

RS PRO DIGITAL & ANALOGUE TEMPERATURE CONTROLLER



With Analogue Set, ON/OFF or Time Proportional Digital & Analogue Temperature Controller

- 4 Digits Display
- J type Thermocouple Input or, K type Thermocouple Input or, R type Thermocouple Input or, S type Thermocouple Input or, 2 or 3-wire PT 100 Input (It must be determined in order)
- ON/OFF or Time Proportional Operation
- Adjustable Hysteresis Value with DIP Switch for ON/OFF Control
- Adjustable Control Period with DIP Switch for ON/OFF Control
- Adjustable Set Offset Value

Digital & Analogue Temperature Controllers are designed for measuring and controlling temperature. They can be used in many applications with their simple and easy to use properties. On / Off and time proportional control form. They are mainly used in glass, plastic, petro-chemistry, textile, automotive and machine production industries.

SPECIFICATIONS INPUT

Thermocouple(TC): J, K (IEC 584.1) (ITS90)
 Thermoresistance(RTD): 2 or 3-wire Pt100 (IEC 751)(ITS90)
 Measurement Range: It is in ordering information
 Accuracy: $\pm 1\%$ of full scale
 Cold Junction Compensation: Automatically $\pm 0.1^\circ\text{C}/1^\circ\text{C}$
 Sensor Break Protection: Upscale
 Sampling Cycle: 3 samples per second

CONTROL

Control Form: ON/OFF or P(Time Proportional) selectable.
 Proportional Band : It can be adjust up to %30 of full scale.
 ON/OFF Hysteresis : It can be adjust %0.25, 0.5%, %1 or %2 of full scale with DIP switch
 Control Time: 1 second (SSR output active), 5 seconds (SSR and Relay outputs active), 10 seconds (SSR and Relay outputs active) and 20seconds (SSR and Relay outputs active) options are selectable with DIP switch

OUTPUT

Control Output: Relay(5A@250V~ at resistive load)
 SSR Driver Output (Maximum 50mA,Maximum 18V=)

SETTINGS

Set Point : It can be adjust with potentiometer on the front panel.
 Set Offset : It can be adjust up to %20 of full scale from the front panel
 Resolution of Set Point: ± 0.2 of full scale
 Accuracy of Set Point: $\pm 1\%$ of full scale

DISPLAY

Display :8 mm Green 4 digits LED indicator
 LED Indicators : PWR(Green), Out(Red)

POWER SUPPLY

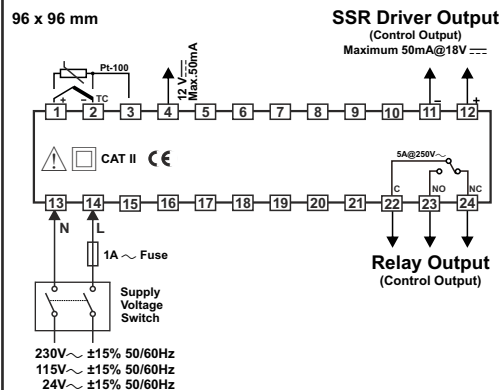
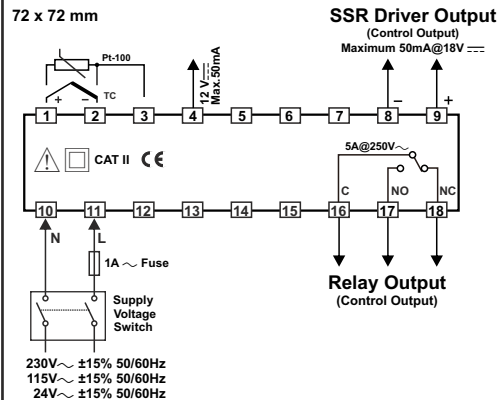
Power Supply Voltage : 230 V ~ ($\pm 15\%$) 50/60 Hz - 4VA
 115 V ~ ($\pm 15\%$) 50/60 Hz - 4VA
 24 V ~ ($\pm 15\%$) 50/60 Hz - 4VA
 (It must be determined in order.)

