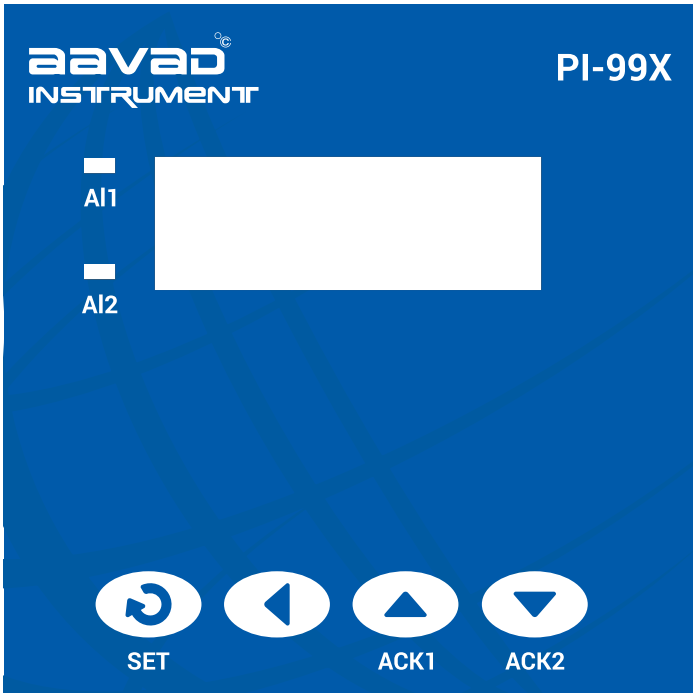
aavad INSTRUMENT

VALUE OF WORDS

User's Operating Manual for Digital Process Indicator with Alarm



Display Type

1

4-Digit 7 segment LED (RED)

Model No.	PI-44X	PI-88X	PI-77X	PI-99X
Display height	0.36"	0.56"	0.56"	0.56"

Input

Sensor Input	:	TC-J,K,R,S,N,T,B & RTD (PT-100)
Analog Input	:	0 - 20mA, 4 - 20mA, 0 - 1VDC, 0 - 5VDC, 0 - 3.3VDC, 0 - 10VDC (Selectable)
Range	:	-1999 to 9999
Resolution	:	0.001, 0.01, 0.1 & 1˚C (Selectable)
Digital Filter	:	1 to 10 (Selectable)

Output (2 Nos. Relay / SSR. Need to specify)

a) Relay Output

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

b) SSR Drive Output

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

Functions : Both output work as Alarm

Environmental

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

Power Supply

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

Physical

Housing	:	ABS Plastic

Over all Dimensions

Dim / Model	A	B	C	D	E	F	G	H
PI-44X	48	48	8	85	43	44	44	9
PI-77X	72	72	10	65	66	68	68	9
PI-99X	96	96	10	53	89	92	92	9
PI-88X	48	96	10	53	43	44	92	9

Safety Instruction

General

1) The controller must be configured correctly for intended operation. Incorrect configuration could result in damage to the equipment or the process under control.

2) 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

1) 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 byproducts.

2) The Controller in its installed state should not be exposed to carbon dust, salt air, direct sunlight or radiant heat

3) Ambient temperature and relative humidity surrounding the controller must not exceed the maximum specified limit for proper operation of the controller.

Electrical

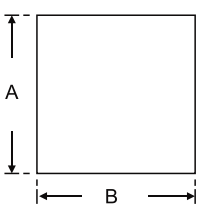
1) The controller must be wired as per wiring diagram & it must comply with local electrical regulation.

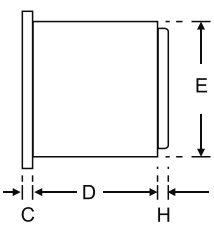
2) Circuit breaker or mains s/w with fuse (275V/1A) must be installed between power supply and supply terminals to protect the controller from any possible damage due to high voltage surges of extended duration.

