

HYW3

Series Intelligent Universal Circuit Breaker

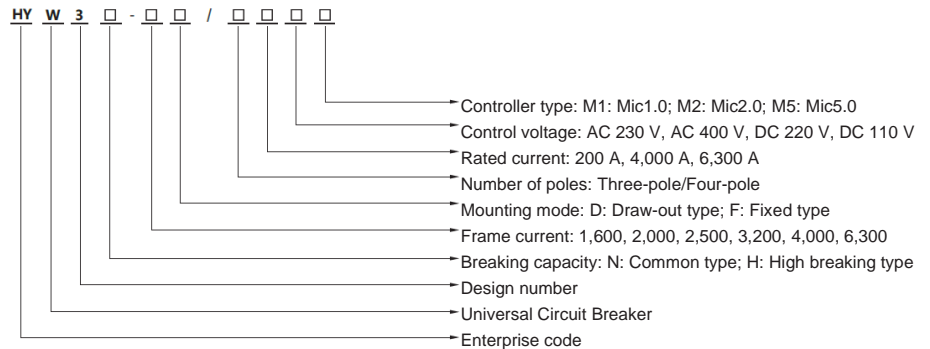


I. Overview

The HYW3 Series Intelligent Universal Circuit Breaker (hereinafter referred to as “the circuit breaker”) is suitable for distribution networks with AC 50/60 Hz, rated working voltage up to 690 V and rated current below 6,300 A. The circuit breaker is mainly used for distribution, feeding and power generation protection to protect circuits and power supplies from HHH load, undervoltage, overvoltage, imbalance of current and voltage, short circuit and grounding. The circuit breaker can also be directly used for overload, undervoltage and short-circuit protection of motors and generators. The core component of the circuit breaker adopts the intelligent controller, which has accurate selective protection, so as to avoid unnecessary power failure and improve the reliability, continuity and safety of power supply. The circuit breaker is also equipped with an open communication interface to realize telemetering, telesignaling, telecontrol and teleregulation, thus meeting the requirements of the control center and automation system.

The circuit breaker complies with GB/T 14048.2 and IEC 60947-2.

II. Model Description



III. Normal Operating Conditions

1. Ambient air temperature:
It is suitable for ambient temperature of -5°C~+40°C, -40°C~+70°C (Mic1.0 standard) and -25°C~+70°C (Mic2.0 multifunctional and Mic5.0 intelligent).
2. Altitude: The altitude of the installation location shall not exceed 2,000 meters.
3. Atmospheric conditions: The relative atmospheric humidity does not exceed 50% when the maximum temperature is +40°C, and a higher relative humidity is allowed at a lower temperature. For example, the humidity is 90% at 20°C, and special measures shall be taken for occasional condensation due to the temperature change.
4. Contamination grade: Grade 3.
5. Installation category: The installation category of the breaker’s main circuit, undervoltage release’s coil and primary coil of the power transformer is IV, and the other auxiliary circuits and control circuits are III.
6. Use category: Class B.

HYW3

Series Intelligent Universal Circuit Breaker

IV. Classification

1. According to the installation mode: Fixed type, draw-out type.
2. According to the operation mode: Electrical operation, manual operation (for overhaul and maintenance).
3. According to the number of poles: 3 poles, 4 poles.
4. According to the release type: Intelligent release, undervoltage instantaneous (or delay) release, shunt release.
5. According to the performance of the intelligent overcurrent controller: Mic5.0 (intelligent), Mic2.0 (multifunctional), Mic1.0 (standard). The functions of the three types of controllers are shown in Table 1.

Controller type	Mic1.0 standard digital display	Mic2.0 multifunctional liquid crystal display	Mic5.0 intelligent liquid crystal display with communication
Standard functions	<ul style="list-style-type: none"> > Overload long time delay protection > Overload thermal memory > Short-circuit short time delay protection > Short-circuit instantaneous protection > Grounding protection (differential type) > Neutral line protection (4P, 3P+N) > MCR and HSISC protection > Current measurement (phase pole, N pole) > LED fault status indication > Fault record and inquiry > Historical current peak record > Alarm history inquiry > Fault trip signal output > Self-diagnosis > Simulated tripping test > Contact wear equivalent (alarm)% inquiry 	<ul style="list-style-type: none"> > Overload long time delay protection > Overload thermal memory > Short-circuit short time delay protection > Short-circuit instantaneous protection > Grounding protection (differential type) > Neutral line protection (4P, 3P+N) > Current imbalance protection > MCR and HSISC protection > Load monitoring > Current measurement (phase pole, N pole) > LED fault status indication > Fault record and inquiry > Historical current peak record > Alarm history inquiry > Fault trip signal output > Self-diagnosis > Simulated tripping test > Contact wear equivalent (alarm)% inquiry > Operation times inquiry > Password setting > USB port 	<ul style="list-style-type: none"> > Overload long time delay protection > Overload thermal memory > Short-circuit short time delay protection > Short-circuit instantaneous protection > Grounding protection (differential type) > Neutral line protection (4P, 3P+N) > Current imbalance protection > MCR and HSISC protection > Load monitoring > Undervoltage, over-voltage protection > Voltage imbalance protection > Underfrequency, overfrequency protection > Phase loss protection > Current measurement (phase pole, N pole) > Phase sequence testing > Frequency measurement > Required value measurement (power) > Power measurement (active power, reactive power, apparent power) > Power factor measurement > Electric energy measurement (active electric energy, reactive electric energy, apparent electric energy) > Harmonic measurement > Heat capacity measurement > LED fault status indication > Fault record and inquiry > Historical current peak record > Alarm history inquiry > Fault trip signal output > Self-diagnosis > Simulated tripping test > Contact wear equivalent (alarm)% inquiry > Operation times inquiry > Clock > I/O setting > Password setting > USB port > Communication (MODBUS-RTU)
Optional functions	<ul style="list-style-type: none"> > Overload early warning > Grounding warning > Remote reset of controller > External transformer > Special for wind power and photovoltaics > Overtemperature environment (-40°C→+70°C) > Wifi connection > Leakage protection (equipped with special transformer, without grounding protection) 		<ul style="list-style-type: none"> > Overload early warning > Grounding warning > Over-temperature protection and alarm > Zone selective interlocking > Residual current protection > Voltage (phase voltage, line voltage, voltage imbalance rate) > Remote reset of controller > Automatic reclosing (photovoltaics only) > Wireless remote control (mobile phone control) > Wifi connection > External transformer > Special for wind power and photovoltaics > Extreme temperature (-40°C→+70°C) > Leakage protection (equipped with special transformer, without grounding protection)

HYW3

Series Intelligent Universal Circuit Breaker

		<ul style="list-style-type: none"> > Overload early warning > Grounding warning > Over-temperature protection and alarm > Zone selective interlocking > Residual current protection > Voltage (phase voltage, line voltage, voltage imbalance rate) > Remote reset of controller > Automatic reclosing (photovoltaics only) > External transformer > Special for wind power and photovoltaics > Extreme temperature (-40°C—+70°C) > Undervoltage, over-voltage protection > Voltage imbalance protection > Phase sequence protection > Underfrequency, overfrequency protection > Demand value protection (current) > Reverse power protection > Phase loss protection > Wifi connection 	<ul style="list-style-type: none"> > Leakage protection (equipped with special transformer, without grounding protection)
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Table 1

HYW3

Series Intelligent Universal Circuit Breaker

V. Technical Data and Performance

1. Basic parameters of the circuit breaker

Type and frame current Inm	HYW3-1600		HYW3-2000		HYW3-2500		HYW3-3200		HYW3-4000		HYW3-6300		
	N	H	N	H	N	H	N	H	N	H	N	H	
Rated current In (A)	200, 400, 630 800, 1000, 1250		630, 800, 1000 1250, 1600, 2000		2000, 2500		2000, 2500 3200		3200, 4000		4000, 5000 6300		
Neutral rated current In (A)	100%In		100%In		100%In		100%In		100%In		50%In		
Rated working voltage Ue (V)	AC400/690												
Frequency	50/60Hz												
Number of poles	3P/4P												
Rated impulse withstand voltage Uimp (kV)	AC12												
Rated insulation voltage Ui (V)	AC1000												
Power frequency withstand voltage (V)	AC3500												
Rated ultimate short-circuit breaking capacity Icu (kA)	AC400V	50	65	85	85	85	85	85	100	85	100	120	125
	AC690V	35	42	50	65	65	65	65	70	65	70	85	100
Rated operating short-circuit breaking capacity Ics (kA)	AC400V	42	50	65	85	85	85	70	85	70	85	100	125
	AC690V	35	42	50	65	65	65	65	70	65	70	85	100
Rated short-time withstand capacity Icw/1 s (kA)	AC400V	42	50	65	85	85	85	70	85	70	85	100	125
	AC690V	35	42	50	65	65	65	65	70	65	70	85	100
Rated short-circuit making capacity (kA)	AC400V	110	143	176	187	187	187	187	220	187	220	264	275
	AC690V	73.5	88.2	110	143	143	143	143	154	143	154	187	220
Use category	B												
Breaking time	≤30 ms												
Closing time	=70ms												
Electrical life (times) ≤ 2,500 1 time/3 min > 2,500 1 time/6 min	400V	10000		10000		10000		6000		6000		5000	
	690V	6000		6000		6000		3500		3500		2000	
Mechanical life (times) ≤ 2,500 1 time/3 min > 2,500 1 time/6 min	Without maintenance	20000		20000		20000		15000		15000		10000	
	With maintenance	30000		30000		30000		25000		25000		20000	
Mechanical life of drawer seat (times) 1 time/2 min	1000		1000		1000		600		600		300		
Incoming mode	Top-in or bottom-in												
Flashover distance (mm)	0												
Installation mode	Fixed or drawer												
Wiring mode	Horizontal or vertical wiring						Horizontal wiring						

HYW3

Series Intelligent Universal Circuit Breaker

2. Protection characteristics and functions of the intelligent overcurrent controller

Figure 1 Standard inverse time limit

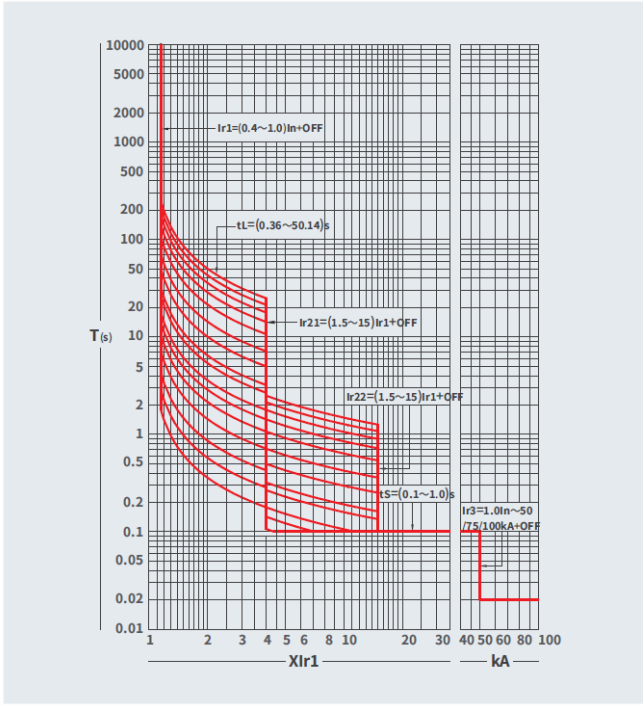


Figure 2 Grounding fault protection

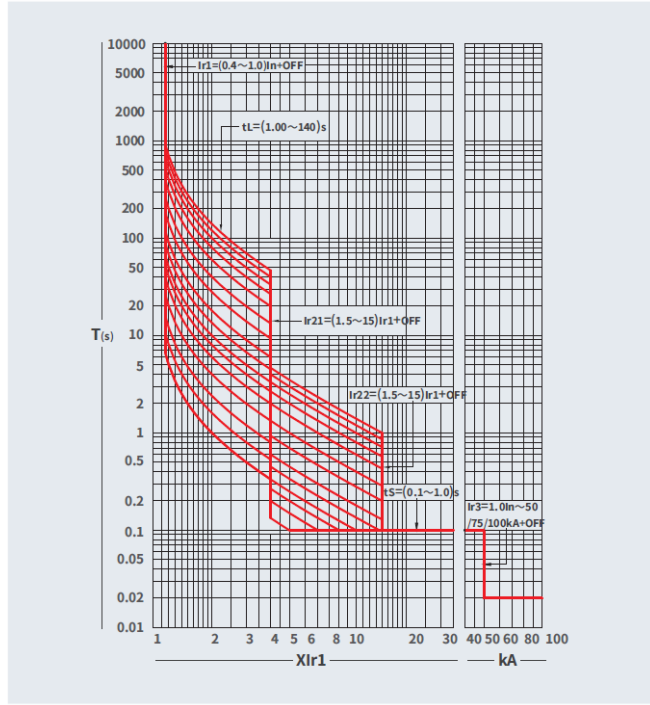


Figure 3 Express inverse time limit (general protection)

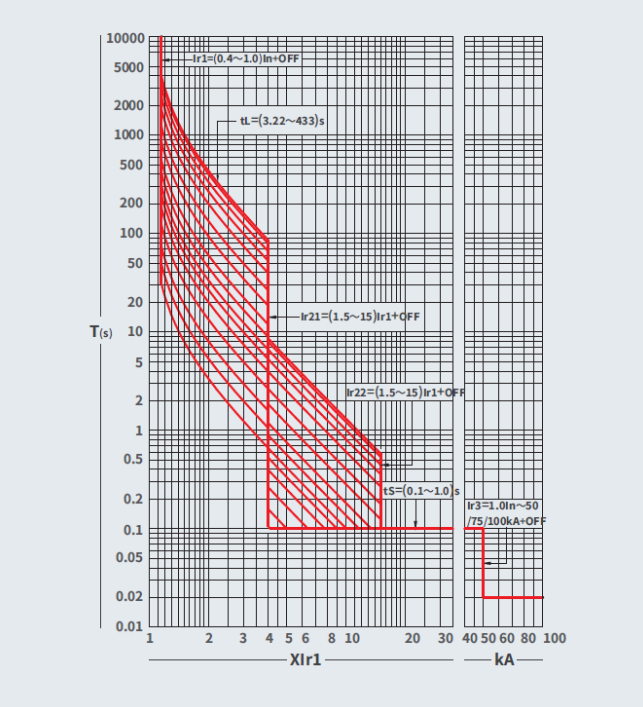
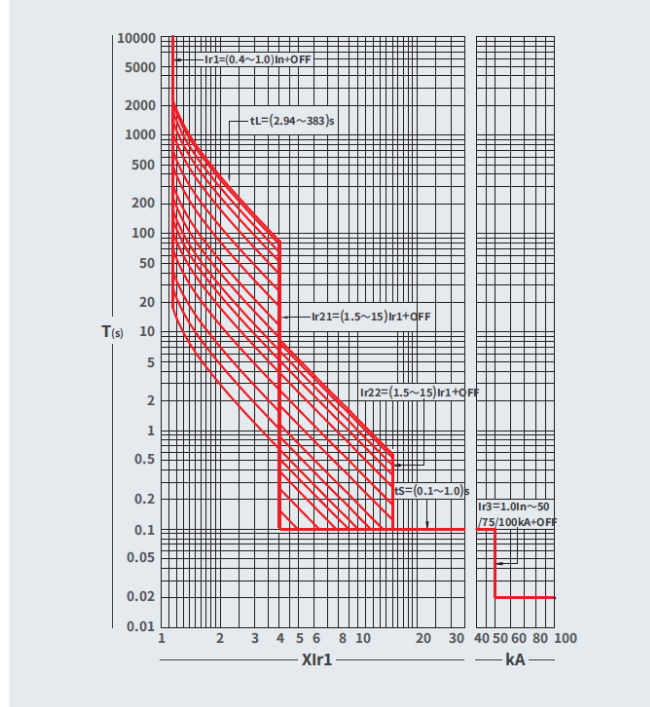


Figure 4 Express inverse time limit (motor protection)



