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 units connectible on local bus including IO power supply modules and IO-Link master (See note)
- Up to 16 remote NX I/O units connectible via couplers
- High speed local bus for up to 256 IO points with expansion to 808 IO points
- Up to two option boards connectible to add serial communications or analog I/O functionality
- Battery-free operation
- Fully conforms with IEC 61131-3 standard programming

Note: Additional power supply modules such as NX-PFXXXX maybe required to supply IO power and these are counted towards the total number of connectible modules.

Option Boards
- Serial Communications
- Analog I/O

NX I/O and Special Use Units
- Digital and Analog I/O
- Temperature Input
- Heater Burnout Detector
- Load Cell Input
- Position Interfaces: Encoder and SSI Input, Pulse Output
- IO-Link Master, Serial Communications
- Additional NX power supply modules

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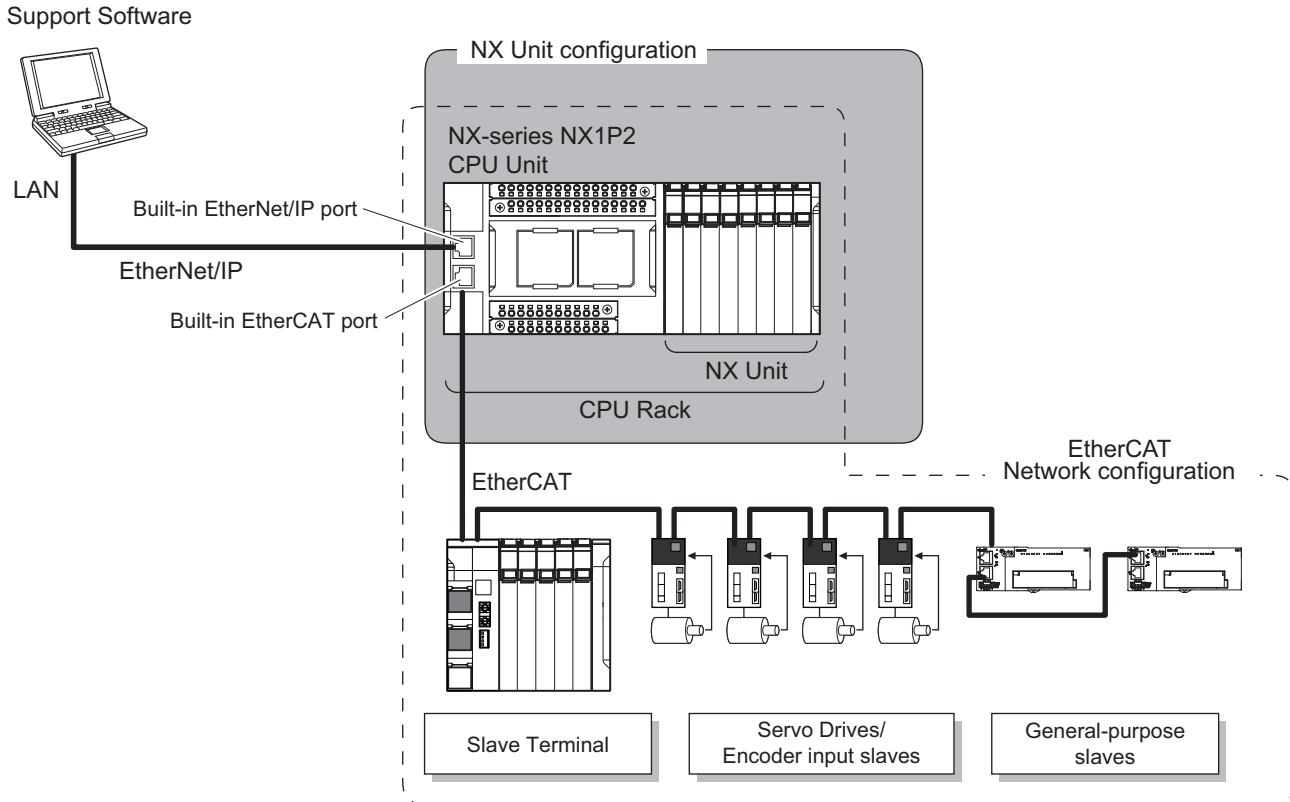
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System Configuration

Basic System Configuration

Support Software

LAN

Built-in EtherNet/IP port

EtherNet/IP

Built-in EtherCAT port

NX Unit configuration

NX-series NX1P2
CPU Unit

NX Unit

CPU Rack

EtherCAT

EtherCAT
Network configuration

| Slave Terminal | Servo Drives/
Encoder input slaves | General-purpose
slaves |

Interpreting Model Numbers

Model Number Legend (Not all models that can be represented with the model number legend can necessarily be produced.)

NX1P2-□□□□□D□
 1   2 3   4 5 6

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 only[+])
3	Synchronized motion control axes *	0	2 axes (available only for models with motion control axes)
		1	4 axes (available only for models with motion control 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 "Control engine" is "1".
When "Control engine" is "9", "Synchronized motion control axes" is always "0"
and those models will only perform "Single-axis position control".

"+": Motion Control Axes includes:
- Point to point positioning
- Synchronized motion (gearing/camming)
- Multi-Axes coordinated motion (circular/linear interpolation)
- Axes grouping

Single-axis position control includes:
- Only point-to-point positioning
- No Synchronized motion (gearing/camming)
- No Multi-Axes coordinated motion (circular/linear interpolation)
- No Axes grouping

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, RCM: Regulatory Compliance Mark, RCM: RCM 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 |
				Motion control axes[1]	Single-axis position control[2]		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, CE, RCM, KC
								16 points, PNP transistor[3]	NX1P2-1140DT1	
			6 axes	2 axes	4 axes			16 points, NPN transistor	NX1P2-1040DT	
								16 points, PNP transistor[3]	NX1P2-1040DT1	
			4 axes	0 axes	4 axes	24 points	14 points	10 points, NPN transistor	NX1P2-9024DT	
								10 points, PNP transistor[3]	NX1P2-9024DT1	

Note: One NX-END02 End Cover is provided with the NX1P2 CPU Unit.

