

NH40SZ
Automatic Changeover Switch

1. General

NH40SZ automatic changeover switch disconnector 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

- H: With box
- Y:Liquid crystal display
- F: Split type
- X: 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; overvoltageand 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;
- L: The terminal is 2 input and 1output wiring
- SZ: Dual-power supply automatic transfer
- "3" represents three poles
  "4" represents four poles
- Rated operational current
- 40: Design sequence No.
- H: Isolating switch
- N: 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 adjustble between 1～999s).

b. Phase loss detection protection function, overvoltage、 undervoltage protection fuctions.

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:

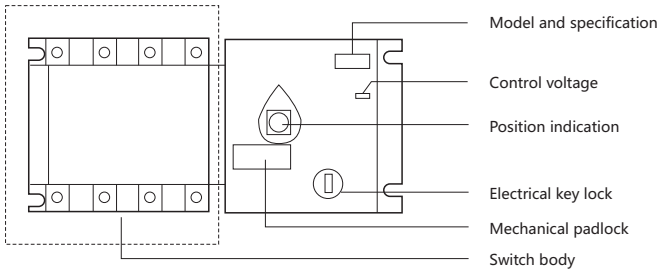
a. This switch applies to the mutual standby or automatic change and automatic recovery of mains supply-oil generator (automatic oil generator with signals) systems. Power supply I (the mains supply) precedes. When power supply I fails, the switch gives a signal to start the oil generator. The oil generator 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).

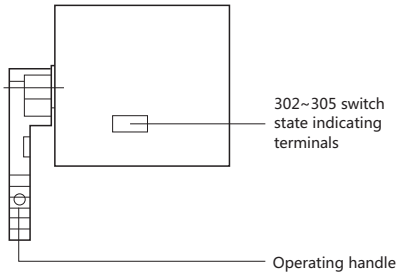
b. Three-phase overvoltage and undervoltage protection functions for mains supply and oil generator.

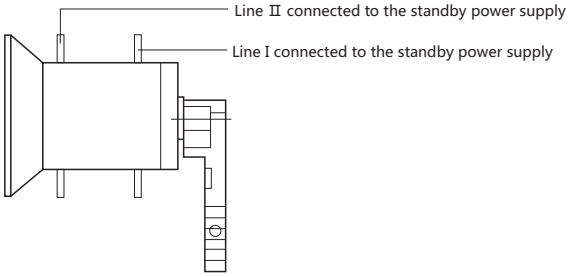
Type I, type Ⅱ and type Ⅲ switches have:

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.

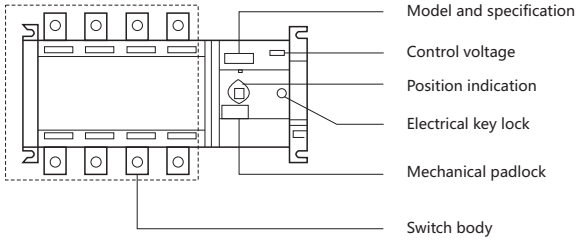
16A-100A/4(Common type)

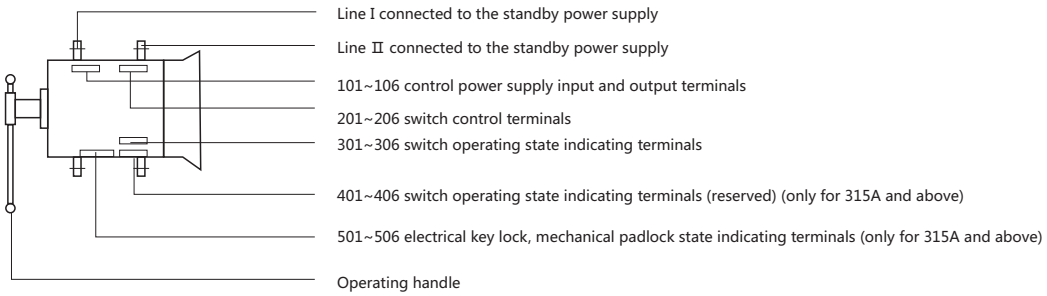






100A/3 common type; 100A/3, 4 type Ⅰ, type Ⅱ, type Ⅲ; 125A-3200A/3, 4 common type, type Ⅰ, type Ⅱ, type Ⅲ





a. Electrical key lock: It controls the power supply of the internal control circuit of the switch. When the electrical lock is in the "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 elctrical 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);

