Chipsmall

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OMRON

Machine Automation Controller
NX1P

Compact package-type
machine automation controller

NX1P2-9024DT
NX1P2-9024DT1

NX1P2-1□40DT
NX1P2-1□40DT1

Features

- Integrated sequence control and motion control
- Up to eight axes of control via EtherCAT
- Up to four synchronized axes - electronic gear/cam and linear/circular interpolation
- Standard-feature EtherCAT control network support
- Safety subsystem on EtherCAT
- Standard-feature EtherNet/IP port
- Built-in I/O
- Up to eight NX I/O Units connectable
- Up to sixteen remote NX I/O Units connectable via EtherCAT coupler
- Up to two option boards connectable to add serial communications or analog I/O functionality
- Battery-free operation
- Fully conforms with IEC 61131-3 standard programming

System Configuration

Basic System Configuration

Support Software

* Includes System Units such as Additional I/O Power Supply Unit.

Interpreting Model Numbers

Not all combinations are possible. Refer to List of Models in Ordering Information, below.

No	Item	Symbol	Specifications
1	Type	P	DC power supply model with built-in I/O
2	Control engine	1	Motion control axes
		9	No motion control axis (Single-axis position control axes only)
3	Synchronized motion control axes *	0	2 axes
		1	4 axes
4	Built-in I/O	24	24 (14 inputs, 10 outputs)
		40	40 (24 inputs, 16 outputs)
5	Built-in input type	D	DC inputs
6	Built-in output type	T	NPN transistor outputs
		T1	PNP transistor outputs

* The number of synchronized motion control axes when "2 Control engine" is "1".
  When "2 Control engine" is "9", "3 Synchronized motion control axes" is always "0" but there is no synchronized motion control axis.

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: EU Directives, EAC: EAC mark, RCM: Regulatory Compliance Mark and KC: KC Registration.
- Contact your OMRON representative for further details and applicable conditions for these standards.

NX-series NX1P2 CPU Units

Product Name	Program capacity	Memory capacity for variables	Maximum number of used real axes			Total number of built-in I/O points			Model	Standards
				Used motion control servo axes *1	Used single-axis position control servo axes *1		Number of input points	Number of output points		
NX1P2 CPU Unit	1.5 MB	32 KB (Retained during power interruptions) or 2 MB (Not retained during power interruptions)	8 axes	4 axes	4 axes	40 points	24 points	16 points, NPN transistor	NX1P2-1140DT	UC1, N, L, CE, RCM, KC, EAC
								16 points, PNP transistor *2	NX1P2-1140DT1	
			6 axes	2 axes	4 axes			16 points, NPN transistor	NX1P2-1040DT	
								16 points, PNP transistor *2	NX1P2-1040DT1	
			4 axes	0 axes	4 axes	24 points	14 points	10 points, NPN transistor	NX1P2-9024DT	
								10 points, PNP transistor *2	NX1P2-9024DT1	

Note: One NX-END02 End Cover is provided with the NX1P2 CPU Unit.
*1. The following table shows the enabled functions.

Motion control function	Motion control servo axes	Single-axis position control servo axes
Single-axis position control	Yes	Yes
Single-axis synchronized control	Yes	No
Single-axis velocity control	Yes	Yes *
Single-axis torque control	Yes	No
Multi-axes coordinated control	Yes	No

*You can use only the MC_MoveVelocity (Velocity Control) instruction.
*2. With the load short-circuit protection.

Option Boards (For CPU Units)

The Option Boards are mounted to the option board slot on the CPU Unit.

Product Name	Specification	Supported protocol	Model	Standards
Serial Communications Option Board	One RS-232C port. Transmission distance: 15 m. Connection type: Screwless clamping terminal block (9 terminals).	Host link, Modbus-RTU master, and no-protocol	NX1W-CIF01	UC1, L, CE, RCM, KC
	One RS-422A/485 port. Transmission distance: 50 m. Connection type: Screwless clamping terminal block (5 terminals)		NX1W-CIF11	
	One RS-422A/485 port (isolated). Transmission distance: 500 m. Connection type: Screwless clamping terminal block (5 terminals)		NX1W-CIF12	
Analog I/O Option Board	Analog input: 2 Voltage input: 0 to 10 V (Resolution: 1/4,000). Current input: 0 to 20 mA (1/2,000) Connection type: Screwless clamping terminal block (5 terminals)		NX1W-ADB21	
	Analog output: 2 Voltage output: 0 to 10 V (Resolution: 1/4,000) Connection type: Screwless clamping terminal block (3 terminals)		NX1W-DAB21V	
	Analog input: 2/Analog output: 2 Voltage input: 0 to 10 V (Resolution: 1/4,000). Current input: 0 to 20 mA (1/2,000) Voltage output: 0 to 10 V (Resolution: 1/4,000) Screwless clamping terminal block (8 terminals)		NX1W-MAB221	

NX Units

Up to eight NX Units can be connected to an NX1P2 CPU Unit.

Digital Input Units

Product Name	Specification					Model	Standards
	Number of points	Internal I/O common	Rated input voltage	I/O refreshing method	ON/OFF response time		
DC Input Unit (Screwless Clamping Terminal Block, 12 mm Width)	4 points	NPN	12 to 24 VDC	Switching Synchronous I/O refreshing and Free-Run refreshing	20 µs max./400 µs max.	**NX-ID3317**	UC1, N, L, CE, RCM, KC
			24 VDC			**NX-ID3343**	
				Input refreshing with input changed time only *	100 ns max./100 ns max.	**NX-ID3344**	
		PNP	12 to 24 VDC	Switching Synchronous I/O refreshing and Free-Run refreshing	20 µs max./400 µs max.	**NX-ID3417**	
			24 VDC			**NX-ID3443**	
				Input refreshing with input changed time only *	100 ns max./100 ns max.	**NX-ID3444**	
	8 points	NPN	24 VDC	Switching Synchronous I/O refreshing and Free-Run refreshing	20 µs max./400 µs max.	**NX-ID4342**	
		PNP				**NX-ID4442**	
	16 points	NPN				**NX-ID5342**	
		PNP				**NX-ID5442**	
DC Input Unit (M3 Screw Terminal Block, 30 mm Width)	16 points	For both NPN/PNP	24 VDC	Switching Synchronous I/O refreshing and Free-Run refreshing	20 µs max./400 µs max.	**NX-ID5142-1**	
DC Input Unit (MIL Connector, 30 mm Width)	16 points	For both NPN/PNP	24 VDC	Switching Synchronous I/O refreshing and Free-Run refreshing	20 µs max./400 µs max.	**NX-ID5142-5**	
	32 points					**NX-ID6142-5**	
DC Input Unit (Fujitsu Connector, 30 mm Width)	32 points	For both NPN/PNP	24 VDC	Switching Synchronous I/O refreshing and Free-Run refreshing	20 µs max./400 µs max.	**NX-ID6142-6**	
AC Input Unit (Screwless Clamping Terminal Block, 12 mm Width)	4 points		200 to 240 VAC, 50/60 Hz (170 to 264 VAC, ±3 Hz)	Free-Run refreshing	10 ms max./40 ms max.	**NX-IA3117**	UC1, N, CE, RCM, KC

* To use input refreshing with input changed time, the EtherCAT Coupler Unit with unit version 1.1 or later and the Sysmac Studio version 1.07 or higher are required.

Digital output Units

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		
Transistor Output Unit (Screwless Clamping Terminal Block, 12 mm Width)	2 points	NPN	0.5 A/point, 1 A/Unit	24 VDC	Output refreshing with specified time stamp only *	300 ns max./ 300 ns max.	NX-OD2154	
		PNP					NX-OD2258	
	4 points	NPN	0.5 A/point, 2 A/Unit	12 to 24 VDC	Switching Synchronous I/O refreshing and Free-Run refreshing	0.1 ms max./ 0.8 ms max.	NX-OD3121	
				24 VDC		300 ns max./ 300 ns max.	NX-OD3153	
		PNP				0.5 ms max./ 1.0 ms max.	NX-OD3256	
						300 ns max./ 300 ns max.	NX-OD3257	
			2 A/point, 8 A/Unit			0.5 ms max./ 1.0 ms max.	NX-OD3268	
	8 points	NPN	0.5 A/point, 4 A/Unit	12 to 24 VDC		0.1 ms max./ 0.8 ms max.	NX-OD4121	
		PNP		24 VDC		0.5 ms max./ 1.0 ms max.	NX-OD4256	
	16 points	NPN		12 to 24 VDC		0.1 ms max./ 0.8 ms max.	NX-OD5121	
		PNP		24 VDC		0.5 ms max./ 1.0 ms max.	NX-OD5256	
Transistor Output Unit (M3 Screw Terminal Block, 30 mm Width)	16 points	NPN	0.5 A/point, 5 A/Unit	12 to 24 VDC	Switching Synchronous I/O refreshing and Free-Run refreshing	0.1 ms max./ 0.8 ms max.	NX-OD5121-1	UC1, N, L, CE, RCM, KC
		PNP		24 VDC		0.5 ms max./ 1.0 ms max.	NX-OD5256-1	
Transistor Output Unit (MIL Connector, 30 mm Width)	16 points	NPN	0.5 A/point, 2 A/Unit	12 to 24 VDC	Switching Synchronous I/O refreshing and Free-Run refreshing	0.1 ms max./ 0.8 ms max.	NX-OD5121-5	
		PNP		24 VDC		0.5 ms max./ 1.0 ms max.	NX-OD5256-5	
	32 points	NPN	0.5 A/point, 2 A/common, 4 A/Unit	12 to 24 VDC		0.1 ms max./ 0.8 ms max.	NX-OD6121-5	
		PNP		24 VDC		0.5 ms max./ 1.0 ms max.	NX-OD6256-5	
Transistor Output Unit (Fujitsu Connector, 30 mm Width)	32 points	NPN	0.5 A/point, 2 A/common, 4 A/Unit	12 to 24 VDC	Switching Synchronous I/O refreshing and Free-Run refreshing	0.1 ms max./ 0.8 ms max.	NX-OD6121-6	
Relay Output Unit (Screwless Clamping Terminal Block, 12 mm Width/24 mm Width)	2 points	N.O.	250 VAC/2 A (cosφ=1) 250 VAC/2 A (cosφ=0.4) 24 VDC/2 A 4 A/Unit		Free-Run refreshing	15 ms max./15 ms max.	NX-OC2633	UC1, N, L, CE, RCM, KC
		N.O.+N.C.					NX-OC2733	UC1, N, CE, RCM, KC
	8 points	N.O.	250 VAC/2 A (cosφ=1) 250 VAC/2 A (cosφ=0.4) 24 VDC/2 A 8 A/Unit		Free-Run refreshing	15 ms max./15 ms max.	NX-OC4633	UC1, N, L, CE, EAC, RCM, KC

