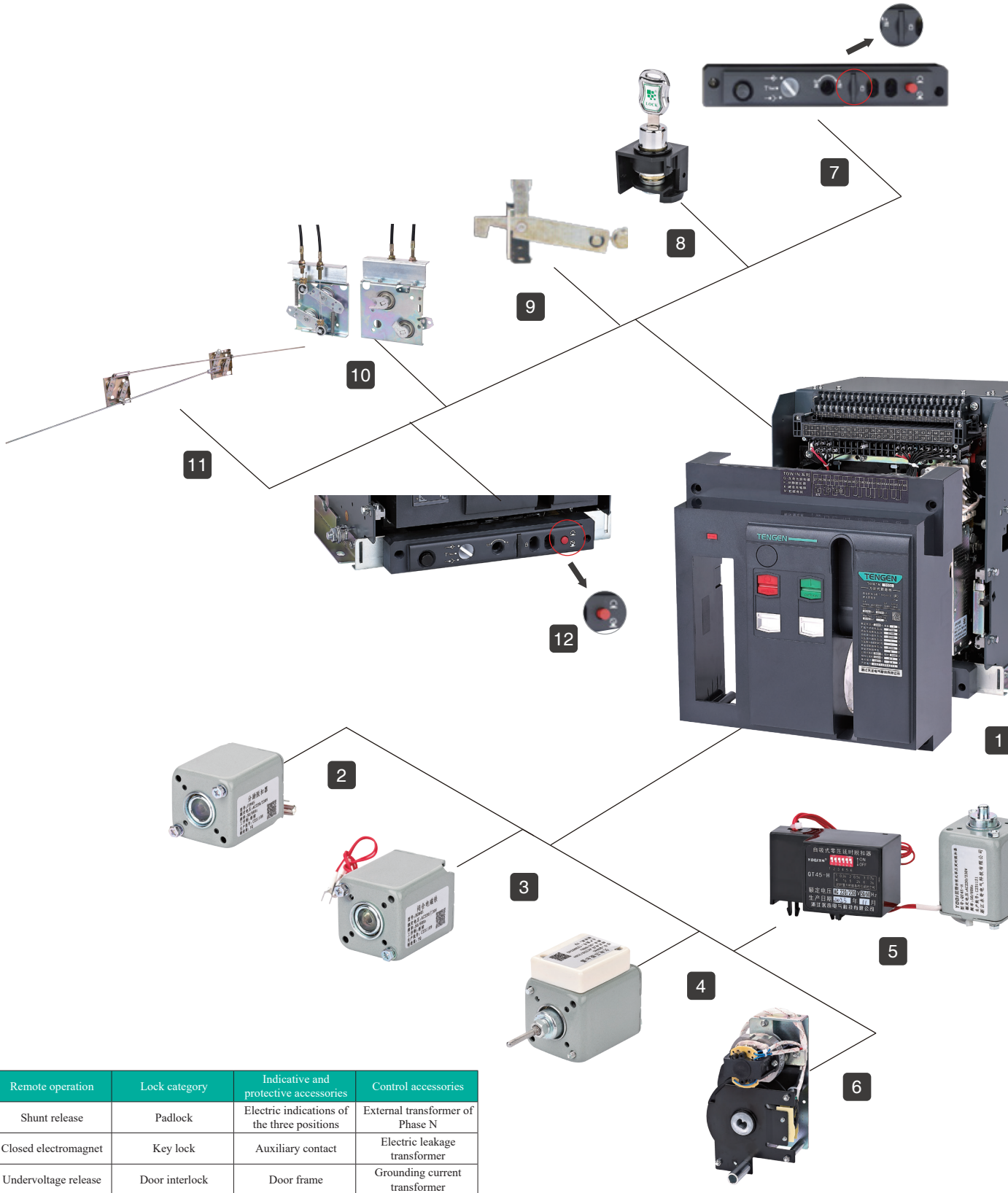
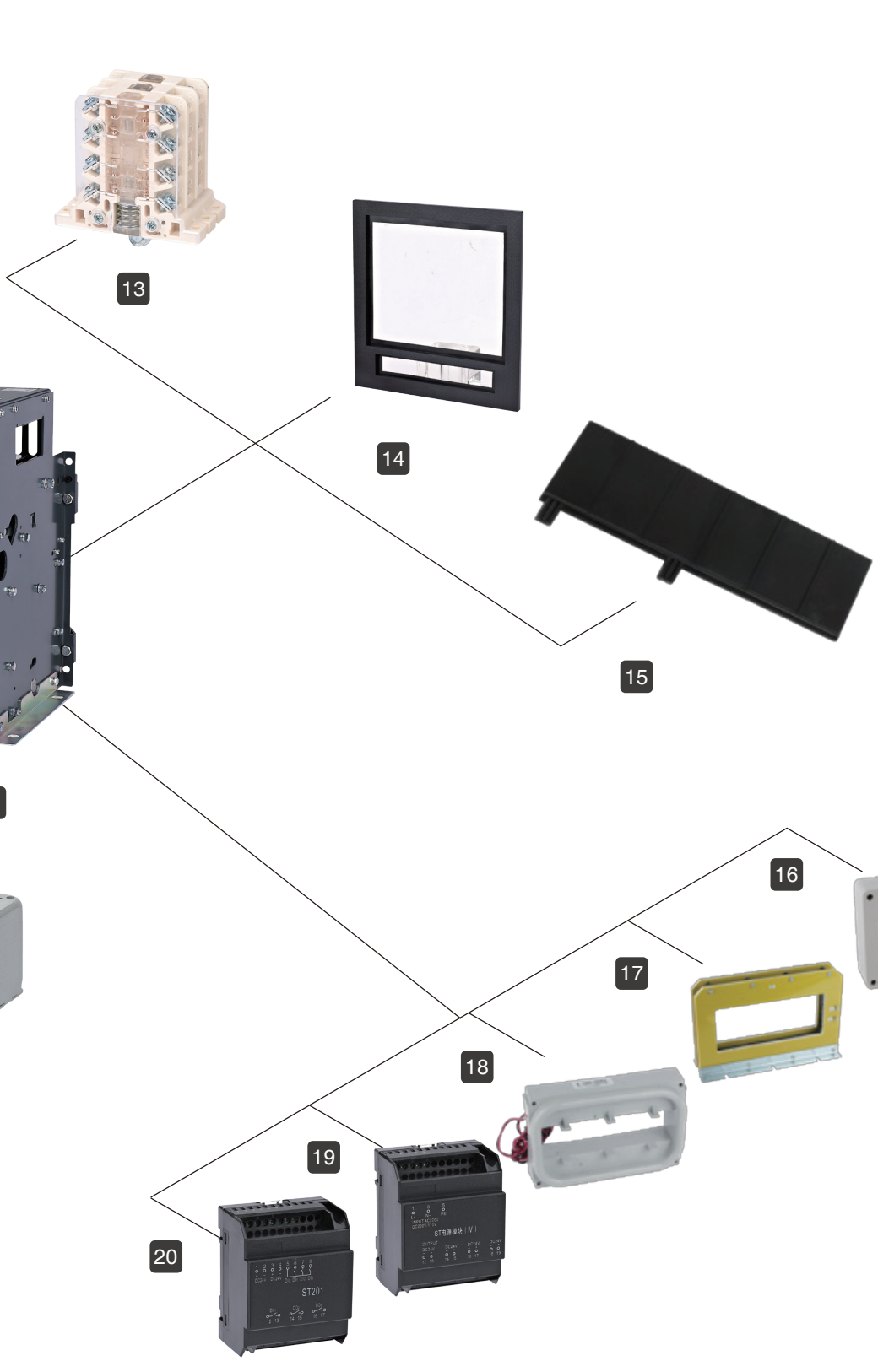
TGW1N Series Air Circuit Breaker



Remote operation	Lock category	Indicative and protective accessories	Control accessories
Shunt release	Padlock	Electric indications of the three positions	External transformer of Phase N
Closed electromagnet	Key lock	Auxiliary contact	Electric leakage transformer
Undervoltage release	Door interlock	Door frame	Grounding current transformer
Undervoltage time-delay release	Three-position lock	Phase partition	Power supply module
Motor-operated mechanism	Mechanical interlock		Relay module



1 Air Circuit Breakers
2 Shunt release
3 Closing electromagnet
4 Undervoltage release
5 Undervoltage delay release
6 Motor mechanism
7 Padlock
8 Key lock
9 Door interlock
10 Cable interlock
11 Lever interlock
12 Three-position lock
13 Aux. switch
14 Door frame
15 Phase partition
16 Earthing current transformers
17 Leakage transformer
18 N-phase external transformer
19 Power module
20 Relay module

TGW1N Series Air Circuit Breaker

1 Overview

TGW1N series Air Circuit Breaker (hereinafter referred to as the circuit breaker) is suitable for distribution network with AC 50/60Hz, rated voltage of AC380V-AC690V, rated current of 200A-6,300A. It is used for distributing electric energy and protecting circuits and power units from overload, short circuit, undervoltage, one-phase ground or residual current. The circuit breaker has the functions of communication and intelligent protection, which can improve the reliability of power supply and avoid unnecessary power failure. It can fully replace CW45 products in the market with its excellent breaking performance and high quality.

International Standard and Certification: CE CB

Comply with the standard: IEC/EN60947-2

2 Type Designation

TG W 1N 2000 H / 3P □ □ □ □ □ □ □ □ □ □

- Special requirements: Default: No lever interlock / cable interlock / one lock and one key / two locks and one key / three locks and one key / extended busbar / electrical three-position indicator / door interlock / dual power controller button lock
- Application: Default: None Plateau Damp and heat Environmental protection Salt spray Low temperature
- Auxiliary contact code: No code: 4NO+4NC
  Other requirements, please specify, for example 5NO+5NC ,6NO+6NC
- Undervoltage release voltage: Default: No AC220V/230V AC380V/400V When the undervoltage voltage is inconsistent with the control circuit voltage, please specify this
- Undervoltage time delay: 1s
- Control circuit voltage: AC220V/230V AC380V/400V DC220V DC110V If there are multiple voltage grades, indicate them in the special instructions
- Controller code: Default: M type For other types of controller, please specify: 3M type 3H type 3P+N (T type) 3P+N (W type)
- Wiring method: Horizontal Vertical Upper horizontal and lower vertical wiring Lower horizontal and upper vertical wiring
- Installation mode: Fixed type Drawer type
- Rated current: 200A …… 6300A
- Number of poles: 3P 4P
- Breaking capacity: None: Conventional type H: High breaking
- Frame current: 1000 1600 2000 2500 3200 4000 6300
- Design code
- Frame code
- Enterprise code

TGW1N Series Air Circuit Breaker

3 Technical Parameters

Basic parameters							
Frame current (A)		1000		1600		2000	
Rated working voltage Ue(V)		AC380/400/415V/660/690V					
Rated insulation voltage Ui(V)		1000					
Rated impulse withstand voltage Uimp(kV)		12					
Frequency (HZ)		50/60					
Usage category		B					
Number of poles		3P/4P					
Maximum continuous current of N pole (A)		100%In					
Full-breaking delay time without addition (ms)		≤30					
Closing time (ms)		≤70					
Flashover distance (mm)		0					
Rated current In(A)		200/400/630 800/1000		200/400/630 800/1000 1250/1600		200/250/400/500/ 630/800/1000/1250/ 1600/1900/2000	
Breaking capacity							
Breaking capacity		Conventional	H	Conventional	H	Conventional	H
Rated ultimate short-circuit breaking capacity Icu(kA)	AC415V	50	66	50	66	80	90
	AC690V	36	42	36	42	50	65
Rated operating short-circuit breaking capacity Ics(kA)	AC415V	50	55	50	55	80	90
	AC690V	36	42	36	42	50	65
Rated short-time withstand current Icw(kA)/1s	AC415V	42	55	42	55	55	65
	AC690V	36	36	36	36	50	55
Rated short-time withstand current Icw(kA)/0.5s	AC415V	/	/	/	/	/	75
	AC690V	/	/	/	/	/	65
Rated short-circuit making capability Icm(kA)	AC415V	110	121	110	121	176	198
	AC690V	55	66	55	66	110	143
Lifetime of product							
Electrical life (times)	AC415V	8,000		8,000		8,000	
	AC690V	3,000		3,000		3,000	
Mechanical life (times)	Without maintenance	15,000		15,000		15,000	
	With With maintenance	30,000		30,000		30,000	
Standard configuration		Fixed	Drawer-type	Fixed	Drawer-type	Fixed	Drawer-type
The body of the circuit breaker		■	■	■	■	■	■
Drawer base		–	■	–	■	–	■
Intelligent controller		■	■	■	■	■	■
Upper and lower horizontal connecting wires		■	■	■	■	■	■
Indicating contact of opening/closing		■	■	■	■	■	■
Indicating contact of fault tripping		■	■	■	■	■	■
Auxiliary contact 4NO+4NC		■	■	■	■	■	■
Electric motor operating mechanism		■	■	■	■	■	■
Closing electromagnet		■	■	■	■	■	■
Shunt release		■	■	■	■	■	■
Phase partition		■	■	■	■	■	■
Door frame		■	■	■	■	■	■
Optional accessories							
Instantaneous undervoltage release		□	□	□	□	□	□
Time-delay undervoltage release		□	□	□	□	□	□
Opening and closing button lock		□	□	□	□	□	□
Lock for the drawer base		□	□	□	□	□	□
Lock for the separation position of the drawer seat		□	□	□	□	□	□
Key lock		□	□	□	□	□	□
Door interlock		□	□	□	□	□	□
Auxiliary contact 6NO+6NC		□	□	□	□	□	□
Electric indications of three positions on the drawer base		□	□	□	□	□	□
Steel cable interlock		□	□	□	□	□	□
Locking interlock		□	□	□	□	□	□
Dual power controller		□	□	□	□	□	□
External neutral line transformer		□	□	□	□	□	□
Zero-sequence transformer		□	□	□	□	□	□
Ground current transformer and its accessories		□	□	□	□	□	□

■ Standard configuration □ Optional

TGW1N Series Air Circuit Breaker

Basic parameters								
Frame current (A)		2500		3200		4000		6300
Rated working voltage Ue(V)		AC380/400/415V/660/690V						
Rated insulation voltage Ui(V)		1000						
Rated impulse withstand voltage Uimp(kV)		12						
Frequency (HZ)		50/60						
Usage category		B						
Number of poles		3P/4P						
Maximum continuous current of N pole (A)		100%In				100%In		50%In
Full-breaking delay time without addition (ms)		≤30						
Closing time (ms)		≤70						
Flashover distance (mm)		0						
Rated current In(A)		630/800/1000/1250/1600/2000 2500		2000/2500 2900/3150 3200		2500/2900/3200/3600/3900/4000		4000/4900 5000/5900 6300
Breaking capacity								
Breaking capacity		Conventional	H	Conventional	H	Conventional	H	Conventional
Rated ultimate short-circuit breaking capacity Icu(kA)	AC415V	100	100	100	100	100	100	120
	AC690V	65	70	65	70	65	85	85
Rated operating short-circuit breaking capacity Ics(kA)	AC415V	80	100	80	100	85	100	100
	AC690V	65	70	65	70	65	85	85
Rated short-time withstand current Icw(kA)/1s	AC415V	80	85	80	85	85	90	100
	AC690V	65	70	65	70	65	85	85
Rated short-time withstand current Icw(kA)/0.5s	AC415V	/	100	/	100	/	100	/
	AC690V	/	75	/	75	/	/	/
Rated short-circuit making capability Icm(kA)	AC415V	220	220	220	220	220	220	264
	AC690V	143	143	143	143	143	143	165
Lifetime of product								
Electrical life (times)	AC415V	6,000		6,000		6,000		1,500
	AC690V	2,000		2,000		2,000		1,000
Mechanical life (times)	Without maintenance	10,000		10,000		10,000		5,000
	With With maintenance	20,000		20,000		20,000		10,000

Standard configuration	Fixed	Drawer-type	Fixed	Drawer-type	Fixed	Drawer-type	Fixed	Drawer-type
The body of the circuit breaker	■	■	■	■	■	■	■	■
Drawer base	–	■	–	■	–	■	–	■
Intelligent controller	■	■	■	■	■	■	■	■
Upper and lower horizontal connecting wires	■	■	■	■	■	■	■	■
Indicating contact of opening/closing	■	■	■	■	■	■	■	■
Indicating contact of fault tripping	■	■	■	■	■	■	■	■
Auxiliary contact 4NO+4NC	■	■	■	■	■	■	■	■
Electric motor operating mechanism	■	■	■	■	■	■	■	■
Closing electromagnet	■	■	■	■	■	■	■	■
Shunt release	■	■	■	■	■	■	■	■
Phase partition	■	■	■	■	■	■	■	■
Door frame	■	■	■	■	■	■	■	■
Optional accessories								
Instantaneous undervoltage release	□	□	□	□	□	□	□	□
Time-delay undervoltage release	□	□	□	□	□	□	□	□
Opening and closing button lock	□	□	□	□	□	□	□	□
Lock for the drawer base	□	□	□	□	□	□	□	□
Lock for the separation position of the drawer seat	□	□	□	□	□	□	□	□
Key lock	□	□	□	□	□	□	□	□
Door interlock	□	□	□	□	□	□	□	□
Auxiliary contact 6NO+6NC	□	□	□	□	□	□	□	□
Electric indications of three positions on the drawer base	□	□	□	□	□	□	□	□
Steel cable interlock	□	□	□	□	□	□	□	□
Locking interlock	□	□	□	□	□	□	□	□
Dual power controller	□	□	□	□	□	□	□	□
External neutral line transformer	□	□	□	□	□	□	□	□
Zero-sequence transformer	□	□	□	□	□	□	□	□
Ground current transformer and its accessories	□	□	□	□	□	□	□	□

■ Standard configuration □ Optional

TGW1N Series Air Circuit Breaker

4 Operating Conditions

4.1 Ambient temperature

4.2 Installation category

Class IV for main circuits of the circuit breaker and voltage tripper coil and primary coil of power transformer; Class III for auxiliary circuit and control circuits. The inclination with the vertical plane does not exceed 5° when installation.

