Air Circuit Breake

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CHINT ELECTRIC

Air Circuit Breaker

ACB

NA8G

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NA1

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NA8G Air Circuit Breaker

1. General

1.1 Application scope

With rated current from 200A to 6300A, and rated service voltage of AC 415V or 690V, NA8G series air circuit breaker is mainly used in the distribution network with the circuit of AC 50HZ/60HZ to distribute electric energy and protect circuits and electric equipment against over-load, under-voltage, short- circuit, single-phase earthing fault.

Having art-oriented appearance, high breaking capacity, zero arcover and varities of intellectualized protection functions, the breaker can be used for selective protection with accurate action, no unnecessary power cut, and better power supply reliability.

That breaker can be widely used for power stations, factories, mines and modern tall buildings, especially the distribution system in the intelligent building, and also widely used in green projects such as wind and solar power generation.

1.2 Standard : IEC/EN 60947-2.

2. Operating conditions

2.1 Temperature condition:

-5℃~40℃; the average value within 24h shall not exceed +35℃ (special situation excluded);

2.2 Altitude:≤2000m;

2.3 Pollution grade: Grade 3;

2.4 Air conditions:

At mounting site, relative humidity not exceed 50% at the max temperature of +40℃, higher relative humidity is allowable under lower temperature, RH could be 90% at +20℃, special measures should be taken to occurrence of dews;

2.5 Note: Without the intelligent controller, the breaker functions as a switch-disconnector.

2.6 Type designation

NA8 G - □-□□/□-□-□-□-□

Voltage of secondary circuit
AC230V, AC400V
DC220V, DC110V

Wiring of main circuit:
H:Horizontal wiring of main circuit
V:Vertical wiring of main circuit

Mode of installation:
F:Fixed type
D:Draweout type

Mode of operation:
M:Manual
P: Power-driven

No. of poles:
3:3-pole
4:4-pole

Intelligent controller:
M: Standard type
H: Multifunctional type

Rated current:

Frame size rated current	Rated current
1600A	400A
	630A
	800A
	1000A
	1250A
	1600A
3200A	1600A
	2000A
	2500A
	3200A
4000A	2500A
	3200A
	4000A
6300A	4000A
	5000A
	6300A

Frame size rated current:
1600A, 3200A, 4000A, 6300A

Improved product code

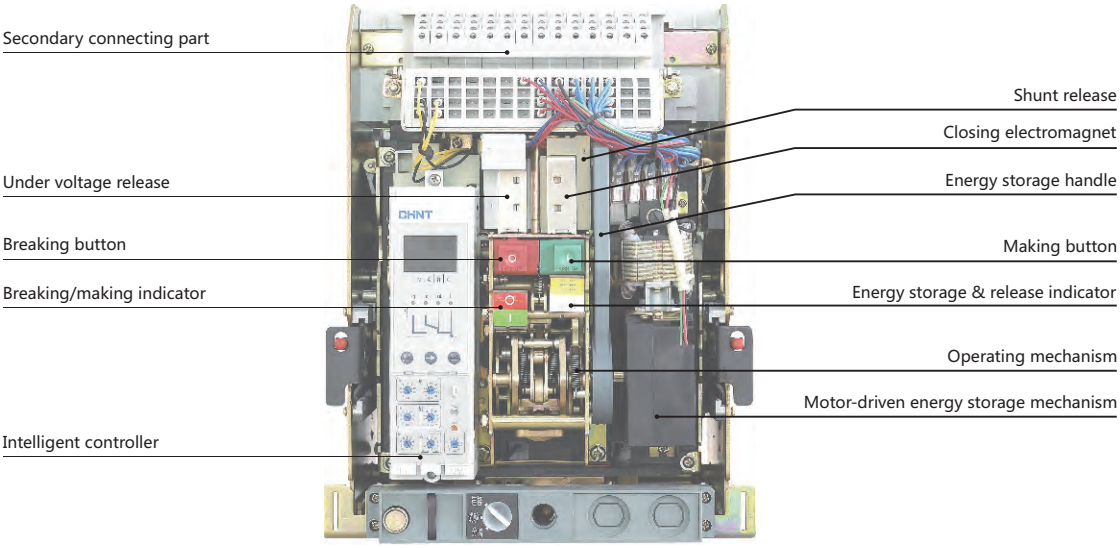
Design sequence number

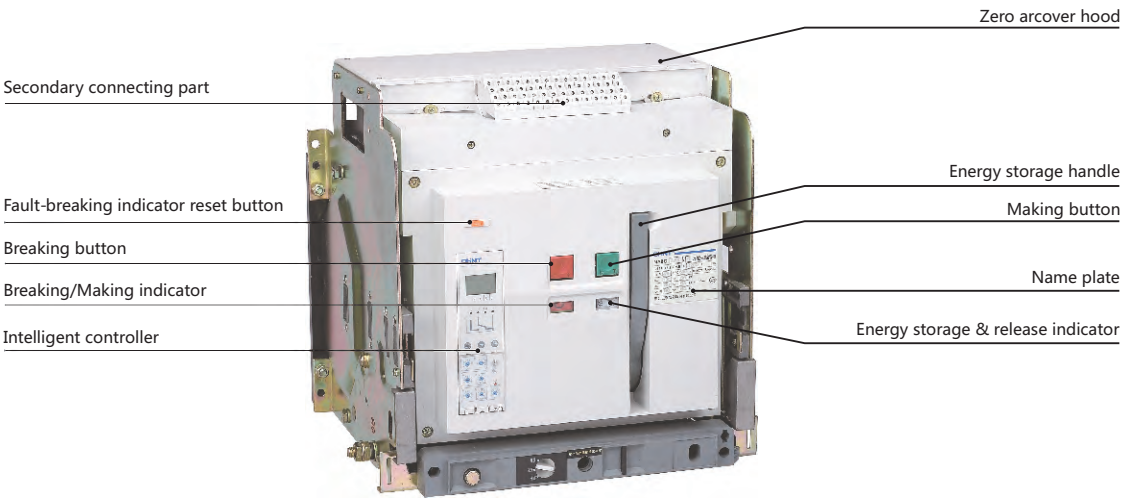
ACB

Company code

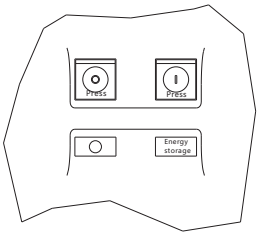
3. Product structure

Body structure

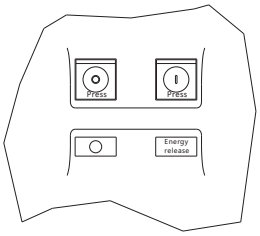




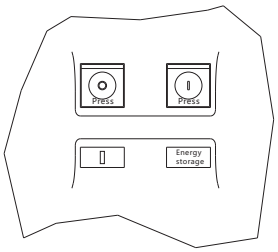
Breaker off and energy storage over



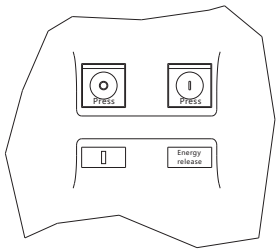
Breaker off and no energy storage



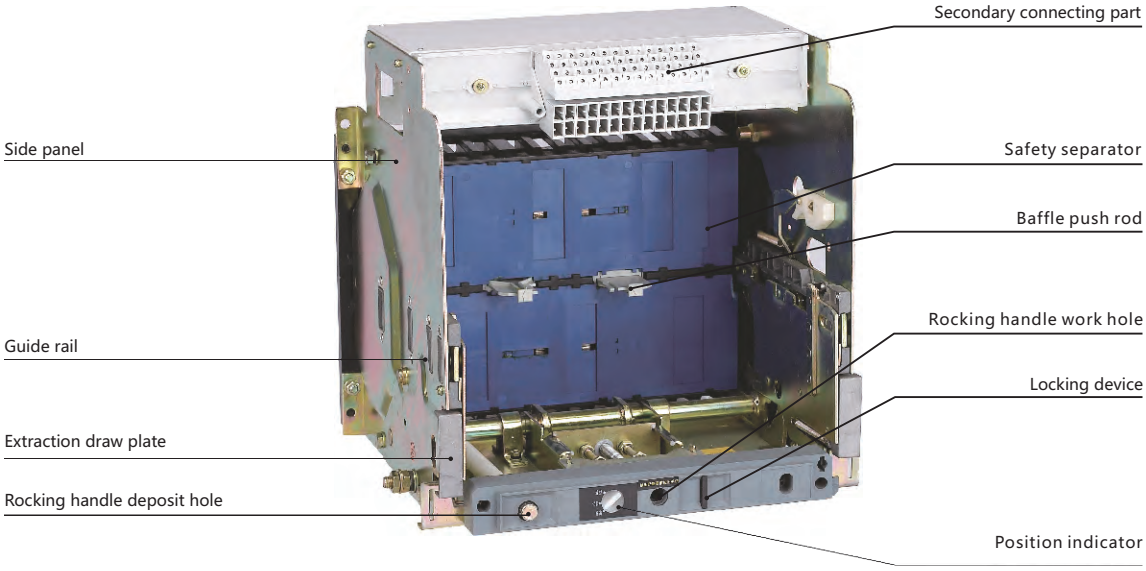
Breaker on and energy storage over

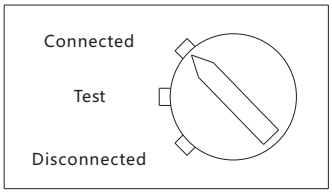


Breaker on and no energy storage

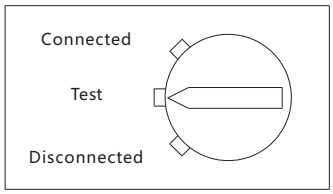


Drawout structure

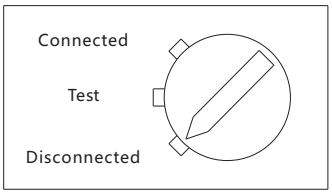




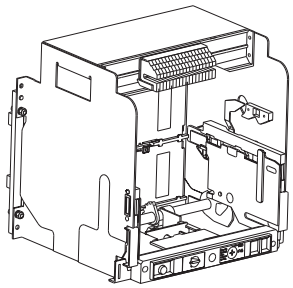
Connected: both main circuit and secondary circuit are connected



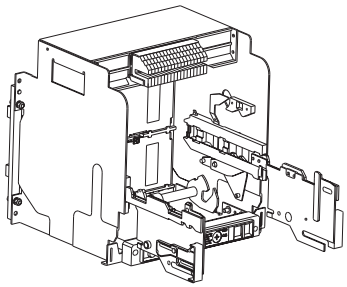
Test: the main circuit is disconnected,
the safety separator works well,
and the secondary circuit is connected.



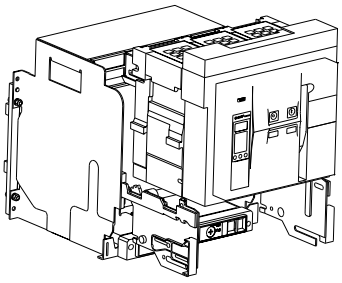
Disconnected: neither main circuit nor secondary circuit is connected



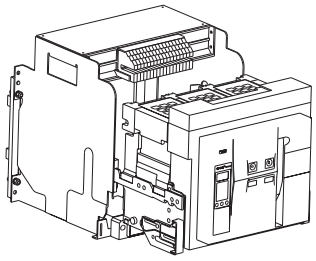
(1)Draw-out socket placed horizontally



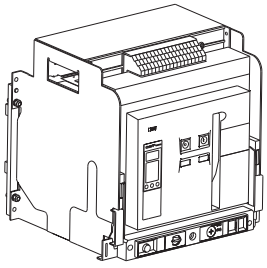
(2)Pull out the guide rail



(3)Place the breaker body on the guide rail



(4)Move the breaker body onto the guide rail with a snap



(5)Push the breaker body in, and turn the break body to the connected position

4. Main technical parameters

4.1 Main technical parameters

Shell grade rated current Inm (A)		1600	3200	4000	6300	
Rated current In (A)		400,630,800, 1000,1250,1600	1600,2000, 2500,3200	2500,3200,4000	4000,5000	6300
Nominal insulation voltage Ui (V)		690	1000	1000	1000	
Rated operational voltage Ue (V)		415 690	415 690	415 690	415	
Rated ultimate short circuit breaking capacity Icu (kA)		50 25	100 65	100 65	120	
Rated service short circuit breaking capacity Ics (kA)		40 20	80 65	100 65	100	
Rated short time withstand current Icw, 1s (kA)		40 20	80 65	85 65	100	
Number of poles		3P 4P	3P 4P	3P 4P	3P 4P	3P
Frequency of operation (number of times/hour)		20	10	10	10	
Number of operations	Mechanical life	3000	3000	3000	2000	
	Electrical Life	1000	1000	1000	500	
Flashover distance mm		0	0	0	0	
Wire incoming pattern		Wire to enter from the upper or lower port	Wire to enter from the upper or lower port	Wire to enter from the upper or lower port	Wire to enter from the upper or lower port	
Net weight (3 poles/4 poles)	fixed type (kg)	22/26.5	52.5/66.5	58/75	-	
	draw-out type (kg)	42.5/55	98/121	110/145	210/233	233
Size(3 poles/4 poles) Height × width × depth	fixed type	320×(254/324)×258	406×(422/537)×329	402×(432.5/547.5)×330	-	
	draw-out type	351×(282/352)×352	439.5×(435/550)×445	439.5×(435/550)×445	439×(813/928)×501	439×928×501

4.2 Capacity-reducing usage

4.2.1 Capacity-reducing at different temperatures

The following table shows the continual current-loading capacity of the circuit breakers and buses in each wiring mode at the corresponding ambient environment temperatures and under the conditions of the satisfaction of conventional heating with a similarity in capacity reducing between the breaker connected in a mixed way and the breaker connected horizontally.

Style wiring mode ambient temperature℃	Draw-out type									
	Front/rear horizontal wiring mode					Rear vertical wiring mode				
	-5~40	45	50	55	60	-5~40	45	50	55	60
1600	400	400	400	400	400	400	400	400	400	400
	630	630	630	630	550	630	630	630	630	580
	800	800	800	800	700	800	800	800	800	700
	1000	1000	1000	950	900	1000	1000	1000	950	900
	1250	1250	1250	1150	1050	1250	1250	1250	1200	1100
	1600	1550	1500	1450	1350	1600	1600	1550	1500	1450
3200	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
	2000	2000	2000	2000	1900	2000	2000	2000	2000	1950
	2500	2500	2500	2450	2350	2500	2500	2500	2500	2400
	3200	3200	3100	3000	2900	3200	3200	3200	3050	2900
4000	2500	2500	2500	2450	2350	2500	2500	2500	2500	2400
	3200	3200	3100	3000	2900	3200	3200	3200	3050	2900
	4000	3800	3600	3400	3200	4000	3800	3600	3400	3200
6300	4000	4000	4000	3900	3800	4000	4000	4000	3900	3800
	5000	5000	4700	4600	4400	5000	5000	4800	4650	4500
	6300	6100	6000	5500	5200	6300	6100	6000	5500	5200

4.2.2 Capacity-reducing at different altitudes

When the altitude is higher than 2000m, there will appear changes in insulation property, cooling performance, pressure,and the performance can be modified in reference to the following table.

Altitude(m)	2000	3000	4000	5000
Insulation withstand voltage(V)	3500	3000	2500	2000
Insulation voltage(V)	1000	800	700	600
Rated operational voltage(V)	690	580	500	400
Rated operational current(A)	1×In	0.96×In	0.92×In -	0.87×In

4.3 Power loss

Power loss is the loss at each pole which is measured when the breaker is charged with the rated current.

Power loss			
Breaker type	**Rated current**	**Draw-out type**	**Fixed type**
NA8G-1600	400	140	80
	630	161	100
	800	215	110
	1000	230	120
	1250	250	130
	1600	460	220
NA8G-3200	1600	390	170
	2000	470	250
	2500	600	260
	3200	670	420
NA8G-4000	2500	600	260
	3200	670	420
	4000	1047	656
NA8G-6300	4000	550	-
	5000	590	-
	6300	950	-

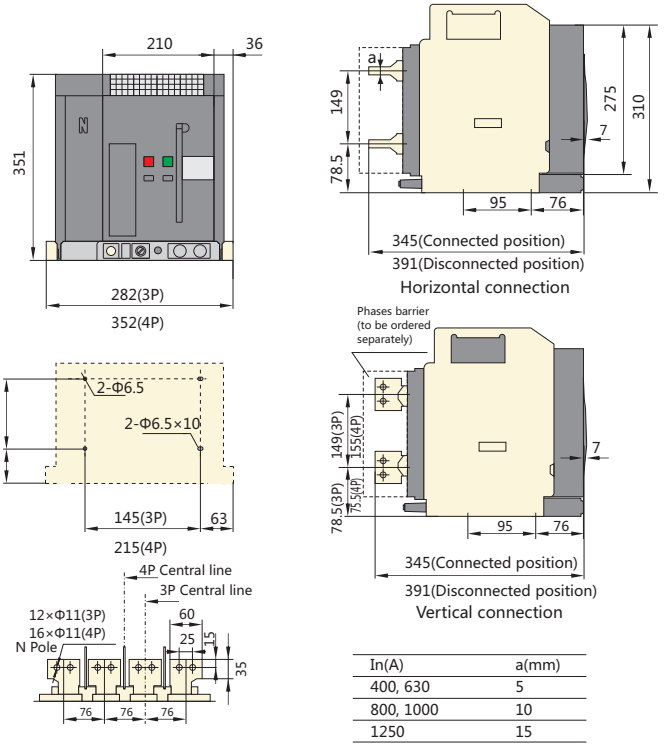
Note: The data and parameters in the above technical documentation results from tests and theoretical calculation, and can only be used as a general type selection guide.They cannot replace industrial practical experience or proof test.

5.4 Recommended bus for the breaker and recommendation for users to install the buses

Inm(A)		**NA8G-1600**						**NA8G-3200**				**NA8G-4000**			**NA8G-6300**		
In(A)		400	630	800	1000	1250	1600	1600	2000	2500	3200	250	3200	4000	4000	5000	6300
Busbar	Thickness(mm)	5	5	5	5	8	10	6	6	5	10	6	10	10	10	10	10
	Width(mm)	50	40	50	60	60	60	100	100	100	100	80	100	100	100	100	100
	Number of buses	1	2	2	2	2	2	2	3	4	4	4	4	5	5	7	8

5. Dimensions and connection

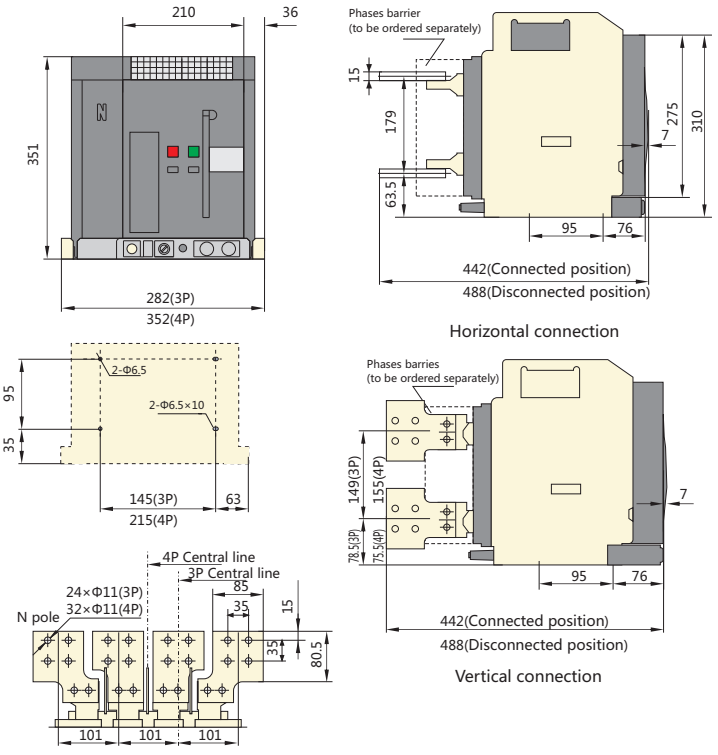
NA8G-1600 (In=400A ~1250A) Draw-out type
(Only horizontal connection is provided by the factory, vertical one has to be made by users themselves).



In(A)	a(mm)
400, 630	5
800, 1000	10
1250	15

Note: If users intend to change the horizontal connection into vertical connection, they need to replace the upper and lower busbars on both sides with the same one as the central busbar.

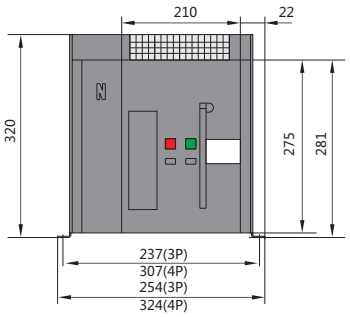
NA8G-1600 (In=1600A) Draw-out type
(Only horizontal connection is provided by the factory, vertical one has to be made by users themselves).

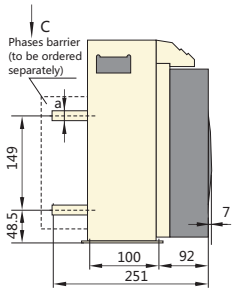


Note: If users intend to change the horizontal connection into vertical connection, they need to replace the upper and lower busbars on both sides with the same one as the central busbar.

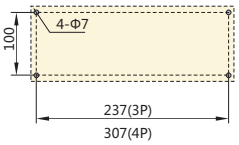
NA8G-1600 (400A~1250A) Fixed type

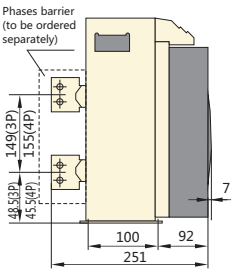
(Only horizontal connection is provided by the factory, vertical one to has be made by users themselves).



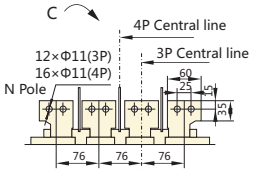


Horizontal connection





Vertical connection

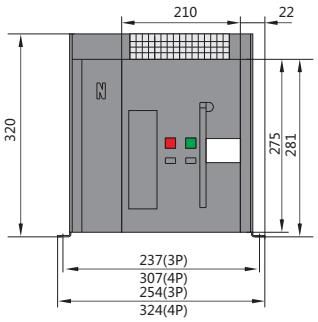


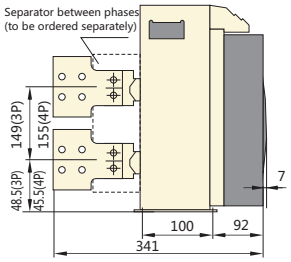
In(A)	a(mm)
400, 630	5
800, 1000	10
1250	15

Note: If users intend to change the horizontal connection into vertical connection, they need to replace the upper and lower busbars on both sides with the same one as the central busbar.

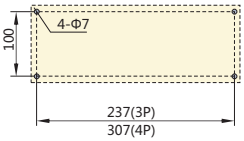
NA8G-1600 (In=1600A) Fixed type

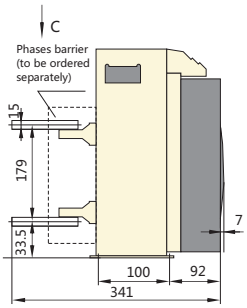
(Only horizontal connection is provided by the factory, vertical one has to be made by users themselves).



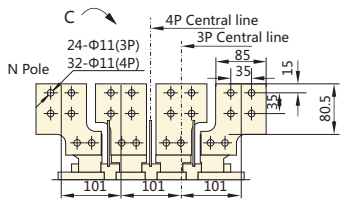


Vertical connection



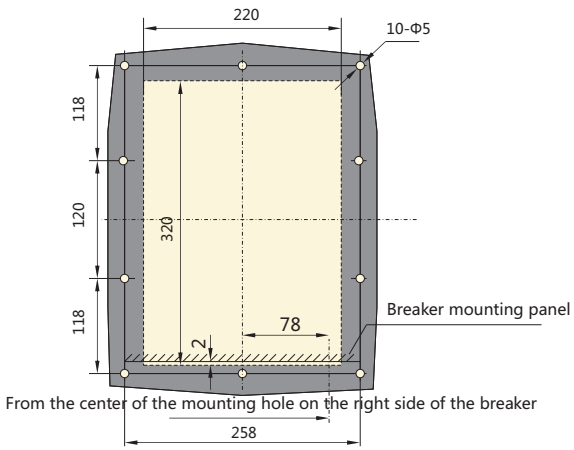


Horizontal connection

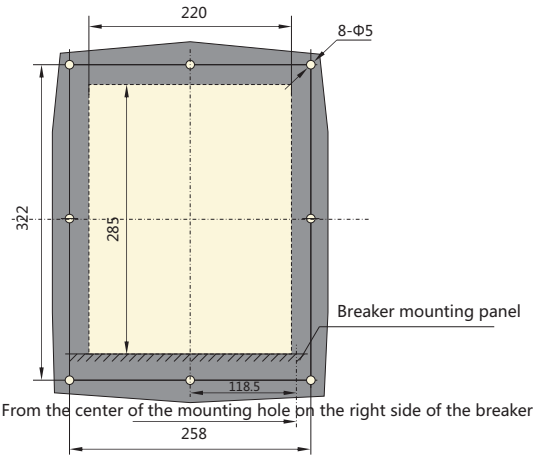


Note: If users intend to change the horizontal connection into vertical connection, they need to replace the upper and lower busbars on both sides with the same one as the central busbar.

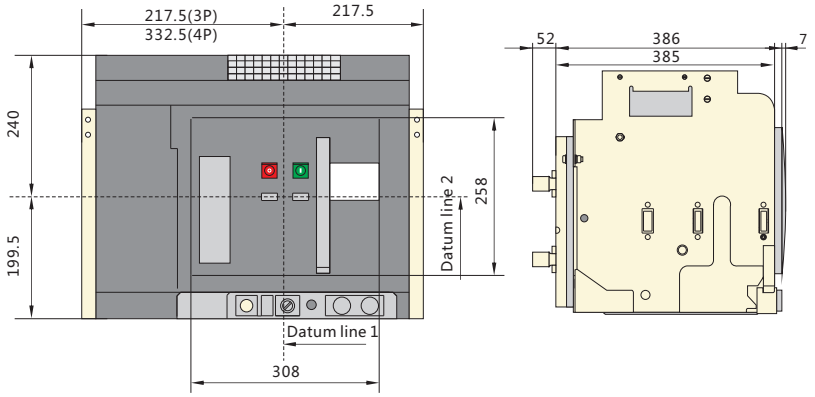
NA8G-1600 Draw-out type
Size of the hole to be drilled on the panel

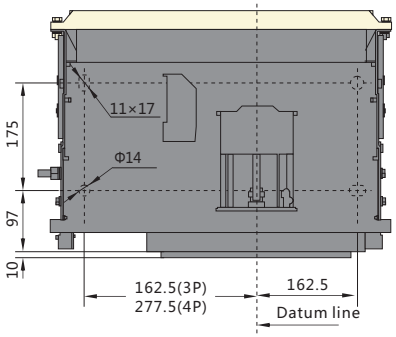


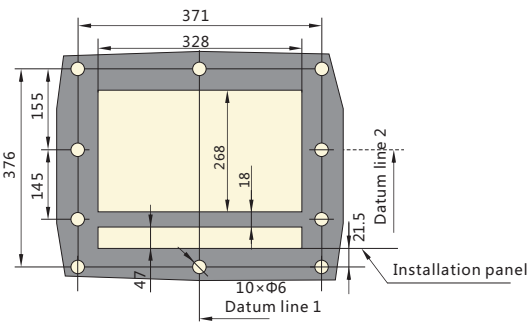
NA8G-1600 Fixed type
Size of the hole to be drilled on the panel



NA8G-3200 Draw-out type
Size of the hole to be drilled on the panel

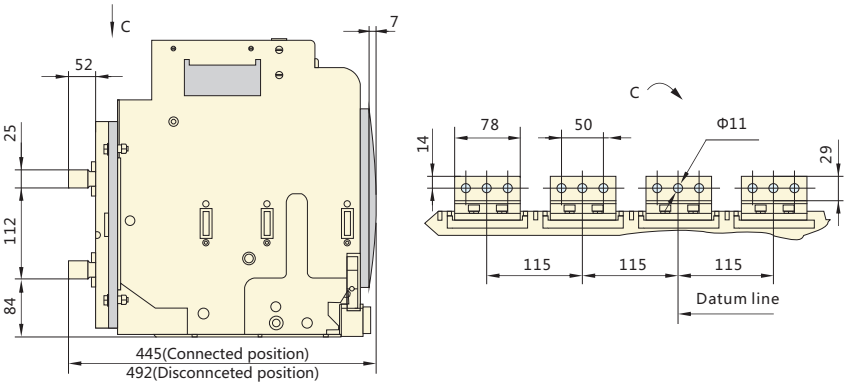






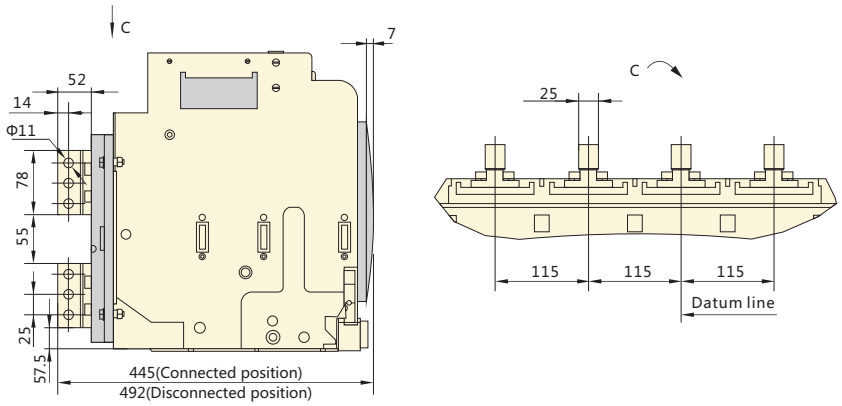
Size of the hole to be drilled on the panel

NA8G-3200(In=1600A~2500A) Draw-out type
(Only horizontal connection is provided by the factory).



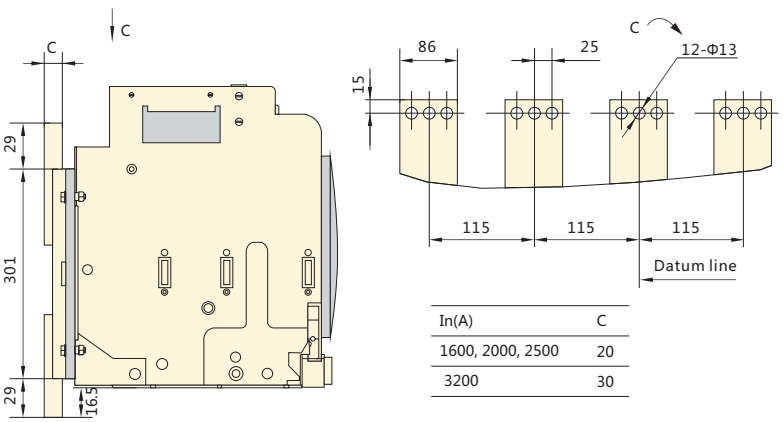
Note: If users want to change the horizontal connection into vertical connection, they only have to turn the busbar by 90°.

NA8G-3200(In=1600A~2500A) Draw-out type
(Vertical connection has to be made by users themselves).



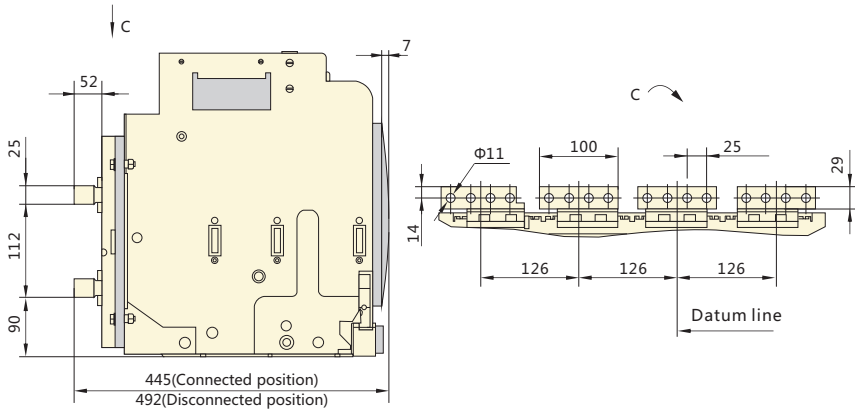
Note: If users want to change the vertical connection into horizontal connection, they only have to turn the busbar by 90°.

NA8G-3200 Draw-out type; Front connection

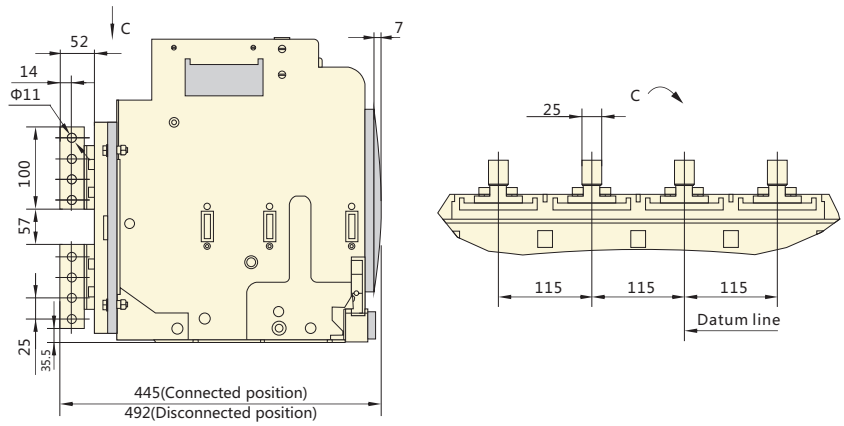


In(A)	C
1600, 2000, 2500	20
3200	30

NA8G-3200(In= 3200A) Draw-out type (Only horizontal connection is provided by the factory)

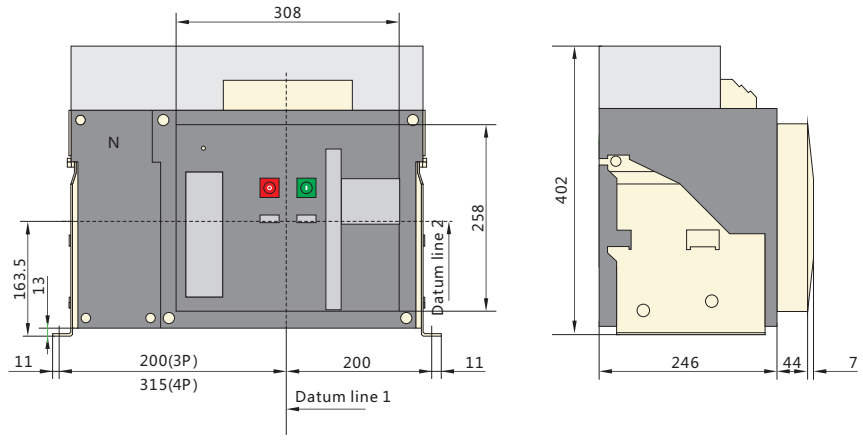


NA8G-3200(In= 3200A) Draw-out type (Vertical connection has to be made by users themselves)

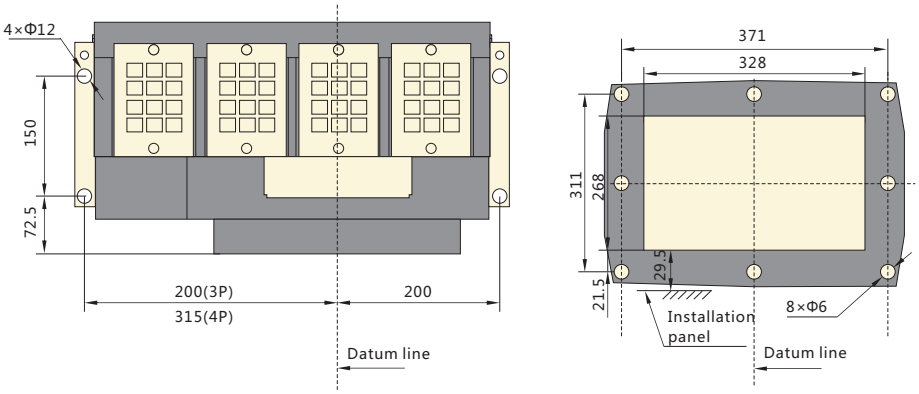


Note: If users want to change the horizontal connection into vertical connection,
it is necessary to replace the upper and lower busbars for the N and B phases with the same one as the A and C phases.

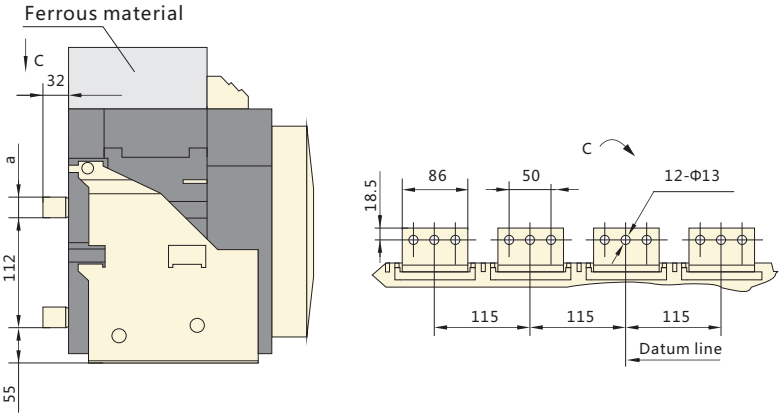
NA8G-3200 Fixed type



NA8G-3200 Fixed type, size of the hole to be drilled on the panel



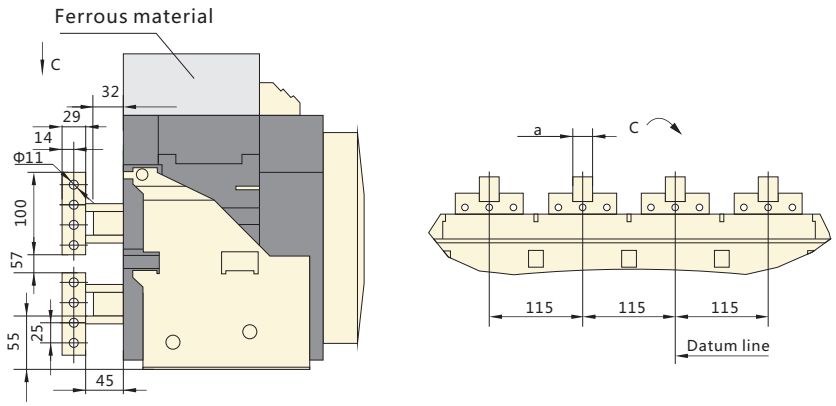
NA8G-3200 Fixed type (Only horizontal connection is provided by the factory)



In(A)	a(mm)
1600~2500	20
3200	30

Note: If users want to change the horizontal connection into vertical connection, they only have to additionally install vertical busbars.

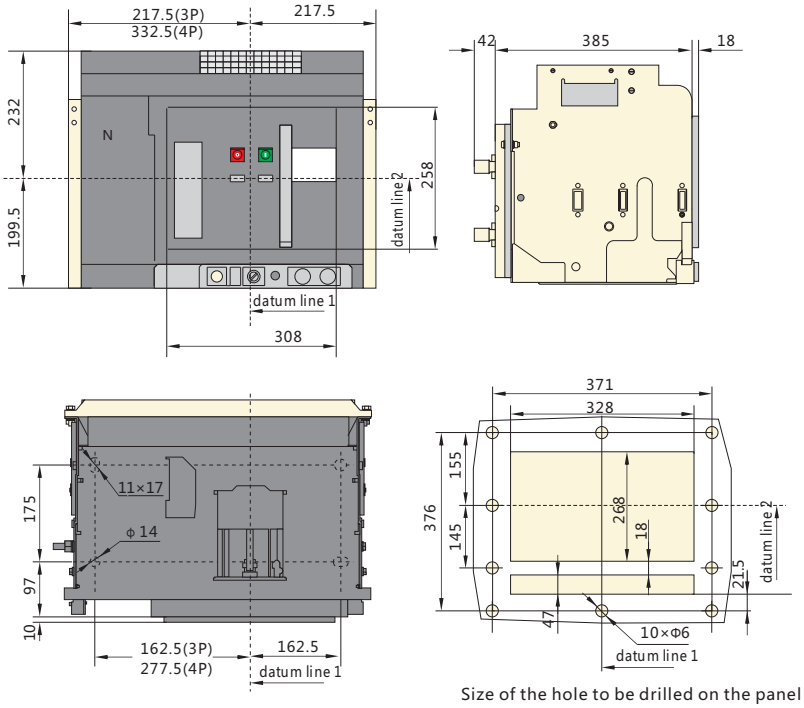
NA8G-3200 Fixed type (Vertical connection has to be made by users themselves)



In(A)	a(mm)
1600~2500	20
3200	30

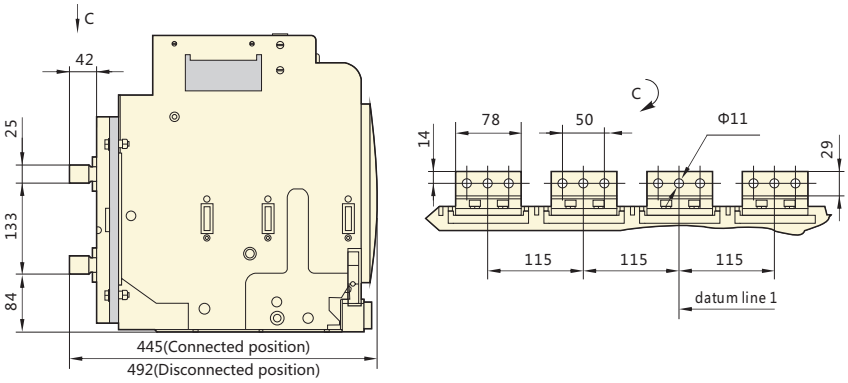
Note: If users want to change the horizontal connection into vertical connection, they only have to additionally install vertical busbars.

