NA8 Air Circuit Breaker

1. General

With a rated current from 200A to 6300A and a rated operational voltage of AC 400V or 690V (specifications 3200 and 6300 AC 690V in trial production), the NA8 series air circuit breaker (hereinafter referred to as circuit breaker) and is mainly used in distribution networks with an AC frequency of 50Hz to distribute electric energy and protect lines and power equipment from being damaged by overload, under voltage, short cirucit, single-phase grounding and other failures. Having art-oriented appearance, high breaking capacity, zero arcover and a variety of intellectualized protection functions, the circuit breaker can be used for selective protection with accurate action, no unnecessary power cut, and better power supply reliability.

The circuit 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.

The product allows the wire to enter from the upper or lower port, and the open frame (draw-out) circuit breaker has isolation function.

The product meets the standards GB 14048.2 and IEC 60947-2 and has obtained the CCC certificate.

2. Type designation

NA8 - □/□

- Number of poles in the breaker (pole 3 may be omitted)
- Shell grade rated current of the breaker
- Enterprise design code
- Enterprise's air circuit breaker code
- Enterprise feature code

3. Operation conditions

3.1 When the ambient air tempeature is -5℃～+40℃, the mean value is no greater than +35℃ within 24 hours.

Note: If the upper limit is higher than +40℃ or lower limit lower than -5℃ in work, discussions shall be made between the user and the manufacturer.

3.2 Altitude: not higher than 2000m for the installation site.

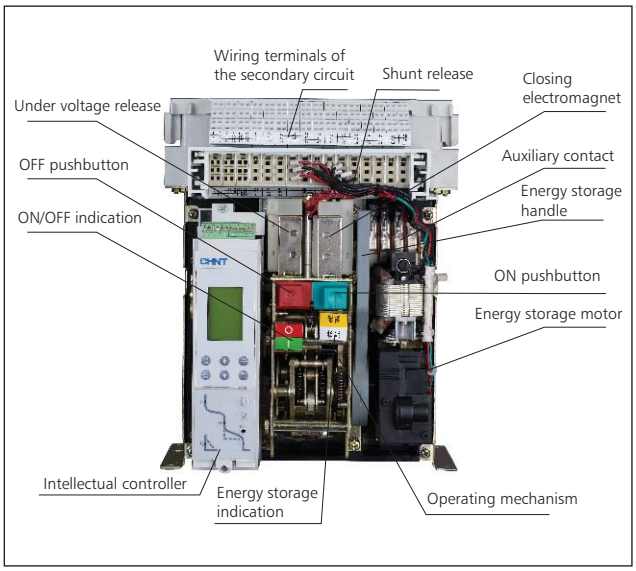
3.3 When the ambient air temperature is +40℃, the relative humidity of the air shall not be higher than 50%; a higher relative humidity is allowed at a lower temperature; for example, for the wettest month, the maximum relative humidity averaged shall be 90% while the lowest temperature averaged in that month +20℃, and special measures shall be taken for the condensation occasionally produced due to temperature change.

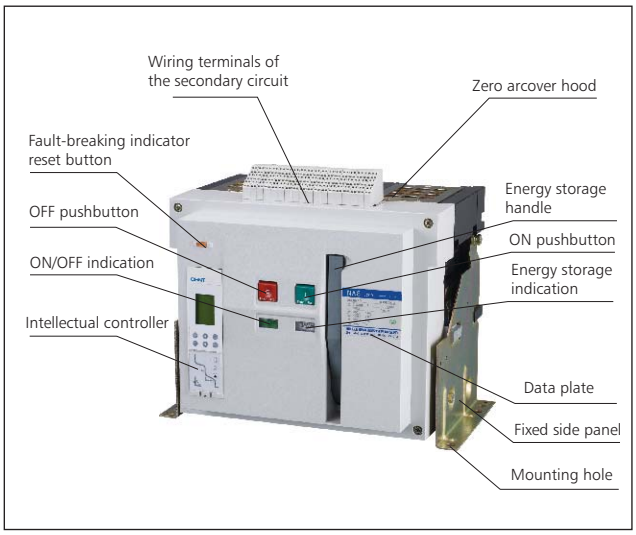
3.4 Class of pollution: 3.

3.5 The installation category of the breaker's main circuit is IV; when the rated operational voltage of the main circuit is less than or equal to AC400V, the installation category of the control circuit and auxiliary circuit is III, apart from the similarity between the under voltage release coil and the intellectual controller's power transormer primary coil and the breaker; When the rated operational voltage of the major loop is greater than AC400V and less than or equal to AC690V, it is necessary for the control circuit and auxiliary circuit to be isolated from the major loop with an isolating transformer, and the highest operational voltage of the control circuit and auxiliary circuit is AC400V, the installation category of the control circuit and auxiliary circuit being III.

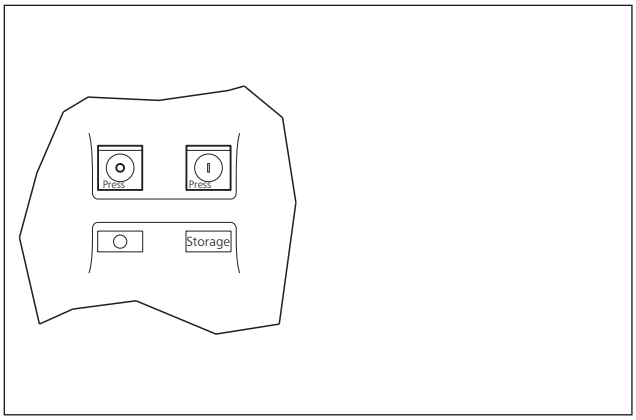
4. Product structure

Body structure

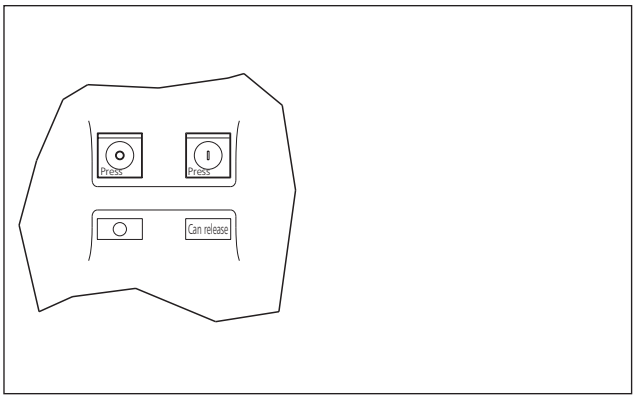




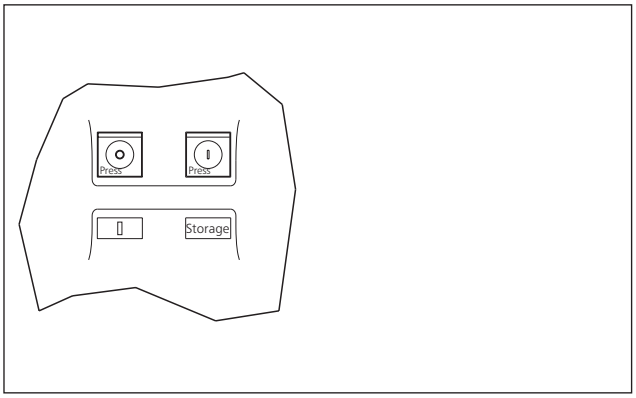
Breaker off and energy storage over



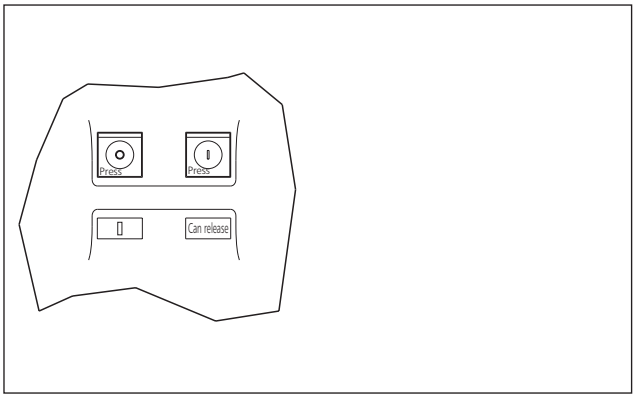
Breaker off and no energy storage



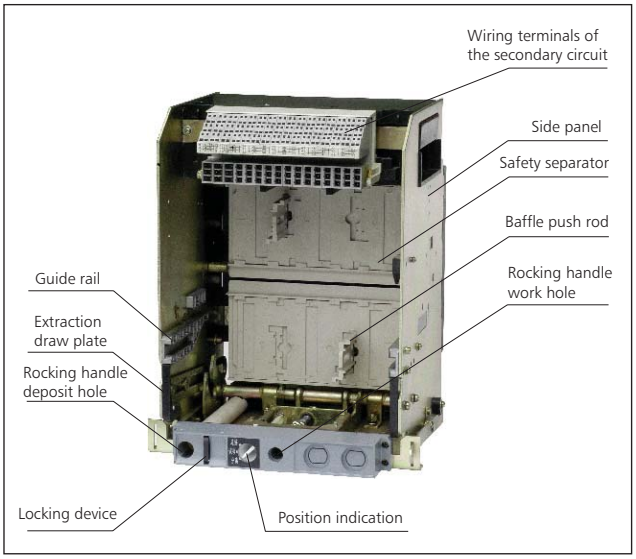
Breaker on and energy storage over



Breaker on and no energy storage



Drawout structure



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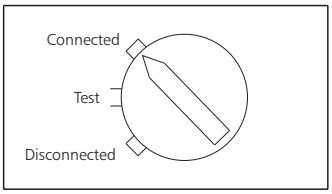
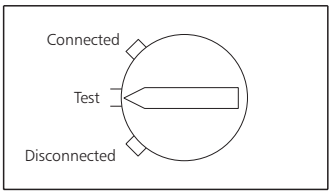
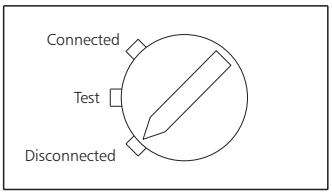


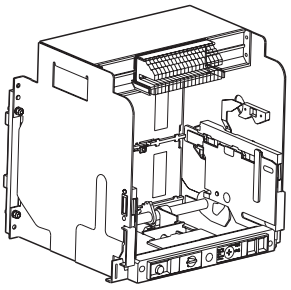
Connected: both main circuit and secondary circuit are connected



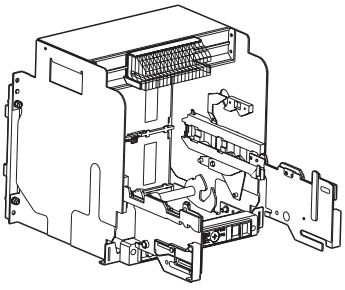
Test: the main circuit is disconnected, the safety separator woks well, and the secondary circuit is connected



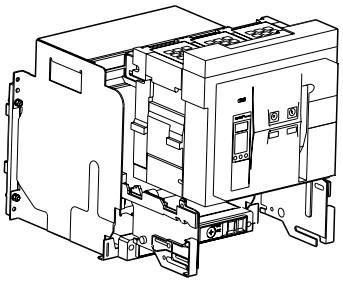
Disconnected: neither main circuit nor secondary circuit is connected



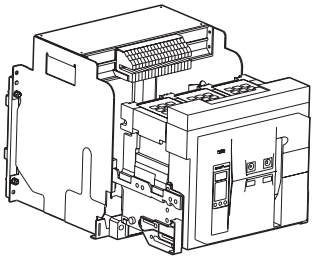
(1) Draw-out socket placed horizontally



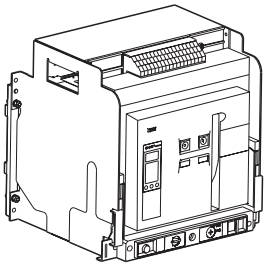
(2) Pull out the guide rail



(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 the turn the breaker body to the working position

5. Main technical parameters

5.1 Main technical parameters

Type		NA8-1600	NA8-3200	NA8-6300
				
Shell grade rated current Inm A		1600	3200	6300
Rated current In A		200,400,630,800, 1000,1250,1600	1600,2000,2500,3200	4000,5000,6300
Nominal insulation voltage Ui V		1000	1000	1000
Rated operational voltage Ue V		400,690	400,(690V In trial production)	400,(690V In trial production)
Rated ultimate short circuit breaking capacity Icu kA		55,30	100,75	125,85
Rated service short circuit breaking capacity Ics kA		42,25	100,75	125,85
Rated short time withstand current Icw,1s kA		42,25	85,-	100,-
Frequency of operation (number of times/h)		20	10	10
Number of operations	Mechanical life	3000	3000	2000
	Electric life	1000	500	500
Flashover distance mm		0	0	0
Line incoming pattern		Wire to enter from the upper or lower part	Wire to enter from the upper or lower part	Wire to enter from the upper or lower part
Weight (3P/4P)	Fixed type kg	22/26.5	52.5/66.5	-
	Draw-out type kg	38/55	98/121	200
Size (3P/4P) Height×width×depth	Fixed type kg	320×(254/324)×251	354×(422/537)×331	-
	Draw-out type kg	351×(282/352)×345	431×(435/550)×445	471×780×445

5.2 Capacity-reducing usage

5.2.1 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	200	200	200	200	200	200	200	200	200	200
	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
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

5.2.2 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

5.3 Power loss

Power loss is the total loss measured when the breaker is charged with the rated current.

