Mianyang Weibo Electronic Co.,Ltd

Designing, Manufacturing and Supplying WB Series Electric Isolated Sensor and Digital Electrical Transducer since 1989

USER MANUAL

WB9128-1 Power Transducer

(RS 485 Interface 3-phase 3 wire; 3 –phase 4-wire)

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Tel: 86 816 2971265

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ISO9001 ISO14000 ISO18000

Certified

Quality Warranty

Any quality problem found in WB series products, we offer

One year free charge of repair the products, and six months guaranteed free charge of change and return the products.

WB9128-1 Power Transducer (RS 485 Interface)

Safety claim

The information in the safety claim of the equipment documentation is intended to ensure that equipment is properly installed in order to maintain it in a condition.

It is assumed that everyone who would be associated with the equipment should be familiar with the contents of that safety section, or this safety guide.

When electrical equipment is in operation, dangerous voltages will be present in certain parts of the equipment (e.g. the input terminal). Failure to obverse warning notices, incorrect use, or improper use may endanger personnel and equipment and course personal injury or physical damage.

Before working in the terminal strip area, the equipment must be isolated.

Proper and safe operation of the equipment depends on appropriate shipping and handling, proper storage, installation and commissioning, and on careful operation, maintenance and servicing.

The operating manual for the equipment gives instructions for its installation, commissioning, and operation. However, the manual cannot cover all conceivable circumstances or include detailed information on all topics. In the event of questions or specific problem, do not take any action without proper authorization. Contact the appropriate WB technical sales office and request the necessary information.

Standard application

1. Accuracy

   Accurate degree is conformed to IEC688:1992

2. Safety

   2.1 Overload capability

   Overload capability is conformed to IEC688:1992

   2.2 Isolation voltage

   Can be endured testing voltage is conformed to Q/72085584-0.1-2004

   2.3 Insulation impedance

   The insulation impedance is no less than 20M Ohm, is conformed to Q/72085584-0.1-2004

3. Electromagnetic Capability

   3.1 Electromagnetic field immunity test according to IEC 61000-4-3:1995

   3.2 Power frequency magnetic field immunity test according to IEC 61000-4-8:1993

Product Description and Application

WB9128-1 adopts special made isolation module, professional MCU controller and high speed data synchronizing sampling and processing technologies to isolate and convert active power of three-phase four-wired electric system or 3 phase 3 wire system into RS485 bus and load independent output DC average current signal 4-20mA or 0-20mA and dc voltage signal 0-5V or 1-5V; It has certain advantages of input/output isolation, high performance, low drifting by temperature, and low power consuming, etc.

Product Dimensional Drawing (unit: mm)
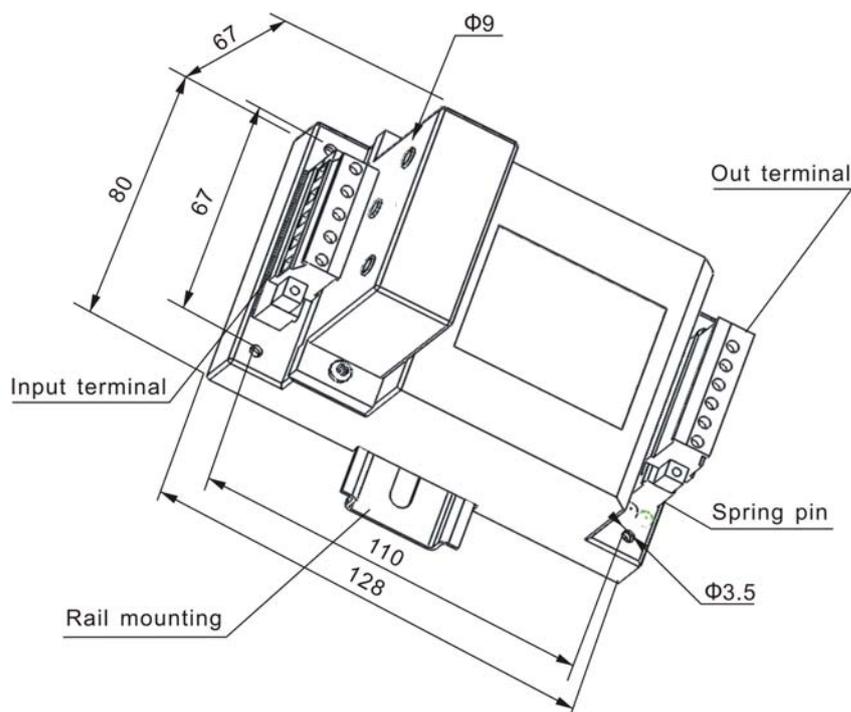
Key Technical Data:

1. Input: Phase Voltage AC 57.7V ~ 289V; Line Voltage AC 100V ~500V; Current AC 1A~ 50A;

2. Input Configuration System: 3- phase 3- wire; 3- phase 4- wire;

3. Linear Measurement Range: Voltage 20% - 100% of rated input voltage; Current 1% - 100% of rated input current; Power Factor: -0.1 – 1.0 -0.1;

4. Input Frequency: 50Hz;

5. Short Time Over Load Capacity: 2 times of input voltage, continuous 1 second, interval 10 seconds; repeat 10 times; 20 times of input current, continuous 1 second, interval 300 seconds, repeat 5 times;

6. Output Types: One channel RS 485; 2 – Channel analogue quantities;

7. Analogue Output Specifications: DC Voltage output:2.5V±2.5V; 0-5V; 1..5V;3V±2V; DC Current:10mA ± 10mA; 0-20mA; 4-20mA; 12mA±8mA;

8. Output Parameters:E,R,PQ,C,S,Ua,Ub,Uc,Uab,Ubc,Uac,Ia,Ib,Ic,Pa,Pb,Pc,Qa,Qb,Qc,Ca,Cb,CC,Sa,Sb,Sc

9. Accuracy Grade: Current, voltage 0.2% reactive/active power /power factor 0.5%

10. Response Time: 200ms;

11. Auxiliary Power Supply: DC 12V; DC 24V;

12. Static Current: 65mA;

13. Operating Temperature: 0-50 ℃;

14. Communication Protocol: Modbus – RTU;

15. Baud Rate: 300, 600, 1200,2400, 4800, 9600,19200,38400,57600,115200;

16. Parity Bit: odd, even, none;

17. EMC Index: Surge: power supply port, communication port, analogue output port, input port, ±2KV; Highest Grade: 3; EFT（Electrical Fast Transient）protection: ±2KV;

18. Stop Bit: Odd Parity 1 stop bit; Even Parity 1 stop bit; None Parity 1 stop bit; None Parity 2 stop bite;

19. Address: 1 – 247;

20. Voltage Insulation: dc 2500V; 1 minute;

21. Temperature Drift: 100 PPM;

22. Output Ripple: 10mV;

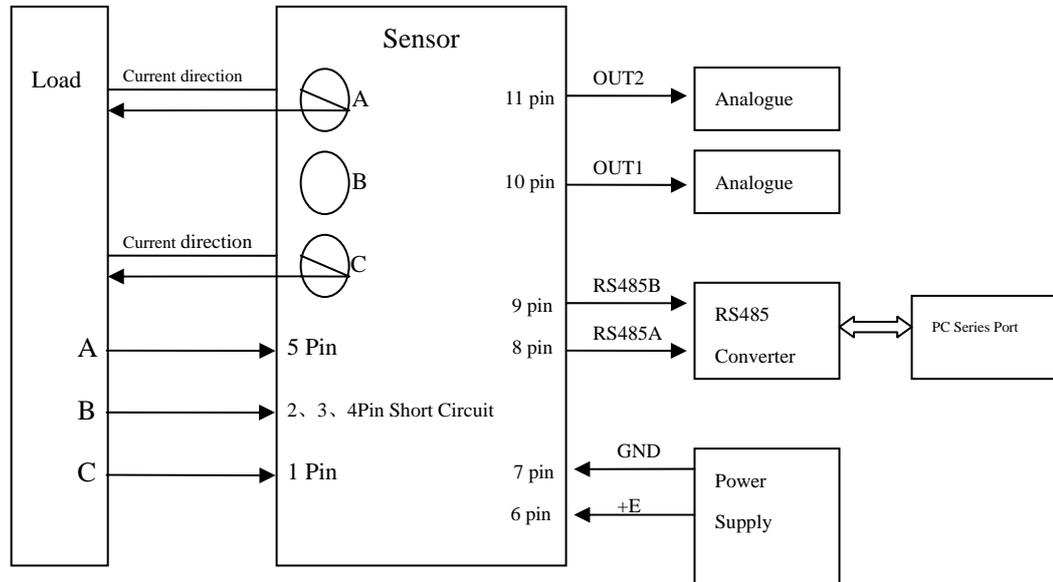23. Mounting: DIN Rail 35mm Mounting;

