600 Series intelligent temperature controller manual

Ⅰ、Survey：

XMT*-600 series temperature controller adopts advanced single-chip signal processing and control, reduce the peripheral components, to improve the reliability of the controller; The controller has many optional alarm mode, the control mode in addition to the conventional two type, on the basis of traditional PID control algorithm, combined with the fuzzy control theory, created a new artificial intelligent PID algorithm, the control process has a fast response, small overshoot and high steady precision etc; Adopt four keys operation, double row LED digital display, can display measuring temperature and setting temperature value at the same time, and with good human-machine interface, can shield some not commonly used parameters, the controller has the advantages of simple operation, easy to learn; At present, XMT * - 600 series controller has been widely used in machinery, chemical, ceramics, light industry, petrochemical, temperature control system and other industries.

Ⅱ、Main technical index：

2.1、 Measurement accuracy:± 0.5%F.S   cold end compensating error:± 2.0℃

2.2、 Sampling time:0.5 second

2.3、 Control cycle: relay output control for 2~ 120seconds adjustable, the others for 4 seconds

2.4、 control mode: PID control and two type (P = 0)   two optional

2.5、 Master control output mode： ①、 Relay contact output (passive): resistive load AC220V/5A；
  ②、 Driver solid state relay signal output: voltage ≥ DC9V,   current ≥ 15mA

2.6、 Working voltage：100V～242V AC， 50/60Hz，Or other special order

2.7、 Working environment: temperature 0～50 ℃, humidity≤ 85%RH, no strong electromagnetic interference or corrosive gas.

Ⅲ、Description of panel (Reference)：

（1）PV display window： Under the normal display condition show the temperature measured value; under the parameter modification state display parameters symbols.

（2）SV display window： Under the normal display condition show the temperature setting value; under the parameter modification state display parameters setting value.

（3）AL1 Indicator lamp（red）：When the indicator light, meter corresponding AL1 relay has output.

（4）AL2 Indicator lamp（red）：When the indicator light, meter corresponding AL2 relay has output.

（5）AT Indicator lamp（green）：When meter self-tuning is open, the indicator light.

（6）OUT Indicator lamp（blue）：When the indicator light, meter has control signal output.

（7）Function key（SET）：Pressing the key for 3S can enter the parameter modification status; In the condition of parameter Settings, press the key to save the current parameter Settings and enter into the state of the next parameter Settings.

（8）Shift key： Under the parameters modification state or the setting value modification state, pressing this key can achieve to modify digital location mobile.

（9）Data reduced key：Under the parameter modification, the setting value modification state or the manually adjusting state can realize the reduction in numbers; long pressing 3seconds enter into the setting value modification state.

（10）Data increased key：Under the parameter modification, the setting value modification state or the manually adjusting state can realize the increase in numbers; long pressing 3seconds enter into the setting value modification state.

Ⅳ、Parameter symbol and meaning

NO.	Code	Name	Setting range	Manual	Ex-Factory
0	**SP**	Setting value of temperature	Determined by P-SL and P-SH	The user can set the temperature setting value free according to the requirements of control. Control output corresponds to indicator light "OUT" on the panel. Please refer to **"5.2、 The SP setting"**	50
1*	**AL_1**	The first alarm value	Full range	The first alarm, second alarm setting value, corresponding to AL1 lamp, AL2 lamp on the panel. Alarm mode is determined by the parameter " ALP".	100
2*	**AL_2**	The second alarm value			30
3	P			Value is similar to the conventional PID regulator proportional band, the change is the opposite, the greater	500

