

W45 Air Circuit Breaker



1. Application

W45 series air circuit breaker (hereinafter referred to as breaker) is suitable for the circuit of AC 50/60Hz with rated voltage 400V, 690V and rated current up to 6300A. It is mainly used to distribute electric energy and protect circuit and power supply equipment from overload, under-voltage short-circuit, and single-phase earthing. With intelligent and selective protection functions, the breaker can improve the reliability of power supply, and avoid unnecessary power failure. The breaker is applicable for power stations, factories, mines (for 690V) and modern high-building, especially for the distribution system of intelligent building.

The breaker conforms to IEC60947-2. The whole series have past CCC certification and CE certification.

2. Working Condition

Temperature condition: $-5^{\circ}\text{C}\sim+40^{\circ}\text{C}$; the average value within 24h not exceed $+35^{\circ}\text{C}$.

Elevation: altitude of installation place shall not exceed 2000m.

Atmosphere condition: relative humidity at $+40^{\circ}\text{C}$ shall not exceed 50%. Higher humidity is permissible at lower temperature condition. When the higher monthly average relative humidity is 90% in the humidest month, the lowest monthly average temperature of this month is $+25^{\circ}\text{C}$. And consider the influence of dew on product surface due to temperature changes.

Pollution grade: grade III.

The breaker should be installed according to the requirement on the instruction manual: the vertical inclination degree shall not exceed 5° .

3. Specification

Type		W45-2000	W45-3200	W45-4000	W45-6300
Frame rated current I_{nm} (A)		2000	3200	4000	6300
Number of poles		3,4	3,4	3,4	3,4
Rated current I_n (A)		630,800,1000, 1250,1600,2000	2000,2500, 3200	2000,2500, 3200,4000	4000,5000, 6300
I_{cu} (kA)	400V	80	100	100	120
	690V	50	65	65	80
$I_{cs} = I_{cw}$ (kA)	400V	50	80	80	100
	690V	40	50	50	65
Rated current at N-pole I_n (A)		50% I_n , 100% I_n			
Inherent making & breaking time		23-32ms			
Operational performance (operations)	Electric life	500			
	Mechanical life	Maintenance-free 2500 Maintenance 10000			
Mounting mode		Fixed / Withdrawable			
Arcing distance(mm)		0			
Intelligent controller		Standard type(M) telecommunication type (H)			



W45-6300

4. Intelligent Controller

Intelligent controller is one of the core components of the circuit breaker

4.1 properties of the intelligent controller

- Protective function of over-load long time-delay and inverse time limit, short time-delay and inverse time limit, short time-delay definite time limit instantaneous operation protection;
- Single-phase earthing failure protection;
- Display of setting current I_r and operational current;
- Ampere meter;
- Over-load alarm;
- Short-circuit alarm
- Testing of operational properties

Note: The breakers with telecommunication port are available to realize remote control to breaker through master computer.

4.2 Protection performances of over-current release

- Ir and its inaccuracy of the controller

Inm(A)	Long time-delay		Short time-delay		Instantaneous		Earthing failure	
	Ir1	Error	Ir2	Error	Ir3	Error	Ir4	Error
≥ 2000	$(0.4\sim 1)I_n$	$\pm 10\%$	$(0.4\sim 15)I_n$	$\pm 10\%$	$1.0I_n\sim 15kA$	$\pm 15\%$	$I_{nm} \leq 4000A(0.2-0.8) I_n$ (Max.1200A.Min.200A)	$\pm 10\%$
							$I_{nm} \leq 6300A(0.2-1.0) I_n$	

Note: 1. When the breaker could realize over-load with long time delay ,short-circuit with short time-delay and short-circuit instantaneous protections, the setting ratings can not be over-lapped ,and $I_{r1} < I_{r2} < I_{r3}$

2. When the frame is 3200A and above ,the setting ratings range from $1.01I_n$ to 75kA.

- Characteristics of long time-delay protection

1.05 Ir1	1.3 Ir1	1.5 Ir	2.0 Ir1
>2h non-tripping	<1h tripping	15s,30s,60s,120s,240s,480s	8.4s,16.9s,33.7s,67.5s,135s,270s

- Characteristics of short time-delay protection.

For low over-current ,inverse time-limit protection could be realized; when the over-current is $>8 I_{r1}$, it will automatically change to be definite time-limit protection properties.

