When installing and using, pay attention to
personal safety and read the instructions carefully

Intelligent Universal
Circuit Breaker

PRODUCT MANUAL

PRODUCTS CONTENTS

Intelligent Universal Circuit Breaker

Intelligent Universal Circuit Breaker

1. Use And Range Of Application

In the circuit of AC 50Hz, its rated working voltage is under 400V and 690V, its rated working cuttent reaches to 800A,could be used for controlling the low voltage distribution net and keeping it safety.It is used to distribute electric energy, protect line and power equipment from overload, short circuit, undervoltage, single-phase grounding fault.Circuit breaker Introduction of the structure as a variety of protection functions, selective protection is accurate, can avoid unnecessary power outage, improve the safety and reliability of power grid operation. Under normal conditions, it can be used for infrequent switching of routes. 620A and below can be used for infrequent starting order and protection of motors. The circuit breaker has isolation function,its corresponding symbol is shown as " ___/ �".

The circuit breaker comply with the demands of the following standards, GB/T14048.2<Low voltage switchgear and control equipment,the part2:circuit breaker>

The circuit breaker comply with the demands of the following standards, IEC60947.2/T14048.2<Low voltage switchgear and control equip ment,the part2:circuit breaker>.

2. Product Category

☐ W 1 – ☐ ☐ / ☐ ☐–☐–☐

Breaking capacity:L=Economical type,M=General intelligent type,H=Communication type
Rated current(In)
Construction:C(Draw-out type),G(fixed type)
Pole:3P,4P
Breaking capacity:M=Standard type,H=High score type
Current rank(Inm)
Design code
Intelligent universal circuit breakers
Enterprise code
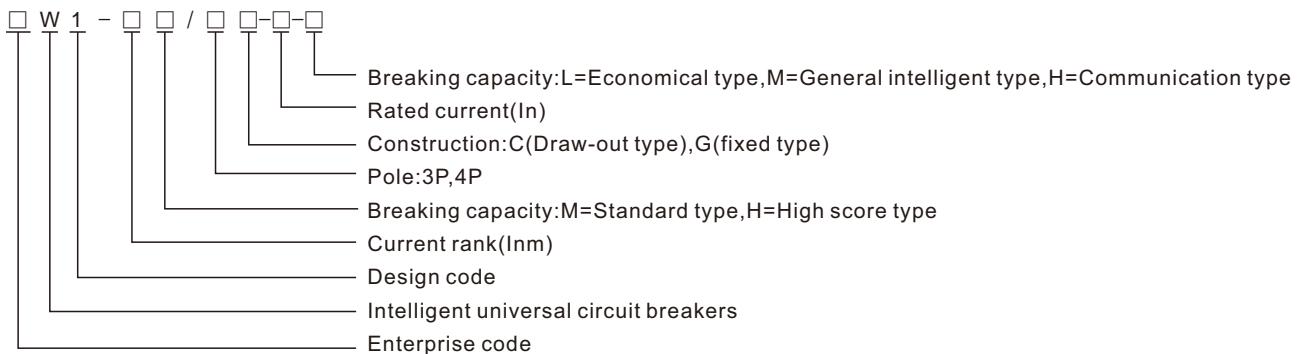
■ Category

☐ Category of use: The main electrical:B(selective protection),ancillary circuit :AC-15,DC-13;

☐ According to the control mode of the operating mechanism: Electric operation; Manual operation (for overhaul and maintenance)

☐ Whether maintenance is needed: maintenance is needed; No maintenance required;

☐ Pole: 3P,4P;

☐ Installation method: Fixed type; Draw-out;

☐ Weather need the Single-phase grounding protection: no single-phase grounding protection; With single-phase grounding protection.

■ Type of release device

Intelligent controller, undervoltage instantaneous (or delay) trip, shunt trip.

■ Intelligent controller performance

☐ With overload long delay reverse time limit, short circuit delay (reverse time limit + fixed time limit), short circuit instantaneous, can be set by the user to form the required protection characteristics;

☐ Single-phase grounding fault protection function;

☐ Display function: setting current display, action current display, operating current display, fault current display (M type), voltage display;

☐ Alarm function: overload alarm, fault trip alarm, self-diagnosis alarm;

☐ Self-check function: Overheating self-inspection, microcomputer self-diagnosis;

☐ Test function: Test the action current of the controller.

Intelligent Universal Circuit Breaker

3.Introduction Of The Structure

1.Draw-out circuit breaker

2. Fixed circuit breaker

3. Intelligent controller

4. Operating mechanism

5. Auxiliary contact

6. Key lock

7. Arc extinguishing chamber

8. Secondary connector

9. Cable chain

10.Link chain

11. Shunt release

12. Undervoltage release

13. Closed electromagnet

14. Electric energy storage mechanism

15. Mounting plate
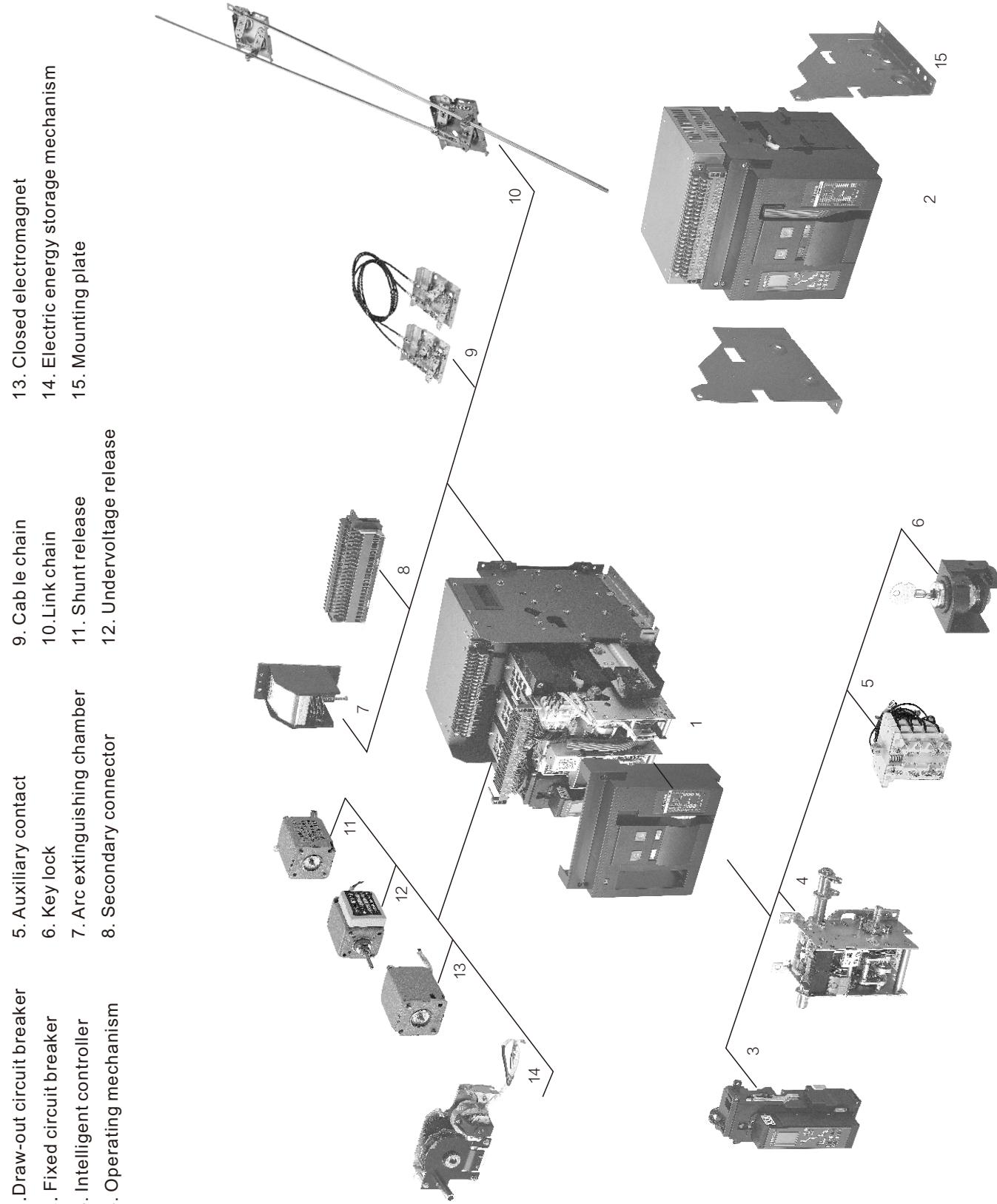
Intelligent Universal Circuit Breaker

4. Environment For Operation And Installation

☐ Ambient temperature: -5℃~+40℃, and average temperature in 24 hours below+35℃ (except for special orders).

☐ Elevation of installation site:<=2000m.

☐ Relative humidity: not exceeding 50% at the maximum ambient temperature,higher humidity would be permitted, but the lowest average temperature in a month not exceeding +25℃ during the most moist month, and the maximum monthly average relative humidity not exceeding 90% in that month, and giving consideration the dews on the goods surface, which would appear due to temperature change.

☐ Pollution protection: 3 grade.

☐ Protection grade：IP30.

☐ Installing categories: IV for breaker main circuits, coils of under voltage release and primary circuit of transformers; III for other auxiliary circuits and control circuit.

☐ The breakers should be installed according to stipulations in operation manual. For breakers in common use, the vertical gradient isn't more than 5℃ ,for that used on mine, the vertical gradient isn't more than15℃.

5．Technical Data And Performance

☐ Rated current of the circuit breaker:shown list a

Table a

Rated current of the current rank Inm(A)	Rated current In(A)
1000	200、400、630、800、1000

☐ Rated operating voltage (Ue) of circuit breaker: 400V

☐ Rated insulation voltage (Ui) of the breaker :690V

☐ Rated impact withstand voltage (Uimp) of circuit break er :8kV(2000m)

☐ The breaking capacity, in-line mode and arcing distance of circuit breaker are shown in Table b

Table b

Inm(A)		1000	In-line mode	arcing distance
Rated ultimate short-circuit breaking capacity Icu(kA	400	40	Up line or down line	zero arc
Rated operating short-circuit breaking capacity Ics(kA)	400	30		
Rated short-time withstand current Icw (kA)	400	30		

■ Intelligent controller overcurrent protection features and functions

☐ Ir&DNL of intelligent controller:See list c

Table c

Inm(A)	Type	long time delay	short time delay		instantaneous		ground fault	
		Ir1	Ir2	error	Ir3	error	Ir4	error
1000	L	(0.4-1.0)In	(3-10)In	±10%	(10-20)In	±15%	(0.2-0.8)In	±15%

☐ The operation time of long delay overcurrent protection is shown inTable d, and the time error is ±15%

Table d

1.05Ir1	Inaction			
1.3Ir1	Action			
1.5Ir1 Setting time s	30	60	120	240
2.0Ir1 Setting time s	16.9	33.7	67.5	135

☐ Short-circuit short-delay operation characteristic is inverse time characteristic (I<8Ir1) + fixed time characteristic (Ir1 > 8Ir1), the operation time is 0.2s and 0.4s, the accuracy is ±10%;

☐ The delay action time of grounding protection is 0.2s, 0.4s, 0.6s and 0.8s respectively, and the accuracy is ±15%.

☐ Overcurrent controller protection characteristic curve: long delay, short delay, instantaneous action protection characteristic curve is shown in Figure 1; Ground fault protection characteristic curve is shown in Figure 2.

Intelligent Universal Circuit Breaker

■ Rated current see chart 1

Rated current of the current rank Inm(A)	Rated current In(A)
2000	400、630、800、1000、1250、1600、2000
3200	2000、2500、2900、3200
4000	3200、3600、4000
6300	4000、5000、6300

■ The rated short-circuit breaking capacity and short-time with stand current of the circuit breaker are shown in chart 2.The arc distance of the circuit breaker is "zero" (i.e. there is no arcout side the circuit breaker).

Table 2

Rated current of the current rank Inm(A)	Voltage (V)	2000M	2000H	3200M	3200H	4000	6300
Rated limit short-circuit breaking capacity Icu(KA) O-CO	400V	80	100	100	110	100	120
	690V	50		65		65	80
Rated short-circuit switching capacity n×Icu(KA)/cosΦ	400V	176/0.2		220/0.2		220/0.2	264/0.2
	690V	105/0.25		143/0.2		143/0.2	187/0.2
Rated operating short-circuit breaking capacity Ics(KA) O-CO-CO	400V	50	65	65	85	65	80
	690V	40		50		50	70
Rated short-time withstand current Icw(KA)/1s O-CO	400V	50	65	65	85	65/80(MCR)	85/100(MCR)
	690V	40		50		50/65(MCR)	65/75(MCR)

Note: the breaking capacity in chart is the same up and down the line

■ The maximum power loss of the circuit breaker is 360W. The rated and continuous current of the circuit breaker at different ambient temperatures are shown in chart 3.

Table 3

environment temperature℃ \ In	200A	400A	630A	800A	1000A	1250A	1600A	2000A
40	200A	400A	630A	800A	1000A	1250A	1600A	2000A
50	200A	400A	630A	800A	1000A	1250A	1550A	1900A
60	200A	400A	630A	800A	1000A	1250A	1550A	1800A

Note: The capacity reduction coefficient of 2500 and above is 0.9, and the capacity of 4000A in 6300A is not reduced.

■ Intelligent overcurrent controller protection characteristics and functional controller over current protection characteristics, a. Setting value Ir(I/In) and error of controller.See table 4.

Table 4

long time delay	short time delay		instantaneous		ground fault		
Ir1	Ir2	error	Ir3	error	Ir4		error
(0.4-1)In	(0.4-15)In	±10%	In~50kA(Inm=2000A) In~75kA(Inm=3200A~4000A) In~100kA(Inm=6300A)	±15%	Inm=2000A~4000A (0.2~0.8)In Max.1200A Min.160A	Inm=6300A (0.2~1.0 In)	±10%

Note: Setting values cannot be crossed when three protection sections

Long delay overcurrent protection inverse timelimit,operation characteristic $I^2T_L=(1.5I_{r1})^2t_L$,the operation time of (1.05~2.0) I_{r1} is shown in Table 5,and the time error is ±15%.
Note:tL-long delay 1.5 Ir1 setting time, TL-long delay actiontime

Table 5

1.05 Ir1	1.30 Ir1	1.5 Ir1 Setting time (s)
>2h Inaction	<1h Action	2.0 Ir1 Setting time (s)

C.The characteristics of short delay overcurrent protection are shown in the following table.The short delay over current protection is a fixed time limit. If the low multiple is required to be a negative time limit,its characteristics are as follows: $I^2T_s=(8I_{r1})^2T_s$,Ts is the general delay design time; When the overload current>8I_{r1},it is automatically converted to fixed-time characteristic, whose fixed-time characteristic is shown in Table 6.The time limit error is ±15%

Table 6

delay time(s)				returnable time(s)			
0.1	0.2	0.3	0.4	0.06	0.14	0.23	0.35

D.The protection characteristics of over current trip are shown in Figure 1, and the protection characteristics of ground fault are shown in Figure 2.

Intelligent Universal Circuit Breaker

■ Function of M type intelligent controller

a. Ammeter function

　Display each phase operating current and grounding leakage current, normal display of the maximum phase current, but also display setting, test and fault current value or time value.

b. Voltmeter function

　Display voltage of each line, normally display maximum value.

c. Remote monitoring and self-diagnosis

　① The controller has the function of self-diagnosis of local faults

　When the computer breaks down, it can send out the error "E" display or alarm, and restart the computer at the same time. When the user needs, it can also break the circuit breaker.

　② When the local ambient temperature reaches 80℃, it can send an alarm, and can break the circuit breaker when the current is small (when the user needs).

　③The intelligent controller has overload, grounding, short circuit, load monitoring, warning, tripping indication (OCR) and other signals through contact or optocoupler output, easy for users to use external remote control, contact Point capacity DC28V, 3A; AC125V, 3 a.

d.　**Setting function**

　With the ⌷set⌷ ⌷+⌷⌷-⌷ ⌷storage⌷ four buttons can be set to the controller parameters. Press ⌷setting⌷ to desired setting state (indicated by status indicator), then press ⌷+⌷ or ⌷-⌷ key to adjust parameters size to the required value, then click ⌷storage⌷ , storage light once indicates that the setting value has been locked, the protection parameters of the controller shall not be set across. After the controller is reset, press the ⌷setting⌷ button, various parameters can be checked circularly.

e.　**Test function**

　With the ⌷setting⌷ of ⌷+⌷⌷-⌷ ⌷trip⌷⌷not trip⌷ ⌷reset⌷ and other keys, the controller can be checked for various protective. Use the ⌷set⌷ ⌷+⌷ ⌷-⌷ key to adjust a simulated fault test current 9 (note: do not press ⌷Storage⌷ lock), and then press ⌷tripping⌷ or ⌷not tripping⌷ key test, the controller can enter the fault processing. Press the ⌷tripping⌷ key to disengage the circuit breaker. Press the ⌷non-tripping⌷ key to disengage the circuit breaker and control it .The indicator status of the machine is normal. After the test, you need to press the ⌷reset⌷ or ⌷clear⌷ key to carry out other tests.

　Note: for the convenience of the test, regardless of whether the ground leakage is set in trip or alarm position, the test is trip processing, and the priority is less than overload protection, once the failure occurs in the test process, control the machine automatically stops cutting test and enters fault processing.

f.　**Load monitoring**

　Set two integer values: ILC1 (0.2 to 1 In) and ILC2 (0.2 to 1 In). ILC1 delay characteristic is inverse time characteristic, and its time setting value is 1/2 of the long delay setting value.

　ILC2 has two delay characteristics. The first one is the reverse time function, whose time setting value is 1/4 of the long time setting value, and the second one is the fixed time, whose delay time is 60s,these two kinds of delayed work.

