# NC400-6 Counter

**ELECTRONIC PROGRAMMABLE COUNTER – INSTRUCTIONS MANUAL – V1.2x A**

1295 Morningside Ave Units 16, 17, & 18
Toronto ON M1B 4Z4 Canada
Telephone: 416-261-4865 Fax: 416-261-7879
www.scigiene.com

Man 5001392

## SAFETY ALARMS

The following symbols appear in the device and throughout this manual to call the user's attention as to important information related to safety and device use.

| ⚠ | ⚡ |
|---|---|
| **CAUTION:** | **CAUTION OR DANGER:** |
| Read manual carefully before installing and operating the device | Risk of electrical shocks |

All safety recommendations must be followed as to warrant the individual's safety and prevent damage to the instrument or system. If the instrument is used in another way other than that specified in this manual, the equipment safety protections may not work properly.

### Over Temperature Protection

When a system is designed, it is fundamental that one considers the consequence of any failure in any component of such system. In temperature control application, danger is even higher when heating remains constantly on. In applications where physical damage or device destruction may occur, the installation of an independent protection device is recommended, which has its own temperature sensor and can turn off the heating circuit in case of over heating. Note that the counter output relays of NC400-6 do not offer protection to all failure conditions.

## INTRODUCTION

NC400-6 is an advanced 6-digit counter that also performs batch and totalizer counting operations. It has two outputs with independent and configurable presets that can be triggered based on counting, batch or totalization values. Its 2 outputs allow for an independent timed triggering.

The counting input can be configured to read dry-contact, voltage pulse, NPN our PNP sensor connections. Sensors may be powered by an internal power supply.

Counting mode can be configured as progressive, regressive, quadrature, ADD or SUB. Several reset modes — automatic or manual — can be configured. Manual reset can be generated by a digital input or key from the front panel.

## DESCRIPTION

The NC400-6 counter and its configuration parameters are divided in the following blocks:

| | |
|---|---|
| • Inputs | • Totalizador counter |
| • Main counter | • OUT1 |
| • Batch counter | • OUT2 |

Each of these blocks has its own set of configuration parameters, which together determine how the device works. A summary of the operation of each block is presented below as well as their parameters.

### INPUTS

NC400-6 has three inputs that can be configured to read contacts, NPN sensors, PNP sensors or voltage pulse connections. All inputs must receive the same type of input signal. Functions of each input are:

COUNT1:     Main counting input

HOLD/COUNT2: Input to hold counting or second counting input. The second counting input is required when the NC400-6 counter increases or decreases actions are determined by an external signal (quadrature signals, for example).

RESET:     Input for external *reset* of counters and/or outputs.

The following configuration parameters are directly related to the operation of inputs:

| | | |
|---|---|---|
| **SEnS.tY** | ➜ | Selection of type of signal (contact, pulse, NPN, PNP). |
| **Coun.tY** | ➜ | Selection of counting speed (slow or fast). |
| **Coun.UP** | ➜ | Progressive or regressive counting choice and use of COUNT2 input. |

### MAIN COUNTER

It counts pulses from inputs, showing the value in the display after multiplying it by a configurable scaling factor. Manual or automatic reset. Two Set points can be defined (presets); when they are reached they produce configurable actions (enable output, increment batch counter, reset counter etc.) The following configuration parameters are directly related to the main counter operation.

| | | |
|---|---|---|
| **FActor** | ➜ | Factor that multiplies the number of input pulses (**0.00001** to **9.99999**). |
| **SP1 C** | ➜ | Set point 1 for the main counter. |
| **SP2 C** | ➜ | Set point 2 for the main counter. |
| **OPt.SP.C** | ➜ | Condition for Set point 1 reached (main counter higher or lower than Set point 1). |
| **OFF.C** | ➜ | Initial value (*Offset*) for main counter. |
| **rES.C** | ➜ | *Reset* options in the main counter (input, key, Set point, output, etc.). |

## BATCH COUNTER

Counts the number of times that Set point 2 for the main counter was reached, with manual or automatic reset. When its Set point is exceeded (greater than or equals to) results in configurable actions (enable output or increment totalizer counter). It is always a progressive counter. The following configuration parameters are directly related to the batch counter operation.

| | | |
|---|---|---|
| **SP bAt** | ➜ | Batch counter Set point. |
| **OFF.bAt** | ➜ | Initial value (*Offset*) for the batch counter. |
| **rES.bAt** | ➜ | *Reset* options for the batch counter (input, key, Set point, output, etc.). |

## TOTALIZER COUNTER

Totalizes the main counter or the number of times that the batch counter Set point was reached, with manual or automatic reset. When its Set point is reached (greater than or equals to) it can activate an output. The following configuration parameters are directly related to the totalizer operation.

