TH-900 Series Temperature & Humidity Dual-loop Intelligence PID Controller

Instruction Manual (Ⅰ)

Thank you for purchasing our TH Series Temperature & Humidity Controller .This manual primarily describes that Precaution required in Installing and wiring the Controller. Before operating the product , read this manual through to acquire sufficient knowledge of the product .Please keep this manual close to you for reference

1、Attention

1.1 Please do not use the product in places where explosive or flammable gases may be present.

1.2 Please make sure that the load power supply is within the rating and terminal position is correct , before supplying power .Or else , the controller would be damage.

1.3 Disassembling , modifying and repairing the product is forbidden.

1.4 Please do not use the product in the following conditions:
   Places where temperature fluctuates dram-atically.
  ○ Places where humidity is high and condens-ation may occur.
  ○ Places where oscillation is drastic.
  ○ Places where there is caustic gases and dust.
  ○ Places where there is danger of splashing of water , oil or any
  ○ chemicals.

1.5 To avoid other interference , please keep the wiring supplied distance from high voltage wire and high voltaic power wire . Please make sure of terminal position is correct.

1.6 Please avoid eroding the product by organic liquor ,acid , alkali.

2.General characteristic

Power voltage:AC85-265V,50/60HZ(DC input 12-58V optional)

Power consumed: 5VA max

Control mode: PID,PD,PI,P,ON/OFF

Operation ambience temperature: -10-60℃

Operation ambience humidity:0-90%RH

Sampling time:150ms

(1) The controller with the special control systerm for Pt100 temp-erature measurement of wet and dry ball

(2) with two independent loops of measurement and control can carry out temperature and humidity control at the same time.

(3) The first loop is the PV1 loop which is designed to detect and control the temperature of dry ball.

(4) The second PV2 loop is the detection and control loop which is with the option of the wet-ball temperature or the relative value of the temperature.

(5) The first loop and the second loop can be independent to choose fixed-point measurement and display of screen opera-tion of Man-computer; also make the first or second loop circuit automatically display screen, and choose the time of circuit .

(6) Please be sure to choose fixed-point display , then carry out the following operation.Adjusting the Testing volume of a loop , modifing SV, entering manually or automatically switch, rechec-king, amending the value of PV and so on .

(7) The At function of PID parameter self-tuning; two loops can be independently activated At, can also be activated At at the same time .

(8)PV1, PV2, 2 loops are respectively with AL1, AL2 a group of the alarm output interface.If necessary, both of AL1 and AL2 interface can be thetransmission output which are choice for the value of relative humidity or dry-ball temperature, wet-ball temperature.

(9) The local with MODBUS or RS-485 communication.

(10)The local can be respectively amended the dry-ball temper-ature, wet-ball temperature or relative humidity values.

3.Operation Panel Function Description
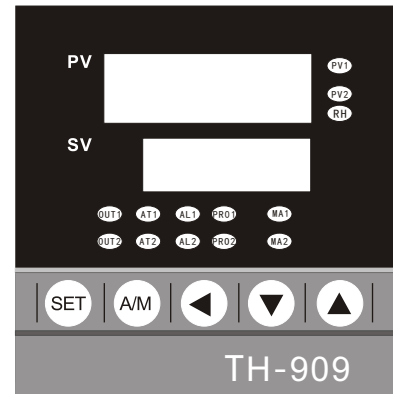
NO.	Front Panel	Instruction
1	PV	Display detecting value/model.
2	SV	Displayer Set value / Content model.
3	OUT1	Output 1 indicator
4	OUT2	Output 2 indicator
5	AT1、AT2	Automatic indicator
6	AL1	Alarm 1 indicator
7	AL2	Alarm 2 indicator
8	PV1(PV2 ,RH)	The present panel display the No. of loop indicator
9	MA1、MA2	Loop manual indicator
10	▲	Add key
11	▼	Reduce key
12	◄	Shift key
13	SET	Circle / Confirm key
14	A/M	Automatic/Manual key
15	PR01、PRO2	Slope control indicator

