

SI Series Sensor Indicator User Manual



Features:

- ⊙ TC / RTD / Analog signal universal input.
- ⊙ With display, alarm and current transmission function.
- ⊙ With RS485 communication function.
- ⊙ With color bar display function.
- ⊙ Universal power supply 100-240VAC.
- ⊙ With one-way ON/OFF control function.
- ⊙ With 24VDC auxiliary External supply voltage.

For your safety, please read following content carefully before you are using our meter!

■ Safe Caution

※ Please read the manual carefully before you use the temperature controller.

※ Please comply with the below important points.

⚠ Warning An accident may happen if the operation does not comply with the instruction.

⚠ Notice An operation that does not comply with the instruction may lead to product damage.

※ The instruction of the symbol in the manual is as below.

⚠ An accident danger may happen in a special condition.

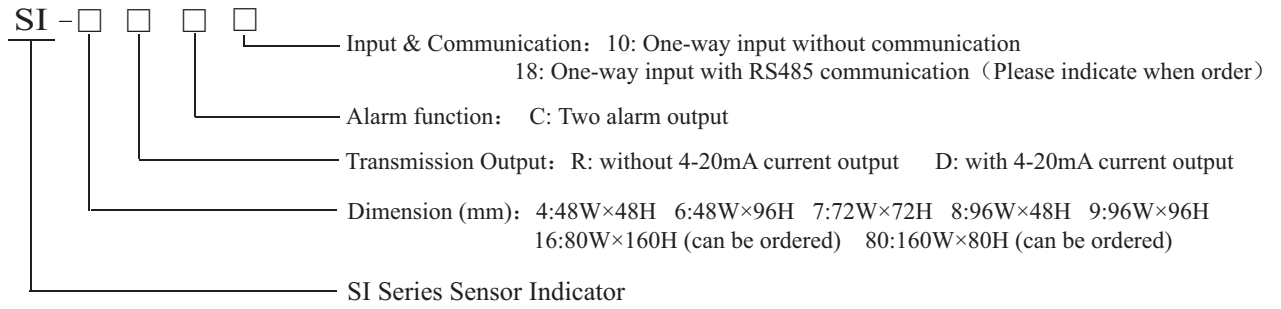
⚠ Warning

1. A safety protection equipment must be installed or please contact with us for the relative information if the product is used under the circumstance such as nuclear control, medical treatment equipment, automobile, train, airplane, aviation and equipment etc. Otherwise, it may cause serious loss, fire or person injury.
2. A panel must be installed, otherwise it may cause creepage (leakage).
3. Do not touch wire connectors when the power is on, otherwise you may get an electric shock.
4. Do not dismantle or modify the product. If you have to do so, please contact with us first. Otherwise it may cause electric shock and fire.
5. Please check the connection number while you connect the power supply wire or input signal, otherwise it may cause fire.

⚠ Caution

1. This product cannot be used outdoors. Otherwise the working life of the product will become shorter, or an electric shock accident may happen.
2. When you connect wire to the power input connectors or signal input connectors, the moment of the No.20 AWG (0.50 mm²) screw tweaked to the connector is 0.74n.m - 0.9n.m. Otherwise the connectors may be damaged or get fire.
3. Please comply with the rated specification. Otherwise it may cause electric shock or fire, and damage the product.
4. Do not use water or oil base cleaner to clean the product. Otherwise it may cause electric shock or fire and damage the product.
5. This product should be avoid working under the circumstance that is flammable, explosive, moist, under sunshine, heat radiation and vibration. Otherwise it may cause explosion.
6. In this unit it must not have dust or deposit, otherwise it may cause fire or mechanical malfunction.
7. Do not use gasoline, chemical solvent to clean the cover of the product because such solvent can damage it. Please use some soft cloth with water or alcohol to clean the plastic cover.

