

Machine Automation Controller NX1P

**Compact package-type
machine automation controller**



**NX1P2-9024DT
NX1P2-9024DT1**



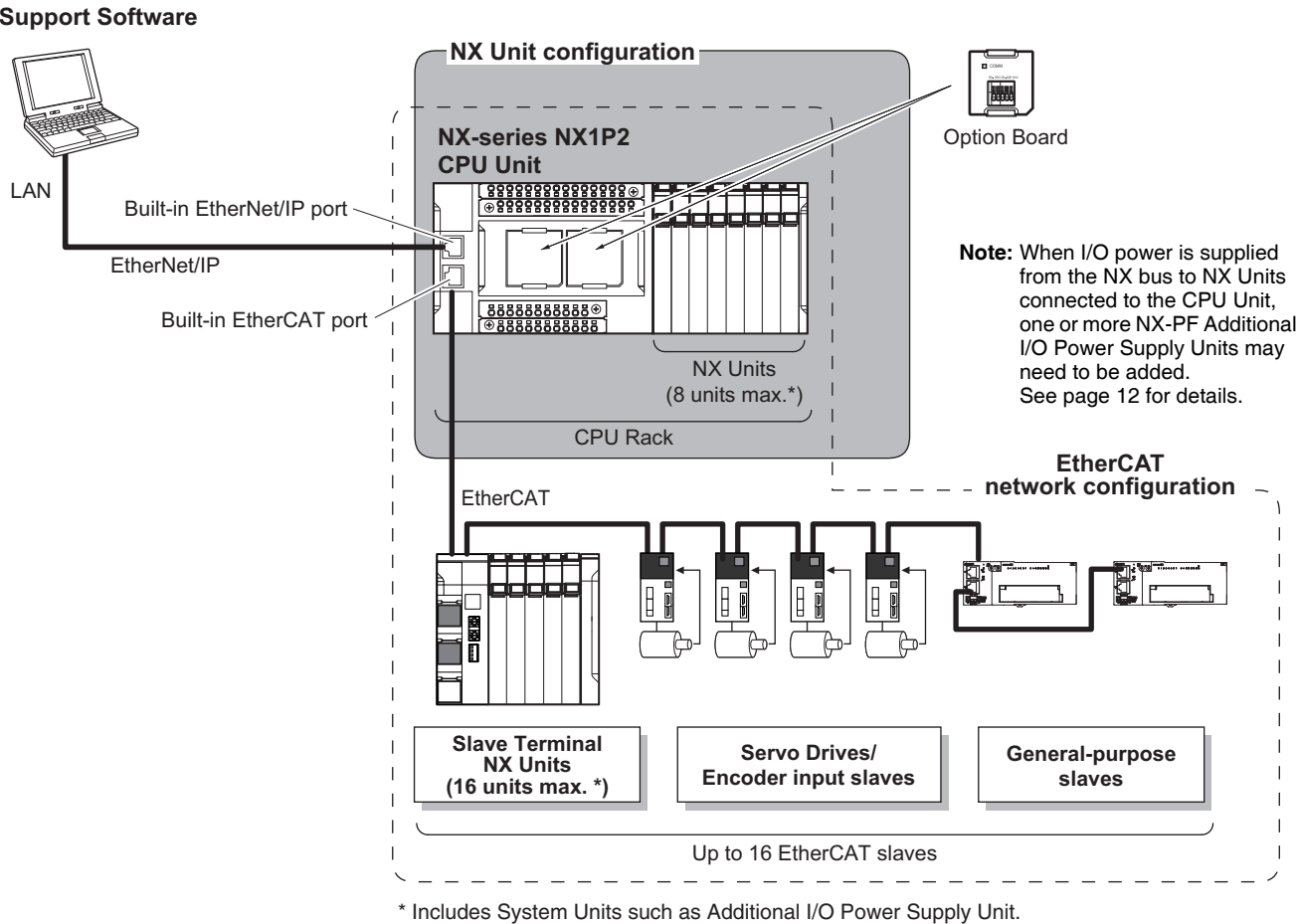
**NX1P2-1□40DT
NX1P2-1□40DT1**

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



Interpreting Model Numbers

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

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 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

Applicable standards

Refer to the OMRON website (www.ia.omron.com) or ask your OMRON representative for the most recent applicable standards for each model.

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 |
|--|------------------|---|----------------------------------|-----------------------------------|---|-------------------------------------|------------------------|------------------------------|----------------------|
| | | | | Used motion control servo axes *1 | Used single-axis position control servo axes *1 | | Number of input points | Number of output points | |
|   | 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 |
| | | | | | | | | 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 |
|--|---|---|--------------------|
| 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 |
| | 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 |
|---|------------------|---------------------|---|--|-------------------------|--------------------|
| | 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 |
| | | | 24 VDC | | 100 ns max./100 ns max. | NX-ID3343 |
| | | PNP | 12 to 24 VDC | Input refreshing with input changed time only * | 20 μs max./400 μs max. | NX-ID3344 |
| | | | 24 VDC | | 100 ns max./100 ns max. | NX-ID3417 |
| | 8 points | NPN | 24 VDC | Switching Synchronous I/O refreshing and Free-Run refreshing | 20 μs max./400 μs max. | NX-ID3443 |
| | | PNP | | | | NX-ID3444 |
| | 16 points | NPN | | | | NX-ID4342 |
| | | PNP | | | | NX-ID4442 |
| 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 |
| | 32 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 |
| 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-ID6142-5 |
| | 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 |
| 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 |
| | 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 |



