![Acrel logo]

Digital Residual Current Transformer
AKH-0.66L35D
AKH-0.66L50D
AKH-0.66L70D
AKH-0.66L105D

Installation and Operation Manual V1.1

Acrel Co., Ltd.

Contents

1. Overview

Relying on the AC sampling technology, Digital Residual Current Transformer can monitor the residual current in power distribution circuits and thus prevent electrical fires. It also supports the standard MODBUS-RTU protocol and connects with various standard systems. Our Digital Residual Current Transformer complies with requirements of *Electrical fire monitoring system----Part 2:Residual current electrical fire monitoring detectors*, GB14287.2.

2. Technical parameters

| Technical parameters		Index
Input	Network	3-phase 4-wire/TN, TT system
	Frequency	50Hz or 60Hz
	Residual current	Rated measuring range: 10mA～3000mA
		Setting range: I△n：30-1000mA, step: 1mA
		Measurement accuracy class of residual current: 1.0
Communication		RS485 port, MODBUS-RTU protocol
Power supply		DC 24V, power consumption: ≤2VA
Safety		Power frequency withstand voltage: AC3kV/1min between the terminal block and the housing Insulation resistance: ＞100MΩ between the terminal block and the housing
Environment		Working temperature:－10℃～＋45℃; storage temperature: －20℃～＋70℃; Relative humidity: 5%～95%, without condensation; altitude: ≤2500m

3. Installation and wiring

3.1 Outline and dimensions of installation (unit: mm)

AKH-0.66L50D：
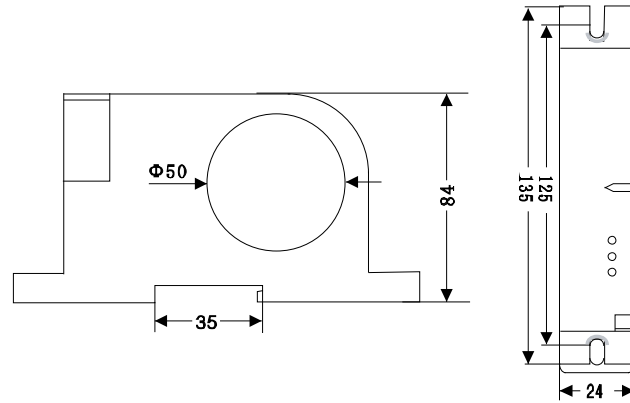
AKH-0.66L35D, AKH-0.66L50D, AKH-0.66L50D：
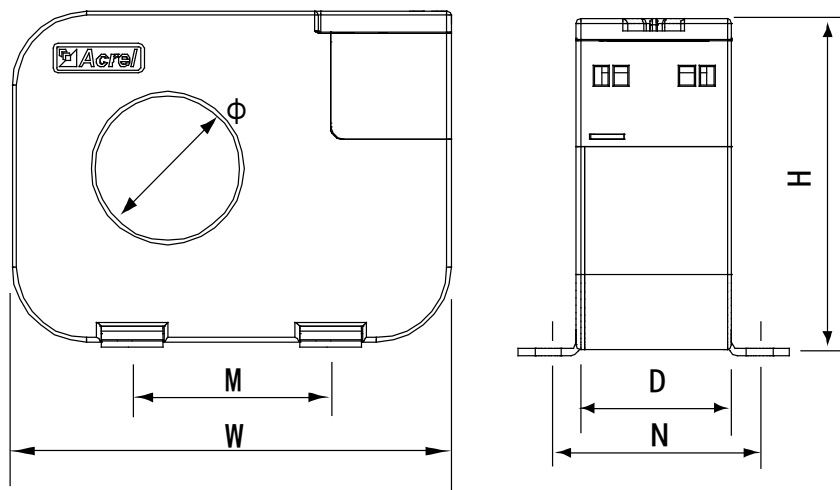
Dimensions Spec&type	Overall dimensions			Hole size	Installation dimensions	
	W	H	D	Φ	M	N
L-35	106	80	32.5	35	48	51
L-70	136	110	32.5	70	66	51
L-105	176	150	32.5	105	92	51

3.2 Mode of installation

Digital Residual Current Transformer is rail-mounted or fixed.