Power loss			
Breaker type	**Rated current (A)**	**Draw-out type (W)**	**Fixed type (W)**
NA8-1600	200	115	45
	400	140	80
	630	161	100
	800	215	110
	1000	230	120
	1250	250	130
	1600	460	220
NA8-3200	1600	390	170
	2000	470	250
	2500	600	260
	3200	670	420
NA8-6300	4000	550	-
	5000	590	-
	6300	950	-

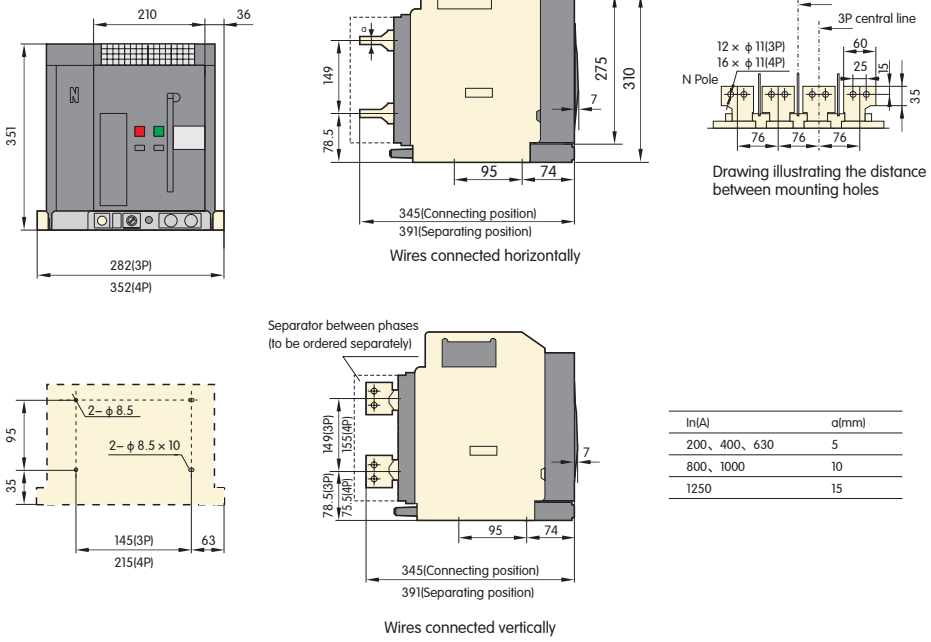
Note: The data and parameters in the above technical documentation result from tests and theoretical calculation, and can only be used as a general type selection guide. They cannot replace industrial practical experience or proof test.

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

Inm(A)		**NA8-1600**							**NA8-3200**				**NA8-6300**		
In (A)		200	400	630	800	1000	1250	1600	1600	2000	2500	3200	4000	5000	6300
Busbar	Thickness (mm)	5	5	5	5	5	8	10	6	6	5	10	10	10	10
	Width (mm)	20	50	40	50	60	60	60	100	100	100	100	100	100	100
	Number of buses	1	1	2	2	2	2	2	2	3	4	4	5	7	8

6. Dimensions and connection of the circuit breaker

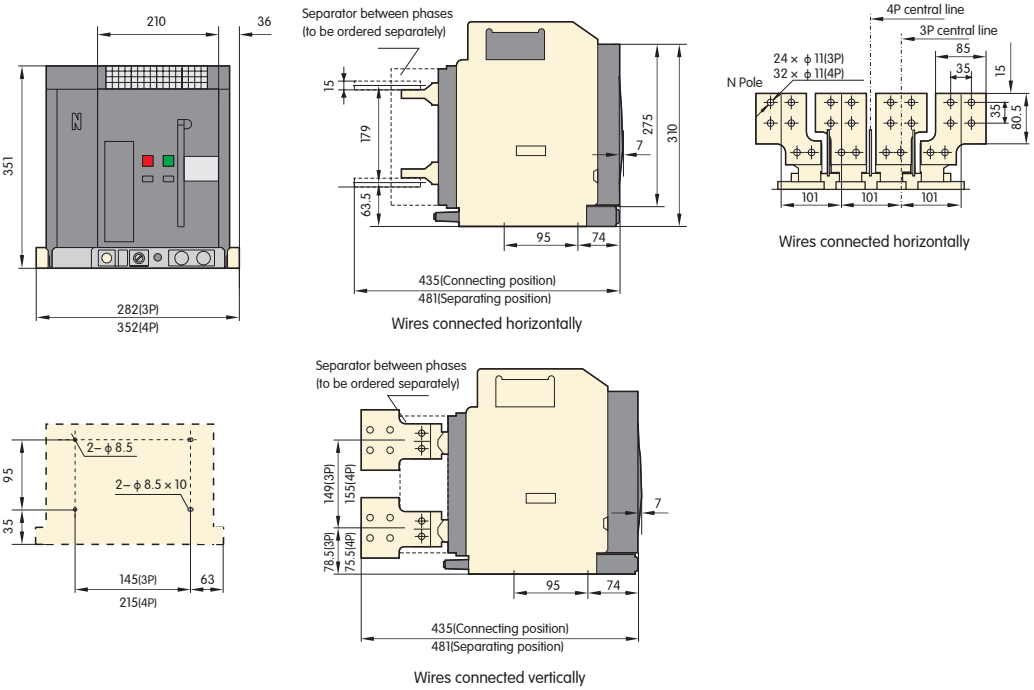
NA8-1600(In=200A~1250A) Draw-out type
(horizontal connection is the default by the factory, vertical one to be made by users themselves)



In(A)	a(mm)
200、400、630	5
800、1000	10
1250	15

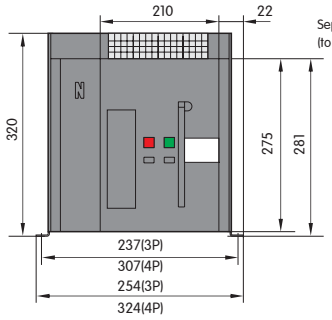
Note: If users intend to change the horizontal connection into vertical one on site, they need to replace the upper and lower buses on both sides with the same one as the central bus.

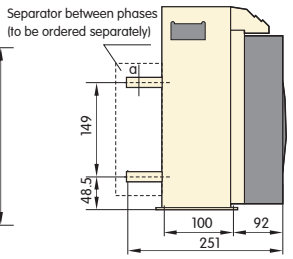
NA8-1600(In=1600A) Draw-out type
(horizontal connection is the default by the factory, vertical one to be made by users themselves)



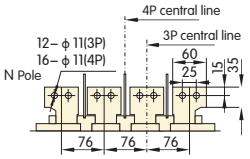
Note: If users intend to change the horizontal connection into vertical one on site, they need to replace the upper and lower buses on both sides with the same one as the central bus.

NA8-1600(In=200A~1250A) Fixed type
(horizontal connection is the default by the factory, vertical one to be made by users themselves)

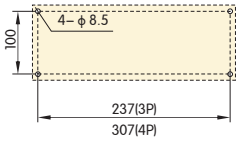




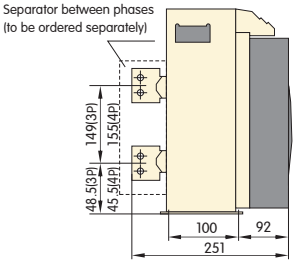
Wires connected horizontally



Wires connected horizontally



Drawing illustrating the distance
between mounting holes

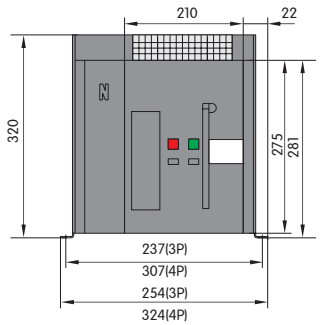


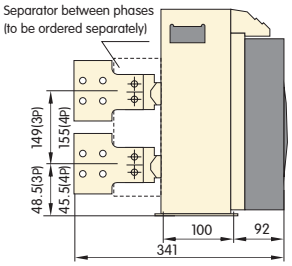
Wires connected vertically

In(A)	a(mm)
200、400、630	5
800、1000	10
1250	15

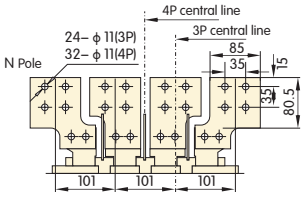
Note: If users intend to change the horizontal connection into vertical one on site, they need to replace the upper and lower buses on both sides with the same one as the central bus.

NA8-1600(In=1600A) Fixed type
(horizontal connection is the default by the factory, vertical one to be made by users themselves)

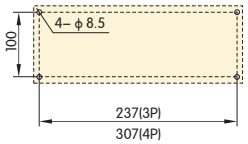




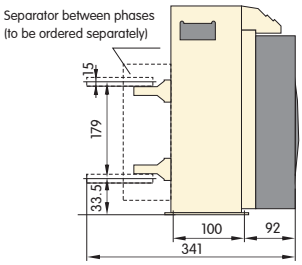
Wires connected vertically



Wires connected horizontally



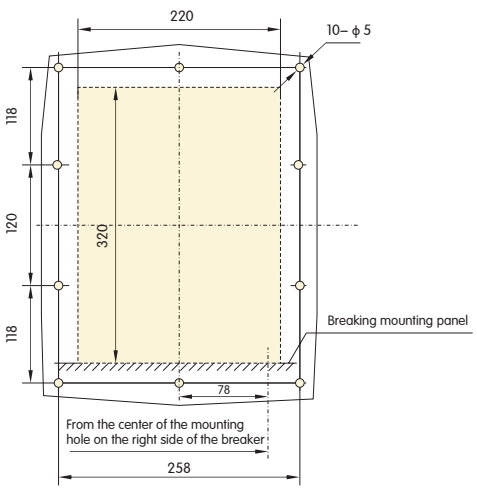
Maximum bottom surface



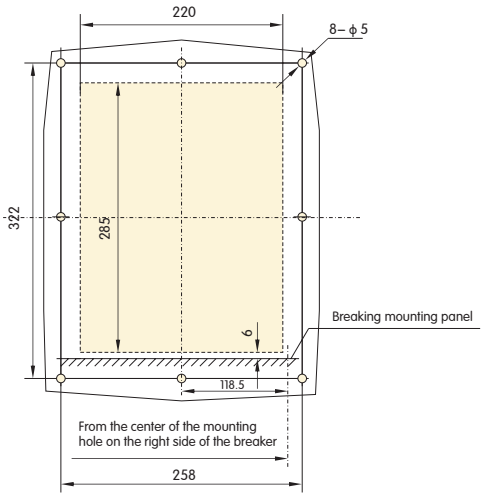
Wires connected horizontally

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

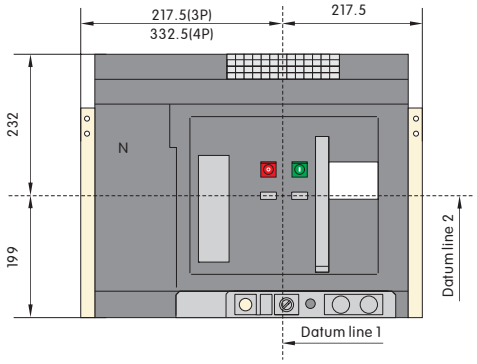
NA8-1600 Draw-out type Size of the hole to be drilled on the panel



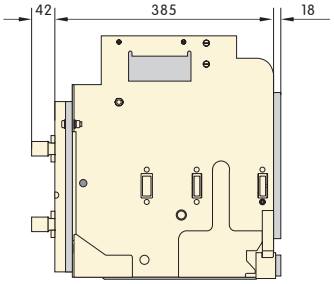
NA8-1600 Fixed type Size of the hole to be drilled on the panel



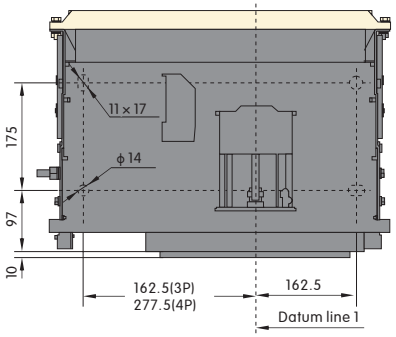
NA8-3200 Draw-out type size of the hole to be drilled on the panel



