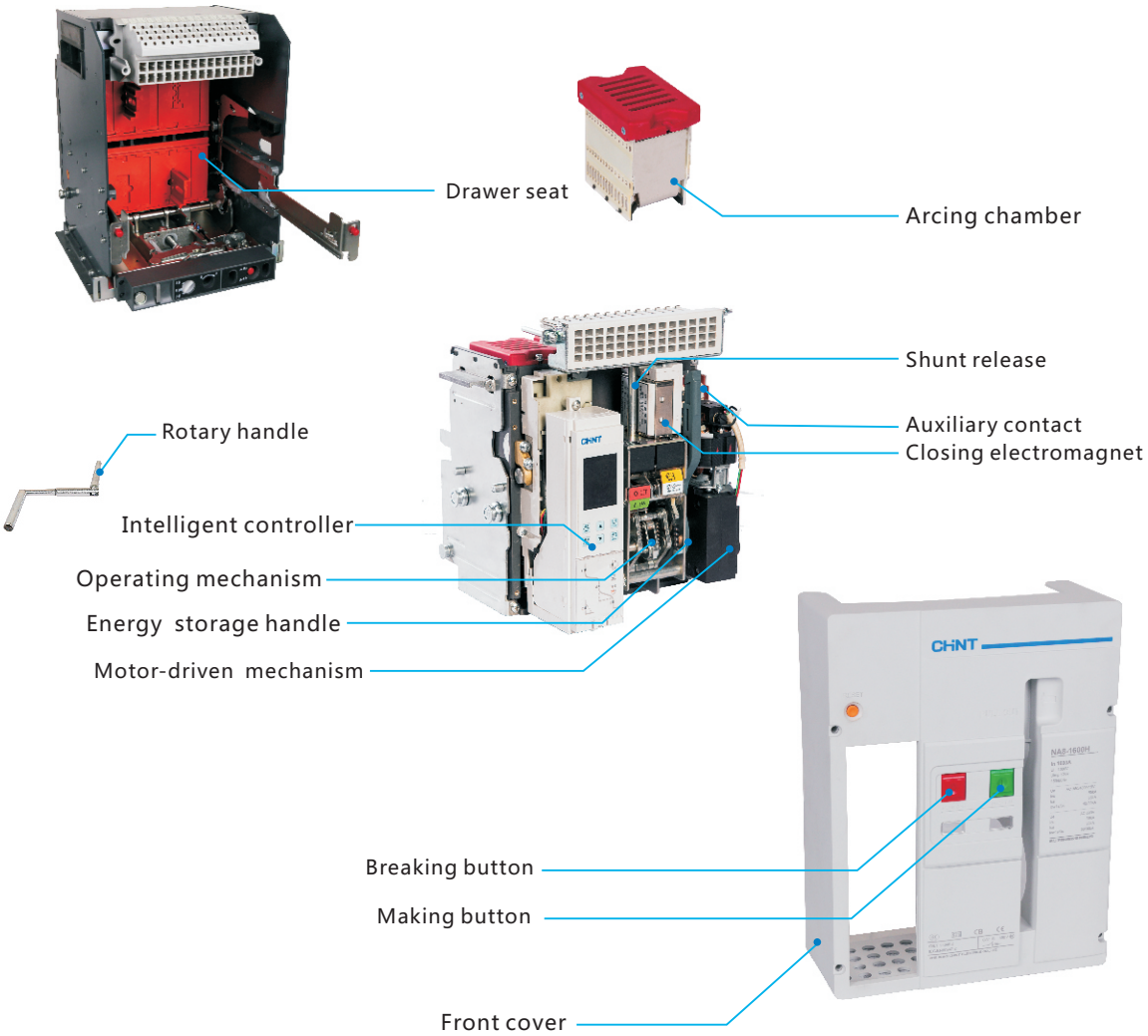
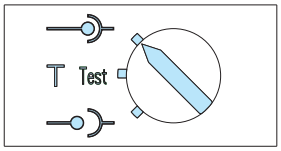
NA8 Air Circuit Breaker

Structural Features of Circuit Breaker

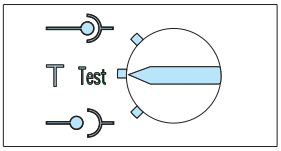


Identification of Circuit Breaker Panel

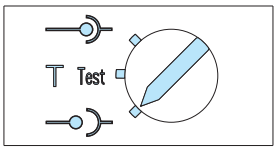
1	Trademark	9	Draw-out plate
2	Secondary wiring terminal	10	Three-position locking device
3	Breaking button	11	Drawer padlock
4	Energy- storage handle	12	Racking- handle entry
5	Making button	13	Position indicator
6	Name plate	14	Rotary handle storage hole
7	Energy-storage/release indicator	15	Intelligent controller
8	Breaking/Making indicator	16	Fault-breaking indicator reset button



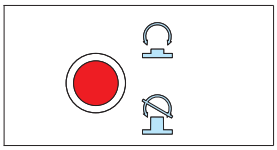
: "Connected" position, main circuit and secondary circuit are both connected



Test : "Test" position, main circuit disconnected and isolated with safety barrier, only secondary circuit is connected



: "Disconnected" position, main circuit and secondary circuit are both disconnected



: Button does not pop up, and handle is free to rotate;

: Button pops up, and handle can not be rotated until button is reset manually.

Circuit Breaker

- Frame size (A): 1600 (In preparation...) , 2500, 4000, 7500
- Two kinds of breaking capacity: N, H (for 7500)
- Rated voltage Ue (VAC): 380/400/415, 690,
- Number of poles: 3 or 4 poles
- Mounting mode: draw-out type or fixed type
- Mode of connection: horizontal connection, vertical connection, mixed connection

Operating Conditions and Environmental Suitability

- NA8 products can operate normally at the following temperature.

  Electric and mechanical characteristic applicable for ambient temperature -5℃~+40℃ (certified), and also peripheral ambient temperature -45℃~+70℃ (M type), -20℃~+70℃ (H type).
- For specific derating factor, see P23.

  Storage conditions: Applicable for -45℃~+70℃.
- NA8 may resist against the following electromagnetic interference:

  EMI-generated overvoltage;

  Overvoltage caused by environmental disturbance or distribution system;

  Radio wave (radio, interphone, radar, etc.)

  Static discharge of terminal users
- NA8 circuit breakers have successfully accredited through the EMC test specified in the following standards:

  IEC/ EN 60947-2

  The above tests may ensure:

  no false tripping fault, tripping time not interrupted.
- Protection grade

  Front IP20 , other sides IP00

Intelligent Controller

- M type (basic type)

  Basic functions: current measurement and display, protection function (L, S, I&G)

- H type (communication type)

  Including all protection functions of M Type

  LCD display

  Communication function

- H type +optional functions

  Including all protection and measurement functions of H type

  (optional) voltage, power and other measurement functions

  (optional) advanced protection function

  (optional) harmonic measurement and analysis

  (optional) multiple auxiliary functions

Connection

- Rear connection

  Horizontal connection, vertical connection, mixed connection are optional, and horizontal connection is of standard configuration

- Optional accessories

  Interphase insulating barrier, NA8-1600 expansion busbar

Lock

- Key lock
- Drawer position padlock (to lock the circuit breaker at the disconnected position)
- Drawer shutters padlock
- Breaking/Making button padlock
- Door interlock

Indication Contacts

- Standard contacts

  Breaking/Making indication contact

  Fault tripping indication contact

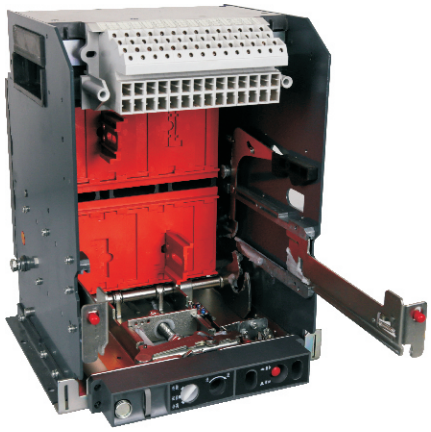
  Spring energy storage indication contact

- Options

  Drawer seat position indication contact

  The ready to close contact may be added

  (There is no such function for 1600A frame).



Remote Operation

- Standard accessories

  Motor-driven mechanism: MO

  Closing electromagnet: CC

  Shunt release: ST

- Options

  Undervoltage time delay release: UVTD

  Undervoltage instantaneous release: UVT

NA8 Air Circuit Breaker

Product model	Breaking capacity \ Rated current	200	400	630	800	1000	1250	1600	2000	2500	3200	4000	5000	6300	7500
NA8-1600 (In preparation...)	N	■	■	■	■	■	■	■							
NA8-2500	H			■	■	■	■	■	■	■					
NA8-4000	H							■	■	■	■	■			
NA8-7500	N											■	■	■	■
	H											■	■	■	■

NA8 Product Model Definition and Explanations

NA8	- 1600	- N	- 1600	- M	/ 3	MO	D	230VAC	- OTHER
Product code	Frame current	Breaking capacity code	Rated current	Intelligent controller code	Number of poles code	Operation mode code	Mounting mode code	Control circuit voltage code	Special requirement code
	1600 2500 4000 7500	N: standard type H: higher type	200 400 630 800 1000 1250 1600 2000 2500 3200 4000 5000 6300 7500	M: basic type (digital display type) H: communication type (LCD display type)	3: three poles 4: four poles	MO: motor-driven operation MN: manual operation	W : draw-out type F: fixed type	230VAC: AC 230 V 400VAC: AC 400 V 110VDC: DC 110 V 220VDC: DC 220 V	None: no special requirement special requirement, like: KL : key lock

Notes: 1) "N "needs not be indicated for type N breaking capacity of NA8-7500, and may be omitted; if type H breaking capacity is selected, "H" needs to be indicated."
2) Manual operation: excluding motor-driven mechanism and closing electromagnet, shunt release. motor-drivenoperation: including all remote operation standard accessories.
3) Code instance: NA8-2500H-2000M/3MO-D AC230V: 2500A frame H type breaking capacity, rated current 2000A ,M type ntelligent controller, 3poles,motor-driven operation, draw-out type, control voltage AC230V.

NA8 Accessory Model Definition and Explanations (1)

NA8	- 1600	- CC	- 230VAC
Product code	Frame current	Accessory code	Rated voltage code
	1600	CC: closing electromagnet	230VAC : AC230V
	2500	ST: shunt release	400VAC : AC400V
	2500 ~ 7500	UVT: undervoltage instantaneous release	110VDC : DC110V
	4000 ~ 7500	MO: motor-driven mechanism	220VDC : DC220V
		UVTD: undervoltage time delay release	

NA8 Accessory Model Definition and Explanations (2)

NA8	-	1600	-	OF	-	C04
Product code		Frame current		Accessory code		Accessory specification
		1600		OF: auxiliary contact		C04: four groups of contacts
		2500				C06: six groups of contacts
		4000				N3: 3 NO 3 NC
		7500				N4: 4 NO 4 NC
		2500～7500				N5: 5 NO 5 NC
		4000～7500				
				KL: key lock		1S1S: one lock one key
						2S1S: two locks one key
						3S2S: three locks two keys
				FCDP: fixed door frame		
				DCDP: draw-out type door frame		
				FD3: fixed three-pole interphase insulating barrier		
				FD4: fixed four-pole interphase insulating barrier		
				DD3: draw-out type three-pole interphase insulating barrier		
				DD4 : draw-out type four-pole interphase insulating barrier		
				CE-CD-CT: drawer seat three-position signal		
				ILK2: draw-out type two wire rope mechanical interlock		
				ILK2F: fixed two wire rope mechanical interlock		
				ILK3: mechanical interlock (3 in 2)		
				ILK4 :mechanical interlock (3 in 1)		

Note

Main Technical Parameters of Circuit Breaker

Characteristics

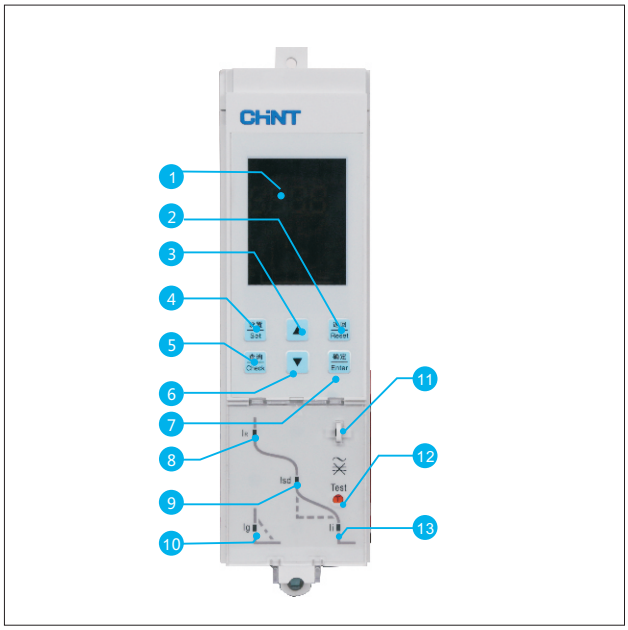
Number of poles	3/4	
Rated operational voltage Ue (V)	380/400/415、690	
Rated insulation voltage Ui (V)	1000	
Rated impulse withstand voltage Uimp (kV)	12	
Rated frequency (Hz)	50/60	
Flashover distance (mm)	0	
Suitability for isolation	IEC/EN 60947-2	Applicable
Pollution grade	IEC 60664-1	N:3

Frame size			
Rated current (A)			
Rated current of the N pole (A)			
Type of the circuit breaker			
Rated ultimate short-circuit breaking capacity (kA rms) VAC 50/60Hz	Icu		380/400/415V、690V
Rated service short-circuit breaking capacity (kA rms) VAC 50/60H z	Ics		380/400/415V、690V
Utilization category			
Rated short- time withstand current (kA rms) VAC 50/60Hz	Icw 1s		380/400/415V、690V
	Icw 3s		380/400/415V、690V
Rated short-circuit making capacity (kA peak) VAC 50/60Hz	Icm		380/400/415V、690V
Making current tripping protection function (MCR kA rms)			
Breaking time (ms)			
Closing time (ms)			
Mounting, connection and service life			
Service life C/O cycle		Mechanical	No maintenance
		Electrical	No maintenance
Connection		Horizontal、Vertical、Mixed	
Size (H×W×D)		Fixed type	3P
			4P
		Draw-out type	3P
			4P

	NA8-1600 (In preparation...)							NA8-2500						
	200	400	630	800	1000	1250	1600	630	800	1000	1250	1600	2000	2500
	200	400	630	800	1000	1250	1600	630	800	1000	1250	1600	2000	2500
	N(400V)		N(690V)					H (415V)			H (690V)			
	55		30					85			65			
	42		25					85			65			
	B							B						
	42		25					85			65			
								50			50			
	121		63					176			121			
	10							16						
	20～30							20～30						
	30～40							30～40						
	20000							20000						
	8000		3000					8000			4000			
	■							■						
	320×254×250							367×370×357						
	320×324×250							367×461×357						
	351×282×350							431×375×478						
	351×352×350							431×470×478						

NA8-4000					NA8-7500							
1600	2000	2500	3200	4000	4000	5000	6300	7500				
1600	2000	2500	3200	4000	4000	5000	6300	3750				
H(415V)	H(690V)				N(440V)	N(690V)	H(440V)	H(690V)	N(440V)	N(690V)	H(440V)	H(690V)
100	85				135	100	150	100	135	100	150	100
100	85				135	100	135	100	135	100	150	100
B					B							
100	85				135	100	135	100	135	100	135	100
75	75				100	100	100	100	100	100	100	100
220	187				297	220	330	220	297	220	330	220
26					26							
20～30					20～30							
30～40					30～45							
10000					1000							
6000	3000	500			1500(440v) 1000(690v)							
■					■							
402×422×341												
402×537×341												
431.5×435×456					472×786×464							
431.5×550×456					472×1016×464							

Function Overview of Intelligent Controller



1 Display window: display the current value, setting parameter, fault current, tripping time, etc.

2 Return button: exit from current menu and enter the upper-level menu, or cancel current setting parameter value.

3 Up button: move up the check box submenu at the current menu, or realize "+" parameter setting in parameter setting.

4 Set button: switch to the default setting menu.

5 Check button: switch to the default query menu.

6 Down button: move down the check box submenu at the current menu, or realize "-" parameter setting in parameter setting.

7 Enter button: enter the next-level menu of current selected box, or save current parameter setting.

8 Ir indicator for overload long-time-delay tripping.

9 Isd indicator for short circuit short-time-delay tripping.

10 Ig indicator for earth fault tripping.

11 Cover lock hole

12 Button for tripping test

13 Ii indicator for short-circuit instantaneous tripping.

M Type intelligent controller (basic type)

Protection

All protective threshold values and time delays are set using buttons.

- Overload protection

  True RMS long time delay protection.

  Thermal memory: heat accumulation before and after tripping.

- Short circuit protection

  Short time delay (RMS) and instantaneous protection

  4 definite time-delay options in terms of time delay

- Earth fault protection

  4 definite time-delay options in terms of time delay

- Test function

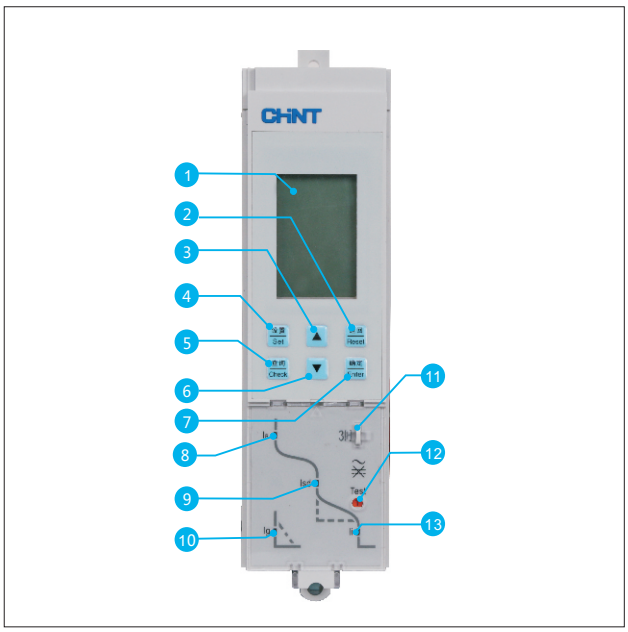
  Simulate $6I_R$ test current for tripping test.

- Tripping recording function

  Tripping reason display function

- Ammeter

  M Type intelligent controller measures the current true effective value (RMS) from 40% to 150% with an accuracy of 2%.



1 Display window: display the current value, setting parameter, fault current, tripping time, etc.

2 Return button: exit from current menu and enter the upper3.8-level menu, or cancel current setting parameter value.

3 Up button: move up the check box submenu at the current menu, or realize "+" parameter setting in parameter setting.

4 Set button: switch to the default setting menu.

5 Check button: switch to the default query menu

6 Down button: move down the check box submenu at the current menu, or realize "-" parameter setting in parameter setting.

7 Enter button: enter the next-level menu of current selected box, or save current parameter setting.

8 Ir indicator for overload long-time-delay tripping.

9 Isd indicator for short circuit short-time-delay tripping .

10 Ig indicator for earth fault tripping.

11 Cover lock hole

12 Test button for tripping test

13 Ii indicator for overload long-time-delay tripping.

H Type Intelligent Controller (communication type)

Protection

All protective threshold values and time delays are set using buttons.

- Contain all protection functions of M type control unit.
- Communication function

  Modbus - RTU communication protocol
- Leakage protection function (optional)

  Special external transformer is equipped.
- Advanced protection function (optional)

  Voltage unbalance protection

  Overvoltage and undervoltage protection

  Overfrequency and under-frequency protection

  Phase sequence protection

  Reverse power protection function

  Demand value protection function
- Expanded functions

  Intelligent controller self-diagnostics

  Operation times/fault tripping/alarm/ deflection recording function: providing the record of the latest 10times.

  Main contact abrasion display function: evaluate the contact abrasion degree according to the mechanical life, electric life and breaking capacity of different frames.

  Internal clock function.

