DTXG PID Temperature controller instruction manual

1. Features:

1.1.Input Sensor Types

Can be connected to the following sensors (universal input).

-TC: K, J, T, E

-RTD: Pt100, CU50

1.2.Control Outputs

The control output can be relay output, voltage output (for driving SSR), or current output, depending on the model number.

1.3.Adjusting PID Constants

Can be easily set the optimum PID constants by performing AT (auto-tuning) with the limited cycle method.

1.4.Standard Alarms

Alarm output (relay switch) turns On when the deviation, process value, set point, or manipulated value reaches a specific value.

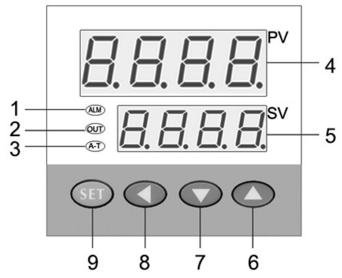
1.5 Sampling Time: 1 sec

1.6 Working ambient conditions:

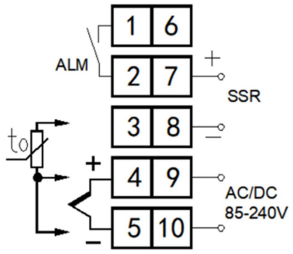
Allowable ambient temperature: −0 to +55 °C

Allowable ambient humidity: 5 to 85 % RH.

2. Parts Description:



Terminal Arrangement



1 ALM1: Lamp lights when event occurs

2 AT lamp: Flashes during Auto-tuning (AT)

3 Output lamp: Lights when output is turned on

4 PV display: Displays measured value (PV) or various parameter symbols

5 SV display: Displays setting value (SV), manipulated output value (MV) or various parameter setting values.

6 Up key: Increases numerals

7 Down key: Decreases numerals

8Shift key: Shift digits when settings are changed

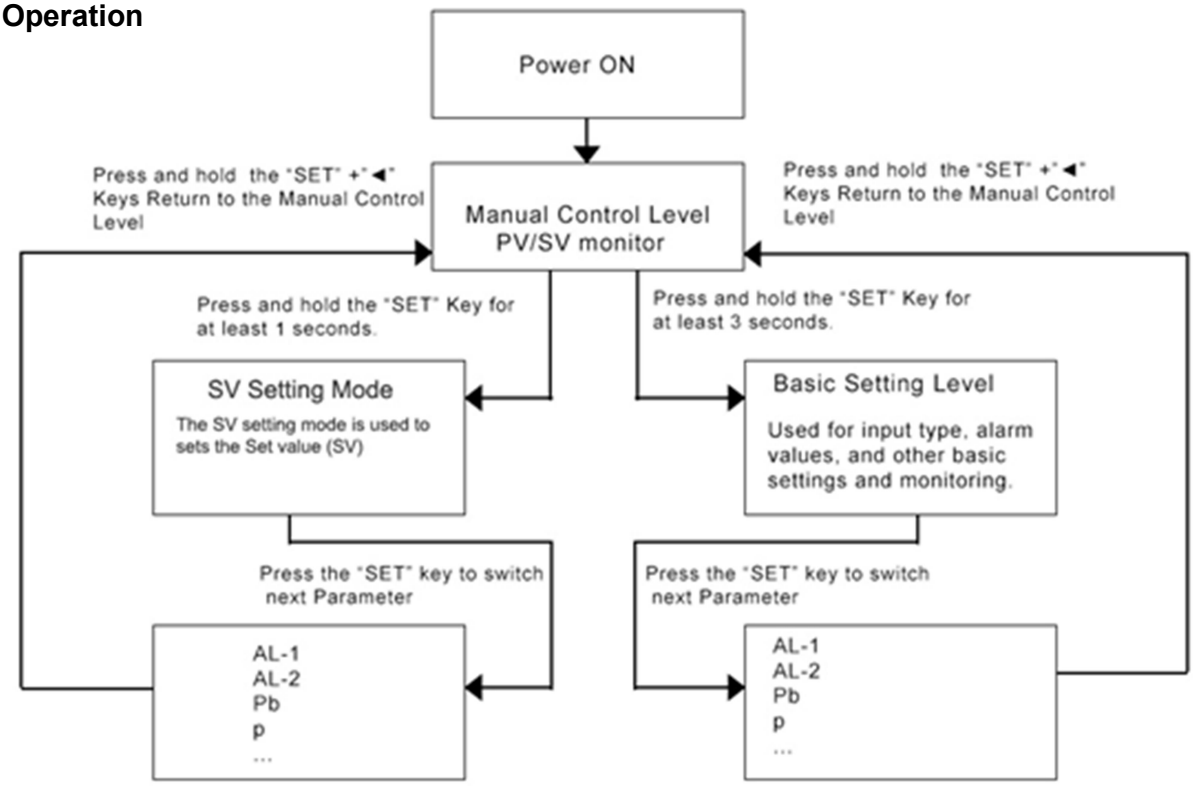
9 Set (SET) key: Parameter setting values

