NOVUS
We Measure, We Control, We Record

N1540 Process Indicator

UNIVERSAL INDICATOR – INSTRUCTIONS MANUAL – V2.1x C

PRESENTATION

N1540 is a quite versatile process indicator. With a wide list of input types - thermocouples, thermo-resistance, voltage and current – the N1540 is capable of measuring the majority of the variables and sensors encountered in industrial processes.

It contains two alarms (six functions), sensor offset, configuration of parameters protected by password, serial communication, indication in degrees Celsius (°C) or Fahrenheit (°F), among others.

Configuration can be performed either directly on the indicator or via the USB interface once **QuickTune** software has been installed on the computer to be used. Once connected to USB, the device will be recognized as a serial communication (COM) port operating with Modbus RTU protocol.

Through the USB interface, even if disconnected from the power supply, the configuration performed in a piece of equipment can be can be saved in a file and repeated in other pieces of equipment that require the same configuration.

FEATURES

SIGNAL INPUT (TYPE)

The input type to be used by the indicator is defined in the equipment configuration. **Table 01** presents the input options available for the user.

TYPE	CODE	RANGE OF MEASUREMENT
J	tc J	Range: -110 to 950 °C (-166 to 1742 °F)
K	tc K	Range: -150 to 1370 °C (-238 to 2498 °F)
T	tc t	Range: -160 to 400 °C (-256 to 752 °F)
N	tc n	Range: -270 to 1300 °C (-454 to 2372 °F)
R	tc r	Range: -50 to 1760 °C (-58 to 3200 °F)
S	tc S	Range: -50 to 1760 °C (-58 to 3200 °F)
B	tc b	Range: 400 to 1800 °C (752 to 3272 °F)
E	tc E	Range: -90 to 730 °C (-130 to 1346 °F)
Pt100	Pt	Range: -200 to 850 °C (-328 to 1562 °F)
0-20 mA	L0.20	Analog Linear Signal Indication programmable from -2000 to 30000.
4-20 mA	L4.20	
0–50 mV	L0.50	
0-5 VDC	L0.5	
0-10 VDC	L0.10	
4-20 mA NON LINEAR	Ln J	Non Linear Analog Signal Indication range according to the associated sensor.
	Ln K	
	Ln t	
	Ln n	
	Ln r	
	Ln S	
	Ln b	
	Ln E	
	Ln.Pt	

Table 01 – Inputs Types

ALARMS

The indicator has two alarms. Each alarm is associated with an output with the same name: AM1 and ALM2. The alarms can assume the functions described on **Table 02**.

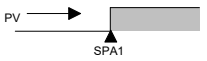
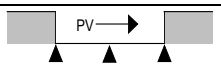
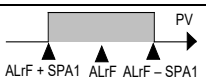
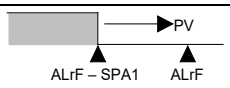
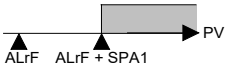
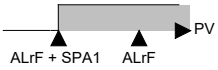
oFF	Alarm off.	
Lo	Alarm of the absolute minimum value. It triggers when the value of the **PV** is **below** the value defined by the alarm Setpoint (**SPA1** or **SPA2**).	
HI	Alarm of the absolute maximum value. It triggers when the value of the **PV** is **above** the value defined by the alarm Setpoint.	
dIF	Alarm of the differential value. In this function, the parameters "SPA1" and "SPA2" represent errors (difference) between the PV and one reference value ALrF.	
		
	SPA1 positive	SPA1 negative
dIFL	Alarm of the minimum differential value. It triggers when the value of the PV is **below** the point defined by: **ALrF-SPA1** (using alarm 1 as an example).	
		
	SPA1 positive	SPA1 negative
dIFH	Alarm of the maximum differential value. It triggers when the value of the PV is **above** the point defined by: **ALrF+SPA1** (using alarm 1 as an example).	
		
	SPA1 positive	SPA1 negative
IErr	Alarms of the Sensor Break (Sensor *Break Alarm*). It is activated when the Input presents problems such as interrupted sensor, bad connection, etc.	