* 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 | |
|---|--|---------------------|--|-----------------------|--|--|--------------------------|-------------|
| | Number of points | Internal I/O common | Maximum value of load current | Rated voltage | I/O refreshing method | ON/OFF response time | | |
| <div>Transistor Output Unit</div> <div></div> <div>(Screwless Clamping Terminal Block, 12 mm Width)</div> | 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 | 2 A/point, 8 A/Unit | | | 0.5 ms max./ 1.0 ms max. | NX-OD3256 | |
| | | | | | | 300 ns max./ 300 ns max. | NX-OD3257 | |
| | 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 | |
| <div>Transistor Output Unit</div> <div></div> <div>(M3 Screw Terminal Block, 30 mm Width)</div> | 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 | |
| | | PNP | | 24 VDC | | 0.5 ms max./ 1.0 ms max. | NX-OD5256-1 | |
| | <div>Transistor Output Unit</div> <div></div> <div>(MIL Connector, 30 mm Width)</div> | 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 | |
| <div>Transistor Output Unit</div> <div></div> <div>(Fujitsu Connector, 30 mm Width)</div> | 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 | |
| <div>Relay Output Unit</div> <div></div> <div>(Screwless Clamping Terminal Block, 12 mm Width/24 mm Width)</div> | 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 | Free-Run refreshing | 15 ms max./15 ms max. | NX-OC2633 | |
| | | N.O.+N.C. | | | | | NX-OC2733 | |
| | 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 | Free-Run refreshing | 15 ms max./15 ms max. | NX-OC4633 | |

* 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 |
|---|---|--|---|--|--|--------------------|
| | 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 |
| | | 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 | | | | | | | | Model |
|---|------------------|---|---|--------------------|------------------|-----------------------|---------------------|----------------------------|-----------|
| | Number of points | Input range | Resolution | Input method | Conversion time | Trigger input section | | I/O refreshing method | |
| | | | | | | 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 | <ul style="list-style-type: none">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 |
| | | | | | | | PNP | | NX-HAD402 |

Analog Input Units



| Product Name | Specification | | | | | | | | | Model | | | |
|--|------------------|--------------|--|--|--------------------------|--------------------|--------------------|--|--|---------------------|--|-------|---------------------|
| | 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 | | | |
| | | | | | | 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 |
| | | | | | | | | | Differential Input | | | | |
| | | | | 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 | 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 |
|---|------------------|--------------|------------|--|--------------------------|-----------------|--|-----------|
| | 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 |
| | | | 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 |

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Temperature Control Units

| Product name | Specifications | | | | | | | | Model |
|---|--------------------|--|----------------------------------|-------------------------|---------------------------|-------------------------|-----------------|-----------------------|-----------|
| | 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 |
| | | | | | 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 |
| | | | | | 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 | |
|---|------------------|--|-------------------|--|-----------------|-----------------------|---------------------|------------------|------------------|
| | 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 | |
| | 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 | | Free-Run refreshing | 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 |


*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 |
|---|------------------|------------------------|------------------------|---------------------|-------------------------|---------------|----------------------|-----------|
| | 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/Orefreshing method | |
| <div>Heater Burnout Detection Unit</div> <div></div> | 4 | 50 AAC | 4 | NPN | 0.1 A/point, 0.4 A/Unit | 12 to 24 VDC | Free-Run refreshing | NX-HB3101 |
| | | | | PNP | | 24 VDC | | NX-HB3201 |

Load Cell Input Unit


| Product Name | Specification | | | | | Model |
|--|----------------------------------|------------------|---|------------------------------|------------------|-----------|
| | Number of Model Standards points | Conversion cycle | I/O refreshing method * | Load cell excitation voltage | Input range | |
|  Load Cell Input Unit | 1 | 125 μ s | <ul style="list-style-type: none"> Free-Run refreshing Synchronous I/O refreshing Task period prioritized refreshing | 5 VDC \pm 10% | -5.0 to 5.0 mV/V | NX-RS1201 |

* 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 |
|--|--------------------|-----------------|----------------------------|--|------------------------------|-----------|
| | Number of channels | External inputs | Maximum response frequency | I/O refreshing method | Number of I/O entry mappings | |
| <div>Incremental Encoder Input Unit</div> <div></div> | 1 (NPN) | 3 (NPN) | 500 kHz | <div>• Free-Run refreshing</div> <div>• Synchronous I/O refreshing</div> | 1/1 | NX-EC0112 |
| | 1 (PNP) | 3 (PNP) | | | | NX-EC0122 |
| | 1 | 3 (NPN) | 4 MHz | | | NX-EC0132 |
| | | 3 (PNP) | | | | NX-EC0142 |
| | 2 (NPN) | None | 500 kHz | | 2/2 | NX-EC0212 |
| | 2 (PNP) | | | | | NX-EC0222 |

Position interface: SSI Input Units

| Product Name | Specification | | | | | Model |
|--|--------------------|-----------------------|---------------------|----------------------|---|-----------|
| | 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 |
| | 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 |
|---|-----------------------|-------------------|--------------------|----------------------------|--|------------------------------|--------------------------|-------------|
| | 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 | |
| <div>Pulse Output Unit</div> <div></div> | 1 (NPN) | 2 (NPN) | 1 (NPN) | 500 kpps | <div>• Synchronous I/O refreshing</div> <div>• Task period prioritized refreshing *2</div> | 1/1 | Open collector output | NX-PG0112 |
| | 1 (PNP) | 2 (PNP) | 1 (PNP) | | | | | NX-PG0122 |
| | 2 | 5 inputs/CH (NPN) | 3 outputs/CH (NPN) | 4 Mpps | | 2/2 | Line driver output | NX-PG0232-5 |
| | | 5 inputs/CH (PNP) | 3 outputs/CH (PNP) | | | | | NX-PG0242-5 |
| | 4 | 5 inputs/CH (NPN) | 3 outputs/CH (NPN) | | | 4/4 | | NX-PG0332-5 |
| | | 5 inputs/CH (PNP) | 3 outputs/CH (PNP) | | | | | 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.

