

5.1 ALARM INITIAL BLOCKING


Alarm blocking at power-up inhibits the relay alarm to trip when the unit is first energized. The alarm will only trip after the process variable reaches a new alarm situation.


Error alarm shows sensor defects or not properly connected.

6 PROBLEMS WITH THE CONTROLLER

Connection and configuration errors state for most of the problems in using the controller. A final revision of parameters will save time and further losses.



Error messages are displayed to help the user to identify possible problems.

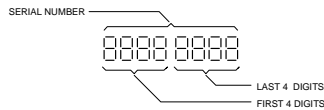
: Process temperature is below the selected sensor range.

: Process temperature is above the selected sensor range

Error: Controller or sensor error. Example: Broken thermocouple or Pt100. Pt100 badly connected, short-circuited or high cable resistance.

6.2 ELECTRONIC SERIAL NUMBER VISUALIZATION

To read the 8-digit serial number go to the Operation Level and press the  key for 3 seconds. The display will show the first 4 digits. Then keep the  key pressed for 3 seconds and the display will show the last 4 digits.



When powering the unit the display will show the software version for a few seconds.

7 PRODUCT IDENTIFICATION



The label attached to the controller case identifies the model and the optional present in the product, as described below:

MODEL: **N4801 – A – B**, where:

- A:** Outputs: **RP** OUT A = Relay and OUT B = Relay
 RF OUT A = Relay and OUT B = 24Vdc auxiliary supply
- B:** Voltage rating: **blank** (100-240 Vac/dc) or **24V** (24 Vac/dc)



8 TECHNICAL ASSISTANCE

If you encounter a problem with your controller, review the configuration with regard to inputs, outputs, alarms, etc. If the problem persists, contact your supplier or Novus at info@novus.com.br.

	MICROPROCESSOR BASED TEMPERATURE INDICATOR N 4 8 0 1 - V 3.1x	
		OPERATING MANUAL

1 SAFETY SUMMARY

The symbols below are used on the equipment and throughout this document to draw the user's attention to important operational and safety information.

	
CAUTION or WARNING: Read complete instructions prior to installation and operation of the unit.	CAUTION or WARNING: Electrical Shock Hazard

All safety related instructions that appear in the manual must be observed to ensure personal safety and to prevent damage to either the instrument or the system. *If the instrument is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.*

2 SPECIFICATIONS

- Dimensions: 48 x 48 x 110 mm (1/16 DIN). Panel cut-out: 45,5 x 45,5 mm. Weight: 150 g (max.);
- Power: 100 to 240 Vac / dc ($\pm 10\%$), 50 / 60 Hz or 24 Vdc / ac ($\pm 10\%$); Max. Consumption: 9 VA;
- Pt100: $\alpha=385$. 3-wire connection. Excitation current: 0.170 mA;
- Accuracy: 0.2 % of full scale for Pt100 and 0,25 % of full scale $\pm 1\text{ }^\circ\text{C}$ for T/C
- Thermocouple input impedance: 10 M Ω
- A/D converter resolution: 15000 steps
- Sampling rate: 10 measurements per second
- Environmental conditions: 5 to 50 $^\circ\text{C}$; Relative humidity (maximum): 80 % up to 30 $^\circ\text{C}$. For temperatures above 30 $^\circ\text{C}$, decrease 3 % per $^\circ\text{C}$. Installation category II. Pollution degree 2. Altitude < 2000 m.
- Front panel: Polycarbonate UL94 V-2; Back panel: ABS + PC UL94 V-0
- EMC: EN 61326-1:1997 and EN 61326-1/A1:1998
- SAFETY: EN 61010-1: 1993 e EN 61010-1/A2: 1995

