OMRON

Sysmac Catalog

One Machine Control

SYSMAC
always in control

News

CONTROLLERS

NX-series
NX701 CPU Unit

Ideal for large-scale, fast, and highly-accurate control with up to 256 axes.

NJ-series
NJ101 CPU Unit

New controllers ideal for simple machines.

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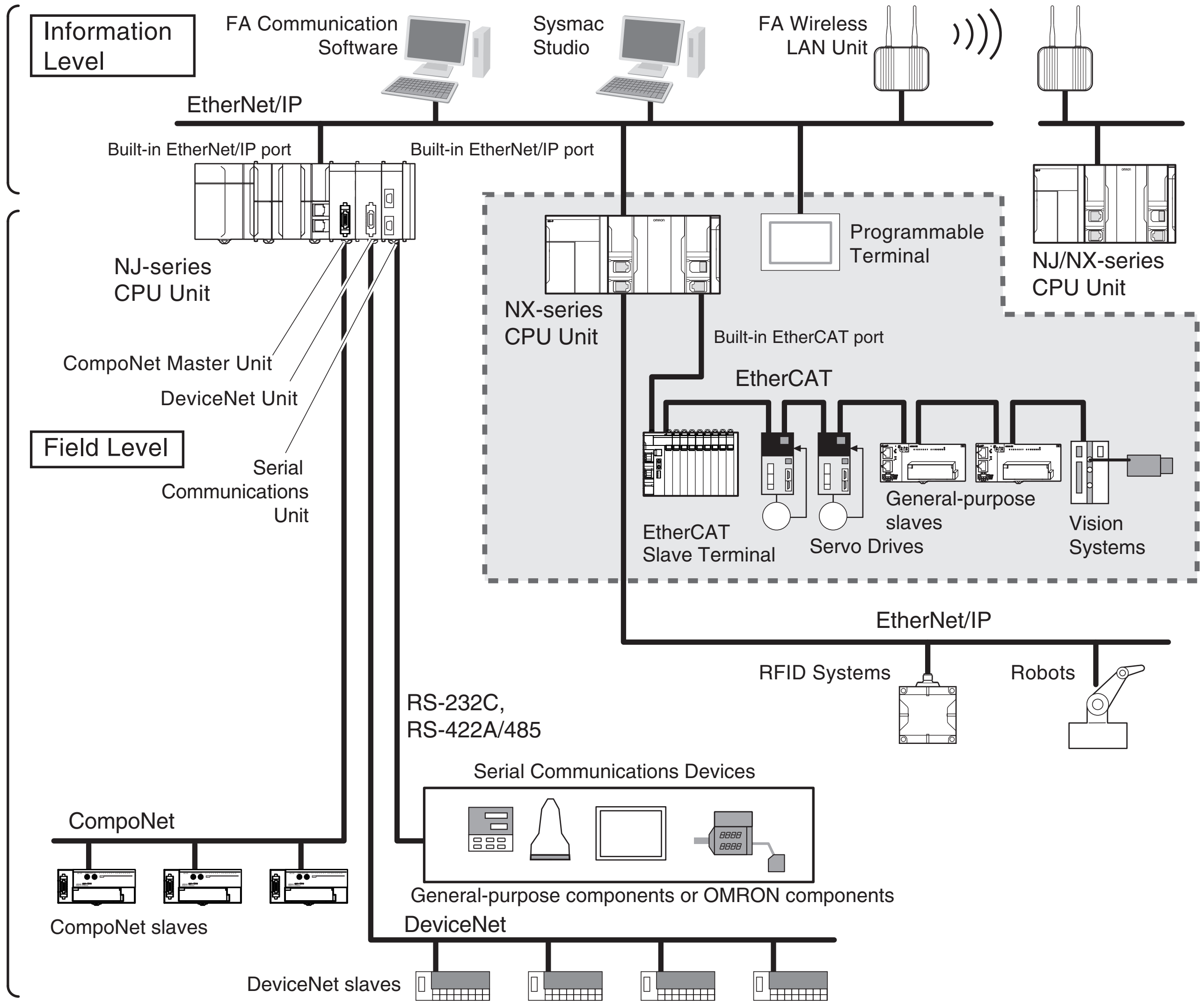
Network Configuration

You can make networks in the following layers with an NJ/NX-Series Controller.


Information Level
FA Communication Software
Sysmac Studio
FA Wireless LAN Unit
EtherNet/IP
Built-in EtherNet/IP port
Built-in EtherNet/IP port
NJ-series CPU Unit
Programmable Terminal
NJ/NX-series CPU Unit
NX-series CPU Unit
Built-in EtherCAT port
CompoNet Master Unit
DeviceNet Unit
EtherCAT
Field Level
Serial Communications Unit
General-purpose slaves
EtherCAT Slave Terminal
Servo Drives
Vision Systems
EtherNet/IP
RFID Systems
Robots
RS-232C, RS-422A/485
Serial Communications Devices
CompoNet
General-purpose components or OMRON components
DeviceNet
CompoNet slaves
DeviceNet slaves

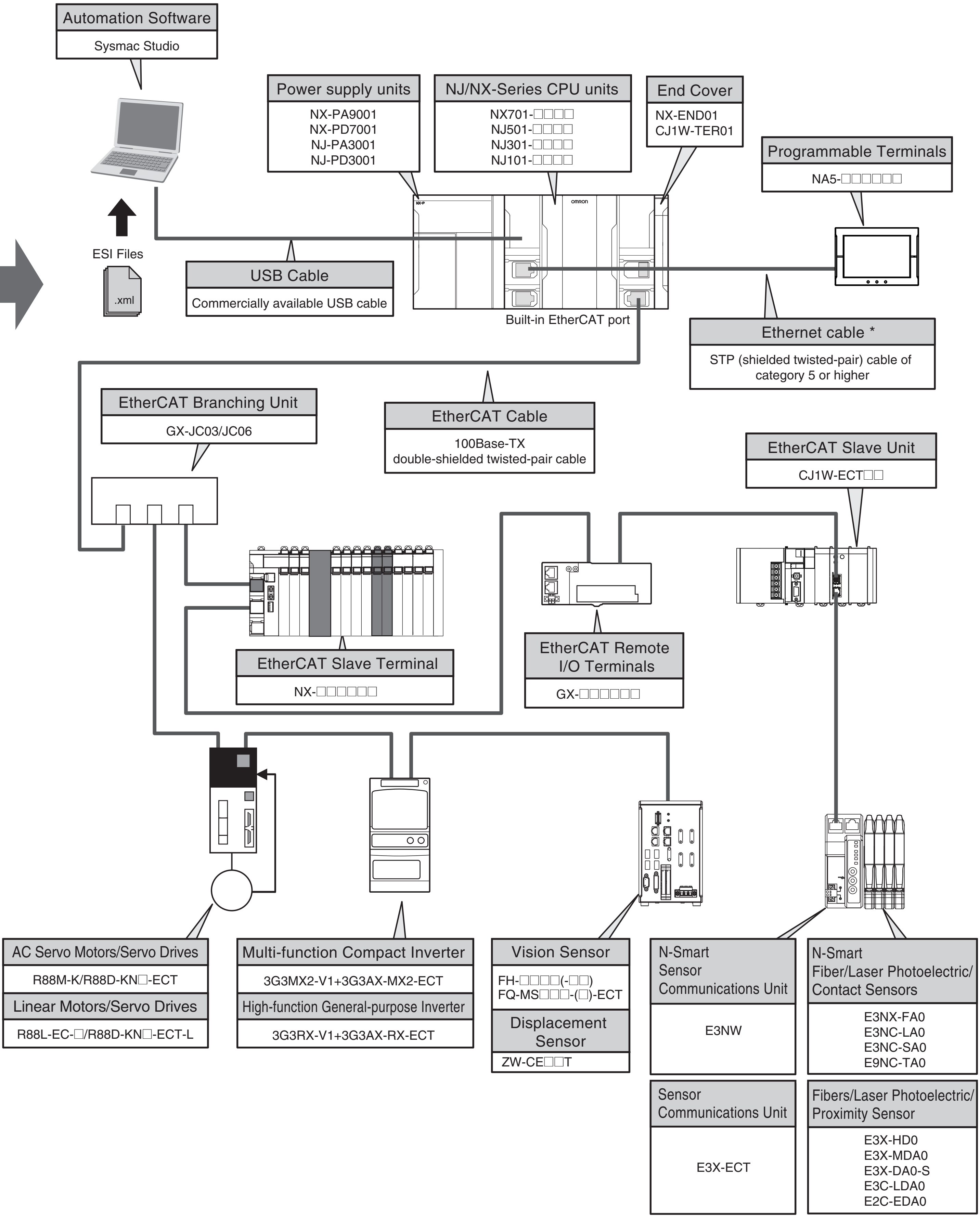
Connection		Connection method
Sysmac Studio		Use USB or the built-in EtherNet/IP port.
Between Controllers	NJ/NX-series Controller or CJ-series PLC	Use the built-in EtherNet/IP port or a port on an EtherNet/IP Unit. *1
Devices	Servo Drives, general-purpose slaves and Vision Systems	Use the built-in EtherCAT port.
	Ethernet communications devices	Use the built-in EtherNet/IP port or a port on an EtherNet/IP Unit. *1
	Serial communications devices	Mount a Serial Communications Unit *1 and use RS-232C port or RS-422A/485 ports.
	DeviceNet slaves	Mount a DeviceNet Unit*2 and use DeviceNet.
	CompoNet slaves	Mount a CompoNet Master Unit*2 and use CompoNet.
Programmable Terminals		Use the built-in EtherNet/IP port or a port on an EtherNet/IP Unit. *1
Servers	Connections to BOOTP server, DNS server, or NTP server	Use the built-in EtherNet/IP port or a port on an EtherNet/IP Unit. *1

*1 Use a CJ-series EtherNet/IP Unit with a unit version of 2.1 or later.
Also, mount the EtherNet/IP Unit to an NJ-series CPU Unit with unit version 1.01 or later, and use Sysmac Studio version 1.02 or higher.
Refer to the NJ/NX-series CPU Unit Software User's Manual (Cat. No. W501) for information on version upgrades.

*2 Mount to an NJ-series CPU Unit.

EtherCAT Network Configuration

With an NJ/NX-Series, you can use an EtherCAT network as a basic system.


Automation Software
Sysmac Studio
ESI Files
.xml
Power supply units
NX-PA9001
NX-PD7001
NJ-PA3001
NJ-PD3001
NJ/NX-Series CPU units
NX701-□□□□
NJ501-□□□□
NJ301-□□□□
NJ101-□□□□
End Cover
NX-END01
CJ1W-TER01
Programmable Terminals
NA5-□□□□□□
USB Cable
Commercially available USB cable
Built-in EtherCAT port
Ethernet cable *
STP (shielded twisted-pair) cable of category 5 or higher
EtherCAT Branching Unit
GX-JC03/JC06
EtherCAT Cable
100Base-TX
double-shielded twisted-pair cable
EtherCAT Slave Unit
CJ1W-ECT□□
EtherCAT Slave Terminal
NX-□□□□□□
EtherCAT Remote I/O Terminals
GX-□□□□□□
AC Servo Motors/Servo Drives
R88M-K/R88D-KN□-ECT
Linear Motors/Servo Drives
R88L-EC-□/R88D-KN□-ECT-L
Multi-function Compact Inverter
3G3MX2-V1+3G3AX-MX2-ECT
High-function General-purpose Inverter
3G3RX-V1+3G3AX-RX-ECT
Vision Sensor
FH-□□□□(-□□)
FQ-MS□□□-(□)-ECT
Displacement Sensor
ZW-CE□□T
N-Smart Sensor Communications Unit
E3NW
N-Smart Fiber/Laser Photoelectric/ Contact Sensors
E3NX-FA0
E3NC-LA0
E3NC-SA0
E9NC-TA0
Sensor Communications Unit
E3X-ECT
Fibers/Laser Photoelectric/ Proximity Sensor
E3X-HD0
E3X-MDA0
E3X-DA0-S
E3C-LDA0
E2C-EDA0

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

Note: NX Units should be connected to Slave Terminals. The NX bus connector of the CPU Unit is provided for future expansion so that it cannot be used to connect any NX Unit.

Machine Automation Controller

NJ/NX-Series

Machine Automation Controller
NJ/NX-Series

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

NX701-□□□□

NJ501-□□□□

Features

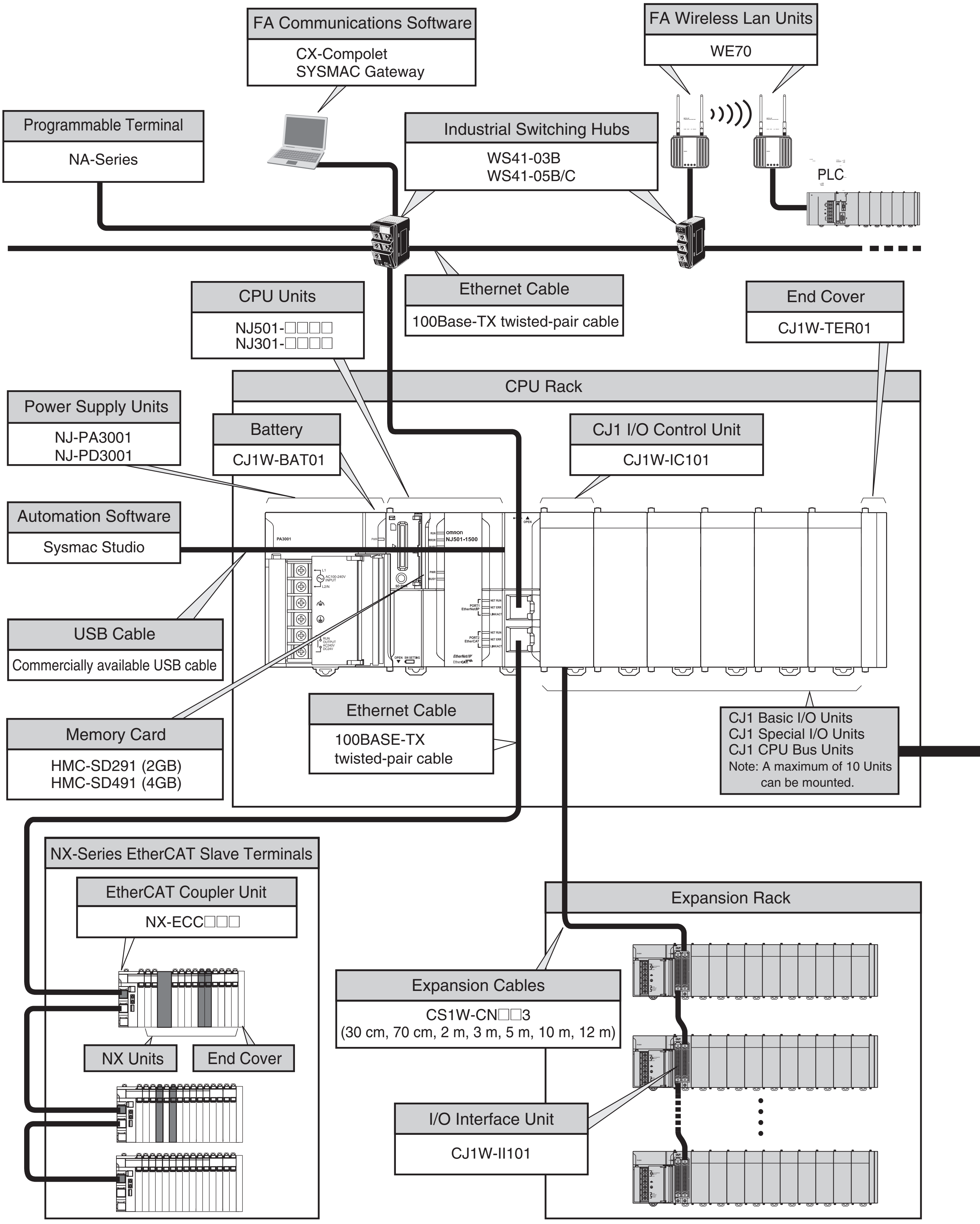
- Scalable CPUs for max 256 axes.
- Integration of Logic and Motion in one CPU.
- Conforms to IEC 61131-3 (JIS B 3503) standard programming and PLCopen function blocks for Motion Control. Programming with variables allows users to create complex programs efficiently.
- Fast and accurate control by synchronizing 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 large-scale, fast, and highly-accurate control with up to 256 axes. (NX701-□□□□)
- Ideal for large-scale, fast, and high-accurate control with up to 64 axes. (NJ501-□□□□)
- Ideal for small-scale control with up to 8 axes. (NJ301-□□□□)
- Ideal for simple machines. (NJ101-□□□□)
- The Controller can be directly connected to a database. No special Unit, software, nor middleware is required. (NJ501-1□20)
- The controller is connected directly to the host. No separate computer, special communications Unit or software required.
- Parallel link robot control function. (NJ501-4□□0)

Unit Configuration

Basic system (NX series)

Refer to "EtherCAT Network Configuration" of page 5 for details.

Basic system (NJ series)


FA Communications Software
CX-Compolet
SYSMAC Gateway
FA Wireless Lan Units
WE70
Programmable Terminal
NA-Series
Industrial Switching Hubs
WS41-03B
WS41-05B/C
PLC
Ethernet Cable
100Base-TX twisted-pair cable
CPU Units
NJ501-□□□□
NJ301-□□□□
End Cover
CJ1W-TER01
CPU Rack
Power Supply Units
NJ-PA3001
NJ-PD3001
Battery
CJ1W-BAT01
CJ1 I/O Control Unit
CJ1W-IC101
Automation Software
Sysmac Studio
USB Cable
Commercially available USB cable
Memory Card
HMC-SD291 (2GB)
HMC-SD491 (4GB)
Ethernet Cable
100BASE-TX
twisted-pair cable
CJ1 Basic I/O Units
CJ1 Special I/O Units
CJ1 CPU Bus Units
Note: A maximum of 10 Units can be mounted.
NX-Series EtherCAT Slave Terminals
EtherCAT Coupler Unit
NX-ECC□□□
NX Units
End Cover
Expansion Rack
Expansion Cables
CS1W-CN□□3
(30 cm, 70 cm, 2 m, 3 m, 5 m, 10 m, 12 m)
I/O Interface Unit
CJ1W-II101

Configuration Units

CJ1 Basic I/O Units			
8-point Units	**16-point Units**	**32-point Units**	**64-point Units**
Input Units			
● DC Input Unit CJ1W-ID201 ● AC Input Unit CJ1W-IA201	● DC Input Unit CJ1W-ID211 CJ1W-ID212 High-speed type ● AC Input Unit CJ1W-IA111	● DC Input Unit CJ1W-ID231 CJ1W-ID232 CJ1W-ID233 High-speed type	● DC Input Unit CJ1W-ID261 CJ1W-ID262
Output Units			
● Relay Contact Output Unit (independent commons) CJ1W-OC201 ● Triac Output Unit CJ1W-OA201 ● Transistor Output Units CJ1W-OD201 CJ1W-OD203 CJ1W-OD202 CJ1W-OD204	● Relay Contact Output Unit CJ1W-OC211 ● Transistor Output Units CJ1W-OD211 CJ1W-OD213 High-speed type CJ1W-OD212	● Transistor Output Units CJ1W-OD231 CJ1W-OD233 CJ1W-OD234 High-speed type CJ1W-OD232	● Transistor Output Units CJ1W-OD261 CJ1W-OD263 CJ1W-OD262
I/O Units			
---	---	(16 inputs, 16 outputs) ● DC Input/Transistor Output Units CJ1W-MD231 CJ1W-MD233 CJ1W-MD232	32 inputs, 32 outputs ● DC Input/Transistor Output Units CJ1W-MD261 CJ1W-MD263 32 inputs, 32 outputs ● TTL I/O Unit CJ1W-MD563
Other Units			
---	● Quick-response Input Unit CJ1W-IDP01	---	● B7A Interface Units (64 inputs) CJ1W-B7A14 (64 outputs) CJ1W-B7A04 (32 inputs, 32 outputs) CJ1W-B7A22

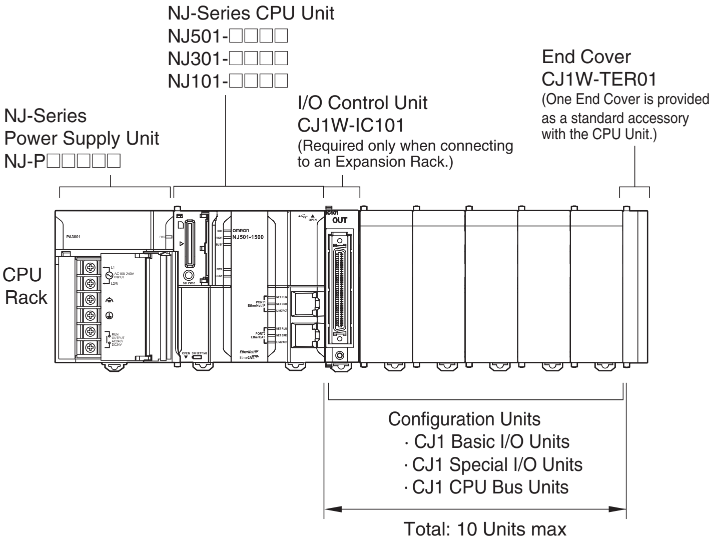
CJ1 Special I/O Units and CPU Bus Units			
■ Process I/O Units ● Isolated-type Units with Universal Inputs CJ1W-PH41U CJ1W-AD04U ● Isolated-type DC Input Unit CJ1W-PDC15 ■ Analog I/O Units ● Analog Input Units CJ1W-AD042 High-speed type CJ1W-AD081-V1 CJ1W-AD041-V1 ● Analog Output Units CJ1W-DA042V High-speed type CJ1W-DA08V CJ1W-DA08C CJ1W-DA041 CJ1W-DA021 ● Analog I/O Units CJ1W-MAD42 ■ Temperature Control Units CJ1W-TC003, CJ1W-TC004 CJ1W-TC103, CJ1W-TC104	■ High-speed Counter Units CJ1W-CT021	■ Serial Communications Units CJ1W-SCU22 High-speed type CJ1W-SCU32 High-speed type CJ1W-SCU42 High-speed type ■ EtherNet/IP Unit CJ1W-EIP21 *1 ■ DeviceNet Unit CJ1W-DRM21 ■ CompoNet Master Unit CJ1W-CRM21 *2	■ ID Sensor Units CJ1W-V680C11 CJ1W-V680C12

*1.Supported only by the EtherNet/IP Units with unit version 2.1 or later , CPU Units with unit version 1.01 or later and the Sysmac Studio version 1.02 or higher.

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

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.


NJ-Series CPU Unit
NJ501-□□□□
NJ301-□□□□
NJ101-□□□□
End Cover
CJ1W-TER01
(One End Cover is provided as a standard accessory with the CPU Unit.)
I/O Control Unit
CJ1W-IC101
(Required only when connecting to an Expansion Rack.)
NJ-Series
Power Supply Unit
NJ-P□□□□□
CPU
Rack
Configuration Units
· CJ1 Basic I/O Units
· CJ1 Special I/O Units
· CJ1 CPU Bus Units
Total: 10 Units max

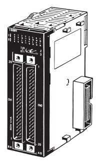
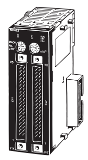
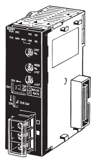
Even though the NJ-Series Controllers do not have Backplanes, the term “slot” still used to refer to the location of Units. Slot numbers are assigned in order to Units from left to right on the CPU Rack (slot 0, slot 1, slot 2, etc.).

● 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.

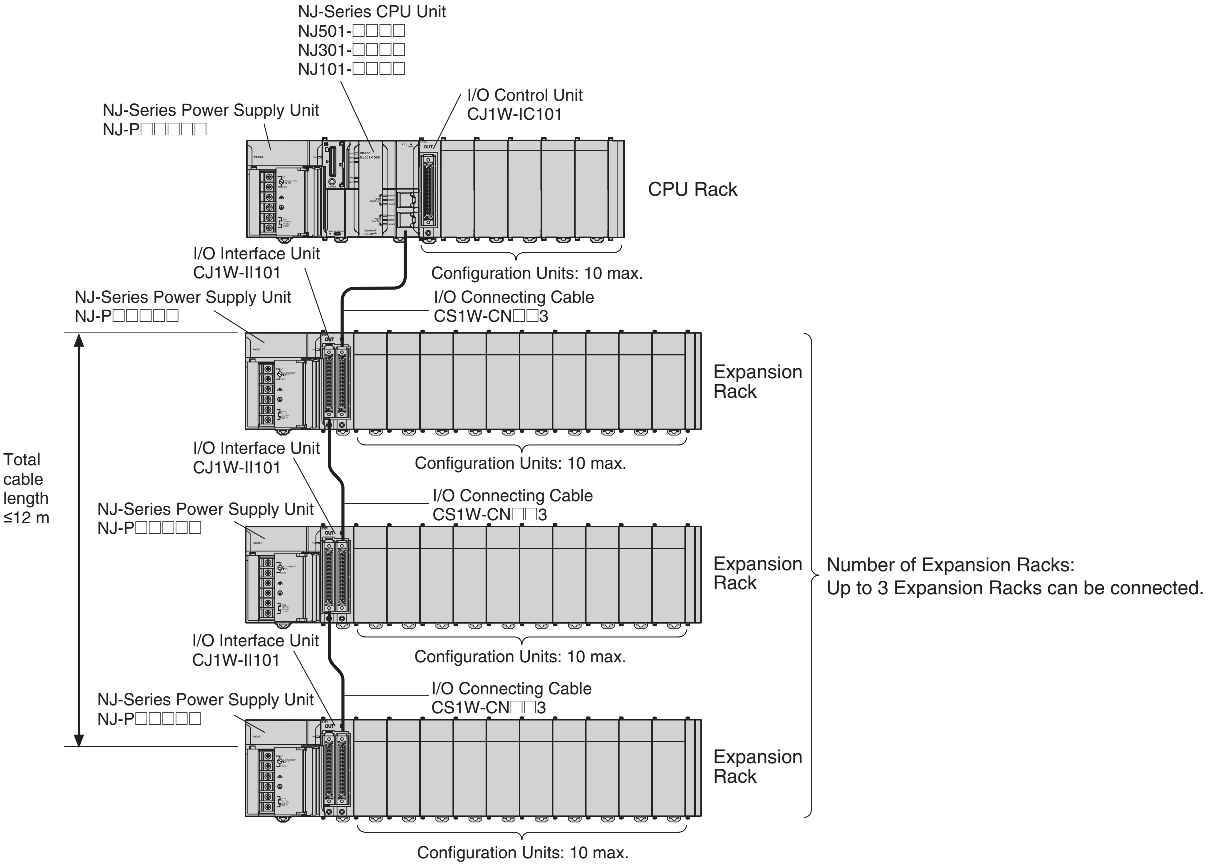
● Types of Configuration Units

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.


NJ-Series CPU Unit
NJ501-□□□□
NJ301-□□□□
NJ101-□□□□
NJ-Series Power Supply Unit
NJ-P□□□□□
I/O Control Unit
CJ1W-IC101
CPU Rack
I/O Interface Unit
CJ1W-II101
Configuration Units: 10 max.
NJ-Series Power Supply Unit
NJ-P□□□□□
I/O Connecting Cable
CS1W-CN□□3
Expansion Rack
Total cable length ≤12 m
I/O Interface Unit
CJ1W-II101
Configuration Units: 10 max.
I/O Connecting Cable
CS1W-CN□□3
NJ-Series Power Supply Unit
NJ-P□□□□□
Expansion Rack
Number of Expansion Racks:
Up to 3 Expansion Racks can be connected.
I/O Interface Unit
CJ1W-II101
Configuration Units: 10 max.
I/O Connecting Cable
CS1W-CN□□3
NJ-Series Power Supply Unit
NJ-P□□□□□
Expansion Rack
Configuration Units: 10 max.

● 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.

CJ-Series Special I/O Units

Type	Name	Specifications	Model	Unit No.	Number of words allocated	Words allocated in DM Area	Number of mountable Units	Current consumption (A)		Weight
								5 VDC	24 VDC	
Special I/O Units	General-purpose Universal Analog Input Unit	4 inputs, fully universal	CJ1W-AD04U	0 to 95	10 words	100 words	40 Units	0.32	---	150 g max.
	Analog Input Units	8 inputs (4 to 20 mA, 1 to 5 V, etc.)	CJ1W-AD081-V1	0 to 95	10 words	100 words	40 Units	0.42	---	140 g max.
		4 inputs (4 to 20 mA, 1 to 5 V, etc.)	CJ1W-AD041-V1	0 to 95	10 words	100 words	40 Units	0.42	---	140 g max.
		4 inputs (4 to 20 mA, 1 to 5 V, etc.)	CJ1W-AD042	0 to 95	10 words	100 words	40 Units	0.52	---	150 g max.
	Analog Output Units	4 outputs (1 to 5 V, 4 to 20 mA, etc.)	CJ1W-DA041	0 to 95	10 words	100 words	40 Units	0.12	---	150 g max.
		2 outputs (1 to 5 V, 4 to 20 mA, etc.)	CJ1W-DA021	0 to 95	10 words	100 words	40 Units	0.12	---	150 g max.
		8 outputs (1 to 5 V, 0 to 10 V, etc.)	CJ1W-DA08V	0 to 95	10 words	100 words	40 Units	0.14	---	150 g max.
		8 outputs (4 to 20 mA)	CJ1W-DA08C	0 to 95	10 words	100 words	40 Units	0.14	---	150 g max.
		4 outputs (1 to 5 V, 0 to 10 V, etc.)	CJ1W-DA042V	0 to 95	10 words	100 words	40 Units	0.40	---	150 g max.
	Analog I/O Unit	4 inputs (1 to 5 V, 4 to 20 mA, etc.) 2 outputs (1 to 5 V, 4 to 20 mA, etc.)	CJ1W-MAD42	0 to 95	10 words	100 words	40 Units	0.58	---	150 g max.
	Isolated-type High-resolution Universal Input Unit	4 inputs, fully universal Resolution: 1/256,000, 1/64,000, 1/16,000	CJ1W-PH41U	0 to 95	10 words	100 words	40 Units	0.30	---	150 g max.
	Direct Current Input Unit	DC voltage or DC current, 2 inputs	CJ1W-PDC15	0 to 95	10 words	100 words	40 Units	0.18	---	150 g max.
	Temperature Control Units	2 control loops, thermocouple inputs, NPN outputs, heater burnout detection	CJ1W-TC003	0 to 94 (uses words for 2 unit numbers)	20 words	200 words	40 Units	0.25	---	150 g max.
		2 control loops, thermocouple inputs, PNP outputs, heater burnout detection	CJ1W-TC004	0 to 94 (uses words for 2 unit numbers)	20 words	200 words	40 Units	0.25	---	150 g max.
		2 control loops, temperature-resistance thermometer inputs, NPN outputs, heater burnout detection	CJ1W-TC103	0 to 94 (uses words for 2 unit numbers)	20 words	200 words	40 Units	0.25	---	150 g max.
		2 control loops, temperature-resistance thermometer inputs, PNP outputs, heater burnout detection	CJ1W-TC104	0 to 94 (uses words for 2 unit numbers)	20 words	200 words	40 Units	0.25	---	150 g max.
	ID Sensor Units	V680-Series single-head type	CJ1W-V680C11	0 to 95	10 words	100 words	40 Units	0.26	0.13	120 g max.
		V680-Series two-head type	CJ1W-V680C12	0 to 94 (uses words for 2 unit numbers)	20 words	200 words	40 Units	0.32	0.26	130 g max.
	High-speed Counter Unit	Number of counter channels: 2, Maximum input frequency: 500 kHz, line driver compatible	CJ1W-CT021	0 to 92 (uses words for 4 unit numbers)	40 words	400 words	24 Units	0.28	---	100 g max.
	CompoNet Master Unit	CompoNet remote I/O Communications mode No. 0: 128 inputs/ 128 outputs for Word Slaves	CJ1W-CRM21 *1	0 to 94 (uses words for 2 unit numbers)	None	20 words	40 Units	0.40	---	130 g max.
		Communications mode No. 1: 256 inputs/ 256 outputs for Word Slaves		0 to 92 (uses words for 4 unit numbers)	None	40 words	24 Units	0.40	---	
		Communications mode No. 2: 512 inputs/ 512 outputs for Word Slaves		0 to 88 (uses words for 8 unit numbers)	None	80 words	12 Units	0.40	---	
		Communications mode No. 3: 256 inputs/ 256 outputs for Word Slaves and 128 inputs/ 128 outputs for Bit Slaves		0 to 88 (uses words for 8 unit numbers)	None	80 words	12 Units	0.40	---	
		Communications mode No. 8: 1,024 inputs/ 1,024 outputs for Word Slaves and 256 inputs/ 256 outputs for Bit Slaves maximum		0 to 95 uses words for 1 unit number)	Depends on setting	10 words *2	40 Units	0.40	---	

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

*2 In addition, up to 208 other words are allocated depending on the number of Slave Units to which words are allocated and their I/O capacity. Use the CX-Integrator to allocate words.

CJ-Series CPU Bus Units

Type	Name	Specifications	Model	Unit No.	Number of words allocated	Maximum number of Units	Current consumption (A)		Weight
							5 VDC	24 VDC	
CPU Bus Units	Serial Communications Units	Two RS-232C ports High-speed models	CJ1W-SCU22	0 to F	25 words	16 Units	0.29 *1	---	160 g max.
		Two RS-422A/485 ports High-speed models	CJ1W-SCU32				0.46		120 g max.
		One RS-232C port and one RS-422A/485 port High-speed models	CJ1W-SCU42				0.38 *1		140 g max.
	EtherNet/IP Unit	Tag data links, CIP message communications, FTP server, etc.	CJ1W-EIP21 *2	0 to F	25 words	4 Units	0.41	---	94 g max.
	DeviceNet Unit	DeviceNet remote I/O, 2,048 points; Both Master and Slave functions, Automatic allocation possible without Configurator	CJ1W-DRM21	0 to F	25 words	16 Units	0.29	---	118 g max. *3
	EtherCAT Slave Unit	EtherCAT REMORT I/O DATA Input: 400 bytes Output: 400 bytes	CJ1W-ECT21	0 to F	25 words	16 Units	0.34	---	97 g max.

*1. Increases by 0.15 A/Unit when an NT-AL001 RS-232C/RS-422A Link Adapter is used. Increases by 0.04 A/Unit when a CJ1W-CIF11 RS-422A Converter is used. Increases by 0.20 A/Unit when an NV3W-M□20L Programmable Terminal is used.
*2. Supported only by the EtherNet/IP Units with unit version 2.1 or later , CPU Units with unit version 1.01 or later and the Sysmac Studio version 1.02 or higher.
*3. Includes the weight of accessory connectors.

Power Supply Units Current Consumption

Checking Current Consumption and Power Consumption

After selecting a Power Supply Unit based on considerations such as the power supply voltage, calculate the current and power requirements for each Rack.

Condition 1: Current Requirements
There are two voltage groups for internal power consumption: 5 V and 24 V.
Current consumption at 5 V (internal logic power supply)
Current consumption at 24 V (relay driving power supply)

Condition 2: Power Requirements
For each Rack, the upper limits are determined for the current and power that can be provided to the mounted Units. Design the system so that the total current consumption for all the mounted Units does not exceed the maximum total power or the maximum current supplied for the voltage groups shown in the following tables.
The maximum current and total power supplied for CPU Racks and Expansion Racks according to the Power Supply Unit model are shown below.

Note: 1. For CPU Racks, include the CPU Unit current and power consumption in the calculations. When expanding, also include the current and power consumption of the I/O Control Unit in the calculations.
2. For Expansion Racks, include the I/O Interface Unit current and power consumption in the calculations.

Power Supply Units	Max. current supplied			(C) Max. total power supplied
	(A) 5-VDC CPU Racks*	(A)5-VDC Expansion Rack	(B) 24 VDC	
NJ-PA3001	6.0 A	6.0 A	1.0 A	30 W
NJ-PD3001	6.0 A	6.0 A	1.0 A	30 W

* Including supply to the CPU Unit.

Conditions 1 and 2 below must be satisfied.
Condition 1: Maximum Current
(1) Total Unit current consumption at 5 V ≤ (A) value
(2) Total Unit current consumption at 24 V ≤ (B) value
Condition 2: Maximum Power
(1) × 5 V + (2) × 24 V ≤ (C) value

Example: Calculating Total Current and Power Consumption

Example: When the Following Units are Mounted to a NJ-Series CPU Rack Using a NJ-PA3001 Power Supply Unit

Unit type	Model	Quantity	Voltage group	
			5 V	24 V
CPU Unit	NJ501-1500	1	1.90 A	---
I/O Control Unit	CJ1W-IC101	1	0.02 A	---
Basic I/O Units (Input Units)	CJ1W-ID211	2	0.08 A	---
	CJ1W-ID231	2	0.09 A	---
Basic I/O Units (Output Units)	CJ1W-OC201	2	0.09 A	0.048 A
Special I/O Unit	CJ1W-DA041	1	0.12 A	---
CPU Bus Unit	CJ1W-SCU22	1	0.29 A	---
Current consumption	Total		1.9 A+0.02 A+0.08 A × 2+0.09 A × 2+0.09 A × 2+0.12 A+0.29	0.048 A × 2
	Result		2.85 A (≤ 6.0 A)	0.096 A (≤ 1.0 A)
Power consumption	Total		2.85A × 5 V = 14.25 W	0.096 A × 24 V = 2.3 W
	Result		14.25 W + 2.3 W = 16.5 W (≤ 30 W)	

Note: For details on Unit current consumption, refer to Ordering Information.

Using the Sysmac Studio to Display Current Consumption and Width

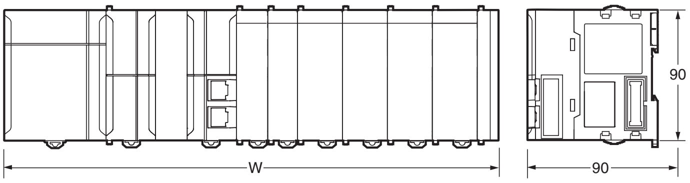
CPU Rack and Expansion Rack current consumption and width can be displayed by selecting ***CPU/Expansion Racks*** from the ***Configurations and Setup*** in the Multiview Explorer. If the capacity of the Power Supply Unit is exceeded, an error icon is displayed in the power supply unit of a corresponding rack. For details, refer to Symac Studio Version 1 Operation manual (W504).

Dimensions

Note: Units are in mm unless specified otherwise.

Product Dimensions

● **Dimensions**



Example Rack Widths using NJ-PA3001 Power Supply Unit (AC)

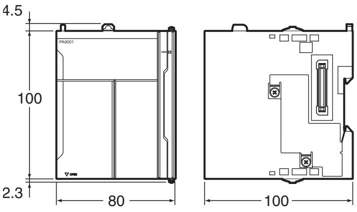
No. of Units mounted with 31-mm width	Rack width (mm)
	With NJ501-1500
1	205.7
2	236.7
3	267.7
4	298.7
5	329.7
6	360.7
7	391.7
8	422.7
9	453.7
10	484.7

● Power Supply Units, CPU Units, and End Covers

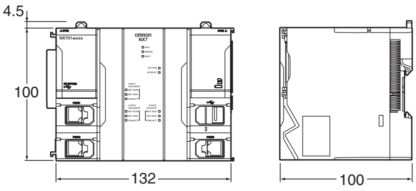
Unit/product	NX-series		NJ-series	
	Model	Width	Model	Width
Power Supply Unit	NX-PA9001	80	NJ-PA3001	70
	NX-PD7001	51	NJ-PD3001	
CPU Unit	NX701-□□□□	132	NJ501-□□□□	90
			NJ301-□□□□	
			NJ101-□□□□	
End Cover	NX-END01	12	CJ1W-TER01	14.7

NX-series

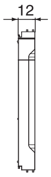
● Power Supply Units
NX-PA9001



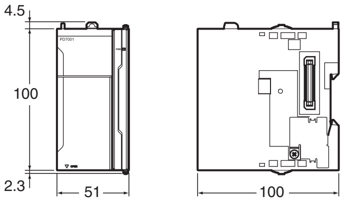
● CPU Units
NX701-□□□□



● End Cover
(included with CPU Units)
NX-END01

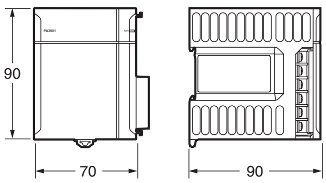


NX-PD7001



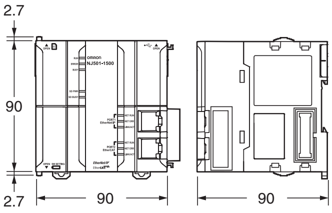
NJ-series

● Power Supply Units
NJ-PA3001
NJ-PD3001

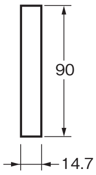


W=70 :NJ-PA3001
:NJ-PD3001

● CPU Units
NJ501-□□□□
NJ301-□□□□
NJ101-□□□□



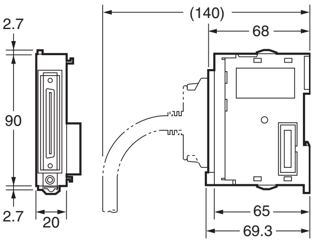
● End Cover
(included with CPU Units)
CJ1W-TER01



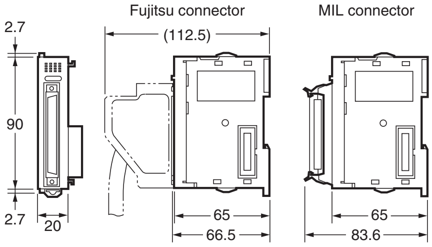
● Units of Width 20 mm

Unit/product	Model	Width
I/O Control Unit	CJ1W-IC101	20
32-point Basic I/O Units	CJ1W-ID231/232/233	
	CJ1W-OD231/232/233/234	
B7A Interface Unit	CJ1W-B7A22 CJ1W-B7A14 CJ1W-B7A04	

● I/O Control Unit


2.7
(140)
68
90
2.7
20
65
69.3

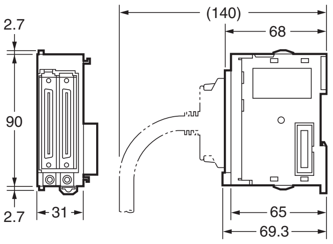
● 32-Point I/O Units (CJ1W-ID223□/OD23□)


Fujitsu connector
MIL connector
2.7
(112.5)
90
2.7
20
65
66.5
65
83.6

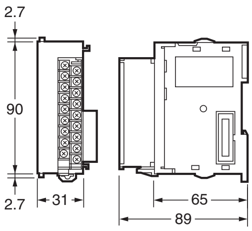
● Units of Width 31 mm

Unit	Model	Width
I/O Interface Unit	CJ1W-II101	31
8/16-point Basic I/O Units	CJ1W-ID201 CJ1W-ID211/212 CJ1W-IA111/201 CJ1W-OD20□ CJ1W-OD211/212/213 CJ1W-OC201/211 CJ1W-OA201	
32-point Basic I/O Units	CJ1W-MD231 CJ1W-MD232/233	
64-point Basic I/O Units	CJ1W-ID261 CJ1W-OD261 CJ1W-MD261	
	CJ1W-ID262 CJ1W-OD262/263 CJ1W-MD263 CJ1W-MD563	
Quick-response Input Unit	CJ1W-IDP01	
Analog I/O Units	CJ1W-AD□□□ (-V1) CJ1W-DA□□□ (□) CJ1W-MAD42	
Process Input Units	CJ1W-PH41U CJ1W-AD04U CJ1W-PDC15	
Temperature Control Units	CJ1W-TC□□□	
High-speed Counter Unit	CJ1W-CT021	
ID Sensor Units	CJ1W-V680C11 CJ1W-V680C12	
Serial Communications Units	CJ1W-SCU22 CJ1W-SCU32 CJ1W-SCU42	
EtherNet/IP Unit	CJ1W-EIP21	
EtherCAT Slave Unit	CJ1W-ECT21	
DeviceNet Unit	CJ1W-DRM21	
CompoNet Master Unit	CJ1W-CRM21	
EtherCAT Slave Unit	CJ1W-ECT21	

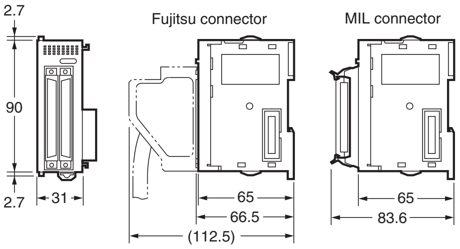
● I/O Interface Unit


2.7
(140)
68
90
2.7
31
65
69.3

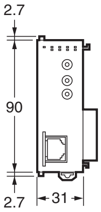
● 8/6-point Basic I/O Units, and High-speed Input Unit


2.7
90
2.7
31
65
89

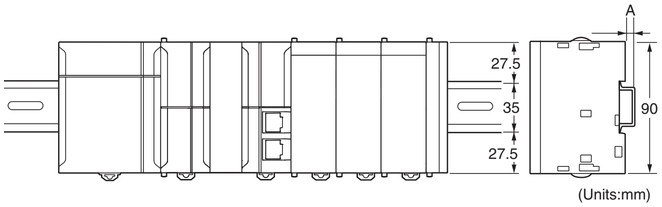
● 64-point Basic I/O Units and 32-point Basic I/O Units (CJ1W-MD23□)


2.7
Fujitsu connector
MIL connector
90
2.7
31
65
66.5
(112.5)
65
83.6

● Special I/O Units and CPU Bus Units



Mounting Dimensions

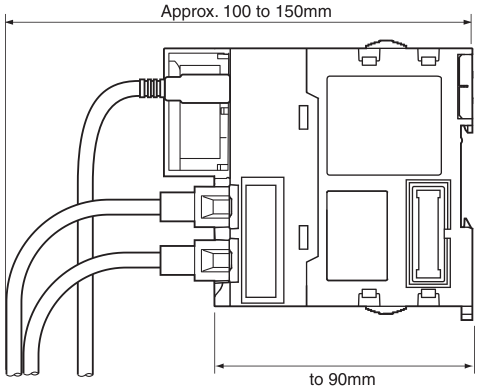


(Units:mm)

DIN Track model number	A
PFP-100N2	16 mm
PFP-100N	7.3 mm
FPP-50N	7.3 mm

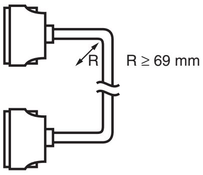
Mounting Height

With a height of 90.0 mm, the CPU Unit is the highest component in an NJ-Series CPU Rack. It is also higher than any Units on an Expansion Rack. When a cable is connected (such as a connecting cable to Support Software), however, even greater height is required. Allow sufficient depth in the control panel containing the Controller.



Note: Consider the following points when expanding the configuration:
The total length of I/O Connecting Cable must not exceed 12 m.
I/O Connecting Cables require the bending radius indicated below.

Expansion Cable



Note: Outer diameter of cable: 8.6 mm.

General Specifications

Item		NX701-□□□□	NJ501-□□□□	NJ301-□□□□	NJ101-□□□□
Enclosure		Mounted in a panel			
Grounding Method		Ground to less than 100 Ω			
Dimensions (height×depth×width)		100 mm × 100 mm × 132 mm	90 mm × 90 mm × 90 mm		
Weight		880 g (including the End Cover)	550 g (including the End Cover)		
Current Consumption		---	5 VDC, 1.90 A (including SD Memory Card and End Cover)		
Power consumption		40 W (including SD Memory Card and End Cover)	---		
Operation Environment	**Ambient Operating Temperature**	0 to 55°C			
	Ambient Operating Humidity	10% to 95% (with no condensation)	10% to 90% (with no condensation)		
	Atmosphere	Must be free from corrosive gases.			
	Ambient Storage Temperature	-25 to 70°C (excluding battery)	-20 to 75°C (excluding battery)		
	Altitude	2,000 m or less			
	Pollution Degree	2 or less: Conforms to JIS B3502 and IEC 61131-2.			
	Noise Immunity	2 kV on power supply line (Conforms to IEC 61000-4-4.)			
	Overvoltage Category	Category II: Conforms to JIS B3502 and IEC 61131-2.			
	EMC Immunity Level	Zone B			
	Vibration Resistance	Conforms to IEC 60068-2-6. 5 to 8.4 Hz with 3.5-mm amplitude, 8.4 to 150 Hz Acceleration of 9.8 m/s^2 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**	2.5 years (at 25°C, Power ON time rate 0% (power OFF))	5 years at 25°C		
	Model	CJ1W-BAT01			
Applicable Standards		Conforms to cULus, EC Directives, RCM and KC Registration.	Conforms to cULus, NK, LR, EC Directives, C-Tick and KC Registration*.		

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

Performance Specifications

Item				NX701-		NJ501-			NJ301-		NJ101-	
				1700	1600	□5□0	□4□0	□3□0	1200	1100	1000	9000
Processing Time	**Instruction Execution Times**	**LD instruction**		0.37ns or more		1.2ns (1.9ns or less)			2.0ns (3.0ns or less)		3.3ns (5.0ns or less)	
		Math Instructions (for Long Real Data)		3.2ns ns or more		26 ns or more			42 ns or more		70 ns or more	
Programming	**Program capacity*1**	**Size**		80 MB		20 MB			5 MB		3 MB	
		Number	**POU definition**	6,000		3,000			750		450	
			POU instance	48,000		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*2**	**Size**	256 MB		4 MB			2 MB			
			Number	360,000		90,000			22,500			
		Retain Attribute*3	**Size**	4 MB		2 MB			0.5 MB			
			Number	40,000		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**		8,000		2000			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)*4			32,768 words × 4 banks (E0_00000 to E3_32767)			
Unit Configuration	**Maximum Number of Connectable Units**	**Maximum number of CJ/NX 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		4000 (on NX series EtherCAT slave terminal)							400 (on NX series EtherCAT slave terminal)	
	Maximum number of Expansion Racks			0		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**		NX-PA9001 NX-PD7001		NJ-P□3001						
		Power OFF Detection Time	**AC Power Supply**	30 to 45 ms		30 to 45 ms						
			DC Power Supply	5 to 20ms		22 to 25 ms						
Motion Control	**Number of Controlled Axes**	**Maximum Number of Controlled Axes *5**		256 axes	128 axes	64 axes	32 axes	16 axes	15 axes	15 axes	6 axes	---
		Maximum number of used real axes *6		256 axes	128 axes	64 axes	32 axes	16 axes	8 axes	4 axes	2 axes	
		Maximum Number of Axes for Single-axis Control *7		256 axes	128 axes	64 axes	32 axes	16 axes	15 axes	15 axes	6 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			64 groups		32 groups						
	Motion Control Period			The same control period as that is used for the process data communications cycle for EtherCAT.								

*1.This is the capacity for the execution objects and variable tables (including variable names).
*2. Words for CJ-series Units in the Holding, DM, and EM Areas are not included.
*3. Words for CJ-series Units in the CIO and Work Areas are not included.
*4. When the Spool function is enabled, the DB Connection Service uses E9_0 to E18_32767.
*5 This is the total for all axis types.
The Maximum number of TCP socket service of the CPU Unit version 1.05 or earlier is 8 axes (NJ301-1200), 4 axes (NJ301-1100).
*6. This is the total number of axes that are set as servo axes or encoder axes and are also set as used axes.
*7. The Maximum Number of Axes for Single-axis Control of the CPU Unit version 1.05 or earlier is 8 axes (NJ301-1200), 4 axes (NJ301-1100).

Item				NX701-		NJ501-			NJ301-		NJ101	
				1700	1600	□5□0	□4□0	□3□0	1200	1100	1000	9000
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		1,048,560 points			262,140 points			
		Maximum Number of Cam Tables		640 tables		640 tables			160 tables			
	Position Units			Pulses, millimeters, micrometers, nanometers, degrees or inches								
	Override Factors			0.00% or 0.01% to 500.00%								
Peripheral USB Port	**Supported Services**			Sysmac Studio connection								
	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**			2		1						
	Physical Layer			10BASE-T/ 100BASE-TX / 1000BASE-T		10Base-T or 100Base-TX						
	Frame length			1514 max.								
	Media Access Method			CSMA/CD								
	Modulation			Baseband								
	Topology			Star								
	Baud Rate			1Gbps (1000BASE-T)		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**		256 / port total 512		32						
		Packet interval *8		0.5 to 10,000 ms in 0.5-ms increments Can be set for each connection.		1 to 10,000 ms in 1.0-ms increments *9 Can be set for each connection. (Data will be refreshed at the set interval, regardless of the number of nodes.)						
		Permissible Communications Band		40,000 pps*10 including heartbeat		3,000 pps *10 *11 (including heartbeat)						
		Maximum Number of Tag Sets		256 / port total 512		32						
		Tag types		Network variables		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 / port total 512		256						
		Maximum number of tag		369,664 byte		19,200 bytes						
		Maximum Data Size per Connection		1,444 byte		600 bytes						
		Maximum Number of Registrable Tag Sets		256 / port total 512 (1 connection = 1 tag set)		32 (1 connection = 1 tag set)						
		Maximum Tag Set Size		1,444 bytes (Two bytes are used if Controller status is included in the tag set.)		600 bytes (Two bytes are used if Controller status is included in the tag set.)						
		Multi-cast Packet Filter *12		Supported.								

*8. Data is updated on the line in the specified interval regardless of the number of nodes.
*9. The Packet interval of the CPU Unit version 1.02 or earlier is 10 to 10,000 ms in 1.0-ms increments.
*10. Means packets per second, i.e., the number of communications packets that can be sent or received in one second.
*11. The Permissible Communications Band of the CPU Unit version 1.02 or earlier is 1,000 pps.
*12. 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.

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

Item				NX701-		NJ501-			NJ301-		NJ101	
				1700	1600	□5□0	□4□0	□3□0	1200	1100	1000	9000
Built-in EtherNet/IP Port	**Cip Message Service: Explicit Messages**	**Class 3 (number of connections)**		128 / port total 256 (clients plus server)		32 (clients plus server)						
		UCMM (non-connection type)	**Maximum Number of Clients that Can Communicate at One Time**	32 / port total 64		32						
			Maximum Number of Servers that Can Communicate at One Time	32 / port total 64		32						
	Maximum number of TCP socket service			30		30 *13					30	
Built-in EtherCAT Port	**Communications Standard**			IEC 61158 Type12								
	EtherCAT Master Specifications			Class B (Feature Pack Motion Control compliant)								
	Physical Layer			100BASE-TX								
	Modulation			Baseband								
	Baud Rate			100 Mbps (100Base-TX)								
	Duplex mode			Auto								
	Topology			Line, daisy chain, and branching								
	Transmission Media			Twisted-pair cable of category 5 or higher (double-shielded straight cable with aluminum tape and braiding)								
	Maximum Transmission Distance between Nodes			100m								
	Maximum Number of Slaves			512		192					64	
	Range of node address			1-512		1-192						
	Maximum Process Data Size			Inputs: 11,472 bytes Outputs: 11,472 bytes		Inputs: 5,736 bytes Outputs: 5,736 bytes (However, the maximum number of process data frames is 4.)						
	Maximum Process Data Size per Slave			Inputs: 1,434 bytes Outputs: 1,434 bytes								
	Communications Cycle			• Primary periodic task: 125 µs, 250 µs to 8 ms (in 250-µs increments) • Priority-5 periodic task: 125 µs, 250 µs to 100 ms (in 250-µs increments)		500/1,000/2,000/4,000 µs*14					1,000/2,000/4,000 µs	
	Sync Jitter			1 µs max.								
Internal Clock				At ambient temperature of 55°C: -3.5 to +0.5 min error per month At ambient temperature of 25°C: -1.5 to +1.5 min error per month At ambient temperature of 0°C: -3 to +1 min error per month								

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

*14.The Maximum Communications Cycle of the NJ301 CPU Unit version 1.02 or earlier is 1,000/2,000/4,000 µs.
The EtherCAT communications cycle of NJ501-4□□0 for robot control is 1 ms or less.

