

The physical product shall prevail, and any changes will not be separately notified.

Certificate of
Conformity

Name:

Smart Reclosed Circuit
Breaker

Inspector:

Inspector 05

The product complies with the GB/T14048.2/
IEC 60947-2 standard and has passed inspection,
thereby approved for shipment.

Smart Reclosed Circuit Breaker User Manual

Please read this user manual in detail before
installation, operation, and maintenance.

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1. Applicable scope

The series of intelligent circuit breakers are suitable for three-phase four-wire neutral point directly grounded (TT) 50Hz AC distribution networks with a rated voltage of 400V, a rated insulation voltage of 1000V and a rated current of up to 800A. It is used to provide protection against the risk of indirect contact and to prevent fire hazards caused by equipment insulation damage and ground fault currents. It can also be used to distribute power and protect lines and power supply equipment from overload, undervoltage, short-circuit, single-phase grounding and other fault hazards.

The product conforms to the following standards:

GB/T14048.1-2012 Low-voltage switchgear and controlgear- Part 1: General-rules

GB/T14048.2-2008 Low-voltage switchgear and controlgear-Part 2: Circuit-breakers

GB/T17701-2008 Circuit-breaker for equipment

GB/Z22202-2016 Reliability test method of leakage current operated circuit-breakers for household and similar uses

JB/T10494-2005 Reliability test method of leakage current operated circuit-breakers for household and similar uses

JB/T8979-2006 leakage current operated circuit breaker with or without integral overload protection

IEC 60947-1-2011 Low-voltage switchgear and controlgear-Part 1: General-rules

IEC 60947-2-2016 Low-voltage switchgear and controlgear-Part 2: Circuit-breakers

2. Main functions and features:

- Adopting high-performance 32-bit ARM microprocessor for real-time signal processing and intelligent control;

- LCD English screen, friendly human-machine interface, easy to operate;

- leakage current (leakage) protection, the leakage current gear can be adjusted online, with reclosing function;

- Real-time monitoring and tracking of the line leakage current, automatic adjustment of gear, to ensure the operation rate and reliability of the product;

- Three-section protections: long delay, short delay, and instantaneous protections; adopting electronic release;

- Overvoltage protection, undervoltage protection, and phase loss protection;

- Real-time display of line leakage current, three-phase power supply voltage and load current;

- Protection functions and parameters can be set and modified online;

- Able to identify trip type (leakage current, lockout, overload, undervoltage, overvoltage, and phase loss), display, store, query and delete;

- With communication function, 1 channel RS485 communication, 1 channel Bluetooth communication function (optional), can realize remote communication, telemetry, remote control;

- It has infrared communication function and be equipped with external lightning-protection module.

3. Operating environment

- The installation site should be no conductive dust, no corrosive gas, no flammable and explosive gas, no rain and snow invasion;

- Within 2000m in altitude;

- Ambient temperature-5[°] C ~ + 45[°] C, the daily maximum temperature not greater than + 35[°] C;

- The average maximum relative humidity shall not exceed 95% (when the ambient temperature is + 40[°] C);

- The strength of the magnetic field of the external magnetic field of the installation site in any direction should not be more than 5 times that of the earth magnetic field;

- The installation position should have good ventilation and heat dissipation conditions.

4. Main technical parameters

Specification/Model	125		250	400	630	800
Frame current (A)	125		250	400	630	800
No. of poles	3P+N					
Rated operating voltage Ue (V)	AC 400 50HZ					
Rated insulation voltage Ui (V)	AC 1000					
Rated impulse withstand voltage Uimp (V)	8000					
Arc distance (mm)	≥50			≥100		
Ultimate short-circuit breaking capacity Icu (kA)	50 70 (H-type)			65 85 (H-type)		
Short-circuit breaking capacity (kA)	35 50 (H-type)			42 65 (H-type)		
Rated short-time withstand current Iew (1 s) (kA)	1.5	3	5	8	10	
Rated residual short-circuit connecting (breaking) capacity IΔm (kA)	12.5 17.5 (H-type)			21.5 16.5 (H-type)		
Residual current operating characteristics	AC					
Rated residual operating current IΔn (mA)	Regular products	30/50/100/200/300/400/500/600/800 Auto, OFF			30/50/100/200/300/400/500/600/800/1000, Auto	
	New protocol products	Adjustable from 50 to 800 (125, 250, 400):			Adjustable from 50 to 1000 (630, 800)	
Residual action time characteristics	Delay/non-delay-type					
Breaking time (s)	Delay	IΔn≤0.5	2IΔn≤0.2	5IΔn≤0.15	10IΔn≤0.15	
	None-delay	IΔn≤0.3	2IΔn≤0.15	5IΔn≤0.04	10IΔn≤0.04	
Delay limit non-drive time (s)	2IΔn: 0.06 (standard product), 2IΔn: 0.06/0.1/0.2 (product of new specification)					
Automatic reclosing time (s)	20-60					
Operating performance (times)	Power on	1500	1000	1000		
	Not powered on	8500	7000	4000		
	Total frequency	10000	8000	5000		
Overload and short-circuit characteristics	Three-stage protection, electronically adjustable. For details, see the Protection Characteristics Specification.					
Overvoltage protection value (V)	Set value (250 ~ 300) +5% (standard product)/+2% (product of new specification), off by default					
Undervoltage protection value (V)	Set value (145~200) +5% (standard product)/+2% (product of new specification), off by default					
Interlock delay time (ms)	≤40ms					
Communication delay time (ms)	≤200ms					

5. Description of protection characteristic

5.1 Overload Protection

5.1.1 Setting range

Table 1: Overload parameter setting

Parameter	Frame current	Settings	Factory settings
Action settings I _{rl}	125	50A, 63A 80A, 100A, 125A	125 A
	250	100A, 125A, 140A, 160A 180A, 200A, 225A, 250A	250 A
	400	200A, 225A, 250A, 315A, 350A, 400A	400 A
	630	315A, 350A, 400A, 500A, 630A	630 A
Delay time settings I _{tl}	800	400A, 500A, 630A, 700A, 800A	800 A
		3s, 4s, 6s, 8s, 10s, 12s, 16s, 18s, OFF	12s

5.1.2 Action characteristic

Table 2: Protection characteristics

ambient temperature	Current Type	Multiple of Current	Appointed time
+40℃	Conventional non-tripping current	1.05I _r	≥2h
	Conventional tripping current	1.3I _r	<2h

5.1.3 Time delay characteristics

Overload protection is based on the inverse time characteristics:

$T = (6I_r/I)^2 T_r$ Delay precision: ±10%

Where, T is the action time value, I_r is the long delay protection setting value, I is the fault current, and T_r is the long delay time setting value.