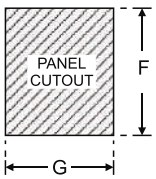
3) Circuit breaker and appropriate fuses must be used for driving high voltage loads to protect the controller from any possible damage due to short circuit on loads.

Over All Dimensions & Panel Cut out (in Mm)

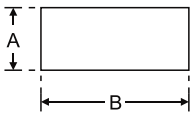
MODEL:-PI-44X / PI-77X / PI-99X

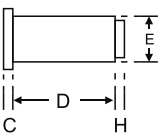


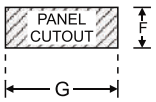




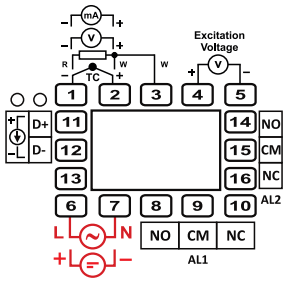
MODEL : PI-88X



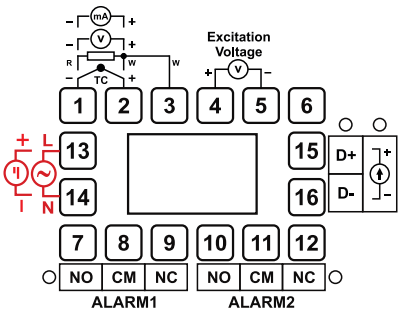




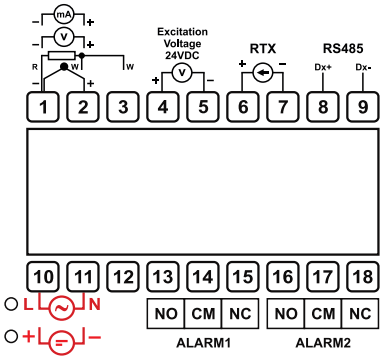
Terminal Diagram



PI-44X



PI-77X



PI - 99X / 88 X

Power Up

At power on, following sequence will be prompted on the display till it reaches to Home display mode.

Programming

User List

(1) To enter in this mode, Press and hold SET Once.

(2) Press UP or DOWN key to scroll between parameter options.

(3) Press SET key to store the current parameter & move on to the next parameter

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

Para meter	Dispaly	Range	Description	Default
Alarm 1 Set Point	A1.SP > 0	Ai.Lo ~ Ai.Hi	User can change the 'Alarm 1 Set point' value using UP/ DOWN keys. Holding the key will change the value at a faster rate. Press SET key to store the desired value and move on to the next parameter.	0
Alarm 1 band	A1.bd > 0	-50 ~ 50	This parameter will appear only if, In Control list Alarm 1 type(A1.Ty) as Band Selected. User can change the 'Alarm 1 Band' value using UP/ DOWN keys. Press SET key to store the desired value and move on to the next parameter. For range limit as per resolution selected Ref. Table No.2 (Page No. 8)	0
Alarm 2 Set Point	A2.SP > 0	Ai.Lo ~ Ai.Hi	User can change the 'Alarm 2 Set point' value using UP/ DOWN keys. Holding the key will change the value at a faster rate. Press SET key to store the desired value and move on to the next parameter.	0
Alarm 2 Band	A2.bd > 0	-50 ~ 50	This parameter will appear only if, In Control list Alarm 2 type(A2.Ty) as Band Selected. User can change the 'Alarm 2 Band' value using UP/ DOWN keys. Press SET key to store the desired value and move on to the next parameter. For range limit as per resolution selected Ref. Table No.2 (Page No. 8).	0

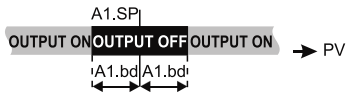
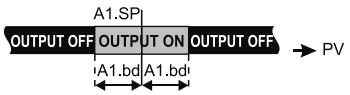
Control List

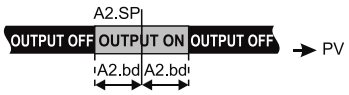
(1) To enter in this mode, Press and hold SET & DOWN key simultaneously for 3 sec.