1. Model



2. Model Indication

Model		Transmission Output (BS)	ON/OFF Control Output (OUT) ①	Alarm	Communication
Size: 48×48	SI4-RC10	No	No	2 Alarm	No
	SI4-DC10	4-20mA transmit output	No	2 Alarm	No
	SI4-RC18	No	No	2 Alarm	RS485
	SI4-DC18	4-20mA transmit output	No	2 Alarm	RS485
Other Size	SI□-RC10	No	Relay output	2 Alarm	No
	SI□-DC10	4-20mA transmit output	Relay output	2 Alarm	No
	SI□-RC18	No	Relay output	2 Alarm	RS485
	SI□-DC18	4-20mA transmit output	Relay output	2 Alarm	RS485

Note: ①: ON/OFF Control Output (OUT) : Transmission measured value is less than the input set value, the relay contact closure;
measured values greater than the set value, the relay contacts disconnect.

3. Main Technical Parameters

1. Whole controller parameters

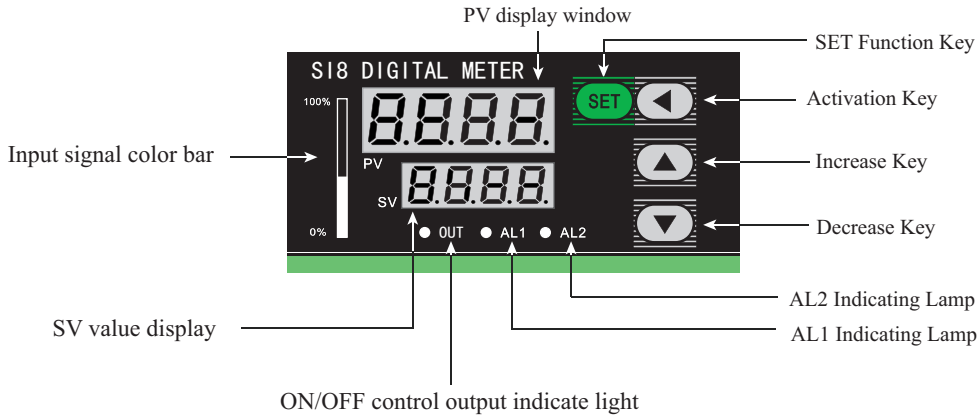
Power Supply	100~240V AC/DC 50/60Hz
Total Current	<30mA (220VAC/50Hz)
Transmission Output (BS)	4~20mA transmit current, Load Resistance 600Ω max
Alarm Output	Relay output load ability: 1A/230VAC
ON/OFF control output (OUT)	Relay output load ability: 3A/230VAC
Auxiliary Voltage Output	DC 24V<30mA
Dielectric Strength	The inter-communal dielectric between Supply-side, relay contacts, the signal input terminal higher than 2000VAC 50Hz 1Min
Communication Function	RS485 Communication MODBUS RTU Protocol
Panel Protection Level	IP65
Working Condition	0~50℃ 45~80RH%
Storage Condition	-10~60℃ 25~85RH%

2. Input signal table

No.	Symbol	Input signal	Measuring range	Resolution	Accuracy	Input impedance
0	K	K type thermocouple	-50~1300℃	1℃	0.3%FS±3digits	>100KΩ
1	J	J type thermocouple	-50~1200℃	1℃	0.3%FS±3digits	>100KΩ
2	E	E type thermocouple	-50~1000℃	1℃	0.3%FS±3digits	>100KΩ
3	T	T type thermocouple	-50~400℃	1℃	0.3%FS±3digits	>100KΩ
4	B	B type thermocouple	600~1800℃	1℃	0.3%FS±3digits	>100KΩ
5	R	R type thermocouple	-10~1700℃	1℃	0.3%FS±3digits	>100KΩ
6	S	S type thermocouple	-10~1600	1℃	0.3%FS±3digits	>100KΩ
7	N	N type thermocouple	-50~1200℃	1℃	0.3%FS±3digits	>100KΩ
8	PT	PT100	-199.9~850.0℃	0.1℃	0.3%FS±3digits	(0.2mA)
9	JPT	JPT100	-199.9~500.0℃	0.1℃	0.3%FS±3digits	(0.2mA)
10	CU50	CU50	-50.0~150.0℃	0.1℃	0.3%FS±3digits	(0.2mA)
11	CU100	CU100	-50.0~150.0℃	0.1℃	0.3%FS±3digits	(0.2mA)
12	V	Linear voltage 0-50mV	-1999~9999	1digits	0.2%FS±3digits	>100KΩ
13	I	Linear current 4-20mA	-1999~9999	1digits	0.2%FS±3digits	<150Ω
14	V	Linear voltage 0-10V	-1999~9999	1digits	0.2%FS±3digits	>100KΩ
15	R	Linear resistance 0-400Ω	-1999~9999	1digits	0.2%FS±3digits	(0.2mA)