Table 02 – Alarm Functions

Note: The figures are also valid for Alarm 2 (SPA2).

Important note: Alarms configured with the **HI**, **dIF** and **dIFH** functions also trigger their associated output when a sensor fault is identified and signaled by the indicator. A relay output, for example, configured to act as a High Alarm (**HI**), will operate when the SPAL value is exceeded and also when the sensor connected to the indicator input is broken.

BLOCKING INITIAL OF THE ALARM

The **Initial Blocking** option inhibits the alarm from being recognized if an alarm condition is present in the process when the indicator is first energized. The alarm will be enabled only after the occurrence of no alarm condition.

The initial blocking is useful, for example, when one of the alarms is set up as a minimum value alarm, which may cause the activation of the alarm soon upon the process start-up; an occurrence that may undesirable in many cases.

The initial blocking is not valid for the function IErr (Sensor Break).

OFFSET

Allows fine adjustments to the PV indication, correcting measurement errors that appear, for example, after the replacement of the temperature sensor.

MAXIMUM AND MINIMUM

The indicator memorizes the measured maximum and minimum values (peak and valley). The operator can observe these extreme values at any time. These two values are shown when pressing the **F1** (maximum) and **F2** (minimum) keys. Pressing both keys simultaneously will clear the memory for a new peak and valley detection.

To clear the stored values and begin a new cycle of monitoring endpoints, just press the F1 and F2 keys **simultaneously**. When turn off the indicator this information is not saved.

CUSTOM LINEARIZATION

This feature allows accurate measurement of the input signals with nonlinear characteristics.

Linearization consists in dividing the calibration curve of the input signal into segments of variable gain. Each segment consists of a start and an end. For each input value (InP.xx) a respective output indication (oUP.xx) is defined.

The input signal must present an always-crescent.

Applied to 0-20 mA, 4-20 mA, 0-50 mV, 0-5 V and 0-10 V input types.

24 VDC AUXILIARY VOLTAGE SOURCE

The standard version of the N1540 provides an auxiliary power supply for exciting field transmitters (terminals 11 and 13 on the rear panel).

SERIAL COMMUNICATION

Follows a description of the usual communication registers. For full documentation download the **Registers Table N1540 for Serial Communication** on our web site – www.novusautomation.com.

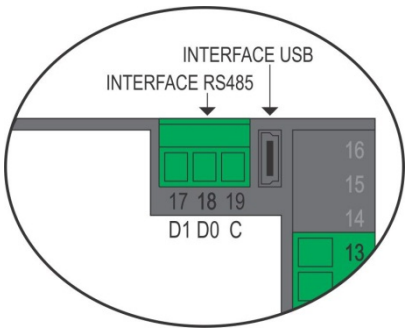


Figure 01 – Serial communication

USB INTERFACE

The USB interface is used to CONFIGURE, MONITOR or UPDATE the controller FIRMWARE. The user should use **QuickTune** software, which offers features to create, view, save and open settings from the device or files on the computer. The tool for saving and opening configurations in files allows the user to transfer settings between devices and perform backup copies.

For specific models, **QuickTune** allows to update the firmware (internal software) of the controller via the USB interface.

For MONITORING purposes, the user can use any supervisory software (SCADA) or laboratory software that supports the MODBUS RTU communication over a serial communication port. When connected to a computer's USB, the controller is recognized as a conventional serial port (COM x).

The user must use **QuickTune** software or consult the DEVICE MANAGER on the Windows Control Panel to identify the COM port assigned to the controller.

The user should consult the mapping of the MODBUS memory in the controller's communication manual and the documentation of the supervision software to start the MONITORING process.

Follow the procedure below to use the USB communication of the device:

1. Download **QuickTune** software from our website and install it on the computer. The USB drivers necessary for operating the communication will be installed with the software.
2. Connect the USB cable between the device and the computer. The controller does not have to be connected to a power supply. The USB will provide enough power to operate the communication (other device functions may not operate).
3. Run the **QuickTune** software, configure the communication and start the device recognition.

