

OPERATING INSTRUCTIONS PIC 100N



48X96

SPECIFICATIONS

1. 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 (4nos)

2. POWER

AC Versions- 85 to 270 VAC, 50 or 60 Hz, 5 VA
DC Versions (Optional) - 24 VDC

3. SETTINGS

Via three keys on front panel.

4. MEMORY

Nonvolatile EEPROM retains all programmable parameters and values.

5. 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
C : 0 to 2300°C
E : -200 to 750°C
B : +150 to 1820°C
N : -200 to 1300°C
L : -200 to 600°C
U : -200 to 900°C
W : 0 to 2300°C
Platinel II: 0 to 1390°C

RTD inputs (2 wire or 3 wire)

- PT100: -100 to 850°C
PT1000: -200 to 300°C

Signal inputs

- mV (linear) : -5mV to 56mV
mV (linear) : 0mV to 100mV

Voltage : 0 - 10 VDC

Current : 0 - 20mA DC

6. INDICATION ACCURACY

Temperature: 0.25% of Span $\pm 1^\circ\text{C}$ (20min. Warmup)
Signal input: 0.05 % ± 1 digit

7. ALARM OUTPUTS

4 nos : Relay output: 5A @ 250VAC or 24VDC
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

8. SENSOR SUPPLY

24VDC supply to power the sensors

9. LINEAR DC OUTPUT (optional)

Re-transmission: 4 to 20 mA or 0 to 5 V or 0 to 10 V
Update rate: 100msec

10. SERIAL COMMUNICATIONS (optional)

Type - RS485
Protocol - MODBUS
Data Format - 8 bit for Modbus
Start bit - programmable; Stop bit: programmable
Parity - programmable
Node Address - 1 to 99, max of 32 units per line

11. ENVIRONMENTAL CONDITIONS

Operating Range: 0 to 50°C
Storage Range: -20 to 75°C
Humidity: 95% max.

12. ISOLATION BREAKDOWN RATINGS

AC line with respect to all inputs and outputs: 2000 Volts
All other inputs and outputs with respect to Relay contacts: 2000 VAC

13. CONNECTION

Wire clamping screw terminals

14. WEIGHT

300 grams

SAFETY SUMMARY

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.

WARNING: Risk of electric shock.

WIRING GUIDELINES

CAUTION:

- To prevent the risk of electric shock power supply to the equipment must be kept OFF while doing the wiring arrangement.
- Wiring shall be done strictly according to the terminal layout with shortest connections. Confirm that all connections are correct.
- Use lugged terminals to meet M3 screws.
- To eliminate electromagnetic interference use of short wire with adequate ratings and twists of the same in equal size shall be made.
- 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

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

INSTALLATION GUIDELINES

CAUTION:

- 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.
- 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.
- 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:

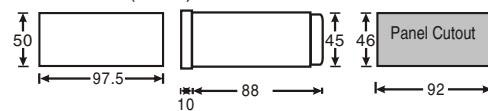
- The equipment shall not be installed in environmental conditions other than those mentioned in this manual.
- Fuse Protection: The equipment does not have a built-in fuse. Installation of external fuse of rating 275VAC/1Amp for electrical circuitry is highly recommended.
- Thermal dissipation of equipment 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.
- The output terminals shall be strictly loaded to the manufacturer specified values/range.

Mechanical Installation:

For installing the controller

- Prepare the panel cutout with proper dimensions as shown

DIMENSIONS (in mm)



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

CAUTION:

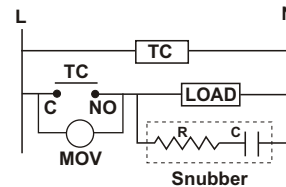
The equipment in its installed state must not come in close proximity to any heating sources, caustic vapors, oils, steam, or other unwanted process by-products.

EMC Guidelines:

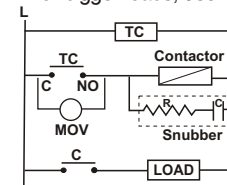
- Use proper input power cables with shortest connections and twisted type.
- Layout of connecting cables shall be away from any internal EMI source.