  Button Trip-test function.
- Electric energy meter (optional)

  Voltage measurement

  Frequency measurement

  Demand value measurement

  Power (active power, reactive power, apparent power) measurement

  Electric energy (active power, reactive power, apparent power) measurement

  Power factor measurement
- Load monitoring function (optional)
- Zone selectivity interlock (optional)
- Input/output function (optional)

  3DO, 4DO or 2DI, 2DO

  DI signal: AC230 V (standard, other optional); DC110V;

  DO requires the power module (24VDC output) and relay module.
- Harmonic analysis function (optional)

  Measuring the fundamental wave current, fundamental wave line voltage, fundamental wave phase voltage, fundamental wave power and each 3-31 odd harmonic current ratio (HRIh), harmonic voltage ratio(HRUh), total harmonic current distortion [THDi , thdi], total harmonic voltage distortion [THDu, thdu].

  Harmonic wave ratio (HR):

  the ratio of the RMS value of the hth of harmonic component contained in the cyclic AC quantity to the RMS value of fundamental wave component (in percentage).

Protective Characteristics of Intelligent Controller

Protective characteristics of intelligent controller consist of inverse time-delay and definite time-delay.
When the fault current exceeds the inverse time-delay
setting, the controller provides time delay protection according to the definite time-delay.
The inverse time-delay current conforms to the characteristic curve I^2t.

Overload long-time-delay protection characteristics

Overload long-time-delay protection acting by threshold value.

Setting parameter	Setting range								
Long time-delay setting current Ir	(0.4-1 .0) In+OFF								±15%
Long time-delay setting step size	1A (1600-2500 Frame size) ； 2A(4000-7500 Frame size)								
Long time-delay setting time tr	(1-2- 4-8 -12-16-20 -24 -30)s								±10%
Anti-time-limit characteristic curve	$t=(\frac{6}{N})^2\times tr$								
Fault current	**Action time**								
I< 0.85Ii	No action								
I> 1.l5Ii	Action								
1.5Ir	16	32	64	128	192	256	320	384	480
2.0Ir	9	18	36	72	108	144	180	216	270
6.0Ir	1	2	4	8	12	16	20	24	30

Notes:N --- the multiple of fault current divided by set current I/Ir
t --- fault operating delay time
t_R --- long time delay set value
Operating time permissible error±15%
Conventional factory setting: overload long time delay current 1.0In;
Conventional factory setting: overload 6Ir; operating time 2s
Example: Given that overload long time delay current 1.0In, delay time 2s (at 6Ir), now line current I=1.8In, actual fault operating delay time t may be calculated:
N =1.8In/1.0In=1.8

$t= (6/1.8)^2 \times 2 =22.2s$

Short circuit short-time-delay protection characteristics

Short circuit short time delay protection acting by threshold value.

Setting parameter	Setting range		Error
Short time-delay setting current Isd	(1.5-10) In+OFF		±10%
Short time-delay setting step size	1A (1600-2500 Frame size) ； 2A(4000-7500 Frame size)		
Short time-delay setting time tsd	Definite-time-limit: 0.11、0.21、0.31、0.41; Anti-time-limit:0.1、0.2、0.3、0.4		±15% or inherent 40ms (take the maximum)
Fault current	**Action time**		
I< 0.9Isd	No action		
I> 1.l5Isd	Time-delay action		
Isd <I≤10I	Anti-time-limit	Action characteristics$I^2t=(10I_r)^2tsd$	
		Setting times0.1、0.2、0.3、0.4	
1≥1.1Isd	Definite-time-limit	Setting times0.11、0.21、0.31、0.41	
		Min.s 0.06、0.16、0.255、0.34	
		Max.s 0.14、0.24、0.345、0.46	
	Return time	0.05、0.14、0.25、0.33	

Notes: Isd --- short time delay current set value
I --- fault current
Ir --- long time delay set value
t --- fault operating delay time
tsd --- short time delay inverse time-delay set value
Operating time permissible error±15%
Conventional factory setting: short time delay current 8Ir
Conventional factory setting: short time delay operating time 0.4s

Short circuit instantaneous protection characteristic

Short circuit instantaneous protection acting by threshold value.

Setting parameter	Setting range	
Instantaneous setting current Ii	(2~1 5) In+OFF	
Short time-delay setting step size	1A (1600-2500 Frame size) ； 2A(4000-7500 Frame size)	
Operating characteristics	I＜0.85Ii	No action
	I＞1.15Ii	Action
	≤100ms	Action time

Earth Fault Protection Characteristic

Earth fault protection operating threshold

<0.9Ig: no action;

>1.1Ig: action;

NA8 -1600\2500: 0.2In~1.0In + OFF (MAX:1200A)

NA8-4000\7500: 500 A~1200 A + OFF

Definite time-delay	Setting time (s)	0.1	0.2	0.3	0.4
	Min (s)	0.06	0.16	0.255	0.34
	Max (s)	0.14	0.24	0.345	0.46
	Return time	0.05	0.14	0.25	0.33
Inverse time-delay	$t=\frac{(I_g)^2}{I^2}\times tg$				

Notes: I_g — earth protection setting, NA8-1600\2500 default factory setting I_g =0.5In , 4000\7500 default factory setting I_g =800A
I --- fault current
T --- fault operating delay time
tg --- earth inverse time-delay set value
Inverse time-delay operating time permissible error±15%
Conventional factory setting: OFF

Controller Minimum Factory Display Current

Frame	Rated current	Minimum display value
1600	400~1600	80
2500	630~2500	80
≥4000	≥1600	160

Measuring Accuracy of Intelligent Controller

Current measurement	
Measuring range	Ia, Ib, Ic and I_N not more than 15In (circuit breaker rated current)
Measuring accuracy	Below 0.1In, measurement is inaccurate.
	0.1In~0.4In, the accuracy will linearly change from 5% to 2%.
	0.4In~1.5In, the accuracy is 2%.
	> 1.5In, the accuracy will linearly change from 2% to 15%.
	Measuring accuracy of earth current is 10%.

Voltage measurement	
Measuring range	Line voltage: 0~600 V
	Phase voltage: 0~300 V
Measuring accuracy	Error: ±1%

Frequency	
Measuring range	40Hz~70Hz
Error	Error: ±0.1H z

Power	
Measurement mode	Effective value
Measuring content	3P: total active power, total reactive power, total apparent power
	4P: split phase active power, split phase reactive power, split phase apparent power, total active power, total reactive power, total apparent power
Measuring range	Active power: -32768kW~+32767kW
	Reactive power: -32768Kvar~+32767Kvar
	Apparent power: 0KVA~65535kVA
	Error: ±2.5%

Power factor	
Measuring content	3P: total power factor
	4P: split phase power factor
Measuring range	-1.00~+1.00

Electric energy	
Measuring content	Input reactive electric energy (EQin), output reactive electric energy (EQout)
	Input active electric energy (EPin), output active electric energy (EPout)
	Total active electric energy (EPtotal), total reactive electric energy (EQtotal), total apparent electric energy (EStotal)
Measuring range	Active electric energy: -32768kWh~+32767kWh
	Reactive electric energy: -32768Kvarh~+32767Kvarh
	Apparent electric energy: 0~65535kVAh
Measuring accuracy	±2.5%

Harmonic measurement	
Fundamental wave measurement	Current: Ia, Ib, Ic
	Voltage: Uab, Ubc, Uca
Total harmonic distortion	THD: total distortion ratio of harmonic wave in relative to fundamental wave
THD and Thd	Thd: total distortion ratio of harmonic wave in relative to effective value
Harmonic amplitude spectrum	The controller may display FFT amplitude of 3~31 odd harmonic in percentage "%".
Control unit measuring accuracy	±2%

Tripping Characteristic Curve of Intelligent Controller

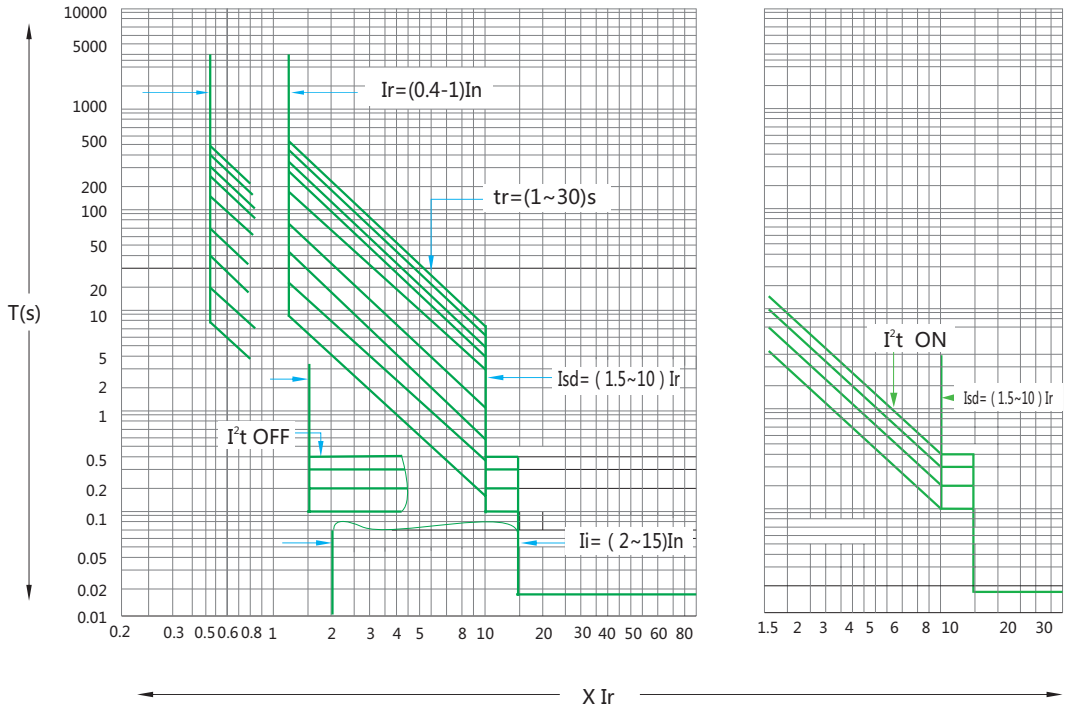


Fig.1 Overcurrent protection curves

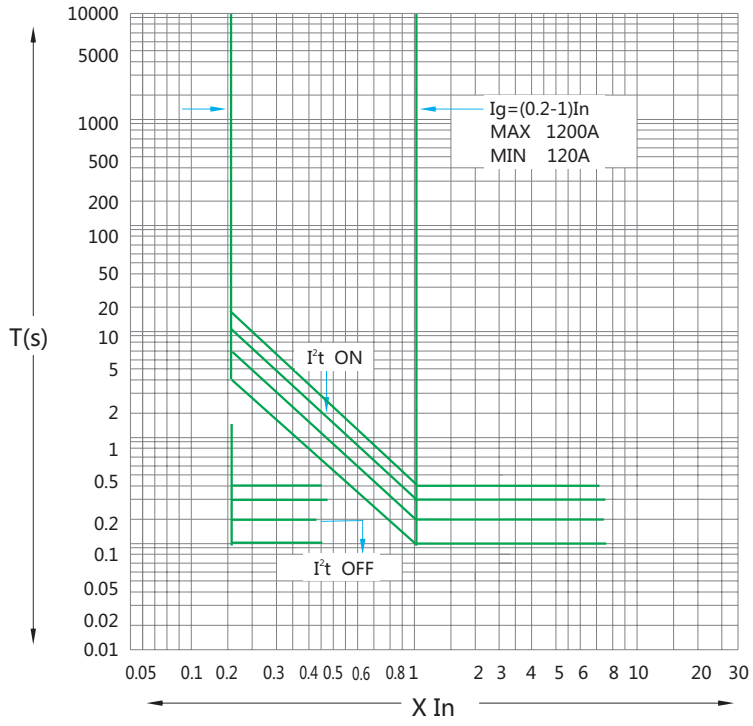
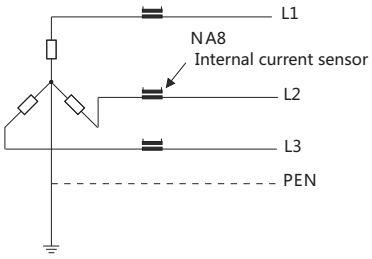


Fig.2 Asymmetrical earth fault protection curves

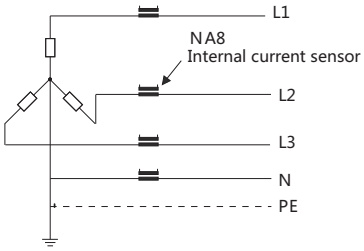
Explanations on Earth Fault Protection

Single Phase Earth Fault Protection

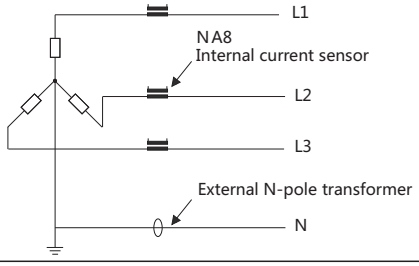
- The three-pole circuit breaker realizes earth protection through testing whether the three-phase current vector sum is zero or not via internal three current transformers.



- The four-pole circuit breaker realizes earth protection through testing whether the three-phase current and N phase current vector sum is zero or not via internal four current transformers.



- The 3P+N system realizes earth protection through the vector sum calculation via the three-pole circuit breaker and external N-pole transformer.

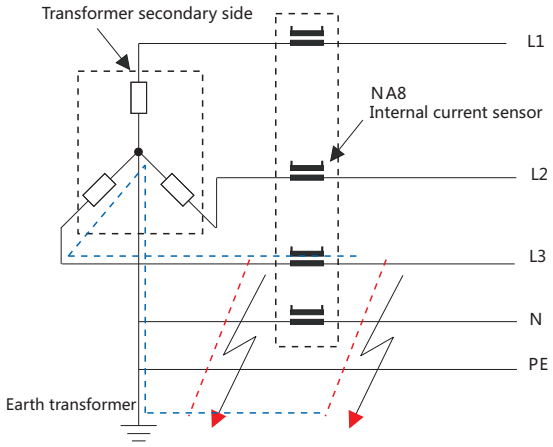


Notes: ① The external N-phase current transformer is special transformer configured by the company, and the default lead wire is 2m long.

② At 3PT, the earth protection can be only used for balanced load; for unbalanced load, this function should be closed or the set value is set above the permissible unbalanced current; otherwise, it might cause the operation of intelligent controller.

③ At (3P+N) T, maximum distance between transformer and circuit breaker cannot exceed 5m; when the transformer lead wire exceeds 2m long, it should be particularly indicated upon placing an order.

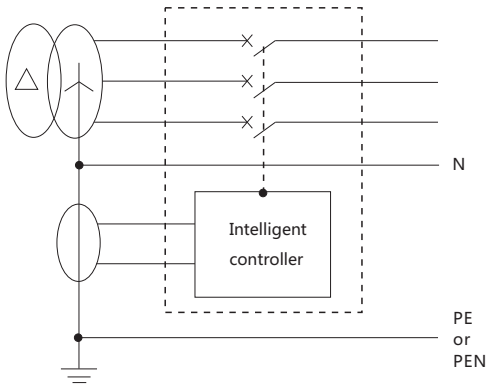
As show below, a load side fault of NA8 circuit breaker: The fault current only flows through one phase. If the three-phase current vector sum detected by 4 current sensors is higher than the set threshold, the intelligent control unit will activate the differential earth protection function. Such earth protection realizes the load side earth fault protection.



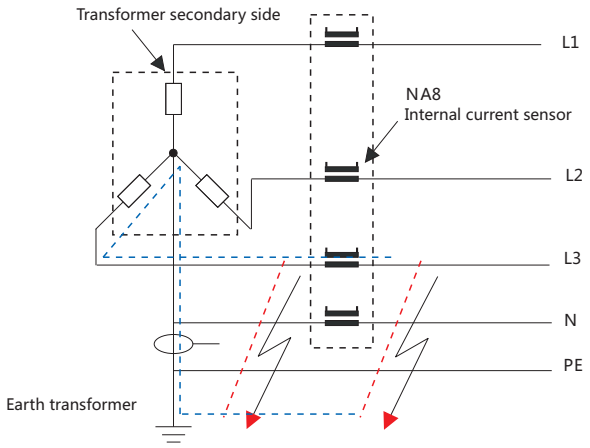
Earth Current Type Earth Protection

The earth transformer is used at the transformer star center to fulfill earth protection.

On condition of the circuit breaker protection of medium voltage/low voltage transformer, an earth transformer can be equipped at the transformer star connection center (the circuit breaker should be equipped with the H type controller, and the earth current protection transformer should be selected), and this earth transformer may measure the earth fault current at the power supply side and load side of NA8 circuit breaker, as shown below.



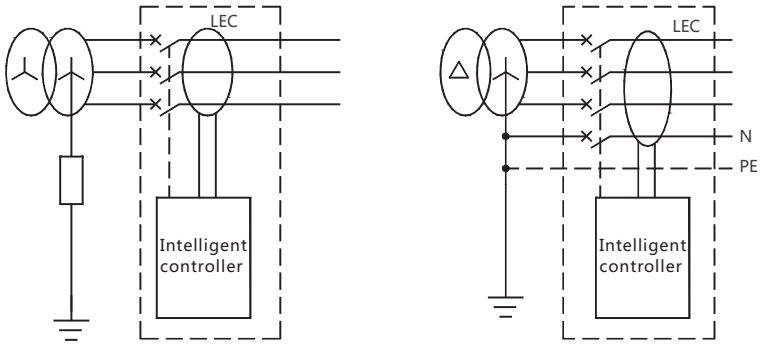
As shown below, through installing the external earth transformer, the earth fault at the power supply side of circuit breaker can be checked, and the earth fault at the load side of NA8 circuit breaker can also be detected.



Residual Leakage Protection

It is especially suitable for places having high-sensitivity requirement for the residual current protection to prevent man-made indirect contact. For NA8 circuit breaker, the H type controller should be selected, and the leakage protection function and leakage transformer (LEC) accessory should be added so as to realize leakage protection.

Leakage current I△n	[A]0.5-1-2-3-5-7-10-20-30
Tripping time △t	[s]0.06-0.17-0.25-0.33-0.42-0.58-0.75-0.83



The NA8 circuit breaker realizes the residual current protection function and needs to meet the following requirements:

1. Select the H-type controller;
2. Adding the leakage protection function of the controller;
3. Adding leakage current transformer (LEC) accessories;
4. The outgoing terminal of the circuit breaker is connected vertically;
5. It is available when the rated current of the circuit breaker is ≤3200A,

Accessory: Lock

Key Lock KL

There are 3 kinds of key lock (The later two kinds are used in the distribution system of two incoming cabinets and one connection cabinet):

one lock one key (1S1S)

two locks one key (2S1S)

three locks two keys (3S2S)

Drawer shutters Padlock

The padlock should be self prepared by the user.

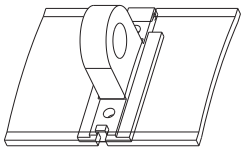
If the padlock is selected, when the circuit breaker body is at the disconnected or test position, it should ensure the body terminal is not connected with external live circuit.

Drawer Position Padlock

The padlock should be self prepared by the user.

After the drawer seat and body are locked at the disconnected using the padlock, the drawer seat rocker couldn’ t be inserted into the drawer seat rocking-handle hole, so the draw-out type circuit breaker body position cannot be changed.

Door Interlock



Circuit breaker condition door interlock

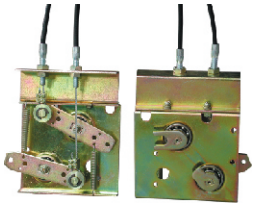
When the circuit breaker is closed, it is forbidden to open the switchgear door; when the circuit breaker is opened, it is allowed to open the switchgear door.

Circuit breaker position door interlock

When the circuit breaker is at the connection and test position, it is forbidden to open the switchgear door; when the circuit breaker is at the detachment position, it is allowed to open the switchgear door.

Pushbutton Lock PL

Pushbutton lock: used to lock up the mechanical button opening and closing the circuit breaker, and the padlock is used. After locking, manual opening and closing operation couldn't be done. (the padlock should be self-prepared by the user).



