TH Series Temperature and Humidity Controller User Manual

■ Features:

1. Adopt high accuracy digital temperature and humidity measurement sensor with temperature and humidity controller.
2. Display temperature and humidity, with two control output
3. With the function of PID heating, compressor delay cooling, ON/OFF humidification and dehumidification.
4. With RS485 communication function.

The instructions explain the instrument setting, connections, names and operations ect. Please read carefully before you use the TH Series Temperature and Humidity Controller. Please keep it properly for necessary reference.

KKTH-A01ET01-A0-20190415

14) Please don`t knock or rub the panel with rigid thing.
15)The readers of this manual should have basic knowledge of electrical,control, computer and communications.
16)The illustration, example of data and screen in this manual is convenient to understand,instead of guaranteeing the result of the operation.
17) In order to use this product with safety for long-term,regular maintenance is necessary. The life of some parts of the equipments are by some restrictions, but the performance of some will change for using many years.
18)Without prior notice, the contents of this manual will be change. We hope these is no any loopholes, if you have questions or objections, please contact us.

⚠ Caution of Install and Connection

1. Installation:
1) This product is used in the following environmental standards.
  (IEC61010-1) [Overvoltage category Ⅱ, Class of pollution 2]
2) This product is used in the following scope: surrounding environment, temperature, humidity and environmental conditions.
Temperature: 0~50℃, Humidity: 45~85%RH; Environment condition: indoor warranty, the altitude is less than 2000m.
3) Please avoid using in the following places:
The place will be dew for changing temperature;with corrosive gases and flammable gas;with vibration and impact;with water, oil, chemicals, smoke and steam facilities with Dust, salt, metal powder;and with clutter interference, static electric and magnetic fields,noise;where has air conditioning or heating of air blowing directly to the site; where will be illuminated directly by sunlight; where accumulation of heat will happen caused by radiation.
4) On the occasion of the installation, please consider the following before installation.
In order to protect heat saturated, please ensure adequate ventilation space.
Please consider connections and environment,and ensure that the products below for   more than 50mm space.
Please avoid to installed over the machine of the calorific value(Such as heaters, transformer, semiconductor operations, the bulk resistance).
In order to improve the anti - interference performance and security, please try to stay away from high pressure machines, power machines to install.
Don`t install on the same plate with high pressure machine and the product.
The distance should be more than 200mm between the product and power line.
The power machine should be installated as far apart as possible

⚠ Cable Caution

1) The temperature and humidity sensor should be used with controller, and connection cable must be connected correctly according to the connection diagram.
2) The temperature and humidity sensor is a digit I2C transmission. In order to improve the reliability, the cable length needs to be within 3m.

■ Safty Caution:

⚠ Warning

1) When the failure or abnormal of the products lead to a system of major accidents, please set the proper production circuit in the external.
2) Please don't pulg in before completing all the wire. Otherwise it may lead to electric shock, fire, fault
3) Not allow to use outside the scope of product specification, otherwise it may lead to fire, fault.
4) Not allow to use in the place where is imflammable and explosive gas.
5) Do not touch power terminal and other high voltage part when power on, otherwise you may get an electric-shock.
6) Do not disassemble, repair or alter this product,otherwise it may lead to electric shock, fire and malfunction.

⚠ Caution

1) The product should not be used in a nuclear facility and human life associated medical   equipment.
2) The product may occur radio interference when it used at home.You should take adequate countermeasures.
3)The product get an electric shock protection through reinforced Insulation. when the product is embedded in the devices and wiring, please subject to the specification of embedded devices.
4)In order to prevent surge occurs,when using this product in the place of over 30m indoor wiring and wiring in outdoor,you need to set the proper surge suppression circuitry.
5) The product is produced based on mounting on the disk.In order to avoid to touch the wire connectors,please take the necessary measures on the product
6) Be sure to observe the precautions in this manual, otherwise there is a risk of a major injury or accident.
7) When wiring, please observe the local regulation.
8) To prevent to damage the machine and prevent to machine failure, the product is connected with power lines or large
9) Please don't put metal and wire clastic mixed with this product,otherwise it may lead to electric shock, fire, fault.
10) Please tighten screw torque according to the rules.If not,it may lead to electric shock and fire.
11) In order not to interfere with this products to dissipate heat, please don't plug casing around the cooling vent hole and equipment.
12) Please don't connect any unused terminal.
13)Please do the cleaning after power off, and use the dry cleaning cloth to wipe away the dirt. Please don't use desiccant, otherwise, it may casue the deformation or discoloration of the product.

