

# PRODUCT MANUAL

## Temperature Controller



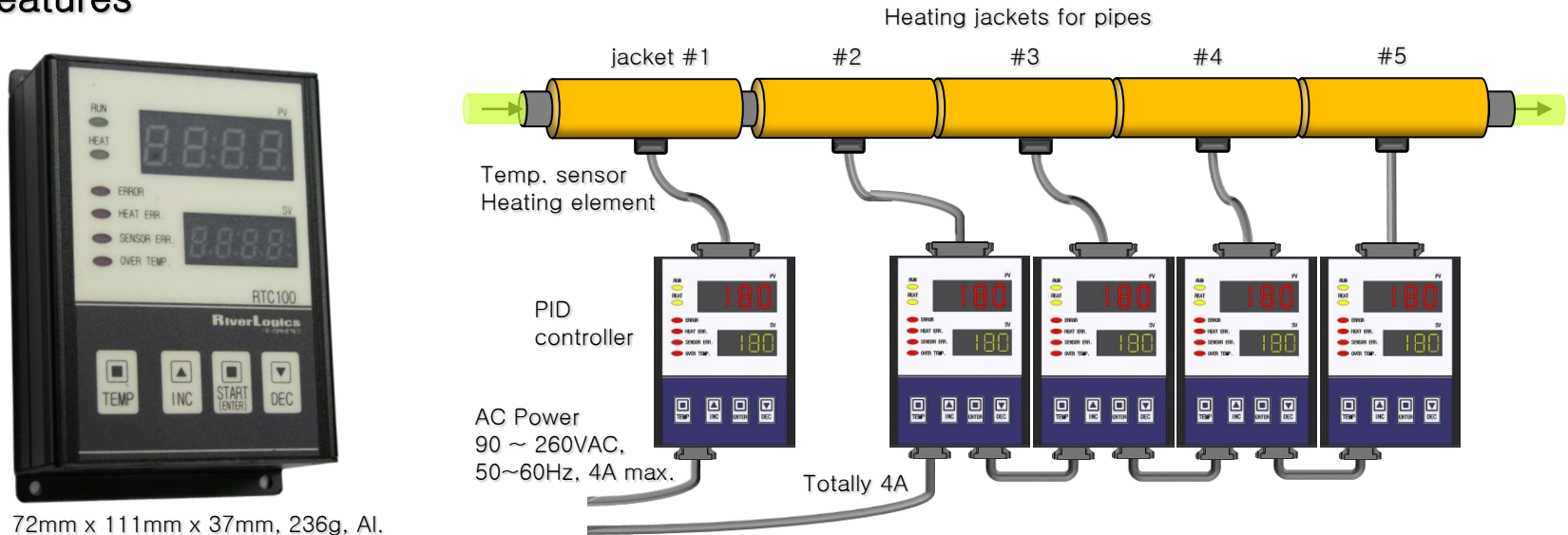
**RiverLogics**  
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# Temperature Controller

