Contents

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Product Specifications

General Specifications

Item		Specifications	Remarks
Temperature	Operating	-0 °C to +60 °C (32 °F to 140 °F)	
	Storage	-40 °C to +85 °C (-40 °F to 185 °F)	
Humidity	Operating	5 to 95% RH (Non-condensing)	
	Storage	5 to 95% RH (Non-condensing)	
Vibration immunity		10 to 55Hz, double amplitude of 0.75mm, 10 minutes on each of 3 axes (X, Y, Z)	
Shock immunity		Peak acceleration and duration 15g/11ms, 3 times on each of 3 axes (X, Y, Z)	
Capsuling		Din rail or screw tightening	

DeviceNet Communication Specification

Item	Specifications	Remarks
Communication Specification	I/O Slave messaging (Group 2 Only slave) • Poll command : Y • Bit_strobe command : Y • Cyclic command : Y • COS command : Y	
Communication Distance	Max. 500Meter (125Kbps) Max. 250Meter (250Kbps) Max. 100Meter (500Kbps)	
Node Settings	Max. 64 nodes (Using front panel Rotary switch)	
Communication speed	125Kbps, 250Kbps, 500Kbps	Auto setting supported
Isolation	I/O and internal circuit: Photocoupler isolation Isolation voltage:1250Vrms/V AC DeviceNet and internal circuit: Non-isolation DeviceNet power: Non-isolation	
DeviceNet power	Rated voltage: 24V DC nominal Voltage range: 11 to 28.8V DC Current consumption: Max 1.5W	

2

DeviceNet Setting

DeviceNet settings include the following configurations:

- Communication parameter setting
- I/O allocation
- Data format setting for adapter module
- Individual I/O Module setting

Communication Parameter Setting

Node Address Setting

- Node address is determined by the node address rotary switch on the front panel of adapter module.
- Set node address is recognized on the power-on of adapter module.

Ex) When node address is set as 11:

X 10

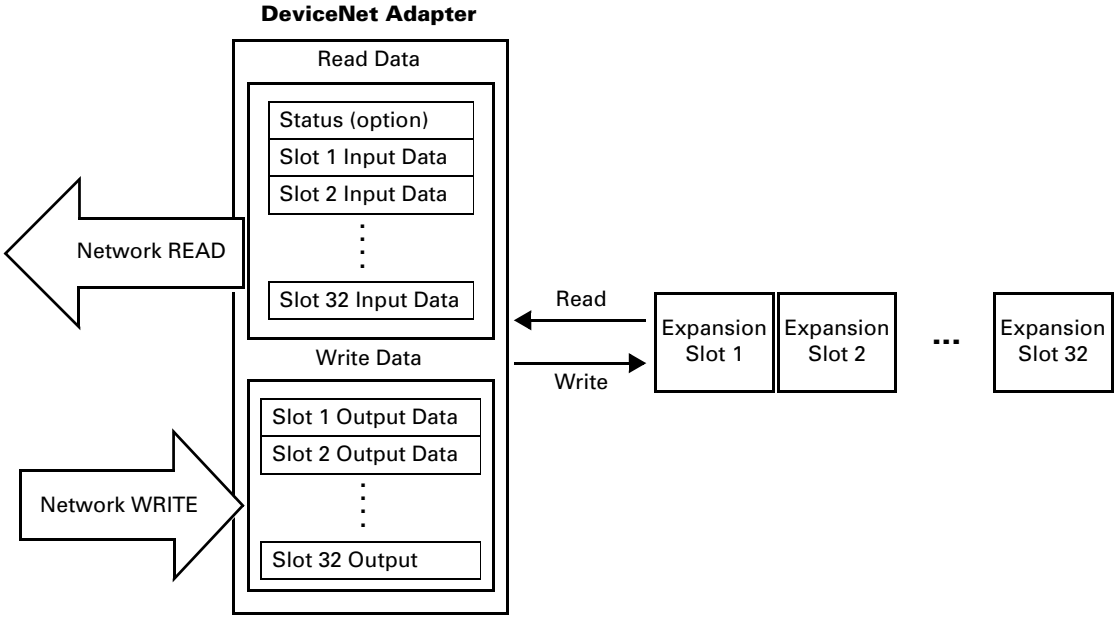
X 1

Communication Speed Setting

- See Master Module Setting about communication speed setting.

I/O Allocation

I/O allocation of NXIO is divided into input and output by the order of installed slots, based on the I/O configuration. Memory MAP is configured by the unit of Byte for each input and output.



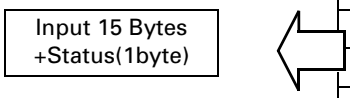
I/O Allocation Example

I/O Configuration Example

Slot No	Model Number	Description	I/O Configuration
0	NXIO-DNA	DeviceNet Adapter	8 points input (NXIO-Bus Status)
1	NXIO-XN4B	24V DC 4 points Sink input	4 points input
2	NXIO-XN8B	24V DC 8 points Sink input	8 points input
3	NXIO-AI4BM	4 to 20mA 4 channel input	64 points input (16 points per channel)
4	NXIO-YN4B	24V DC 4 points Sink output	4 points output
5	NXIO-YN8B	24V DC 8 points Sink output	8 points output
6	NXIO-YN16B	24V DC 16 points Sink output	16 points output
7	NXIO-AO2L	-10 to 10V 2 channel output	32 points output (16 points per channel)
8	NXIO-NX16B	24V DC 16 points Sink input	16 points input
9	NXIO-YN4LD	24V DC Diagnostic 4 points Sink output	4 points output, 4 points input

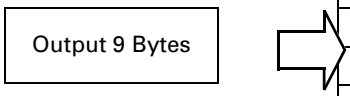
I/O Allocation Results (Uncompressed Mode)

Input Image



Slot Number	Module
1	4 points input
2	8 points input
3	64 points input
8	16 points input
9	4 points input

Output Image



Slot Number	Module
4	4 points output
5	8 points output
6	16 points output
7	32 points output
9	4 points output

Input Process Image Map

Byte	Slot #	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Read Byte 0	Status	Field Power				NXIO-Bus Status			
Read Byte 1	Slot 1	Reserved				Discrete Input 4 points			
Read Byte 2	Slot 2	Discrete Input 8 points							
Read Byte 3	Slot 3	Analog Input Ch0 low byte							
Read Byte 4		Analog Input Ch0 high byte							
Read Byte 5		Analog Input Ch1 low byte							
Read Byte 6		Analog Input Ch1 high byte							
Read Byte 7		Analog Input Ch2 low byte							
Read Byte 8		Analog Input Ch2 high byte							
Read Byte 9		Analog Input Ch3 low byte							
Read Byte 10		Analog Input Ch3 high byte							
Read Byte 12	Slot 8	Discrete Input 16 points low 8 points							
Read Byte 13		Discrete Input 16 points high 8 points							
Read Byte 14	Slot 9	Reserved				Discrete Input 4 points			

Output Process Image Map

Byte	Slot #	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Write Byte 0	Slot 4	Reserved				Discrete Output 4 points			
Write Byte 1	Slot 5	Discrete Output 8 points							
Write Byte 2	Slot 6	Discrete Output 16 points low Byte							
Write Byte 3		Discrete Output 16 points high Byte							
Write Byte 4	Slot 7	Analog Output Ch0 low byte							
Write Byte 5		Analog Output Ch0 high byte							
Write Byte 6		Analog Output Ch1 low byte							
Write Byte 7		Analog Output Ch1 high byte							
Write Byte 8	Slot 9	Reserved				Discrete Output 4 points			

NXIO-YN4LD module in slot 9 is an output module, but it can receive self-diagnosis results about output contacts. Therefore, input contacts are allocated as well as output.

