ACDC M3EL Series Residual Current Protection Circuit Breaker User Manual

Contents

ACDC M3EL Series Residual Current Protection Circuit Breaker

Scope of application

The rated insulation voltage of the M3EL series of residual current action circuit breaker is 800V, which is suitable for those three-phase four-wire neutral-point direct ground (TT) distribution network of AC 50Hz, rated voltage 400V, and rated current of up to 630A. They are used to provide indirect contact protection; to prevent the damage to insulation of the equipment, which will produce the fire hazards caused by the grounding fault current; also, they can be used to distribute power, protect circuits and power equipment from overload, undervoltage, short circuit, single-phase grounding and other malfunctions.

- The products shall meet the following standards:
- GB 14048. 1-2012 “Low-voltage switchgear and controlgear – Part 1: General Provisions”;
- GB 14048. 2-2008 “Low-voltage switchgear and controlgear – Part 2: circuit breaker”;
- GB17701-2008 “Circuit Breaker for
- Equipment”;
- GB/Z22202-2008: Reliability Test Method for Residual Current Action Circuit Breaker for

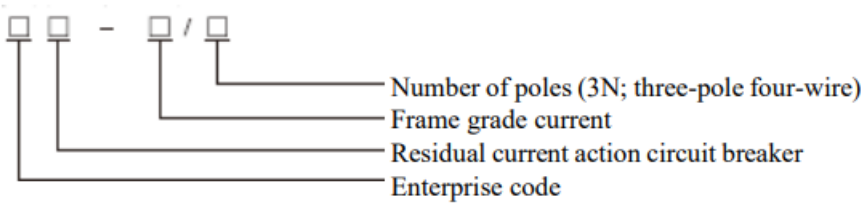
Household and Similar Applications;
JB/T 10494-2005 Reliability Test Method for Residual Current Action Circuit Breaker for
Household and Similar Applications
JB/T 8979-2006 “Residual Current Action Circuit Breaker With or Without Overload Protection”

Main functions and characteristics:

- **A** high-performance 32-bit ARM microprocessor is adopted to carry out signal processing and intelligent control in real time;
- LCD display in Chinese, with friendly human-machine interface, easy for operation;
- Residual current (leakage) protection, with residual current shift being fixable online, with the function of reclosing;
- Monitor and track the circuit’s residual current in real time, and automatically adjust the shift position, to ensure delivery rate and reliability of products;

- Three-stage protection (long delay, short delay and instantaneous), with electronic tripping, independent of the power supply voltage;
- With high breaking capacity, ensure the reliability of short-circuit protection of the line;
- Over-voltage protection, under-voltage protection, phase loss protection;
- Real-time display of residual current, three-phase power supply voltage and load current of the line;
- Protection functions and parameters can be set and modified online;
- Identification and display of tripping type (residual current, blocking, overload, undervoltage, overvoltage, phase loss), which can be stored, queried and deleted.
- With communication function, remote signaling, telemetry, remote control, remote adjustment can be realized.
- With infrared communication function, it can be also equipped with the outer hanging lightning protection module.

Product model and its meaning



Use environment

- The installation site should be free of conductive dust, corrosive gases, flammable and explosive gases, rain or snow erosion
- Altitude ≯2,000m;
- Ambient temperature -5℃~ +40℃, the average daily maximum temperature ≤ +35 ℃;
- Relative humidity ≤ 50% (when ambient temperature is +40 ℃);
- The strength of external magnetic field in the installation place should not exceed 5 times of that of the geomagnetic field in any direction.
- The installation location shall be well ventilated and heat dissipated.

Main technical parameters

Specifications and models	125	250	400	630
Frame current (A)	125	250	400	630
Number of poles	3P+N	3P+N	3P+N	3P+N
Rated working voltage Ue (V)	AC 400 50HZ			
Rated insulation voltage Ui (V)	AC 800			

Rated impact resistance voltage Uimp (V)		8000			
Arc distance (mm)		>50	>50	>100	>100
Limit short-circuit breaking capacity Icu (kA)		50	50	65	85
Running short-circuit breaking capacity Ics (kA)		35	35	42	65
Rated residual short-circuit switching (breaking) capacity IΔm(kA)		12. 5	12. 5	16 5	21 5
Residual current action characteristics		AC type			
Rated residual action current IΔn (mA)		50/100/200/300/400/500/600/ 800, automatic, OFF	100/200/300/400/500/600/800/ 1000 automatic, OFF		
Residual action time characteristics		Delay type/non-delay type			
Breaking time (S)	Delayed type	IΔn≤0.5	IΔn≤0.5	5 IΔn≤0.15	10 IΔn≤0.15
	Non-delayed type	IΔn≤0.3	2 IΔn≤0.15	5 IΔn≤0.04	10 IΔn≤ 0.04
Delay-type limit non-driving time (S)		2 IΔn: 0.06			
Automatic reclosing time (S)		20-60			
Operating performance (times)	Powered	1500	1000	1000	1000
	Unpowered	8500	7000	4000	4000
	Total number of times	10000	8000	5000	5000
Overload and short-circuit characteristics		Three-stage protection, electronically adjustable. See “Protection Characteristics Description” for details			

Overvoltage protection valu e (V)	Set the value (250~300)+5% off by default
Undervoltage protection val ue (V)	Set the value (145~200)+ 5%, off by default
Joint control delay time (ms)	≤40ms
Communication delay time (ms)	≤200ms

Description of protection characteristics

Overload long delay protection

Action value setting range
Table 1: Overload long delay parameter setting

Parameter	Frame current	Set value	Factory setting value
Action setting value M	125	50A, 63A, 80A, 100A, 125A	125A
	250	100A, 125A, 140A, 160A 180A, 200A, 225A, 250A	250A
	400	200A, 225A, 250A, 315A, 350A, 400A	400A
	630	315A, 350A, 400A, 500A, 630A	630A
Delay time setting value tL		3s, 4s, 6s, 8s, 10s, 12s, 14s, 16s, 18s, OFF	12 s

Action characteristics
Table 2: Protection action characteristics

Ambient temperature	Current name	Current name	Current name
+ 40 ℃	Agree not to trip the current	1.05 Ir1	≥2h
	Agree to trip the current	1.3Ir1	<2h

Time delay characteristics
The overload protection is carried out according to the anti-timing characteristics:
T= (6Irl/I) 2tL Delay accuracy: ± 10%
Among them, T is the action time value, Irl is the long delay protection setting value, I is the fault current, and tL is the long delay time setting value

short-circuit short delay protection
Short-circuit short time delay protection prevents the impedance short circuit of the power distribution system. The delay of trip is to realize the selective protection.