The USB interface IS NOT SEPARATE from the signal input (PV) or the indicator's digital inputs and outputs. It is intended for temporary use during CONFIGURATION and MONITORING periods. For the safety of people and equipment, it must only be used when the piece of equipment is completely disconnected from the input/output signals. Using the USB in any other type of connection is possible but requires a careful analysis by the person responsible for installing it. When MONITORING for long periods of time and with connected inputs and outputs, we recommend using the RS485 interface, which is available or optional in most of our products.

RETRANSMISSION OF PV

The indicator may include an analog output which performs the retransmission of the measured process variable (PV) values. The analog retransmission can be scaled, i.e., there are minimum and maximum limits to establish the retransmission range, defined in the parameters **"rtLL"** and **"rtHL"**.

The indicator allows a ratio between indication range and output current with inversely proportional behavior (rtLL > rtHL).

The analog output is available on terminals 18 (+) and 19 (-) for models **N1540-RT** and **N1540-RT-24V**.

The user sets the relay signal between 0 to 20 mA and 4 to 20 mA.

In order to obtain retransmission at an electrical voltage of 0 to 10 V, the user shall install a *shunt* resistor (500 Ω max.) across the analog output terminals and select the 0 to 20 mA signal as the electrical relay signal.

The analog retransmission output is electrically isolated the other indicator circuits.

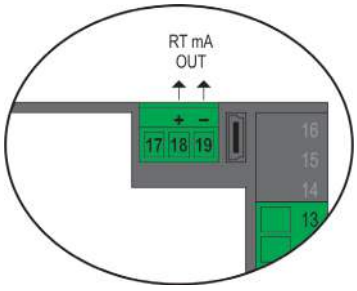


Figure 02 – PV Retransmission Terminals (RT mA OUT)

Note: RS485 Communication and PV Retransmission features are mutually exclusive.

INSTALLATION / CONNECTIONS

The indicator is meant for panel mounting. The sequence of steps is:

- Prepare a cut-out of 93.0 by 45.5 mm on the panel;
- Remove the mounting clamp from the indicator;
- Insert the indicator into the cut-out from the front side of the panel;
- Place the clamp on the indicator again, pressing until firm grip to the panel.

SAFETY ALERTS

The symbols below are used on the equipment and throughout this manual in order to draw the user´s attention to important information related to the equipment safety and operation.

CAUTION: Read the manual thoroughly before installing and operating the instrument	**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.

ELECTRICAL CONNECTIONS

The terminals configurations are shown in **Figure 03**:

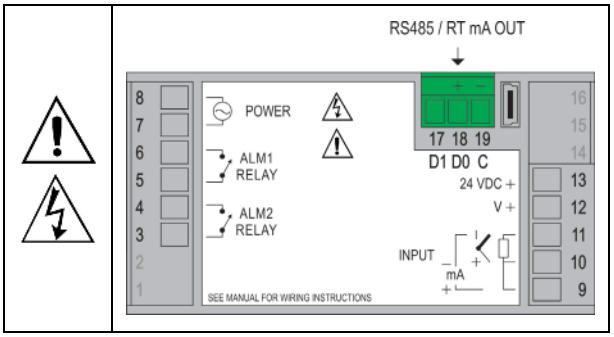


Figure 03 – Inputs connections and power supply

It is necessary to observe the existence of polarity in the connection of power supply line in models 24 V: Terminal 18 = (+) and terminal 19 = (-).

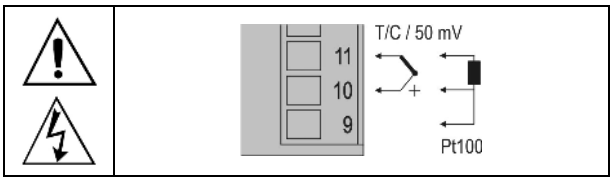


Figure 04 – Thermocouple, Pt100 and 50 mV signal connection

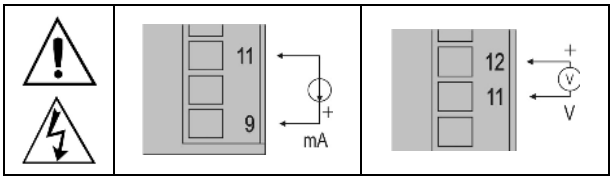


Figure 05 – Current (mA) and Voltage (V) signal connection

This indicator offers an auxiliary 24 Vdc power supply which is typically applied to power up two wire 4-20 mA field transmitters. The **Figure 06** presents the wiring for this application:

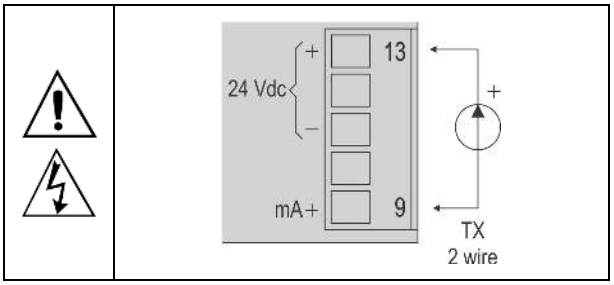


Figure 06 – Auxiliary 24 Vdc usage example

RECOMMENDATIONS FOR THE INSTALLATION

- To minimize the pick-up of electrical noise, the low voltage DC connections and the sensor input wiring should be routed away from high-current power conductors. If this is impractical, use shielded cables. In general, keep cable lengths to a minimum.
- The input signals conductors shall be positioned throughout the factory separate from the output and the power supply conductors, in grounded conduits if possible.
- The power supply of the electronic instruments shall come from a proper source for the instrumentation network.
- It is recommended to use RC FILTERS (0,1 uF in series with 100 ohms) to suppress the noise generated by contactors coils, solenoids, etc.

OPERATION

The indicator front panel, together with its elements, can be seen on **Figure 08**:

Figure 08 - Identification of the front panel parts

Display: Shows the process variable **PV**, the configuration parameters prompts and their respective values/conditions.

Indicators A1 and A2: signalize the occurrence of an alarm condition.

Key P: used to walk through the parameters in the menu cycles.

F1 / ▲ key and F2 / ▼ key: Used to change parameter values.

Key ◄: go back to the previous displayed parameter.

START UP

When the indicator is powered up, the indicator displays the number of the software version present in the first 3 seconds, then the value of the measured process variable (PV) is shown in the display. This is the **Indication Screen**.

To be used, the indicator must be previously configured. The configuration consists of the definition of each of the various parameters displayed. The user must understand the importance of each parameter and determine a valid condition or a valid value for each one of them.

The configuration parameters are grouped in levels according to their affinity. The 5 parameters levels are:

– Operation
– Alarms
– Input
– Linearization
– Calibration

The **P** key provides the access to the levels and to the parameters of these levels.

Keeping the **P** key pressed, at every 2 seconds, the indicator jumps from one level to another, presenting the first parameter of each level:

PV >> FuA I >> tYPE >> LEnbL >> PASS >> PV ...

To enter into a particular level, simply release the **P** key when the first parameter in that level is displayed.

To walk through the parameters in a level, press the P key with short strokes. To go back to the previous parameters, use the ◄ Key.

After the last parameter of the cycle, the indicator always returns to the **PV Indication** screen.

The display alternates the presentation of the parameter prompt and its value. The parameter value is displayed with a light blinking to differentiate it from the parameter prompt.

Depending on the level of parameter protection adopted, the parameter **PASS** precedes the first parameter in the level where the protection is active. See section CONFIGURATION PROTECTION.

DESCRIPTION OF THE PARAMETERS

OPERATION CYCLE

PV	**Indication Display of PV**. The value of the measured variable (PV) is shown on the upper display (red).
SPA1 **SPA2** *Setpoint Alarm*	Alarm SP: Value that defines the alarm activation point. For the alarms set up with the functions of the type **Differential**, these parameters define the maximum differences accepted between **PV** and a reference value defined in the parameter **ALrF**. For the alarm function **lErr,** this parameter is not used. Parameters shown in this level only when enabled in the parameters **SP1E** and **SP2E**.