4.3 Pollution degree: 3

4.4 Altitude ≤2,000 meters, derating when above 2,000 meters.

4.5 Atmospheric conditions

The relative humidity does not exceed 50% at the ambient temperature of +40°C, and a higher relative humidity at the lower temperature may be allowed;

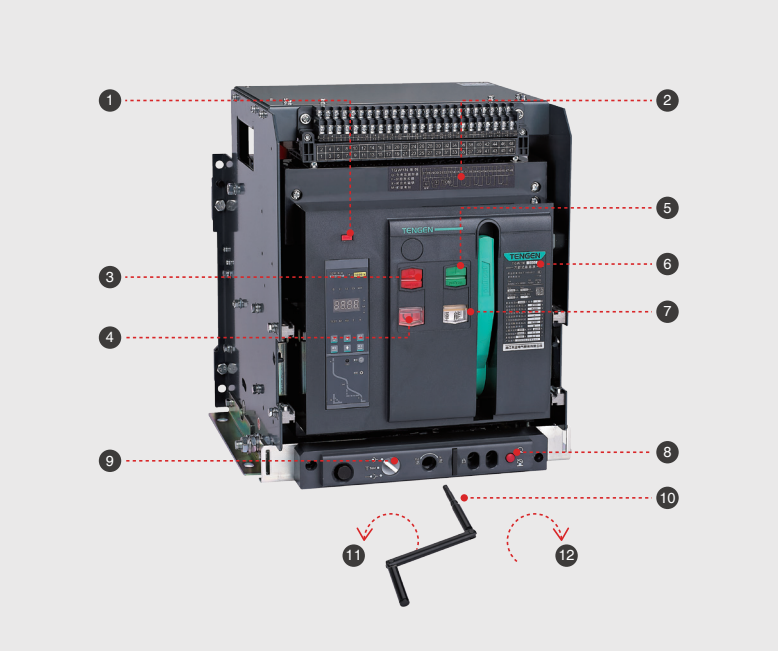
The relative humidity at the low temperature +25°C can be up to 90%. The necessary measures can be taken for condensation on the product surface due to temperature changes.

4.6 Protection grade: IP20 for the front and IP00 for the remaining

4.7 Electromagnetic interference: Suitable for electromagnetic environment A

5 Product Structure

5.1 External structure



1 Reset button for fault trip indication

2 Shell

3 Switching-OFF button

4 Indictor of circuit breaker closed and open

5 Switching-ON button

6 Nameplate

7 Energy storage/release indicator light

8 Drawer three-position button

9 Indication of connection, test and separation positions

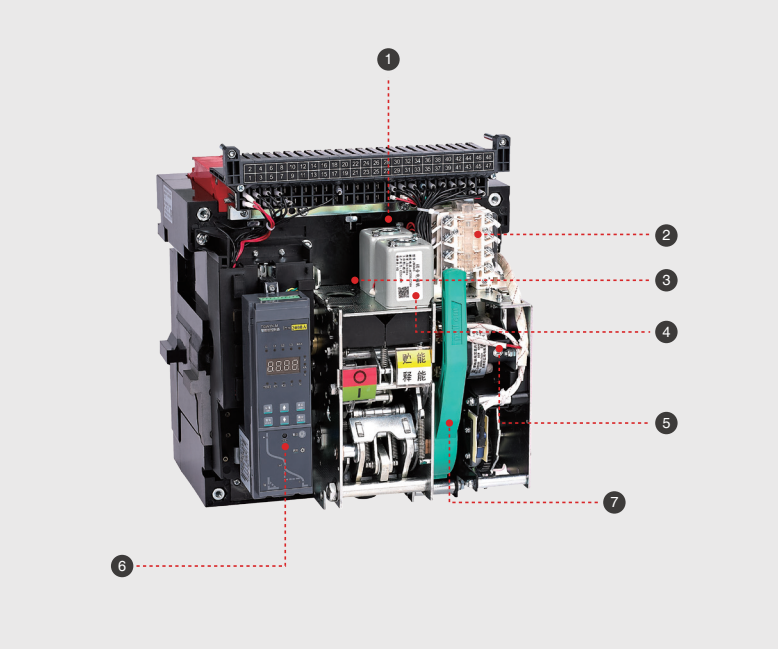
10 Jiggle bar

11 Screw out

12 Screw in

TGW1N Series Air Circuit Breaker

5.2 Internal structure



1 Shunt release

2 Auxiliary contact

3 Undervoltage release

4 Closing electromagnet

5 Electric energy storage mechanism

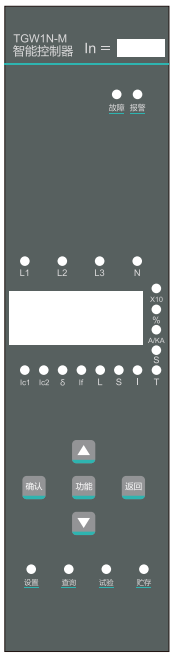
6 Intelligent controller

7.Operating handle

6 Intelligent Controller

6.1 TGW1N-1000/1600 controller

6.1.1 TGW1N-M type



Instructions of key:

- “Enter” key, for entering the next level menu pointed by the current project or select the current parameter, or store the parameter.
- “Function” key, for entering the measurement and protection setting function.
- “Return” key, for returning to the previous menu or cancelling the current parameter, or returning to the main interface.
- “Up” key, for moving the cursor upward or increasing the parameter.
- “Down” key: for moving the cursor downward or decreasing the parameter.

Instructions of indicator lights:

“Fault”: Tripping fault

“Alarm”: Failure alarm

“L1 L2 L3 N”: Current indicator lights, representing: Phase A, Phase B, Phase C and Phase N respectively

“X10”: Indicator light of the action times of the switch

“A/KA”: Current unit indicator light:

“Setting, query, test, storage”: Indicator light for controller operation

“IC1”: Load monitoring 1 indicator light

“δ”: Current unbalance indicator light

“L”: Long-time delay indicator light

“I”: Instantaneous indicator light

“%”: Contact wear indicator light

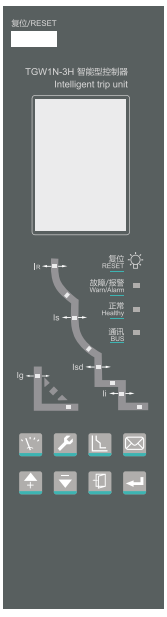
“S”: Time unit indicator light

“IC2”: Load monitoring 2 indicator light

“If”: Grounding indicator light

“T”: Self-diagnosis indicator light

6.1.2 TGW1N-3M/3H type



Instructions of key:

- “Measure” key, for switching to “measure” interface (it is “left” key in the password input interface).
- default translation
- “Set” key, for switching to “system parameter setting” interface (it is “right” key in the password input interface).
- “Protection” key, for switching to the “protection parameter setting” interface.
- “Information” key, for switching to the “information record” interfaces.
- “Up” key, for moving the cursor upward or increasing the parameter.
- “Down” key, for moving the cursor downward or decreasing the parameter.
- “Return” key, for returning to the previous menu or cancelling the current parameter, or returning to the main interface.
- “Enter” key, for entering the next level menu pointed by the current project or select the current parameter, or store the parameter.

“IR” is the indicator light of overload long-time delay fault, which will be on after parameter setting and fault tripping.
“Isd” is the indicator light of short circuit short-time delay fault, which will be on after parameter setting and fault tripping.
“Ii” is the indicator light of short circuit instantaneous fault, which will be on after parameter setting and fault tripping.
“Ig” is the indicator light of ground fault, which will be on after parameter setting and fault tripping.

“Fault / Alarm”: Fault or alarm indicator light
“Normal”: Controller normal operation indicator light
“Communication”: Communication indicator light

TGW1N Series Air Circuit Breaker

6.2 TGW1N-2000-6300 controller

6.2.1 TGW1N-M type (LED display)

Instructions of key:

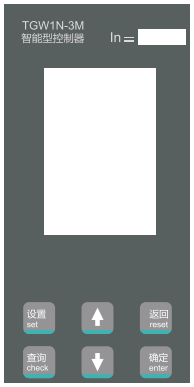
- “Set” key, for entering the measurement and protection setting function.
- “Up” key, for moving the cursor upward or increasing the parameter.
- “Return” key, for returning to the previous menu or cancelling the current parameter, or returning to the main interface.
- “Check” key, enter the setting and information.
- “Down” key, for moving the cursor downward or decreasing the parameter.
- “Enter” key, for entering the next level menu pointed by the current project or select the current parameter, or store the parameter.
- “TEST” key, for instantaneous trip test.
- “Reset” key, for exiting the fault display status.

Instructions of indicator lights:

“In”: Indicate the rated current of the controller
“G”: Grounding or electric leakage current indicator light
“L1 L2 L3”: Current indicator lights, representing: Phase A, Phase B and Phase C
“A/KA”: Current unit indicator light:
“TEST”: Function test indicator light
“IC1”: Load monitoring 1 protection indicator light
“δ”: Current unbalance indicator light
“IR”: Long-time delay protection indicator light
“Status”: Controller operation status indicator light;
Green: Represent normal operation;
Blue: Represent protection alarm;
Red: Represent protection action and controller tripping.

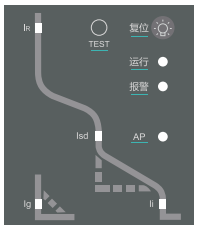
“Ii”: Instantaneous indicator light
“MAX”: Maximum current indicator light for Phase A, Phase B and Phase C
“S”: Time unit indicator light
“IC2”: Load monitoring 2 protection indicator light
“N”: Phase N indicator light
“Isd”: Short-time delay protection indicator light
“Ig”: Ground protection indicator light

6.2.2 TGW1N-3M/3H type (LCD display)



Instructions of key:

- “Set” key, for entering the measurement and protection setting function.
- "Up" key for moving the cursor upward or increasing the parameter.
- “Return” key, for returning to the previous menu or cancelling the current parameter, or returning to the main interface.
- “Check” key, enter the setting and information.
- “Down” key, for moving the cursor downward or decreasing the parameter.
- “Check” key, for entering the next level menu pointed by the current project or select the current parameter, or store the parameter.
- “TEST” key, for instantaneous trip test.
- “Reset” key, for exiting the fault display status.



Instructions of indicator lights:

“IR” is the indicator light of overload long-time delay fault, which will be on after parameter setting and fault tripping.
“Isd” is the indicator light of short circuit short-time delay fault, which will be on after parameter setting and fault tripping.
“Ii” is the indicator light of short circuit instantaneous fault, which will be on after parameter setting and fault tripping.
“Ig” is the indicator light of ground fault, which will be on after parameter setting and fault tripping.
“AP”: Advanced protection failure indication (such as: phase loss, overvoltage, voltage unbalance, under-frequency, over-frequency, phase sequence, reverse power and other fault tripping. If it only alarms and doesn’t trip, the "alarm" lamp will be on.))

“Operation” lamp flicker represents that the controller works normally.
“Alarm” lamp flicker represents fault tripping. If it keeps on, it represents alarm.
“Communication” lamp flicker represents that it is communicating.

6.3 Differences of intelligent controllers

Function configuration	Model and specification of the intelligent controller			Remarks
	M	3M	3H	
Current display function	√	√	√	①
Overload long-time delay protection (inverse time-delay)	√	√	√	
Short circuit short-time delay (definite time-delay + inverse time-delay)	√	√	√	
Instantaneous short circuit protection	√	√	√	
Single-phase grounding protection	√	√	√	
Current unbalance protection	√	√	√	
Parameter setting function	√	√	√	
Simulation test function	√	√	√	
Check function	√	√	√	
Self-diagnostic function	○	√	√	
Programming interface function	△	△	△	
Communicating and networking function	△	△	√	
Record of contact equivalent	△	√	√	
Record of operation times	△	√	√	
Clock record	△	√	√	
Alarm records	△	√	√	
Displacement record	△	√	√	
Historical peak current record	△	√	√	
MCR and HSISC functions	○	○	○	
Electric leakage protection (inverse time-delay and definite time-delay)	○	○	○	
Neutral phase (N-phase) protection	○	○	√	
Load monitoring function (Method I or Method II)	○	√	√	
Voltage measurement display function	△	○	√	
Frequency measurement display function	△	○	√	
Display of unbalanced voltage measurement	△	○	√	
Power measurement display function	△	○	√	
Electric energy measurement and display function	△	○	√	
Fault clock function	△	√	√	
Historical data recording function	√	○	√	
Phase sequence test	△	○	√	
Harmonic measurement function	△	○	√	
Harmonic impact factor function	△	○	√	
Overvoltage and undervoltage protection	△	○	√	
Voltage unbalance protection	△	○	√	
Over-frequency and under-frequency protection	△	○	√	
Phase sequence protection	△	○	√	
Inverse power protection	△	○	√	
Demand value protection	△	○	○	
Location lock function	△	△	△	
Thermal memory function	√	√	√	
Relay output function	○	○	√	

1. Note: "√" represents default configuration function; "○" represents optional function; " △ " represents unsupported functions.
2. Remarks: ① Conventional product of TGW1N series is M controller

TGW1N Series Air Circuit Breaker

7 Protective Characteristics of the Intelligent Controller

7.1 Protective characteristics of the intelligent controller

Protective characteristics of the intelligent controller include inverse time-delay and definite time-delay. When the fault current exceeds the inverse time-delay setting value, the controller provides the time-delay protection function according to the definite time-delay.

7.1.1 Overload long-time delay protection features

Overload long-time delay protection		<1.05IR: >2h Inaction; >1.3IR; <1h Action						
Range of IR current setting value		（0.4 ～ 1.0）In+OFF						
Inverse time-delay action features		$t=(1.5/N)^2*t_R$						
Setting scope of the time t_R		15s	30s	60s	120s	240s	480s	OFF
Action time s	$1.5I_R$	15s	30s	60s	120s	240s	480s	Alarm
	$6I_R$	0.938s	1.875s	3.75s	7.5s	15s	30s	
	$7.2I_R$	0.651s	1.302s	2.604s	5.208s	10.4s	20.8s	
Thermal memory time		30min(ON)/OFF						

Note: N Fault current divide the multiple of setting current I/I_R
t Fault action delay time
t_R Long-time delay action setting value
Allowable error of action time ±10%

7.1.2 Short circuit short-time delay protection features

Short circuit short-time delay protection		<0. 9Isd; Inaction; >1.1Isd: Action						
Range of Isd current setting value		（0.4 ～ 15）In+OFF						
Setting scope of the time tsd		0.1s 0.2s 0.3s 0.4s OFF						
Action time s	Isd ＜ I≤$8I_R$	Inverse time-delay	Action feature	$I^2t=(8I_R)^2tsd$				
	I ＞ 8Isd	Definite time-delay	Setting time s (tsd)	0.1	0.2	0.3	0.4	Alarm
			Time-delay (ms)	60	160	255	340	
			Maximum disconnection time (ms)	140	240	345	460	

Note: Isd Short-time delay current setting value
I Fault current value
I_R Long-time delay setting value
tsd Short-time delay inverse time-delay setting value
Allowable error of action time ±15%

7.1.3 Instantaneous short circuit protection features

Threshold value of short circuit instantaneous protection action	≤0.85Ii: Inaction; >1.15Ii: Action;
1600AF, 2000AF: 1.0In ~ 50kA+OFF (Setting step length of 1A)	
2500AF, 3200AF,4000AF: 1.0In ~ 75kA+OFF (Setting step length of 2A)	
6300AF: 1.0In ~ 100kA+OFF (Setting step length of 2A)	
Accuracy: Less than 100ms (including the inherent breaking time of the circuit breaker)	

7.1.4 Ground fault protection features

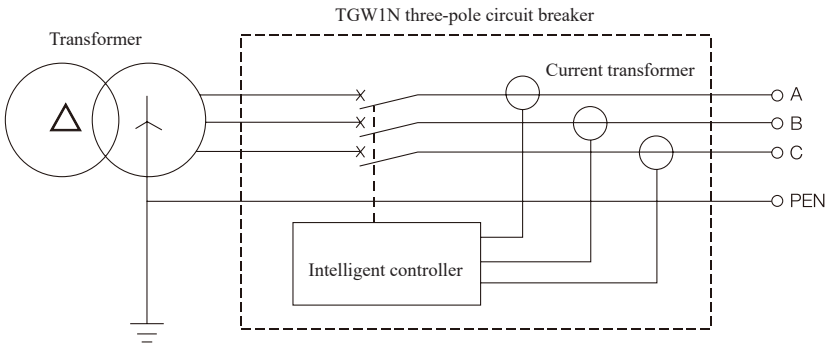
Ground fault protection action threshold value		< 0.9Ig; Inaction > 1.1Ig; Action					
Current setting value		(0. 2 ~1. 0) In+OFF 100A min					
Setting scope of the time tg		0.1s 0.2s 0.3s 0.4s OFF					
tg(s)		Action feature					
	tg	0.1s	0.2s	0.3s	0.4s	0.4s	OFF
	Time-delay	60	160	255	340	340	Alarm
	Maximum disconnection time (ms)	140	240	345	460	460	
		Allowable error of action time ±15%					

7.1.5 Intelligent controller factory setting value

Tripping curve I^2t	Long-time delay	Short-time delay	Instantaneous	Instantaneous fault	Thermal memory
	I_R t_R	Isd tsd	Ii	Ig tg	
	1.0In 60s	8In 0.2s	12In	0.8In 0.4s	OFF

7.2 Grounding current protection

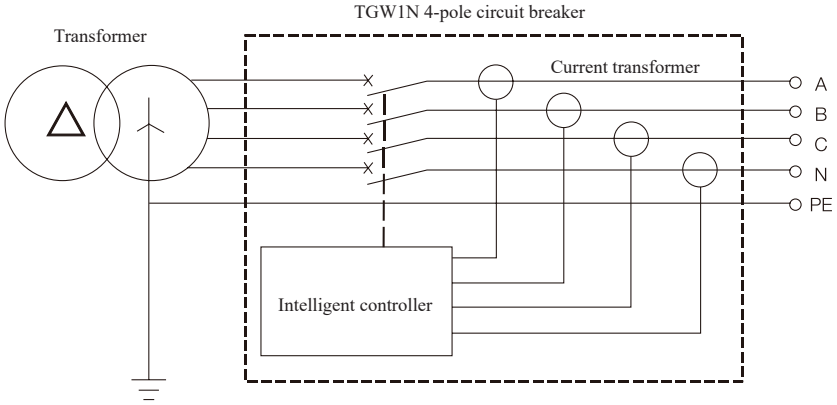
7.2.1 3PT type (Standard)