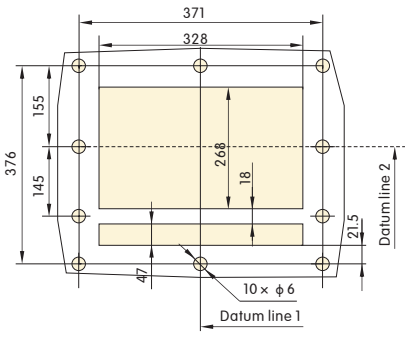
Dimensions



Dimensions

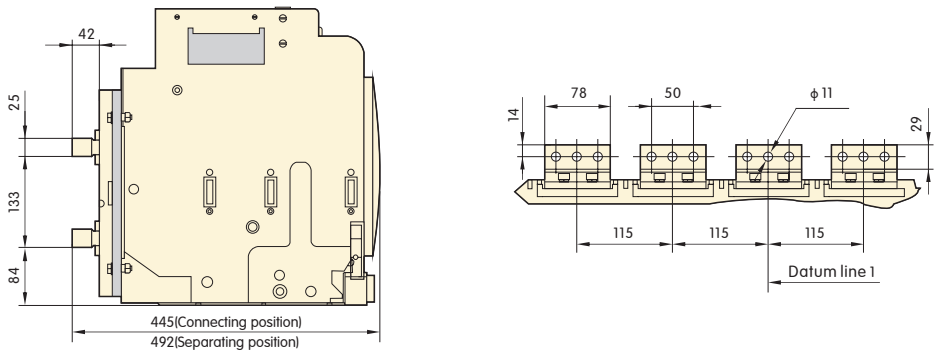


Installation dimensions



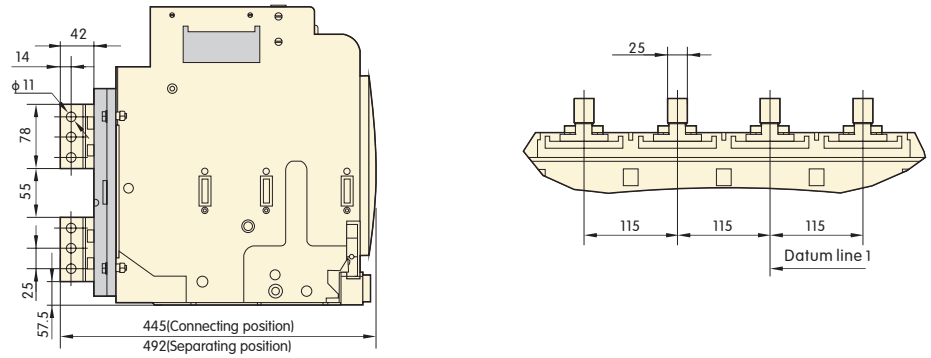
Size of the hole to be drilled on the panel

NA8-3200(In=1600A~2500A) Draw-out type (horizontal connection is the default by the factory)



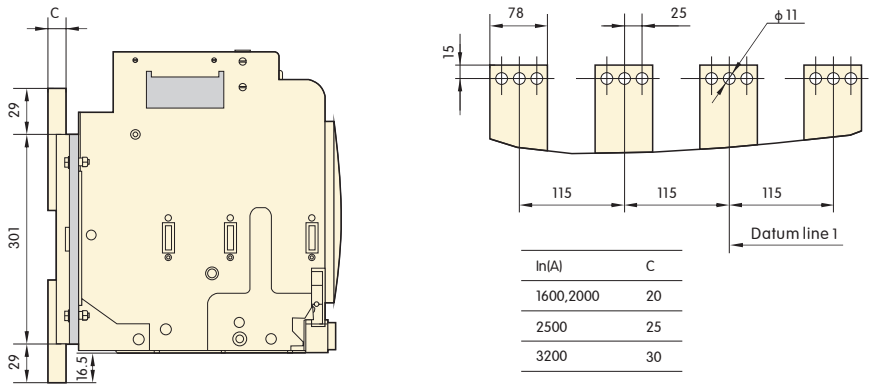
Note: If users want to change the horizontal connection into vertical one on site, they only have to turn the bus by 90°.

NA8-3200(In=1600A~2500A) Draw-out type (vertical connection to be made by users themselves)



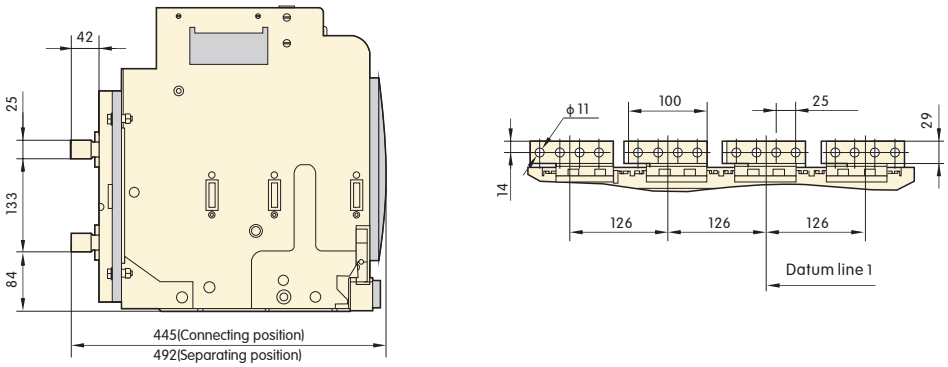
Note: If users want to change the vertical connection into horizontal one on site, they only have to turn the bus by 90°.

NA8-3200(In=1600A~3200A) Draw-out type (front connection)



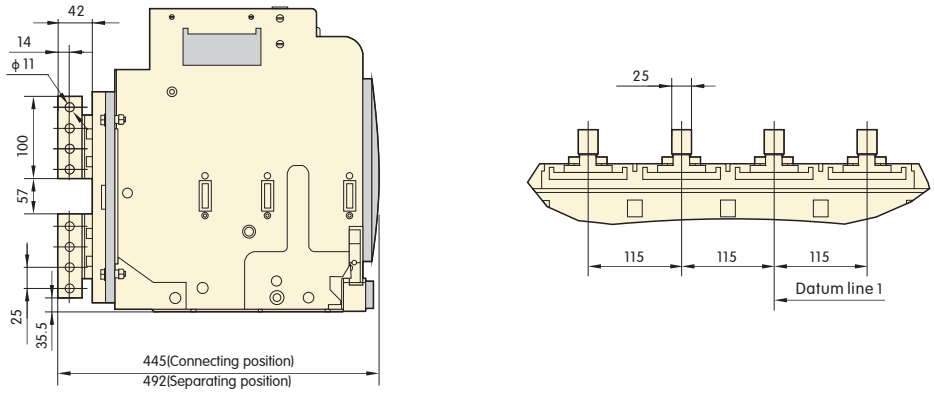
In(A)	C
1600,2000	20
2500	25
3200	30

NA8-3200(In=3200A) Draw-out type (horizontal connection is the default by the factory)



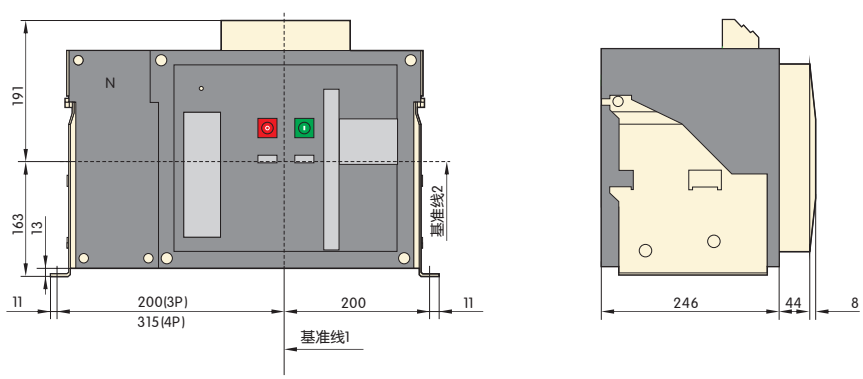
Note: If users want to change the horizontal connection into vertical one on site, it is necessary to replace the upper and lower buses for the N and B phases with the same one as the A and C phases.

NA8-3200(In=3200A) Draw-out type (vertical connection to be made by users themselves)

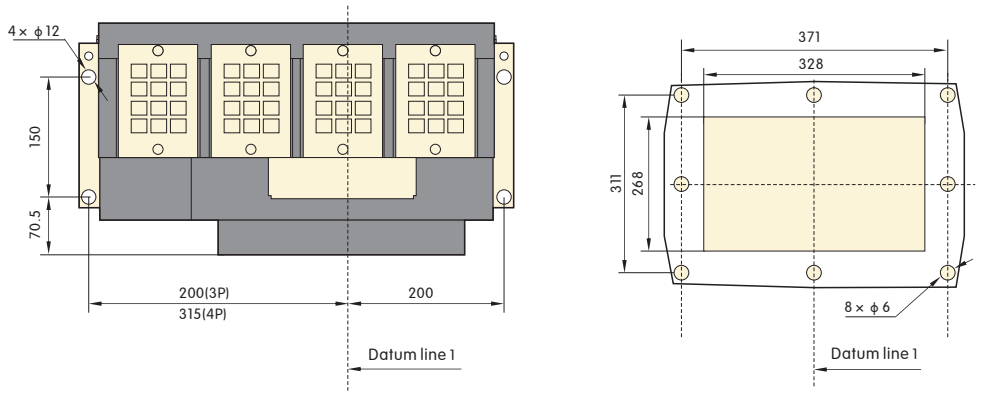


Note: If users want to change the vertical connection into horizontal one on site, it is necessary to replace the upper and lower buses for the N and B phases with the different one from the A and C phases.

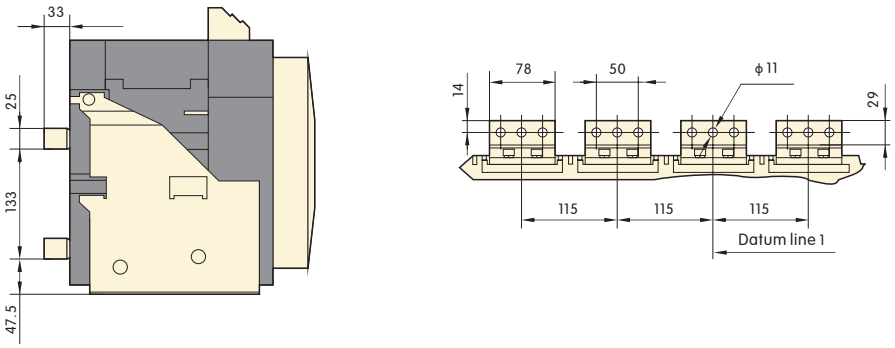
NA8-3200 Fixed type



NA8-3200 Fixed type Size of the hole to be drilled on the panel

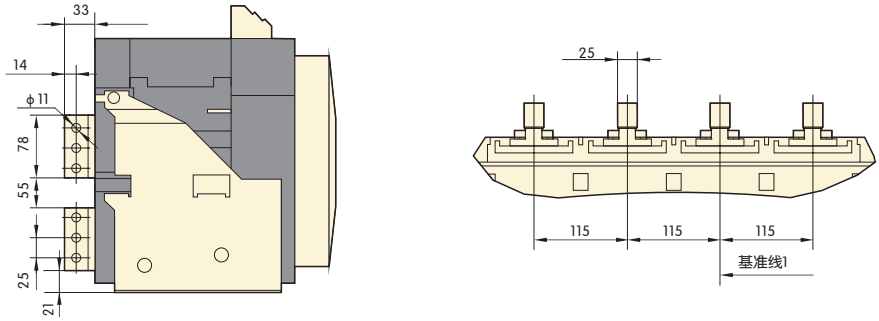


NA8-3200(In=1600A~2500A) Fixed type (horizontal connection is the default by the factory)



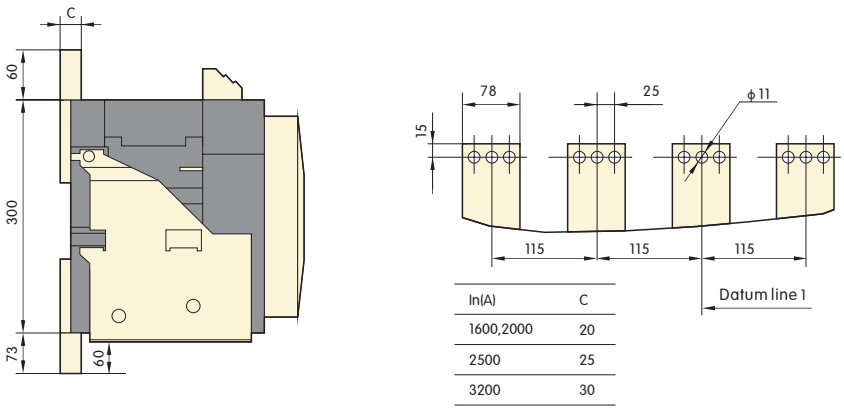
Note: If users want to change the horizontal connection into vertical one on site, they only have to turn the bus by 90°.