Setting of short-circuit short delay protection parameters
Table 3: Setting of short-circuit short delay parameters

Parameter setting		Factory setting value
Short delay action current setting value Ir2	2Irl, 2.5 Irl, 3Irl, 4Irl, 5Irl, 6Irl, 7Irl, 8Irl, 10Ir, 12Ir	6Irl
Short delay time setting value ts	0.1s, 0.2s, 0.3s, 0.4s, 0.6s, 0.8s, 1.0s, OFF	0.4s

Short-circuit short delay protection action characteristics

Table 4: Short-circuit short delay action characteristics

Characteristics	Fault current multipler	Tripping time	Time delay error
Non-action characteristic	≤0.8 Ir2	No action	±40ms
Action characteristics	>1.2 Ir2	Delayed action	±40ms

Instantaneous protection
Setting of short-circuit instantaneous protection parameters

Table 5: Instantaneous parameter settings

Parameter setting		Factory setting value
Instantaneous action current setting value Ir3	4Irl, 6 Irl, 7 Irl, 8 Irl, 10Irl, 11Irl, 12 Irl, 13 Irl, 14 Irl, OFF	10 Irl

Short-circuit instantaneous protection action characteristics
Table 6: Instantaneous action characteristics

Characteristics	Current multipler (I/Ir3)	Time delay error
Non-action characteristic	≤0.8	
Action characteristics	>1. 2	±40ms

Residual current protection characteristics
Shift setting range

Model Specification	Parameter	Setting value (mA)	Factory setting value
125-400	Residual action current IΔn	50,100,200,300,400,500,600,800, off, automatic	500
630-800		100,200,300,400,500,600,800,1000,off, automatic	

Action characteristics

Parameter	Characteristics				
Rated non-action current	0.5IΔn				
Rated action current	≥0.75IΔn				
Time delay characteristics	2IΔn Limit non-driving time (Δt)	Breaking time			
		IΔn	2 IΔn	5 IΔn	10 IΔn
Non-delayed type	—-	≤0.3s	≤0.15s	≤ 0.04s	
Delayed type	≥0.06s	≤0.5s	≤ 0.2s	≤ 0.15s	

Automatic shift mode
In the automatic shift mode, the shift values and the floating values are:

Shift value (mA)	200	300	400	500
Floating value (mA)	100	150	200	

When the residual current exceeds the floating value of the shift and fails to achieve its action value, and maintains stable for 60s, it will float up by one shift, and so on, until the maximum shift; When the residual current is less than the floating value of the next shift and remains stable for 120s, it will float down by one shift, and so on, until the minimum shift. Take the “automatic” shift, with the initial residual current of the line being 100mA, as example. The circuit breaker is energized and the shift setting is automatically fixed at 300mA. After the residual current increases to 150mA and above, and keep stable for 60s, the shift changes to 400mA; When the residual current decreases to 100mA and below, and keep stable for 120s, the shift changes to 200mA.

Automatic reclosing/locking
Automatic reclosing: After the residual current exceeds the action current value shift and gets tripped, it will be able to reconnect automatically after 20~60 seconds, but the manual closing is not time-limited.
Locking: The locking time is 5s, that is, when there is another leakage fault within 5s after the product reclosing, the circuit breaker can trip again and lock in the time of action, and it is necessary to manually close instead of automatically reclosing; When the product has a leakage failure outside 5s after the re-closing, the circuit breaker is tripped but not locked during the action time, and it can be automatically reclosed within 20~ 60 seconds.

Over-voltage protection function
When the line phase voltage is higher than the over-voltage protection setting value, the circuit breaker performs protective tripping. When the line voltage is restored to normal voltage, the circuit breaker can be automatically closed and put into operation. The setting value of over-voltage protection is 250V ~ 300V, and the factory value is set to 265V. Users can set or close the protection by themselves.

Under-voltage protection function
When the line phase voltage is lower than the under-voltage protection setting value, the circuit breaker performs protective tripping. When the line voltage is restored to normal voltage, the circuit breaker can be automatically closed and put into operation. The setting value of the under-voltage protection is 150V~200V, the factory setting value is 165V. Users can set or close the protection by themselves.

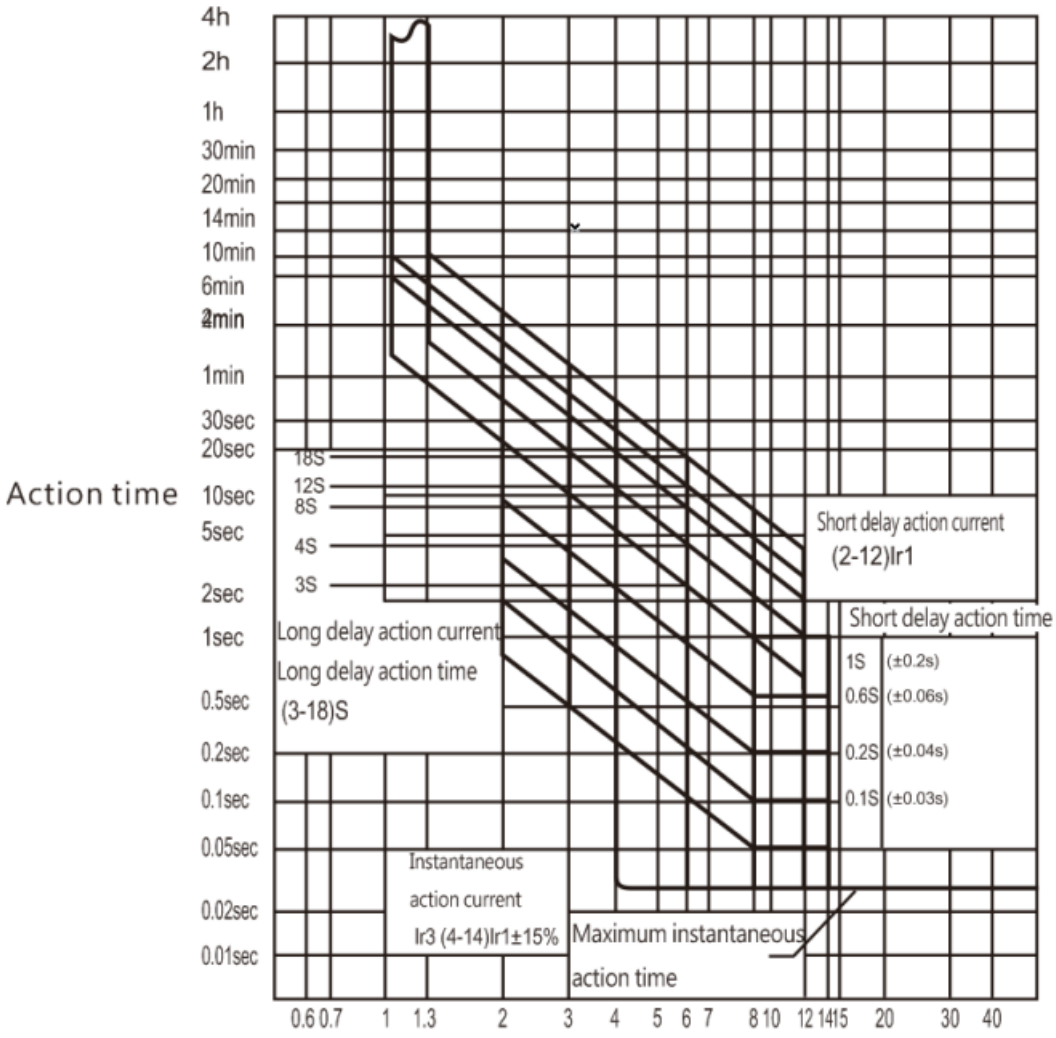
Phase loss protection function
When there is a phase loss on the line power supply terminal, the circuit breaker performs protective tripping. When the line is restored to normal voltage, it can be automatically closed and put into operation. The factory default setting is closing.

