


Machine Automation Controller

NJ-Series

Controller that covers functions and high-speed processing required for machine control and safety, reliability and maintainability

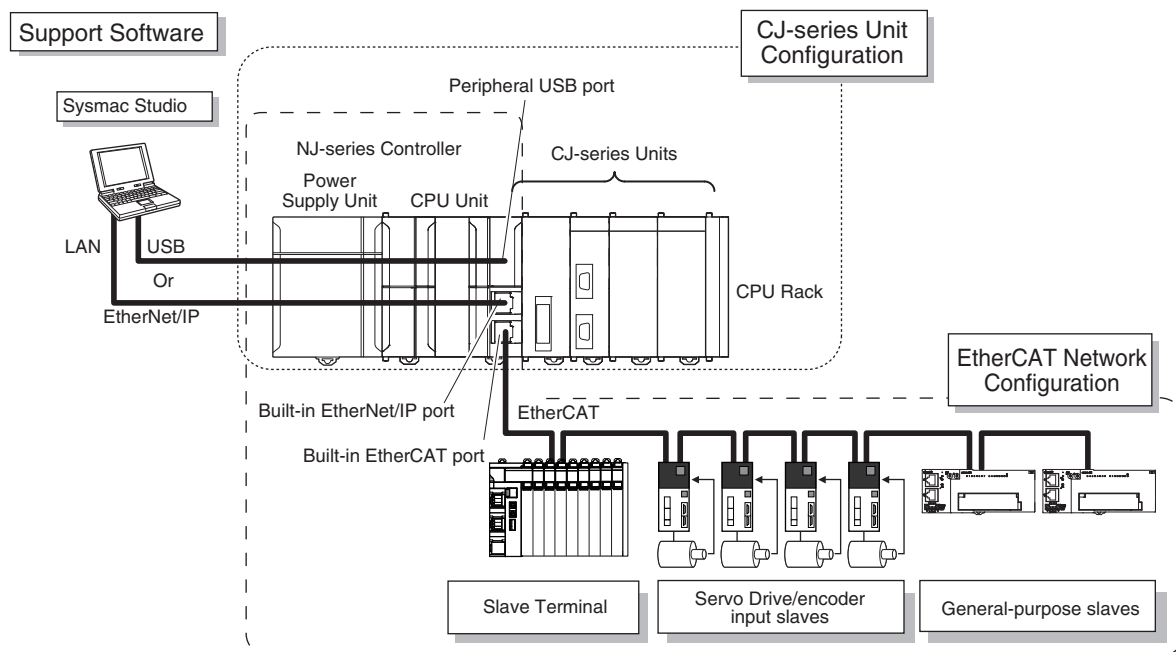


Features

- Implemented OPC UA as standard feature.  OPC UA (NJ501-1□□00)
- Integration of Logic and Motion in one CPU.
- Conforms to IEC 61131-3 (JIS B 3503) standard programming and PLCopen function blocks for Motion Control. Programming with variables allows users to create complex programs efficiently.
- Fast and accurate control by synchronizing all EtherCAT devices, such as vision sensors, servo drives, and field devices, with the PLC and Motion Engines.
- Offers speed without compromising on reliability and robustness expected from PLCs.
- Complete RAS functions: Transmission frame error check, timeout, bus diagnosis, Watchdog (WDT), memory check, and topology check, etc.
- Ideal for small-scale control with up to 8 axes. (NJ301-□□□□)
- Ideal for simple machines. (NJ101-□□□□)
- Linear and circular interpolation.
- Electronic gear and cam synchronization.
- The Controller can be directly connected to a database. No special Unit, software, nor middleware is required. (NJ501-□□20/NJ101-□□20)
- The NJ501 SECS/GEM CPU Unit has built-in the SECS/GEM communications functions which are the standards in the semiconductor industry. (NJ501-1340)
- Control function of parallel link robots, cartesian robots and serial link robots. (NJ501-4□□0)
- Integration of Logic, Motion, OMRON Robot and Kinematics in one CPU. (NJ501-R□□0)
- Realize high-accuracy synchronization motion control (MC) and numerical control (NC) functions by ONE controller. G-Code available. (NJ501-5300)

NJ-Series

System Configuration

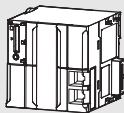
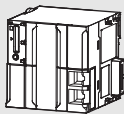
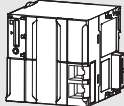


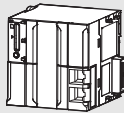
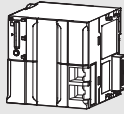
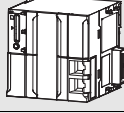
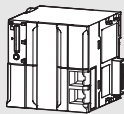
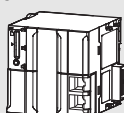
Ordering Information

Applicable standards

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

CPU Units

| Product name | Specifications | | | | Model |
|------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|------------------|--------------------------------------------------------------------------------------------|-----------------------|------------|
| | I/O capacity / maximum number of configuration Units (Expansion Racks) | Program capacity | Memory capacity for variables | Number of motion axes | |
| NJ501 CPU Units  OPC UA Support | 2,560 points / 40 Units (3 Expansion Racks) | 20 MB | 2 MB: Retained during power interruption 4 MB: Not retained during power interruption | 64 | NJ501-1500 |
| | | | | 32 | NJ501-1400 |
| | | | | 16 | NJ501-1300 |
| NJ301 CPU Units  | | 5 MB | 0.5 MB: Retained during power interruption 2 MB: Not retained during power interruption | 8 | NJ301-1200 |
| | | | | 4 | NJ301-1100 |
| NJ101 CPU Units  | | 3 MB | | 2 | NJ101-1000 |
| | 0 | | | NJ101-9000 | |

| Product name | Specifications | | | | | | | | | Model | | | | | | | | |
|----------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|---------------------|--------------------------------------------------------------------------------------------------|--------------------------------|--------------------------|------------------------------------|---------------------------------------|-----------------------------------|--------------------------------------------|------------|------------|------------|-----|------------|------------|-----------|--|------------|
| | I/O capacity / maximum number of configuration Units (Expansion Racks) | Program capacity | Memory capacity for variables | Number of motion axes | Number of CNC axes | Database Connection function | SECS/GEM Communication function | Number of controlled robots | Number of controlled OMRON robots | | | | | | | | | |
| Database Connection CPU Units  | 2,560 points / 40 Units (3 Expansion Racks) | 20 MB | 2 MB: Retained during power interruption 4 MB: Not retained during power interruption | 64 | 0 | Yes | No | --- | | NJ501-1520 | | | | | | | | |
| | | | | | | | | | | 32 | NJ501-1420 | | | | | | | |
| | | | | | | | | | | 16 | NJ501-1320 | | | | | | | |
| | | 3 MB | 0.5 MB: Retained during power interruption 2 MB: Not retained during power interruption | 2 | | | | | | NJ101-1020 | | | | | | | | |
| | | | | 0 | | | | | | NJ101-9020 | | | | | | | | |
| SECS/GEM CPU Unit  | 2,560 points / 40 Units (3 Expansion Racks) | 20 MB | 2 MB: Retained during power interruption 4 MB: Not retained during power interruption | 16 | | No | Yes | --- | | --- | | NJ501-1340 | | | | | | |
| NJ Robotics CPU Units  | | | | 64 | | | | | | | | | | | | 8 max. *1 | | NJ501-4500 |
| | | | | 32 | | | | | | | | | | | | | | NJ501-4400 |
| | | | | | | | | | | | | | | | | | | NJ501-4300 |
| | | | | | | | 16 | | | | | 1 | | NJ501-4310 | | | | |
| | | | | | | | | Yes | No | 8 max. *1 | 8 max. | NJ501-4320 | | | | | | |
| Robot Integrated CPU Units  | | | | | 64 | | No | NJ501-R500 | | | | | | | | | | |
| | | | | | | | Yes | NJ501-R520 | | | | | | | | | | |
| | | | | | 32 | No | NJ501-R400 | | | | | | | | | | | |
| | | | | | 16 | Yes | NJ501-R420 | | | | | | | | | | | |
| | | | | | | No | NJ501-R300 | | | | | | | | | | | |
| | | | | | | Yes | NJ501-R320 | | | | | | | | | | | |
| NC Integrated Controller  | | | | | | | 16 | 16 *2 *3 | | | | No | --- | --- | NJ501-5300 | | | |

*1. The number of controlled robots varies according to the number of axes used for the system.

*2. With a combination of a CPU Unit with CNC version 1.03 or higher and Sysmac Studio version 1.60 or higher, up to 32 axes can be controlled. For a CPU Unit with CNC version 1.02 or lower, the maximum number of motion axes and CNC axes total is 16 axes.

*3. One CNC Operator License (SYSMAC-RTNC0001L) is attached with the CPU Unit.

NJ-Series

Accessories

The following accessories come with the CPU Unit.

| Product name | Model |
|--------------------------------------|------------------------------------------------------------------------|
| Battery | CJ1W-BAT01 |
| End Cover | CJ1W-TER01 (must be attached to the right end of the CPU Rack) |
| End Plate | PFP-M (2 required) |
| SD Memory Card (Flash Memory) | NJ501-□□20, NJ501-1340, NJ501-R□□□: HMC-SD492 NJ101-□□20: HMC-SD292 |

Power Supply Units

One Power Supply Unit is required for each Rack.


| Product name | Power supply voltage | Output current | | Output capacity Total power consumption | Options | | | Model |
|-----------------------------|----------------------|-----------------------|------------------------|--------------------------------------------|-----------------------------|------------|------------------------------|------------------|
| | | 5-VDC output capacity | 24-VDC output capacity | | 24-VDC service power supply | RUN output | Maintenance forecast monitor | |
| AC Power Supply Unit | 100 to 240 VAC | 6.0 A | 1.0 A | 30 W | No | Yes | No | NJ-PA3001 |
| DC Power Supply Unit | 24 VDC | | | | | | | NJ-PD3001 |

Note: Power supply units for the CJ-Series cannot be used as a power supply for a CPU rack of the NJ system or as a power supply for an expansion rack.

Expansion Racks


Select the I/O Control Unit, I/O Interface Unit, Expansion Connecting Cable, and Power Supply Unit.

CJ-Series I/O Control Unit (Mounted on CPU Rack when Connecting Expansion Racks)

| Product name | Specifications | Current consumption (A) | | Model |
|--------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|------|-------------------|
| | | 5 V | 24 V | |
| CJ-Series I/O Control Unit  | Mount one I/O Control Unit on the CJ-Series CPU Rack when connecting one NJ-Series Expansion Racks. Connecting Cable: CS1W-CN□□3 Expansion Connecting Cable Connected Unit: CJ1W-II101 I/O Interface Unit Mount to the right of the CPU Unit. | 0.02 | --- | CJ1W-IC101 |


Note: Mounting the I/O Control Unit in any other location may cause faulty operation.

CJ-Series I/O Interface Unit (Mounted on Expansion Rack)

| Product Name | Specifications | Current consumption (A) | | Model |
|----------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|------|-------------------|
| | | 5 V | 24 V | |
| CJ-Series I/O Interface Unit  | One I/O Interface Unit is required on each Expansion Rack. Connecting Cable: CS1W-CN□□3 Expansion Connecting Cable Mount to the right of the Power Supply Unit. | 0.13 | --- | CJ1W-II101 |

Note: Mounting the I/O Interface Unit in any other location may cause faulty operation.

I/O Connecting Cables

| Product name | Specifications | Model |
|--------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| I/O Connecting Cable  | <ul style="list-style-type: none"> Connects an I/O Control Unit on NJ-Series CPU Rack to an I/O Interface Unit on a NJ-Series Expansion Rack. or Connects an I/O Interface Unit on NJ-Series Expansion Rack to an I/O Interface Unit on another NJ-Series Expansion Rack. | Cable length: 0.3 m |
| | | CS1W-CN313 |
| | | Cable length: 0.7 m |
| | | CS1W-CN713 |
| | | Cable length: 2 m |
| | | CS1W-CN223 |
| | | Cable length: 3 m |
| | | CS1W-CN323 |
| | | Cable length: 5 m |
| | | CS1W-CN523 |
| | | Cable length: 10 m |
| | | CS1W-CN133 |
| | | Cable length: 12 m |
| | | CS1W-CN133-B2 |

Automation Software Sysmac Studio

The Sysmac Studio is the software that provides an integrated environment for setting, programming, debugging and maintenance of machine automation controllers including the NJ/NX-series CPU Units, NY-series Industrial PC, EtherCAT Slave, and the HMI.

For details, refer to your local OMRON website and Sysmac Studio Catalog (Cat. No. P138).

Collection of software functional components Sysmac Library

Please download it from following URL and install to Sysmac Studio.

https://www.ia.omron.com/sysmac_library/

Typical Models

| Product | Features | Model |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| Vibration Suppression Library | The Vibration Suppression Library is used to suppress residual vibration caused by the operation of machines. | SYSMAC-XR006 |
| Device Operation Monitor Library | The Device Operation Monitor Library is used to monitor the operation of devices such as air cylinders, sensors, motors, and other devices. | SYSMAC-XR008 |
| Dimension Measurement Library | The Dimension Measurement Library is used to dimension measurement with ZW-8000/7000/5000 Confocal Fiber Displacement Sensor, or E9NC-TA0 Contact-Type Smart Sensor. | SYSMAC-XR014 |

SECS/GEM Configurator (For NJ-series SECS/GEM CPU Unit NJ501-1340)

Please purchase the required number of SECS/GEM Configurator licenses and a Sysmac Studio Standard Edition DVD the first time you purchase the SECS/GEM Configurator.

The Sysmac Studio Standard Edition DVD includes the SECS/GEM Configurator. The license does not include the DVD.

| Product Name | Specifications | | Model |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|------------|
| | Number of licenses | Media | |
| SECS/GEM Configurator Ver.1.□□ | The SECS/GEM Configurator is the software to make HSMS, SECSII and GEM settings for NJ501 SECS/GEM CPU Units. The software is included in the Sysmac Studio Standard Edition DVD. | 1 license --- | WS02-GCTL1 |

Operation Software CNC Operator (For NJ-series NC Integrated Controller NJ501-5300)

Please purchase a DVD or download it from following URL.

<http://www.ia.omron.com/cnc-operator/>

One CNC Operator License (SYSMAC-RTNC0001L) is attached with the CPU Unit.

| Product Name | Specifications | Number of licenses | Media | Model |
|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-------------------|------------------|
| | | | | |
| CNC Operator | The CNC Operator is the software that provides a operation interface for NC programming, debugging and maintenance of CNC machine. | --- (Installer only) | --- (Download) | SYSMAC-RTNC0000 |
| | | --- (Media only) | DVD | SYSMAC-RTNC0000D |
| CNC Operator License | The one license key (hardware key, USB dongle). The CNC Operator needs license key. | 1 license | --- | SYSMAC-RTNC0001L |
| CNC Operator Software Development Kit | The CNC Operator Software Development Kit provides a environment for customization of CNC Operator. Supported execution environment: NET Framework (4.6.1) Development environment: Visual Studio 2013/2015 Development languages: C# | --- | DVD | SYSMAC-RTNC0101D |

Recommended EtherCAT and EtherNet/IP Communications Cables





Use a straight STP (shielded twisted-pair) cable of category 5 or higher with double shielding (aluminum tape and braiding) for EtherCAT.

For EtherNet/IP, required specification for the communications cables varies depending on the baud rate.

For 100BASE-TX/10BASE-T, use a straight or cross STP (shielded twisted-pair) cable of category 5 or higher.

For 1000BASE-T, use a straight or cross STP cable of category 5e or higher with double shielding (aluminum tape and braiding).

Cable with Connectors

| Item | | Recommended manufacturer | Cable length (m) | Model |
|--------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|------------------|----------------------|
| Wire Gauge and Number of Pairs: AWG26, 4-pair Cable Cable Sheath material: PUR | Cable with Connectors on Both Ends (RJ45/RJ45) Standard RJ45 plug type *1 Cable color: Yellow *2 EtherCAT/ EtherNet/IP (10BASE/100BASE/1000BASE *4)  | OMRON | 0.3 | XS6W-6PUR8SS30CM-YF |
| | | | 0.5 | XS6W-6PUR8SS50CM-YF |
| | | | 1 | XS6W-6PUR8SS100CM-YF |
| | | | 2 | XS6W-6PUR8SS200CM-YF |
| | | | 3 | XS6W-6PUR8SS300CM-YF |
| | | | 5 | XS6W-6PUR8SS500CM-YF |
| Wire Gauge and Number of Pairs: AWG22, 2-pair cable | Cable with Connectors on Both Ends (RJ45/RJ45) Rugged RJ45 plug type *1 Cable color: Light blue EtherCAT/ EtherNet/IP (10BASE/100BASE)  | OMRON | 0.3 | XS5W-T421-AMD-K |
| | | | 0.5 | XS5W-T421-BMD-K |
| | | | 1 | XS5W-T421-CMD-K |
| | | | 2 | XS5W-T421-DMD-K |
| | | | 5 | XS5W-T421-GMD-K |
| | | | 10 | XS5W-T421-JMD-K |
| | Cable with Connectors on Both Ends (M12 Straight/M12 Straight) Shield Strengthening Connector cable *3 M12/Smartclick Connectors Cable color: Black EtherCAT/ EtherNet/IP (10BASE/100BASE)  | OMRON | 0.5 | XS5W-T421-BM2-SS |
| | | | 1 | XS5W-T421-CM2-SS |
| | | | 2 | XS5W-T421-DM2-SS |
| | | | 3 | XS5W-T421-EM2-SS |
| | | | 5 | XS5W-T421-GM2-SS |
| | | | 10 | XS5W-T421-JM2-SS |
| | Cable with Connectors on Both Ends (M12 Straight/RJ45) Shield Strengthening Connector cable *3 M12/Smartclick Connectors Rugged RJ45 plug type Cable color: Black EtherCAT/ EtherNet/IP (10BASE/100BASE)  | OMRON | 0.5 | XS5W-T421-BMC-SS |
| | | | 1 | XS5W-T421-CMC-SS |
| | | | 2 | XS5W-T421-DMC-SS |
| | | | 3 | XS5W-T421-EMC-SS |
| | | | 5 | XS5W-T421-GMC-SS |
| | | | 10 | XS5W-T421-JMC-SS |

*1. Cables with standard RJ45 plugs are available in the following lengths: 0.2 m, 0.3 m, 0.5 m, 1 m, 1.5 m, 2 m, 3 m, 5 m, 7.5 m, 10 m, 15 m, 20 m. Cables with rugged RJ45 plugs are available in the following lengths: 0.3 m, 0.5 m, 1 m, 2 m, 3 m, 5 m, 10 m, 15 m.


