

# Programmer controller INSTRUCTION MANUAL

Before operating this instrument, please read this manual carefully and fully understand its contents.

## WARNING

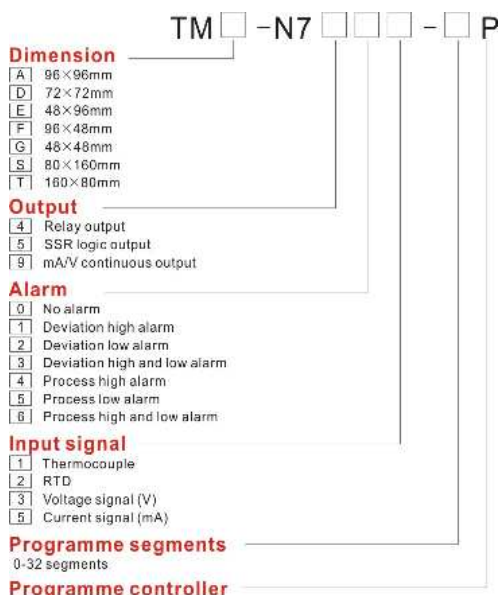
- If failure or error of this instrument could result in a critical accident of the system, install an external protection circuit to prevent such an accident.
- Do not turn on the power supply until all of the wiring is completed. Otherwise electric shock, fire or malfunction might result.
- Use this instrument within the scope of its specifications. Otherwise fire or malfunction might result.
- Do not use this instrument in the places subject to flammable or explosive gas.
- Do not touch high voltage blocks, such as power supply terminals. Otherwise electric shock may result.
- Never disassemble, repair or modify this instrument by yourself. This might cause malfunction.

## Main specifications

- TM programmer controller has the following principal characteristics:
- ◇ Independent process and set point displays.
  - ◇ 32 segments max, and it can be programmed according to user's need.
  - ◇ PID control with auto tuning; ON/OFF control
  - ◇ Main control output: relay, SSR logic or continuous Volt/mA.
  - ◇ Selectable heating/cooling control.
  - ◇ Selectable many alarm modes.

## Order code

Please check whether the delivered product is as specified by referring to the following model code list. And please specify the model code when you place the order.



Ex: TME - N 7 4 1 1 - 32 P K 0-1372℃

It's a programmer controller with Relay output; one deviation high alarm; thermocouple K input; range 0 to 1372 degrees Celsius; and 32 segments programmer.

## Technical features introduction

### Inputs

- ◇ IEC 584 thermocouple  
K, J, R, S, B, E, T
- ◇ IEC 751 resistance temperature detector  
Pt100, Cu50
- ◇ Linear signals  
0/1-5V, 0/4-20mA

### Main heating/cooling output

- ◇ Cycle time 1-100s
- ◇ Actuation
  - ✓ SPDT relay 5A@250V AC, 6A@125V AC
  - ✓ 0-12VDC logic, 35mA max load
  - ✓ Linear Voltage 0/1-5V
  - ✓ Linear Current 0/4-20mA

### Alarms

- ◇ 2 relay alarms
- relay 5A@250V AC

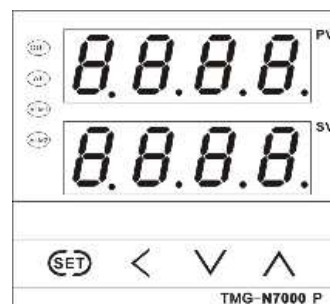
### Environment

- ◇ 0 ~ 50℃ ambient temperature
- ◇ 45 ~ 85% non-condensing humidity

### Power supply

- ◇ 100~240VAC 50-60Hz 4VA

## Description of the front panel

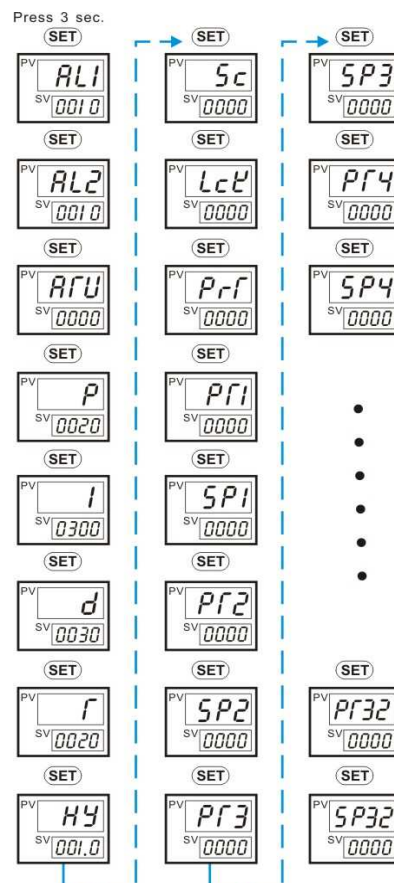


PV	Process value
SV	Setting value
AT	auto-tuning status
OUT	Output status
ALM1	ALM1 status
ALM2	ALM2 status
(SET)	Function key Press this key to change the parameter levels.
<	Shift key; RUN/HOLD key; To start the programmer segment, press this key 3 seconds.
∇	Down key; Pause key; Press this key 3 seconds, the running programmer would stop, and SV window will show "REST" signal.
∧	Up key; segment display key; Press this key on normal display mode, SV window will display the present running segment and the running time of this segment (Unit: minute). This two parameters will be displayed 5 seconds alternately