LOAD CONNECTIONS

- For load current less than 0.5A



- For bigger loads, use interposing relay / contactor



1) Snubber Part No.: APRC - 01.

2) MOV Part No.: AP-MOV - 03.

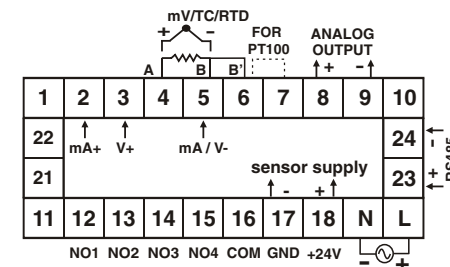
Note: For inductive loads, use of snubber and MOV, as shown above, is recommended.

ELECTRICAL PRECAUTIONS DURING USE

Electrical noise generated by switching of inductive loads can create momentary disruption, erratic display, latch up, data loss or permanent damage to the instrument. To reduce noise:

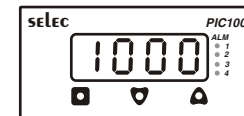
- Use of MOV across supply of temperature controller & snub
- Use separate shielded wires for inputs.

TERMINAL CONNECTIONS



TERMINAL DESCRIPTION	TERMINAL
Live & Neutral	L & N
+ve mA	2
+ve V	3
+ve mV / TC+ / RTD 1	4
-ve mV / TC- / RTD 2 / -ve mA / -ve V	5
+ve analog output	8
-ve analog output	9
NO for relay1	12
NO for relay2	13
NO for relay3	14
NO for relay4	15
COM for relay1	16
GND / -ve sensor supply	17
+24 V / +ve sensor supply	18

KEYS 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 the 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

PROGRAMMING OF LEVELS

PROGRAMMING OF LEVEL 0

KEY PRESS	DISPLAY	DESCRIPTION
Press ▲ + ▼ Key	U.L.L.	Parameters in this level can be set.
Press ■ + ▼ Key	U.L.0	

PROGRAMMING OF LEVEL 1

KEY PRESS	DISPLAY	DESCRIPTION
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Press **A** key to select Alarm high limit
 Default value: 750°C

NOTE: This parameter is not prompted if alarm mode is OFF / FDR / LAR

Display **HA** for 1sec **Alarm high limit**

Press **Q** + **A**/**V** to change value
 Range: LA to SPHL (BAND mode)
 SPLL to SPHL(HA mode)
 (display as per resolution selected.)

Press **A** key to select Alarm low limit
 Default value: -200°C

NOTE: This parameter is not prompted if alarm mode is OFF / FDR / HAR

Display **LA** for 1sec **Alarm low limit**

Press **Q** + **A**/**V** to change value
 Range: SPHL to HA (BAND mode)
 SPLL to SPHL (LA mode)
 For AIN display as per decimal point selected.

Press **A** key to select Alarm hysteresis.
 Default value: 1.0

NOTE: This parameter is not prompted if alarm mode is OFF / FDR / FOR

Display **HYS** for 1sec **Alarm hysteresis**

Press **Q** + **A**/**V** to change value
 Range: 0.1 to 99.9 °C (for TC/RTD)
 1 to 999 (for analog input)
 For AIN display as per decimal point selected.

Press **A** key to select Delay timer
 Default value: 0.00

NOTE: This parameter is not prompted if alarm mode is OFF / FDR / FOR

Display **ETN** for 1sec **Delay timer**

Press **Q** + **A**/**V** to change value
 Range: 0.0 to 99.59 min.sec

Press **A** key to select Alarm mode.

Default setting: HA for level 1 & 3
 Default setting: LAR for level 2 & 4.