Note: ① SI4 series Model should change inner circuit when use 4-20mA current input, there is no adjust after production, this should be indicated when you are ordering

4. Panel indication

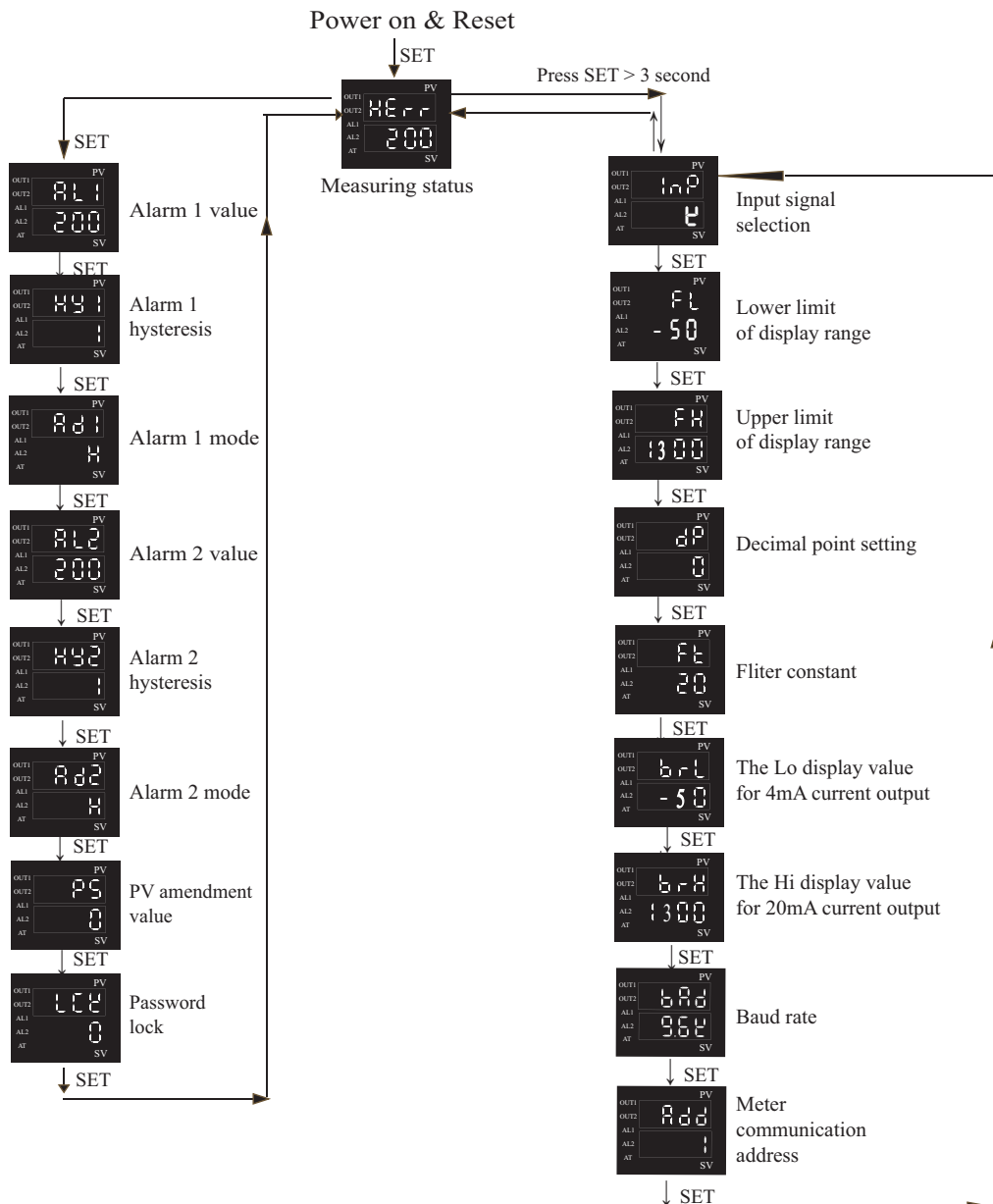


PV Display Window:
Measuring Value or parameter code Display Window
SV Display Window:
ON/OFF control Setting Value and parameter Display Window
AL1: Alarm output indication, light on: alarm is on,
light off: alarm is off.
AL2: Alarm output indication, light on: alarm is on,
light off: alarm is off.
COMM: Communication indicating lamp, when it is flashing,
communication is working.
OUT: Control output indicating lamp, light on: output,
light off: no output.
Color bar: there is no bar on SI4 series model because
of size

5. Panel Key Operation

- (1) SET key: In normal display status, press SET key to show setting menu, press SET key for a few seconds to show advanced setting menu. Under the condition of modifying SV and Parameter Value, SET should be pressed after each changing
- (2) ◀ key: press ◀ key to make the parameters to flicker, the parameters can be changed.