3) In order to avoid the effect of noise,please put the input dignal away from meter cable,power cable,load cable to wiring.
4) In order to reduce the power cables and the load power cables on the effect of this product,please use noise filter in the place where easy to effect.You must install it on the grounding of the disk if you use the noise filter,and make the wiring to be shortest between noise filter output side and power connectors.Don`t install fuse and switch on the wiring of noice filter output side,otherwise it will reduce the effect of noise filter.
5) It takes 5s from input power to output.If there is a place with interlocking actions circuit signal,please use timer relay.
6) Please use twisted pair with a shield for analog output line,to ensure the reliabilty of signal, if necessary.
7) Please use twisted pair with a shield for remote RS485 communication cable,and deal with the shield on the host side earth, to ensure the reliabilty of signal. You can add 120Ω termination matching resistor if necessary.
8) This product don't have the fuse; please set according to rated voltage 250V,rated current 1A if you need; fuse type:relay fuse.
9) Please use the suitable screw force and crimp terminal.
The screw terminal size: M3X8 (with 6.8X6.8 square base)
Recommended tightening torque: 0.4N.m
Proper cables: 0.25~1.65mm single cable/multiple core cable.
10) Please don`t put the Crimp terminal or bare wire part contact with adjacent connector.

■ Model:

TH 9 — R 18 - A ⟶ A: Code
→ 10:without communication 18:with RS485 communication
→ R : relay output S: SSR output D: DC 4-20MA
  (can be set to analog output)
→ 3: 72W*36H*70.5L 6: 48W*96H*100L 7: 72W*72H*100L
  9: 96W*96H*100L   80: 160W*80H*100L
→ TH Series Temperature and Humidity Controller

■ Main Parameter:

1) Parameters of temperature and humidity controller:

Sampling Speed	0.5, 1, 2, 4, 10 times/second (set by MPS menu)
Relay Capacity	AC 250V /2A, Lifetime > 100,000 times
Power Supply	AC/DC 100 ~ 240V (85-265V)

| Power consumption	< 6VA
Environment	Indoor temperature: 0 ~ 50℃ no condensation, Humidity < 85%RH, Altitude>2000m
Storage Environment	-10 ~ 60℃, no condensation
SSR output	DC 24V pulse voltage, Load<30mA
Current output	DC 4 ~ 20mA load< 500Ω
Communication	RS485, Modbus-RT protocol, maximum connect 30pcs
Insulation impedance	input, output, power VS meter cover > 20MΩ
ESD	IEC/EN61000-4-2 Contact ±4KV /Air ±8KV perf.Criteria B
Pulse traip anti-interference	IEC/EN61000-4-4 ±2KV perf.Criteria B
Surge immunity	IEC/EN61000-4-5 ±2KV perf.Criteria B
Voltage drop & short interruption immunity	IEC/EN61000-4-29 0% ~ 70% perf.Criteria B
Isolation strength	Signal, output and power: 2000VAC 1min, between lower than 60V circuits, DC500V,1min
Total Weight	About 400g
Cover material	The shell and panel frame PC/ABS (Flame Class UL94V-0)
Panel material	PET(F150/F200)
Power failure memory	10 years, writing times: 1 million times
Panel Protection level	IP65(IEC60529)
Safety Standard	IEC61010-1, Overvoltage category Ⅱ, pollution level 2, Level Ⅱ (Enhanced insulation)

2) Parameters of temperature and humidity sensor:

| Power Supply	Minimum value 3.3V, Maximum value 5.5V
Temperature range	Physical range: -40.0 ~ 1250.0 ℃, safe range: -40 ~ 80.0℃, resolution: 0.1℃
Humidity range	0.0 ~ 100.0% RH; Resolution: 0.1%RH
Temperature accuracy	Within 0.0 ~ 80.0℃ Typical value ±0.2℃ Max value: ±0.4℃
Humidity accuracy	within 0.0 ~ 90.0%RH Typical value: ±2%RH Max value: ±2.5%RH
Wire length	Standard: 2M; The maximum lead length of the controller is less than 3 meters
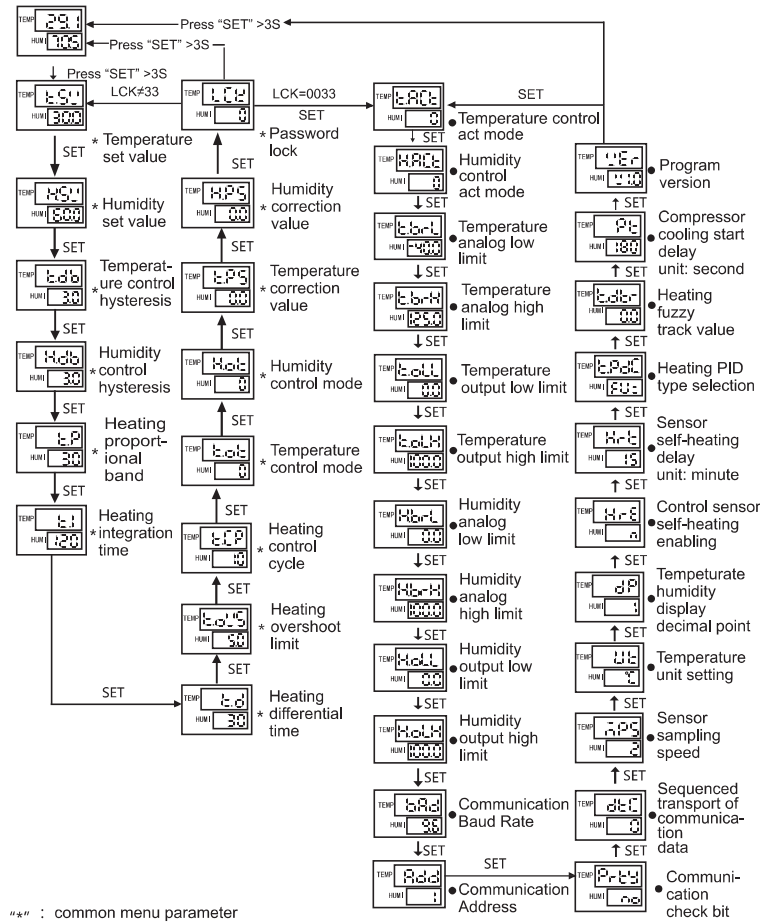
3) Isolation diagram
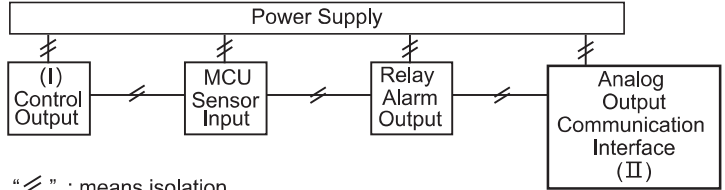
"⚡" : means isolation
Notes: when the output between (Ⅰ)&(Ⅱ) is SSR output, it is not insulated; when it is relay output,it is insulated.

■ Name of Universal Panel
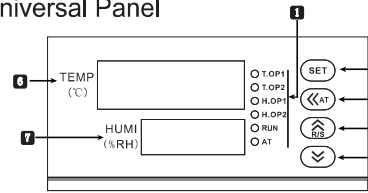
No.	Symbol	Name	Function
1	T.OP1	T.OP1 light (red)	Temperature control output indicator, when output, the light is on
	T.OP2	T.OP2 light(red)	Reserve
	H.OP1	H.OP1 light(red)	Humidity control output indicator, when output, the light is on
	H.OP2	H.OP2 light(red)	Reserve
	RUN	Run indicate light (green)	When the light is on, control is runing. Light is off, stop control output.
	AT	AT indicate light (green)	PID auto-tuning indicate light, it indicates auto-tuning status when light is on
2	SET	SET function key	Menu key/confirm key, enter or exit modified mode or confirm modification.
3	≪AT	Shift AT key	Activate/shift key/AT auto-tuning key,long press it to enter/exit auto-tuning under measure control mode
4	⌃ R/S	Increase key /R/S	Increase key, long press it to shift RUN/STOP mode under measure control mode.
5	⌄	Decrease	Decrease key
6	TEMP	Temperature Display (red)	Temperature measure value or parameter code display window
7	HUMI	Humidity Display (green)	Humidity measure value or parameter value display window