Function Specifications

Item				NX701-□□□□	NJ501-□□□□	NJ301-□□□□	NJ101-□□□□
Tasks	**Function**			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.			
		Periodically Executed Tasks	**Maximum Number of Primary Periodic Tasks**	1			
			Maximum Number of Periodic Tasks	4	3		
		Conditionally executed tasks *1	**Maximum number of event tasks**	32			
			Execution conditions	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).		
Programming	**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 Languages	**Types**		Ladder diagrams *2 and structured text (ST)			
	Namespaces *3			A concept that is used to group identifiers for POU definitions.			
	Variables	**External Access of Variables**	**Network Variables**	The function which allows access from the HMI, host computers, or other Controllers			
	Data Types	**Data Types**	**Boolean**	BOOL			
			Bit Strings	BYTE, WORD, DWORD, LWORD			
			Integers	INT, SINT, DINT,LINT, UINT, USINT, UDINT, ULINT			
			Real Numbers	REAL, 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 Members	2048			
			Nesting Maximum Levels	8			
			Member Data Types	Basic data types, structures, unions, enumerations, array variables			
			Specifying Member Offsets	You can use member offsets to place structure members at any memory locations.*3			
		Unions	**Function**	A derivative data type that groups together data with different variable types.			
			Maximum Number of Members	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 Attributes	**Array Specifications**	**Function**	An array is a group of elements with the same data type. You specify the number (subscript) of the element from the first element to specify the element.			
			Maximum Number of Dimensions	3			
			Maximum Number of Elements	65535			
			Array Specifications for FB Instances	Supported.			
		Range Specifications		You can specify a range for a data type in advance. The data type can take only values that are in the specified range.			
		Libraries		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				NX701-□□□□	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.			
			Command position compensation *5	The function which compensate the position for the axis in operation.			
			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				NX701-□□□□	NJ501-□□□□	NJ301-□□□□	NJ101-□□□□
Motion Control	**Axes Groups**	**Multi-axes Coordinated Control**	**Absolute Linear Interpolation**	Linear interpolation is performed to a specified absolute position.			
			Relative Linear Interpolation	Linear interpolation is performed to a specified relative position.			
			Circular 2D Interpolation	Circular interpolation is performed for two axes.			
			Axes Group Cyclic Synchronous Absolute Positioning	A positioning command is output each control period in Position Control Mode.*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 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				NX701-□□□□	NJ501-□□□□	NJ301-□□□□	NJ101-□□□□
Unit (I/O) Management	EtherCAT Slaves	Maximum Number of Slaves		512	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.			
	EtherNet/IP 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 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.			
	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).			
		Packet Monitoring *8		The frames that are sent by the master and the frames that are received by the master can be saved.The data that is saved can be viewed with WireShark or other applications.			
		Enable/disable Settings for Slaves		The slaves can be enabled or disabled as communications targets.			
		Disconnecting/Connecting Slaves		SDO messages of the CAN application can be sent to slaves via EtherCAT.			
		Supported Application Protocol	CoE	SDO messages that conform to the CANopen standard can be sent to slaves via EtherCAT.			
	Communications Instructions			The following instructions are supported. CIP communications instructions, socket communications instructions, SDO message instructions, FTP client 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		
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		2,048	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. For NJ301, Supported only by the CPU Units with unit version 1.10 or later.

Item				NX701-□□□□	NJ501-□□□□	NJ301-□□□□	NJ101-□□□□
Debugging	**Online Editing**	**Single**		Programs, function blocks, functions, and global variables can be changed online. Different operators can change different POUs across a network.			
	Forced Refreshing			The user can force specific variables to TRUE or FALSE.			
		Maximum Number of Forced Variables	**Device Variables for EtherCAT Slaves**	64			
			Device Variables for CJ-series Units and Variables with AT Specifications	---	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	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 POUs 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	5 *11		5
		Verification of User Program Execution ID		The user program cannot be executed without entering a user program execution ID from the Sysmac Studio for the specific hardware (CPU Unit).			
SD Memory Card Functions	**Storage Type**			SD Memory Card, SDHC Memory Card			
	Application	**Automatic transfer from SD Memory Card *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.			
		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 systemdefined 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.
*9. Cannot be used with the NJ101-9000.
*10.Maximum Number of Simultaneous Data Trace of the NJ501-1□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				NX701-□□□□	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 or compare data.			
			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.			
		Protection	**Prohibiting backing up data to the SD Memory Card**	Prohibit SD Memory Card backup functions.			
	Sysmac Studio Controller 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.

Function Specifications of DB Connection Function

Besides functions of the NJ501-□□□□, functions supported by the NJ501-1□20 are as follows.

Item		Description
Supported port		Built-in EtherNet/IP port
Supported DB		Microsoft Corporation: SQL Server 2008/2008 R2/2012 Oracle Corporation: Oracle Database 10g /11g
Number of DB Connections (Number of databases that can be connected at the same time)		3 connections max. ✻1
Instruction	**Supported operations**	The following operations can be performed by executing DB Connection Instructions in the NJ-series CPU Units. Inserting records (INSERT), Updating records (UPDATE), Retrieving records (SELECT), and Deleting records (DELETE)
	Number of columns in an INSERT operation	SQL Server: 1,024 columns max. Oracle: 1,000 columns max.
	Number of columns in an UPDATE operation	SQL Server: 1,024 columns max. Oracle: 1,000 columns max.
	Number of columns in a SELECT operation	SQL Server: 1,024 columns max. Oracle: 1,000 columns max.
	Number of records in the output of a SELECT operation	65,535 elements max., 4 MB max.
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 ✻2
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.

*1. When two or more DB Connections are established, the operation cannot be guaranteed if you set different database types for the connections.
*2. Refer to "NJ-series Database Connection CPU Units User's Manual(W527)" for the information.

Functions Supported by NJ501-1340

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: • 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	Can record the following information. • 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. *2
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
State Model	Yes
Equipment Processing State	
Host-initiated S1, F13/F14 Scenario	
Event Notification	
On-Line Identification	
Error Message	
Control (Operator Initiated)	
Documentation	

Additional capabilities	GEM-compliant
Establish Communications	**Yes**
Dynamic Event Report Configuration	
Variable Data Collection	
Trace Data Collection	
Status Data Collection	
Alarm Management	
Remote Control	
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)	

Functions Supported by NJ501-4□□□

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

Item				NJ501-			
				4500	4400	4300	4310
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.			

Version Information

Unit Versions

Units	Models	Unit Version
NX701 CPU Units	NX701-□□□□	Unit version 1.10
NJ501 CPU Units	NJ501-□□□□	From unit version 1.00 to 1.10
NJ501 Database Connection CPU Units	NJ501-1□20	Unit version 1.10 Unit version 1.09 Unit version 1.08 Unit version 1.07 Unit version 1.05
NJ501 SECS/GEM CPU Unit	NJ501-1340	From unit version 1.09 to 1.10
NJ501 NJ Robotics CPU Units	NJ501-4□□0	From unit version 1.02 to 1.09
NJ301 CPU Units	NJ301-□□□□	From unit version 1.01 to 1.10
NJ101 CPU Units	NJ101-□□□□	Unit version 1.10

Unit Versions and Programming Devices

The following tables show the relationship between unit versions and Sysmac Studio versions.

Unit Versions and Programming Devices

Unit Version of CPU Unit	Corresponding version of Sysmac Studio
1.10 *1	1.13 1.12
1.09 *2	1.11 1.10
1.08	1.09
1.07	1.08
1.06	1.07
1.05 *3	1.06
1.04	1.05
1.03	1.04
1.02	1.03
1.01	1.02
1.00 *4	1.01
	1.00

*1. NX701-□□□□/NJ101-□□□□ CPU Unit can be used with Sysmac Studio version 1.13 or higher.
*2. The NJ501-1340 CPU Unit can be used with Sysmac Studio version 1.11 or higher.
*3. The NJ501-1□20 CPU Unit can be used with Sysmac Studio version 1.07 or higher.
*4. There is no NJ301-□□□□ CPU Unit with unit version 1.00. Therefore, you cannot use an NJ301-□□□□ CPU Unit with Sysmac Studio version 1.01 or lower.

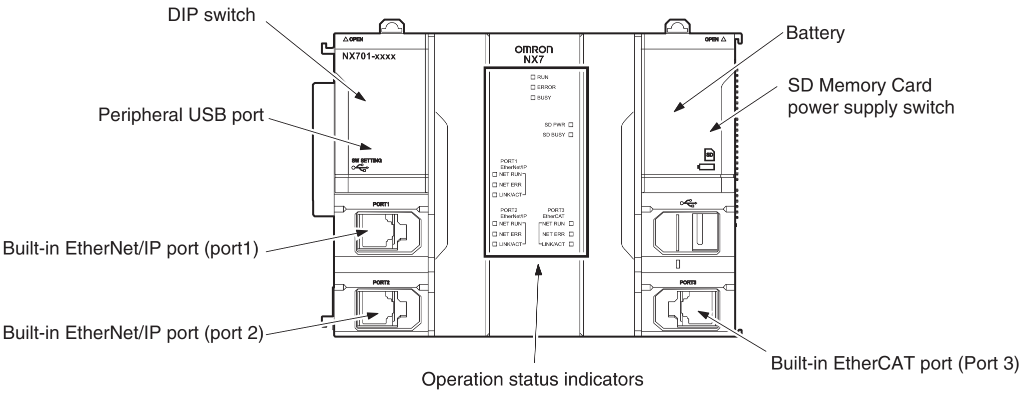
Note: 1. If you use a lower version of the Sysmac Studio, you can use only the functions of the unit version of the CPU Unit that corresponds to the Sysmac Studio version.
If you use a CPU Unit with an earlier version, select the unit version of the connected CPU Unit or an earlier unit version in the Select Device Area of the Project Properties Dialog Box on the Sysmac Studio. You can use only the functions that are supported by the unit version of the connected CPU Unit.

2. The license number for a robot is required to use this CPU Unit. Contact your OMRON representative for details.

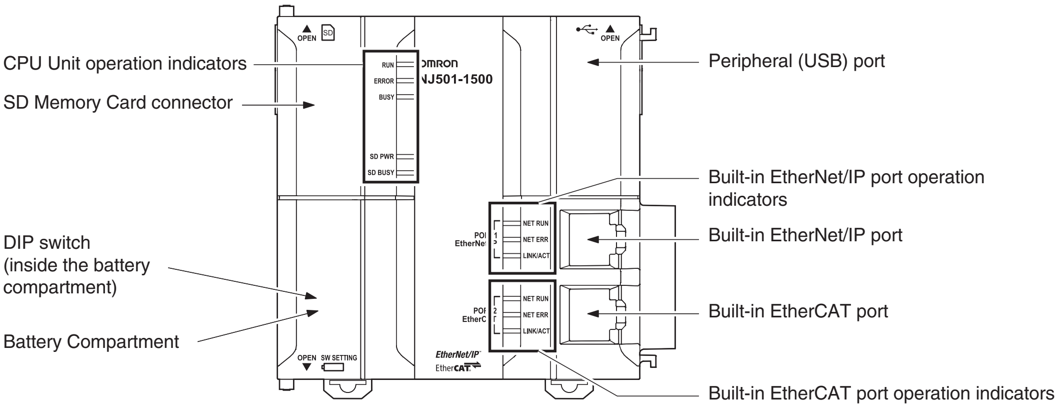
3. Refer to the NJ501-4□□□ Datasheet for "Unit Versions and Robot Versions and Programming Devices".

Components and Functions

NX-series CPU Unit

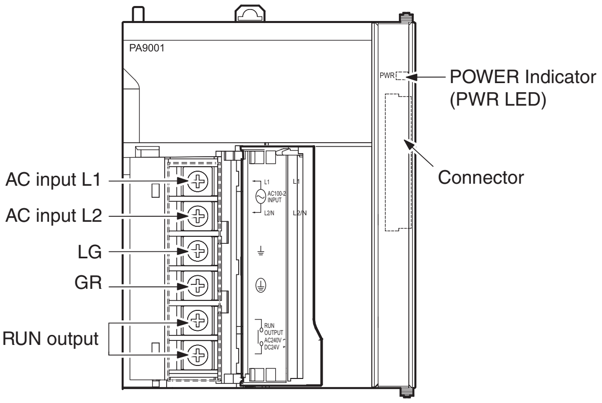

DIP switch
Peripheral USB port
Built-in EtherNet/IP port (port1)
Built-in EtherNet/IP port (port 2)
Operation status indicators
Built-in EtherCAT port (Port 3)
SD Memory Card power supply switch
Battery
NX701-xxxx
OMRON
NX7
RUN
ERROR
BUSY
SD PWR
SD BUSY
PORT1 EtherNet/IP
NET RUN
NET ERR
LINK/ACT
PORT2 EtherNet/IP
PORT3 EtherCAT
OPEN
SW SETTING
PORT1
PORT2
PORT3

NJ-series CPU Unit

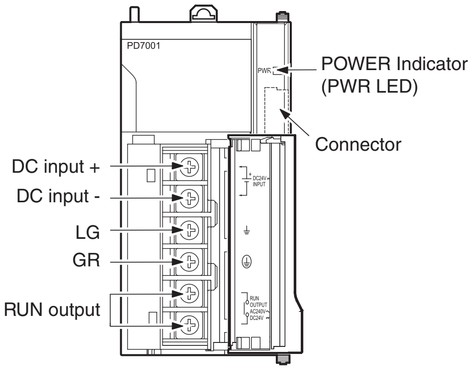

CPU Unit operation indicators
SD Memory Card connector
DIP switch
(inside the battery
compartment)
Battery Compartment
Peripheral (USB) port
Built-in EtherNet/IP port operation
indicators
Built-in EtherNet/IP port
Built-in EtherCAT port
Built-in EtherCAT port operation indicators
OPEN
SD
RUN
ERROR
BUSY
SD PWR
SD BUSY
OMRON
NJ501-1500
NET RUN
NET ERR
LINK/ACT
SW SETTING
EtherNet/IP
EtherCAT

Power Supply Unit

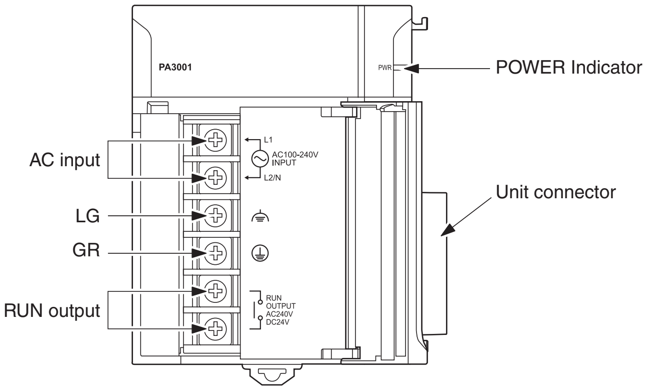
NX-PA9001


PA9001
PWR
POWER Indicator
(PWR LED)
Connector
AC input L1
AC input L2
LG
GR
RUN output

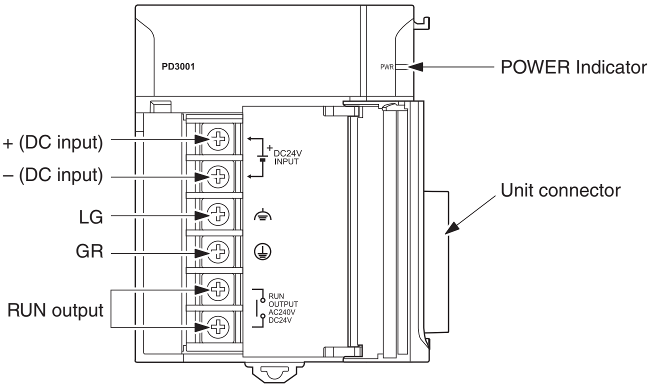
NX-PD7001


PD7001
PWR
POWER Indicator
(PWR LED)
Connector
DC input +
DC input -
LG
GR
RUN output

NJ-PA3001


PA3001
PWR
POWER Indicator
AC input
LG
GR
RUN output
Unit connector
L1
AC100-240V
INPUT
L2/N
RUN
OUTPUT
AC240V
DC24V

NJ-PD3001


PD3001
PWR
POWER Indicator
+ (DC input)
– (DC input)
LG
GR
RUN output
Unit connector
DC24V
INPUT
RUN
OUTPUT
AC240V
DC24V

Automation Software

Sysmac Studio

Sysmac Studio for machine creators

The Sysmac Studio provides an integrated development environment to set up, program, debug, and maintain NJ/NX-series Controllers and other Machine Automation Controllers, as well as EtherCAT slaves.

OMRON
Sysmac Studio Version 1.0

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Features

- One software for motion, logic, safety, drives , vision and HMI
- Fully compliant with open standard IEC 61131-3 and Japanese standard JIS B3503
- Supports Ladder, Structured Text and Function Block programming with a rich instruction set
- CAM editor for easy programming of complex motion profiles
- One simulation tool for sequence and motion in a 3D environment
- Advanced security function with 32 digit security password

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Other company names and product names in this document are the trademarks or registered trademarks of their respective companies.

System Requirements

Item	Requirement
Operating system (OS) *1 *2 *3	Windows XP (Service Pack 3 or higher, 32-bit version) / Windows Vista (32-bit version) / Windows 7 (32-bit/64-bit version) / Windows 8 (32-bit/64-bit version) / Windows 8.1 (32-bit/64-bit version)
CPU *3	Windows computers with Celeron 540 (1.8 GHz) or faster CPU. Core i5 M520 (2.4 GHz) or equivalent or faster recommended
Main memory *3 *4	2 GB min. 4 GB min. recommended.
Recommended video memory / video card for using 3D motion trace	Video memory: 512 MB min. Video card: Either of the following video cards: • NVIDIA® GeForce® 200 Series or higher • ATI RadeonHD5000 Series or higher
Hard disk	At least 1.6 GB of available space
Display	XGA 1024 × 768, 16 million colors. WXGA 1280 × 800 min. recommended
Disk drive	DVD-ROM drive
Communications ports	USB port corresponded to USB 2.0, or Ethernet port *5
Supported languages *6	Japanese, English, German, French, Italian, Spanish, simplified Chinese, traditional Chinese, Korean

***1.** Sysmac Studio Operating System Precaution: System requirements and hard disk space may vary with the system environment.

***2.** The following restrictions apply when Sysmac Studio is used with Microsoft Windows Vista, Windows 7 or Windows 8 / Windows 8.1.

1) Some Help files cannot be accessed.
   The Help files can be accessed if the Help program distributed by Microsoft for Windows (WinHlp32.exe) is installed. Refer to the Microsoft homepage listed below or contact Microsoft for details on installing the file. (The download page is automatically displayed if the Help files are opened while the user is connected to the Internet.)
   http://support.microsoft.com/kb/917607/en-us
2) The following restrictions apply to some application operations.

Application	Restriction
CX-Designer	If a new Windows Vista, Windows 7 or Windows 8 / Windows 8.1 font (e.g., Meiryo) is used in a project, the font size on labels may be bigger and protrude from the components if the project is transferred from CX-Designer running on a Windows XP or earlier OS to the NS/NSJ.
CX-Integrator/Network Configurator	Although you can install CPS files, EDS files, Expansion Modules, and Interface Modules, the virtual store function of Windows Vista, Windows 7 or Windows 8 / Windows 8.1 imposes the following restrictions on the use of the software after installation. • If another user logs in, the applications data will need to be installed again. • The CPS files will not be automatically updated. These restrictions will not exist if application data is installed using Run as Administrator.

***3.** If you create a user program with a memory size that exceeds 20 MB, use the 64-bit edition of the operating system and 8 GB or more of main memory. If the user program size is large, we recommend that you use the 64-bit edition of the operating system, a Core i7 processor or the equivalent, and 8 GB or more of main memory.

***4.** The amount of memory required varies with the Support Software used in Sysmac Studio for the following Support Software. Refer to user documentation for individual Support Software for details.
CX-Designer, CX-Protocol, and Network Configurator

***5.** Refer to the hardware manual for your CPU unit for hardware connection methods and cables to connect the computer and CPU unit.

***6.** Supported only by the Sysmac Studio version 1.01 or higher about German, French, Italian and Spanish.
Supported only by the Sysmac Studio version 1.02 or higher about simplified Chinese, traditional Chinese and Korean.

Common Function Specifications

Item			Function	Applicable versions
Setting Parameters	**EtherCAT Configuration and Setup**		You can create a configuration in the Sysmac Studio of the EtherCAT slaves connected to the built-in EtherCAT port of the NJ/NX-series CPU Unit and set the parameters for the EtherCAT masters and slaves.	All versions
		Registering slaves	You can set up devices by dragging slaves from the device list displayed in the Toolbox Pane to the locations where you want to connect them.	
		Changing the Coupler model	You change the model number or unit version of a Coupler Unit. Use this function to change the model number and version of the Coupler Unit registered in the project to the new model number and version when replacing a Coupler Unit.	Ver. 1.09 or higher
		Setting master parameters	You set the common parameters of the EtherCAT network (e.g., the fail-soft operation and wait time for slave startup settings).	All versions
		Setting slave parameters	You set the standard slave parameters and assign PDOs (process data objects).	
		Comparing and merging network configuration information	The EtherCAT network configuration information in the NJ/NX-series CPU Unit and in the Sysmac Studio are compared and the differences are displayed.	
		Transferring the network configuration information	The EtherCAT network configuration information is transferred to the NJ/NX-series CPU Unit. Or, the EtherCAT network configuration information in the CPU Unit is transferred to the Sysmac Studio and displayed in the EtherCAT Editor.	
		Installing ESI files	ESI (EtherCAT slave information) files are installed.	
	EtherCAT Slave Terminal Configuration and Setup		The configuration of any Slave Terminal that is connected to an EtherCAT network is created on the Sysmac Studio. The NX Units that compose the Slave Terminal are set in the configuration.	Ver. 1.06 or higher
		Registering NX Units	A Slave Terminal is built by dragging NX Units from the device list displayed in the Toolbox to the locations where you want to mount them.	
		Setting NX Units	The I/O allocations, mounting settings, and Unit operation settings of the NX Units are edited.	
		Displaying the width of a Slave Terminal configuration	The width and power consumption of a Slave Terminal are displayed based on the Unit configuration information.	
		Comparing and merging the Slave Terminal configuration information	When online, you can compare the configuration information in the project with the physical configuration. You can also select the missing Units and add them to the project.	
		Transferring the Slave Terminal configuration information	The Unit configuration information is transferred to the CPU Unit.	
	CPU/Expansion Rack Configuration and Setup		You create the configuration in the Sysmac Studio of the Units mounted in the NJ-series CPU Rack and Expansion Racks and the Special Units.	All versions
		Registering Units	A Rack is built by dragging Units from the device list displayed in the Toolbox Pane to the locations where you want to mount them.	
		Creating Racks	An Expansion Rack (Power Supply Unit, I/O Interface Unit, and End Cover) is added.	
		Switching Unit displays	The model number, unit number, and slot number are displayed.	
		Setting Special Units	The input time constants are set for Input Units and parameters are set for Special Units.	
		Displaying Rack widths, current consumption, and power consumption	The Rack widths, current consumption, and power consumption are displayed based on the Unit configuration information.	
		Comparing the CPU/ Expansion Rack configuration information with the physical configuration	When online, you can compare the configuration information in the project with the physical configuration. You can also select the missing Units and add them.	
		Transferring the CPU/ Expansion Rack configuration information	The Unit configuration information is transferred to the CPU Unit. The synchronize function is used.	
		Printing the Unit configuration information	The Unit configuration information is printed.	
	Controller Setup		The Controller Setup is used to change settings related to the operation of the Controller. The Controller Setup contains PLC Function Module operation settings and built-in EtherNet/IP Function Module port settings.	All versions
		Operation Settings	The Startup Mode, SD Memory Card diagnosis at Startup, Write Protection at Startup, Controller Error Level Changes *1, and other settings are made.	
		Transferring Operation Settings	Use the synchronize operation to transfer the operation settings to the NJ/NX-series CPU unit.	
		Built-in EtherNet/IP Port Settings	These settings are made to perform communications using the built-in EtherNet/IP port of the NJ/NX-series CPU unit.	
		Transferring Built-in EtherNet/IP Port Settings	Use the synchronize operation to transfer the Built-in EtherNet/IP Port Settings to the NJ/NX-series CPU unit.	
	Motion Control Setup		The Motion Control Setup is used to create the axes to use in motion control instructions, assign those axes to Servo Drives and encoders, and set axis parameters.	All versions
		Axis Settings	Axes are added to the project.	
		Axis Setting Table	The Axis Setting Table is a table of all registered axis parameters. You can edit any axis parameters here just as you can on the Axis Settings Tab Page.	
	Axes Group Settings		You can set up axes to perform interpolated motions as an axes group.	All versions
		Axes Group Basic Settings	Set the axes group number, whether to use the axes group, the composition, and the composition axes.	
		Operation Settings	Set the interpolated velocity, the maximum interpolated acceleration and deceleration, and the interpolated operation settings.	

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*1. Changing event levels for Controller errors is supported by version 1.04 or higher.

Item			Function	Applicable versions
Setting Parameters	**Cam Data Settings**		The Cam Data Settings are used to create electronic cam data. When you build the project for the Controller, a cam table is created according to the Cam Data Settings.	All versions
		Registering cam data settings	Cam data settings is added to the project.	
		Editing cam data settings	You can set properties and node points for cam data settings.	
		Transferring cam data settings	You can select to transfer all or part of the cam data.	
		Importing cam data settings	You can import cam data settings from a CSV file.	
		Exporting cam data settings	You can export cam data to a CSV file.	
		Registering cam definitions	You add new cam definitions to change a cam table in the program.	Ver.1.09 or higher
		Editing cam definitions	You set cam definitions.	
		Transferring cam definitions	You transfer cam definitions to the Controller.	
		Exporting cam tables	You can export a cam table to a CSV file.	All versions
		Transferring cam tables from the Controller to files	You can save a cam table in the NJ/NX-series CPU unit to a CSV file.	
		Transferring cam tables from files to the Controller	You can transfer a cam table that is saved in a CSV file to update the contents of a cam table that is already in the NJ/NXseries CPU unit.	
		Superimposing Cam Table	You can superimpose the cam table from a CSV file on the cam profile curve position graph that is currently displayed.	
	Task Setup		Programs are executed in tasks in an NJ/NX-series CPU Unit. The Task Settings define the execution period, the execution timing, the programs executed by the task, the I/O refreshing performed by the task, and which variables to share between tasks.	All versions
		Registering tasks	The tasks, which are used to execute programs, are registered.	
		Setting task I/O	The task I/O settings define what Units the task should perform I/O refreshing for.	
		Assigning programs	Program assignments define what programs a task will execute.	
		Setting exclusive control of variables in tasks	You can specify if a task can write to its own values (known as a refreshing task) or if it can only access them (an accessing task) for global variables. This ensures concurrency for global variable values from all tasks that reference them.	
	I/O Map Settings		The I/O ports that correspond to the registered EtherCAT slaves and to the registered Units on the CPU Rack and Expansion Racks are displayed. The I/O Map is edited to assign variables to I/O ports. The variables are used in the user program.	All versions
		Displaying I/O ports	I/O ports are displayed based on the configuration information of the devices (slaves and Units).	
		Assigning variables	Variables are assigned to I/O ports.	
		Creating device variables	Device variables are created in the I/O Map. You can either automatically create a device variable or manually enter the device variable to create.	
		Checking I/O assignments	The assignments of external I/O devices and variables are checked.	
	Vision Sensor Settings		You can set and calibrate Vision Sensors. Refer to "**Function Specifications of Vision Sensor Functions**".	Ver.1.01 or higher
	Displacement Sensor Settings		You can set and calibrate Displacement Sensors. Refer to "**Function Specifications of Displacement Sensor Functions**".	Ver.1.05 or higher
	DB Connection Function Settings		You can set and transfer the DB connection function settings. Refer to "**Function Specifications of DB Connection Function**".	Ver. 1.06 or higher with the NJ501-1□20 selected
	EtherNet/IP Connection Settings		You can make settings related to tag data links (connections) in an EtherNet/IP network. Refer to "**Function Specifications of EtherNet/IP Connection Settings**".	Ver. 1.10 or higher
	EtherNet/IP Slave Terminal Settings		You can make and transfer settings for EtherNet/IP Slave Terminals. Refer to "**Functional Specifications of EtherNet/IP Slave Terminal Settings**" for details.	Ver. 1.11 or higher
	NA-series Programmable Terminal (PT) Settings		You can make settings and transfer projects for NA-series Programmable Terminals. Refer to "**Functional Specifications of HMIs**".	Ver. 1.11 or higher

Item			Function	Applicable versions
Programming	**Instruction list (Toolbox)**		A hierarchy of the instructions that you can use is displayed in the Toolbox. You can drag the required instruction to a program in the Ladder Editor or ST Editor to insert the instruction.	All versions
	Programming ladder diagrams		Ladder diagram programming involves connecting rung components with connecting lines to build algorithms. Rung components and connecting lines are entered in the Ladder Editor.	All versions
		Starting the Ladder Editor	The Ladder Editor for the program is started.	
		Adding and deleting sections	You can divide your ladder diagrams into smaller units for easier management. These units of division are called sections.	
		Inserting rung components	You insert rung components in the Ladder Editor to create an algorithm.	
		Inserting and deleting function blocks	You can insert a function block instruction or user-defined function block into the Ladder Editor.	
		Inserting and deleting functions	You can insert a function instruction or user-defined function into the Ladder Editor.	
		Inserting and deleting inline ST	You can insert a rung component in a ladder diagram to enable programming in ST. This allows you to include ST in a ladder diagram.	
		Editing rung components	You can copy and past rung components.	
		Inserting and deleting jump labels and jumps	You can insert a jump label in the rung to jump to and then specify that jump label when you insert a jump.	
		Inserting and deleting bookmarks	You can add bookmarks to the beginning of rungs and move between them.	
		Rung comments	You can add comments to rungs.	
		Displaying rung errors	When you enter a rung component, the format is always checked and any mistakes are displayed as errors. If there are any errors, a red line is displayed between the rung number and the left bus bar.	
		Entry assistance	When you enter instructions or parameters, each character that you enter from the keyboard narrows the list of candidates that is displayed for selection.	
		Displaying variable comments ✻2	A specified variable comment can be displayed with each variable of rung components on the ladder diagrams. You can change the length of the displayed variable comments to make them easier to read. ✻3	Ver.1.01 or higher
	Programming structured text		You combine different ST statements to build algorithms.	All versions
		Starting the ST Editor	The ST Editor for programs or for functions/function blocks is started.	
		Editing ST	You combine different ST statements to build algorithms.	
		Entering calls to functions and function blocks	You can enter the first character of the instance name of the function or the function block in the ST Editor to call and enter a function or function block.	
		Entering constants	You can enter constants in the ST Editor.	
		Entering comments	Enter "(*" at the beginning and "*)" at the end of any text to be treated as a comment in the ST Editor. If you only want to comment out a single line, enter a double forward slash (//) at the beginning of the line.	
		Copying, pasting, and deleting ST elements	You can copy, paste, and delete text strings.	
		Indenting	You can indent nested statements to make them easier to read.	
		Moving to a specified line	You can specify a line number to jump directly to that line.	
		Bookmarks	You can add bookmarks to any lines and move between them.	
		Entry assistance	When you enter instructions or parameters, each character that you enter from the keyboard narrows the list of candidates that is displayed for selection.	
	Namespaces		Namespaces allow you to group and nest the names of functions, function block definitions, and data types so that you can manage them. This reduces the chance of duplicated names and makes the entities easier to access.	Ver.1.02 or higher
	Variable Manager		A list of the variables in the global and local variable tables is displayed in a separate window. You can display variable usage, sort and filter the variables, edit and delete variables, or move variables while displaying another editing view.	Ver.1.04 or higher
	Changing variable comments and data type comments		You can globally change variable comments and data type comments to other comments. You can change the comments to different language for users in a different country.	
	Sorting and filtering variables		You can sort and filter the variables in each variable table.	Ver.1.08 or higher
	Searching and replacing		You can search for and replace strings in the data of a project.	All versions
	Retrace searching		You can search for the program inputs and the input parameters to functions or function blocks that use the selected variable if the selected variable is used as a program output or as the output parameter of a function or function block. Also, you can search for the program outputs and the output parameters to functions or function blocks that use the selected variable if the selected variable is used as a program input or as the input parameter of a function or function block.	Ver.1.01 or higher
	Jumping		You can jump to the specified rung number or line number in the program.	All versions
	Building	**Building**	The programs in the project are converted into a format that is executable in the NJ/NX-series CPU unit.	
		Rebuilding	A rebuild is used to build project programs that have already been built.	
		Aborting a build operation	You can abort a build operation.	
	Creating applications for NA-series PTs		You can create and transfer pages and subroutines for NA-series Programmable Terminals. Refer to "**Functional Specifications of HMIs**".	Ver.1.11 or higher

*2 Displaying comments for members of arrays, structures, and unions and displaying long comments for variables (up to five lines) are supported by version 1.04 or higher.

*3. Changing the length of the displayed variable comments is supported by version 1.05 or higher.

System Configuration
Controllers
Softwares
Programmable Terminals
EtherCAT Slave Terminals
Safety
Mortion/Drives
Inverters
Sensors
Remote I/O Terminals
Ordering Information
Features
System Requirements
Function Specifications
Version Information
Web Support Services
Applicable Models

Item			Function	Applicable versions
Reuse Functions	**Library**		You can create functions, function block definitions, programs ✻4, and data types in a library file to use them as objects in other projects.	Ver.1.02 or higher
		Creating libraries	You can create library files to enable using functions, function block definitions, and data types in other projects.	
		Using libraries	You can access and reuse objects from library files that were created in other projects.	
File Operations	**File operations**	**Creating a project file**	A project file is created.	All versions
		Opening a project file	A project file is opened.	
		Saving the project file	The project file is saved.	
		Saving a project file under a different name	A project file is saved under a different name.	
		Project update history management	You can assign numbers to projects to manage the project history.	Ver.1.03 or higher
		Exporting a project file	You can export a project to an .smc2 or .csm2 project file ✻5. You can also export a project to a previous project file format, i.e., .smc or .csm.✻6.	All versions
		Importing a project file	You can import a project from an .smc2 ✻5, .csm2 ✻5, .smc, or .csm ✻6 project file.	
		Importing a ST project file	Import of ST program files created by the Simulink® PLC Coder™ (version R2013a or higher) from MathWorks® Inc.	Ver.1.04 or higher
		Offline comparison	You can compare the data for an open project with the data for a project file and display the results. You can also compare the open project with an exported .smc2 ✻5 or .smc project file. Or, you can merge detailed comparison results. ✻7	Ver.1.02 or higher
	Cutting, copying, and pasting		You can cut, copy, or paste items that are selected in the Multiview Explorer or any of the editors.	All versions
	Synchronize		The project file in the computer is compared with the data in the online NJ/NX-series CPU Unit and any differences are displayed. You can specify the transfer direction for any type of data and transfer all of the data.	
	Batch transfer		You transfer data between the computer and NJ/NX-series CPU Unit that are connected online. You can select the same data to transfer as in the synchronization operation. Unlike the synchronization operation, the data is transferred in the specified direction without displaying the comparison results.	Ver.1.09 or higher
	Printing		You can print various data. You can select the items to print.	All versions
	Clear All Memory		The Clear All Memory Menu command is used to initialize the user program, Controller Configurations and Setup, and variables in the CPU Unit to the defaults from the Sysmac Studio.	
	SD Memory Cards		The following procedures are used to execute file operations for the SD Memory Card mounted in the NJ/NX-series CPU unit and to copy files between the SD Memory Card and computer.	All versions
		Formatting the SD Memory Card	The SD Memory Card is formatted.	
		Displaying properties	The properties of the selected file or folder in the SD Memory Card are displayed.	
		Copying files and folders in the SD Memory Card	The selected file or folder in the SD Memory Card is copied to the SD Memory Card.	
		Copying files and folders between the SD Memory Card and the computer	The selected file or folder in the SD Memory Card is copied to the computer. Or, the selected file or folder in the computer is copied to the SD Memory Card.	
Debugging	**Monitoring**		Variables are monitored during ladder program execution. You can monitor the TRUE/FALSE status of inputs and outputs and the present values of variables in the NJ/NX-series CPU unit. You can monitor operation on the Ladder Editor, ST Editor, Watch Tab Page, or I/O Map.	All versions
	Differential monitoring		You can detect the number of times the specified BOOL variable or BOOL member changes to TRUE or FALSE and display the count in the Differential Monitor Window. You can check if bits turn ON and OFF and the number of times that they turn ON and OFF.	Ver.1.04 or higher
	Changing present values and TRUE/FALSE		You can change the values of variables that are used in the user program and settings to any desired value, and you can change program inputs and outputs to TRUE or FALSE. This allows you to check the operation of the user program and settings.	All versions
	Changing the present values of variables ✻8		You can change the present values of user-defined variables, system-defined variables, and device variables as required. You can do this in the Ladder Editor, ST Editor, Watch Tab Page or I/O Map.	
	Forced refreshing		Forced refreshing allows the user to refresh external inputs and outputs with user-specified values from the Sysmac Studio. The specified value is retained even if the value of the variable is overwritten from the user program. You can use forced refreshing to force BOOL variables to TRUE or FALSE in the Ladder Editor, Watch Tab Page, or I/O Map.	
	Online editing		Online editing allows you to edit programs on systems that are currently in operation. Online editing can be used to edit only POUs and global variables. User-defined data types cannot be edited with online editing.	
	Cross Reference Tab Page		Cross references allow you to see the programs and locations where program elements (variables, data types, I/O ports, functions, or function blocks) are used. You can view all locations where an element is used from this list.	

*4. Creating programs in a library file is supported by version 1.06 or higher.
*5. Supported only by the Sysmac Studio version 1.08 or higher.
*6. The .csm format is supported by version 1.04 or higher. The size of a csm file is smaller than the size of the smc file.
*7. Merging detailed comparison results is supported by version 1.03 or higher.
*8. Changing present values in the Ladder Editor or ST Editor is supported by version 1.03 or higher.

Item			Function	Applicable versions
Debugging	**Data tracing**		Data tracing allows you to sample the specified variables and store the values of the variables in trace memory without any programming. You can choose between two continuous trace methods: a triggered trace, where you set a trigger condition and data is saved before and after that condition is met, or a continuous trace, in which continuous sampling is performed without any trigger and the results are stored in a file on your computer. However, you can still display data retrieved on the Sysmac Studio and save those results to a file even if you use a triggered trace. These same functions can be used with the Simulator as well.	All versions
		Setting sampling intervals	The interval to perform sampling on the target data is set. Sampling is performed for the specified task period, at the specified time, or when a trace sampling instruction is executed.	
		Setting triggers	To perform a triggered trace, you set a condition to trigger sampling. A suitable trigger condition is set to record data before and after an event.	
		Setting a continuous trace	The method to save the data traced during a continuous trace is set.	
		Setting variables to sample	The variables to store in trace memory are registered. The sampling intervals can also be set.	
		Starting and stopping tracing	The data trace settings are transferred to the NJ/NX-series CPU unit and the tracing starts. If you selected *Trigger (Single)* as the trace type, tracing waits for the trigger to begin sampling. If you selected Continuous, sampling begins immediately and all traced data is transferred to the computer as it is gathered and saved to a file.	
		Displaying trace results	You view the results of the traced data in either a chart or the 3D Motion Monitor. After sampling begins, sample data is immediately transferred and drawn on the graph. The trace target variable table shows the maximum, minimum, and average values for each variable. You can change the line colors on the graph. ✻9 You can consecutively read and display continuous trace results from more than one file. ✻10	
		Exporting/ Importing trace results	Trace results are saved within your project automatically when you save the project on the Sysmac Studio. If you want to save this data as a separate file, you can export the data to a CSV file.You can import trace results that you have exported.	
		Printing trace results	You can print out data trace settings along with digital and analog charts.	
	Debugging Vision Sensors		You can debug the Vision Sensor offline. Refer to "**Function Specifications of Vision Sensor Functions**".	Ver.1.01 or higher
	Debugging Displacement Sensors		You can debug Displacement Sensors offline. Refer to "**Function Specifications of Displacement Sensor Functions**".	Ver.1.05 or higher
Simulation	**Programs for debugging**		You can create programs for debugging that are used only to execute simulations and specify virtual inputs for simulation.	All versions
	Executing a simulation	**Selecting what to simulate**	You can select the programs to simulate from all of the programs in the Sysmac Studio. Programs can be dragged to select them.	
		Setting breakpoints	You can set breakpoints to stop the simulation in the Program Editor.	
		Executing and stopping simulations	You can control simulation execution to monitor the user program or to check operation through data tracing. Step execution and pausing are also possible.	
			You can perform a linked simulation between sequence control and continuous control (operations controlled by Simulink) to debug the sequence control program and continuous control program. ✻11	Ver.1.09 or higher
		Changing the simulation speed	You can change the execution speed.	All versions
		Task period simulation	You can display the task periods.	
		Batch transfer of the present values of variables	You can save the values of variables at specific times during simulations in a file, or you can write the values of variables that were saved in a file back to the Simulator. This allows you to write the initial values of variables, e.g., for test applications, before you start a simulation.	Ver.1.02 or higher
		Integrated NS-series PT simulation ✻12	You can simulate the linked operation of a sequence program and an NS-series Programmable Terminal to debug the sequence program and screen data offline.	
		Simultaneous simulation of Controller and NA-series PT	You can simultaneously simulate sequence control and NA-series PT operation, including displaying pages and subroutines created with Visual Basic and debugging the sequence programming.	Ver.1.11 or higher
	Setting the virtual equipment	**Creating 3D equipment models**	You can create a 3D equipment model at the control target to monitor with the 3D Motion Monitor function.	All versions
		3D Motion Monitor Display Mode	You set the axis variables for each element of the 3D equipment model, and then set the 3D equipment into motion according to those axis motions.	
		Displaying 2D paths	You can display the 2D paths of the markers for the projections in the 3D display.	
Monitoring Information	**Displaying unit production information**		You can display the production information of the NJ/NX-series CPU unit and Special Units, including the models of the Units and unit versions.	All versions
	Monitoring task execution times		You can monitor the execution time of each task when the user program is executed on a NJ/NX-series CPU unit or in the Simulator. When you are connected to the Simulator, you can also monitor the real processing time of tasks. This allows you to perform a Controller performance test.	

*9. Changing the colors of graph lines is supported by version 1.01 or higher.
*10.Consecutively reading and displaying continuous trace results from more than one file is supported by version 1.05 or higher.
*11.MATLAB®/Simulink R2013a or higher is required.
*12.CX-Designer version 3.41 or higher is required.

Item			Function	Applicable versions
Monitoring Information	**Troubleshooting**		You can use troubleshooting to check the errors that occurred in the Controller, display corrections for the errors, and clear the errors.	All versions
		Controller errors	Any current Controller errors are displayed. (Observations and information are not displayed.)	
		User-defined errors	Information is displayed on current errors.	
		Controller event log	You can display a log of Controller events (including Controller errors and Controller information). (You cannot display logs from EtherCAT slaves.)	
		User-defined event log	The log of user-defined events that were stored for the Create User-defined Error (SetAlarm) instruction and the Create User-defined Information (SetInfo) instruction is displayed.	
		Event Settings Table	The Event Setting Table is used to register the contents displayed on the Sysmac Studio and on HMIs for User-defined events that occur for execution of the Create User-defined Error (SetAlarm) instruction and the Create User-defined Information (SetInfo) instruction.	
	User memory usage monitor		The space that is used by the project file you are editing in the Sysmac Studio is displayed in relation to the size of the NJ/NX-series CPU unit's memory. The file cannot be transferred to the CPU unit if the files size exceeds the available space.	All versions
	Setting clock information		You can read and set the NJ/NX-series CPU unit's clock. The computer's clock information is also displayed.	
	DB connection function		You can monitor information for the DB connection. Refer to "**Function Specifications of DB Connection Function**".	Ver. 1.06 or higher with the NJ501-1□20 selected
Communi-cations	**Going online with a Controller**		An online connection is established with the Controller. You also can transfer a project from the connected Controller to the computer with a simple operation without creating a new project or opening an existing project. *5	All versions
	Checking for forced refreshing		When you go offline, any forced refreshing is cleared.	
Maintenance	**Changing the operating mode of the Controller**		There are two operating modes for NJ/NX-series Controllers, depending on if control programs are executed or not. These are RUN mode and PROGRAM mode.	All versions
	Resetting the Controller		The operations and status when the power supply to the Controller is cycled are emulated. This can be performed only in PROGRAM mode. You cannot reset the Controller in RUN mode.	
	Backup functions		You can back up, restore, and compare the user program and other NJ/NX-series Controller data to replace hardware, such as the CPU Unit, or to restore device data.	
		Variables and memory backup	You can back up the contents of retained memory to a file and restore the contents of the backup file. You can individually select the retained variables to restore. *13	
		Controller backup	You can back up data (user program and settings, variable values, memory values, Unit settings, and slave settings) from a Controller to a file and restore the backed up data from the file to the Controller.	Ver.1.04 or higher
		SD Memory Card backup	You can backup the data in the NJ/NX-series CPU unit to an SD Memory Card mounted in the Controller or compare the data in the NJ/NX-series Controller to data in the SD Memory Card.	
		Importing/exporting to/from backup files	You can import the data in a backup file created for a Controller backup or SD Memory Card backup to a project. Also, you can export project data to a backup file.	
Security Measures	**Prevention of incorrect connections**	**Confirming NJ/NX-series CPU unit names and serial IDs**	If the name or the serial ID is different between the project and the NJ/NX-series CPU unit when an online connection is established, a confirmation dialog box is displayed.	All versions
	Prevention of incorrect operation	**Operation authority verification**	You can set any of five levels of operation authority (Administrator, Designer, Maintainer, Operator, and Observer) for a Sysmac Studio project file or NJ/NX-series CPU Unit to restrict the operations that can be performed according to the operation authority of the user.	
		Write protection of the CPU Unit	You can prevent rewriting of data in the CPU Unit from the Sysmac Studio.	
	Prevention of the theft of assets	**Authentication of user program execution IDs**	You can ensure that a user program cannot be operated on another CPU Unit even if copied.	
		User program transfer with no restoration information	The program source code is not transferred. If this option is selected, programs are not displayed even if uploaded from another computer. However, variables and settings are transferred even if this option is selected.	
		Password protection for project files	You can place a password on the file to protect your assets.	
		Data protection	You can set passwords for individual POUs (programs, functions, and function block definitions) to prohibit displaying, changing, and copying them.	Ver.1.02 or higher
Window Operation	**Docking**		You can dock and undock configuration tab pages, program editors, Watch Tab Pages, Cross Reference Tab Page, and other window parts to/from the main Sysmac Studio window.	Ver.1.09 or higher
Online Help	**Sysmac Studio help system**		You can access Sysmac Studio operating procedures.	All versions
	Instructions reference		Information is provided on how to use the instructions that are supported by the NJ-series CPU Units.	
	System-defined variable reference		You can display a list of descriptions of the system-defined variables that you can use on the Sysmac Studio.	
	Keyboard mapping reference		You can display a list of convenient shortcut keys that you can use on the Sysmac Studio.	

*5. Supported only by the Sysmac Studio version 1.08 or higher.

*13.Individual selection of the retained variables to restore is supported by version 1.05 or higher.

Function Specifications of DB Connection Function

Item		Function
Setting parameters		–
	DBMS settings	The database to connect is selected.
	Run mode setting of the DB connection service	The Operation Mode is selected to send SQL statements when DB connection instructions are executed or Test Mode is selected to not send SQL statements when DB connection instructions are executed.
	Spooling settings	You can set the service so that SQL statements are spooled when problems occur and resent when operation is restored.
	Operation log settings	Settings are made for the execution log for execution of the DB connection service, the debug log for execution of SQL statements for the DB connection service, and the SQL execution failure log for SQL execution failures.
	Database connection service shutdown settings	Settings are made to control operation in order to end the DB connection service after automatically storing the operation log files on an SD Memory Card.
Programming	**DB connection instructions**	You can use the following DB connection instructions to write the user program for controlling the data in the database. DB_Insert (Insert DB Record), DB_Select (Retrieve DB Record), DB_Update (Update DB Record), and DB_Delete (Delete DB Record)
Monitoring information		–
	Monitoring the DB connection service	The status of the DB connection service is monitored.
	Monitoring the DB connections	The status of each DB connection is monitored.
	Displaying the operation logs	The contents of the execution log, debug log, and SQL execution failure log are displayed.

Note: The DB connection service can be used if the NJ501-1□20 is selected with Sysmac Studio version 1.06 or higher.

Function Specifications of EtherNet/IP Connection Settings

Item			Function
EtherNet/IP Connection Settings			Functions related to tag data link (connection) settings in the EtherNet/IP network are provided.
	Setting Connections	**Editing Tag Sets**	You create tags and tag sets using network variables.
		Editing Target Devices	You add target devices to connect to.
		Editing Connections	You select tag sets from a list and create connections.
		Adding EDS Files	You can add the types of EtherNet/IP devices that can be set as targets.
	Transferring Connections	**Synchronized Transfer and Batch Transfer**	All the connection settings in the Controller or the project are transferred at the same time.
		Individual Transfer and Comparison	You can transfer or compare the connection settings of each EtherNet/IP device individually.
	Monitoring Connections	**Status Monitor**	The operating status of one or more connections is displayed. You can start or stop all the connections at the same time.
		Tag/Tag Set Monitor	The detailed operation information of tags and tag sets, such as the presence or absence of tags and connection times of tag sets, is displayed.
		Ethernet Information Monitor	The detailed operation information of EtherNet/IP devices, such as bandwidth usage (pps), is displayed.

Note: Supported only by the Sysmac Studio version 1.10 or higher.

Function Specifications of EtherNet/IP Slave Terminal Settings

Item		Function
EtherNet/IP Slave Terminal Configuration and Setup		You create the configuration of Slave Terminal to be connected to the EtherNet/IP network on the Sysmac Studio and set the NX Units that compose the Slave Terminal.
	Registering the NX Units	You configure the Slave Terminal by dragging the NX Units from the device list displayed in the Toolbox to the positions where to mount the Units.
	Setting the NX Units	You edit the I/O allocation settings, mounting settings and Unit operation settings of the NX Units.
	Displaying the Width of Slave Terminal Configuration	The width and power consumption of the Slave Terminal configuration are displayed based on the Unit configuration information.
	Comparing and Merging the Slave Terminal Configuration Information	You can compare the configuration information on the project with actual configuration online, select the Units with different information to correct, and merge the information.
	Transferring the Slave Terminal Configuration Information	You transfer the Unit configuration information to the Slave Terminal.

Note: Supported only by the Sysmac Studio version 1.11 or higher.

Function Specifications of Safety Control Units

Item			Function
Setting Parameters	**Safety I/O Settings**		You make a setting for safety process data communications and connection with safety I/O devices.
		Safety Process Data Communications Settings	You select Safety I/O Units to perform safety process data communications (FSoE communications) and make necessary settings.
		Safety Device Allocation Settings	You set the connection between Safety I/O Units and safety devices.
	Standard I/O Settings	**Exposed Variable Settings**	You set whether to expose global variables of the Safety CPU Unit. The values of exposed variables can be referenced from NJ/NX-series CPU Units.
		Standard Process Data Communications ✻1	You set the devices and ports of the Standard I/O Units for the exposed variables of the Safety CPU Unit.
	Safety Task Settings		You define the execution cycle and timing of the safety task and programs to be executed in the task.
		Assigning Programs	You assign safety programs to execute to the task.
	I/O Map Settings		The ports of Safety I/O Units used in safety process data communications are displayed. You assign device variables used in safety programs to the I/O ports.
Creating Safety Programs	**Instruction List (Toolbox)**		A hierarchy of the functions and function blocks that you can use is displayed in the Toolbox. You can drag the required functions and function blocks onto the FBD editor to insert it to a safety program.
	FBD Programming		You connect variables, functions, and function blocks with connecting lines to build networks. The FBD editor is used to enter them.
		Adding FBD Networks	You create FBD networks on the FBD editor to create algorithms.
		Inserting and Deleting Functions and Function blocks	You insert and delete functions and function blocks on the FBD editor.
		Entry Assistance	When you enter functions, function blocks, or parameters, each character that you enter from the keyboard narrows the list of candidates that is displayed for selection.
		Commenting Out FBD Networks	You can comment out each FBD network. When a network is commented out, it is no longer executed.
	Creating Variables		You create variables used in safety programs in the global or local variable table.
	Function Blocks		You create user-defined function blocks.
		Help Reference ✻2	You can display the user-defined function block help with the popup menu or shortcut key.
		Export/Import ✻2	You can export/import user-defined function blocks.
	Searching and Replacing		You can search for and replace strings in the variable tables, programs, and function blocks of a Safety CPU Unit.
Debugging	**Monitoring**		Variables are monitored during safety program execution. You can monitor the present values of device variables assigned to Safety I/O Units and user-defined variables. The values can be monitored on the FBD editor or Watch Tab Page.
	Changing the Present Values of Variables		You can change the present values of user-defined variables and device variables as required. You can do this on the FBD editor or Watch Tab Page.
	Forced Refreshing		The inputs from external devices and outputs to external devices are refreshed with a specified value on the Sysmac Studio. The specified value is retained even if the value of the variable is overwritten from the user program. You can use forced refreshing on the FBD editor or Watch Tab Page.
	Offline Debugging ✻3		You can check if the control program logic works as designed in advance using a special debugging function for the Simulator without connecting online with the Safety CPU Unit.
	User Memory Usage Monitor ✻4		The memory usage of the safety control system and usage of safety network such as I/O data size are displayed.
Safety	**Safety Validation**		You append the "safety-validated" information to a safety program when you can ensure safety of the program after you complete debugging.
	Changing Operating Mode		There are four operating modes; PROGRAM mode, DEBUG mode (STOPPED), DEBUG mode (RUN), and RUN mode. The RUN mode can be selected only for the validated safety programs.
Security Measures	**Prevention of Incorrect Connections**	**Setting the Node Name**	You set a unique name for each Safety CPU Unit to confirm that you operate the correct Safety CPU Unit.
	Prevention of Incorrect Operation	**Safety Password**	You can prevent unauthorized access to safety functions of Safety CPU Units by setting a safety password for online operations that affect the safety functions.
	Prevention of the Theft of Assets ✻2	**Data Protection**	You can set passwords for individual user-defined function blocks to prohibit displaying or changing them.

Note: Supported only by the Sysmac Studio version 1.07 or higher.
✻1. Supported if the EtherNet/IP Coupler is selected with Sysmac Studio version 1.11 or higher.
✻2. Supported only by the Sysmac Studio version 1.12 or higher.
✻3. Supported only by the Sysmac Studio version 1.08 or higher.
✻4. Supported only by the Sysmac Studio version 1.10 or higher.