1. Motion Control Axes includes:
   - Point to point positioning
   - Synchronized motion (gearing/camming)
   - Multi-Axes coordinated motion (circular/linear interpolation)
   - Axes grouping

2. Single-axis position control includes:
   - Only point-to-point positioning
   - No Synchronized motion (gearing/camming)
   - No Multi-Axes coordinated motion (circular/linear interpolation)
   - No Axes grouping

3. 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, 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	

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	---
	Other than the above.	KC

* 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
		Maximum number of controlled axes — Motion control axes+	8 axes	6 axes	---
		Maximum number of controlled axes — Single-axis position control+	4 axes	4 axes	4 axes
		Maximum number of used real axes	8 axes	6 axes	4 axes
		Maximum number of used real axes — Motion control axes	4 axes	2 axes	---
		Maximum number of used real axes — Single-axis position control	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.		

*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.

"+": Motion Control Axes includes:
- Point to point positioning
- Synchronized motion (gearing/camming)
- Multi-Axes coordinated motion (circular/linear interpolation)
- Axes grouping

Single-axis position control includes:
- Only point-to-point positioning
- No Synchronized motion (gearing/camming)
- No Multi-Axes coordinated motion (circular/linear interpolation)
- No Axes grouping

Item			NX1P2-		
			11□□□□/ 11□□□□1	10□□□□/ 10□□□□1	90□□□□/ 90□□□□1
Built-in EtherNet/IP port	**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.		
	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		
		UCMM (non-connection type) — **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		

*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

Item				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 ($\geq$), Less Than (<), Less than or equals ($\leq$), Not equal ($\neq$)
			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 and verification operations are performed by manipulating system-defined variables.
			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.
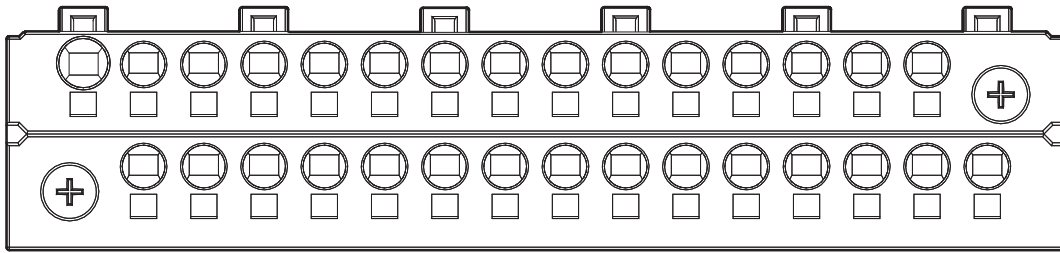*3. This is the total of 512 events for the CPU Unit and 16 events for the NX Unit.

OMRON

Input Terminal Block

Terminal Arrangement

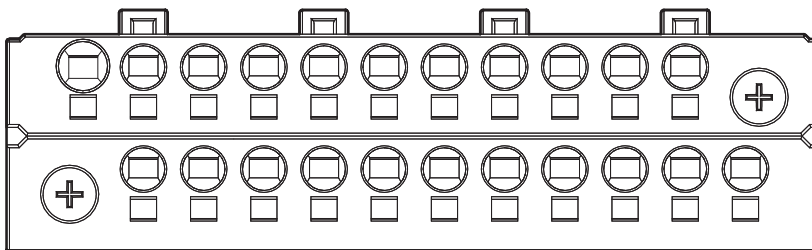The description is given for each CPU Unit model.

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.	---

OMRON

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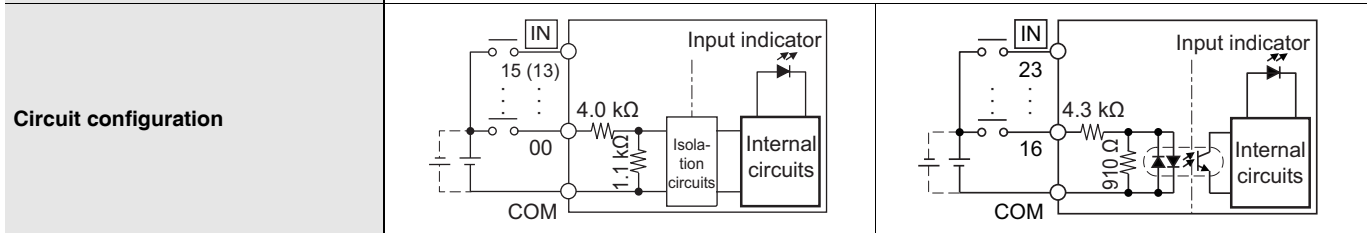
*1. These values are the fixed response time needed by the hardware. A value from 0 to 32 ms (default: 1 ms) that is set on the Support Software is added to these values.
*2. Set the filter time for every 4 points.

Output Terminal Block

Terminal Arrangement

The description is given for each CPU Unit model.

NX1P2-1□40DT
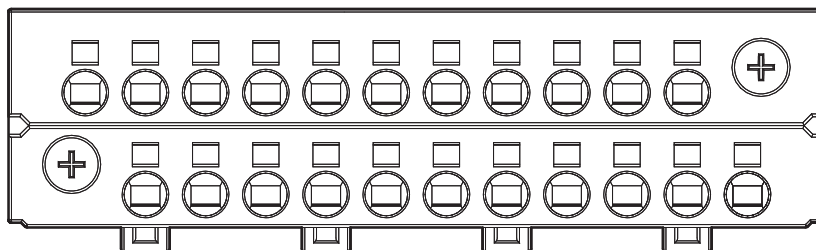
NC	NC	00	02	04	06	NC	08	10	12	14	
	C0 (0V)	01	03	05	07	C1 (0V)	09	11	13	15	NC

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.	---

NX1P2-9024DT1

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

NC	C0 (+V)	00	02	04	06	08	NC	NC	NC	NC	
	0V0	01	03	05	07	09	NC	NC	NC	NC	NC

Symbol	Terminal name	Description	Reference
C0 (+V)	Common terminal	Connected to the 24-V side of the I/O power supply.	Refer to the *Output Specifications* page.
0V0	0 V terminal	Supplies 0 V for the internal circuits for driving.	
00 to 09	Output terminals	PNP (sourcing) type output with the load short-circuit protection function	
NC	NC	Do not connect anything.	---

Output Specifications

The models of the CPU Units are divided according to the following two output types: the NPN (sinking) type and PNP (sourcing) type.
There is no difference in specifications between the models with different output terminal numbers.