| | | |
|---|---|---|
| **Opt.tot** | ➜ | Totalizer counting option (input pulse or batch) |
| **SP tot** | ➜ | Totalizer Set point. |
| **OFF.t** | ➜ | Initial value (*Offset*) for the totalizer. |
| **rES.tot** | ➜ | *Reset* options for the totalizer (input, key, Set point, output, etc.). |

## OUT1

This output is always associated to the main counter, and it is **activated when Set point 1 is reached**, and disabled with time, reset, Set point 1 or when OUT2 is enabled. The following configuration parameters are directly related to the OUT1 operation.

| | | |
|---|---|---|
| **Out1.t** | ➜ | Time to deactivate OUT1 (**0.00** to **9999.99** s). |
| **Out1.E** | ➜ | Turn-off options of OUT1 (time, OUT2, *reset*, Set point 2). |
| **Out1.OP** | ➜ | Freeze counting while OUT1 is activated (yes, no). |
| **Out1.c** | ➜ | OUT1 normal state open or closed. |

## OUT2

This output can be activated by Set point 2 of the main counter, by the batch counter Set point or by the totalizer Set point. It can be deactivated by time, reset, activation of OUT1 or Set point that activated it. The following configuration parameters are directly related to the OUT2 operation.

| | | |
|---|---|---|
| **Out2.SE** | ➜ | OUT2 activation options (Set point 2, batches or totalizer). |
| **Out2.t** | ➜ | Time to deactivate OUT2 (**0.00** to **9999.99** s). |
| **Out2.E** | ➜ | Turn-off options of OUT2 (time, OUT1, *reset*). |
| **Out2.OP** | ➜ | Freeze counting while OUT2 is activated (yes, no). |
| **Out2.c** | ➜ | OUT2 normal mode open or closed. |

## BLOCK DIAGRAM

**Figure 1** illustrates associations among features and resources of NC400-6:
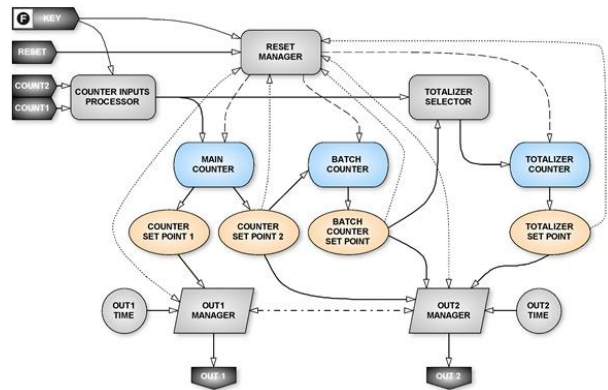


**Figure 1** – Diagram with features and resoucers of NC400-6

## COUNTING MODES

The **Coun.tY** parameter selects the counting mode as slow or fast. In the slow counting mode, a filter is applied to the counting signals, limiting the maximum pulse frequency, which is necessary to count the number of activations of electromechanical contacts. In the fast counting mode, NC400-6 operates up to the maximum frequency specified for the input signal. The frequency limits for each mode are defined in *Item 5*.

The **Coun.UP** parameter defines the main counting direction (UP or DOWN) and the function of each input. **Table 1** shows options for this parameter.

| Code | COUNT2/HOLD Input | COUNT1 Input | Main direction |
|---|---|---|---|
| **0** | HOLD | SUB | DOWN |
| **1** | HOLD | ADD | UP |
| **4** | SUB | SUB | DOWN |
| **5** | SUB | ADD | UP |
| **6** | ADD | SUB | DOWN |
| **7** | ADD | ADD | UP |
| **8** | Select ADD | SUB or ADD | DOWN |
| **9** | Select SUB | ADD or SUB | UP |
| **12** | QUADRATURE | | DOWN |
| **13** | QUADRATURE | | UP |
| **14** | QUADRATURE 2x | | DOWN |
| **15** | QUADRATURE 2x | | UP |

**Table 1** – Counting modes that can be selected with the **Coun.UP** parameter.

The main counting direction affects the main counter:

Main direction UP: Main counter count upstream, starting from the Offset value defined (usually zero). Actions can be programmed to take place in Set point 1 and 2 values.

Main direction DOWN: The main counter count downstream, starting from the Set point 2 value (**SP2C**). The action programmed for this Set point will take place when the counter reaches the programmed Offset value.

The totalizer direction is always up.

| ⚠ | Operation descriptions in this manual consider that the NC400-6 counter is operating in the UP direction. To operate in DOWN direction, refer to the explanation above. |
|---|---|

You can select functions for COUNT1 and COUNT2/HOLD inputs:

ADD: Progressive counting input.

SUB: Regressive counting input.

HOLD: Stops the counting input for COUNT1.

Select ADD/SUB: COUNT2 input defines if COUNT1 input is progressive or regressive.

QUADRATURE: Bidirectional counting mode that uses two counting inputs to determine if counting is progressive or regressive. In this counting mode, the **Coun.tY** parameter is ignored and the counting mode is always fast.

QUADRATURE 2X: The same as the QUADRATURE mode, but it counts twice as fast, increasing resolution. In this counting mode, the **Coun.tY** parameter is ignored and the counting mode is always fast.

The counter is incremented or decremented whenever the voltage level in the counting inputs increases (rising edge) except in the fast counting mode (**Coun.tY** = **1**) in COUNT1 input.

The most representative counting modes are shown in **Figures 2** to **5**. Low and High levels in the following figures correspond to voltage levels in these inputs with PNP sensor or Voltage pulse. For the case of NPN sensors or dry contact, signals will be reversed.
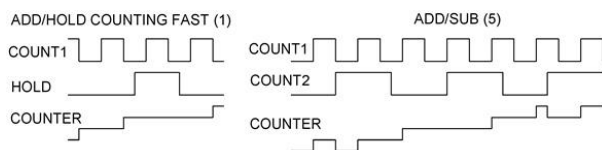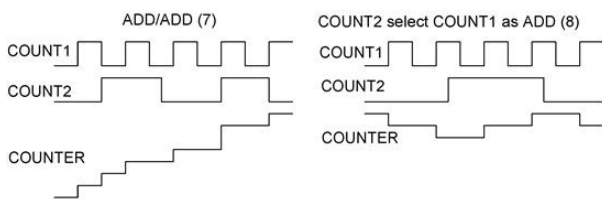


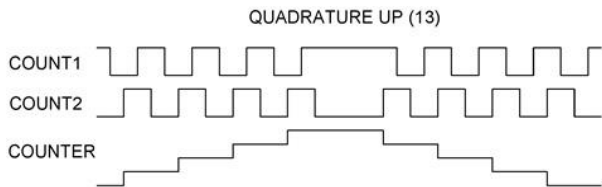**Figure 2** – Counting modes 1 and 5



**Figure 3** – Counting modes 7 and 8



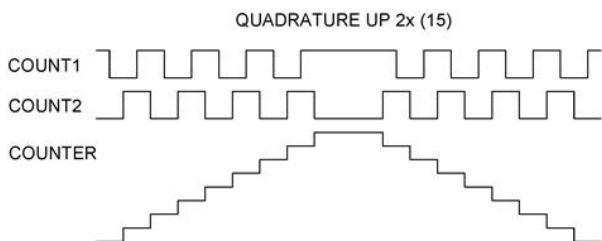**Figure 4** – Counting mode 13 (quadrature)



**Figure 5** – Counting mode 15 (quadrature 2x)

### SERIAL COMUNICATION (OPTIONAL)

Optionally, NC400-6 can be deliverd with an assynchronous master-slave serial communication interface RS-485 to communicate with a supervisor computer (master). The counter is always the slave. Communication always start with the master, which sends a command to the slave address with whom it wants to communicate. The addressed slave undertakes the command and sends the response to the master. NC400-6 also accepts *broadcast* commands.

### FEATURES

- Signals compliant with the RS-485 standard. MODBUS (RTU) protocol. 2 wire connection between 1 master and up to 31 (able to address up to 247) instruments in bus topology. Communication signals are electrically isolated from the rest of the device;

- Maximum connection distance: 1000 meters;

- NC400-6 disconnection time: Maximum 2 ms after the last byte;

- Fixed communication speed (*Baud Rate*): 9600 bps;

- Number of data bits: 8, no parity. Number of *stop* bits: 1;

- Transmission onset and response time: maximum of 100 ms after command.

RS-485 signals are:

| D1 | D | D + | B | Bidirectional data line. | Terminal 16 |
|----|---|-----|---|--------------------------|-------------|
| D0 | $\bar{D}$ | D - | A | Reserved bidirectional data line. | Terminal 17 |
| C | | | | Optimal connection that enhances the communication performance. | Terminal 18 |
| GND | | | | | |

### CONFIGURATION OF SERIAL COMMUNICATION PARAMATERS

Parameter that must be configured when the serial communication used:

**Addres** ➔ NC400-6 counter communication adress.

### OVERFLOW AND UNDERFLOW

If the counter is at **0** and it receives a pulse to decrement, the counter will show **999.999** and turn the OVFL flag on. This means that the counter rolls to **999.999**. If it increments beyond this, it will roll back to **0**, clearing OVFL flag.

On a similar way, when the counter is at **999.999** and it is increased, it will roll to **0** and turn the OVFL flag on. When it decreases again below **0**, it will turn the flag off and roll back to **999.999**.

**Note**: The setpoints and output control have no effect while OVFL flag is on, except those who are cleared by time.

## INSTALATION

### PANEL MOUNT

NC400-6 must be installed in a papel. To install, follow the steps below:

1. Make a panel cutout of 45.5 x 45.5 mm;
2. Remove the clips from NC400-6;
3. Insert NC400-6 in the frontal panel cutout;
4. Replace clips in NC400-6 and press them tightly to clamp the counter to the panel.