Refer to table below for time-limit properties.

Setting delay time (s)	Returnable time (s)
0.1, 0.2, 0.3, 0.4	0.06, 0.14, 0.23, 0.35

5. Standard Composition

To facilitate your ordering and utilization, the W45 intelligent with basic electric accessories as follows.

Standard composition of the breaker	Fixed type	Withdrawable type
Body	■	■
Drawer base	■	■
Intelligent controller	■	■
Electric motor	■	■
Closing electro-magnet	■	■
Shunt release	■	■
Under-voltage	■	■
Auxiliary contact	■	■
Door frame	■	■

6. Accessories

6.1 Shunt release

a. Shunt release is for remote breaking of circuit breaker so as to enhance security of the operator;

b. Ratings of shunt release

Rated operational voltage (V)	AC220V	AC380V	DC110V	DC220V
Operational voltage range	(70%~110%) U _e			
Power consumption	24VA	24VA		40W

6.2 Under-voltage release

a. It is an optional accessory;

b. Mainly used to protect apparatus from damage due to lowering of the operational voltage to a certain value;

c. Two types of release are available: instantaneous release and time-delay release;

d. For breakers appended with the release, it should be electrified continuously;

e. Ratings of under-voltage release.

f. Operation properties of under-voltage release

Rated operational voltage (V)	AC220V	AC380V	DC110V	DC220V
Operational voltage range	(35%~110%) U _s			
Power consumption	24VA	24VA		40W

Category		Under-voltage time-delay release	Under-voltage instantaneous release
Operation time of the release		Time-delay: 1s,3s,5s	Instantaneous
Operational voltage of the release	35% U _s ~70% U _s	Break the breaker	Break the breaker
	< 35% U _s	Can not make the breaker	Can not make the breaker
	≥ 85% U _s ~110% U _s	Reliably make the breaker	Reliably make the breaker
Within 1/2 delay time, voltage of power supply recovers to 85% U _s		Can not trip the breaker	

Note: Error the time of time-delay is ±10%

6.3 Closing electro-magnet

a. The magnet is for remote making of circuit breaker so as to enhance security of the operator.

b. The magnet could not be electrified for a long time.

c. Ratings of the magnet.

Rated operational voltage (V)	AC220V	AC380V	DC110V	DC220V
Operational voltage range	(85%~110%) U _s			
Power consumption	40VA	40VA		40W

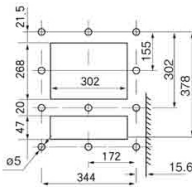
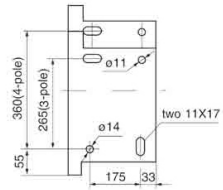
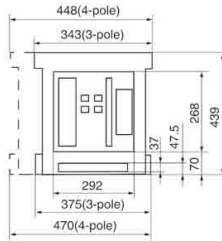
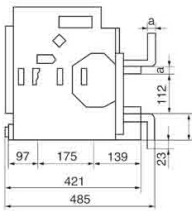
6.4 Auxiliary contact

a. Conventional heating current of auxiliary contact: 6A

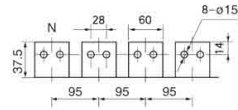
b. Auxiliary contacts: 4NO+4NC, 3NO+NC, 5NO+5NC(customization)

7. Outline and Installation Dimensions (mm)

W45-2000 Drawer-type

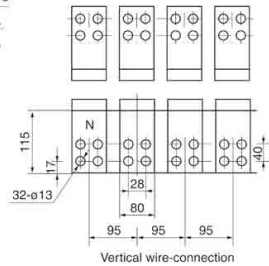


Opening hole on panel



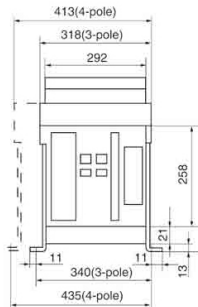
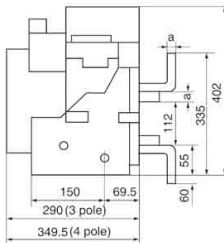
Horizontal Wire-connection