　Yes, the former is used to disconnect the unimportant load when the current is close to the setting value of overload, and the latter is used to disconnect the unimportant load after delay when the current exceeds the setting value of ILC1 the current drops, so that the main circuit and important load circuit protect the power supply. When the current drops to ILC2, after a certain delay, the instruction is issued to reconnect the lower circuit which has been cut off and restore the whole system unified power supply. Users can choose either of the above two types of monitoring protection. See Figure 3 and Figure 4 for monitoring features.

g.　**MCR trip and simulated trip protection can be turned off according to user requirements, which is generally required for short delay break test.**

　①MCR on and off protection is mainly used in the line fault state when closing (the controller is energized moment), the controller has the function of breaking the circuit breaker with short circuit current at low times. The factory setting is 10KA, error ± 20%, the current can be set according to user requirements.

　②The controller is equipped with the function of sending trip signal directly without processing by the host chip when the extra short circuit current occurs.

h.Thermal memory function

　After the controller is overloaded or short-circuit delayed tripping, the controller has the memory function that simulates the characteristics of bimetal sheet before the controller is powered off. The overload energy is released in 30 minutes and the short delay energy is 15 minutes , release end, overload, short delay fault occurs during this period, tripping time will become short, the controller power, energy automatically zero.

Intelligent Universal Circuit Breaker

Overcurrent trip protection characteristics are shown in Figure 1

Ground fault protection characteristics are shown in Figure 2

Fig. 1

Ir1=(0.4-1)In
TL=(15-480)s
Ir2=(0.4-1.5)In
0.4s
0.3s
0.2s
0.1s
Ir3=In-50/75/100kA
xIr1
KA
t(s)

Fig. 2

Ir4=(0.2-0.8)In
或(0.2In-2000A)
0.4s
0.3s
0.2s
0.1s
xIn
t(s)
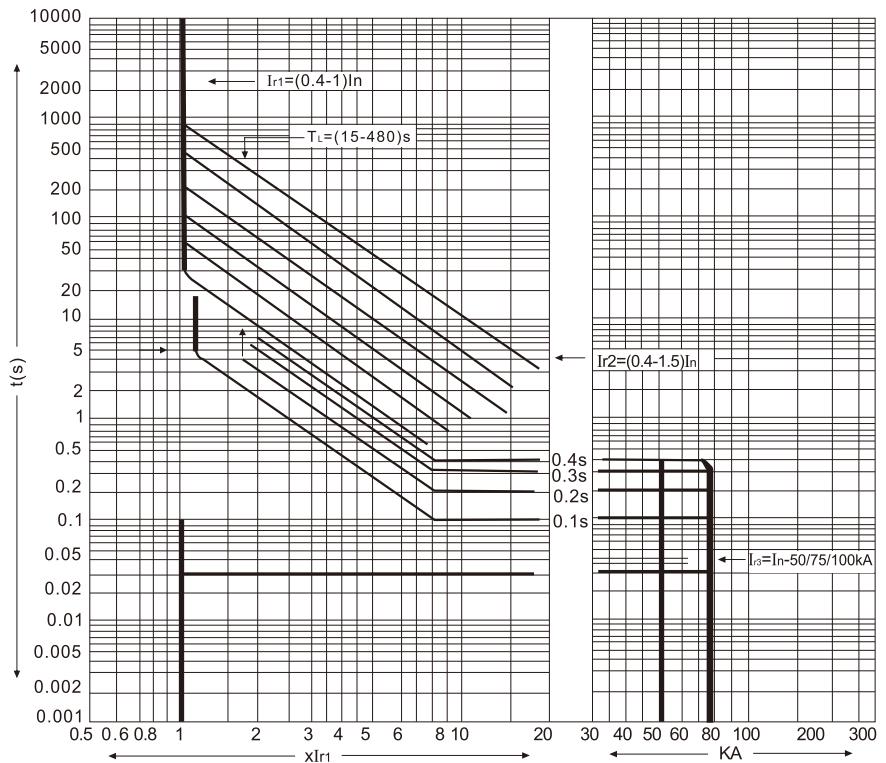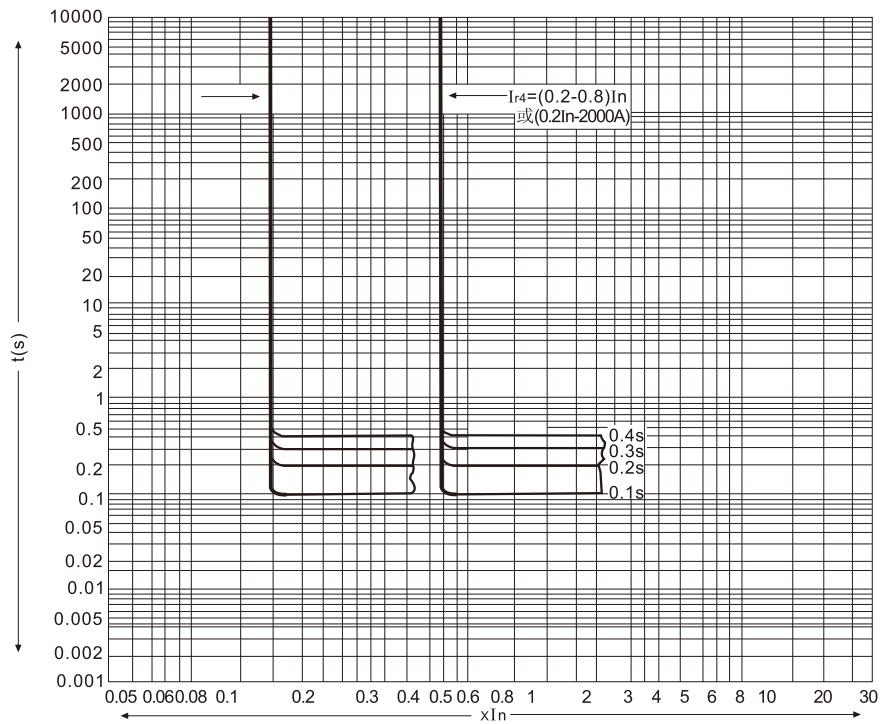
Intelligent Universal Circuit Breaker

Monitor Characteristic,
see fig.3 and fig. 4

Fig. 3
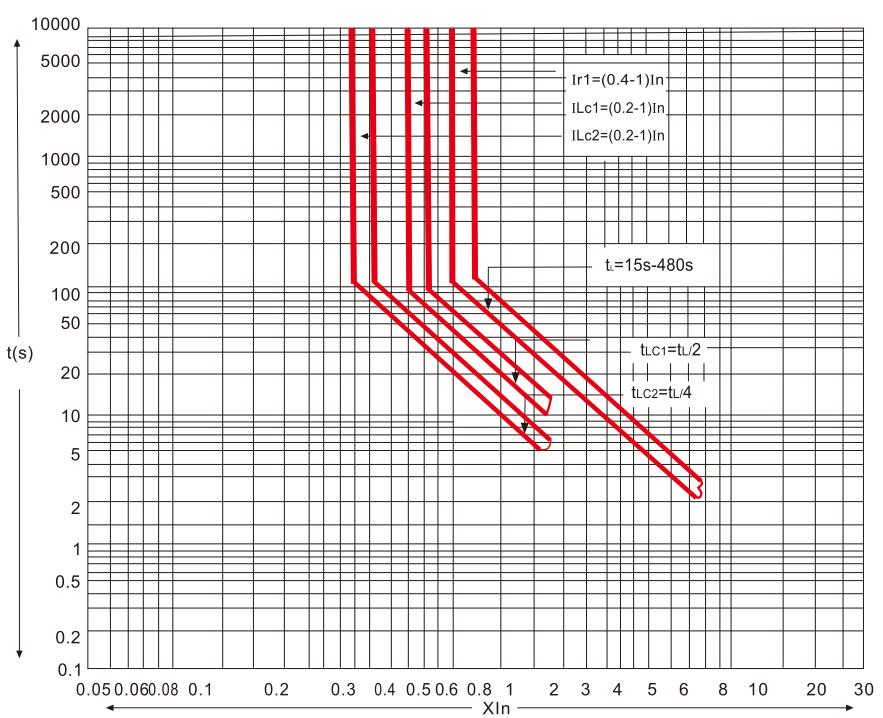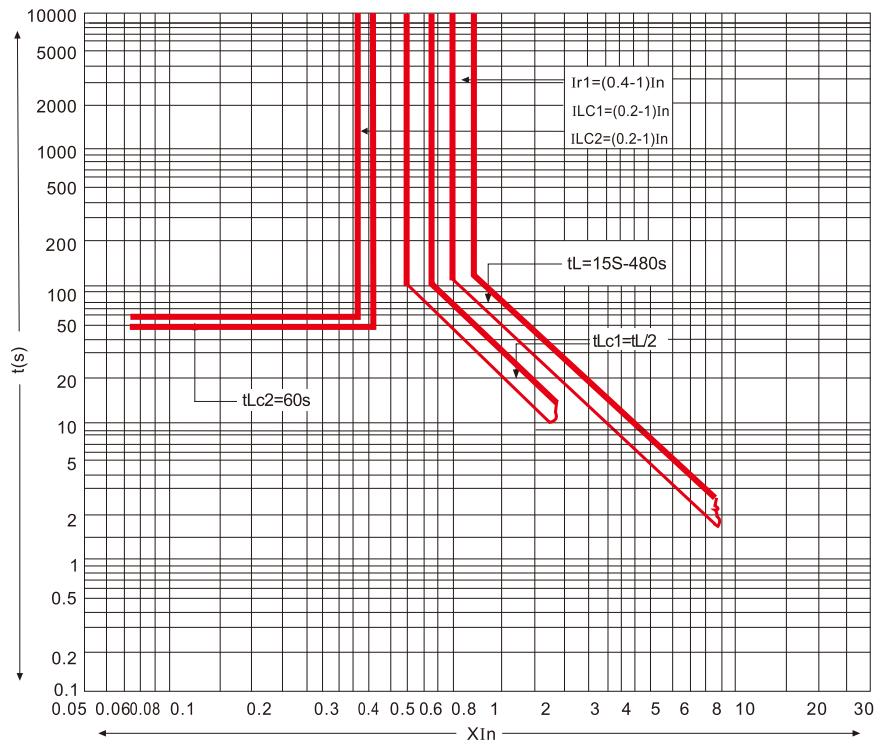
Fig. 4

Intelligent Universal Circuit Breaker

■ H Type intelligent Controller

Containing all the functions of M type, it also has a serial communication interface. Through the communication interface, a local area network system with master-slave structure (system) can be formed. 1-2 computers are used as the master station, and several intelligent circuit breakers or other communicable elements are used as the slave stations. The system network structure is shown in the figure below. For the circuit breaker unit, the system can realize the remote "four remotes" function.

Monitoring of power grid parameters, operation parameters and intelligent circuit breaker status. Adjusting and downloading protection limit parameters. Controlling intelligent circuit breaker ON/OFF etc. The system is applicable to distribution monitoring for power stations, power plants, small and medium-sized substations, industrial and mining enterprises, buildings, etc.

Special communication protocol interface connection diagram is as follows:

Computer master station

RS485/RS232 converter or interface

N P N P P N

Communication terminal AB Intelligent type circuit breaker slave station #1

Communication terminal AB Intelligent type circuit breaker slave station #2

Communication terminal AB Intelligent type circuit breaker slave station #n(n≤256)
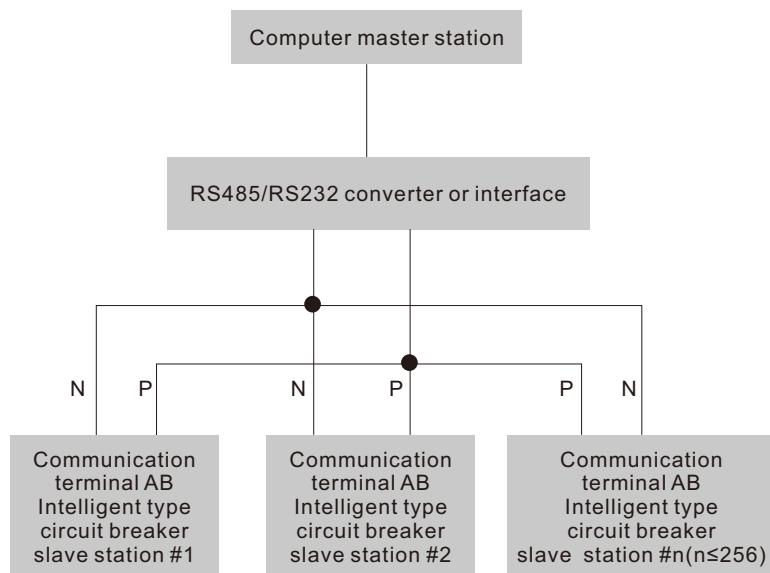
Circuit breaker products (general DP protocol) connection diagram is as follows:

Upper management computer

CP5611

Field-bus

DP module

DP module

DP module

DP module

Intelligent Type Circuit Breaker

Intelligent Type Circuit Breaker

Intelligent Type Circuit Breaker

Other interface products
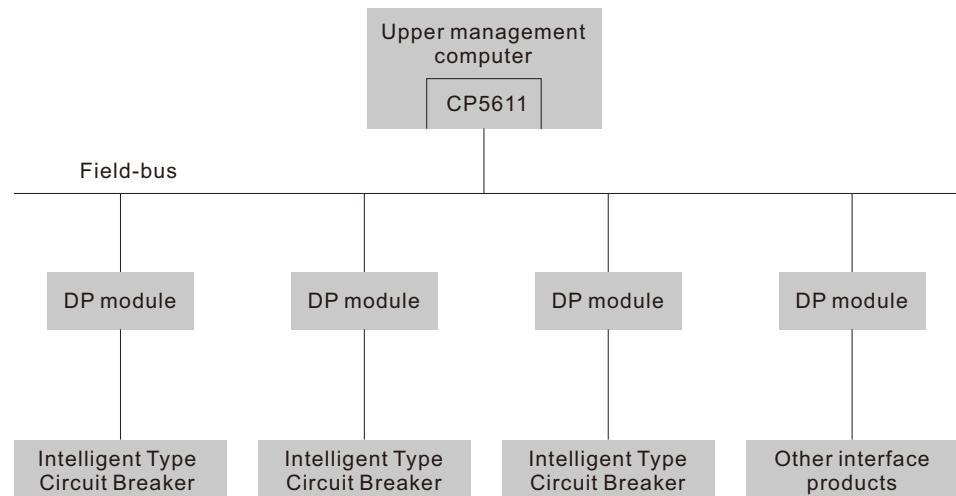
Intelligent Universal Circuit Breaker

a. System composition

①.Data communication network system hardware structure

The intelligent circuit breaker provides a standard RS485 communication interface, which is led out from terminal 10 and 11 of the circuit breaker;

Communication media to the system: Class A barrier twisted pair.

②.Network main characteristics

Two-way serial data transmission mode, the product can provide a variety of communication protocol modes: low voltage apparatus data transmission communication protocol v1.0, PROFIBUS-DP, MODBUS, etc.

Strict master-slave mode, that is, the master station is the initiator and controller of communication, and the slave station can only communicate with the master station, not directly with other slave stations.

The communication baud rate is 9600bit/s, the communication distance is 1.2km, and the typical application of PROFIBUS-DP communication baud rate can reach 187.5kbit/s.

③. Monitoring software

The intelligent control software can realize the configuration application of the required monitoring and management soft ware according to different engineering requirements. For the intelligent circuit breaker, it can realize the operation monitoring operation and a variety of daily management functions.

b．System functions

①.Remote control

Remote control refers to the operation control of energy storage, closing and opening of each slave station circuit breaker in the system through the master station computer. The operator selects the corresponding object from the system interface, clicks the remote control button with the mouse, and the system will provide the current operation status of the corresponding object. After the operator enters the operation password, he can issue the command of remote control "closing" or "opening". The system will transmit the command to the corresponding circuit breaker slave station. After receiving the command, the slave station will conduct opening, closing, energy storage and other operations according to the specified sequence, and report the remote control results to the master station.

②.Remote adjustment

Remote adjustment refers to setting the protection setting value of the slave station through the master station computer. In the master station computer, the protection table and setting table of all slave stations are stored. The operator selects the corresponding object from the system interface and clicks the remote adjustment button with the mouse. The system will provide the current setting of the protection setting of the corresponding object and the protection setting table of the object. After the operator enters the operation password, he can select the required parameters from the parameter table, and then click the corresponding button. The master station will download the parameters to the corresponding slave station.And report the result of remote adjustment. After receiving the command, the slave station will modify its own protection setting value.

③.Telemetry

Telemetry refers to the real-time monitoring of the power grid operation parameters of each slave station through the master station computer. The communication sub station reports the following working parameters to the upper computer: real-time phase a, B, C, n current values of each sub station, voltage values of UAB, UBC, UCA, etc. The fault record can record the following fault parameters: A, B, C, n-phase current value at fault, UAB, UBC, UCA voltage value, fault type, fault action time, and record the fault in the fault database. The computer displays the current real-time current and voltage of each substation in the form of bar graph and absolute value table, and the real-time curve displays the operation status of each node.

④.Teleconference teleconference

Teleconference teleconference refers to viewing the model, closing and opening status, various protection settings, and the operation and fault information status of the slave station through the master station computer. The parameters reported by the slave station circuit breaker to the upper computer mainly include: switch model, switch status (on / off), fault information, alarm information, various protection settings, etc.

⑤.Other system functions

With to the four remote operation control functions, the system can also perform a variety of management functions: accident alarm (information screen, picture promotion, event printing, accident dialing, sound alarm), event recording, maintenance tagging, shift management, load trend analysis, various report printing, etc.

■ L−type intelligent controller

The L-type controller adopts the setting mode of coding switch and pull-out switch. It has four protection characteristics of overload long time delay, short circuit short time delay, instantaneous and earth leakage, as well as the functions of fault status and load current light column indication. However, it has no digital display and has less complete functions than m and H-type. For users to choose in general occasions.