3.3 Connection mode

3.3.1 Primary side connection

Wiring diagram / Phase / Connection mode	3-phase 3-wire	3-phase 4-wire
TT		
TN — TNS		
TN — TNC		
TN — TN-C-S		

Note: The symbol ⬭ in the table indicates a residual current transformer. It is necessary to distinguish the wire N from the wire PE during the installation of residual current transformer. Wire N in a 4-wire system must be connected with the residual current transformer. Such wire N must not be used as wire PE. Wire PE must not be connected with a residual current transformer. For a TNC system, it is required to modify the system into a partial TT system or a TN-C-S system and then connect wires as illustrated above.
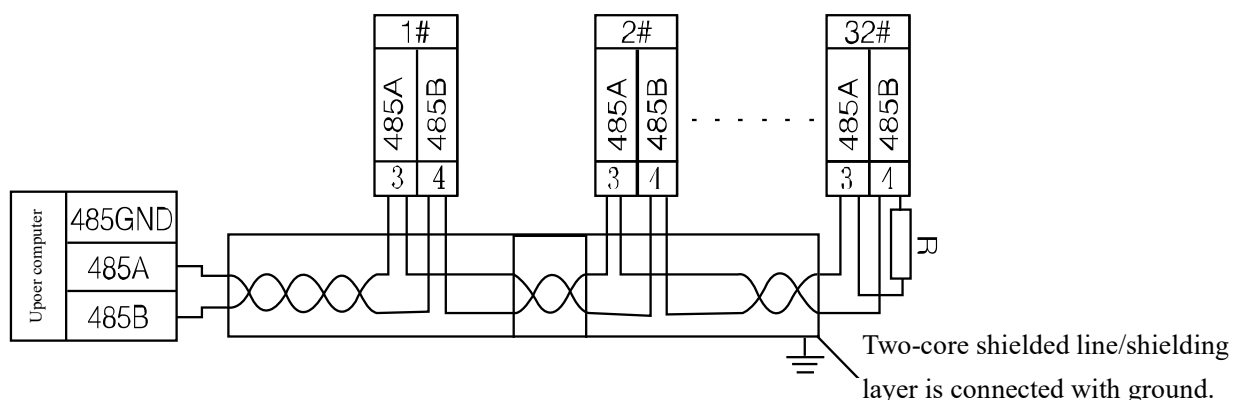
3.3.2 Secondary side connection

AKH-0.66L50D：

Example of Communication Connection

| 1 | 2 | 3 | 4 |

+　−　A+ B−
DC24V　RS485

Correct connection mode:Communication cable shielding layer is connectea with ground.

Two-core shielded line/shielding layer is connected with ground.

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Example of Communication Connection

| 1S1 | 1S2 | 2S1 | 2S2 |

+　−　A+ B−
DC24V　RS485

Correct connection mode:Communication cable shielding layer is connectea with ground.