Item	Specification	
	NX1P2-□□□□DT	**NX1P2-□□□□DT1**
Internal I/O common	NPN (sinking)	PNP (sourcing)
Maximum switching capacity	12 to 24 VDC (10.2 to 28.8 VDC), 300 mA per point	24 VDC (15 to 28.8 VDC), 300 mA per point
	NX1P2-1□40DT□: 1.8 A/common (3.6 A/Unit) NX1P2-9024DT□: 2.4 A/common (2.4 A/Unit)	
Minimum switching capacity	12 to 24 VDC (10.2 to 28.8 VDC), 1 mA	24 VDC (15 to 28.8 VDC), 1 mA
Leakage current	0.1 mA max.	
Residual voltage	1.5 V max.	
ON response time	0.1 ms max.	0.5 ms max.
OFF response time	0.8 ms max.	1.0 ms max.
Current consumption from I/O power supply *1	---	NX1P2-1□40DT1: 40 mA/common NX1P2-9024DT1: 50 mA/common
Load short-circuit protection	Not provided	Provided *2
Circuit configuration	NX1P2-1□40DT 	NX1P2-1□40DT1
	NX1P2-9024DT 	NX1P2-9024DT1

*1. The internally consumed current from I/O power supply. The current flows from the common terminal Cn (+V) to the 0Vn terminal. The current consumption of any external load is excluded.

*2. The load short-circuit protection is provided for each point of the PNP (sourcing) type output terminal. It protects the output circuits when a load short circuit occurs.
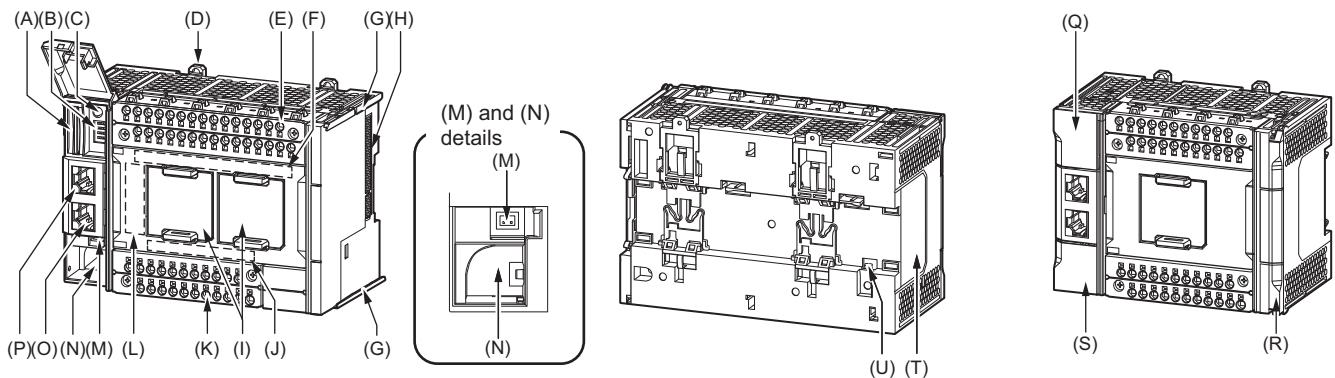
Part Names and Functions

CPU Unit

The following two models have the different numbers of the option board slots and built-in I/O points, but the names and functions of their parts are the same. Refer to the *Ordering Information* page for the CPU Unit models and specifications such as the number of built-in I/O points.

NX1P2-1□40□□□   **NX1P2-9024□□□**

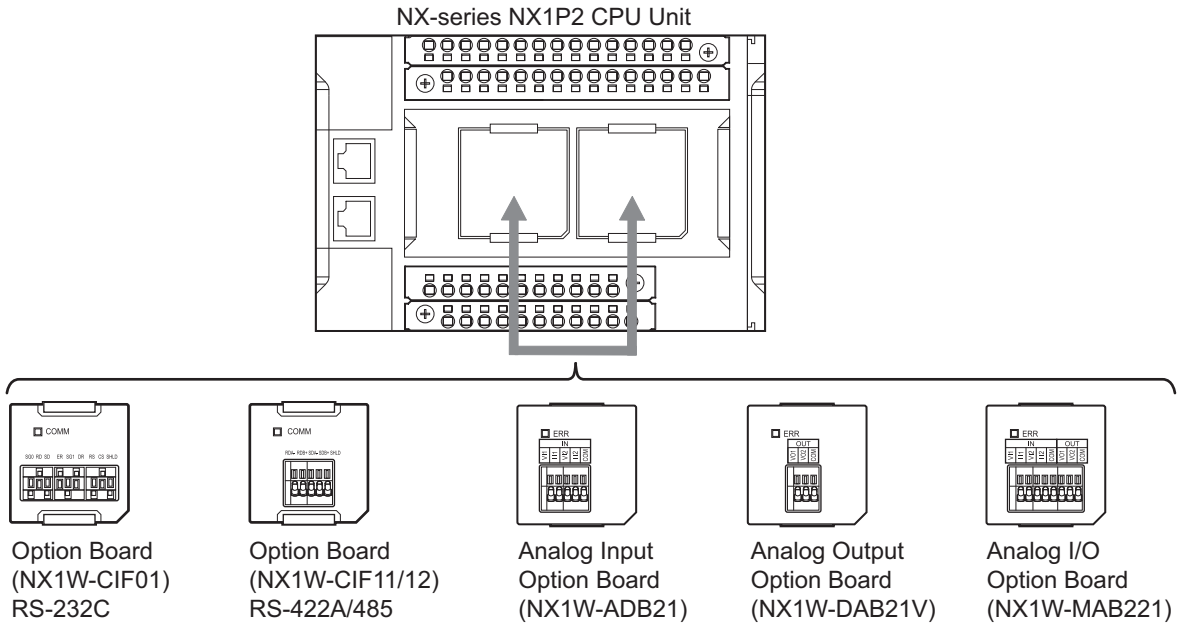| Letter	Name	Function
A	SD Memory Card connector	Connects the SD Memory Card to the CPU Unit.
B	DIP switch	Used in Safe Mode *1 or when backing up data *2. Normally, turn OFF all of the pins.
C	SD Memory Card power supply switch	Turns OFF the power supply so that you can remove the SD Memory Card.
D	DIN Track mounting hook	These hooks are used to mount the Unit to a DIN Track.
E	Input terminal block	This terminal block is used for wiring for the Unit power supply, grounding, and built-in input.
F	Input indicator	Shows the operation status of the built-in input.
G	Unit hookup guides	These guides are used to mount an NX Unit or End Cover.
H	NX bus connector	This connector is used to connect the CPU Unit to the NX Unit on the right of the CPU Unit.
I	Option board slot 1 (left), Option board slot 2 (right)	Remove the covers of the slots and mount Option Boards. For the models with 24 built-in I/O points, only one slot is provided. Keep the removed covers in a safe place.
J	Output indicator	Shows the operation status of the built-in output.
K	Output terminal block	This terminal block is used to wire the built-in output.
L	CPU Unit operation status indicator	Shows the operation status of the CPU Unit.
M	Battery connector	Connector to mount the backup battery that is sold separately.
N	Battery slot	Used to mount the backup battery that is sold separately.
O	Built-in EtherCAT port (port 2)	Connects the built-in EtherCAT with an Ethernet cable.
P	Built-in EtherNet/IP port (port 1)	Connects the built-in EtherNet/IP with an Ethernet cable.
Q	SD Memory Card cover	Cover for the SD Memory Card and DIP switch. The cover swings upward.
R	End Cover	Cover to protect the CPU Unit and NX Units. One End Cover is provided with the CPU Unit.
S	Battery cover	Cover for the battery slot. Remove this cover when you mount/remove the battery.
T	ID information indication	Shows the ID information of the CPU Unit.
U	DIN Track contact plate	This plate is connected internally to the functional ground terminal on the terminal block.