Differential ground fault protection, with the signal from the vector sum of three-phase current (Three-phase unbalance)

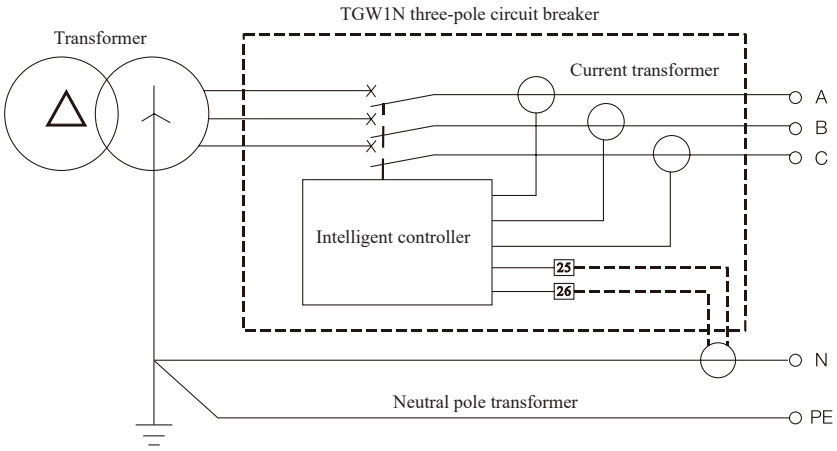
TGW1N Series Air Circuit Breaker

7.2.2 4PT type



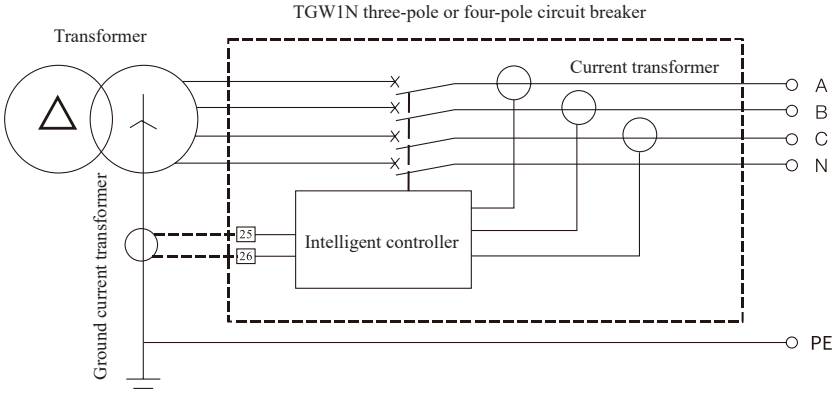
Differential ground fault protection, with the signal from of the vector sum of three-phase current and N pole current

7.2.3 (3P+N)T type



Differential ground fault protection for external neutral pole transformer, with the signal from the vector sum of three-phase current and N pole current only

7.2.4 (3P+N) W type



Ground current type ground fault protection of the external grounding current transformer, with the signal between the neutral point of the main power supply and ground.

8 Measurement Accuracy of the Controller

Current measurement	
Measurement range	Ia, Ib, Ic and IN less than 15IN (rated current of circuit breaker)
Measurement accuracy	Below 0.1In; it is inaccurate during measurement
	0.1In-0.4In; the accuracy will change from 5% to 2% linearly
	0.4In - 1.5In; the accuracy is 2%
	Above 1.5In; the accuracy will change from 2% to 15% linearly
Voltage measurement	
Measurement range	Line voltage: (0~1200)V
Measurement accuracy	Phase voltage: (0~690)V
	Error: ±1%
Frequency	
Measurement range	40Hz~70Hz
Error	±0.1Hz
Power	
Measurement mode	Effective value
Measurement contents	3P type: Total active power, total reactive power and total apparent power
	4P type: Split-phase active power, split-phase reactive power, split-phase apparent power, total active power, total reactive power, total apparent power
Measurement range	Active power: -32768KW~+32767KW
	Reactive power: -32768Kvar~+32767Kvar
	Apparent power: 0KVA~65535Kvar
	Error: ±2.5%
Power factor	
Measurement contents	3P type: Total power factor
	4P type: Split-phase power factor of each
Measurement range	-1.00~+1.00
Electric energy	
Measurement contents	Input reactive electric energy (EQin), output reactive electric energy (EQout)
	Input active electric energy (EQin), output reactive electric energy (EQout)
	Total active energy (EPtotal), total reactive energy (EQtotal) and total apparent energy (EStotal)
Measurement range	Active: 0~4294967295kWh
	Reactive: 0~4294967295kvarh
	Apparent: 0~4294967295kVAh
Measurement accuracy	±2.5%
Harmonics measurement	
Fundamental wave measurement	Current: Ia, Ib, Ic
	Voltage: Uab, Ubc, Uca
Total harmonic distortion	
THD and Thd	THD: The total distortion rate of harmonics relative to fundamental waves
	ThD: The total distortion rate of harmonics relative to effective values
The amplitude spectrum of harmonics	The controller can display the FFT amplitude of 3~31 odd harmonics, in the unit of %.
Measurement accuracy of the control unit	±2%

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9 Product Accessories

9.1 Shunt release

After the circuit breaker stores energy, the shunt excitation coil can disconnect the circuit breaker instantaneously under the specified power supply voltage, which can be achieved remotely;

9.1.1 1000/1600 frame

Rated control power supply voltage Us (V)	AC220/230/240 AC380/400/415	DC220、DC110
Action voltage (V)	(0.7~1.1)Us	
Power consumption	56VA	250W
Segment time (ms)	(50±10)ms	

9.1.2 2000-6300 frame

Rated control power supply voltage Us (V)	AC220/230/240 AC380/400/415	DC220	DC110
Action voltage (V)	(0.7~1.1)Us		
Power consumption	300VA	132W	70W
Segment time (ms)	30~50		

Note: The pulse mode with a pulse width of 1s must be available, otherwise the component may be burnt out.

9.2 Closing electromagnet

After the circuit breaker stores energy, the closed electromagnet can close the circuit breaker under the specified power supply voltage, which can be achieved remotely;

9.2.1 1000/1600 frame

Rated control power supply voltage Us (V)	AC220/230/240 AC380/400/415	DC220、DC110
Action voltage (V)	(0.85~1.1)Us	
Power consumption	56VA	250W

9.2.2 2000-6300 frame

Rated control power supply voltage Us (V)	AC380/400、230/220	DC220	DC110
Action voltage (V)	(0.85~1.1)Us		
Power consumption	300VA	132W	70W
Closing time (ms)	No more than 70ms		

Note: It is prohibited to work for long time to prevent damage. Especially in the automatic control system, the pulse mode with a pulse width of 1s must be available, otherwise the component may be burnt out.

9.3 Undervoltage release

Achieve the undervoltage protection function of the circuit breaker. The Undervoltage time-delay release can disconnect the circuit breaker after 0.5s, 1s, 1.5s, 3s, 5s and 7s.

- When the voltage is 35%-70% of the rated working voltage, the Undervoltage release shall make the circuit breaker trip reliably.
- When the voltage is 85%-110% of the rated working voltage, the Undervoltage release shall ensure to make the circuit breaker closed.
- When the voltage is below 35% of the rated working voltage, the Undervoltage release shall prevent the circuit breaker from closing.

9.3.1 1000/1600 frame

Rated working voltage Ue(V)	AC220/230/240、AC380/400/415
Action voltage (V)	(0.35~0.7)Ue
Reliable closing voltage (V)	(0.85~1.1)Ue
Reliable unclosing voltage (V)	≤0.35Ue
Power consumption	20VA

9.3.2 2000-6300 frame

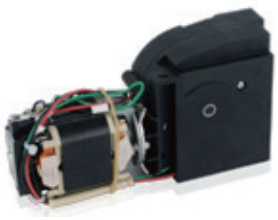
Rated working voltage Ue(V)	AC220/230/240 AC380/400/415	DC220、DC110
Action voltage (V)	（0.35~0.7）Ue	（0.35~0.7）Ue
Reliable closing voltage (V)	（0.85~1.1）Ue	（0.85~1.1）Ue
Reliable unclosing voltage (V)	≤0.35Ue	≤0.35Ue
Power consumption	48VA	48W

Note: The Undervoltage releasemust be energized first in order to re-buckle and close the circuit breaker, otherwise it will damage the circuit breaker.

9.4 Electric motor operating mechanism

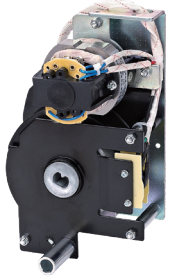
When the circuit breaker is powered on, it will automatically store energy; The energy can be stored with handle when it is powered off.

9.4.1 1000/1600 frame



Rated control power supply voltage Us (V)	AC220/230/240 AC380/400/415	DC220、DC110
Action voltage (V)	(0.85~1.1)Us	
Power consumption	90VA	90W
Stored-energy time	＜ 4s	
Operation frequency	≤ 3 minutes/time	

9.4.2 2000-6300 frame



Rated control power supply voltage Us (V)	AC220/230/240 AC380/400/415	DC220	DC110
Action voltage (V)	(0.85~1.1)Us		
Power consumption	85/110	85	110
Stored-energy time	≤ 5s		

Note: It shall not be powered on for a long time, to avoid damage.

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9.5 Auxiliary contact

It can be used for monitoring the status of the circuit breaker, such as connecting with the position signal lamp and disconnecting indicator light of the circuit breaker.

- Standard type, 4NO+4NC by default (4 sets of transfer contacts)
- Special type, 3NO+3NC, 5 sets of transfer contact, 6 sets of transfer contact

1000/1600 frame

2000-6300 frame

Rated voltage (V)	Rated heating current Ith (A)	Rated control capacity
AC230	6	300VA
AC415	6	300VA
DC220	6	60W

9.6 Door frame and gasket

It is installed on the door of the distribution cabinet chamber for sealing, with the protection grade of IP40 (it is divided into drawer type and fixed type).

9.7 Dust cover

Fastened to the beam of the drawer seat to prevent any dust or other debris from falling into the secondary circuit terminal, leading to poor contact.

9.8 Phase partition

It is installed between phases of the terminal block, for increasing the interphase insulation capacity of the circuit breaker.

9.9 Grounding current transformer

It is a special external transformer for measuring neutral phase current when the ground mode is ground current return mode. It can protect the upper and lower ground faults of the circuit breaker at the same time.

9.10 External transformer of Phase N

It is an external transformer for measuring the neutral phase current under 3P+N grounding mode. It shall be sleeved on the busbar

1000/1600 frame

2000-6300 frame

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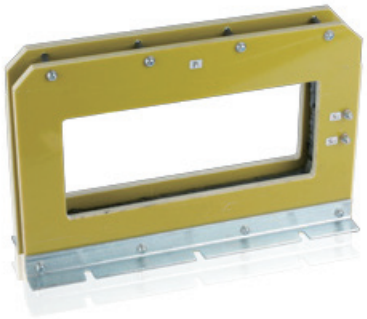
9.11 Electric leakage transformer

It is a special external rectangular transformer under the electric leakage grounding protection.



9.12 Power supply module

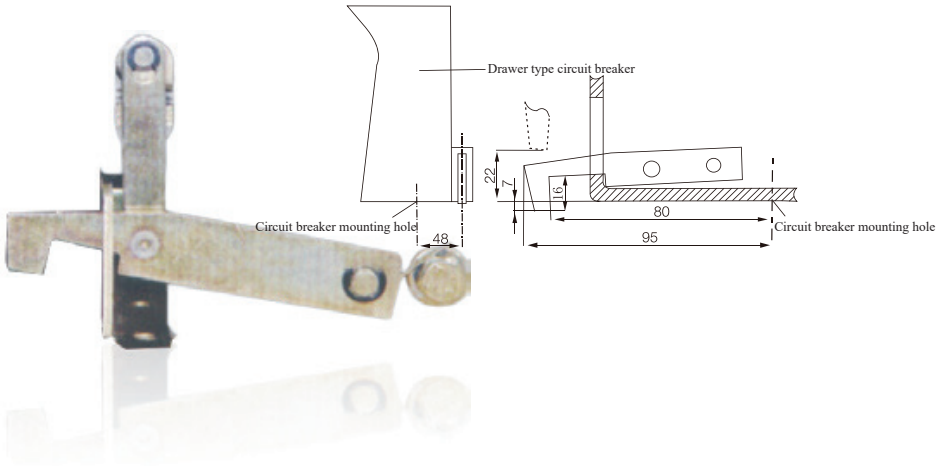
It can provide a DC 24V power supply with the power not less than 9.6W. It can output 4 sets of wiring terminals. Both AC and DC inputs are available (AC/DC220V). It can be used as a relay module power supply.

9.13 Power supply module

The output signal unit of the controller is generally used for fault alarm or indication. When the load capacity generated when it is used for the closing and opening of the circuit breaker is large, the control should be conducted after it is converted through the relay module. Contact capacity is: AC250V,10A,DC28V,10A

9.14 Door interlock

The gate interlock mechanism is installed on the circuit breaker, which can avoid the opening of the small chamber gate when the drawer type circuit breaker is separated. The door interlock is generally installed on the right side of the circuit breaker.



9.15 Key lock

The opening lock can lock the circuit breaker at the disconnection position. The circuit breaker can be closed only when the lock is opened with a key and the key is not pulled out.

- One key with one lock
- Two locks with one key
- Three locks with two keys
- Five locks with three keys

9.16 Three-position lock

It is in the drawer type circuit breaker and is used for breaking the “connection”, “test” and “separation” positions of the circuit breaker. The three positions of the circuit breaker shall be indicated by the indicator. The handle is locked in the exact position. The locking can be released through the reset button.

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9.17 Reclosing Function Introduction

9.17.1 Operation panel

Turn the rocker switch on the panel to the “Auto” position to allow the automatic reclosing operation; the auto reclosing operation is not allowed when at the “Manual” position.

Indication diagram shown below:

Auto reclosing is only suitable for fault caused by undervoltage or overload, and there is no magnetic flow. The opening action can be conducted by the shunt coil (the contacts of one circuit shall be controlled) or the undervoltage release. The auto reclosing is not allowed for the opening operation caused by magnetic flow.

9.17.2 Undervoltage reclosing function

The undervoltage reclosing function can be used in the power grid in the area where there area where the thunder and lightning occur frequently and where the power supply is unstable to prevent the circuit breaker from trip due to voltage reduction for short time for protection due to abnormal line voltage.

9.17.2.1 Parameters setting

- Press the “Set” key to enter the “Undervoltage” submenu under the “Voltage protection” menu; firs set the execution mode = “reclosing”, and then set the start value, start time, return value, and return time. The set values are as follows:

Execution mode ↓ =reclosing Start value =280V	Start time ↕ = 0,0s Return value =320V	Return time ↑ = 3,0s

When the measured line voltage is below the start value 280V that is an operating voltage, the controller will issue an opening signal instantly after 0.0s to make the shunt coil or undervoltage release work; when the voltage recovers to the return value 320V, the controller will issue a pulse signal to the closing coil after 3.0s to activate it to conduct the automatic reclosing operation.

9.17.2.2 Port setting

- Press the “Query” key to enter the “Function setting” submenu under the “I/O setting” menu, and conduct the following settings:

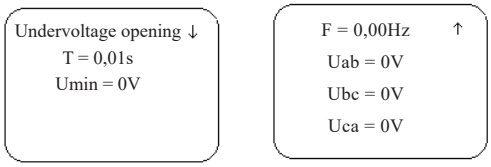
Function setting = D03 = OFF	Function setting = D04 = ON

- Press the “Query” key to enter the “Execution mode” submenu under the “I/O setting” menu, and conduct the following settings:

Execution mode = D03 = Normally open pulse = 1s	Execution mode = D04 = Normally open pulse = 1s

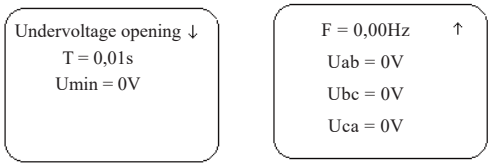
9.17.2.3 Fault records

In the event of an undervoltage fault, the controller will pop up the following interface:

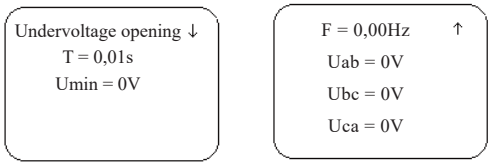


If the voltage recovers to the normal value, and closing is conducted successfully, return to the power-on interface.

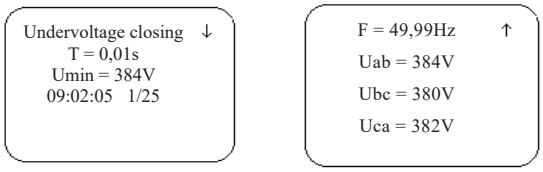
After the controller is powered off, and the last fault is caused by undervoltage to turn the rocker switch to the "Reclosing auto" state, the following interface will pop up automatically after power-on:



The undervoltage opening record can be inquired in the trip record, and the display contents are shown below:



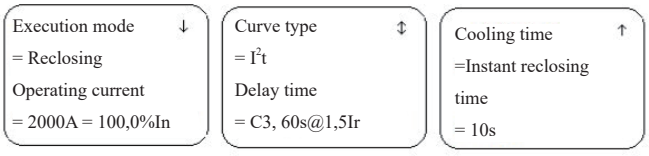
The undervoltage automatic closing record is only inquired in the trip records with an interface not popped up, and the display contents are shown below:



9.17.3 Overload reclosing function

9.17.3.1 Parameters setting

- Press the "Set key" twice to enter the "Long delay" submenu under the "Current protection" menu; first set the execution mode = "Reclosing", and then set the operating current, curve type, delay time, cooling time, reclosing current and reclosing time, such as:



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Overload opening operation characteristics

Characteristic	Current multiple (I/Ir)	Appointed opening time	Allowed delay error
Non-operating characteristic	<1.05	No operate >2h	±10%
Operating characteristic	>1.2	Operated <1h	
Operation delay	≥1.2		

Overload reclosing operation characteristics

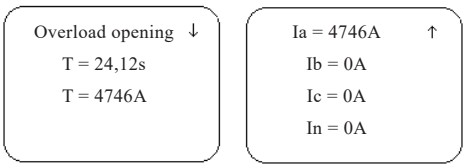
Characteristic	Reclosing time	Appointed closing time	Allowed delay error
Non-return characteristic	<	Non-closing	±10%
Return characteristic	>=	Closing, definite time characteristic equals to the set delay time	

- ●If the “IO setting” of the undervoltage reclosing is modified, the IO function setting and execution mode of the overload reclosing are consistent with those of the undervoltage reclosing. If not, please set it according to the above undervoltage reclosing setting mode.