### INSTALLATION RECOMMENDATIONS

- Input signal wires must be installed in grounded conduits and away from power or contactor wires+

- Instruments must be powered only by an exclusive power supply.

- System failure should always be taken into account when designing a control panel to avoid irreversible damage to equipment or people. The output internal relay does not warrant total protection.

- Installing RC filters (47 Ohms and 100 nF, serial) is strongly recommended at contactor coils or any other inductors.

### ELECTRICAL CONNECTIONS

You can remove the internal part of the device from its case without removing connections. Signals are distributed in the rear panel as shown in **Figure 6**.
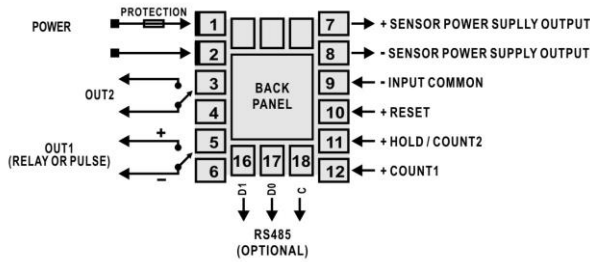
**Figure 6** – Electrical connections of NC400-6

## POWER SUPPLY - POWER

Before making the power supply connection (terminals 1 and 2), check the power voltage specified in the NC400-6 lateral identification label. It is recommended to install electrical safety devices.

| | Installation must have a switch that is able to turn off all electrical current leads. This device must be mounted close to the NC400-6, with easy operator access and identified as a device that disconnects the instrument. |
|---|---|
| | Input, output and power connections, according to **Figure 6**. |

## OUTPUTS – OUT1 / OUT2

OUT 2 (terminals 3 and 4) is always a relay. OUT1 (terminals 5 and 6) can be a relay or voltage pulse. See *Item 6 – Identification* to determinate the OUT1 type.

Connect outputs respecting the specified capacity for voltage and current. Check polarity for pulse output.

### Counting and command inputs – COUNT1 / COUNT2 / RESET

COUNT1, COUNT2 and RESET inputs accept connections of NPN or PNP sensors, dry-contact or voltage pulse. The type of signal is configured through the **SEnS.tY** parameter, and all inputs must be the same type.

**Figures 7a**, **7b a**nd **7c** illustrates connections of those signals to the COUNT1 input. The same connection scheme applies to the other inputs.
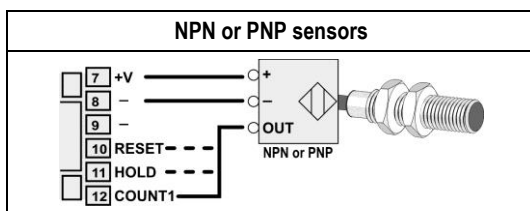


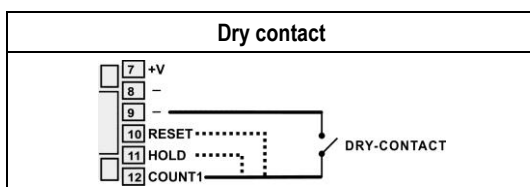**Figure 7a** – Connections to the NC400-6 inputs



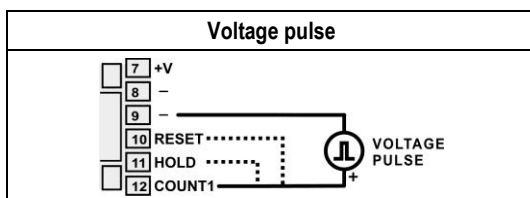**Figure 7b** – Connections to the NC400-6 inputs



**Figure 7c** – Connections to the NC400-6 inputs

## AUXILIARY SUPPLY OUTPUT

NC400-6 has an auxiliary power supply output for external sensors (terminals 7 and 8). Check polarity and current limits before connecting external devices to the auxiliary supply. Inputs 8 and 9 are internally connected (not isolated)

## CONFIGURATION

The proper operation of NC400-6 depends on the proper configuration of all parameters. Read the manual carefully and thoroughly before using the equipment.

## KEYBOARD AND DISPLAY OPERATION

All configuration operations are performed through the front panel display and keyboard. The following are the panel elements and how to operate them.

| | |
|---|---|
| | **RUN**: It is activated when the display shows the main counter value. |
| | **PM**: It is activated when the display shows the batch counter value. |
| | **TOT**: It is activated when the display shows the totalizer value. |
| | **OUT1**: It is activated whenever OUT1 is on. |
| | **OUT2**: It is activated whenever OUT2 is on. |
| | **HOLD**: It is activated whenever the counting input is on hold (because of *Hold* input activation, programmed input for key ⑤ or configuration in **Out1.OP** or **Out2.OP**). |
| **COM**: | Flashes whenever NC400-6 is exchanging data through the communication interface (optional). |
| **OVFL**: | When the display shows the value of one of the 3 counters, it means that the counter displayed is in overflow (counting over 999999 or below 0). |
| **MIN**: | When the display shows the value of the main counter or totalizer, it means that the counter displayed is with a value below the offset (**OFF.C** or **OFF.t**). |
| **MAX**: | When the display shows the value of the main counter, the batch counter or totalizer, it means that the counter displayed is with a value above **SP2C**, **SPbAt** or **SPtot**, respectively. |
| ☐P | Navigation key to access parameters. |
| ☐▲ | Key to increment NC400-6 parameters. |
| ☐▶ | Navigation key to access different digits in NC400-6. |
| ☐F | User-programmed key (see parameter **F.Func**). |

Operation and configuration parameters of NC400-6 are grouped in 4 *Cycles*:

| CYCLE | ACCESS |
|---|---|
| Count | Free |
| Set points (*presets*) | Timed. Can be password-protected |
| Configuration | Timed. Can be password-protected |
| Hardware setup | Time and password-protected |

When the device is powered, display shows the counting cycle and the main counter value. Press ☐P to switch to the batch counter and totalizer. Press ☐▶ to select the decimal point position for the main counter and totalizer (the batch counter does not use decimal points).

To access cycles with timed access, press ☐P and hold for 2 seconds, which will provide access to the following upper cycle. Press and hold to access the following upper cycles.

In any cycle you can use ☐P to go to the next parameter. Press ☐▶ to change a parameter. Press ☐▲ to increment the flashing digit and ☐▶ to go to the next digit. In screens with decimal point configuration,

it can be configured after passing through all the other digits. The parameter changed is saved in nonvolatile memory when ⒫ is pressed.

| Keys to access, change and save configuration parameters | |
|---|---|
| ⒫ To change parameters | ⒫ For 2 seconds to change cycle |
| ⓘ Blink the most significant digit | ▲ To increment the blinking digit |
| ⓘ To change the blinking digit | ⒫ To save and change parameter again |

## PASSWORD

Depending on the protection level defined in **Prot**, the **PASS** screen can be displayed before access to **Set points, Configuration or Hardware setup Cycles**. If the wrong password is informed, all parameters will be protected against changes, and could only be viewed. Insert the right password to change parameters for a cycle. Default password is **1111**, and can be changed in **Pass.C** parameter.

| ⚠ | In case you enter the wrong password 5 consecutive times, a new attempt will only be allowed after 10 minutes. |
|---|---|
| | In case you have changed or forgotten the password, see item "*Master Password*" to check how to determine a master password for your device. |

## MASTER PASSWORD

The master password allows user to define a new password for the NC400-6. It is the first four digits of the serial number.

Ex.: The master password for device with serial number **87123465** is: **8 7 1 2**

**How to use the master password:**

1- Enter the master password value at **PasS**.

2- Go to **PAS.c** parameter and enter a new password.

3- Now you can use this new password.

## COUNTING CYCLE

| 000000 RUN | Indication of MAIN COUNTER value Press ⓘ to change the decimal point position |
|---|---|
| 000000 PM | Indication of BATCH COUNTER value |
| 000000 TOT | Indication of TOTALIZER COUNTER value Press ⓘ to change the decimal point position. |

## SET POINTS CYCLE

| **SP1 C** Set Point 1 - Counter | Set point 1 value of the main counter. Values range from **0.00000** to **999999** with configurable decimal point. |
|---|---|
| **Sp2 c** Set Point 2 - Counter | Set point 2 value of the main counter. Values range from **0.00000** to **999999** with configurable decimal point. |
| **SP bat** Set Point – Batch | Batch counter Set point value. Values range from **0** to **999999**. |
| **SP tot** Set Point - Totalizer | Set point 1 value of the totalizer counter. Values range from **0.00000** to **999999** with configurable decimal point. |

## CONFIGURATION CYCLE

| **Out1.t** Out1 Time | Duration in seconds of OUT1 pulse. Configurable from **0.00** to **9999.99**s. If OUT1 is configured to turn off after a period of time (**Out1.E**) parameter) and the programmed time is **0**, OUT1 will not be enabled. |
|---|---|
| **Out2.t** Out2 Time | Duration in seconds of OUT2 pulse. Configurable from **0.00** to **9999.99**s. If OUT2 is configured to turn off after a period of time (**Out2.E** parameter) and the programmed time is **0**, OUT2 will not be enabled. |
| **Off.c** Offset - Counter | Value assigned to the main counter when it is started (*reset*). May vary from **0** to **999999**. |
| **Off.bat** Offset - Batch | Value assigned to the batch counter when it is started (*reset*). May vary from **0** to **999999**. |
| **Off.tot** Offset - Totalizer | Value assigned to the totalizer counter as soon as it is started (*reset*). May vary from **0** to **999999**. |

| **f.func** F Key Function | Function programmed to Ⓕ key. **0**: No function associated. **1**: *Hold*s input countings. Press Ⓕ once to hold the counters. Press the key again to return counting. **2**: *Reset* of counters configured to reset with Ⓕ key. Leaves *Hold* state. **3**: Output *Reset*. **4**: *Reset* of counters configured to reset with Ⓕ key. Outputs reset. Leaves *Hold* state. |
|---|---|

| **Opt.tot** Options - Totalizer | Define work modes for the totalizer. **1**: Totalizes pulses applied to the main counter **0**: Counts how many times the batch counter reached **SPbAt**. |
|---|---|

| **out1.e** Out1 – End | Condition for OUT1 to turn off. | | |
|---|---|---|---|
| | 0̶0̶0000 | **0**: | Set point 1 does not turn off OUT1. |
| | | **1**: | Turns off when (see parameter **opt.sp.c**). For example: If OUT1 was enabled when the Set point 1 value was reached in a progressive counting, OUT 1 will be disabled when the counter becomes lower than Set point 1. |
| | 00̶0000 | **0**: | Set point 2 does not affect OUT1. |
| | | **1**: | Turns off when the counter reaches Set point 2. |
| | 000̶000 | **0**: | External reset does not affect OUT1. |
| | | **1**: | Turns off at the start of na external reset pulse. |
| | | **2**: | Turns off at the end of an external reset pulse. |
| | | **3**: | Turns off at the start of an external reset pulse. |
| | 0000̶00 | **0**: | OUT2 does not affect OUT1. |
| | | **1**: | Turns off when OUT2 is turned on. |
| | | **2**: | Turns off when OUT2 is turned off. |
| | | **3**: | Turns off when OUT2 is turned on or off. |
| | 00000̶0 | **0**: | OUT1 (**out1.t**) time does not affect OUT1. |
| | | **1**: | Turns off after the time defined in OUT1 Time parameter (**out1.t**) has expired. |

| **out2.e** Out2 - End | Condition for OUT2 to turn off. | | |
|---|---|---|---|
| | 00̶0000 | **0**: | Set points do not turn off OUT2. |
| | | **1**: | Turns off when the condition that turned it on is not valid anymore (see parameter **out2.se**). |
| | 000̶000 | **0**: | External reset does not affect OUT2. |
| | | **1**: | Turns off at the start of an external reset pulse. |
| | | **2**: | Turns off at the end of an external reset pulse. |
| | | **3**: | Turns off at the start of an external reset pulse. |

| | | |
|---|---|---|
| | ▢▢▢▢☼▢ | **0**: OUT1 does not affect OUT2.<br>**1**: Turns off when OUT1 is turned on.<br>**2**: Turns off when OUT1 is turned on.<br>**3**: Turns off when OUT1 is turned on or off. |
| | ▢▢▢▢▢☼ | **0**: OUT2 (**out2.t**) time does not affect OUT2.<br>**1**: Turns off after the time in OUT2 Time parameter (**out2.t**) has expired. |

| **res.c**<br>**Res**et **C**ounter | Effect of *reset* on the main counter. | |
| | ▢☼▢▢▢▢ | **0**: OUT2 does not affect the main counter.<br>**1**: Resets when OUT2 is turned on.<br>**2**: Resets when OUT2 is turned off.<br>**3**: Resets when OUT2 is turned on or off. |
| | ▢▢▢☼▢▢ | **0**: OUT1 does not affect the main counter.<br>**1**: Resets when OUT1 is turned on.<br>**2**: Resets when OUT1 is turned off.<br>**3**: Resets when OUT1 is turned on or off. |
| | ▢▢▢▢☼▢ | **0**: 🅕 key does not affect the main counter.<br>**1**: 🅕 key resets the main counter if configured as reset. |
| | ▢▢▢▢☼▢ | **0**: Remote reset does not affect the main counter.<br>**1**: Remote reset resets the main counter. |
| | ▢▢▢▢▢☼ | **0**: Set point 2 does not affect the main counter.<br>**1**: Resets the main counter when Set point 2 is triggered. |

| **rES.bat**<br>**Res**et **Bat**ch | Effect of *reset* on the batch counter. | |
| | ▢▢☼▢▢▢ | **0**: OUT2 does not affect the batch counter.<br>**1**: Resets when OUT2 is turned on.<br>**2**: Resets when OUT2 is turned off.<br>**3**: Resets when OUT2 is turned on or off. |
| | ▢▢▢▢☼▢ | **0**: 🅕 key does not affect the batch counter.<br>**1**: 🅕 key resets the batch counter if configured as reset. |
| | ▢▢▢▢☼▢ | **0**: Remote reset does not affect the batch counter.<br>**1**: Remote reset resets the batch counter. |
| | ▢▢▢▢▢☼ | **0**: Batch Set point does not affect the batch counter.<br>**1**: Resets batch counter when Batch Set point 2 is triggered. |

