518

ASJ60-LD16A Residual Current Monitor

Installation and Operation Manual V1.3

Acrel Co., Ltd.

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The contents of the manual will be continuously updated and revised, thus the products functions in this manual may inevitably have a slight discrepancy with the real objects during the continuous upgrading process. Users should give first place to the purchased real products, and can search www.acrel-electric.com to downloads or through sales channels to obtain the latest version of the manual.

Change log

Sequence	Change date	Version	Description of changes
1	2021-05-20	V1.0	First version
2	2023-03-15	V1.1	Fix errors, modify product size, modify button descriptions
3	2024-04-15	V1.2	Revised according to software upgrade (replace DI-CH2 with remote reset)
4	2024-01-02	V1.3	Modify company contact details
Notes:			

Contents

ASJ60-LD16A Residual Current Monitor

1 Introduction

ASJ60-LD16A residual current monitor is suitable for distribution lines of 400V AC and below, to monitoring residual current as a residual current electrical fire monitoring detector, or combined with low-voltage circuit breaker or AC contactor to be residual current devices to protect the electrical circuit from ground fault. Prevent equipment damage and electrical fire accident caused by ground fault current, or provide indirect contact protection against personal electric shock.

ASJ60-LD16A can be used in distribution boxes of petrochemical, industrial plants, large public buildings, kindergartens, nursing homes and other places, as well as in distribution boxes of street lamps, courtyard lamps and landscape lamps for leakage or grounding fault monitoring.

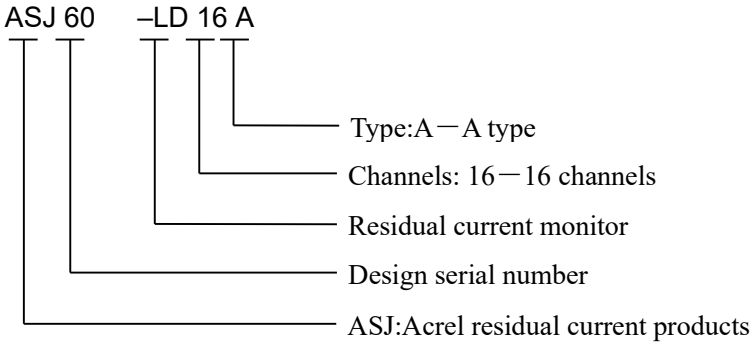
2 Functions features

- Monitoring and display residual current of TN-S,TT distribution lines.
- 16 measuring channels per devices for residual current measurement, response value ranges:1mA…30A.
- Adjustable alarm value with ranges: 1mA…30A, and each channel can be set as over value alarm, operating, or function closing for residual current monitoring
- 1 relay for water immersion, 16 relays for 16 channels residual current monitor with automatic reclosing function, adjustable reclosing times and delay. Reclosing function can be turned off when the residual monitoring is set alarm and operated mode.
- 2 DI for water immersion and remote reset.
- RS485 interface with Modbus-RTU protocol
- 30 fault records, including fault type and fault time.
- Self-test function, test hardware by press test button.
- Reset function, reset fault when it is removed.
- Mute function, to mute the buzzer by press mute button.

3 Reference standard

■ IEC62020-1:2020 Electrical accessories - Residual current monitors (RCMs) - Part 1: RCMs for household and similar uses.

4 Naming rules



5 Technical parameters

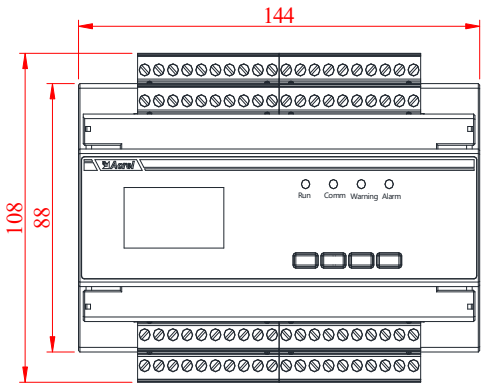
Parameters		Specifications
Power supply	Voltage range	AC/DC85V~265V
	Power consumption	≤10VA
Input	Number of measuring channels(per device)	16 channels
	Range of Residual current measurement	1mA~30A
	Rated residual operating current $I_{\triangle n}$	10mA ~30A continuous adjustable
	Operating characteristic	AC, pulsed DC
	Frequency	50Hz±5Hz
	Operating delay	adjustable from 0s to 10s
	Switch status input	2DI with passive dry node input
Output	Output mode	1 alarm relay for water immersion (N/C or N/O) 16 alarm relays for residual current monitor (N/C or N/O)
	Contact capacity	AC 250V/3A DC 30V/3A
Automatic reclosing	Frequency	0-99 adjustable continuously
	Interval time	0-999s adjustable continuously
Communication		RS485 interface with Modbus-RTU protocol
Environment	Temperature	Operating temperature:-10℃~55℃ Storage temperature:-30℃~70℃
	Humidity	≤95%, No condensation