ENVIRONMENTAL RATINGS and PHYSICAL SPECIFICATIONS

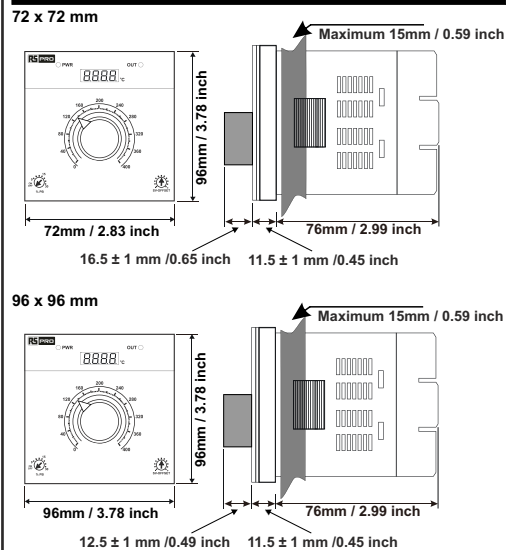
Operating Temperature : 0...50°C
 Humidity : 0-90%RH (none condensing)
 Protection Class : IP65 at front, IP20 at rear

WEIGHT	DIMENSION	PANEL CUT-OUT
300 gr	72x72 mm, Depth:104 mm	69 x 69 mm
400 gr	96x96 mm, Depth:100 mm	92 x 92 mm

Electrical Wiring



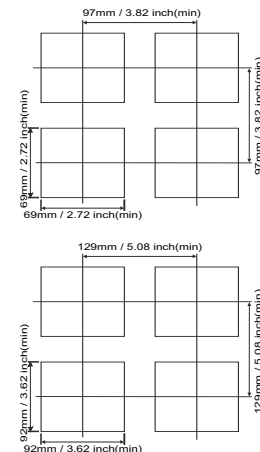
Dimensions



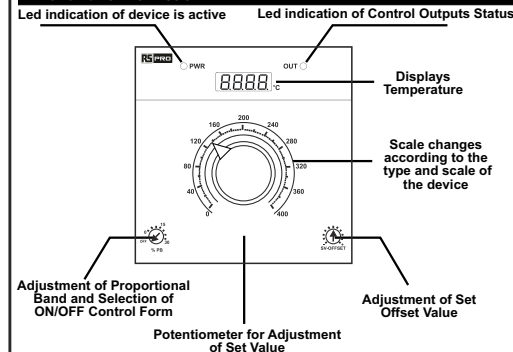
Panel Mounting

- 1- Before mounting the device in your panel, make sure that the panel cut-out is suitable.
- 2- Check front panel gasket Position.
- 3- Insert the device through the cut-out. If the mounting clamp are on the unit, put out them before inserting the unit to the panel.
- 4- Insert the unit in the panel cut-out from the front side.
- 5- Insert the mounting clamps to the holes that located top and bottom sides of device and screw up the fixing screws until the unit completely immobile within the panel.

Panel Cut-out



Front Panel Definition



Operation Settings

Set Values

Set value can be adjusted with Set Value Adjustment Potentiometer that is on the front panel. Set value range changes according to the type and scale of the device. Minimum and maximum values of Set value according to the device type are given below:

Set Values according to the Type and Scale of the Device

For PT-100 (-100.0 to 100.0) °C
For PT-100 (0.0 to 50.0) °C
For PT-100 (0.0 to 200.0) °C
For PT-100 (0 to 400) °C
For J Type TC (0 to 400) °C
For J Type TC (0 to 800) °C
For K Type TC (0 to 1200) °C
For R Type TC (0 to 1600) °C
For S Type TC (0 to 1600) °C

ON/OFF, Time Proportional Operation Form Selection

Operation form can be adjusted with proportional band adjustment and ON/OFF Control Form selection trimpot that is on the front panel.



Trimpot is adjusted to point out ON/OFF part for ON/OFF Control form.



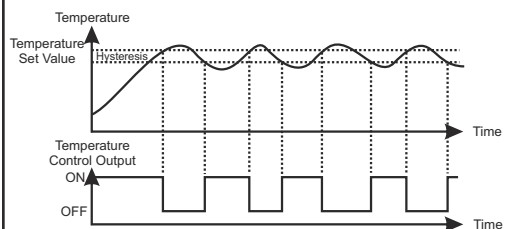
Trimpot is adjusted to point out different from ON/OFF part for proportional operation. Proportional Band Value can be adjusted from 0% to 30% of full scale. Minimum and maximum value of proportional band according to the type and scale of the device are given below:.

