

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. With temperature and humidity display, 4 loops control output
3. With the function of PID heating, compressor delay cooling, ON/OFF humidification and dehumidification.
4. RS485 communication function.

KKTH-A01E-A1-20240910

- 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 °C, 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 installed 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.
- 3) In order to avoid the effect of noise, please put the input signal away from meter cable, power cable, load cable to wiring.

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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.

■ Safe 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 pull 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 inflammable 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 cause the deformation or discoloration of the product.

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- 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 noise 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 reliability 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 reliability 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:

TH9□-RA18□-A

- 1 A: Version
- 2 A: Screw type sensor B: Rail type sensor C: Metal housing sensor
- 3 10: without communication 18: with RS485 communication
- 4 A: no alarm C: with 1 temperature & 1 humidity alarm
- 5 Blank: no output, R: relay output S: SSR output
D: DC 4-20mA analog output, V: DC 0-10V output
- 6 Blank: AC/DC 100 ~ 240V power, F: AC/DC 24V power (customized)
- 7 80: 160W*80H*100L 9: 96W*96H*100L 7: 72W*72H*100L
6: 48W*96H*100L 3: 72W*36H*70.5L
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Note: (1) Size 3 doesn't have alarm function,
(2) For size 7, when it is SSR output, it doesn't have alarm function.

■ Specification:

1) Parameters of temperature and humidity controller:

Sampling Speed	0.5, 1, 2, 4, 10 times (chosen by MPS menu)
Relay Capacity	AC 250V /2A, Life of rated load> 100,000 times
Power Supply	AC/DC 100 ~ 240V (85-265V)
Power consumption	< 6VA
Environment	Temperature of indoor: 0 ~ 50°C no condensation, Humidity < 85%RH, Altitude>2000m

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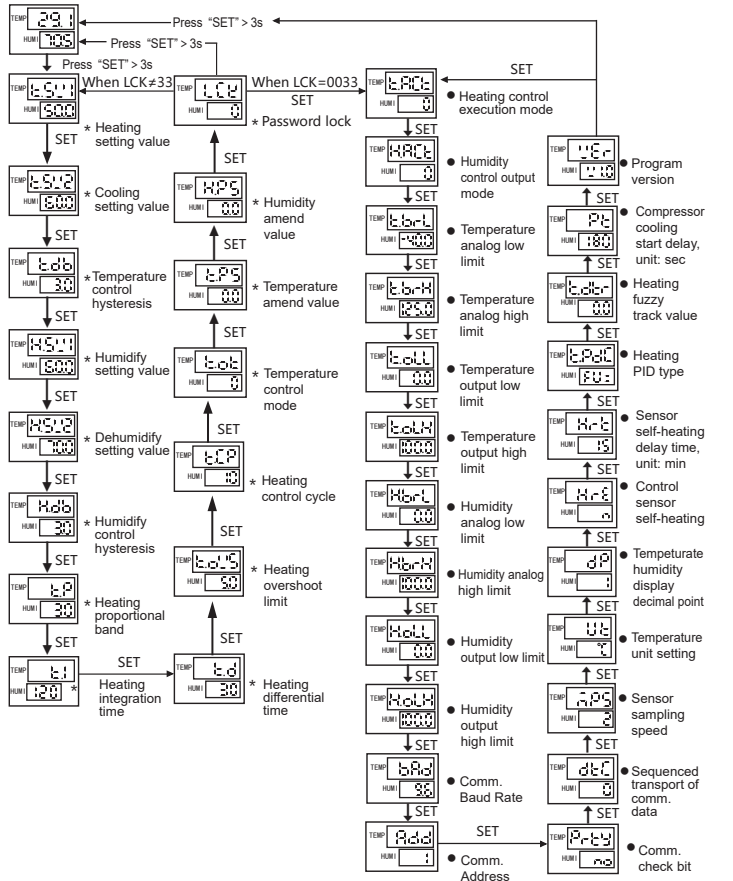
Storage Environment	-10 ~ 60℃, no condensation
SSR output	DC 24V pulse voltage, Load<30mA
Current output	DC 4 ~ 20mA load< 500Ω, temperature drift 250PPM
Communication	RS485, Modbus-RT protocol, max access 30 units
Insulation impedance	input, output, power VS meter cover > 20MΩ
ESD	IEC/EN61000-4-2 Contact ±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
Shell material	The shell and panel frame PC/ABS (Flame Class UL94V-0)
Panel material	PET(F150/F200)
Power failure memory	10 years, time of writing: 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 Measurement Range	Physical range: -40.0 ~ 125.0 ℃, safe range: -40 ~ 80.0 ℃, resolution: 0.1 ℃
Humidity Measurement Range	0.0 ~ 100.0% RH; Resolution: 0.1 ℃ RH
Temperature Accuracy	Within 0.0 ~ 80.0℃ Typical value ±0.2℃ Maximum value: ±0.4℃
Humidity Accuracy	within 0.0 ~ 90.0%RH Typical value: ±2%RH Maximum value: ±2.5%RH
Wire Length	Standard: 2M; The maximum length of the lead with the controller is less than 3 meters