	Altitude	⩽2500m
MTBF		⩾50000 hours

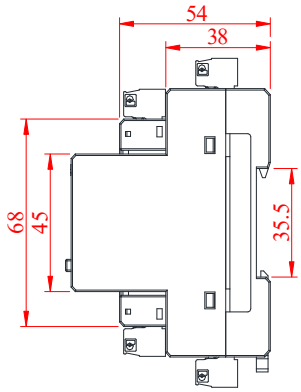
6 Installation and wiring

6.1 Dimension diagrams

See the figure below(dimensions in mm)



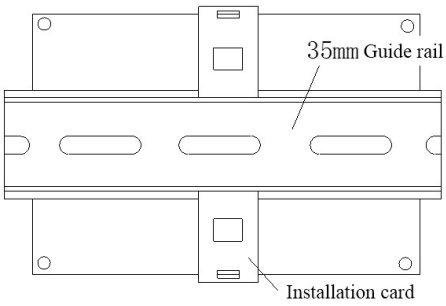
Front view



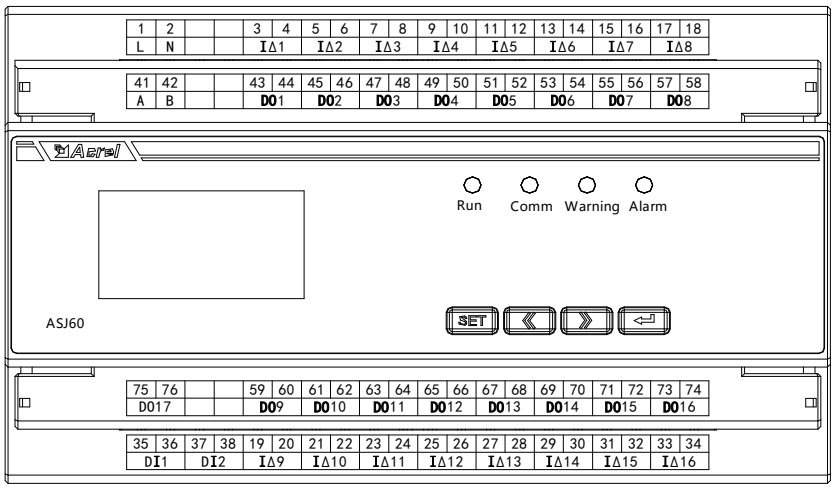
Side view

6.2 Installation

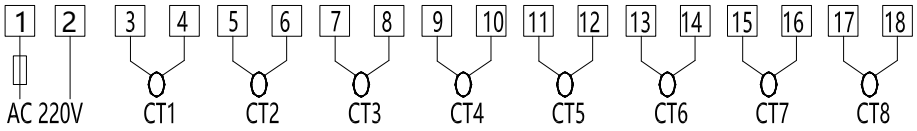
ASJ60-LD16A residual current monitor is installed with DIN rail and fixed with snap, as shown in the figure below



6.3 Wiring diagram

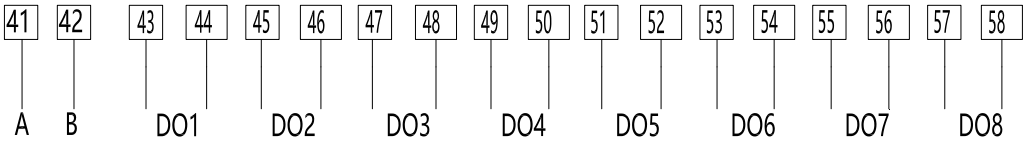


The wiring and description of the lower row terminals on the upper side are shown in the figure below:



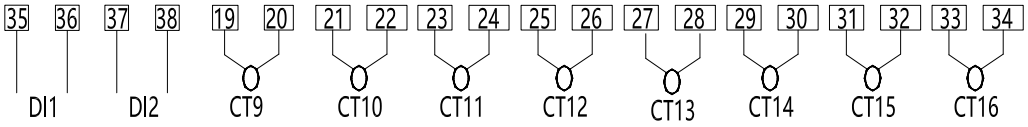
Power supply Residual current signal input of channel 1 to 8

