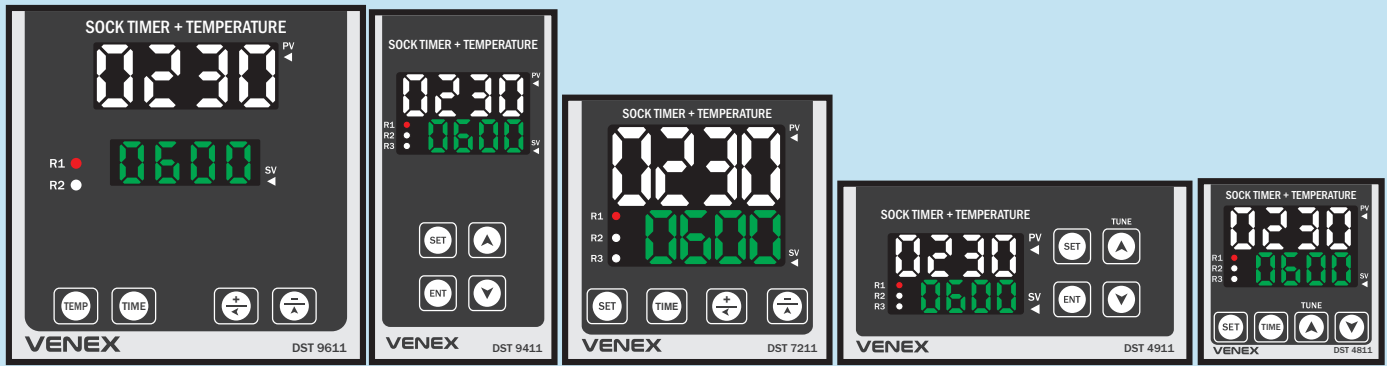


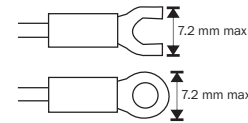
This section gives you all the information necessary to help you monitor and operate your controller including an Operator Interface overview, an explanation of the Displays, keys, LEDs, Mode access, and Operation Modes.



| | | |
|-----------------------|---|---|
| INPUT | Sensor Range | J & K OR RTD & RTD.1 2W/3W (Configurable) J(0°C to 400°C & 0°C to (600°C), K(0°C to 1200°C), PT-100 2W/3W(0°C to 400°C, - 50.0°C to 200.0°C) |
| OUTPUT | Control Output Capacity SSR | RELAY + SSR (RELAY + RELAY) 1CO, 7 Amp. 230 Volt AC 12 V DC Approximately |
| SPECIFICATIONS | Supply Voltage Time Range Set Point Control Mode Operating Mode Accuracy Enclosure Material Operating Temperature Relative Humidity | 230v AC, ±10%, 50Hz 9999 Second / Minute / Hour 1 Set Point PID / Time Proportional / ON-OFF (Configurable) Sock + Temperature ±1% of FSD Polycarbonate + ABS Plastic 0°C - 55°C Upto 95% RH Non Condensing |

