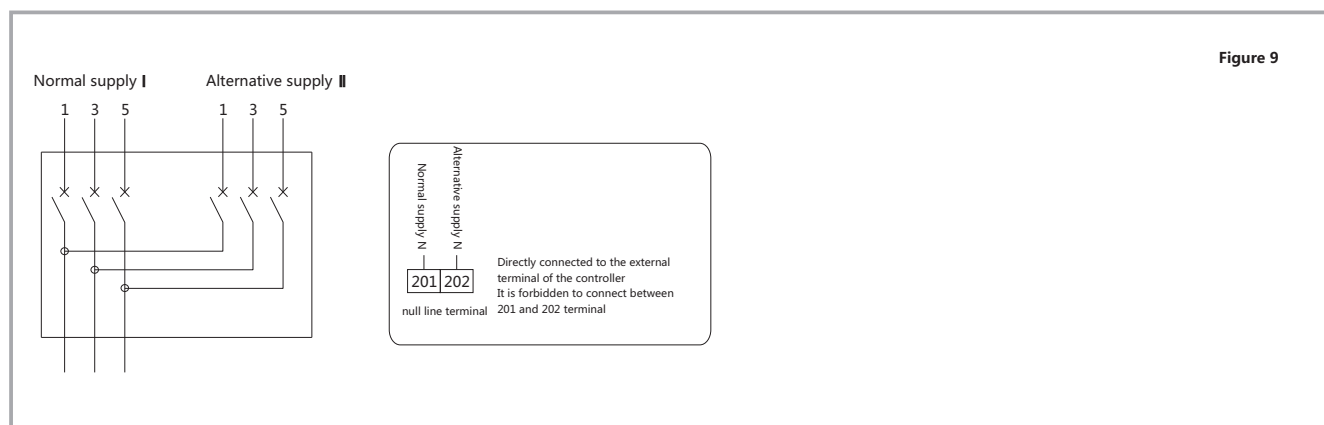
Product incoming line mode: incoming line at the top of product; outgoing line at the bottom of product

Installation mode: vertically or horizontally

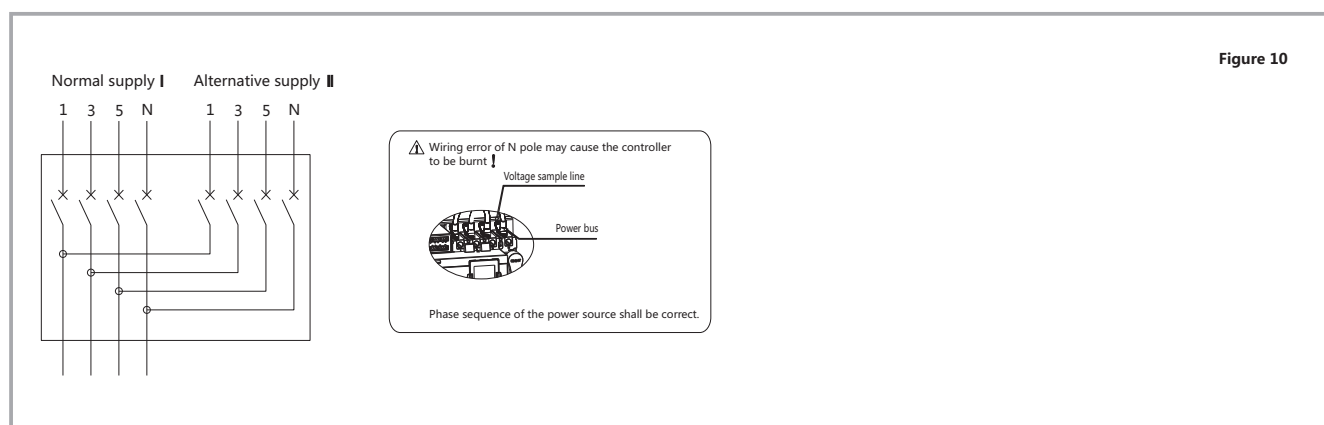


Product wiring

3P

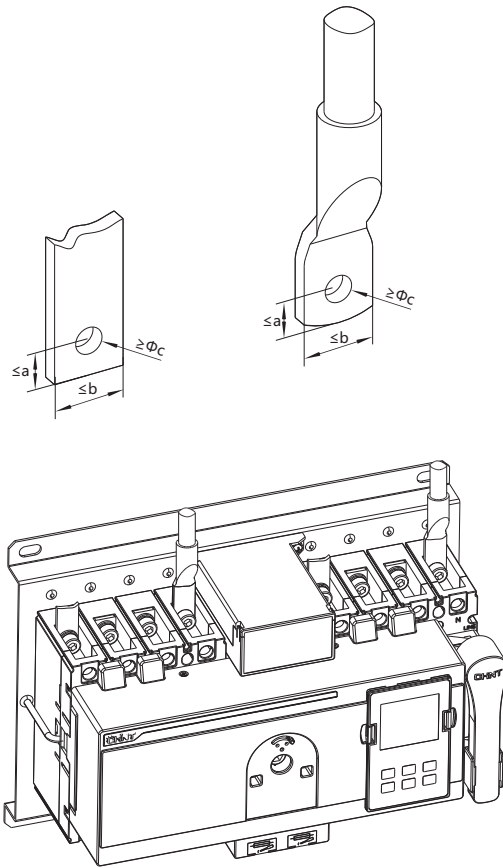


4P



Wire connection

Figure 11



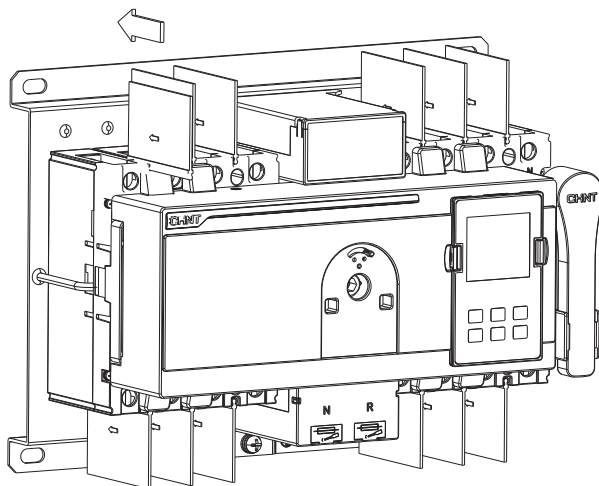
Unit: mm

Product code	a	b	c
MXZ(H)M-63, 125	6.5	14	5.5 ($\leq 63A$)
	7.5	17	6.5 ($> 63A$)
MXZ(H)M-160	7.5	14.5	8.5
MXZ(H)M-250, 320	10	23	8.5
MXZ(H)M-400, 630	10.5	30.5	10.5
MXZ(H)M-800	15	43	14

8. Mode of connection of the main part and controller

Installation of interphase barrier

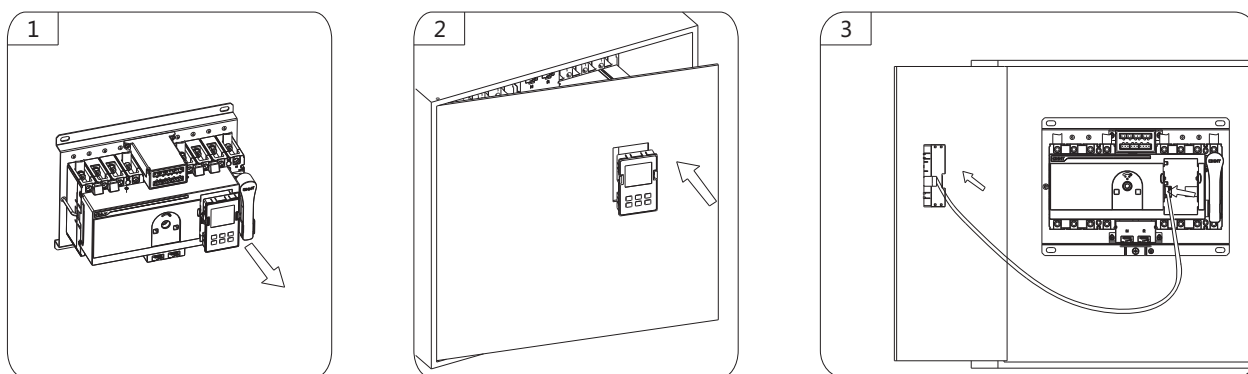
Figure 12



Note: The interphase barrier for NXZ(H)M-160 is preassembled before delivery.

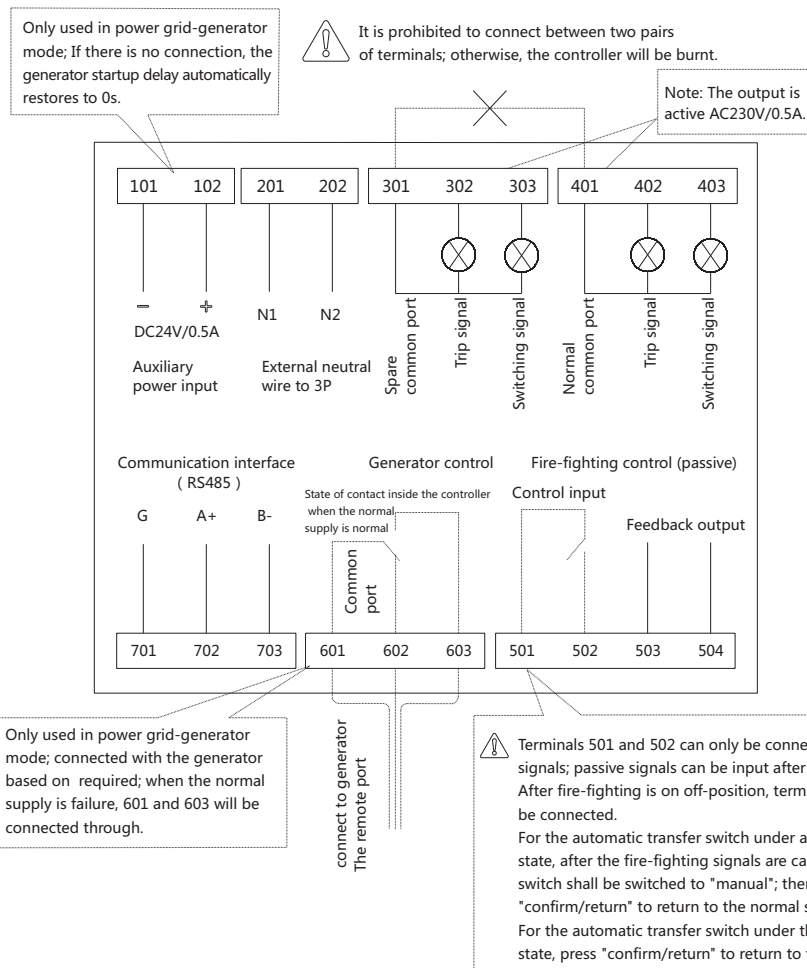
Split type installation of the display module (cabinet door)