The wiring and description of the upper row terminals on the upper side are shown in the figure below:



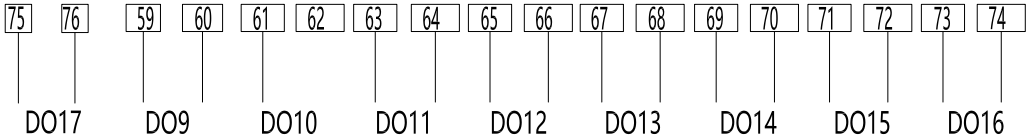
RS485 Residual current alarm relay output of channel1 to 8

The wiring and description of the lower row terminals on the lower side are shown in the figure below:



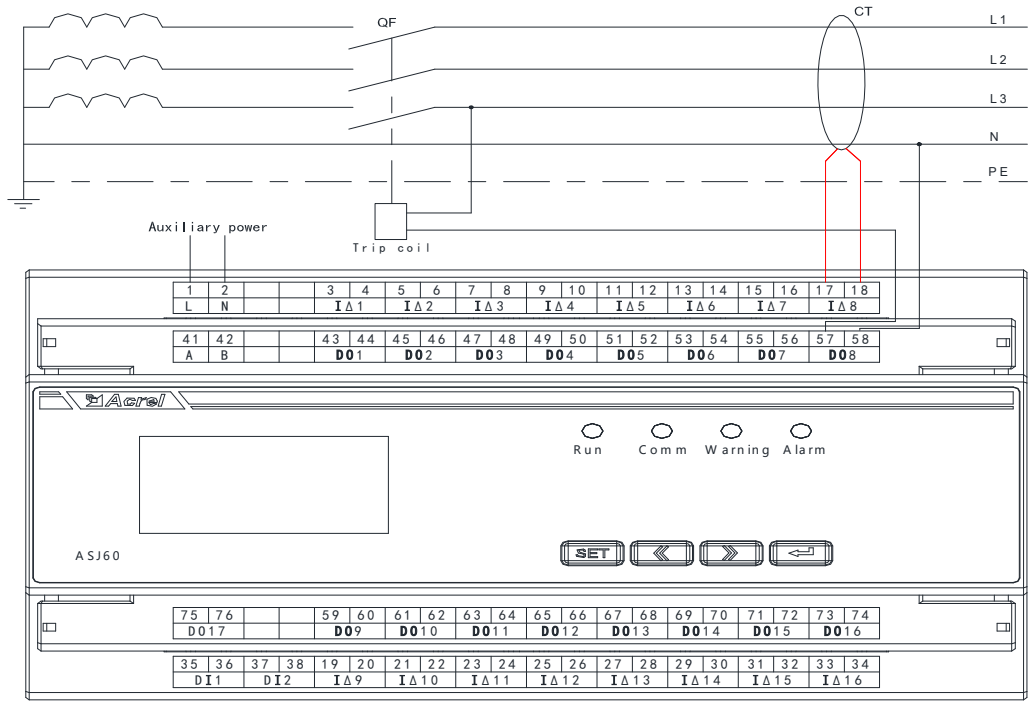
Digital Input Residual current signal input of channel 9 to 16

The wiring and description of the upper row terminals on the lower side are shown in the figure below:



Water immersion alarm relay Residual current alarm relay output of channel 9 to 16

6.4 Typical wiring diagram



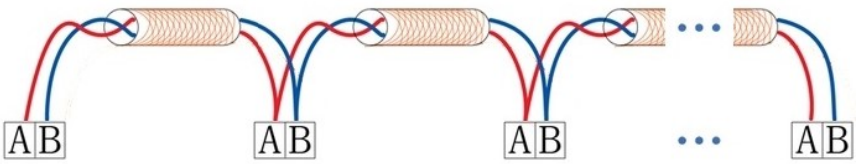
Note:

1)Each residual current monitor can be configured with up to 16 AKH-0.66/L series residual current transformers to monitor the residual current of 16 circuits.

2)The L,N terminals of the residual current monitor are the auxiliary power supply terminals, which need to be connected with AC 220V, and the L terminal can be connected with 6A fuse in series as protection.