## 1. Features

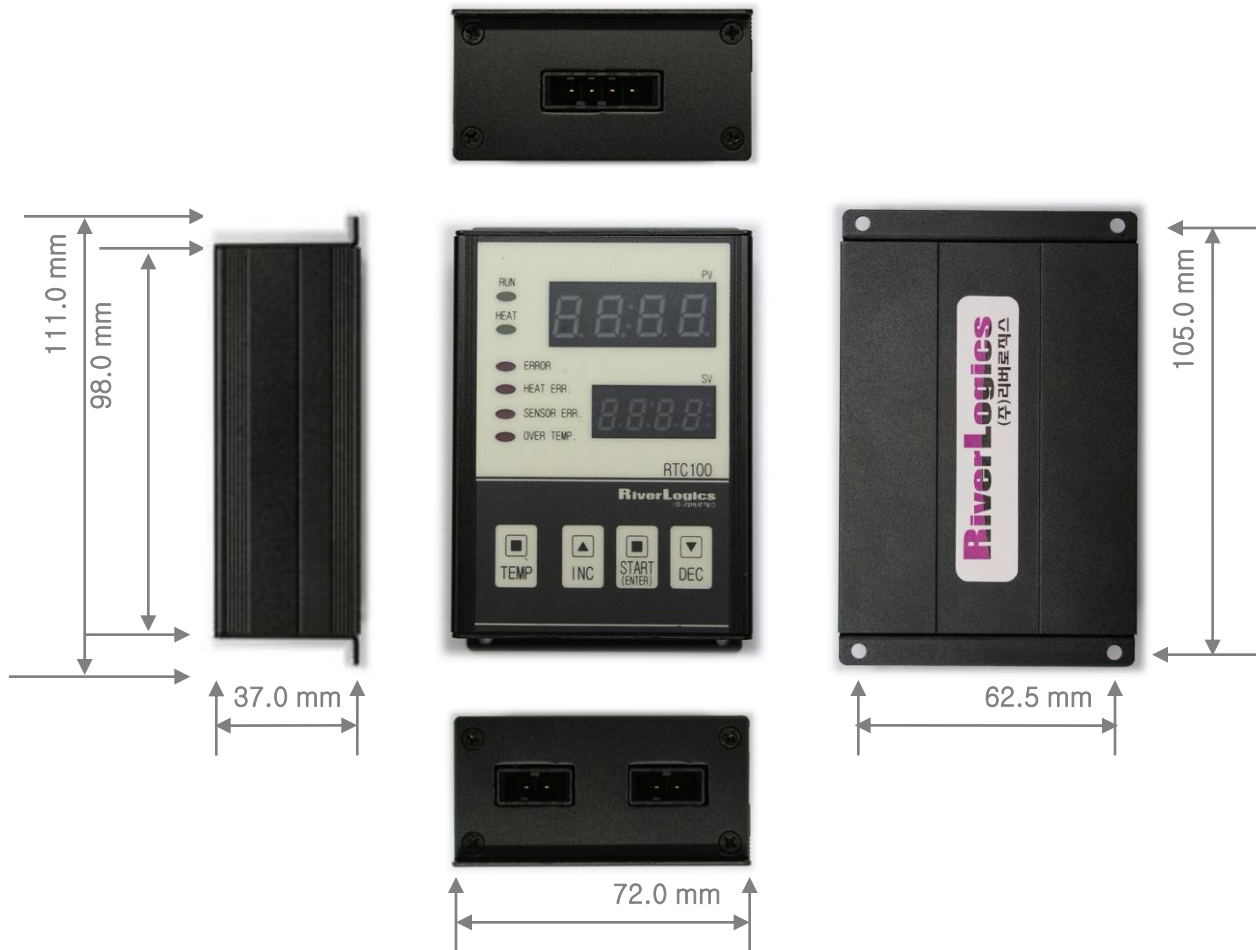


72mm x 111mm x 37mm, 236g, Al.

- A small-sized PID temperature controller for heating jackets, machines and equipment
- Adaptive control scheme for various heating systems does not require tuning time and effort
- Three types of selectable PID settings are provided considering the rise time and overshoot
- Built-in free voltage power supply (90 ~ 260VAC, 50~60Hz, 4A max.)
- A built-in high current heating switch (TRIAC, BTA26-600B)
- High precision temperature control (display resolution  $\pm 0.1^{\circ}\text{C}$ )
- Wide control temperature range ( $-100 \sim +350^{\circ}\text{C}$ )
- Open circuit & short circuit fault check on the temperature sensor, heating element and switch
- Safety trips and alarms (circuit fault, power frequency)
- Stop running when temperature indication(PV) is  $10^{\circ}\text{C}$  higher than the set-value(SV) – (standard)
- Can start by itself when the main power is applied – (special order specification)
- Heat-resistant aluminium case (with special order magnets inside)

