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ZW5(DW450) Series Intelligent Air Circuit Breaker A.C.B



- 3P.4P
- In200-1600A
- Small volume
- High breaking capacity
- Zero-fly arc
- Full intelligence



Shanghai Huatong Electricity Co., Ltd.



Catalogue

ZW5 series intelligent air circuit breaker

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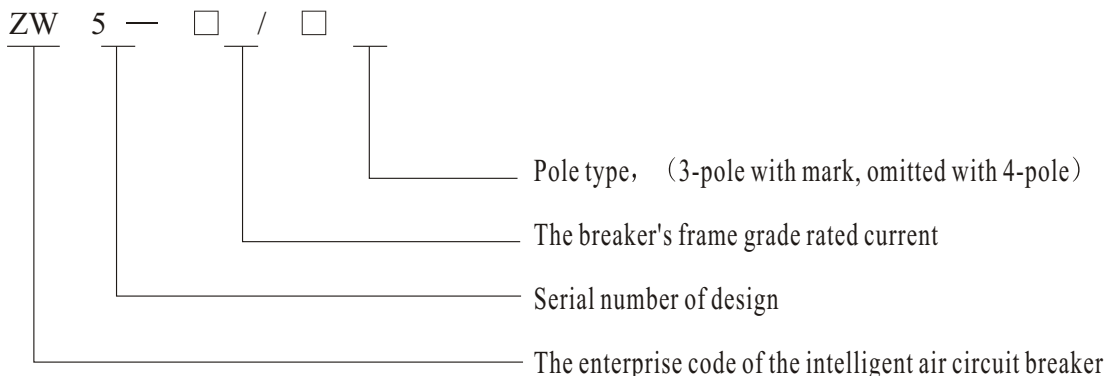
◆ ZW5 series intelligent air circuit breaker ("breaker" in short hereinafter) conformed standards

IEC 60947-2 《low-voltage switchgear and control-gear Part 2: low voltage circuit breaker》
 GB 14048.2 《low-voltage circuit breaker》

◆ ZW5 series breaker's application

Zw5 series intelligent air circuit breaker is mounted in the distribution network of AC50Hz, 400V or 690V for the electric energy distribution, line protection and protecting the power equipment against the danger caused by the failure of overload, short-circuit, under-voltage, or single-phase grounding with great and selective intelligent protective functions so as to avoid unnecessary power-cut and raise both the safety and reliability of the electricity network in running. It is suitable for the non-frequent conversion in the circuit or for the non-frequent start-up to protect the electromotor.

◆ Model and meaning



◆ Normal working condition and mounting mode

- Ambient air temperature -5 ~ +40 °C, and the average value during 24h is not over 35 °C.;
- The elevation at the installation place not over 2000m;
- The RH not over 50% at the maximum temperature +40 °C; can be higher at a lower Temperature, the lowest average temperature in a most humidity month is not over 25°C , the RH is not over 90% in the month, the condensed dewdrops produced on the product surface due to temperature variation should be taken into consideration
- Pollution grade: 3;
- The installation mode IV is suitable in the main circuit of the breaker and for the under-voltage shunt release coils, the power transformer primary coils. Other auxiliary circuit and control circuit should be fitted with installation mode III.;
- Category for use: B, A;
- The installation mode: fixed-type, drawer-type;
- The vertical gradient of the breaker not allowed to over 5° ;



◆ Category

- According to the application:
 - Main circuit:
 - A type (non-selective protection) ;
 - B type (selective protection) and AC-3 (Direct operation motor) ;
 - Auxiliary circuit:
 - AC-15
 - DC-13
- According to the design:
 - Opening type (i.e. Conventional type)
- According to the controller performance:
 - a. H type: High level (Basic function, intelligent function, Communication interface) ;
 - b. M type: Basic type (Basic function, intelligent function) ;
 - c. L type: Economic type (Basic function) ;
- According to the isolating function:
 - a. Suitable for isolating;
 - b. non-suitable for isolation;
- According to the maintenance: Necessary type and Unnecessary type
- According to the mounting mode:
 - a. Fixed type;
 - b. Drawer type.
- According to the residual current protection:
 - a. With the function
 - b. Without the function.

◆ The type of the release

The intelligent over-current controller, under-voltage instantaneous (or delay) release, shunt release.

◆ The performance of the intelligent over-current controller

- With over-load long delay inverse time-limit, short-circuit short delay inverse time-limit, short-circuit short delay definite time-limit, short-circuit instantaneous acting function, Can be set by users according to the needs.(see table 3)
- Single phase grounding protection function.
- Residual current protective function
- Load monitoring function
- Imbalanced current protection
- Alarm function: over-load alarm
- Self-diagnosis: over-heat protection and self-diagnosis
- Test function: the motion characteristic of the tested controller.

◆ The technical parameter and performance

- The breaker's rated current (see table 1);

Table 1

Frame grade rated current I_{nm} A	Rated current I_n A (i.e. Max rated current of the controller)
1600	200、400、630、800、1000、1250、1600

- The breaker's rated working voltage, rated limit short-circuit breaking capacity and short time withstand current, wiring mode, arcover distance.(see table 2)



Table 2

Frame grade rated current I_{nm} (A)	1600		Wiring mode	Arcover distance
Rated limit short-circuitbreaking capacity I_{cu} (KA) O-CO	400V	55	Up-or down-wiring	0mm
	690V	-		
Rated operating short-circuitbreaking capacity I_{cs} (KA) O-CO-CO	400V	42		
	690V	-		
Rated short time withstand current I_{cw} (KA) 1s, O-CO	400V	35		
	690V	-		

◆ Intelligent over-current controller protective characteristic and function

● The intelligent controller's setting value I_r and error (see table 3)

Table 3

I_{nm} A	Long-delay	Short-delay		Instantaneous		Grounding fault
	I_r	I_{sd}	Error	I_i	Error	I_q
1600	$(0.4-1) I_n$	$(3-10) I_r$	$\pm 10\%$	$(3-15) I_n$	$\pm 15\%$	$(0.2-0.8) I_n$ (Minimum 100A)

● The motion characteristic of the long-delay over-current protection inverse-time limit.

a. The power distribution and the electric motor protection $I^2T=(1.5I_r)^2tr$, the motion time during $(1.05\sim 7.2)I_n$ see table 4, the time error is $\pm 15\%$.

Notes: tr - the setting time of long-delay $1.5I_r$, T - the acting time of long-delay.