Communications Interface Units

| Product Name | Serial interface | External connection terminals | Number of serial ports | Communications protocol | Model |
|---|------------------|-----------------------------------|------------------------|---|-----------|
|  Communications Interface Unit | RS-232C | Screwless Clamping Terminal Block | 1 port | <ul style="list-style-type: none"> No-protocol Signal lines | NX-CIF101 |
| | RS-422A/485 | | | | NX-CIF105 |
| | RS-232C | D-Sub connector | 2 ports | | NX-CIF210 |

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RFID Units

| Product name | Amplifier/Antenna | No. of unit numbers used | Model |
|----------------------------|-------------------|--------------------------|------------------|
| RFID Unit (1Ch) | V680 series | 1 | NX-V680C1 |
| RFID Unit (2Ch) | | 2 | NX-V680C2 |

IO-Link Master Unit

| Product Name | Specification | | | Model |
|--------------------------------|-------------------------|-----------------------|-----------------------------------|------------------|
| | 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 |


System Units

| Product Name | Specification | Model |
|---|---|------------------|
| 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 |
| 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 |
| | 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 |
| | Number of I/O power terminals: IOV: 16 terminals Current capacity of I/O power terminal: 4 A/terminal max. | NX-PC0020 |
| | 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 |
| Shield Connection Unit | Number of shield terminals: 14 terminals (The following two terminals are functional ground terminals.) | NX-TBX01 |

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

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 |
|---|---------------------------------|---------------------|----------------------------------|------------------|
|  EtherCAT Coupler Unit *1 | 250 to 4000 μ s *2 | 1.45 W max. | 4 A | NX-ECC201 |
| | 250 to 4000 μ s *2 | | 10 A | NX-ECC202 |
| | 125 to 10000 μ s *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 μ s, 1,000 μ s, 2,000 μ s, and 4,000 μ s. 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 |
|--|-------------------------------------|------------------|-------------------------------------|-----------------------|--------------|------------------|
| | Maximum number of safety I/O points | Program capacity | Number of safety master connections | I/O refreshing method | Unit version | |
|  | 256 points | 512 KB | 32 | Free-Run refreshing | Ver.1.1 | NX-SL3300 |
|  | 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 |
|---|-------------------------------|------------------------------|----------------------|---------------------|------------------------------------|------------------------------------|-----------------------|--------------|------------------|
| | 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 |
|  | 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 |
|---|--------------------------------------|------------------------|---|---------------|------------------------------------|-----------------------|--------------|------------------|
| | 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 |
|  | 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.

NX Unit Power Supply System

Add one or more NX-PF Additional I/O Power Supply Units when I/O power is supplied from the NX bus to NX Units connected to the CPU Unit. Check the table below.

| NX Units | Model | NX-PF Additional I/O Power Supply Unit required | NX Units | Model | NX-PF Additional I/O Power Supply Unit required |
|-------------------------------|-------------|---|---|-------------|---|
| Digital Input Units | NX-ID3317 | Yes | Analog Input Units | NX-AD3208 | No |
| | NX-ID3343 | Yes | | NX-AD4203 | Yes |
| | NX-ID3344 | Yes | | NX-AD4204 | No |
| | NX-ID3417 | Yes | | NX-AD4208 | No |
| | NX-ID3443 | Yes | Analog Output Units | NX-DA2603 | Yes |
| | NX-ID3444 | Yes | | NX-DA2605 | Yes |
| | NX-ID4342 | Yes | | NX-DA3603 | Yes |
| | NX-ID4442 | Yes | | NX-DA3605 | Yes |
| | NX-ID5342 | Yes | | NX-DA2203 | Yes |
| | NX-ID5442 | Yes | | NX-DA2205 | Yes |
| | NX-ID5142-1 | No | | NX-DA3203 | Yes |
| | NX-ID5142-5 | No | | NX-DA3205 | Yes |
| | NX-ID6142-5 | No | Temperature Control Units | NX-TC2405 | Yes |
| | NX-ID6142-6 | No | | NX-TC2406 | Yes |
| | NX-IA3117 | No | | NX-TC2407 | Yes |
| Digital output Units | NX-OD2154 | Yes | | NX-TC2408 | Yes |
| | NX-OD2258 | Yes | | NX-TC3405 | Yes |
| | NX-OD3121 | Yes | | NX-TC3406 | Yes |
| | NX-OD3153 | Yes | | NX-TC3407 | Yes |
| | NX-OD3256 | Yes | | NX-TC3408 | Yes |
| | NX-OD3257 | Yes | Temperature Input Units | NX-TS2101 | No |
| | NX-OD3268 | No | | NX-TS3101 | No |
| | NX-OD4121 | Yes | | NX-TS2102 | No |
| | NX-OD4256 | Yes | | NX-TS3102 | No |
| | NX-OD5121 | Yes | | NX-TS2104 | No |
| | NX-OD5256 | Yes | | NX-TS3104 | No |
| | NX-OD5121-1 | No | | NX-TS2201 | No |
| | NX-OD5256-1 | No | | NX-TS3201 | No |
| | NX-OD5121-5 | No | | NX-TS2202 | No |
| | NX-OD5256-5 | No | | NX-TS3202 | No |
| | NX-OD6121-5 | No | | NX-TS2204 | No |
| | NX-OD6256-5 | No | | NX-TS3204 | No |
| | NX-OD6121-6 | No | Heater Burnout Detection Units | NX-HB3101 | Yes |
| | NX-OC2633 | No | | NX-HB3201 | Yes |
| | NX-OC2733 | No | Load Cell Input Unit | NX-RS1201 | No |
| | NX-OC4633 | No | | NX-EC0112 | Yes |
| Digital Mixed I/O Units | NX-MD6121-5 | No | Position interface: Incremental Encoder Input Units | NX-EC0122 | Yes |
| | NX-MD6256-5 | No | | NX-EC0132 | Yes |
| | NX-MD6121-6 | No | | NX-EC0142 | Yes |
| High-speed Analog Input Units | NX-HAD401 | Yes | | NX-EC0212 | Yes |
| | NX-HAD402 | Yes | | NX-EC0222 | Yes |
| Analog Input Units | NX-AD2603 | Yes | Position interface: SSI Input Units | NX-ECS112 | Yes |
| | NX-AD2604 | No | | NX-ECS212 | Yes |
| | NX-AD2608 | No | Position interface: Pulse Output Units | NX-PG0112 | Yes |
| | NX-AD3603 | Yes | | NX-PG0122 | Yes |
| | NX-AD3604 | No | | NX-PG0232-5 | No |
| | NX-AD3608 | No | | NX-PG0242-5 | No |
| | NX-AD4603 | Yes | | NX-PG0332-5 | No |
| | NX-AD4604 | No | | NX-PG0342-5 | No |
| | NX-AD4608 | No | Communications Interface Units | NX-CIF101 | No |
| | NX-AD2203 | Yes | | NX-CIF105 | No |
| | NX-AD2204 | No | | NX-CIF210 | No |
| | NX-AD2208 | No | RFID Units | NX-V680C1 | Yes |
| | NX-AD3203 | Yes | | NX-V680C2 | Yes |
| | NX-AD3204 | No | IO-Link Master Unit | NX-ILM400 | Yes |

