

# Digital PID Temperature Controller

## User manual

TSN05-561-E1



- Relay + SSR Drive output field selectable
- 3%F.S measuring accuracy
- Maximum 2 alarms
- C or F display field selectable
- Various size available
- Universal input
- Bar graphic display
- Program run/stop function
- Parameter reset function
- Loop break alarm

# TSN Series Temperature Controller

## Instruction Manual

TSN05-561-E1

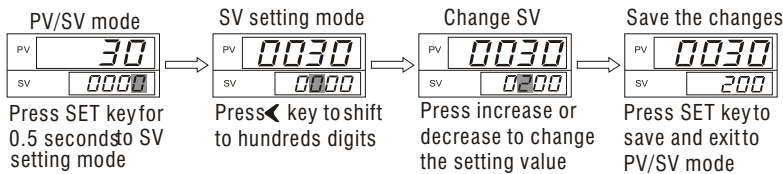
Thank you for choosing our products, Please read this manual carefully and keep it in a safe place for further reference

### General Information

- MTD has 4 digits dual LED display, 0.3% measuring accuracy with bar graphic display, 0.1 resolution for TC and RTD sensors
- Please make sure the power supply and the outputs both correctly configured before using, always refer to connection stickers on the side of the controller
- This controller supports various TC and RTD, analog signals, you can switch between TC and RTD via key pad. analog signals needs to be pre-determined before order. Please check "6.3" parameter INP1 for more information
- OUT was configured as reverse action (heating) as factory default, user can change it to direct (cooling) action, refer to "6.3" parameter Oud for more information
- This controller is a PID controller with auto-tuning function
- ON/OFF control, change P=0 to active ON/OFF control mode, the hysteresis for the ON/OFF controller is HYS. For heating, OUT off when PV>SV, OUT on when PV<SV-HYS, For cooling, OUT on when PV>SV+HYS, OUT off when PV<SV Refer to 6.1 for details?
- Time proportional control, when I=0, d=0 P≠0, control mode change to time proportional control, rest windup is rSt, control cycle time is Cyt, output gets smaller when rSt gets smaller at heating mode, outputs increase when rSt decrease at cooling mode
- Please always perform auto-tuning to have a better control result at PID mode, refer to "7 auto-tuning"
- Output selectable between Relay, SSR Drive, standard SSR trigger, random SSR trigger, phase angled trigger, refer to "6.3" parameter OUT for more details

## 1. Quick Start Guide

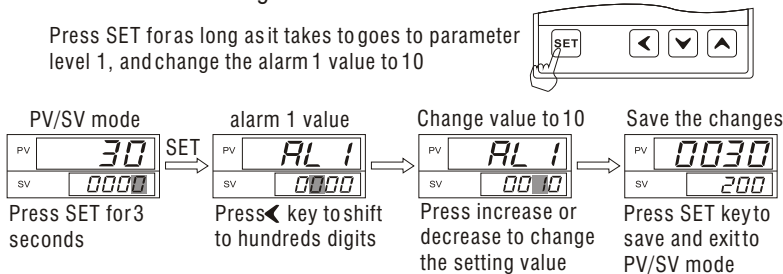
### 1.1 Setting Value Configuration (change SV from 0 to 200)



Press increase or decrease once, the value will increase or decrease by 1 unit at each time, Press decrease or increase and hold it to fast decreasing or increasing the numbers. controller goes back to PV/SV mode and SV configuration saved if no input within 3 seconds Press **←** for as long as it takes to go back to previous parameters

### 1.2 Alarm value configuration

Press SET for as long as it takes to go to parameter level 1, and change the alarm 1 value to 10



### 1.3 Switch the display from Celsius to Fahrenheit

Press SET and **←** the same time to pass word menu, input ?0101" as password and goes to parameter level 2



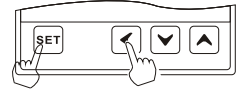
### 1.4 Switch output from Relay to SSR Drive

Press SET and **←** the same time to pass word menu, input ?0101" as password and goes to parameter level 2

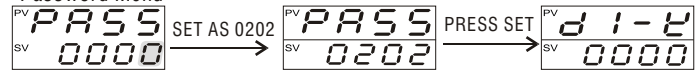


### 1.5 Configuration for RUN/STOP function

Press SET and **←** at the same time to password menu, input ?0202" as password and press SET key



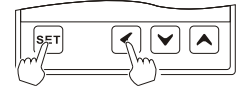
Password Menu



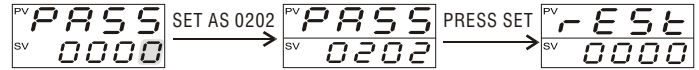
This is the parameter defines the RUN/STOP function for the controller, when d1-K=0, the Run/Stop function will be disabled. when d1-K=1, the Run/Stop function will be activated, press **↓** for 3 seconds, the controller will enter into STOP status, the output will be terminated, Press **↑** for 3 seconds, the controller will enter into normal control status, and the program will run again.

### 1.6 Configuration for parameter Reset function

Press SET and **←** at the same time to password menu, input ?0202" as password and press SET key



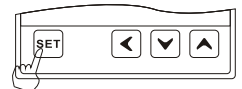
Password Menu



This is the parameter defines the RESET function, when you set Reset=0, the parameter Reset function disabled, when you set Reset=1, the parameter reset function activated, press **←** **↑** left arrow and increase key at the same time for as long as it takes, all the parameters goes back to factory setting. this function is very useful for first-timer users when they are still learning the function, and messing with the controller. all parameter goes back to factory setting when they get lost during the process.