Function Specifications of HMI

NA-series Programmable Terminals

Item			Function
Parameter settings	**Device references**		Devices, such as Controllers, through which the NA-series PT can read and write information with communications are created on the Sysmac Studio and settings are made for them.
		Displaying internal devices	Controllers that were created in the project are displayed.
		Registering external devices	Devices, such as Controllers, that were not created in the project are registered. The communications settings of the devices to communicate with the NA-series PT and information, such as variables and addresses within the devices that the NA-series PT will read and write, are also registered.
	Mapping variables		The information on the devices registered in the device references, such as variables and addresses, are mapped to the global variables of the NA-series PT.
	HMI settings		Settings for NA-series PT operation are made.
		Device settings	Settings, such as the startup page, default language, layout of the USB keyboard, automatic logout, screen saver, screen brightness, and method to change to the System Menu, are made.
		TCP/IP settings	Settings for the Ethernet port that is built-in to the NA-series PT are made.
		FTP setting	Settings to communicate with FTP clients using the Ethernet port are made.
		NTP setting	Settings to communicate with an NTP server using the Ethernet port are made.
		FINS setting	Settings to communicate with devices that support FINS are made.
		VNC setting	Settings to communicate with VNC clients using the Ethernet port are made.
	Security settings		Settings, such as user registration and permissions to restrict NA-series PT operation and displays, are made.
		User account settings	The user names, login passwords, and permissions for each user to operate the NA-series PT are set.
		Permission and access level settings	The range of information that can be accessed for different permissions are set.
	Language settings		Language settings to perform multi-language displays on the NA-series PT are made.
Creating data and programming	**Editing pages**		The pages to display on the NA-series PT are edited.
		Adding and deleting pages	Pages are added, deleted, or copied with the Multiview Explorer. Pages can also be copied to other projects.
		Adding and deleting page groups	Groups to organize and manage pages on the Multiview Explorer are added and deleted. Pages can be added to or moved to the groups.
		Page properties settings	The page type, overlapping, background color, etc., are set in the Properties Window.
		Changing the display language	If using multiple languages is set in the language settings, the resources displayed on the Page Editor are displayed in the language set for each resource.
		Displaying object configuration	The objects and groups that were added to each page can be confirmed in a tree structure using the Page Explorer.
		Adding objects	Objects, such as buttons or graphics, to display on a page are added by dragging them from the Toolbox to the Page Editor.
		Grouping objects	Settings to operate multiple objects together as a group are made.
		Aligning objects	Multiple objects are aligned.
		Editing objects	Objects and groups can be copied within a page or to another page. Objects can also be deleted, and locations, sizes, rotations, and position relationships with other objects can be set.
		Object property settings	Properties, such as the colors and shapes of objects and the mapped variables, can be changed. Properties are displayed and changed in the Properties Window.
		Animation settings	Animation to modify dynamically the appearance of objects are set. Animation is displayed and changed in the Animation Window.
		Event and action settings	The events that can be set for objects and the actions that can be executed when an event occurs are set.
	Programming with Visual Basic		Subroutines are created with Visual Basic.
		Language specifications	Visual Basic 2008 and .NET Compact Framework 3.5 are supported. ✻
		Adding subroutine groups	Groups to organize and manage global subroutines on the Multiview Explorer are added or deleted. Subroutines can be added or moved to the groups.
		Editing subroutines	Subroutines are created using the Code Editor, which is optimized for Visual Basic.
		Bookmarks	Bookmark can be added to any code line and you can move between the bookmarks.
		Data entry assistance	The characters that are entered from the keyboard are used to display candidates when entering source code.
	User alarms		Settings for detection conditions and displaying messages for user alarms are made.
		Adding and deleting user alarm groups	Groups to organize and manage user alarms on the Multiview Explorer are added or deleted. User alarms can be created in the groups.
		Registering and deleting User Alarm	Settings for detection conditions for user alarms and displaying messages or popup pages are made for user alarm groups.
		Copying user alarms	User alarms can be copied within a group or to another group.
		Event and action settings	Events and the actions that are executed when the events occur are set for the user alarms. Displaying and changing the settings for events and actions is performed in the Events and Actions Window.

Note: These specifications are supported by Sysmac Studio version 1.11 or higher.
✻ There are restrictions on the functions that can be used.

Item			Function
Creating data and programming	**Data logging**		Data logging is set to log specified data in the NA-series PT at the specified times.
		Adding and deleting data sets	Data sets are added to perform data logging.
		Log condition setting	Conditions to perform data logging and target global variables are set for the data sets.
	Recipes		Data groups that are retained in the NA-series PT and can be switched for user requests are set.
		Adding and deleting templates	Data storage locations, value ranges, and data names are added or deleted.
		Recipe data settings	The actual data is set for each recipe.
	Global events		The events that are detected on any page and the actions that are executed when the events occur are set.
	Resource management		All of the character strings and graphics that are displayed on pages are managed.
		Registering and deleting general character strings	The character strings that are displayed on pages are registered and deleted, except for character stings used for user alarms.
		Registering and deleting character strings for user alarms	The character strings used for user alarms are added or deleted.
		Registering and deleting document files	Document files that are displayed with the Document Viewer are set or deleted.
		Registering and deleting image files	Image files that are displayed for objects are set or deleted.
		Registering and deleting movies	Movie files that are displayed for Media Player objects are set or deleted.
		Importing and exporting	The general character strings and alarm character strings can be imported and exported using Excel files.
	Searching and replacing		You can search for and replace character strings in subroutines that are created with Visual Basic.
	Building		The project is converted into a format that can be executed in the NA-series PT.
Reusability	**IAGs (intelligent application gadgets)**		Multiple objects and subroutines are combined to create a reusable object.
		Creating IAGs	An IAG that consists of multiple objects and subroutines is created as a functional unit in an IAG project.
		Creating IAG collection files	A created IAG is built and saved as a module that can be distributed and reused.
		Using IAGs	IAG collection files are imported using the IAG Collection Manager. The imported IAGs are displayed in the Toolbox and can be used in the same way as other objects.
	Custom objects		The selected objects are registered in a reusable format in the Toolbox.
		Registering custom objects	Objects or grouped objects are dragged to the Toolbox to register them.
		Using custom objects	Custom objects are displayed on a page by dragging them from the Toolbox to the Page Editor.
File operations	**Synchronization**		The data in the NA-series PT that is online is compared with the data in the Sysmac Studio. You can check the differences and then transfer the data after specifying the transfer direction.
	Transferring files via storage media		The data in a storage media in the computer is compared with the data in the Sysmac Studio. You can check the differences and then transfer the data to the storage media. You can use the System Menu to transfer a saved project file to the NA-series PT.
	Clearing all memory		All of the data except for the clock information is deleted from the NA-series PT.
Simulation	**Executing simulations**		A project file on the computer is virtually executed to debug it.
		Setting and clearing breakpoints	Breakpoints can be set at the specified positions in a subroutine.
		Synchronized simulation with Controller Simulator	Sequence control and NA-series PT operation, such as displaying pages and subroutine operation, is simulated together to debug the application in the NA-series PT.
Monitoring information	**Setting clock information**		The clock information in the NA-series PT can be checked and set.
Communications	**Going online with NA-series PT**		The computer can be placed online with the NA-series PT. However, information in the NA-series PT, such as the values of variables, cannot be read.
	Upgrading system program		When the Sysmac Studio is online with the NA-series PT, the system program in the NA-series PT can be upgraded as required.
Security	**Preventing malfunctions**		If the name or serial ID of the project and the NA-series PT are different when the Sysmac Studio goes online, a confirmation dialog box is displayed.
	Preventing incorrect operation		You can prevent data in the NA-series PT from being overwritten from the Sysmac Studio.

Note: These specifications are supported by Sysmac Studio version 1.11 or higher.

Function Specifications of Vision Sensor Functions

FQ-M-series Vision Sensors

Item			Function
Setting Parameters			–
	Main Edit	**General Settings**	Displays and sets basic information of the sensor.
		Sensor connection	Changes the connection status of the Sensor, and sets the conditions for communications with the Sensor.
		Sensor control in online	Performs various controls for the sensor mode change, data transfer/save, and monitoring.
		Sensor error history	Displays and clears the error history of an online Sensor.
		Tool	Restarts and initializes the sensor, updates the firmware of the sensor, reads sensor data from a file, saves sensor data to a file, prints the sensor parameters, and displays help.
	Scene data Edit	**Image condition Settings**	Adjusts the image condition.
		Specifies the calibration pattern	Sets a registered calibration pattern.
		Registers inspection item	Registers the inspection item to use in the measurement. You can select from the following inspection items: Edge position, Search, Labeling, Shape search
		Calculation Settings	Makes a setting for basic arithmetic operations and function operations using inspection item judgment results and measurement data.
		Logging Settings	Makes a setting for logging measurement results of inspection items and calculation results.
		Output Settings	Makes a setting for data to output to external devices.
		Run Settings	Switch Sensor modes or monitors measurement results.
	Sensor system data Edit	**Trigger condition Settings**	Sets the trigger type and image timing.
		I/O Settings	Sets the conditions of output signals. You can check the status of I/O signal while online.
		Encoder Settings	Make settings for the encoder such as common encoder settings, ring counter settings, and encoder trigger settings.
		Ethernet communication Settings	Makes Ethernet communication settings. You can select data communication from no-protocol data, PLC link data, and programmable no-protocol data.
		EtherCAT communication Settings	Makes the EtherCAT communication settings according to the communication settings of the EtherCAT master.
		Logging condition Settings	Sets the conditions to log to the internal memory of sensor.
		Sensor Settings	Makes the settings for startup scene control function, password setting function, and adjustment judgment function.
	Calibration Scene Data Settings		Calculates, views, and edits the calibration parameters. The Vision Sensor supports general-purpose calibration and calibration for conveyor tracking.
Debugging		**Offline debugging of sensor operation**	Simulates measurements offline without connecting to the Vision Sensor. You can use external image files and perform measurements under the conditions set in the offline settings, then display the results of those measurements.
		Offline debugging of the sensor control program and sensor operation	Performs a linked simulation between the sequence control of an NJ/NX-series Controller and the operation of an FQ-M Sensor in EtherCAT configuration systems. This allows you to debug operation offline from when measurements and other processing are performed for control signals such as measurement triggers through the output of processing results.

Note: Supported only by the Sysmac Studio version 1.01 or higher.

FH-series Vision Sensors

Item			Function
Setting Parameters			–
	Main Edit	**Sensor Information**	Displays and sets basic information of the sensor.
		Online	Changes the connection status of the sensor, and performs various controls such as sensor restart and initialization.
	Line Edit	**Operation View**	Monitors the measurement images of the sensor and detailed results of each process unit.
		Scene Maintenance View	Edits, manages, and saves the scene groups and scenes.
	Scene Data Edit	**Flow Edit**	Creates the process flow in combination of user-specified units.
		Process Unit Edit	Edits each process unit.
	Sensor System Data Edit	**Camera Settings**	Checks the camera connection status and sets the camera's imaging timing and communications speed.
		Controller Settings	Makes the system environment settings for the sensor.
		Parallel I/O Settings	Sets the conditions of output signals.
		RS-232C/422 Settings	Makes the RS-232C/422 communications settings.
		Ethernet Communication Settings	Makes the Ethernet communication settings.
		EtherNet/IP Communication Settings	Makes the EtherNet/IP communications settings.
		EtherCAT Communication Settings	Makes the EtherCAT communications settings.
		Encoder Settings	Makes the encoder settings.
	Tools	**Communication Command Customization Tool**	Makes the settings for customized communication commands.
		File Saving Tool	Copies and transfers the files in the sensor memory.
		Calibration Support Tool	Checks the calibration information.
		User Data Tool	Edits the data (user data) that can be shared and used in sensors.
		Security Setting Tool *1	Edits the security settings of the sensor.
		Scene Group Save Destination Setting Tool *1	Sets the destination to save the scene group data.
		Image File Save Tool *1	Saves the logging images and image files stored in the sensor memory.
		Registered Image Management Tool *1	Saves the images used for model registration and reference registration as registered images.
		Reference Position Update Tool *1	Edits all reference positions of more than one processing unit.
		Scene Group Data Conversion Tool *1	Creates the scene group data with more than 128 scenes.
		Scene Control Macro Tool *1	Makes a setting for complementing and expanding the measurement flow and scene control.
Debugging		**Offline Debugging of Sensor Operation**	Simulates measurements offline without connecting to the sensor. You can use external image files and perform measurements under the conditions set in the offline settings, then display the results of those measurements.
		Offline Debugging of Sensor Control Program and Sensor Operation *2	Simulates the linked operation of the sequence controls in the NJ/NX-series Controller and FH-series Sensor operation for an EtherCAT system. You can debug a series of operations offline to perform the measurement and other processing and output the results when a control signal such as measurement trigger is input to the Sensor.
Security		**Prevention of Incorrect Operation *3**	Prevents unauthorized access by setting an account password for online operations.

Note: Supported only by the Sysmac Studio version 1.07 or higher.
***1.** Supported only by the Sysmac Studio version 1.10 or higher.
***2.** Supported only by the Sysmac Studio version 1.08 or higher.
***3.** Supported only by the Sysmac Studio version 1.09 or higher.

Function Specifications of Displacement Sensor Functions

Item			Function
Setting Parameters			–
	Main Editing	**General Settings**	Displays and sets basic information on the Sensor.
		Sensor Connection	Changes the connection status of the Sensor, and sets the conditions for communications with the Sensor.
		Online Sensor Control	Performs various controls for the Sensor (e.g., changing the mode, controlling internal logging, and monitoring).
		Tools	Restarts and initializes the Sensor, updates the firmware in the Sensor, recovers ROM data, prints the Sensor parameters, and displays help.
	Editing Bank Data	**Setting Sensing Conditions**	Adjusts the light reception conditions for each measurement region.
		Setting Task Conditions	Used to select the measurement items to use in measurements. You can select from the height, thickness, or calculations. The following are set for the measurement items: scaling, filters, holding, zero-resetting, and judgement conditions.
		Setting I/O Conditions	Sets parameters for outputting judgements and analog values to external devices.
	Editing Bank Data	**Sensor Settings**	Sets the following: ZW Sensor Controller’s key lock, number of displayed digits below the decimal point, the bank mode, the analog output mode, and timing/reset key inputs.
		Ethernet Communications Settings	Sets up Ethernet communications and field bus parameters.
		RS-232C Communications Settings	Sets up RS-232C communications.
		Data Output Settings	Sets serial output parameters for holding values.
Debugging		**Offline Debugging of Sensor Control Programs and Sensor Operation**	Performs a linked simulation between the sequence control of an NJ/NX-series Controller and the operation of a ZW Sensor in EtherCAT configuration systems. This allows you to simulate the operation of signals when timing signals and other control signals are input to the Sensor to debug the control logic offline.

Note: Supported only by Sysmac Studio version 1.05 or higher.

Version Information

Please refer to "Change history" in the website at: www.fa.omron.co.jp/ss_rev_e/.

Web Support Services

Category	Function
Online User Registration	You can register online as a user of Sysmac Studio.
Automatic Update	With the automatic update function of Sysmac Studio, the latest update information for your computer environment can be searched for and applied using the Internet. Your Sysmac Studio can be constantly updated to the latest state.

Applicable Models

Series		Unit version	Model	Applicable versions
CPU	**NX-series**	---	NX701-□□□□	Ver.1.13 or higher
	NJ-series	---	NJ501-1□00	All versions
			NJ501-1□20	Ver.1.07 or higher
			NJ501-1340 ✻1	Ver.1.11 or higher
			NJ501-4□□0	Ver.1.04 or higher
			NJ301-□□□□	Ver.1.02 or higher
			NJ101-□□□□	Ver.1.13 or higher
Servo Drives	**G5-series**	Servo Drives with unit version 2.1 or later recommended	R88D-KN□-ECT R88D-KN□-ECT-L	All versions
Inverters	**MX2-V1**	Inverters with version 1.1 or later ✻2	3G3MX2-A□□□□-V1	Ver.1.05 or higher
	RX-V1	Inverters with version 2.0 or later ✻3	3G3RX-A□□□□-V1	Ver.1.03 or higher
Vision Sensors	**FQ-series**	---	FQ-MS12□-ECT FQ-MS12□-M-ECT FQ-MS12□ FQ-MS12□-M	Ver.1.01 or higher
	FH-series	---	FH-1050 FH-1050-10 FH-1050-20 FH-3050 FH-3050-10 FH-3050-20	Ver.1.07 or higher
Displacement Sensors	**ZW-series**	---	ZW-CE1□ ZW-CE1□T ZW-C1□ ZW-C1□T	Ver.1.05 or higher
Fiber Sensors, Laser Sensors ✻4	**N-Smart** **E3NX** **E3NC**	---	E3NX-FA0 E3NC-LA0/SA0	
Fiber Sensors, Laser Photoelectric Sensors, Proximity Sensors ✻5	**E3X** **E3C** **E2C**	---	E3X-HD0/MDA0/DA0-S E3C-LDA0 E2C-EDA0	Ver.1.02 or higher
EtherCAT Coupler Unit	**NX-series**	---	NX-ECC20□	Ver.1.06 or higher
EtherNet/IP Coupler Unit	**NX-series**	---	NX-EIC202	Ver.1.11 or higher
NX Units ✻6	**NX-series**	---	NX-ID□□□□ NX-IA□□□□ NX-OC□□□□ NX-OD□□□□ NX-AD□□□□ NX-DA□□□□ NX-TS□□□□ NX-PD1□□□ NX-PF0□□□ NX-PC0□□□ NX-TBX□□ NX-EC0□□□ NX-ECS□□□ NX-PG0□□□	Ver.1.06 or higher
Safety Control Units ✻7	**NX-series**	---	NX-SL3500 ✻8 NX-SL3300 ✻9 NX-SIH400 NX-SID800 NX-SOH200 NX-SOD400	Ver.1.07 or higher
Remote I/O Terminals	**GX-series**	Remote I/O Terminals with unit version 1.1 or later recommended	GX-ID16□2/OD16□2/MD16□2 GX-□D16□1/OC1601 GX-AD0471/DA0271 GX-EC0211/EC0241	All versions
HMIs	**NS-series**	To connect the NJ5 Controller : NS system version 8.5 or higher CX-Designer version 3.3 or higher To connect the NJ3/NJ1 Controller : NS system version 8.61 or higher CX-Designer version 3.4 or higher To connect the NX7 Controller : NS system version Ver.3.64 CX-Designer version Ver.8.9	NS5-MQ11(B)-V2/-SQ11(B)-V2/-TQ11(B)-V2 NS8-TV01(B)-V2 NS10-TV01(B)-V2 NS12-TS01(B)-V2 NS15-TX01S-V2/-TX01B-V2	All versions
	NA-series	To connect the NX7/NJ1 Controller : NA system version 1.02 or later Sysmac Studio version 1.13 or later	NA5-15□□□□□ NA5-12□□□□□ NA5-9□□□□□ NA5-7□□□□□	Ver.1.11 or higher

Note: For details, refer to "Unit Configuration" of "Machine Automation Controller NJ-Series" of System Design Guide on the Sysmac Catalogue (Cat. No. P072).

✻1. To use the SECS/GEM service of the SECS/GEM CPU Unit, the SECS/GEM Configurator (WS02-CGTL1) is additionally required.

✻2. A communications unit for connecting to EtherCAT network (3G3AX-MX2-ECT with unit version 1.1 or higher) is additionally required.

✻3. A communications unit for connecting to EtherCAT network (3G3AX-RX-ECT) is additionally required.

✻4. A communications unit for connecting to EtherCAT network (E3NW-ECT) is additionally required.

✻5. A communications unit for connecting to EtherCAT network (E3X-ECT) is additionally required.

✻6. The EtherCAT Coupler Unit (NX-ECC20□ with unit version 1.0 or later) or EtherNet/IP Coupler Unit (NX-EIC202 with unit version 1.0 or later) is additionally required. For details, refer to the NX-series "Version Information".

✻7. The EtherCAT Coupler Unit (NX-ECC20□ with unit version 1.1 or later) or EtherNet/IP Coupler Unit (NX-EIC202 with unit version 1.0 or later. The NX-3500 cannot be connected.) is additionally required. For details, refer to the "Version Information" of NX-series Safety Control Units.

✻8. The NX-SL3500 with unit version 1.0 or later can be used with the Sysmac Studio version 1.08 or higher, and unit version 1.1 or later can be used with the Sysmac Studio version 1.10 or higher.

✻9. The Safety Control Units with unit version 1.1 can be used with the Sysmac Studio version 1.10 or higher.

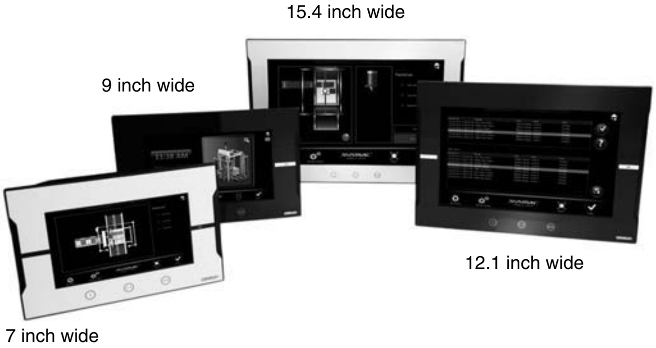
Programmable Terminal

NA-Series

Bringing technology to life

The NA-Series Programmable Terminal transforms machine data into information, shows information and controls devices based on requirements at FA manufacturing sites.

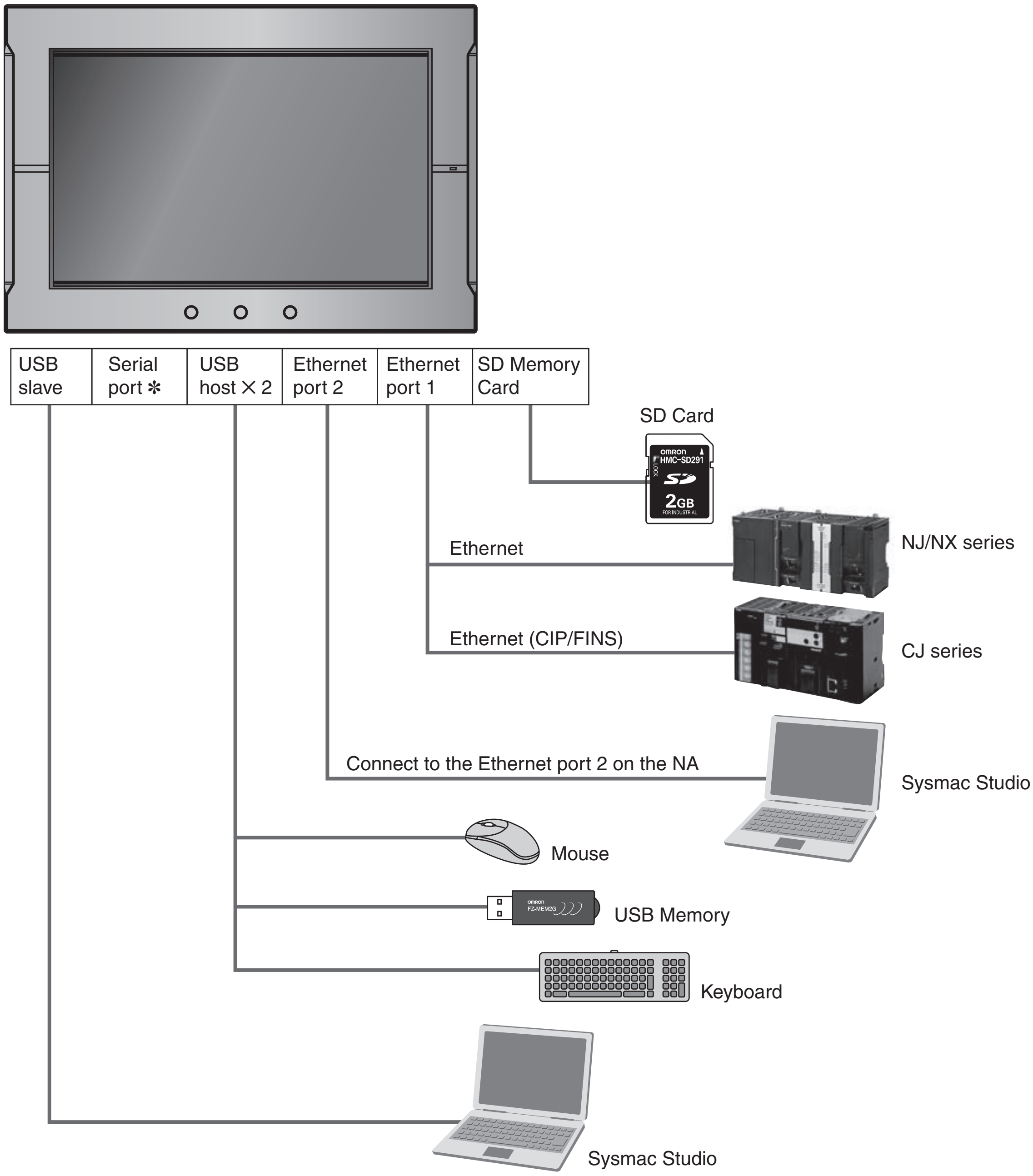
The NA-Series, together with the NJ/NX-series Machine Automation Controller and the Automation Software Sysmac Studio, allows you to simply and flexibly create sophisticated user interfaces to suit your machines.



Features

- Widescreen in all models: 7, 9, 12, and 15 inches
- More than 16 million color display for all models and 1280 x 800 high resolution display for the 12 and 15-inch models
- Multimedia including video and PDF
- 2 Ethernet ports capable of simultaneous access from both the control device and maintenance segments by separating the segments
- Sysmac Studio providing an Integrated Development Environment
  NJ/NX variables sharing in the NA project and NA application testing with the NJ/NX program via the Simulator to reduce development time
- Many security features including operation authority settings and execution restrictions with IDs
- Microsoft Visual Basic for versatile, flexible and advanced programming

System configuration


USB slave
Serial port ✻
USB host × 2
Ethernet port 2
Ethernet port 1
SD Memory Card
SD Card
OMRON HMC-SD291
2GB
Ethernet
NJ/NX series
Ethernet (CIP/FINS)
CJ series
Connect to the Ethernet port 2 on the NA
Sysmac Studio
Mouse
USB Memory
Keyboard
Sysmac Studio

* The serial port is for future expansion.

Performance Specifications

DisplayDisplay

Item		Specification			
		NA5-15	NA5-12	NA5-9	NA5-7
Display panel *1	**Display device**	TFT LCD			
	Screen size	15.4 inches	12.1 inches	9.0 inches	7.0 inches
	Resolution	1,280 × 800 dots (horizontal ✕ vertical)		800 × 480 dots (horizontal ✕ vertical)	
	Colors	16,770,000 colors (24 bit full colors)			
	Effective display area	331 × 207 mm (horizontal ✕ vertical)	261 × 163 mm (horizontal ✕ vertical)	197 × 118 mm (horizontal ✕ vertical)	152 × 91 mm (horizontal ✕ vertical)
	View angles	Left: 60°, Right: 60°, Top: 60°, Bottom: 60°			
Backlight *2	**Life**	50,000 hours min. *3			
	Brightness adjustment	200 levels			
Front panel indicators *4	**RUN**	Lit green: Normal operation Lit red: Error			

*1. There may be some defective pixels in the display. This is not a fault as long as the numbers of defective light and dark pixels fall within the following standard ranges.

Model	Standard range
NA5-15W□□□□ NA5-12W□□□□ NA5-9W□□□□ NA5-7W□□□□	Number of light and dark pixels: 10 or less. (There must not be 3 consecutive light/dark pixels.)

*2. The backlight can be replaced at an OMRON maintenance base.

*3. This is the estimated time before brightness is reduced by half at room temperature and humidity. The life expectancy is drastically shortened if Programmable Terminal is used at high temperatures.

*4. The brightness of the front panel indicators is also adjustable when you adjust the brightness of the backlight.

Operation

Item	Specification			
	NA5-15	NA5-12	NA5-9	NA5-7
Touch panel	Method: Analog resistance membrane (pressure sensitive)			
	Resolution: 16,384 ✕ 16,384			
	Life: 1,000,000 operations			
Function keys *	3 inputs (capacitance inputs)			

* Each function key has blue indicator. The brightness of the function key indicators is also adjustable when you adjust the brightness of the backlight.

Data Capacity

Item	Specification			
	NA5-15	NA5-12	NA5-9	NA5-7
User data capacity	256 MB			

External Interfaces

Item		Specifications (Same for all models.)
Ethernet ports	**Applications**	Port 1: Connecting to anything other than the Sysmac Studio, e.g., device connections and VNC clients Port 2: Connecting to the Sysmac Studio in addition to the applications of port 1.
	Number of ports	2 ports
	Compliant standards	IEEE 802.3i (10BASE-T), IEEE 802.3u (100BASE-TX), and IEEE 802.3ab (1000Base-T)
	Transmission media	Shielded twisted-pair (STP) cable: Category 5, 5e, or higher
	Transmission distance	100 m
	Connector	RJ-45 8P8C modular connector
USB host ports	**Applications**	USB Memory Device, keyboard, or mouse
	Number of ports	2 ports
	Compliant standards	USB 2.0
	Transmission distance	5 m max.
	Connector	Type-A connector
USB slave port	**Applications**	Sysmac Studio connection
	Number of ports	1 port
	Compliant standards	USB 2.0
	Transmission distance	5 m max.
	Connector	Type-B connector
Serial port *	**Applications**	Device Connection
	Number of ports	1 port
	Compliant standards	RS-232C
	Transmission distance	15 m max.
	Connector	D-DUB 9-pin female connector
SD Memory Card slot	**Applications**	To transfer or store the project or to store log data.
	Number of slots	1 slot
	Compliant standards	SD/SDHC
Expansion Unit connector *	**Applications**	Expansion Unit
	Quantity	1

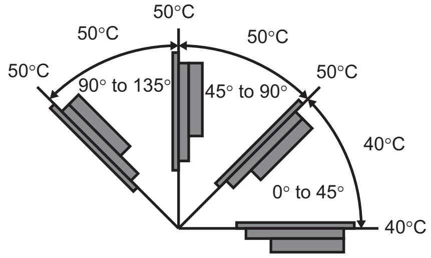
* The serial port and Expansion Unit connector are for future expansion.

General Specifications

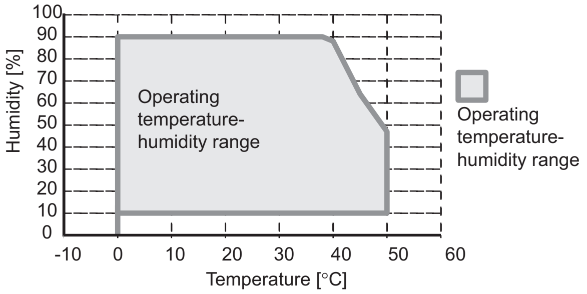
Item	Specification			
	NA5-15	NA5-12	NA5-9	NA5-7
Rated supply voltage	24 VDC			
Allowable power supply voltage range	19.2 to 28.8 VDC (24 VDC ±20%)			
Allowable momentary power interruption time	Operation for momentary power interruption is not specified.			
Power consumption	47 W max.	45 W max.	40 W max.	35 W max.
Ambient operating temperature	0 to 50°C *1 *2			
Ambient storage temperature	−20 to +60°C *3			
Ambient operating humidity	10 to 90% *2 Must be no condensation.			
Atmosphere	Must be free from corrosive gases.			
Pollution degree	2 or less: JIS B 3502, IEC 61131-2			
Noise immunity	2 kV on power supply line (Conforms to IEC 61000-4-4.)			
Vibration resistance (during operation)	Conforms to IEC 60068-2-6. 5 to 8.4 Hz with 3.5 mm half amplitude and 8.4 to 150 Hz with 9.8 m/s^2 for 100 minutes each in X,Y, and Z directions (Time coefficient of 10 minutes × coefficient factor of 10 = total time of 100 min.)			
Shock resistance (during operation)	Conforms to IEC 60028-2-27. 147 m/s^2 3 times each in X, Y, and Z directions			
Dimensions	420 × 291 × 69 mm (W × H × D)	340 × 244 × 69 mm (W × H × D)	290 × 190 × 69 mm (W × H × D)	236 × 165 × 69 mm (W × H × D)
Panel cutout dimensions	392^{+1}_{0} × 268^{+1}_{0} mm (horizontal × vertical) Panel thickness: 1.6 to 6.0 mm	310^{+1}_{0} × 221^{+1}_{0} mm (horizontal × vertical) Panel thickness: 1.6 to 6.0 mm	261^{+1}_{0} × 166^{+1}_{0} mm (horizontal × vertical) Panel thickness: 1.6 to 6.0 mm	$197^{+0.5}_{0}$ × $141^{+0.5}_{0}$ mm (horizontal × vertical) Panel thickness: 1.6 to 6.0 mm
Weight	3.2 kg max.	2.3 kg max.	1.7 kg max.	1.3 kg max.
Degree of protection	Front-panel controls: IP65 oil-proof type			
Battery life	Battery life: 5 years at 25°C The RTC will be backed up for 5 days after the battery runs low. The RTC will be backed up by a super capacitor for 5 minutes after removing the old battery. (This assumes that the power is first turned ON for at least 5 minutes and then turned OFF.)			
International standards	Please refer to the chart below.			

*1. The ambient operating temperature is subject to the following restrictions, depending on the mounting angle.

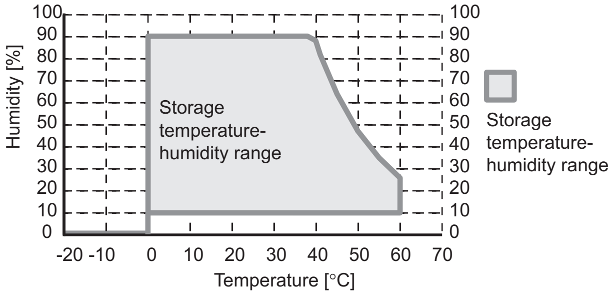
- The ambient operating temperature is 0° to 40°C when the mounting angle is 0° or more and less than 45° to the horizontal.
- The ambient operating temperature is 0° to 50°C when the mounting angle is 45° or more and 90° or less to the horizontal.
- The ambient operating temperature is 0° to 50°C when the mounting angle is 90° or more and 135° or less to the horizontal.



*2. Use the Programmable Terminal within the following temperature and humidity ranges.



*3. Store the Programmable Terminal within the following temperature and humidity ranges.



Certified safety standards

Standards		New models NA5-□U□□□□	Existing models NA5-□W□□□□
Waterproof ratings	IP65	Yes	Yes
	UL Type 4X	No	No
International standards	UL508/CSA Standard C22.2 No 142	Yes	No *
	ANSI/ISA 12.12.01 Class 1 Division 2/ CSA standard C22.2 No.213	Yes	No *
	RCM	Yes	Yes
	KC	Yes	Yes
	LR	Yes	Yes
	NK	No	Yes
	DNV	No	Yes
Self-declaration	CE	Yes	Yes

* Since products meet the criteria specified in this standard, existing models will be recertified to this standard when they are rated UL Type 4X.

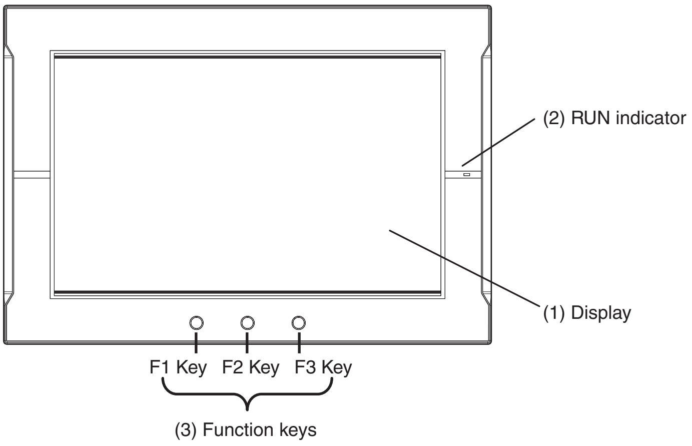
Version Information

NA-Series and Programming Devices

NA-Series		Corresponding unit versions/version	
Model	**NA system version**	**NJ/NX-series CPU Units** **NX701-□□□□** **NJ501-□□□□** **NJ301-□□□□** **NJ101-□□□□**	**Sysmac studio**
NA5-15 NA5-12 NA5-9 NA5-7	1.02 or later	NX701: 1.10 or later NJ101: 1.10 or later	1.13 or later
	1.01 or later	NJ501 : 1.01 or later NJ501 Database Connection : 1.05 or later NJ301 : 1.01 or later	1.11 or later

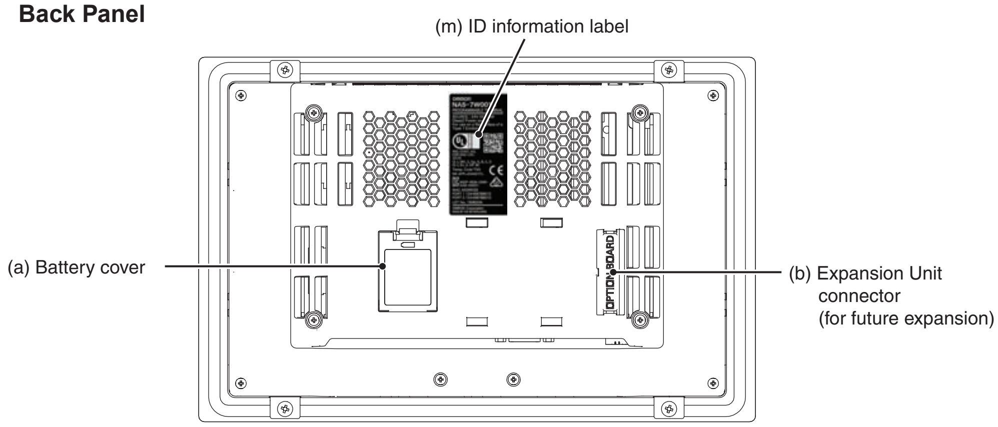
Components and Functions

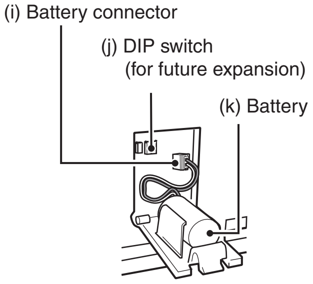
Front Panel



No.	Name	Description
(1)	Display	The entire display is a touch panel that also functions as an input device.
(2)	RUN indicator	The status of the indicator changes according to the status of the NA.
(3)	Function keys	There are three function keys: F1, F2, and F3. ⊙ : F1 Key, ⊙ : F2 Key, ⊙ : F3 Key You can use the function keys as execution conditions for the actions for global or page events. You can also use the function keys for interlocks.

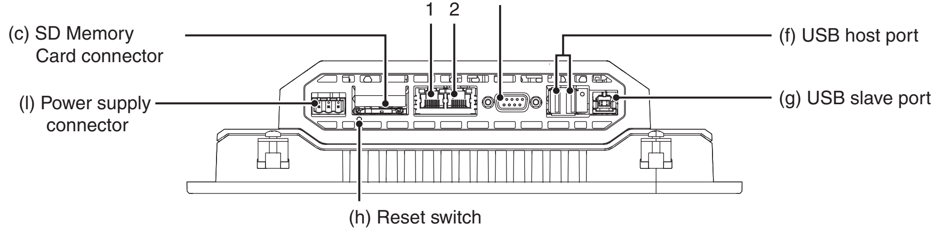
Back Panel


(m) ID information label
(a) Battery cover
(b) Expansion Unit connector (for future expansion)
OPTION BOARD


(i) Battery connector
(j) DIP switch (for future expansion)
(k) Battery

(Appearance with the Battery Cover Open)

Bottm Panel


(d) Ethernet ports
1
2
(e) Serial port (for future expansion)
(c) SD Memory Card connector
(f) USB host port
(l) Power supply connector
(g) USB slave port
(h) Reset switch

No.	Name	Description
(a)	Battery cover	Open this cover to replace the Battery.
(b)	Expansion Unit connector *	For future expansion.
(c)	SD Memory Card connector	Insert an SD Memory Card here.
(d)	Ethernet port 1	Connect a device other than the Sysmac Studio.
	Ethernet port 2	Connect mainly the Sysmac Studio.
(e)	Serial port *	For future expansion.
(f)	USB host port	Connect this port to a USB Memory Device, mouse, etc.
(g)	USB slave port	Connect the Sysmac Studio or other devices.
(h)	Reset switch	Use this switch to reset the NA.
(i)	Battery connector	Connect the connector on the backup Battery here.
(j)	DIP switch *	For future expansion. (The DIP switch is on a PCB that is accessed by opening the Battery cover.) Do not change any of the factory settings of the pins on the DIP switch. (Default setting: OFF)
(k)	Battery	This is the battery to backup the clock information in the NA.
(l)	DC input terminals	These are the power supply terminals. Connect the accessory power supply connector and supply power.
(m)	ID information label	You can check the ID information of the NA.

* The DIP switch, Expansion Unit connector, and serial port are for future expansion.

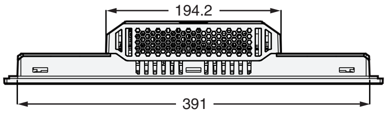
Supported Devices

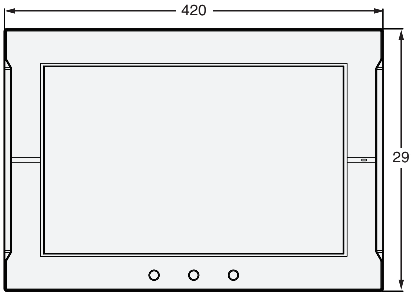
Manufacturer	Models	Connection method	Communications driver
OMRON	NX701-□□□□ NJ501-□□□□ NJ301-□□□□ NJ101-□□□□	Built-in EtherNet/IP port	Ethernet
	CJ2H-CPU64/65/66/67/68-EIP CJ2M-CPU31/32/33/34/35	Built-in EtherNet/IP port	CIP Ethernet
	CJ2H-CPU64/65/66/67/68-EIP CJ2M-CPU31/32/33/34/35	CJ1W-EIP21	
	CJ2H-CPU64/65/66/67/68-EIP CJ2M-CPU31/32/33/34/35	Built-in EtherNet/IP port	FINS Ethernet
	CJ1H-CPU65H/66H/67H CJ1H-CPU65H/66H/67H-R CJ1G-CPU42H/43H/44H/45H CJ1M-CPU11/12/13/21/22/23 CJ2H-CPU64/65/66/67/68(-EIP) CJ2M-CPU11/12/13/14/15 CJ2M-CPU31/32/33/34/35	CJ1W-ETN21 CJ1W-EIP21	

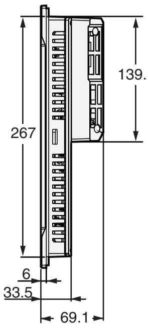
Dimensions

(Unit: mm)

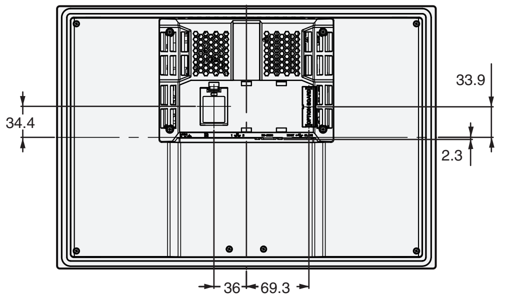
NA5-15

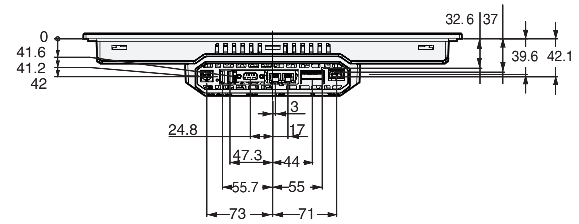




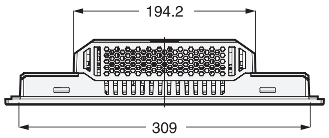

139.1
267
6
33.5
69.1

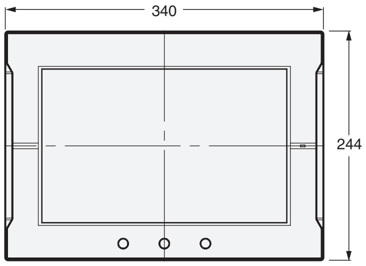
Cable Connection Dimensions

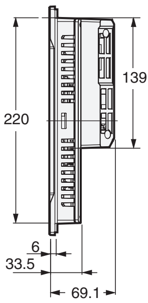

33.9
34.4
2.3
36
69.3


0
41.6
41.2
42
32.6
37
39.6
42.1
3
24.8
17
47.3
44
55.7
55
73
71

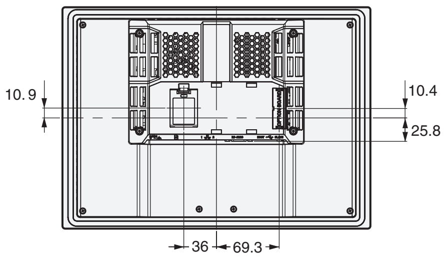
NA5-12

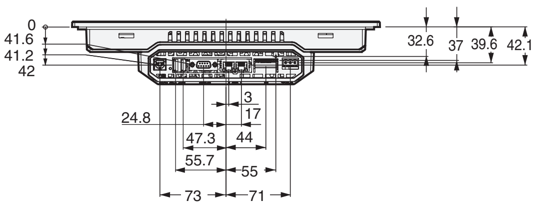




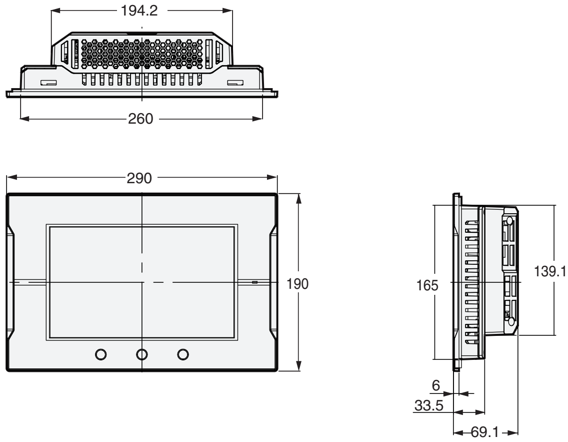

139.1
220
6
33.5
69.1

Cable Connection Dimensions

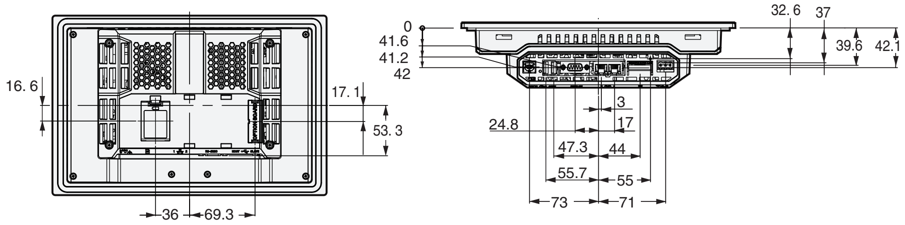

10.9
10.4
25.8
36
69.3


0
41.6
41.2
42
32.6
37
39.6
42.1
3
24.8
17
47.3
44
55.7
55
73
71

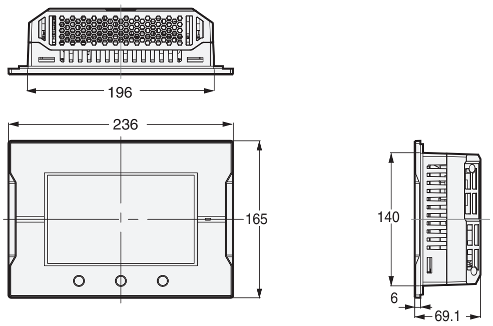
NA5-9


194.2
260
290
190
165
139.1
6
33.5
69.1

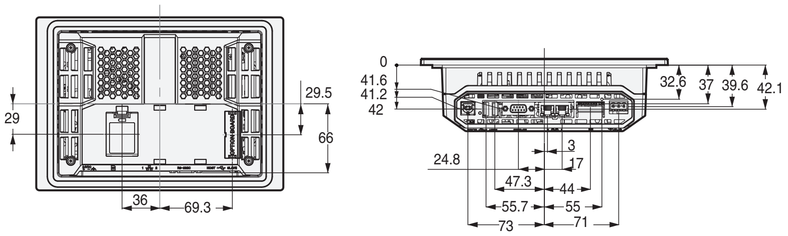
Cable Connection Dimensions


16. 6
17. 1
53. 3
36
69.3
0
41.6
41.2
42
32. 6
37
39.6
42.1
3
17
24.8
47.3
44
55.7
55
73
71

NA5-7


196
236
165
140
6
69.1

Cable Connection Dimensions


29
29.5
66
36
69.3
0
41.6
41.2
42
32.6
37
39.6
42.1
3
17
24.8
47.3
44
55.7
55
73
71

EtherCAT Slave Terminals
NX Series

High-speed, High-precision Slice Type

- EtherCAT Coupler Unit 4A, 10A
- Digital Input Unit 4, 8, 16, 32 Points
- Digital Output Unit 2, 4, 8, 16, 32 Points
- Digital Mixed I/O Unit 16 Points
- Analog Input Unit 2, 4, 8 Points
- Analog Output Unit 2, 4 Points
- Temperature Input Unit 2, 4 Points
- Position Interface Unit 1, 2CH
- System Unit
- Safety Control Units
  Safety CPU Unit
  Safety Input Unit 4, 8 Points
  Safety Output Unit 2, 4 Points

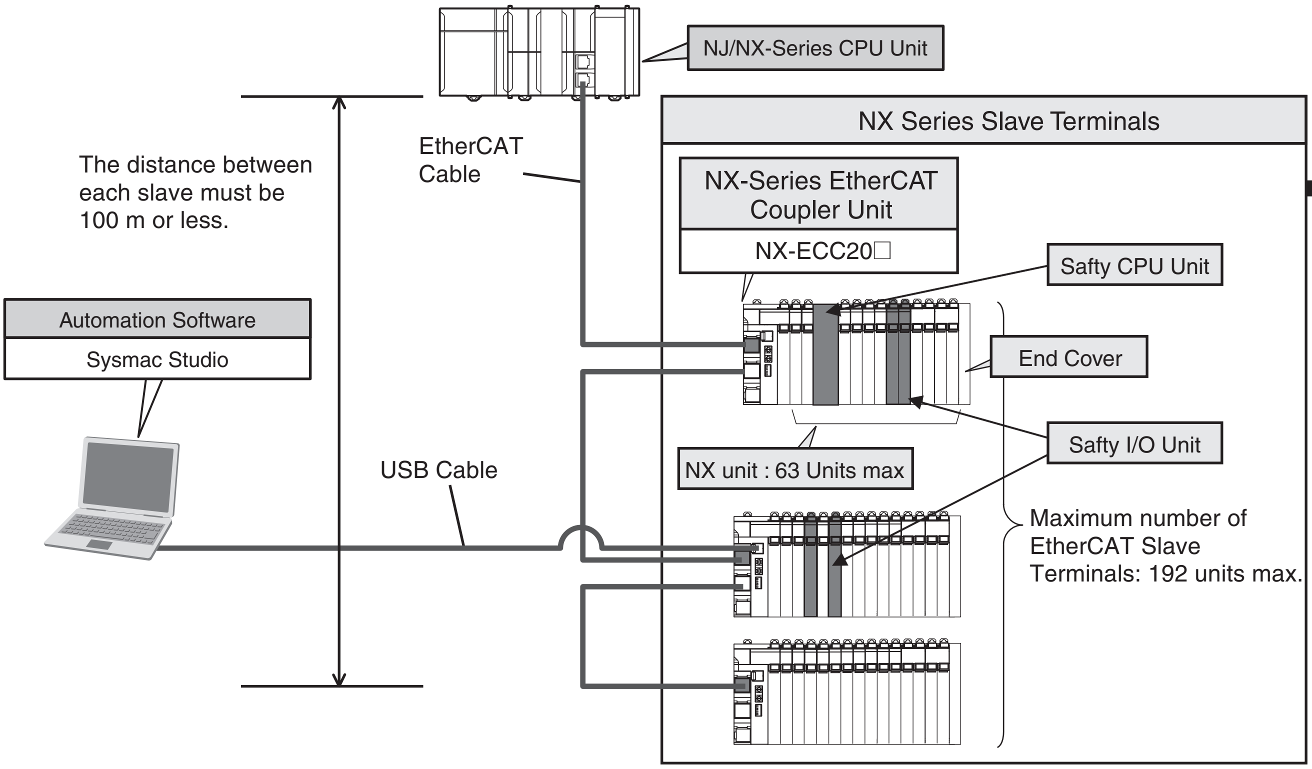
Features

- Up to 63 NX-IO Units can be connected to one EtherCAT Coupler Unit. Standard and high-performance units can be mixed. *
- Each Coupler plus its I/O form just a single EtherCAT node on the network.
- I/O control and safety control can be integrated by connecting Units for safety.
- The Coupler supports the EtherCAT Distributed Clock (DC) and propagates this to synchronous I/O units.
- The node address can be fixed by rotary switches, or set by software. Choose the method that best suits your way of engineering.
- Slave configuration by Sysmac Studio can be done centrally via the controller, or on-the-spot using the Coupler's built-in USB port.
- Screwless clamp terminal block and Connector types are significantly reduces wiring work.

* Input per Coupler Unit: Maximum 1024 bytes, Output per Coupler Unit: Maximum 1024 bytes

Unit Configuration

Basic System


NJ/NX-Series CPU Unit
NX Series Slave Terminals
The distance between each slave must be 100 m or less.
EtherCAT Cable
NX-Series EtherCAT Coupler Unit
NX-ECC20□
Safty CPU Unit
Automation Software
Sysmac Studio
End Cover
Safty I/O Unit
NX unit : 63 Units max
USB Cable
Maximum number of EtherCAT Slave Terminals: 192 units max.

