# USER'S OPERATING MANUAL FOR DIGITAL TEMPERATURE CONTROLLER
## (Models: AI 5442 / 5742 / 5942)



**AI - 5442**
(48 X 48)

**AI - 5742**
(72 X 72)

**AI - 5942**
(96 X 96)

## SPECIFICATIONS : -

**1. DISPLAY TYPE** : 4- Digit 7 segment LED (Bright White)

| Model no. | AI-5442 | AI-5742 | AI-5942 |
|---|---|---|---|
| Display height | 0.36" | 0.56" | 0.56" |

**STATUS LED'S** : OP1 : Main Control Output
OP2 : Alarm Status
: Auxiliary control output

**2. INPUT**

Sensor Input : TC:J,K,R,S & RTD: Pt-100
Range : Refer below table

| Sensor Type | Range | Resolution | Accuracy |
|---|---|---|---|
| Fe-k(J) T/C | 0 ~ 760°C | 1 °C | |
| Cr-AL(K) T/C | -99 ~ 1300°C | 1 °C | |
| (R) T/C | 0 ~ 1700°C | 1 °C | ± 1 °C |
| (S) T/C | 0 ~ 1700°C | 1 °C | |
| Pt-100(RTD) | -100 ~ 450°C | 1 °C | |
| Pt-100(RTD 0.1) | -99.9 ~ 450.0°C | 0.1 °C | ± 0.3 °C |

Sampling Time : 125 msec.
Resolution : 1°C/0.1°C(Only for RTD)
CJC for TC : Built in automatic
LWC for Pt-100 : Built in upto 18E max.
Digital Filter : 1 to 10 Sec.

**3. RELAY OUTPUT**

Contact type : N/O, CM, N/C
Contact Rating : 5A @ 250VAC or 30 VDC
Life expectancy : > 5,00,000 operations
Isolation : Inherent

**4. SSR DRIVE OUTPUT**

Drive Capacity : 12V @ 30mA.
Isolation : Non-Isolated.

**5. FUNCTION**

Output 1 : Main Control output
Output 2 : Programmable
1) Auxiliary control  2) Alarm
Control Action : ON-OFF/T.P (Select)
Control Mode : Heat/Cool (Select)
Compliance : ----

**6. ENVIRONMENTAL**

Operating Range : 0 ~50°C, 5~90% Rh
Storage Humidity : 95% Rh (Non-condensing)

**7. POWER SUPPLY**

Supply Voltage : 90~270VAC, 50/60Hz.
Consumption : 4W Maximum.

**8. PHYSICAL**

Housing : ABS Plastic

| Model no. | AI-5442 | AI-5742 | AI-5942 |
|---|---|---|---|
| Weight (gms.) | 130 | 200 | 240 |

## SAFETY INSTRUCTION :

This controller is meant for temperature control applications. It is important to read the manual prior to installing or commissioning of controller. All safety related instruction appearing in this manual must be followed to ensure safety of the operating personnel as well as the instrument.

## GENERAL

❖ The controller must be configured correctly for intended operation. Incorrect configuration could result in damage to the equipment or the process under control or it may lead personnel injury.
❖ The controller is generally part of control panel and in such a case the terminals should not remain accessible to the user after installation.

## MECHANICAL

❖ The Controller in its installed state must not come in close poximity to any corrosive/combustible gases, caustic vapors, oils, steam or any other process by-products.
❖ The Controller in its installed state should not be exposed to carbon dust, salt air, direct sunlight or radiant heat.
❖ Ambient temperature and relative humidity surrounding the controller must not exceed the maximum specified limit for proper operation of the controller.
❖ The controller in its installed state must be protected against excessive electrostatic or electromagnetic interferences. Ventilation holes provided on the chassis of the instrument are meant for thermal dissipation hence should not be obstructed in the panel.

## ELECTRICAL

❖ The controller must be wired as per wiring diagram & it must comply with local electrical regulation.
❖ Care must be taken not to connect AC supplies to low voltage sensor input.
❖ Circuit breaker or mains s/w with fuse (275V/1A) must be installed between power supply and supply terminals to protect the controller from any possible damage due to high voltage surges of extended duration.
❖ Circuit breaker and appropriate fuses must be used for driving high voltage loads to protect the controller from any possible damage due to short circuit on loads.
❖ To minimize pickup of electrical noise, the wiring for low voltage DC and sensor input must be routed away from high current power cables. Where it is impractical to do this, use shielded ground at both ends.
❖ The controller should not be wired to a 3-Phase supply with unearthed star connection. Under fault condition such supply could rise above 264 VAC which will damage the controller.
❖ The Electrical noise generated by switching inductive loads might create momentary Fluctuation in display, alarm latch up, data loss or permanent damage to the instrument.
To reduce this use snubber circuit across the load.
❖ It is essential to install a over Temp. Protection device to avoid any failure of heating system. Apart from spoiling the product, this could damage the process being controlled.