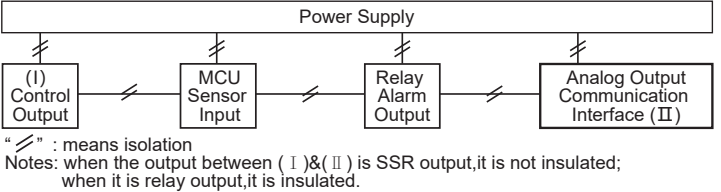
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VII. Operation & menu

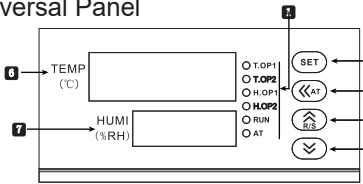


“*” : common menu parameter
“●” : project menu parameter

3) Isolation diagram



■ Name of Universal Panel



No.	Symbol	Name	Function
1	T.OP1	T.OP1 indicate light (red)	Heating output indicator, when the output is ON, the light is on
	T.OP2	T.OP2 indicate light (red)	Cooling output indicator, when the output is ON, the light is on
	H.OP1	H.OP1 indicate light (red)	Humidifying output indicator, when the output is ON, the light is on
	H.OP2	H.AL1 indicate light (red)	Dehumidifying output indicator, when the output is ON, the light is on
	RUN	Control- run indicate light (green)	It is runing when the light is on, it stops running when the ligh is off.
	AT	AT indicate light (green)	Heating PID auto-tuning indicate light,it indicates auto-tuning status when lighting on
2	SET	SET function key	Menu key/confirm key, to enter or exit modified mode or confirm modified parameters
3	<<AT	Shift AT key	Activation/shift key/AT auto-tuning key,long press 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 Window (red)	Temperature measurement value or parameter code display window
7	HUMI	Humidity Display Window(green)	Humidity measurement value or parameter value display window

- In the normal measurement control mode after power on, long press " SET " key for more than 3s to enter the menu parameter view mode.
- In the menu view mode, short press " SET " key to cycle to view the common menu parameters.
- 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; this cycle.
- In the parameter modification mode, each short press the " ⏶ " or " ⏷ " key can increase the flashing data bit by one or minus one.
- Under the parameter modify mode, after the parameters are modified, short press the " SET " key to ensure to save the parameters, and exit the menu view mode.
- In the normal measurement control mode, long press " <<AT " key for more than 3 sec to enter the heating PID auto-tuning state. The auto-tuning TEMP display value needs to be smaller than the T.SV1 value.
- Under the normal measurement control mode, long press " ⏶ " key for more than 3 sec to enter or exit the Run or Stop mode.