Figure 13



Signal and control terminal wiring

Figure 14

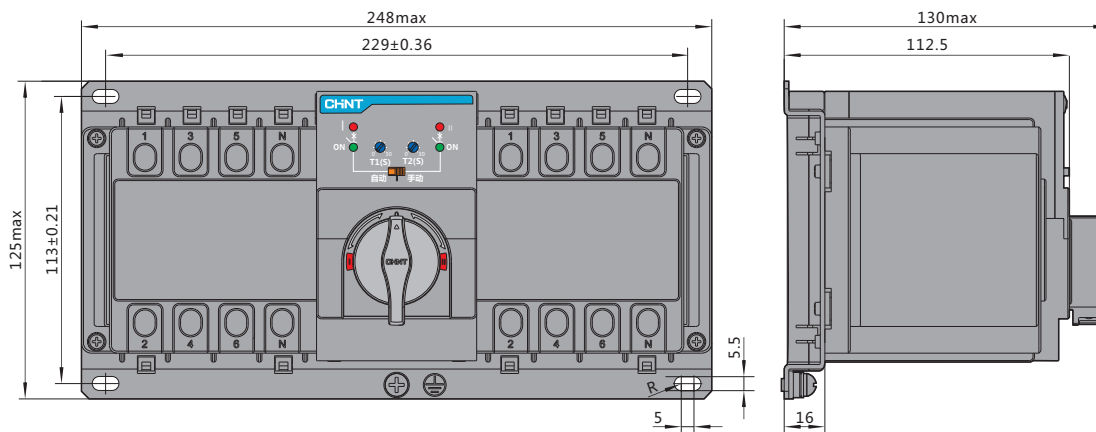


9. Overall and installation dimension

Overall and installation dimension of NXZB and NXZHB

Overall and installation dimension
(the dimension of 3P product and 4P is the same)

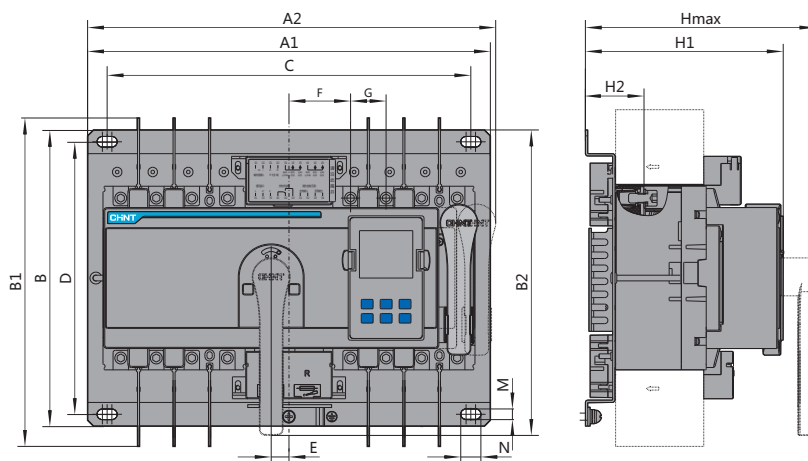
Figure 15



Overall and installation dimension of NXZM and NXZHM

Overall and installation dimension

Figure 16

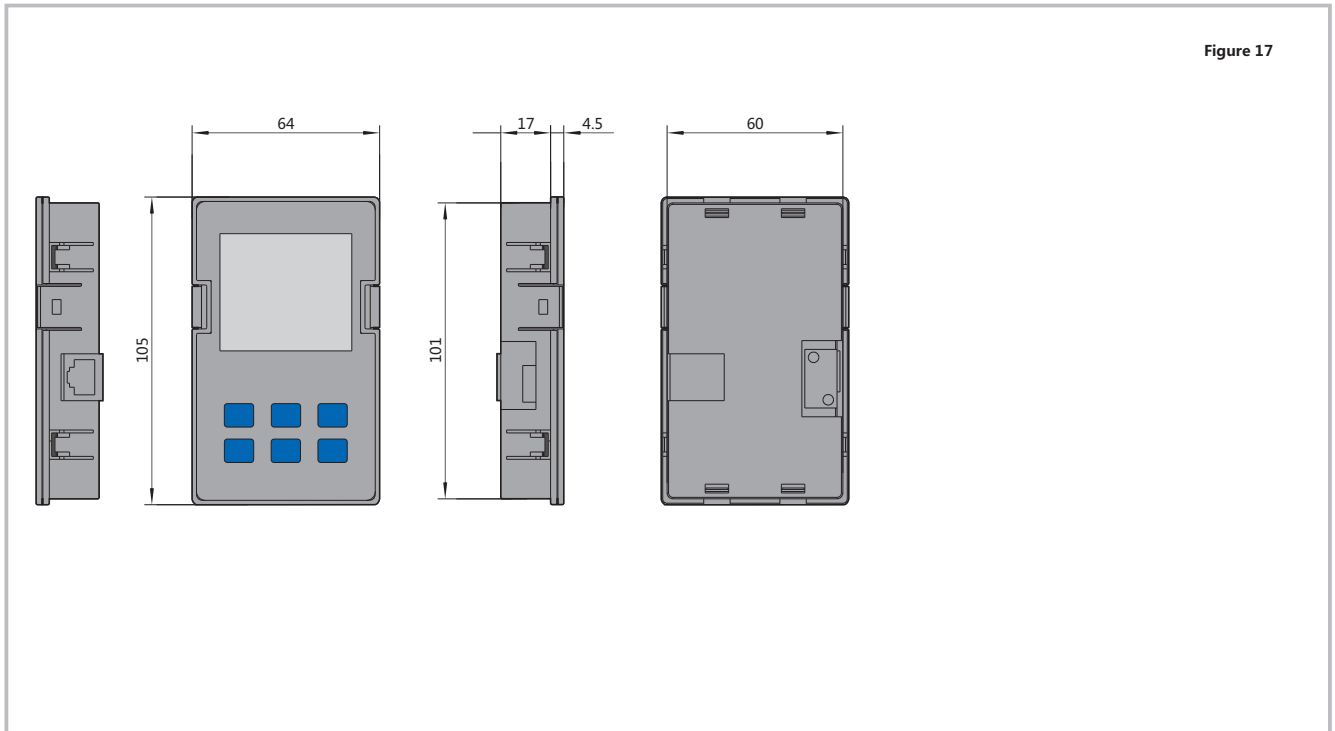


Take 4p product as the example

Unit: mm

Product code	A1 4P	A2 3P	B	B1	B2	C	D	E 4P	F 3P	G	H S	H1 S	H2 S	M	N
NXZ(H)M-63, 125	300	312	240	230	223	267	220	12.5	0	51.5	64	25	178	190	17
NXZ(H)M-160	340	345	250	245	240	307	230	15	0	52	67	30	167	195	17
NXZ(H)M-250, 320	390	393	250	367	240	357	230	17.5	0	60	77.5	35	181	216	17
NXZ(H)M-400, 630	535	540	334	464	342	475	304	24	0	84	108	44	234	198	26
NXZ(H)M-800	660	663	344	477	344	600	314	29	0	106	135	58	228	203	26

Overall dimension of split type module (unit: mm)





NH40S Changeover S

1. General

1.1 Application

Mainly used in the distributing and motor circuit which has high short-circuit current, and acted as main switch or master switch infrequently operated by hand, it is particularly suitable in the relative high class with drawable low voltage complete equipment. They provide safety isolation and protection against overcurrent for any low voltage electrical circuit.

1.2 Standard: IEC/EN 60947-3.

1.3 General characteristic

Full-enclosed structure
Unique rolling insert type contact system.

2. Type designation

2.1 Ordering information

NH40 - □ / □ C S □ □

With "F" : terminal protection type
(only for 125~250A)

Without "F" : without terminal protection

With "W" : the handle is operated outside the cabinet

Without "W" : the handle is operated inside the cabinet

S: Changeover switch

C: lateral operation

Blank: front operation

3 represents three poles: 31 represents three poles with auxiliary, one open and one closed

32 represents three poles with auxiliary, two open and two closed

4 represents four poles: 41 represents four poles with auxiliary, one open and one closed

42 represents four poles with auxiliary, two open and two closed

Conventional thermal current

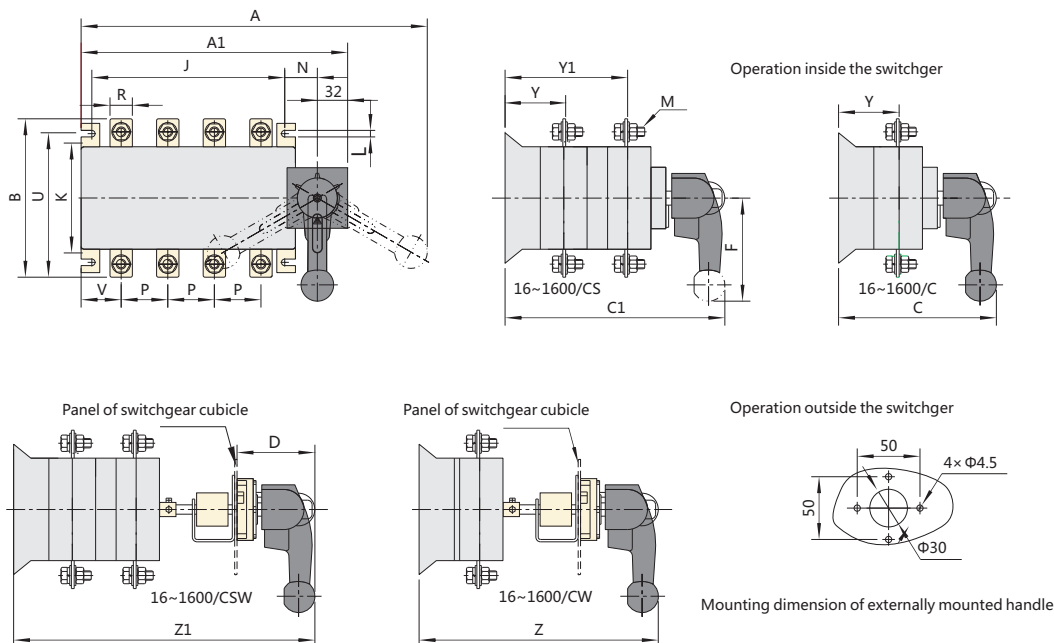
Series No.

2.2 Technical data

Conventional thermal current		16	32	40	63	80	100	125	160	200	250	315	400	630
Associated fuse rating (A)		16	32	40	63	80	100	125	160	200	250	315	400	630
Rated insulation voltage(V) Ui		800												
Rated current (A)	400V AC21B	16	32	40	63	80	100	125	160	200	250	315	400	630
	400V AC22B	-	-	-	-	-	-	125	125	200	250	315	400	630
	400V AC23A	-	-	-	-	-	-	125	160	200	250	315	400	630
	690V AC21B	16	32	40	63	63	63	125	160	200	250	315	400	500
	690V AC22B	-	-	-	-	-	-	100	100	160	160	200	250	315
	690V AC23A	-	-	-	-	-	-	50	63	70	80	125	160	200
Operation force (N)		30~50						40~60				65~100		