**Press and Hold SET & UP Key Simutaneously for 3 Sec.**

**Press and Hold SET & DOWN Key Simutaneously for 3 Sec.**

**Press SET Key Once in Run Mode**

## Configuration

| Display | Default | Parameter Name | Range |
|---------|---------|----------------|-------|
| LOCY | 15 | Lock Code | 1 ~ 9999 |
| InPt | J | Input Type | J, K, R, S, N, T, B RTD, RTD.1 |
| LSPL | 0 | Lower Set Point Limit | Ref Table 1 |
| HSPL | 400 | Higher Set Point Limit | Ref Table 1 |
| OFSt | 0 | Process Value Offset | -25 ~ 25 -25.0 ~ 25.0 (RTD.1) |
| FLtr | 6 | Input Filter | 1 ~ 10 |
| ñodE | PId | Control Mode | PID , On~Off |
| LoGC | HEAt | Control Logic | Heat, Cool |
| ♦ OP2 | AUCn | Output 2 Function | None, Aux, Alarm, Soak, AL.ST |
| ♦ SP2 | AbS | Setpoint 2 | Absolute, Deviation |
| ♦ OP2L | HEAt | Output 2 Logic | Heat, Cool |
| SP1 | EnbL | Setpoint 1 | Enable, Disable |
| ★ SP2 | EnbL | Setpoint 2 | Enable, Disable |
| ★ ALty | LOY | Alarm Type | Low, High, Deviation, Band |
| ★ ALLG | dIr | Alarm Logic | Direct, Reverse |
| ★ AL.IH | yES | Alarm Inhibit | Yes, No |
| ★ ALAY | AUtO | Alarm ACK. | Auto, Manual, Both |
| ULOC | 15 | User Lock Code | 1 ~ 9999 |

## Control List

| Display | Default | Parameter Name | Range |
|---------|---------|----------------|-------|
| LOCY | 15 | Lock Code | 1 ~ 9999 |
| ⚙ P.bnd | 5.0 | Proportional Band | 0.5 ~ 99.9 °C |
| ⚙ CYCt | 16.0 | Cycle Time | 1.0 ~ 100.0 Sec. |
| ■ HY1 | 2 | Control Hysterisis | 1 ~ 100 0.1 ~ 100.0 (RTD.1) |
| ■ dLY1 | 0 | Delay 1 | 0 ~ 500 Sec. |
| ♦ HYS.2 ★ | 2 | Hysteresis 2 | 1 ~ 100 0.1 ~ 100.0 (RTD.1) |
| ♦ dLY2 | 0 | Delay 2 | 0 ~ 500 Sec. |
| ● SPOF | 0 | Manual Offset | -25 ~ 25 °C |

## User List

| Display | Default | Parameter Name | Range |
|---------|---------|----------------|-------|
| SP1 | 0 | Control Setpoint | LSPL ~ HSPL |
| ♦ SP2 | 0 | Setpoint 2 | LSPL ~ HSPL |

| Parameter will display according to below symbols | |
|---|---|
| ⚙ | Control Mode = PID |
| ■ | Control Mode = ON-OFF |
| ♦ | OP2 = Auxiliary |
| ★ | OP2 = Alarm & Alarm Soak |
| ● | OP2 = Soak & Alarm Soak |

# MECHANICAL INSTALLATION

The label on the controller identifies the serial number, wiring connections and batch number.

