

NX-series Digital Mixed I/O Units

NX-MD

CSM_NX-MD_DS_E_2_1

Digital Mixed I/O Units for High speed Synchronous Control

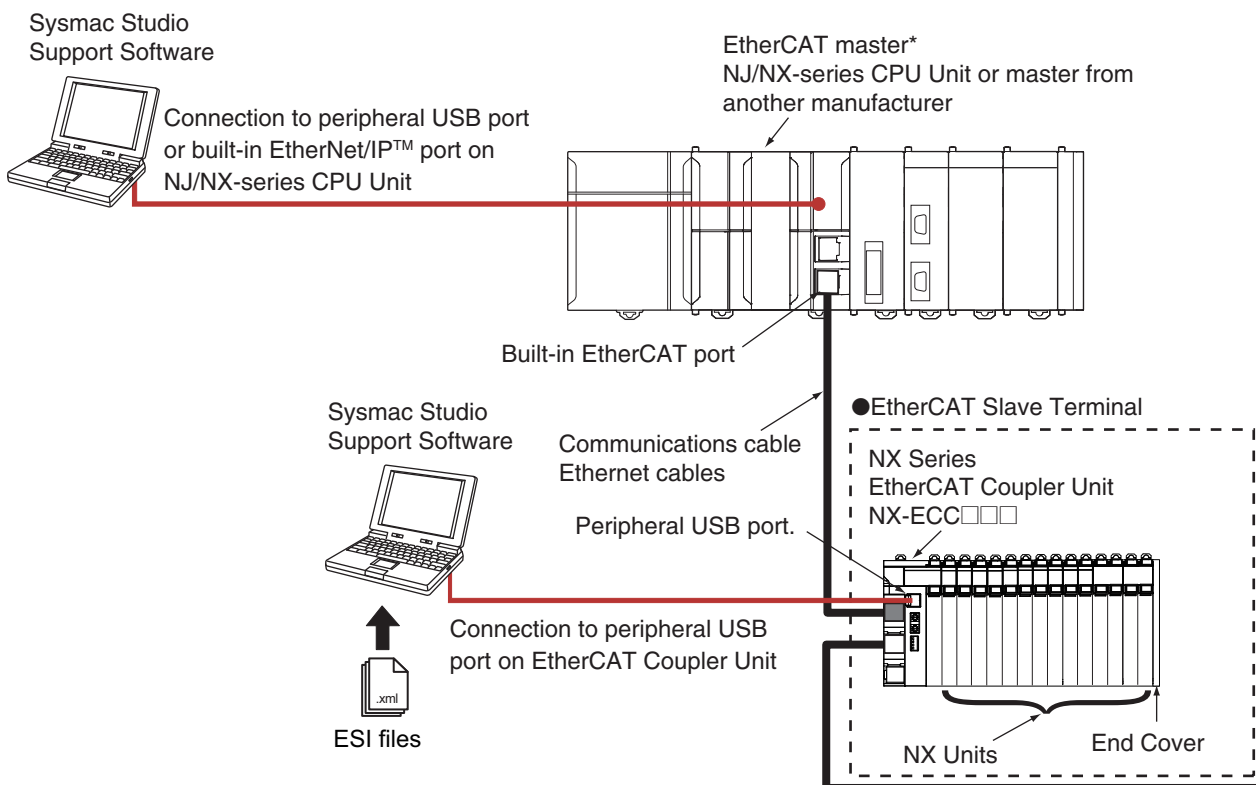
- DC Input/Transistor Output Units for the NX-series modular I/O system.
- Connect to other NX-series I/O Units and EtherCAT Coupler units using the high-speed NX-bus.
- One Unit enables synchronous Units to update the status of input devices to the controller and the output status of synchronous Units according to the controller's instructions every EtherCAT cycle.



Features

- High-speed I/O refreshing is possible by connecting with the NX-series EtherCAT Coupler.
- Output refreshing can be synchronized with the control cycle of the Controller. (Synchronous refreshing)
- Connector Types significantly reduces wiring work.

System Configuration



* Refer to *Versions information* on the unit versions of CPU Units when you connect an EtherCAT Slave Terminal to the built-in EtherCAT port on an OMRON NJ/NX-series CPU Unit. OMRON CJ1W-NC□81/□82 Position Control Units cannot be connected to the EtherCAT Slave Terminal even though they support EtherCAT.