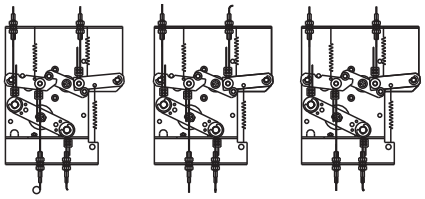
Mechanical Interlock IKL2 (Wire rope two interlock):

It may realize the interlocking of two horizontal or vertically installed three- or four-pole circuit breakers.

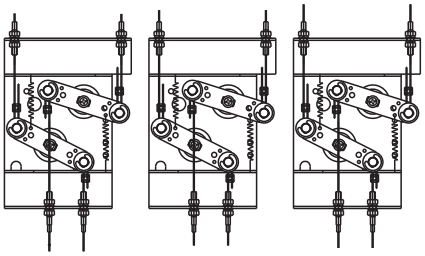
Circuit diagram	Possible mode of operation	
	1QF	2QF
	0	0
1QF 2QF	0	1
	1	0

Notes: a. When it needs to bend the wire rope, the transition arc at the bend should be higher than R120mm to ensure it can move flexibly.
b. Check the wire rope and ensure enough lubricating oil in it to ensure its flexible movement.

ILK -3 three interlock diagram



ILK -4 three interlock diagram



Mechanical Interlock ILK-3/4 (wire rope three interlock)

It may realize the interlocking of three flat or vertically installed three- or four-pole circuit breakers

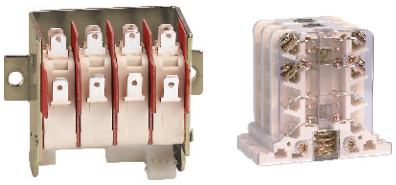
ILK-3 three interlock Circuit diagram	Possible mode of operation		
	1QF	2QF	3QF
	0	0	0
	0	0	1
	0	1	0
	1	0	0
	0	1	1
	1	0	1
	1	1	0

ILK- 4 three interlock Circuit diagram	Possible mode of operation		
	1QF	2QF	3QF
	0	0	0
	0	0	1
	0	1	0
	1	0	0

Notes: a. When it needs to bend the wire rope, the transition arc at the bend should be higher than R120mm to ensure it can move flexibly.

b . Check the wire rope and ensure enough lubricating oil in it to ensure its flexible movement.

Accessory: Indication Contact



Auxiliary contact OF			
Standard configuration		4CO	6CO (NA8-1600)
Breaking capacity		current (A)/voltage (V)	current (A)/voltage (V)
Utilization category	VAC (AC-15)	1.3/240 , 0.75/415	1.3/240 , 0.75/415
	VDC (DC-13)	0.55/220 , 0.27/110	- -

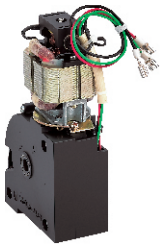
Drawer seat three-position indication contact CD - CE - CT		
Standard configuration		1CO/3
Breaking capacity		current (A)/voltage (V)
Utilization category	VAC (AC-15)	1.3/240 , 0.75/415
	VDC (DC-13)	0.55/220 , 0.27/110

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

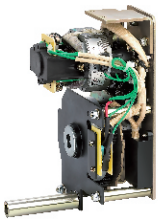
Spring energy storage indication contact		
Standard configuration		1NO
Breaking capacity		current (A)/voltage (V)
Utilization category	VAC (AC-15)	1.3/240 , 0.75/415
	VDC (DC-13)	0.55/220 , 0.27/110

Notes: 1) CO is the changeover contact, 1NO 1NC is matched with a common terminal.

2) NO is normally open contact, NC is normally closed contact.



1600 frame MO



2500、4000~7500 frame MO

Motor-driven mechanism (MO)

It has the function of motor energy storage and automatic re-energy storage after closing of circuit breaker to ensure the circuit breaker can be closed immediately after opening. Where there is no auxiliary power supply, the energy storage handle is used as standby.

Characteristic		
Power supply	VAC 50/60Hz	220/230/240 , 380/400/415
	VDC	110 , 220
Operating threshold		0.85-1.1Us
Frame: power consumption (VA or W)		1600:75W ; 2500:85W ; 4000~7500:180W
Motor over-current time		≤1min
Energy storage time		≤7s
Operating frequency		≤2times/min

1600 frame CC&ST

Electric remote operation coil (CC and ST)

Closing electromagnet (CC)

If energy storage of the mechanism is done, CC may fulfill remote closing after being energized.

Characteristic		CC
Power supply	VAC 50/60Hz	220/230/240
		380/400/415
	VDC	220,110
Operating voltage		0.85-1.1Us
Frame: power consumption (VA or W)	AC	400VA
	DC	1600 : 380W ; 2500、4000~7500 : 130W
Circuit breaker response time		30ms-45ms

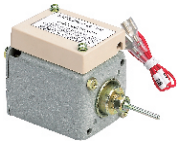
2500、4000~7500 frame CC&ST

Shunt release (ST)

After being energized, ST will open the circuit breaker instantaneously.

Characteristic		ST
Power supply	VAC 50/60Hz	220/230/240
		380/400/415
	VDC	220,110
Operating voltage		0.85-1.1Us
Frame: power consumption (VA or W)	AC	400VA
	DC	1600 : 380W ; 2500、4000~7500 : 130W
Circuit breaker response time		25ms-35ms

1600 frame UVT



2500、4000~7500 frame UVT

Undervoltage release (UVT)

If the supply voltage reduced to a value between 35% and 70% of rated voltage, this tripping coil leads to the instantaneous opening of circuit breaker. If the UVT tripping coil is not energized, the circuit breaker cannot be closed, manually (closing button) or electrically (closed electromagnet). Only when the supply voltage of UVT tripping coil reaches 85% of rated voltage, the circuit breaker can be closed.

Characteristic			
Power supply	VAC 50/60Hz		220/230/240 , 380/400/415
	VDC		–
Operating threshold	Opening	0.35-0.7Ue	0.35-0.7Ue
	Closing	0.85Ue	0.85-1.1Ue
Frame: power consumption (W)			1600 : 220W/15W ; 2500、4000~7500 : 220W/13W

Note: attracting/holding.

Undervoltage time delay release (UVTD)

To prevent the false tripping circuit breaker resulting from short time voltage drop, it requires UVT operating time delay. A time delay unit is added besides UVT to realize this function.

Characteristic		
Power supply	VAC 50/60Hz	
Operating threshold	Opening	0.35-0.7Ue
	Closing	0.85Ue
Frame: power consumption (VA)	1600 : 20VA ; 25000、4000~7500 : 48VA	
Adjustable time	1s~5s, the time delay can be selected and adjustable.	

Note: Only NA8 - 1600 uses the external undervoltage time delay module, and 2500、4000~7500 product undervoltage time delay release has built-in undervoltage time delay unit.

Capacticy Derating and Power Loss

NA8-1600 (In preparation...)

Ambient temperature	200A		400A		630A		800A		1000A		1250A		1600A	
Connection mode	Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical
40°	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45°	-	-	-	-	-	-	-	-	-	-	-	-	1550	-
50°	-	-	-	-	-	-	-	-	-	-	-	-	1500	1550
55°	-	-	-	-	-	-	-	-	950	950	1150	1200	1450	1500
60°	-	-	-	-	550	580	700	700	900	900	1050	1100	1350	1450

NA8-2500

Ambient temperature	630A		800A		1000A		1250A		1600A		2000A		2500A	
Connection mode	Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical
40°	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45°	-	-	-	-	-	-	-	-	-	-	1900	-	2400	2400
50°	-	-	-	-	-	-	-	-	1500	1550	1850	1900	2300	2300
55°	-	-	-	-	-	-	-	-	1400	1450	1800	1800	2200	2200
60°	-	-	-	-	-	-	-	-	1300	1350	1700	1700	2100	2100

NA8-4000

Ambient temperature	1600A		2000A		2500A		3200A		4000A	
Connection mode	Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical
40°	-	-	-	-	-	-	-	-	-	-
45°	-	-	-	-	-	-	-	-	3800	3850
50°	-	-	-	-	-	-	3100	-	3600	3650
55°	-	-	-	-	2450	-	3000	3050	3400	3450
60°	-	-	1900	1950	2350	2400	2900	2950	3200	3250

NA8-7500

Ambient temperature	4000A		5000A		6300A		7500A	
Connection mode	Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical
40°	-	-	-	-	/	-	/	-
45°	-	-	-	-	/	6100	/	7000
50°	-	-	4700	4800	/	6000	/	6550
55°	3900	3900	4600	4650	/	5500	/	6050
60°	3800	3800	4400	4500	/	5200	/	5650

Note: "-" represents no derating; "/" means no horizontal connection.

Altitude Capacity Derating Factor

Voltage performance corrections under different altitudes

Altitude (m)		2000	3000	4000	5000
Rated impusle withstand voltage (kV)	Uimp	12	10	8.5	7.5
Average insulation grade (V)	Ui	1000	800	700	600
Power frequency withstand voltage (V)		2200	1955	1760	1600
Maximum operational voltage (V)	Ue	690	580	500	400

Current performance corrections under different altitudes

Altitude (m)	Rated operating current (Ie)
2000	1.0Ie
2500	0.93Ie
3000	0.88Ie
3500	0.83Ie
4000	0.78Ie
4500	0.73Ie
5000	The factory must be contacted for confirmation

Note: If the ambient temperature is lower than 40 ℃, Ie = In ; if the ambient temperature is higher than 40 ℃, derating use must be done in strict accordance with the requirement of operation manual; in such case, Ie ≠ In , Ie and In can be looked up according to the temperature derating table.

Power loss

Power loss is the power consumption per pole measured at In, 50/60 Hz.

Frame	Rated current (A)	Power loss of draw-out type (W)	Power loss of fixed type (W)
1600A (In preparation...)	200	115	45
	400	140	80
	630	161	100
	800	215	110
	1000	230	120
	1250	250	130
	1600	460	220
2500A	630	58.6	26.4
	800	73.7	36.6
	1000	172	78
	1250	268	122
	1600	440	200
	2000	530	262
	2500	600	312
4000A	2000	470	250
	2500	550	280
	3200	670	420
	4000	1047	656
7500A	4000	550	-
	5000	590	-
	6300	950	-
	7500	1500	-

Dimension Of Busbar

Bolt Configuration and Mounting Torque

Bolt type	Application	Preferred tightening torque
M3	Fasten the secondary connecting conductor	(0.5~0.7) N·m
M8 (with flat washer only)	Fasten the product on the switchgear (1600A frame)	(18~25) N·m
M10 (with flat washer only)	Fasten the product on the switchgear (2500A and above frame)	(25~40) N·m
M10	Fasten the busbar	(36~52) N·m

Connection Busbar Specification Reference under Different Temperatures

Permissible maximum busbar temperature: 100℃

The busbar material is bare copper, and the unit of width and thickness is both mm.

Frame current	Rated current (A)	Ambient temperature (-5~40) ℃				Ambient temperature 50℃				Ambient temperature 60℃			
		Recommended busbar specification				Recommended busbar specification				Recommended busbar specification			
		Width	Thickness	Number of panels	Specification	Width	Thickness	Number of panels	Specification	Width	Thickness	Number of panels	Specification
1600A (In preparation...)	200	30	5	1	30*5*1	30	5	1	30*5*1	40	5	1	40*5*1
	400	30	5	2	30*5*2	30	5	2	30*5*2	30	10	1	30*10*1
	630	40	5	2	40*5*2	40	5	2	40*5*2	50	5	2	50*5*2
	800	50	5	2	50*5*2	50	5	2	50*5*2	50	6	2	50*6*2
	1000	50	5	3	50*5*3	50	5	3	50*5*3	50	6	3	50*6*3
	1250	60	8	2	60*8*2	60	8	2	60*8*2	60	10	2	60*10*2
	1600	60	10	2	60*10*2	60	10	2	60*10*2	60	10	3	60*10*3
2500A	630	40	5	2	40*5*2	50	5	2	50*5*2	50	5	2	50*5*2
	800	50	5	2	50*5*2	50	5	2	50*5*2	60	5	2	60*5*2
	1000	50	5	3	50*5*3	50	5	3	50*5*3	60	5	3	60*5*3
	1250	60	8	2	60*8*2	60	8	2	60*8*2	60	8	3	60*8*3
	1600	60	10	2	60*10*2	60	10	2	60*10*2	60	10	3	60*10*3
	2000	100	5	3	100*5*3	100	5	3	100*5*3	100	5	4	100*5*4
	2500	100	10	2	100*10*2	100	10	2	100*10*2	80	10	3	80*10*3
4000A	2000	80	8	3	80*8*3	80	8	3	80*8*3	80	10	3	80*10*3
	2500	80	6	4	80*6*4	80	6	4	80*6*4	80	8	4	80*8*4
	3200	100	10	4	100*10*4	100	10	4	100*10*4	100	10	4	100*10*4
	4000	100	10	5	100*10*5	100	10	5	100*10*5	120	10	5	120*10*5
7500A	4000	100	10	5	100*10*5	100	10	5	100*10*5	100	10	6	100*10*5
	5000	100	10	7	100*10*7	100	10	7	100*10*7	120	10	7	120*10*7
	6300	120	10	7	120*10*7	120	10	7	120*10*7	120	10	8	120*10*8
	7500	120	10	9	120*10*9	120	10	9	120*10*9	120	10	10	120*10*10

Notes: a. When the copper busbar selected by the user is not matched with the circuit breaker connection terminal, it needs to design and process the extension busbar for connection. The extension busbar will be designed by the user; its section area cannot be less than the above requirement, and the clearance between extension busbars cannot be less than that between the circuit breaker connection terminals.

b. After installing the above recommended busbar, it shall ensure the electric clearance between adjacent phases of the circuit breakers is not less than 18mm.

c. For electric components using thyristor for three-phase rectification and high-frequency inversion in the load devices, like high-frequency induction heating electric furnace (intermediate frequency furnace steel facility), solid state high frequency welder (such as submerged arc welder), vacuum heating melting facility (like single crystal growing furnace) , upon selecting the circuit breaker, it should take into account not only the impact of ambient temperature and altitude, but also the impact of higher harmonic generated by thyristor on the circuit breaker; in such case, it must be used by derating, and the recommended derating factor is (0.5~0.8).

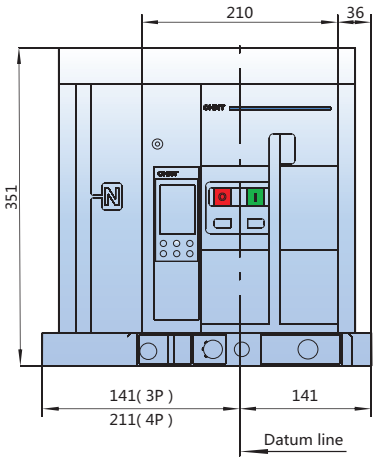
d. After the user installs the busbar, the electric clearance between upper and lower busbar fastening bolts should not be less than 20 mm.

e. After the circuit breaker is installed, the safe spacing between different potential electrified bodies and between the electrified body and ground should be not less than 18mm.

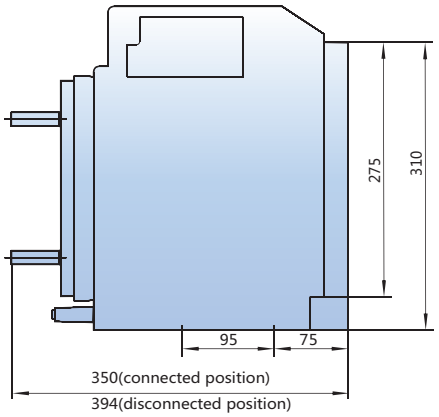
Dimension And Installation

NA8-1600 draw-out type (In preparation...)

Front view

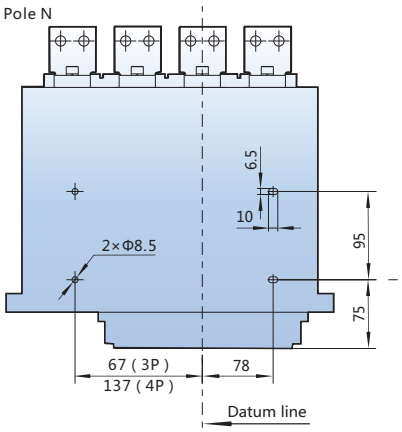


Side view

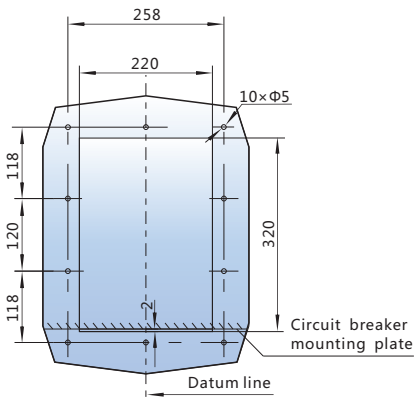


Hole size

Hole size of the base

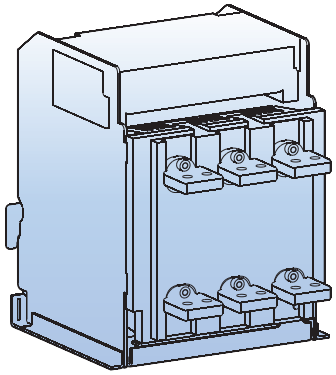


Hole size of the panel



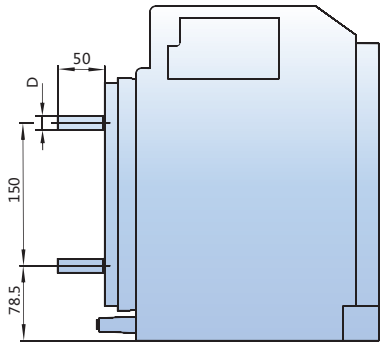
Horizontal connection

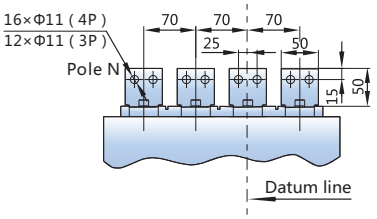
Side view



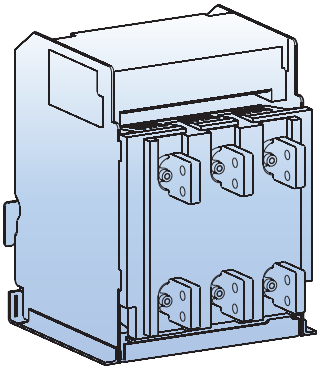
In(A)	D(mm)
200~800	10
1000~1600	16

Busbar mounting dimensions



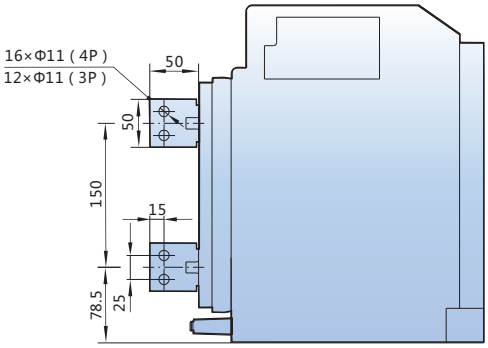


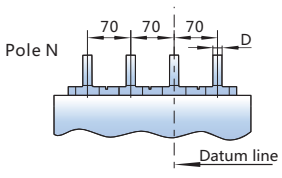
Vertical connection



In(A)	D(mm)
200~800	10
1000~1600	16

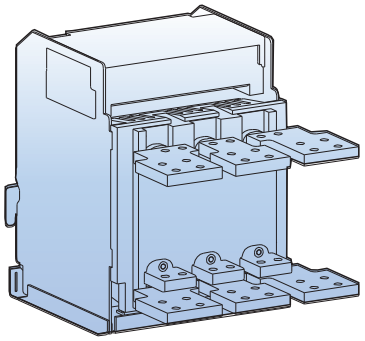
Busbar mounting dimensions



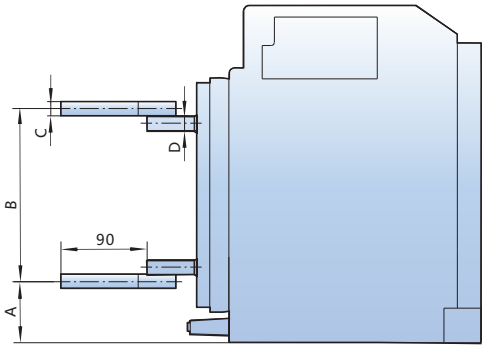


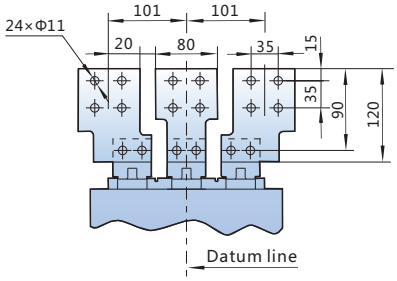
Three-pole product horizontal extension busbar (optional)

Side view



Busbar mounting dimensions





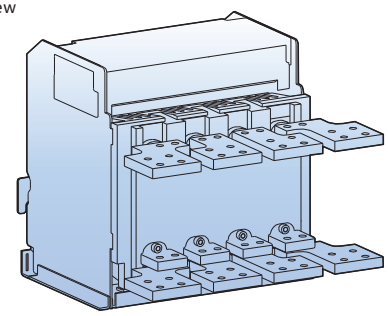
Unit: mm

In(A)	A	B	C	D
200~800	68.5	169	10	10
1000~1600	63	179	15	16

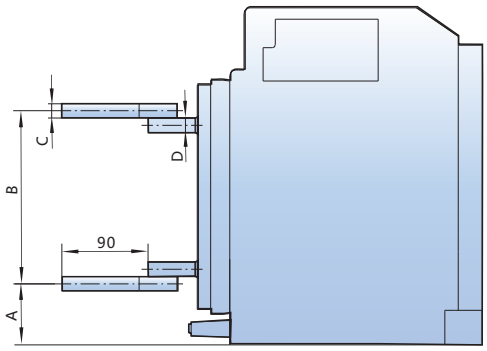
Note: The extension busbar is of optional accessory, requiring additional expense.