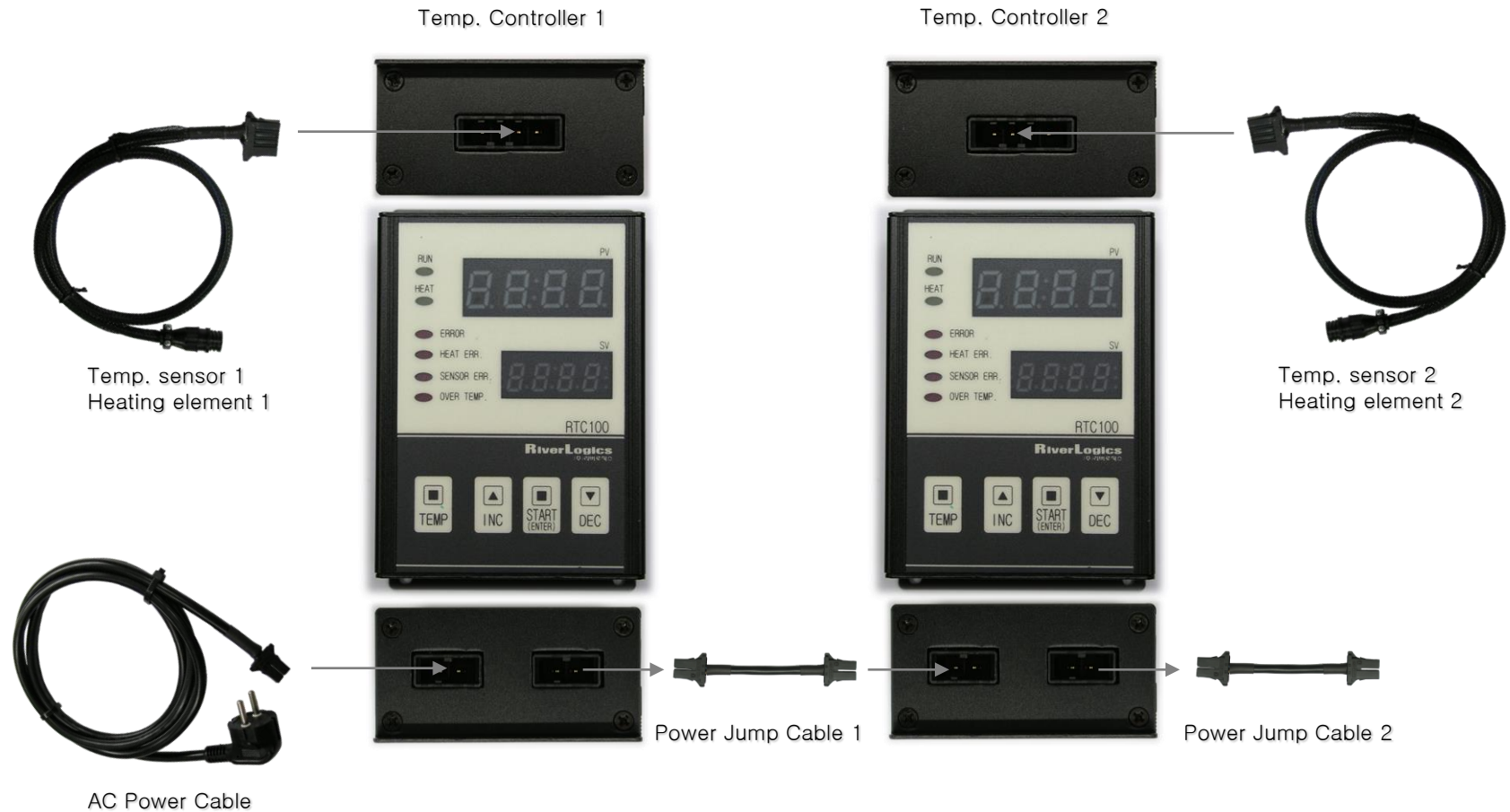
# Temperature Controller

## 2. Outline & Dimension



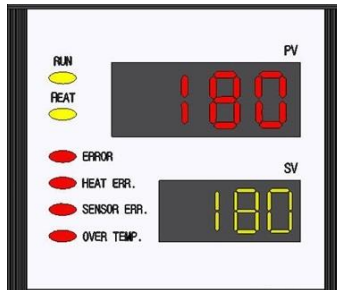
# Temperature Controller

## 3. Wiring



# Temperature Controller

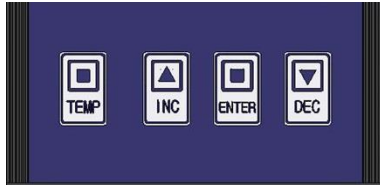
## 4. Display Panel



- ✓ PV : Display for Present Value of a temperature sensor  
Resolution  $\pm 0.1^{\circ}\text{C}$
- ✓ SV : Set Value display for the control  
Resolution  $\pm 0.1^{\circ}\text{C}$
- ✓ RUN : The operation lamp turns on while the controller is running
- ✓ HEAT : The heating lamp turns on when the heating switch is turned on  
Heating intensity to be proportional to the lamp duty cycle
- ✓ ERROR : The error lamp turns on and the controller stops when one or more faults occurred during the temperature control operation
- ✓ HEAT ERR : The heat error lamp turns on during the heating element fault
- ✓ SENSOR ERR : The sensor error lamp turns on during the temp. sensor fault
- ✓ OVERTEMP : The over-temp. lamp turns on when PV is  $10^{\circ}\text{C}$  higher than SV during the control