NA8G-4000 Draw-out type, size of the hole to be drilled on the panel



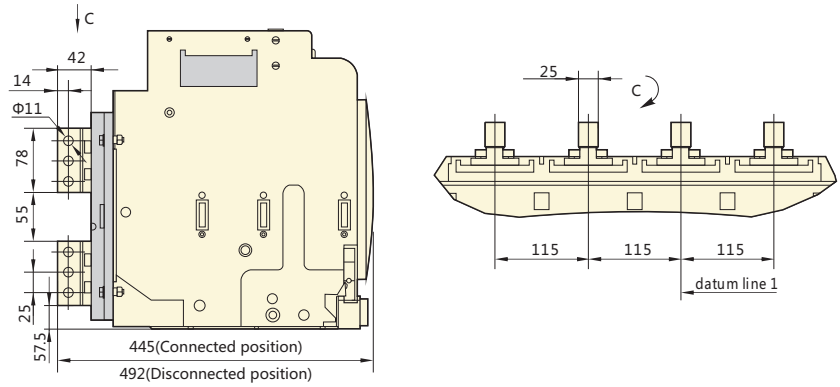
Size of the hole to be drilled on the panel

NA8G-4000(In=2500A) Draw-out type (only horizontal connection is provided by the factory)



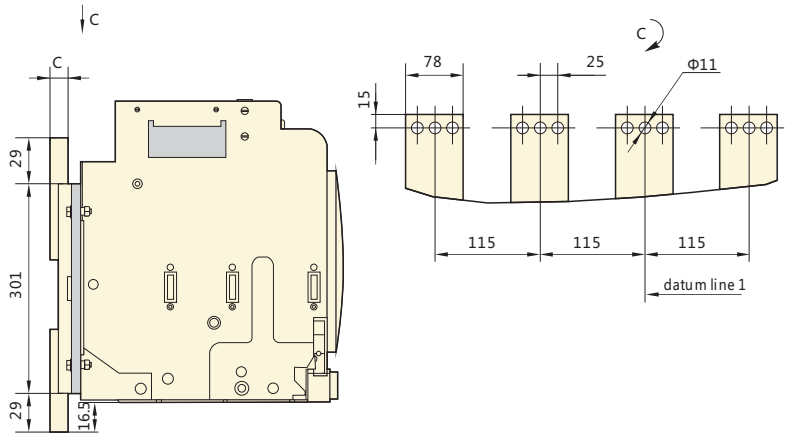
Note: If users want to change the horizontal connection into vertical connection,they only have to rotate the busbars by 90°.

NA8G-4000(In=2500A) Draw-out type (vertical connection has to be made by users themselves)



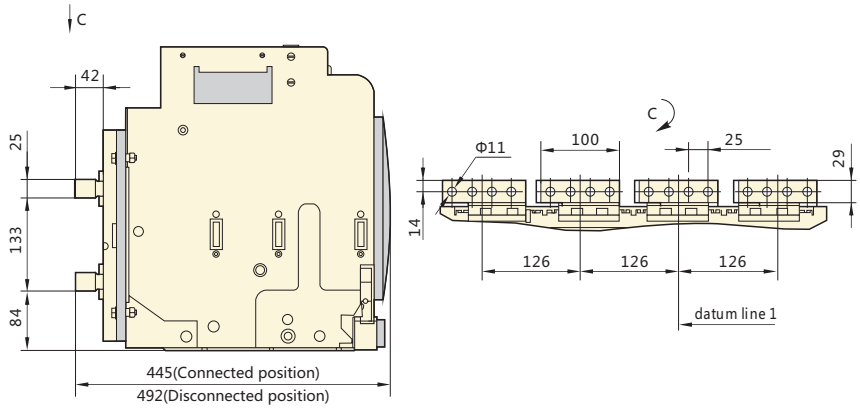
Note: If users want to change the horizontal connection into vertical connection,they only have to rotate the busbars by 90°.

NA8G-4000 Draw-out type, size of the hole to be drilled on the panel



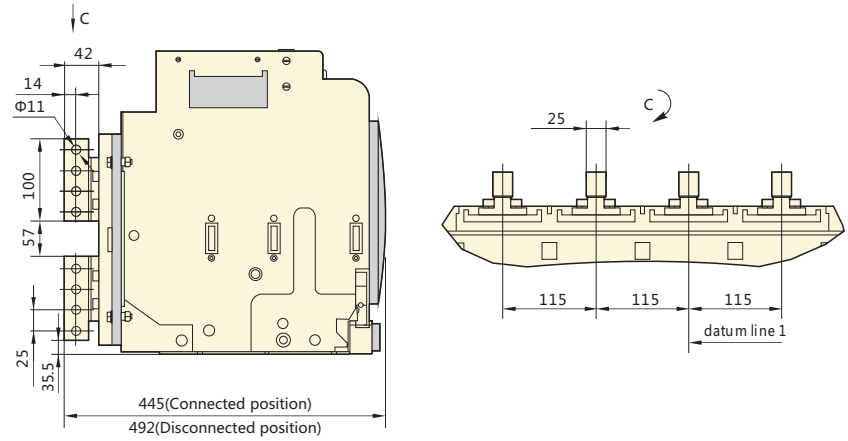
In(A)	C
2500	25
3200~4000	30

NA8G-4000(In=3200A~4000A) Draw-out type (only horizontal connection is provided by the factory)



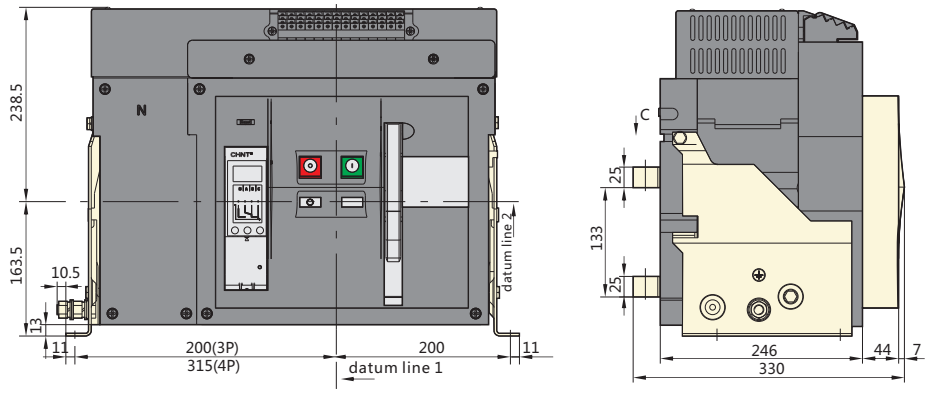
Note: If users want to change the horizontal connection into vertical connection,they only have to change the busbar of N、B phases to A、C phases.

NA8G-4000(In=3200A~4000A) Draw-out type (vertical connection has to be made by users themselves)

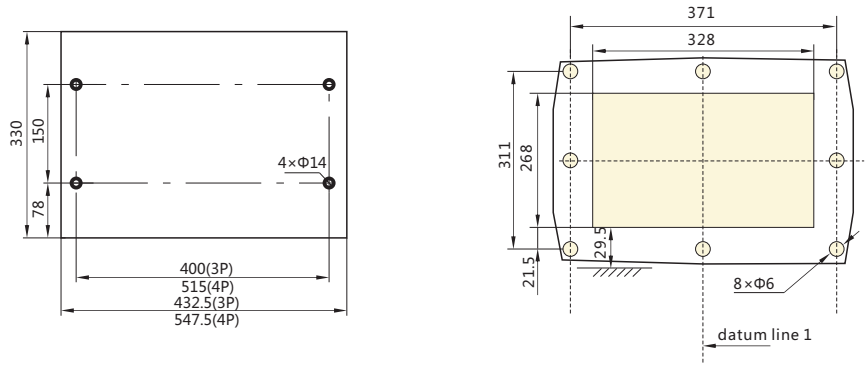


Note: If users want to change the horizontal connection into vertical connection,they only have to change the busbar of N、B phases to A、C phases.

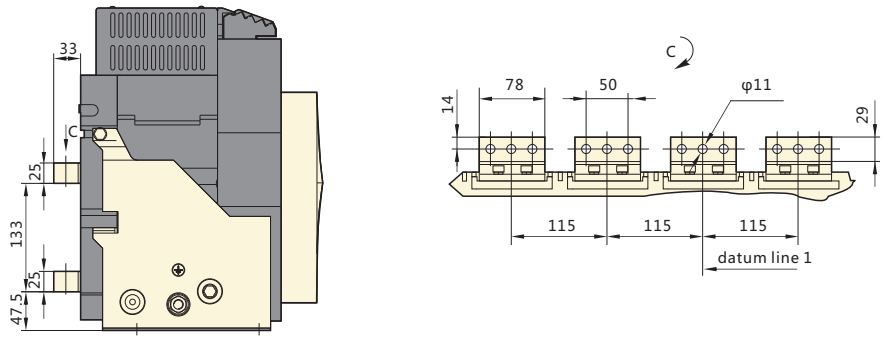
NA8G-4000 Fixed type , outline dimension



NA8G-4000 Fixed type ,size of the hole to be drilled on the panel

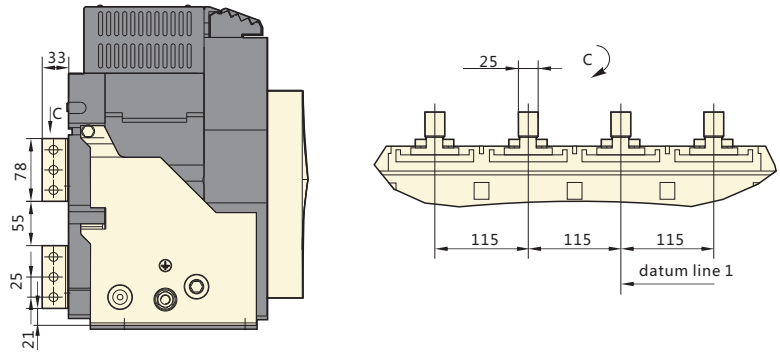


NA8G-4000(In=2500A) Fixed type (only horizontal connection is provided by the factory)



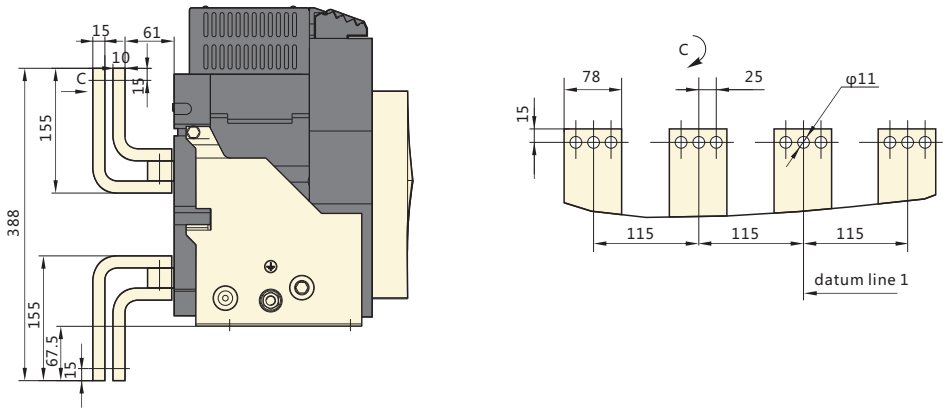
Note: If users want to change the horizontal connection into vertical connection,they only have to rotate the busbars by 90°.

NA8G-4000(In=2500A) Fixed type (vertical connection has to be made by users themselves)

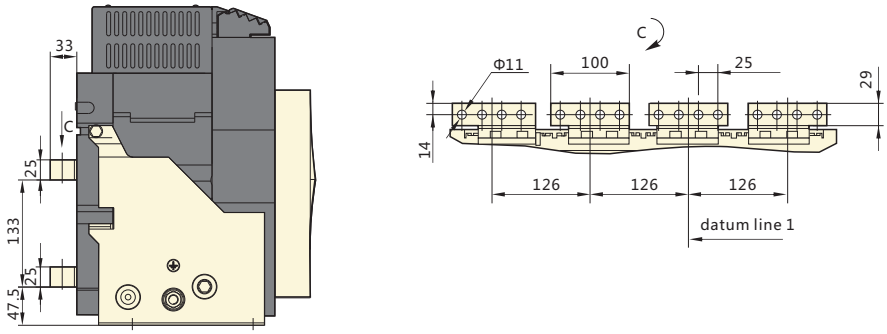


Note: If users want to change the horizontal connection into vertical connection,they only have to rotate the busbars by 90°.

NA8G-4000 Fixed type , outline dimension(Front connection)

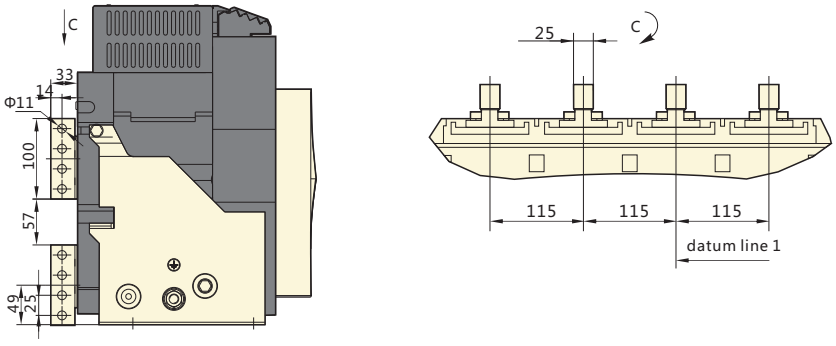


NA8G-4000(In=3200A~4000A) Fixed type (only horizontal connection is provided by the factory)



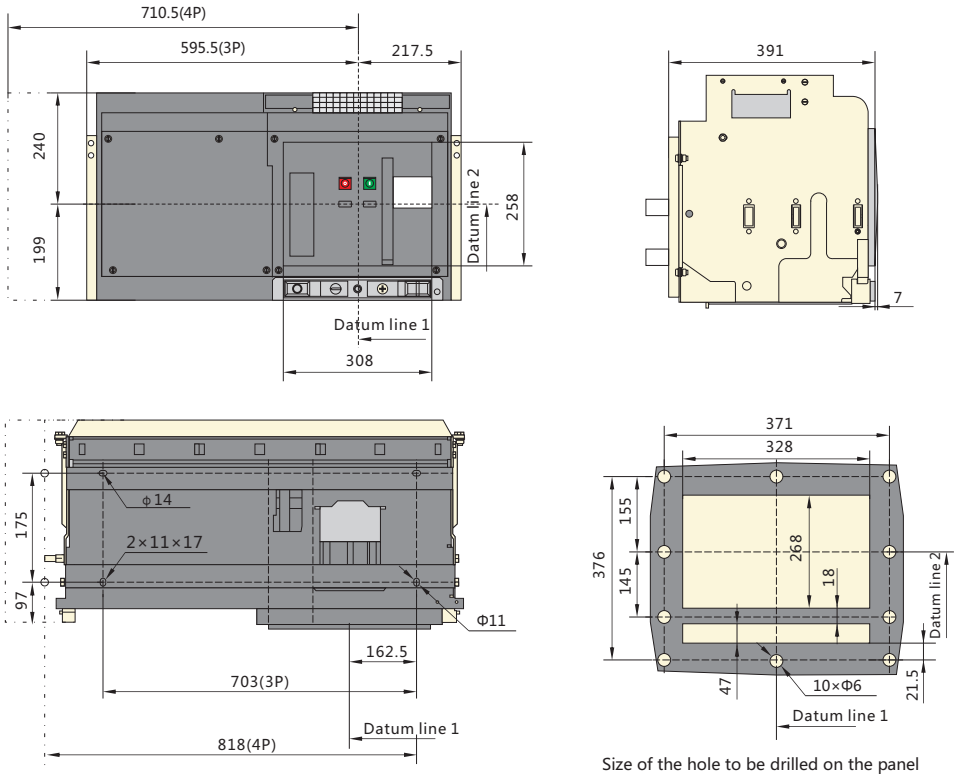
Note: If users want to change the horizontal connection into vertical connection,they only have to change the busbar of N、B phases to A、C phases.

NA8G-4000(In=3200A~4000A) Fixed type (vertical connection has to be made by users themselves)



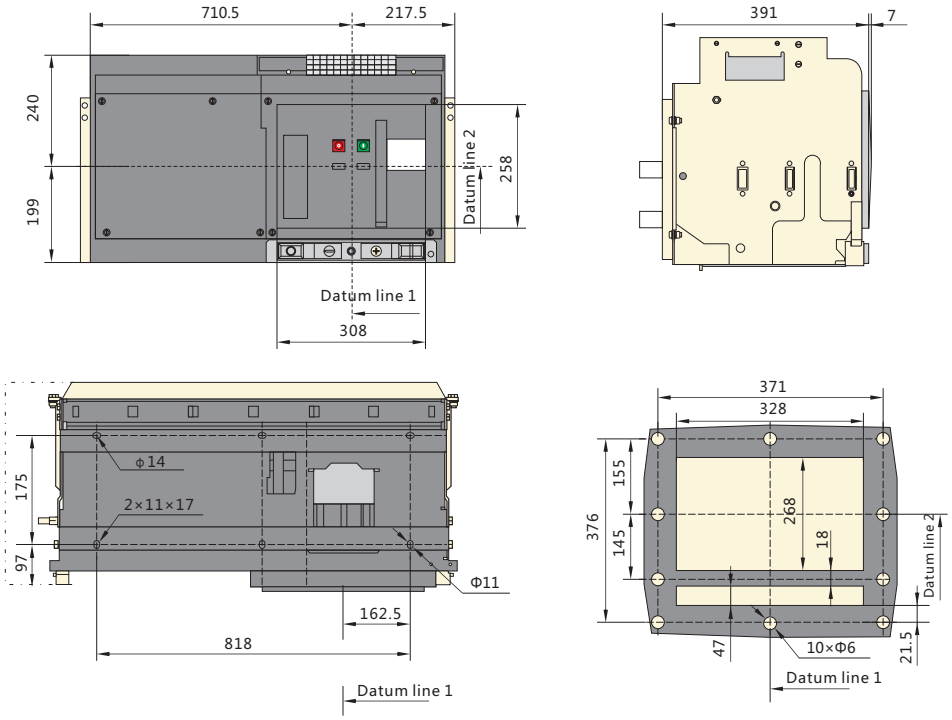
Note: If users want to change the horizontal connection into vertical connection,they only have to change the busbar of N、B phases to A、C phases.

NA8G-6300 In=(4000A~5000A) Draw-out type
Size of the hole to be drilled on the panel



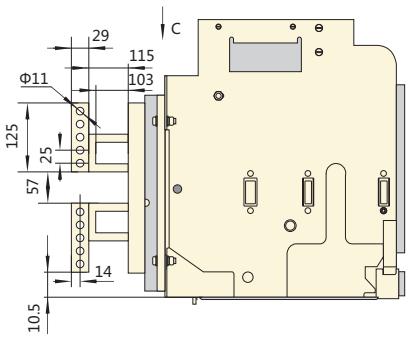
Size of the hole to be drilled on the panel

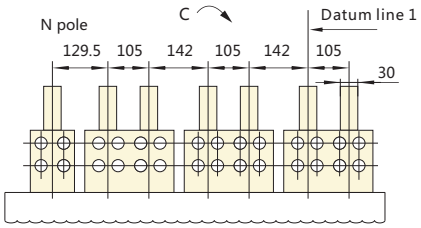
NA8G-6300 In=(6300A) Draw-out type
Size of the hole to be drilled on the panel



Size of the hole to be drilled on the panel

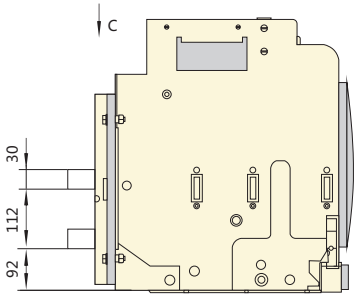
NA8G-6300(In=4000A~5000A) Draw-out type
(Vertical connection has to be made by users themselves)

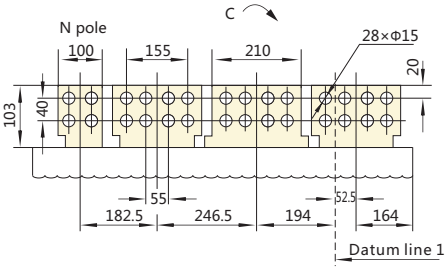




Note: If users want to change the horizontal connection into vertical connection, they only have to additionally install vertical busbars.

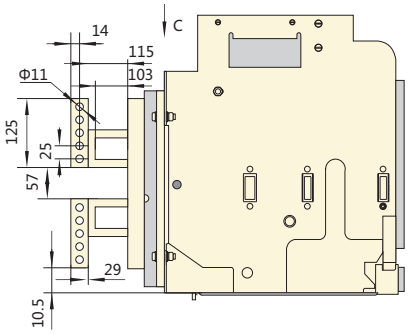
NA8G-6300(In=4000A~5000A) Draw-out type (Only horizontal connection is provided by the factory)

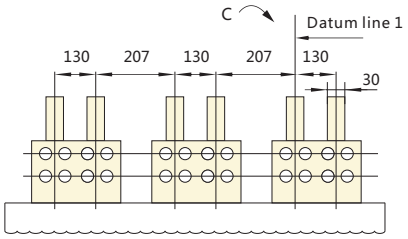




Note: If users want to change the horizontal connection into vertical connection, they only have to additionally install vertical busbars.

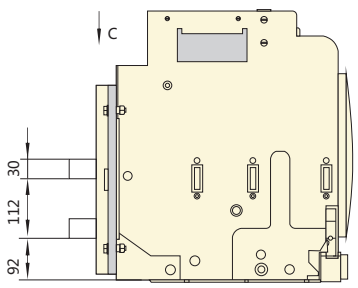
NA8G-6300(In=6300A) Draw-out type (Vertical connection has to be made by users themselves)

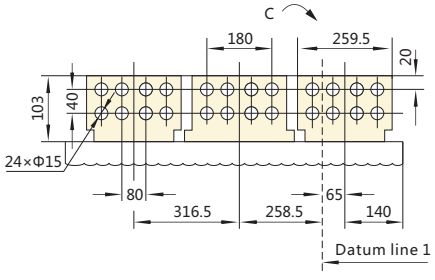




Note: If users want to change the horizontal connection into vertical connection, they only have to additionally install vertical busbars.

NA8G-6300(In=6300A) Draw-out type (Only horizontal connection is provided by the factory)

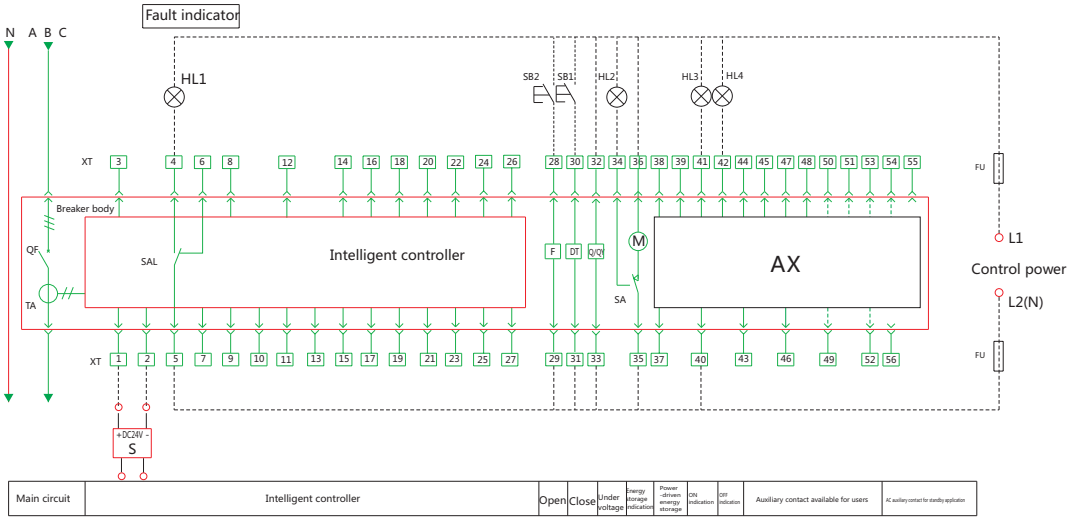




Note: If users want to change the horizontal connection into vertical connection, they only have to additionally install vertical busbars.

6. Secondary circuit wiring

Connection diagram for the secondary circuit of NA8G-1600 with standard type intelligent controller



DT——closing electromagnet
SA——travel switch
SB1~SB2——pushbutton
QF——breaker

F——shunt release
M——energy storage motor
HL1~HL4——indicator light
S——power module

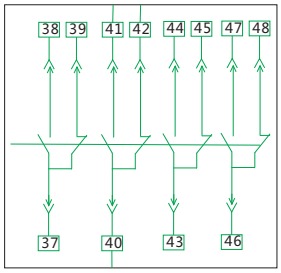
Q/QY—under voltage release
AX—auxiliary contact
XT—connection terminal
SAL—sensitive switch

FU—fuse
TA—current transformer

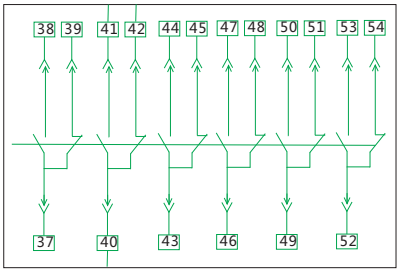
#1 and #2: input (terminals) for intellectual controller auxiliary power supply
#4, #5 and #6: faulty tripping contact output (#5 is the common terminal, AC250V 5A)

The auxiliary contact modes for customer use

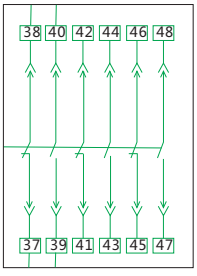
Ⅰ Four switch contact (acquiescence)



Ⅱ Six switch contact

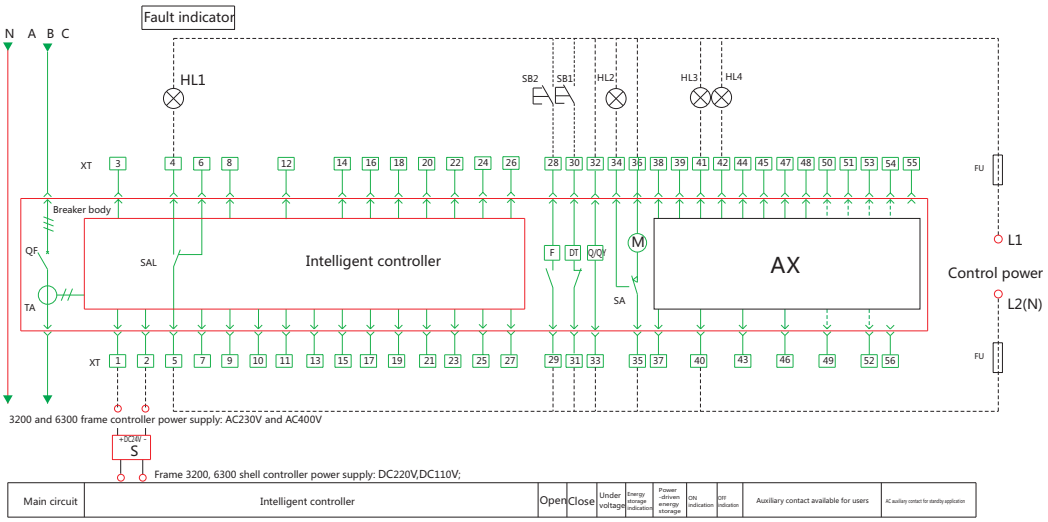


Ⅲ Three open and three close contact



Notes: 1. Four switch contact is the normal auxiliary contact mode.When special order is made for alternating current, six switch contact, three open and three close contact can be selectedadditionally. Four switch contact is the only mode in case of direct current.
2. When the controller voltage is AC230/400V, it can be directly put into #1 and #2; if the voltage is DC220/110V, it has to be put into #1 and #2 after the power module output DC24V.
3. The wiring for the part indicated by dashed lines shall be made by users.

Connection diagram for the secondary circuit of NA8G-3200 to 6300 with standard type intelligent controller



DT——closing electromagnet
SA——travel switch
SB1~SB2——pushbutton
QF——breaker

F——shunt release
M——energy storage motor
HL1~HL4——indicator light
S——power module

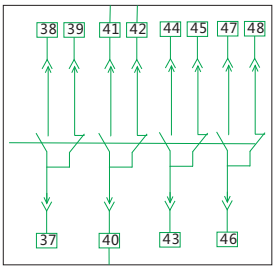
Q/QY—under voltage release
XT—connection terminal
AX—Auxiliary contact
SAL—sensitive switch

FU—fuse
TA—current transformer

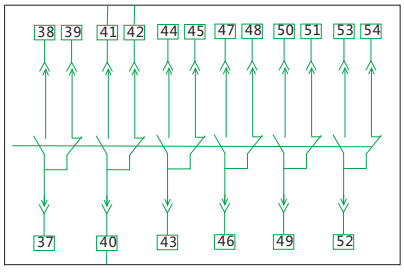
#1 and #2: input (terminals) for intelligent controller auxiliary power supply
#4, #5 and #6: faulty tripping contact output (#5 is the common terminal, AC250V 5A)

The auxiliary contact modes for customer use

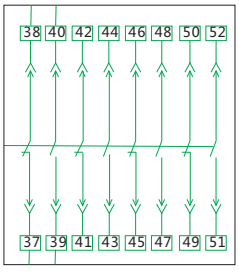
Ⅰ Four switch contact (acquiescence)



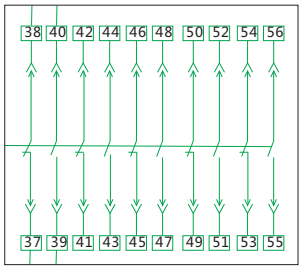
Ⅱ Six switch contact



Ⅲ Four open and four close contact

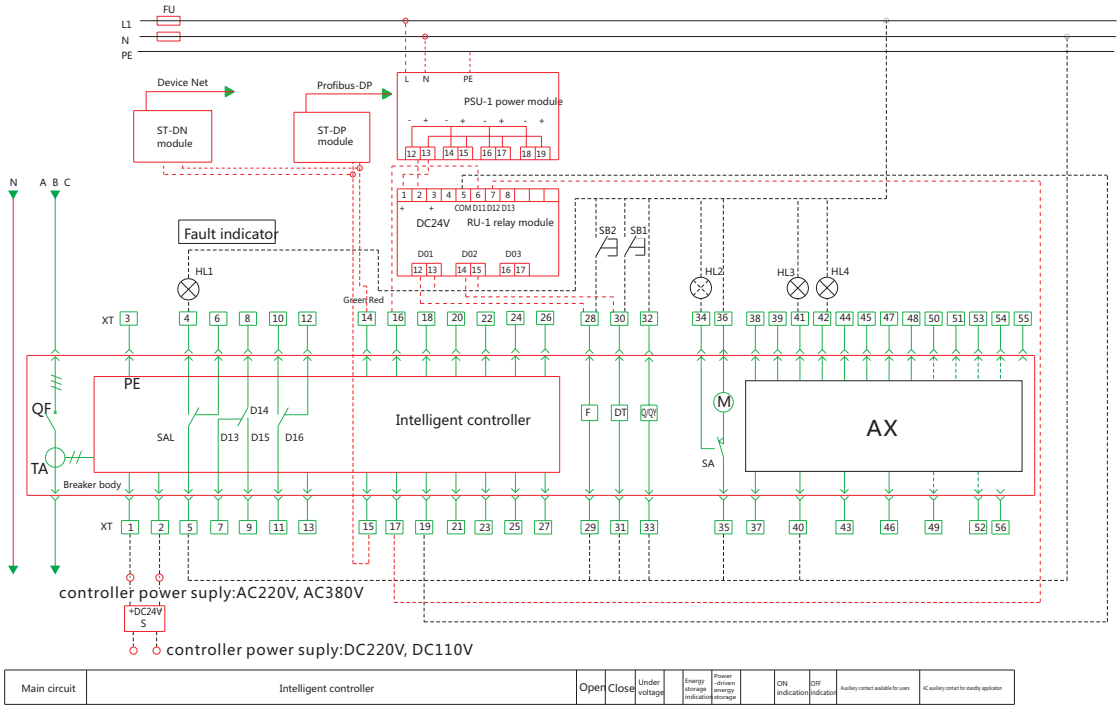


Ⅳ Five open and five close contact



Notes: 1. Four switch contact is the normal auxiliary contact mode. When special order, six switch contact, four open and four close contact, five open and five close contact can be selected additionally.
2. When the controller voltage of frame 3200 and 6300 is AC230V/400V, it can be directly put to #1 and #2; if the voltage is DC220V/110V, it has to be put to #1 and #2 after the power module outputs DC24V.
3. The wiring of the part indicated by dashed lines shall be made by users.

Connection diagram for the secondary circuit of NA8G-1600 with multifunctional type intelligent controller



DT——closing electromagnet
SA——travel switch
SB1~SB2——pushbutton
QF——breaker
PSU-1——power module (optional)

F——shunt release
M——energy storage motor
HL1~HL4——indicator light
S——power module
AX—Auxiliary contact

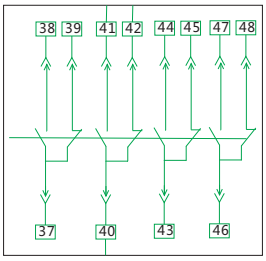
Q/QY—under voltage release
XT—connection terminal
ST-DP —communication module
ST-DN—communication module
SAL—sensitive switch

FU—fuse
TA—current transformer
RU-1—relay module (optional)

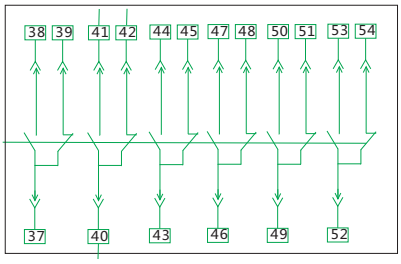
#1 and #2: input (terminals) for intelligent controller auxiliary power supply
#3 : PE
#4, #5 and #6: faulty tripping contact output (#5 is the common terminal, AC250V 5A)
#7, #8 and #9: auxiliary contact output (#8 is the common terminal, AC250V 5A)
#10, #11 and #12: auxiliary contact output (#11 is the common terminal, AC250V 5A)
#14 and #15 : RS485 communication interfaces (in case of communication type)
#16, #17, #18, #19, #26 and #27: programmable input/output points (DC110V 0.5A, AC250V, 5A)
#20, #21, #22, and #23: A, B, C, and N voltage signal output (in case of multifunction type) (maximum voltage AC400V)
#24 and #25: to be externally connected to the mutual inductor input

The auxiliary contact modes for customer use

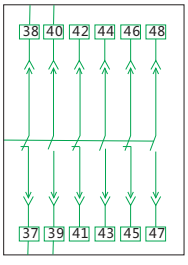
Ⅰ Four switch contact (acquiescence)



Ⅱ Six switch contact

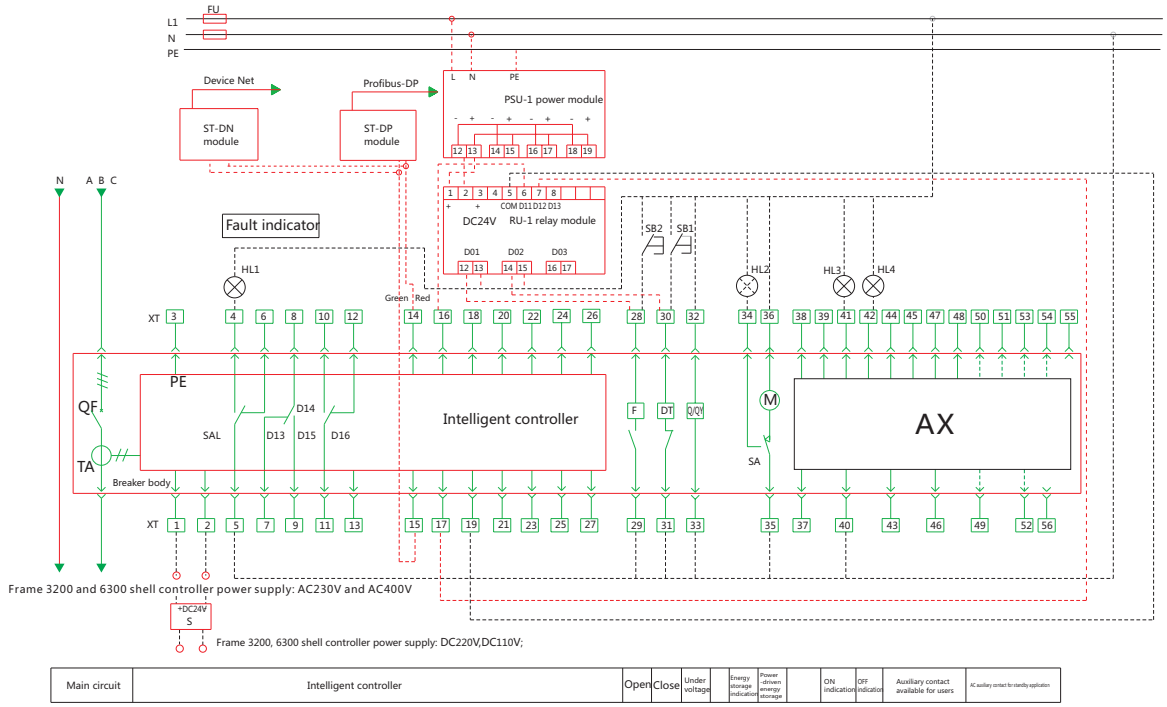


Ⅲ Three open and three close contact



Notes: 1. Notes: 1. Four switch contact is the normal auxiliary contact mode. When special order is made for alternating current, six switch contact, three open and three close contact can be selected additionally. Four switch contact is the only mode in case of direct current.
2. The wiring of the part indicated by dashed lines to be made by users.
3. When the controller voltage is AC230/400V, it can be directly put into #1 and #2; if the voltage is DC220/110V, it has to be put into #1 and #2 after the power module output DC24V.

Connection diagram for the secondary circuit of NA8G-3200 and 6300 with multifuctional type itelligent controller.