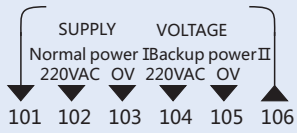
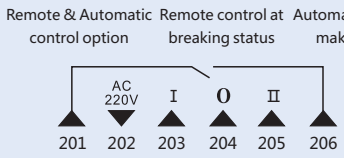
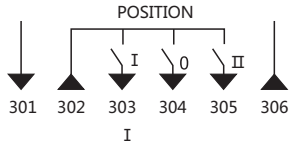
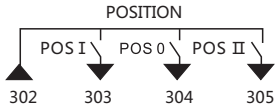
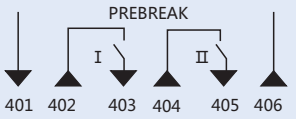
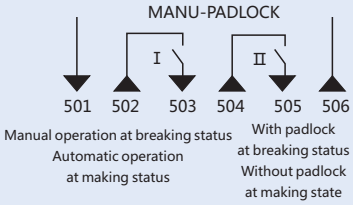
d. Position indication: It indicates the operating position (Ⅰ; 0; Ⅱ) of the switch;

e. Control voltage: The control voltage class of the switch is 220VAC;

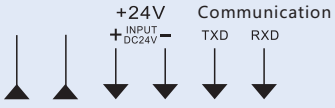
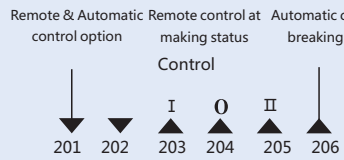
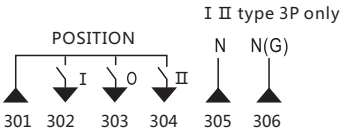
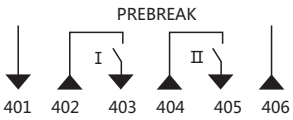
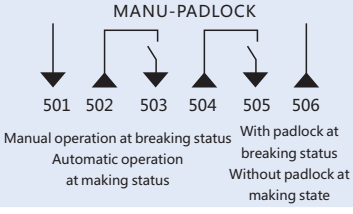
f. Switch body: The front part is line Ⅰ, which is connected to the "Normal power supply"; the rear part is line Ⅱ, which is connected to the "Standby power supply".

4.3 Connection terminal of control circuit

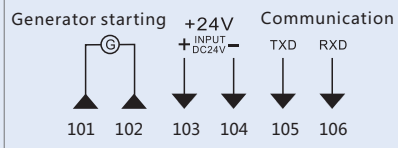
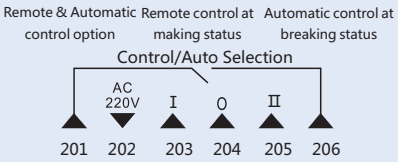
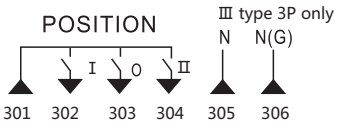
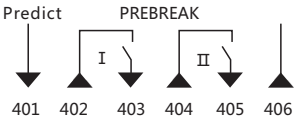
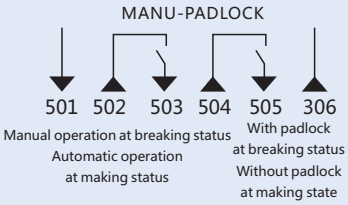
Common type

Connection terminal 1		Connection terminal 2	
Connection terminal 3		Connection terminal 3	 (16A~100A common type only)
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

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

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.