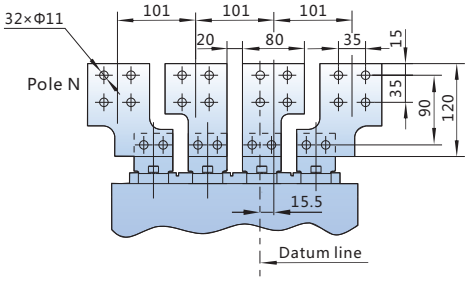
Four-pole product horizontal extension busbar (optional)

Side view



Busbar mounting dimensions





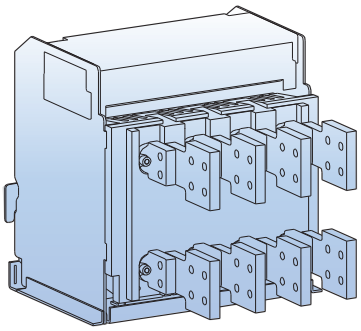
Unit: mm

In(A)	A	B	C	D
200~800	68.5	169	10	10
1000~1600	63	179	15	16

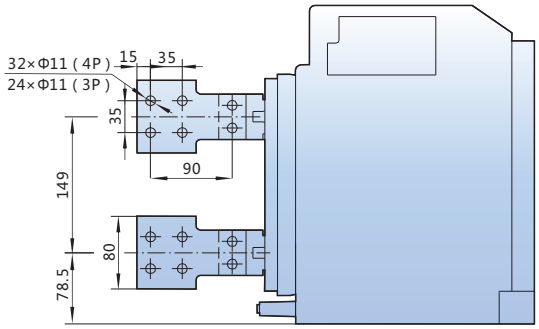
Note: The extension busbar is of optional accessory, requiring additional expense.

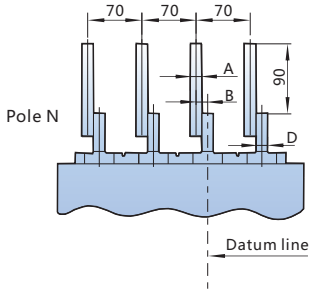
Vertical extension busbar (optional)

Side view



Busbar mounting dimensions





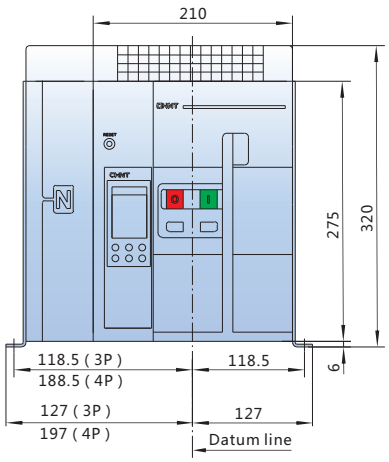
Unit: mm

In(A)	A	B	D
200~800	10	10	10
1000~1600	15	15.5	16

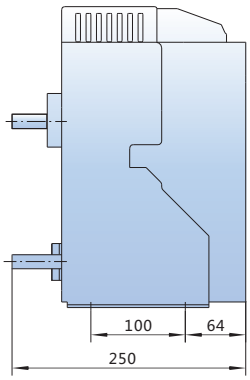
Note: The extension busbar is of optional accessory, requiring additional expense.

NA8-1600 fixed type (In preparation...)

Front view

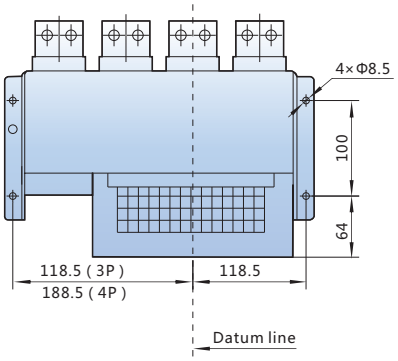


Side view

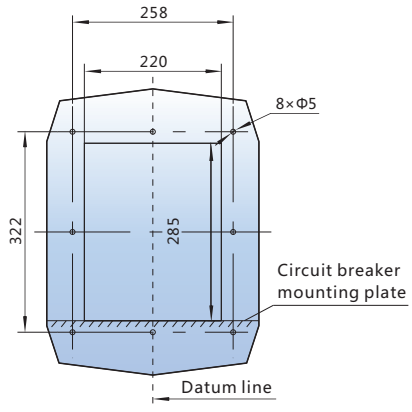


Hole size

Hole size of the base

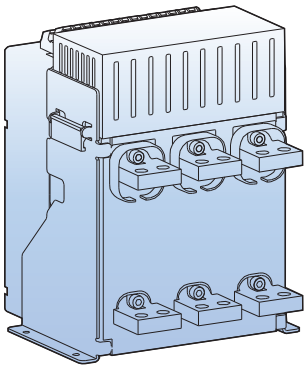


Hole size of the panel

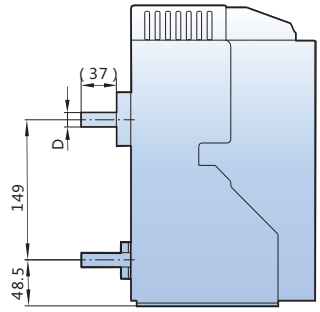


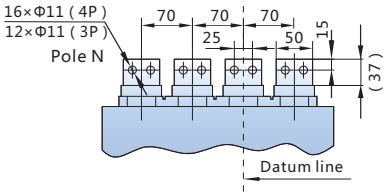
Horizontal connection

Side view



Busbar mounting dimensions



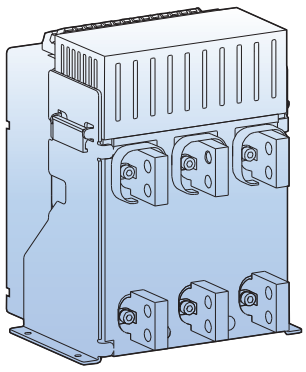


In(A)	D(mm)
200~800	10
1000~1600	16

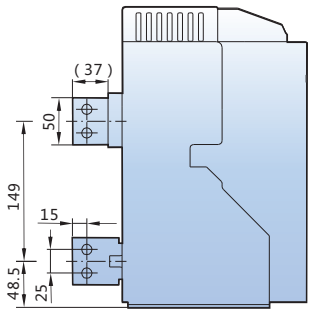
Note: If the user intends to change horizontal connection into vertical connection at site, it only needs to rotate the busbar by 90°.

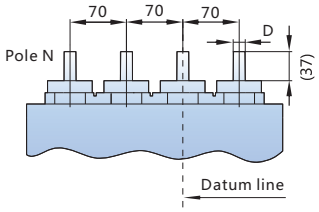
Vertical connection

Side view



Busbar mounting dimensions



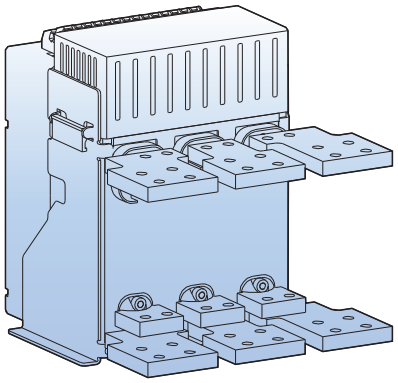


In(A)	D(mm)
200~800	10
1000~1600	16

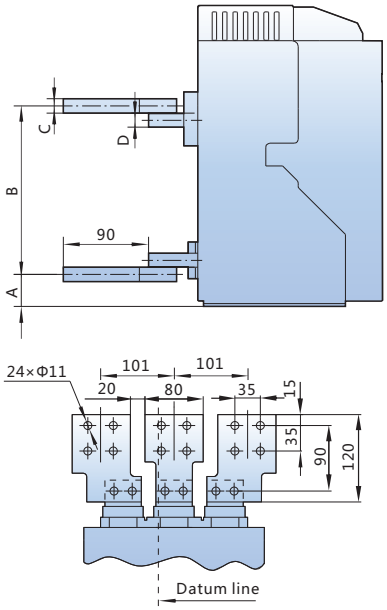
Note: If the user intends to change vertical connection into horizontal connection at site, it only needs to rotate the busbar by 90°.

Three-pole product horizontal extension busbar connection (optional)

Side view



Busbar mounting dimensions



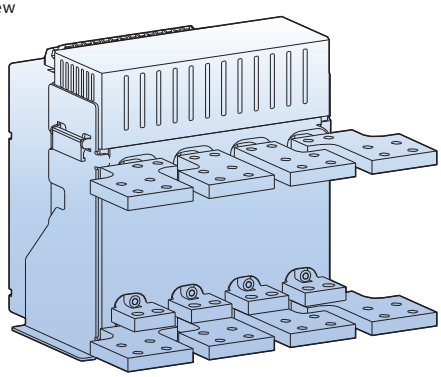
Unit: mm

In(A)	A	B	C	D
200~800	38.5	169	10	10
1000~1600	33	179	15	16

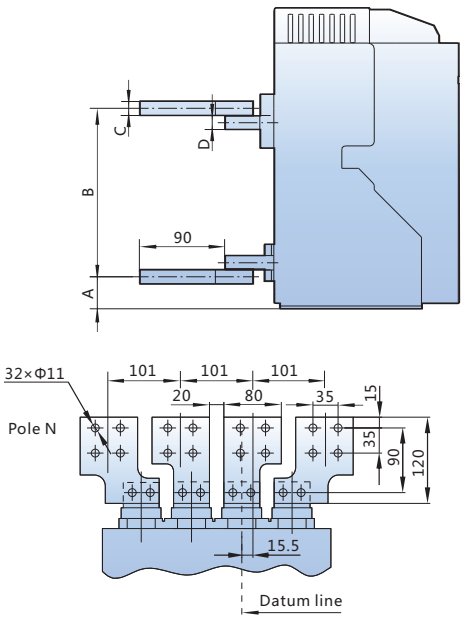
Note: The extension busbar is of optional accessory, requiring additional expense.

Four-pole product horizontal extension busbar connection (optional)

Side view



Busbar mounting dimensions



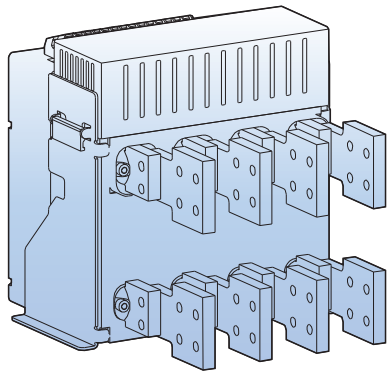
Unit: mm

In(A)	A	B	C	D
200~800	38.5	169	10	10
1000~1600	33	179	15	16

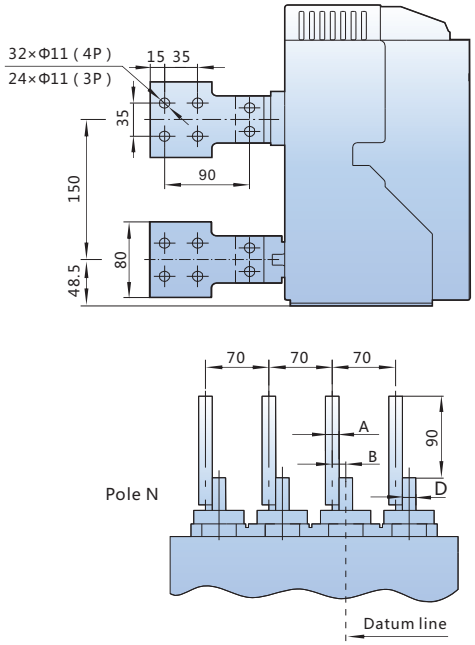
Note: The extension busbar is of optional accessory, requiring additional expense.

Vertical connection of extension busbar (optional)

Side view



Busbar mounting dimensions



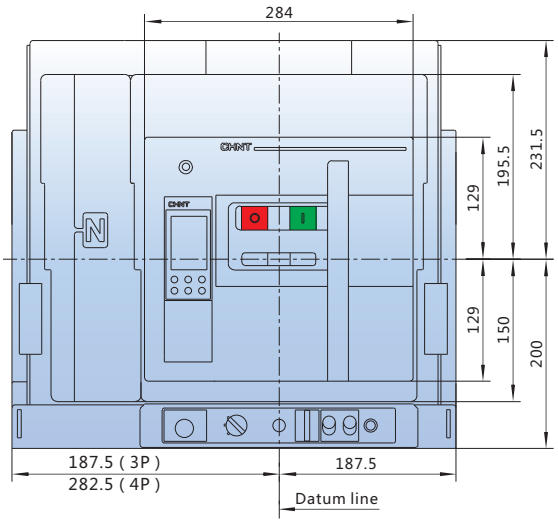
Unit: mm

In(A)	A	B	D
200~800	10	10	10
1000~1600	15	15	16

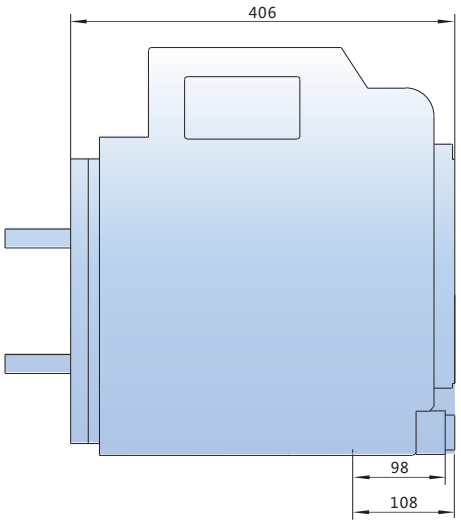
Note: The extension busbar is of optional accessory, requiring additional expense.

NA8-2500 Draw-out type

Front view

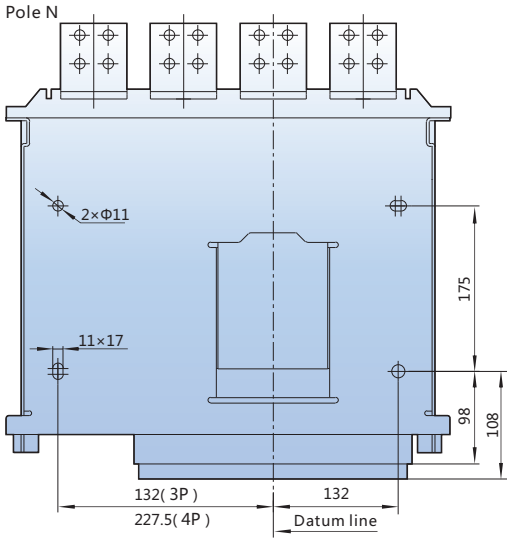


Side view

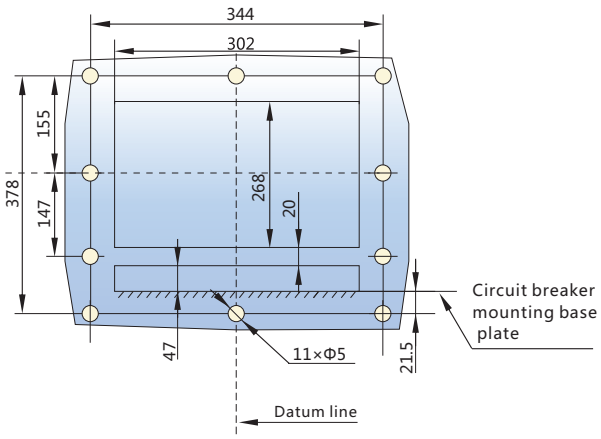


Hole size

Hole size of the base

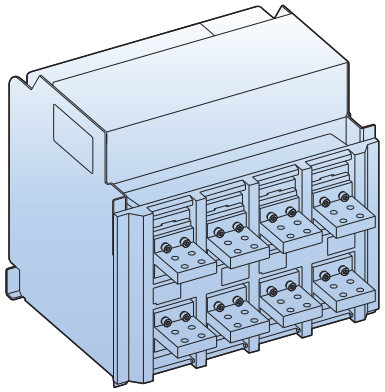


Hole size of the panel

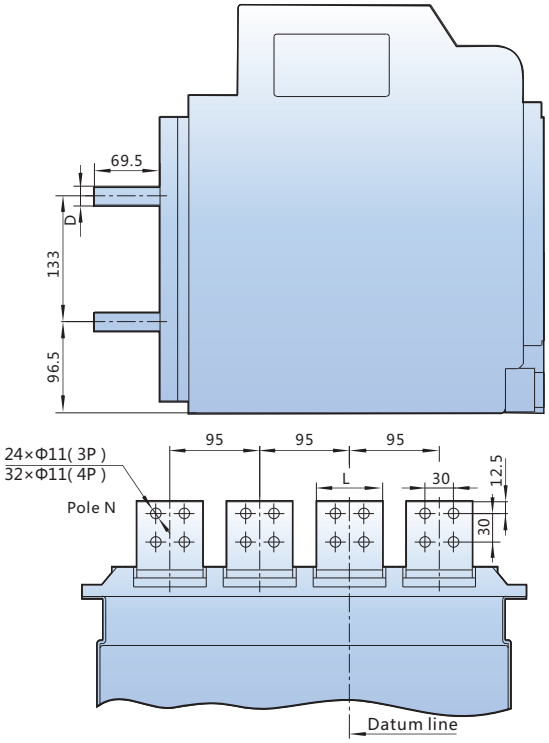


Horizontal connection

Side view



Busbar mounting dimensions



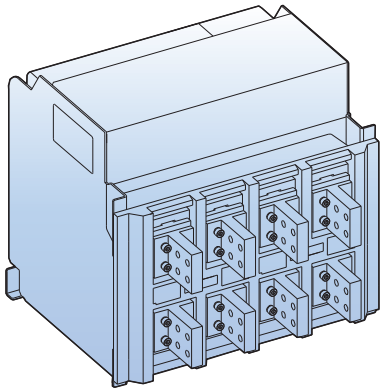
Unit: mm

In (A)	D	L
630～1600	15	60
2000～2500	20	70

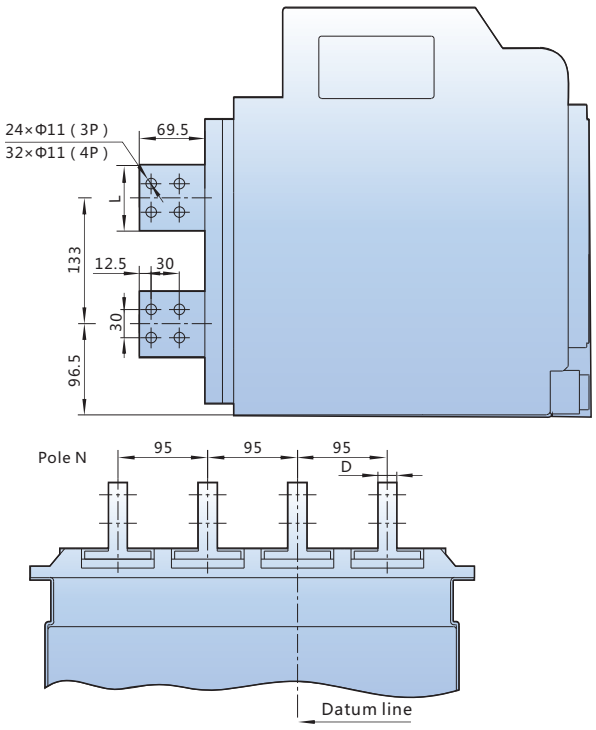
Note: If the user intends to change horizontal connection into vertical connection at site, it only needs to rotate the busbar by 90°.