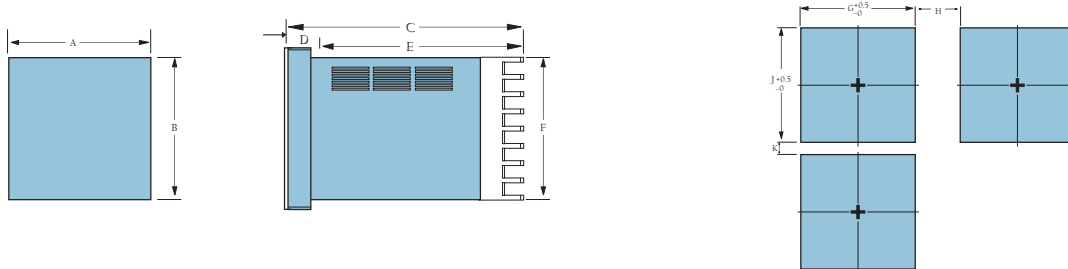
PRECAUTIONS WHEN WIRING

- Separate input leads and power lines in order to prevent external noise.
- Use specified size (M3.5, width 7.2 mm or less) crimped terminals for wiring. To connect bare wires to the terminal block, use copper braided or solid wires with a rated temperature of over 70 °C and a gauge of AWG24 to AWG14 (equal to a cross-sectional area of 0.205 to 2.081 mm²). (The stripping length is 5 to 6 mm.) Up to two wires of same size and type, or two crimped terminals can be inserted into a single terminal.
- Use crimp terminals when wiring the terminals.
- Use the suitable wiring material and crimp tools for crimp terminals.
- Tighten the terminal screws to between 0.74 and 0.90 N-m.
- Use the following types of crimp terminals for M3.5 screws.



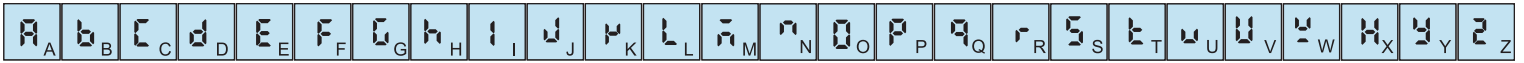
MOUNTING

The controller can be mounted on either a vertical or tilted panel using the mounting bracket supplied. Adequate access space must be available at the back of the panel for installation and servicing activities. Overall dimensions and panel cutout requirements for mounting the controller are shown in Figure



| Size | A | B | C | D | E | F | G | H(Min) | J | K(Min) |
|---------|-----|-----|-----|---|----|----|----|--------|----|--------|
| (96*96) | 100 | 100 | 45 | 3 | 42 | 90 | 92 | 25 | 92 | 25 |
| (96*48) | 50 | 96 | 73 | 3 | 70 | 86 | 44 | 25 | 88 | 25 |
| (72*72) | 72 | 72 | 62 | 3 | 59 | 65 | 66 | 25 | 66 | 25 |
| (48*48) | 50 | 50 | 100 | 3 | 97 | 43 | 44 | 25 | 44 | 25 |
| (48*96) | 96 | 51 | 73 | 3 | 70 | 86 | 88 | 25 | 44 | 25 |

Display Alphabet Characters



PARAMETER SETTING

Press 5 Sec

Password 30

Default Password Screen
Use &

Press

Enter Password 030 For Parameter
Use &

Press

Offset Value
Use &

Press

Save & Exit

Password 70

Default Password Screen
Use &

Press

Enter Password 070 For Parameter
Use &

Press

Sensor Selection Input J/K Type
Use &

Press

Control Action TP/ON-OFF/PID
Use &

Press

Mode Selection Power ON/Set Point
Use &

Press

Unit Selection (Sec./Min./Hr.)
Use &

Press

| | | |
|-------|-------|-------|
| SEC | MIN | HRS |
| 9.999 | 999.9 | 99.59 |
| 999.9 | 99.59 | 999.9 |
| 9999 | 9999 | 9999 |