9.17.3.2 View fault record

The following interface will pop up in the event of an overload fault. If the fault is eliminated and the closing is conducted successfully, return to the power-on operation interface. After the controller is powered off, if the last fault is caused by the overload, the following interface will pop up automatically after power-on.

The automatic closing record can be inquired without popping up the interface.



9.17.3.3 Advanced setting

In order to improve the safety of the product, the overload reclosing times and time window length are limited. The specific operations are as follows:

When the controller is in the Reset state, with the “▲”, “▼” and “Confirm” keys pressed, the window will display “0000”; press the “Confirm” key, and enter the advanced password “0001”; press the “Confirm” key, and then press the “▼” key to move the frame to the “Advanced setting” interface; press the “Confirm” key again to move the frame to the “Time window length” and “Reclosing (closing) times” menus for setting. Press the “Confirm” key to save. Press the “Exit” to cancel modification.

Note: For the opening of the controller due to overload fault within the default 10 minutes, the reclosing operation can be conducted three times; it is recommended not conduct any change by users.

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10 Mechanical Accessories

10.1 Interlock mechanism

The mechanical interlock mechanism is installed on the right-side plate of circuit breaker;

When any circuit breaker is closed, then none of other circuit breakers can be closed;

The interlock mechanism and the interlocking that can be used for both drawer type circuit breakers and the fixed circuit breakers;

The interlock mechanism is installed by the user;

The distance between the circuit breaker using cable interlock and the circuit breaker shall not be more than 2m;

The distance between the circuit breaker using hard lever interlock and the circuit breaker is 0.9m;

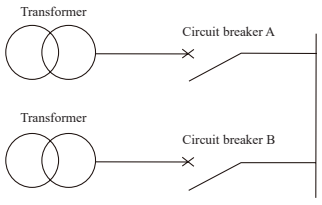
When using the cable interlock, the minimum corner radius of the cable interlock shall not be less than R120mm.

Mechanical interlock type that can be provided

Interlocking pattern	Between two circuit breakers		Among three circuit breakers	
	Horizontal	Vertical	Horizontal	Vertical
Cable interlock	√	√	√	√
Hard lever interlock	×	√	×	×

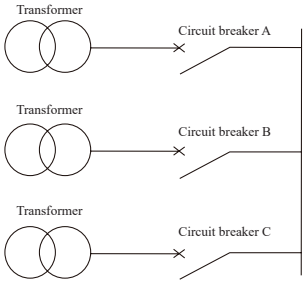
10.2 Typical application of the interlocking device

10.2.1 Interlock between two circuit breakers



Emergency power supply (circuit breaker B)	Normal power supply (circuit breaker A)
0	0
0	1
1	0
1 represents circuit breaker closing; 0 represents circuit breaker disconnection	

10.2.2 Interlock among three circuit breakers (only one circuit breaker can be closed)



Emergency power supply (circuit breaker)	Emergency power supply (circuit breaker)	Normal power supply (circuit breaker)
0	0	0
0	0	1
0	1	0
1	0	0
1 represents circuit breaker closing; 0 represents circuit breaker disconnection		

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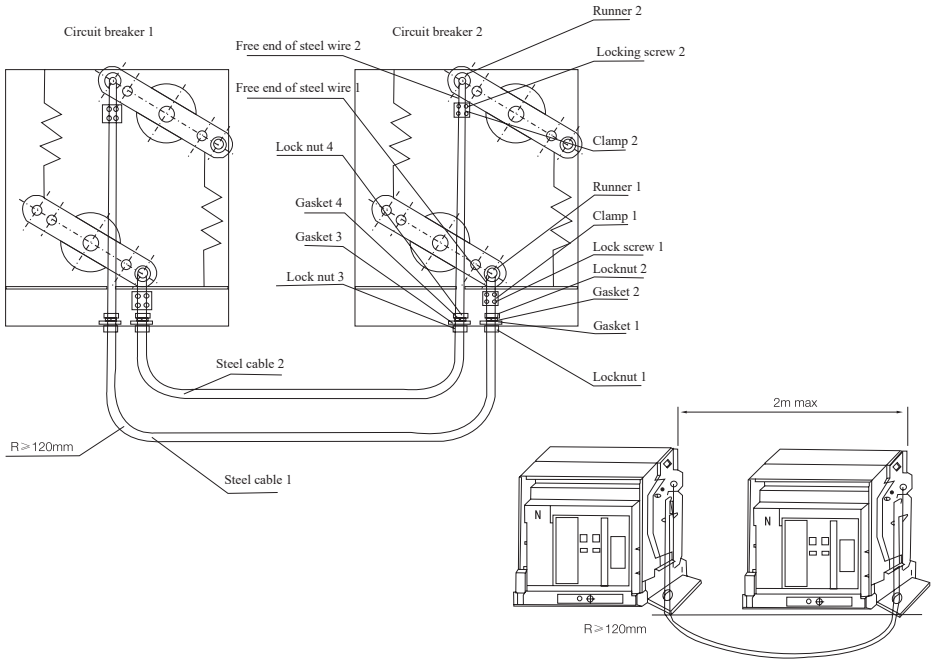
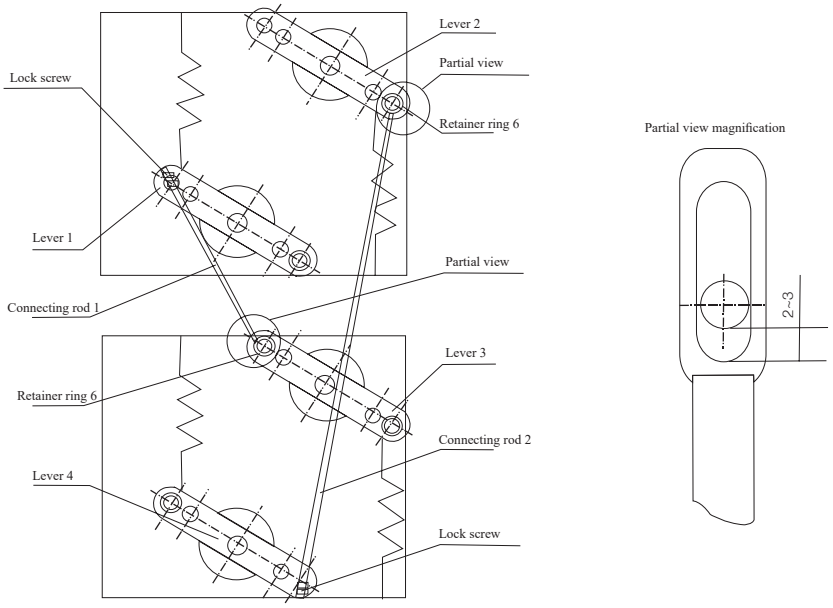
10.3 Schematic diagram of cable connection between two circuit breakers



10.4 Connection diagram for hard lever interlock between two circuit breakers



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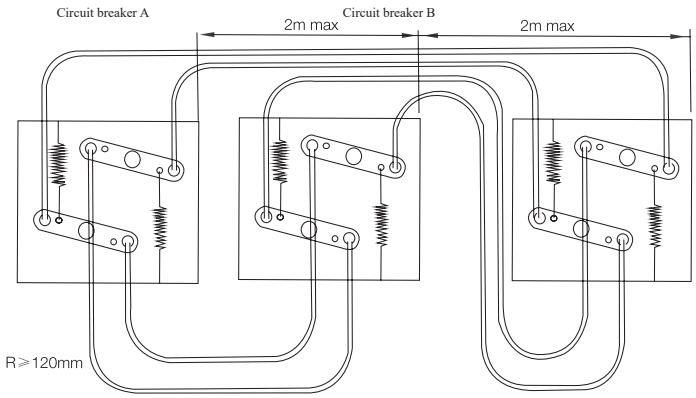
10.5 Cable interlock among three circuit breakers



Key lock

The breaking button of the circuit breaker can be locked at the down position. At the same time, the circuit breaker cannot close.

If the user selects it, the manufacturer will provide a lock and key.

If the user buys the key lock separately. During installation, a hole saw is required.

Tap a hole, with the diameter of φ28mm. The hole saw shall be prepared by the user.

Note: After the circuit breaker is locked with a key lock, it cannot be closed manually or electrically.

a. One key with one lock: A circuit breaker is equipped with an independent lock and a key.

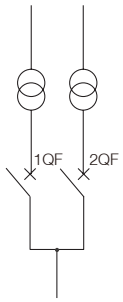
Circuit diagram

Possible modes of operation

QF
0
1

b. Two locks with one key: Two circuit breakers are equipped with 2 same locks and 1 key.

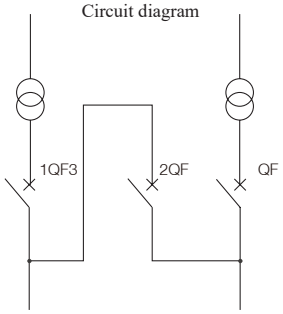
Circuit diagram



Possible modes of operation

1QF	2QF
0	0
0	1
1	0

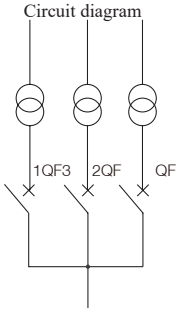
c. Three locks with two keys: Three circuit breakers are equipped with 3 same locks and 2 same keys.



Possible modes of operation

1QF	2QF	3QF
0	0	0
0	0	1
0	1	1
1	0	0
1	1	0
1	0	1

d. Three locks with one key: Two circuit breakers are equipped with 3 same locks and 1 key.



Possible modes of operation

1QF	2QF	3QF
0	0	0
0	0	1
0	1	0
1	0	0

Attention: For a Air Circuit Breaker with a key interlock, when the key needs to be pulled out, press the opening button firstly, turn the key counterclockwise and pull it out.

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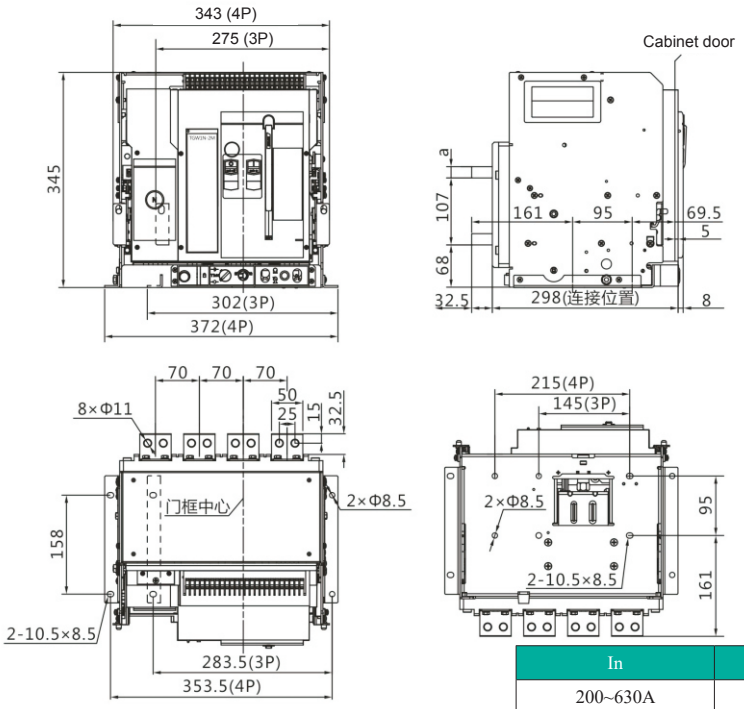
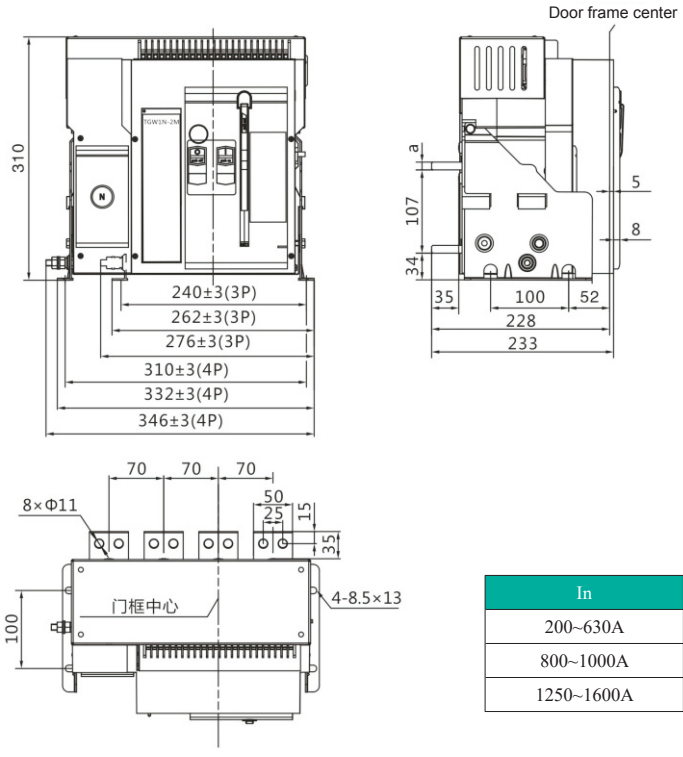
11 Outline and Installation Dimensions

11.1 TGW1N-1000/1600 intelligent Air Circuit Breaker (drawer type)



In	a (mm)
200~630A	6
800~1000A	10
1250~1600A	18

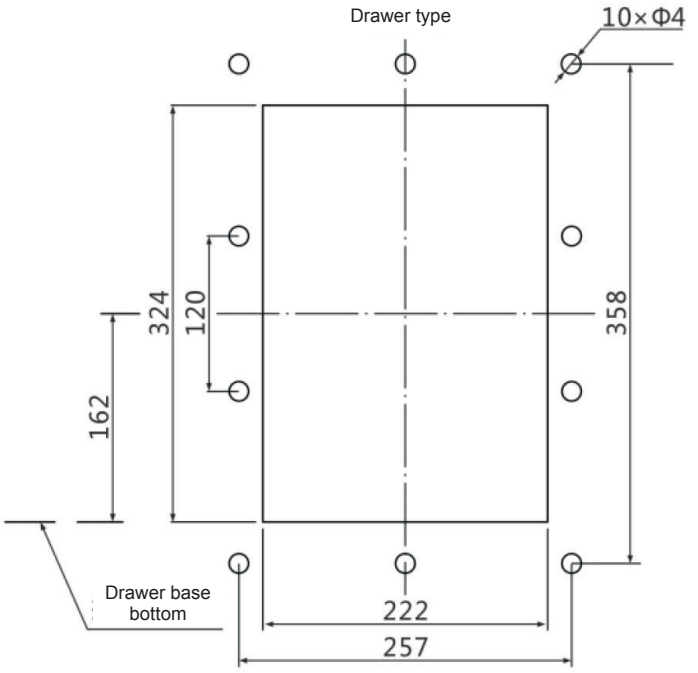
11.2 TGW1N-1000/1600 intelligent Air Circuit Breaker (fixed)



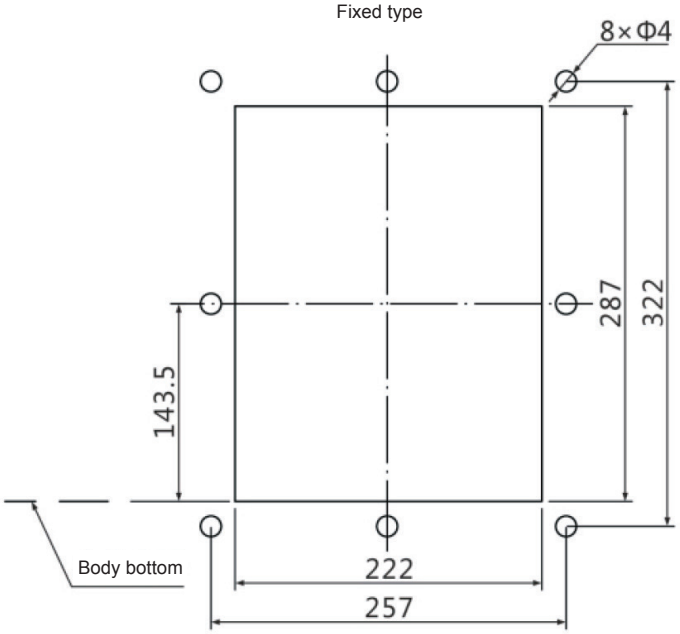
In	a (mm)
200~630A	6
800~1000A	10
1250~1600A	18

11.3 Hole sizes of TGW1N-1000/1600 panel

Hole size of door frame

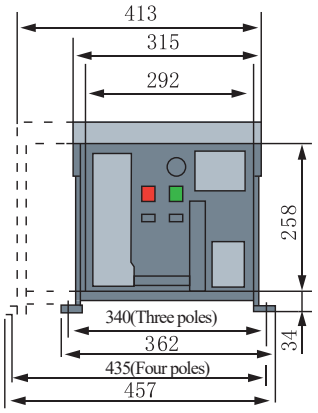


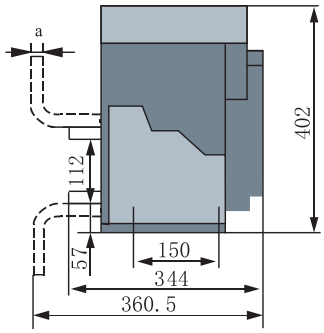
Hole size of door frame

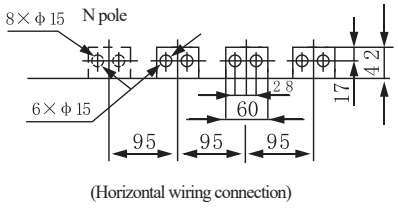


TGW1N Series Air Circuit Breaker

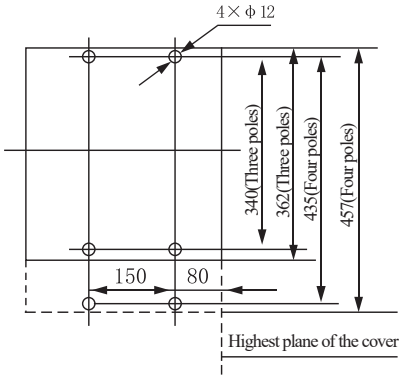
11.4 TGW1N-2000/TGW1N-2000H fixed type circuit breaker