For details, refer to the *Industrial Ethernet Connectors Catalog* (Cat. No. G019).

*2. Cable colors are available in yellow, green, and blue.

*3. For details, contact your OMRON representative.

*4. The products can be used only with the NX701/NX502.

Cables / Connectors

| Item | | Recommended manufacturer | Model |
|----------------------------------------------------------------|-----------------------------------------------------|-------------------------------------------------------------------------------------|----------------------------------------|
| Products for EtherCAT or EtherNet/IP (1000BASE-T*2/100BASE-TX) | Wire Gauge and Number of Pairs: AWG24, 4-pair Cable | Cables | Kuramo Electric Co. KETH-SB *1 |
| | | RJ45 Connectors | Panduit Corporation MPS588-C *1 |
| Products for EtherCAT or EtherNet/IP (100BASE-TX/10BASE-T) | Wire Gauge and Number of Pairs: AWG22, 2-pair Cable | Cables | Kuramo Electric Co. KETH-PSB-OMR *3 |
| | | RJ45 Assembly Connector | JMACS Japan Co., Ltd. PNET/B *3 |
| | |  | OMRON XS6G-T421-1 *3 |

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



*2. The products can be used only with the NX701/NX502.

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

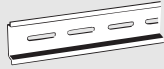

Optional Products and Maintenance Products

| Product name | Specifications | Model |
|-----------------|------------------------|-----------|
| Memory Cards *1 | SD memory card, 2GB | HMC-SD292 |
| | SDHC memory card, 4GB | HMC-SD492 |
| | SDHC memory card, 16GB | HMC-SD1A2 |

*1. There are restrictions on the combination of CPU Unit version and memory card. Refer to NJ/NX-series CPU Unit Software User's Manual (W501) 8-5-2 *Specifications of Supported SD Memory Cards, Folders, and Files* for details.










| Product name | Specifications | | Model |
|---------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| <div>Battery Set</div> <div></div> | Battery for NX701-□□□□/NJ501-□□□□/ NJ301-□□□□/NJ101-□□□□ NJ/NX-Series CPU Unit maintenance | Note: 1. The battery is included as a standard accessory with the CPU Unit. 2. The battery service life is 5 years at 25°C. (The service life depends on the ambient operating temperature and the power conditions.) 3. Use batteries within two years of manufacture. | CJ1W-BAT01 |
| <div>End Cover</div> <div></div> | Mounted to the right-hand side of NJ-Series CPU Racks or Expansion Racks. | One End Cover is provided as a standard accessory with each CPU Unit and I/O Interface Unit. | CJ1W-TER01 |

DIN Track Accessories

| Product name | Specifications | Model |
|---------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|-----------|
| DIN Track  | Length: 0.5 m; Height: 7.3 mm | PFP-50N |
| | Length: 1 m; Height: 7.3 mm | PFP-100N |
| | Length: 1 m; Height: 16 mm | PFP-100N2 |
| End Plate  | There are 2 stoppers provided with CPU Units and I/O Interface Units as standard accessories to secure the Units on the DIN Track. | PFP-M |

Basic I/O Units






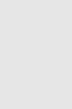
Input Units

| Unit classification | Product name | Specifications | | | | Number of bits allocated | Response time *1 | | Current consumption (A) | | Model |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|----------------------|--------------------------|--------------------------|------------------|-------------|-------------------------|------|---------------|
| | | I/O points | Input voltage and current | Commons | External connection | | ON | OFF | 5 V | 24 V | |
| CJ1 Basic I/O Units | DC Input Units         | 8 inputs | 12 to 24 VDC, 10 mA | Independent contacts | Removable terminal block | 16 | 20 µs max. | 400 µs max. | 0.08 | --- | CJ1W-ID201 |
| | | 16 inputs | 24 VDC, 7 mA | 16 points, 1 common | Removable terminal block | 16 | 20 µs max. | 400 µs max. | 0.08 | --- | CJ1W-ID211 |
| | | 16 inputs <i>High-speed type</i> | 24 VDC, 7 mA | 16 points, 1 common | Removable terminal block | 16 | 15 µs max. | 90 µs max. | 0.13 | --- | CJ1W-ID212 |
| | | 32 inputs | 24 VDC, 4.1 mA | 16 points, 1 common | Fujitsu/OTAX connector | 32 | 20 µs max. | 400 µs max. | 0.09 | --- | CJ1W-ID231 *2 |
| | | 32 inputs | 24 VDC, 4.1 mA | 16 points, 1 common | MIL connector | 32 | 20 µs max. | 400 µs max. | 0.09 | --- | CJ1W-ID232 *2 |
| | | 32 inputs <i>High-speed type</i> | 24 VDC, 4.1 mA | 16 points, 1 common | MIL connector | 32 | 15 µs max. | 90 µs max. | 0.20 | --- | CJ1W-ID233 *2 |
| | | 64 inputs | 24 VDC, 4.1 mA | 16 points, 1 common | Fujitsu/OTAX connector | 64 | 120 µs max. | 400 µs max. | 0.09 | --- | CJ1W-ID261 *2 |
| | | 64 inputs | 24 VDC, 4.1 mA | 16 points, 1 common | MIL connector | 64 | 120 µs max. | 400 µs max. | 0.09 | --- | CJ1W-ID262 *2 |
| | AC Input Units  | 8 inputs | 200 to 24 VAC, 10 mA (200 V, 50 Hz) | 8 points, 1 common | Removable Terminal Block | 16 | 10 µs max. | 40 µs max. | 0.08 | --- | CJ1W-IA201 |
| | | 16 inputs | 100 to 120 VAC, 7 mA (100 V, 50 Hz) | 16 points, 1 common | Removable Terminal Block | 16 | 10 µs max. | 40 µs max. | 0.09 | --- | CJ1W-IA111 |

*1 This is the input response time when no filter (i.e., 0 ms) is set.

*2 The cable-side connector is not provided with Units equipped with cables. Purchase the 40-pin connector separately (Refer to page 11), or use an OMRON XW2K Series Datasheet (Cat. No. G152) and XW2R Datasheet or a G7□ I/O Relay Terminal.

Output Units

| Unit classification | Product name | Specifications | | | | | Number of bits allocated | Current consumption (A) | | Model |
|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|----------------------------------------------|-------------------------------------------|----------------------|--------------------------|--------------------------|-------------------------|------------|-------------------------------|
| | | Output type | I/O points | Maximum switching capacity | Commons | External connection | | 5 V | 24 V | |
| CJ1 Basic I/O Units | Relay Contact Output Units  | — | 8 outputs | 250 VAC/24 VDC, 2 A | Independent contacts | Removable terminal block | 16 | 0.09 | 0.048 max. | CJ1W-OC201 |
| | | — | 16 outputs | 250 VAC/24 VDC, 2 A | 16 points, 1 common | Removable terminal block | 16 | 0.11 | 0.096 max. | CJ1W-OC211 |
| | Triac Output Unit  | — | 8 outputs | 250 VAC, 0.6 A | 8 points, 1 common | Removable terminal block | 16 | 0.22 | — | CJ1W-OA201 *1 CJ1W-OA201-1 |
| | Transistor Output Units     | Sinking | 8 outputs | 12 to 24 VDC, 2 A | 4 points, 1 common | Removable terminal block | 16 | 0.09 | — | CJ1W-OD201 |
| | | Sinking | 8 outputs | 12 to 24 VDC, 0.5 A | 8 points, 1 common | Removable terminal block | 16 | 0.10 | — | CJ1W-OD203 |
| | | Sinking | 16 outputs | 12 to 24 VDC, 0.5 A | 16 points, 1 common | Removable terminal block | 16 | 0.10 | — | CJ1W-OD211 *2 |
| | | Sinking | 16 outputs <small>High-speed type</small> | 24 VDC, 0.5 A | 16 points, 1 common | Removable terminal block | 16 | 0.15 | — | CJ1W-OD213 *2 |
| | | Sinking | 32 outputs | 12 to 24 VDC, 0.5 A | 16 points, 1 common | Fujitsu/OTAX connector | 32 | 0.14 | — | CJ1W-OD231 *3 |
| | | Sinking | 32 outputs | 12 to 24 VDC, 0.5 A | 16 points, 1 common | MIL connector | 32 | 0.14 | — | CJ1W-OD233 *2, *3 |
| | | Sinking | 32 outputs <small>High-speed type</small> | 24 VDC, 0.5 A | 16 points, 1 common | MIL connector | 32 | 0.22 | — | CJ1W-OD234 *2, *3 |
| | | Sinking | 64 outputs | 12 to 24 VDC, 0.3 A | 16 points, 1 common | Fujitsu/OTAX connector | 64 | 0.17 | — | CJ1W-OD261 *3 |
| | | Sinking | 64 outputs | 12 to 24 VDC, 0.3 A | 16 points, 1 common | MIL connector | 64 | 0.17 | — | CJ1W-OD263 *3 |
| | | Sourcing | 8 outputs | 24 VDC, 2 A Short-circuit protection | 4 points, 1 common | Removable terminal block | 16 *1 | 0.11 | — | CJ1W-OD202 |
| | | Sourcing | 8 outputs | 24 VDC, 0.5 A Short-circuit protection | 8 points, 1 common | Removable terminal block | 16 *1 | 0.10 | — | CJ1W-OD204 |
| | | Sourcing | 16 outputs | 24 VDC, 0.5 A Short-circuit protection | 16 points, 1 common | Removable terminal block | 16 | 0.10 | — | CJ1W-OD212 |
| | | Sourcing | 32 outputs | 24 VDC, 0.5 A Short-circuit protection | 16 points, 1 common | MIL connector | 32 | 0.15 | — | CJ1W-OD232 *3 |
| | | Sourcing | 64 outputs | 12 to 24 VDC, 0.3 A | 16 points, 1 common | MIL connector | 64 | 0.17 | — | CJ1W-OD262 *3 |


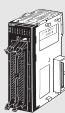
*1 CJ1W-OA201 is not UC1 cULus (Class I Division 2 hazardous location certification). If cULus (Class I Div 2 hazardous location certification) is required, use CJ1W-OA201-1.

*2 The ON/OFF response time for the CJ1W-OD213/CJ1W-OD234 is shorter than for the CJ1W-OD211/CJ1W-OD233, as shown below.

- ON response time: 0.1 ms improved to 0.015 ms
- OFF response time: 0.8 ms improved to 0.08 ms

*3 Connectors are not provided with these connector models. Either purchase one of the following 40-pin Connectors, or use an OMRON XW2K Series Datasheet (Cat. No. G152) and XW2R Datasheet or a G7□ I/O Relay Terminal.

I/O Units

| Unit classification | Product name | Specifications | | | | | Number of bits allocated | Current consumption (A) | | Model |
|---------------------|------------------------------------------------------------------------------------------------------------------------------|----------------|-------------------------------------------|------------------------------|---------------------|------------------------|--------------------------|-------------------------|--------------|--------------|
| | | Output type | I/O points | Input voltage, Input current | Commons | External connection | | 5 V | 24 V | |
| | | | | Maximum switching capacity | | | | | | |
| CJ1 Basic I/O Units | DC Input/Transistor Output Units  | Sinking | 16 inputs | 24 VDC, 7 mA | 16 points, 1 common | Fujitsu/OTAX connector | 32 | 0.13 | --- | CJ1W-MD231*2 |
| | | | 16 outputs | 250 VAC/24 VDC, 0.5 A | 16 points, 1 common | | | | | |
| | | Sinking | 16 inputs | 24 VDC, 7 mA | 16 points, 1 common | MIL connector | 64 | 0.13 | --- | CJ1W-MD233*2 |
| | | | 16 outputs | 12 to 24 VDC, 0.5 A | 16 points, 1 common | | | | | |
| | | Sinking | 32 inputs | 24 VDC, 4.1 mA | 16 points, 1 common | Fujitsu/OTAX connector | 32 | 0.14 | --- | CJ1W-MD261*1 |
| | | | 32 outputs | 12 to 24 VDC, 0.3 A | 16 points, 1 common | | | | | |
| | | Sinking | 32 inputs | 24 VDC, 4.1 mA | 16 points, 1 common | MIL connector | 64 | 0.14 | --- | CJ1W-MD263*1 |
| | | | 32 outputs | 12 to 24 VDC, 0.3 A | 16 points, 1 common | | | | | |
| | Sourcing | 16 inputs | 24 VDC, 7 mA | 16 points, 1 common | MIL connector | 32 | 0.13 | --- | CJ1W-MD232*2 | |
| | | 16 outputs | 24 VDC, 0.5 A Short-circuit protection | 16 points, 1 common | | | | | | |
| | TTL I/O Units  | --- | 32 inputs | 5 VDC, 35 mA | 16 points, 1 common | MIL connector | 64 | 0.19 | --- | CJ1W-MD563*1 |
| | | | 32 outputs | 5 VDC, 35 mA | 16 points, 1 common | | | | | |

*1 Connectors are not provided with these connector models. Either purchase one of the following 40-pin Connectors, or use an OMRON XW2K Series Datasheet (Cat. No. G152) and XW2R Datasheet or a G7□ I/O Relay Terminal.

*2 Connectors are not provided with these connector models. Either purchase one of the following 20-pin or 24-pin Connectors, or use an OMRON XW2K Series Datasheet (Cat. No. G152) and XW2R Datasheet or a G7□ I/O Relay Terminal.

Applicable Connectors

Fujitsu/OTAX Connectors for 32-input, 32-output, 64-input, 64-output, 32-input/32-output, and 16-input/16-output Units

| Name | Connection | Remarks | Applicable Units | Model |
|-------------------|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| 40-pin Connectors | Soldered | Connector Fujitsu FCN-361J040-AU Connector Cover Fujitsu FCN-360C040-J2 OTAX N360C040J2 | Fujitsu/OTAX Connectors: CJ1W-ID231(32 inputs): 1 per Unit CJ1W-ID261 (64 inputs) 2 per Unit CJ1W-OD231 (32 outputs):1 per Unit CJ1W-OD261 (64 outputs): 2 per Unit CJ1W-MD261 (32 inputs, 32 outputs): 2 per Unit | C500-CE404 |
| | Crimped | Housing Fujitsu FCN-363J040 OTAX N363J040 Contactor Fujitsu FCN-363J-AU OTAX N363JAU Connector Cover Fujitsu FCN-360C040-J2 OTAX N360C040J2 | | C500-CE405 |
| | Pressure welded | Fujitsu FCN-367J040-AU/F | | C500-CE403 |
| | | | | |
| 24-pin Connectors | Soldered | Connector Fujitsu FCN-361J024-AU Connector Cover Fujitsu FCN-360C024-J2 OTAX N360C024J2 | Fujitsu/OTAX Connectors: CJ1W-MD231 (16 inputs, 16 outputs): 2 per Unit | C500-CE241 |
| | Pressure welded | Fujitsu FCN-367J024-AU/F OTAX N367J024AUF | | C500-CE243 |

MIL Connectors for 32-input, 32-output, 64-input, 64-output, 32-input/32-output, and 16-input/16-output Units

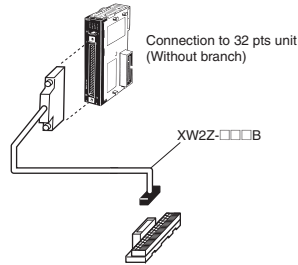
| Name | Connection | Remarks | Applicable Units | Model |
|-------------------|-----------------|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| 40-pin Connectors | Pressure welded | FRC5-AO40-3TOS | MIL Connectors: CJ1W-ID232/233 (32 inputs): 1 per Unit CJ1W-OD232/233/234 (32 outputs):1 per Unit CJ1W-ID262 (64 inputs): 2 per Unit CJ1W-OD262/263 (64 outputs): 2 per Unit CJ1W-MD263/563 (32 inputs, 32 outputs): 2 per Unit | XG4M-4030-T |
| 20-pin Connectors | Pressure welded | FRC5-AO20-3TOS | MIL Connectors: CJ1W-MD232/233 (16 inputs, 16 outputs): 2 per Unit | XG4M-2030-T |

Applicable Connector-terminal block conversion unit

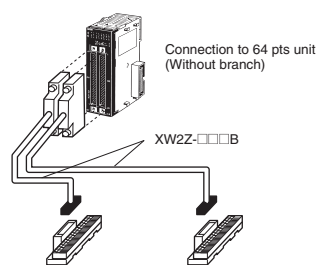
Example: With OMRON Connector-terminal block conversion unit

Only main products are shown here.
More detail informations are shown in *XW2K Series Datasheet* (Cat. No. G152) and *XW2R Datasheet*.