Communication Protocol

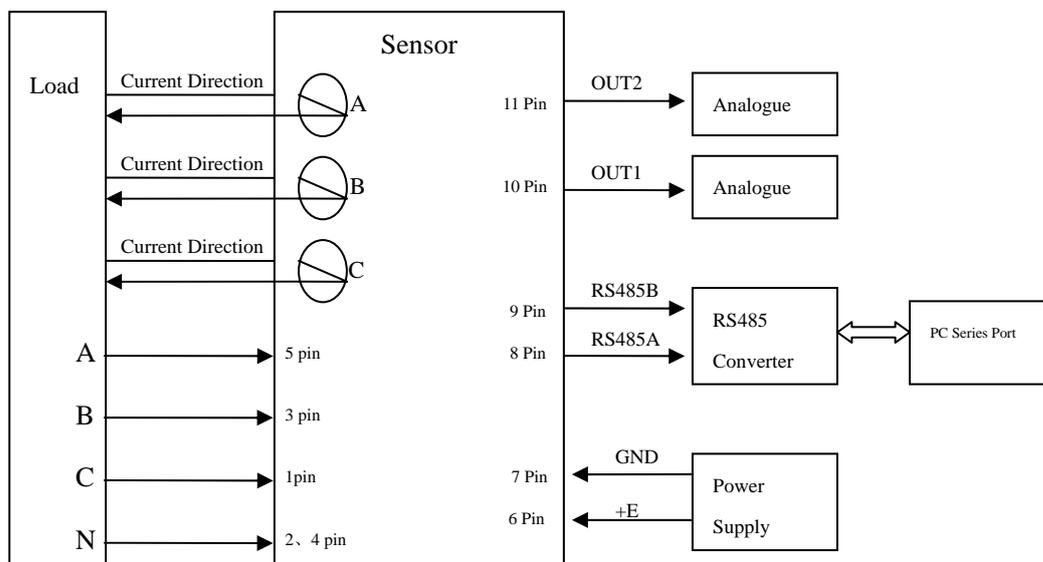| Order	Register Address	Content	Meaning	Byte
1	0	E	Active Energy	4
2	1			
3	2	R	Reactive Energy	4
4	3			
5	4	Psum	Total Active Power	2
6	5	Qsum	Total Reactive Power	2
7	6	Csum	Total Power Factor	2
8	7	Ssum	Total Apparent Power	2
9	8	Ua	A Phase Voltage	2
10	9	Ub	B Phase Voltage	2
11	10	Uc	C Phase Voltage	2
12	11	Uca	CA Line Voltage	2
13	12	Uab	AB Line Voltage	2
14	13	Ubc	BC Line Voltage	2
15	14	Ia	A Phase Current	2
16	15	Ib	B Phase Current	2
17	16	Ic	C Phase Current	2
18	17	Pa	A Phase Active Power	2
19	18	Pb	B Phase Active Power	2
20	19	Pc	C Phase Active Power	2
21	20	Qa	A Phase Reactive Power	2
22	21	Qb	B Phase Reactive Power	2
23	22	Qc	C Phase Reactive Power	2
24	23	Ca	A Phase Power Factor	2
25	24	Cb	B Phase Power Factor	2
26	25	Cc	C Phase Power Factor	2
27	26	Sa	A Phase Apparent Power	2
28	27	Sc	B Phase Apparent Power	2
29	28	Sc	C Phase Apparent Power	2

Note 1: Output parameters of WB9128-1 power transducer can be selected by the User. Its default settings of address is 1, baud rate is 9600 bps and 1 stop bit. If the user needs other settings of communication address, baud rate, system types, output parameters and output specifications, WB9128-1 can be configured by configuration software, please refer to 《 WB9128-1 upper computer user configuration manual 》。