Display **NODE** for 1sec **Alarm mode ***

- Press **Q** + **A** OFF Alarm off
- Press **Q** + **A** HA High Alarm
- Press **Q** + **A** LA Low Alarm
- Press **Q** + **A** BAND Band Alarm
- Press **Q** + **A** FDR Fault Diagnosis Alarm
- Press **Q** + **A** FOR Fail Output Alarm

Press **A** key to select Alarm latch status.
 Default setting: OFF

NOTE: This parameter is not prompted if alarm mode is OFF

Display **LECH** for 1sec **Latch alarm***

Press **Q** + **A**
 When latch is ON Alarm status will be preserved at any process condition.

KEY PRESS DISPLAY DESCRIPTION

Press **A** key to select Alarm hold status.
 Default setting: OFF

NOTE: This parameter is not prompted if alarm mode is OFF

Display **HOLD** for 1sec **Hold Alarm***

Press **Q** + **A**
 Used to avoid alarm at power ON. Alarm is enabled only after the process value has reached the set point.

Press **A** key to select Relay status for alarm1.
 Default setting: EN

NOTE: This parameter is not prompted if alarm mode is OFF

Display **PLY** for 1sec **Relay status for Alarm1**

Press **Q** + **A**
 Relay Energized.
 Press **Q** + **A**
 Relay De - energized

Press **A** key to select Alarm annunciator.
 Default setting: OFF

NOTE: This parameter is not prompted if alarm mode is OFF

Display **ANN** for 1sec **Alarm annunciator***

Press **Q** + **A** OFF OFF No annunciator
 Press **Q** + **A** LED LED LED of alarm1 blinks at the rate of 0.2sec
 Press **Q** + **A** DSP DSP LED blinking; display flashing b/w PV and message (ALRM) at 1sec

PROGRAMMING OF LEVEL 5

Press **Q** + **A** till Level 5 is displayed

KEY PRESS	DISPLAY	DESCRIPTION
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Parameters in this level can be set.

Press **A** key to select Baudrate.
 Default value: 9600

Display **BAUD** for 1sec **Baud rate**

Press **Q** + **A**/**V** to change value
 Programmable for 300, 600, 1200, 2400, 4800, 9600 bps.

Press **A** key to select Address.
 Default value: 01

Display **ADDN** for 1sec **Address**

Press **Q** + **A**/**V** to change value
 Range: 01 to 99

Press **A** key to select Parity.
 Default setting: NONE

Display **PARN** for 1sec **Parity**

- Press **Q** + **A** NONE None
- Press **Q** + **A** EVEN Even
- Press **Q** + **A** ODD Odd
- Press **Q** + **A** MARK Mark
- Press **Q** + **A** SPACE Space

Note: * mark explained in the user guide.

KEY PRESS DISPLAY DESCRIPTION

Press **A** key to select Stop bits.
 Default value: 1

Display **STOP** for 1sec **Stop bits**

Press **Q** + **A**
 Selectable between 1 & 2
 (Stop bit 2 is not valid only if Parity is other than NONE)

NOTE: Applicable only if Analog output is available.

PROGRAMMING OF LEVEL 6

KEY PRESS	DISPLAY	DESCRIPTION
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Press **Q** + **A** till Level 6 is displayed

Parameters in this level can be set.

Press **A** key to select Manual Mode.
 Default setting: OFF

Display **MANL** for 1sec **Manual Mode**

Press **Q** + **A**
 Used to set manual output On / Off.
 Press **Q** + **A**

Press **A** key to select Analog low scaling point
 Default value: -1999

NOTE: This parameter is prompted only if manual = OFF

Display **A-L0** for 1sec **Low scaling point**

Press **Q** + **A**/**V** to change value
 Programmable from -1999 to 9999.
 Fixed 1°C resolution for TC / RTD.
 For AIN display as per decimal point selected

Press **A** key to select Analog high scaling point
 Default value: 9999

NOTE: This parameter is prompted only if manual = OFF

Display **A-HI** for 1sec **High scaling point**

Press **Q** + **A**/**V** to change value
 Programmable from -1999 to 9999
 Fixed 1°C resolution for TC / RTD.
 For AIN display as per decimal point selected