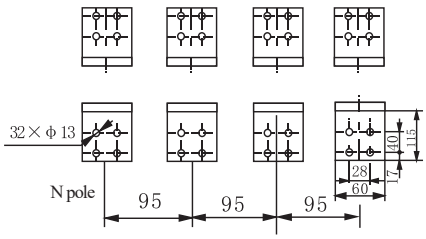






(Horizontal wiring connection)

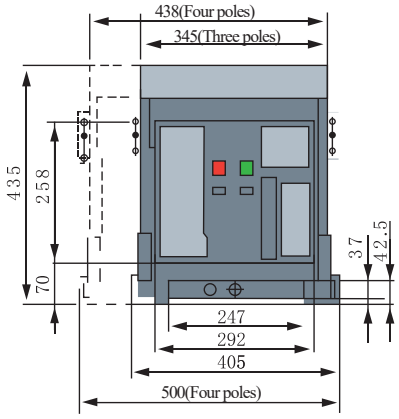


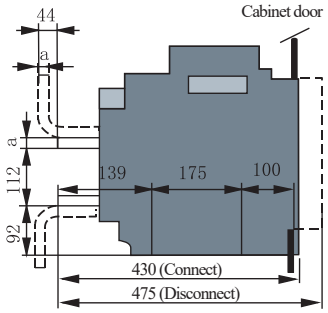


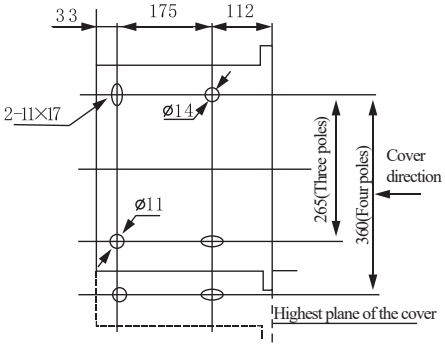
(L type vertical wiring connection)

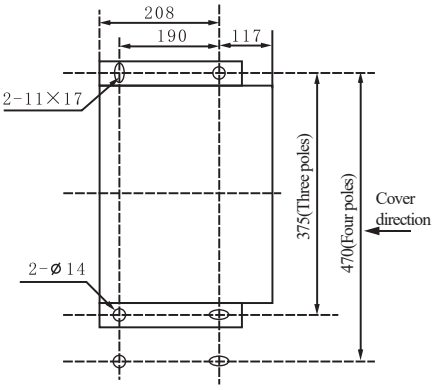
In	200-630A	800-1600A	1900-2000A
a	10	15	20

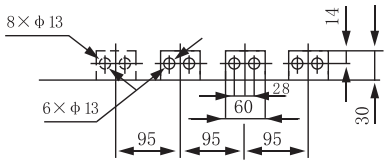
11.5 TGW1N-2000/TGW1N-2000H drawer type circuit breaker



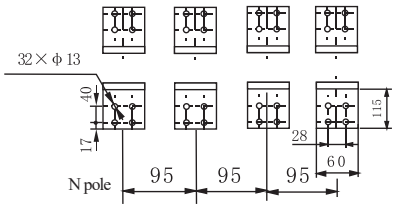








(Horizontal wiring connection)

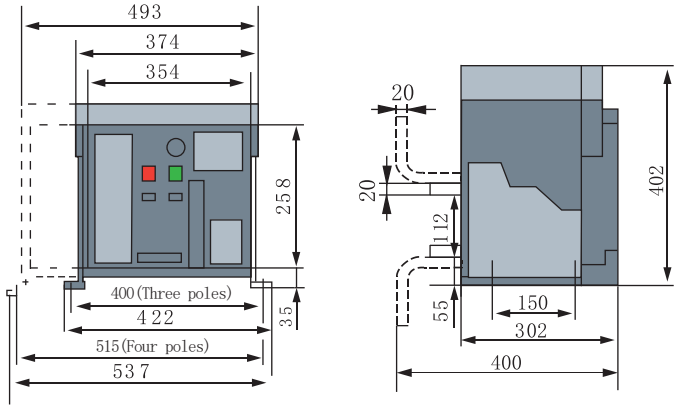


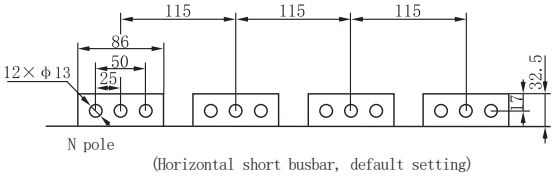
(L type vertical wiring connection)

In	200-630A	800-1600A	1900-2000A
a	10	15	20

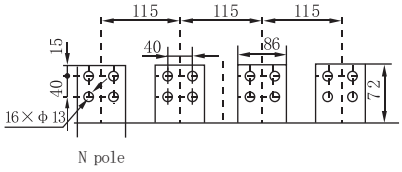
TGW1N Series Air Circuit Breaker

11.6 TGW1N-2500/TGW1N-2500H fixed type circuit breaker

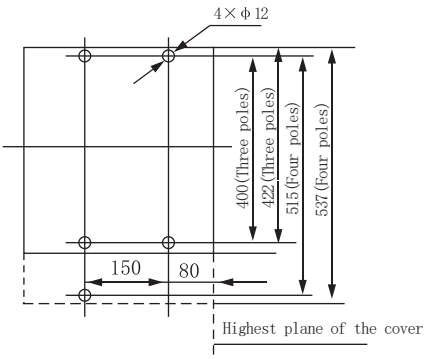


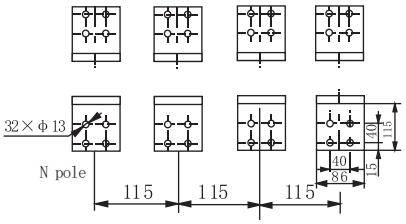


(Horizontal short busbar, default setting)



(Horizontal long busbar)

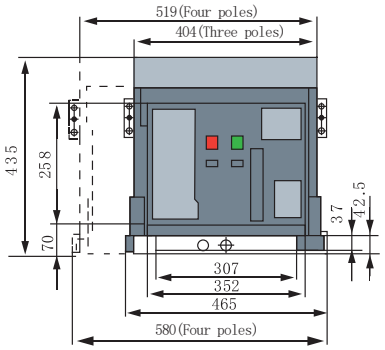


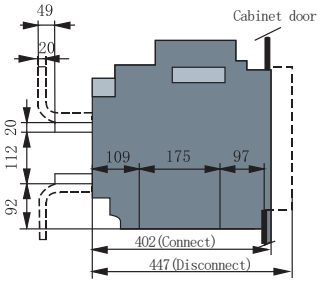


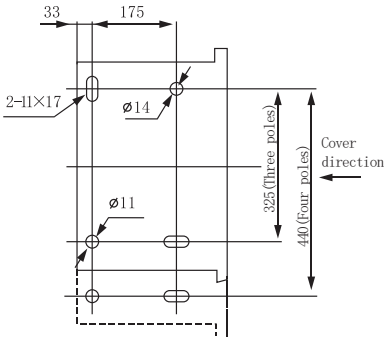
(L type vertical wiring connection)

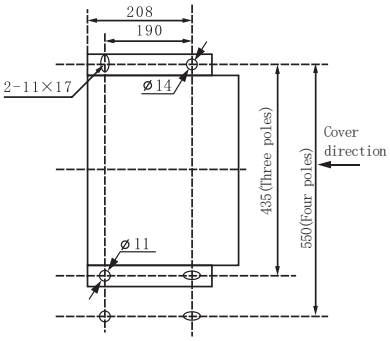
TGW1N Series Air Circuit Breaker

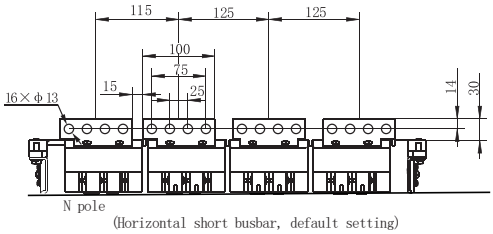
11.7 TGW1N-2500/TGW1N-2500H drawer type circuit breaker



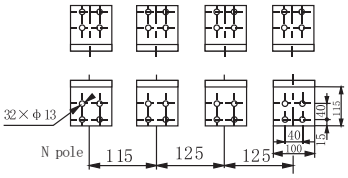




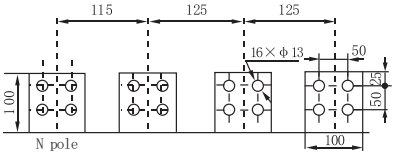




(Horizontal short busbar, default setting)



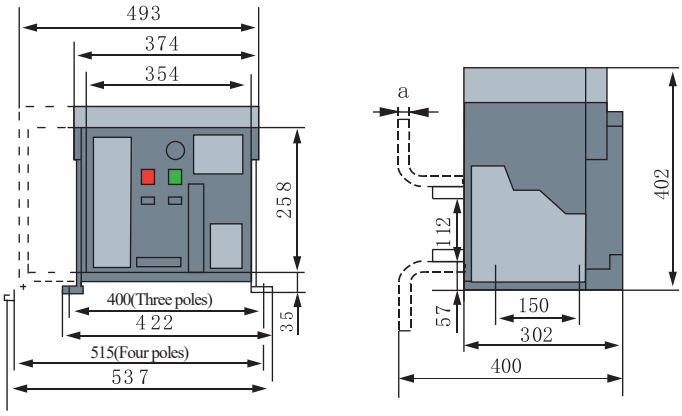
(L type vertical wiring connection)

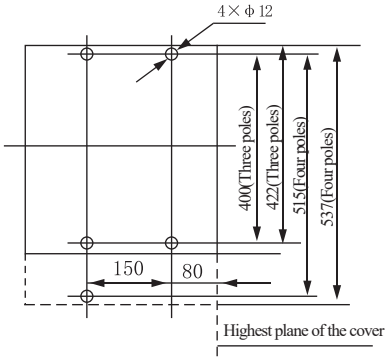


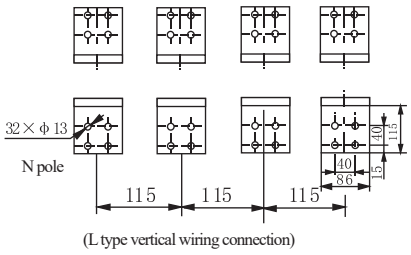
(Horizontal long busbar)

TGW1N Series Air Circuit Breaker

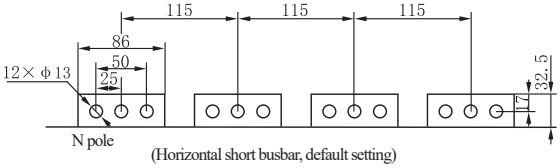
11.8 TGW1N-3200/TGW1N-3200H fixed type circuit breaker



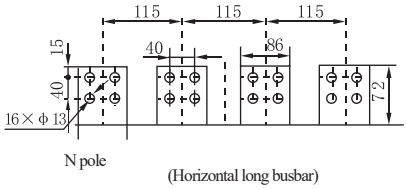




(L type vertical wiring connection)



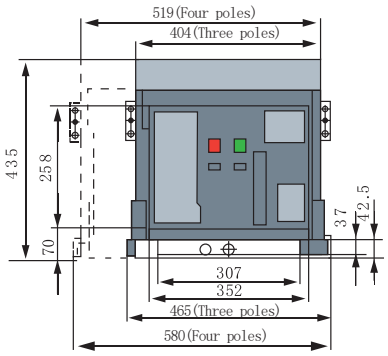
(Horizontal short busbar, default setting)

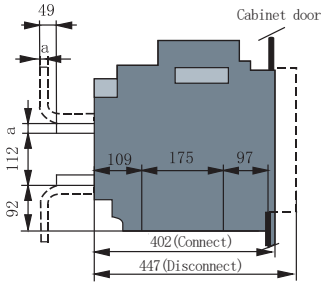


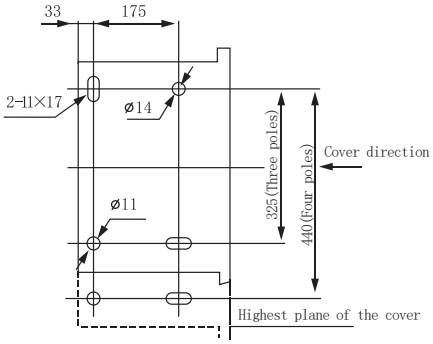
(Horizontal long busbar)

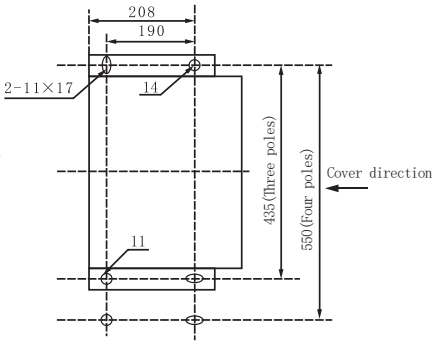
In	2000A、2500A	2900A、3200A
a	20	30

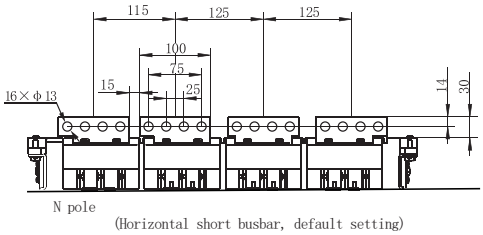
11.9 TGW1N-3200/TGW1N-3200H drawer type circuit breaker



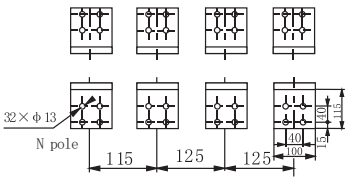




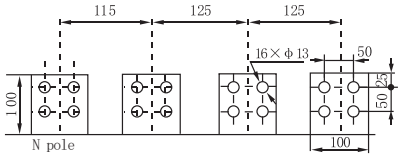




(Horizontal short busbar, default setting)



(L type vertical wiring connection)

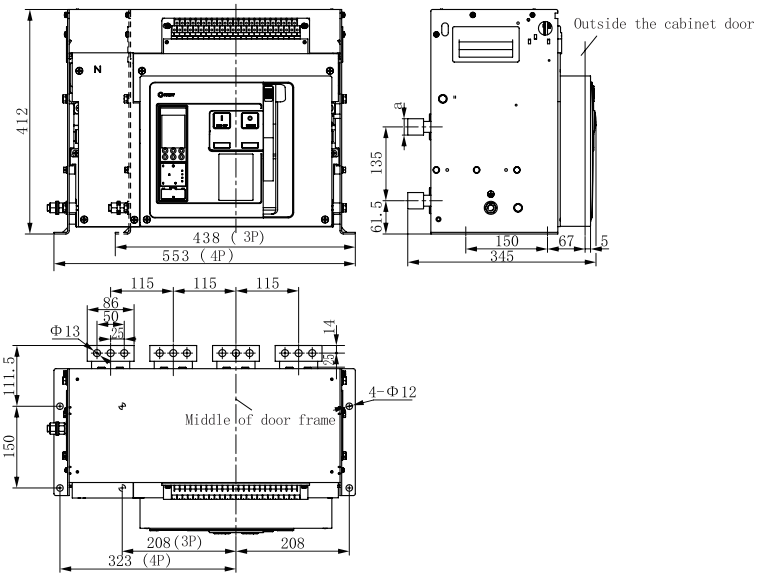


(Horizontal long busbar)

