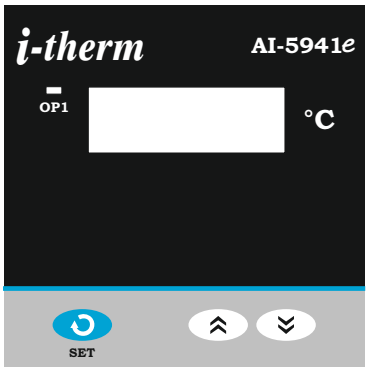
USER'S OPERATING MANUAL FOR DIGITAL TEMPERATURE CONTROLLER

(Model : AI-5941e)



(96 X 96)

OVER ALL DIMENSIONS & PANEL CUT OUT (IN MM)

MODEL :- AI-5941e

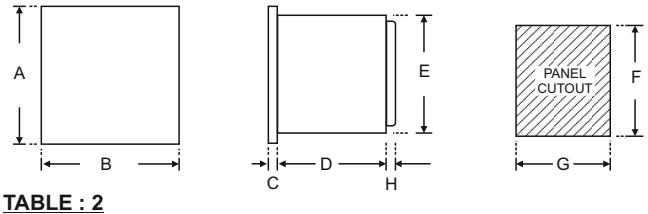


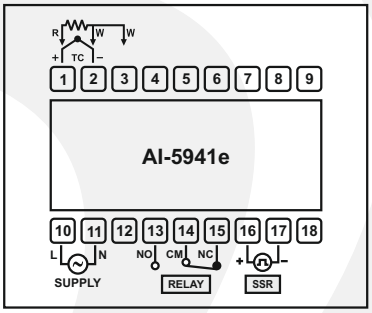
TABLE : 2

Dim / Model	A	B	C	D	E	F	G	H
AI-5941e	96	96	10	45	89	92	92	9

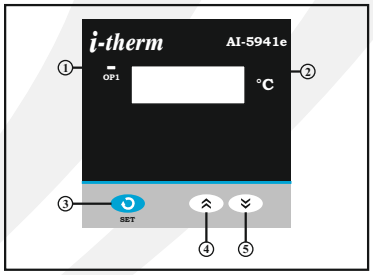
INSTALLATION GUIDELINES

1. Prepare the cut-out with proper dimension as shown in above figure.
2. Remove side clamp from controller.
3. Push the controller through panel cut-out and secure the controller in its place by tightening the side clamp.

Electrical Installation :-



Front Panel Layout :-



SPECIFICATIONS: -

1. **DISPLAY TYPE** : 4-Digit 7 segment LED (RED) - 0.56"
   STATUS LED : OP1 : Main Control Output
2. **INPUT**
   Sensor Input : TC : J,K & RTD : Pt-100
   Range : Refer below Table No. 1

Sensor Type	Range	Resolution	Accuracy
Fe-k(J) T/C	0 ~ 760°C	1 °C	± 1 °C
Cr-AL(K) T/C	0 ~ 1200 °C	1 °C	
Pt-100(RTD)	-99 ~ 450°C	1 °C	

   Sampling Time : 125 msec.
   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
   Control Action : ON-OFF/T.P (Select)
   Control Mode : Heat/Cool (Select)
6. **ENVIRONMENTAL**
   Operating Range : 0 ~50°C, 5~90% Rh
   Storage Humidity : 95% Rh (Non-condensing)
7. **POWER SUPPLY**
   Supply Voltage : 230VAC
   Consumption : 4W Maximum.
8. **PHYSICAL**
   Housing : ABS Plastic.

Model No.:	AI-5941e
Weight (gms.)	300

Table No. 3 :-

Sr.	NAME	FUNCTION
1	OP1 LED	Glows when OP1 is ON & flashes when delay time (dly) 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) value in run mode. (3) Parameters Value/code in program mode.
3		SET Key :- (1) For SP programming. (2) To access Control mode with DN Key. (3) To access Configuration mode with UP key. (4) To scroll the parameter & store its value.
4		UP Key :- (1) To increase/alter parameter value in program mode. (2) To Enter in configuration mode(with SET key). (3) To Set SP Offset (with DOWN Key).
5		DOWN Key :- (1) To decrease/alter parameter value in program mode. (2) To Enter control mode

Table No. 4 :- Error Messages

Error Messages	Description
OPEN	Open Circuit of Control Sensor
LLLL	Process Value Under Sensor Range
HHHH	Process Value Above Sensor Range

PROGRAMMING :-

(All following selected parameter's code shown in shaded will be displayed for 1 sec. followed by their values / options)

USER LIST :- To access the user list Press & Release SET key once.