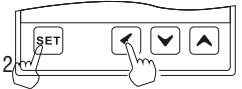
### 1.7 Active auto-tuning function

Press SET for as long as it takes to go to parameter level 1, first parameter you will see is AT, this is the parameter used to active the auto-tuning Put the value as ?Yes? if you want to active the auto-tuning Put the value as ?No? if you want to abort the auto-tuning in the process

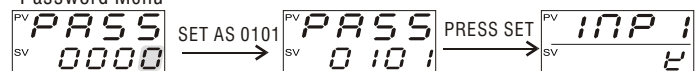


### 1.8 Change the input sensor type

Press SET and **←** at the same time to pass word menu, input ?0101" as password and goes to parameter level 2



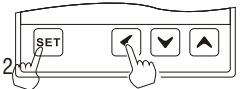
Password Menu



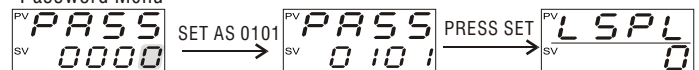
The first parameter you will see is the ?Inp1", this is the parameter where you can configure the input sensors, the default code is for type ?K? sensor, you can change to Pt100, type J etc.

### 1.9 Change the upper limit and lower limit of Setting value

Press SET and **←** at the same time to pass word menu, input ?0101" as password and goes to parameter level 2

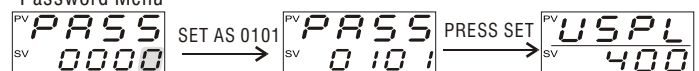


Password Menu



Locate the parameter ?LSPL?, this parameter defines the lower limit of the setting value, you can change them to other values as per your application

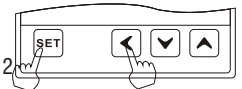
Password Menu



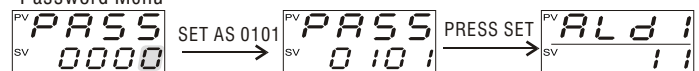
Locate the parameter ?USPL?, this parameter defines the higher limit of the setting value, the default upper limit of the setting value is 400C, you can change to other value if you want.

### 1.10 Change the alarm output mode

Press SET and **←** at the same time to pass word menu, input ?0101" as password and goes to parameter level 2



Password Menu



Locate the parameter ?ALD1?, this parameter defines the alarm output mode for alarm 1, the alarm mode has various options such as deviation high alarm, absolute high alarm, band alarm etc, the default mode is no alarm function ALD1=10, you can change it based on your application

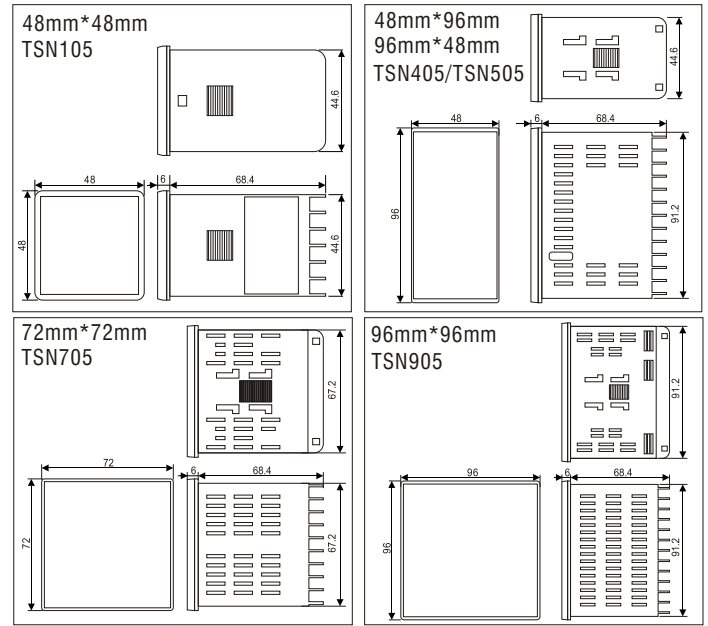
## 1.11 Alarm mode details

\*\*ALARM TYPE TABLE (ALd\_00~16)

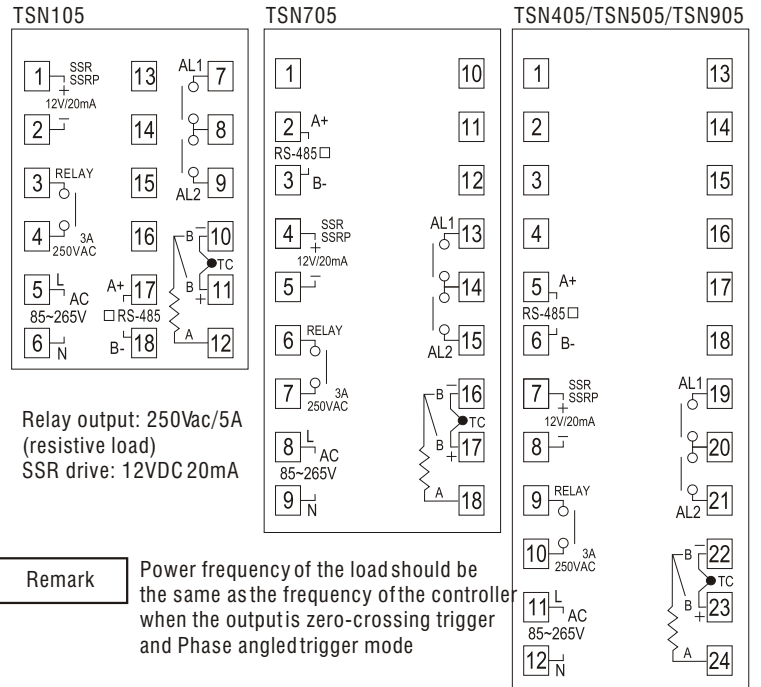
10: No alarm output	00: No alarm output	09: Loop break alarm
11: Deviation high alarm	01: Deviation high alarm with hold action	
12: Deviation low alarm	02: Deviation low alarm with hold action	
13: Deviation high/low alarm	03: Deviation high/low alarm with hold action	
14: Deviation band alarm	04: Deviation band alarm with hold action	
15: Process high alarm	05: Process high alarm with hold action	
16: Process low alarm	06: Process low alarm with hold action	