NA8-3200(In=1600A~2500A) Fixed type (vertical connection to be made by users themselves)



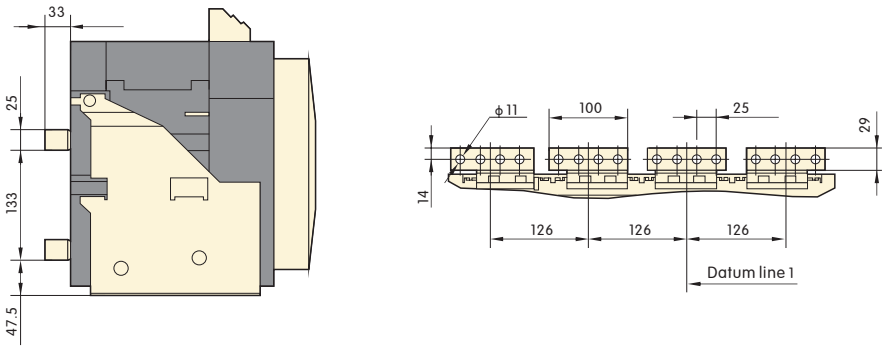
Note: If users want to change the vertical connection into horizontal one on site, they only have to turn the bus by 90°.

NA8-3200(In=1600A~3200A) Fixed type (front connection)



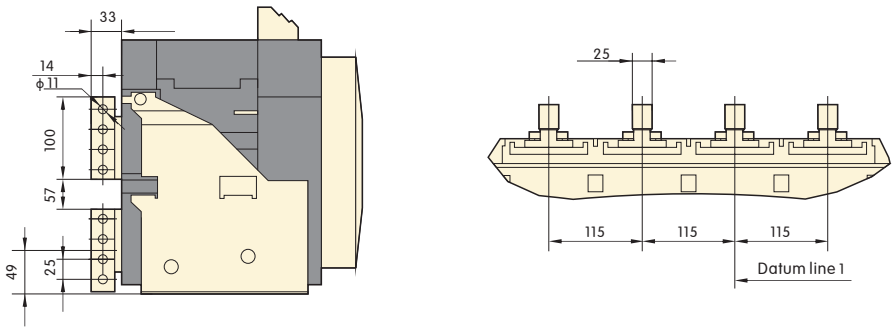
In(A)	C
1600,2000	20
2500	25
3200	30

NA8-3200(In=3200A) Fixed type (horizontal connection is the default by the factory)



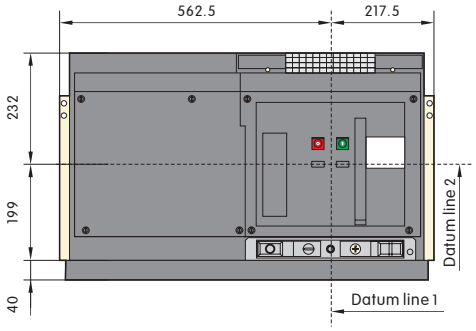
Note: If users want to change the horizontal connection into vertical one on site, it is necessary to replace the upper and lower buses for the N and B phases with the same one as the A and C phases.

NA8-3200(In=3200A) Fixed type (vertical connection to be made by users themselves)

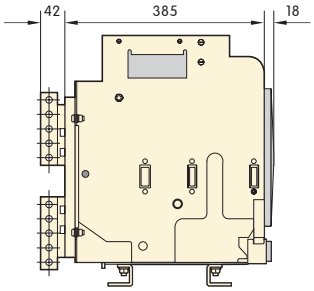


Note: If users want to change the vertical connection into horizontal one on site, it is necessary to replace the upper and lower buses for the N and B phases with the different one from the A and C phases.

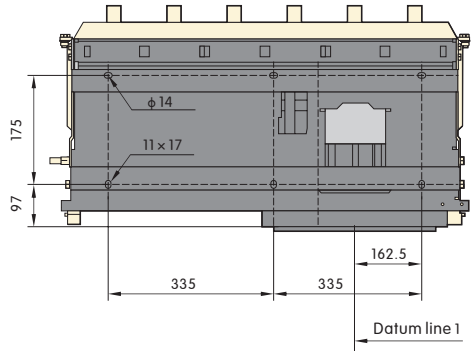
NA8-6300 Draw-out type size of the hole to be drilled on the panel



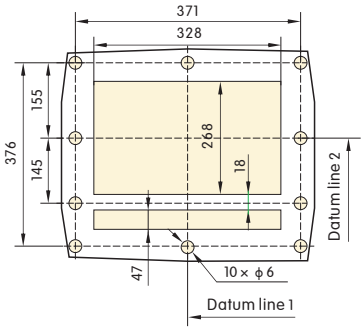
Dimensions



Dimensions

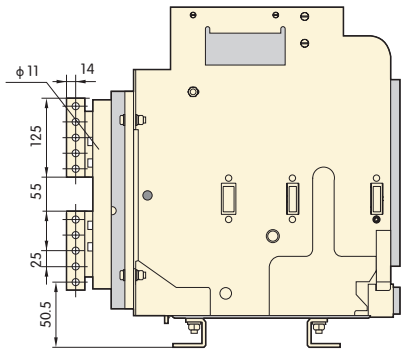


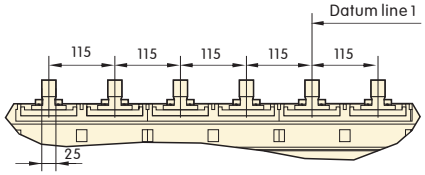
Installation dimensions



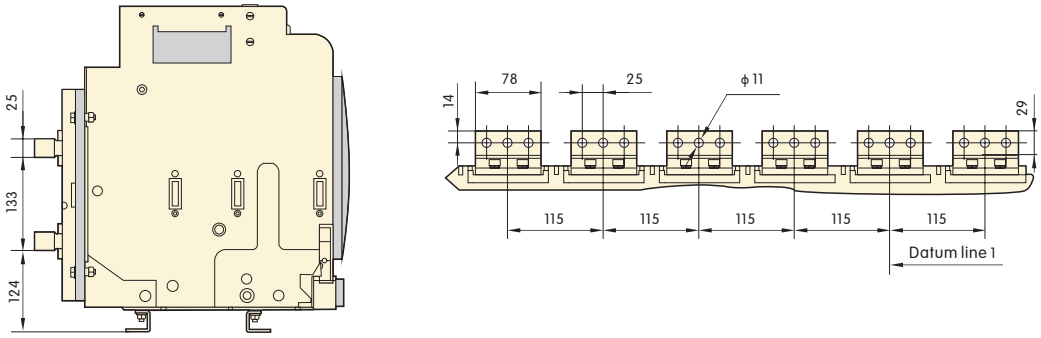
Mounting dimension

NA8-6300(In=6300A) Draw-out type (vertical connection is the default by the factory)



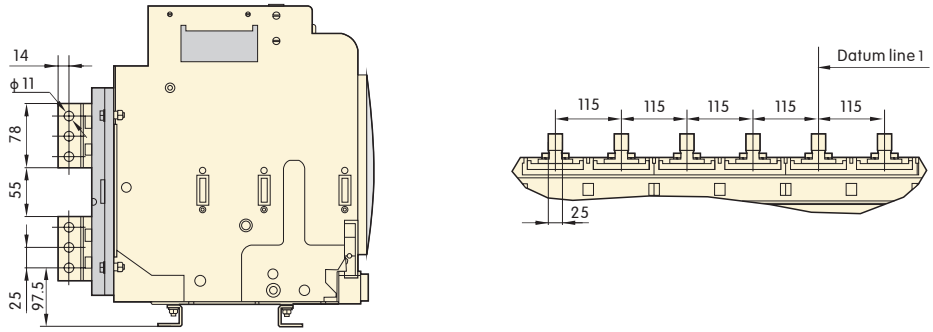


NA8-6300(In=4000A~5000A) Draw-out type (horizontal connection is the default by the factory)



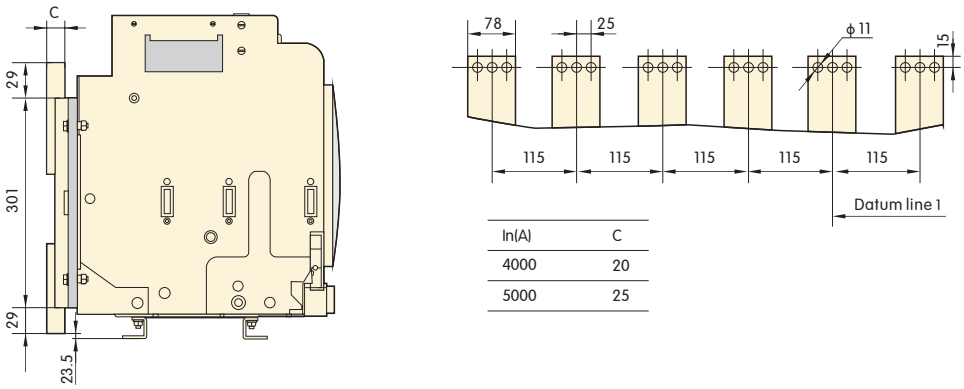
Note: If users want to change the horizontal connection into vertical one on site, they only have to turn the bus by 90°.

NA8-6300(In=4000A~5000A) Draw-out type (vertical connection to be made by users themselves)



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

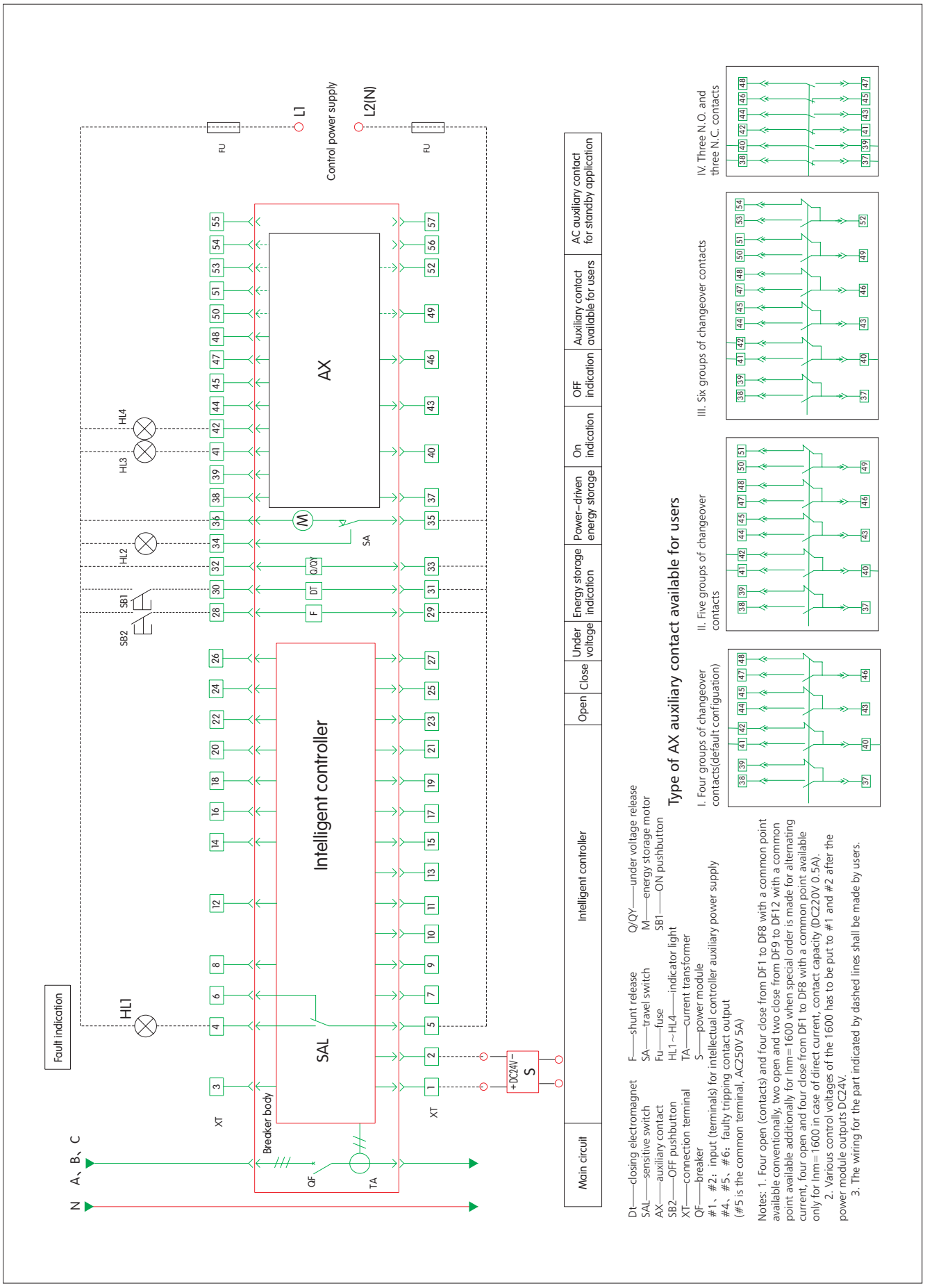
NA8-6300(In=4000A~5000A) Draw-out type (front connection)