Table 4

$1.05I_r$	$1.2I_{r1}$	$1.5I_{r1}$ setting time (s)	30	60	120	240
$>2h$ no motion	$<1h$ motion	$2.0I_{r1}$ setting time (s)	16.9	33.7	67.5	135
		$7.2I_r$ setting time (s)	1.3	2.6	5.2	10

b. The generator protection $I^2T= (1.2I_r)^2 tr$, the $I_r(1.05\sim 6I_r)$ motion time see table 5, the time error is $\pm 15\%$.

Notes: tr - the setting time of long-delay $1.2I_r$, T - the motion time of long-delay.

Table 5

$1.05I_r$	$1.2I_{r1}$	$1.2I_r$ setting time (s)	15	20	30	40	60
$>2h$ no motion	$<1h$ motion	$6I_r$ setting time (s)	0.6	0.8	1.2	1.6	2.4



- The protective characteristic of short-circuit short delay
 - a. L-type controller has the motion characteristic of definite-time limit ,When the over-load current I is over the setting value I_{sd} , the controller will be in 02s or 04s grade protection (see table 6), The accuracy is $\pm 10\%$.
 - B. The H-type and M-type controller when in low times current (normally not over $8I_r$) can be also of inverse time-limit characteristic. The tripping time T can be counted according to the formula: $I^2T = (8I_r)^2 I_{tsd}$. When the over-load current $> 8I_r$, it Automatic transfer to definite time-limit tripping time setting value.

Table 6

S

Short delay tripping time setting value t_{sd}	0.2	0.4
Max breaking time	0.23	0.46
Non-tripping continuous time	0.14	0.33

- H type and M type controller externally connect with residual current mutual inductor to realize the residual current protective function. (See table 7)

Its motion performance is delay type (see table 8)

Table 7

Setting current	$I_f(I\Delta n) = I_E \times \dots$	0.1~1 (IE is fixed with 30A)	
	Motion characteristic	Motion during $0.8I\Delta n \sim 1.0I\Delta n$	$< 0.8I\Delta n$ no motion
			$\geq 1.0I\Delta n$ delay motion

Table 8

2 times limit no motion time (s)	0.06	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
Residual current	Max breaking time										
$I\Delta n$	0.36	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5
$2I\Delta n$	0.18	0.25	0.5	0.75	1	1.25	1.5	1.75	2	2.25	2.5
$5I\Delta n$	0.072	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
$10I\Delta n$											



●The load-monitor and protective characteristic of H- and M-type controller::

It may be used to pre-alarm or to control the leg load, the controller may output two passive signals contact. There are two ways to make options, , one is controlling two circuit loads, it will issue signal contact separately in inverse-time limit delay-time characteristic when the running current is more than the setting value of 1.2 times. The inverse-time limit is same with over-load type, but the current value can be set alone, Normally when the setting value $I_{c1} > I_{c2}$, the issued signal contact may be used in alarm, also can be used to control and break two circuits loads so as to maintain the power supply of the main systems. Another way is controlling the leg loads. If the operating current after breaking recover normal, when the current value is less than the I_{c2} setting value and continue 60S, the controller will issue another signal contact to switch-on the loads which has break and recover the power supply of the systems.

●Imbalanced current protective characteristic of H-and M-type.

It may be used to protect the imbalanced currents of the three-phase or phase breaking.. The formula is $\delta = [I - I_{av}] / I_{av}$, I_{av} (i.e. the average value of three-phase current). The delay-time is definite-time limit (i.e. t_{δ}). If t_{δ} is off, it means only for alarm without tripping. (See table 9).

Table 9

Setting value	$\delta =$	40%~100%+OFF (OFF means exit, grade step is 1%)
	Motion or alarm characteristic	$\leq 0.9 \delta$ No-motion, during $0.9 \delta \sim 1.1 \delta$ delay time Motion or alarm $\leq 1.1 \delta$ delay motion
Delay time	$t_{\delta} =$	0.1~1s+OFF (OFF means alarm without tripping, grade step is 0.1s)



- The delay-time for grounding protection has 4 grades of 0.2s、0.4s、0.6s、0.8s, Rated current with grounding and no motion $< 0.8I_q$, rated current with grounding and Motion $\geq 1.15I_q$
- The characteristic curve of over-current protection of the controller (see chart 1)

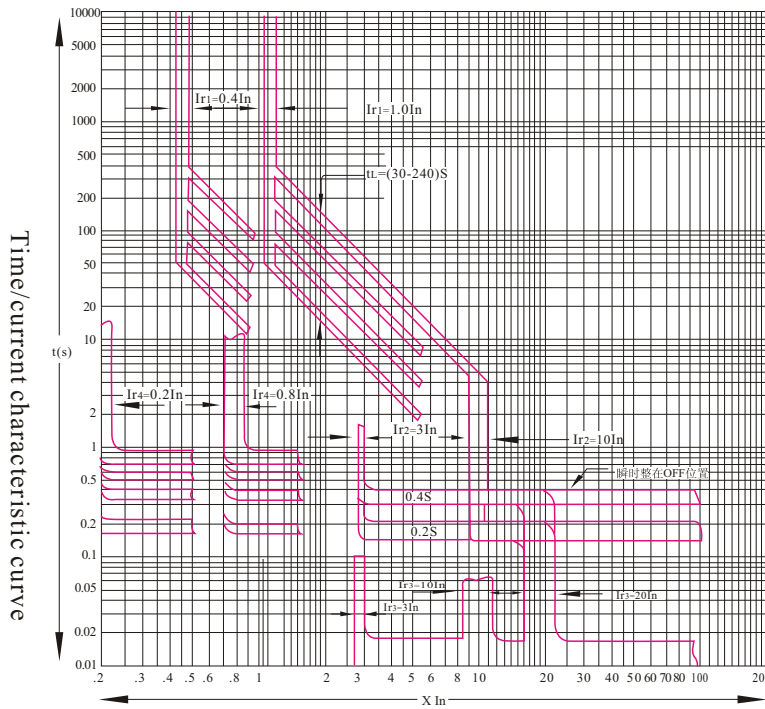


Table 1

- ◆ The temperature rise test copper bar (or PVC insulating copper wire) cross-section area (see Table 10).

Table 10

Test current A	Copper wire		Copper bar	
	Pieces	Cross-section area mm ²	Pieces	Dimensions mm
200	1	95		
400	1	240		
630	2	185	2	40×5
800	2	240	2	50×5
1000			2	60×5
1250			2	80×5
1600			2	100×5

Notes: On the copper plate spreads the black flat paint, and the distance is 10mm between the two copper bars.



◆The breaker's power loss (ambient temperature +40°C) and reduced capacity coefficient.