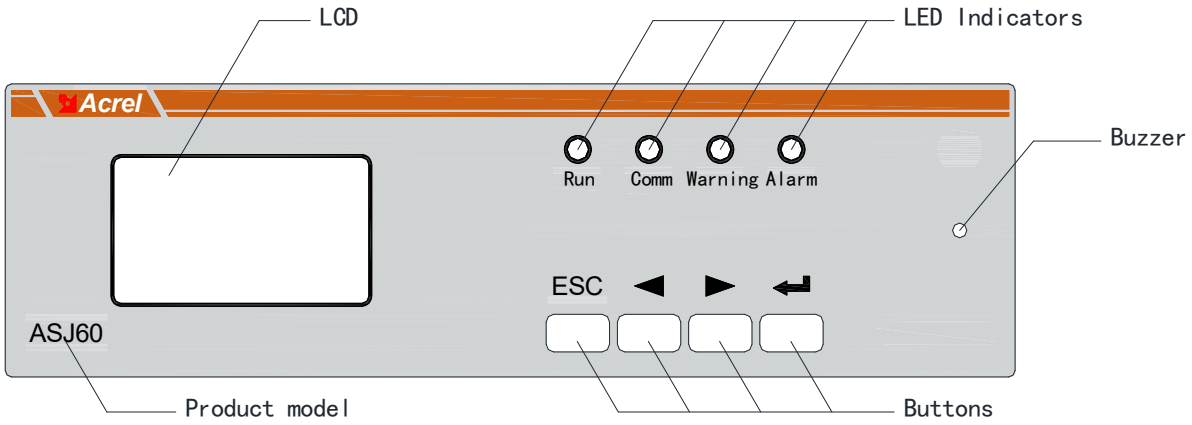
3)The AKH-0.66/L series residual current transformer need to pass through L,N(single phase)or A,B,C,N(three-phase) lines of the circuit. PE wire does not need to pass through. The output line of residual current transformer is connected to the corresponding circuit terminal of residual current monitor. Unused channels must be closed in the menu to avoid false alarm.

4)A,B are communication terminals, when multiple residual current monitors are required to networked through RS485 bus, the communication terminals of each residual current monitor shall be connected hand in hand by $2\times1.5mm^2$ shielded twisted pair. A matching resistor(120 Ω) shall be connected in parallel between the two communication terminals of the two devices at the end and head of the bus, to ensure normal communication.



7 Operation and Application

7.1 Panel Description



7.2 Description of LED indicators

Status of LED	Description
Run	Flashes one time per second when running
Comm	Flashes when data communicating
Warning	Flashes when residual current of one or more circuits over the warning value
Alarm	Flashes when residual current of one or more circuits over the alarm value.

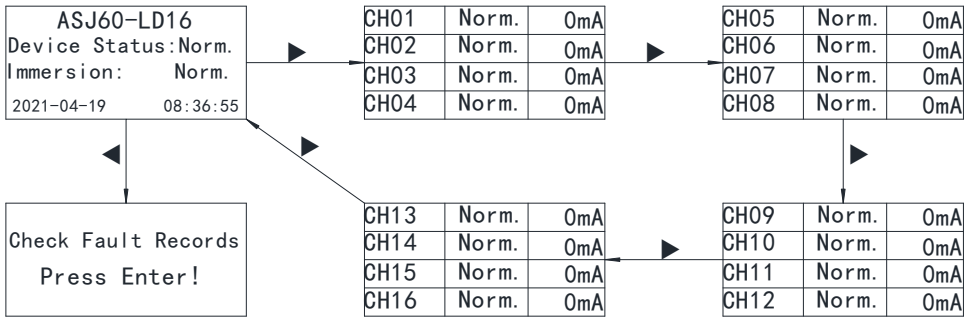
7.3 Function description of buttons

Key	Functions
ESC	In non-programming mode, used to mute the alarm sound; In programming mode, used to return to the previous tab.
◀	In non-programming mode, used to view the fault records; In programming mode, used to increase or decrease the values and digits, or to change the protection action status. In the alarm status, press and hold for more than three seconds and release the button to reset the device.
▶	In non-programming mode, used to view the fault records; In programming mode, used to increase or decrease the values and digits, or to change the protection action status. In normal status, press and hold for more than three seconds and release the button to start the self-test function.
↵	In non-programming mode, press this key to enter the programming mode In programming mode, used as the Enter key.

