

**NX-series High-speed Counter Unit****NX-CT□□□□**

**High-speed counter unit ideal for edge control,  
achieving high-speed response  
and high-resolution performance**

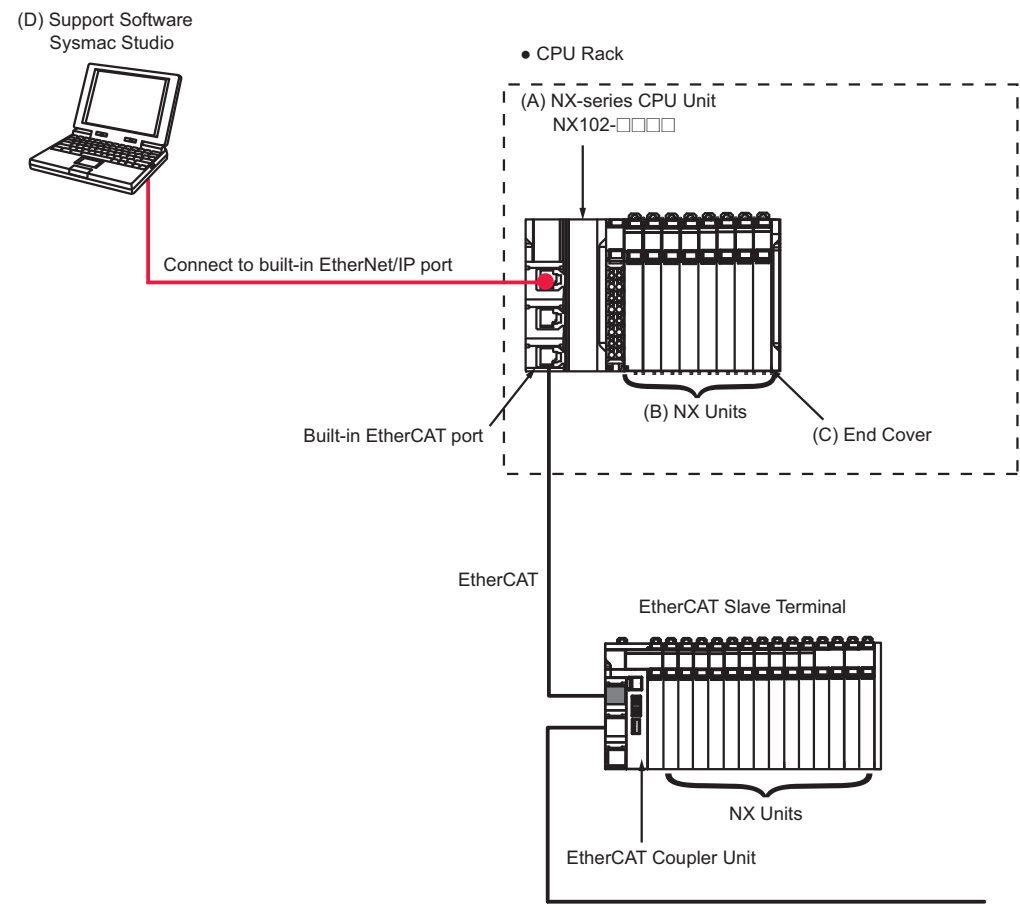
**Features**

- Counter Match Output with detection performance of less than 1  $\mu$ s, realizing high-speed edge control independent of the system's scan time
- Advance Time for precisely adjusting the output timing by correcting for the target device's operation delays
- Counter Logging, which collects the count data of fast-moving workpieces Logging up to 4,096 data entries
- PWM Output, which synchronizes the control pulse signal output with the target matching
- Switchable between the three-phase (Phase A/Phase B/Phase Z), 2-channel mode and the single-phase, 6-channel mode
- Counter Noise Filter configurable per channel

System Configuration

System Configuration in the Case of a CPU Unit

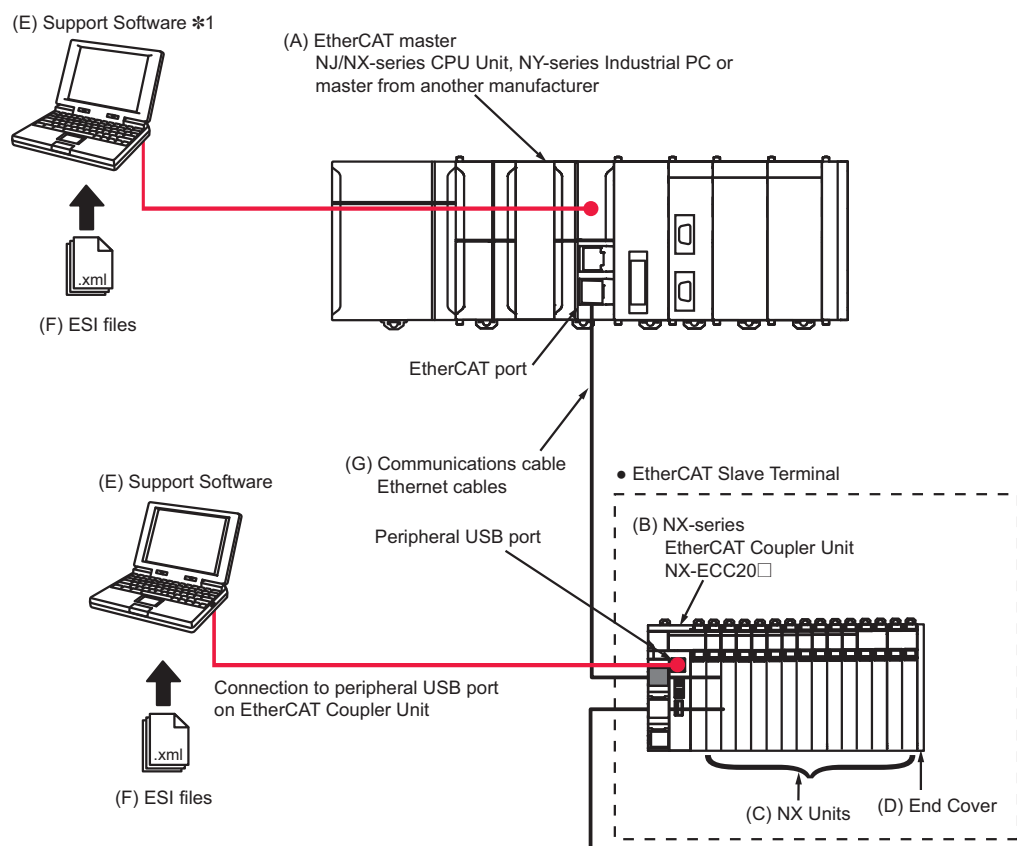
The following figure shows a system configuration when a group of NX Units is used with an NX-series NX102 CPU Unit. Refer to the user's manual for the connected CPU Unit for information on how to configure the system when a CPU Unit other than the NX102 CPU Unit is used. You can connect the EtherCAT Slave Terminal to the built-in EtherCAT port on the CPU Unit.



| Letter | Item                             | Description                                                                                                                                                                                                                                        |
|--------|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (A)    | NX-series CPU Unit               | The Unit that serves as the center of control for a Machine Automation Controller. It executes tasks, refreshes I/O for other Units and slaves, etc. NX Units can be connected to an NX102 CPU Unit.                                               |
| (B)    | NX Units                         | The NX Units perform I/O processing with connected external devices. The NX Units exchange data with the CPU Unit through I/O refreshing. A maximum of 32 NX Units can be connected to an NX102 CPU Unit.                                          |
| (C)    | End Cover                        | The End Cover is attached to the end of the CPU Rack.                                                                                                                                                                                              |
| (D)    | Support Software (Sysmac Studio) | A computer software application for setting, programming, debugging, and troubleshooting NJ/NX/NY-series Controllers.<br>For an NX102 CPU Unit, this application performs setting operation by making a connection to a built-in EtherNet/IP port. |

## System Configuration of Slave Terminals

The following figure shows an example of the system configuration when an EtherCAT Coupler Unit is used as a Communications Coupler Unit. Refer to *the user's manual for the connected Communications Coupler Unit* for details on how to configure the system when any other type of Communications Coupler Unit is used.



\*1. The connection method for the Support Software depends on the model of the CPU Unit or Industrial PC.

| Letter | Item                                   | Description                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------|----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (A)    | EtherCAT master *1                     | The EtherCAT master manages the network, monitors the status of slaves, and exchanges I/O data with slaves.                                                                                                                                                                                                                                                                                                                        |
| (B)    | EtherCAT Coupler Unit                  | The EtherCAT Coupler Unit serves as an interface for process data communications on the EtherCAT network between the NX Units and the EtherCAT master. The I/O data for the NX Units is accumulated in the EtherCAT Coupler Unit and then all of the data is exchanged with the EtherCAT master at the same time. The EtherCAT Coupler Unit can also perform message communications (SDO communications) with the EtherCAT master. |
| (C)    | NX Units *2                            | The NX Units perform I/O processing with connected external devices. The NX Units perform process data communications with the EtherCAT master through the EtherCAT Coupler Unit.                                                                                                                                                                                                                                                  |
| (D)    | End Cover                              | The End Cover is attached to the end of the Slave Terminal.                                                                                                                                                                                                                                                                                                                                                                        |
| (E)    | Support Software *3                    | The Support Software runs on a personal computer and it is used to configure the EtherCAT network and EtherCAT Slave Terminal, and to program, monitor, and troubleshoot the Controllers.                                                                                                                                                                                                                                          |
| (F)    | ESI (EtherCAT Slave Information) files | The ESI files contain information that is unique to the EtherCAT Slave Terminal in XML format. You can load an ESI file into the Support Software to easily allocate Slave Terminal process data and make other settings. The ESI files for OMRON EtherCAT slaves are installed in the Support Software. You can obtain the ESI files for the latest models through the Support Software's automatic update function.              |
| (G)    | Communications cable                   | Use a double-shielded cable with aluminum tape and braiding of Ethernet category 5 (100Base-TX) or higher, and use straight wiring.                                                                                                                                                                                                                                                                                                |

\*1. An EtherCAT Slave Terminal cannot be connected to any of the OMRON CJ1W-NC□81/□82 Position Control Units even though they can operate as EtherCAT masters.

\*2. For whether an NX Unit can be connected to the Communications Coupler Unit, refer to *the version information in the user's manual for the NX Unit*.

\*3. The term Support Software indicates software that is provided by OMRON. If you connect to a master from another company, use the software tool corresponding to that master.

## Ordering Information

### High-speed Counter Unit

| Product name            | Specification         |                           |                            |                               |                                                                                                                                                         |                            | Model            |
|-------------------------|-----------------------|---------------------------|----------------------------|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|------------------|
|                         | Number of channels *1 | Number of external inputs | Number of external outputs | Maximum response frequency *2 | I/O refreshing method                                                                                                                                   | Input method               |                  |
| High-speed Counter Unit | 2 (NPN)               | 6 (NPN)                   | 6 (NPN)                    | 1 MHz                         | <ul style="list-style-type: none"><li>• Free-Run refreshing</li><li>• Synchronous I/O refreshing</li><li>• Task period prioritized refreshing</li></ul> | 5 V/24 V voltage input     | <b>NX-CT2120</b> |
|                         | 2 (PNP)               | 6 (PNP)                   | 6 (PNP)                    |                               |                                                                                                                                                         |                            | <b>NX-CT2220</b> |
|                         | 2                     | 6 (NPN)                   | 6 (NPN)                    | 4 MHz                         |                                                                                                                                                         | RS-422 Line receiver input | <b>NX-CT2320</b> |
|                         | 2                     | 6 (PNP)                   | 6 (PNP)                    |                               |                                                                                                                                                         |                            | <b>NX-CT2420</b> |

\*1. When set to 6ch mode, the counter channel number is 6 channels.

\*2. When set to 6ch mode, the maximum response frequency is 100 kHz.

### Optional Products (Order Separately)

| Product name                    | Specification                                             |  |  | Model           |
|---------------------------------|-----------------------------------------------------------|--|--|-----------------|
| Unit/Terminal Block Coding Pins | For 10 Units<br>(30 terminal block pins and 30 unit pins) |  |  | <b>NX-AUX02</b> |

| Product name   | Specification    |                      |                           | Model            |
|----------------|------------------|----------------------|---------------------------|------------------|
|                | No. of terminals | Ground terminal mark | Terminal current capacity |                  |
| Terminal Block | 16               | None                 | 10 A                      | <b>NX-TBA162</b> |
|                |                  |                      |                           | <b>NX-TBB162</b> |

## General Specifications

| Item                    |                               | Specification                                                                                                                                                                                                   |
|-------------------------|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Enclosure               |                               | Mounted in a panel                                                                                                                                                                                              |
| Grounding methods       |                               | Ground to 100 $\Omega$ or less                                                                                                                                                                                  |
| Operating environment   | Ambient operating temperature | 0 to 55°C                                                                                                                                                                                                       |
|                         | Ambient operating humidity    | 10 to 95% RH (with no icing or condensation)                                                                                                                                                                    |
|                         | Atmosphere                    | Must be free from corrosive gases.                                                                                                                                                                              |
|                         | Ambient storage temperature   | -25 to 70°C (with no icing or condensation)                                                                                                                                                                     |
|                         | Altitude                      | 2,000 m max.                                                                                                                                                                                                    |
|                         | Pollution degree              | Pollution degree 2 or less: Conforms to JIS B 3502 and IEC 61131-2.                                                                                                                                             |
|                         | Noise immunity                | Conforms to IEC 61000-4-4, 2 kV (power supply line)                                                                                                                                                             |
|                         | Overvoltage category          | Category II: Conforms to JIS B 3502 and IEC 61131-2.                                                                                                                                                            |
|                         | EMC immunity level            | Zone B                                                                                                                                                                                                          |
|                         | Vibration resistance          | Conforms to IEC 60068-2-6.<br>5 to 8.4 Hz with amplitude of 3.5 mm,<br>8.4 to 150 Hz, acceleration of 9.8 m/s <sup>2</sup><br>100 min each in X, Y, and Z directions (10 sweeps of 10 min each = 100 min total) |
|                         | Shock resistance              | Conforms to IEC 60068-2-27, 147 m/s <sup>2</sup> , 3 times each in X, Y, and Z directions                                                                                                                       |
| Applicable standards *1 |                               | cULus: Listed (UL61010-2-201), ANSI/ISA 12.12.01, EU: EN 61131-2, RCM, KC (KC Registration) and Shipbuilding standards (NK/LR)                                                                                  |

\*1. Refer to the OMRON website ([www.ia.omron.com](http://www.ia.omron.com)) or ask your OMRON representative for the most recent applicable standards for each model.