# Temperature Controller

## 5. Control Keys

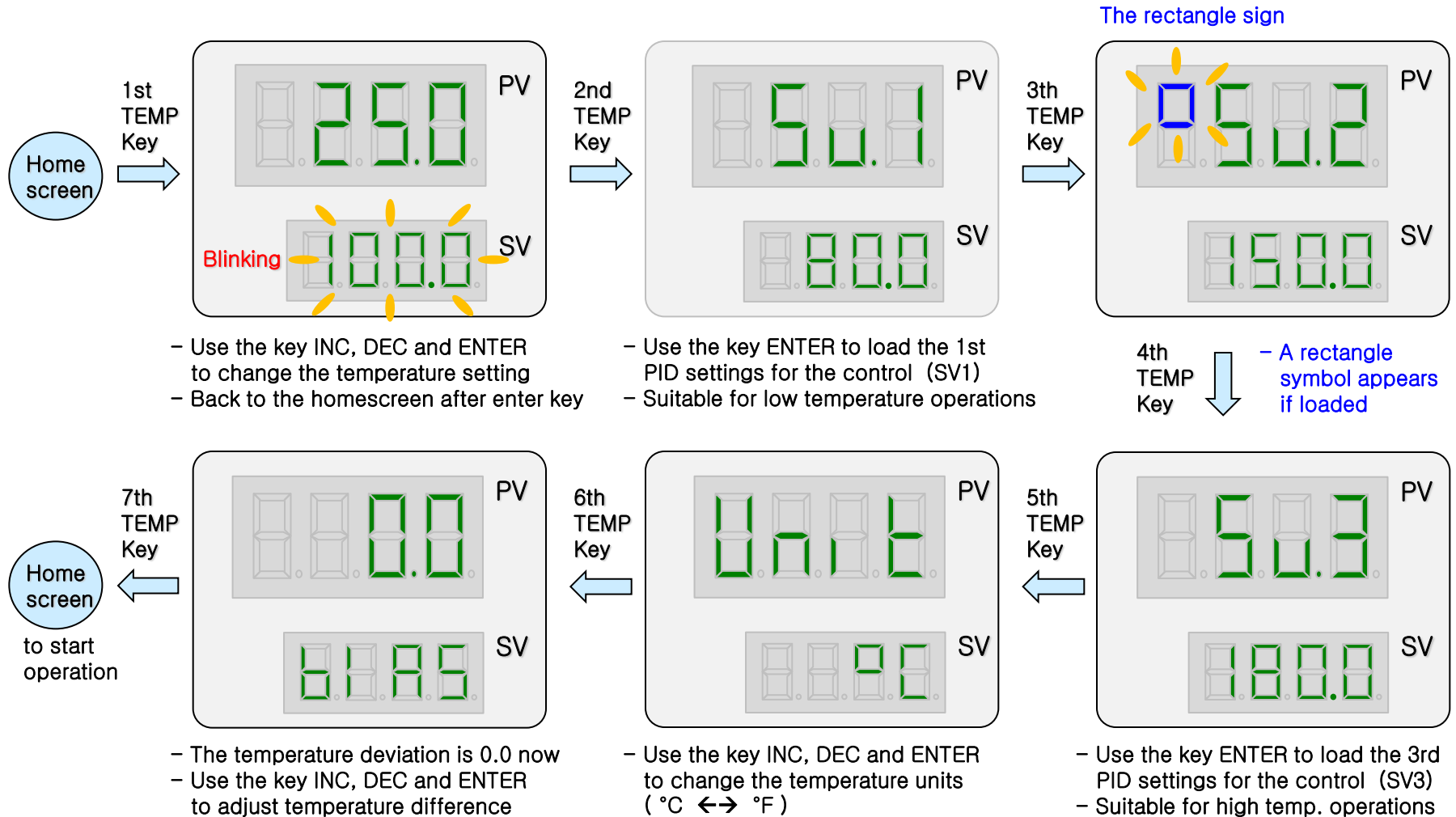


- ✓ TEMP : One of the menus below appears if the TEMP key is pressed
  - (1) : Changing the temperature setting(SV) for the control
  - (2) : SV1 parameter(PID for 80°C) loading for the control
  - (3) : SV2 parameter(PID for 150°C) loading for the control
  - (4) : SV3 parameter(PID for 180°C) loading for the control
  - (5) : Changing the temperature units ( °C ↔ °F )
  - (6) : Temperature difference adjustment
- ✓ INC : Contents of the menus above are increased if the INC key is pressed
- ✓ DEC : Contents of the menus above are decreased if the DEC key is pressed
- ✓ ENTER : Contents of the menus above are fixed if the ENTER key is pressed