Configuration Units

EtherCAT Coupler Unit

Unit	Model	
	4A	10A
EtherCAT Coupler Unit	NX-ECC201	NX-ECC202 NX-ECC203

I/O Units

Unit	Model				
	2-point Units	4-point Units	8-point Units	16-point Units	32-point Units
Digital Input Unit	–	NX-ID3317 NX-ID3343 NX-ID3344 NX-ID3417 NX-ID3443 NX-ID3444 NX-IA3117	NX-ID4342 NX-ID4442	NX-ID5142-1 NX-ID5142-5 NX-ID5342 NX-ID5442	NX-ID6142-5 NX-ID6142-6
Digital Output Unit	NX-OD2154 NX-OD2258 NX-OC2633 NX-OC2733	NX-OD3121 NX-OD3153 NX-OD3256 NX-OD3257 NX-OD3268	NX-OD4121 NX-OD4256	NX-OD5121 NX-OD5121-1 NX-OD5121-5 NX-OD5256 NX-OD5256-1 NX-OD5256-5	NX-OD6121-5 NX-OD6256-5
Digital Mixed I/O Unit	–	–	–	NX-MD6121-5 NX-MD6121-6 NX-MD6256-5	–
Analog Input Unit	NX-AD2603 NX-AD2604 NX-AD2608 NX-AD2203 NX-AD2204 NX-AD2208	NX-AD3603 NX-AD3604 NX-AD3608 NX-AD3203 NX-AD3204 NX-AD3208	NX-AD4603 NX-AD4604 NX-AD4608 NX-AD4203 NX-AD4204 NX-AD4208	–	–
Analog Output Unit	NX-DA2603 NX-DA2605 NX-DA2203 NX-DA2205	NX-DA3603 NX-DA3605 NX-DA3203 NX-DA3205	–	–	–
Temperature Input Unit	NX-TS2101 NX-TS2102 NX-TS2104 NX-TS2201 NX-TS2202 NX-TS2204	NX-TS3101 NX-TS3102 NX-TS3104 NX-TS3201 NX-TS3202 NX-TS3204	–	–	–

Position Interface Unit

Unit	Model	
	1CH	2CH
Incremental Encoder Input Unit	NX-EC0112 NX-EC0122 NX-EC0132 NX-EC0142	NX-EC0212 NX-EC0222
SSI Input Unit	NX-ECS112	NX-ECS212
Pulse Output Unit	NX-PG0112 NX-PG0122	–

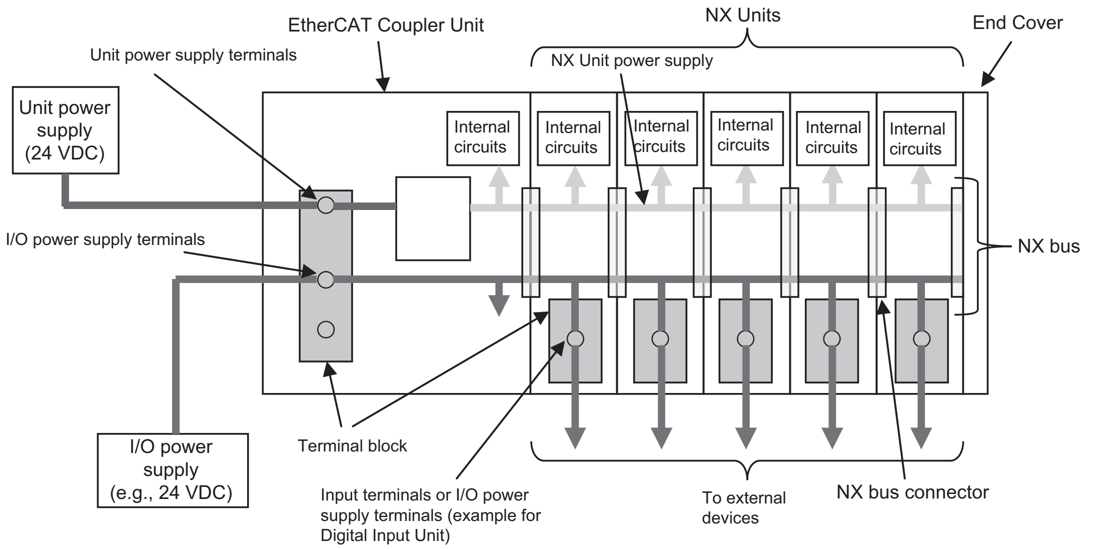
System Units

Unit	Model
Additional NX Unit Power Supply Unit	NX-PD1000
Additional I/O Power Supply Unit	NX-PF0630 NX-PF0730
I/O Power Supply Connection Unit	NX-PC0010 NX-PC0020 NX-PC0030
Shield Connection Unit	NX-TBX01

Safety Control Units

Unit	Model
Safety CPU Unit	NX-SL3300 NX-SL3500
Safety Input Unit	NX-SIH400 NX-SID800
Safety Output Unit	NX-SOH200 NX-SOD400

Power Supply System Configuration Diagram


EtherCAT Coupler Unit
NX Units
End Cover
Unit power supply terminals
NX Unit power supply
Unit power supply (24 VDC)
Internal circuits
Internal circuits
Internal circuits
Internal circuits
Internal circuits
Internal circuits
I/O power supply terminals
NX bus
I/O power supply (e.g., 24 VDC)
Terminal block
Input terminals or I/O power supply terminals (example for Digital Input Unit)
To external devices
NX bus connector

Note: Always use separate power supplies for the Unit power supply and the I/O power supply. If you supply power from the same power supply, noise may cause malfunctions.

Power Supply System and Design Concepts

Designing the NX Unit Power Supply System

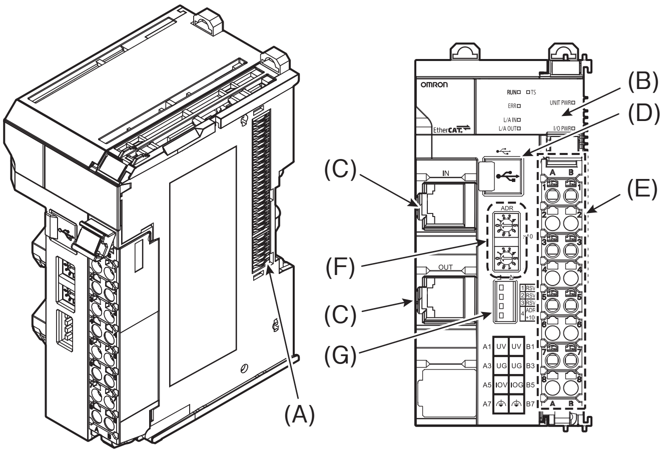
For designing the NX Unit power supply of the EtherCAT Slave Terminal, refer to EtherCAT Coupler Unit USER'S MANUAL (Cat. W519).

Designing the I/O Power Supply System

For designing the NX Unit power supply of the EtherCAT Slave Terminal, refer to EtherCAT Coupler Unit USER'S MANUAL (Cat. W519).

Components and Functions

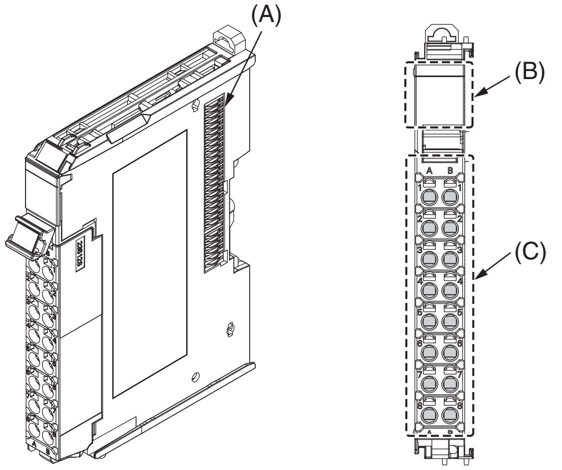
EtherCAT Coupler Unit NX-ECC☐☐☐



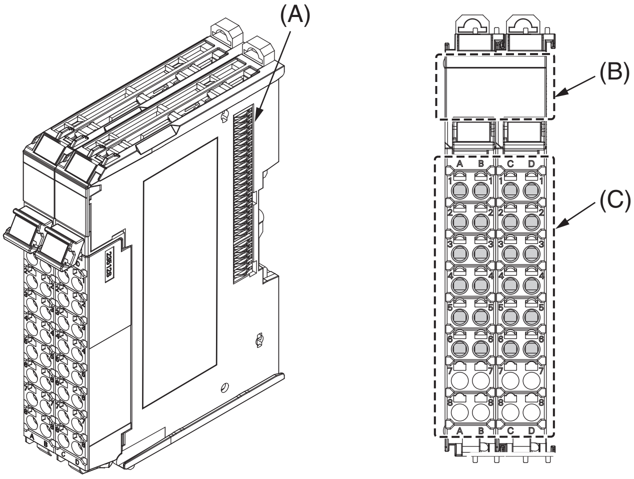
Symbol	Name	Function
(A)	NX bus connector	This connector is used to connect each Unit.
(B)	Indicators	The indicators show the current operating status of the Unit.
(C)	Communications connectors	These connectors are connected to the communications cables of the EtherCAT network. There are two connectors, one for the input port and one for the output port.
(D)	Peripheral USB port	This port is used to connect to the Sysmac Studio Support Software.
(E)	Terminal block	The terminal block is used to connect external devices. The number of terminals depends on the type of Unit.
(F)	Rotary switches	These rotary switches are used to set the 1s digit and 10s digit of the node address of the EtherCAT Coupler Unit as an EtherCAT slave. The address is set in decimal.
(G)	DIP switch	The DIP switch is used to set the 100s digit of the node address of the EtherCAT Coupler Unit as an EtherCAT slave.

Screwless clamp terminal block

12mm Width

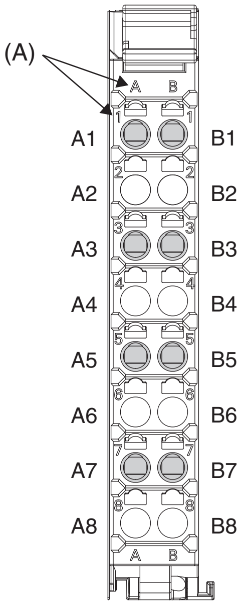


24mm Width

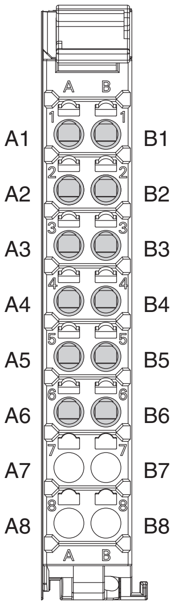


Symbol	Name	Function
(A)	NX bus connector	This connector is used to connect each Unit.
(B)	Indicators	The indicators show the current operating status of the Unit.
(C)	Terminal block	The terminal block is used to connect external devices. The number of terminals depends on the type of Unit.

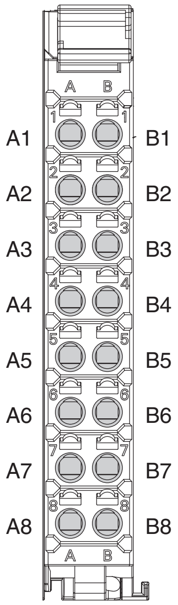
Terminal Blocks


(A)
A B
A1 B1
A2 B2
A3 B3
A4 B4
A5 B5
A6 B6
A7 B7
A8 B8
A B

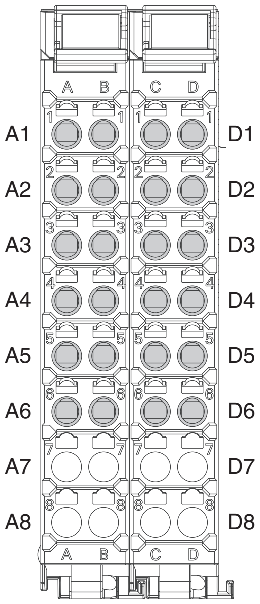
12 mm width
8-terminal type


A B
A1 B1
A2 B2
A3 B3
A4 B4
A5 B5
A6 B6
A7 B7
A8 B8
A B

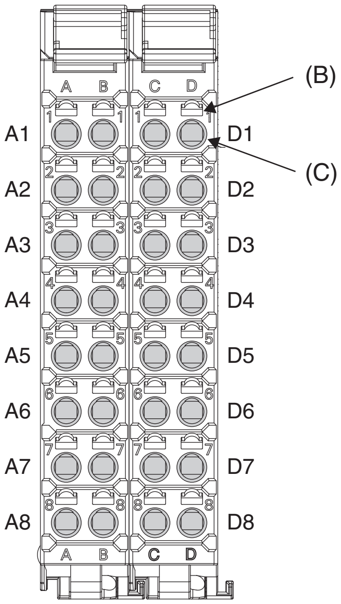
12 mm width
12-terminal type


A B
A1 B1
A2 B2
A3 B3
A4 B4
A5 B5
A6 B6
A7 B7
A8 B8
A B

12 mm width
16-terminal type


A B C D
A1 D1
A2 D2
A3 D3
A4 D4
A5 D5
A6 D6
A7 D7
A8 D8
A B C D

24 mm width
12-terminal type x 2


(B)
(C)
A B C D
A1 D1
A2 D2
A3 D3
A4 D4
A5 D5
A6 D6
A7 D7
A8 D8
A B C D

24 mm width
16-terminal type x 2

Symbol	Name	Function
(A)	Terminal number indications	Terminal numbers for which A and B indicate the column, and 1 to 8 indicate the line are displayed. The terminal number is a combination of column and line, i.e. A1 to A8 and B1 to B8. The terminal number indications are the same regardless of the number of terminals on the terminal block.
(B)	Release holes	Insert a flat-blade screwdriver into these holes to connect and remove the wires.
(C)	Terminal holes	The wires are inserted into these holes.

The following Terminal Blocks can be purchased individually.

Model	No. of terminals	Terminal number indications	Ground terminal mark	Terminal current capacity
NX-TBA082	8	A/B	None	10A
NX-TBA122	12	A/B		
NX-TBA162	16	A/B		
NX-TBB122	12	C/D		
NX-TBB162	16	C/D		
NX-TBC082	8	A/B	Provided	
NX-TBC062	16	A/B		

Note: Refer to the user's manual of each Unit for the applicable Terminal Blocks.

Applicable Wires

Using Ferrules

If you use ferrules, attach the twisted wires to them.
Observe the application instructions for your ferrules for the wire stripping length when attaching ferrules.
Always use one-pin ferrules. Do not use unplated ferrules or two-pin ferrules.

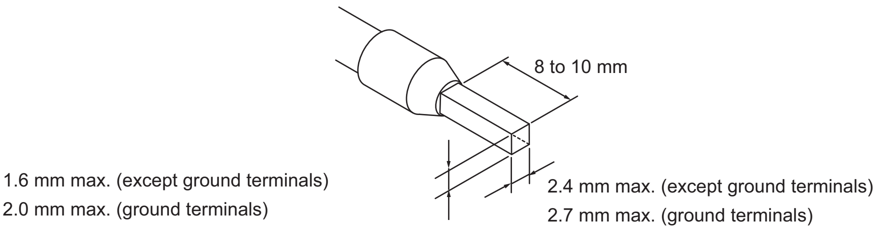
The applicable ferrules, wires, and crimping tool are given in the following table.

Terminal types	Manufacturer	Ferrule model number	Applicable wire (mm^2 (AWG))	Crimping tool
Terminals other than ground terminals	Phoenix Contact	AI0,34-8	0.34 (#22)	Phoenix Contact (The figure in parentheses is the applicable wire size.) CRIMPFOX 6 (0.25 to 6 mm^2, AWG24 to 10)
		AI0,5-8	0.5 (#20)	
		AI0,5-10		
		AI0,75-8	0.75 (#18)	
		AI0,75-10		
		AI1,0-8	1.0 (#18)	
		AI1,0-10		
		AI1,5-8	1.5 (#16)	
		AI1,5-10		
Ground terminals		AI2,5-10	2.0 *	
Terminals other than ground terminals	Weidmuller	H0.14/12	0.14 (#26)	Weidmuller (The figure in parentheses is the applicable wire size.) PZ6 Roto (0.14 to 6 mm^2, AWG 26 to 10)
		H0.25/12	0.25 (#24)	
		H0.34/12	0.34 (#22)	
		H0.5/14	0.5 (#20)	
		H0.5/16		
		H0.75/14	0.75 (#18)	
		H0.75/16		
		H1.0/14	1.0 (#18)	
		H1.0/16		
		H1.5/14	1.5 (#16)	
		H1.5/16		

* Some AWG 14 wires exceed 2.0 mm^2 and cannot be used in the screwless clamping terminal block.

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

Finished Dimensions of Ferrules

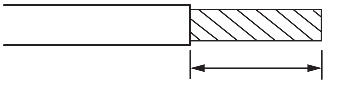

8 to 10 mm
1.6 mm max. (except ground terminals)
2.0 mm max. (ground terminals)
2.4 mm max. (except ground terminals)
2.7 mm max. (ground terminals)

Using Twisted Wires/Solid Wires

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

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

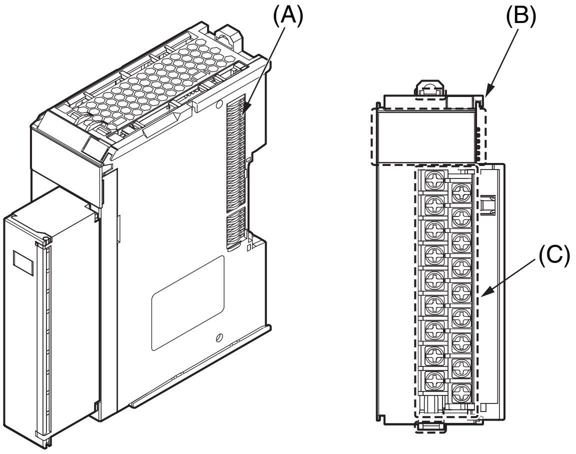
*1 Secure wires to the screwless clamping terminal block. Refer to the *Securing Wires* in the USER'S MANUAL for how to secure wires.
*2 With the NX-TB□□□1 Terminal Block, use twisted wires to connect the ground terminal. Do not use a solid wire.


Conductor length (stripping length)

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

M3 Screw Terminal Block Type

30 mm Width

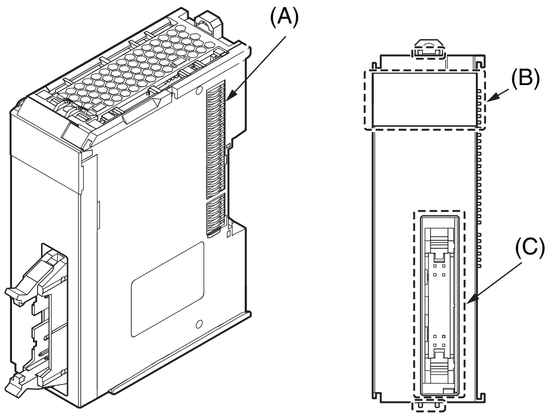


Symbol	Name	Function
(A)	NX bus connector	This connector is used to connect each Unit.
(B)	Indicators	The indicators show the current operating status of the Unit.
(C)	Screw terminals	These screw terminals are used to connect the wires.

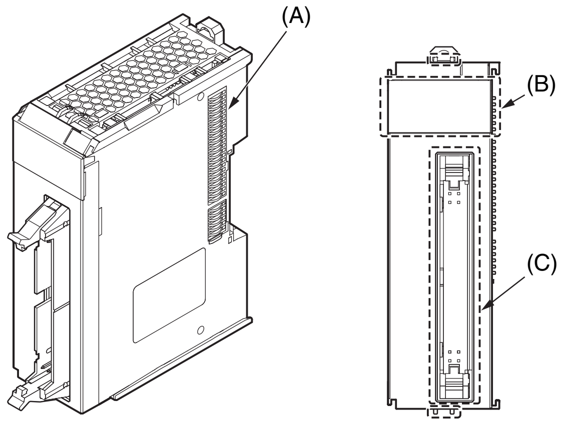
Connector Types

30 mm Width

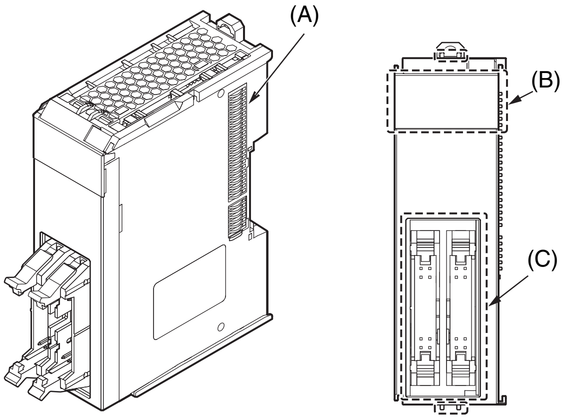
Units with MIL Connectors (1 Connector with 20 Terminals)



Units with MIL Connectors (1 Connector with 40 Terminals)

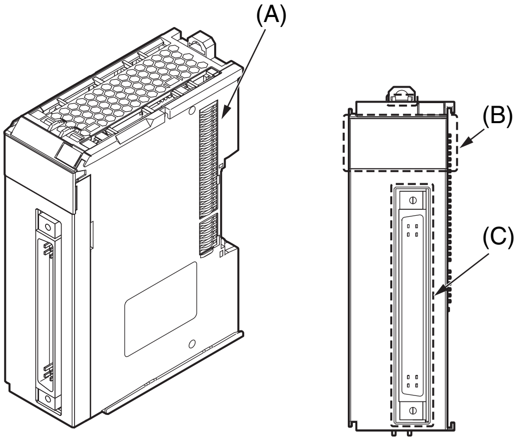


Units with MIL Connectors (2 Connectors with 20 Terminals)



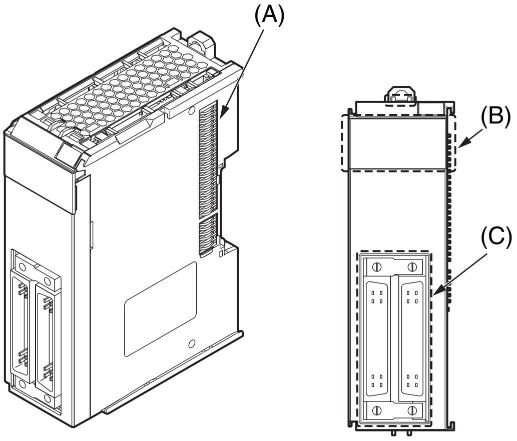
Symbol	Name	Function
(A)	NX bus connector	This connector is used to connect each Unit.
(B)	Indicators	The indicators show the current operating status of the Unit.
(C)	Connector	The connector is used to connect external devices. The number of terminals depends on the type of Unit.

Units with Fujitsu Connectors (1 Connector with 40 Terminals)



Symbol	Name	Function
(A)	NX bus connector	This connector is used to connect each Unit.
(B)	Indicators	The indicators show the current operating status of the Unit.
(C)	Connector	The connectors are used to connect to external devices.

Units with Fujitsu Connectors (2 Connectors with 24 Terminals)



Symbol	Name	Function
(A)	NX bus connector	This connector is used to connect each Unit.
(B)	Indicators	The indicators show the current operating status of the Unit.
(C)	Connector	The connectors are used to connect to external devices.

Dimensions/Mounting Dimensions

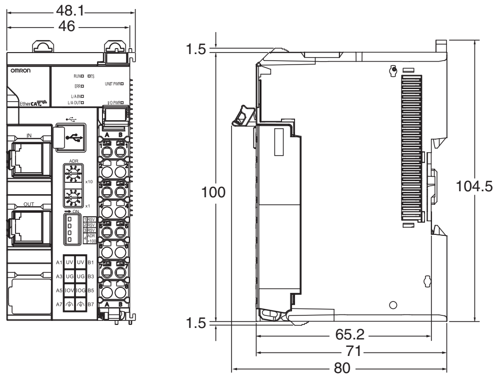
(Unit: mm)

Product Dimensions

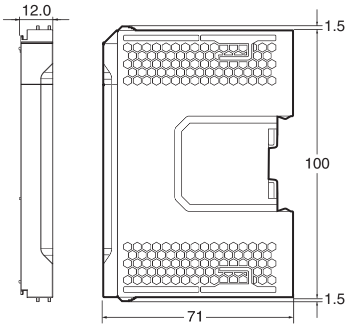
EtherCAT Coupler Unit, End Cover

Unit	Model	Width
EtherCAT Coupler Unit	NX-ECC□□□	46
End Cover	NX-END01	12

- **EtherCAT Coupler Unit**

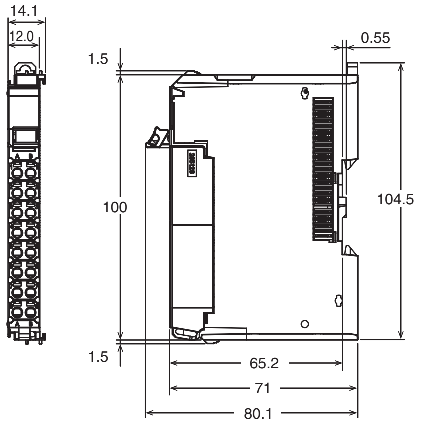


- **End Cover**
  (Included with EtherCAT Coupler Unit .)



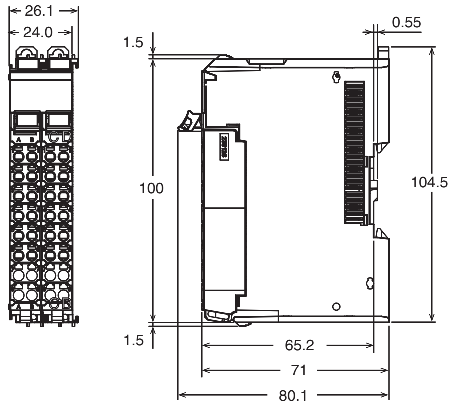
● Screwless clamp terminal block 12mm

Unit	Model	Width
Digital Input Unit	NX-ID□□□□/IA□□□	12
Digital Output Unit	NX-OD□□□□/OC□□□□	
Analog Input Unit	NX-AD□□□□	
Analog Output Unit	NX-DA□□□□	
Temperature Input Unit	NX-TS2□□□	
Incremental Encoder Input Unit	NX-EC0112/122/212/222	
SSI Input Unit	NX-ECS□□□	
Pulse Output Unit	NX-PG0112/122	
Additional NX Unit Power Supply Unit	NX-PD1000	
Additional I/O Power Supply Unit	NX-PF□□□□	
I/O Power Supply Connection Unit	NX-PC□□□□	
Shield Connection Unit	NX-TBX01	



● Screwless clamp terminal block 24mm

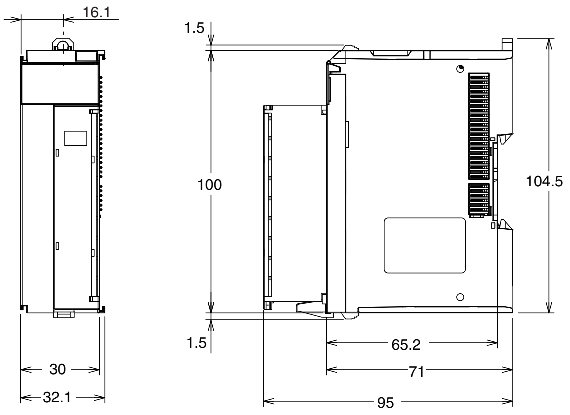
Unit	Model	Width
Temperature Input Unit	NX-TS3□□□	24
Incremental Encoder Input Unit	NX-EC0132/0142	



●M3 Screw Terminal Block Type

30 mm Width

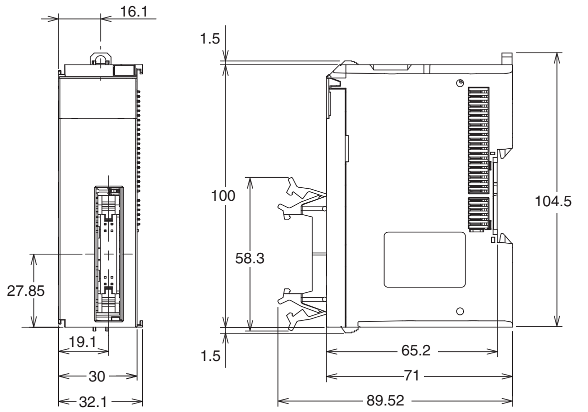
Unit	Model	Width
Digital Input Unit	NX-ID5142-1	30
Digital Output Unit	NX-OD5121-1 NX-OD5256-1	



●MIL connectors

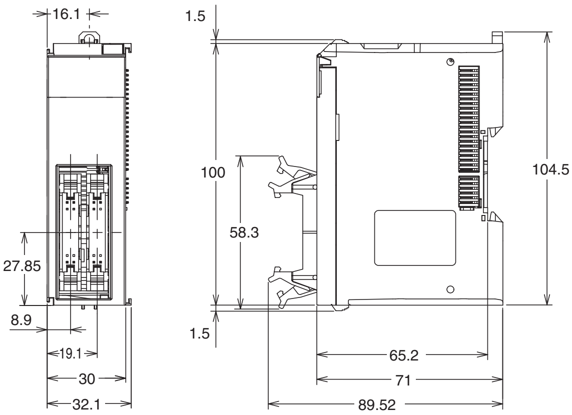
1 Connector with 20 Terminals

Unit	Model	Width
Digital Input Unit	NX-ID5142-5	30
Digital Output Unit	NX-OD5121-5 NX-OD5256-5	


16.1
1.5
100
58.3
104.5
27.85
19.1
30
32.1
1.5
65.2
71
89.52

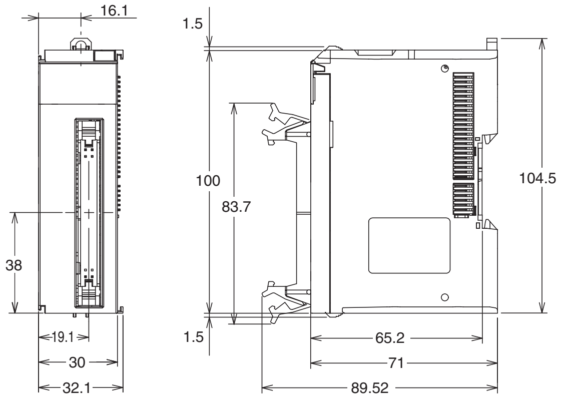
2 Connectors with 20 Terminals

Unit	Model	Width
Digital Mixed I/O Unit	NX-MD6121-5 NX-MD6256-5	30


16.1
1.5
100
58.3
104.5
27.85
8.9
19.1
30
32.1
1.5
65.2
71
89.52

1 Connector with 40 Terminals

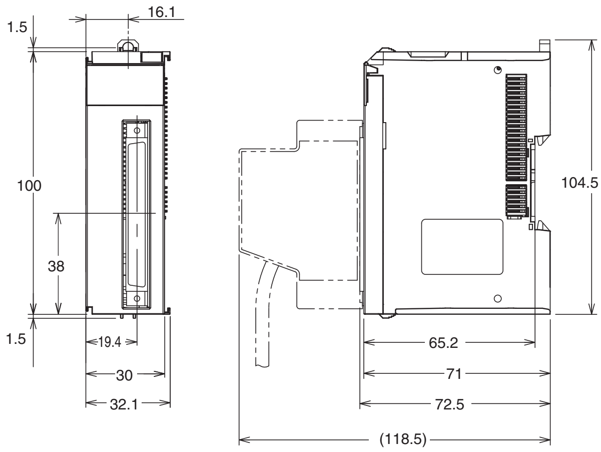
Unit	Model	Width
Digital Input Unit	NX-ID6142-5	30
Digital Output Unit	NX-OD6121-5 NX-OD6256-5	


16.1
1.5
100
83.7
104.5
38
19.1
30
32.1
1.5
65.2
71
89.52

●Units with Fujitsu Connectors

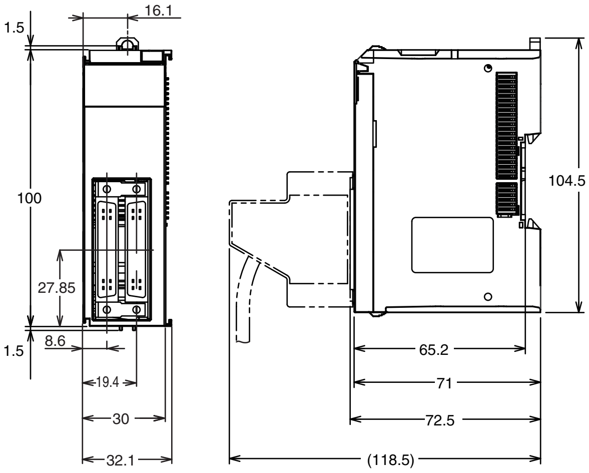
1 Connector with 40 Terminals

Unit	Model	Width
Digital Input Unit	**NX-ID6142-6**	30
Digital Output Unit	**NX-OD6121-6**	

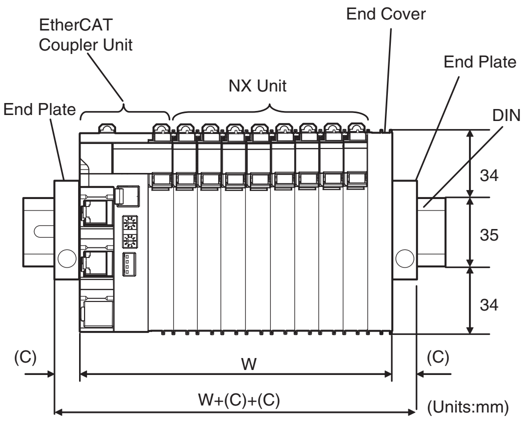

16.1
1.5
100
38
1.5
19.4
30
32.1
104.5
65.2
71
72.5
(118.5)

2 Connectors with 24 Terminals

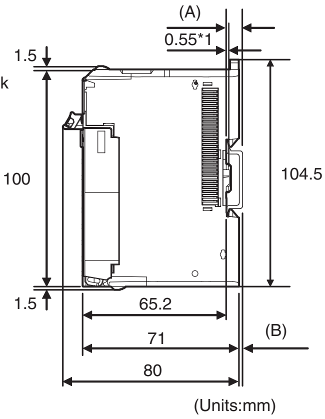
Unit	Model	Width
Digital Mixed I/O Unit	**NX-MD6121-6**	30


16.1
1.5
100
27.85
8.6
1.5
19.4
30
32.1
104.5
65.2
71
72.5
(118.5)

Mounting Dimensions

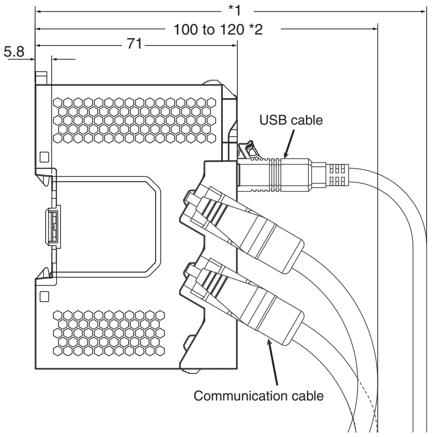

EtherCAT
Coupler Unit
End Cover
End Plate
NX Unit
End Plate
DIN Track
34
35
34
(C)
W
(C)
W+(C)+(C)
(Units:mm)

Screwless clamp terminal block


(A)
0.55*1
1.5
100
104.5
1.5
65.2
71
(B)
80
(Units:mm)

Installation Height

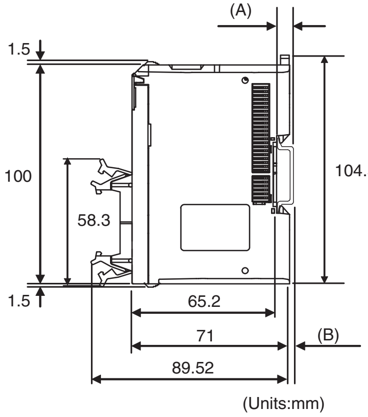
The installation height of the EtherCAT Slave Terminal depends on the model of DIN Track and on the models of NX Units that are mounted. Also, additional space is required for the cables that are connected to the Unit. Allow sufficient depth in the control panel and allow extra space when you mount the EtherCAT Slave Terminal. The following figure shows the dimensions from the cables connected to the EtherCAT Coupler Unit to the back of the Unit.


*1
100 to 120 *2
71
5.8
USB cable
Communication cable

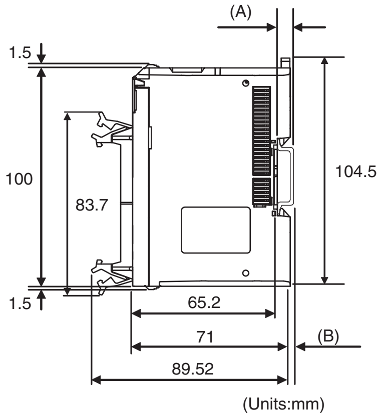
*1 This dimension depends on the specifications of the commercially available USB cable. Check the specifications of the USB cable that is used.

*2 Dimension from Back of Unit to Communications Cables
  - 100 mm: When an MPS588-C Connector is used.
  - 120 mm: When an XS6G-T421-1 Connector is used.

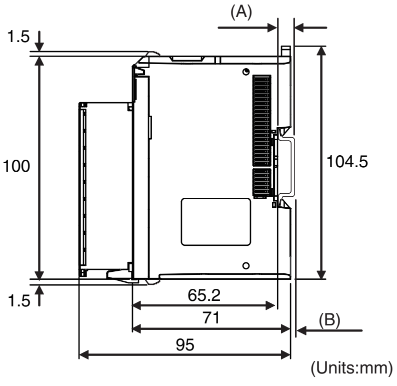
MIL connector (1 Connector with 20 Terminals, 2 Connector with 40 Terminals)


(A)
1.5
100
58.3
104.5
1.5
65.2
71
(B)
89.52
(Units:mm)

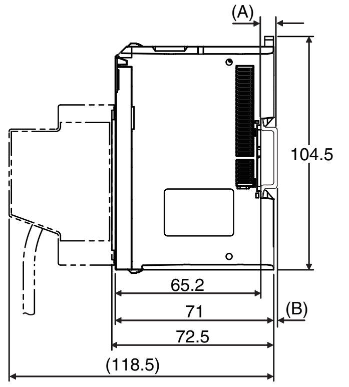
MIL connector (40-pin connector x 1)


(A)
1.5
100
83.7
104.5
1.5
65.2
71
(B)
89.52
(Units:mm)

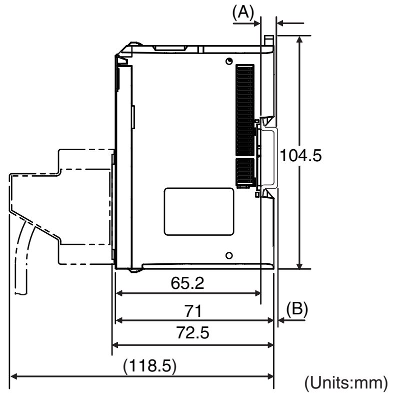
M3 Screw Terminal Block Type


(A)
1.5
100
104.5
1.5
65.2
71
(B)
95
(Units:mm)

Fujitsu Connectors (1 Connector with 40 Terminals)


(A)
104.5
65.2
71
(B)
72.5
(118.5)

Fujitsu Connectors (2 Connectors with 24 Terminals)


(A)
104.5
65.2
71
(B)
72.5
(118.5)
(Units:mm)

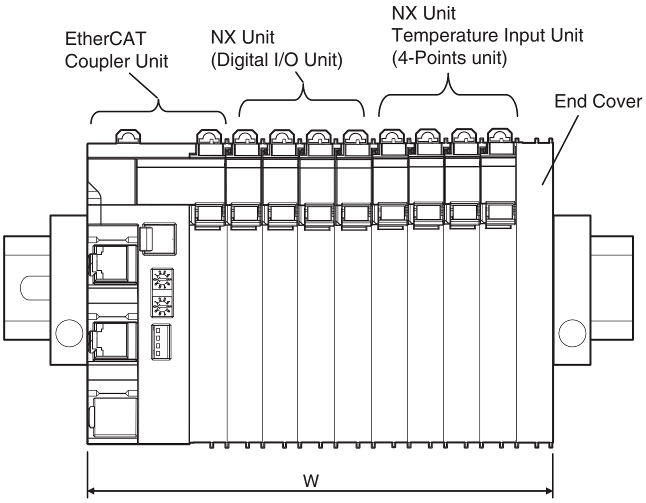
W: Width of EtherCAT Slave Terminal

W+(C)+(C): Width of EtherCAT Slave Terminal including End Plates

DIN Track model number	(A) DIN Track Dimentions	(B)
PFP-100N	7.3mm	1.5mm
PFP-50N	7.3mm	1.5mm
NS 35/7,5 PERF (PHOENIX CONTACT)	7.5mm	1.7mm
NS 35/15 PERF (PHOENIX CONTACT)	15mm	9.2mm

End Plate model number	(C) End Plate Dimentions
PFP-M	10mm
CLIPFIX 35 (PHOENIX CONTACT)	9.5mm

● Example: Calculating Width of EtherCAT Slave Terminal



- Widths of Units in the Slave Terminal:

Name	Model	Width
EtherCAT Coupler Unit	NX-ECC201	46mm
NX Units: Digital Input Units	NX-ID3317	12mm × 4 Units
NX Units: Incremental Encoder Input Units	NX-TS3201	24mm × 2 Units
End Cover	NX-END01	12mm

Total: W=46+12×4+24×2+12=154mm

General Spesifications

Item		Specification
Grounding method		Mounted in a panel
Operating environment	Ambient operating temperature	0 to 55°C
	Ambient operating humidity	10% to 95% (with no condensation or icing)
	Atmosphere	Must be free from corrosive gases.
	Ambient storage temperature	-25 to 70°C (with no condensation or icing)
	Altitude	2,000 m max.
	Pollution degree	2 or less: Conforms to JIS B3502 and IEC 61131-2.
	Noise immunity	2 kV on power supply line (Conforms to IEC61000-4-4.)
	Overvoltage category	Category II: Conforms to JIS B3502 and IEC 61131-2.
	EMC immunity level	Zone B
	Vibration resistance	Conforms to IEC 60068-2-6. 5 to 8.4 Hz with 3.5-mm amplitude, 8.4 to 150 Hz, acceleration of 9.8 m/s^2, 100 min each in X, Y, and Z directions (10 sweeps of 10 min each = 100 min total)
	Shock resistance	Conforms to IEC 60068-2-27. 147 m/s^2, 3 times each in X, Y, and Z directions
Applicable standards		cULus: Listed UL508 and ANSI/ISA 12.12.01 EC: EN 61131-2 and C-Tick3, KC: KC Registration

NX-series EtherCAT Coupler Unit

NX-ECC

Combine flexibility in Remote I/O configuration with the speed and determinism of EtherCAT.

- The EtherCAT Coupler Unit is the link between the EtherCAT Machine Control network and the NX-series I/O Units. With I/O Units ranging from basic I/O's to high-speed synchronous models, the NX-series is the perfect match for the Sysmac Machine Automation Controllers.

Features

- Up to 63 NX-IO Units can be connected to one EtherCAT Coupler Unit. Standard and high-performance units can be mixed.[*1]
- High-speed remote I/O control is possible at the fastest communication cycle of 125 us.[*2]
- Each Coupler plus its I/O form just a single EtherCAT node on the network.
- I/O control and safety control can be integrated by connecting Units for safety.
- The Coupler supports the EtherCAT Distributed Clock (DC) and propagates this to synchronous I/O units.
- The node address can be fixed by rotary switches, or set by software. Choose the method that best suits your way of engineering.
- Slave configuration by Sysmac Studio can be done centrally via the controller, or on-the-spot using the Coupler's built-in USB port.

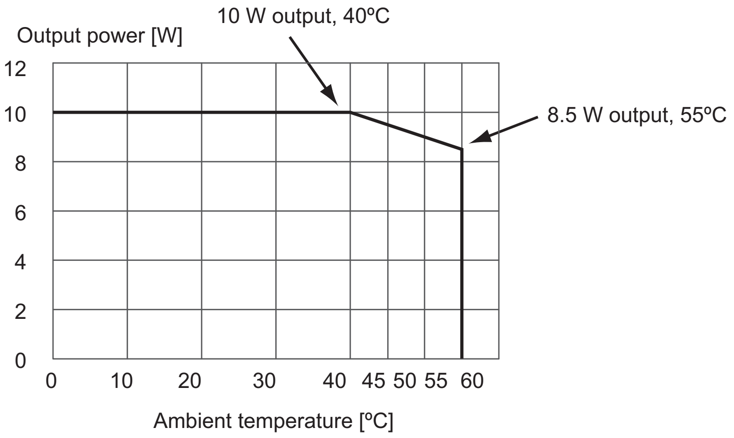
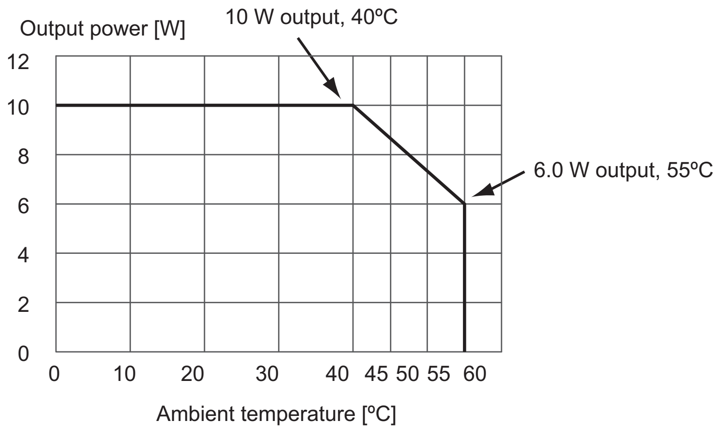
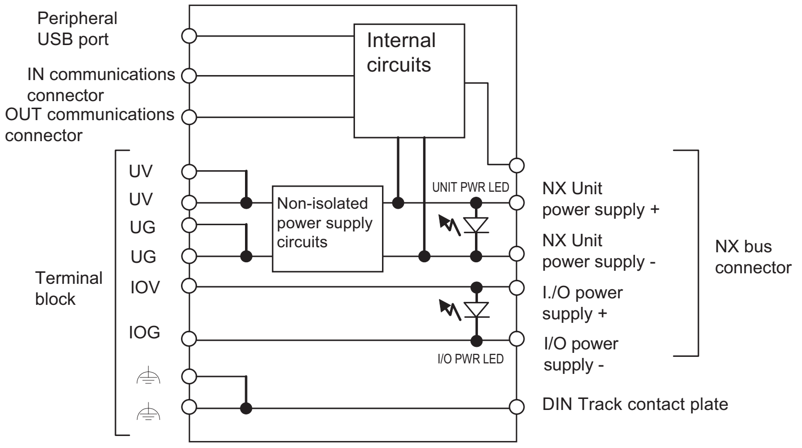
*1 Input per Coupler Unit: Maximum 1024 bytes, Output per Coupler Unit: Maximum 1024 bytes
*2 NX7-□□□□ and NX-ECC203 combined

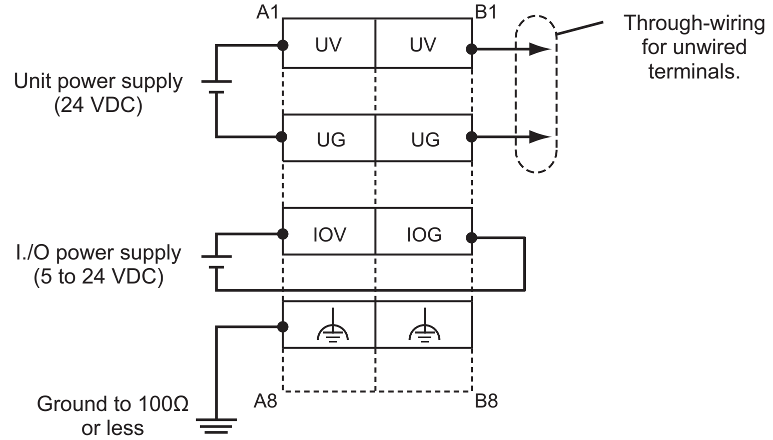
Specifications

EtherCAT Coupler Unit NX-ECC201/NX-ECC202/NX-ECC203

Item		Specification		
		NX-ECC201	NX-ECC202	NX-ECC203
Number of connectable NX Units		63 Units max.[*1]		
Send/receive PDO data sizes		Input: 1,024 bytes max. (including input data, status, and unused areas) Output: 1,024 bytes max. (including output data and unused areas)		
Mailbox data size		Input: 256 bytes Output: 256 bytes		
Mailbox		Emergency messages and SDO requests		
Refreshing methods [*2]		• Free-Run refreshing • Synchronous I/O refreshing • Time stamp refreshing		• Free-Run refreshing • Synchronous I/O refreshing • Time stamp refreshing • Task period prioritized refreshing
Node address setting range		When Connected to the Built-in EtherCAT Port on an NX-series CPU Unit • Set on switches: 1 to 199 • Set with the Sysmac Studio: 1 to 512		
		When Connected to the Built-in EtherCAT Port on an NJ-series CPU Unit • Set on switches: 1 to 192 • Set with the Sysmac Studio: 1 to 192		
I/O jitter performance		Inputs: 1 µs max. Outputs: 1 µs max.		
Communications cycle in DC Mode		250 to 4,000 µs[*3][*4]		125 to 10,000 µs[*3][*4]
Unit power supply	**Power supply voltage**	24 VDC (20.4 to 28.8 VDC)		
	NX Unit power supply capacity	10 W max. Refer to *Installation orientation and restrictions* for details.		
	NX Unit power supply efficiency	70%		
	Isolation method	No isolation between NX Unit power supply and Unit power supply terminals		
	Current capacity of power supply terminals	4 A max.		
I/O power supply	**Power supply voltage**	5 to 24 VDC (4.5 to 28.8 VDC) [*5]		
	Maximum I/O power supply current	4 A	10 A	
	Current capacity of power supply terminals	4 A max.	10 A max.	
NX Unit power consumption		1.45 W max.		1.25 W max.
Current consumption from I/O power supply		10 mA max. (for 24 VDC)		
Dielectric strength		510 VAC for 1 min, leakage current: 5 mA max. (between isolated circuits)		
Insulation resistance		100 VDC, 20 MΩ min. (between isolated circuits)		

*1. Refer to the *NX-series Safety Control Units User's Manual* (Cat. No. Z930) for the number of Safety Control Units that can be connected.
*2. This function was added or improved for a version upgrade. Refer to *NX-series EtherCAT Coupler Unit User's Manual* (Cat. No. W519) for information on version upgrades
*3. This depends on the specifications of the EtherCAT master. The values are as follows when you are connected to the built-in EtherCAT port on an NJ5-series CPU Unit: 500 µs, 1,000 µs, 2,000 µs, and 4,000 µs. Refer to the *NJ/NX-series CPU Unit Built-in EtherCAT Port User's Manual* (Cat. No. W505) for the specifications of the built-in EtherCAT ports on NJ/NX-series CPU Units.
*4. This depends on the Unit configuration.
*5. Use an output voltage that is appropriate for the I/O circuits of the NX Units and the connected external devices.

Item	Specification		
	NX-ECC201	NX-ECC202	NX-ECC203
External connection terminals	Communications Connector For EtherCAT communications. • RJ45 × 2 (shielded) • IN: EtherCAT input data, OUT: EtherCAT output data		
	Screwless Clamping Terminal Block For Unit power supply, I/O power supply, and grounding. Removable.		
	Peripheral USB Port For Sysmac Studio connection. • Physical layer: USB 2.0-compliant, B-type connector • Transmission distance: 5 m max.		
Dimensions	46 × 100 × 71 mm (W×H×D)		
Weight	170 g max.		
Installation orientation and restrictions	Installation orientation: 6 possible orientations Restrictions: Used in the upright installation orientation.  Used in another orientation other than the upright installation orientation. 		
Circuit layout	 Peripheral USB port IN communications connector OUT communications connector Internal circuits UV UV UG UG IOV IOG Terminal block Non-isolated power supply circuits UNIT PWR LED I/O PWR LED NX Unit power supply + NX Unit power supply - I./O power supply + I/O power supply - NX bus connector DIN Track contact plate		

Item	Specification		
	NX-ECC201	NX-ECC202	NX-ECC203
Terminal arrangement	 A1 B1 UV UV UG UG Through-wiring for unwired terminals. Unit power supply (24 VDC) IOV IOG I./O power supply (5 to 24 VDC) Ground to 100Ω or less A8 B8		
Accessory	End Cover (NX-END01): 1		

EtherCAT Communications Specifications

Item	Specification
Communications standard	IEC 61158 Type 12
Physical layer	100BASE-TX (IEEE 802.3)
Modulation	Baseband
Baud rate	100 Mbps
Topology	Depends on the specifications of the EtherCAT master.
Transmission media	Category 5 or higher twisted-pair cable (Recommended cable: double-shielded cable with aluminum tape and braiding)
Transmission distance	Distance between nodes: 100 m or less

Version Information

Model number of EtherCAT Coupler Unit	Unit version	Corresponding unit version/version [*1]			
		Using an NX-series CPU Unit		Using an NJ-series CPU Unit	
		Unit version of CPU Unit	Sysmac Studio version	Unit version of CPU Unit	Sysmac Studio version
NX-ECC201	1.2	Ver. 1.10 or later	Ver. 1.13 or later	Ver. 1.07 or later	Ver. 1.08 or higher
	1.1			Ver. 1.06 or later	Ver. 1.07 or higher
	1.0			Ver. 1.05 or later	Ver. 1.06 or higher
NX-ECC202	1.2 [*2]			Ver. 1.07 or later	Ver. 1.08 or higher
NX-ECC203	1.3 [*3]			Ver. 1.07 or later	Ver. 1.13 or higher

*1 Some Units do not have all of the versions given in the above table. If a Unit does not have the specified version, support is provided by the oldest available version after the specified version. Refer to the user's manuals for the specific Units for the relation between models and versions.

*2 For the NX-ECC202, there is no unit version of 1.1 or earlier.

*3 For the NX-ECC203, there is no unit version of 1.2 or earlier.

NX-series EtherNet/IP Coupler Unit

NX-EIC

Connecting to open industrial network standard EtherNet/IP

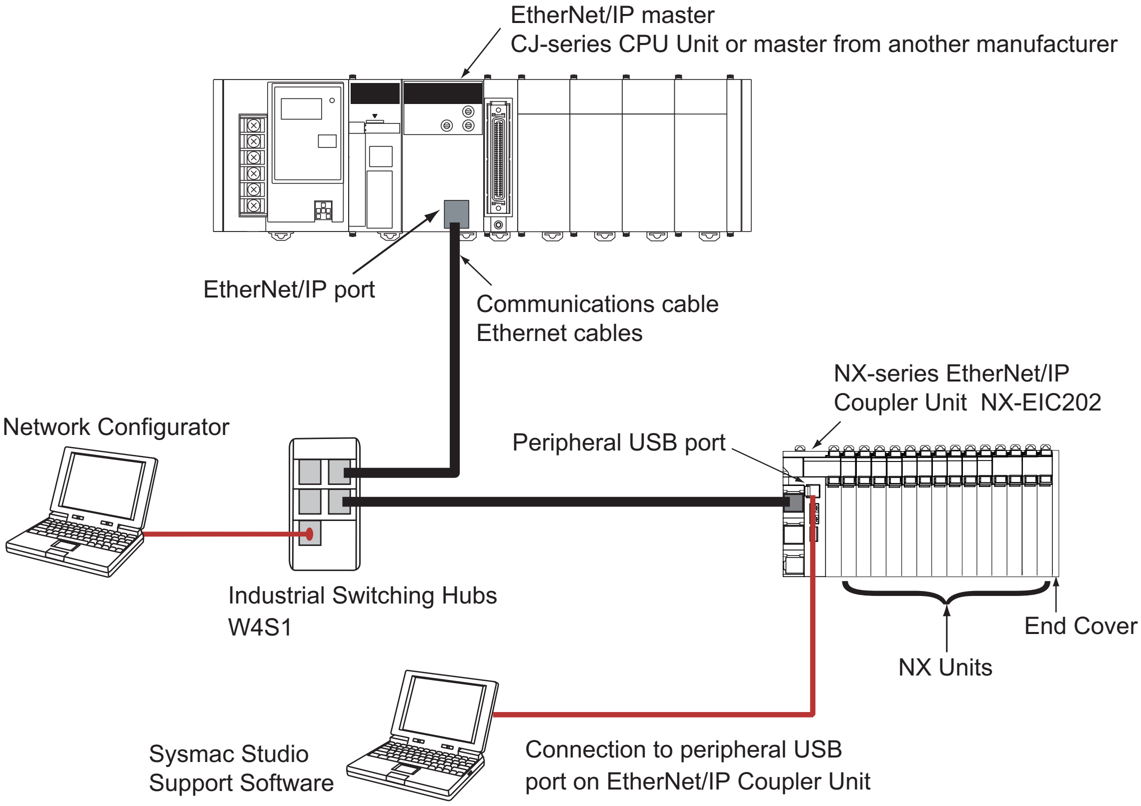
- The EtherNet/IP Coupler Unit is the link between the EtherNet/IP multivendor network and the NX-series I/O Units and Safety Units. With wide variety of the I/O Units and Safety Units, the NX-series is the perfect match for the CJ-series and multivendor Controllers.