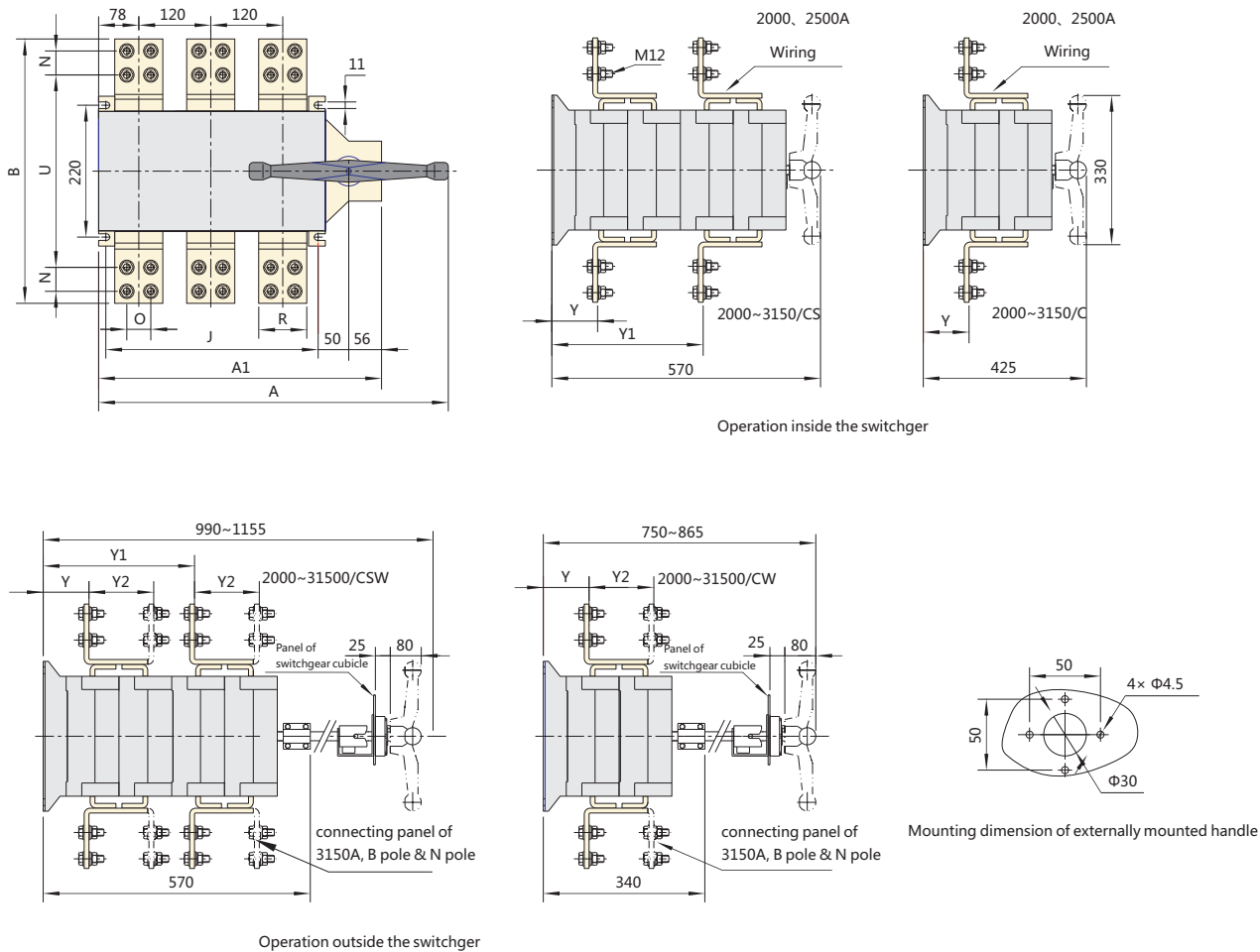
Conventional thermal current		1000	1250	1600	2000	2500	3150
Associated fuse rating (A)		1000	1250	2×800	2×1000	2×1250	
Rated insulation voltage(V) Ui		800					
Rated current (A)	400V AC21B	1000	1250	1600	2000	2500	3150
	400V AC22B	1000	1250	1600	2000	2500	3150
	690V AC21B	800	800	1000	1600	1600	2000
	690V AC22B	800	800	800	1000	1000	1250
Operation force (N)		200~300					

Mounting dimensions of NH40-16~1600/C and NH40-16~1600/CS



Mounting dimension of NH40 lateral operation and NH40 changeover switch disconnecter

Specification	NH40-XX/C NH40-XX/CS Overall and mounting dimensions (mm)																			
Current	A	A1	B	C	C1	D	F	J	K	L	N	P	R	U	V	M	Y	Y1	Z	Z1
16~100A/3	290	170	107	135	185	85	135	116	84	7	25	30	14	90	20	6	39	90	360~465	440~545
16~100A/4	290	170	107	135	185	85	135	116	84	7	25	30	14	90	20	6	39	90	360~465	440~545
125A/3	295	192	135	155	235	85	135	120	95	7	29.5	36	18	115	31	8	58	122	410~515	480~595
160A/3	295	192	135	155	235	85	135	120	95	7	29.5	36	20	115	29	8	58	122	410~515	480~595
125A/4	325	222	135	155	235	85	135	150	95	7	29.5	36	18	115	31	8	58	122	410~515	480~595
160A/4	325	222	135	155	235	85	135	150	95	7	29.5	36	20	115	29	8	58	122	410~515	480~595
200A/3	335	232	170	176	260	85	135	160	115	7	29.5	50	25	142	37	10	67	148	430~535	510~615
250A/3	335	232	170	176	260	85	135	160	115	7	29.5	50	25	142	37	10	67	148	430~535	510~615
200A/4	385	282	170	176	260	85	135	210	115	7	29.5	50	25	142	37	10	67	148	430~535	510~615
250A/4	385	282	170	176	260	85	135	210	115	7	29.5	50	25	142	37	10	67	148	430~535	510~615
315A/3	430	298	240	233	335	105	160	210	180	9	43	65	32	205	48	12	84	196	515~630	620~735
400A/3	430	298	240	233	335	105	160	210	180	9	43	65	35	205	48	12	84	196	515~630	620~735
630A/3	430	298	260	233	335	105	160	210	180	9	43	65	40	220	48	12	84	196	515~630	620~735
315A/4	490	358	240	233	335	105	160	270	180	9	43	65	32	205	48	12	84	196	515~630	620~735
400A/4	490	358	240	233	335	105	160	270	180	9	43	65	35	205	48	12	84	196	515~630	620~735
630A/4	490	358	260	233	335	105	160	270	180	9	43	65	40	220	48	12	84	196	515~630	620~735
1000A/3	580	472	316	280	424	105	165	353	220	11	50	120	60	240	78	12	108	253	605~720	750~865
1250A/3	580	472	356	280	424	105	165	353	220	11	50	120	70	246	78	12	108	253	605~720	750~865
1600A/3	580	472	356	280	424	105	165	353	220	11	50	120	80	246	78	12	108	253	605~720	750~865
1000A/4	700	592	316	280	424	105	165	473	220	11	50	120	60	240	78	12	108	253	605~720	750~865
1250A/4	700	592	356	280	424	105	165	473	220	11	50	120	70	246	78	12	108	253	605~720	750~865
1600A/4	700	592	356	280	424	105	165	473	220	11	50	120	80	246	78	12	108	253	605~720	750~865



Mounting dimension of NH40 changeover switch disconnect

Specification	NH40-XX/C NH40-XX/CS Overall and mounting dimensions (mm)										
Current	A	A1	B	R	J	U	O	N	Y	Y1	Y2
2000A/3	580	472	440	80	353	325	40	40	105	335	-
2500A/3	580	472	440	80	353	325	40	40	105	335	-
3150A/3	580	472	510	120	353	360	50	50	105	335	105
2000A/4	700	592	440	80	473	325	40	40	105	335	-
2500A/4	700	592	440	80	473	325	40	40	105	335	-
3150A/4	700	592	510	120	473	360	50	50	105	335	105



NZ7 Automatic Transfer Switching Equipment

1. General

Applicable to the three-phase four-line two-circuit power supply network with an AC power frequency of 50Hz, rated operational voltage of AC400V, and rated operational current of up to 630A, the NZ7 series automatic transfer switching equipment can automatically connect one or several loads from one power source to another to ensure the normal power supply of the load circuit.

This product is applicable to the important places such as industrial, commercial, and storied buildings, and residential houses.

Certificate: KEMA

Execution standard: IEC/EN 60947-6-1

2. Type designation

N Z 7 - □□/□□□□□□

Automatic transfer switching equipment

Company code

Design serial number

Frame size rated current (Arabic numerals)

Breaking capacity code: S, H, R

Number of poles: 3, 4

Release with nothing as its code: NM1

Rated current (Arabic numerals)

Actuator circuit breaker type

Without code: NM1

Without code: separated (type)

Y: integrated (type)

Structure

Controller type

A: basic type

Transfer mode without code:

Users can set the matter

R: self-throwing and self-reset

(power network to power network)

S: self-throwing and not self-reset

(power network to power network)

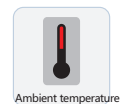
F: self-throwing and self-reset

(power network to power generation)

3. Operating conditions

3.1 Ambient air temperature

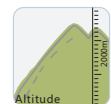
The upper limit for the ambient air temperature is +40°C, lower limit -5°C, and the mean value of the temperature is not greater than +35°C within 24 hours;



Ambient temperature

3.2 Altitude

Altitude: not higher than 2,000m for the installation site.



Altitude

3.3 Atmospheric conditions:

When the ambient air temperature is +40°C, the relative humidity of the air shall not be higher than 50%, a higher relative humidity is allowed at a lower temperature, e.g. 90% at +20°C, and special measures shall be taken for the condensation occasionally produced due to temperature changes.



No Pollution

3.4 Class of pollution:

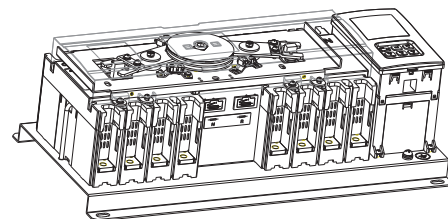
Class of pollution: 3

4. Technical data

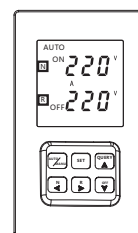
Product type	NZ7-63			NZ7-125			NZ7-250				NZ7-400				NZ7-630			
Up to standard	IEC/EN 60947-6-1																	
Actuator circuit breaker	NM1-63			NM1-125				NM1-250				NM1-400				NM1-630		
Parameters of electrical characteristics																		
Operating environment temperature	-5℃~+40℃																	
Altitude	2000m																	
Class of pollution	3																	
Specification for current	10,16,20,25,32,40,50,63A			16,20,25,32,40,50,63,80,100A				100,125,160,180,200,225A				250,315,350,400A				400,500,630A		
Rated operational voltage(Ue)	400V 50Hz																	
Nominal insulation voltage(Ui)	AC500V			AC800V														
Rated impulse withstand voltage	6kV			8kV														
Number of poles	3P		4P	3P			4P	3P			4P	3P, 4P			3P, 4P			
Short circuit breaking capacity codes	S	H	H	S	H	R	H	S	H	R	H	S	H	R	S	H	R	
Rated short circuit making capacity(Icm)	31.5	73.5	73.5	52.5	105	143	105	52.5	105	143	105	73.5	110	154	73.5	110	154	
Rated short circuit breaking capacity(Icn)	15	35	35	25	50	65	50	25	50	65	50	35	50	70	35	50	70	
Service life	6000 times			6000 times				6000 times				4000 times				3000 times		
Usage category	AC-33B																	
Electric equipment grade	CB Class																	
Protection level	IP30(except the main circuit terminal)																	
Protection	Overload protection/short circuit protection																	
Controller characteristic																		
Controller	Type A(basic type)																	
Rated control supply voltage Us	230V 50Hz																	
Installation mode for the controller	Integrated/separated (as installed on the surface of the cabinet)																	
Operating transfer time (no time delay)	≤3.2s			≤3.5s				≤3.6s				≤4s				≤5s		
Power consumption	≤10W																	
Installation and connection																		
Installation mode	Fixed type																	
Connection mode	Front connection																	

5. Characteristics and functions

The NZ7 series automatic transfer switching equipment (hereinafter referred to as automatic transfer switch) is the CB class product of a new generation combined with the advanced digital electronic control technique. The product features compactness, energy conservation, convenient installation, reliable dual-interlock protection, etc., and is advanced and complete in terms of function.



