24 Vdc 16 DI Module NJ1001

Nexto Series

Doc. Code: CE114306 Revision: C

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 is suitable for control systems ranging from medium to high-end large applications. Finally, its compact size, high density of points per module and superior performance, allow Nexto Series to be applied in small automation systems with high performance requirements, such as manufacturing applications and industrial machines.

In this context, Nexto Jet is a selection of I/O modules that uses the existing CPUs and modules from Nexto Series to provide the best solution for applications in verticals like infrastructure, building, water, wastewater, food, machines and several OEM projects. Nexto Jet is ideal for systems with no hot-swapping and conformal coating requirements.

Finally, the module NJ1001 is a module that offers 16 isolated inputs of source/sink type for general use and it is a module that uses one rack position.

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
- Isolated inputs
- Display for module diagnostics and input state indication
- Removable terminal blocks with support for field wiring fixation

Ordering Information

Included Items

The product package contains the following items:

- NJ1001 module
- 20-terminals connector with wire holder

Product Code

The following code should be used to purchase the product:

Code	Description
NJ1001	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.

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

	NJ1001
Backplane rack occupation	1 slot
Input type	Sink or source type 1
Number of inputs	16 digital inputs
Input voltage	24 Vdc 15 to 30 Vdc for level logic 1 0 to 5 Vdc for level logic 0
Input impedance	4.95 kΩ
Maximum input current	6,2 mA @ 30 Vdc
Input filter	2 ms to 255 ms - per software
Transaction time	90 µs – transaction off to on @ 30 Vdc 110 µs - transaction on to off @ 30 Vdc
Input update time	1 ms
Input state indication	Yes
One Touch Diag (OTD)	No
Electronic Tag on Display (ETD)	No
Status and diagnostic indication	Display, web pages and CPU's internal memory
Hot swap capability	No
Isolation **Input group to others input groups** **Inputs to logic** **Inputs to protective earth** ⏚ **Logic to protective earth** ⏚	 1000 Vac / 1 minute 2500 Vac / 1 minute 2500 Vac / 1 minute 1500 Vac / 1 minute
Current consumption from rack PSU	160 mA
Maximum power dissipation	3,8 W
IP Level	IP 20
Operating temperature	0 to 60 °C
Storage temperature	-25 to 85 °C
Operating and storage relative humidity	5 to 96 %, non-condensing
Standards	IEC 61131-2 CE, Electromagnetic Compatibility (EMC) and Low-Voltage Directive (LVD) UL Listed (file E473496)
Module dimensions (W x H x D)	17.90 x 113.00 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: NJ1001'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.

Input filter: The usage of digital input filter is indicated for environments susceptible to high electromagnetic interference levels to the defined in the standard IEC 61131-2 or due to special features of used sensor.

Installation

Electrical Installation

The figure below shows an example where NJ1001 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.

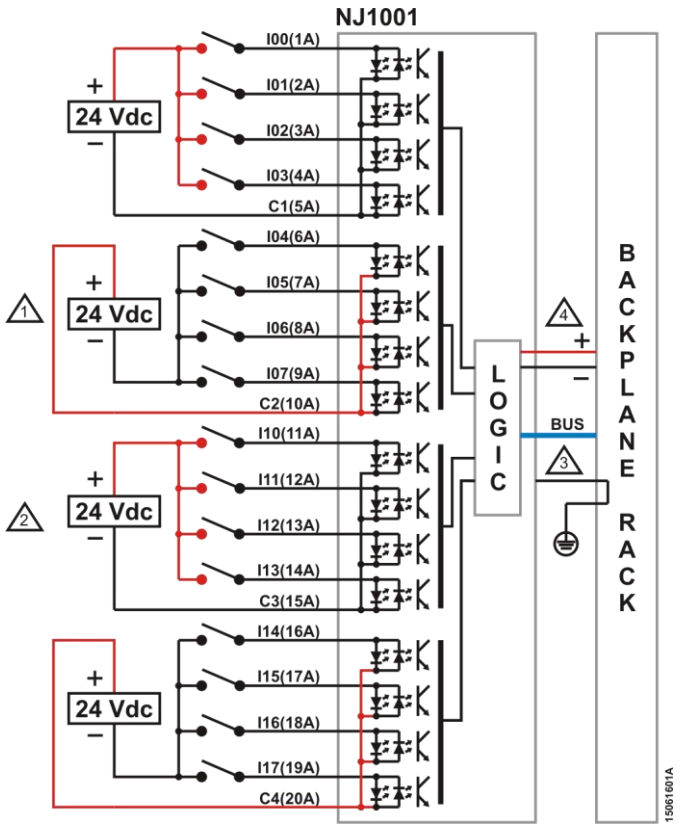


Diagram Notes:

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 NJ1001 and other Nexto Series products.

NJ1001		Software Version Compatible			
Version	**Revision**	**NX3004**	**NX3010, NX3020 and NX3030**	**NX5110**	**MasterTool IEC XE**
1.2.0.4 or higher	AA or higher	1.5.1.0 or higher	1.5.1.0 or higher	1.1.1.0 or higher	2.03 or higher

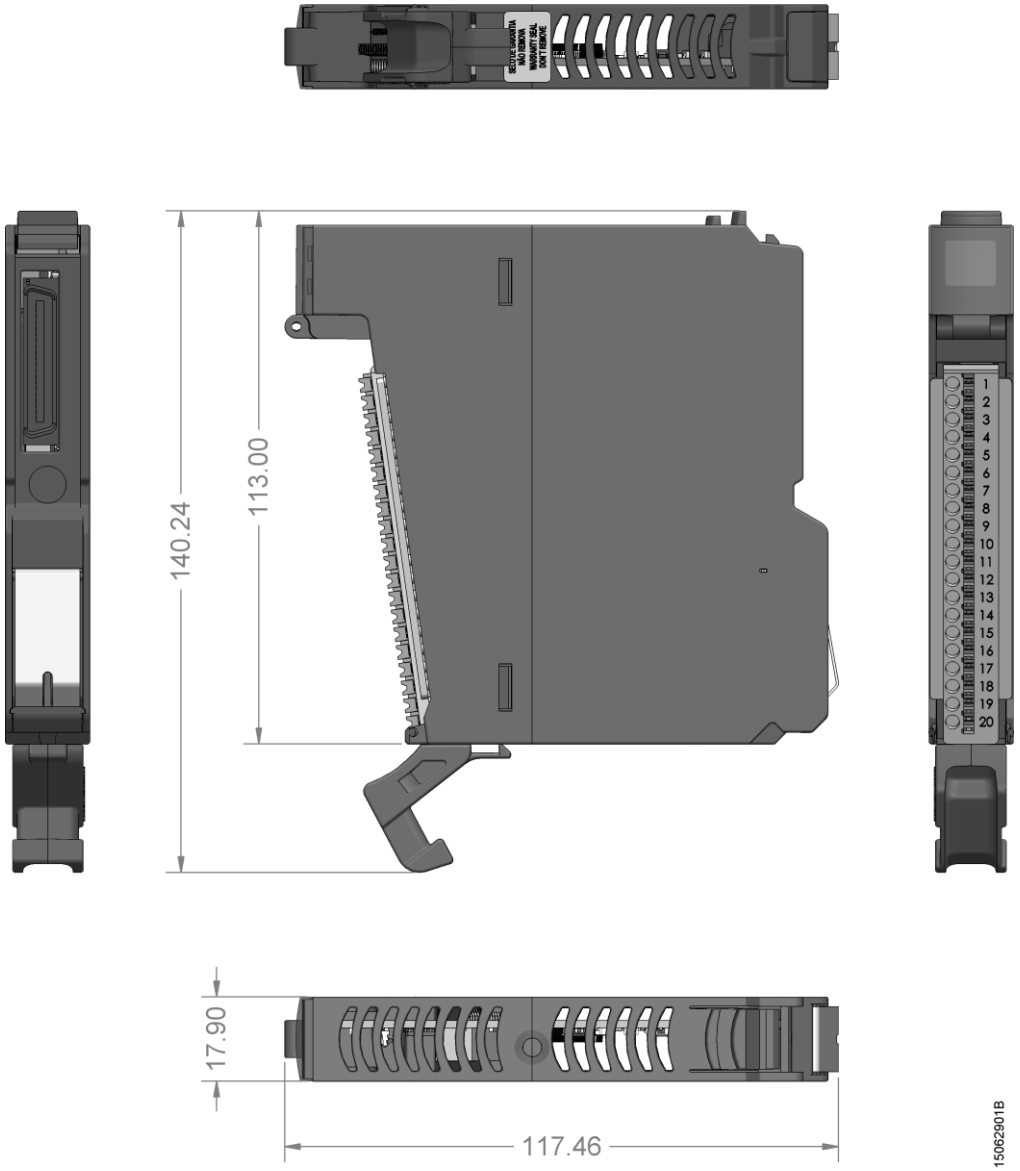
Note:

Revision: 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.

> ATTENTION:
>
> The CPUs, racks and the PROFIBUS remote head of Nexto Series support the use of Nexto Jet Modules. The Nexto Jet is formed by I/Os modules and when used in configuration with CPUs or PROFIBUS remote head of Nexto Series, no other I/O type of Nexto Series can be used in the same bus.

Physical Dimensions

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



Configuration

NJ1001 was developed to be used with Nexto Series products, which compose the Nexto Jet solution. 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 NJ1001. The list below describes all variables delivered by NJ1001.

The process data of the module, when inserted in a PROFIBUS network, can be accessed through variables. The NJ1001 module has two bytes to access the input data.

Besides this data, NJ1001 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
%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

Note:

Update: The field Update indicates if the respective process data is updated by CPU and NJ1001. 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 NJ1001 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	Options	Standard Value
Input Filter Enable Mask	Enables or disables input filter feature per channel	False True	False
Input Filter Time Constant	Sets input filter time constant (ms)		7
%Q Start Address of Module Diagnostics	Defines the start address of the module diagnostics		-

Notes:

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.

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.

Module Usage

General Purpose Input Read

NJ1001 has two variables to access its inputs (Digital Inputs Byte-0 and Digital Inputs Byte-1). Both variables have 8 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.

NJ1001 offers important features to assist users during maintenance: status and diagnostics indicators, web page with complete status and diagnostics list and status and diagnostics mapped to variables.

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.

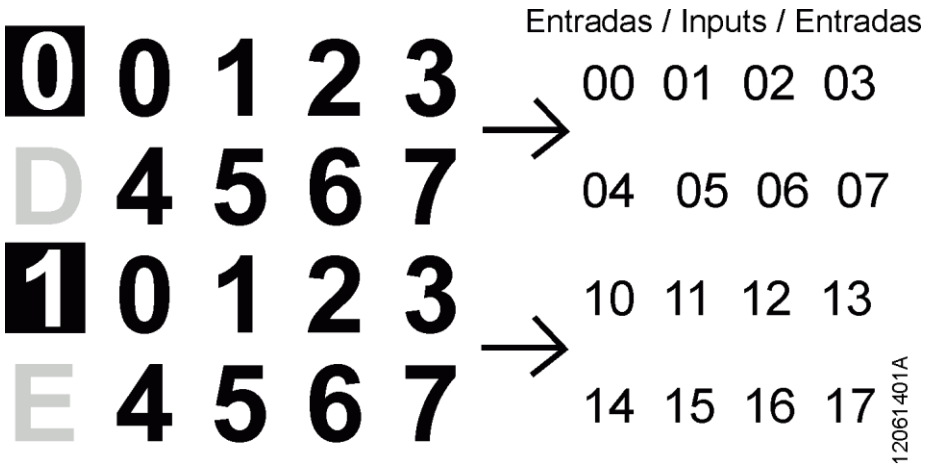
The meaning of the numerical characters can be different for specific modules. In case of digital input modules, the numerical characters represent its physical state as well. When the numerical character is on, the respective input is also on, and if the numerical character is off, the respective input 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	Module off, external power supply fail or hardware fail	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	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;	CPU in STOP mode	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 basic functionality of the product	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
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 Check if CPU is in RUN mode or if PROFIBUS head is Active.	4
Off	Blinking 3x	Reserved	-	-	3
Off	Blinking 1x	Parameterization error	The module isn't parameterized or didn't receive the parameterization	Check if the module parameterization is ok	2
Off	Blinking 4x	Fatal hardware fault	Hardware fail	In this case, the module should return to the manufacturer	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 NJ1001'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 NJ1001 and their respective memory addresses, descriptions, symbolic variables and strings that will be shown on the CPU's 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/ DIAGNOSTIC	bActiveDiagnostics	TRUE – Module has active diagnostics	-
		-		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..7	Reserved			

Notes:

Direct Representation Variable: "n" is the address defined in the field %Q Start Address of Diagnostic on the NJ1001'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 does not supports hot swap.

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 NJ1001. 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	Nexto Series – Technical Characteristics	English
CT114000	Série Nexto – Características Técnicas	Portuguese
CS114000	Serie Nexto – Especificaciones y Configuraciones	Spanish
MU214600	Nexto Series User Manual	English
MU214000	Manual de Utilização Série Nexto	Portuguese
MU214300	Manual Del Usuario Serie Nexto	Spanish
MU214605	Nexto Series CPUs User Manual	English
MU214100	Manual de Utilização UCPs Série Nexto	Portuguese
MU214305	Manual del Usuario UCPs Serie Nexto	Spanish
MU299609	MasterTool IEC XE User Manual	English
MU299048	Manual de Utilização MasterTool IEC XE	Portuguese
MU299800	Manual Del Usuário MasterTool IEC XE	Spanish
MP399609	MasterTool IEC XE Programming Manual	English
MP399048	Manual de Programação MasterTool IEC XE	Portuguese
MP399800	Manual de Programación MasterTool IEC XE	Spanish
MU214608	Nexto PROFIBUS-DP Head Utilization Manual	English
MU214108	Manual de Utilização da Cabeça PROFIBUS-DP Nexto	Portuguese
MU214308	Manual de Utilización Cabeça PROFIBUS Nexto	Spanish