Right Use of WB9128-1

1. Wiring: 3- phase 3 - wire (notice: the user needs short circuit of pin 2, pin3, pin 4 first, then connect with load

```
                          Sensor
                                                    OUT2
Load   Current direction    ⊘A          11 pin  ──────────→  Analogue

                             ○B          10 pin   OUT1  ────→  Analogue

       Current direction
                             ⊘C                    RS485B
                                          9 pin  ──────────→  RS485        ⟷   PC Series Port
 A  ──────────────→  5 Pin                8 pin   RS485A      Converter

 B  ──────────────→  2、3、4Pin Short Circuit

 C  ──────────────→  1 Pin                7 pin   GND  ←────  Power
                                          6 pin   +E   ←────  Supply
```

3-phase 4-wire

```
                          Sensor
                                                    OUT2
Load   Current Direction    ⊘A          11 Pin  ──────────→  Analogue

       Current Direction    ⊘B          10 Pin   OUT1  ────→  Analogue

       Current Direction    ⊘C
                                                   RS485B
                                          9 Pin  ──────────→  RS485        ⟷   PC Series Port
 A  ──────────────→  5 pin                8 Pin   RS485A      Converter

 B  ──────────────→  3 pin

 C  ──────────────→  1pin                 7 Pin   GND  ←────  Power
                                          6 Pin   +E   ←────  Supply
 N  ──────────────→  2、4 pin
```

2. **RS 485 output data calculation method**

Rx is parameter value returned by register; Umax represents rated voltage value; Imax represents rated current value.

3 –phase 3-wire calculation

Parameter Name	Calculation Method	Data Format	Parameter Content
Line Voltage	Rx×Umax/$\sqrt{3}$×0.0001	Unsigned Integer	Uca,Ubc,Uab
Current	Rx×Imax×0.0001	Unsigned Integer	Ia,Ic
Power Factor	Rx×0.0001	Signed Integer	COSφ
Total Active Power	Rx×Umax×Imax×$\sqrt{3}$×0.0001	Signed Integer	Psum
Total Reactive Power	Rx×Umax×Imax×$\sqrt{3}$×0.0001	Signed Integer	Qsum
Total Apparent Power	Rx×Umax×Imax×$\sqrt{3}$×0.0001	Unsigned Integer	Ssum

3-phase 4-wire calculation

Parameter Name	Calculation Method	Data Format	Parameter Content
Phase Voltage	Rx×Umax×0.0001	Unsigned Integer	Ua,Ub,Uc,
Line Voltage	Rx×Umax/$\sqrt{3}$×0.0001	Unsigned Integer	Uca,Ubc,Uab
Current	Rx×Imax×0.0001	Unsigned Integer	Ia,Ib,Ic
Power Factor	Rx×0.0001	Signed Integer	COSφ, COSφa, COSφb, COSφc
Active Power	Rx×Umax×Imax× 0.0001	Signed Integer	Pa,Pb,Pc
Reactive Power	Rx×Umax×Imax× 0.0001	Signed Integer	Qa,Qb,Qc
Apparent Power	Rx×Umax×Imax×0.0001	Unsigned Integer	Sa,Sb,Sc
Total Active Power	Rx×Umax×Imax× 3×0.0001	Signed Integer	Psum
Total Reactive Power	Rx×Umax×Imax× 3×0.0001	Signed Integer	Qsum
Total Apparent Power	Rx×Umax×Imax×3×0.0001	Unsigned Integer	Ssum

3. **Analogue Output Data Calculation**

3-phase 3-wire

Output Parameter	Output Specification	Actual Output Value Calculation Formula U_z (Rated Output Line Voltage :V) I_z (Rated Output Current : mA)
Psum	0V～5V	Psum=(U_z-0)/5×(Ux×Ix×$\sqrt{3}$)
	1V～5V	Psum=(U_z-1)/4×(Ux×Ix×$\sqrt{3}$)
	2.5V±2.5V	Psum=(U_z-2.5)/2.5×(Ux×Ix×$\sqrt{3}$)
	3V±2V	Psum=(U_z-3)/2×(Ux×Ix×$\sqrt{3}$)
	0mA～20mA	Psum=(I_z-0)/20×(Ux×Ix×$\sqrt{3}$)
	4mA～20mA	Psum=(I_z-4)/16×(Ux×Ix×$\sqrt{3}$)
	10mA±10mA	Psum=(I_z-10)/10×(Ux×Ix×$\sqrt{3}$)
	12mA±8mA	Psum=(I_z-12)/8×(Ux×Ix×$\sqrt{3}$)
	0V～5V	Qsum=(U_z-0)/5×(Ux×Ix×$\sqrt{3}$)
	1V～5V	Qsum=(U_z-1)/4×(Ux×Ix×$\sqrt{3}$)