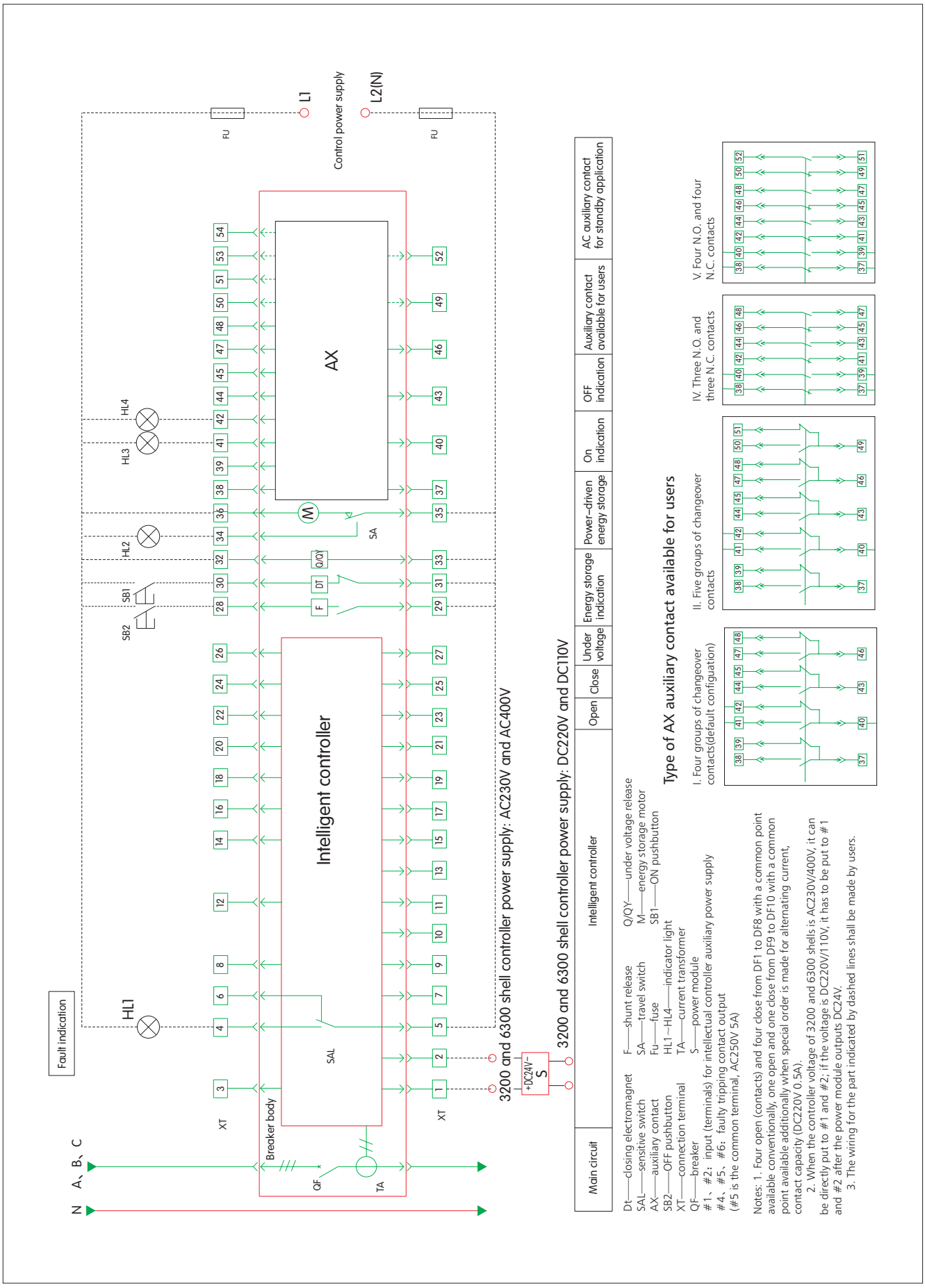
In(A)	C
4000	20
5000	25

7. Connection diagram for the secondary circuit

Connection diagram for the secondary circuit of the NA8-1600 optional standard type intellectual controller

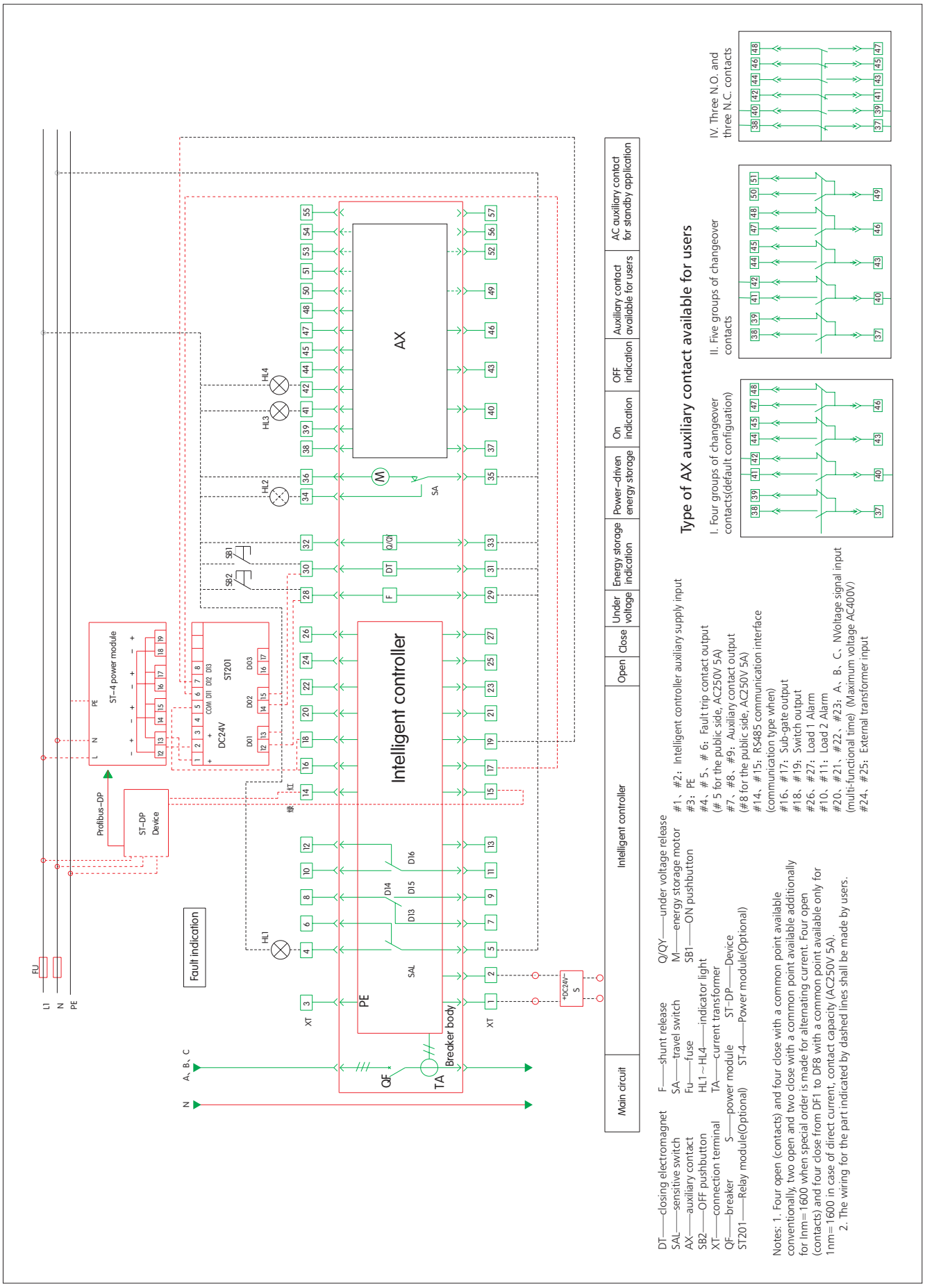


Connection diagram for the secondary circuit of the NA8-3200~6300 optional standard type intellectual controller

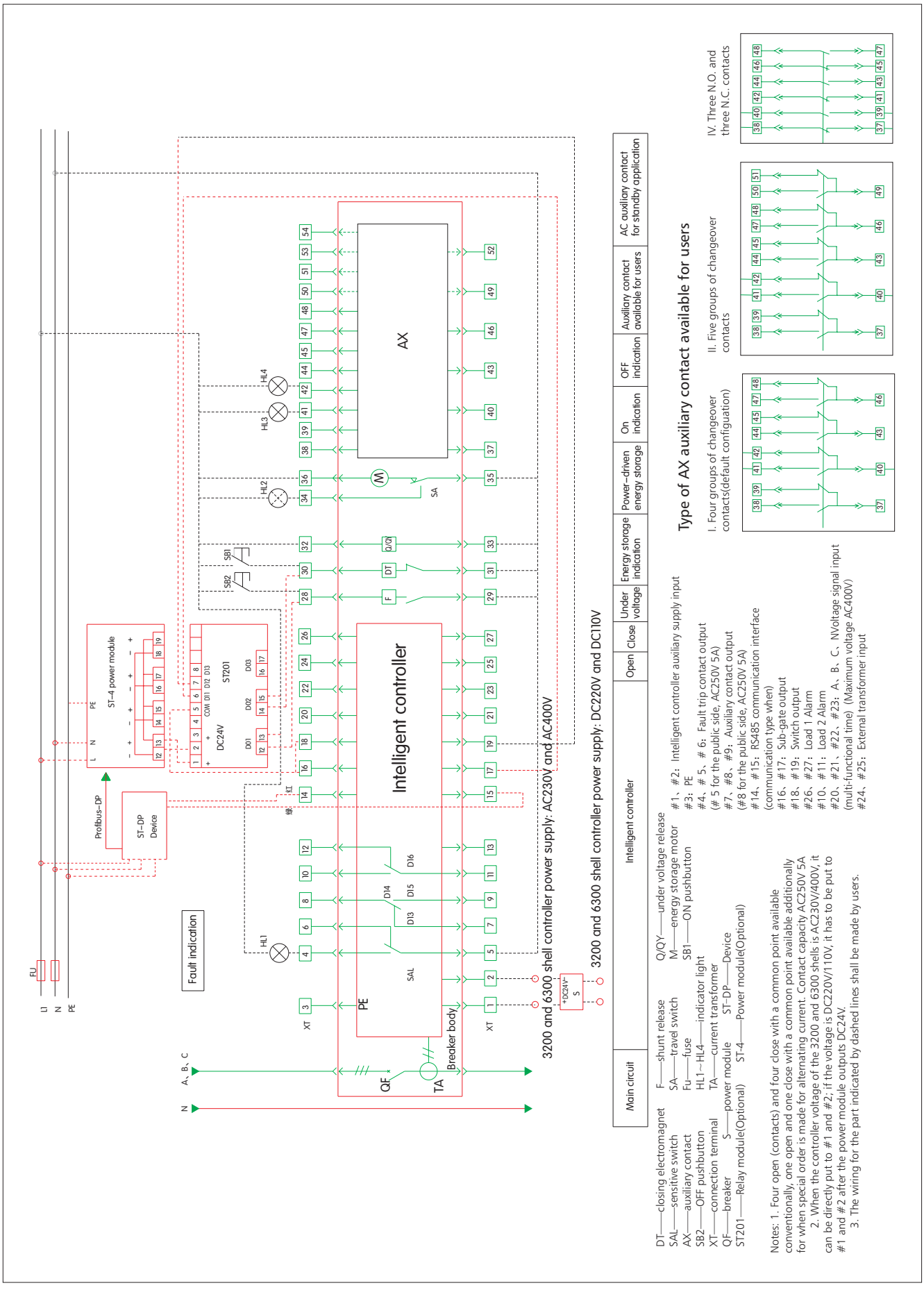


7. Connection diagram for the secondary circuit

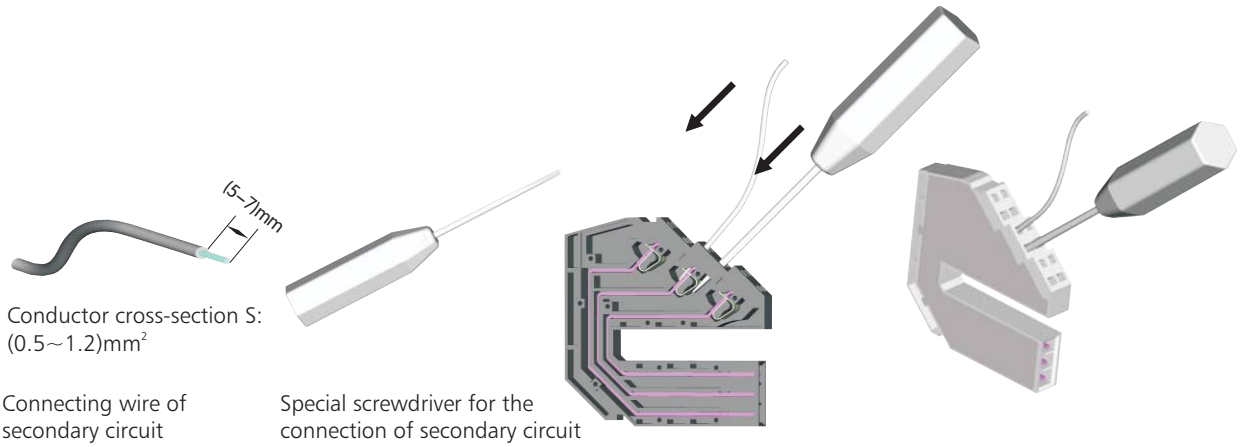
Connection diagram for the secondary circuit of the NA8-1600 optional type multifunctional intellectual controller