Code	ALD	Specification (Example for alarm 1)
N	10 or 00	No alarm
A	11	Deviation high alarm $AL1 \geq 0$ LOW SV $\Delta$ AH1 Alarm ON SV+AL1 HIGH
		Deviation high alarm $AL1 < 0$ LOW $\Delta$ SV+AL1 SV HIGH
B	12	Deviation low alarm $AL1 \geq 0$ LOW SV $\Delta$ AH1 Alarm ON SV+AL1 HIGH
		Deviation low alarm $AL1 < 0$ LOW SV+AL1 $\Delta$ SV HIGH
C	13	Deviation high/low alarm Alarm ON AH1 $\Delta$ AH1 Alarm ON LOW SV-AL1 $\Delta$ SV $\Delta$ SV+AL1 HIGH
D	14	Deviation band alarm Alarm ON LOW SV-AL1 $\Delta$ SV $\Delta$ SV+AL1 HIGH
H	15	Process high alarm Alarm ON AH1 $\Delta$ AH1 Alarm ON LOW $\Delta$ AL1 HIGH
J	16	Process low alarm Alarm ON AH1 $\Delta$ AH1 Alarm ON LOW $\Delta$ AL1 HIGH
E	01	Deviation high alarm with hold action $AL1 \geq 0$ LOW SV $\Delta$ AH1 Alarm ON SV+AL1 HIGH
		Deviation high alarm with hold action $AL1 < 0$ LOW $\Delta$ SV+AL1 SV HIGH
F	02	Deviation low alarm with hold action $AL1 \geq 0$ LOW SV $\Delta$ AH1 Alarm ON SV+AL1 HIGH
		Deviation low alarm with hold action $AL1 < 0$ LOW SV+AL1 $\Delta$ SV HIGH
G	03	Deviation high/low alarm with hold action Alarm ON AH1 $\Delta$ AH1 Alarm ON LOW SV-AL1 $\Delta$ SV $\Delta$ SV+AL1 HIGH
M	04	Deviation band alarm with hold action Alarm ON LOW SV-AL1 $\Delta$ SV $\Delta$ SV+AL1 HIGH
K	05	Process high alarm with hold action Alarm ON AH1 $\Delta$ AH1 Alarm ON LOW $\Delta$ AL1 HIGH
L	06	Process low alarm with hold action Alarm ON AH1 $\Delta$ AH1 Alarm ON LOW $\Delta$ AL1 HIGH
	09	LBA alarm will be triggered if the temperature did not increase more than the LbAb value within the time duration defined under LbAt, this applies for reverse (heating) control mode when output is 100% LBA alarm will be triggered if the temperature did not decrease more than the LbAb value within the time duration defined under LbAt, this applies for direct (cooling) control mode when output is 100%

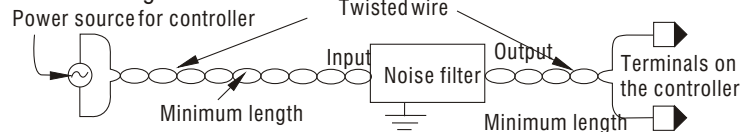
## 2. Mounting and Dimensions



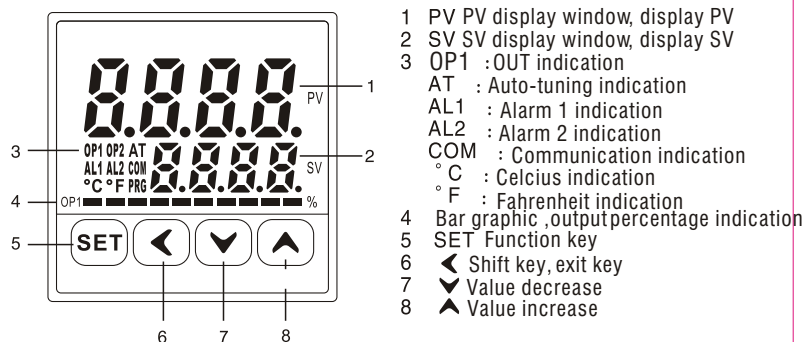
## 3. Wiring Diagram



### 3.1 Wiring instruction

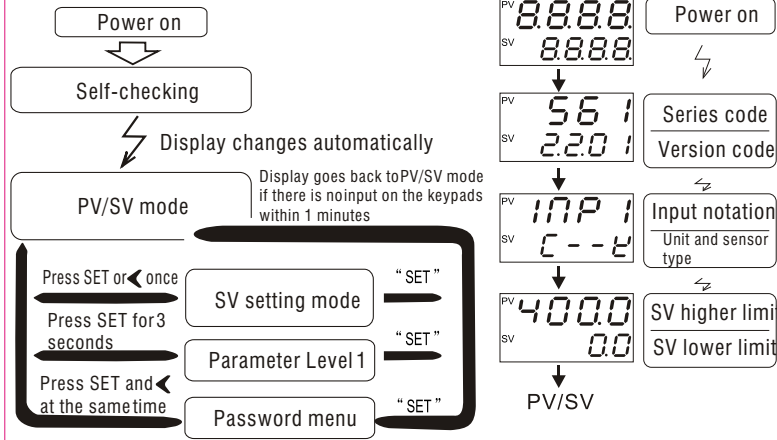


## 4. Panel Description



# 5. Setting and Configuration

## 5.1 Setting flow chart



## 5.2 Compatible input sensors and Range

This controller will display factory default sensors and range as well as display unit during the power up process, below is a table you can use to check if the controller has been configured with the correct sensor and display unit, you may switch to other sensor type and display unit if you want.