- Power loss (ambient temperature +40°C) ;

ZW5—1600 three-pole	340W
Zw5—1600 four-pole	400W

- The reduced capacity coefficient (see Table 11) 。

Table 11, The breaker's reduced capacity coefficient

Ambient temperature		+40°C	+45°C	+50°C	+55°C	+60°C
Continued working current allowed	1600A	1In	0.95In	0.92In	0.88In	0.85In

Notes: the relationship between the ambient temperature and the continued working current allowed (under all kinds of ambient temperature condition, the temperature of the turnover terminal of the testing breaker achieved 110 °C is the data)

◆The category of the intelligent controller according to their function

- The intelligent controller divides into L (L2, L3, L4), M, H, the concrete function Classification (see Table 12);



Table 12

Model		Basic function	With selective additional function	
L	2L2	1.Long delay、instantaneous (3~15) In 2.Load current photo-column indicator 3.MCU operation indicator 4.Fault type indicator 5.Fault memory function 6.Instantaneous acting test function	1.MCR making/breaking 2.Over-limit tripping 3.Alarm signal unit (Pre-alarm, self-diagnosis, fault tripping, grounding alarm)	
	2L3	1. Long delay、short delay (3~10) Ir、instantaneous (3~15) In 2.Load current photo-column indicator 3.MCU operating indicator 4.Fault type indicator 5.Fault memory function 6.Instantaneous acting test function	1.MCR making/breaking 2.Over-limit tripping 3.Alarm signal unit (pre-alarm, self-diagnosis, fault tripping, grounding alarm)	
	2L4	1.Long delay、short-delay (3~10) Ir、instantaneous (3~15) In、 Single phase grounding fault protection (Residual current protection) 2.Load current photo-column indicator 3.MCU operating indicator 4.Fault type indicator 5.Fault memory function 6.Instantaneous acting test function	1.MCR making /breaking 2.Over-limit tripping 3. Alarm signal unit (pre-alarm, self-diagnosis , fault tripping, grounding alarm)	
M	6.Ampere-meter function 7.Fault type indicator 8.Fault inquiry function 9.Instantaneous acting test function	Standard Rs485 interface Standard setting is MODBUS-RTU agreement、Position lock	1.MCR Making/breaking 2.Over-limit tripping 3.Alarm signal unit Four groups signal output, function programmable)	
H				

● If no specification of ordering from users, the factory will set the parameter (see table 13). Any special requirement for the product's characteristic of table 3 when order, please Specify it so the factory will set it accordingly.

Table 13

Grounding protection	Long delay protection	Short-delay protection	Instantaneous protection
$I_q=0.8I_n$ $t_q=0.2S$	$I_r=I_n$ $t_r=120S$	$I_{sd}=6I_r$ $t_{sd}=0.2S$	$I_i=10I_n$

Notes: The parameter provided above may not applicable to all sites, please set it practically if necessary.

◆ The breaker's operational performance

The breaker's operational performance by operational cycle times (see table 14).

Table 14

Inm A	The operational cycle times per hour	Electrifying operational cycle times	No power operational cycle times	Total times
1600	20	500	2500	3000



◆ The breaker's accessories main technical parameters

● The breaker's under-voltage release, shunt-release, energy release (switch-on) electric-magnet, electric operational mechanism, intelligent controller working voltage (see table 15)

Table 15

Model	Rated voltage V			Remarks	
	AC (50Hz)	DC			
Under-voltage release	Ue	230、400		Instantaneous or Delay	
Shunt release	Us	230、400	110、220	The breaking operation can be in remote control.	
Energy-release (Switch-on) electric magnet	Us			The making operation can be in remote control.	
Electric operational mechanism	Us				
Intelligent controller	Us				
Note1: The under-voltage release breaks the breaker within 70%~35%Ue. It can't switch-on if $\leq 35\%Ue$, while switch-on definitely within 85%~110%Ue. The delay under-voltage release during half delay time, if the power voltage recovers to 85%Ue, the breaker won't break. The shunt-release acts stably within 70%~110%Ue; The energy-release (closed) electro-magnet and electric operating mechanism Acts reliably within 85%~110%Ue. Note2: Aux. power loss					
Type \ Rated voltage	230V~	400V~	110V—	220V—	Notes
Under-voltage release	400VA	400VA	—	—	Max instantaneous power loss
Shunt release	200VA	200VA	200W	200W	Max instantaneous power loss
Energy-release (switch-on) electric magnet	400VA	400VA	400W	400W	Max instantaneous power loss
Electric operational mechanism	80VA		80W		

◆ Auxiliary contact 's performance

- Its rated thermo-current is 6A, rated working voltage AC up to 400V, DC up to 200V.
- Aux. contact's form: standard form is Four-N.O, Four-N.C (If special form required, please remark when order.)
- Aux. contact's use category is AC-15 or DC-13, rated control capacity Pe is 300VA AC, 60W DC.
- The making and breaking capacity of the aux. Contact under non-normal conditions of Use (see table 16)

Table 16

Utilization type	Making			Breaking			Making/breaking operation cycle times and operation frequency		
	I/Ie	U/Ue	COS φ or T0.95	I/Ie	U/Ue	COS φ or T0.95	Operational cycle times	The operation cycle times per minute	Minimum electrifying time (S)
AC-15	10	1.1	0.3	10	1.1	0.3	10	6 or same operational frequency with main circuit	2 cycle wavelength
DC-13	1.1	1.14	300ms	1.1	1.1	300ms			T0.95



- The making and breaking capacity of the aux. Contact under normal condition of use(see table 17)

Table 17

Utilization type	Making			Breaking			The making/breaking operational cycle times and operational frequency		
	I/Ie	U/Ue	COS ϕ or T _{0.95}	I/Ie	U/Ue	COS ϕ or T _{0.95}	Operation cycle times	The operational cycle times per minute	Minimum electrifying time (s)
AC—15	10	1	0.3	1	1	0.3	3000	6	2 cycle wavelength
DC—13	1	1	300ms	1	1	300ms			T _{0.95}