HYW3

Series Intelligent Universal Circuit Breaker

Figure 5 High-voltage fuse compatibility

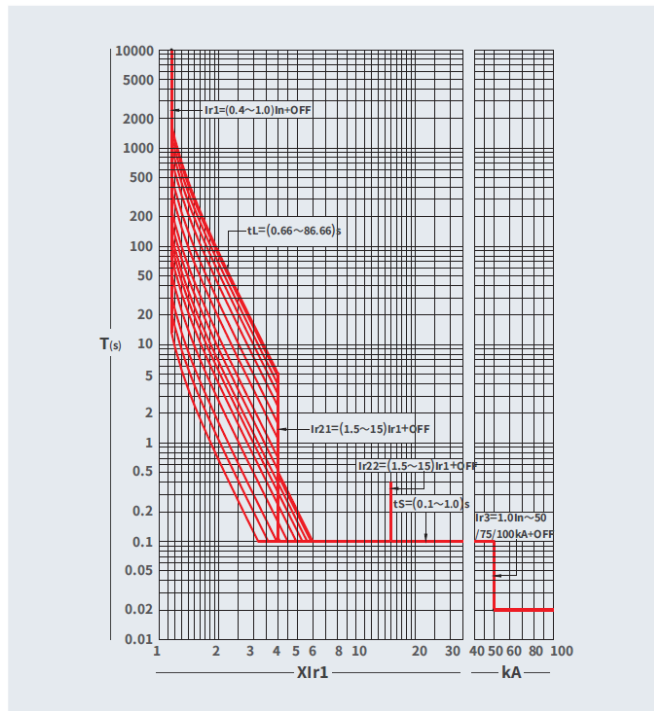


Figure 6 Express inverse time limit 2 (general purpose)

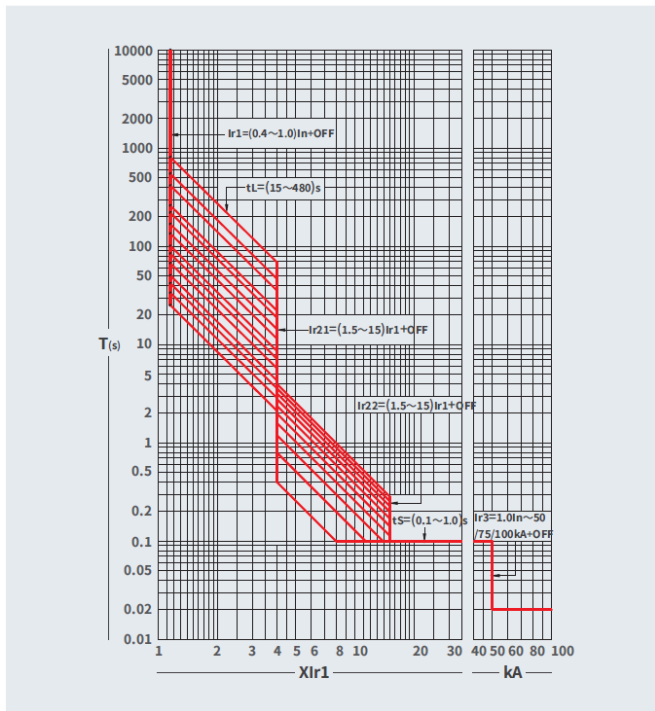


Figure 7 Asymmetric grounding protection

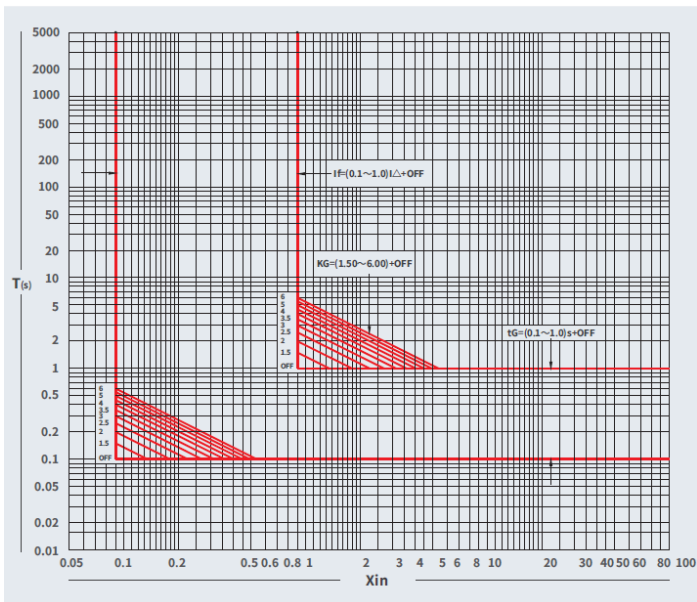
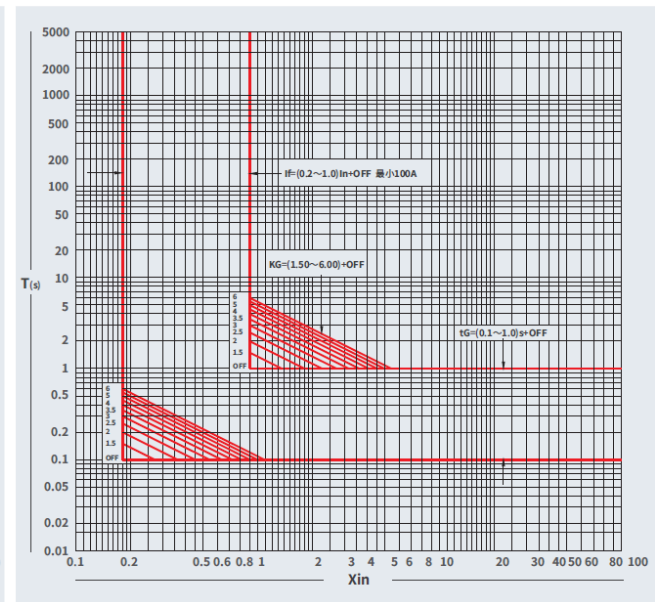


Figure 8 Leakage protection (external leakage transformer)



3.1 Current setting value I_r and tolerance of the release

Table 4

Long time delay		Short time delay		Instantaneous		Grounding fault	
I_r	Tolerance	I_{sd}	Tolerance	I_i	Tolerance	I_g	Tolerance
$(0.4\sim 1)I_n+OFF$	$\pm 10\%$	$(1.5\sim 15)I_r+OFF$	$\pm 10\%$	$(1.0\sim 20)I_r+OFF$	$\pm 15\%$	$(0.2\sim 1.0)I_n+OFF$	$\pm 10\%$

Note: When three sections of protection are available at the same time, the setting values cannot cross, and $I_r < I_{sd} < I_i$.

HYW3

Series Intelligent Universal Circuit Breaker

3.1.2 Function introduction

- Main protection functions (The functions of the controller have been set according to the requirements when leaving the factory. Please contact our company if resetting is required)

Overload long-delay inverse time protection, short-circuit short-delay fixed time and inverse time protection, short-circuit instantaneous protection, grounding or leakage current fixed time and inverse time protection, N-phase protection, current imbalance protection caused by disconnection, load inverse time monitoring and other protection functions.

- Measurement and operation monitoring

Real-time measurement of various power grid operating parameters, such as frequency, power factor, and active power; real-time indication of running status, such as fault status, alarm status, system self-diagnosis status, and normal running status.

- Inquiry

Running parameter inquiry, protection parameter setting value inquiry, historical fault record inquiry, self-diagnosis fault information inquiry and power grid measurement parameter inquiry.

- Parameter setting

The following protection parameters can be directly set on the controller panel: Current value and time value of overload long-delay protection, inverse time current value of short-circuit short-delay protection, fixed time current value and time value, current value of instantaneous protection, current value and time value of load monitoring, set value of N-phase protection, current value, time value and inverse time coefficient of grounding or residual current protection, imbalance rate and time value of current imbalance rate protection and harmonic influence coefficient.

The following operations can also be performed on the controller panel: System clock calibration (only after this function is selected); setting all the internal parameters of the system that can be set by the programmer (no programmer but the permission password is required).

- Programming interface

It provides the interface with the programmer to modify some specific parameters, such as function setting of output contacts, wiring mode of voltage measurement, system clock, protection characteristic curve, thermal memory function, communication address, and communication baud rate.

- Communication networking (this function is only available for Mic5.0 intelligent controllers)

The controller provides the standard RS485 interface, and can realize data transmission by Modbus or Profibus-DP or DeviceNet protocol, so as to meet the requirements of telemetering, telesignaling, telecontrol and teleregulation of different monitoring systems.

- Test

The test functions are divided into two types: Instantaneous tripping simulation test and non-tripping simulation test:

(1) Instantaneous tripping simulation test: The tripping test of instantaneous operation of the circuit breaker can be carried out, and the inherent operating time of the circuit breaker can be displayed after the operation.

(2) Non-tripping simulation test: The simulated test current is selected for the system non-tripping test. After the test is completed, the test current, the system delay operating time under the test current and the fault category of the simulated test are alternately displayed.

- Self-diagnosis

It is used to diagnose and alarm some faults of the controller itself.

- Fault clock

It is used to record the time when the fault occurred. It can record the year, month, day, hour, minute and second of the fault occurred. (Up to 8 times can be recorded)

- Historical data record (optional)

It is used to record the four-phase current, three-phase voltage, frequency, power, power factor and active power, which can be recorded every half hour for three months.

- Load monitoring protection

Load monitoring is used to control the different loads of the circuit breaker to ensure the power supply of the main load. Load monitoring can be used for pre-alarm and branch load control. The controller can be programmed to output two passive signal contacts for load monitoring.

- MCR make-break and off-limit tripping (optional)

Make-break means that when the power grid is in a fault state before the circuit breaker is closed and the current greater than the MCR set value is generated at the closing moment, the controller breaks the circuit breaker in an instantaneous way through the analog circuit. This function only works at the closing moment (within 100 ms).

Off-limit tripping means that when the circuit breaker is in normal operation, and the short-circuit current exceeds a certain value (generally the limit current of the circuit breaker), the controller breaks the circuit breaker in an instantaneous way through the analog circuit. This function is not affected by the instantaneous set value.

- Communication protocol

It contains Modbus-RTU, which can be transferred to Profibus-DP or DeviceNet through an external module.

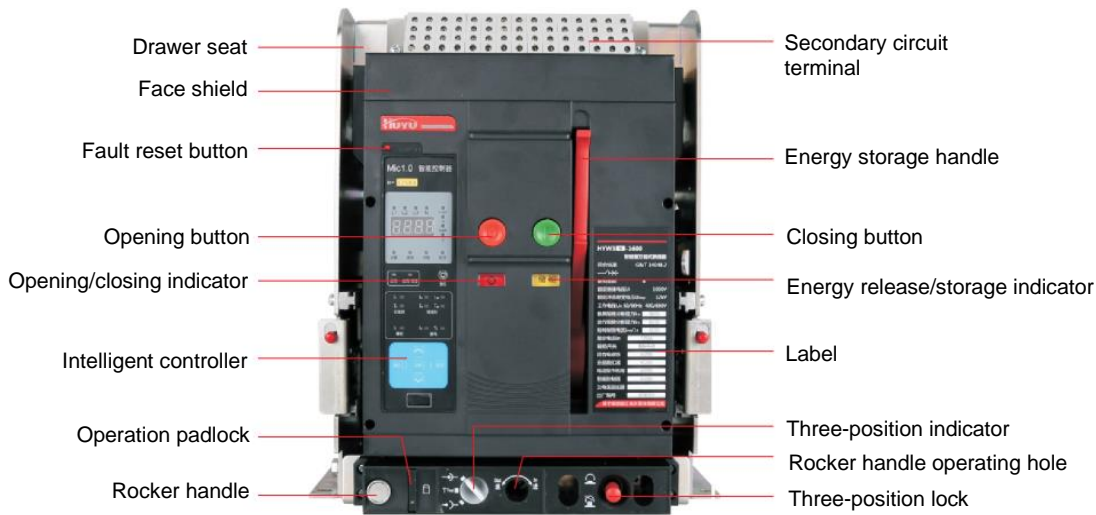
HYW3

Series Intelligent Universal Circuit Breaker

VI. Structure Overview

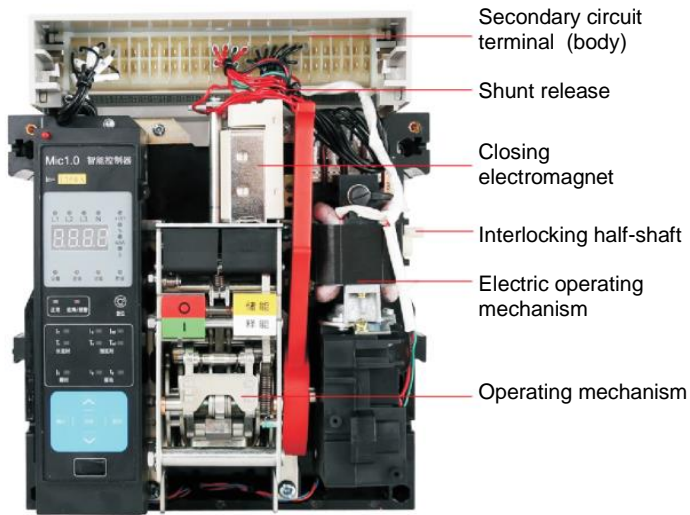
The circuit breaker is of compact structure and characterized by modularization. The contact system is enclosed between two insulation baseboards with partition structure, and the contacts of each phase are partitioned to form independent chambers. The intelligent controller, operating mechanism, manual and electric operating mechanisms are arranged in front of each other in turn to form their own independent units. If one of the units fails, the unit can be completely removed for the replacement (see Figure 6 and Figure 7).

Figure 5 Operation indication diagram of the HYW3 Series Intelligent Universal Circuit Breaker



HYW3-1600/3 Draw-out Circuit Breaker

Figure 6 Internal diagram of the HYW3 Series Intelligent Universal Circuit Breaker

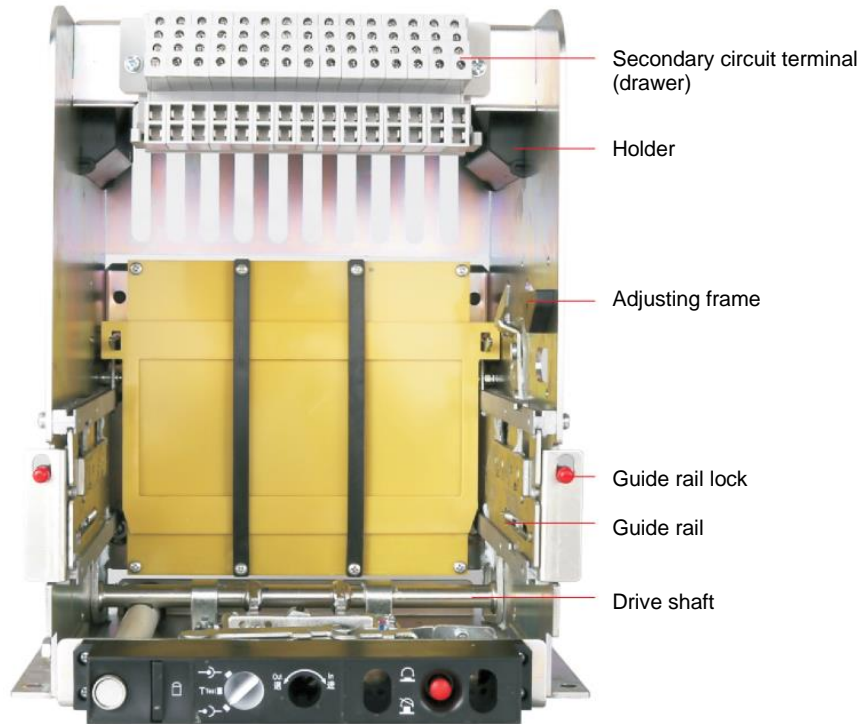


HYW3-1600/3 Body

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Figure 7 Drawer seat of the HYW3 Series Intelligent Universal Circuit Breaker



HYW3-1600/3 Drawer Seat

1: Draw-out circuit breaker

The draw-out circuit breaker consists of a circuit breaker body and a drawer. Guide rails are arranged on both sides of the drawer seat, which have movable guide plates on them, and the main frame of the circuit breaker is placed on the left and right guide plates. The drawer circuit breaker is connected to the main circuit by inserting the busbar on the breaker body into the bridge contact on the drawer seat. Through cranking the handle of the lower beam of the drawer seat, three working positions of the drawer circuit breaker can be realized (there is a position indication beside the handle).

“Connection” position: The main circuit and the secondary circuit are connected.

“Test” position: The main circuit is disconnected and separated by an insulating plate. Only when the secondary circuit is connected, the necessary operation test can be carried out.

“Disconnection” position: The main circuit and the secondary circuit are all disconnected. If the circuit breaker body needs to be removed in the “Disconnection” position, the rocker handle must be removed.

The draw-out circuit breaker has a mechanical interlocking device, which can only make the circuit breaker closed at the connection position or the test position. It cannot be closed in the middle of the connection and test positions.

2: Interlocking mechanism

The interlocking mechanism is installed on the right side plate of the circuit breaker. The flat circuit breaker is interlocked by the steel cable (Figure 8), and the stacked circuit breaker is interlocked by the connecting rod (Figure 9). When one circuit breaker is in the closing state, the other one cannot be closed. The interlocking mechanism is installed by the user.