2) Menu illustration

No.	Menu Name	Description	Setting Range	Factory Setting
1	TEMP(℃)	Temperature measured value, unit ℃ or °F		
2	HUMI (%RH)	Humidity measured value, unit %RH		
3	T.SV1	Heating setting value, when OT= 0 or P=0, it is ON/OFF control, not PID control, when TEMP < T.SV1 - T.DB, heating output is on; when TEMP ≥ T.SV1, it stops heating. When it is set as PID heating control, this value is PID control target set value.	-40.0~125.0 or -40.0~257.0	50.0
4	T.SV2	Cooling setting value, The cooling modes include compressor cooling and ON OFF cooling. Compressor cooling method when TEMP ≥ T.SV2, the PT delay time is reached and the cooling output is started. When it is in ON OFF mode, the cooling output is directly started. Stop cooling output when TEMP<T.SV2-T.DB.	-40.0~125.0 or -40.0~257.0	60.0
5	T.DB	Temperature control hysteresis, it is used in concert 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.SV1	Humidity setting value, when it is set as ON/OFF humidifying control, when HUMI< H.SV1-H.DB, humidifying output is on, when HUMI≥H.SV1, it stops humidifying output.	0.0 ~ 100.0	60.0
7	H.SV2	Dehumidify setting value, when it is set as ON/OFF dehumidifying control, when HUMI≥H.SV2-H.DB, dehumidifying output is on, when HUMI< H.SV2, it stops dehumidifying output.	0.0 ~ 100.0	70.0
8	H.DB	Humidity control hysteresis, it is used in concert with humidity control. Note: when the value is negative, it will be treated as an absolute value.	-30.0 ~ 30.0	3.0

No.	Menu Name	Description	Setting Range	Factory Setting
9	T.P	Heating proportional band, the smaller the value is, the faster the system will respond, otherwise, it will be slower. Increasing the proportional band can reduce the oscillation, but the control deviation will be increased. Reducing the proportional band can reduce the control deviation, but it will cause oscillation.	0~9999	30
10	T.I	Heating integral time, the smaller the value is, the stronger the integral action will be, the smaller the deviation from the set value will be. If the integral action is too weak, the deviation may not be eliminated.	0~9999	120
11	T.D	Heating differential time, reduce the differential action to a suitable value can prevent the system from oscillation. The greater the value is, the stronger the differential action will be.	0~9999	30
12	T.OVS	Heating overshoot limit, during the PID control, when TEMP (measured value) > T.SV1 (set value) + T.OVS (overshoot), force to close output. Note: the smaller this value is, the smaller the PID adjustment range will be, the worse the control stability will be. Please set the appropriate value according to the actual situation.	0~100.0	5.0
13	T.CP	Heating control cycle, 1 is SSR control output, 4 ~ 255 is relay control output, unit: second	1~200	10
14	T.OT	Temperature control mode, 0: ON/OFF heating; 1: ON/OFF cooling; 2: PID heating	0~2	0
15	T.PS	Temperature amend value, display value= measured value + amend value	-30.0~30.0	0.0
16	H.PS	Humidity amend value, display value= measured value + amend value.	-30.0~30.0	0.0
17	LCK	Lock function; 010: menu set value can be checked only, cannot be modified. 0033: enter to advanced menu.	0~9999	0
18	T.ACT	Heating control output mode: 0: relay or SSR control output; 1: reserve; 2: 4~20mA control output (please set it according to the selected meter configuration); 3: change the 4~20mA control output into analog output	0~3	0

