# 24 Vdc 16 DI Module NX1001

## Nexto Series

Doc. Code: CE114301 Revision: D

## Product Description

- Nexto Series is a powerful and complete Programmable Logic Controller (PLC) with unique and innovative features. Due to its flexibility, smart design, enhanced diagnostics capabilities and modular architecture, Nexto can be used for control systems from medium to high-end large applications or in machinery with high performance requirements. Nexto Series has a wide range of digital I/O modules designed to fit requirements in different kinds of applications providing high-density I/O modules. The NX1001 is a digital input module designed to cover high I/O density requirements. NX1001 offers 16 isolated sink/source inputs for general purpose use and it requires only one slot of Nexto Series Backplane Rack. NX1001 has some exclusive features brought by Nexto Series like Electronic Tag on Display™, Easy Plug System™ and One Touch Diag™.


Its main features are:

- High density, with 16 inputs in single width module
- Four independent input groups which can be used as sink or source inputs
- Isolated inputs
- Display for module diagnostics and input state indication
- Easy Plug SystemTM
- One Touch DiagTM
- Electronic Tag on DisplayTM

## Ordering Information

### Included Items

The product package contains the following items:

- NX1001 module
- 20-terminals connector with wire holder
- Installation guide

### Product Code

The following code should be used to purchase the product:

| Code | Description |
|---|---|
| **NX1001** | 24 Vdc 16 DI Module |

### Related Products

The following product must be purchased separately when necessary:

| Code | Description |
|---|---|
| **NX9403** | 20-terminal connector with cable guide |

## Innovative Features

Nexto Series brings to the user several innovations in utilization, supervision and system maintenance. These features were developed focusing a new experience in industrial automation. The list below shows some new features that the user will find in NX1001 module:

**Easy Plug System ™:** Nexto Series has an exclusive method to plug and unplug I/O connectors. The entire connector can be easily removed with a single movement and with no special tools or huge effort. In order to plug the connector back to the module, close the frontal cover and the connector will be fit, ready to use.

**One Touch Diag ™:** One Touch Diag is an exclusive feature that Nexto Series brings to PLCs. With this new concept, the user can check diagnostic information of any module present in the system directly on CPU's graphic display with one single press in the diagnostic switch of the respective module. OTD is a powerful diagnostic tool that can be used offline (without supervisor or programmer), reducing maintenance and commissioning times.

**ETD – Electronic Tag on Display ™:** Another exclusive feature that Nexto Series brings to PLCs is the Electronic Tag on Display. This new functionality makes the process of checking the tag names of any I/O terminal or module used in the system directly on the CPU's graphic display. Along with this information, the user can check the description, as well. This feature is extremely useful during maintenance and troubleshooting procedures.

**IF Product Design Award 2012:** Nexto Series was the winner of iF Product Design Award 2012 in industry + skilled trades group. This award is recognized internationally as a seal of quality and excellence, considered the Oscars of the design in Europe.

## Product Features

### General Features

| | NX1001 |
|---|---|
| **Backplane rack occupation** | 1 slot |
| **Input type** | Sink or source type 1 |
| **Number of inputs** | 16 |
| **Input voltage** | 24 Vdc<br>15 to 30 Vdc for level logic 1<br>0 to 5 Vdc for level logic 0 |
| **Input impedance** | 4.18 kΩ - input 00<br>4.90 kΩ - inputs 01 to 07 and 10 to 17 |
| **Maximum input current** | 6 mA for 24 Vdc – input 00<br>5 mA for 24 Vdc – input 01 to 07 and 10 to 17 |
| **Input state indication** | Yes |
| **Input filter** | 100 µs – per hardware<br>2 ms to 255 ms - per software |
| **Input update time** | 2 ms |
| **Input state indication** | Yes |
| **One Touch Diag (OTD)** | Yes |
| **Electronic Tag on Display (ETD)** | Yes |
| **Status and diagnostic indication** | Display, web pages and CPU's internal memory |
| **Hot swap capability** | Yes |
| **Isolation**<br>**Input group to others input groups**<br>**Inputs to logic**<br>**Inputs to protective earth** ⏚<br>**Logic to protective earth** ⏚ | <br>1000 Vac / 1 minute<br><br>2500 Vac / 1 minute<br>2500 Vac / 1 minute<br>1250 Vac / 1 minute |
| **Current consumption from rack PSU** | 160 mA |
| **Maximum power dissipation** | 4 W |
| **Operating temperature** | 0 to 60 °C |
| **Storage temperature** | -25 to 75 °C |
| **Operating and storage relative humidity** | 5 to 96 %, non-condensing |
| **Conformal coating** | Yes |
| **Standards** | IEC 61131-2<br>CE, Electromagnetic Compatibility (EMC) and Low-Voltage Directive (LVD)<br>CE<br>RoHS 2002/95/EC |
| **Module dimensions (W x H x D)** | 18.00 x 114.62 x 117.46 mm |
| **Package dimensions (W x H x D)** | 25.00 x 122.00 x 147.00 mm |
| **Weight** | 200 g |
| **Weight with package** | 250 g |