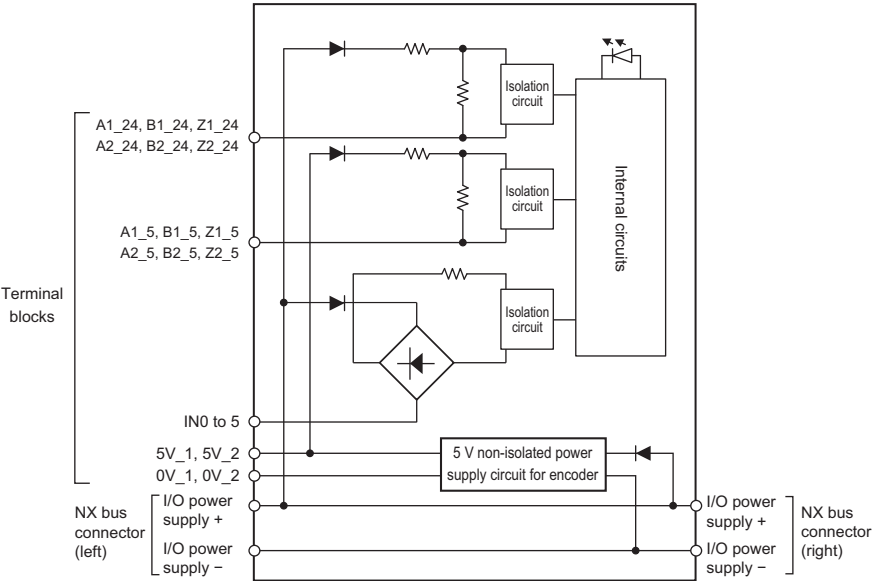
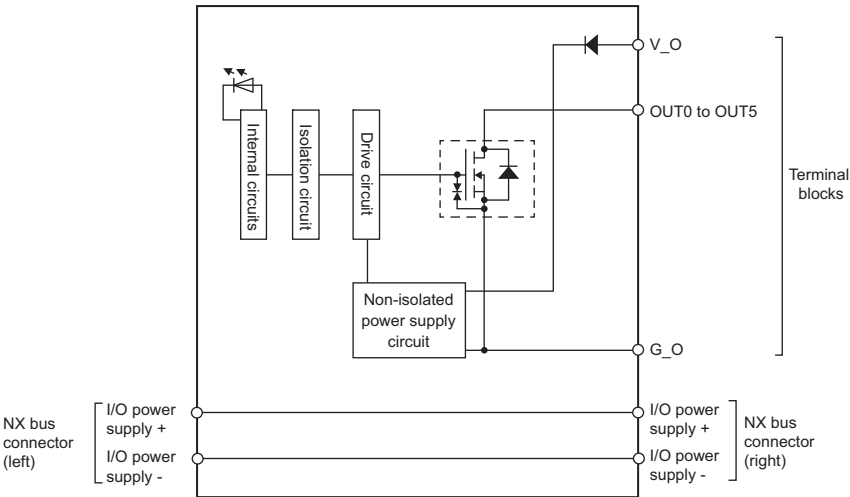
# NX-CT2120

**CT2120**

■ TS

CH [ 1 2 3 ] IN [ 0 1 2 ]  
[ 4 5 6 ] [ 3 4 5 ]

CH1 A B Z OUT [ 0 1 2 ]  
CH2 A B Z [ 3 4 5 ]

|                                                  |                                                                                                                                                                                                                                    |                                                  |                                                                                                                                                            |
|--------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Dimensions</b>                                | 24 (W) × 100 (H) × 71 (D)                                                                                                                                                                                                          | <b>Isolation method</b>                          | Photocoupler isolation                                                                                                                                     |
| <b>Insulation resistance</b>                     | 20 MΩ min. between isolated circuits (at 100 VDC)                                                                                                                                                                                  | <b>Dielectric strength</b>                       | 510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.                                                                           |
| <b>NX Unit power consumption</b>                 | <ul style="list-style-type: none"> <li>Connected to a CPU Unit<br/>1.45 W max.</li> <li>Connected to Communications Coupler Unit<br/>1.05 W max.</li> </ul>                                                                        | <b>Current consumption from I/O power supply</b> | Unit current consumption:<br>20 mA max.<br>External 5 V power supply consumption:<br>$0.25 \times \text{external 5 V power supply current consumption} *2$ |
| <b>Weight</b>                                    | 140 g max.                                                                                                                                                                                                                         |                                                  |                                                                                                                                                            |
| <b>Circuit layout</b>                            | <p>Count input, external input</p>  <p>External output</p>  |                                                  |                                                                                                                                                            |
| <b>Installation orientation and restrictions</b> | Refer to <i>NX-series High-speed Counter Units User's Manual</i> (Man. No. W647).                                                                                                                                                  |                                                  |                                                                                                                                                            |
| <b>Terminal connection diagram</b>               | Refer to <i>Terminal Block Arrangement and Wiring Example</i> on page 14.                                                                                                                                                          |                                                  |                                                                                                                                                            |

\*1. When counter input is input voltage (24 V), external power supply (5 V) cannot be used.

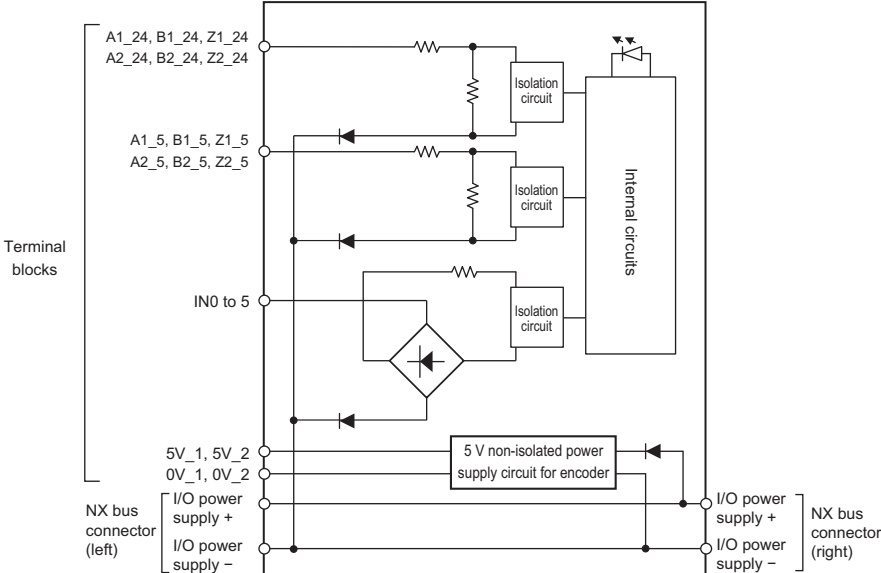
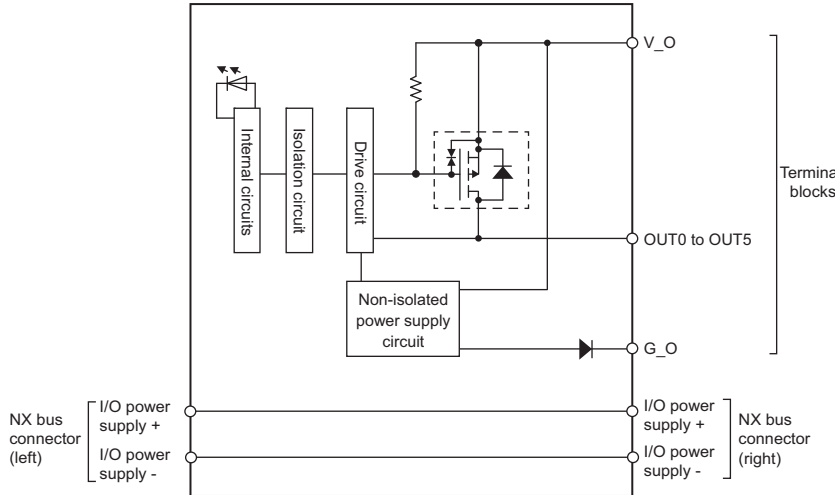
\*2. Use this formula to convert 5 V power supply current consumption to 24 V power supply current consumption.

|                              |                                                                                        |                                      |                                                      |
|------------------------------|----------------------------------------------------------------------------------------|--------------------------------------|------------------------------------------------------|
| <b>Unit name</b>             | High-speed Counter Units                                                               | <b>Model</b>                         | NX-CT2220                                            |
| <b>Number of channels</b>    | 2ch/6ch switching                                                                      | <b>External connection terminals</b> | Screwless clamping terminal block (16 terminals × 2) |
| <b>I/O refreshing method</b> | Free-Run refreshing, synchronous I/O refreshing, or task period prioritized refreshing |                                      |                                                      |

|                             |                                                                                                                                         |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <b>Input signals</b>        | Counter input terminal: In 2ch Mode: A-phase 2, B-phase 2, Z-phase 2<br>In 6ch Mode: A-phase 6<br>External input terminal: 6            |
| <b>Output signal</b>        | External output terminal: 6                                                                                                             |
| <b>Counter input format</b> | Voltage input (5 V, 24 V)                                                                                                               |
| <b>Pulse Input Method</b>   | In 2ch Mode: Phase differential pulse (multiplication x1/2/4), pulse + direction, up and down pulse inputs<br>In 6ch Mode: Single-phase |
| <b>Counter range</b>        | -2147483648 to 2147483647                                                                                                               |

| Counter Input Specifications (Voltage input) |                                                                                                                                                                       |                               |                        |
|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|------------------------|
| Input voltage (24 V)                         | 20.4 to 28.8 VDC<br>(24 VDC +20%/-15%)                                                                                                                                | Input voltage (5 V)           | 4.5 to 5.5 VDC         |
| ON voltage/ON current (24 V)                 | 18.6 VDC min./3 mA min.                                                                                                                                               | ON voltage/ON current (5 V)   | 4.5 VDC min./3 mA min. |
| OFF voltage/OFF current (24 V)               | 4.0 VDC max./1 mA max.                                                                                                                                                | OFF voltage/OFF current (5 V) | 1.5 VDC max./1 mA max. |
| Input current (24 V)                         | 5.6 mA typical (24 VDC)                                                                                                                                               | Input current (5 V)           | 5.3 mA typical (5 VDC) |
| Maximum response frequency                   | In 2ch Mode: A- and B-phase: Single-phase 250 kHz (phase differential pulse input at multiplication x4: 1 MHz), Z-phase: 250 kHz<br>In 6ch Mode: Single-phase 100 kHz |                               |                        |
| Internal I/O common processing               | PNP                                                                                                                                                                   |                               |                        |
| I/O power supply method                      | Supply from the NX Bus                                                                                                                                                |                               |                        |
| External power supply output (5 V) *1        | Output voltage: 4.9 to 5.25 VDC (5 VDC +5%/-2%)<br>Output current: 500 mA/channel min., 1 A/unit min.                                                                 |                               |                        |

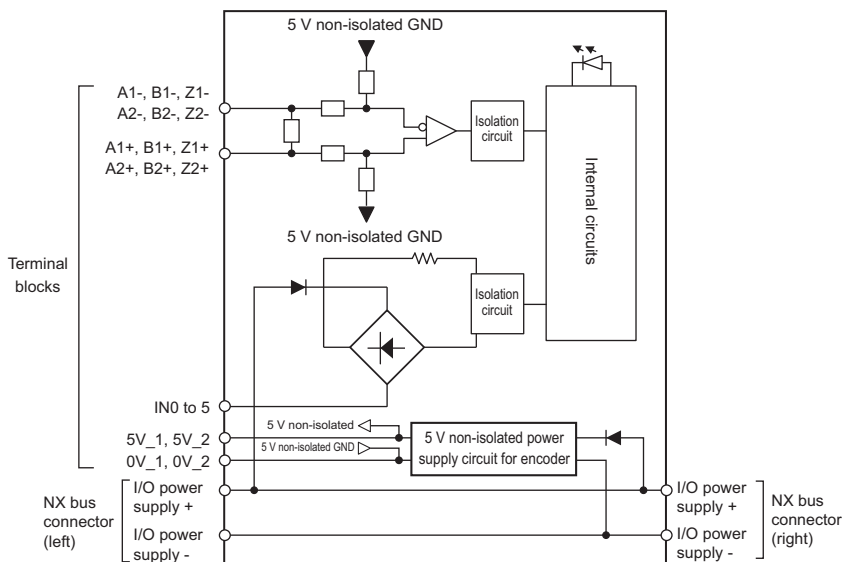
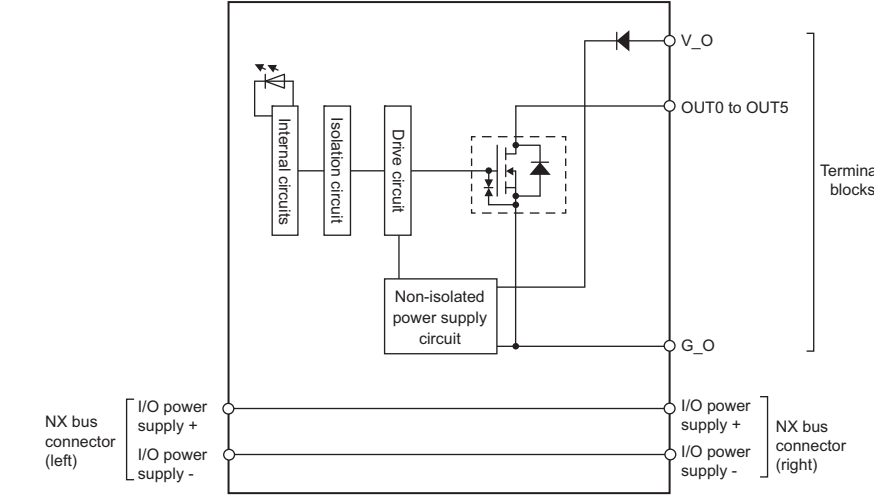
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|--------------------------------------------------|---------------------------------------------------|
| <b>External Output Specifications</b>            |                                                   |
| <b>Rated voltage</b>                             | 5 to 24 VDC                                       |
| <b>Load voltage range</b>                        | 4.75 to 28.8 VDC                                  |
| <b>Maximum value of load current</b>             | 0.5 A/point, 1.8 A/Unit                           |
| <b>ON/OFF response time</b>                      | 1 μs max./3 μs max. (at load current 7 to 500 mA) |
| <b>Internal I/O common processing</b>            | PNP                                               |
| <b>I/O power supply method</b>                   | External supply, 4.75 to 28.8 VDC                 |
| <b>Current consumption from I/O power supply</b> | 30 mA max.                                        |

|                                           |                                                                                                                                                          |                                           |                                                                                                                                           |
|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| Dimensions                                | 24 (W) × 100 (H) × 71 (D)                                                                                                                                | Isolation method                          | Photocoupler isolation                                                                                                                    |
| Insulation resistance                     | 20 MΩ min. between isolated circuits (at 100 VDC)                                                                                                        | Dielectric strength                       | 510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.                                                          |
| NX Unit power consumption                 | <ul style="list-style-type: none"><li>Connected to a CPU Unit<br/>1.45 W max.</li><li>Connected to Communications Coupler Unit<br/>1.05 W max.</li></ul> | Current consumption from I/O power supply | Unit current consumption:<br>20 mA max.<br>External 5 V power supply consumption: 0.25 × external 5 V power supply current consumption *2 |
| Weight                                    | 140 g max.                                                                                                                                               |                                           |                                                                                                                                           |
| Circuit layout                            | Count input, external input                                                                                                                              |                                           |                                                                                                                                           |
|                                           |                                                                       |                                           |                                                                                                                                           |
| Circuit layout                            | External output                                                                                                                                          |                                           |                                                                                                                                           |
|                                           |                                                                      |                                           |                                                                                                                                           |
| Installation orientation and restrictions | Refer to <i>NX-series High-speed Counter Units User's Manual</i> (Man. No. W647).                                                                        |                                           |                                                                                                                                           |
| Terminal connection diagram               | Refer to <i>Terminal Block Arrangement and Wiring Example</i> on page 18.                                                                                |                                           |                                                                                                                                           |

\*1. When counter input is input voltage (24 V), external power supply (5 V) cannot be used.