DT——closing electromagnet
SA——travel switch
SB1~SB2——pushbutton
QF——breaker
PSU-1——power module (optional)

F——shunt release
M——energy storage motor
HL1~HL4——indicator light
S——power module
AX—Auxiliary contact

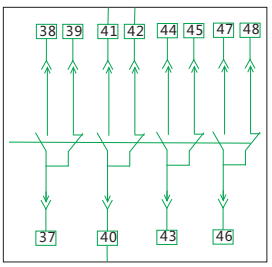
Q/QY—under voltage release
XT—connection terminal
ST-DP —communication module
ST-DN—communication module
SAL—sensitive switch

FU—fuse
TA—current transformer
RU-1—relay module (optional)

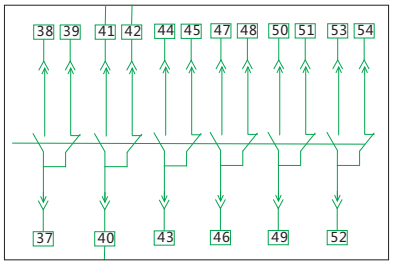
#1 and #2: input (terminals) for intelligent controller auxiliary power supply
#3 : PE
#4, #5 and #6: faulty tripping contact output (#5 is the common terminal, AC250V 5A)
#7, #8 and #9: auxiliary contact output (#8 is the common terminal, AC250V 5A)
#10, #11 and #12: auxiliary contact output (#11 is the common terminal, AC250V 5A)
#14 and #15 : RS485 communication interfaces (in case of communication type)
#16,#17, #18, #19, #26 and #27: programmable input/output points (DC110V 0.5A, AC250V, 5A)
#20, #21, #22, and #23: A, B, C, and N voltage signal output (in case of multifunction type) (maximum voltage AC400V)
#24 and #25: to be externally connected to the mutual inductor input

The auxiliary contact modes for customer use

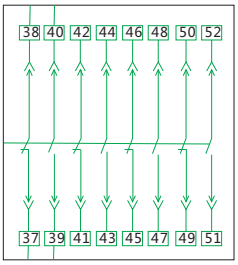
Ⅰ Four switch contact (acquiescence)



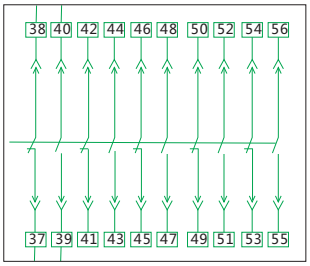
Ⅱ Six switch contact



Ⅲ Four open and four close contact



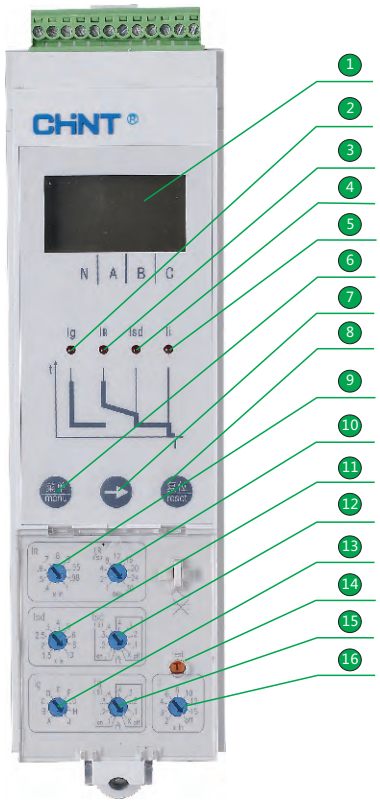
Ⅳ Five open and five close contact



Notes: 1. Four switch contact is the normal auxiliary contact mode. When special order, six switch contact, four open and four close contact, five open and five close contact can be selected additionally.
2. When the controller voltage of the 3200 and 6300 shells is AC230V/400V, it can be directly put to #1 and #2;if the voltage is DC220V/110V, it has to be put to #1 and #2 after the power module inputs DC24V.
3. The wiring of the part indicated by the dashed lines shall be made by users.

7. Intelligent controller and protective characteristics

7.1 User interface of the standard type controller



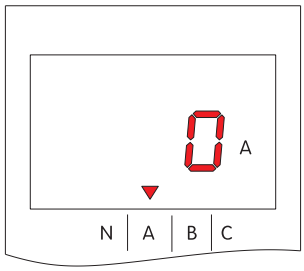
1	LED window	LED window capable of showing the current for each phase, various setting parameters, rated current, fault current, tripping time, and the like
2	" Ig " limp	Single-phase earthing fault indicator
3	" IR " limp	Long time-delay overcurrent fault indicator
4	" Isd " limp	Short-circuit short time-delay overcurrent
5	" Ii " limp	Short-circuit instantaneous overcurrent fault indication
6	" MENU " Pushbutton	Successively access to submenus at various levels by pressing the MENU key To inquire the current for each phase at present: recurrently select the contents in the menus at various levels
7	" ⟵ " Pushbutton	Return to previous menu; the intelligent controller software is reset;
8	" RESET " Pushbutton	RESET key must be pressed after the encoder switch position is adjusted; the intellectual controller faulty tripping results in fault memory which can be cleared only by pressing the RESET key;
9	" IR " Knob switch	There are (0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 0.95, 0.98, 1.0)In, nine settings altogether, for the current multiple setting of long time-delay overcurrent.
10	" tR " Knob switch	There are (1, 2, 4, 8, 12, 16, 20, 24, 30)s, nine settings altogether, for the time delay time setting of long time-delay overcurrent in case of 6IR.
11	" Isd " Knob switch	There are (1.5, 2, 2.5, 3, 4, 5, 6, 8, 10)Ir, nine settings altogether, for the current multiple setting of short-time short time-delay.
12	" tsd " Knob switch	For the short-circuit short time-delay time setting, there are nine settings: the inverse time limit, i.e., I^2t on(0.1, 0.2, 0.3, 0.4)s, the definite-time limit, i.e., I^2t OFF (0.1 0.2 0.3 0.4)s and X, i.e., closing the short time-delay
13	" Ig " Knob switch	There are (A, B, C, D, E, F G, H, J), nine settings altogether, for the current multiple setting of single-phase earthing.
14	" test " Pushbutton	Button for simulating instantaneous tripping test
15	" tg " Knob switch	For the time setting of single-phase earthing, there are nine settings: the inverse time limit, i.e., I^2t on(0.1, 0.2, 0.3, 0.4)s, and the definite-time limit, i.e., I^2t OFF(0.1 0.2 0.3 0.4)s, and X, i.e., closing the single-phase earthing.
16	" Ii " Knob switch	Short-circuit instantaneous current multiple setting.

7.2 Default interface and operation method for the standard type controller

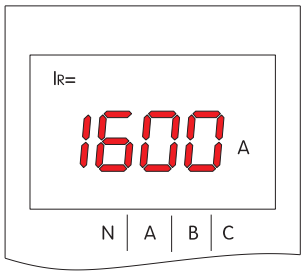
The default interface for the standard type controller is described as follows: (The current for each phase to be selected by pressing "→")

Press "MENU"key once to go to the status for parameter query as follows, and then press"→"to go to query the setting parameter of quadruple overcurrent protection.

Default interface of the standard type controller

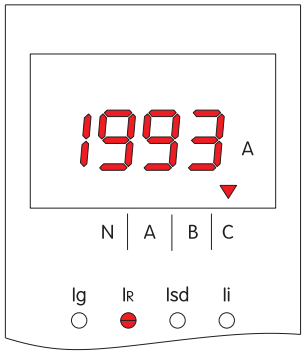


Status for parameter query—setting current of long time-delay

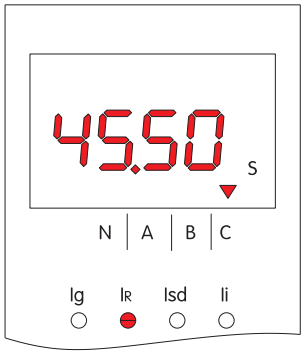


Press "MENU" key twice to go to the status for fault query as follows,show the latest fault information:

Status for fault query—tripping current

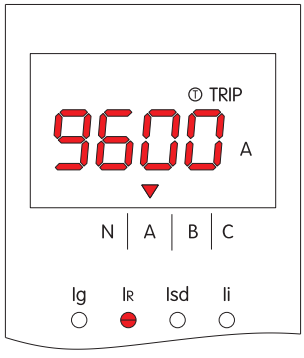


Status for fault query—tripping time

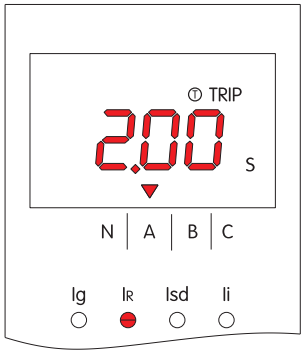


Press "TEST" key to go to the status for simulating tripping test in case of $6I_{R}$ and after tripping as follows:

Status of simulating tripping test—simulating current

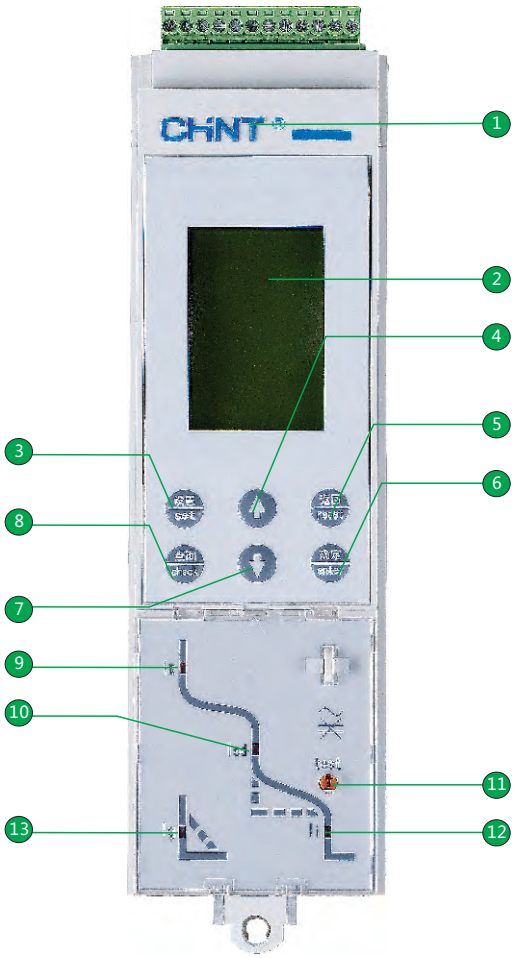


Status of simulating tripping test—simulating time



Press "RESET"key at any status to go back to default interface.

7.3 User interface of the multifunctional controller



1	Brand	"CHINT" Brand
2	LED window	LCD window capable of showing the current for each phase, various setting parameters, rated current, fault current, tripping time and the like
3	SET key	Switch to the set default menu (left arrow key, when it is necessary to move leftwards or rightwards for the set interface).
4	UP key	Move the box select menu under the current menu to change the position of said box upwards, and perform the setting of the parameter ADD in the parameter setup menu.
5	RETURN key	Exit the current menu and go to the previous menu, or cancel the value of the current setup parameter.
6	ACK key	Go to the next menu of the currently selected select box (go to the set state under the set interface, a nd exit the set state by pressing the key again).
7	DOWN key	Move the box select menu under the current menu to change the position of said box downwards, and perform the setting of the parameter SUBTRACT in the parameter setup menu.
8	INQUIRY key	Switch to the inquiry default menu (right arrow key, when it is necessary to move leftwards or rightwards for the set interface).
9	" IR " limp	Long time-delay overcurrent fault indicator
10	" Isd " limp	Short-circuit short time-delay overcurrent fault indicator
11	" test "	Button for simulating instantaneous tripping test
12	" Ii " limp	Short-circuit instantaneous overcurrent fault indicator
13	" Ig " limp	Single-phase earthing fault indicator

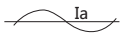
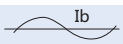
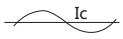
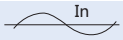
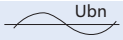
7.4 Default interface and menu structure for the multifunctional controller

The multifunctional controller provides 4 title menus (measurement menu, parameter setup menu, protection parameter setup menu, and history record and maintenance menu) and 1 default menu.

Default interface for the multifunctional controller

7.4.1 Structure of the measurement menu

Primary menu	Secondary menu	Third menu	Fourth menu	Fifth menu
Magnitude of current I	Instantaneous value	Ia Ib Ic In	Ia= 1000A	
			Ib= 1001A	
			Ic= 998A	
			In= 0A	
			Ig= 0A or IΔn=0.00A	
		Maximum	Ia= 1300A	
			Ib= 1400A	
			Ic= 1380A	
			In= 200A	
			Ig= 0A or IΔn=0.00A	
		Unbalance rate	Ia= 3%	
			Ib= 5%	
			Ic= 1%	
	Current thermal capacitance	100%		
	Required value	Real-time value $\bar{Ia}$,$\bar{Ib}$, $\bar{Ic}$,$\bar{In}$	15min	
			$\bar{Ia}$= 1000A	
			$\bar{Ib}$= 1000A	
			$\bar{Ic}$= 998A	
			$\bar{In}$= 0A	
		Maximum	$\bar{Ia}$= 1050A	
			$\bar{Ib}$= 1040A	
			$\bar{Ic}$= 1010A	
			$\bar{In}$= 0A	
Voltage U	Instantaneous value	Uab= 380V		
		Ubc= 380V		
		Uca= 380V		
		Uan= 220V		
		Ubn= 220V		
		Ucn= 220V		
	Mean value	Uav= 380V		
	Unbalance rate	0%		
	Phase sequence	A,B,C		
FrequencyF	50Hz			
Electric energy E	Total electric energy	EP= 200kWh		
		EQ= 10kvarh		
		ES= 200kVAh		
	Input electric energy	EP= 200kWh		
		EQ= 200kvarh		
	Output electric energy	EP= 0kWh		
		EQ= 0kvarh		
	Electric energy reset	Reset		

Primary menu	Secondary menu	Third menu	Fourth menu	Fifth menu
Power P	Instantaneous value	P, Q, S	P= 660kW	
			Q= 0kvar	
			S= 660kVA	
		Power factor	-1.00	
			Perceptual	
			PFa= 1.00	
			PFb= 1.00	
			PFc= 1.00	
		Pa, Qa, Sa	Pa= 220kW	
			Qa= 0kvar	
			Sa= 220kVA	
		Pb, Qb, Sb	Pb= 220kW	
			Qb= 0kvar	
			Sb= 220kVA	
		Pc, Qc, Sc	Pc= 220kW	
			Qc= 0kvar	
			Sc= 220kVA	
	Required value	$\overline{P}$, Q, S	$\overline{P}$= 660kW	
			$\overline{Q}$= 0kvar	
			$\overline{S}$= 660kVA	
		Maximum	$\overline{P}$= 661kW	
			$\overline{Q}$= 2kvar	
			$\overline{S}$= 662kVA	
			Reset(+/-)	
Harmonic H	Waveform	Ia , Ib Ic , In	 Ia	
			 Ib	
			 Ic	
			 In	
		Uan , Ubn Ucn	 Uan	
			 Ubn	
			 Ucn	
	Base form	I(A)	Ia= 1000A	
			Ib= 1000A	
			Ic= 1000A	
			In= 1000A	
		U(V)	Uab= 380V	
			Ubc= 380V	
			Uca= 380V	
			Uan= 220V	
			Ubn= 220V	
			Ucn= 220V	
	THD	I(%)	Ia= 0.0%	
			Ib= 0.0%	
			Ic= 0.0%	
			In= 0.0%	
		U(%)	Uab= 0.0%	
			Ubc= 0.0%	
			Uca= 0.0%	
			Uan= 0.0%	
			Ubn= 0.0%	
			Ucn= 0.0%	
	thd	I(%)	Ia= 0.0%	
			Ib= 0.0%	
			Ic= 0.0%	
			In= 0.0%	

Primary menu	Secondary menu	Third menu	Fourth menu	Fifth menu
	thd	U(%)	Uab= 0.0%	
			Ubc= 0.0%	
			Uca= 0.0%	
			Uan= 0.0%	
			Ubn= 0.0%	
			Ucn= 0.0%	
	FFT	I(3, 5, 7...31)	Ia(3, 5, 7...31)	Ia FFT THD=0.0% 0.0% 3 5 7 9 11...31)
			Ib(3, 5, 7...31)	Ib FFT THD=0.0% 0.0% 3 5 7 9 11...31)
			Ic(3, 5, 7...31)	Ic FFT THD=0.0% 0.0% 3 5 7 9 11...31)
			In(3, 5, 7...31)	In FFT THD=0.0% 0.0% 3 5 7 9 11...31)
		U(3, 5, 7...31)	Uab(3, 5, 7...31)	Uab FFT THD=0.0% 0.0% 3 5 7 9 11...31)
			Ubc(3, 5, 7...31)	Ubc FFT THD=0.0% 0.0% 3 5 7 9 11...31)
			Ubc(3, 5. 7...31)	Ubc FFT THD=0.0% 0.0% 3 5 7 9 11...31)
			Uca(3, 5, 7...31)	Uca FFT THD=0.0% 0.0% 3 5 7 9 11...31)

7.4.2 Structure of the parameter setup menu

Primary menu	Secondary menu	Third menu	Fourth menu	Fifth menu
Setting of the measurement meter	System type	=3Φ4W 4CT		
	Line incoming pattern	=Wire to enter from the upper port		
Test & lock	Test tripping	Test type	=three section protection	
		Test parameter	=I:9999A	
		Test initiation	=start	
	Remote locking	Remote locking	=unlock	
	Parameter locking	Parameter locking	Parameter locking =locking	
		(input) user password =0000	User password (change) =0000	
Communication setting	Address	=3		
	Baud rate	=9.6K		
I/O setting	Function setting	=DO1 =regional interlocking		
	Executive mode	=DO1 =N.O. pulse =360s		
	I/O state	I/O state DO1 DO2 DO3 DI1 1 1 1 1		

7.4.3 Structure of the protection parameter setup menu

Primary menu	Secondary menu	Third menu	Fourth menu	Fifth menu
Current protection	Long time delay	Ir	e.g.: =1000A=100%In	
		Current protection	e.g.: =ON	
		Delay time	e.g.: =C1, Is@6Ir	
		Cooling time	e.g.: =3h	

Primary menu	Secondary menu	Third menu	Fourth menu	Fifth menu
Current protection	Short-time delay	Definite-time limit	Operating current	e.g. =5000A=5.0Ir
				e.g. =0.1s
		Inverse-time limit	Delay time	e.g. =2000A=2.0Ir
				e.g. =C1，0.Is@6Ir
	Instantaneous	Operating current	e.g. =10000A=10.0In	
	Neutral phase protection	Neutral phase protection	e.g. =200%	
	Ground protection	Operating current	e.g. =800A	
		Delay time	e.g. =0.4s	
		Coefficient of earthing	e.g. =6.0	
	Grounding alarm	Starting current	e.g. =600A	
		Starting time	e.g. =0.1s	
		Return current	e.g. =100A	
		Return time	e.g. =0.1s	
	Leakage protection	Operating current	e.g. =8.0A	
		Setup delay time	e.g. =0.75s	
	Electric leakage alarm	Starting current	e.g. =5.0A	
		Starting time	e.g. =0.1s	
		Return current	e.g. =4.0A	
		Return time	e.g. =0.1s	
Load Monitoring	Executive mode	e.g. =I the first method		
	Unloading value 1	e.g. =800A		
	Unloading time 1	e.g. =50%tr		
	Unloading value 2	e.g. =700A		
	Unloading time 2	e.g. =25%tr		
Voltage protection	Under voltage	Executive mode	e.g. =Alarm	
		Startup value	e.g. =200V	
		Starting time	e.g. =0.2s	
		Return value	e.g. =320V	
		Return time	e.g. =60.0s	
	Over voltage	Executive mode	e.g. =Alarm	
		Startup value	e.g. =480V	
		Starting time	e.g. =1s	
		Return value	e.g. =400V	
		Return time	e.g. =60.0s	
	U unbalanced	Executive mode	e.g. =Alarm	
		Startup value	e.g. =10%	
		Starting time	e.g. =1s	
		Return value	e.g. =5%	
		Return time	e.g. =60.0s	

7.4.4 Structure of the history record and maintenance menu

Primary menu	Secondary menu	Third menu	Fourth menu	Fifth menu
Current alarm	e.g. phase sequence alarm, Inverse power alarm, over frequency alarm...			
Number of operations	Total number of times Number of operations	e.g.: 300 e.g.: 219(ACK key, reset)		
Contact wear	Total wear IContact wear	e.g.: 120 e.g.: 20(ACK key, reset)		
Product information	Zhejiang CHINT electrics co., LTD			
Tripping record	e.g.: 1 Under voltage tripping 2004/06/17	Under voltage tripping T=0.20s Umax=0V 11:24:59 6/17		
		F=0.00Hz Uab= 0V Ubc= 0V Uca= 0V		
	.....	.....		

Primary menu	Secondary menu	Third menu	Fourth menu	Fifth menu
Tripping record	e.g. 8 (for) short-circuit definite-time limit 2004/05/30	A phase short-circuit definite-time limit T= 0.4s I= 4300A 15:28:25 5/30		
		Ia= 4300A Ib= 4200A Ic= 4000A In= 150A		
Alarm logging	e.g. 1 DI (for) DI input alarm 2004/07/16	Di input alarm Di1 2004/07/16 20:38:45		
	.....	.....		
	e.ge 8 Under voltage alarm 2004/06/20 Note: Up to 8 times of alarms can be recorded	Under voltage alarm Umax= 0V 2004/06/20 22:29:40		
Position changing record	e.g. 1 (for) local switch on 2002/06/18	local switch on 2002/06/18 9:30:56		
	.....	.....		
	e.g. 8 (for) testing tripping 2002/06/15 Note: Up to 8 times can be recorded	Test tripping 2002/06/15 10:30:20		

Notes: a. The actual menu will very depend on the function selected by the user.
b. The controller starts screensaver automatically 10min later.

7.5 List of the controller functions

Standard configuration

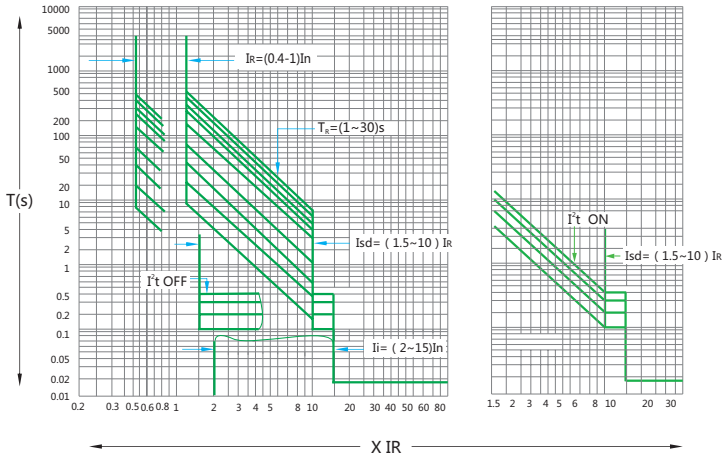
Standard type (M type)	Multifunction type (H type)
1.Quadruple overcurrent protection (for long time-delay, short-circuit short time-delay,instantaneous,earthing); earthing corresponds to vector sum (T type); 2.Parameter setup: fixed value setting position setting function; 3.Current measurement; 4.Test function; 5.Fault recording function; 6.Self-diagnostic function; 7.MCR make/break function; 8.Human-machine interface: 33×22 LED.	1.Quadruple over current protection (for long time-delay,short-circuit short time-delay,instantaneous,earthing); earthing corresponds to vector sum (T type); 2.Parameter setup: fixed value keyboard setting function; 3.Current measurement function; 4.Current unbalance rate measurement function; 5.Two test functions: (1)Instantaneous tripping test simulated on the panel; (2)Triple over current, grounding/leakage and operating time tests simulated by software; 6.Fault recording function: 8 times of failures can be recorded; 7.Self-diagnostic function; 8.MCR make/break function; 9.Communication function: MODBUS protocol; 10.Alarm logging function; 11.Recording number of operations; 12.Contact wear; 13.Position changing record; 14.Human-machine interface: 28×43 LCD; 15.Heat capacity measurement.

Heat capacity measurement

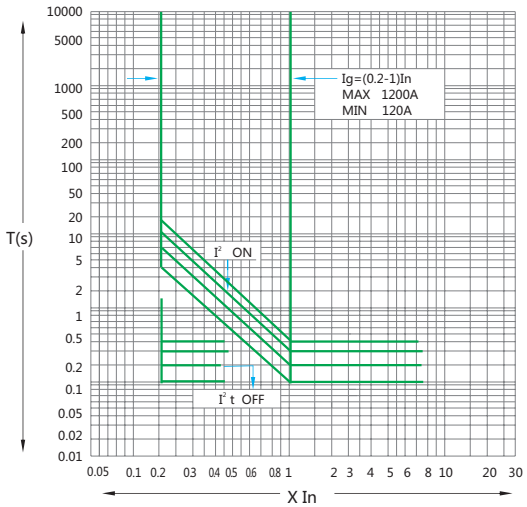
Standard type (M type)	Multifunction type (H type)	
	P Function	H Function
None	1.Voltage measurement; 2.Voltage unbalance measurement; 3.Frequency measurement; 4.Phase sequence measurement; 5.Electric energy measurement; 6.Power measurement; 7.Power factor measurement; 8.Earth-current grounding protection; 9.Leakage protection; 10.Load monitoring function; 11.Quadruple D0 output function; 12.DI input function; 13.Regional interlocking function; 14.Under and over voltage protection;	1.Voltage measurement; 2.Voltage unbalance measurement; 3.Frequency measurement; 4.Phase sequence measurement; 5.Electric energy measurement; 6.Power measurement; 7.Power factor measurement; 8.Earth-current grounding protection; 9.Leakage protection; 10.Load monitoring function; 11.Quadruple DO output function; 12.DI input function; 13.Regional interlocking function; 14.Under and over voltage protection; 15.Measurement of harmonic current; 16.Neutral phase protection

7.6 Characteristic parameters of the standard type intelligent controller

Overcurrent protection characteristics



Neutral line (earthing) fault protection characteristic



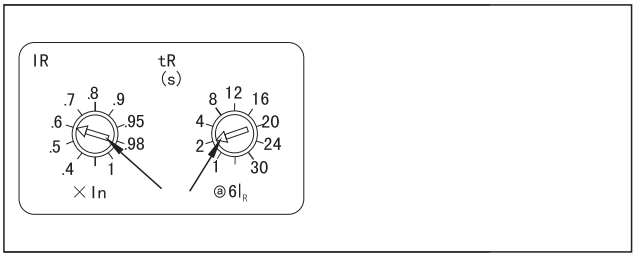
7.6.1 Long time-delay overcurrent protection characteristic

Rated current range [IR]	Error	Current [I]	Operating time [tR(s)]									Time error
(0.4~1)In	±10%	≤1.05I_R	No actuation within 2h									
		>1.30I_R	<1h and then actuate									
		1.5IR	16	32	64	128	192	256	320	384	480	±15%
		2.0IR	9	18	36	72	108	144	180	216	270	
		6.0IR	1	2	4	8	12	16	20	24	30	

Explanation for parameter setting
Current of long time-delay overcurrent protection: I_R=(0.4-0.5-0.6-0.7-0.8-0.9-0.95-0.98-1)×In, optional.

The long-time delay tripping time represents the inverse-time limit characteristic, and nine optional settings are readily available for tripping time in case of 6IR:TR=(1-2-4-8-12-16-20-24-30)s.

For setting, insert a small slotted screwdriver to the knob groove as shown in the right drawing, gently turn it to make the arrow of the knob point at the current and time set as required. As shown in the figure, the over current long time delay protection current setting value I_R=0.6In, and the delay tripping time is 2s (in the condition of 6I_R).



Example 1: If it is known that in condition of I=6I_R,
The tripping time setting value is 2s,
and now the circuit current I=1.5I_R,
then the actual tripping time T_R can be worked out by:
(1.5I_R)2×T_R=(6I_R)2×2. The answer is obtained as T_R=32s

7.6.2 Short-circuit short time-delay overcurrent protection characteristic.

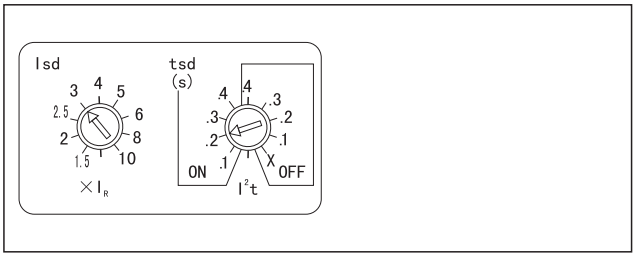
Rated current range [Isd]	Error	Current [I]	Operating time [tsd(s)]	Time error
(1.5~10)I_R +OFF(Power off)	±15%	<0.85Isd	No action	±15%
		>1.15Isd	Time-delay action	
		I^2t OFF	0.1 0.2 0.3 0.4	
		I^2t ON I>10IR	0.1 0.2 0.3 0.4	
		I^2t ON I≤10IR	anti-time-limit delay:$I^2Tsd=(10I_R)^2tsd$	

Explanation for parameter setting
Current of short-circuit short time-delay overcurrent protection : Isd=(1.5-2-2.5-3-4-5-6-8-10)×I_R, optional.

There are nine settings for the short-circuit short time-delay tripping time, wherein 4 settings represent the definite-time limit characteristic (i.e., I^2t OFF), 4 seetings the inverse-time limit characteristic, and 1 setting the function of closing the short- circuit short time-delay (X).

When the tripping time is set as definite-time limit operating characteristic (i.e., the arrow points at the off area), the tripping time can be selected as tsd=(0.1s-0.2s-0.3s-0.4s-x (i.e., the function of closing the short-time delay).

When the tripping time is set as inverse-time limit operating characteristic(i.e., I^2t ON), there are two cases: ①the case of 1 > 1.15Isd and 1 > 10I_R represents the definite-time limit; ② the case of 1 > 1.15Isd and I≤10I_R represents the inverse-time limit characteristic and the actual tripping time is calculated according to the formula $I^2Tsd=(10I_R)^2tsd$, where in I is the line current, Tsd the actual tripping time, and tsd the setting tripping time. The method for setting the current and time for the short-circuit short time-delay overcurrent protection is similar to that for over long time-delay overcurrent protection. As shown in the figure, the current for the short-circuit short time-delay overcurrent protection is 3I_R, and the tripping time is set as tsd=0.2s in the setting position of inverse time limit (I^2t ON).



Example 2: If it is known that the short-time delay setting current is Isd=3I_R,
then the tripping time is set as tsd=0.2s
in the setting position of inverse
time limit (I^2t ON). Now the current is 7I_R
in the line current, then the short-time delay tripping time can be worked out by calculation:
1.5Isd=1.15×3I_R=3.45I_R
Then I=7I_R > 1.15Isd
And because I=7I_R < 10I_R
So accotding to I^2×Tsd=(10I)^{2}tsd
$(7I_R)^2$×Tsd=$(10I_R)^2$×0.2
Tsd=0.41s

7.6.3 Short-circuit instantaneous overcurrent protection

Rated current range [Ii]	Error	Line current [I]	Operating Characteristics
(2~15)In +OFF(Power off)	±15%	≤0.85Ii	no-action
		> 1.15Ii	action

Explanation for parameter setting

Current of short-circuit instantaneous over current protection: Ii=[2-3-4-6-8-10-12-15-OFF]×In, optional.
The method for setting the current of short-circuit instantaneous

overcurrent protection is similar to that for long time-delay overcurrent protection setting. As shown in the figure, the instantaneous overcurrent protection current setting value is 8In.

7.6.4 Single-phase earthing fault protection

Rated current range [Ig]	Error	Line current [I]	Operating time [tg(s)]	Time (delay) error
(A~J)In +OFF(Power off)	±10%	< 0.9Ig	no-action	
		> 1.1Ig	time-delay action	±15%
		I^2T OFF	0.1 0.2 0.3 0.4	
		I^2T ON I > J	0.1 0.2 0.3 0.4	
		I^2T ON I≤J	anti-time-limit delay $I^2Tg=(J)^2tg$	

Meaning of Ig

Rated current In	A	B	C	D	E	F	G	H	J	Note
In≤400A	0.3	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	×In
400A<In≤1200A	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	×In
1200A<In	500A	640A	720A	800A	880A	960A	1040A	1120A	1200A	

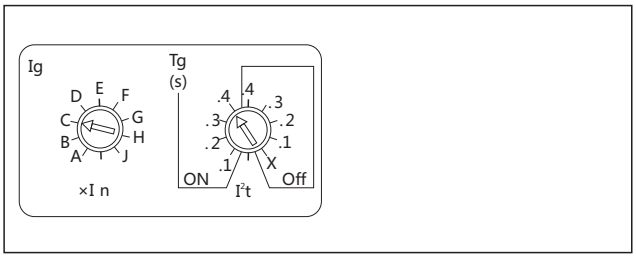
Explanation for parameter setting

Current of single-phase earthing protection : Ig=(A-B-C-D-E-F-G-H-J)×In, optional.

There are nine setting positions for the protective delay tripping time, wherein 4 settings represent the definite-time limit characteristic (i.e., I^2t OFF), 4 settings the inverse-time limit characteristic (I^2t ON), and 1 setting the function of closing the single-phase earthing protection (X).

When the tripping time is set as definite-time limit operating characteristic (i.e., the arrow points at the OFF area), the tripping time can be selected as tg=0.1s-0.2s—0.3s-0.4s-x (i.e., the function of closing the single-phase earthing protection).

When the tripping time is set as inverse-time limit operating characteristic (i.e., I^2t ON), there are two cases:
① in the case of I > 1.1Ig and I > J, the result of the automatic changeover process is the definite-time limit operating characteristic, tg=0.1s-0.2s-0.3s-0.4s;
② The case of the current meeting the condition of 1.1Ig < I≤J represents the inverse-time limit characteristic and the actual tripping time is calculated according to the formula $I^2Tg=(J)^2tg$.
In the formula, I is the circuit current, Tg is the actual operating time, J is the setting current, and tg is the setting tripping time.The method for setting the parameter is similar to that for long time-delay current protection. As shown in the figure, the single-phase earthing protection current is C×In, and the tripping time setting is tg=0.4s in the setting position of inverse time limit (I^2t ON).



Example 3: If it is known that the single-phase earthing protection setting current for the intelligent controller with rated current of In=800A is as the setting position of C, the tripping time is set as the inverse time limit 0.4s.
Now there is a failure in the circuit, the circuit current I=400A, then the actual tripping time can be worked out; it can be seen from the table that the result is
C=0.4
Ig=C×In=0.4×800=320A
So I=400A > 1.1Ig
According to the formula $I^2T_g=(J)^2t_g$
$(400)^2\times T_g=(1.0\times800)^2\times0.4$
$T_g=1.6s$

Note: For the intelligent controller, the current settings for the long time-delay and the short-circuit short time-delay and the intantaueous overcurrent protection should not come across each other, and the condition of I_R < Isd < Ii must be ensured.

7.7 Explanation for auxiliary functions

a. Explanation for test functions

When onsite adjustment, periodical inspection or overhaul is made with the controller supported by the breaker, breaking several times is necessary by using the test functions of the controller to check the cooperation of the controller and the breaker. With the breaker on, press the test key, and the intelligent controller will trip instantaneously to cut off the breaker.

Note: ① This function can be used only when onsite adjustment or overhaul for the breaker is made, and shall not be used during the normal operation.

② Each time before the controller is switched on, it is necessary to press the reset button in the upper position of the controller panel so that the breaker can be switched on again for operation.

b. Explanation for fault memory

The controller still has the function of fault memory after reset or de-energized to keep a latest historical event for post analysis. Only when there is a new fault again, the original information is cleared with the current latest faulty data saved. For the inquiry method, refer to the above explanation about fault display.

7.8 Explanation for display function

When the rated current is greater than or equal to 400A, the primary current shall not be lower than 0.4In for single phase, and 0.2In for three phases for normal operation of the breaker.

When the rated current is less than 400A, the primary current shall not be lower than 0.8In for single phase, and 0.4In for three phases for normal operation of the breaker.

Note: When the AC220V ST power module is energized, and the voltage falls to AC120V, there will be no display on the controller.

When the AC380V ST power module is energized, and the voltage falls to AC200V, there will be no display on the controller.

a. Current display Error range for current display: ±5%

b. Voltage display Error range for voltage display: ±1.5%

8. Accessories

8.1 Under voltage release

When the under voltage release is not energized, neither power-driven nor manual operation can make the breaker on. For the under voltage release, there are two varieties: instantaneous and time-delay operations.The time for the under voltage time-delay release is Inm=1600A, the time can be selected from but not adjusted in the range of 0 – 7s; Inm=3200A or 6300A, the time can be selected from but not adjusted among 0.5s, 1s, 3s, and 5s. When, within 1/2 delay time, the power voltage returns to 85%Ue or above, the breaker will not get disconnected.

Operating characteristic:

Rated operational voltage Ue(V)	AC230 AC400
Operating voltage(V)	(0.35~0.7)Ue
Reliable switching voltage(V)	(0.85~1.1)Ue
Reliable not-switching voltage(V)	≤0.35Ue
Power dissipation(W)	20VA

Under-voltage release (Inm=1600A)

Under-voltage release (Inm=3200A, 6300A)

8.2 Shunt release

After the shunt release is energized, the breaker is switched off instantaneously to allow remote operation.

Operating characteristic:

Rated control supply voltage Us(V)	AC230 AC400	DC220 DC110
Operating voltage (V)	(0.7~1.1)Us	
Power consumption (W)	200VA	200W
Breaking time	50±10ms	

Shunt release (Inm=1600A)

Shunt release (Inm=3200A, 6300A)

8.3 Closing electromagnet

After the motor-driven energy storage is ended, energizing the closing electromagnet will make the energy storage spring force of the operating mechanism to be released instantaneously to rapidly switch the breaker on.

Operating characteristic:

Rated control supply voltage Us(V)	AC230 AC400	DC220 DC110
Operating voltage (V)	(0.85~1.1)Us	
Power dissipation (W)	200VA	200W
Closing time	50±10ms	

Closing electromagnet (Inm=1600A)

Closing electromagne (Inm=3200A, 6300A)

8.4 Motor-driven energy storage mechanism

The functions of motor-driven energy storage and automatic energy re-storage after the breaker comes on are available to ensure that the breaker can come on immediately after it gets

disconnected.Operating characteristic:

Rated control supply voltage Us(V)	AC230 AC400	DC220 DC110
Operating voltage (V)	(0.85~1.1)Us	
Power dissipation (W)	75/150VA	75/150W
Energy storage time	<4s	
Frequency of operation	At most 3 times in a minute	

(Inm=1600A)

(Inm=3200A, 6300A)

8.5 Auxiliary contact

Standard type:4 switch contact

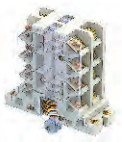
Special type:5 switch contact

6 switch contact (Only for I_{nm}=1600A, and not available for DC)

3 N.O. and 3 N.C.

4 N.O. and 4 N.C.(I_{nm}=3200A and 6300A provided)

(Inm=1600A)



(Inm=3200A, 6300A)

Technical parameters:

Rated voltage(V)		Rated thermal current Ith(A)	Rated control capacity
AC	230 / 400	6	300VA
DC	220	6	60W

8.6 Phases barrier

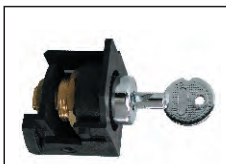
Phases barrier is installed between the phases of the line bank to improve the insulating ability between the phases of the breaker.

8.7 Key lock

The OFF pushbutton of the breaker can be locked in the position of depress, and at this time, the breaker cannot be closed for operation; When the user selects the option, the factory provides locks and keys; One breaker is provided with one lock and one key for the lock; Two breakers are two provided with locks and one key for the locks; Three breakers are provided with three same locks and two same keys for the locks.

Note:

For the air circuit breaker with key lock, when the key has to be pulled out, it is necessary to first press the OFF key, turn the key anticlockwise, and then pull out the key.



8.8 Button locking device

It is used to lock the button for opening and closing the breaker with the padlock used for such a purpose. (Padlock is provided by users themselves)

8.9 Doorcase

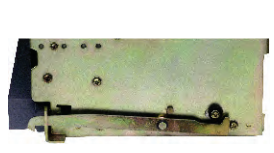
They are installed on the door of the distribution cabinet room to seal it with a protection level of up to IP40.

8.10 "Disconnected" pation locking device for the draw-out.

For the "separation" position of the open frame (draw-out) circuit breaker, a lock rod can be pulled out to lock the matter, and the breaker locked will be unable to be turned towards the TEST or CONNECTION position. Padlocks have to be provided by users themselves.

8.11 Three-position locking device for the draw-out.

After the breaker body is locked automatically in any working position, it is necessary to turn the key to unlock the matter so that the break body can be moved to the next working position by turning the handle. (this function available for 3200 to 6300).



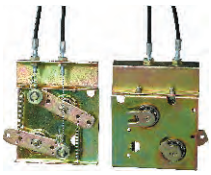
8.12 Door interlock

Door interlock for the breaker status

When the breaker is closed, the cabinet door must not be opened; when the breaker is switched off, the cabinet door is allowed to be opened. Door interlock for the breaker position When the breaker is in the position of connection and test, the cabinet door must not be opened; when the breaker is the separation position, the cabinet door is allowed to be opened.

8.13 Mechanical interlock

It can realize the interlock of two horizontal or vertical-installed,three poles or four poles,drawout or fixed breakers.



9. Installation

9.1 Following items to be checked before installation Check the label plate on the breaker panel to see if it is conform to the specifications of the ordered goods.

a.Rated current
b.Under voltage release voltage and delay time
c.Shunt release voltage
d.Closing electromagnet voltage
e.Motor voltage

9.2 Before installation, operation, maintenance and inspection, you shall read this manual, and consult the manufacturer for questions, if any.