Linkage protection function
Through the linkage interface, it can be linked with other fire protection equipment for linkage protection, specifically as follows:

DI input settings		Functional specifications	Priority	Delay time (ms)
Input control	IN1 is short connected with DCOM	Circuit breaker closing	Low	≤40ms
	IN3 is short connected with DCOM	Circuit breaker opening	Height	

Note: In case of short connection for a long period of time, the short-circuit is always in the opening state.

Overcurrent short-circuit protection characteristic curve



Communication function

Communication interface	Interface type	Communication protocol	Communication address	Communication rate
RS485	External terminal	DL/T-645 Modbus (adjustable)	1-255	600-38400 (adjustable)

Product installation

Product installation notes

- Please check whether the product specifications are correct and the accessories are complete before installation;
- Please read the instructions for use carefully, to ensure proper installation and daily maintenance;
- Products must be installed vertically;
- According to the product rated current and relevant criteria, select the appropriate wire and connect in strict accordance with the provisions of wiring.

The upper part is the power supply terminal, in which 1, 3 and 5 are respectively connected with phases A, B, C, and N is connected with zero line. The lower part is the load terminal, in which 2, 4 and 6 are respectively connected with phases A, B, C, and N is connected with zero line;

- The cross-sectional area of incoming and outgoing lines shall meet the construction requirements as specified in the standard, and the conductive part shall not be exposed beyond the shell;
- Install the arc plate correctly after wiring is completed;
- Install in places where non-electrician and minors are not accessible, to prevent electric shock or changes to the correct configuration and wiring of the product;

Operation of LCD products
The circuit breaker is equipped with a test power-up function upon power-on (which can be turned off), which can effectively guarantee safety of the follow-up equipment.

Fig. 1

Product commissioning
After the wiring is complete and correct through check, energize the circuit breaker. When the circuit breaker is in a disconnected state, set the parameters according to the operation instructions. After the setting is complete, perform the closing operation. The running states are shown in Fig. 2, Fig. 3 and Fig. 4.
In the closing condition, press [test trip] key to carry on the residual current test trip, and perform reclosing within 20S-60S.

15:04:23		15:07:25Automatic	13:01:25 Automatic
Ua:220V	Ub:220V	Ua:220V Ub:220V	Rated residual 200mA
Uc:220V		Uc:220V	Residual current 0mA
Opening standby		Closing operation	During closing…
Fig. 2		Fig. 3	Fig. 4

Closing operation of the circuit breaker

1. **Automatic closing**
   Press [closing] key for 2 seconds, and LCD will display “during closing..”. After the closing, the state of the LCD screen appears as “closing operation”, and the circuit breaker enters the normal operation state.
2. **Manual closing**
3. Use the attached manual wrench, insert it into the hole, and rotate clockwise by around 360°. After the success of closing, the state of the LCD screen is automatically updated as “closing operation”, and the circuit breaker enters the normal operation state.
   Note: Manual switching can be performed when the circuit breaker’s main contact is disconnected. The closing operation is shown in the above Method 2. Pay attention to the safety of load equipment and personnel during manual closing.

Disconnection operation of circuit breakers

1. In the running state, press the [opening] key. After the successful opening, the state of the LCD screen is shown as “opening standby”.
2. If manual opening is needed, use wrench, insert it into the hole, and rotate clockwise by around 180°. After the successful opening, the state opening/closing is shown as “opening”.

Operation instructions of LCD products

Main menu

■ Setting 2 Query 3. About 4. Maintenance	1. Setting ■. Query 3. About 4. Maintenance	1. Setting 2 Query ■. About 4. Maintenance

- In the real-time display status
- Press [Setting] button to enter the main menu interface as shown above.
- Press [Up/Down] button to control the highlighted display position.
- Press [OK] button to enter the corresponding sub-menus.

Setup menu

■ Overvoltage setting	■ Short-circuit setting	■ Time setting
2. Undervoltage setting	6. Characteristics setting	A. Communication setting
3. Default phase setting	7. Residual current setting	B. Display setting
4. Overload setting	8. Residual record setting	C. Password setting

■ Overvoltage setting	■ Short-circuit setting	■ Time setting
2. Undervoltage setting	6. Characteristics setting	A. Communication setting
3. Default phase setting	7. Residual current setting	B. Display setting
4. Overload setting	8. Residual record setting	C. Password setting

As shown above.

- **[Up**/**Down]** button to control the highlighted display position or page flip.
- **[OK]** button to enter the corresponding setting menu.
- **[Return]** button to return to the previous menu.

Overvoltage setting

■ Overvoltage setting	Setting value: 265V	Setting value: 265V
2. Undervoltage setting	Trip switch: ON	Trip switch: ON
3. Default phase setting	Alarm switch: OFF	Alarm switch: OFF
4. Overload setting	Setting: return	Save: cancel

As shown above.

- **[Up**/**Down]** button to control the highlighted display position or adjust parameters.
- **[OK]** button to enter the corresponding setting menu/switch setting options.
- **[Return]** button to return to the previous menu.
  Overvoltage protection can be turned OFF or set as 250V to 300V.

Undervoltage setting

1. Overvoltage setting	Setting value: 145V	Setting value: 145V
■. Undervoltage setting	Trip switch: ON	Trip switch: ON
3. Default phase setting	Alarm switch: OFF	Alarm switch: OFF
4. Overload setting	Setting: return	Save: cancel

As shown above.

- **[Up/Down]** button to control the highlighted display position or adjust parameters.
- **[OK]** button to enter the corresponding setting menu/switch setting options.
- **[Return]** button to return to the previous menu.
  Undervoltage protection can be turned OFF or set as 150V to 200V.

Default phase setting

1. Overvoltage setting	Setting value: 50V	Setting value: 50V
2. Undervoltage setting	Trip switch: ON	Trip switch: ON
■. Default phase setting	Alarm switch: OFF	Alarm switch: OFF
4. Overload setting	Setting: return	Save: cancel

As shown above.

- **[Up/Down]** button to control the highlighted display position or adjust parameters.
- **[OK]** button to enter the corresponding setting menu/switch setting options.
- **[Return]** button to return to the previous menu.
  Phase default protection can be turned OFF or set as 10V to 50V.

