

# NI2400/NI816/NI4866 DATALOGGER

NI2400/NI816/NI4866



**8/16/24 CHANNEL ETHERNET DATA LOGGER**  
**with Embedded Web Server**

DATASHEET

Rev. 07 del 17/11/2017  
Redatto da R&D  
Approvato da MKT

 **NEXT**  
industries MILANO

	NI4866	NI816	NI2400
Ethernet	Y	Y	Y
Relay Output (30V 1A)	7	1	1
Digital Input (24V 10mA)	2	2	2
Analog Input Number	4-8	8-16	24
Internal Temperature Sensor	Y	Y	Y
Voltage	Y	Y	Y
Current	Y	Y	Y
mV/V	Y	Y	Y
PT100	N/Y**	N/Y**	Y
NTC	Y	Y	Y
Vibrating Wire	N/Y**	N/Y**	Y
Internal CJC Sensor	Y	N	Y
Thermocouple	Y	N	Y
Switchable Power Supply	N/Y**	N/Y**	Y
(Selectable by Software: 24V, 20V, 10V, 5V)			
RS485	2	2	2
Power Supply RS485	Y	Y	Y
Smart MUX*	N	N	N
RS232	Y	Y	Y
Display	128x64 px	128x64 px	128x64 px
USB HOST	Y	Y	Y
Analog Expansion with Multiplexer	N	Y	Y
DI/DO Expansion	6 IN/ 6 OUT	-	-
Memory	2GB	2GB	2GB
Software Web Server	Y	Y	Y
Cloud Dashboard Management Option	Y	Y	Y
Weight	980g		
Dimensions (L x W x H)	231 x 138 x 117 mm		
Material	Plastic and Metal		
Wiring	Screws clamp termination block up to 1,3mm2 (16AWG)		
Calibration	Recommended every 1 year		
Operating Voltage	10 to 30V DC (reverse polarity protected)		
*Smart MUX: Allows to connect an NI100 to an NI110 and Multiplexers to read Vibrating Wire (with NTC) sensors. Up to 16 Multiplexers and 16 NI110, for a total of 384 sensors.			
**Depending on model			

# SPECIFICATIONS NI2400



- Webserver on board
- 24 Differential Analog Input Channels
- Measures: Thermocouples, PT100 RTD, NTC Thermistor, mV, mA, mV/V
- View Data in real Time or Store to 2 GB Internal Memory
- GPRS Modem available
- 0.01% FS Accuracy
- Expandable up to 384 channels with multiplexers
- Ethernet, RS485, RS232 and USB Connections
- SMS and e-mail Alerts

## PHYSICAL CHARACTERISTICS

<b>Weight</b>	980 g (2.16 lb)
<b>Dimensions (L x W x H)</b>	231 L x 138 W x 117 mm H (9.09 x 5.43 x 4.61")
<b>Material</b>	Plastic and metal
<b>Wiring</b>	Removable screw terminal connectors

## CPU AND MEMORY

<b>Processor</b>	ARM Cortex-M3 MCU with 1 MB Flash, 120 MHz CPU, ART Accelerator, Ethernet
<b>RAM Memory</b>	1 Mbyte RAM
<b>Mass storage</b>	2 GB SD card for data (about 5 Mega data points) and Web pages
<b>Clock accuracy</b>	High precision RTC (real time clock with battery back-up) temperature compensated
<b>On-board sensors</b>	Temperature (accuracy $\pm 1\%$ ), measured inside the datalogger

## ANALOG INPUTS

Number of Inputs: 24 differential analog inputs, individually configured. Channel expansion provided by multiplexers. There are 8 terminal blocks (each terminal block can handle up to 3 sensors). NI2400 is designed to work with 2 to 6-wire sensors. You can connect 2-wire sensors on each channel and read 24 sensors, or 4-wire sensor and read 12 channels. The system will order sensors depending on how many wires they use, placing 6 wires sensors first, 4 wires in the middle, and 2 wires last. Once software configuration is done, a click on "Wiring scheme" button on the web interface near the sensors will show how to physically connect the chosen sensor to the block. It shows "relative" position, so if you start connecting sensors from the first you will not have to leave "unused" positions (except for the ground connection of every block, if not used).