In(A)	a(mm)
630	10
800-1600	15
2000	20

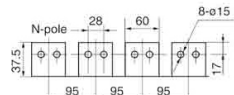


Vertical wire-connection

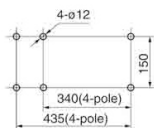
W45-2000 Fixed type



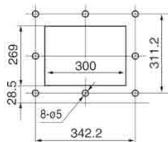
In(A)	a(mm)
630	10
800-1600	15
2000	20



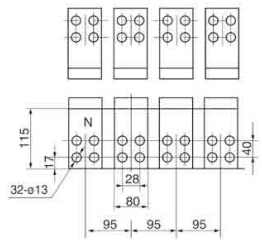
Horizontal Wire-connection



Installation hole on flight & outer side

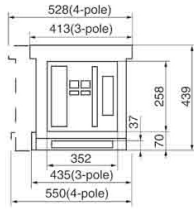
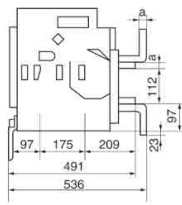


Opening hole on panel

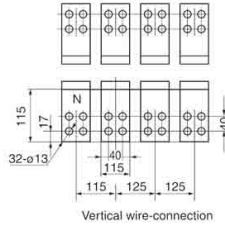
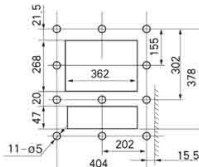
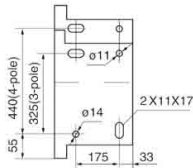
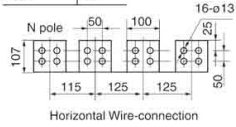


Vertical wire-connection

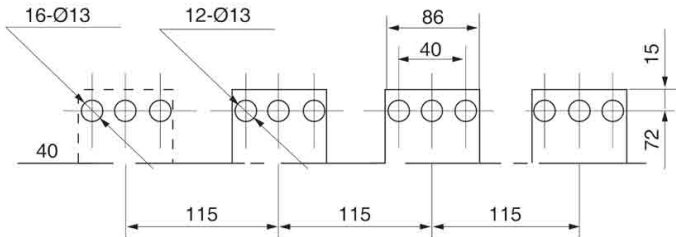
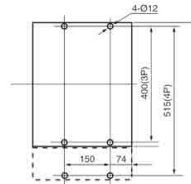
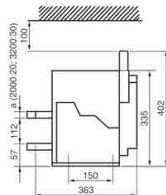
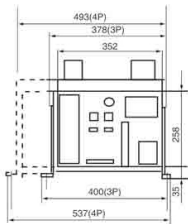
W45-3200 Drawer type



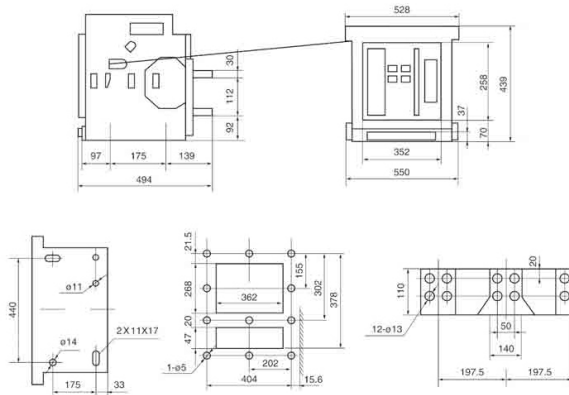
In(A)	a(mm)
2000-2500	20
3200	30



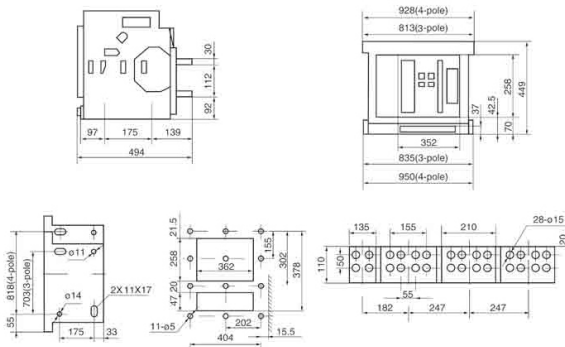
W45-3200 Fixed type



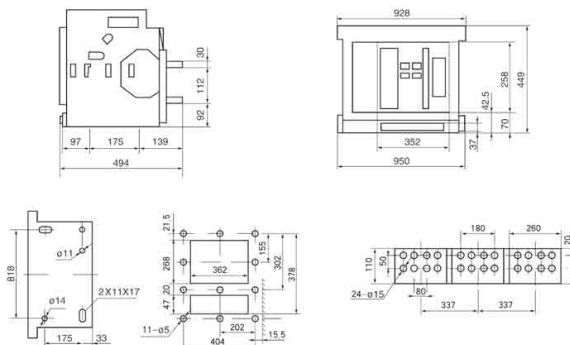
W45-4000 Drawer type (3-pole)



