

Digital Indicators BROCHURE

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INTRODUCTION

The Universal Indicator N480i is complete and yet easy-to-use instrument which holds in a very popular and compact 1/16 DIN enclosure the great accuracy and flexibility only found in the high end digital process meters.

It is a low-cost instrument which can be easily installed and operated. It accepts most thermocouples and Pt100 RTD, linear signals as 4 to 20 mA and millivolt.

Full rangeability and decimal point configuration from the keypad are basic features that make this instrument easily configured by non-experienced users.

Dual alarm relays with six alarm functions and a 24 Vdc output for remote transmitters excitation are options that complete this simple yet complete instrument.



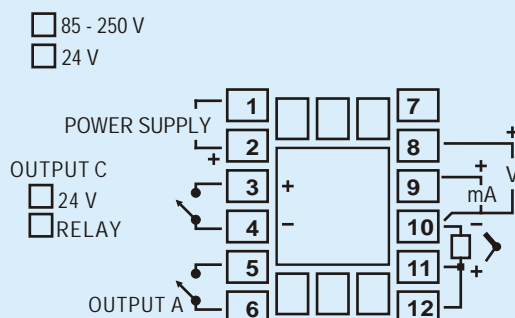
FEATURES

- Accepts thermocouples type J, K, T, E, N, R, S, B, Pt100 RTD, 4-20 mAdc, 0-50 Vdc e 0-10 Vdc without any hardware change or recalibration.
- 2 alarms with programmable functions.
- Alarm outputs: 2 SPST relays (1 NO contact).
- Alarm functions: LO, HI, differential, differential LO, differential HI and sensor break
- Universal switching power supply guarantees high accuracy even under severe mains power oscillations.
- Optional: 24 Vdc power output for remote transmitters excitation.
- Detects any sensor failure condition.
- Features internal auto-zero and auto-range function maximum measurement stability.
- Simplified operation menu turns programming into an easy-to-do task.
- Working range can be easily programmed from keypad.
- Indelible eight-digit electronic serial number can be viewed at the display.
- Silicone rubber keypad.
- Front panel: IP65, Polycarbonate UL94 V-2.
- Back panel: IP30, ABS+PC UL94 V-0.
- Circuitry can be removed without disconnection wiring.
- Flame retardant polycarbonate enclosure.
- Popular 1/16 DIN size.

MODELS

N480i	→	Only indicator
N480i — R	→	1 relay
N480i — RF	→	1 relay + 24 Vdc Power Output
N480i — RR	→	2 relays

ELECTRICAL CONNECTIONS



SPECIFICATIONS

- Accepts thermocouples type J (FeCo), type K (Ni-CrNi), T (CuCo), E (NiCo), N, R (PtRh-Pt 13%), S (PtRh-Pt10%), B (PtRh-Pt 30%), with cold junction compensation.
- Accepts 2 or 3-wire Pt100 RTD, range -200°C to 530°C, with cable resistance compensation.
- Pt100 excitation current: 170 μ A.
- Internal A/D resolution: 15000 levels.
- Displayed resolution: 7500 levels.
- Four-digit 10 mm red display for measured variable and four-digit 7 mm green display for setpoint.
- Sampling rate: 10 measurements per second.
- Dual SPST 3 A @ 250 Vac alarm relay output.
- Power: 85 to 250 Vca, 50/60 Hz; optional 24 Vdc/ac.
- Consumption: 3VA maximum.
- Operating environment: 0 to 55°C, 20 to 95% RH.
- Dimensions: 48 x 48 x 110 mm (1.89"x1.89"x4.33").
- Panel cutout: 45.5 mm x 45.5 mm.
- Weight: 130 g (basic), 150 g with 2 relays.

SENSOR TYPES AND RANGES

TYPE	CHARACTERISTICS
Thermocouple J	-50 to 760°C (-58 to 1400°F)
Thermocouple K	-90 to 1370°C (-130 to 2498°F)
Thermocouple T	-100 to 400 °C (-148 to 752°F)
Thermocouple E	-30 to 720°C (-22 to 1328°F)
Thermocouple N	-90 to 1300°C (-130 to 2372°F)
Thermocouple R	0 to 1760°C (32 to 3200°F)
Thermocouple S	0 to 1760°C (32 to 3200°F)
Pt100 (0.1°C Resolution)	-199.9 to 530.0°C (-199.9 to 986.0°F)
Pt100 (1°C Resolution)	-200 to 530°C (-328 to 986°F)
4 to 20 mA	Linearized as J. Max. range -110 to 760°C
4 to 20 mA	Linearized as K. Max. range -150 to 1370°C
4 to 20 mA	Linearized as T. Max. range -160 to 400°C
4 to 20 mA	Linearized as E. Max. range -90 to 720°C
4 to 20 mA	Linearized as N. Max. range -150 to 1300°C
4 to 20 mA	Linearized as R. Max. range 0 to 1760°C
4 to 20 mA	Linearized as S. Max. range 0 to 1760°C
4 to 20 mA	Linearized as Pt100. Max. range -199.9 to 530.0°C
4 to 20 mA	Linearized as Pt100. Max. range -200 to 530°C
0 to 50 mV	Linear. Programmable range -1999 to 9999
4 to 20 mA	Linear. Programmable range -1999 to 9999
0 to 10 V	Linear. Programmable range -1999 to 9999

INTRODUCTION

The Universal Indicator **N1040i** combines, in one compact and convenient 1/16 DIN enclosure, a high precision microprocessor based analog circuit with a very simple configuration interface to monitor a wide range of analog variables.

This low cost tough versatile indicator is compatible with most common thermocouples, Pt100 RTD and linear as 4 to 20 mA and mV.

With a intuitive interface to program range and decimal point through the keypad, **N1040i** allows inexperienced instrumentation operators easy installation and start up for most processes.

Optionally **N1040i** has two alarm relays with 6 programmable functions and auxiliary power supply for external signal conditioners.



FEATURES AND SPECIFICATIONS

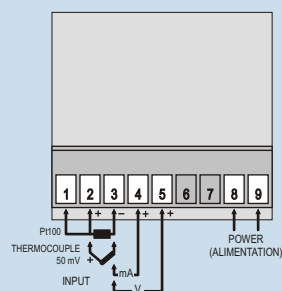
- Thermocouple inputs J, K, T, N, R, S, B, E, RTD Pt100 and linear 0-20 mA, 4-20 mA, 0-50 mV, 0-5 V e 0-10 V in one model.
- Input adjustable Offset allows small indication corrections
- Analog input signal retransmission over 0-20 mA or 4-20 mA
- Up to 2 programmable alarms outputs
- Up to 2 relay outputs, SPDT and SPST-NO
- Alarm Functions: minimum, maximum, differential, minimum differential, maximum differential and sensor break.
- Features Initial alarm blocking function
- Flash alarm function alerts operator to condition while in alarm state.
- Sensor failure detection
- Simple configuration and operation interface
- Password para meters protection
- Display accessible electronic serial number
- Silicone rubber keypad
- Factory calibration parameters recovery
- Universal switching power supply ensures high precision even under mains voltage oscilations
- Optional auxiliary 24 Vdc power supply to connect field transmitters
- Optional RS485 interface
- Power Supply:
 - 100 to 240 Vac ($\pm 10\%$), 50/60 Hz
 - 48 to 240 Vdc ($\pm 10\%$)
 - 24 to 240 Vdc ($\pm 10\%$) (model N1040i-F)
- Maximum power consumption: 6 VA
- Dimensions: 48 x 48 x 80 mm
- Approximate Weight: 75 g
- Environmentl Conditions
 - Operation Temperature: 0 to 50 °C
 - Relative Humidity: 80% a 30 °C
 - For temperatures above 30 °C, reduce 3 % per °C
- Indoor use: Installation Category II, Pollution Degree 2; altitude < 2000 meters
- Input: According to Table 01
- Internal Resolution: 32767 levels (15 bits)
- Display Resolution: 12000 levels (de -1999 to 9999)
- Input reading rate: up 55 per second
- Precision:
 - Thermocouples J, K, T, E: 0.25 % of the span 1°C
 - Thermocouples N, R, S, B: 0.25 % of the span 3°C
 - 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 M Ω
 - 0-5 V, 0-10 V > 500 k Ω
 - 4-20 mA: 100 Ω
- Measuring of the Pt100: 3 wire type, (=0.00385)
- With compensation of the cable length, max 50 meters, excitation current of 0.170 mA.
- Output Alarm1: Relay SPDT; 240 Vac / 30 Vdc / 3 A
- Output Alarm2: Relay SPST-NA; 240 Vac/ 30 Vdc / 1.5 A
- Retransmission of PV: 0-20 mA / 4-20 mA / 500 Ω máx. / 12 000 levels
- 24 VDC Source: 24 Vdc (5 %) / 20 mA max.
- Case: IP65, Polycarbonate (PC) UL94 V-2
- Back Panel: IP30, ABS+PC UL94 V-0
- Adequete connections for terminals of the clamp type
- Starts operation after 3 seconds connected to the power supply
- Certifications: CE, UL