a. In the normal measurement control mode after power on, long press " SET " key for more than 3s to enter the menu parameter view mode.
b. In the menu view mode, short press " SET " key to check common menu parameters in cycle.
c. In the menu view mode, short press the " <<AT " key to flash the displayed menu parameter value to enter the parameter modification mode, and each short press can move one bit to the left in cycle.
d. In the parameter modification mode, each short press the " ⌃ " or " ⌄ " key can increase or decrease the flashing data one by one.
e. Under parameter modify mode, after parameter modification, short press SET key to confirm modified parameters, and exit to the menu view mode.
f. In normal measure control mode, long press <<AT key for more than 3s to enter heating PID auto-tuning status. In auto-tuning, TEMP display value should be smaller than the T.SV1 value.
h. Under normal measure control mode, long press ⌃ key more than 3s to enter or exit the Run or Stop mode.

2) Menu illustration

No.	Menu Name	Description	Setting Range	Factory Setting
1	TEMP(℃)	Measuring temperature display value, unit ℃ or ℉		
2	HUMI (%RH)	Measuring humidity display value, unit %RH		
3	T.SV	Heating set value, when OT= 0 or P=0, it means ON/OFF control, not PID control. TEMP< T.SV1-T. DB starts heating output, when TEMP≥ T.SV1, it stops heating. When PID control heating, the value is PID control target set value.	-40.0 ~ 125.0 or -40.0 ~ 257.0	30.0
4	H.SV1	Humidifying set value, humidifying control is ON/ OFF mode; When HUMI< H.SV1-H.DB, it will start humidify output, when HUMI≥H.SV1, it will stops humidifying output.	0.0 ~ 100.0	60.0
5	T.DB	Temperature control backlash should be used matching with temperature control, note:when the value is negative, it will be treated as an absolute value.	-30.0 ~ 30.0	3.0
6	H.DB	Humidity control hysteresis should be used matching with humidity control. Note: when the value is negative, it will be treated as an absolute value.	-30.0 ~ 30.0	3.0
7	T.P	Heating proportional band, the smaller setting value is the faster heating system, on the contrary, the slower. Increasing the proportional band to reduce the oscillation, but it will increase control deviation. Reduce proportional band can reduce control deviation, but may cause oscillation.	0 ~ 9999	30

■ Operation & menu

"*" : common menu parameter
"●" : project menu parameter

No.	Menu Name	Description	Setting Range	Factory Setting
8	T.I	Heating integration time, the value is smaller, the integral action is stronger. And themore it tends to eliminate the deviation from the set value. if the integral action is too weak, the deviation may not be eliminated.	0 ~ 9999	120
9	T.D	Heating differential time and reducing the differential action to a suitable value can prevent the system from oscillating. The value is larger, the differential action is stronger	0 ~ 9999	30
10	T.OVS	Heating overshoot limit, during PID control, when TEMP (measured value) > T.SV1 (set value) + T.OVS (overshoot), forcibly close the output. Note: the value is smaller, PID adjustment range is smaller, control stability is bad, please set suitable value accoring to actual situation.	0 ~ 100.0	5.0
11	T.CP	Heating control cycle, 1 is SSR control output, 4 ~ 255 is relay control output, unit: second	1 ~ 200	10
12	T.OT	Temperature control mode, 0: ON/OFF heating; 1: ON/OFF Cooling; 2: PID heating	0 ~ 2	0
13	H.OT	Humidifying control mode, 0:ON/OFF humidifying; 1:ON/OFF dehumidifying.	0 ~ 1	0
14	T.PS	Temperature correction value, display value= measured value + correction value	-30.0 ~ 30.0	0.0
15	H.PS	Humidity correction value, display value= measured value + correction value.	-30.0 ~ 30.0	0.0
16	LCK	Password lock function; 010: menu setting value only can be viewed and cannot be modified. If set as 0033 can enter to project parameter menu .	0 ~ 9999	0
17	T.ACT	Heating control mode: 0: relay or SSR output control; 1: reserve; 2: 4~20mA control output, can set according to selected meter configuration; 3: 4~20mA analog output.	0 ~ 3	0
18	H.ACT	Humidify control mode: 0: relay or SSR output control;1, 2: reserve; 3: 4 ~ 20mA analog output (36H*72Wmm without this function)	0 ~ 3	0

