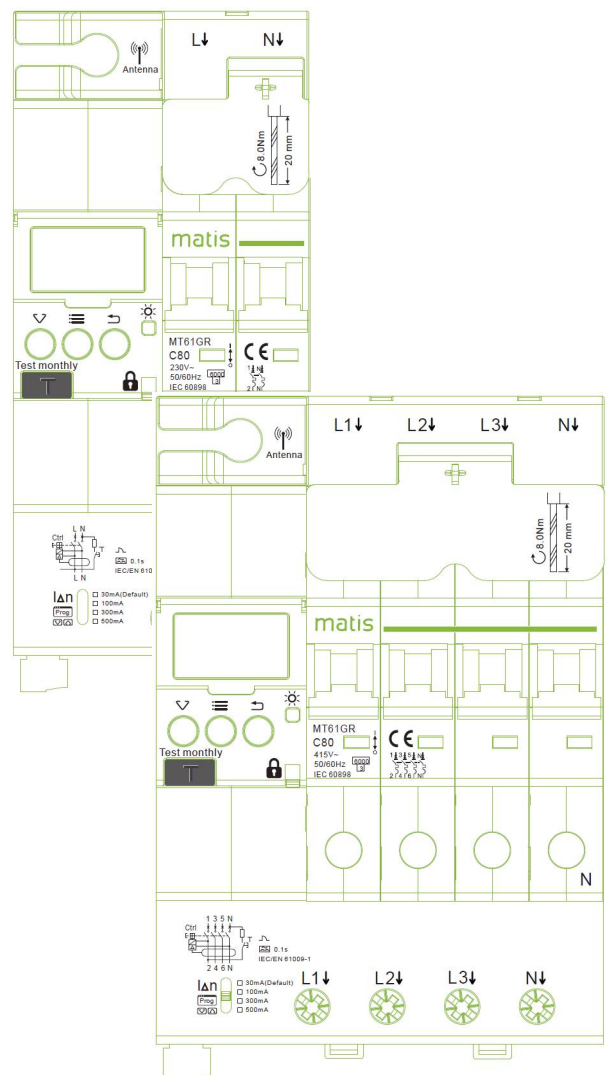
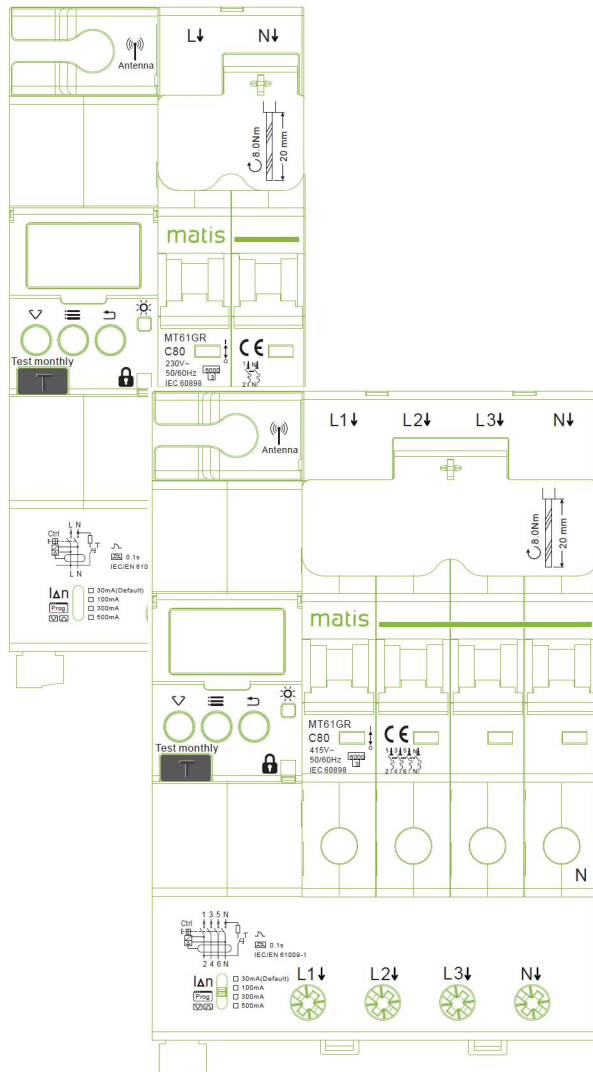


Smart Circuit Breaker

MT61SR

User Manual

12/2024



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Background

With the deepening of the concept of smart grid, the demand-side management is gradually extended to the distribution side. For example, real-time monitoring, protection and decision-making analysis will gradually replace the traditional distribution system.