Single motor structure, compact



Visualized management

5.1 Compactness

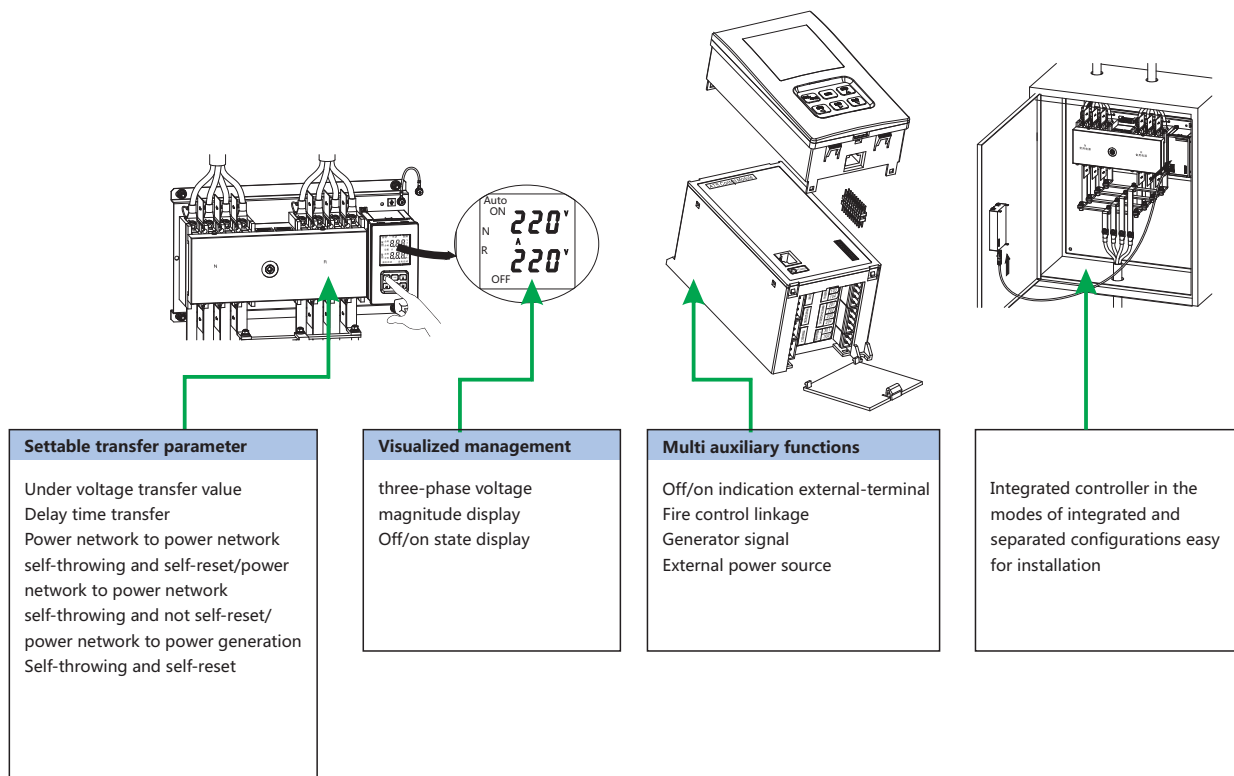
The transfer function is achieved via using the forward and backward rotation of the only one motor which allows for reducing the product's height and room for its installation.

5.2 Energy saving

The driving mechanism works in the mode of motor drive with less power consumption and noise.

Type A controller (long-term service)	Transmission mechanism (short-term service)		
	Type 63/Type 100	Type 225	Type 400/Type 630
≤10W	20W	40W	20W

5.3 Advanced and multipurpose functions



5.4 Dual-interlock protection

The mechanical-electrical interlock duplex protection is used to prevent two power sources from being connected simultaneously to the load, wherein the electrical interlock works in the breaker contact position mode for directly indicating the automatic transfer switch to perform the genuine electrical interlock so that the automatic transfer does not take place automatically in such cases as contact fusion welding, breaker handle damage, and circuit fault breaker tripping.

6. Controller

Type and function	Type A (basic type)
Modes of manual and automatic transfer	■
Working position of the main contact (actuator circuit breaker)	
Prime power turned on	■
Standby power turned on	■
OFF	■
Automatic control	
Monitoring the prime power	Failures such as loss of phase/voltage, under and over voltage for any of three phases of the power supply
Monitoring the standby power	Failures such as loss of phase/voltage, under and over voltage for any of three phases of the power supply
Self-throwing and self-reset	■
Self-throwing and not self-reset	■
Power network to power network	■
Power network to power generation	■
No-voltage transfer	■
Under voltage transfer	■
Over voltage transfer	■
Adjustable delay time	■
Transfer delay a	Continuously adjustable in the range of 0s~180s
Return c	Continuously adjustable in the range of 0s~180s
Generator control	■
Fire control linkage (inactive contact)	■
Indication	
Indication for on, off, and double-break	■
Prime power indication	■ (Displaying voltage magnitude)
Standby power indication	■ (Displaying voltage magnitude)
Fault tripping indication	■
External indication signal terminal	■
Parameter setting indication	■
Interlock protection	
Mechanical interlock	■
Electrical interlock	■ (not transfer automatically with faulty tripping)

6.1 The Type A integrated controller works in the modes of integrated or separated configurations, and is installed in the cabinet or on the panel to allow operation outside the cabinet.
Whether to transfer from one power source to another depends on the state of the operational power supply.
Generating set control
Press-key manually forced transfer operating

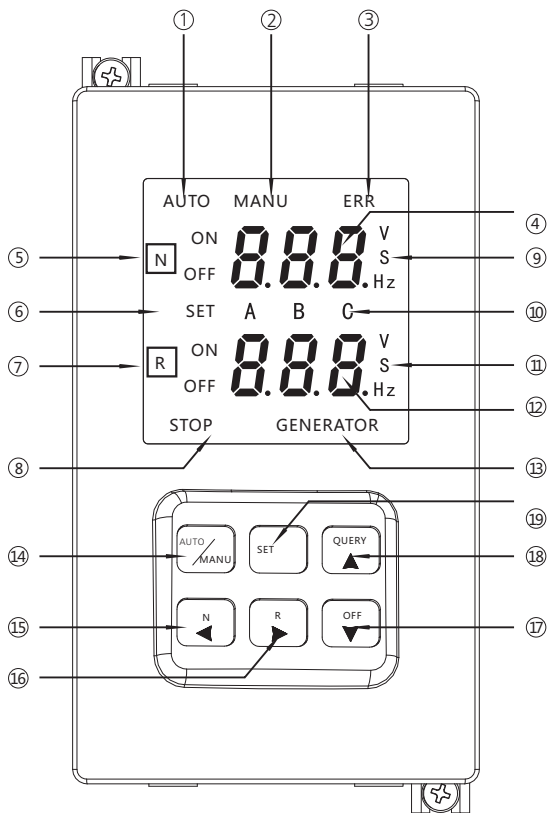
6.2 Control voltage
AC230V 50Hz

6.3 Operation: automatic operation, manual operation

6.4 Setting delay
Transfer delay: adjustable in the range of 0s - 180s, prime power failure, time before off for QN;
Return delay: continuously adjustable within the range of 0s - 180s, prime power recovery, time before off for QR.

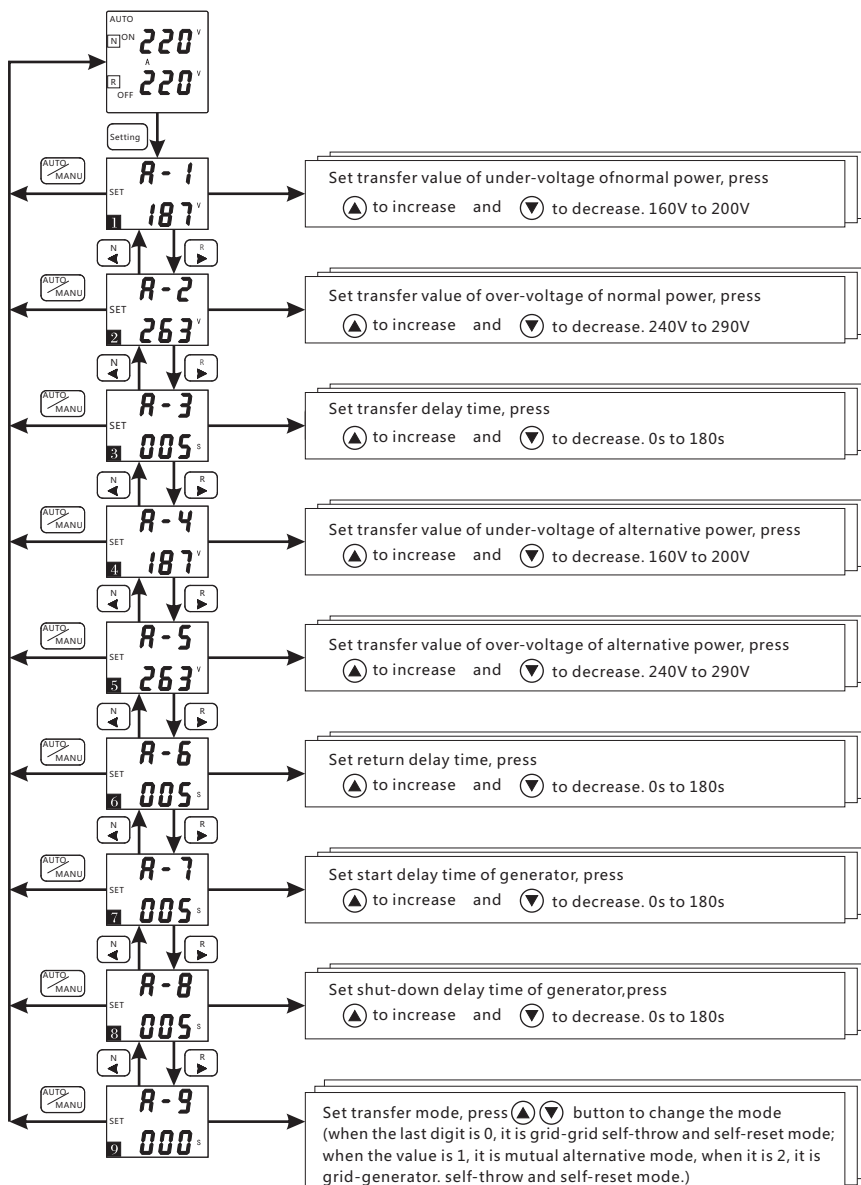
6.5 Interface for display and operation

LED digital display



1. Indication of automatic working mode;
2. Indication of manual working mode;
3. Failure indication
When the breaker is disengaged due to the failure or short-circuit of the switch, this lamp will be on;
4. Display area of normal power voltage parameters
It displays normal power voltage parameters and changeover delay time under the working condition, and setting items under the setting condition;
5. Indication of the on or off of breaker on the normal power side
6. Indication of setting condition
7. Indication of the on or off of breaker on the alternative power side
8. Indication of the start of stop function;
9. Units of voltage, time, and frequency of the normal power;
10. Phases A, B, and C;
11. Units of voltage, time, and frequency of the alternative power;
12. Display area of alternative power voltage parameters;
It displays alternative power voltage parameters and transfer delay time under the working condition, and setting items under the setting condition;
13. Indication of the start signal of generator
14. Selection button of automatic/manual transfer
When it is regularly used, it can be used for selecting the automatic or manual mode; it saves and exits the functions when it is under the setting condition.
15. Button for compulsorily turn off the normal power
Under the manual control mode, if this button is pressed, it can compulsorily switch to the normal power; if it is setting condition, this button is the "scroll up" button of setting programs;
16. Button for compulsorily turn off the alternative power
Under the manual control mode, if this button is pressed, it can compulsorily switch to the alternative power; if it is setting condition, this button is the "scroll up" button of setting programs;
17. Off button
Under the manual control mode, if either line of both power lines are normal and this button is pressed, it will switch to the disengagement position; this button is the minus button for setting parameters when it is under setting condition;
18. Failure inquiry button
When the switch fails and malfunction lamp on the failure screen is on, the detail malfunction code can be inquired if it is pressed; this button is the plus button if it is under the setting condition;
19. Setting button
When this button is pressed, it may enter into the parameter setting menu of the controller.