Press **A** key to select Sensor error level
 Default setting: HIGH

Display **SEPN** for 1sec **Sensor error level**

Press **Q** + **A**
 Incase of sensor failure the output can be set to high or low value of range.
 Press **Q** + **A**

Press **A** key to select Analog output %.
 Default setting: 0.0

NOTE: This parameter is prompted only if manual = OFF

Display **PTAO** for 1sec **Analog output %**

Press **Q** + **A**/**V** to change value
 Programmable from 0.0 to 100.0

PROGRAMMING OF LEVEL 7

Press **Q** + **A** till Level 7 is displayed

KEY PRESS	DISPLAY	DESCRIPTION
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Parameters in this level can be set.

Press **A** key to select user Identification Code
 Default setting: 0

Display **ID** for 1sec **User Identification Code**

Press **Q** + **A**/**V** to change value
 Range: 0000 to 9999

Press **A** key to select Lock level 0
 Default setting: FULL

Display **LY-0** for 1sec **Lock level 0**

Press **Q** + **A** full access to level 0 parameters
 Press **Q** + **A** level 0 parameters can be read
 Press **Q** + **A** No access to level 0 parameters

Press **A** key to select Lock level 1
 Default setting: FULL

Display **LY-1** for 1sec **Lock level 1**

Press **Q** + **A** full access to level 1 parameters
 Press **Q** + **A** level 1 parameters can be read
 Press **Q** + **A** No access to level 1 parameters

Press **A** key to select Lock level 2
 Default setting: FULL

Display **LY-2** for 1sec **Lock level 2**

Press **Q** + **A** full access to level 2 parameters
 Press **Q** + **A** level 2 parameters can be read
 Press **Q** + **A** No access to level 2 parameters

Press **A** key to select Lock level 3
 Default setting: FULL

Display **LY-3** for 1sec **Lock level 3**

Press **Q** + **A** full access to level 3 parameters
 Press **Q** + **A** level 3 parameters can be read
 Press **Q** + **A** No access to level 3 parameters

Press **A** key to select Lock level 4
 Default setting: FULL

Display **LY-4** for 1sec **Lock level 4**

Press **Q** + **A** full access to level 4 parameters
 Press **Q** + **A** level 4 parameters can be read
 Press **Q** + **A** No access to level 4 parameters

Press **A** key to select Lock level 5
 Default setting: FULL

NOTE: This parameter is not prompted if Level 5 is not present.

Display **LY-5** for 1sec **Lock level 5**

Press **Q** + **A** full access to level 5 parameters
 Press **Q** + **A** level 5 parameters can be read
 Press **Q** + **A** No access to level 5 parameters

KEY PRESS	DISPLAY	DESCRIPTION
Press A key to select Lock level 6		Default setting: FULL NOTE: This parameter is not prompted if Level 6 is not present.
	Display L 6 - 6 for 1sec	Lock level 6
Press 0 + A	FULL	full access to level 6 parameters
Press 0 + A	PERD	level 6 parameters can be read
Press 0 + A	LOCY	No access to level 6 parameters
Press A key to select change password		Default setting: 1d-0

	Display 1d-0 for 1sec	Change password
Press 0 + A	1d-0	
Press 0 + A	1d-4	

Press A key to select new password		Default value: 0
This parameter is prompted only if - 1d-3		
	Display 1d for 1sec	New password
Press 0 + A / 0	0	Range : 0000 to 9999 to change value

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:

- measurement value exceeds range
- Sensor reverse condition (applicable for TC/RTD/0-56mV).

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.

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 controller'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.

ALARM ANNUNCIATOR:

When alarm annunciator is ON, during alarm condition, visual annunciation is given by the upper display altering between AL-NO and process temperature where NO is the alarm number. The annunciator may be disabled by selecting function ANN as OFF.