Qsum	2.5V±2.5V	Qsum=$(U_z-2.5)/2.5×(U_x×I_x×\sqrt{3})$
	3V±2V	Qsum=$(U_z-3)/2×(U_x×I_x×\sqrt{3})$
	0mA~20mA	Qsum=$(I_z-0)/20×(U_x×I_x×\sqrt{3})$
	4mA~20mA	Qsum=$(I_z-4)/16×(U_x×I_x×\sqrt{3})$
	10mA±10mA	Qsum=$(I_z-10)/10×(U_x×I_x×\sqrt{3})$
	12mA±8mA	Qsum=$(I_z-20)/8×(U_x×I_x×\sqrt{3})$
Csum	0V~5V	Csum=$(U_z-0)/5$
	1V~5V	Csum=$(U_z-1)/4$
	2.5V±2.5V	Csum=$(U_z-2.5)/2.5$
	3V±2V	Csum=$(U_z-3)/2$
	0mA~20mA	Csum=$(I_z-0)/20$
	4mA~20mA	Csum=$(I_z-4)/16$
	10mA±10mA	Csum=$(I_z-10)/10$
	12mA±8mA	Csum=$(I_z-12)/8$
Ssum	0V~5V	Ssum=$(U_z-0)/5×(U_x×I_x×\sqrt{3})$
	1V~5V	Ssum=$(U_z-1)/4×(U_x×I_x×\sqrt{3})$
	0mA~20mA	Ssum=$(I_z-0)/20×(U_x×I_x×\sqrt{3})$
	4mA~20mA	Ssum=$(I_z-4)/16×(U_x×I_x×\sqrt{3})$
Uab Ubc Uac	0V~5V	Uab、Ubc、Uca=$(U_z-0)/5×U_x$
	1V~5V	Uab、Ubc、Uca=$(U_z-1)/4×U_x$
	0mA~20mA	Uab、Ubc、Uca=$(I_z-0)/20×U_x$
	4mA~20mA	Uab、Ubc、Uca=$(I_z-4)/16×U_x$
Ia Ic	0V~5V	Ia、Ic=$(U_z-0)/5×I_x$
	1V~5V	Ia、Ic=$(U_z-1)/4×I_x$
	0mA~20mA	Ia、Ic=$(I_z-0)/20×I_x$
	4mA~20mA	Ia、Ic=$(I_z-4)/16×I_x$

3- Phase 4-wire

Parameter Name	Output Specifications	Actual Output Value Calculation Formula U_z (Rated Output Line Voltage :V) *I_z (Rated Output Current : mA)*
Psum	0V~5V	Psum=$(U_z-0)/5×(U_x×I_x×3)$
	1V~5V	Psum=$(U_z-1)/4×(U_x×I_x×3)$
	2.5V±2.5V	Psum=$(U_z-2.5)/2.5×(U_x×I_x×3)$
	3V±2V	Psum=$(U_z-3)/2×(U_x×I_x×3)$
	0mA~20mA	Psum=$(I_z-0)/20×(U_x×I_x×3)$
	4mA~20mA	Psum=$(I_z-4)/16×(U_x×I_x×3)$
	10mA±10mA	Psum=$(I_z-10)/10×(U_x×I_x×3)$
	12mA±8mA	Psum=$(I_z-12)/8×(U_x×I_x×3)$
Qsum	0V~5V	Qsum=$(U_z-0)/5×(U_x×I_x×3)$
	1V~5V	Qsum=$(U_z-1)/4×(U_x×I_x×3)$
	2.5V±2.5V	Qsum=$(U_z-2.5)/2.5×(U_x×I_x×3)$
	3V±2V	Qsum=$(U_z-3)/2×(U_x×I_x×3)$
	0mA~20mA	Qsum=$(I_z-0)/20×(U_x×I_x×3)$
	4mA~20mA	Qsum=$(I_z-4)/16×(U_x×I_x×3)$
	10mA±10mA	Qsum=$(I_z-10)/10×(U_x×I_x×3)$