Features

- Up to 63 NX-IO Units can be connected to one EtherNet/IP Coupler Unit. Standard and high-performance units can be mixed.*
- Each Coupler plus its I/O form just a single EtherCAT node on the network.
- I/O control and safety control can be integrated by connecting Units for safety.
- The IP address can be found on the label on the Unit, without using software.
- Slave configuration by Sysmac Studio can be done centrally via the controller, or on-the-spot using the Coupler's built-in USB port.

* Input per Coupler Unit: Maximum 504 bytes, Output per Coupler Unit: Maximum 504 bytes

System Configuration


EtherNet/IP master
CJ-series CPU Unit or master from another manufacturer
EtherNet/IP port
Communications cable
Ethernet cables
NX-series EtherNet/IP
Coupler Unit NX-EIC202
Network Configurator
Peripheral USB port
Industrial Switching Hubs
W4S1
End Cover
NX Units
Sysmac Studio
Support Software
Connection to peripheral USB
port on EtherNet/IP Coupler Unit

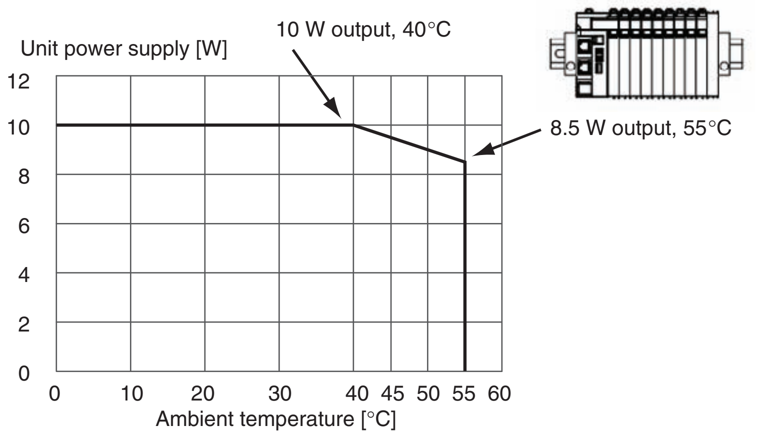
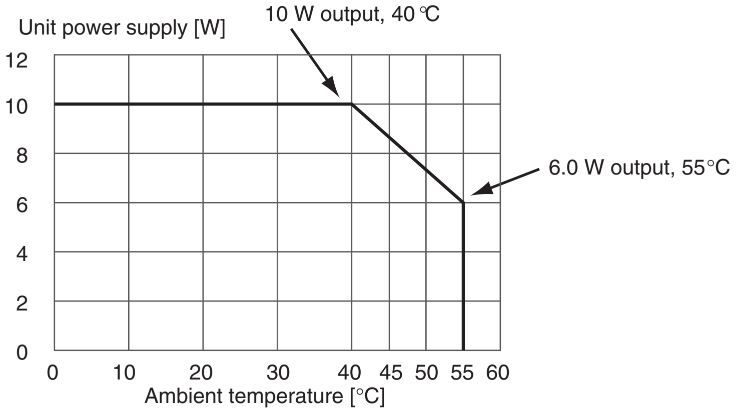
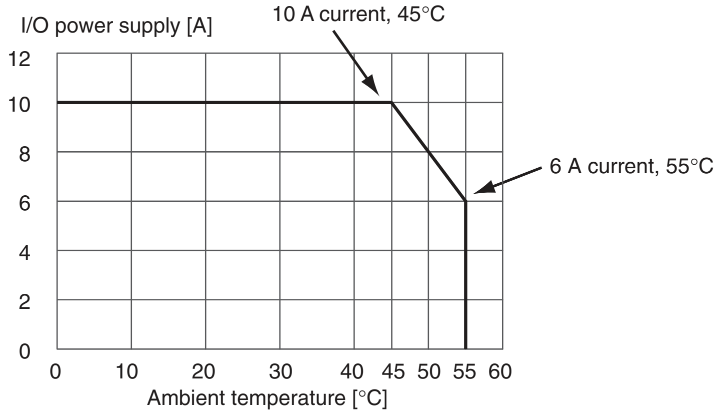
Refer to page17 for the NX Units that can be connected to the NX-series EtherNet/IP Coupler Unit.

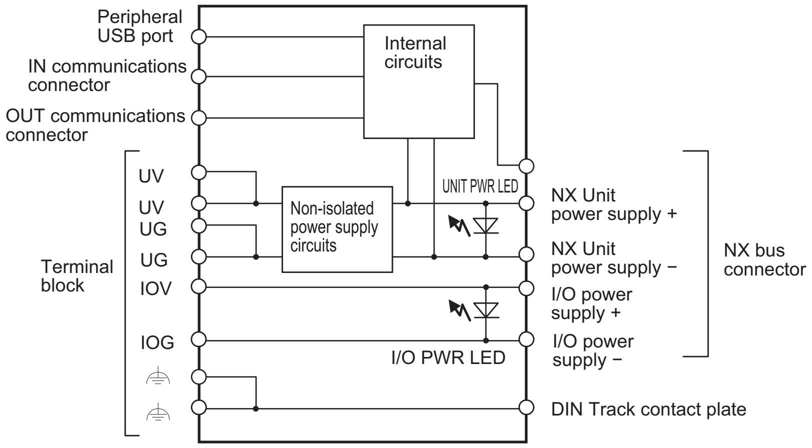
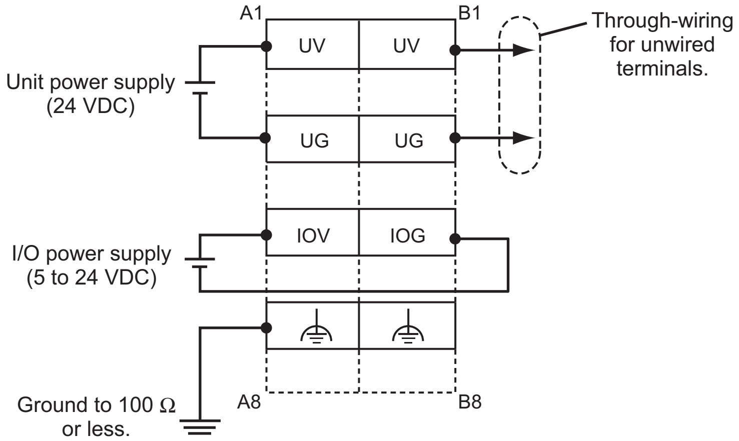
Specifications

EtherNet/P Coupler Unit NX-EIC202

Item		Specification	
Model		NX-EIC202	
Number of connectable NX Units		63 Units max.*1	
Communications protocols		EtherNet/IP	
		UDP/IP and TCP/IP (Message Services)	Number of buffers (sockets): • 8 message buffers for server • No message buffers for client • Shared buffers for UDP/IP messages and TCP/IP messages Maximum message size: • Request: 492 bytes • Response: 496 bytes Maximum NX output data size: • 490 bytes Maximum NX input data size: • 496 bytes
Modulation		Baseband	
Link speed		100 Mbps	
Physical layer		100BASE-TX (IEEE 802.3)	
Number of connections		8	
Received Packet Interval (RPI, refresh cycle)		4 to 1,000 ms	
Allowed communications bandwidth per Unit		1,000 pps	
Topology		Line, Tree, Star	
Transmission media		Category 5 or higher twisted-pair cable (Recommended cable: double-shielded cable with aluminum tape and braiding)	
Transmission distance		Distance between nodes: 100 m or less	
NX bus I/O data size		Input: 512 bytes max. (including input data, status, and unused areas) Output: 512 bytes max. (including output data and unused areas)	
EtherNet/IP I/O connection size		Input: 504 bytes max. (including input data, status, and unused areas) Output: 504 bytes max. (including output data and unused areas)	
Refreshing methods		Free-Run refreshing	
Unit power supply	**Power supply voltage**	24 VDC (20.4 to 28.8 VDC)	
	NX Unit power supply capacity	10 W max.	
	NX Unit power supply efficiency	70%	
	Isolation method	No isolation between NX Unit power supply and Unit power supply terminals	
	Current capacity of power supply terminals	4 A max.	
I/O power supply	**Power supply voltage**	5 to 24 VDC (4.5 to 28.8 VDC) *2	
	Maximum I/O power supply current	10 A	
	Current capacity of power supply terminals	10 A max.	
NX Unit power consumption		1.60 W max.	
Current consumption from I/O power supply		10 mA max. (for 24 VDC)	
Dielectric strength		510 VAC for 1 min, leakage current: 5 mA max. (between isolated circuits)	
Insulation resistance		100 VDC, 20 MΩ min. (between isolated circuits)	
External connection terminals		Communications Connector For EtherNet/IP communications. • RJ45 × 2 (shielded)	
		Screwless Clamping Terminal Block For Unit power supply, I/O power supply, and grounding. Removable.	
		Peripheral USB Port For Sysmac Studio connection. • Physical layer: USB 2.0-compliant, B-type connector • Transmission distance: 5 m max.	
Dimensions		46 × 100 × 71 mm (W×H×D)	
Weight		150 g max.	

*1. Refer to the NX-series Safety Control Unit User's Manual (Cat. No. Z930) for the number of Safety Control Units that can be connected.
*2. Use a voltage that is appropriate for the I/O circuits of the NX Units and the connected external devices.

Item	Specification
Installation orientation and restrictions	Installation orientation: 6 possible orientations Restrictions: • Used in the upright installation orientation.  • Used in any other orientation than the upright installation orientation.  

Item	Specification
Circuit layout	 Peripheral USB port IN communications connector OUT communications connector Internal circuits Terminal block UV UV UG UG IOV IOG Non-isolated power supply circuits UNIT PWR LED I/O PWR LED NX Unit power supply + NX Unit power supply − I/O power supply + I/O power supply − NX bus connector DIN Track contact plate
Terminal arrangement	 A1 B1 UV UV UG UG IOV IOG Unit power supply (24 VDC) I/O power supply (5 to 24 VDC) Through-wiring for unwired terminals. Ground to 100 Ω or less. A8 B8
Accessory	End Cover (NX-END01): 1

Version Information

NX-series EtherNet/IP Coupler Unit and Sysmac Studio

NX Units		version
Model	**Unit Version**	**Sysmac Studio**
NX-EIC202	Ver.1.0	Version 1.10 or later

NX-series Digital Input Unit

NX-ID/IA

A Wide Range of Digital Input Units from General Purpose use to High-Speed Synchronous Control

- Digital Input Units for the NX-series modular I/O system.
- Connect to other NX-series I/O Units and EtherCAT Coupler units using the high-speed NX-bus.
- Synchronous Units update the status of input devices to the controller every EtherCAT cycle.

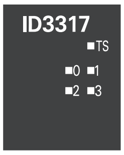
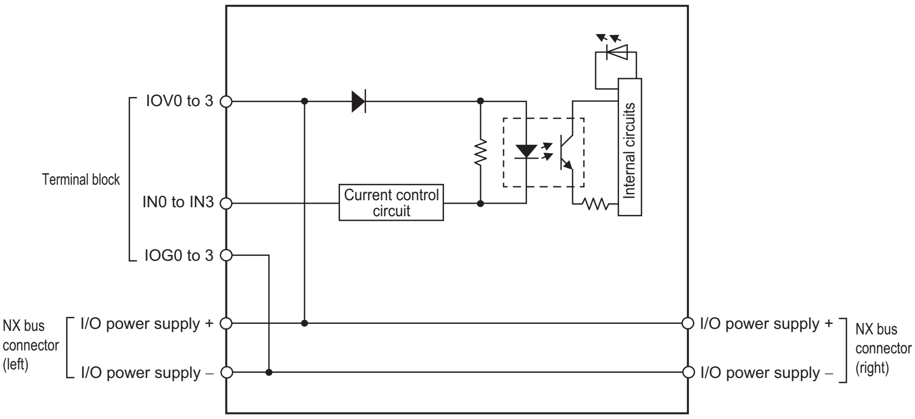
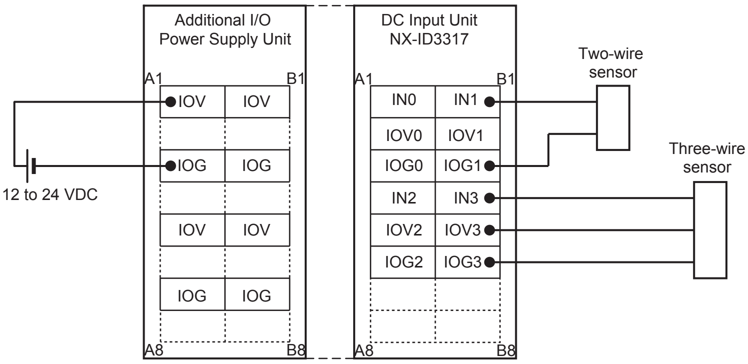
Features

- High-speed I/O refreshing is possible by connecting with the NX-series EtherCAT Coupler.
- I/O refreshing can be synchronized with the control cycle of the Controller. (Synchronous refreshing)
- ON/OFF response time of the high-speed model is 100 ns max, which enables high-speed, high-precision control.
- The screwless terminal block is detachable for easy commissioning and maintenance.
- Screwless clamp terminal block and Connector types (Units with MIL/Fujitsu Connectors) are significantly reduces wiring work.
- Up to 16 digital inputs in a space-saving 12 mm width. (Connector Types 30 mm width)
- The lineup includes 4-point, 8-point, 16-point, and 32-point types with 3-wire, 2-wire and 1-wire connection methods.
- With input refreshing with input changed time, the Input Unit records the time when the input is changed and the changed time with the input value is read into the Controller.
- Using with the Unit that supports output refreshing with specified time stamp enables high-precision I/O control independent of the control cycle of the Controller.

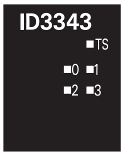
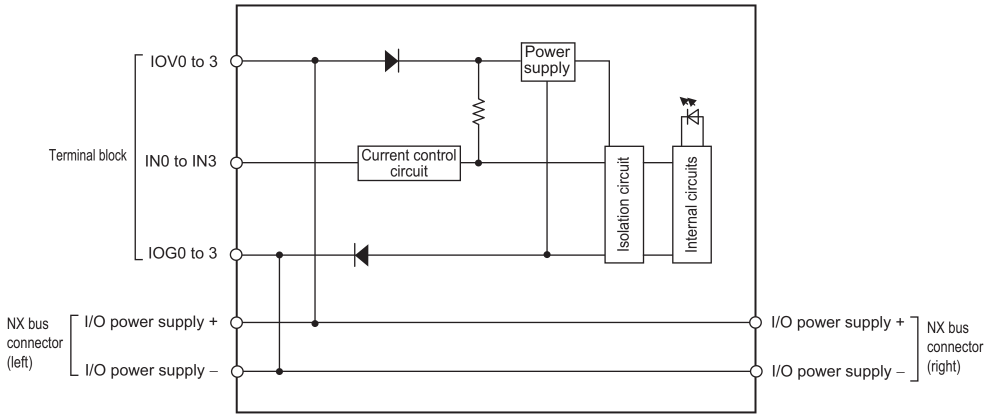
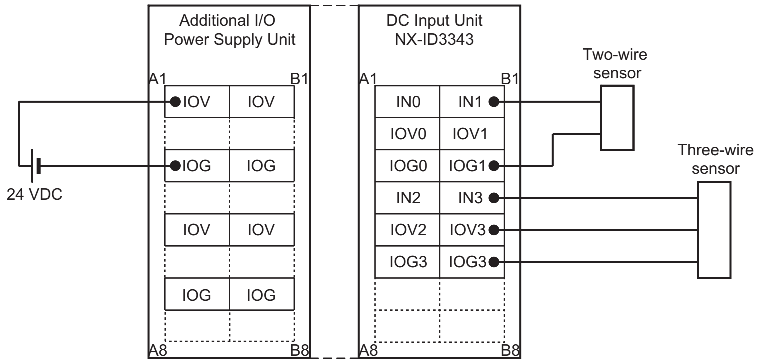
Digital Input Unit Specifications

● DC Input Unit (Screwless Clamping Terminal Block 12 mm, Width)

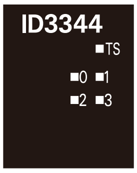
NX-ID3317

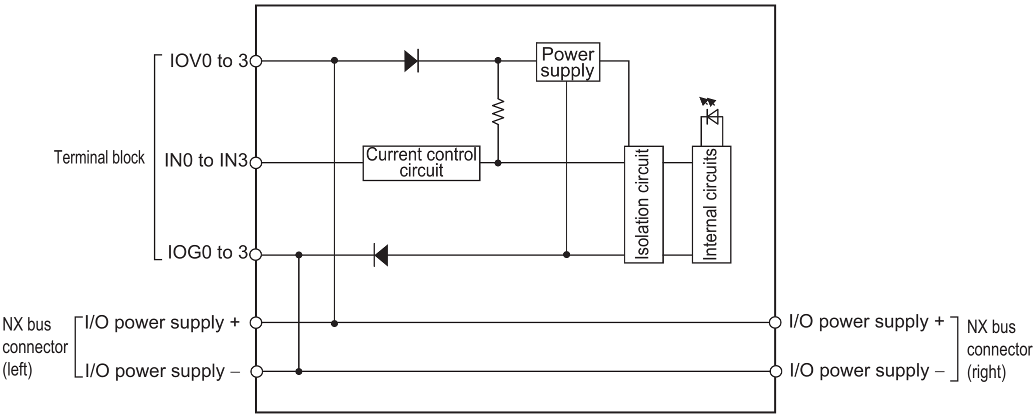
Unit name	DC Input Unit	**Model**	NX-ID3317
Capacity	4 points	**External connection terminals**	Screwless clamping terminal block (12 terminals)
I/O refreshing method	Selectable Synchronous I/O refreshing or Free-Run refreshing		
Indicators	TS indicator, input indicator  ID3317 TS 0 1 2 3	**Internal I/O common**	NPN
		Rated input voltage	12 to 24 VDC (9 to 28.8 VDC)
		Input current	6 mA typical (at 24 VDC), rated current
		ON voltage/ON current	9 VDC min./3 mA min. (between IOV and each signal)
		OFF voltage/OFF current	2 VDC max./1 mA max. (between IOV and each signal)
		ON/OFF response time	20 µs max./400 µs max.
		Input filter time	Without filter, 0.25 ms, 0.5 ms, 1 ms (factory setting), 2 ms, 4 ms, 8 ms, 16 ms, 32 ms, 64 ms, 128 ms, 256 ms
Dimensions	12 (W) x 100 (H) x 71 (D)	**Isolation method**	Photocoupler isolation
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	Supply from the NX bus	**Current capacity of I/O power supply terminal**	IOV: 0.1 A/terminal max., IOG: 0.1 A/terminal max.
NX Unit power consumption	0.50 W max.	**Current consumption from I/O power supply**	No consumption
Weight	65 g max.		
Circuit layout	 IOV0 to 3 Terminal block IN0 to IN3 IOG0 to 3 Current control circuit Internal circuits NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right)		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 Additional I/O Power Supply Unit A1 B1 IOV IOV IOG IOG IOV IOV IOG IOG A8 B8 12 to 24 VDC DC Input Unit NX-ID3317 A1 B1 IN0 IN1 IOV0 IOV1 IOG0 IOG1 IN2 IN3 IOV2 IOV3 IOG2 IOG3 A8 B8 Two-wire sensor Three-wire sensor		
Disconnection/ Short-circuit detection	Not supported.	**Protective function**	Not supported.

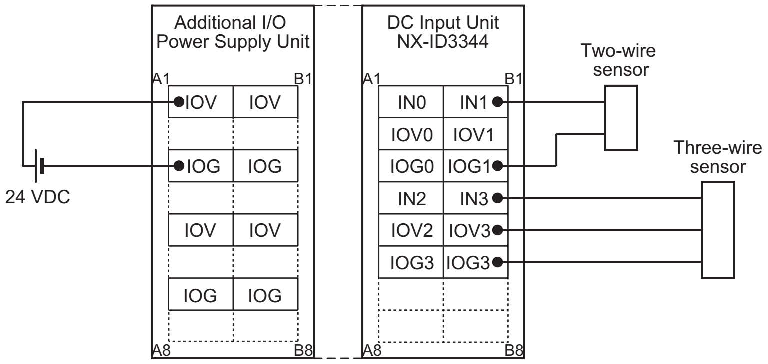
NX-ID3343

Unit name	DC Input Unit	**Model**	NX-ID3343
Capacity	4 points	**External connection terminals**	Screwless clamping terminal block (12 terminals)
I/O refreshing method	Selectable Synchronous I/O refreshing or Free-Run refreshing		
Indicators	TS indicator, input indicator  ID3343 TS 0 1 2 3	**Internal I/O common**	NPN
		Rated input voltage	24 VDC (15 to 28.8 VDC)
		Input current	3.5 mA typical (at 24 VDC), rated current
		ON voltage/ON current	15 VDC min./3 mA min. (between IOV and each signal)
		OFF voltage/OFF current	5 VDC max./1 mA max. (between IOV and each signal)
		ON/OFF response time	100 ns max./100 ns max.
		Input filter time	Without filter, 1 µs, 2 µs, 4 µs, 8 µs (factory setting), 16 µs, 32 µs, 64 µs, 128 µs, 256 µs
Dimensions	12 (W) x 100 (H) x 71 (D)	**Isolation method**	Digital isolator isolation
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	Supply from the NX bus	**Current capacity of I/O power supply terminal**	IOV: 0.1 A/terminal max., IOG: 0.1 A/terminal max.
NX Unit power consumption	0.55 W max.	**Current consumption from I/O power supply**	30 mA max.
Weight	65 g max.		
Circuit layout	 IOV0 to 3 Terminal block IN0 to IN3 IOG0 to 3 Power supply Current control circuit Isolation circuit Internal circuits NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right)		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 Additional I/O Power Supply Unit A1 B1 IOV IOV IOG IOG IOV IOV IOG IOG A8 B8 24 VDC DC Input Unit NX-ID3343 A1 B1 IN0 IN1 IOV0 IOV1 IOG0 IOG1 IN2 IN3 IOV2 IOV3 IOG3 IOG3 A8 B8 Two-wire sensor Three-wire sensor		
Disconnection/ Short-circuit detection	Not supported.	**Protective function**	Not supported.

NX-ID3344

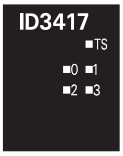
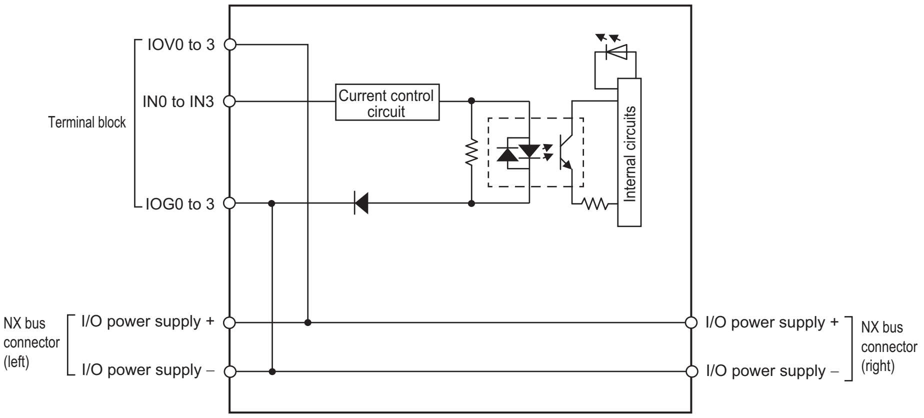
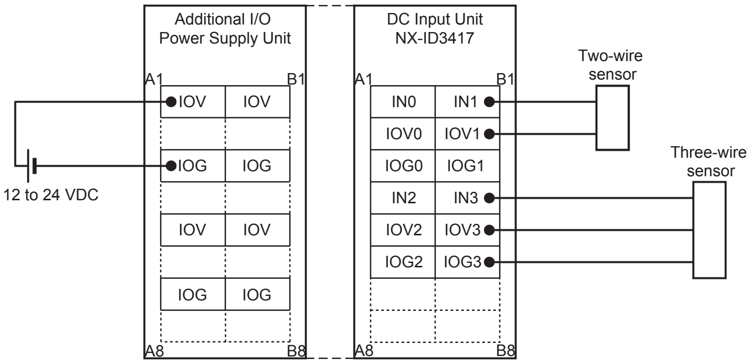
<table>
<tr><td>Unit name</td><td>DC Input Unit</td><td>Model</td><td>NX-ID3344</td></tr>
<tr><td>Capacity</td><td>4 points</td><td>External connection terminals</td><td>Screwless clamping terminal block (12 terminals)</td></tr>
<tr><td>I/O refreshing method</td><td colspan="3">Input refreshing with input changed time</td></tr>
<tr><td rowspan="7">Indicators</td><td rowspan="7">TS indicator, input indicators

ID3344
■TS
■0 ■1
■2 ■3

</td><td>Internal I/O common</td><td>NPN</td></tr>
<tr><td>Rated input voltage</td><td>24 VDC (15 to 28.8 VDC)</td></tr>
<tr><td>Input current</td><td>3.5 mA typical (at 24 VDC), rated current</td></tr>
<tr><td>ON voltage/ON current</td><td>15 VDC min./3 mA min. (between IOV and each signal)</td></tr>
<tr><td>OFF voltage/OFF current</td><td>5 VDC max./1 mA max. (between IOV and each signal)</td></tr>
<tr><td>ON/OFF response time</td><td>100 ns max./100 ns max.</td></tr>
<tr><td>Input filter time</td><td>No filter</td></tr>
<tr><td>Dimensions</td><td>12 (W) x 100 (H) x 71 (D)</td><td>Isolation method</td><td>Digital isolator isolation</td></tr>
<tr><td>Insulation resistance</td><td>20 MΩ min. between isolated circuits (at 100 VDC)</td><td>Dielectric strength</td><td>510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.</td></tr>
<tr><td>I/O power supply method</td><td>Supply from the NX bus</td><td>Current capacity of I/O power supply terminal</td><td>IOV: 0.1 A/terminal max.,
IOG: 0.1 A/terminal max.</td></tr>
<tr><td>NX Unit power consumption</td><td>0.55 W max.</td><td>Current consumption from I/O power supply</td><td>30 mA max.</td></tr>
<tr><td>Weight</td><td colspan="3">65 g max.</td></tr>
<tr><td>Circuit layout</td><td colspan="3">
IOV0 to 3
Terminal block
IN0 to IN3
IOG0 to 3
Current control circuit
Power supply
Isolation circuit
Internal circuits
NX bus connector (left)
I/O power supply +
I/O power supply –
I/O power supply +
I/O power supply –
NX bus connector (right)

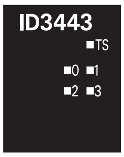
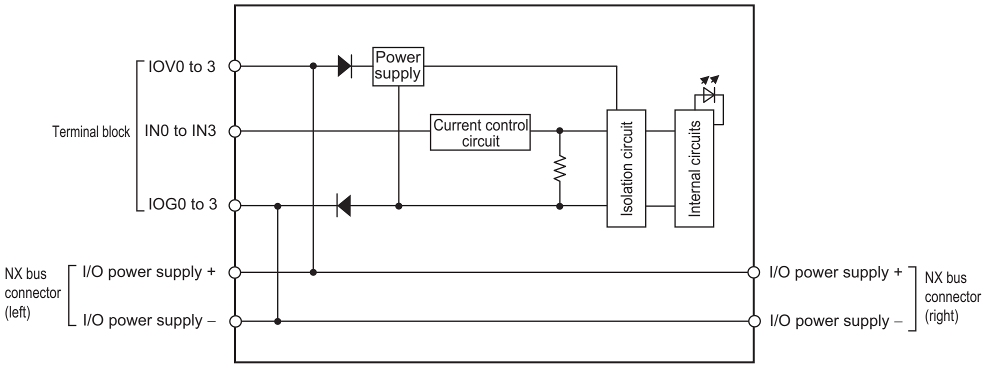
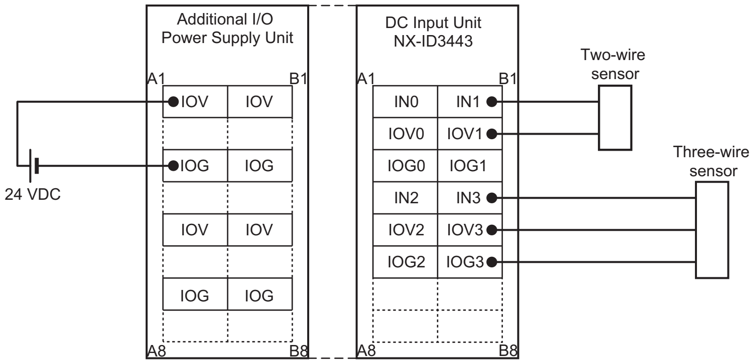
</td></tr>
<tr><td>Installation orientation and restrictions</td><td colspan="3">Installation orientation: Possible in 6 orientations.
Restrictions: No restrictions</td></tr>
<tr><td>Terminal connection diagram</td><td colspan="3">
Additional I/O Power Supply Unit
A1
B1
IOV IOV
IOG IOG
IOV IOV
IOG IOG
A8
B8
24 VDC
DC Input Unit NX-ID3344
A1
B1
IN0 IN1
IOV0 IOV1
IOG0 IOG1
IN2 IN3
IOV2 IOV3
IOG3 IOG3
A8
B8
Two-wire sensor
Three-wire sensor

</td></tr>
<tr><td>Disconnection/ Short-circuit detection</td><td>Not supported.</td><td>Protective function</td><td>Not supported.</td></tr>
</table>

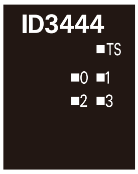
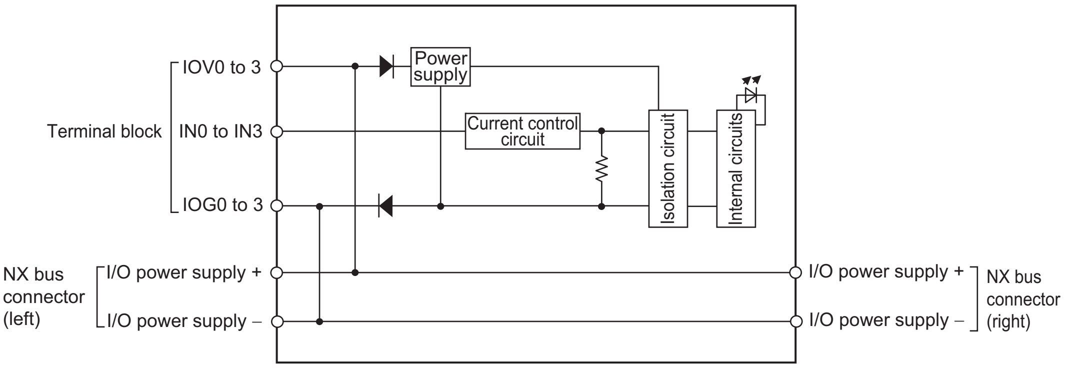
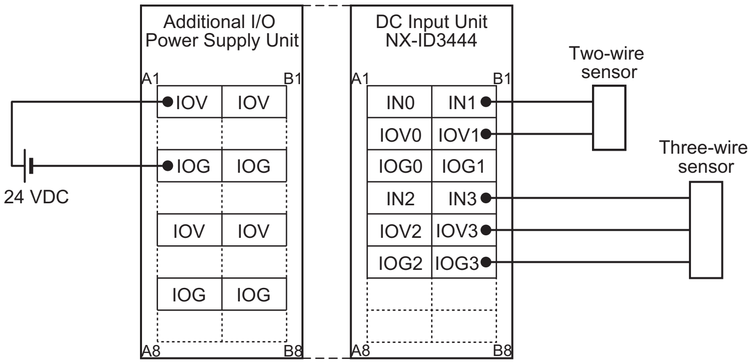
NX-ID3417

Unit name	DC Input Unit	**Model**	NX-ID3417
Capacity	4 points	**External connection terminals**	Screwless clamping terminal block (12 terminals)
I/O refreshing method	Selectable Synchronous I/O refreshing or Free-Run refreshing		
Indicators	TS indicator, input indicator  ID3417 ■TS ■0 ■1 ■2 ■3	**Internal I/O common**	PNP
		Rated input voltage	12 to 24 VDC (9 to 28.8 VDC)
		Input current	6 mA typical (at 24 VDC), rated current
		ON voltage/ON current	9 VDC min./3 mA min. (between IOG and each signal)
		OFF voltage/OFF current	2 VDC max./1 mA max. (between IOG and each signal)
		ON/OFF response time	20 µs max./400 µs max.
		Input filter time	Without filter, 0.25 ms, 0.5 ms, 1 ms (factory setting), 2 ms, 4 ms, 8 ms, 16 ms, 32 ms, 64 ms, 128 ms, 256 ms
Dimensions	12 (W) x 100 (H) x 71 (D)	**Isolation method**	Photocoupler isolation
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	Supply from the NX bus	**Current capacity of I/O power supply terminal**	IOV: 0.1 A/terminal max., IOG: 0.1 A/terminal max.
NX Unit power consumption	0.50 W max.	**Current consumption from I/O power supply**	No consumption
Weight	65 g max.		
Circuit layout	 IOV0 to 3 IN0 to IN3 Terminal block IOG0 to 3 Current control circuit Internal circuits NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right)		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 Additional I/O Power Supply Unit A1 B1 IOV IOV IOG IOG IOV IOV IOG IOG A8 B8 12 to 24 VDC DC Input Unit NX-ID3417 A1 B1 IN0 IN1 IOV0 IOV1 IOG0 IOG1 IN2 IN3 IOV2 IOV3 IOG2 IOG3 A8 B8 Two-wire sensor Three-wire sensor		
Disconnection/ Short-circuit detection	Not supported.	**Protective function**	Not supported.

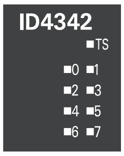
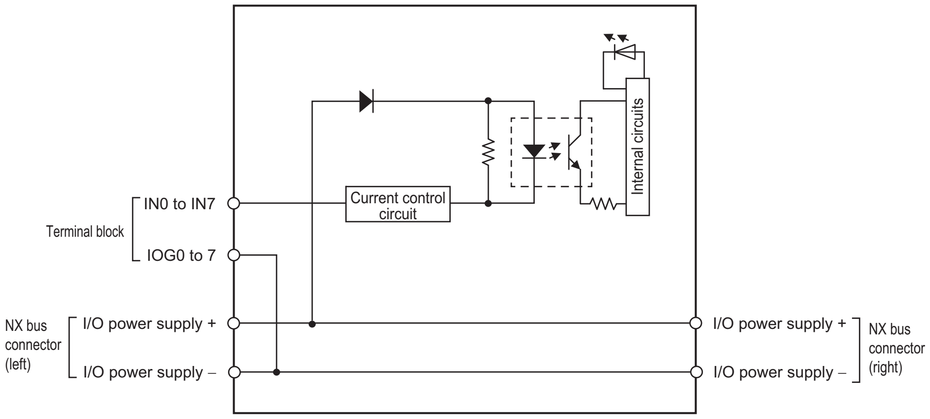
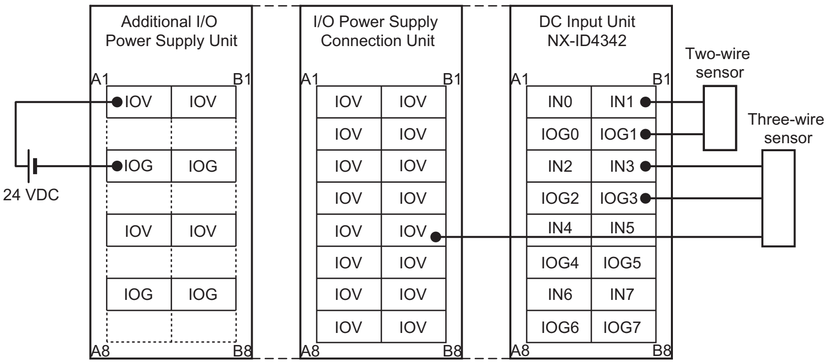
NX-ID3443

Unit name	DC Input Unit	**Model**	NX-ID3443
Capacity	4 points	**External connection terminals**	Screwless clamping terminal block (12 terminals)
I/O refreshing method	Selectable Synchronous I/O refreshing or Free-Run refreshing		
Indicators	TS indicator, input indicator  ID3443 TS 0 1 2 3	**Internal I/O common**	PNP
		Rated input voltage	24 VDC (15 to 28.8 VDC)
		Input current	3.5 mA typical (at 24 VDC), rated current
		ON voltage/ON current	15 VDC min./3 mA min. (between IOG and each signal)
		OFF voltage/OFF current	5 VDC max./1 mA max. (between IOG and each signal)
		ON/OFF response time	100 ns max./100 ns max.
		Input filter time	Without filter, 1 µs, 2 µs, 4 µs, 8 µs (factory setting),16 µs, 32 µs, 64 µs, 128 µs, 256 µs
Dimensions	12 (W) x 100 (H) x 71 (D)	**Isolation method**	Digital isolator isolation
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	Supply from the NX bus	**Current capacity of I/O power supply terminal**	IOV: 0.1 A/terminal max., IOG: 0.1 A/terminal max.
NX Unit power consumption	0.55 W max.	**Current consumption from I/O power supply**	30 mA max.
Weight	65 g max.		
Circuit layout	 IOV0 to 3 Terminal block IN0 to IN3 IOG0 to 3 Power supply Current control circuit Isolation circuit Internal circuits NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right)		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 Additional I/O Power Supply Unit A1 B1 IOV IOV IOG IOG IOV IOV IOG IOG A8 B8 24 VDC DC Input Unit NX-ID3443 A1 B1 IN0 IN1 IOV0 IOV1 IOG0 IOG1 IN2 IN3 IOV2 IOV3 IOG2 IOG3 A8 B8 Two-wire sensor Three-wire sensor		
Disconnection/ Short-circuit detection	Not supported.	**Protective function**	Not supported.

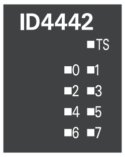
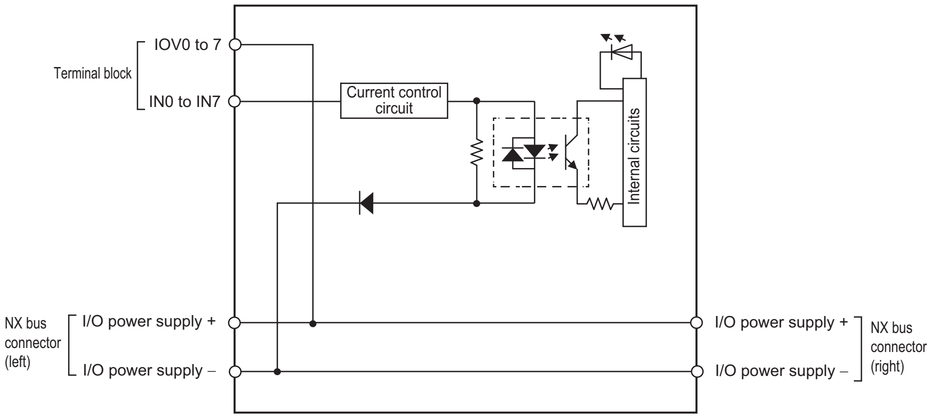
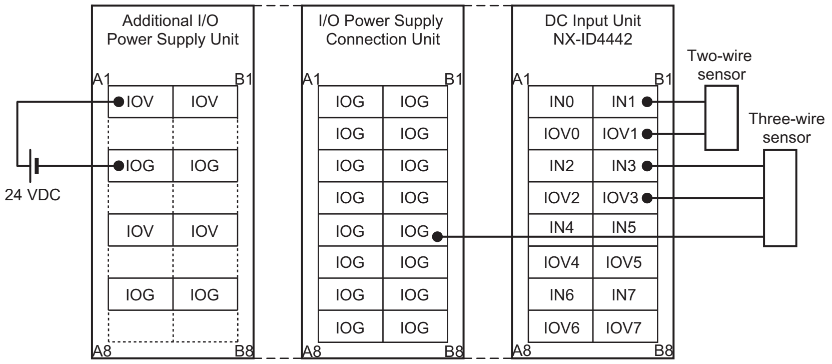
NX-ID3444

Unit name	DC Input Unit	**Model**	NX-ID3444
Capacity	4 points	**External connection terminals**	Screwless clamping terminal block (12 terminals)
I/O refreshing method	Input refreshing with input changed time		
Indicators	TS indicator, input indicators  ID3444 ■TS ■0 ■1 ■2 ■3	**Internal I/O common**	PNP
		Rated input voltage	24 VDC (15 to 28.8 VDC)
		Input current	3.5 mA typical (at 24 VDC), rated current
		ON voltage/ON current	15 VDC min./3 mA min. (between IOG and each signal)
		OFF voltage/OFF current	5 VDC max./1 mA max. (between IOG and each signal)
		ON/OFF response time	100 ns max./100 ns max.
		Input filter time	No filter
Dimensions	12 (W) x 100 (H) x 71 (D)	**Isolation method**	Digital isolator isolation
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	Supply from the NX bus	**Current capacity of I/O power supply terminal**	IOV: 0.1 A/terminal max., IOG: 0.1 A/terminal max.
NX Unit power consumption	0.55 W max.	**Current consumption from I/O power supply**	30 mA max.
Weight	65 g max.		
Circuit layout	 IOV0 to 3 Terminal block IN0 to IN3 IOG0 to 3 Power supply Current control circuit Isolation circuit Internal circuits NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right)		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 Additional I/O Power Supply Unit A1 B1 IOV IOV IOG IOG IOV IOV IOG IOG A8 B8 24 VDC DC Input Unit NX-ID3444 A1 B1 IN0 IN1 IOV0 IOV1 IOG0 IOG1 IN2 IN3 IOV2 IOV3 IOG2 IOG3 A8 B8 Two-wire sensor Three-wire sensor		
Disconnection/ Short-circuit detection	Not supported.	**Protective function**	Not supported.

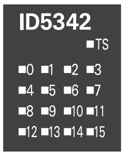
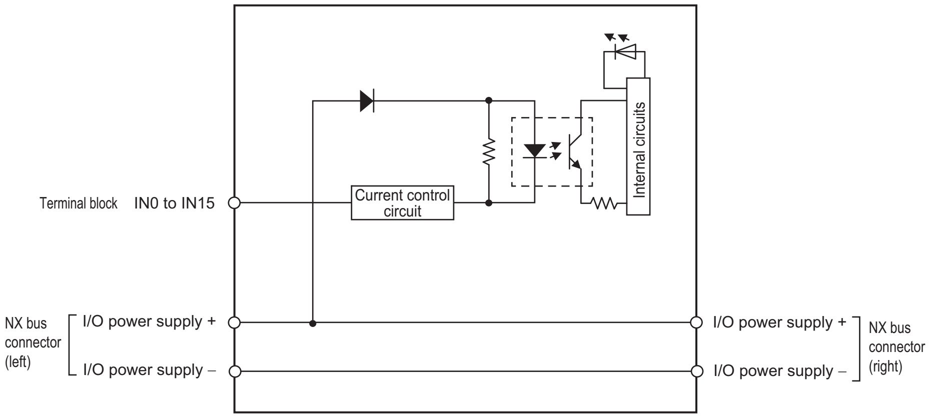
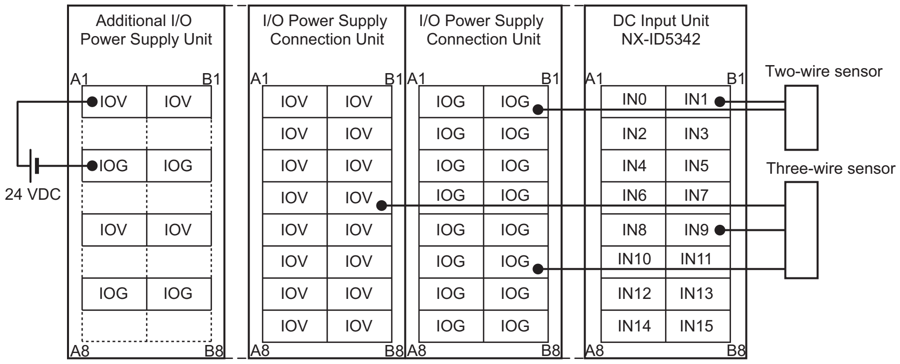
NX-ID4342

Unit name	DC Input Unit	**Model**	NX-ID4342
Capacity	8 points	**External connection terminals**	Screwless clamping terminal block (16 terminals)
I/O refreshing method	Selectable Synchronous I/O refreshing or Free-Run refreshing		
Indicators	TS indicator, input indicator  ID4342 TS 0 1 2 3 4 5 6 7	**Internal I/O common**	NPN
		Rated input voltage	24 VDC (15 to 28.8 VDC)
		Input current	3.5 mA typical (at 24 VDC), rated current
		ON voltage/ON current	15 VDC min./3 mA min. (between IOG and each signal)
		OFF voltage/OFF current	5 VDC max./1 mA max. (between IOG and each signal)
		ON/OFF response time	20 μs max./400 μs max.
		Input filter time	Without filter, 0.25 ms, 0.5 ms, 1 ms (factory setting), 2 ms, 4 ms, 8 ms, 16 ms, 32 ms, 64 ms, 128 ms, 256 ms
Dimensions	12 (W) x 100 (H) x 71 (D)	**Isolation method**	Photocoupler isolation
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	Supply from the NX bus	**Current capacity of I/O power supply terminal**	IOG: 0.1 A/terminal max.
NX Unit power consumption	0.50 W max.	**Current consumption from I/O power supply**	No consumption
Weight	65 g max.		
Circuit layout	 Internal circuits Current control circuit Terminal block IN0 to IN7 IOG0 to 7 NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right)		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 Additional I/O Power Supply Unit I/O Power Supply Connection Unit DC Input Unit NX-ID4342 A1 B1 A8 B8 IOV IOG 24 VDC IN0 IN1 IOG0 IOG1 IN2 IN3 IOG2 IOG3 IN4 IN5 IOG4 IOG5 IN6 IN7 IOG6 IOG7 Two-wire sensor Three-wire sensor		
Disconnection/ Short-circuit detection	Not supported.	**Protective function**	Not supported.

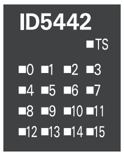
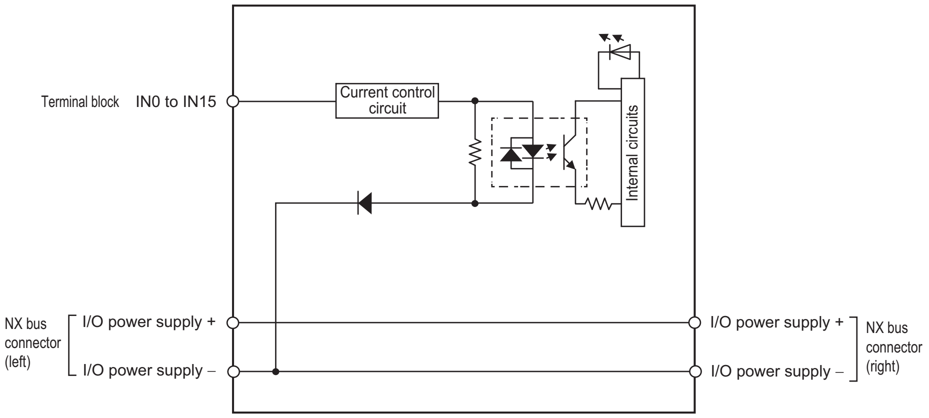
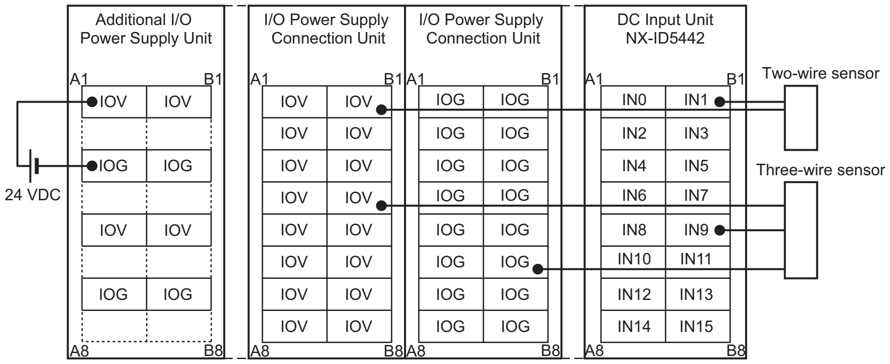
NX-ID4442

Unit name	DC Input Unit	**Model**	NX-ID4442
Capacity	8 points	**External connection terminals**	Screwless clamping terminal block (16 terminals)
I/O refreshing method	Selectable Synchronous I/O refreshing or Free-Run refreshing		
Indicators	TS indicator, input indicator  ID4442 ■TS ■0 ■1 ■2 ■3 ■4 ■5 ■6 ■7	**Internal I/O common**	PNP
		Rated input voltage	24 VDC (15 to 28.8 VDC)
		Input current	3.5 mA typical (at 24 VDC), rated current
		ON voltage/ON current	15 VDC min./3 mA min. (between IOG and each signal)
		OFF voltage/OFF current	5 VDC max./1 mA max. (between IOG and each signal)
		ON/OFF response time	20 µs max./400 µs max.
		Input filter time	Without filter, 0.25 ms, 0.5 ms, 1 ms (factory setting), 2 ms, 4 ms, 8 ms, 16 ms, 32 ms, 64 ms, 128 ms, 256 ms
Dimensions	12 (W) x 100 (H) x 71 (D)	**Isolation method**	Photocoupler isolation
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	Supply from the NX bus	**Current capacity of I/O power supply terminal**	IOV: 0.1 A/terminal max.
NX Unit power consumption	0.50 W max.	**Current consumption from I/O power supply**	No consumption
Weight	65 g max.		
Circuit layout	 Terminal block IOV0 to 7 IN0 to IN7 Current control circuit Internal circuits NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right)		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 Additional I/O Power Supply Unit A1 B1 IOV IOV IOG IOG IOV IOV IOG IOG A8 B8 24 VDC I/O Power Supply Connection Unit A1 B1 IOG A8 B8 DC Input Unit NX-ID4442 A1 B1 IN0 IN1 IOV0 IOV1 IN2 IN3 IOV2 IOV3 IN4 IN5 IOV4 IOV5 IN6 IN7 IOV6 IOV7 A8 B8 Two-wire sensor Three-wire sensor		
Disconnection/ Short-circuit detection	Not supported.	**Protective function**	Not supported.

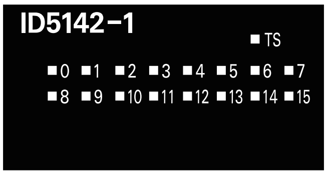
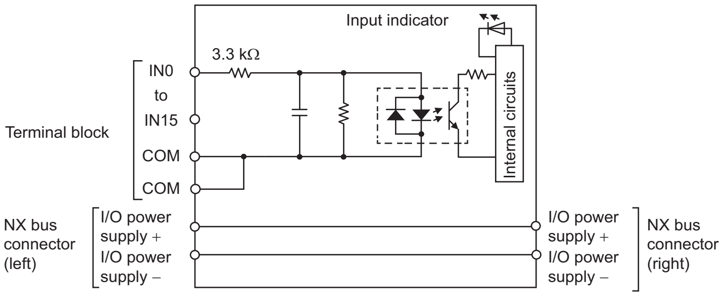
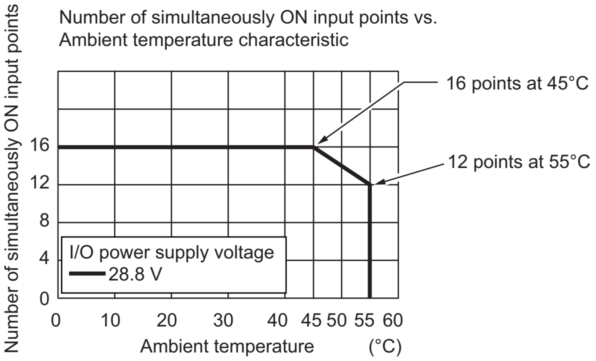
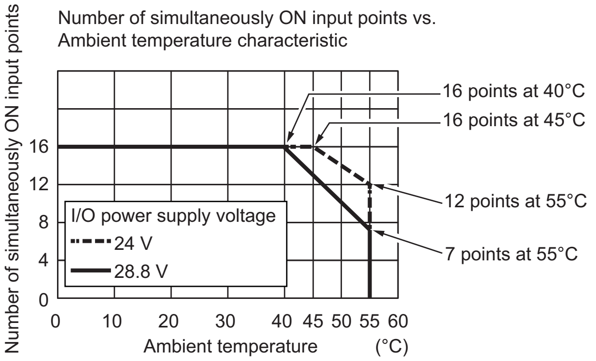
NX-ID5342

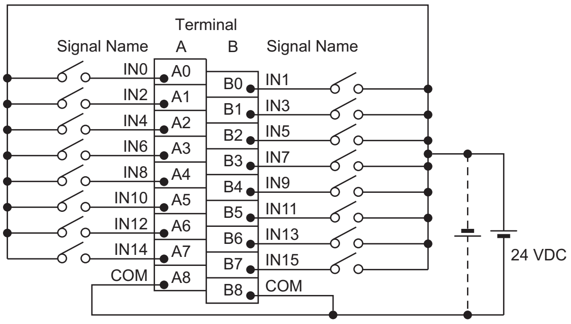
Unit name	DC Input Unit	**Model**	NX-ID5342
Capacity	16 points	**External connection terminals**	Screwless clamping terminal block (16 terminals)
I/O refreshing method	Selectable Synchronous I/O refreshing or Free-Run refreshing		
Indicators	TS indicator, input indicator  ID5342 ■TS ■0 ■1 ■2 ■3 ■4 ■5 ■6 ■7 ■8 ■9 ■10 ■11 ■12 ■13 ■14 ■15	**Internal I/O common**	NPN
		Rated input voltage	24 VDC (15 to 28.8 VDC)
		Input current	2.5 mA typical (at 24 VDC), rated current
		ON voltage/ON current	15 VDC min./2 mA min. (between IOG and each signal)
		OFF voltage/OFF current	5 VDC max./0.5 mA max. (between IOG and each signal)
		ON/OFF response time	20 µs max./400 µs max.
		Input filter time	Without filter, 0.25 ms, 0.5 ms, 1 ms (factory setting), 2 ms, 4 ms, 8 ms, 16 ms, 32 ms, 64 ms, 128 ms, 256 ms
Dimensions	12 (W) x 100 (H) x 71 (D)	**Isolation method**	Photocoupler isolation
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	Supply from the NX bus	**Current capacity of I/O power supply terminal**	Without I/O power supply terminals
NX Unit power consumption	0.55 W max.	**Current consumption from I/O power supply**	No consumption
Weight	65 g max.		
Circuit layout	 Terminal block IN0 to IN15 Current control circuit Internal circuits NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right)		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 Additional I/O Power Supply Unit I/O Power Supply Connection Unit I/O Power Supply Connection Unit DC Input Unit NX-ID5342 A1 B1 A8 B8 IOV IOG 24 VDC IN0 IN1 IN2 IN3 IN4 IN5 IN6 IN7 IN8 IN9 IN10 IN11 IN12 IN13 IN14 IN15 Two-wire sensor Three-wire sensor		
Disconnection/ Short-circuit detection	Not supported.	**Protective function**	Not supported.