Use &

Press

Relay 2 Time (In Sec.)
Use &

Press

Save & Exit

Password 90

Default Password Screen
Use &

Press

Enter Password 090 For Parameter
Use &

Press

If ON-OFF

Hysteresis
Use &

Press

Save & Exit

If PID

Proportional Constant
Use &

Press

Integral Constant
Use &

Press

Derivative Constant
Use &

Press

Cycle Time
Use &

Press

Save & Exit

If TP

Proportional band
Use &

Press

Cycle Time
Use &

Press

Manual Reset
Use &

Press

Relay Function Heat /Cool
Use &

Press

Save & Exit

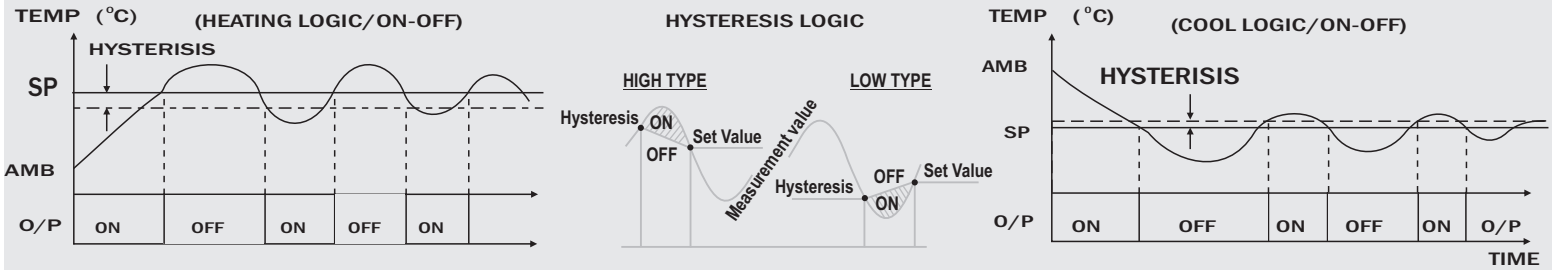
Measured Signal Specifications

| Input type | symbol | Measuring range | Resolution | Accuracy | Input impedance/ auxiliary current |
|------------|--------|-----------------|------------|-----------------|------------------------------------|
| J | | 0~600°C | 1°C | 1.0%F.S±3digits | >500kΩ |
| K | | 0~1200°C | 1°C | 1.0%F.S±3digits | >500kΩ |

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------------------------------|------------------------------|------------------------|---|------|---------------------|------|---------------|-----|--------------|------|------------|------|--------------|------|--------------|------|--------------|------|-----------|------|---------------------|------|----------------|------|----------------|------|-----------|------|-------------------|------|------------|------|----------------|------|------------|------|--------------|------|--------|------|-----------------------|------|-------------------|------|----------------|------|-----------------|------|------------|------|----------|------|-------|------|--------|------|---------------|
| <p>TEMP. SET POINT</p> | <p>TIME SET POINT</p> | <p>POWER ON</p> | <p>DISPLAY MESSAGES</p> <table border="1"> <tr> <td>0.5E</td><td>Offset Value</td> <td>0.5P</td><td>Time Proposal</td> <td>000</td><td>Cooling mode</td> </tr> <tr> <td>0.0E</td><td>Input Type</td> <td>0.0P</td><td>Input K Type</td> <td>0.0E</td><td>Heating mode</td> </tr> <tr> <td>0.0E</td><td>Input J Type</td> <td>5.5E</td><td>Set Value</td> <td>0.0E</td><td>Derivative constant</td> </tr> <tr> <td>0.0E</td><td>Control Action</td> <td>0.0E</td><td>Control Action</td> <td>5.5E</td><td>Set Point</td> </tr> <tr> <td>0.0E</td><td>Proportional band</td> <td>0.0E</td><td>Cycle Time</td> <td>5.5E</td><td>Mode Selection</td> </tr> <tr> <td>0.0E</td><td>Hysteresis</td> <td>0.0E</td><td>Manual Reset</td> <td>5.5E</td><td>Second</td> </tr> <tr> <td>0.0E</td><td>Proportional Constant</td> <td>0.0E</td><td>Integral Constant</td> <td>0.0E</td><td>Unit Selection</td> </tr> <tr> <td>0.0E</td><td>Range Selection</td> <td>0.0E</td><td>Relay Time</td> <td>0.0E</td><td>Power On</td> </tr> <tr> <td>0.0E</td><td>Hours</td> <td>0.0E</td><td>Minuet</td> <td>0.0E</td><td>Memory Retain</td> </tr> </table> | 0.5E | Offset Value | 0.5P | Time Proposal | 000 | Cooling mode | 0.0E | Input Type | 0.0P | Input K Type | 0.0E | Heating mode | 0.0E | Input J Type | 5.5E | Set Value | 0.0E | Derivative constant | 0.0E | Control Action | 0.0E | Control Action | 5.5E | Set Point | 0.0E | Proportional band | 0.0E | Cycle Time | 5.5E | Mode Selection | 0.0E | Hysteresis | 0.0E | Manual Reset | 5.5E | Second | 0.0E | Proportional Constant | 0.0E | Integral Constant | 0.0E | Unit Selection | 0.0E | Range Selection | 0.0E | Relay Time | 0.0E | Power On | 0.0E | Hours | 0.0E | Minuet | 0.0E | Memory Retain |
| 0.5E | Offset Value | 0.5P | Time Proposal | 000 | Cooling mode | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.0E | Input Type | 0.0P | Input K Type | 0.0E | Heating mode | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.0E | Input J Type | 5.5E | Set Value | 0.0E | Derivative constant | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.0E | Control Action | 0.0E | Control Action | 5.5E | Set Point | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.0E | Proportional band | 0.0E | Cycle Time | 5.5E | Mode Selection | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.0E | Hysteresis | 0.0E | Manual Reset | 5.5E | Second | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.0E | Proportional Constant | 0.0E | Integral Constant | 0.0E | Unit Selection | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.0E | Range Selection | 0.0E | Relay Time | 0.0E | Power On | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.0E | Hours | 0.0E | Minuet | 0.0E | Memory Retain | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