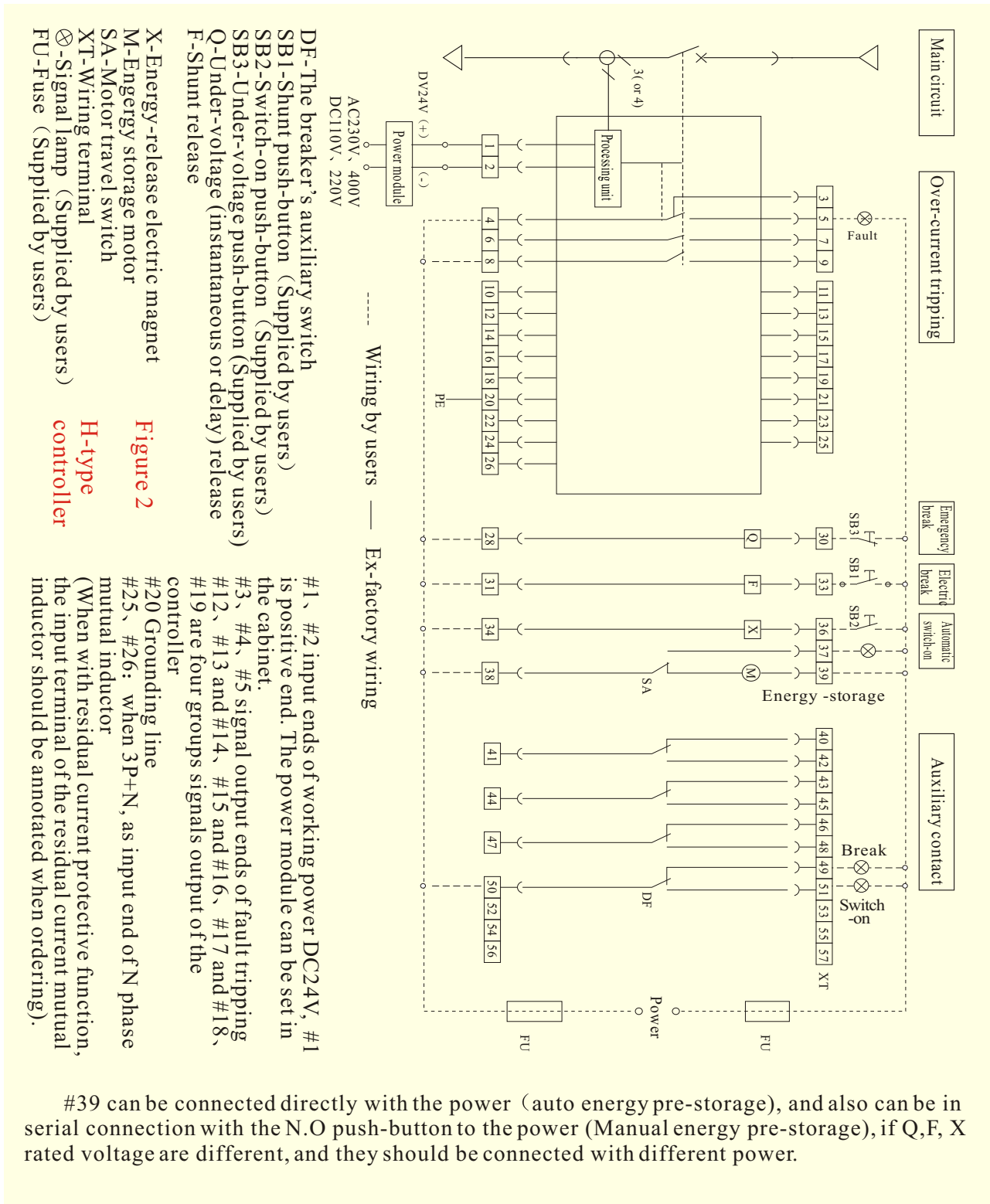
Structure:

The fixed-type breaker is mainly consisted of the contact system, intelligent controller, manual operational mechanism, electric energy-stored mechanism .It is of three-dimensional layout with compact , small volume structure feature. The contact system is sealed in an insulating base to form many small rooms. The intelligent controller, manual operational mechanism, electrical operational mechanism in its front forms each one independent unit in turn. It can be removed one by one and replaced by a new one accordingly.

The drawer-type breaker is consisted of its main body and the drawer base. Beside the drawer base, there are lead rails, on which there are mobilizable guide plate, and the breaker's main body is set on the left and right guide plates. To connect with the main circuit, the drawer-type breaker is by tusing its main body's busbar to insert into the bridge- contact on the drawer base. There are 3 working position: “connected” position, “experimental” position, “isolated” position changed by a handle to spin in or out. There is an indicator on the crossbeam of the drawer base to show their positions. When it is on “connected” position, the primary circuit and secondary one are connected; when it is on “experimental” position, the primary circuit is off and isolated by an insulation base, only secondary circuit is on; when it is on “ isolated” position, all of them are breaking. Since there is an interlocking mechanism in the drawer-type breaker, only on “connected” or “experimental” position, the breaker can switch-on; while on the middle position between the “connected” and “experimental” , the breaker can not switch-on.

◆ The wiring terminal

- The breaker has 57 wiring terminals, easy to connect, convenient for users. See figure 2 and figure 3.