*1. To use Safe Mode, set the DIP switch as shown below and then turn ON the power supply to the Controller.
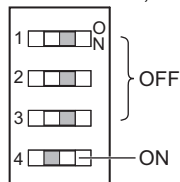
If the power supply to the Controller is turned ON with the CPU Unit in Safe Mode, the CPU Unit will start in PROGRAM mode. Use the Safe Mode if you do not want to execute the user program when the power supply is turned ON or if it is difficult to connect the Sysmac Studio. For information on Safe Mode, refer to the *NJ/NX-series Troubleshooting Manual* (Cat. No. W503).

*2. Refer to the *NJ/NX-series CPU Unit Software User's Manual* (Cat. No. W501) for details on backing up data.

Option Board

NX-series NX1P2 CPU Unit

| Option Board (NX1W-CIF01) RS-232C | Option Board (NX1W-CIF11/12) RS-422A/485 | Analog Input Option Board (NX1W-ADB21) | Analog Output Option Board (NX1W-DAB21V) | Analog I/O Option Board (NX1W-MAB221) |

Specifications of Serial Communications Option Board

Item	Specification		
Model	NX1W-CIF01	NX1W-CIF11	NX1W-CIF12
Communications port	One RS-232C port	One RS-422A/485 port	One RS-422A/485 port (isolated)
Communications method	Half-duplex		
Synchronization method	Start-stop synchronization		
Baud rate	1.2/2.4/4.8/9.6/19.2/38.4/57.6/115.2 kbps		
Transmission distance	15 m	50 m	500 m
Supported protocol	Host link, Modbus-RTU master, and no-protocol		
Connection type	Screwless clamping terminal block (9 terminals)	Screwless clamping terminal block (5 terminals)	
Applicable wire size	AWG28 to 20	AWG24 to 20	
Dimensions (mm) *1	35.9 × 35.9 × 13.5 (W×H×D)		
Weight	16 g	13 g	14 g
Power consumption	Included in the CPU Unit power consumption. The Option Board power consumption is included in the definition of the CPU Unit power consumption.		
Isolation method	No isolation		Isolation *2

*1. Projecting parts such as a terminal block is not included. When the Option Board is mounted to the CPU Unit, it protrudes through the CPU Unit surface. Refer to the *NX-series NX1P2 CPU Unit Hardware User's Manual* (Cat. No. W578) for details.
*2. The terminals are isolated from the internal circuits of the CPU Unit.

RS-232C Option Board (NX1W-CIF01)

Communications status indicator
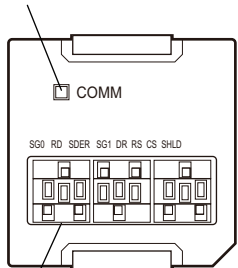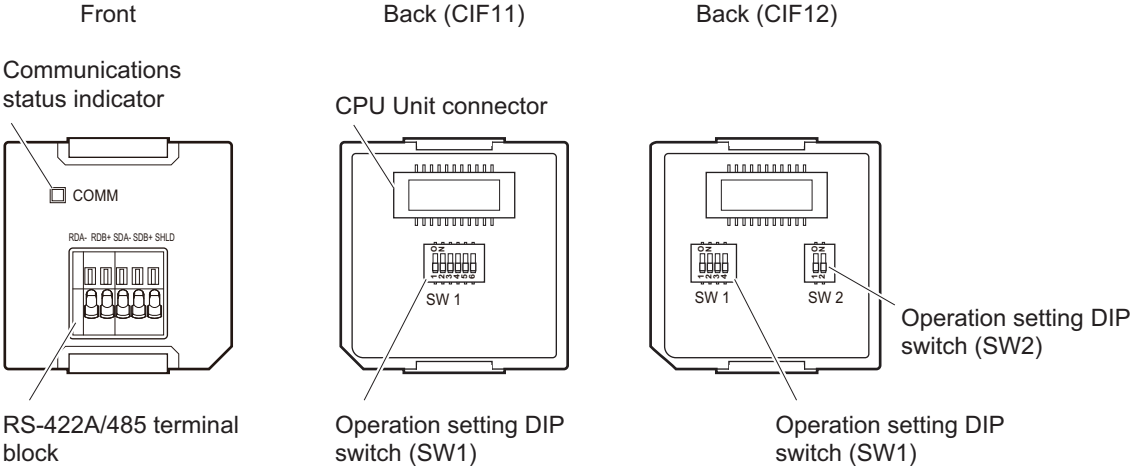