9.3 Preparations before installation Before the breaker is installed, check the insulation resistance of the breaker by using a 1000V megohmmeter according to regulations; when the surrounding media temperature is 25℃±5℃ and the relative humidity 50% - 70%, the insulation resistance shall not be less than 20 megohm.

The place with the insulation resistance to be tested includes: the place between various phases and between various phases and the frame when the breaker is closed; the place between in- and out- lines of various phases.

Listed below are the problems which users may encounter during installation, adjustment, and operation of the breaker, and the possible reasons and elimination methods.

9.4 Installation of the fixed type breaker
Place the breaker into the distribution cabinet, and fasten it by using 4 pieces of M6(In=1600A) or M10(In=3200A or more) bolts and washers. The breaker shall be installed stably with no additional mechanical stress to avoid damage of the breaker or bad contact of the main bus bar.

9.5 Installation of the open frame (draw-out) circuit breaker Take the breaker body out of the draw-out socket, and install the socket in the distribution cabinet, and fasten it by using 4 pieces of M6(In=1600A) or M10(In=3200A or more) bolts and washers; the breaker shall be installed stably with no additional mechanical stress to avoid damage of the breaker or bad contact of the main bus bar. After the work is completed, mount the body into the draw-out socket.

9.6 The specifications of the wiring copper bars for the primary circuit of the breaker shall meet the copper bar specifications used under the conditions of conventional heating in IEC/EN 60947-2.

9.7 The breaker shall be grounded substantially.

10. Common faults and troubleshooting

No.	Technical problems	Possible causes	
1	Breaker tripping (fault indicator on)	Overload fault tripping (long time delay indicator on)	Diagnosis and trouble shooting 1 Check the breaking current and operating time on the intelligent controller 2 Analyze the operation of the load and power network 3 Promptly find and shoot the trouble if overload is confirmed 4 For lack of match between the actual running current and the long time delay operating current, please modify the long time-delay operating current setting for a proper match and protection according to the actual running current 5 Press the reset button to close the breaker again
		Short-circuit fault tripping (short time-delay or instantaneous overcurrent indicator on)	1 Check the breaking current and operating time on the intelligent controlle 2 Promptly find and shoot the trouble if overload is confirmed 3 Check the setting value of the intelligentcontroller 4 Check to see whether the breaker is in good condition, and determine whether it can be closed for operation 5 Press the reset button to close the breaker again
		Earthing fault tripping (earthing fault indicator on)	1 Check the breaking current and operating time on the intelligent controller 2 Promptly find and shoot the trouble if it is confirmed that there is a earthing fault 3 If no earthing fault is detected, please determine whether the earthing fault current setting is proper, and can be well matched with the actual protection; if not, the setting shall be modified 4 Press the reset button to close the breaker again
2	Breaker fails to close	Under voltage release Tripping	1 Check to see if the power voltage is lower than 70%Ue 2 Check the under voltage release and control unit for fault
		Mechanical interlock action	Check the working condition of two breakers equipped with mechanical interlock.
		Under voltage release No attracting	1 Whether the under voltage release has been energized 2 Whether the power voltage is lower than 85%Ue 3 Whether the under voltage release or control unit malfunctions, if so, the release shall be replaced.
		Reset button fails to reset	Press the reset button to close the breaker again.
		Open frame (draw-out) circuit breaker fails to be put to the righ t position by rocking	Check the contract status of the secondary circuit, and shoot the trouble, if any
		Open frame (draw-out) circuit breaker Bad contact for the secondary circuit	1 Check the motor control power supply and see if it is well providing power, and the voltage must be ⩾85%Us 2 Check the status of the motor energy storage mechanism.
		Breaker fails to pre-store energy	Put the open frame (draw-out) circuit breaker to the right position by rocking (with it locked in the connected position)
		Closing electromagnet trouble	1 Check the power voltage of the closing electromagnet, and it must be higher than or equal to 85%Us 2 If there is any trouble in the closing electromagnet to enable the attracting, it shall be replaced.

No.	Technical problems	Possible causes	
3	Breaker trips after closed	Tripping immediately Delay tripping	1 There may be short circuit current when the matter is switched on, and in this case you shall find and shoot the trouble 2 Check to see if there is any overload current in the circuit, find and shoot the trouble 3 Check the setting value of the intelligent controller for reasonability, and a re-setting process is necessary if not reasonable 4 Press the reset button to close the breaker again
4	Breaker fails to open	The breaker fails to break in power-driven modeThe breaker fails tobreak in manual mode	1 Check the shunt release circuit for reliable connection and the shunt release for trouble, and the release shall be replaced if the fault is confirmed 2 Check the operating mechanism for mechanical fault.
5	Breaker fails to store energy	Energy failed to be stored in power-driven mode	1 Check the motor-driven energy storage mechanism control power voltage, and the voltage shall be ≥85%Us; check the status of the circuit connection 2 Check the motor
		Energy failed to be stored in manual mode	Check the operating mechanism for mechanical fault
6	Breaker fails to be pulled out when the open frame (draw-out) circuit breaker is in the SEPARATION position	Rock rod fails to be pulled out Breaker fails to completely reach the SEPERATION position	Pull out the rock rod Put the breaker completely to the “disconnected” position by rocking
7	Open frame (draw-out) circuit breaker fails to be put to the CONNECTION position by rocking	The "drawer” has seized up for foreign matters fall in it; damage in the mechanism for putting in by rocking or the gear thereof; Position locking device fails to be unlocked	Check it for foreign matters and for condition of the rack and gear Turn the key on the “drawer” to unlock the matter
8	No display on the intellectual controller screen	Intelligent controller fails to be energized by power supply: Improper input voltage for the auxiliary power supplyImproper secondary output voltage for the transmitter Unreliable connection between the secondary output terminal of the transmitter and the controller	1 Check to see if the intelligent controller power supply is well be connected and works well 2 Cut off the intellectual controller control power supply, and then connect the power supply; If the fault is still present, there may be some troubles in the controller which has to be replaced

11. Ordering specification

User		Order amount	Order date	Tel
Type and size	☐NA8G-1600	☐NA8G-3200	☐NA8G-4000	☐NA8G-6300
Rated current (In)A	☐400 ☐630 ☐800 ☐1000 ☐1250 ☐1600	☐1600 ☐2000 ☐2500 ☐3200	☐ 2500 ☐ 3200 ☐ 4000	☐4000 ☐5000 ☐6300(don' t have 4P)
Installation mode	☐draw-out type ☐Fixed type (no such products for over 4000A)			
Connection mode	☐Horizontal connection ☐Vertical connection ☐Front connection ☐mixed connection (connection mode to be noted)			
Number of poles	☐3P ☐4P			
Intelligent controller	Setting of the protection parameter	Factory' s setting values: I_R=1In, t_r=2s@6I_R; I_{sd}=8I_R, inverse-time protection,t_{sd}= 0.4s; I_i=12I_n;OFF(If on, when I_n > 1200A I_g=800A; when I_n≤1200A I_g=0.5I_n) If the user has some requirements different from the defaulting, please write the numerical values on the line below		
		Long-time delay protectionIR	Operating current setting_____In (0.4,0.5,0.6,0.7,0.8,0.9,0.95,0.98,1) Operating time setting_____s (1,2,4,8,12,16,20,24,30)	
		Short-circuit short-time delay protectionIsd	Operating current setting_____IR (1.5,2,2.5,3,4,5,6,8,10) Operating time setting ☐inverse time_____s (0.1,0.2,0.3,0.4,OFF)	
		Short-circuit instantaneous protectionIi	Operating current setting_____In (2,3,4,6,8,10,12,15,OFF)	
		Ground protectionIg	Operating current setting_____In Operating time setting ☐inverse time_____s ☐Definite-time limit_____s	
	Selecting the type	☐Standard type ☐Multifunctional type		
	Power input	☐AC400V ☐AC230V ☐DC220V ☐DC110V ☐DC24V		
	Basic function	Three-section protection against over current Neutral line or grounding fault protection Voltage measurement Test function Fault inquiry/memory function Self-diagnostic function		
	Optional function (this function to be added as required by the user, and to be matched with the controller type)	☐Over voltage protection ☐Under voltage protection ☐Over frequency protection ☐Under frequency protection ☐Voltage unbalance measurement ☐Phase sequence protection ☐Voltage measurement ☐Frequency measurement ☐Measurement of harmonic current ☐Power factor measurement ☐Power measurement ☐Phase sequence detection ☐Voltage unbalance rate measurement ☐Electric energy measurement ☐Contact equivalent ☐MCR make/break function ☐Load monitoring function ☐Signal contact output function ☐Communication function ☐ZSI regional interlocking protection		
	Note: when the product is a multifunctional controller as arranged by the user, the communication function and the like are the basic function configuration			
Accessories for standard configuration	Under voltage release	☐Instantaneous ☐Time delay_____s (1-2-3-4-5-6-7s provided for frame 1600, optional but not adjustable; 0.5-1-3-5s for frame 3200 and 6300l, optional but not adjustable) ☐AC400V ☐AC230V		
	Shunt release	☐AC400V ☐AC230V ☐DC220V ☐DC110V		
	Closing electromagnet	☐AC400V ☐AC230V ☐DC220V ☐DC110V		
	Energy storage motor	☐AC400V ☐AC230V ☐DC220V ☐DC110V		
	Auxiliary contact	☐4 switch contact ☐6 swith contact ☐3 N.O. and 3 N.O. (only for frame 1600 provided) ☐4 N.O. and 4 N.O. (only for frame 3200,4000,6300 provided) ☐6 N.O. and 6 N.0(only for frame 3200,4000,6300 provided)		
Accessories for optional configuration	OFF locking device	☐One breaker is provided with one lock and one key ☐Two breakers is provided with two same locks and one key ☐Three breakers is provided with three same locks and two keys		
	Mechanical interlock	Mechanical interlock ☐Steel cable interlock ☐Connecting-rod interlock		
	☐Button locking device ☐Phases barrier	☐Three-position locking device for the draw-out socket	☐Door interlock	

Note: Extra costs are needed for the optional functions, optional accessories and the like for the breaker.

Summary

5 basic frame sizes

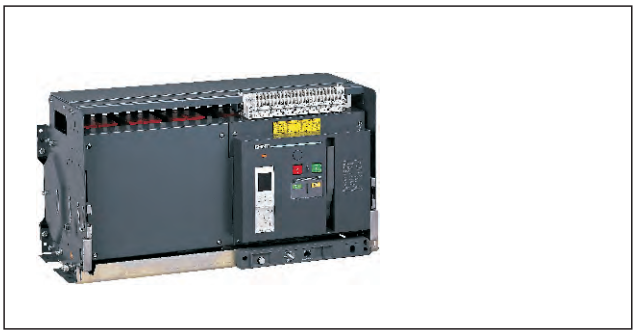
For your various requirements, the Air Circuit Breaker NA1 includes 5 basic frame sizes as followed.

NA1-1000X
200A to 1000A

NA1-2000X,NA1-2000XN，NA1-2000XH
630A to 2000A

NA1-3200X,NA1-3200XN,NA1-4000X
2000A to 4000A

NA1-6300X,NA1-6300XN
4000A to 6300A



1. General

1.1 Application scope

NA1 series air circuit breaker is suitable for the circuit of AC 50Hz/60Hz with rated service voltage 400V, 690V and rated service current up to 6300A. It is mainly used to distribute electric energy and protect circuits and electric equipment against over-load, under-voltage, short-circuit and single-phase earthing fault.

With intelligentized and selective protection functions, the breaker can improve the reliability of power supply, and avoid unnecessary power failure. The breaker is applicable for power stations, factories, mines (for 690V) and modern high-buildings, especially for the distribution system of intelligentized building.

1.2 Standard: IEC/EN 60947-2.

2. Operating conditions

2.1 Temperature condition:

-5℃~40℃; the average value within 24h shall not exceed +35℃ (special situation excluded);

2.2 Altitude:≤2000m;

2.3 Pollution grade: Grade 3;

2.4 Air conditions:

At mounting site, relative humidity not exceed 50% at the max temperature of +40℃, higher relative humidity is allowable under lower temperature, RH could be 90% at +20℃, special measures should be taken to occurrence of dews;

2.5 Note: Without the intelligent controller, the breaker functions as a switch-disconnector.

2.6 Type designation

NA1 - □□-□□/□-□-□-□-□

Voltage of secondary circuit
AC220V, AC380V,
AC230V, AC400V
DC220V, DC110V

Wiring of main circuit:
H:Horizontal wiring of main circuit
V:Vertical wiring of main circuit

Mode of installation:
F:Fixed type
D:Draweout type

Mode of operation:
M:Manual
P: Power-driven

No. of poles:
3:3-pole
4:4-pole

Intelligent controller:
M: Standard type
3M: Multifunctional type
3H: Communication type

Rated current:

Frame size rated current	Rated current
1000A	200A
	400A
	630A
	800A
	1000A
2000A	630A
	800A
	1000A
	1250A
	1600A
	2000A
3200A	2000A
	2500A
	3200A
4000A	4000A
6300A	4000A
	5000A
	6300A

Breaking capacity:
X
XN
XH

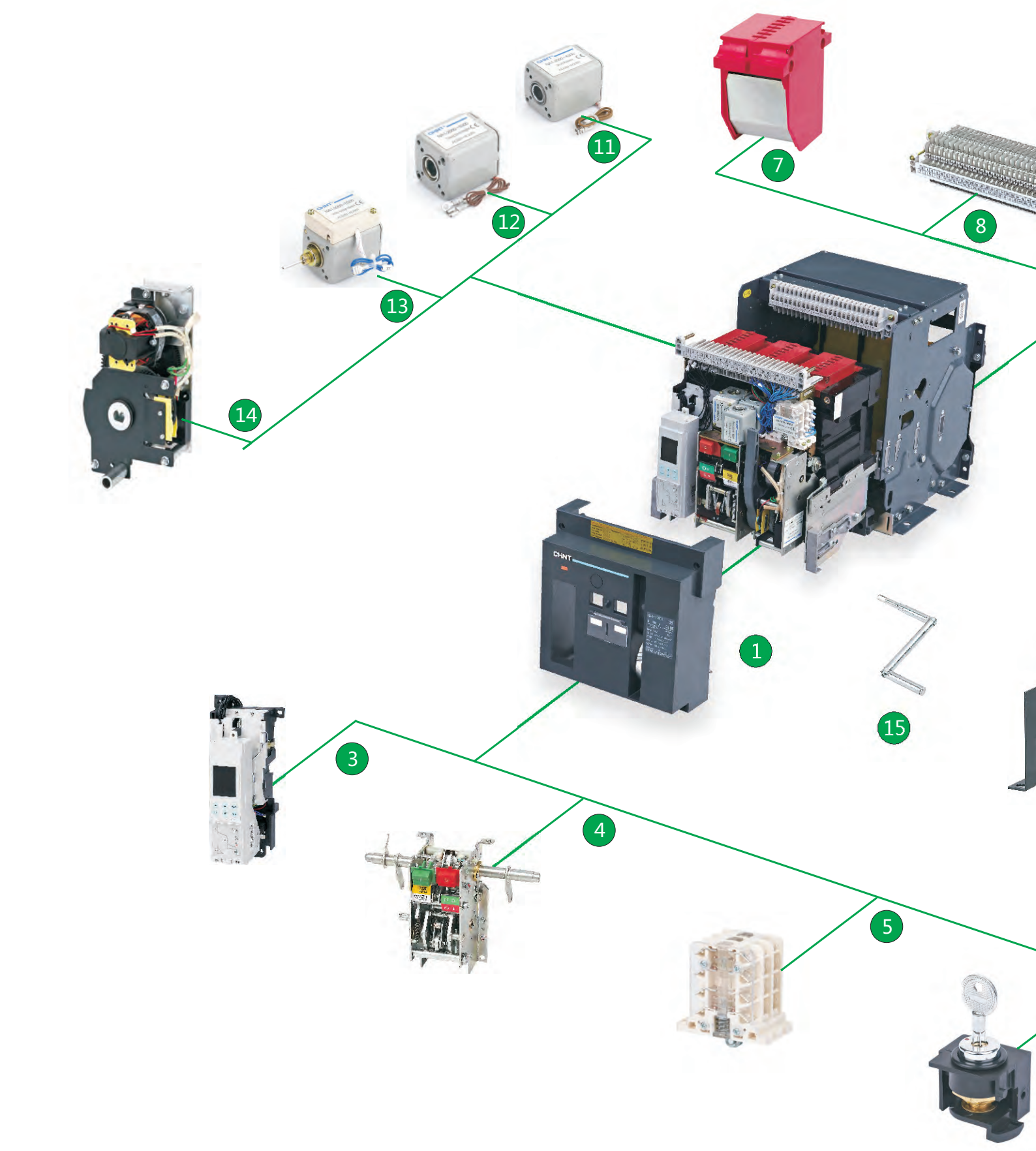
Frame size rated current:
1000,2000,3200,4000,6300

Design sequence number

ACB

Company code

C


11
12
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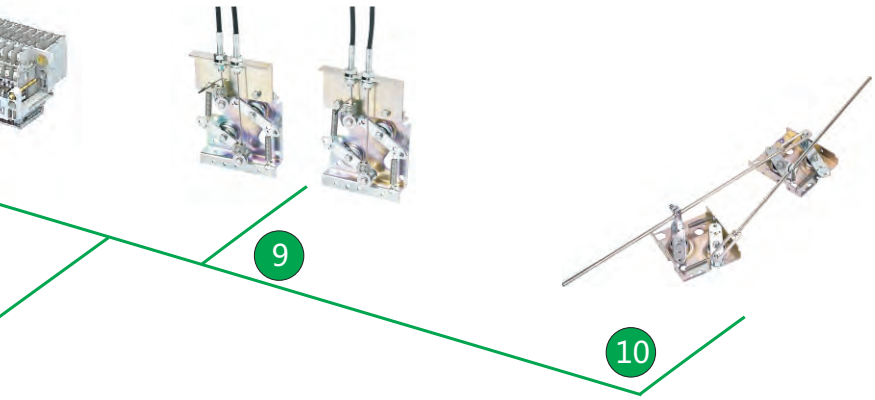
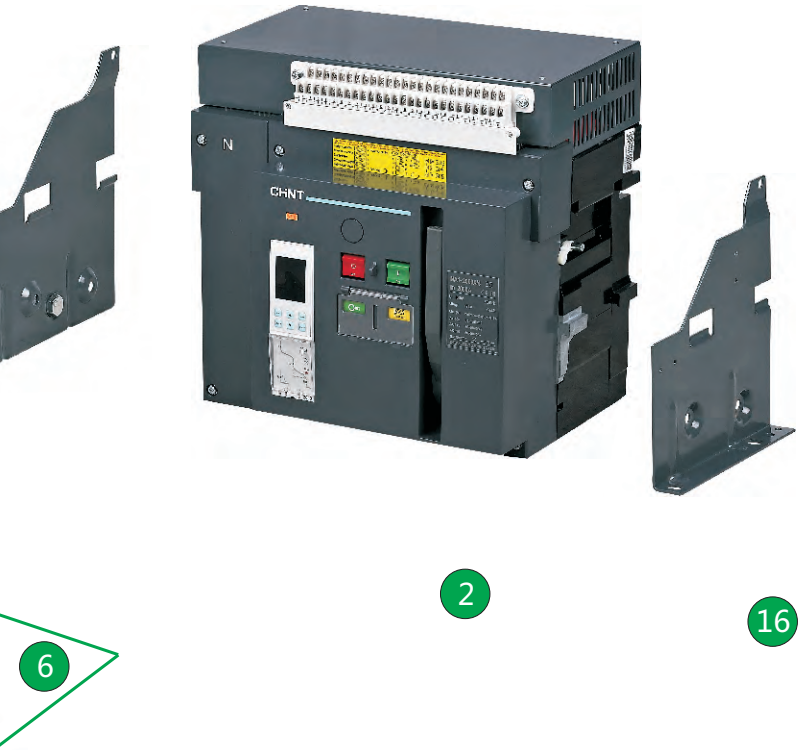


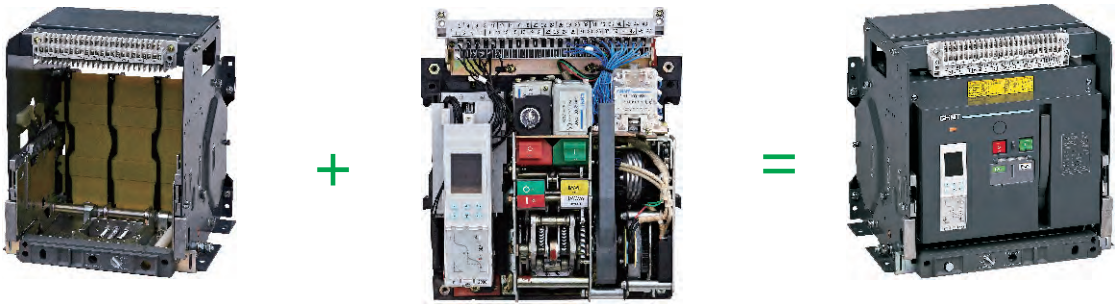


NA1 Air Circuit Breaker

1. Drawout type
2. Fixed type
3. Intelligent controller
4. Operating mechanism
5. Auxiliary contact
6. Locking-device
7. Arcing chamber
8. Secondary wiring terminal
9. Wire-cable mechanical interlock
10. Connecting-rod type mechanical interlock
11. Shunt release
12. Closing electromagnet
13. Under-voltage release
14. Motor-driven energy-storage mechanism
15. Rotary handle
16. Mounting plate

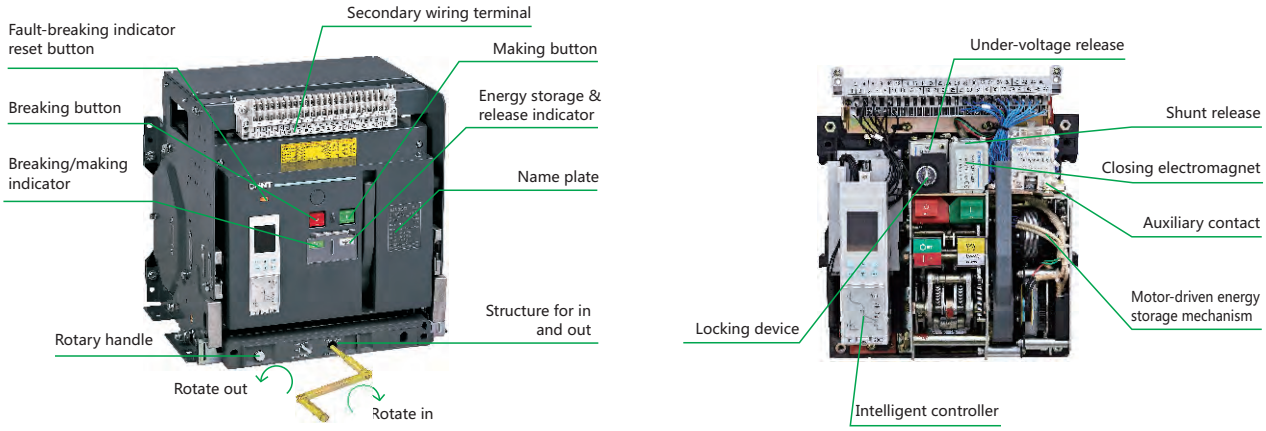
C

3. Structure



Drawer seat + Body = Drawout type breaker/switch-disconnector

Mounting plate — Mounting plate for the fixed type breaker/switch-disconnector — Mounting plate



4. Main technical parameter

Type		NA1-1000X				
						
Rated ultimate short circuit breaking capacity (Icu)	AC400V	42				
	AC690V	25				
Rated service short circuit breaking capacity (Ics)	AC400V	30				
	AC690V	20				
Rated short-time withstand current (Icw.1s)	AC400V	30				
	AC690V	20				
Rated current In (A)		200	400	630	800	1000
Number of poles		3, 4				
Rated voltage Ue (V)		AC 400, AC 690				
Rated insulation voltage Ui (V)		800				
Rated current of N-pole In (A)		100%In				
Fixed disconnection time (ms)		23~32				
Intelligent controller	Standard type (M)	●	●	●	●	●
	Communication type (H)	●	●	●	●	●
Operation performance	Electric life	AC 400V:6500, AC 690V:3000				
	Mechanical life	Non-maintenance 15,000				
		Maintenance 30,000				
Connection pattern		Horizontal, Vertical				
Motor operational standard configuration weight (kg)	Drawout 3P/4P	38/55				
	Fixed 3P/4P	22/26.5				

C

Type		NA1-2000X			NA1-2000XN		NA1-2000XH
							
Rated ultimate short circuit breaking capacity (Icu)	AC400V	80			50		65
	AC415V	50			40		50
	AC690V	50			40		50
Rated service short circuit breaking capacity (Ics)	AC400V	65			50		65
	AC415V	40			40		40
	AC690V	40			40		40
Rated short-time withstand (Icw.1s)	AC400V	50			50		50
	AC415V	40			40		40
	AC690V	40			40		40
Rated short-time withstand (Icw.3s)	AC400V	42			42		42
	AC415V	42			42		42
Rated current In (A)		630	800	1000	1250	1600	2000
Number of poles		3, 4					
Rated voltage Ue (V)		AC 400, AC 415, AC 690					
Rated insulation voltage Ui (V)		1000					
Rated current of N-pole In (A)		100%In					
Fixed disconnection time (ms)		23~32					
Intelligent controller	Standard type (M)	●	●	●	●	●	●
	Communication type (H)	●	●	●	●	●	●
Operation performance	Electric life	AC400:6500 AC690V:3000					
	Mechanical life	Non-maintenance 15,000					
		Maintenance 30,000					
Connection pattern		Horizontal, Vertical					
Motor operational standard configuration weight (kg)	Drawout 3P/4P	67.5 / 80			70 / 84		79 / 90.5
	Fixed 3P/4P	42 / 52			44 / 52		45 / 54

C

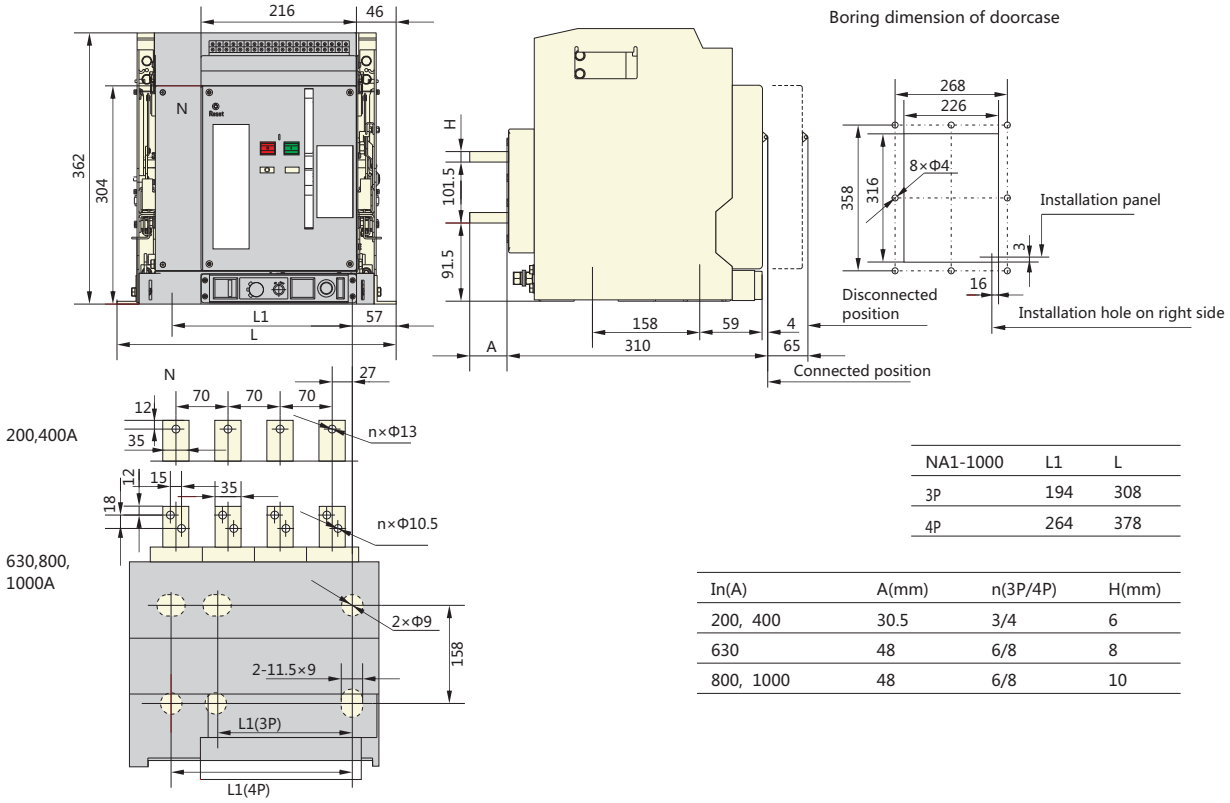
Type			NA1-3200X		NA1-3200XN	NA1-4000X
						
Rated ultimate short circuit breaking capacity (Icu)		AC400V	80		65	80
		AC415V	65		50	—
		AC690V	65		50	65
Rated service short circuit breaking capacity (Ics)		AC400V	65		65	65
		AC415V	65		50	—
		AC690V	65		50	65
Rated short-time withstand (Icw.1s)		AC400V	65		65	65
		AC415V	50		50	—
		AC690V	50		50	50
Rated short-time withstand (Icw.3s)		AC400V	45		45	—
		AC415V	45		45	—
Rated current I_n (A)			2000	2500	3200	4000
Number of poles			3, 4			3
Rated voltage Ue (V)			AC 400, AC 415, AC 690			
Rated insulation voltage Ui (V)			1000			
Rated current of N-pole I_n (A)			100%In			
Fixed disconnection time (ms)			23~32			
Intelligent controller	Standard type (M)		●	●	●	●
	Communication type (H)		●	●	●	●
Operation performance	Electric life		AC400V:3000 AC690V:2000			AC400V:1500 AC690V:1000
	Mechanical life		Non-maintenance 10,000			
			Maintenance 20,000			
Connection pattern			Horizontal, Vertical			
Motor operational standard configuration weight (kg)	Drawout 3P/4P		90.5 / 116	90.5 / 116	103 / 130	132
	Fixed 3P/4P		55 / 68	55 / 68	56.5 / 71	72 / -

Type			NA1-6300X		NA1-6300XN
					
Rated ultimate short circuit breaking capacity (Icu)		AC400V	120		100
		AC415V	85		75
		AC690V	85		75
Rated service short circuit breaking capacity (Ics)		AC400V	100		100
		AC415V	75		75
		AC690V	75		75
Rated short-time withstand (Icw.1s)		AC400V	100		100
		AC415V	75		75
		AC690V	75		75
Rated short-time withstand (Icw.3s)		AC400V	50		50
		AC415V	50		50
rated current In (A)			4000	5000	6300
Number of poles			3, 4		3
Rated voltage Ue (V)			AC 400, AC 415, AC 690		
Rated insulation voltage Ui (V)			1000		
Rated current of N-pole In (A)			50%In		—
Fixed disconnection time (ms)			23~32		
Intelligent controller	Standard type (M)		●	●	●
	Communication type (H)		●	●	●
Operation performance	Electric life		AC400V:1500 AC690V:1000		
	Mechanical life		Non-maintenance 5000		
			Maintenance 10,000		
Connection pattern			Horizontal, Vertical		
Motor operational standard configuration weight (kg)	Drawout 3P/4P		210 / 233	210 / 233	233 / -
	Fixed 3P/4P		- / -	- / -	- / -

Standard configuration: M type intelligent controller; Under-voltage release; Shunt release; Motor-driven energy-storage mechanism; Closeing electromagnet.

5. Dimensions and connection

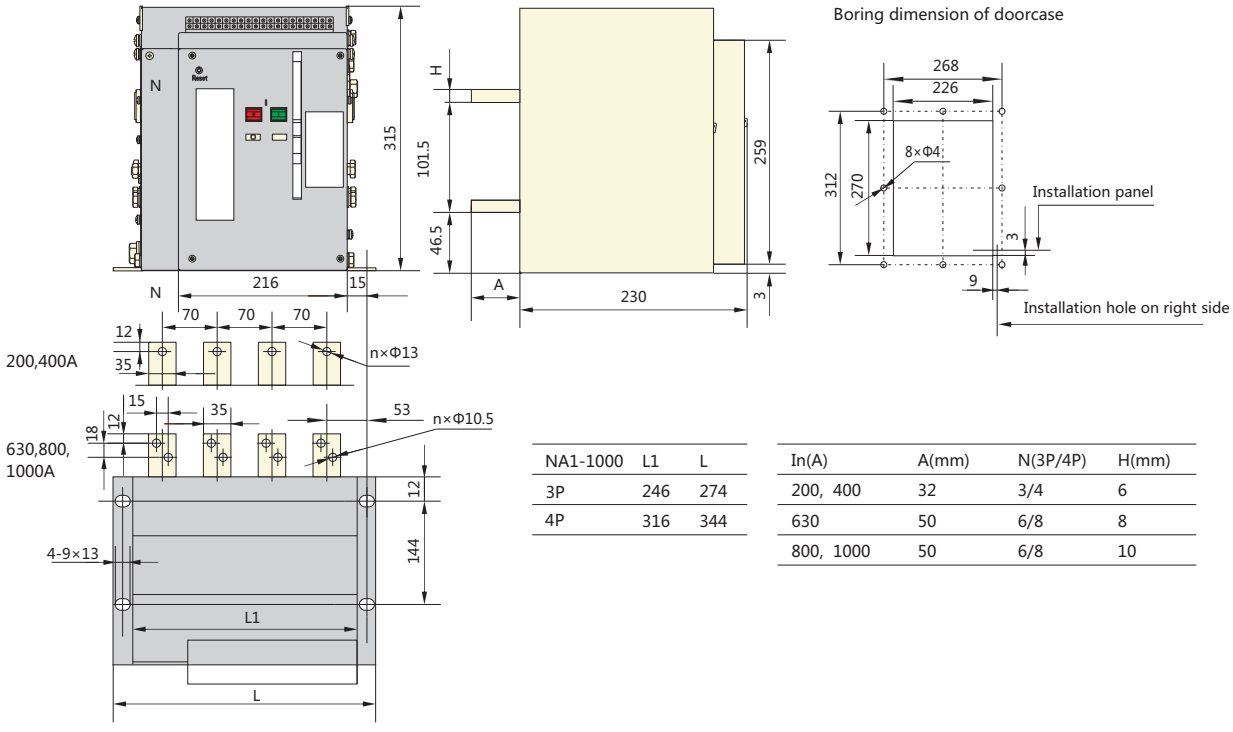
NA1-1000X Drawout-type



NA1-1000	L1	L
3P	194	308
4P	264	378

In(A)	A(mm)	n(3P/4P)	H(mm)
200, 400	30.5	3/4	6
630	48	6/8	8
800, 1000	48	6/8	10

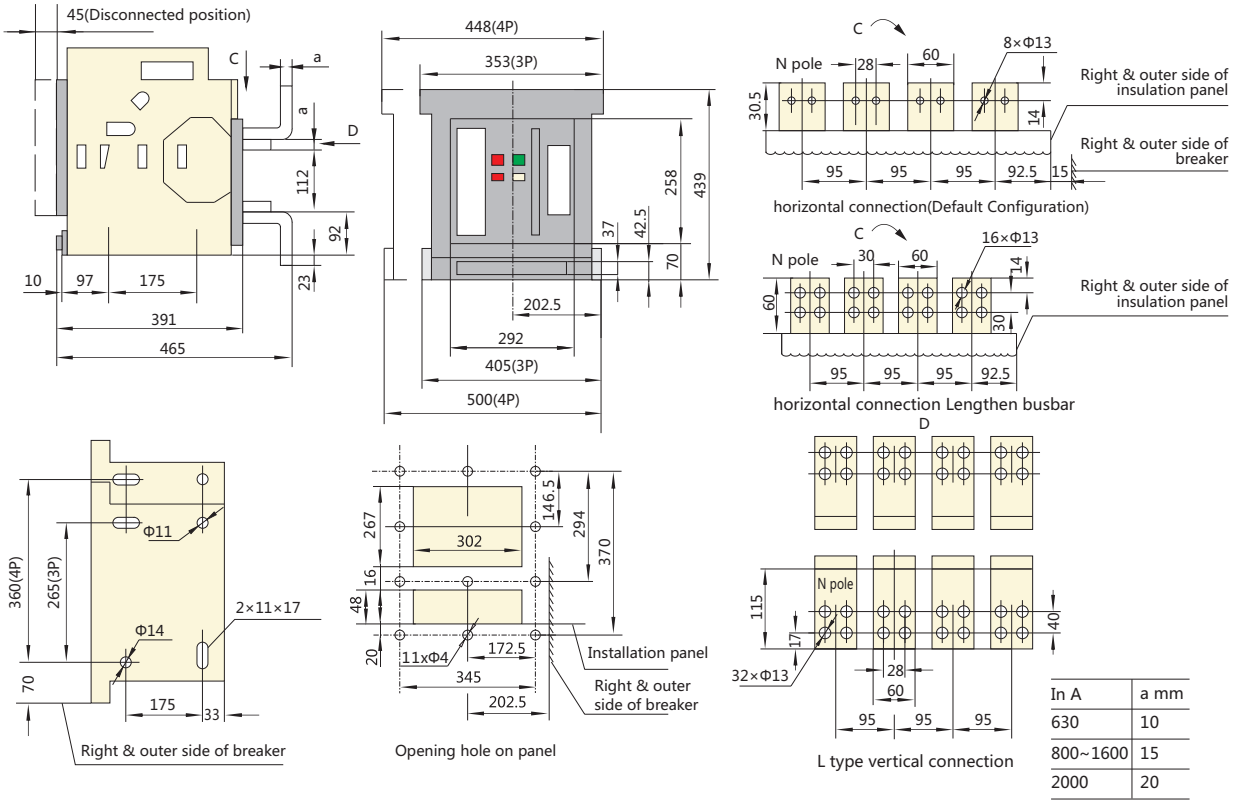
NA1-1000X Fixed-type



NA1-1000	L1	L
3P	246	274
4P	316	344

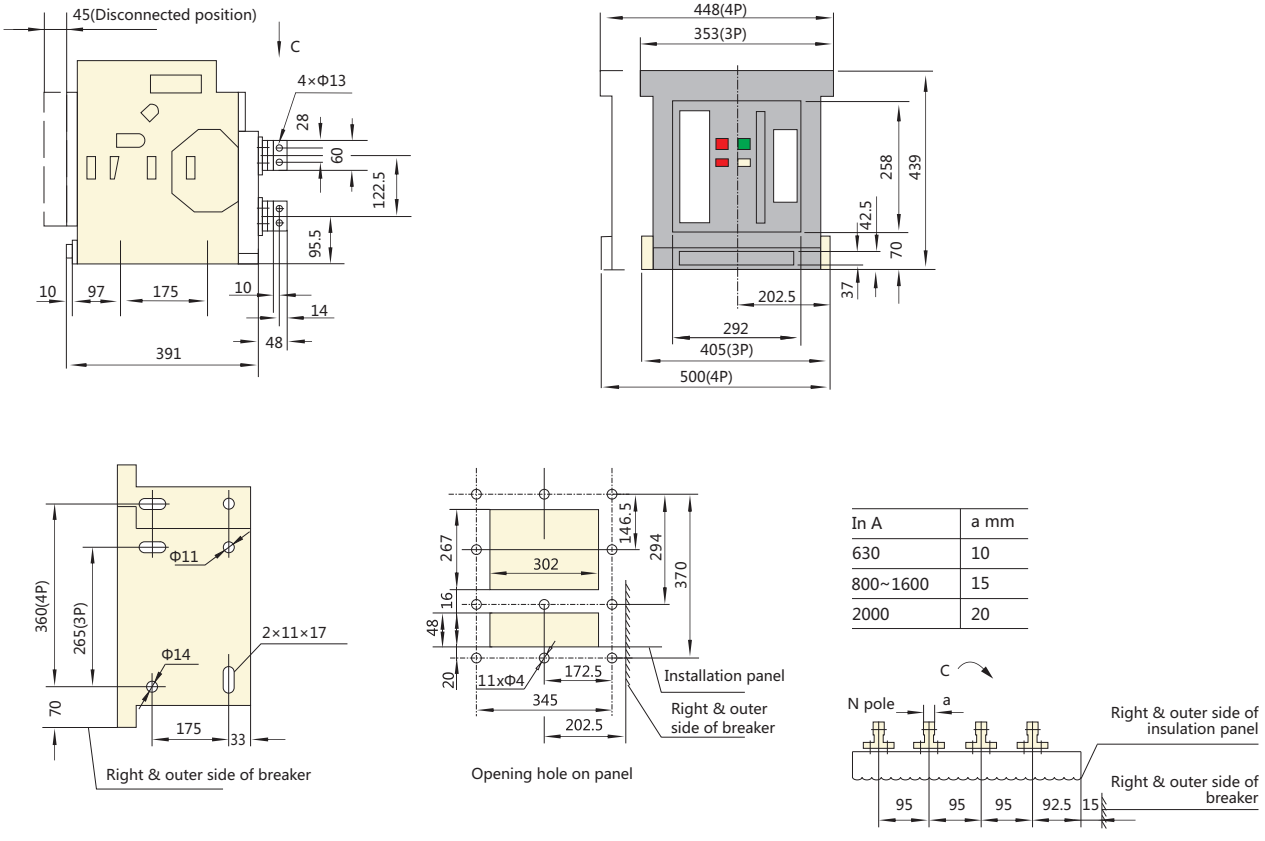
In(A)	A(mm)	N(3P/4P)	H(mm)
200, 400	32	3/4	6
630	50	6/8	8
800, 1000	50	6/8	10