DeviceNet I/O Data Format Setting

I/O data format can be configured for NXIO-DNA.

Data format can be determined by changing object value with DeviceNet configuration software.

Selection of Input Instance Type

ID	Value	Description
Service Code	0x10	Set_Attribute_Single
Class	0x70	NXIO_Bus Manager Object
Instance	1	
Attribute	5	Selection of Produced Connection Type
Service Data	1 Byte	0 to 3

Selection of Produced Connection Type

Produced Connection Type Number	Description	Input Assembly Type
0	Uncompressed Input Processing Data + Status (default)	100
1	Uncompressed Input Processing Data	101
2	Compressed Input Processing Data + Status	102
3	Compressed Input Processing Data	103

Selection of Output Instance Type

ID	Value	Description
Service Code	0x10	Set_Attribute_Single
Class	0x70	NXIO_Bus Manager Object
Instance	1	
Attribute	6	Selection of Produced Connection Type
Service Data	1 Byte	0 or 1

Selection of Consumed Connection Type

Consumed Connection Type Number	Description	Output Assembly Type
0	Uncompressed Output Processing Data (default)	150
1	Compressed Output Processing Data	151

Ex) When deleting NA module NXIO-Bus Status, use configuration software to send out the following message.

ID	Value	Description
Service Code	0x10	Set_Attribute_Single
Class	0x70(100)	NXIO_Bus Manager Object
Instance	1	
Attribute	5	Selection of Produced Connection Type
Service Data	1 Byte	1 = Uncompressed Input Processing Data

I/O Module Setting

In general, parameters for I/O modules are configured automatically for basic operations. You can use these auto-set parameter values unless you need special adjustments. However, operation value for network faults can be configured for digital output modules. In the case of analog modules, operation parameters should be set manually. Operation parameters can be set by using either ODVA Standard EDS or Modular EDS. Use a configuration tool available for selected EDS.

IMPORTANT Operation parameters should be set manually for certain types of modules, including analog modules. EDS file should be registered first. EDS (Electronic Data Sheet) file is a manufacturer-provided electronic catalogue that contains the information necessary for product setting.

Reference: Download the file at the company web site. (Filename: NXIO_EDS.zip)

Operation Parameter Setting Using Standard EDS

EDS file contains parameter setting items for each module. Values can be set by the parameter item of the corresponding slot. The parameter format is Set + Class + Slot# + Config.

I/O module setting Class is 71. Instance indicates Slot Number. See *"Appendix C. Configuration Parameter by Model"*.

For example, when NXIO-YN4K module is installed in slot 1, you can find the parameter information in *"Appendix C. Configuration Parameter by Model"* as follows:

NXIO-YN4K (4-sinking output, 24V DC 0.5A)

Valid Parameter length: 2 bytes

Parameter Data

Offset	Decimal Bit	Description	Default Value
0	00-03	Fault Action (ch0 to ch3) 0: Fault Value, 1: Hold last state	0 (Fault Value)
	04-07	Reserved	0
1	00-03	Fault Value (ch0 to ch3) 0: off, 1: on	0 (off)
	04-07	Reserved	0
2	00-07	Not used	0
3	00-07	Not used	0
4	00-07	Not used	0
5	00-07	Not used	0
6	00-07	Not used	0
7	00-07	Not used	0

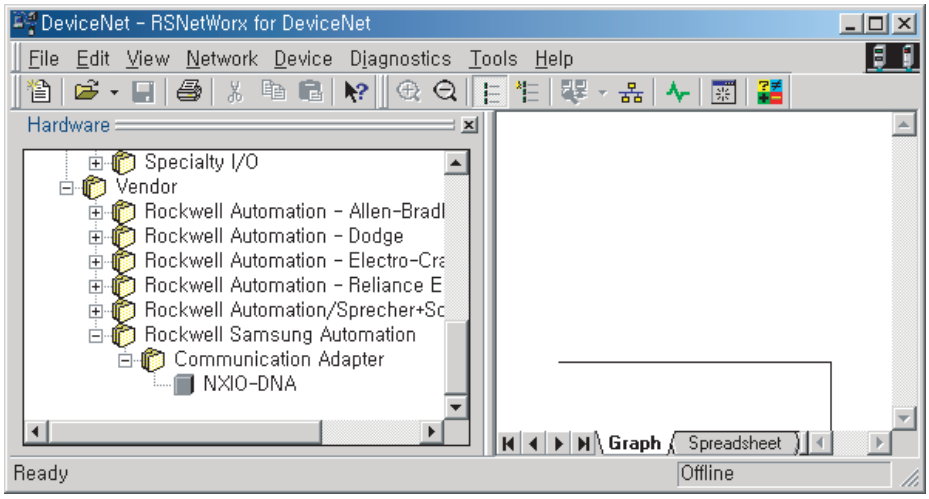
* All values are stored in DeviceNet Adapter's EEPROM.

For example, when you want to turn off all outputs in case of a system fault, set the first and second byte as 0x00. Therefore, the parameter can be set as 0x0000.

Operation Parameter Setting Using Modular EDS

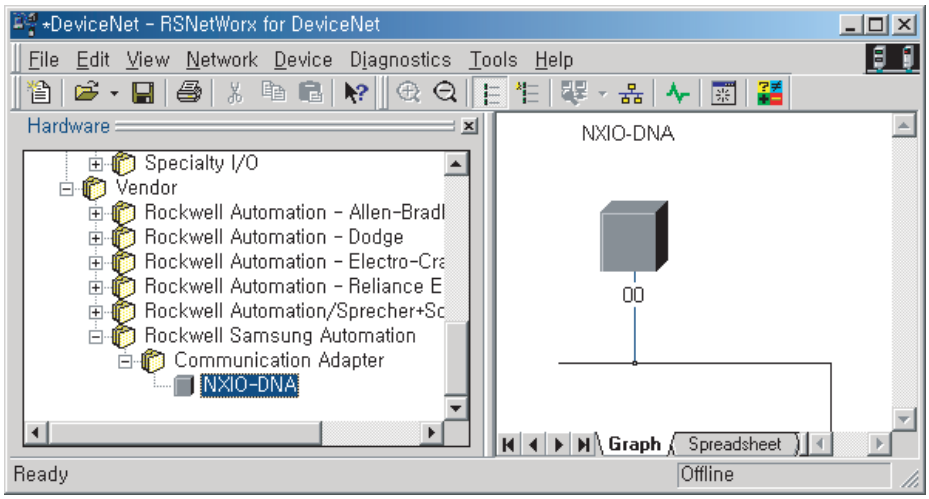
Modular EDS file contains more configuration information than Standard EDS. Therefore, it is not necessary to look up Appendix B to set each parameter. However, you should use a configuration software that supports Modular EDS.

The following example shows I/O module setting using RSNetWorx for DeviceNet provided by Rockwell Software Incorporated.

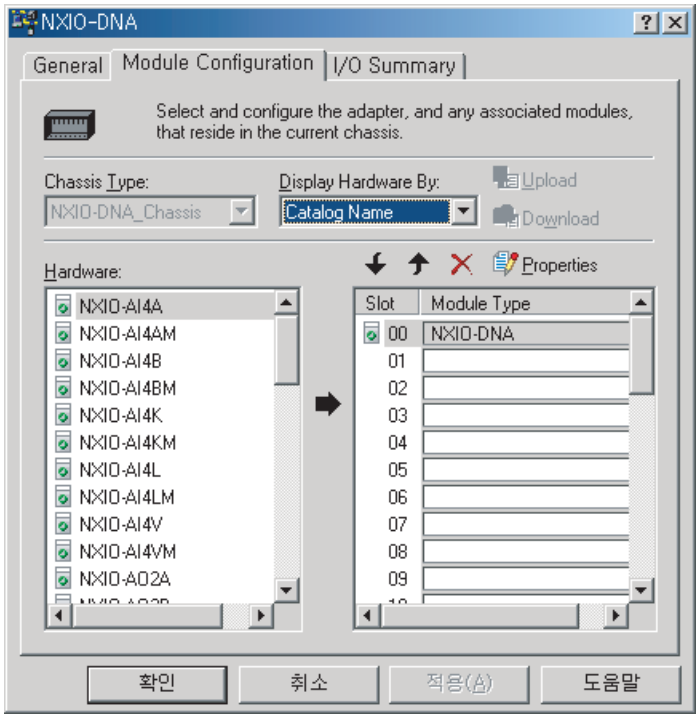


Start RSNetWorx and configure NXIO-DNA as a Communication Adapter node.
After that, double-click NXIO-DNA node under the Communication Adapter node.

The added NXIO-DNA item image is shown on the Graph tab as illustrated below.

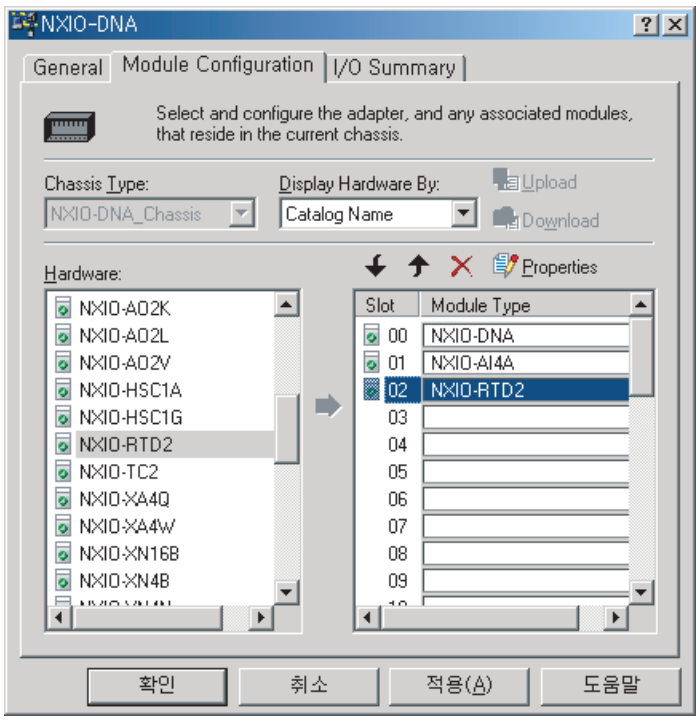


Double-click the NXIO-DNA item image on the Graph tab. The NXIO-DNA window appears as illustrated below.

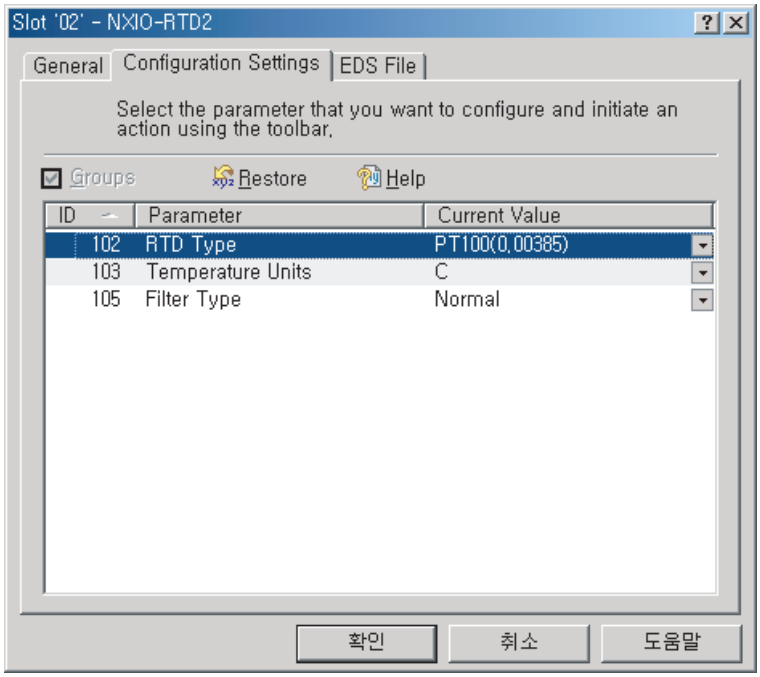


Double-click the modules currently connected to DeviceNet node (DeviceNet Adaptor) in the Hardware list.

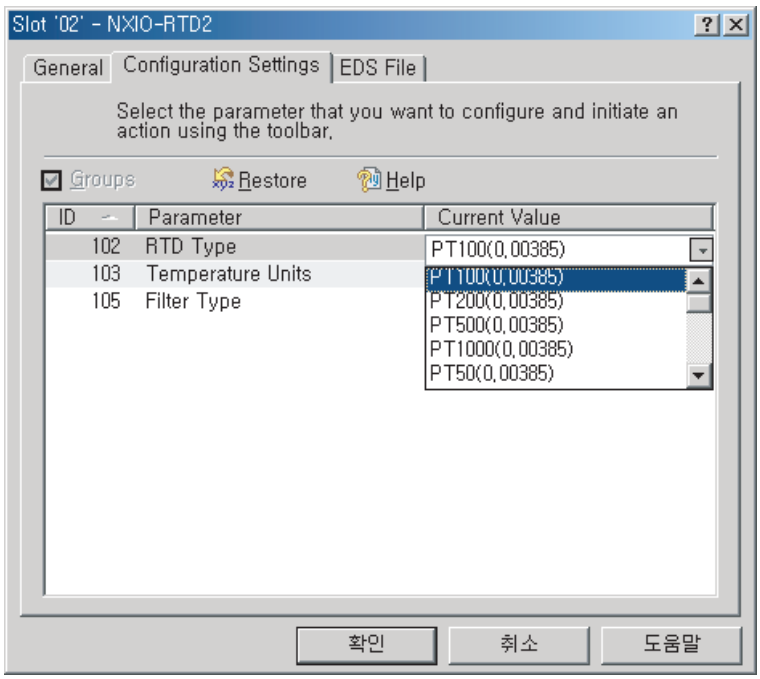
For example, NXIO-AI4A is installed in Slot 1 and NXIO-RTD2 module is in Slot 2, double-click NXIO-AI4A first and then NXIO-RTD2 in the Hardware list.