In	2000A、2500A	2900A、3150A、3200A
a	20	30

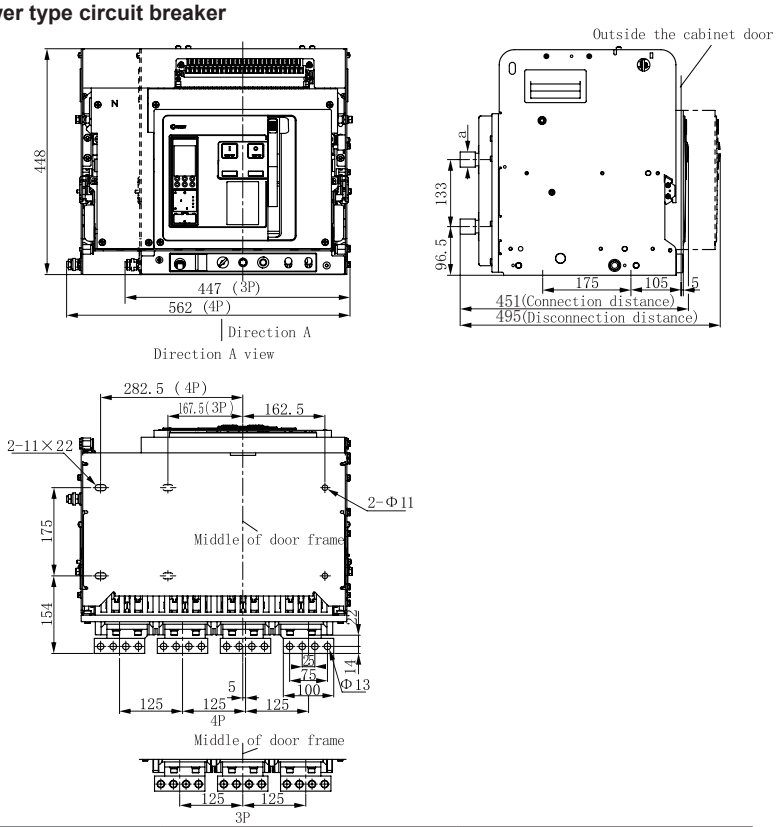
TGW1N Series Air Circuit Breaker

11.10 Outline dimension and installation dimension drawing of TGW1N-4000(In=2500-3200A) fixed circuit breaker



In	2500A	2900A、3200A
a	20	30

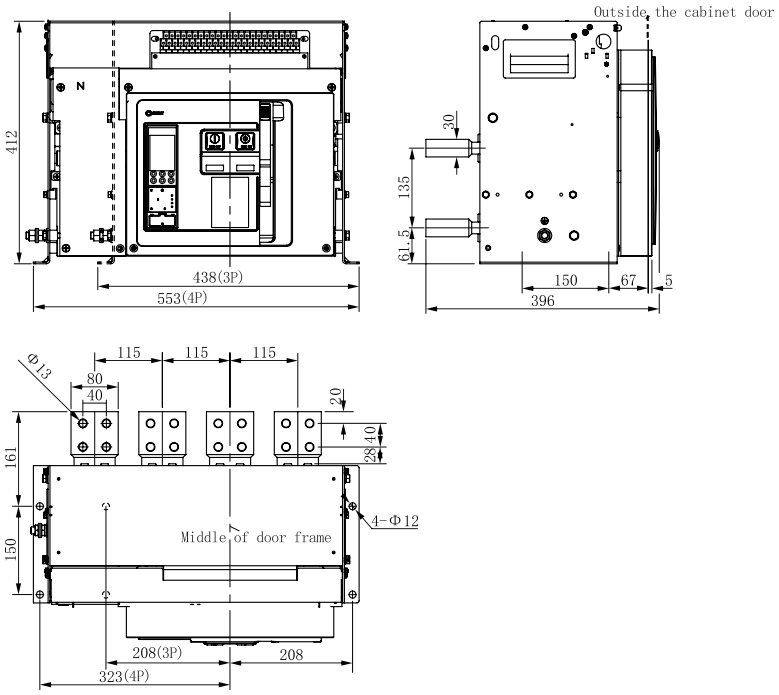
11.11 Outline dimension and installation dimension drawing of TGW1N-4000(In=2500-3200A) drawer type circuit breaker



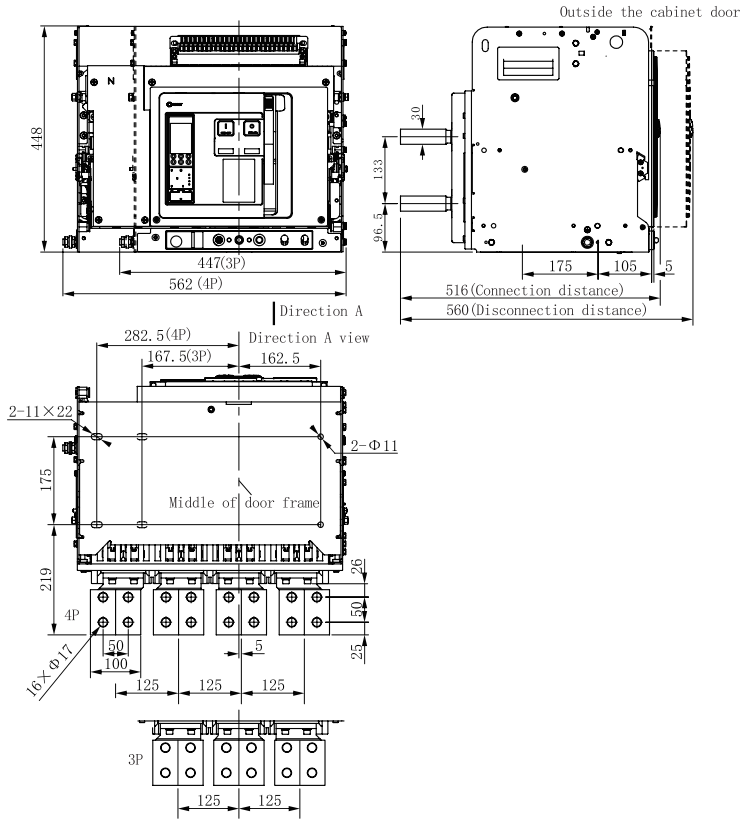
In	2500A	2900A、3200A
a	20	30

TGW1N Series Air Circuit Breaker

11.12 Outline dimension and installation dimension drawing of TGW1N-4000 (In=3600-4000A) fixed circuit breaker

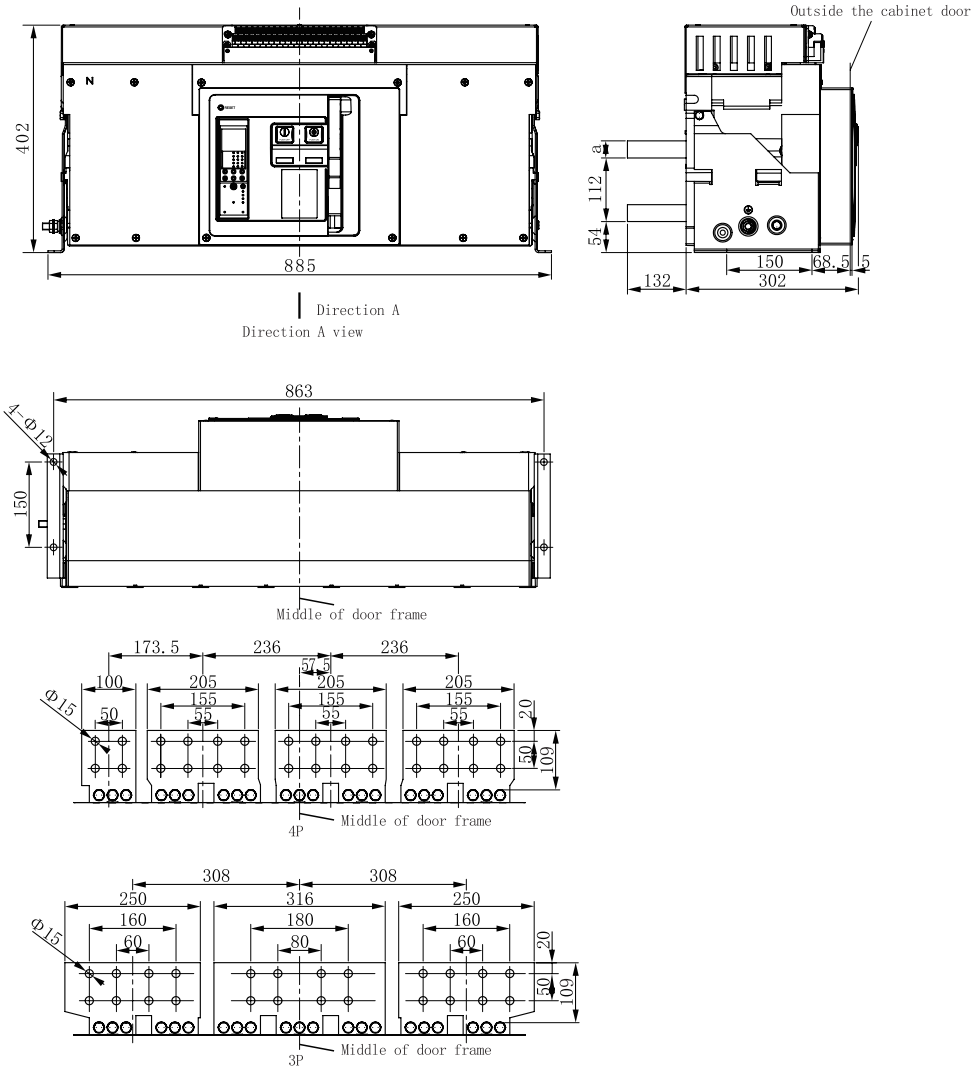


11.13 Outline dimension and installation dimension drawing of TGW1N-4000(In=3600-4000A) drawer type circuit breaker



TGW1N Series Air Circuit Breaker

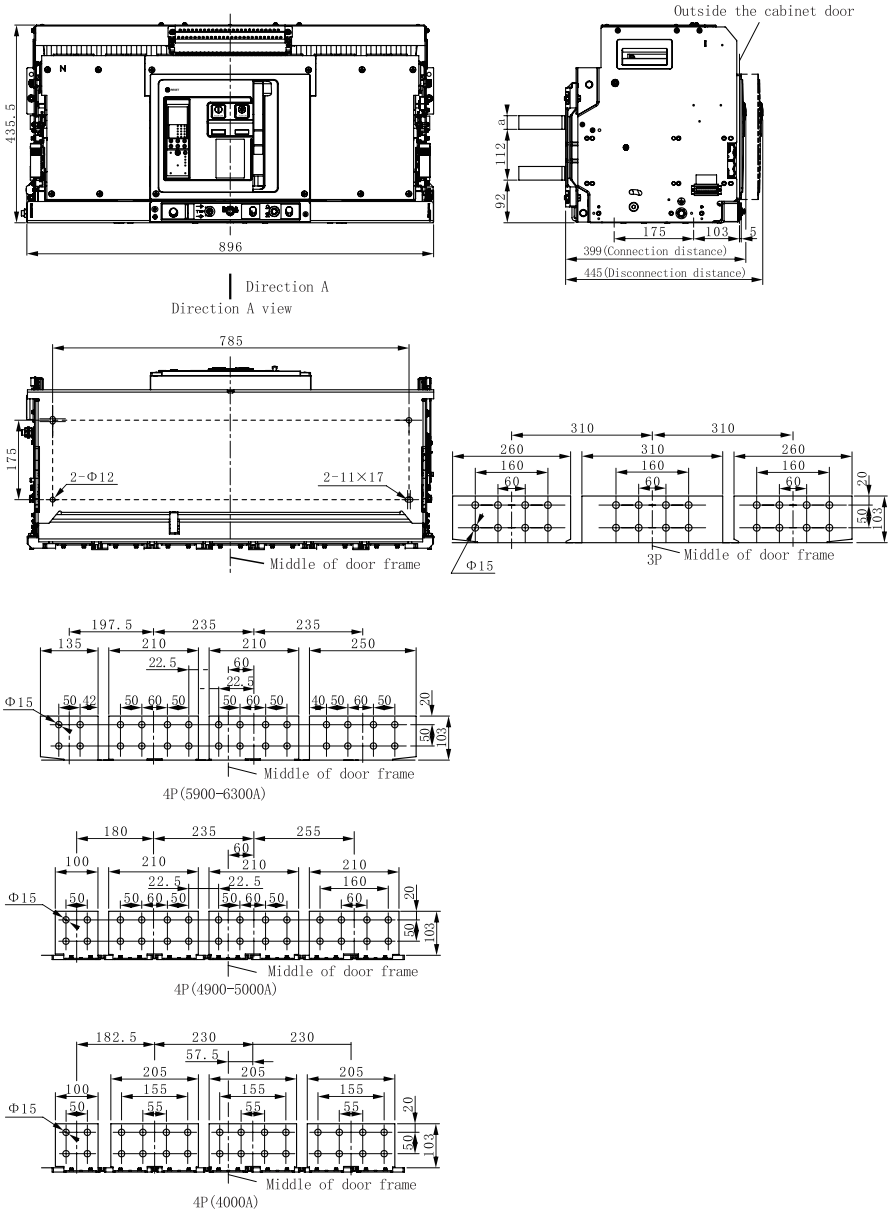
11.14 Outline dimension and installation dimension drawing of TGW1N-6300 fixed circuit breaker



In	4000A	4900A, 5000A, 5900A, 6300A
a	20	30

TGW1N Series Air Circuit Breaker

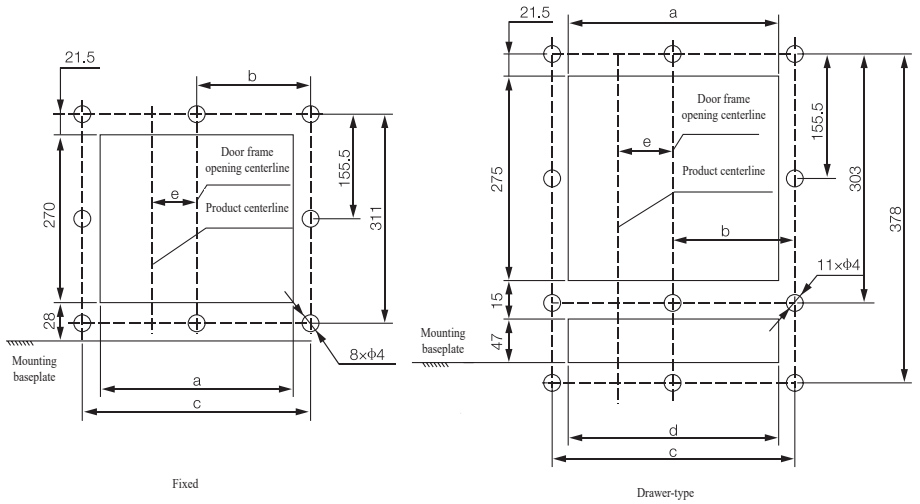
11.15 Outline dimension and installation dimension drawing of TGW1N-6300 drawer type circuit breaker



In	4000A	4900A, 5000A, 5900A, 6300A
a	20	30

TGW1N Series Air Circuit Breaker

11.16 Hole sizes of TGW1N-2000-6300 panel

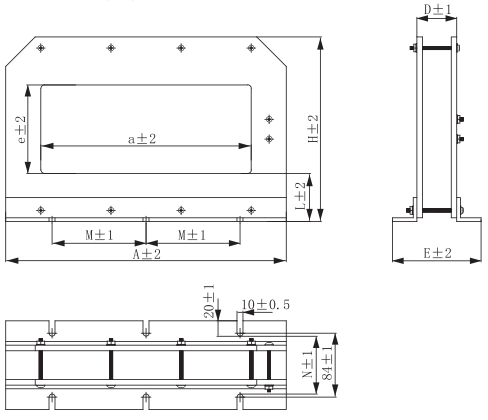


In	a	b	c	d	e (3 poles)	e (4 poles)
2000	306	172.5	345	263	0	47.5
2500/3200	366	202.5	405	323	0	57.5
4000	366	202.5	405	323	0	57.5
6300	366	202.5	405	323	0	
					0	

12 Installation Dimensions of External Transformer

12.1 ZCT1 current residual transformer

It is a special external rectangular transformer under the current residual (E) grounding protection. The installation dimensions are shown in the following figure.



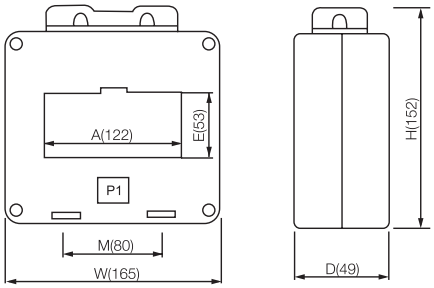
TGW1N Series Air Circuit Breaker

Model	Outline dimensions					Hole size		Installation dimensions	
	A	H	D	E	L	a	e	M	N
ZCT1-285×120	380	250	54	114	68	285	120	125	74
ZCT1-390×120	485	250	54	114	68	390	120	150	74
ZCT1-420×120	515	250	54	114	68	420	120	150	74
ZCT1-500×120	595	250	54	114	68	500	120	150	74
ZCT1-900×120	995	250	54	114	68	900	120	300	74

Note:
2000/3P has a default specification 285x120;
2000/4P, 2500/3P, 3200/3P, and 4000/3P have a default specification 390x120;
2500/4P, 3200/4P, and 4000/4P has a default specification 500x120;
6300/3P(4P) has a default specification 900x120;
Users can select them according to the working conditions.

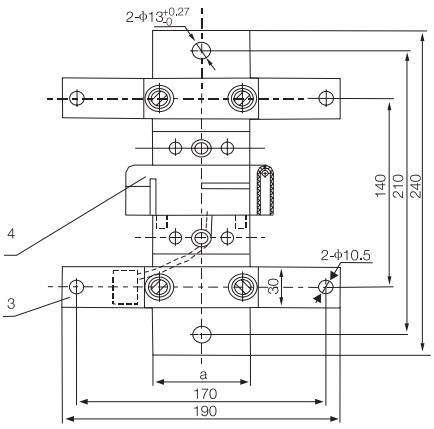
12.2 ZT100 grounding transformer

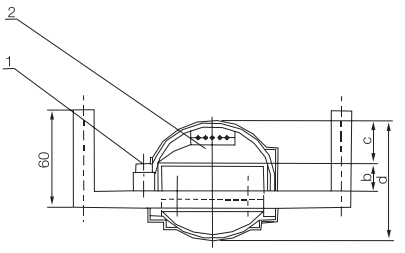
It is a special external transformer when the ground mode is ground current return mode (W). The installation dimensions are shown in the following figure.



12.3 External transformer of Phase N

When 3P+N grounding is adopted, the installation and outline dimension of the neutral pole transformer or ground current transformer is as follows.