- ✓ START/STOP : The START/STOP key is identical to the ENTER key
  - : They are one and the same
  - : This key is used to turn the temperature control operation on or off
  - : The controller starts or stops operation if the toggle key is pressed



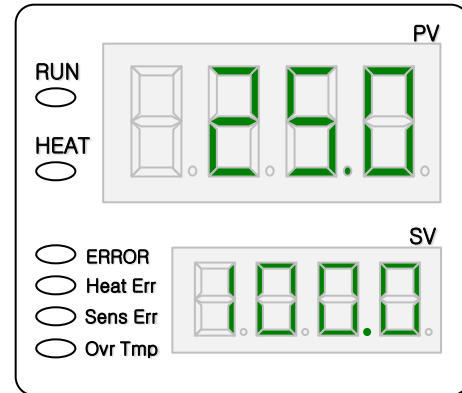
# Temperature Controller

## 6. Functional Flow



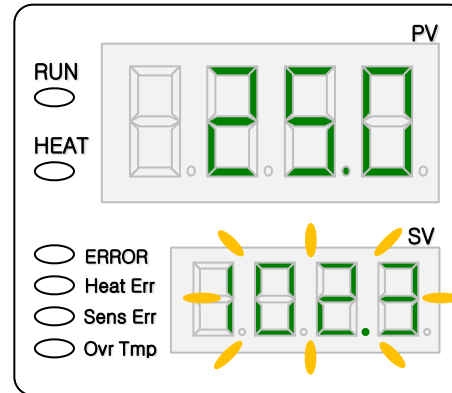
# Temperature Controller

## 7. Operation & Errors



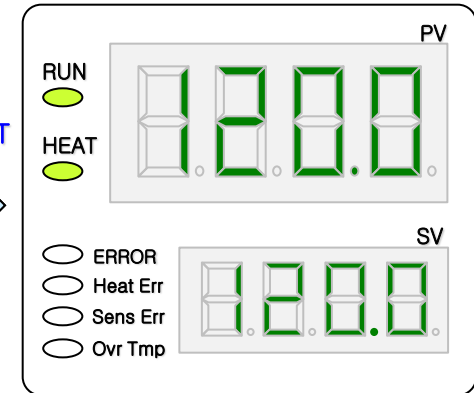
- Home screen to start operation
- Remove connector J1

the TEMP Key

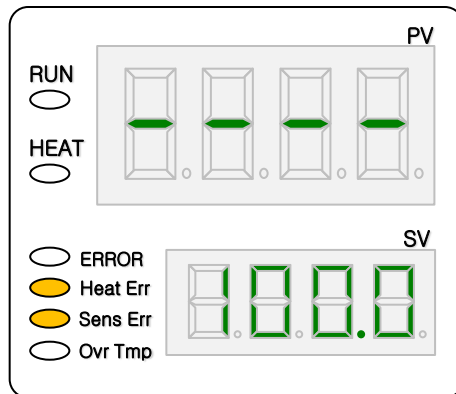


- Use the key INC, DEC and ENTER to change the temperature setting
- Remove connector J1