**Notes**

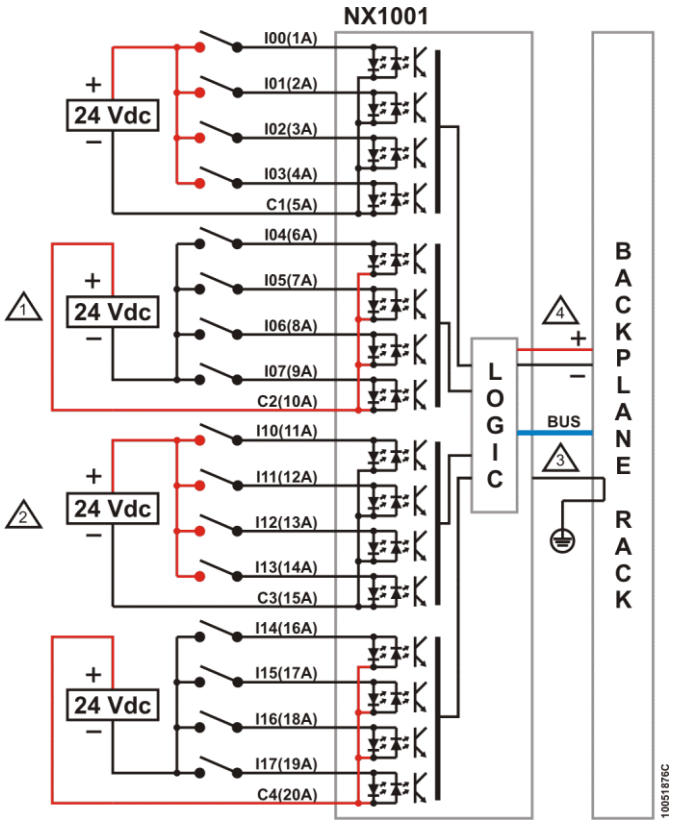
**Input Type:** NX1001's inputs are divided in four input groups: 00 to 03, 04 to 07, 10 to 13 and 14 to 17. Each group can be used as source input as well as sink inputs independently of the type used in the other groups. To use an input group as source inputs, the respective common terminal must be connected to 24 Vdc. To use an input group as sink inputs, the respective common terminal must be connected to 0 Vdc. For more information please check the section Installation in this document.

**Conformal Coating:** Conformal coating protects the electronic components inside the product from moisture, dust and other harsh elements to electronic circuits.

# Installation

## Electrical Installation

The figure below shows an example where NX1001 is used as sink or source inputs. The inputs 00 to 03 and 10 to 13 are used as sink inputs while inputs 04 to 07 and 14 to 17 are used as source inputs. Each input group is isolated.




### Diagram Notes

**1** – Typical usage of source digital inputs, C2 is the +24 Vdc common to input group I04 to I07**.**

**2** – Typical usage of sink digital inputs, C3 is the 0 Vdc common to input group I10 to I13.

**3** – The module is grounded through the Nexto Series backplane racks.

**4** – The module power supply is derived from the connection to the backplane rack, not requiring external connections.

### Connector Pinout

The following table shows the function of each connector terminal:

| Terminal Number | Description |
|---|---|
| **1** | Input 00 |
| **2** | Input 01 |
| **3** | Input 02 |
| **4** | Input 03 |
| **5** | Common for inputs 00 to 03 |
| **6** | Input 04 |
| **7** | Input 05 |
| **8** | Input 06 |
| **9** | Input 07 |
| **10** | Common for inputs 04 to 07 |
| **11** | Input 10 |
| **12** | Input 11 |
| **13** | Input 12 |
| **14** | Input 13 |
| **15** | Common for inputs 10 to 13 |
| **16** | Input 14 |
| **17** | Input 15 |
| **18** | Input 16 |
| **19** | Input 17 |
| **20** | Common for inputs 14 to 17 |

## Mechanical and Electrical Assembly

The mechanical and electrical mounting and the connector insertion and removing for single hardware width I/O modules are described at Nexto Series User Manual – MU214600.

## Compatibility with Other Products

The following table provides information regarding the compatibility of the module NX1001 and Nexto Series programming tool MasterTool IEC XE.

| **NX1001** | | | **Software Version Compatible** | |
|---|---|---|---|---|
| **Version** | **Revision** | **Feature** | **MasterTool IEC XE** | **Nexto CPU's** |
| 1.0.0.0 | AA | Mode 0 | 1.22 or higher | 1.0.0.9 or higher |
| 1.1.0.1 or higher | AB or higher | Mode 1, 2, 3, 4 | 1.29 or higher | |
| | | Hardware External Event | 1.31 or higher | 1.2.2.1 or higher |