Notation	<i>E</i>	<i>E</i>	<i>J</i>	<i>N</i>	<i>U</i>
Sensor type	K	E	J	N	Wu3_Re25
Range	1300 °C	600 °C	800 °C	1300 °C	2000 °C
Notation	<i>S</i>	<i>T</i>	<i>R</i>	<i>B</i>	<i>PL</i>
Sensor type	S	T	R	B	Pt100
Range	1600 °C	400 °C	1700 °C	1800 °C	800 °C

## 5.3 Parameter configuration(except SV)

Use increase and decrease to change the parameter value and press SET to save the configuration after locate the parameters

# 6. Parameter Level

## 6.1 Parameter level 1

Press SET key for 3 seconds to parameter level 1

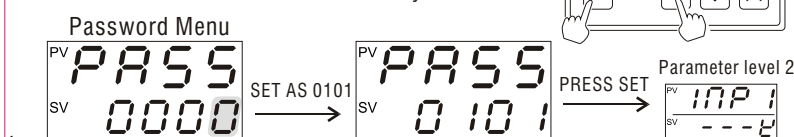
### 6.1.1 Parameter list

Below parameter will be displayed one by one, press SET key can shuffle among each parameters Press SET key for 3 seconds to save the configuration and exit to PV/SV mode  
1# factory default

Notation	Name	Range	1#	Description
<i>AT</i>	Autotune	NO or YES	NO	AT=YES, Autotune activated, AT=NO, Autotune off
<i>AL1</i>	Alarm 1	-1999 to 9999	10	Value for alarm1, HYS for alarm1=AH1
<i>AL2</i>	Alarm 2	-1999 to 9999	10	Value for alarm2, HYS for alarm2=AH2
<i>SC</i>	Input offset	-199 to 199	0.0	to compensate the error caused by sensor
<i>P</i>	Proportional band	0.0 to 200.0	20.0	Proportional band for PID, Set P=0 for ON/OFF mode
<i>HYS</i>	Hysteresis for ON/OFF	0 to 999	1.0	HYS for ON/OFF mode Heating: Out off when PV>SV, Out on when PV<SV-HYS cooling: Out on when PV>SV+HYS, Out off when PV<SV
<i>I</i>	Integral time	0 to 3600 Sec	210	Integral off when I=0. I gets smaller integral gets stronger, but oscillation can be expected
<i>d</i>	Derivative time	0 to 3600 Sec	30	Derivative off when d=0 Counter balance the overshoot if increase d a little bit
<i>CYT</i>	Cycle time	0 to 999 Sec	20	Cycle time, Set as 20 for Relay output and 2 for SSR drive output
<i>rST</i>	Rest Windup	-199 to 200	-5.0	overshoot suppression after poweron(rst>-P/2) recommend to calculate by autotune process
<i>LCK</i>	Protection lock	0-2	0	LCK=0: Be able to modify all parameters LCK=1: Only access to SV and auto-tune LCK=2: Only access to SV

## 6.2 Password

Press SET and left arrow key at the same time



## 6.3 Parameter level 2

Refer to ?6.2" and Set PASS=0101 to go to parameter level 2

Below parameter will be displayed one by one, press SET key can shuffle among each parameters Press SET key for 3 seconds to save the configuration and exit to PV/SV mode