* To use input refreshing with input changed time, the EtherCAT Coupler Unit with unit version 1.1 or later and the Sysmac Studio version 1.07 or higher are required.

Digital Mixed I/O Units

Product Name	Specification					Model	Standards
	Number of points	**Internal I/O common**	**Maximum value of load current**	**I/O refreshing method**	**ON/OFF response time**		
DC Input/Transistor Output Unit (MIL Connector, 30 mm Width)	Outputs: 16 points Inputs: 16 points	Outputs: NPN Inputs: For both NPN/PNP	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, N, L, CE, RCM, 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 Unit (Fujitsu Connector, 30 mm Width)	Outputs: 16 points Inputs: 16 points	Outputs: NPN Inputs: For both NPN/PNP	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**	

High-speed Analog Input Units

Product name	Specifications					Trigger input section		I/O refreshing method	Model	Standards
	Number of points	**Input range**	**Resolution**	**Input method**	**Conversion time**	**Number of points**	**Internal I/O common**			
High-speed Analog Input Unit	4	-10 to 10 V -5 to 5 V 0 to 10 V 0 to 5 V 1 to 5 V 0 to 20 mA 4 to 20 mA	• Input range of -10 to 10 V or -5 to 5 V: 1/64,000 (full scale) • Other input range: 1/32,000 (full scale)	Differential input	5 μs per channel	4	NPN	Synchronous I/O refreshing	**NX-HAD401**	UC1, CE, RCM, KC, EAC
							PNP		**NX-HAD402**	

Analog Input Units

Product Name	Specification									Model	Standards
	Number of points	Input range	Resolution	Conversion value, decimal number (0 to 100%)	Over all accuracy (25°C)	Input method	Conversion time	Input impedance	I/O refreshing method		
Voltage Input Unit	2 points	-10 to +10 V	1/8000	-4000 to 4000	±0.2% (full scale)	Single-ended input	250 µs/ point	1 MΩ min.	Free-Run refreshing	NX-AD2603	UC1, N, L, CE, RCM, KC
						Differential Input				NX-AD2604	
			1/30000	-15000 to 15000	±0.1% (full scale)	Differential Input	10 µs/ point		Selectable Synchronous I/O refreshing or Free-Run refreshing	NX-AD2608	
	4 points		1/8000	-4000 to 4000	±0.2% (full scale)	Single-ended input	250 µs/ point		Free-Run refreshing	NX-AD3603	
						Differential Input				NX-AD3604	
			1/30000	-15000 to 15000	±0.1% (full scale)	Differential Input	10 µs/ point		Selectable Synchronous I/O refreshing or Free-Run refreshing	NX-AD3608	
	8 points		1/8000	-4000 to 4000	±0.2% (full scale)	Single-ended input	250 µs/ point		Free-Run refreshing	NX-AD4603	
						Differential Input				NX-AD4604	
			1/30000	-15000 to 15000	±0.1% (full scale)	Differential Input	10 µs/ point		Selectable Synchronous I/O refreshing or Free-Run refreshing	NX-AD4608	
Current Input Unit	2 points	4 to 20 mA	1/8000	0 to 8000	±0.2% (full scale)	Single-ended input	250 µs/ point	250 Ω	Free-Run refreshing	NX-AD2203	
						Differential Input				NX-AD2204	
			1/30000	0 to 30000	±0.1% (full scale)	Differential Input	10 µs/ point		Selectable Synchronous I/O refreshing or Free-Run refreshing	NX-AD2208	
	4 points		1/8000	0 to 8000	±0.2% (full scale)	Single-ended input	250 µs/ point		Free-Run refreshing	NX-AD3203	
						Differential Input				NX-AD3204	
			1/30000	0 to 30000	±0.1% (full scale)	Differential Input	10 µs/ point		Selectable Synchronous I/O refreshing or Free-Run refreshing	NX-AD3208	
	8 points		1/8000	0 to 8000	±0.2% (full scale)	Single-ended input	250 µs/ point	85 Ω	Free-Run refreshing	NX-AD4203	
						Differential Input				NX-AD4204	
			1/30000	0 to 30000	±0.1% (full scale)	Differential Input	10 µs/ point		Selectable Synchronous I/O refreshing or Free-Run refreshing	NX-AD4208	

Analog Output Units

Product Name	Specification							Model	Standards
	Number of points	Input range	Resolution	Output setting value, decimal number (0 to 100%)	Over all accuracy (25°C)	Conversion time	I/O refreshing method		
Voltage Output Unit	2 points	-10 to +10 V	1/8000	-4000 to 4000	±0.3% (full scale)	250 µs/ point	Free-Run refreshing	NX-DA2603	UC1, N, L, CE, RCM, KC
			1/30000	-15000 to 15000	±0.1% (full scale)	10 µs/ point	Selectable Synchronous I/O refreshing or Free-Run refreshing	NX-DA2605	
	4 points		1/8000	-4000 to 4000	±0.3% (full scale)	250 µs/ point	Free-Run refreshing	NX-DA3603	
			1/30000	-15000 to 15000	±0.1% (full scale)	10 µs/ point	Selectable Synchronous I/O refreshing or Free-Run refreshing	NX-DA3605	
Current Output Unit	2 points	4 to 20 mA	1/8000	0 to 8000	±0.3% (full scale)	250 µs/ point	Free-Run refreshing	NX-DA2203	
			1/30000	0 to 30000	±0.1% (full scale)	10 µs/ point	Selectable Synchronous I/O refreshing or Free-Run refreshing	NX-DA2205	
	4 points		1/8000	0 to 8000	±0.3% (full scale)	250 µs/ point	Free-Run refreshing	NX-DA3203	
			1/30000	0 to 30000	±0.1% (full scale)	10 µs/ point	Selectable Synchronous I/O refreshing or Free-Run refreshing	NX-DA3205	

Temperature Control Units

Product name	Specifications								Model	Standards
	Number of channels	Input type	Output	Number of output points	Number of CT input points	Control type	Conversion time	I/O refreshing method		
Temperature Control Unit 2-channel Type	2	Universal input (thermocouple, resistance thermometer)	Voltage output (for driving SSR)	2	2	Standard control	50 ms	Free-Run refreshing	NX-TC2405	UC1, CE, RCM, KC, EAC
					None	Standard control			NX-TC2406	
			Voltage output (for driving SSR)	4	None	Heating/cooling control			NX-TC2407	
			Linear current output	2	None	Standard control			NX-TC2408	
Temperature Control Unit 4-channel Type	4		Voltage output (for driving SSR)	4	4	Standard control			NX-TC3405	UC1, CE, RCM, KC, EAC
					None	Standard control			NX-TC3406	
			Voltage output (for driving SSR)	8	None	Heating/cooling control			NX-TC3407	
			Linear current output	4	None	Standard control			NX-TC3408	

Temperature Input Units

Product Name	Specification							Model	Standards
	Number of points	Input type	Resolution (25°C)	Over all accuracy (25°C)	Conversion time	I/O refreshing method	Terminals		
Thermocouple Input type	2 points	Thermocouple	0.1°C max. *1	Refer to your OMRON website for details.	250 ms/Unit	Free-Run refreshing	16 Terminals	NX-TS2101	UC1, N, L, CE, RCM, KC
	4 points						16 Terminals x 2	NX-TS3101	
	2 points		0.01°C max.		10 ms/Unit		16 Terminals	NX-TS2102	
	4 points						16 Terminals x 2	NX-TS3102	
	2 points		0.001°C max.		60 ms/Unit		16 Terminals	NX-TS2104	
	4 points						16 Terminals x 2	NX-TS3104	
Resistance Thermometer Input type	2 points	Resistance Thermometer (Pt100/Pt1000, three-wire) *2	0.1°C max.		250 ms/Unit		16 Terminals	NX-TS2201	
	4 points						16 Terminals x 2	NX-TS3201	
	2 points		0.01°C max.		10 ms/Unit		16 Terminals	NX-TS2202	
	4 points						16 Terminals x 2	NX-TS3202	
	2 points		0.001°C max.		60 ms/Unit		16 Terminals	NX-TS2204	
	4 points						16 Terminals x 2	NX-TS3204	

*1. The resolution is 0.2°C max. when the input type is R, S, or W.
*2. The NX-TS2202 and NX-TS3202 only supports Pt100 three-wire sensor.