The access of complex distributed power sources and new energy loads has put forward higher requirements for the flexible, intelligent, safe and reliable design and planning of the power supply of the distribution network. In order to better optimize and protect electrical equipment and personal safety, the distribution network needs to be equipped with multifunctional smart protection circuit breakers with residual current protection to prevent electrical fires and risks of electric shock. To meet the needs of different customers and different scenarios, the MT61SR product hardware and firmware are upgraded.

The main features are as follows:

1. Flexible installation. Single-phase and three-phase, guide rail installation.
2. Comprehensive functions: over-voltage and under-voltage protection, phase loss protection, power failure protection, overcurrent & overload protection, leakage protection; remote control, timing control, automatic reclosing and other control logics, suitable for a wide range of scenarios, fully meeting the power distribution needs of the power supply and load ends.
3. Standardized protocol. Communication through Modbus facilitates quick and accurate access of device to the monitoring platform.

1 Overview

1.1 Function Overview

The MT61SR is a smart auto-reclosing circuit breaker, which has functions such as over-voltage and under-voltage protection, phase loss protection, power failure protection, overcurrent & overload protection, leakage protection, voltage detection, parameter setting, RS485 communication, etc.;

Models:

- MT61SR-RS N/2P C16~80A
- MT61SR-RS N/4P C16~80A

Main functions of the device:

- Voltage detection
- Over-voltage and under-voltage protection
- Phase loss protection
- Power failure protection
- Overcurrent and overload protection
- Leakage protection (leakage value adjustable)
- Timing control
- Remote control
- Modbus communication
- Time-stamped event log

1.2 Main Features

Features	MT61SR-RS N/2P	MT61SR-RS N/4P
Measurement display	n	n
Voltage detection	n	n
Control (remote ON/OFF control, reclosing control)	n	n

Control (programmable digital input)	1*ON 1*OFF by default	1*ON 1*OFF by default
Control (timing control)	n	n
Over-voltage and under-voltage protection	n	n
Phase loss protection	n	n
Power failure protection	n	n
Overcurrent and overload protection	n	n
Leakage protection (leakage value adjustable)	30mA/100mA/300mA/500mA	30mA/100mA/300mA/500mA
Communication control	Modbus	Modbus
Width (18 mm module in DIN rail mounting)	4P	6P

2 Functions

2.1 Functions and Advantages

Functions	Advantages
Voltage detection	Real-time monitoring of three-phase voltage
Electrical protection	Over/under voltage, phase loss, power failure, over current & overload protection, leakage protection
Event record	Support 20 event record alarms with time stamp
Remote control	Remote control via RS485 or IO
Automatic reclosing configuration	Multi-function reclosing list to meet the needs of different reclosing scenarios

3 Description

3.1 MT61SR Smart Circuit Breaker

(拍照补图)

4 Hardware and Installation

4.1 MT61SR Dimensions (mm)

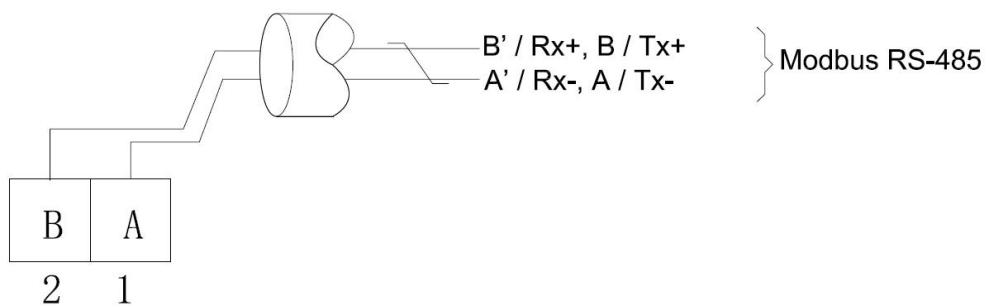
(补图)

5 Wiring

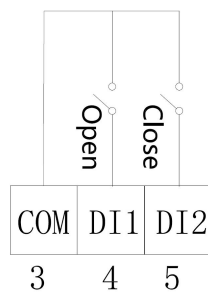
5.1 MT61SR Wiring Diagram

(补图)

5.2 Modbus Communication Wiring Diagram



5.3 IO Port Wiring Diagram



6 Communication LED Indicator

The communication LED indicates the communication status between the smart circuit

breaker and the main device as follows.