NX-ID5442

Unit name	DC Input Unit	**Model**	NX-ID5442
Capacity	16 points	**External connection terminals**	Screwless clamping terminal block (16 terminals)
I/O refreshing method	Selectable Synchronous I/O refreshing or Free-Run refreshing		
Indicators	TS indicator, input indicator  ID5442 TS 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	**Internal I/O common**	PNP
		Rated input voltage	24 VDC (15 to 28.8 VDC)
		Input current	2.5 mA typical (at 24 VDC), rated current
		ON voltage/ON current	15 VDC min./2 mA min. (between IOG and each signal)
		OFF voltage/OFF current	5 VDC max./0.5 mA max. (between IOG and each signal)
		ON/OFF response time	20 µs max./400 µs max.
		Input filter time	Without filter, 0.25 ms, 0.5 ms, 1 ms (factory setting), 2 ms, 4 ms, 8 ms, 16 ms, 32 ms, 64 ms, 128 ms, 256 ms
Dimensions	12 (W) x 100 (H) x 71 (D)	**Isolation method**	Photocoupler isolation
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	Supply from the NX bus	**Current capacity of I/O power supply terminal**	Without I/O power supply terminals
NX Unit power consumption	0.55 W max.	**Current consumption from I/O power supply**	No consumption
Weight	65 g max.		
Circuit layout	 Terminal block IN0 to IN15 Current control circuit Internal circuits NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right)		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 Additional I/O Power Supply Unit I/O Power Supply Connection Unit I/O Power Supply Connection Unit DC Input Unit NX-ID5442 A1 B1 A8 B8 IOV IOG 24 VDC IN0 IN1 IN2 IN3 IN4 IN5 IN6 IN7 IN8 IN9 IN10 IN11 IN12 IN13 IN14 IN15 Two-wire sensor Three-wire sensor		
Disconnection/ Short-circuit detection	Not supported.	**Protective function**	Not supported.

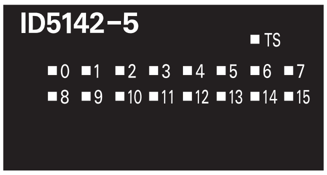
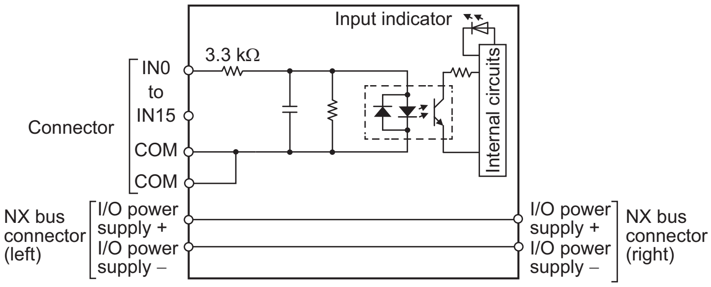
● DC Input Units (M3 Screw Terminal Block, 30 mm Width)
NX-ID5142-1

Unit name	DC Input Unit	**Model**	NX-ID5142-1
Number of points	16 points	**External connection terminals**	M3 screw terminal block (18 terminals)
I/O refreshing method	Switching Synchronous I/O refreshing and Free-Run refreshing		
Indicators	TS indicator, input indicators  ID5142-1 TS 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	**Internal I/O common**	For both NPN/PNP
		Rated input voltage	24 VDC (15 to 28.8 VDC)
		Input current	7 mA typical (at 24 VDC)
		ON voltage/ON current	15 VDC min./3 mA min. (between COM and each signal)
		OFF voltage/OFF current	5 VDC max./1 mA max. (between COM and each signal)
		ON/OFF response time	20 µs max./400 µs max.
		Input filter time	No filter, 0.25 ms, 0.5 ms, 1 ms (default), 2 ms, 4 ms, 8 ms, 16 ms, 32 ms, 64 ms, 128 ms, 256 ms
Dimensions	30 (W) x 100 (H) x 71 (D)	**Isolation method**	Photocoupler isolation
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	Supply from external source	**Current capacity of I/O power supply terminal**	Without I/O power supply terminals
NX Unit power consumption	0.55 W max.	**Current consumption from I/O power supply**	No consumption
Weight	125 g max.		
Circuit layout	 Input indicator 3.3 kΩ IN0 to IN15 Terminal block COM COM Internal circuits NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right)		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: As shown in the following. • For upright installation  • For any installation other than upright  		

Terminal connection diagram	 Terminal Signal Name A B Signal Name IN0 A0 B0 IN1 IN2 A1 B1 IN3 IN4 A2 B2 IN5 IN6 A3 B3 IN7 IN8 A4 B4 IN9 IN10 A5 B5 IN11 IN12 A6 B6 IN13 IN14 A7 B7 IN15 COM A8 B8 COM 24 VDC • The polarity of the input power supply can be connected in either direction.		
Disconnection/ Short-circuit detection	Not supported.	**Protective function**	Not supported.

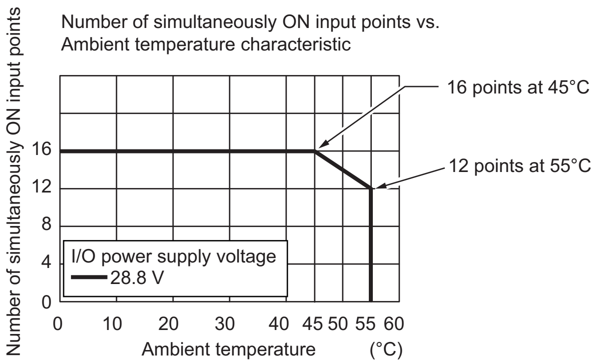
● DC Input Units (MIL Connector, 30 mm Width)

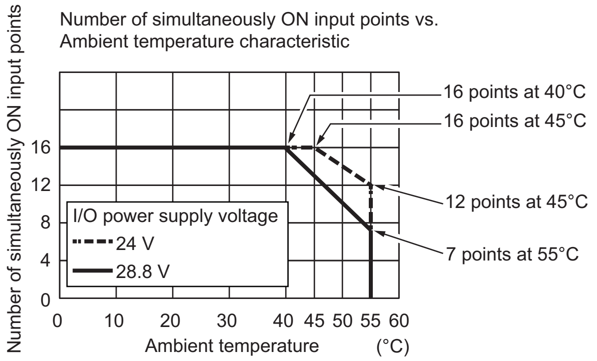
NX-ID5142-5

Unit name	DC Input Unit	**Model**	NX-ID5142-5
Number of points	16 points	**External connection terminals**	MIL connector (20 terminals)
I/O refreshing method	Switching Synchronous I/O refreshing and Free-Run refreshing		
Indicators	TS indicator, input indicators 	**Internal I/O common**	For both NPN/PNP
		Rated input voltage	24 VDC (15 to 28.8 VDC)
		Input current	7 mA typical (at 24 VDC)
		ON voltage/ON current	15 VDC min./3 mA min. (between COM and each signal)
		OFF voltage/OFF current	5 VDC max./1 mA max. (between COM and each signal)
		ON/OFF response time	20 µs max./400 µs max.
		Input filter time	No filter, 0.25 ms, 0.5 ms, 1 ms (default), 2 ms, 4 ms, 8 ms, 16 ms, 32 ms, 64 ms, 128 ms, 256 ms
Dimensions	30 (W) x 100 (H) x 71 (D)	**Isolation method**	Photocoupler isolation
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	Supply from external source	**Current capacity of I/O power supply terminal**	Without I/O power supply terminals
NX Unit power consumption	0.55 W max.	**Current consumption from I/O power supply**	No consumption
Weight	85 g max.		
Circuit layout			

ID5142-5
■TS
■0 ■1 ■2 ■3 ■4 ■5 ■6 ■7
■8 ■9 ■10 ■11 ■12 ■13 ■14 ■15

Input indicator
3.3 kΩ
IN0
to
IN15
Connector
COM
COM
Internal circuits
NX bus connector (left)
I/O power supply +
I/O power supply –
I/O power supply +
I/O power supply –
NX bus connector (right)

<table>
<tr>
<td>Installation orientation and restrictions</td>
<td colspan="3">Installation orientation: Possible in 6 orientations.
Restrictions: As shown in the following.
• For upright installation

Number of simultaneously ON input points vs. Ambient temperature characteristic

• For any installation other than upright

Number of simultaneously ON input points vs. Ambient temperature characteristic
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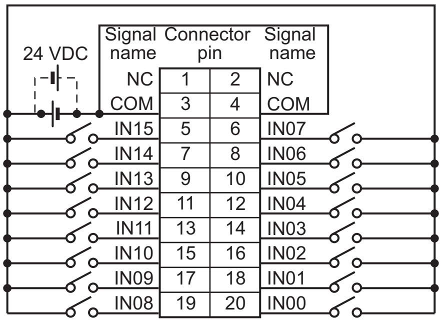
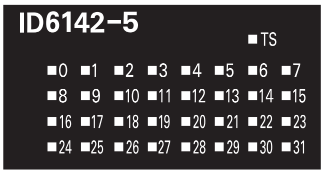
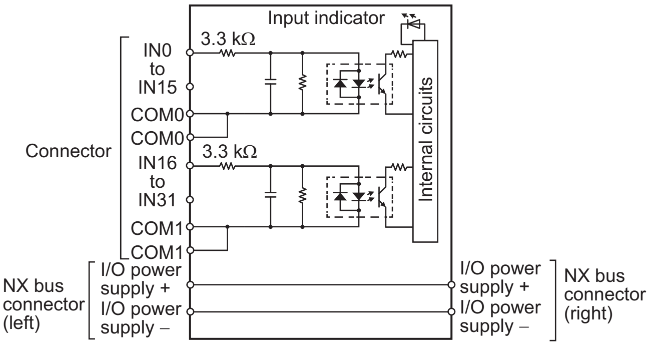
<tr>
<td>Terminal connection diagram</td>
<td colspan="3">

<table>
<tr><th>Signal name</th><th colspan="2">Connector pin</th><th>Signal name</th></tr>
<tr><td>NC</td><td>1</td><td>2</td><td>NC</td></tr>
<tr><td>COM</td><td>3</td><td>4</td><td>COM</td></tr>
<tr><td>IN15</td><td>5</td><td>6</td><td>IN07</td></tr>
<tr><td>IN14</td><td>7</td><td>8</td><td>IN06</td></tr>
<tr><td>IN13</td><td>9</td><td>10</td><td>IN05</td></tr>
<tr><td>IN12</td><td>11</td><td>12</td><td>IN04</td></tr>
<tr><td>IN11</td><td>13</td><td>14</td><td>IN03</td></tr>
<tr><td>IN10</td><td>15</td><td>16</td><td>IN02</td></tr>
<tr><td>IN09</td><td>17</td><td>18</td><td>IN01</td></tr>
<tr><td>IN08</td><td>19</td><td>20</td><td>IN00</td></tr>
</table>
• The polarity of the input power supply can be connected in either direction.
• Be sure to wire both pins 3 and 4 (COM), and set the same polarity for both pins.</td>
</tr>
<tr>
<td>Disconnection/
Short-circuit detection</td>
<td>Not supported.</td>
<td>Protective function</td>
<td>Not supported.</td>
</tr>
</table>

NX-ID6142-5

Unit name	DC Input Unit	**Model**	NX-ID6142-5
Number of points	32 points	**External connection terminals**	MIL connector (40 terminals)
I/O refreshing method	Switching Synchronous I/O refreshing and Free-Run refreshing		
Indicators	TS indicator, input indicators 	**Internal I/O common**	For both NPN/PNP
		Rated input voltage	24 VDC (19 to 28.8 VDC)
		Input current	4.1 mA typical (24 VDC)
		ON voltage/ON current	19 VDC min./3 mA min. (between COM and each signal)
		OFF voltage/OFF current	5 VDC max./1 mA max. (between COM and each signal)
		ON/OFF response time	20 µs max./400 µs max.
		Input filter time	No filter, 0.25 ms, 0.5 ms, 1 ms (default), 2 ms, 4 ms, 8 ms, 16 ms, 32 ms, 64 ms, 128 ms, 256 ms
Dimensions	30 (W) x 100 (H) x 71 (D)	**Isolation method**	Photocoupler isolation
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	Supply from external source	**Current capacity of I/O power supply terminal**	Without I/O power supply terminals
NX Unit power consumption	0.60 W max.	**Current consumption from I/O power supply**	No consumption
Weight	90 g max.		
Circuit layout			

ID6142-5
■TS
■0 ■1 ■2 ■3 ■4 ■5 ■6 ■7
■8 ■9 ■10 ■11 ■12 ■13 ■14 ■15
■16 ■17 ■18 ■19 ■20 ■21 ■22 ■23
■24 ■25 ■26 ■27 ■28 ■29 ■30 ■31

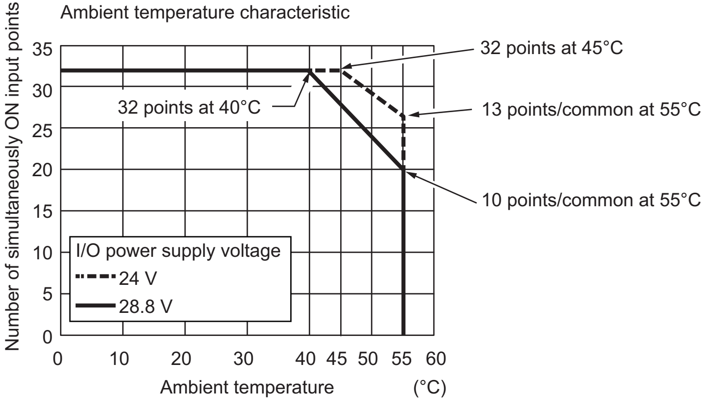
Input indicator
3.3 kΩ
IN0
to
IN15
COM0
COM0
3.3 kΩ
IN16
to
IN31
COM1
COM1
Connector
Internal circuits
NX bus connector (left)
I/O power supply +
I/O power supply –
I/O power supply +
I/O power supply –
NX bus connector (right)

System Configuration
Controllers
Softwares
Programmable Terminals
EtherCAT Slave Terminals
Features
Digital Input Unit Specifications
Version Information
Safety
Mortion/Drives
Inverters
Sensors
Remote I/O Terminals
Ordering Information

<table>
<tr>
<td>Installation orientation and restrictions</td>
<td colspan="3">
Installation orientation: Possible in 6 orientations.
Restrictions: As shown in the following.

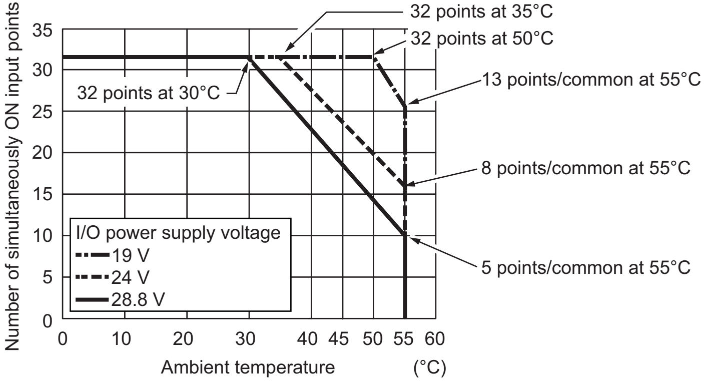
- For upright installation

Number of simultaneously ON input points vs.
Ambient temperature characteristic



- For any installation other than upright

Number of simultaneously ON input points vs.
Ambient temperature characteristic



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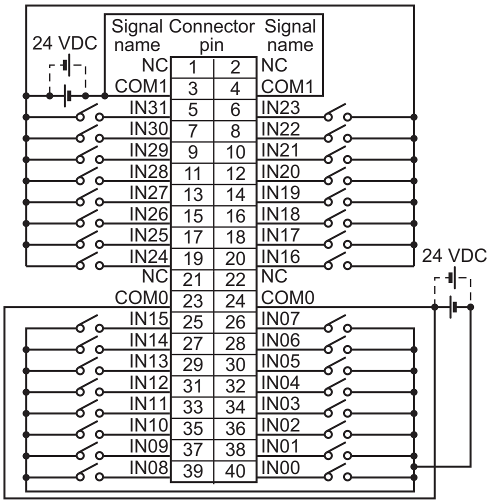
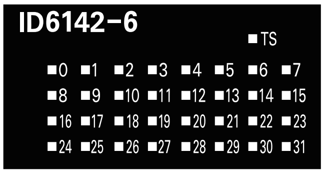
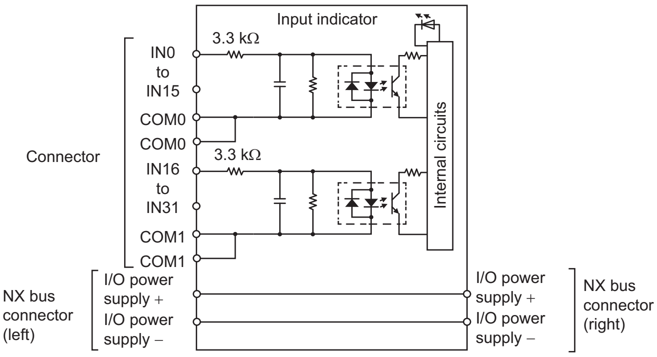
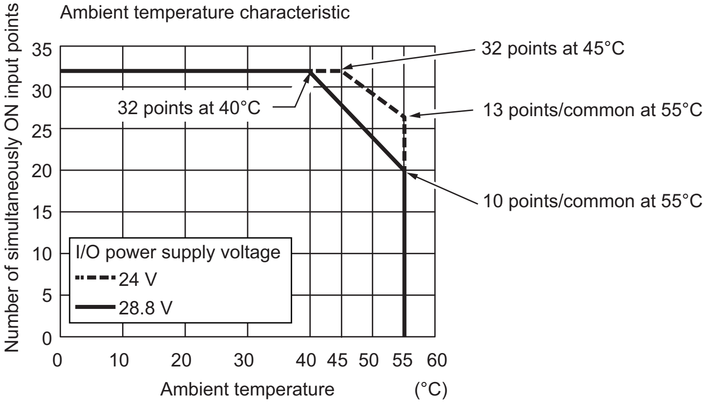
<tr>
<td>Terminal connection diagram</td>
<td colspan="3">

24 VDC
Signal name
Connector pin
Signal name
NC 1 2 NC
COM1 3 4 COM1
IN31 5 6 IN23
IN30 7 8 IN22
IN29 9 10 IN21
IN28 11 12 IN20
IN27 13 14 IN19
IN26 15 16 IN18
IN25 17 18 IN17
IN24 19 20 IN16
NC 21 22 NC
COM0 23 24 COM0
IN15 25 26 IN07
IN14 27 28 IN06
IN13 29 30 IN05
IN12 31 32 IN04
IN11 33 34 IN03
IN10 35 36 IN02
IN09 37 38 IN01
IN08 39 40 IN00
24 VDC

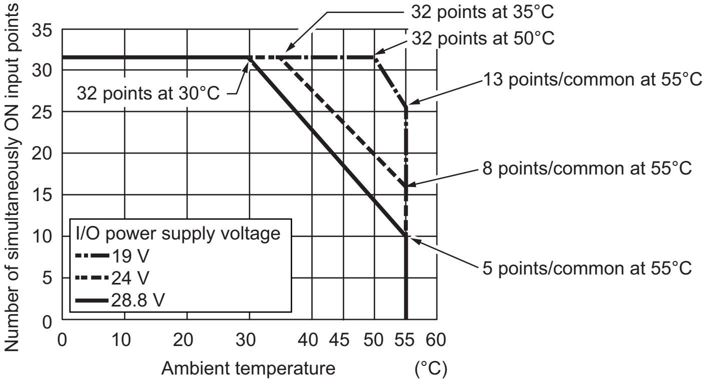
- The polarity of the input power supply can be connected in either direction.
- Be sure to wire both pins 23 and 24 (COM0), and set the same polarity for both pins.
- Be sure to wire both pins 3 and 4 (COM1), and set the same polarity for both pins.
</td>
</tr>
<tr>
<td>Disconnection/
Short-circuit detection</td>
<td>Not supported.</td>
<td>Protective function</td>
<td>Not supported.</td>
</tr>
</table>

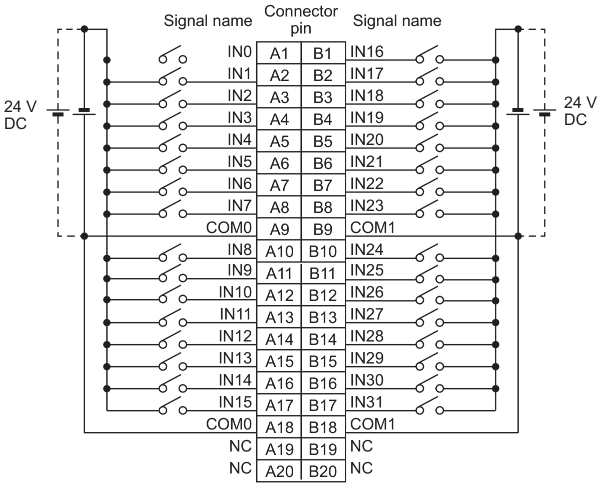
● DC Input Units (Fujitsu Connector, 30 mm Width)

NX-ID6142-6

Unit name	DC Input Unit	**Model**	NX-ID6142-6
Number of points	32 points	**External connection terminals**	Fujitsu connector (40 terminals)
I/O refreshing method	Switching Synchronous I/O refreshing and Free-Run refreshing		
Indicators	TS indicator, input indicators  ID6142-6 TS 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	**Internal I/O common**	For both NPN/PNP
		Rated input voltage	24 VDC (19 to 28.8 VDC)
		Input current	4.1 mA typical (24 VDC)
		ON voltage/ON current	19 VDC min./3 mA min. (between COM and each signal)
		OFF voltage/OFF current	5 VDC max./1 mA max. (between COM and each signal)
		ON/OFF response time	20 µs max./400 µs max.
		Input filter time	No filter, 0.25 ms, 0.5 ms, 1 ms (default), 2 ms, 4 ms, 8 ms, 16 ms, 32 ms, 64 ms, 128 ms, 256 ms
Dimensions	30 (W) x 100 (H) x 71 (D)	**Isolation method**	Photocoupler isolation
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	Supply from external source	**Current capacity of I/O power supply terminal**	Without I/O power supply terminals
NX Unit power consumption	0.55 W max.	**Current consumption from I/O power supply**	No consumption
Weight	90 g max.		
Circuit layout	 Input indicator 3.3 kΩ IN0 to IN15 COM0 COM0 3.3 kΩ IN16 to IN31 COM1 COM1 Connector Internal circuits NX bus connector (left) I/O power supply + I/O power supply − I/O power supply + I/O power supply − NX bus connector (right)		

<table>
<tr><td>Installation orientation and restrictions</td><td colspan="3">
Installation orientation: Possible in 6 orientations.
Restrictions: As shown in the following.
• For upright installation
Number of simultaneously ON input points vs.
Ambient temperature characteristic


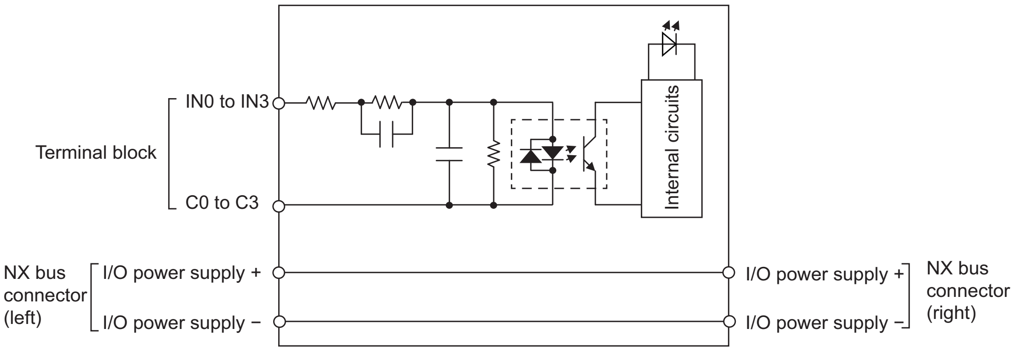
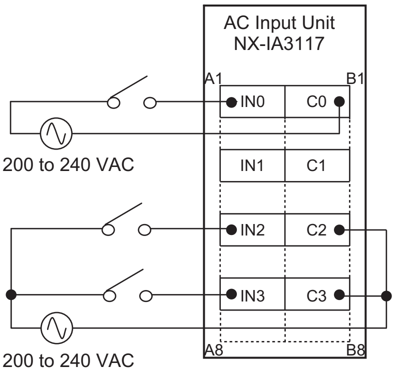
• For any installation other than upright
Number of simultaneously ON input points vs.
Ambient temperature characteristic


</td></tr>
<tr><td>Terminal connection diagram</td><td colspan="3">

Signal name
Connector pin
Signal name
24 V DC
24 V DC
IN0 A1 B1 IN16
IN1 A2 B2 IN17
IN2 A3 B3 IN18
IN3 A4 B4 IN19
IN4 A5 B5 IN20
IN5 A6 B6 IN21
IN6 A7 B7 IN22
IN7 A8 B8 IN23
COM0 A9 B9 COM1
IN8 A10 B10 IN24
IN9 A11 B11 IN25
IN10 A12 B12 IN26
IN11 A13 B13 IN27
IN12 A14 B14 IN28
IN13 A15 B15 IN29
IN14 A16 B16 IN30
IN15 A17 B17 IN31
COM0 A18 B18 COM1
NC A19 B19 NC
NC A20 B20 NC

• The polarity of the input power supply can be connected in either direction.
• Be sure to wire both pins A9 and A18 (COM0), and set the same polarity for both pins.
• Be sure to wire both pins B9 and B18 (COM1), and set the same polarity for both pins.
</td></tr>
<tr><td>Disconnection/
Short-circuit detection</td><td>Not supported.</td><td>Protective function</td><td>Not supported.</td></tr>
</table>

● AC Input Units (Screwless Clamping Terminal Block, 12 mm Width)

NX-IA3117

Unit name	AC Input Unit	**Model**	NX-IA3117
Number of points	4 points, independent contacts	**External connection terminals**	Screwless clamping terminal block (8 terminals)
Capacity	Free-Run refreshing		
Indicators	TS indicator, input indicator IA3117 TS 0 1 2 3	**Internal I/O common**	No polarity
		Rated input voltage	200 to 240 VAC, 50/60 Hz (170 to 264 VAC, ±3 Hz)
		Input current	9 mA typical (at 200 VAC, 50 Hz) 11 mA typical (at 200 VAC, 60 Hz)
		ON voltage/ON current	120 VAC min./4 mA min.
		OFF voltage/OFF current	40 VAC max./2 mA max.
		ON/OFF response time	10 ms max./40 ms max.
		Input filter time	No filter, 0.25 ms, 0.5 ms, 1 ms (default), 2 ms, 4 ms, 8 ms, 16 ms, 32 ms, 64 ms, 128 ms, 256 ms
Dimensions	12 (W) x 100 (H) x 71 (D)	**Isolation method**	Photocoupler isolation
Insulation resistance	Between each AC input circuit: 20 MΩ min. (at 500 VDC) Between the external terminals and the functional ground terminal: 20 MΩ min. (at 500 VDC) Between the external terminals and internal circuits: 20 MΩ min. (at 500 VDC) Between the internal circuit and the functional ground terminal: 20 MΩ min. (at 100 VDC)	**Dielectric strength**	Between each AC input circuit: AC3700V VAC for 1 min at a leakage current of 5 mA max. Between the external terminals and functional ground terminal: 2300 VAC for 1 min at a leakage current of 5 mA max. Between the external terminals and internal circuits: 2300 VAC for 1 min at a leakage current of 5 mA max. Between the internal circuit and the functional ground terminal: 510 VAC for 1 min at a leakage current of 5 mA max.
I/O power supply method	Supplied from external source.	**Current capacity of I/O power supply terminal**	Without I/O power supply terminals
NX Unit power consumption	0.5 W max.	**Current consumption from I/O power supply**	No consumption
Weight	60 g max.		
Circuit layout	 IN0 to IN3 Terminal block C0 to C3 Internal circuits NX bus connector (left) I/O power supply + I/O power supply − I/O power supply + I/O power supply − NX bus connector (right)		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 AC Input Unit NX-IA3117 A1 B1 IN0 C0 IN1 C1 IN2 C2 IN3 C3 A8 B8 200 to 240 VAC 200 to 240 VAC		
Disconnection/ Short-circuit detection	Not supported.	**Protective function**	Not supported.

Version Information

NX Units		Corresponding Unit Versions/Versions *1		
Model	Unit version	EtherCAT		
		Communications Coupler Units NX-ECC20□	NJ/NX series CPU Units NJ501-□□□□ NJ301-□□□□ NJ101-□□□□ NX701-□□□□	Sysmac Studio
NX-ID3317	Ver.1.0	Ver.1.0	Ver.1.05	Ver.1.06
NX-ID3343				
NX-ID3344		Ver.1.1	Ver.1.06 *2	Ver.1.07
NX-ID3417		Ver.1.0	Ver.1.05	Ver.1.06
NX-ID3443				
NX-ID3444		Ver.1.1	Ver.1.06 *2	Ver.1.07
NX-ID4342		Ver.1.0	Ver.1.05	Ver.1.06
NX-ID4442				
NX-ID5142-1				Ver.1.13
NX-ID5142-5				Ver.1.10
NX-ID5342				Ver.1.06
NX-ID5442				
NX-ID6142-5				Ver.1.10
NX-ID6142-6				Ver.1.13
NX-IA3117				Ver.1.08

*1 Some Units do not have all of the versions given in the above table. If a Unit does not have the specified version, support is provided by the oldest available version after the specified version. Refer to the user's manuals for the specific Units for the relation between models and versions.

*2 The instructions for time stamp refreshing are supported by CPU Units with unit version 1.06 or later. If you do not use instructions for time stamp refreshing, you can use version 1.05. Refer to the *NJ/NX-series Instructions Reference Manual* (Cat. No. W502) for details on the instructions for time stamp refreshing.

NX-series Digital Output Units

NX-OD/OC

A Wide Range of Digital Output Units from General Purpose use to High-Speed Synchronous Control

- Transistor and relay Output Units for the NX-series modular I/O system.
- Connect to other NX-series I/O Units and EtherCAT Coupler units using the high-speed NX-bus.
- Synchronous Units update their output status according to the controller's instructions every EtherCAT cycle.

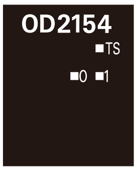
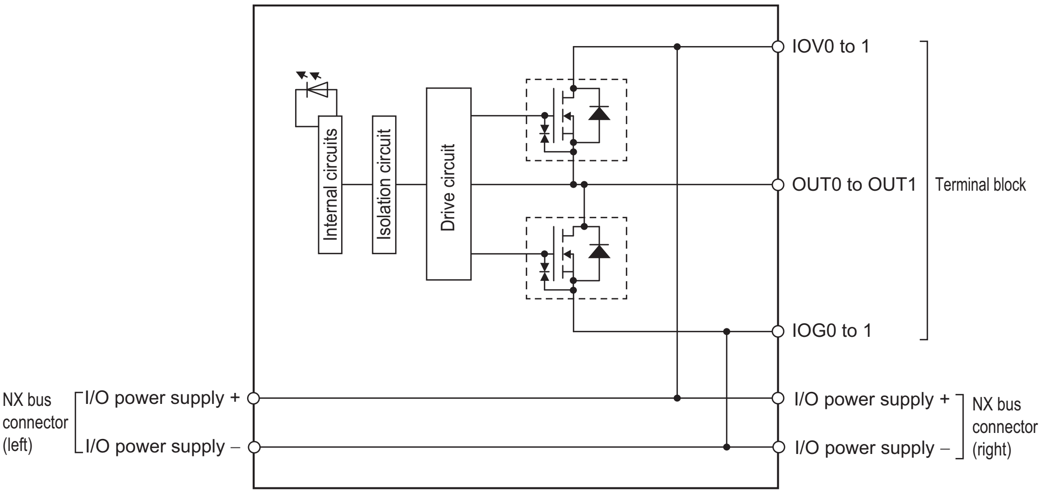
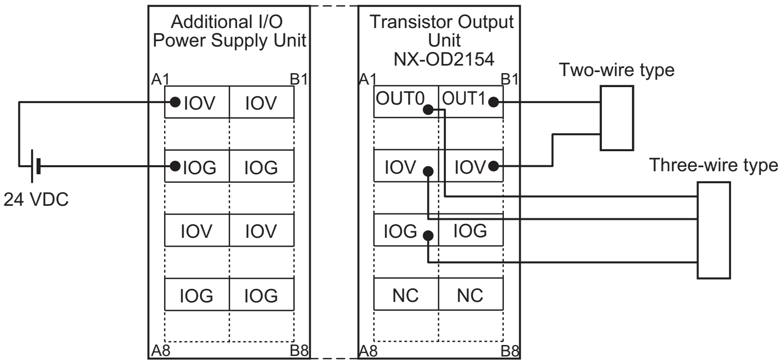
Features

- High-speed I/O refreshing is possible by connecting with the NX-series EtherCAT Coupler.
- Output refreshing can be synchronized with the control cycle of the Controller. (Synchronous refreshing)
- ON/OFF response time of the high-speed model is 300 ns max, which enables high-speed, high-precision control.
- The screwless terminal block is detachable for easy commissioning and maintenance.
- Screwless clamp terminal block and Connector types (Units with MIL/Fujitsu Connectors) are significantly reduces wiring work.
- Up to 16 digital outputs in a space-saving 12 mm width. (Connector Types 30 mm width)
- The lineup includies 2-point, 4-point, 8-point, 16-point, and 32-point types with 3-wire, 2-wire and 1-wire connection methods.
- With output refreshing with specified time stamp, the Output Unit refreshes outputs at the time specified by the program. This enables high-precision output control independent of the control cycle of the Controller.

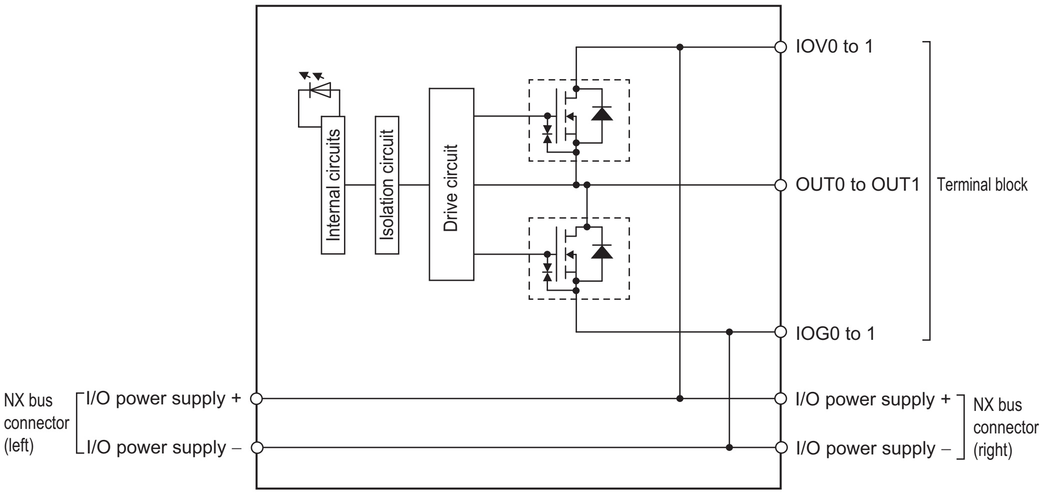
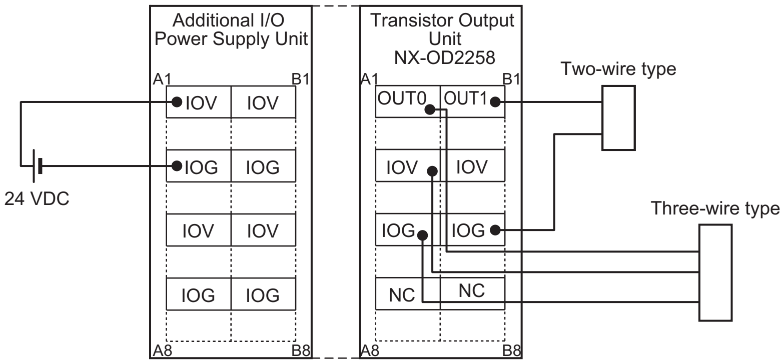
Digital Output Unit Specifications

● Transistor Output Unit (Screwless Clamping Terminal Block 12 mm, Width)

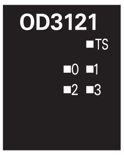
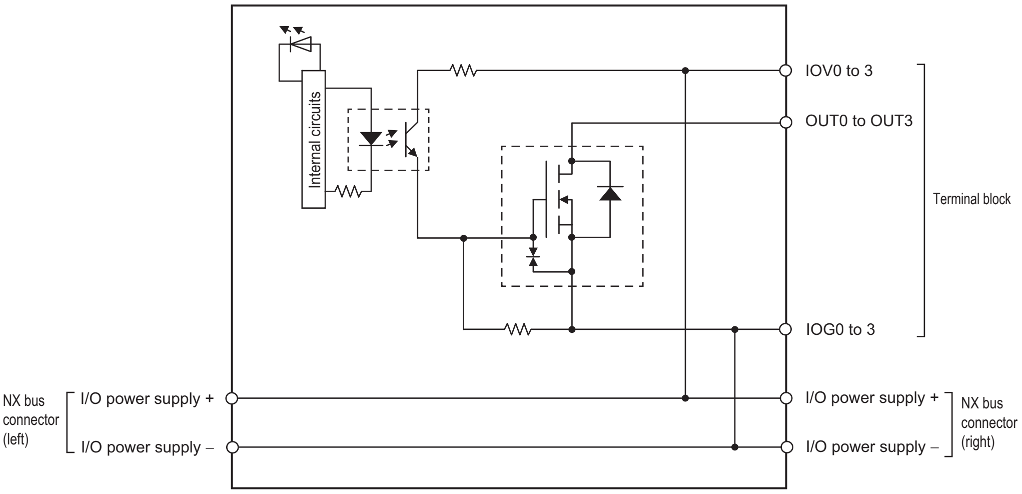
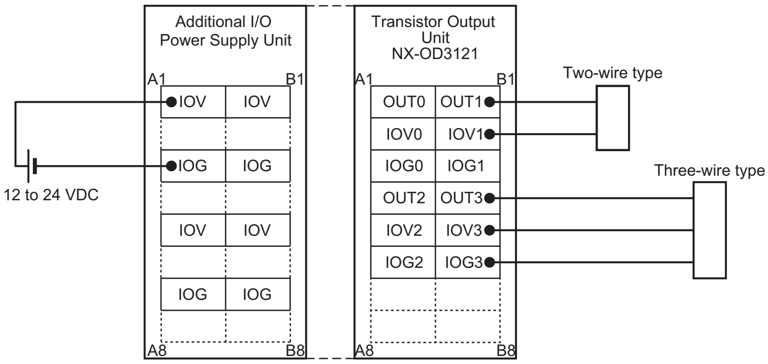
NX-OD2154

Unit name	Transistor Output Unit	**Model**	NX-OD2154
Capacity	2 points	**External connection terminals**	Screwless clamping terminal block (8 terminals)
I/O refreshing method	Output refreshing with specified time stamp		
Indicators	TS indicator, output indicator  OD2154 ■TS ■0 ■1	**Internal I/O common**	NPN
		Rated voltage	24 VDC
		Operating load voltage range	15 to 28.8 VDC
		Maximum value of load current	0.5 A/point, 1 A/Unit
		Maximum inrush current	4.0 A/point, 10 ms max.
		Leakage current	0.1 mA max.
		Residual voltage	1.5 V max.
		ON/OFF response time	300 ns max./300 ns max.
Dimensions	12 (W) x 100 (H) x 71 (D)	**Isolation method**	Digital isolator isolation
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	Supply from the NX bus	**Current capacity of I/O power supply terminal**	IOV: 0.5 A/terminal max., IOG: 0.5 A/terminal max.
NX Unit power consumption	0.50 W max.	**I/O current consumption**	30 mA max.
Weight	70 g max.		
Circuit layout	 Internal circuits Isolation circuit Drive circuit IOV0 to 1 OUT0 to OUT1 Terminal block IOG0 to 1 NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right) This unit uses a push-pull output circuit.		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 Additional I/O Power Supply Unit A1 B1 IOV IOV IOG IOG IOV IOV IOG IOG A8 B8 24 VDC Transistor Output Unit NX-OD2154 A1 B1 OUT0 OUT1 IOV IOV IOG IOG NC NC A8 B8 Two-wire type Three-wire type		
Disconnection/ Short-circuit detection	Not supported.	**Protective function**	Not supported.

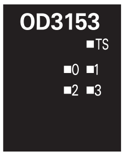
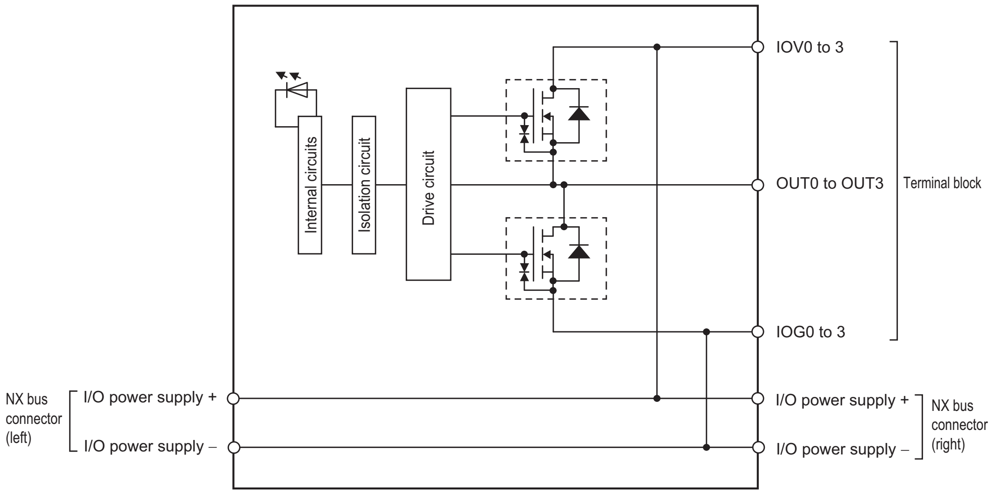
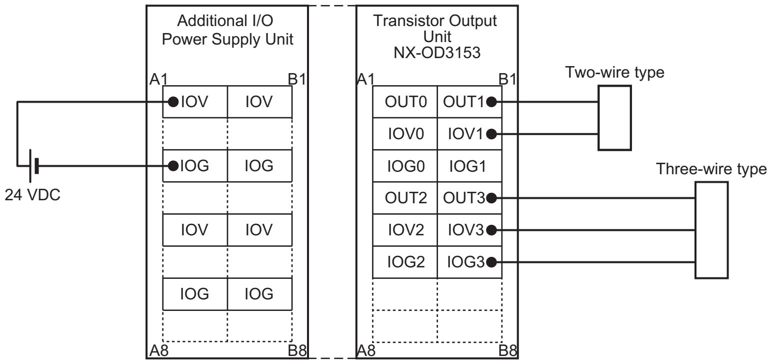
NX-OD2258

Unit name	Transistor Output Unit	**Model**	NX-OD2258
Capacity	2 points	**External connection terminals**	Screwless clamping terminal block (8 terminals)
I/O refreshing method	Output refreshing with specified time stamp		
Indicators	TS indicator, output indicator OD2258 ■TS ■0 ■1	**Internal I/O common**	PNP
		Rated voltage	24 VDC
		Operating load voltage range	15 to 28.8 VDC
		Maximum value of load current	0.5 A/point, 1 A/Unit
		Maximum inrush current	4.0 A/point, 10 ms max.
		Leakage current	0.1 mA max.
		Residual voltage	1.5 V max.
		ON/OFF response time	300 ns max./300 ns max.
Dimensions	12 (W) x 100 (H) x 71 (D)	**Isolation method**	Digital isolator isolation
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	Supply from the NX bus	**Current capacity of I/O power supply terminal**	IOV: 0.5 A/terminal max., IOG: 0.5 A/terminal max.
NX Unit power consumption	0.50 W max.	**I/O current consumption**	40 mA max.
Weight	70 g max.		
Circuit layout	 Internal circuits Isolation circuit Drive circuit IOV0 to 1 OUT0 to OUT1 Terminal block IOG0 to 1 NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right) This unit uses a push-pull output circuit.		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 Additional I/O Power Supply Unit Transistor Output Unit NX-OD2258 A1 B1 A8 B8 IOV IOG OUT0 OUT1 NC 24 VDC Two-wire type Three-wire type		
Disconnection/ Short-circuit detection	Not supported.	**Protective function**	With load short-circuit protection.

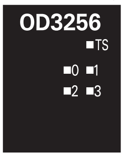
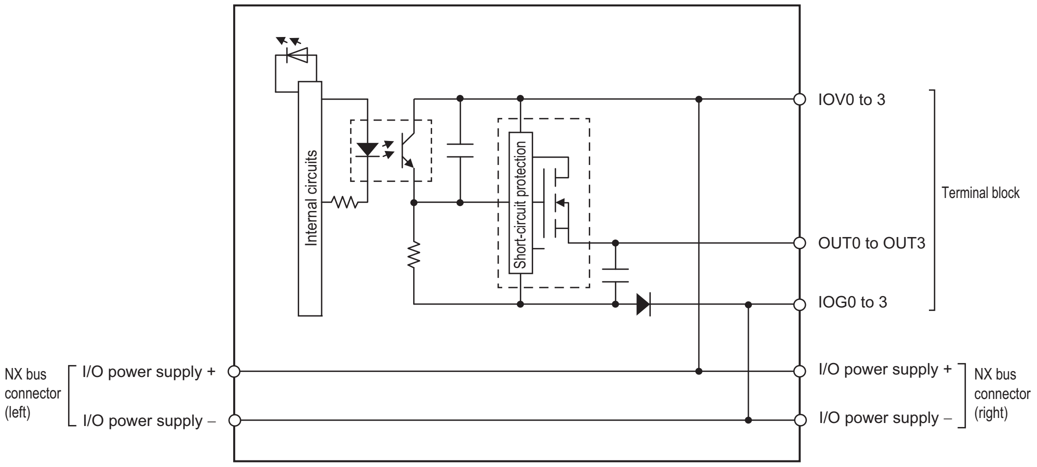
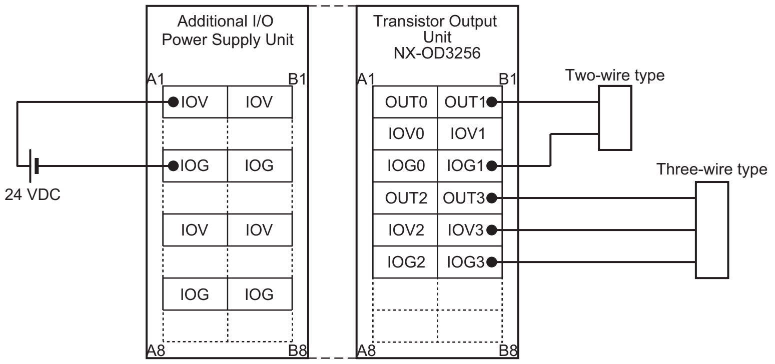
NX-OD3121

Unit name	Transistor Output Unit	**Model**	NX-OD3121
Capacity	4 points	**External connection terminals**	Screwless clamping terminal block (12 terminals)
I/O refreshing method	Selectable Synchronous I/O refreshing or Free-Run refreshing		
Indicators	TS indicator, output indicator  OD3121 TS 0 1 2 3	**Internal I/O common**	NPN
		Rated voltage	12 to 24 VDC
		Operating load voltage range	10.2 to 28.8 VDC
		Maximum value of load current	0.5 A/point, 2 A/Unit
		Maximum inrush current	4.0 A/point, 10 ms max.
		Leakage current	0.1 mA max.
		Residual voltage	1.5 V max.
		ON/OFF response time	0.1 ms max./0.8 ms max.
Dimensions	12 (W) x 100 (H) x 71 (D)	**Isolation method**	Photocoupler isolation
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	Supply from the NX bus	**Current capacity of I/O power supply terminal**	IOV: 0.5 A/terminal max., IOG: 0.5 A/terminal max.
NX Unit power consumption	0.55 W max.	**I/O current consumption**	10 mA max.
Weight	70 g max.		
Circuit layout	 Internal circuits IOV0 to 3 OUT0 to OUT3 Terminal block IOG0 to 3 NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right)		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 Additional I/O Power Supply Unit A1 B1 IOV IOV IOG IOG IOV IOV IOG IOG A8 B8 12 to 24 VDC Transistor Output Unit NX-OD3121 A1 B1 OUT0 OUT1 IOV0 IOV1 IOG0 IOG1 OUT2 OUT3 IOV2 IOV3 IOG2 IOG3 A8 B8 Two-wire type Three-wire type		
Disconnection/ Short-circuit detection	Not supported.	**Protective function**	Not supported.

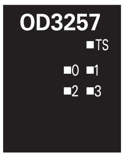
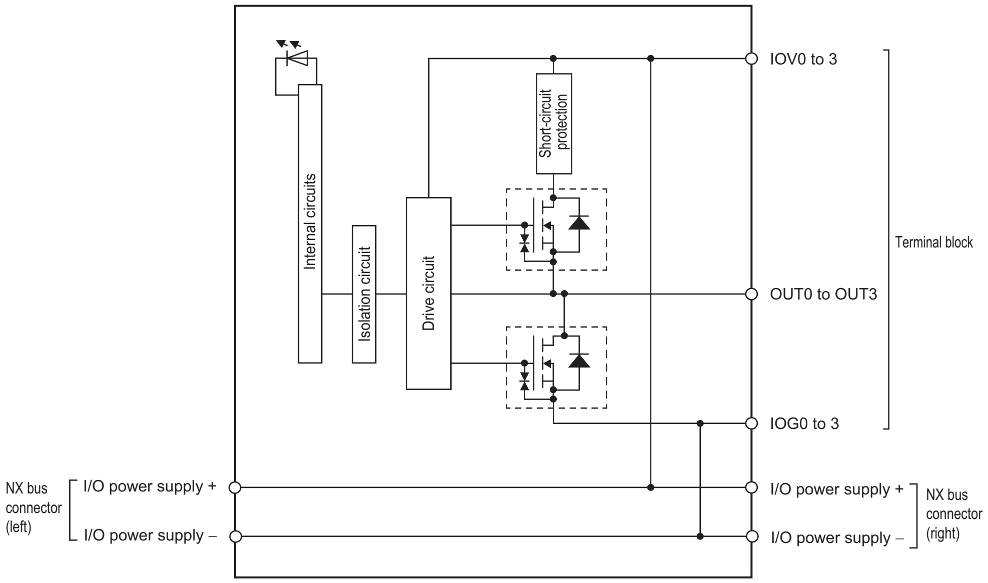
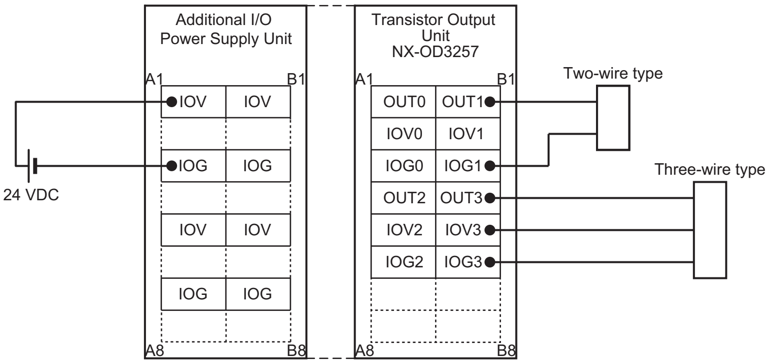
NX-OD3153

Unit name	Transistor Output Unit	**Model**	NX-OD3153
Capacity	4 points	**External connection terminals**	Screwless clamping terminal block (12 terminals)
I/O refreshing method	Selectable Synchronous I/O refreshing or Free-Run refreshing		
Indicators	TS indicator, output indicator  OD3153 ■TS ■0 ■1 ■2 ■3	**Internal I/O common**	NPN
		Rated voltage	24 VDC
		Operating load voltage range	15 to 28.8 VDC
		Maximum value of load current	0.5 A/point, 2 A/Unit
		Maximum inrush current	4.0 A/point, 10 ms max.
		Leakage current	0.1 mA max.
		Residual voltage	1.5 V max.
		ON/OFF response time	300 ns max./300 ns max.
Dimensions	12 (W) x 100 (H) x 71 (D)	**Isolation method**	Digital isolator isolation
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	Supply from the NX bus	**Current capacity of I/O power supply terminal**	IOV: 0.5 A/terminal max., IOG: 0.5 A/terminal max.
NX Unit power consumption	0.50 W max.	**I/O current consumption**	30 mA max.
Weight	70 g max.		
Circuit layout	 IOV0 to 3 OUT0 to OUT3 Terminal block IOG0 to 3 Internal circuits Isolation circuit Drive circuit NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right) This unit uses a push-pull output circuit.		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 Additional I/O Power Supply Unit Transistor Output Unit NX-OD3153 A1 B1 A1 B1 IOV IOV IOG IOG IOV IOV IOG IOG A8 B8 A8 B8 OUT0 OUT1 IOV0 IOV1 IOG0 IOG1 OUT2 OUT3 IOV2 IOV3 IOG2 IOG3 24 VDC Two-wire type Three-wire type		
Disconnection/ Short-circuit detection	Not supported.	**Protective function**	Not supported.

