24Vdc 8 DI Monitored Module

NX1006

Nexto Series

Product Description

Nexto Series is a powerful and complete Programmable Logic Controller (PLC) Series with unique and innovative features. Due to irs 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 syze, 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.

The Series has a wide variety of CPUs, I/O and communication modules with feature to fit requirements in diferente kinds of applications. The options available cover from standard automation systems, high-availability applications where redundancy is major requirement, distributed applications to functional safety systems.

The NX1006 module offers 8 monitored digital inputs, occupying only one position in the rack. Finally, the Nexto Series has some innovative features for diagnostics and maintenance such as Electronic Tag on Display, Easy Plug System and One Touch Diag.

Its main features are:
- 08 inputs in a single width module
- Self-test for damaged inputs
- Diagnosis of failure causes
- Galvanic isolation between outputs and internal logic
- Protection against surge voltage
- Open loop diagnostics
- Display for module diagnostics and output state indication
- Easy Plug System
- One Touch Diag
- Electronic Tag on Display

Ordering information

Included Items

The product package contains the following items:
- NX1006 module
- 20-terminals conector with wire holder
- Installation guide

Product Code

The following code should be used to purchase the product:

Code	Description
NX1006	24Vdc 8 DI Monitored Module

Related Products

The following product must be purchased separately when necessary:

Code	Description

NX9403	20-terminals conector with cable guides

Innovative Features

Nexto Series brings to the user many innovations regarding utilization, supervision and system maintenance. These features were developed focusing a new concept in industrial automation. The list below shows some of these features that you will find in the NX1006 module:

Easy Plug System: Nexto Series has an exclusive method to plug and unplug I/O terminal blocks. The terminal blocks can be easily removed with a single movement and with no special tools. In order to plug the terminal block back to the module, the frontal cover assists the installation procedure, fitting the terminal block to the module.

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 brings the process of checking the tag names of any I/O pin or module used in the system directly to 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

	NX1006
Backplane rack occupation	1 slot
Number of inputs	8 monitored digital inputs

Operating voltage	- Normal Operation:
	   Minimum Voltage = 5,0 Vdc
	   Maximum voltage = 11,9 Vdc
	- Fault:
	   Minimum Voltage = 0,0 Vdc
	   Maximum voltage = 2,3 Vdc
	- Alarm:
	   Minimum Voltage = 16,0 Vdc
	   Maximum voltage = 30,0 Vdc

Input Type	8 Sink inputs
Input Current	6 mA @ 24 Vdc
Input Impedance	2,1 kΩ @ 8 Vdc 1,8 kΩ @ 24 Vdc
External loop termination resistor	4,7 kΩ (± 10 %) / 1W

Input Update Time:
  Single input without test pulse
  Single Input with Test Pulse
  Multiple inputs without test pulse
  Multiple inputs with individual test pulse
  Multiple inputs with shared test pulse
	
	6 ms
	9 ms
	3 ms
	3 ms
	
	9 ms

Input status 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
Module protections	Yes, protection against voltage surges per input
Operation modes	Safe Mode, with all protections enabled Normal Mode, with protections disabled or partially enabled

Isolation (@1 minuto)
  Output to logic
  Output to protective earth ⏚
  Logic to protective earth ⏚
	
	1500 Vdc
	1500 Vdc
	1500 Vdc

Current consumption from backplane rack power supply	200 mA
External power supply	19,2 to 30 Vdc
External power supply current	50 mA @ 24 Vdc
Maximum power dissipation	3 W
IP level	IP 20
Operating temperature	0 a 60 °C
Storage temperature	-25 a 75 °C
Operating and storage relative humidity	5 to 96 %, non-condensing

Coating of electronic circuits	Yes
Standards	IEC 61131-2 CE – 2011/65/EU (RoHS), 2014/35/EU (LVD) and 2014/30/EU (EMC) ✔ RoHS
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	150 g
Weight with package	200 g
Conformal coating	Yes

Note:

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

External Power Supply: The terminals 17 to 20 are used to supply power to the outputs only. NX1006 internal logic is supplied by the Power Supply Module placed on the Nexto Backplane Rack.

Connector Pinout

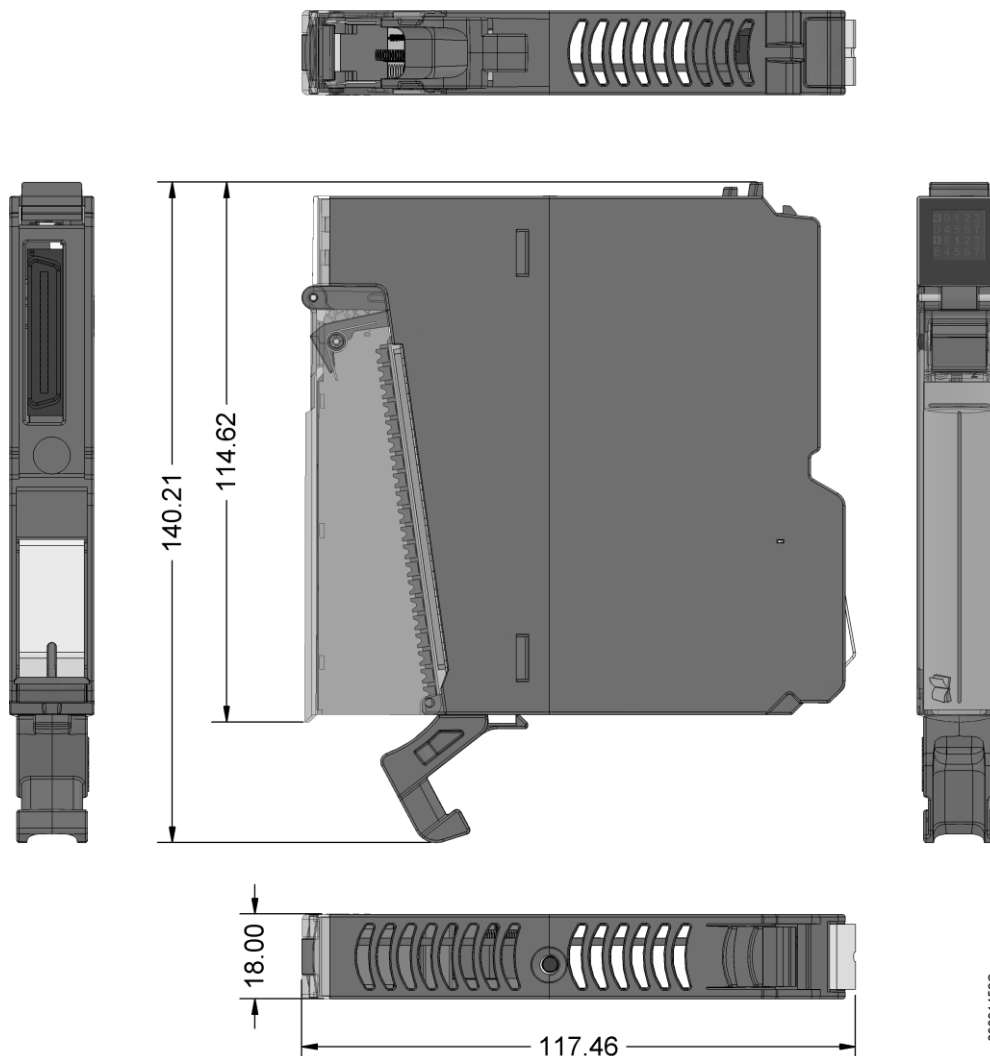The following table shows the description of each conector terminal:

Terminal Number	Description
1	Input 00
2	Pulse output 00
3	Input 01
4	Pulse output 01
5	Input 02
6	Pulse output 02
7	Input 03
8	Pulse output 03
9	Input 04
10	Pulse output 04
11	Input 05
12	Pulse output 05
13	Input 06
14	Pulse output 06
15	Input 07
16	Pulse output 07
17	0 Vdc
18	24 Vdc
19	0 Vdc
20	24 Vdc

Mechanical Assembly

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

Physical Dimensions

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

Configuration

The NX1006 was developed for use with the Nexto Series products. All Nexto Series products are configured in MasterTool IEC XE. All configuration data of a given module can be accessed through a double click in it on the Graphical Editor.

Process Data

Process Data, when available, are the variables that are used to access and control the module. The list below describes all variables delivered by NX1006.

The table below shows the organization structure of the variables in the memory of the CPU.

Besides this data, NX1006 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	Channel 00 to 07 output value	Input (Read/Write)	Always

Note:

Update: The field "Update" indicates if the respective process data is updated by CPU and NX1006 by default. When defined as "Always", it means that the process data is always updated. When defined as "Selectable", it 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 NX1006 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	Options	Configuration
Mode	How to use the output	Normal	Normal Safe	Per Intput
Self Test	Self Test to be performed when in safe mode using the pulse output	Disabled	Disabled Active	Per Intput
Self Test Time	Value to be used in time in the self test (ms)	25,5	Unit in the hundredths of microseconds.	Per Intput
%Q Start Address of Module Diagnostics Area	Defines the start address of the module diagnostics area	-	-	Per module

Notes:

Configuration: Configuration indicates if the parameter is related to the entire module (per module) or if the parameter is related to a single input (per input). In case of input wise parameters, all parameters will be repeated for each available input.

Normal Mode: It is possible to individually enable each protection and test via bits 1 to 4.

Safe Mode: All protections and tests will be automatically enabled, and the parameters set by the other enable bits will be disregarded.