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Ordering Information

International Standards


- The standards are abbreviated as follows: U: UL, U1: UL (Class I Division 2 Products for Hazardous Locations), C: CSA, UC: cULus, UC1: cULus (Class I Division 2 Products for Hazardous Locations), CU: cUL, N: NK, L: Lloyd, CE: EC Directives, and KC: KC Registration.
- Contact your OMRON representative for further details and applicable conditions for these standards.

Digital Mixed I/O Unit

● DC Input/Transistor Output Units (MIL Connector, 30 mm Width)

Unit type	Product Name	Specification						Model	Standards
		Number of points	Internal I/O common	Maximum value of load current	Rated voltage	I/O refreshing method	ON/OFF response time		
NX Series Digital Mixed I/O Units		Outputs: 16 points Inputs: 16 points	Outputs: NPN Inputs: For both NPN/PNP	0.5 A/point, 2 A/Unit	Outputs: 12 to 24 VDC Inputs: 24 VDC	Switching Synchronous I/O refreshing and Free-Run refreshing	Outputs: 0.1 ms max./ 0.8 ms max. Inputs: 20 μs max./ 400 μs max.	NX-MD6121-5	UC1, CE, KC
			Outputs: PNP Inputs: For both NPN/PNP		Outputs: 24 VDC Inputs: 24 VDC		Outputs: 0.5 ms max./ 1.0 ms max. Inputs: 20 μs max./ 400 μs max.	NX-MD6256-5	

● DC Input/Transistor Output Units (Fujitsu Connector, 30 mm Width)

Unit type	Product Name	Specification						Model	Standards
		Number of points	Internal I/O common	Maximum value of load current	Rated voltage	I/O refreshing method	ON/OFF response time		
NX Series Digital Output Units		Outputs: 16 points Inputs: 16 points	Outputs: NPN Inputs: For both NPN/PNP	0.5 A/point, 2 A/Unit	Outputs: 12 to 24 VDC Inputs: 24 VDC	Switching Synchronous I/O refreshing and Free-Run refreshing	Outputs: 0.1 ms max./ 0.8 ms max. Inputs: 20 μs max./ 400 μs max.	NX-MD6121-6 NEW	UC1, CE, KC

Accessories

Not included.

General Specification

Item	Specification	
Enclosure	Mounted in a panel	
Grounding method	Ground to 100 Ω or less	
Operating environment	Ambient operating temperature	0 to 55°C
	Ambient operating humidity	10% to 95% (with no condensation or icing)
	Atmosphere	Must be free from corrosive gases.
	Ambient storage temperature	-25 to 70°C (with no condensation or icing)
	Altitude	2,000 m max.
	Pollution degree	2 or less: Conforms to JIS B3502 and IEC 61131-2.
	Noise immunity	2 kV on power supply line (Conforms to IEC61000-4-4.)
	Overvoltage category	Category II: Conforms to JIS B3502 and IEC 61131-2.
	EMC immunity level	Zone B
	Vibration resistance *1	Conforms to IEC 60068-2-6. 5 to 8.4 Hz with 3.5-mm amplitude, 8.4 to 150 Hz, acceleration of 9.8 m/s ² , 100 min each in X, Y, and Z directions (10 sweeps of 10 min each = 100 min total)
Shock resistance *1	Conforms to IEC 60068-2-27. 147 m/s ² , 3 times each in X, Y, and Z directions	
Applicable standards *2	cULus: Listed UL508 and ANSI/ISA 12.12.01 EC: EN 61131-2 and C-Tick, KC: KC Registration, NK, LR	

*1 For the Relay Output Unit, refer to the Digital Input Unit Specifications.

*2 Refer to the OMRON website (<http://www.ia.omron.com/>) or consult your OMRON representative for the most recent applicable standards for each model.