When NXIO-RTD2 item added as Slot 02 is double-clicked, the Slot '02' – NXIO-RTD2 window appears as illustrated below. If the module requires manual parameter setting like NXIO-RTD2, the Configuration Settings tab appears.



Click the Configuration Settings tab and set parameters such as RTD Type. When necessary, See *"Appendix C. Configuration Parameter by Model"* about parameter values for each model.

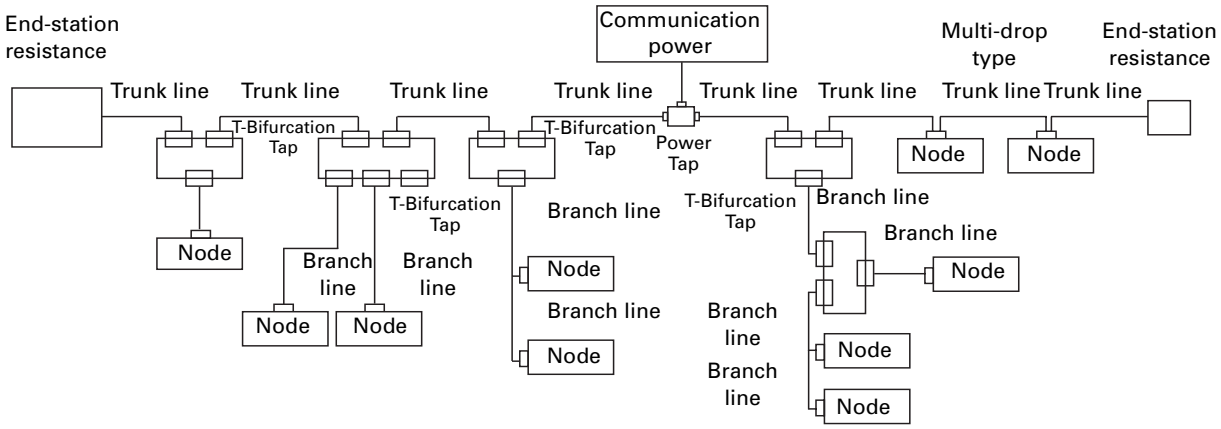


3

Network Wiring

Network wiring includes the following components. NX I/O adopts globally accepted DeviceNet standard. For more reliable operation, set up network wiring to connect every component in compliance with DeviceNet standard.

- DeviceNet Cable (trunk and branch line)
- DeviceNet power
- End-station resistance
- Tap (optional)
- Grounding



Network Wiring Example

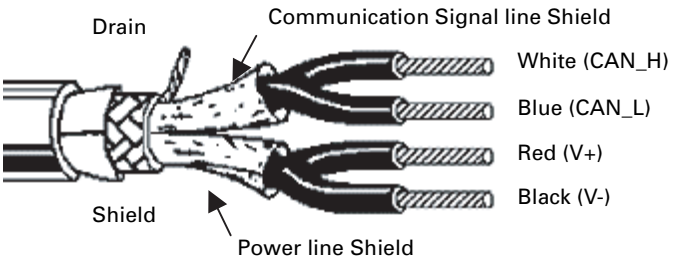
NodeThe connection point of DeviceNet master and slave devices.

Trunk line At both ends of trunk line, end-station resistances are connected.

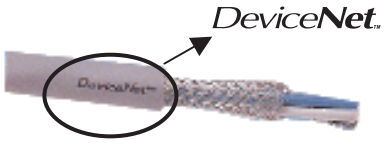
Branch line All cables branching off from the trunk line are called branch lines.

Bifurcation When a branch line is branched off from a trunk line, a bifurcation tap is used.
When bifurcation tap is not used for wiring, it is called Multi Drop type.

DeviceNet cable



A single DeviceNet cable includes both power and communication signal cables. White and blue lines are for communications, and red and black lines are for power. For stronger noise immunity, communication and power lines are separately shielded. Make sure to use DeviceNet certified products.



There are two types of cables available for each usage: THICK cable and THIN cable. The maximum length of network for each cable type is as follows:

Communication speed	THICK cable	THIN cable	Branch length	Total branch length
500K	100m or less	100m	6m or less	39m or less
250K	250m or less		6m or less	78m or less
125K	500m or less		6m or less	156m or less

For safe system operation, make sure to use cables recommended by Rockwell Automation Korea.

Item	Model	Pair	AWG	Impedance	Case	Maker
Trunk Cable	3082A	data	18	120Ω	Lt. Grey PVC	Belden, USA
		power	15	-		
	3083A	data	18	120Ω	Yellow CPE	
		power	15	-		
Branch Cable	3084A	data	24	120Ω	Lt. Grey PVC	
		power	22	-		
	3085A	data	24	120Ω	Yellow CPE	
		power	22	-		

Network Power

Network power is 24V, and used for NXIO and communication operations of devices connected to the network. Network and I/O power must be separated. If not, network malfunction can be caused. Adapter power should be supplied through the trunk line.

Principally, one power supply is provided per network. However, when one power is not enough for device requirements, multiple power supplies can be used. When more than one power supply is used, the supply circuits must be separated. However, V- should be shared.

Specifications for power supply are as follows:

Rated voltage: 24V DC

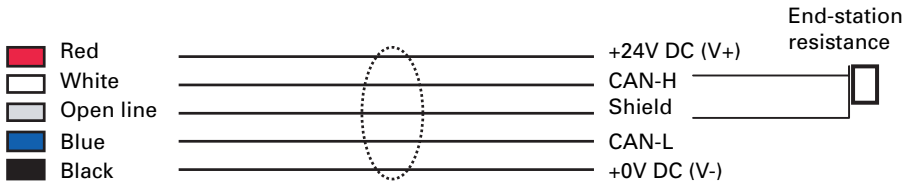
Range: +/- 3%

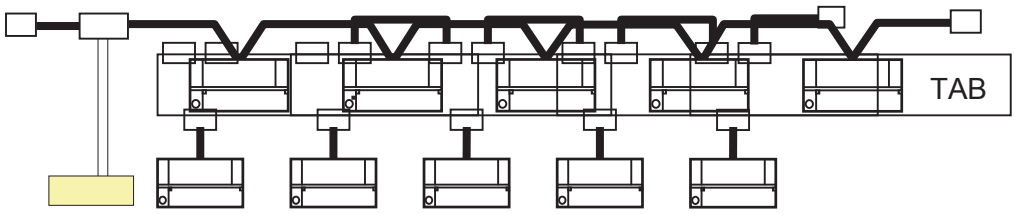
End-station Resistance (Terminator Resistors)

To facilitate signal transmission, end-station resistances should be connected to both ends of communication cable. Make sure to install end-station resistances on both ends of communication cable connecting CAN_H and CAN_L signals. When end-station resistance is missing, communication errors may occur due to data transmission failure.