Self Test: The self test generates a trigger pulse at the pulse output of the respective point for a maximum user-specified time. It is intended to diagnose faults in the module's input circuits and short circuits in the field wiring. The Self Test Time is specified in units of 0.1 ms, and can take values from 0.4 ms to 25.5 ms (numbers smaller than 0.4 will be considered as 0.4 ms). The time between single point tests is fixed at 32 s.

Module Usage

General Purpose Output Write

The NX1006 has two variables to control its inputs (Digital Inputs - Byte 0). The variable has 8 bits where each bit represents the logic state of each output 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 module connections be checked and that dust or any type of dirt on the outside of the module be removed every 6 months.

The NX1006 module offers five important features to assist the user during maintenance: Electronic Tag on Display, One Touch Diag, Status and Diagnostics Indicators, Web Page with Complete List of Status and Diagnostics, and Diagnostics via Variables.

Electronic Tag on Display e 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.

Electronic Tag on Display and One Touch Diag are easy-to-use features. To check the tag and diagnostics of a given module, it's required only one short press (shorter than 1 s) on its diagnostic switch. After pressing once, CPU will start to scroll tag information and diagnostic information of the module. To access the respective module description just long press (longer than 1 s) the diagnostics switch of the respective module.

More information about Electronic Tag on Display and One Touch Diag can be found at User Manual of each respective CPU (listed at manual of Nexto Series - MU214600).

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 I/O modules. These states can be consulted in the table below.

The meaning of the numeric characters can be different for specific modules. For analog modules, the numeric characters show the respective state of each output. When the numeric character is connected, the respective output is configured and enabled; if it is disconnected, the respective output is disabled. The relationship between the output number and its respective numerical character can be found in the following figure.
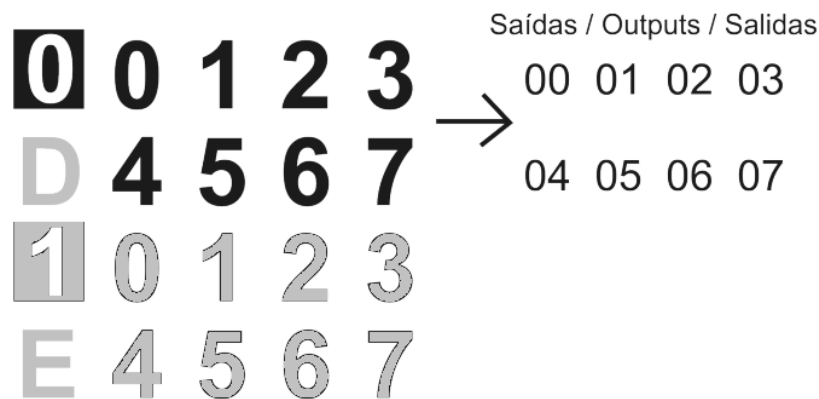
D and E Symbols States

D	E	Description	Cause	Solution	Priority
Off	Off	Display failure or module off	Module disconnected, external power missing, or hardware failure	Check if the module is completely connected to the rack, if the rack is powered by an external source, if the module has external power.	-
On	Off	Normal use	-		9 (Lower)
Blinking 1x	Off	Active Diagnostics	There is at least one active diagnostic related to the module	Check which diagnosis is active. More information can be found in the subsection Diagnostics via Variables.	8
Blinking 2x	Off	CPU in STOP mode	CPU in STOP mode. If the module is in a PROFIBUS Remote, the Master is in the Clear state	Check that the CPU is in RUN mode or that the PROFIBUS Master is in OPERATE mode. More information can be found in the documentation of the CPU or the PROFIBUS Master.	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's diagnostic information. If it is a hardware failure, have the part replaced. If it's software, contact Technical Support.	5
Off	Blinking 1x	Parameterization error	The module is not parameterized or has not received the new parameterization	Verify that the module parameterization is correct	4
Off	Blinking 2x	Loss of bus master	Loss of communication between the module and the CPU.	Check if the module is completely connected to the rack and if the CPU is in RUN mode.	3

Off	Blinking 3x	Reserved	-	-	2
Off	Blinking 4x	Fatal hardware fault	Hardware fault	In this case the module must be returned 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 first 8 I/O and the numerical characters used for the last 8 I/O. In case of NX1006 only the character 0 is on. The figure below shows the relation between numerical characters and the respective output.

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 simple browser.

More information about web page with complete status and diagnostics list can be found at User Manual of each respective CPU (listed at Nexto Series User Manual - MU214600).

Diagnostics Through Variables

All diagnostics of the NX1006 module can be accessed through variables that can be manipulated by the user application or even forwarded to a supervisory using a communication channel. There are two different ways to access diagnostics in the user application: using symbolic variables with AT directive or addressing memory. Altus recommends use symbolic variables for diagnostic accessing. The table below shows all available diagnostics for this module and their respective memory address, description, symbolic variable and string that will be shown on the CPU graphical display and web.