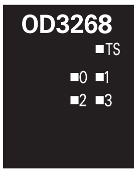
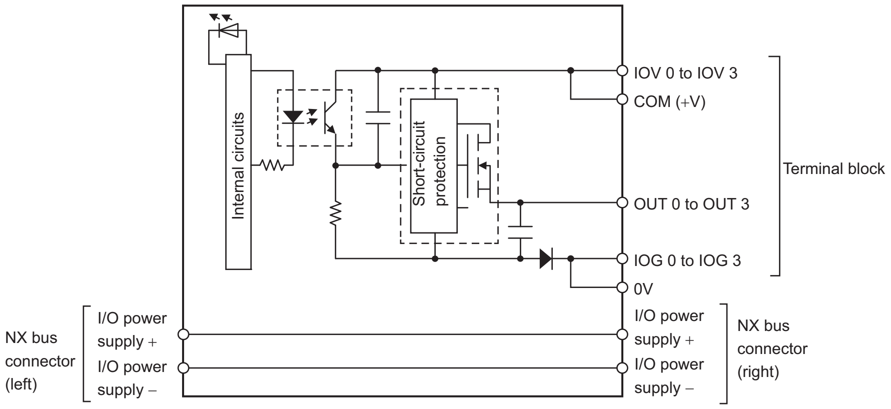
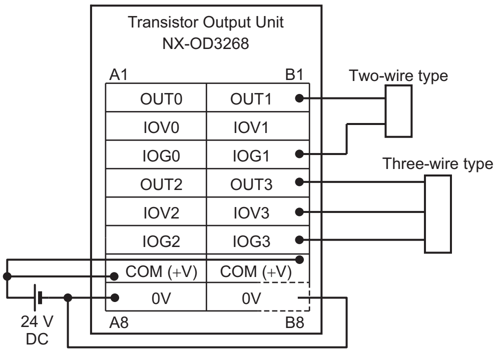
NX-OD3256

Unit name	Transistor Output Unit	**Model**	NX-OD3256
Capacity	4 points	**External connection terminals**	Screwless clamping terminal block (12 terminals)
I/O refreshing method	Selectable Synchronous I/O refreshing or Free-Run refreshing		
Indicators	TS indicator, output indicator  OD3256 TS 0 1 2 3	**Internal I/O common**	PNP
		Rated voltage	24 VDC
		Operating load voltage range	15 to 28.8 VDC
		Maximum value of load current	0.5 A/point, 2 A/Unit
		Maximum inrush current	4.0 A/point, 10 ms max.
		Leakage current	0.1 mA max.
		Residual voltage	1.5 V max.
		ON/OFF response time	0.5 ms max./1.0 ms max.
Dimensions	12 (W) x 100 (H) x 71 (D)	**Isolation method**	Photocoupler isolation
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	Supply from the NX bus	**Current capacity of I/O power supply terminal**	IOV: 0.5 A/terminal max., IOG: 0.5 A/terminal max.
NX Unit power consumption	0.55 W max.	**I/O current consumption**	20 mA max.
Weight	70 g max.		
Circuit layout	 Internal circuits Short-circuit protection IOV0 to 3 Terminal block OUT0 to OUT3 IOG0 to 3 NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right)		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 Additional I/O Power Supply Unit A1 B1 IOV IOV IOG IOG IOV IOV IOG IOG A8 B8 24 VDC Transistor Output Unit NX-OD3256 A1 B1 OUT0 OUT1 IOV0 IOV1 IOG0 IOG1 OUT2 OUT3 IOV2 IOV3 IOG2 IOG3 A8 B8 Two-wire type Three-wire type		
Disconnection/ Short-circuit detection	Not supported.	**Protective function**	With load short-circuit protection.

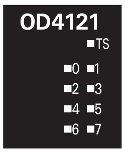
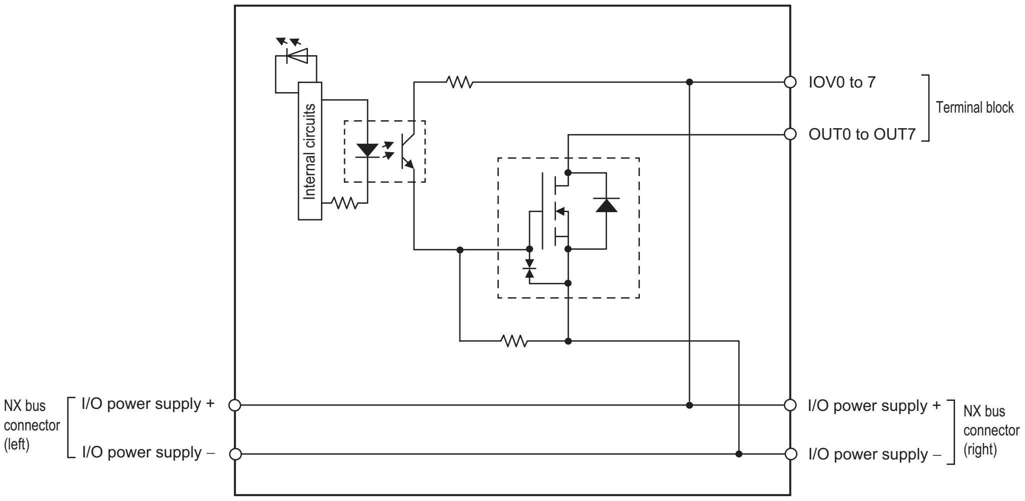
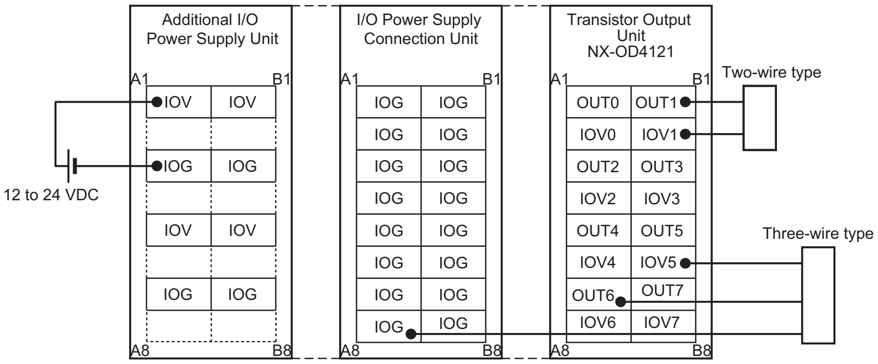
NX-OD3257

Unit name	Transistor Output Unit	**Model**	NX-OD3257
Capacity	4 points	**External connection terminals**	Screwless clamping terminal block (12 terminals)
I/O refreshing method	Selectable Synchronous I/O refreshing or Free-Run refreshing		
Indicators	TS indicator, output indicator  OD3257 TS 0 1 2 3	**Internal I/O common**	PNP
		Rated voltage	24 VDC
		Operating load voltage range	15 to 28.8 VDC
		Maximum value of load current	0.5 A/point, 2 A/Unit
		Maximum inrush current	4.0 A/point, 10 ms max.
		Leakage current	0.1 mA max.
		Residual voltage	1.5 V max.
		ON/OFF response time	300 ns max./300 ns max.
Dimensions	12 (W) x 100 (H) x 71 (D)	**Isolation method**	Digital isolator isolation
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	Supply from the NX bus	**Current capacity of I/O power supply terminal**	IOV: 0.5 A/terminal max., IOG: 0.5 A/terminal max.
NX Unit power consumption	0.50 W max.	**I/O current consumption**	40 mA max.
Weight	70 g max.		
Circuit layout	 Internal circuits Isolation circuit Drive circuit Short-circuit protection IOV0 to 3 OUT0 to OUT3 IOG0 to 3 Terminal block NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right) This unit uses a push-pull output circuit.		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 Additional I/O Power Supply Unit A1 B1 IOV IOV IOG IOG IOV IOV IOG IOG A8 B8 24 VDC Transistor Output Unit NX-OD3257 A1 B1 OUT0 OUT1 IOV0 IOV1 IOG0 IOG1 OUT2 OUT3 IOV2 IOV3 IOG2 IOG3 A8 B8 Two-wire type Three-wire type		
Disconnection/ Short-circuit detection	Not supported.	**Protective function**	With load short-circuit protection.

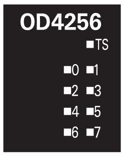
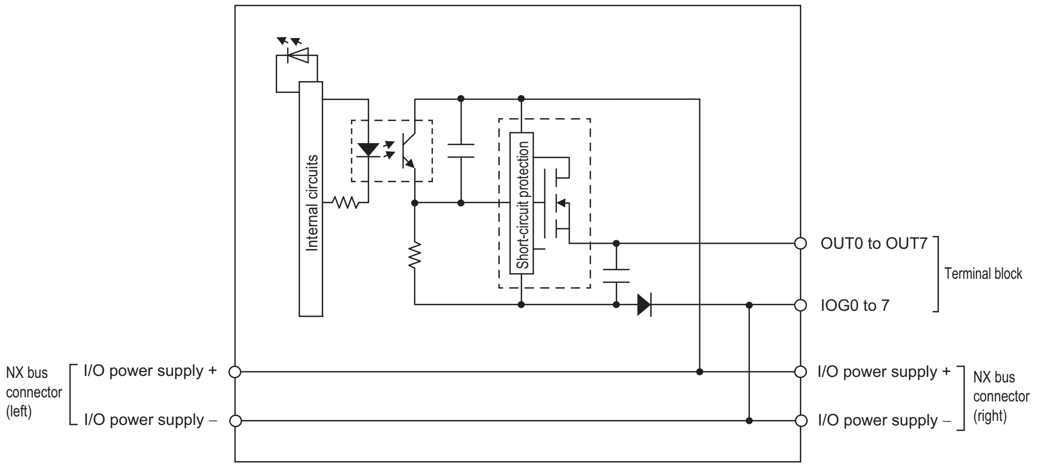
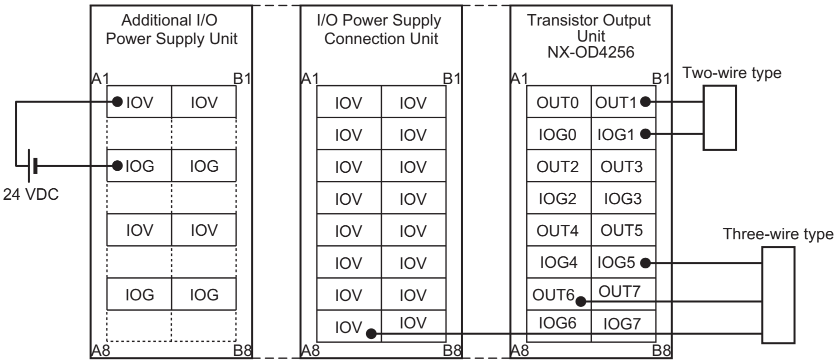
NX-OD3268

Unit name	Transistor Output Unit	**Model**	NX-OD3268
Number of points	4 points	**External connection terminals**	Screwless clamping terminal block (16 terminals)
I/O refreshing method	Switching Synchronous I/O refreshing and Free-Run refreshing		
Indicators	TS indicator, output indicator  OD3268 ■TS ■0 ■1 ■2 ■3	**Internal I/O common**	PNP
		Rated voltage	24 VDC
		Operating load voltage range	15 to 28.8 VDC
		Maximum value of load current	2 A/point, 8 A/Unit
		Maximum inrush current	4.0 A/point, 10 ms max.
		Leakage current	0.1 mA max.
		Residual voltage	1.5 V max.
		ON/OFF response time	0.5 ms max./1.0 ms max.
Dimensions	12 (W) x 100 (H) x 71 (D)	**Isolation method**	Photocoupler isolation
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	Supply from external source	**Current capacity of I/O power supply terminal**	IOV: 2 A/terminal max., IOG: 2 A/terminal max., COM (+V): 4 A/terminal max., 0V: 4 A/terminal max.
NX Unit power consumption	0.50 W max.	**Current consumption from I/O power supply**	20 mA max.
Weight	70 g max.		
Circuit layout	 Internal circuits Short-circuit protection IOV 0 to IOV 3 COM (+V) Terminal block OUT 0 to OUT 3 IOG 0 to IOG 3 0V NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right)		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 Transistor Output Unit NX-OD3268 A1 B1 OUT0 OUT1 IOV0 IOV1 IOG0 IOG1 OUT2 OUT3 IOV2 IOV3 IOG2 IOG3 COM (+V) COM (+V) 0V 0V A8 B8 Two-wire type Three-wire type 24 V DC • 0V has 2 terminals, so be sure to wire both terminals. • COM (+V) has 2 terminals, so be sure to wire both terminals.		
Disconnection/ Short-circuit detection	Not supported.	**Protective function**	With load short-circuit protection.

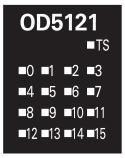
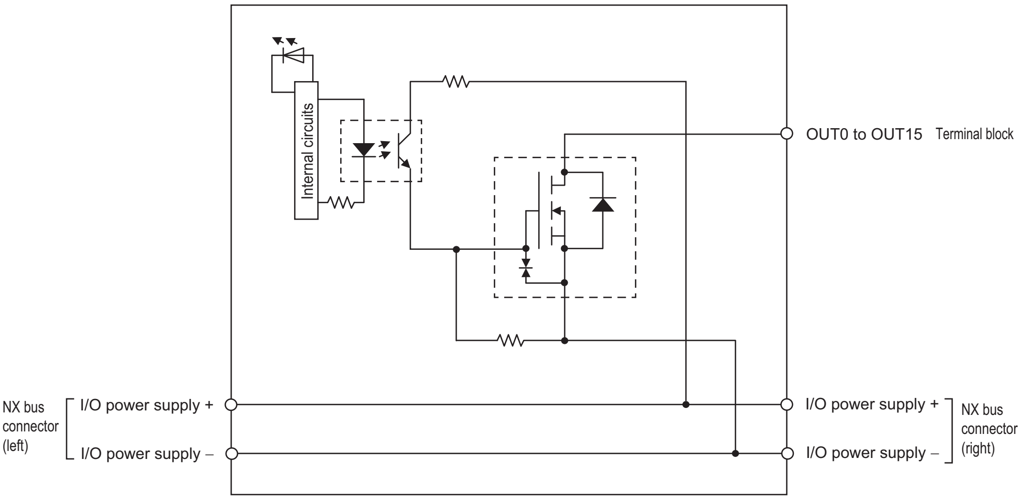
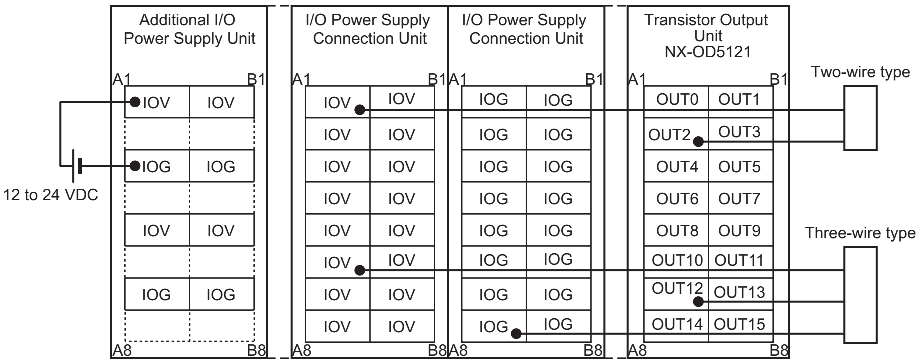
NX-OD4121

Unit name	Transistor Output Unit	**Model**	NX-OD4121
Capacity	8 points	**External connection terminals**	Screwless clamping terminal block (16 terminals)
I/O refreshing method	Selectable Synchronous I/O refreshing or Free-Run refreshing		
Indicators	TS indicator, output indicator  OD4121 ■TS ■0 ■1 ■2 ■3 ■4 ■5 ■6 ■7	**Internal I/O common**	NPN
		Rated voltage	12 to 24 VDC
		Operating load voltage range	10.2 to 28.8 VDC
		Maximum value of load current	0.5 A/point, 4 A/Unit
		Maximum inrush current	4.0 A/point, 10 ms max.
		Leakage current	0.1 mA
		Residual voltage	1.5 V max.
		ON/OFF response time	0.1 ms max./0.8 ms max.
Dimensions	12 (W) x 100 (H) x 71 (D)	**Isolation method**	Photocoupler isolation
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	Supply from the NX bus	**Current capacity of I/O power supply terminal**	IOV: 0.5 A/terminal max.
NX Unit power consumption	0.55 W max.	**I/O current consumption**	10 mA max.
Weight	70 g max.		
Circuit layout	 Internal circuits IOV0 to 7 OUT0 to OUT7 Terminal block NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right)		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 Additional I/O Power Supply Unit I/O Power Supply Connection Unit Transistor Output Unit NX-OD4121 A1 B1 A8 B8 IOV IOG 12 to 24 VDC OUT0 OUT1 IOV0 IOV1 OUT2 OUT3 IOV2 IOV3 OUT4 OUT5 IOV4 IOV5 OUT6 OUT7 IOV6 IOV7 Two-wire type Three-wire type		
Disconnection/ Short-circuit detection	Not supported.	**Protective function**	Not supported.

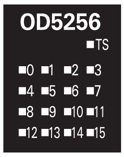
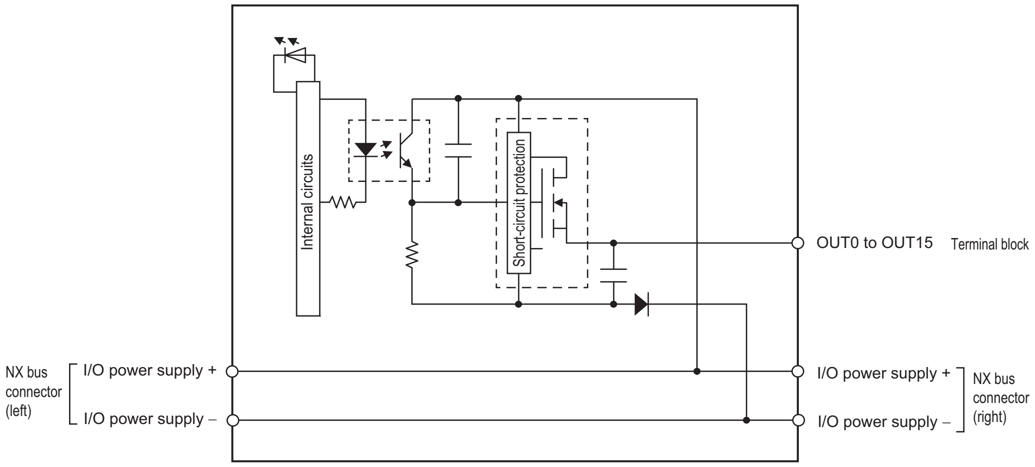
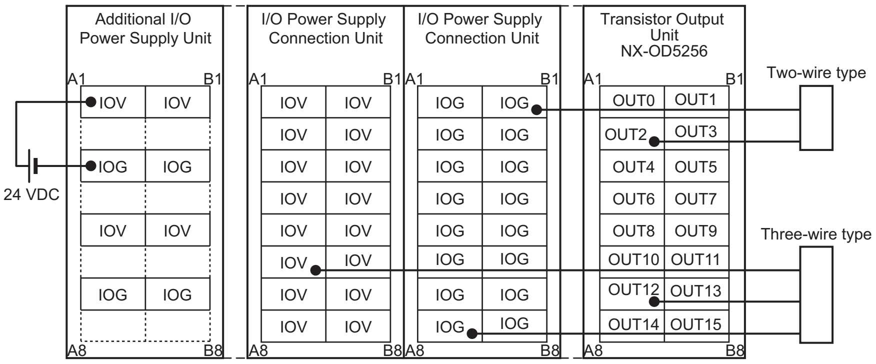
NX-OD4256

Unit name	Transistor Output Unit	**Model**	NX-OD4256
Capacity	8 points	**External connection terminals**	Screwless clamping terminal block (16 terminals)
I/O refreshing method	Selectable Synchronous I/O refreshing or Free-Run refreshing		
Indicators	TS indicator, output indicator  OD4256 ■TS ■0 ■1 ■2 ■3 ■4 ■5 ■6 ■7	**Internal I/O common**	PNP
		Rated voltage	24 VDC
		Operating load voltage range	15 to 28.8 VDC
		Maximum value of load current	0.5 A/point, 4 A/Unit
		Maximum inrush current	4.0 A/point, 10 ms max.
		Leakage current	0.1 mA
		Residual voltage	1.5 V max.
		ON/OFF response time	0.5 ms max./1.0 ms max.
Dimensions	12 (W) x 100 (H) x 71 (D)	**Isolation method**	Photocoupler isolation
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	Supply from the NX bus	**Current capacity of I/O power supply terminal**	IOG: 0.5 A/terminal max.
NX Unit power consumption	0.65 W max.	**I/O current consumption**	30 mA max.
Weight	70 g max.		
Circuit layout	 Internal circuits Short-circuit protection OUT0 to OUT7 IOG0 to 7 Terminal block NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right)		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 Additional I/O Power Supply Unit I/O Power Supply Connection Unit Transistor Output Unit NX-OD4256 A1 B1 A8 B8 IOV IOG 24 VDC OUT0 OUT1 IOG0 IOG1 OUT2 OUT3 IOG2 IOG3 OUT4 OUT5 IOG4 IOG5 OUT6 OUT7 IOG6 IOG7 Two-wire type Three-wire type		
Disconnection/ Short-circuit detection	Not supported.	**Protective function**	With load short-circuit protection.

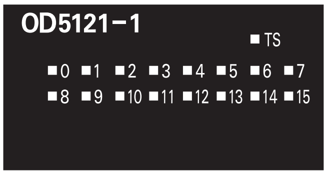
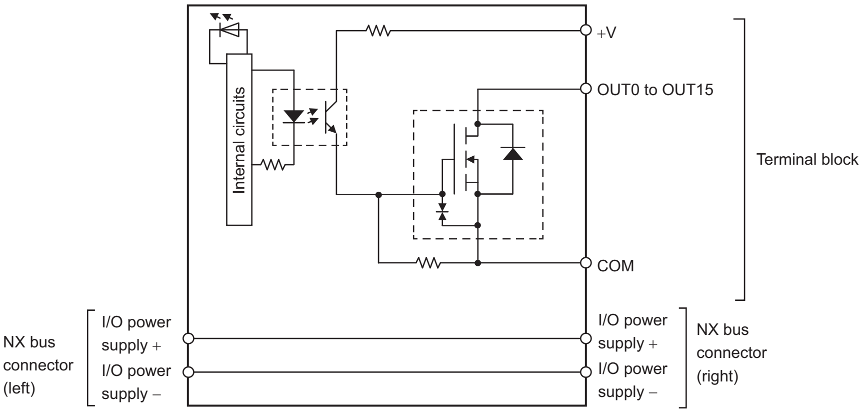
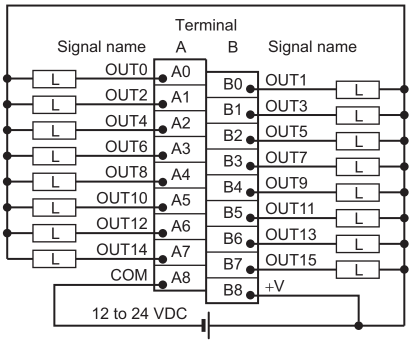
NX-OD5121

Unit name	Transistor Output Unit	**Model**	NX-OD5121
Capacity	16 points	**External connection terminals**	Screwless clamping terminal block (16 terminals)
I/O refreshing method	Selectable Synchronous I/O refreshing or Free-Run refreshing		
Indicators	TS indicator, output indicator  OD5121 TS 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	**Internal I/O common**	NPN
		Rated voltage	12 to 24 VDC
		Operating load voltage range	10.2 to 28.8 VDC
		Maximum value of load current	0.5 A/point, 4 A/Unit
		Maximum inrush current	4.0 A/point, 10 ms max.
		Leakage current	0.1 mA max.
		Residual voltage	1.5 V max.
		ON/OFF response time	0.1 ms max./0.8 ms max.
Dimensions	12 (W) x 100 (H) x 71 (D)	**Isolation method**	Photocoupler isolation
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	Supply from the NX bus	**Current capacity of I/O power supply terminal**	Without I/O power supply terminals
NX Unit power consumption	0.65 W max.	**I/O current consumption**	20 mA max.
Weight	70 g max.		
Circuit layout	 Internal circuits OUT0 to OUT15 Terminal block NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right)		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 Additional I/O Power Supply Unit I/O Power Supply Connection Unit I/O Power Supply Connection Unit Transistor Output Unit NX-OD5121 A1 B1 A8 B8 IOV IOG 12 to 24 VDC OUT0 OUT1 OUT2 OUT3 OUT4 OUT5 OUT6 OUT7 OUT8 OUT9 OUT10 OUT11 OUT12 OUT13 OUT14 OUT15 Two-wire type Three-wire type		
Disconnection/ Short-circuit detection	Not supported.	**Protective function**	Not supported.

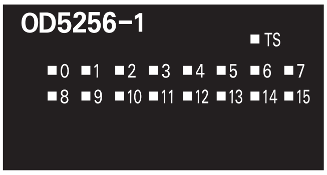
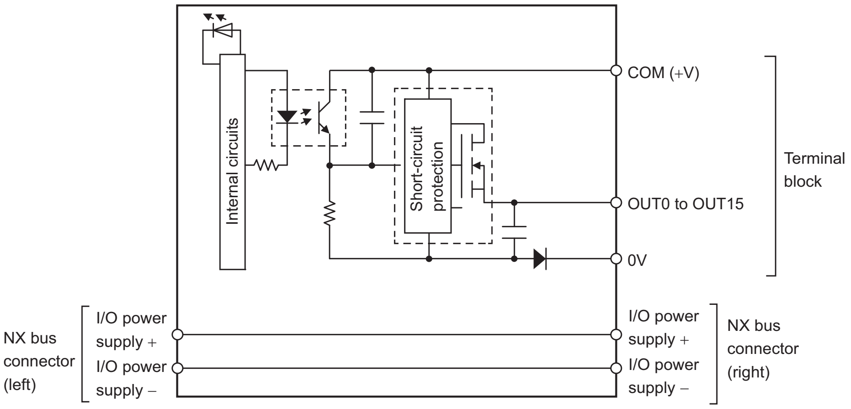
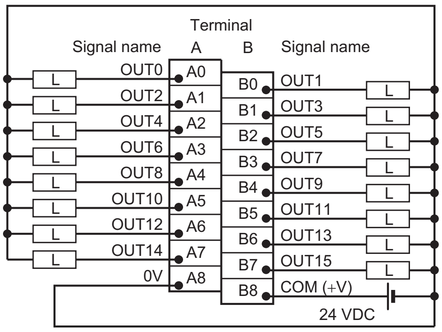
NX-OD5256

Unit name	Transistor Output Unit	**Model**	NX-OD5256
Capacity	16 points	**External connection terminals**	Screwless clamping terminal block (16 terminals)
I/O refreshing method	Selectable Synchronous I/O refreshing or Free-Run refreshing		
Indicators	TS indicator, output indicator  OD5256 TS 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	**Internal I/O common**	PNP
		Rated voltage	24 VDC
		Operating load voltage range	15 to 28.8 VDC
		Maximum value of load current	0.5 A/point, 4 A/Unit
		Maximum inrush current	4.0 A/point, 10 ms max.
		Leakage current	0.1 mA max.
		Residual voltage	1.5 V max.
		ON/OFF response time	0.5 ms max./1.0 ms max.
Dimensions	12 (W) x 100 (H) x 71 (D)	**Isolation method**	Photocoupler isolation
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	Supply from the NX bus	**Current capacity of I/O power supply terminal**	Without I/O power supply terminals
NX Unit power consumption	0.70 W max.	**I/O current consumption**	40 mA max.
Weight	70 g max.		
Circuit layout	 Internal circuits Short-circuit protection OUT0 to OUT15 Terminal block NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right)		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 Additional I/O Power Supply Unit I/O Power Supply Connection Unit I/O Power Supply Connection Unit Transistor Output Unit NX-OD5256 A1 B1 A8 B8 IOV IOG 24 VDC OUT0 OUT1 OUT2 OUT3 OUT4 OUT5 OUT6 OUT7 OUT8 OUT9 OUT10 OUT11 OUT12 OUT13 OUT14 OUT15 Two-wire type Three-wire type		
Disconnection/ Short-circuit detection	Not supported.	**Protective function**	With load short-circuit protection.

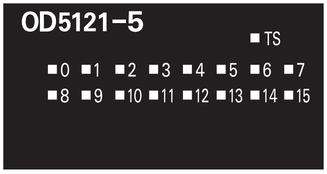
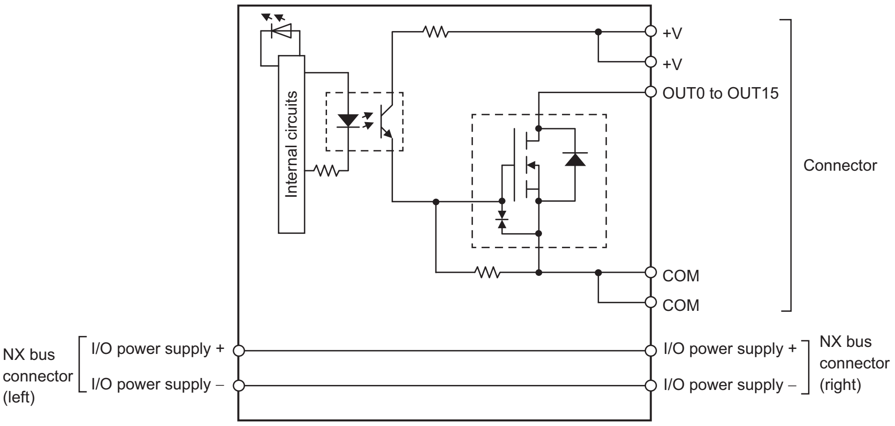
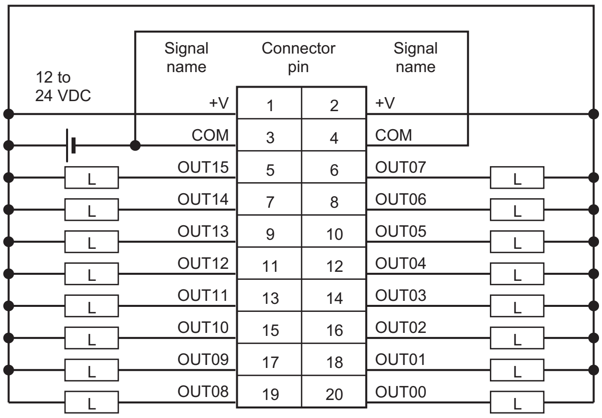
● Transistor Output Units (M3 Screw Terminal Block, 30 mm Width)
NX-OD5121-1

Unit name	Transistor Output Unit	**Model**	NX-OD5121-1
Number of points	16 points	**External connection terminals**	M3 screw terminal block (18 terminals)
I/O refreshing method	Switching Synchronous I/O refreshing and Free-Run refreshing		
Indicators	TS indicator, output indicator  OD5121-1 ■TS ■0 ■1 ■2 ■3 ■4 ■5 ■6 ■7 ■8 ■9 ■10 ■11 ■12 ■13 ■14 ■15	**Internal I/O common**	NPN
		Rated voltage	12 to 24 VDC
		Operating load voltage range	10.2 to 28.8 VDC
		Maximum value of load current	0.5 A/point, 5 A/Unit
		Maximum inrush current	4.0 A/point, 10 ms max.
		Leakage current	0.1 mA max.
		Residual voltage	1.5 V max.
		ON/OFF response time	0.1 ms max./0.8 ms max.
Dimensions	30 (W) x 100 (H) x 71 (D)	**Isolation method**	Photocoupler isolation
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	Supply from the external source	**Current capacity of I/O power supply terminal**	Without I/O power supply terminals
NX Unit power consumption	0.60 W max.	**Current consumption from I/O power supply**	30 mA max.
Weight	125 g max.		
Circuit layout	 Internal circuits +V OUT0 to OUT15 Terminal block COM NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right)		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 Terminal Signal name A B Signal name OUT0 A0 B0 OUT1 OUT2 A1 B1 OUT3 OUT4 A2 B2 OUT5 OUT6 A3 B3 OUT7 OUT8 A4 B4 OUT9 OUT10 A5 B5 OUT11 OUT12 A6 B6 OUT13 OUT14 A7 B7 OUT15 COM A8 B8 +V L 12 to 24 VDC		
Disconnection/ Short-circuit detection	Not supported.	**Protective function**	Not supported.

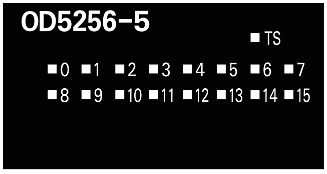
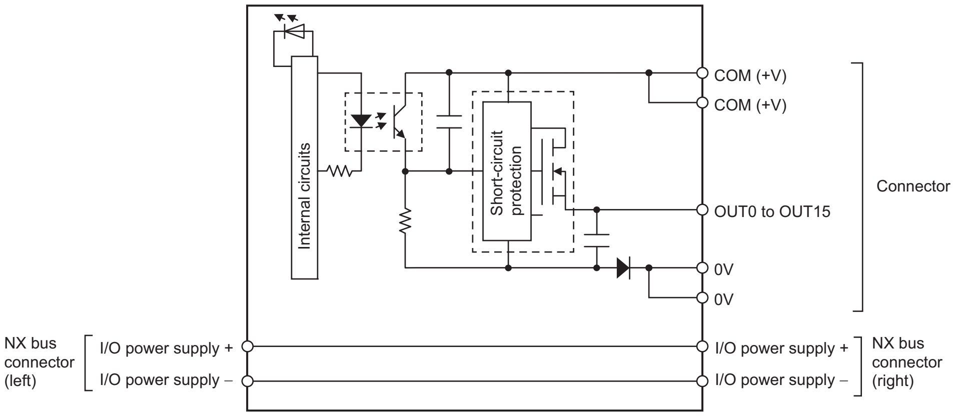
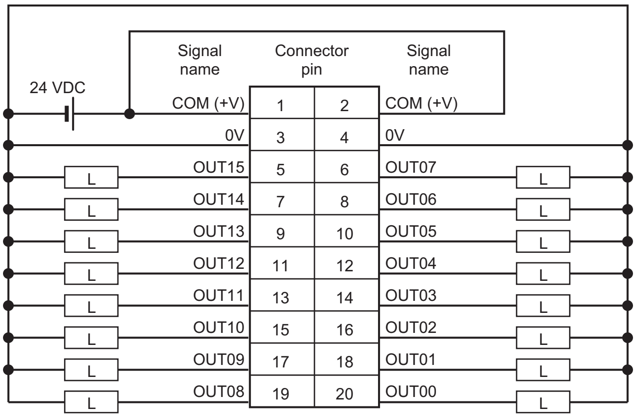
NX-OD5256-1

Unit name	Transistor Output Unit	**Model**	NX-OD5256-1
Number of points	16 points	**External connection terminals**	M3 screw terminal block (18 terminals)
I/O refreshing method	Switching Synchronous I/O refreshing and Free-Run refreshing		
Indicators	TS indicator, output indicator  OD5256-1 TS 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	**Internal I/O common**	PNP
		Rated voltage	24 VDC
		Operating load voltage range	20.4 to 28.8 VDC
		Maximum value of load current	0.5 A/point, 5 A/Unit
		Maximum inrush current	4.0 A/point, 10 ms max.
		Leakage current	0.1 mA max.
		Residual voltage	1.5 V max.
		ON/OFF response time	0.5 ms max./1.0 ms max.
Dimensions	30 (W) x 100 (H) x 71 (D)	**Isolation method**	Photocoupler isolation
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	Supply from external source	**Current capacity of I/O power supply terminal**	Without I/O power supply terminals
NX Unit power consumption	0.65 W max.	**Current consumption from I/O power supply**	30 mA max.
Weight	125 g max.		
Circuit layout	 Internal circuits Short-circuit protection COM (+V) OUT0 to OUT15 0V Terminal block NX bus connector (left) I/O power supply + I/O power supply − I/O power supply + I/O power supply − NX bus connector (right)		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 Terminal Signal name A B Signal name OUT0 A0 B0 OUT1 OUT2 A1 B1 OUT3 OUT4 A2 B2 OUT5 OUT6 A3 B3 OUT7 OUT8 A4 B4 OUT9 OUT10 A5 B5 OUT11 OUT12 A6 B6 OUT13 OUT14 A7 B7 OUT15 0V A8 B8 COM (+V) L 24 VDC		
Disconnection/ Short-circuit detection	Not supported.	**Protective function**	With load short-circuit protection.

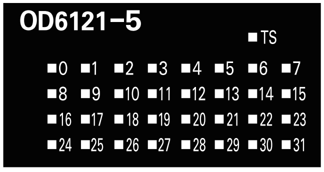
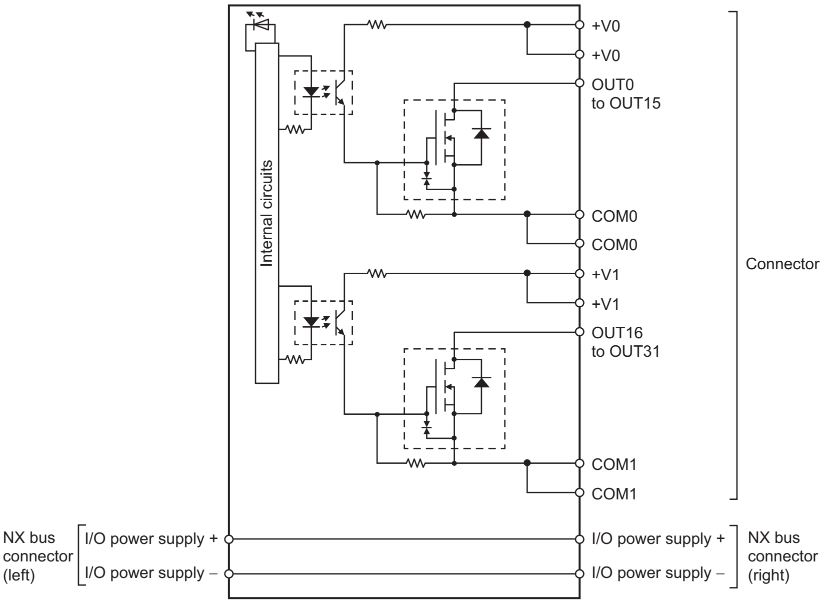
● Transistor Output Units (MIL Connector, 30 mm Width)
NX-OD5121-5

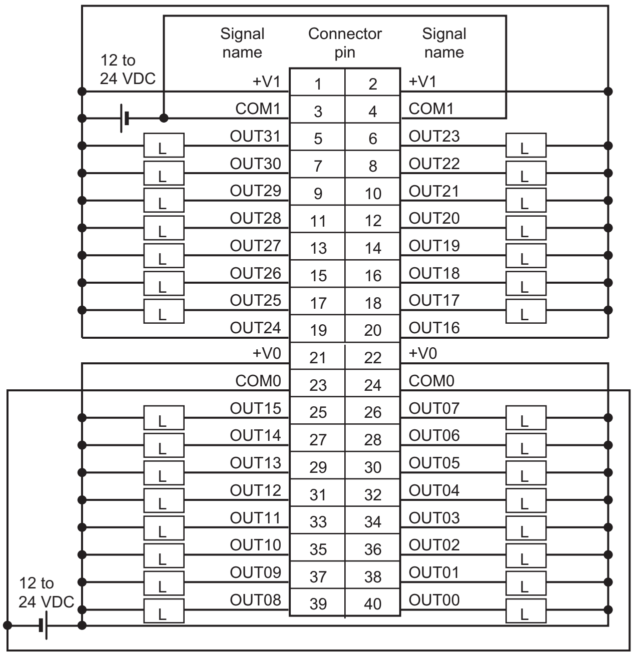
Unit name	Transistor Output Unit	**Model**	NX-OD5121-5
Number of points	16 points	**External connection terminals**	MIL connector (20 terminals)
I/O refreshing method	Switching Synchronous I/O refreshing and Free-Run refreshing		
Indicators	TS indicator, output indicator  OD5121-5 ■TS ■0 ■1 ■2 ■3 ■4 ■5 ■6 ■7 ■8 ■9 ■10 ■11 ■12 ■13 ■14 ■15	**Internal I/O common**	NPN
		Rated voltage	12 to 24 VDC
		Operating load voltage range	10.2 to 28.8 VDC
		Maximum value of load current	0.5 A/point, 2 A/Unit
		Maximum inrush current	4.0 A/point, 10 ms max.
		Leakage current	0.1 mA max.
		Residual voltage	1.5 V max.
		ON/OFF response time	0.1 ms max./0.8 ms max.
Dimensions	30 (W) x 100 (H) x 71 (D)	**Isolation method**	Photocoupler isolation
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	Supply from external source	**Current capacity of I/O power supply terminal**	Without I/O power supply terminals
NX Unit power consumption	0.60 W max.	**Current consumption from I/O power supply**	30 mA max.
Weight	80 g max.		
Circuit layout	 +V +V OUT0 to OUT15 Internal circuits Connector COM COM NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right)		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 12 to 24 VDC Signal name Connector pin Signal name +V 1 2 +V COM 3 4 COM OUT15 5 6 OUT07 OUT14 7 8 OUT06 OUT13 9 10 OUT05 OUT12 11 12 OUT04 OUT11 13 14 OUT03 OUT10 15 16 OUT02 OUT09 17 18 OUT01 OUT08 19 20 OUT00 L • Be sure to wire both pins 3 and 4 (COM). • Be sure to wire both pins 1 and 2 (+V).		
Disconnection/Short-circuit detection	Not supported.	**Protective function**	Not supported.

NX-OD5256-5

Unit name	Transistor Output Unit	**Model**	NX-OD5256-5
Number of points	16 points	**External connection terminals**	MIL connector (20 terminals)
I/O refreshing method	Switching Synchronous I/O refreshing and Free-Run refreshing		
Indicators	TS indicator, output indicator  OD5256-5 ■TS ■0 ■1 ■2 ■3 ■4 ■5 ■6 ■7 ■8 ■9 ■10 ■11 ■12 ■13 ■14 ■15	**Internal I/O common**	PNP
		Rated voltage	24 VDC
		Operating load voltage range	20.4 to 28.8 VDC
		Maximum value of load current	0.5 A/point, 2 A/Unit
		Maximum inrush current	4.0 A/point, 10 ms max.
		Leakage current	0.1 mA max.
		Residual voltage	1.5 V max.
		ON/OFF response time	0.5 ms max./1.0 ms max.
Dimensions	30 (W) x 100 (H) x 71 (D)	**Isolation method**	Photocoupler isolation
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	Supplied from external source.	**Current capacity of I/O power supply terminal**	Without I/O power supply terminals
NX Unit power consumption	0.70 W max.	**Current consumption from I/O power supply**	40 mA max.
Weight	85 g max.		
Circuit layout	 Internal circuits Short-circuit protection COM (+V) COM (+V) OUT0 to OUT15 0V 0V Connector NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right)		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 24 VDC Signal name Connector pin Signal name COM (+V) 1 2 COM (+V) 0V 3 4 0V OUT15 5 6 OUT07 OUT14 7 8 OUT06 OUT13 9 10 OUT05 OUT12 11 12 OUT04 OUT11 13 14 OUT03 OUT10 15 16 OUT02 OUT09 17 18 OUT01 OUT08 19 20 OUT00 L • Be sure to wire both pins 1 and 2 (COM (+V)). • Be sure to wire both pins 3 and 4 (0V).		
Disconnection/Short-circuit detection	Not supported.	**Protective function**	With load short-circuit protection.

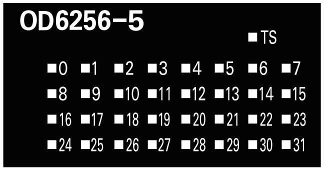
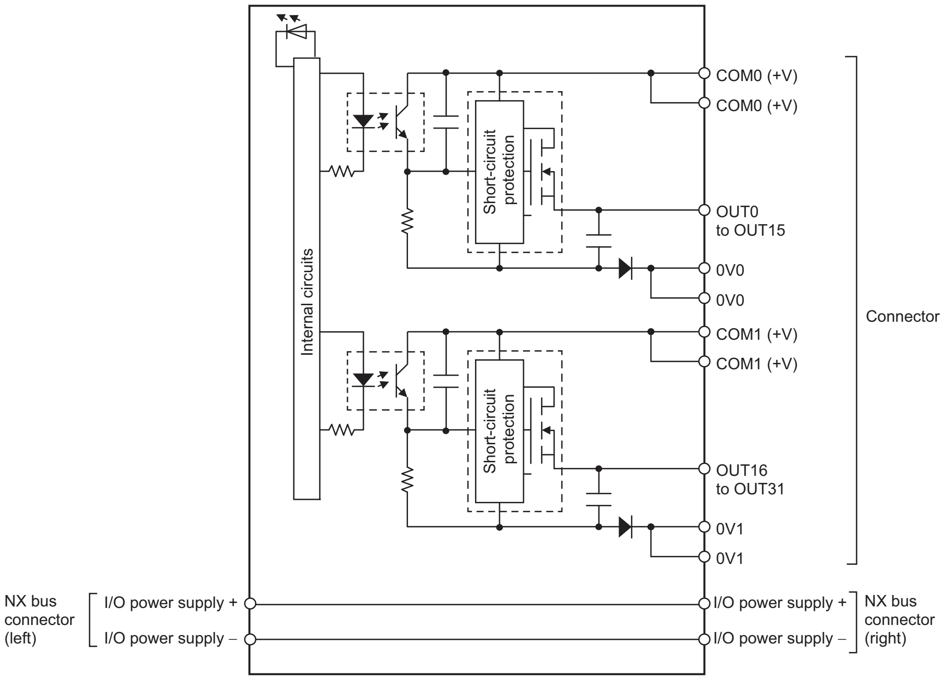
NX-OD6121-5

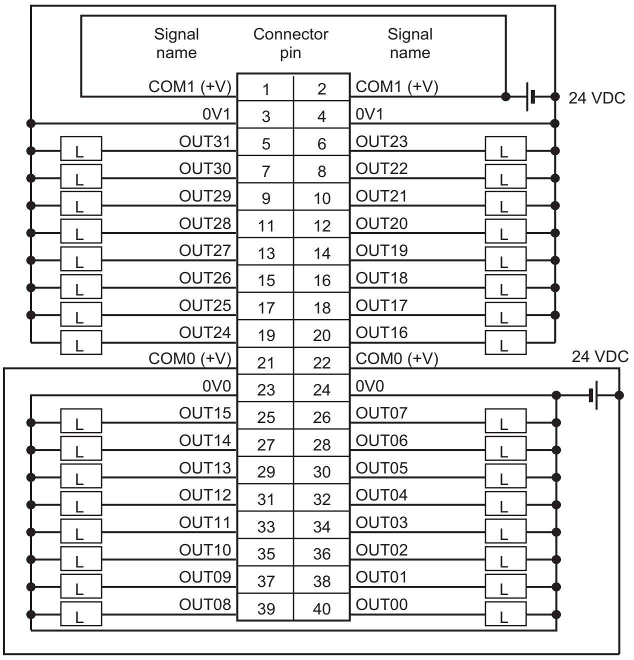
Unit name	Transistor Output Unit	**Model**	NX-OD6121-5
Number of points	32 points	**External connection terminals**	MIL connector (40 terminals)
I/O refreshing method	Switching Synchronous I/O refreshing and Free-Run refreshing		
Indicators	TS indicator, output indicator  OD6121-5 ■TS ■0 ■1 ■2 ■3 ■4 ■5 ■6 ■7 ■8 ■9 ■10 ■11 ■12 ■13 ■14 ■15 ■16 ■17 ■18 ■19 ■20 ■21 ■22 ■23 ■24 ■25 ■26 ■27 ■28 ■29 ■30 ■31	**Internal I/O common**	NPN
		Rated voltage	12 to 24 VDC
		Operating load voltage range	10.2 to 28.8 VDC
		Maximum value of load current	0.5 A/point, 2 A/common, 4 A/Unit
		Maximum inrush current	4.0 A/point, 10 ms max.
		Leakage current	0.1 mA max.
		Residual voltage	1.5 V max.
		ON/OFF response time	0.1 ms max./0.8 ms max.
Dimensions	30 (W) x 100 (H) x 71 (D)	**Isolation method**	Photocoupler isolation
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	Supply from external source	**Current capacity of I/O power supply terminal**	Without I/O power supply terminals
NX Unit power consumption	0.80 W max.	**Current consumption from I/O power supply**	50 mA max.
Weight	90 g max.		
Circuit layout	 Internal circuits +V0 +V0 OUT0 to OUT15 COM0 COM0 +V1 +V1 OUT16 to OUT31 COM1 COM1 Connector NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right)		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		

<table>
<tr><td>Terminal connection diagram</td><td colspan="3">

Signal name
Connector pin
Signal name
12 to 24 VDC
+V1 1 2 +V1
COM1 3 4 COM1
OUT31 5 6 OUT23
OUT30 7 8 OUT22
OUT29 9 10 OUT21
OUT28 11 12 OUT20
OUT27 13 14 OUT19
OUT26 15 16 OUT18
OUT25 17 18 OUT17
OUT24 19 20 OUT16
+V0 21 22 +V0
COM0 23 24 COM0
OUT15 25 26 OUT07
OUT14 27 28 OUT06
OUT13 29 30 OUT05
OUT12 31 32 OUT04
OUT11 33 34 OUT03
OUT10 35 36 OUT02
OUT09 37 38 OUT01
OUT08 39 40 OUT00
12 to 24 VDC
L

- Be sure to wire both pins 21 and 22 (+V0).
- Be sure to wire both pins 23 and 24 (COM0).
- Be sure to wire both pins 1 and 2 (+V1).
- Be sure to wire both pins 3 and 4 (COM1).
</td></tr>
<tr><td>Disconnection/Short-circuit detection</td><td>Not supported.</td><td>Protective function</td><td>Not supported.</td></tr>
</table>

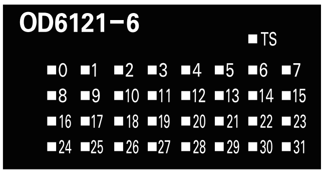
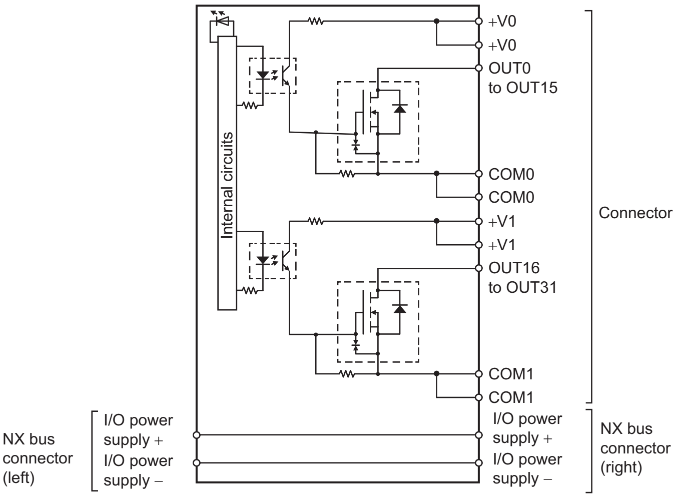
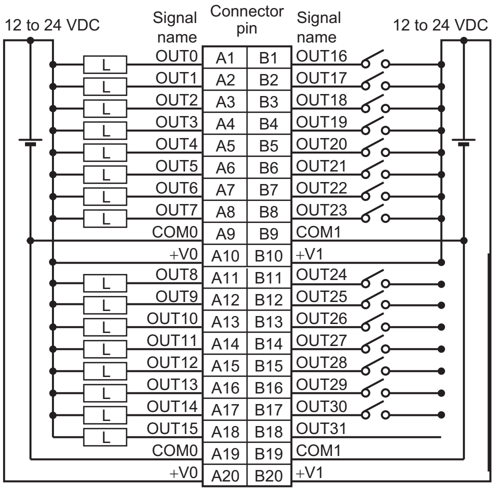
NX-OD6256-5

Unit name	Transistor Output Unit	**Model**	NX-OD6256-5
Number of points	32 points	**External connection terminals**	MIL connector (40 terminals)
I/O refreshing method	Switching Synchronous I/O refreshing and Free-Run refreshing		
Indicators	TS indicator, output indicator  OD6256-5 ■TS ■0 ■1 ■2 ■3 ■4 ■5 ■6 ■7 ■8 ■9 ■10 ■11 ■12 ■13 ■14 ■15 ■16 ■17 ■18 ■19 ■20 ■21 ■22 ■23 ■24 ■25 ■26 ■27 ■28 ■29 ■30 ■31	**Internal I/O common**	PNP
		Rated voltage	24 VDC
		Operating load voltage range	20.4 to 28.8 VDC
		Maximum value of load current	0.5 A/point, 2 A/common, 4 A/Unit
		Maximum inrush current	4.0 A/point, 10 ms max.
		Leakage current	0.1 mA max.
		Residual voltage	1.5 V max.
		ON/OFF response time	0.5 ms max./1.0 ms max.
Dimensions	30 (W) x 100 (H) x 71 (D)	**Isolation method**	Photocoupler isolation
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	Supply from external source	**Current capacity of I/O power supply terminal**	Without I/O power supply terminals
NX Unit power consumption	1.00 W max.	**Current consumption from I/O power supply**	80 mA max.
Weight	95 g max.		
Circuit layout	 Internal circuits Short-circuit protection Short-circuit protection COM0 (+V) COM0 (+V) OUT0 to OUT15 0V0 0V0 COM1 (+V) COM1 (+V) OUT16 to OUT31 0V1 0V1 Connector NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right)		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		

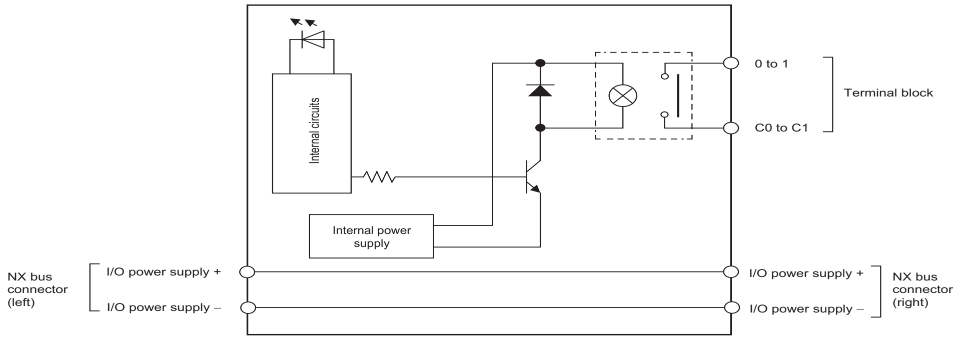
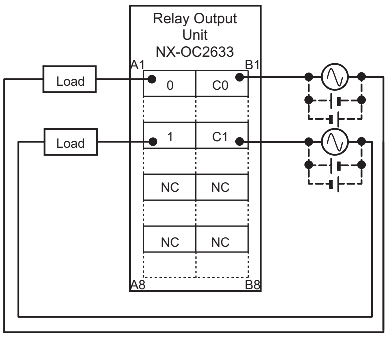
<table>
<tr><td>Terminal connection diagram</td><td colspan="3">
Signal name
Connector pin
Signal name
COM1 (+V) 1 2 COM1 (+V)
24 VDC
0V1 3 4 0V1
OUT31 5 6 OUT23
OUT30 7 8 OUT22
OUT29 9 10 OUT21
OUT28 11 12 OUT20
OUT27 13 14 OUT19
OUT26 15 16 OUT18
OUT25 17 18 OUT17
OUT24 19 20 OUT16
COM0 (+V) 21 22 COM0 (+V)
24 VDC
0V0 23 24 0V0
OUT15 25 26 OUT07
OUT14 27 28 OUT06
OUT13 29 30 OUT05
OUT12 31 32 OUT04
OUT11 33 34 OUT03
OUT10 35 36 OUT02
OUT09 37 38 OUT01
OUT08 39 40 OUT00
L
• Be sure to wire both pins 21 and 22 (COM0 (+V)).
• Be sure to wire both pins 1 and 2 (COM1 (+V)).
• Be sure to wire both pins 23 and 24 (0V0).
• Be sure to wire both pins 3 and 4 (0V1).</td></tr>
<tr><td>Disconnection/Short-circuit detection</td><td>Not supported.</td><td>Protective function</td><td>With load short-circuit protection.</td></tr>
</table>

● Transistor Output Units (Fujitsu Connector, 30 mm Width)

NX-OD6121-6

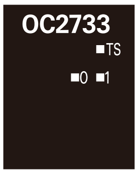
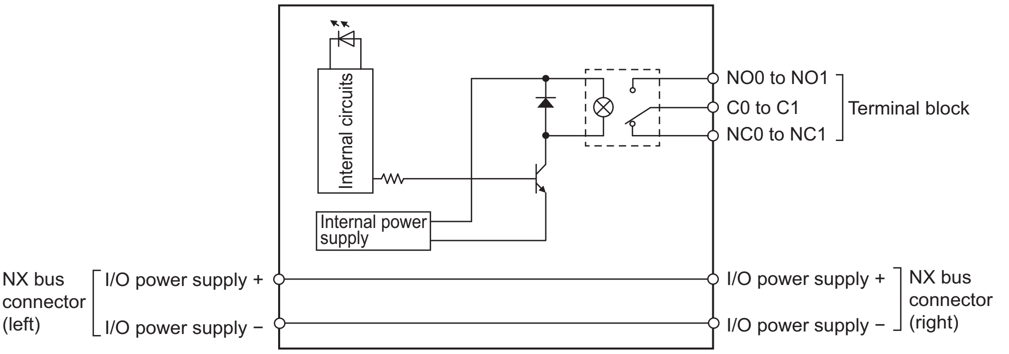
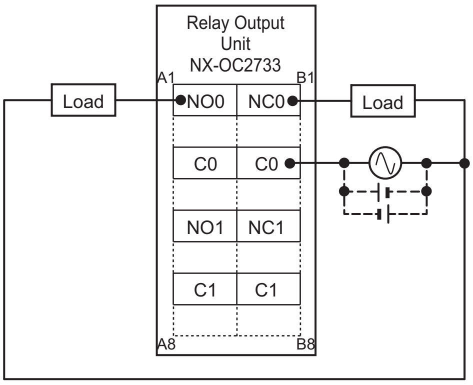
Unit name	Transistor Output Unit	**Model**	NX-OD6121-6
Number of points	32 points	**External connection terminals**	Fujitsu connector (40 terminals)
I/O refreshing method	Switching Synchronous I/O refreshing and Free-Run refreshing		
Indicators	TS indicator, output indicator  OD6121-6 TS 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	**Internal I/O common**	NPN
		Rated voltage	12 to 24 VDC
		Operating load voltage range	10.2 to 28.8 VDC
		Maximum value of load current	0.5 A/point, 2 A/common, 4 A/Unit
		Maximum inrush current	4.0 A/point, 10 ms max.
		Leakage current	0.1 mA max.
		Residual voltage	1.5 V max.
		ON/OFF response time	0.1 ms max./0.8 ms max.
Dimensions	30 (W) x 100 (H) x 71 (D)	**Isolation method**	Photocoupler isolation
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	Supply from external source	**Current capacity of I/O power supply terminal**	Without I/O power supply terminals
NX Unit power consumption	0.80 W max.	**Current consumption from I/O power supply**	50 mA max.
Weight	90 g max.		
Circuit layout	 Internal circuits +V0 +V0 OUT0 to OUT15 COM0 COM0 +V1 +V1 OUT16 to OUT31 COM1 COM1 Connector NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right)		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 12 to 24 VDC Signal name Connector pin Signal name 12 to 24 VDC L OUT0 A1 B1 OUT16 OUT1 A2 B2 OUT17 OUT2 A3 B3 OUT18 OUT3 A4 B4 OUT19 OUT4 A5 B5 OUT20 OUT5 A6 B6 OUT21 OUT6 A7 B7 OUT22 OUT7 A8 B8 OUT23 COM0 A9 B9 COM1 +V0 A10 B10 +V1 OUT8 A11 B11 OUT24 OUT9 A12 B12 OUT25 OUT10 A13 B13 OUT26 OUT11 A14 B14 OUT27 OUT12 A15 B15 OUT28 OUT13 A16 B16 OUT29 OUT14 A17 B17 OUT30 OUT15 A18 B18 OUT31 COM0 A19 B19 COM1 +V0 A20 B20 +V1 • Be sure to wire both pins A9 and A19 (COM0). • Be sure to wire both pins B9 and B19 (COM1). • Be sure to wire both pins A10 and A20 (+V0). • Be sure to wire both pins B10 and B20 (+V1).		
Disconnection/ Short-circuit detection	Not supported.	**Protective function**	Not supported.