\*2. Use this formula to convert 5 V power supply current consumption to 24 V power supply current consumption.

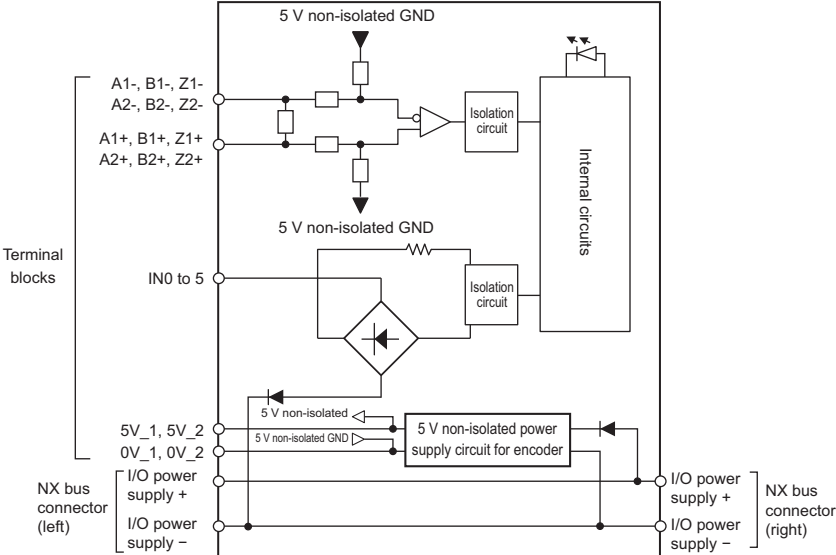
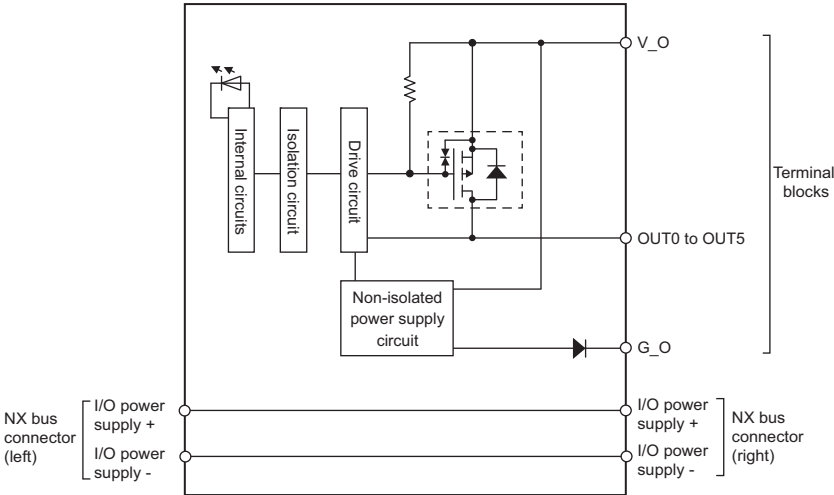
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|--------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Dimensions</b>                                | 24 (W) × 100 (H) × 71 (D)                                                                                                                                                                                                          | <b>Isolation method</b>                          | Photocoupler isolation                                                                                                                                     |
| <b>Insulation resistance</b>                     | 20 M $\Omega$ min. between isolated circuits (at 100 VDC)                                                                                                                                                                          | <b>Dielectric strength</b>                       | 510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.                                                                           |
| <b>NX Unit power consumption</b>                 | <ul style="list-style-type: none"> <li>Connected to a CPU Unit<br/>1.45 W max.</li> <li>Connected to Communications Coupler Unit<br/>1.1 W max.</li> </ul>                                                                         | <b>Current consumption from I/O power supply</b> | Unit current consumption:<br>30 mA max.<br>External 5 V power supply consumption:<br>$0.25 \times \text{external 5 V power supply current consumption} *2$ |
| <b>Weight</b>                                    | 140 g max.                                                                                                                                                                                                                         |                                                  |                                                                                                                                                            |
| <b>Circuit layout</b>                            | <p>Count input, external input</p>  <p>External output</p>  |                                                  |                                                                                                                                                            |
| <b>Installation orientation and restrictions</b> | Refer to <i>NX-series High-speed Counter Units User's Manual</i> (Man. No. W647).                                                                                                                                                  |                                                  |                                                                                                                                                            |
| <b>Terminal connection diagram</b>               | Refer to <i>Terminal Block Arrangement and Wiring Example</i> on page 22.                                                                                                                                                          |                                                  |                                                                                                                                                            |

\*1. External power supply (5 V) may be unavailable due to installation orientation or ambient operating temperature. Refer to *NX-series High-speed Counter Units User's Manual* (Man. No. W647).

\*2. Use this formula to convert 5 V power supply current consumption to 24 V power supply current consumption.

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|                                                  |                                                                                                                                                                                                                                    |                                                  |                                                                                                                                                            |
|--------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Dimensions</b>                                | 24 (W) × 100 (H) × 71 (D)                                                                                                                                                                                                          | <b>Isolation method</b>                          | Photocoupler isolation                                                                                                                                     |
| <b>Insulation resistance</b>                     | 20 MΩ min. between isolated circuits (at 100 VDC)                                                                                                                                                                                  | <b>Dielectric strength</b>                       | 510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.                                                                           |
| <b>NX Unit power consumption</b>                 | <ul style="list-style-type: none"> <li>Connected to a CPU Unit<br/>1.45 W max.</li> <li>Connected to Communications Coupler Unit<br/>1.05 W max.</li> </ul>                                                                        | <b>Current consumption from I/O power supply</b> | Unit current consumption:<br>30 mA max.<br>External 5 V power supply<br>consumption: $0.25 \times \text{external 5 V power supply current consumption} *2$ |
| <b>Weight</b>                                    | 140 g max.                                                                                                                                                                                                                         |                                                  |                                                                                                                                                            |
| <b>Circuit layout</b>                            | <p>Count input, external input</p>  <p>External output</p>  |                                                  |                                                                                                                                                            |
| <b>Installation orientation and restrictions</b> | Refer to <i>NX-series High-speed Counter Units User's Manual</i> (Man. No. W647).                                                                                                                                                  |                                                  |                                                                                                                                                            |
| <b>Terminal connection diagram</b>               | Refer to <i>Terminal Block Arrangement and Wiring Example</i> on page 26.                                                                                                                                                          |                                                  |                                                                                                                                                            |

\*1. External power supply (5 V) may be unavailable due to installation orientation or ambient operating temperature. Refer to *NX-series High-speed Counter Units User's Manual* (Man. No. W647).

\*2. Use this formula to convert 5 V power supply current consumption to 24 V power supply current consumption.

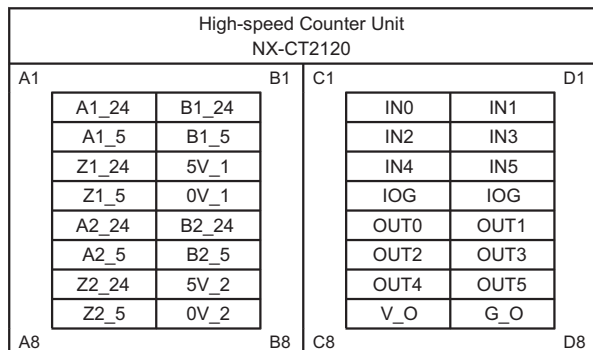
## Terminal Block Arrangement and Wiring Example

For each High-speed Counter Unit model, terminal block array and wiring examples for 2ch mode and 6ch mode are described here.  
For Counter Input A-phase/B-phase/Z-phase wiring, use a shielded cable with a ground of 100  $\Omega$  or less for the shield.

### NX-CT2120

#### In 2ch Mode

##### Terminal Block Arrangement



| Pin No. | Symbol | I/O | Name                           |
|---------|--------|-----|--------------------------------|
| A1      | A1_24  | I   | Counter 1 input A-phase (24 V) |
| A2      | A1_5   | I   | Counter 1 input A-phase (5 V)  |
| A3      | Z1_24  | I   | Counter 1 input Z-phase (24 V) |
| A4      | Z1_5   | I   | Counter 1 input Z-phase (5 V)  |
| A5      | A2_24  | I   | Counter 2 input A-phase (24 V) |
| A6      | A2_5   | I   | Counter 2 input A-phase (5 V)  |
| A7      | Z2_24  | I   | Counter 2 input Z-phase (24 V) |
| A8      | Z2_5   | I   | Counter 2 input Z-phase (5 V)  |

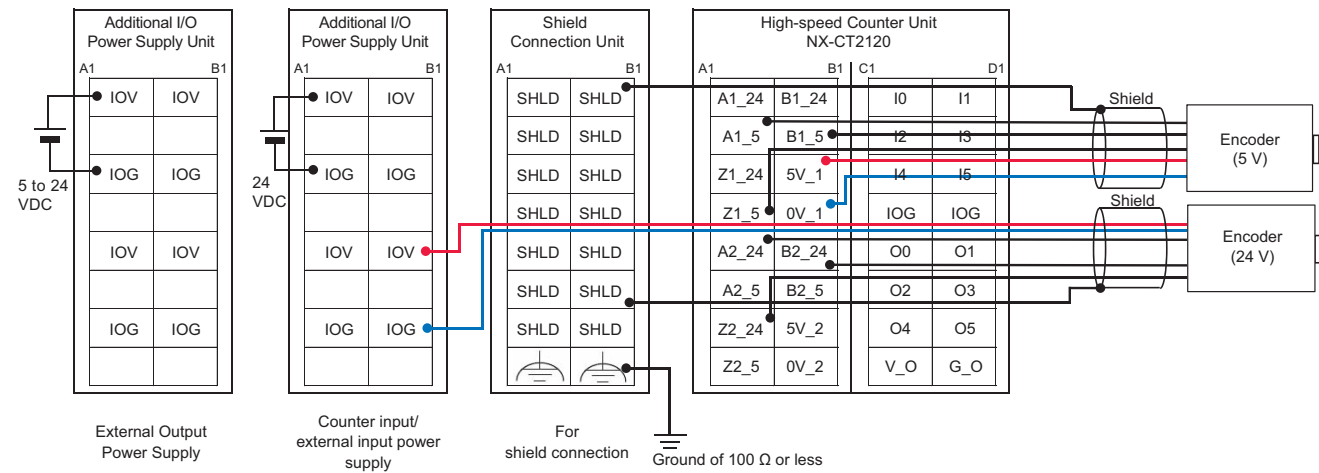
| Pin No. | Symbol | I/O | Name                                  |
|---------|--------|-----|---------------------------------------|
| B1      | B1_24  | I   | Counter 1 input B-phase (24 V)        |
| B2      | B1_5   | I   | Counter 1 input B-phase (5 V)         |
| B3      | 5V_1   | O   | Encoder power supply output 1, 5 V *1 |
| B4      | 0V_1   | O   | Encoder power supply output 1, 0 V *1 |
| B5      | B2_24  | I   | Counter 2 input B-phase (24 V)        |
| B6      | B2_5   | I   | Counter 2 input B-phase (5 V)         |
| B7      | 5V_2   | O   | Encoder power supply output 2, 5 V *1 |
| B8      | 0V_2   | O   | Encoder power supply output 2, 0 V *1 |

\*1. Encoder power output can be used as a power supply for the 5 V type encoder. When using a 24 V encoder, do not use the encoder power output.

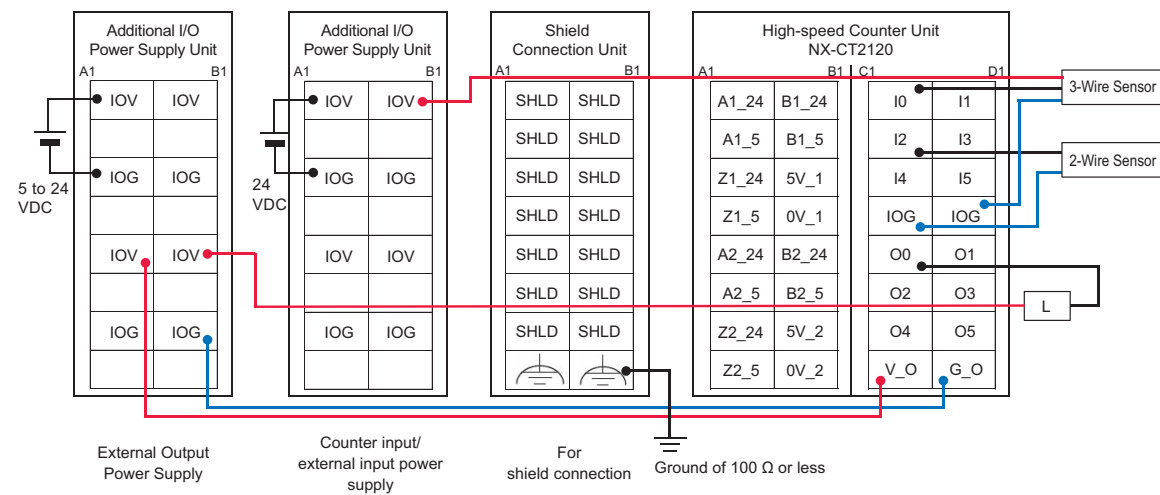
| Pin No. | Symbol | I/O | Name                         |
|---------|--------|-----|------------------------------|
| C1      | IN0    | I   | External Input0              |
| C2      | IN2    | I   | External Input2              |
| C3      | IN4    | I   | External Input4              |
| C4      | IOG    | --- | I/O power supply -           |
| C5      | OUT0   | O   | External Output0             |
| C6      | OUT2   | O   | External Output2             |
| C7      | OUT4   | O   | External Output4             |
| C8      | V_O    | I   | External Output Power Supply |

| Pin No. | Symbol | I/O | Name                         |
|---------|--------|-----|------------------------------|
| D1      | IN1    | I   | External Input1              |
| D2      | IN3    | I   | External Input3              |
| D3      | IN5    | I   | External Input5              |
| D4      | IOG    | --- | I/O power supply -           |
| D5      | OUT1   | O   | External Output1             |
| D6      | OUT3   | O   | External Output3             |
| D7      | OUT5   | O   | External Output5             |
| D8      | G_O    | I   | External Output Power Supply |