Heater Burnout Detection Units

Product Name	Specification							Model	Standards
	CT input section		Control output section						
	Number of inputs	Maximum heater current	Number of outputs	Internal I/O common	Maximum load current	Rated voltage	I/O refreshing method		
Heater Burnout Detection Unit	4	50 AAC	4	NPN	0.1 A/point, 0.4 A/Unit	12 to 24 VDC	Free-Run refreshing	NX-HB3101	UC1, N, L, CE, RCM, KC
				PNP		24 VDC		NX-HB3201	

Load Cell Input Unit

Product Name	Specification					Model	Standards
	Number of Model Standards points	Conversion cycle	I/O refreshing method *	Load cell excitation voltage	Input range		
Load Cell Input Unit	1	125 μs	• Free-Run refreshing • Synchronous I/O refreshing • Task period prioritized refreshing	5 VDC ± 10%	-5.0 to 5.0 mV/V	**NX-RS1201**	UC1, N, L, CE, RCM, KC

* Refer to the *NX-series Load Cell Input Unit User's Manual* (W565) for detailed information on I/O refresh cycle.

Position interface: Incremental Encoder Input Units

Product Name	Specification					Model	Standards
	Number of channels	External inputs	Maximum response frequency	I/O refreshing method	Number of I/O entry mappings		
Incremental Encoder Input Unit	1 (NPN)	3 (NPN)	500 kHz	• Free-Run refreshing • Synchronous I/O refreshing	1/1	**NX-EC0112**	UC1, N, CE, RCM, KC
	1 (PNP)	3 (PNP)	500 kHz		1/1	**NX-EC0122**	UC1, N, L, CE, RCM, KC
	1	3 (NPN)	4 MHz		1/1	**NX-EC0132**	UC1, N, CE, RCM, KC
		3 (PNP)	4 MHz		1/1	**NX-EC0142**	UC1, N, L, CE, RCM, KC
	2 (NPN)	None	500 kHz		2/2	**NX-EC0212**	UC1, N, CE, RCM, KC
	2 (PNP)		500 kHz		2/2	**NX-EC0222**	UC1, N, L, CE, RCM, KC

Position interface: SSI Input Units

Product Name	Specification					Model	Standards
	Number of channels	Input/Output form	Maximum data length	Encoder power supply	Type of external connections		
SSI Input Unit	1	EIA standard RS-422-A	32 bits	24 VDC, 0.3 A/CH	Screwless push-in terminal block (12 terminals)	**NX-ECS112**	UC1, N, L, CE, RCM, KC
	2	EIA standard RS-422-A	32 bits	24 VDC, 0.3 A/CH	Screwless push-in terminal block (12 terminals)	**NX-ECS212**	

Position interface: Pulse Output Units

Product Name	Specification							Model	Standards
	Number of channels *1	External inputs	External outputs	Maximum pulse output speed	I/O refreshing method	Number of I/O entry mappings	Control output interface		
Pulse Output Unit	1 (NPN)	2 (NPN)	1 (NPN)	500 kpps	• Synchronous I/O refreshing • Task period prioritized refreshing *2	1/1	Open collector output	**NX-PG0112**	UC1, N, CE, RCM, KC
	1 (PNP)	2 (PNP)	1 (PNP)	500 kpps		1/1	Open collector output	**NX-PG0122**	UC1, N, L, CE, RCM, KC
	2	5 inputs/CH (NPN)	3 outputs/CH (NPN)	4 Mpps		2/2	Line driver output	**NX-PG0232-5**	UC1, CE, RCM, KC
		5 inputs/CH (PNP)	3 outputs/CH (PNP)	4 Mpps		2/2	Line driver output	**NX-PG0242-5**	
	4	5 inputs/CH (NPN)	3 outputs/CH (NPN)	4 Mpps		4/4	Line driver output	**NX-PG0332-5**	
		5 inputs/CH (PNP)	3 outputs/CH (PNP)	4 Mpps		4/4	Line driver output	**NX-PG0342-5**	

*1. This is the number of pulse output channels.
*2. Unit version 1.2 or later and an NX-ECC203 EtherCAT Coupler Unit are required.

Machine Automation Controller **NX1P**

Communications Interface Units

Product Name	Serial interface	External connection terminals	Number of serial ports	Communications protocol	Model	Standards
Communications Interface Unit	RS-232C	Screwless Clamping Terminal Block	1 port	• No-protocol • Signal lines	**NX-CIF101**	UL, N, L, CE, RCM, KC
	RS-422A/485				**NX-CIF105**	
	RS-232C	D-Sub connector	2 ports		**NX-CIF210**	

IO-Link Master Unit

Product Name	Specification			Model	Standards
	Number of IO-Link ports	I/O refreshing method	I/O connection terminals		
IO-Link Master Unit	4	Free-Run refreshing	Screwless clamping terminal block	**NX-ILM400**	UC1, N, L, CE, RCM, KC

System Units

Product Name	Specification	Model	Standards
Additional NX Unit Power Supply Unit	Power supply voltage: 24 VDC (20.4 to 28.8 VDC) NX Bus power supply capacity: 10 W max.	**NX-PD1000**	UC1, N, L, CE, RCM, KC
Additional I/O Power Supply Unit	Power supply voltage: 5 to 24 VDC (4.5 to 28.8 VDC) I/O power feed maximum current: 4 A	**NX-PF0630**	UC1, N, L, CE, RCM, KC
	Power supply voltage: 5 to 24 VDC (4.5 to 28.8 VDC) I/O power feed maximum current: 10 A *	**NX-PF0730**	
I/O Power Supply Connection Unit	Number of I/O power terminals: IOG: 16 terminals Current capacity of I/O power terminal: 4 A/terminal max.	**NX-PC0010**	UC1, N, L, CE, RCM, KC
	Number of I/O power terminals: IOV: 16 terminals Current capacity of I/O power terminal: 4 A/terminal max.	**NX-PC0020**	UC1, N, L, CE, RCM, KC
	Number of I/O power terminals: IOV: 8 terminals, IOG: 8 terminals Current capacity of I/O power terminal: 4 A/terminal max	**NX-PC0030**	UC1, N, L, CE, RCM, KC
Shield Connection Unit	Number of shield terminals: 14 terminals (The following two terminals are functional ground terminals.)	**NX-TBX01**	UC1, N, L, CE, RCM, KC

* Use the NX-PF0730 at 4 A or less on the CPU Rack where the NX1P2 CPU Unit is mounted.

OMRON

EtherCAT Coupler Units

NX-series Units on previous pages and NX-series Safety Units can be used by connecting to the EtherCAT Coupler Unit that is connected to the built-in EtherCAT port on the NX1P2 CPU Unit.

Product Name	Communications cycle in DC Mode	Current consumption	Maximum I/O power supply current	Model	Standards
EtherCAT Coupler Unit *1	250 to 4000 μs *2	1.45 W max.	4 A	NX-ECC201	UC1, N, L, CE, KC
	250 to 4000 μs *2		10 A	NX-ECC202	
	125 to 10000 μs *2	1.25 W max.		NX-ECC203	

*1. One End Cover NX-END01 is provided with the EtherCAT Coupler Unit.
*2. This depends on the specifications of the EtherCAT master. For example, the values are as follows when the EtherCAT Coupler Unit is connected to the built-in EtherCAT port on an NJ5-series CPU Unit: 500 μs, 1,000 μs, 2,000 μs, and 4,000 μs. Refer to the *NJ/NX-series CPU Unit Built-in EtherCAT Port User' Manual* (Cat. No. W505) for the specifications of the built-in EtherCAT ports on NJ/NX-series CPU Units. This also depends on the unit configuration.

Safety CPU Units

Appearance	Specification					Model	Standards
	Maximum number of safety I/O points	Program capacity	Number of safety master connections	I/O refreshing method	Unit version		
	1,024 points	2,048 KB	128	Free-Run refreshing	Ver.1.3	NX-SL5500	UC, CE, RCM, KC, EAC
	2,032 points	4,096 KB	254			NX-SL5700	
	256 points	512 KB	32	Free-Run refreshing	Ver.1.1	NX-SL3300	UC, N, L, CE, KC
	1024 points	2048 KB	128	Free-Run refreshing	Ver.1.1	NX-SL3500	

Note: Connect the Safety CPU Unit to the NX1P2 CPU Unit via the EtherCAT Coupler Unit.