Two-core shielded line/shielding layer is connected with ground.
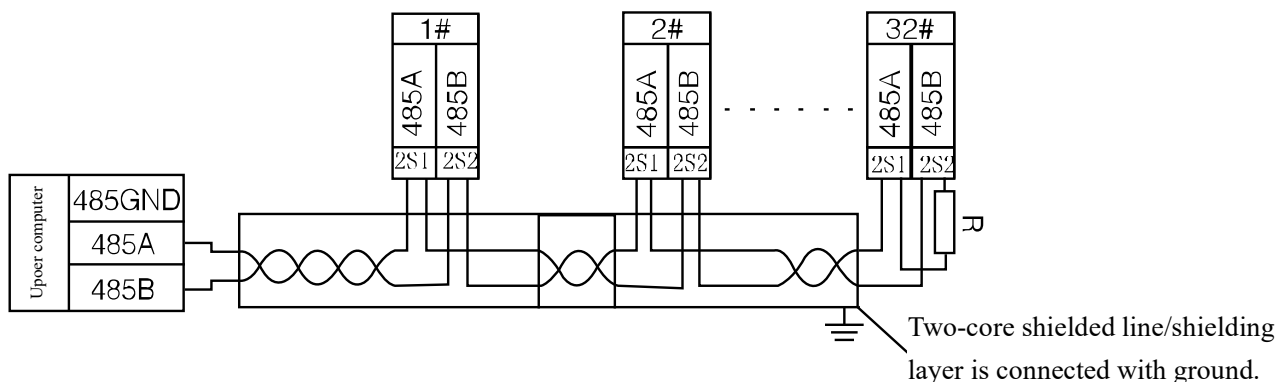
Address	Parameter	R/W	Value range	Data type
0000H	1st-circuit residual current	R	0~3000 mA	Word
0001H~0007H	Reserved			Word

0008H	1st-circuit actuation current	R	30~1000 mA (OFF)		Word
0009H~000FH	Reserved				Word
0010H	1st-circuit delay time	R	0.1S~60.0S		Word
0011H~0017H	Reserved				Word
0018H	Communication address	R	1~247		Word
0019H	Communication baud rate	R	1, 2, 3 and 4 indicate 4.800、9.600、19.20、38.40 kbps respectively with 9.600 kbps by default		Word
001AH	Alarm status	R	Refer to the attached data analysis table for details		Word
001BH	Remote alarm clearing	R/W	An alarm can be cleared remotely if 0x1234 is written. Return to zero automatically after the alarm is cleared successfully (resolve the fault in advance).		Word
001CH 001DH	Reserved				Word
001EH	Year	R/W	00-99 indicates 2000-2099		Word
	Month	R/W	1-12		
001FH	Day	R/W	1-31		Word
	Hour	R/W	0-59		
0020H	Minute	R/W	0-59		Word
	Second	R/W	0-59		
0021H	Software version	R	For example, 10 indicates the version V1.0.		Word
0022H~002BH	Reserved				Word
002CH	Event record 0	Event type	R	Type 1: residual current Type 2: temperature	Word
		Event channel	R	Current channels 1, 2, 3, 4 correspond to circuits 1, 2, 3, 4 Temperature channels 2, 3, 4 correspond to temperatures at phases A, B, C.	
002DH		Alarm setting	R	For the residual current type, the unit is mA For the temperature type, the unit is °C.	Word
002EH		Actual alarm value	R	For the residual current type, the unit is mA For the temperature type, the unit is °C.	Word
002FH		Year	R	Alarm time, year	Word
		Month	R	Alarm time, month	
0030H		Day	R	Alarm time, day	Word
		Hour	R	Alarm time, hour	

Note: The power supply is an isolated 24VDC power source. Make sure that the input voltage of

transformer is not below 18V. If the input voltage is below 18V, it is necessary to apply an auxiliary power source near the existing power source and keep these power sources separated in connnection. The shielded twisted pair or 4-core shielded wire are preferred for communication connection (consistent with the power connection). The minimum wire diameter is 0.75mm². The shielding layer is connected with ground. The communication connection must be far away from the power cable or other strong electric field. If the wire routing is longer than 100m, it is preferred to configure an appropriate resistor (recommended 120Ω) between A+ and B- of the last transformer.

4. Communication protocol

Modbus-RTU communication protocol is followed. The table below lists communication addresses.

Attachment:

0031H		Minute	R	Alarm time, minute	Word
		Second	R	Alarm time, second	
0032H~0067H	Rest 9 alarm entries are saved here in the rule and format same as above				Word

Bit1	Bit0	Status
0	0	Normal
0	1	Early warning
1	0	Alarm
1	1	Reserved

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