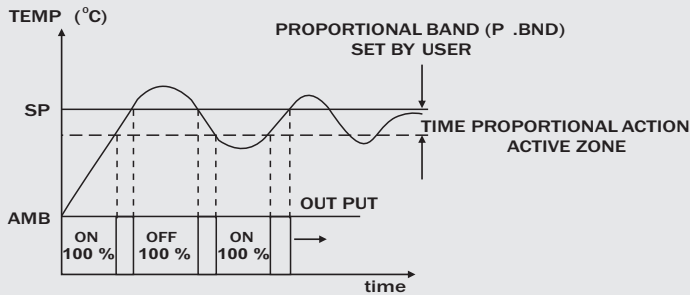
ON-OFF Algorithm

When high accuracy of a temperature control is not required, Especially for the high time constant and small delay, it is possible to use ON-OFF control with hysteresis. Disadvantage of this method to use ON-OFF control with hysteresis. Disadvantage of this method is the occurrence of oscillations, even at small hysteresis values.



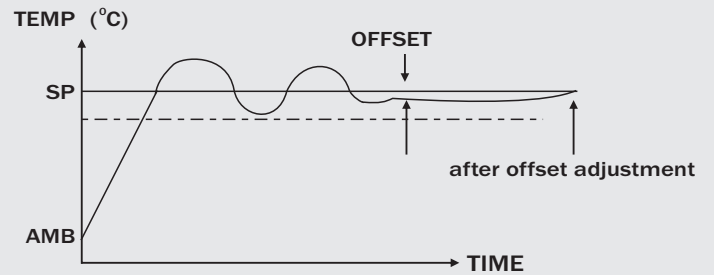
TIME PROPORTIONAL ACTION:

In this mode, ON & OFF time of output (Relay/SSR) varies proportionally in every cycle (cycle time settable by user) depending on the deviation of PV w.r.t. Set Value. This action Starts/continues only when PV enters or is within the band.



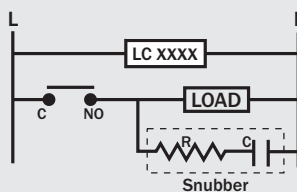
MANUAL RESET (OFFSET ADJUSTMENT):

In some application, after adopting Time proportionating action, system may stabilize at particular temperature over a period of time which can be different than the set value. This steady state (error) offset can be eliminated by setting this value equal and opposite to the existing offset.