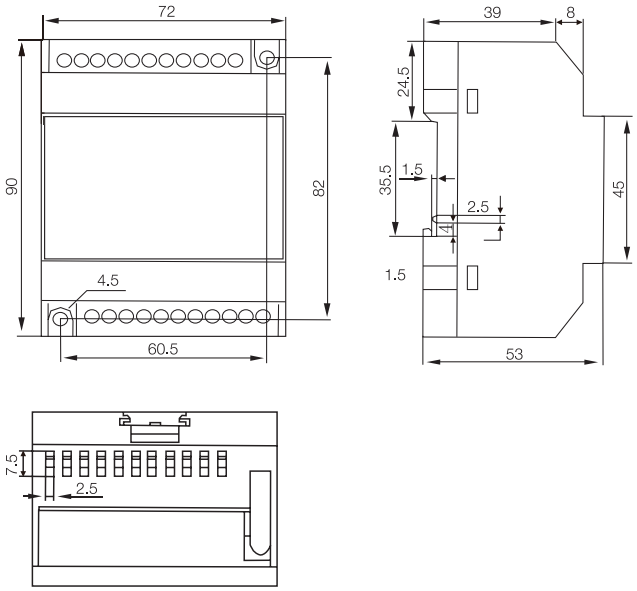
1- Earth plate 2- Busbar
3- Retaining plate 4- Transformer

In(A)	a	b	c	d
2000	60	12.5	34	φ89
2500, 3200, 4000	80	20	35	φ109.5

TGW1N Series Air Circuit Breaker

13 Installation Dimensions of the Power Supply Module and Panel

The module is installed with 25mm standard guide rail or fixed directly. The outline and installation dimensions are as follows:



14 Electrical Schematic Diagram

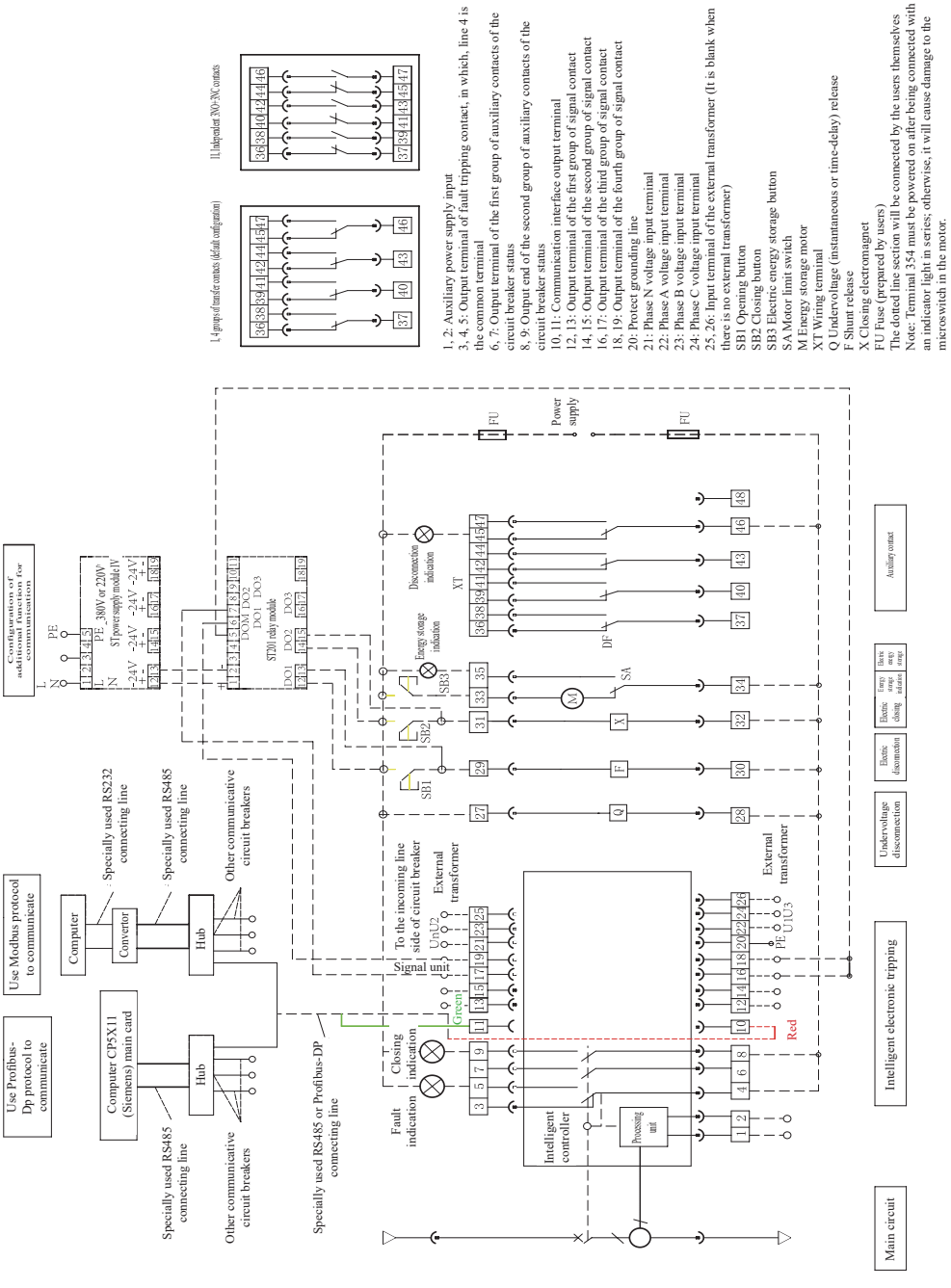
14.1 48 circuit wiring diagram of TGW1N-1000/1600 circuit breaker with (M, 3M) controller

1, 2: Aux. power input
3, 4, 5: 4# line at the fault trip contact output terminal is common terminal
6, 7: First set of aux. contact output terminal of circuit breaker state output terminal
8, 9: Second set of aux. contact output terminal of circuit breaker state
10, 11: Empty
12, 13: First set of single contact output terminal
14, 15: Second set of single contact output terminal
16, 17: Third set of single contact output terminal
18, 19: Fourth set of single contact output terminal
12~19: When with the contact output function
20: Protective earth wire
21: N phase voltage input terminal
22: A phase voltage input terminal
23: B phase voltage input terminal
24: C phase voltage input terminal
25, 26: External transformer input terminal (empty if without external transformer)
21~24: When with voltage measurement function
SB1 Open button
SB2 Closed button
SB3 Electric energy storage button
SA Motor travel switch
M Energy storge motor
XT Terminal block
Q Undervoltage (instantaneous or delay) release
F Shunt release
X Closing electromagnet
FU Fuse (provided by user)
Those marked with dotted line are connected by user

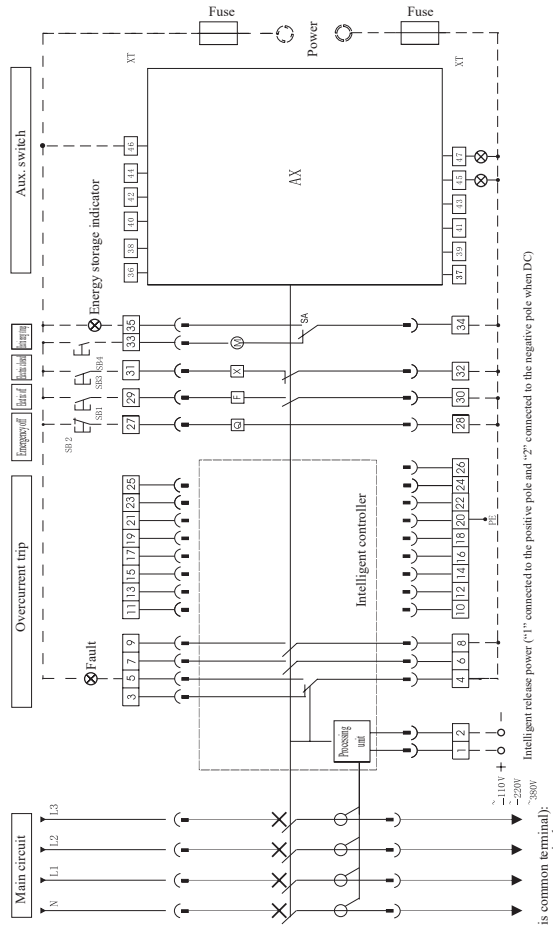
Note: The terminal 35# can be connected to the power supply only after connecting an indicator in series, otherwise this may cause damage to the micro switch in the motor.

TGW1N Series Air Circuit Breaker

14.2 48 circuit wiring diagram of TGW1N-1000/1600 circuit breaker with (2H) controller



14.3 47 circuit wiring diagram of TGW1N-2000-6300 circuit breaker with (M, 3M) controller (48 circuit for the drawer type, 48# is empty)



1#, 2#: Intelligent controller power;
3#, 4#, 5#: Fault trip contact output terminals (4# is common terminal);
6#, 7#: Circuit breaker state first set of aux. contact output terminals
8#, 9#: Circuit breaker state second set of aux. contact output terminals
12#, 13#: First set of signal contact output terminal;
14#, 15#: Second set of signal contact output terminal;
16#, 17#: Third set of signal contact output terminal;
18#, 19#: Fourth set of signal contact output terminal;
12#–19#: (When with contact output function):
20#: Protection earth wire;
21#: N phase voltage input terminal;
22#: A phase voltage input terminal;
23#: B phase voltage input terminal;
24#: C phase voltage input terminal;
21#–24#: (When with voltage function):
25#–26#: External transformer input terminal (empty if no this function is available)
36#–47#: Aux. contact terminal: (45#: Opening indicator; 47#: Closing indicator;)
SB1: Shunt button; SB2: Emergency opening button; SB3: Closing button; SB4: Motor energy storage button; Q: Undervoltage (instantaneous or delay) release; F: Shunt release; X: Closing electromagnet; M: Energy storage motor; SA: Motor travel switch; XT: Terminal block; AX: Aux. switch;
Notes: 1. Those in the dashed box are connected by the user, and a fuse protection is provided in the control circuit;
2. The terminal 33# can be directly connected to the power supply (automatic pre-storage of energy), and can be connected to the power supply after connecting the normally open button in series (manual pre-storage of energy).
3. If the Q, F, and X have the different control power voltage, they can be connected to the different power supply respectively. When the intelligent controller has a DC power supply, if there is an external power module, it can be connected to 1# and 2# through the power module inputs 1# and 2# rather than direct connection.

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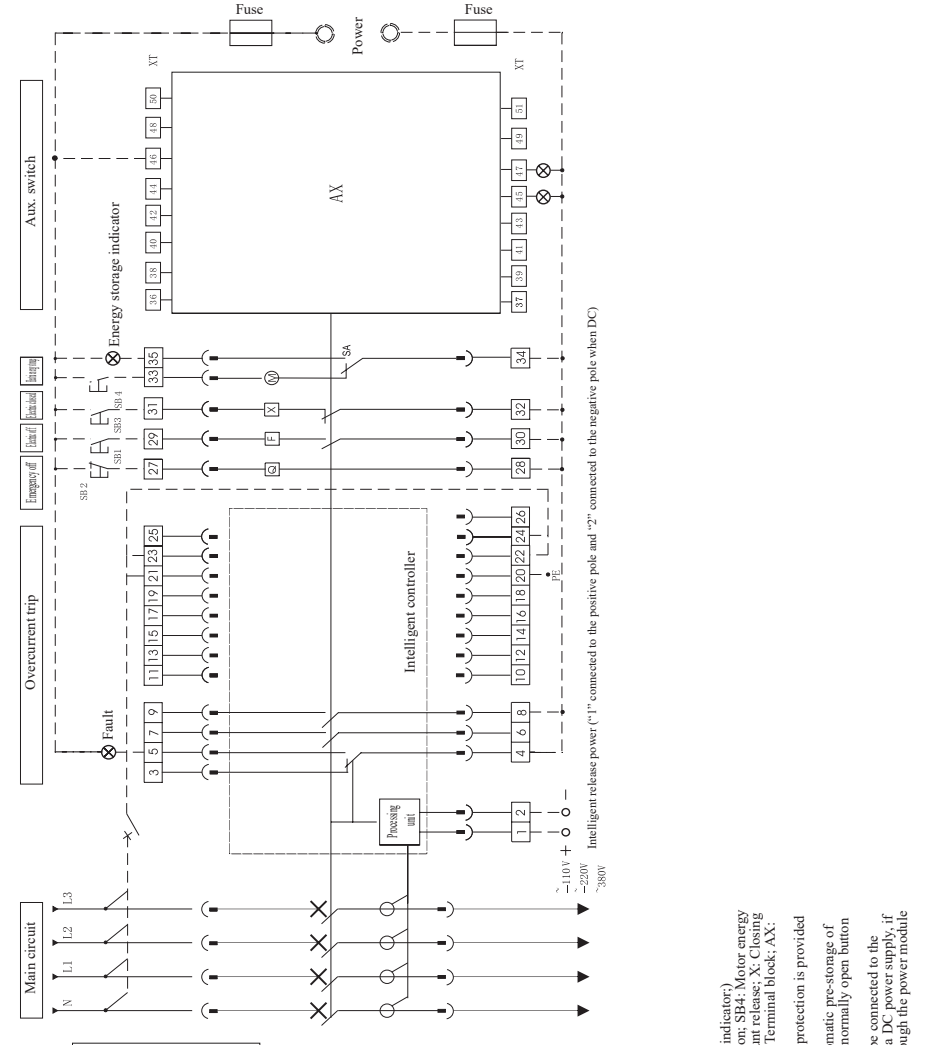
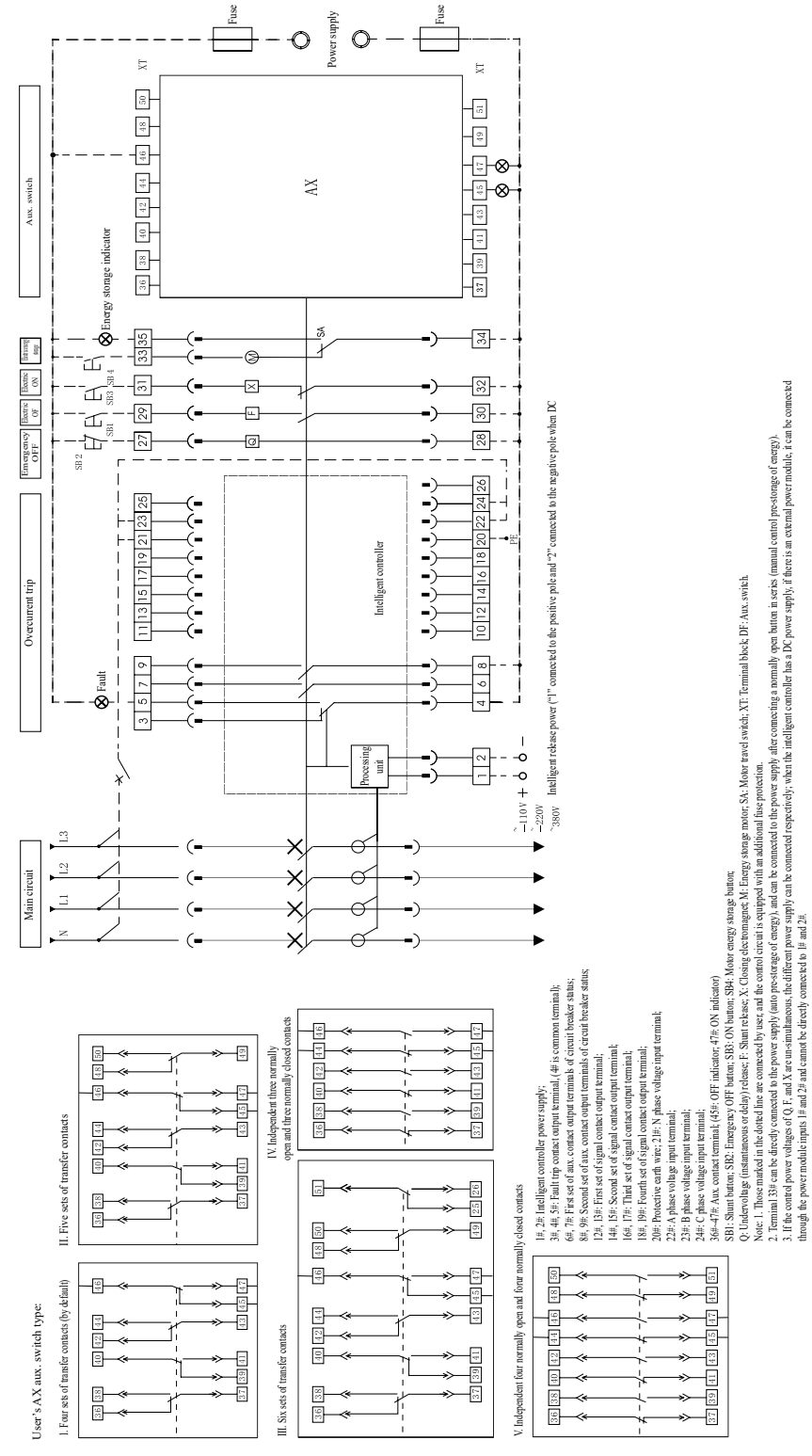
14.4 51 circuit wiring diagram of TGW1N-2000-6300 circuit breaker with (M, 3M) controller (52 circuit for the drawer type, 52# is empty)

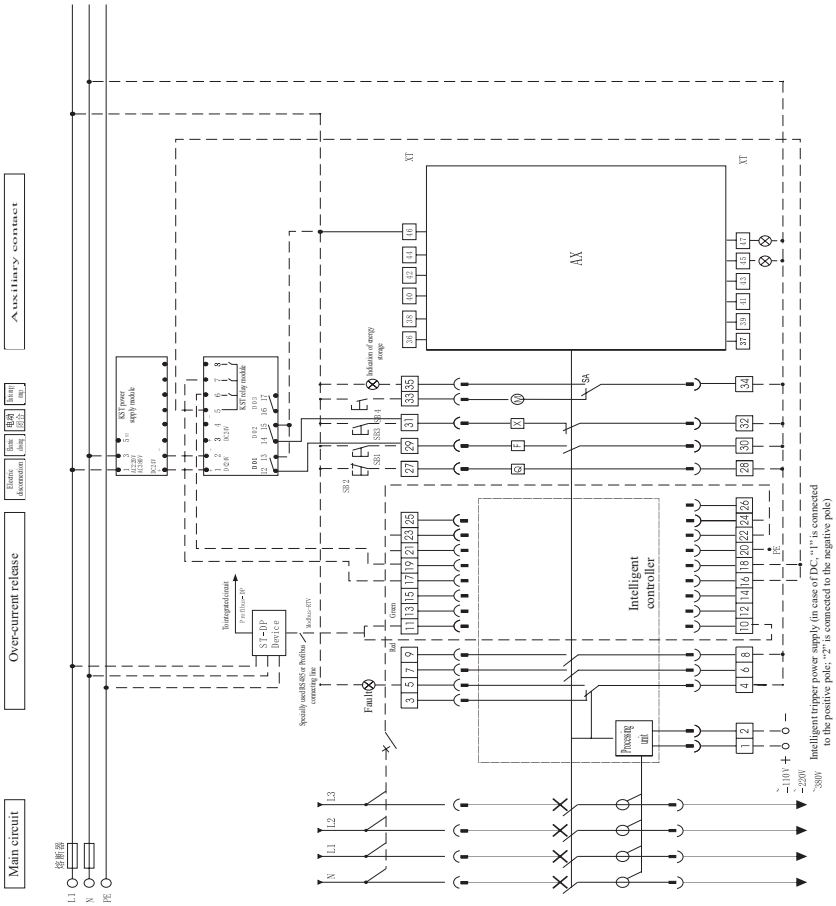


14.5 Wiring diagram of circuit 51 of TGW1N-2000-6300 circuit breaker with (M, 3M type) controller but without transformer connected (circuit 52 for drawer type, 52# is empty)



TGW1N Series Air Circuit Breaker

14.6 TGW1N-2000~6300 has an intelligent trip unit 47 Secondary circuit wiring diagram (drawer type: 48 circuits, 48# is empty)



1#, 2#: Power supply of intelligent controller;
3#, 4#: Fault tripping contact output terminal (4# for common end);
5#, 6#: Output terminal of the first group of auxiliary contacts of the circuit breaker status;
7#, 8#: Output terminal of the second group of auxiliary contacts of the circuit breaker status;
9#, 10#: Output terminal of the third group of auxiliary contacts of the circuit breaker status;
11#, 12#: Communication interface output terminal;
13#, 14#: Output terminal of the first group of signal contact;
15#, 16#: Output terminal of the second group of signal contact;
17#, 18#: Output terminal of the third group of signal contact;
19#, 20#: Output terminal of the fourth group of signal contact;
21#: Protective grounding line;
22#: Phase A voltage input terminal;
23#: Phase B voltage input terminal;
24#: Phase C voltage input terminal;
25#, 26#: Input terminal of the external transformer (W type or (3P+N) T type);
36#~47#: Auxiliary contact terminals; (45#: Opening indication; 47#: Closing indication;)
SB1: Shunt button;
SB2: Emergency opening button;
SB3: Switching-ON button;
SB4: Electric energy storage button;
Q: Undervoltage (instantaneous or time-delay) release;
F: Shunt release;
X: Closing electromagnet;
M: Energy storage motor;
SA: Limit switch of electric motor;
XT: Wiring terminal;
DF: Auxiliary contact;

Note: 1. The dotted portion shall be wired by users. The control circuit shall be equipped with a fuse for protection.
2. Terminal 3.3# can be directly connected with the power supply (Automatic pre-storage of energy) and can be powered on after being connected with the NO button in series (manual pre-storage of energy).
3. If the voltages of the control power supplies of Q, F and X are different, they can connect with different power supplies. When the current of the intelligent controller is DC, if there is an external power supply module, 1# and 2# must be inputted through the power supply module. It shall not be connected to 1# and 2# directly.