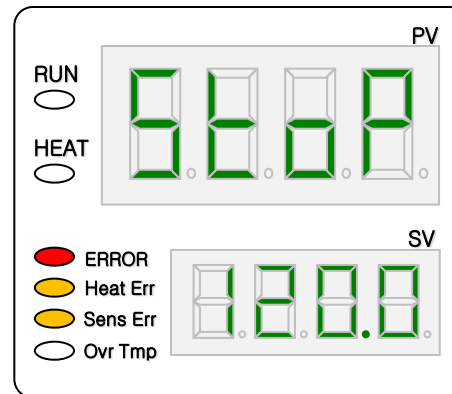
the START Key



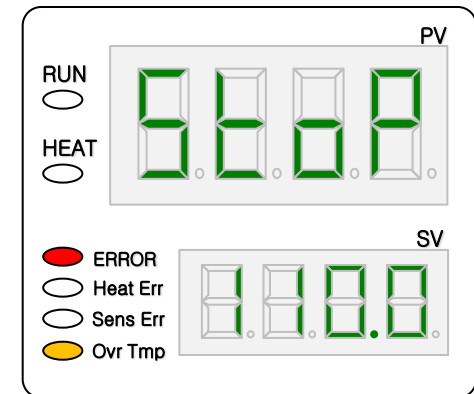
- The temperature control operation
- Turn down the temp setting 10°C



- The error lamps turn on during faults (the heating element, the temp. sensor)



- The controller stops when errors happen (the heating element, the temp. sensor)

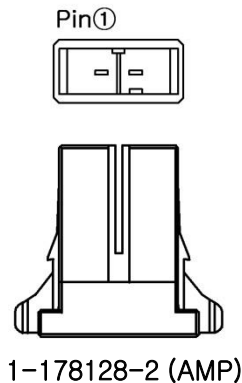
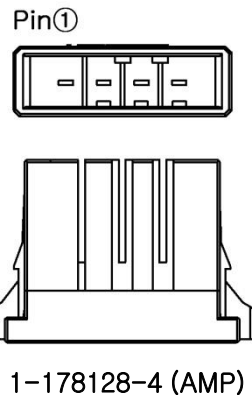


- The over-temp lamp turns on when PV is 10°C higher than SV during the control operation



# Temperature Controller

## 8. Connectors



Conn. J1

Pin	Description
1	TC- (temp. sensor)
2	TC+ (temp. sensor)
3	Heating element (AC)
4	Heating element (AC)

- Type K Thermocouple can be used as a temperature sensor
- Specific heat capacity of an element should be found for a heating