		Proportional band	0～9999	P value , proportional differential effect is proportional to increase, the smaller the value, proportion differential effect weaken, the parameter value has nothing to do with the integral action. When P=0, the meter is ON/OFF control.	
4*	I	Integral time	0～3000S	Set integration time, in order to relieve the residual deviation of proportional control happening, too much to delay the time of system balance, too small will fluctuate.	1000
5*	d	Differential time	0～2000S	Set differential time, in order to prevent the fluctuations in the output, improve the stability of the control.	140
6*	t	Control cycle	2～120S	This is the control cycle when master control is the artificial intelligence PID control mode, output is the relay. The shorter the time, the control effect is better, but the movement frequency is bigger, that will affect the life of the relay.	10
7*	At	Self-tuning function	0～1	0：Close setting itself function 1：Open setting itself function Please refer to "Ⅶ、**Self-tuning function**" .	0
8*	Hy	Main control by drop in level	0.1～50.0	Only have meaning when main control output is ON/OFF(P=0) Please refer to "Ⅵ、**Control mode selection**"	0.5
9	Sc	Sensor error correction	-50.0～50.0	Sensor error correction value, if the measured temperature is higher than the actual value, set to a negative value; if the measured temperature is lower than the actual value, set to a positive value.	0.0
10	dp	Display precision	0 or 1	1: have radix point, 0: have not radix point	0
11	LOCK	Coded lock	0～150	When LOCK=0，allowed to change 0 ~ 10 parameters，When LOCK=1，Only allowed to modify the setting value（SP），**When LOCK=145,** appear the following 12-17 parameters, otherwise return measurement condition. When the LOCK is other value, all parameters cannot be modified.	145
12*	Sn	Sensor Input type	K E J PT100 CU50	Input type Measuring range K： -50.0～1300 E: -50.0～800.0 J: -50.0～900.0 PT100： -199.9～600.0 CU50： -50.0～150.0	
13*	P-SL	The min. value of temperature range	-1999～P-SH	They are used to reset proper temperature range as per user's application. As for the Max. temperature range for different inputs, please refer to **Sn, P-SH≥P-SL**	
14*	P_SH	The max. value of temperature range	P-SL～9999		

15*	ALP	Alarm mode selection (Note ①)	0～10	0	No alarm	1	Upper limit alarm
				2	lower limit alarm	3	Upper and lower limit alarm
				4	Upper deviation alarm	5	Lower deviation alarm
				6	Upper and lower deviation alarm	7	outside the interval alarm
				8	inside the interval alarm	9	Two groups upper limit alarms
				10	Two lower limit alarms		

16*	COOL	Heating, refrigeration control selection	0 or 1	0: Heating mode； 1: Refrigeration mode Please refer to "Ⅵ、**Control mode selection**"	0

17*	HY1	Drop in level of **AL1**	0.1～50.0	When the controller relieves alarm, need minus or plus the alarm return difference value. For example AL – 1 for upper limit alarm, set for 100, HY1 set to 1.0: When the measuring value ≥ 100, AL-1 indicator light on panel is on, corresponding relay action; When the measured value < 100-1.0, the AL - 1 indicator on the panel is off, corresponding relay have no output.	0.5
18*	HY2	Drop in level of **AL-2**	0.1～50.0		0.5

Note① : When only one alarm，the first alarm (AL-1) is priority, only when the alarm mode ALP is 3,6,9,10, use the second alarm (AL-2); When the Measured temperature achieve the alarm set value, the corresponding alarm indicator is light, corresponding alarm relay output;

Note: parameter sheet marked with * part parameters because of different setting, can automatically be shield and don't display.

Ⅴ、**Setting method**

5.1: According to the wiring diagram on the meter, please correct connection to electricity, the controller after self-checking enter into the normal display status, the PV display window display the measuring temperature, SV display window display the setting temperature value.

5.2: The SP setting：

In the normal display state, press the ▲ or ▼ key 3S enter into the setting value modification state, in the PV window displays the parameter code "SP", in the SV window displays the setting value of temperature. In this time press the ▲、 ▼ or ◄ key to adjust the setting value, then press the SET key to confirm and preserve data.

5.3: Parameter setting（1～27）：

In the normal display state, press the **SET** key 3S enter into parameter modification state, in the PV window displays the parameter code, in the SV window displays the parameter setting value. In this time press the ▲、 ▼ or ◄ key to adjust the parameter, then press the SET key to preserve and enter into the next parameter modification state, according to the operation until return the normal display state. If within 15 seconds do not press every key then it will automatically preserve the data and exit the modified state.