Specifications of end-station resistance are as follows:

Resistance: 120Ω,1%, 1/2W





Tap (Optional)

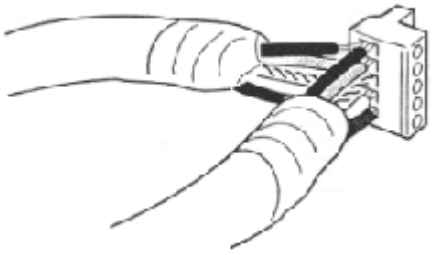
Tap is a convenient component when setting up network wiring among devices at distant locations. Tap is not a required component for wiring. Examples of network wiring in several model cases are as follows:

Wiring with Multi-Drop

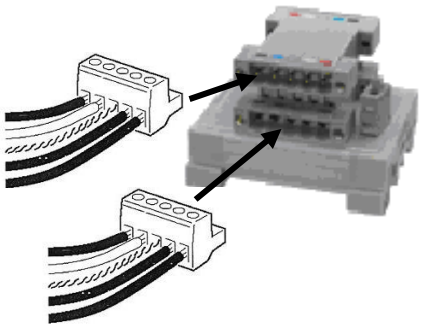
Wiring with Tap

Connector wiring based on network wiring

When not using Tap, wire two lines of same color into the same hole of connector contained in product package. When using Tap, wire each cable separately and link connector to the Tap.



(Using Multi-Drop)



(Using Tap)

Grounding process

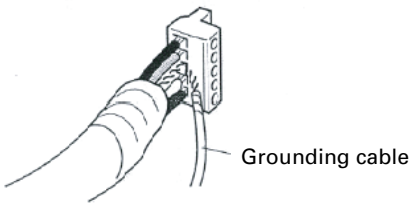
Grounding is necessary to block outside noises from communication signals. When grounding is not properly set up, communication error may occur.

- Ground only one point at the end of power output, to prevent Ground loop between shield and 24V GND lines. Do not set up grounding at multiple points.
- Set up grounding as close as possible to the center of the network.
- Make sure to use triple grounding.
- Separate system grounding and operational inverter (AC drive) grounding.

Connect Drain line of the cable to the FG (Frame Ground) of power supply. The maximum cable length between power supply and power Tap should be 3m (10 feet).

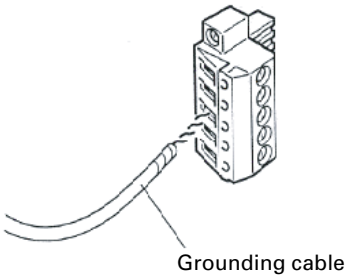
Grounding cable from connector without Tap

Fix the grounding cable with drain line of cable in the same hole as illustrated below.



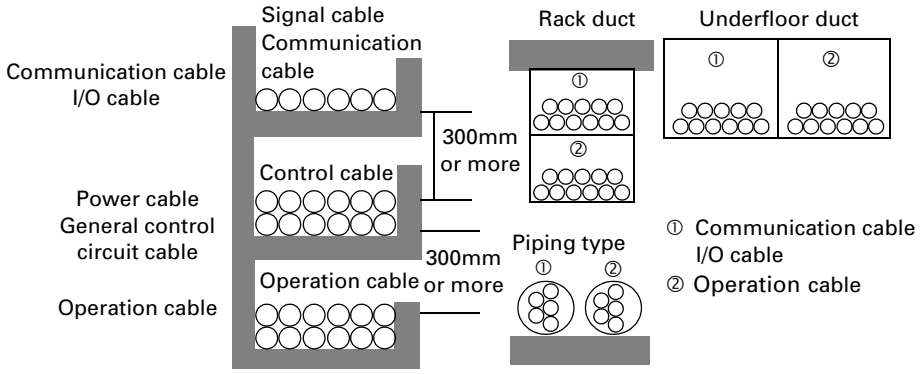
Grounding cable with Tap

Plug a connector linked only to grounding cable to a connector of bifurcation Tap as illustrated below.

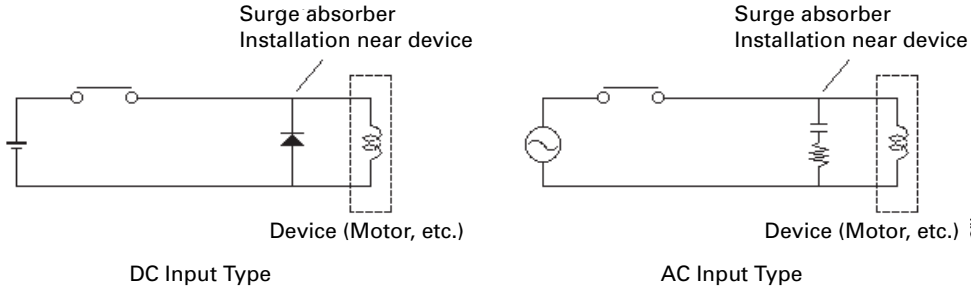


Precautions for wiring

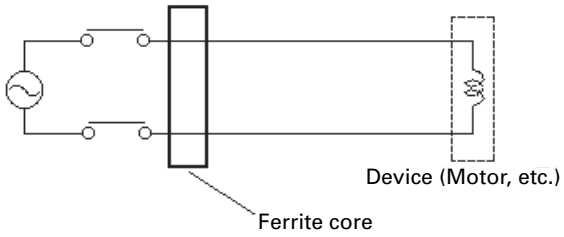
- To prevent induced noise, keep communication, (power) and operation cables as far apart as possible.



- Avoid areas near high-voltage equipment.
- Install surge absorber on noise-generating devices (especially, motor, transformer, solenoid, and magnetic coiled inductor).



- When surge absorber is not available, ferrite core can be also effective when installed next to the terminal block contacts.
- Insert line filter to the 1st communication power.



4

Check Operation Status

When all installation and configuration processes are complete, the adaptor module status LED (MOD LED) and network status LED (NET LED) shall be lit in a green color. If not, it indicates that an error has occurred. See the following table for proper measures.

Item	LED color and status		Symptom	Action
Module status LED (MOD LED)	Off	○	Power error	Check the power connection of adaptor module.
	Green On	●	Normal operation	
	Green Flashing	◐	No initialization	Initialize adaptor module.
	Red On	●	Fatal fault	Check the connections of I/O modules. If error continues, replace adaptor module.
	Red Flashing	◐	Minor fault	
Network status LED (NET LED)	Off	○	Power failure or off-line status	Check the communication and power cables of adaptor module.
	Green On	●	Normal communication	
	Green Flashing	◐	Master communication stand-by Master not configured	Check master module settings. Download settings to master module.
	Red On	●	Communication error	Check all communication settings.
	Red Flashing	◐	Unstable communication	Check connections of communication cables.