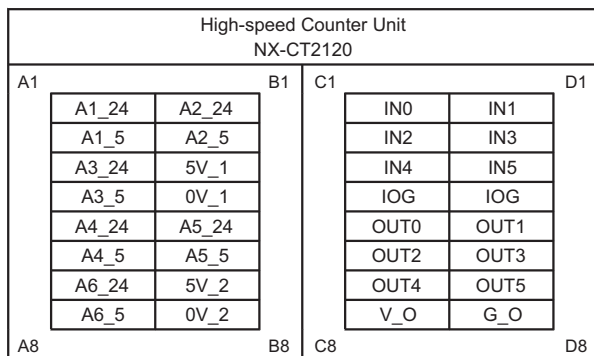
Wiring Example (NX-CT2120 2ch mode)  
Counter Input Wiring Example



External I/O Wiring Example



## In 6ch Mode Terminal Block Arrangement



| Pin No. | Symbol | I/O | Name                           |
|---------|--------|-----|--------------------------------|
| A1      | A1_24  | I   | Counter 1 input A-phase (24 V) |
| A2      | A1_5   | I   | Counter 1 input A-phase (5 V)  |
| A3      | A3_24  | I   | Counter 3 input A-phase (24 V) |
| A4      | A3_5   | I   | Counter 3 input A-phase (5 V)  |
| A5      | A4_24  | I   | Counter 4 input A-phase (24 V) |
| A6      | A4_5   | I   | Counter 4 input A-phase (5 V)  |
| A7      | A6_24  | I   | Counter 6 input A-phase (24 V) |
| A8      | A6_5   | I   | Counter 6 input A-phase (5 V)  |

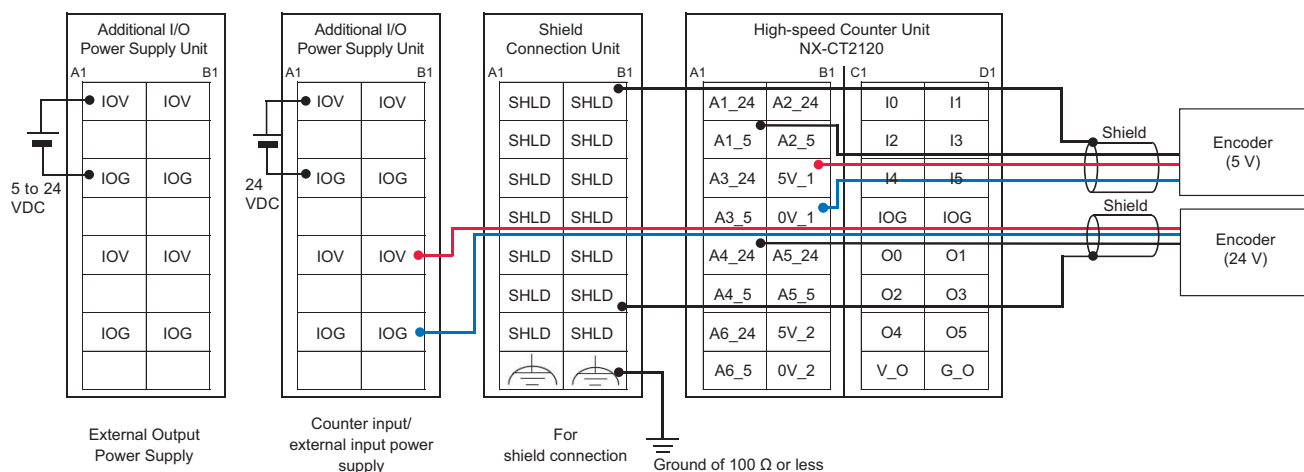
| Pin No. | Symbol | I/O | Name                                |
|---------|--------|-----|-------------------------------------|
| B1      | A2_24  | I   | Counter 2 input A-phase (24 V)      |
| B2      | A2_5   | I   | Counter 2 input A-phase (5 V)       |
| B3      | 5V_1   | O   | Encoder power supply output, 5 V *1 |
| B4      | 0V_1   | O   | Encoder power supply output, 0 V *1 |
| B5      | A5_24  | I   | Counter 5 input A-phase (24 V)      |
| B6      | A5_5   | I   | Counter 5 input A-phase (5 V)       |
| B7      | 5V_2   | O   | Encoder power supply output, 5 V *1 |
| B8      | 0V_2   | O   | Encoder power supply output, 0 V *1 |

\*1. Encoder power output can be used as a power supply for the 5 V type encoder. When using a 24 V encoder, do not use the encoder power output.

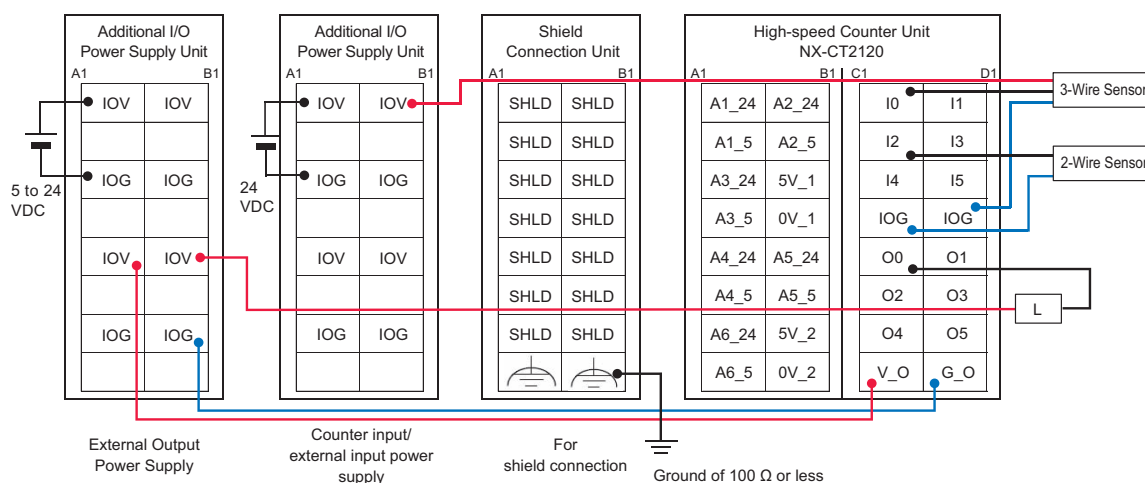
| Pin No. | Symbol | I/O | Name                         |
|---------|--------|-----|------------------------------|
| C1      | IN0    | I   | External Input0              |
| C2      | IN2    | I   | External Input2              |
| C3      | IN4    | I   | External Input4              |
| C4      | IOG    | --- | I/O power supply -           |
| C5      | OUT0   | O   | External Output0             |
| C6      | OUT2   | O   | External Output2             |
| C7      | OUT4   | O   | External Output4             |
| C8      | V_O    | I   | External Output Power Supply |

| Pin No. | Symbol | I/O | Name                         |
|---------|--------|-----|------------------------------|
| D1      | IN1    | I   | External Input1              |
| D2      | IN3    | I   | External Input3              |
| D3      | IN5    | I   | External Input5              |
| D4      | IOG    | --- | I/O power supply -           |
| D5      | OUT1   | O   | External Output1             |
| D6      | OUT3   | O   | External Output3             |
| D7      | OUT5   | O   | External Output5             |
| D8      | G_O    | I   | External Output Power Supply |

## Wiring Example (NX-CT2120 6ch mode) Counter Input Wiring Example

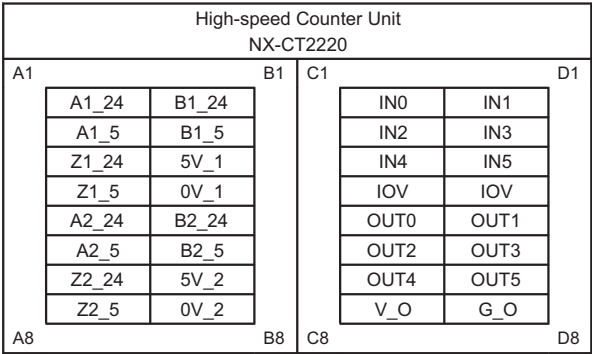


## External I/O Wiring Example



NX-CT2220

In 2ch Mode  
Terminal Block Arrangement



| Pin No. | Symbol | I/O | Name                           |
|---------|--------|-----|--------------------------------|
| A1      | A1_24  | I   | Counter 1 input A-phase (24 V) |
| A2      | A1_5   | I   | Counter 1 input A-phase (5 V)  |
| A3      | Z1_24  | I   | Counter 1 input Z-phase (24 V) |
| A4      | Z1_5   | I   | Counter 1 input Z-phase (5 V)  |
| A5      | A2_24  | I   | Counter 2 input A-phase (24 V) |
| A6      | A2_5   | I   | Counter 2 input A-phase (5 V)  |
| A7      | Z2_24  | I   | Counter 2 input Z-phase (24 V) |
| A8      | Z2_5   | I   | Counter 2 input Z-phase (5 V)  |

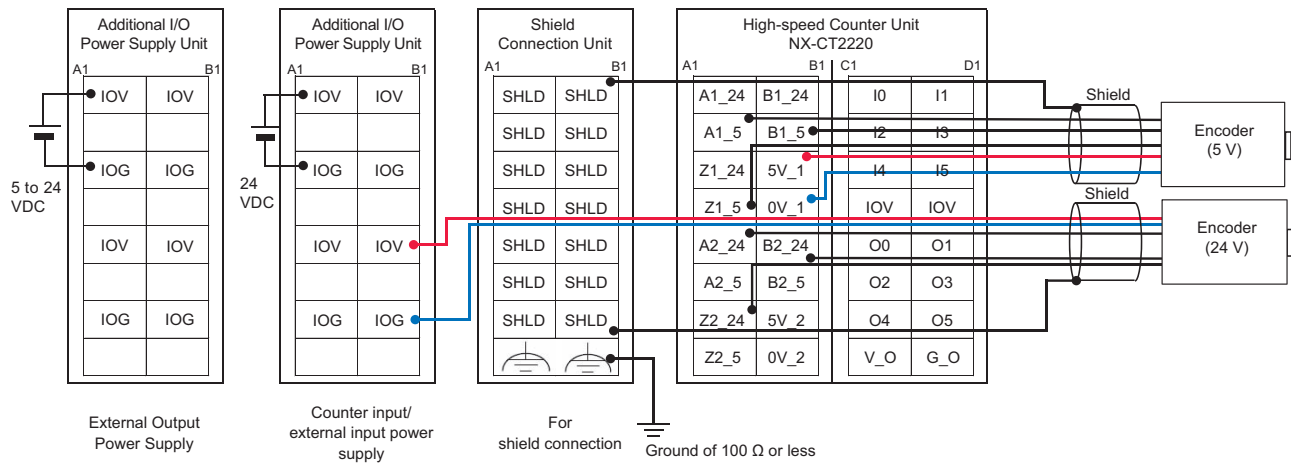
\*1. Encoder power output can be used as a power supply for the 5 V type encoder. When using a 24 V encoder, do not use the encoder power output.

| Pin No. | Symbol | I/O | Name                         |
|---------|--------|-----|------------------------------|
| C1      | IN0    | I   | External Input0              |
| C2      | IN2    | I   | External Input2              |
| C3      | IN4    | I   | External Input4              |
| C4      | IOV    | --- | I/O power supply +           |
| C5      | OUT0   | O   | External Output0             |
| C6      | OUT2   | O   | External Output2             |
| C7      | OUT4   | O   | External Output4             |
| C8      | V_O    | I   | External Output Power Supply |

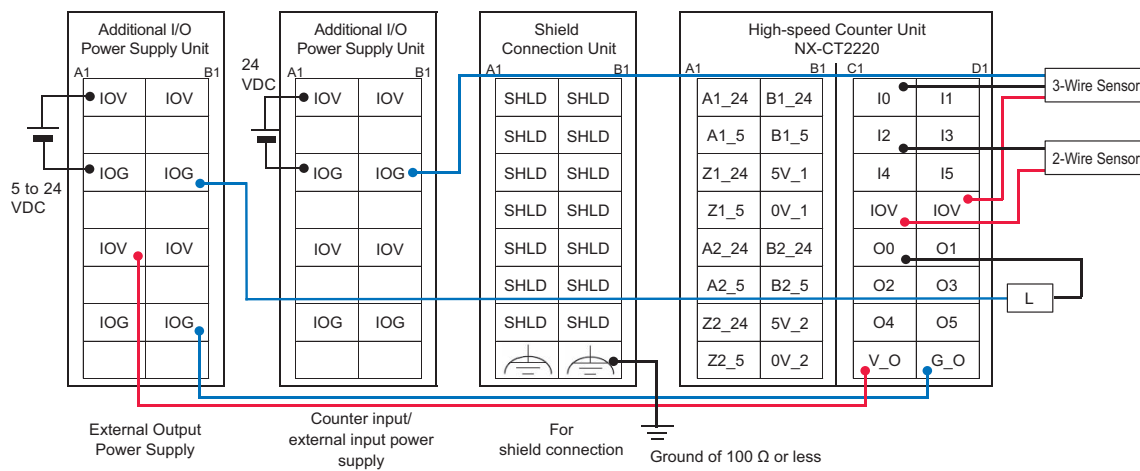
| Pin No. | Symbol | I/O | Name                                  |
|---------|--------|-----|---------------------------------------|
| B1      | B1_24  | I   | Counter 1 input B-phase (24 V)        |
| B2      | B1_5   | I   | Counter 1 input B-phase (5 V)         |
| B3      | 5V_1   | O   | Encoder power supply output 1, 5 V *1 |
| B4      | 0V_1   | O   | Encoder power supply output 1, 0 V *1 |
| B5      | B2_24  | I   | Counter 2 input B-phase (24 V)        |
| B6      | B2_5   | I   | Counter 2 input B-phase (5 V)         |
| B7      | 5V_2   | O   | Encoder power supply output 2, 5 V *1 |
| B8      | 0V_2   | O   | Encoder power supply output 2, 0 V *1 |

| Pin No. | Symbol | I/O | Name                         |
|---------|--------|-----|------------------------------|
| D1      | IN1    | I   | External Input1              |
| D2      | IN3    | I   | External Input3              |
| D3      | IN5    | I   | External Input5              |
| D4      | IOV    | --- | I/O power supply +           |
| D5      | OUT1   | O   | External Output1             |
| D6      | OUT3   | O   | External Output3             |
| D7      | OUT5   | O   | External Output5             |
| D8      | G_O    | I   | External Output Power Supply |