Indicator Status	Description
LED red indicator flashes	Communication with the device has been established.
	NOTE: The LED will also flash if an online error occurs.
LED off	There is no active communication between the master and slave devices

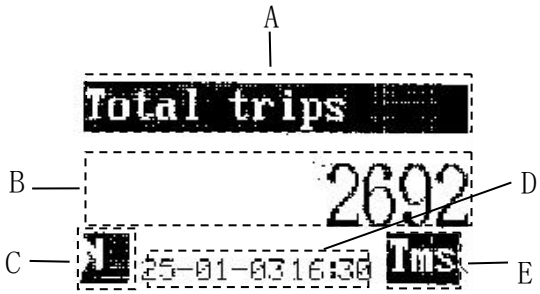
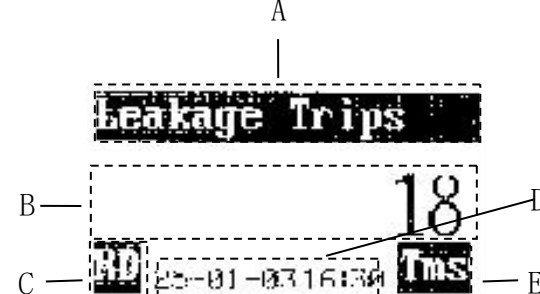
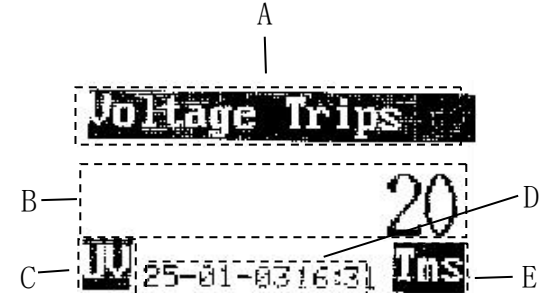
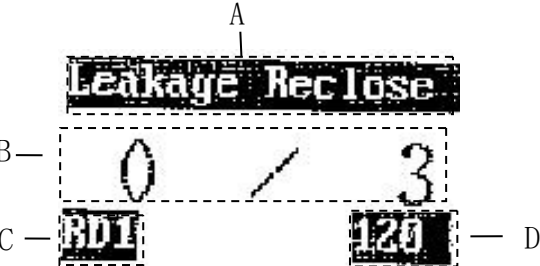
7 Data Display and Settings

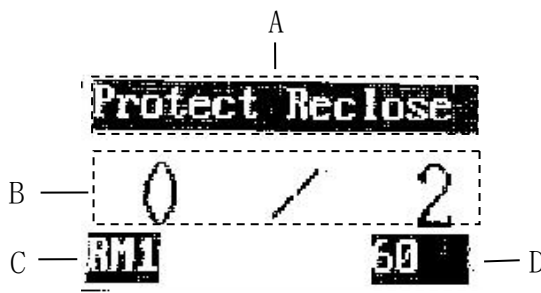
The smart circuit breaker's front panel with LED, graphic display and menu buttons allow you to access the information required to operate and modify parameter settings.

Parameters can also be displayed and configured via the front panel.