6.6 Operation description on parameter setting



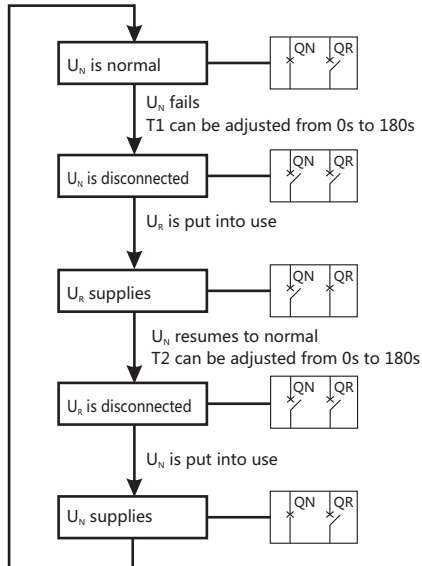
Note for keys

Button Description:

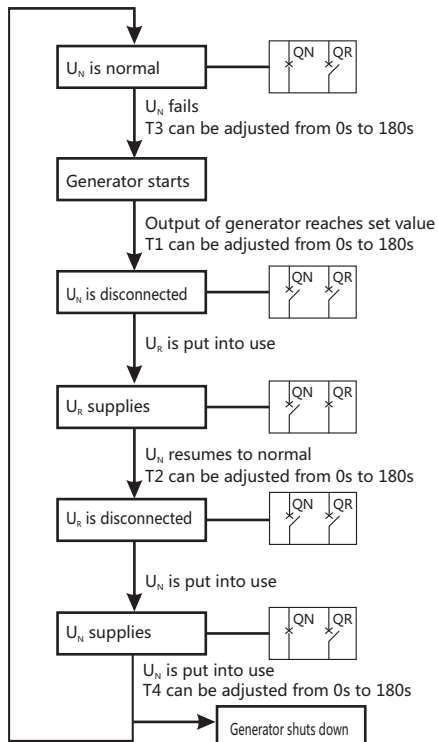
Press the Setting Button when the controller is working, LED will display the parameter setting menu interface displayed in Figure ; press “◀” and “▶” buttons in the setting menu to scroll up the setting options; if the automatic/ manual button is pressed, it will exit the setting menu; press “▼” or “▲” to change parameters.

Working processes of typy A controller

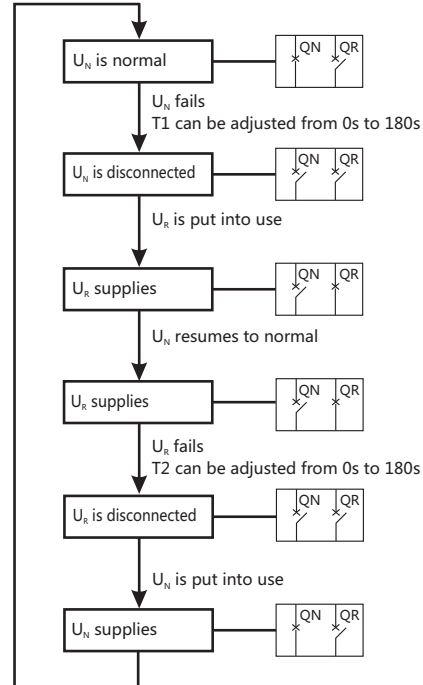
Grid – Grid
self-throw and self-reset operation



Grid-Power Generation
self-throw and self-reset operation



Grid – Grid
mutual alternative operation



T1: Transfer delay can be adjusted from 0s to 180s
Failure of UN , time before disconnecting QN

T2: Return delay time can be adjusted from 0s to 180s
Normal of UN , time before disconnecting QR

T3: Delay time in starting generator can be adjusted from 0s to 180s

T4: Delay time in shutting-down generator can be adjusted from 0s to 180s

QN: Operating breaker on the frequently used side

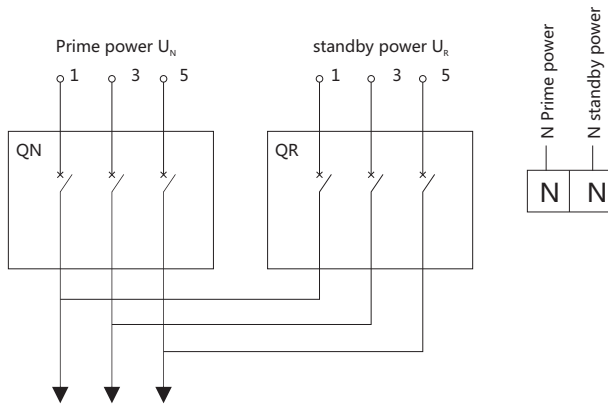
QR: Operating breaker on the stand-by side

UN : Normal power supply

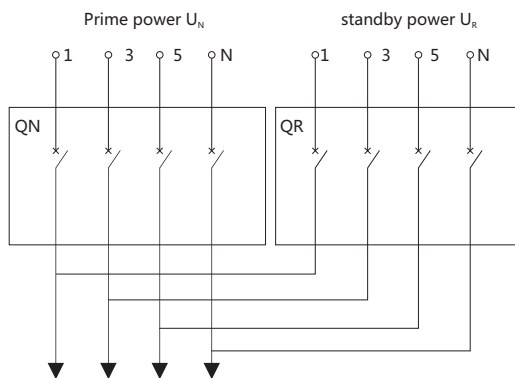
UR : Alternative power supply

7. NZ7 external connection diagram

7.1 Product connection diagram

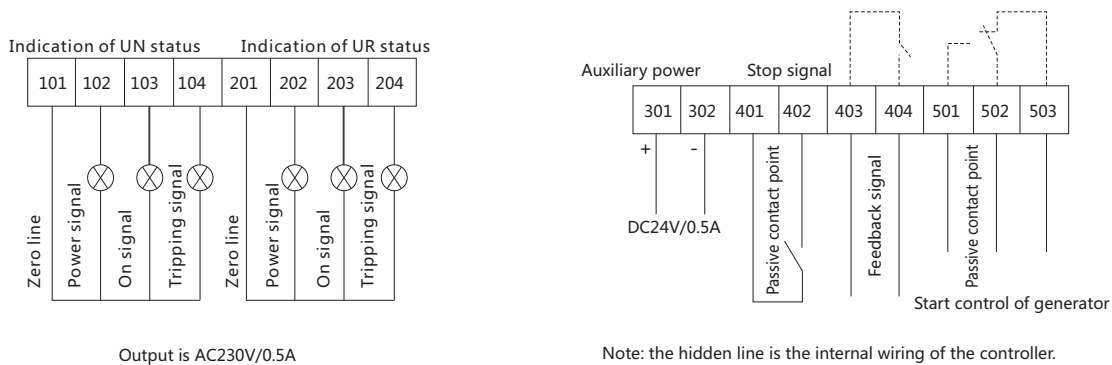


7.2 4P product connection diagram

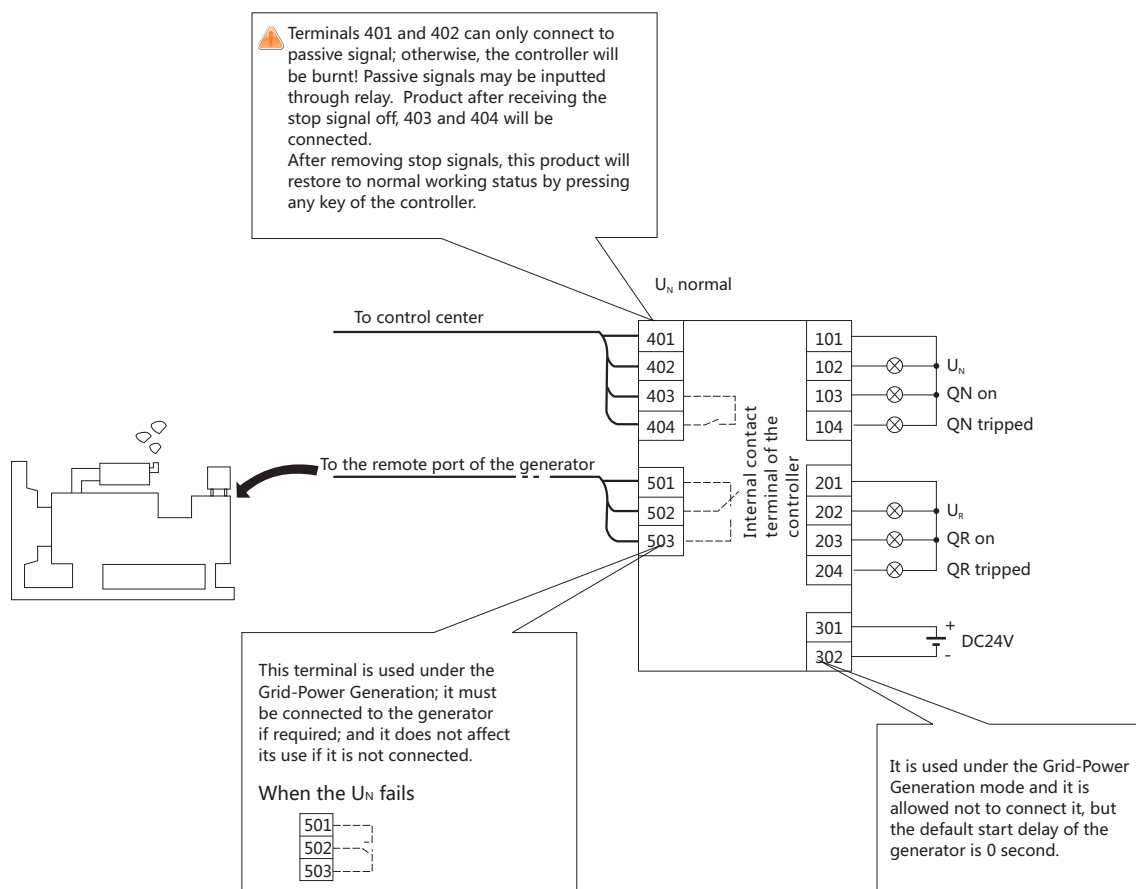


Note: QN actuator circuit breaker on the prime (normal) side
QR actuator circuit breaker on the standby (reserve) side