## Wiring Example (NX-CT2220 2ch mode) Counter Input Wiring Example

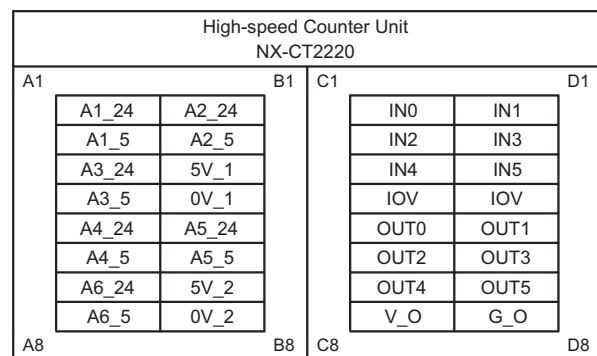


## External I/O Wiring Example



## In 6ch Mode

### Terminal Block Arrangement



| Pin No. | Symbol | I/O | Name                           |
|---------|--------|-----|--------------------------------|
| A1      | A1_24  | I   | Counter 1 input A-phase (24 V) |
| A2      | A1_5   | I   | Counter 1 input A-phase (5 V)  |
| A3      | A3_24  | I   | Counter 3 input A-phase (24 V) |
| A4      | A3_5   | I   | Counter 3 input A-phase (5 V)  |
| A5      | A4_24  | I   | Counter 4 input A-phase (24 V) |
| A6      | A4_5   | I   | Counter 4 input A-phase (5 V)  |
| A7      | A6_24  | I   | Counter 6 input A-phase (24 V) |
| A8      | A6_5   | I   | Counter 6 input A-phase (5 V)  |

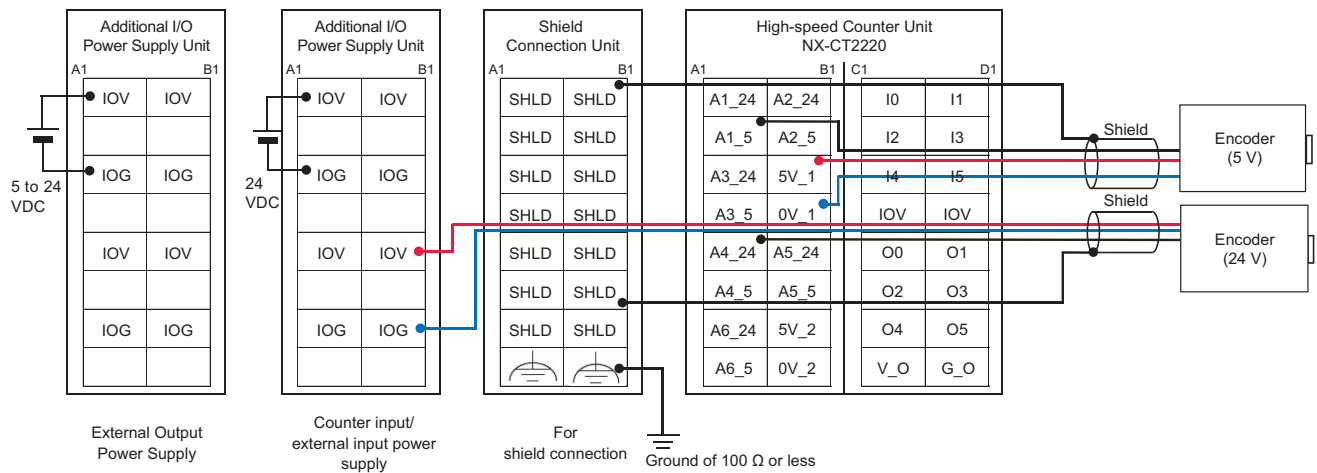
| Pin No. | Symbol | I/O | Name                                |
|---------|--------|-----|-------------------------------------|
| B1      | A2_24  | I   | Counter 2 input A-phase (24 V)      |
| B2      | A2_5   | I   | Counter 2 input A-phase (5 V)       |
| B3      | 5V_1   | O   | Encoder power supply output, 5 V *1 |
| B4      | 0V_1   | O   | Encoder power supply output, 0 V *1 |
| B5      | A5_24  | I   | Counter 5 input A-phase (24 V)      |
| B6      | A5_5   | I   | Counter 5 input A-phase (5 V)       |
| B7      | 5V_2   | O   | Encoder power supply output, 5 V *1 |
| B8      | 0V_2   | O   | Encoder power supply output, 0 V *1 |

\*1. Encoder power output can be used as a power supply for the 5 V type encoder. When using a 24 V encoder, do not use the encoder power output.

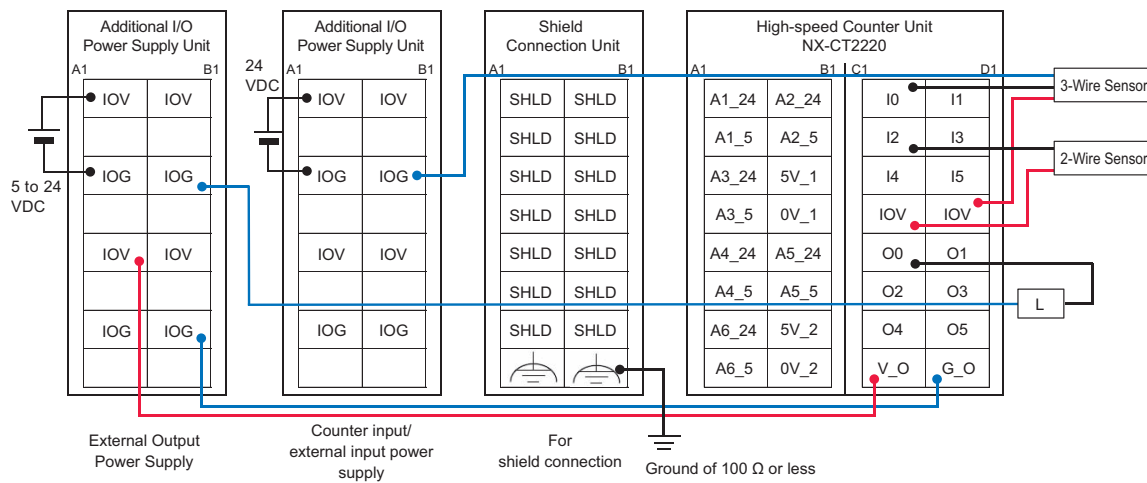
| Pin No. | Symbol | I/O | Name                         |
|---------|--------|-----|------------------------------|
| C1      | IN0    | I   | External Input0              |
| C2      | IN2    | I   | External Input2              |
| C3      | IN4    | I   | External Input4              |
| C4      | IOV    | --- | I/O power supply +           |
| C5      | OUT0   | O   | External Output0             |
| C6      | OUT2   | O   | External Output2             |
| C7      | OUT4   | O   | External Output4             |
| C8      | V_O    | I   | External Output Power Supply |

| Pin No. | Symbol | I/O | Name                         |
|---------|--------|-----|------------------------------|
| D1      | IN1    | I   | External Input1              |
| D2      | IN3    | I   | External Input3              |
| D3      | IN5    | I   | External Input5              |
| D4      | IOV    | --- | I/O power supply +           |
| D5      | OUT1   | O   | External Output1             |
| D6      | OUT3   | O   | External Output3             |
| D7      | OUT5   | O   | External Output5             |
| D8      | G_O    | I   | External Output Power Supply |

## Wiring Example (NX-CT2220 6ch mode) Counter Input Wiring Example



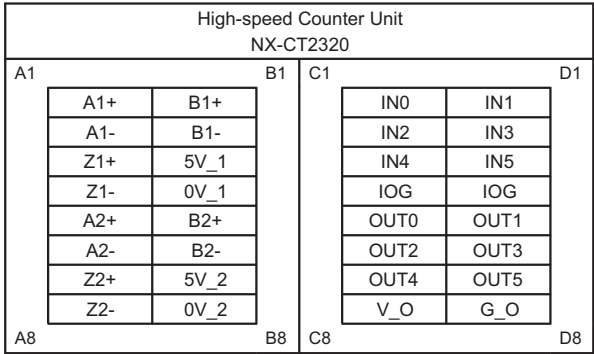
## External I/O Wiring Example



NX-CT2320

In 2ch Mode

Terminal Block Arrangement



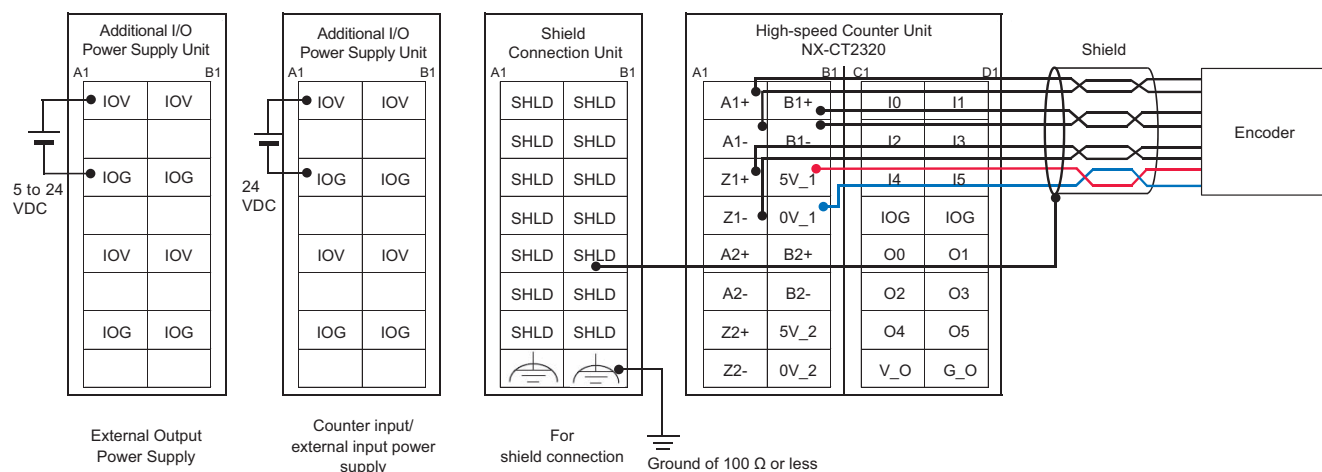
| Pin No. | Symbol | I/O | Name                      |
|---------|--------|-----|---------------------------|
| A1      | A1+    | I   | Counter 1 input A-phase + |
| A2      | A1-    | I   | Counter 1 input A-phase - |
| A3      | Z1+    | I   | Counter 1 input Z-phase + |
| A4      | Z1-    | I   | Counter 1 input Z-phase - |
| A5      | A2+    | I   | Counter 2 input A-phase + |
| A6      | A2-    | I   | Counter 2 input A-phase - |
| A7      | Z2+    | I   | Counter 2 input Z-phase + |
| A8      | Z2-    | I   | Counter 2 input Z-phase - |

| Pin No. | Symbol | I/O | Name                         |
|---------|--------|-----|------------------------------|
| C1      | IN0    | I   | External Input0              |
| C2      | IN2    | I   | External Input2              |
| C3      | IN4    | I   | External Input4              |
| C4      | IOG    | --- | I/O power supply -           |
| C5      | OUT0   | O   | External Output0             |
| C6      | OUT2   | O   | External Output2             |
| C7      | OUT4   | O   | External Output4             |
| C8      | V_O    | I   | External Output Power Supply |

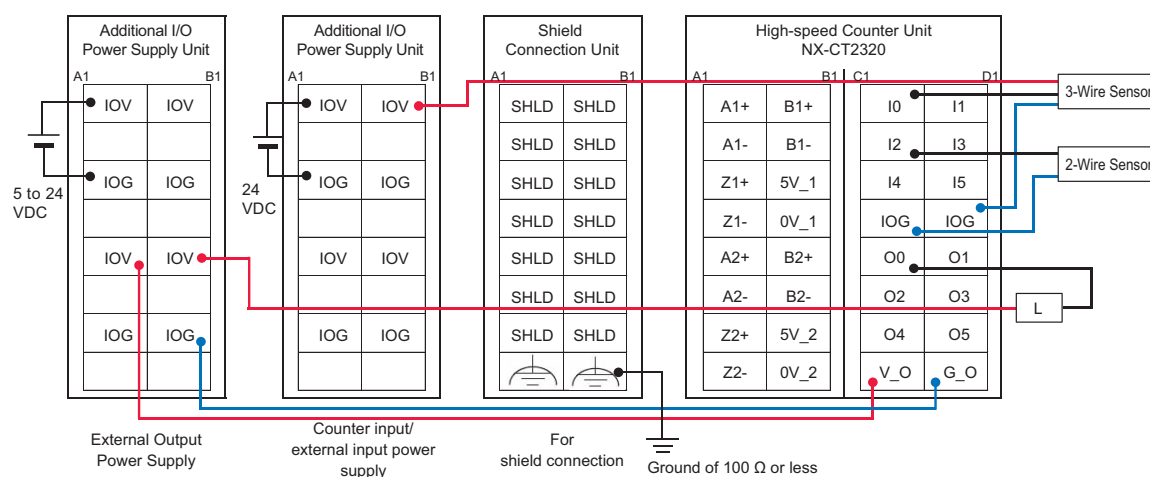
| Pin No. | Symbol | I/O | Name                               |
|---------|--------|-----|------------------------------------|
| B1      | B1+    | I   | Counter 1 input B-phase +          |
| B2      | B1-    | I   | Counter 1 input B-phase -          |
| B3      | 5V_1   | O   | Encoder power supply output 1, 5 V |
| B4      | 0V_1   | O   | Encoder power supply output 1, 0 V |
| B5      | B2+    | I   | Counter 2 input B-phase +          |
| B6      | B2-    | I   | Counter 2 input B-phase -          |
| B7      | 5V_2   | O   | Encoder power supply output 2, 5 V |
| B8      | 0V_2   | O   | Encoder power supply output 2, 0 V |

| Pin No. | Symbol | I/O | Name                         |
|---------|--------|-----|------------------------------|
| D1      | IN1    | I   | External Input1              |
| D2      | IN3    | I   | External Input3              |
| D3      | IN5    | I   | External Input5              |
| D4      | IOG    | --- | I/O power supply -           |
| D5      | OUT1   | O   | External Output1             |
| D6      | OUT3   | O   | External Output3             |
| D7      | OUT5   | O   | External Output5             |
| D8      | G_O    | I   | External Output Power Supply |

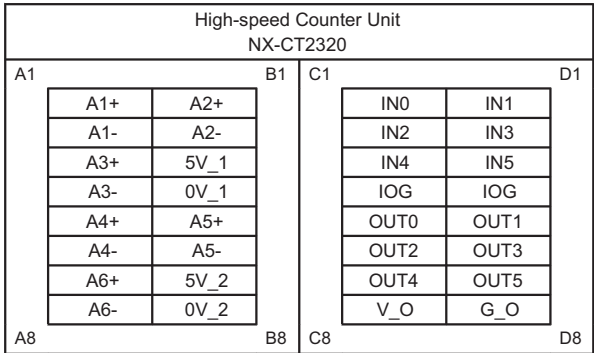
## Wiring Example (NX-CT2320 2ch mode) Counter Input Wiring Example



## External I/O Wiring Example



In 6ch Mode  
Terminal Block Arrangement



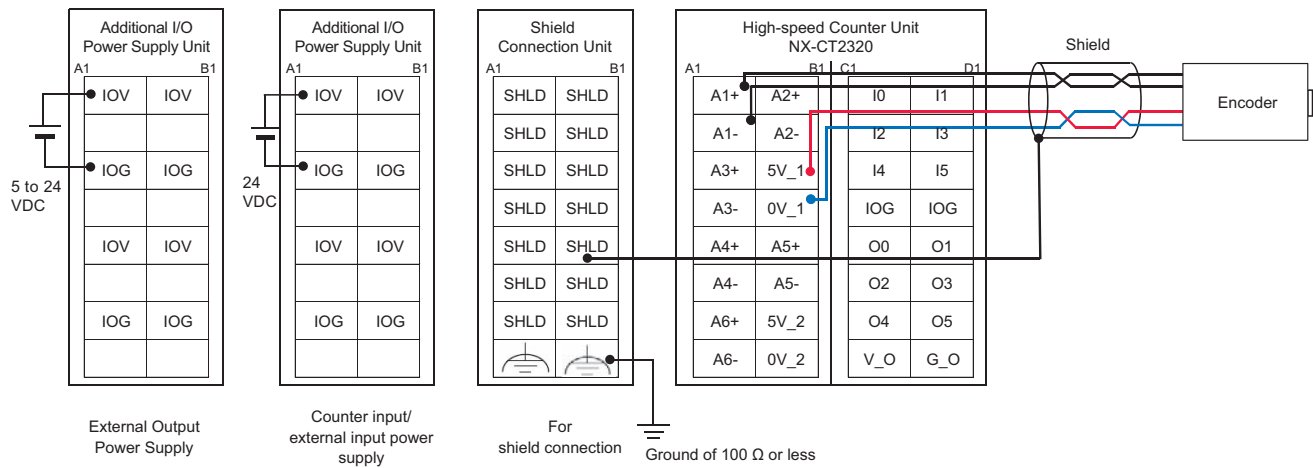
| Pin No. | Symbol | I/O | Name                      |
|---------|--------|-----|---------------------------|
| A1      | A1+    | I   | Counter 1 input A-phase + |
| A2      | A1-    | I   | Counter 1 input A-phase - |
| A3      | A3+    | I   | Counter 3 input A-phase + |
| A4      | A3-    | I   | Counter 3 input A-phase - |
| A5      | A4+    | I   | Counter 4 input A-phase + |
| A6      | A4-    | I   | Counter 4 input A-phase - |
| A7      | A6+    | I   | Counter 6 input A-phase + |
| A8      | A6-    | I   | Counter 6 input A-phase - |

| Pin No. | Symbol | I/O | Name                         |
|---------|--------|-----|------------------------------|
| C1      | IN0    | I   | External Input0              |
| C2      | IN2    | I   | External Input2              |
| C3      | IN4    | I   | External Input4              |
| C4      | IOG    | --- | I/O power supply -           |
| C5      | OUT0   | O   | External Output0             |
| C6      | OUT2   | O   | External Output2             |
| C7      | OUT4   | O   | External Output4             |
| C8      | V_O    | I   | External Output Power Supply |

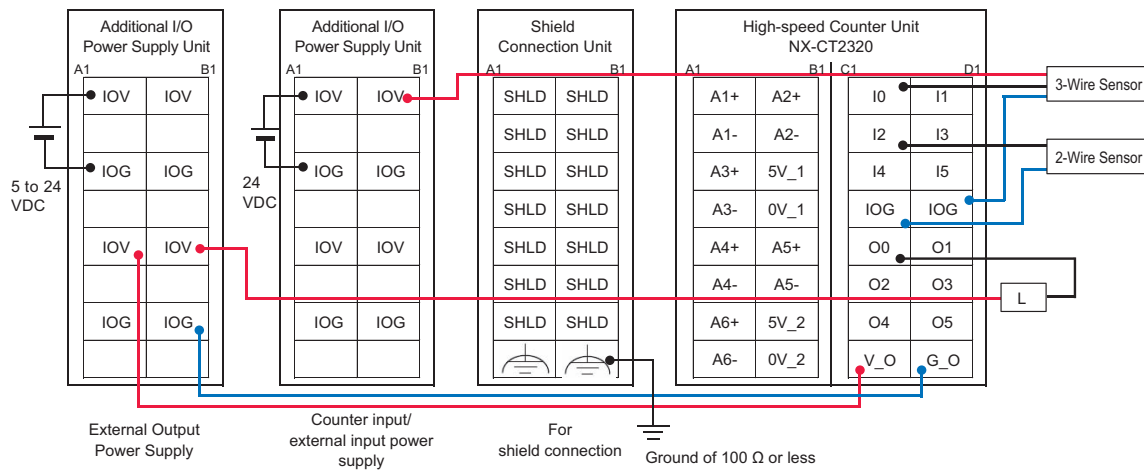
| Pin No. | Symbol | I/O | Name                             |
|---------|--------|-----|----------------------------------|
| B1      | A2+    | I   | Counter 2 input A-phase +        |
| B2      | A2-    | I   | Counter 2 input A-phase -        |
| B3      | 5V_1   | O   | Encoder power supply output, 5 V |
| B4      | 0V_1   | O   | Encoder power supply output, 0 V |
| B5      | A5+    | I   | Counter 5 input A-phase +        |
| B6      | A5-    | I   | Counter 5 input A-phase -        |
| B7      | 5V_2   | O   | Encoder power supply output, 5 V |
| B8      | 0V_2   | O   | Encoder power supply output, 0 V |

| Pin No. | Symbol | I/O | Name                         |
|---------|--------|-----|------------------------------|
| D1      | IN1    | I   | External Input1              |
| D2      | IN3    | I   | External Input3              |
| D3      | IN5    | I   | External Input5              |
| D4      | IOG    | --- | I/O power supply -           |
| D5      | OUT1   | O   | External Output1             |
| D6      | OUT3   | O   | External Output3             |
| D7      | OUT5   | O   | External Output5             |
| D8      | G_O    | I   | External Output Power Supply |

## Wiring Example (NX-CT2320 6ch mode) Counter Input Wiring Example

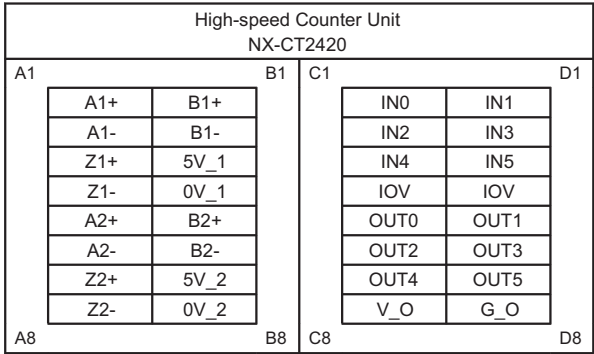


## External I/O Wiring Example



NX-CT2420

In 2ch Mode  
Terminal Block Arrangement



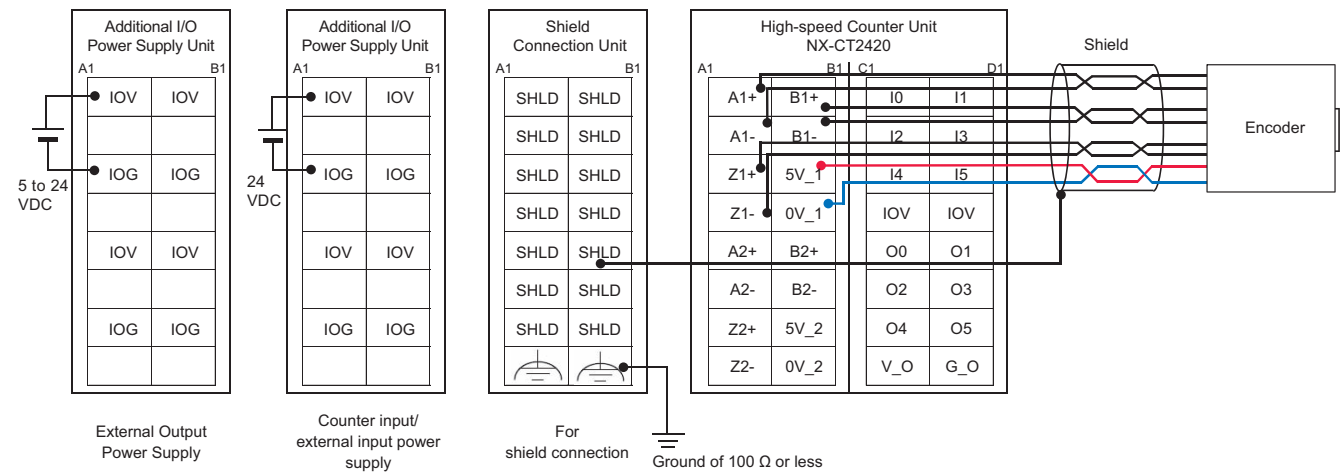
| Pin No. | Symbol | I/O | Name                      |
|---------|--------|-----|---------------------------|
| A1      | A1+    | I   | Counter 1 input A-phase + |
| A2      | A1-    | I   | Counter 1 input A-phase - |
| A3      | Z1+    | I   | Counter 1 input Z-phase + |
| A4      | Z1-    | I   | Counter 1 input Z-phase - |
| A5      | A2+    | I   | Counter 2 input A-phase + |
| A6      | A2-    | I   | Counter 2 input A-phase - |
| A7      | Z2+    | I   | Counter 2 input Z-phase + |
| A8      | Z2-    | I   | Counter 2 input Z-phase - |

| Pin No. | Symbol | I/O | Name                         |
|---------|--------|-----|------------------------------|
| C1      | IN0    | I   | External Input0              |
| C2      | IN2    | I   | External Input2              |
| C3      | IN4    | I   | External Input4              |
| C4      | IOV    | --- | I/O power supply +           |
| C5      | OUT0   | O   | External Output0             |
| C6      | OUT2   | O   | External Output2             |
| C7      | OUT4   | O   | External Output4             |
| C8      | V_O    | I   | External Output Power Supply |

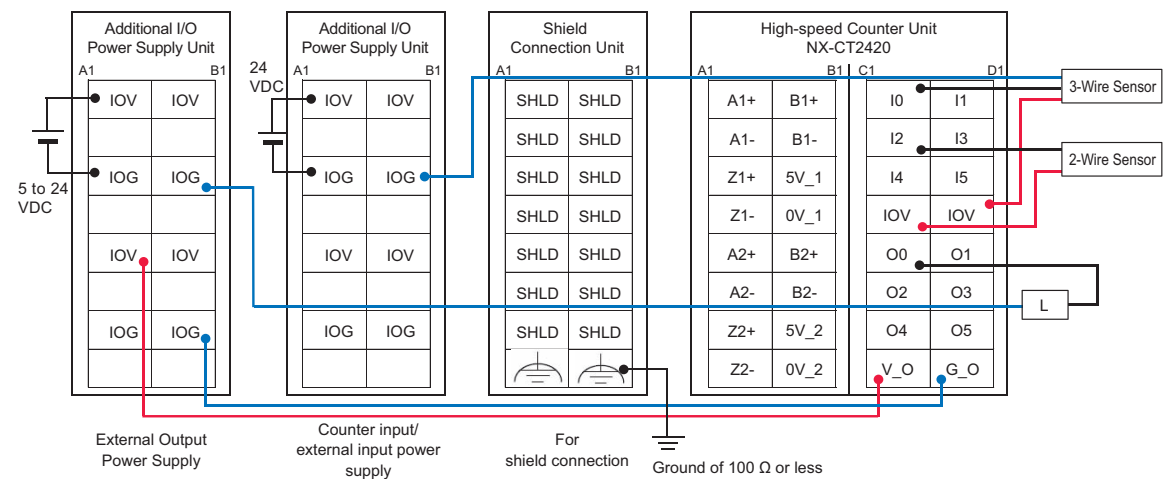
| Pin No. | Symbol | I/O | Name                               |
|---------|--------|-----|------------------------------------|
| B1      | B1+    | I   | Counter 1 input B-phase +          |
| B2      | B1-    | I   | Counter 1 input B-phase -          |
| B3      | 5V_1   | O   | Encoder power supply output 1, 5 V |
| B4      | 0V_1   | O   | Encoder power supply output 1, 0 V |
| B5      | B2+    | I   | Counter 2 input B-phase +          |
| B6      | B2-    | I   | Counter 2 input B-phase -          |
| B7      | 5V_2   | O   | Encoder power supply output 2, 5 V |
| B8      | 0V_2   | O   | Encoder power supply output 2, 0 V |

| Pin No. | Symbol | I/O | Name                         |
|---------|--------|-----|------------------------------|
| D1      | IN1    | I   | External Input1              |
| D2      | IN3    | I   | External Input3              |
| D3      | IN5    | I   | External Input5              |
| D4      | IOV    | --- | I/O power supply +           |
| D5      | OUT1   | O   | External Output1             |
| D6      | OUT3   | O   | External Output3             |
| D7      | OUT5   | O   | External Output5             |
| D8      | G_O    | I   | External Output Power Supply |

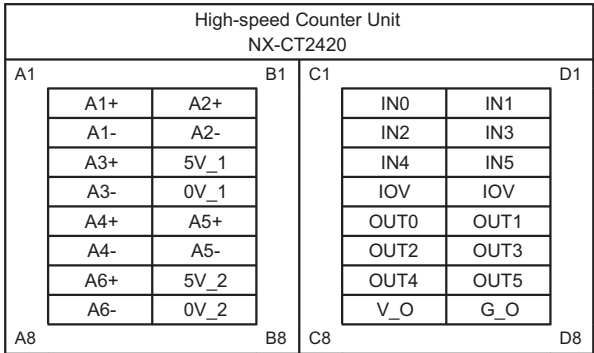
Wiring Example (NX-CT2420 2ch mode)  
Counter Input Wiring Example



External I/O Wiring Example



In 6ch Mode  
Terminal Block Arrangement



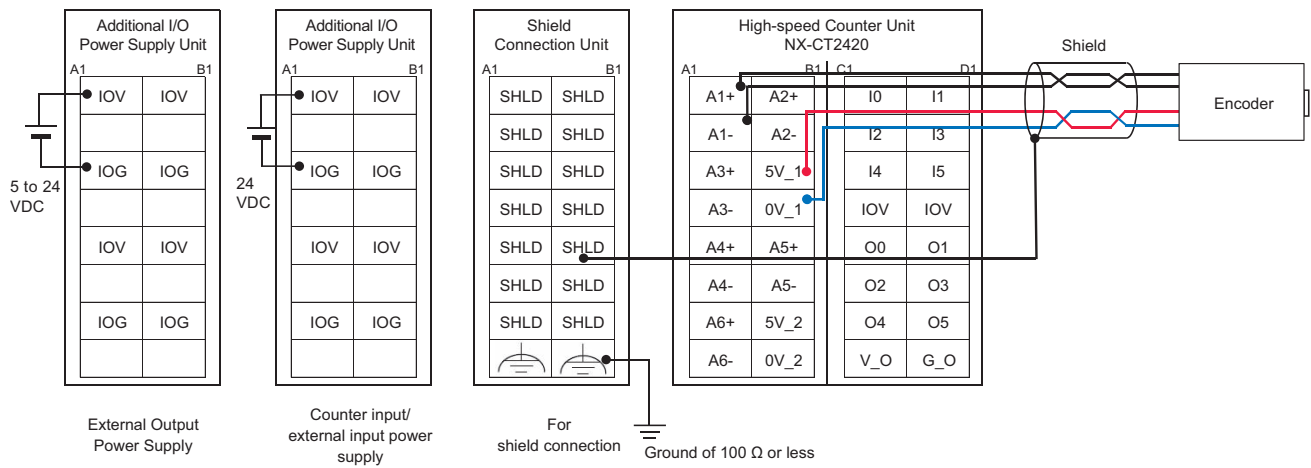
| Pin No. | Symbol | I/O | Name                      |
|---------|--------|-----|---------------------------|
| A1      | A1+    | I   | Counter 1 input A-phase + |
| A2      | A1-    | I   | Counter 1 input A-phase - |
| A3      | A3+    | I   | Counter 3 input A-phase + |
| A4      | A3-    | I   | Counter 3 input A-phase - |
| A5      | A4+    | I   | Counter 4 input A-phase + |
| A6      | A4-    | I   | Counter 4 input A-phase - |
| A7      | A6+    | I   | Counter 6 input A-phase + |
| A8      | A6-    | I   | Counter 6 input A-phase - |

| Pin No. | Symbol | I/O | Name                         |
|---------|--------|-----|------------------------------|
| C1      | IN0    | I   | External Input0              |
| C2      | IN2    | I   | External Input2              |
| C3      | IN4    | I   | External Input4              |
| C4      | IOV    | --- | I/O power supply +           |
| C5      | OUT0   | O   | External Output0             |
| C6      | OUT2   | O   | External Output2             |
| C7      | OUT4   | O   | External Output4             |
| C8      | V_O    | I   | External Output Power Supply |

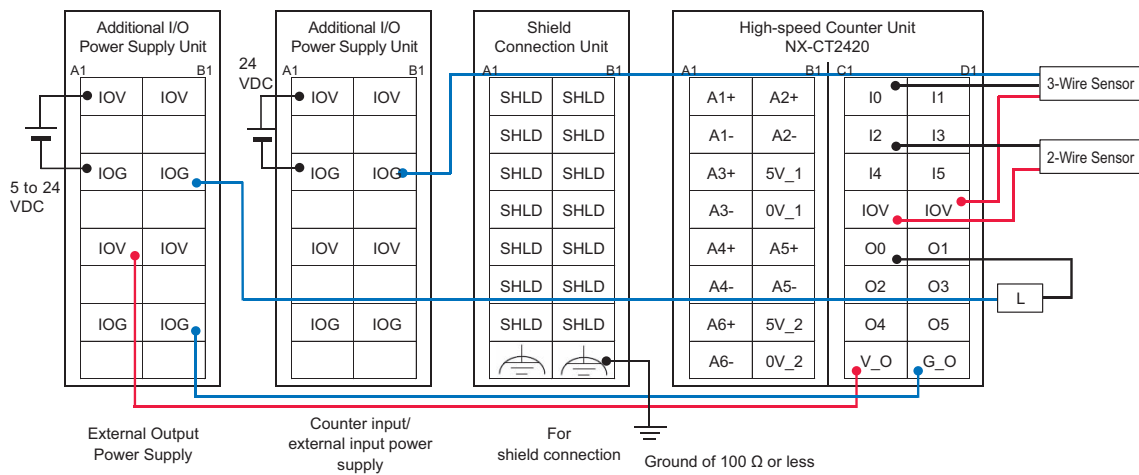
| Pin No. | Symbol | I/O | Name                             |
|---------|--------|-----|----------------------------------|
| B1      | A2+    | I   | Counter 2 input A-phase +        |
| B2      | A2-    | I   | Counter 2 input A-phase -        |
| B3      | 5V_1   | O   | Encoder power supply output, 5 V |
| B4      | 0V_1   | O   | Encoder power supply output, 0 V |
| B5      | A5+    | I   | Counter 5 input A-phase +        |
| B6      | A5-    | I   | Counter 5 input A-phase -        |
| B7      | 5V_2   | O   | Encoder power supply output, 5 V |
| B8      | 0V_2   | O   | Encoder power supply output, 0 V |

| Pin No. | Symbol | I/O | Name                         |
|---------|--------|-----|------------------------------|
| D1      | IN1    | I   | External Input1              |
| D2      | IN3    | I   | External Input3              |
| D3      | IN5    | I   | External Input5              |
| D4      | IOV    | --- | I/O power supply +           |
| D5      | OUT1   | O   | External Output1             |
| D6      | OUT3   | O   | External Output3             |
| D7      | OUT5   | O   | External Output5             |
| D8      | G_O    | I   | External Output Power Supply |

Wiring Example (NX-CT2420 6ch mode)  
Counter Input Wiring Example



External I/O Wiring Example



## Version Information

### Connected to a CPU Unit

Refer to the user's manual for the CPU Unit for details on the CPU Units to which NX Units can be connected.

| NX Units  |              | Corresponding unit versions |               |
|-----------|--------------|-----------------------------|---------------|
| Model     | Unit version | CPU Units                   | Sysmac Studio |
| NX-CT2120 | Ver.1.0      | Ver.1.13                    | Ver.1.65      |
| NX-CT2220 |              |                             |               |
| NX-CT2320 |              |                             |               |
| NX-CT2420 |              |                             |               |

### Connected to an EtherCAT Coupler Unit

| NX Units  |              | Corresponding unit versions |                           |               |
|-----------|--------------|-----------------------------|---------------------------|---------------|
| Model     | Unit version | EtherCAT Coupler Unit       | CPU Unit or Industrial PC | Sysmac Studio |
| NX-CT2120 | Ver.1.0      | Ver.1.0                     | Ver.1.05                  | Ver.1.65      |
| NX-CT2220 |              |                             |                           |               |
| NX-CT2320 |              |                             |                           |               |
| NX-CT2420 |              |                             |                           |               |

### Connected to an EtherNet/IP Coupler Unit

| NX Units  |              | Corresponding unit versions               |                           |               |                                            |               |                       |
|-----------|--------------|-------------------------------------------|---------------------------|---------------|--------------------------------------------|---------------|-----------------------|
| Model     | Unit version | Use with an NJ/NX/NY-series Controller *1 |                           |               | Application with an CS/CJ/CP-series PLC *2 |               |                       |
|           |              | EtherNet/IP Coupler Unit                  | CPU Unit or Industrial PC | Sysmac Studio | EtherNet/IP Coupler Unit                   | Sysmac Studio | NX-IO Configurator *3 |
| NX-CT2120 | Ver.1.0      | Ver.1.0                                   | Ver.1.05                  | Ver.1.65      | Ver.1.0                                    | Ver.1.65      | Ver.1.25              |
| NX-CT2220 |              |                                           |                           |               |                                            |               |                       |
| NX-CT2320 |              |                                           |                           |               |                                            |               |                       |
| NX-CT2420 |              |                                           |                           |               |                                            |               |                       |

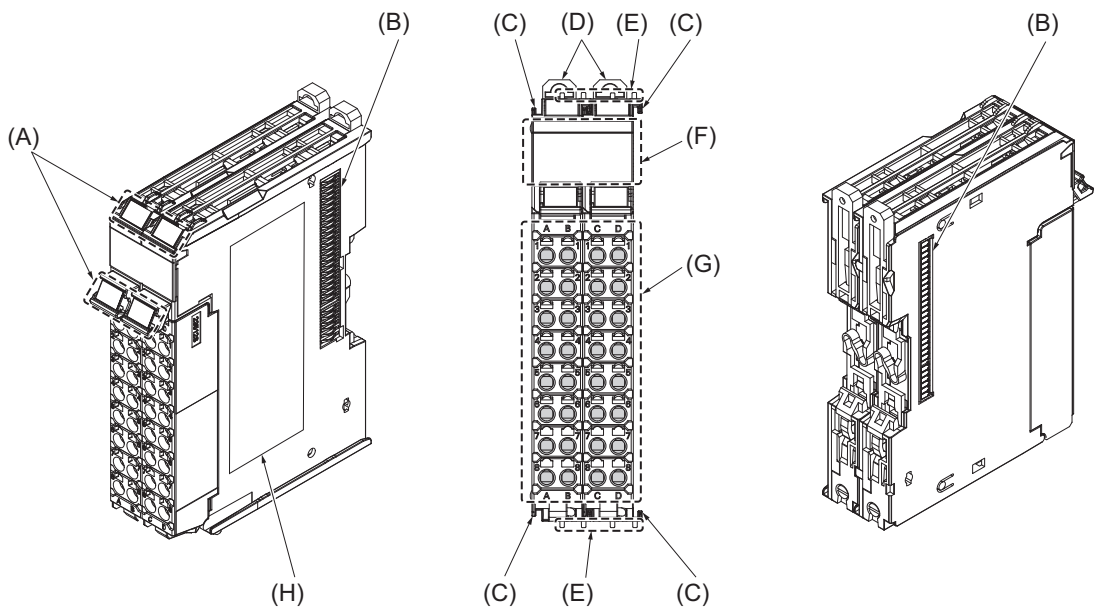
\*1. Refer to version information in the user's manual of the EtherNet/IP Coupler Unit for the unit versions of EtherNet/IP Units corresponding to EtherNet/IP Coupler Units.

\*2. Refer to version information in the user's manual of the EtherNet/IP Coupler Unit for the unit versions of CPU Units and EtherNet/IP Units corresponding to EtherNet/IP Coupler Units.

\*3. For connection to an EtherNet/IP Coupler Unit with unit version 1.0, connection is supported only for a connection to the peripheral USB port on the EtherNet/IP Coupler Unit. You cannot connect by any other path. If you need to connect by another path, use an EtherNet/IP Coupler Unit with unit version 1.2 or later.

# External Interface

This section describes the names and functions of the parts of the High-speed Counter Units.

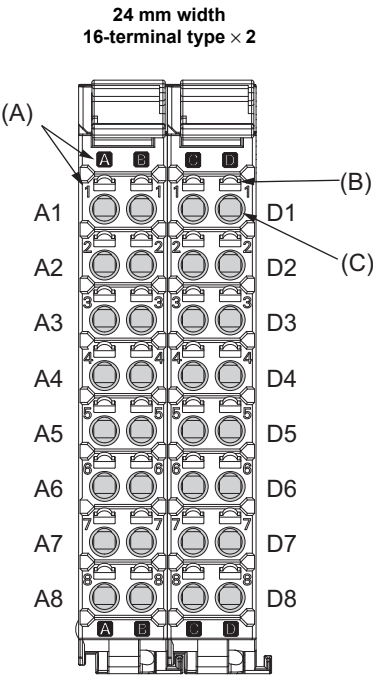


| Letter | Name                              | Description                                                                                                                                                      |
|--------|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (A)    | Marker attachment locations       | The locations where markers are attached. The markers made by OMRON are installed for the factory setting. Commercially available markers can also be installed. |
| (B)    | NX bus connector                  | This connector is used to connect each Unit.                                                                                                                     |
| (C)    | Unit hookup guides                | These guides are used to connect two Units.                                                                                                                      |
| (D)    | DIN Track mounting hooks          | These hooks are used to mount the NX Unit to a DIN Track.                                                                                                        |
| (E)    | Protrusions for removing the Unit | The protrusions to hold when removing the Unit.                                                                                                                  |
| (F)    | Indicators                        | The indicators show the current operating status of the Unit.                                                                                                    |
| (G)    | Terminal block                    | The terminal block is used to connect external devices.                                                                                                          |
| (H)    | Unit specifications               | The specifications of the Unit are given.                                                                                                                        |

Refer to *Installation in the hardware user's manual for the connected CPU Unit* or *the user's manual for the Communications Coupler Unit* for details on attaching markers.

Terminal Blocks

Screwless clamping terminal blocks are used for the High-speed Analog Input Units for easy wiring and removal.  
The compatible terminal blocks for the High-speed Analog Input Units are NX-TBA162 and NX-TBB162.  
The NX-TBA162 terminal block is connected to the left side of the Unit and the NX-TBA162 terminal block is connected to the right side of the Unit.



| Letter | Name                        | Description                                                                                                                                                                                                                                                                                                                                 |
|--------|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (A)    | Terminal number indications | Terminal numbers for which A to D indicate the column, and 1 to 8 indicate the line are displayed.<br>The terminal number is a combination of column and line, i.e. A1 to A8 and B1 to B8.<br>A1 to A8 and B1 to B8 are terminal number of the left terminal block, C1 to C8 and D1 to D8 are terminal numbers of the right terminal block. |
| (B)    | Release holes               | Insert a flat-blade screwdriver into these holes to connect and remove the wires.                                                                                                                                                                                                                                                           |
| (C)    | Terminal holes              | The wires are inserted into these holes.                                                                                                                                                                                                                                                                                                    |

## Applicable Wires

### Using Ferrules

If you use ferrules, attach the twisted wires to them.

Observe the application instructions for your ferrules for the wire stripping length when attaching ferrules.

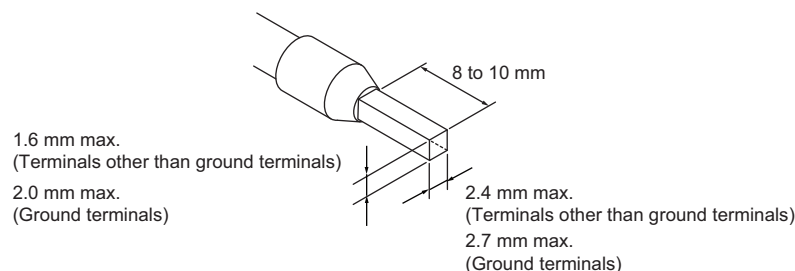
Always use plated one-pin ferrules. Do not use unplated ferrules or two-pin ferrules.