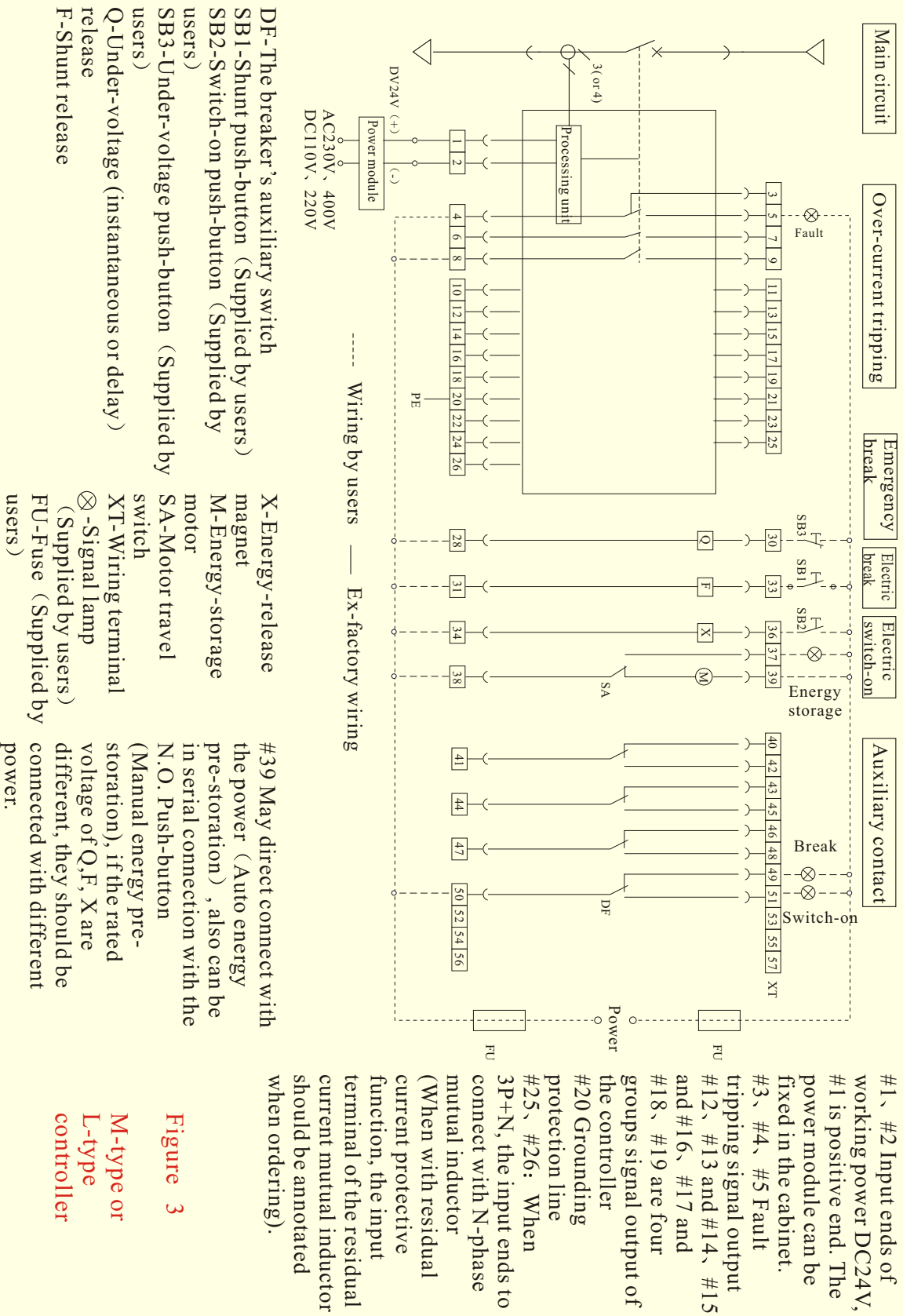


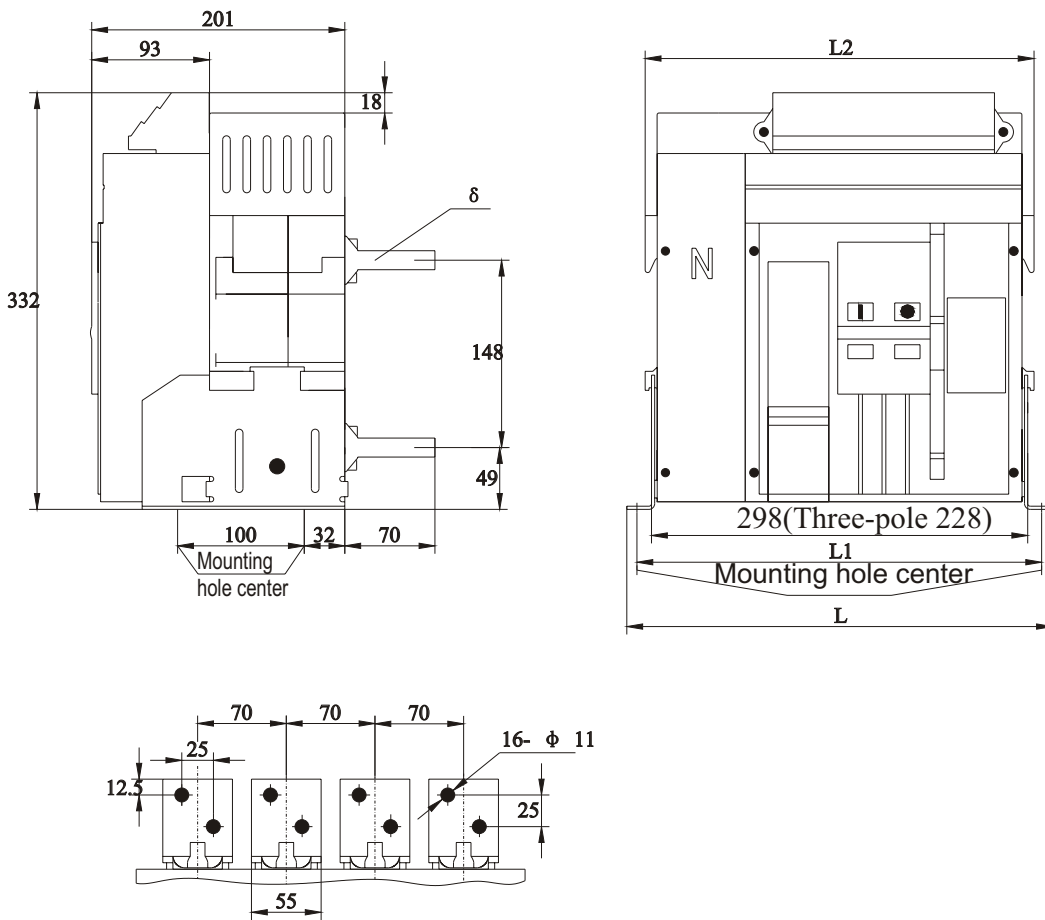
Figure 3

M-type or L-type controller



◆ The breaker's overall and mounting dimensions.

● The fixed type breaker overall and mounting dimensions see figure 4.



In A	200~800 A	1000~1600 A
δ mm	10	15

Pole type	L mm	L1 mm	L2 mm
Three-pole	267	250	237
Four-pole	337	320	307

Figure 4



● The drawer type breaker's overall and mounting dimensions, see figure 5.