NA1-2000X/NA1-2000XN/NA1-2000XH Drawout-type



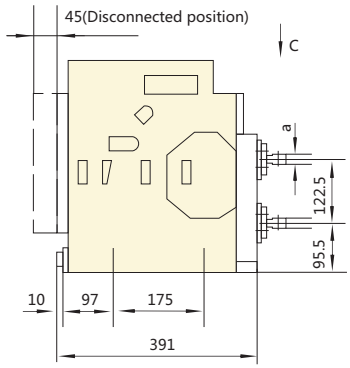
In A	a mm
630	10
800~1600	15
2000	20

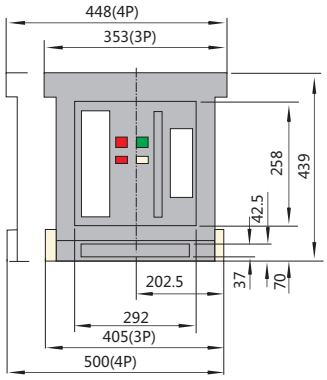
NA1-2000X/NA1-2000XN/NA1-2000XH Drawout-type,vertical,rear connection

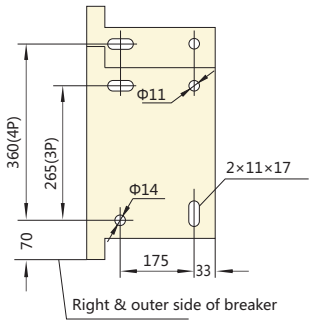


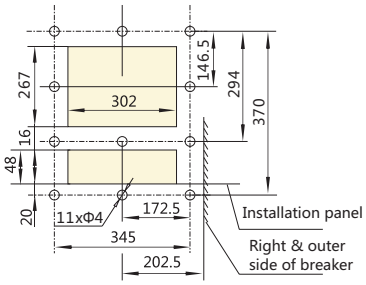
In A	a mm
630	10
800~1600	15
2000	20

NA1-2000X/NA1-2000XN/NA1-2000XH Drawout-type, horizontal, rear connection

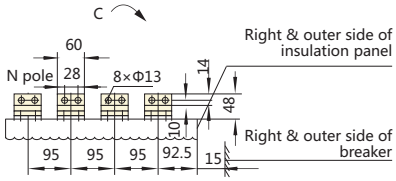




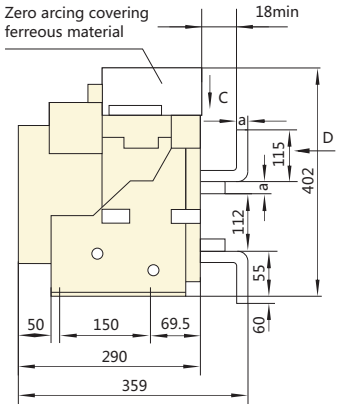


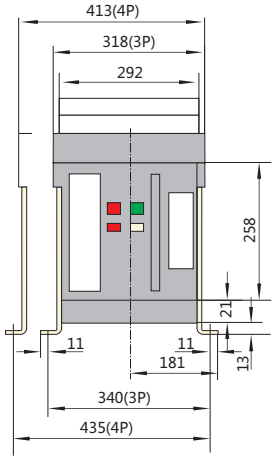


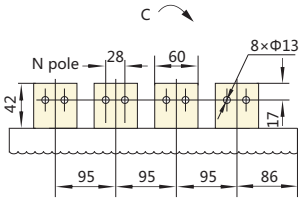
In A	a mm
630	10
800~1600	15
2000	20

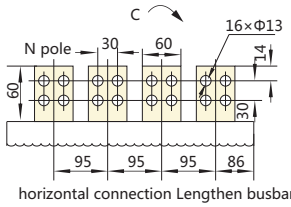


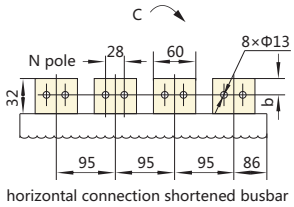
NA1-2000X/NA1-2000XN/NA1-2000XH Fixed-type

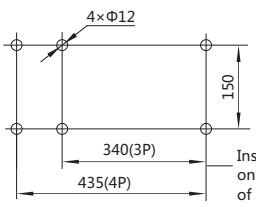


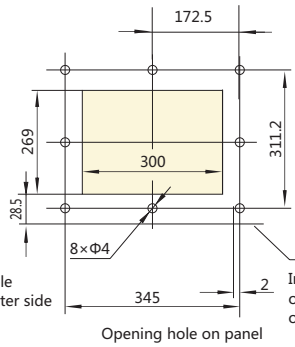


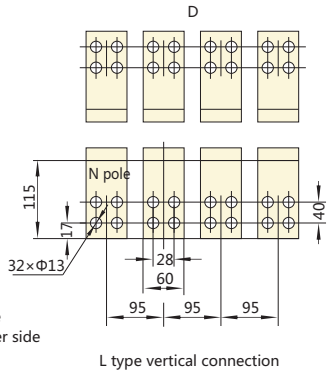






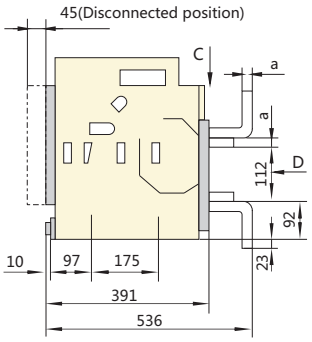


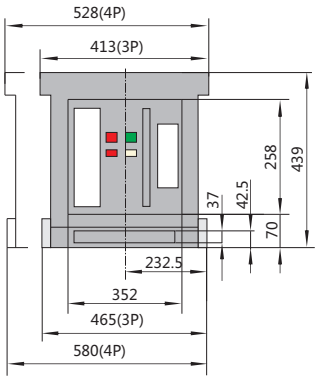


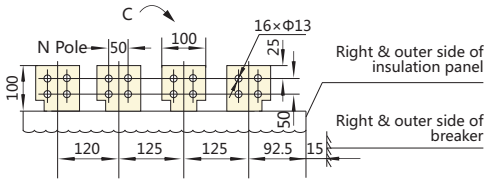


In A	a mm	b mm
630	10	17
800~1600	15	17
2000	20	18.5

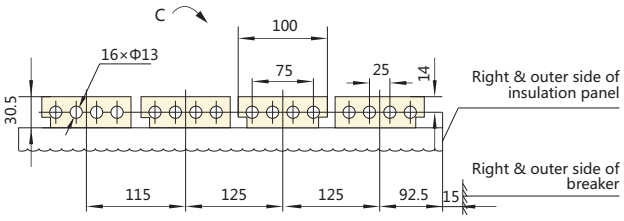
NA1-3200X/NA1-3200XN Drawout-type



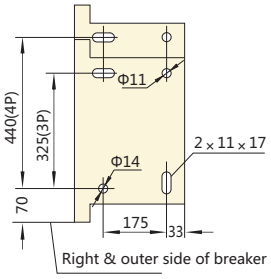


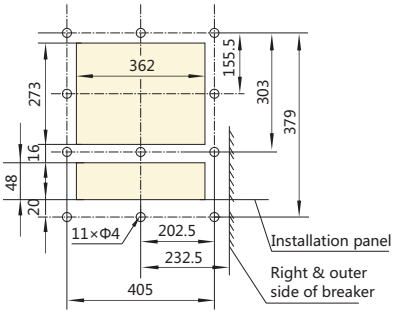


horizontal connection(Default Configuration)

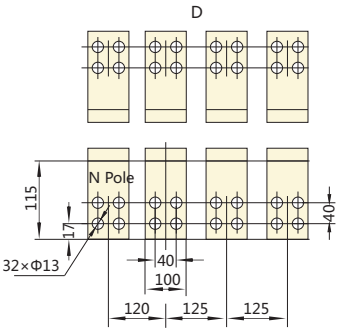


horizontal connection shorten busbar





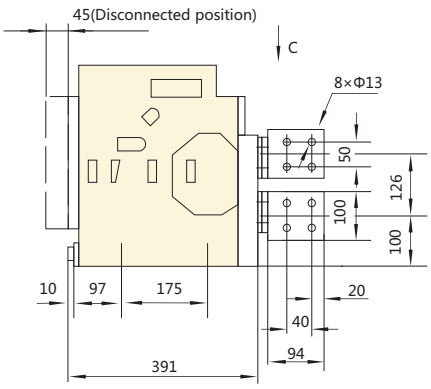
Opening hole on panel

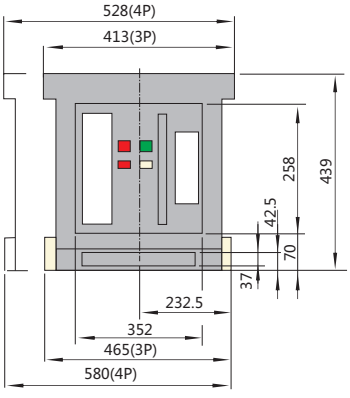


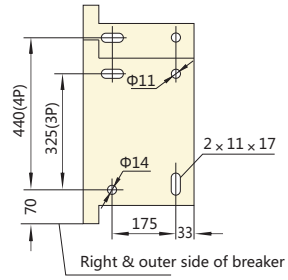
L type vertical connection

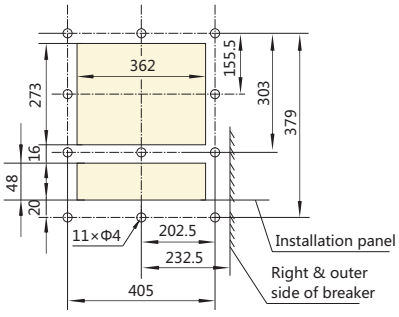
In A	a mm
2000~2500	20
3200	30

NA1-3200X/NA1-3200XN Drawout-type, vertical, rear connection



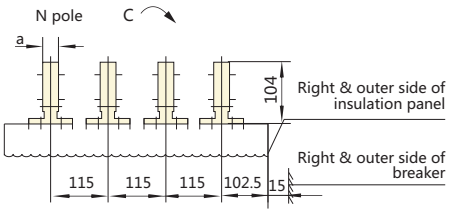




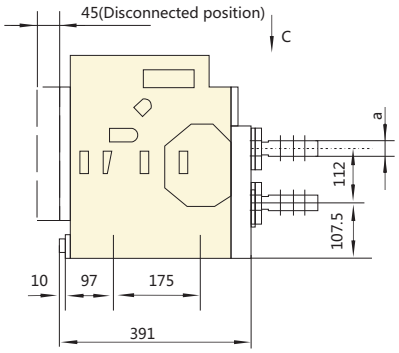


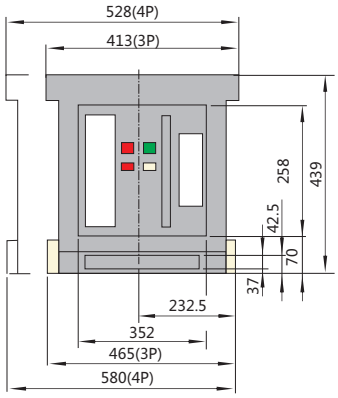
Opening hole on panel

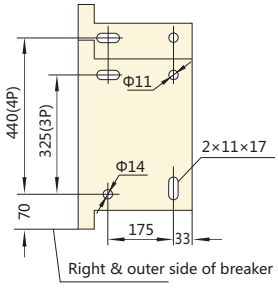
In A	a mm
2000~2500	20
3200	30

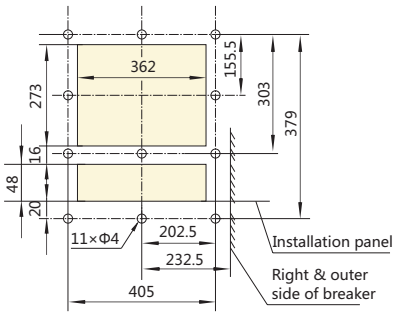


NA1-3200X/NA1-3200XN Drawout-type, horizontal, rear connection



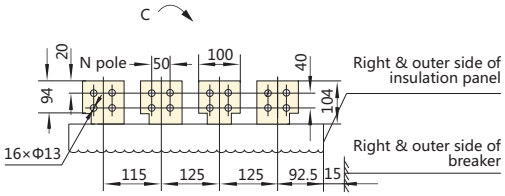




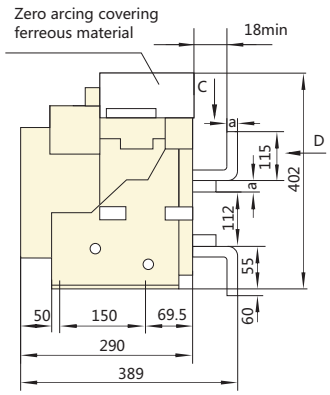


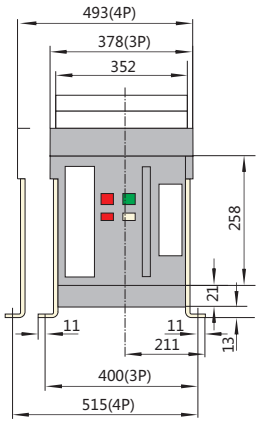
Opening hole on panel

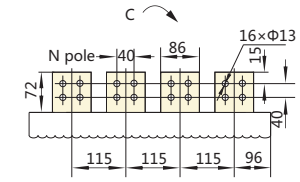
In A	a mm
2000~2500	20
3200	30



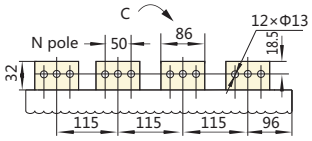
NA1-3200X/NA1-3200XN Fixed-type



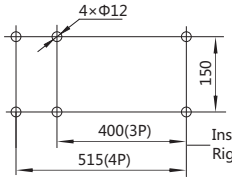




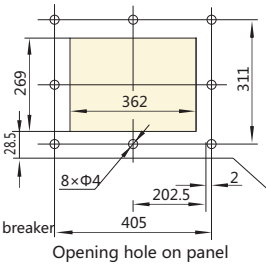
horizontal connection(Default Configuration)



horizontal connection shorten busbar



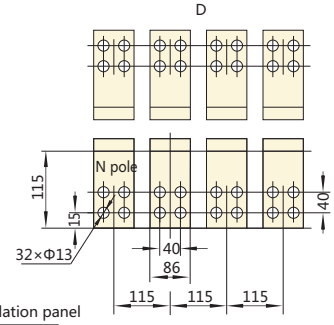
Installation hole on Right & outer side of breaker



Opening hole on panel

Installation panel

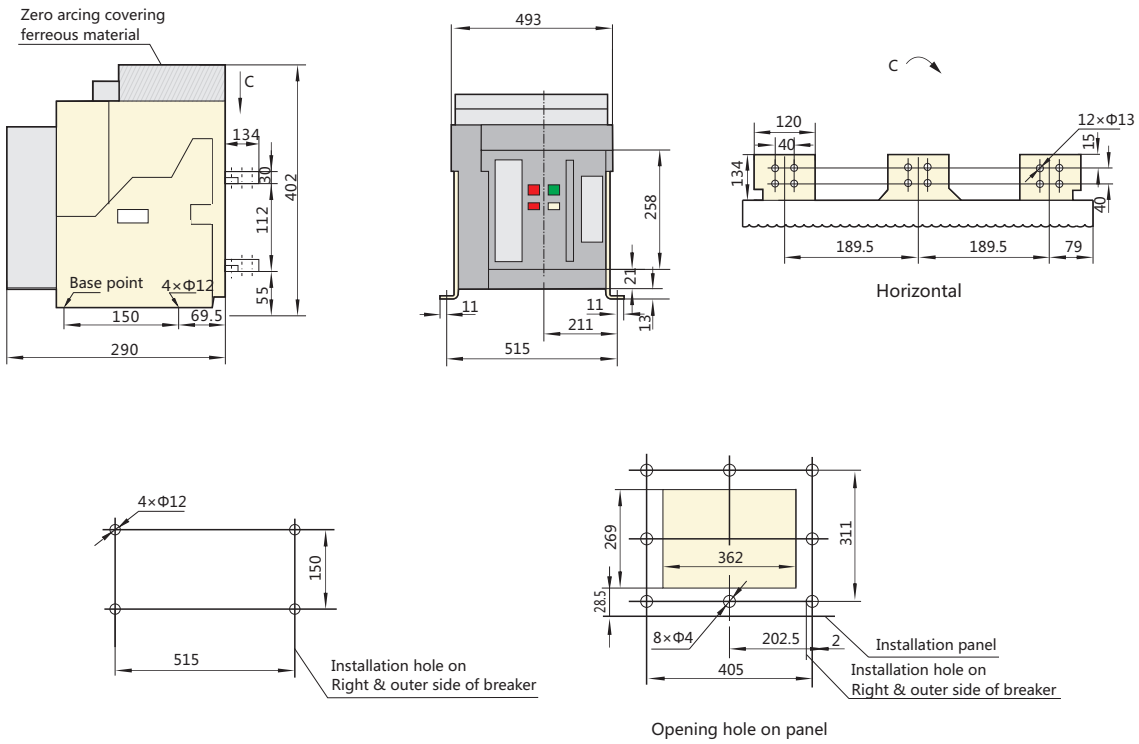
Installation hole on Right & outer side of breaker



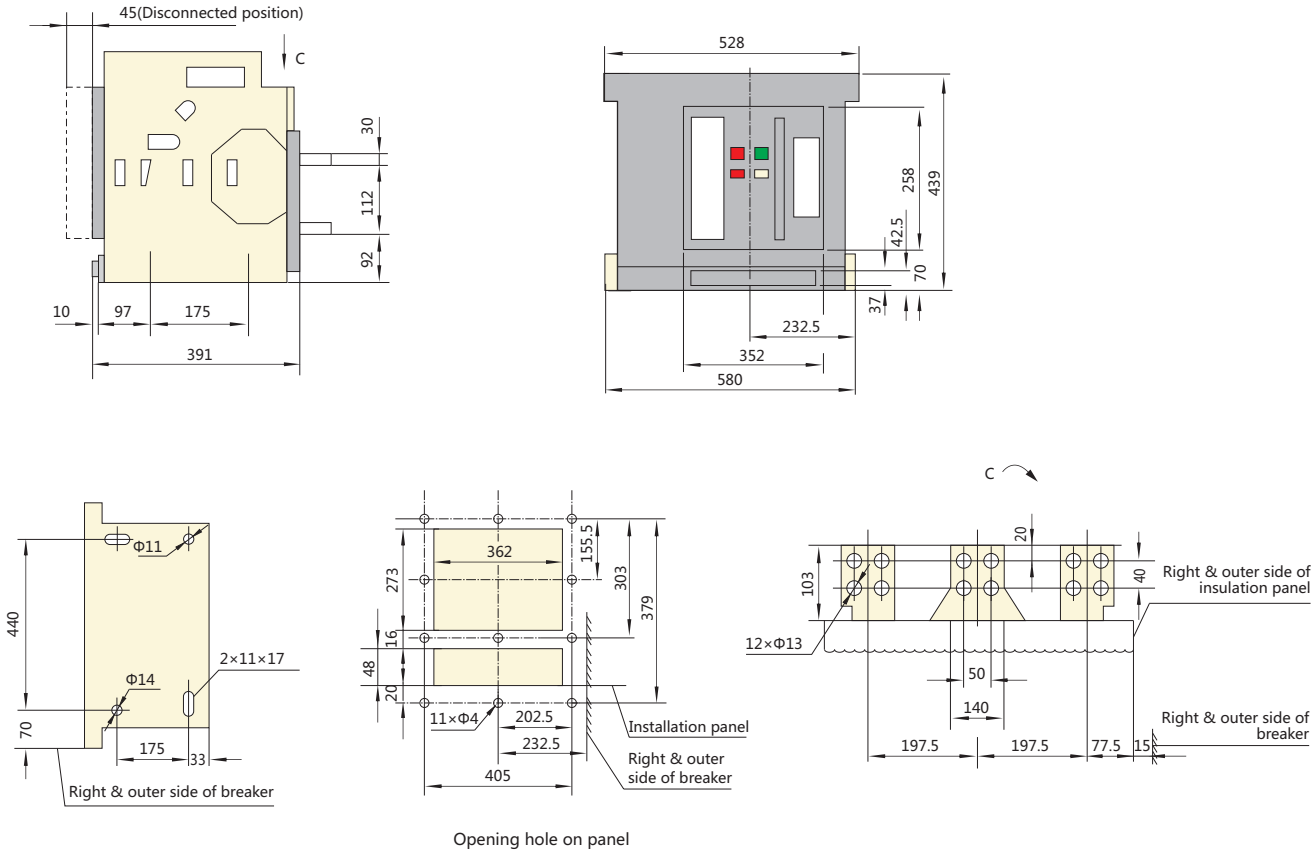
L type vertical connection

In A	a mm
2000~2500	20
3200	30

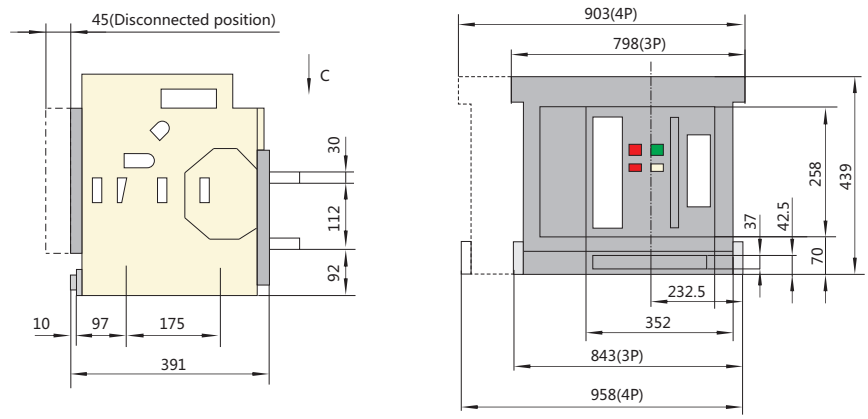
NA1-4000X Fixed-type (3P)

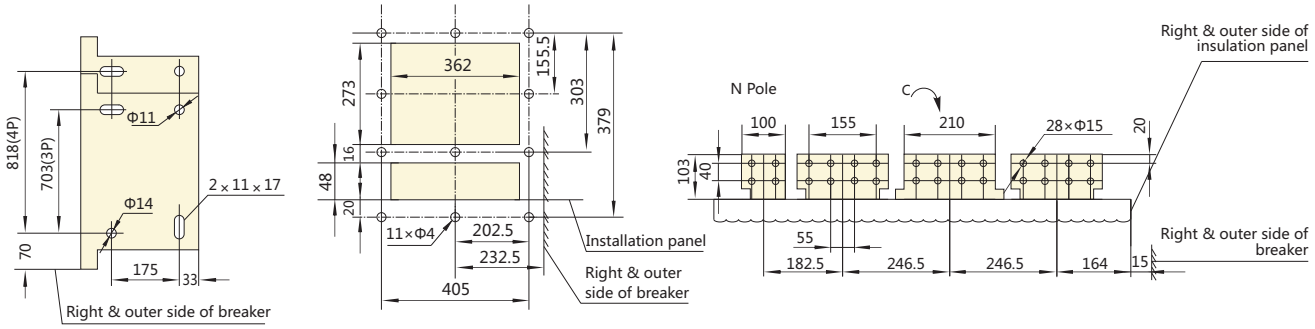


NA1-4000X Drawout-type (3P)



NA1-6300X/NA1-6300XN (In=4000A,5000A) Drawout-type

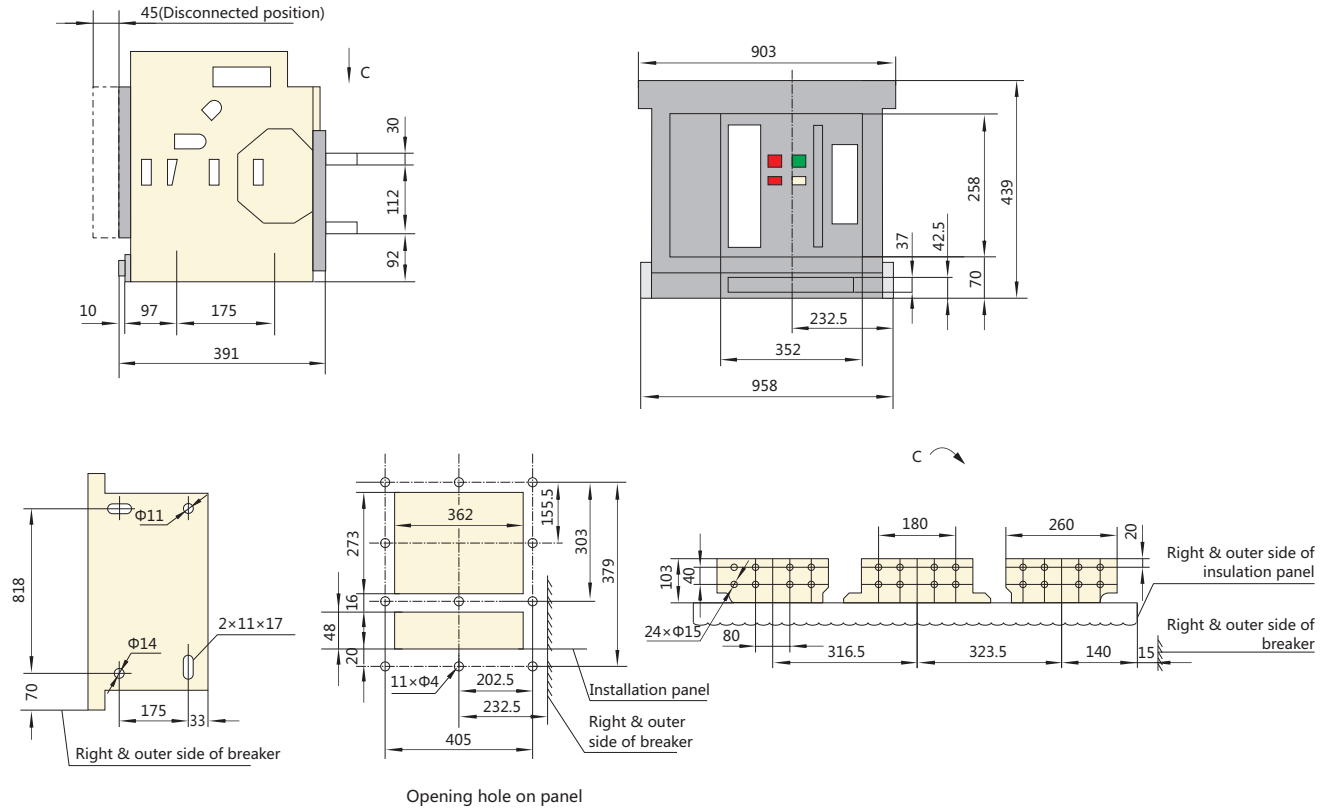




Opening hole on panel

C

NA1-6300X/NA1-6300XN (In=6300A) Drawout-type (3P)

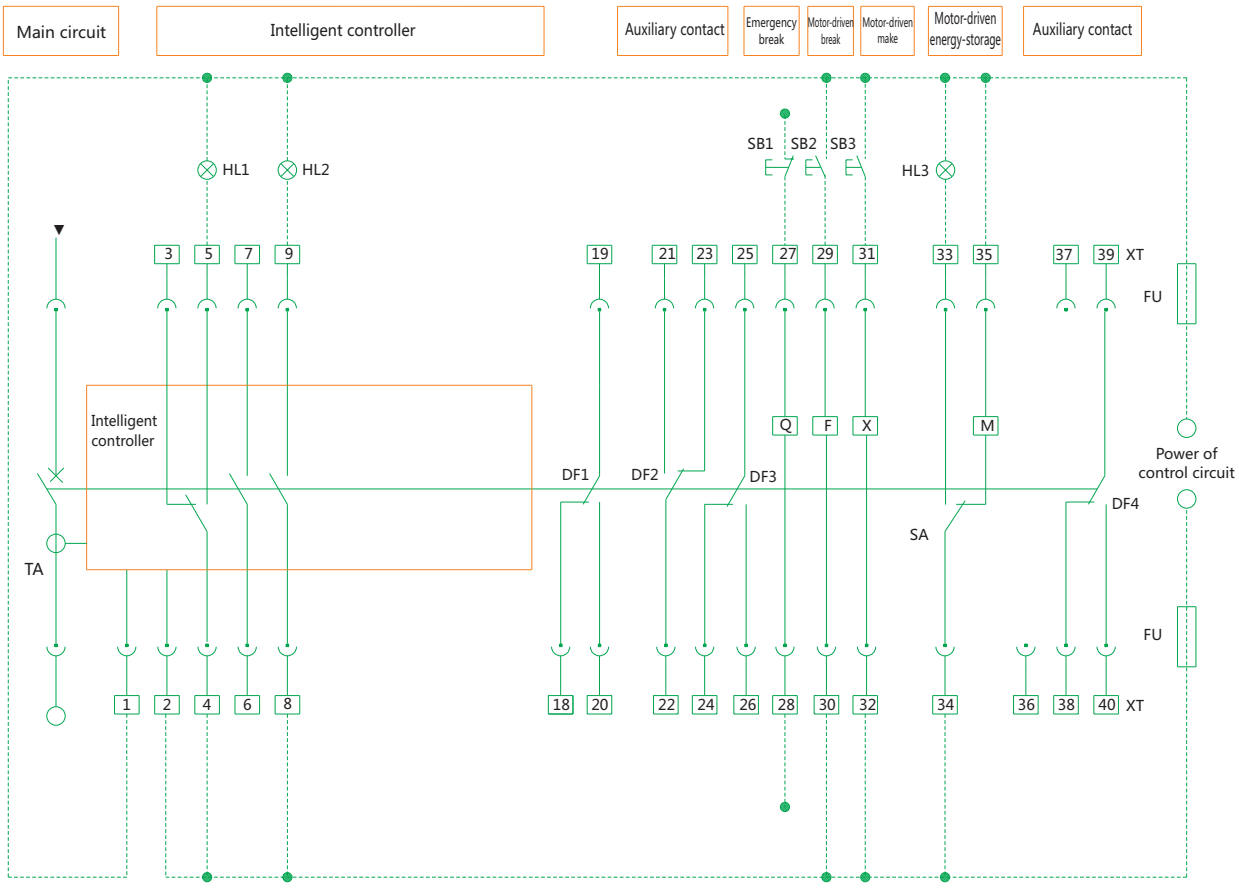


Opening hole on panel

6. Secondary circuit wiring

6.1 NA1-1000X

Standard type, type (M/3M)

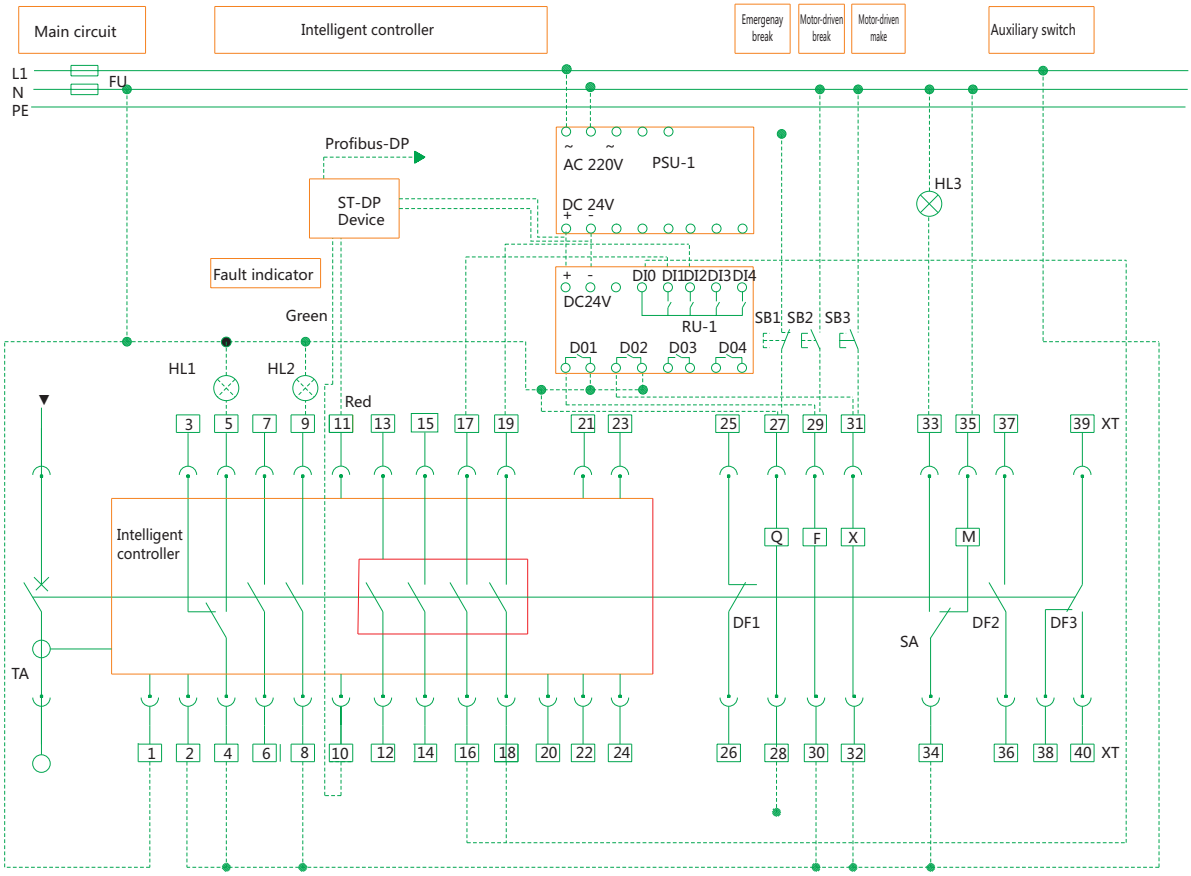


HL1: Failure indicator
HL2: Close indicator
HL3: Energy storage indicator
SB1: Under-voltage button
SB2: Shunt button
SB3: Close button
Q: Under-voltage release
F: Shunt release
X: Close electromagnet
M: Energy storage motor
DF1-DF4: Auxiliary switch
1#, 2#: Auxiliary power input
3#,4#,5#: Fault trip contact output(4# common terminal,
contact capacity AC230V,5A
6#,7#: To be connected with current transformer(selective)

8#,9#: Making indicator (capacity AC400V,1A)
27#,28#: Under-voltage release(Connected to the main circuit)
29#,30#: Shunt release
31#,32#: Closing electromagnet
33#,34#,35#: Energy storage motor
18#~26#, 38#~40#: Auxiliary contact
(auxiliary contact capacity: AC230V,5A)

Note:
Dashed is to be connected by users.

Communication type, type (H/3H)

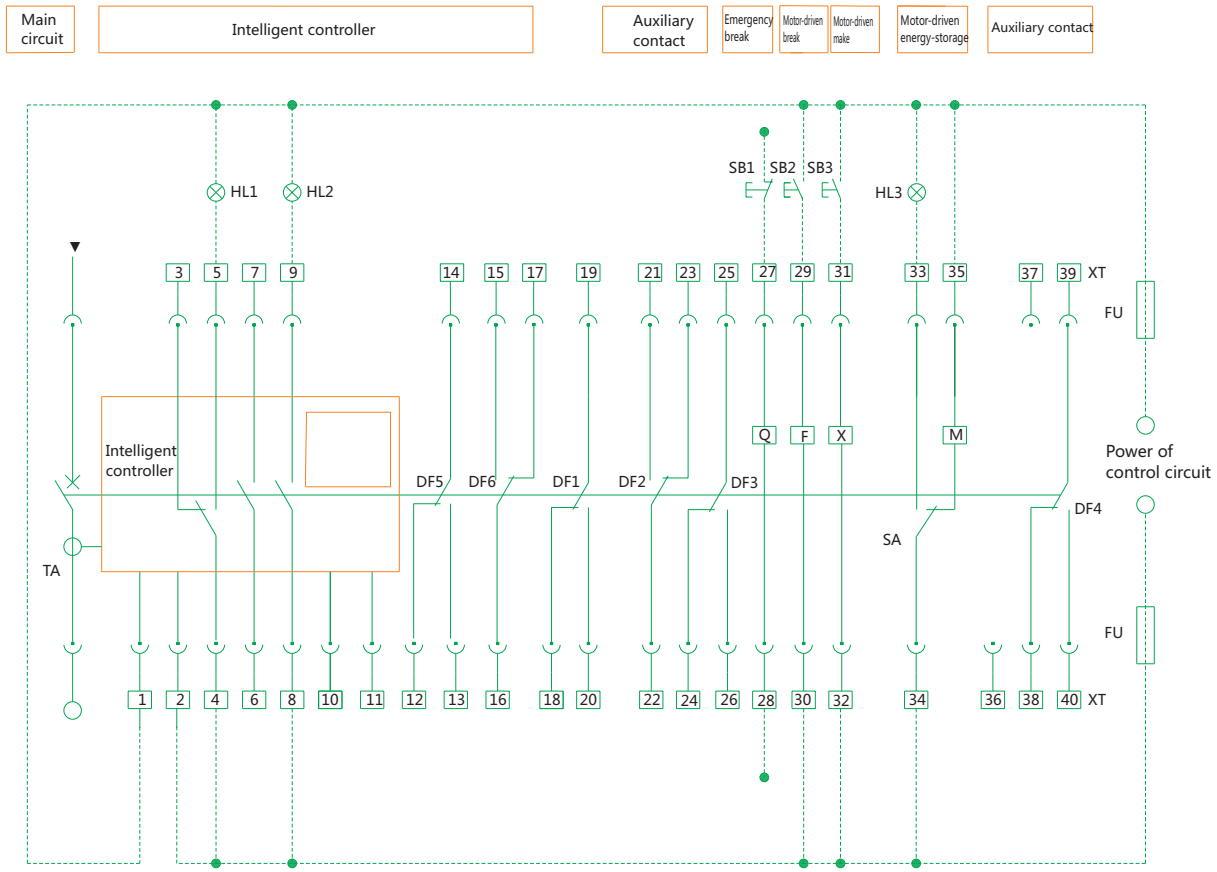


HL1: Failure indicator
HL2: Close indicator
HL3: Energy storage indicator
SB1: Under-voltage button
SB2: Shunt button
SB3: Close button
Q: Under-voltage release
F: Shunt release
X: Close electromagnet
M: Energy storage motor
DF1-DF3: Auxiliary switch
1#, 2#: Auxiliary power input(DC24)
3#,4#,5#: Fault trip contact output(4# common terminal, contact capacity AC230V,5A
6#, 7#: To be connected with current transformer(N/O auxiliary contact, capacity AC400V, 1A,when no current transformer)

Note:
Dashed is to be connected by users.