Overload setting

1. Overvoltage setting	Setting value: 2.0Ir1	Setting value: 2.0Ir1
2. Undervoltage setting	Setting value: 100A	Setting value: 200A
3. Default phase setting	Delay time: 12S	Delay time: OFF
■. Overload setting	Setting: return	Save: cancel

As shown above

- **[Up/Down]** button to control the highlighted display position or adjust parameters.
- **[OK]** button to enter the corresponding setting menu/switch setting options.
- **[Return]** button to return to the previous menu.
  Delay time is OFF / (or) overcurrent protection function is disabled when it is OFF See the curve chart for the overload delay time curve.

Short-circuit setting

1. Overvoltage setting	Setting value: 2.0Ir1	Setting value: 2.0Ir1
2. Undervoltage setting	Setting value: 100A	Setting value: 200A
3. Default phase setting	Delay time: 12S	Delay time: OFF
■. Overload setting	Setting: return	Save: cancel

As shown above

- **[Up/Down]** button to control the highlighted display position or adjust parameters.
- **[OK]** button to enter the corresponding setting menu/switch setting options.
- **[Return]** button to return to the previous menu.
  Delay time is OFF / (or) overcurrent protection function is disabled when it is OFF Ir3: short-circuit instantaneous current
  Ir2: short-circuit short-time delay current
  Note: the Ir2 setting value cannot exceed the Ir3 setting value

Characteristics setting

5. Short-circuit setting	Common alarm: ON	Gear Return: ON
■. Characteristics setting	Reclose: ON	Overcurrent alarm: ON
7. Residual current setting	Overcurrent protection: ON	Sound and light alarm output: ON
8. Residual record setting	Setting 1: return	Save 2: cancel

As shown above

- **[Up/Down]** button to control the highlighted display position or adjust parameters.
- **[OK]** button to enter the corresponding setting menu/switch setting options.
- **[Return]** button to return to the previous menu.

Delay time is OFF / (or) overcurrent protection function is disabled when it is OFF Common alarm: short-circuit instantaneous current
Reclosing enablement: it will not automatically reclose after closing
Gear return: the residual current will not automatically float in auto mode after shutdown Overcurrent protection: all current-related faults will not be protected after shutdown Overcurrent alarm: all current-related faults will not be signaled after shutdown
Sound and light alarm: all alarms will not be output after shutdown

Residual current setting

5. Short-circuit setting	Residual gear: 200mA	Residual gear: automatic
6. Characteristics setting	Non-driving time: 100ms	Non-driving time: –
■. Residual current setting	Action type: trip	Action type: trip
8. Residual record setting	Setting: return	Save: cancel

As shown above.

- **[Up/Down]** button to control the highlighted display position or adjust parameters.
- **[OK]** button to enter the corresponding setting menu/switch setting options.

- **[Return]** button to return to the previous menu.

Residual record setting

5. Short-circuit setting	Change difference: 50mA	Change difference: 50mA
6. Characteristics setting	Interval time: 60 minutes	Interval time: 60 minutes
7. Residual current setting	Overlimit alarm value: 400mA	Overlimit alarm value: 400mA
■. Residual record-setting	Setting: return	Save: cancel

As shown above.

- **[Up/Down]**button to control the highlighted display position or adjust parameters.
- **[OK]** button to enter the corresponding setting menu/switch setting options.
- **[Return]** button to return to the previous menu.

Time setting

■ Time setting	Time setting	Time setting
B. Communication setting	October 12, 2014	October 12, ■
C. Display setting	12: 12: 34	12: 12: 34
D. Password setting	Setting: return	Save: cancel

As shown above.

- **[Up/Down]** button to control the highlighted display position or adjust parameters.
- **[OK]** button to enter the corresponding setting menu/switch setting options.
- **[Return]** button to return to the previous menu.

Communication setting

9. Time setting	Protocol type: Modbus	Protocol type: DL_T654
A. Communication setting	Address: 001	Address:001
B. Display setting	Baud rate: 38400	Baud rate: 24000
C. Password setting	Setting: return	Save: cancel

As shown above

- **[Up/Down]** button to control the highlighted display position or adjust parameters.
- **[OK]** button to enter the corresponding setting menu/switch setting options.
- **[Return]** button to return to the previous menu.

Display setting

9. Time setting	Display setting	Display setting
A. Communication setting	Scroll time: 10S	Scroll time: 10S
B. Display setting	Return time: 10S	Return time: 10S
C. Password setting	Setting: return	Save: cancel

As shown above.
[Up/Down] button to control the highlighted display position or adjust parameters.
[OK] button to enter the corresponding setting menu/switch setting options.
[Return] button to return to the previous menu.

Password setting

9. Time setting	Level 0 password setting	Level 2 password setting
A. Communication setting	— Please enter the password!! –	–wrong password! !-
B. Display setting	Original password: 0000	Original password: 1234
C. Password setting	New password: 0000	New password: 0000

As shown above

- **[Up/Down]** button to control the highlighted display position or page flip.
- **[OK]** button to enter the corresponding setting menu.
- **[Return]** button to return to the previous menu.
    - **Level 0** password default value: 0000
    - **Level 1** password default value: 0000
    - **Level 2** password default value: 0000

Other settings

D. Other setting	Other setting	Other setting
E. Trail trip setting	Switch-on trial power: OFF	Power-on trial power: OFF
F. Restore factory setting	Power-off release: OFF	Power-off release: ON
G. Return setting	Setting: return	Save: cancel

As shown above

- **[Up/Down]** button to control the highlighted display position or adjust parameters.
- **[OK]** button to enter the corresponding setting menu/switch setting options.
- **[Return]** button to return to the previous menu.
- **Switch-on trial power:** ON– if the circuit is energized and is faultless, the product will automatically close;

- **Power-off release:** ON– the product automatically trips when the circuit is de-energized

Trial trip setting

D. Other settings	Trial trip setting	Trial trip setting
E. Trial trip setting	Trial trip time: OFF	Trial trip time: ON
F. Restore factory setting	12:12 on the 12th	12:12 on the 12th
G. Return	Setting: return	Save: cancel

As shown above.
[Up/**Down]** button to control the highlighted display position or adjust parameters.
[OK] button to enter the corresponding setting menu/switch setting options.
[Return] button to return to the previous menu.

Restore factory setting

D. Other settings	
E. Trial trip setting	Restore factory setting
F. Restore factory setting	
G. Return	Return OK

As shown above
[Up/**Down]** button to control the highlighted display position or adjust parameters.
[OK] button to enter the corresponding setting menu/switch setting options.
[Return] button to return to the previous menu.

Level 1 password is required for restoring factory setting. No records and password parameters are allowed to be cleared when factory setting is restored and the maintenance mode can not be exited

Query menu

1. Setting	1. Cumulative record	5. Trip record
2. Query	2. Peak record	6. Residual alarm record
3. About	3. Residual over-limit record	7. Line-residual record
4. Maintenance	4. Self-inspection record	8. System record

As shown above.