- (3) ▲ key: Under the condition of modifying SV and Menu parameter, press this key less than 3 seconds can slowly increase value, on the contrary, press this key more than 3 seconds can quickly increase value
- (4) ▼ Key: Under the condition of modifying SV and Menu parameter, press this key less than 3 seconds can slowly decrease value, on the contrary, press this key more than 3 seconds can quickly decrease value

6. Operation Sequence



7. Primary Menu

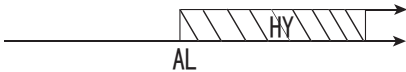

Parameter name	Indication	Setting range	Ex-factory setting
AL1	Alarm 1 value	FL-FH	200
HY1	Alarm 1 hysteresis	0-1999	1
Ad1	Alarm 1 mode: L: Inverse (Low limit);, H: Direct (High limit)	L/H	H
AL2	Alarm 2 value	FL-FH	600
HY2	Alarm 2 hysteresis	0-1999	5
Ad2	Alarm 2 mode: L: Inverse (Low limit);, H: Direct (High limit)	L/H	L
PS	PV measured value amendment	-1000-1000	0
LCK	Password lock. If the units digit (4th digit from left to right) is 1, SV is prohibited to changed; if the tens digit (3rd digit) is 1, menu parameters are prohibited to changed (except for LCK menu).	0-255	0

8. Senior Menu

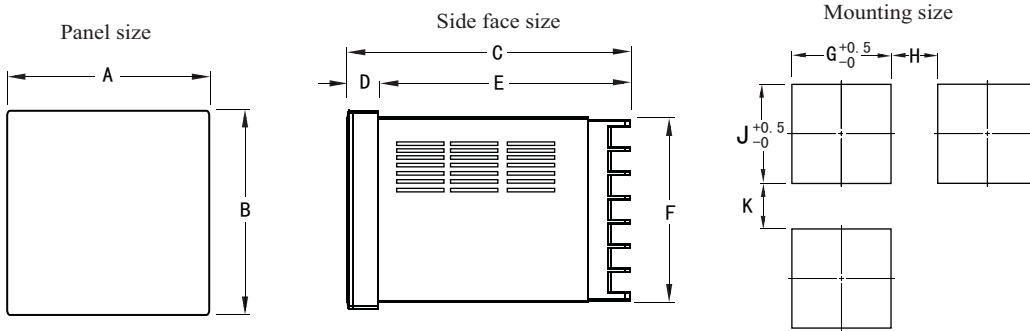
Parameter name	Indication	Setting range	Ex-factory setting
INP	Input signal type	①	K
FL	Lower display limit of input signal	②	-50
FH	Upper display limit of input signal	②	1300
dP	Display decimal point setting. Only effective for line voltage, current and resistance input.	0-3	0
Ft	Filter constant. The bigger the value is, the slower the display value changes. The smaller the value is, the faster the display value changes.	1-255	20
brL	The display value for lower limit of transmit current output	③	-50
brH	The display value for upper limit of transmit current output	③	1300
bAd	RS485 communication baud rate	4.8K, 9.6K	9.6K
Add	RS485 communication meter address	0-255	1

- Note:
- ① Reference page 2 to select parameter value;
 - ② Display up and low range setting,
TC signal input: setting in the range of measuring;
Analog signal input: setting in the range of -1999----9999;
 - ③ The range of transmit output be setting in the range of FL and FH, counter to 4--20mA Variable ratio output;

Alarm function table

Alarm code	Alarm mode	Alarm output (AL1, AL2 is independent with each other)
H	Direct (High limit)	
L	Inverse (Low limit)	

9. Appearance & Mounting Dimension



Model	A	B	C	D	E	F	G	H(Min)	J	K(Min)
SI4	48	48	97.5	6.5	91	45	45.5	25	45.5	25
SI6	48	96	97.5	9	88.5	89.5	45	25	92	25
SI7	72	72	97.5	9	88.5	67	67.5	25	67.5	25
SI8	96	48	97.5	9	88.5	44.5	92	25	45	25
SI9	96	96	97.5	9	88.5	91.5	92	25	92	25
SI80	160	80	96	13	83	75.5	155.5	30	76	30
SI16	80	160	96	13	83	155	76	30	155.5	30
Note	Unit:(mm) Tolerance +0.5%(special marked not be included)									

10. Connection Drawing

SI series sensor meter

Model: SI4

Accuracy: 0.3%FS ±3 digits 25°C

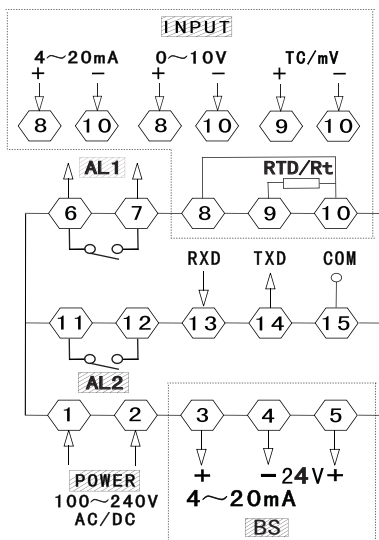
Temperature drift: ≤ 0.01%FS / °C

SI series sensor meter

Model: SI7

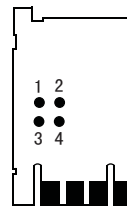
Accuracy: 0.3%FS ±3 digits 25°C

Temperature drift: ≤ 0.01%FS / °C



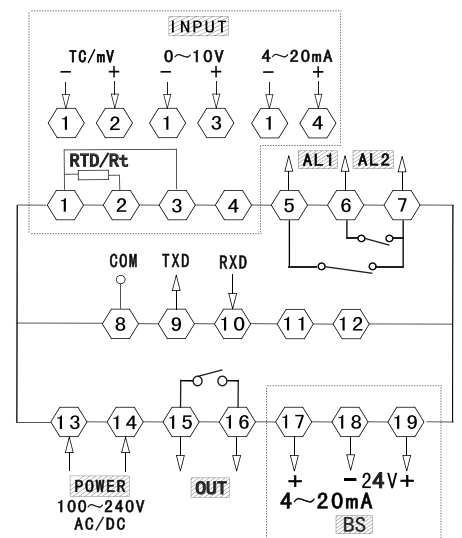
when SI4 input 4~20mA, should change signal manually it must connect as follow:

main board picture



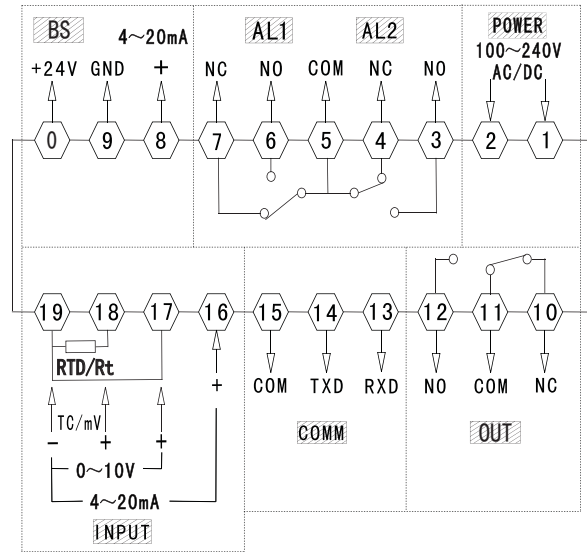
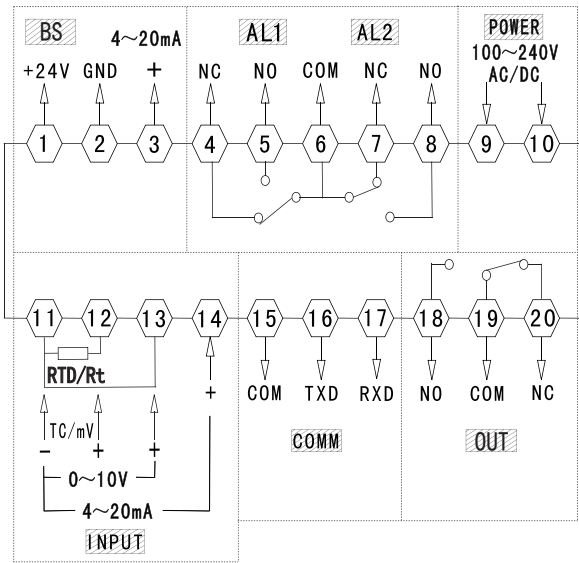
4~20mA: connect ② ④

Not 4~20mA: connect ③ ④



SI series sensor meter
 Model: SI 6/8/16/80
 Accuracy: 0.3%FS ±3 digits 25℃
 Temperature drift: ≤ 0.01%FS /℃

SI series sensor meter
 Model: SI 9
 Accuracy: 0.3%FS ±3 digits 25℃
 Temperature drift: ≤ 0.01%FS /℃



11. Simple Problem Shooting

Display Message	Shooting Method
Display HHHH	Input disconnect or over upper limit, please check input signal, FH value and ambient working temperature.
Display LLLL	Input disconnect or under lower limit, please check input signal, FL value and ambient working temperature.

12. Communication

SI series sensor meter follow Modbus RTU communication protocol, and it can run RS485 half-duplex communication. Read function code is 0x03, write function code is 0x10, 16-bit CRC checking is applied.

Data Frame flag:

Start bit	Data bit	Stop bit	Check bit
1	8	2	None

1. Read Multiple Registers

For example: The host computer read the float number AL1 (The value of Alarm 1 is 15.4).