7.1 Data Display

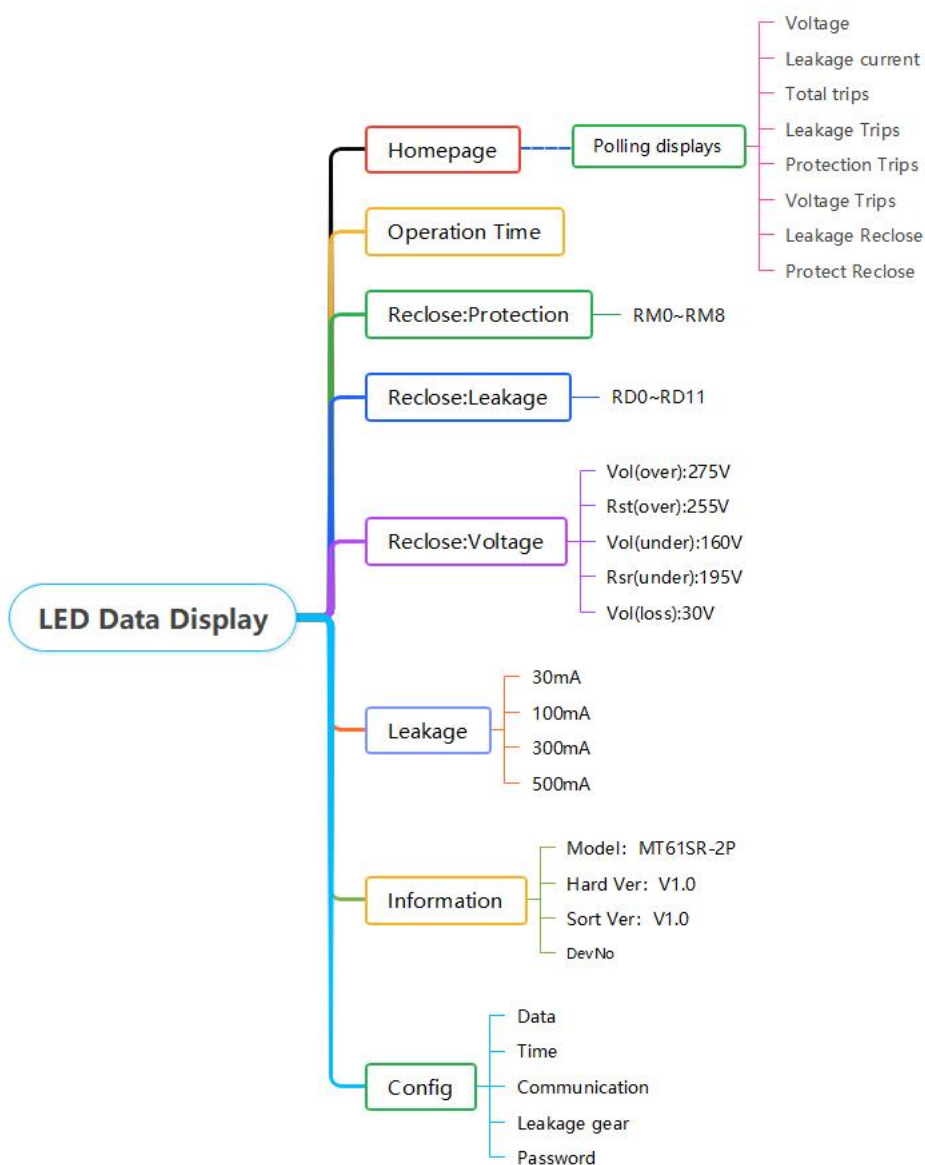
	A	Voltage
	B	Value (three-phase voltage)
	C	Voltage
	D	Date and time
	E	Unit
	F	Scrollable screen
	G	View additional screens related to the measurement category (if available)
	H	Return to previous screen
	A	Leakage current
	B	Value (leakage current value)
	C	Leakage action current symbol
	D	Date and time
	E	Unit