Multiplexers are needed if the total "wires" from sensors exceeds the 48 provided by NI2400.

Analog Measurements Measurement Rate	Maximum Speed	Standard Speed
Analog Initialization ( $\pm 10V$ range)	1.70 sec	7.10 sec
Instrument Warm-Up	Depends on sensor configuration	
Measurement ( $\pm 10V$ range)	80 ms	1.57 sec
Accuracy:	0.13 %FS	0.01 %FS (0.1%FS for PT100 and NTC)
ADC:	<p>Times indicated are not valid for vibrating wire measures</p> <p>Init analog phase is made only once before measurement cycle</p> <p>24-bit (22 true bit) differential analog-to-digital converters, 5SPS to 1000SPS, 0-24 average function, auto-calibration and auto-range</p>	

### ANALOG INPUT TYPES

Current Loop (2 Wires)	0 to 25 mA range; power supply: 24/10 Vdc, external
Transmitter (3-4 Wires)	0 to 25 mA range; power supply: 24/10 Vdc, external
Voltage (4 Wires)	$\pm 10$ mV, $\pm 100$ mV, $\pm 1V$ , $\pm 10V$ ranges; power supply: 24/20/10/5Vdc, external
Servo Inclinator	$\pm 5V$ range; power supply: $\pm 12$ Vdc (dual), external
Wheatstone Bridge (6 Wires, With Sensing)	$\pm 10mV/V$ range; power supply: 10/5 Vdc, external (max 10 Vdc)
Minimum bridge resistance	200 $\Omega$ ; power supply: 10/5 Vdc, external (max 10 Vdc)
Potentiometer	$\pm 2.5V$ range; power supply: 10/5 Vdc

## THERMOCOUPLE (LOGGER @ 25°C AMBIENT TEMPERATURE)

TC TYPE	RANGE	ERROR
TC-K	From -200 °C to 1370°C	±1,24 °C
TC-B	From 600 °C to 1820 °C	±1,22 °C
TC-J	From -200 °C to 1200 °C	±1,04 °C
TC-T	From -200 °C to 400 °C	±1,99 °C
TC-E	From -200 °C to 1000 °C	±0,93 °C
TC-R	From -20 °C to 1760 °C	±1,64 °C
TC-N	From -260°C to 1300°C	±1,24 °C
TC-S	From -20 °C to 1760 °C	±1,64 °C

ANALOG MEASUREMENTS	
<b>RTD Input</b>	Platinum (Pt100/200/500/1000) RTD: range -195 to 847°C (-319 to 1556°F); maximum error $\pm 0,17\%$ FS; power supply: 1.2 mA
<b>Thermistor (3000 <math>\Omega</math>@25°C NTC)</b>	range -50 to 0°C (-58 to 32°F) maximum error $\pm 2^\circ\text{C}$ ( $\pm 3,6^\circ\text{F}$ ); range -0 to 150°C (32 to 302°F) maximum error $\pm 1^\circ\text{C}$ ( $\pm 1,8^\circ\text{F}$ ); power supply: 0.05 mA /0.1 mA/1.2 mA
<b>USB Device</b>	USB 2.0 full speed 5V, max 500mA, USB pendrive only
<b>Reading Resolution</b>	1 $\mu\text{A}$ at FS for 20 mA range; 1 $\mu\text{V}$ at FS for $\pm 10$ mV range; 10 $\mu\text{V}$ at FS for $\pm 100$ mV range; 100 $\mu\text{V}$ at FS for $\pm 1$ V range; 1 mV at FS for $\pm 10$ V range; 0.1 $^\circ\text{C}$ for Pt100 RTD; 0.1 $^\circ\text{C}$ for NTC thermistor; 0.1 Hz for 6000 Hz range; 0.001 mV/V at FS for $\pm 10$ mV/V (Wheatstone bridge)
<b>Measurement Accuracy</b>	0.01% mV/mA FS (0.1% FS for Pt100 and NTC) - with Standard Measurement 0.13% mV/mA FS - with Max Speed Measurement Temperature Drift: < 10 ppm/ $^\circ\text{C}$ , range -30 to 70°C Input Noise Voltage: 5.42 $\mu\text{V}$ pp Input Limits : $\pm 12\text{V}$ DC Common Mode Rejection: >105 dB Normal Mode Rejection: >90 dB Input Impedance: 20 M $\Omega$ typical
<b>Switched Output Power Supply</b>	The voltage 'V OUT' is switched on and off under program control. V OUT is the unregulated input power supply 'V IN' (2 A)