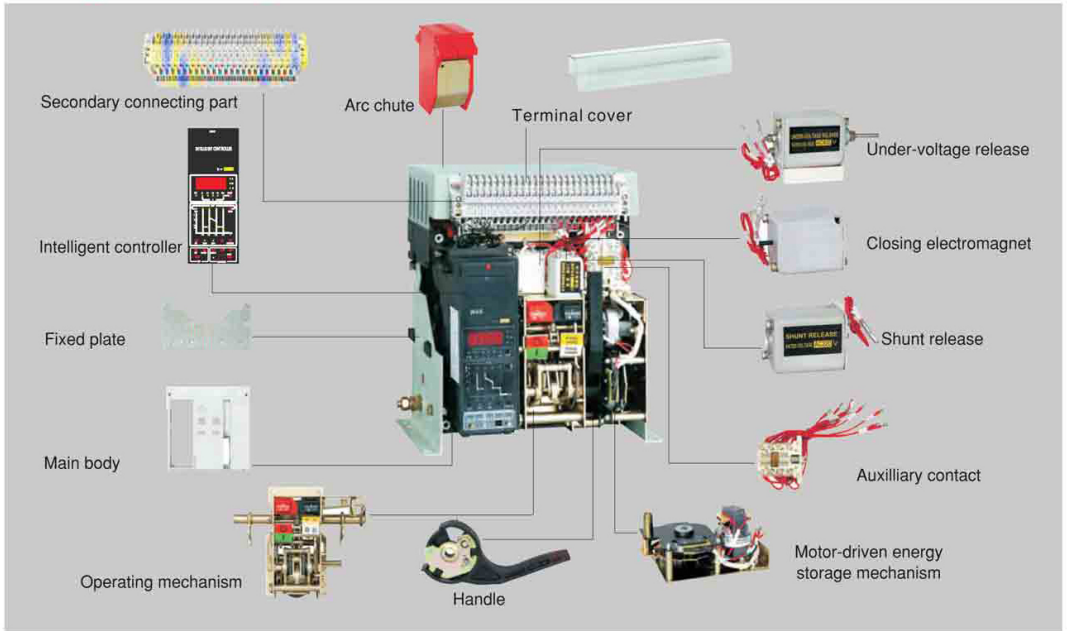
W45-4000,5000 Drawer-type



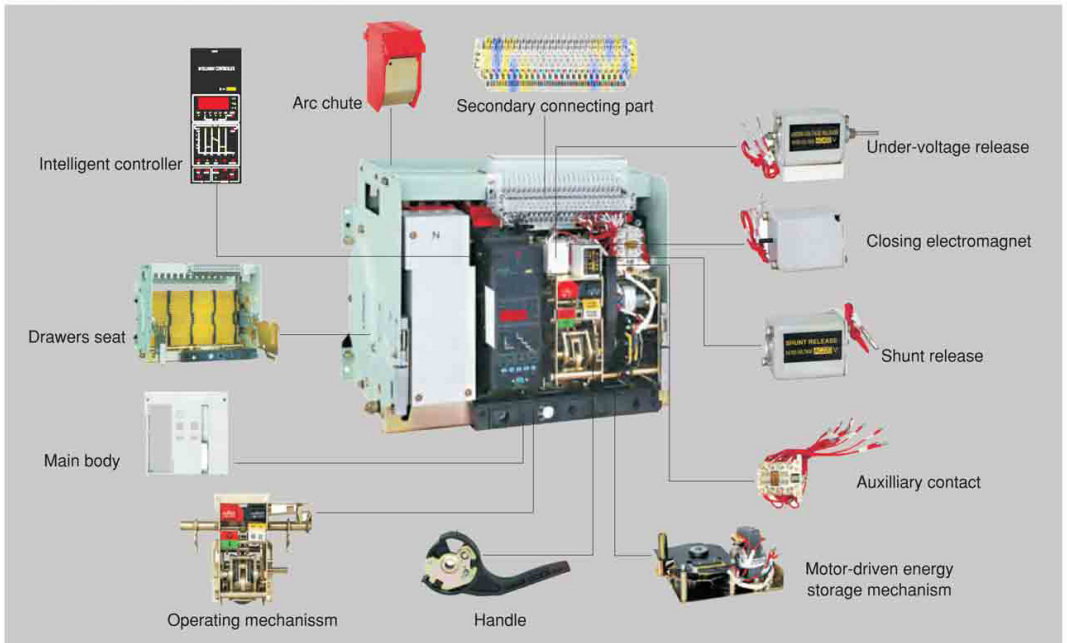
W45-6300 Drawer type (3-pole)



