OP168-V04

selec PIC152N

Operating Instructions

48 x 96

SPECIFICATIONS

DISPLAY
4-digit (7 segment LED) 0.5" height Display Messages:
"Or" - a) Appears when measurement exceeds display scaling range(9999) for signal inputs
b) When open sensor is detected. (Applicable for TC/RTD/-5 to 56mV)
"rE" a) Appears when measurement is below display scaling range (-1999) for signal inputs.
B) Sensor reverse condition occurs. (Applicable for TC/RTD/mV)
Display alternating between PV and ALrM with LED of respective alarm flashing.
(Programmable annunciator option)
LED Status Annunciators - Alarm ON (2 nos)

POWER
85 to 270V AC/DC (AC : 50 or 60Hz),
5VA (Optional) - 24V DC

SETTINGS
Via three keys on front panel.

MEMORY
Nonvolatile EEPROM retains all programmable parameters and values.

MAIN SENSOR INPUT (Universal)
Thermocouple inputs
J : -200 to 750°C
K : -200 to 1350°C
T : -200 to 400°C
R : 0 to 1750°C
S : 0 to 1750°C
RTD input (2 wire or 3 wire)
PT100 : -100 to 850°C
Signal inputs
mV (linear) : - 5 to 56mV
Voltage : 0 - 10V DC
Current : 0 - 20mA DC

INDICATION ACCURACY
Temperature : 0.25% of Span ±1°C (20min.Warmup)
Signal input : 0.05% ±1 digit

ALARM OUTPUTS
2 nos : Relay output : 5A @ 250V AC or 24V DC
Alarm modes - Alarm High, Alarm Low, Band, Fault output and Fault diagnosis.
Hysteresis - Programmable.
Annunciator - Programmable.
Reset Action - Programmable : automatic or latched.
Standby Mode - Programmable : enable or disable.

SENSOR SUPPLY
24V DC supply to power the sensor

LINEAR DC OUTPUT (optional)
Re-transmission : 4 to 20mA or 0 to 5V or 0 to 10V
Update rate : 100msec.

ENVIRONMENTAL CONDITIONS
Operating Range : 0°C to 50°C
Storage Range : -20°C to 75°C
Humidity : 85% max.

ISOLATION BREAKDOWN RATINGS
AC line with respect to all inputs and outputs : 2000 Volts. All other inputs and outputs with respect to relay contacts : 2000V AC

CONNECTION
Wire clamping screw terminals

WEIGHT
300 grams

SAFETY PRECAUTIONS

All safety related codifications ; symbols and instructions that appear in this operating manual or on the equipment must be strictly followed to ensure the safety of the operating personnel as well as the instrument.

If the equipment is not handled in a manner specified by the manufacturer it might impair the protection provided by the equipment.

⚠ **CAUTION :** Read complete instructions prior to installation and operation of the unit.

⚠ **CAUTION :** Risk of electric shock.

WIRING GUIDELINES

⚠ **CAUTION :**
1. To prevent the risk of electric shock power supply to the equipment must be kept OFF while doing the wiring arrangement.
2. Wiring shall be done strictly according to the terminal layout with shortest connections. Confirm that all connections are correct.
3. Use lugged terminals to meet M3 screws.
4. To eliminate electromagnetic interference use of short wire with adequate ratings and twists of the same in equal size shall be made.
5. Cable used for connection to power source, must have a cross section of 1mm² or greater. These wires shall have insulation capacity made of at least 1.5KV.

MAINTENANCE

1. The equipment should be cleaned regularly to avoid blockage of ventilating parts.
2. Clean the equipment with a clean soft cloth. Do not use Isopropyl alcohol or any other cleaning agent.

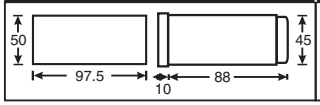
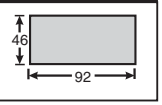
INSTALLATION GUIDELINES

⚠ **CAUTION :**
1. This equipment, being built-in-type, normally becomes a part of main control panel and in such case the terminals do not remain accessible to the end user after installation and internal wiring.
2. Conductors must not come in contact with the internal circuitry of the equipment or else it may lead to a safety hazard that may in turn endanger life or cause electrical shock to the operator.
3. Circuit breaker or mains switch must be installed between power source and supply terminals to facilitate power 'ON' or 'OFF' function. However this switch or breaker must be installed in a convenient position normally accessible to the operator.