RS232C terminal block

RS-232C Terminal Block

SG0 RD SD ER SG1 DR RS CS SHLD
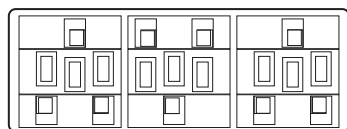
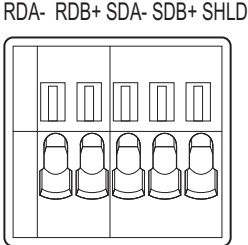| Abbreviation	Signal name	I/O
SG0	Signal grounding	---
RD	Receive data	Input
SD	Send data	Output
ER	Data terminal ready	Output
SG1	Signal grounding	---
DR	Data set ready	Input
RS	Send request	Output
CS	Data can be sent	Input
SHLD	Shield	---

Note: 1. As the Option Board does not have a 5 V power supply terminal, it cannot be connected to external converters such as an CJ1W-CIF11 and NT-AL001, or an NV3W-M☐20L Programmable Terminal.
2. The terminal block is not removable.

RS-422A/485 Option Board (NX1W-CIF11/NX1W-CIF12)

Front   Back (CIF11)   Back (CIF12)

Communications status indicator

CPU Unit connector

COMM

RDA- RDB+ SDA- SDB+ SHLD

SW 1   SW 1   SW 2

Operation setting DIP switch (SW2)

RS-422A/485 terminal block

Operation setting DIP switch (SW1)

Operation setting DIP switch (SW1)

Note: All pins are turned OFF by default.
Use a narrow-tipped tool such as a flat-blade screwdriver to change the settings of the DIP switches.

RS-422A/485 Terminal Block

RDA- RDB+ SDA- SDB+ SHLD

Abbreviation	Four-wire type selected		Two-wire type selected	
	Signal name	I/O	Signal name	I/O
RDA-	Reception data -	Input	Communication data -	I/O *
RDB+	Reception data +		Communication data +	
SDA-	Transmission data -	Output	Communication data -	I/O *
SDB+	Transmission data +		Communication data +	
SHLD	Shield			

* For two-wire connection, either the RDA-/RDB+ pair or SDA-/SDB+ pair can be used.

Specifications of Analog I/O Option Board

Item	Specification				
Model	NX1W-ADB21		NX1W-DAB21V		NX1W-MAB221	
I/O	Analog input		Analog output		Analog I/O	
Voltage input	0 to 10 V	2 words total	---		0 to 10 V	2 words total
Current input	0 to 20 mA		---		0 to 20 mA	
Voltage output	---		0 to 10 V	2 words	0 to 10 V	2 words
Connection type	Screwless clamping terminal block (5 terminals)		Screwless clamping terminal block (3 terminals)		Screwless clamping terminal block (8 terminals)	
Applicable wire size	AWG24 to 20					
Dimensions (mm) *	35.9 × 35.9 × 28.2 (W×H×D)					
Weight	24 g		24 g		26 g	
Power consumption	Included in the CPU Unit power consumption. The Option Board power consumption is included in the definition of the CPU Unit power consumption.					
Isolation method	No isolation					

* Projecting parts such as a terminal block is not included. When the Option Board is mounted to the CPU Unit, it protrudes through the CPU Unit surface. Refer to the *NX-series NX1P2 CPU Unit Hardware User's Manual* (Cat. No. W578) for details.

Analog Input Option Board (NX1W-ADB21)

Status indicator

ERR
IN
VI1 I1 VI2 I2 COM
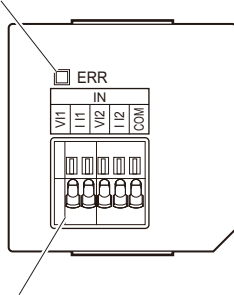
Analog input terminal block

Analog Input Terminal Array
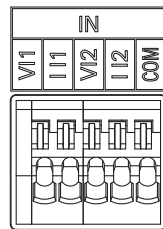
Abbreviation	Signal name
V I1	Voltage input 1
I I1	Current input 1
V I2	Voltage input 2
I I2	Current input 2
COM	Input common

Note: When you use the current input, be sure to short-circuit V I1 with I I1, and short-circuit V I2 with I I2.
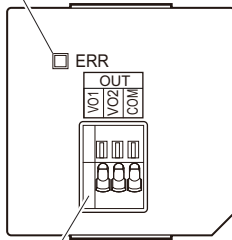
Analog Input Specifications

Item		Specification	
		Voltage input	Current input
Input method		Single-ended input	Single-ended input
Input range		0 to 10 V	0 to 20 mA
Input conversion range		0 to 10.24 V	0 to 30 mA
Absolute maximum rating		-1 to 15 V	-4 to 30 mA
Input impedance		200 kΩ min.	Approx. 250 Ω
Resolution		1/4,000 (full scale)	1/2,000 (full scale)
Overall accuracy	25°C	±0.5% (full scale)	±0.6% (full scale)
	0 to 55°C	±1.0% (full scale)	±1.2% (full scale)
Averaging processing		Not provided	
Conversion time		Internal sampling time: 2 ms per point *	

* Refer to the *NX-series NX1P2 CPU Unit Built-in I/O and Option Board User's Manual* (Cat. No. W579) for information on refresh time.

Analog Output Option Board (NX1W-DAB21V)

Status indicator

Analog output terminal block

Analog Output Terminal Array

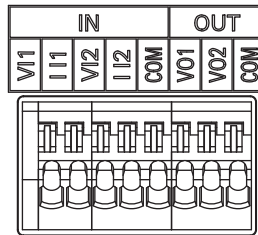| Abbreviation	Signal name
VO1	Voltage output 1
VO2	Voltage output 1
COM	Output common

Analog Output Specifications

Item		Specification	
		Voltage output	**Current output**
Output range		0 to 10 V	---
Output conversion range		0 to 10.24 V	---
Allowable load resistance		2 kΩ min.	---
Output impedance		0.5 Ω max.	---
Resolution		1/4,000 (full scale: 4,000)	---
Overall accuracy	**25°C**	±0.5% (full scale)	---
	0 to 55°C	±1.0% (full scale)	---
Conversion time		Internal sampling time: 2 ms per point *	

* Refer to the *NX-series NX1P2 CPU Unit Built-in I/O and Option Board User's Manual* (Cat. No. W579) for information on refresh time.