Intelligent Universal Circuit Breaker

■ Circuit Breaker Operating performance
The performance is expressed by the number of operating cycles,see Table 7

Rated current of the current rank Inm(A)	Times of operating cycles
1000	5000
2000	10000
3200、4000	5000
6300	2000

■ Working voltage and power of shunt release,under−voltagerelease, electric operating mechanism,energy release(closing) electromagnet and short circuit controller, see Table 8

Power / Rated voltage Item			AC(50HZ)		DC	
			220V	380V	110V	220V
Shunt release			24VA	36VA	24W	24W
Under-voltage release			24VA	36VA	/	/
Closing electromagnet			24VA	36VA	24W	24W
Electric operator	Shell current level	1000A	80VA	80VA	80W	80W
		2000A	85VA	85VA	85W	85W
		3200A、4000A	110VA	110VA	110W	110W
		6300A	150VA	150VA	150W	150W
Power voltage of intelligent controller			AC220V、AC380V、DC220V、DC110V			

Note: The reliable operating voltage range of shunt release is 70%~110%; the closing electromagnet and operating mechanism are 85%~110%.
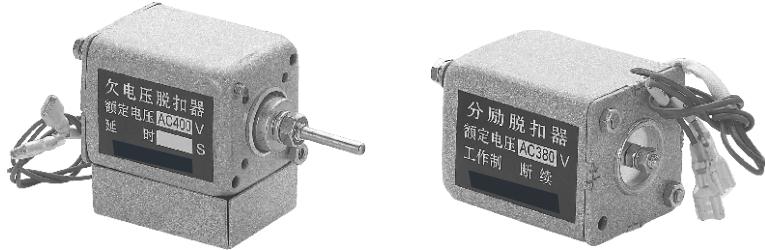
■ Under-voltage release performance, see Table 9

Category			Under-voltage delay release	Under-voltage instantaneous release
Release action time			Delay 1, 3, 5s	Instantaneous
Release action voltage		35%~70%Ue	Can be disconnected reliably	
		≤35%Ue	Cannot be closed	
		(85~110%)Ue	Can be closed reliably	
Within 1/2 delay time, if the power supply voltage recovers to 85%Ue			Circuit breaker does not open	/
Note: The delay time accuracy is ± 10%				

■ Performance of auxiliary contact

The agreed heating current of the auxiliary contact is 6A.

Form of auxiliary contact: four normally open and four normally closed(transfer contact form).

■ Shunt release
can be remotely operated to disconnect the circuit breaker.

Rated working voltage Ue (V)	AC400	AC230	DC220
Operating voltage (V)	(0.7~1.1)Ue		
Instantaneous current (A)	0.7	1.3	1.3
Breaking time	Not more than 30ms		

■ Closing electromagnet
After energy storage,the closing electromagnet can instantly release the energy storage spring force of the operating mechanism and quickly close the full circuit breaker.

Rated working voltage Ue(V)	AC400	AC230	DC220
Operating voltage(V)	(0.85~1.1)Ue		
Instantaneous current (A)	0.7	1.3	1.3
Closing time	≤70ms		

■ Electric operating mechanism
The circuit breaker has the functions of motor energy storage and automatic energy restorage,and the can also store energy manually.

Rated working voltage Ue(V)	AC400	AC230	DC220
Operating voltage (V)	(0.85~1.1)Ue		
power waste	192VA		192W
Energy storage time	≤5ms		

■ Auxiliary contact Rating

Rated Voltage(V)		Agreed heating current ith (A)	Rated control capacity
AC	230	6	300VA
	400		
DC	220		60W

Table 10

■ Abnormal making and breaking capacity of auxiliary contact making and breaking capacity of auxiliary contact,under abnormal service conditions,see table10

Usage category	ON			OFF			On/OFF operation cycle times and operation frequency		
	U/Ue	I/Ie	$\cos\phi$ or $T_{0.95}$	I/Ie	U/Ue	$\cos\phi$ or $T_{0.95}$	Operating cycle times	Operating cycle times per minute	Power ON time (s)
AC-15	1.1	10	0.3	10	1.1	0.3	10	6 (or the same as the operating frequency of the main circuit)	0.05
DC-13	1.1	1.1	6Pe	1.1	1.1	6Pe			

Note: when PE ≥ 50W, upper limit of t0.95 =6pe ≤ 300ms

Table 11

■ Making and breaking capacity of auxiliary contact,under normal service conditions.See table 11

Usage category	ON			OFF		
	I/Ie	U/Ue	$\cos\phi$ or $T_{0.95}$	I/Ie	U/Ue	$\cos\phi$ or $T_{0.95}$
AC-15	10	1	0.3	1	1	0.3
DC-13	1	1	6Pe	1	1	6Pe

□ OFF position key lock
The circuit breaker is equipped with an "off position key lock" accessory (provided according to the order requirements), which can lock the circuit breaker in the off position. At this time, the circuit breaker can not be closed by using either the closing button or the energy release (closing) electromagnet.

6. Structure Overview

The fixed circuit breaker is mainly composed of contact system, insulating base, intelligent controller, manual operating mechanism, electric operating mechanism and mounting plate. The drawer type circuit breaker is mainly composed of contact system, insulating base, intelligent controller, manual operating mechanism, electric operating mechanism and drawer base.

The circuit breaker is a three-dimensional arrangement with the characteristics of compact structure and small volume. The contact system is enclosed in the insulating base plate, and each phase of the contact is also separated by the insulating plate to form a small room. The intelligent controller, manual operating mechanism and electric operating mechanism are arranged in front of each other to form their own independent units. If one of the units is broken, the whole unit can be removed and replaced with a new one.

The drawer type circuit breaker consists of a plug-in circuit breaker and a drawer base. The guide rail in the drawer base can be pulled in and out, the inserted circuit breaker is located on the guide rail to enter and exit the drawer, and the main circuit is connected through the insertion and connection of the bus on the inserted circuit breaker and the bridge contact on the drawer base.

The drawer type circuit breaker has three working positions: "connection" position, "test" position and "separation" position. The position change is realized by screwing in or out the handle, and the indication of the three positions is displayed by the pointer on the crossbeam of the drawer base.

Intelligent Universal Circuit Breaker

When in the "ON" position, both the main circuit and the secondary circuit are connected; when in the "Test" position, the main circuit is disconnected and separated by an insulating partition. Only the secondary circuit is connected, and some necessary action tests can be carried out; when in the "OFF" position, the main circuit and the secondary circuit are all disconnected.
In addition, the drawer type circuit breaker has a mechanical interlocking position. The circuit breaker can only be closed at the ON position or test position, while the circuit breaker at the middle position of ON and test cannot be closed.

Interlock mechanism of circuit breaker (applicable to drawer type and fixed type). Users can use the interlocking mechanism alone to convert two or three sets, or it can be equipped with the company's ATS series dual power supply automatic switching device to realize the automatic switching of dual power supply.

■ Interlock mechanism
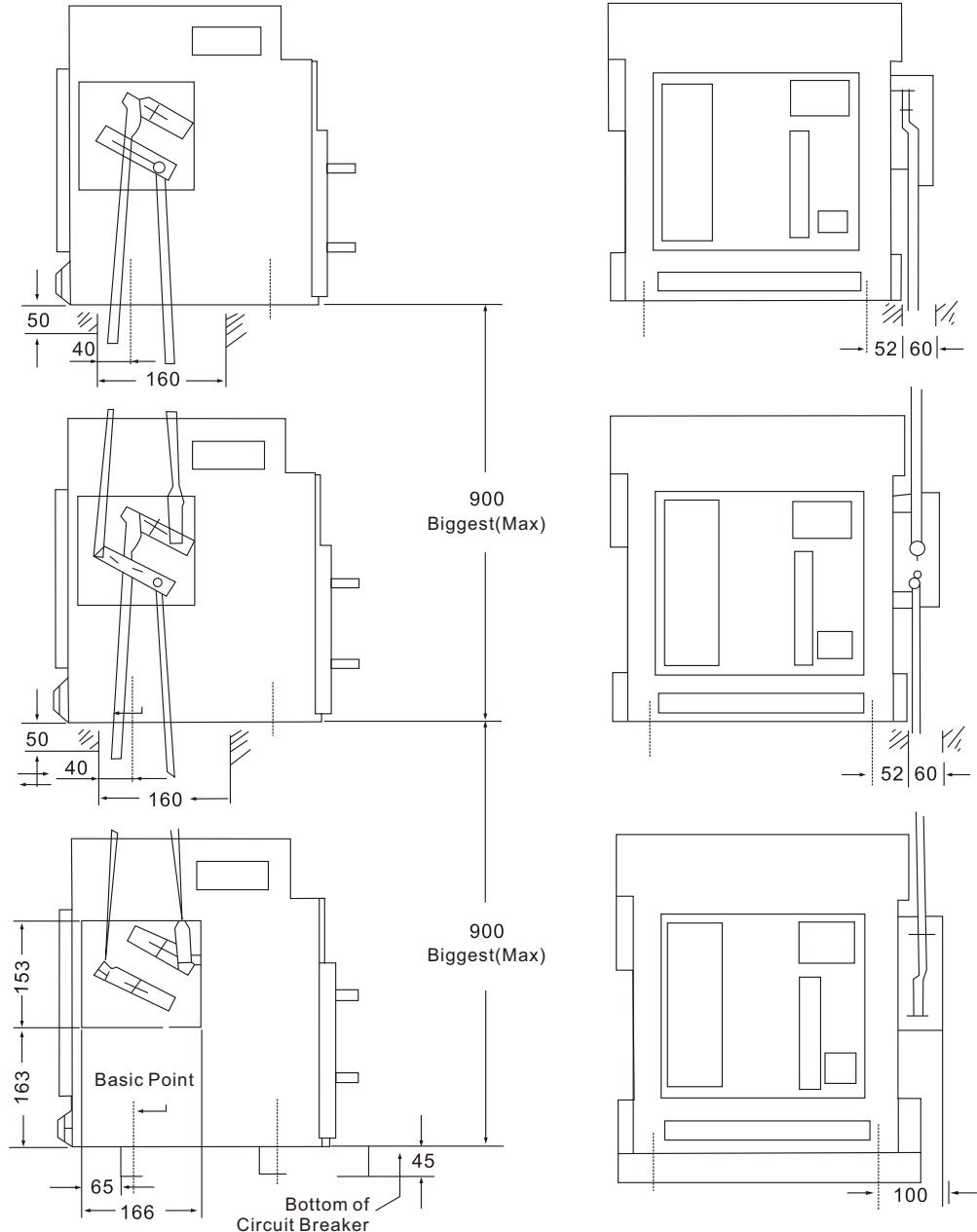
Fig 5(A)

3 vertical mounted circuit breakers, with interlock mechanism. If two circuit breakers are interlocked, only the uppermost circuit breaker needs to be removed.

Intelligent Universal Circuit Breaker

■ Softinter lock(both horizontal and vertical)

2m Biggest(Max)

R≥120mm | Circuit breaker 1
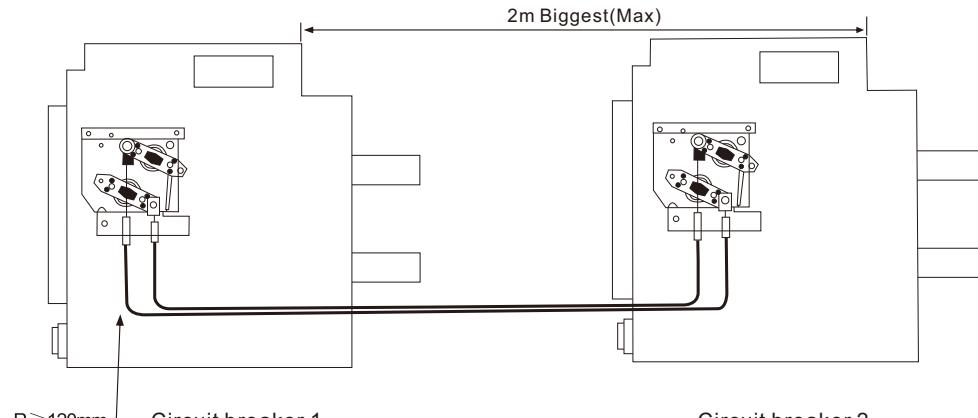
Circuit breaker 2

Fig 5(B)

■ Earth fault protection circuit

3P circuit breaker

Transformer

Current transformer

A
B
C

PEN

Intelligent controller

3PT type
Differential earth fault protection, the signal only takes the vector sum of three-phase current
(Three-phase unbalance)

4P circuit breaker

Transformer

Current transformer

A
B
C
N

PE

Intelligent controller

4PT type
Differential grounding fault protection, the signal is taken as the vector sum of three-phase current and N-phase current

Fig 6(A)

Intelligent Universal Circuit Breaker

3P circuit breaker
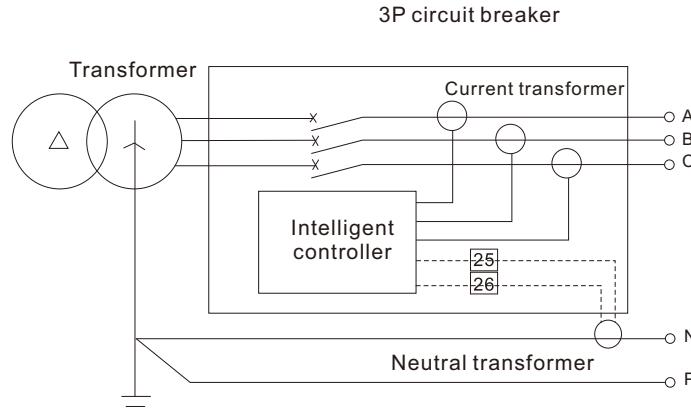
(3P+N)T type
External neutral pole transformer difference type ground fault protection, the signal only takes the vector sum of three-phase current and n-phase current.

3P/4P circuit breaker
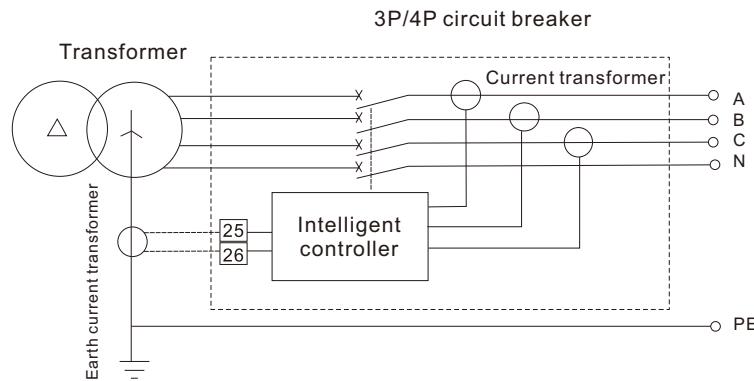
(3P+N)W type
External grounding current transformer ground current type ground fault protection, the signal is directly taken between the neutral point of the main power supply and the ground.

Fig 6(B)

■ External single-phase grounding protection function

External transformer (neutral pole transformer or ground current transformer) is provided to the user as an accessory. The user sets it into the busbar and connects the wire (2m long) to the secondary wiring terminals 25 and 26 of the circuit breaker. The size of the central opening of the external transformer (the maximum allowable passing through of the through core busbar) is as follows:

Model Number	Width	Height
2000、4000/4	61	21
3200 and above, (except 4000/4)	87	31

Intelligent Universal Circuit Breaker

■ Terminal block

There are 47 overall wiring terminals of the circuit breaker, which are simple and convenient for users. See Figure 7A, B and C for the wiring diagram

Note: In order to avoid unnecessary damage to the shunt release and closing electromagnet, please connect a group of normally open (shunt) and normally closed (closing) contacts in series before the shunt release. (Which can be connected in series outside the secondary wiring terminal) when the user is using it. It is not connected by our company.

Fig. 7A (the controller is M-type or L-type with basic function)
Other wiring of intelligent controller
#1、#2 AC working power input (input from DC power modules U1 and U2 in DC)
#25、#26 external neutral pole or ground current transformer input

Fig 7A

Note:
(1) If the control power supply voltages of F, X and M are different, different power supplies shall be connected respectively.
(2) Terminal 35 can be directly connected to the power supply (automatic pre stored energy), or connected to the power supply after the normally open button in series (manual pre stored energy).
(3) If the user requests, terminals 6 to 7 can output normally closed contacts.
(4) Additional accessories are provided by the user.
(5) When the working power supply of the intelligent controller is DC power supply, the DC power supply module must be added (at this time, terminals 1 and 2 cannot be directly connected to AC power supply).
The secondary wiring is as shown in the figure [DC power supply DC110V or DC220V is input from U1 (+) and U2 (-), and the two output terminals of the DC power module are respectively connected with terminals 1 (+) and 2 (-) of the secondary wiring base].