- **[Up**/**Down]** button to control the highlighted display position or adjust parameters.
- **[OK]** button to enter the corresponding setting menu/switch setting options.
- **[Return]** button to return to the previous menu.

Cumulative record

Data reset: 00000 time	Current trip: 00001 time	Trial trip: 00001 time
Fault trip: 00000 time	Voltage trip: 00001 time	Exit the residual: 00001 time
Blocking trip: 00001 time	Manual trip: 00001 time	Operation time: 0000 minute
Residual trip: 00001 time	Zero-default trip: 00001 time	12:12, October 12, 2014

As shown above.
[Up/**Down]** button to flip for checking.
[Return] button to return to the previous menu.

October 12, 2014 is the time when the system is restarted
Peak record

XXX.XV	XXXX.XXA	XXXXmA
XXX.XV	XXXX.XXA	XXXXmA
Type: phase B voltage	Type: phase B current	Type: residual current
Peak date: 1st	Peak date: 21st	Peak date: 12th

As shown above.

- **[Up**/**Down]** button to control the highlighted display position or adjust parameters.
- **[OK]** button to enter the corresponding setting menu/switch setting options.
- **[Return]** button to return to the previous menu.

The peak record of the three-phase voltage, the three phase current and the residual current from the 1st to the 31st (maximum and minimum occurrence time) can be queried

Residual over-limit record

1. Setting	1. Cumulative record	Over-limit phase: unknown
2. Query	2. Peak record	Over-limit value: XXXXmA
3. About	3. Residual over-limit record	Start
4. Maintenance	4. Self-inspection record	End 00

As shown above.

- **[Up**/**Down]** button to query the record before and after.
- **[Return]** button to return to the previous menu.
- **00:** represents the current record location

Self-inspection record

1. Setting	1. Cumulative record	Self-inspection: successful
2. Query	2. Peak record	Self-inspection mode: button
3. About	3. Residual over-limit record	Date: October 12, 2014
4. Maintenance	4. Self-inspection record	time: 12:11:11

As shown above.

- **[Up/Down]** button to query the record before and after.
- **[Return]** button to return to the previous menu.
- **01:** represents the current record location

Trip record

1. Setting	5. Trip record	Cause of fault: overvoltage
2. Query	6. Residual alarm record	Fault phase: phase A
3. About	7. Line-residual record	Date: October 10, 2014
4. Maintenance	8. System record	01 time: 12:00:12

As shown above.

- **[Up/Down]** button to query the record before and after.
- **[Return]** button to return to the previous menu.
- **[OK]** button to switch to the real-time status before fault.
- **01:** represents the current record location

Residual alarm record

1. Setting	5. Trip record	Start: January 10, 2014
2. Query	6. Residual alarm record	Time: 12:33:10
3. About	7. Line-residual record	End: October 11, 2014
4. Maintenance	8. System record	01 Time: 12:35:50

As shown above.

- **[Up/Down]** button to query the record before and after.
- **[Return]** button to return to the previous menu.
- **01:** represents the current record location

Line-residual record

1. Setting	5. Trip record	Residual phase: unknown
2. Query	6. Residual alarm record	Residual value: 1000mA
3. About	7. Line-residual record	Date: October 9, 2014
4. Maintenance	8. System record	01 time: 12:35:50

As shown above.

- **[Up/Down]** button to query the record before and after.
- **[Return]** button to return to the previous menu.
- **01:** represents the current record location

System record

1. Setting	5. Trip record	System record
2. Query	6. Residual alarm record	Event 002: system start-up
3. About	7. Line-residual record	00:00:00 ID:001
4. Maintenance	8. System record	October 20, 2014 Return

As shown above.

- **[Up/Down]** button to query the record before and after.
- **[OK]** button to return to the previous menu.
- **[Return]** button to return to the previous menu.
- **ID:** represents the current record location

About menu

XXXX- 250A	After-sales service:	Factory: 20XX-XX-XX
Fixed version: V01.01	Tel: XXXXXXXX	==========
Hardware version: V05.08	Company: XXXXXXXX	No.: XXXXXXA0000
Factory: 20XX-XX-XX	www. XX. Com	==========

As shown above.

- **[Up/Down]** button to flip up and down.
- **[Return]** button to return to the previous menu.

Maintenance menu

1. Setting	—-Level 2 password—-	1. Maintenance 5. Mechanical test
2. Query	–Please enter the password!!—	2. Capacity 6. Password reset
3. About	0000	■ Trial trip 7. Logout return
4. Maintenance	————————————-	4. Self-inspection 8. Return

As shown above.

- **[Up/Down]** button to control the highlighted display position or adjust parameters.
- **[OK]** button to enter the corresponding setting menu/switch setting options.
- **[Return]** button to return to the previous menu.

Level 2 password is required to log in maintenance menu which will be automatically logged out when there is no keyboard operation within return time after logging in
Maintenance menu can check and operate the event record, login password and switch status, etc. Trial trip: if the switch is in close status, the trial trip function will be started to check whether release can be normally carried out

Self-inspection: the switch starts the self-inspection program to check whether there are error parameters
Mechanical test: the switch automatically conducts the on and off operation, with an interval of 10 to 999 seconds/time

Maintenance mode

1. Maintenance 5. Mechanical test	Maintenance mode	Maintenance mode
2. Capacity 6. Password reset	Level 0 password: ****	Level 0 password: ****
3.Trial trip 7. Logout return	Please enter the password!!	Please enter the password!!
4. Self-inspection 8. Return	Enter Log out	Enter Log out

As shown above.

- **[Up/Down]** button to control the highlighted display position or adjust parameters.
- **[OK]** button to enter the corresponding setting menu/switch setting options.
- **[Return]** button to return to the previous menu.

The switch does not conduct any protection under the maintenance mode, the backlight of the screen flashes, and the power is still maintained in maintenance mode until you press the “return” or “logout return” to exit maintenance mode; after choosing “return” to exit, level 0 password is required for reentering the maintenance mode, while after choosing “logout return”, the password shall be entered for reentering.

Capacity

1. Maintenance 5. Mechanical test	Capacity query	Maintenance mode
2. Capacity 6. Password reset	System: 0000/1963 No	Over-limit: 0000/0010 No
3.Trial trip 7. Logout return	Trip: 0000/0010 No	Alarm: 0000/0010 No
4. Self-inspection 8. Return	Self-inspection: 0000/0010 No	Clear all data: No

- **[Up/Down]** button to control the highlighted display position or adjust parameters. [OK] button to enter the corresponding setting menu/switch setting options.
- **[Return]** button to return to the previous menu.