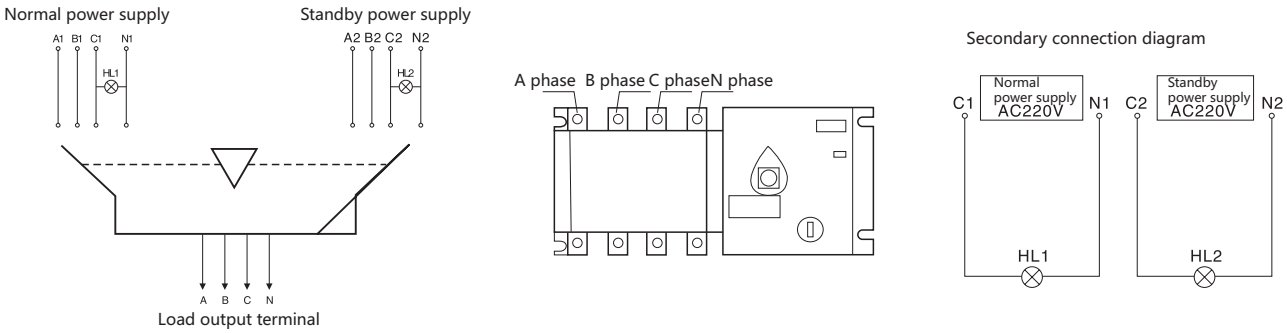
Terminal 3, position indication and zero-line terminal
301, 302-Switch Ⅰ position
301, 303-At "0" position, all swithes breaks
301, 304-Switch Ⅱ position.
305-Type Ⅰ, Ⅱ, switch Ⅰ controls zero-line "N1";
type Ⅲ switch Ⅰ controls zero-line "N" (only for 3 poles)

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.

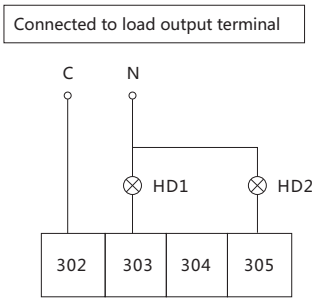
Terminal 5 Manual and automatic operation mode and whether locking the switch
502, 503, Automatic and manual control indication
504, 505, Indcation of whether locking the switch Terminal 6 Start-up terminals
for diesel generator
501,506: They are supuerfluity.

5. Connection diagram

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



(Special attention should be paid to the sequence of connection.)

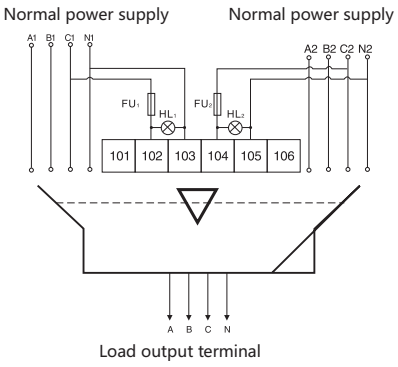


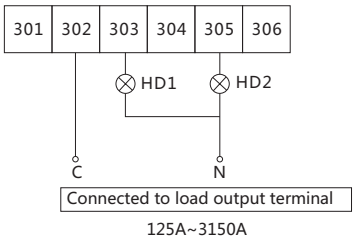
HL1 and HL2 are respectively the resumption indicators of the normal and standby power supplies;

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

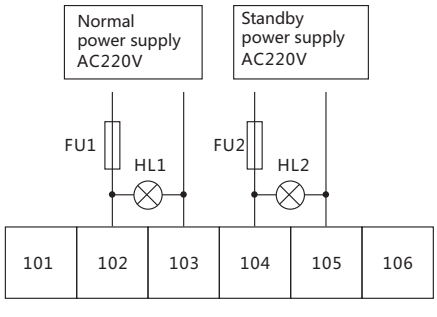


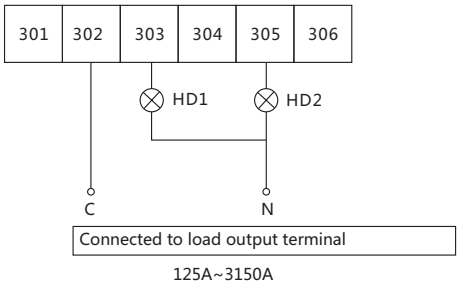


125A~3150A

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)