HYW3

Series Intelligent Universal Circuit Breaker

Figure 8 Interlocking with the Flat Circuit Breaker

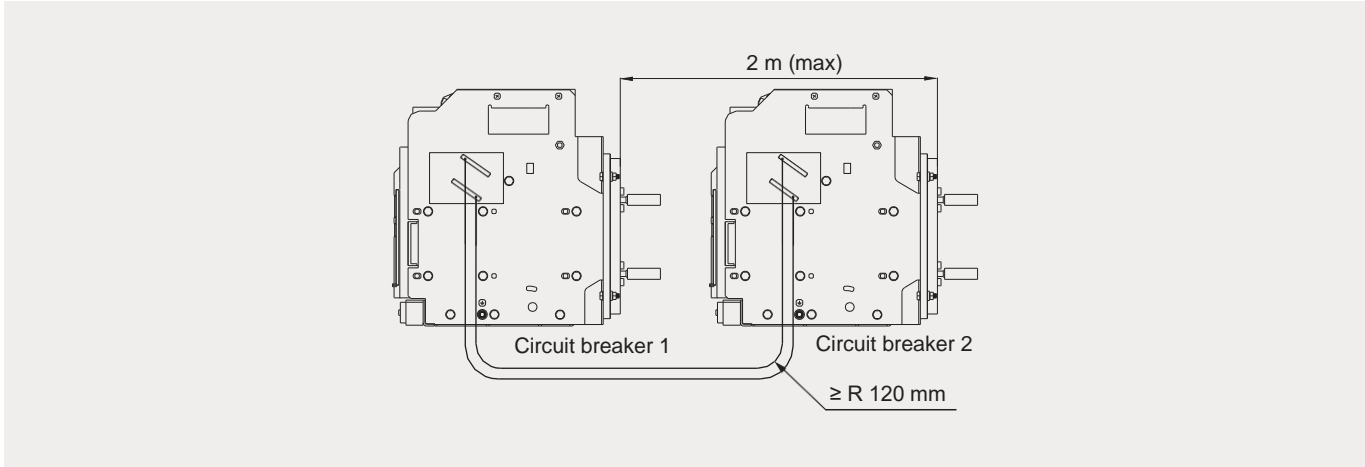
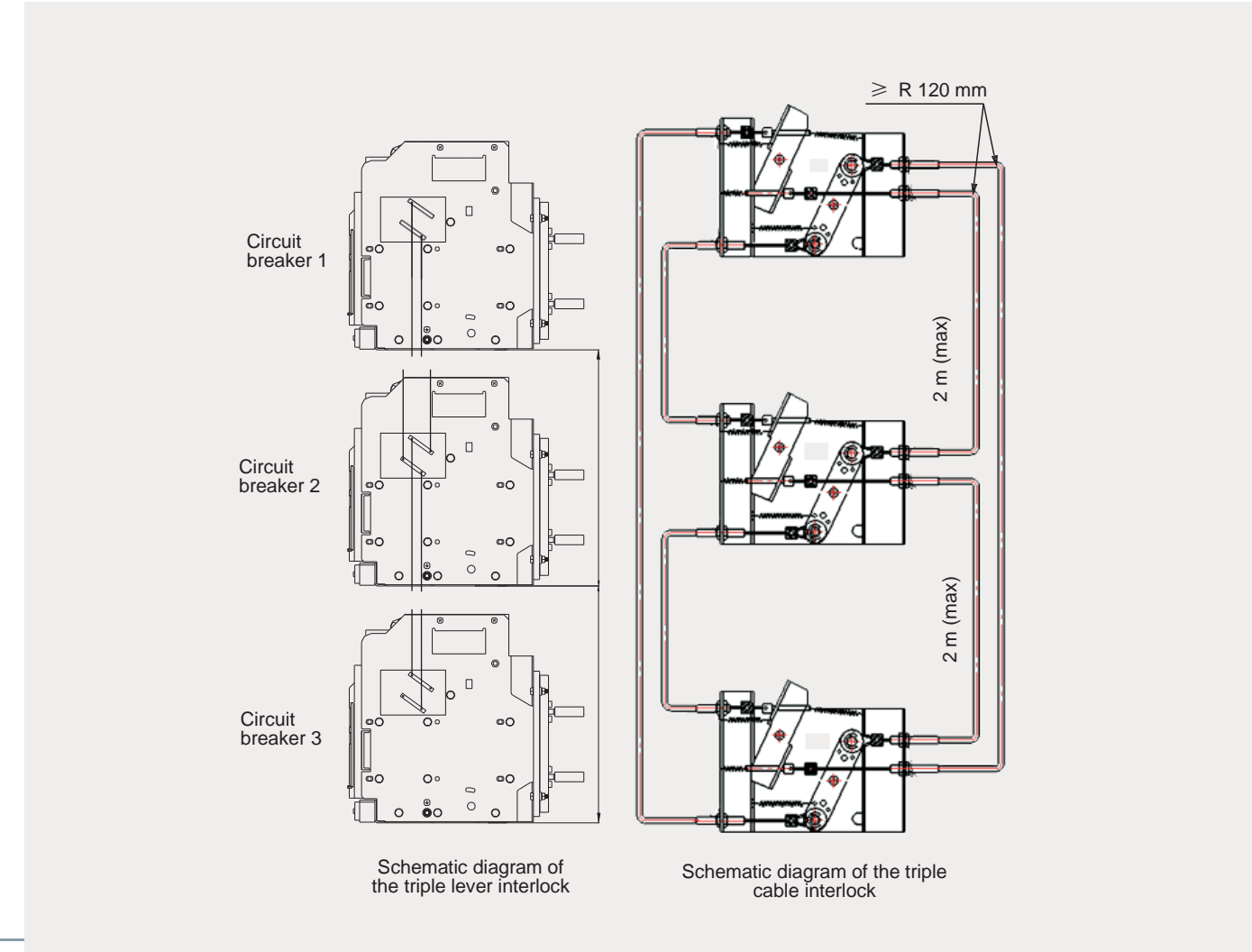


Figure 9 Connecting rod interlocking for the Stacked Circuit Breaker (Figure 9 shows three stacked circuit breakers interlocked with connecting rods. If two circuit breakers are interlocked, only the top one shall be removed)



HYW3

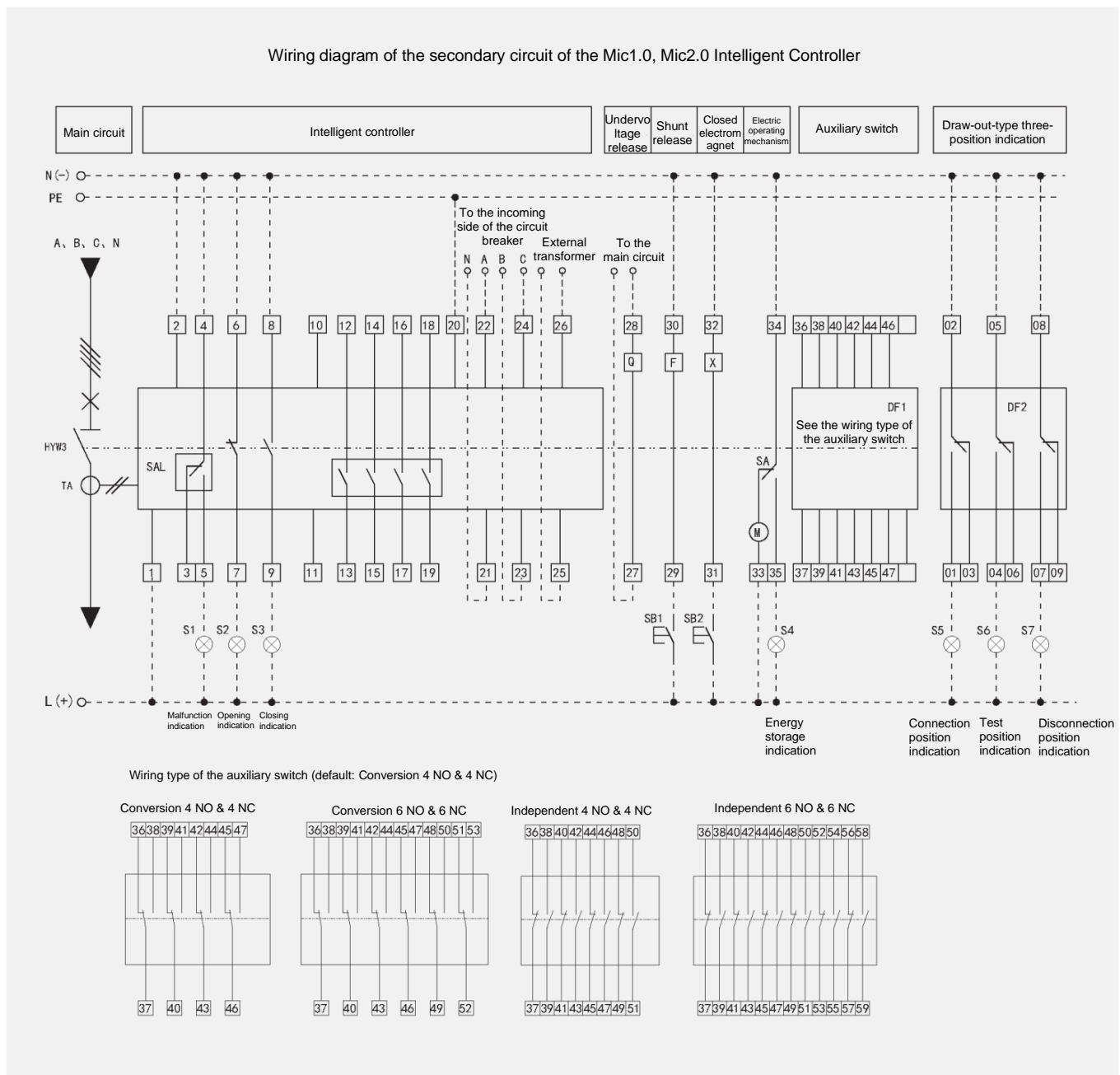
Series Intelligent Universal Circuit Breaker

VII. Wiring Diagrams

Secondary circuit wiring diagram

- 1) The circuit on the dotted line is wired by the user, which cannot be performed when the optional accessories are not customized.
- 2) The accessories such as intelligent controller, undervoltage release, shunt release, closing electromagnet and electric operating mechanism shall be connected to different power supplies respectively when the voltages are different.
- 3) The undervoltage release shall be directly connected to the incoming line of the main circuit, with the highest working voltage not exceeding its rated working voltage; when the working voltage of the main circuit exceeds its rated working voltage, a transformer is required to reduce it to its rated working voltage before it can be used.
- 4) The three-position indication function of the drawer seat is only optional for the Draw-out circuit breaker.
- 5) When the working power supply of the intelligent controller is DC 110 V or DC 24 V, the ST power supply module (optional) shall be connected first, and then the 1# and 2# intelligent controllers.

Wiring diagram of the secondary circuit of the Mic1.0, Mic2.0 Intelligent Controller



HYW3

Series Intelligent Universal Circuit Breaker

Terminal function in the wiring diagram of secondary circuit of the Mic1.0, Mic2.0 Intelligent Controller

Terminal number	Function description	Notes
1, 2	Auxiliary power input: AC 220 V, AC 380 V, DC 220 V, DC 110 V	
3, 4, 5	Fault trip auxiliary contact, contact capacity: AC 250 V, 3 A	
6, 7	Circuit breaker status auxiliary contact (normally closed), contact capacity: AC 250 V, 3 A	
8, 9	Circuit breaker status auxiliary contact (normally open), contact capacity: AC 250 V, 3 A	
20	Grounding (PE)	
21, 22, 23, 24	Voltage signal measurement: 21 connected to N, 22 connected to A, 23 connected to B, 24 connected to C	Optional functions
25, 26	External transformer input (leakage transformer, neutral transformer, ground current transformer)	Optional functions and accessories
27, 28	Undervoltage release	Optional accessories
29, 30	Shunt release	
31, 32	Closed electromagnet	
33, 34, 35	Electric operating mechanism	
36~...	DF1 auxiliary switch terminal	

Terminal function in the wiring diagram of secondary circuit of the Mic5.0 intelligent controller

Terminal number	Function description	Notes
1, 2	Auxiliary power input: AC 220 V, AC 380 V, DC 220 V, DC 110 V	
3, 4, 5	Fault trip auxiliary contact, contact capacity: AC 250 V, 3 A	
6, 7	Circuit breaker status auxiliary contact (normally closed), contact capacity: AC 250 V, 3 A	
8, 9	Circuit breaker status auxiliary contact (normally open), contact capacity: AC 250 V, 3 A	
10, 11	Communication interface output, 10 connected to A, 11 connected to B	Modbus protocol by default
12~19	Signal input/output; 12, 13: DO1; 14, 15: DO2; 16, 17: DO3; 18, 19: DO4	Set based on functional requirements
20	Grounding (PE)	
21, 22, 23, 24	Voltage signal measurement: 21 connected to N, 22 connected to A, 23 connected to B, 24 connected to C	
25, 26	External transformer input (leakage transformer, neutral transformer, ground current transformer)	Optional functions and accessories
27, 28	Undervoltage release	Optional accessories
29, 30	Shunt release	
31, 32	Closed electromagnet	
33, 34, 35	Electric operating mechanism	
36~...	DF1 auxiliary switch terminal	

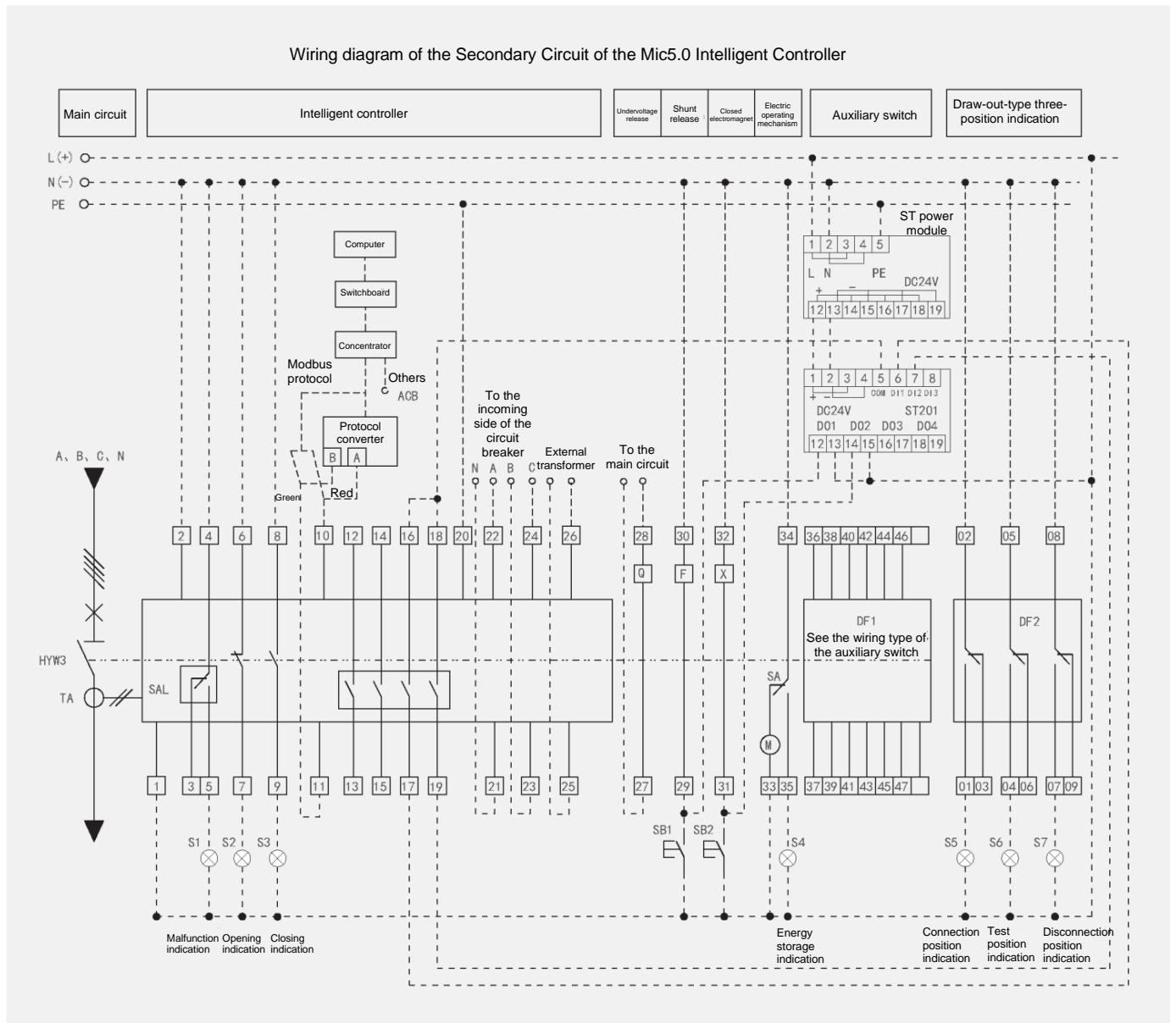
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Series Intelligent Universal Circuit Breaker