3. Parameters

ID	Code	Name	Manual	Setting range	Ex-Factory
1	SP	Set value	Set point temperature (SV) which is the target value for control	Determined by Input Sensor	100
2	AL-1	Alarm Set value	Refer to ALP for the suitable alarm mode	Determined by Input Sensor	300

3	HY-1	Alarm Differential gap	If the measured value (PV) is close to alarm set value, the relay contact may repeatedly turn ON and OFF (due to input fluctuation). The differential gap setting can prevent this ON/OFF repetition.	0x09	-
4	SC	PV Bias	The value of PV bias is added to the actual input value to calibrate the input reading.	±20.0	0.0
5	HY	Differential gap (Hysteresis)	When the controller is on ON/OFF controlling mode (P=0), if the measured value (PV) is close to set point temperature (SV) relay contact may repeatedly turn ON and OFF. The differential gap (hysteresis) setting can prevent this ON/OFF repetition by giving a range to the set point temperature (SV).	0.1～50.0	0.5
6	P	Proportional Band	This parameter is set when controller is on PI or PID controlling mode (for heating/cooling PID action). **When P=0 the controller is on ON/OFF controlling mode.**	1～100.0	30
7	I	Calculus time	Eliminates offset occurring in proportional control.	0～9999	240
8	d	Differential time	Prevents overshoot and/or undershoot caused by integral action effect.	0～250S	60S
9	t	Control time	Proportional cycle time	2～120	10S
10	At	Auto tuning	ON: Auto tuning (AT) with learning start OFF: Auto tuning (AT) with learning stop Turns OFF automatically when the AT with learning function is completed.	ON/OFF	OFF
11	CooL	Hot/Cold	0:reverse control(heating) 1:positive control(cooling)	0～1	0
12	ALP	Alarm type	0: Alarm function OFF; 1: Process high alarm; 2: Process low alarm; 3: Deviation High alarm ; 4: Deviation low alarm; 5: Deviation high/low alarm; 6: Band alarm.	0～10	1
13	PF	Digital Filter	This is a 1st-order lay filter by software prepared in order to reduce fluctuations of the measured value (PV) by noise.	0～99	20
14	dP	Decimal point position	Position of the decimal point, for the displayed measured value (PV).	0～3	1
15	LocY	Set data lock	LOCK=18, all parameters can be set. Otherwise, No parameter can be changed.	0～50	18
16	uo	Initial output (Output percentage)	After auto tuning, increase the value of this parameter if the measured value (PV) is less than the set value (SV) for a long time.	0-100	10
17	C F	**Measured value (PV) unit select**	C: Celsius F: Fahrenheit If the value is changed, the controller needs to execute Auto-tuning again. Refer to row 10.Auto-tuning of this table.	C , F	F
18	Sn	Input type	Cu50(Cu50)–50.0～150.0°C; Pt100 (Pt2)–199.9～600.0°C; K(K) 0～1300°C; E(E) 0～700.0°C; J (J)0～900.0°C; T(t) 0～400.0°C;	K,J,E,T Cu50 Pt100	K

4. Operation



4.1 Basic Setting Level:

Press and hold the SET key for 3S to enter main Parameters setting mode (the controller will display the parameters code (1～25) in the upper window and the parameters value at the lower one). Press ▲,▼ or ◄ key to adjust each parameter and then by pressing the SET key each parameter will be saved. The parameters can be saved automatically and controller goes out of parameter setting mode within 10 seconds if no action is taken or no key is pressed.

