USER'S OPERATING MANUAL FOR PID DIGITAL TEMPERATURE CONTROLLER
(Models: AI 7481 / 7781 / 7981 / 7681 / 7881)

AI - 7481
(48 X 48)

AI - 7781
(72 X 72)

AI - 7981
(96 X 96)

AI - 7681
(96 X 48)

AI - 7881
(48 X 96)

SPECIFICATIONS : -

1. **DISPLAY TYPE** : Dual 4- Digit 7 segment LED
   4 Digit Bright White (PV)
   4 Digit Luminous Green (SV)

Model no.	AI-7481	AI-7781	AI-7981	AI-7681	AI-7881
Display height (PV)	0.36"	0.56"	0.80"	0.36"	0.36"
Display height (SV)	0.24"	0.39"	0.56"	0.36"	0.36"

STATUS LED'S : OP 1 : Main Control Output

2. **INPUT**
   Sensor input : TC : J,K,R,S,N,T,B
   RTD : Pt-100
   Range : Refer below table.

Sensor Type	Range	Resolution	Accuracy
Fe-k(J) T/C	0 ~ 760°C	1 °C	± 1 °C
Cr-AL(K) T/C	-99 ~ 1300°C	1 °C	
(R) T/C	0 ~ 1700°C	1 °C	
(S) T/C	0 ~ 1700°C	1 °C	
TC - N	-99 ~ 1300°C	1 °C	
TC - T	-99 ~ 400°C	1 °C	
TC - B	0 ~ 1800°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
   Control Action : ON-OFF/PID (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 : 90~270VAC, 50/60Hz.
   Consumption : 4W Maximum.

8. **PHYSICAL**
   Housing : ABS Plastic.

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 proximity 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.

PROGRAMMING

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

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

Press & Hold Shift Key for 3 Sec. in Run Mode

Press SET Key Once in Run Mode

Configuration

Display	Default	Parameter Name	Range
LOCP	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	P Id	Control Mode	PID , On~Off
OP IL	HEAt	Control Logic	Heat, Cool
OPtY	rLY	Output Type	Relay , SSR
⚙ OCP	dSbL	Overshoot Control Point	0 ~ 100
⚙ rAtE	EnbL	Ramp Rate	Enable , Disable
LdSP	SP I	Lower Display Message	Toggle, T-SP, R-SP
⚙ tunE	EnbL	Auto Tune	Enable , Disable
SP	EnbL	Setpoint 1	Enable , Disable
ULOC	15	User Lock Code	1 ~ 9999

Control List

Display	Default	Parameter Name	Range
LOCP	15	Lock Code	1 ~ 9999
⚙ Pb	5.0	Proportional Band	0.5 ~ 99.9 °C
⚙ Int	240	Integral Time	0 ~ 3600 Sec.
⚙ dt	60	Derivative Time	0 ~ 300 Sec.
⚙ CYCt	16.0	Cycle Time	1.0 ~ 100.0 Sec.
⚙ OUtL	100.0	Output Power Limit	0.0 ~ 100.0 %
⚙ t.OFS	100	Tune Offset	50.0 ~ 100.0 %
■ HY I	2	Control Hysterisis	1 ~ 100 0.1 ~ 100.0 (RTD.1)
■ dLY I	0	Delay 1	0 ~ 500 Sec.
⚙ OP.OF	dSbL	Output Off	0 ~ 10

User List

Display	Default	Parameter Name	Range
SPI	0	Control Setpoint	LSPL ~ HSPL
▲ rAtE	5.0	Ramp Rate	0.0 ~ 25.0 °C

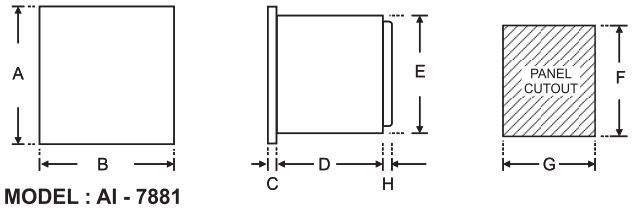
Auto Tunning Mode

Display	Default	Parameter Name	Range
⚙ tUnE	nO	Auto Tunning Mode	Yes, No

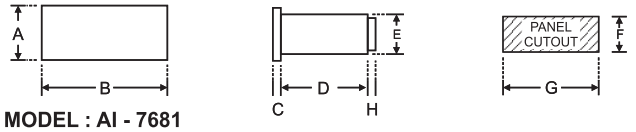
Parameter will display according to below symbols	
⚙	Control Mode = PID
■	Control Mode = ON-OFF
▲	Rate is Enable

OVER ALL DIMENSIONS & PANEL CUT OUT (IN MM)