 The LCD display shows 'Total trips' at the top. Below it is a large number '2692'. At the bottom, there is a date and time '25-01-03 16:30' and a unit 'Tms'. Labels A, B, C, D, and E point to specific parts of the display: A points to the title, B points to the value, C points to the date/time, D points to the unit, and E points to the unit label.	<table> <tr> <td>A</td><td>Total number of reclosings</td></tr> <tr> <td>B</td><td>Value (total number of times)</td></tr> <tr> <td>C</td><td>Number of times</td></tr> <tr> <td>D</td><td>Date and time</td></tr> <tr> <td>E</td><td>Unit</td></tr> </table>	A	Total number of reclosings	B	Value (total number of times)	C	Number of times	D	Date and time	E	Unit
A	Total number of reclosings										
B	Value (total number of times)										
C	Number of times										
D	Date and time										
E	Unit										
 The LCD display shows 'Leakage Trips' at the top. Below it is a large number '18'. At the bottom, there is a date and time '25-01-03 16:30' and a unit 'Tms'. Labels A, B, C, D, and E point to specific parts of the display: A points to the title, B points to the value, C points to the date/time, D points to the unit, and E points to the unit label.	<table> <tr> <td>A</td><td>Number of leakage openings</td></tr> <tr> <td>B</td><td>Value (number of leakage openings)</td></tr> <tr> <td>C</td><td>Leakage protection gear</td></tr> <tr> <td>D</td><td>Date and time</td></tr> <tr> <td>E</td><td>Unit</td></tr> </table>	A	Number of leakage openings	B	Value (number of leakage openings)	C	Leakage protection gear	D	Date and time	E	Unit
A	Number of leakage openings										
B	Value (number of leakage openings)										
C	Leakage protection gear										
D	Date and time										
E	Unit										
 The LCD display shows 'Protection Trips' at the top. Below it is a large number '28'. At the bottom, there is a date and time '25-01-03 16:30' and a unit 'Tms'. Labels A, B, C, D, and E point to specific parts of the display: A points to the title, B points to the value, C points to the date/time, D points to the unit, and E points to the unit label.	<table> <tr> <td>A</td><td>Current fault opening times</td></tr> <tr> <td>B</td><td>Value (current fault opening times)</td></tr> <tr> <td>C</td><td>Current fault protection gear symbol</td></tr> <tr> <td>D</td><td>Date and time</td></tr> <tr> <td>E</td><td>Unit</td></tr> </table>	A	Current fault opening times	B	Value (current fault opening times)	C	Current fault protection gear symbol	D	Date and time	E	Unit
A	Current fault opening times										
B	Value (current fault opening times)										
C	Current fault protection gear symbol										
D	Date and time										
E	Unit										
 The LCD display shows 'Voltage Trips' at the top. Below it is a large number '20'. At the bottom, there is a date and time '25-01-03 16:30' and a unit 'Tms'. Labels A, B, C, D, and E point to specific parts of the display: A points to the title, B points to the value, C points to the date/time, D points to the unit, and E points to the unit label.	<table> <tr> <td>A</td><td>Voltage fault opening times</td></tr> <tr> <td>B</td><td>Value (voltage fault opening times)</td></tr> <tr> <td>C</td><td>Voltage fault</td></tr> <tr> <td>D</td><td>Date and time</td></tr> <tr> <td>E</td><td>Unit</td></tr> </table>	A	Voltage fault opening times	B	Value (voltage fault opening times)	C	Voltage fault	D	Date and time	E	Unit
A	Voltage fault opening times										
B	Value (voltage fault opening times)										
C	Voltage fault										
D	Date and time										
E	Unit										
 The LCD display shows 'Leakage Reclose' at the top. Below it is a large number '0' followed by a slash and the number '3'. At the bottom, there is a date and time '25-01-03 16:30' and a unit 'Tms'. Labels A, B, C, and D point to specific parts of the display: A points to the title, B points to the value, C points to the date/time, and D points to the unit.	<table> <tr> <td>A</td><td>Leakage reclosing</td></tr> <tr> <td>B</td><td>Value (number of leakage automatic reclosings)</td></tr> <tr> <td>C</td><td>Leakage protection gear (RD1)</td></tr> <tr> <td>D</td><td>Automatic reclosing waiting time (s)</td></tr> </table>	A	Leakage reclosing	B	Value (number of leakage automatic reclosings)	C	Leakage protection gear (RD1)	D	Automatic reclosing waiting time (s)		
A	Leakage reclosing										
B	Value (number of leakage automatic reclosings)										
C	Leakage protection gear (RD1)										
D	Automatic reclosing waiting time (s)										

 The screenshot shows a monochrome LCD display. At the top, it says 'Protect Reclose'. Below that, a large '0' is on the left and a '2' is on the right, separated by a diagonal slash. At the bottom left, it shows 'RM1' and at the bottom right, it shows '50'. Labels A, B, C, and D point to specific parts of the display: A points to the title, B points to the '0', C points to 'RM1', and D points to '50'.	A	Current fault reclosing
	B	Value (number of current fault automatic reclosings)
	C	Current fault protection gear (RM1)
	D	Automatic reclosing waiting time (s)

