NOVUS
We Measure, We Control, We Record

N1030T Controller

TEMPERATURE CONTROLLER AND TIME – INSTRUCTION MANUAL – V2.0x (*)

(*) The V2.0x version also covers V1.05 version controllers, except for the points indicated in the text.

SAFETY ALERTS

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: Read the manual thoroughly before installing and operating the equipment.	**CAUTION OR DANGER:** 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.

INSTALLATION / CONNECTIONS

The controller should be fixed to a panel, following the sequence of steps below:

- Make a cutout in the panel according to the Specifications.
- Remove the controller fixing clip.
- Insert the controller into the cutout from the front of the panel.
- Replace the clip on the controller, pressing until it is well fixed.

INSTALLATION RECOMMENDATIONS

- Input signal conductors should run through the plant separately from output and supply conductors. If possible, in grounded conduits.
- The power supply for electronic instruments must come from a network dedicated to the instrumentation.
- The use of RC FILTERS (noise suppressors) in contactor coils, solenoids, etc. is recommended.
- In control applications, it is essential to consider what can happen when any part of the system fails. The controller internal devices do not provide full protection.

ELECTRICAL CONNECTIONS

The figure below shows the connections on the back panel of the controller:

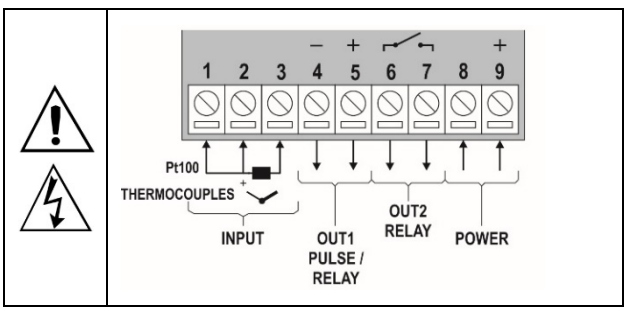


Figure 1 – Connections of the back panel

FEATURES

INPUT TYPE DEFINITION

The temperature sensor or input type to be used by the controller is defined during equipment configuration. **Table 01** shows the available options:

TYPE	CODE	MEASUREMENT RANGE
Thermocouple **J**	tc J	Range: -110.0 to 950.0 °C (-166.0 to 1742 °F)
Thermocouple **K**	tc K	Range: -150.0 to 1370 °C (-238.0 to 2498 °F)
Thermocouple **T**	tc t	Range: -160.0 to 400.0 °C (-256.0 to 752.0 °F)
Pt100	Pt	Range: -200.0 to 850.0 °C (-328.0 to 1562 °F)

Table 1 – Input types

The input type should be the first parameter to be configured. Any modifications on the input type will automatically change other related parameters. When changing the sensor type, you should check the overall condition of the configuration.

OUTPUTS

The controller has two outputs, OUT1 and OUT2, which have the following characteristics:

OUTPUT **OUT1** - Logical pulse, 5 Vdc / 25 mA or
Output Relay SPST-NA / 1.5 A / 240 Vac

OUTPUT **OUT2** - Output Relay SPST-NA / 1.5 A / 240 Vac

These outputs can be configured to operate as **Control Output**, **Alarm Output**, or **Output Timers T1** or **T2**.

CONTROL OUTPUT (CtrL)

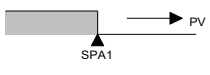
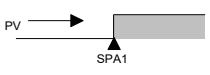
The process control output can operate in **ON/OFF** mode or in **PID** mode.

To operate in **ON/OFF** mode, the value set in parameter **Pb** must be 0.0.

With values other than zero in parameter **Pb**, the controller operates in **PID** mode. The values for the PID parameters can be set automatically with the help of Auto Tune (**AtUn**).

ALARM OUTPUT (A1)

The controller has an alarm that can be directed to any of the outputs. When enabled, you can configure the alarm to operate with one of the functions described in **Table 02:**

oFF	Alarm off.	
Lo	Alarm of absolute minimum value. It triggers when the value of measured PV is **below** the value defined for alarm Setpoint *(SPA1)*.	
HI	Alarm of absolute maximum value. It triggers when the value of measured PV is **above** the value defined for alarm Setpoint (*SPA1*).	