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| No.	Menu Name	Description	Setting Range	Factory Setting
19	T.BRL	Temperature analog range low limit: note: if the value is larger than the high limit of analog range, it is reverse analog output.	Refer to T.SV	-40.0
20	T.BRH	Temperature analog range high limit: note: if the value is smaller than the low limit of analog range, it is reverse analog output.	Refer to T.SV	125.0
21	T.OLL	Temperature output range low limit, limit output of low limit current amplitude, set value must be less than the high limit value.	-5.0 ~ 100.0	0.0
22	T.OLH	Temperature output range high limit, limit output of high limit current amplitude, set value must be larger than the low limit value.	0.0 ~ 105.0	100.0
23	H.BRL	Humidity analog range low limit: note: if the value is larger than the high limit of analog range, it is reverse analog output	0.0~ 100.0	0.0
24	H.BRH	Humidity analog range high limit: note: if the value is smaller than the low limit of analog range, it is reverse analog output	0.0~ 100.0	100.0
25	H.OLL	Humidity output range low limit, limit output of low limit current amplitude, set value must be less than high limit setting	-5.0~ 100.0	0.0
26	H.OLH	Humidity output range high limit, limit output of high limit current amplitude, set value must be large than low limit setting	0.0~ 105.0	100.0
27	BAD	RS485 baud rate 0: 4800; 1: 9600; 2: 19200	0 ~ 2	9.6
28	ADD	Communication Address	0 ~ 255	1
29	PRTY	Communication check bit sett, 0: NO checking,1: ODD checking, 2: EVEN checking	0 ~ 2	NO
30	DTC	Sequenced transport of communication data 000; 1st, 3rd bit, reserve function, 2nd bit is byte sequenced exchange	Reference to communication procotol	0
31	MPS	Sampling speeds: 0: 0.5 times, 1: 1 time, 2: 2 times,3: 4 times, 4: 10 times	0 ~ 4	2
32	UT	Temperature unit setting 25: ℃ 26 : ℉. Note: the unit setting is only for the temperature measurement signal.	C/F	℃
33	DP	Tempertaure and humidity set the dcimal point setting,reserve decimal bit	0 ~ 1	1
34	HRE	Control sensor self-heating enablity, when set to Y, the sensor starts to self-heating	N/Y	N

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35	HRT	Sensor self-heating delay time, unit: minutes	0 ~ 200	15
36	T.PDC	Heating PID type 0: FUZ fuzzy control PID,1: STD standard PID control	FUZ/STD	FUZ
37	T.DTR	Heating fuzzy track value, in some occasion, set the value appropriately to obtain a relatively stable control display value, which is independent of the actual measured value. Note: after seting the value, if the set value is equal to TEMP set value, the output execution is based on the actual measure value. Set it as 0 to close this function. Temperature unit: ℃ or ℉.	0 ~ 2.0	0.0
38	PT	Compressor cooling start delay time, unit: seconds	0 ~ 9999	0
39	VER	Software Version	--	--

■ Key function operation

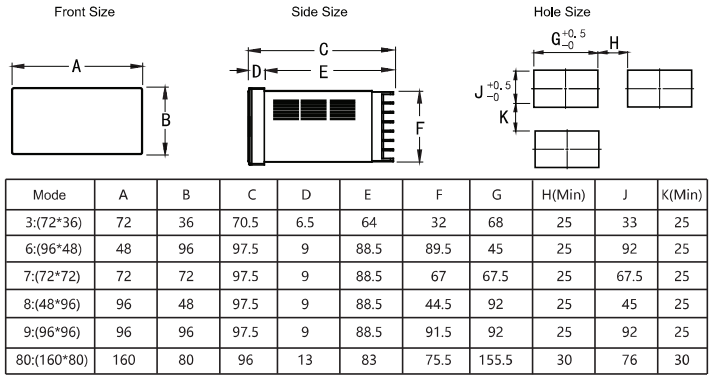1. Run and stop mode operation

   1) Under the measure mode, press ⚠ to enter stop mode; and the RUN indication light will be off; long press ⚠ to enter the run mode.

   2) Under run mode, all the output will work accoring to the specified requirements,and will stop output under stop mode.