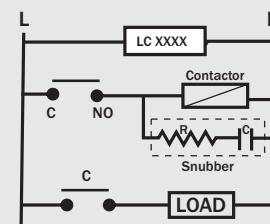


Load connection

For Load Current Less Than 0.5A



For Bigger Loads, use Interposing relay / Contactor



Warranty and Application Considerations

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Warranty and Limitations of Liability

WARRANTY

(12 Months, unless agreed otherwise by us) We undertake to replace or repair at our option any defective product that needs replacement or repair, by reason of defective workmanship or defective materials, brought to our notice within the period specified below as "Warranty Period" after delivery to the buyer, providing also that it we so require, the part in respect of which a complaint is made must, before liability can be entertained under this clause, be sent at buyer's expense to our works or our office, as we may determine. Under no circumstances do we undertake liability for indirect or consequential loss or damage of any nature. This guarantee is given in lieu of and excludes every other condition or warranty whether statutory or otherwise.

LIMITATIONS OF LIABILITY

VAPL Shall Not Be Responsible For Special, Indirect, Or Consequential Damages, Loss Of Profits, Or Commercial Loss In Any Way Connected With The Products, Whether Such Claim Is Based On Contract, Warranty, Negligence, Or Strict Liability.

In no event shall the responsibility of VAPL for any act exceed the individual price of the product on which liability is asserted

In No Event Shall VAPL Be Responsible For Warranty, Repair, Or Other Claims Regarding The Products Unless VAPL's Analysis Confirms That The Products Were Properly Handled, Stored, Installed, And Maintained And Not Subject To Contamination, Abuse, Misuse, Or Inappropriate Modification Or Repair.

Application Considerations

SUITABILITY FOR USE

VAPL shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of products in the customer's application or use of the products.

Take all necessary steps to determine the suitability of the product for the systems, machines, and equipment with which it will be used.

Know and observe all prohibitions of use applicable to this product.

Never Use The Products For An Application Involving Serious Risk To Life Or Property Without Ensuring That The System As A Whole Has Been Designed To Address The Risks, And That The VAPL Products Are Properly Rated And Installed For The Intended Use Within The Overall Equipment Or System.

DISCLAIMERS

PERFORMANCE DATA

Performance data given in this catalog is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of VAPL's test conditions, and the users must correlate it to actual application requirements. Actual performance is subject to the VAPL Warranty and Limitations of Liability.

CHANGE IN SPECIFICATIONS

Product specifications and accessories may be changed at any time based on improvements and other reasons. Consult with your VAPL representative at any time to confirm actual specifications of purchased product.

DIMENSIONS AND WEIGHTS

Dimensions and weights are nominal and are not to be used for manufacturing purposes, even when tolerances are shown.

SAFETY PRECAUTIONS

Do not touch the terminals while power is being supplied. Doing so may occasionally result in minor injury due to electric shock.



Do not allow pieces of metal, wire clippings, or fine metallic shavings or filings from installation to enter the product. Doing so may occasionally result in electric shock, fire, or malfunction.



Do not use the product where subject to flammable or explosive gas. Otherwise, minor injury from explosion may occasionally occur.



Never disassemble, modify, or repair the product or touch any of the internal parts. Minor electric shock, fire, or malfunction may occasionally occur



If the output relays are used past their life expectancy, contact fusing or burning may occasionally occur. Always consider the application conditions and use the output relays within their rated load and electrical life expectancy. The life expectancy of output relays varies considerably with the output load and switching conditions



Tighten the terminal screws to between 0.74 and 0.90 N·m. Loose screws may occasionally result in fire.



Set the parameters of the product so that they are suitable for the system being controlled. If they are not suitable, unexpected operation may occasionally result in property damage or accidents.



A malfunction in the Temperature Controller may occasionally make control operations impossible or prevent alarm outputs, resulting in property damage. To maintain safety in the event of malfunction of the Temperature Controller, take appropriate safety measures, such as installing a monitoring device on a separate line.



VBTRON AUTOMATION PVT. LTD.

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Kathwada, Ahmedabad.
(GUJARAT) INDIA

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product improvement, specifications are
subject to change without notice.

PRECAUTIONS FOR SAFE USE

Be sure to observe the following precautions to prevent operation failure, malfunction, or adverse effects on the performance and functions of the product. Not doing so may occasionally result in unexpected events.