Fixed Type Structure Explosion



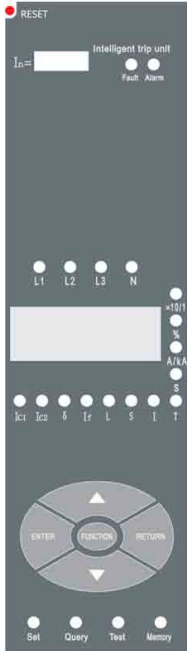
Drawer Type Structure Explosion



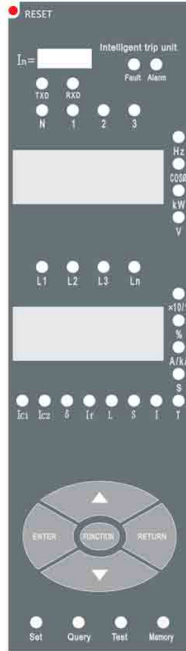
Controller

Controller category

2M type



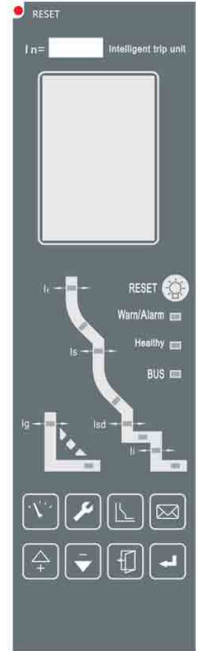
2H type



3M type



3H type



Controller functions

Function items	2M	2H	3M	3H
Display interface				
Digital tube display	●	●	—	—
LCD display	—	—	●	●
Protection function				
Overload long delay protection	●	●	●	●
Overload thermal memory	●	●	●	●
Overload pre-alarm/alarm signaling operation	●/○	●/○	●/○	●/○
Short-circuit short delay protection	●	●	●	●
Short delay thermal memory	●	●	●	●
Short-circuit instantaneous protection	●	●	●	●
Grounding protection (Differential T)	●	●	●	●
Grounding alarm/ alarm signaling operation	●/○	●/○	●/○	●/○
Leakage protection/alarm/ alarm signaling operation (and grounding protection for selection)	○/○/○	○/○/○	○/○/○	○/○/○
Neutral solidly grounding protection	●	●	●	●
Current asymmetric protection/ alarm/ alarm signaling operation	●/●/○	●/●/○	●/●/○	●/●/○
MCR/HSISC	○/○	○/○	○/○	○/○
Load monitor/ alarm/ alarm signaling operation	○/○/○	●/●/○	○/○/○	●/●/○