### DIGITAL I/O

<b>Digital Output</b>	One relay output (for alarm, etc.): volt-free closure (low voltage 30V, 2A)
<b>Digital Input:</b>	<p>Two opto-isolated digital inputs</p> <p>Max Input Voltage: 24V (max current: 10mA)</p> <p>Min Input Voltage: 5V (max current: 2mA)</p> <p>Measurement Rate (MR): max frequency 1 kHz</p> <p>Accuracy: 0.1 Hz</p>

### PROTECTIONS

Electro-Mechanical Relays for Measuring Each Channel:

Electrical Endurance: min 2 x 10<sup>5</sup> operations

Mechanical Endurance: 100 x 10<sup>6</sup> operations.

Circuit Protection (Gas Discharge Tubes):

DC Breakdown Voltage (@100V/s): 75V

Tolerance of DCBV: ± 20%

Impulse Breakdown Voltage (@100v/μs): 250V

Impulse Breakdown Voltage (@1kv/μs): 525V

Overvoltage and Reverse Polarity Protection

Short Circuit Protection on Every Output



### INTERFACES

#### Display & Keyboard

Small backlight graphic LCD 128 x 64 dpi with membrane keyboard for the minimal local management without the PC. Keyboard for starting a data acquisition scan, sequential display of the last stored readings for each channel (sensor ID, converted unit reading, unit of measure), device status, data download and firmware/Web pages update by USB pen drive, safe mode (back-up/format/restore internal SD card).

#### LAN Ethernet Iso- lated

10/100 Mbps, RJ45

#### RS232

9-pin, DE9: DCE port for optional GSM/GPRS modem connection  
Baud Rates: selectable from 9600 bps to 115.2 kbps  
Default Format: 8 data bits; 1 stop bits; no parity

#### USB

USB 2.0 pen drive only (FAT 32), 5 V 200 mA

#### RS485#1 Opto-Isolated

Connection: 5 screw clamp port for max. No.254 Modbus RS485 digital bus sensors  
Communication Interface: RS485  
Communication Protocol: MODBUS RTU  
Voltage 'V OUT': Switched on and off under program control. V OUT is the unregulated input power supply 'V IN' (1 A).  
Power supply management: Always on or energy safe

#### RS485#2 Opto-Isolated

Connection: 5 screw clamp port for max. 16 multiplexer boards connection.  
Communication interface: RS485  
Communication protocol: MODBUS RTU  
Voltage 'V OUT': Switched on and off under program control. V OUT is the unregulated input power supply 'V IN' (1 A).  
Every channel of each multiplexer board is completely independent.

### SOFTWARE & FIRMWARE

- Web server on board (independent OS platform)
- Acquisition Time Interval: selectable from 1 second up to 1 week (depends on the number of channels acquired)
- FTP client to send data/alarms on an FTP server (SFTP not supported)
- MAIL to send data/alarms to max 5 email address (SMTPS / SSL not supported)
- SMS to send alarms to max 5 telephone numbers
- Data download (readings, logs) in .csv file (compatible with Microsoft Excel)
- Virtual channels management
- Languages: Italian, English and French

### SYSTEM POWER REQUIREMENTS

<b>Voltage (External Power Supply)</b>	10 to 30 Vdc (reverse polarity protected)
<b>External Rechargeable Batteries</b>	12 Vdc nominal
<b>Typical Current Drain (@12 Vdc, External Power Supply)</b>	Sleep Mode(MAX): 315 $\mu$ A ON: 62 mA - ON with ethernet connected: 87 mA - ON with display ON: 115 mA ON with display ON and ethernet connected: 142 mA
<b>Analog Initialization</b>	115 mA
<b>Measurement</b>	123 mA (with 12 mA @ 24 V sensor consumption)