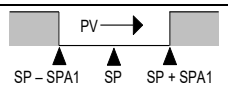
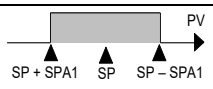
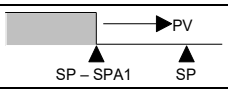
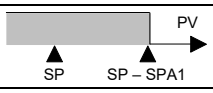
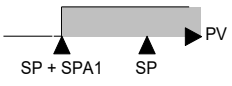
d IF	Differential alarm. In this function, SPA1 represents an error (difference) between CONTROL PV and SP.
	 Positive SPA1
	 Negative SPA1
d IFL	Alarm of minimum differential value. It triggers when the PV value is **below** the defined point by SP-SPA1.
	 Positive SPA1
	 Negative SPA1
d IFH	Alarm of maximum differential. It triggers when the PV value is **above** the defined point by SP+SPA1.
	 Positive SPA1
	 Negative SPA1
IErr	Open sensor alarm. It triggers when the input presents problems such as a broken sensor, poorly connected sensor etc.

Table 2 – Alarm functions

Important note: Alarms configured with the **H I**, **d IF**, and **d IFH** functions also trigger their associated output when a sensor fault is identified and signaled by the controller. A relay output, for example, configured to function as a Higher Alarm (**H I**), will operate when the SPA1 value is exceeded and when the sensor connected to the controller input is broken.

ALARM INITIAL BLOCKING

The **Initial Blocking** option inhibits the alarm from being triggered if an alarm condition exists when the controller is turned on. The alarm is triggered only after the process goes through a non-alarm condition.

The initial blocking is useful, for example, when one of the alarms is configured as a minimum value alarm, which can cause the alarm to be triggered as soon as the process is started (a behavior that is often undesired).

The initial block is not valid for the **IErr** function.

RUN FUNCTION

The **RUN** function is executed by parameter **run** and works as a general switch that allows you to enable or disable the operation of the controller.

When enabled (**run** = **YES**), the controller is free to perform all its functions. When disabled (**run** = **no**), its outputs are turned off, and only the functions related to temperature measurement and display will continue to operate.

When lit on the controller front panel, the **RUN** indicator signals that the control is enabled (**run** = **YES**).

You can perform this function by using the F key, which switches the control condition between enabled and disabled.

The key must be pressed longer, i.e., > 2 seconds, to disregard accidental touches.

OFFSET

Function that allows you to make a small adjustment to the PV indication. Allows you to correct measurement errors that appear, for example, when replacing the temperature sensor.

TIMERS

The controller has two timers, **T1** and **T2**, which have different modes of operation. Timing starts with **T1** and, at the end of **T1**, starts with **T2**.

Only the time count of **T1** will be shown in the controller display.

When you set ZERO for any of the timers, the timing and sequence will remain unchanged.

The timers can be associated with any output of the controller: **OUT1** or **OUT2**. The output associated with **T1** turns on during **T1** timing, and the output associated with **T2** turns on during **T2** timing.

A1 and **A2** indicators turn on during **T1** and **T2** timings, respectively.

At the end of **T2**, **A2** indicator flashes. If **T2** = 0, then **A1** flashes at the end of **T1**. It is possible to configure the controller to disable control (**run** = **oFF**) at the end of the timer. In this situation the indicators are also turned off.

TIMING START MODES

There are two starting options:

SP	Starts counting when the measured temperature value (PV) reaches the SP value set for the process.
F	Starts the timer by pressing the F key (short touch < 1 s). After the timer starts, pressing the F key briefly allows you to interrupt the timer only (stop and reset). When **run** = **F**, pressing the F key for a long time (> 2 s) allows you to start the control and the timer. Pressing the F key for a long time allows you to disable control.

Table 3 – Timing start modes

The timing start mode is defined in parameter **t.Str** of the controller Timer Cycle.

BEHAVIOR OF THE TEMPERATURE CONTROL AT THE END OF THE TIMER (T1+T2)

During **T1** and **T2** interval timing, the temperature control has normal, independent operation. However, at the end of the **T1** + **T2** interval, it is possible to configure the controller to disable temperature control.