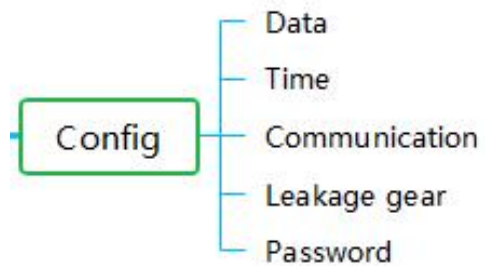
The main screen only displays Voltage. Press the down key to display other interfaces in turn;

7.2 Data Display



8 Parameter Configuration

8.1 Configuration Mode Menu Tree



8.2 Device Configuration

Function	Factory settings
Rated frequency	50 Hz
Digital Input	1*ON 1*OFF by default
Communication	Baud rate=9600; Address=1
Password	0000
Alarm	Disable

8.2.1 Configuration Mode

1. Go to the main menu and find the "config" menu.
2. Enter your password when prompted. The configuration menu appears.

8.2.2 Modify Parameters

There are two ways to modify parameters, depending on the type of parameter:

1. Modify the numerical value digit by digit on the screen.
2. Modify via modbus.

Note: Before modifying any parameters, make sure you are familiar with the device's HMI functionality and navigation structure in configuration mode.

9 Protection: Over/Under Voltage, Phase Loss, Power Failure, Leakage Protection

9.1 Over/under Voltage and Phase Loss Configuration

Over/Under Voltage Protection Settings			
Item	Voltage	Time	Execute
Overvoltage value L1	$\geq 275\text{v}$ Setting value (265~350V)	5s	☐ Alarm ☐ Open (default) ☐ Lock
Overvoltage recovery value	$\leq 1.1U_e$ 255V	30s (default) 20~60s can be set	
Undervoltage value L1	$\leq 160\text{v}$ setting value (100~200V)	3s	☐ Alarm ☐ Open (default) ☐ Lock
Undervoltage recovery value	$\geq 0.85U_e$ 195V	30s (default) 20~60s can be set	

Phase Loss Protection Settings			
Item	Voltage	Time	Execute
Phase loss voltage value	$\leq 30\text{v}$ Setting value (100~200V)	3s	☐ Alarm ☐ Open (default) ☐ Lock

Phase loss voltage recovery value	$\geq 0.85U_e$ 195V	30s (default) 20~60s can be set	
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9.2 Device Configuration

The leakage alarm is required and can be associated with the leakage opening as an option. And device defaults to leakage opening.

Leakage Protection		
Item	Leakage value	Execute
Leakage value 1	30mA	☐ Alarm ☐ Open
Leakage value 2	100mA	
Leakage value 3	300mA	
Leakage value 4	500mA	

9.3 Configuration Mode

1. Go to the main menu and find the “config” menu.
2. Enter your password when prompted. The configuration menu appears.

10 Automatic Reclosing and Configuration

When tripping is caused by leakage or current fault (overload, short circuit), automatic reclosing can be performed according to a certain time.

Automatic reclosing parameters can be configured in the screen menu, and reclosing list parameters can be selected.

10.1 SRM: Configuration of Current Fault Reclosing Times

After the current fault (overload, short circuit) tripping, the device will be closed after the "RT" time, but manual closing is not limited by time. If the fault current is eliminated within "CT" time after closing, the closing is successful and the circuit breaker operates normally; If the fault current is not eliminated, the circuit breaker will re-adjust and perform

automatic reclosing according to the number of reclosing "NR" in the selected mode "RM".
If the reclosing fails, manual unlocking or closing is required.

Each sequence determines the maximum number of reclosings (NR), reclosing time (RT) and reset time (CT).

RM	NR	RT	CT
RM0	Circuit breaker disables auto-reclosing		
RM1	2	1min	15min
RM2	2	1min	15min
RM3	2	90s	15min
RM4	2	90s	15min
RM5	2	3min	15min
RM6	2	30s	30min
RM7	2	30s	30min
RM8	Used for customerization.		