	12mA±8mA	Qsum=(I_z-20)/8×(Ux×Ix×3)
Csum	0V~5V	Csum=(U_z-0)/5
	1V~5V	Csum=(U_z-1)/4
	2.5V±2.5V	Csum=(U_z-2.5)/2.5
	3V±2V	Csum=(U_z-3)/2
	0mA~20mA	Csum=(I_z-0)/20
	4mA~20mA	Csum=(I_z-4)/16
	10mA±10mA	Csum=(I_z-10)/10
	12mA±8mA	Csum=(I_z-12)/8
Ssum	0V~5V	Ssum=(U_z-0)/5×(Ux×Ix×3)
	1V~5V	Ssum=(U_z-1)/4×(Ux×Ix×3)
	0mA~20mA	Ssum=(I_z-0)/20×(Ux×Ix×3)
	4mA~20mA	Ssum=(I_z-4)/16×(Ux×Ix×3)
Ua Ub Uc	0V~5V	Ua、Ub、Uc=(U_z-0)/5×Ux
	1V~5V	Ua、Ub、Uc=(U_z-1)/4×Ux
	0mA~20mA	Ua、Ub、Uc=(I_z-0)/20×Ux
	4mA~20mA	Ua、Ub、Uc=(I_z-4)/16×Ux
Ia Ib Ic	0V~5V	Ia、Ib 、Ic=(U_z-0)/5×I_x
	1V~5V	Ia、Ib 、Ic=(U_z-1)/4×I_x
	0mA~20mA	Ia、Ib 、Ic=(I_z-0)/20×I_x
	4mA~20mA	Ia、Ib 、Ic=(I_z-4)/16×I_x
Pa Pb Pc	0V~5V	Pa、Pb、Pc=(U_z-0)/5×(Ux×Ix)
	1V~5V	Pa、Pb、Pc=(U_z-1)/4×(Ux×Ix)
	2.5V±2.5V	Pa、Pb、Pc=(U_z-2.5)/2.5×(Ux×Ix)
	3V±2V	Pa、Pb、Pc=(U_z-3)/2×(Ux×Ix)
	0mA~20mA	Pa、Pb、Pc=(I_z-0)/20×(Ux×Ix)
	4mA~20mA	Pa、Pb、Pc=(I_z-4)/16×(Ux×Ix)
	10mA±10mA	Pa、Pb、Pc=(I_z-10)/10×(Ux×Ix)
	12mA±8mA	Pa、Pb、Pc=(I_z-12)/8×(Ux×Ix)
Qa Qb Qc	0V~5V	Qa、Qb、Qc=(U_z-0)/5×(Ux×Ix)
	1V~5V	Qa、Qb、Qc=(U_z-1)/4×(Ux×Ix)
	2.5V±2.5V	Qa、Qb、Qc=(U_z-2.5)/2.5×(Ux×Ix)
	3V±2V	Qa、Qb、Qc=(U_z-3)/2×(Ux×Ix)
	0mA~20mA	Qa、Qb、Qc=(I_z-0)/20×(Ux×Ix)
	4mA~20mA	Qa、Qb、Qc=(I_z-4)/16×(Ux×Ix)
	10mA±10mA	Qa、Qb、Qc=(I_z-10)/10×(Ux×Ix)
	12mA±8mA	Qa、Qb、Qc=(I_z-20)/8×(Ux×Ix)
Ca Cb Cc	0V~5V	Ca、Cb、Cc=(U_z-0)/5
	1V~5V	Ca、Cb、Cc=(U_z-1)/4
	2.5V±2.5V	Ca、Cb、Cc=(U_z-2.5)/2.5
	3V±2V	Ca、Cb、Cc=(U_z-3)/2

Caution:

1. Pay attention to the auxiliary power information, especially the auxiliary power grade, and polarity, other wise will damage the product.

2. Pay attention to the wire connection; wrong terminal connection will cause malfunction of the product and even damage the product;

3. Don't dismantle the product, and carry with care to avoiding bump and fall of the product;

4. If the product has been using under the environment with strong magnetic field interference, please pay attention to the shield of input wire, and the output signal wire should be as short as possible. For product intensive installation, the space between each product should not be smaller than 10mm.

5. Only use identified terminals.

6. There is no lightening strike prevention circuit design in this product. For out door and hazardous environment using, please add protective alternatives.

7. This product uses fire prevent ABS crust, its temperature withstand is only limited as +85℃, higher than this limitation will cause the product deformation. Please use and store carefully.