All the Parameter can be set or revised when Lock=18

4.2 Setting value (SV):

Press the SET key once to enter SV Setting Mode. The Set value (SV) can be set when the operation mode is on Auto-tuning.

4.3 Manual Control Operation:

Press and hold ◄ key for 3S to enter the manual regulation. When it displays “H” on the lower window you can set the output power. Press and hold ◄ key for 3S again to get out of manual regulation mode.

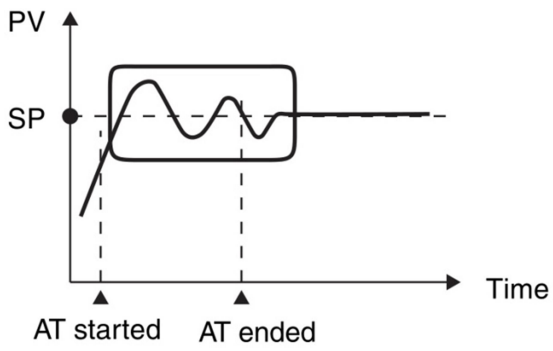
4.4 Output percentage:

Press ▲ key to enter output percentage.

5. Determining PID Constants (Auto-tuning)

When AT is executed, the optimum PID constants for the set point at that time are set automatically. A method (called the limit cycle method) for forcibly changing the manipulated variable and finding the characteristics of the control object is employed.

Set HY on 0.5～1℃. If the output is relay, set t=2S and then set AT=On. AT lamp will be flashing and at this time controller enters **Auto-tuning** mode. Now, the controlling way is on-off mode and after 3 times vibrating (3 control period) P, I, D parameters will be automatically saved and the self-adjusting process is completed (Operation will be as shown in the diagram):



Attentions：

- When **Auto-tuning**, the controller should not change the set value.
- When the power turns Off during **Auto-tuning**, it will restart **Auto-tuning** next time.
-When it is needed to artificially exit during **Auto-tuning**, set parameter (AT) to OFF so can exit (but the setting result will not be valid).

6. Alarm function

Alarm (ALM) function sets up the alarm status when the measured value (PV) or the deviation reaches the alarm set values. In the alarm status, the alarm output is dry contact type (terminals 1 and 2), and the alarm is used to drive the equipment danger signals or the safety equipment.

Alarm (ALM) function	Alarm status[ON]	Alarm status[OFF]
Process high alarm	Measured value>Alarm set value	Measured value<Alarm set value
Process low alarm	Measured value<Alarm set value	Measured value>Alarm set value
Deviation high alarm	Measured value>Alarm set value + Set value	Measured value>Alarm set value + Set value
Deviation low alarm	Measured value<Alarm set value - Set value	Measured value>Alarm set value - Set value
Band alarm	Measured value<Alarm1 set value And Measured value>Alarm2 set value	Measured value>Alarm1 set value Or Measured value<Alarm2 set value
Out of band alarm	Measured value>Alarm1 set value Or Measured value<Alarm2 set value	Measured value<Alarm1 set value And Measured value>Alarm2 set value

Character Symbols ： This manual indicates 9-segment display characters as shown below.

A	B	C	D	E	F	G	H	I	J	K	L	M
A	b	C	d	E	F	G	H	I	J	K	L	M
N	**O**	**P**	**Q**	**R**	**S**	**T**	**U**	**Y**				
n	o	P	q	r	S	t	u	y				

Wiring diagram for SSR output: