

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.

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

NX6100 brings the two most used analog interfaces in a single product, delivering to the end user an extremely versatile option. NX6100 has 4 analog outputs which can be individually configured as voltage output or current output. Also, this module provides different scales for both voltage and current outputs. Due to a high speed conversion, NX6100 can reach fast I/O requirements commonly seen in machinery automation. Finally, it has some exclusive features brought by Nexto Series such as Electronic Tag on Display, Easy Plug System and One Touch Diag.



Its main features are:

- Four outputs in a single width module
- Galvanic isolation between outputs and internal logic
- Protection against surge voltage and polarity inversion
- Short circuit and open loop diagnostic
- 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:

- NX6100 module
- 20-terminal connector with wire holder
- Installation guide

Product Code

The following code should be used to purchase the product:

Code	Description
NX6100	4 AO Voltage/Current Module

Related Products

The following product must be purchased separately when necessary:

Code	Description
NX9403	20-terminal connector with wire holder

Innovative Features

Nexto Series brings to the user several innovations in utilization, supervision and system maintenance. These features were developed focusing on a new experience in industrial automation. The list below shows some new features that the user will find in NX6100 module:



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

NX6100	
Backplane rack occupation	1 slot
Number of inputs	4 analog outputs
Output type	Voltage or current output, individually configured
Data format	16 bits in two's complement, justified to the left
Converter resolution	16 bits monotonicity guaranteed, no missing codes
Configurable parameters	Signal type per output
Output 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
Module protection	Yes, protection against surge voltages and polarity inversion
Isolation	
Outputs to logic	1500 Vac / 1 minute
Outputs to protective earth 	1500 Vac / 1 minute
Logic to protective earth 	1250 Vac / 1 minute
Outputs to power supply	500 Vac / 1 minute
Current consumption from backplane rack	130 mA
External power supply	19.2 to 30 Vdc
External power supply current	150 mA @ 24 Vdc
Maximum power dissipation	3 W
IP level	IP 20
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 CE, Electromagnetic Compatibility (EMC) and Low-Voltage Directive (LVD)  
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:

External Power Supply: The terminals 19 and 20 are used to supply power to the outputs only. NX6100 internal logic is supplied by the Power Supply Module placed on the Nexto Backplane Rack.

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

ATTENTION:
If the external power supply is below the 19.2 V limit, the outputs go to a safe state. However, since the display only shows the outputs' logical state, its indication may not match the physical state of outputs.

Voltage Mode Features

	NX6100 – Voltage Mode	
	Range	Resolution
Output ranges	0 to 10 V -10 to 10 V	183.10 μ V 366.21 μ V
Precision	\pm 0.1 % of full scale rating @ 25 °C \pm 0.005 % of full scale rating / °C	
Scanning time	1 ms for all outputs	
Stabilization time	100 μ s	
Maximum output value	\pm 10.5 V	
Load impedance	> 1 k Ω	

Note:

Output Ranges: The presented resolutions are the optimal delivered by the hardware.

Current Mode Features

	NX6100 – Current Mode	
	Range	Resolution
Output ranges	0 to 20 mA 4 to 20 mA	366.21 nA 366.21 nA
Precision	\pm 0.1 % of full scale rating @ 25 °C \pm 0.005 % of full scale rating / °C	
Scanning time	1 ms for all outputs	
Stabilization time	10 μ s	
Maximum output value	21 mA	
Load impedance	< 600 Ω	

Note:

Output Ranges: The presented resolutions are the optimal delivered by the hardware.

Installation

Electrical Installation

The figure below shows an example where the four outputs are used. The first three outputs are configured as voltage outputs, while the last output is configured as current output.