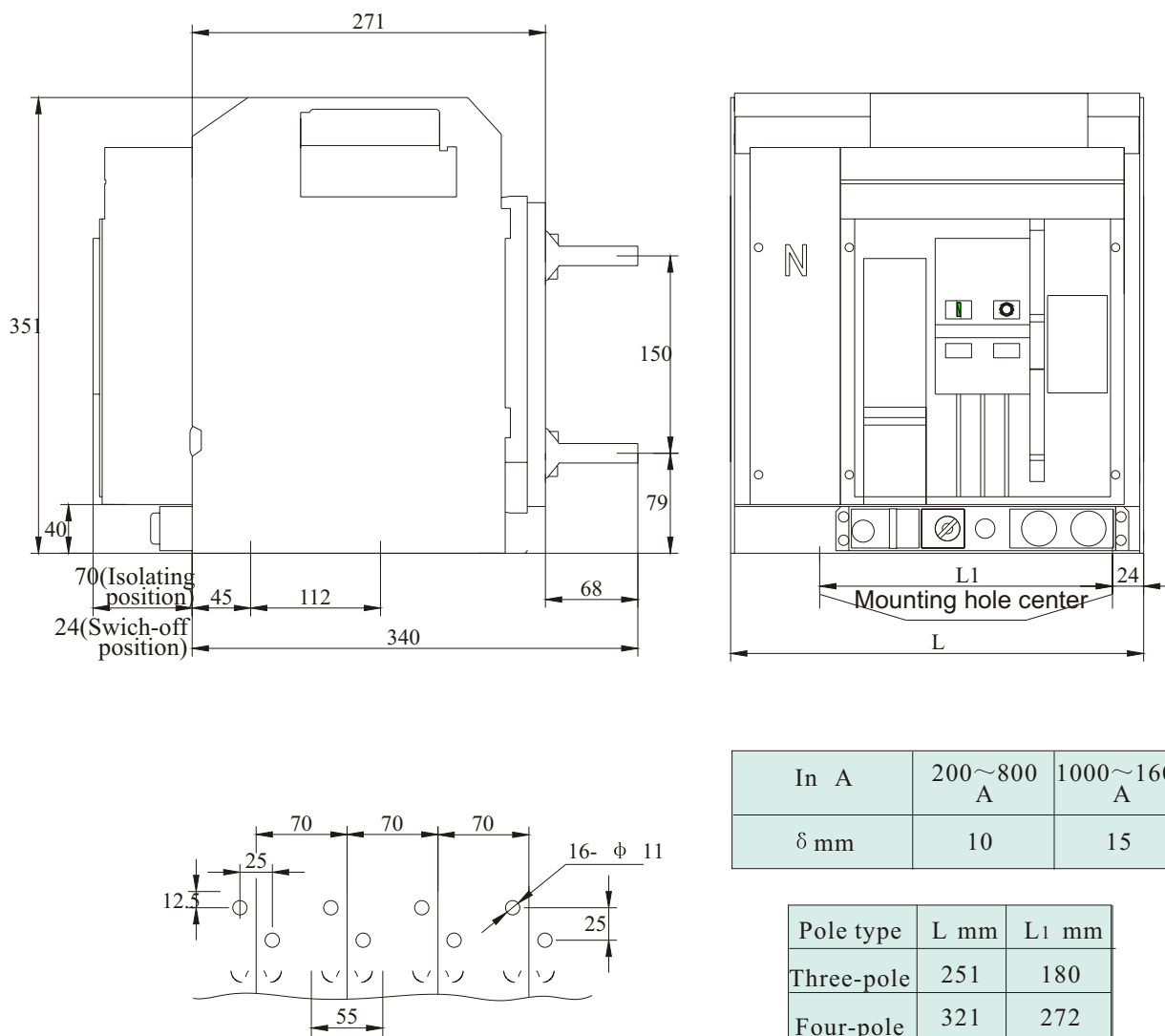
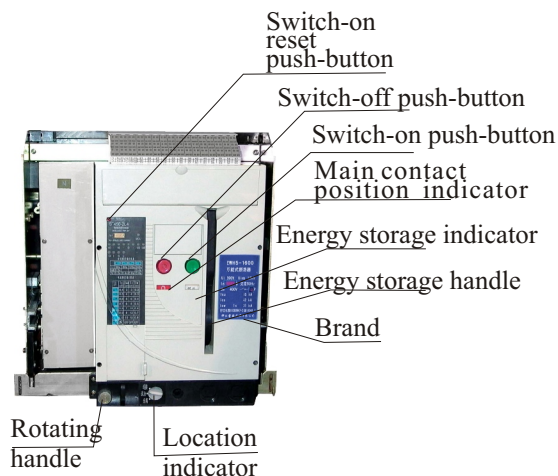


Figure 5

◆ Installation

- Check the specification if it meets the requirement before installation
- it won't change its technical performance through top-wiring or bottom-wiring of it.
- Before the installation first use the 500V megameter to check the circuit breaker dielectric resistance which should be not less than $10M\ \Omega$ under the condition of ambient temperature $20\pm 5\ ^\circ\text{C}$ and relative humidity $50\% \sim 70\%$. Otherwise should make it dry until its dielectric resistance meets the requirement.
- When install the breaker, its base foundation should be in the horizontal position, and with M6 screw fixation in balance without additional mechanical stress.
- When install it, there should be with a reliable protection grounding , around which with an obvious grounding marker.
- After the installation and wiring according to the chart, before electrifying the main circuit (at this moment, the drawer-type's indication is on the “experimental” position), the following operation test should be done:
 - A. To check the under-voltage, shunt-release, energy-release (closed) electro-magnet, electric operational mechanism , if they meet the requirement (the under-voltage release must be electrified before the breaker switch-on).
 - B. To check the energy manual-storation, manual on and off operation if it is stable. To turn the handle on the mask up and down around 5 times, it will shows “energy storage” with a sound of “ka-da” to finish. To press the button of “ | ” , the breaker closed reliably, on-off indicator indicates “ | ” . While to press “ ○ ” button, it breaks and the indicator indicates “ ○ ” .
 - C. To electrify the motor until the mask shows “ energy storage”, with a sound “ka-da” to finish, then the motor will be auto-power-cut , press the “ | ” button, the breaker is reliable closed.
 - D. When the breaker is closed, use any one of the under-voltage release, shunt-release or the “ ○ ” button on the mask, the tripping test of the intelligent controller should be able to break the breaker.
 - E. To check the setting parameters of the intelligent controller if it meets the requirement of use. When using the experimental function of the intelligent controller to simulate the fault signal so as to check the matching situation of the controller and breaker, the following step must be taken: firstly, to close the breaker, then press the “experimental” button on the panel of the controller which will issue an instantaneous operation signal to break the breaker; meanwhile, the panel will indicate the instantaneous operation fault. After the experiment finished, the “reset” button must be pressed to make the controller back into normal running, then press the switching-on reset-button of the breaker so as to close the breaker again to start running.





◆ L-type intelligent controller panel's introduction (ZT5-1600-L4 as example)

1 Load indicator

To indicate the load current and over-load long delay current;

2 Fault indicator lamp

To indicate the fault type ;

3 Long-delay protective current setting code switch

To set the long delay protective current value according to the current setting value check list.

4 Short delay protective current setting code switch

To set the short delay protective current value according to the current setting value check list.

5 Instantaneous protective current setting code switch

To set the instantaneous protective current value according to the current setting check list.

6 Grounding fault protective current setting code switch

To set the grounding fault protective current value according to the current setting value check list.

7 Fault check button

To press it after the breaker's fault tripping to indicate the fault type, it has the function of fault memory after power Cut.