INPUT TYPE	CODE	RANGE
Termocouple J	0	-50 to 760 $^\circ\text{C}$ (-58 to 1400 $^\circ\text{F}$)
Termocouple K	1	-90 to 1370 $^\circ\text{C}$ (-130 to 2498 $^\circ\text{F}$)
Termocouple T	2	-100 to 400 $^\circ\text{C}$ (-148 to 752 $^\circ\text{F}$)
Termocouple E	3	-30 to 720 $^\circ\text{C}$ (-22 to 1328 $^\circ\text{F}$)
Termocouple N	4	-90 to 1300 $^\circ\text{C}$ (-130 to 2372 $^\circ\text{F}$)
Termocouple R	5	0 to 1760 $^\circ\text{C}$ (32 to 3200 $^\circ\text{F}$)
Termocouple S	6	0 to 1760 $^\circ\text{C}$ (32 to 3200 $^\circ\text{F}$)
Pt100 (Resolution 0.1 $^\circ\text{C}$)	7	-199.9 to 530.0 $^\circ\text{C}$ (-199.9 to 986.0 $^\circ\text{F}$)
Pt100 (Resolution 1 $^\circ\text{C}$)	8	-200 to 530 $^\circ\text{C}$ (-328 to 986 $^\circ\text{F}$)
4 to 20 mA	9	Linearized J. Maximum range -110 to 760 $^\circ\text{C}$
4 to 20 mA	10	Linearized K. Maximum range -150 to 1370 $^\circ\text{C}$
4 to 20 mA	11	Linearized T. Maximum range -160 to 400 $^\circ\text{C}$
4 to 20 mA	12	Linearized E. Maximum range -90 to 720 $^\circ\text{C}$
4 to 20 mA	13	Linearized N. Maximum range -150 to 1300 $^\circ\text{C}$
4 to 20 mA	14	Linearized R. Maximum range 0 to 1760 $^\circ\text{C}$
4 to 20 mA	15	Linearized S. Maximum range 0 to 1760 $^\circ\text{C}$
4 to 20 mA	16	Linearized Pt100. Max. range -199.9 to 530.0 $^\circ\text{C}$
4 to 20 mA	17	Linearized Pt100. Max. range -200 to 530 $^\circ\text{C}$
0 to 50 mV	18	Linear. Programmable range from -1999 to 9999
4 to 20 mA	19	Linear. Programmable range from -1999 to 9999
0 to 10 V	20	Linear. Programmable range from -1999 to 9999

Table 1 – Types of sensors accepted by the indicator

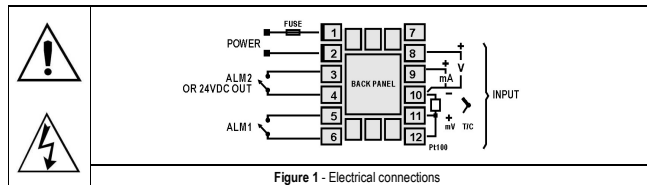
3 INSTALLATION

The indicator should be installed in a panel cut out as specified. First remove the mounting clamp and insert the controller into the panel cut out. Place the unit into the panel cut-out and slide the mounting clamp from the rear to a firm grip at the panel.

The internal circuitry can be fully removed from the housing without disconnecting any wiring. By using the thumb just press the tab in the lower part of the front panel, grab firmly the front panel and pull out the circuitry from the housing.

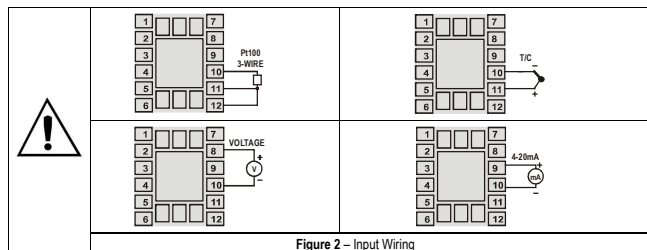
3.3 POWER

Mains power is connected to terminals 1 and 2. Check the upper side of the housing for proper power indication. Figure 1 shows the electrical terminals of the indicator.