Digital Mixed I/O Unit Specifications

● DC Input/Transistor Output Units (MIL Connector, 30 mm Width) NX-MD6121-5

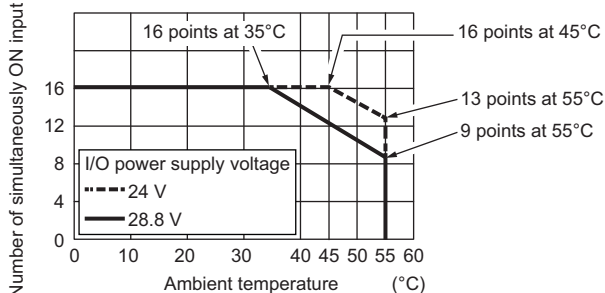
Unit name		DC Input/Transistor Output Unit	Model	NX-MD6121-5		
Number of points		16 inputs/16 outputs	External connection terminals	2 MIL connectors (20 terminals)		
I/O refreshing method		Switching Synchronous I/O refreshing and Free-Run refreshing				
Output section (CN1)	Internal I/O common	NPN	Input section (CN2)	Internal I/O common	For both NPN/PNP	
	Rated voltage	12 to 24 VDC		Rated input voltage	24 VDC (15 to 28.8 VDC)	
	Operating load voltage range	10.2 to 28.8 VDC		Input current	7 mA typical (at 24 VDC)	
	Maximum value of load current	0.5 A/point, 2 A/Unit		ON voltage/ON current	15 VDC min./3 mA min. (between COM and each signal)	
	Maximum inrush current	4.0 A/point, 10 ms max.		OFF voltage/OFF current	5 VDC max./1 mA max. (between COM and each signal)	
	Leakage current	0.1 mA max.		ON/OFF response time	20 μs max./400 μs max.	
	Residual voltage	1.5 V max.		Input filter time	No filter, 0.25 ms, 0.5 ms, 1 ms (default), 2 ms, 4 ms, 8 ms, 16 ms, 32 ms, 64 ms, 128 ms, 256 ms	
Indicators	TS indicator, I/O indicators		Dimensions	30 (W) x 100 (H) x 71 (D)		
			Isolation method	Photocoupler isolation		
			Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)		
			Dielectric strength	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.		
			I/O power supply method	Supply from external source		
			Current capacity of I/O power supply terminal	Without I/O power supply terminals		
			NX Unit power consumption	0.70 W max.		
			Current consumption from I/O power supply	30 mA max.		
			Weight	105 g max.		
	Circuit layout	<p>CN1 (left) output circuit</p>				
<p>CN2 (right) input circuit</p>						

Installation orientation and restrictions

Installation orientation: Possible in 6 orientations.
Restrictions: As shown in the following.

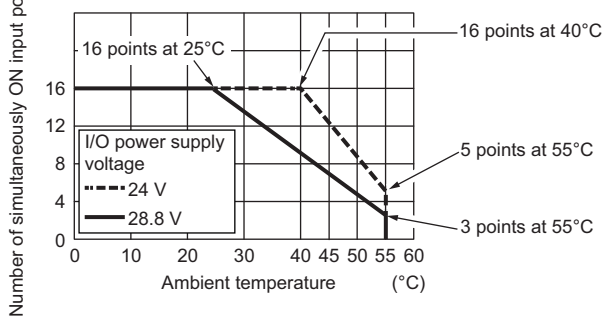
• For upright installation

Number of simultaneously ON input points vs. Ambient temperature characteristic



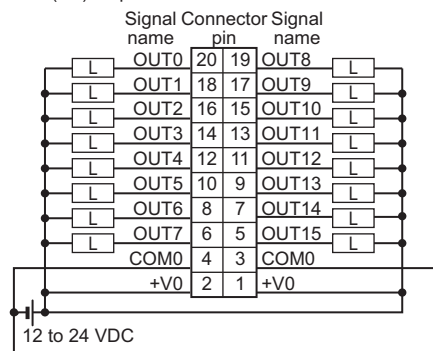
• For any installation other than upright

Number of simultaneously ON input points vs. Ambient temperature characteristic



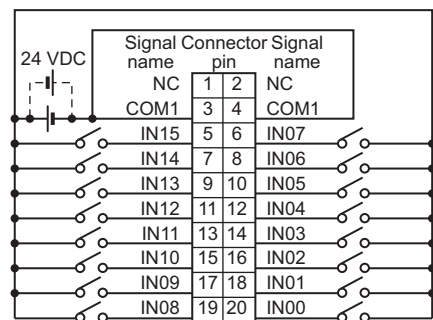
Terminal connection diagram

CN1 (left) output terminal



- Be sure to wire both pins 3 and 4 (COM0) of CN1.
- Be sure to wire both pins 1 and 2 (+V0) of CN1.

CN2 (right) input terminal



- The polarity of the input power supply of CN2 can be connected in either direction.
- Be sure to wire both pins 3 and 4 (COM1) of CN2, and set the same polarity for both pins.