Alarm display options:

- Press the **0** key to view the status of alarms
- Press **0** + **0** to view the status of next alarm (after alarm 4 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 for alarm 1,
HA-1 for high alarm for alarm 1,
FO-1 for Fail output alarm for alarm 1,
FD-1 for fault diagnosis for alarm 1.
- Press **0** + **A** to acknowledge the particular alarm (Alarm will be acknowledged only if latch ON).

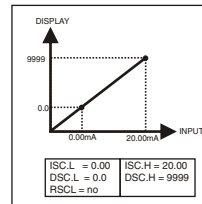
SCALING FOR ANALOG INPUT:

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 0 mA input and display 9999 at 20.00 mA input.) Reverse acting indication can be accomplished by setting

reverse scaling parameter as YES. In this case referring the

above eg. for 0.00 mA input the display will show 9999 and 20.00 mA input the display will show 0.0.

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



KEY PRESS	DISPLAY	DESCRIPTION
Setting for Manual output mode :-		
Eg. For 4-20 mA if constant 12mA output current is desired then Setting for manual output :		
Press 0 + A	LUL6	
Press A key	ARRL	display momentarily
Press 0 + A / 0	00	(Selection for manual output mode)
Press A	PERD	
Press 0 + A / 0	500	Adjust display to 50.0% to get 12mA at output
Press A key		

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 A + 0	LUL1	
Press 0 + 0	LULO	
Press A key	INP	
Using 0 + A / 0	P100	Select the Input type as RTD
Press A till	LULO	is displayed
Press 0 + A till	LUL6	is display
Press A key	ARRL	display momentarily

KEY PRESS	DISPLAY	DESCRIPTION
and then display	OFF	(Selection for retransmission mode)
Press A	R-L0	
Press 0 + A / 0	0	Adjust the display to 0
Press A	R-H1	
Press 0 + A / 0	400	Adjust the display to 400
Press A key		

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 A + 0	LUL1	
Press 0 + 0	LULO	
Press A	INP	
Using 0 + A / 0	00LE	Select the Input type as voltage
Press A until	DSCL	Is displayed
Using 0 + A / 0	0	Adjust the display to 0
Press A	LSCL	
Press 0 + A / 0	0.00	Adjust the display to 0
Press A	DSCH	
Press 0 + A / 0	400	Adjust the display to 400
Press A	LSCH	
Press 0 + A / 0	10.0	Adjust the display to 10

Note : By default the display will be 10.00 for 0-10V Input
Press **A** Key

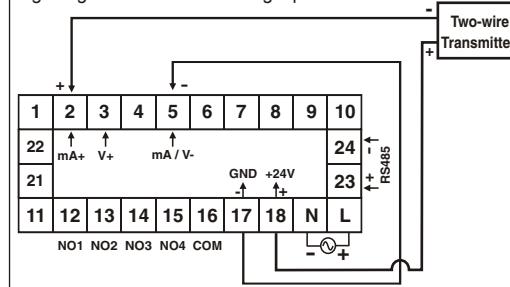
Setting for Retransmission :

Press 0 + A till	LUL6	
Press A key	ARRL	displays momentarily
and then display	OFF	
Press A	R-L0	
Press 0 + A / 0	0	Adjust the display to 0
Press A	R-H1	
Press 0 + A / 0	400	Adjust the display to 400
Press A key		

Connection with 2-wire Transmitter

Connection with Internal 24VDC 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)

Sources calibrated against:

Hinditron Multimeter, Model 86, Sr.No.:1094

Multimeter calibration report no:

ERTL (W), Mumbai, INDIA

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

SENSOR	CALIBRATION TEMP.(°C) (0.1 Resolution)	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
PT1000	0.0	0.0
	100.0	100.0
	250.0	250.0

INPUT	CALIBRATION VALUE (0.1 Resolution)	DISPLAY VALUE
Voltage (VDC)	0.0	0.0
	10.0	10.0
Current (mA)	0.0	0.0
	20.0	20.0
0-100mV	0.0	0.0
	100.0	100.0

The actual results versus the input given falls within specified accuracy of 0.25% & hence the unit is certified & passed.

CHECKED BY:

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

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