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

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 |
|--|---|---------------------|-------|----------------------|
| | | | | |
| 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. | --- (Media only) | DVD | SYSMAC-SE200D |
| | <p>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)</p> <p>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.</p> | 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-8000/7000/5000 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 (100BASE-T/100BASE-TX) | Wire Gauge and Number of Pairs: AWG24, 4-pair Cable | Cables | Hitachi Metals, Ltd. | NETSTAR-C5E SAB 0.5 × 4P CP *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 |
|---|---|---|--------------|
| 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 |
| | 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 |
| | | 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 |
| Memory Cards | SD memory card, 2 GB | | HMC-SD291 |
| | SDHC memory card, 4 GB | | HMC-SD491 |
| | SDHC memory card, 16GB | | HMC-SD1A1 *3 |
| 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 <i>Battery</i> page for details. | | CJ1W-BAT01 |
| End Cover (For NX1P2 CPU Unit) *4 | 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) *4 | 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 |
|-----------------|------------------|-----------------------------|----------------------|---------------------------|-----------|
| | 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. HMC-SD1A1 can be used for a CPU Unit with unit version 1.21 or later.

*4. 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 not 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: Meets IEC 61010-2-201. |
| | Noise immunity | 2 kV on power supply line (Conforms to IEC 61000-4-4.) |
| | Overvoltage category | Category II: Meets IEC 61010-2-201. |
| | 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) |
| 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 | | |
| | | | Number of POU Instances | 1,800 | | |
| | Memory capacity for variables *2 | Retain attributes | Size | 32 kB | | |
| | | | Number of variables | 5,000 | | |
| | | No Retain attributes | Size | 2 MB | | |
| | | | 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 | | --- |
| | | | 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. | | | | |

Machine Automation Controller NX1P

| 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, branching and ring *9 | | |
| | 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 *10 | | |
| | 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 |
| | | Number of points | | 16 | 16 | 10 |
| | Output | 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.

*9. Ring topology is supported with the project version 1.40 or later.

Slaves on a ring topology should support a ring topology. If Omron slaves, please see the user's manual of slaves.

*10. For project unit version earlier than 1.40, the data must be within one frame.

Function Specifications

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

| 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. |
| | | | Cam monitor | Outputs the specified offset position for the slave axis in synchronous control. |
| | | | 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 Deceleration 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. |

Machine Automation Controller NX1P

| 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). |
| | | 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 POU's 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 (≥), 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 POU's 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.

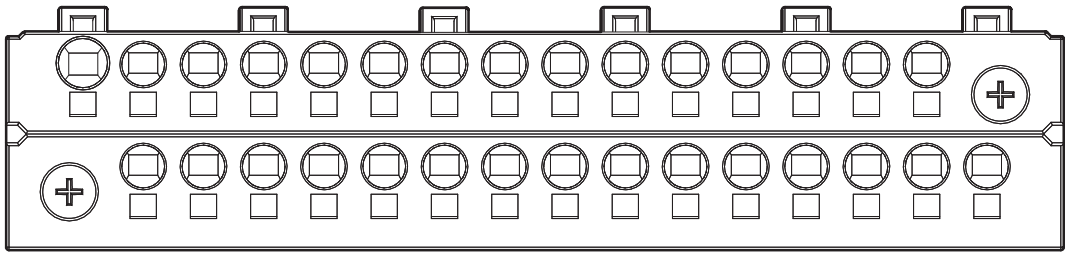
*4. Restore is supported with unit version 1.14 or later.

Input Terminal Block

Terminal Arrangement

The description is given for each CPU Unit model.

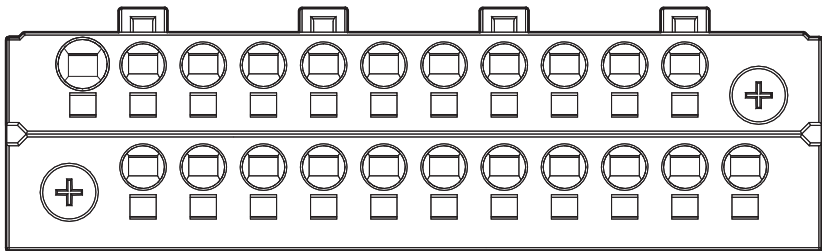
NX1P2-1□40DT□



| | | | | | | | | | | | | | | | |
|---|---|---|-----|----|----|----|----|----|----|----|----|----|----|----|----|
| ⏏ | + | - | 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 <i>NX-series NX1P2 CPU Unit Hardware User's Manual</i> (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 <i>Input Specifications</i> page. |
| 00 to 15 | Input terminals | General-purpose input A | |
| 16 to 23 | Input terminals | General-purpose input B | |