**Notes**

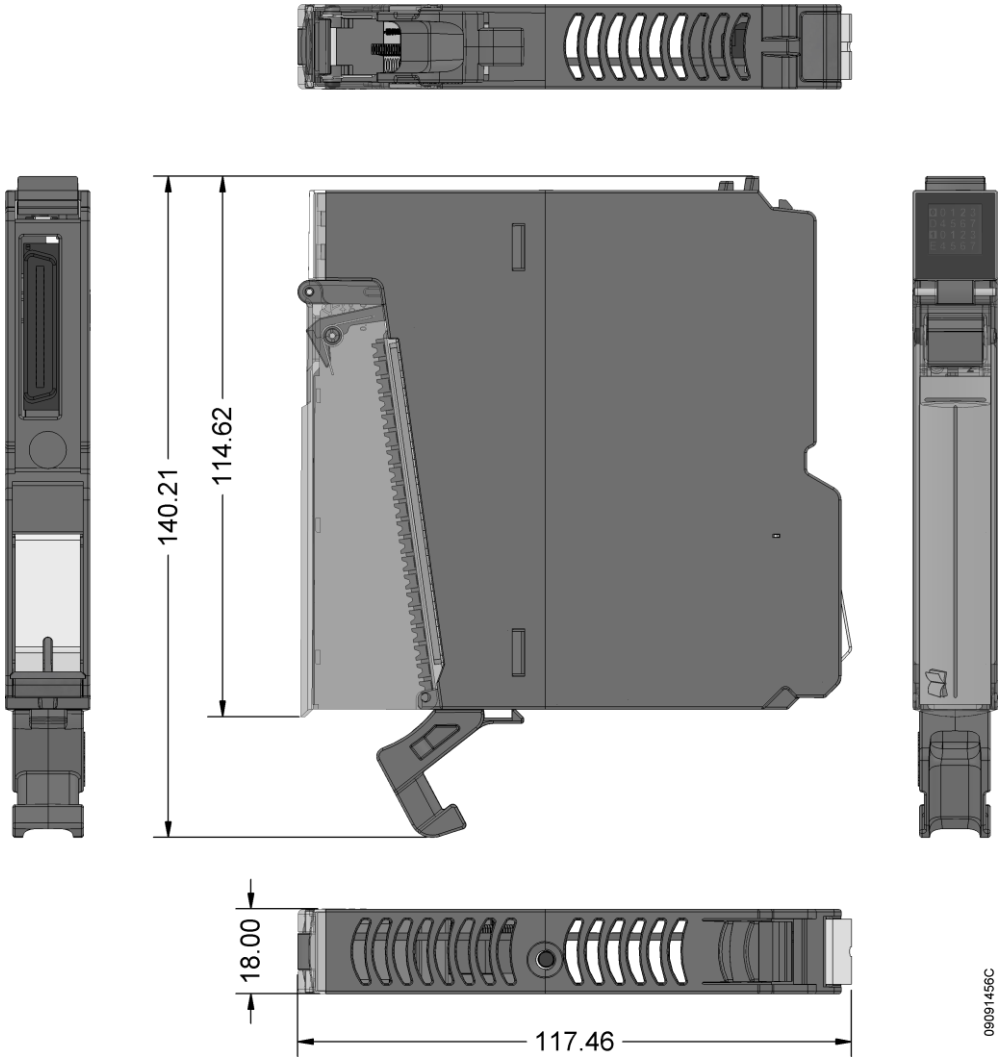
**Mode 1, 2, 3, 4:** The pulse capture, counters and period measurement features are only available from the software versions indicated in the table.

**Hardware External Event:** The hardware external event feature is available from the software versions indicated in the table. More information about Hardware External Event can be found at Nexto Series CPUs Utilization Manual – MU214605

**Product Review**: if the software is upgraded in the field the product reviewing indicated on the label will no longer match the actual review of the product.

## Physical Dimensions

Nexto Series User Manual - MU214600 should be consulted for general measurement of installation panel.
Dimensions in mm.



## Configuration

NX1001 was developed to be used with Nexto Series products. All Nexto Series products configurable in the MasterTool IEC XE. All configuration data of a given module can be accessed through a double click in the desired module on the graphical editor.

### Process Data

Process Data, when available, are the variables that are used to access and control NX1001. The list below describes all variables delivered by NX1001.

The process data of the module, when inserted in a PROFIBUS network, can be accessed through variables. The NX1001 module has two bytes to access the input data. The module NX1001 HSC is described in the table below that presents the variables organizational structure in the UCP memory.

Besides this data, NX1001 also provides a set of variables containing information related to diagnostics which are also described in this document.

| Variable | Size | Process Data | Description | Type | Update |
|---|---|---|---|---|---|
| %QB(n) | BYTE | High Speed Counter Input 00 Command | Counter commands structure of input 00 | Output (Write) | Selectable |
| %QB(n+1) | DWORD | High Speed Counter Input 00 Preset Value | Counter preset command of input 00 | Output (Write) | Selectable |
| %QB(n+5) | BYTE | High Speed Counter Input 01 Command | Counter commands structure of input 01 | Output (Write) | Selectable |
| %QB(n+6) | DWORD | High Speed Counter Input 01 Preset Value | Counter preset command of input 01 | Output (Write) | Selectable |
| %QB(n+10) | BYTE | Pulse-Catch Reset – Byte 0 | Reset command to recognize the pulse catch of inputs 00 to 07 | Output (Write) | Selectable |
| %IB(n) | BYTE | Digital Inputs Byte-0 | Input value of channel 00 to 07 | Input (Read) | Always |
| %IB(n+1) | BYTE | Digital Inputs Byte-1 | Input value of channel 10 to 07 | Input (Read) | Always |
| %IB(n+2) | BYTE | High Speed Counter Input 00 Status | Counter commands status of input 00 | Input (Read) | Selectable |
| %IB(n+3) | DWORD | High Speed Counter Input 00 Current Value | Counter value of input 00 | Input (Read) | Selectable |
| %IB(n+7) | BYTE | High Speed Counter Input 01 Status | Counter commands status of input 01 | Input (Read) | Selectable |
| %IB(n+8) | DWORD | High Speed Counter Input 01 Current Value | Counter value of input 01 | Input (Read) | Selectable |
| %IB(n+12) | DWORD | Input 02 Period | Period measurement value of input 02 | Input (Read) | Selectable |

**Notes**

**Update:** The field Update indicates if the respective process data is updated by CPU and NX1001. When defined as Always, it means that the process data is always updated. When defined as Selectable, means that the user can select if the respective process data will be updated or not. All these process data are exchanged between CPU and NX1001 through the bus, to improve CPU performance, it's recommended to update only the process data that will be used in the application.

## Module Parameters

| Name | Description | Standard value |
|---|---|---|
| Operating Mode | Sets special features configuration mode (fixed parameter) | Mode 0 |
| Input Filter Enable Mask | Enables or disables input filter feature per channel | False |
| Input Filter Time Constant | Sets input filter time constant (ms) | 7 |
| Pulse Catch Enable Mask | Enables or disables pulse catcher | False |
| Elongation Time of Pulse Catch | Sets the Elongation Time of the pulse catch | 50 |
| Period Measurement Enable Mask | Enables or disables period measurement (available only to input 02) | False |
| %Q Start Address of Module Diagnostics | Defines the start address of the module diagnostics | - |

**Notes**

**Operating Mode:** For further information, the Operating Modes section should be consulted.

**Input Filter Enable Mask:** The field can be selected by the user to enable the input filter feature in a specific channel. If the input filter is enabled in a channel, the module will reject pulses smaller than the time configured in the Input Filter Time Constant.

**Elongation Time of Pulse Catch**: This field determines the time that the pulse detected by the input module will remain active, so it is suggested that the set value in this field is always greater than the cycle time of application. The range configuration of this parameter is 0 to 255 ms.

**Input Filter Time Constant:** The field determines the time to apply in the filter and this parameter can be set from 2 to 255 ms. If enabled some different operation mode than Mode 0, this parameter is ignored for inputs related to the selected operating mode, the remaining inputs must have the same behavior of Mode 0.

### Operating Modes

NX1001 provides five operation modes, where each one has some functionality features in common and also specific features. The table below describes the available features in each operation mode:

| Operating Mode | Description |
|---|---|
| **Mode 0** | Input 00 to 07 and 10 to 17: Standard digital input |
| **Mode 1** | Input 00 to 07: Pulse catch<br>Input 00 to 07 and 10 to 17: Standard digital input (only in disabled pulse catch inputs) |
| **Mode 2** | Input 00: Counter 1, count direction defined by software<br>Input 01: Standard digital input<br>Input 02: Period measurement<br>Input 03 to 07 and 10 to 17: Standard digital input |
| **Mode 3** | Input 00: Counter 1, count direction defined by Input 01<br>Input 01: Count direction control of Counter 1<br>Input 02: Period measurement<br>Input 03 to 07 and 10 to 17: Standard digital input |
| **Mode 4** | Input 00: Counter 1, count direction defined by software<br>Input 01: Counter 2, count direction defined by software<br>Input 02: Period measurement<br>Input 03 to 07 and 10 to 17: Standard digital input |

### Mode 1: Pulse Catch

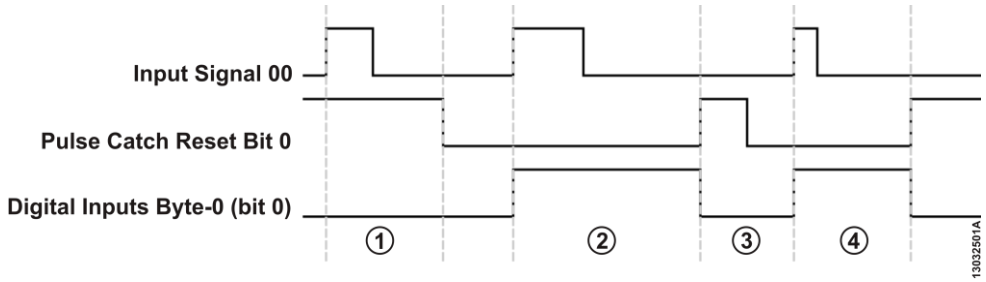
Pulse catch functionality can be configured when you select the operation mode 1, as can be seen in the table above. This feature is used to detect fast pulses, which cannot be identified during a standard scan of the application, and increase them for such a scan can detect.

The capture of the pulse can be enabled individually for each digital input via Pulse-Catch Enable Mask parameter. The inputs that are not used as pulse catch can be used as standard digital input.

The behavior of the pulse catch is associated with the identification of pulses with not less than 1 ms width, generated by field signal in the respective input enabled. When this is identified, the module indicates through the Digital Inputs Byte-0 variables setting the bit corresponding to input that is with this feature enabled. This bit will remain on for the time configured in the Pulse-Catch Elongation Time parameter. We recommend configuring in this parameter a time greater than the Interval Time of the Main Task; otherwise the standard scan may not detect this.

The command Pulse-Catch Reset has priority over the field signal, i.e., when this command is active for the corresponding input, the pulses generated by the field signal are ignored.

In order to exemplify the behavior described above, the figures below indicate the State of the field signal, Pulse-Catch Reset command and the result of this functionality in Digital Inputs Byte-0 variables.



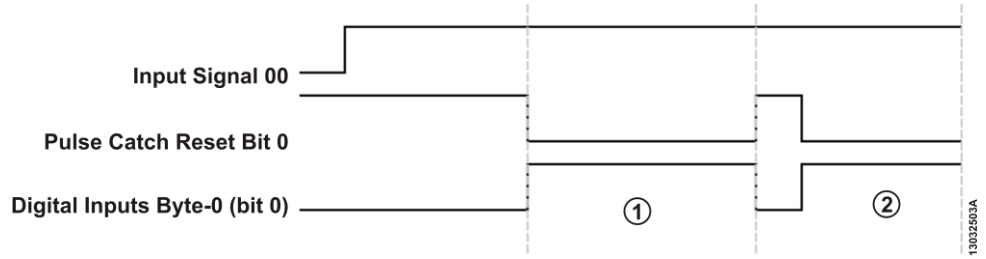

**Notes**

**1:** Pulse generated by the field signal more than 1 ms at the input 00 but with the command Pulse-Catch Reset bit 0 on, in this case the user will not identify any change in the Digital Inputs Byte-0 bit 0 variable.

**2:** Pulse generated by field signal more than 1 ms at the input 00 with Pulse-Catch Reset bit 0 command off; in this case the module sets the bit 0 of the Digital Inputs Byte-0 variable, keeping it in TRUE until the reset command. In this case the application scan interval identifies the pulse that was captured by this feature.

**3:** Displays the reset signal turning off the bit 0 of the Digital Inputs Byte-0 variable.

**4:** This case presents a pulse equal to 1 ms in field signal, which is identified by the module. In this way the bit 0 of the Digital Inputs Byte-0 variable remains on until the reset command.




**Notes**

**1 and 2:** If the field signal does not generate pulses and stay always on, the signal from the Digital Inputs Byte-0 variable will be switched on whenever there is a transition from the reset command. In this situation, the signal of Digital Inputs Byte-0 variable may only be turned on when the Pulse-Catch Reset command is off.

### *Mode 2: Counter*

The counter in operation mode 2 is able to register Input 00 count and set the count direction by up and down functions via software command, which is available in bit 0 of the High Speed Counter Input 00 Command, called Direction. The count value can be read through the variable High Speed Counter Input 00 Current Value which can assume the values defined in the count presented on the table of characteristics of the mode 2.

To stop counting, use the Stop Counter command available in the command variable. Other commands like Preset, Reset and Hold counter can also be performed. The logical state of activation of any command is logic level 1, and these will be accepted only if the counter is running or stopped (STOP).

To run a stop counting, using the command Stop Counter in the variable command. Other commands such as Preset, Reset and Hold counter can also be performed. The logical state of any command activation is logic level 1, and these will be accepted only if the meter is running or stopped mode (STOP).

If the Reset and Preset commands are sent simultaneously to the module, the Reset command is performed. The same applies to the Stop and Hold commands, but in this case the Stop command is performed.

The status bit Direction, Run and Stop modes according to the direction of the count. However, in Hold, it indicates the last known good configuration.

The status bit “Direction” – in Run and Stop modes - informs the counting direction. But in Hold mode, it indicates the last valid configuration.

The Reset and Preset status indicate when the command was successfully held. Their value resets when command bit goes to zero.

In case of counter overflow, that is, when the value of the count reaches its maximum value the count will automatically assume the minimum value.

| | **Counter Mode 2** |
|---|---|
| **Count input** | Input 00 |
| **Count range** | -2.147.483.648 to +2.147.483.647 |
| **Count direction control** | By software |
| **Maximum frequency of the count input (fc)** | 20 kHz |
| **Minimum time of count direction setting** | 10 ms |
| **Update time** | 2 ms |
| **Count input detection edge** | Rise, active on logical level 1 |

Attention:
It is recommended to use a duty-cycle of 50% for counter inputs.