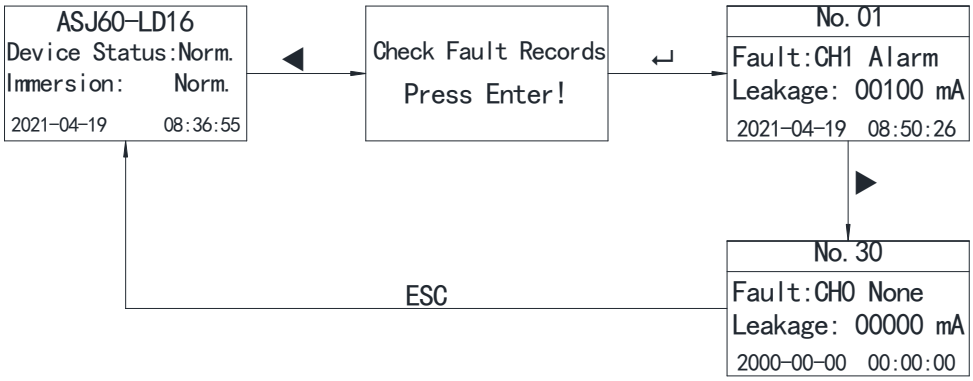
7.4 Key operation descriptions

7.4.1 Operation in non-programming mode

1)View the operation interface



2)View the fault record



7.4.2Operation in programming mode

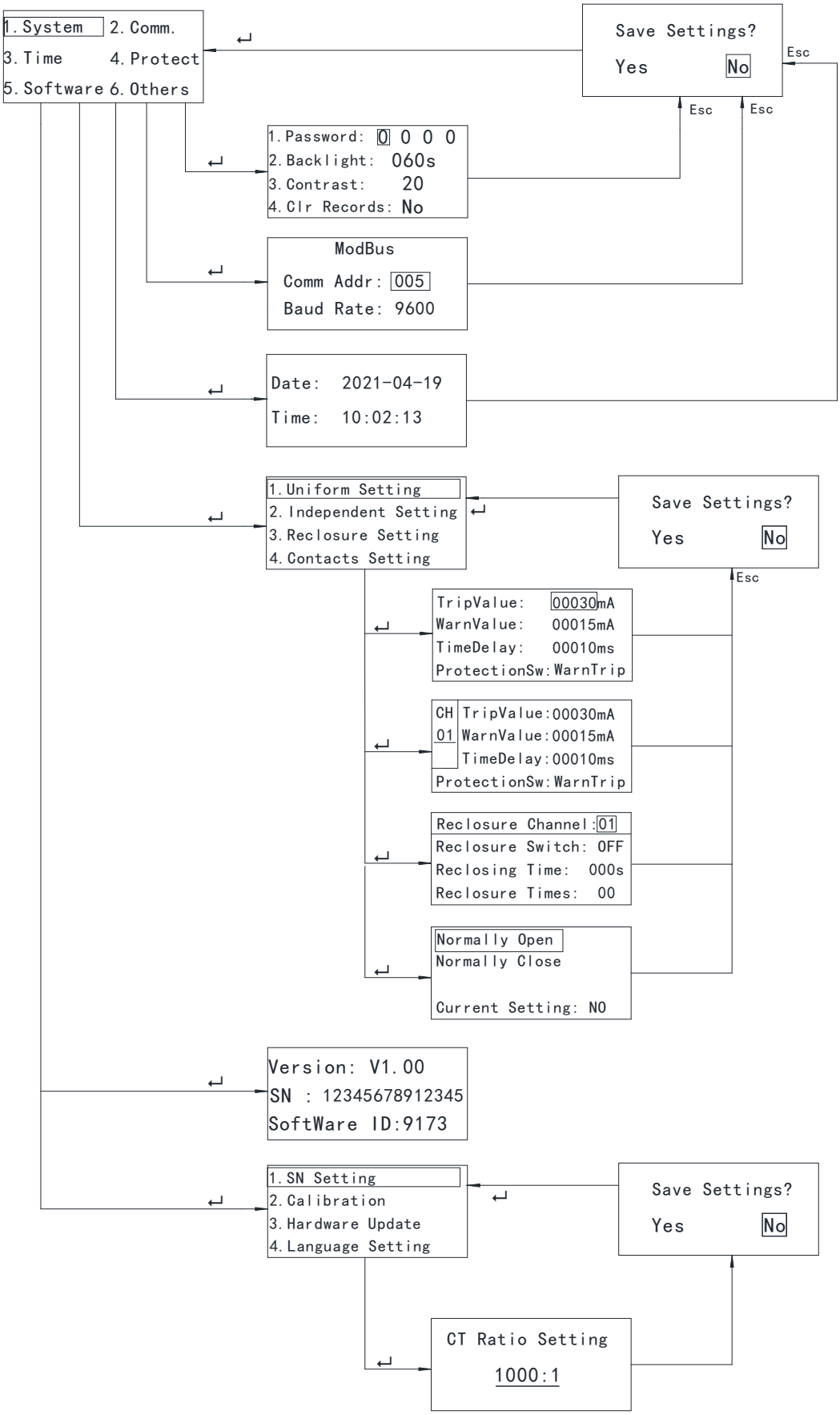
1)Enter programming mode

Note: The default password is 0001.