NX1P2-9024DT□

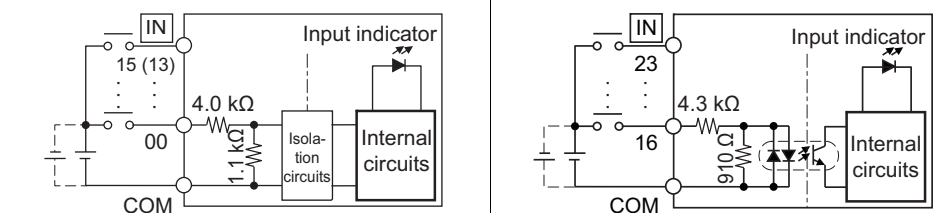


| | | | | | | | | | | | |
|---|---|---|-----|----|----|----|----|----|----|----|----|
| ⏏ | + | - | COM | 01 | 03 | 05 | 07 | 09 | 11 | 13 | |
| | + | - | 00 | 02 | 04 | 06 | 08 | 10 | 12 | NC | NC |

| Symbol | Terminal name | Description | Reference |
|----------|-----------------------------|--|--|
| ⏏ | Functional ground terminal | The functional ground terminal. Connect the ground wire to the terminal. | Refer to the <i>NX-series NX1P2 CPU Unit Hardware User's Manual</i> (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 <i>Input Specifications</i> page. |
| 00 to 13 | Input terminals | General-purpose input A | |
| NC | NC | Do not connect anything. | --- |

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.

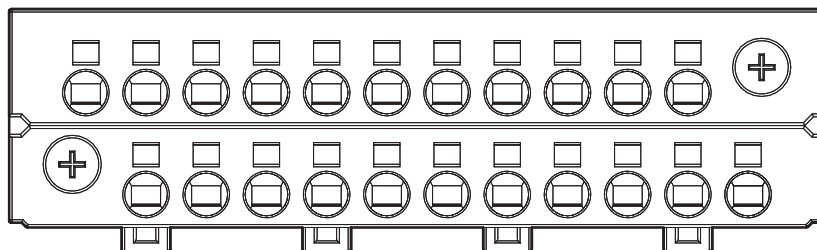
*2. Set the filter time for every 4 points.

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 <i>Output Specifications</i> 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 <i>Output Specifications</i> 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 <i>Output Specifications</i> 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 |

| Symbol | Terminal name | Description | Reference |
|----------|------------------|--|---|
| C0 (+V) | Common terminal | Connected to the 24-V side of the I/O power supply. | Refer to the <i>Output Specifications</i> 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 NX1P2-1□40DT□: 1.8 A/common (3.6 A/Unit) NX1P2-9024DT□: 2.4 A/common (2.4 A/Unit) | 24 VDC (15 to 28.8 VDC), 300 mA per point |
| 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.

Machine Automation Controller NX1P

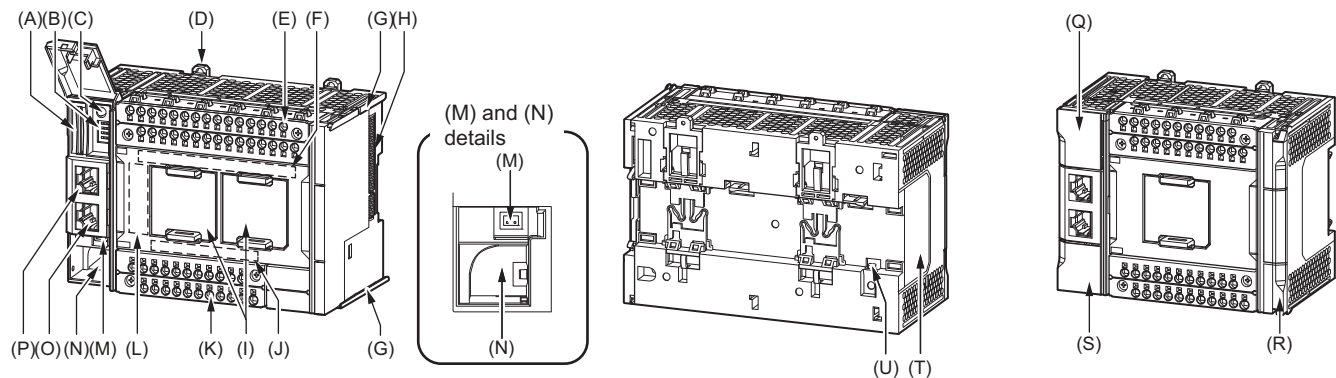
Part Names and Functions

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.

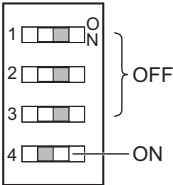
NX1P2-1□40□□□

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. |

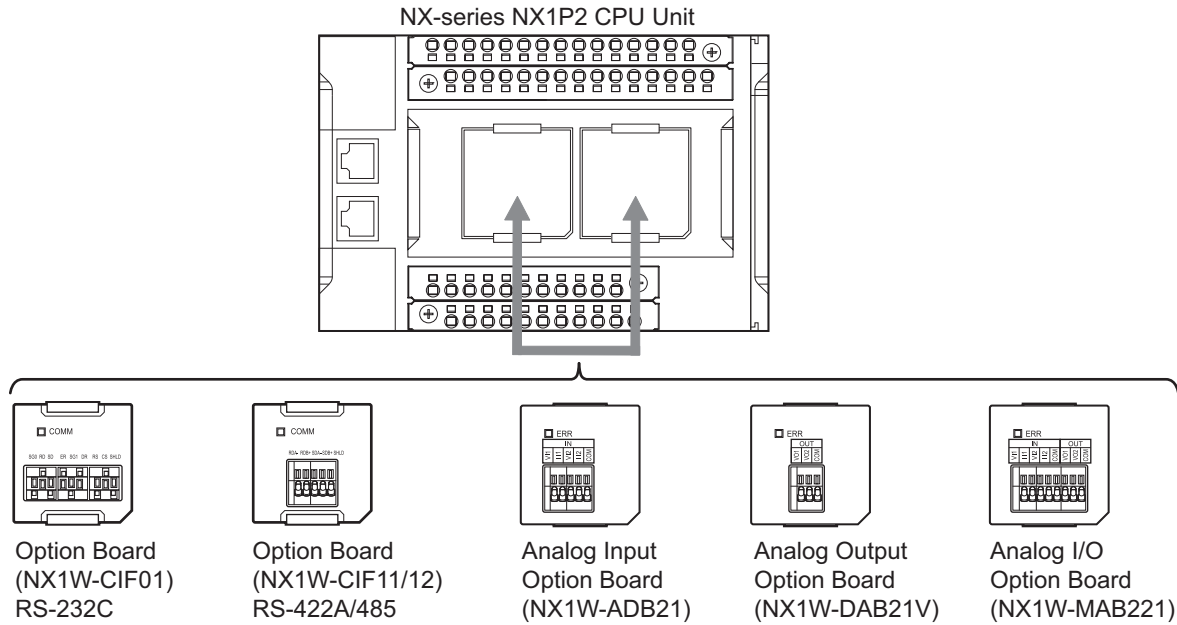
*1. To use Safe Mode, set the DIP switch as shown below and then turn ON the power supply to the Controller.



