

TM SERIES 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

- ◇ Independent process and set point displays.
- ◇ PID control with auto tuning.
- ◇ Main control output: relay, SSR logic or continuous Volt/mA.
- ◇ Selectable heating/cooling control.
- ◇ Two configurable alarms
- ◇ Selectable max output power to load.

Order code

Please check whether the delivered product is as specified by referring to the following model code list.

TM - N7

Panel size

☐ G 48×48mm
☐ E 48×96mm
☐ D 72×72mm
☐ A 96×96mm
☐ F 96×48mm
☐ S 80×160mm
☐ T 160×80mm

Series No.

Output

☐ 4 Relay output
☐ 5 SSR logic output
☐ 6 Shift-phase signal to drive single phase SCR
☐ 7 Zero-cross signal to drive single phase SCR
☐ 8 Shift-phase signal to drive three-phase SCR
☐ 8A Zero-cross signal to drive three-phase SCR
☐ 9 DC4-20mA current continuous output

Alarms

☐ See Alarm code*

Input

☐ 1 Thermocouple signal input
☐ 2 RTD input
☐ 5 linear mA/V input

Ex: TMG - N7 4 3 1 K 0-400

It's a controller with PID control; dimension 48x48mm; input type K and range 0~400? ; relay output; two alarms with deviation high and low alarm mode; 100~240VAC power supply.

Technical features introduction

Inputs

IEC 584 thermocouple

Input	Range	Reso.
K	0 ~ 1372	0.1/1
J	0 ~ 1200	0.1/1
E	0 ~ 1000	0.1/1
S	0 ~ 1769	0.1/1
R	0 ~ 1769	0.1/1
B	0 ~ 1820	0.1/1
N	0 ~ 1300	0.1/1
T	0.0 ~ 400.0	0.1/1

IEC 751 resistance temperature detector

Input	Range	Reso.
Pt100	-199.9~649.0	0.1
Cu50	-50 ~ 100.0	0.1

Linear signals

Input type	Code	Range	Resolution
Volt 0/1-5V	V	-1999~9999	0.2%F.S.
mA 0/4-20mA	A	-1999~9999	0.2%F.S.

*Other special input type, should be specified in the order.

Main 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
 - SPDT relay 5A@250V AC
- Alarm code*:
 - 0 no alarm
 - 1 deviation high alarm
 - 2 deviation low alarm
 - 3 deviation high/low alarm
 - 4 process high alarm
 - 5 process low alarm
 - 6 process high/low alarm

Auto tuning (ATU) function

The ATU function automatically measures, computers and sets the optimum PID constants.

Requirements for ATU start

- ✓ Prior to starting the ATU function, end all the parameter settings other than PID.
- ✓ Confirm the LCK function has not been engaged.
- Requirements for ATU suspension
 - ✓ When the SV is changed.
 - ✓ When the PV bias value is changed.
 - ✓ When the sensor loop break.
 - ✓ When P (proportional band) = 0

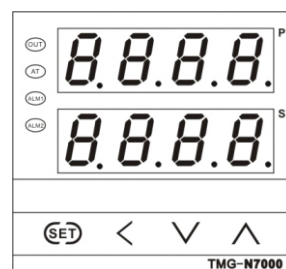
Environment

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

Power supply

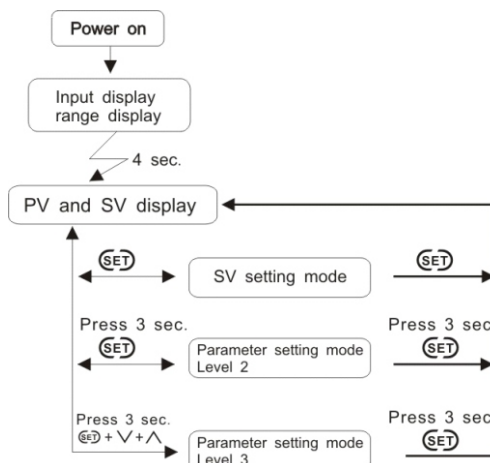
- 100~240VAC 50-60Hz
- Consumption: 4VA

Description of the front panel

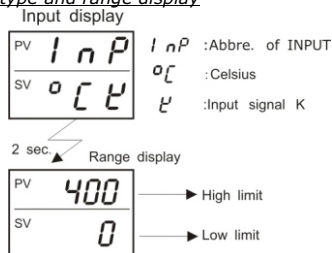


PV	Process value
SV	Setting value
OUT	Output status
AT	auto-tuning status
ALM1	ALM1 status
ALM2	ALM2 status
(SET)	Function key
<	Shift key
> / ^	Down and up key for setting value

Operating flow chart



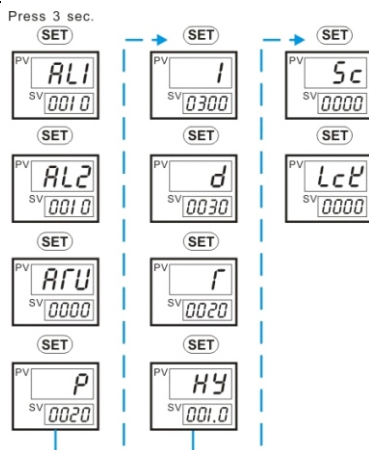
Layout of input type and range display



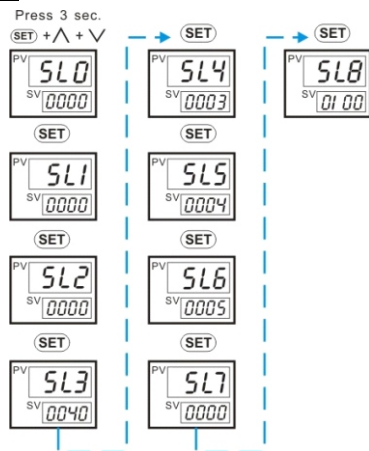
◆ Parameters menu

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

LEVEL TWO:



LEVEL THREE:



◆ Parameters description

Parameters in LEVEL TWO

AL1 alarm value of ALARM 1. Factory set value is 0010. This parameter is connected to the alarm mode parameter SL4. Supposed the Alarm 1 mode is Deviation high alarm, AL1=10, 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.

In case the alarm mode is set as deviation low alarm, AL1=0010, then alarm value is 10 lower than 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.

NOTE: It can be used with SL8 parameter which is for setting auto tuning start on percentage of set point.

P proportional band

Set when PI, PD or PID control is performed.

0000 no proportional band, ON/OFF control.

Setting range 0 to 200

Factory set value 0020

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

Setting range 0.1 to 100.0

This parameter would be covered when the control method is PID. Only displayed when control method is ON/OFF.

Factory set value 001.0

Sc offset of cold junction.

Setting range ± 100.0

To modify the value of sensor. PV value is Sc value and sensor measuring value.

Factory set value 000.0

LcK 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

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 0004 (deviation low alarm)

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

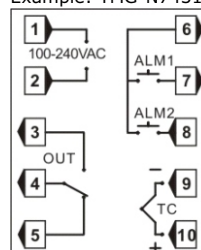
Factory set value 0000

SL8 percentage of auto tuning

Factory set value 0100 (100%)

◆ Wire connection

Example: TMG-N7431



Please check the wire connection diagram on the instrument very carefully before use.