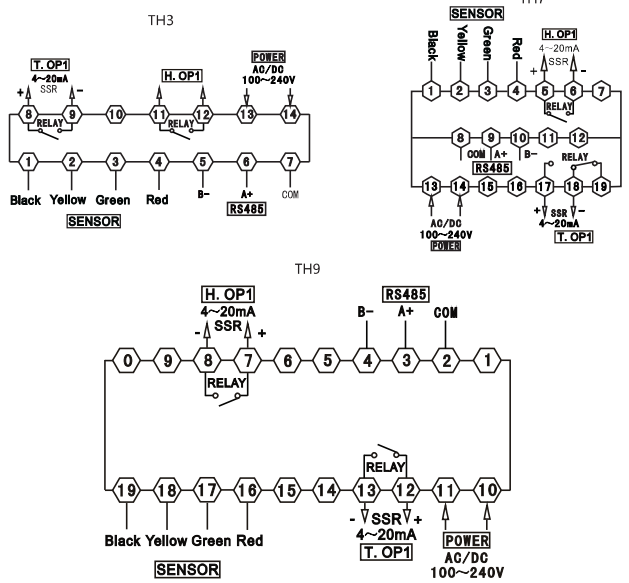2. PID parameter confirmation and auto-tuning operation

   1) Sometimes the default PID parameter setting is not suitable for the using occasion; please use auto-tuning function to get the suitable PID parameter.

   2) It will control output shortly after power is turned on, the product can be set to the stop mode first in order not affect the auto-tuniing result. Or temporarily disconnect the control output load power. Regardless of the operation, ensure that the T.SV value is bigger than the current TEMP value and the larger the difference, the better.

   3) Set the PID type and the T.SV value, the factory default setting is fuzzy PID.

   4) Set the PID control, when the output is 4-20mA, please set the output limit of OLL and OLH to the appropriate range factory default:OLL=0%,OLH=100%

   5) When the TEMP<T.SV value is at normal room temperature, exit the stop mode and connect the load power, and immediately press the "<<AT" key to enter the auto-tuning mode. At this time, the AT indicator lights is on.

   6) The auto-tuning will take a certain amount of time, in order not to affect the auto-tuning result, please do not modify the parameter or power off in the auto-tuning mode.

   7) When the AT light is off, it will exit the auto-tuning. The PID parameter will update automatically and automatic and accurate control will be performed.

   8) During auto-tuning, long press " <<AT" key, measure beyond the range, display abnormally, shift to Stop status, power-off etc will stop the auto-tuning.

   9) Note: In the place with current output amplitude limit, it may not get the best PID parameters even after auto-tuning.

   10) Experienced users can set a proper PID parameter accoding to their experience.

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■ Dimension and installation size

Mode	A	B	C	D	E	F	G	H(Min)	J	K(Min)
3:(72*36)	72	36	70.5	6.5	64	32	68	25	33	25
6:(96*48)	48	96	97.5	9	88.5	89.5	45	25	92	25
7:(72*72)	72	72	97.5	9	88.5	67	67.5	25	67.5	25
8:(48*96)	96	48	97.5	9	88.5	44.5	92	25	45	25
9:(96*96)	96	96	97.5	9	88.5	91.5	92	25	92	25
80:(160*80)	160	80	96	13	83	75.5	155.5	30	76	30

■ Connections

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TH80

H. OP1
- 4~20mA +
SSR
RELAY

B— RS485 A+   COM

(20) (19) (18) (17) (16) (15) (14) (13) (12) (11)

RELAY

(10) (9) (8) (7) (6) (5) (4) (3) (2) (1)

Black Yellow Green Red   - SSR +   POWER
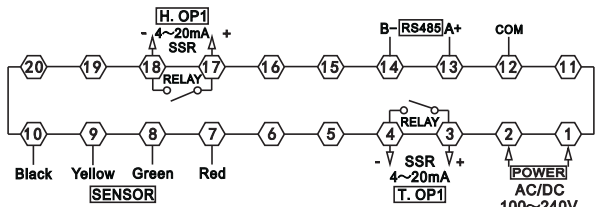SENSOR   4~20mA   AC/DC
                                  T. OP1   100~240V

Note: if have any change , please refer to the wire connection on the meter cover

■ Simple troubleshooting method

Display	Troubleshooting method
Err/HHHH	The sensor error or over the measuring range. Check whether the input is disconnected, the sensor is damaged, or measure range is beyond the sensor range

■ Communication Procotol

Meter adopt RS485 Modbus-RTU communication protocol, RS485 half duplex communication. Read function code: 0x03;write function code: 0x10/ 0x06. Adpots 16 digit CRC check, the meter does not return for error check.