SB1 Shunt button (provided by the user)
SB2 Under-voltage button (provided by the user)
SB3 Closing button (provided by the user)
X   Closing electromagnet
DF   Auxiliary contact
Q   Under-voltage release or under-voltage delay release

M Energy storage motor
F   Shunt release
O   Normally open contact (3A/AC380V)
XT Terminal
SA Motor micro switch
⊗   Signal lamp (provided by the user)
FU Fuse (provided by the user)

# Intelligent Universal Circuit Breaker

Fig 7B (controller is L-type with additional function)

Other wiring of intelligent controller:
#1、#2 AC working power input (input from DC
          power modules U1 and U2 in DC)
#12 overload forecast alarm signal output
#14 instantaneous short delay tripping signal output
#15 long delay tripping signal output
#16 ground (or neutral) fault tripping signal output
#19 signal output common line
#20 self diagnosis signal output
#21 tripping signal (available for shunt excitation or
      undervoltage actuator)
#25、#26 external neutral pole or ground current
              transformer input
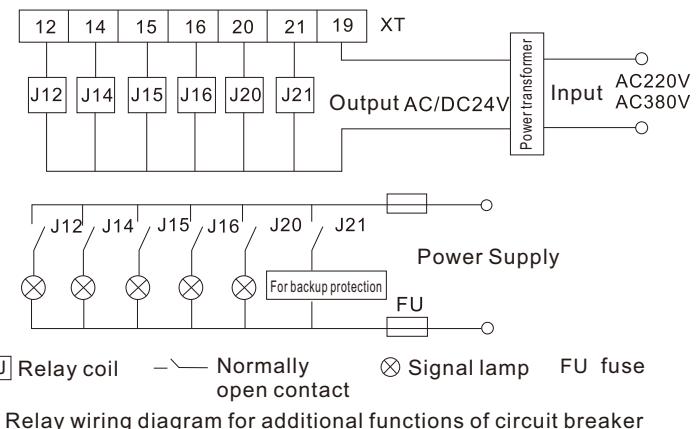
Relay wiring diagram for additional functions of circuit breaker

1) The controller signal drives the external relay J to output the contact action signal through terminals 12, 14-16, 20 and 21.
2) The power transformer (the user shall specify the input voltage value in the order specification) is provided by the manufacturer.
   The power transformer can be inserted into the standard guide rail together with the relay base and installed at the appropriate
    position of the switch cabinet by the user.
3) Relay model: HH62P, AC/DC24V, prepared by the user.
4) Self diagnosis signal output conditions:
a. Internal temperature of controller > 80 ℃;
b. The chip is not working properly;
c. Power loss of controller;
5) Users can select J12, J14~J16, J20 and J21 according to their actual needs.
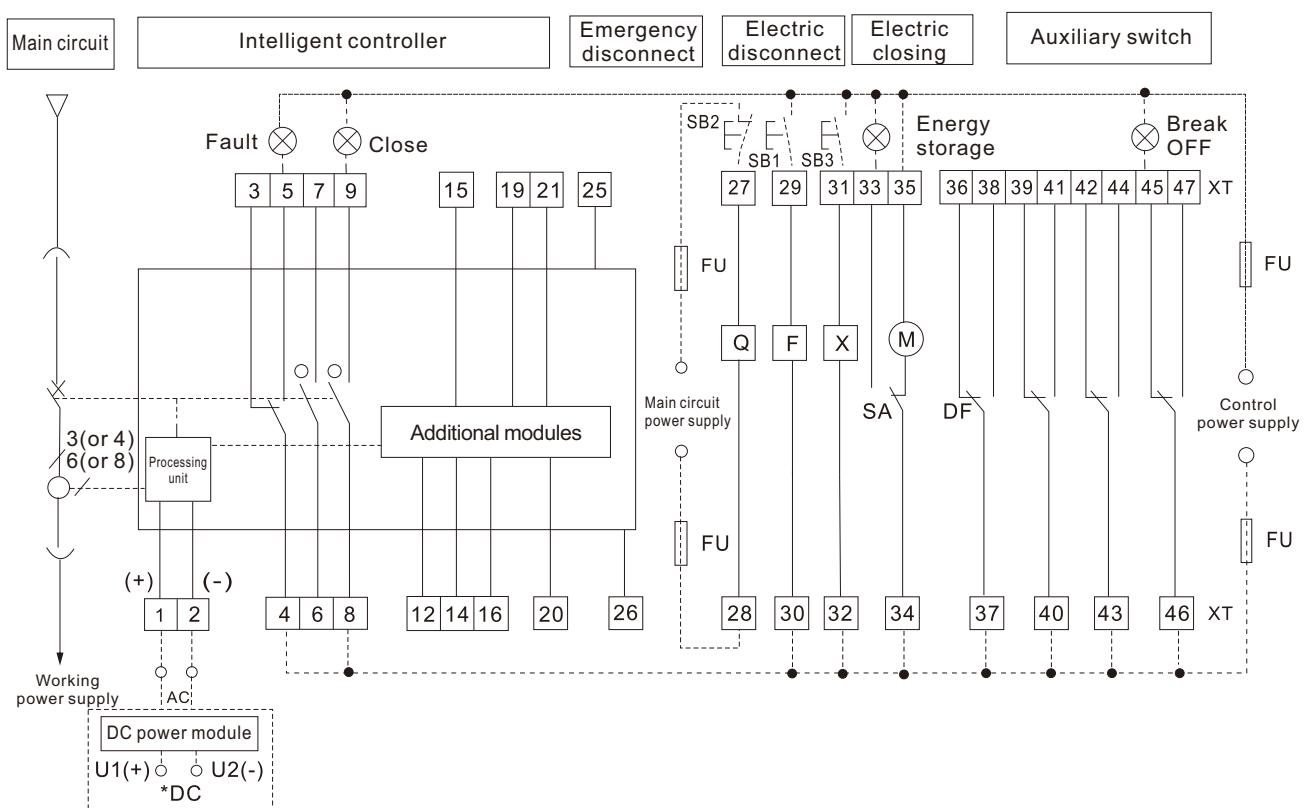
Fig 7B

Intelligent Universal Circuit Breaker

Note:
(1) If the control power supply voltages of F, X and m are different, different power supplies shall be connected respectively.
(2) Terminal 35 can be directly connected to the power supply (automatic pre stored energy), or connected to the power supply after the normally open button in series (manual pre stored energy).
(3) If the user requests, terminals 6 to 7 can output normally closed contacts.
(4) Additional accessories are provided by the user.
(5) When the working power supply of the intelligent controller is DC power supply, the DC power supply module must be added (at this time, terminals 1 and 2 cannot be directly connected to AC power supply).
    The secondary wiring is as shown in the figure [DC power supply dc110v or dc220v is input from U1 (+) and U2 (-), and the two output terminals of the DC power module are respectively connected with terminals 1 (+) and 2 (-) of the secondary wiring base].

SB1 Shunt button (provided by the user)
SB2 Under-voltage button (provided by the user)
SB3 Closing button (provided by the user)
X   Closing electromagnet
DF   Auxiliary contact
Q   Under-voltage release or under-voltage delay release

M   Energy storage motor
F   Shunt release
O   Normally open contact (3a/ac380v))
XT Terminal
SA Motor micro switch
⊗ Signal lamp (provided by the user)
FU Fuse (provided by the user)

Figure7C(The controller is M type with additional functionor H type)

Other wiring of intelligent controller:

#1、#2 AC working power input (input from DC power modules U1 and U2 in DC)

#10 RS485 communication P terminal (simplex) } remote control
#11 RS485 communication N terminal (simplex) } remote control telemetry, etc.
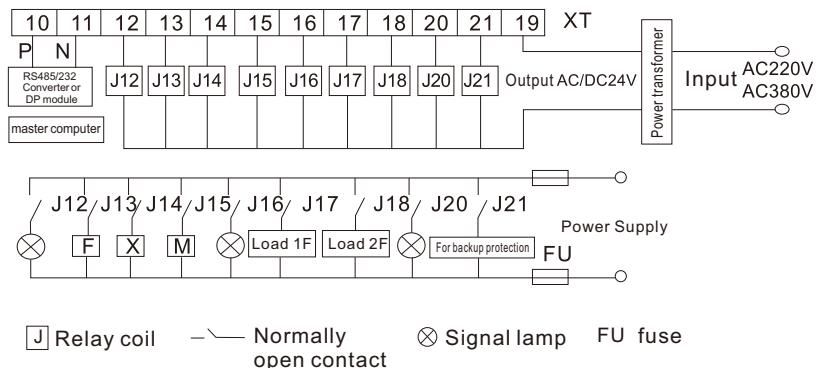
Relay wiring diagram for additional functions of circuit breaker
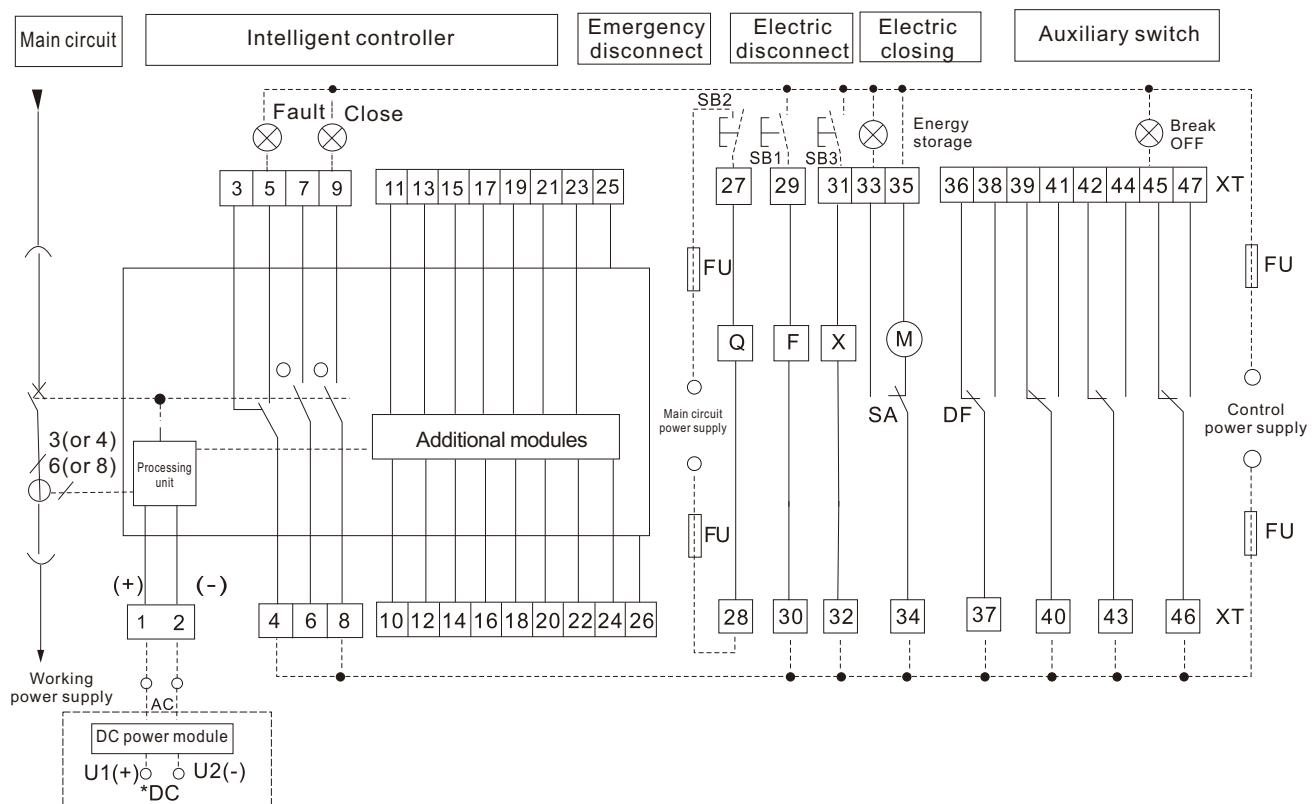
Fig 7C

#12 overload forecast alarm signal output
#13 Communication remote control shunt trip output
#14 instantaneous short delay tripping signal output
#15 Long-delay trip signal output or communication remote control energy storage output
#16 ground (or neutral) fault tripping signal output
#17 Unloading 1 signal output
#18 Unloading 2 signal output
#19 signal output common line
#20 self diagnosis signal output
#21 tripping signal (available for shunt excitation or undervoltage actuator)
#22 A phase voltage signal ⎫
#23 B phase voltage signal ⎬ Direct access from the main circuit
#24 C phase voltage signal ⎭
#25、#26 external neutral pole or ground current transformer input

1) The controller signal drives the external relay J to output the contact action signal through terminals 12-18, 20 and 21.
2) RS485/232 converter, DP module, current transformer (users need to specify the input voltage value in the order specification) are provided by the manufacturer,the power transformer can be inserted into the standard rail together with the relay base,installed by the user at a suitable location in the switchgear.
3) Relay model: HH62P, AC/DC24V, prepared by the user.
4) The master computer is prepared by the user
5) The output of terminals 13~15 can be used for remote control opening, closing and energy storage.The trip signals of the corresponding terminals 14 and 15 are no longer output at this time.The normally open contacts of the corresponding relays are connected in parallel with the corresponding buttons for manual control.It can realize remote control,If the remote control function is not required,Terminals 14 and 15 can be connected to two signal lamps in series through the normally open contacts of relays J14 and J15, and the corresponding signals can be output remotely.Please indicate whether the remote control function is required in the order specification,The manufacturer determines the corresponding functions of the terminals 14 and 15 according to this.Terminal 21 output push relay J21 can be used as backup protection.
6) Self diagnosis signal output conditions:
a. Internal temperature of controller $>$ 80 ℃; b. The chip is not working properly; c. Power loss of controller.
7) Users can select J12, J14~J18, J20 and J21 according to their actual needs.

Note:
(1) If the control power supply voltages of F, X and m are different, different power supplies shall be connected respectively.
(2) Terminal 35 can be directly connected to the power supply (automatic pre stored energy), or connected to the power supply after the normally open button in series (manual pre stored energy).
(3) If the user requests, terminals 6 to 7 can output normally closed contacts.
(4) Additional accessories are provided by the user.
(5) When the working power supply of the intelligent controller is DC power supply, the DC power supply module must be added (at this time, terminals 1 and 2 cannot be directly connected to AC power supply).
The secondary wiring is as shown in the figure [DC power supply dc110v or dc220v is input from U1 (+) and U2 (-), and the two output terminals of the DC power module are respectively connected with terminals 1 (+) and 2 (-) of the secondary wiring base].

SB1 Shunt button (provided by the user)
SB2 Under-voltage button (provided by the user)
SB3 Closing button (provided by the user)
X   Closing electromagnet
DF   Auxiliary contact
Q   Under-voltage release or under-voltage delay release

M   Energy storage motor
F   Shunt release
O   Normally open contact (3a/ac380v))
XT Terminal
SA Motor micro switch
⊗   Signal lamp (provided by the user)
FU Fuse (provided by the user)

■ 2M/3M/2H/3H controller four groups of signal contact output terminal factory default state

Connect No. Controller Type	12,13	14,15	16,17	18,19
2M/3M Type	Load monitoring 1 unloading signal	Load monitoring 2 unloading signal	Self-diagnostic fault alarm number	Fault trip alarm signal
2H/3H Type	Load monitoring 1 unloading signal	Load monitoring 2 unloading signal	Remote opening	Remote closing

Illstrate:
The controller has four independent signal contact outputs,its function can be set by programmer or special method.There are 10 kinds of signal output functions provided,its functions and numbers are as follows:
1. Short circuit instantaneous fault tripping alarm; 2. Trip alarm for grounding or leakage fault; 3. Current unbalance fault trip alarm; 4. Short circuit short delay fault tripping alarm;5. Overload long time delay fault tripping alarm; 6. Fault trip alarm; 7. Load monitoring 1 unloading output; 8. Load monitoring 2 unloading output; 9. System self-diagnosis fault alarm; 10. Power grid fault status alarm.
If the user has no special requirements, the four groups of contact functions of the controller are set to the default state at the factory.

Intelligent Universal Circuit Breaker

2000~6300 type circuit breaker secondary loop wiring diagram with L/M type intelligent controller(auxiliary switch consists of five open and five closed contacts)
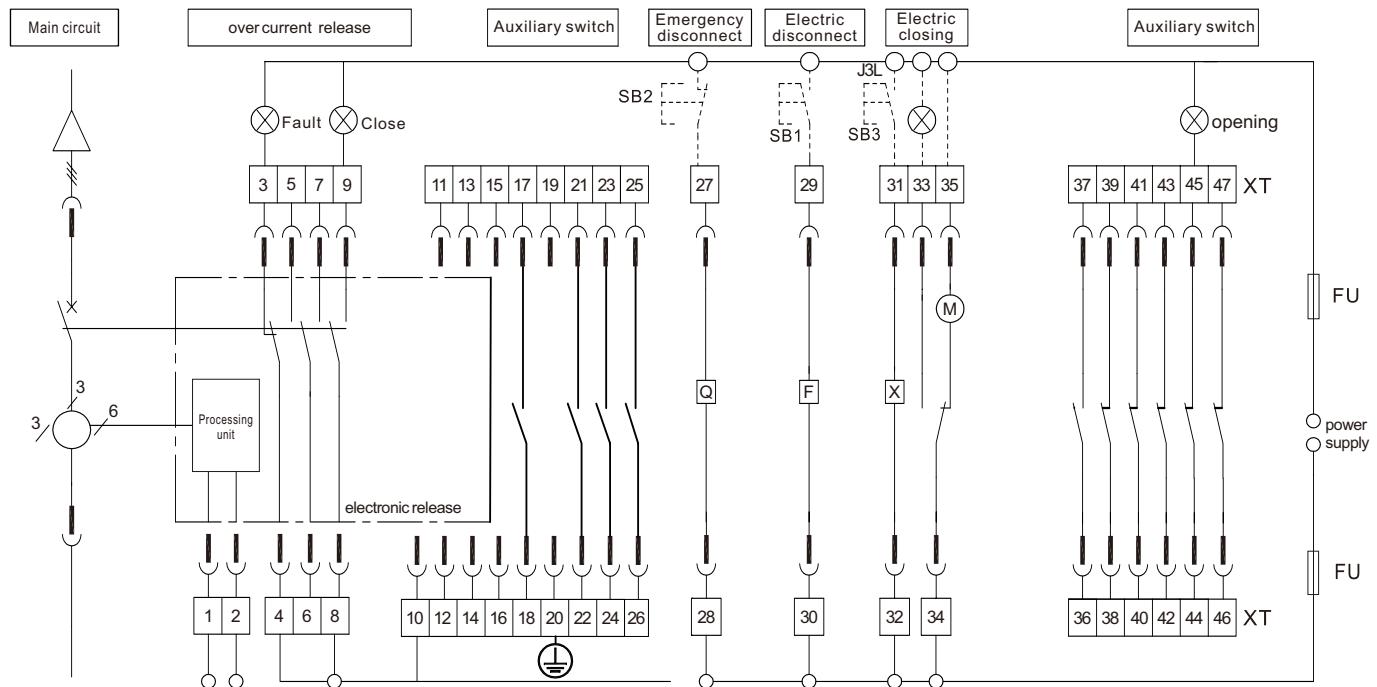
Main circuit	over current release	Auxiliary switch	Emergency disconnect	Electric disconnect	Electric closing	Auxiliary switch

Fault Close

SB2   SB1   J3L SB3   opening

| 3 | 5 | 7 | 9 | 11 | 13 | 15 | 17 | 19 | 21 | 23 | 25 | 27 | 29 | 31 | 33 | 35 | 37 | 39 | 41 | 43 | 45 | 47 | XT |

Processing unit

Q   F   X   M

electronic release

| 1 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 | 32 | 34 | 36 | 38 | 40 | 42 | 44 | 46 | XT |