5.4.5 Over-Voltage Protection Function

When the phase voltage of the line is higher than the over-voltage protection set value, the circuit breaker will trip. When the line voltage recovers to the normal voltage, the circuit breaker can be closed automatically. The protection function can be set or disabled by user.

5.4.6 Under-Voltage Protection Function

When the phase voltage of the line is below the under-voltage protection set value, the circuit breaker will trip. When the line voltage recovers to normal the circuit breaker can be closed automatically. The protection function can be set or disabled by user.

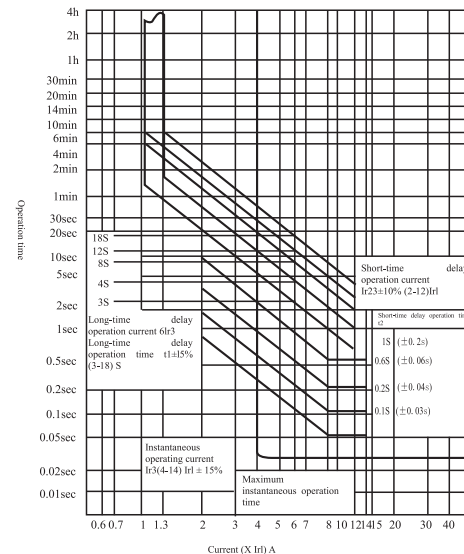
5.5 Default Phase Protection Function

When the phase loss occurs at the supply side of the line, the circuit breaker will trip for protection. When the line voltage recovers to normal, the breaker will be closed automatically. The factory default setting is for this function to be disabled.

5.6 Trip Against Power Failure and Close After Power-on Function

In case of power failure at the supply side of the line, the circuit breaker will trip for protection. When the line recovers the power supply, the circuit breaker can be closed automatically. The factory default setting is for this function to be disabled.

6. Curve of overcurrent short circuit protection characteristic



7. Communication function

Communication interface	Interface type	Communication protocol	Communication address	Communication rate
RS485	External terminal	DL/T-645 Modbus(Adjustable)	1-255	600-19200(Adjustable)

8. Product installation

8.1 Precautions for installation

- Before installation, check whether the specification and model are correct and the accessories are complete;
- For correct installation and daily maintenance, please read this manual carefully;
- The product shall be installed vertically;

5.2 Definite Time Overcurrent Protection

Definite time overcurrent protection prevents short-circuit impedance in the distribution system, and the tripping delay provides selective protection.

5.2.1 Definite time overcurrent protection related parameters setting

Table 3:

Parameter setting	Set Value Options Isd	Factory setting value
Short delay action current setting value Isd	2Ir, 2.5Ir, 3Ir, 4Ir, 5Ir, 6Ir, 7Ir, 8Ir, 10Ir, 12Ir	6Ir
Short delay time setting value Ts	0.1s, 0.2s, 0.3s, 0.4s, 0.6s, 0.8s, 1.0s, OFF	0.4s

5.2.2 Definite time overcurrent protection action characteristics

Table 4:

Characteristic	Fault current multiple	Tripping time	Delay time error
No action characteristics	$\leq 0.8I_{sd}$	No action	$\pm 40\text{ms}$
Action characteristic	$> 1.2I_{sd}$	Delay action	$\pm 40\text{ms}$

5.3 Instantaneous Overcurrent Protection

5.3.1 Instantaneous overcurrent protection related parameters setting

Table 5:

Parameter setting	Set value options	Factory setting value
Instantaneous action current setting value Ii	4Ir, 6Ir, 7Ir, 8Ir, 10Ir, 11Ir, 12Ir, 13Ir, 14Ir, OFF	10Ir

5.3.2 Instantaneous overcurrent protection action characteristic

Table 6:

characteristic	Current multiple (I / Ii)	Delay time error
No action characteristics	≤ 0.8	/
Action characteristic	> 1.2	$\pm 40\text{ms}$

5.4 Leakage current protection characteristics

5.4.1 Gear setting range

Model	Parameter	Settings (mA)	Factory settings
125~400	Residual action current $I\Delta n$	30/50/100/200/300/400/500/600/800, Auto, OFF (standard product)	500
		50-800 adjustable (125, 250, 400), (product of new specification)	
630		Standard product: 30/50/100/200/300/400/500/600/800/1000, Auto, OFF, product of new specification: 50-1000 adjustable	800
800			

5.4.2 Action characteristic

Parameters	Characteristics				
Rated non-operating current	0.5 IΔn				
Rated operating current	≥ 0.85 IΔn				
Delay characteristics	2 IΔn limit non-actuating time (Δt)	Breaking time			
		IΔn	2IΔn	5IΔn	10IΔn
Non-delay type	/	≤ 0.3s	≤ 0.15s	≤ 0.04s	
Time delay type	≥ 0.06s	≤ 0.5s	≤ 0.2s	≤ 0.15s	

5.4.3 Auto gear mode

In the auto gear mode, all gear values and float values as listed below:

Gear value (mA)	200	300	400	500
Floating value (mA)	100	150	200	/

When the leakage current is greater than the float value of this gear but less than the action value, and remains stable for 60s, the gear will float up one gear and so on, until it reaches the maximum gear. When the leakage current is less than the float value of the lower gear and is maintained for 120s, the gear will float down one gear and so on, until it reaches the minimum gear.

Take the "Auto" gear with initial leakage current of 100mA of line as an example. When the circuit breaker is switched on, the gear will be automatically set to 300mA. When the leakage current rises above 150mA and remains stable for 60s, the gear will be shifted to 400mA gear. When the leakage current drops below 100mA and remains stable for 120s, the gear will be shifted to 200mA

5.4.4 Auto reclosing / locking

Auto reclosing: When the circuit breaker trips due to the leakage current exceeding the action current value, it can be reclosed automatically after 20~60s, but the manual closing is not limited by time.