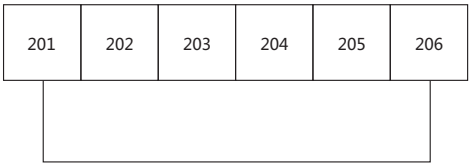
125A~3150A

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.

J

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

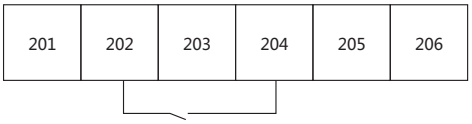
a. Fully automatic connection mode



201 and 206 short connected (Normal Type)

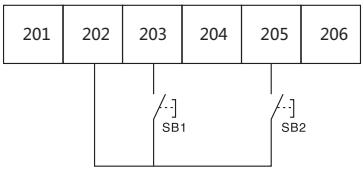
Note: Secondary connection of terminal 1 is required.

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

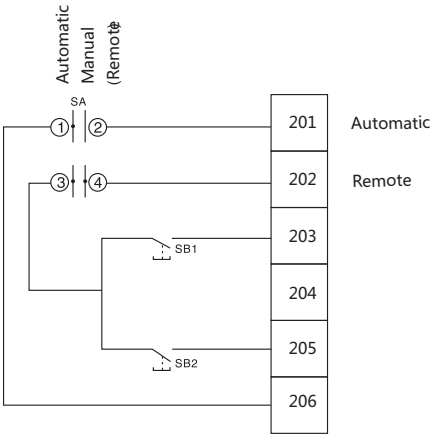


Forced reset contact (passive)

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)



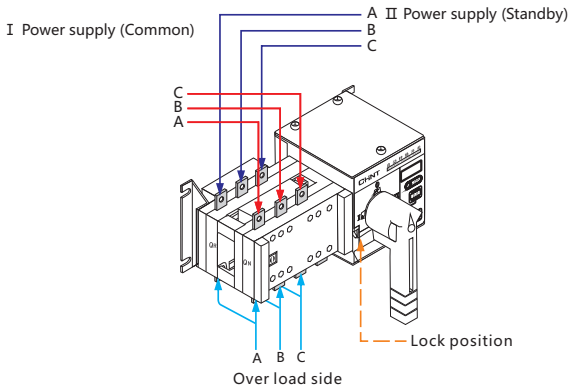
Normal Mode
Note: When switch SA is in the automatic position,① and ②
are connected.
When switch SA is in the manual position, ④ and ③
are connected, but the switch SA must break.

5. Connection diagram

5.5 Connection diagram

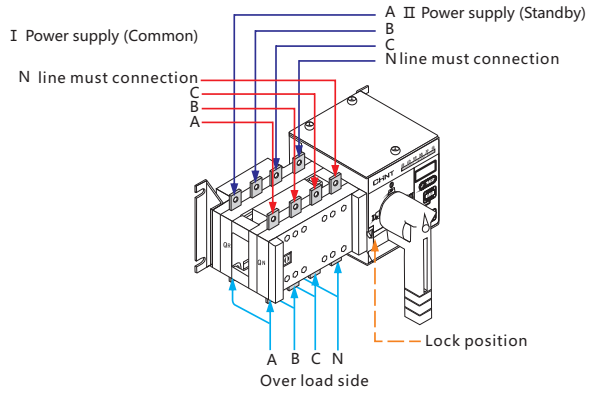
NH40-16~100

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:

a. 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.

b. The control power supplies are obtained respectively from phases T and N of the normal and standby power supplies.