Analog I/O Option Board (NX1W-MAB221)

Status indicator
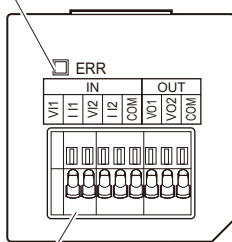
Analog output terminal block

Analog I/O Terminal Array

	Abbreviation	Signal name
IN	VI1	Voltage output 1
	II1	Current input 1
	VI2	Voltage input 2
	II2	Current input 2
	COM	Input common
OUT	VO1	Voltage output 1
	VO2	Voltage output 2
	COM	Output common

Note: When you use the current input, be sure to short-circuit VI1 with II1, and short-circuit VI2 with II2.
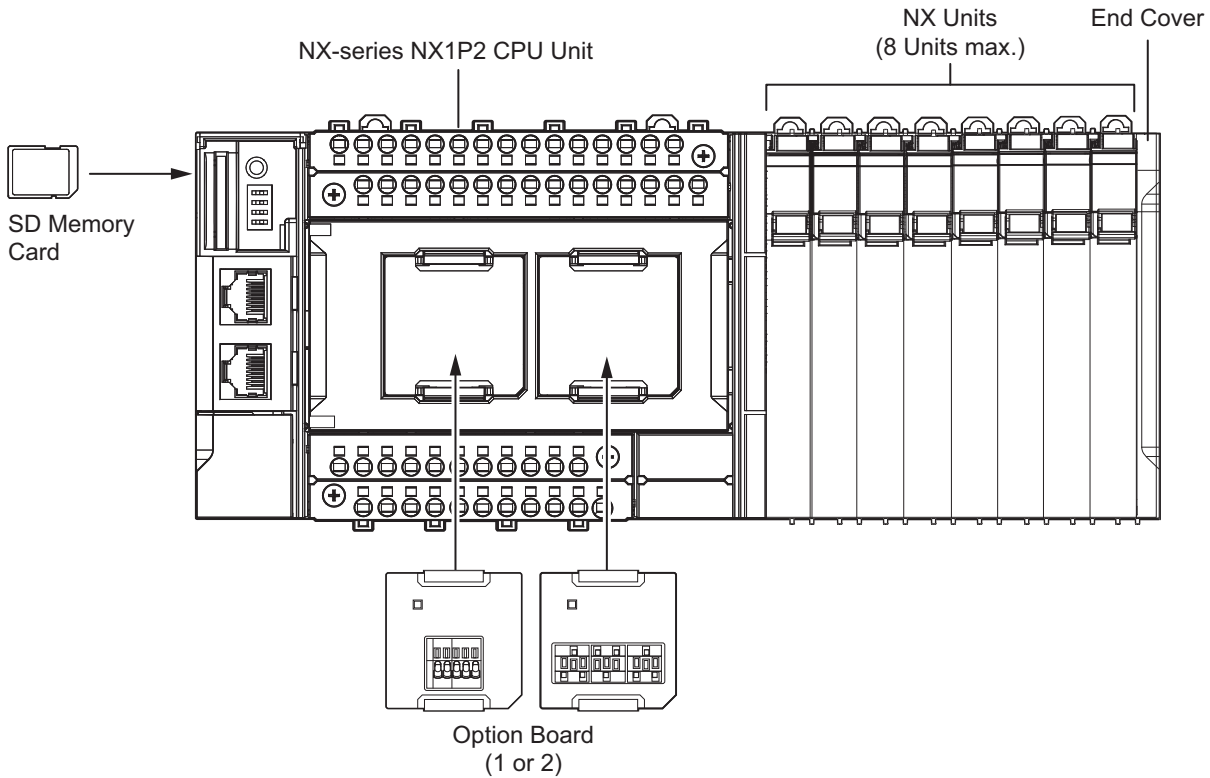
Analog I/O Specifications

Item			Specification	
			Voltage I/O	**Current I/O**
Analog input section	**Input method**		Single-ended input	Single-ended input
	Input range		0 to 10 V	0 to 20 mA
	Input conversion range		0 to 10.24 V	0 to 30 mA
	Absolute maximum rating		-1 to 15 V	-4 to 30 mA
	Input impedance		200 kΩ min.	Approx. 250 Ω
	Resolution		1/4,000 (full scale)	1/2,000 (full scale)
	Overall accuracy	**25°C**	±0.5% (full scale)	±0.6% (full scale)
		0 to 55°C	±1.0% (full scale)	±1.2% (full scale)
	Averaging processing		Not provided	
Analog output section	**Output range**		0 to 10 V	---
	Output conversion range		0 to 10.24 V	---
	Allowable load resistance		2 kΩ min.	---
	Output impedance		0.5 Ω max.	---
	Resolution		1/4,000 (full scale)	---
	Overall accuracy	**25°C**	±0.5% (full scale)	---
		0 to 55°C	±1.0% (full scale)	---
Conversion time			Internal conversion time: 6 ms (Total of 4 channels) *	

* Refer to the *NX-series NX1P2 CPU Unit Built-in I/O and Option Board User's Manual* (Cat. No. W579) for information on refresh time.

NX Unit Configuration

CPU Rack

The CPU Rack consists of an NX-series NX1P2 CPU Unit, NX Units, and an End Cover.
Up to eight NX Units can be connected.