MODEL:-AI-7481/7781/7981



MODEL : AI - 7881



MODEL : AI - 7681

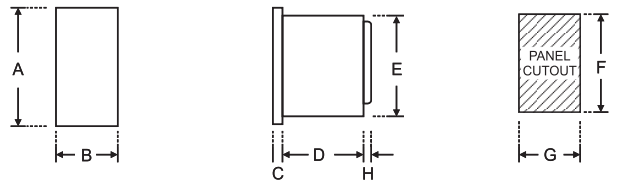


TABLE : 1

Dim / Model	A	B	C	D	E	F	G	H
AI-7481	48	48	8	75	43	44	44	9
AI-7781	72	72	10	65	66	68	68	9
AI-7981	96	96	10	45	89	92	92	9
AI-7681	96	48	10	45	89	92	44	9
AI-7881	48	96	10	45	43	44	92	9

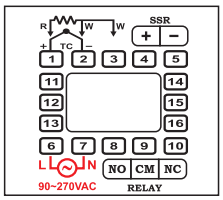
INSTALLATION GUIDELINES :

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

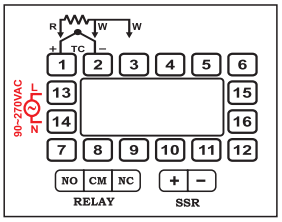
Model no.	AI-7481	AI-7781	AI-7981	AI-7681	AI-7881
Weight (gms.)	130	200	240	200	200

ELECTRICAL INSTALLATION :

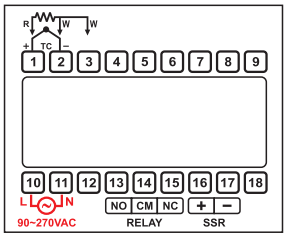
The electrical connection diagram shown on the controller enclosure is as below.



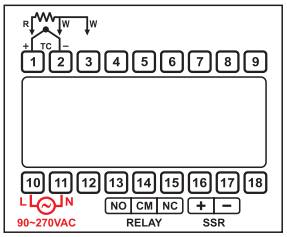
AI - 7481



AI - 7781

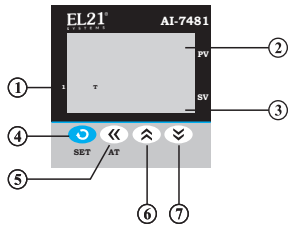


AI - 7981

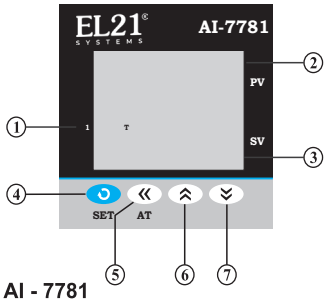


AI - 7681 / AI - 7881

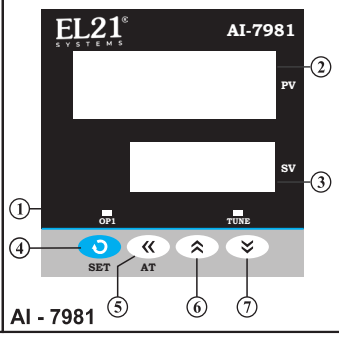
FRONT PANEL LAYOUT



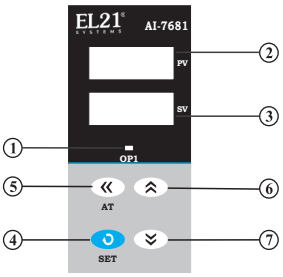
AI - 7481



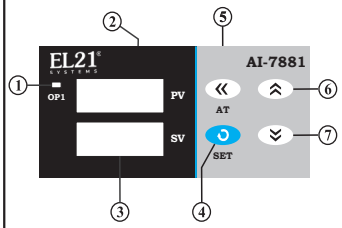
AI - 7781



AI - 7981



AI - 7681



AI - 7881

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)
2	UPPER DISPLAY	It will display (1) Measured value of selected input or Error massages in run mode. (2) Parameters Value in program mode.
3	LOWER DISPLAY	It will display (1) SP (Main set point) / SP2 (Auxiliary/Alarm) set value / Set Soak time value/ balance or elapsed soak time in run mode. (2) Parameter code in program mode.
4	SET KEY	(1) For SP programming. (2) To access Control mode. (3) To access Configuration mode along with UP key. (4) To scroll the parameter & to store its value.
5	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.
6	UP KEY	(1) To increase/alter parameter value in program mode. (2) To Enter in configuration mode (with SET key) . (3) To acknowledge Alarm. (4) To enter in tune mode (with DOWN Key).
7	DOWN KEY	(1) To decrease / alter parameter value in program mode. (2) To enter in tune mode (with UP Key).

EL21 SYSTEMS
+91 98249 51027
el21systems@gmail.com
Block No. 569, Plot No. 7/A, First Floor Shop, Behind Ice Factory, Near. Swaminarayan Temple,Palsana Chokdi, Palsana, N.H.53, Surat-394 315
www.el21systems.com