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



Specifications of Serial Communications Option Board

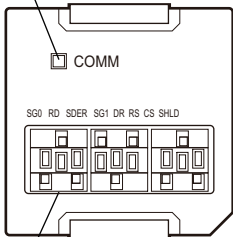
| Item | Specification | | |
|------------------------|--|---|---------------------------------|
| Model | NX1W-CIF01 | NX1W-CIF11 | NX1W-CIF12 |
| Communications port | One RS-232C port | One RS-422A/485 port | One RS-422A/485 port (isolated) |
| Communications method | Half-duplex | | |
| Synchronization 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)

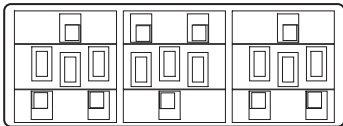
Communications status indicator



RS232C terminal block

RS-232C Terminal Block

SG0 RD SD ER SG1 DR RS CS SHLD

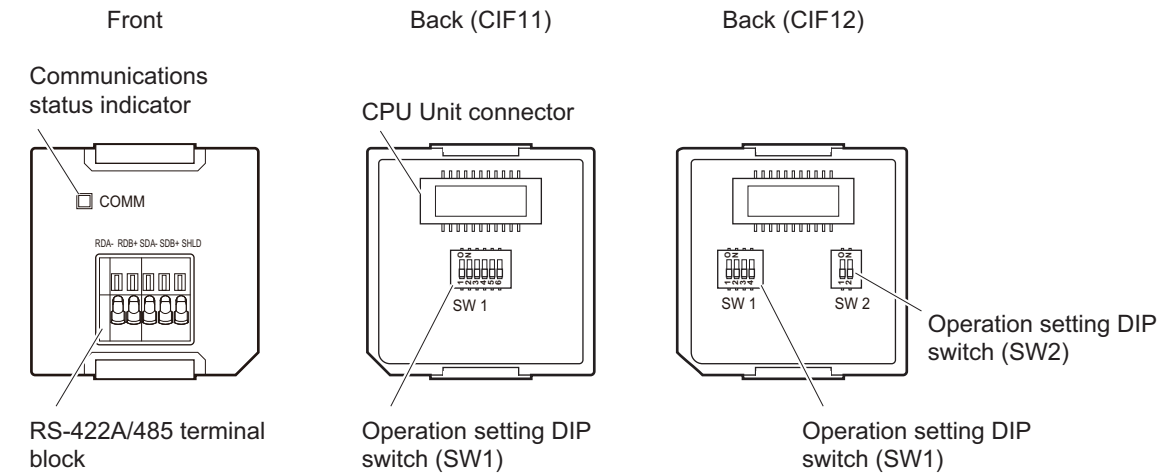


| Abbreviation | Signal name | I/O |
|--------------|---------------------|--------|
| SG0 | Signal grounding | --- |
| RD | Receive data | Input |
| SD | Send data | Output |
| ER | Data terminal ready | Output |
| SG1 | Signal grounding | --- |
| DR | Data set ready | Input |
| RS | Send request | 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.

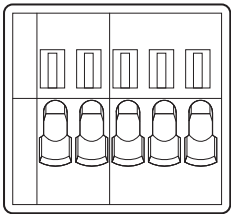
RS-422A/485 Option Board (NX1W-CIF11/NX1W-CIF12)



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.

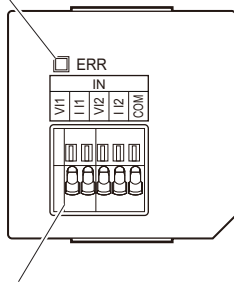
Specifications of Analog I/O Option Board

| 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.

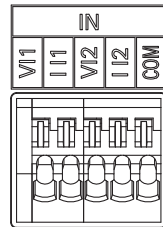
Analog Input Option Board (NX1W-ADB21)

Status indicator



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.

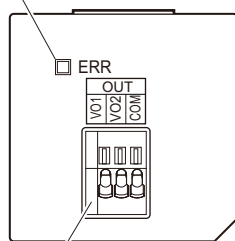
Analog Input Specifications

| 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 to 55°C | ±1.0% (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.

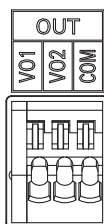
Analog Output Option Board (NX1W-DAB21V)

Status indicator



Analog output terminal block

Analog Output Terminal Array



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

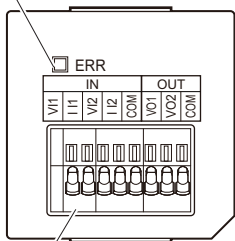
Analog Output Specifications

| Item | | Specification | |
|---------------------------|-----------|--|----------------|
| | | Voltage output | Current output |
| Output range | | 0 to 10 V | --- |
| Output conversion range | | 0 to 10.24 V | --- |
| Allowable load resistance | | 2 k Ω 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.