Conn. J2 and J3

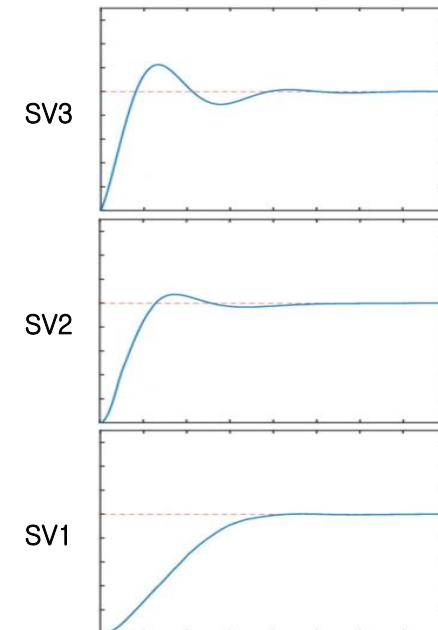
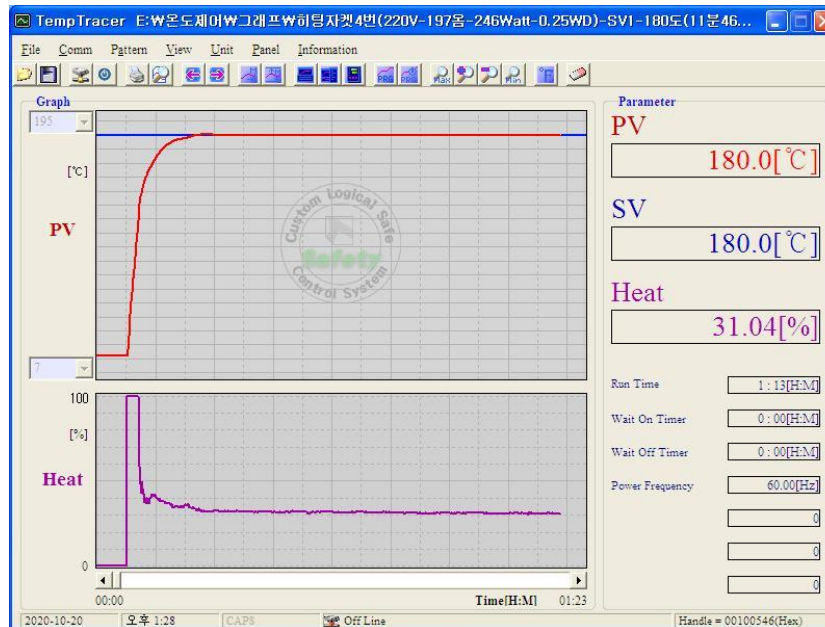
Pin	Description
1	AC power N
2	AC Power L

- Make sure neutral terminals from the AC power are always connected to the pin no. 1 of J2 and J3
- Otherwise, short circuits caused by incorrect cable connections lead to some serious damage

# Temperature Controller

## 9. Temperature Control

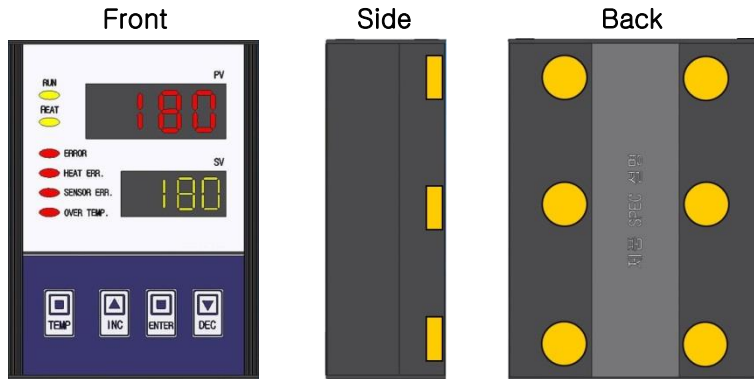
- Adaptive control scheme for various latent heat and time delay systems does not require tuning
- Selectable PID settings provided in the controller saves time and effort to tune
- Three types of PID settings(SV1, SV2 or SV3) considering the rise time and overshoot
- Choose a PID setting among the given choices to get the best result for the system
- The shorter rise time is the bigger overshoot is



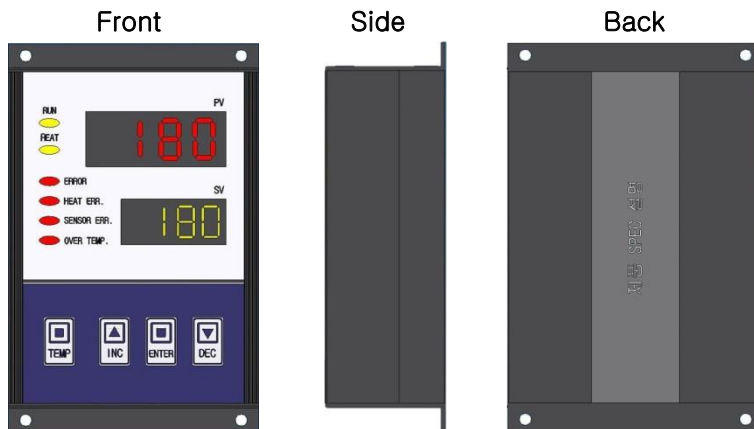
- Settling time : 11m. 46s.
- Overshoot : 0.4°C
- Undershoot : 0.0°C
- Heating jacket : 180°C, 220V, 197Ω, 246Watt, 0.25W/cm<sup>2</sup>, SV1@ 24°C