Locking: The blocking time is 5s, i.e. if the leakage fault occurs again within 5s after the product has been reclosed, the circuit-breaker will trip and block again within the action time, automatic reclosure is not possible and it must be closed manually; after 5 seconds of the circuit breaker being reclosed, if the electrical leakage fault occurs again, the circuit breaker will trip during the action time but will not block and it will automatically reclose after 20 to 60 seconds.

- Choose suitable wires according to the rated current and relevant standards, and connect them as required.
- The upper portion is the power end. 1, 3 and 5 are respectively connected with phase A, B and C, and N is connected with null line. The lower portion is the load end. 2, 4 and 6 are respectively connected with phase A, B and C, and N is connected with null line;
- The sectional area of inlet and outlet wires shall meet the construction requirements, and the conductive part shall not expose from the shell;
- After wiring, please install the flash barrier correctly;
- To avoid electric shock or changing the correct configuration and wiring, the flash barrier shall be installed in the position inaccessible to non-electricians or juveniles;
- Shifting the auto/manual switch to the manual position can exit all functions except short-circuit protection

9. Operation of LCD products

To protect the safety of subsequent equipment, the circuit breaker shall have the trial power-on function (can be shut down) after startup.

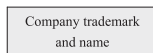


Figure 1

9.1 Product trial operation

Power on the circuit breaker after the wiring is arranged completely and checking. When the circuit breaker is in the breaking state, set the parameters in accordance with the operation instructions. After completing the setting, close the circuit breaker and the operation status is shown in Figure 2, 3 and 4.

In closing state, press [Trial Trip] for residual current trial trip, and the product can be reclosed within 20-60s.

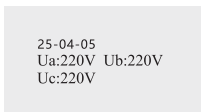


Figure 2

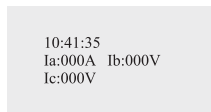


Figure 3

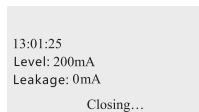


Figure 4

9.2 Closing operation of circuit breaker

1. Automatic closing

Press and hold [Closing] for 2s, the LCD will display "Closing.". After the circuit breaker is successfully closed, the LCD will display "closing operation" and the circuit breaker will operate normally.

2. Manual closing

Insert the manual wrench in the appendix into the hole and rotate it by about 360° clockwise. After the circuit breaker is successfully closed, the LCD will automatically update into "closing operation" and the circuit breaker will operate normally.

Notes: The product can be closed manually when the main contact of circuit breaker is disconnected. See Mode 2 above for the closing operation. During manual closing, pay attention to the safety of load equipment and personnel.

9.3 Breaking operation of circuit breaker

1. In operating state, press [Opening]. After the circuit breaker is successfully opened, the LCD will display "opening standby".

2. When opening manually, insert the wrench into the hole and rotate it by 180° clockwise. After opening, the open/close indicator indicates "Open".

10. Operation instructions for LCD products

10.1 Main menu



Figure 5



Figure 6



Figure 7

In the real-time display state,

Press [Set] to enter the main menu as shown in the above figure.

Press [Up/Down] to control the reverse display position.

Press the [OK] button to enter the corresponding submenu.

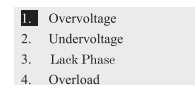


Figure 8



Figure 9

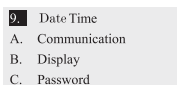


Figure 10



Figure 11

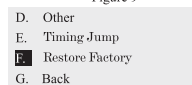


Figure 12

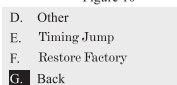


Figure 13

As shown in the above figures.

Press [Up/Down] to control the reverse display position or turn the page.

Press the [OK] button to enter the corresponding setting menu.

Press the [Return] button to return to the previous menu.

10.2.1 Overvoltage

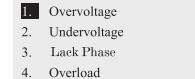


Figure 14

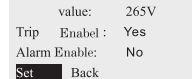


Figure 15

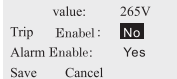


Figure 16

As shown in the above figures.

Press the [Up/Down] button to control the reverse display position or adjust parameters.

Press the [OK] button to enter the corresponding setting menu/switch setting options.

Press the [Return] button to return to the previous menu.

Overvoltage protection can be turned off or set as 250V-300V.

10.2.2 Undervoltage

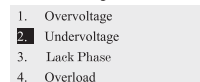


Figure 17

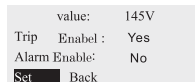


Figure 18

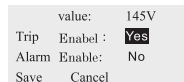


Figure 19

As shown in the above figures.

Press the [Up/Down] button to control the reverse display position or adjust parameters.

Press the [OK] button to enter the corresponding setting menu/switch setting options.

Press the [Return] button to return to the previous menu.

Undervoltage protection can be turned off or set as 145V-200V.

10.2.3 Lack phase

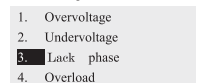


Figure 20

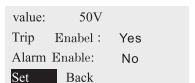


Figure 21

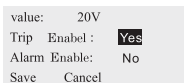


Figure 22

As shown in the above figures.

Press the [Up/Down] button to control the reverse display position or adjust parameters.

Press the [OK] button to enter the corresponding setting menu/switch setting options.

Press the [Return] button to return to the previous menu.

The default phase protection can be turned off or set as 10V-50V.

10.2.4 Overload

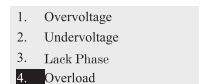


Figure 23



Figure 24



Figure 24

As shown in the above figures.

Press the [Up/Down] button to control the reverse display position or adjust parameters.

Press the [OK] button to enter the corresponding setting menu/switch setting options.

Press the [Return] button to return to the previous menu.

When the delay time is OFF/(or) the overcurrent protection function is turned off, the overload protection function fails.

Please refer to the curve graph for overload delay time curve.

Short circuit



Figure 26

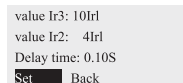


Figure 27

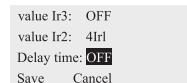


Figure 28

As shown in the above figures.

Press the [Up/Down] button to control the reverse display position or adjust parameters.

Press the [OK] button to enter the corresponding setting menu/switch setting options.

