

NI400 DATALOGGER

NI400



4 CHANNELS WIRELESS DATA LOGGER
with Embedded Web Server

DATASHEET

Rev. 18 del 13/10/2021
Redatto da R&D
Approvato da MKT



SPECIFICATIONS



- 4 differential analog channels
- Measures: mV, mA, mV/V, NTC, Thermocouple
- Vibrating Wire (it depends on the model)
- 2G/3G, LTE CAT-M / NB1*, SigFox, Lo.Ra, WiFi
- Web Server on board
- Internet Of Things Technology
- 0,05% F.S. Accuracy with mV measure
- Cloud Based Dashbord Management

PHYSICAL CHARACTERISTICS	
Weight	780 grams (batteries included)
Dimensions (L x W x H)	151 x 125 x 90 mm (without cable gland and antenna)
Material	Polycarbonate
Wiring	5 screws clamp termination blocks; it clamps solid and stranded conductors up to 1,3 mm ² (16 AWG)
Calibration	Recommended every 1 year

We reserve the right to change our product without prior notice

**available from 2022*

NI400					
	SigFox	Lo.Ra	2G/3G	LTE CAT-M	NBIoT
	NI400S	NI400L	NI400G	NI400C	NI400N
2G/3G	N	N	Y	N	N
LTE CAT-M / NB1*	N	N	N	Y/N	N/Y
SigFox	Y	N	N	N	N
Lo.Ra	N	Y	N	N	N
WiFi (for logger setup)	Y	Y	Y	Y	Y
WiFi (for data sending)	N	N	N	N	N
Relay Output (30v 1A)	Y	Y	Y	Y	Y
Analog Input Number	4	4	4	4	4
Voltage	Y	Y	Y	Y	Y
Current	Y	Y	Y	Y	Y
mV/V	Y	Y	Y	Y	Y
Vibrating Wire**	Y	Y	Y	Y	Y
PT100	N	N	N	N	N
NTC	Y	Y	Y	Y	Y
Internal CJC Sensor	Y	Y	Y	Y	Y
Thermocouple	Y	Y	Y	Y	Y
Switchable Power supply (Selectable by Factory: 24V, 12V, 5V)	Y	Y	Y	Y	Y
RS485	Y	Y	Y	Y	Y
Power Supply RS485	Y	Y	Y	Y	Y
Display	7 segments	7 segments	7 segments	7 segments	7 segments
USB HOST	Y	Y	Y	Y	Y
PC Connection with USB	Y	Y	Y	Y	Y
Memory	32GB	32GB	32GB	32GB	32GB
Software Web Server	Y	Y	Y	Y	Y
Compatibility with Cloud Dashboard Management	Y	Y	Y	Y	Y
Weight (Batteries Included)	780g				

* Available from 2022

**Vibrating Wire reading is under development even if User Manual is ready for this feature.

NI400	
Case and Protection	IP67
Dimensions (L x W x H, without cable glands and antenna)	151 x 125 x 90 mm
Material	Polycarbonate
Wiring	5 screws clamp termination block up to 1,3mm ² (16AWG)
Calibration	Recommended every 1 year
Operating Voltage	7,2 to 14V DC, 12W Max

CPU AND MEMORY

Processor	ARM Cortex - M3 MCU with 1 MB Flash, 20 MHz CPU, ART Accelerator
RAM Memory	128 Kbyte internal RAM
Mass storage	SD CARD 32 GB for data (min. 5 Mega data points) and WEB pages
Clock accuracy	High precision RTC (real time clock with battery back-up)
On-board sensors	Temperature measured on the electronic board

INPUT

Analog differential inputs	<p>4 differentials channels, individually configured at factory, according to the following sensors:</p> <ul style="list-style-type: none"> - Thermocouples - Vibrating Wire + Thermistor (NTC) - Thermistor (NTC) - 4-20 mA current loop (2 wires) - 4-20 mA (3-4 wires) - Voltage (4 wires) - Wheatston bridge (6 wires, utilize No. 2 channels)
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INTERFACES

Display & Keyboard	7 segment LED display and two selection keys for the minimal local management without PC: device status, data download and FW/web pages update by USB pen drive (≤ 32GB)
USB Host	USB 2.0 full speed (Type A connector) 5V, max 500 mA, pen drive only (FAT 16 or FAT 32)
USB Device	USB 2.0 full speed (Mini B connector) 5V, max 500 mA, PC connection only

Modbus RTU sensor slave RS485	<p>5 screw clamp port for max. No.64 Modbus digitized sensors. Communication interface: RS485 Communication protocol: MODBUS RTU The voltage 'V OUT' is switched on and off from the software. V OUT is the unregulated power supply input 'V IN' (0,75 A) Power supply management (always on or energy safe)</p>
WIRELESS	
2G/3G	<p>Integrated SIM holder Extended temperature range (-40° to 85°C). Stubby antenna with SMA connector</p>
LTE CAT-M	Available from 2022
NB IoT	Available from 2022
WIFI	802.11b/g/n 16mbps
Security	WPA-WPA2 PSK
SigFox	<p>RCZ1 – 868MHz (Europe) RCZ2 – 902MHz (US, Canada and Mexico) RCZ3 – 923Mhz (Japan and Korea) RCZ4 – 920-922MHz (ANZ, Latin America and S-E Asia) 14/22 dBm</p>
Lo.Ra (LoRaWAN stack)	<p>868 MHz (Europe) at 14dBm maximum 915 MHz (North and South America, Australia and New Zealand) at 20dBm maximum 433 MHz (Europe) at 10dBm maximum 470 – 510 MHz (China) at 14dBm maximum</p>

ANALOG MEASUREMENTS

ADC	<p>24-bit (22 true bit) differential Analog-to-Digital Converters, 5SPS to 1000SPS, 0-24 Average Function, auto-calibration and auto-range</p>
Measures type and power supply	<p>Current loop (2 wires): range 0÷25 mA Power supply: 24V DC, 12V DC (up to 25 mA), external Transmitter (3-4 wires): range 0÷25mA Power supply: 24V DC, 12V DC (up to 50 mA), external Voltage (4 wires): range ±10mV, ±100mV, ±1V, ±10V Power supply: 24V DC, 12V DC, 5 V DC (up to 50 mA), external Wheatstone bridge (6 wires, with sensing, 2 channels used): range ±10mV/V Min. bridge resistance: 200 Ω Power supply: 5 V DC (up to 50 mA) Thermistor (NTC 3KΩ): range -50°C to +150°C Power supply: 0.05mA / 0.1mA</p>

Cold Junction Compensation Accuracy	$\pm 0.25^{\circ}\text{C}$ * With stable temperature conditions. Tested in climatic chamber.
Supported Thermocouples (optional)	K-J-T-R-B-E-N-S
Reading resolution	1 μA at FS 20 mA - 1 μV at FS ± 10 mV - 10 μV at FS ± 100 mV - 100 μV at FS ± 1 V - 1 mV at FS ± 10 V 0.1 $^{\circ}\text{C}$ for NTC - 0.1 Hz at FS 6000 Hz - 0.001 mV/V at FS ± 10 mV/V
Measurement accuracy	<0.05% F.S. with m/V measure (0,1% F.S. for NTC) - with Standard Measurement
Temperature drift	< 10ppm/ $^{\circ}\text{C}$, range -30°C to $+70^{\circ}\text{C}$
Input noise voltage	5,42 μVpp
Input limits	$\pm 12\text{V}$
DC common mode rejection	>105dB
Normal mode rejection	>90dB
Input impedance	20 M Ω typical

OUTPUT

Digital output One relay output (for alarm, etc.): volt-free closure (low voltage 30V, 1A)

PROTECTIONS

Electro-mechanical relays for each measuring channel:
 Electrical endurance: min. relays for each measuring channel: Electrical endurance: min. 2×10^5 operations
 Mechanical endurance: 100×10^6 operations.
 Circuit protection: Gas Discharge Tubes: DC Breakdown Voltage (@100v/s) 75;
 tolerance of DCBV $\pm 20\%$;
 impulse Breakdown Voltage (@100v/ μs) 250.
 impulse Breakdown Voltage (@1kv/ μs) 525.
 Short circuit protection on every outputs.

Voltage 7.2 to 14 V DC, max 12 W

External rechargeable battery 12V DC nominal

(i.e. solar panel system)

Internal non-rechargeable 6 batteries size AA, chemistry Lithium/ Iron disulfide (Life s2), nominal voltage 1.5

batteries (no external power supply)	min 2 A continuous current discharge, min 2 A pulse capability, min 3 Ah capacity
Operating time with internal batteries	<p>> 2 months with 1 acquisition every 1 hour with no.4 instruments (24V DC @12 mA @25 °C, 5 sec warm up), data transmitted via FTP/email after every acquisition, datalogger configured in "Timed mode"</p> <p>> 6 months with 1 acquisition every 1 hour with no.4 instruments (24V DC @12 mA @25 °C, 5 sec warm up), data transmitted via FTP/email once a day, datalogger configured in "Timed mode".</p> <p>> 7 months with 1 acquisition every 1 hour with no.4 instruments (24V DC @12 mA @25 °C, 5 sec warm up), no data transmission, datalogger configured in "Timed mode".</p>
Typical current drain (@9 V)	<p>Sleep mode: 60µA</p> <p>On: 10 mA</p> <p>On with display on: 40 mA</p> <p>Analog initialisation: 27 mA</p> <p>Measurement: 70 mA (with 12 mA @ 24 V sensor consumption)</p> <p>On with GPRS module: 104 mA (typically), 350 mA peak</p>

ENVIRONMENTAL CONDITIONS

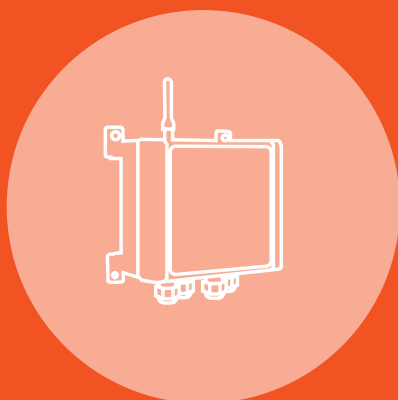
Operating temperature	-30 to +70°C (batteries -20 to +60°C)
Storage temperature	-40 to +85°C (batteries 0 to +40°C)
Protection	IP67
Humidity	80%

SOFTWARE & FIRMWARE

- Web server on board (independent OS platform)
- Live update (firmware)
- Data download (readings, logs) in .csv file (compatible with Microsoft Excel)
- Virtual channels management
- Languages: Italian, English and French
- FTP* client to send data/alarms on a 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

* only for 2G/3G/4G (CAT-M) models

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**INTERNET OF THINGS
SENSORS**



ARTIFICIAL INTELLIGENCE



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