Note: The 11th parameter in controller is coded LOCK, LOCK in different Settings has different functions, please check the instructions in the parameters sheet;

When P set to 0, controller is ON/OFF control, does not appear I, D, T, AT parameters this time.

Ⅵ、**Control mode selection**

The controller come with PID artificial intelligence and ON/OFF two control modes.

PID artificial intelligent control: control parameter "P"≠ 0. Advantage is based on the heating curves of the controller, control output in advance, no overshoot, control effect is good, the best control error is about 1 degree. The disadvantage is that the output movement is frequent, have certain influence to the life of the follower.

ON/OFF control: control parameter "P" =0. Apply to that the temperature change is not big, the temperature requirement is not high. The associated parameters master return difference "HY". For example: set the "SP" = 100, "HY" = 5.

If it's heating control (**CooL** = 0) : when the measuring temperature > "SP", that is 100, the control output shut off;

When the measuring temperature < "SP" - "HY", that is 100-5 = 95 degree, the control output open.

If it is cooling control (**CooL** = 1) : when the measuring temperature < "SP", that is 100, the control output shut off;

When the measuring temperature < "SP" + "HY" , that is 100 + 5 = 105 degree, the control output open.

Ⅶ、**Self-tuning function**

Controller factory default P, I, D control parameters values, can meet most of the equipment control effect, set up the temperature set ting value (SP), the controller can work normally. If encounter controller factory default temperature control effect is not good, the controller conduct a self-tuning. Method is as follows:
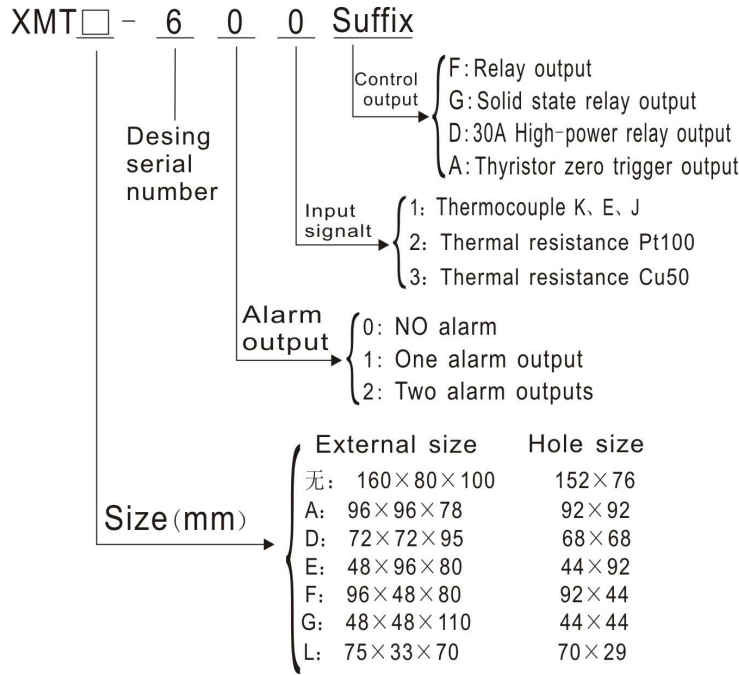
1, Set the temperature setting value (SP);

2, The self-tuning parameters (At) is set to "1", the "At" indicator lighten on the panel, start the self-tuning function. This moment controller is ON/OFF control mode, the controller after three times of heating, cooling, automatic save setting of P, I, D control parameters, the At parameters are automatically set to "0", At light is off, self-tuning process is all over.

Note: When the self-tuning opens, are not allowed to modify the setting value of temperature (SP);

When self-tuning opens, the measuring temperature not more than the setting temperature, measuring temperature is more

close to the ambient temperature, the effect is the better after setting,.