- The product is designed for indoor use only. Do not use the product outdoors or in any of the following locations.
 - Places directly subject to heat radiated from heating equipment.
 - Places subject to splashing liquid or oil atmosphere.
 - Places subject to direct sunlight.
 - Places subject to dust or corrosive gas (in particular, sulfide gas and ammonia gas).
 - Places subject to intense temperature change.
 - Places subject to icing and condensation.
 - Places subject to vibration and large shocks.
- Use/store within the rated temperature and humidity ranges. Provide forced-cooling if required.
- To allow heat to escape, do not block the area around the product. Do not block the ventilation holes on the product.
- Be sure to wire properly with correct polarity of terminals.
- Use specified size (M3.5, width 7.2 mm or less) crimped terminals for wiring. To connect bare wires to the terminal block, use copper braided or solid wires with a rated temperature of over 70°C and a gauge of AWG24 to AWG14 (equal to a cross-sectional area of 0.205 to 2.081 mm²). (The stripping length is 5 to 6 mm.) Up to two wires of same size and type, or two crimped terminals can be inserted into a single terminal.
- Do not wire the terminals which are not used.
- Allow as much space as possible between the controller and devices that generate a powerful high-frequency or surge. Separate the high-voltage or large-current power lines from other lines, and avoid parallel or common wiring with the power lines when you are wiring to the terminals.
- Use this product within the rated load and power supply.
- Make sure that the rated voltage is attained within two seconds of turning ON the power using a switch or relay contact. If the voltage is applied gradually, the power may not be reset or output malfunctions may occur. into consideration when performing control.
- Make sure that the Controller has 30 minutes or more to warm up after turning ON the power before starting actual control operations to ensure the correct temperature display.
- A switch or circuit breaker should be provided close to this unit. The switch or circuit breaker should be within easy reach of the operator, and must be marked as a disconnecting means for this unit.
- Do not use paint thinner or similar chemical to clean with. Us standard grade alcohol.
- Design system (control panel, etc) considering the 2 seconds of delay that the controller's output to be set after power ON.
- The output may turn OFF when shifting to certain levels. Take this into consideration when performing control.
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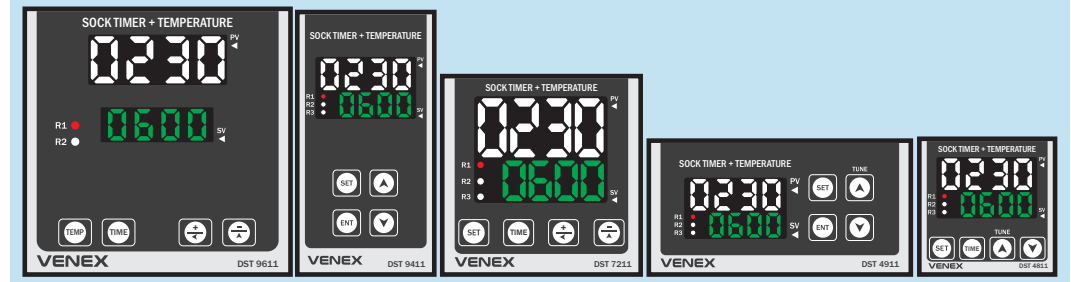
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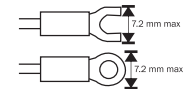
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| OUTPUT | Control Output Capacity SSR | RELAY + SSR (RELAY + RELAY) 1CO, 7 Amp, 230 Volt AC 12 V DC Approximately |
| SPECIFICATIONS | Supply Voltage Time Range Set Point Control Mode Operating Mode Accuracy Enclosure Material Operating Temperature Relative Humidity | 230v AC, ±10%, 50Hz 9999 Second / Minute / Hour 1 Set Point PID / Time Proportional / ON-OFF (Configurable) Sock + Temperature ±1% of FSD Polycarbonate + ABS Plastic 0°C - 55°C Upto 95% RH Non Condensing |