Interpretation of symbols in the wiring diagram

Symbol	Interpretation	Notes	Symbol	Interpretation	Notes
HYW3	HYW3 Series Universal Circuit Breaker		PE	Grounding wire	
S1-S7	Signal lamp	User-provided	L(+), N(-)	Control power supply (DC L is positive; N is negative)	
TA	Current transformer		A, B, C, N	Main circuit phase line	
SAL	Microswitch		DF1	Auxiliary switch	Type optional
SB1	Opening button	User-provided	DF2	Drawer-mode three-position electric indicator switch	Optional accessories
SB2	Closing button	User-provided	ST power module	Provided with DC 24 V power supply	Optional accessories
X	Closed electromagnet		ST201	Relay	Optional accessories
F	Shunt release		Protocol converter	Except Modbus protocol, other protocols need to be configured.	Optional accessories
Q	Undervoltage release	Optional accessories			
M	Electric operating mechanism				
SA	Electric operating mechanism limit switch				

Wiring diagram of the Secondary Circuit of the Mic5.0 Intelligent Controller

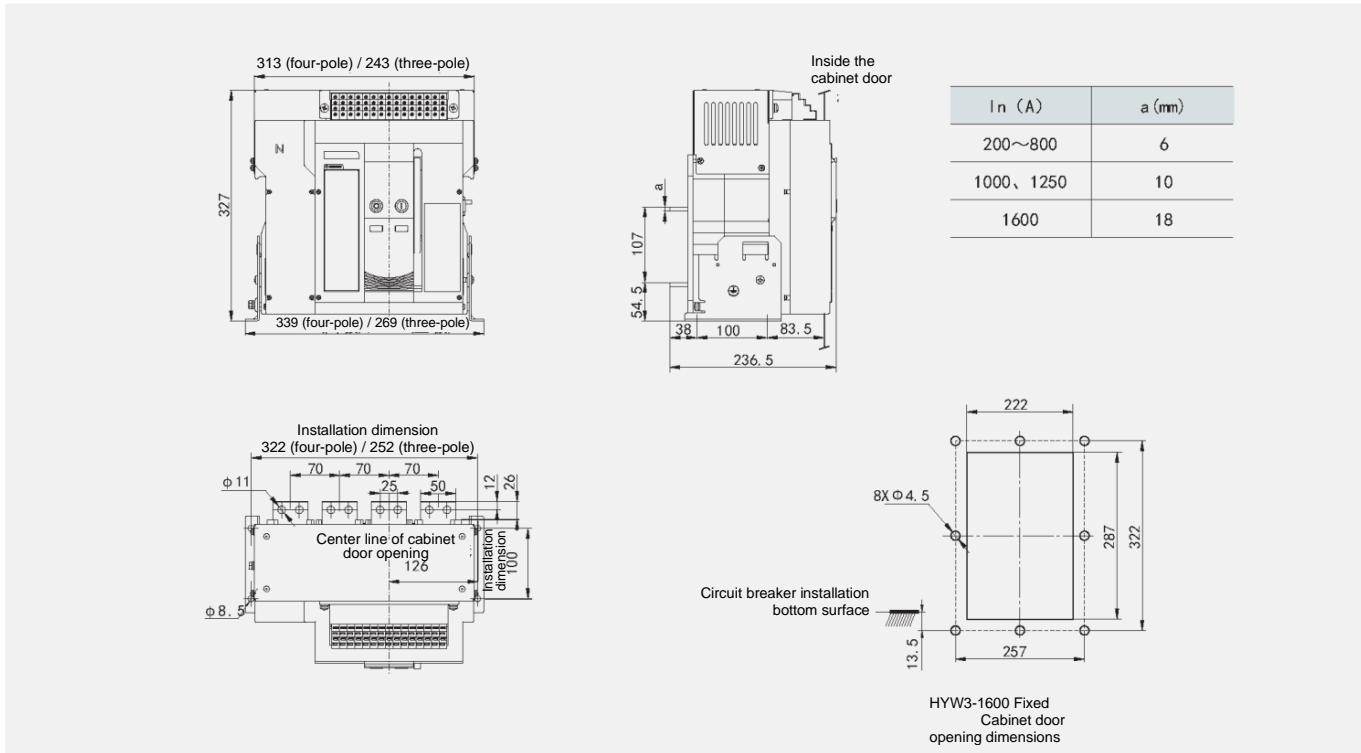


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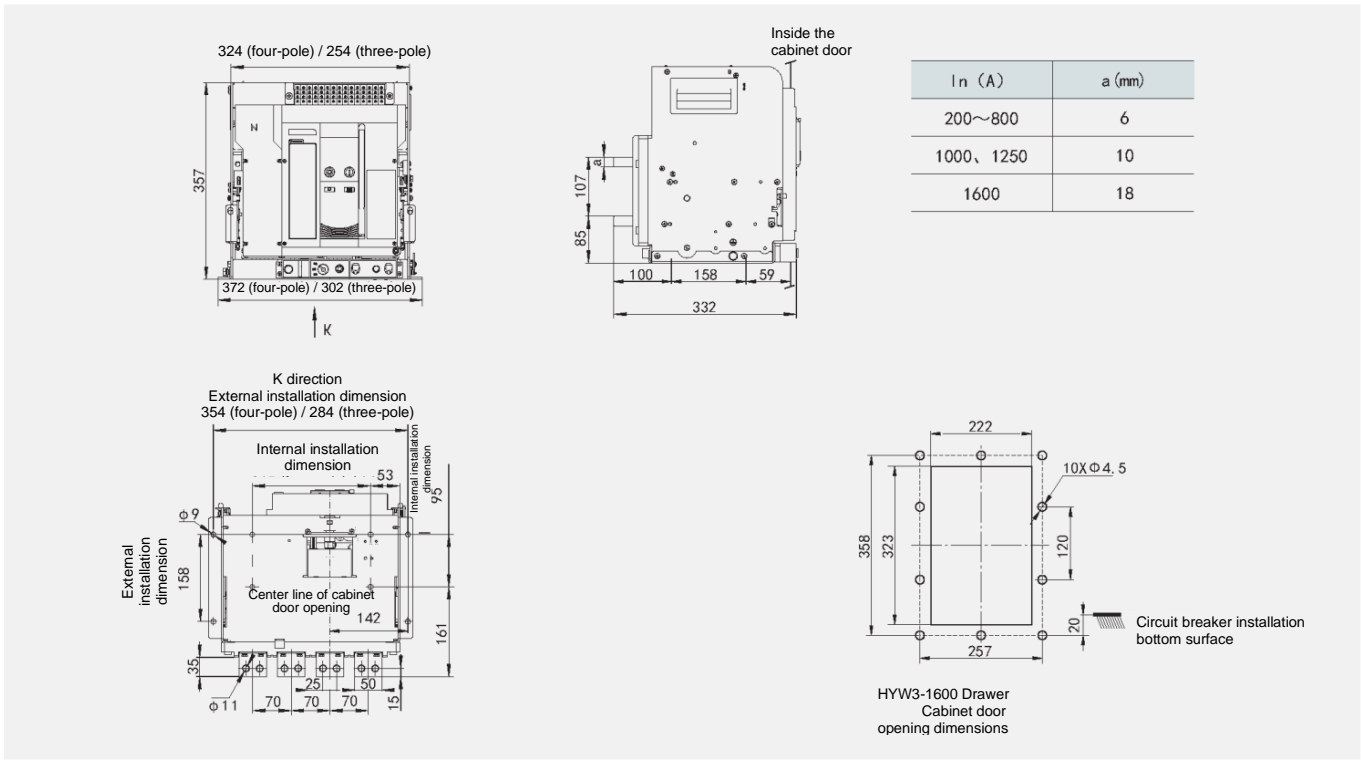
Series Intelligent Universal Circuit Breaker

VIII. Outline and Installation Dimensions

Outline and Installation Dimensions of the HYW3-1600 Fixed Circuit Breaker



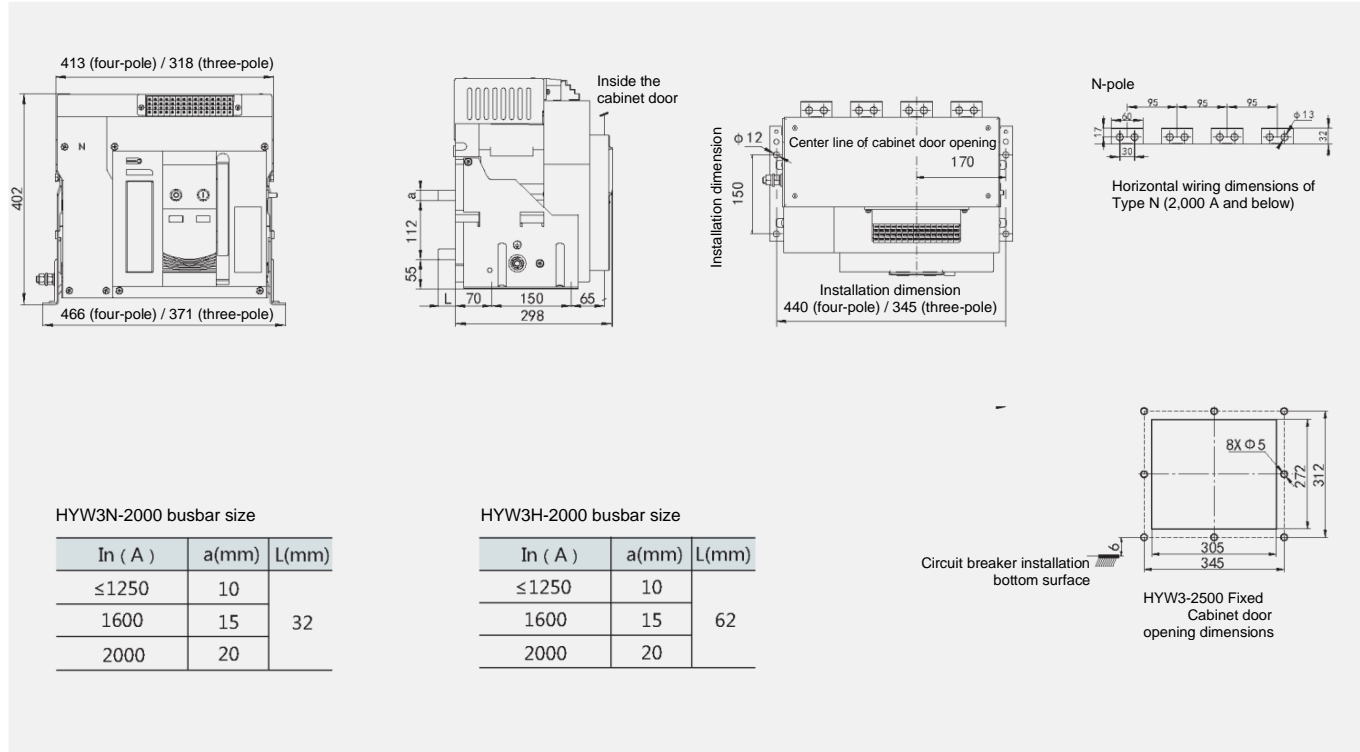
Outline and installation dimensions of the HYW3-1600 Draw-out Circuit Breaker (only the internal or external installation dimensions can be used for the fixation)



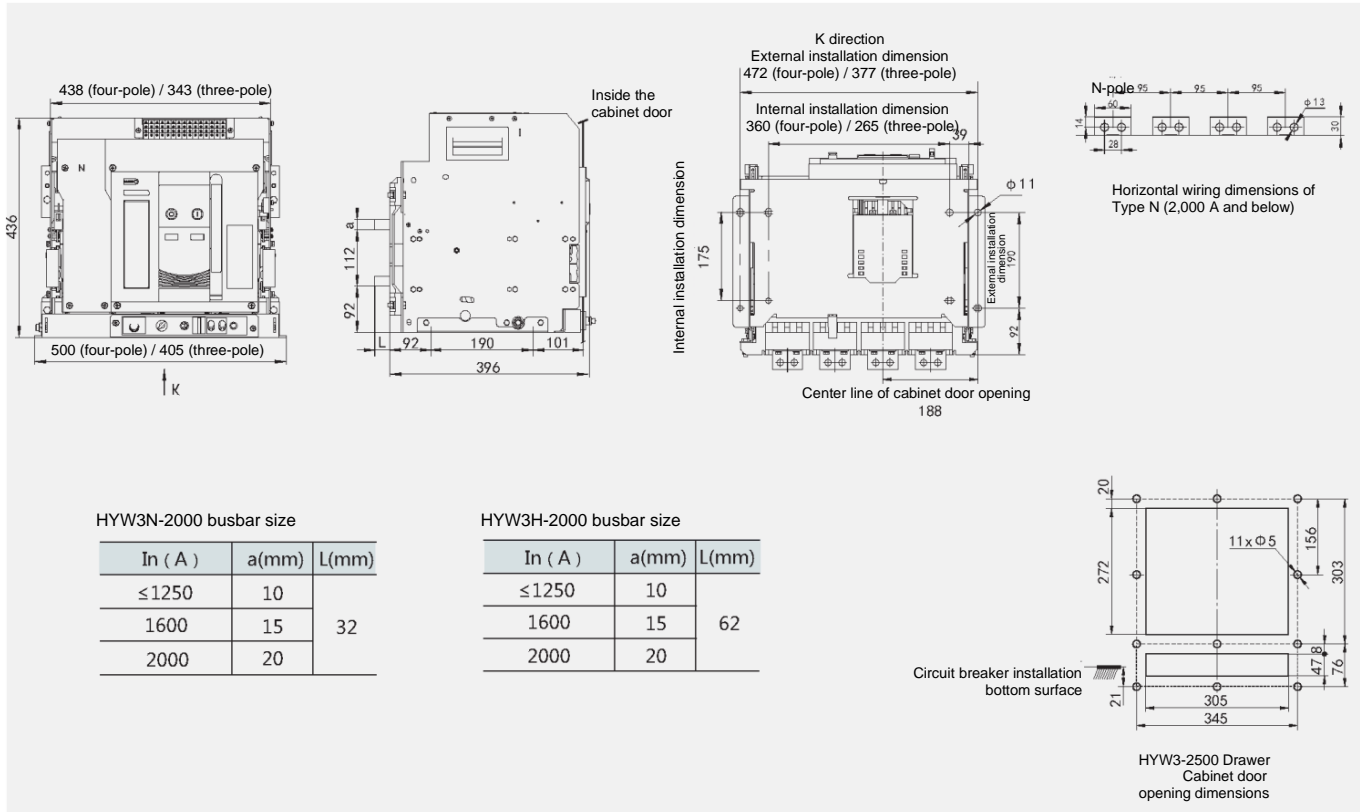
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Outline and Installation Dimensions of the HYW3-2000 Fixed Circuit Breaker



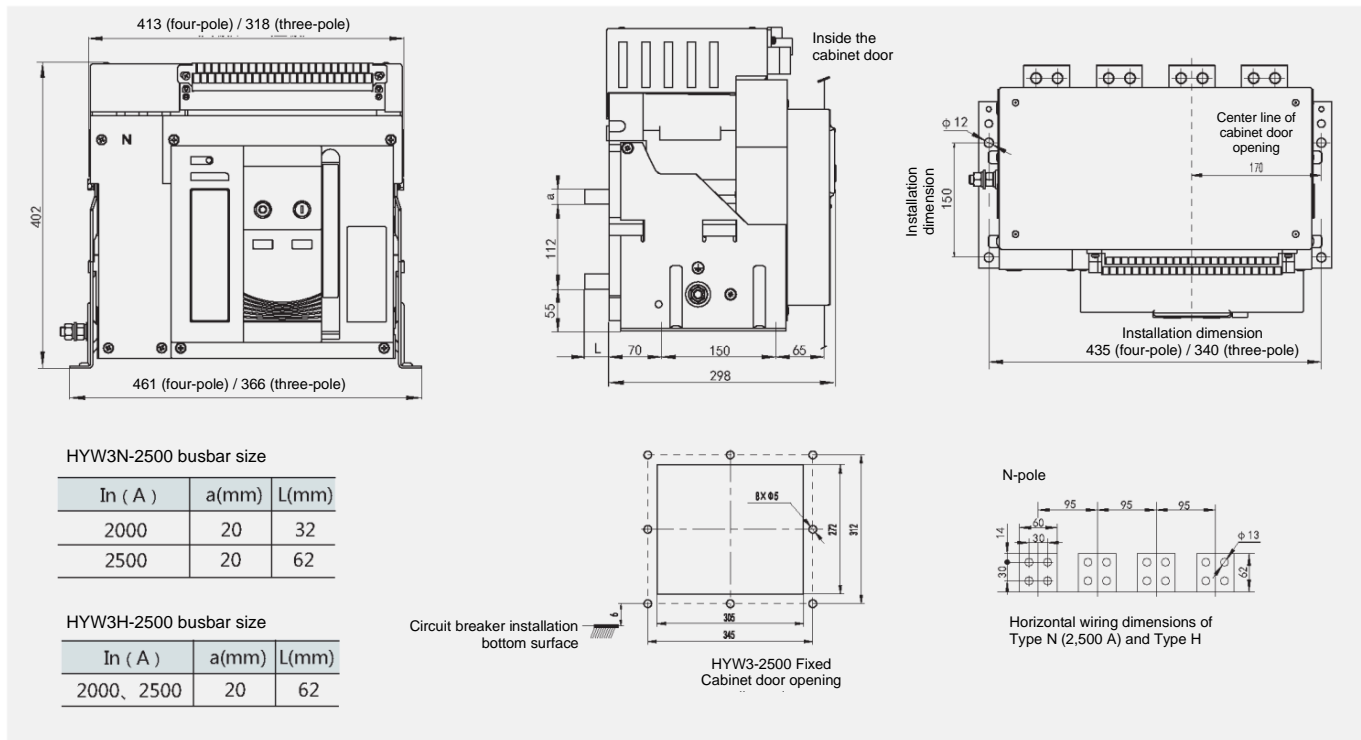
Outline and installation dimensions of the HYW3-2000 Draw-out Circuit Breaker (only the internal or external installation dimensions can be used for the fixation)