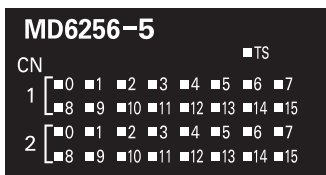
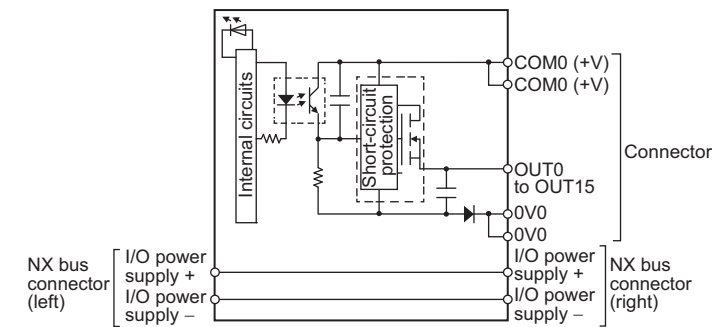
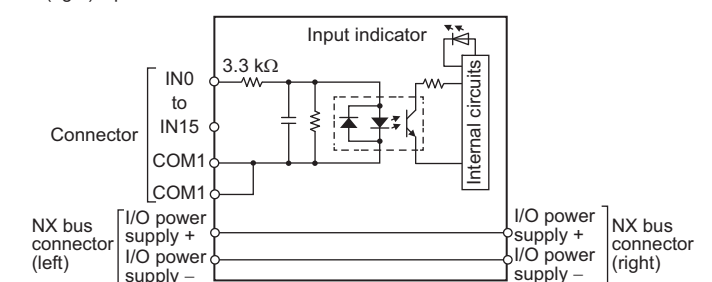
Disconnection/Short-circuit detection

Not supported.

Protective function

Not supported.

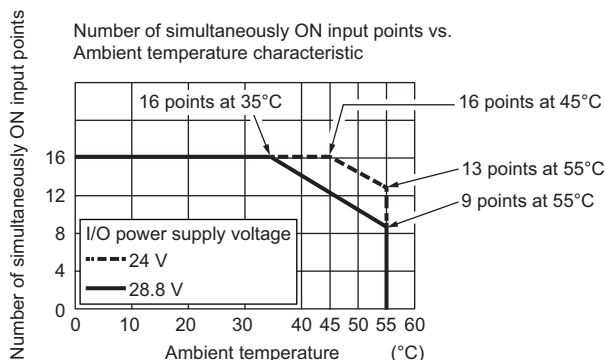
NX-MD6256-5

Unit name		DC Input/Transistor Output Unit	Model	NX-MD6256-5	
Number of points		16 inputs/16 outputs	External connection terminals	2 MIL connectors (20 terminals)	
I/O refreshing method		Switching Synchronous I/O refreshing and Free-Run refreshing			
Output section (CN1)	Internal I/O common	PNP	Input section (CN2)	Internal I/O common	For both NPN/PNP
	Rated voltage	24 VDC		Rated input voltage	24 VDC (15 to 28.8 VDC)
	Operating load voltage range	20.4 to 28.8 VDC		Input current	7 mA typical (at 24 VDC)
	Maximum value of load current	0.5 A/point, 2 A/Unit		ON voltage/ON current	15 VDC min./3 mA min. (between COM and each signal)
	Maximum inrush current	4.0 A/point, 10 ms max.		OFF voltage/OFF current	5 VDC max./1 mA max. (between COM and each signal)
	Leakage current	0.1 mA max.		ON/OFF response time	20 μs max./400 μs max.
	Residual voltage	1.5 V max.		Input filter time	No filter, 0.25 ms, 0.5 ms, 1 ms (default), 2 ms, 4 ms, 8 ms, 16 ms, 32 ms, 64 ms, 128 ms, 256 ms
Indicators	TS indicator, I/O indicators		Dimensions	30 (W) x 100 (H) x 71 (D)	
			Isolation method	Photocoupler isolation	
Circuit layout			Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	
			Dielectric strength	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.	
			I/O power supply method	Supply from external source	
			Current capacity of I/O power supply terminal	Without I/O power supply terminals	
			NX Unit power consumption	0.75 W max.	
			Current consumption from I/O power supply	40 mA max.	
			Weight	110 g max.	