Vertical connection

Side view



Busbar mounting dimensions



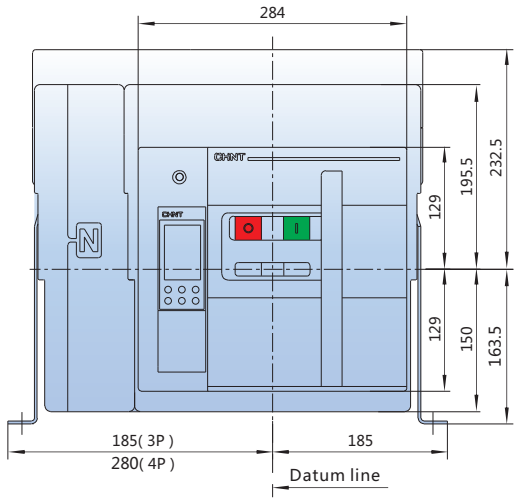
Unit: mm

In (A)	D	L
630～1600	15	60
2000～2500	20	70

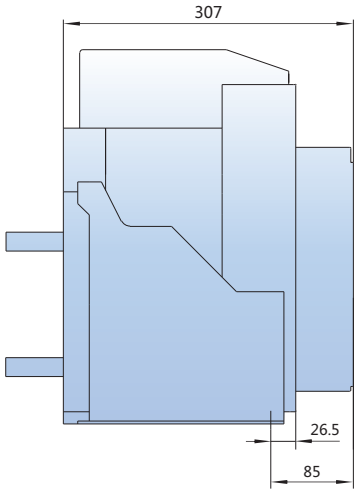
Note: If the user intends to change vertical connection into horizontal connection at site, it only needs to rotate the busbar by 90°.

NA8-2500 fixed type

Front view

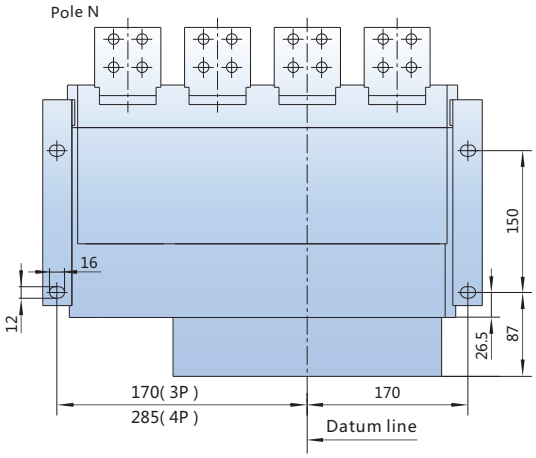


Side view

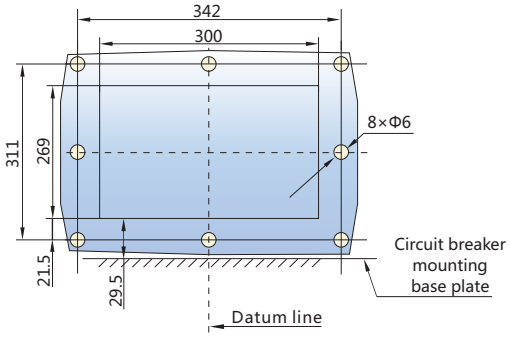


Hole size

Hole size of the base

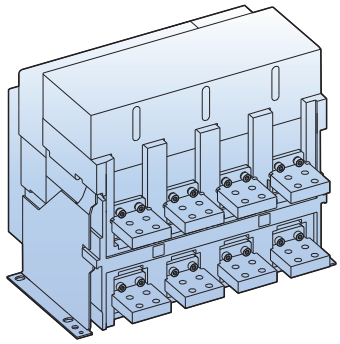


Hole size of the panel

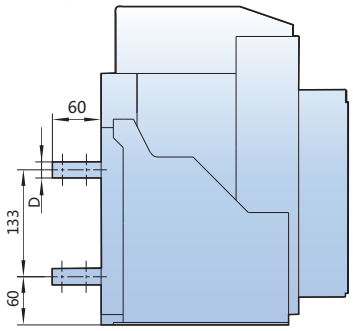


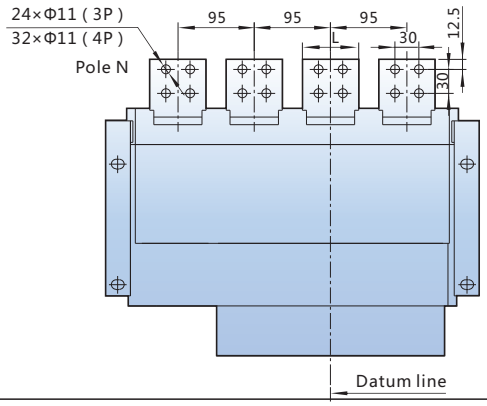
Horizontal connection

Side view



Busbar mounting dimensions





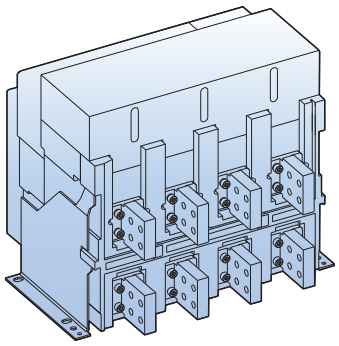
Unit: mm

In (A)	D	L
630～1600	15	60
2000～2500	20	70

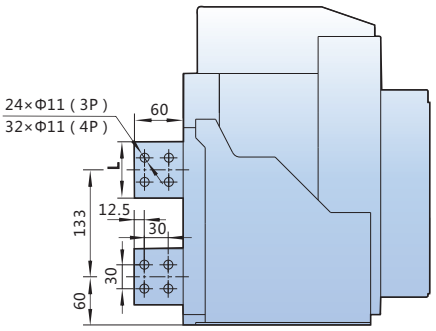
Note: If the user intends to change horizontal connection into vertical connection at site, it only needs to rotate the busbar by 90°.

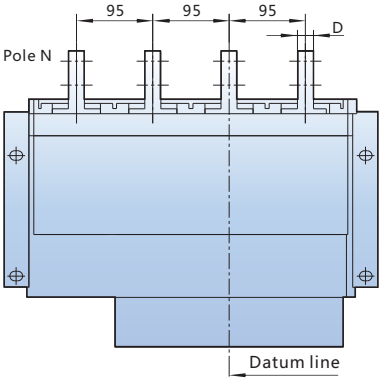
Vertical connection

Side view



Busbar mounting dimensions





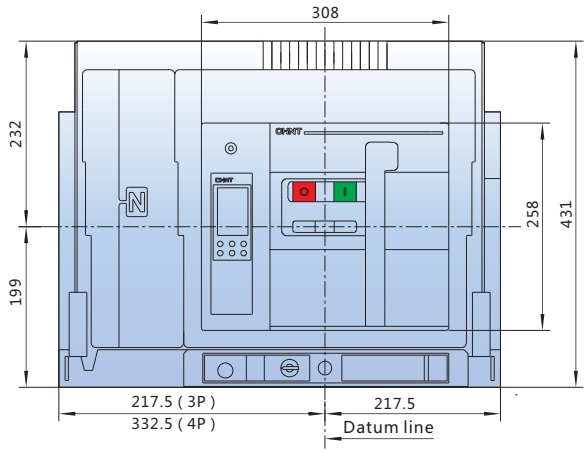
Unit: mm

In (A)	D	L
630～1600	15	60
2000～2500	20	70

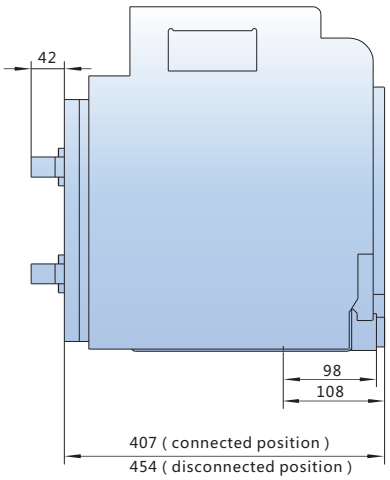
Note: If the user intends to change vertical connection into horizontal connection at site, it only needs to rotate the busbar by 90°.

NA8-4000 draw-out type

Front view

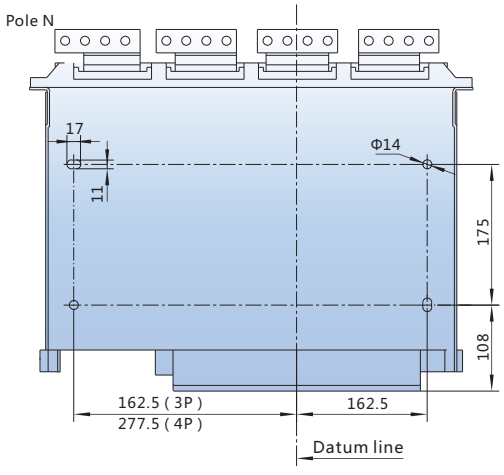


Side view

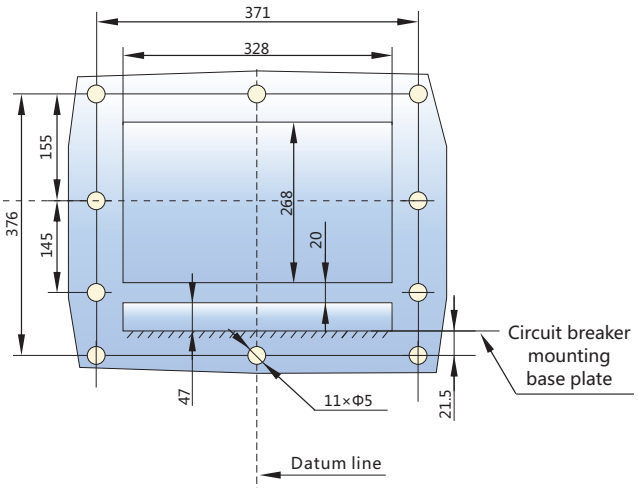


Hole size

Hole size of the base

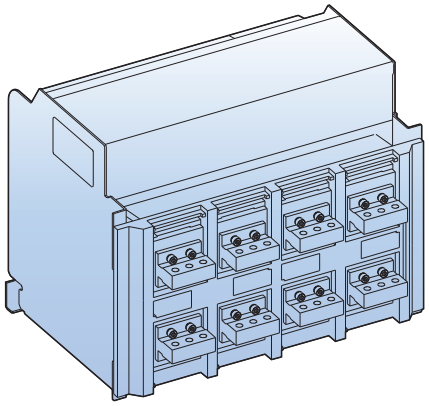


Hole size of the panel

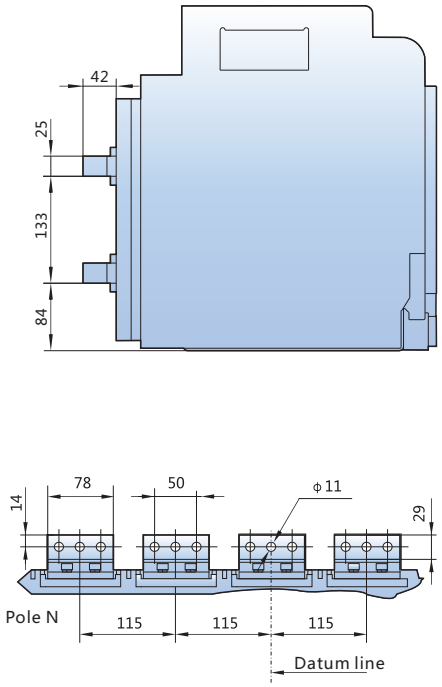


Horizontal connection (In=1600A~2500A)

Side view



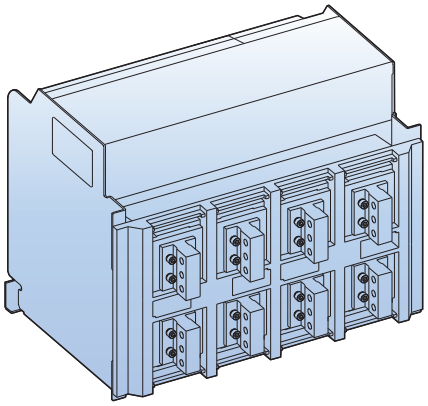
Busbar mounting dimensions



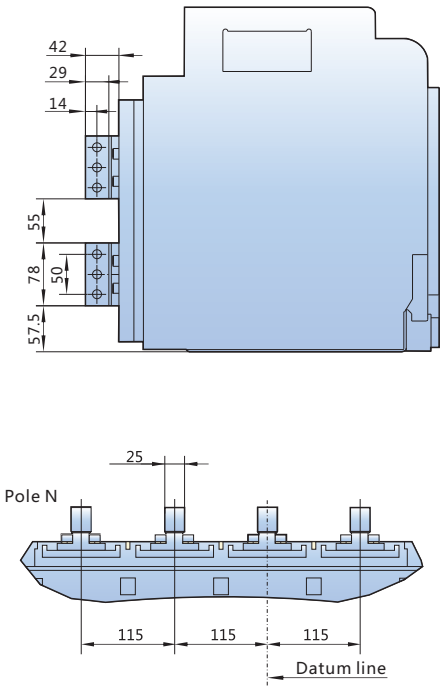
Note: If the user intends to change horizontal connection into vertical connection at site, it only needs to rotate the busbar by 90°.

Vertical connection (In=1600A~2500A)

Side view



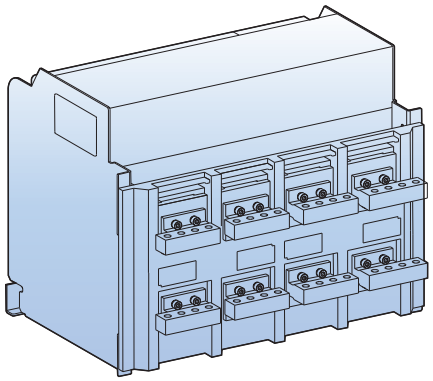
Busbar mounting dimensions



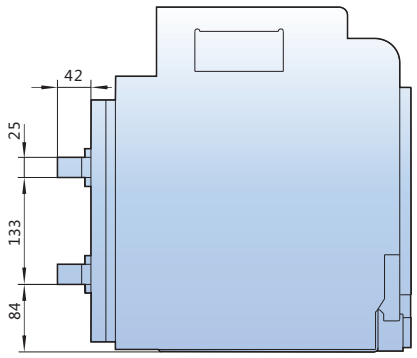
Note: If the user intends to change vertical connection into horizontal connection at site, it only needs to rotate the busbar by 90°.

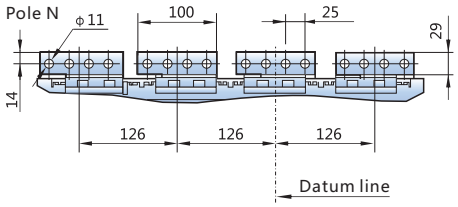
Horizontal connection (In=3200A~4000A)

Side view



Busbar mounting dimensions

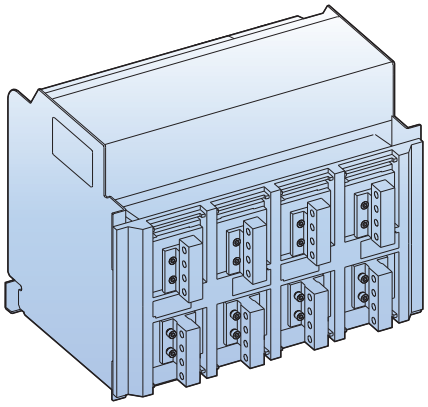




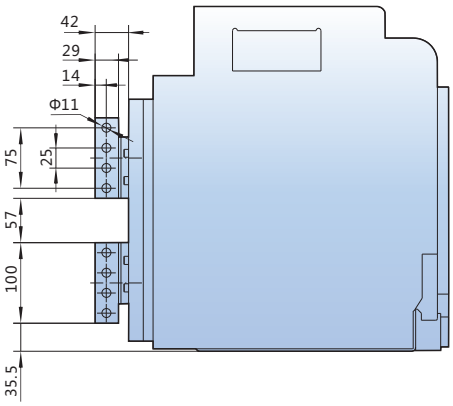
Note: If the user intends to change horizontal connection into vertical connection at site, it needs to change the upper and lower busbars of phases N and B into the same busbars of phases A and C.

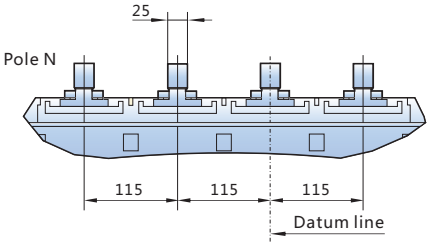
Vertical connection (In=3200A~ 4000A)

Side view



Busbar mounting dimensions

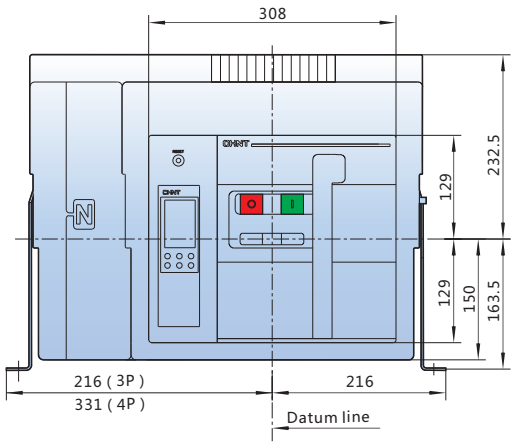




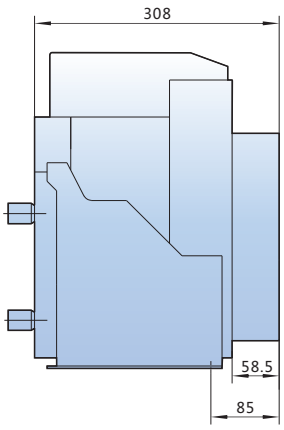
Note: If the user intends to change vertical connection into horizontal connection at site, it needs to change the upper and lower busbars of phases N and B into the same busbars of phases A and C.