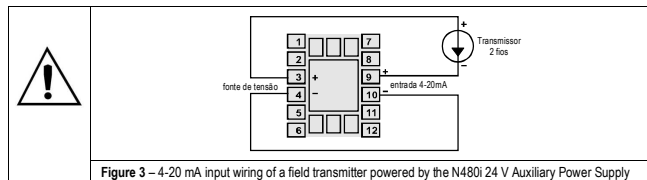
3.4 INPUT WIRING

The different input signals are connected according Figure 2.



- Notes:
- 1 For proper wire length compensation, all Pt100 wires should have the same electrical resistance.
 - 2 For 2 wire Pt100, short circuit terminals 11 and 12. Cable length is not compensated.
 - 3 Thermocouples must be connected with the proper extension wire.

3.5 USING THE PROVIDED AUXILIARY DC VOLTAGE SUPPLY FOR POWERING 2-WIRE FIELD TRANSMITTERS



4 CONFIGURATION AND OPERATION

Prior to first operation the controller should be fully configured. The user must set basic parameters as temperature type (**TYPE**), the desired control set point (**SP**), the alarms set points (**RISP** and **R2SP**), etc.

4.1 PARAMETERS FLOW CHART

The programming parameters are organized in 4 different sets or levels:

Mensuration Level / Alarms Level / Configuration Level / Calibration Level

At power up the controller displays a prompt at the Operation level and remains in this level while under normal operation.

The other levels are only accessed when a change of parameters is necessary. To reach these other parameters the user must keep the **[P]** key pressed for about three seconds. After this time the controller will show the first parameter of the next level. By keeping the **[P]** key pressed for another 3 seconds the next level will be accessed.

Release the **[P]** key when the desired level is reached. Press once the **[P]** key to go to the next prompt in the same level. Use the **[◀]** key to go back to the previous displayed parameter.

The upper display (red) shows the parameter name while the lower display (green) shows its value. The keys **[▲]** and **[▼]** allow changing the parameter value.

The indicator will resume and show the operation level after all prompts have been accessed or whenever the keyboard is not used for more than 20 seconds.

Any changed parameter is only saved into non-volatile memory after moving to the next parameter or when no key is touched for 20 seconds.

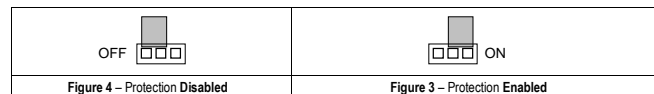
4.2 PROGRAM SECURITY

To avoid tampering, parameter **"Prot"** and a hardware jumper can be used to disable access to programming parameters.

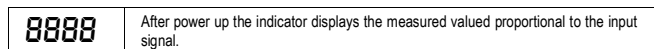
With the jumper in the **OFF** position, all program levels are unprotected. The **"Prot"** parameter can only be changed with the jumper in the **OFF** position.

With the jumper in the **ON** position or **removed**, the protection level is defined by the current value of the **"Prot"** parameter:

- 0** No protection. All parameters can be accessed;
- 1** No access to the calibration level;
- 2** No access to calibration and configuration levels;
- 3** No access to calibration, configuration and tuning and alarms levels;



4.3 OPERATION LEVEL



4.4 ALARMS LEVEL

RISP SP Alarm 1	SETPOINT for Alarm 1: Tripping point for alarm 1
R2SP SP Alarm 2	SETPOINT for Alarm 2: Tripping point for alarm 2
RLrE Alarm Reference	REFERENCE VALUE FOR DIFFERENTIAL ALARM: a value in respect to which the differential, differential low and differential high alarms will be set.