8#,9#: Making indicator(capacity AC400V,1A)
10#, 11#: communication output
12#, 13#: Signal alarm of load 1 output
14#, 15#: Signal alarm of load 2 output
16#, 17#: Making signal output
18#, 19#: Closing signal output
20#: Communication shield ground line
21#~24#: Voltage signal input of phase N,A,B,C (With voltage measurement);
21#~23# is a set of auxiliary switches (Without voltage measurement)
22# common terminal,contact capacity AC230V,5A
25#, 26#: Auxiliary contact (capacity:AC230V,5A)
27#,28#: Under-voltage release(Connected to the main circuit)
29#,30#: Shunt release
31#,32#: Closing electromagnet
33#,34#,35#: Energy storage motor
36#~40#: Auxiliary contact (capacity:AC230V,5A)

Six pairs change-over contacts standard type (M/3M)



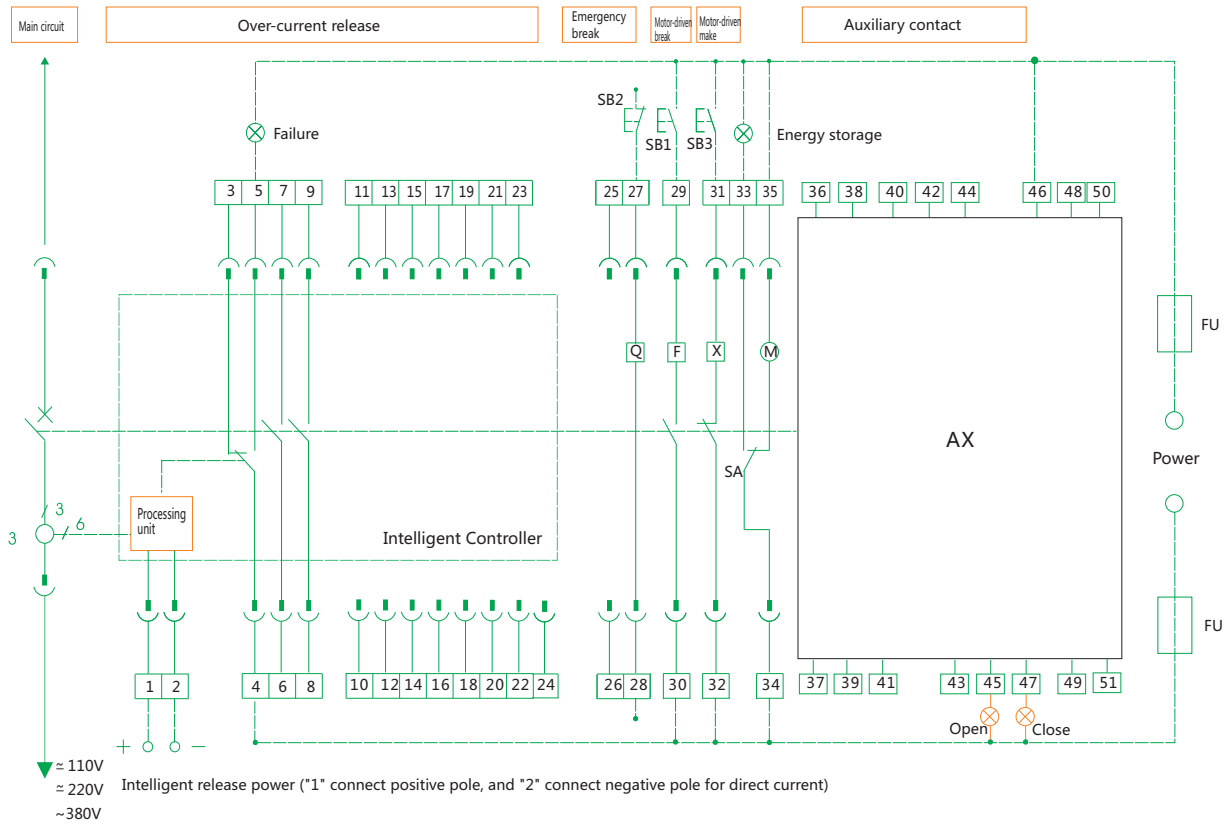
HL1: Failure indicator
HL2: Close indicator
HL3: Energy storage indicator
SB1: Under-voltage button
SB2: Shunt button
SB3: Close button
Q: Under-voltage release
F: Shunt release
X: Close release
M: Energy storage motor
DF1-DF6: Auxiliary switch
1#, 2#: Auxiliary power input
3#,4#,5#: Fault trip contact output(4# common terminal,contact capacity AC230V,5A
6#, 7#: to be connected with current transformer(selective)
8#,9#: Making indicator (capacity AC400V,1A)
12#~26#: Auxiliary contact(auxiliary contact capacity: AC230V,1A)
27#,28#: Under-voltage release(Connected to the main circuit)
29#,30#: Shunt release
31#,32#: Closing release
33#,34#:Energy storage indicator
34#,35#: Energy storage motor
38#~40#: Auxiliary contact(auxiliary contact capacity: AC230V,1A)

Note:

Six pairs change-over contacts , without any additional function.
Dashed is to be connected by users.

6.2 NA1-2000X~6300X

The secondary circuit wiring for NA1-2000X~6300X with standard type (M) intelligent controller and instantaneous under-voltage release

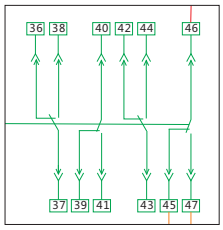


SB1: Shunt button
SB2: Under-voltage button
SB3: Making button
Q: Under-voltage release
F: Shunt release
X: Closing electromagnet
M: Energy storage motor
XT: Connection terminal
SA: Position switch
Note: If control voltage of Q, F, X is different from each other, they can be connected to different power.

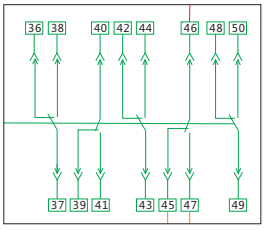
1#,2#: Auxiliary power input
3#,4#,5#: Fault trip contact output(4# common terminal)
6#,7#,8#,9#: Auxiliary contact, normal open,
10#~24#: empty
25#,26#: to be connected with current transformer(selective)
27#,28#: Under-voltage release(Connected to the main circuit)
29#,30#: Shunt release
31#,32#: Closing release
33#,34#: Energy storage indicator
34#,35#: Energy storage motor
36#,51#: Auxiliary contact

The auxiliary contact modes for customer use

I Four pairs change-over contacts

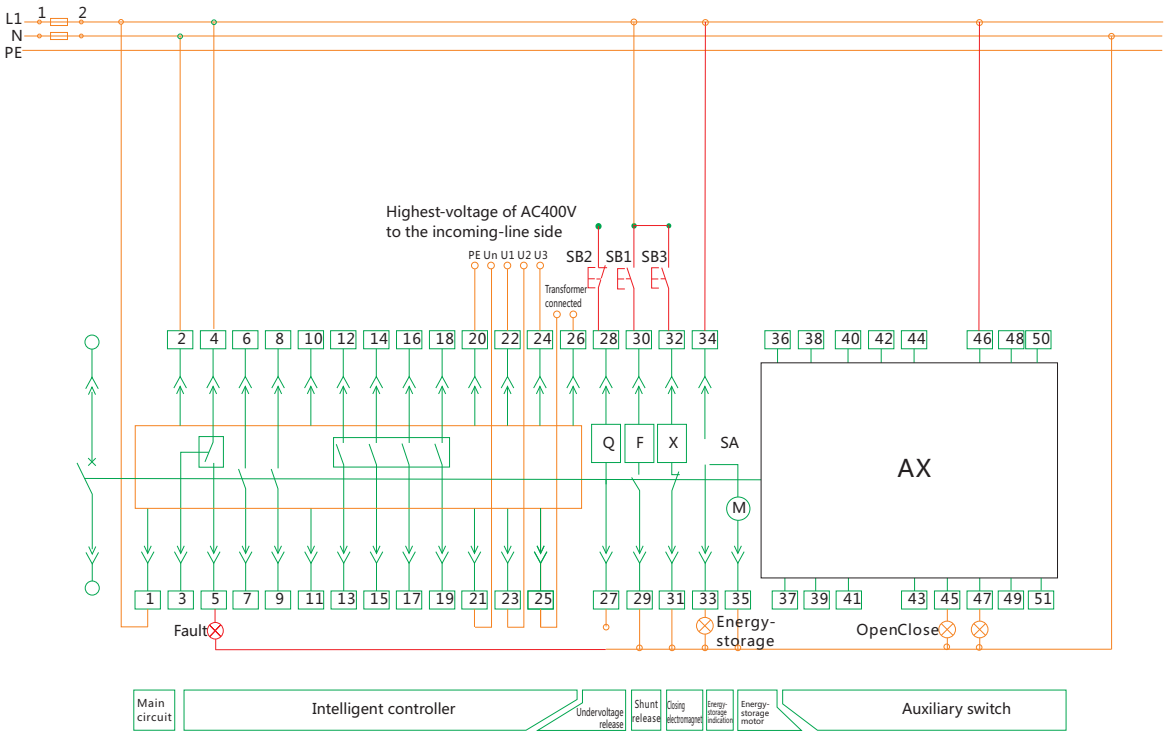


II Five pairs change-over contacts



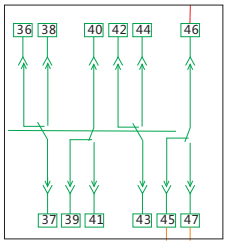
Circuit explanation for signal output:
a. Broken-line parts shall be provided by customers.
b. Terminals 6#,7# can output NC (normal close) contact if that is required by users.
c. Terminal 35# can be directly connected to power (automatic pre-storing energy), alternatively connect power after connecting NO button (manual-controlled pre-storing energy).
d. Terminals 21#~24# is only for wiring with function meter display. (excluding the special wiring)

The secondary circuit wiring for NA1-2000X~6300X with type (3M) intelligent controller and instantaneous under-voltage release

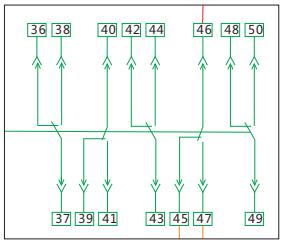


The auxiliary contact modes for customer use

Ⅰ Four pairs change-over contacts



Ⅱ Five pairs change-over contacts



SB1: Shunt button
SB2: Under-voltage button
SB3: Making button
Q: Under-voltage release
F: Shunt release
X: Closing release
M: Energy storage motor
XT: connection terminal
SA: Position switch
1#, 2#: Intelligent controller power input
Note: When the power supply of the intelligent controller is AC power, the 1#~2# connects to the AC power directly. When the power supply is DC power, forbid connecting the 1#~2# to the DC power directly. Add a DC power supply module, then the DC power connect to the input terminal of the DC power supply module, and the 1#~2# connect to the output terminal of the DC power supply module, or else the intelligent controller will be damaged.

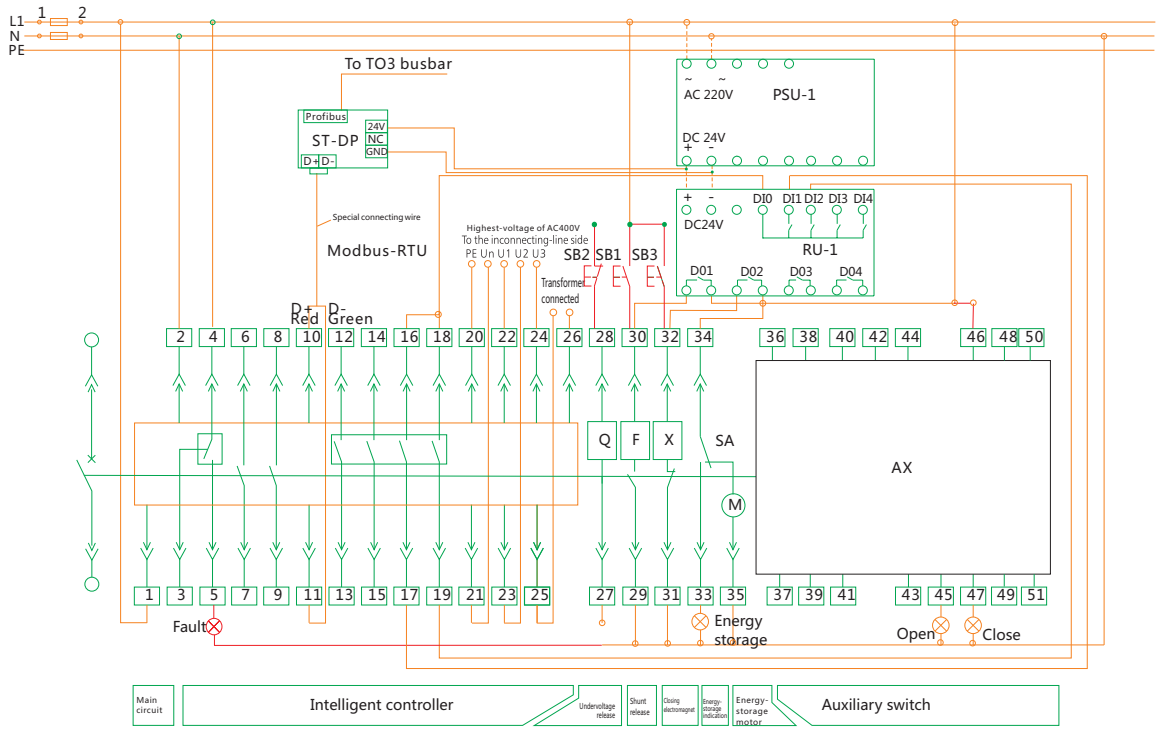
3#,4#,5#: Fault trip contact output(4#common terminal)
6#,7#,8#,9#: Auxiliary contact(normal open)
10#~11#: empty
12#~19#: The programmable output terminal. The normal products without these terminals, but if the customer special ordered, the cost extra added.

3M type acquiescence output:
12#,13#: Signal alarm of load 1 output; 14#,15#: Signal alarm of load2 output
16#,17#: Self-diagnose alarm; 18#,19#: Fault trip; 20#: PE line; 21#~24#: Display the voltage of the signal input.
The normal products without these terminals,
if the customer special ordered the function meter, the cost extra added.
21#: N phase input terminal
22#,23#,24#: A, B, C three phase power input terminal (note the sequence)(highest-voltage of AC 400V)

25#,26#: Connect to the N phase current transformer or the input terminal of the current leakage transformer.
The normal products without these terminals, if the customer special ordered, the cost extra added.
27#,28#: Under-voltage release(Connected to the main circuit); 29#,30#: Shunt release; 31#,32#: Closing release;
33#,34#: Energy storage indicator; 34#,35#: Energy storage motor; 36#~51#: Auxiliary contact

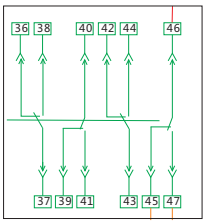
Note:
a. Red colored part is to be connected by users
b. When the power system is three phase three wire, directly connect the Un to U2.
(If the voltage exceeds 400V, special explanation when ordered)

The secondary circuit wiring for NA1-2000X~6300X with type (3H) intelligent controller and instantaneous under-voltage release

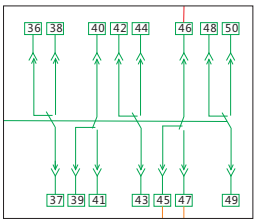


The auxiliary contact modes for customer use

I Four pairs change-over contacts



II Five pairs change-over contacts



SB1: Shunt button; SB2: Under-voltage button
SB3: Making button; Q: Under-voltage release
F: Shunt release; X: Closing release
M: Energy storage motor; XT: connection terminal
SA: Position switch
1#, 2#: Intelligent controller power input
Note: When the power supply of the intelligent controller is AC power, the 1#~2# connects to the AC power directly. When the power supply is DC power, forbid connecting the 1#~2# to the DC power directly. Add a DC power supply module, then the DC power connect to the input terminal of the DC power supply module, and the 1#~2# connect to the output terminal of the DC power supply module, or else the intelligent controller will be damaged.

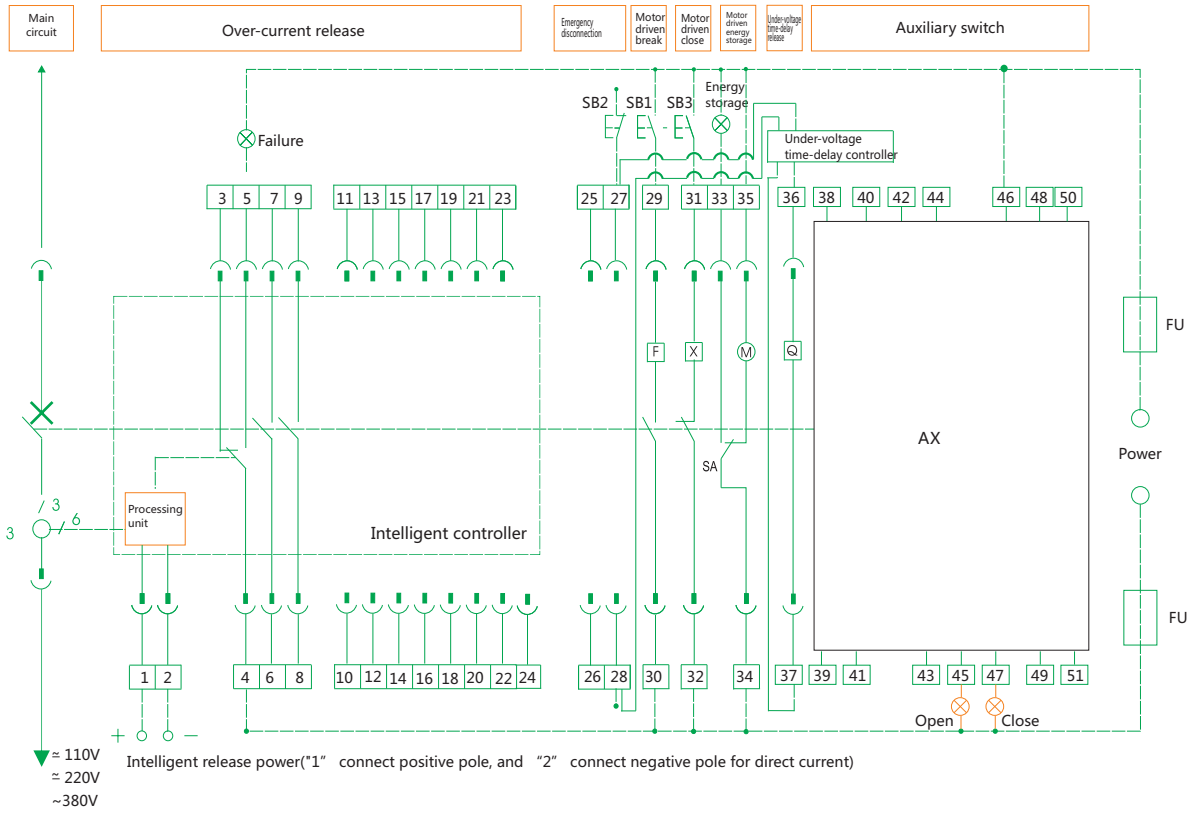
3#,4#,5#: Fault trip contact output(4# common terminal)
6#,7#,8#,9#: Auxiliary contact (normal open)
10#~11#: communication output
12#,13#: Signal alarm of load 1 output; 14#,15#: Signal alarm of load2 output
16#,17#:Breaking signal output; 18#,19#:Making signal output
20#: PE line; 21#: N phase input terminal
22#,23#,24#: A, B, C three phase power input terminal (note the sequence)(highest-voltage of AC 400V)

25#26#: Connect to the N phase current transformer or the input terminal of the current leakage transformer.
The normal products without these terminals, if the customer special ordered, the cost extra added.
ST~DP: DP protocol module. There is no need for the ST-DP protocol module,
if the communication protocol is Modbus-RTV. But when the communication protocol is Profibus-DP,
the ST-DP protocol module is necessary, but the cost extra added.
ST power module IV: power converter (optional components)
ST201: Magnify the signal capacity of the controller. (optional components) If the customer special ordered,
the cost extra added.
27#,28#: Under-voltage release(Connected to the main circuit); 29#,30#: Shunt release
31#,32#: Closing release; 33#,34#: Energy storage indicator
34#,35#: Energy storage motor; 36#~51#: Auxiliary contact

Note:

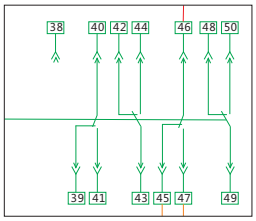
a. Red colored part is to be connected by users
b. When the power system is three phase three wire, directly connect the Un to U2.
(If the voltage exceeds 400V, special explanation when ordered)

The secondary circuit wiring for NA1-2000X~6300X with standard type (M) intelligent controller and time-delay under-voltage release



The auxiliary contact modes for customer use

I Four pairs change-over contacts

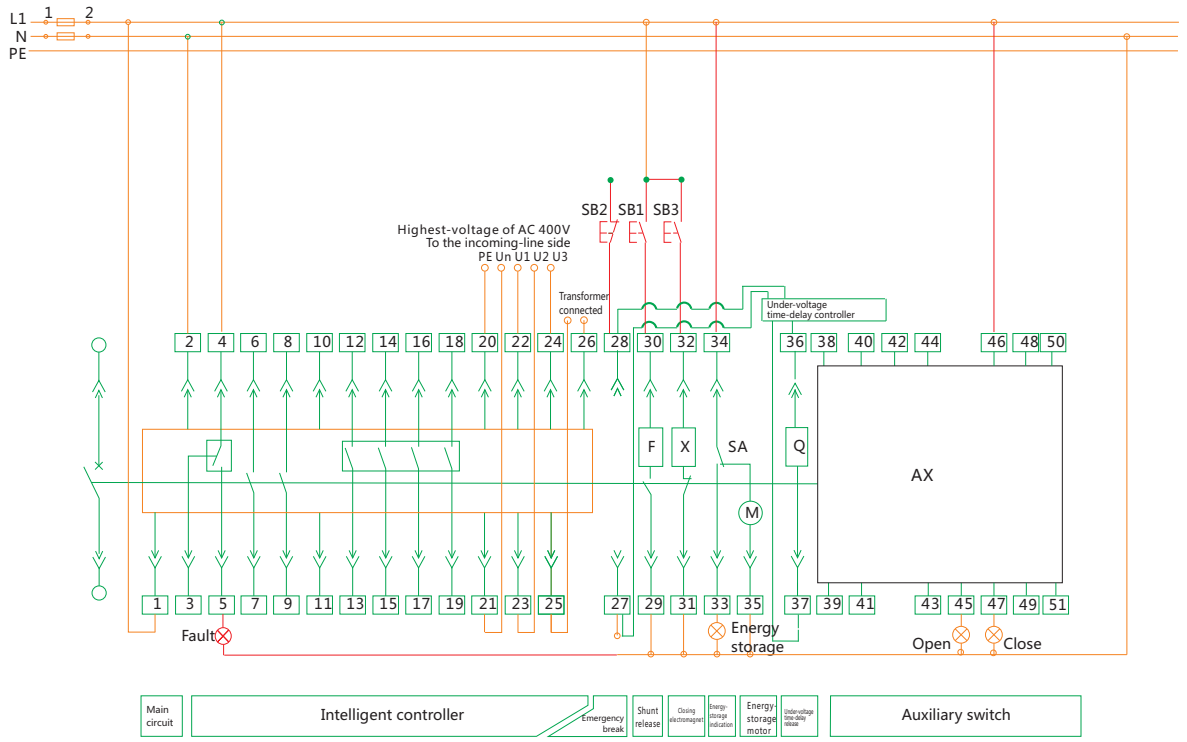


SB1: Shunt button SB2: Under-voltage button SB3: Making button
Q: Under-voltage time-delay release F: Shunt release
X: Closing electromagnet M: Energy storage motor
XT: Connection terminal SA: Position switch
Note: If control voltage of Q, F, X is different from each other, they can be connected to different power.

1#,2#: Auxiliary power input
3#,4#,5#: Fault trip contact output(4# common terminal)
6#,7#,8#,9#: Auxiliary contact (normal open)
10#~24#: empty
25#,26#: to be connected with current transformer(selective)
27#,28#: Under-voltage release(Connected to the main circuit)
29#,30#: Shunt release
31#,32#: Closing release
33#,34#: Energy storage indicator
34#,35#: Energy storage motor
36#,37#: Under-voltage time delay release
38#~51#: Auxiliary contact

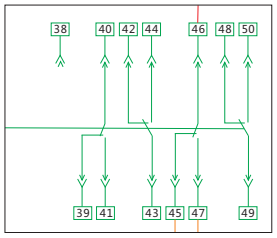
Circuit explanation for signal output:
a. Broken-line parts shall be provided by customers.
b. Terminals 6#,7# can output NC (normal close) contact if that is required by users.
c. Terminal 35# can be directly connected to power (automatic pre-storing energy), alternatively connect power after connecting NO button (manual-controlled pre-storing energy).
d. The 21#~24# is only for wiring with function meter display. (Excluding the special wiring)

The secondary circuit wiring for NA1-2000X~6300X with type (3M) intelligent controller and time-delay under-voltage release



The auxiliary contact modes for customer use

I Four pairs change-over contacts



SB1: Shunt button; SB2: Under-voltage button
SB3: Making button; Q: Under-voltage release
F: Shunt release; X: Closing release
M: Energy storage motor; XT: Connection terminal
SA: Position switch
1#, 2#: Intelligent controller power input
Note: When the power supply of the intelligent controller is AC power, the 1#~2# connects to the AC power directly. When the power supply is DC power, forbid connecting the 1#~2# to the DC power directly. Add a DC power supply module, then the DC power connect to the input terminal of the DC power supply module, and the 1#~2# connect to the output terminal of the DC power supply module, or else the intelligent controller will be damaged.

3#,4#,5#: Fault trip contact output(4# common terminal); 6#,7#,8#,9#: Auxiliary contact (normal open)
10#~11#: empty; 12#~19# are the programmable output terminal. The normal products without these terminals, but if the customer special ordered, the cost extra added.

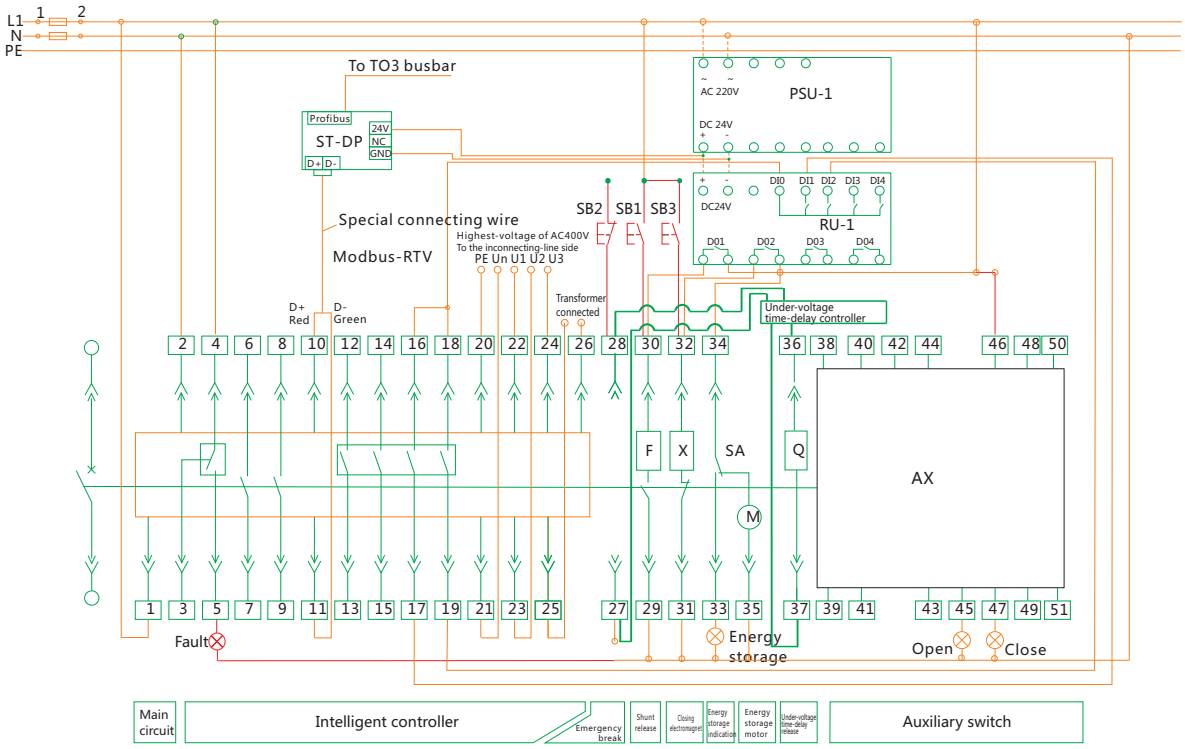
3M type acquiescence output:
12#,13#: Signal alarm of load 1 output; 14#,15#: Signal alarm of load2 output
16#,17#: Self-diagnose alarm; 18#,19#: Fault trip
20#: PE line; 21#~24#: Display the voltage of the signal input. The normal products without these terminals, if the customer special ordered the function meter, the cost extra added.
21#: N phase input terminal; 22#,23#,24#: A, B, C three phase power input terminal (note the sequence)(Highest-voltage of AC400V)

25#,26# Connect to the N phase current transformer or the input terminal of the current leakage transformer. The normal products without these terminals, if the customer special ordered, the cost extra added.
27#,28#: Under-voltage release(Connected to the main circuit); 29#,30#: Shunt release
31#,32#: Closing release; 33#,34#: Energy storage indicator
34#,35#: Energy storage motor; 36#,37#: Under-voltage time delay release
38#~51#: Auxiliary contact

Note:

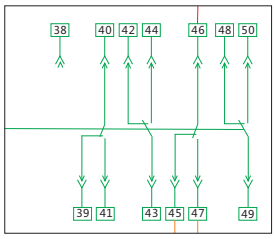
a. Red colored part is to be connected by users
b. When the power system is three phase three wire, directly connect the Un to U2. (If the voltage exceeds 400V, special explanation when ordered)

The secondary circuit wiring for NA1-2000X~6300X with type (3H) intelligent controller and time-delay under-voltage release



The auxiliary contact modes for customer use

I Four pairs change-over contacts



SB1: Shunt button; SB2: Under-voltage button
SB3: Making button; Q: Under-voltage release
F: Shunt release; X: Closing release
M: Energy storage motor; XT: Connection terminal
SA: Position switch
1#, 2#: Intelligent controller power input
Note: When the power supply of the intelligent controller is AC power, the 1#~2# connects to the AC power directly. When the power supply is DC power, forbid connecting the 1#~2# to the DC power directly. Add a DC power supply module, then the DC power connect to the input terminal of the DC power supply module, and the 1#~2# connect to the output terminal of the DC power supply module, or else the intelligent controller will be damaged.

3#,4#,5#: Fault trip contact output(4# common terminal)
6#,7#,8#,9#: Auxiliary contact (normal open)
10#~11#: Communication output; 12#,13#: Signal alarm of load 1 output
14#,15# : Signal alarm of load 2 output; 16#,17#: Breaking signal output; 18#,19#: Closing signal output
20#: PE line; 21#: N phase input terminal
22#,23#,24#: A, B, C three phase power input terminal (note the sequence)(highest-voltage of AC400V)
25#,26# Connect to the N phase current transformer or the input terminal of the current leakage transformer.
The normal products without these terminals, if the customer special ordered, the cost extra added.
ST~DP: DP protocol module. There is no need for the ST-DP protocol module,
if the communication protocol is Modbus-RTV. But when the communication protocol is Profibus-DP,
the ST-DP protocol module is necessary, but the cost extra added.
ST power module IV: power converter (optional components)
ST201: Magnify the signal capacity of the controller. (optional components)
If the customer special ordered, the cost extra added.
27#,28#: Under-voltage release(Connected to the main circuit); 29#,30#: Shunt release
31#,32#: Closing release; 33#,34#: Energy storage indicator
34#,35#: Energy storage motor; 36#,37#: Under-voltage time delay release
38#~51#: Auxiliary contact

Note:
a. Red colored part is to be connected by users
b. When the power system is three phase three wire, directly connect the Un to U2.
(If the voltage exceeds 400V, special explanation when ordered)

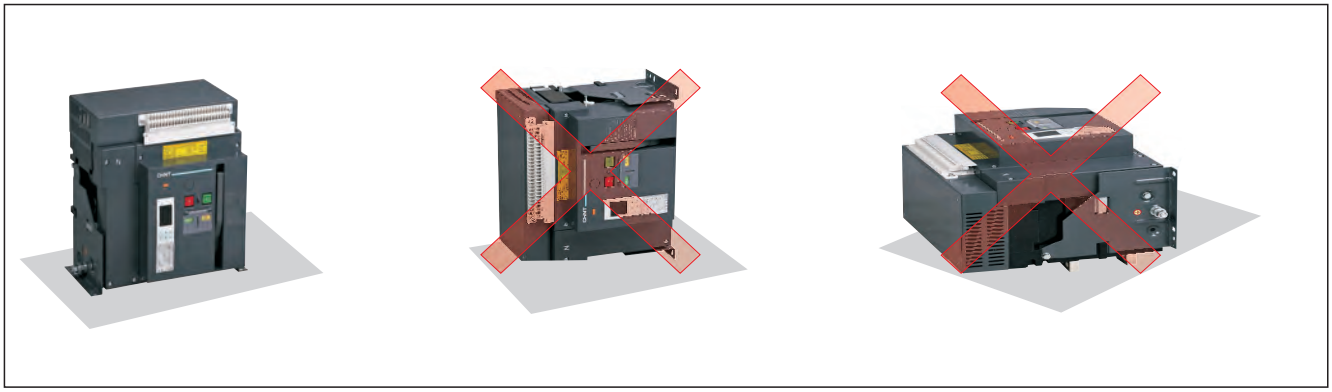
7. Installation

7.1 Installation

7.1.1 Unload the breaker from the soleplate of package. If it is drawout type, firstly pull out the handle under the drawer-base of breaker, and plug it into the hole on central part of plastic cover under the drawer-base crossbeam, anticlockwise turns the handle, the body will slowly slide along the outside of drawer-base.

When the guide rod points to separated position and handle can't be rotated any longer, pull out the handle and firmly grasp the aluminum handle on drawer-base, pull out the breaker body and remove it form the base, then move the base from the sole plate and clean up the dirty things inside the drawer-base.

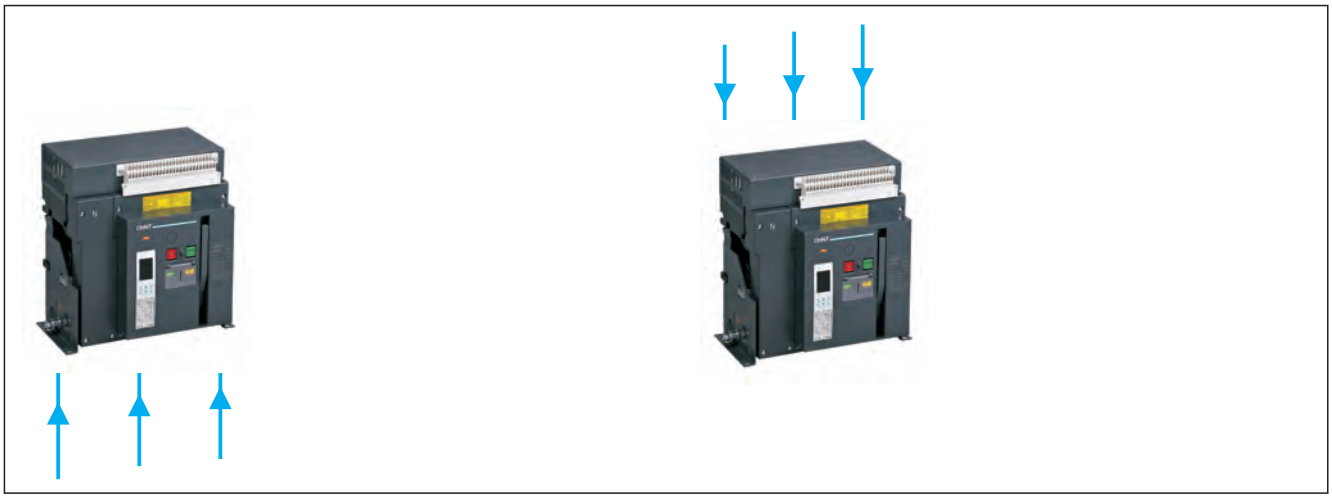
Possible positions



7.1.2 Check the insulation resistance with a 500V megger, resistance should not be less than 20MΩ when ambient temperature is 20℃±5℃ and relative humidity is 50%~70%. Otherwise dry it.

7.1.3 Power supply

NA1 devices can be supplied either from the top or from the bottom without reduction in performance, in order to facilitate connection when installed in a switchboard.



7.1.4 Put the breaker (fixed-type) or drawer-base (drawout-type) into the installation-bracket, and make it fixed, directly connect the cable wire of main circuit to the bus wire of fixed-type circuit breaker. Alternatively put breaker body onto the slideway of drawer-base. Plug the handle into installation hole, clockwise turns it until the under-part of drawer-base points at the connection position and " click" sound is heard. It indicates that breaker body has been connected to its place, then connect the cable of main circuit to drawer-base.

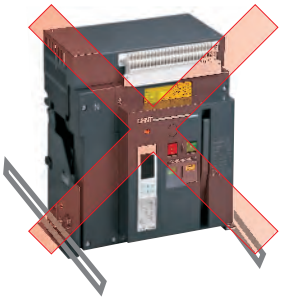
Mounting the circuit-breaker

It is important to distribute the weight of the device uniformly over a rigid mounting surface such as rails or a base plate.

This mounting plane should be perfectly flat (tolerance on support flatness: 2 mm).This eliminates any risk of deformation which could interfere with correct operation of the circuit breaker.

NA1 devices can also be mounted on a vertical plane using the special brackets.

Mounting with vertical brackets

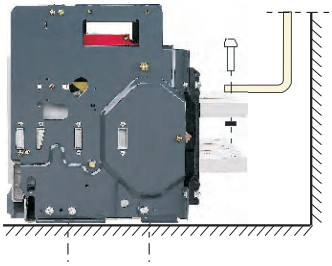


Mounting on rails

7.1.5 Partitions

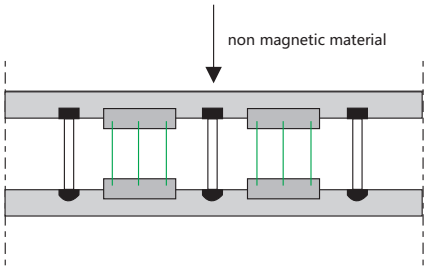
Sufficient openings must be provided in partitions to ensure good air circulation around the circuit breaker;
Any partition between upstream and downstream connections of the device must be made of nonmagnetic material.
For high-currents, of 2500 A and upwards, the metal supports or barriers in the immediate vicinity of a conductor ;Metal barriers through which a conductor passes must not form a magnetic loop.

A:non magnetic material



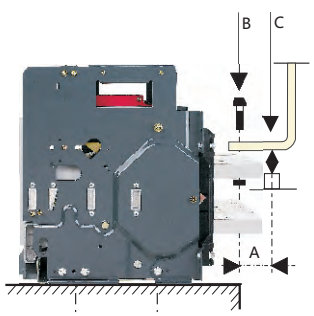
Busbars

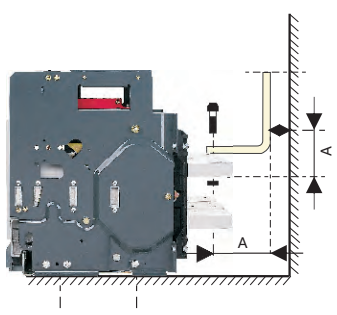
The mechanical connection must be exclude the possibility of formation of a magnetic loop around a conductor.

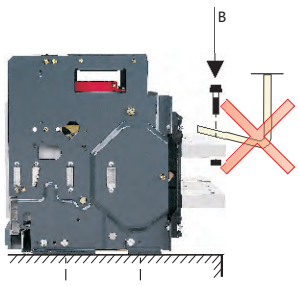


7.1.6 Busbar connections

The busbars should be suitably adjusted to ensure the connection points are positioned on the terminals before the bolts B are inserted. The connections are held by the supporter which is fixed to the framework of the switchboard, in this way the circuit breaker terminals do not have to support its weight C.
(This support should be placed close to the terminals).