In the controller Timer Cycle, the parameter **t.E.C.o** allows you to set the desired condition:

on	Temperature control continues to operate as usual.
oFF	Temperature control is disabled by turning off the control output

Table 4 – **t.E.C.o** parameter

UP/DOWN TIMER COUNTING

The time counting for both timers can occur in UP or DOWN mode. In UP mode, counting starts at zero and runs up to the programmed time interval (T1, T2). In DOWN mode, it starts at the programmed time value and counts down to zero.

TIMERS TIME BASE

At the end of the Timing Cycle, the parameter **tbAS** defines the time base to be used. The options are:

SEc	MM:SS. **T1** and **T2** time intervals are shown in minutes and seconds.
Min	HH:MM. **T1** and **T2** time intervals are shown in hours and minutes.

Table 5 – Timers time base

OPERATION

The front panel of the controller can be seen in the figure below:

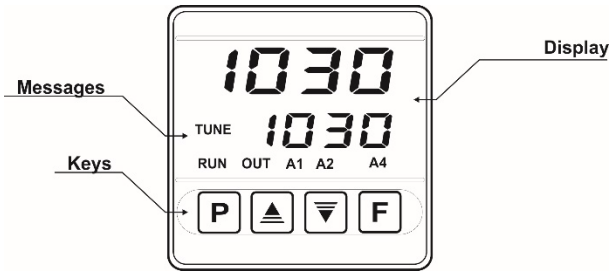


Figure 2 – Front panel

Display: Displays the measured variable, configuration parameter symbols and their respective values/conditions.

TUNE Indicator: Stays on while the controller is in tuning process.

RUN Indicator: Indicates that the controller is enabled to operate.

OUT Indicator: Signals the control output status.

A1 Indicator: Signals the T1 output status.

A2 Indicator: Signals the T2 output status.

A4 Indicator: Signals the alarm status.

P **Key**: Key used to advance the successive parameters and parameter cycles.

▲ **Increment key and** ▼ **Decrement key**: Keys used to change parameter values.

F **Key**: Key used to move back parameters during configuration and perform special functions.

OPERATION

When turned on, the controller shows the software version for the first 3 seconds, then it shows the value of the measured process variable (PV) in the upper display. In the lower display, it shows the SP value. This is the **Indication Screen**.

To be used in a process, the controller must be previously configured. To configure it, each of the various parameters presented must be defined. You must understand the importance of each parameter and determine a valid condition or value.

The configuration parameters are gathered in affinity groups, called parameter cycles. The parameter cycles are:

1 – Operation / 2 - Tuning / 3 - Timer / 4 - Input / 5 - Calibration

The P key gives access to the cycles and their parameters.

By keeping the P key pressed, every 2 seconds the controller jumps from one cycle to another, presenting the first parameter of each cycle:

PV >> AtUn >> t 1 >> tYPE >> PASS >> PV …

To enter the desired cycle, simply release the P key when the first parameter is displayed. To move forward through the parameters of that cycle, use the P key. To go backwards through the parameters, use the F key.

The symbol of each parameter is shown in the upper display. Its respective value/condition is shown in the lower display.

Depending on the configuration protection that you have adopted, the **PASS** parameter is shown as the first parameter of the cycle where the protection starts. See **Configuration Protection** chapter.

PARAMETERS DESCRIPTION

OPERATION CYCLE

PV **SP**	**PV Indication Screen**. The upper (red) display shows the measured temperature value (**PV**). The lower display (green) shows the control Setpoint value (**SP**), which is the desired value for the process temperature.
PV **TM**	**Display PV and current timer count.** The upper display (red) shows the measured temperature value (PV). The lower display (green) shows the current **T1** timer count. You cannot set this display.
t 1 *Timer 1*	**T1** time interval. From 00:00 to 99:59 (HH:MM or MM:SS). Parameter shown in this cycle when set in parameter **t.En**.
run Run	Enables or disables the controller to act on the process. Acts as a switch, turning the controller on or off. **YES** Enabled control. **no** Disabled control. **F** Enable/disable command via F key (*). Parameter shown in this cycle when set in parameter **r.En**.
SPA 1	Alarm SP. Value that defines the alarm actuation point. For **Differential** type functions, this parameter specifies error (**) (***).