⚠ **CAUTION :**
1. The equipment shall not be installed in environmental conditions other than those mentioned in this manual.
2. Fuse Protection : The equipment does not have a built in-type fuse. Installation of external fuse of rating 275V AC/1Amp for electrical circuitry is highly recommended.
3. Thermal dissipation of equipment is met through ventilation holes provided on chassis of equipment. Such ventilation holes shall not be obstructed else it can lead to a safety hazard.
4. The output terminals shall be strictly loaded to the manufacturer specified values/range.

MECHANICAL INSTALLATION

For installing the controller
1. Prepare the panel cutout with proper dimensions as shown

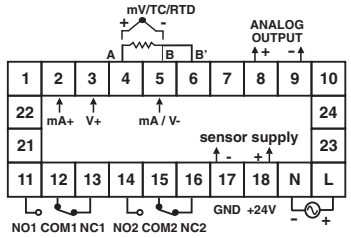
OUTLINE Dimensions (in mm)	PANEL CUTOUT Dimensions (in mm)
	

2. Remove clamp from the controller and push the controller into the panel cutout. Secure the controller in its place by pushing the clamp on rear side.
3. For proper sealing, tighten the screws evenly with required torque.

⚠ **CAUTION:**
The equipment in its installed state must not come in close proximity to any heating sources, caustic vapors, oils, steam, or other unwanted process by-products.

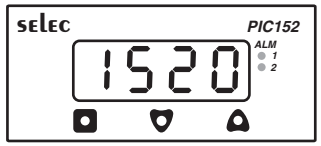
EMC Guidelines:
1. Use proper input power cables with shortest connections and twisted type.
2. Layout of connecting cables shall be away from any Internal EMI source.

TERMINAL CONNECTIONS



TERMINAL DESCRIPTION	TERMINAL
Live	L
Neutral	N
+ve mA	2
+ve V	3
+ve mV / TC / RTD1	4
- ve mV / TC- / RTD 2 / -ve mA / - ve V	5
+ve analog output	8
-ve analog output	9
NO for relay1	11
COM for relay1	12
NC for relay1	13
NO for relay2	14
COM for relay2	15
NC for relay2	16
GND / -ve sensor supply	17
+24 V / +ve sensor supply	18

FRONT PANEL DESCRIPTION



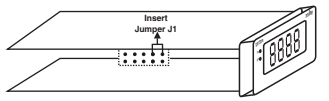
Functions	Key press
To enter or exit program mode	▲ + ▼ together for 3 seconds
To change levels	▲ or ▼ till Level is displayed. ■ + ▲ / ▼ to increase or decrease the level number.
To view function on the same level and to display the current option.	▲ or ▼ key once to view next / previous function.
To increase or decrease the value of a particular function.	■ + ▲ to increase and ■ + ▼ to decrease the value of particular function.

NOTE : The unit will autoexit program mode after 60 seconds of inactivity.

To enter or exit program mode : Press ▲ & ▼ together for 3 seconds

KEY PRESS	DISPLAY	DESCRIPTION
Press ▲ + ▼ for 3sec	Id	**Lock code** Enter valid lock code as set in the LOCK parameter of level 0.
	0	

NOTE : Lock code will not be prompted if jumper **J1** (besides the calibration jumper) is present.