4.Signal Input / alarm mode selection table

Type of input	Symbol	Range
DPT100	dPt	0-100.0℃

Code	Instruction
0	Deviation high alarm
1	Deviation low alarm
2	Absolute value high alarm
3	Absolute value low alarm
4	Alarm in the region
5	Alarm out the region
6	Deviation low alarm (first time no alarm)
7	Absolute value low alarm (first time no alarm)
8	T/C broken alarm
9	In-band alarm (first time no alarm)

5.Panel Cutout / Overall Dimensions

● Panel cutout   ● Overall Dimensions
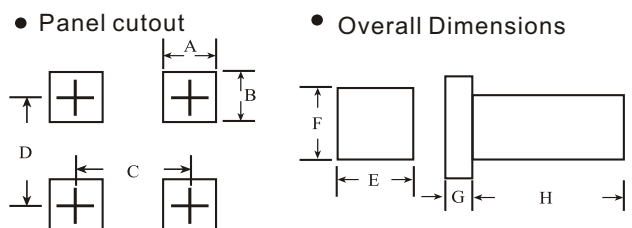
	A	B	C	D	E	F	G	H
TH-908	44+0.5	90+0.5	90	126	48	96	14	80
TH-909	90+0.5	90+0.5	126	126	96	96	14	80
TH-910	152+0.5	74-0.5	188	110	160	80	14	80

6.Connection instruction
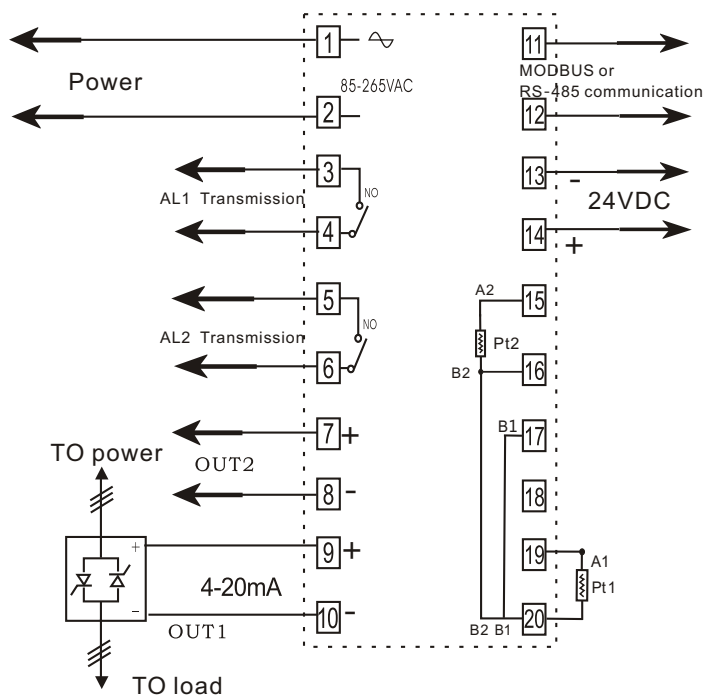
TH-909 or TH-908

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7.Error and Warning Messages

Error code	Instruction	Possible cause
⊔⊔⊔⌐	The first group sensor wire broken, electrode opposition, out the range. The first group input signal higher than USP	Check input signal Check the range of input whether reasonable
-00.0	The first group input signal lower than LPS	Check the range of input whether reasonable

8.Operating instruction

8.1 general operation

Step 1 : First loop input signal selection.

A , press SET KEY and SHIFT KEY at the same time ,into LEVEL 2.

B , Under INP , press SHIFT KEY one time then SV indicator lightning.

C , press ▲ KEY or ▼ KEY ,to choose input signal Pt Indexing.

D , press SET KEY to confirm.

E , press SET KEY and SHIFT KEY at the same time ,returne to LEVEL 0.
Second loop input signal selection.

A , Press SET KEY and ▼KEY at the same time.enter into LEVEL 3

B , Press SET KEY, choose IN2, choose Pt Indexing.

C , Press SET KEY to choose LS2 , set the minimum value of SV2.

D , Press SET KEY to choose US2, set the maximum value of SV2.

E , Choose NL2 to check 0 point of input range , input Pt=0Ω. Press SHIFT KEY(lighting),then press SET KEY to confirm.

F , Choose NH2, Pt=313.59Ω input the maximum value , press SHIFT KEY (lighting),then press SET KEY to confirm.set in the range of -200C-600C,then select the range at 0-100C.