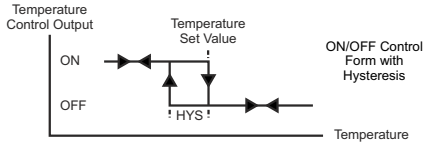
Proportional Band Values according to the type and scale of the device

For PT-100 (-100.0 to 100.0) °C scaled devices : 0.0 to 60.0 °C
For PT-100 (0.0 to 50.0) °C scaled devices : 0.0 to 15.0 °C
For PT-100 (0.0 to 200.0) °C scaled devices : 0.0 to 60.0 °C
For PT-100 (0 to 400) °C scaled devices : 0 to 120 °C
For J Type TC (0 to 400) °C scaled devices : 0 to 120 °C
For J Type TC (0 to 800) °C scaled devices : 0 to 240 °C
For K Type TC (0 to 1200) °C scaled devices : 0 to 360 °C
For R Type TC (0 to 1600) °C scaled devices : 0 to 480 °C
For S Type TC (0 to 1600) °C scaled devices : 0 to 480 °C

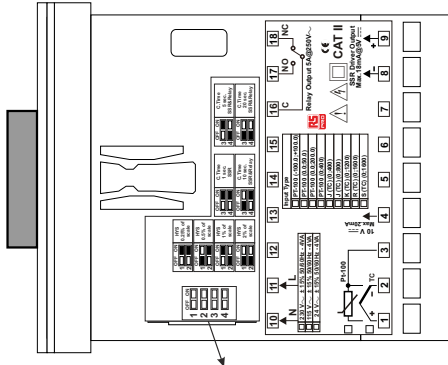
Adjustment of Hysteresis Value for ON/OFF Control

In ON/OFF control algorithm, temperature value is tried to keep equal to set value by opening or closing completely last control element. ON/OFF controlled system, temperature value oscillates continuously. Temperature value's oscillation period or amplitude around set value changes according to controlled system. For reducing oscillation period of temperature value, a threshold zone is formed below or around set value and this zone is named hysteresis. Action of control output is described with figures below.





In operation with ON/OFF Control form; hysteresis value can be adjusted with DIP Switch on the device.



DIP Switch is under cover and cover is on top side of the device

Hysteresis Value Selection

OFF ON 1 <input type="checkbox"/> <input checked="" type="checkbox"/> 2 <input type="checkbox"/> <input checked="" type="checkbox"/>	%0.25 of full scale is selected
OFF ON 1 <input type="checkbox"/> <input checked="" type="checkbox"/> 2 <input checked="" type="checkbox"/> <input type="checkbox"/>	%0.5 of full scale is selected
OFF ON 1 <input checked="" type="checkbox"/> <input type="checkbox"/> 2 <input type="checkbox"/> <input type="checkbox"/>	%1 of full scale is selected
OFF ON 1 <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> 2 <input checked="" type="checkbox"/> <input type="checkbox"/>	%2 of full scale is selected

Minimum and maximum value of hysteresis according to the type and scale of the device are given below:

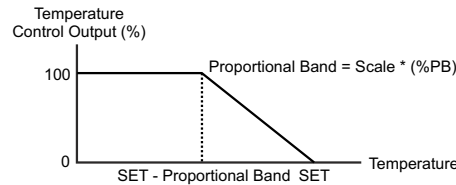
Input Type	Dip Switch Position			
	%0.25	%0.5	%1.0	%2.0
For PT-100 (-100.0 to 100.0) °C :	0.5°C	1.0°C	2.0°C	4.0°C
For PT-100 (0.0 to 50.0) °C :	0.2°C	0.3°C	0.5°C	1.0°C
For PT-100 (0.0 to 200.0) °C :	0.5°C	1.0°C	2.0°C	4.0°C
For PT-100 (0 to 400) °C :	1.0°C	2.0°C	4.0°C	8.0°C
For J Type TC (0 to 400) °C :	1.0°C	2.0°C	4.0°C	8.0°C
For J Type TC (0 to 800) °C :	2.0°C	4.0°C	8.0°C	16.0°C
For K Type TC (0 to 1200) °C :	3.0°C	6.0°C	12.0°C	24.0°C
For R Type TC (0 to 1600) °C :	4.0°C	8.0°C	16.0°C	32.0°C
For S Type TC (0 to 1600) °C :	4.0°C	8.0°C	16.0°C	32.0°C

Adjustment of Control Period For Time Proportional Control

In time proportional operation; Control Period is adjusted by changing the position of the DIP Switch that is on the device.