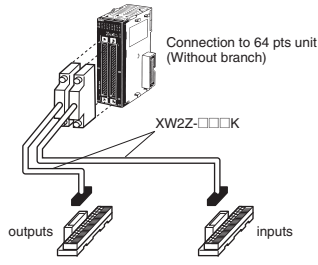
32-point Input Unit or Output Unit
CJ1W-ID231 32-point



64-point Input Unit or Output Unit
CJ1W-ID261 64-point



64-point Output Unit
CJ1W-MD563 IN 32 Points, OUT 32 Points



Choose the wiring method.
Choose □□ from a following combination table PLC type.




| Wiring method | Model |
|-------------------------------------|---------------|
| Models with Push-In Plus | XW2K-40G-O32□ |
| Models with Phillips screw | XW2R-J34GD-C□ |
| Models with Slotted screw (rise up) | XW2R-E34GD-C□ |

Combination table

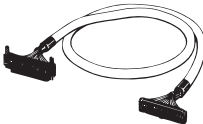

| PLC Type (Connector-terminal block) | | PLC | | | Connecting cables |
|-------------------------------------|------|--------------|------------|----------------------|----------------------------------------------------------------|
| XW2K | XW2R | I/O | I/O Points | I/O unit model | |
| O32A | C1 | Input | 32 | CJ1W-ID231 | XW2Z-□□□B 32-point Unit: 1 Cable 64-point Unit: 2 Cables |
| | | | 64 | CJ1W-ID261 | |
| | | Input/Output | 32 | CJ1W-MD261 (inputs) | |
| O32C | C2 | Input | 32 | CJ1W-ID232 | XW2Z-□□□K 32-point Unit: 1 Cable 64-point Unit: 2 Cables |
| | | | 64 | CJ1W-ID262 | |
| | | Input/Output | 32 | CJ1W-MD263 (inputs) | |
| | | | | CJ1W-MD563 (inputs) | |
| | | | | | |
| O32B | C3 | Input | 32 | CJ1W-OD231 | XW2Z-□□□B 32-point Unit: 1 Cable 64-point Unit: 2 Cables |
| | | | 64 | CJ1W-OD261 | |
| | | Input/Output | 32 | CJ1W-MD261 (outputs) | |
| O32C | C4 | Output | 32 | CJ1W-OD232 | XW2Z-□□□K 32-point Unit: 1 Cable 64-point Unit: 2 Cables |
| | | | | CJ1W-OD233 | |
| | | | | CJ1W-OD234 | |
| | | | 64 | CJ1W-OD262 | |
| | | | | CJ1W-OD263 | |
| | | Input/Output | 32 | CJ1W-MD263 (outputs) | |
| | | | | CJ1W-MD563 (outputs) | |

Note: 1. □□□ is replaced by the cable length.
2. There is one common for each 32 points.


Connector-terminal block conversion unit

| Product name | Specifications | I/O Points (number of poles) | Model |
|------------------------------------------|--------------------------------------------------------------------------------------------------------------|------------------------------|---------------|
| Connector-Terminal Block Conversion Unit | Push-In Plus  | 32 (36) | XW2K-40G-O32A |
| | | 32 (36) | XW2K-40G-O32B |
| | | 32 (36) | XW2K-40G-O32C |
| | Phillips screw  | 32 (34) | XW2R-J34GD-C1 |
| | | 32 (34) | XW2R-J34GD-C2 |
| | | 32 (34) | XW2R-J34GD-C3 |
| | | 32 (34) | XW2R-J34GD-C4 |
| | Slotted screw (rise up)  | 32 (34) | XW2R-E34GD-C1 |
| | | 32 (34) | XW2R-E34GD-C2 |
| | | 32 (34) | XW2R-E34GD-C3 |
| | | 32 (34) | XW2R-E34GD-C4 |

Connecting cables

| Product name | Appearance | Connectors | Model | Cable length (m) |
|-------------------------------|--------------------------------------------------------------------------------------------------|------------------------------------------------------|-----------|------------------|
| For I/O Unit Connecting Cable | XW2Z-□□□B  | One 40-pin FCN Connector to One 40-pin MIL Connector | XW2Z-050B | 0.5 |
| | | | XW2Z-100B | 1 |
| | | | XW2Z-150B | 1.5 |
| | | | XW2Z-200B | 2 |
| | | | XW2Z-300B | 3 |
| | | | XW2Z-500B | 5 |
| | XW2Z-□□□K  | One 40-pin MIL Connector to One 40-pin MIL Connector | XW2Z-C50K | 0.5 |
| | | | XW2Z-100K | 1 |
| | | | XW2Z-150K | 1.5 |
| | | | XW2Z-200K | 2 |
| | | | XW2Z-300K | 3 |
| | | | XW2Z-500K | 5 |


Quick-response Input Units

| Unit classification | Product name | Specifications | | | | Number of bits allocated | Response time | | Current consumption (A) | | Model |
|---------------------|------------------------------------------------------------------------------------------------------------------|----------------|------------------------------|---------------------|--------------------------|--------------------------|---------------|-------------|-------------------------|------|------------|
| | | I/O points | Input voltage, Input current | Commons | External connection | | ON | OFF | 5 V | 24 V | |
| CJ1 Basic I/O Units | Quick-response Input Unit  | 16 inputs | 24 VDC, 7 mA | 16 points, 1 common | Removable terminal block | 16 | 0.05 ms max. | 0.5 ms max. | 0.08 | --- | CJ1W-IDP01 |

Special I/O Units and CPU Bus Units

Process I/O Units


Isolated-type Units with Universal Inputs

| Unit classification | Product name | Input points | Signal range selection | Signal range | Conversion speed (resolution) | Accuracy (at ambient temperature of 25°C) | External connection | No. of unit numbers allocated | Current consumption (A) | | Model |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-------------------------------|-------------------------|------|---------------|
| | | | | | | | | | 5 V | 24 V | |
| CJ1 Special I/O Units | Process Input Units (Isolated-type Units with Universal Inputs)  | 4 inputs | Set separately for each input | Universal inputs: Pt100 (3-wire), JPt100 (3-wire), Pt1000 (3-wire), Pt100 (4-wire), K, J, T, E, L, U, N, R, S, B, WRe5-26, PL II, 4 to 20 mA, 0 to 20 mA, 1 to 5 V, 0 to 1.25 V, 0 to 5 V, 0 to 10 V, ±100 mV selectable range, -1.25 to 1.25 V, -5 to 5 V, -10 to 10 V, ±10 V selectable range, potentiometer | Resolution (conversion speed): 1/256,000 (conversion cycle: 60 ms/ 4 inputs) 1/64,000 (conversion cycle: 10 ms/ 4 inputs) 1/16,000 (conversion cycle: 5 ms/ 4 inputs) | Standard accuracy: ±0.05% of F.S. | Removable terminal block | 1 | 0.30 | --- | CJ1W-PH41U *1 |
| | | 4 inputs | Set separately for each input | Universal inputs: Pt100, JPt100, Pt1000, K, J, T, L, R, S, B, 4 to 20 mA, 0 to 20 mA, 1 to 5 V, 0 to 5 V, 0 to 10 V | Conversion speed: 250 ms/ 4 inputs | Accuracy: Platinum resistance thermometer input: (±0.3% of PV or ±0.8°C, whichever is larger) ±1 digit max. Thermocouple input: (±0.3% of PV or ±1.5°C, whichever is larger) ±1 digit max. *2 Voltage or current input: ±0.3% of F.S. ±1 digit max. | | | 0.32 | --- | CJ1W-AD04U |

*1 Do not connect a Relay Output Unit to the same CPU Rack or to the same Expansion Rack as the CJ1W-PH41U.

*2 L and -100°C or less for K and T are ±2°C±1 digit max., and 200°C or less for R and S is ±3°C±1 digit max. No accuracy is specified for 400°C or less for B.



Isolated-type DC Input Units

| Unit classification | Product name | Input points | Signal range selection | Conversion speed (resolution) | Accuracy (at ambient temperature of 25°C) | External connection | No. of unit numbers allocated | Current consumption (A) | | Model |
|-----------------------|---------------------------------------------------------------------------------------------------------------------|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|-------------------------------------------|--------------------------|-------------------------------|-------------------------|--------|------------|
| | | | | | | | | 5 V | 24 V | |
| CJ1 Special I/O Units | Isolated-type DC Input Units  | 2 inputs | DC voltage: 0 to 1.25 V, -1.25 to 1.25 V, 0 to 5 V, 1 to 5 V, -5 to 5 V, 0 to 10 V, -10 to 10 V, ±10 V selectable range DC current: 0 to 20 mA, 4 to 20 mA | Conversion speed: 10 ms/ 2 inputs Resolution: 1/ 64,000 | Standard accuracy: ±0.05% of F.S. | Removable terminal block | 1 | 0.18 | 0.09 * | CJ1W-PDC15 |

* This is for an external power supply, and not for internal current consumption.

Analog I/O Units

Analog Input Units



| Unit classification | Product name | Input points | Signal range selection | Signal range | Resolution | Conversion speed | Accuracy (at ambient temperature of 25°C) | External connection | No. of unit numbers allocated | Current consumption (A) | | Model |
|-----------------------|---------------------------------------------------------------------------------------------------------|--------------|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|------------------------------------------------------------------------|------------------------------------------------------------------|--------------------------|-------------------------------|-------------------------|------|---------------|
| | | | | | | | | | | 5 V | 24 V | |
| CJ1 Special I/O Units | Analog Input Units  | 4 inputs | Set separately for each input | 1 to 5 V (1/10,000), 0 to 10 V (1/20,000), –5 to 5 V (1/20,000), –10 to 10 V (1/40,000), and 4 to 20 mA (1/10,000) | | 20 μs/1 point, 25 μs/2 points, 30 μs/3 points, 35 μs/4 points | Voltage: ±0.2% of F.S. Current: ±0.4% of F.S. | Removable terminal block | 1 | 0.52 | --- | CJ1W-AD042 *1 |
| | Analog Input Units  | 8 inputs | | 1 to 5 V, 0 to 5 V, 0 to 10 V, – 10 to 10 V, 4 to 20 mA | 1/4000, (Settable to 1/8000) *2 | 1 ms/point max. (Settable to 250 μs/point) *2 | Voltage: ±0.2% of F.S. Current: ±0.4% of F.S. *3 | | | 0.42 | --- | CJ1W-AD081-V1 |
| | | 4 inputs | | | | | | | | 0.42 | --- | CJ1W-AD041-V1 |

*1 The direct conversion function using the AIDC instruction cannot be used.

*2 The resolution and conversion speed cannot be set independently. If the resolution is set to 1/4,000, then the conversion speed will be 1 ms/point.

*3 At 23 ±2°C


Analog Output Units

| Unit classification | Product name | Output points | Signal range selection | Signal range | Resolution | Conversion speed | Accuracy (at ambient temperature of 25°C) | External connection | External power supply | No. of unit numbers allocated | Current consumption (A) | | Model |
|-----------------------|------------------------------------------------------------------------------------------------------------|---------------|-------------------------------|--------------------------------------------------------------------------------|-------------------------------|----------------------------------------------------------------------------------------|---------------------------------------------------------|--------------------------|---------------------------------------------------------|-------------------------------|-------------------------|------------|----------------|
| | | | | | | | | | | | 5 V | 24 V | |
| CJ1 Special I/O Units | Analog Output Units  | 4 outputs | Set separately for each input | 1 to 5 V (1/10,000), 0 to 10 V (1/20,000), and −10 to 10 V (1/40,000) | | 20 μs/ 1 point, 25 μs/ 2 points, 30 μs/ 3 points, 35 μs/ 4 points | ±0.3% of F.S. | Removable terminal block | --- | 1 | 0.40 | --- | CJ1W-DA042V *1 |
| | Analog Output Units  | 8 outputs | | 1 to 5 V, 0 to 5 V, 0 to 10 V, −10 to 10 V | 1/4,000 (Settable to 1/8,000) | 1 ms/point max. (Settable to 250 μs/point) | | | 24 VDC ^{+10%} _{−15%} , 140 mA max. | | 0.14 *2 | CJ1W-DA08V | |
| | | 8 outputs | | 4 to 20 mA | | | | | 24 VDC ^{+10%} _{−15%} , 170 mA max. | | 0.14 *2 | CJ1W-DA08C | |
| | | 4 outputs | | 1 to 5 V, 0 to 5 V, 0 to 10 V, −10 to 10 V, 4 to 20 mA | 1/4000 | 1 ms/point max. | 24 VDC ^{+10%} _{−15%} , 200 mA max. | | 0.12 | | 0.2 *2 | CJ1W-DA041 | |
| | | 2 outputs | | | | | 24 VDC ^{+10%} _{−15%} , 140 mA max. | | 0.12 | | 0.14 *2 | CJ1W-DA021 | |

*1 The direct conversion function using the AODC instruction cannot be used.


*2 This is for an external power supply, and not for internal current consumption

Analog I/O Units


| Unit classification | Product name | No. of points | Signal range selection | Signal range | Resolution (See note.) | Conversion speed (See note.) | Accuracy (at ambient temperature of 25°C) | External connection | No. of unit numbers allocated | Current consumption (A) | | Model |
|-----------------------|-------------------------------------------------------------------------------------|---------------|-------------------------------|--------------------------------------------------------------------|-------------------------------------|------------------------------------------------------|----------------------------------------------------------------------|--------------------------|-------------------------------|-------------------------|------|------------|
| | | | | | | | | | | 5 V | 24 V | |
| CJ1 Special I/O Units |  | 4 inputs | Set separately for each input | 1 to 5 V, 0 to 5 V, 0 to 10 V, -10 to 10 V, 4 to 20 mA | 1/4,000 (Settable to 1/8,000) | 1 ms/point (Settable to 500 µs/ point max.) | Voltage input: ±0.2% of F.S. Current input: ±0.2% of F.S. | Removable terminal block | 1 | 0.58 | --- | CJ1W-MAD42 |
| | | 2 outputs | | | | | Voltage output: ±0.3% of F.S. Current output: ±0.3% of F.S. | | | | | |

Note: The resolution and conversion speed cannot be set independently. If the resolution is set to 1/4,000, then the conversion speed will be 1 ms/point.

Temperature Control Units

| Unit classification | Product name | Specifications | | | No. of unit numbers allocated | Current consumption (A) | | Model |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------|--------------------------------------------|-------------------------------------------------------|-------------------------------------|-------------------------------|-------------------------|------|------------|
| | | No. of loops | Temperature sensor inputs | Control outputs | | 5 V | 24 V | |
| CJ1 Special I/O Units | Temperature Control Units  | 2 loops, heater burnout detection function | Thermocouple input (R, S, K, J, T, B, L) | Open collector NPN outputs (pulses) | 2 | 0.25 | --- | CJ1W-TC003 |
| | | | | Open collector PNP outputs (pulses) | | 0.25 | --- | CJ1W-TC004 |
| | | | Platinum resistance thermometer input (JPt100, Pt100) | Open collector NPN outputs (pulses) | | 0.25 | --- | CJ1W-TC103 |
| | | | | Open collector PNP outputs (pulses) | | 0.25 | --- | CJ1W-TC104 |





High-speed Counter Unit

| Unit classification | Product name | Specifications | | | No. of unit numbers allocated | Current consumption (A) | | Model |
|-----------------------|----------------------------------------------------------------------------------------------------------------------|--------------------|--------------------------------------------------------------------------------------------------|--------------------|-------------------------------|-------------------------|------|------------|
| | | Countable channels | Encoder A and B inputs, pulse input Z signals | Max. counting rate | | 5 V | 24 V | |
| CJ1 Special I/O Units | High-speed Counter Unit  | 2 | Open collector Input voltage: 5 VDC, 12 V, or 24 V (5 V and 12 V are each for one axis only.) | 50 kHz | 4 | 0.28 | --- | CJ1W-CT021 |
| | | | RS-422 line driver | 500 kHz | | | | |

Note: The following functions become unavailable when it is used with the NJ-Series CPU unit.

- Counter value capture using allocation area(CIO)
- The capture, Stop/capture/continue, Stop/capture/reset/continue, and Capture/reset functions using External Control Input Function
- Pulse rate range control using Output Control Mode
- The pulse rate measurement function
- Because the NJ-Series has no power OFF interrupt task, operation cannot be restarted from the position at which the power was interrupted.
- Read or write the data using IORD/IOWR instruction
- Starting of External Interrupt Task by Output and External Control Input

Serial Communications Units

| Unit classification | Product name | Specifications | | No. of unit numbers allocated | Current consumption (A) | | Model |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|-------------------------------------|------------|------------|
| | | Communications Interface | Communications functions | | 5 V | 24 V | |
| CJ1 CPU Bus Units | <div>Serial Communications Units</div> <div>High-speed type</div> <div>  </div> | 2 RS-232C ports | The following functions can be selected for each port: Protocol macro *1 Host Link NT Links (1:N mode) Serial Gateway No-protocol *3 Modbus-RTU Slave | 1 | 0.29 *2 | --- | CJ1W-SCU22 |
| | | 2 RS-422A/485 ports | | | 0.46 | --- | CJ1W-SCU32 |
| | | 1 RS-232C port and 1 RS-422A/485 port | | | 0.38 *2 | --- | CJ1W-SCU42 |
| | | RS-422A Converter | | | Converts RS-233C to RS-422A/RS-485. | CJ1W-CIF11 | |
|  | | | | | | | |


Note: Simple Backup Function and Interrupt notification function cannot be used.

*1 You can activate protocol macro trace function when the CPU Unit is set to the RUN Mode. (MONITOR Mode is not available with the NJ-Series CPU Units.)

*2 When an NT-AL001 RS-232C/RS-422A Conversion Unit is used, this value increases by 0.15 A/Unit. Add 0.20A/Unit when using NV3W-M□20L Programmable Terminals. Add 0.04A/Unit when using CJ1W-CIF11 RS-422A Adapters.

*3 Supported only by the SerialRcvNoClear Instructions with Serial communication unit version 2.1 or later, CPU Units with unit version 1.03 or later and the Sysmac Studio version 1.04 or higher.

EtherNet/IP Unit


| Unit classification | Product name | Specifications | | | No. of unit numbers allocated | Current consumption (A) | | Model |
|---------------------|-----------------------------------------------------------------------------------|--------------------------------------------------------------------|-------------------------------------------------------------------------------------------|-----------------------------------|-------------------------------|-------------------------|------|-------------------|
| | | Communications cable | Communications functions | Max. Units mountable per CPU Unit | | 5 V | 24 V | |
| CJ1 CPU Bus Unit |  | Shielded twisted-pair (STP) cable Categories: 100 Ω at 5, 5e | Tag Data Link Functions, Message Communications Functions, Socket Service Functions | 4 | 1 | 0.65 | --- | CJ1W-EIP21S *1 |
| | | | Tag Data Link Functions, Message Communications Functions | | | 0.41 | --- | CJ1W-EIP21 *1, *2 |

*1 EtherNet/IP Unit with unit version 1.0 or later (Lot number 241001□ or later) is required to connect CJ1W-EIP21S to NJ-series CPU Unit. Use NJ-series CPU Unit with version 1.67 or later and Sysmac Studio with version 1.60 or later.

EtherNet/IP Unit with unit version 2.1 or later is required to connect CJ1W-EIP21 to NJ-series CPU Unit. Use NJ-series CPU Unit with version 1.01 or later and Sysmac Studio with version 1.02 or later.

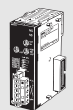
*2 Product no longer available to order.

EtherCAT Slave Unit

| Unit classification | Product name | Specifications | Communications type | No. of unit numbers allocated | Current consumption (A) | | Model |
|---------------------|------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|-------------------------------|-------------------------|------|--------------|
| | | | | | 5 V | 24 V | |
| CJ1 CPU Bus Units |  | STP (shielded twisted-pair) cable of category 5 or higher with double shielding | Refreshing methods: Free-Run Mode PDO DATA SIZE: TxPDO 400byte or less/RxPDO: 400byte or less | 1 | 0.34 | --- | CJ1W-ECT21 * |

* When using with the Machine Automation Controller NJ /NXSeries, use CPU Units with unit version 1.10 or later and the Sysmac Studio version 1.13 or higher.


DeviceNet Unit

| Unit classification | Product name | Specifications | Communications type | No. of unit numbers allocated | Current consumption (A) | | Model |
|---------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|-------------------------|------|------------|
| | | | | | 5 V | 24 V | |
| CJ1 CPU Bus Units |  | Functions as master and/or slave; allows control of 32,000 points max. per master. | <ul style="list-style-type: none"> Remote I/O communications master (fixed or user-set allocations) Remote I/O communications slave (fixed or user-set allocations) Message communications | 1 | 0.29 | --- | CJ1W-DRM21 |

Note: 1. Simple backup function cannot be used.

2. DeviceNet configurator cannot be used. Use CX-Integrator.

CompoNet Master Unit


| Unit classification | Product name | Specifications | | No. of unit numbers allocated | Current consumption (A) | | Model |
|-----------------------|-------------------------------------------------------------------------------------|-----------------------------------------------------|------------------------------------------------------------------------------------------------------------------|-------------------------------|-------------------------|------|--------------|
| | | Communications functions | No. of I/O points per Master Unit | | 5 V | 24 V | |
| CJ1 Special I/O Units |  | Remote I/O communications Message communications | Word Slaves: 2,048 max. (1,024 inputs and 1,024 outputs) Bit Slaves: 512 max. (256 inputs and 256 outputs) | 1, 2, 4, or 8 | 0.4 | --- | CJ1W-CRM21 * |

Note: 1. Simple backup function cannot be used.

2. The FINS command to the CompoNet Master Unit cannot be issued.

* Supported only by the CPU Units with unit version 1.01 or later and the Sysmac Studio version 1.02 or higher.

ID Sensor Units



| Unit classification | Product name | Specifications | | | No. of unit numbers allocated | Current consumption (A) | | Model |
|---------------------|------------------------------------------------------------------------------------------------------------------------------|----------------------|----------------------------|-----------------------|-------------------------------|-------------------------|--------|--------------|
| | | Connected ID Systems | No. of connected R/W heads | External power supply | | 5 V | 24 V | |
| CJ1 CPU Bus Units |  ID Sensor Units V680-Series RFID System | | 1 | Not required. | 1 | 0.26 | 0.13 * | CJ1W-V680C11 |
| | | | 2 | | 2 | 0.32 | 0.26 | CJ1W-V680C12 |

Note: The data transfer function using intelligent I/O commands can not be used.

* To use a V680-H01 Antenna, refer to the V680 Series RFID System Catalog (Cat. No. Q151).

Peripheral Devices


EtherCAT junction slaves

| Product name | | No. of ports | Power supply voltage | Current consumption (A) | Model |
|--------------------------|-----------------------------------------------------------------------------------|--------------|------------------------------------------|-------------------------|---------|
| EtherCAT junction slaves |  | 3 | 20.4 to 28.8 VDC (24 VDC -15 to +20%) | 0.08 | GX-JC03 |
| |  | 6 | | 0.17 | GX-JC06 |

Note: 1. Please do not connect EtherCAT junction slaves with OMRON position control unit, Model CJ1W-NC□81/□82.

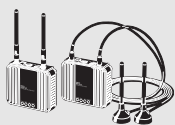
2. EtherCAT junction slaves cannot be used for EtherNet/IP and Ethernet.

Industrial Switching Hubs for EtherNet/IP and Ethernet

| Product name | Appearance | Functions | No. of ports | Accessories | Current consumption (A) | Model |
|---------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|--------------|------------------------|-------------------------|----------|
| Industrial Switching Hubs |  | Quality of Service (QoS): EtherNet/IP control data priority 10/100BASE-TX, Auto-Negotiation | 5 | Power supply connector | 0.07 | W4S1-05D |

Note: Industrial switching hubs cannot be used for EtherCAT.

WE70 FA WIRELESS LAN UNITS (Final order entry date: The end of June, 2020)

| Product name | Applicable region | Type | Model |
|----------------------------------------------------------------------------------------------------------------|-------------------|-----------------------|---------------|
|  WE70 FA WIRELESS LAN UNITS | Japan | Access Point (Master) | WE70-AP |
| | | Client (Slave) | WE70-CL |
| | Europe | Access Point (Master) | WE70-AP-EU |
| | | Client (Slave) | WE70-CL-EU |
| | U.S | Access Point (Master) | WE70-AP-US *1 |
| | | Client (Slave) | WE70-CL-US *1 |
| | Canada | Access Point (Master) | WE70-AP-CA *2 |
| | | Client (Slave) | WE70-CL-CA *2 |
| | China | Access Point (Master) | WE70-AP-CN |
| | | Client (Slave) | WE70-CL-CN |

Note: 1. A Pencil Antenna, mounting magnet, and screw mounting bracket are included as accessories.

2. Always use a model that is applicable in your region. Refer to the WE70 Catalog (Cat. No. N154).

*1. From December 2015, the WE70-AP-US and WE70-CL-US can be used in Mexico.

The Units will be sold in the USA until the end of May 2016.

*2. From January 2016, the WE70-AP-CA and WE70-CL-CA can be used in Singapore.

General Specifications

| Item | | Specification | | |
|---------------------------------|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------|
| | | NJ501-□□□□ | NJ301-□□□□ | NJ101-□□□□ |
| Enclosure | | Mounted in a panel | | |
| Grounding Method | | Ground to less than 100 Ω | | |
| Dimensions (height×depth×width) | | 90 mm × 90 mm × 90 mm | | |
| Weight | | 550 g (including the End Cover) | | |
| Current Consumption | | 5 VDC, 1.90 A (including SD Memory Card and End Cover) | | |
| Operation Environment | Ambient Operating Temperature | 0 to 55°C | | |
| | Ambient Operating Humidity | 10% to 90% (with no condensation) | | |
| | Atmosphere | Must be free from corrosive gases. | | |
| | Ambient Storage Temperature | -20 to 75°C (excluding battery) | | |
| | Altitude | 2,000 m or less | | |
| | Pollution Degree | 2 or less: Meets IEC 61010-2-201. | | |
| | Noise Immunity | 2 kV on power supply line (Conforms to IEC 61000-4-4.) | | |
| | Overvoltage Category | Category II: Meets IEC 61010-2-201. | | |
| | EMC Immunity Level | Zone B | | |
| | Vibration Resistance | Conforms to IEC 60068-2-6. 5 to 8.4 Hz with 3.5-mm amplitude, 8.4 to 150 Hz Acceleration of 9.8 m/s ² for 100 min in X, Y, and Z directions (10 sweeps of 10 min each = 100 min total) | | |
| | Shock Resistance | Conforms to IEC 60068-2-27. 147 m/s ² , 3 times in X, Y, and Z directions (100 m/s ² for Relay Output Units) | | |
| Battery | Life *1 | 5 years at 25°C | | |
| | Model | CJ1W-BAT01 | | |
| Applicable Standards *2 | | cULus, EU, UKCA, RCM, KC, NK, LR *3 | | |

*1. This is the value when the power ON time rate is 0% (power OFF).

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

*3. Supported only by the CPU Units with unit version 1.01 or later.

NJ-Series

Performance Specifications

| Item | | | | NJ501- | | | NJ301- | | NJ101- | | | | |
|-----------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|---------|---------|--------------------------------------------------|---------------------------------------------------------------------------------------------------|--------|--------------------------------------------|--|-----|--|
| | | | | □5□0 | □4□0 | □3□0 | 1200 | 1100 | 1□□0 | 9□□0 | | | |
| Processing Time | Instruction Execution Times | LD instruction | | 1.1 ns (1.7 ns or less) | | | | 1.6 ns (2.5 ns or less) *2 | | 3.0 ns (4.5 ns or less) *2 | | | |
| | | Math Instructions (for Long Real Data) | | 24 ns or more *1 | | | | 35 ns or more *2 | | 63 ns or more *2 | | | |
| Programming | Program capacity *3 | Size | | 20 MB (400 KS) | | | | 5 MB (100 KS) | | 3 MB (60 KS) | | | |
| | | Number | POU definition | 3,000 | | | | 750 | | 450 | | | |
| | | | POU instance | Using Sysmac Studio Ver. 1.05 or lower : 6,000 Using Sysmac Studio Ver. 1.06 or higher : 9,000 | | | | Using Sysmac Studio Ver. 1.04 or lower : 1,500 Using Sysmac Studio Ver. 1.05 or higher : 3,000 | | 1,800 | | | |
| | | | | | | | | | | | | | |
| | Variables capacity | No Retain Attribute *4 | Size | 4 MB | | | | 2 MB | | | | | |
| | | | Number | 180,000 *5 | | | | 90,000 *6 | | 22,500 | | | |
| | | Retain Attribute *7 | Size | 2 MB | | | | 0.5 MB | | | | | |
| | | | Number | 10,000 | | | | Using Sysmac Studio Ver. 1.04 or lower : 2,500 Using Sysmac Studio Ver. 1.05 or higher : 5,000 | | 5,000 | | | |
| | Data type | Number | 2,000 | | | | 1,000 | | | | | | |
| | Memory for CJ-Series Units (Can be Specified with AT Specifications for Variables.) | CIO Area | 6,144 words (CIO 0 to CIO 6143) | | | | | | | | | | |
| | | Work Area | 512 words (W0 to W511) | | | | | | | | | | |
| | | Holding Area | 1,536 words (H0 to H1535) | | | | | | | | | | |
| | | DM Area | 32,768 words (D0 to D32767) | | | | | | | | | | |
| | | EM Area | 32,768 words × 25 banks (E0_00000 to E18_32767) *8 | | | | 32,768 words × 4 banks (E0_00000 to E3_32767) *8 | | | | | | |
| Unit Configuration | Maximum Number of Connectable Units | Maximum number of CJ unit per CPU Rack or Expansion Rack | | 10 Units | | | | | | | | | |
| | | Maximum number of CJ unit on the system | | 40 Units | | | | | | | | | |
| | | Maximum number of NX unit on the system | | 4,096 (on NX series EtherCAT slave terminal) | | | | | | 400 (on NX series EtherCAT slave terminal) | | | |
| | Maximum number of Expansion Racks | | 3 max. | | | | | | | | | | |
| | I/O Capacity | Maximum number of I/O Points on CJ-series Units | | 2,560 points max. | | | | | | | | | |
| | Power Supply Unit for CPU Rack and Expansion Racks | Model | | NJ-P□3001 | | | | | | | | | |
| | | PowerOFF Detection Time | AC Power Supply | 30 to 45 ms | | | | | | | | | |
| | | | DC Power Supply | 22 to 25 ms | | | | | | | | | |
| Motion Control | Number of Controlled Axes | Maximum Number of Controlled Axes | | Maximum number of axes which can be defined. | | | | | | | | --- | |
| | | | | 64 axes | 32 axes | 16 axes | 15 axes *9 | 15 axes *9 | 6 axes | | | | |
| | | Motion control axes | | Maximum number of motion control axes which can be defined. All motion control function is available. | | | | | | | | | |
| | | | | 64 axes | 32 axes | 16 axes | 15 axes | 15 axes | 6 axes | | | | |
| | | Maximum number of used real axes | | Maximum number of used real axes. The Number of used real axes includes following servo axes and encoder axes. | | | | | | | | | |
| | | | | 64 axes | 32 axes | 16 axes | 8 axes | 4 axes | 2 axes | | | | |
| | | Used motion control servo axes | | Maximum number of servo axes which all motion control function is available. | | | | | | | | | |
| | | | | 64 axes | 32 axes | 16 axes | 8 axes | 4 axes | 2 axes | | | | |
| | | Maximum number of axes for linear interpolation axis control | | 4 axes per axes group | | | | | | | | | |
| | | Number of axes for circular interpolation axis control | | 2 axes per axes group | | | | | | | | | |
| | Maximum Number of Axes Groups | | 32 groups | | | | | | | | | | |
| Motion Control Period | | The same control period as that is used for the process data communications cycle for EtherCAT. | | | | | | | | | | | |

*1. When the hardware revision for the Unit is A or B.

*2. When the hardware revision for the Unit is A.

*3. This is the capacity for the execution objects and variable tables (including variable names).

*4. Words for CJ-series Units in the Holding, DM, and EM Areas are not included.

*5. The number of variables of the CPU Unit version 1.19 or earlier is 90,000.

*6. The number of variables of the CPU Unit version 1.18 or earlier is 22,500.

*7. Words for CJ-series Units in the CIO and Work Areas are not included.

*8. When the Spool function of the NJ501-□□20 is enabled, the DB Connection Service uses E9_0 to E18_32767 (NJ501-1□□20).

When the Spool function of the NJ101-□□20 is enabled, the DB Connection Service uses E1_0 to E3_32767 (NJ101-□□20).

*9. This number of axes is achieved in a combination of a CPU Unit with unit version 1.06 or later and Sysmac Studio version 1.07 or higher.
In other combinations, the maximum number of controlled axes is 8 axes (NJ301-1200) or 4 axes (NJ301-1100).

| Item | | | | NJ501- | | | NJ301- | | NJ101 | |
|----------------------------------------|----------------------------------------------------------------|------------------------------------------------------------|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|------------|----------------|-------|------|
| | | | | □5□0 | □4□0 | □3□0 | 1200 | 1100 | 1□□0 | 9□□0 |
| Motion Control | Cams | Number of Cam Data Points | Maximum Points per Cam Table | 65,535 points | | | | | | --- |
| | | | Maximum Points for All Cam Tables | 1,048,560 points | | | | 262,140 points | | |
| | | Maximum Number of Cam Tables | 640 tables | | | | 160 tables | | | |
| | Position Units | | | Pulses, millimeters, micrometers, nanometers, degrees or inches | | | | | | |
| | Override Factors | | | 0.00% or 0.01% to 500.00% | | | | | | |
| | Supported Services | | | Sysmac Studio connection | | | | | | |
| Peripheral USB Port | Physical Layer | | | USB 2.0-compliant B-type connector | | | | | | |
| | Transmission Distance between Hub and Node | | | 5 m max. | | | | | | |
| Built-in EtherNet/IP Port | Number of port | | | 1 | | | | | | |
| | Physical Layer | | | 10Base-T or 100Base-TX | | | | | | |
| | Frame length | | | 1514 max. | | | | | | |
| | Media Access Method | | | CSMA/CD | | | | | | |
| | Modulation | | | Baseband | | | | | | |
| | Topology | | | Star | | | | | | |
| | Baud Rate | | | 100 Mbps (100Base-TX) | | | | | | |
| | Transmission Media | | | STP (shielded, twisted-pair) cable of Ethernet category 5, 5e or higher | | | | | | |
| | Maximum Transmission Distance between Ethernet Switch and Node | | | 100m | | | | | | |
| | Maximum Number of Cascade Connections | | | There are no restrictions if Ethernet switch is used. | | | | | | |
| | CIP service: Tag Data Links (Cyclic Communications) | Maximum Number of Connections | | 32 | | | | | | |
| | | Packet interval *10 | | 1 to 10,000 ms in 1.0-ms increments *11 Can be set for each connection. (Data will be refreshed at the set interval, regardless of the number of nodes.) | | | | | | |
| | | Permissible Communications Band | | 3,000 pps *12 *13 (including heartbeat) | | | | | | |
| | | Maximum Number of Tag Sets | | 32 | | | | | | |
| | | Tag types | | Network variables, CIO, Work, Holding, DM, and EM Areas | | | | | | |
| | | Number of tags per connection (i.e., per tag set) | | 8 (7 tags if Controller status is included in the tag set.) | | | | | | |
| | | Maximum Link Data Size per Node (total size for all tags) | | 256 | | | | | | |
| | | Maximum number of tag | | 19,200 bytes | | | | | | |
| | | Maximum Data Size per Connection | | 600 bytes | | | | | | |
| | | Maximum Number of Registrable Tag Sets | | 32 (1 connection = 1 tag set) | | | | | | |
| | | Maximum Tag Set Size | | 600 bytes (Two bytes are used if Controller status is included in the tag set.) | | | | | | |
| Multi-cast Packet Filter *14 | | Supported. | | | | | | | | |
| Cip Message Service: Explicit Messages | Class 3 (number of connections) | | 32 (clients plus server) | | | | | | | |
| | UCMM (non-connection type) | Maximum Number of Clients that Can Communicate at One Time | 32 | | | | | | | |
| | | Maximum Number of Servers that Can Communicate at One Time | 32 | | | | | | | |
| Maximum number of TCP socket service | | | | 30 *15 | | | | | 30 | |

*10.Data is updated on the line in the specified interval regardless of the number of nodes.

*11.The Packet interval of the CPU Unit version 1.02 or earlier is 10 to 10,000 ms in 1.0-ms increments.

*12.Means packets per second, i.e., the number of communications packets that can be sent or received in one second.

*13.The Permissible Communications Band of the CPU Unit version 1.02 or earlier is 1,000 pps.

*14.An IGMP client is mounted for the EtherNet/IP port. If an ethernet switch that supports IGMP snooping is used, filtering of unnecessary multicast packets is performed.

*15.The Maximum number of TCP socket service of the CPU Unit version 1.02 or earlier is 16.

| Item | | | | NJ501- | | | NJ301- | | NJ101 | |
|----------------------------|---------------------------------------------|-------------------------------------------------------------------------------------|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|--------|------|----------------------|------|
| | | | | □5□0 | □4□0 | □3□0 | 1200 | 1100 | 1□□0 | 9□□0 |
| Built-in EtherNet/IP Port | OPC UA Server (NJ501-1□00) | Support Profile/Model | | Embedded 2017 UA Server Profile PLCopen Information Model 1.00 | | | --- | | --- | |
| | | Default Endpoint/Port | | opc.tcp://192.168.250.1:4840/ | | | --- | | --- | |
| | | Maximum number of sessions (Client) | | 5 | | | --- | | --- | |
| | | Maximum number of Monitored Items per server | | 2,000 | | | --- | | --- | |
| | | Sampling rate of the Monitored Items (ms) | | 0, 50, 100, 250, 500, 1000,2000, 5000, 10000 if set to 0 (zero), it is assumed that is set to 50. | | | --- | | --- | |
| | | Maximum number of Subscriptions per server | | 100 | | | --- | | --- | |
| | | Maximum number of variables that can be published | | 10,000 | | | --- | | --- | |
| | | Maximum number of structure definitions that can be published | | 100 | | | --- | | --- | |
| | | Restrictions on variables unable to be published | | • Variable which size are over 60 KB • Double and over dimensional array of structures (global variables) • Structures includes double and over dimensional array (global variables) • Structures nested 4 and over Unions • Array which's index number don't start from 0 • Array which's element is over 2048 (global variables) • Structures which's members are over 100. | | | --- | | --- | |
| | | SecurityPolicy/Mode | | • None • Sign - Basic128Rsa15 • Sign - Basic256 • Sign - Basic256Sha256 • Sign - Aes128Sha256RsaOaep • Sign - Aes256Sha256RsaPss • SignAndEncrypt - Basic128Rsa15 • SignAndEncrypt - Basic256 • SignAndEncrypt - Basic256Sha256 • SignAndEncrypt - Aes128Sha256RsaOaep • SignAndEncrypt - Aes256Sha256RsaPss | | | --- | | --- | |
| Application Authentication | Authentication | X.509 | | | --- | | --- | | | |
| | Maximum number of certification | Trusted certification: 32 Issuer certification: 32 Rejected certification: 32 | | | --- | | --- | | | |
| | User Authentication | Authentication | User name / Password / Role *16 Anonymous | | | --- | | --- | | |
| Built-in EtherCAT Port | Communications Standard | | | IEC 61158 Type12 | | | | | | |
| | EtherCAT Master Specifications | | | Class B (Feature Pack Motion Control compliant) | | | | | | |
| | Physical Layer | | | 100BASE-TX | | | | | | |
| | Modulation | | | Baseband | | | | | | |
| | Baud Rate | | | 100 Mbps (100Base-TX) | | | | | | |
| | Duplex mode | | | Auto | | | | | | |
| | Topology | | | Line, daisy chain, branching and ring *17 | | | | | | |
| | Transmission Media | | | Twisted-pair cable of category 5 or higher (double-shielded straight cable with aluminum tape and braiding) | | | | | | |
| | Maximum Transmission Distance between Nodes | | | 100m | | | | | | |
| | Maximum Number of Slaves | | | 192 | | | | | 64 | |
| | Range of node address | | | 1-192 | | | | | | |
| | Maximum Process Data Size | | | Inputs: 5,736 bytes Outputs: 5,736 bytes *18 | | | | | | |
| | Maximum Process Data Size per Slave | | | Inputs: 1,434 bytes Outputs: 1,434 bytes | | | | | | |
| | Communications Cycle | | | 500/1,000/2,000/4,000 μs *19 | | | | | 1,000/2,000/4,000 μs | |
| Sync Jitter | | | 1 μs max. | | | | | | | |
| Internal Clock *20 | | | | At ambient temperature of 55°C: -4.5 to +4.5 min error per month At ambient temperature of 25°C: -3.5 to +3.5 min error per month At ambient temperature of 0°C: -4.5 to +4.5 min error per month | | | | | | |

*16.Roles can be set for the unit versions 1.62 or later of CPU Units.

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

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

*18.For project unit version earlier than 1.40, the data must be within four frames.

*19.The Maximum Communications Cycle of the NJ301 CPU Unit version 1.02 or earlier and NJ501-R□□□ are 1,000/2,000/4,000 μs.

The EtherCAT communications cycle of NJ501-4□□0 for robot control is 1 ms or more.

*20.The values shown are values in continuous operation.

Note: For robot control by NJ501-4□□0, use the G5 series/1S series AC Servo Drive with built-in EtherCAT communications, absolute encoder, and brake.

Performance Specifications Supported by NC Integrated Controller

| Item | | | NJ501- |
|-------------------|------------------------------|------------------------------------------------------------------------------------------------------------------|------------------------------------------|
| | | | 5300 |
| Numerical Control | Task Period | Primary periodic cycle | 500/1,000/2,000/4,000 μs |
| | | CNC Planner Service period | 500 μs to 16 ms |
| | Number of CNC motors | Maximum number of CNC motors | 16 |
| | | Maximum number of CNC coordinate systems | 4 |
| | CNC Coordinate system | Maximum number of CNC motor configurations that are included in a CNC coordinate system (excluding spindle axes) | 8 |
| | | Number of spindle axes that are included in a CNC coordinate system | 1 |
| | | Number of simultaneous interpolation axes | 4 |
| | NC Program | Program buffer size *1 | 16 MB |
| | | Maximum number of programs | Upper limit of main registrations 512 |
| | | | Upper limit of sub registrations 512 |
| | NC program variables | P variable | Double-precision floating point 65536 *2 |
| | | Q variable | Double-precision floating point 8192 *2 |
| | | L variable | Double-precision floating point 256 |
| | CNC motor compensation table | Maximum number of CNC motor compensation tables | 32 |
| | | Maximum size of all compensation tables | 1 MB |

- *1. The number of programs and their capacities that can be loaded into the CPU Unit at the same time.
The program capacity is the maximum size available. As fragmentation will occur, the size that is actually available will be smaller than the maximum size.
- *2. Some parts of the area are reserved by the system.

Function Specifications

| Item | | | | NJ501-□□□□ | NJ301-□□□□ | NJ101-□□□□ |
|------------------|----------------------------------------|-----------------------------------------|-----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------|
| Tasks | Function | Periodically Ex- ecuted Tasks | Maximum Number of Pri- mary Periodic Tasks | I/O refreshing and the user program are executed in units that are called tasks. Tasks are used to specify execution conditions and execution priority. | | |
| | | | Maximum Number of Peri- odic Tasks | 1 | | |
| | | Conditionally executed tasks *1 | Maximum number of event tasks | 3 | | |
| | | | Execution conditions | 32 | | |
| | | System Service Tasks (NJ501-R□□□) | Maximum number of V+ Tasks | When Activate Event Task instruction is executed or when condition expression for variable is met. | | |
| | Setup | System Service Monitoring Settings | | The execution interval and the percentage of the total user program execution time are monitored for the system services (processes that are executed by the CPU Unit separate from task execution). | | |
| Program- ming | POU (program organization units) | Programs | | POUs that are assigned to tasks. | | |
| | | Function Blocks | | POUs that are used to create objects with specific conditions. | | |
| | | Functions | | POUs that are used to create an object that determine unique outputs for the inputs, such as for data processing. | | |
| | Programming Lan- guages | Types | | Ladder diagrams *2 Structured text (ST) V+ (NJ501-R□□□) | | |
| | Namespaces *3 | | | A concept that is used to group identifiers for POU definitions. | | |
| | Variables | External Ac- cess of Vari- ables | Network Variables | The function which allows access from the HMI, host computers, or other Controllers | | |
| | Data Types | Data Types | Boolean | BOOL | | |
| | | | Bit Strings | BYTE, WORD, DWORD, LWORD | | |
| | | | Integers | INT, SINT, DINT,LINT, UINT, USINT, UDINT, ULINT | | |
| | | | Real Numbers | REAL, LREAL | | |
| | | | Durations | TIME | | |
| | | | Dates | DATE | | |
| | | | Times of Day | TIME_OF_DAY | | |
| | | | Date and Time | DATE_AND_TIME | | |
| | | | Text Strings | STRING | | |
| | | Derivative Data Types | | Structures, unions, enumerations | | |
| | | Structures | Function | A derivative data type that groups together data with different variable types. | | |
| | | | Maximum Number of Mem- bers | 2048 | | |
| | | | Nesting Maximum Levels | 8 | | |
| | | | Member Data Types | Basic data types, structures, unions, enumerations, array variables | | |
| | | | Specifying Member Offsets | You can use member offsets to place structure members at any memory locations.*3 | | |
| | | Unions | Function | A derivative data type that groups together data with different variable types. | | |
| | | | Maximum Number of Mem- bers | 4 | | |
| | | | Member Data Types | BOOL, BYTE, WORD, DWORD, LWORD | | |
| | | Enumerations | Function | A derivative data type that uses text strings called enumerators to express variable values. | | |
| | Data Type Attri- butes | Array Specifi- cations | Function | An array is a group of elements with the same data type. You specify the number (subscript) of the element from the first element to specify the element. | | |
| | | | Maximum Number of Dimensions | 3 | | |
| | | | Maximum Number of Elements | 65535 | | |
| | | | Array Specifications for FB Instances | Supported. | | |
| | | Range Specifications | | You can specify a range for a data type in advance. The data type can take only values that are in the specified range. | | |
| | | Libraries *3 | | User libraries | | |

*1. Supported only by the CPU Units with unit version 1.03 or later.

*2. Inline ST is supported. (Inline ST is ST that is written as an element in a ladder diagram.)

*3. Supported only by the CPU Units with unit version 1.01 or later.

| Item | | | | NJ501-□□□□ | NJ301-□□□□ | NJ101-□□□□ |
|----------------|-------------------------------|---------------------------------------------|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|------------|------------|
| Motion Control | Control Modes | | | position control, velocity control, torque control | | |
| | Axis Types | | | Servo axes, virtual servo axes, encoder axes, and virtual encoder axes | | |
| | Positions that can be managed | | | Command positions and actual positions | | |
| | Single-axis | Single-axis Position Control | Absolute Positioning | Positioning is performed for a target position that is specified with an absolute value. | | |
| | | | Relative Positioning | Positioning is performed for a specified travel distance from the command current position. | | |
| | | | Interrupt Feeding | Positioning is performed for a specified travel distance from the position where an interrupt input was received from an external input. | | |
| | | | Cyclic synchronous absolute positioning *1 | The function which outputs command positions in every control period in the position control mode. | | |
| | | Single-axis Velocity Control | Velocity Control | Velocity control is performed in Position Control Mode. | | |
| | | | Cyclic Synchronous Velocity Control | A velocity command is output each control period in Velocity Control Mode. | | |
| | | Single-axis Torque Control | Torque Control | The torque of the motor is controlled. | | |
| | | Single-axis Synchronized Control | Starting Cam Operation | A cam motion is performed using the specified cam table. | | |
| | | | Ending Cam Operation | The cam motion for the axis that is specified with the input parameter is ended. | | |
| | | | Starting Gear Operation | A gear motion with the specified gear ratio is performed between a master axis and slave axis. | | |
| | | | Positioning Gear Operation | A gear motion with the specified gear ratio and sync position is performed between a master axis and slave axis. | | |
| | | | Ending Gear Operation | The specified gear motion or positioning gear motion is ended. | | |
| | | | Synchronous Positioning | Positioning is performed in sync with a specified master axis. | | |
| | | | Master Axis Phase Shift | The phase of a master axis in synchronized control is shifted. | | |
| | | | Combining Axes | The command positions of two axes are added or subtracted and the result is output as the command position. | | |
| | | Single-axis Manual Operation | Powering the Servo | The Servo in the Servo Drive is turned ON to enable axis motion. | | |
| | | | Jogging | An axis is jogged at a specified target velocity. | | |
| | | Auxiliary Functions for Single-axis Control | Resetting Axis Errors | Axes errors are cleared. | | |
| | | | Homing | A motor is operated and the limit signals, home proximity signal, and home signal are used to define home. | | |
| | | | Homing with parameter *1 | Specifying the parameter, a motor is operated and the limit signals, home proximity signal, and home signal are used to define home. | | |
| | | | High-speed Homing | Positioning is performed for an absolute target position of 0 to return to home. | | |
| | | | Stopping | An axis is decelerated to a stop at the specified rate. | | |
| | | | Immediately Stopping | An axis is stopped immediately. | | |
| | | | Setting Override Factors | The target velocity of an axis can be changed. | | |
| | | | Changing the Current Position | The command current position or actual current position of an axis can be changed to any position. | | |
| | | | Enabling External Latches | The position of an axis is recorded when a trigger occurs. | | |
| | | | Disabling External Latches | The current latch is disabled. | | |
| | | | Zone Monitoring | You can monitor the command position or actual position of an axis to see when it is within a specified range (zone). | | |
| | | | Enabling digital cam switches *4 | You can turn a digital output ON and OFF according to the position of an axis. | | |
| | | | Monitoring Axis Following Error | You can monitor whether the difference between the command positions or actual positions of two specified axes exceeds a threshold value. | | |
| | | | Resetting the Following Error | The error between the command current position and actual current position is set to 0. | | |
| | | | Torque Limit | The torque control function of the Servo Drive can be enabled or disabled and the torque limits can be set to control the output torque. | | |
| | | | Slave Axis Position Compensation *5 | This function compensates the position of the slave axis currently in synchronized control. | | |
| | | | Cam monitor (NJ□01-□□00) | Outputs the specified offset position for the slave axis in synchronous control. | | |
| | | | Start velocity *6 | You can set the initial velocity when axis motion starts. | | |

*1. Supported only by the CPU Units with unit version 1.03 or later.

*4. Supported only by the CPU Units with unit version 1.06 or later.

*5. Supported only by the CPU Units with unit version 1.10 or later.

*6. Supported only by the CPU Units with unit version 1.05 or later.

| Item | | | | NJ501-□□□□ | NJ301-□□□□ | NJ101-□□□□ |
|----------------|---------------------|--------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| Motion Control | Axes Groups | Multi-axes Co-ordinated Control | Absolute Linear Interpolation | Linear interpolation is performed to a specified absolute position. | | |
| | | | Relative Linear Interpolation | Linear interpolation is performed to a specified relative position. | | |
| | | | Circular 2D Interpolation | Circular interpolation is performed for two axes. | | |
| | | | Axes Group Cyclic Synchronous Absolute Positioning | A positioning command is output each control period in Position Control Mode.*3 | | |
| | | Auxiliary Functions for Multi-axes Coordinated Control | Resetting Axes Group Errors | Axes group errors and axis errors are cleared. | | |
| | | | Enabling Axes Groups | Motion of an axes group is enabled. | | |
| | | | Disabling Axes Groups | Motion of an axes group is disabled. | | |
| | | | Stopping Axes Groups | All axes in interpolated motion are decelerated to a stop. | | |
| | | | Immediately Stopping Axes Groups | All axes in interpolated motion are stopped immediately. | | |
| | | | Setting Axes Group Override Factors | The blended target velocity is changed during interpolated motion. | | |
| | | | Reading Axes Group Positions | The command current positions and actual current positions of an axes group can be read.*3 | | |
| | | | Changing the Axes in an Axes Group | The Composition Axes parameter in the axes group parameters can be overwritten temporarily.*3 | | |
| | Common Items | Cams | Setting Cam Table Properties | The end point index of the cam table that is specified in the input parameter is changed. | | |
| | | | Saving Cam Tables | The cam table that is specified with the input parameter is saved in non-volatile memory in the CPU Unit. | | |
| | | | Generating cam tables *7 | The cam table that is specified with the input parameter is generated from the cam property and cam node. | | |
| | | Parameters | Writing MC Settings | Some of the axis parameters or axes group parameters are overwritten temporarily. | | |
| | | | Changing axis parameters *7 | You can access and change the axis parameters from the user program. | | |
| | Auxiliary Functions | Count Modes | | You can select either Linear Mode (finite length) or Rotary Mode (infinite length). | | |
| | | Unit Conversions | | You can set the display unit for each axis according to the machine. | | |
| | | Acceleration/Deceleration Control | Automatic Acceleration/Deceleration Control | Jerk is set for the acceleration/deceleration curve for an axis motion or axes group motion. | | |
| | | | Changing the Acceleration and Deceleration Rates | You can change the acceleration or deceleration rate even during acceleration or deceleration. | | |
| | | In-position Check | | You can set an in-position range and in-position check time to confirm when positioning is completed. | | |
| | | Stop Method | | You can set the stop method to the immediate stop input signal or limit input signal. | | |
| | | Re-execution of Motion Control Instructions | | You can change the input variables for a motion control instruction during execution and execute the instruction again to change the target values during operation. | | |
| | | Multi-execution of Motion Control Instructions (Buffer Mode) | | You can specify when to start execution and how to connect the velocities between operations when another motion control instruction is executed during operation. | | |
| | | Continuous Axes Group Motions (Transition Mode) | | You can specify the Transition Mode for multi-execution of instructions for axes group operation. | | |
| | | Monitoring Functions | Software Limits | Software limits are set for each axis. | | |
| | | | Following Error | The error between the command current value and the actual current value is monitored for an axis. | | |
| | | | Velocity, Acceleration Rate, Deceleration Rate, Torque, Interpolation Velocity, Interpolation Acceleration Rate, And Interpolation Deceleration Rate | You can set and monitor warning values for each axis and each axes group. | | |
| | | Absolute Encoder Support | | You can use an OMRON G5-Series or 1S-Series Servomotor with an Absolute Encoder to eliminate the need to perform homing at startup. | | |
| | | Input signal logic inversion *6 | | You can inverse the logic of immediate stop input signal, positive limit input signal, negative limit input signal, or home proximity input signal. | | |
| | | External Interface Signals | | | The Servo Drive input signals listed on the right are used. Home signal, home proximity signal, positive limit signal, negative limit signal, immediate stop signal, and interrupt input signal | |

*3. Supported only by the CPU Units with unit version 1.01 or later.

*6. Supported only by the CPU Units with unit version 1.05 or later.