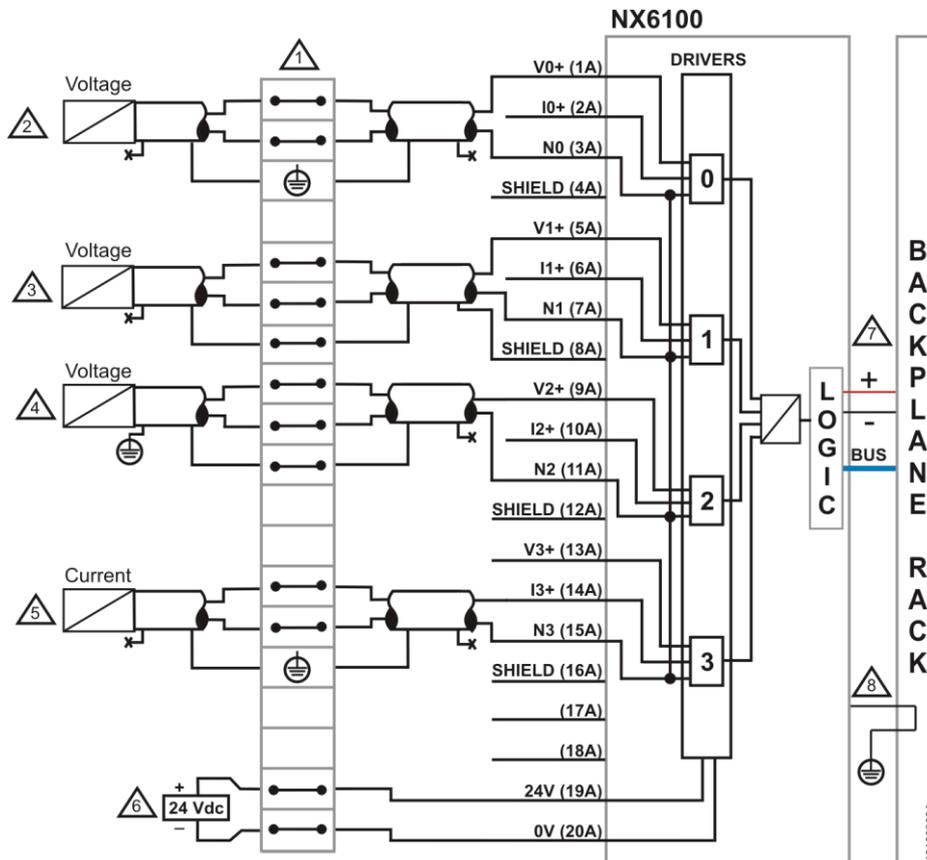


Diagram Notes:

1 - The diagram above has the representation a set of terminal blocks where each symbol represents a different kind of terminal block: represents a standard feed-through terminal block, represents a grounding terminal block, represents a feed-through terminal block with connection to other terminal block and represents a fuse terminal block.

2, 3, 4 – Voltage output mode uses the pins V and N, pin I of the respective output must be kept not connected. 2, 3, 4 – The examples show 3 different ways to connect the cable shielding.

2 – The cable shielding of the output 00 is connected to the grounding terminal block.

3 – The cable shielding of the output 01 is connected to the SHIELD pin.

4 – The cable shielding of the output 02 is connected to the earth close to the device on the field

2,3,4 – In all examples the cable shielding is connected only in only one point.

5 – Current output mode uses the pins I and N, pin V of the respective output must be kept not connected.

6 – The external power supply is connected to the pins 19A and 20A.

7 – The module power supply is derived from the connection to the backplane rack.

8 – NX6100 is connected to the protective earth through the backplane rack.

Connector Pinout

The following table shows the description of each connector terminal:

Terminal Number	Description
1	Voltage output 00
2	Current output 00
3	Reference output 00
4	Shield
5	Voltage output 01
6	Current output 01
7	Reference output 01
8	Shield
9	Voltage output 02
10	Current output 02
11	Reference output 02
12	Shield
13	Voltage output 03
14	Current output 03
15	Reference output 03
16	Shield
17	Not connected
18	Not connected
19	24 Vdc
20	0 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.

Compatibility with Other Products

The following table provides information regarding the compatibility of the module NX6100 and Nexto Series programming tool MasterTool IEC XE.