ENVIROMENTAL CONDITIONS	
<b>Operating Temperature</b>	-30 to 70°C (display -20 to 70°C)
<b>Storage Temperature</b>	-40 to 85°C (display -30 to 80°C)
<b>Relative Humidity</b>	80 %RH
<b>Overvoltage Category</b>	II
<b>Pollution Degree</b>	2
<b>Sound Levels</b>	< 74 dBA
<b>Maximum Height of Use</b>	3000 m (9800 ft)

# SPECIFICATIONS NI816



- Webserver on board
- Differential Analog Input Channels
- Measures: PT100 RTD, NTC Thermistor, mV, mA, mV/V
- View Data in real Time or Store to 2 GB Internal Memory
- GPRS Modem available
- 0.01% FS Accuracy
- Expandable up to 384 channels with multiplexers
- Ethernet, RS485, RS232 and USB Connections
- SMS and e-mail Alerts

## PHYSICAL CHARACTERISTICS

<b>Weight</b>	980 g (2.16 lb)
<b>Dimensions (L x W x H)</b>	231 L x 138 W x 117 mm H (9.09 x 5.43 x 4.61")
<b>Material</b>	Plastic and metal
<b>Wiring</b>	Removable screw terminal connectors

### CPU AND MEMORY

<b>Processor</b>	ARM Cortex-M3 MCU with 1 MB Flash, 120 MHz CPU, ART Accelerator, Ethernet
<b>RAM Memory</b>	1 Mbyte RAM
<b>Mass storage</b>	2 GB SD card for data (about 5 Mega data points) and Web pages
<b>Clock accuracy</b>	High precision RTC (real time clock with battery back-up) temperature compensated
<b>On-board sensors</b>	Temperature (accuracy $\pm 1\%$ ), measured inside the datalogger

### ANALOG INPUTS

Number of Inputs: 8-16 differential analog inputs, individually configured. Channel expansion provided by multiplexers. There are 8 terminal blocks (each terminal block can handle up to 2 sensors). NI816 is designed to work with 2 to 6-wire sensors. Once software configuration is done, a click on "Wiring scheme" button on the web interface near the sensors will show how to physically connect the chosen sensor to the block.

Analog Measurements Measurement Rate	Maximum Speed	Standard Speed
Analog Initialization ( $\pm 10V$ range)	1.70 sec	7.10 sec
Instrument Warm-Up	Depends on sensor configuration	
Measurement ( $\pm 10V$ range)	80 ms	1.57 sec
Accuracy:	0.13 %FS	0.01 %FS (0.1%FS for PT100 and NTC)
ADC:	Times indicated are not valid for vibrating wire measures	
	Init analog phase is made only once before measurement cycle	
	24-bit (22 true bit) differential analog-to-digital converters, 5SPS to 1000SPS, 0-24 average function, auto-calibration and auto-range	

### ANALOG INPUT TYPES (power supply depending on models)

Current Loop (2 Wires)	0 to 25 mA range; power supply: 24/10 Vdc, external
Transmitter (3-4 Wires)	0 to 25 mA range; power supply: 24/10 Vdc, external
Voltage (4 Wires)	$\pm 10$ mV, $\pm 100$ mV, $\pm 1V$ , $\pm 10V$ ranges; power supply: 24/20/10/5Vdc, external
Servo Inclinator	$\pm 5V$ range; power supply: $\pm 12$ Vdc (dual), external
Wheatstone Bridge (6 Wires, With Sensing)	$\pm 10mV/V$ range; power supply: 10/5 Vdc, external (max 10 Vdc)
Minimum bridge resistance	200 $\Omega$ ; power supply: 10/5 Vdc, external (max 10 Vdc)
Potentiometer	$\pm 2.5V$ range; power supply: 10/5 Vdc

ANALOG MEASUREMENTS	
<b>RTD Input</b> (depending on models)	Platinum (Pt100/200/500/1000) RTD: range -195 to 847°C (-319 to 1556°F); maximum error $\pm 0,17\%$ FS; power supply: 1.2 mA
<b>Thermistor (3000 <math>\Omega</math>@25°C NTC)</b>	range -50 to 0°C (-58 to 32°F) maximum error $\pm 2^\circ\text{C}$ ( $\pm 3,6^\circ\text{F}$ ); range -0 to 150°C (32 to 302°F) maximum error $\pm 1^\circ\text{C}$ ( $\pm 1,8^\circ\text{F}$ ); power supply: 0.05 mA /0.1 mA/1.2 mA
<b>USB Device</b>	USB 2.0 full speed 5V, max 500mA, USB pendrive only
<b>Reading Resolution</b>	1 $\mu\text{A}$ at FS for 20 mA range; 1 $\mu\text{V}$ at FS for $\pm 10$ mV range; 10 $\mu\text{V}$ at FS for $\pm 100$ mV range; 100 $\mu\text{V}$ at FS for $\pm 1$ V range; 1 mV at FS for $\pm 10$ V range; 0.1 °C for Pt100 RTD; 0.1 °C for NTC thermistor; 0.1 Hz for 6000 Hz range; 0.001 mV/V at FS for $\pm 10$ mV/V (Wheatstone bridge)
<b>Measurement Accuracy</b>	0.01% mV/mA FS (0.1% FS for Pt100 and NTC) - with Standard Measurement 0.13% mV/mA FS - with Max Speed Measurement Temperature Drift: < 10 ppm/°C, range -30 to 70°C Input Noise Voltage: 5.42 $\mu\text{V}$ pp Input Limits : $\pm 12\text{V}$ DC Common Mode Rejection: >105 dB Normal Mode Rejection: >90 dB Input Impedance: 20 M $\Omega$ typical
<b>Switched Output Power Supply</b>	The voltage 'V OUT' is switched on and off under program control. V OUT is the unregulated input power supply 'V IN' (2 A)

### DIGITAL I/O

**Digital Output** One relay output (for alarm, etc.): volt-free closure (low voltage 30V, 2A)

**Digital Input:** Two opto-isolated digital inputs  
 Max Input Voltage: 24V (max current: 10mA)  
 Min Input Voltage: 5V (max current: 2mA)  
 Measurement Rate (MR): max frequency 1 kHz  
 Accuracy: 0.1 Hz

### PROTECTIONS

Electro-Mechanical Relays for Measuring Each Channel:  
 Electrical Endurance: min 2 x 10<sup>5</sup> operations  
 Mechanical Endurance: 100 x 10<sup>6</sup> operations.  
 Circuit Protection (Gas Discharge Tubes):  
 DC Breakdown Voltage (@100V/s): 75V  
 Tolerance of DCBV: ± 20%  
 Impulse Breakdown Voltage (@100v/μs ): 250V  
 Impulse Breakdown Voltage (@1kv/μs ): 525V  
 Overvoltage and Reverse Polarity Protection  
 Short Circuit Protection on Every Output



<b>INTERFACES</b>	
<b>Display &amp; Keyboard</b>	Small backlight graphic LCD 128 x 64 dpi with membrane keyboard for the minimal local management without the PC. Keyboard for starting a data acquisition scan, sequential display of the last stored readings for each channel (sensor ID, converted unit reading, unit of measure), device status, data download and firmware/Web pages update by USB pen drive, safe mode (back-up/format/restore internal SD card).
<b>LAN Ethernet Isolated</b>	10/100 Mbps, RJ45
<b>RS232</b>	9-pin, DE9: DCE port for optional GSM/GPRS modem connection Baud Rates: selectable from 9600 bps to 115.2 kbps Default Format: 8 data bits; 1 stop bits; no parity
<b>USB</b>	USB 2.0 pen drive only (FAT 32), 5 V 200 mA
<b>RS485#1 Opto-Isolated</b>	Connection: 5 screw clamp port for max. No.254 Modbus RS485 digital bus sensors Communication Interface: RS485 Communication Protocol: MODBUS RTU Voltage 'V OUT': Switched on and off under program control. V OUT is the unregulated input power supply 'V IN' (1 A). Power supply management: Always on or energy safe
<b>RS485#2 Opto-Isolated</b>	Connection: 5 screw clamp port for max. 16 multiplexer boards connection. Communication interface: RS485 Communication protocol: MODBUS RTU Voltage 'V OUT': Switched on and off under program control. V OUT is the unregulated input power supply 'V IN' (1 A). Every channel of each multiplexer board is completely independent.

### SOFTWARE & FIRMWARE

- Web server on board (independent OS platform)
- Acquisition Time Interval: selectable from 1 second up to 1 week (depends on the number of channels acquired)
- FTP client to send data/alarms on an FTP server (SFTP not supported)
- MAIL to send data/alarms to max 5 email address (SMTPS / SSL not supported)
- SMS to send alarms to max 5 telephone numbers
- Data download (readings, logs) in .csv file (compatible with Microsoft Excel)
- Virtual channels management
- Languages: Italian, English and French

### SYSTEM POWER REQUIREMENTS

<b>Voltage (External Power Supply)</b>	10 to 30 Vdc (reverse polarity protected)
<b>External Rechargeable Batteries</b>	12 Vdc nominal
<b>Typical Current Drain (@12 Vdc, External Power Supply)</b>	Sleep Mode(MAX): 315 $\mu$ A ON: 62 mA - ON with ethernet connected: 87 mA - ON with display ON: 115 mA ON with display ON and ethernet connected: 142 mA
<b>Analog Initialization</b>	115 mA
<b>Measurement</b>	123 mA (with 12 mA @ 24 V sensor consumption)

ENVIROMENTAL CONDITIONS	
<b>Operating Temperature</b>	-30 to 70°C (display -20 to 70°C)
<b>Storage Temperature</b>	-40 to 85°C (display -30 to 80°C)
<b>Relative Humidity</b>	80 %RH
<b>Overvoltage Category</b>	II
<b>Pollution Degree</b>	2
<b>Sound Levels</b>	< 74 dBA
<b>Maximum Height of Use</b>	3000 m (9800 ft)

# SPECIFICATIONS NI4866



- Webserver on board
- 4-8 Differential Analog Input Channels
- Measures: Thermocouples, PT100 RTD, NTC Thermistor, mV, mA, mV/V
- View Data in real Time or Store to 2 GB Internal Memory
- GPRS Modem available
- 0.01% FS Accuracy
- 6 Digital Output and 6 Digital Input expansion integrated
- Ethernet, RS485, RS232 and USB Connections
- SMS and e-mail Alerts

## PHYSICAL CHARACTERISTICS

**Weight** 980 g (2.16 lb)

**Dimensions (L x W x H)** 231 L x 138 W x 117 mm H (9.09 x 5.43 x 4.61")

**Material** Plastic and metal

**Wiring** Removable screw terminal connectors

## CPU AND MEMORY

<b>Processor</b>	ARM Cortex-M3 MCU with 1 MB Flash, 120 MHz CPU, ART Accelerator, Ethernet
<b>RAM Memory</b>	1 Mbyte RAM
<b>Mass storage</b>	2 GB SD card for data (about 5 Mega data points) and Web pages
<b>Clock accuracy</b>	High precision RTC (real time clock with battery back-up) temperature compensated
<b>On-board sensors</b>	Temperature (accuracy $\pm 1\%$ ), measured inside the datalogger

## ANALOG INPUTS

Number of Inputs: 4-8 differential analog inputs, individually configured. Channel expansion provided by multiplexers. There are 8 terminal blocks four can handle up to 2 sensors each, while two can handle up to 3 di each and two can handle (6 up to) do each. NI4866 is designed to work with 2 to 6-wire sensors. Once software configuration is done, a click on "Wiring scheme" button on the web interface near the sensors will show how to physically connect the chosen sensor to the block. 6 additional Digital Output and 6 additional digital Input increase applications for the device.

Analog Measurements Measurement Rate	Maximum Speed	Standard Speed
Analog Initialization ( $\pm 10V$ range)	1.70 sec	7.10 sec
Instrument Warm-Up	Depends on sensor configuration	
Measurement ( $\pm 10V$ range)	80 ms	1.57 sec
Accuracy:	0.13 %FS	0.01 %FS (0.1%FS for PT100 and NTC)
	Times indicated are not valid for vibrating wire measures	
	Init analog phase is made only once before measurement cycle	
ADC:	24-bit (22 true bit) differential analog-to-digital converters, 5SPS to 1000SPS, 0-24 average function, auto-calibration and auto-range	