*7. Supported only by the CPU Units with unit version 1.08 or later.

| Item | | | | NJ501-□□□□ | NJ301-□□□□ | NJ101-□□□□ |
|-----------------------|-----------------------------------------|------------------------------------|---------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------|
| Unit (I/O) Management | EtherCAT Slaves | Maximum Number of Slaves | | 192 | | 64 |
| | CJ-Series Units | Maximum number of Units | | 40 | | |
| | | Basic I/O Units | Load Short-circuit Protection and I/O Disconnection Detection | Alarm information for Basic I/O Units is read. | | |
| Communications | Peripheral USB Port | | | A port for communications with various kinds of Support Software running on a personal computer. | | |
| | Secure Communications | | | Function for secure communication with support software | | |
| | Built-in EtherNet/IP port Internal Port | Communications protocol | | TCP/IP, UDP/IP | | |
| | | CIP Communications Service | Tag Data Links | Programless cyclic data exchange is performed with the devices on the EtherNet/IP network. | | |
| | | | Message Communications | CIP commands are sent to or received from the devices on the EtherNet/IP network. | | |
| | | TCP/IP functions | CIDR | The function which performs IP address allocations without using a class (class A to C) of IP address. | | |
| | | TCP/IP Applications | Socket Services | Data is sent to and received from any node on Ethernet using the UDP or TCP protocol. Socket communications instructions are used. | | |
| | | | FTP client *7 | File can be read from or written to computers at other Ethernet nodes from the CPU Unit. FTP client communications instructions are used. | | |
| | | | FTP Server | Files can be read from or written to the SD Memory Card in the CPU Unit from computers at other Ethernet nodes. | | |
| | | | Automatic Clock Adjustment | Clock information is read from the NTP server at the specified time or at a specified interval after the power supply to the CPU Unit is turned ON. The internal clock time in the CPU Unit is updated with the read time. | | |
| | | | SNMP Agent | Built-in EtherNet/IP port internal status information is provided to network management software that uses an SNMP manager. | | |
| | | OPC UA (NJ501-1□00) | Server Function | Functions to respond to requests from clients on the OPC UA network | --- | --- |
| | EtherCAT Port | Supported Services | Process Data Communications | Control information is exchanged in cyclic communications between the EtherCAT master and slaves. | | |
| | | | SDO Communications | A communications method to exchange control information in noncyclic event communications between EtherCAT master and slaves. This communications method is defined by CoE. | | |
| | | Network Scanning | | Information is read from connected slave devices and the slave configuration is automatically generated. | | |
| | | DC (Distributed Clock) | | Time is synchronized by sharing the EtherCAT system time among all EtherCAT devices (including the master). | | |
| | | Enable/disable Settings for Slaves | | The slaves can be enabled or disabled as communications targets. | | |
| | | Disconnecting/Connecting Slaves | | Temporarily disconnects a slave from the EtherCAT network for maintenance, such as for replacement of the slave, and then connects the slave again. | | |
| | | Supported Application Protocol | CoE | SDO messages of the CAN application can be sent to slaves via EtherCAT. | | |
| | Communications Instructions | | | The following instructions are supported. CIP communications instructions, socket communications instructions, SDO message instructions, no-protocol communications instructions, protocol macro instructions, and FTP client instructions *7, and Modbus RTU protocol instructions *8 | | |
| Operation Management | RUN Output Contacts | | | The output on the Power Supply Unit turns ON in RUN mode. | | |
| System Management | Event Logs | Function | | Events are recorded in the logs. | | |
| | | Maximum number of events | System event log | 1,024 | 512 | |
| | | | Access event log | 1,024 | 512 | |
| | | | User-defined event log | 1,024 | 512 | |

*6. Supported only by the CPU Units with unit version 1.05 or later.

*7. Supported only by the CPU Units with unit version 1.08 or later.

*8. Supported only by the CPU Units with unit version 1.11 or later.

| Item | | | | NJ501-□□□□ | NJ301-□□□□ | NJ101-□□□□ |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|---------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-------------------------------------------------------------------|
| Debugging | Online Editing | Single | | Programs, function blocks, functions, and global variables can be changed online. Different operators can change different POU's across a network. | | |
| | Forced Refreshing | Maximum Number of Forced Variables | Device Variables for Ether-CAT Slaves | 64 | | |
| | | | Device Variables for CJ-series Units and Variables with AT Specifications | 64 | | |
| | | | MC Test Run *9 | | | Motor operation and wiring can be checked from the Sysmac Studio. |
| | Synchronizing | | | The project file in the Sysmac Studio and the data in the CPU Unit can be made the same when online. | | |
| | Differentiation monitoring *1 | | | Rising/falling edge of contacts can be monitored. | | |
| | | Maximum number of contacts *1 | | 8 | | |
| | Data Tracing | Types | Single Triggered Trace | When the trigger condition is met, the specified number of samples are taken and then tracing stops automatically. | | |
| | | | Continuous Trace | Data tracing is executed continuously and the trace data is collected by the Sysmac Studio. | | |
| | | Maximum Number of Simultaneous Data Trace | | 4 *10 | 2 | |
| | | Maximum Number of Records | | 10,000 | | |
| | | Sampling | Maximum Number of Sampled Variables | 192 variables | 48 variables | |
| | | Timing of Sampling | | Sampling is performed for the specified task period, at the specified time, or when a sampling instruction is executed. | | |
| | | Triggered Traces | Trigger conditions are set to record data before and after an event. | | | |
| | | | Trigger Conditions | When BOOL variable changes to TRUE or FALSE Comparison of non-BOOL variable with a constant Comparison Method: Equals (=), Greater than (>), Greater than or equals (≥), Less Than (<), Less than or equals (≤), Not equal (≠) | | |
| Delay | Trigger position setting: A slider is used to set the percentage of sampling before and after the trigger condition is met. | | | | | |
| Simulation | | | The operation of the CPU Unit is emulated in the Sysmac Studio. | | | |
| Reliability Functions | Self-diagnosis | Controller Errors | Levels | Major fault, partial fault, minor fault, observation, and information | | |
| | | User-defined errors | | User-defined errors are registered in advance and then records are created by executing instructions. | | |
| | | | Levels | 8 levels | | |
| Security | Protecting Software Assets and Preventing Operating Mistakes | CPU Unit Names and Serial IDs | | When going online to a CPU Unit from the Sysmac Studio, the CPU Unit name in the project is compared to the name of the CPU Unit being connected to. | | |
| | | Protection | User Program Transfer with No Restoration Information | You can prevent reading data in the CPU Unit from the Sysmac Studio. | | |
| | | | CPU Unit Write Protection | You can prevent writing data to the CPU Unit from the Sysmac Studio or SD Memory Card. | | |
| | | | Overall Project File Protection | You can use passwords to protect .smc files from unauthorized opening on the Sysmac Studio. | | |
| | | | Data Protection | You can use passwords to protect POU's on the Sysmac Studio.*3 | | |
| | | Verification of Operation Authority | | Online operations can be restricted by operation rights to prevent damage to equipment or injuries that may be caused by operating mistakes. | | |
| | | | Number of Groups | 5 *11 | 5 | |
| SD Memory Card Functions | Storage Type | | | SD Memory Card, SDHC Memory Card | | |
| | Application | Automatic transfer from SD Memory Card *1 | | The data in the autoload folder on an SD Memory Card is automatically loaded when the power supply to the Controller is turned ON. | | |
| | | Transfer program from SD Memory Card *8 | | The user program on an SD Memory Card is loaded when the user changes system-defined variable to TRUE. | | |
| | | SD Memory Card Operation Instructions | | You can access SD Memory Cards from instructions in the user program. | | |
| | | File Operations from the Sysmac Studio | | You can perform file operations for Controller files in the SD Memory Card and read/write standard document files on the computer. | | |
| | | SD Memory Card Life Expiration Detection | | Notification of the expiration of the life of the SD Memory Card is provided in a system-defined variable and event log. | | |

*1. Supported only by the CPU Units with unit version 1.03 or later.

*3. Supported only by the CPU Units with unit version 1.01 or later.

*8. Supported only by the CPU Units with unit version 1.11 or later.

*9. Cannot be used with the NJ101-9000.

*10. Maximum Number of Simultaneous Data Trace of the NJ501-□□20 CPU Unit with unit version 1.08 or later is 2.

*11. When the NJ501 CPU Units with unit version 1.00 is used, this value becomes two.

| Item | | | | NJ501-□□□□ | NJ301-□□□□ | NJ101-□□□□ |
|------------------------|-------------------------------------------|------------|----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|------------|------------|
| Backup functions *1 | SD Memory Card backup functions | Operation | Using front switch | You can use front switch to backup, compare, or restore data. | | |
| | | | Using system-defined variables | You can use system-defined variables to backup, compare, or restore data. *12 | | |
| | | | Memory Card Operations Dialog Box on Sysmac Studio | Backup and verification operations can be performed from the SD Memory Card Operations Dialog Box on the Sysmac Studio. | | |
| | | | Using instruction *7 | Backup operation can be performed by using instruction. | | |
| | Sysmac Studio Controller backup functions | Protection | Prohibiting backing up data to the SD Memory Card | Prohibit SD Memory Card backup functions. | | |
| | | | | Backup, restore, and verification operations for Units can be performed from the Sysmac Studio. | | |

*1. Supported only by the CPU Units with unit version 1.03 or later.

*7. Supported only by the CPU Units with unit version 1.08 or later.

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

NJ-Series

Function Specifications of Database Connection CPU Units

Besides functions of the NJ501-□□□□/NJ101-□□□□, functions supported by the NJ501-□□20/NJ101-□020 are as follows.

| Item | | Description | |
|------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| | | NJ501-□□20 | NJ101-□020 |
| Supported port | | Built-in EtherNet/IP port | |
| Supported DB *1*2 | | Microsoft Corporation: SQL Server 2012/2014/2016/2017/2019/2022 Oracle Corporation: Oracle Database 11g /12c/18c/19c/21c/23ai (23c) MySQL Community Edition 5.6/5.7/8.0 *3 International Business Machines Corporation (IBM): DB2 for Linux, UNIX and Windows 9.7/10.1/10.5/11.1 *4 Firebird Foundation Incorporated: Firebird 2.5 *4 The PostgreSQL Global Development Group: PostgreSQL 9.4/9.5/9.6/10/11/12/13/14/15/16 *4 | |
| Number of DB Connections (Number of databases that can be connected at the same time) | | 3 connections max. *5 | 1 |
| Instruction | Supported operations | The following operations can be performed by executing DB Connection Instructions in the NJ/NX-series CPU Units. Inserting records (INSERT), Updating records (UPDATE), Retrieving records (SELECT), Deleting records (DELETE), Execute Stored Procedure *6, and Execute Batch Insert *6 | |
| | Max. number of instructions for simultaneous execution | 32 | |
| | Max. number of columns in an INSERT operation | SQL Server: 1,024 Oracle: 1,000 DB2: 1,000 MySQL: 1,000 Firebird: 1,000 PostgreSQL: 1,000 | |
| | Max. number of columns in an UPDATE operation | SQL Server: 1,024 Oracle: 1,000 DB2: 1,000 MySQL: 1,000 Firebird: 1,000 PostgreSQL: 1,000 | |
| | Max. number of columns in a SELECT operation | SQL Server: 1,024 Oracle: 1,000 DB2: 1,000 MySQL: 1,000 Firebird: 1,000 PostgreSQL: 1,000 | |
| | Max. number of records in the output of a SELECT operation | 65,535 elements, 4 MB | 65,535 elements, 2 MB |
| | Stored procedure call *6 | Supported databases | • SQL Server • Oracle Database • MySQL Community Edition • PostgreSQL *7 |
| | | Argument (Sum of IN, OUT and INOUT) | Up to 256 variables *8 |
| | | Return value | One variable |
| | | Result set | Supported |
| | | Spool function | Not supported |
| | Batch insert execution *6 | Supported databases | • SQL Server • Oracle Database • MySQL Community Edition • PostgreSQL *7 |
| | | Supported data size | Less than 1,000 columns and upper limit of structure variable size or less *9 |
| | | Spool function | Not supported |
| | Max. number of DB Map Variables for which a mapping can be connected *10 | | SQL Server: 60 Oracle: 30 DB2: 30 *4 MySQL: 30 Firebird: 15 *4 PostgreSQL: 30 *4 |
| Run mode of the DB Connection Service | | Operation Mode or Test Mode • Operation Mode: When each instruction is executed, the service actually accesses the DB. • Test Mode: When each instruction is executed, the service ends the instruction normally without accessing the DB actually. | |
| Spool function | | Used to store SQL statements when an error occurred and resend the statements when the communications are recovered from the error. | |
| | Spool capacity | 1 MB *11 | 192 KB *11 |
| Operation Log function | | The following three types of logs can be recorded. • Execution Log: Log for tracing the executions of the DB Connection Service. • Debug Log: Detailed log for SQL statement executions of the DB Connection Service. • SQL Execution Failure Log: Log for execution failures of SQL statements in the DB. | |
| DB Connection Service shutdown function | | Used to shut down the DB Connection Service after automatically saving the Operation Log files into the SD Memory Card. | |
| Encrypted Communication | Supported databases | • SQL Server • Oracle Database • MySQL Community Edition • PostgreSQL *7 | |
| | TLS Ver. | TLS 1.2 | |

- *1. SQL Server 2014, Oracle Database 12c and PostgreSQL 9.4 are supported by the DB Connection Service Version 1.02 or higher.
SQL Server 2016, My SQL 5.7, DB2 11.1 and Postgre SQL 9.5/9.6 are supported by the DB Connection Service Version 1.03 or higher.
SQL Server 2017 is supported by the DB Connection Service Version 1.04 or higher.
Oracle Database 18c, MySQL Community Edition 8.0 and PostgreSQL 10 are supported by the DB Connection Service Version 2.00 or higher.
You cannot use Oracle 10g with the DB Connection Service version 2.00 or higher.
SQL Server 2019, Oracle Database 19c and PostgreSQL 11/12/13 are supported by the DB Connection Service Version 2.01 or higher.
SQL Server 2022, Oracle Database 21c/23ai (23c) and PostgreSQL 14/15/16 are supported by the DB Connection Service Version 2.04 or higher.
- *2. Connection to the DB on the cloud is not supported.
- *3. The supported storage engines of the DB are InnoDB and MyISAM.
- *4. NJ501-4320 is not supported.
- *5. When two or more DB Connections are established, the operation cannot be guaranteed if you set different database types for the connections.
- *6. The function is available for the DB Connection Service Version 2.00 or higher.
- *7. The NJ501-4320 does not support PostgreSQL.
- *8. Depends on members of a structure.
- *9. Constrained by the memory capacity for variables. See the specifications for the memory capacity for variables.
- *10. Even if the number of DB Map Variables has not reached the upper limit, the total number of members of structures used as data type of DB Map Variables is 10,000 members max.
- *11. Refer to "NJ/NX-series Database Connection CPU Units User's Manual(W527)" for the information.

Note: The extended support for databases has ended for the following DB versions.
Please consider replacing the current database with a new version.

| Item | Discription |
|------------------------------------------------------------------------------------|-------------|
| Microsoft Corporation: SQL Server | 2008/2008R2 |
| Oracle Corporation: Oracle Database | 10g |
| Oracle Corporation: MySQL Community Edition | 5.1/5.5 |
| International Business Machines Corporation (IBM): DB2 for Linux, UNIX and Windows | 9.5 |
| Firebird Foundation Incorporated: Firebird | 2.1 |
| The PostgreSQL Global Development Group: PostgreSQL | 9.2/9.3 |

NJ-Series

Function Specifications of SECS/GEM CPU Units

Besides functions of the NJ501-1300, functions supported by the NJ501-1340 are as follows.

| Item | Description |
|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Supported port | Built-in EtherNet/IP port |
| Supported standard *1 | The Unit conforms to the following SEMI standards: E37-0303, E37.1-0702, E5-0707, and E30-0307 |
| Fundamental GEM requirement | State Model, Equipment Processing State, Host-initiated S1, F13/F14 Scenario, Event Notification, On-Line Identification, Error Message, Control (Operator Initiated), Documentation |
| Additional GEM capability | Establish Communications, Dynamic Event Report Configuration, Variable Data Collection, Trace Data Collection, Status Data Collection, Alarm Management, Remote Control, Equipment Constant, Process Recipe Management *1, Material Movement, Equipment Terminal Service, Clock, Limit Monitoring, Spooling *2, Control (Host Initiated) |
| User-defined message | You can create non-GEM compliant communications messages and have host communications. |
| GEM specific instruction | The Unit supports 29 instructions to perform the following: <ul style="list-style-type: none"> • Changing the GEM Service status. • Setting HSMS communications. • Reporting events and reporting alarms. • Acknowledging host commands and enhanced remote commands. • Changing equipment constants. • Uploading and downloading process programs. • Sending and acknowledging equipment terminal messages. • Requesting to change time. • Sending user-defined messages. • Getting SECS communications log. |
| GEM Service log *2 | Can record the following information. <ul style="list-style-type: none"> • HSMS communications log: Keeps log of HSMS communications operations. • SECS message log: Keeps log of SECS-II communications messages. • Execution log: Keeps log of executions of GEM instructions. |
| Shutting down the GEM Service | Saves the spool data and GEM Service log records into an SD Memory Card and ends the GEM Service. |

*1. E42 recipes, large process programs, and E139 recipes are not supported.

*2. The capability is not available when no SD Memory Card is mounted.