5

Troubleshooting

LED Status Diagnosis

Simple status checking and troubleshooting measures using product LED.

NX I/O has 3 types of LED indicators. You can check the operation status of the product with each LED.

MOD	Module status indicator
NET	Network connection status indicator
I/O	I/O status indicator

LED color and device status, and symptoms and proper measures for each case.

Item	LED color and status		Symptom	Action
MOD	Off	○	Power error	Check power supply status.
	Green On	●	Normal operation	
	Red On	●	Basic unit error	Check connection status with extended unit. If error continues, replace product.
	Red Flashing	◐	Extended unit error	
NET	Green On	●	Normal communication	
	Green Flashing	◐	Master communication stand-by Master not configured	Check master configuration. Download settings.
	Red On	●	Communication Error	Check all communication settings.
	Red Flashing	◐	Unstable communication	Check communication wiring status.

Checkpoints about Network Connection Failure after Initial Installation

- Check for false or missing wiring
  Check connector wiring status for each node.
  Check if connector color matches wire color to find out whether there is false or missing wiring.
- End-station resistance
  Check if end-stations are installed at the ends of the network.
- Station number setting
  Check the stations numbers set with rotary switch at each node, and find out whether there are duplicate node addresses.
- Master module setting
  Check if master module settings are correct.
  If configuration is correct, download the settings.
  Use the master module configuration software to check if auto-recognized products at each node are correctly configured.

  - Communication speed setting
  - I/O allocation
  - Settings for each node
  - Download
- Environmental check including grounding
  NX I/O has been approved for excellent environmental noise resistance and has been certified by European CE, American UL and Australian cTick. However, it is better to change the environment when proper communication cannot be established.

Appendix A

Checklist

Master/Slave configuration (Configuration software)

Item	Event	Result
Master	Is communication speed configured?	☐
	Does communication speed match slave speed?	☐
	Is node address configured?	☐
	Is node address not duplicated with another node?	☐
Slave	Is communication speed configured?	☐
	Is the communication speed the same at all nodes on the network?	☐
	Is node address configured?	☐
	Is node address not duplicated with another node?	☐

Wiring

Item	Event	Result
Connector	Are connector/cable correctly linked to Master?	☐
	Are connector/cable correctly linked to Slave?	☐
	Is connector installed correctly?	☐
	Is there no risk of connector separation due to cable weight?	☐
End-station resistance	Are end-station resistances (total 2) installed on both ends of the trunk cable?	☐
	Is proper end-station resistance being used?	☐
Network length	Is the maximum length of network within the proper range?	☐
Branch length	Is branch line length not longer than 6m?	☐
	Is the total branch line length within the proper range?	☐
Cable	Is the right cable for total node current consumption being used?	☐
	Is dedicated cable being used?	☐
	Is the cable wired separately from power and high-voltage cables?	☐
	Is there no tension in the connector on the wiring?	☐
Drain line grounding	Is there only one point of grounding on the network?	☐
	Is the grounding exclusive? (Separation between power and grounding cables)	☐
Others	No other devices besides DeviceNet connected on the communication line?	☐

Power device

Item	Event	Result
Power capacity	Is power capacity calculated from current consumption of each node?	☐
	Is initial current on the first power-on considered for power capacity?	☐
Isolation	Are AC input and DC output isolated in the power supply?	☐

Appendix B

I/O Data Allocation by Model

Adapter Module

NXIO-DNA

Bit No	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte 0	0	0	0	0	D3	D2	D1	D0

Bit Description	Bit	Explanation
NXIO-Bus Status	00-03	0: Exchange IO data (normal operation) 1: Stop Exchanging IO (ready to exchange IO) 2: NXIO-Bus Communication Fault 3: Slot Configuration Fault 4: No Expansion Slot
Reserved	04-06	Reserved
Field Power Status	07	0: 24V ADC Field Power On 1: 24V DC Field Power Off

4 Points Input Module

NXIO-XN4B (24V DC 4 points Sink Type input)
NXIO-XP4B (24V DC 4 points Source Type input)
NXIO-XN4N (48V DC 4 points Sink Type input)
NXIO-XP4N (48V DC 4 points Source Type input)
NXIO-XA4Q (110V AC 4 points input module)
NXIO-XA4W (220V AC 4 points input module)

Bit No	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte 0	0	0	0	0	D3	D2	D1	D0

8 Points Input Module

NXIO-XN8B (24V DC 8 points Sink input)
NXIO-XP8B (24V DC 8 points Source input)
NXIO-XN8N (48V DC 8 points Sink input)
NXIO-XP8N (48V DC 8 points Source input)

Bit No	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte 0	D7	D6	D5	D4	D3	D2	D1	D0

16 Points Input Module

NXIO-XN16B (24V AC 16 points Sink input)

NXIO-XP16B (24V AC 16 points Source input)

Bit No	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte 0	D7	D6	D5	D4	D3	D2	D1	D0
Byte 1	D15	D14	D13	D12	D11	D10	D9	D8

2 Channel 12bit Aanalog Input

NXIO-RTD2 (2Ch, RTD Input)

NXIO-TC2 (2Ch, Thermocouple Input)

Bit No	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte 0	D7	D6	D5	D4	D3	D2	D1	D0
Byte 1	0	0	0	0	D11	D10	D9	D8
Byte 2	D7	D6	D5	D4	D3	D2	D1	D0
Byte 3	0	0	0	0	D11	D10	D9	D8

4 Channel 12bit Aanalog Input

NXIO-AI4A (12bit, 4Ch, 0 to 20mA Current Input)

NXIO-AI4B (12bit, 4Ch, 4 to 20mA Current Input)

NXIO-AI4V (12bit, 4Ch, 0 to 5V Voltage Input)

NXIO-AI4K (12bit, 4Ch, 0 to 10V Voltage Input)

NXIO-AI4L (12bit, 4Ch, -10 to 10V Voltage Input)

Bit No	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte 0	D7	D6	D5	D4	D3	D2	D1	D0
Byte 1	0	0	0	0	D11	D10	D9	D8
Byte 2	D7	D6	D5	D4	D3	D2	D1	D0
Byte 3	0	0	0	0	D11	D10	D9	D8
Byte 4	D7	D6	D5	D4	D3	D2	D1	D0
Byte 5	0	0	0	0	D11	D10	D9	D8
Byte 6	D7	D6	D5	D4	D3	D2	D1	D0
Byte 7	0	0	0	0	D11	D10	D9	D8

4 Channel 14bit Aanalog Input

NXIO-AI4AM (14bit, 4Ch, 0 to 20mA Current Input)

NXIO-AI4BM (14bit, 4Ch, 4 to 20mA Current Input)

NXIO-AI4VM (14bit, 4Ch, 0 to 5V Voltage Input)

NXIO-AI4KM (14bit, 4Ch, 0 to 10V Voltage Input)

NXIO-AI4LM (14bit, 4Ch, -10 to 10V Voltage Input)