Safety Input Units

Appearance	Specification							Model	Standards
	Number of safety input points	Number of test output points	Internal I/O common	Rated input voltage	OMRON special safety input devices	Number of safety slave connections	I/O refreshing method	Unit version		
	4 points	2 points	Sinking inputs (PNP)	24 VDC	Can be connected.	1	Free-Run refreshing	Ver.1.1	NX-SIH400	Refer to your OMRON website for details.
	8 points	2 points	Sinking inputs (PNP)	24 VDC	Cannot be connected.	1	Free-Run refreshing	Ver.1.0	NX-SID800	

Note: Connect the Safety Input Unit to the NX1P2 CPU Unit via the EtherCAT Coupler Unit.

Safety Output Units

Appearance	Specification						Model	Standards
	Number of Model safety output points	Internal I/O common	Maximum load current	Rated voltage	Number of safety slave connections	I/O refreshing method	Unit version		
	2 points	Sourcing outputs (PNP)	2.0 A/point, 4.0 A/Unit at 40°C, and 2.5A/Unit at 55°C The maximum load current depends on the installation orientation and ambient temperature.	24 VDC	1	Free-Run refreshing	Ver.1.0	NX-SOH200	Refer to your OMRON website for details.
	4 points	Sourcing outputs (PNP)	0.5 A/point and 2.0 A/Unit	24 VDC	1	Free-Run refreshing	Ver.1.0	NX-SOD400	

Note: Connect the Safety Output Unit to the NX1P2 CPU Unit via the EtherCAT Coupler Unit.

Automation Software Sysmac Studio

Please purchase a DVD and required number of licenses the first time you purchase the Sysmac Studio. DVDs and licenses are available individually.
Each model of licenses does not include any DVD.

Product Name	Specification		Number of licenses	Media	Model	Standards
Sysmac Studio Standard Edition Ver.1.□□	The Sysmac Studio is the software that provides an integrated environment for setting, programming, debugging and maintenance of machine automation controllers including the NJ/NX-series CPU Units, NY-series Industrial PC, EtherCAT Slave, and the HMI. Sysmac Studio runs on the following OS. Windows 7 (32-bit/64-bit version)/Windows 8 (32-bit/64-bit version)/ Windows 8.1 (32-bit/64-bit version)/Windows 10 (32-bit/64-bit version) The Sysmac Studio Standard Edition DVD includes Support Software to set up EtherNet/IP Units, DeviceNet slaves, Serial Communications Units, and Support Software for creating screens on HMIs (CX-Designer). Refer to your OMRON website for details.		--- (Media only)	DVD	**SYSMAC-SE200D**	---
			1 license *	---	**SYSMAC-SE201L**	---

* Multi licenses are available for the Sysmac Studio (3, 10, 30, or 50 licenses).

Collection of software functional components Sysmac Library

Please download it from following URL and install to Sysmac Studio.
    http://www.ia.omron.com/sysmac_library/

Typical Models

Product	Features	Model
Vibration Suppression Library	The Vibration Suppression Library is used to suppress residual vibration caused by the operation of machines.	**SYSMAC-XR006**
Device Operation Monitor Library	The Device Operation Monitor Library is used to monitor the operation of devices such as air cylinders, sensors, motors, and other devices.	**SYSMAC-XR008**
Dimension Measurement Library	The Dimension Measurement Library is used to dimension measurement with ZW-7000/5000 Confocal Fiber Displacement Sensor, or E9NC-TA0 Contact-Type Smart Sensor.	**SYSMAC-XR014**

Recommended EtherCAT and EtherNet/IP Communications Cables

Use Straight STP (shielded twisted-pair) cable of category 5 or higher with double shielding (braiding and aluminum foil tape) for EtherCAT.
For EtherNet/IP, required specification for the communications cables varies depending on the baud rate.
For 100BASE-TX/10BASE-T, use an STP (shielded twisted-pair) cable of Ethernet category 5 or higher.

Cable with Connectors

Item		Recommended manufacturer	Cable length (m)	Model
Wire Gauge and Number of Pairs: AWG26, 4-pair Cable Cable Sheath material: LSZH *2	Cable with Connectors on Both Ends (RJ45/RJ45) Standard RJ45 plug type *1 Cable color: Yellow *3	OMRON	0.3	XS6W-6LSZH8SS30CM-Y
			0.5	XS6W-6LSZH8SS50CM-Y
			1	XS6W-6LSZH8SS100CM-Y
			2	XS6W-6LSZH8SS200CM-Y
			3	XS6W-6LSZH8SS300CM-Y
			5	XS6W-6LSZH8SS500CM-Y
Wire Gauge and Number of Pairs: AWG22, 2-pair cable	Cable with Connectors on Both Ends (RJ45/RJ45) Rugged RJ45 plug type *1 Cable color: Light blue	OMRON	0.3	XS5W-T421-AMD-K
			0.5	XS5W-T421-BMD-K
			1	XS5W-T421-CMD-K
			2	XS5W-T421-DMD-K
			5	XS5W-T421-GMD-K
			10	XS5W-T421-JMD-K
	Cable with Connectors on Both Ends (M12 Straight/M12 Straight) Shield Strengthening Connector cable *4 M12/Smartclick Connectors Cable color: Black	OMRON	0.5	XS5W-T421-BM2-SS
			1	XS5W-T421-CM2-SS
			2	XS5W-T421-DM2-SS
			3	XS5W-T421-EM2-SS
			5	XS5W-T421-GM2-SS
			10	XS5W-T421-JM2-SS
	Cable with Connectors on Both Ends (M12 Straight/RJ45) Shield Strengthening Connector cable *4 M12/Smartclick Connectors Rugged RJ45 plug type Cable color: Black	OMRON	0.5	XS5W-T421-BMC-SS
			1	XS5W-T421-CMC-SS
			2	XS5W-T421-DMC-SS
			3	XS5W-T421-EMC-SS
			5	XS5W-T421-GMC-SS
			10	XS5W-T421-JMC-SS

*1. Cables with standard RJ45 plugs are available in the following lengths: 0.2 m, 0.3 m, 0.5 m, 1 m, 1.5 m, 2 m, 3 m, 5 m, 7.5 m, 10 m, 15 m, 20 m. Cables with rugged RJ45 plugs are available in the following lengths: 0.3 m, 0.5 m, 1 m, 2 m, 3 m, 5 m, 10 m, 15 m.
For details, refer to the *Industrial Ethernet Connectors Catalog* (Cat. No. G019).
*2. The lineup features Low Smoke Zero Halogen cables for in-cabinet use and PUR cables for out-of-cabinet use. Although the LSZH cable is single shielded, its communications and noise characteristics meet the standards.
*3. Cable colors are available in yellow, green, and blue.
*4. For details, contact your OMRON representative.

Cables / Connectors

Item			Recommended manufacturer	Model
Products for EtherCAT or EtherNet/IP (1000BASE-T/100BASE-TX)	Wire Gauge and Number of Pairs: AWG24, 4-pair Cable	Cables	Hitachi Cable, Ltd.	NETSTAR-C5E SAB 0.5 $\times$ 4P *1
			Kuramo Electric Co.	KETH-SB *1
			SWCC Showa Cable Systems Co.	FAE-5004 *1
		RJ45 Connectors	Panduit Corporation	MPS588-C *1
Products for EtherCAT or EtherNet/IP (100BASE-TX/10BASE-T)	Wire Gauge and Number of Pairs: AWG22, 2-pair Cable	Cables	Kuramo Electric Co.	KETH-PSB-OMR *2
			JMACS Japan Co., Ltd.	PNET/B *2
		RJ45 Assembly Connector	OMRON	XS6G-T421-1 *2

*1. We recommend you to use the above Cable and RJ45 Connector together.
*2. We recommend you to use the above Cable and RJ45 Assembly Connector together.