Conformance to Fundamental GEM Requirements and Additional Capabilities

| Fundamental GEM requirements | GEM-compliant | Additional capabilities | GEM-compliant |
|-------------------------------------|---------------|------------------------------------|-------------------------------------------------------------|
| State Model | Yes | Establish Communications | Yes |
| Equipment Processing State | | Dynamic Event Report Configuration | |
| Host-initiated S1, F13/F14 Scenario | | Variable Data Collection | |
| Event Notification | | Trace Data Collection | |
| On-Line Identification | | Status Data Collection | |
| Error Message | | Alarm Management | |
| Control (Operator Initiated) | | Remote Control | |
| Documentation | | Equipment Constant | |
| | | Process Recipe Management | Process program: Yes E42 recipes: No E139 recipes: No |
| | | Material Movement | Yes |
| | | Equipment Terminal Service | |
| | | Clock | |
| | | Limit Monitoring | |
| | | Spooling | |
| | | Control (Host Initiated) | |

Function Specifications of NJ Robotics CPU Units

Besides functions of the NJ501-1□00, functions supported by the NJ501-4□□□ are as follows.

| Item | | | | NJ501- | | | | |
|-------------------------|---------------------|--------------------------------------------------------|---------------------|-------------------------------------------------------------------------------------------------|------|------|------|------|
| | | | | 4500 | 4400 | 4300 | 4310 | 4320 |
| Robot control functions | Axes groups | Multi-axes coordinated control | Conveyer tracking | The robot is moved in synchronization with the conveyor during the conveyor tracking operation. | | | | |
| | | Auxiliary functions for multi-axes coordinated control | Kinematics Setting | Set parameters for robot operation, such as arm length of Delta3 robot. | | | | |
| | Auxiliary functions | Monitoring functions | Work space function | Set the coordinate values for workspace check and check the workspace during operation. | | | | |

Function Specifications of NC Integrated Controller

Besides functions of the NJ501-1□00, functions supported by the NJ501-5300 are as follows.

| Item | | | | NJ501-5300 | | |
|-------------------|-----------------------|-------------------------------|---------------------------------|--------------------------------|------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| Numerical Control | CNC coordinate system | Axes types | | Positioning axis, Spindle axis | | |
| | | Control modes | Positioning axis | Position control | | |
| | | | Spindle axis | Velocity control | | |
| | | Positions that can be managed | | | Absolute position (command), absolute position (actual), program position, remaining travel distance | |
| | | NC program execution | Execute | | Executes the NC program. | |
| | | | Reset | | Interrupt NC program | |
| | | | Single step execution | | Executes the NC program by block. | |
| | | | Back trace | | Executes back trace of interpolation pass. | |
| | | | Feed hold / Feed hold reset | | Temporarily stops the NC program, and restarts it. | |
| | | | Optional stop | | Stops the NC program with optional signal. | |
| | | | Optional block stop | | Skips one block of the NC program with optional signal. | |
| | | | Dry run | | Runs operation from the NC program. | |
| | | | Machine lock | | Locks each axis operation during execution of the NC program. | |
| | | | Auxiliary lock | | Locks M code output. | |
| | | | Override | | Overrides the feed rate and spindle velocity. | |
| | | G Code | Position control | Rapid Positioning | | Rapid feed of each CNC motor according to the motor setting. |
| | | | | Linear interpolation | | Interpolates linearly. |
| | | | | Circular interpolation | | Interpolates circularly, helically, spirally, or conically. |
| | | | | Skip function | | Rapid feed until an external signal is input. |
| | | | Return to reference point | | | Returns to a specified position on the machine. |
| | | | Canned cycle | Rigid tap | | Performs tapping machining. |
| | | | Feed function | Exact stop | | Temporarily prevents blending of positioning operations before and after an exact stop direction. |
| | | | | Exact stop mode | | Mode in which anteroposterior positioning operations are not blended. |
| | | | | Continuous-path mode | | Mode in which anteroposterior positioning operations are blended. |
| | | | | Dwell | | Waits for the specified period of time. |
| | | | Coordinate system selection | Machine Coordinate System | | The coordinate system uses the machine home position as the home of the system. |
| | | | | Work Coordinate System | | The coordinate system has work offset for the Machine Coordinate System. |
| | | | | Local Coordinate System | | The coordinate system has additional offset for the Work Coordinate System. |
| | | | Auxiliary for coordinate system | Absolute/relative selection | | Specifies manipulated variable absolutely, or switches to the relative setting. |
| | | | | Metric/inch selection | | Selects metric or inch as the orthogonal axes unit system. |
| | | | | Scaling | | Scales the current coordinates of the orthogonal axes. |
| | | | | Mirroring | | Mirrors the current coordinates for the specified orthogonal axes. |
| | | | | Rotation | | Rotate the current coordinates around the coordinates of the specified axis. |
| | | | Tool functions | Cutter compensation | | Compensation of the tool edge path according to the tool radius. |
| | | | | Tool length compensation | | Compensation of tool center point path according to the tool length. |
| | | M code | M code/M code reset | | | Outputs M codes, and interlocks with sequence control program using reset. |
| | | | Spindle axis | CW/CCW/Stop | | Outputs/stops velocity commands in velocity loop control mode. |
| | | | | Orientation | | Stops spindle axis to the specified phase by setting up feed back loop. |
| | | | Subroutine call | | | Calls a subroutine of the NC program. |
| | | NC programming | Arithmetic operation | | | Performs a calculation in the NC program. |
| | | | Branch control | | | Branches on condition in the NC program. |
| | | | User variables | | | Memory area in the NC program used for processing such as data calculation. |
| | | | | P variable | | System global memory area common to CNC coordinate systems |
| | | | | Q variable | | Global system area unique to each CNC coordinate system |
| | | | | L variable | | Memory area that can be used as the primary area during execution of the NC program |
| | | Auxiliary control functions | Error reset | | | Function that resets errors or CNC coordinate system and CNC motor. |
| | | | Immediate stop | | | Function that stops all the CNC motors of the CNC coordinate system. |

| Item | | | | NJ501- 5300 | |
|-------------------|--------------|-------------------------------|---------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| Numerical Control | CNC motor | Positions that can be managed | | Commanded positions and actual positions. | |
| | | Position control | Absolute positioning | Positioning is performed for a target position that is specified using an absolute value. | |
| | | | Relative positioning | Positioning is performed for a specified travel distance from the command current position. | |
| | | | Cyclic positioning | A commanded position is output at each control period in Position Control Mode. | |
| | | Spindle control | CW/CCW/Stop | | Outputs/stops velocity commands in velocity loop control mode. |
| | | Manual operation | Powering the Servo | | The Servo in the servo driver is turned ON to enable CNC motor operation. |
| | | | Jogging | | A CNC motor is jogged at a specified target velocity. |
| | | Auxiliary control functions | Homing | | A CNC motor is operated, and the limit signals, home proximity signal, and home signal are used to define home. |
| | | | Immediate stop | | A CNC motor is stopped immediately. |
| | | CNC motor compensation table | Ball screw compensation | | Pitch error compensation for one-dimensional ball screw. |
| | | | Cross-axis compensation | | Compensation of one-dimensional cross-axis. |
| | | | Editing the CNC motor compensation table | | Edit using sequence control program. (Read/write) |
| | | Auxiliary functions | In-position check | | You can set an in-position range and in-position check time to confirm when positioning is completed. |
| | | | Stop method | | You can set the stop method to the immediate stop input signal or limit input signal. |
| | | | Monitoring functions | Software limits | Monitors the movement range of a CNC motor. |
| | | | | Following error | Monitors the error between the command current value and the actual current value for a CNC motor. |
| | | | Absolute encoder support | | You can use an OMRON 1S-series Servomotor or G5-series. Servomotor with an Absolute Encoder to eliminate the need to perform homing at startup. |
| | | | Input signal logic inversion | | You can inverse the logic of immediate stop input signal, positive limit input signal, negative limit input signal, or home proximity input signal. |
| | | External interface signals | | The Servo Drive input signals listed on the right are used. Home signal, home proximity signal, positive limit signal, negative limit signal, immediate stop signal, and interrupt input signal. | |
| | Common items | Parameters | Changing CNC coordinate system and CNC motor parameters | You can access and change the CNC coordinate system and CNC motor parameters from the user program. | |

Function Specifications of Robot integrated CPU Units

Besides functions of the NJ501-1□□0, functions supported by the NJ501-R□□0 are as follows.

| Item | | | Description |
|---------------|------------------|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | | NJ501-R□□0 |
| Robot Control | Number of robots | Maximum number of robots | 8 robots |
| | Motion Operation | Basic operation | Joint interpolation operation, Linear motion, Arc motion, Jog motion |
| | | Coordinate system of Tool | Descent (APPRO), Rising (DEPART), Tool alignment (ALIGN) |
| | | Joint motion | Each joint operation (DRIVE) |
| | | Application | Pick or Place |
| | | Continuous-path motion | ON, OFF |
| | | Deceleration Stop | Braking current motion |
| | | Home position | Move to home position (READY) |
| | Motion Modifiers | Speed of the robot | Velocity profile, Velocity, Acceleration, Deceleration, Minimum operation time |
| | | Unit of speed | Ratio for maximum velocity, [mm/s], [inch/s] |
| | | Arm configuration | ABOVE/BELOW, LEFTY/RIGHTY, FLIP/NOFLIP |
| | | Hardware servo | High accuracy/Low accuracy |
| | | Axis of rotation | Rotation Range, Rotation Range Over Error |
| | Latching | Position Deviation | Pending position deviation cancellation |
| | | Robot position | You can read the robot position in the V+ program when a latch signal occurred. |
| | Other functions | Local encoder | You can read the counter value of encoder that is connected to the encoder input port of OMRON robot in the V+ program when a latch signal occurred. |
| | | Coordinate system | World coordinate system, Tool coordinate system, Conversion from/to NJ Robotics function coordinate system |
| | | Position variable | Conversion, Relative conversion, High accuracy position |
| | | Robot tool | Tool offset setting |
| | | End effector operation | Open/Close/Loosen Gripper |
| | | Conveyor tracking | Belt variable, Nominal transformation, Encoder scaling factor, Encoder offset, Belt window, Belt relative motion |
| | | Stop | Specified time stop (DELAY) |

NJ-Series

Version Information

Unit Versions and Programming Devices (NJ-series CPU Units)

Refer to *NJ-series CPU Unit Hardware User's Manual* (W500).

Unit Versions, DBCon Versions and Programming Devices (Database Connection CPU Units)

Refer to *NJ/NX-series Database Connection CPU Units User's Manual* (W527).

Unit Versions, Robot Versions and Programming Devices (NJ Robotics CPU Units)

Refer to *NJ-series Robotics CPU Units User's Manual* (W539).

Unit Versions and Programming Devices (NC Integrated Controller)

Refer to *NJ/NY-series NC Integrated Controller User's Manual* (O030).

Unit Versions, Robot Control Versions and Programming Devices (Robot Integrated CPU Units)

Refer to *NJ-series Robot Integrated CPU Unit User's Manual* (O037).

Relationship between Hardware Revisions of CPU Units and Sysmac Studio Versions

Refer to *NJ-series CPU Unit Hardware User's Manual* (W500).

Functions That Were Added or Changed for Each Unit Version and Sysmac Studio version

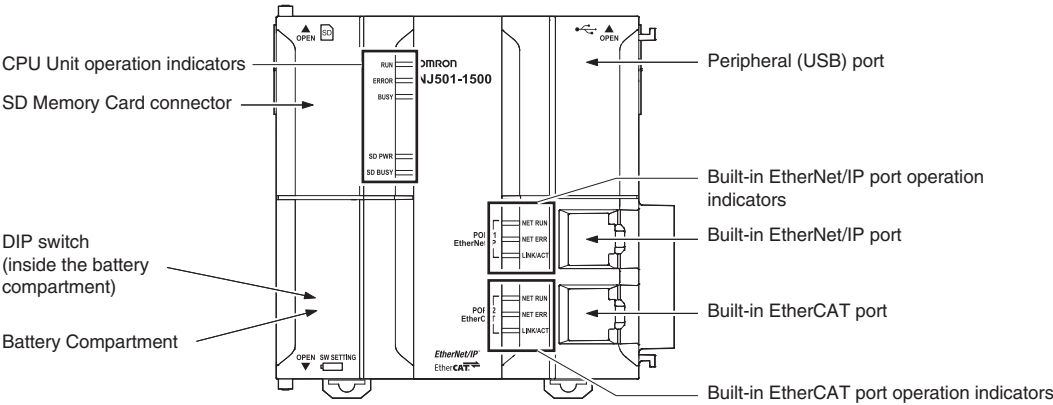
Refer to *NJ-series CPU Unit Hardware User's Manual* (W500).

Performance Improvements for Unit Version Upgrades

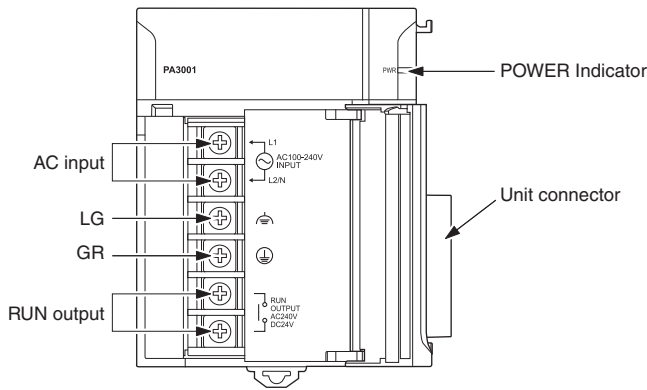
Refer to *NJ-series CPU Unit Hardware User's Manual* (W500).

Components and Functions

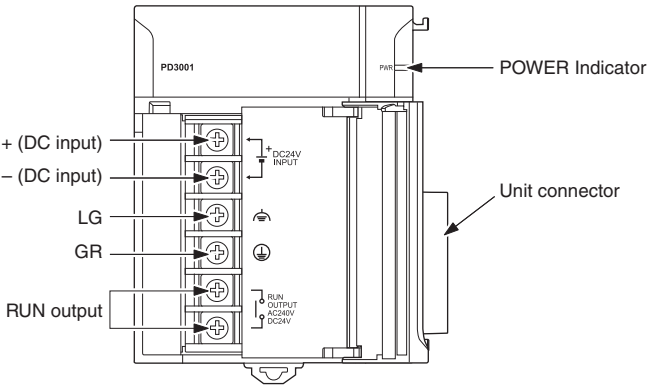
CPU Unit
NJ001-0000



Power Supply Unit
NJ-PA3001



NJ-PD3001

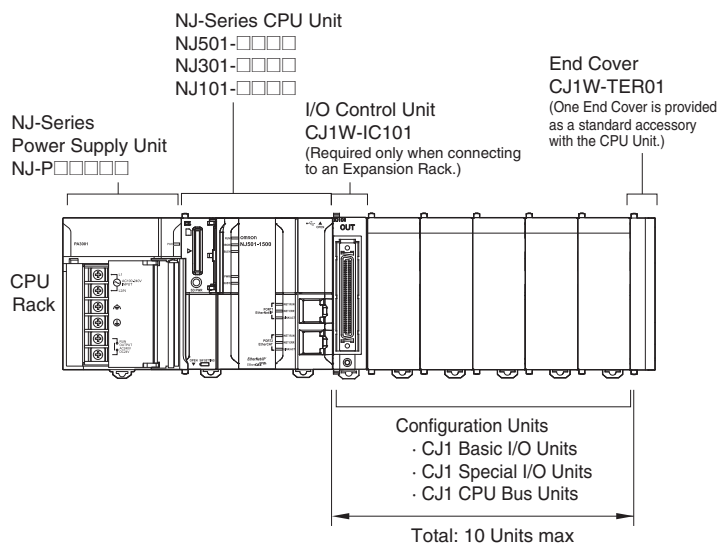


NJ-Series

Unit Configuration

NJ-Series CPU Racks

A NJ-Series CPU Rack consists of a CPU Unit, Power Supply Unit, Configuration Units (Basic I/O Units, Special I/O Units, and CPU Bus Units), and an End Cover.





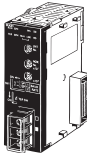
Even though the NJ-Series Controllers do not have Backplanes, the term “slot” still used to refer to the location of Units. Slot numbers are assigned in order to Units from left to right on the CPU Rack (slot 0, slot 1, slot 2, etc.).