| **rES.tot**<br>**Res**et **Tot**alizer | Effect of reset on the totalizer counter. | |
| | ▢▢☼▢▢▢ | **0**: OUT2 does not affect the totalizer counter.<br>**1**: Resets when OUT2 is turn on.<br>**2**: Resets when OUT2 is turn off.<br>**3**: Resets when OUT2 is turned on or off. |
| | ▢▢▢☼▢▢ | **0**: 🅕 key does not affect the totalizer counter.<br>**1**: 🅕 key resets totalizer counter if configured as reset. |
| | ▢▢▢▢☼▢ | **0**: Remote reset does not affect the totalizer counter.<br>**1**: Remote reset resets the totalizer counter. |
| | ▢▢▢▢▢☼ | **0**: Set point 2 does not affect the totalizer counter.<br>**1**: Resets totalizer counter when Totalizer Set point is triggered. |

| | |
|---|---|
| **Opt.sp.c**<br>**Opt**ion for **C**ounter **Set**point | Set point 1 reached.<br>**0**: Actions corresponding to SP1 are performed when the main counter becomes **lower** than or **equal** to SP1 value.<br>**1**: Actions corresponding to SP1 are performed when the main counter becomes **higher** than or **equal** to SP1 value. |
| **Out1.op**<br>**Out1 Op**tion | Option that determines whether counting will be frozen or not while OUT1 is triggered.<br>**0**: *Releases* counting while OUT1 is triggered.<br>**1**: *Holds* counting while OUT1 is triggered. |
| **Out2.op**<br>**Out2 Op**tion | Option that determines whether counting will be frozen or not while OUT2 is triggered.<br>**0**: *Releases* counting while OUT2 is triggered<br>**1**: *Holds* counting while OUT2 is triggered. |
| **Out2.se**<br>**Out2 Se**lector | Selects which Set point will enable OUT2.<br>**0**: Main counter Set point 2.<br>**1**: Batch counter set point.<br>**2**: Totalizer set point. |

## HARDWARE CONFIGURATION CYCLE

| | |
|---|---|
| **Pass**<br>**Pass**word | Parameter that requires a **password** to be inserted in order to enable changes on next parameters (see item "*Password*").<br>Accepts values from **0000** to **9999**. |
| **Out1.c**<br>**Out1 C**ontact | Definition of OUT1 normal mode.<br>**0**: Relay (NO - *closes* contact when triggered).<br>**1**: Relay (NC - *opens* contact when triggered). |
| **Out2.c**<br>**Out2 C**ontact | Definition of OUT2 normal mode.<br>**0**: Relay (NO - *closes* contact when triggered).<br>**1**: Relay (NF - *opens* contact when triggered). |
| **Sens.ty**<br>**Sens**or **Ty**pe | Signal polarity applied to all inputs of NC400-6, it makes possible to change hardware input settings according to signal used.<br>**0**: Sensor with open collector output *NPN* or *dry contact*.<br>**1**: Sensor with open collector output *PNP* or pulse input. |
| **coun.ty**<br>**Coun**ter **Ty**pe | It define the input signal reading mode.<br>**0**: *slow* reading speed. A filter is applied to inputs and after a pulse is acknowledged it ignores for 9 ms any following pulse in that input (it must be used in Dry Contac signals). In quadrature counting modes (**coUn.UP ≥12**) this filter is ignored.<br>**1**: *fast* reading speed. A filter is not applied to inputs. |

| **coun.up**<br>**Coun**ter **Up** | Selections of the NC400-6 counting direction.<br>**Note**: See *"Counting Modes"* for further details.<br>*Regressive* (*DOWN*) starting from Set point 2 down.<br>*Progressive* (*UP*) starting from offset.<br>For counting modes with two inputs, the COUNT2 input is used as secondary counting input. |

| Code | COUNT2/HOLD Input | COUNT1 Input | Main Direction |
|---|---|---|---|
| **0** | HOLD | SUB | DOWN |
| **1** | HOLD | ADD | UP |
| **4** | SUB | SUB | DOWN |
| **5** | SUB | ADD | UP |
| **6** | ADD | SUB | DOWN |
| **7** | ADD | ADD | UP |
| **8** | Select ADD | SUB or ADD | DOWN |
| **9** | Select SUB | ADD or SUB | UP |
| **12** | QUADRATURE | | DOWN |
| **13** | QUADRATURE | | UP |
| **14** | QUADRATURE 2x | | DOWN |
| **15** | QUADRATURE 2x | | UP |

| | |
|---|---|
| **Erase.0**<br>**Erase 0** | **0**: Does not erase zeros on the left.<br>**1**: Erases zeros on the left of the first decimal point digit. |
| **factor**<br>**Factor** | Counter conversion factor is the value by which the input pulses are multiplied. Configurable from **0.00001** to **9.99999**. Value programmed here is the increment value (or decrement) applied to main counter at every counting pulse. |