Connection diagram for the secondary circuit of the NA8-3200 and 6300 optional type multifunctional intellectual controller



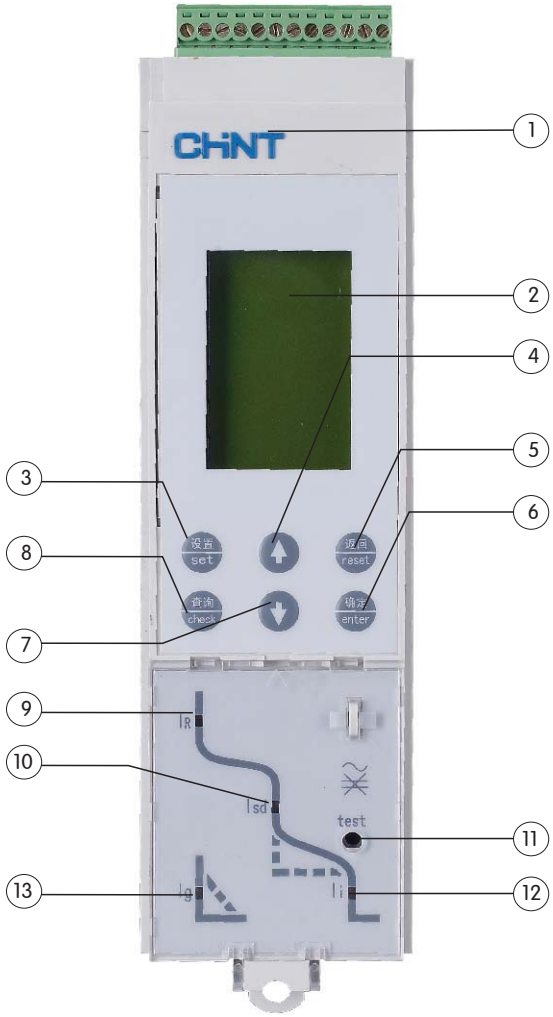
Connection of the secondary circuit



Screwless terminal connection system is used for the secondary connection of the breaker. The connection is made by using special flat blade screwdriver and single-core conductor by reference to the connectin diagram for the seondary circuit.
Screwless terminal system is used for the connection of the secondary circuit. Insert the special screwdriver into the terminal hole shown in the figure to deform the clamp, insert the conductor into the corresponding terminal hole, and then take out the screwdriver.

8. Intellectual controller and protective characteristics

8.1 User interface of the standard type (M type) and multifunctional type (H type) intellectual controllers.

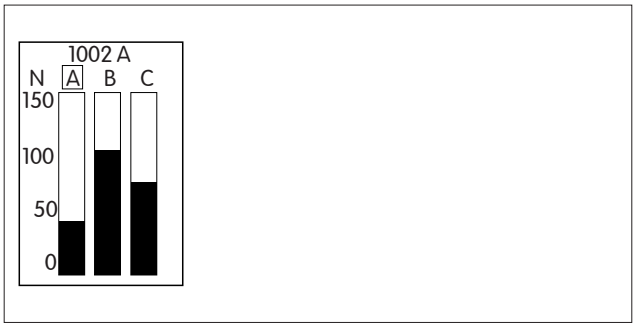


⑴Brand "CHINT" brand
⑵LCD window LCD window capable of showing the current for each phase, various setting parameters, rated current, fault current, tripping time, and the like
⑶SET key Switch to the set default menu (left arrow key, when it is necessary to move leftwards or rightwards for the set interface).
⑷UP 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.
⑸RETURN key Exit the current menu and go to the previous menu, or cancel the value of the current setup parameter.
⑹ACK key Go to the next menu of the currently selected select box (go to the set state under the set interface, and exit the set state by double pressing the key).
⑺DOWN 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.
⑻INQUIRY key Switch to the inquiry default menu (right arrow key, when it is necessary to move leftwards or rightwards for the set interface).
⑼"IR" lamp Over current long time delay fault indication
⑽"Isd" lamp Short-circuit short-time delay fault indication
⑾"test" lamp Button for simulating instantaneous tripping test
⑿"Ii" lamp Short-circuit instantaneous fault indication
⒀"Ig" lamp Asymmetric grounding, neutral line fault indication

8.2 Default interface and menu structure for the multifunctional controller

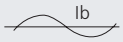
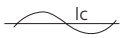
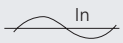
The multifunctional controller provides 4 title menus (measurement menu, parameter setup menu, protection parameter setup menu, history record and maintenance menu) and 1 default menu.

Default interface for the multifunctional controller



8.2.1 Structure of the measurement menu

1 menu	2 menu	3 menu	4 menu	5 menu
Current I	Instantaneous value	Ia Ib Ic In	Ia= 1000A	
			Ib= 1001A	
			Ic= 998A	
			In= 0A	
			Ig= 0A or I△n=0. 00A	
		Maximum	Ia= 1300A	
			Ib= 1400A	
			Ic= 1380A	
			In= 200A	
			Ig= 0A or I△n=0. 00A	
			Reset(+/−)	
		Unbalance rate 100%	Ia=3%	
			Ib=5%	
			Ic=1%	
	Current thermal capacitance			
	Required value	Real-time value Iā,Ib̄, Ic̄,In̄	15min	
			Iā= 1000A	
			Ib̄= 1000A	
			Ic̄= 998A	
			In̄= 0A	
		Maximum	Iā= 1050A	
			Ib̄= 1040A	
			Ic̄= 1010A	
			In̄= 0A	
			Reset(+/-)	
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		
Frequency F	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		

1 menu	2 menu	3 menu	4 menu	5 menu
Power P	Instantaneous value	P，Q，S	P= 660kW	
			Q= 0kvar	
			S= 660kVA	
		Power factor	-1.00	
			Inductive	
			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	$\overline{P}$，$\overline{Q}$，$\overline{S}$	$\overline{P}$= 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%	

C

1 menu	2 menu	3 menu	4 menu	5 menu
Harmonic H	thd	I(%)	Ia= 0.0%	
			Ib= 0.0%	
			Ic= 0.0%	
			In= 0.0%	
	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)

8.2.2 Structure of the parameter setup menu

1 menu	2 menu	3 menu	4 menu	5 menu
Setting of the measurement meter	System type	=3 ϕ 4W 4CT		
	Line incoming pattern	=Wire to enter from the upper port		
Test & lock	Test tripping	Test type	=three section protection	
		Test parameter	=1:9999A	
		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		

8.2.3 Structure of the protection parameter setup menu

1 menu	2 menu	3 menu	4 menu	5 menu
Current protection	Long time delay	I_R	e.g.：=1000A=100%In	
		Current protection	e.g.：=ON	
		Delay time	e.g.：=C1，Is@6IR	
		Cooling time	e.g.：=3h	
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	

C

8.2.4 Structure of the history record and maintenance menu

1 menu	2 menu	3 menu	4 menu	5 menu
Current alarm	e.g. phase sequence alarm, inverse power alarm, over frequency alarm…			
Number of operations	Total number of times		e.g.:300	
	Number of operations		e.g.:219(ACK key, Reset)	
Contact wear	Total wear		e.g.:120	
	Contact wear		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	
	……		……	
	e.g.: 8 (for) short-circuit definite-time limit 2004/05/03		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.g.: 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 vary depend on the function selected by the user.

b. The controller starts screensaver automatically 10min later.

8.3 List of controller functions

Standard configuration

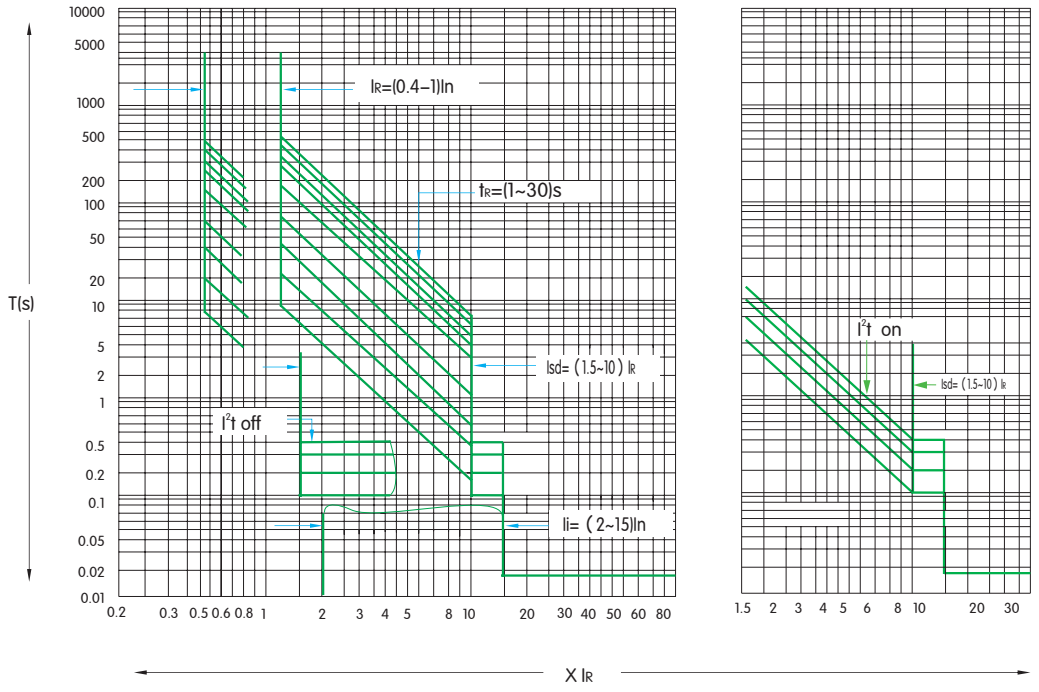
Standard type (M type)	Multifunction type (H type)
1. Quadruple over current protection (for overload, short-time delay time, instantaneous, grounding); grounding corresponds to vector sum (T type); 2. Parameter setup: fixed value keyboard setting function; 3. Current measurement function; 4. Current 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. MCRmake/break function; 9. Alarm logging function; 10. Recording number of operations; 11. Contact wear; 13. Position changing record; 13. Human-machine interface: 28×43 LCD; 14. Heat capacity measurement	1. Quadruple over current protection (for overload, short-time delay time, instantaneous, grounding); grounding 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. MCRmake/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

Selection of optional additional functions

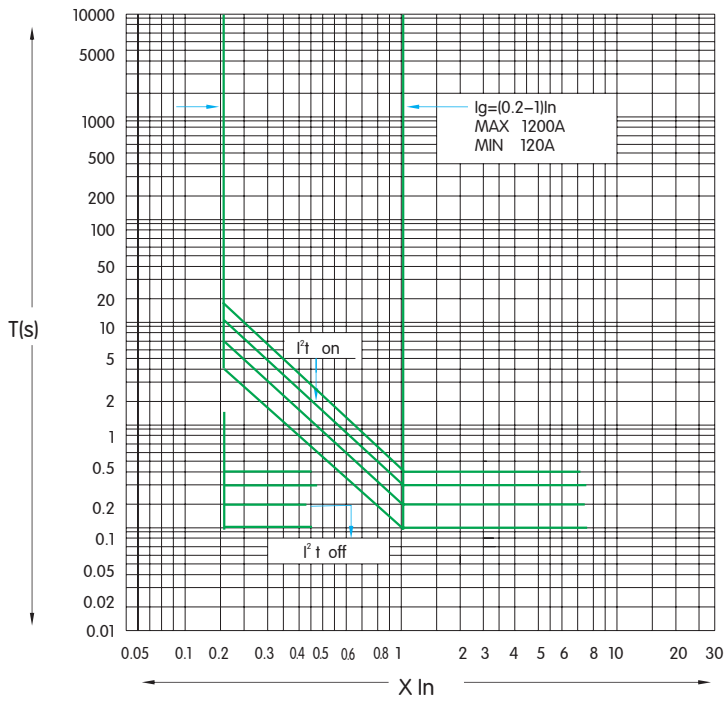
P function	H function
1. Voltage measurement; 2. Voltage unbalance measurement; 3. Frequency measurement; 4. Phase sequence measurement; 5. Electric energy measurement; 6. Power measurement; 7. Power factor measurement; 8. Earth-current grounding protection; 9. Leakage protection; 10. Load monitoring 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

8.4 Characteristic parameters of the standard type intellectual controller

Over current protection characteristics



Neutral line (grounding) fault protection characteristic



8.4.1 Over current long time delay protection characteristic

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

Explanation for parameter setting:
Long-time delay operating current continuously adjustable: IR=(0.4～1)×In.
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.
Example 1: If it is know that in conditions of I=6IR, the tripping time setting value is 2s, and now the line current I=1.5IR, then the actual tripping time TR can be worked out by: $(1.5IR)^2 \times TR = (6IR)^2 \times 2$. The answer is obtained as TR=32s.