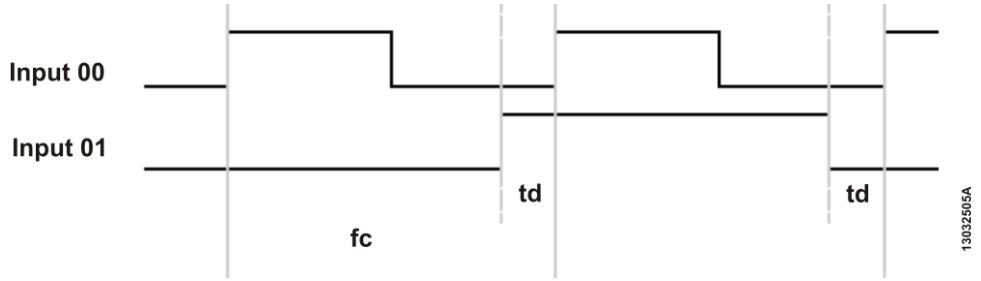
| **Process Data** | **Bit** | **Command** | **Description** |
|---|---|---|---|
| **High Speed Counter Input 00 Command** | **0** | Direction | Sets the direction of the count:<br>FALSE – count up<br>TRUE – countdown |
| | **1** | Stop Counter | Runs the counter stop<br>FALSE – running conter<br>TRUE – stops the count |
| | **2** | Hold Counter | Freezes the count value<br>FALSE – running conter<br>TRUE – freezes value in the variable HSC Input 00 Current Value, but continues to count |
| | **3** | Reset Counter | TRUE – returns the count to zero |
| | **4** | Preset Counter | TRUE – loads the counter with the value of HSC Input Preset Value |
| | **5 to 7** | Reserved | |
| **High Speed Counter Input 00 Preset Value** | **DINT** | Contains the value to be loaded into the counter | |
| **High Speed Counter Input 00 Status** | **0** | Direction | Indicates the direction of the count |
| | **1** | Stop Counter | Indicates whether the counter is stopped |
| | **2** | Hold Counter | Indicates whether the value of the counter was frozen |
| | **3** | Reset Counter | Indicates that the count returned to zero |
| | **4** | Preset Counter | Indicates that the value of HSC Input Preset Value was loaded into the counter. |
| | **5 to 7** | Reserved | |
| **High Speed Counter Input 00 Current Value** | **DINT** | Contains the value of the count | |

### Mode 3: Counter

The count mode available in operating mode 3 has the same functionality of the mode 2 with some particularities: the count direction is not configured by software but rather through the logical state of the input 01. The option “count up” is defined by the logical state 0 and countdown by logical state 1. The other commands have the same operating form of mode 2. The table below presents the general characteristics and limits in this mode.

| | **Counter Mode 3** |
|---|---|
| **Count input** | Input 00 |
| **Control input** | Input 01 |
| **Count range** | -2.147.483.648 to +2.147.483.647 |
| **Maximum frequency of the count input (fc)** | 20 kHz |
| **Maximum frequency of the control input** | 2 kHz |
| **Minimum time control input configuration** | 100 us |
| **Update time** | 2 ms |
| **Count input detection edge** | Rise, active on logical level 1 |
| **Control input detection edge** | Rise – countdown<br>Fall – count up |

The chart below shows the behavior of the counter input 00 in relation to input 01 which serves to set the count direction.




**Notes**

**fc:** Sets the maximum frequency of the count signal.

**td:** Sets the minimum time for count signal identification, and the minimum value is 100 us.

### Mode 4: Counter

The count mode available in operating mode 4 has two counters: fast count input (Input 00 counter) and count input (Input 01 counter). The commands operate in the same manner as in mode 2, whose count direction is determined by software. The table below presents the general characteristics and limits in this mode.

| | **Counter Mode 4** |
|---|---|
| **Fast count input** | Input 00 |
| **Count input** | Input 01 |
| **Count range** | -2.147.483.648 to +2.147.483.647 |
| **Maximum frequency of the fast count input** | 20 kHz |
| **Maximum frequency of the count input** | 2 kHz |
| **Minimum time count direction configuration** | 10 ms |
| **Update time** | 2 ms |
| **Fast count input detection edge** | Rise, active on logical level 1 |
| **Count input detection edge** | Rise, active on logical level 1 |

**Note**

**Update Time:** Is the time required to update a new measurement.

### Period Measurement in Modes 2, 3 and 4

The period measurement mode is available in operating modes 2, 3 and 4, at the input 02. General information and limits are presented in the table below.

| | **Period measurement** |
|---|---|
| **Measurement input** | Input 02 |
| **Minimum period / Maximum frequency** | 200 us / 5 kHz |
| **Maximum period / Minimum frequency** | 1 s / 1 Hz |
| **Sensitivity** | 1 us |
| **Precision** | < 2% of the measured value |
| **Pulses for measuring** | 4 pulses |
| **Update time** | 2 ms |
| **Detection edge** | Rise, active on logical level 1 |

**Notes**

**Pulses for Measuring:** For period measuring are necessary only four pulses on rise edge of the signal.

**Update Time:** Is the time required to update a new measurement.

If there is no signal in input 02, Input 02 Period will show the last valid value for 2s and after will show zero, if there is a signal with frequency out of range specified above, the value shown in Input 02 Period is zero.