(*) When set to **run** = **F**, the control will be disabled (**no**) when you turn on the controller or when it returns from a power failure.

(**) This parameter is not displayed when the alarm function is set to **oFF** or **iErr**.

(***) This parameter is not available for version 1.0x of the controller.

TUNING CYCLE

AtUn	**AUTO-TUNE**. Enables the automatic tuning of the PID parameters (**Pb**, **Ir**, **dt**). See **PID Parameters Definition** chapter. **oFF** Auto-tune off. **FASt** Perform tuning in fast mode. **FULL** Perform tuning in precise mode.
Pb	Proportional Band. Value of the term **P** of the control mode PID, in percentage of the maximum span of the input type. Adjustable between 0 and 500.0 %. **When set to zero (0), control action is ON/OFF.**
Ir	Integral Rate. Value of the term **I** of the PID algorithm, in repetitions per minute (Reset). Adjustable between 0 and 24.00. Displayed only if proportional band ≠ 0.
dt	Derivative Time. Value of the term **D** of the control mode PID, in seconds. Adjustable between 0 and 250 seconds. Displayed only if proportional band ≠ 0.
Ct	Cycle time. Pulse Width Modulation (PWM) period in seconds. Adjustable between 0.5 and 100.0 seconds. Displayed only if proportional band ≠ 0.

HYSt	Control hysteresis. Hysteresis value in degrees for ON/OFF control. Adjustable between 0 and the measurement range width of the selected input type.
ACt	Action control: rE Control with **Reverse Action**. Appropriate for **heating**. Turns control output on when PV is below SP. dir Control with **Direct Action**. Appropriate for **cooling**. Turns control output on when PV is above SP.
Out.1 Out.2	Operation mode of OUT1 and OUT2 outputs: oFF Not used. CtrL Acts as a temperature controller. A1 Acts as alarm output. t1 Acts as T1 timer output. t2 Acts as T2 timer output.

TIMER CYCLE

t1 *Timer 1*	Allows setting **T1** time interval. From 00:00 to 99:59 (MM:SS or HH:MM).
t1.En *Timer Enable*	Allows displaying the **T1** parameter in the main (operating) cycle. YES Shows **T1** in the Operating cycle. no Hides **T1** from the Operating cycle.
t.dir *Timer Direction*	Counting direction of **T1** timer: uP Up counting, starting from zero. dn Down counting.
t.Str *Timer Start*	Defines starting mode for **T1** timer. SP Starts when PV reaches SP. F F key starts the timing.
t2 *Timer 2*	Allows setting the time interval **T2**. From 00:00 to 99:59 (MM:SS or HH:MM). Time interval that output **T2** will remain on after the end of timing **T1**.
t.E.C.o *Timer End Control Off ?*	Control output behavior after **T1 + T2** interval. on Control output remains active. oFF Turns off the control at the end of the timer.
tbAS *time base*	Time base for **T1** and **T2** timers. SEc Minutes and seconds (MM:SS). Min Hours and minutes (HH:MM).

INPUT CYCLE

tYPE	**Input Type:** Sets the input type used by the controller: J: tc J -110 to 950 °C / -166 to 1742 °F K: tc K -150 to 1370 °C / -238 to 2498 °F T: tc t -160 to 400 °C / -256 to 752 °F Pt100: Pt -200 to 850 °C / -328 to 1562 °F
dPPo	Decimal point. Sets the presentation mode of the decimal point.
unit	Sets the temperature unit to be used: C Indication in Celsius. F Indication in Fahrenheit.
oFFS	Offset. Parameter that allows you to make corrections to the indicated PV value.
SPLL SPHL	SP Low/High Limit. Sets the lower/upper limits for adjustments to the control SP value. Does not limit the setting of the Alarm SP value.
FuA1	Alarm functions. Sets the alarm functions from the options in **Table 02**.
SPA1	Alarm SP. Sets the alarm actuation point. For **Differential** type functions, this parameter defines the error (**).
bLA1	Blocking Alarm. This function blocks the alarms (**). YES Enables initial blocking. no Inhibits initial blocking.
HYA1	Alarm hysteresis. Sets the difference between the PV value at which the alarm is turned on and the value at which it is turned off (**).
SP1E	Allows to display SPA1 parameter in the controller Operation Cycle (**) (***). YES Displays SPA1 parameter in the Operation Cycle. no Does not display SPA1 parameter in the Operation Cycle.