Iq -Grounding protective current setting value

Ir1-Long delay current setting value

Isd- Short delay current setting value

Ii-Instantaneous current setting value

t q-Grounding protective time setting value

tr - Long delay time setting value

tsd -Short delay time setting value

8 Test button

To check the cooperation state of the controller and the breaker(Instantaneous acting test)

9 Reset button

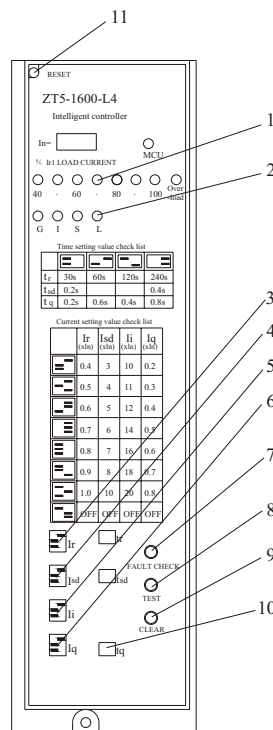
To press it after the controller's setting, test, fault, to make it back to normal operation..

10 Fault protective time setting code switch

To set the time by dial the code switch position according to the current setting value check list.

11 Reset button

After the breaker fault tripping, to press it then the breaker can switch-on.





◆ L type intelligent controller setting mode (ZT5-1600-L4 as example)

If need to reset the protective current value and fault motion time, the operation should be done by the professional according to the check list. The code switch should accord with the corresponding position which indicates the protective parameters. The code switch is not allowed to stop over the middle position between the two scales, and each protective parameters can't be set crosswise, it should accord with $I_r < I_{sd} < I_i$.

● Long delay setting

- a. The I_r code switch setting current is $(0.4 \sim 1) I_n$;
- B. When I_r code switch in on OFF position, it means it quits from the function.

● Short delay setting

- a. The I_{sd} code switch setting current is $(3 \sim 10) I_n$;
- B. When I_{sd} code switch in on OFF position, it means it quits from the function.

● Instantaneous setting

- a. The I_i code switch setting current is $(3 \sim 15) I_n$;
- B. When I_i code switch in on OFF position, it means it quits from the function.

● Grounding fault setting

- a. The I_q code switch setting current is $(0.2 \sim 0.8)I_n$, Minimum is 100A ;
- B. When I_q code switch in on OFF position, it means it quits from the function.

● Fault protective time setting

- a. The I_r code switch setting long delay time is one of the 30s, 60s, 120s, or 240s ;
- b. The t_{sd} code switch setting short time is 0.2s or 0.4s ;
- c. The t_g code switch grounding protective time is one of the 0.2s, 0.4s, 0.6s, or 0.8s.

● The controller in operation.

To press the reset button after the controller's parameter setting finished.



◆ M type, H type intelligent controller's panel introduction (ZT5-1600-H as example)

1 LCD interface display

2 “ Fault/Alarm ” LED

In normal working condition, LED doesn't lighten ; when fault tripping, the red LED will flash quickly, and when in alarm, the red LED lighten stably.

3 “ Normal ” LED

Only if ZT5-1600-H is electrified and in normal working condition, the green LED will flash stably.

4 Communication indicator light (M type nil)

The communication state display as follows:

Profibus: It is off when without communication; it is on when in communication.

Modbus: It is off when without communication; it is on when in communication.

Device

Net : It will flash when without communication; it is on when in communication.

5 Curve LED

There are hidden LED indicator light in the curve, when fault tripping, the corresponding LED lighten stably and indicate the present setting items.

6 Reset button.

The button will pop-up after the fault tripping or test tripping; if it is not pressed down, the breaker can't switch-on; when it is pressed down, the fault indication will be reset at same time.

7 Measurement--Function button 1 ,

switch to the default measurement theme menu.

(at the secret code input interface, is the “turn left” button)

8 Setting-- function button 2 ,

switch to parameter setting theme menu.

(at the secret code input interface, is the “turn right” button)

9 Protection--function button 3 ,

switch to the protective parameters setting theme menu.

10 Information--function button 4 ,

switch to the historical records and maintenance theme menu.

11 Up--To scroll up the menu contents base on the present grade, or scroll up to choose the parameters.

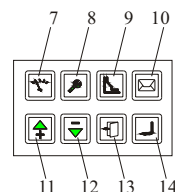
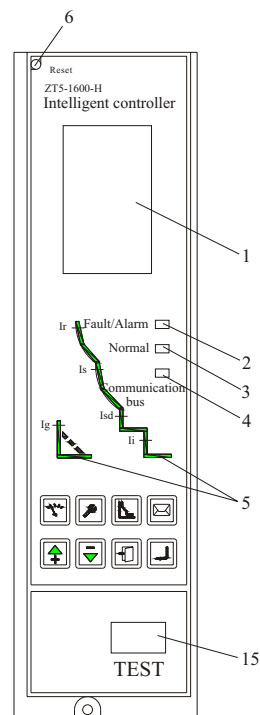
12 Down--To scroll down the menu base on the present grades, or scroll down to choose the parameters.

13 Exit--To quit from the present grades to go into last grade menu, or to cancel the present parameter's selection.

14 Choice--To go into the present item's next grade menu,

or to select the present parameter, and save the modification.

15 Test port--At the bottom of the front panel, there is a 16-needles test port, which can be inserted with a plug-in portable power box or overhaul unit.



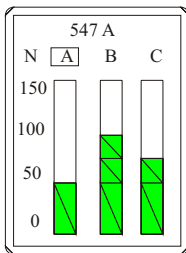


◆ M type, H type intelligent controller instruction of use.

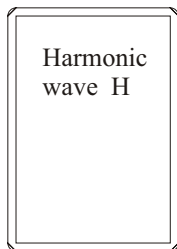
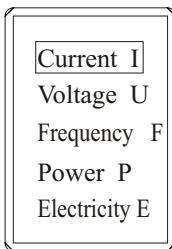
ZT5-1600-M or H controller provide 4 theme menus and 1 default interface :

● Default interface

When without other function operation, it indicates each phase current bar-graph.

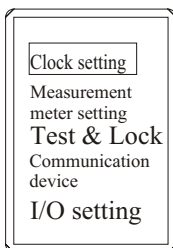


● “ Measurement ” menu



- To press or push button to return to the default interface
- At other non-fault interface, to press to switch over to the measurement menu.
- If no other operation, the system will return back to the default interface after several minutes.

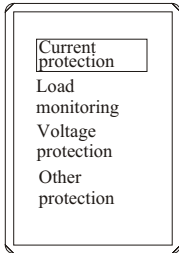
● “ System parameters setting ” menu



- To press or push button to return to the default interface.
- At other non-fault interface, to press switch over to the system parameter setting menu.
- If no other operation, the system will return back to the default interface after several minutes.