Self-inspection

1. Maintenance 5. Mechanical test		Self-inspection result: successful
2. Capacity 6. Password reset	Under self-inspection…	Self-inspection mode: button
3.Trial trip 7. Logout return	Please wait…	Date: December 10, 2013
4. Self-inspection 8. Return		01 time: 12:11:11

Mechanical test

1. Maintenance 5. Mechanical test	Successful opening: 000000 times	Mechanical test
2. Capacity 6. Password reset	Unsuccessful opening: 000000 times	Closing countdown: 101s
3.Trial trip 7. Logout return	Successful opening: 000000 times	Opening countdown: 101s
4. Self-inspection 8. Return	Unsuccessful opening: 000000 times	Opening standby

As shown above.

- **[Up/down]** button to adjust the countdown parameters.
- **[Setting]** button to switch setting options.
- **[OK]** button to check operation times.
- **[Return]** button to return to the previous menu.

In the mechanical test mode, press the button to exit the mechanical test mode, in which the up and down buttons are to check the number of tests, and the countdown will be automatically displayed when the buttons are not operated beyond the return time.

Password reset

1. Maintenance 5. Mechanical test	——Level 0 password—-	
2. Capacity 6. Password reset	–Please enter the password!!–	
3.Trial trip 7. Logout return	0000	
4. Self-inspection 8. Return	———————————-	

As shown above.

- **[Up/Down]** button to control the highlighted display position or adjust parameters.
- **[OK]** button to enter the corresponding setting menu/switch setting options.
- **[Return**] button to return to the previous menu. Level 0 password is required to reset the password, and when it is correct, it will automatically return to maintenance menu

Logoff return

1. Maintenance 5. Mechanical test
2. Capacity 6. Password reset
3.Trial trip 7. Logout return
4. Self-inspection 8. Return

- **[Up/Down]** button to control the highlighted display position or adjust parameters.
- **[OK]** button to enter the corresponding setting menu/switch setting options.
- **[Return]** button to return to the previous menu.
  Password is required for reentering after logoff return

Operation of digital tube products

The circuit breaker is provided with the switch-on trail power function (which can be turned off), which can effectively prevent the safety of the follow-up equipment. See the setting code table for specific operation.

Test run of products
After the connection is finished, the circuit breaker will be electrified after being checked to be free of errors. The circuit breaker is in segment status, and the parameters are set according to the operation instructions. After the setting is completed, the closing operation is performed. During the closing, the closing indicator light flashes, which is always on after the closing is completed.
In the closing state, press [trial trip] key for residual current trial trip, in which reclosing can be repeated within 20s to 60s.

Closing operation of circuit breaker

1. **Automatic closing**
   Long press the [close] key for 2 seconds. The closing indicator light flashes, which is always on after the closing, and when the closing and opening indication is “close”, the circuit breaker enters the normal operation status.

2. **Manual closing**

   Insert the manual wrench mentioned in the annex in the hole and turn clockwise about 360°. After the closing is successful, the closing indicator light is always on, the closing indication is “closed” and the circuit breaker enters the normal operation status.

Note: when the main contact of the circuit breaker is disconnected, the manual closing can be carried out. See mode 2 above for closing operation. Pay attention to the safety of the load equipment and personnel during manual closing.

Disconnection operation of circuit breaker

1. Under the operation state, press the [open] key. After the opening is successful, the closing indicator lights are off and the closing and opening indications are “open”.
2. If manual opening is required, insert a wrench into the hole and turn it clockwise 180 °. After the opening is successful, the opening and closing indications are “open” and the closing indicator light is off.

Operation instructions of digital tube

Menu description of digital tube

The menu is displayed in the way of [real-time display], [parameter setting], [fault display] and [fault query] with panel indicator light. The display panel is as follows:

Setting menu		Unit	Setting menu		Unit	Setting menu		Unit
S-01	Overvoltage	V	s-11	Actuation time	ms	S-12	Baud rate	
s-02	Overvoltage alarm		s-12	Leakage alarm		s-22	Address	
s-03	Overvoltage trip		s-13	Ir1 setting	A	s-23	Password	
s-04	Under-voltage valu e	V	s-14	Ir1 actuation time	a	s-24	Time- year	
s-05	Under-voltage alar m		s-15	Ir2 setting	x1R1	s-25	Time- month	
s-06	Under-voltage trip		s-16	Ir2 actuation time	ms	s-26	Time- day	
s-07	Phase default valu e		s-17	Ir3 setting	x1R1	s-27	Time- hour	
s-08	Phase default alar m		s-18	Power close		s-28	Time- minute	
s-09	Phase default trip		s-19	Power-off close		s-29	Zero default alarm	
s-10	Leakage value	mA	s-20	Communication t ype		s-30	Zero default trip	

Setting	Query	Alarm	Fault	Automation	Communication	Close	Open
○	○	○	○	○	○	○	○

Fault display						Real-time display		Unit	Real-time display		Unit
F-02	Leakage	F-07	Phase default	F-13	Long-distance	U-A	Phase A voltage	V	L-B	Phase B current	A
F-04	Zero default	F-08	Under-voltage	F-14	Simulation	U-B	Phase B voltage	V	L-C	Phase C current	A
F-05	Overload	F-09	Overvoltage	F-15	Blocking	U-C	Phase C voltage	V	L-D	Real-time leakage current	mA
F-06	Short circuit	F-12	Test	F-18	Manual	L-A	Phase A current	A	L-L	Rated leakage current	mA

- **Indicator light description**
- **Set (indicator light):** after entering the setting menu, this light is on automatically, otherwise it will be in off status.
- **Query (indicator light):** after entering the query menu, this light is on automatically, otherwise it will be in off status.
- **Alarm (indicator light):** when there is alarm information, this light is on automatically, otherwise it will be in off status.
- **Fault (indicator light):** when this product trips due to faults, this light is on automatically, otherwise it will be in off status.
- **Automatic (indicator light):** when the leakage is set as automatic mode, this light is on automatically, otherwise it will be in off status.
- **Communication (indicator light):** when communicating with the external equipment, this light is on automatically, otherwise it will be in off status.
- **Close (indicator light):** when this product is in automatic closing, this light flashes, and is always on after closing, otherwise it will be in off status.
- **Block (indicator light):** when the product is in closing status, this light is on automatically, otherwise it will be

in off status.

Real-time display

- [Real-time display] is displayed in the way of switching display between the code and the real time value, and the display unit has been marked on the panel.
- Press [up]/[down] button for switching display contents.
- Press [set] button to enter [parameter setting] menu.
- Press [OK] button to enter [fault query] menu.

Parameter setting

- [Parameter setting] is displayed in the way of switching display between the set code and the set value, and the display unit has been marked on the panel.
- [Parameter setting] defaults to the query mode, and at this time, the set code is displayed with the set value.
- Press [up]/[down] button for switching display contents. When setting is required, press [OK] button to enter the setting mode, but at this time, only the set value is displayed, so press [up]/[down] button for
- parameter adjustment. Press [OK] button to save the set parameters, and return to query mode.
- The 4-digit operation password shall be entered for setting the parameters the first time, and the digital tube displays when the password is entered. At this time, press [OK] button to enter the password entering status, press [up]/[down] button for adjusting the password entering values and press [set] button to select the password. If the password is wrong, reenter.