7.3 Wiring diagram of external terminals of the controller

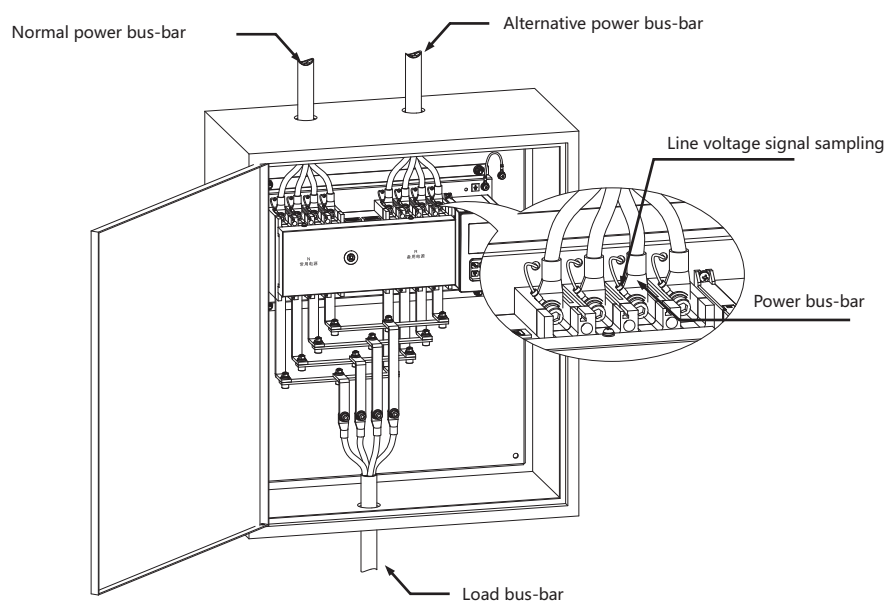


7.4 Application



8. Line incoming pattern

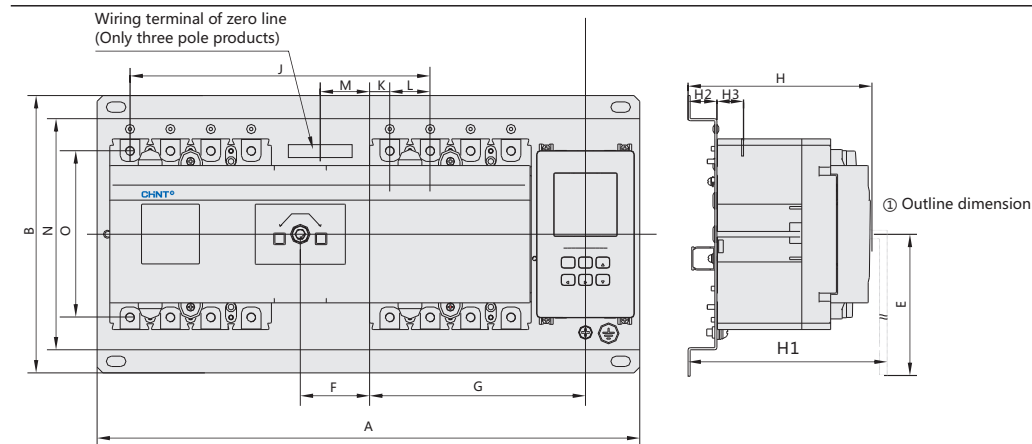
8.1 Connecting bus-bar type



8.2 Installation mode: vertical installation or horizontal installation

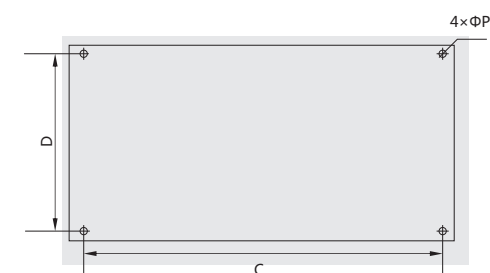
9. Overall and mounting dimensions (mm)

9.1 Outline dimension & Installation dimension



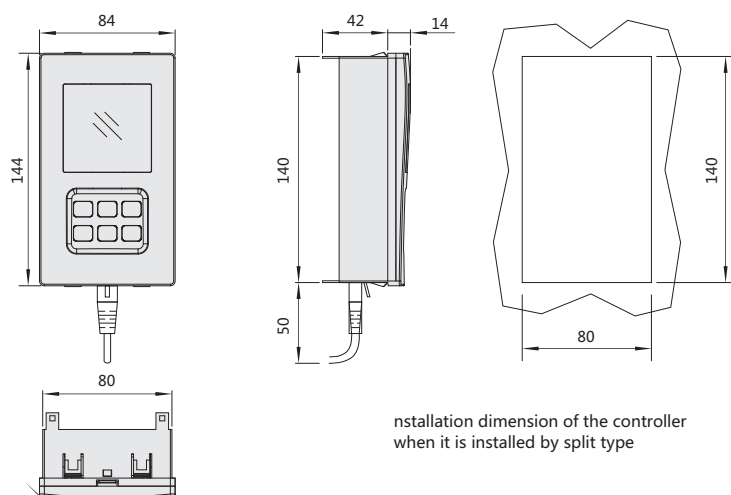
Dimension Modle	A		B	E	F		G		J	K		L	M	N	O	H	H1	H2	H3
	3P	4P			3P	4P	3P	4P		3P	4P								
NZ7-63	355	380	240	200	40	52.5	132.5	145	178	24	11.5	25	40	200	117	150	170	25	18/28
NZ7-125	390	420	240	200	43	58	148	163	194	24	9	30	43	200	136	150	180	25	24
NZ7-250	435	470	240	200	41.5	59	170.5	188	225	36	18.5	35	41.5	200	144	160	190	25	24
NZ7-400	565	615	330	225	43.5	68.5	232.5	257.5	304	61.5	36.5	48	43.5	265	224	200	227	24	40
NZ7-630	680	740	330	225	45.5	74.5	291	320	385	89	60	58	45.5	270	234	200	232	24	42

9.2 Installation dimension



Dimension Modle	C		D	P
	3P	4P		
NZ7-63	322	347	220	Φ8
NZ7-100	357	387	220	Φ8
NZ7-225	402	437	220	Φ8
NZ7-400	505	555	300	Φ10
NZ7-630	622	680	300	Φ10

9.3 Controller Module



10. Ordering information

The user shall indicate such items as the type, current specification, number of poles.

Example: If you order an auto transfer switch equipment, shell current 100A, rated current 100A, breaking capacity of Type H, 4 poles, Type A controller, you can write it as NZ7-100H/4100YA.



NH40SZ Automatic Changeover Switch

1. General

NH40SZ automatic changeover switch disconnecter integrates electrical and mechanical interlocking systems to guarantee safe transfer operation. It is applicable for the three-phase four-wire power supply system of AC 50Hz, rated voltage AC 380V, rated current up to 3150A.

It can realize automatic and manual changeover between normal and back up power supply power, and stop power supplying to load when changeover process of power supply is carried out.

The switch is applicable for two circuits power supply and in the condition which requires high quality power supply.

Standard: IEC 60947-6-1

2. Type designation

N H 40 - □ / □ SZ L □ X F □ H

With box

Y: Liquid crystal display

Split type

Fire function

Without any words means normal type, automatic change and recovery

A means normal type, automatic change but not automatic recovery

I: Mains supply-mains supply, mutual standby, phase loss protection;

overvoltage and undervoltage protection;

II: Mains supply-mains supply, automatic change and automatic recovery, phase loss protection, overvoltage and undervoltage protection;

III: Mains supply-oil engine, automatic change and automatic recovery, phase loss protection, overvoltage and undervoltage protection;

The terminal is 2 input and 1 output wiring

Dual-power supply automatic transfer

"3" represents three poles

"4" represents four poles

Rated operational current

Design sequence No.

Isolating switch

Company code

3. Technical data

Conventional thermal current (A)		16	32	40	63	80	100	125	160	200	250	315	400	630	800	1000	1250	1600	2000	2500	3150												
Ie (A)		16	32	40	63	80	100	125	160	200	250	315	400	630	800	1000	1250	1600	2000	2500	3150												
Ui(V)		660														800																	
Uimp(V)		8														12																	
Ue, Us		Ue=400V; Us=220V																															
Rated making and breaking capacity		6Ie																															
Icw (KA)		5						10						12.6						50				50									
Converting time (S)		≤3s																				≤4s											
Rated controlling capacity (W)	Startup	300						325						355						400				600									
	Natural	55						62						74						98				120									
Operation force (N)		30~50						40~60			65~100			75~120						200~300				250~400									

4. Control characteristics and product structure

4.1 Control characteristics:

There are two types of switch products, three-pole and four-pole (three poles + switchable neutral pole).

Four control types (common type, I, II, III), usually it is common type.

Control characteristics of common type switch:

- a. This switch applies to the automatic change and automatic recovery of main power supply-standby power supply (including manual oil generator; Note: Manual oil generator does not have to be used with type III switches) systems. Power supply I precedes. When power supply I is normal, it is switched on; when power supply I fails and power supply II is normal, the switch changes to power supply II; when power supply I resumes, the switch automatically changes to power supply I.

Control characteristics of type I switch:

- a. This switch applies to the mutual standby of mains supply systems. When the switch is in the "0" position, power supply I precedes. When power supply I fails and power supply II is normal, the switch changes to power supply II; when power supply II is on and power supply I resumes, the switch does not automatically change to power supply I, it will change to power supply I only when power supply II fails. The main power supply changes to the standby power supply (the delay continuously adjustable between 1 ~ 999s), the standby power supply changes to the main power supply (the delay continuously adjustable between 1 ~ 999s).
- b. Phase loss detection protection function, overvoltage, undervoltage protection functions.

4.2 Product structure

Control characteristics of type II switch:

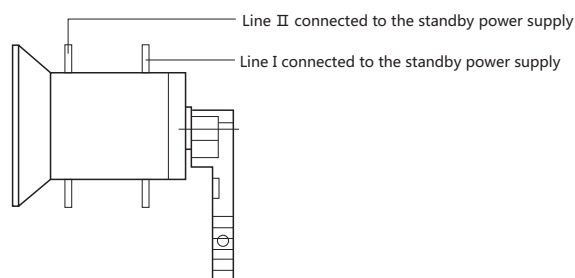
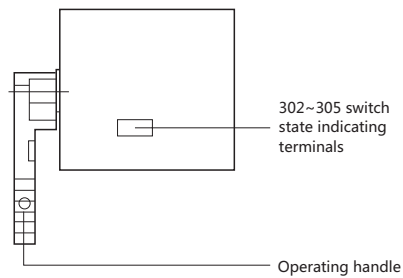
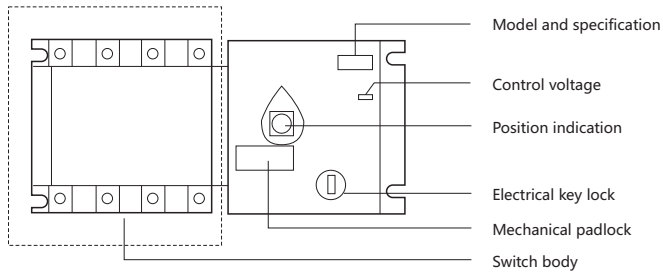
- a. This switch applies to the automatic change and automatic recovery of mains supply-mains supply systems. Power supply I precedes. When power supply I is normal, it is switched on; when power supply I fails and power supply II is normal, the switch changes to power supply II; when power supply I resumes, the switch automatically changes to power supply I. The main power supply changes to the standby power supply (the delay continuously adjustable between 1 ~ 999s), the standby power supply changes to the main power supply (the delay continuously adjustable between 1 ~ 999s).
- b. Three-phase overvoltage, undervoltage and phase loss detection protection functions.