ALARMS CYCLE

FuA1 **FuA2**	Alarm Functions. It defines the functions of the alarms among the options in **Table 02**.
ALrF *Alarm Reference*	Reference value used for the alarms with differential function, minimum differential or maximum differential.
SPA1 **SPA2** *Setpoint Alarm*	Alarm SP: Value that defines the point of activation of the alarm outputs. For the alarms programmed with the functions of the type **Differential**, these parameters represent the deviations. For the **lErr** alarm function, this parameter has no meaning.
SP1E **SP2E** *SP Enable*	It allows the parameters SPA1 and SPA2 to be displays also in the indicator operation cycle. **YES** Shows the parameters SPA1/SPA2 in the operation cycle. **no** Does not show the parameters SPA1/SPA2 in the operation cycle.
bLA1 **bLA2** *Blocking Alarm*	Alarms Initial Blocking. **YES** Enables the initial blocking. **no** Inhibits the initial blocking.
HYA1 **HYA2** *Hysteresis of Alarm*	Alarm Hysteresis. It defines the difference between the value of PV at which the alarm is triggered and the value at which it is turned off.
FLSh *Flash*	It allows signalization of an alarm conditions occurrence by flashing the indication of PV on the indication display. **YES** Enables alarm signalization by flashing **PV**. **no** Disables the flashing **PV**.

INPUT CYCLE

tYPE *Type*	Input Type. Selection of the input type, used by the indicator. Refer to **Table 01**.
FLtr *Filter*	Digital Input Filter – Used to improve the stability of the measured signal (PV). Adjustable between 0 and 20. At 0 (zero) it means filter turned off and 20 means maximum filter. The higher the filter value, the slower is the response of the measured value.
dPPo *Decimal Point*	It determines the position of the decimal point on the display.
unit *Unit*	It defines the temperature unit to be used: **C** Indication in Celsius. **F** Indication in Fahrenheit.
OFFS *Offset*	Parameter that allows the user to make fine adjustments to the indicated PV value.
inLL *Input Low Limit*	It defines the lower value of the indication range when the input types of 0-20 mA, 4-20 mA, 0-50 mV, 0-5 V and 0-10 V are used.
inHL *Input High Limit*	It defines the upper value of the indication range when the input types of 0-20 mA, 4-20 mA, 0-50 mV, 0-5 V and 0-10 V are used.
rEtr ***Retr**ans-mission*	It allows the definition of the mode of retransmission of PV. **P020** Determines retransmission in 0-20 mA. **P420** Determines retransmission in 4-20 mA. Parameter showed when there is retransmission of PV available on the indicator.
rtLL *Retrans-mission Low Limit*	It defines the lower limit of the retransmission range of PV. Parameter shown there is retransmission of PV available on the indicator.
rtHL *Retrans-mission High Limit*	It defines the upper limit of the retransmission range of PV. Parameter shown there is retransmission of PV available on the indicator.
bAud *Baud Rate*	Baud Rate of the serial communication. In kbps. 1.2, 2.4, 4.8, 9.6, 19.2, 38.4, 57.6 and 115.2
PrtY *Parity*	Parity of the serial communication. **nonE** Without parity **EuEn** Even parity **Odd** Odd parity
Addr *Address*	Communication Address. A number that identifies the indicator in the serial communication network, between 1 and 247.

CUSTOM LINEARIZATION CYCLE

LEnbL	Enables custom linearization. When you enable this parameter, the display shall meet the requirements set points defined in the parameters below.
inP.00 **inP.10**	Defines the extreme points of the ten possible segments for custom linearization. Values in input signal unit: mA, mV or V.
out.00 **out.10**	Defines the indications corresponding to the extreme points of the ten segments of the custom linearization defined in the parameter (**inP**.xx) above. Values displayed in the desired display unit.

CALIBRATION CYCLE

All types of input are calibrated in the factory. In case a recalibration is required; it shall be carried out by a specialized professional. In case this cycle is accidentally accessed, do not perform alteration in its parameters. The factory calibration can be restored in the parameter rStr.