8.4.2 Short-circuit short-time delay protection characteristic

Rated current range IR	Error	Line current I	Operating time tR(s)	Time error
(1.5～10)IR +OFF(Power off)	±15%	<0.85 Isd	No-action	±15%
		>1.15 Isd	Time-delay action	
		Definite-time limit	0.1,0.2,0.3,0.4,0.5,0.6,0.7,0.8,0.9,1.0	
		Inverse-time limit I≤10IR	0.1tR	
		Definite-time limit I>10IR	0.1,0.2,0.3,0.4,0.5,0.6,0.7,0.8,0.9,1.0	

Explanation for parameter setting:
The short-circuit short-time delay protection operating current continuously adjustable: Isd=(1.5～10)×IR.
The short-time delay tripping time can be selected as tsd=(0.1s～1s).
When the tripping time is set as inverse-time limit operating characteristic, there are two cases: ① the case of I>1.15Isd and I>10IR represents the definite-time limit; ② the case of I>1.15Isd and I≤10IR represents the inverse-time limit characteristic and the actual tripping time is calculated according to the formula tsd=0.1tR, wherein tR is the long-time delay time, tsd is the short-time delay time.
The method for setting the current and time for the short-circuit short-time delay protection is similar to that for over current long time delay protection.

8.4.3 Short-circuit instantaneous protection characteristic

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:
The instantaneous protection operating current is continuously adjustable: Ii=(2～15)In.
The method for setting the current for the instantaneous protection is similar to that for over current long time delay protection setting.

8.4.4 Single-phase grounding fault protection characteristic

Rated current range IR	Error	Line current I	Operating time tg(s)	Time error	Inverse-time limt shearing factor	Setting range	Setting step
(1.5～10)IR +OFF(Power off)	±10%	<0.9 Ig	No-action	±15%	k	1.5～6，OFF	0.5
		>1.1 Ig	Time-delay action				
			0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1.0				

Note: k is the fault current multiple (I/Ig), I is the fault current, Ig is the setup operating current.

Explanation for parameter setting:

The single-phase grounding protection operating current can be adjusted and selected: Ig=(0.2～1)×In.

The protection delay tripping time can be selected as tg=(0.1s～1s).

① The case of I≥kIg or k set to OFF represents the definite-time limit characteristic, tg=0.1s-0.2s-0.3s-0.4s-0.5s-0.6s-0.7s -0.8s-0.9s-1s；

② The case of the current meeting the condition of 1.1Ig≤ I＜kIg represents the inverse-time limit characteristic and the actual tripping time is calculated according to the formula t=Tg×k×Ig/I.

In the formula, I is the line current, Tg is the setup delay time, Ig is the setup operating current, t is the operating time, k is the shearing factor.

The method for setting the parameter is similar to that for over current long time delay protection.

Note: For the intellectual controller, the current settings for the long- and the short-time delay and the instantaneous protection should not come across each other, and the condition of IR＜Isd＜Ii must be ensured.

8.5 Explanation for auxiliary functions

a. Explanation for test conditions

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. When the breaker on, press the "test" button, and the intellectual 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.

8.6 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 controller. 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 controller.

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

When the AC380V S 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%

9. Accessories

9.1 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 adjustable in the range of (0～7)s; Inm=3200A or 6300A, the time can be selected from and adjusted among 0.5s, 1s, 3s and 5s.

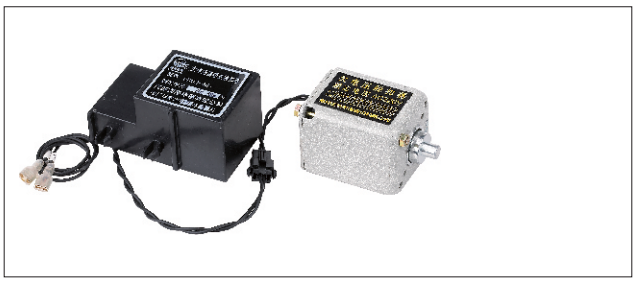
When, within 1/2 delay time, the power voltage returns to 85%Ue or above, the breaker will not get disconnected.

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 consumption (W)	20VA

Under voltage release (Inm=1600A)

Under voltage release (Inm=3200A、6300A)



9.2 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±10)ms	

Shunt releasee (Inm=1600A)

Shunt release (Inm=3200A、6300A)

9.3 Closing electromagnet

After the motor 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 consumption (W)	200VA	200W
Closing time	(50±10)ms	

Closing electromagnet (Inm=1600A)

Closing electromagnet (Inm=3200A、6300A)

9.4 Power operating mechanism

The functions of motor 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. The breaker also allows manual energy pre-storage.

Rated operational voltage Ue(V)	AC230 AC400	DC220 DC110
Operating voltage (V)	(0.85~1.1)Ue	
Reliable switching voltage (V)	75/150VA	75/150W
Energy storage time	<4s	
Frequency of operation	At most 3 times in a minute	

Power operating mechanism (Inm=1600A)

Power operating mechanism (Inm=3200A、6300A)

9.5 Auxiliary contact (with a common point)

Standard type: 4 groups of changeover contacts (default configuration) are provided

Special type: 5 groups of changeover contacts

6 groups of changeover contacts (Inm=1600A provided, but not available for DC)

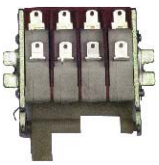
3 N.O. and 3 N.C.

4 N.O. and 4 N.C. (Inm=3200A and 6300A provided)

Technical parameters:

Rated voltage (V)		Rated thermal current Ith(A)	Rated control capacity
AC	230 / 400	6	300VA
DC	220	0.5	60W

Auxiliary contact (Inm=1600A)

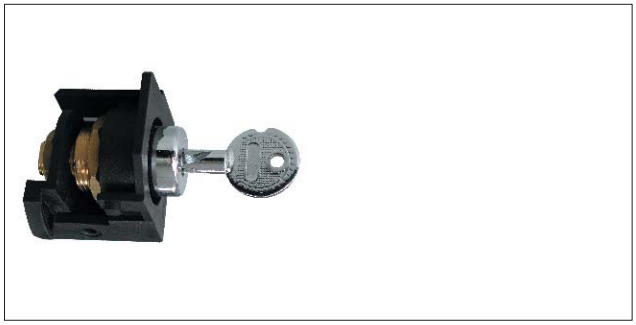


Auxiliary contact (Inm=3200A、6300A)

9.6 Separator between phases

The separator is installed between the phases of the line bank to improve the insulating ability between the phases of the breaker.

9.7 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; after the user selects the option, the factory provides locks and keys; one breaker is provided with one independent lock and one key for the one lock; two breakers, two independent locks and one key for the two locks; three breakers, three same locks and two same keys for the three locks.
Note:
a. For the air circuit breaker with key interlock, 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.
b. The key for the 1600 does not work for the 3200 and 6300 shell breakers and vice versa, so be on guard against the distinction between them.



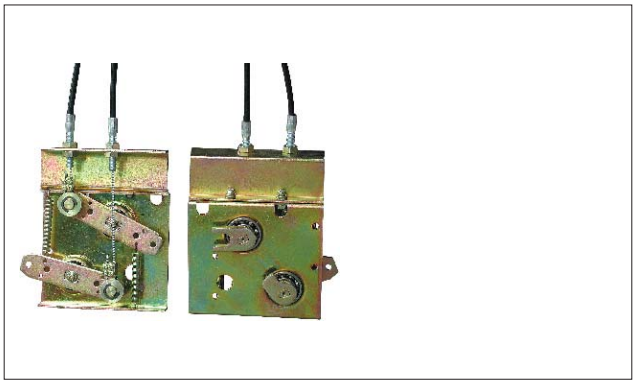
9.8 Pushbutton lock
It is used to lock the button for opening and closing the breaker with the padlock used for such a purpose. (Padlocks to be provided by users themselves)

9.9 Door frame and lining pad
They are installed on the door of the distribution cabinet room to seal it with a protection level of up to IP40.

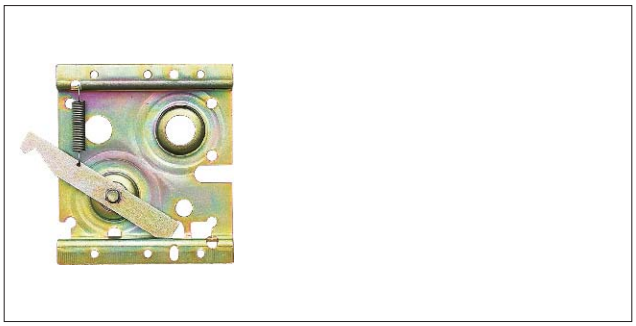
9.10 Drawer type of air circuit breaker “separation” position locking device
For the “separation” position of the open frame (draw-out) circuit breaker, a lock rod can be pulled out to lock the matter, and the breaker locked will be unable to be turned towards the TEST or CONNECTION position.
Padlocks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

9.11 The drawer type of air circuit breaker about any working position locking device
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 breaker body can be moved to the next working position by turning the handle. (This function available for 3200 to 6300).

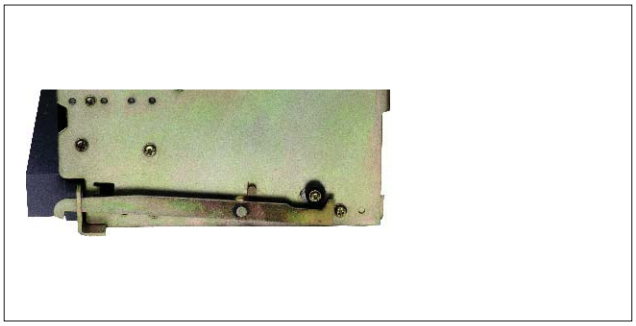
9.12 Mechanical interlock
a. Steel cable interlock for two breakers placed horizontally can realize the interlock between circuit breakers of similar or different shells.
b. Joint rod interlock for two superimposed brewakers.



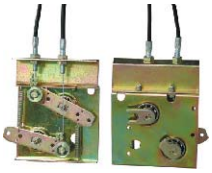
b. Interlock with the door for the breaker position (only for the 1600 shell)
When the breaker is in the position of connection and test, the cabinet door must not be opened; when the breaker is in the separation position, the cabinet door is allowed to be opened.



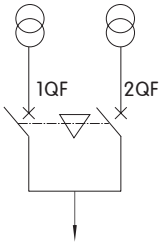
9.14 Counter
The counter counts the number of mechanical operations of the circuit breaker for the user.