Control characteristics of type III switch:

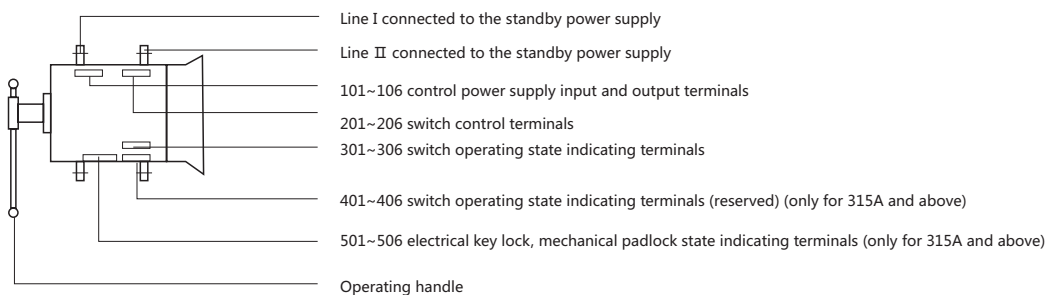
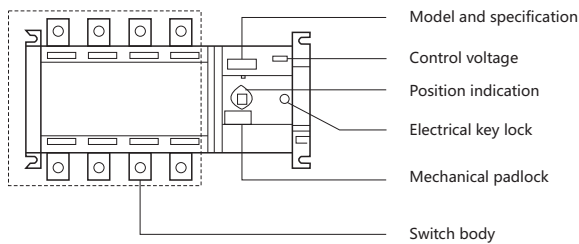
- a. This switch applies to the mutual standby or automatic change and automatic recovery of mains supply-oil generator (automatic oil generator with signals) systems. Power supply I (the mains supply) precedes. When power supply I fails, the switch gives a signal to start the oil generator. The oil generator has warm-up delay (continuously adjustable between 0 ~ 180s) function. After the oil generator has started, the switch changes to power supply II (the oil generator). When power supply I resumes, the switch automatically changes to power supply I, the oil generator automatically stops after a cooling delay (continuously adjustable between 0 ~ 180s).
- b. Three-phase overvoltage and undervoltage protection functions for mains supply and oil generator.

Type I, type II and type III switches have:

- 1) Automatic, remote and manual control functions
- 2) A 0.5s delay of the detection signal, to prevent misoperation.
- 3) A remote control "0" position in automatic state.
- 4) A key switch for the selection of operation mode.



100A/3 common type; 100A/3, 4 type I, type II, type III; 125A-3200A/3, 4 common type, type I, type II, type III



- a. Electrical key lock: It controls the power supply of the internal control circuit of the switch. When the electric "Automatic" position, the switch can be operated automatically or remotely. When the electrical lock is in the manual position, the switch can only be operated manually;
- b. Operating handle: When operating the switch with the operating handle, the electrical lock must be in the "Manual" position;
- c. Mechanical padlock: Before maintenance, put the switch to the 0 position with the operating handle, pull up the padlock structure and lock the padlock. (Pulling up the mechanical padlock switches off the internal control power supply of the switch so that it cannot be operated electrically or manually);
- d. Position indication: It indicates the operating position (I; 0; II) of the switch;
- e. Control voltage: The control voltage class of the switch is 220VAC;
- f. Switch body: The front part is line I, which is connected to the "Normal power supply" ; the rear part is line II, which is connected to the "Standby power supply" .

4.3 Connection terminal of control circuit

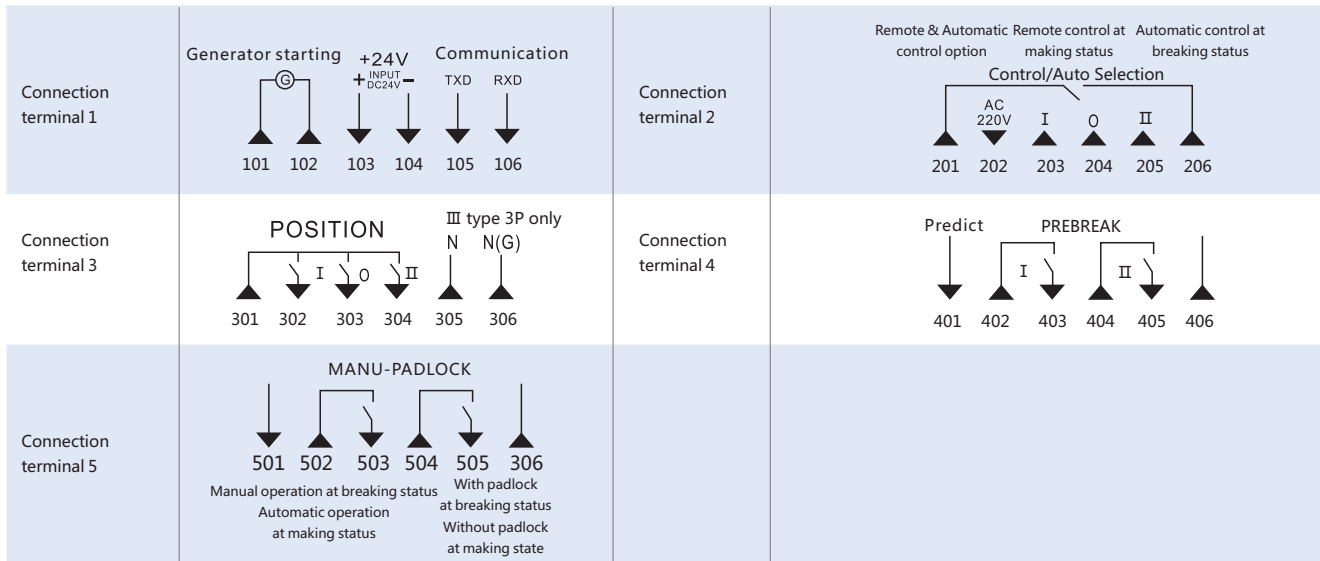
Common type

Connection terminal 1		Connection terminal 2	
Connection terminal 3		Connection terminal 3	
Connection terminal 4		Connection terminal 5	

Type I and type II

Connection terminal 1		Connection terminal 2	
Connection terminal 3		Connection terminal 4	
Connection terminal 5			

Type III



Terminal 1, main options

101, 106-Note: They do not connect with other terminal (only for common type)
 102, 103-Power control terminal of circuit I (only for common type)
 104, 105-Power control terminal of circuit II (only for common type)
 101, 102-Generator starting signal input (for type III)
 103, 104-Firefighting +24V input, enforce "0", both switches breaks (for type I, II, III)
 105, 106-Communication Interface (Reserved)

Terminal 2, remote control

201, 206-Terminal of remote controlling, automatic controlling functions. Remote control at breaking status and automatic control at making status.
 202, 203-Making switch I.
 202, 204-At "0" position, both switches breaks (for type I, II, III) (include preferring position "0")
 202, 205-Making switch II.

Terminal 3, position indication and zero-line terminal

301, 302-Switch I position
 301, 303-At "0" position, all switches breaks
 301, 304-Switch II position.
 305-Type I, II, switch I controls zero-line "N1";
 type III switch I controls zero-line "N" (only for 3 poles)

Terminal 4, pre-breaking auxiliary contact

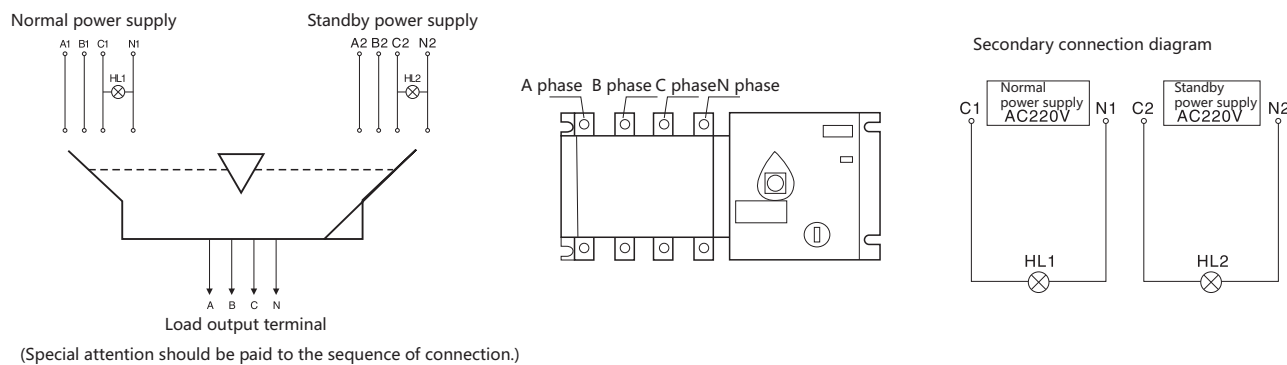
306-Type I, II, switch II controls zero-line "N2"; type III, switch II controls zero-line "N(G)"
 402, 403, Pre-breaking position of indication switch I.
 404, 405, Pre-breaking position of indication switch II.

Terminal 5 Manual and automatic operation mode and whether locking the switch

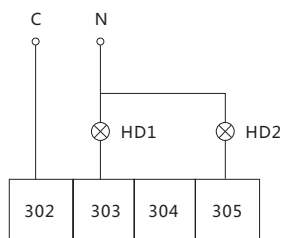
502, 503, Automatic and manual control indication
 504, 505, Indication of whether locking the switch
 Terminal 6 Start-up terminals for diesel generator
 501, 506: They are superfluous.

5. Connection diagram

5.1 16A~100A 4 poles main switch wiring diagram



Connected to load output terminal

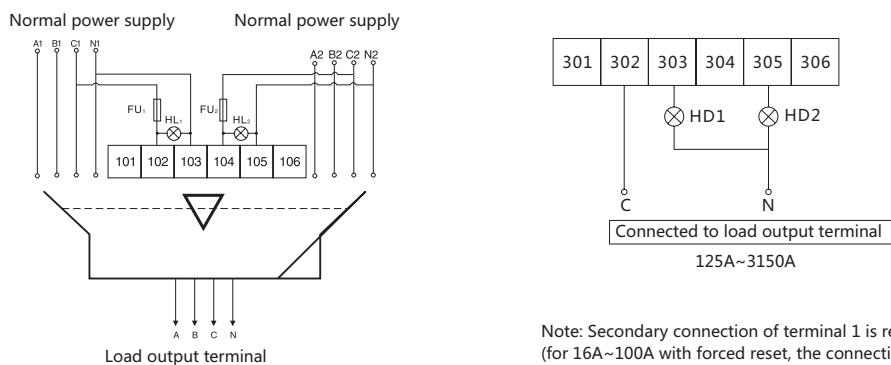


HL1 and HL2 are respectively the resumption indicators of the normal and standby power supplies;

HD1 and HD2 are respectively the service indicators of the normal and standby power supplies;

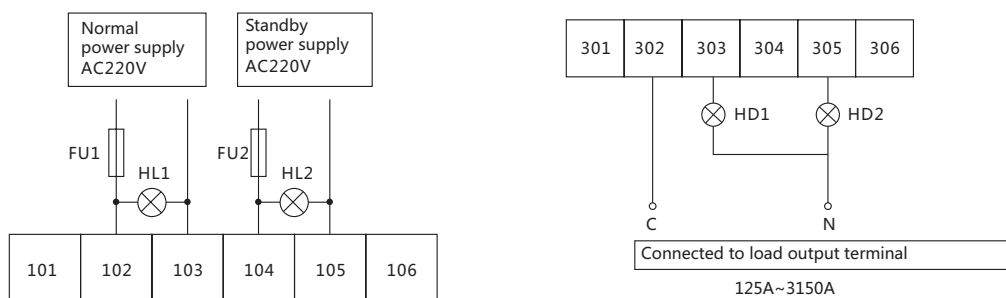
302~305 are switch terminals.