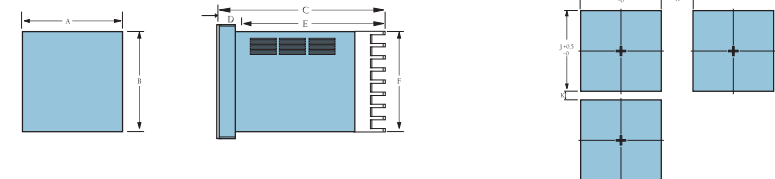
PRECAUTIONS WHEN WIRING

- Separate input leads and power lines in order to prevent external noise.
- Use specified size (M3.5, width 7.2 mm or less) crimped terminals for wiring. To connect bare wires to the terminal block, use copper braided or solid wires with a rated temperature of over 70 °C and a gauge of AWG24 to AWG14 (equal to a cross-sectional area of 0.205 to 2.081 mm²). (The stripping length is 5 to 6 mm.) Up to two wires of same size and type, or two crimped terminals can be inserted into a single terminal.
- Use crimp terminals when wiring the terminals.
- Use the suitable wiring material and crimp tools for crimp terminals.
- Tighten the terminal screws to between 0.74 and 0.90 N-m.
- Use the following types of crimp terminals for M3.5 screws.



MOUNTING

The controller can be mounted on either a vertical or tilted panel using the mounting bracket supplied. Adequate access space must be available at the back of the panel for installation and servicing activities. Overall dimensions and panel cutout requirements for mounting the controller are shown in Figure



| Size | A | B | C | D | E | F | G | H(Min) | J | K(Min) |
|---------|-----|-----|-----|---|----|----|----|--------|----|--------|
| (96*96) | 100 | 100 | 45 | 3 | 42 | 90 | 92 | 25 | 92 | 25 |
| (96*48) | 50 | 96 | 73 | 3 | 70 | 86 | 44 | 25 | 88 | 25 |
| (72*72) | 72 | 72 | 62 | 3 | 59 | 65 | 66 | 25 | 66 | 25 |
| (48*48) | 50 | 50 | 100 | 3 | 97 | 43 | 44 | 25 | 44 | 25 |
| (48*96) | 96 | 51 | 73 | 3 | 70 | 86 | 88 | 25 | 44 | 25 |

Display Alphabet Characters



PARAMETER SETTING

0035
0000
Press 5 Sec

Password 30 Password 70 Password 90

0043 Default Password Screen Use (A) & (B) Press

0030 Enter Password 030 For Parameter Use (A) & (B) Press

0000 Offset Value Use (A) & (B) Press

Save & Exit

0043 Default Password Screen Use (A) & (B) Press

0070 Enter Password 070 For Parameter Use (A) & (B) Press

EL-V Sensor Selection Input J/K Type Use (A) & (B) Press

0-0F Control Action TP/ON-OFF/PID Use (A) & (B) Press

SETP Mode Selection Power ON/Set Point Use (A) & (B) Press

5E Unit Selection (Sec./Min./Hr.) Use (A) & (B) Press

9999 SEC MIN HRS
13.999 999.9 99.99
999.9 99.99 999.9
9999 9999 9999 Use (A) & (B) Press

0010 Relay 2 Time (In Sec.) Use (A) & (B) Press

Save & Exit

0043 Default Password Screen Use (A) & (B) Press

0090 Enter Password 090 For Parameter Use (A) & (B) Press

If ON-OFF If PID If TP

0002 Hysteresis Use (A) & (B) Press

0022 Proportional Constant Use (A) & (B) Press

0222 Integral Constant Use (A) & (B) Press

0055 Derivative Constant Use (A) & (B) Press

0013 Cycle Time Use (A) & (B) Press

0005 Proportional band Use (A) & (B) Press

0004 Cycle Time Use (A) & (B) Press

0000 Manual Reset Use (A) & (B) Press

HEAT Relay Function Heat /Cool Use (A) & (B) Press

RELV Relay Function Heat /Cool Use (A) & (B) Press

Save & Exit

Measured Signal Specifications

| Input type | symbol | Measuring range | Resolution | Accuracy | Input impedance/ auxiliary current |
|------------|--------|-----------------|------------|-----------------|------------------------------------|
| J | J | 0~600℃ | 1℃ | 1.0%F.S±3digits | > 500kΩ |
| K | K | 0~1200℃ | 1℃ | 1.0%F.S±3digits | > 500kΩ |