ANALOG INPUT TYPES (power supply depending on models)		
Current Loop (2 Wires)	0 to 25 mA range; power supply: 24/10 Vdc, external	
Transmitter (3-4 Wires)	0 to 25 mA range; power supply: 24/10 Vdc, external	
Voltage (4 Wires)	$\pm 10$ mV, $\pm 100$ mV, $\pm 1V$ , $\pm 10V$ ranges; power supply: 24/20/10/5Vdc, external	
Servo Inclinator	$\pm 5V$ range; power supply: $\pm 12$ Vdc (dual), external	
Wheatstone Bridge (6 Wires, With Sensing)	$\pm 10mV/V$ range; power supply: 10/5 Vdc, external (max 10 Vdc)	
Minimum bridge resistance	200 $\Omega$ ; power supply: 10/5 Vdc, external (max 10 Vdc)	
Potentiometer	$\pm 2.5V$ range; power supply: 10/5 Vdc	

## THERMOCOUPLE (LOGGER @ 25°C AMBIENT TEMPERATURE)

TC TYPE	RANGE	ERROR
TC-K	From -200 °C to 1370°C	±1,24 °C
TC-B	From 600 °C to 1820 °C	±1,22 °C
TC-J	From -200 °C to 1200 °C	±1,04 °C
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TC-E	From -200 °C to 1000 °C	±0,93 °C
TC-R	From -20 °C to 1760 °C	±1,64 °C
TC-N	From -260°C to 1300°C	±1,24 °C
TC-S	From -20 °C to 1760 °C	±1,64 °C

ANALOG MEASUREMENTS	
<b>RTD Input (depending on models)</b>	Platinum (Pt100/200/500/1000) RTD: range -195 to 847°C (-319 to 1556°F); maximum error $\pm 0,17\%$ FS; power supply: 1.2 mA
<b>Thermistor (3000 <math>\Omega</math>@25°C NTC)</b>	range -50 to 0°C (-58 to 32°F) maximum error $\pm 2^\circ\text{C}$ ( $\pm 3,6^\circ\text{F}$ ); range -0 to 150°C (32 to 302°F) maximum error $\pm 1^\circ\text{C}$ ( $\pm 1,8^\circ\text{F}$ ); power supply: 0.05 mA /0.1 mA/1.2 mA
<b>USB Device</b>	USB 2.0 full speed 5V, max 500mA, USB pendrive only
<b>Reading Resolution</b>	1 $\mu\text{A}$ at FS for 20 mA range; 1 $\mu\text{V}$ at FS for $\pm 10$ mV range; 10 $\mu\text{V}$ at FS for $\pm 100$ mV range; 100 $\mu\text{V}$ at FS for $\pm 1$ V range; 1 mV at FS for $\pm 10$ V range; 0.1 °C for Pt100 RTD; 0.1 °C for NTC thermistor; 0.1 Hz for 6000 Hz range; 0.001 mV/V at FS for $\pm 10$ mV/V (Wheatstone bridge)
<b>Measurement Accuracy</b>	0.01% mV/mA FS (0.1% FS for Pt100 and NTC) - with Standard Measurement 0.13% mV/mA FS - with Max Speed Measurement Temperature Drift: < 10 ppm/°C, range -30 to 70°C Input Noise Voltage: 5.42 $\mu\text{V}$ pp Input Limits : $\pm 12\text{V}$ DC Common Mode Rejection: >105 dB Normal Mode Rejection: >90 dB Input Impedance: 20 M $\Omega$ typical
<b>Switched Output Power Supply</b>	The voltage 'V OUT' is switched on and off under program control. V OUT is the unregulated input power supply 'V IN' (2 A)



### DIGITAL I/O

#### Digital Output

6 Relay output (for alarm, etc.): volt-free closure (low voltage 30V, 2A)  
One additional relay output controllable from Modbus TCP.

#### Digital Input:

Two opto-isolated digital inputs  
Max Input Voltage: 24V (max current: 10mA)  
Min Input Voltage: 5V (max current: 2mA)  
Measurement Rate (MR): max frequency 1 kHz  
Accuracy: 0.1 Hz  
6 Additional Digital Input available as trigger for acquisition and alarms.