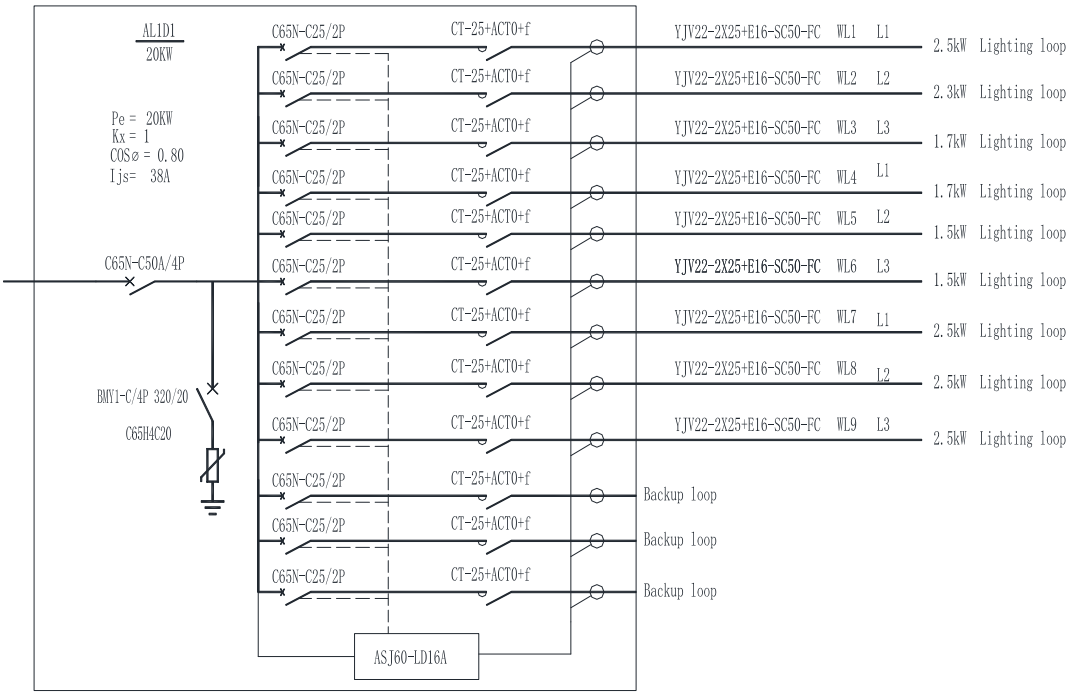
2)Exit programming mode

Press’ESC’to exit the programming mode.

3) Parameter setting


1. System
2. Comm.
3. Time
4. Protect
5. Software
6. Others
Save Settings?
Yes
No
Esc
1. Password: 0 0 0 0
2. Backlight: 060s
3. Contrast: 20
4. Clr Records: No
ModBus
Comm Addr: 005
Baud Rate: 9600
Date: 2021-04-19
Time: 10:02:13
1. Uniform Setting
2. Independent Setting
3. Reclosure Setting
4. Contacts Setting
TripValue: 00030mA
WarnValue: 00015mA
TimeDelay: 00010ms
ProtectionSw: WarnTrip
CH 01
TripValue: 00030mA
WarnValue: 00015mA
TimeDelay: 00010ms
ProtectionSw: WarnTrip
Reclosure Channel: 01
Reclosure Switch: OFF
Reclosing Time: 000s
Reclosure Times: 00
Normally Open
Normally Close
Current Setting: NO
Version: V1.00
SN : 12345678912345
SoftWare ID: 9173
1. SN Setting
2. Calibration
3. Hardware Update
4. Language Setting
CT Ratio Setting
1000:1

8 Application example



9 Communication protocol

9.1 Modbus-RTU communication protocol

9.1.1 Function code 03H or 04H: Read the registers

This function allows the user to acquire the data collected and recorded by equipment and the system parameters. The number of data requested by hosts has no limit, but cannot exceed the defined address range.

The following example shows how to read version of program from No.01 slave controllers, with the address of the insulation resistance value of 0009H.

Host sends		Send message
Address code		01H
Function code		03H
Start address	High	00H
	Low	09H
Number of registers	High	00H
	Low	01H
CRC check code	Low	54H
	High	08H

Slave returns		Return message
Address code		01H
Function code		03H
Bytes		02H
Register data	High	00H
	Low	64H
CRC check code	Low	B9H
	High	AFH

9.1.2 Function code 10H:write the registers

The function code 10H allows the user to change the contents of multiple registers, which can write the time and date in this meter. The host can write up to 16 (32 bytes) data at a time.