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19	H.ACT	Humidifying control output mode: 0: relay or SSR control output; 1, 2: reserve; 3: 4~20mA analog output (size 3 without this function)	0~3	0
20	T.BRL	Temperature analog output low limit, note: when T.BRL > T.BRH, it is inverted analog output.	Refer to T.SV1	-40.0
21	T.BRH	Temperature analog output high limit, note: when T.BRH < T.BRL, it is inverted analog output.	Refer to T.SV1	125.0
22	T.OLL	Temperature current output low limit, note: this value must be smaller than T.OLH.	-5.0 ~ 100.0	0.0
23	T.OLH	Temperature current output high limit, note: this value must be greater than T.OLL.	0.0 ~ 105.0	100.0
24	H.BRL	Humidity analog output low limit, note: when H.BRL > H.BRH, it is inverted analog output.	0.0~100.0	0.0
25	H.BRH	Humidity analog output high limit, note: when H.BRH < H.BRL, it is inverted analog output.	0.0~100.0	100.0
26	H.OLL	Humidity current output low limit, note: this value must be smaller than H.OLH.	-5.0~100.0	0.0
27	H.OLH	Humidity current output high limit, note: this value must be greater than H.OLL.	0.0~105.0	100.0
28	BAD	RS485 communication baud rate 0: 4800; 1: 9600; 2: 19200	0 ~ 2	9.6
29	ADD	Communication Address	0 ~ 255	1
30	PRTY	Communication check bit setting, 0: NO check, 1: ODD check, 2: EVEN check	0 ~ 2	NO
31	DTC	Communication data transport sequence 000; 1st, 3rd are function reserved, 2nd bit is byte sequence exchange	Refer to comm. protocol	0
32	MPS	Sampling speeds: 0: 0.5 times, 1: 1 time, 2: 2 times, 3: 4 times, 4: 10 times	0 ~ 4	2
33	UT	Temperature unit setting 25: °C, 26: °F. Note: the unit setting is only for the temperature measurement signal.	C/F	°C
34	DP	Decimal point setting, reserve decimal bit	0 ~ 1	1
35	HRE	Control sensor self-heating, when set to Y, the sensor starts to self-heating	N/Y	N
36	HRT	Sensor self-heating delay time, unit: minutes	0 ~ 200	15

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37	T.PDC	Heating PID type. 0:FUZ fuzzy PID control, 1: STD standard PID control	FUZ/STD	FUZ
38	T.DTR	TEMP fuzzy tracking value, properly set this value on some occasions, it can get a more stable control display value, this value is independent from the actual measured value. Note: after setting this value, when T.SV is equal to TEMP value, the control output operation is subject to the actual measured value. Set it as 0 to close this function. The temperature unit is: °C or °F.	0 ~ 2.0	0.0
39	PT	Compressor cooling start delay time, unit: seconds	0 ~ 9999	180
40	VER	Software Version	--	--

■ Key function operation

1. Run and stop mode operation

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

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

2. PID parameter confirmation and auto-tuning operation

1) The default PID parameter of factory 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 to affect the auto-tuning effect. Or temporarily disconnect the control output load power. Regardless of the operation, ensure that the T.SV1 value is greater than the current TEMP value and the larger the difference, the better.

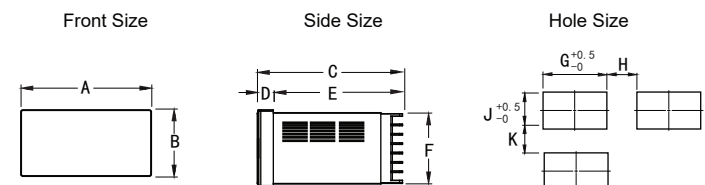
3) Set the PID type and the T.SV1 value, the factory default setting is fuzzy PID.

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<H.SV1 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 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.

■ Dimension and installation size

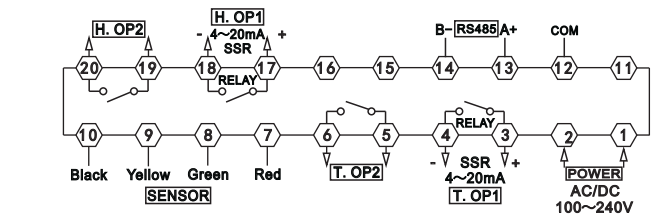


Mode	A	B	C	D	E	F	G	H(Min)	J	K(Min)
3:(72*36)	72	36	70.5	6.5	64	32	68	25	33	25
6:(96*48)	48	96	97.5	9	88.5	89.5	45	25	92	25
7:(72*72)	72	72	97.5	9	88.5	67	67.5	25	67.5	25
8:(48*96)	96	48	97.5	9	88.5	44.5	92	25	45	25
9:(96*96)	96	96	97.5	9	88.5	91.5	92	25	92	25
80:(160*80)	160	80	96	13	83	75.5	155.5	30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