PROGRAMMING OF LEVELS

PROGRAMMING OF LEVEL 0

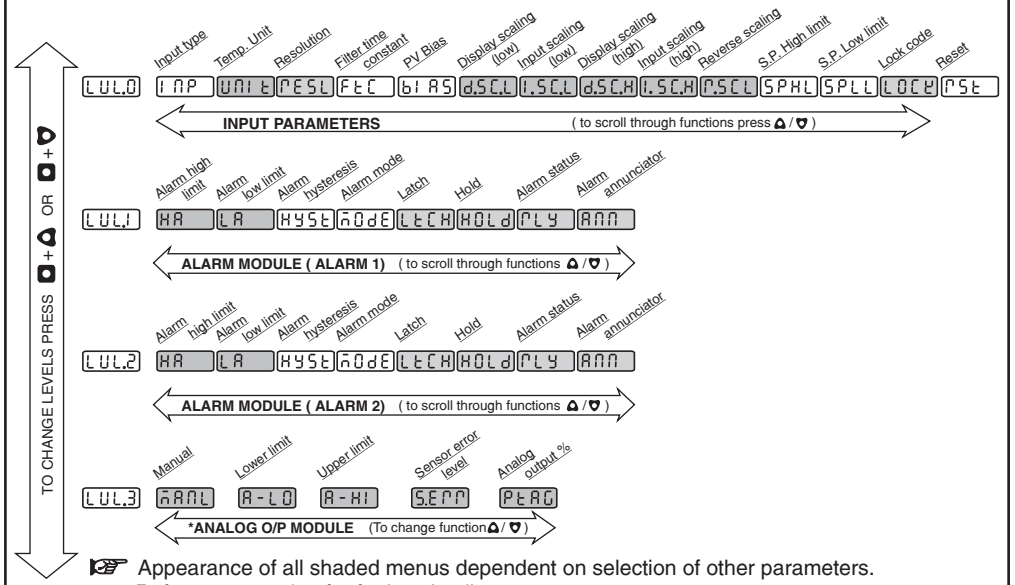
KEY PRESS	DISPLAY	DESCRIPTION
Press ▲	LUL.1	
Press ■ + ▼	LUL.0	Parameters in this level can be set.

Press ▲ key to select input sensor type

Default setting : J

Display	INP	for 1sec **Input sensor selection**
	J	J (-200 to 750°C)
Press ■ + ▲	K	K (-200 to 1350°C)
Press ■ + ▲	t	T (-200 to 400°C)
Press ■ + ▲	r	R (0 to 1750°C)
Press ■ + ▲	S	S (0 to 1750°C)
Press ■ + ▲	P100	PT100 (-100 to 850°C)
Press ■ + ▲	mV	mV (linear) -5 to 56mV
Press ■ + ▲	VOLt	10V DC
Press ■ + ▲	CURR	20mA DC

FUNCTIONS MENU



☞ Appearance of all shaded menus dependent on selection of other parameters. Refer programming for further details.
*-Applicable only for analog output models.

KEY PRESS	DISPLAY	DESCRIPTION
Press key to select Temperature unit		Default setting : °C
NOTE : This parameter is not prompted if analog input is selected.		
		Temperature Unit
	Display UNIt	for 1 sec.
	°C	Value displayed in °C
Press +	°F	Value displayed in °F
Press key to select Resolution		Default value : 1
NOTE : This parameter is not prompted if input is R, S type thermocouple.		
		Resolution
	Display RESL	for 1 sec.
	1	Range : 1 / 0.1 for TC / RTD
Press +	0.1	1 / 0.1 / 0.01 / 0.001 for AIN
Press key to select Filter time constant		Default value : 1sec.
		Filter time constant *
	Display FtC	for 1 sec.
Press + / to change value	1	Range : OFF, 1 to 99 sec.
Press key to select PV bias		Default value : 0.0
	Display bIAS	for 1 sec. **PV bias ***
Press + / to change value	0.0	Range : -200 to 200 (fixed 0.1°C for TC/RTD) For AIN display as per decimal point selected.

KEY PRESS	DISPLAY	DESCRIPTION
Press key to select Display value scaling point1		Default value : 0
NOTE : This parameter is not prompted if TC/RTD input types are selected		
		Display value scaling point low (DSCL) *
	Display d.SCL	for 1sec
Press + / to change value	0	Range : -1999 to DSCH For AIN display as per decimal point selected.
Press key to select input value scaling point 1		Default value : 0.00
NOTE : This parameter is not prompted if TC/RTD input types are selected		
		Input value scaling point low (ISCL) *
	Display I.SCL	for 1sec.
Press + / to change value	0.00	Range : 0.0mA / -5mV / 0.0 V to ISCH (default value changes as per analog input selected)
Press key to select Display value scaling point 2		Default value : 9999
NOTE : This parameter is not prompted if TC/RTD input types are selected		
		Display value scaling point high (DSCH) *
	Display d.SCH	for 1sec.
Press + / to change value	9999	Range : DSCL to 9999 For AIN display as per decimal point selected.