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|---|---|
| **addres**<br>Addres | NC400-6 communication address. Configurable from 1 to 247. **Only used in equipment with RS-485 communication (optional)**. |
| **Prot**<br>Protection | Defines the parameter levels that will be protected, preventing changes in parameters.<br>**1**: Only the *Hardware Configuration* level is protected (factory setting)<br>**2**: *Configuration* and *Hardware Configuration* levels are protected.<br>**3**: *Hardware Configuration*, *Configuration* and *Set points* levels are protected. |
| **Pass.c**<br>Password Change | Parameter that makes possible to change the current password. Can only be accessed if the right password was informed in **Pass** screen. Configurable from **0000** to **9999**. |
| **Ser.n.1**<br>Serial Number 1 | Shows the *four first* digits of the NC400-6 serial number. |
| **Ser.n.2**<br>Serial Number 2 | Shows the *four last* digits of the NC400-6 serial number. |

## SPECIFICATIONS

6-digit red display 12 mm-high.

Three inputs: COUNT1, COUNT2 and *Reset*.

Can be configured four NPN, PNP, dry-contact or voltage pulse

Low level: < 2 Vdc, High level: > 3 Vdc

Input Impedance: 4700 $\Omega$.

Maximum input voltage: ± 30 Vdc.

Dry-contact input polarization: 5 V / 4700 $\Omega$.

Maximum counting frequency (square wave):

- 20 kHz in COUNT1 input for **Coun.tY** = **1** and **COUNT.UP** < **12**.
- 4 kHz in COUNT2 input for **Coun.tY** = **1** and **COUNT.UP** < **12**.
- 55 Hz for **Coun.tY** = **0** and **Coun.UP** < **12**.
- 4 kHz for both inputs **Coun.UP** ≥ **12**.

Counting modes: Up, down, ADD/ADD, ADD/SUB, SUB/ADD, SUB/SUB, external selection of UP/DOWN Quadrature, Quadrature 2x..

Response time for output activation, reset and batch count: 0,5 to 5 ms.

Relay outputs: SPST 3 A @ 250 Vca.

Pulse output: 5 Vdc. Output impedance 100 $\Omega$.

Timing accuracy: 3 %.

Supply output: 12 Vdc (± 10 %) / 50 mA.

Power supply: 100 to 240 Vac/dc, 50/60 Hz; opcional 24 Vdc/ac.

Consumption: 9 VA max.

Internal battery: Lithium CR2032 4-year autonomy.

Configuration parameters hold: 10-year minimum in E2PROM memory.

Dimensions: 48 x 48 x 110 mm.

Panel cutout: 45.5 x 45.5 mm.

Material and front panel sealing: Polycarbonate UL94 V-2, IP65.

Material and case sealing: ABS+PC UL94 V-0, IP20.

Operating Temperature: 0 to 50 °C

Relative humidity: Maximum: 80 % up to 30 ºC. For temperatures 30 ºC, decrease 3 % per ºC.

Panel protection: Complies to NEMA 4X internal use; Installation II, Pollution level 2; altitude < 2000 m.

EMC: EN 61326-1:1997 and EN 61326-1/A1:1998

Safety: EN61010-1:1993 and EN61010-1/A2:1995

## IDENTIFICATION

In order to identify your model of NC400-6, check the name in the device label, as per **Table 1**.

Example:

| NC400-6 - | RR - | 485 - | 24V |
|---|---|---|---|
| **A** | **B** | **C** | **D** |

| | | |
|---|---|---|
| **A**: | Model | **NC400-6** |
| **B**: | Optional | **RR** (model with OUT1: Relay and OUT2: Relay) |
| | | **RP** (model with OUT1: Pulse and OUT2: Relay) |
| **C**: | Digital Communication | **blank** (basic version, without serial communication) |
| | | **485** (version with serial RS485, Modbus protocol) |
| **D**: | Power Supply | **blank** (basic version, with 100 to 240 Vac/dc power supply) |
| | | **24V** (version with 24 Vdc/ac power supply) |

**Table 1** – Identification of NC400-6

## WARRANTY

The manufacturer products are covered by a 12-month warranty provided the purchaser presents the sales receipt and the following conditions are met:

- Products are covered for one year from the original date of purchase.

- Within this period, warranty against defects in material and workmanship under normal use is free of charge.

- For repair, send the product and the sales receipt to our address.

- Expenses and transportation risks are under the purchaser's responsibility.

- This warranty does not cover any damage due to accident, misuse, abuse, or negligence.