(2) Press UP or DOWN key to scroll between parameter options.

(3) Press SET key to store the current parameter & move on to the next parameter

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

Para meter	Dispaly	Description		Default
Alarm Lock code	AL.LP > 0	User can change the 'Alarm 1 Set point' value using UP/ DOWN keys. Holding the key will change the value at a faster rate. Press SET key to store the desired value and move on to the next parameter.		0
Alarm type 1	A1.TY > LOW HIGH bAnd	Direct acting	Reverse acting	LOW
		Low Alarm : Op1 activates when PV<A1.SP. 	Op1 activates when PV>A1.SP. 	
		High Alarm: Op1 activates when PV>A1.SP. 	Op1 activates when PV<A1.SP 	
		Band Alarm: Op1 activates when PV falls outside the Alarm 1 Band w.r.t. Alarm 1 Set point in either direction 	Op1 activates when PV falls Inside the Alarm 1 Band w.r.t. Alarm 1 Set point in either direction. 	
ALARM 1 LOGIC	A1.LG > dir rEv	If this parameter is set as 'Direct', Relay/SSR energizes under Alarm condition & remains De-energized otherwise, 'Direct' setting is generally used for Audio/Visual Alarm Output.		Direct
		If this parameter is set as 'Reverse', Relay/SSR De-energizes under Alarm condition & remains energized otherwise, 'Reverse' setting is generally used for tripping the process under Alarm condition.		
ALARM 1 INHIBIT	A1.H > YES no	This parameter can be used to inhibit (suppress) the Alarm 1 activation upon power-up conditions by setting the parameter value to 'YES". From Power-up, the Alarm system remains disabled until PV is found with in the limits.		No
		If Alarm 1 activation is desired even under Power-up condition, Set this parameter value to 'NO'.		
ALARM 1 ACK.	A1.AP > AUTO MANUL BOTH	Once Alarm 1 is activated, user has following three options to de-activate it. Auto :- When PV falls within the programmed limits, Alarm 1 will be de-activated automatically.		Auto
		Manual :- Once Alarm 1 is activated, it remains activated until manually acknowledged by UP key.		
		Both :- Once Alarm 1 is activated, it can be de-activated either by pressing UP key or when PV falls within the alarm limits.		

Para meter	Dispaly	Description	Default
ALARM 1 Hysterisis	A1.HY > 2	It sets the dead band between ON & OFF switching of the Output. Larger value of hysterisis minimize the number of ON-OFF operation of load. This increases life of actuators like contactors. For range limit as per resolution selected Ref. Table No.2 (Page No. 8).	2°C
ALARM 1 Set Point	A1.SP > EnbL dSbL	If Enabled, User can View & edit the Alarm 1 Set point (A1.SP) & Alarm 1 Band (A1.bd) in USER list. If disabled, User can only View but can not edit Alarm 1 Set Point (A1.SP) and Alarm 1 Band (A1.bd) in USER list.	Enable
ALARM 2 Type	A2.tY > LOY HIGH bAnd	Direct acting / Reverse acting Low Alarm: Op1 activates when PV<A2.SP.  / Op1 activates when PV>A2.SP.  High Alarm : Op1 activates when PV>A2.SP  / Op1 activates when PV<A2.SP  Band Alarm : Op1 activates when PV falls outside the Alarm 1 Band w.r.t. Alarm 1 Set point in either direction.  / Op1 activates when PV falls Inside the Alarm 1 Band w.r.t. Alarm 1 Set point in either direction. 	Low
ALARM 2 LOGIC	A2.LO > dIr rEv	If this parameter is set as 'Direct', Relay/SSR energizes under Alarm condition & remains Deenergized otherwise. 'Direct' setting is generally used for Audio/Visual Alarm Output. If this parameter is set as 'Reverse', Relay/SSR De-energizes under Alarm condition & remains energized otherwise. 'Reverse' setting is generally used for tripping the process under Alarm condition.	Direct
ALARM 2 INHIBIT	A2.1 H > YES nO	This parameter can be used to inhibit (suppress) the Alarm 1 activation upon power-up conditions by setting the parameter value to 'YES". From Power-up, the Alarm system remains disabled until PV is found with in the limits. If Alarm 1 activation is desired even under Power-up condition, Set this parameter value to 'NO'.	No
ALARM 2 ACK.	A2.AP > AUtO nAUL bOtH	Once Alarm 2 is activated, user has following three options to de-activate it. Auto :- When PV falls within the programmed limits, Alarm 2 will be de-activated automatically. Manual :- Once Alarm 2 is activated, it remains activated until manually acknowledged by DN key. Both :- Once Alarm 2 is activated, it can be de-activated either by pressing DN key or when PV falls within the alarm limits.	auto
ALARM 2 Hysterisis	A2.HY > 2	It sets the dead band between ON & OFF switching of the Output. Larger value of hysterisis minimize the number of ON-OFF operation of load. This increases life of actuators like contactors. For range limit as per resolution selected Ref. Table No.2 (Page No. 8).	2°C
ALARM 2 SET POINT	A2.SP > EnbL dSbL	If Enabled, User can View & edit the Alarm 2 Set point (A2.SP) & Alarm 2 Band(A2.bd) in USER list If disabled, User can only View but can not edit Alarm 2 Set Point (A2.SP) & Alarm 2 Band(A2.bd) in USER list.	Enable