The following example shows a preset address of 01 with an installation date and time of 12:00, Friday, December 1st, 2009, in which the Monday to Sunday are replaced with number 1 to 7.

Host sends		Send message
Address code		01H
Function code		10H
Start address	High	00H
	Low	6AH
Number of registers	High	00H
	Low	06H
Bytes		0CH
0004H Data to be written	High	00H
	Low	09H
0005H Data to be written	High	00H
	Low	0CH
0006H Data to be written	High	00H
	Low	01H
0007H Data to be written	High	00H
	Low	0CH
0008H Data to be written	High	00H
	Low	00H
0009H Data to be written	High	00H
	Low	00H
CRC check code	Low	DFH
	High	05H

Slave returns		Return message
Address code		01H
Function code		10H
Start address	High	00H
	Low	6AH
Number of registers	High	00H
	Low	06H
CRC check code	Low	60H
	High	17H

9.2 Parameter address table

Sequence	Address	Parameter	R/W Permissions	Value range	Data type
0-7	0000H-0007H	Serial Number	R	SN code in ASCII	UINT16*7
8	0008H	Software code	R	0-65535	UINT16

9	0009H	Software version	R	For example 100,means V1.00	UINT16
10-14	000AH-000EH	Reserved			UINT16*5
15	000FH High	DI1 Status	R	0: Open, 1: Closed	UINT16
	000FH Low	DI2 Status	R	0: Open, 1: Closed	
16	0010H	Reserved			UINT16
17	0011H	CH1 Status	R	0:Normal, 1:Warning, 2:Alarm	UINT16
18	0012H	CH1 Real-time residual current value	R	0-30000(Unit: mA)	UINT16
19-48	0013H-0030H	CH2~CH16 channel status and real-time residual current value, the rules and format are the same as CH1			UINT16*30
49-99	0031H-0063H	Reserved			UINT16*50
100	0064H	Password	R/W	0-9999	UINT16
101	0065H	LCD contrast	R/W	0~60(default 20)	UINT16
102	0066H	Backlight duration	R/W	0-60s	UINT16
103	0067H	Reserved			UINT16
104	0068H	Communication address	R/W	1-247 (Default: 1)	UINT16
105	0069H	Communication baud rate	R/W	0-2: 4800, 9600, 19200 (unit: bps) (default: 1)	UINT16
106	006AH	Year	R/W	1-99 (unit: year) (default: 11)	UINT16
107	006BH	Month	R/W	1-12 (unit: month) (default: 4)	UINT16
108	006CH	Day	R/W	1-31 (unit: day) (default: 20)	UINT16
109	006DH	Hour	R/W	1-24 (unit: hour) (default: 12)	UINT16
110	006EH	Minute	R/W	1-60 (unit: minutes) (default: 0)	UINT16

111	006FH	Seconds	R/W	1-60 (unit: seconds) (default: 0)	UINT16
112	0070H	Mute flag	R/W	Write 1 to mute	UINT16
113	0071H	Reset flag	R/W	Write 1 to reset	UINT16
114	0072H	Test flag	R/W	Write 1 to test	UINT16
115-149	0073H-0095H	Reserved			UINT16*36
150	0096H	Unified setting of trip value	R/W	10-30000 (unit: mA)	UINT16
151	0097H	Unified setting of warning value	R/W	10-30000 (unit: mA)	UINT16
152	0098H	Unified setting of delay duration	R/W	0-60000 (step 10) (unit: ms)	UINT16
153	0099H	Unified setting of protection mode	R/W	0-No alarm, no tripping, 1-Only warning, 2-Only tripping, 3-Both alarm and tripping	UINT16
154	009AH	Unified setting of reclosing switch	R/W	1: Open, 0: Closed	UINT16
155	009BH	Unified setting of reclosing interval time	R/W	0-999 (unit: s)	UINT16
156	009CH	Unified setting of reclosing times	R/W	0-99	UINT16
157	009DH	CH1 trip value	R/W	10-30000(unit: mA)	UINT16
158	009EH	CH1 warning value	R/W	10-30000(unit: mA)	UINT16
159	009FH	CH1 delay duration	R/W	0-60000 (step 10) (unit: ms)	UINT16
160	00A0H	CH1 protection mode	R/W	0-No alarm, no tripping, 1-Only warning, 2-Only tripping, 3-Both alarm and tripping	UINT16