1# stands for factory default

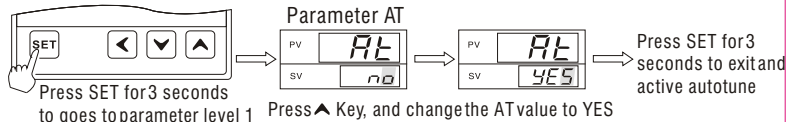
Notation	Description	Range	1#	Description																																																
<i>INP1</i>	Input signal selection	<table border="1"> <tr> <td>Notation</td> <td><i>E</i></td> <td><i>E</i></td> <td><i>J</i></td> <td><i>N</i></td> <td><i>U</i></td> <td><i>S</i></td> <td><i>T</i></td> <td><i>R</i></td> <td><i>B</i></td> </tr> <tr> <td>Description</td> <td>K</td> <td>E</td> <td>J</td> <td>N</td> <td>Wu3_Re25</td> <td>S</td> <td>T</td> <td>R</td> <td>B</td> </tr> <tr> <td>Range</td> <td>1300 °C</td> <td>600 °C</td> <td>800 °C</td> <td>1300 °C</td> <td>2000 °C</td> <td>1600 °C</td> <td>400 °C</td> <td>1700 °C</td> <td>1800 °C</td> </tr> </table> <table border="1"> <tr> <td>Notation</td> <td><i>AN4</i></td> <td><i>AN3</i></td> <td><i>AN2</i></td> <td><i>AN1</i></td> <td><i>PL</i></td> </tr> <tr> <td>Description</td> <td>Backup</td> <td>Backup</td> <td>0-50mV</td> <td>0-20mV</td> <td>Pt100</td> </tr> <tr> <td>Range</td> <td></td> <td></td> <td></td> <td></td> <td>800 °C</td> </tr> </table>	Notation	<i>E</i>	<i>E</i>	<i>J</i>	<i>N</i>	<i>U</i>	<i>S</i>	<i>T</i>	<i>R</i>	<i>B</i>	Description	K	E	J	N	Wu3_Re25	S	T	R	B	Range	1300 °C	600 °C	800 °C	1300 °C	2000 °C	1600 °C	400 °C	1700 °C	1800 °C	Notation	<i>AN4</i>	<i>AN3</i>	<i>AN2</i>	<i>AN1</i>	<i>PL</i>	Description	Backup	Backup	0-50mV	0-20mV	Pt100	Range					800 °C		
Notation	<i>E</i>	<i>E</i>	<i>J</i>	<i>N</i>	<i>U</i>	<i>S</i>	<i>T</i>	<i>R</i>	<i>B</i>																																											
Description	K	E	J	N	Wu3_Re25	S	T	R	B																																											
Range	1300 °C	600 °C	800 °C	1300 °C	2000 °C	1600 °C	400 °C	1700 °C	1800 °C																																											
Notation	<i>AN4</i>	<i>AN3</i>	<i>AN2</i>	<i>AN1</i>	<i>PL</i>																																															
Description	Backup	Backup	0-50mV	0-20mV	Pt100																																															
Range					800 °C																																															
<i>DP</i>	Decimal Points	0 to 1	0	0: without decimal point 1: One decimal point, for all input signals 2: two decimal points 3: three decimal points, for analog input signal only																																																
<i>LSPL</i>	Lower limit for SV	-1999 to 9999	0	Lower limit for SV, or lower limit for Re-transmitted value																																																
<i>USPL</i>	Higher limit for SV	-1999 to 9999	400	Higher limit for SV, or higher limit for Re-transmitted value																																																
<i>UNIT</i>	Display Unit	C or F	C	C: Celsius F: Fahrenheit																																																
<i>PIFt</i>	PV input filter	0 to 60	55	1-30 For general filter effects, 31-60 For enhanced filter effects																																																
<i>ANL1</i>	Lower limit display for analog input	-199~9999	0	0-50mV input, display at ANL1 value when input is 0																																																
<i>ANH1</i>	Higher limit display for analog input	-1999~9999	2000	0-50mV input, display at ANH1 value when input is 50mV																																																
<i>ALd1</i>	Alarm 1 mode	00 to 16	10	To SET the alarm mode for alarm 1																																																
<i>AH1</i>	alarm 1 hysteresis	0.0to 100.0	0.4	To SET the hysteresis for alarm 1																																																
<i>ALd2</i>	Alarm 2 mode	00 to 16	10	To SET the alarm mode for alarm 2																																																
<i>AH2</i>	Alarm 2 hysteresis	0.0to 100.0	0.4	To SET the hysteresis for alarm 2																																																
<i>OUT</i>	Control mode	Heat or cool	HEAT	HEAT :Reverse action(heating) COOL :Direct action(cooling)																																																
<i>OUT</i>	Output mode	rLY or Ssr	RLY	Relay or SSR Drive rLY ↔ SSR																																																
<i>SSRn</i>	SSRP ouptut mode	Std or CYCL or PHAS	Std	Standard SSR or zero-crossing trigger or phase angled trigger Std ↔ CYCL ↔ PHAS *only available for configuration when Out=ssr																																																
<i>HZ</i>	Power frequency selection	50HZ or 60HZ	60HZ	50HZ ↔ 60HZ 50HZ or 60HZ																																																
<i>LbAL</i>	Loop break alarm time duration condition	0-9999 s	80	LbA alarm will be triggered if the temperature did not increase more than the LbAb value within the time duration defined under LbAt, this applies for reverse(heating) control mode when output is 100%																																																
<i>LbAb</i>	Loop break alarm temperature variables	0-9999 Degrees	2	LbA alarm will be triggered if the temperature did not decrease more than the LbAb value within the time duration defined under LbAt, this applies for direct(cooling) control mode when output is 100% *LbAt and LbAb only available for configuration when Ald=09 orAld2=09																																																

\*\*ALARM TYPE TABLE (ALd\_00~16)

- |                              |   |
|------------------------------|---|
| 10: No alarm output          | 00: No alarm output                           |
| 11: Deviation high alarm     | 01: Deviation high alarm with hold action     |
| 12: Deviation low alarm      | 02: Deviation low alarm with hold action      |
| 13: Deviation high/low alarm | 03: Deviation high/low alarm with hold action |
| 14: Deviation band alarm     | 04: Deviation band alarm with hold action     |
| 15: Process high alarm       | 05: Process high alarm with hold action       |
| 16: Process low alarm        | 06: Process low alarm with hold action        |
|                              | 09: Loop break alarm                          |

# 7. Auto-tuning

Please active auto-tuning right after power on when Process value still far away from Setting value



Goes to parameter AT and change the AT value to NO if you want to turn off the auto-tuning. AT indicator flashing after auto-tuning initiated. Auto-tuning is an ON/OFF control mode, significant temperature oscillation is expected and the time duration for the auto-tuning could be extra long then expected depends on different system AT indicator stop flashing after autotune finished, P, I, D, rSt value was calculated automatically during the autotune process. controller goes back to PV/SV mode and with all the mentioned parameter saved with a new value. Controller starts to control the system with new parameter

# 8. Sensor type and Range

Sensor type	Code
K	0 to 400 °C K A4
	0 to 600 °C K A6
	0 to 1300 °C K B3
E	0 to 200 °C E A2
	0 to 400 °C E A4
	0 to 600 °C E A6
J	0 to 400 °C J A4
	0 to 600 °C J A6
	0 to 800 °C J A8
T	0 to 200 °C T A2
	0 to 300 °C T A3
	0 to 400 °C T A4
S	0 to 1600 °C S B6
R	0 to 1700 °C R B7
B	200 to 1800 °C B B8
N	0 to 1300 °C N B3
Wu3_Re25	600 to 2000 °C W B0

Sensor type	Code
Pt100	0 to 400 °C D A4
	0 to 600 °C D A6
	0 to 800 °C D A8
	-100 to +200 °C D C2
	-200 to +800 °C D C8
	-100.0 to +200.0 °C D F2
-50.0 to +200.0 °C D G2	
Input type	
0 to 20mV	V 01
0 to 50mV	V 02
0 to 5VDC	V 03
0 to 10VDC	V 04
1 to 5VDC	V 08
2 to 10VDC	V 09
4 to 20mA	A 03
0 to 20mA	A 02

Remark: The accuracy is not guaranteed for S type sensor at 0-100C

# Digital PID Controller

## EM104/EM404/EM504/EM704/EM904

### INSTRUCTION MANUAL

EM04-219-E1

Carefully read all the instructions in this manual. Please place this manual in a convenient location for easy reference.