(**) This parameter is not displayed when the alarm function is set to oFF or iErr.

(***) This parameter is not available for version 1.0x of the controller.

CALIBRATION CYCLE

All types of input are calibrated in the factory. In case a recalibration is required; it shall be conducted by a specialized professional. In case this cycle is accidentally accessed, do not perform alteration in its parameters.

PASS	Password. This parameter is shown before the protected cycles. See **Configuration Protection** chapter.
CAL 1b	Calibration. Allows you to enable the function to calibrate the controller. When the function is not enabled, the calibration of the related parameters will remain hidden.
InLC	Input Low Calibration. Allows you to enter the value corresponding to the low scale signal applied to the analog input.
InHC	Input High Calibration. Allows you to enter the value corresponding to the full-scale signal applied to the analog input.
rStr	Restore. Allows you to reset the input factory calibrations, disregarding all changes made.
PASC	Password Change. Allows you to set a new access password, always different from zero.
Prot	Protection. Allows you to define the protection cycle. See **Table 06**.
r.En *RUN Enable*	Displays **RUN** (run) parameter also in the Operation Cycle. YES Releases **RUN** for the Operation cycle. no Does not release **RUN** for the Operation cycle.
run Run	Enables or disables the controller to act on the process. Acts as a switch, turning the controller on or off. YES Enabled control.

	no Disabled control. **F** Enable/disable command via (F) key (****). Parameter shown in this cycle when set in parameter **r.En**.

(****) When set to **run** = **F**, the control will be disabled (**no**) when you turn on the controller or when it returns from a power failure.

CONFIGURATION PROTECTION

The controller allows you to protect its configuration, preventing undue changes. In the Calibration cycle, the *Protection* parameter (**Prot**) determines the protection cycle to be adopted, limiting access to the cycles, as shown in the table below:

PROTECTION CYCLE	PROTECTION CYCLES
1	Only the Calibration cycle is protected.
2	Calibration and Input cycles are protected.
3	Calibration, Input, and Timers cycles are protected.
4	Calibration, Input, Timers and Tuning cycles are protected.
5	All cycles are protected, including SP.

Table 6 – Protection cycles

ACESS PASSWORD

To access the Calibration cycle, a password is required. If entered correctly, it allows changing the configuration of the parameters of these cycles, including the *Protection* parameter (**Prot**).

You can set the password in the *Password Change* parameter (**PASC**), which is also present in the Calibration cycle. **The controllers leave the factory with the password set to 1111.**

PROTECTION ACCESS PASSWORD

The controller has a security system that helps prevent the entry of numerous passwords to guess the correct password. Once 5 consecutive invalid passwords are identified, the controller stops accepting passwords for 10 minutes.

MASTER PASSWORD

If you forget the password, you can use the Master Password feature. When entered, this password gives access and allows changing the *Password Change* parameter (**PASC**). This makes it possible to set a new password for the controller.

The master password is formed by the last three digits of the controller serial number **plus** the number 9000.

Example: For a device with serial number 07154321, the master password is 9321.

You can get the serial number of the controller by pressing (F) key for 5 seconds.

PID PARAMETERS DEFINITION

During auto-tuning, the process is controlled in ON/OFF mode at the programmed setpoint (SP). In some processes the auto-tuning can take many minutes to complete. The recommended procedure for its execution is:

- Set the desired SP value for the process.
- On the **Atun** screen, enable automatic tuning by selecting **FAST** or **FULL**.

The **FAST** option performs the tuning in the minimum possible time. The **FULL** option prioritizes a more precise tuning.