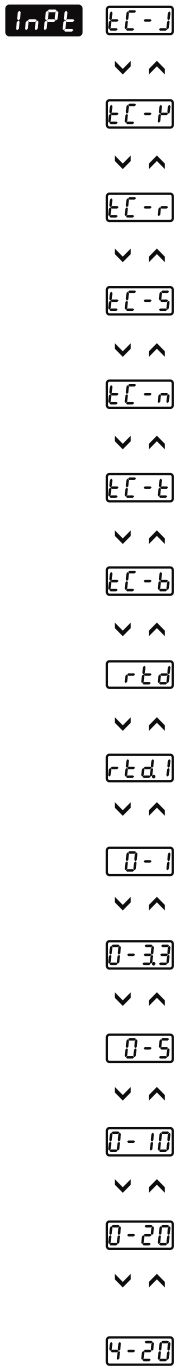
Confriguration List

(1) To enter in this mode, Press and hold SET & UP key simultaneously for 3 sec.

(2) Press UP or DOWN key to scroll between parameter options.

(3) Press SET key to store the current parameter & move on to the next parameter

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

Para meter	Dispaly	Description	Default
CONFIG LOCK CODE		Set this parameter to 15 (Default LOCK CODE) to access Configuration List. User has a choice to set different Lock Code in the range 1 ~ 9999 via USER LOCK CODE in Configuration List.	0
Input Types		'TC-J' :- If selected, instrument will accept temperature input from thermocouple J type sensor at rear terminal. Below range it will display 'LLLL' message & above range it will display 'HHHH'.	TC-J
		'TC-K' :- If selected, instrument will accept temperature input from thermocouple K type sensor at rear terminal. Below range it will display 'LLLL' message & above range it will display 'HHHH'.	
		'TC-R' :- If selected, instrument will accept temperature input from thermocouple R type sensor at rear terminal. Below range it will display 'LLLL' message & above range it will display 'HHHH'.	
		'TC-S' :- If selected, instrument will accept temperature input from thermocouple S type sensor at rear terminal. Below range it will display 'LLLL' message & above range it will display 'HHHH'	
		'TC-N' :- If selected, instrument will accept temperature input from thermocouple N type sensor at rear terminal. Below range it will display 'LLLL' message & above range it will display 'HHHH'	
		'TC-T' :- If selected, instrument will accept temperature input from thermocouple N type sensor at rear terminal. Below range it will display 'LLLL' message & above range it will display 'HHHH'.	
		'TC-B' :- If selected, instrument will accept temperature input from thermocouple B type sensor at rear terminal. Below range it will display 'LLLL' message & above range it will display 'HHHH'.	
		'RTD' :- If selected, instrument will accept temperature input from PT-100 sensor at rear terminal. Below range it will display 'LLLL' message & above range it will display 'HHHH'.	
		'RTD.1' :- If selected, instrument will accept temperature input from PT-100 sensor at rear terminal. Below range it will display 'LLLL' message & above range it will display 'HHHH'.	
		'0 - 1' :- If selected, instrument will accept 0 - 1VDC input at rear terminal. Below 0V it will display 'LLLL' message & above 1V it will display 'HHHH'.	
		'0 - 3.3' :- If selected, instrument will accept 0 - 3.3VDC input at rear terminal. Below 0V it will display 'LLLL' message & above 3.3V it will display 'HHHH'.	
		'0 - 5' :- If selected, instrument will accept 0 - 5 VDC input at rear terminal. Below 0V it will display 'LLLL' message & above 5V it will display 'HHHH'.	
		'0 - 10' :- If selected, instrument will accept 0 - 10VDC input at rear terminal. Below 0V it will display 'LLLL' message & Above 10V it will display 'HHHH'.	