Mechanical interlock



Circuit diagram



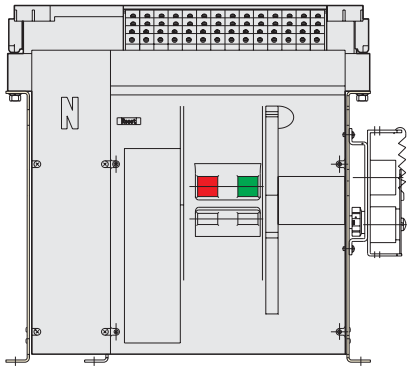
Possible operating mode

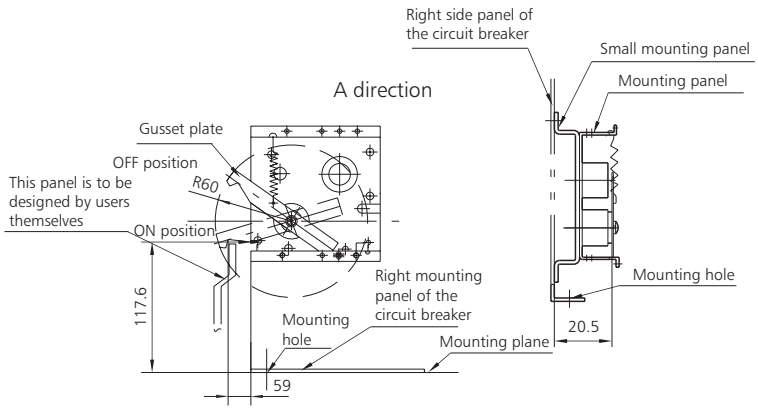
1QF	2QF
0	0
0	1
1	0

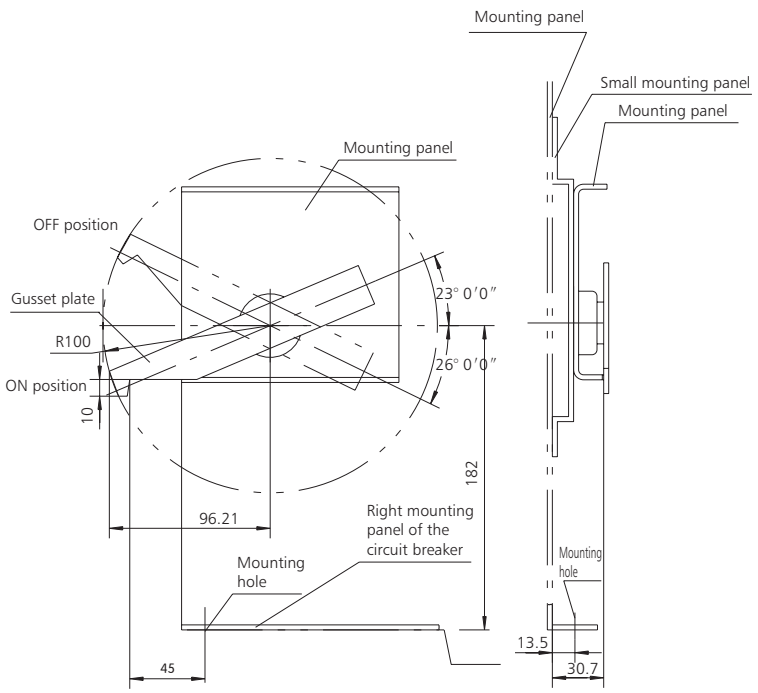
Note: a. When it is necessary to bend the steel cable, the transition arc at the bend shall be larger than R120mm, in order to ensure the flexible movement of the steel cable.

b. Check the steel cable to see if there is sufficient lubricating oil in it, in order to ensure the flexible movement of the steel cable.

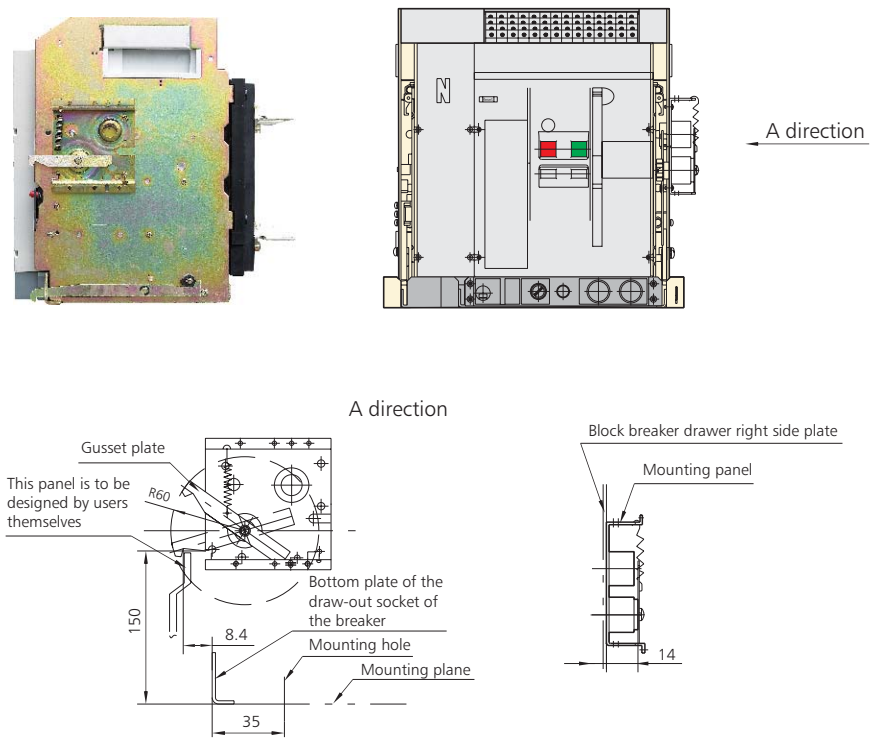
Mounting dimensions of the interlock with the door for the status of the NA8-1600 air circuit breaker (fixed type)

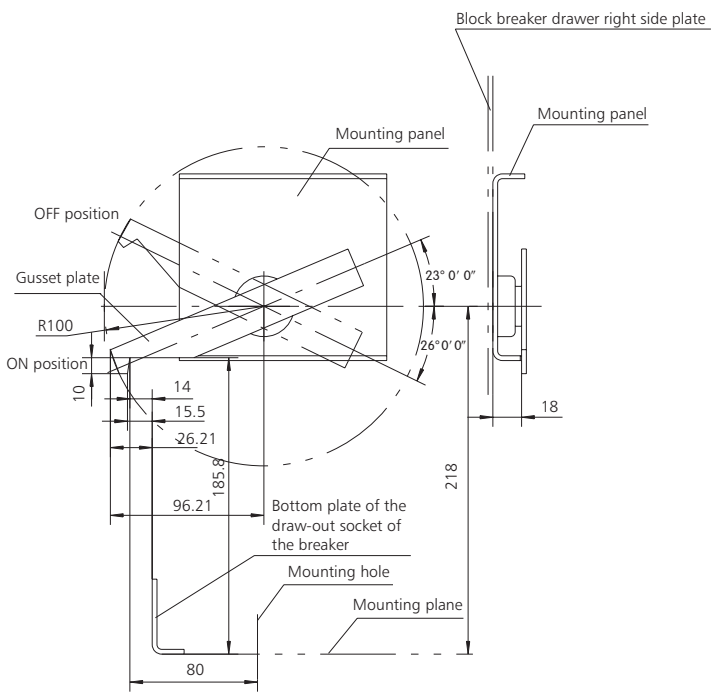






Mounting dimensions of the interlock with the door for the status of the NA8-1600 air circuit breaker (draw-out type)





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10. Installation

10.1 Following items to be checked before installation

Check the label plate on the breaker panel to see if it conforms 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;

3. Motor voltage.

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

10.3 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 is 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 when the breaker is switched off.

10.4 Installation of the fixed type breaker

Place the breaker into the distribution cabinet, and fasten it by using 4 pieces of M6(Inm=1600A) or M10(Inm=3200A or above) 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.

10.5 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(Inm=1600A) or M10 (Inm=3200A or above) 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 and the secondary circuit. After the work is completed, mount the body into the draw-out socket.

10.6 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 GB14048.2.

10.7 The breaker shall be grounded substantially.

11. Common faults and troubleshooting

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

No.	Technical problems	Possible causes	Diagnosis and trouble shooting
1	Breaker tripping (fault indicator on)	Overload fault tripping (long time delay indicator on)	1 Check the breaking current and operating time on the intellectual 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 indicator on)	1 Check the breaking current and operating time on the intellectual controller; 2 Promptly find and shoot the trouble if short circuit is confirmed; 3 Check the setting value of the intellectual controller; 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.
		Grounding fault tripping (grounding fault indicator on)	1 Check the breaking current and operating time on the intellectual controller; 2 Promptly find and shoot the trouble if it is confirmed that there is a grounding fault; 3 If no grounding fault is detected, please determine whether the grounding 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 right position by rocking	Put the open frame (draw-out) circuit breaker to the right position by rocking (with it locked in the connection position)
		Open frame (draw-out) circuit breaker bad contact for the secondary circuit	Check the contact status of the secondary circuit, and shoot the trouble, if any
		Breaker fails to pre-store energy	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.
		Closing electromagnet trouble	1 Check the power voltage of the closing electromagnet, and it must be ⩾85%Us; 2 if there is any trouble in the closing electromagnet to enable the attracting, it shall be replaced.
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, if any; 3 Check to see whether the breaker mechanism is in good condition; 4 Check the setting value of the intellectual controller for reasonability, and a re-setting process is necessary if not reasonable; 5 Press the reset button to close the breaker again.
4	Breaker fails to open	The breaker fails to open in power-driven mode The breaker fails to open 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 energy storage mechanism control power voltage, and the voltage shall be ⩾85%Us; check the status of the circuit connection; 2 Check the motor;
		Can't achieve manual energy storage	Energy storage mechanism malfunction.
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 SEPARATION position	Pull out the rock rod. Put the breaker completely to the SEPARATION 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	Intellectual controller fails to be energized by power supply; improper input voltage for the auxiliary power supply; improper 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 intellectual controller power supply is well 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.

12. Order specification

User		Order amount	Order date	Tel

Type and size	☐ NA8-1600		☐ NA8-3200		☐ NA8-6300
Rated current (In)A	☐ 200 ☐ 400 ☐ 630 ☐ 800 ☐ 1000 ☐ 1250 ☐ 1600		☐ 1600 ☐ 2000 ☐ 2500 ☐ 3200		☐ 4000 ☐ 5000 ☐ 6300
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			

Intellectual controller	Setting of the protection parameter	Factory's setting values: I_R=1In, 2s(6I_R); definite-time limit Isd=8IR, 0.4s; inverse-time limit Isd=6IR, tsd=0.2s@6I_R, Ii=12In; Ig is off (if it is on, it shall be specially stated, the default value is Ig=0.5×In, the inverse-time limit shearing factor is k=OFF, thetime is T=0.4s). If the user has some requirements different from the defaulting, please write the numerical values on the line below.	
		Long-time delay protection I_R	Operating current setting: _____ In (0.4~1 ON/OFF) Operating time setting (@6I_R): _____s(1,2,4,8,12,16,20,24,30)
		Short-circuit short-time delayprotection Isd	Operating current setting:☐ Definite-time limit _____ I_R (1.5~10，OFF)； ☐ Inverse-time limit _____ I_R (1.5~10，OFF)； Operating time setting:☐ Definite-time limit _____ s (0.1,0.2,0.3,0.4,0.5,0.6,0.7,0.8,0.9,1.0); ☐ Inverse-time limit:0.1tR
		Short-circuit instantaneous protection Ii	Operating current setting: _____ In (1~15,OFF)
		Ground protection Ig	Operating current setting: _____ I_R Operating time setting: _____ s (0.1,0.2,0.3,0.4,0.5,0.6,0.7,0.8,0.9,1.0); Inverse-time limt shearing factor k: _____ (1.5~6,OFF)
	Selecting the type	☐ Standard type ☐ Multifunctional type	
	Power input	☐ AC400V ☐ AC230V ☐ DC220V ☐ DC110V ☐ DC24V	
	Basic function	Three-section protection against over current Test function	Neutral line or grounding fault protection Fault inquiry/memory function	Current measurement 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 frequency protection ☐ Voltage measurement ☐ Power factor measurement ☐ Voltage unbalance rate measurement ☐ Power network history parameter recording function ☐ MCR make/break function ☐ Communication function	☐ Under voltage protection ☐ Voltage unbalance protection ☐ Frequency measurement ☐ Power measurement ☐ Electric energy measurement ☐ Load monitoring function ☐ ZSI regional interlocking protection function	☐ Over frequency protection ☐ Phase sequence protection ☐ Measurement of harmonic current ☐ Phase sequence detection ☐ Contact equivalent ☐ Leakage protection ☐ Signal contact output function
	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 the 1600 shell, optional but not adjustable; 0.5-1-3-5s for the 3200 shell, optional and 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 groups of changeover contacts ☐ 6 groups of changeover contacts (Inm=1600 not available for DC) ☐ 3 N.O. and 3 N.C. ☐ 4 N.O. and 4 N.C. (Inm=3200 and 6300 provided)	
Optional accessories	Key lock	One breaker is provided with one independent lock and one key Two breakers are provided with two independent locks and one key (the same key/lock not available for the 1600 and 3200/6300 shell breakers) Two breakers are provided with three independent locks and two keys (the same key/lock not available for the 1600 and 3200/6300 shell breakers)	
	Mechanical interlock	Two-breaker interlock solution ☐ Steel cable interlock (can realize the interlock between circuit breakers of similar or different shells) ☐ Joint rod interlock (can realize the interlock between similar shells)	
	☐ Button locking device ☐ SEPARATION position locking device ☐ Door interlock ☐ Counter ☐ Separator between phases		

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

NA8-1600

NA8-3200

NA8-6300