NA8-4000 fixed type

Front view

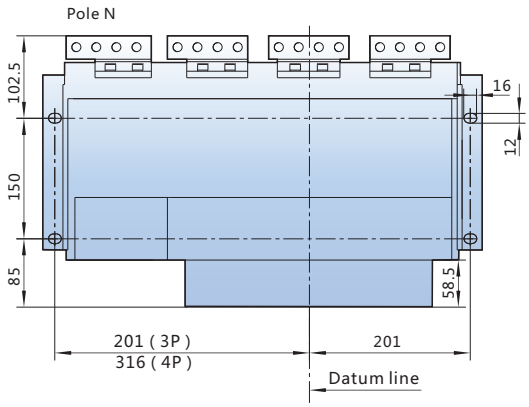


Side view

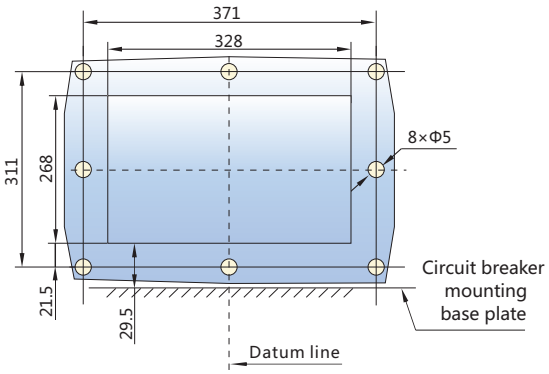


Hole size

Hole size of the base

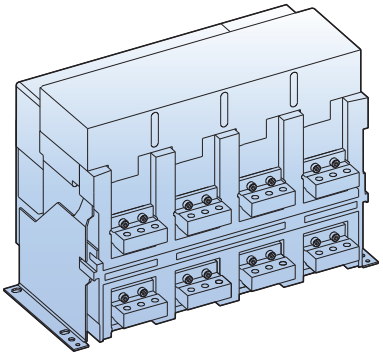


Hole size of the panel

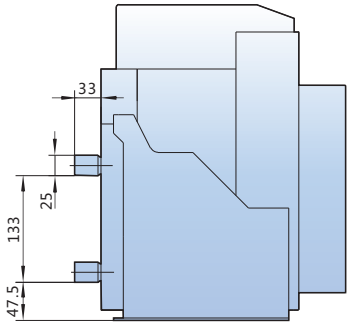


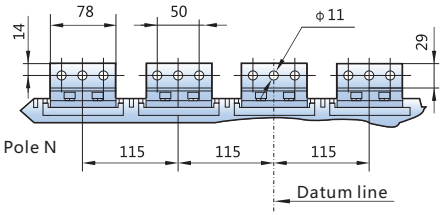
Horizontal connection (In=1600A~2500A)

Side view



Busbar mounting dimensions

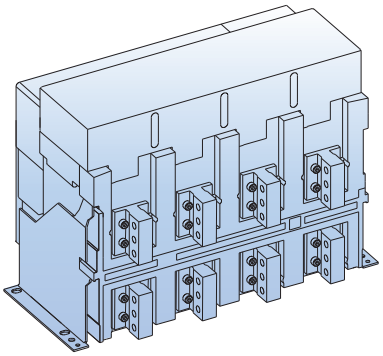




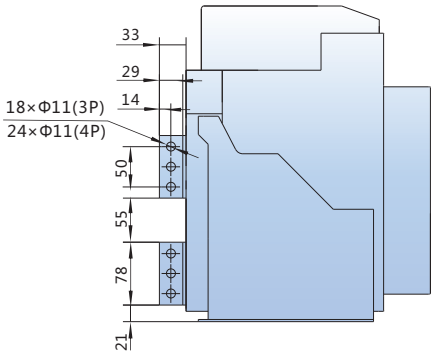
Note: If the user intends to change horizontal connection into vertical connection at site, it only needs to rotate the busbar by 90°.

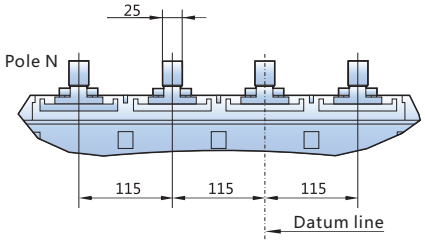
Vertical connection (In=1600A~2500A)

Side view



Busbar mounting dimensions

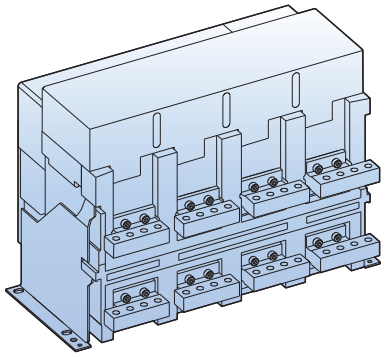




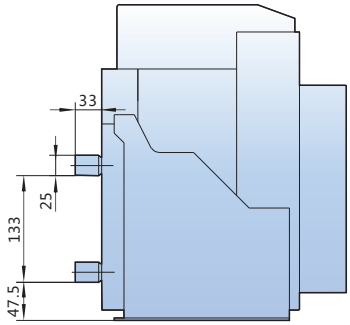
Note: If the user intends to change vertical connection into horizontal connection at site, it only needs to rotate the busbar by 90°.

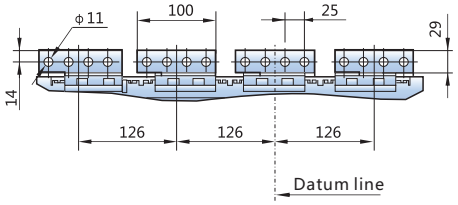
Horizontal connection (In=3200A~ 4000A)

Side view



Busbar mounting dimensions

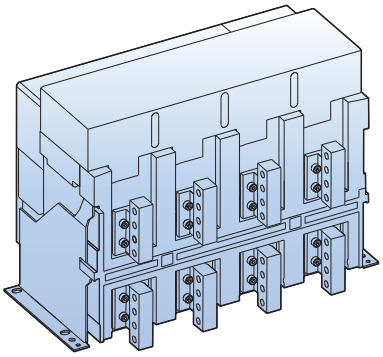




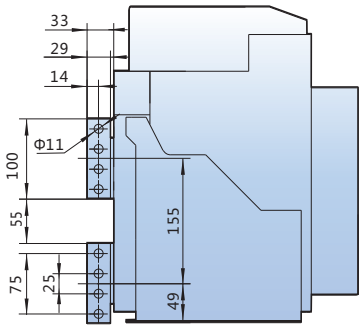
Note: If the user intends to change horizontal connection into vertical connection at site, it needs to change the upper and lower busbars of phases N and B into the same busbars of phases A and C.

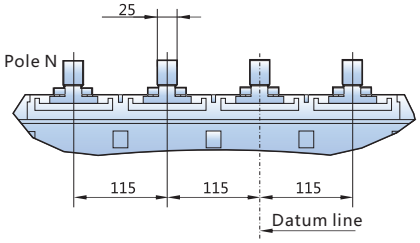
Vertical connection (In=3200A~ 4000A)

Side view



Busbar mounting dimensions

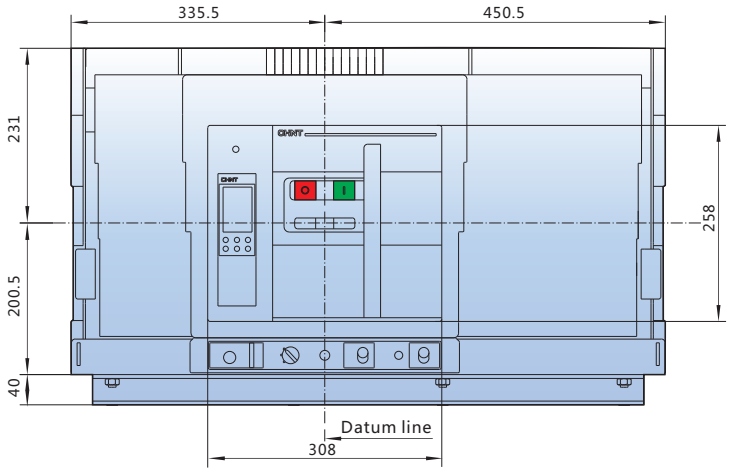




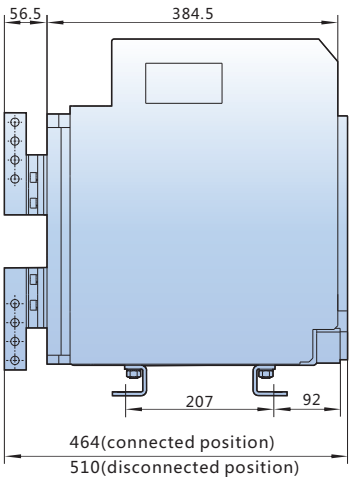
Note: If the user intends to change vertical connection into horizontal connection at site, it needs to change the upper and lower busbars of phases N and B into the same busbars of phases A and C.

NA8-7500 (In=4000A~ 6300A) three-pole draw-out type

Front view

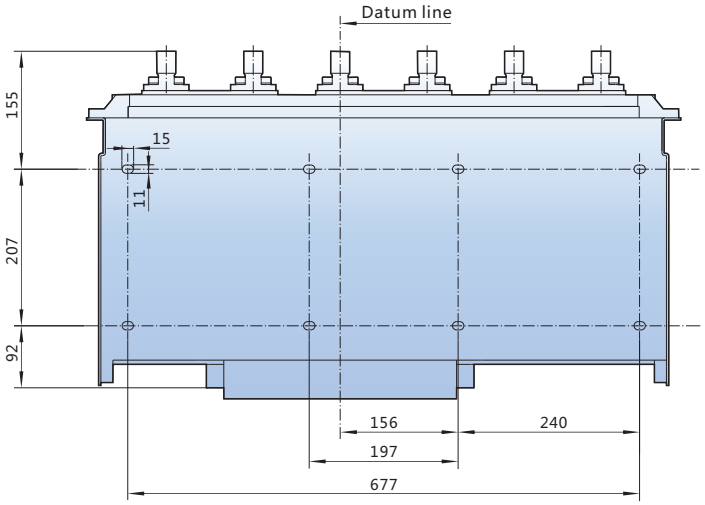


Side view

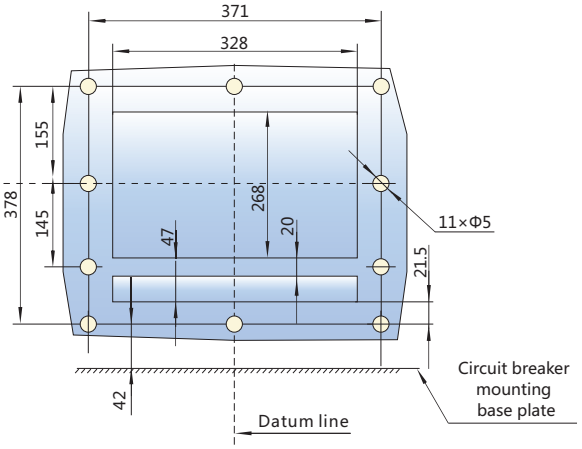


Hole size

Hole size of the base

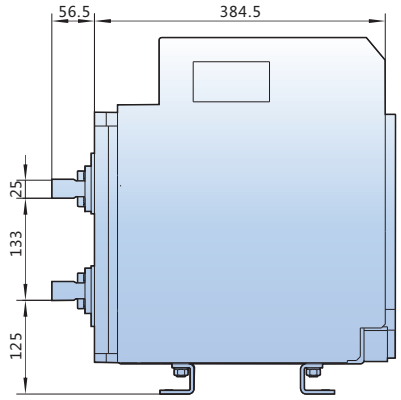


Hole size of the panel

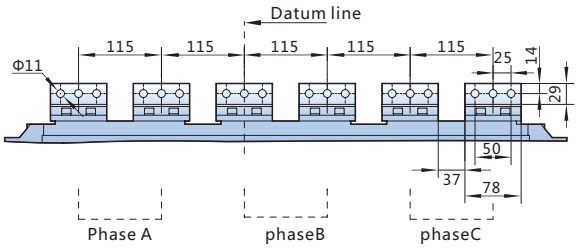


Horizontal connection (In=4000A~ 5000A/ three poles)

Side view



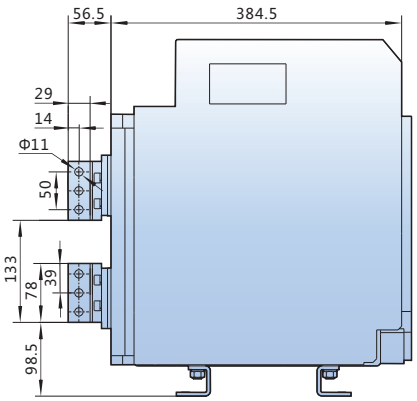
Busbar mounting dimensions



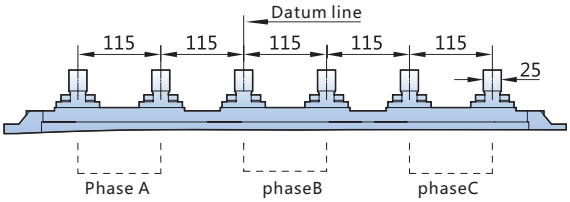
Note: If the user intends to change horizontal connection into vertical connection at site, it only needs to rotate the busbar by 90°.

Vertical connection (In=4000A~ 5000A/ three poles)

Side view



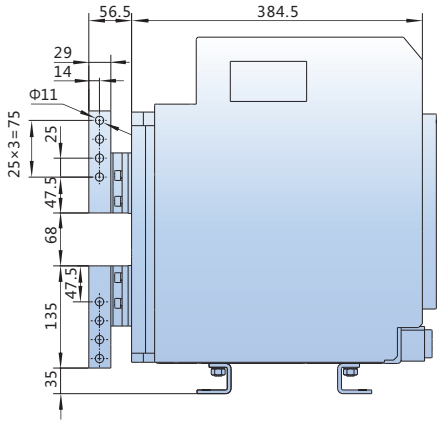
Busbar mounting dimensions



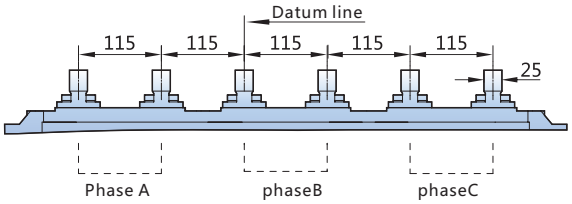
Note: If the user intends to change vertical connection into horizontal connection at site, it only needs to rotate the busbar by 90°.

Vertical connection (In=6300A/ three poles)

Side view



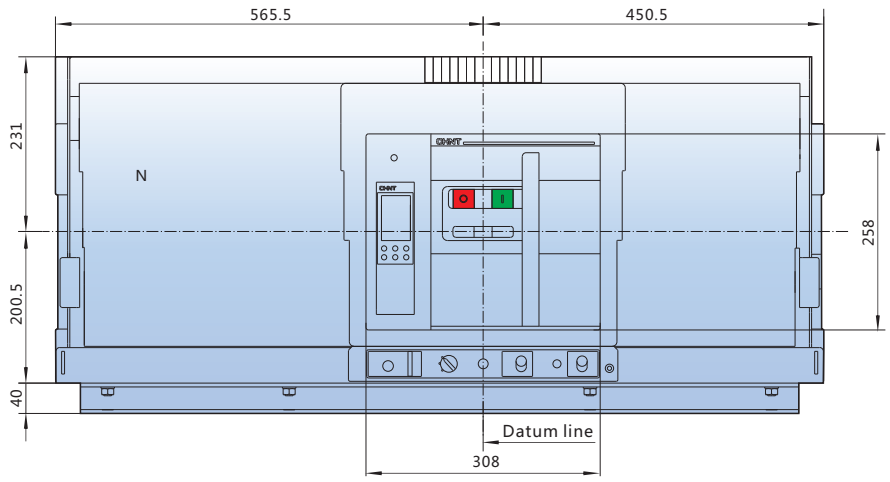
Busbar mounting dimensions



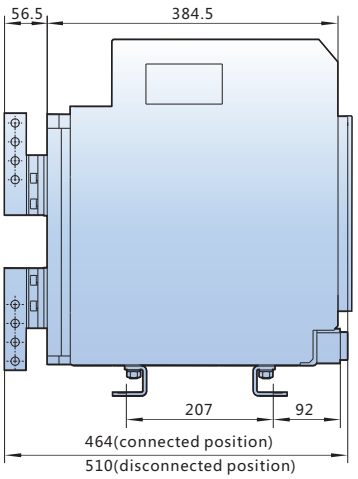
Note: In=6300A only has vertical connection and has no horizontal connection.

NA8-7500 draw-out type (In=4000A~ 6300A) four poles/ (In=7500A) three & four poles

Front view

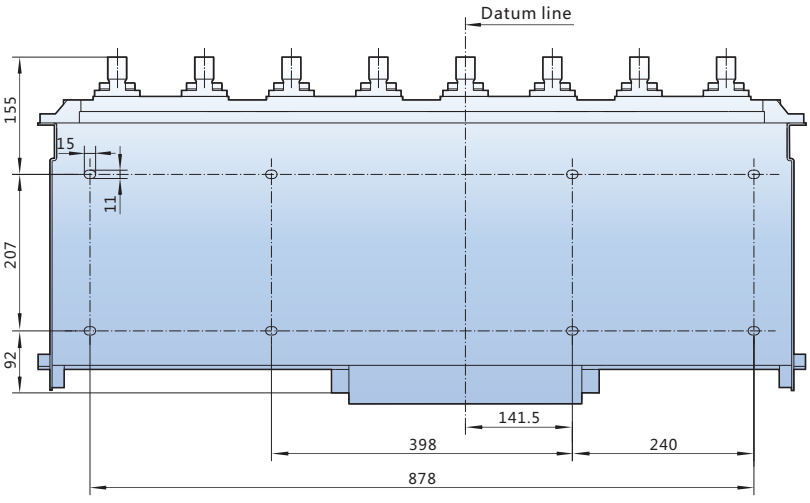


Side view

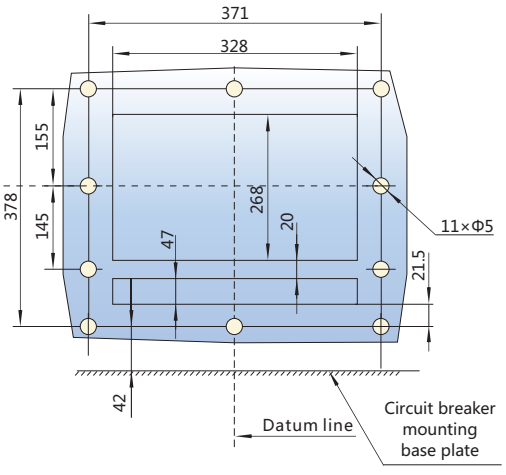


Hole size

Hole size of the base

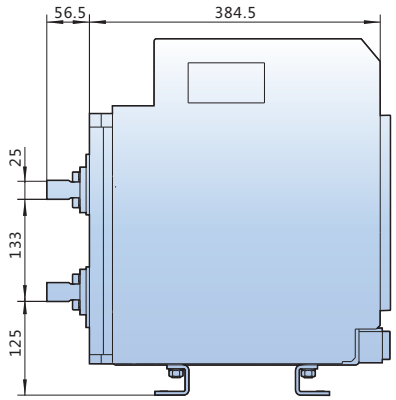


Hole size of the panel

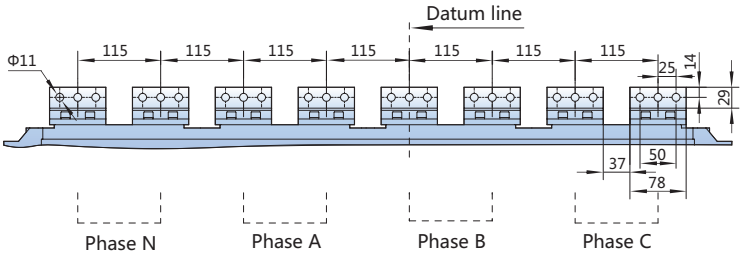


Horizontal connection (In=4000A ~ 5000A/ four poles)

Side view



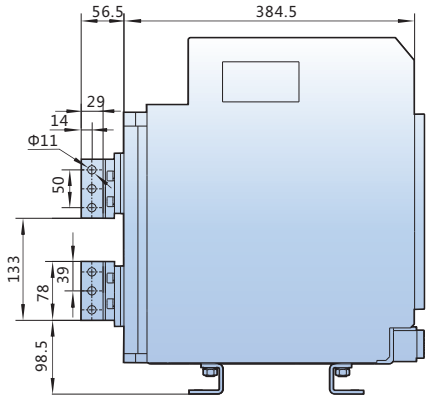
Busbar mounting dimensions



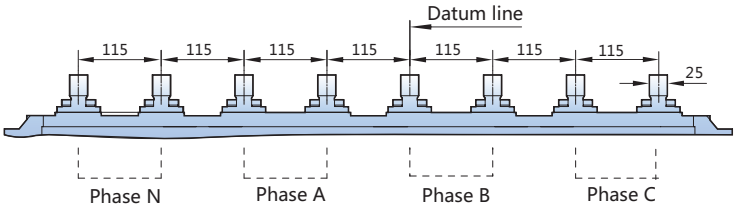
Note: If the user intends to change horizontal connection into vertical connection at site, it only needs to rotate the busbar by 90°.