		'0 - 20' :- If selected, instrument will accept 0 - 20 mA input at rear terminal. Below 0 mA it will display 'LLLL' message & Above 20 mA it will display 'HHHH'.	
		'4 - 20' :- If selected, instrument will accept 4 - 20mA input at rear terminal. Below 3.8mA it will display 'LLLL' message & Above 20mA it will display 'HHHH'. If input is less than 3.2mA it will display 'L.BRK'(Loop Break) message.	

Confriguration List

Para meter	Dispaly	Description	Default
RESOLUTION	rESL > 0 ⌄⌃ 0.0 ⌄⌃ 0.00 ⌄⌃ 0.000	This parameter will NOT be prompted when input type is selected as Thermocouple (TC-J,K,R,S,N & B) & RTD. By this parameter user can select four format of resolution only for analog input, i.e. "0.000, 0.00, 0.0, 0". For range limit as per resolution selected Ref. Table No.2 (Page No. 8).	0
ANALOG INPUT LOW VALUE	Ai.Lo > 0	By this parameter user can define Low scale for input signal. Which can be in between '-1999 to Ai.Hi'. For range limit as per resolution selected Ref. Table No.2 (Page No. 8).	0
ANALOG INPUT HIGH VALUE	Ai.Hi > 1200	By this parameter user can define HIGH scale for input signal. Which can be in between 'Ai.Lo to 9999'. For range limit as per resolution selected Ref. Table No.2 (Page No. 8).	1200
LOWER SP LIMIT	LSPL > 0	This parameter will only be prompted if Input type is thermocouple or RTD. Sets the minimum limit for set point adjustment. It can be set from minimum specified range of selected sensor to HSPL value. For range limit as per sensor selected Ref. Table No.1 (Page No. 8).	0 °C
HIGHER SP LIMIT	HSPL > 400	This parameter will only be prompted if Input type is thermocouple or RTD. Sets the maximum limit for set point adjustment. It can be set from LSPL value to maximum specified range of selected sensor. For range limit as per sensor selected Ref. Table No.1 (Page No. 8).	400 °C
Analog Input Logic	AILG > dIr ⌄⌃ rEv	By this parameter user can select the logic of the Analog Input. 'DIR' :- If selected then the value will vary from Ai.Lo to Ai.Hi. 'REV' :- If selected then the value will vary from Ai.Hi to Ai.Lo.	Dir
PROCESS VALUE OFFSET	OFSt > 0	Function of this parameter is to add/subtract a constant value to the measured PV to obtain Final PV. For range limit as per resolution selected Ref. Table No.2 (Page No. 8).	0
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.	04
mA Output Type	tmA 0-20 ⌄⌃ 4-20	This parameter will be prompted only if factory set control output is "mA". If "0~20" Selected, Control Output will be 0~20 mA. If "4~20" Selected, Control Output will be 4~20 mA.	4~20 mA
RE-Tx Direction	rtdi dIr ⌄⌃ rEv	If this parameter is set as 'Direct',the retransmission output is 4 mA at AI.LO value and 20 mA at AI.HI value If this parameter is set as 'Reverse',the retransmission output is 20 mA at AI.LO value and 4 mA at AI.HI value	Direct
RE-Tx Low Value	rtLo 0	By this parameter user can define Low scale for Retransmission. Which can be in between '-1999 to rt.Hi'.	0
RE-Tx High Value	rtHi 1200	By this parameter user can define High scale for Retransmission. Which can be in between 'rt.Lo to 9999.	1200