Optional Products/Maintenance Products/DIN Track Accessories

Product Name	Specification		Model	Standards
EtherCAT junction slaves *1	3 ports. Power supply voltage: 20.4 to 28.8 VDC (24 VDC -15 to +20%). Current consumption (A): 0.08		GX-JC03	CE, UC1
	6 ports. Power supply voltage: 20.4 to 28.8 VDC (24 VDC -15 to +20%). Current consumption (A): 0.17		GX-JC06	
Industrial Switching Hubs for EtherNet/IP and Ethernet *2	Quality of Service (QoS): EtherNet/IP control data priority Failure detection: Broadcast storm and LSI error detection 10/100BASE-TX, Auto-Negotiation	3 ports. Current consumption (A): 0.22 Power supply connector included.	W4S1-03B	UC, CE
		5 ports. Current consumption (A): 0.22 Power supply connector included.	W4S1-05B	
		5 ports. Current consumption (A): 0.22 Failure detection Power supply connector and Connector for informing error included.	W4S1-05C	CE
Memory Cards	SD memory card, 2 GB		HMC-SD291	N, L, CE
	SD memory card, 4 GB		HMC-SD491	CE
Battery	The battery is not mounted when the product is shipped. To turn OFF the power supply to the equipment for a certain period of time by using the clock data for programming, event logs, etc., you need a separately-sold battery to retain the clock data. Refer to the *Battery* page for details.		CJ1W-BAT01	---
End Cover (For NX1P2 CPU Unit) *3	Must be connected to the right end of the CPU Rack. One End Cover is provided with the CPU Unit.		NX-END02	---
End Cover (For EtherCAT Coupler Unit) *3	One End Cover is provided with the EtherCAT Coupler Unit.		NX-END01	---
DIN Tracks	Length: 0.5 m; Height: 7.3 mm		PFP-50N	---
	Length: 1 m; Height: 7.3 mm		PFP-100N	
End Plate	There are 2 stoppers provided with CPU Units and I/O Interface Units as standard accessories to secure the Units on the DIN Track.		PFP-M	---
Unit/Terminal Block Coding Pins	For 10 Units (Terminal Block: 30 pins, Unit: 30 pins)		NX-AUX02	---
DIN Track Insulation Spacers	A Spacer to insulate the control panel from the DIN Track. To insulate the EtherCAT Slave Terminal from the control panel, use Din Track Insulation Spacers.		NX-AUX01	---

Product Name	Specification				Model	Standards
	No. of terminals	Terminal number indications	Ground terminal mark	Terminal current capacity		
Terminal Blocks	8	A/B	None	10 A	NX-TBA082	---
	12	A/B			NX-TBA122	
	16	A/B			NX-TBA162	
	12	C/D			NX-TBB122	
	16	C/D			NX-TBB162	
	8	A/B	Provided		NX-TBC082	
	16	A/B			NX-TBC162	

*1. EtherCAT junction slaves cannot be used for EtherNet/IP and Ethernet.
*2. Industrial switching hubs cannot be used for EtherCAT.
*3. Use the NX-END02 End Cover only for the CPU Unit and the NX-END01 End Cover only for the EtherCAT Coupler Unit.

Electrical and Mechanical Specifications

Item		Specification	
Model		NX1P2-1□40DT□	NX1P2-9024DT□
Enclosure		Mounted in a panel	
Dimensions (mm) *1		154 × 100 × 71 mm (W×H×D)	130 × 100 × 71 mm (W×H×D)
Weight *2		NX1P2-1□40DT: 650 g NX1P2-1□40DT1: 660 g	NX1P2-9024DT: 590 g NX1P2-9024DT1: 590 g
Unit power supply	Power supply voltage	24 VDC (20.4 to 28.8 VDC)	
	Unit power consumption *3	NX1P2-1□40DT: 7.05 W NX1P2-1□40DT1: 6.85 W	NX1P2-9024DT: 6.70 W NX1P2-9024DT1: 6.40 W
	Inrush current *4	For cold start at room temperature: 10 A max./0.1 ms max. and 2.5 A max./150 ms max.	
	Current capacity of power supply terminal *5	4 A max.	
	Isolation method	No isolation: between the Unit power supply terminal and internal circuit	
Power supply to the NX Unit power supply	NX Unit power supply capacity	10 W max.	
	NX Unit power supply efficiency	80 %	
	Isolation method	No isolation: between the Unit power supply terminal and NX Unit power supply	
I/O Power Supply to NX Units		Not provided *6	
External connection terminals	Communication connector	RJ45 for EtherNet/IP Communications × 1 RJ45 for EtherCAT Communications × 1	
	Screwless clamping terminal block	For Unit power supply input, grounding, and input signal: 1 (Removable) For output signal: 1 (Removable)	
	Output terminal (service supply)	Not provided	
	RUN output terminal	Not provided	
	NX bus connector	8 NX Units can be connected	
	Option board slot	2	1

*1. Includes the End Cover, and does not include projecting parts.
*2. Includes the End Cover. The weight of the End Cover is 82 g.
*3. Includes the SD Memory Card and Option Board. The NX Unit power consumption to NX Units is not included.
*4. The inrush current may vary depending on the operating condition and other conditions. Therefore, select fuses, breakers, and external power supply devices that have enough margin in characteristic and capacity, considering the condition under which the devices are used.
*5. The amount of current that can be passed constantly through the terminal. Do no exceed this current value when you use a through-wiring for the Unit power supply.
*6. When the type of the I/O power supply to NX Units you use is the supply from NX bus, an Additional I/O Power Supply Unit is required. The maximum I/O power supply current from an Additional I/O Power Supply Unit is 4 A. Refer to the *NX-series NX1P2 CPU Unit Hardware User's Manual* (Cat. No. W578) for details.

General Specifications

Item		Specification
Enclosure		Mounted in a panel
Grounding method		Ground to less than 100 Ω.
Operating environment	Ambient operating temperature	0 to 55°C
	Ambient operating humidity	10% to 95% (with no condensation)
	Atmosphere	Must be free from corrosive gases.
	Ambient storage temperature	-25 to 70°C (excluding battery)
	Altitude	2,000 m max.
	Pollution degree	2 or less: Conforms to JIS B 3502 and IEC 61131-2.
	Noise immunity	2 kV on power supply line (Conforms to IEC 61000-4-4.)
	Overvoltage category	Category II: Conforms to JIS B 3502 and IEC 61131-2.
	EMC immunity level	Zone B
	Vibration resistance	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	Conforms to IEC 60068-2-27. 147 m/s^2, 3 times in X, Y, and Z directions
Battery	Life	5 years (Power ON time rate 0% (power OFF))
	Model	CJ1W-BAT01 (sold separately)
Applicable standards *	EU Directives	EN 61131-2
	cULus	Listed UL 61010-2-201 and ANSI/ISA 12.12.01
	Shipbuilding Standards	NK, LR
	Other than the above.	RCM, KC, EAC

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

Performance Specifications

Item			NX1P2-		
			11□□□□/ 11□□□□1	10□□□□/ 10□□□□1	90□□□□/ 90□□□□1
Processing time	Instruction execution times	LD instruction	3.3 ns		
		Math instructions (for long real data)	70 ns or more		
Programming	Program capacity *1	Size	1.5 MB		
		Quantity — Number of POU definitions	450		
		Quantity — Number of POU Instances	1,800		
	Memory capacity for variables *2	Retain attributes — Size	32 kB		
		Retain attributes — Number of variables	5,000		
		No Retain attributes — Size	2 MB		
		No Retain attributes — Number of variables	90,000		
	Data types	Number of data types	1,000		
	Memory for CJ-series Units (Can be specified with AT specifications for variables.)	CIO Area	0 to 6,144 channel (0 to 6,143) *3		
		Work Area	0 to 512 channel (W0 to W511) *3		
		Holding Area	0 to 1,536 channel (H0 to H1,535) *4		
		DM Area	0 to 16,000 channel (D0 to F15,999) *4		
		EM Area	---		
Motion control	Number of controlled axes *5	Maximum number of controlled axes	12 axes	10 axes	4 axes
		Motion control axes	8 axes	6 axes	---
		Single-axis position control axes	4 axes	4 axes	4 axes
		Maximum number of used real axes	8 axes	6 axes	4 axes
		Used motion control servo axes	4 axes	2 axes	---
		Used single-axis position control servo axes	4 axes	4 axes	4 axes
		Maximum number of axes for linear interpolation axis control	4 axes per axes group		---
		Number of axes for circular interpolation axis control	2 axes per axes group		---
	Maximum number of axes groups		8 axes groups		---
	Motion control period		Same as the period for primary periodic task		
	Cams	Number of cam data points — Maximum points per cam table	65,535 points		---
		Number of cam data points — Maximum points for all cam tables	262,140 points		---
		Maximum number of cam tables	80 tables		---
	Position units		Pulse, mm, µm, nm, degree, and inch		
	Override factors		0.00% or 0.01% to 500.00%		
Built-in EtherNet/IP port	Number of ports		1		
	Physical layer		10BASE-T, 100BASE-TX		
	Frame length		1,514 bytes max.		
	Media access method		CSMA/CD		
	Modulation		Baseband		
	Topology		Star		
	Baud rate		100 Mbps/s (100BASE-TX)		
	Transmission media		STP (shielded, twisted-pair) cable of Ethernet category 5, 5e or higher		
	Maximum transmission distance between Ethernet switch and node		100 m		
	Maximum number of cascade connections		There are no restrictions if an Ethernet switch is used.		
	CIP service: Tag data links (cyclic communications)	Maximum number of connections	32		
		Packet interval *6	Can be set for each connection. 2 to 10,000 ms in 1-ms increments		
		Permissible communications band	3,000 pps *7 (including heartbeat)		
		Maximum number of tag sets	32		
		Tag types	Network variables CIO/WR/HR/DM		
		Number of tags per connection (i.e., per tag set)	8 (7 tags if Controller status is included in the tag set.)		
		Maximum number of tags	256		
		Maximum link data size per node (total size for all tags)	19,200 bytes		
		Maximum data size per connection	600 bytes		
		Maximum number of registrable tag sets	32 (1 connection = 1 tag set)		
		Maximum tag set size	600 bytes (Two bytes are used if Controller status is included in the tag set.)		
		Multi-cast packet filter *8	Supported.		