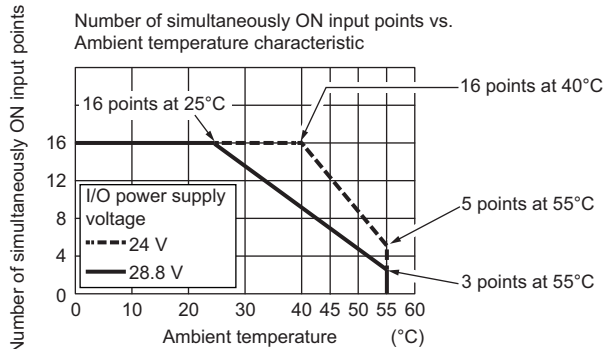
Installation orientation and restrictions

Installation orientation: Possible in 6 orientations.
Restrictions: As shown in the following.

- For upright installation

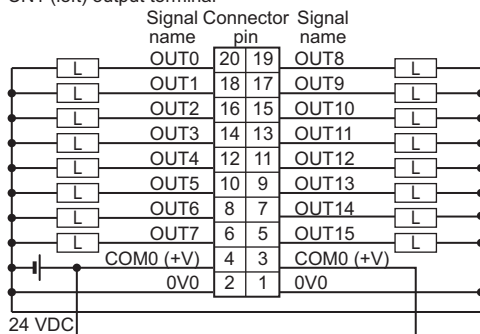


- For any installation other than upright



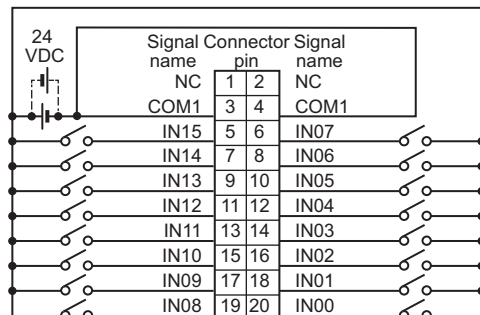
Terminal connection diagram

CN1 (left) output terminal



- Be sure to wire both pins 3 and 4 (COM0 (+V)) of CN1.
- Be sure to wire both pins 1 and 2 (0V0) of CN1.

CN2 (right) input terminal



- The polarity of the input power supply of CN2 can be connected in either direction.
- Be sure to wire both pins 3 and 4 (COM1) of CN2, and set the same polarity for both pins.

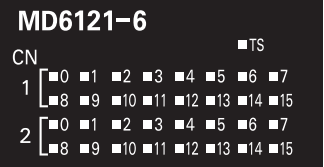
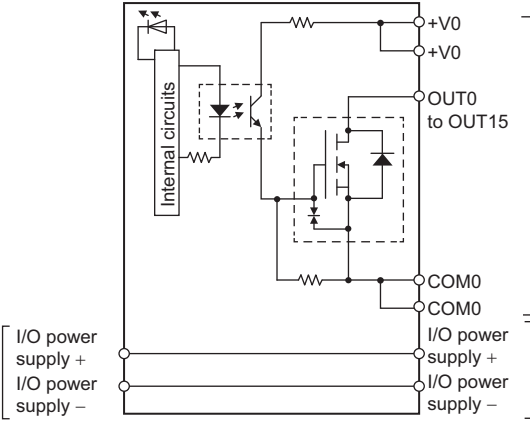
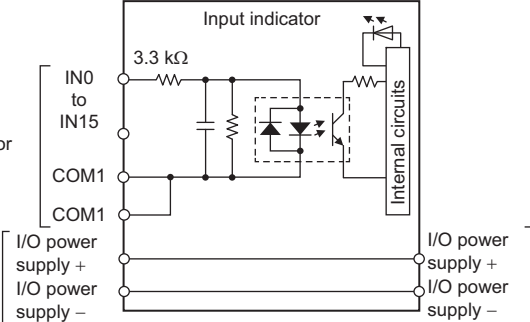
Disconnection/Short-circuit detection

Not supported.

Protective function

With load short-circuit protection.

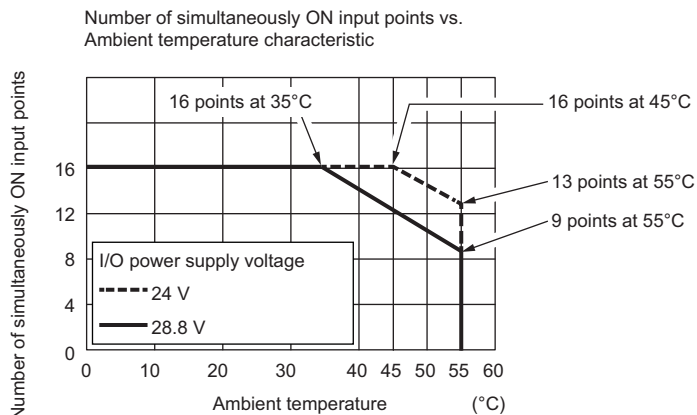
● DC Input/Transistor Output Units (Fujitsu Connector, 30 mm Width) NX-MD6121-6