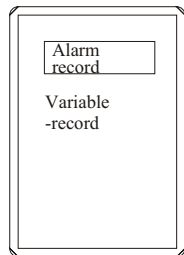
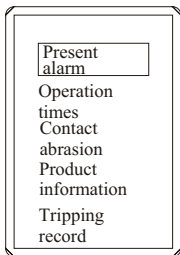


● “ Protective parameters setting ” menu



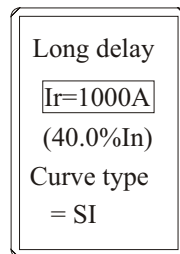
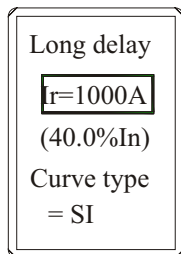
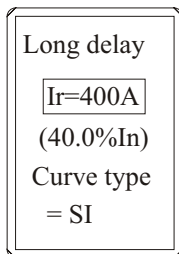
- To press or to return to the default interface
- At other non-fault interface, to press to switch over to the protective parameters setting menu.
- If without other operation, the system will return back to the default interface after several minutes.

● “ Historical records and maintenance ” menu



- To press or to return to the default interface
- At other non-fault interface, to press to switch over to the historical records and maintenance menu.
- If without other operation, the system will return back to the default interface after several minutes.

● Example of the sub-menu operation : over-load long delay protection setting



Adjust the setting value Save the setting value



Maintenance:

- .Each rotation spots should be filled in with lubricant oil regularly during the process of use
- .Keep maintenance regularly and clean the dust so as to keep the insulation ability of the breaker.
- .To check the contact system regularly especially each time of short-circuit breaking , the contents including:
 - a.Smoke mark cleaning on the walls of arc-extinguishing room, any cracks of the wall, whether the arc-extinguishing grid burns out seriously which must be changed in time according to the circumstance.
 - b.Whether the adjoined parts is loose or not .
- .After the fault breaking of breaker, the controller indicates the fault reason with power-cut memory function. i.e. after the power on again, to press the “fault check” button on the control panel, the reason of last fault breaking will come out. If new failure occurs, it will clear the last one and keep the new one. Please notice that analog tripping in experiment is without memory when power cut. To press “reset” button after check to let the controller runs in normal.
- .Under the circumstance of proper use according to the contents of this book, any quality problem will be solved without pay by our after-sales department within 18 months from the date of ex-works.(for domestic customers only).



Norms of order

(Please use this order form to telex us , per specs per form.) (Please mark with √. Or fill in with number)

Unit name		Ordering pieces	Ordering date	Delivery date
Model <input type="checkbox"/> ZW5-1600 Rated current <input type="checkbox"/> 200A <input type="checkbox"/> 400A <input type="checkbox"/> 630A <input type="checkbox"/> 800A <input type="checkbox"/> 1000A <input type="checkbox"/> 1250A <input type="checkbox"/> 1600A <input type="checkbox"/> Drawer type <input type="checkbox"/> Fixed type <input type="checkbox"/> Four pole <input type="checkbox"/> Three pole				
The breaker's rated working voltage		<input type="checkbox"/> 400V <input type="checkbox"/> 690V		
Intelligent controller	Model	Basic function		Selective additional function
	<input type="checkbox"/> L2 (2L2)	Long delay, Instantaneous (3~15)In	1、 Load current Cursor indication 2、 MCU operation monitor 3、 Over-load Thermo-memory Function 4、 Fault indication 5、 Fault memory function 6、 Instantaneous acting test function	<input type="checkbox"/> MCR Making/Breaking <input type="checkbox"/> Over-limit tripping function <input type="checkbox"/> Alarm signal unit (Pre-alarm, Self-diagnosis, Fault tripping, Grounding alarm)
	<input type="checkbox"/> L3 (2L3)	Long delay, Short delay (3~10)Ir , Instantaneous (3~15)In		
	<input type="checkbox"/> L4 (2L4)	Long delay, short delay (3~10)Ir Instantaneous (3~15) In , Single phase grounding (0.2~0.8) In (minimum 100A)		
	<input type="checkbox"/> M (2M)	1、 Long delay, short delay, instantaneous protection 2、 Single phase grounding protection.(Residual protection) 3、 Load monitoring protection 4、 Imbalanced current protection 5、 Each state indicator and value indicator 6、 Ampere meter function 7、 Fault memory function 8、 Thermo-memory function 9、 Instantaneous acting test Function	Rs485 serial interface	<input type="checkbox"/> Load monitoring <input type="checkbox"/> Electric meter function <input type="checkbox"/> MCR Making/breaking <input type="checkbox"/> Over-limit tripping function <input type="checkbox"/> Alarm signal unit (Four groups output function programmable) <input type="checkbox"/> Clock function <input type="checkbox"/> Accident record
<input type="checkbox"/> M/F (2MF)				
<input type="checkbox"/> H (2H)				
<input type="checkbox"/> H/F (2H/F)				
The controller's power module voltage	<input type="checkbox"/> AC230V; <input type="checkbox"/> AC400V; <input type="checkbox"/> DC110V; <input type="checkbox"/> DC220V; (Notes: outputs are DC24V)			
Accessories	<input type="checkbox"/> Under-voltage release voltage		<input type="checkbox"/> AC230V; <input type="checkbox"/> AC400V;	<input type="checkbox"/> Instantaneous <input type="checkbox"/> Delay <input type="checkbox"/> 1s <input type="checkbox"/> 3s <input type="checkbox"/> 5s
	<input type="checkbox"/> Shunt release voltage		<input type="checkbox"/> AC230V; <input type="checkbox"/> AC400V; <input type="checkbox"/> DC220V; <input type="checkbox"/> DC110V	
	<input type="checkbox"/> Energy release (Switch-on) electric magnet voltage		<input type="checkbox"/> AC230V; <input type="checkbox"/> AC400V; <input type="checkbox"/> DC220V; <input type="checkbox"/> DC110V	
	<input type="checkbox"/> Electric operational mechanism voltage		<input type="checkbox"/> AC230V; <input type="checkbox"/> AC400V; <input type="checkbox"/> DC220V; <input type="checkbox"/> DC110V	
Connection	<input type="checkbox"/> Horizontal wiring <input type="checkbox"/> Vertical wiring			
Auxiliary contact	Standard type <input type="checkbox"/> Four N.O., Four N.C., Transferring contact (For special requirement, please remark the circuit diagram if need to be modified)			