G , Press SET KEY and ▼ KEY into LEVEL 0 , check the relationship bet-ween PV2 show value and input signal . If error , please input amend-value which is in PS2 unit of LEVEL 3 .

STEP 2: set alarm mode Ad1(the same can be set up Ad2)

A , Press SET KEY for 5 seconds for enter LEVEL 1.

B , Press SET KEY several times until enter into Ad1,then press SHIFT KEY one time , SV indicator lighting.

C ,Press ▲ KEY or ▼ KEY to choose alarm mode.(refer to the chart of alarm mode).

D , Press SET KEY to confirm amendation.

E , Press SET KEY for 5 seconds , return to LEVEL 0.

STEP 3: set the value of alarm AL1(the same wat to set up Ad2)

A , Press SET KEY several times until enter to Ad1, then press SHIFT KEY one time , the first figure on SV-display will lighting.

B , Press ▲ KEY or ▼KEY to set value , then press SHIFT KEY to enter the next figure , then set the value as the same way.

C , After setting value , then press SET KEY to confirm .

D , Press SET KEYfor 5 seconds , return to LEVEL 0.

E , There are two modes of alarm-output in the local .

1) Relay contact output

2)1-5V DC switching-voltage-output can drive with solid state relays SSR in the outside.

Note : As alarm mode 0 , 1 , 4 , 5 , 6, 9, the value of AL1,AL2 is the devi-ation of SV ; as mode 2 , 3 , 7 , the value is temperature of absolute value of alarm ; as mode 8 , there is no prescript ;AL 1 for the first input; AL2 for the second input .

Step 4 :set temperature control (SV)

A , Press SET KEY for several times,choose LOP,press SHIFT KEY, the first figure o SV-display will lighting,then press ▼ ▲ KEYS Choose "1",press SET KEYS for several times , return into $\frac{PV}{SV}$ is the display of the first fixed-point .

B , At this point , SV on the panel is the first set-value (SV1),PV is the first mea sure-value(PV1).Please press SHIFT KEY and ▼▲ KEYS for am-ending preset set-value of SV1.

C , And so on, LOP choose 2 , $\frac{PV}{SV}$ the fixed-point display the value of and SV2 , with the B operation to amend the set-value of SV2.

D , In the LEVEL 0,C-R unit,can choose the second display parameter,(tempe rature of wet-ball PV2 or humidity-value Rh%), On-line display of parameters is the second Charged-with- -parameter.

STEP 5: set automatic operation(AT)

A , Under LEVEL 0 , press SET KEY for several times until enter to AT .

B , Press SHIFT KEY, the first figure on SV-display lighting , then press ▲ KEY(4 modes can be chosen):

When At=0,two loops do not start At-function.

When At=1,only start the loop of PV1 to carry out At.

When At=2,only start the loop of PV2 to carry out At.

When At=3,start the loops of PV2 and PV1 at the same time, to carry out At.

C , After choosing the mode of At, the corresponding loop At1 or At2 is lighting , and will automatically be off at the end.

D , During pyrology parameter , AT operation will not fail.

Note :1 , Please make sure that you have finished setting SV , the value of PV is lower than the value of SV and the margin between SV and PV is lower than 15 degree . Then set AT.parameter is better.

2 , AT indicator off predicates that AT automatic operation is success . This means that the instrument system in accordance with the status quo has been automatically chosen a right group of PID control para- meters and Pro-system -parameters for working.

3 , Manual set parameter is necessary under some special conditions. (E.g. skyscraping quality of controller or can't use the AT operation.)

8.2. Further operation

8.2.1 The switch between manual and automatic without disturbing normal working effect under the display of fixed-point)

Press A/M key , MAN indicator lighting , enter into manual . The present value on SV display is percentage of output , the value of PV-display is measure value . Press ?key and ??key can manually amend percent-age of output . Then press A/M key , MAN indicator off , the controller enter into automatic , and SV-display show original set value , PV dis-play is measure value.

Remark : the controller could enter into manual and automatic in any condition.

8.2.2 Manually amend parameter of PID

Under Level 0 , press SET key for 5 seconds , enter into level 1, press SET key to choose parameter of P ,1, D or P1,I1,D1 and to set.In LEVEL2,3 , can amend tp1, U01 and tp2 , U02.