Unit name		DC Input/Transistor Output Unit		Model		NX-MD6121-6	
Number of points		16 inputs/16 outputs		External connection terminals		2 Fujitsu connectors (24 terminals)	
I/O refreshing method		Switching Synchronous I/O refreshing and Free-Run refreshing					
Output section (CN1)	Internal I/O common	NPN		Input section (CN2)	Internal I/O common	For both NPN/PNP	
	Rated voltage	12 to 24 VDC			Rated input voltage	24 VDC (15 to 28.8 VDC)	
	Operating load voltage range	10.2 to 28.8 VDC			Input current	7 mA typical (at 24 VDC)	
	Maximum value of load current	0.5 A/point, 2 A/Unit			ON voltage/ON current	15 VDC min./3 mA min. (between COM and each signal)	
	Maximum inrush current	4.0 A/point, 10 ms max.			OFF voltage/OFF current	5 VDC max./1 mA max. (between COM and each signal)	
	Leakage current	0.1 mA max.			ON/OFF response time	20 μs max./400 μs max.	
	Residual voltage	1.5 V max.			Input filter time	No filter, 0.25 ms, 0.5 ms, 1 ms (default), 2 ms, 4 ms, 8 ms, 16 ms, 32 ms, 64 ms, 128 ms, 256 ms	
	ON/OFF response time	0.1 ms max./0.8 ms max.					
Indicators	TS indicator, I/O indicators			Dimensions		30 (W) x 100 (H) x 71 (D)	
				Isolation method		Photocoupler isolation	
				Insulation resistance		20 MΩ min. between isolated circuits (at 100 VDC)	
				Dielectric strength		510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.	
				I/O power supply method		Supply from external source	
				Current capacity of I/O power supply terminal		Without I/O power supply terminals	
				NX Unit power consumption		0.70 W max.	
				Current consumption from I/O power supply		30 mA max.	
				Weight		95 g max.	
	Circuit layout	<p>CN1 (left) output circuit</p> 					
<p>CN2 (right) input circuit</p> 							

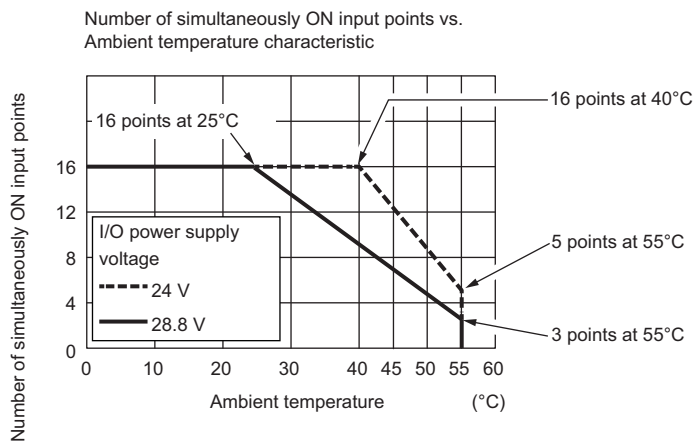
Installation orientation and restrictions

Installation orientation: Possible in 6 orientations.
 Restrictions: As shown in the following.