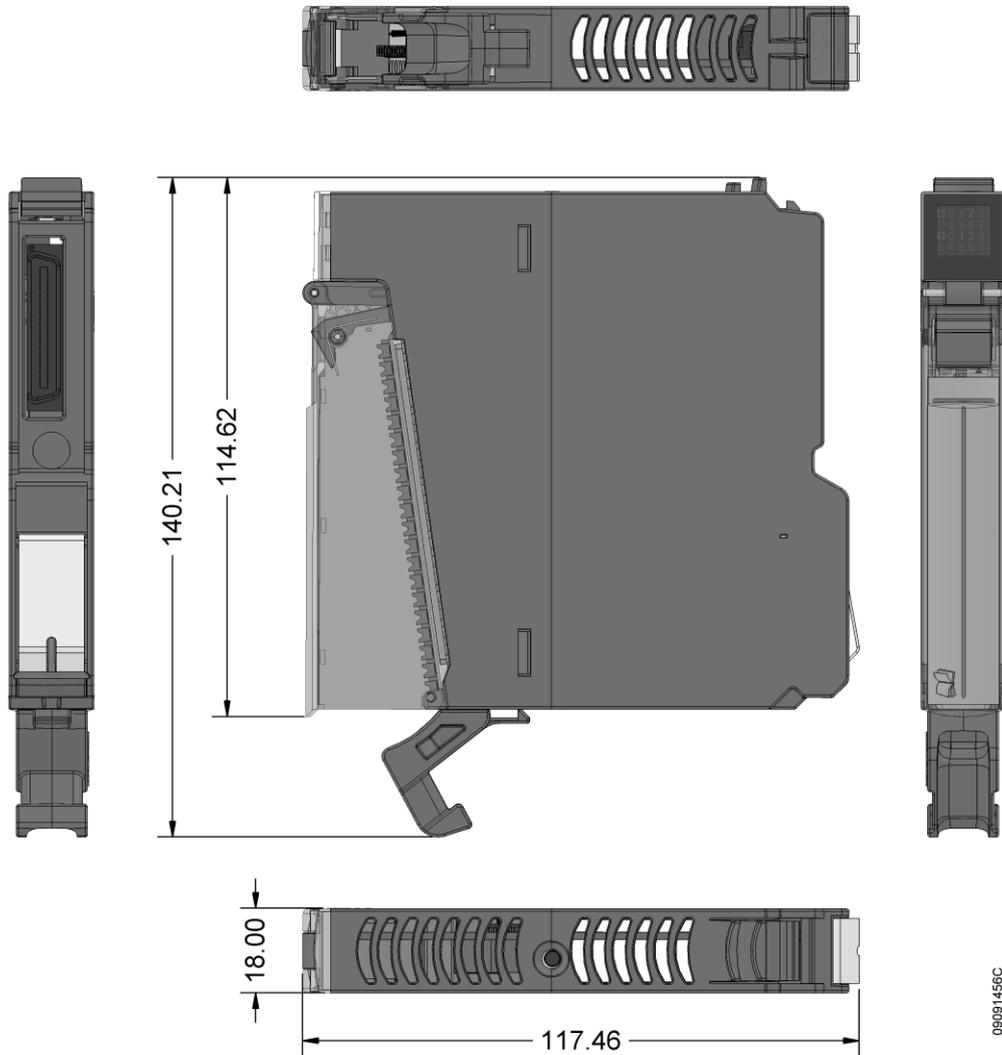
NX6100		Software Version Compatible
Version	Revision	MasterTool IEC XE
1.0.0.0 or lower	AA	1.26 or higher
1.0.1.1 or higher	AE or higher	1.29 or higher

Note:

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

NX6100 was developed to be used with 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 are the variables that are used to access and control NX6100. The list below describes all variables delivered by NX6100.

The process data of the module, when inserted in a PROFIBUS network, can be accessed through variables. The table below presents the variables organizational structure in the UCP memory.

Besides these data, NX6100 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
%QW(n)	WORD	AO 00	Analog Output 00	INT (Read/ Write)	Always
%QW(n+2)	WORD	AO 01	Analog Output 01	INT (Read/ Write)	Always
%QW(n+4)	WORD	AO 02	Analog Output 02	INT (Read/ Write)	Always
%QW(n+6)	WORD	AO 03	Analog Output 03	INT (Read/ Write)	Always

Note:

Update: The field "Update" indicates if the respective process data is updated by CPU and NX6100 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 NX6100 through the bus, to improve CPU performance, it's recommended to update only the process data that will be used in the application.

Modules Parameters

Name	Description	Standard Value	Options	Configuration
Type	Set Analog Output Type	0 to 10 Vdc	Not Configured Voltage 0 – 10 Vdc Voltage ± 10 Vdc Current 0 – 20 mA Current 4 – 20 mA	Per output
Min Value	Engineering Unit Scale – Minimum Value	0	-	Per output
Max Value	Engineering Unit Scale – Maximum Value	30000	-	Per output
Output Behavior on CPU STOP Mode	This parameter is individually defined for each output and defines the behavior of each output when CPU is in STOP mode	False	False True	Per output
User Defined Output Value	Set the User Defined Output Value when Output Behavior on CPU Stop Mode is TRUE	0	-	Per output
%Q Start Address of Module Diagnostics	Defines the start address of the module diagnostics	-	-	Per module

Notes:

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

Output Behavior on CPU STOP Mode: This is the behavior of the outputs when the CPU is in STOP mode. During procedures of CPU exception, reset warm, reset cold, reset origin or power failure this behavior may be in effect while CPU is changing through internal states. If module is hot-swapped with CPU in STOP mode, the output behavior will not be in effect. After downloading a project with different behavior settings, the new settings will only be updated only on CPU RUN state.

Min and Max Value: These parameters can be configured in any value from -30000 to 30000, as long as the Max Value is larger than the Min Value.

User Defined Output Value: This parameter can be configured in any value between Min Value and Max Value parameter.

Module Usage

General Purpose Output Write

NX6100 has one variable for each output. The parameters Min Value and Max Value are used by the module to convert the engineering value to the analog output value.

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.

NX6100 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 internal memory.

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.

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 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, ,  and numerical characters. The states of the symbols D, E, ,  are common for all Nexto Series I/O 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 analog modules, the numerical characters show the respective state of each output. When the numerical character is on the respective output is configured and enabled and if the numerical character is off the respective output is disabled. The relationship between the output number and its respective numerical character can be found on the following figure.

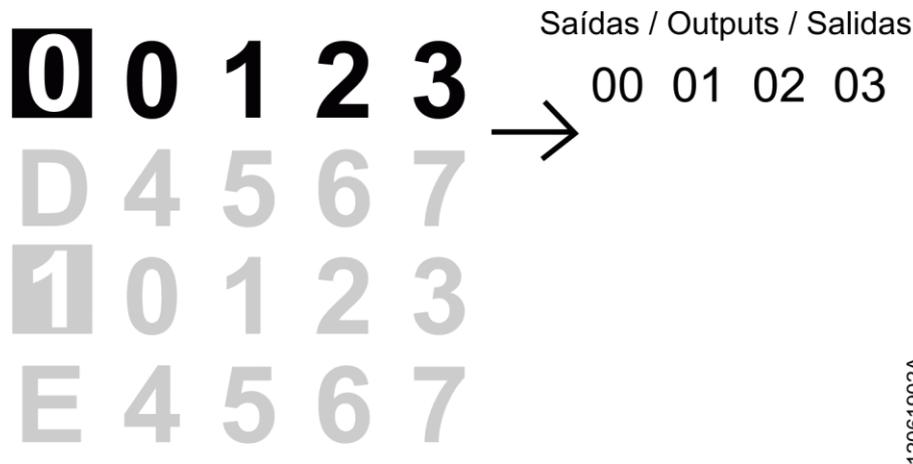
D and E States

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 NX6100	Check what the active diagnostic is. More information can be found at section Diagnostics Mapped to Variables 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	Check the module diagnostic information. If it is a hardware fault,	5

			impact on the basic functionality of the product	provide the replacement of this part. If it is a software fault, please contact the Technical Support	
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	Module without calibration	NX6100 isn't calibrated or there was an error with the calibrated value	In this case, the module should return to the manufacturer	3
Off	Blinking 1x	Parameterization error	NX6100 isn't parameterized or didn't receive the new parameterization	-	2
Off	Blinking 4x	Fatal hardware fault	-	In this case, the module should return to the manufacturer	1 (Higher)

Q, 1 and Numerical Characters

In case of NX6100 only character Q is on. The following figure shows the relation between numerical character and the respective outputs.



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 Nexto Series CPUs User Manual – MU214605.

Diagnostics Mapped to Variables

All NX6100'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 addressing memory. Altus recommends use symbolic variables for diagnostic accessing. The table below shows all available diagnostics for NX6100 and their respective memory address, description, symbolic variable and string that will be shown on the CPU graphical display and web.

Direct Representation Variable		Diagnostic Message	Symbolic Variable DG_modulename.tGeneral.	Description	PROFIBUS Message Code
Variable	Bit				
%QB(n)	0	OUTPUT 00 W/ DIAG	bActiveDiagnosticsOutput00	TRUE – Output 00 has active diagnostics	-
		-		FALSE – Output 00 doesn't have active diagnostics	
	1	OUTPUT 01 W/ DIAG	bActiveDiagnosticsOutput01	TRUE – Output 01 has active diagnostics	-
		-		FALSE – Output 01 doesn't have active diagnostics	
	2	OUTPUT 02 W/ DIAG	bActiveDiagnosticsOutput02	TRUE – Output 02 has active diagnostics	-
		-		FALSE – Channel 02 doesn't have active diagnostics	
	3	OUTPUT 03 W/ DIAG	bActiveDiagnosticsOutput03	TRUE – Output 03 has active diagnostics	-
-		FALSE – Output 03 doesn't have active diagnostics			
4.7	Reserved				
%QB(n+1)	0	MODULE W/ DIAGNOSTICS	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	OTD SWITCH ERROR	bOTDSwitchError	TRUE – Diagnostic switch failure	28
		-		FALSE – Diagnostics switch ok	
	5	CALIBRATION ERROR	bCalibrationError	TRUE – Module without calibration	29
		-		FALSE – Module calibrated	
	6	NO EXTERNAL SUPPLY	bNoExternalSupply	TRUE – No external voltage	30
		-		FALSE – Power supply ok	
7	Reserved				

Detailed Diagnostics

Direct Representation Variable		Diagnostic Message	Symbolic Variable DG_modulename.tDetailed.tAnalogOutput_XX	Description	PROFIBUS Message Code
Variable	Bit				
%QB(n+2+X X*2)	0..7	Reserved			
%QB(n+2+X X*2 + 1)	0	-	bOutputNotEnable	TRUE – Output XX is not enable	-
		-		FALSE – Output XX is enable	
	1	OPEN LOOP	bOpenLoop	TRUE – Output XX is in open loop condition	25
		-		FALSE – Output XX is not in open loop condition	
	2	OUTPUT SHORT CIRCUIT	bShortCircuit	TRUE – There is a short-circuit in Output XX	26
		-		FALSE – There are no short-circuit in the Output XX	
3..7	Reserved				

Notes:

Open Loop: This diagnostics turns on when the output voltage of the channel exceeds 13.4 Vdc.

Direct Representation Variable: “n” is the address defined in the field %Q Start Address of Diagnostic Area on the NX6100’s 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.

Hot Swap

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

Nexto Series

Doc. Code: CE114403

Revision: F

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 NX6100. 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 Usuario 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 Cabeza PROFIBUS Nexto	Spanish