5.2 125A~3150A main switch wiring diagram



Note: Secondary connection of terminal 1 is required (for 16A~100A with forced reset, the connection mode is the same as above).

5.3 125A~3150A Secondary wiring diagram (3P, 4P)



HL1 and HL2 are respectively the resumption indicators of the normal and standby power supplies;

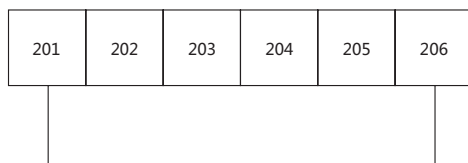
HD1 and HD2 are respectively the service indicators of the normal and standby power supplies;

FU1 and FU2 are 5A fuses;

101~106, 201~206, 301~306 are switch terminals.

5.4 Depending on the operating mode, the following connection modes can be used for terminal 2:

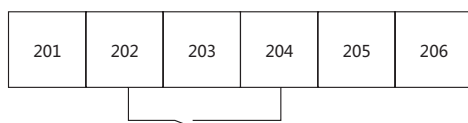
a. Fully automatic connection mode



201 and 206 short connected (Normal Type)

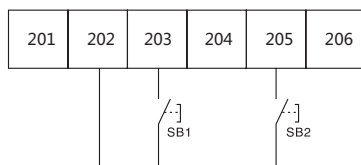
Note: Secondary connection of terminal 1 is required.

b. Remote reset (the two power supplies are disconnected) connection mode

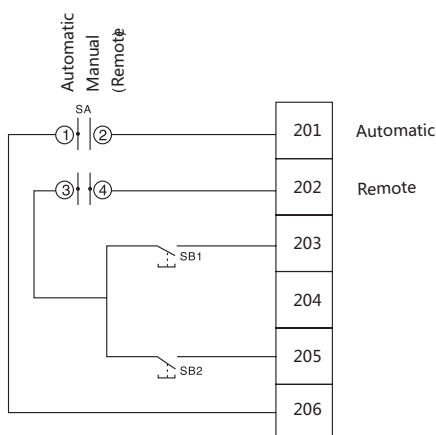


Forced reset contact (passive)

c. Remote connection mode (Note: SB1 and SB2 are external push-button switches)



d. Fully automatic + manual (remote) connection mode (Note: SB1 and SB2 are external push-button switches)



Normal Mode

Note: When switch SA is in the automatic position, ① and ② are connected.

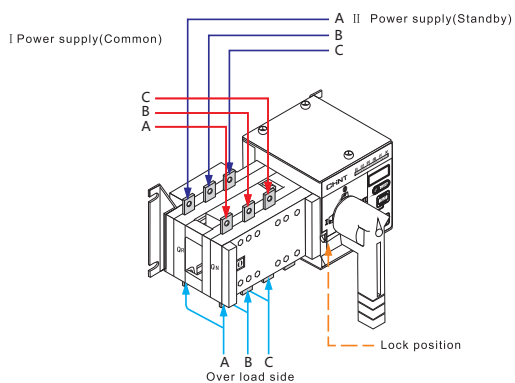
When switch SA is in the manual position, ④ and ③ are connected, but the switch SA must break.

5. Connection diagram

5.5 Connection diagram

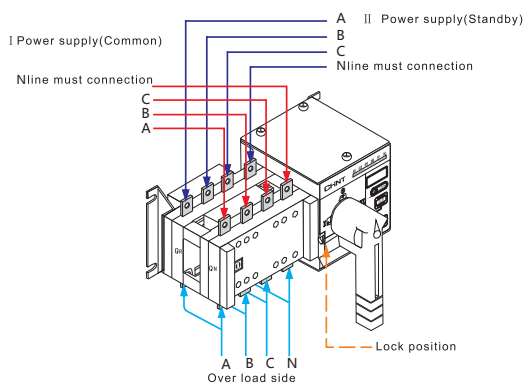
NH40-16~100

16~100A 3P connection chart



16~100A 3P connection chart

16~100A 4P connection chart



16~100A 4P connection chart

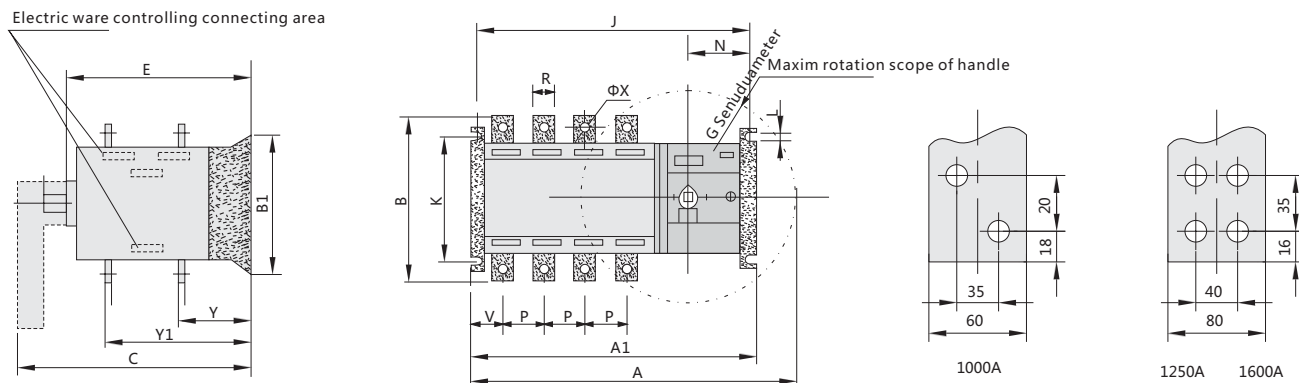
Correct mounting of the switch:

- Copper busbars I and II are respectively connected to phases R, S, T, N of the normal (front) and standby (rear) power supplies from left to right.
- The control power supplies are obtained respectively from phases T and N of the normal and standby power supplies.
- AC220V control power supplies I and II are respectively connected to terminals 102~103 and 104~105, among which 102 and 104 are respectively the live wires of the normal and standby power supplies.
- Terminals 1.1 and 106 are only used as the control power supplies of the signal lamps. Note: They should not be connected to any other lines.
- When upper (lower) incoming line is used, phases R, S, T, N of the lower (upper) lines I and II are respectively connected with copper busbars or conductors as the output.

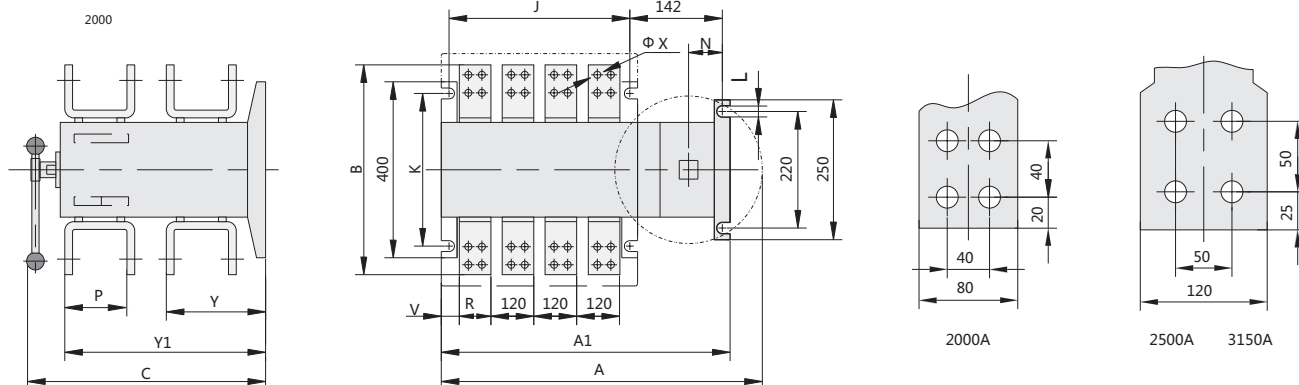
6. Mounting dimension of NH40SZ automatic changeover switch disconnecter

16 ~ 1600A

Electric wire controlling connecting area



2000 ~ 3150A



5. Connection diagram

Specification	NH40SZ Mounting dimensions														
Ith/Poles	A	A1	B	C	E	J	K	L	N	P	R	V	ΦX	Y	Y1
16A/3, 4	305	245	106	170	133	234	84	7	75	30	14	10.5	6	36	86
32A/3, 4	305	245	106	170	133	234	84	7	75	30	14	10.5	6	36	86
40A/3, 4	305	245	106	170	133	234	84	7	75	30	14	10.5	6	36	86
63A/3, 4	305	245	106	170	133	234	84	7	75	30	14	10.5	6	36	86
80A/3, 4	305	245	106	170	133	234	84	7	75	30	14	10.5	6	36	86
100A/3, 4	305	245	106	170	133	234	84	7	75	30	14	10.5	6	36	86
125A/3	380	292	135	240	208	275	78/108	7	87	36	20	20	9	58	135
160A/3	380	292	135	240	208	275	78/108	7	87	36	20	20	9	58	135
125A/4	410	320	135	240	208	312	78/108	7	87	36	20	20	9	58	135
160A/4	410	320	135	240	208	312	78/108	7	87	36	20	20	9	58	135
200A/3	420	330	170	240	208	312	78/108	7	87	50	25	27	11	60	140
250A/3	420	330	170	240	208	312	78/108	7	87	50	25	27	11	60	140
200A/4	470	380	170	240	208	358	78/108	7	87	50	25	27	11	60	140
250A/4	470	380	170	240	208	358	78/108	11	87	50	25	27	11	60	140
315A/3	455	382	240	315	270	365	180	11	95	65	32	37.5	11	84	195
400A/3	455	382	240	315	270	365	180	11	95	65	32	37.5	11	84	195
630A/3	455	382	260	315	270	365	180	11	95	65	40	37.5	13	84	195
315A/4	515	450	240	315	270	430	180	11	95	65	32	37.5	11	84	195
400A/4	515	450	240	315	270	430	180	11	95	65	32	37.5	11	84	195
630A/4	515	450	260	315	270	430	180	11	95	65	40	37.5	13	84	195
800A/3	900	520	310	368	320	500	220	11	85	120	60	60.5	13	108	252
1000A/3	900	520	310	368	320	500	220	11	85	120	60	60.5	13	108	252
1250A/3	900	520	360	368	320	500	220	11	85	120	70	60.5	13	108	252
1600A/3	900	520	360	368	320	500	220	11	85	120	80	60.5	13	108	252
800A/4	1010	635	310	368	320	610	220	11	85	120	60	60.5	13	108	252
1000A/4	1010	635	310	368	320	610	220	11	85	120	60	60.5	13	108	252
1250A/4	1010	635	360	368	320	610	220	11	85	120	70	60.5	13	108	252
1600A/4	1010	635	360	368	320	610	220	11	85	120	80	60.5	13	108	252
2000A/3	900	520	455	562	495	500	220	11	85	137	80	33	13	226	457
2000A/4	1010	635	455	562	495	610	220	11	85	137	80	33	13	226	457
2500A/3	900	520	455	562	495	500	220	11	85	137	80	33	13	226	457
2500A/4	1010	635	455	562	495	610	220	11	85	137	80	33	13	226	457
3150A/3	900	520	505	562	495	500	220	11	85	142	120	13	13	230	462
3150A/4	1010	635	505	562	495	610	220	11	85	142	120	13	13	230	462