## Module Usage

### General Purpose Input Read

NX1001 has two variables to access its inputs (Digital Inputs Byte-0 and Digital Inputs Byte-1). Both variables have eight bits where each bit represents the physical input state of a given input channel. The relationship between each bit and its respective input can be found on the Bus I/O Mapping tab.

## Maintenance

Altus recommends that all modules' connections should be checked and any dust or any kind of dirt in the module's enclosure should be removed at least every 6 months.

NX1001 offers five important features to assist users during maintenance: Electronic Tag on Display, One Touch Diag, Status and Diagnostics Indicators, Web Page with Complete Status and Diagnostics List and Status and Diagnostics Mapped to Variables.

### Electronic Tag on Display and One Touch Diag

Electronic Tag on Display and One Touch Diag are important features that provide to the user the option to check the tag, description and diagnostics related to a given module directly on the CPU display.

To check the tag and diagnostics of a given module, it's required only one short press on its diagnostic switch. After pressing once, CPU will start to scroll tag and diagnostics information of the module. To access the respective module description just long press (longer than 1 s) the diagnostic switch of the respective module. More information about Electronic Tag on Display can be found at Nexto Series CPUs Utilization Manual – MU214605.

### Status and Diagnostics Indicators

Nexto I/O modules have a display with the following symbols: D, E, 0, 1 and numerical characters. The states of the symbols D, E, 0, 1 are common for all Nexto Series modules. These states can be consulted in the table below.

The meaning of the numerical characters can be different for specific modules. In case of digital input modules, the numerical characters represent its physical state as well. When the numerical character is on, the respective input is also on, and if the numerical character is off, the respective input is also off. The relationship between the input number and its respective numerical character can be found on the following figure.

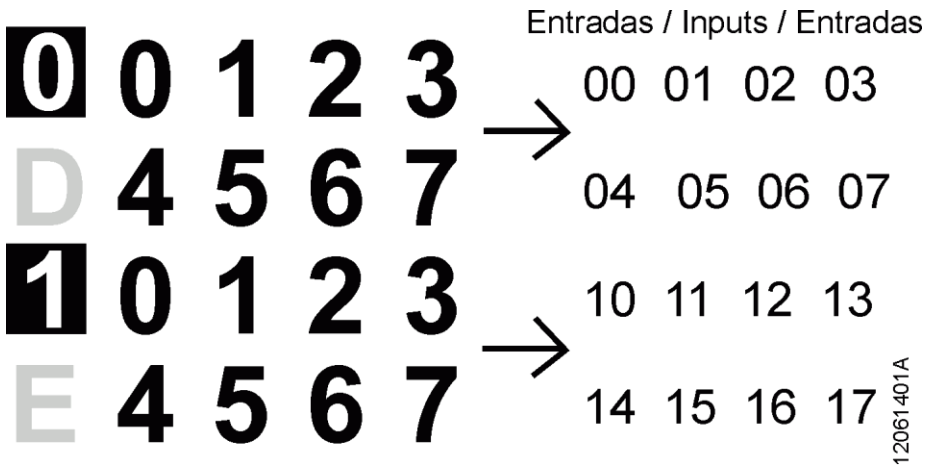
#### D and E States

| D | E | Description | Causes | Solution | Priority |
|---|---|---|---|---|---|
| Off | Off | Display fail or module off | - | Check if the module is completely connected to the backplane rack and if the backplane rack is supplied by an external power supply | - |
| On | Off | Normal use | - | - | 9 (Lower) |
| Blinking 1x | Off | Active Diagnostic | There is at least one active diagnostic related to the module NX1001 | Check what the active diagnostic is. More information can be found at Diagnostics Mapped to Variables section of this document | 8 |
| Blinking 2x | Off | CPU in STOP mode. If the module is in a Remote PROFIBUS, Master is in Clear state; | - | Check if CPU is in RUN mode or if PROFIBUS Master is in OPERATE mode. More information can be found on CPU's or PROFIBUS Master's documentation | 7 |
| Blinking 3x | Off | Reserved | - | - | 6 |
| Blinking 4x | Off | Non-Fatal Fault | Failure in some hardware or software component, which does not have impact on the | Check the module diagnostic information. If it is a hardware fault, provide the replacement of this part. If it is a software fault, please contact the Technical Support | 5 |

| | | | | | |
|---|---|---|---|---|---|
| | | | basic functionality of the product | | |
| Off | Blinking 1x | Parameterization error | NX1001 isn't parameterized or didn't receive the new parameterization | - | 4 |
| Off | Blinking 2x | Loss of master | Loss of communication between module and CPU or module and PROFIBUS head | Check if the module is completely connected to the backplane rack<br>Check if CPU is in RUN mode or if PROFIBUS head is Active. | 3 |
| Off | Blinking 3x | Reserved | - | - | 2 |
| Off | Blinking 4x | Fatal hardware fault | - | - | 1 (Higher) |