PASS	*Password*. Entering the Access password. This parameter is presented before the protected cycles. See item Protection of Configuration.
CAlb	*Calibration*. Enables the possibility for calibration of the indicator. When the calibration is not enabled, the related parameters are hidden.
inLC	*Input Low Calibration*. Indication of the low scale calibration signal applied to the input.

InHC	*Input High Calibration*. Indication of the full scale calibration signal applied to the input.
rStr	*Restore*. It restores the factory calibrations of the input, disregarding any modifications carried out by the user.
CJ	*Cold Junction*. Temperature of the indicator cold junction.
PASC	*Password Change*. It allows the definition of a new access password, always different from zero.
Prot	*Protection*. Sets up the Level of Protection. See **Table 03**.
FrEQ	*Frequency*. Frequency of the local electrical network.
Sn H	First part of the indicator serial number.
Sn L	Second part of the indicator serial number.

CONFIGURATION PROTECTION

The indicator provides means for protecting the parameters configurations, not allowing modifications to the parameters values, avoiding tampering or improper manipulation. The parameter **Protection** (**Prot**) in the Calibration level determines the protection strategy, limiting the access to particular levels, as shown in the table below.

PROTECTION LEVEL	PROTECTED LEVELS
1	Only the Calibration level is protected.
2	Custom Linearization and Calibration levels are protected.
3	Input, Custom Linearization and Calibration levels are protected.
4	Alarms, Input, Custom Linearization and Calibration levels are protected.

Table 03 – Levels of Protection of the Configuration

ACCESS PASSWORD

The protected levels, when accessed, request the user to provide the **Access Password** for granting permission to change the configuration of the parameters on these levels.

The prompt **PASS** precedes the parameters on the protected levels. If no password is entered, the parameters of the protected levels can only be visualized.

The Access Password is defined by the user in the parameter *Password Change* (**PASC**), present in the Calibration Level. **The factory default for the password code is 1111**.

PROTECTION OF THE ACCESS PASSWORD

The protection system built into the indicator blocks for 10 minutes the access to protected parameters after 5 consecutive frustrated attempts of guessing the correct password.

MASTER PASSWORD

The Master Password is intended for allowing the user to define a new password in the event of it being forgotten. The Master Password doesn't grant access to all parameters, only to the *Password Change* parameter (**PASC**). After defining the new password, the protected parameters may be accessed (and modified) using this new password.

The master password is made up by the last three digits of the serial number of the indicator **added** to the number 9000.

As an example, for the equipment with serial number 07154321, the master password is 9 3 2 1.

The indicator serial number can be obtained by pressing ◄ for 5 seconds.

INPUT CALIBRATION

All inputs are factory calibrated and recalibration should only be done by qualified personnel. If you are not familiar with these procedures do not attempt to calibrate this instrument.

The calibration steps are:

1. Configure the input type to be calibrated.
2. Configure the lower and upper indication limits for the maximum span of the selected input type.
3. Connect to the input terminals a signal corresponding to a known indication value a little above the lower display limit.
4. Access the parameter **InLc**. With the keys ▲ and ▼ adjust the display reading to match the applied signal. Then press the **P** key to store.
5. Inject a signal that corresponds to a value a little lower than the upper limit of indication.
6. Access the parameter **Inhc**. With the keys ▲ and ▼ adjust the display reading to match the applied signal. Then press the **P** key to store.
7. Validate the calibration.

Note: When checking the indicator 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 indicator.

ANALOG OUTPUT CALIBRATION

1. Configure the retransmission type (**rEtr** =**P.0.20**).
2. Install a milliampere meter at the terminals 18(+) and 19(-).
3. Enter the Calibration Cycle.
4. Select the **ouLC** screen.
5. Press the key ▲ or the key ▼.
6. Read the current value displayed on the milliampere meter. With the help of the keys ▲ and ▼, adjust the value displayed on the indicator to match the value displayed on the milliampere meter.
7. Press the **P** key to save and access the **ouHC** parameter.
8. Press the key ▲ or the key ▼.
9. Reread the new current value displayed by the milliampere meter. With the help of the keys ▲ and ▼, adjust the value displayed on the indicator to match the value displayed on the milliampere meter.
10. Read the current displayed in the milliampere meter and indicated in the **ouHc** screen through the keys ▲ and ▼.
11. Exit the Calibration Cycle.
12. Validate the performed calibration.