Query mode

- Press [up]/[down] button for switching the setting options
- Press [OK] button to enter the setting mode, in which the operation password shall be entered for setting the first time, and press [return] button to return to [real-time display] menu.

Setting mode

- Press [up]/[down] button to adjust and set the parameters
- Press [OK] button to save the set parameters, exit the setting mode and return to query mode Press [set] button to operate the parameter shift.
- Press [return] button to return to [real-time display] menu.
- 12.6 Fault display
- [Fault display] is displayed in the way of fault code which has been marked on the panel.

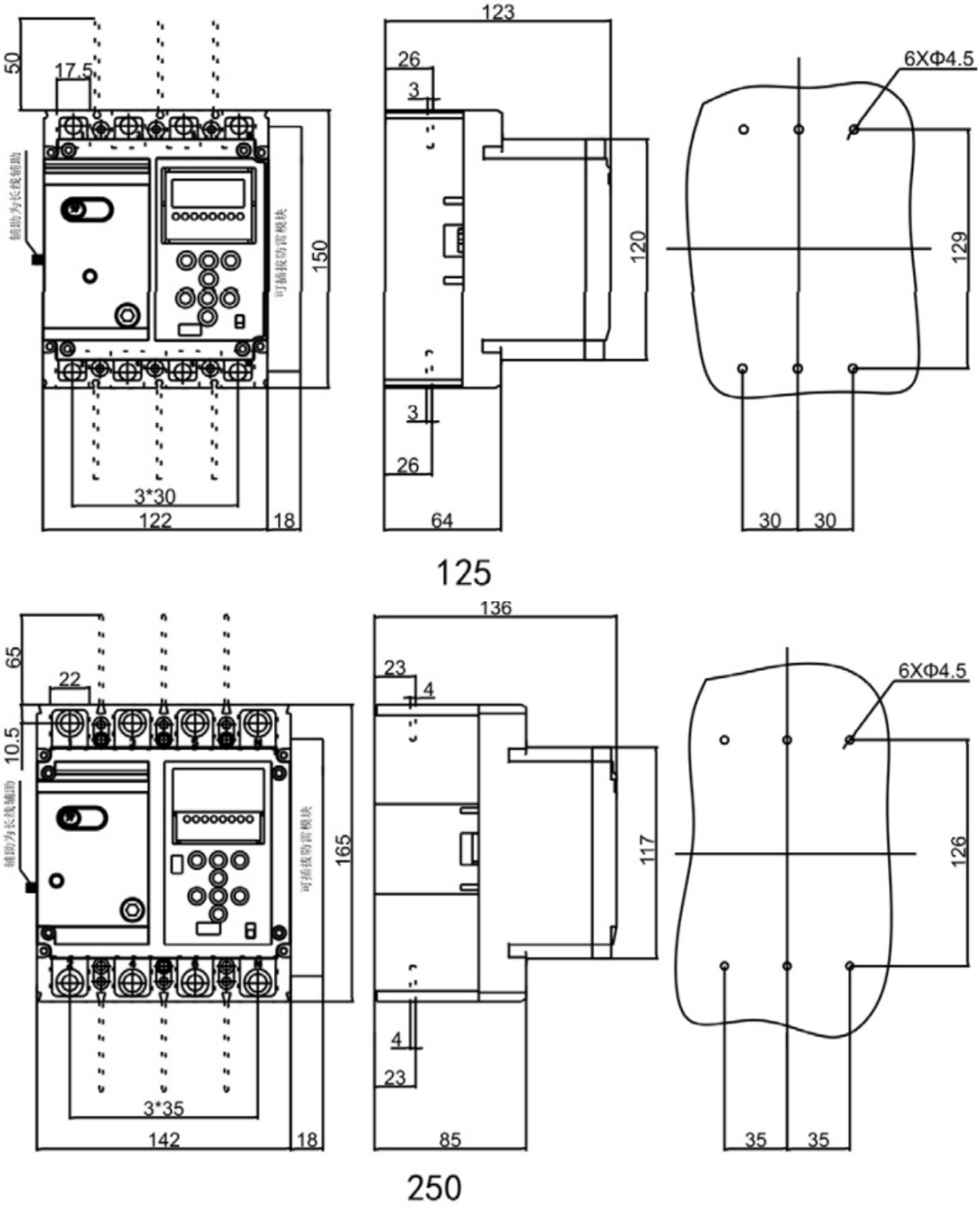
Fault query

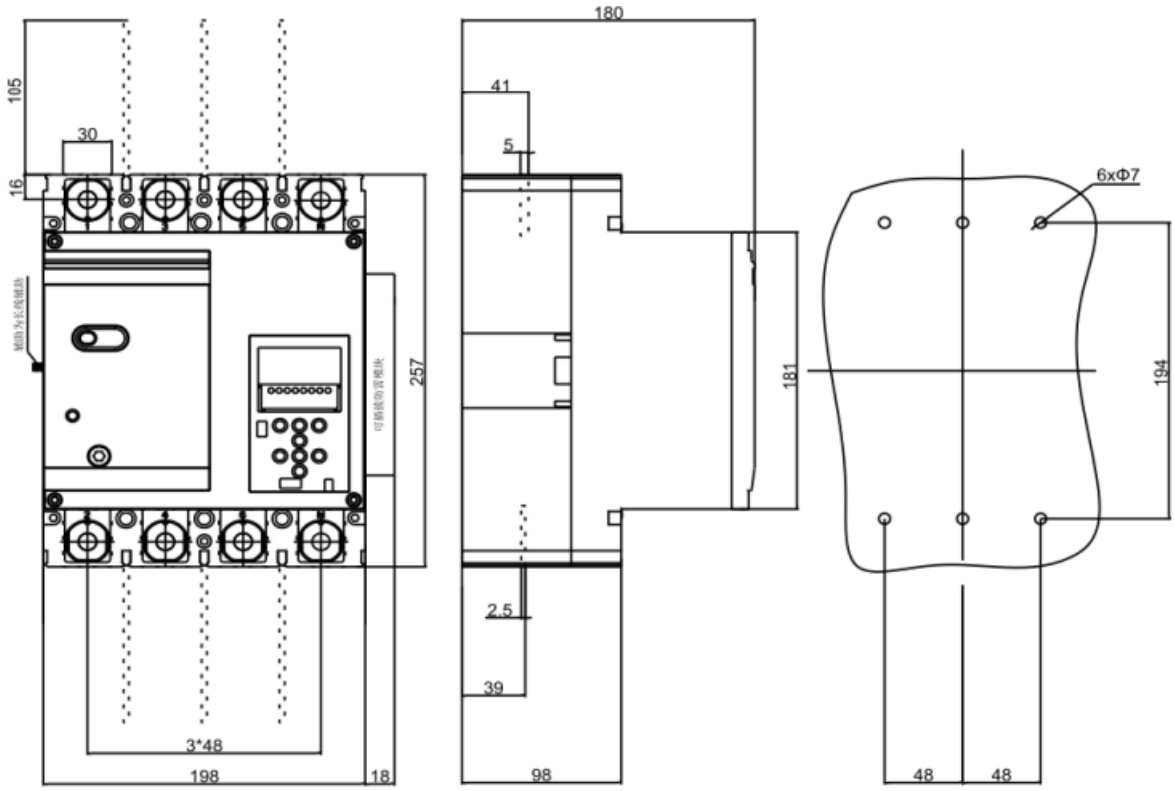
- [Fault query] is displayed in the way of fault code and fault index, in which the fault code has been marked on the panel.
- Press [up]/[down] button to query the fault record before and after
- Press [OK] to return to [real-time display] menu.