FU   power supply   FU

2000~6300 type circuit breaker secondary loop wiring diagram with L/M type intelligent controller(auxiliary switch consists of four open and six closed contacts)
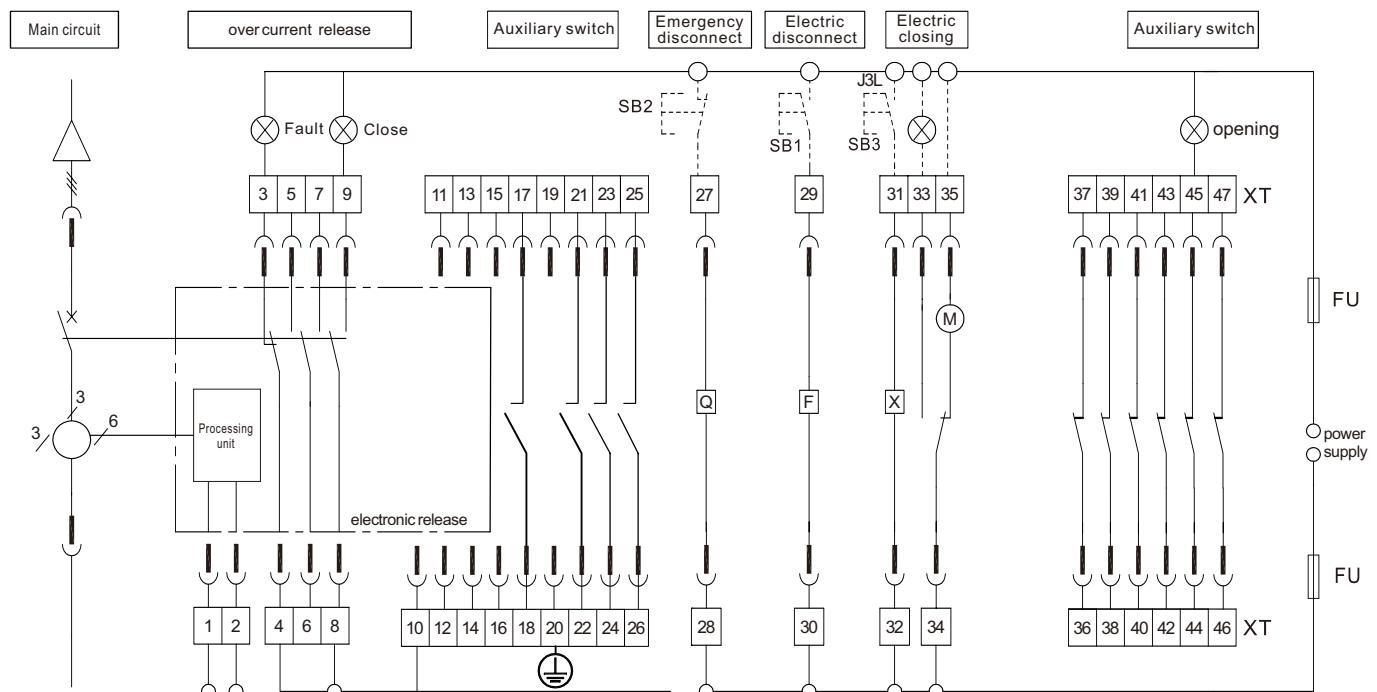
Main circuit	over current release	Auxiliary switch	Emergency disconnect	Electric disconnect	Electric closing	Auxiliary switch

Fault Close

SB2   SB1   J3L SB3   opening

| 3 | 5 | 7 | 9 | 11 | 13 | 15 | 17 | 19 | 21 | 23 | 25 | 27 | 29 | 31 | 33 | 35 | 37 | 39 | 41 | 43 | 45 | 47 | XT |

Processing unit

Q   F   X   M

electronic release

| 1 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 | 32 | 34 | 36 | 38 | 40 | 42 | 44 | 46 | XT |

FU   power supply   FU

Intelligent Universal Circuit Breaker

2000~6300 type circuit breaker secondary loop wiring diagram with L/M type intelligent controller(auxiliary switch consists of four open and four closed contacts)
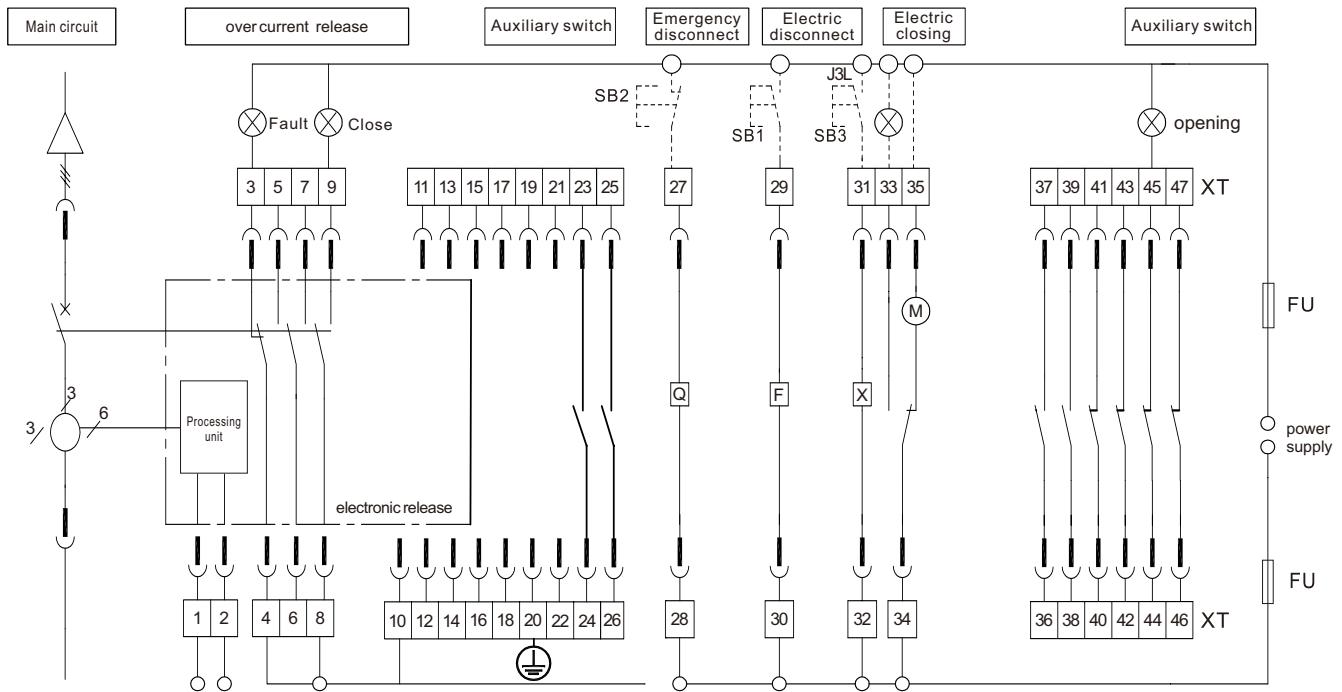
2000~6300 type circuit breaker secondary loop wiring diagram with L/M type intelligent controller(The auxiliary switch consists of six groups of changeover contacts)
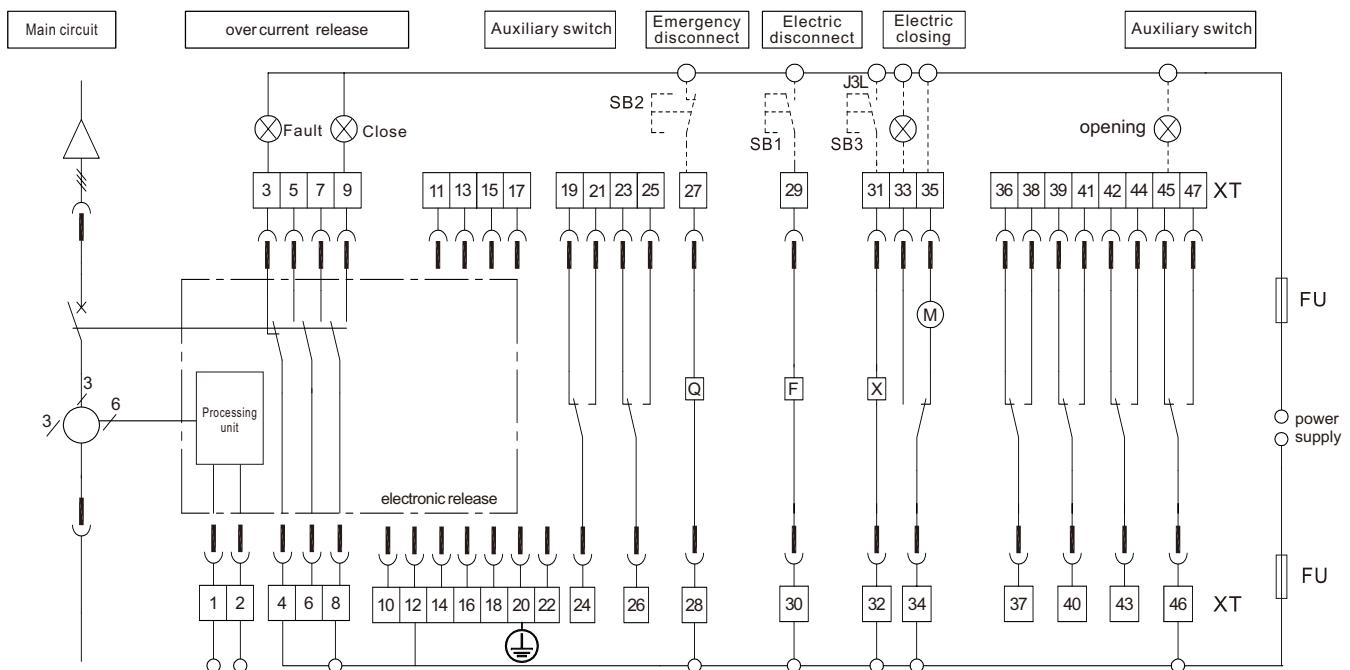
Intelligent Universal Circuit Breaker

1000 type circuit breaker secondary loop wiring diagram with L/M type intelligent controller (The auxiliary switch consists off our groups of change over contacts)

1000 type circuit breaker secondary loop wiring diagram with L/M type intelligent controller (The auxiliary switch consists of six groups of change over contacts)

Control power supply — L / N / PE

FU

Main circuit — TA

Intelligent controller

ST-DP Device / Profibus-DP / Modbus-RTU

Processing unit

to incoming side of circuit breaker

External transformer

UN/UA/UB/UC

Under-voltage release

shunt release

Closed electromagnet

Energy storage instructions

Energy storage motor

Auxiliary switch

KST relay module
DC24V/DC24V DC1/D1 DI2/D13
DO1 DO2 DO3
12 13   14 15   16 17

KST power module
INPUT OUTPUT
AC24V E AC24V E DC24V DC24V
12 13   14 15   16 17   19 20   21 22

SB1 SB2
Q F X SA M AX

HL1 HL2 HL3 HL4

XT

Legend (left column):
SB 1 : Shunt button
SB 3 : Closing button
HL1 : Fault indicator
HL2 : Energy storage indication;
HL3 : Disconnect indicator;
HL4 : Closure indication;

Q : Under-voltage release
F : shunt release
X : Closed electromagnet
M : Energy storage instructions
MX : Auxiliary switch
XT : terminal
SA : motor travel switch

1 #, 2 # : controller auxiliary power input (dc needs to be connected to the power module terminal number 1, 3);
3 #, 4 #, 5 # : failure trip contact output (4 # is the common end) contact capacity AC230V, 5A;
6 # ~ 9 # : circuit breaker status, controller auxiliary contact output (auxiliary contact capacity AC380V1A)

10 #, 11 # : communication interface output;
12 #, 13 # : output end of the first set of signal contacts of the controller;
14 #, 15 # : output end of the second set of signal contacts of the controller;
16 # ~ 17 # : output end of the third group of signal contacts of the controller;
20 # : controller ground wire;

21 # ~ 24 # : N, A, B, C phase voltage signal input (note that the sequence can not be wrong and connected to the power input side, there is no optional function, this pin is blank)

25 #, 26 # : external transformer input terminal;
36 # ~ 47 # : Auxiliary contact (48 # is empty foot).

Note: the part of dotted line is connected by the user. If the rated voltage of each accessory is different, it can be connected to the power supply separately.

1000 type circuit breaker secondary loop wiring diagram with H type intelligent controller (Auxiliary switch consists of four groups of switching contacts)

Control power supply

Main circuit

Intelligent controller

Under-voltage release | **shunt release** | **Closed electromagnet** | **Energy storage instructions** | **Energy storage motor** | **Auxiliary switch**

to incoming side of circuit breaker

External transformer

Processing unit

ST-DP Device

Profibus-DP

Modbus-RTU

Q:Under-voltage release
F:shunt release
X:Closed electromagnet
M:Energy storage instructions
MX:Auxiliary switch
SA:motor travel switch
XT:terminal

SB 1 : Shunt button
SB 3 : Closing button
HL1:Fault indicator
HL2: Energy storage indication;
HL3: disconnect indicator;
HL4: Closure indication;

1#、2#: controller auxiliary power input (dc needs to be connected to the power module terminal number 1, 3);
3#、4#、5#: failure trip contact output (4# is the common end) contact capacity AC230V,5A;
6#～9#: circuit breaker status, controller auxiliary contact output (auxiliary contact capacity AC380V1A)

10#、11#: communication interface output;
12#、13#: output end of the first set of signal contacts of the controller;
14#、15#: output end of the second set of signal contacts of the controller;
16#～17#: output end of the third group of signal contacts of the controller;
20#: controller ground wire;
Note: the part of dotted line is connected by the user. If the rated voltage of each accessory is different, it can be connected to the power supply separately.

21#～24#: N, A, B, C phase voltage signal input (note that the sequence can not be wrong and connected to the power input side, there is no optional function, this pin is blank)
25#、26#: external transformer input terminal;
36#～47#: Auxiliary contact (48# is empty foot).

1000 type circuit breaker secondary loop wiring diagram with H type intelligent controller (auxiliary switch consists of a set of change-over normally open contacts

Intelligent Universal Circuit Breaker

7．Appearance And Mounting Dimensions

☐ The Overall dimensions and mounting dimensions of 1000A/3,4 Fixed type ACB
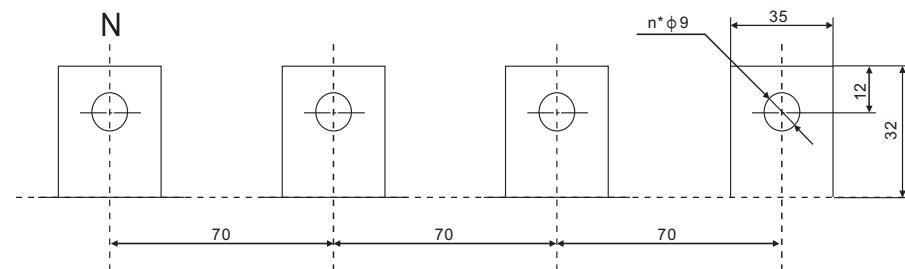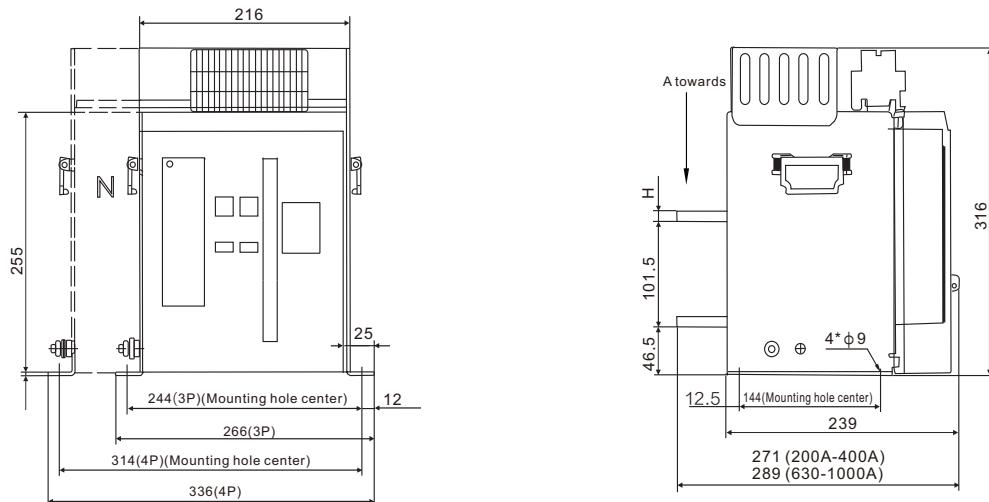
Rated current In: 200A~ 400A   A towards Busbar size
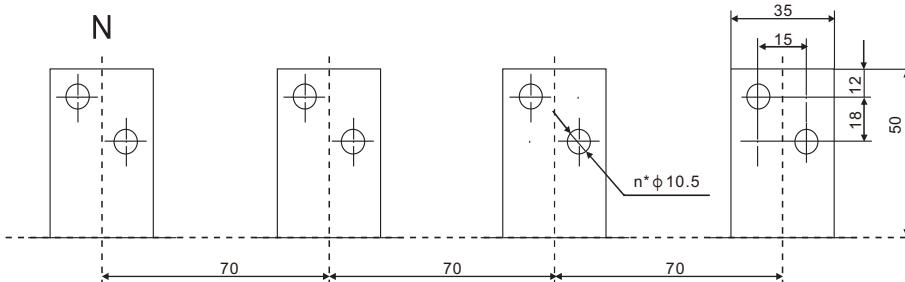
Rated current In: 630A~1000A   A towards Busbar size

Rated current (A)	200、400	630	800、1000	Remark
Busbar thickness H (mm)	6	8	10	——
n	6	12	12	3P
	8	16	16	4P