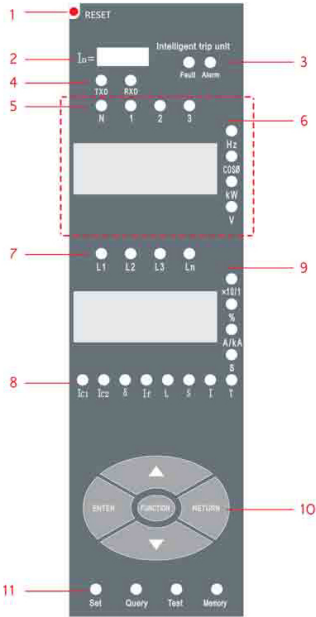
Controller functions

Function items	2M	2H	3M	3H
Protection function				
Under-voltage protection/ alarm/ alarm signaling operation	—	—	●/●/○	●/●/○
Over-voltage protection/ alarm/ alarm signaling operation	—	—	●/●/○	●/●/○
Voltage asymmetric protection /alarm/ alarm signaling operation	—	—	●/●/○	●/●/○
Phase sequence protection/ alarm/ alarm signaling operation	—	—	●/●/○	●/●/○
Under-frequency protection /alarm/ alarm signaling operation	—	—	●/●/○	●/●/○
Over-frequency protection /alarm/ alarm signaling operation	—	—	●/●/○	●/●/○
Current allowable -value protection /alarm/ alarm signaling operation	—	—	●/●/○	●/●/○
Reverse-power protection/ alarm/ alarm signaling operation	—	—	●/●/○	●/●/○
Testing functions				
Current testing (Phase-poles, N pole and Grounding)	●	●	●	●
Voltage testing (Phase-voltage, Cable-voltage and Voltage asymmetric rate)	○	● (no-voltage asymmetric rate)	●	●
Phase sequence testing	—	—	●	●
Frequency testing	○	●	●	●
Allowable-value testing (Current)	—	—	●	●
Allowable-value testing (Power)	—	—	●	●
Power testing (Active & Reactive power)	○	● (active power)	●	●
Power factor testing	—	● (total power factor)	●	●
Power energy testing (Active & Reactive power energy)	—	—	●	●
Harmonics testing	—	—	○	○
Maintenance functions				
Fault status indicating	●	●	●	●
Fault record and query	●	●	●	●
Past record of peak current	—	—	●	●
Past record of alarm and query	—	—	●	●
Fault to trip signaling operation	●	●	●	●
Self-diagnostics function	●	●	●	●
Analog tripping test function	●	●	●	●
Contacts abrasion equivalent(alarm) query	●	●	●	●
Operation times query	●	●	●	●
Clock functions	○	○	●	●
Other				
Signal unit	○	●	○	●
Communication	—	●	—	●
Regional selection interlock	○	○	○	○

Remarks: “●” with this function “○” functions for selection “—” without this function

Controller

Controller Panel

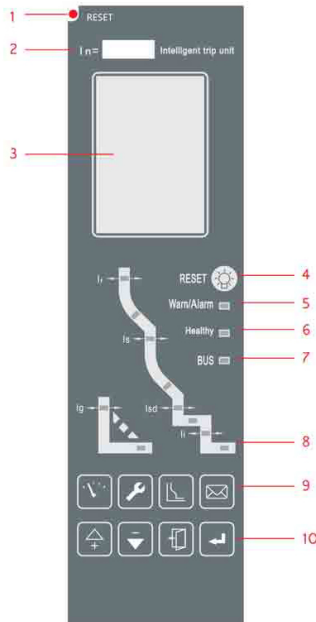


2M/2H type controller

1. Fault to trip & reset
2. Rated current for name-plate
3. In sequence of fault & alarm indicating
4. In sequence of communication emission & receiver indicating
5. In sequence of N phase, A phase, B phase, C phase voltage indicating
6. In sequence of frequency, power factor, power, voltage indicating from upper to bottom
7. In sequence of A phase, B phase, C phase, N phase current indicating
8. In sequence of load monitor 1, load monitor 2, asymmetric current, grounding protection, over-load long delay, short-circuit instantaneous indicating
9. In sequence of opening & closing time, main contacts abrasion rate, current unit, time, self-diagnostics fault statuses indicating from upper to bottom
10. 5 pieces operation buttons
11. In sequence of controller setting, query, testing, store service statuses indicating

Notes:

1. The dashed box is controller with voltage indicating function. Without indicating if no.
2. Serial 4 is controller with communication function. Without indicating if no.
3. A/Ka of serial 9, light fixed is current A and continuous blinking in kA
4. kW of serial ,light fixed is active power and continuous blinking is reactive power



3M/3H type controller

1. Fault to trip & reset
2. Rated current for name-plate
3. LCD indicating interface
4. Fault/alarm resetting button
5. Fault/alarm LED indicating (LED without light while normal working, LED with continuous blinking quickly while fault to trip, LED with light fixed while alarm)
6. LED always continuous blinking while controller on power and normal working status
7. Communication indicating (Modbus: extinguish without communication. Continuous blinking while communication. Proibus: extinguish without communication. Light fixed while communication)
8. Curre LED (Fault to trip at corresponding LED light flash indicating fault type. LED light fixed indicating present setting items while protective parameter setting)
9. In sequence of testing function, setting function, protection function and information function button from left to right.
10. In sequence of upward, downward, ESC and selection OK button from left to right

Remarks: Serial 7 is controller with communication function. No indicating if no-communication function.