SPECIFICATIONS

DIMENSIONS:..... 96 x 48 x 35 mm (1/16 DIN)
Panel Cut-out.....93.0 x 45.5 mm
Approximate Weight: ..... 110 g

POWER SUPPLY:.....100 to 240 Vac/dc (±10 %), 50/60 Hz
Optional 24 V:.....12 to 24 Vdc / 24 Vac (-10 % / +20 %)
Maximum consumption: ..... 6 VA

ENVIRONMENTAL CONDITIONS:
Operation Temperature: ..... 0 to 50 ºC
Relative Humidity:.....80 % @ 30 ºC
For temperatures above 30 ºC, reduce 3 % per ºC. Indoor use; Installation Category II, Pollution Degree 2; altitude < 2000 m.

INPUT.....According to **Table 01**
Internal Resolution:..... 32767 levels (15 bits)
Display Resolution:..... 32000 levels (from -2000 to 30000)
Temperature Resolution:..... 0.1 / 1 °F / °C

Input reading rate: .....up to 55 per second

Precision: ...Thermocouples **J**, **K**, **T**, **E**: 0.25 % of the span ±1 ºC

.....Thermocouples **N**, **R**, **S**, **B**: 0.25 % of the span ±3 ºC

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

.....4-20 mA, 0-50 mV, 0-5 V, 0-10 V: 0.2 % of the span

Input impedance: ..... Pt100, thermocouples, 0-50 mV: > 10 MΩ

..... 0-5 V, 0-10 V: > 500 kΩ

.....4-20 mA: 100 Ω

Measuring of the Pt100: .....3 wire type, (α=0.00385)

With compensation of the cable length, max 50 meters, excitation current of 0.170 mA.

OUTPUT ALARM1:.....Relay SPST; 240 Vac / 30 Vdc / 1.5 A

OUTPUT ALARM2:.....Relay SPST; 240 Vac / 30 Vdc / 1.5 A

RETRANSMISSION (mA RT – OUTPUT):.....0-20 mA / 4-20 Ma

Accuracy.....0.15 % FS

Maximum impedance .....500 Ω (10 V max.)

Thermal coefficient .....0.004 mA / °C

Resolution.....< 0.005 mA

AUXILIARY VOLTAGE SOURCE: .....24 Vdc (±10 %) / 20 mA max.

CASE: .....Polycarbonate (PC) UL94 V-2

BACK PANEL: ..... ABS+PC UL94 V-0

CONNECTIONS (WIRING): ..... Plug-in block terminals, 5 mm pitch

USB INTERFACE: 2.0, CDC class (virtual communications port), MODBUS RTU protocol.

STARTS OPERATION: After 3 seconds connected to the power supply.

CERTIFICATIONS:

IDENTIFICATION

N1540	Basic version.
N1540-24V	Basic version with power supply 24 V.
N1540-485	With serial communication RS485.
N1540-485-24V	Version with RS485 and power 24 V.
N1540-RT	Version with PV retransmission.
N1540-RT-24V	Version with PV retransmission and power supply 24 V.

Note:

1. Communication signals are electrically isolated from the other of the indicator circuits.
2. The analog output circuit is electrically isolated from the other indicator circuits.
3. RS485 Communication and PV Retransmission features are mutually exclusive.

MAINTENANCE

PROBLEMS WITH THE INDICATOR

Connection errors and inadequate programming are the most common problems encountered during the indicator operation. A final revision can avoid loss of time and damages.

The indicator displays some messages to help the user identify the problems.

MESSAGE	DESCRIPTION OF THE PROBLEM
----	Open input. Without sensor or signal.
Err 1 Err6	Connection and/ or configuration problems. Check the wiring and the configuration.

Other error messages may indicate hardware problems requiring maintenance service.

WARRANTY

Warranty conditions are available on our website www.novusautomation.com/warranty.