- For upright installation

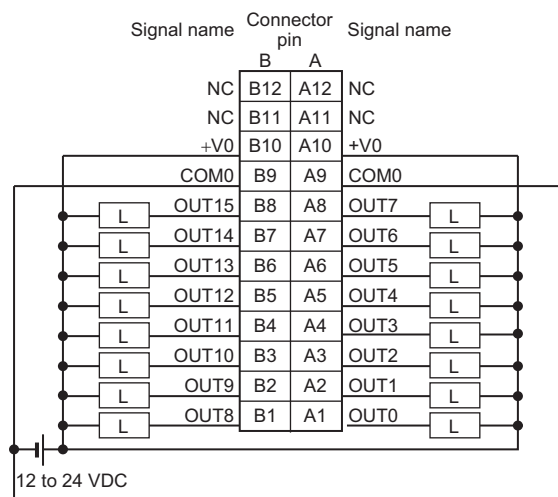


- For any installation other than upright



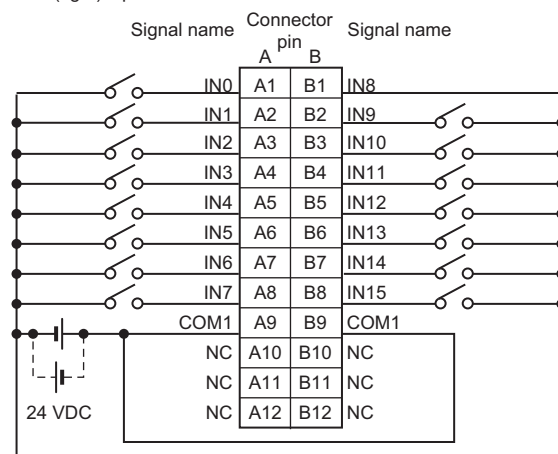
Terminal connection diagram

CN1 (left) output terminal



- Be sure to wire both pins A9 and B9 (COM0) of CN1.
- Be sure to wire both pins A10 and B10 (+V0) of CN1.

CN2 (right) input terminal



- The polarity of the input power supply of CN2 can be connected in either direction.
- Be sure to wire both pins A9 and B9 (COM1) of CN2, and set the same polarity for both pins.

Disconnection/Short-circuit detection

Not supported.

Protective function

Not supported.

Version Information

NX Units		Corresponding Unit Versions/Versions *				
Model	Unit version	EtherCAT			EtherNet/IP	
		Communications Coupler Units NX-ECC20□	NJ/NX series CPU Units NJ501-□□□□ NJ301-□□□□ NJ101-□□□□ NX701-□□□□	Sysmac Studio	Communications Coupler Units NX-EIC202	Sysmac Studio
NX-MD6121-5	Ver.1.0	Ver.1.0	Ver.1.05	Ver.1.10	Ver.1.0	Ver.1.10
NX-MD6121-6				Ver.1.13		Ver.1.13
NX-MD6256-5				Ver.1.10		Ver.1.10

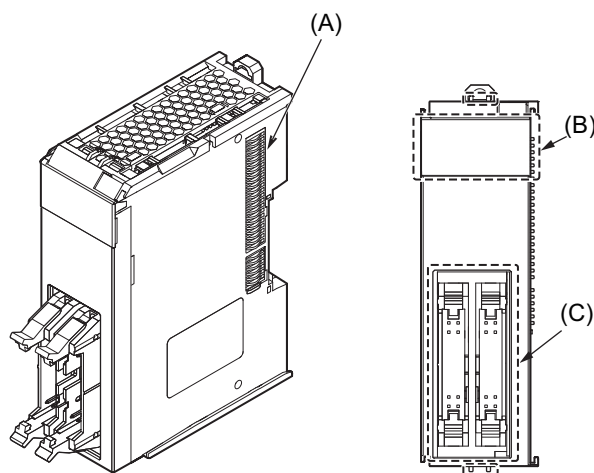
* Some Units do not have all of the versions given in the above table. If a Unit does not have the specified version, support is provided by the oldest available version after the specified version. Refer to the user's manuals for the specific Units for the relation between models and versions.

External Interface

Connector Types

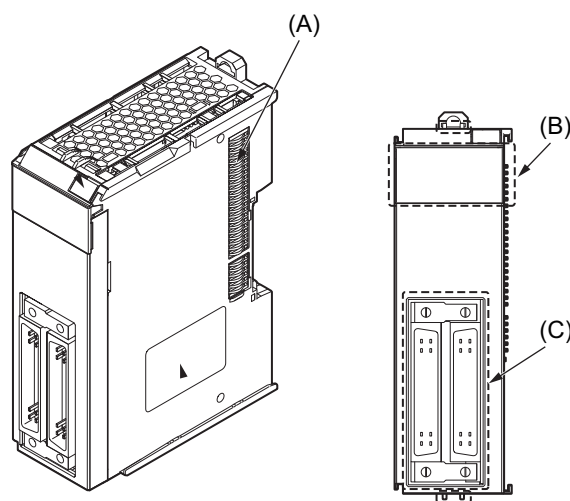
NX Units (30 mm Width)

● Units with MIL Connectors (2 Connectors with 20 Terminals)



Letter	Name	Function
(A)	NX bus connector	This connector is used to connect each Unit.
(B)	Indicators	The indicators show the current operating status of the Unit.
(C)	Connectors	The connectors are used to connect to external devices. The number of terminals depends on the type of Unit.