### PROTECTIONS

Electro-Mechanical Relays for Measuring Each Channel:  
Electrical Endurance: min 2 x 10<sup>5</sup> operations  
Mechanical Endurance: 100 x 10<sup>6</sup> operations.  
Circuit Protection (Gas Discharge Tubes):  
DC Breakdown Voltage (@100V/s): 75V  
Tolerance of DCBV: ± 20%  
Impulse Breakdown Voltage (@100v/μs ): 250V  
Impulse Breakdown Voltage (@1kv/μs ): 525V  
Overvoltage and Reverse Polarity Protection  
Short Circuit Protection on Every Output

### INTERFACES

#### Display & Keyboard

Small backlight graphic LCD 128 x 64 dpi with membrane keyboard for the minimal local management without the PC. Keyboard for starting a data acquisition scan, sequential display of the last stored readings for each channel (sensor ID, converted unit reading, unit of measure), device status, data download and firmware/Web pages update by USB pen drive, safe mode (back-up/format/restore internal SD card).

#### LAN Ethernet Iso- lated

10/100 Mbps, RJ45

#### RS232

9-pin, DE9: DCE port for optional GSM/GPRS modem connection  
Baud Rates: selectable from 9600 bps to 115.2 kbps  
Default Format: 8 data bits; 1 stop bits; no parity

#### USB

USB 2.0 pen drive only (FAT 32), 5 V 200 mA

#### RS485#1 Opto-Isolated

Connection: 5 screw clamp port for max. No.254 Modbus RS485 digital bus sensors  
Communication Interface: RS485  
Communication Protocol: MODBUS RTU  
Voltage 'V OUT': Switched on and off under program control. V OUT is the unregulated input power supply 'V IN' (1 A).  
Power supply management: Always on or energy safe

### SOFTWARE & FIRMWARE

- Web server on board (independent OS platform)
- Acquisition Time Interval: selectable from 1 second up to 1 week (depends on the number of channels acquired)
- FTP client to send data/alarms on an FTP server (SFTP not supported)
- MAIL to send data/alarms to max 5 email address (SMTPS / SSL not supported)
- SMS to send alarms to max 5 telephone numbers
- Data download (readings, logs) in .csv file (compatible with Microsoft Excel)
- Virtual channels management
- Languages: Italian, English and French

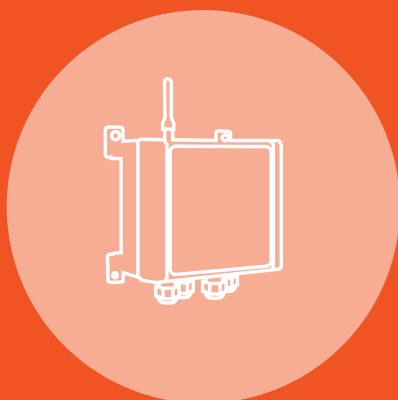
### SYSTEM POWER REQUIREMENTS

<b>Voltage (External Power Supply)</b>	10 to 30 Vdc (reverse polarity protected)
<b>External Rechargeable Batteries</b>	12 Vdc nominal
<b>Typical Current Drain (@12 Vdc, External Power Supply)</b>	Sleep Mode(MAX): 315 $\mu$ A ON: 62 mA - ON with ethernet connected: 87 mA - ON with display ON: 115 mA ON with display ON and ethernet connected: 142 mA
<b>Analog Initialization</b>	115 mA
<b>Measurement</b>	123 mA (with 12 mA @ 24 V sensor consumption)

### ENVIROMENTAL CONDITIONS

<b>Operating Temperature</b>	-30 to 70°C (display -20 to 70°C)
<b>Storage Temperature</b>	-40 to 85°C (display -30 to 80°C)
<b>Relative Humidity</b>	80 %RH
<b>Overvoltage Category</b>	II
<b>Pollution Degree</b>	2
<b>Sound Levels</b>	< 74 dBA
<b>Maximum Height of Use</b>	3000 m (9800 ft)

# NI2400/NI816/NI4866 DATALOGGER



**DATALOGGERS**



**INTERNET OF THINGS  
SENSORS**



**WEB SOFTWARE**