During automatic tuning, the **TUNE** indicator remains lit on the front of the controller. You must wait until the tuning is finished before you can use the controller.

During the execution of the automatic tuning, it is possible to induce PV oscillations in the process around the setpoint.

If the tuning does not result in satisfactory control, **Table 04** presents guidelines on how to correct the process behavior:

PARAMETER	VERIFIED PROBLEM	SOLUTION
Band Proportional	Slow answer	Decrease
	Great oscillation	Increase
Rate Integration	Slow answer	Increase
	Great oscillation	Decrease
Derivative Time	Slow answer or instability	Decrease
	Great oscillation	Increase

Table 7 – Guidance for manual adjustment of the PID parameters

FACTORY CONFIGURATION

OPERATION CYCLE

PARAMETER	DESCRIPTION	PARAMETER FACTORY
PV **SP**	PV Indication screen.	**0**
PV **TM**	PV and current timer count screen.	-
t1	Set the **T1** time interval.	**0.00**
run	Screen that enables or disables the controller action on the process.	**no**

Table 8 – Factory configuration: Operation

TUNING CYCLE

PARAMETER	DESCRIPTION	PARAMETER FACTORY
Atun	Enables the auto-tuning function for PID parameters (**Pb, Ir, dt**).	**oFF**
Pb	Proportional band.	**0.0**
ir	Integral rate.	**0.00**
dt	Derivative time	**0**
Ct	Cycle time PWM.	**5.0**
HYSt	Control hysteresis.	**1**
ACt	Action control.	**rE**
Out.1	Operation mode of **OUT1** and **OUT2** outputs.	**oFF**

Table 9 – Factory configuration: Tuning

TIMER CYCLE

PARAMETER	DESCRIPTION	PARAMETER FACTORY
t1	**T1** time interval setting.	**0.00**
t1.En	Allows displaying **T1** parameter in the main (operating) cycle.	**YES**
t.dir	Counting direction of **T1** timer.	**UP**
t.Str	Defines starting mode for **T1** timer.	**SP**

PARAMETER	DESCRIPTION	PARAMETER FACTORY
t2	**T2** time interval setting.	0:20
t.E.C.o	Control output behavior after **T1** + **T2** interval.	on
tbAS	Time base for **T1** and **T2** timers.	SEc

Table 10 – Factory configuration: Timer

INPUT CYCLE

PARAMETER	DESCRIPTION	PARAMETER FACTORY
tYPE	Input type.	J
dP.Po	Selects the decimal point position.	0
un.t	Selects display indication: Celsius or Fahrenheit.	c
oFFS	Parameter that allows to adjust the PV value indicated.	0
SPLL	Defines the lower/upper limit for SP adjustment.	-110 / 950 (limits do sensor J)
SPHL		
FuAL	Alarm functions.	oFF
SPAL	Alarm SP.	0
bLAL	Alarm initial blocking.	no
HYAL	Alarm hysteresis.	0

Table 11 – Factory configuration: Input

CALIBRATION CYCLE

PARAMETER	DESCRIPTION	PARAMETER FACTORY
PASS	Access password Input.	0000
CAL Ib	Enables calibrating the indicator.	no
inLC	Enter the value corresponding to the low scale signal applied to the analog input.	0000
inHC	Enter the value corresponding to the full-scale signal applied to the analog input.	0000
rStr	Restores input factory calibration.	no
PASC	Restores input factory calibration.	0000
Prot	Sets up the protection cycles.	1
r.En	Shows the parameter **RUN** (run) also in the Operation Cycle.	YES
run	Display for enable or disable the controller action on the process.	no

Table 12 – Factory configuration: Calibration

MAINTENANCE

PROBLEMS WITH THE CONTROLLER

Wiring errors and improper programming represent most of the problems that can occur when using the controller. A final review can avoid wasted time and losses.

The controller presents some messages that are intended to help you identify problems.

MESSAGE	PROBLEM DESCRIPTION
----	Open input. No sensor or signal.
Err 1 Err6	Connection and/or configuration problems. Check the wiring and the configuration.

Table 13 – Error messages

Other error messages displayed by the controller represent internal damages that necessarily imply sending the equipment for maintenance.