15 Special Environments

15.1 Derating under different temperatures

Ambient temperature		+40°C	+45°C	+50 °C	+55°C	+60 °C
Allowable continuous working current	TGW1N-2000/2000H	1In	0.95In	0.9In	0.85In	0.80In
	TGW1N-2500 (H) /3200 (H) /4000(H)	1In	0.92In	0.86In	0.81In	0.74In
	TGW1N-6300	1In	0.93In	0.87In	0.81In	0.75In

15.2 Derating requirements under different altitudes

When the altitude exceeds 2,000 meters, insulation performance, cooling performance and pressure in the atmosphere will change. Its performance shall be modified in accordance with the following table.

15.2.1 Voltage

Altitude (m)	Power frequency withstand voltage (V)	Insulation voltage (V)	Rated working voltage (V)
2000	2200	1000	690
3000	1955	800	580
4000	1760	700	500
5000	1600	600	400

15.2.2 Current

Altitude (m)	Power frequency withstand voltage (V)
2000	Ie
2500	0.93
3000	0.88
3500	0.83
4000	0.78
4500	0.73
5000	Need to contact the manufacturer

If the ambient temperature is +40°C~-5°C, Ie=In; if the ambient temperature exceeds 40°C, derate in strict accordance with the requirements in the instructions, while Ie ≠ In. Ie shall be inquired in accordance with the current and temperature.

TGW1N Series Air Circuit Breaker

16 Dual Power Control System

16.1 Dual power automatic transfer switch

Dual power automatic transfer switch is CB grade. It mainly consists of two sets of TGW1N series intelligent Air Circuit Breaker and power transfer switch controller. It is suitable for three-phase four-wire power grid with the frequency of 50/60Hz, and rated working voltage of 415V. Dual power automatic transfer switch is divided into two types: automatic transfer and restoration, power grid- generation. When ordering the dual power automatic transfer switch, please note that:

a. In order to prevent wrong wiring by the users, the dual power controller must be ordered together with the circuit breaker.

b. Cable interlocking and 4 sets of transfer auxiliary contacts must be ordered simultaneously (3 sets of transfer contacts are used actually by users).

c. The length of the special cable for dual power automatic controller is 2m. The length of the cable between two circuit breakers is 2m.

d. Key lock is prevented for the circuit breaker with dual power automatic controller.

e. The voltage of the control power supply of the dual power automatic controller is: AC220V.

f. The circuit breaker with the dual power automatic controller shall not be equipped with the opening and closing status gate interlock.

g. When the circuit breaker with the dual power automatic controller is equipped with a H type intelligent controller, the closing and opening functions of the remote-controlled circuit breaker shall not be used.

h. The circuit breaker must be equipped with the undervoltage release.

l. The circuit breaker and dual power supply automatic controller must be grounded reliably.

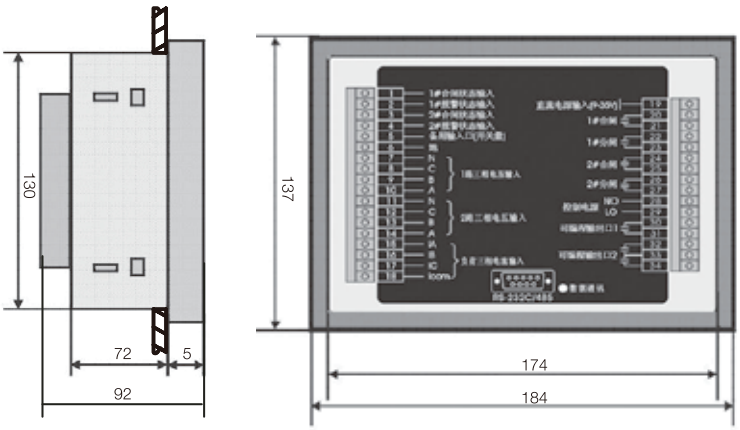
J. Type of dual power automatic controller:

Power grid – power grid, automatic transfer and restoration type:

Power grid – power generation, automatic transfer and restoration type.

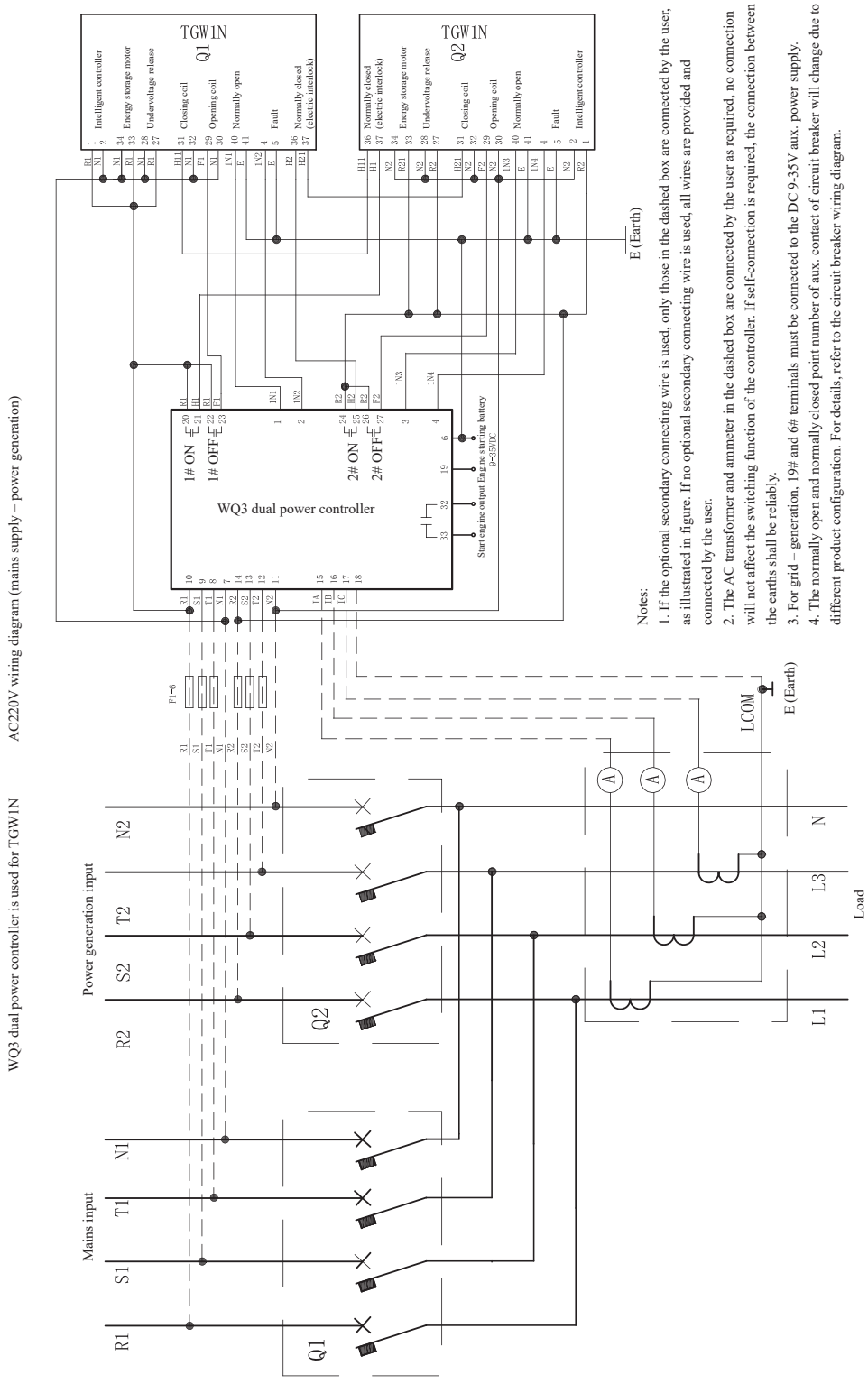
Note: After wiring, the user shall press "↑" and "↓". If all lamps are on, it means that the product is qualified.

16.2 Outline and installation dimension of the dual power controller



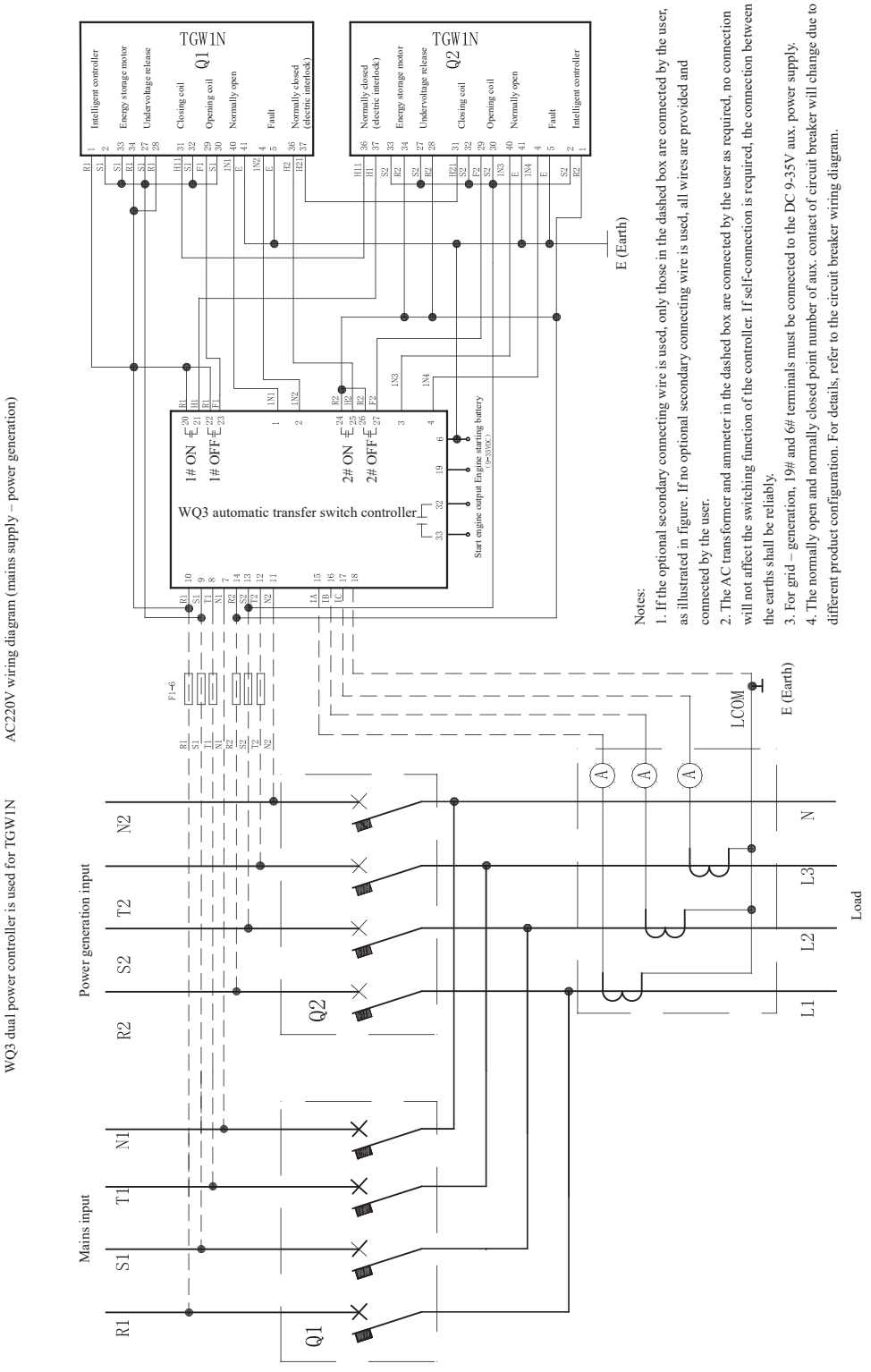
Note: Panel hole size (localizable) is (175×131) mm.

16.3 Dual power wiring diagram of TGW1N 4P circuit breaker.



TGW1N Series Air Circuit Breaker

Dual power wiring diagram of TGW1N four-pole circuit breaker.



TGW1N Series Air Circuit Breaker

17 Ordering Notice

When ordering, please fill in the following table.

<table>
<tr><td colspan="2">Buyer</td><td></td><td>Ordering quantity</td><td></td><td>Ordering time</td><td></td></tr>
<tr><td colspan="2">Model and specification</td><td>Frame rated current</td><td>Number of poles</td><td>□3P
□4P</td><td>Installation mode</td><td>□ Fixed type
□ Drawer-type</td></tr>
<tr><td colspan="7">Rated current In= A</td></tr>
<tr><td rowspan="5">Intelligent controller</td><td>Type</td><td colspan="5">□ M type (conventional) □ 3M type □ 3H type</td></tr>
<tr><td>Basic function</td><td colspan="5">□ Overload long-time delay protection □ Short circuit short-time delay protection □ Instantaneous short circuit protection □ Single-phase grounding protection
□ Current display function □ Fault memory function □ Test function</td></tr>
<tr><td>Additional function</td><td colspan="5">□ Voltmeter function □ Communications function □ Electric leakage protection □ MCR and HSISC □ DO/DI function</td></tr>
<tr><td>Grounding mode</td><td colspan="5">□ 3PT □ 4PT □ (3P+N)T type shall be connected to an external transformer □ (3P+N)W type shall be connected to an external transformer</td></tr>
<tr><td>Controller power supply</td><td colspan="5">□ AC220V/AC230V □ AC380V/AC400WAC415V □ DC220V □ DC110V</td></tr>
<tr><td colspan="2" rowspan="4">Standard accessories</td><td>□ Shunt release</td><td colspan="4">□ AC220V/AC230V/AC240V □ AC380V/AC400V/AC415V
□ DC220V □ DC110V</td></tr>
<tr><td>□ Closing electromagnet</td><td colspan="4">□ AC220V/AC230V/AC240V □ AC380V/AC400V/AC415V
□ DC220V □ DC110V</td></tr>
<tr><td>□ Electric Motor operating mechanism</td><td colspan="4">□ AC220V/AC230V/AC240V □ AC380V/AC400V/AC415V
□ DC220V □ DC110V</td></tr>
<tr><td>□ Auxiliary contact</td><td colspan="4">□ 4 groups of transfer contact (conventional) □ 5 groups of transfer contact □ Independent 3NO+3NC contacts</td></tr>
<tr><td colspan="2" rowspan="5">Optional accessories</td><td>□ Mechanical interlock</td><td colspan="4">□ Cable interlock □ Hard lever interlock □ Three locks with two keys □ Two locks with one key □ One key with one lock</td></tr>
<tr><td rowspan="2">□ Undervoltage release</td><td colspan="4">□ AC220V/AC230V □ AC240V □ AC380V/AC400V □ AC415V
□ DC220V □ DC110V</td></tr>
<tr><td colspan="4">□ Undervoltage instantaneous release □ Undervoltage time-delay release (zero voltage) □ 1s □ 2s □ 3s □ 4s □ 5s □ 6s □ 7s</td></tr>
<tr><td>□ Phase partition</td><td colspan="4"></td></tr>
<tr><td>Connecting way</td><td colspan="4">□ Horizontal connection (conventional) □ Vertical connection (the drawings shall be provided by the user)</td></tr>
<tr><td colspan="2">Remarks</td><td>For other special requirements, please fill them in the remark column.</td><td colspan="4"></td></tr>
<tr><td colspan="7">Note:
1, If there is no special requirement, the all current values and time values for protection of the controller shall be set according to the factory default value.
2, Only one type of external transformer can be selected.
3, For special requirements, please fill them in the remark column.
4, Voltages of the control circuit of TGW1N-2000-6300 type product don't include AC240V and AC415V.</td></tr>
</table>