Confriguration List

Para meter	Dispaly	Description	Default
RE-Tx Error	rtEr → US.Lo ⌄⌃ US.Hi ⌄⌃ Si.Lo ⌄⌃ Si.Hi	In case of error condition, the retransmission output will be 4 mA.	US.Lo
		In case of error condition, the retransmission output will be 20 mA.	
		In case of error condition, the retransmission output will be 0 mA.	
		In case of error condition, the retransmission output will be 22 mA.	
RE-Tx Error	id-1 → 1	Set device id for communication. Range:- 1 to 9999.	1
Baud Rate	bAUd → 9600 ⌄⌃ 1920 ⌄⌃ 3125 ⌄⌃ 3840 ⌄⌃ 7680	By this parameter user can select baud rate for communication purpose.	9600
Parity	PAr → n_81 ⌄⌃ n_82 ⌄⌃ o_81 ⌄⌃ o_82 ⌄⌃ E_81 ⌄⌃ E_82	By this parameter user can select parity for communication purpose.	o_81
User Lock Code	ULOC > 15	Default USER LOCK CODE is 15 to access Control & Configuration List. User has a choice to set its own USER LOCK CODE between 1 to 9999, this is to prevent unauthorized access of Control & Configuration List.	15

User Calibration List

(1) To enter in this mode, Press and hold SHIFT key simultaneously for 3 sec.

(2) Press UP or DOWN key to scroll between parameter options.

(3) Press SET key to store the current parameter & move on to the next parameter.

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

Para meter	Dispaly	Description	Default
User Calib. Lock	UCLP > 0	Set this parameter to "7" (Default LOCK CODE) to access User Calibration List.	7
Calibration Type	IOtY > IP / OP	This parameter allows the user to select and calibrate either input or output other than the factory programmed values.	Input Type

A) When calibration type INPUT is selected :

(Calibration can ONLY be done of the Analog Input Type selected in Configuration List.)

Para meter	Dispaly	Description	Default
Low Calibration	LCAL > 0	This parameter allows the user to program "Lower Calibration" values other than factory programed values. With the help of Up / Down Key "Low Calibration" can be adjusted (As per selected input apply Low mA/Volt at input terminal).	0
High Calibration	HCAL > 9999	This parameter allows the user to program "Higher calibration" values other than factory programed values. With the help of Up / Down Key "High Calibration" can be adjusted (As per selected input apply High mA/Volt at input terminal)	9999
Factory Default	F.dEF > YES / nO	Yes:- If selected, User calibration will be canceled and instrument will run on factory set calibration values. No:- If selected, there is no effect on User Calibration and instrument will run as per User defined Calibration values.	NO

B) When calibration type OUTPUT is selected :

Para meter	Dispaly	Description	Default
Output Type	OPtY > 0-20 / 4-20	This parameter allows the user to calibrate either 0 - 20 or 4 - 20 mA in output	0 - 20
mA Low Calibration	CLO > 16.70	This parameter will be prompted only if factory set control output is "mA". By this parameter user can adjust Lower calibration for Selected mA type.(Adjust 0mA on meter if 0~20 selected or 4mA on meter if 4~20 selected)	16.70
mA High Calibration	CHO > 85.50	This parameter will be prompted only if factory set control output is "mA". By this parameter user can adjust Higher calibration for Selected mA type. (Adjust 20mA on Meter with this parameter).	85.50
mA Default	dnA > YES / nO	This parameter will be prompted only if factory set control output is "mA". If "Yes" Selected, User Calibration will be replaced with Factory Calibration. If "No" Selected, No change in User Calibration.	No

Table 1 : Range of Different Sensor Types.