Vertical connection (In=4000A~ 5000A/ four poles)

Side view



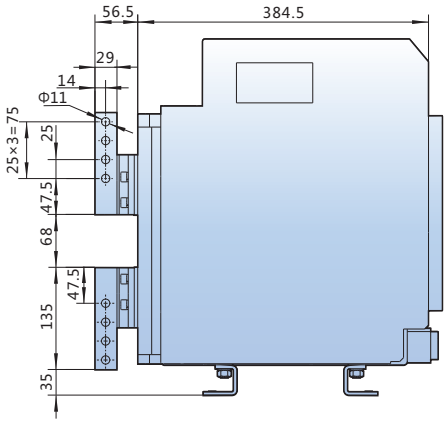
Busbar mounting dimensions



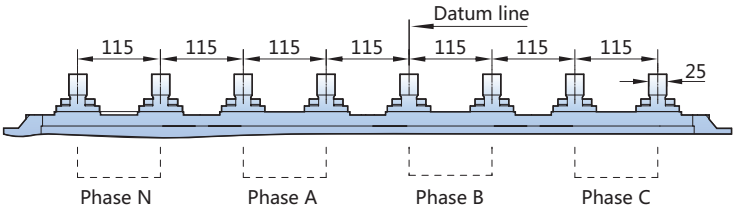
Note: If the user intends to change vertical connection into horizontal connection at site, it only needs to rotate the busbar by 90°.

Vertical connection (In=6300A/ four poles)

Side view



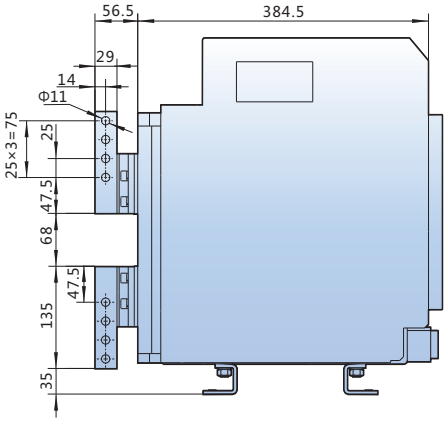
Busbar mounting dimensions



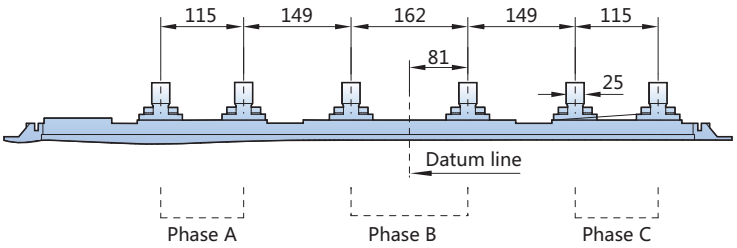
Note: In=6300A only has vertical connection and has no horizontal connection.

Vertical connection (In=7500A/ three poles)

Side view



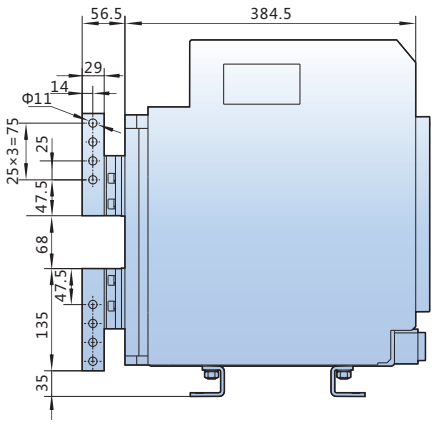
Busbar mounting dimensions



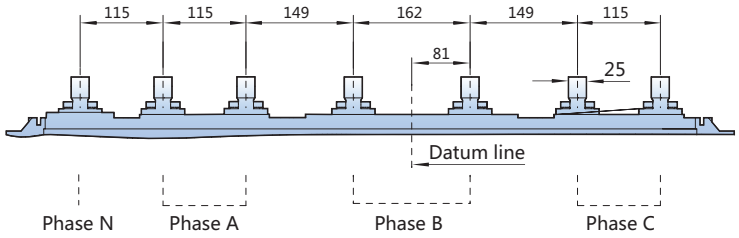
Note: In=7500A only has vertical connection and has no horizontal connection.

Vertical connection (In=7500A/ four poles)

Side view

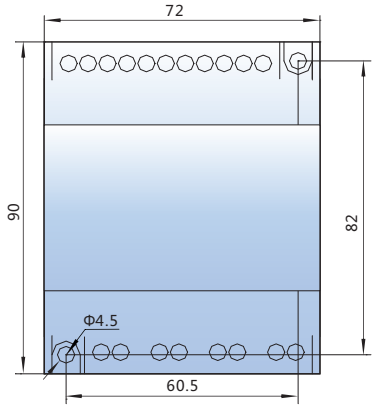


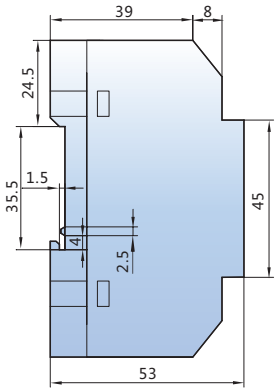
Busbar mounting dimensions



Note: In=7500A only has vertical connection and has no horizontal connection.

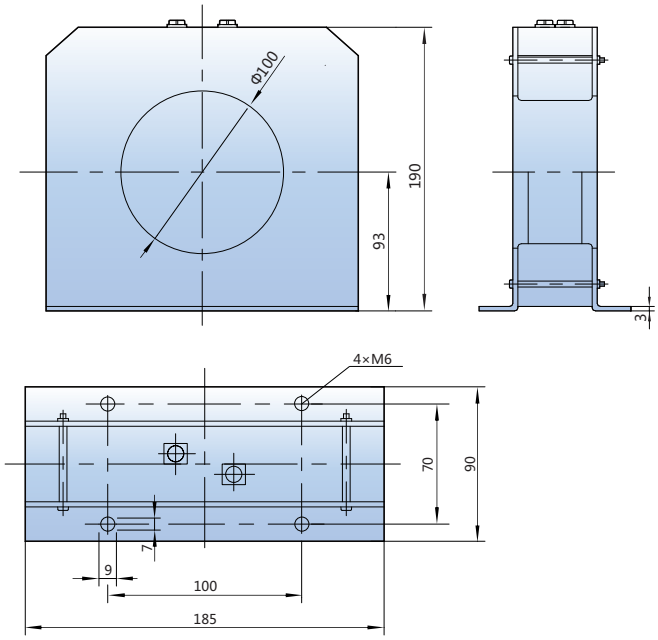
Dimensions of undervoltage time delay control module, power module, RU-1 relay signal module



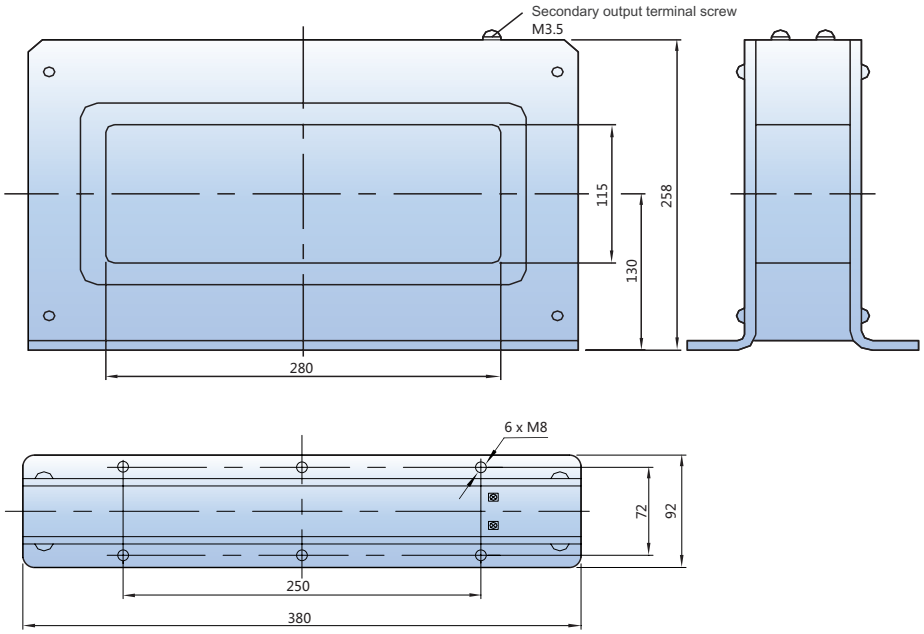


Note: Undervoltage time delay control module, power module, RU-1 relay signal module have consistent overall dimensions, and can be installed using the 35mm standard DIN rail mounting.

Dimensions of ground current transformer

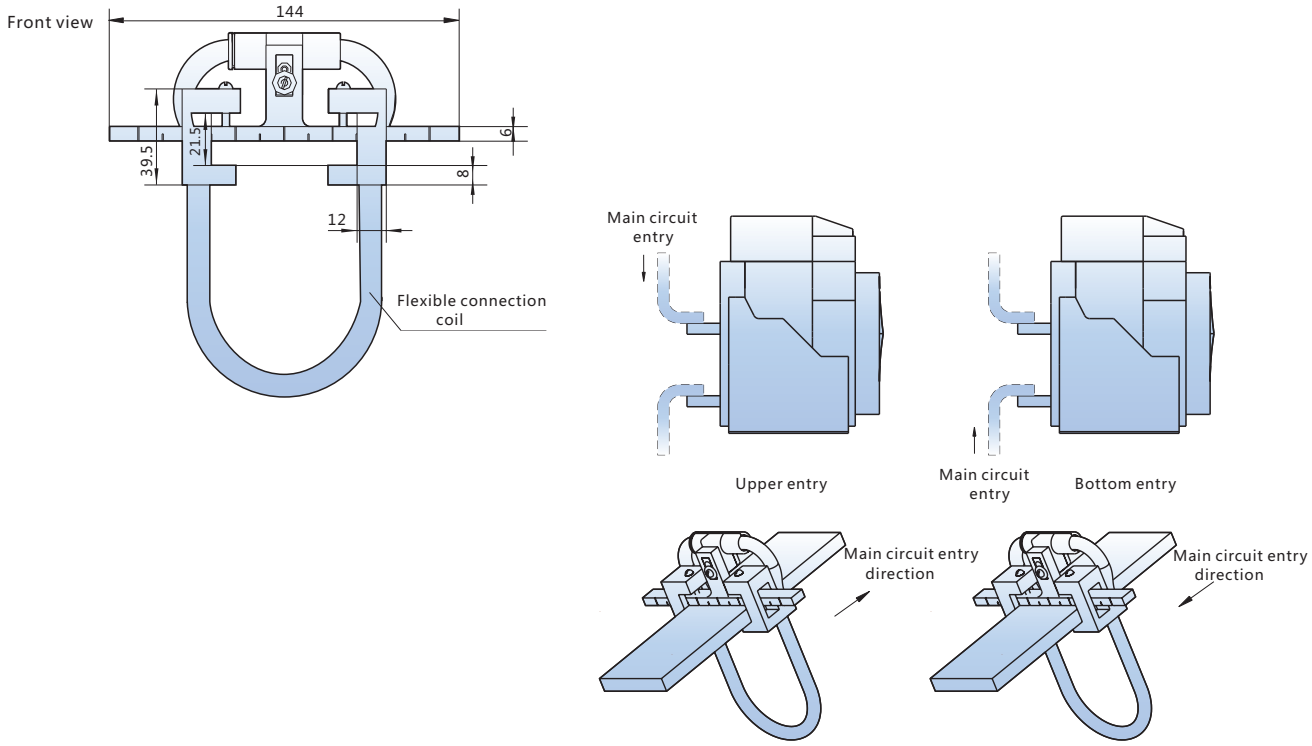


Dimensions of leakage protection transformer



Note: The circuit breaker selected with the leakage transformer should use the vertical busbar connection mode.

Dimensions of neutral pole current transformer

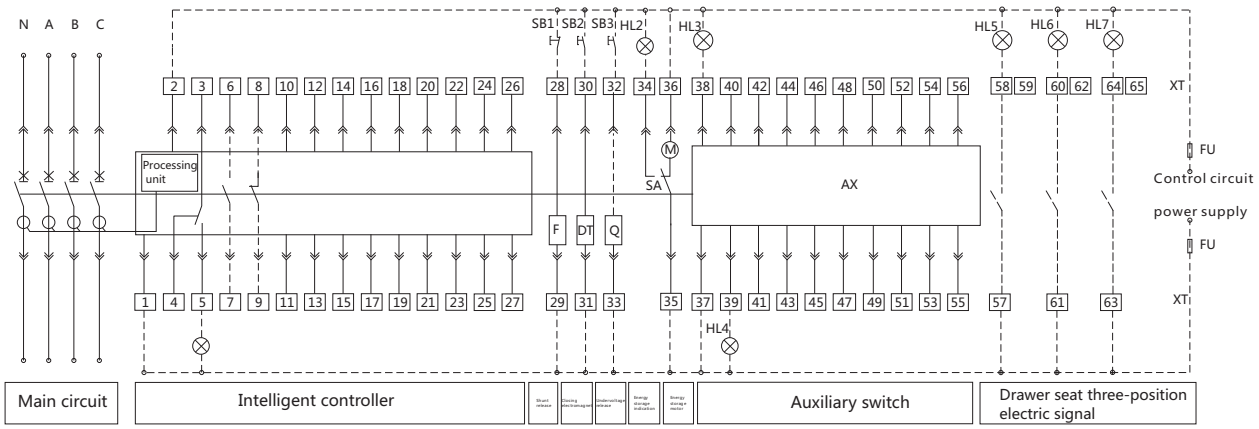


Note: 1. Upon fixing the neutral transformer, it needs to install it at the entry end of circuit breaker, and one side of its flexible cable should face the entry direction of main circuit.
2.When the rated current is 200A-630A, the transformer needs to be wrapped around the busbar twice to be used normally.

Secondary Circuit Wiring

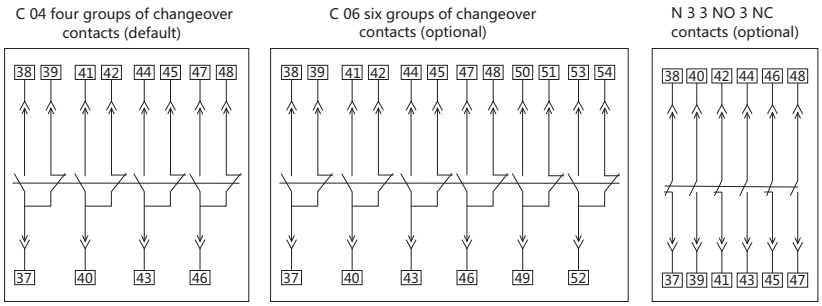
NA8-1600 (In preparation...)

M Type controller



Type of AX auxiliary contact

Used by the user



F—Shunt release DT—Closing electromagnet

Q—Undervoltage release

M—Motor-driven mechanism

SA—Travel switch XT—Connection terminal

AX—Auxiliary contact SB1—Breaking button

SB2—Making button SB3—Emergency stop button

HL1—Fault indicator light HL2—Energy storage indicator light

HL3—Breaking indicator light

HL4—Making indicator light

HL5 ~7 —Position indicator light

FU—Fuse (6A)

1#, 2#: Intelligent controller power supply: voltage AC220/380V can be directly connected to 1#, 2#; If voltage is DC220/110V, it needs to through the power module,and the power module outputs 24V which can be connected to 1#, 2#.

3#~5#: Tripping alarm contact (3 is the common point.)

6#~ 9#: Auxiliary contact (1 NO and 1 NC), optional.

10#, 11#: Empty

12#~ 19#: Empty

20#: Empty

21#~24#: Empty

24#, 25#: The contacts for external phase N transformer input signal; for conventional product, they are empty, and should be ordered by the user specifically. Where external transformer is required, they are the external transformer signal input contacts.

27# : Protective grounding, is connected to the outer board of the circuit breaker;

28#, 29#: Shunt release;

30#, 31#: Closing electromagnet;

32#, 33#: Undervoltage release.

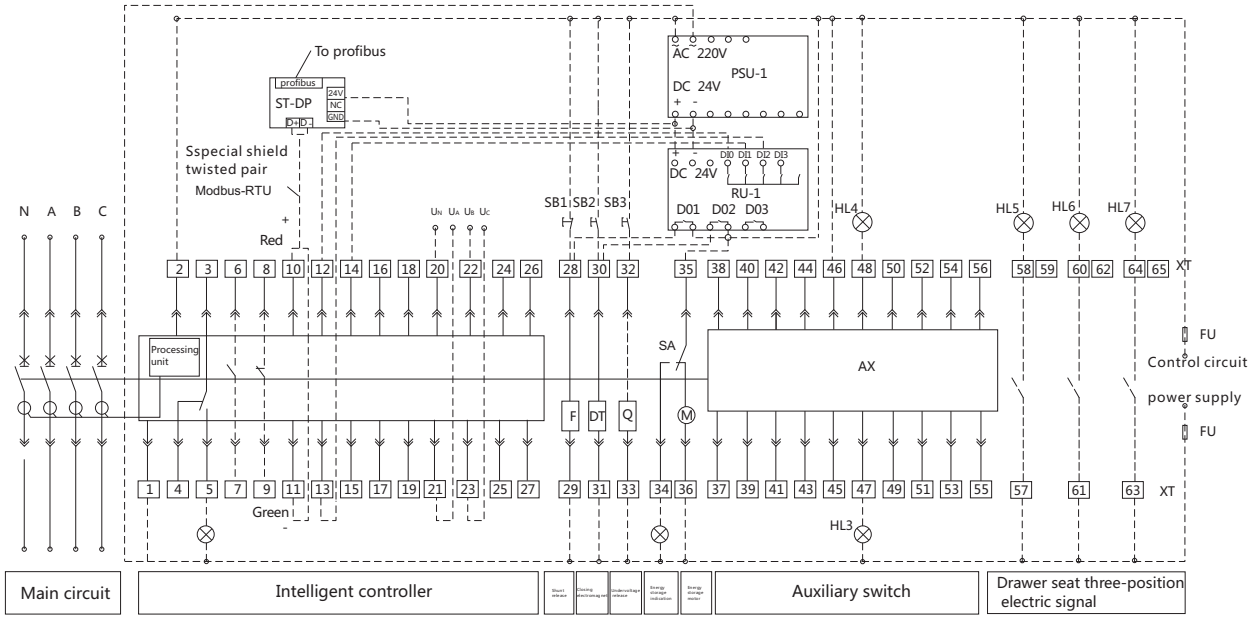
34#~36#: Motor-driven mechanism.

37#~56#: Auxiliary contact.The conventional product has 4 groups of changeover auxiliary contacts; in case of special order from the user, 6 groups of changeover contacts can be provided, 3 NO 3C contacts. 6 groups of changeover contacts are used for AC only.

57#~65#: Draw-out type circuit breaker three-position signal indication; the conventional supply has not wire connection, is only for the draw-out type circuit breaker with the secondary functions selected.

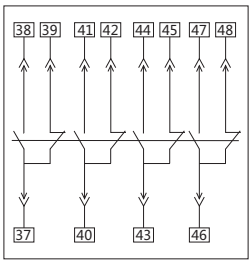
Note: The part in solid line has been connected by the factory, and the part in dashed line shall be connected by the customer.