Note : * mark explained in the user guide.
AIN - Analog Input

KEY PRESS	DISPLAY	DESCRIPTION
Press key to select Input value scaling point 2		Default value : 20.0mA
NOTE : This parameter is not prompted if TC/RTD input types are selected		
		Input value scaling point high (ISCH) *
	Display I.SCH	for 1 sec.
Press + / to change value	20.00	Range : ISCL to 20.00mA / 56mV / 10.00V (default value changes as per analog input selected)
Press key to select Reverse scaling		Default setting : no
NOTE : This parameter is not prompted if TC/RTD input types are selected		
		Reverse scaling*
	Display r.SCL	for 1 sec.
	no	The display scaling point settings can be reversed by selecting Reverse scaling as YES
Press +	YES	
Press key to select Set point high limit		Default value : 750°C
		Set point high limit (SPHL)
	Display SPHL	for 1sec
Press + / to change value	750	Range : SPLL to max. range of sensor (for TC/RTD) SPLL to DPSH (for AIN) for AIN display as per decimal point selected.
Press key to select Set point low limit		Default value : -200°C
		Set point low limit (SPLL)
	Display SPLL	for 1sec
Press + / to change value	-200	Range : min. range of sensor to SPHL (for TC/RTD) DSCL to SPHL (for AIN) for AIN display as per decimal point selected.
Press key to select Lock code		Default setting : 0
		Lock code
	Display LOCK	for 1sec
Press + / to change value	0	Range : 0 to 9999
Press key to select Reset		Default setting : no
		Reset
	Display rSt	for 1sec
	no	All parameters set to factory setting
Press +	YES	

NOTE : After altering the value of the input parameters press or for change to actually take effect.

NOTE : Programming steps for Level1 (Alarm1 module**) & Level2 (**Alarm2 module**) is same.** Programming of level1 is shown.

PROGRAMMING OF LEVEL 1

Press + till Level 1 is displayed

KEY PRESS	DISPLAY	DESCRIPTION
	LUL 1	Parameters in this level can be set.
Press key to select Alarm high limit		Default value : 750°C
NOTE : This parameter is not prompted if alarm mode is OFF / FdA / FOA / LA		
		Alarm high limit
	Display HA	for 1sec
Press + / to change value	750	Range : LA to SPHL (BAND mode) SPLL to SPHL (HA mode) for AIN display as per decimal point selected.
Press key to select Alarm low limit		Default value : -200°C
NOTE : This parameter is not prompted if alarm mode is OFF / FdA / FOA / LA		
		Alarm low limit
	Display LA	for 1sec
Press + / to change value	-200	Range : SPHL to HA (BAND mode) SPLL to SPHL (LA mode) for AIN display as per decimal point selected.
Press key to select Alarm hysteresis.		Default value: 1.0
NOTE : This parameter is not prompted if alarm mode is OFF / FdA / FOA		
		Alarm hysteresis
	Display HYSt	for 1sec
Press + / to change value	1.0	Range: 0.1 to 99.9 °C (for TC/RTD) 1 to 999 (for analog input) for AIN display as per decimal point selected.

KEY PRESS	DISPLAY	DESCRIPTION

Press ▲ key to select Alarm mode.
Default setting : HA
In **level 2** default setting is LA

Alarm mode *

Display	AMODE	for 1sec
	OFF	Alarm off
Press ■+▲	HA	High Alarm
Press ■+▲	LA	Low Alarm
Press ■+▲	bAnd	Band Alarm
Press ■+▲	FdA	Fault Diagnosis Alarm
Press ■+▲	FOA	Fail Output Alarm

Press ▲ key to select Alarm latch status.
Default setting : OFF
NOTE : This parameter is not prompted when alarm mode is OFF

Latch alarm*

Display	LtCH	for 1 sec.
Press ■+▲	OFF	When latch is ON Alarm status will be preserved at any process condition.
	On	

Press ▲ key to select Alarm hold status.
Default setting : OFF
NOTE : This parameter is not prompted if alarm mode is OFF

Hold Alarm*

Display	HOLd	for 1 sec.
Press ■+▲	OFF	Used to avoid alarm at power ON. Alarm is enabled only after the process value has reached the set point.
	On	

Press ▲ key to select Relay status for alarm1.
Default setting : En
NOTE : This parameter is not prompted when alarm mode is OFF

Relay status for Alarm1

Display	rLY	for 1 sec.
Press ■+▲	En	Relay Energized.
	dEn	Relay De - energized

Press ▲ key to select Alarm annunciator.
Default setting : OFF
NOTE : This parameter is not prompted if alarm mode is OFF

Alarm annunciator*

Display	Ann	for 1 sec.
	OFF	OFF No annunciator
Press ■+▲	LEd	LED LED of alarm1 blinks at the rate of 0.2sec
Press ■+▲	dSP	dSP LED blinking ; display flashing b/w PV and message (ALRM) at 1 sec.