SUPPORTED SENSORS AND MAXIMUM RANGES

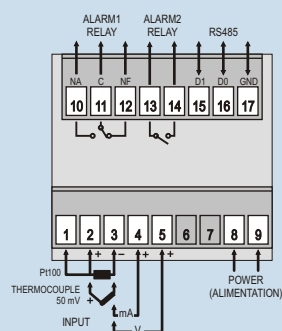
TYPE	CODE	RANGE OF MEASUREMENT
J	tc J	Range: -110 to 950 °C (-166 to 1742 °F)
K	tc K	Range: -150 to 1370 °C (-238 to 2498 °F)
T	tc t	Range: -160 to 400 °C (-256 to 752 °F)
N	tc n	Range: -270 to 1300 °C (-454 to 2372 °F)
R	tc r	Range: -50 to 1760 °C (-58 to 3200 °F)
S	tc S	Range: -50 to 1760 °C (-58 to 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)
Pt 100	Pt	Range: -200 to 850 °C (-328 to 1562 °F)
0-20 mA	L020	Analog Linear Signal Indication programmable from -1999 to 9999.
4-20 mA	L420	
0-50 mV	L050	
0-5 Vdc	L05	
0-10 Vdc	L010	
4-20mA NON LINEAR	LnJ	Non Linear Analog Signal Indication range according to the associated sensor.
	LnK	
	Ln t	
	Ln n	
	Ln r	
	Ln S	
	Ln b	
	Ln E	
	LnPt	

Table1

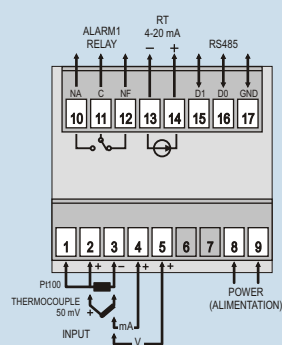
ELECTRICAL CONNECTIONS



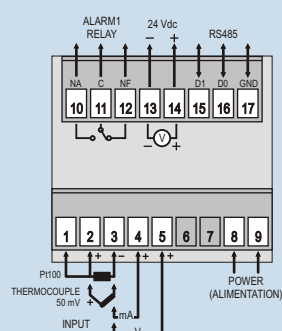
Model: N1040i-F



Model: N1040i-RR
N1040i-RR-485



Model: N1040i-RA
N1040i-RA-485



Model: N1040i-RE
N1040i-RE-485

HOW TO SPECIFY

Model	Description
N1040i-F	Basic version. Wide power supply:100 to 240 Vac, 24 to 240 Vdc
N1040i-RR	Model with two alarm outputs
N1040i-RA	Model with one alarm output and one output for the retransmission of PV
N1040i-RE	Model with one alarm output and one auxiliary 24 VDC voltage source
N1040i-RR-485	Model with two alarm outputs and serial communication RS485
N1040i-RA-485	Model with expansion one alarm output, one output for the retransmission of PV and serial communication RS485
N1040i-RE-485	Model with one alarm output, one auxiliary 24 VDC voltage source and serial communication Rs485

INTRODUCTION

The **N1500** series of Universal Process Indicators are high performance instruments used for monitoring analog signals in the vast majority of industrial and laboratory processes. Configuration from the front panel is fast and easy, accepting thermocouples, Pt100 and 4-20mA or voltage signals.

Available in two models: **N1500** with universal input, and **N1500LC**, with load cell input and excitation.

Both models come with key panel programmable range, selectable decimal point, universal switching power supply, 24Vdc output for field transmitters excitation (10Vdc output in **N1500LC**), ultra bright six digit LED display and 2 relay alarms with 6 programmable functions and temporization. Available options are 4 to 20 mA output for retransmission of measured variable to a recorder or PLC, two extra alarm relays, and RS485 digital comm interface with MODBUS protocol.



FEATURES & SPECIFICATIONS

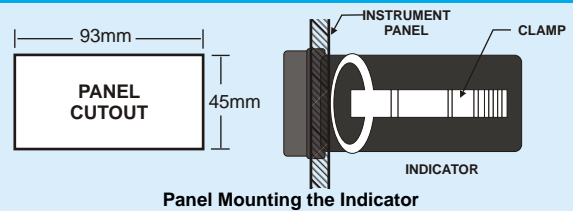
- Easily configurable through the front keypad.
- Configurable Input:
 - **N1500**: J, K, T, E, N, R, S and B type thermocouples, Pt100, 4-20 mA, 0-50 mV, 0-10 Vdc and 0-5 Vdc;
 - **N1500 LC**: 0-20mV, -20 to 20mV, 0-50mV, 0-20 mA and 4-20 mA.
- 62000 counts display resolution. Keyboard programmable range from -31000 to +31000. Configurable decimal point indication
- Adjustable digital filter.
- Accuracy:
 - J, K, T, E, B and N thermocouples: 0.25% of max. span $\pm 1^\circ\text{C}$.
 - R, S and B thermocouples: 0.25% of max. span $\pm 3^\circ\text{C}$.
 - Pt100: 0.20% of maximum span.
 - Linear voltage and current: 0.15% of maximum span.
- Input sampling rate: 15 samples/sec for V and mA input, 7.5 samples/sec for mV and 5 samples/sec for other signals.
- Input Resistance:
 - 0-50 mV, Pt100 and Thermocouples: 10 M Ω .
 - 0-5 V, 0-10 V > 1 M Ω .
 - 4-20 mA: 15 Ω +2 Vdc.
- Pt100 measurement: 3 wire circuit. Bias current 750 μA .
- 4-20 mA input signals can be linearized according to thermocouples curves.
- Programmable custom linearization, in up to 30 linear segments.
- Key panel protection to avoid tampering.
- Alarms: Two 3A/250 Vac SPDT relays in the standard version. Two optional SPST relays. All alarms allow temporization and start-up blocking.
- Alarm functions: High, Low, Differential high, Differential low, Differential, sensor break.
- High brightness 13 mm, 6- digit display.
- Display hold and minimum/maximum detection functions.
- Tare and zero from the keypad or digital input (**N1500 LC**).
- 4-20/0-20mA output for process variable retransmission (optional).
- RS485 Modbus RTU communication interface (optional).
- Power supply: 85 to 264 Vac/Vdc, 50/60 Hz, 6 VA. Optional: 24Vac/Vdc.
- Circuitry can be removed from housing without disconnecting wires.
- Power supply output: 24 Vdc $\pm 10\%$, 35 mA (**N1500**) or 10 Vdc $\pm 0.5\%$, 35 mA (**N1500LC**).
- Environment conditions: 0 to 55°C, 20 to 95% RH, non-condensing.
- Front panel: IP65, Polycarbonate UL94 V-2.
- Back panel: IP30, ABS+PC UL94 V-0.
- Dimensions: 96 x 48 x 92 mm. 93 x 45 mm panel cutout.
- Aproximate weight: 240g (standard) to 265g (complete).

SENSOR TYPES AND RANGES

TYPE	CHARACTERISTICS
J	range: -130 to 940 °C (-202 to 1724 °F)
K	range: -200 to 1370 °C (-328 to 2498 °F)
T	range: -200 to 400 °C (-328 to 752 °F)
E	range: -100 to 720 °C (-148 to 1328 °F)
N	range: -200 to 1300 °C (-328 to 2372 °F)
R	range: 0 to 1760 °C (32 to 3200 °F)
S	range: 0 to 1760 °C (32 to 3200 °F)
B	range: 500 to 1800 °C (932 to 3272 °F)
Pt100	range: -200.0 to 850.0 °C (-328.0 to 1562.0 °F)
0 - 50 mV	Linear. Programmable range: -31000 a 31000
0 - 5 V	Linear. Programmable range: -31000 a 31000
0 - 10 V	Linear. Programmable range: -31000 a 31000
4 - 20 mA	Linearized as J. Programmable range: -130 a 940 °C
4 - 20 mA	Linearized as K. Programmable range: -200 a 1370 °C
4 - 20 mA	Linearized as T. Programmable range: -200 a 400 °C
4 - 20 mA	Linearized as E. Programmable range: -100 a 720 °C
4 - 20 mA	Linearized as N. Programmable range: -200 a 1300 °C
4 - 20 mA	Linearized as R. Programmable range: 0 a 1760 °C
4 - 20 mA	Linearized as S. Programmable range: 0 a 1760 °C
4 - 20 mA	Linearized as B. Programmable range: 500 a 1800 °C
4 - 20 mA	Linearized as Pt100. Programmable range: -200.0 a 850.0 °C
0 - 20 mA	Linear. Programmable range: -31000 a 31000
4 - 20 mA	Linear. Programmable range: -31000 a 31000
N1500LC:	
0 - 20 mV	Linear. Programmable range: -31000 a 31000
-20 - 20 mV	Linear. Programmable range: -31000 a 31000
0 - 50 mV	Linear. Programmable range: -31000 a 31000
0 - 20 mA	Linear. Programmable range: -31000 a 31000
4 - 20 mA	Linear. Programmable range: -31000 a 31000