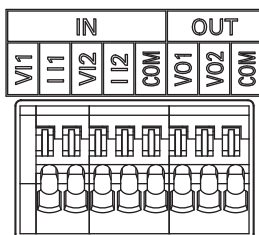
Analog I/O Option Board (NX1W-MAB221)

Status indicator



Analog output terminal block

Analog I/O Terminal Array



| | | Abbreviation | Signal name |
|-----|--|--------------|------------------|
| IN | | VI1 | Voltage input 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

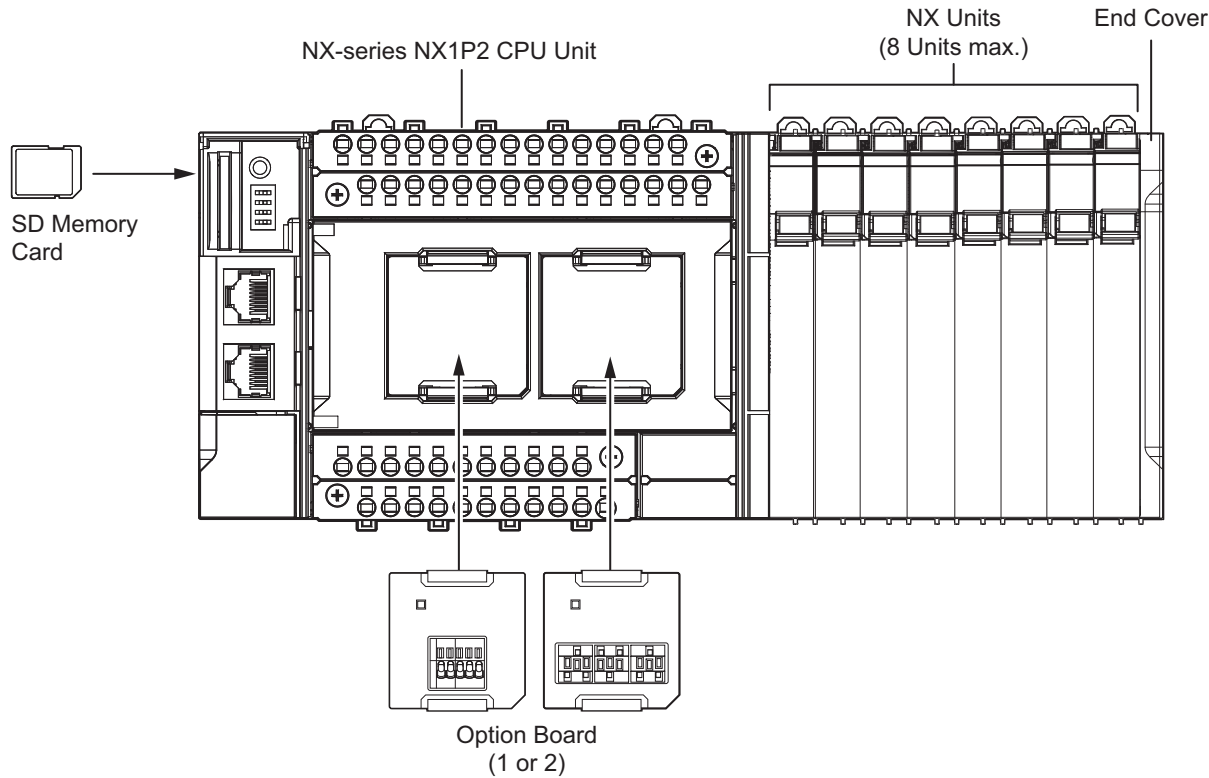
| Item | | | Specification | |
|-----------------------|---------------------------|-----------|--|----------------------|
| | | | Voltage I/O | Current I/O |
| Analog input section | Input method | | Single-ended input | Single-ended input |
| | Input range | | 0 to 10 V | 0 to 20 mA |
| | Input conversion 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.



| 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 | <ul style="list-style-type: none">Up to eight Units (including System Units such as Additional I/O Power Supply Unit) can be mounted to each Expansion Rack.For the NX Units connectable to the CPU Unit, refer to the <i>Ordering Information</i> 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 <i>NX-series Data Reference Manual</i> (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. |

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.

The following describes the purpose of the battery mounting, the battery model, and the battery-related error detection and clock data settings.

Purpose of the Battery Mounting

The battery is used to retain the clock data while the power is not supplied to the CPU Unit. The clock data is retained by the built-in capacitor whether the battery is mounted or not, but the retention period depends on the continuous power-ON time of the CPU Unit, as shown below.

| Continuous power-ON time of CPU Unit * | Retention period during no power supply at an ambient temperature of 40°C |
|--|---|
| 100 hours | Approx. 10 days |
| 8 hours | Approx. 8 days |
| 1 hour | Approx. 7 days |

* This is equivalent to the time to charge a built-in capacitor in which no electric charge is accumulated.

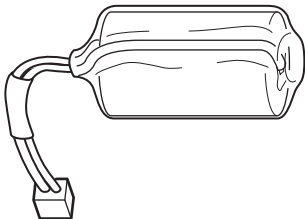
When you use the clock data for programming, use a battery if you cannot ensure the continuous power-ON time shown above or the power-OFF time is longer than the above power-ON time.

The following data (other than the clock data) is retained in the built-in non-volatile memory, so they are not lost even if the battery and built-in capacitor are fully discharged.