Item			NX1P2-		
			11□□□□/ 11□□□□1	10□□□□/ 10□□□□1	90□□□□/ 90□□□□1
Built-in EtherNet/IP port	CIP message service: Explicit messages	Class 3 (number of connections)	32 (clients plus server)		
		UCMM (non-connection type) · Maximum number of clients that can communicate at one time	32		
		Maximum number of servers that can communicate at one time	32		
	Number of TCP sockets		30		
Built-in EtherCAT port	Communications standard		IEC 61158 Type12		
	EtherCAT master specifications		Class B (Feature Pack Motion Control compliant)		
	Physical layer		100BASE-TX		
	Modulation		Baseband		
	Baud rate		100 Mbps (100BASE-TX)		
	Duplex mode		Auto		
	Topology		Line, daisy chain, and branching		
	Transmission media		Twisted-pair cable of category 5 or higher (double-shielded straight cable with aluminum tape and braiding)		
	Maximum transmission distance between nodes		100 m		
	Maximum number of slaves		16		
	Range of node addresses that can be set		1 to 192		
	Maximum process data size		Input: 1,434 bytes Output: 1,434 bytes However, the maximum number of process data frames is 1.		
	Maximum process data size per slave		Input: 1,434 bytes Output: 1,434 bytes		
	Communications cycle		2,000 μs to 8,000 μs in 250-μs increments		
	Sync jitter		1 μs max.		
Serial Communications (Serial Communications Option Board)	Communications method		half duplex		
	Synchronization		Start-stop		
	Baud rate		1.2/2.4/4.8/9.6/19.2/38.4/57.6/115.2 kbps		
	Transmission distance		Depends on Option Board.		
	Supported protocol		Host link, Modbus-RTU master, and no-protocol		
Unit configuration	Maximum number of connectable Units	Maximum number of NX Units that can be mounted to the CPU Unit	8		
		Maximum number of NX Units for entire controller	24 On CPU Rack: 8 On EtherCAT Slave Terminals: 16		
	Power supply	Model	A non-isolated power supply for DC input is built into the CPU Unit.		
		Power OFF detection time	2 to 8 ms		
Option Board	Number of slots		2	2	1
Built-in I/O	Input	Number of points	24	24	14
	Output	Number of points	16	16	10
		Load short-circuit protection	11□□DT/10□□DT/9024DT: Not provided (NPN) 11□□DT1/10□□DT1/9024DT1: Provided (PNP)		
Internal clock	Accuracy		At ambient temperature of 55°C: -3.5 to 0.5 min error per month At ambient temperature of 25°C: -1.5 to 1.5 min error per month At ambient temperature of 0°C: -3 to 1 min error per month		
	Retention time of built-in capacitor		At ambient temperature of 40°C: 10 days		

*1. Execution objects and variable tables (including variable names)
*2. Memory used for CJ-series Units is included.
*3. The value can be set in 1 ch increments. The value is included in the total size of variables without a Retain attribute.
*4. The value can be set in 1 ch increments. The value is included in the total size of variables with a Retain attribute.
*5. Refer to the *NJ/NX-series CPU Unit Motion Control User's Manual* (Cat. No. W507) for the description of this term.
*6. Data will be refreshed at the set interval, regardless of the number of nodes.
*7. "pps" means packets per second, i.e., the number of communications packets that can be sent or received in one second.
*8. As the EtherNet/IP port implements the IGMP client, unnecessary multi-cast packets can be filtered by using an Ethernet switch that supports IGMP Snooping.

Function Specifications

Item				NX1P2
Tasks	**Function**			I/O refresh and the user program are executed in units that are called tasks. Tasks are used to specify execution conditions and execution priority.
		Periodically Executed Tasks	**Maximum Number of Primary Periodic Tasks**	1
			Maximum Number of Periodic Tasks	2
		Conditionally Executed Tasks	**Maximum Number of Event Tasks**	32
			Execution Condition	When Activate Event Task instruction is executed or when condition expression for variable is met
	Setup	**System Service Monitoring Settings**		Not supported
Programming	**POUs (programorganization units)**	**Programs**		POUs that are assigned to tasks.
		Function Blocks		POUs that are used to create objects with specific conditions.
		Functions		POUs that are used to create an object that determine unique outputs for the inputs, such as for data processing.
	Programming Languages	**Types**		Ladder diagrams * and structured text (ST)
	Namespaces			Namespaces are used to create named groups of POU definitions.
	Variables	**External Access of variables**	**Network Variables**	The function which allows access from the HMI, host computers, or other Controllers
	Data Types	**Data types**	**Boolean**	BOOL
			Bit Strings	BYTE, WORD, DWORD, LWORD
			Integers	INT, SINT, DINT, LINT, UINT, USINT, UDINT, ULINT
			Real Numbers	REAL and LREAL
			Durations	TIME
			Dates	DATE
			Times of Day	TIME_OF_DAY
			Date and Time	DATE_AND_TIME
			Text Strings	STRING
		Derivative Data Types		Structures, Unions, and Enumerations
		Structures	**Function**	A derivative data type that groups together data with different data types.
			Maximum Number of Members	2048
			Nesting Maximum Levels	8
			Member Data Types	Basic data types, structures, unions, enumerations, array variables
			Specifying Member Offsets	You can use member offsets to place structure members at any memory locations.
		Union	**Function**	A derivative data type that enables access to the same data with different data types.
			Maximum Number of Members	4
			Member Data Types	BOOL, BYTE, WORD, DWORD, and LWORD
		Enumeration	**Function**	A derivative data type that uses text strings called enumerators to express variable values.
	Data Type Attributes	**Array Specifications**	**Function**	An array is a group of elements with the same data type. You specify the number (subscript) of the element from the first element to specify the element.
			Maximum Number of Dimensions	3
			Maximum Number of Elements	65535
			Array Specifications for FB Instances	Supported
		Range Specifications		You can specify a range for a data type in advance. The data type can take only values that are in the specified range.
		Libraries		You can use user libraries.
Motion Control	**Control Modes**			Position control, Velocity control, and Torque control
	Axis Types			Servo axes, Virtual servo axes, Encoder axes, and Virtual encoder axes
	Positions that can be managed			Command positions and actual positions

Item				NX1P2
Motion Control	Single Axes	Single-Axis Position Control	Absolute Positioning	Positioning is performed for a target position that is specified with an absolute value.
			Relative Positioning	Positioning is performed for a specified travel distance from the command current position.
			Interrupt Feeding	Positioning is performed for a specified travel distance from the position where an interrupt input was received from an external input.
			Cyclic Synchronous Absolute Positioning	A positioning command is output each control period in Position Control Mode.
		Single-axis Velocity Control	Velocity Control	Velocity control is performed in Position Control Mode.
			Cyclic Synchronous Velocity Control	A velocity command is output each control period in Velocity Control Mode.
		Single-axis Torque Control	Torque Control	The torque of the motor is controlled.
		Single-axis Synchronized Control	Starting Cam Operation	A cam motion is performed using the specified cam table.
			Ending Cam Operation	The cam motion for the axis that is specified with the input parameter is ended.
			Starting Gear Operation	A gear motion with the specified gear ratio is performed between a master axis and slave axis.
			Positioning Gear Operation	A gear motion with the specified gear ratio and sync position is performed between a master axis and slave axis.
			Ending Gear Operation	The specified gear motion or positioning gear motion is ended.
			Synchronous Positioning	Positioning is performed in sync with a specified master axis.
			Master Axis Phase Shift	The phase of a master axis in synchronized control is shifted.
			Combining Axes	The command positions of two axes are added or subtracted and the result is output as the command position.
		Single-axis Manual Operation	Powering the Servo	The Servo in the Servo Drive is turned ON to enable axis motion.
			Jogging	An axis is jogged at a specified target velocity.
		Auxiliary Functions for Single-axis Control	Resetting Axis Errors	Axes errors are cleared.
			Homing	A motor is operated and the limit signals, home proximity signal, and home signal are used to define home.
			Homing with specified parameters	The parameters are specified, the motor is operated, and the limit signals, home proximity signal, and home signal are used to define home.
			High-speed Homing	Positioning is performed for an absolute target position of 0 to return to home.
			Stopping	An axis is decelerated to a stop.
			Immediately Stopping	An axis is stopped immediately.
			Setting Override Factors	The target velocity of an axis can be changed.
			Changing the Current Position	The command current position or actual current position of an axis can be changed to any position.
			Enabling External Latches	The position of an axis is recorded when a trigger occurs.
			Disabling External Latches	The current latch is disabled.
			Zone Monitoring	You can monitor the command position or actual position of an axis to see when it is within a specified range (zone).
			Enabling Digital Cam Switches	You can turn a digital output ON and OFF according to the position of an axis
			Monitoring Axis Following Error	You can monitor whether the difference between the command positions or actual positions of two specified axes exceeds a threshold value.
			Resetting the Following Error	The error between the command current position and actual current position is set to 0.
			Torque Limit	The torque control function of the Servo Drive can be enabled or disabled and the torque limits can be set to control the output torque.
			Command Position Compensation	The function which compensate the position for the axis in operation.
			Start Velocity	You can set the initial velocity when axis motion starts.