Bit No	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte 0	D7	D6	D5	D4	D3	D2	D1	D0
Byte 1	0	0	D13	D12	D11	D10	D9	D8
Byte 2	D7	D6	D5	D4	D3	D2	D1	D0
Byte 3	0	0	D13	D12	D11	D10	D9	D8
Byte 4	D7	D6	D5	D4	D3	D2	D1	D0
Byte 5	0	0	D13	D12	D11	D10	D9	D8
Byte 6	D7	D6	D5	D4	D3	D2	D1	D0
Byte 7	0	0	D13	D12	D11	D10	D9	D8

2 Points Output Module

NXIO-YR2W (Relay 2 points Output Module)

NXIO-YT2V (110V/0.5A SSR 2 points Output Module)

Bit No	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte 0	Reserved						D1	D0

4 Points Output Module

NXIO-YN4K (24V DC/0.5A 4 points Sink output module)

NXIO-YP4K (24V DC/0.5A 4 points Source output module)

Bit No	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte 0	Reserved				D3	D2	D1	D0

Diagnostic 4 Points Output Module (Output and Status Input)

The following models have not only output contacts but also input contacts that show the status of each output contact.

NXIO-YN4LD (24V DC/2A Diagnostic 4 points Sink output module)

NXIO-YP4LD (24V DC/2A Diagnostic 4 points Source output module)

Bit No	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte 0	Reserved				D3	D2	D1	D0

Input Data

Bit No	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte 0	Reserved				S3	S2	S1	S0

When an error occurs at an output contact, the corresponding bit turns ON. The following items can be self-diagnosed.

8 Points Output Module

NXIO-YN8K (24V DC/0.5A 8 points Sink output module)

NXIO-YP8K (24V DC/0.5A 8 points Source output module)

Bit No	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte 0	D7	D6	D5	D4	D3	D2	D1	D0

16 Points Output Module

NXIO-YN16G 24V DC/0.1A 16 points Sink output module

NXIO-YP16G 24V DC/0.1A 16 points Source output module

Bit No	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte 0	D7	D6	D5	D4	D3	D2	D1	D0
Byte 1	D15	D14	D13	D12	D11	D10	D9	D8

2 Channel Aanalog Output Module

NXIO-AO2A (12bit 2Ch 0 to 20mA Current Output Module)

NXIO-AO2B (12bit 2Ch 4 to 20mA Current Output Module)

NXIO-AO2V (12bit 2Ch 0 to 5V Voltage Output Module)

NXIO-AO2K (12bit 2Ch 0 to 10V Voltage Output Module)

NXIO-AO2L (12bit 2Ch -10 to 10V Voltage Output Module)

Bit No	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte 0	D7	D6	D5	D4	D3	D2	D1	D0
Byte 1	0	0	0	0	D11	D10	D9	D8
Byte 2	D7	D6	D5	D4	D3	D2	D1	D0
Byte 3	0	0	0	0	D11	D10	D9	D8

1 Channel High-Speed Counter Module

Input Data

Byte Offset	Decimal Bit							
	Bit 7	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
Byte #0	Current Count Value (Low) when IDS=0 Stored Count Value (Low) when IDS=1							
Byte #1	Current Count Value (Middle) when IDS=0 Stored Count Value (Middle) when IDS=1							
Byte #2	Current Count Value (High) when IDS=0 Stored Count Value (High) when IDS=1							
Byte #3	Always 0							
Byte #4	Status Low (compared flags)							
	0	0	SUF	SOF	SEQL(=)	SEQ(=)	SLT(<)	SGT(>)
Byte #5	Status High (same as LED display)							
	0	0	SOT	SGIN	SBIN	SAIN	SDN	SUP

SUF: Status Underflow (Latched)

SOF: Status Overflow (Latched)

SEQL(=): Status Current count value = Compare count value (Latched)

SEQ(=): Status Current count value = Compare count value (Unlatched)

SLT(<): Status Current count value < Compare count value (Unlatched)

SGT(>): Status Current count value > Compare count value (Unlatched)

SUP: Status Counter Up

SDN: Status Counter Down

SAIN: Status A Terminal Input

SBIN: Status B Terminal Input

SGIN: Status G Terminal Input

SOT: Status Output Terminal (same as OT)

Output Data

<table>
<tr><th rowspan="2">Byte Offset</th><th colspan="8">Decimal Bit</th></tr>
<tr><th>Bit 7</th><th>Bit 6</th><th>Bit 5</th><th>Bit 4</th><th>Bit 3</th><th>Bit 2</th><th>Bit 1</th><th>Bit 0</th></tr>
<tr><td rowspan="2">Byte #0</td><td colspan="8">Status Output Terminal (OT) Control</td></tr>
<tr><td colspan="4">Status Output Terminal Selection
“0000” : Force Off
“0001” : GT
“0010” : LT
“0011” : EQ
“0101” : Overflow
“0110” : Underflow
“1001” : Count Up
“1010” : Count Down
“1011” : A Terminal Input
“1100” : B Terminal Input
“1101” : G Terminal Input
“1110” : PWM Output
“1111” : Force On
others: Force Off</td><td colspan="4">Status Output Terminal Pulse Width
“0000” : Bypass
“0001” : 1msec
“0010” : 5msec
“0011” : 10msec
“0100” : 20msec
“0101” : 50msec
“0110” : 100msec
“0111” : 200msec
“1000” : 500msec
“1111” : Latched
others: Bypass</td></tr>
<tr><td rowspan="4">Byte #1</td><td colspan="9">Command or PWM Duty value (PWM Output Mode)</td></tr>
<tr><td rowspan="2">Command</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
<tr><td>HRST</td><td>CR</td><td>CP</td><td>CST</td><td>PU</td><td>PO</td><td>PE</td><td>IDS</td></tr>
<tr><td>PWM duty value</td><td colspan="8">0 to 100dec(=0 to 100%)</td></tr>
</table>

HRST: HSC Reset
CR: Counter Reset, Current count value=0
CP: Counter Preset, Current count value=Initial count value
CST: Clear Status (SOT,SUF,SOF,SEQL)
Pot: Process Overflow
PU: Process Underflow
PE: Process Equal
IDS: Input Data Selection (0:Current count value, 1:Store count value)

Appendix C

Configuration Parameter by Model

Configuration settings are saved on the EEPROM of the module, and maintained until re-configuration.