Intelligent Universal Circuit Breaker

□ The Overall dimensions and mounting dimensions of 1000A/3,4 Drawer type ACB

Nuit: mm

Rated current In:200A~400A   A towards Busbar size

Rated current In: 630A~1000A   A towards Busbar size

Rated current (A)	200、400	630	800、1000	Remark
Busbar thickness H (mm)	6	8	10	——
n	6	12	12	3P
	8	16	16	4P

□ Door frame and cupboard door punch size & mounting holes pitch-row of 1000A/3,4 ACB

Nuit: mm
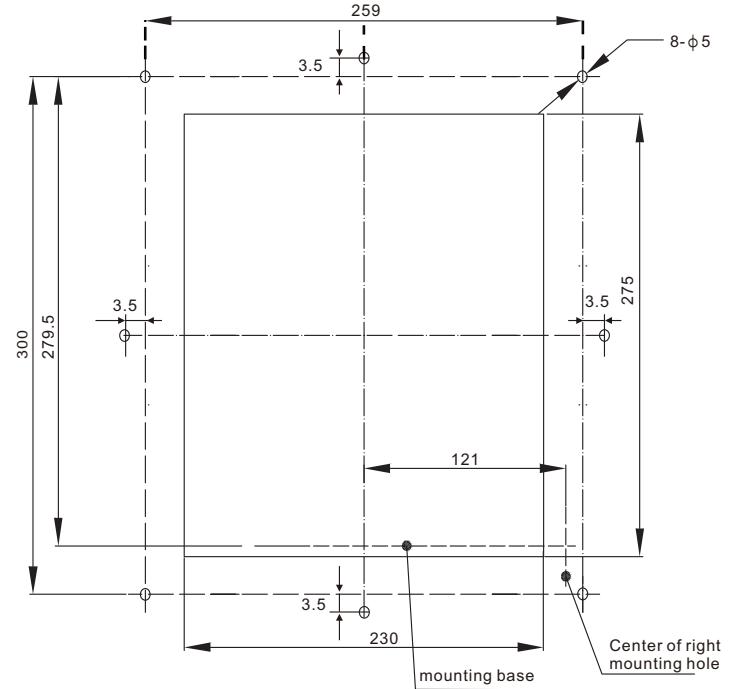
Fixed type 3P/4P Door frame and cupboard door punch size
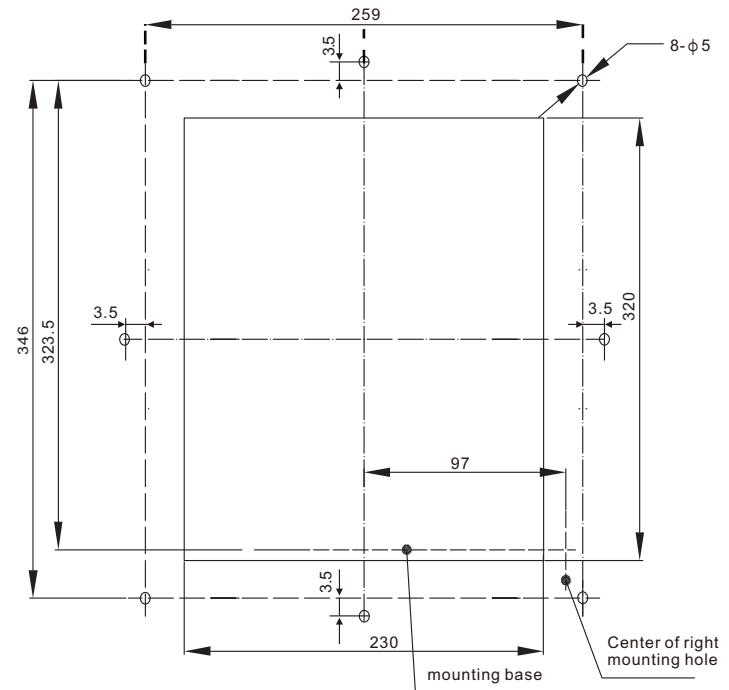
Drawer type 3P/4P Door frame and cupboard door punch size

Intelligent Universal Circuit Breaker

□ The mounting dimensions and door frame punch hole of 2000/3,4 drawer type ACB   Nuit: mm
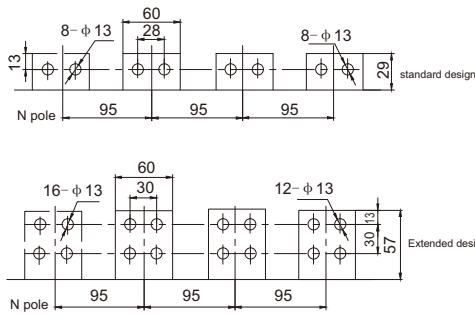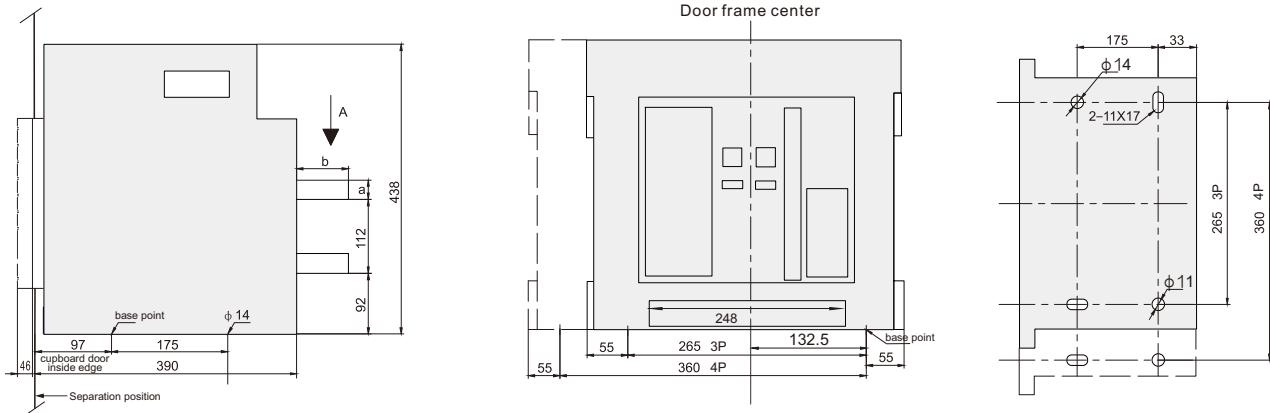
The Punch hole diagram before installing door frame
The minimum distance between the center of the control panel and the right hinge of the cabinet door is 256mm
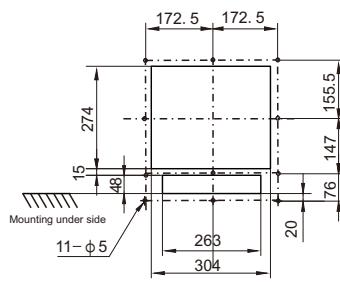
In	a mm	b mm	
		standard design	Extended design
630,800A	10	29	57
1000,1600A	15	29	57
2000A	20	29	57

□ The mounting dimensions and door frame punch hole of 2000/3,4 Fixed type ACB

The Punch hole diagram before installing door frame
The minimum distance between the center of the control panel and the right hinge of the cabinet door is 256mm

In	a mm	b mm	
		standard design	Extended design
630,800A	10	32	63
1000,1600A	15	32	63
2000A	20	32	63

Intelligent Universal Circuit Breaker

□ The mounting dimensions and door frame punch hole of 3200/3,4 drawer type ACB

Door frame center

The Punch hole diagram before installing door frame
The minimum distance between the center of the control panel and the right hinge of the cabinet door is 264mm

In	a mm	b mm	
		standard design	Extended design
2000,2500A	20	29	67
2900,3200A	30	29	67
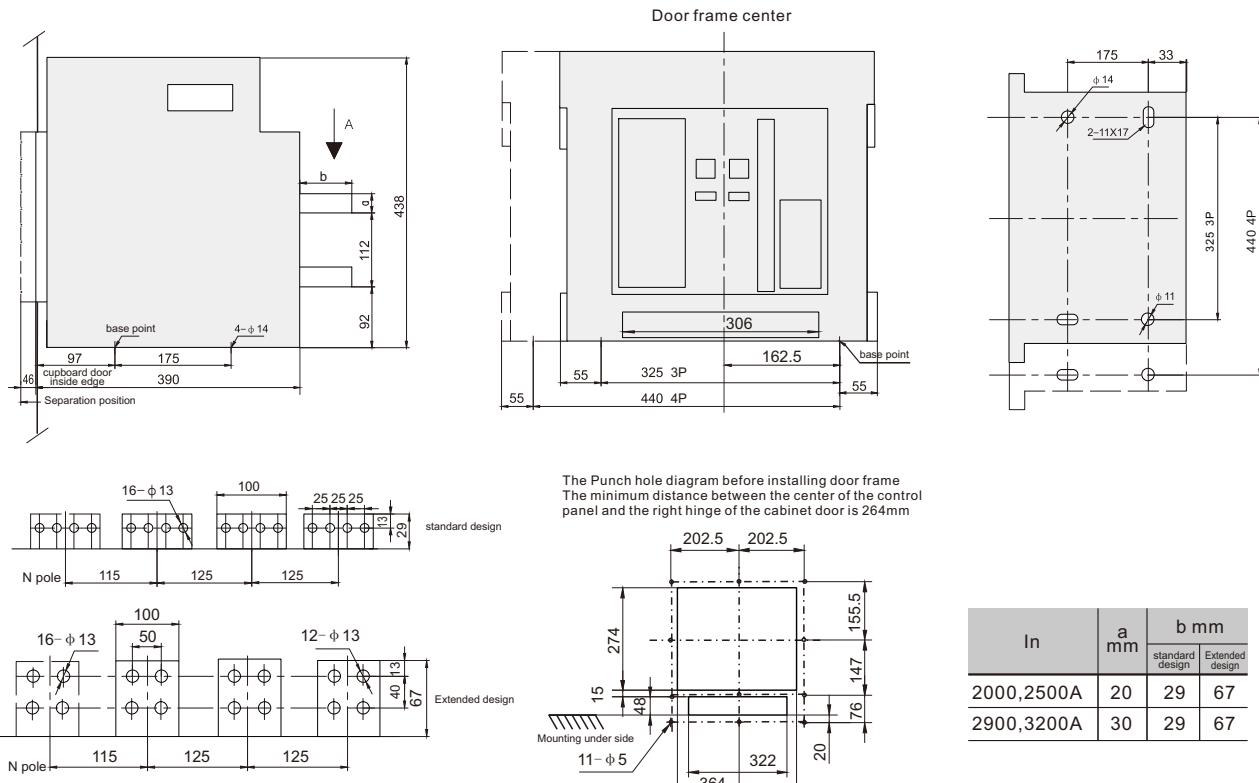
□ The mounting dimensions and door frame punch hole of 3200/3,4 Fixed type ACB

Door frame center

The Punch hole diagram before installing door frame
The minimum distance between the center of the control panel and the right hinge of the cabinet door is 264mm

In	a mm	b mm	
		standard design	Extended design
2000,2500A	20	32	72
2900,3200A	30	32	72
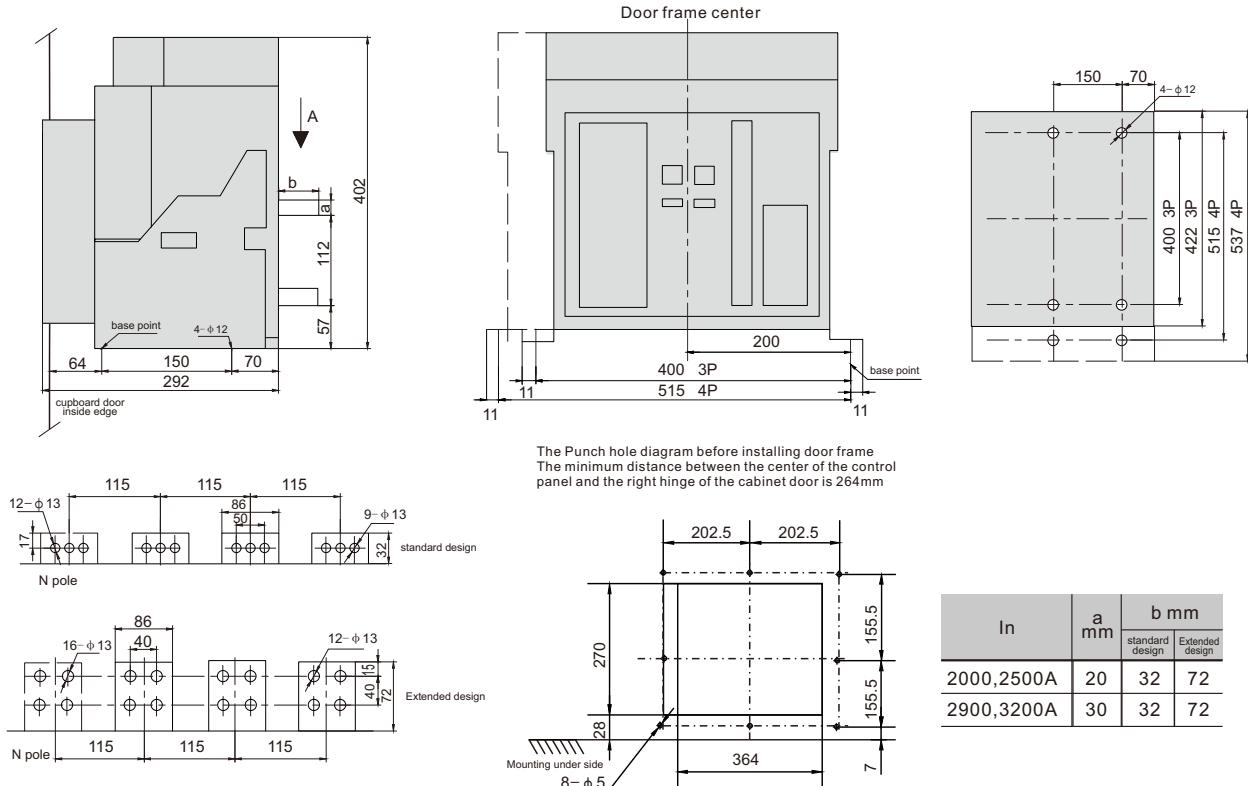
Intelligent Universal Circuit Breaker

□ 4000A/3 drawer mounting dimensions with door frame opening

Frame center

base point

Opening diagram before installing door frame
The minimum distance between the center of the control
panel and the right hinge of the cabinet door is 264mm

underside
11− φ5
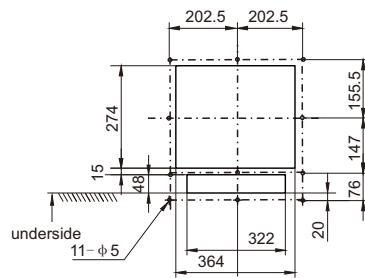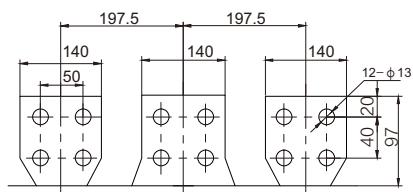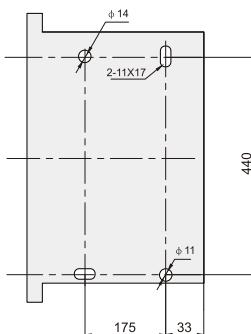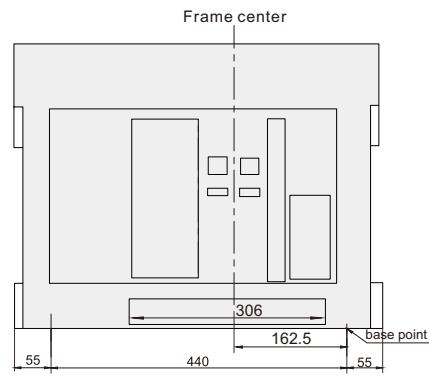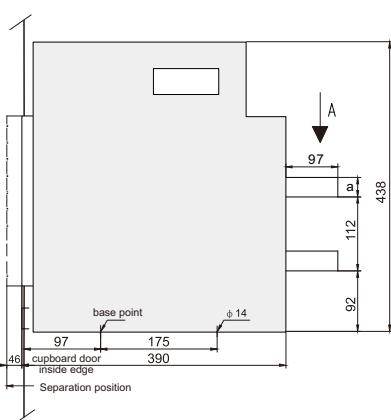
In	a mm
3600A	30
4000A	30

□ 4000A/4 drawer mounting dimensions withdoor frame opening

Frame center

cabinet door

504(connection)
569(connection)
615(Separation)

(N)
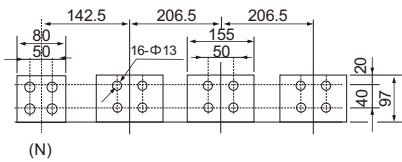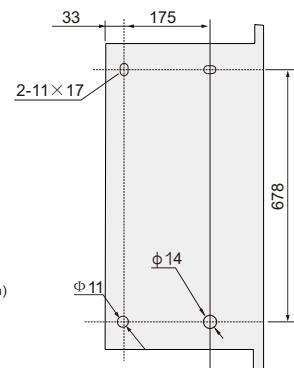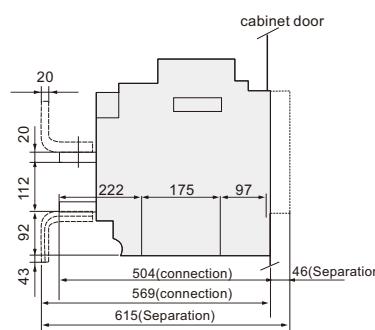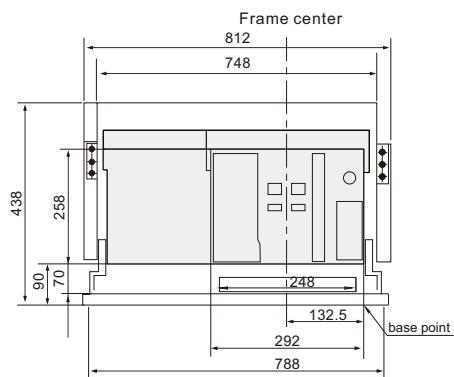
(The level of connection)