Ⅷ、 Model definition

XMT□ - 6 0 0 Suffix

Desing serial number

Control output
- F: Relay output
- G: Solid state relay output
- D: 30A High-power relay output
- A: Thyristor zero trigger output

Input signalt
- 1: Thermocouple K、E、J
- 2: Thermal resistance Pt100
- 3: Thermal resistance Cu50

Alarm output
- 0: NO alarm
- 1: One alarm output
- 2: Two alarm outputs

Size(mm)

	External size	Hole size
无:	160×80×100	152×76
A:	96×96×78	92×92
D:	72×72×95	68×68
E:	48×96×80	44×92
F:	96×48×80	92×44
G:	48×48×110	44×44
L:	75×33×70	70×29

For example: models for XMTD – 611F, external dimension is 72 x 72 * 72 (mm), hole size is 68 x 68 mm, thermocouple sensor input, there are an alarm output, the master output is relay.

Ⅸ、 Meter wiring (reference):
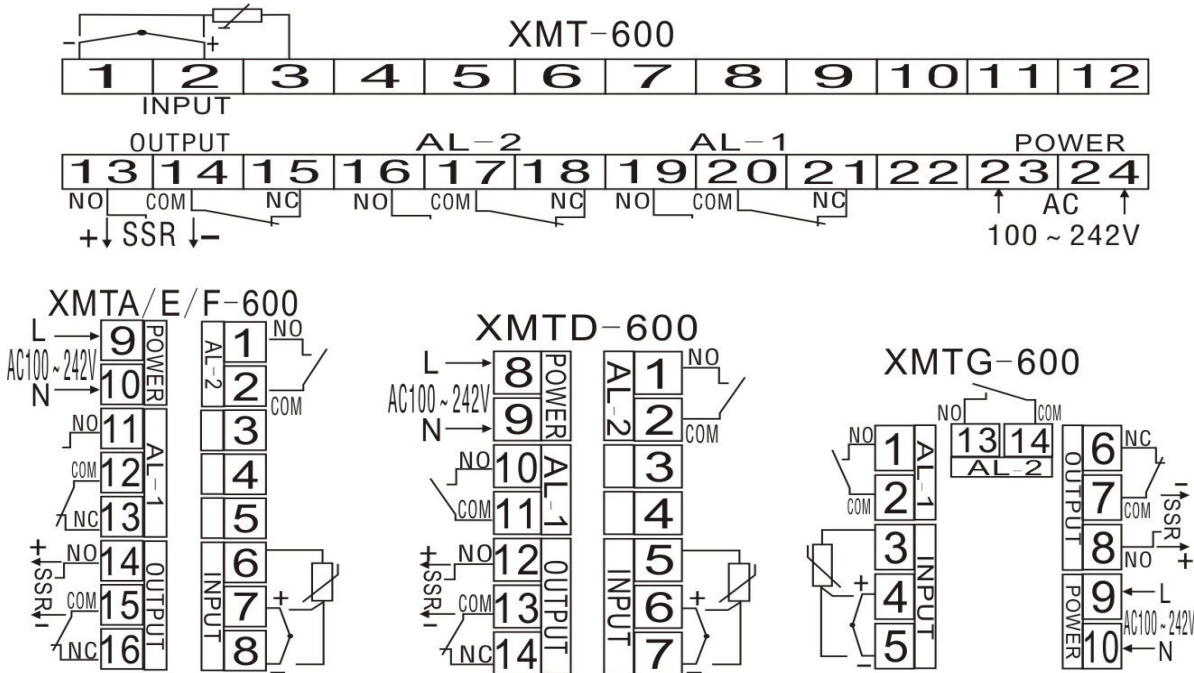
Attached 1： Statement of meter's parameter attention letter and English letter

A	B	C	D	E	F	G	H	I	J	K	L	M
A	b	C	d	E	F	G	H	I	J	H	L	n̄

N	O	P	Q	R	S	T	U	Y				
n	o	P	q	r	S	t	u	y				

★Note: Our company will continue to improve product technology, design specification. If change, please subject to the material object, without notice.