Control Period Select, on

OFF ON 3 <input type="checkbox"/> <input checked="" type="checkbox"/> 4 <input type="checkbox"/> <input checked="" type="checkbox"/>	1 Second (For SSR Driver Output)
OFF ON 3 <input type="checkbox"/> <input checked="" type="checkbox"/> 4 <input type="checkbox"/> <input type="checkbox"/>	5 Seconds (For SSR and Relay Output)
OFF ON 3 <input type="checkbox"/> <input type="checkbox"/> 4 <input type="checkbox"/> <input checked="" type="checkbox"/>	10 Seconds (For SSR and Relay Output)
OFF ON 3 <input type="checkbox"/> <input type="checkbox"/> 4 <input type="checkbox"/> <input type="checkbox"/>	20 Seconds (For SSR and Relay Output)



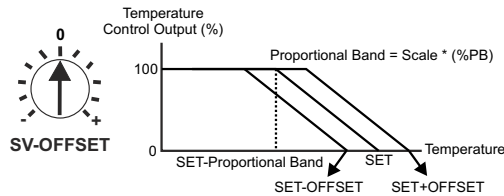
Relay Output : Output period must be short for stable process control. Relay must not be used in short output periods because of limited life of their relay contact (number of open/close events).

SSR Output : If short output period is needed in a system (approximately 1-2 seconds) SSR driver output module as last control element is recommended.

Example : For a (0 , 400°C) scaled device, proportional band is adjusted 15 with proportional band adjustment and ON/OFF control form trimpot. control period is adjusted 10 seconds with DIP switch. The system will give 100% output, until temperature is in proportional band, namely until temperature is 340°C (Scale*15/100 = 400*15/100 = 60). When temperature is being close to set value, %output is started to be reduced. In this case, when the device calculates 60% output, the system will be energised for 60% of device's control period. (For this example; 60% of 10 seconds = 6 seconds the system will be energised and the system will not be energised for 4 seconds)

Adjustment of Set Offset Value

Set offset value can be adjusted with set offset trimpot that is located on front panel.



When temperature is not equal to SET value, to remove the difference between SET value and temperature and to make equal the temperature and SET value, set offset is used. It can be adjusted from -20% to 20% of full scale. Minimum and maximum value of set offset value according to the type and scale of the device are given below:

Set Offset Values according to the type and scale of the device

For PT-100 (-100.0 to 100.0) °C scaled devices : (-20.0 to +20.0) °C
For PT-100 (0.0 to 50.0) °C scaled devices : (-10.0 to +10.0) °C
For PT-100 (0.0 to 200.0) °C scaled devices : (-20.0 to +20.0) °C
For PT-100 (0 to 400) °C scaled devices : (-8 to +8) °C
For J Type TC (0 to 400) °C scaled devices : (-8 to +8) °C
For J Type TC (0 to 800) °C scaled devices : (-16 to +16) °C
For K Type TC (0 to 1200) °C scaled devices : (-24 to +24) °C
For R Type TC (0 to 1600) °C scaled devices : (-32 to +32) °C
For S Type TC (0 to 1600) °C scaled devices : (-32 to +32) °C

Failure Message in Temperature Controller

Sensor failure in analogue inputs. It occurs if;
Sensor connection is wrong or
There is no sensor connection or
The value on analogue input exceeds scale of the device.

Installation

Before beginning installation of this product, please read the instruction manual and warnings below carefully.

- In package ,
- One piece unit
 - Two pieces mounting clamps
 - One piece instruction manual

A visual inspection of this product for possible damage occurred during shipment is recommended before installation. It is your responsibility to ensure that qualified mechanical and electrical technicians install this product.

If there is danger of serious accident resulting from a failure or defect in this unit, power off the system and separate the electrical connection of the device from the system.

The unit is normally supplied without a power switch or a fuse. Use power switch and fuse as required.

Be sure to use the rated power supply voltage to protect the unit against damage and to prevent failure.

Keep the power off until all of the wiring is completed so that electric shock and trouble with the unit can be prevented.

Never attempt to disassemble, modify or repair this unit. Tampering with the unit may results in malfunction, electric shock or fire.

Do not use the unit in combustible or explosive gaseous atmospheres.

During the equipment is putted in hole on the metal panel while mechanical installation some metal burrs can cause injury on hands, you must be careful.

Montage of the product on a system must be done with it's own fixing clamps. Do not do the montage of the device with inappropriate fixing clamps. Be sure that device will not fall while doing the montage.

It is your responsibility if this equipment is used in a manner not specified in this instruction manual.

Warranty

Warrants that the equipment delivered is free from defects in material and workmanship. This warranty is provided for a period of two years. The warranty period starts from the delivery date. This warranty is in force if duty and responsibilities which are determined in warranty document and instruction manual performs by the customer completely.

Maintenance

Repairs should only be performed by trained and specialized personnel. Cut power to the device before accessing internal parts. Do not clean the case with hydrocarbon-based solvents (Petrol, Trichlorethylene etc.). Use of these solvents can reduce the mechanical reliability of the device. Use a cloth dampened in ethyl alcohol or water to clean the external plastic case.