Item				NX1P2
Motion Control	Axes Groups	Multi-axes Coordinated Control	Absolute Linear Interpolation	Linear interpolation is performed to a specified absolute position.
			Relative Linear Interpolation	Linear interpolation is performed to a specified relative position.
			Circular 2D Interpolation	Circular interpolation is performed for two axes.
			Axes Group Cyclic Synchronous Absolute Positioning	A positioning command is output each control period in Position Control Mode.
		Auxiliary Functions for Multi-axes Coordinated Control	Resetting Axes Group Errors	Axes group errors and axis errors are cleared.
			Enabling Axes Groups	Motion of an axes group is enabled.
			Disabling Axes Groups	Motion of an axes group is disabled.
			Stopping Axes Groups	All axes in interpolated motion are decelerated to a stop.
			Immediately Stopping Axes Groups	All axes in interpolated motion are stopped immediately.
			Setting Axes Group Override Factors	The blended target velocity is changed during interpolated motion.
			Reading Axes Group Positions	The command current positions and actual current positions of an axes group can be read.
			Changing the Axes in an Axes Group	The Composition Axes parameter in the axes group parameters can be overwritten temporarily.
	Common Items	Cams	Setting Cam Table Properties	The end point index of the cam table that is specified in the input parameter is changed.
			Saving Cam Tables	The cam table that is specified with the input parameter is saved in non-volatile memory in the CPU Unit.
			Generating Cam Tables	The cam table is generated from the cam property and cam node that is specified in input parameters.
		Parameters	Writing MC Settings	Some of the axis parameters or axes group parameters are overwritten temporarily.
			Changing Axis Parameters	You can access and change the axis parameters from the user program.
	Auxiliary Functions	Count Modes		You can select either Linear Mode (finite length) or Rotary Mode (infinite length).
		Unit Conversions		You can set the display unit for each axis according to the machine.
		Acceleration/ Deceleration Control	Automatic Acceleration/ Deceleration Control	Jerk is set for the acceleration/deceleration curve for an axis motion or axes group motion.
			Changing the Acceleration and Deceleration Rates	You can change the acceleration or deceleration rate even during acceleration or deceleration.
		In-Position Check		You can set an in-position range and in-position check time to confirm when positioning is completed.
		Stop Method		You can set the stop method to the immediate stop input signal or limit input signal.
		Re-execution of Motion Control Instructions		You can change the input variables for a motion control instruction during execution and execute the instruction again to change the target values during operation.
		Multi-execution of Motion Control Instructions (Buffer Mode)		You can specify when to start execution and how to connect the velocities between operations when another motion control instruction is executed during operation.
		Continuous Axes Group Motions (Transition Mode)		You can specify the Transition Mode for multi-execution of instructions for axes group operation.
		Monitoring Functions	Software limits	The movement range of an axis is monitored.
			Following Error	The error between the command current value and the actual current value is monitored for each axis.
			Velocity, Acceleration Rate, Deceleration Rate, Torque, Interpolation Velocity, Interpolation Acceleration Rate, and Interpolation Dceleration Rate	You can set and monitor warning values for each axis and each axes group.
		Absolute Encoder Support		You can use an OMRON 1S-series Servomotor or G5-series Servomotor with an Absolute Encoder to eliminate the need to perform homing at startup.
		Input Signal Logic Inversion		You can inverse the logic of immediate stop input signal, positive limit input signal, negative limit input signal, or home proximity input signal.

Item				NX1P2
Motion Control	External Interface Signals			The Servo Drive input signals listed on the right are used. Home signal, home proximity signal, positive limit signal, negative limit signal, immediate stop signal, and interrupt input signal
Unit (I/O) Management	EtherCAT slaves	Maximum Number of Slaves		16
	CJ-Series Units	Maximum Number of Units		Not supported
Communications	Peripheral USB Port			Not supported
	Built-in EtherNet/IP Port	Communications Protocol		TCP/IP and UDP/IP
		CIP Communications Service	Tag Dta Links	Programless cyclic data exchange is performed with the devices on the EtherNet/IP network.
			Message Communications	CIP commands are sent to or received from the devices on the EtherNet/IP network.
		TCP/IP Applications	Socket Services	Data is sent to and received from any node on Ethernet using the UDP or TCP protocol. Socket communications instructions are used.
			FTP Client	Files are transferred via FTP from the CPU Unit to computers or Controllers at other Ethernet nodes. FTP client communications instructions are used.
			FTP Server	Files can be read from or written to the SD Memory Card in the CPU Unit from computers at other Ethernet nodes.
			Automatic Clock Adjustment	Clock information is read from the NTP server at the specified time or at a specified interval after the power supply to the CPU Unit is turned ON. The internal clock time in the CPU Unit is updated with the read time.
			SNMP Agent	Built-in EtherNet/IP port internal status information is provided to network management software that uses an SNMP manager.
	EtherCAT Port	Supported Services	Process Data Communications	A communications method to exchange control information in cyclic communications between the EtherCAT master and slaves. This communications method is defined by CoE.
			SDO Communications	A communications method to exchange control information in noncyclic event communications between EtherCAT master and slaves. This communications method is defined by CoE.
		Network Scanning		Information is read from connected slave devices and the slave configuration is automatically generated.
		DC (Distributed Clock)		Time is synchronized by sharing the EtherCAT system time among all EtherCAT devices (including the master).
		Packet Monitoring		The frames that are sent by the master and the frames that are received by the master can be saved. The data that is saved can be viewed with WireShark or other applications.
		Enable/Disable Settings for Slaves		The slaves can be enabled or disabled as communications targets.
		Disconnecting/Connecting Slaves		Temporarily disconnects a slave from the EtherCAT network for maintenance, such as for replacement of the slave, and then connects the slave again.
		Supported Application Protocol	CoE	SDO messages of the CAN application can be sent to slaves via EtherCAT
	Serial Communication	Protocol		Host link (FINS), no-protocol, and Modbus-RTU master (when connected to the Serial Communications Option Board)
	Communications Instructions			FTP client instructions, CIP communications instructions, socket communications instructions, SDO message instructions, noprotocol communications instructions, and Modbus RTU protocol instructions
Operation Management	RUN Output Contacts			Not supported
System Management	Event Logs	Function		Events are recorded in the logs
	Maximum Number of Events	System Event Log		576 *2
		Access Event Log		528 *3
		User-defined Event Log		512
Debugging	Online Editing	Single		Programs, function blocks, functions, and global variables can be changed online. More than one operators can change POUs individually via network.
	Forced Refreshing			The user can force specific variables to TRUE or FALSE.
		Maximum Number of Forced Variables	Device Variables for EtherCAT Slaves	64
			Device Variables for CJ-series Units and Variables with AT Specifications	Not supported
	MC Test Run			Motor operation and wiring can be checked from the Sysmac Studio.
	Synchronizing			The project file in the Sysmac Studio and the data in the CPU Unit can be made the same when online.
	Differentiation Monitoring			You can monitor when a variable changes to TRUE or changes to FALSE.
		Maximum Number of Contacts		8

				NX1P2
Debugging	**Data Tracing**	**Types**	**Single Triggered Trace**	When the trigger condition is met, the specified number of samples are taken and then tracing stops automatically.
			Continuous Trace	Data tracing is executed continuously and the trace data is collected by the Sysmac Studio.
		Maximum Number of Simultaneous Data Traces		2
		Maximum Number of Records		10000
		Maximum Number of Sampled Variables		48 variables
		Timing of Sampling		Sampling is performed for the specified task period, at the specified time, or when a sampling instruction is executed.
		Triggered Traces		Trigger conditions are set to record data before and after an event.
			Trigger Conditions	When BOOL variable changes to TRUE or FALSE Comparison of non-BOOL variable with a constant Comparison Method: Equals (=), Greater than (>), Greater than or equals (?), Less Than (<), Less than or equals (?), Not equal (?)
			Delay	Trigger position setting: A slider is used to set the percentage of sampling before and after the trigger condition is met.
	Simulation			The operation of the CPU Unit is emulated in the Sysmac Studio.
Reliability functions	**Self-Diagnosis**	**Controller Errors**	**Levels**	Major faults, partial faults, minor faults, observation, and information
			Maximum number of message languages	9 (Sysmac Studio) 2 (NS-series PT)
		User-defined Errors	**Function**	User-defined errors are registered in advance and then records are created by executing instructions.
			Levels	8
			Maximum number of message languages	9
Security	**Protecting Software Assets and Preventing Operating Mistakes**	**CPU Unit Names and Serial IDs**		When going online to a CPU Unit from the Sysmac Studio, the CPU Unit name in the project is compared to the name of the CPU Unit being connected to.
		Protection	**User Program Transfer with no Restoration Information**	You can prevent reading data in the CPU Unit from the Sysmac Studio.
			CPU Unit Write Protection	You can prevent writing data to the CPU Unit from the Sysmac Studio or SD Memory Card.
			Overall Project File Protection	You can use passwords to protect .smc files from unauthorized opening on the Sysmac Studio.
			Data Protection	You can use passwords to protect POUs on the Sysmac Studio.
		Verification of Operation Authority		Online operations can be restricted by operation rights to prevent damage to equipment or injuries that may be caused by operating mistakes.
			Number of Groups	5
		Verification of User Program Execution ID		The user program cannot be executed without entering a user program execution ID from the Sysmac Studio for the specific hardware (CPU Unit).
SD Memory Card functions	**Storage Type**			SD Memory Card, SDHC Memory Card
	Application	**Automatic Transfer from SD Memory Card**		When the power supply to the Controller is turned ON, the data that is stored in the autoload directory of the SD Memory Card is transferred to the Controller.
		Program transfer from SD Memory Card		With the specification of the system-defined variable, you can transfer a program that is stored in the SD Memory Card to the Controller.
		SD Memory Card Operation Instructions		You can access SD Memory Cards from instructions in the user program.
		File Operations from the Sysmac Studio		You can perform file operations for Controller files in the SD Memory Card and read/write general-purpose document files on the computer.
		SD Memory Card Life Expiration Detection		Notification of the expiration of the life of the SD Memory Card is provided in a system-defined variable and event log.
Backing up data	**SD Memory Card backups**	**Operating methods**	**CPU Unit front panel DIP switch**	Backup, verification, and restoration operations are performed by manipulating the front-panel DIP switch on the CPU Unit.
			Specification with system-defined variables	Backup, verification, and restoration operations are performed by manipulating system-defined variables.*4
			SD Memory Card Window in Sysmac Studio	Backup and verification operations are performed from the SD Memory Card Window of the Sysmac Studio.
			Special instruction	The special instruction is used to backup data.
		Protection	**Disabling backups to SD Memory Cards**	Backing up data to a SD Memory Card is prohibited.
	Sysmac Studio Controller backups			The Sysmac Studio is used to backup, restore, or verify Controller data.