● Units with Fujitsu Connectors (2 Connectors with 24 Terminals)



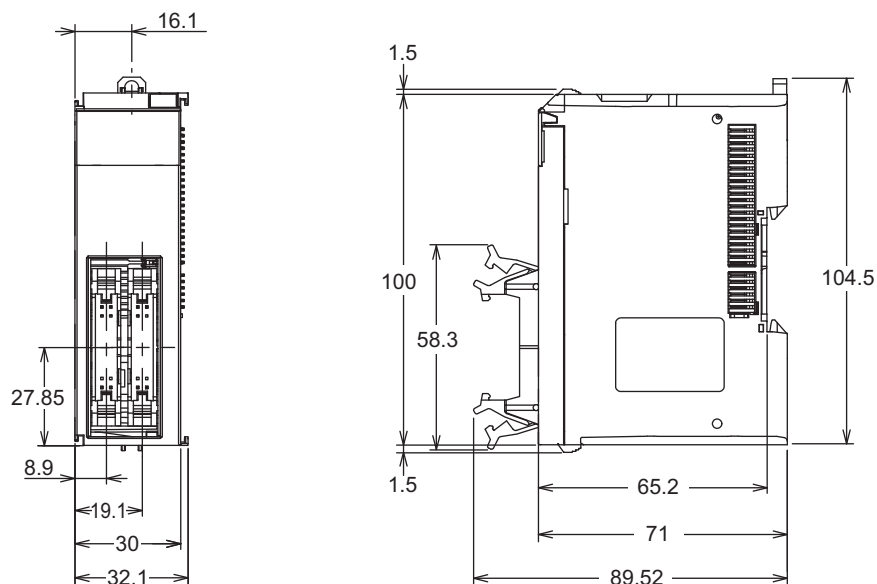
Letter	Name	Function
(A)	NX bus connector	This connector is used to connect each Unit.
(B)	Indicators	The indicators show the current operating status of the Unit.
(C)	Connectors	The connectors are used to connect to external devices.

Dimensions

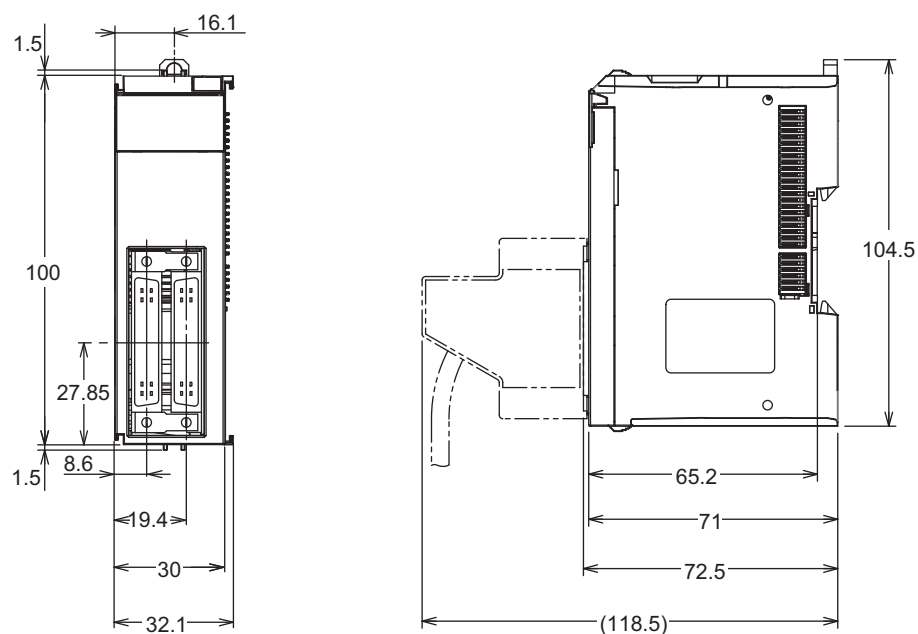
Connector Types

30 mm Width

● Units with MIL Connectors (2 Connectors with 20 Terminals)



● Units with Fujitsu Connectors (2 Connectors with 24 Terminals)



Related Manuals

Cat. No.	Model number	Manual name	Application	Description
W521	NX-IA□□□□ NX-ID□□□□ NX-OD□□□□ NX-OC□□□□ NX-MD□□□□	NX-series Digital I/O Units User's Manual	Learning how to use NX-series Digital I/O Units	The hardware, setup methods, and functions of the NX-series Digital I/O Units are described.

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Read and understand this catalog.

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