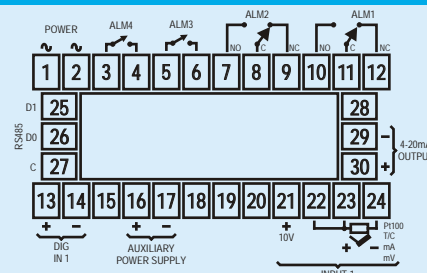
Note: a custom 30-segment linearization profile can be programmed for the linear input types.

PANEL ASSEMBLY



Panel Mounting the Indicator

ELECTRICAL CONNECTIONS



HOW TO SPECIFY

The standard unit includes 2 SPDT relays, 1 digital input and 24 Vdc (**N1500**) or 10 Vdc (**N1500LC**) supply output.

Option 1: 2 SPST alarm relays (ALM3 and ALM4). **Option 2:** 4-20 mA / 0-20 mA analog output. **Option 3:** RS485 Modbus communication interface.

Option 4: 24 Vac/Vdc power supply input.



novus

REV200114



Universal Indicator N1540



Introduction

N1540 process meter was designed with advanced technology for highest performance and reliability in the most demanding applications. Based on an advanced and robust hardware platform, the **N1540** can be fully programmed via its front keypad or via a USB interface. The unique USB interface makes the programming task a simple one step fool proof operation. It allows, for example, the set up of several instruments with the same programming parameters with extreme ease while saving precious time.

The USB interface also provides an invaluable means for continuous monitoring of the measured process variable.

With a very short 33 mm (1.34 inches) depth enclosure, the **N1540** can be easily installed in panels and enclosures where space is at a premium. Dual alarm relays and a convenient 24 V auxiliary power supply are also available in this competitively priced process meter.

Features

- Accepts thermocouples J, K, T, E, N, R, S, B, Pt100, 0-50 mV, 0-5 Vdc, 0-10 Vdc, 0-20 mA and 4-20 mA
- Temperature in °C or °F
- Adjustable indication offset
- Adjustable digital filter
- Programmable indicating range from -1999 to 9999
- Sampling rate: up to 50 measurements per second
- Two relay alarms: SPST 1.5 A / 240 Vac
- Alarm functions: LO, HI, differential, differential LO, differential HI, sensor break
- Alarm initial blocking
- Alarm hysteresis
- Flash function (display flashes under alarm condition)
- Detachable wire connectors
- Bright 14 mm display
- Recorded maximum HI and minimum LO values can be retrieved via keypad

- Password for configuration protection
- Auxiliary 24 Vdc voltage source
- USB Interface for configuration and monitoring
- Factory configuration parameters retrieval
- IP65 UL 94 V-2 front; IP20 UL 94V-0 enclosure
- Silicone rubber keypad
- CE and UL certification
- Size: 96 x 48 x 34 mm
- Power: 100~240 Vac/dc $\pm 10\%$

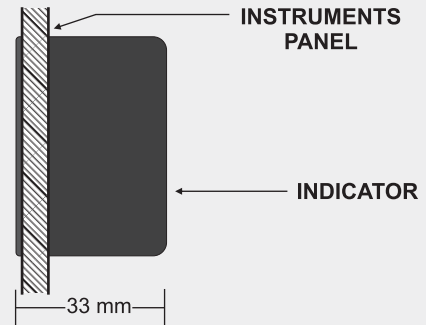
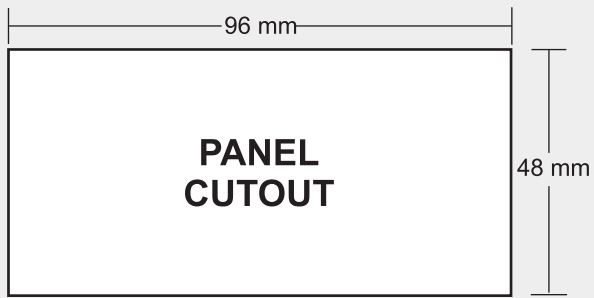
OPTIONS:

- RS485 Modbus RTU serial communication
- Power: 12 to 24 Vac/dc

MODELS

MODELS	
N1540-USB	Basic Indicator USB
N1540-485-USB	Basic Indicator USB + RS485

Panel Mounting



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