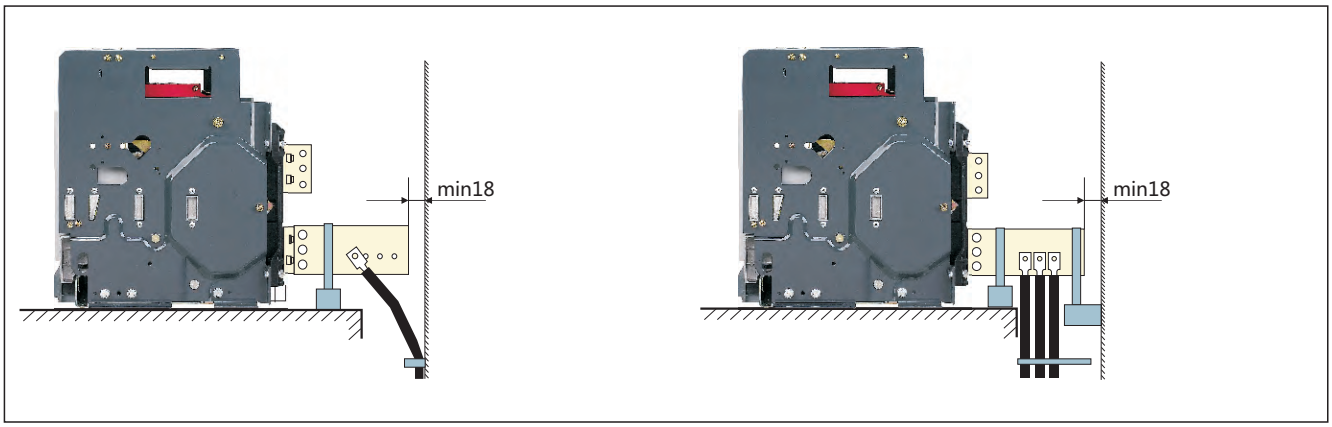






7.1.7 Main circuit adopts cable connection

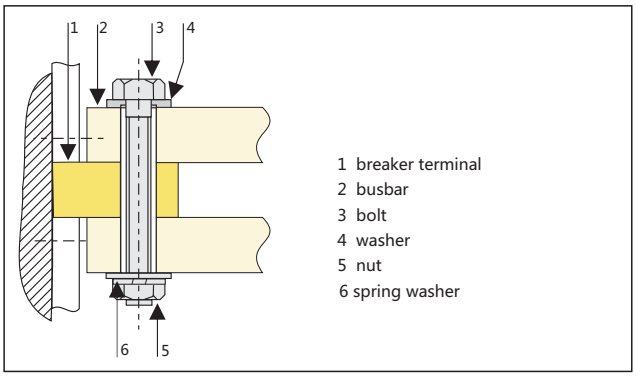
Users should not apply too strong mechanical strength on the terminals of Air Circuit Breaker. Extend the bus-bar of circuit breaker with connecting bus-bar, position the wiring piece of cable before inserting bolts; the cable should be fixed on the frame of distributing cabinet firmly.



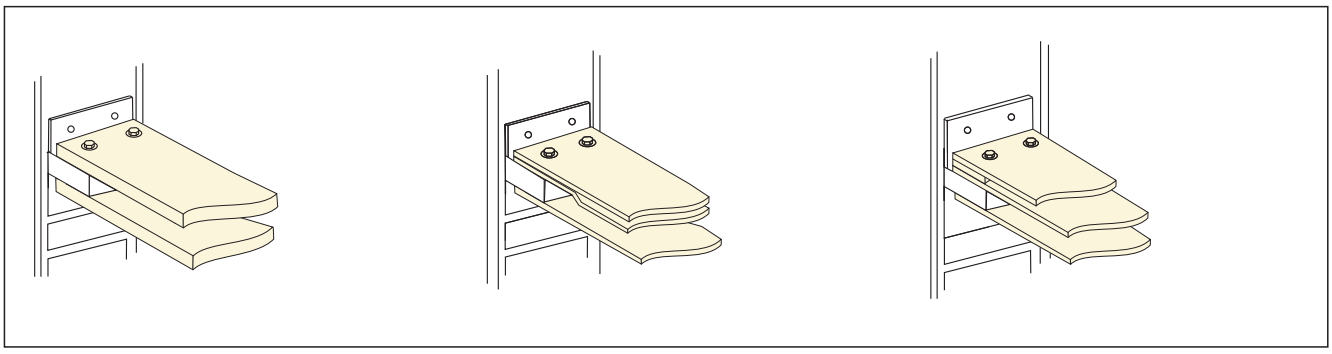
7.1.8 Clamping

Correct clamping of busbars depends on the tightening torques used for the nuts and bolts,etc. Over-tightening may have the same consequences as under-tightening.

For connecting busbars to the circuit breaker, the tightening torques to be used are shown in the table below. These values are for use with copper busbars and steel nuts and bolts, class ≥8.8.

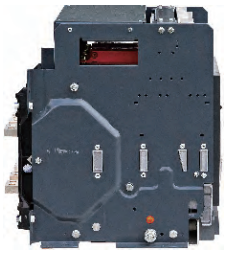
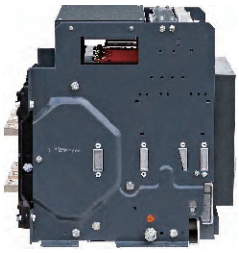
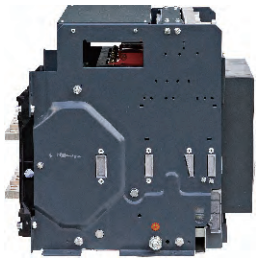
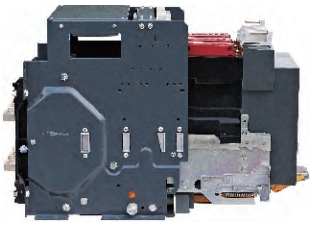
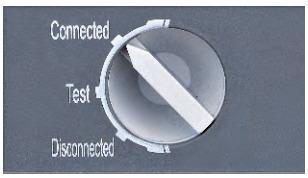
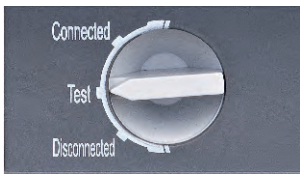
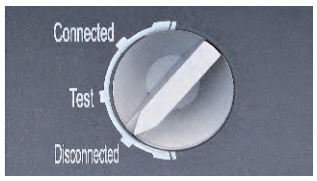


Examples



Preferred tightening torque for NA1's tightening components

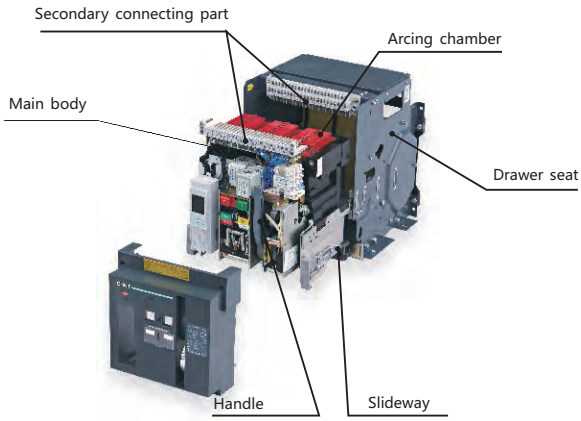
Type of screw	Application	Preferred tightening torque
M3	Screws for secondary terminals	0.5~0.7 N·m
M10	Installing bolts of Air Circuit Breaker	38~55 N·m
M12	Connection terminals	61~94 N·m

Connected position	Test position	Disconnected position	Drawout position
			
			
1.Both main circuit and control circuit are connected. 2.Normal application conditions	1.The main circuit is disconnected, and the control circuit is connected. 2.Test application conditions.	Neither the main circuit nor the control circuit is connected.	Main body is out of the drawer seat.

7.2 Wiring the secondary circuit according to electric principle diagram.
Note: Bolts, nuts, gaskets shouldn't be left inside the drawer seat to avoid being blocked.

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

7.4 Maintenance
Check the technical parameters in time or add some lubricating oil, etc.
This breaker structure is arranged vertically and modularized composition with each functioncell separated, which make the maintenance easy.
It has compact structure, reliable operation and strong free maintenance capability. Please check the technical parameters on the nameplate in accordance with the requirements of order before installation.



Making the secondary circuit power, the motor-driven mechanism can store energy automatically until hearing the click and energy stored indicating on the panel.

Otherwise press the storage handle for 6 times until hearing the click and the indicator display energy stored

And the closing operation can be realized either by closing electromagnet or manual button.

Manual energy-storage

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

8. Recommendation for user's connecting bus-bar

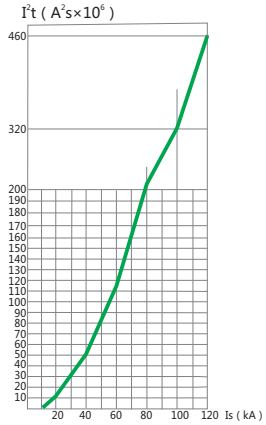
Inm(A)		NA1-1000X					NA1-2000X/NA1-2000XN/NA1-2000XH						NA1-3200X/NA1-3200XN			NA1-4000X		NA1-6300X/NA1-6300XN		
In(A)		200	400	630	800	1000	630	800	1000	1250	1600	2000	2000	2500	3200	4000/3P	4000/4P	4000	5000	6300
Busbar	Thickness(mm)	5	5	5	6	8	5	6	8	10	12	10	8	10	10	10	-	10	10	10
	Width(mm)	30	30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

Note: the specifications in the table is obtained as the ambient temperature of air circuit breaker is 40℃, with open installation; this is in compliance with the specification of copper busbars adopted under the heating conditions regulated in IEC/EN60947-2.

9. Power loss

Inm(A)		NA1-1000X					NA1-2000X/NA1-2000XN/NA1-2000XH						NA1-3200X/NA1-3200XN			NA1-4000X		NA1-6300X/NA1-6300XN		
In(A)		200	400	630	800	1000	630	800	1000	1250	1600	2000	2000	2500	3200	4000/3P	4000/4P	4000	5000	6300
Power loss (W)	Drawer type	40	101	123	110	171	70	110	172	268	440	530	384	600	737	921	-	575	898	1426
	Fixed type	33	85	107	94	146	34.4	50	78	122	200	262	200	312	307	450	-	-	-	-

10. A^2S curve

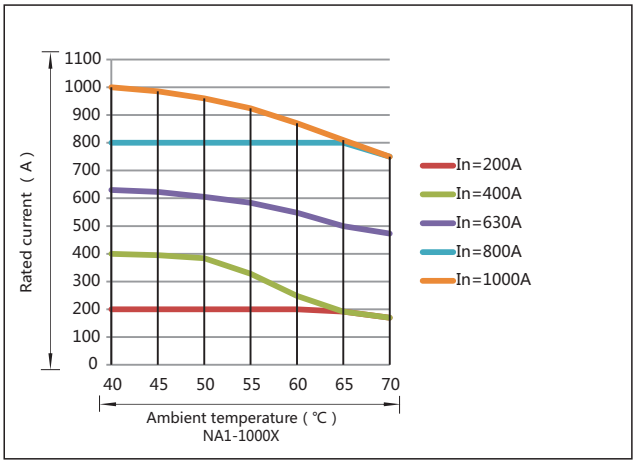


Is: prospective symmetrical current(of an a.c. circuit)

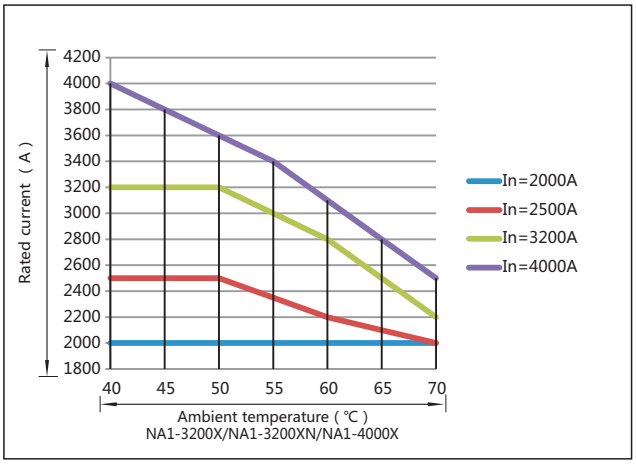
11. Temperature compensation correction

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

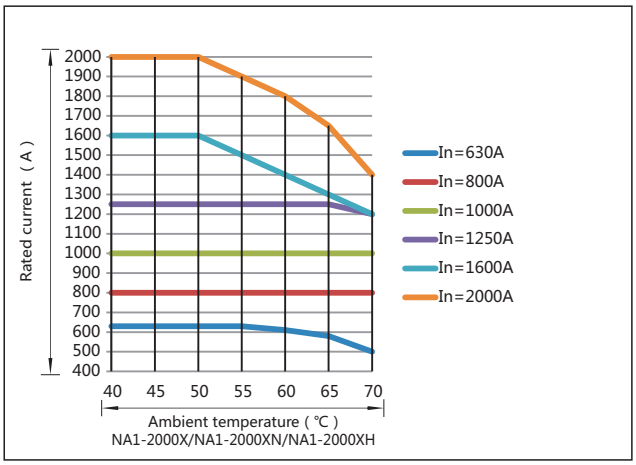
Note: The ACB is to calibrated at 40℃, special application please refer to the table above and the curve below.



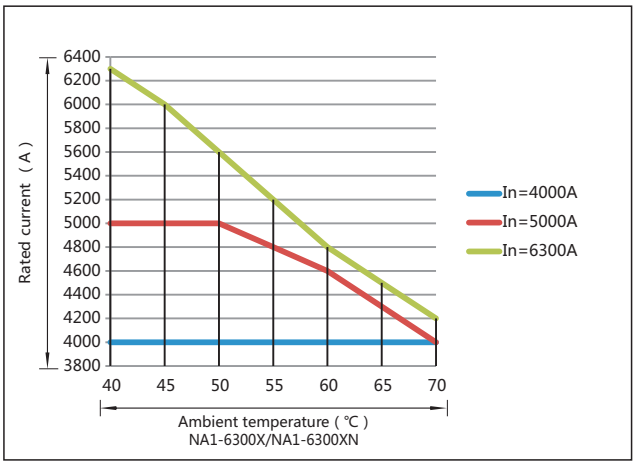
NA1-1000X



NA1-3200X/NA1-3200XN/NA1-4000X



NA1-2000X/NA1-2000XN/NA1-2000XH



NA1-6300X/NA1-6300XN

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12. Coordination recommendations

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

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

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13. Selectivity protection

13.1 Selective protection between NM8 and NA1

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

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

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

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

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13.2 Selective protection in NA1

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

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

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

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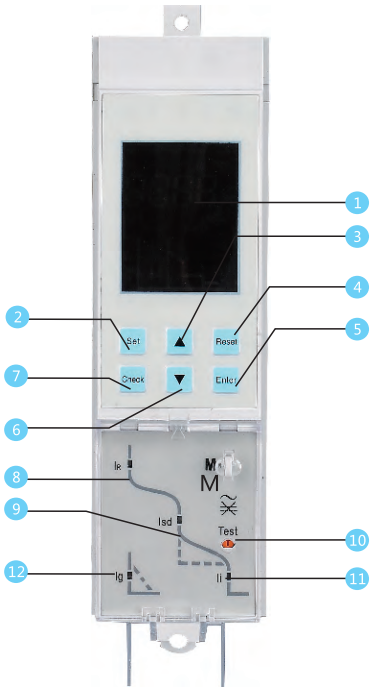
Intelligent Controller of NA1 series

14 Protection Features of intelligent controller

14.1 M/H and 3M/3H intelligent controller UI



M/H control

3M/3H control

1. Display window
   Display current value, setting value, tripping time and so on
2. "Set"
   Switch to setting menu
3. "Up"
   Change the marquee or the selected parameter
4. "Return"
   Escape from this grade and return to upper menu or cancel the current selected parameter
5. "Enter"
   Enter into the next menu directed by the current item, or select current parameter and store modifications
6. "Down"
   Change the marquee or the selected parameter
7. "Check"
   Switch to query menu
8. "IR" light
   Overload long delay fault indication
9. "Isd" light
   Short-circuit Short delay indication
10. "Test"
    Trip test button
11. "Ii" light
    Instantaneous Short-circuit fault indication
12. "Ig" light
    Asymmetric earthing or neutral line fault indication
13. Alarm light
14. Communication light
15. Run light

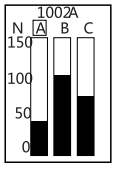
Note: Method of 3M/3H controller application please refer to 3M/3H controller instruction.

14.2 3M/3H controller default interface and menu structure

3M/3H controller has four subjects menus and a default interface:

The subjects menus are composed of 4 parts: measurement menu, parameter set menu, protection parameter set menu, history and maintenance menu.

3M/3H controller default interface



14.3 Explanation of M/H controller symbols

14.3.1 Explanation of symbols for reference

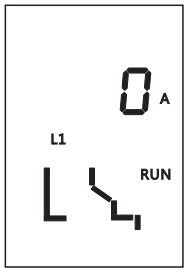
No.	symbol	explanation
1	IR= tR=	Long delay current setting, long delay time setting
2	Isd= tsd=	Short delay current setting, short delay time setting
3	Ig= tg=	Earthing current setting, earthing time setting
4	Ii=	Instantaneous current setting
5	N=	Neutral line protection parameter setting
6	TM	Trip simulated by software
7	TRIP	Tripped
8	RUN	Run normally
9	SET	Normally on: in settable state; Flickering: modifiable parameter
10	LIN	Storing state
11	P┣0	Protection setting interface
12	ΓES	Trip simulated by software setting interface
13	RLR	Alarm setting or query interface
14	SYS	System setting interface (current calibration , frequency setting ...)
15	DBS	Communication setting interface of H-type controller
16	DOS	DO setting interface (H type with DO function)
17	FRU	Fault record query interface
18	COU	Operation times and life query interface
19	HDΓ	Thermal capacity query interface
20	DOC	DO state query interface
21	H	Thermal capacity data
22	F--	Fault record number
23	R--	Alarm record number
24	Lg L1 L2 L3 LN	Earthing ,A,B,C,N phase
25	L L	The corresponding LED lamp will flash to indicate the fault type after tripping. The LED lamps are always on when the system is normal.

14.3.2 Operation and display instruction

There are four states, default state, setting state, query state and tripping state.

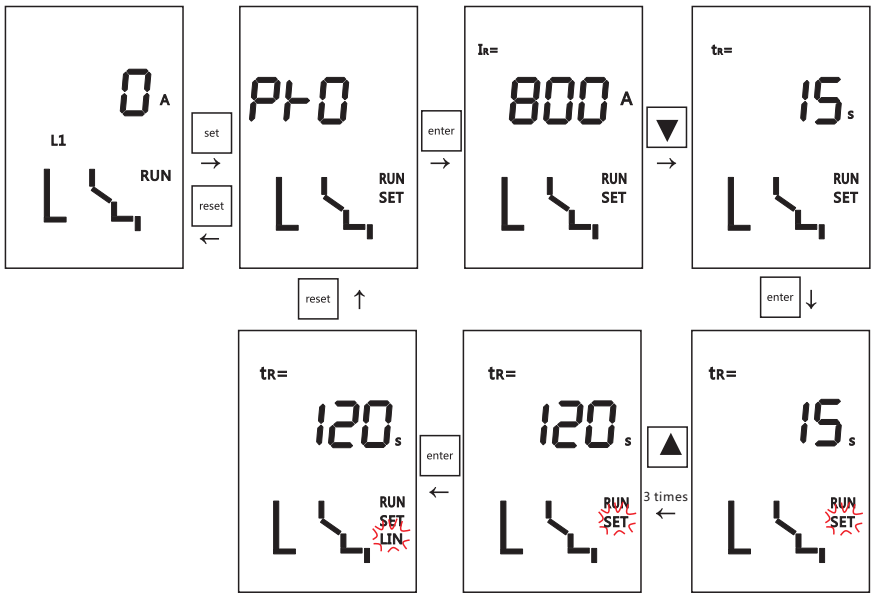
① Default state: default state is also called measuring state. All fault indicating lamps are off and maximum phase current is displayed. In this state, if "▲" or "▼" button is pressed, L1,L2,L3(LN),Lg current can be displayed in turn.

Example is shown below:

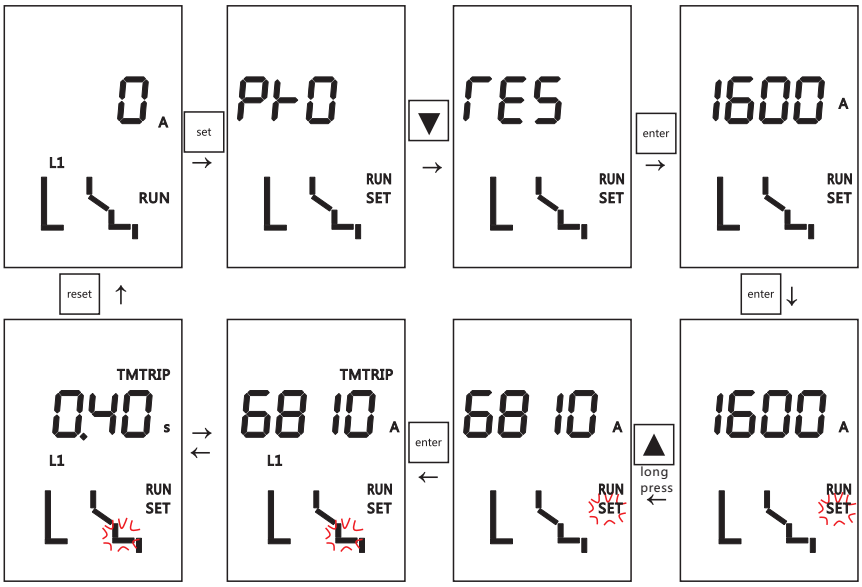


L1 phase current display interface

②Setting state: press "Set" button in default interface to enter into setting interface. Current protection parameters, overload pre-alarm value, earthing alarm threshold value and delay time can be queried or changed in setting state. Tripping can be simulated by software. In this state, "▲" or "▼" button can be pressed to add or subtract value when "SET" indicating lamp is flickering. Don't forget to press "Enter" button to save data after setting.
Example 1 of changing long delay time is shown below:

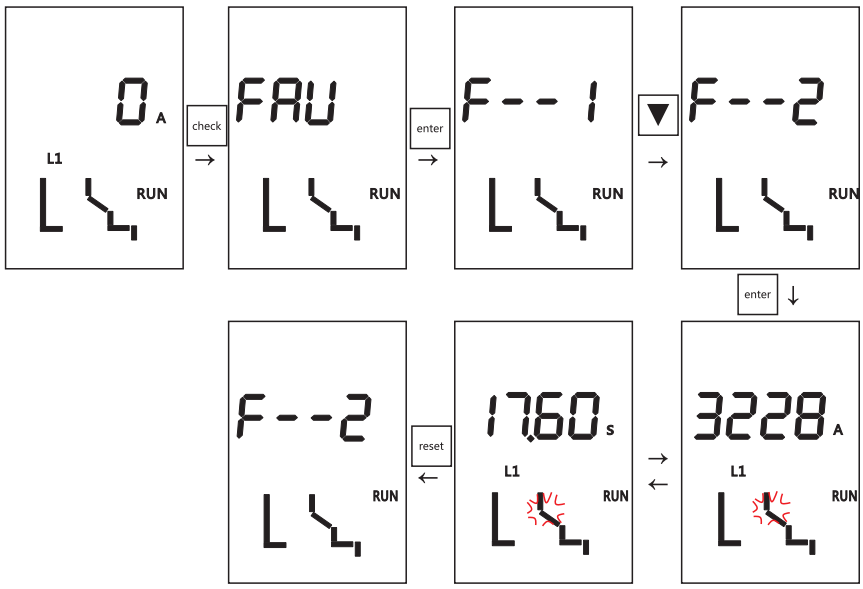


Example 2 of short delay tripping simulated by software is shown below:

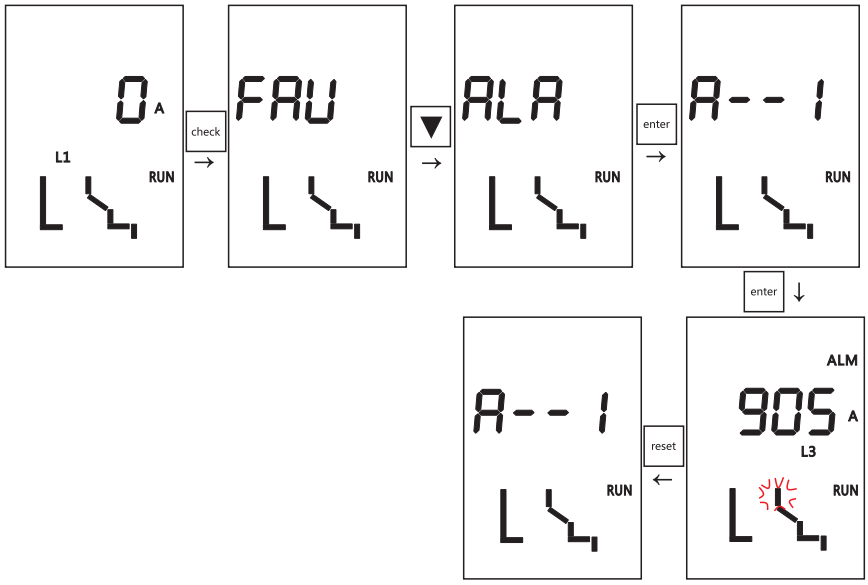


Example3 of setting earthing alarm threshold current is shown below:

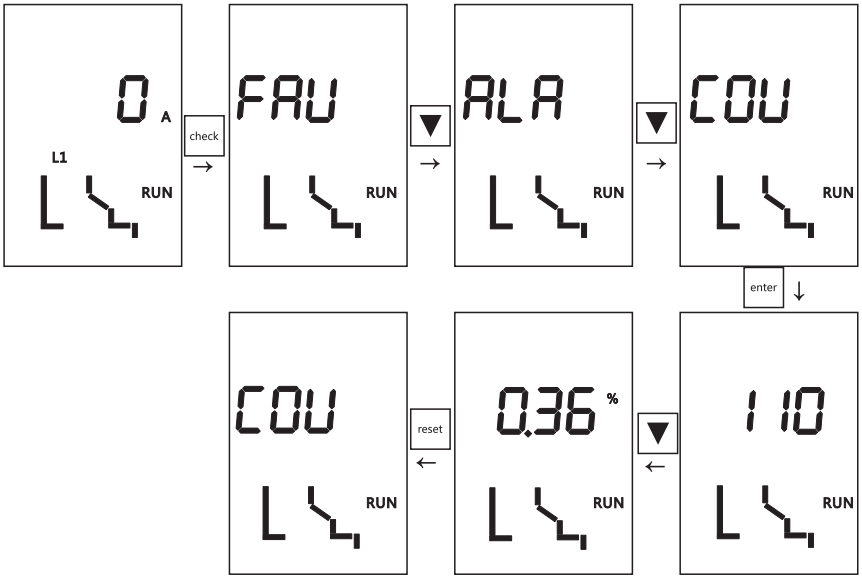
③Query state: press "Check" button in default interface to enter into query interface. Last 8 fault records, last 8 alarm records, breaker operation times, life record and thermal capacity can be queried in query state.
Example4 of querying second fault record is shown below:



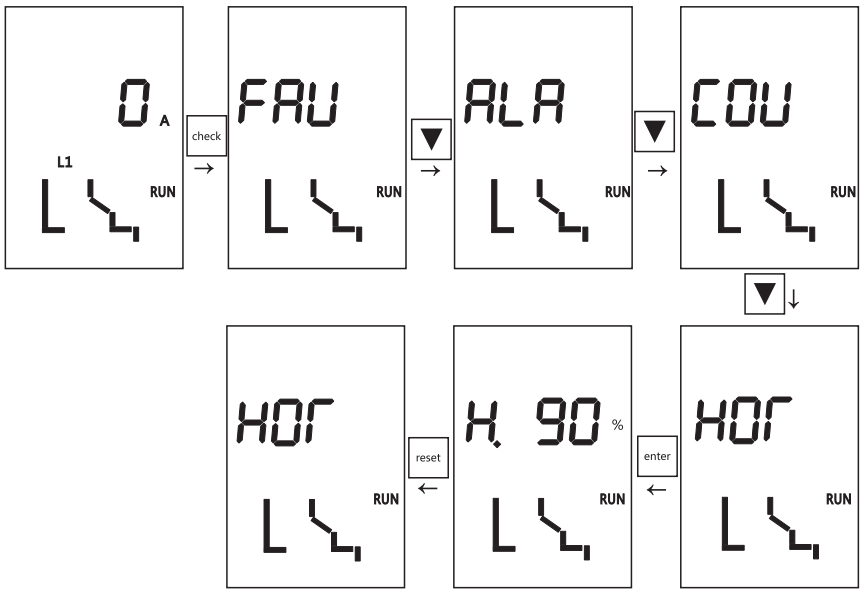
Example5 of querying first alarm record is shown below:



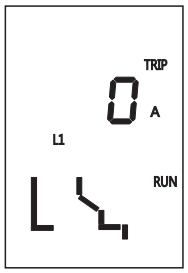
Example6 of querying breaker operation times and life record is shown below:



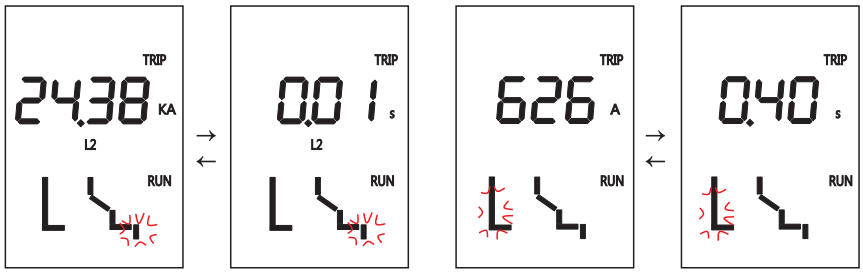
Example7 of querying thermal capacity after tripping is shown below:



④Tripping state: "Reset" button should be press to return default interface after tripping at fault.



Press "Test" button to simulate Instantaneous trip



Instantaneous trip state

Earthing trip state

14.3.3 Controller functions list

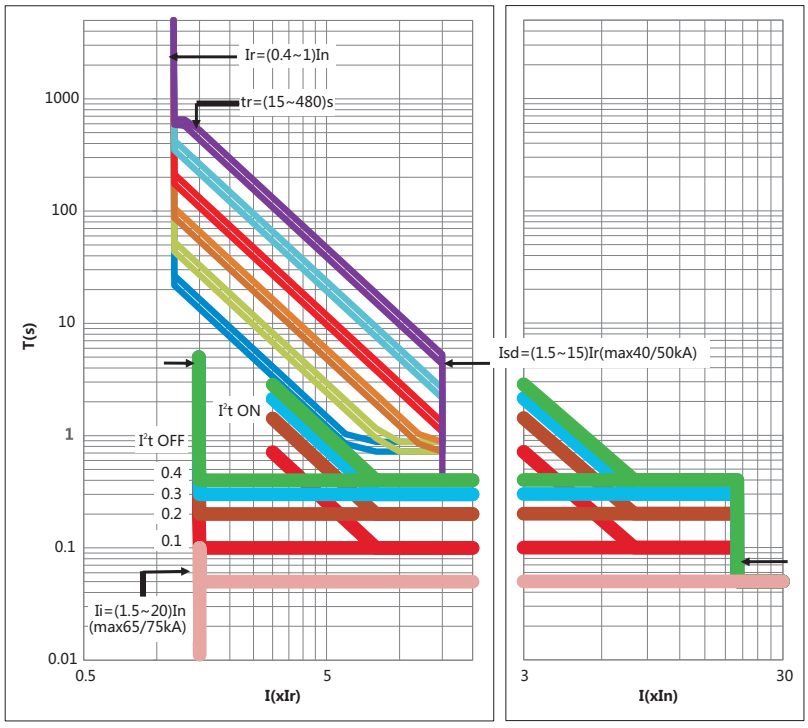
M type	H type
1 over-current protection (overload, short delay, instantaneous, earthing); vector sum grounding mode. 2 Neutral line protection 3 Current measurement 4 two test functions: (1)Instantaneous trip test simulated by mechanical button (2)Other trip tests simulated by software 5 Ten fault records 6 Ten alarm records 7 MCR protection 8 operation times records 9 thermal capacity 10 overload pre-alarm	1 over-current protection (overload, short delay, instantaneous, earthing); vector sum grounding mode. 2 Neutral line protection 3 Current measurement 4 two test functions: (1)Instantaneous trip test simulated by mechanical button (2)Other trip tests simulated by software 5 Ten fault records 6 Ten alarm records 7 MCR protection 8 operation times records 9 thermal capacity 10 overload pre-alarm 11 communication function: MODBUS protocol 12 four DO function (optional)

3M type	3H type
1 all functions of M-type controller are included 2 HMI:128*64 LCD	1 all functions of 3M-type controller are included 2 voltage measurement and protection 3 frequency measurement and protection 4 power measurement and protection 5 electric energy, power-factor, harmonic measurement 6 communication function: MODBUS protocol 7 DI/DO function

14.4 specifications of characteristics

14.4.1 Over-current protection characteristic curve

Over-current protection characteristic curve



14.4.2 Overload long time-delay protection

Operating characteristics

Current Ratings Range(Ir)	tolerance	Current	Action time(s)						Time tolerance
(0.4~1)In+ OFF	±10%	≤1.05Ir	>2h Non-trip						
		> 1.3Ir	<1h trip						
		1.5Ir(setting time)	15	30	60	120	240	480	±10%
		2.0Ir	8.4	16.9	33.7	67.5	135	270	±10%
Phase N Overload and Over-Current Characteristic			100% or 50%(Applicable to 3P+N or 4P)						

14.3 Short-circuit short-delay protection

Short-circuit short delay protection has two protection modes. One is inverse time and definite time protection. $I^2Tsd = (8Ir)^2tsd$ works when current is low. In this formula, I is actual current, Tsd is actual trip time, tsd is set trip delay time. When I is over inverse time set value but below 8Ir, controller will operate according to over-current protection characteristic curve. When I is over both of inverse time set value and 8Ir, controller will operate according to definite time protection. The other is definite time protection and set time is 0.11s, 0.21s, 0.31s, and 0.41s. When I is over Isd but below Ii, controller will operate according to definite time protection.

Operating characteristics

Current Ratings Range(Isd)	tolerance	Current	Action time(s)				Time tolerance
(1.5~15)Ir+ OFF	±10%	≤0.9Isd	In the 2tsd Non-trip				
		> 1.1Isd	In the 2tsd Delayed-trip				
		tsd	0.1	0.2	0.3	0.4	±15%
		Returnable time	0.06	0.14	0.25	0.33	±15%

Note: a. When the intelligent controller is FrameⅡ (Inm=3200A、4000A), Isd shouldn’t be more than 40KA.
b. When the intelligent controller is FrameⅢ (Inm=6300), Isd shouldn’t be more than 50KA.
c. When tsd is 0.1s or 0.2s, time permissible error is ±0.040s.

14.4.4 Short-circuit instantaneous protection

Instantaneous protection trip time should be less than 100ms.

Operating characteristics

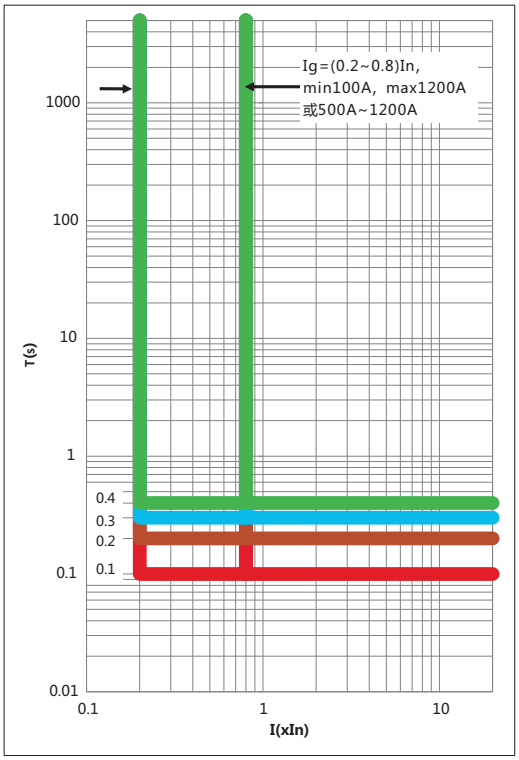
Current Ratings Range(Ii)	tolerance	Current	Time tolerance
(1.5~20)In+ OFF	±15%	≤0.85Ii	In the 0.2s Non-trip
		> 1.15Ii	In the 0.2s trip

Note: a. When the intelligent controller is Frame Ⅰ (Inm=2000A), Ii shouldn’t be more than 50KA.
b. When the intelligent controller is FrameⅡ (Inm=3200A、4000A), Ii shouldn’t be more than 65KA.
c. When the intelligent controller is FrameⅢ (Inm=6300), Ii shouldn’t be more than 75KA.

14.4.5 Earthing protection

Earthing protection has definite time characteristic. Fault delay time is shown below.

Earthing protection characteristic curve



Operating characteristics of single-phase earthing protection

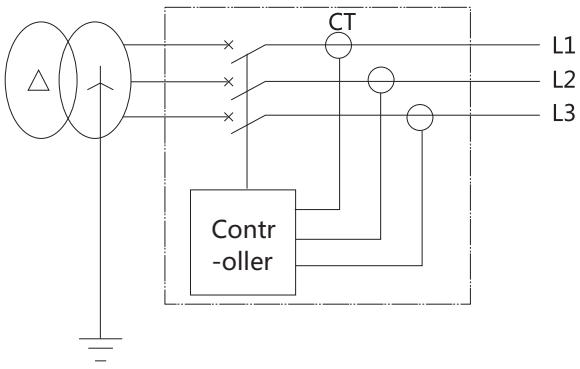
Current Ratings Range(Ig)	tolerance	Current	Action time(s)				Time tolerance
Inm=1000/2000 , (0.2~0.8)In+ OFF Inm=3200/4000/6300, (500~1200)A+ OFF	±10%	≤0.9Ig	In the 2tg Non-tripping				
		> 1.1Ig	In the tg±0.032s or tg(1±25%) Tripping				
		tg	0.1	0.2	0.3	0.4	±15%
		Returnable time	0.06	0.14	0.25	0.33	±15%

Note: a. When tg is 0.1s or 0.2s, time permissible error is ±0.040s;
b. When Inm is 1000A, Ig should be more than 100A. When Inm is 2000A, Ig shouldn' t be more than 1200A.
c. When Inm is 3200A, 4000A or 6300A, Ig should be between 500A and 1200A.

Single-phase protection is usually used in neutral-point solid ground system. Controller has two different protection modes, being vector sum mode and external transformer mode.

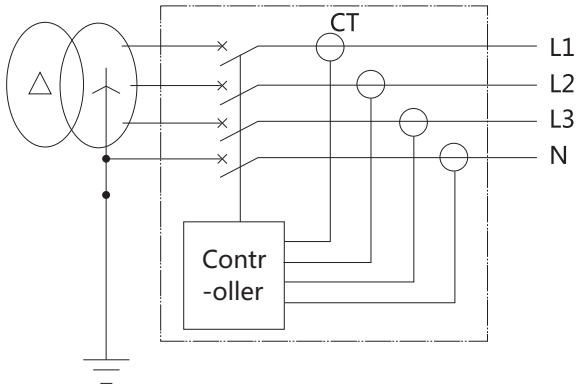
In three-phase three-wire system using 3-pole breaker without external transformer, earthing fault signal comes from three- phase current vector sum. Operating characteristic is definite time protection.

3PT mode



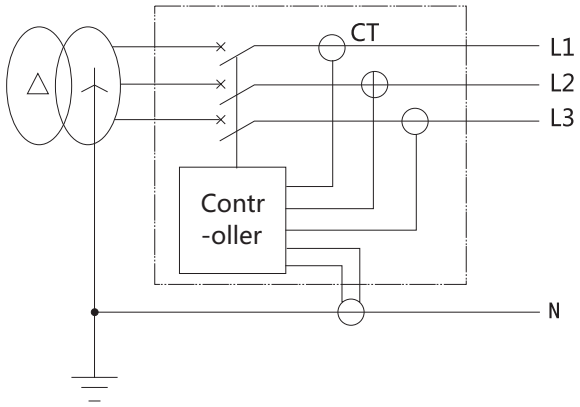
In three-phase four-wire system using 4-pole breaker without external transformer , earthing fault signal comes from three- phase current and N-Pole current vector sum. Operating characteristic is definite time protection.

4PT mode



In three-phase four-wire system using 3-pole breaker with external N-pole transformer, earthing fault signal comes from three- phase and N-Pole current vector sum. Operating characteristic is definite time protection.

(3P+N)T mode



Note:

① External N-pole transformer (connected to 6#, 7# terminal for NA1-1000, connected to 25#, 26# terminal for NA1-2000-6300) is a special product. Default lead wire is 2 meters long.

② Earthing protection in 3PT mode can only be used in balance load. It should be turned off or set value above allowable unbalance current when the load is unbalance or the controller may operate.

③ The distance between external transformer and breaker should be less than 5m in (3P+N)T mode. When lead wire of external transformer needs to be longer than 2 meters, special requirement should be noted when ordering.

15. Accessories

15.1 Under-voltage release

Without power supply, under-voltage release can't close.

It is classified into instantaneous and time-delay type.

Delay time 1s, 3s, 5s, 7s are fixed for NA1-1000; 1s, 3s, 5s are fixed for NA1-2000, 3200, 4000, 6300.

Within 1/2 time-delay range, circuit breaker does not trip when power voltage recovers and exceeds 85%Ue.