The applicable ferrules, wires, and crimping tool are given in the following table.

| Terminal type                         | Manufacturer    | Ferrule model | Applicable wire (mm <sup>2</sup> (AWG)) | Crimping tool                                                                                                                     |
|---------------------------------------|-----------------|---------------|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| Terminals other than ground terminals | Phoenix Contact | AI0,34-8      | 0.34 (#22)                              | Phoenix Contact (The figure in parentheses is the applicable wire size.)<br>CRIMPFOX 6 (0.25 to 6 mm <sup>2</sup> , AWG 24 to 10) |
|                                       |                 | AI0,5-8       | 0.5 (#20)                               |                                                                                                                                   |
|                                       |                 | AI0,5-10      |                                         |                                                                                                                                   |
|                                       |                 | AI0,75-8      | 0.75 (#18)                              |                                                                                                                                   |
|                                       |                 | AI0,75-10     |                                         |                                                                                                                                   |
|                                       |                 | AI1,0-8       | 1.0 (#18)                               |                                                                                                                                   |
|                                       |                 | AI1,0-10      |                                         |                                                                                                                                   |
|                                       |                 | AI1,5-8       | 1.5 (#16)                               |                                                                                                                                   |
|                                       |                 | AI1,5-10      |                                         |                                                                                                                                   |
| Ground terminals                      |                 | AI2,5-10      | 2.0 *1                                  |                                                                                                                                   |
| Terminals other than ground terminals | Weidmuller      | H0.14/12      | 0.14 (#26)                              | Weidmuller (The figure in parentheses is the applicable wire size.)<br>PZ6 Roto (0.14 to 6 mm <sup>2</sup> , AWG 26 to 10)        |
|                                       |                 | H0.25/12      | 0.25 (#24)                              |                                                                                                                                   |
|                                       |                 | H0.34/12      | 0.34 (#22)                              |                                                                                                                                   |
|                                       |                 | H0.5/14       | 0.5 (#20)                               |                                                                                                                                   |
|                                       |                 | H0.5/16       |                                         |                                                                                                                                   |
|                                       |                 | H0.75/14      | 0.75 (#18)                              |                                                                                                                                   |
|                                       |                 | H0.75/16      |                                         |                                                                                                                                   |
|                                       |                 | H1.0/14       | 1.0 (#18)                               |                                                                                                                                   |
|                                       |                 | H1.0/16       |                                         |                                                                                                                                   |
|                                       |                 | H1.5/14       | 1.5 (#16)                               |                                                                                                                                   |
|                                       |                 | H1.5/16       |                                         |                                                                                                                                   |

\*1. For the ferrule type AI2,5-10, use wires with a diameter of 2.0 to 2.1 mm<sup>2</sup>. Wires with a diameter exceeding 2.1 mm<sup>2</sup> cannot be used with the screwless clamping terminal block.

When you use any ferrules other than those in the above table, crimp them to the twisted wires so that the following processed dimensions are achieved.



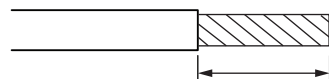
### Using Twisted Wires/Solid Wires

If you use the twisted wires or the solid wires, use the following table to determine the correct wire specifications.

| Terminals                                |                                     | Wire type      |                 |                 |                 | Wire size                                  | Conductor length<br>(stripping length) |
|------------------------------------------|-------------------------------------|----------------|-----------------|-----------------|-----------------|--------------------------------------------|----------------------------------------|
|                                          |                                     | Twisted wires  |                 | Solid wire      |                 |                                            |                                        |
| Classification                           | Current capacity                    | Plated         | Unplated        | Plated          | Unplated        |                                            |                                        |
| All terminals except<br>ground terminals | 2 A or less                         | Possible       | Possible        | Possible        | Possible        | 0.08 to 1.5 mm <sup>2</sup><br>AWG28 to 16 | 8 to 10 mm                             |
|                                          | Greater than<br>2 A and 4 A or less |                | Not<br>Possible | Possible<br>*1  | Not<br>Possible |                                            |                                        |
|                                          | Greater than<br>4 A                 | Possible<br>*1 |                 | Not<br>Possible | Possible<br>*2  |                                            |                                        |
| Ground terminals                         | ---                                 | Possible       | Possible        | Possible<br>*2  | Possible<br>*2  | 2.0 mm <sup>2</sup>                        | 9 to 10 mm                             |

\*1. Secure wires to the screwless clamping terminal block. Refer to the Securing Wires in the USER'S MANUAL for how to secure wires.

\*2. With the NX-TB□□□1 Terminal Block, use twisted wires to connect the ground terminal. Do not use a solid wire.

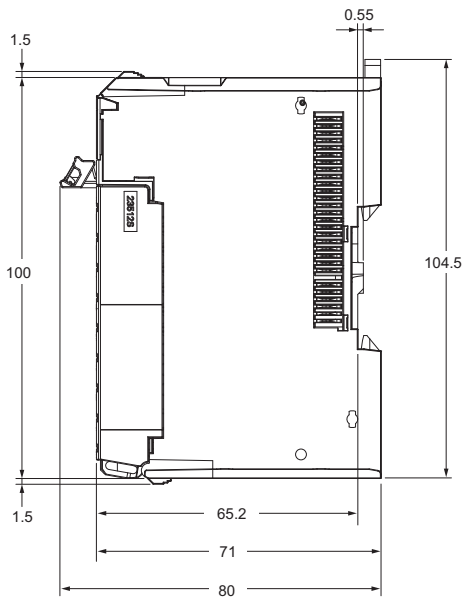
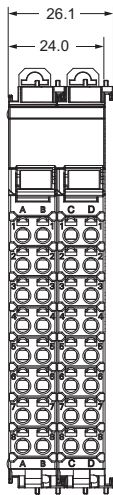


Conductor length (stripping length)

<Additional Information> If more than 2 A will flow on the wires, use plated wires or use ferrules.

Dimensions

NX-CT2□□20



## Related Manuals

The following table shows related manuals. Use these manuals for reference.

| Manual name                                       | Cat. No. | Model numbers                                                                                  | Application                                                                                                                                                                      | Description                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------------------------|----------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NX-series High-speed Counter Units User's Manual  | W647     | NX-CT□□□□                                                                                      | Learning how to use NX-series High-speed Counter Units.                                                                                                                          | The hardware, setup methods, and functions of the NX-series High-speed Counter Units are described.                                                                                                                                                                                                                                                                       |
| 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.                                                                                                                                                                                                                                 |
| NX-series System Units User's Manual              | W523     | NX-PD1□□□<br>NX-PF0□□□<br>NX-PC0□□□<br>NX-TBX01                                                | Learning how to use NX-series System Units.                                                                                                                                      | The hardware and functions of the NX-series System Units are described.                                                                                                                                                                                                                                                                                                   |
| 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-IO Configurator Operation Manual               | W585     | CXONEAL□□D-V4                                                                                  | Learning about the operating procedures and functions of the NX-IO Configurator.                                                                                                 | Describes the operating procedures of the NX-IO Configurator.                                                                                                                                                                                                                                                                                                             |
| NJ/NX-series Troubleshooting Manual               | W503     | NX701-□□□□<br>NX502-□□□□<br>NX102-□□□□<br>NX1P2-□□□□<br>NJ501-□□□□<br>NJ301-□□□□<br>NJ101-□□□□ | Learning about the errors that may be detected in an NJ/NX-series Controller.                                                                                                    | Concepts on managing errors that may be detected in an NJ/NX-series Controller and information on individual errors are described.                                                                                                                                                                                                                                        |
| NY-series Troubleshooting Manual                  | W564     | NY532-□□□□<br>NY512-□□□□                                                                       | Learning about the errors that may be detected in an NY-series Industrial PC.                                                                                                    | Concepts on managing errors that may be detected in an NY-series Controller and information on individual errors are described.                                                                                                                                                                                                                                           |
| NX-series EtherCAT® Coupler Unit User's Manual    | W519     | NX-ECC20□                                                                                      | Learning how to use an NX-series EtherCAT Coupler Unit and Ether-CAT 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 EtherNet/IP™ Coupler Unit User's Manual | W536     | NX-EIC202                                                                                      | Learning how to use an NX-series EtherNet/IP Coupler Unit and EtherNet/IP Slave Terminals.                                                                                       | The following items are described: the overall system and configuration methods of an EtherNet/IP Slave Terminal (which consists of an NX-series EtherNet/IP Coupler Unit and NX Units), and information on hardware, setup, and functions to set up, control, and monitor NX Units.                                                                                      |
| NX-series CPU Unit Hardware User's Manual         | W535     | NX701-□□□□                                                                                     | Learning the basic specifications of the NX701 CPU Units, including introductory information, designing, installation, and maintenance. Mainly hardware information is provided. | An introduction to the entire NX701 system is provided along with the following information on the CPU Unit. <ul style="list-style-type: none"> <li>• Features and system configuration</li> <li>• Introduction</li> <li>• Part names and functions</li> <li>• General specifications</li> <li>• Installation and wiring</li> <li>• Maintenance and inspection</li> </ul> |

| Manual name                                                                             | Cat. No. | Model numbers                                                                                  | Application                                                                                                                                                                                     | Description                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------------------------------------------------------------------------|----------|------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NX-series<br>NX502 CPU Unit Hardware<br>User's Manual                                   | W629     | NX502-□□□□                                                                                     | Learning the basic specifications of the NX502 CPU Units, including introductory information, designing, installation, and maintenance. Mainly hardware information is provided.                | An introduction to the entire NX502 system is provided along with the following information on the CPU Unit. <ul style="list-style-type: none"> <li>• Features and system configuration</li> <li>• Introduction</li> <li>• Part names and functions</li> <li>• General specifications</li> <li>• Installation and wiring</li> <li>• Maintenance and inspection</li> </ul>                |
| NX-series<br>NX102 CPU Unit Hardware<br>User's Manual                                   | W593     | NX102-□□□□                                                                                     | Learning the basic specifications of the NX102 CPU Units, including introductory information, designing, installation, and maintenance. Mainly hardware information is provided.                | An introduction to the entire NX102 system is provided along with the following information on the CPU Unit. <ul style="list-style-type: none"> <li>• Features and system configuration</li> <li>• Introduction</li> <li>• Part names and functions</li> <li>• General specifications</li> <li>• Installation and wiring</li> <li>• Maintenance and inspection</li> </ul>                |
| NX-series<br>NX1P2 CPU<br>Unit Hardware<br>User's Manual                                | W578     | NX1P2-□□□□                                                                                     | Learning the basic specifications of the NX1P2 CPU Units, including introductory information, designing, installation, and maintenance. Mainly hardware information is provided.                | An introduction to the entire NX1P2 system is provided along with the following information on the CPU Unit. <ul style="list-style-type: none"> <li>• Features and system configuration</li> <li>• Introduction</li> <li>• Part names and functions</li> <li>• General specifications</li> <li>• Installation and wiring</li> <li>• Maintenance and inspection</li> </ul>                |
| NJ-series<br>CPU Unit Hardware<br>User's Manual                                         | W500     | NJ501-□□□□<br>NJ301-□□□□<br>NJ101-□□□□                                                         | Learning the basic specifications of the NJ-series CPU Units, including introductory information, designing, installation, and maintenance. Mainly hardware information is provided.            | An introduction to the entire NJ-series system is provided along with the following information on the CPU Unit. <ul style="list-style-type: none"> <li>• Features and system configuration</li> <li>• Introduction</li> <li>• Part names and functions</li> <li>• General specifications</li> <li>• Installation and wiring</li> <li>• Maintenance and inspection</li> </ul>            |
| NY-series<br>IPC Machine Controller<br>Industrial Panel<br>PC Hardware<br>User's Manual | W557     | NY532-□□□□                                                                                     | Learning the basic specifications of the NY-series Industrial Panel PCs, including introductory information, designing, installation, and maintenance. Mainly hardware information is provided. | An introduction to the entire NY-series system is provided along with the following information on the Industrial Panel PC. <ul style="list-style-type: none"> <li>• Features and system configuration</li> <li>• Introduction</li> <li>• Part names and functions</li> <li>• General specifications</li> <li>• Installation and wiring</li> <li>• Maintenance and inspection</li> </ul> |
| NY-series<br>IPC Machine Controller<br>Industrial Box<br>PC Hardware<br>User's Manual   | W556     | NY512-□□□□                                                                                     | Learning the basic specifications of the NY-series Industrial Box PCs, including introductory information, designing, installation, and maintenance. Mainly hardware information is provided.   | An introduction to the entire NY-series system is provided along with the following information on the Industrial Box PC. <ul style="list-style-type: none"> <li>• Features and system configuration</li> <li>• Introduction</li> <li>• Part names and functions</li> <li>• General specifications</li> <li>• Installation and wiring</li> <li>• Maintenance and inspection</li> </ul>   |
| NJ/NX-series<br>CPU Unit Software<br>User's Manual                                      | W501     | NX701-□□□□<br>NX502-□□□□<br>NX102-□□□□<br>NX1P2-□□□□<br>NJ501-□□□□<br>NJ301-□□□□<br>NJ101-□□□□ | 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"> <li>• CPU Unit operation</li> <li>• CPU Unit features</li> <li>• Initial settings</li> <li>• Programming based on IEC 61131-3 language specifications</li> </ul>                                                                                           |

| Manual name                                                                                                                  | Cat. No. | Model numbers                                                                                  | Application                                                                                       | Description                                                                                                                                                                                                                  |
|------------------------------------------------------------------------------------------------------------------------------|----------|------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NY-series<br>IPC Machine Controller<br>Industrial Panel PC/<br>Industrial Box PC Software<br>User's Manual                   | W558     | NY532-□□□□<br>NY512-□□□□                                                                       | Learning how to program and<br>set up the Controller functions<br>of an NY-series Industrial PC.  | The following information is provided on the<br>NY-series Controller functions.<br>• Controller operation<br>• Controller features<br>• Controller settings<br>• Programming based on IEC 61131-3<br>language specifications |
| NJ/NX-series<br>CPU Unit Built-in<br>EtherCAT® Port<br>User's Manual                                                         | W505     | NX701-□□□□<br>NX502-□□□□<br>NX102-□□□□<br>NX1P2-□□□□<br>NJ501-□□□□<br>NJ301-□□□□<br>NJ101-□□□□ | Using the built-in EtherCAT<br>port on an NJ/NX-series CPU<br>Unit.                               | Information on the built-in EtherCAT port is<br>provided.<br>This manual provides an introduction and<br>provides information on the configuration,<br>features, and setup.                                                  |
| NY-series<br>IPC Machine Controller<br>Industrial Panel PC/<br>Industrial Box PC<br>Built-in EtherCAT® Port<br>User's Manual | W562     | NY532-□□□□<br>NY512-□□□□                                                                       | Using the built-in EtherCAT<br>port in an NY-series Industrial<br>PC.                             | Information on the built-in EtherCAT port is<br>provided.<br>This manual provides an introduction and<br>provides information on the configuration,<br>features, and setup.                                                  |
| NJ/NX-series<br>Instructions<br>Reference Manual                                                                             | W502     | NX701-□□□□<br>NX502-□□□□<br>NX102-□□□□<br>NX1P2-□□□□<br>NJ501-□□□□<br>NJ301-□□□□<br>NJ101-□□□□ | Learning detailed<br>specifications on the basic<br>instructions of an NJ/NXseries<br>CPU Unit.   | The instructions in the instruction set<br>(IEC 61131-3 specifications) are described.                                                                                                                                       |
| NY-series<br>Instructions<br>Reference Manual                                                                                | W560     | NY532-□□□□<br>NY512-□□□□                                                                       | Learning detailed<br>specifications on the basic<br>instructions of an NYseries<br>Industrial PC. | The instructions in the instruction set<br>(IEC 61131-3 specifications) are described.                                                                                                                                       |

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This image shows a full page of white paper with horizontal grey ruling lines. The word "MEMO" is printed at the top center in bold black capital letters. The rest of the page is filled with evenly spaced horizontal lines, typical of notebook paper.

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## **Change in Specifications.**

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## **Errors and Omissions.**

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**Note: Do not use this document to operate the Unit.**

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