Required Units

| Rack | Unit name | Required number of Units |
|----------|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CPU Rack | NJ-Series Power Supply Unit | 1 |
| | NJ-Series CPU Unit | 1 |
| | I/O Control Unit | Required only for mounting to an Expansion Rack. Mount the I/O Control Unit immediately to the right of the CPU Unit. |
| | Number of Configuration Units | 10 max. (Same for all models of CPU Unit.) (The number of Basic I/O Units, Special I/O Units, and CPU Bus Units can be varied. The number does not include the I/O Control Unit.) |
| | End Cover | 1 (Included with CPU Unit.) |
| | NJ-Series SD Memory Card | Install as required. |

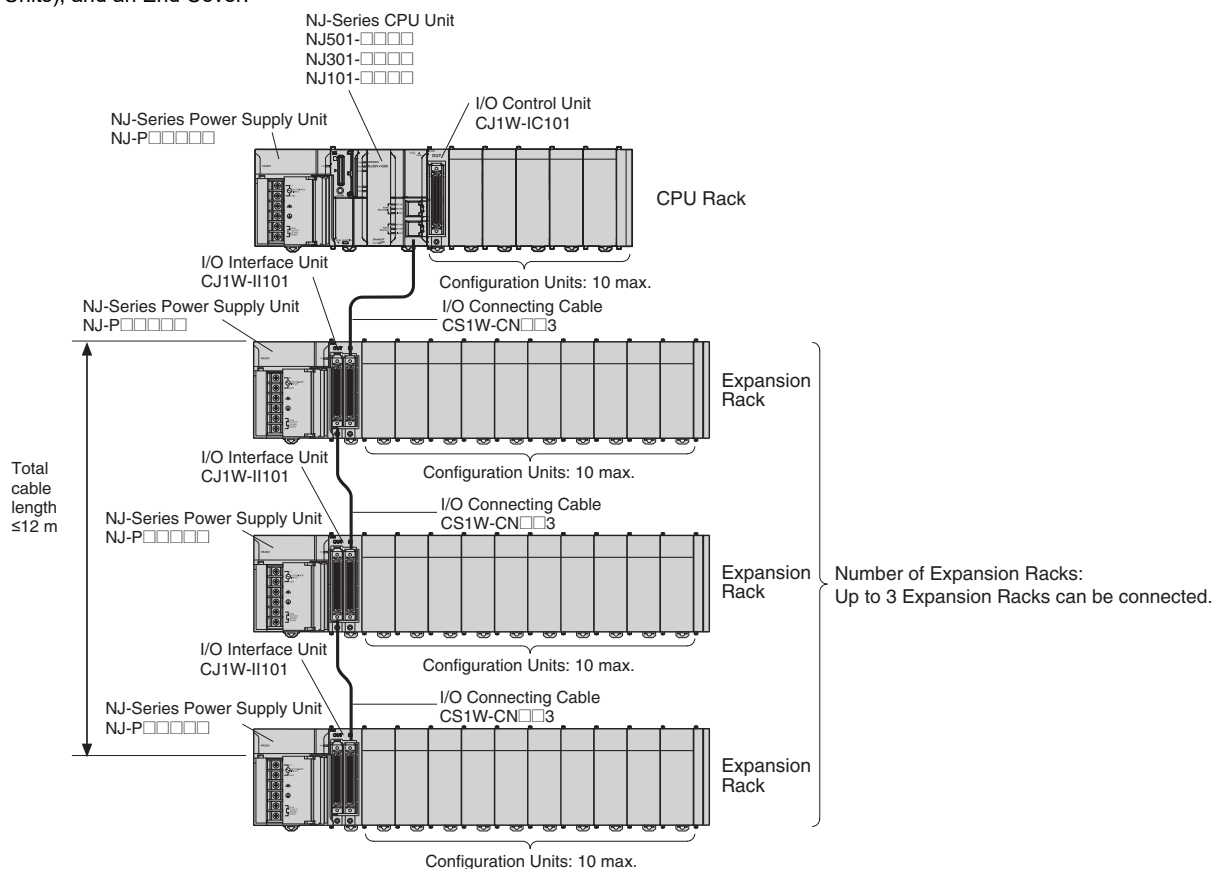
Types of Configuration Units

In the NJ-Series, Configuration Units are classified into the following three types. The number of Racks differs depending on the type.

| Type | Appearance (example) | Description | Unit recognition method | Max. Units mountable per CPU Unit |
|-------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| Basic I/O Units |  | Units with contact inputs and contact outputs. | Recognized by the CPU Unit according to the position of the Rack and slot. | A maximum of 40 Units can be mounted. |
| Special I/O Units |  | Special I/O Units provide more advanced functions than do Basic I/O Units, including I/O other than contact inputs and contact outputs. Examples of Special I/O Units are Analog I/O Units and High-speed Counter Units. They differ from CPU Bus Units (including Network Communications Units) in having a smaller area for exchanging data with the CPU Unit. | Recognized by the CPU Unit according to the unit number (0 to 95) set with the rotary switches on the front panel. | A maximum of 40 Units can be connected. (Multiple unit numbers are allocated per Unit, depending on the model and settings.) |
| CPU Bus Units |  | CPU Bus Units exchange data with the CPU Unit via the CPU Bus. Examples of CPU Bus Units are Network Communications Units and Serial Communications Units. They differ from Special I/O Units in having a larger area for exchanging data with the CPU Unit. | Recognized by the CPU Unit according to the unit number (0 to F) set with the rotary switch on the front panel. | A maximum of 16 Units can be mounted. |

NJ-Series Expansion Racks

A NJ-Series Expansion Rack consists of a Power Supply Unit, an I/O Interface Unit, Configuration Units (Basic I/O Units, Special I/O Units, and CPU Bus Units), and an End Cover.



Required Units

| Rack | Unit name | Required number of Units |
|----------------|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| CPU Rack | I/O Control Unit | One Unit. Required only when an Expansion Rack is used. Mount the I/O Control Unit immediately to the right of the CPU Unit. *1 |
| Expansion Rack | Power Supply Unit | One Unit |
| | I/O Interface Unit | One Unit. Mount the I/O Interface Unit immediately to the right of the Power Supply Unit. *2 |
| | Number of Configuration Units | Ten Units max. (The number of Basic I/O Units, Special I/O Units, and CPU Bus Units can be varied. This number does not include the I/O Interface Unit.) |
| | End Cover | One (Included with the I/O Interface Unit.) |

*1 Mounting the I/O Control Unit in any other location may cause faulty operation.

*2. Mounting the I/O Interface Unit in any other location may cause faulty operation.

Configuration Units

Maximum Number of Configuration Units That Can Be Mounted

| CPU Unit | Model | Total Units | No. of Units on CPU Rack | No. of Expansion Racks |
|--------------------|------------|-------------|--------------------------|------------------------|
| NJ-Series CPU Unit | NJ501-□□□□ | 40 | 10 per Rack | 3 Racks x 10 Units |
| | NJ301-□□□□ | | | |
| | NJ101-□□□□ | | | |

Note: It may not be possible to mount the maximum number of configuration Units depending on the specific Units that are mounted. Refer to the next page for details.

Number of mountable units per Configuration Unit

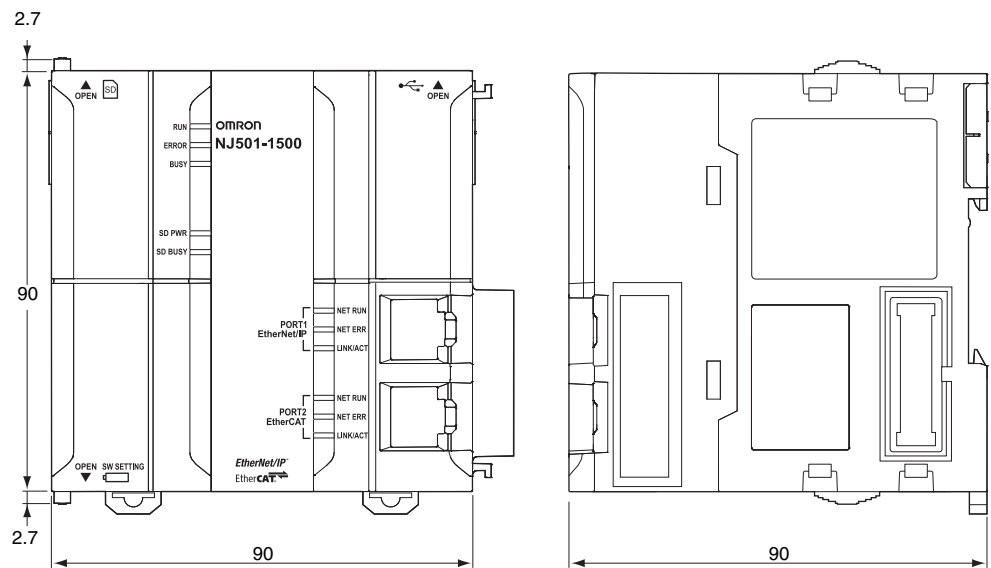
Basic I/O Units, Special I/O Units, and CPU Bus Units of the CJ-Series are used as Configuration Units of the NJ-Series. All Basic I/O Units are useable. Not all Special I/O Units and CPU Bus Units can be used. Units that can be used are shown in the list. In addition, note that the number of units that can be connected to one CPU vary depending on the units.

NJ-Series

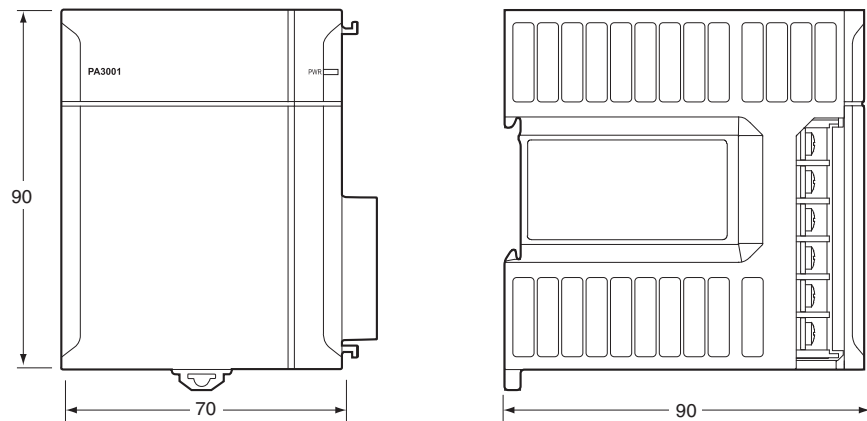
Dimensions

(Unit: mm)

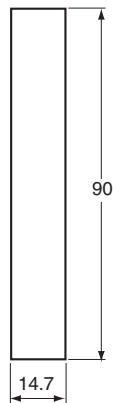
CPU Units
NJ001-0000



Power Supply Units
NJ-PA3001
NJ-PD300



End Cover (included with CPU Units)
CJ1W-TER01



Related Manuals

| Cat. No. | Model number | Manual | Application | Description |
|----------|------------------------------------------------------------------------------------------------|---------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| W513 | NJ501-□□□□ NJ301-□□□□ NJ101-□□□□ | NJ Series Startup Guide (CPU Unit) | Using the NJ-series CPU Unit for the first time | The startup procedures for using an NJ-series CPU Unit and the basic operating instructions for the Sysmac Studio are described with a simple sequence control example. |
| W514 | NX701-□□□□ NX1P2-□□□□ NJ501-□□□□ NJ301-□□□□ NJ101-□□□□ | NJ/NX-series Startup Guide (Motion Control) | Using the motion control function module of the NJ/NX-series for the first time | The startup procedures for setting axis parameters and performing simple one-axis positioning and two-axis linear interpolation with an NJ/NX-series CPU Unit and the operating instructions for the Sysmac Studio are described. |
| W500 | NJ501-□□□□ NJ301-□□□□ NJ101-□□□□ | NJ-series CPU Unit Hardware User's Manual | 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 a Controller built with a CPU Unit. <ul style="list-style-type: none"> • Features and system configuration • Introduction • Part names and functions • General specifications • Installation and wiring • Maintenance and inspection |
| W501 | NX701-□□□□ NX502-□□□□ NX102-□□□□ NX1P2-□□□□ NJ501-□□□□ NJ301-□□□□ NJ101-□□□□ | NJ/NX-series CPU Unit Software User's Manual | Learning how to program and set up an NJ/NX-series CPU Unit. Mainly software information is provided. | The following information is provided on a Controller built with an NJ/NX-series CPU Unit. <ul style="list-style-type: none"> • CPU Unit operation • CPU Unit features • Initial settings • Programming language specifications and programming with the IEC 61131-3 standard. |
| W507 | NX701-□□□□ NX502-□□□□ NX102-□□□□ NX1P2-□□□□ NJ501-□□□□ NJ301-□□□□ NJ101-□□□□ | NJ/NX-series CPU Unit Motion Control User's Manual | Learning about motion control settings and programming concepts | The settings and operation of the CPU Unit and programming concepts for motion control are described. |
| W505 | NX701-□□□□ NX502-□□□□ NX102-□□□□ NX1P2-□□□□ NJ501-□□□□ NJ301-□□□□ NJ101-□□□□ | NJ/NX-series CPU Unit Built-in EtherCAT Port User's Manual | Using the built-in EtherCAT port on an NJ/NX-series CPU Unit | Information on the built-in EtherCAT port is provided. This manual provides an introduction and provides information on the configuration, features, and setup. |
| W539 | NJ501-4□□□ NJ501-R□□□ | NJ-series NJ Robotics CPU Unit User's Manual | Controlling robots with NJ-series CPU Units. | Describes the functionality to control robots. |
| O037 | NJ501-R□□□ | NJ-series Robot Integrated CPU Unit User's Manual | Using the NJ-series Robot Integrated CPU Unit. | Describes the settings and operation of the CPU Unit and programming concepts for OMRON robot control. |
| W527 | NX701-□□20 NX502-1□00 NX102-□□20 NJ501-□□20 NJ101-□□20 | NJ/NX-series Database Connection CPU Units User's Manual | Learning about the functions and application procedures of the NJ/NX-series DB Connection function. | Describes the functions and application procedures of the NJ/NX-series DB Connection function. |
| W528 | NJ501-1340 | NJ-series SECS/GEM CPU Unit User's Manual | Learning about the SECS/GEM CPU Unit and how to use it. | Functional outline, GEM instructions, settings with the GEM Configurator and so on are provided. |
| O030 | NJ501-5300 NY532-5400 | NJ/NY-Series NC Integrated Controller User's Manual | For numerical control with NJ/NY-series | Describes the numerical control function. |
| W506 | NX701-□□□□ NX502-□□□□ NX102-□□□□ NX1P2-□□□□ NJ501-□□□□ NJ301-□□□□ NJ101-□□□□ | NJ/NX-series CPU Unit Built-in EtherNet/IP Port User's Manual | Using the built-in EtherNet/IP port on an NJ/NX-series CPU Unit | Information on the built-in EtherNet/IP port is provided. Information is provided on the basic setup, tag data links, FINS communications (non-disclosure), and other features. |
| W588 | NX102-□□□□ NX701-1□□□ NX502-1□00 NJ501-1□00 | NJ/NX-series CPU Unit OPC UA User's Manual | Using the OPC UA. | Describes the OPC UA. |
| W502 | NX701-□□□□ NX502-□□□□ NX102-□□□□ NX1P2-□□□□ NJ501-□□□□ NJ301-□□□□ NJ101-□□□□ | NJ/NX-series Instructions Reference Manual | Learning about the specifications of the instruction set that is provided by OMRON | The instructions in the instruction set (IEC 61131-3 specifications) are described. |
| W508 | NX701-□□□□ NX502-□□□□ NX102-□□□□ NX1P2-□□□□ NJ501-□□□□ NJ301-□□□□ NJ101-□□□□ | NJ/NX-series Motion Control Instructions Reference Manual | Learning about the specifications of the motion control instructions that are provided by OMRON | The motion control instructions are described. |
| W503 | NX701-□□□□ NX502-□□□□ NX102-□□□□ NX1P2-□□□□ NJ501-□□□□ NJ301-□□□□ NJ101-□□□□ | NJ/NX-series Troubleshooting Manual | 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. |

NJ-Series

| Cat. No. | Model number | Manual | Application | Description |
|----------------------------------------------------------------------|------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| W504 | SYSMAC-SE2□□□ | Sysmac Studio Version 1 Operation Manual | Learning about the operating procedures and functions of the Sysmac Studio. | Describes the operating procedures of the Sysmac Studio. |
| O031 | NJ501-5300 NY532-5400 | NJ/NY-series G code Instruction Reference Manual | Learning about detailed specifications of the G code/M code instructions. | This section describes G code/M code instructions in detail. |
| W589 | SYSMACSE2□□□ SYSMAC-TA4□□□ | Sysmac Studio Project Version Control Function Operation Manual | Learning the overview of the Sysmac Studio project version control function and how to use it. | The manual outlines the Sysmac Studio project version control function, and describes how to install, basic operation, and how to operate its major functions. |
| O032 | SYSMAC-RTNC0□□□D | CNC Operator Operation Manual | Learning the overview of CNC Operator and how to use it. | Describes the CNC Operator, installation procedure, basic operation, connection operation, and operating procedures for main functions. |
| W595 | SYSMAC-SE2□□□ SYSMAC-SE200D-64 | Sysmac Studio Robot Integrated System Building Function with Robot Integrated CPU Unit Operation Manual | Learning about the operating procedures and functions of the Sysmac Studio to configure Robot Integrated System using Robot Integrated CPU Unit. | Describes the operating procedures of the Sysmac Studio for Robot Integrated CPU Unit. |
| W621 | SYSMAC-SE2□□□ SYSMAC-SE200D-64 | Sysmac Studio Robot Integrated System Building Function with IPC Application Controller Operation Manual | Learning about the operating procedures and functions of the Sysmac Studio to configure Robot Integrated System using IPC Application Controller. | Describes the operating procedures of the Sysmac Studio for IPC Application Controller. |
| W490 W498 W491 Z317 W492 W494 W497 W495 W493 | CJ1W-□□□□ | CJ-series Special Unit Manuals for NJ-series CPU Unit | Learning how to connect CJ-series Units | The methods and precautions for using CJ-series Units with an NJ-series CPU Unit are described, including access methods and programming interfaces. Manuals are available for the following Units. Analog I/O Units, Insulated-type Analog I/O Units, Temperature Control Units, ID Sensor Units, High-speed Counter Units, and DeviceNet Units, EtherNet/IP Units, CompoNet Master Units |
| Y128 | SYSMAC-SE20□□ SYSMAC-RA401L NJ501-4□□□ R88D-KN□-ECT FH-1□□□ FH-3□□□ | Vision & Robot Integrated Simulation Startup Guide | Learning about the operating procedures of Vision & Robot integrated simulation. | Describes the operating procedures of Vision & Robot integrated simulation. |
| Y213 | | Vision & Robot Integrated Simulation Technology Introduction Guide (Calibration Parameter) | Learning about the calibration parameters created using the 3D Equipment Model Creation Wizard for the Vision & Robot integrated simulation. | Describes calibration parameters created using the 3D Equipment Model Creation Wizard for the Vision & Robot integrated simulation. |
| Z368 | | Vision Sensor FH Series Conveyor Tracking Application Programming Guide | Learning about the setup procedure of the wizard style calibration for cameras, robots, or conveyors. | Describes how to configure and operate Conveyor Tracking Calibration Wizard on Sysmac Studio on FH Sensor Controllers. |
| Z369 | | Vision Sensor FH Series Operation Manual Sysmac Studio Calibration Plate Print Tool | Learning about the setup procedure for printing the Pattern on a Calibration Plate used for calibration for cameras and robots on Sysmac Studio. | Describes how to configure and operate Calibration Plate Print Tool on Sysmac Studio on FH Sensor Controllers. |
| Z370 | | Vision Sensor FH Series Operation Manual Sysmac Studio Conveyor Tracking Calibration Wizard Tool | Learning about the setting procedure of sample macros for conveyor tracking. | Describes the setting procedure of sample macros used for applications of conveyor tracking on FH Sensor Controllers. |
| Z371 | | Vision Sensor FH Series Operation Manual Sysmac Studio Conveyor Panorama Display Tool | Learning about the setup procedure of panorama display for image capture of targets on conveyors. | Describes how to configure and operate the Conveyor Panorama Display tool on Sysmac Studio on FH Sensor Controllers. |

Applicable Models for Cable Redundancy Function

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

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