Characteristic

Type	NA1-1000X	NA1-2000X/NA1-2000XN/NA1-2000XH/NA1-3200X/NA1-3200XN/NA1-4000X/NA1-6300X/NA1-6300XN	
Rated control power voltage Us(V)	**AC230, 400**	**AC400, 230, 127**	**DC220, 110**
Action voltage(V)	(0.35-0.7)Us		
Reliable making voltage(V)	(0.85-1.1)Us		
Reliable non-making voltage(V)	≤0.35Us		
Power loss(W)	20VA	48VA	48W

Optional configure: Auto suction type under-voltage release, and this device can substitute normal one, it can prevent mechanism form misoperation.

Make sure there is power supply on the under-voltage release, before making the circuit breaker.

15.2 Shunt release

Shunt release can realize the remote control to break the circuit breaker.

Characteristic

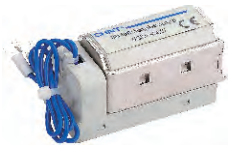
Type	NA1-1000X		NA1-2000X/NA1-2000XN/NA1-2000XH/NA1-3200X/NA1-3200XN/NA1-4000X/NA1-6300X/NA1-6300XN		
Rated control power voltage Us(V)	AC230, 400	DC220, 110	AC400, 230, 127	DC220, 110	
Work voltage	(0.7-1.1)Us				
Power loss	56VA	250W	300VA	132W	70W
Breaking time	(50±10)ms	(50±10)ms	(30~50)ms	(30~50)ms	

Forbid making the power for long time to avoid the shunt release being damaged.

15.3 Closing electromagnet

After the motor finishing the energy storage, closing release can instantly close the circuit breaker.

Characteristic



Type	NA1-1000X		NA1-2000X/NA1-2000XN/NA1-2000XH/NA1-3200X/NA1-3200XN/NA1-4000X/NA1-6300X/NA1-6300XN		
Rated control power voltage Us(V)	AC230, 400	DC220, 110	AC400, 230, 127	DC220, 110	
Work voltage	(0.85-1.1)Us				
Power loss (W)	56VA	250W	300VA	132W	70W
Closing time	(50±10)ms	(50±10)ms	≤70ms	≤70ms	

Forbid making the power for long time to avoid the closing release being damaged.

15.4 Motor-driven energy-storage mechanism

With the function of motor-driven energy storing and auto restoring energy after closing the circuit breaker, the mechanism can ensure closing the circuit breaker instantly after breaking the circuit breaker.

Manual energy-store is available.

Characteristic

Type	NA1-1000X		NA1-2000X/NA1-2000XN/NA1-2000XH/NA1-3200X/NA1-3200XN/NA1-4000X/NA1-6300X/NA1-6300XN	
Rated control power voltage Us(V)	AC230, 400	DC220, 110	AC400, 230, 127	DC220, 110
Work voltage	(0.85-1.1)Us			
Power loss (W)	90W	90W	85/110/150W	85/110/150W
Closing time	≤5s	≤5s	≤5s	≤5s
Energy-storage time				
Operation frequency				

15.5 Auxiliary contact NO

Standard model: 4NO(normal open)/4NC(normal close) and 6NC(normal close).

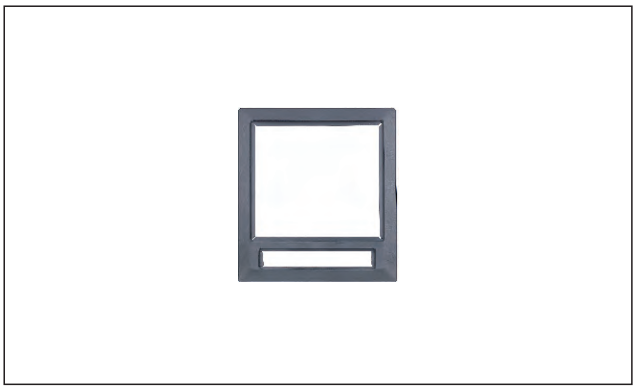
Characteristic

Type	NA1-1000X			NA1-2000X/NA1-2000XN/NA1-2000XH/NA1-3200X/NA1-3200XN/NA1-4000X/NA1-6300X/NA1-6300XN		
Rated voltage (V)	AC230	AC400	DC220	AC230	AC400	DC220
conventional free-air thermal current Ith (A)	10	6	0.5	6	6	6
Rated control capacity	300VA	100VA	60W	300VA	300VA	60W

NA1-1000X			NA1-2000X/NA1-2000XN/NA1-2000XH/NA1-3200X/NA1-3200XN/NA1-4000X/NA1-6300X/NA1-6300XN		
Category	Voltage	Current	Category	Voltage	Current
AC-15	AC230V	1.3A	AC-15	AC230V	1.3A
	AC400V	0.25A		AC400V	0.75A
DC-13	DC110V	0.55A	DC-13	DC110V	0.55A
	DC220V	0.27A		DC220V	0.27A

15.6 Doorcase

Installed on the door of the distribution cubicle, for sealing the distribution cubicle and making the protection class to IP40(fixed type and drawout type).



15.7 Phases barrier (Optional)

Installed between the busbars to increase the creepage distance.

15.8 Transparent shield (NA1-2000) (Optional)

Installed on the doorcase of the cubicle's small door, make the protection class to IP54. It is suitable for the fixed, drawout type circuit breaker and the load switch.

15.9 Off position locking mechanism

When the circuit breaker is disconnected, padlock can be used to lock it after pulling out the lock lever, then the circuit breaker can't be "Test" or "connected" position.(Padlock is prepared by users)

15.10 Key lock

Lock the circuit breaker on the OFF position, then the circuit breaker can't be closed.

Locks and keys will be provided by us.

Separate lock and key is matched with one set of the circuit breaker.

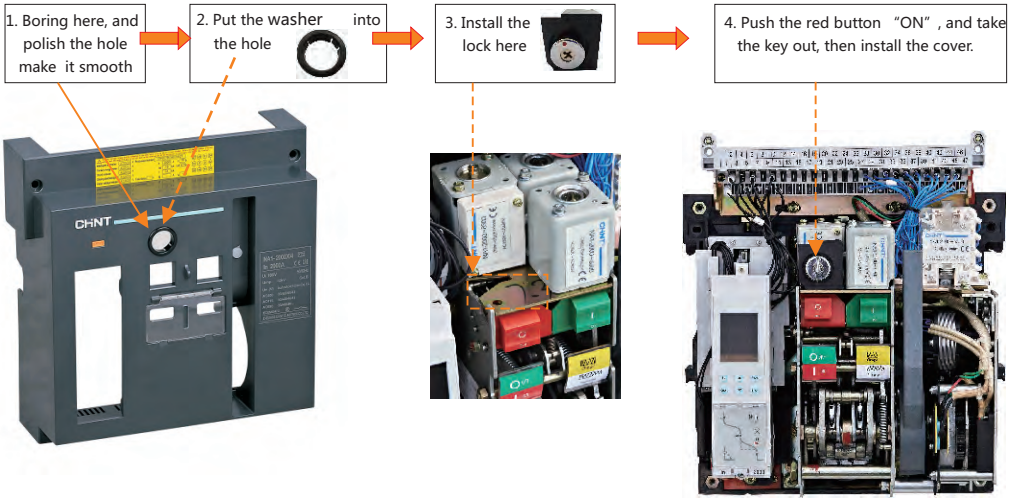
Three same locks and two same keys are matched with three circuit breaker.

Note: Before pulling out the key, the break pushbutton should be pressed first, rotate the key anticlockwise, then pull it out.

★ NA1Install the locking system

1. Components of the locking system:

2. Installation sequence:



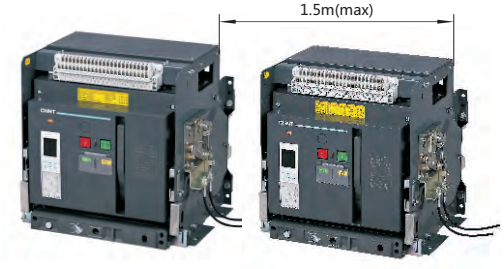
15.11 Cable mechanical interlock

It can realize the interlock of two horizontal or vertical-installed, three poles or four poles , drawout type or fixed type circuit breaker.

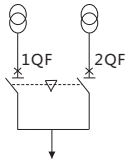
a. If need bend the cable, make sure the radian is more than 120°.

b. Check and make sure enough lubricating oil of the cable.

c. The maximum distance between two interlock circuit breakers is 1.5m.



Circuit diagram



Available running manner

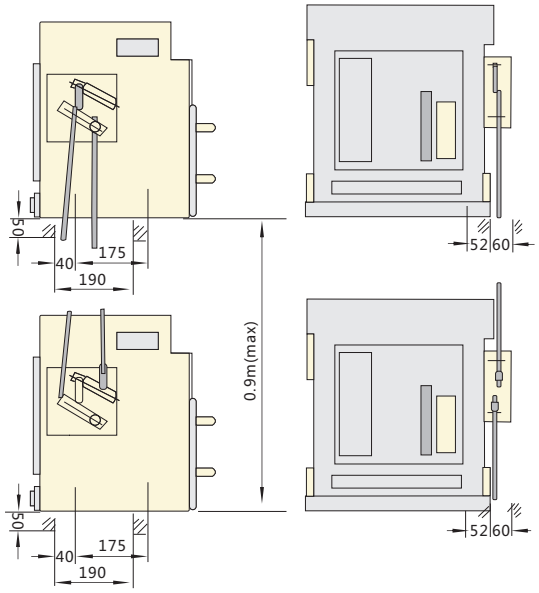
1QF	2QF
0	0
0	1
1	0

Notes: a. when the steel cable needs to be bent, enough transition arc should be reserved to guarantee flexible movement of steel cable;

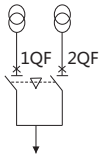
b. check the steel cable and make sure there is enough lubricant in the steel cable to guarantee flexible movement of steel cable.

15.12 Connecting-rod type mechanical interlock

Two vertical-installed three-poles or four-poles, drawout-type or fixed type circuit breakers realize the interlock between one breaker with another two different-state breakers.



Circuit diagram	Available running manner
Manner 1: three power supplies are provided for one circuit breaker only	



1QF	2QF
0	0
0	1
1	0

C

16. Maintenance and Overhaul of Circuit Breaker

Safety Precautions

The following operations must be executed in turn before conducting the maintenance or overhaul of circuit breakers:

a. Circuit breaker opening operation to ensure the circuit breaker is in an opening state;

b. Disconnecting the upper-level knife switch (if any) to ensure the main circuit and secondary circuit are uncharged;

c. Circuit breaker discharging, opening operation to ensure the circuit breaker is in a discharging and opening state;

d. The components which the personnel might contact must be uncharged.

Keep Safe

Maintenance and overhaul cycle

Condition	Environment	Maintenance cycle	Overhaul cycle	Remarks
General environment	The air should be always kept clean and dry. There is no corrosive gas. The temperature is in between -5℃~+40℃ The humidity should conform to Specification 1.3 Operating Conditions c Requirement for extreme atmosphere conditions.	Every six months	Once per year (every six months for more than 3 years of mounting period)	Confirming to IEC60947-2 Requirement for general environmental conditions.
Severe environment	Low temperature -5℃~-40℃ or high temperature 40℃ ~ 65℃ or humidity≥90%	Every three months	Every six months (every three months for more than 3 years of mounting period)	
	Places with more dust and corrosive gases	Every month	Every three months	

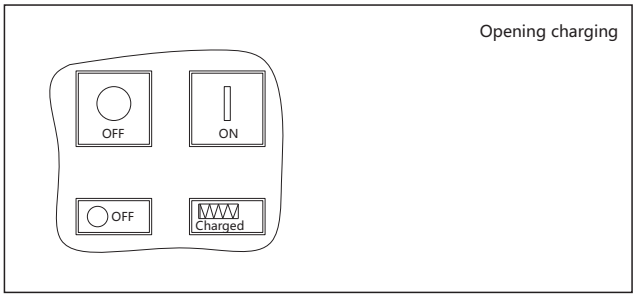
16.1 Maintenance of circuit breaker

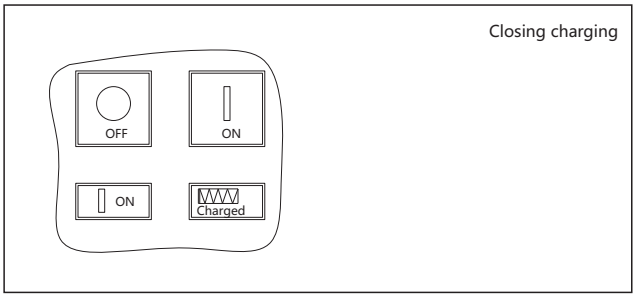
16.1.1 Foreign objects (such as tools, wire leads or fragments, metal objects) in the switchgear should be regularly cleared.

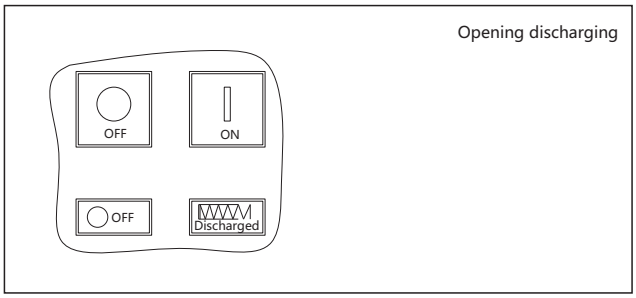
16.1.2 The dust on the circuit breaker must be regularly cleared to maintain its good insulation.

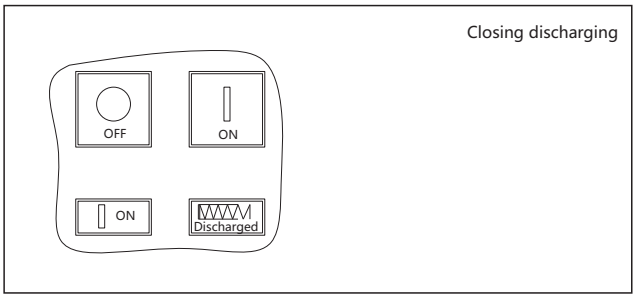
16.1.3 The spring washers of the main circuit connecting bolts , the earthing bolts must be checked for whether they are flattened and theconnection is firm.

16.1.4 Whether the opening or closing indication is correct and reliable.









16.2 Overhaul of circuit breaker

16.2.1 Connecting and mounting inspection

It is proposed to refer to the following requirement for the torsional forces of main circuit and secondary circuit.

Fastener specification	Torque requirement N·m
M3	0.5~0.7
M4	1.2~1.7
M8	16~26
M10	36~52
M12	61~94

16.2.2 Insulating property test

The phase-phase and phase-earth insulation resistance, requirement≥20MΩ.

The insulation resistance test must be first done after overhaul and long-time（≥7days）of deenergization and before energization again.

16.2.3 Operating characteristic inspection

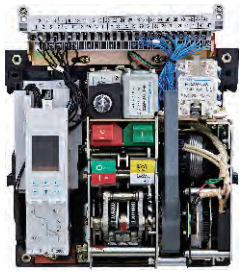
All accessories shall be connected with corresponding rated voltage according to the face shield nameplate requirement, and the following operations should be done:

Electric charging, closing and opening operation, 5times in cycle

Manual charging, closing and opening operation, 5times in cycle

The circuit breaker charging, opening and closing should be normal.

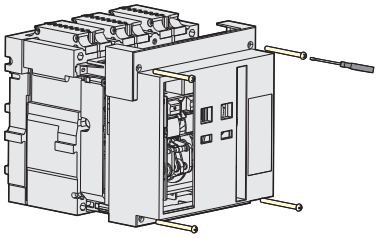
Note: The main circuit must be uncharged. If there is an under-voltage release, the rated voltage must be first connected.



Note: The picture takes NA1-2000X as an example

16.2.4 Inspection of circuit breaker components

16.2.4.1 Face shield dismantling



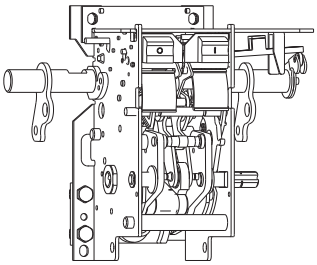
- Remove four bolts of circuit breaker fixed panel and take off the face shield.

Note: The picture takes NA1-2000X as an example.

16.2.4.2 Operating mechanism inspection

The mechanism components should be free of fracture and damage, and the fasteners are fastened.

Clear the dust and evenly apply oil onto the rotating components.



- Evenly apply 7012 low-temperature lubricating grease or lubricate same using the similar solid grease onto the mechanism rotating positions.

Note: The picture takes NA1-2000X as an example.

16.2.4.3 Intelligent controller (taking NA1-2000 type M type controller as an example)

Parameter setting should conform to the site use requirement.

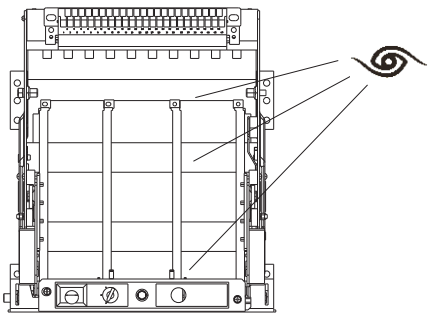
Simulated test tripping function

- 1. Press the “Set” button to enter the parameter setting interface “Pro”.
- 2. Press the “Enter” button to enter the protective parameter setting and query interface.
- 3. Press the “▲” or “▼” button to in turn select the display of protective parameter setting details.
- 4. Press the “Reset” button to return to the upper-level menu or exit from the interface.

• Press the "Test" button to simulate the tripping test.

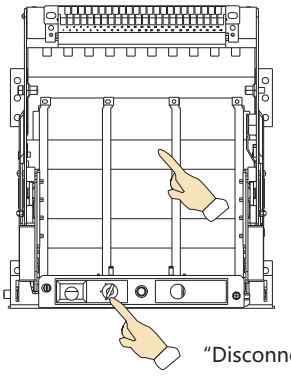
• Press the orange "Reset" button on the face shield to return to normal state.

16.2.4.4 Drawer set inspection (conduct the test after removing the body, taking NA1-2000X as an example)
There are no foreign objects inside.



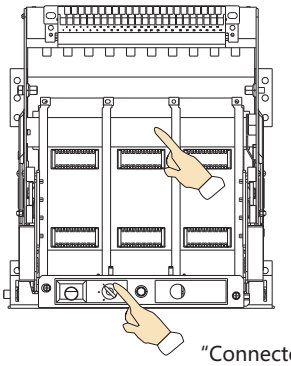
• Observe whether there are foreign objects inside the draw-out socket, like screws, wire leads, scrap iron; please clear same if any.

The flash barrier opening or closing is normal, and the spacing contact has no deformation or oxidization.



"Disconnected"

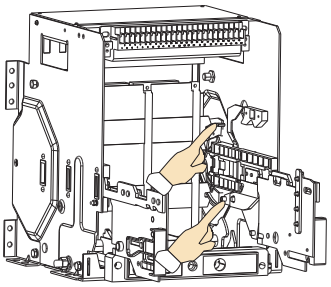
• Rotate to the "Disconnected" position, and the flash barrier is shown as the left figure.

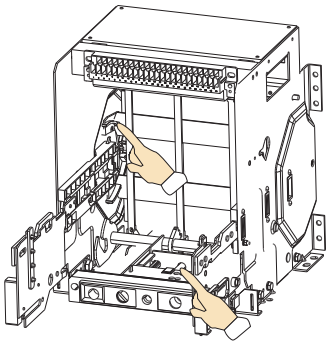


"Connected"

• Rotate NA1-2000X~6300X to the Connected position.
• Press down NA1-1000X separator and open the connecting rod. The flash barrier is shown as the left figure. Observe whether each phase bridge contacts are deformed, misplaced or oxidized. If any, replace same.

Rotate the friction positions and apply oil evenly.



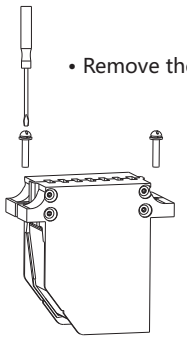


• Evenly apply 7012 low-temperature lubricating grease or similar solid grease onto the positions indicated in the left figure.

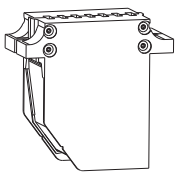
16.2.4.5 Arcing Chamber (taking NA1-2000X~6300X as an example)

Each arc and arcing chambers are not broken. If any, please promptly replace same and clear inside dust, corrosion layer and arc discharge point. In case of serious corrosion or rust, please promptly conduct replacement.

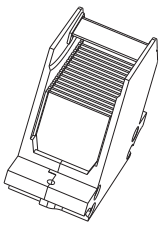
Note: Inspection must be done after short-circuit current breaking.



• Remove the fixing bolts

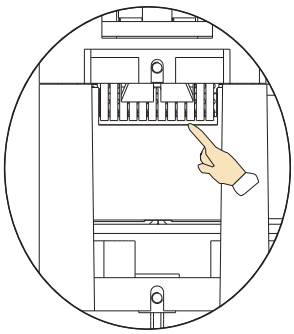


• Take out the arc chamber.



• Check chamber conditions.

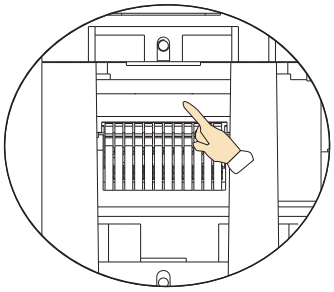
16.2.4.6 Required main contact (taking NA1-2000X~6300X as an example) over-travel≥2mm.



• Conduct manual closing operation, and observe the main contact over-travel.

Note: Please replace the contact if it reaches the position shown.

Clear dust, corrosion layer and particle burnt objects.



• Close the product and main contact is at the shown position. Observe any dust, particle burnt objects and oxidized corrosion layer of dynamic and static contacts. If any, please promptly clear same.

Note: Inspection must be done after short-circuit current breaking.

16.2.4.7 Secondary circuit inspection

No shell damage.

Inspect the contact between the draw-out body secondary circuitand drawer set secondary circuit using the multimeter. At the "Test" or "Connection" position, the contacts are in good contact , and the connecting screws are fastened , and the conductor insulation has no damage.

16.3 Replacement of undervoltage release, shunt release and closed electromagnet accessories. The following operations must be executed before replacing the accessories.

Cut off all power supplies and ensure the main circuit and secondary circuit power supplies are uncharged. The circuit breakers are in the discharging opening state.

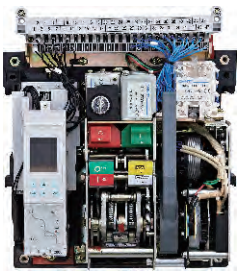
16.3.1 Replacement of fixed accessories

Remove the panel fixing bolts and dismantle the panel.

Untie the tape and remove the connecting conductor.

Remove the fixed accessory mounting screws.

Dismantle the accessories and replace same.



Note: The shunt release should be first dismantled before replacing the NA1-2000 undervoltage release.

16.3.2 Replacement of draw-out accessories

Rotate the body to the detachment position and remove the body.

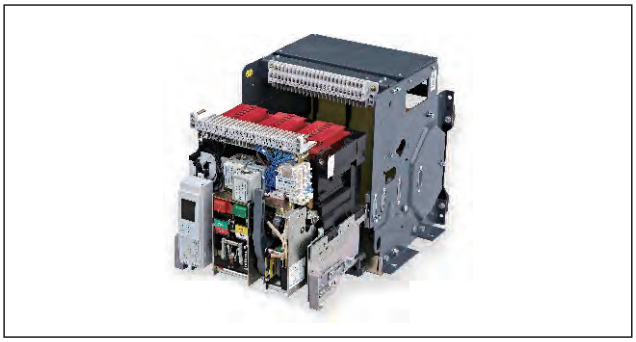
Remove the panel fixing bolts and dismantle the panel.

Untie the tape and remove the connecting conductor.

Remove the fixed accessory mounting screws.

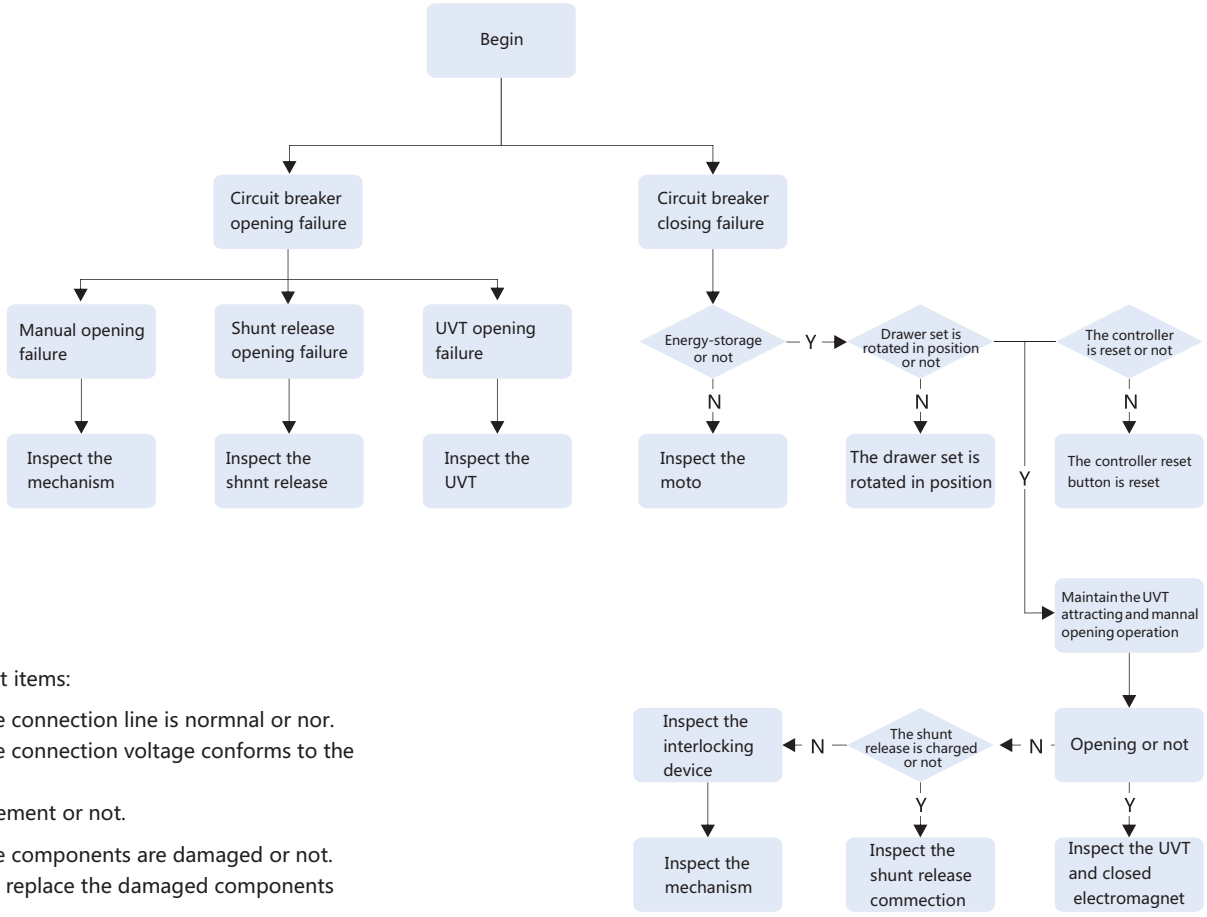
Dismantle the accessories and replace same.

Note: The shunt release should be first dismantled before replacing the NA1-2000 undervoltage release.



17. Common Failure Causes and Solutions

17.1 Troubleshooting logic



Inspect items:

1、The connection line is normnal or nor.

2、The connection voltage conforms to the

requirement or not.

3、The components are damaged or not.

please replace the damaged components

17.2 Faulty tripping analysis (taking NA1-2000X M as an example)

Failure cause identification

The failures are identified through the intelligent controller indication..

• Presss the "Reset" button till it returns to the default display interface.

• Press the "Check" button to enter the query menu interface; Press the "Enter" button to enter the failure query menu interface; press the "▼" and select the failure record frequency to be viewed, and press the "Enter" button again to query the failure details.

• Presss the "Reset" button to exit from or return to the upper-level menu.

Note: The electrical closing operation is forbidden before troubleshooting.

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18. Regular malfunction and solutions

Fault description	Reasons analysis	Maintenance method
Tripping of circuit breaker	Over load tripping (Ir indicator flashing)	1. Check the breaking current value and operation time of intelligent release. 2. Analyze the load and electric network, exclude the overload if it happens. 3. Match the actual operating current with long time-delay current setting value. 4. Press the reset button to reclose the breaker
	Short circuit tripping ("Isd" or "Ii" indicator flashing)	1. Check the breaking current value and operation time of intelligent release. 2. Exclude the short circuit fault if it happens 3. Check the setting value of intelligent release 4. Check the normal state of breaker 5. Press the reset button to reclose the breaker
	Earthing fault tripping (IG indicator flashing)	1. Check the breaking current value and acting time of intelligent release. 2. Exclude the earthing fault if that happens. 3. Match the fault current setting value with the actual protection. 4. Press the reset button to reclose the breaker.
	Under-voltage release fault: 1. Rated working voltage is less than 70%Ue 2. Fault of control unit	1.Check the power is on or not 2.Check the power voltage of under-voltage release, it shouldn't be less than 85%Ue. 3.Replace the control unit of under-voltage release
	Mechanical interlock acting	Check the working state of two circuit breakers fixed with mechanical interlock
The breaker can't be closed	Intelligent release don't reset (panel is raised)	Press the reset button to reclose the breaker
	Secondary circuit of drawerout-type breaker isn't connected	Make the breaker to "making" position ("click" sound will be heard)
	Breaker hasn't stored energy	Check the secondary circuit: 1. Power voltage of motor shouldn't less than 85%Ue. 2. Check the storage mechanism, replace it if necessary.
The breaker can't be closed	Mechanical interlock acting leads to locking of breaker	Check the working state of two circuit breakers fixed with mechanical interlock
	Closing electromagnet: 1.Rated control voltage is less than 85%Us; 2.Closing electromagnet is damaged	1. Power voltage of closing electromagnet shouldn't less than 85%Us. 2. Replace the electromagnet.
Tripping after closing the circuit breaker (Fault indicator flashing)	Tripping immediately: 1. Short circuit current is closed 2.Delay tripping because of transient current is high when closing; 3. Overload current is closed	1. Check the breaking current value and operation time of intelligent release; 2. Exclude the short circuit fault if it happens; 3. Exclude overload fault 4. Check the normal state of breaker 5. Modify the current setting value of intelligent release 6. Press the reset button to reclose the breaker
Circuit breaker can't be opened	The breaker can't be opened manually 1. There is fault with mechanical operating mechanism	1. Check the mechanism, if there is fault happened.
	The breaker can't be opened by motor remotely 1. There is fault with mechanical operating mechanism 2. Power voltage of shunt release is less than 70%Us; 3. Shunt release is damaged	1. Check the mechanism, if there is fault happened. 2. Check the Power voltage of shunt release is less than 70%Us or not 3. Replace shunt release

Fault description	Reasons analysis	Maintenance method
Circuit breaker can't store energy	Manual storage can't be realized	Mechanical fault with the energy-storage device
	Motor storage can't be realized 1. Power voltage of motor energy-stored device is less than 85%Us; 2. There is mechanical fault with energy-storage device	1. Power voltage of motor energy-stored device shouldn't less than 85%Us 2. Mechanical fault with the energy-storage device
Handle of drawerout-type circuit breaker can't be drawn in or out	1. There is padlock at the "opening" position 2. Slideway or breaker body isn't pulled into its position	1. Take away the padlock 2. Pull the slideway or breaker body into its position
Drawerout-type breaker can't be drawn out at the "opening" position	1. Handle isn't pulled out 2. Breaker is not totally at the "opening" position	1. Pull out the handle 2. Keep the circuit breaker totally at "opening" position
Drawerout-type breaker can't reach the "making" position	1. Something drop into the drawer base, and lock the mechanism or mechanism fault happens. 2. Breaker body not match with the frame -size rated current of drawer base	1. Check and clean the drawer base, or contact with manufacturer 2. Match the body with relevant drawer base
No display on intelligent release panel	1. Release isn't connected with power 2. There is fault with release	1. Check the power is connected or not 2. Cut off the power, then connect again. Otherwise contact with manufacturer
	Rated control voltage is less than 85%Us;	Check the electromagnet power voltage shouldn't be less than 85%Us.
Fault indicator still flashing after pressing the Reset button	Fault happened with intelligent release	Cut off the power, then connect again. Otherwise contact with manufacturer

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NA1-1000X~6300X Ordering specification

Customer: Tel: Date:

Quantity:

Model		☐NA1-1000X	☐NA1-2000X ☐NA1-2000XN ☐NA1-2000XH	☐NA1-3200X ☐NA1-3200XN	NA1-4000X	☐NA1-6300X ☐NA1-6300XN
Rated current In (A)		☐200 ☐400 ☐630 ☐800 ☐1000	☐630 ☐800 ☐1000 ☐1250 ☐1600 ☐2000	☐2000 ☐2500 ☐3200	☐4000	☐4000 ☐5000 ☐6300(no four poles)
Installation mode		☐ Drawout type ☐Fixed type (Note: no fixed type when In> 4000A)				
Number of poles		☐ Three poles ☐Four poles				
Intelligent Controller		Protection function			Auxiliary functions	Optional function
	☐ M type Standard (Default configuration)	1. ☐ Ir overload long delay, Isd short-circuit short delay inverse time + definite time, Ii transient short-circuit, Ig single-phase grounding 4-section protection 2. ☐ Ir overload long delay, Isd definite time short-circuit short delay,Ii transient short-circuit, Ig single-phase grounding 4-section protection			1. Ammeter function 2. Self-diagnostic function 3. Tuning function 4. Test function 5 Display function	/
	☐ 3M type Multifunctional (Optional configuration)	1. ☐ Ir overload long delay, Isd short-circuit short delay inverse time + definite time, Ii transient short-circuit, Ig single-phase grounding 4-section protection 2. ☐ Ir overload long delay, Isd definite time short-circuit short delay,Ii transient short-circuit, Ig single-phase grounding 4-section protection				☐ Voltage display ☐ Frequency display ☐ Power Factor show ☐ Active power display ☐ Load monitoring function Note: For the specific optional function, refer to List of controller functions in the sample (The cost of optional functions will be calculated additionally).
	☐ 3H-type Communication type (Optional configuration)	1. ☐ Ir overload long delay Isd short-circuit short delay inverse time +definite time Ii transient short-circuit, Ig single-phase grounding 4-section protection 2. ☐ Ir overload long delay, Isd definite time short-circuit short delay, Ii transient short-circuit, Ig single-phase grounding 4-section protection 3. ☐ with PROFIBUS-DP communication protocol ☐ with MODBUS communication protocol				
	Notes: Protection function Settable range and conventional factory tuning	Ir long delay current setting range: (0.4 to 1) In Overload 1.5Ir action time setting range: 15,30,60 ..... 480s	! Conventional factory tuning: overload long delay 1.0In ! Conventional factory tuning: overload 1.5Ir; action 15s			
		Isd short delay current setting range: (1.5 to 15) Ir; short delay action time (0.1 ~ 0.4) s	! Conventional factory setting: short delay current 8Ir ; ! Conventional factory tuning: Short delay action time 0.4s [Note: 3M, 3H for (1.5 to 15) Ir]			
		Ii instantaneous current setting range: 1.5In ~ 50kA/65kA/75kA ! Conventional factory tuning: 12In [Note: 3M, 3H for (1.5In~50kA/65kA/75kA)]				
		Ig earthing protection current setting range: (0.2 to 0.8) In; the earthing protection time setting range: (0.1to0.4)s ! Conventional factory setting: 0.5 In; OFF				
	Controller power	☐AC380V,☐AC400V,☐AC220V,☐AC230V,☐AC127V,☐DC220V,☐DC110V				(Optional)
Electrical accessories	Undervoltage release (default configuration)	☐AC380V,☐AC400V,☐AC220V,☐AC230V,☐AC127V,☐Order____V ,☐Non-undervoltage				(Optional)
		☐ Instantaneous ☐ delay, s; ☐ Resistance capacity loss release delay (1,3,5) s, and optional non-adjustable				(Optional)
	Shunt release	☐AC380V,☐AC400V,☐AC220V,☐AC230V,☐AC127V,☐DC220V,☐DC110V				(Optional)
	Closing electromagnet	☐AC380V,☐AC400V,☐AC220V,☐AC230V,☐AC127V,☐DC220V,☐DC110V				(Optional)
	Electric motor	☐AC380V,☐AC400V,☐AC220V,☐AC230V,☐AC127V,☐DC220V,☐DC110V				(Optional)
Special requirements	Interlock device (surcharge)	Mechanical linkage: ☐ Link interlock ☐ Cable interlock Door interlock: ☐ Switch body position door interlock ☐ Switch on/off state door interlock (drawer-type)				(Optional)
	Accessories (surcharge)	Button lock: ☐Panel products on/off button lock Key lock: ☐1 lock 1 key ☐2 locks 1 key ☐3 locks 1 key ☐ 3 locks 2 keys ☐5 locks 3 keys ☐Special custom__lock__ key External transformer: ☐External N phase transformer [(3P+N)T type ☐External leakage zero sequence current transformer (E mode) ☐External ground current transformer (W) Module: ☐ PSU-1 Power module ☐RU-1 relay module ☐ST-DP protocol converting module ☐Position signaling devices (☐Connected ☐Test ☐Unconnected) ☐Mechanical counting device				(Optional)
	The main circuit connection	☐Horizontal connection (default) ☐Vertical connection (with L vertical bus-bar) ☐Rotation busbar horizontal connection (Drawer In ≤ 3200) ☐Rotation busbar vertical connection (drawer-type In ≤ 3200)				(Optional)

Note: The casing current, rated current and auxiliary control voltage must be specified when ordering!
Note: 1) Please mark "√" or fill figure in the relative " ☐" if no mark, we will provide according to conventional.
Note: 2) The operational fuction of the intellgent controller and special requirements require additional costs.

Tel.:0577-62877777-6213 Fax :0577-62877777-6288


NA1-6300X


NA1-4000X


NA1-3200X


NA1-2000X


NA1-1000X

Configuration instructions

1. NA1-2000X~6300X fundamental configurations
   a. Motor-driven:
   Under-voltage instantaneous release;
   Shunt release;
   Closing electromagnet;
   4 suits of transform contact;
   Motor driven operating mechanism;
   M-type Intelligent Controller;
   Horizontal wiring of main circuit;
   Doorcase;
   Element of main circuit;
   Operating instructions of M-type Intelligent Controller
   Operating instructions of Air Circuit Breaker;
   Packing box;
   Drawer seat (Drawout type)

   b. Manual:
   Under-voltage instantaneous release;
   4 suits of transform contact;
   M-type Intelligent Controller;
   Horizontal wiring of main circuit;
   Doorcase;
   Element of main circuit;
   Operating instructions of M-type Intelligent Controller
   Operating instructions of Air Circuit Breaker;
   Packing box;
   Drawer seat(Drawout type)

3. NA1-2000X~6300X operational configuration (additional costs)
   Nonadjustable under voltage delayed release (1s, 3s, 5s);
   Connecting-rod type mechanical interlock (for drawout type);
   Wire-cable mechanical interlock; Button lock; Key lock;
   Door interlock'Locking device;
   External current transformer earthing protection; Vertical busbar;
   Rotating busbar (IN≤3200);
   3NO (normal open) and 3NC (normal close) contacts;
   4NO and 4NC contacts; 5 groups changeover contacts;
   3 groups changeover contacts; H type intelligent controller;
   Position signal; Counter; Protecting cover (NA1-2000);
   Double power controller.

2. NA1-1000X fundamental configurations
   a. Motor-driven:
   Under-voltage instantaneous release;
   Shunt release;
   Closing electromagnet;
   Motor driven operating mechanism;
   4 normal open and 4 normal close auxiliary contacts;
   M-type Intelligent Controller;
   Closing and breaking push button lock;
   Horizontal wiring of main circuit;
   Doorcase;
   Element of main circuit;
   Operating instructions of Air Circuit Breaker;
   Packing box;
   Drawer seat(Drawout type)

   b. Manual:
   Under-voltage instantaneous release;
   4 normal open and 4 normal close auxiliary contacts;
   M-type Intelligent Controller;
   Horizontal wiring of main circuit;
   Closing and breaking push button lock;
   Doorcase;
   Element of main circuit;
   Operating instructions of Air Circuit Breaker;
   Packing box;
   Drawer seat(Drawout type)

4. NA1-1000X operational configuration (additional costs)
   Under voltage delayed release; wire-cable mechanical interlock;
   key lock; External current transformer earthing protection;
   Vertical busbar; 6 groups changeover contacts;
   H type intelligent controller; Phases barrier, position signal.

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