Parameter	Display	Range	Description	Default
Control Set Point	SP > 0	LSPL ~ HSPL	User can change SP value using UP/ DOWN keys. Holding the key, will change the value at a faster rate. Press SET key to store the value & move on to next parameter.	0°C

CONTROL LIST : To enter in this mode, press SET & DOWN key simultaneously for 3 sec. User can then set all the control related parameters as shown below.

Parameter	Display	Range	Description	Default
Lock Code	LOCK > 0	1 ~ 9999	Set this parameter to 15 (Default LOCK CODE) to access Control List. User has a choice to set different Lock Code via USER LOCK CODE in Config. List.	0
P. Band	Pb > 5.0	0.5 ~ 99.9 °C	This parameter will appear if selected control action is T.P. It sets bandwidth over which the output power is adjusted depending upon the error (SV-PV).	5.0 °C
Cycle Time	CYCt > 16.0	0.5 ~ 100.0 Sec	This parameter will appear if selected control action is T.P. User can set this value based on, process being controlled & selected output type. For Relay O/P it should be more than 12 Sec & for SSR O/P it should be less than 5 Sec.	16.0 Sec
Control Hyst.	HYSt > 2	1 ~ 25 °C	This parameter will appear if selected control action is ON-OFF. It sets the dead band between ON & OFF switching of the Output. Larger value of hysterisis minimize the number of ON-OFF operation of the load. This increases life of actuators like Relay but, also produces large errors.	2 °C
Delay	dLY > 0	0 ~ 500 Sec	This parameter will appear only if selected control action is ON-OFF. It sets the main output restart time. If set to '0', O/P will be switched without delay. Also, Delay will be considered in case of every power ON.	0 Sec
Manual Offset	SP.OF > 0	-25 ~ 25 °C	By this parameter user can add manual offset in Set Value.	0 °C

CONFIGURATION LIST : To enter in this mode, press SET & UP key simultaneously for 3 sec. User can then set all the control related parameters as shown below.

Parameter	Display	Description	Default
Lock Code	LOCK > 0	1 ~ 9999 — Set this parameter to 15 (Default LOCK CODE) to access Configl List. User has a choice to set different Lock Code via USER LOCK CODE in Config. List.	0
Input Type	InPt > tC-J / tC-K / rtd	Sensor Type: Fe-k(J) T/C — Range: 0 ~ 760°C — Resolution: 1 °C Sensor Type: Cr-AL(K) T/C — Range: 0 ~ 1200°C — Resolution: 1 °C Sensor Type: Pt-100(RTD) — Range: -99 ~ 450°C — Resolution: 1 °C Accuracy: ± 1 °C	J Type
Lower SP Limit	LSPL > 0	Sets the minimum limit for set point adjustment. It can be set from minimum specified range of selected sensor to HSPL value.	0 °C
Higher SP Limit	HSPL > 400	Sets the maximum limit for set point adjustment. It can be set from LSPL value to maximum specified range of selected sensor.	400 °C
PV Offset	OFSt > 0	Function of this parameter is to add/subtract a constant value to the measured PV to obtain Final PV for control applications.	0 °C
Input Filter	FLtr > 4	Controller is equipped with an adaptive digital filter which is used to filter out any extraneous pulses on the PV. Filtered PV Value is used for all PV dependent functions. If PV signal is fluctuating due to noise, increase the filter time constant value.	4 °C
Control Mode	nodE > tP / OnOF	User can select between ON-OFF or T.P action algorithm to be adopted for output. (Refer User Guide)	On ~ Off
Control Logic	LoGC > HEAt / COOL	This parameter will appear only if selected control mode is ON-OFF. User can select heating logic in which OP1 will remain ON till PV < SP. (PV increases when output is ON.) User can select cooling logic in which OP1 will remain ON till PV > SP. (PV decreases when output is ON.)	Heat
Output Type	OPtY > rLY / SSr	Separate terminals for RELAY & SSR : - Refer Electrical Installation. Select Relay if LOAD is connected via Contactor. Whenever user selects Relay, Cycle time will automatically set to 16 sec. User can modify cycle time via Control List. Select SSR if LOAD is connected via SSR (DC voltage pulses). Whenever user selects SSR , Cycle time will automatically set to 1sec. User can modify cycle time via Control List.	Relay
Set Point Access	SP > EnbL / dSbL	If Enabled, User can View & edit the Set point in USER list. If disabled, User can only View the Set Point but Can not edit it in USER list.	Enable
User Lock	ULOP > 0	User has a choice to set its own USER LOCK CODE between 1 to 999, this is to prevent unauthorized access of Control & Configuration List.	15

Mfgd by: Innovative Instruments & Controls LLP
Unit no 101- 105, Patel Industrial Estate, Building No.5, Near Range office,
Gauraipada, Vasai East, Palghar, Maharashtra 401208.
Sales : +91-8591939916 / 17 / +91-8655832205
Support : +91-7208897610
E-mail : sales@itherm.co.in Website : www.itherm.co.in