- Press [return] button to return to [real-time display] menu.

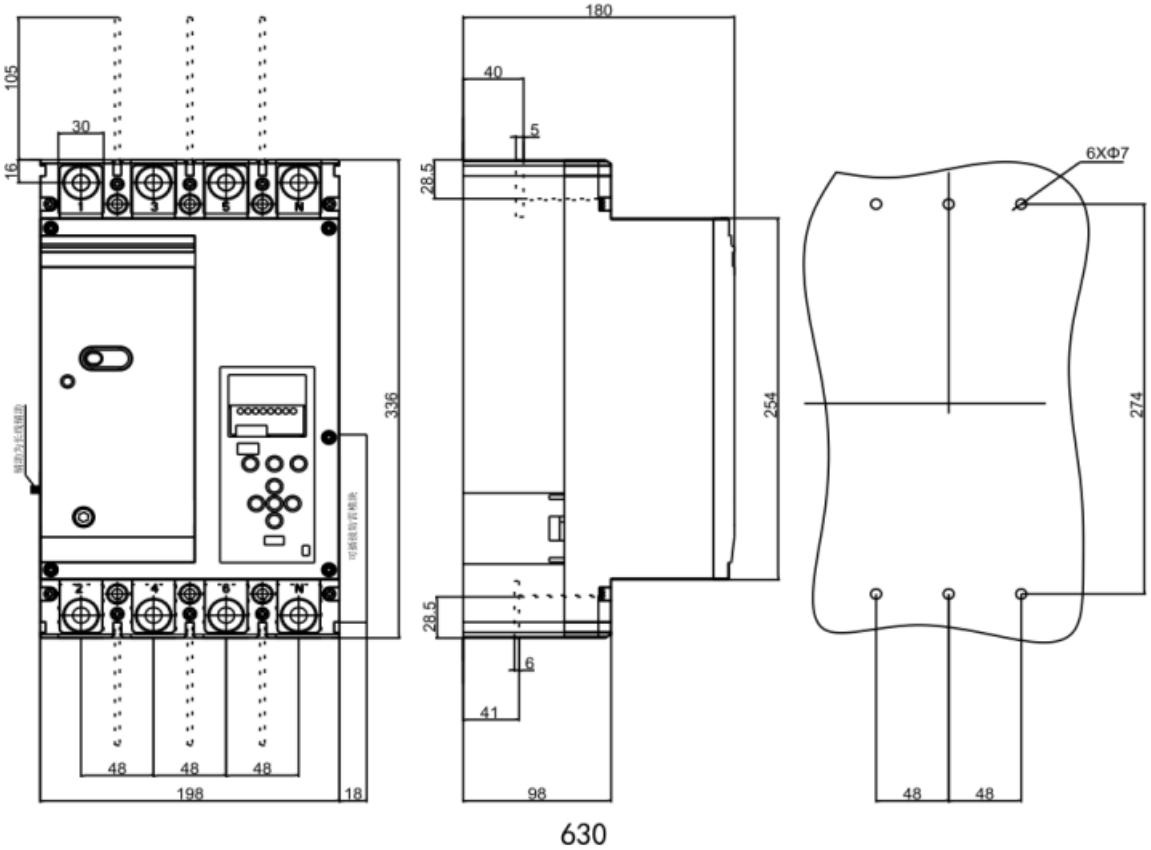
Appearance and installation dimensions

Appearance and installation dimension diagram





400



630

Match of cross-sectional area and the rated current of connecting wire

Cross-sectional area with rated current not greater than 400A but matched with the connecting wire

Rated current (A)	16 and 20	25	32	40 and 50	63	80	100	125 and 140	160
Sectional area of wire (mm2)	2.5	4.0	6.0	10	16	25	35	50	70
Rated current (A)	180, 200 and 225	250	315 and 350	400					
Sectional area of wire (mm2)	95	120	185	240					

Cross-sectional area with rated current greater than 400A but matched with the connecting wire

Rated current A	Cable		Copper bar	
	Cross-sectional area m2	Quantity	Dimension mmxmm	Quantity
500	150	2	30 X5	2
630	185	2	40X5	2

Transportation and storage

Transportation
Prevent the invasion and mixed loading of water, rain, snow or other harmful liquids such as chemical solvents, corrosive liquids during the transportation of products; prevent the strong impact and extrusion between objects; stack according to the direction given on the packaging. See the outer box identification for the number of layers.

Storage

- Environment conditions for storage: environment temperature -10℃ – +45℃;
- Relative humidity≤90% (when the environment temperature is + 20℃);
- The storage place shall be free of dust and conductive dust;
- There shall be free of corrosive, flammable and explosive gases and free of rain and snow invasion;
- Dry and ventilated;
- Stack according to the direction given on the package and do not stack higher than that identified on the outer box.

Precautions

- After the products are normally put into operation, they shall be tested once a month and the test record shall

be done.

- The Company does not assume “three guarantees” responsibility for the non-quality problems caused by improper installation and use and the burnt wiring terminals due to improper wiring
- If there is a problem in the use of the products, please contact the local dealer or the customer service center of the Company.

Customer service hotline
Please keep this instruction properly.

CERTIFICATE OF CONFORMITY

- **Name:** Residual current protection circuit breaker
- **Examined by:** Examiner 5

The products shall conform to GB14048. 2 standard. After passing the inspection, they shall be allowed to leave the factory.

QR SCAN

www.acdc.co.za

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Germiston 011 418 9600 | Richmond Park 021 492 2000 | Riverhorse 031 492 4800 | Pinetown 031 700 4215

Documents / Resources

	ACDC M3EL Series Residual Current Protection Circuit Breaker [pdf] User Manual M3EL Series Residual Current Protection Circuit Breaker, M3EL Series, Residual Current Protection Circuit Breaker, Protection Circuit Breaker, Circuit Breaker, Breaker