*1. Inline ST is supported. (Inline ST is ST that is written as an element in a ladder diagram.)
*2. This is the total of 512 events for the CPU Unit and 64 events for the NX Unit.
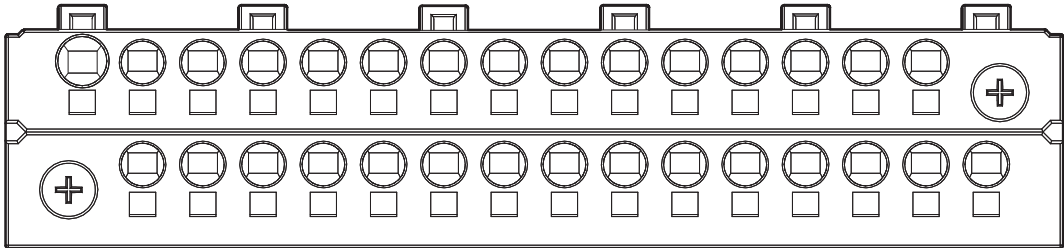*3. This is the total of 512 events for the CPU Unit and 16 events for the NX Unit.
*4. Restore is supported with unit version 1.14 or later.

Input Terminal Block

Terminal Arrangement

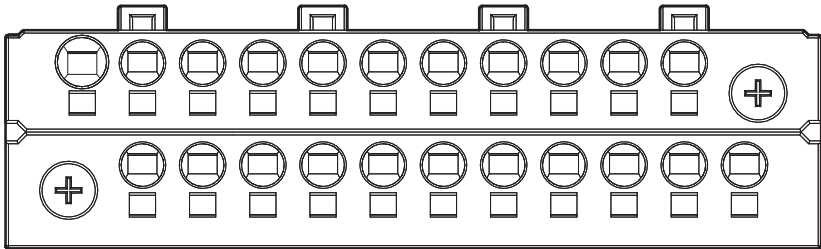The description is given for each CPU Unit model.

NX1P2-1□40DT□

⏚	+	-	COM	01	03	05	07	09	11	13	15	17	19	21
	+	-	00	02	04	06	08	10	12	14	16	18	20	22	23

Symbol	Terminal name	Description	Reference
⏚	Functional ground terminal	The functional ground terminal. Connect the ground wire to the terminal.	Refer to the *NX-series NX1P2 CPU Unit Hardware User's Manual* (Cat. No. W578) for details.
+/-	Unit power supply terminals	These terminals are connected to the Unit power supply. The + terminals and - terminals are internally connected to each other.	
COM	Common terminal	Common terminal for the input circuits	Refer to the *Input Specifications* page.
00 to 15	Input terminals	General-purpose input A	
16 to 23	Input terminals	General-purpose input B	

NX1P2-9024DT□

⏚	+	-	COM	01	03	05	07	09	11	13
	+	-	00	02	04	06	08	10	12	NC	NC

Symbol	Terminal name	Description	Reference
⏚	Functional ground terminal	The functional ground terminal. Connect the ground wire to the terminal.	Refer to the *NX-series NX1P2 CPU Unit Hardware User's Manual* (Cat. No. W578) for details.
+/-	Unit power supply terminals	These terminals are connected to the Unit power supply. The + terminals and - terminals are internally connected to each other.	
COM	Common terminal	Common terminal for the input circuits	Refer to the *Input Specifications* page.
00 to 13	Input terminals	General-purpose input A	
NC	NC	Do not connect anything.	---

Machine Automation Controller **NX1P**

Input Specifications

The specifications depends on the input terminal numbers of the model.

Item	Specification	
Input type	**General-purpose input A**	**General-purpose input B**
Input terminal number	**NX1P2-1□40DT□: 00 to 15** **NX1P2-9024DT□: 00 to 13**	**NX1P2-1□40DT□: 16 to 23** **NX1P2-9024DT□: None**
Internal I/O common	For both NPN/PNP	
Input voltage	24 VDC (15 to 28.8 VDC)	
Connected sensor	Two-wire or three-wire sensors	
Input impedance	4.0 kΩ	4.3 kΩ
Input current	5.8 mA typical	5.3 mA typical
ON voltage	15 VDC min.	
OFF voltage/current	5 VDC max./1 mA max.	
ON response time *1	2.5 μs max.	1 ms max.
OFF response time *1	2.5 μs max.	1 ms max.
ON/OFF filter time *2	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	
Circuit configuration		

*1. These values are the fixed response time needed by the hardware. A value from 0 to 32 ms (default: 1 ms) that is set on the Support Software is added to these values.
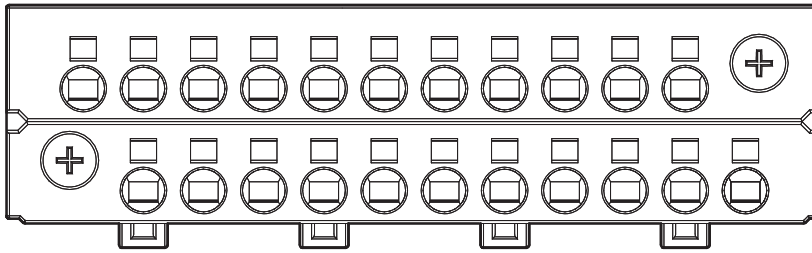*2. Set the filter time for every 4 points.

Output Terminal Block

Terminal Arrangement

The description is given for each CPU Unit model.

NX1P2-1□40DT

NC	NC	00	02	04	06	NC	08	10	12	14	
	C0 (0V)	01	03	05	07	C1 (0V)	09	11	13	15	NC

Symbol	Terminal name	Description	Reference
C0 (0V), C1 (0V)	Common terminal	Connected to the 0-V side of the I/O power supply. C0 (0V) and C1 (0V) are independent from each other inside the CPU Unit.	Refer to the *Output Specifications* page.
00 to 15	Output terminals	NPN (sinking) type output	
NC	NC	Do not connect anything.	---

NX1P2-1□40DT1

The appearance of the terminal block is the same as NX1P2-1□40DT.

NC	C0 (+V)	00	02	04	06	C1 (+V)	08	10	12	14	
	0V0	01	03	05	07	0V1	09	11	13	15	NC

Symbol	Terminal name	Description	Reference
C0 (+V), C1 (+V)	Common terminal	Connected to the 24-V side of the I/O power supply. C0 (+V) and C1 (+V) are independent from each other inside the CPU Unit.	Refer to the *Output Specifications* page.
0V0, 0V1	0 V terminal	Supplies 0 V for the internal circuits for driving. 0V0 and 0V1 are independent from each other inside the CPU Unit.	
00 to 15	Output terminals	PNP (sourcing) type output with the load short-circuit protection function	
NC	NC	Do not connect anything.	---

NX1P2-9024DT

The appearance of the terminal block is the same as NX1P2-1□40DT.

NC	NC	00	02	04	06	08	NC	NC	NC	NC	
	C0 (0V)	01	03	05	07	09	NC	NC	NC	NC	NC

Symbol	Terminal name	Description	Reference
C0 (0V)	Common terminal	Connected to the 0-V side of the I/O power supply.	Refer to the *Output Specifications* page.
00 to 09	Output terminals	NPN (sinking) type output	
NC	NC	Do not connect anything.	---