Default value: RM1

10.2 SRD: Configuration of Leakage Reclosing Times

When the residual current exceeds the operating current value and the circuit breaker trips, it will close after the "RT" time, but manual closing is not limited by time. If the fault current is eliminated within "CT" time after closing, the closing is successful and the circuit breaker operates normally; If the fault current is not eliminated, the circuit breaker will be adjusted according to the number of reclosing "NR" in the selected mode "RD" and perform automatic reclosing. If the reclosing fails, manual unlocking or closing is required.

Each sequence determines the maximum number of reclosings (NR), reclosing time (RT) and reset time (CT).

RD	NR	RT	CT
RD0	Leakage disables automatic reclosing		
RD1	3	2,4 and 8min.	15min

RD2	6	2,4 and 8 min., the rest repeat 8 min.	15min
RD3	6	10,20,30,60,130 and 600s.	15 min.
RD4	7	30s,1,2,3,4,8 and 16min.	15min
RD5	7	2,4,8,16 and 32min., the rest repeat 32 min.	15min
RD6	8	30s,1,2,3,4,5,6, and 7min.	15min
RD7	8	2,4 and 6min., the rest repeat 6 min.	15min
RD8	10	90s.	15 min.
RD9	10	1min.	15min
RD10	10	3min.	15min
RD11	30	20s, 40s and 5min., the rest repeat 5 min.	15min
RD12	Used for customization.		

Default value: RD1

11 Input and Output

11.1 Digital Input

The device can accept 2 digital inputs, namely DI1 and DI2.

Digital input has 5 operating modes:

- General input status: For simple on/off digital input. The digital input can be the OF or SD signal of the circuit breaker, or the status of external devices, etc.
- Control ON/OFF: Used to control the opening and closing operations of the circuit breaker. The detection signal can be used for both short and long signals.

- DI1: Open
- DI2: Close

12 Modbus List

See modbus list for details.

13 Electrical Characteristics

13.1 Power System Input

Characteristics	Value
Measuring voltage	230V L-N $\pm 20\%$; 400V L-L $\pm 20\%$;
Frequency	50/60Hz $\pm 10\%$

13.2 Protection: Over/Under Voltage, Phase Loss, Power Failure

Characteristics	Value
Overvoltage fault action	Overvoltage value: 275V (default/settable)
	Overvoltage recovery value: 255V (default/settable)
Undervoltage fault action	Undervoltage value: 160V (default/settable)
	Undervoltage recovery value: 195V (default/settable)
Output to correlate	Outputs to correlate: 0 = not correlated; 1 = correlated Bit0 = Alarm Bit1 = Open Bit2 = Lock

Characteristics	Value
Phase loss action value:	30V (default/settable)
Output to correlate	Outputs to correlate: 0 = not correlated; 1 = correlated Bit0 = Alarm

	Bit1 = Open Bit2 = Lock
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13.3 Protection: Overload (Overcurrent), Leakage Protection

Characteristics	Value
Overcurrent/overload_fault action	Adjust according to actual needs
Output to correlate	Outputs to correlate: 0 = not correlated; 1 = correlated Bit0 = Alarm Bit1 = Open Bit2 = Lock

Leakage Protection	Value
Sensitivity I Δ n	3=30mA; 10=100mA; 30=300mA; 50=500mA; (Program and screen adjustable)
Perform action	Alarm and trip optional

13.4 Digital Input

	Characteristics	Value
Digital Input	ON / OFF or customized	1*ON 1*OFF by default

13.5 Mechanical Characteristics

Characteristics	Value
IP protection grade	IP40
Active energy display range	999999.99 kwh
Communication LED	LED flashes red

Weight	MT61SR 2P 617g, MT61SR 4P 1008g
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13.6 Environmental Characteristics

Characteristics	Value
Operating temperature	-15 ~ 55 °C
Storage temperature	-25 ~ 70 °C
Relative humidity	5 ~ 95% non-condensing
Altitude	Below 2000 meters above sea level

13.7 Modbus Communication

Characteristics	Effective value	Default value
Baud rate	9600/19200/38400	9600
Data bit	8	8
Check mode	Odd/Even/No check	No check
Stop bit	1	1
Address	1–247	1