Doc. Code: CE114316   Revision: A

General Diagnóstics

Direct Representation Variable		Diagnostic Message	Symbolic Variable DG_modulename.tGeneral.	Description
Variable	**Bit**			
%QB(n)	**0**	INPUT 00 W/ DIAG	bActiveDiagnosticsInput00	TRUE – Input 00 has active diagnostics
				FALSE – Input 00 doesn't have active diagnostics
	1	INPUT 01 W/ DIAG	bActiveDiagnosticsInput01	TRUE – Input 01 has active diagnostics
				FALSE – Input 01 doesn't have active diagnostics
	2	INPUT 02 W/ DIAG	bActiveDiagnosticsInput02	TRUE – Input 02 has active diagnostics
				FALSE – Input 02 doesn't have active diagnostics
	3	INPUT 03 W/ DIAG	bActiveDiagnosticsInput03	TRUE – Input 03 has active diagnostics
				FALSE – Input 03 doesn't have active diagnostics
	4	INPUT 04 W/ DIAG	bActiveDiagnosticsInput04	TRUE – Input 04 has active diagnostics
				FALSE – Input 04 doesn't have active diagnostics
	5	INPUT 05 W/ DIAG	bActiveDiagnosticsInput05	TRUE – Input 05 has active diagnostics
				FALSE – Input 05 doesn't have active diagnostics
	6	INPUT 06 W/ DIAG	bActiveDiagnosticsInput06	TRUE – Input 06 has active diagnostics
				FALSE – Input 06 doesn't have active diagnostics
	7	INPUT 07 W/ DIAG	bActiveDiagnosticsInput07	TRUE – Input 07 has active diagnostics
				FALSE – Input 07 doesn't have active diagnostics
%QB(n+1)	**0**	MODULE W/ DIAGNOSTICS	bActiveDiagnostics	TRUE – Module has active diagnostics
				FALSE – Module doesn't have active diagnostics
	1	MODULE W/ FATAL ERROR	bFatalError	TRUE – Fatal error
				FALSE – No fatal error
	2	CONFIG. MISMATCH	bConfigMismatch	TRUE – Parameterization error
				FALSE – Parameterization ok
	3	WATCHDOG ERROR	bWatchdogError	TRUE – Watchdog has been detected
				FALSE – No Watchdog
	4	OTD SWITCH ERROR	bOTDSwitchError	TRUE – Module has switch failure
				FALSE – Diagnostics switch ok
				FALSE – Calibrated module
	5	EXTERNAL SUPPLY	bNoExternalSupply	TRUE – External supply with voltage below 19 Vdc
				FALSE – External supply with voltage above 19 Vdc
	6..7	Reserved		

Detailed Diagnostics

Direct Representation Variable		Diagnostic message	Symbolic Variable DG_modulename.tDetailed. tDigitalInput_XX	Description
Variable	Bit			
%QB(n+2+XX*2)	0..7	Reservado		
%QB(n+2+2*XX+1)	0	SELF TEST	tDigitalInput_XX bTest	TRUE – Defective input (shorted input).
				FALSE – Faultless entry
	1..7	Reserved		

Notes:

Direct Representation Variable: "n" is the address defined in the field %Q Start Address of Diagnostic Area on the module configuration screen – Modules Parameters tab in the MasterTool IEC XE, "XX" is the channel of analog output.

Symbolic Variable: Some symbolic variables serve to access diagnostics. These diagnostics are stored into the addressing memory, then the AT directive is used to map the symbolic variables in the addressing memory. 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 inside of Diagnostics object.

Doc. Code: CE114316   Revision: A

Manuals

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

This table is only a guide to some relevant documents that may be useful when using, maintaining, and programming the NX1006. The complete and updated table containing all Nexto Series documents can be found in the Nexto Series User Manual - MU214600.

Code	Description	Language
CE114000 **CT114000** **CS114000**	Nexto Series – Technical Characteristics Série Nexto – Características Técnicas Serie Nexto – Especificaciones y Configuraciones	English Portuguese Spanish
MU214600 **MU214000** **MU214300**	Nexto Series User Manual Manual de Utilização Série Nexto Manual Del Usuario Serie Nexto	English Portuguese Spanish
MU214605 **MU214100** **MU214305**	Nexto Series CPUs User Manual Manual de Utilização UCPs Série Nexto Manual del Usuario UCPs Serie Nexto	English Portuguese Spanish
MU299609 **MU299048** **MU299800**	MasterTool IEC XE User Manual Manual de Utilização MasterTool IEC XE Manual Del Usuario MasterTool IEC XE	English Portuguese Spanish
MU214603 **MU214003**	Nexto Series HART Manual Manual HART Série Nexto	English Portuguese