NOTE : Applicable only if Analog output is available.

PROGRAMMING OF LEVEL 3

Press ■ + ▲ till Level 3 is displayed

KEY PRESS	DISPLAY	DESCRIPTION

	LUL.3	Parameters in this level can be set.

Press ▲ key to select Manual.
Default setting : OFF

Manual

Display	mAnL	for 1sec
	OFF	Used to set manual output On / Off.
Press ■+▲	On	

Press ▲ key to select Analog low scaling point
Default value : -9999
NOTE : This parameter is prompted only if manual is OFF

Low scaling point

Display	A-LO	for 1sec
Press ■+▲ / ▼ to change value	-1999	Programmable from -1999 to 9999. Fixed 1°C resolution for TC / RTD. For AIN display as per decimal point selected.

Press ▲ key to select Analog high scaling point
Default value : 9999
NOTE : This parameter is prompted only if manual is OFF

High scaling point

Display	A-HI	for 1 sec.
Press ■+▲ / ▼ to change value	9999	Programmable from -1999 to 9999 Fixed 1°C resolution for TC / RTD. For AIN display as per decimal point selected.

Press ▲ key to select Sensor error level
Default setting : HIGH

Sensor error level

Display	S.Err	for 1 sec.
Press ■+▲	HIGH	Incase of sensor failure the output can be set to high or low value of range.
	LOW	

Press ▲ key to select Analog output %.
Default setting : 0.0
NOTE : This parameter is prompted only if manual is On

Analog output %

Display	PtAG	for 1 sec.
Press ■+▲ / ▼ to change value	0.0	Programmable from 0.0 to 100.0

USER GUIDE

ALARM MODES

High Alarm:
The alarm is turned ON when PV rises above a preset value.

Low Alarm:
The alarm is turned ON when PV falls below a preset value.

Band Alarm:
The alarm is turned ON when PV rises above or falls below a preset value.

Fault Diagnosis Alarm:
The alarm is turned ON in case a hardware failure occurs.

Fail Output Alarm:
The alarm is turned ON in case of :
a) measurement value exceeds range
b)Sensor reverse condition(applicable for TC/RTD).

Latch Alarm:
This function is used to latch the alarm. When activated, the alarm is latched until it is acknowledged manually, even though the alarm condition may have disappeared.

Hold Alarm:
When hold is selected, in any alarm mode, it prevents an alarm signal on power-up. The alarm is enabled only if the process temperature is within alarm range.

Alarm display options :
(1) Press the ■ key to view the status of alarms
(2) Press ■+▲ to view the status of next alarm (after alarm 2 it rolls over to alarm 1).

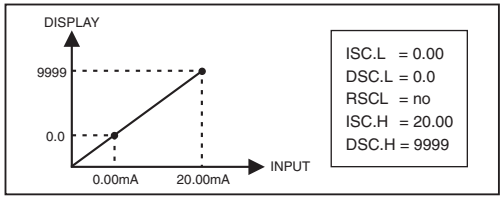
Only the alarms that are active can be viewed.
Alarm status (e.g : of alarm 1) will be displayed as follows:
LA-1 for low alarm, HA-1 for high alarm,
FO-1 for Fail output alarm, FD-1 for fault diagnosis.
(3) Press ■+▲ to acknowledge the particular alarm (Alarm will be acknowledged only if latch ON).

FILTER TIME CONSTANT :
The filter is an adaptive digital filter that discriminates between measurement noise and actual process changes. If the signal is varying too greatly due to measurement noise, increase the filter value. If the fastest controller response is needed, decrease the filter value.

BIAS :
This value offsets the indicator's PV display value by the entered amount. This is useful in applications in which the sensor cannot provide the actual temperature signal due to mounting constraints, inaccuracy etc.

SCALING FOR ANALOG INPUT :
To scale the controller, two scaling points are necessary. Each scaling point has a coordinate pair of Display Values and Input Values. It is recommended that the two scaling points be at the low and high ends of the input signal being measured. Process value scaling will be linear between and continue past the entered points to the limits of the input range. (Factory settings example will display 0.0 at 0mA input and display 9999 at 20.00mA input.) Reverse acting indication can be accomplished by setting reverse scaling parameter as YES. In this case referring the above eg. For 0.00mA input the display will show 9999 and 20.00mA input the display will show 0.0.