4 Points Output Module

NXIO-YN4K (4-sinking output, 24V DC 0.5A)

NXIO-YP4K (4-sourcing output, 24V DC 0.5A)
NXIO-YN4KD (4-sinking output, Diag, 24V DC 0.5A)
NXIO-YP4KD (4-sourcing output, Diag, 24V DC 0.5A)
NXIO-YN4LD (4-sinking output, Diag, 24V DC 2A)
NXIO-YP4LD (4-sourcing output, Diag, 24V DC 2A)

Size: 2 bytes

Parameter Data

Offset	Bit	Description	Default Value
0	00-03	Fault Action (ch0 to ch3) 0: Fault Value, 1: Hold last state	0 (Fault Value)
	04-07	Reserved	0
1	00-03	Fault Value (ch0 to ch3) 0: off, 1: on	0 (off)
	04-07	Reserved	0

8 Points Output Module

NXIO-YN8K (8-sinking output, 24V DC 0.5A)
NXIO-YP8K (8-sourcing output, 24V DC 0.5A)

Size: 2 bytes

Parameter Data

Offset	Bit	Description	Default Value
0	00-07	Fault Action (ch0 to ch7) 0: Fault Value, 1: Hold last state	0 (Fault Value)
1	00-07	Fault Value (ch0 to ch7) 0: off, 1: on	0 (off)

16 Points Output Module

NXIO-YN16G (16-sinking output, 24V DC 0.3A)
NXIO-YP16G (16-sourcing output, 24V DC 0.3A)

Size: 4 bytes

Parameter Data

Offset	Bit	Description	Default Value
0	00-07	Fault Action (ch0 to ch7) 0: Fault Value, 1: Hold last state	0 (Fault Value)
1	00-07	Fault Action (ch8 to ch15) 0: Fault Value, 1: Hold last state	0 (Fault Value)
2	00-07	Fault Value (ch0 to ch7) 0: off, 1: on	0 (off)
3	00-07	Fault Value (ch8 to ch15) 0: off, 1: on	0 (off)

2 Points Output Module

NXIO-YR2W (2-relay output, 230V AC 2A)
NXIO-YT2V (2-triac output, 120V AC 0.5A)

Size: 2 bytes

Parameter Data

Offset	Bit	Description	Default Value
0	00, 01	Fault Action (ch0, ch1) 0: Fault Value, 1: Hold last state	0 (Fault Value)
	02-07	Reserved	0
1	00, 01	Fault Value (ch0, ch1) 0: off, 1: on	0 (off)
	02-07	Reserved	0

RTD Module

NXIO-RTD2 (2- RTD/Resistance input)

Size: 2 bytes

Parameter Data

Offset	Bit	Description	Default Value
0	00-07	The selection **Sensor Type** =**00h**:PT100, 0.00385, -200 to 850°C, 0.1°C /count =**01h**:PT200, 0.00385, -200 to 850°C, 0.1°C/count =**02h**:PT500, 0.00385, -200 to 850°C, 0.1°C/count =**03h**:PT1000, 0.00385, -200 to 350°C, 0.1°C/count =**04h**:PT50, 0.00385, -200 to 850°C, 0.1°C/count =**10h**:JPT100, 0.003916, -200 to 640°C, 0.1°C/count =**11h**:JPT200, 0.003916, -200 to 640°C, 0.1°C/count =**12h**:JPT500, 0.003916, -200 to 640°C, 0.1°C/count =**13h**:JPT1000, 0.003916, -200 to 350°C, 0.1°C/count =**20h**:NI100, 0.00618, -60 to 250°C, 0.1°C/count =**21h**:NI200, 0.00618, -60 to 250°C, 0.1°C/count =**22h**:NI500, 0.00618, -60 to 250°C, 0.1°C/count =**23h**:NI1000, 0.00618, -60 to 180°C, 0.1°C/count =**30h**:NI120, 0.00672, -80 to 250°C, 0.1°C/count =**40h**:CU10, 0.00427, -200 to 260°C, 0.1°C/count =**80h**:Resistance Input, 1 to 2,000Ω, 100mΩ/1count =**81h**: Resistance Input, 1 to 2,000Ω, 100mΩ/1count =**82h**: Resistance Input, 1 to 2,000Ω, 100mΩ/1count =Others: Reserved	0: PT100
1	00	Temperature Type 0: Celsius (°C), 1: Fahrenheit (°F)	0: Celsius (°C)
	01-03	Reserved	0
	04	Filter Type 0: Normal Filter, 1: Enhanced Filter	0: Normal Filter
	05-07	Reserved	0

TC Module

NXIO-TC2 (2- Thermocouple/mV input)

Size: 2 bytes

Parameter Data

Offset	Decimal Bit	Description	Default Value
0	00-07	The selection **Sensor Type** =**00h**: Type K, 0.1°C/count =**01h**: Type J, 0.1°C/count =**02h**: Type T, 0.1°C/count =**03h**: Type B, 0.1°C/count =**04h**: Type R, 0.1°C/count =**05h**: Type S, 0.1°C/count =**06h**: Type E, 0.1°C/count =**07h**: Type N, 0.1°C/count =**08h**: Type L, 0.1°C/count =**09h**: Type U, 0.1°C/count =**0Ah**: Type C, 0.1°C/count =**0Bh**: Type D, 0.1°C/count =**80h**: 10uV Input, -78.0 to 78.0mV, 10uV/1count =**81h**: 1uV Input, -32.7 to 32.7mV, 1uV/1count =**82h**: 2uV Input, -65.5 to 65.5mV, 2uV/1count =Others: Reserved	0: Type K
1	00	Temperature Type 0: Celsius (°C), 1: Fahrenheit (°F)	0: Celsius (°C)
	01	0: Cold Junction Compensation 1: Disable Compensation	0
	02, 03	Reserved	0
	04	Filter Type 0: Normal Filter, 1: Enhanced Filter	0: Normal Filter
	05-07	Reserved	0

Aanalog Output Module

NXIO-AO2A (2-current analog output, 0 to 20mA, 12bit)
NXIO-AO2B (2-current analog output, 4 to 20mA, 12bit)
NXIO-AO2K (2-voltage analog output, 0 to 10V DC, 12bit)
NXIO-AO2L (2-voltage analog output, -10 to 10V DC, 12bit)
NXIO-AO2V (2-voltage analog output, 0 to 5V DC, 12bit)

Size: 6 bytes

Parameter Data

Offset	Bit	Description	Default Value
0	00-01	Fault Action for channel 0 00: Fault Value, 01: Hold last state, 10: Low Limit, 11:High Limit	0 (Fault Value)
	02-03	Fault Action for channel 0 00: Fault Value, 01: Hold last state, 10: Low Limit, 11:High Limit	0 (Fault Value)
	04-07	Reserved	0
1	00-07	Reserved	0
2	00-07	Channel 0 Fault Value Low Byte	0
3	00-03	Channel 0 Fault Value High Byte	0
	04-07	Reserved	0
4	00-07	Channel 1 Fault Value Low Byte	0
5	00-03	Channel 1 Fault Value High Byte	0
	04-07	Reserved	0
6	00-07	Not used	0
7	00-07	Not used	0

High-speed Counter Module

NXIO-HSC1A (1 Channel High Speed Counter 5V DC)
NXIO-HSC1G (1 Channel High Speed Counter 24V DC)

Size: 6 bytes

Parameter Data

Offset	Decimal Bit	Description	Default Value
0	00-03	Counter Mode	0
	04-07	Gate Function	0
1	00-03	Input Filter	0
	04-07	Gate Sampling Time	0
2	00-07	Not used	0
3	00-07	Not used	0
4	00-07	Not used	0
5	00-07	Not used	0
6	00-07	Not used	0
7	00-07	Not used	0