### *0, 1 and Numerical Characters*

The segments 0 and 1 are used to group the numerical characters used for the 16 inputs. The numerical characters that are placed at the right side of character 0 represent the inputs from 00 to 07, where character 0 is related to input 00 and character 7 is related to input 07. In the same way the numerical characters that are placed at the right side of character 1 represent the inputs from 10 to 17, where character 0 is related to input 10 and the character 7 is related to input 17. The figure below shows the relation between numerical characters and the respective inputs.




## *Web Page with Complete Status and Diagnostics List*

Another way to access diagnostics information on Nexto Series is via web pages. Nexto Series CPU's has an embedded web page server that provides all Nexto status and diagnostics information, which can be accessed using a browser.

More information about web page with complete status and diagnostics list can be found at Nexto Series CPUs User Manual – MU214605.

## *Diagnostics Mapped to Variables*

All NX1001's diagnostics can be accessed through variables that can be handled by the user application or even forwarded to a supervisory system using a communication channel. There are two different ways to access diagnostics in the user application: using symbolic variables with AT directive or direct representation variable. Altus recommends the use of symbolic variables. The table below shows all available diagnostics for NX1001 and their respective memory addresses, descriptions, AT variables and strings that will be shown on the CPU graphical display and web.

### *General Diagnostics*

| Direct Representation Variable | | Diagnostic Message | Symbolic Variable DG_modulename.tGeneral. | Description | PROFIBUS Message Code |
|---|---|---|---|---|---|
| **Variable** | **Bit** | | | | |
| **%QB(n)** | **0..7** | Reserved | | | |
| **%QB(n+1)** | **0** | MODULE W/ DIAGNOSTICS | bActiveDiagnostics | TRUE – Module has active diagnostics | - |
| | | NO DIAG | | FALSE – Module doesn't have active diagnostic | |
| | **1** | MODULE W/ FATAL ERROR | bFatalError | TRUE – Fatal error | 25 |
| | | - | | FALSE – No fatal error | |
| | **2** | CONFIG. MISMATCH | bConfigMismatch | TRUE – Parameterization error | 26 |
| | | - | | FALSE – Parameterization ok | |
| | **3** | WATCHDOG ERROR | bWatchdogError | TRUE – Watchdog has been detected | 27 |
| | | - | | FALSE – No watchdog | |
| | **4** | OTD SWITCH ERROR | bOTDSwitchError | TRUE – Module has diagnostic switch failure | 28 |
| | | - | | FALSE – Diagnostic switch ok | |
| | **5..7** | Reserved | | | |

**Notes**

**Direct Representation Variable:** "n" is the address defined in the field %Q Start Address of Diagnostic on the NX1001's configuration screen – Modules Parameters tab in the MasterTool IEC XE.

**Symbolic Variable:** Some symbolic variables serve to access diagnostics. These diagnostics are stored in the direct representation variable, then the AT directive is used to map the symbolic variables in the direct representation variable. The directive AT is a reserved word in the MasterTool IEC XE, that uses this directive to declares the diagnostics automatically on a symbolic variables. All symbolic variables declared automatically can be found in the Diagnostics object.

## *Hot Swap*

This product supports hot swap. For further information about how to correctly perform a hot swap, consult Nexto Series User Manual - MU214600.

## Manuals

For further technical details, configuration, installation and programming of Nexto Series the table below should be consulted.

The table below is only a guide of some relevant documents that can be useful during the use, maintenance, and programming of NX1001. The complete and updated table containing all documents of Nexto Series can be found at Nexto Series User Manual – MU214600.

| Document Code | Description | Language |
|---|---|---|
| **CE114000**<br>**CT114000**<br>**CS114000** | Nexto Series – Technical Characteristics<br>Série Nexto – Características Técnicas<br>Serie Nexto – Especificaciones y Configuraciones | English<br>Portuguese<br>Spanish |
| **MU214600**<br>**MU214000**<br>**MU214300** | Nexto Series User Manual<br>Manual de Usuário Série Nexto<br>Manual Del Usuario Serie Nexto | English<br>Portuguese<br>Spanish |
| **MU214605**<br>**MU214100**<br>**MU214305** | Nexto Series CPUs User Manual<br>Manual de Utilização UCPs Série Nexto<br>Manual del Usuario UCPs Serie Nexto | English<br>Portuguese<br>Spanish |
| **MU299609**<br>**MU299048**<br>**MU299800** | MasterTool IEC XE User Manual<br>Manual de Usuário MasterTool IEC XE<br>Manual Del Usuário MasterTool IEC XE | English<br>Portuguese<br>Spanish |