Press the [Return] button to return to the previous menu.

When the delay time is OFF/(or) the overcurrent protection function is turned off, the short circuit short-time delay protection function fails.

Ir3:Short circuit instantaneous current

Ir2:Short circuit short-time delay current

Notes: The Ir2 setting value shall not exceed the Ir3 setting value.

10.2.6 Feature



Figure 29

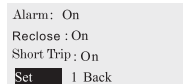


Figure 30

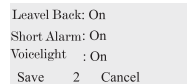


Figure 31

As shown in the above figures.

Press the [Up/Down] button to control the reverse display position or adjust parameters.

Press the [OK] button to enter the corresponding setting menu/switch setting options.

Press the [Return] button to return to the previous menu.

When the delay time is OFF/(or) the overcurrent protection function is turned off, the short circuit short-time delay protection function fails.

General alarm: Short circuit instantaneous current

Reclosing permitted: The product cannot be reclosed automatically after closing

Gear return: The residual current will not float down automatically after closing

Over-current protection: All faults caused by current will not be protected after closing

Overcurrent alarm: All faults caused by current will not be alarmed after closing

Acousto-optic alarm: All alarm will not output after closing

10.2.7 Leakage



Figure 32



Figure 33

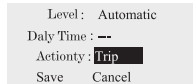


Figure 34

As shown in the above figures.

Press the [Up/Down] button to control the reverse display position or adjust parameters.

Press the [OK] button to enter the corresponding setting menu/switch setting options.

Press the [Return] button to return to the previous menu.

10.2.8 Leakage record

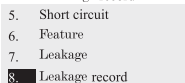


Figure 35

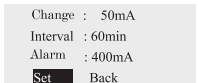


Figure 36

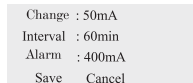


Figure 37

As shown in the above figures.

Press the [Up/Down] button to control the reverse display position or adjust parameters.

Press the [OK] button to enter the corresponding setting menu/switch setting options.

Press the [Return] button to return to the previous menu.

10.2.9 Date Time



Figure 38



Figure 39

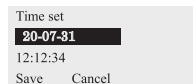


Figure 40

As shown in the above figures.

Press the [Up/Down] button to control the reverse display position or adjust parameters.

Press the [OK] button to enter the corresponding setting menu/switch setting options.

Press the [Return] button to return to the previous menu.

10.2.10 Communication



Figure 41

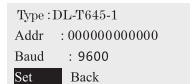


Figure 42

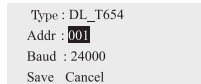


Figure 43

As shown in the above figures.

Press the [Up/Down] button to control the reverse display position or adjust parameters.

Press the [OK] button to enter the corresponding setting menu/switch setting options.

Press the [Return] button to return to the previous menu.

10.2.11 Display



Figure 44



Figure 45

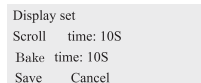


Figure 46

As shown in the above figures.

Press the [Up/Down] button to control the reverse display position or adjust parameters.

Press the [OK] button to enter the corresponding setting menu/switch setting options.

Press the [Return] button to return to the previous menu.

10.2.12 Password



Figure 47

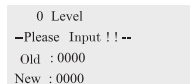


Figure 48

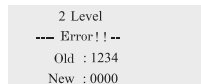


Figure 49

As shown in the above figures.

Press the [Up/Down] button to control the reverse display position or adjust parameters.

Press the [OK] button to enter the corresponding setting menu/switch setting options.

Press the [Return] button to return to the previous menu.

Default value of level 0 passwords: 0000

Default value of level 1 passwords: 0000

Default value of level 2 passwords: 0000

10.2.13 Other settings

D. Other
E. Timing Jump
F. Restore Factory
G. Back

Figure 50

As shown in the above figures.

Press the [Up/Down] button to control the reverse display position or adjust parameters.

Press the [OK] button to enter the corresponding setting menu/switch setting options.

Press the [Return] button to return to the previous menu.

Trial power-on after startup: On-The product will be closed automatically if there is no circuit fault after powering on;

Power-off trip: On-the product will trip automatically after powering off.

10.2.14 Trial trip setting

D. Other
E. Timing Jump
F. Restore Factory
G. Back

Figure 53

As shown in the above figures.

Press the [Up/Down] button to control the reverse display position or adjust parameters.

Press the [OK] button to enter the corresponding setting menu/switch setting options.

Press the [Return] button to return to the previous menu.

10.2.15 Factory reset

D. Other
E. Timing Jump
F. Restore Factory
G. Back

Figure 56

Above figure:

Press the [Up/Down] button to control the reverse display position or adjust parameters.

Press the [OK] button to enter the corresponding setting menu/switch setting options.

Press the [Return] button to return to the previous menu.

Factory reset cannot remove the record and password parameters

Other set
TryClose: On
PowerOFF: Off
Set Back

Figure 51

Other set
Jump: Off
Alarm: Off
Save Cancel

Figure 52

Timing Jump
Timing Jump: Off
20DD23HH30MM
Set Back

Figure 54

Timing Jump
Timing Jump: Off
20DD23HH30MM
Save Cancel

Figure 55

10.3 Query menu

1. Set
2. Query
3. About
4. Maintain

Figure 58

As shown in the above figures.

Press the [Up/Down] button to control the reverse display position or adjust parameters.

Press the [OK] button to enter the corresponding setting menu/switch setting options.

Press the [Return] button to return to the previous menu.

10.3.1 Cumulative record

Data clear: 00000 times
Fault Jump: 00000 times
Lock: 00001 times
Leakage: 00001 times

Figure 61

As shown in the above figures.

Press [Up/Down] for page turning and viewing.

Press the [Return] button to return to the previous menu.

The system starts at 12:12 on October 12, 2014.

10.3.2 Peak record

XXX.XV
XXX.XV
Type: Phase B voltage
Peak date: 1st days

Figure 64

As shown in the above figures.

Press the [Up/Down] button to control the reverse display position or adjust parameters.

Press the [OK] button to enter the corresponding setting menu/switch setting options.

Press the [Return] button to return to the previous menu.

The peak records of three-phase voltage and three-phase current and residual current from 1 to 31days are available.
(The occurrence time of maximum and minimum)

1. Cumulative
2. Peak
3. Over Leakage
4. Self Check

Figure 59

As shown in the above figures.