NOTE : This change will not be visible in the programming menu.



SETTING FOR MANUAL OUTPUT MODE :

KEY PRESS	DISPLAY	DESCRIPTION

Eg. For 4-20 mA if constant 12mA output current is desired then setting for manual output :

Press ■+▲	LUL.3	
Press ▲	mAnL	display momentarily
Press ■+▲ / ▼	On	(Selection for manual output mode)
Press ▲	PtAG	
Press ■+▲ / ▼	50.0	Adjust the display to 50.0 to get 12mA at output

SETTING FOR RETRANSMISSION MODE

Eg. : 1) For Temperature Input :
Input : RTD Input
Retransmission output : 4 - 20 mA
Desired output : 4mA at 0°C, 20mA at 400°C
Settings :

Press ▲+▼	LUL.I	
Press ■+▼	LUL.0	
Press ▲	INP	
Using ■+▲ / ▼	P100	Select the Input type as RTD
Press ▲ till	LUL.0	is displayed
Press ■+▲ till	LUL.3	is displayed
Press ▲	mAnL	display momentarily
and then display	OFF	(Selection for retransmission mode)
Press ▲	A-LO	
Press ■+▲ / ▼	0	Adjust the display to 0
Press ▲	A-HI	

KEY PRESS	DISPLAY	DESCRIPTION
Press ▣ + ▲ / ▼	400	Adjust the display to 400
Press ▲		

Eg. : 2) For analog Input :

Retransmission output : 4 - 20 mA
Desired output : 4mA at 0V ; 20mA at 10V
Input Scaling : 0V - 0 ; 10V - 400
Settings :

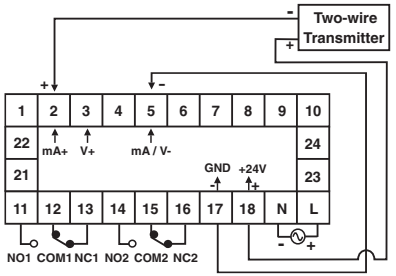
Press ▲ + ▼	LUL.1	
Press ▣ + ▼	LUL.0	
Press ▲	INP	
Using ▣ + ▲ / ▼	VOLt	Select the Input type as voltage
Press ▲ until	d.SC.L	is displayed
Using ▣ + ▲ / ▼	0	Adjust the display to 0
Press ▲	I.SC.L	
Press ▣ + ▲ / ▼	0.00	Adjust the display to 0
Press ▲	d.SC.H	
Press ▣ + ▲ / ▼	400	Adjust the display to 400
Press ▲	I.SC.H	
Press ▣ + ▲ / ▼	10.0	Adjust the display to 10

Note : By default the display will be 10.00 for 0-10V Input
Press ▲
Setting for Retransmission :

Press ▣ + ▲ till	LUL.3	
Press ▲	rANL	displays momentarily
and then display	OFF	
	A-LO	
Press ▣ + ▲ / ▼	0	Adjust the display to 0
	A-HI	
Press ▣ + ▲ / ▼	400	Adjust the display to 400
Press ▲		

CONNECTION WITH 2-WIRE TRANSMITTER

Connection with Internal 24V DC supply :
Eg : To give 0-20mA DC analog input



CALIBRATION CERTIFICATE

Date:

Model No:_____

Sr. No.:_____

Claimed Accuracy : ± 0.25 % of full scale ± 1 digit
(After 20min warmup time)

The calibration of this unit has been verified at the following values :

SENSOR	CALIBRATION TEMP. (°C) (0.1Resolution)	DISPLAY VALUE (°C)
K	35.0	35.0
	700.0	700.0
	1350	1350
PT100	0.0	0.0
	500.0	500.0
	800.0	800.0

SENSOR	CALIBRATION VALUE (0.1Resolution)	DISPLAY VALUE
Voltage (VDC)	0.0	0.0
	10.0	10.0
Current (mA)	0.0	0.0
	20.0	20.0

The thermocouple / RTD curves are linearised in this microprocessor based product; and hence the values interpolated between the readings shown above are also equally accurate; at every point in the curve.

Unit is accepted as accuracy is within the specified limit of claimed accuracy and certificate is valid up to one year from the date of issue

CHECKED BY :

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(Specifications subject to change as development is a continuous process.)

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