INPUT CALLIBRATION

All controller input types leave the factory already calibrated. Recalibration is not recommended for inexperienced operators. If it is necessary to recalibrate an input, proceed as follows:

a) In the tYPE parameter, set the input type to be calibrated.

b) Program the lower and upper SP limits for the extremes of the input type.

c) Access the Calibration cycle.

d) Enter the access password.

e) In parameter CAL Ib, enable the calibration by setting **YES**.

f) With an electrical signal simulator, apply to the input terminals a signal near the lower limit of the configured input measurement range.

g) In the nLC parameter, use the ▲ and ▼ keys to make the display indicate the expected value for the applied signal. Then press the P key.

h) Apply a signal near the **upper** limit of the configured input measurement range to the input terminals.

i) In the InHC parameter, use the ▲ and ▼ keys to make the display indicate the expected value for the applied signal. Then, press the P key until returning to the **PV Indication Screen**.

j) Validate the calibration.

Note: When checking the controller calibration with a Pt100 simulator, pay attention to the simulator minimum excitation current requirement, which may not be compatible with the 0.170 mA excitation current provided by the controller.

SPECIFICATIONS

DIMENSION: .....48 x 48 x 35 mm

Approximate weight: ..... 60 g

POWER SUPPLY:

Standard Model .....100 to 240 Vac (±10 %), 50/60 Hz

.....48 to 240 Vdc (±10 %)

24 V Model:..... 12 to 24 Vdc / 24 Vac (-10 % / +20 %)

Maximum Consumption: ..... 5 VA

ENVIRONMENTAL CONDITIONS:

Operation Temperature: ..... 0 to 50 °C

Relative Humidity:.....80 % @ 30 °C

For temperatures above 30 °C, reduce 3 % for each °C

Internal use; Category of installation II, Pollution Degree 2; altitude < 2000 meters

INPUT:..... Thermocouples **J**; **K**; **T** and **Pt100** (according of **Table 01**)

Internal Resolution:.....32767 levels (15 bits)

Display Resolution:..... 12000 levels (from -1999 up 9999)

Rate of input reading: .....up 5 per second

Accuracy: ..Thermocouples **J**, **K**, **T**: 0.25 % of the *span* ±1 °C (*)

.....Pt100: 0.2 % of the *span*

Input impedance: .....Pt100 and thermocouples: > 10 MΩ

Pt100 Measurement: .....3-wire type, (α= 0.00385)

With compensation for cable length. Excitation current of 0.170 mA.

OUTPUTS: OUT1: .....Voltage pulse, 5 Vdc / 25 mA

.....Relay SPST; 1.5 A / 240 Vac / 30 Vdc

OUT2: .....Relay SPST; 1.5 A / 240 Vac / 30 Vdc

FRONT PANEL: ..... IP65, Polycarbonate (PC) UL94 V-2

HOUSING:..... IP30, ABS+PC UL94 V-0

ELECTROMAGNETIC COMPATIBILITY:..... EN 61326-1:1997 and EN 61326-1/A1:1998

EMISSION:..... CISPR11/EN55011

IMMUNITY:.....EN61000-4-2, EN61000-4-3, EN61000-4-4, EN61000-4-5, EN61000-4-6, EN61000-4-8 and EN61000-4-11

SAFETY: ..... EN61010-1:1993 and EN61010-1/A2:1995

SPECIFIC CONNECTIONS FOR PIN TERMINALS.

PWM PROGRAMABLE CYCLE: From 0.5 up 100 seconds.

START-UP: After 3 seconds connected to the power supply.

CERTIFICATIONS: CE, UKCA, UL.

IDENTIFICATION

N1030T -	A -	B

A: Outputs Features

PR: OUT1 = Pulse / OUT2 = Relay

RR: OUT1 = Relay / OUT2 = Relay

B: Power Supply

(Blank): .....Model standard

.....100~240 Vac / 48~240 Vdc; 50~60 Hz

24V: .....Model 24 V

.....12~24 Vdc / 24 Vac

WARRANTY

The warranty conditions are on our website www.novusautomation.com/warranty.