4.5 CONFIGURATION LEVEL

TYPE TYPE	INPUT TYPE: Selects the input sensor type to be connected to the indicator (refer to Table 1). This is the first parameter to be set.
dPPo Decimal Point Position	DECIMAL POINT: Available only for input types 18, 19 or 20. Defines the number of digits to be shown after the decimal point. Programmable from 0 to 3.
unit unit	TEMPERATURE UNIT: Selects display indication for degrees Celsius or Fahrenheit. 0 - degrees Celsius (°C); 1 - degrees Fahrenheit (°F);
inLL Input Low Limit	INPUT LOW LIMIT: Available for input types from 9 to 20. Defines the lowest value to be displayed when the input signal is at its lower value. For input types from 0 to 8 it defines the lowest alarm set point value.
inHL Input High Limit	INPUT HIGH LIMIT: Available for input types from 9 to 20. Defines the highest value to be displayed when the input signal is at its upper value. For input types from 0 to 8 it defines the highest alarm set point value.
OFFS OFFSET	SENSOR OFFSET: Offset value to be added to the PV to compensate sensor error. Default value: zero
R1Fu Alarm 1 Function	FUNCTION OF ALARM 1: Refer to Table 2 for function description and respective codes to set at this prompt.
R2Fu Alarm 2 Function	FUNCTION OF ALARM 2: Refer to Table 2 for function description and respective codes to set at this prompt.
R1Hy Alarm 1 Hysteresis	ALARM 1 HYSTERESIS: Defines the difference between the point at which the alarm is activated and the point at which it is deactivated.

R2Hy Alarm 2 Hysteresis	ALARM 2 HYSTERESIS: Defines the difference between the point at which the alarm is activated and the point at which it is deactivated.
Prot	PARAMETER PROTECTION: Refer to Table 2 for description of functions for this prompt.

4.6 CALIBRATION LEVEL

ATTENTION

These parameters are used to calibrate the temperature measurement and should only be dealt with by experienced and well equipped personnel.

inLC Input Low Calibration	SENSOR OFFSET CALIBRATION: Sets the temperature sensor low calibration (offset). The display shows only the corrected temperature and not the offset added. A signal simulator should be used to inject a low value signal to properly adjust the offset.
inHC Input High Calibration	INPUT HIGH CALIBRATION: Sets the sensor input circuit gain or high calibration. A signal simulator should be used to inject a high value signal to properly adjust the offset.
CJL Cold Junction Low Calibration	COLD JUNCTION OFFSET CALIBRATION: Sets the cold junction offset calibration. A good thermometer or a temperature simulator should be used to properly adjust this parameter.

5 ALARM FUNCTIONS

Low and high alarms are used to signal minimum and maximum temperature values as programmed in the **"RISP"** and **"R2SP"** prompts.

Differential alarms are used to indicate deviations from the desired set point (**SP**) temperature. These deviations are programmed at the **"RLrE"** and **"R2SP"** prompts.

Table 2 shows each alarm function operation with their respective code. Alarm 1 is used as an example.

TYPE	CODE	ACTION
LOW	0	Alarm ON → TEMPERATURE SPA1
HIGH	1	Alarm ON → TEMPERATURE SPA1
LOW differential	2 Negative	Alarm ON → TEMPERATURE SP + SPA1 SP
	2 Positive	Alarm ON → TEMPERATURE SP SP + SPA1
HIGH differential	3 Negative	Alarm ON → TEMPERATURE SP + SPA1 SP
	3 Positive	Alarm ON → TEMPERATURE SP SP + SPA1
differential or deviation	4 Negative	Alarm ON → TEMPERATURE SP + SPA1 SP SP - SPA1
	4 Positive	Alarm ON → TEMPERATURE SP - SPA1 SP SP + SPA1
Input sensor error	5	Alarm is ON whenever: <ul style="list-style-type: none"> • Temperature is below selected range; • Temperature is above selected range; • Thermocouple or Pt100 is broken; • Pt100 is shorted, badly connected or wire impedance is too high;
Alarm Functions With alarm inhibition at power-up	6	Low limit alarm disabled at power-up
	7	High limit alarm disabled at power-up
	8	Differential low limit alarm disabled at power-up
	9	Differential high limit alarm disabled at power-up
	10	Differential alarm disabled at power-up

Table 2 - Alarm functions and their identification codes