(N)

(The vertical line)

Install the bottom
11− φ5
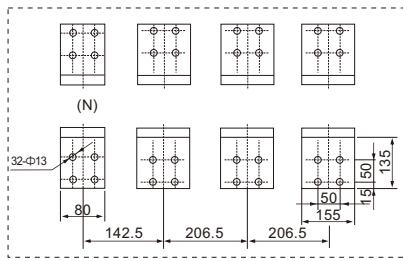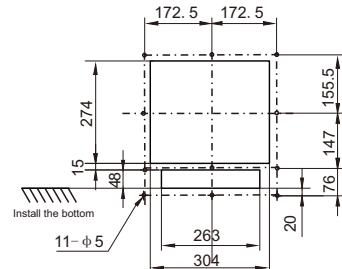
Note: panel center to circuit breaker center
The left and right dimensions are 206.5

Intelligent Universal Circuit Breaker

☐ 4000A/3 fixed mounting dimensions and door frame openings

Frame center

Opening diagram before installing door frame
The minimum distance between the center of the control panel and the right hinge of the cabinet door is 264mm

In	a mm
3600A	30
4000A	30

☐ 6300/4000A,5000A/3,4 drawer type installation size and door frame opening

Door frame center

Opening diagram before installing door frame
The minimum distance between the center of the control panel and the right hinge of the cabinet door is 264mm

In	a mm
4000A	20
5000A	30
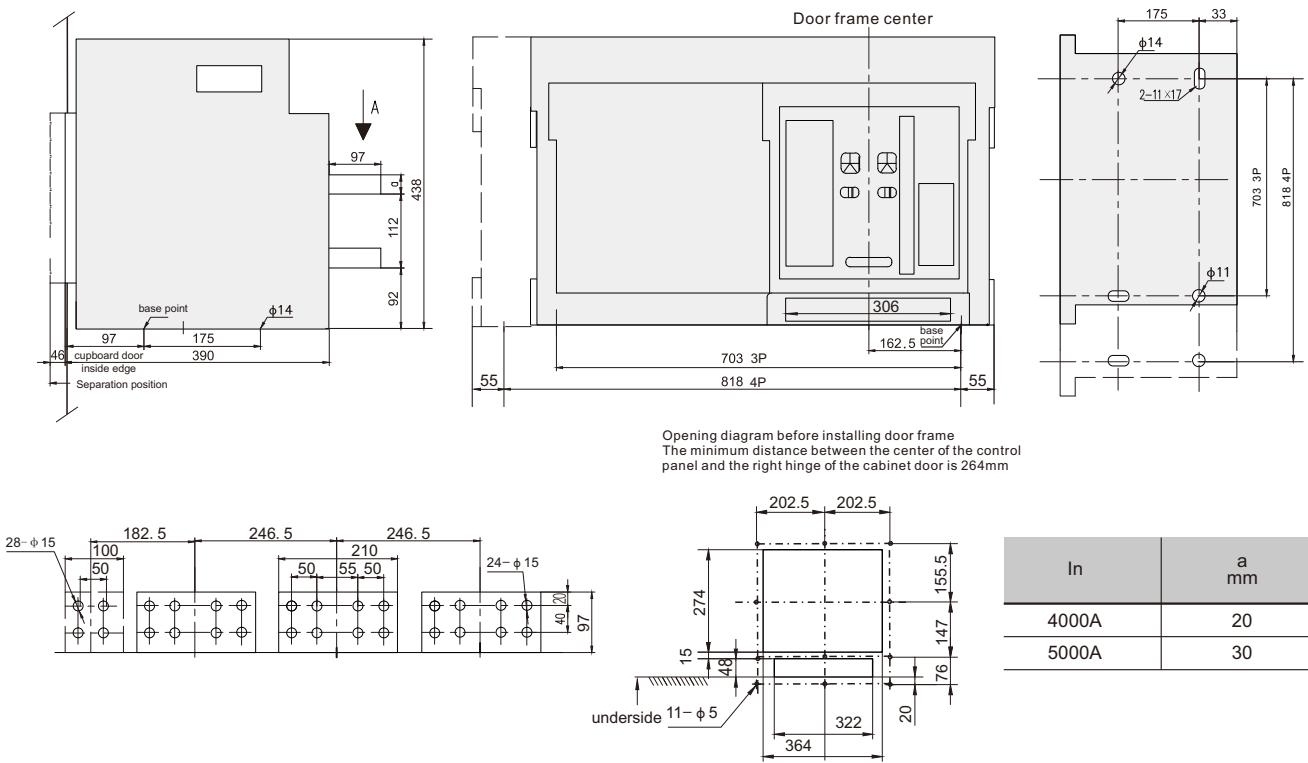
Intelligent Universal Circuit Breaker

□ 6300A/3 draw-out mounting dimensions with door frame openings

Nuit: mm

Opening diagram before installing door frame
The minimum distance between the center of the control panel
and the righ thinge of the cabinet door is 264mm

In	a mm
6300A	30
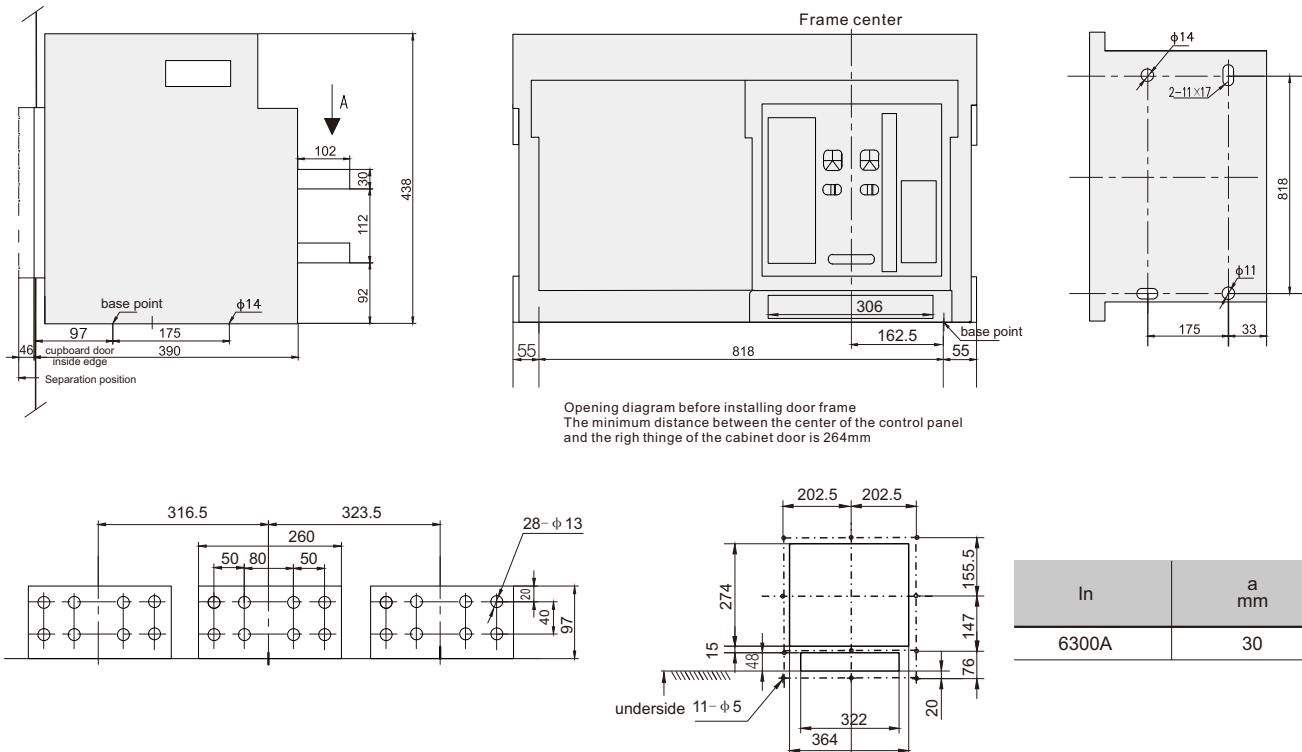
□ Specifications and quantity of user connection copperbar

Rated current	External copper bar specifications	Number of each pole	Rated current	External copper bar specifications	Number of each pole
630A	40×5	2	2900A	100×10	3
800A	50×5	2	3200A	120×10	3
1000A	60×5	2	3600A	120×10	4
1250A	80×5	2	4000A	120×10	4
1600A	100×5	2	5000A	120×10	5
2000A	100×5	3	6300A	120×10	6
2500A	100×5	4	/	/	/

□ Drawing of door frame size and mounting hole spacing
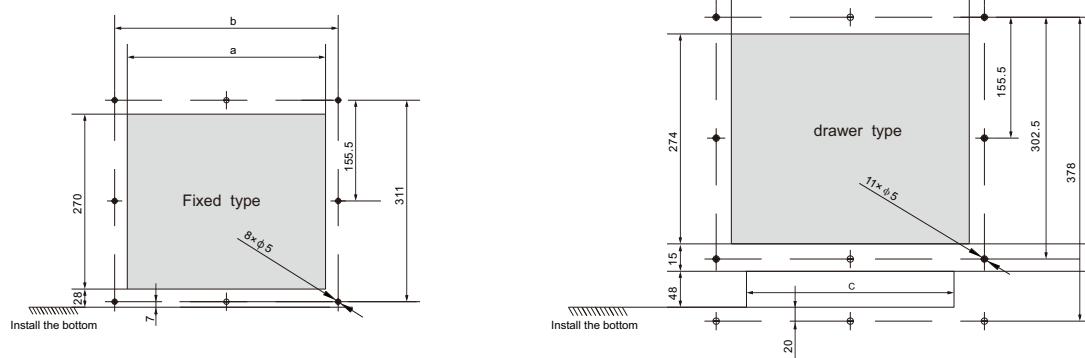
Shell frame grade Rated current Inm (A)	a(mm)	b(mm)	c(mm)
2000/3P,2000/4P	304	345	263
3200/3P,3200/4P,4000/3P	364	405	322
4000/4P,2000/7P	304	345	263
6300/3P,6300/4P	364	405	322

8．Installation, Use And Maintenance

■ Installation

☐ Check whether circuit breakers meet requirements before installation.

☐ Before installation, use a 500V megohm meter to check the insulation resistance of the circuit breaker. The insulation resistance must be greater than or equal to 10 megohm when the ambient medium temperature is 20±5°c and the relative humidity ranges from 50% to 70%. Otherwise, it should be dried and insulated. Resistance to meet the requirements before use.

☐ When installing the circuit breaker, the base should be in a horizontal position and secured with 10M screws.

☐ During installation, ensure reliable protective grounding of the circuit breaker. The grounding point is marked with obvious grounding mark.

☐ The technical performance of the circuit breaker is not changed by the incoming or incoming wires.

☐ After the circuit breaker is installed and connected according to the relevant wiring diagram, the following operation tests shall be carried out before the main circuit is energized (drawer type circuit breaker drawer seat indicates in the test position).

A. Check whether the voltages of undervoltage, shunt trip, energy releasing (closing) electromagnet and electric operating mechanism are consistent (undervoltage trip must be energized before the circuit breaker is closed).

B. Flip the handle of the mask up and down for seven times, and the rear panel will display "energy storage", accompanied by a sound of "jammed", that is, the energy storage is finished. Press the "I" button or the energy release (closing) electromagnet to energize and break the circuit. The device is reliably closed (in the case of the controller reset button reliably reset), and the handle can be stored again.

C. The motor is powered on until the mask displays "energy storage", and with a sound of "jammed", the storage is over, the motor is automatically powered off, press the "I" button or release energ (closing) electromagnet is powered on,The circuit breaker is closed reliably.

D. After the circuit breaker is closed, the trip test of the intelligent controller shall disengage the circuit breaker, whether using under voltage, shunt trip, or the "0" button on the mask.

9. Application Of Intelligent Controller

■ Controller setting

Controller long delay current setting: press the [clear light] button, then press the [set] button until the long delay status indicator lights up,showing the long delay factory current setting value, generally In, current setting,the fixed value range is (0.4~1.0)In. Press the [+] and [-] keys as required, and increase and decrease at < 2% intervals each time until the nearest current is required. Then press the [storage] key once, and the storage finger.When the indicator lights up again and again, it indicates that the long delay current setting value has been stored.

Long delay time setting: after the long delay current setting, press the [setting] button again. The status indicator of long delay time will light up and display the factory setting value of long delay time. Press the [+] button,Press a time to double, such as time is too long, you can press [-] key, each press, time to reduce double, until the most close to the time needed, then press a [storage] key, storage the indicator lights off again and again, indicating the end of the long delay time setting. Load monitoring, short delay, instantaneous, grounding protection action value setting and action time, the setting method is the same as above, but for should be indicated in different states. The grounding time is set at the OFF position, and the grounding alarm only does not trip, indicating the fault state; If the transient setting is set in OFF position, it indicates that the protection is cancelled and the controller, in the process of setting, once there is a fault signal, it will automatically block the function and jump into the fault processing state.

Each protection parameter of the controller shall not be set crosswise. The protection priorities of the controller are as follows: Long delay < Short delay < Instantaneous. For reclosing, ILC2 set value is less than ILC1, controller parameter. After all the number is set, press the [light button] again, or reset the power once, so that the controller is in the running state.

■ Controller test

After setting controller parameters, users can check various protection functions of the controller according to their needs before the circuit breaker runs. The controller test has tripping/not tripping option, press [tripping] Key test, circuit breaker off, press [not trip] key test, no trip signal, circuit breaker is not broken. (Note: L type products only trip test, press the [test] button, then the controller instantaneous signal, circuit breaker off).

Overload test, press the [setting] key to the long delay state, check the overload setting value and then go to other current state, press the [+] and [-] key to adjust the current to > 1.3IR1 current, press the test key can enter the overload test state, the controller according to the inverse time law delay action, and indicate the fault type and test state. Other characteristics of the same test, after the end of the test press the [light] button,enter the normal operation state, at the same time must press the mechanical [reset] button, can close the circuit breaker.

■ Other rules for using the controller

If the controller does not press the button within 1 minute after setting and checking the status, the key is automatically cleared and enters the running state. In case of a fault, the key function is automatically blocked and the controller enters the fault handling state.

a. Set check

After the controller presses the lamp , in the case of no fault, press the setting key continuously, indicating various states and the corresponding setting current and time value circulatively. Please press the light button after checking(enter normal operation state automatically without pressing the button within 1min).

b. Check the power grid operating current and voltage

After the controller presses the clear lamp , in the case of no fault, continuously select select 1 (select) key, cycling indicates the operating current value of each phase and grounding current value, normal display of the maximum phase current, continuous Press the " select 2 " button (H-type controller) to indicate the voltage of each line cyclically and display the maximum line voltage normally. After the controller presses the light , press the fault check button to display the last fault state and fault current. After the test or fault trip, press the " select 1 " button to display the test or fault cycle. The current or time value of the fault. The test state is not memorized.

c. Reset

Before the circuit breaker is closed, the controller light button must be pressed first to make the controller enter the normal operation state, and then press the mechanical reset button to close the circuit breaker. The root user according to Table 4, Table 5 and Table 6, there are specific requirements for the characteristics of the products, which can be explained at the time of ordering and set according to the ordering requirements at the factory.

☐ There are no instructions when users order. The controller is M type and the factory setting is as follows:

A. Long delay Ir1 is set at 1.0in, 1.5IR1 action time is set at 15s.

B. The short-delay Ir2 is set at a value slightly greater than 8Ir1, and the timing limit is 0.4s($In=4000A$ and above, Ir2=5In).

C. Instantaneous Ir3 is set at 12 In($In=4000A$ and above, Ir3=8In).

D. The ground fault Ir4 is set to 0.4 In., and the operation time is set to 0.2s.

☐ Users need to change the factory setting during use. After fully understanding the product, users are allowed to set it by themselves through the controller according to Table 4.
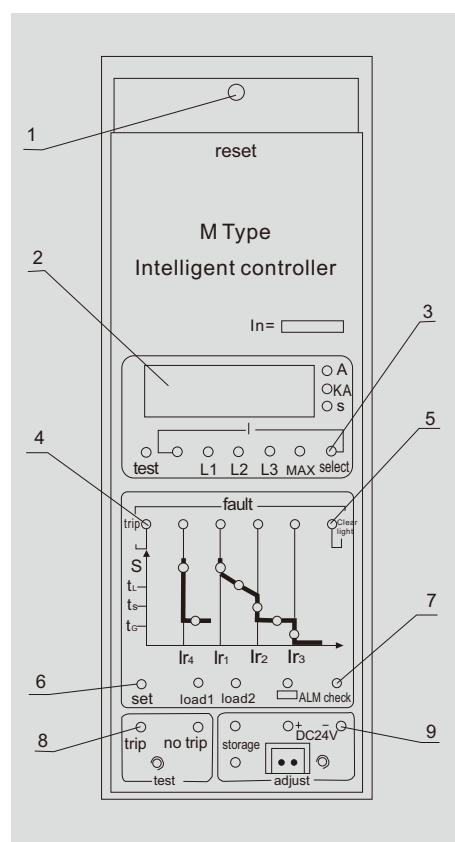
■ M or H controller

1. Reset button, if you want to close again after the circuit breaker fails or the test trip, you need to press the reset button before it can be closed againSecondary close circuit breaker.

2. Current (voltage), time display, can display current (voltage) or time value.

3. Select the key, the normal operation state can display the current (voltage) value, fault state or fault check state can be.The ring displays fault current or time values.

4. LED light indicator, can indicate various states and categories.

5. Clear lamp button, controller setting, must press this button before the circuit breaker is closed after the test failure, so that the tripping device is in normal state running status.

6. Set key, check or set various protection characteristics current or time. Press this key to indicate each state circularly.

7. Fault check button, after the controller lights off , press this button to display and indicate the state of the last fault and fault current or the time value. Fault current or time is cyclically checked by pressing the select key.