NA8-1600（In preparation...）　　H Type controller

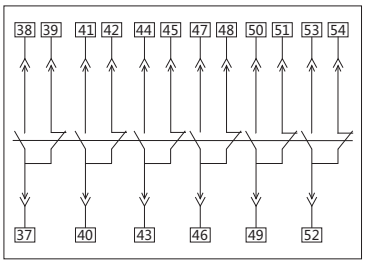


Type of AX auxiliary contact | Used by the user

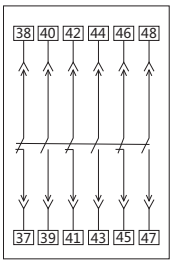
C04 four groups of changeover contacts (default)



C06 six groups of changeover contacts (optional)



N3 3 NO 3 NC contacts (optional)



F —Shunt release DT —Closing electromagnet

Q —Undervoltage release

M —Motor-driven mechanism

SA —Travel switch XT —Connection terminal

AX —Auxiliary contact SB1 —Breaking button

SB2 —Making button SB3 —Emergency stop button

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HL2 —Energy storage indicator light

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HL4 —Making indicator light

HL5 ~ 7 —Position indicator light

FU —Fuse (6A)

1#, 2#: Intelligent controller power supply: voltage AC220/380V can be directly connected to 1#, 2#; If voltage is DC220/110V, it needs to through the power module,and the power module outputs 24V which can be connected to 1#, 2#.

3#~5#: Tripping alarm contact (3 is the common point)

6#~9#: Auxiliary contact (1 NO and 1 NC), optional.

10#, 11#: Type H intelligent controller default communication output contact.

12#~15#: 3 groups of programmable output signal, which must be connected with external RU-1 relay module. When type H intelligent controller has programmable output signal, default output: 12 #, 13#: Closing signal output, 12#,14 #: Opening signal output,12 #, 15 #: Fault tripping. The conventional product has no such connection.

19# : H type intelligent controller communication shielding ground wire

20#~23#: Voltage display input signal contact,20#: Phase N voltage signal,21#: Phase A voltage signal, 22#: Phase B voltage signal,23# : Phase C voltage signal. The conventional product has no such connection.

24#, 25#: External Phase N transformer or external earth current transformer input signal contact; for conventional product, they are empty, and should be ordered by the user specifically. Where external transformer is required, they are the external transformer signal input contacts.

27# : Protective grounding, is connected to the outer board of the circuit breake;

28#, 29#: Shunt release;

30#, 31#: Closing electromagnet;

32#, 33#: Undervoltage release.

34 #~ 36 #: Motor-driven mechanism.

37 #~ 56 #: Auxiliary contact. 6 groups of changeover contacts are used for AC only.The conventional product has 4 groups of changeover auxiliary contacts; in case of special order from the user, 6 groups of changeover contacts, 3 NO 3C contacts can be provided.

57#~ 65#: Draw-out type circuit breaker three-position signal indication; the conventional supply has not wire connection, is only for the draw-out type circuit breaker with the secondary functions selected.

ST-DP: DP protocol module; when the upper computer communication protocol is Modbus-RTU, ST-DP protocol module is not required; when the upper computer communication protocol is Profibus-DP, ST-DP protocol module is required to change the Modbus-RTU protocol into Profibus-DP protocol with the cost separately charged.

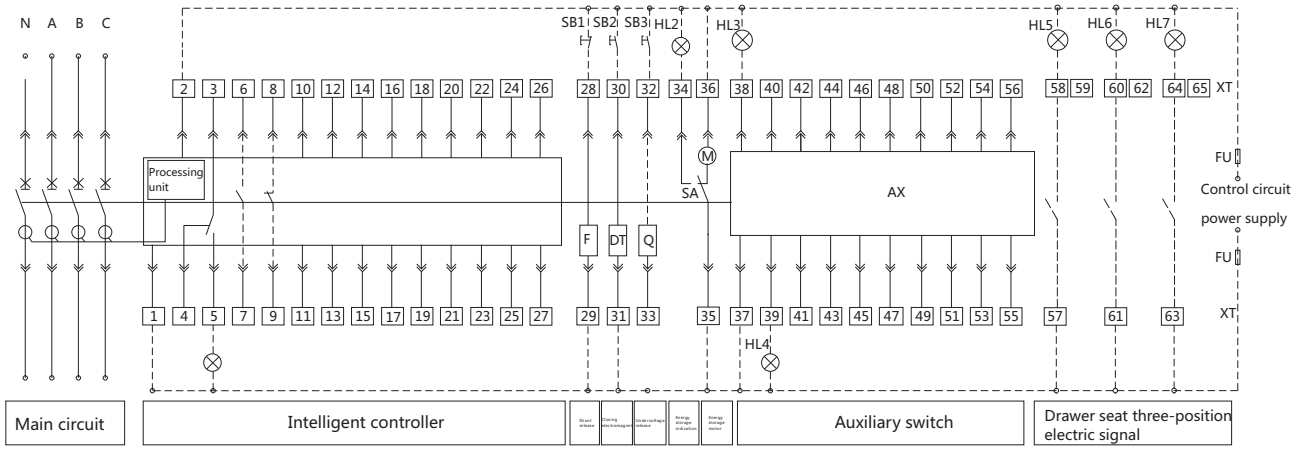
RU-1:Relay module.The upper computer remotely controls it to open or close the circuit breaker, and it is used for amplifying the opening and closing signal energy with the cost separately charged.

Note: The part in solid line has been connected by the factory, and the part in dashed line shall be connected by the customer.

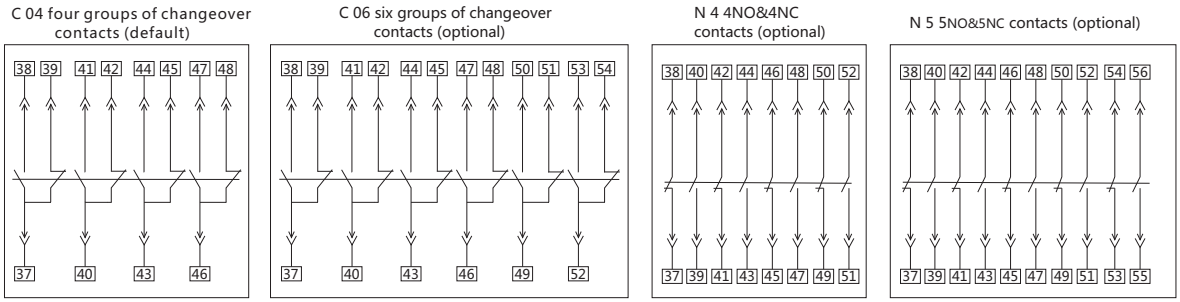
Secondary Circuit Wiring

NA8-2500/4000/7500

M Type controller



Type of AX auxiliary contact | Used by the user



F—Shunt release DT —Closing electromagnet

Q —Undervoltage release

M—Motor-driven mechanism

SA—Travel switch XT—Connection terminal

AX—Auxiliary contact SB1—Breaking button

SB2—Making button SB3—Emergency stop button

HL1—Fault indicator light HL2—Energy storage indicator light

HL3—Breaking indicator light HL4—Making indicator light

HL5 ~ 7—Position indicator light

FU—Fuse (6A)

1#, 2#: Intelligent controller power supply: voltage AC220/380V can be directly connected to 1#, 2#; If voltage is DC220/110V, it needs to through the power module,and the power module outputs 24V which can be connected to 1#, 2#.

3#~ 5#: Tripping alarm contact (3 is the common point)

6#~ 9#: Auxiliary contact (1 NO and 1 NC),optional

10#, 11#: Empty

12#~ 19#: Empty

20#: Empty

21#~ 24#: Empty

24#, 25#: The contacts for external Phase N transformer input signal; for conventional product, they are empty, and should be ordered by the user specifically. Where external transformer is required, they are the external transformer signal input contacts.

27#: Protective grounding, is connected to the outer board of the circuit breaker ;

28 #, 29 #: Shunt release;

30#, 31#: closing electromagnet;

32 #, 33 #: Undervoltage release.

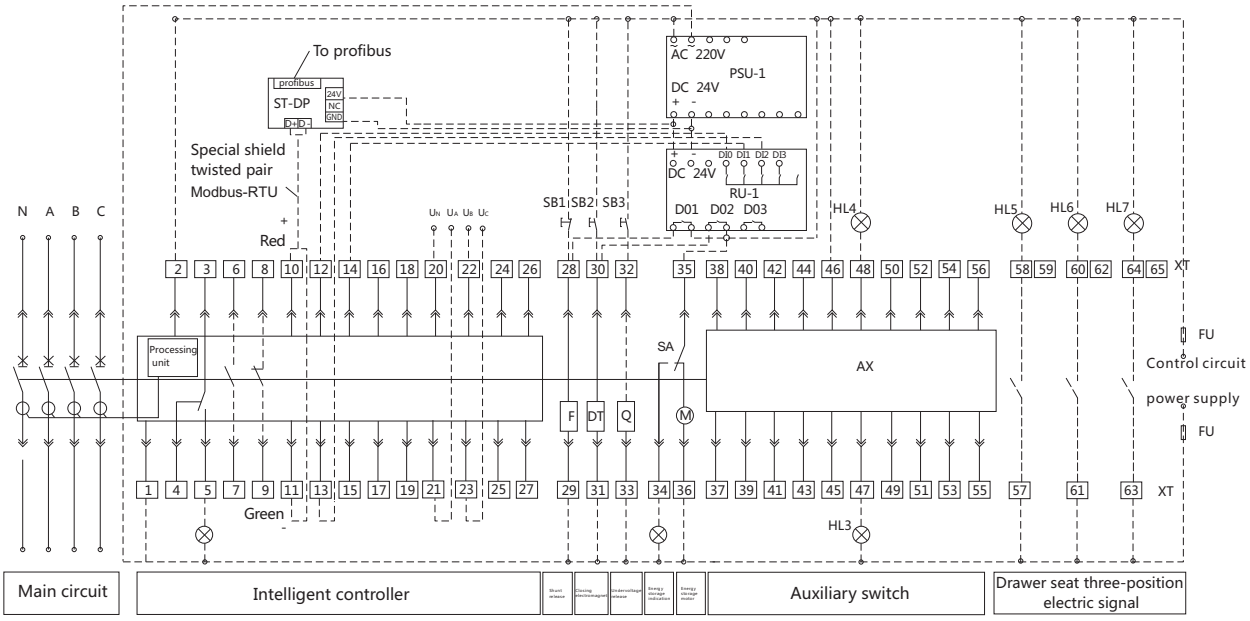
34 #~36 #: Motor-driven mechanism.

37#~56#: Auxiliary contact. 6 groups of changeover contacts are used for AC only.The conventional product has 4 groups of changeover auxiliary contacts; in case of special order from the user, 6 groups of changeover contacts, 4 NO 4 NC contacts and 5 NO 5 NC contacts can be provided.

57#~ 65#: Draw-out type circuit breaker three-position signal indication, the conventional supply has not wire connection, is only for the draw-out type circuit breaker with the secondary functions selected.

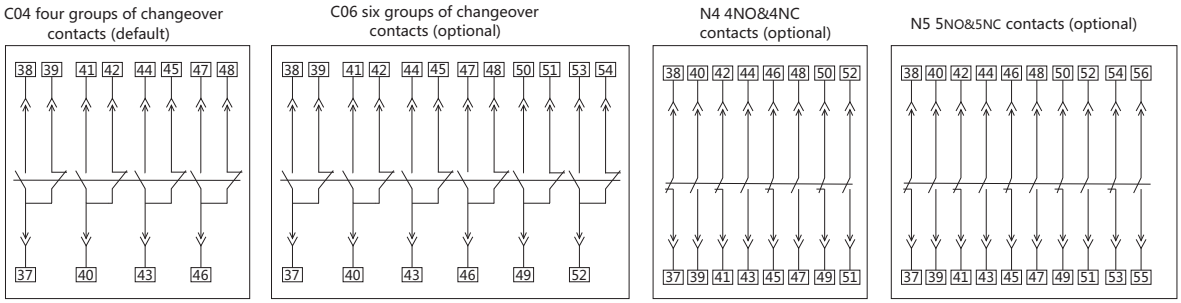
Note: The part in solid line has been connected by the factory, and the part in dashed line shall be connected by the customer.

NA8-2500/4000/7500 H Type controller



Type of AX auxiliary contact

Used by the user



F —Shunt release DT —Closing electromagnet

Q —Undervoltage release

M —Motor-driven mechanism

SA —Travel switch XT —Connection terminal

AX —Auxiliary contact SB1 —Breaking button

SB2 —Making button SB3 —Emergency stop button

HL1 —Fault indicator light HL2 —Energy storage indicator light

HL3 —Breaking indicator light HL4 —Making indicator light

HL5~7 —Position indicator light

FU —Fuse (6A)

1#, 2#:Intelligent controller power supply: voltage AC220/380V can be directly connected to 1#, 2#;If voltage is DC220/110V, it needs to through the power module,and the power module outputs 24V which can be connected to 1#, 2#.

3#~5#: Tripping alarm contact (3 is the common point)

6#~9#: Auxiliary contact (NO contact), optional.

10# , 11#: Type H intelligent controller default communication output contact.

12#~15#: 3 groups of programmable output signal, which must be connected with external RU-1 relay module.When type H intelligent controller has programmable output signal, default output: 12#, 13#: Closing signal output, 12#, 14#: Opening signal output, 12#, 15 #: Fault tripping. The conventional product has no such connection.

19#: H type intelligent controller communication shielding ground wire

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ST-DP: DP protocol module, when the upper computer communication protocol is Modbus-RTU, ST-DP protocol module is not required; when the upper computer communication protocol is Profibus-DP, ST-DP protocol module is required to change the Modbus-RTU protocol into Profibus-DP protocol with the cost separately charged.

RU-1: Relay module. The upper computer remotely controls it to open or close the circuit breaker, and it is used for amplifying the opening and closing signal energy with the cost separately charged.

Note: The part in solid line has been connected by the factory, and the part in dashed line shall be connected by the customer.

Circuit Breaker Configuration

Standard component	NA8-1600 (In preparation...)		NA8-2500		NA8-4000		NA8-7500
	Fixed type	Draw-out type	Fixed type	Draw-out type	Fixed type	Draw-out type	Draw-out type
Circuit breaker body	■	■	■	■	■	■	■
Drawer seat		■		■		■	■
Intelligent controller	■	■	■	■	■	■	■
Upper and lower horizontal connection	■	■	■	■	■	■	■
Auxiliary contact 4CO	■	■	■	■	■	■	■
Fault tripping indication contact	■	■	■	■	■	■	■
Motor-driven operating mechanism	■	■	■	■	■	■	■
Closed electromagnet	■	■	■	■	■	■	■
Shunt release	■	■	■	■	■	■	■
Door frame	■	■	■	■	■	■	■

Note: The table above is the standard configuration of motor-driven type

Optional accessory	NA8-1600 (In preparation...)		NA8-2500		NA8-4000		NA8-7500
	Fixed type	Draw-out type	Fixed type	Draw-out type	Fixed type	Draw-out type	Draw-out type
Undervoltage time delay release	■	■	■	■	■	■	■
Undervoltage instantaneous release	■	■	■	■	■	■	■
Opening/closing button lock	■	■	■	■	■	■	■
Drawer position padlock		■		■		■	■
Drawer safety barrier padlock		■		■		■	■
Body key lock	■	■	■	■	■	■	■
Position door interlock		■		■		■	■
Condition door interlock		■		■		■	■
Auxiliary contact 6CO	■	■	■	■	■	■	■
Auxiliary contact 3NO + 3NC	■	■					
Auxiliary contact 4NO + 4NC			■	■	■	■	■
Auxiliary contact 5NO + 5NC			■	■	■	■	■
Drawer position indication contact		■		■		■	■
Mechanical interlock (two)	■	■	■	■	■	■	■
External neutral line transformer	■	■	■	■	■	■	■
Ground current transformer and accessories	■	■	■	■	■	■	■
Interphase insulating barrier	■	■	■	■	■	■	■
Mechanical interlock (three)			■	■	■	■	■

Circuit Breaker Type Selection Table

Frame current	NA8-1600 (In preparation...)	NA8-2500	NA8-4000	NA8-7500	
Circuit breaker	N ☐	H ☐	H ☐	N ☐	H ☐
Rated current	200A ☐	630A ☐	2000A ☐	4000A ☐	4000A ☐
	400A ☐	800A ☐	2500A ☐	5000A ☐	5000A ☐
	630A ☐	1000A ☐	3200A ☐	6300A ☐	6300A ☐
	800A ☐	1250A ☐	4000A ☐	7500A ☐	7500A ☐
	1000A ☐	1600A ☐	1600A ☐		
	1250A ☐	2000A ☐			
	1600A ☐	2500A ☐			
Number of poles	3 poles ☐	4 poles ☐			
Mounting mode	Draw-out type ☐	Fixed type ☐ (NA8-7500 has no fixed type)			
Busbar connection mode	Horizontal connection ☐	Vertical connection ☐	Mixed connection ☐ (indicating the connection mode)		
Intelligent controller	M type ☐ (basic type)	H type ☐ (communication type)			
Shunt, closing, motor	Closing electromagnet ☐	Shunt release ☐	Energy storage motor ☐		
	AC220/230V ☐	AC380/400V ☐	DC220V ☐	DC110V ☐	
Undervoltage release	UVT ☐	UVTD ☐			
	AC220/230 V ☐	AC380/400 V ☐			
Auxiliary contact	NA8-1600 C04 (standard) C06 ☐ (only for AC) N3 ☐ (only for AC)				
	NA8-2500、NA8-4000~7500 C04 (standard) C06 ☐ N4 ☐ N5 ☐				
Auxiliary contact indication (optional)	Drawer seat three-position signal device ☐				
Connecting accessory (optional)	Interphase insulating barrier ☐	NA8-1600 extension busbar ☐			
Controller function and accessories (optional)	External transformer : Phase N external transformer ☐ External LEC leakage transformer ☐ Ground current protection transformer ☐				
	Controller functions : 3P + N protection function ☐ Leakage protection function ☐ Ground current protection function ☐				
	Voltage measurement and protection function ☐ Electric energy measurement and protection function ☐				
	Signal contact output function ☐				
	ZSI zone interlock protection function ☐ Load monitoring function ☐				
	Notes: 1) For 3P + N protection function, the phase N external transformer must be selected at the same time;				
	2) For the leakage protection function, the external LEC leakage transformer must be selected at the same time;				
	3) For the ground current protection function, the ground current protection transformer must be selected at the same time.				
Lock mechanism (optional)	Breaking/Making button lock ☐	One lock one key ☐	Two locks one key ☐	Three locks two keys ☐	
Mechanical interlock (optional)	Wire rope interlock (two interlock) ☐	Wire rope interlock (MIT-3) ☐	Wire rope interlock (MIT- 4) ☐		
Module (optional)	PSU-1 ☐ RU-1 ☐	ST-DP protocol conversion module ☐			

Remark: Upon placing an order, the frame current, rated current and auxiliary control voltage must be indicated!

Notes: 1) Please check the ☐ corresponding to required option with "√" or "-" , and fill the figure; if there is no marking, we will provide the goods according to the conventional factory setting.

2) If the additional functions and special requirement are selected, additional expense will incur separately. TEL: 0577-62877777 – 706213. FAX: 0577 - 62877777–706288.

Configuration explanations

I. NA8-1600~2500、NA8-4000 ~7500 conventional configuration explanationsShunt release, closing electromagnet, 4 groups changeover contacts, motor, M type intelligent controller, main circuit horizontal connection, door frame,main circuit mounting bolts, circuit breaker operation manual, packing case, drawer seat (draw-out type circuit breaker)

II. Optional configuration (with additional expense)

NA8-1600 optional configuration explanations: undervoltage instantaneous release, undervoltage time delay release, wire rope interlock, key lock, external transformer earth protection function, 6 groups of changeover contacts, 3NO 3NC contacts, H type intelligent controller, optional type H function, interphase insulating barrier, position signal.

NA8-2500、NA8-4000~7500 optional configuration explanations: undervoltage time delay release (1s~5s adjustable), wire rope interlock, button lock, key lock, door interlock,external transformer ground protection function, vertical connection, 6 groups of changeover contacts, 4NO 4NC contacts, 5NO5NCcontacts, type H intelligent controller, optional H type function, position signal.

Note