#### WARNING

An external protection device must be installed if failure of this instrument could result in damage to the instrument, equipment or injury to personnel

All wiring must be completed before power is turned on to prevent electric shock, fire or damage to instrument and equipment

This instrument must be used in accordance with the specifications to prevent fire or damage to instrument and equipment.

This instrument is not intended for use in locations subject to flammable or explosive gases.

Do not touch high-voltage connections such as power supply terminals, etc. to avoid electric shock.

## 1. PRODUCT CHECK

MODEL (Size wideXhigh)	CODE
EM104 (48mmX48mm)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> - <input type="checkbox"/> <input type="checkbox"/> * <input type="checkbox"/> <input type="checkbox"/> - <input type="checkbox"/> <input type="checkbox"/>
EM404 (48mmX96mm)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> - <input type="checkbox"/> <input type="checkbox"/> * <input type="checkbox"/> <input type="checkbox"/> - <input type="checkbox"/> <input type="checkbox"/>
EM504 (96mmX48mm)	ÿ ÿ ÿ ÿ ÿ ÿ (6) (7) (8) (9)
EM704 (72mmX72mm)	
EM904 (96mmX96mm)	

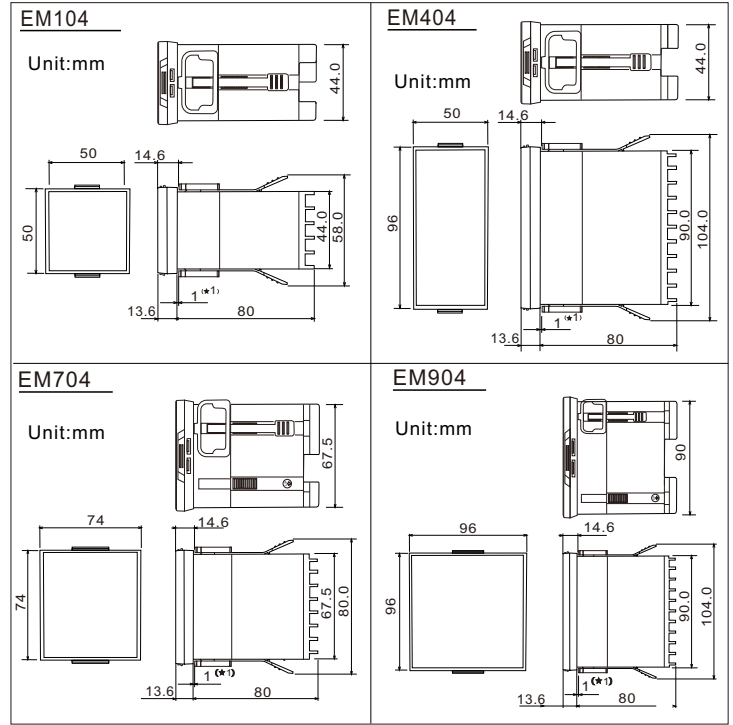
- Control action
  - N: No action
  - F: ReversePID action ( for Heating) D: Direct PID action (for cooling)
  - B: ON/OFF control (for heating) M: ON/OFF control (for cooling)
- Input type, (3) Range code: See"8.INPUT RANGE TABLE"
- Control output [OUT]
  - N: No action
  - M: Relay contact
  - V: Voltage pulse(for SSR)
  - 2: Current(DC0~20mA)
  - 8: Current(DC4 ~ 20 mA)
  - 5: 0~5VDC
  - 6: 0~10VDC
  - 7: 1~5VDC
  - T: Triac single phase zero crossing control
- Remark code: N
- Alarm 1[AL1] (7) Alarm 2[AL2]
  - A: Deviation high alarm
  - G: Deviation high/low alarm with hold action
  - B: Deviation low alarm
  - M: Deviation band alarm with hold action
  - C: Deviation high/low alarm
  - H: Process high alarm
  - D: Deviation band alarm
  - J: Process low alarm
  - E: Deviation high alarm with hold action
  - K: Process high alarm with hold action
  - F: Deviation low alarm with hold action
  - L: Process low alarm with hold action
- Power
  - B: 85-265VAC
- Communication
  - N: No Communication
  - M: Rs485 communication Modbus-RTU