Option Board
(1 or 2)

Configuration		Remarks
NX-series NX1P2 CPU Unit		One required for every CPU Rack.
End Cover		Must be connected to the right end of the CPU Rack. One End Cover is provided with the CPU Unit.
NX Unit	Digital I/O Unit	• Up to eight Units can be mounted to each Expansion Rack. • For the NX Units connectable to the CPU Unit, refer to the *Ordering Information* page. • You cannot mount NX-series Safety Control Units on the CPU Unit and use them. Use NX-series Safety Control Units as a subsystem on EtherCAT. • Refer to the *NX-series Data Reference Manual* (Cat. No. W525. Revision 11 or later) for information such as restrictions on the NX Units.
	Analog I/O Unit	
	System Unit	
	Position Interface Unit	
	Communication Interface Unit	
	Load Cell Input Unit	
Option Board	Serial Communications Option Board	One or two Option Boards can be connected to the CPU Unit.
	Analog I/O Option Board	
SD Memory Card		Install as required.

NX Unit Power Supply System

Refer to the *NX-series NX1P2 CPU Unit Hardware User's Manual* (Cat. No. W578) for the NX Unit power supply system.

Sysmac Studio

The Sysmac Studio is a Support Software package that provides an integrated development environment to design, program, debug, and maintain Sysmac NJ/NX-series Controllers.

Configuration

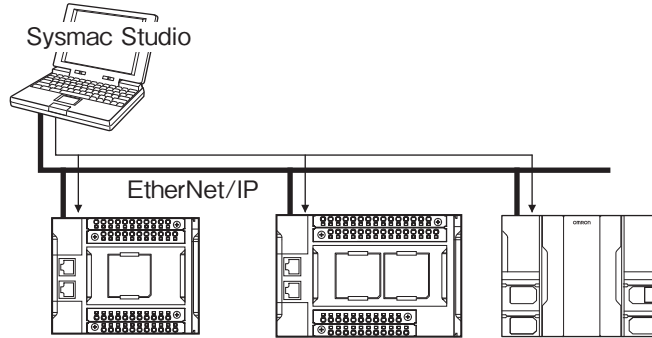With an NX1P2 CPU Unit, you can connect the Sysmac Studio online in the following ways.

Connection with EtherNet/IP

- 1:1 Connection

- Directly specify the IP address of the remote device or
- select the remote device from the node list.

- 1:N Connection

- A direct connection is made from the Sysmac Studio. The IP address and connection device do not need to be specified.
- You can make the connection whether or not a switching hub is used.
- Support for Auto-MDI enables the use of cross cables or straight cables if a direct connection is made.

Version Information

Unit Versions and Corresponding Sysmac Studio Versions

This following table gives the relationship between the unit versions of NX-series NX1P2 CPU Units and Option Boards and the corresponding Sysmac Studio versions.
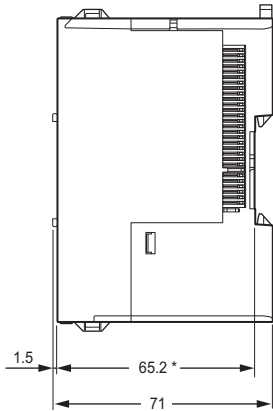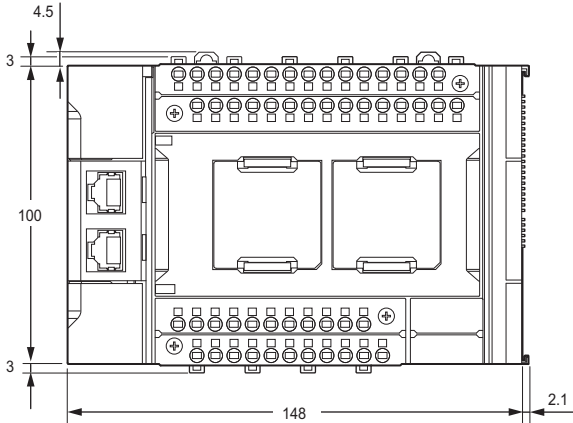
Unit version of CPU Unit	Unit version of Option Board	Corresponding version of Sysmac Studio
Ver.1.13 *	Ver.1.00	Ver.1.17

* There is no NX1P2 CPU Unit with unit version 1.12 or earlier.

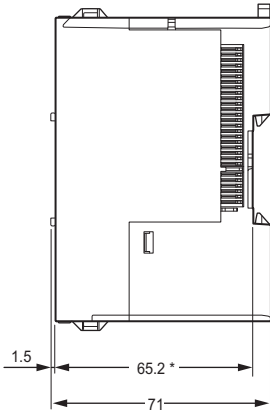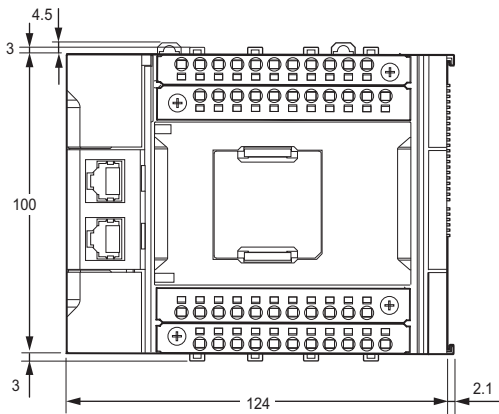# Dimensions

NX-series NX1P2 CPU Units

NX1P2-1□40□□□

148
2.1
100
4.5
3
3
1.5
65.2 *
71

* The dimension from the attachment surface of the DIN Track to the front surface of the CPU Unit.
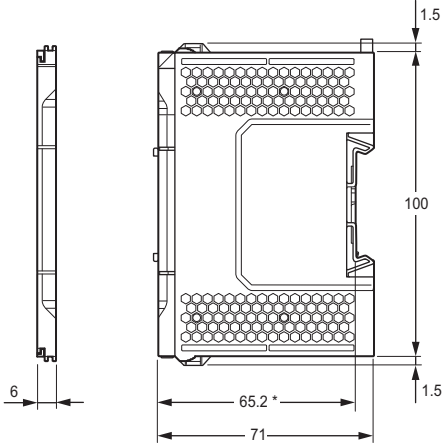
NX1P2-9024□□□

124
2.1
100
4.5
3
3
1.5
65.2 *
71

* The dimension from the attachment surface of the DIN Track to the front surface of the CPU Unit.

End cover

NX-END02

6
65.2 *
71
100
1.5
1.5

* The dimension from the attachment surface of the DIN Track to the front surface of the CPU Unit.

Related Manuals

Manual name	Cat. No.	Model numbers	Application	Description
NX-series NX1P2 CPU Unit Hardware User's Manual	W578	NX1P2-□□□□	Learning the basic specifications of the NX-series NX1P2 CPU Units, including introductory information, designing, installation, and maintenance. Mainly hardware information is provided.	An introduction to the entire NX1P2 CPU Unit system is provided along with the following information on the NX1P2 CPU Unit. • Features and system configuration • Introduction • Part names and functions • General specifications • Installation and wiring • Maintenance and inspection
NX-series NX1P2 CPU Unit Built-in I/O and Option Board User's Manual	W579	NX1P2-□□□□	Learning about the details of functions only for an NX-series NX1P2 CPU Unit and an introduction of functions for an NJ/NX-series CPU Unit.	Of the functions for an NX1P2 CPU Unit, the following information is provided. • Built-in I/O • Serial Communication Option Boards • Analog I/O Option Boards An introduction of following functions for an NJ/NX-series CPU Unit is also provided. • Motion control functions • EtherNet/IP communications functions • EtherCAT communications functions
NJ/NX-series CPU Unit Software User's Manual	W501	NX701-□□□□ NJ501-□□□□ NJ301-□□□□ NJ101-□□□□ NX1P2-□□□□	Learning how to program and set up an NJ/NX-series CPU Unit. Mainly software information is provided.	The following information is provided on a Controller built with an NJ/NX-series CPU Unit. • CPU Unit operation • CPU Unit features • Initial settings • Programming based on IEC 61131-3 language specifications
NJ/NX-series Instructions Reference Manual	W502	NX701-□□□□ NJ501-□□□□ NJ301-□□□□ NJ101-□□□□ NX1P2-□□□□	Learning detailed specifications on the basic instructions of an NJ/NX-series CPU Unit.	The instructions in the instruction set (IEC 61131-3 specifications) are described.
NJ/NX-series CPU Unit Motion Control User's Manual	W507	NX701-□□□□ NJ501-□□□□ NJ301-□□□□ NJ101-□□□□ NX1P2-□□□□	Learning about motion control settings and programming concepts.	The settings and operation of the CPU Unit and programming concepts for motion control are described.
NJ/NX-series Motion Control Instructions Reference Manual	W508	NX701-□□□□ NJ501-□□□□ NJ301-□□□□ NJ101-□□□□ NX1P2-□□□□	Learning about the specifications of the motion control instructions.	The motion control instructions are described.
NJ/NX-series CPU Unit Built-in EtherCAT® Port User's Manual	W505	NX701-□□□□ NJ501-□□□□ NJ301-□□□□ NJ101-□□□□ NX1P2-□□□□	Using the built-in EtherCAT port on an NJ/NX-series CPU Unit.	Information on the built-in EtherCAT port is provided. This manual provides an introduction and provides information on the configuration, features, and setup.
NJ/NX-series CPU Unit Built-in EtherNet/IP™ port User's Manual	W506	NX701-□□□□ NJ501-□□□□ NJ301-□□□□ NJ101-□□□□ NX1P2-□□□□	Using the built-in EtherNet/IP port on an NJ/NX-series CPU Unit.	Information on the built-in EtherNet/IP port is provided. Information is provided on the basic setup, tag data links, and other features.
NJ/NX-series Troubleshooting Manual	W503	NX701-□□□□ NJ501-□□□□ NJ301-□□□□ NJ101-□□□□ NX1P2-□□□□	Learning about the errors that may be detected in an NJ/NX-series Controller.	Describes concepts on managing errors that may be detected in an NJ/NX-series Controller and information on individual errors.
Sysmac Studio Version 1 Operation Manual	W504	SYSMAC-SE2□□□	Learning about the operating procedures and functions of the Sysmac Studio.	Describes the operating procedures of the Sysmac Studio.
NX-series EtherCAT® Coupler Unit User's Manual	W519	NX-ECC20□	Leaning how to use an NX-series EtherCAT Coupler Unit and EtherCAT Slave Terminals	The following items are described: the overall system and configuration methods of an EtherCAT Slave Terminal (which consists of an NX-series EtherCAT Coupler Unit and NX Units), and information on hardware, setup, and functions to set up, control, and monitor NX Units through EtherCAT.
NX-series Data Reference Manual	W525	NX-□□□□	Referencing lists of the data that is required to configure systems with NX-series Units	Lists of the power consumptions, weights, and other NX Unit data that is required to configure systems with NX-series Units are provided.

Manual name	Cat. No.	Model numbers	Application	Description
NX-series NX Units User's Manuals	W521	NX-ID□□□□ NX-IA□□□□ NX-OC□□□□ NX-OD□□□□ NX-MD□□□□	Learning how to use NX Units.	Describe the hardware, setup methods, and functions of the NX Units. Manuals are available for the following Units. Digital I/O Units, Analog I/O Units, System Units, Position Interface Units, Communications Interface Units, Load Cell Input Unit, and IO-Link Master Unit
	W522	NX-AD□□□□ NX-DA□□□□		
	W566	NX-TS□□□□ NX-HB□□□□		
	W523	NX-PD1□□□ NX-PF0□□□ NX-PC0□□□ NX-TBX01		
	W524	NX-EC0□□□ NX-ECS□□□ NX-PG0□□□		
	W540	NX-CIF□□□		
	W565	NX-RS□□□□		
	W567	NX-ILM□□□		
NX-series Safety Control Unit User's Manual	Z930	NX-SL□□□□ NX-SI□□□□ NX-SO□□□□	Learning how to use NX-series Safety Controls Units	The hardware, setup methods, and functions of the NX-series Safety Control Unit are described.
NA-series Programmable Terminal Software User's Manual	V118	NA5-□W□□□□	Learning about NA-series PT pages and object functions.	Describes the pages and object functions of the NA-series Programmable Terminals.
NS-series Programmable Terminals Programming Manual	V073	NS15-□□□□ NS12-□□□□ NS10-□□□□ NS8-□□□□ NS5-□□□□	Learning how to use the NS-series Programmable Terminals.	Describes the setup methods, functions, etc. of the NS-series Programmable Terminals.