8.2.3 Amend display- room-temperature (effect under the display of fixed-point At inputting the graduation of T/C , if the terminal of input is short , the controller will display room temperature . If there is big discre-pancy between display value and actual value , then press SET key and ? key at the same time to enter into level 2 , then press SET key for several times until find PV1 , manually set and amend the value of Pv1 (increase or decrease); or enter into LEVEL3 to find PS2,to amend PV2.

8.2.4 Choosing transmission function (In transmission,the light of AL1 and AL2 is flashing.)The terminal of AL1 and AL2 can respectively be the alarm-output-interface of the first loop and the second loop as usual.Can be configured to two independent transmission-output in the terminal of Al1 and AL2, the content of their choice is from the configuration of the two units of TH and Th1.

8.2.5soft start preset slope control(selective)When your system need to start softly(SV preset slope temperature rise),please operate the controllers according to the following order:Set-up SV value under LEVEL0,Press SET KEY to find RAP item,set slope temperature value press SET KEY again to find Rt1 item,set slope time(mins)(for example :set slope 10C/mins,RA1 or Ra2 is setted as 10.0,RT1 or Rt2 is setted as 001.0) set up done,soft start will temperature up from present PV value according to slope until PV=SV,then stop.

Here are RAI,RT1 and RA2,RT2 two slope preset untils in LEVEL0 Process, for the first loop and second loop to preset indenpendently.

Note:If need to stop slope temperature rise,please SET KEY and ▲ KEY and ▲ KEY at the same time,SV value can be modified randomly for set-value control,if need cancel soft stsrt function,please set0.0C/0 min value.there are two ways for slope control start,one is start after control power on,one is manaully press SET KEY and ▲ KEY once at the same time to start.

Note: No matterwhich process the controllers in,stop operation for one mins,it will be back to PV/SV display condition automatically(means the main working surface)

9.Operating Flow

LEVEL0 — Host enactment mode

Box	Description
Power	
Self-diagnostic	indicator lighting
↓ 5SECS	
INP / TYPE	Declaration of the type of the first loop input
↓ 5SECS	
Lower limit / upper limit	Declaration of the range of the first loop input
↓ 5SECS	
PV / SV	display PV/SV set PV value
↓ set key	
OU1 / 0.0/100.0	output value of the first loop
↓ SET	
OU2 / 0.0-100.0	output value of the second loop
↓ SET	
LOP / 0-2	choose loop "0" Tour shows "1"Display fixed-point of the first loop "2"Display fixed-point of the second loop
↓ SET	
At / 0-3	Auto turning At on "0" none "1" At the first loop "2" At the second loop "3" At the first and the second loop
↓ SET	
AL1 / LSP/USP	Set alarm of the first loop
↓ SET	
AL2 / LSP/USP	Set alarm of the second loop
↓ SET	
RA1 / 0-100	The first-loop slope (RAP,RTM)temperature setting
↓ SET	
RT1 / 0-100	The first-loop slope (RAP,RTM)time setting
↓ SET	
RA2 / 0-100	The second-loop slope (RAP,RTM)temperature setting
↓ SET	
RT2 / 0-100	The second-loop slope (RAP,RTM)time setting
↓ SET	
C-R / PV2/RH	Choose the control screen of the second loop
↓ SET	
DSP / 0-1	DSP=1 SV window display LOP=1 RH% DSP=0 SV window display LOP=1 SV value
↓ SET5s	
LEVEL1	

LEVEL1 — Control parameter model

Box	Description
P / 3	First loop proportional bands(%)
↓ SET	
I / 240	The first loop integral time(seconds) I set 0 as the integration time
↓ SET	
D / 60	The first loop differential coeffient time(seconds) Dset 0 as the differential coeffient time
↓ SET	
OD1 / 0	First road 1:cooling 2:heating
↓ SET	
CT1 / 0-100	The first-loop woke cycle (seconds)0 as M,1as the SSR output
↓ SET	
OL1 / 0.0	The first-loop output volume lower limit setting
↓ SET	
OH1 / 0.0/100.0	The first-loop output volume up limit setting
↓ SET	
P1 / 3	The second-loop proportional band(%) P1 set 0 as ON-OFF control
↓	
I1 / 240	The second-loop integral time(seconds) I1 set 0 as integration
↓	
D1 / 60	The second-loop differential time(seconds) D1 set 0 as differential coefficien time
↓ SET	
OD2 / 0	Second-Road 1:cooling 0:heating
↓ SET	
CT2 / 0-100	The second-loop work cycle(seconds)0 as MA,1as the SSR output
↓ SET	
OL2 / 0.0	set minimum output of the second loop
↓ SET	
OH2 / 0.0/100.0	set maximum output of the second loop
↓ SET	
Hy1 / LSP/USP	alarm 1 hysteresis set
↓ SET	
Ad1 / 00-9	optional alarm mode of the first loop (optional reference mode)
↓	
Hy2 / LSP/USP	alarm 2 hysteresis set
↓	
Ad2 / 00-9	optional alarm mode of the second loop
↓ SET	
RET / 2-60	set cycle tour of loop
↓ SET	
LCK / 000-111	lock document
↓ SET+◀	
LEVEL2	

LEVEL2 — correction parameter mode of the first loop

Box	Description
IN1 / Pt	Indexing input of the first loop
↓ SET	
LS1 / 0.0	minimum of set-value of the first loop
↓ SET	
US1 / 100.0	maximum of set-value of the first loop
↓ SET	
NL1 / ±100%	the first loop input zero adjustment (original set , non adjustment）
↓ SET	
NH1 / ±100%	the first loop input zero adjustment (original set , non adjustment
↓ SET	
CF / 1/0	The first and second use in common 0: ℃ 1: °F
↓ SET	
SFT / 0-99	The first and second use in common input filter constant
↓ SET	
DP / 0-3	Quantity decimal digits selection
↓ SET	
PS1 / -50-50	Temperature correction (first loop artifi cial volume correction decimal point and DP sync)
↓ SET	
PS3 / -50-50	Relative hunidity RH correction
↓ SET	
CL1 / ±100%	The first-loop current output zero-point adjustment
↓ SET	
CH1 / ±100%	The first-loop current output full-scale adjustment
↓ SET	
TP1 / 0-200	When the first-loop has been heating up overshoot higher than referenc volume means it is automatically set
↓	
UO1 / 1-100	The first-loop system operating point shows input percentage displaying value AT means it is automatically created
↓ SET+▼	
LEVEL3	

LEVEL3 — The second input parameter mode adjustment

Box	Description
IN2 / Pt	The second input sub-independence number
↓ SET	
LS2 / 0.0	The second-loop input setting value lower limit
↓ SET	
US2 / 100.0	The second-loop input setting value upper limit
↓ SET	
NL2 / ±100%	The second-loop input zero adjustment
↓ SET	
NH2 / ±100%	The second-loop input full scale adjustment
↓ SET	
PS2 / -50-50	Temperature correction (second loop artifi cial volume correction decimal point and DP sync)
↓ SET	
CL2 / ±100%	The second -loop current output zero adjustment
↓ SET	
CH2 / ±100%	The second -loop current output full scale adjustment
↓ SET	
TP2 / 0-200	the second-loop temperature overshoot referenc value AT fin ish means it is automatically set
↓ SET	
UO2 / 1-100	The second-loop system operating point shows input percentage displaying value AT means it is automatically created
↓ SET	
TH / 0-3	First-loop AI1 port function configuration 0:AL1 relay aralm 1:AL1 voltage 1-5VDC alarm 2:RH relative humidity value transmission output 3:PV1 temperature value transmission output
↓	
CL3 / ±100%	Transmission 1 zero adjustment
↓ SET	
CH3 / ±100%	Transmission 1 full scale adjustment
↓ SET	
TH1 / 0-3	Second-loop AI1 port function configuration 0:AL1 relay aralm 1:AL1 voltage 1-5VDC alarm 2:RH relative humidity value transmission output 3:PV1 temperature value transmission output
↓ SET	
CL4 / ±100%	adjustment of 0 point of transmission 2
↓ SET	
CH4 / ±100%	adjustment of full-scale of transmission 2
↓ SET+▼	
LEVEL0	