## 2. MOUNTING

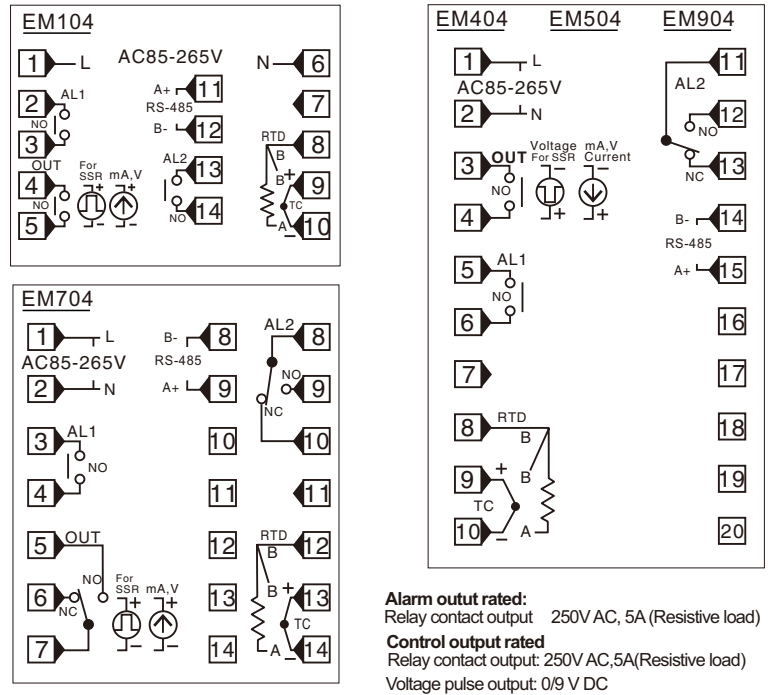
### 2.1 Mounting Cautions

- Use this Instrument within the following ambient temperature and ambient humidity.
  - Allowable ambient temperature: 0 to 50
  - Allowable ambient humidity: 45 to 85% RH
- Avoid the following when selecting the mounting location.
  - Rapid changes in ambient temperature which may cause condensation.
  - Corrosive or inflammable gases.
  - Direct vibration or shock to the mainframe.
  - Water,oil,chemicals,vapor or steam splashes.
  - Excessive induction noise, static electricity, magnetic fields or noise.
  - Direct air flow from an air conditioner.
  - Exposure to direct sunlight.
  - Excessive heat accumulation.

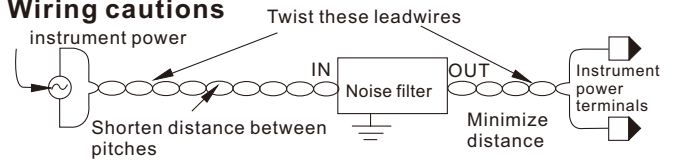
## 2.2 Dimensions



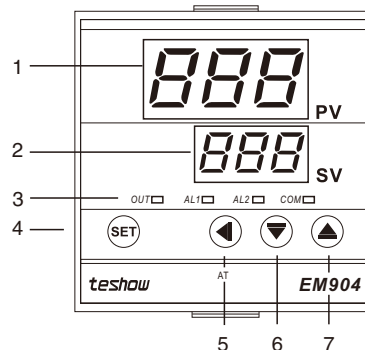
## 3. WIRING



### 3.1 Wiring cautions



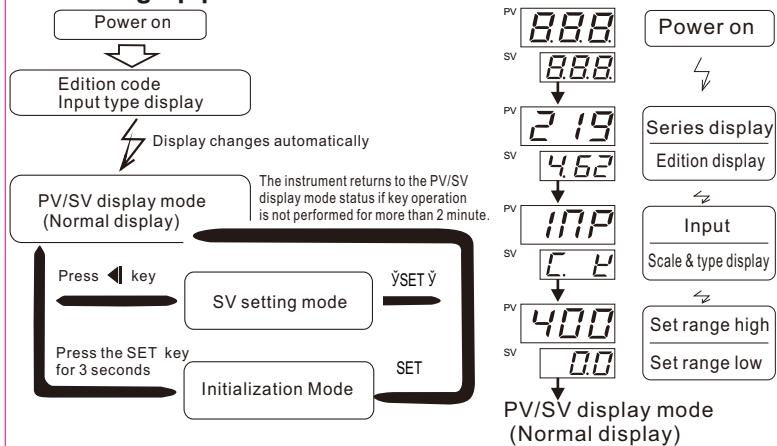
## 4. PARTS DESCRIPTION



- Measured value (PV) display [RED]
- Set value(PV)display [Red]
- Indication lamps  
Control output lamps (OUT1)  
Alarm1 (AL1) Alarm2 (AI2)
- SET** (Set key)  
Used for parameter calling up and set value registration
- ◀ Shift & Autotuning key
- ▼ (Down key) Decrease numbers
- ▲ (Up key) Increase numbers

## 5. SETTING

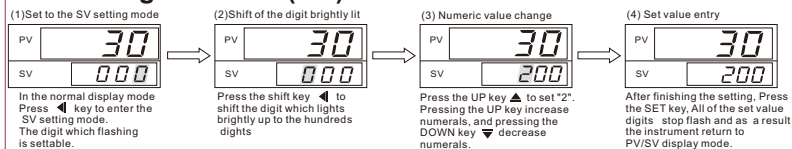
### 5.1 Calling up procedure of each mode



#### \*\*A: Input type table

Display	<i>K</i>	<i>T</i>	<i>E</i>	<i>J</i>	<i>N</i>	<i>Pt</i>
Input	K	T	E	J	N	Pt100
Range	0 to 999 °C	0 to 400 °C	0 to 999 °C	0 to 999 °C	0 to 999 °C	0 to 800 °C

### 5.2 Setting set value(SV) Example: Following is an example of set value(SV) to 200



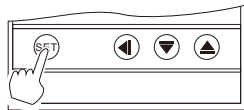
### 5.3 Setting parameters other than set value (SV)

The setting procedures are the same as those of example (2) to (4) in the above "Setting set value (SV)". Press the SET key after the setting end shifts to the next parameter. When no parameter setting is required, return the instrument to the PV/SV display mode.

## 6. Initialization Mode

### 6.1 User level (Level 1)

Press the SET key for 3 seconds to User level



6.1.1 After the value be registered, you can press SET key for 3 seconds to return the instrument to the PV/SV display mode. The following parameter symbols are displayed one by one every time the SET key is pressed.