## Parameters menu

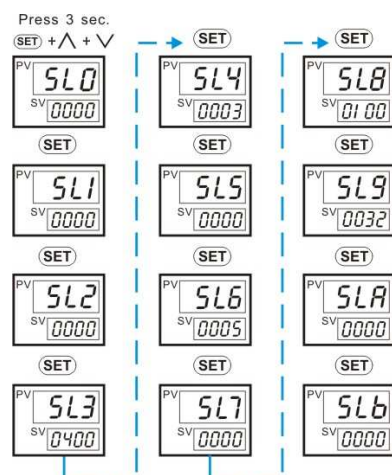
LEVEL ONE: PV and SV display mode (normal display)

LEVEL TWO:



**Note:** Press "SET" + "<" key, to turn back parameters.

### LEVEL THREE:



## ◆ Parameters description

### Parameters in LEVEL TWO

**AL1** alarm value of ALARM 1. Factory set value is 0010. This parameter concerns the alarm mode parameter SL4. Supposed SL4 (Alarm 1 mode) is Deviation high alarm, AL1=0010, then the alarm value would be 10 degrees higher than the set point; If AL1=0020, then alarm value should be 20 degrees higher than the set point.

**AL2** alarm value of ALARM 2. Factory set value is 0010. It is concerned to the Alarm 2 mode parameter SL5. Function is same as AL1.

**ATU** auto tuning

**0000** auto tuning inactive. (factory set value)  
**0001** auto tuning active.

**P** proportional band Factory set value 0020

Set when PI, PD or PID control is performed.  
**0000** no proportional band, ON/OFF control.  
Setting range 0 to 9999(999.9)

**I** integral time. Set the time of integral action which eliminates the offset occurring in proportional control.

**0000** no integral time, PD control  
Setting range 0 to 3600 sec. Factory set value 0300

**D** differential time. Set the time of derivative action which prevents ripples by predicting output changes and thus improves control stability.

**0000** no differential time, PI control.  
Setting range 0 to 3600 sec. Factory set value 0030.

**F** proportioning cycle. Set control output cycle.

Setting range 1 to 100 sec. (0 can not be set)  
Factory set value 0020 (relay output); 0002(SSR output)

**HY** dead band of the main output

This parameter would be covered when the control method is PID. Only displayed when control method is ON/OFF. Setting range 0.1 to 100.0  
Factory set value 001.0

**Sc** offset of cold junction.

To modify the value of sensor. PV value is Sc value and sensor measuring value. Setting range  $\pm 100.0$  Factory set value 000.0

**LcL** Lock parameter (Factory set value 0000)

CODE	Details of lock levels
0000	SV and all parameters can be set
0001	Only SV can be set
0002	SV and all parameters can not be set

**PrT** programmer mode on power on

When PrT is 0000, after power on or electricity break and power on again, controller will start the programmer from Segment 1.  
When PrT is 0001, after power on, controller will start the programmer from the segment which it's running before power on.

**Pr1** time in segment 1 (unit is minute)

**SP1** set point in segment 1

**Pr2** time in segment 2 (unit is minute)

**SP2** set point in segment 2

**Pr32** time in segment 32 (unit is minute)

**SP32** set point in segment 32

NOTE: totally 32 segments. There are two parameters value for each segment, one is for setting time, the other is for setting set point. Segment 3 to segment 31 are passed over.

### Parameters in LEVEL THREE

**SL0** reserved parameter, not available

**SL1** decimal point

**SL2** measurement range lower limit Factory set value 0000  
Setting range is the scope of the input sensor.

**SL3** measurement range upper limit Factory set value 0400  
Setting range is the scope of the input sensor.

**SL4** alarm mode selection of ALARM 1

Code	Alarm mode
0000	No alarm
0001	Process high alarm
0002	Process low alarm
0003	Deviation high alarm
0004	Deviation low alarm

Factory set value 0003 (deviation high alarm).

**SL5** alarm mode selection of ALARM 2

programming codes are same as SL4. Factory set value 0000

**SL6** dead band of Alarm 1 and Alarm 2

Factory set value 0005

**SL7** control method

0000 PID control reverse action  
0001 PID control direct action  
0002 ON/OFF control  
Factory set value 0000

**SL8** percentage of auto tuning

Factory set value 0100 (100%)

**SL9** quantity of segment

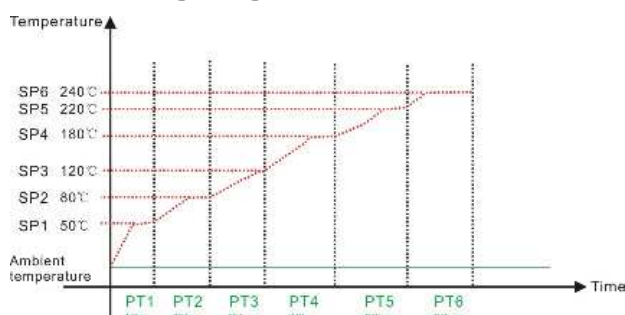
For example, supposed you need 8 segments to control the load, then set this parameter as 0008.

**SLA** for selecting the programmer segment.

Ex. When you want to start the programmer segment from segment 3, then set SLA=0003, after power on the controller, it will start from Segment 3.

**SLb** not available

## ◆ Working diagram



Ex.: We set the parameters:

**segment time: (minutes)**

PT1=120; PT2=180; PT3=180; PT4=240; PT5=240; PT6=240

**Set point: (degrees Celsius)**

SP1=50; SP2=80; SP3=120; SP4=180; SP5=220; SP6=240

We use 6 segments to control the temperature:

The first 120mins(PT1), temperature heat to 50°C(SP1);  
In the next 180mins(PT2), it would heat to 80°C(SP2);  
In the next 180mins(PT3), it would heat to 120°C(SP3);  
In the next 240mins(PT4), it would heat to 180°C(SP4);  
In the next 240mins(PT5), it would heat to 220°C(SP5);  
In the last 240mins(PT6), it would heat to 240°C(SP6);  
and stable on 240°C.