Press the [Up/Down] button to control the reverse display position or adjust parameters.

Press the [OK] button to enter the corresponding setting menu/switch setting options.

Press the [Return] button to return to the previous menu.

Current : 00001 times
Voltage : 00001 times
Manual : 00001 times
Lack_N : 00001 times

Figure 62

As shown in the above figures.

Press [Up/Down] for page turning and viewing.

Press the [Return] button to return to the previous menu.

The system starts at 12:12 on October 12, 2014.

Test : 00001 times
QuitLeakage : 00001 times
RunTime : 00000 times
2014-10-12 12:12

Figure 63

As shown in the above figures.

Press [Up/Down] for page turning and viewing.

Press the [Return] button to return to the previous menu.

The system starts at 12:12 on October 12, 2014.

XXXX.XXA
XXXX.XXA
Type: Phase B current
Peak date: 21st day

Figure 65

As shown in the above figures.

Press the [Up/Down] button to control the reverse display position or adjust parameters.

Press the [OK] button to enter the corresponding setting menu/switch setting options.

Press the [Return] button to return to the previous menu.

The peak records of three-phase voltage and three-phase current and residual current from 1 to 31days are available.
(The occurrence time of maximum and minimum)

XXXXmA
XXXXmA
Type: Residual current
Peak date: 12th day

Figure 66

As shown in the above figures.

Press [Up/Down] for page turning and viewing.

Press the [Return] button to return to the previous menu.

The system starts at 12:12 on October 12, 2014.

10.3.3 Residual over-limit record

1. Set
 2. Query
 3. About
 4. Maintain

Figure 67

As shown in the above figures.

Press [Up/Down] to view the previous and following record.

Press the [Return] button to return to the previous menu.

00:It refers to the position recorded currently.

10.3.4 Self-inspection record

1. Set
 2. Query
 3. About
 4. Maintain

Figure 70

As shown in the above figures.

Press [Up/Down] to view the previous and following record.

Press the [Return] button to return to the previous menu.

01:It refers to the position recorded currently.

10.3.5 Tripping record

1. Set
 2. Query
 3. About
 4. Maintain

Figure 73

As shown in the above figures.

Press [Up/Down] to view the previous and following record.

Press the [Return] button to return to the previous menu.

Press [Confirm] to switch to the real-time state before fault occurs.

01:It refers to the position recorded currently.

1. Cumulative
 2. Peak
 3. Over Leakage
 4. Self Check

Figure 68

As shown in the above figures.

Press [Up/Down] to view the previous and following record.

Press the [Return] button to return to the previous menu.

00:It refers to the position recorded currently.

1. Cumulative
 2. Peak
 3. Over Leakage
 4. Self Check

Figure 71

As shown in the above figures.

Press [Up/Down] to view the previous and following record.

Press the [Return] button to return to the previous menu.

01:It refers to the position recorded currently.

5. Trip
 6. Leakage ALarm
 7. Leakage
 8. System

Figure 74

As shown in the above figures.

Press [Up/Down] to view the previous and following record.

Press the [Return] button to return to the previous menu.

Press [Confirm] to switch to the real-time state before fault occurs.

01:It refers to the position recorded currently.

Phase: Unknown
 Value: XXXXmA
 Begin
 End 00

Figure 69

As shown in the above figures.

Press [Up/Down] to view the previous and following record.

Press the [Return] button to return to the previous menu.

00:It refers to the position recorded currently.

Result:XX
 Mode:XX
 Date: 2014-10-12
 01 Time: 12:11:11

Figure 72

As shown in the above figures.

Press [Up/Down] to view the previous and following record.

Press the [Return] button to return to the previous menu.

01:It refers to the position recorded currently.

Type : Unknown
 phase: Unknown
 Date: 2014-10-10
 01 Time: 12:00:12

Figure 75

As shown in the above figures.

Press [Up/Down] to view the previous and following record.

Press the [Return] button to return to the previous menu.

Press [Confirm] to switch to the real-time state before fault occurs.

01:It refers to the position recorded currently.

10.3.6 Residual alarm record

1. Set
 2. Query
 3. About
 4. Maintain

Figure 76

As shown in the above figures.

Press [Up/Down] to view the previous and following record.

Press the [Return] button to return to the previous menu.

01:It refers to the position recorded currently.

10.3.7 Line residual record

1. Set
 2. Query
 3. About
 4. Maintain

Figure 79

As shown in the above figures.

Press [Up/Down] to view the previous and following record.

Press the [Return] button to return to the previous menu.

01:It refers to the position recorded currently.

10.3.8 System record

1. Set
 2. Query
 3. About
 4. Maintain

Figure 82

As shown in the above figures.

Press [Up/Down] to view the previous and following record.

Press the [Return] button to return to the previous menu.

Press the [Return] button to return to the previous menu.

ID:It refers to the position recorded currently.

5. Trip
 6. Leakage ALarm
 7. Leakage
 8. System

Figure 77

As shown in the above figures.

Press [Up/Down] to view the previous and following record.

Press the [Return] button to return to the previous menu.

01:It refers to the position recorded currently.

5. Trip
 6. Leakage ALarm
 7. Leakage
 8. System

Figure 80

As shown in the above figures.

Press [Up/Down] to view the previous and following record.

Press the [Return] button to return to the previous menu.

01:It refers to the position recorded currently.

5. Trip
 6. Leakage ALarm
 7. Leakage
 8. System

Figure 83

As shown in the above figures.

Press [Up/Down] to view the previous and following record.

Press the [Return] button to return to the previous menu.

Press the [Return] button to return to the previous menu.

ID:It refers to the position recorded currently.

Begin : 2014-01-10
 Time: 12:33:10
 End: 2014-10-11
 01 Time: 12:35:50

Figure 78

As shown in the above figures.

Press [Up/Down] to view the previous and following record.

Press the [Return] button to return to the previous menu.

01:It refers to the position recorded currently.

Phase: Unknown
 Value: 1000mA
 Date: 2014-10-09
 01 Time: 12:35:50

Figure 81

As shown in the above figures.

Press [Up/Down] to view the previous and following record.

Press the [Return] button to return to the previous menu.

01:It refers to the position recorded currently.

System Event
 System startup
 00:00:00 ID:0001
 2014-10-20 Back

Figure 84

As shown in the above figures.

Press [Up/Down] to view the previous and following record.

Press the [Return] button to return to the previous menu.

Press the [Return] button to return to the previous menu.

ID:It refers to the position recorded currently.

10.4 About menu

Date: 2000-00-00
Soft: 03.21s
Hard: 01.07
Num: 000000C0000

Figure 85

1.00.17.0125.202
0001.0001.0007
Apr 18 2025
Mcu-460/GW 11N21

Figure 86

As shown in the above figures.

Press [Up/Down] to page up and down.

Press the [Return] button to return to the previous menu.

10.5 Maintenance menu

1.Set
2.Query
3.About
4.Maintain

Figure 87

----2Level----
Please Input!
8 8 8 8

Figure 88

1.Maintain
2.Capacity
3.TestTrip
4.SelfCheck

Figure 89

As shown in the above figures.

Press the [Up/Down] button to control the reverse display position or adjust parameters.

Press the [OK] button to enter the corresponding setting menu/switch setting options.

Press the [Return] button to return to the previous menu.

Level 2 password shall be set up for logging in the maintenance menu, and if there is no keyboard operation in the return time after login, it will be automatically logged out.

Event records, login password, switch status and other items can be viewed and operated under the maintenance menu.

Trial tripping: If the switch is in closing state, the trial tripping will be started to verify whether it can trip normally.

Self-inspection: the self-inspection of switch is used to check for incorrect parameters.

Mechanical test: The switch starts automatic opening/closing at the interval of 10-999 second/time

10.5.1 Maintenance mode

1.Maintain
2.Capacity
3.TestTrip
4.SelfCheck

Figure 90

Maintain
Please Input!
0 LLevel:8888
Enter Quit

Figure 91

Maintain
Please Input!
0 LLevel:8888
Enter Quit

Figure 92

As shown in the above figures.

Press the [Up/Down] button to control the reverse display position or adjust parameters.

Press the [OK] button to enter the corresponding setting menu/switch setting options.

Press the [Return] button to return to the previous menu.

In the maintenance mode, there is no switch protection, and screen backlight flashes. The maintenance mode is still valid after powering off until press the buttons of "Return" or "Logout Return" for exiting; Do not need to enter level 0 password if entering the maintenance mode again after exiting by pressing the "Return" button. Need to enter the password again if entering the maintenance mode again after exiting by pressing the "Logout Return" button

10.5.2 Capacity

1. Maintain
2. Capacity
3. TestTrip
4. SelfCheck

Figure 93

Capacity
SysT: 087/999 Y
Trip: 002/010 Y
Check: 000/010 N

Figure 94

Capacity
Over: 001/010 Y
Alarm: 000/010 N
Clear All: Yes

Figure 95

Press the [Up/Down] button to control the reverse display position or adjust parameters.

Press the [OK] button to enter the corresponding setting menu/switch setting options.

Press the [Return] button to return to the previous menu.

10.5.3 Self-inspection

1.Maintain
2.Capacity
3.TestTrip
4.SelfCheck

Figure 96

Record Check..
SelfChecking..
PleaseWait 1

Figure 97

Result: OK
Mode: But ton
Date: 08-01-2000
02Timr: 14:23:46

Figure 98

10.5.4 Mechanical Test

5.MachineTest
6.ResetPassWord
7.LogOut
8.Port Control

Figure 99

MachineTest
TestMode: 0
Save Cancel

Figure 100

MachineTest
CloseTiming3010S
TripTiming3010S
OFF

Figure 101

As shown in the above figures.

Press [Up/Down] to adjust the countdown parameters.

Press [Set] to switch the setting option.

Press [Confirm] to view the operation times.

Press the [Return] button to return to the previous menu.

In mechanical test mode, press [Return] to exit the mechanical test mode, press [Up/Down] to view the testing times, and countdown will be displayed automatically if no operation when the return time is over

10.5.5 Password reset

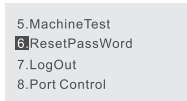


Figure 102



Figure 103

As shown in the above figures.

Press the [Up/Down] button to control the reverse display position or adjust parameters.

Press the [OK] button to enter the corresponding setting menu/switch setting options.

Press the [Return] button to return to the previous menu.

Password reset requires to enter a level 0 password, and the system will automatically return to the maintenance menu if it is correct.

10.5.6 Logout Return

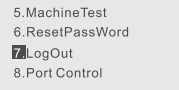


Figure 104

As shown in the above figures.

Press the [Up/Down] button to control the reverse display position or adjust parameters.

Press the [OK] button to enter the corresponding setting menu/switch setting options.

Press the [Return] button to return to the previous menu.

Password is required to enter again after logout and return.

11. Special setting instructions of photovoltaic products

D. Other
E. Timing Jump
F. Restore Factory
G. Back

Figure a

Other set
Closing delay: 300S
Power-off delay: 10S
Save 4 Back

Figure d

Other set
TryClose: On
PowerOFF: Off
Set Back

Figure b

Other set
Closing voltage: 150V
Power-off voltage: 45V
Save 5 Cancel

Figure e

Other set
Jump: Off
Alarm: Off
Save Cancel

Figure c

Other set
Overvoltage delay: 10S
Undervoltage delay: 10S
Save 6 Cancel

Figure f

As shown in the above figures.

Press the [Up/Down] button to control the reverse display position or adjust parameters.

Press the [OK] button to enter the corresponding setting menu/switch setting options.

Press the [Return] button to return to the previous menu.

Trial power-on after startup: On-The breaker will be closed automatically if there is no circuit fault after powering on;

Power-off trip: On-the breaker will trip automatically after powering off.

Closing delay: 0-300S adjustable (default to 300s) -- If there is no circuit fault after powering on, the circuit breaker will be closed automatically after 300S;

Power-off delay: 0-20S adjustable (default to 10S) -- The circuit breaker will trip automatically after the circuit is powered off for 10S;

Closing voltage: 150V-220V adjustable (default to 150V) -- The circuit breaker will be closed automatically when the three-phase voltage is higher than 150V after powering on the circuit;

Power-off voltage: 10-150V adjustable (default to 45V) -- The circuit breaker will be powered off and trip when the three-phase voltage is lower than 45V;

Overvoltage delay: 0-10S adjustable (default to 10S) -- The circuit breaker will trip after 10S when the circuit has overvoltage fault

Undervoltage delay 0-10S adjustable (default to 10S) -- The circuit breaker will trip after 10S when the circuit has undervoltage fault

12. Operation of nixie tubes

In order to protect subsequent equipment, the circuit breaker has the trial power-on function after startup. See the setting code list for the details.

12.1 Product trial operation

Power on the circuit breaker after the wiring is arranged completely and checking. When the circuit breaker is in breaking state, set the parameters according to the operation instructions; when closing the circuit breaker, the closing indicator will flash and normally-on after closing.

In closing state, press [Trial Trip] for residual current trial trip, and the product can be reclosed within 20-60s.

12.2 Closing operation of circuit breaker

1. Automatic closing

Press and hold [Close] for 2s, the closing indicator will flash and normally-on after closing, the open/close indicator indicates "Close", and the circuit breaker works normally.

2. Manual closing

Insert the manual wrench in the appendix into the hole and rotate it by about 360° clockwise. After closing, the closing indicator is normally-on, the open/close indicator indicates "Close", and the circuit breaker works normally.

Notes: The product can be closed manually when the main contact of circuit breaker is disconnected. See Mode 2 above for the closing operation. During manual closing, pay attention to the safety of load equipment and personnel.

12.3 Disconnection of circuit breaker

1. In operating state, press [Opening]. After opening, the closing indicator is OFF, and the open/close indicator indicates "Open".

2. When opening manually, insert the wrench into the hole and rotate it by 180° clockwise. After opening, the open/close indicator indicates "Open", and the closing indicator is OFF.

13. Operation instructions for nixie tubes

13.1 Menu instructions for nixie tube

The menu includes [Utility Display], [Parameter Setting], [Fault Display] and [Fault Query] as well as panel indicator. The display panel is shown as the figure below:

Setting menu		Unit	Setting menu		Unit	Setting menu		Unit
S-01	Overvoltage	V	S-11	Operation time	ms	S-21	Baud rate	
S-02	Overvoltage alarm		S-12	Electric leakage alarm		S-22	Address	
S-03	Overvoltage tripping		S-13	Ir1 Setting value	A	S-23	Password	
S-04	Undervoltage value	V	S-14	Ir1 Operation time	s	S-24	Time-year	
S-05	Undervoltage alarm		S-15	Ir2 Setting value	xIRI	S-25	Time-month	
S-06	Undervoltage tripping		S-16	Ir2 Operation time	ms	S-26	Time-day	
S-07	Default phase value		S-17	Ir3 Setting value	xIRI	S-27	Time-hour	
S-08	Default phase alarm		S-18	Power-on closing		S-28	Time-minute	
S-09	Default phase tripping		S-19	Power-off opening		S-29	Zero-missing alarm	
S-10	Leakage value	mA	S-20	Communication type		S-30	Zero-missing tripping	



Setting Inquiry Alarm Fault Automatic Communication Closing Locking



Fault display				Real-time display		Unit	Real-time display		Unit
F-02	Electric leakage	F-07	Default phase	F-13	Remote	U-A	Phase B voltage	L-B	Phase B current
F-04	Zero missing	F-08	Undervoltage	F-14	Simulate	U-B	Phase B voltage	L-C	C-phase current
F-05	Overloaded	F-09	Overvoltage	F-15	Locking	U-C	Phase B voltage	L-D	Real-time leakage current
F-06	Short circuit	F-12	Test	F-18	Manual	L-A	A-phase current	L-L	Rated leakage current

Description to indicator:

Setting (indicator): After entering the setting menu, the light will be ON automatically, otherwise it is OFF.

Inquiry (indicator): After entering the query menu, the light will be ON automatically, otherwise it is OFF.

Alarm (indicator): When there is alarm information, the light will flash automatically, otherwise it is OFF.

Fault (indicator): After fault tripping occurs in products, the light will be ON automatically, otherwise it is OFF.

Automatic (indicator): When the leakage setting is in automatic mode, the light will be ON automatically, otherwise it is OFF.

Communication (indicator): When communicating with external equipment, the light will flash automatically, otherwise it is OFF.

Closing (indicator): When the product is in automatic closing state, the light will flash; after closing, the light will be normally-on, otherwise it is OFF.

Locking (indicator): When the product is in locking state, the light will be ON automatically, otherwise it is OFF.

13.2 Real-time display

[Real-time Display] displays in the switching mode of code and real-time value, and the display unit has been marked on the panel.

Press [Up]/[Down] to switch the display content.

Press [Set] to enter the [Parameter Setting] menu.

Press [Confirm] to enter the [Fault Query] menu.

13.3 Parameter setting

[Parameter Setting] menu displays in the switching mode of setting code and setting value, and the display unit has been marked on the panel.

[Parameter Setting] menu defaults to query mode, and the setting code and setting value are switched to display.

Press [Up]/[Down] to switch the setting options. When setting is necessary, press [Confirm] to enter the setting mode and display the setting value; press [Up]/[Down] to adjust the parameters. Press [Confirm] to save the setting parameters, and return to the query mode.

Enter the operation password for first setting; when entering password, the nixie tube displays—, requiring four-digit password; press [Confirm] to enter the password inputting state; press [Up]/[Down] to adjust the password; press [Set] to choose the password setting digit, and enter it again if the password is wrong.

13.4 Query pattern

Press [Up]/[Down] to switch the setting options

Press [Confirm] to enter the setting mode, and input the operation password for first setting

Press [Return] to return the [Real-time Display] menu.

13.5 Setting mode

Press [Up]/[Down] to adjust the setting parameters

Press [Confirm] to save the setting parameters, exit the setting mode and return to the query mode

Press [Set] to shift the parameters

Press [Return] to return the [Real-time Display] menu.

13.6 Fault display

[Fault Display] displays in the mode of fault code, which has been marked on the panel.

13.7 Fault Query

[Fault Query] displays in the mode of fault code and fault index, which has been marked on the panel.

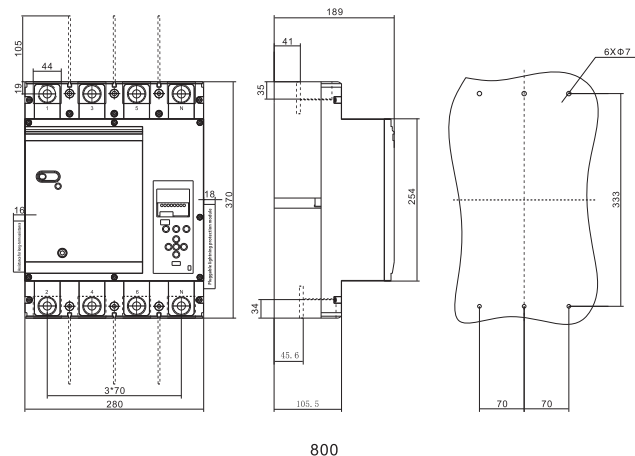
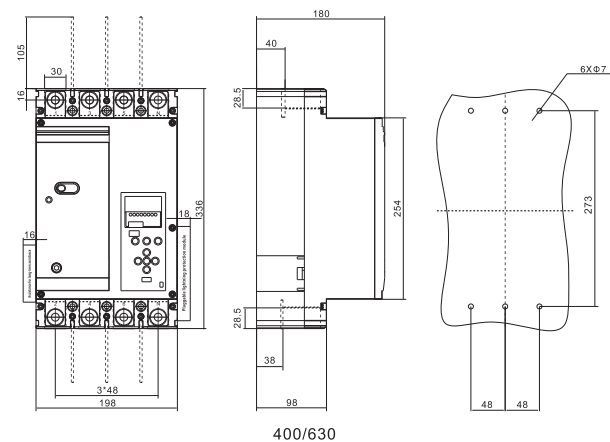
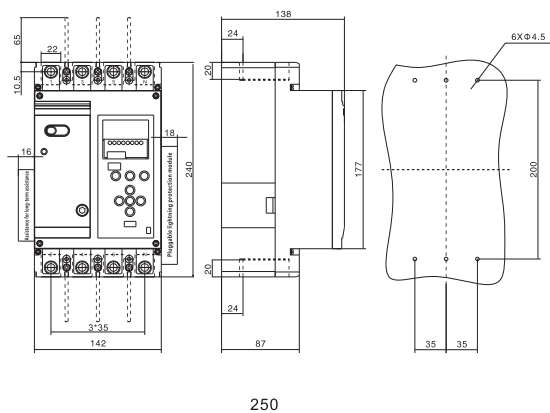
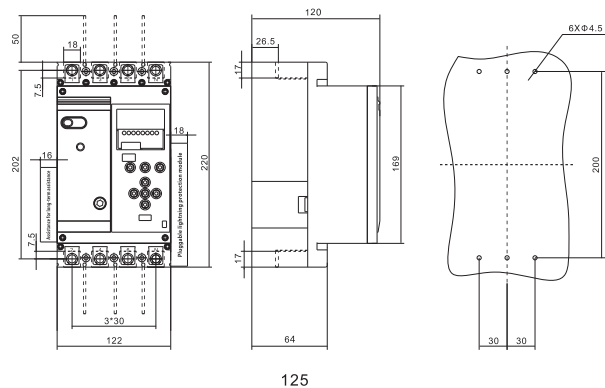
Press [Up]/[Down] to query the previous and following fault record

Press [Confirm] to return the [Real-time Display] menu.

Press [Return] to return the [Real-time Display] menu.

14. Appearance and installation dimension

Outline and installation dimensions diagram



15. Secondary terminal wiring diagram

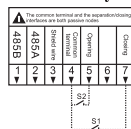


Figure a

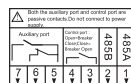


Figure b

Note: The common terminal and the opening and closing ports are passive interfaces. S1 and S2 form a pair of mutually switching passive switch nodes. When S1 is closed, the product closes; when S2 is closed, the product opens.

16. Sectional area and rated current matching of connecting wires

Rated current is not more than 400A and the matching sectional area with connecting wire

Rated current (A)	16,20	25	32	40,50	63	80	100	125,140	160
Sectional area of the connecting wire (mm ²)	2.5	4.0	6.0	10	16	25	35	50	70
Rated current (A)	180,200,225		250	315,350	400				
Sectional area of the connecting wire (mm ²)	95		120	185	240				

Rated current is more than 400A and the matching sectional area with connecting wire

Rated current A	Cable		copper bar	
	Sectional area mm ²	Quantity	Dimension mm x mm	Quantity
500	150	2	30 x 5	2
630	185	2	40 x 5	2

17. Appendix

Lightning protection module	Technical parameters	
	1. Maximum impulse withstand current Iimp	2kA(10/350μs)
	2. Nominal discharge current In	7.5kA(8/20μs)
	3. Impulse voltage durability	6kV (1.2/50μs)
	4. Continuous operating voltage Ue	AC 335V
	5. Protection voltage level	1.5kV

Auxiliary contact	Approximate heating current Ith: 3A
	Wiring diagram
	Note: F11 (F21) for product opening, while F12 (F22) for connection; F11 (F21) for product closing, while F14 (F24) for connection;

18. Transport and storage

18.1 Transport

During the transport of products, water, rain, snow or other chemical solvents, corrosive liquids and other harmful liquids shall be prevented from eroding and mixing; Prevent strong impact and extrusion between objects; According to the packaging direction, and see marks of the outer packaging box for the number of layers.

19.2 Storage

- Storage environmental conditions: Ambient temperature 10 C-+45 C
- Relative humidity ≤90% (when ambient temperature +20 C)
- The storage site shall be free of dust and conductive dust;
- No corrosive, inflammable and explosive gases, and no exposure to rain and snow;
- Drying and well ventilation;
- According to the packing direction, the packing number shall not be more than the mark number of the outer packing box.

19. Notes

- After normal operation, test the product once a month and keep the test record.
- For non-quality problems due to improper installation and use, and burning of connection terminals due to improper wiring, the company will not assume the "Three Guarantees" responsibility.
- Please contact the local distributor or the company's customer service center for any problem in the use of the product.

Customer-service hotline:

Please keep the Manual properly for searching in the future.