

## 1. Product Description

Nexto Series is a powerful and complete Programmable Logic Controller (PLC) Series 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.

NJ6020 is a module that offers 8 individually configurable analog inputs, that allows to read temperature sensor of RTD type (Resistance Temperature Detectors), supporting a vast variety of sensors and ranges of resistances and it is a module that uses one rack position.



Its main features are:

- 08 RTD and resistance analog inputs in a single width module
- Support for different types of RTD sensors: Pt100, Pt200, Pt500, Pt1000, Ni100, Ni120, Ni200, Ni500 and Ni1000
- Support for multiple resistance range: 0 to 400  $\Omega$ , 0 to 4000  $\Omega$  and 0 to 10000  $\Omega$
- Individual configuration per input
- Software configurable filters
- Galvanic isolation between inputs and internal logic
- Protection against surge voltage
- Under and over range diagnostics
- Display for module diagnostics and input state indication

### ATTENTION

Starting from product revision AJ, it was included the connector frontal cover (which was previously exclusive of NX models), thus adding the Easy Plug System feature to this product.

## 2. Ordering Information

### 2.1. Included Items

The product package contains the following items:

- NJ6020 module
- 20-terminal connector with wire holder

### 2.2. Product Code

The following code should be used to purchase the product:

Code	Description
NJ6020	8 AI RTD Module

Table 1: Product Code

## 3. Related Products

The following product must be purchased separately when necessary:

Code	Description
NX9403	20-terminal connector with cable guides

Table 2: Related Products

## 4. 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.



**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.

## 5. Product Characteristics

### 5.1. General Characteristics

	NJ6020
Backplane rack occupation	1 slot
Number of inputs	8 analog inputs
Input type	Individually configurable inputs Resistances: 0 to 400 Ω, 0 to 4000 Ω and 0 to 10000 Ω Sensors RTD: Pt100, Pt200, Pt500, Pt1000, Ni100, Ni120, Ni200, Ni500 and Ni1000
Data format	16 bits in two's complement, justified to the left
Converter resolution	24 bits monotonicity guaranteed, no missing codes
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 support	No
Module protection	Yes, protection against surge voltages
Wire gauge	0,5 mm <sup>2</sup> (20 AWG)
Minimum wire temperature rating	75 °C
Wire material	Copper only

	NJ6020
<b>Isolation</b>	
Inputs to logic	1500 Vac / 1 minute
Inputs to protective earth ⊕	1500 Vac / 1 minute
Logic to protective earth ⊕	1500 Vac / 1 minute
<b>Current consumption from backplane rack</b>	300 mA
<b>Maximum power dissipation</b>	3 W
<b>IP level</b>	IP 20
<b>Operating temperature</b>	0 to 60 °C
<b>Storage temperature</b>	-25 to 75 °C
<b>Operating and storage relative humidity</b>	5% to 96%, non-condensing
<b>Module dimensions (W x H x D)</b>	18.00 x 114.62 x 117.46 mm
<b>Package dimensions (W x H x D)</b>	25.00 x 122.00 x 147.00 mm
<b>Weight</b>	200 g
<b>Weight with package</b>	250 g

Table 3: General Characteristics

**Note:**

**Wire gauge:** Crimp terminals for 0.5 mm<sup>2</sup> wire in each way respecting as described at Nexto Series User Manual - MU214600.

## 5.2. Standards and Certifications

Standards and Certifications	
<b>IEC</b>	61131-2: Industrial-process measurement and control - Programmable controllers - Part 2: Equipment requirements and tests
<b>CE</b>	2014/30/EU (EMC) 2014/35/EU (LVD) 2011/65/EU and 2015/863/EU (ROHS)
<b>UK CA</b>	S.I. 2016 No. 1091 (EMC) S.I. 2016 No. 1101 (Safety) S.I. 2012 No. 3032 (ROHS)
<b>UL LISTED</b>	UL/cUL Listed – UL 61010-1 UL 61010-2-201 (file E473496)
<b>EAC</b>	TR 004/2011 (LVD) CU TR 020/2011 (EMC)

Table 4: Standards and Certifications

## 5.3. Temperature Mode Characteristics (RTD)

	NJ6020
<b>Precision (25 °C)</b> 0..400 Ω 0..4000 Ω 0..10000 Ω Pt(100, 200, 500, 1000) Ni(100, 120, 200, 500, 1000)	± 0.1% of full scale rating ± 0.1% of full scale rating ± 0.1% of full scale rating ± 1 °C ± 1 °C
<b>Precision (0 to 60 °C)</b> 0..400 Ω 0..4000 Ω 0..10000 Ω Pt(100, 200, 500, 1000) Ni(100, 120, 200, 500, 1000)	± 0.3% of full scale rating ± 0.3% of full scale rating ± 0.5% of full scale rating ± 3 °C ± 2 °C
<b>Additional error in case of open channel (interference between channels)</b>	± 0.1% of full scale rating
<b>Measurement unit</b>	°C or °F

	NJ6020
<b>Input impedance</b>	> 10 MΩ
<b>Connection types</b>	2 and 3 wires
<b>Excitation current</b>	1.02 mA
<b>Continuous maximum voltage</b>	± 15 Vdc
<b>Noise Suppression Filter</b>	Disabled, 50 Hz and 60 Hz
<b>Conversion time for Ni, Pt, 400 Ω and 4000 Ω scales</b>	
50 Hz	206 ms / channel
60 Hz	193 ms / channel
Disabled	136 ms / channel
<b>Conversion time for 10000 Ω scale</b>	
50 Hz	281 ms / channel
60 Hz	286 ms / channel
Disabled	211 ms / channel
<b>Update time</b>	It is the sum of conversion time of each channel enabled.
<b>Low pass filter time constant</b>	Disabled, 100 ms, 1 s and 10 s
<b>Configurable parameters</b>	Noise Suppression Filter Temperature Unit Input Type Wire Configuration Digital Filter
<b>Open input detection</b>	Yes, available in diagnostics
<b>Over range indication</b>	Yes
<b>Under range indication</b>	Yes
<b>Sensor cable maximum impedance</b>	20 Ω per wire

Table 5: Temperature Mode Characteristics (RTD)

**Notes:**

**Noise suppression filter:** The value of the selected filter in this parameter will be applied to all module reading inputs.

**Conversion time:** Time for conversion of one channel depending on the sensor type and filter configuration.

**Update time:** Time for updating the measured values (process data).

**Open input detection:** In this situation will be presented an over range indication and the read value presented will be the full scale rating selected.

**Maximum impedance of the sensor cable:** On a two-wire connection, the value read is the result of the sum of the sensor reading and resistance of each wire. In case of using this connection with large cables, the value read by the module will be affected by the effect of the resistance of the cable wires. On a three-wire connection, the error due to wire resistance is compensated by measuring the resistance value of one of the cable wires. Therefore, to enable a correct compensation is necessary for all the cable wires to have the same resistance.

**Over range indication:** When the input selected is RTD reading type and the sensor input value is greater than the maximum value of full scale for the range selected, the symbolic variable will be enabled. In this condition, besides enabling the diagnostic variable, the module will set the value read to the maximum value of full scale configured for this channel. In case of resistance reading, the diagnostic becomes active when the value read in the input is 1% greater than the maximum value of full scale configured for this channel. If the value read exceeds 5% of the maximum value of full scale, the module will set the reading variable of this channel to this value.

**Under range indication:** This diagnostic becomes active when the input selected is RTD reading type and the value read in the channel is less than the minimum value of full scale for the selected range. E.g. for the Pt100E (-200 to +850 °C) scale, the diagnostics variable will be enabled when the measured value is less than -200 °C. In this condition, besides enabling the diagnostic variable, the module will set the value read to the minimum value of full scale configured for this channel. For resistance reading scale this diagnostic is not available.

The tables below show the functioning of over range and under range diagnostics according to the RTD sensor or applicable resistance scale.

Diagnostics	Sensors of Platinum type (Pt) $\alpha = 0.00385$		Sensors of Platinum type (Pt) $\alpha = 0.003916$	
	Temperature	Count	Temperature	Count
Over range	> 850 °C	8500	> 630 °C	6300
No diagnostics	-200 to 850 °C	-2000 to 8500	-200 to 630 °C	-2000 to 6300
Under range	< -200 °C	-2000	< -200 °C	-2000

Table 6: Over range and under range for sensors of Platinum type

Diagnostics	Sensors of Nickel type (Ni)	
	Temperature	Count
Over range	> 250 °C	2500
No diagnostics	-60 to 250 °C	-600 to 2500
Under range	< -60 °C	-600

Table 7: Over range and under range for sensors of Nickel type

Diagnostics	0 to 400 $\Omega$ Scale		0 to 4000 $\Omega$ Scale		0 to 10000 $\Omega$ Scale	
	Resistance	Count	Resistance	Count	Resistance	Count
Over range	> 420 $\Omega$	4200	> 4200 $\Omega$	4200	> 10500 $\Omega$	10500
	404.1 to 420 $\Omega$	4041 to 4200	4041 to 4200 $\Omega$	4041 to 4200	10101 to 10500 $\Omega$	10101 to 10500
No diagnostics	0 to 404 $\Omega$	0 to 4040	0 to 4040 $\Omega$	0 to 4040	0 to 10100 $\Omega$	0 to 10100

Table 8: Over range for Resistances

The table below presents the types of configurable inputs supported by NJ6020 module.

Input type	Temperature Coefficient ( $\alpha$ )	Measurement Band	Count	Resolution
Pt100E, Pt200E, Pt500E, Pt1000E	0.00385	-200 to 850 °C	-2000 to 8500	0.1 °C
		-328 to 1562 °F	-3280 to 15620	0.2 °F
Pt100A, Pt200A, Pt500A, Pt1000A	0.003916	-200 to 630 °C	-2000 to 6300	0.1 °C
		-328 to 1166 °F	-3280 to 11660	0.2 °F
Ni100, Ni200, Ni500, Ni1000	0.00618	-60 to 250 °C	-600 to 2500	0.1 °C
		-76 to 482 °F	-760 to 4820	0.2 °F
Ni120	0.00672	-60 to 250 °C	-600 to 2500	0.1 °C
		-76 to 482 °F	-760 to 4820	0.2 °F
400 $\Omega$	-	0 to 400 $\Omega$	0 to 4000	0.1 $\Omega$
4000 $\Omega$	-	0 to 4000 $\Omega$	0 to 4000	1 $\Omega$
10000 $\Omega$	-	0 to 10000 $\Omega$	0 to 10000	1 $\Omega$

Table 9: Types of Inputs

**Note:**

**Temperature Coefficient ( $\alpha$ ):** For the Platinum type sensors (Pt100, Pt200, Pt500 and Pt1000) there are two supported coefficients. For other types of sensors there is only one associated temperature coefficient. In the [Module Parameters](#) the possible settings per channel can be found.

## 5.4. Compatibility with Other Products

The following table brings information regarding the compatibility between NJ6020 module and other products of Nexto Series.

NJ6020		Compatible Software Version			
Version	Revision	NX3004	NX30x0	NX5110	MasterTool IEC XE
1.1.0.0 or higher	AA	1.5.1.0 or higher	1.5.1.0 or higher	1.1.1.0 or higher	2.03 or higher

Table 10: Compatibility with Other Products

**Revision:** If the software is upgraded in the field the product Revision indicated on the label will no longer match the actual Revision 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.

## 5.5. Physical Dimensions

Dimensions in mm.

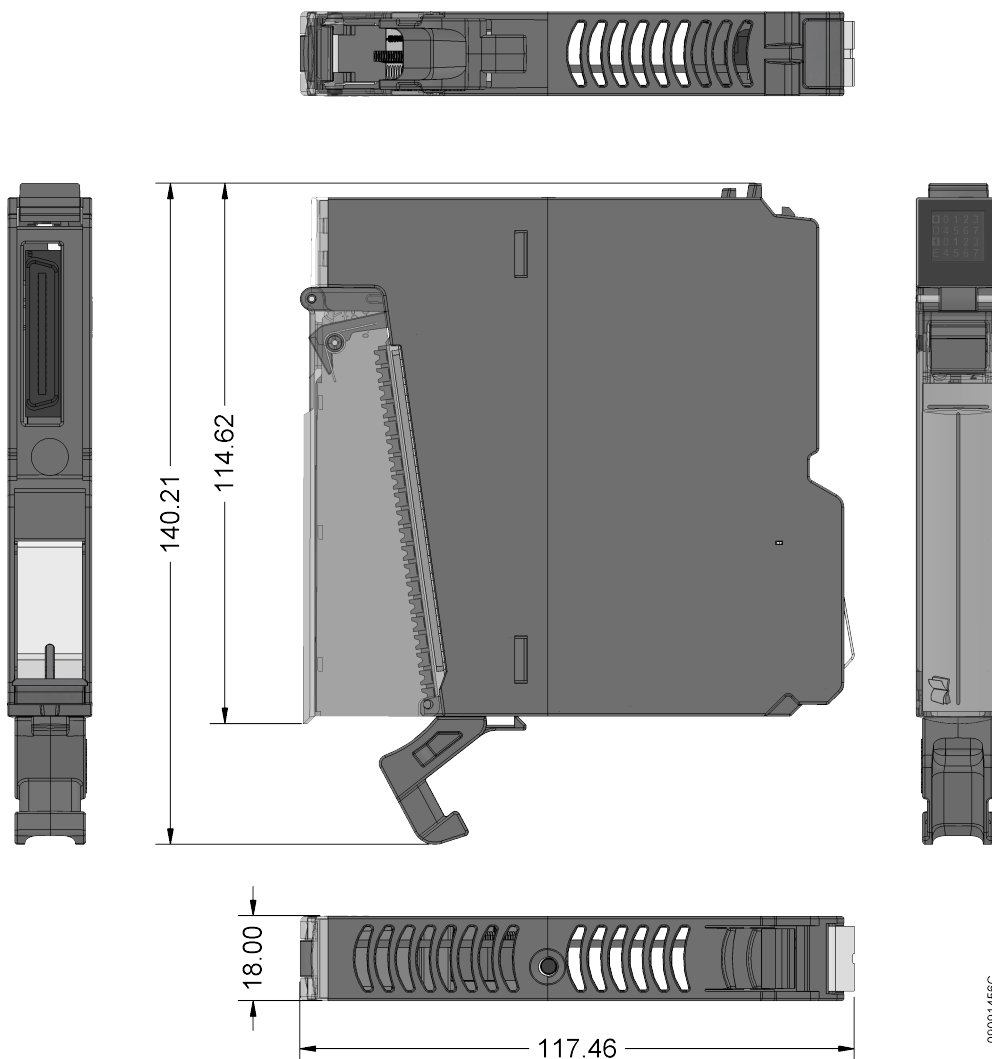


Figure 1: Physical Dimensions

## 6. Installation

For the correct installation of this product, it is necessary to use a rack (backplane rack) and it must be carried out according to the mechanical and electrical installation instructions that follow.

### 6.1. Product Identification

This product has some parts that must be observed before installation and use. The following figure identifies each of these parts.

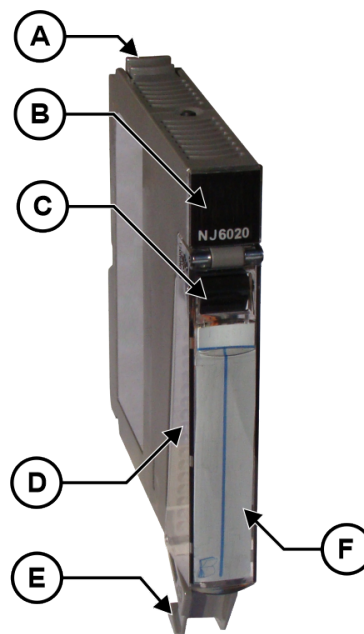


Figure 2: NJ6020

- Ⓐ Fixing lock.
- Ⓑ Status and diagnostic display.
- Ⓒ Terminal block extraction lever.
- Ⓓ Front cover.
- Ⓔ 20 pin terminal block with wire holder.
- Ⓕ Label for module identification.

The product has in its mechanics a label that identifies it and in it are presented some symbols whose meaning is described below:

⚠ Attention! Before using the equipment and installing, read the documentation.

≡ Direct Current.



### 6.2. Electrical Installation

The figure below shows an example where some inputs of NJ6020 module are used: input 00, input 02, input 03 and input 06. Each one of these inputs presents a different type of connection, according to the following.

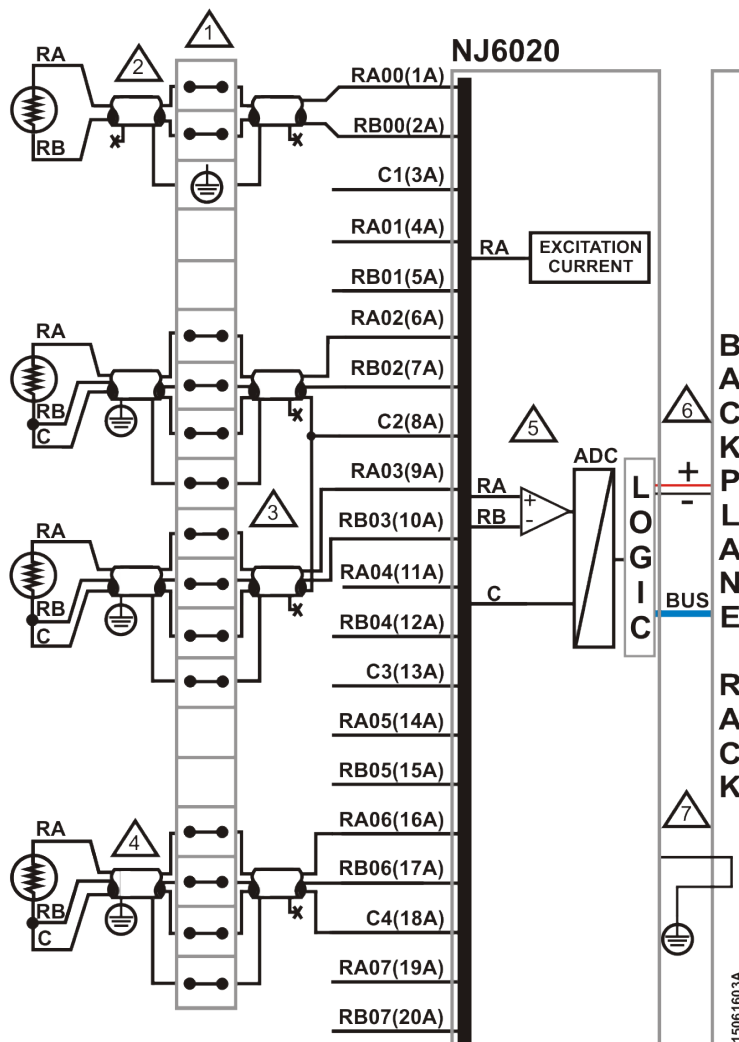














Figure 3: Electrical Installation

### 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 and  represents a feed-through terminal block with connection to other terminal block.
- 2  Input 00 is connected to an RTD temperature sensor and shows an example of a 2-wire connection. In this case only one of the ends of the sensor grounding shield in the field and the cable used to connect the module NJ6020 to the terminals of the electric panel are being connected to the earth terminal of the electric panel. In this type of connection, the other end of each cable must not be connected to other grounding point.
- 3  Inputs 02 and 03 show examples of 3-wire connection, where the compensation wire of the sensors are connected to the NJ6020 module at one single point (C2), which refers to the ports 02 and 03.
- 4  Input 06 shows an example of a 3-wire connection, where the central point of grounding is done in the field. One end of the sensor grid in the field is connected to field grounding point and the other end is connected to the electric panel terminal board. The cable grid used to connect the electric panel terminal board to the NJ6020 module terminals is connected in only one of its ends (which are connected to the electric panel terminal board).
- 5  The use of RA, RB and C signal depends on the number of wires used in the sensor connection.
- 6  The module power supply is derived from the connection to the backplane rack, not requiring external connections.
- 7  The NJ6020 module is grounded  through the backplane rack.
-  Protective conductor terminal.

## 6.3. Connector Pinout

The following table shows the description of each connector terminal:

Terminal	Input	Description
1A	00	RTD positive signal (excitation current for sensor 2/3 wire)
2A		RTD negative signal
3A	Common	Compensation for 3-wire sensor
4A	01	RTD positive signal (excitation current for sensor 2/3 wire)
5A		RTD negative signal
6A	02	RTD positive signal (excitation current for sensor 2/3 wire)
7A		RTD negative signal
8A	Common	Compensation for 3-wire sensor
9A	03	RTD positive signal (excitation current for sensor 2/3 wire)
10A		RTD negative signal
11A	04	RTD positive signal (excitation current for sensor 2/3 wire)
12A		RTD negative signal
13A	Common	Compensation for 3-wire sensor
14A	05	RTD positive signal (excitation current for sensor 2/3 wire)
15A		RTD negative signal
16A	06	RTD positive signal (excitation current for sensor 2/3 wire)
17A		RTD negative signal
18A	Common	Compensation for 3-wire sensor

Terminal	Input	Description
19A	07	RTD positive signal (excitation current for sensor 2/3 wire)
20A		RTD negative signal

Table 11: Connector Pinout

**Note:**

NJ6020 module has no grounding terminals through the connector. The grounding is done through the terminal board or in the field sensor as described in the [Electrical Installation](#).


## 6.4. Mechanical and Electrical 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.


**ATTENTION**

Products with broken warranty seal are not covered in warranty.

**CAUTION**

 The device is sensitive to static electricity (ESD). Always touch in a metallic grounded object before handling it.

**DANGER**

 Nexto Series can operate with voltage up to 250 Vac. Special care must be taken during the installation, which should only be done by qualified technical personnel. Do not touch on the wiring field when in operation.

## 7. Configuration

This module 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.

### 7.1. Process Data

Process Data are the variables used to access the module. The table below describes all the variables made available by this module when declared on the CPU or MODBUS Head bus.

In addition to the data in the table, this product 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
%IW(n)	WORD	AI 00	Analog Input 00	INT (Reading)	Always
%IW(n+2)	WORD	AI 01	Analog Input 01	INT (Reading)	Always
%IW(n+4)	WORD	AI 02	Analog Input 02	INT (Reading)	Always
%IW(n+6)	WORD	AI 03	Analog Input 03	INT (Reading)	Always
%IW(n+8)	WORD	AI 04	Analog Input 04	INT (Reading)	Always
%IW(n+10)	WORD	AI 05	Analog Input 05	INT (Reading)	Always
%IW(n+12)	WORD	AI 06	Analog Input 06	INT (Reading)	Always

Variable	Size	Process Data	Description	Type	Update
%IW(n+14)	WORD	AI 07	Analog Input 07	INT (Reading)	Always

Table 12: Process Data

**Note:**

**Update:** The field “Update” indicates if the respective process data is updated by CPU and NJ6020 module 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 NJ6020 module through the bus, to improve CPU performance. It is recommended to update only the process data that will be used in the application.

### 7.1.1. PROFIBUS Data

When the module is inserted on the bus of a PROFIBUS Head, the variable type will be WORD. In this case, we recommend using symbolic variables of type INT, declared with the *AT* directive at the same addresses as the direct variables. Example, considering the direct variable %IW(n) from the previous table:

```
iChannel_0 AT %IW(n) : INT;
```

The values sent by PROFIBUS are of integer type. For example, on a channel configured as Pt100E (-200°C to 850°C), the temperature of -200°C will be converted to a value of -2000.

## 7.2. Module Parameters

Name	Description	Standard Value	Options	Configuration
Noise Suppression Filter	Noise suppression filter frequencies	60 Hz	Disabled 50 Hz 60 Hz	Per module
Temperature Unit	Selects the temperature unit	Degree Celsius	Degree Celsius Degree Fahrenheit	Per module
Input Type	Configuration of the input type	Not Configured	Not configured 400 Ω 4000 Ω 10000 Ω Pt100A Pt100E Pt200A Pt200E Pt500A Pt500E Pt1000A Pt1000E Ni100 Ni120 Ni200 Ni500 Ni1000	Per channel

Name	Description	Standard Value	Options	Configuration
Wire Configuration	Configures the wire connection type	Two Wires	Two wires Three wires	Per channel
Digital Filter	Configures the time or disables the low pass filter	Disabled	Disabled 100 ms 1 s 10 s	Per channel
%Q Start Address of Module Diagnostics Area	Defines the start address of the module diagnostics	-	-	Per module

Table 13: Module Parameters

**Notes:**

**Configuration:** Indicates whether certain functionality of the module is related to an entire module configuration (per module), or if the functionality is related to a single input (per channel).

**Noise Suppression Filter:** This parameter is used to select the frequency of the noise suppression filter which is applied to all NJ6020 module inputs. This filter rejects a particular frequency in the analog signal measurements. For each frequency configured there is an associated conversion time which must be regarded during the development of an application in the channels reading. For further information on the conversion time according to the selected filter, see the [Temperature Mode Characteristics \(RTD\)](#).

**Input Type:** Exclusively for the RTD sensors of Platinum type (Pt100, Pt200, Pt500 and Pt1000), this module supports two temperature coefficients ( $\alpha$ ), which are different from each other by its last character. For the option which ends with A the  $\alpha$  is 0.003916 and for the option with E  $\alpha$  is 0.00385. For information on the values of the temperature coefficients used for each type of RTD sensor, see the [Temperature Mode Characteristics \(RTD\)](#).

**Digital Filter:** This parameter enables or disables, per channel, a first order low pass digital filter with time constant of 100 ms, 1 s or 10 s.

## 8. Usage

### 8.1. RTD Analog Input Read

NJ6020 module has one variable for each input. The parameters of minimum value and maximum value are automatically configured according to the selected RTD type.




NJ6020 module has one variable for each input, which will be presented in the temperature scale defined in the Temperature Unit, where the value is multiplied for 10. Thus, a 25 °C temperature, for example, is read as 250.

## 9. Maintenance

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

This module offers important features to assist users during the maintenance: Status and Diagnostics Indicators, Web Page with Complete Status and Diagnostics List, and Diagnostics Mapped to Variables.

### 9.1. 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,  and  are common for all Nexto Series I/O modules. These states can be consulted in the table below.

## 9.1.1. D and E States

D	E	Description	Cause	Solution	Priority
Off	Off	Display failure or module off	<ul style="list-style-type: none"> <li>- Module disconnected;</li> <li>- External power supply failure;</li> <li>- Hardware failure.</li> </ul>	Check: <ul style="list-style-type: none"> <li>- If the module is completely connected to the rack;</li> <li>- If the rack is powered by an external source;</li> <li>- If the module has external power.</li> </ul>	-
On	Off	Normal use	-	-	9 (Lower)
Blinking 1x	Off	Active diagnostics	There is at least one active diagnostic related to the module.	Check what the active diagnostic is. More information can be found at section <a href="#">Diagnostics Through Variables</a> .	8
Blinking 2x	Off	No I/O data update	<ul style="list-style-type: none"> <li>- CPU in STOP mode;</li> <li>- Head/Remote in non-ACTIVE state.</li> </ul>	Check: <ul style="list-style-type: none"> <li>- If the CPU is in operation;</li> <li>- If the Fieldbus Master is in operation;</li> <li>- The integrity of the network between the MODBUS Client and the Head/Remote.</li> </ul>	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 2x	Loss of bus master	Loss of communication between: <ul style="list-style-type: none"> <li>- The module and the CPU;</li> <li>- The module and the Head/Remote;</li> <li>- The Head/Remote and the Field Network Master.</li> </ul>	Check: <ul style="list-style-type: none"> <li>- If the module is completely connected to the rack;</li> <li>- If the CPU is in RUN mode;</li> <li>- If the Fieldbus Master is in operation;</li> <li>- Network integrity between PROFIBUS Master and Head/Remote.</li> </ul>	4
Off	Blinking 3x	Module without calibration	<ul style="list-style-type: none"> <li>- The module is not calibrated;</li> <li>- There was an error with the calibration value.</li> </ul>	The module must return to the manufacturer.	3

D	E	Description	Cause	Solution	Priority
Off	Blinking 1x	Missing or parameterization error	The module isn't parameterized.	Check: - If the module parameterization is correct; - Network integrity between PROFIBUS Master and Head/Remote; - Network integrity between PROFINET Controller and Head/Remote.	2
Off	Blinking 4x	Fatal hardware fault	Hardware fault.	The module must return to the manufacturer.	1 (Higher)

Table 14: Status of Symbols D and E

**Notes:**

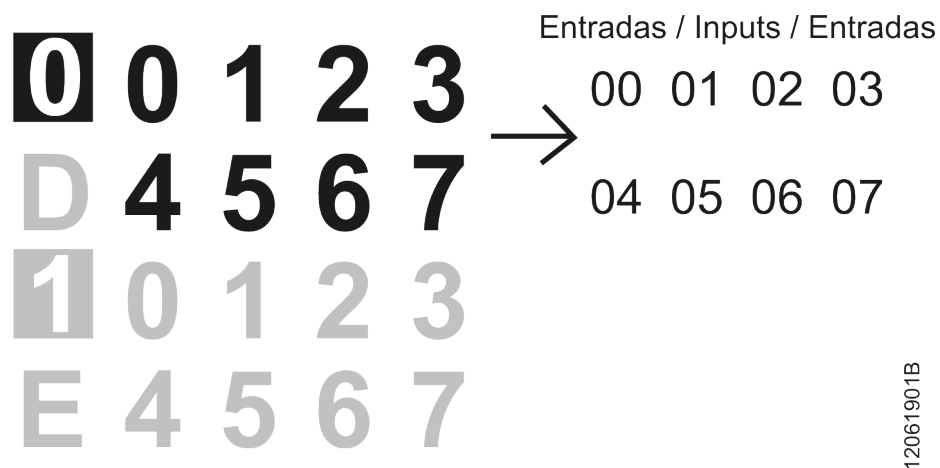
**Field net master:** There are different field net solutions, using different nomenclatures to refer to the net master. Examples: Profibus Master, MODBUS Client, PROFINET Controller, etc.

**Module without calibration:** Only valid for modules that have calibration, typically analog modules. Modules that do not have calibration will never show such an indication through the symbols D and E.

### 9.1.2. 0, 1 and Numerical Characters

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 input. When the numerical character is on, the respective input is configured and enabled, and if the numerical character is off, the respective input is disabled. The relationship between the input number and its respective numerical character can be found on the following figure.

The segments 0 and 1 are used to group the numerical characters used for inputs and outputs. In NJ6020 module's case, the characters that are placed at the right side of character 0 represent the inputs from 00 to 07, where character 0 represents the input 00 and character 7 represents the input 07. The characters that are placed at the right side of character 1 and the segment 1 itself are not used in NJ6020 module. The figure below shows the relationship between the numerical characters and the respective inputs.



12061901B

Figure 4: Numerical Characters

## 9.2. 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).

## 9.3. Diagnostics Through Variables

All diagnostics in this module 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 this module and their respective memory address, description, symbolic variable and string that will be shown on the CPU graphical display and web.

### 9.3.1. General Diagnostics

Direct Variable		Diagnostic Message	Symbolic Variable DG_NJ6020.tGeneral.*	Description	PROFIBUS Message Code	
Variable	Bit					
%QB(n)	0	INPUT 00 W/ DIAG	bActiveDiagnosticsInput00	TRUE – Input 00 has active diagnostics	-	
		-		FALSE – Input 00 has no active diagnostics		
	1	INPUT 01 W/ DIAG	bActiveDiagnosticsInput01	TRUE – Input 01 has active diagnostics	-	
		-		FALSE – Input 01 has no active diagnostics		
	2	INPUT 02 W/ DIAG	bActiveDiagnosticsInput02	TRUE – Input 02 has active diagnostics	-	
		-		FALSE – Input 02 has no active diagnostics		
	3	INPUT 03 W/ DIAG	bActiveDiagnosticsInput03	TRUE – Input 03 has active diagnostics	-	
		-		FALSE – Input 03 has no active diagnostics		
	4	INPUT 04 W/ DIAG	bActiveDiagnosticsInput04	TRUE – Input 04 has active diagnostics	-	
		-		FALSE – Input 04 has no active diagnostics		
	5	INPUT 05 W/ DIAG	bActiveDiagnosticsInput05	TRUE – Input 05 has active diagnostics	-	
		-		FALSE – Input 05 has no active diagnostics		
	6	INPUT 06 W/ DIAG	bActiveDiagnosticsInput06	TRUE – Input 06 has active diagnostics	-	
		-		FALSE – Input 06 has no active diagnostics		
	7	INPUT 07 W/ DIAG	bActiveDiagnosticsInput07	TRUE – Input 07 has active diagnostics	-	
		-		FALSE – Input 07 has no active diagnostics		
		0	MODULE W/ DIAGNOSTICS	bActiveDiagnostics	TRUE – Module has active diagnostics	-



Direct Variable		Diagnostic Message	Symbolic Variable DG_NJ6020.tGeneral.*	Description	PROFIBUS Message Code
Variable	Bit				
%QB(n+1)		NO DIAG		FALSE – Module has no active diagnostics	
	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				

Table 15: General Diagnostics

### 9.3.2. Detailed Diagnostics

Direct Variable		Diagnostic Message	Symbolic Variable DG_NJ6020.tDetailed .tAnalogInput_XX.*	Description	PROFIBUS Message Code
Variable	Bit				
%QB(n+2 +XX*2)	0..7	Reserved			
%QB(n+2+ 2*XX+1)	0	OVER RANGE	bOverRange	TRUE – Input data are over range	24
		-		FALSE – Input data are ok	
	1	UNDER RANGE	bUnderRange	TRUE – Input data are under range	25
		-		FALSE – Input data are ok	
	2	Reserved			
	3	-	bInputNotEnable <sup>(1)</sup>	TRUE – Input is not enabled	-
-		FALSE – Input is enabled			
4..7	Reserved				

Table 16: Detailed Diagnostics

**Notes:**

<sup>(1)</sup>: This diagnosis does not apply to the module when declared on the Profibus Heads or PROFINET Heads bus. It is valid only when the module is declared on the UCPS or MODBUS Heads bus.

**Direct Representation Value:** “n” is the address defined in the field %Q Start Address of Module Diagnostics Area on the NJ6020 module’s configuration screen – Module Parameters tab in the MasterTool IEC XE, “XX” is the channel of analog input.

**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 AT directive is a reserved word in the MasterTool IEC XE, that uses this directive to declare the diagnostics automatically on a symbolic variable. All symbolic variables declared automatically can be found in the diagnostics object.

## 10. Manuals

For further technical details, configuration, installation and programming, 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 this product.

<b>Code</b>	<b>Description</b>	<b>Language</b>
<b>CE114000</b>	Nexto Series – Technical Characteristics	English
<b>CT114000</b>	Série Nexto – Características Técnicas	Portuguese
<b>CS114000</b>	Serie Nexto – Características Técnicas	Spanish
<b>MU214600</b>	Nexto Series User Manual	English
<b>MU214000</b>	Manual de Utilização Série Nexto	Portuguese
<b>MU299609</b>	MasterTool IEC XE User Manual	English
<b>MU299048</b>	Manual de Utilização MasterTool IEC XE	Portuguese
<b>MP399609</b>	MasterTool IEC XE Programming Manual	English
<b>MP399048</b>	Manual de Programação MasterTool IEC XE	Portuguese
<b>MU214608</b>	Nexto PROFIBUS-DP Head Utilization Manual	English
<b>MU214108</b>	Manual de Utilização da Cabeça PROFIBUS-DP Nexto	Portuguese

Table 17: Related Documents