161-220	00A1H-00DCH	CH2~CH16 protection parameters, the rules and format are the same as CH1 protection parameters			UINT16*60
221	00DDH	Reserved			UINT16
222	00DEH	CH1 reclosing switch	R/W	1: Open, 0: Closed	UINT16
223	00DFH	CH1 reclosing interval time	R/W	0-999 (unit: s)	UINT16
224	00E0H	CH1 reclosing times	R/W	0-99	UINT16
225-269	00E1H-010DH	CH2~CH16 reclosing parameters, the rules and format are the same as CH1 reclosing parameters			UINT16*45
270-299	010EH-012B	Reserved			UINT16*30
300	012CH	Number of faults	R	0-30	UINT16
301	012DH High	SOE No.1	R	Event 1 fault channel	UINT16
	012DH Low		R	Event 1 fault type	
302	012EH		R	Event 1 fault value	UINT16
303	012FH		R	Event 1 fault Year	UINT16
304	0130H		R	Event 1 fault Month	UINT16
305	0131H		R	Event 1 fault Day	UINT16
307	0132H		R	Event 1 fault Hour	UINT16
308	0133H		R	Event 1 fault Minute	UINT16
309	0134H		R	Event 1 fault Second	UINT16
310-541	0136H-021DH	Event records No.2-No.30, the rules and format are the same as those in No.1			UINT16*232

10 Power up and debugging

10.1 Wiring check

The wiring of residual current monitor should be checked before power up, and mainly check whether there is wrong connection, missing connection or short circuit according to wiring diagram

(1)Check whether terminals L and N of auxiliary power supply for residual current monitoring are reliably connected to AC 220V.

(2)Check whether the secondary line of each residual current transformer is reliably connected to

the corresponding terminals.

(3)Check whether each DO output of the instrument is reliably connected with the shunt coil of the circuit breaker of the corresponding current transformer monitoring circuit and its power supply.

10.2 Common faults and solutions

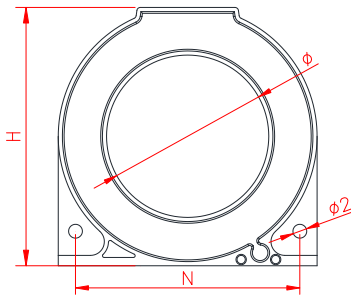
After ensuring the wiring, power on the system and check whether each device is abnormal. For common problems, judge the cause and eliminate fault according to the fault type of each device:

Faults	Possible causes and elimination
The LCD displays the alarm, and the alarm indicator is on	Residual current of one or more circuits exceeds the alarm setting value. Check the cause and eliminate the fault.
The device doesn't light up	Check the wiring of power supply. If the wiring is normal, please contact the manufacturer's technicians for confirmation.
Abnormal communication or no communication	(1)Check the wiring of communication. (2)Check the address and baud rate, the default baud rate is 9600, and should be consistent with the monitoring host.

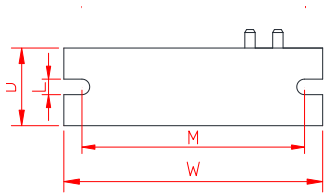
Note:In case of the above faults, power off for fault elimination and adjust the wiring until everything is normal.

11 Accessory:Residual current transformer

AKH-0.66/L series residual current transformer shall be used,the outline and installation dimensions are as follows.(Unit:mm)



Front view



Bottom view

The aperture of residual current transformer can be selected according to the rated current of the circuit. The following are the specific parameters of two common sizes.

Type	Rated current	Size(mm)	Aperture (mm)	Installation dimension (mm)

	(A)	W	H	D	Φ	M	N	L	Φ2
L-20	30	50.5	44.5	19	20	40.5	40.5	3	3
L-45	100	75	75	22	46	65	65	4.3	4

Headquarters: Acrel Co., Ltd.
Trade Company: Acrel E-Business(Shanghai)Co., Ltd.
Address: No.253 Yulv Road, Jiading District, Shanghai, China
TEL.: 0086-21-69156352
Web-site: www.acrel-electric.com
E-mail: sales@acrel-electric.com
Postcode: 201801
Manufacturer: Jiangsu Acrel Electrical Manufacturing Co., Ltd.
Address: No.5 Dongmeng Road, Dongmeng industrial Park, Nanzha Street, Jiangyin City, Jiangsu Province, China
TEL./Fax: 0086-510-86179970
Web-site: www.jsacrel.com
E-mail: sales@email.acrel.cn
Postcode: 214405