The address code of AL1 is 0x0002,

for AL1 is float number (4bits), it will occupy 2 data register. Reference IEEE-574 standard the hexadecimal 16 result of the decimal float number is 0x41766666.

Request from the host computer (Read Multiple Registers)							
1	2	3	4	5	6	7	8
Unit Address	Function code	Start Address Hi	Start Address Lo	Data length Hi	Data length Lo	CRC code Lo	CRC code Hi
0x01	0x03	0x00	0x02	0x00	0x04	0xE05	0xC09

Correct answer from slave unit (Read Multiple Registers)								
1	2	3	4	5	6	7	8	9
Address	Function code	Data byte No.	Data1 Hi byte	Data1 Lo byte	Data2 Hi byte	Data2 Lo byte	CRC Code Lo	CRC Code Hi
0x01	0x03	0x04	0x41	0x76	0x66	0x66	0xE2	0xF4

2. Write Multiple Registers

For example: The host computer read the float number (setting value 600) ,

The address code for SV is 0x0000, for SV is float number (4bits), it will occupy 2 data register. Reference IEEE-574 standard the hexadecimal 16 result of the decimal float number is 0x41766666.

Request from the host computer (Write Multiple Registers)												
1	2	3	4	5	6	7	8	9	10	11	12	13
Unit address	Function Code	Start address Hi	Start address Lo	Data Length Hi	Data Length Lo	Data Length	Data 1 Hi	Data 1 Lo	Data 2 Hi	Data 2 Lo	CRC Lo	CRC Hi
0x01	0x10	0x00	0x00	0x00	0x02	0x04	0x44	0x16	0x00	0x00	0xFD	0xFC

Correct answer from slave unit (Read Multiple Registers)							
1	2	3	4	5	6	7	8
Unit address	Function Code	Start address 8 Hi	Start address 8 Lo	Data Length Hi	Data Length Lo	CRC Lo	CRC Hi
0x01	0x10	0x00	0x00	0x00	0x02	0x41	0xC8

SI Series table reference address

Code	Reference address	Number of Variable	Data Length	Read & Write allow	Remark
0	0x0000	Setting Value SV	2	R/W	
1	0x0002	Alarm value AL1	2	R/W	
2	0x0004	Alarm 1 Hysteresis HY1	2	R/W	
3	0x0006	Alarm value AL2	2	R/W	
4	0x0008	Alarm 2 Hysteresis HY2	2	R/W	
5	0x000A	PV amendment value	2	R/W	
6	0x000C	Display Lower Limit	2	R/W	
7	0x000E	Display High Limit	2	R/W	
8	0x0010	Transmission lower corresponding	2	R/W	
9	0x0012	Transmission higher corresponding	2	R/W	
10	0x0014	Measuring Value	2	R	
11	0x0016	1st Rd Alarm	1	R/W	①
12	0x0018	2nd Rd Alarm	1	R/W	①
13	0x001A	Lock	1	R	
14	0x001C	Input signal type	1	R	②
15	0x001E	Decimal point	1	R	
16	0x0020	Filter constant	1	R	
17	0x0022	Communication baud	1	R	③
18	0x0024	Communication address	1	R	

R: Read only; R/W: Read/Write

Parameter setting range , please according products user's manual

Note ① Alarm Model

Alarm Mode	LO Alarm	HI Alarm
Parameter	0	1

Note② In put signal (please reference to input parameter table)

Note ③ Communication baud

Data value	0	1
Baud rate BAD	4.8	9.6

16 digit CRC verify program

```
unsigned int Get_CRC(uchar *pBuf, uchar num)
{
    unsigned i,j;
    unsigned int wCrc = 0xFFFF;
    for(i=0; i<num; i++)
    {
        wCrc ^= (unsigned int)(pBuf[i]);
        for(j=0; j<8; j++)
        {
            if(wCrc & 1){wCrc >>= 1; wCrc ^= 0xA001; }
            else
                wCrc >>= 1;
        }
    }
    return wCrc;
}
```