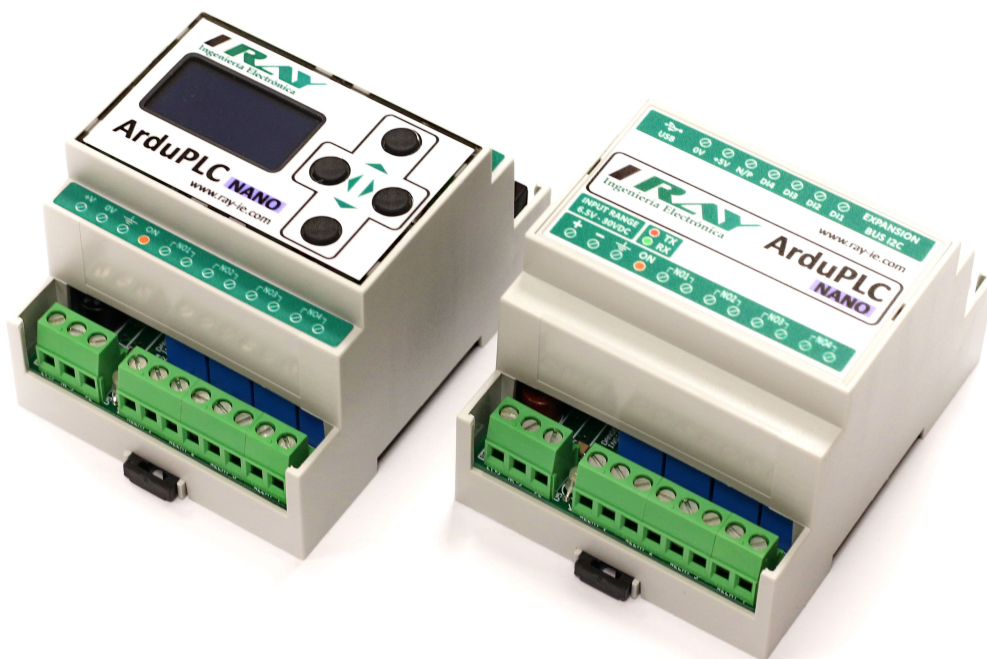


ArduPLC NANO

MANUAL



Document V1.00 – 01/12/2016



https://github.com/raymirabel/ArduPLC_NANO.git

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1. General Description

ArduPLC NANO is a microcontroller device that allows us to connect and control electrical and electronic devices directly without the need for additional components such as relays, optocouplers, etc. Basically it is an Arduino with real possibility of control.

Features:

- Compact Size - DIN rail Mount
- 24V DC Power Supply (6.5-30V DC)
- USB MINI port for programme upload.
- 4 Relays
- 4 opto-isolated digital inputs
- Auxiliary RJ12 connector for I2C expansion bus.
- RTC optional.
- Version with OLED 1.3" Screen and Function buttons

its compact size makes it very versatile for simple applications and where space plays an important role.

We offer two versions according to your type of feed:

- AC version: admissible voltage between 90VAC and 260VAC and mains frequency between 50Hz and 60Hz
- DC version: permissible voltage between 6.5VDC and 30VDC

Thanks to its USB port, it can be programmed directly from the environment or Arduino IDE.

It is recommended for distributed applications like home automation, connection with industrial PLCs, control, etc.

All inputs and outputs are accessible through robust screw terminals. ArduPLC NANO is delivered in a standard DIN rail enclosure. This makes it easier for us to mount it inside electrical panels for automation, home automation, etc.

2. Characteristics.

- *Microcontroller: Atmel ATmega32U4.*
- *4 Output Relays.*
- *4 Opto-isolated Digital Inputs 5...30VDC*
- *Programmed via Mini USB port.*
- *Optional RTC Module*
- *Version with keypad and 1.3" OLED display*
- *I2C Expansion bus via RJ12 connector.*
- *Power Supply: 6.5VDC a 30VDC*
- *Compatible with Arduino IDE.*
- *DIN Rail Mount.*

3. Microcontroller

ArduPLC NANO is based on Arduino and therefore we can use any of the Arduino development environments to program our device.

The equivalence between the ArduPLC NANO and Arduino I / Os are as follows:

Function	IO Pin
RELAY 1	4
RELAY 2	5
RELAY 3	6
RELAY 4	7
DIGITAL INPUT DIN1	0
DIGITAL INPUT DIN2	1
DIGITAL INPUT DIN3	9
DIGITAL INPUT DIN4	10
DIGITAL BUTTON UP	11
DIGITAL BUTTON DOWN	12
DIGITAL BUTTON LEFT	13
DIGITAL BUTTON RIGHT	A0
INT RTC, DREADY	8

4. Power Supply.

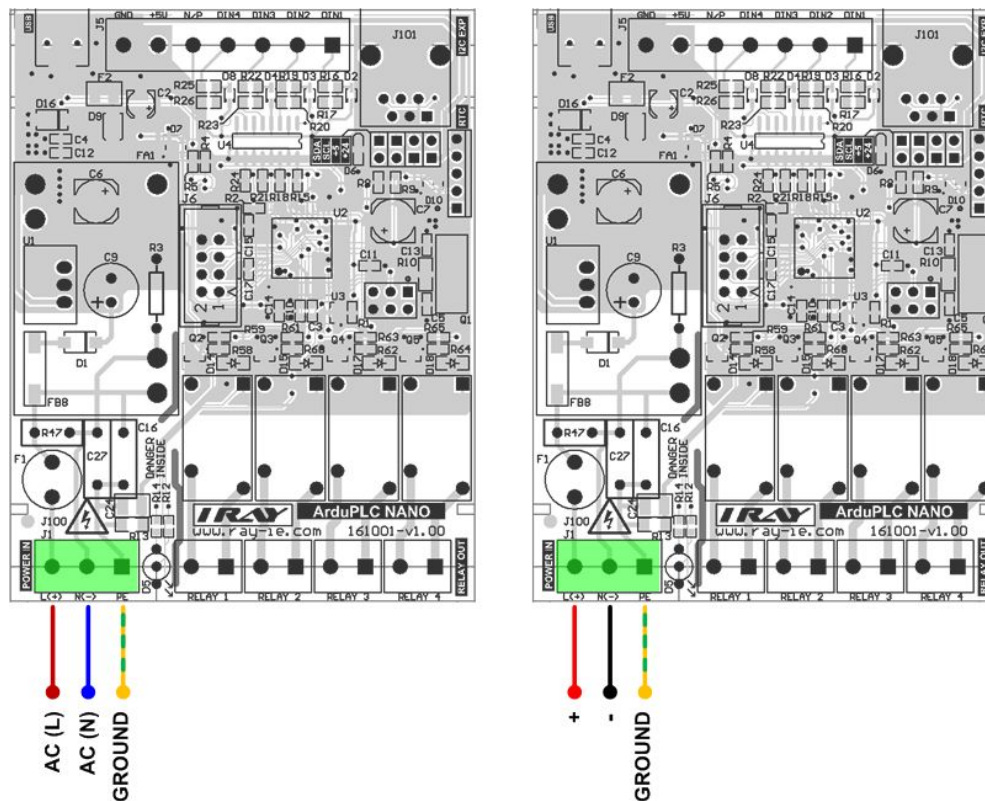
There are two versions of ArduPLC NANO according to their type of feed:

- *AC version: admissible voltage between 90VAC and 260VAC and mains frequency between 50Hz and 60Hz*
- *DC version: admissible voltage between 6.5VDC and 30VDC*

In both cases, this design, provides us with a high feeding efficiency which means low consumption and low heating.

We can also power ArduPLC NANO from the USB port itself. In this case make sure that the USB port where ArduPLC MICRO is going to connect has a current of 500mA, otherwise, maybe when activating the relays, excessive consumption of these causes a reset of the microcontroller.

The selection between external power and USB is automatic.

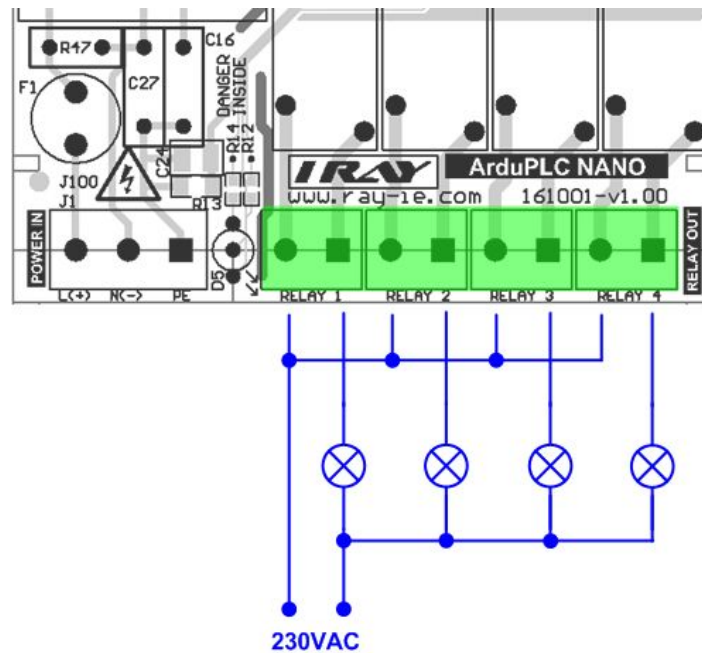


AC or DC connection depending on model

5. Output Relays.

The output relays are of the normally open type. All outputs have totally independent commons.

Example of connection to control 4 lamps:



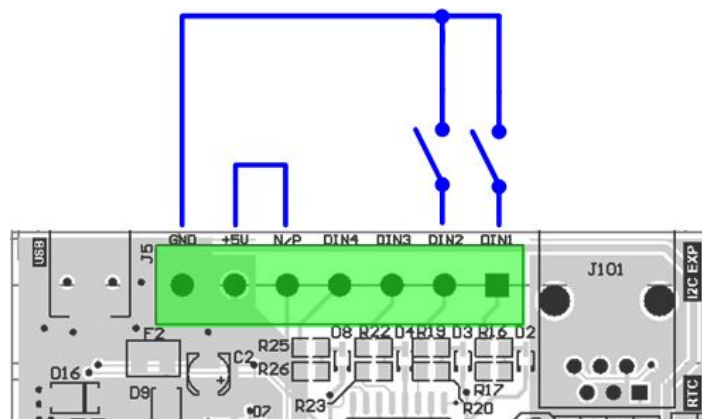
Relay Technical Characteristics:

- *Maximum Current 5A*
- *Maximum Voltage: 250VAC o 30VDC*
- *Maximum Power: 1250VA, 500W*
- *Electrical Life: 100,000 operations at 5A , 250VAC*
- *Mechanical Life: 10,000,000 operations*

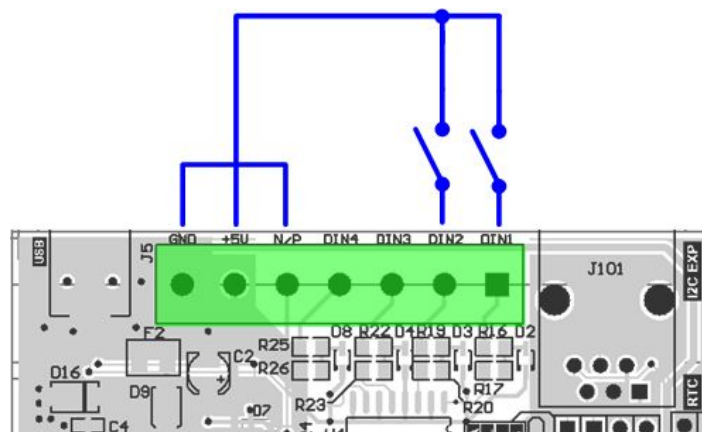
6. Digital Inputs.

The digital inputs are activated with logic levels from 5VDC to 30VDC referenced to the N / P pin. This way we can activate the entries in the COMMON POSITIVE or COMMON NEGATIVE form.

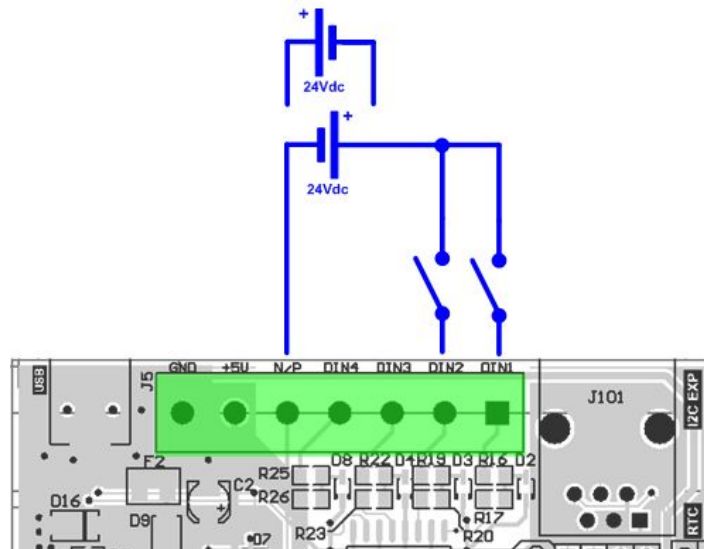
An example of connection for 2 switches in COMMON POSITIVE mode would be as follows:



COMMON NEGATIVE Connection:



Connection COMMON or COMMON POSITIVE NEGATIVE with external 24V source:

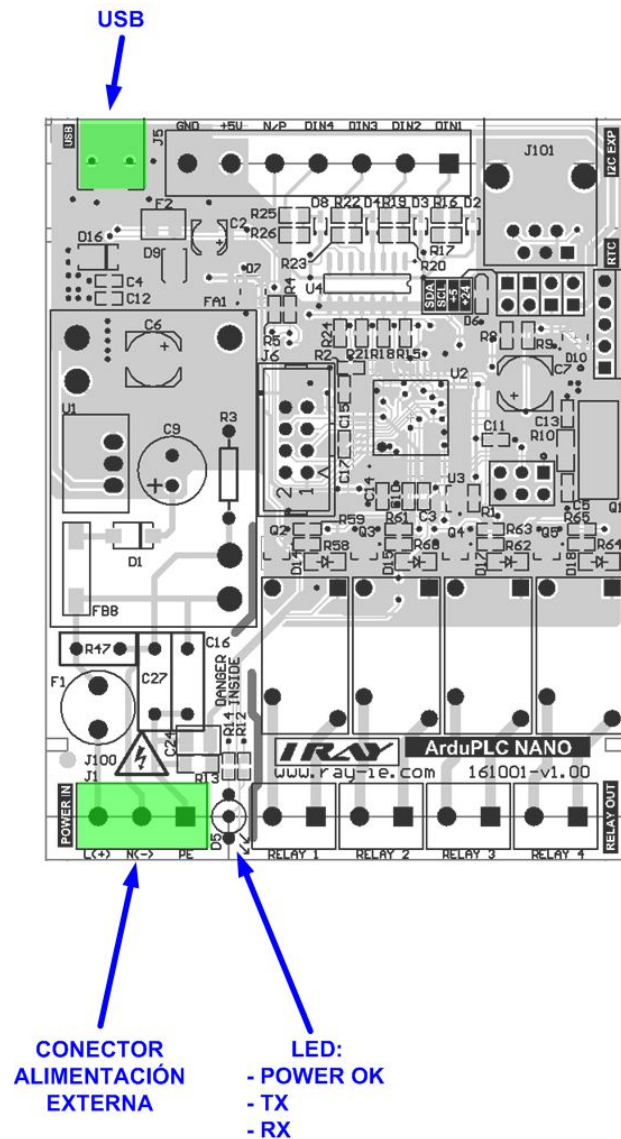


Digital Input Technical Characteristics:

- Isolation: 3Kv
- Input Range (On): 5-30VDC.
- Input Current: 5mA @ 24VDC
- Maximum frequency: 1Khz
- Auxiliary 5V Output Current (Max): 100mA

7. USB.

ArduPLC NANO has a Mini USB connected directly to the ATmega32U4 for programming purposes.



LEDs show USB activity:

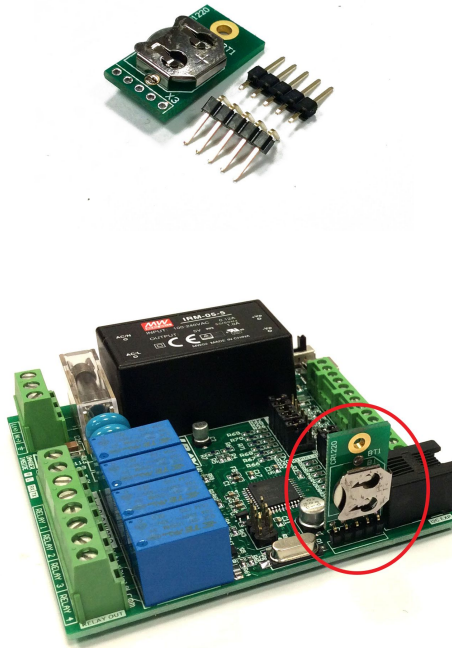
- Orange: Power OK.
- Green : Data RX
- Red: Data TX

ArduPLC NANO is delivered, by default, with bootloader loaded to program from the environment or Arduino IDE.

NOTE: Select "Arduino MICRO" board in the Arduino IDE environment.

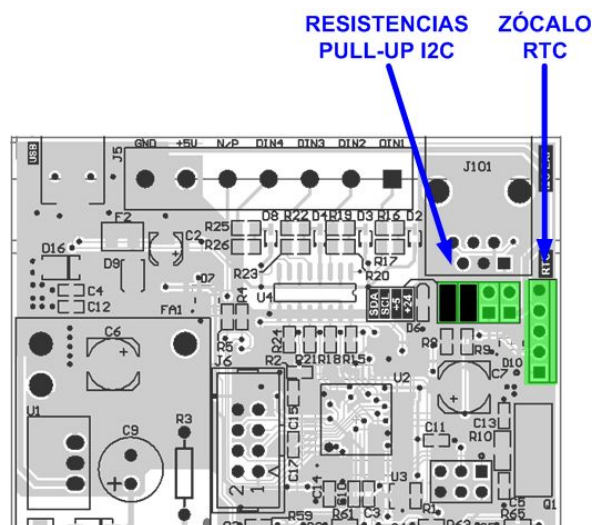
8. Socket for RTC.

You can fit an RTC module to the ArduPLC NANO. To do this, solder the RTC module as shown below:



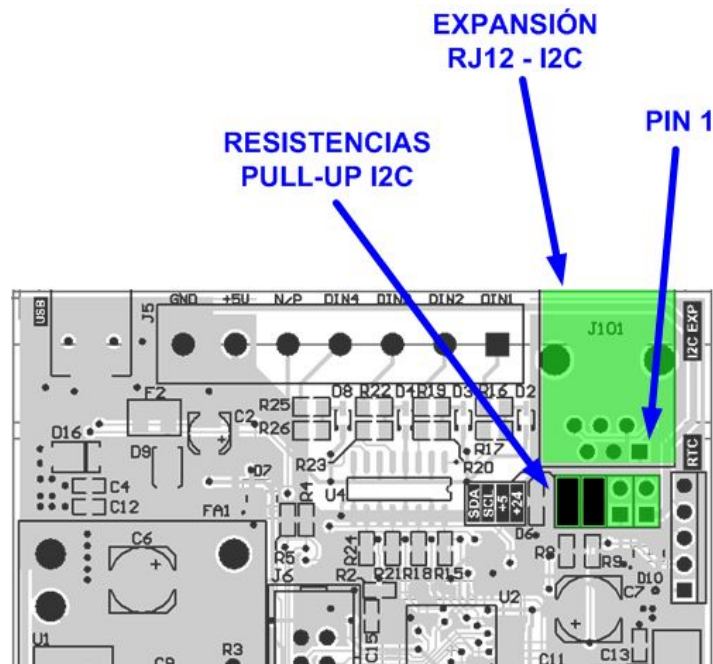
You must activate the pull-up resistors on the I2C bus for the correct operation of the RTC.

Check our website to see the RTC models available for ArduPLC NANO



9. I2C Expansion Bus via RJ12.

ArduPLC NANO facilitates the interconnection of other devices through the RJ12 expansion bus based on the I2C protocol.



In this connector we find:

- I2C bus signals.
- 5VDC and 24VDC (the later is not available in the ArduPLC NANO AC version).
- DREADY interrupt signal.

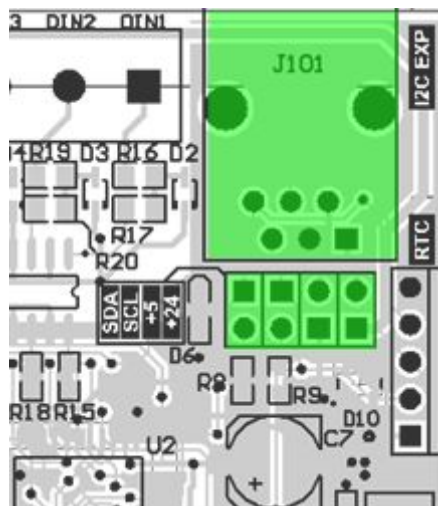
Depending on the case, you may be interested in deactivating any of these lines such as power lines so they do not have conflicts with other devices that use the I2C bus. For example, if you interconnect two modules together, one of them must have the bus power disconnected. You also have to keep in mind that there can only be

one PULL-UP resistor on the entire bus, deactivating the remaining ones.

RJ12 I2C Bus Pinouts:

PIN RJ12	Function
1	+24VDC (not available on AC model)
2	+5VDC
3	GND
4	DREADY
5	SCL
6	SDA

The connector configuration jumpers are listed below, from left to right:



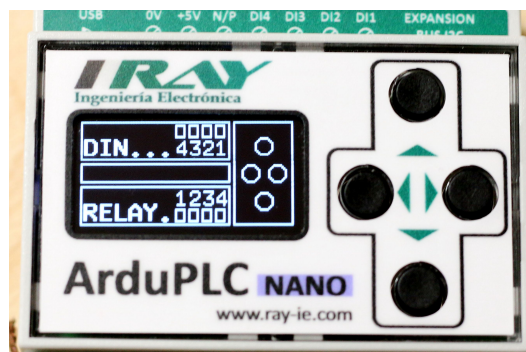
- SDA PULL-UP: on/off pull-up resistor
- SCL PULL-UP: on/off pull-up resistor
- +5ON: 5VDC power on/off.
- +24ON: 24VDC power on/off (not available on AC model)

10. Front HMI.

Optionally you can order ArduPLC NANO with the front HMI (Human-Machine Interface). This front offers us the possibility of interacting with the device thanks to the 1.3 "OLED screen and its 4 buttons.

It can easily display or modify parameters, times, menus, calendar, alarm messages, etc.

The 4 buttons are assigned to direct pins of the microcontroller (see I / O table section 3 of this manual). The screen is controlled by the I2C bus and we recommend the u8glib library



Technical Specifications.

DC Model Power Supply Range: 6.5 a 30 VDC

AC Model Power Supply Range: 90 a 260 VAC, 50-60Hz

Reverse polarity Protection (DC Model)

Surge Protection on digital inputs and USB port

Current Consumption @ 24VDC (typical): 15mA (0.4W)

Current Consumption @ 24VDC (max): 100mA (2.4W)

Current Consumption @ 230VAC (typical): 10mA (2.3W)

Current Consumption @ 230VAC (Max): 30mA (6.9W)

5V Aux Maximum current supply: 100mA

Relay Contact Current (Max): 5A

Relay Contact Voltage: 250VAC / 30VDC

Relay Maximum Power: 1250VA, 500W

Operating Temperature Range: -10 a 60 °C

Width: 70 mm

Hieght: 90 mm

Lemgth: 58 mm

Weight: 190 g.