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)	-100.0 ~ 450.0°C	0.1°C	± 0.3°C

Table 2 : Range as per Resolution.

Resolution	Analog Input Low Value	Analog Input High Value	Process Value Offset	Alarm 1 Band	Alarm 2 Band	ALARM 1 Hysterisis	ALARM 2 Hysterisis
0000	-1999 to 9999	-1999 to 9999	-25 to 25	-50 to 50	-50 to 50	1 to 25	1 to 25
000.0	-199.9 to 999.9	-199.9 to 999.9	25.0 to 25.0	-50.0 to 50.0	-50.0 to 50.0	0.1 to 25.0	0.1 to 25.0
00.00	-19.99 to 99.99	-19.99 to 99.99	-15.00 to 25.00	-19.00 to 50.00	-19.00 to 50.00	0.01 to 25.00	0.01 to 25.00
0.000	-1.999 to 9.999	-1.999 to 9.999	-1.500 to 2.500	-1.900 to 5.000	-1.900 to 5.000	0.001 to 2.500	0.001 to 2.500

Error Message

Display Message	Selected Input	Descriptions
“OPEN”	TC-J,K,R,S,N,B or RTD	Open Circuit of Control Sensor
“HHHH”	TC-J,K,R,S,N,B or RTD	If input is above HSPL it will display “HHHH” message.
“HHHH”	0 ~ 20 / 4 ~ 20 / 0 ~ 10	If input is above range it will display “HHHH” message.
"LLLL"	TC - J,K,R,S,N,B or RTD	If input is below LSPL it will display “LLLL” message.
"LLLL"	0 ~ 20 / 0 ~ 10	If input is below ‘0' it will display “LLLL” message.
"LLLL"	4 ~ 20	If input is below “3.8mA” and above “3.2mA” it will display “LLLL” message.
“L.BRK”	4 ~ 20	If input is less than “3.2mA” it will display “L.BRK” (Loop Break) message.
“C.E.R.R.”	Any Input Selected	The device is out of calibration and need to be sent to factory for re-calibration.

YOUR HELPING HANDS

Inquiry purchase@aavadinstrument.com +91 78740 (AAVAD) 22823	**Quotation** aavad@aavadinstrument.com +91 97277 (AAVAD) 22823	**Demonstration** hrg@aavadinstrument.com +91 90996 (AAVAD) 22823
Client Visit nmr@aavadinstrument.com +91 95109 (AAVAD) 22823	aavad© INSTRUMENT	**Purchase** aavad@aavadinstrument.com +91 97277 (AAVAD) 22823
Disptach purchase@aavadinstrument.com +91 78740 (AAVAD) 22823	**Installation** ipp@aavadinstrument.com +91 86909 (AAVAD) 22823	**Technical Support** ipp@aavadinstrument.com +91 86909 (AAVAD) 22823

216-217, Sangath Mall - 1, Opp. Engineering College, Chandkheda, Motera, Ahmedabad - 380005, Gujarat, India.
E : aavad@aavadinstrument.com **W** : www.aavadinstrument.com **Ph** : +91-972-772-2823, 079-40095342.
GSTIN : 24AHZPG7088C1ZY | **PAN No.** : AHZPG7088C | **MSME No.** : GJ01A0024728
Bank : Kotak Mahindra Bank LTD | **A/c Name :** Aavad Instrument | **A/C No. :** 1411117509 | **IFSC Code :** KKBK0000839