8. Trip and non-trip keys are used for test functions.

9. Storage , + , - keys, setting current or time.

Ir4- Setting of grounding protection current.

Ir1- Long delay current setting.

Ir2- Short delay current setting.

Ir3- Instantaneous current setting value.

TG - Setting of grounding protection time.

TL - Setting value of long delay time.

Ts - Short delay time setting value.
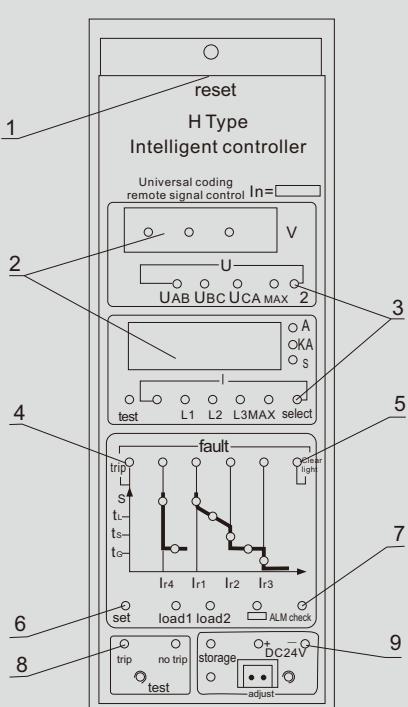
■ L controller

1. Reset button

After the circuit breaker fails or the test trip, press this button to close the circuit breaker again.

2. Load display

Display fault long delay current

3. Long delay, short delay, delay, grounding protection current setting rotation girl, according to the calibration value of the rotation girl to set the protection in the current.

4. Fault indicator

Indicating fault type

5. Long delay overload protection time setting button

Flip the switch position to adjust the time.

6. Setting key for short delay protection time

Flip the switch position to adjust the time.

7. Earthing fault protection time setting button

Flip the switch position to adjust the time.

8. Clear light button

You must press this button after controller setting, test and failure to make the controller enter the normal operation state.

9. Fault check button

Press this button to indicate the cause of fault trip after circuit breaker failure. It still has the function of failure memory after power failure.

10. The test button

This key checks whether the controller and circuit breaker are in good condition.
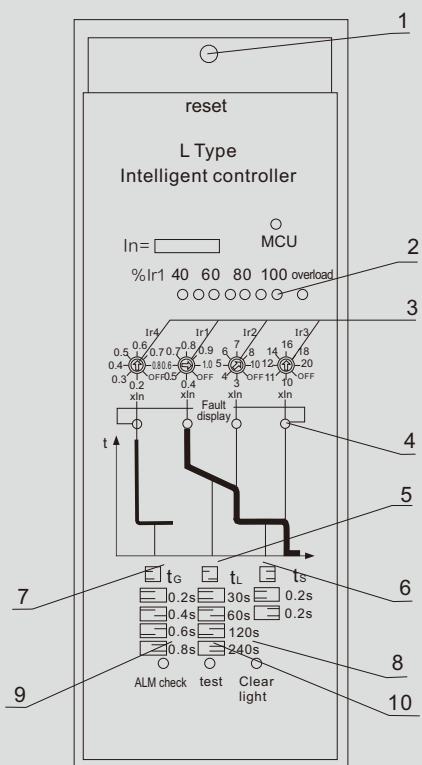
■ L-type setting method

1. Long delay setting

A. Rotate Ir1 switch setting current from (0.4~1)In;

B. Set the tL key for 30s, 60s, 120s, and 240s;

C. If Ir1 switches to OFF, the function is disabled.

2. Short delay setting

A. Rotate Ir2 switch setting current from (3~10)In.

B. Setting time of TS key is 0.2s and 0.4s;

C. If the Ir2 switch is rotated to OFF, the function is disabled.

3. Instantaneous setting

A. Turn Ir3 switch to set current from (3-10)In or (10-20)In or (7-14)In;

B. Rotate Ir3 to OFF to exit the function.

4. Set grounding fault protection

A. Rotate Ir4 switch setting current from (0.2 to 0.8)In;

B. Setting time of tG key is 0.2s, 0.4s, 0.6s, 0.8s;

C. If the Ir4 switch is rotated to OFF, the function is disabled.

5. The controller enters the running state

After adjusting all controller parameters, press the light button.

Intelligent Universal Circuit Breaker

■ Panel diagram of 3M/3H intelligent controller

复位

KST45-3H
智能型控制器

In = 2000A — LCD

Mechanical reset button

Protection area red light

复位 — Fault reset button
故障/报警 — Fault or alarm red light
正常 — Communication green light
通讯 — Working normally green light

Operation parameter button — Information query button
System setting button — Protection setting button
Button up — Confirm button
Button down — Exit button
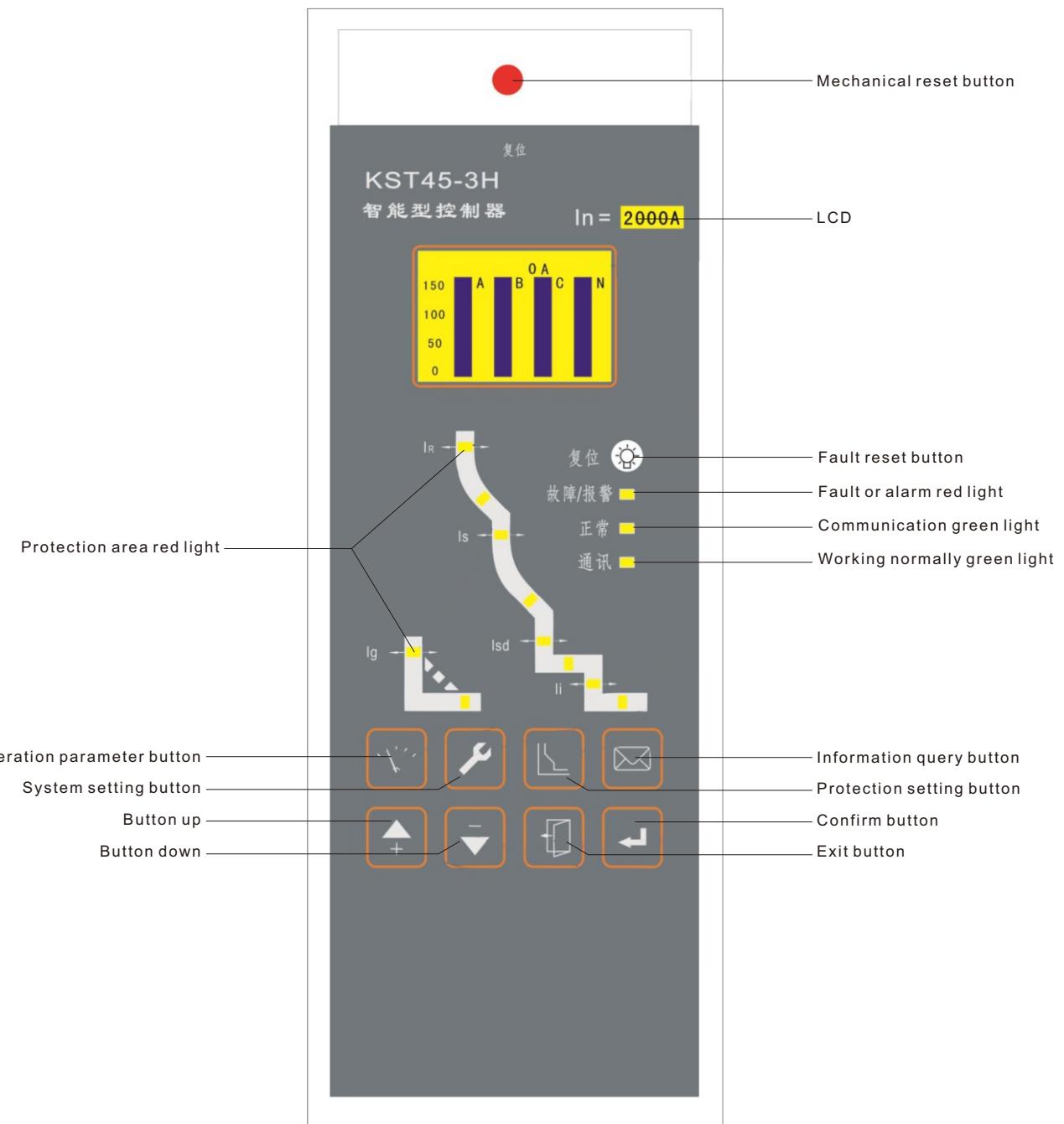
Intelligent Universal Circuit Breaker

■ Instructions

☐ LCD display

☐ Fault and alarm reset button

☐ Fault/alarm "LED:

   When working normally, the LED is not lit; Fault trip, red LED will flash quickly; The red LED is always bright when the alarm occurs.

☐ "Normal" LED As long as the KST45-3 is powered on and working properly, the green LED always flashes.

☐ The communication status is as follows:

   Modbus: Off when there is no communication, and blinking when there is communication

☐ Curve LED:

   Hidden inside the curve is a red LED indicator light. When the fault trip, the corresponding LED light flashes to indicate the fault type;

   When setting protection parameters, the LED light indicates the current setting item

☐ Reset button:

   Fault trip or test trip when the button pops up, not pressed, the circuit breaker can not close; When the button is pressed, the fault

   indicator is reset at the same time.

■ Skeyboard

☐ Measurement -- Function key 1, switch to the measurement default subject menu (" Left "button in the password input interface)

☐ Settings -- Function key 2, switch to the theme menu of parameter Settings (" Right "button in the password input interface)

☐ Protection -- Function key 3. Switch to the theme menu of protection Settings

☐ Info -- Function key 4 to switch to the History and Maintenance topics menu

☐ Up - Moves menu contents up at the current level, or changes selected parameters up

☐ Down - Moves menu contents down at the current level, or changes selected parameters down

☐ Exit -- Exit the current level to enter the upper menu, or deselect the current parameter

   Select -- Go to the next-level menu of the current item, or select the current parameter to save the changes

☐ Test port -- A 16-pin test port at the bottom of the front panel can be inserted into a portable power box or test unit.

■ Shell scripts
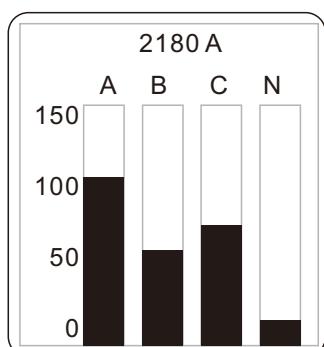
The default screen is displayed when the controller is powered on

Press the key or corresponding theme key under each theme menu to return to the default interface

If there is no key operation within 5 minutes, the box cursor automatically indicates the current maximum phase

If no key operation is performed within 30 minutes, the default screen is automatically displayed

■ Measurement menu

KST45-3H   ↓

Current   I   _
Voltage   U
Frequency   F

KST45-3H   ↑

Electricity E   _
Power   P
Harmonic   H
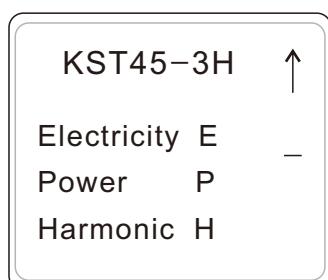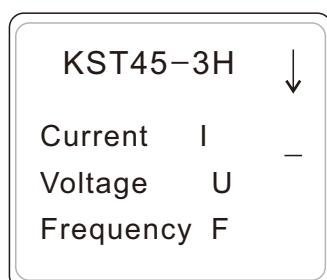
Press or to return to the default screen

In other non - fault interface, press to jump to the

measurement menu

Intelligent Universal Circuit Breaker

■ Menu for setting system parameters 🔧

```
KST45-3H      ↓

Clock Setup
              —
Measurement
scale setup

Test & Lock
```

```
KST45-3H      ↑

Communication
Seyup         —

I/O setup
```
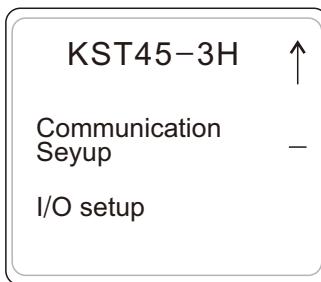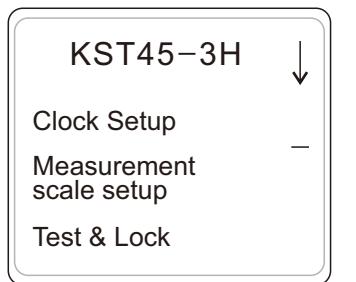
Press 🔧 or 🔲 to return to the default screen
In other non-fault interface, press 🔧 to jump to system
parameter setting menu

■ Protect parameter setting menu ▣

```
KST45-3H      ↓

Current protection
                   —
Load monitoring

Voltage protection
```

```
KST45-3H      ↑

Other protection
                   —
```
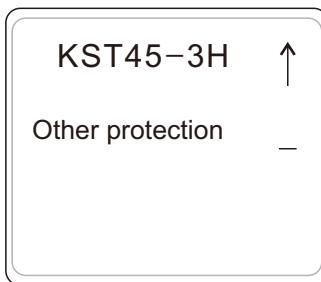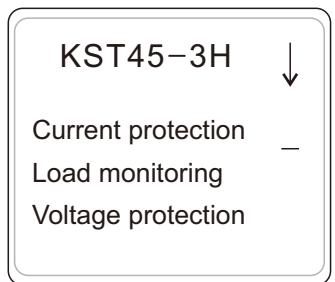
Press ▣ or 🔲 to return to the default screen
In other non-fault interface, press ▣ to jump to the
protection parameter setting menu

■ History and maintenance menu ✉

```
KST45-3H      ↓

Current alarm
              —
Action Per Minute

Contact wear
```

```
KST45-3H      ↑

Variant record
              —
Trip record

Alarm record
```
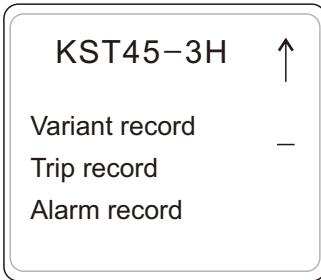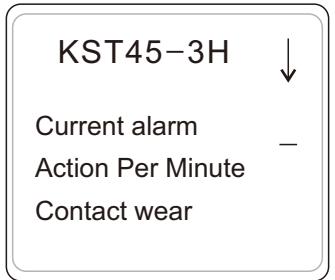
Press ✉ or 🔲 to return to the default screen
On other non-fault screens, press ✉ to go to the history
and Maintenance menus

■ Sub-menu operation example:Over load long delay protection setting

```
KST45-3H          ↓
Ir
=1000A=40.0%In    —
Curve types
=SI
```

```
KST45-3H          ↓
Ir
 − >1200A=48.0%In  —
Curve types
=SI
```

```
KST45-3H          ↓
Ir
=1200A=48.0%In    —
Curve types
=SI
```
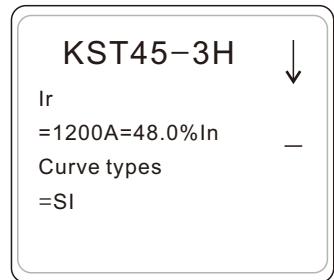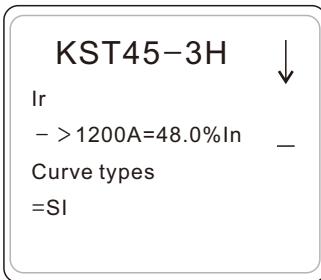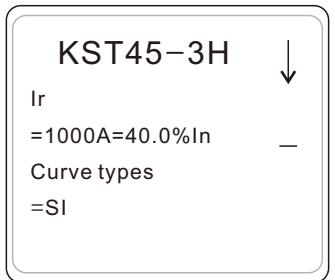
⬆ ⬇ Next ↵   ⬆ ⬇ Adjust the setting value   ↵ Save the setting value

Intelligent Universal Circuit Breaker

10. Regulare Failure And Failure Elimination

No.	Fault phenomenon	Reason	Elimination methods
1	The circuit breaker cannot be closed	☐ Undervoltage tripper has no power supply voltage or is not connected. ☐ After the intelligent controller is activated, the controller panel is displayed The red button on the top is not reset. ☐ Operating mechanism does not store energy. ☐ Drawer type not in "connection" or "test"location ☐ The "open position key lock" is locked	☐ Check the cables and switch on the undervoltage tripper. ☐ Press the reset button ☐ Manually or electrically enable the mechanism to store energy ☐ Shake circuit breaker body to "connected" with handle Or "test" position ☐ Use a special key to open the lock
2	Circuit breakers cannot be electrically stored	☐ The power supply of the electric operating mechanism is not connected ☐ The power supply capacity is insufficient	Check the line and switch on the power Check operating voltage greater than 85% Ue
3	Closing the electromagnet will not close the circuit breaker	☐ No power supply voltage ☐ The power supply capacity is insufficient.	☐ Check the cables and switch on the power supply ☐ Check that the operating voltage is greater than 85% Ue
4	Shunt trip cannot disengage the circuit breaker	☐ No power supply voltage ☐ The power supply capacity is insufficient	☐ Check the cables and switch on the power supply ☐ Check that the operating voltage is greater than 70% Ue
5	Fault current exceeds long delay and short delay.When, instantaneous setting value, only instantaneous action, no short delay, long delay action	Long delay, short delay, instantaneous setting value set value Unreasonable setting, set in the same current value range	According to the principle of Ir1 < Ir2 < Ir3 and consider its action norm wai, reset
6	the circuit breaker frequently trip	Overload protection trip caused by overload operation on site,the thermal memory function failed to be powered off in time due to overload Divide, and re-close.	Power off the controller once, or switch off again after 30 minutes breaker
7	drawer type circuit breaker handle can not be inserted the circuit breaker	Drawer guide rail or circuit breaker body is not fully pushed in	Push the guide rail or circuit breaker body to the bottom
8	drawer type circuit breaker body in the disconnect position cannot draw out the circuit breaker	The handle is not removed The circuit breaker is not fully in the "separate" position	Pull out handle Shake the circuit breaker completely to the "separate" position