- User program
- Set values
- Variables retained during power interruption
- Event logs

Battery Model

The table below shows the model and specifications of the battery that can be used.

| Model | Appearance | Specification |
|------------|---|---|
| CJ1W-BAT01 |  | <p>Service life: 5 years</p> <p>Refer to the <i>NX-series NX1P2 CPU Unit Hardware User's Manual</i> (Cat. No. W578) for details.</p> <p>The clock information is retained during power interruptions.</p> |

Sysmac Studio

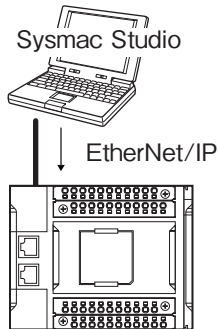
The Sysmac Studio is a Support Software package that provides an integrated development environment to design, program, debug, and maintain Sysmac NJ/NX-series Controllers.

Configuration

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

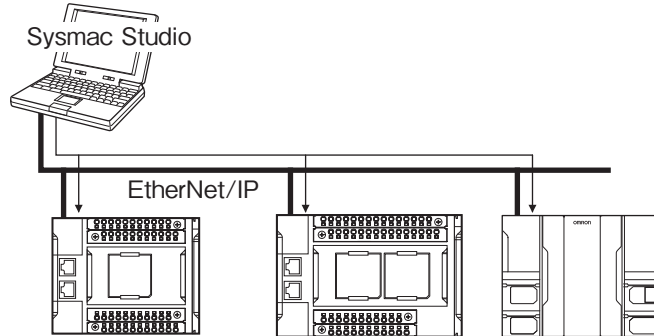
Connection with EtherNet/IP

- 1:1 Connection



- 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.

- 1:N Connection



- Directly specify the IP address of the remote device.

Version Information

Unit Versions and Corresponding Sysmac Studio Versions

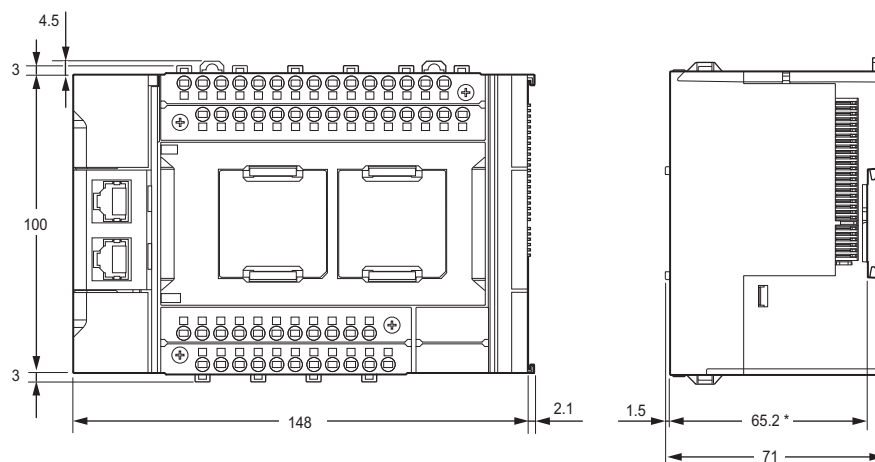
Refer to *NX-series NX1P2 CPU Unit Hardware User's Manual (W578)*.

Dimensions

(Unit: mm)

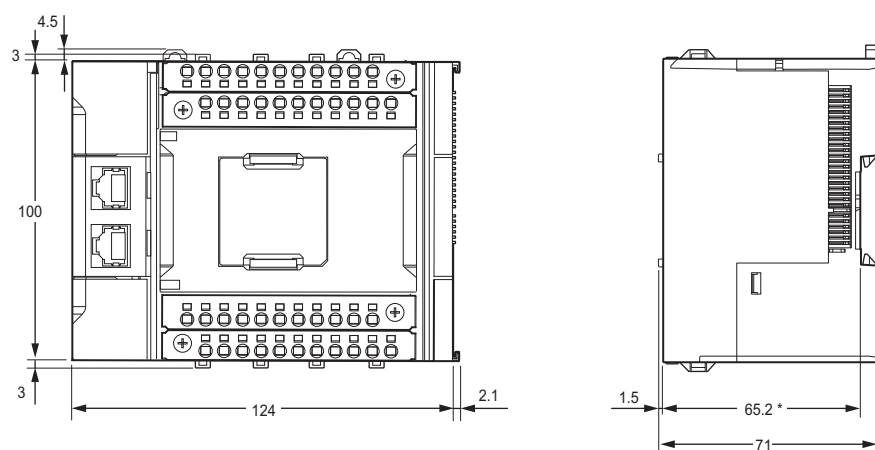
NX-series NX1P2 CPU Units

NX1P2-1□40□□□



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

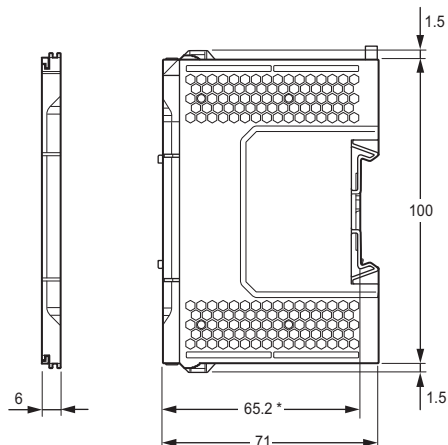
NX1P2-9024□□□



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

End cover

NX-END02



* 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. <ul style="list-style-type: none"> • 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. <ul style="list-style-type: none"> • 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. <ul style="list-style-type: none"> • 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-□□□□ NX102-□□□□ | 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. <ul style="list-style-type: none"> • 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-□□□□ NX102-□□□□ | 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-□□□□ NX102-□□□□ | 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-□□□□ NX102-□□□□ | 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-□□□□ NX102-□□□□ | 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-□□□□ NX102-□□□□ | 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-□□□□ NX102-□□□□ | 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□ | Learning 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. |

Machine Automation Controller NX1P

| 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. |

Applicable Models for Cable Redundancy Function

For more information on applicable models of Cable Redundancy function, refer to the Applicable Models of Cable Redundancy Function (Cat. No. R200).

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