Data Frame Format

Start Bit	Data Bit	Stop Bit	Check Bit
1	8	1	Setting in PRTY menu

Abnormal communication processing:
When abnormal response, put 1 on the highest bit of function code.For example:Host request function code 0x03,and slave response function code should be 0x83.

Error code:
0 x 01 --- Ilegal function: the function code sent from host is not supported by meter.
0 x 02 --- Illegal address: the register address designated by host beyond the address range of meter.
0 x 03 ---Illegal data: date value sent from host exceeds the corresponding data range of meter.
Communication cycle:
Communication cycle is the time from host request to slave response data . ie: communication cycle= time of request data sending +slave preparation time + response delay time + response return time.
Eg:9600 Baud rate:communication cycle of single measured data≥250ms.

1. Read Multi-register
Eg: Host reads the integer T.SV (set value 50.0)
The address code of T.SV1 is 0 x 2003. Because T.SV is integer (2 byte), seizes 1 data register. The memory code of decimal integer 50.0 x 10=500 is 0 x 01F4

Host Request (read multi-register)

1	2	3	4	5	6	7	8
Meter Add	Function Code	Start ADD High Bit	Start ADD Low Bit	Data Byte Length High Bit	Data Byte Length Low bit	※CRC Code Low Bit	※CRC Code High Bit
0x01	0x03	0x20	0x03	0x00	0x01	0x7F	0xCA

Slave Normal Answer (read multi-register)

1	2	3	4	5	6	7
Meter Add	Function Code	Data Byte	Data High Bit	Data Low Bit	※CRC Code Low Bit	※CRC Code High Bit
0x01	0x03	0x02	0x01	0XF4	0XB8	0X53

Function code abnormal answer (eg: host request ADD is 0x201E)

Slave Abnormal Answer (read multi-register)

1	2	3	8	9
Meter ADD	Function Code	Error Code	※CRC Code Low Bit	※CRC Code High Bit
0x01	0x83	0x02	0XC0	0XF1

2. Write Multi-register

Eg: Host writes the integer H.SV (set value 50.0)

The address code of H.SV is 0x2004, because SV is integer (2 byte), seizes 1 data register. The hexadecimal memory of decimal integer 50.0X10=500 is 0x01F4

Host Request (Write Multi-Register)

1	2	3	4	5	6	7	8	9	10	11
Meter ADD	Function Code	Start ADD High Bit	Start ADD Low Bit	Data Byte Length High Bit	Data Byte Length Low Bit	Data Byte Length	Data High Bit	Data Low Bit	※CRC Cpde Low Bit	※CRC Code High Bit
0x01	0x10	0x20	0x04	0x00	0x01	0x02	0x01	0xF4	0x86	0X01

Slave Normal Answer(Write Multi-Register)

1	2	3	4	5	6	7	8
Meter Add	Function Code	Start ADD High Bit	Start ADD Low Bit	Data Byte Length High Bit	Data Byte Length Low Bit	※CRC Code Low Bit	※CRC Code High Bit
0x01	0x10	0x20	0x04	0x00	0x01	0x48	0xC8

Host write single-register SV (setting value 150)

Host Request (write single-register)

1	2	3	4	5	6	7	8
Meter ADD	Function Code	ADD High Bit	ADD Low Bit	Data Byte Length High Bit	Data Low Bit	※CRC Code Low Bit	※CRC Code High Bit
0x01	0x06	0x20	0x04	0x01	0xF4	0x8A	0x1F

Slave Normal Answer (write single-register)

1	2	3	4	5	6	7	8
Meter ADD	Function Code	ADD High Bit	ADD Low Bit	Data Byte Length High Bit	Data Low Bit	※CRC Code Low Bit	※CRC Code High Bit
0x01	0x06	0x20	0x04	0x01	0xF4	0x8A	0x1F

Data location Error Answer (For example: host request ADD is 0 x 201F)

Slave Abnormal Answer (read multi-register)