## OVER ALL DIMENSIONS & PANEL CUT OUT (IN MM)
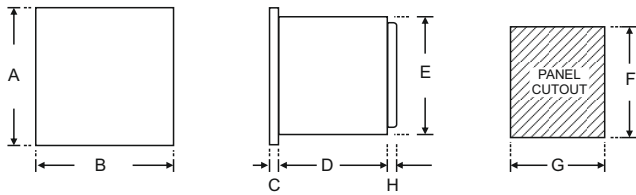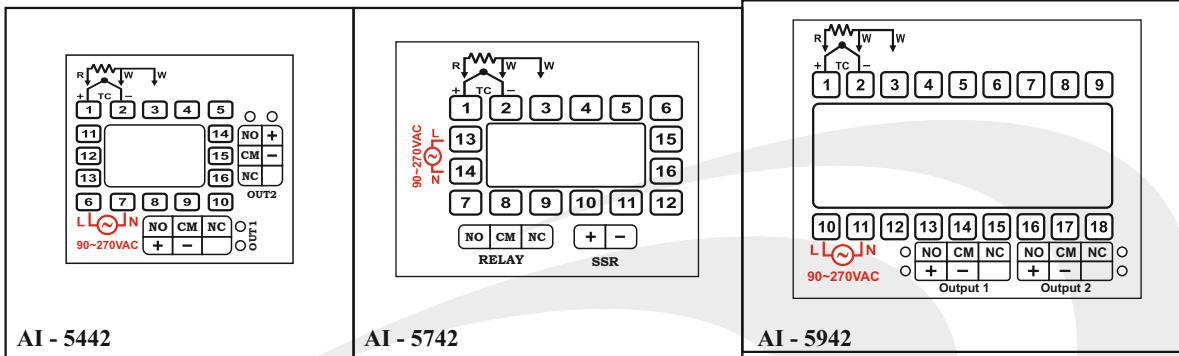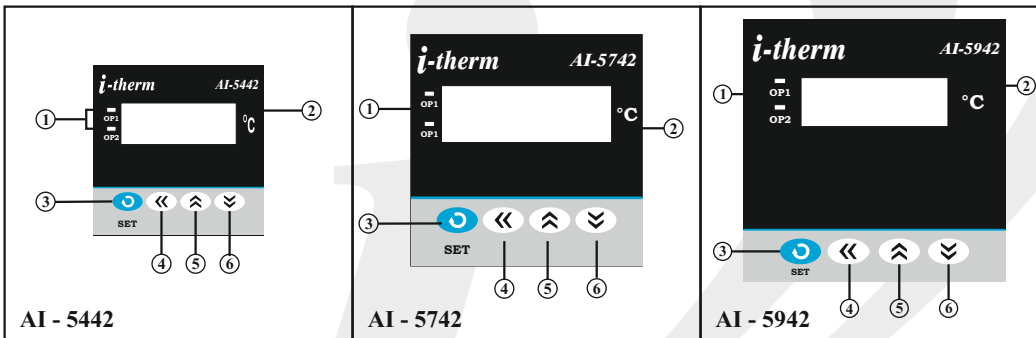
MODEL:-AI-5442/5742/5942



**TABLE : 1**

| Dim Model | A | B | C | D | E | F | G | H |
|---|---|---|---|---|---|---|---|---|
| AI-5442 | 48 | 48 | 8 | 75 | 43 | 44 | 44 | 9 |
| AI-5742 | 72 | 72 | 10 | 65 | 66 | 68 | 68 | 9 |
| AI-5942 | 96 | 96 | 10 | 45 | 89 | 92 | 92 | 9 |

## ELECTRICAL INSTALLATION

The electrical connection diagram is shown on the controller enclosure as shown below.



AI - 5442

AI - 5742

AI - 5942

## FRONT PANEL LAYOUT



AI - 5442

AI - 5742

AI - 5942

## FRONT PANEL LAYOUT DESCRIPTION :

| Sr. | NAME | FUNCTION |
|---|---|---|
| 1 | OP1 LED | Glows when OP1 is ON & flashes when delay time (dly1) is in operation (if selected mode is ON-OFF) |
| | OP2 LED | Glows when OP1 is ON & flashes when alarm condition persists even after acknowledged or delay time (dly2) is in operation (if selected mode is ON-OFF). |
| 2 | DISPLAY | It will display: (1) Measured value of selected input or Error massages. (2) SP (Main set point) / SP2 value in run mode. (3) Parameters Value/code in program mode. |
| 3 | SET KEY | (1) For SP programming. (2) To access Control mode along with DN Key. (3) To access Configuration mode along with UP key. (4) To scroll the parameter & to store its value. |
| 4 | SHIFT KEY | (1) To increase/alter parameter value in program mode with Up / Dn Key. (2) Press for 3Sec in Programming this will help to go back to previous parameter. |
| 5 | UP KEY | (1) To increase/alter parameter value in program mode. (2) To Enter in configuration mode (with SET key). (3) To acknowledge Alarm. |
| 6 | DOWN KEY | (1) To decrease/alter parameter value in program mode. (2) To Enter control mode along with SET Key. |