# Temperature Controller

## 10. Installation



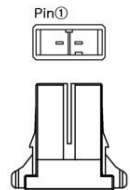
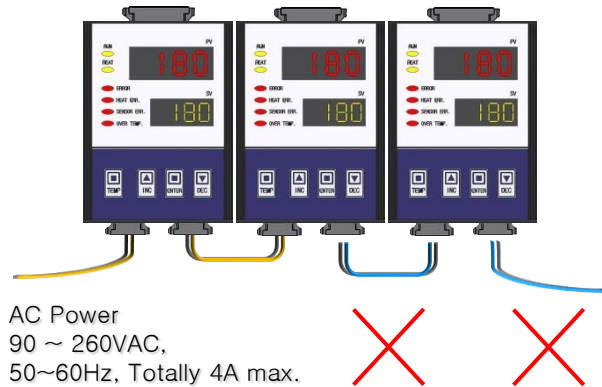
- The first type of controller has six strong thin neodymium magnets inside
- This type of controller is easy to install on the equipment made of steel



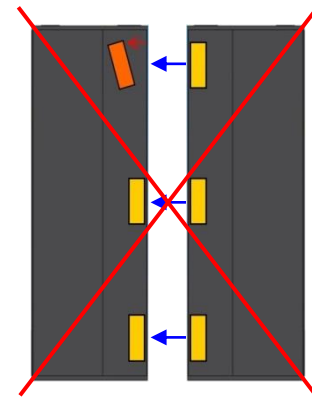
- The second type of controller without magnets has two brackets with holes
- Four M3-sized screws should be used to install a controller

# Temperature Controller

## 11. Cautions



- Make sure neutral terminals from the AC power are always connected to the pin no. 1 of J2 and J3
- Otherwise, short circuits caused by incorrect cable connections lead to some serious damage



- If two controllers with magnets happen back to back, they should not be very close together
- Leave a space between them not to push each other
- Otherwise, magnets may come apart from the body, and lead to serious problems

# Temperature Controller

## 12. Ordering Information

Option	Type	Description
STD	Standard controller	Three selectable PID settings(SV1, 2, 3) are provided in the controller. The standard upper limit of the control temperature is 350 degrees Celsius. Stop running when temperature indication(PV) is 10°C higher than the set-value(SV) during the control. (S10 : Allowable overshoot is 10°C or less during the control)
SV1	Special order	A special order controller with PID setting SV1 only
SV2	Special order	A special order controller with PID setting SV2 only
SV3	Special order	A special order controller with PID setting SV3 only
100	Special order	The upper limit of the control temperature can be changed by order specification, for example 100. When the controller display temperature exceeds the limit, the controller stops.
S01 (~ S99) S00	Special order	S01(~99) : Allowable temperature overshoot range is 1(~99)°C during the control. Control stop with error indication when overshoot higher than the range. S00 : Continuous operation with overshoot indication even under overshoot condition during the control. This setting is necessary when the set-value(SV) is changed to the temperature less than present value(PV) or ambient temperature. (low temperature incubator or chiller with cooling system)
MEM	Special order	A special order controller with memory function. The operation state is memorized when the start key is pressed and operated. It starts by itself when the main power is applied. If the operation is stopped by pressing the stop key, it will not start.
MAG	Special order	A special order controller with magnets. It has six strong thin neodymium magnets inside and it is easy to install on the equipment made of steel.
OV	Controller for jacket or oven	A controller that controls the temperature of jacket or oven air, for example oven or incubator.
BT	Controller for bath	A controller that directly controls the temperature of water or oil, for example water bath.

- product name-**OV-STD** : A standard jacket controller with three PID settings (SV1, 2, 3)
- product name-**OV-SV2-100-MEM** : A controller with PID setting SV2, special limit(100°C) and memory function
- product name-**BT-STD** : A standard bath controller with three PID settings (SV1, 2, 3)
- product name : RTC100

# PRODUCT MANUAL



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