Symbol	Name	Range	Description
<i>AL1</i>	Alarm 1	-199 to 999	Set the alarm value for alarm 1. Alarm differential gap=AH1
<i>AL2</i>	Alarm 2	-199 to 999	Set the alarm value for alarm 2. Alarm differential gap=AH2
<i>LcK</i>	Set data lock	0 to 999	Lck=0, Allow to modify any parameter and SV Lck=1, Only allow to modify SV, Lck=2, Only allow to modify SV, AL1, AL2, Lck=3, , Not allow to modify any parameter and SV Lck=808, Set to 808 and press SET key to level 2 Lck=809, Set to 809 and press SET key to level 3

### 6.2 PID level (Level 2)

Set to LcK to 808 and press SET key to PID level

The following parameter symbols are displayed one by one every time the SET key is pressed. 1# Factory set value

Symbol	Name	Range	1#	Description
<i>P</i>	Proportional band	1.0 to 200	20.0	Proportional band in PID with unit
<i>I</i>	Integral time	0 to 999	210	Set the time of integral action to eliminate the offset occurring in proportional control.
<i>d</i>	Derivative time	0 to 999	30	Set the time of derivative action to improve control stability by preparing for output changes.
<i>CyT</i>	Proportioning cycle	0 to 999	20	Proportioning cycle time for PID control (or compressor protect timer for cooling ON/OFF control)
<i>HYS</i>	Control Hysteresis	0 to 999	1.0	Control out differential gap=HYS (ON/OFF action)

<i>rSt</i>	Proportional reset	-199 to 200	-5.0	Proportional reset for overshoot protection (Auto setting after autotuning)
<i>OPL</i>	Output limit (Low)	0.0 to 100%	0.0	Output manipulated variable lowest limit
<i>OPH</i>	Output limit (High)	0.0 to 100%	100	Output manipulated variable highest limit
<i>bUF</i>	Output buffer	0.0 to 100%	100	Output variance value percentage per second buffer limit Only for 4-20mA output

### 6.3 Input level (Level 3)

Set to LcK to 809 and press SET key to Input level

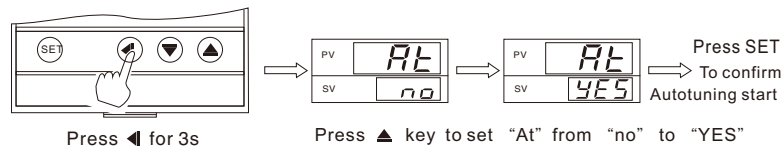
The following parameter symbols are displayed one by one every time the SET key is pressed. 1# Factory set value

Symbol	Name	Range	1#	Description
<i>INP</i>	Main input type select	/	K	K, t, E, J, N, Pt100
<i>dP</i>	Decimal point	0 to 1	0	0: No decimal point, 1: One decimal point mode
<i>SPL</i>	Low setting limiter	-199 to 999	0.0	Set lower setting limiter
<i>SPH</i>	High setting limiter	-199 to 999	400	Set high setting limiter
<i>UNt</i>	Display scale	C or F	C	C: Centigrade F: Fahrenheit
<i>SCb</i>	PV bias	-199 to 999	0.0	Sensor correction is made by adding bias value to measured value(PV).
<i>FIL</i>	PV follow-up PV input filter	0 to 60	55	PV variable-value control, 0-30: for general, 31-60: for enhanced
<i>Act</i>	Control action	/	rE	rE: PID action (reverse action) dr: PID action (Direct action)
<i>CrL</i>	Contron mode	/	Pid	Pid: PID control oF1: On/Off control oF2: On/Off control with compressor protect timer
<i>Ad1</i>	Alarm1 mode	00 to 16	11	Select the type of alarm1 See(**ALARM TYPE TABLE)
<i>AH1</i>	Alarm1 differential gap	0.1 to 999	0.4	Alarm1 differential gap setting
<i>Ad2</i>	Alarm2 mode	00 to 16	10	Select the type of alarm2 See(**ALARM TYPE TABLE)
<i>AH2</i>	Alarm2 differential gap	0.1 to 999	0.4	Alarm2 differential gap setting
<i>AdD</i>	Device address setting	0-127	1	Communication device address setting.
<i>bAU</i>	Band-rate setting	/	9.6	BAUd=2.4K 4.8K 9.6K 19.2K

#### \*\*ALARM TYPE TABLE (Ad\_=00~16)

10: No alarm output	00: No alarm output
11: Deviation high alarm	01: Deviation high alarm with hold action
12: Deviation low alarm	02: Deviation low alarm with hold action
13: Deviation high/low alarm	03: Deviation high/low alarm with hold action
14: Deviation band alarm	04: Deviation band alarm with hold action
15: Process high alarm	05: Process high alarm with hold action
16: Process low alarm	06: Process low alarm with hold action

## 7. AUTOTUNING



Change "At" from "on" to "OFF", then press SET key to confirm, then the Autotuning process will be cancelled.

## 8. INPUT RANGE TABLE

Input type	Code
K	0 to 400 ¯ J : A4
	0 to 600 ¯ K : A6
	0 to 999 ¯ L : A0
E	0 to 400 ¯ E : A4
	0 to 600 ¯ E : A6
	0 to 999 ¯ E : A0
N	0 to 400 ¯ N : A4
	0 to 600 ¯ N : A6
	0 to 999 ¯ N : A0
J	0 to 400 ¯ J : A4
	0 to 600 ¯ J : A6
	0 to 999 ¯ J : A0
T	0 to 400 ¯ T : A4
	0 to 600 ¯ T : A6
	0 to 999 ¯ T : A0
Pt100	0 to 400 ¯ D : A4
	0 to 600 ¯ D : A6
	0 to 800 ¯ D : A8