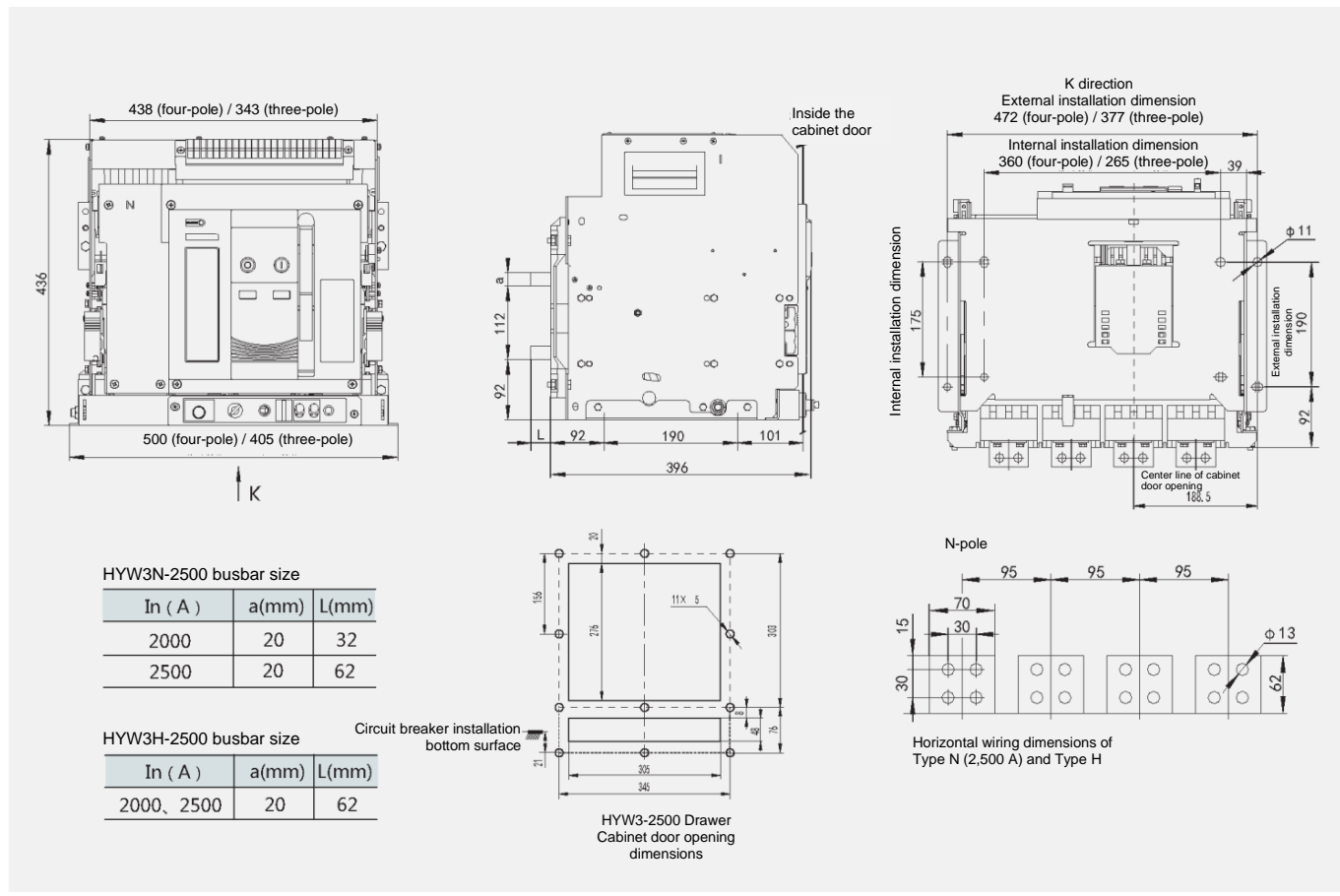
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Outline and installation dimensions of the HYW3-2500 Fixed Circuit Breaker



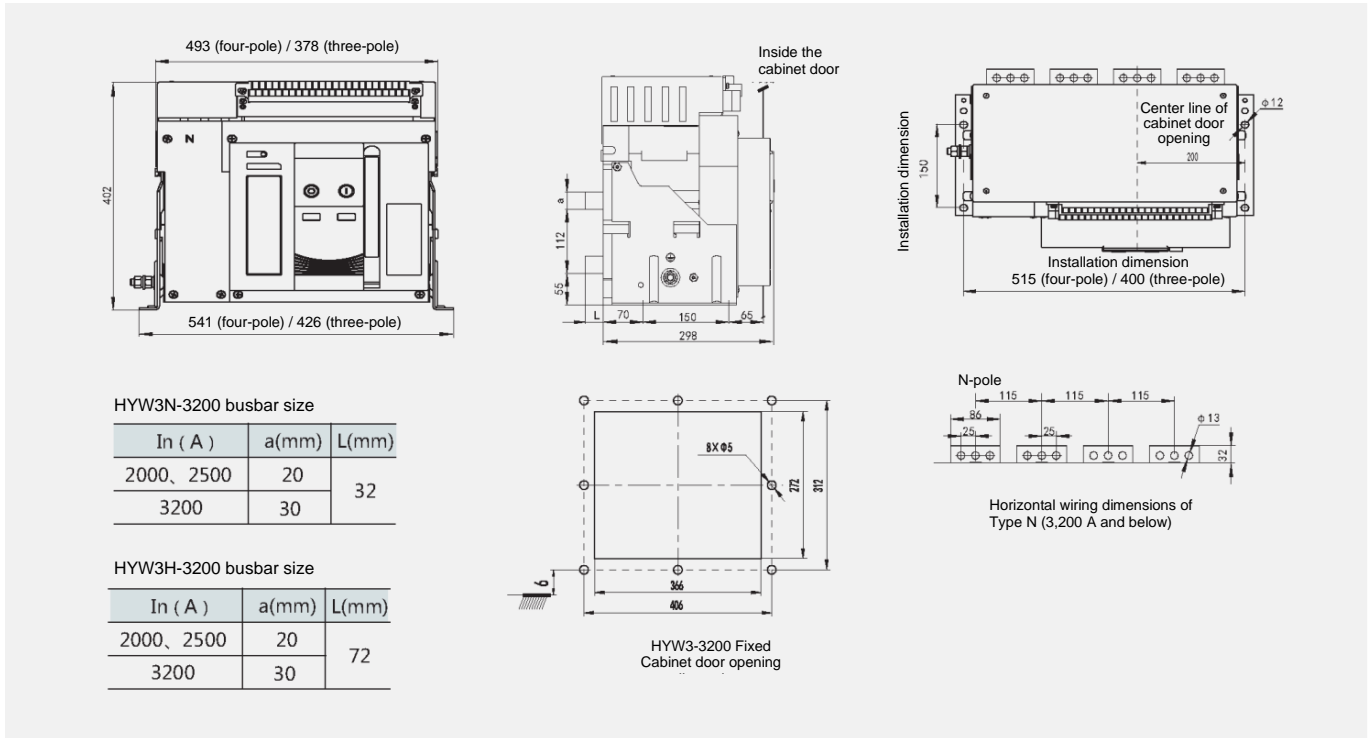
Outline and installation dimensions of the HYW3-2500 Draw-out Circuit Breaker (only the internal or external installation dimensions can be used for the fixation)



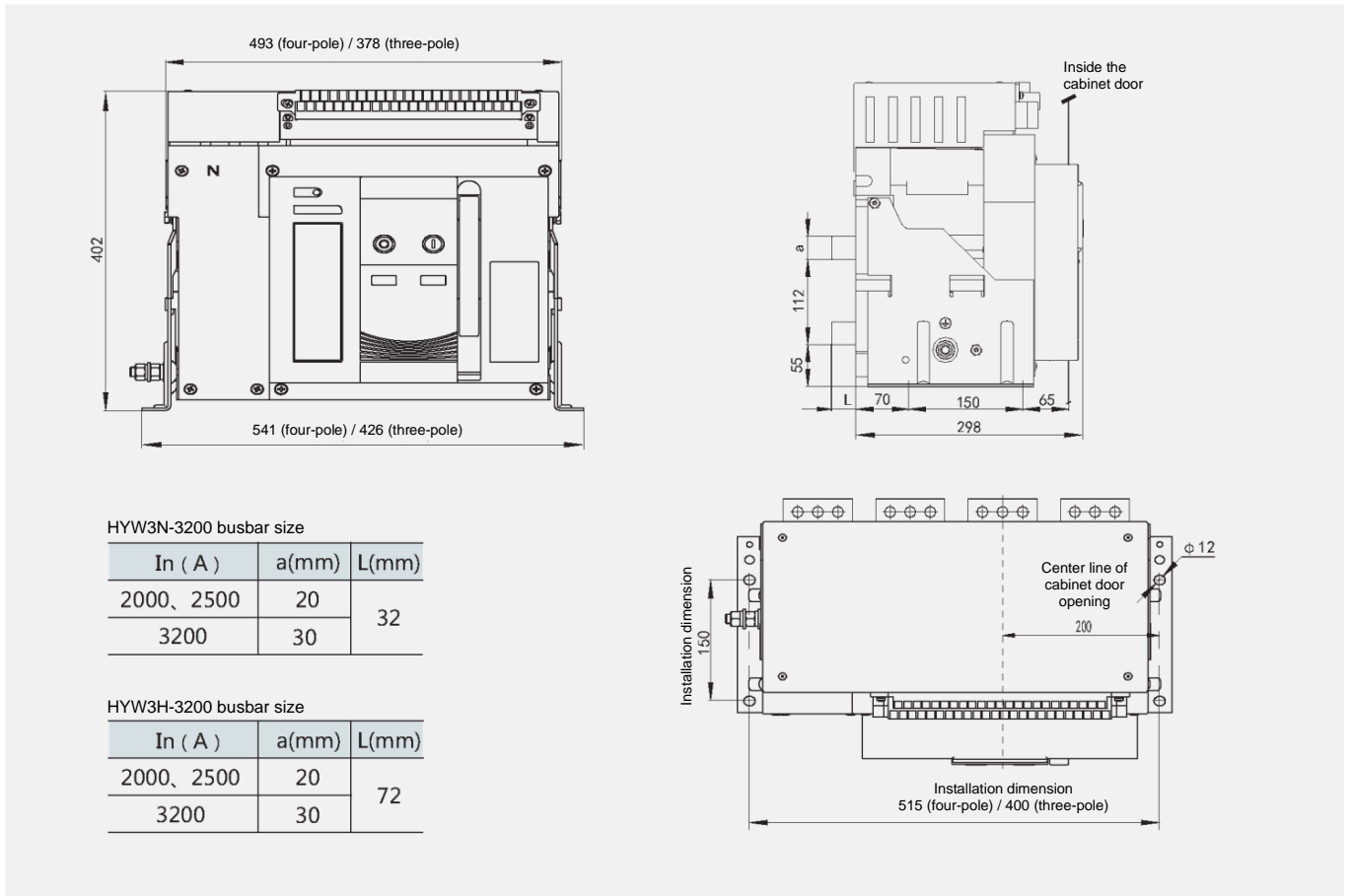
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Series Intelligent Universal Circuit Breaker

Outline and installation dimensions of the HYW3-3200 Fixed Circuit Breaker



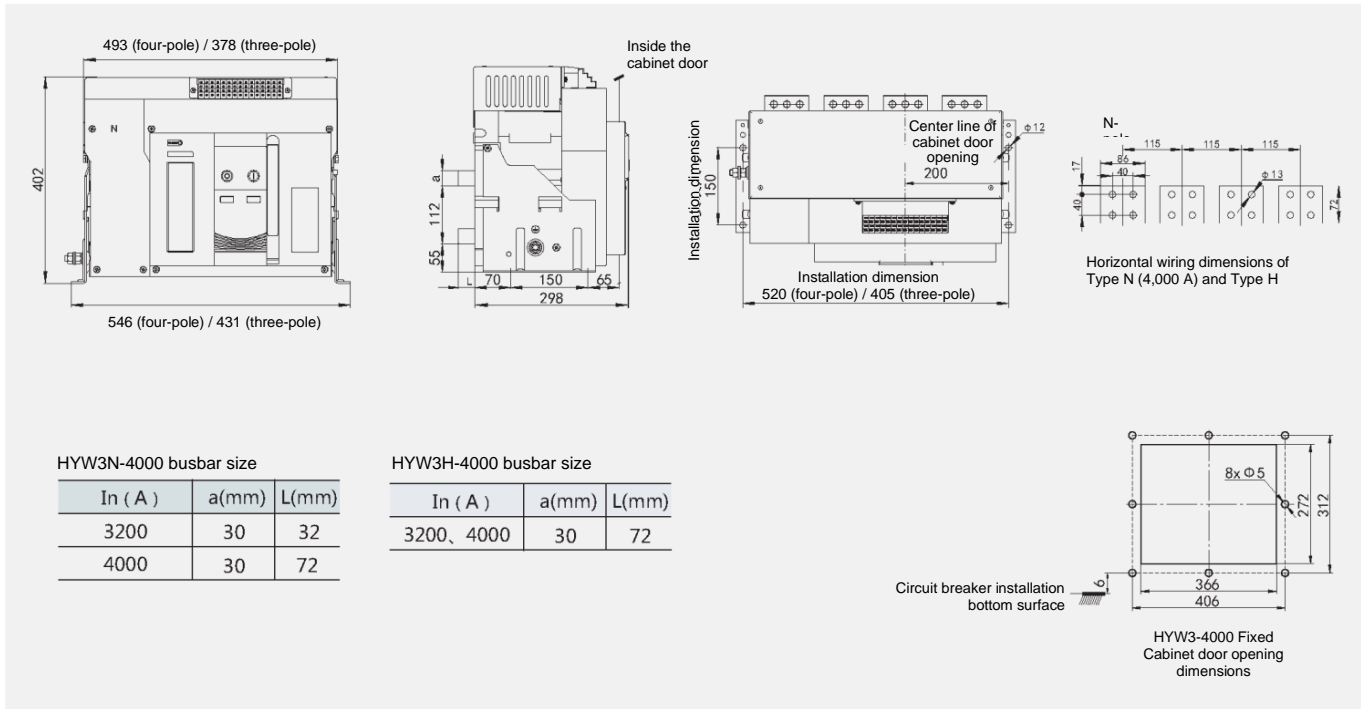
Outline and installation dimensions of the HYW3-3200 Draw-out Circuit Breaker (only the internal or external installation dimensions can be used for the fixation)



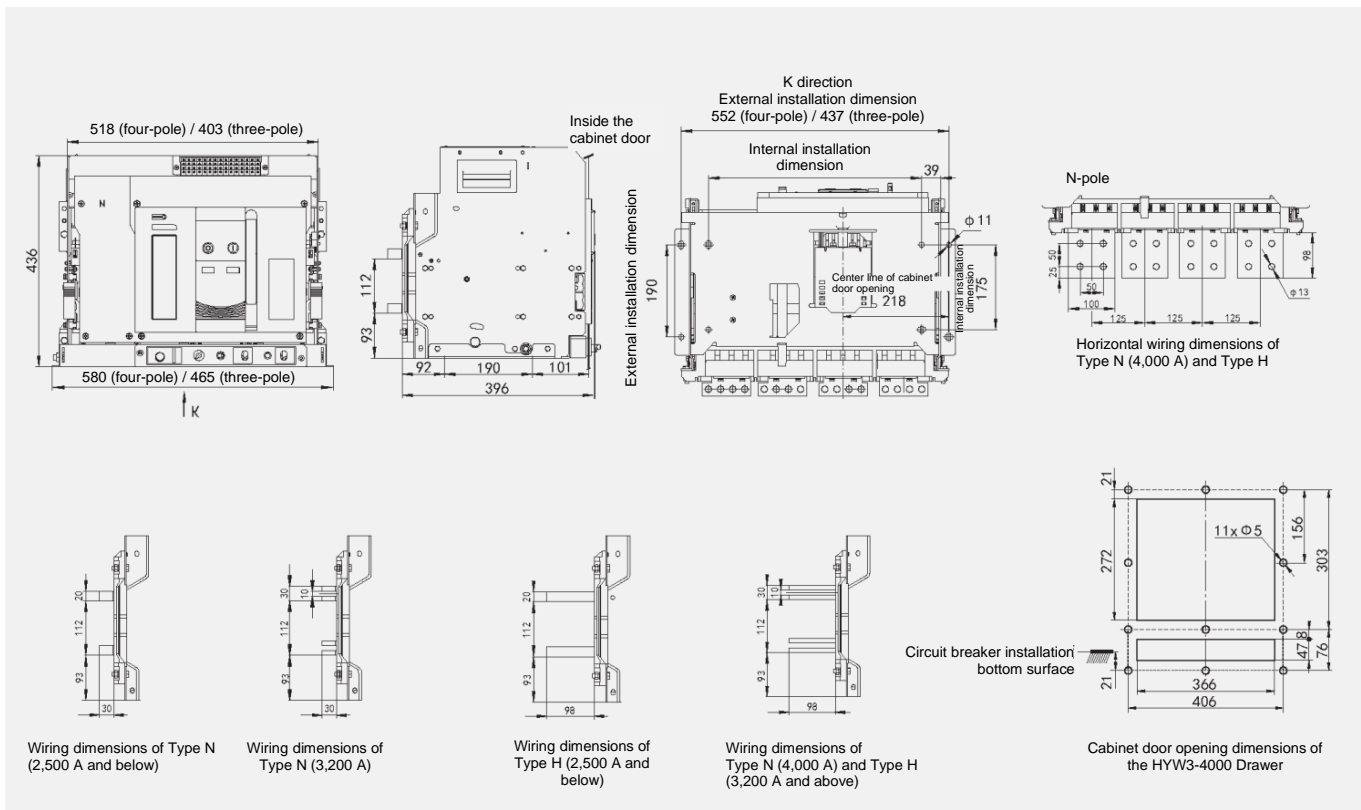
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Series Intelligent Universal Circuit Breaker

Outline and installation dimensions of the HYW3-4000 Fixed Circuit Breaker



Outline and installation dimensions of the HYW3-4000 Draw-out Circuit Breaker (only the internal or external installation dimensions can be used for the fixation)



A Primary power distribution

B Secondary distribution

C Terminal power distribution

D Industrial control and protection

E power device

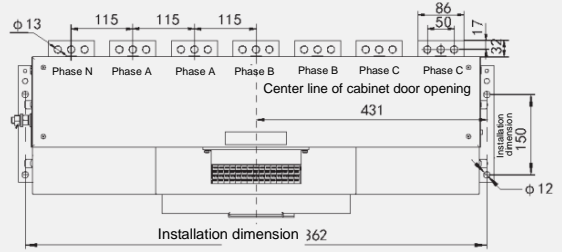
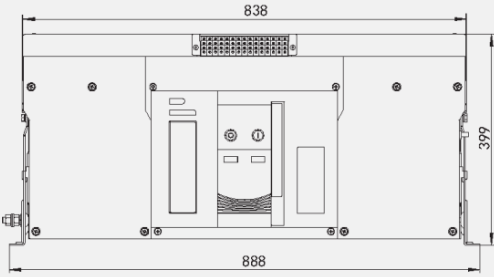
F Power management

G High voltage components

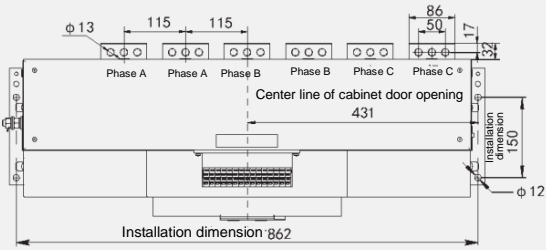
HYW3

Series Intelligent Universal Circuit Breaker

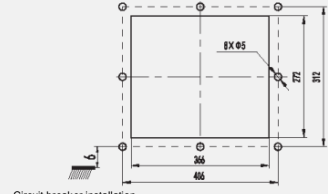
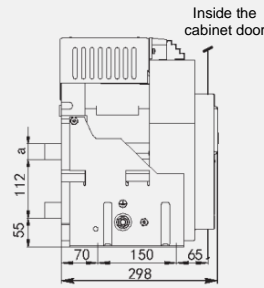
Outline and installation dimensions of the HYW3-6300 Fixed Circuit Breaker



Four-pole installation and horizontal wiring dimensions of Type N



Three-pole installation and horizontal wiring dimensions of Type N

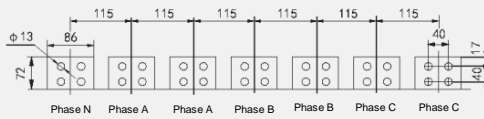


Circuit breaker installation bottom surface
Cabinet door opening dimensions of the HYW3-6300 Fixed

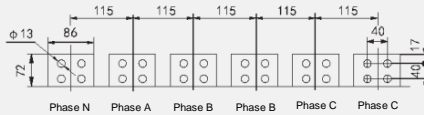
HYW3H-6300 busbar size

I_n (A)	a (mm)
4000、5000	20
6300	30

Note: Two groups of wiring of Phase A, Phase B and Phase C are shorted by users themselves.



Four-pole horizontal wiring dimensions of Type H

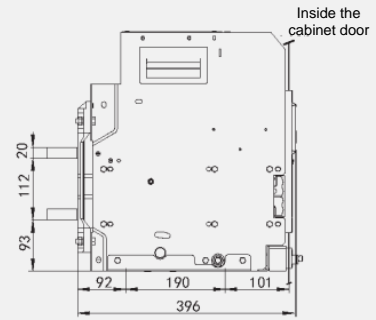
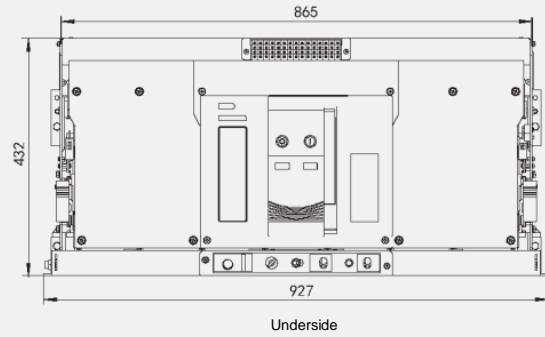


Three-pole horizontal wiring dimensions of Type H

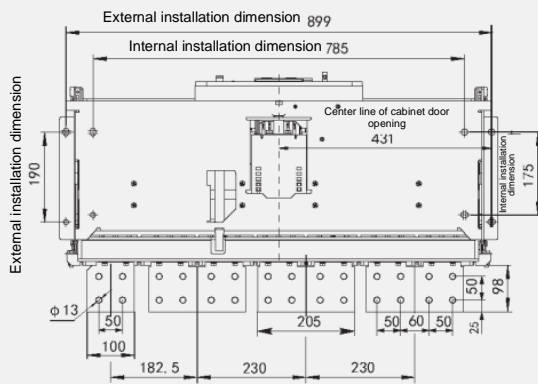
HYW3

Series Intelligent Universal Circuit Breaker

Outline and installation dimensions of the HYW3-6300 Draw-out Circuit Breaker (only the internal or external installation dimensions can be used for the fixation)

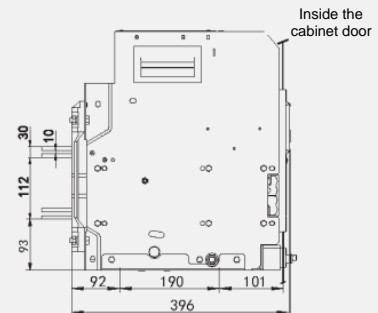


Horizontal wiring dimensions of 4,000 A and 5,000 A

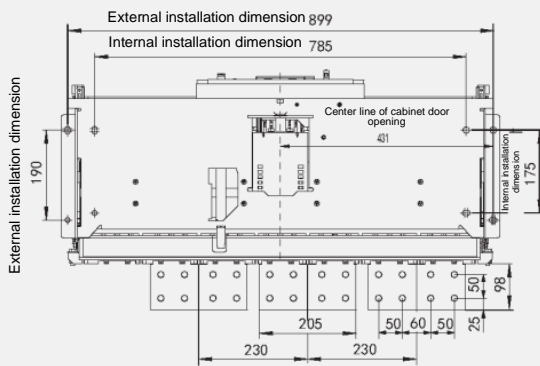


Four-pole installation and horizontal wiring dimensions

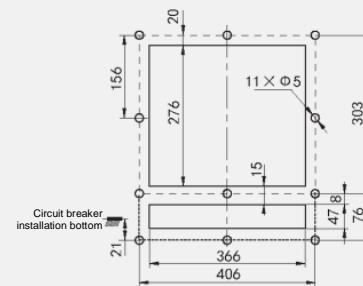
Underside



Horizontal wiring dimensions of 6,300 A



Three-pole installation and horizontal wiring dimensions

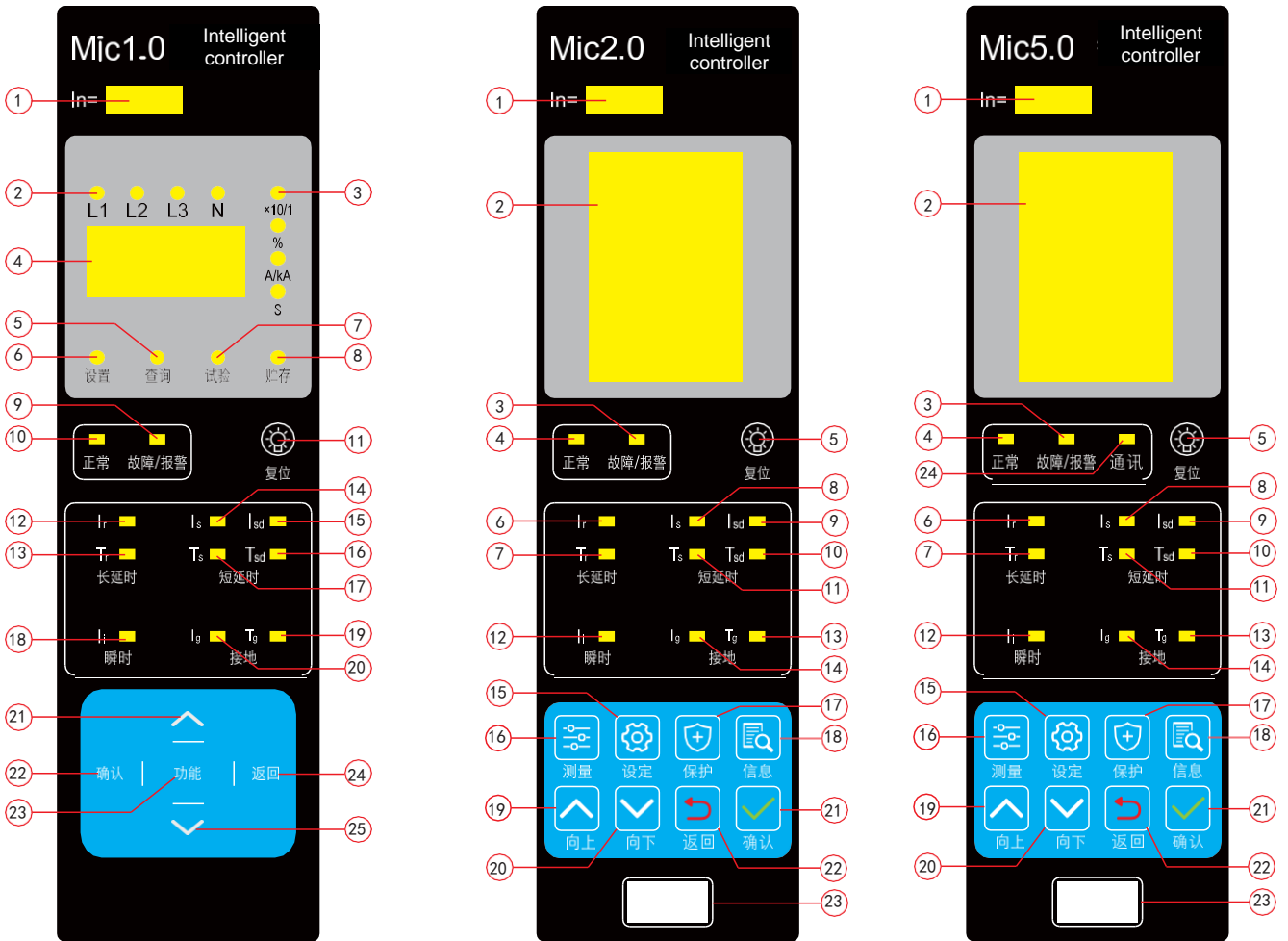


Cabinet door opening dimensions of the HYW3-6300 Draw-out

HYW3

Series Intelligent Universal Circuit Breaker

IX. Panel Structure of Controller



Standard (digital display)

Multifunctional (liquid crystal display)

Intelligent (liquid crystal display with communication)

Note: As the intelligent controller is upgraded quickly, it is not limited to the above three kinds of intelligent controllers, and the physical object shall prevail. If necessary, relevant functions can be customized according to the use requirements.

HYW3

Series Intelligent Universal Circuit Breaker

Mic1.0 standard controller interface symbols, indicator lights and key descriptions

No.	Symbol/Name	Definition
1	In	Circuit breaker rated current
2	L1, L2, L3, N indicator lights	During the normal operation, the current indicator lights of L1, L2, L3 and N (i.e., phases A, B, C and N) flash circularly.
3	Indicator lights of corresponding parameters	×10/1 indicates the number of circuit breaker operations; % indicates the contact wear percentage; A/kA means ampere/kiloampere (current); s indicates seconds (time).
4	Digital display window	Current, voltage, frequency, settings, faults and other parameters are displayed in this window.
5	"Inquiry" indicator light	The "Inquiry" light always on indicates the historical fault information can be viewed.
6	"Set" indicator light	The "Set" indicator light always on indicates the setting values of different protection characteristic parameters can be viewed or modified.
7	"Test" indicator light	The "Test" light always on indicates the trip test can be carried out.
8	"Storage" indicator light	The "Storage" light flashing indicates that a data change has occurred.
9	"Fault/Alarm" indicator light	During the normal operation, the "Fault/Alarm" indicator light does not light up; when the "Fault/Alarm" indicator light flashes, the system must have failed.
10	"Normal" indicator light	After the controller is powered on, the "Normal" indicator light shall always flash. If the light is not on, the controller is not operating properly and shall be replaced immediately.
11	 "Reset" key	Reset and enter the initial operating state in the fault tripping or alarm state.
12	"Ir" indicator light	When setting the current protection parameters, the "Ir" indicator light always on indicates that the long delay protection current value is being set.
13	"Tr" indicator light	When setting the current protection parameters, the "Tr" indicator light always on indicates that the long delay protection current value is being set.
14	"Is" indicator light	When setting the current protection parameters, the "Is" indicator light always on indicates that the short delay inverse time protection current value is being set.
15	"Isd" indicator light	When setting the current protection parameters, the "Isd" indicator light always on indicates that the short delay fixed time protection current value is being set.
16	"Tsd" indicator light	When setting the current protection parameters, the "Tsd" indicator light always on indicates that the short delay fixed time value is being set.
17	"Ts" indicator light	When setting the current protection parameters, the "Ts" indicator light always on indicates that the short delay inverse time value is being set.
18	"Ii" indicator light	When setting the current protection parameters, the "Ii" indicator light always on indicates that the instantaneous protection current value is being set.
19	"Tg" indicator light	When setting the current protection parameters, the "Tg" indicator light always on indicates that the grounding fault delay time value is being set.
20	"Ig" indicator light	When setting the current protection parameters, the "Ig" indicator light always on indicates that the grounding fault protection current value is being set.
21	 "Up" key	During the normal operation, press the "Test" key, then the controller will send an instantaneous tripping signal to test the operation performance of the circuit breaker.
22	"Enter" key	Enter the next menu pointed by the current cursor, or select the current parameter, or save the changes.
23	"Function" key	It is used to view or modify the setting values of different protection characteristic parameters.
24	"Return" key	Press the "Return" key to return to the previous operation.
25	 "Down" key	The MCU lamp is always on during the normal operation, and goes out during self-diagnosis and power failure.

HYW3

Series Intelligent Universal Circuit Breaker

Mic2.0, Mic5.0 multifunctional controller interface symbols, indicator lights and key descriptions

No.	Symbol/Name	Definition
1	In	Circuit breaker rated current
2	Liquid crystal display	All measurement parameters, system setting parameters, protection setting parameters and other information are displayed in Chinese.
3	“Fault/Alarm” indicator light	During the normal operation, the “Fault/Alarm” indicator light does not light up; when the “Fault/Alarm” indicator light flashes, the system must have failed.
4	“Normal” indicator light	After the controller is powered on, the “Normal” indicator light shall always flash. If the light is not on, the controller is not operating properly and shall be replaced immediately.
5	 “Reset” key	Reset and enter the initial operating state in the fault tripping or alarm state.
6	“Ir” indicator light	When setting the current protection parameters, the “Ir” indicator light always on indicates that the long delay protection current value is being set.
7	“Tr” indicator light	When setting the current protection parameters, the “Tr” indicator light always on indicates that the long delay protection current value is being set.
8	“Is” indicator light	When setting the current protection parameters, the “Is” indicator light always on indicates that the short delay inverse time protection current value is being set.
9	“Isd” indicator light	When setting the current protection parameters, the “Isd” indicator light always on indicates that the short delay fixed time protection current value is being set.
10	“Tsd” indicator light	When setting the current protection parameters, the “Tsd” indicator light always on indicates that the short delay fixed time value is being set.
11	“Ts” indicator light	When setting the current protection parameters, the “Ts” indicator light always on indicates that the short delay inverse time value is being set.
12	“Ii” indicator light	When setting the current protection parameters, the “Ii” indicator light always on indicates that the instantaneous protection current value is being set.
13	“Tg” indicator light	When setting the current protection parameters, the “Tg” indicator light always on indicates that the grounding fault delay time value is being set.
14	“Ig” indicator light	When setting the current protection parameters, the “Ig” indicator light always on indicates that the grounding fault protection current value is being set.
15	 “Setting” key	Quickly switch to the main menu of “System Settings”
16	 “Measurement” key	Quickly switch to the main menu of “Running Parameters”
17	 “Protection” key	Quickly switch to the main menu of “Protection Settings”
18	 “Information” key	Quickly switch to the main menu of “Information Inquiry”
19	 “Up” key	Move the cursor up, or change the selected parameter up, or position the display to the left
20	 “Down” key	Move the cursor down, or change the selected parameter down, or position the display to the right
21	 “Enter” key	Enter the next menu pointed by the current cursor, or select the current parameter, or save the changes.
22	 “Return” key	Exit the current menu and enter the previous menu, or cancel the modification of the current parameters.
23	Test interface	Interface between programming and communication
24	“Communication” indicator light	The “Communication” indicator light on means that communication data is being transmitted, and off means that there is no communication data.

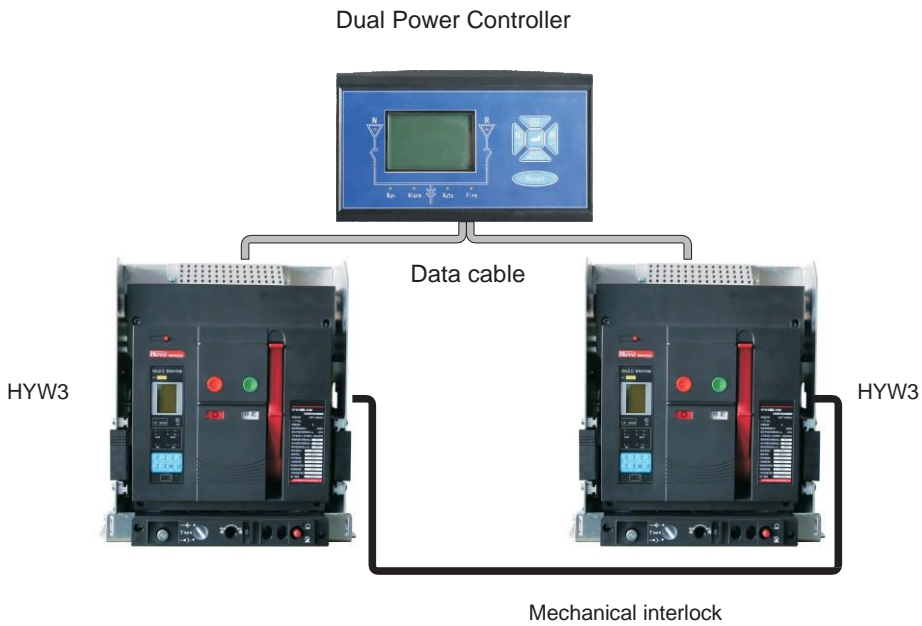
HYW3

Series Intelligent Universal Circuit Breaker

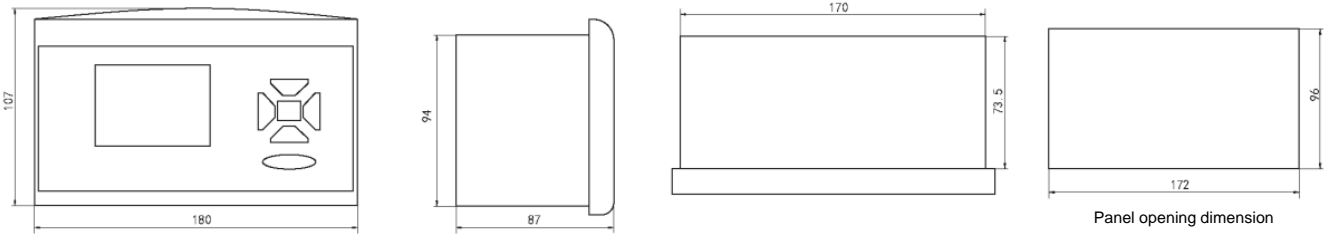
X. Dual Power Automatic Transfer Switch

The dual power automatic transfer switch is CB grade, which is mainly composed of two HYW3 series universal circuit breakers, dual power transfer controller and mechanical interlock. It is suitable for two-way three-phase four-wire power grids with a frequency of 50 Hz/60Hz and a rated working voltage of 400 V. When ordering the dual power automatic transfer switch, the following items must be considered:

- a. To prevent users from damaging the circuit breaker and the dual power controller due to wiring errors, it is suggested that the dual power automatic controller shall not be purchased separately, but ordered together with the circuit breaker.
- b. Mechanical interlocking must be ordered at the same time.
- c. Both the special cable for dual power automatic controller and the connecting line between two circuit breakers are 2 meters long.
- d. Circuit breakers with dual power automatic controllers are forbidden to be equipped with key locks.
- e. The control power supply voltage of the shunt release and closing electromagnet of circuit breaker can only be AC 220 V.
- f. The circuit breaker with dual power automatic controller is forbidden to be equipped with opening/closing status door interlock.
- g. When the circuit breaker with dual power automatic controller is equipped with H-type intelligent controller, the remote control circuit breaker cannot be used for closing and opening.
- h. Communication, fire fighting and engine functions are optional.
- i. The circuit breaker with dual power automatic controller is forbidden to be equipped with undervoltage release.



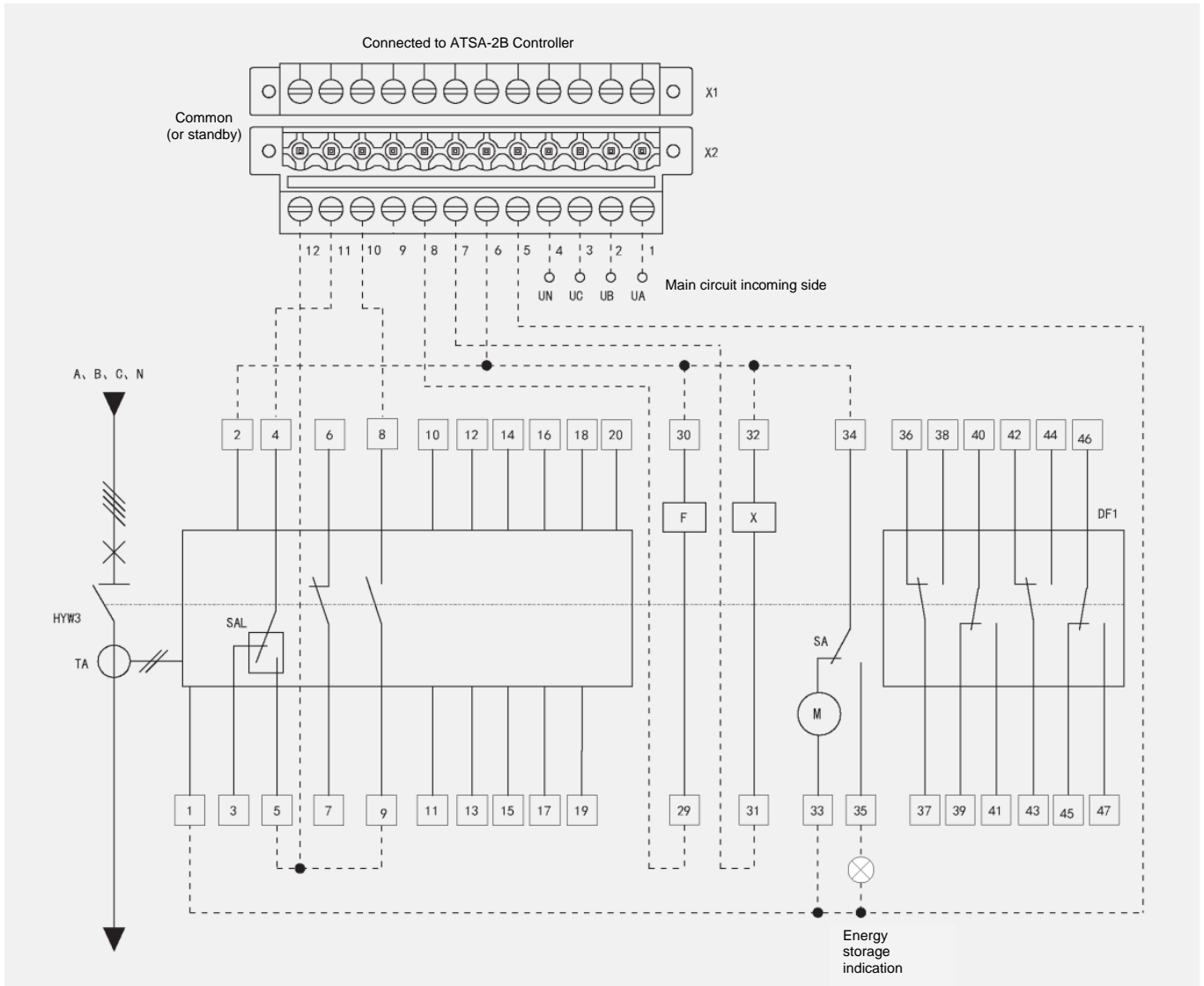
Outline and installation dimensions of the Dual Power Controller



HYW3

Series Intelligent Universal Circuit Breaker

Wiring diagram of the Dual Power Controller



Interpretation of wiring terminal of the Dual Power Controller

Terminal number	Interpretation	Number of terminal connected to the circuit breaker	Notes
1~4	Connected to the main circuit, 1 to UA, 2 to UB, 3 to UG and 4 to UN.	Connected to the incoming side of the main circuit for users.	
5	Control power output terminal (L)	1, 33	AC230V
6	Control power output terminal (N)	2, 30, 32, 34	
7	Signal output DO3 or DO1, connected to the closed electromagnet	31.	
8	Signal output DO4 or DO2, connected to the shunt release	29	
9		Standby	
10	Signal input DI3 or DI1	8	
11	Signal input DI4 or DI2	4	
12	Signal input DIV-	5v 9	

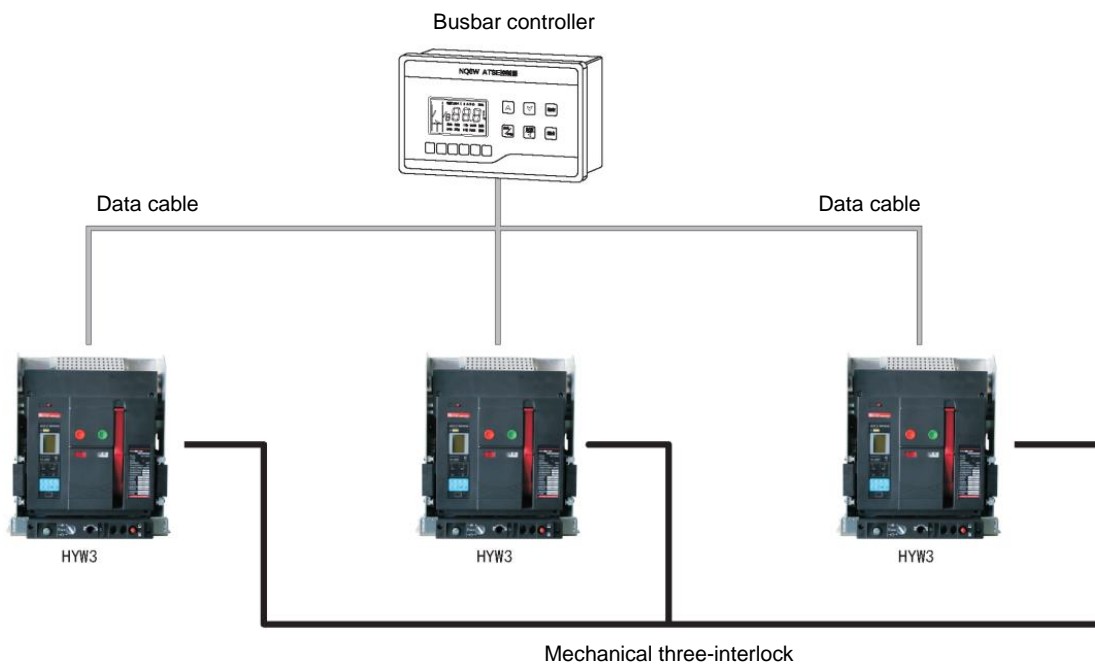
HYW3

Series Intelligent Universal Circuit Breaker

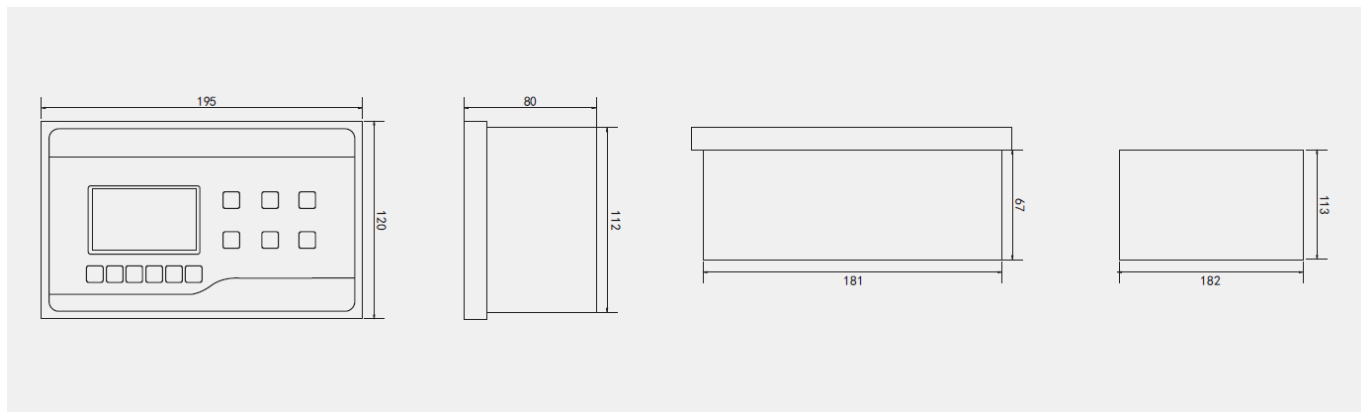
XI. Double Power Automatic Transfer Controller

The NQ6W Double Power Automatic Transfer Controller (hereinafter referred to as “the controller”) controls the frame circuit breaker. It is suitable for important power supply places where power supply failure is not allowed, and can complete the automatic transfer of power supply system, thus ensuring the continuity of power supply. The product has the following features:

- The silicon controlled rectifier (SCR) is adopted to enhance the earthquake resistance and reliability.
- The measurement and control system is built with 32bits-MCU as the core, embedded with 12bits high-speed and high-precision analog-to-digital converter (ADC).
- The three-phase voltage of each power supply can be completely measured. The voltages of each phase of the power supply are calculated by the True-RMS method.
- The secondary connection between the controller and the circuit breaker has good operability and maintainability.
- The electromagnetic compatibility capability beyond the requirements of GB14048.11-2008 is available.
- It has the function of system fault self-diagnosis to improve the reliability and safety of the device.



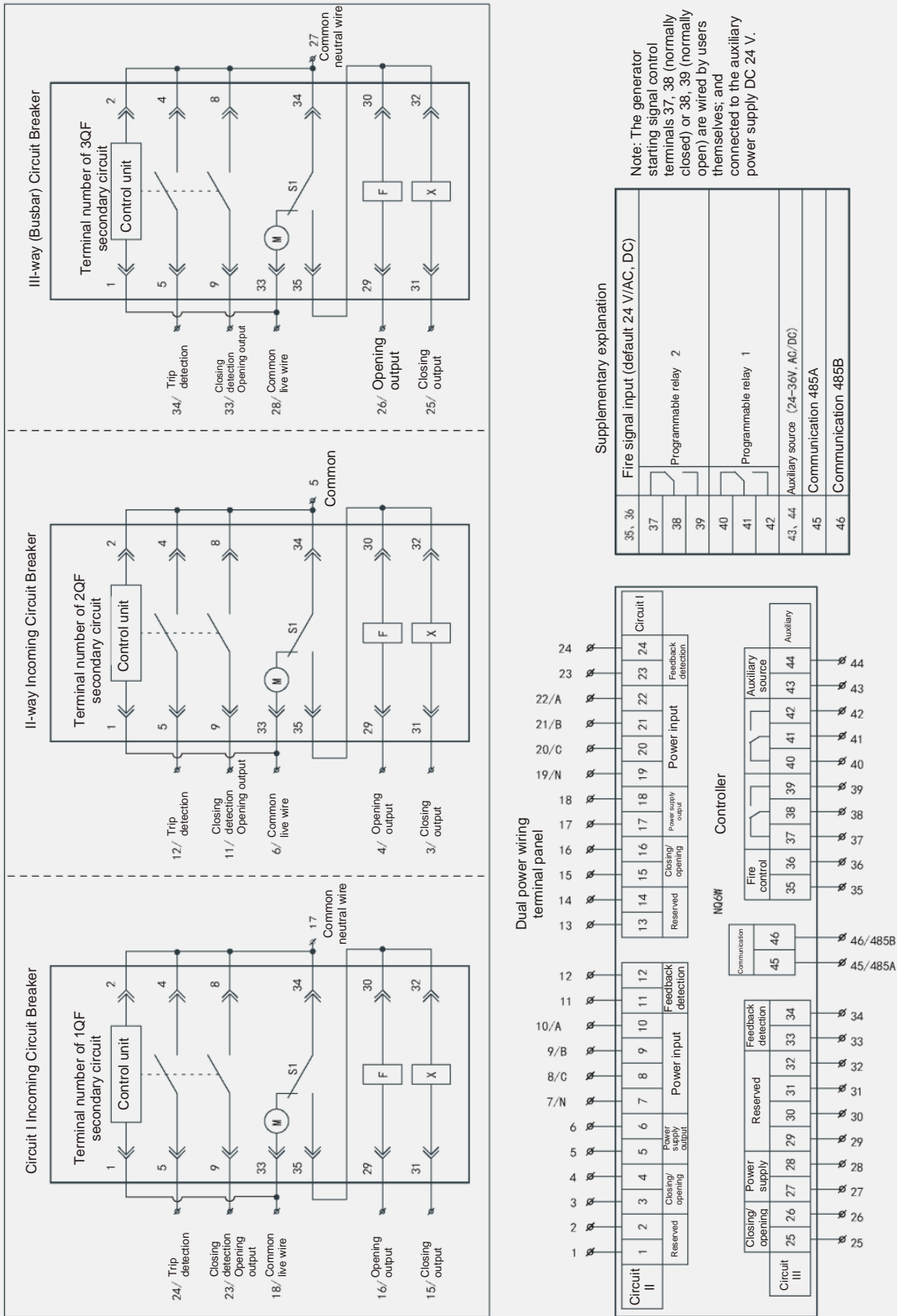
Outline and installation dimensions of the Busbar Controller



HYW3

Series Intelligent Universal Circuit Breaker

Wiring diagram of the Dual Power Busbar Controller



Important reminder: To ensure the normal operation of the dual-power products and prevent the operation errors, the dual power controllers need to be equipped with corresponding mechanical interlocking devices.

HYW3

Series Intelligent Universal Circuit Breaker

XII. Accessories



Closed Electromagnet of 1,600 A Shell Frame



Closed Electromagnet of 2,500 A Shell Frame and Above

Closed electromagnet

When the circuit breaker completes the energy storage and is in the normal opening state, the circuit breaker can be quickly closed by the remote control of closed electromagnet.

Working voltage U_s	AC230V	AC400V	DC220V	DC110V
Working voltage range	(85~110)% U_s			
Starting current	1.3A	0.7A	1.3A	2.5A
Circuit breaker response time	≤60ms			



Shunt Release of 1,600 A Shell Frame



Shunt Release of 2,500 A Shell Frame and Above

Shunt release

When the circuit breaker is in the closing state, the circuit breaker can be quickly opened by the remote control of shunt release.

Working voltage U_s	AC230V	AC400V	DC220V	DC110V
Working voltage range	(70~110)% U_s			
Starting current	1.3A	0.7A	1.3A	2.5A
Circuit breaker response time	≤30ms			

HYW3

Series Intelligent Universal Circuit Breaker



Undervoltage Release of 1,600A Frame



Undervoltage Release of 2,500A Frame and Above



Phase Spacer Plate



Energy Storage Motor of 1,600 A Shell Frame



Energy Storage Motor of 2,500 A Shell Frame and Above

Undervoltage release

When the undervoltage release is not powered, the circuit breaker cannot be closed. The Undervoltage Release of 2,500 A Shell Frame and Above are divided into two types: Suction-assisted type (without delay function) and self-suction type.

Working voltage U_e	AC230V	AC400V
Opening voltage range	(35~70)% U_e	
Reliable closing voltage range	(85~110)% U_e	
Voltage range in which the circuit breaker cannot be closed	$\leq 35\%U_e$	
Power consumption	20VA	
Delay tripping time	Instantaneous, 0.5 s, 1 s, 3 s, 5 s	

Note 1: Within 1/2 delay tripping time, when the working voltage returns to more than 85% U_e , the circuit breaker will not be opened.

Note 2: In lightning-prone areas and power grid with unstable power supply voltage, the undervoltage release with time delay is recommended to prevent the circuit breaker from breaking due to short-term voltage drop.

Note 3: The undervoltage delay tripping time and zero voltage delay tripping time can be up to 10 s and 5 s, respectively (It shall be negotiated with the manufacturer when ordering).

Phase spacer plate

It is vertically installed between the busbars of each phase of the circuit breaker, which is used to enhance the phase-to-phase insulation capability of the circuit breaker.

Energy storage motor

It is used to realize the electrical energy storage of the circuit breaker and automatic energy storage again after the circuit breaker is closed, so that the circuit breaker can be closed again immediately after the interruption.

Working voltage U_s	AC230V	AC400V	DC220V	DC110V
Working voltage range	(85~110)% U_s			
Energy storage time	≤ 7 s (cycle period: ≤ 1 time/min)			
HYW3-1600 power consumption	75VA		75W	
HYW3-2500 power consumption	85VA		85W	
HYW3-4000 power consumption	110VA		110W	

Note: The manual energy storage operation can also be performed during the maintenance of the circuit breaker.

HYW3

Series Intelligent Universal Circuit Breaker



Auxiliary Switch of 1,600



Auxiliary Switch of 2,500 A Shell Frame and Above

Auxiliary switch

Default configuration: Conversion 4 NO & 4 NC

Other types: Independent four normally open & four normally closed, conversion six normally open & six normally closed, independent six normally open & six normally closed

Rated working voltage	AC230V	AC400V	DC220V	DC110V
Arranged thermal current	6A			
Rated control capacity	300VA		60W	



Key lock

■Key lock

Circuit breaker unlocking: When the notch on the key corresponds to the red dot on the lock, the key can be inserted into the lock. When the key rotates clockwise to the rightmost position, it can be unlocked. At this time, the key cannot be directly pulled out, and the circuit breaker can be closed.

Circuit breaker locking: Press the opening button of the circuit breaker, and then turn the key counterclockwise to the leftmost position to remove the key. At this time, the circuit breaker cannot be closed.

Mode I: One Power Supply and One Load

Circuit diagram Possible operation modes



QF
0
1

Note 1: The following list of power supply modes is for reference only. The installation and interlock can be performed according to the needs of the actual power supply system on site, or the manufacturer can be consulted for negotiation.

One lock and one key: One circuit breaker is equipped with a lock and a key. In the locked state, the circuit breaker is not allowed to be closed.

Note 1: QF indicates the HYW3 Circuit Breaker; 0 indicates that the circuit breaker is open; 1 indicates that the circuit breaker is closed.

HYW3

Series Intelligent Universal Circuit Breaker

XIII. Order Specification

Unit:	Contact person:	Tel.:	Order quantity:	(set)	Order date:	
Product model	<input type="checkbox"/> HYW3-1600 <input type="checkbox"/> HYW3-2000	<input type="checkbox"/> HYW3-2500	<input type="checkbox"/> HYW3-3200	<input type="checkbox"/> HYW3-4000	<input type="checkbox"/> HYW3-6300	
	<input type="checkbox"/> N <input type="checkbox"/> H	<input type="checkbox"/> N <input type="checkbox"/> H	<input type="checkbox"/> N <input type="checkbox"/> H	<input type="checkbox"/> N <input type="checkbox"/> H	<input type="checkbox"/> N <input type="checkbox"/> H	
Rated current	<input type="checkbox"/> 200 <input type="checkbox"/> 400 <input type="checkbox"/> 630 <input type="checkbox"/> 800 <input type="checkbox"/> 1000 <input type="checkbox"/> 1250 <input type="checkbox"/> 1600	<input type="checkbox"/> 630 <input type="checkbox"/> 800 <input type="checkbox"/> 1000 <input type="checkbox"/> 1250 <input type="checkbox"/> 1600 <input type="checkbox"/> 2000	<input type="checkbox"/> 2000 <input type="checkbox"/> 2500	<input type="checkbox"/> 2000 <input type="checkbox"/> 2500 <input type="checkbox"/> 3200	<input type="checkbox"/> 3200 <input type="checkbox"/> 4000	
Number of poles	<input type="checkbox"/> Three-pole <input type="checkbox"/> Four-pole					
Installation mode	<input type="checkbox"/> Fixed <input type="checkbox"/> Draw-out					
Breaking capacity	<input type="checkbox"/> N: Common type <input type="checkbox"/> H: High breaking type					
Selection of intelligent controller	Type	<input type="checkbox"/> Mic1.0 (standard, digital display) <input type="checkbox"/> Mic2.0 (multifunctional, liquid crystal display with communication) <input type="checkbox"/> Mic5.0 (intelligent, liquid crystal display)				
	Rated voltage	<input type="checkbox"/> AC230V <input type="checkbox"/> AC400V <input type="checkbox"/> DC220V <input type="checkbox"/> DC110V <input type="checkbox"/> DC24V				
	Protection parameter settings	Default factory settings: Ir = 1 In, Tr = 15 s; Fixed time Isd = 8 Ir, Tsd = 0.4 s; Inverse time Is = 4 Ir; Ii = 12 In; Ig: OFF (open the default value Ig = In, inverse time shear coefficient k = OFF, Tg = 0.4 s)				
		Long time delay protection Ir	Ir = _____In (selected in 0.4–1.0 or OFF) Tr (1.5 Ir) = _____s (selected in 15, 30, 60, ..., 960)			
		Short-circuit short time delay protection Isd	Isd = _____Ir (selected in 1.5–15 or OFF) <input type="checkbox"/> Fixed time Tsd = _____s (selected in 0.1–0.4)			
		Short-circuit instantaneous protection Ii	Ii = _____In (selected in 1.0–20 or OFF) with the maximum value of 100 kA			
Grounding protection Ig	Ig = _____In (selected in 0.2–1.0 or OFF) Tg = _____s (selected in 0.1–1.0) Inverse time shear coefficient k = _(selected in 1.5–6 or OFF)					
Optional functions	<input type="checkbox"/> Voltage measurement <input type="checkbox"/> Frequency measurement <input type="checkbox"/> Voltage imbalance rate measurement <input type="checkbox"/> Phase sequence detection <input type="checkbox"/> Power measurement <input type="checkbox"/> Power factor measurement <input type="checkbox"/> Temperature control monitoring <input type="checkbox"/> Electrical energy measurement <input type="checkbox"/> Zone selective interlocking (ZSI) function <input type="checkbox"/> Harmonic measurement <input type="checkbox"/> Overvoltage protection <input type="checkbox"/> Undervoltage protection <input type="checkbox"/> Voltage imbalance protection <input type="checkbox"/> Overfrequency protection <input type="checkbox"/> Underfrequency protection <input type="checkbox"/> Phase sequence protection <input type="checkbox"/> Reverse power protection <input type="checkbox"/> Demand value protection <input type="checkbox"/> Demand value measurement (current and power) <input type="checkbox"/> Residual action current protection <input type="checkbox"/> Load monitoring function <input type="checkbox"/> Neutral line protection <input type="checkbox"/> DI input function <input type="checkbox"/> DO output function <input type="checkbox"/> Communication function: Modbus protocol (Mic5.0 standard) <input type="checkbox"/> Internet of Things function (WIFI, GPRS)					
Standard configuration accessories	Closed electromagnet	<input type="checkbox"/> AC230V <input type="checkbox"/> AC400V <input type="checkbox"/> DC220V <input type="checkbox"/> DC110V				
	Shunt release	<input type="checkbox"/> AC230V <input type="checkbox"/> AC400V <input type="checkbox"/> DC220V <input type="checkbox"/> DC110V				
	Energy storage motor	<input type="checkbox"/> AC230V <input type="checkbox"/> AC400V <input type="checkbox"/> DC220V <input type="checkbox"/> DC110V				
	Auxiliary switch	<input type="checkbox"/> Conversion Four Normally Open & Four Normally Closed <input type="checkbox"/> Independent Four Normally Open & Four Normally Closed <input type="checkbox"/> Conversion Six Normally Open & Six Normally Closed <input type="checkbox"/> Independent Six Normally Open & Six Normally Closed <input type="checkbox"/> Special form (Note: HYW3-1600 can be equipped with conversion four normally open & four normally closed or conversion six normally open & six normally closed switches)				
	Door frame + O-ring	<input type="checkbox"/> Fixed <input type="checkbox"/> Draw-out				
Optional accessories	Undervoltage release	<input type="checkbox"/> Self-suction type		<input type="checkbox"/> Suction-assisted type (default)		
		<input type="checkbox"/> AC230V <input type="checkbox"/> AC400V				
		<input type="checkbox"/> Instantaneous <input type="checkbox"/> 0.5s <input type="checkbox"/> 1s <input type="checkbox"/> 3s <input type="checkbox"/> 5s		<input type="checkbox"/> Instantaneous (delay)		
Optional accessories	Key lock	<input type="checkbox"/> One circuit breaker with one lock and one key <input type="checkbox"/> Two circuit breakers with two locks and one key <input type="checkbox"/> Three circuit breakers with three locks and two keys <input type="checkbox"/> Special form (customized according to user's requirements)				
	Mechanical interlock	Two circuit breakers <input type="checkbox"/> Lever interlock (up and down interlock) <input type="checkbox"/> Cable interlock				
		Three circuit breakers <input type="checkbox"/> Lever interlock (up and down interlock) <input type="checkbox"/> Cable interlock (Note: Two closing & one opening or one closing & two opening)				
	Dual Power Controller	<input type="checkbox"/> Dual-power <input type="checkbox"/> Three-power <input type="checkbox"/> Dual-power + busbar coupler (Note: It shall be noted when fire fighting, generator or communication functions are provided.)				
Others	<input type="checkbox"/> Leakage transformer <input type="checkbox"/> N-phase current transformer <input type="checkbox"/> Grounding current transformer <input type="checkbox"/> Power adapter <input type="checkbox"/> Door interlock <input type="checkbox"/> Relay module <input type="checkbox"/> Protocol conversion module (Profibus-DP, Device Net) <input type="checkbox"/> Electric three-position lock of drawer seat <input type="checkbox"/> Energy storage ready electrical indicator <input type="checkbox"/> Opening/Closing button lock					

HYW3

Series Intelligent Universal Circuit Breaker

Note 1: If the user has other special requirements for ordering, please consult with the manufacturer before the ordering. 2: The costs of circuit breaker's optional function and accessories are not included in the standard configuration of the circuit breaker, and therefore will be calculated separately. 3: When selecting the dual power controller, the mechanical interlock shall be selected at the same time.