1	2	3	8	9
Meter ADD	Function Code	Error Code	※CRC Code Low Bit	※CRC Code High Bit
0x01	0x90	0x03	0X0C	0x01

Meter Parameters ADD Reflection Form

No.	ADD Reflection	Variable Name	Register	Numerical Magnification	Read/Write	Remark
1	0x2000	TEMP Measurement Value	1	0.1/1	R	Decided by DP
2	0x2001	HUMI Measurement Value	1	0.1/1	R	Decided by DP
3	0x2002	Temperature and Humidity Decimal Point Setting DP	1	1	R/W	
4	0x2003	Temperature Setting Value T.SV	1	0.1	R/W	
5	0x2004	Humidity Setting Value H.SV	1	0.1	R/W	
6	0x2005	Temperature Control Hysteresis T.DB	1	0.1	R/W	
7	0x2006	Humidity Control Hysteresis H.DB	1	0.1	R/W	
8	0x2007	Temperature Shift Correction T.PS	1	0.1	R/W	
9	0x2008	Humidity Shift Correction H.PS	1	0.1	R/W	
10	0x2009	Temperature Analog Low Limit Setting Value T.BRL	1	0.1	R/W	
11	0x200A	Temperature Analog High Limit Setting Value T.BRH	1	0.1	R/W	
12	0x200B	Temperature Control Output Low Limit T.OLL	1	0.1	R/W	

Meter Parameters ADD Reflection Form

15	0x200C	Temperature Control Output High Limit T.OLH	1	0.1	R/W	
16	0x200D	Humidity Analog Value Low Limit H.BRL	1	0.1	R/W	
17	0x200E	Humidity Analog Value High Limit H.BRH	1	0.1	R/W	
18	0x200F	Humidity Output Amplitude Low Limit H.OLL	1	0.1	R/W	
19	0x2010	Humidity Output Amplitude High Limit H.OLH	1	0.1	R/W	
		Reserve				
20	0x2100	Heating Proportional Coefficient T.P	1	1	R/W	
21	0x2101	Heating Integration Time T.I	1	1	R/W	
22	0x2102	Heating Differential Time T.D	1	1	R/W	

Reserve

23	0x2103	Heating Overshoot Limit T.OVS	1	0.1	R/W	
24	0x2104	Heating Control Period T.CP	1	1	R/W	
25	0x2105	Temperature Control Method T.OT	1	1	R/W	
26	0x2106	Humidifying Control Method H.OT	1	1	R/W	
27	0x2107	Heating Control Execution Mode T.ACT	1	1	R/W	
28	0x2108	Humidifing Control Execution Mode H.ACT	1	1	R/W	
29	0x2109	Start Stop Operation	1	1	R/W	1: RUN 2: STOP 3: Start Auto-tuning 4: Stop Auto-tuning
30	0x210A	Temperature Unit Setting UNIT	1	1	R/W	
31	0x210B	Sensor Sampling Speed MPSL	1	1	R/W	
32	0x210C	Sensor Auto-heating HRE	1	1	R/W	
33	0x210D	Sensor Auto-heating Delay Time HRT	1	1	R/W	
34	0x210E	Compressor Cooling Start/ Delay Time PT	1	1	R/W	
35	0x210F	Communication Address ADD	1	1	R/W	
36	0x2110	Communication Baud Rate BAD	1	1	R	
37	0x2111	Communication Data Transmission Sequence DTC	1	1	R	
38	0x2112	Communication Check Bit Setting PRTY	1	1	R	Note②
39	0x2113	Heating PID Type T.PDC	1	1	R	
40	0x2114	Heating Fuzzy Tracking Value T.DTR	1	0.1	R	
41	0x2115	Password Lock Function LCK	1	1	R	
42	0x2116	Temperature and Humidity Controller Status STATUS	1	1	R	
43	0x2117	Temperature and Humidity Controller NAME	1	1	R	Note①

Note①: Output Status Indication

D7	D6	D5	D4	D3	D2	D1	D0
	ERR	RUN	AT		H.OP1		T.OP1

Note②: Sequenced transport and response delay of DTC communication data.
DTC: □ □ □ — Reserve
            — Sequenced transport byte: 0=1,2 1=2, 1
            — Reserve

※16 digits CRC check code get C 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;
}