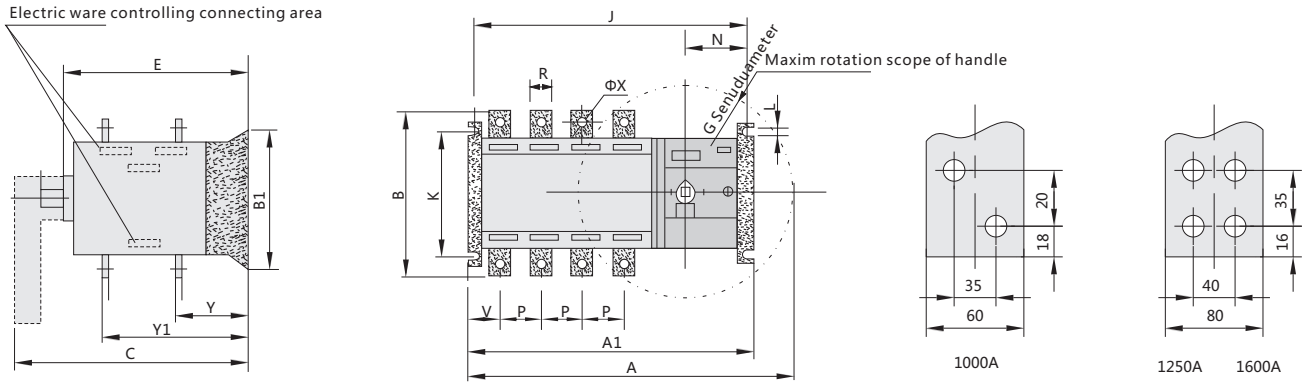
c. AC220V control power supplies I and II are respectively connected to terminals 102~103 and 104~105, among which 102 and 104 are respectively the live wires of the normal and standby power supplies.

d. 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.

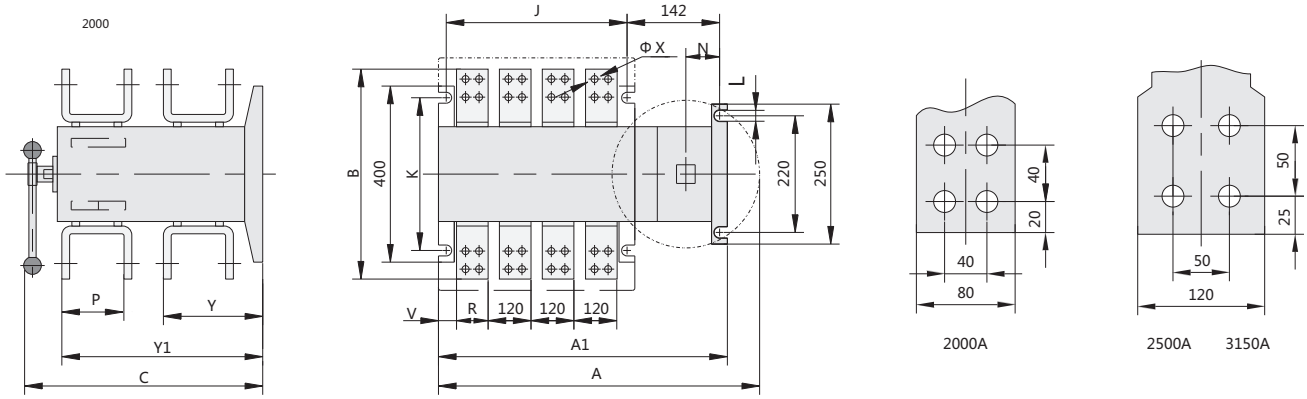
e. When upper (lower) incoming line is used, phases R, S, T, N of the lower (upper) lines I and II are respectively connected with copper busbars or conductors as the output.

6. Mounting dimension of NH40SZ automatic changeover switch disconnector

16 ~ 1600A



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