TEMP.SET POINT
0035 Process Value Set Value
0000 Temp. Set Point Use (A) & (B) Press
Save & Exit

TIME SET POINT
0035 Process Value Set Value
0004 Time Set Point Use (A) & (B) Press
Save & Exit

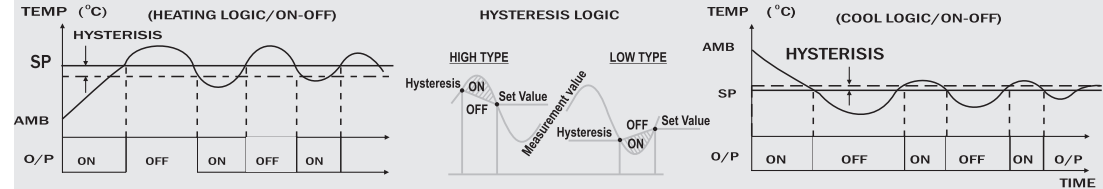
POWER ON
0000 Display for 2 Sec
0000 Display for 2 Sec According to the input Sensor Programmed
000F Display for 2 Sec According to the Action Selection
0000 Process Value

DISPLAY MESSAGES

| | | | |
|-----------------------|------------------------|---------------------|--------------------------|
| 005E Offset Value | EL-V Input Type | EL-V Input K Type | HEAT Cooling mode |
| EL-V Input J Type | SETP Set Value | HEAT Heating mode | HEAT Derivative constant |
| 0-0F Control Action | 0-0F Control Action | SETP Set Point | SETP Mode Selection |
| Proportional band | 0-0F Cycle Time | SETP Mode Selection | SETP Second |
| 0055 Hysteresis | 0-0F Manual Reset | SETP Unit Selection | SETP Unit Selection |
| Proportional Constant | 0-0F Integral Constant | HEAT Unit Selection | HEAT Power On |
| Range Selection | 0-0F Relay Time | HEAT Memory Retain | |
| Hours | 0-0F Minuet | | |

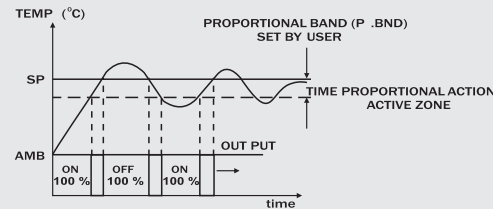
ON-OFF Algorithm

When high accuracy of a temperature control is not required, Especially for the high time constant and small delay, it is possible to use ON-OFF control with hysteresis. Disadvantage of this method to use ON-OFF control with hysteresis. Disadvantage of this method is the occurrence of oscillations, even at small hysteresis values.



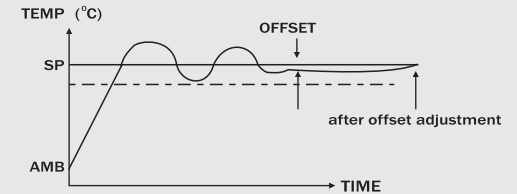
TIME PROPORTIONAL ACTION:

In this mode, ON & OFF time of output (Relay/SSR) varies proportionally in every cycle (cycle time settable by user) depending on the deviation of PV w.r.t. Set Value. This action Starts/continues only when PV enters or is within the band.



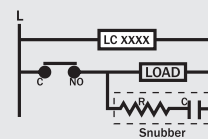
MANUAL RESET (OFFSET ADJUSTMENT):

In some application, after adopting Time proportionating action, system may stabilize at particular temperature over a period of time which can be different than the set value. This steady state (error) offset can be eliminated by setting this value equal and opposite to the existing offset.



Load connection

For Load Current Less Than 0.5A



For Bigger Loads, use

Interposing relay / Contactor