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X. Connections



XI. Checking methods of simple fault

Display	Methods
Err/HHHH	Checks whether the sensor error or over the measuring range; whether the input disconnection and whether the sensor damages, working environment temperature inner the range of sensor measurement range

XII. Communication Protocol

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:

0x01--- Illegal function: the function code sent from host is not supported by meter.

0x02--- Illegal add.: the register address designated by host beyond the address range of meter.

0x03--- 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. For example: communication cycle= time of request data sending +slave preparation time + response delay time + response return time.

E.g.: 9600 baud rate: communication cycle of single measured data ≥ 250ms.

1. Read Multi-register

E.g.: Host reads the integer T.SV1 (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 50.0x10=500 is 0x01F4.

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 (e.g.: host request ADD is 0x 0x2010)

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

E.g.: Host writes the integer H.SV1 (set value 50.0)

The address code of H.SV1 is 0x2003, because SV is integer (2 byte), seizes 1 data register.

The hexadecimal memory code 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 Code Low Bit	※CRC Code High Bit
0x01	0x10	0x20	0x03	0x00	0x01	0x02	0x01	0xF4	0x87	0XB6
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	0x03	0x00	0x01	0xFA	0x09			

Host write single-register SV (set 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	0x03	0x01	0xF4	0x72	0x1D
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	0x03	0x01	0xF4	0x72	0x1D

Data location Error Answer (For example: host request ADD is 0x200F)

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 Measured Value	1	0.1/1	R	Decided by DP
2	0x2001	HUMI Measured Value	1	0.1/1	R	Decided by DP
3	0x2002	Temperature and Humidity Decimal Point Setting DP	1	1	R/W	
4	0x2003	Heating Set Value T.SV1	1	0.1	R/W	
5	0x2004	Cooling Set Value T.SV2	1	0.1	R/W	
6	0x2005	Temperature Control Hysteresis T.DB	1	0.1	R/W	
7	0x2006	Humidity Set Value H.SV1	1	0.1	R/W	
8	0x2007	Dehumidity Set Value H.SV2	1	0.1	R/W	
9	0x2008	Humidity Control Hysteresis H.DB	1	0.1	R/W	
10	0x2009	Temperature Amend Value T.PS	1	0.1	R/W	
11	0x200A	Humidity Amend Value H.PS	1	0.1	R/W	
12	0x200B	Temperature Analog Output Low Limit T.BRL	1	0.1	R/W	
13	0x200C	Temperature Analog Output High Limit T.BRH	1	0.1	R/W	
14	0x200D	Temperature Current Output Low Limit T.OLL	1	0.1	R/W	
15	0x200E	Temperature Current Output High Limit T.OLH	1	0.1	R/W	
16	0x200F	Humidity Analog Output Low Limit H.BRL	1	0.1	R/W	
17	0x2010	Humidity Analog Output High Limit H.BRH	1	0.1	R/W	
18	0x2011	Humidity Current Output Low Limit H.OLL	1	0.1	R/W	
19	0x2012	Humidity Current Output High Limit H.OLH	1	0.1	R/W	
Reserve						
20	0x2100	Heating Proportional Coefficient T.P	1	1	R/W	
21	0x2101	Heating Integral Time T.I	1	1	R/W	
22	0x2102	Heating Differential Time T.D	1	1	R/W	
23	0x2103	Heating Overshoot Limit T.OVS	1	0.1	R/W	
24	0x2104	Heating Control Cycle T.CP	1	1	R/W	

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

Note①: Output Status Indication

D7	D6	D5	D4	D3	D2	D1	D0
	ERR	RUN	AT	H.OP2	H.OP1	T.OP2	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;
}
```