● Relay Output Unit (Screwless Clamping Terminal Block 12 mm, Width)
NX-OC2633

Unit name	Relay Output Units	**Model**	NX-OC2633
Capacity	2 points, independent contacts	**External connection terminals**	Screwless clamping terminal block (8 terminals)
I/O refreshing method	Free-Run refreshing		
Indicators	TS indicator, output indicator OC2633 ■TS ■0 ■1	**Relay type**	N.O. contact
		Maximum switching capacity	250 VAC/2 A (cosϕ = 1), 250 VAC/2 A (cosϕ = 0.4), 24 VDC/2 A, 4 A/Unit
		Minimum switching capacity	5 VDC, 1 mA
Relay service life	Electrical: 100,000 operations* Mechanical: 20,000,000 operations	**ON/OFF response time**	15 ms max./15 ms max.
Dimensions	12 (W) x 100 (H) x 71 (D)	**Isolation method**	Relay isolation
Insulation resistance	Between A1/B1 terminals and A3/B3 terminals: 20 MΩ min. (500 VDC) Between the external terminals and internal circuits: 20 MΩ min. (500 VDC) Between the internal circuit and GR terminal: 20 MΩ min. (100 VDC) Between the external terminals and GR terminal: 20 MΩ min. (500 VDC)	**Dielectric strength**	Between A1/B1 terminals and A3/B3 terminals: 2300 VAC for 1 min at a leakage current of 5 mA max. Between the external terminals and GR terminal: 2300 VAC for 1 min at a leakage current of 5 mA max. Between the external terminals and internal circuits: 2300 VAC for 1 min at a leakage current of 5 mA max. Between the internal circuit and GR terminal: 510 VAC for 1 min at a leakage current of 5 mA max.
Vibration resistance	Conforms to IEC60068-2-6. 5 to 8.4 Hz with amplitude of 3.5 mm, 8.4 to 150 Hz, acceleration of 9.8 m/s^2 100 min each in X, Y, and Z directions (10 sweeps of 10 min each = 100 min total)	**Shock resistance**	100 m/s^2, 3 times each in X, Y, and Z directions
I/O power supply method	Supply from external source	**Current capacity of I/O power supply terminal**	Without I/O power supply terminals
NX Unit power consumption	0.80 W max.	**I/O current consumption**	No consumption
Weight	65 g max.		
Circuit layout	 Internal circuits 0 to 1 C0 to C1 Terminal block Internal power supply NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right) You cannot replace the relay.		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 Relay Output Unit NX-OC2633 A1 B1 Load Load 0 C0 1 C1 NC NC NC NC A8 B8		
Disconnection/ Short-circuit detection	Not supported.	**Protective function**	Not supported.

* Electrical service life will vary depending on the current value. Refer to "NX-series Digital I/O Units User's Manual" for details.

● Relay Output Unit
NX-OC2733

Unit name	Relay Output Unit	**Model**	NX-OC2733
Number of points	2 points, independent contacts	**External connection terminals**	Screwless clamping terminal block (8 terminals)
Capacity	Free-Run refreshing		
Indicators	TS indicator, output indicator  OC2733 TS 0 1	**Maximum switching capacity**	250 VAC/2 A (cosϕ = 1), 250 VAC/2 A (cosϕ = 0.4), 24 VDC/2 A, 4 A/Unit
		Minimum switching capacity	5 VDC, 10 mA
Relay service life	Electrical: 100,000 operations Mechanical: 20,000,000 operations	**ON/OFF response time**	15 ms max./15 ms max.
Dimensions	12 (W) x 100 (H) x 71 (D)	**Isolation method**	Relay isolation
Insulation resistance	Between A1/3, B1/3 terminals and A5/7, B5/7 terminals: 20 MΩ min. (at 500 VDC) Between the external terminals and functional ground terminal: 20 MΩ min. (at 500 VDC) Between the external terminals and internal circuits: 20 MΩ min. (at 500 VDC) Between the internal circuit and the functional ground terminal: 20 MΩ min. (at 100 VDC)	**Dielectric strength**	Between A1/3, B1/3 terminals and A5/7, B5/7 terminals: 2300 VAC for 1 min at a leakage current of 5 mA max. Between the external terminals and the functional ground terminal: 2300 VAC for 1 min at a leakage current of 5 mA max. Between the external terminals and internal circuits: 2300 VAC for 1 min at a leakage current of 5 mA max. Between the internal circuit and the functional ground terminal: 510 VAC for 1 min at a leakage current of 5 mA max.
I/O power supply method	Supply from external source	**Current capacity of I/O power supply terminal**	Without I/O power supply terminals
NX Unit power consumption	0.95 W max.	**Current consumption from I/O power supply**	No consumption
Weight	70 g max.		
Circuit layout	 Internal circuits Internal power supply NO0 to NO1 C0 to C1 NC0 to NC1 Terminal block NX bus connector (left) I/O power supply + I/O power supply − I/O power supply + I/O power supply − NX bus connector (right) NO0 and NO1 are normal open contacts, and NC0 and NC1 are normal close contacts. You cannot replace the relay.		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 Relay Output Unit NX-OC2733 A1 B1 Load NO0 NC0 Load C0 C0 NO1 NC1 C1 C1 A8 B8		
Disconnection/Short-circuit detection	Not supported.	**Protective function**	Not supported.

Version Information

NX Units		Corresponding Unit Versions/Versions *1		
		EtherCAT		
Model	**Unit version**	**Communications Coupler Units NX-ECC20□**	**NJ/NX series CPU Units** **NJ501-□□□□** **NJ301-□□□□** **NJ101-□□□□** **NX701-□□□□**	**Sysmac Studio**
NX-OD2154	Ver.1.0	Ver.1.1	Ver.1.06 *2	Ver.1.07
NX-OD2258				
NX-OD3121		Ver.1.0	Ver.1.05	Ver.1.06
NX-OD3153				
NX-OD3256				
NX-OD3257				
NX-OD3268				Ver.1.13
NX-OD4121				Ver.1.06
NX-OD4256				
NX-OD5121				
NX-OD5121-1				Ver.1.13
NX-OD5121-5				Ver.1.10
NX-OD5256				Ver.1.06
NX-OD5256-1				Ver.1.13
NX-OD5256-5				Ver.1.10
NX-OD6121-5				
NX-OD6121-6				Ver.1.13
NX-OD6256-5				Ver.1.10
NX-OC2633				Ver.1.06
NX-OC2733				Ver.1.08

✻1 Some Units do not have all of the versions given in the above table. If a Unit does not have the specified version, support is provided by the oldest available version after the specified version. Refer to the user's manuals for the specific Units for the relation between models and versions.

✻2 The instructions for time stamp refreshing are supported by CPU Units with unit version 1.06 or later. If you do not use instructions for time stamp refreshing, you can use version 1.05. Refer to the *NJ/NX-series Instructions Reference Manual* (Cat. No. W502) for details on the instructions for time stamp refreshing.

NX-series Digital Mixed I/O Units
NX-MD

Digital Mixed I/O Units for High speed Synchronous Control

- DC Input/Transistor Output Units for the NX-series modular I/O system.
- Connect to other NX-series I/O Units and EtherCAT Coupler units using the high-speed NX-bus.
- One Unit enables synchronous Units to update the status of input devices to the controller and the output status of synchronous Units according to the controller's instructions every EtherCAT cycle.

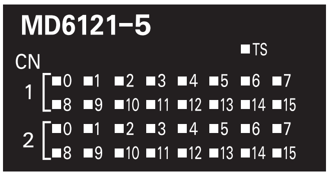
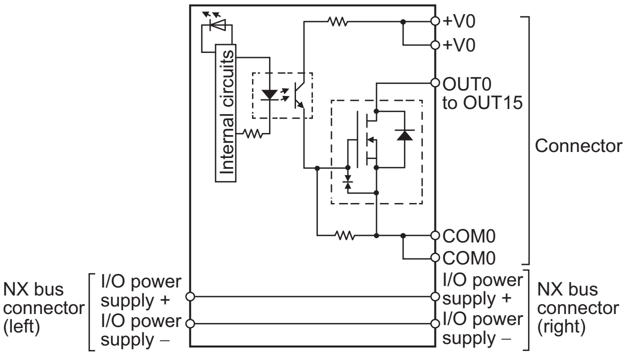
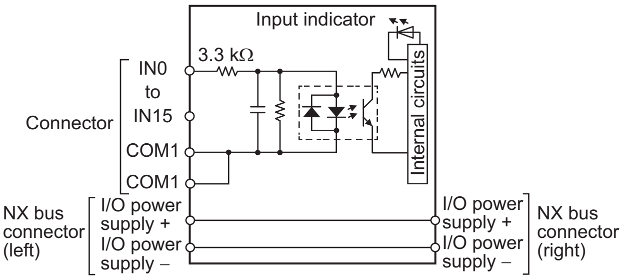
Features

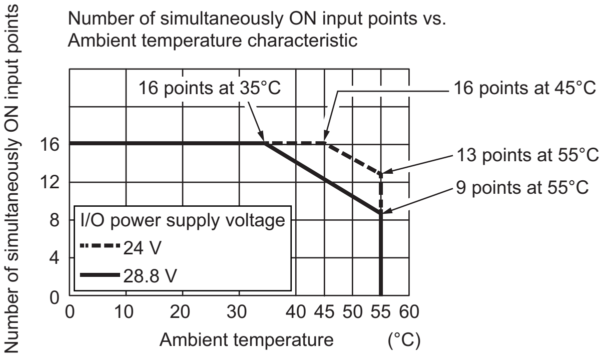
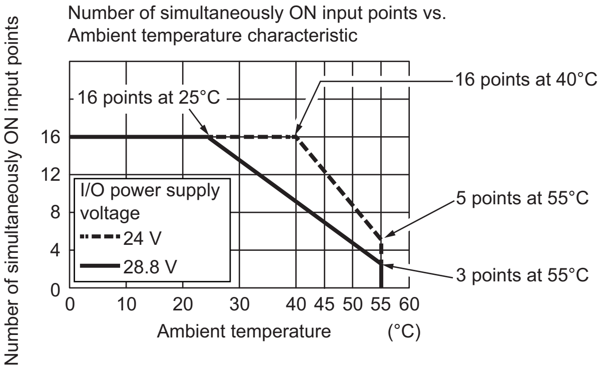
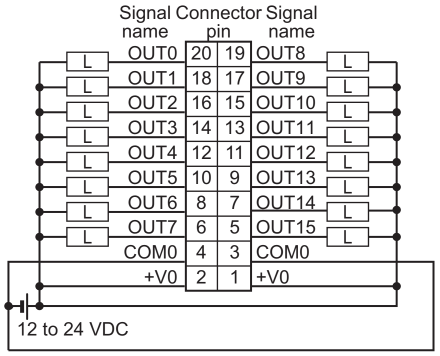
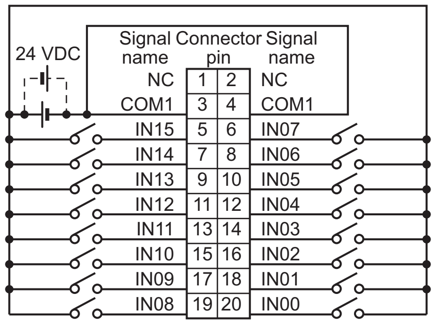
- High-speed I/O refreshing is possible by connecting with the NX-series EtherCAT Coupler.
- Output refreshing can be synchronized with the control cycle of the Controller. (Synchronous refreshing)
- Connector Types significantly reduces wiring work.

Digital Mixed I/O Unit Specifications

● DC Input/Transistor Output Units (MIL Connector, 30 mm Width)

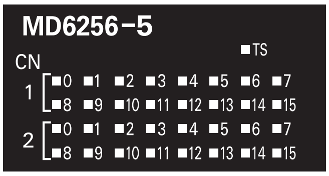
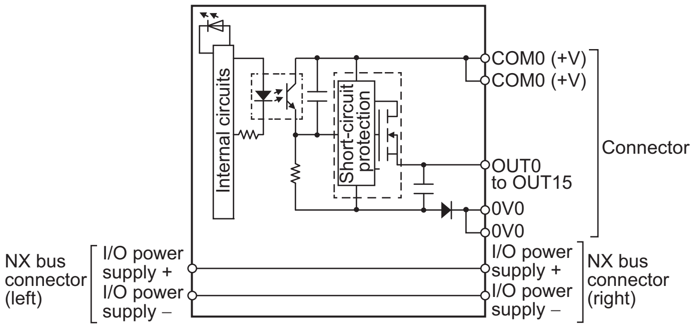
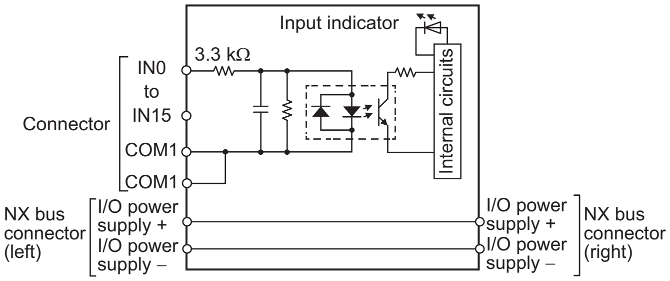
NX-MD6121-5

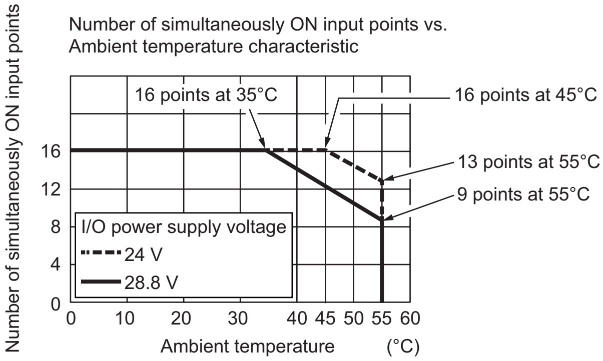
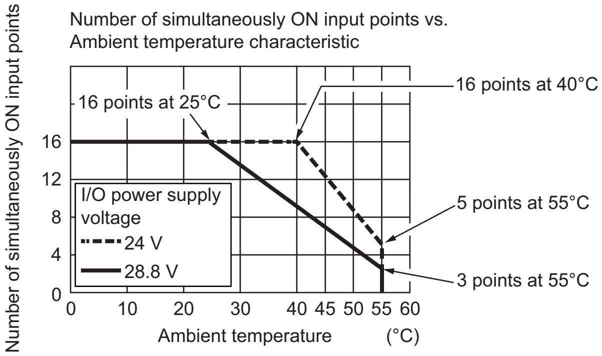
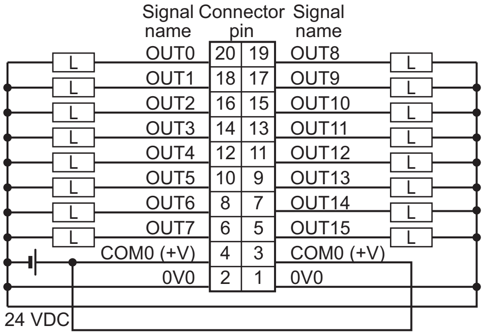
Unit name		DC Input/Transistor Output Unit	**Model**		NX-MD6121-5
Number of points		16 inputs/16 outputs	**External connection terminals**		2 MIL connectors (20 terminals)
I/O refreshing method		Switching Synchronous I/O refreshing and Free-Run refreshing			
Output section (CN1)	**Internal I/O common**	NPN	**Input section (CN2)**	**Internal I/O common**	For both NPN/PNP
	Rated voltage	12 to 24 VDC		**Rated input voltage**	24 VDC (15 to 28.8 VDC)
	Operating load voltage range	10.2 to 28.8 VDC		**Input current**	7 mA typical (at 24 VDC)
	Maximum value of load current	0.5 A/point, 2 A/Unit		**ON voltage/ON current**	15 VDC min./3 mA min. (between COM and each signal)
	Maximum inrush current	4.0 A/point, 10 ms max.		**OFF voltage/OFF current**	5 VDC max./1 mA max. (between COM and each signal)
	Leakage current	0.1 mA max.		**ON/OFF response time**	20 µs max./400 µs max.
	Residual voltage	1.5 V max.		**Input filter time**	No filter, 0.25 ms, 0.5 ms, 1 ms (default), 2 ms, 4 ms, 8 ms, 16 ms, 32 ms, 64 ms, 128 ms, 256 ms
	ON/OFF response time	0.1 ms max./0.8 ms max.			
Indicators		TS indicator, I/O indicators  MD6121−5 ■TS CN 1 ■0 ■1 ■2 ■3 ■4 ■5 ■6 ■7 ■8 ■9 ■10 ■11 ■12 ■13 ■14 ■15 2 ■0 ■1 ■2 ■3 ■4 ■5 ■6 ■7 ■8 ■9 ■10 ■11 ■12 ■13 ■14 ■15	**Dimensions**		30 (W) x 100 (H) x 71 (D)
			Isolation method		Photocoupler isolation
			Insulation resistance		20 MΩ min. between isolated circuits (at 100 VDC)
			Dielectric strength		510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
			I/O power supply method		Supply from external source
			Current capacity of I/O power supply terminal		Without I/O power supply terminals
			NX Unit power consumption		0.70 W max.
			Current consumption from I/O power supply		30 mA max.
			Weight		105 g max.
Circuit layout		CN1 (left) output circuit  Internal circuits +V0 +V0 OUT0 to OUT15 Connector COM0 COM0 NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right) CN2 (right) input circuit  Input indicator 3.3 kΩ Internal circuits Connector IN0 to IN15 COM1 COM1 NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right)			

Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: As shown in the following. • For upright installation  • For any installation other than upright 
Terminal connection diagram	CN1 (left) output terminal  Signal name Connector pin Signal name OUT0 20 19 OUT8 OUT1 18 17 OUT9 OUT2 16 15 OUT10 OUT3 14 13 OUT11 OUT4 12 11 OUT12 OUT5 10 9 OUT13 OUT6 8 7 OUT14 OUT7 6 5 OUT15 COM0 4 3 COM0 +V0 2 1 +V0 L 12 to 24 VDC • Be sure to wire both pins 3 and 4 (COM0) of CN1. • Be sure to wire both pins 1 and 2 (+V0) of CN1. CN2 (right) input terminal  24 VDC Signal name Connector pin Signal name NC 1 2 NC COM1 3 4 COM1 IN15 5 6 IN07 IN14 7 8 IN06 IN13 9 10 IN05 IN12 11 12 IN04 IN11 13 14 IN03 IN10 15 16 IN02 IN09 17 18 IN01 IN08 19 20 IN00 • The polarity of the input power supply of CN2 can be connected in either direction. • Be sure to wire both pins 3 and 4 (COM1) of CN2, and set the same polarity for both pins.

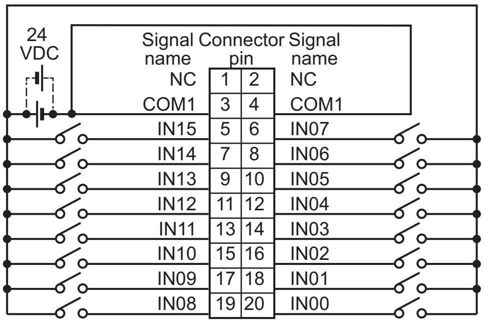
Disconnection/Short-circuit detection	Not supported.	**Protective function**	Not supported.

NX-MD6256-5

Unit name		DC Input/Transistor Output Unit	**Model**		NX-MD6256-5
Number of points		16 inputs/16 outputs	**External connection terminals**		2 MIL connectors (20 terminals)
I/O refreshing method		Switching Synchronous I/O refreshing and Free-Run refreshing			
Output section (CN1)	**Internal I/O common**	PNP	**Input section (CN2)**	**Internal I/O common**	For both NPN/PNP
	Rated voltage	24 VDC		**Rated input voltage**	24 VDC (15 to 28.8 VDC)
	Operating load voltage range	20.4 to 28.8 VDC		**Input current**	7 mA typical (at 24 VDC)
	Maximum value of load current	0.5 A/point, 2 A/Unit		**ON voltage/ON current**	15 VDC min./3 mA min. (between COM and each signal)
	Maximum inrush current	4.0 A/point, 10 ms max.		**OFF voltage/OFF current**	5 VDC max./1 mA max. (between COM and each signal)
	Leakage current	0.1 mA max.		**ON/OFF response time**	20 µs max./400 µs max.
	Residual voltage	1.5 V max.		**Input filter time**	No filter, 0.25 ms, 0.5 ms, 1 ms (default), 2 ms, 4 ms, 8 ms, 16 ms, 32 ms, 64 ms, 128 ms, 256 ms
	ON/OFF response time	0.5 ms max./1.0 ms max.			
Indicators		TS indicator, I/O indicators  MD6256−5 ■TS CN 1 ■0 ■1 ■2 ■3 ■4 ■5 ■6 ■7 ■8 ■9 ■10 ■11 ■12 ■13 ■14 ■15 2 ■0 ■1 ■2 ■3 ■4 ■5 ■6 ■7 ■8 ■9 ■10 ■11 ■12 ■13 ■14 ■15	**Dimensions**		30 (W) x 100 (H) x 71 (D)
			Isolation method		Photocoupler isolation
			Insulation resistance		20 MΩ min. between isolated circuits (at 100 VDC)
			Dielectric strength		510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
			I/O power supply method		Supply from external source
			Current capacity of I/O power supply terminal		Without I/O power supply terminals
			NX Unit power consumption		0.75 W max.
			Current consumption from I/O power supply		40 mA max.
			Weight		110 g max.
Circuit layout		CN1 (left) output circuit  Internal circuits Short-circuit protection COM0 (+V) COM0 (+V) OUT0 to OUT15 0V0 0V0 Connector NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right) CN2 (right) input circuit  Input indicator 3.3 kΩ IN0 to IN15 COM1 COM1 Connector Internal circuits NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right)			

<table>
<tr>
<td>Installation orientation and restrictions</td>
<td colspan="3">Installation orientation: Possible in 6 orientations.
Restrictions: As shown in the following.
• For upright installation

• For any installation other than upright
 </td>
</tr>
<tr>
<td>Terminal connection diagram</td>
<td colspan="3">CN1 (left) output terminal


Signal name
Connector pin
Signal name
OUT0 20 19 OUT8
OUT1 18 17 OUT9
OUT2 16 15 OUT10
OUT3 14 13 OUT11
OUT4 12 11 OUT12
OUT5 10 9 OUT13
OUT6 8 7 OUT14
OUT7 6 5 OUT15
COM0 (+V) 4 3 COM0 (+V)
0V0 2 1 0V0
L
24 VDC

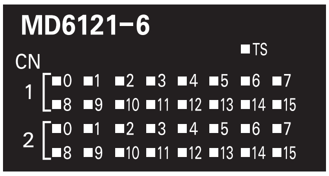
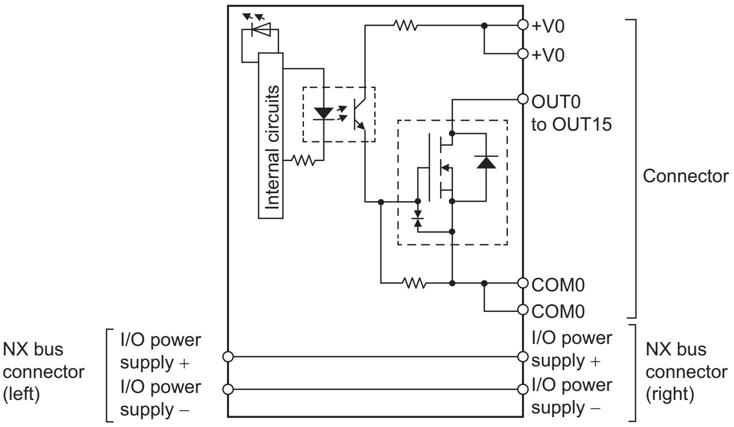
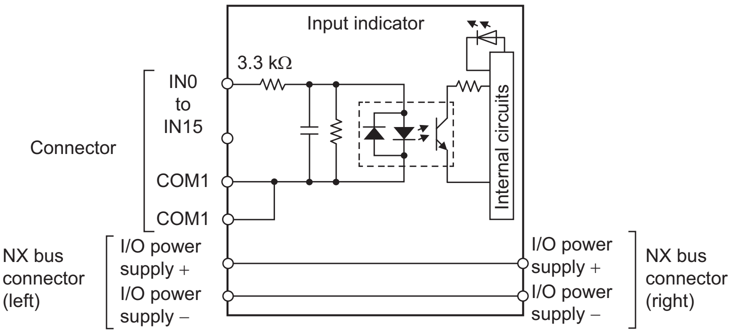
• Be sure to wire both pins 3 and 4 (COM0 (+V)) of CN1.
• Be sure to wire both pins 1 and 2 (0V0) of CN1.
CN2 (right) input terminal


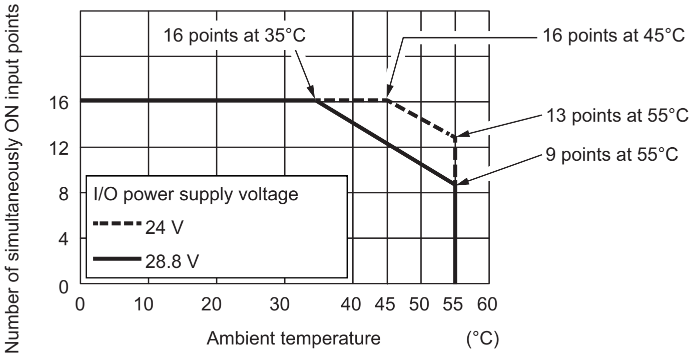
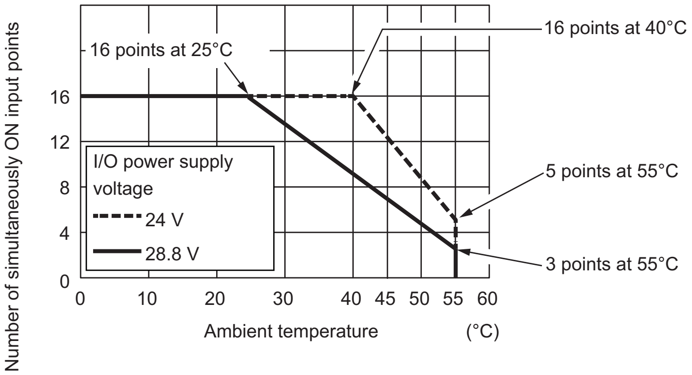
24 VDC
Signal name
Connector pin
Signal name
NC 1 2 NC
COM1 3 4 COM1
IN15 5 6 IN07
IN14 7 8 IN06
IN13 9 10 IN05
IN12 11 12 IN04
IN11 13 14 IN03
IN10 15 16 IN02
IN09 17 18 IN01
IN08 19 20 IN00

• The polarity of the input power supply of CN2 can be connected in either direction.
• Be sure to wire both pins 3 and 4 (COM1) of CN2, and set the same polarity for both pins.</td>
</tr>
<tr>
<td>Disconnection/Short-circuit detection</td>
<td>Not supported.</td>
<td>Protective function</td>
<td>With load short-circuit protection.</td>
</tr>
</table>

● DC Input/Transistor Output Units (Fujitsu Connector, 30 mm Width)

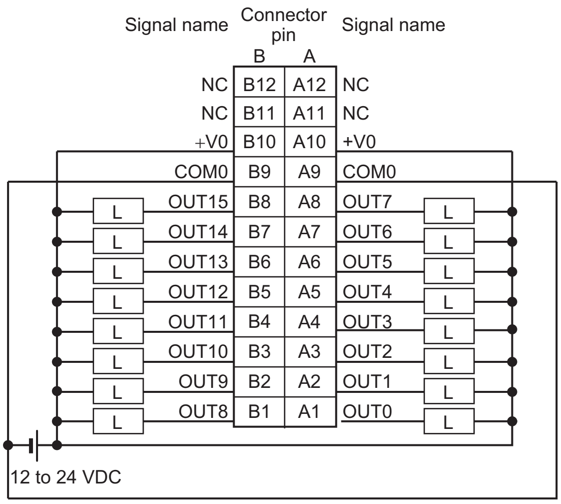
NX-MD6121-6

Unit name		DC Input/Transistor Output Unit	**Model**		NX-MD6121-6
Number of points		16 inputs/16 outputs	**External connection terminals**		2 Fujitsu connectors (24 terminals)
I/O refreshing method		Switching Synchronous I/O refreshing and Free-Run refreshing			
Output section (CN1)	**Internal I/O common**	NPN	**Input section (CN2)**	**Internal I/O common**	For both NPN/PNP
	Rated voltage	12 to 24 VDC		**Rated input voltage**	24 VDC (15 to 28.8 VDC)
	Operating load voltage range	10.2 to 28.8 VDC		**Input current**	7 mA typical (at 24 VDC)
	Maximum value of load current	0.5 A/point, 2 A/Unit		**ON voltage/ON current**	15 VDC min./3 mA min. (between COM and each signal)
	Maximum inrush current	4.0 A/point, 10 ms max.		**OFF voltage/OFF current**	5 VDC max./1 mA max. (between COM and each signal)
	Leakage current	0.1 mA max.		**ON/OFF response time**	20 µs max./400 µs max.
	Residual voltage	1.5 V max.		**Input filter time**	No filter, 0.25 ms, 0.5 ms, 1 ms (default), 2 ms, 4 ms, 8 ms, 16 ms, 32 ms, 64 ms, 128 ms, 256 ms
	ON/OFF response time	0.1 ms max./0.8 ms max.			
Indicators		TS indicator, I/O indicators  MD6121−6 TS CN 1 2 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	**Dimensions**		30 (W) x 100 (H) x 71 (D)
			Isolation method		Photocoupler isolation
			Insulation resistance		20 MΩ min. between isolated circuits (at 100 VDC)
			Dielectric strength		510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
			I/O power supply method		Supply from external source
			Current capacity of I/O power supply terminal		Without I/O power supply terminals
			NX Unit power consumption		0.70 W max.
			Current consumption from I/O power supply		30 mA max.
			Weight		95 g max.
Circuit layout		CN1 (left) output circuit  +V0 +V0 OUT0 to OUT15 Internal circuits Connector COM0 COM0 NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right) CN2 (right) input circuit  Input indicator 3.3 kΩ IN0 to IN15 Connector COM1 COM1 Internal circuits NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right)			

Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: As shown in the following. • For upright installation Number of simultaneously ON input points vs. Ambient temperature characteristic  • For any installation other than upright Number of simultaneously ON input points vs. Ambient temperature characteristic 

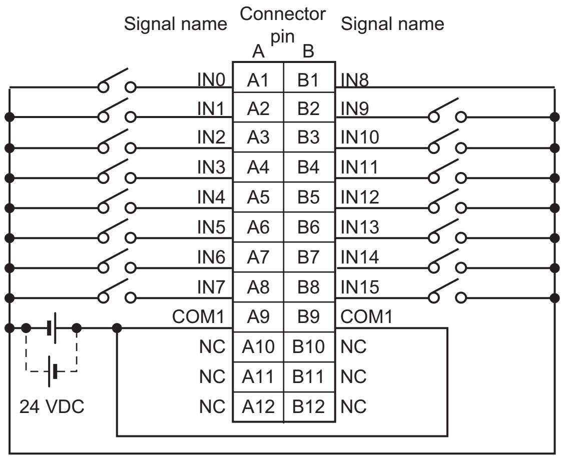
Terminal connection diagram

CN1 (left) output terminal


Signal name
Connector pin
Signal name
B
A
NC B12 A12 NC
NC B11 A11 NC
+V0 B10 A10 +V0
COM0 B9 A9 COM0
OUT15 B8 A8 OUT7
OUT14 B7 A7 OUT6
OUT13 B6 A6 OUT5
OUT12 B5 A5 OUT4
OUT11 B4 A4 OUT3
OUT10 B3 A3 OUT2
OUT9 B2 A2 OUT1
OUT8 B1 A1 OUT0
L
12 to 24 VDC

- Be sure to wire both pins A9 and B9 (COM0) of CN1.
- Be sure to wire both pins A10 and B10 (+V0) of CN1.

CN2 (right) input terminal


Signal name
Connector pin
Signal name
A
B
IN0 A1 B1 IN8
IN1 A2 B2 IN9
IN2 A3 B3 IN10
IN3 A4 B4 IN11
IN4 A5 B5 IN12
IN5 A6 B6 IN13
IN6 A7 B7 IN14
IN7 A8 B8 IN15
COM1 A9 B9 COM1
NC A10 B10 NC
NC A11 B11 NC
NC A12 B12 NC
24 VDC

- The polarity of the input power supply of CN2 can be connected in either direction.
- Be sure to wire both pins A9 and B9 (COM1) of CN2, and set the same polarity for both pins.

Disconnection/Short-circuit detection	Not supported.	**Protective function**	Not supported.

Version Information

NX Units		Corresponding Unit Versions/Versions *		
		EtherCAT		
Model	Unit version	Communications Coupler Units NX-ECC20□	NJ/NX series CPU Units NJ501-□□□□ NJ301-□□□□ NJ101-□□□□ NX701-□□□□	Sysmac Studio
NX-MD6121-5	Ver.1.0	Ver.1.0	Ver.1.05	Ver.1.10
NX-MD6121-6				Ver.1.13
NX-MD6256-5				Ver.1.10

* Some Units do not have all of the versions given in the above table. If a Unit does not have the specified version, support is provided by the oldest available version after the specified version. Refer to the user's manuals for the specific Units for the relation between models and versions.

NX-series Analog Input Unit

NX-AD

Analog Inputs to meet all machine control needs; from general-purpose inputs to high-speed synchronous, high-resolution units

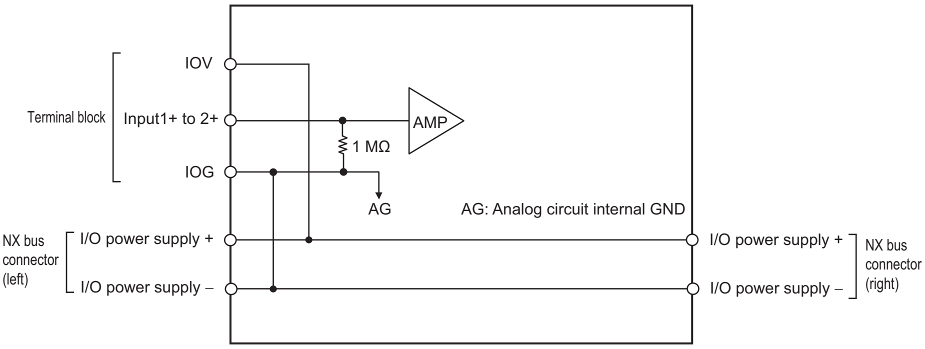
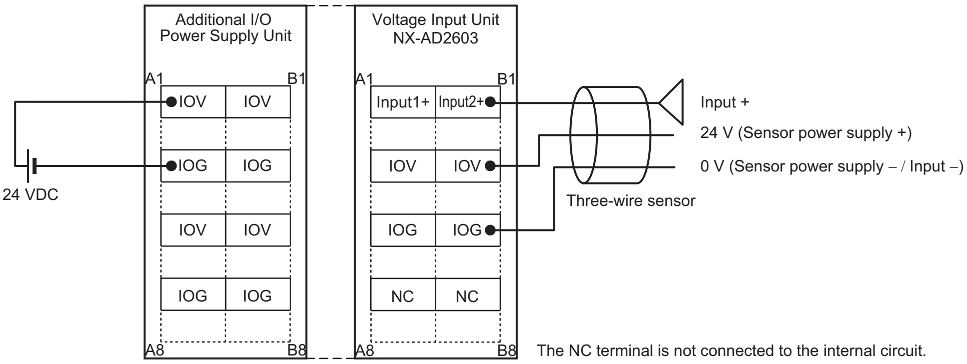
- Analog Input Units for the NX-series modular I/O system.
- Connect to other NX-series I/O Units and EtherCAT Coupler units using the high-speed NX-bus.
- Separate modules for voltage- and current inputs.

Features

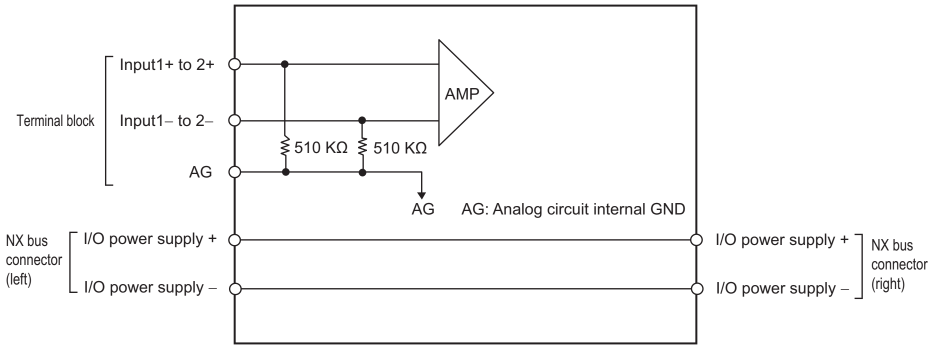
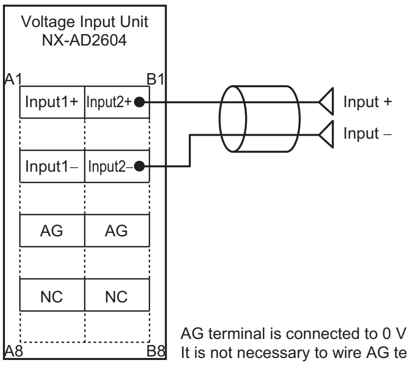
- Up to eight analog inputs per unit.
- Free-run refreshing or synchronous I/O refreshing can be selected using the NX-series EtherCAT Coupler.
- Input update cycles of 10µs per channel, and a resolution of 1/30000, ideal for high-speed measurement and, high-precision control.
- All basic models are available as single-ended and differential-input types.
- The screwless terminal block is detachable for easy commissioning and maintenance.
- Screwless push-in terminal block significantly reduces wiring work.
- All models are just 12 mm wide, saving space in your cabinet.

Analog Input Unit Specifications

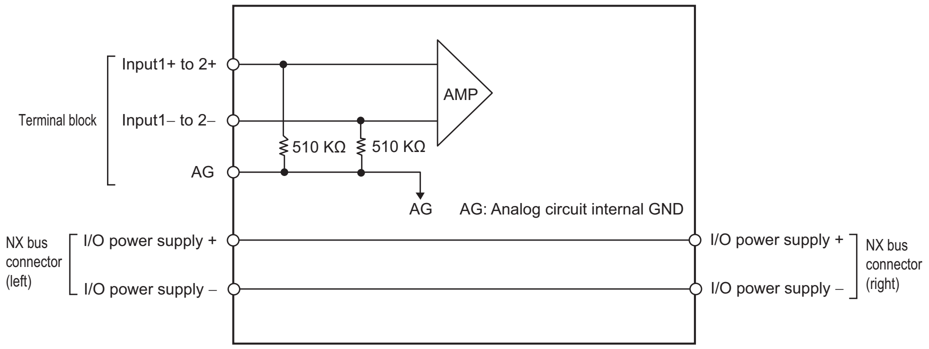
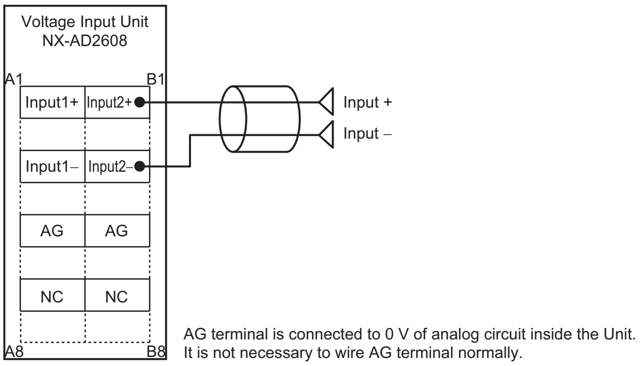
Analog Input Unit (voltage input type) 2 points NX-AD2603

Unit name	Analog Input Unit (voltage input type)	**Model**	NX-AD2603
Capacity	2 points	**External connection terminals**	Screwless clamping terminal block (8 terminals)
I/O refreshing method	Free-Run refreshing		
Indicator	TS indicator 	**Input method**	Single-ended input
		Input range	-10 to +10 V
		Input conversion range	-5 to 105% (full scale)
		Absolute maximum rating	±15 V
		Input impedance	1 MΩ min.
		Resolution	1/8000 (full scale)
		Overall accuracy **25°C**	±0.2% (full scale)
		0 to 55°C	±0.4% (full scale)
		Conversion time	250 μs/point
Dimensions	12 (W) x 100 (H) x 71 (D)	**Isolation method**	Between the input and the NX bus: Power = Transformer, Signal = Digital isolator (no isolation between inputs)
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	Supply from the NX bus	**Current capacity of I/O power supply terminal**	IOV: 0.1 A/terminal max., IOG: 0.1 A/terminal max.
NX Unit power consumption	1.05 W max.	**I/O current consumption**	No consumption
Weight	70 g max.		
Circuit layout	 IOV Terminal block Input1+ to 2+ IOG AMP 1 MΩ AG AG: Analog circuit internal GND NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right)		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 Additional I/O Power Supply Unit A1 B1 IOV IOV IOG IOG IOV IOV IOG IOG A8 B8 24 VDC Voltage Input Unit NX-AD2603 A1 B1 Input1+ Input2+ IOV IOV IOG IOG NC NC A8 B8 Input + 24 V (Sensor power supply +) 0 V (Sensor power supply – / Input –) Three-wire sensor The NC terminal is not connected to the internal circuit.		
Input disconnection detection	Not supported.		

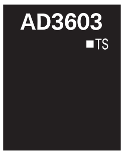
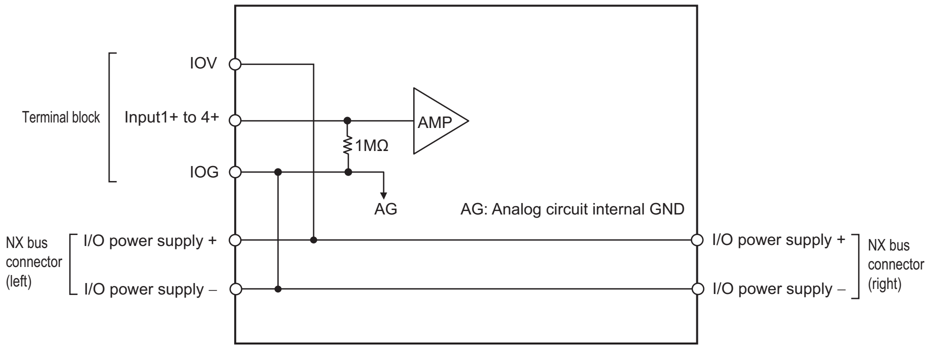
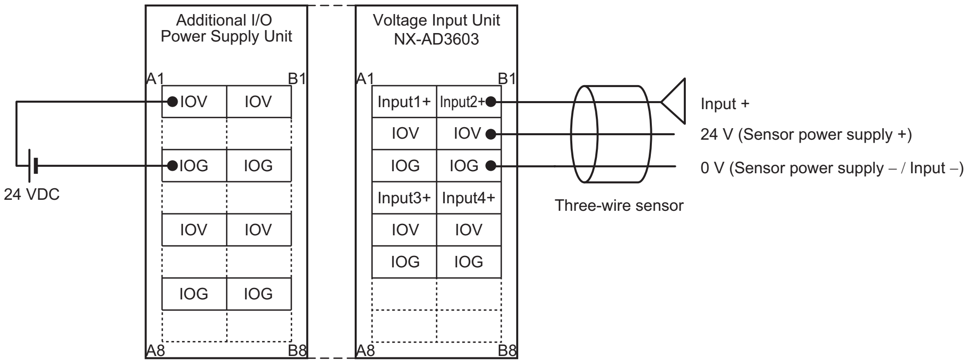
Analog Input Unit (voltage input type) 2 points NX-AD2604

Unit name	Analog Input Unit (voltage input type)	**Model**	NX-AD2604
Capacity	2 points	**External connection terminals**	Screwless clamping terminal block (8 terminals)
I/O refreshing method	Free-Run refreshing		
Indicator	TS indicator 	**Input method**	Differential Input
		Input range	-10 to +10 V
		Input conversion range	-5 to 105% (full scale)
		Absolute maximum rating	±15 V
		Input impedance	1 MΩ min.
		Resolution	1/8000 (full scale)
		Overall accuracy **25°C**	±0.2% (full scale)
		0 to 55°C	±0.4% (full scale)
		Conversion time	250 µs/point
Dimensions	12 (W) x 100 (H) x 71 (D)	**Isolation method**	Between the input and the NX bus: Power = Transformer, Signal = Digital isolator (no isolation between inputs)
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	No supply	**Current capacity of I/O power supply terminal**	Without I/O power supply terminals
NX Unit power consumption	1.05 W max.	**I/O current consumption**	No consumption
Weight	70 g max.		
Circuit layout	 Terminal block Input1+ to 2+ Input1– to 2– AG AMP 510 KΩ 510 KΩ AG AG: Analog circuit internal GND NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right)		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 Voltage Input Unit NX-AD2604 A1 B1 Input1+ Input2+ Input1– Input2– AG AG NC NC A8 B8 Input + Input – AG terminal is connected to 0 V of analog circuit inside the Unit. It is not necessary to wire AG terminal normally.		
Input disconnection detection	Not supported.		

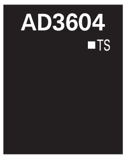
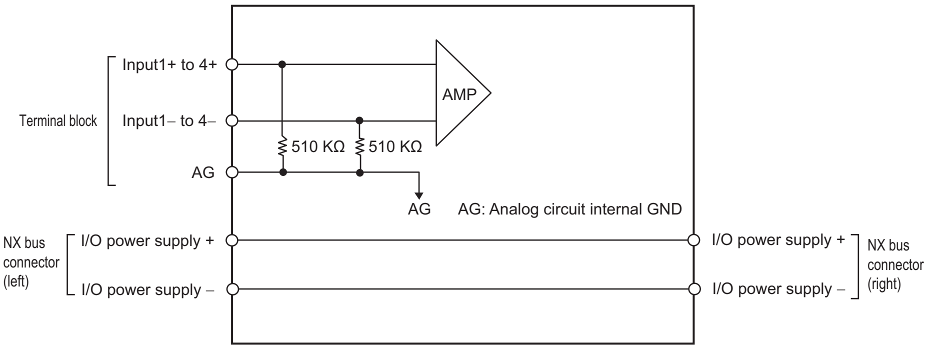
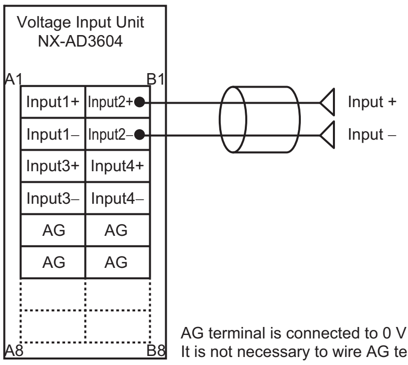
Analog Input Unit (voltage input type) 2 points NX-AD2608

Unit name	Analog Input Unit (voltage input type)	**Model**	NX-AD2608
Capacity	2 points	**External connection terminals**	Screwless clamping terminal block (8 terminals)
I/O refreshing method	Selectable Synchronous I/O refreshing or Free-Run refreshing		
Indicator	TS indicator 	**Input method**	Differential Input
		Input range	-10 to +10 V
		Input conversion range	-5 to 105% (full scale)
		Absolute maximum rating	±15 V
		Input impedance	1 MΩ min.
		Resolution	1/30000 (full scale)
		Overall accuracy **25°C**	±0.1% (full scale)
		0 to 55°C	±0.2% (full scale)
		Conversion time	10 µs/point
Dimensions	12 (W) x 100 (H) x 71 (D)	**Isolation method**	Between the input and the NX bus: Power = Transformer, Signal = Digital isolator (no isolation between inputs)
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	No supply	**Current capacity of I/O power supply terminal**	Without I/O power supply terminals
NX Unit power consumption	1.05 W max.	**I/O current consumption**	No consumption
Weight	70 g max.		
Circuit layout	 Terminal block Input1+ to 2+ Input1– to 2– AG AMP 510 KΩ 510 KΩ AG AG: Analog circuit internal GND NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right)		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 Voltage Input Unit NX-AD2608 A1 B1 Input1+ Input2+ Input1– Input2– AG AG NC NC A8 B8 Input + Input – AG terminal is connected to 0 V of analog circuit inside the Unit. It is not necessary to wire AG terminal normally.		
Input disconnection detection	Not supported.		

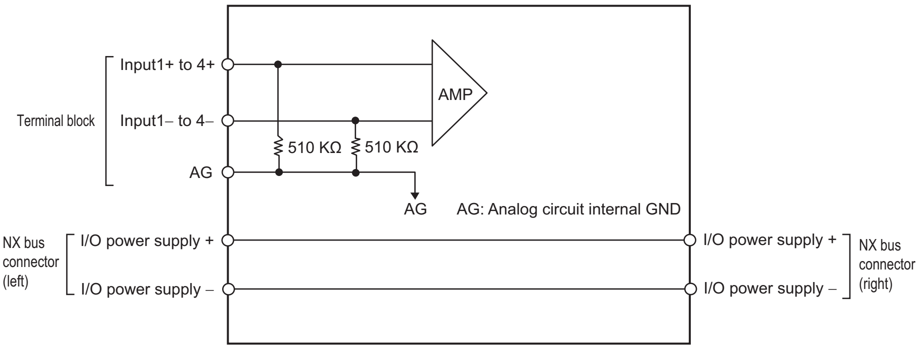
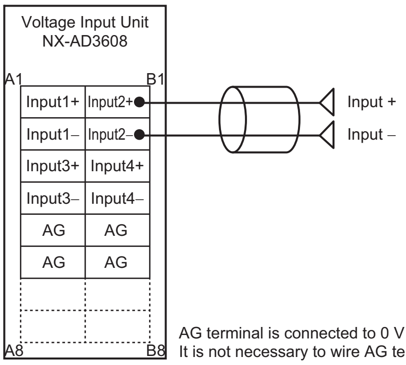
Analog Input Unit (voltage input type) 4 points NX-AD3603

Unit name	Analog Input Unit (voltage input type)	**Model**	NX-AD3603
Capacity	4 points	**External connection terminals**	Screwless clamping terminal block (12 terminals)
I/O refreshing method	Free-Run refreshing		
Indicator	TS indicator 	**Input method**	Single-ended input
		Input range	-10 to +10 V
		Input conversion range	-5 to 105% (full scale)
		Absolute maximum rating	±15 V
		Input impedance	1 MΩ min.
		Resolution	1/8000 (full scale)
		Overall accuracy **25°C**	±0.2% (full scale)
		0 to 55°C	±0.4% (full scale)
		Conversion time	250 µs/point
Dimensions	12 (W) x 100 (H) x 71 (D)	**Isolation method**	Between the input and the NX bus: Power = Transformer, Signal = Digital isolator (no isolation between inputs)
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	Supply from the NX bus	**Current capacity of I/O power supply terminal**	IOV: 0.1 A/terminal max., IOG: 0.1 A/terminal max.
NX Unit power consumption	1.10 W max.	**I/O current consumption**	No consumption
Weight	70 g max.		
Circuit layout	 IOV Terminal block Input1+ to 4+ IOG AMP 1MΩ AG AG: Analog circuit internal GND NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right)		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 Additional I/O Power Supply Unit A1 B1 IOV IOV IOG IOG IOV IOV IOG IOG A8 B8 24 VDC Voltage Input Unit NX-AD3603 A1 B1 Input1+ Input2+ IOV IOV IOG IOG Input3+ Input4+ IOV IOV IOG IOG A8 B8 Three-wire sensor Input + 24 V (Sensor power supply +) 0 V (Sensor power supply – / Input –)		
Input disconnection detection	Not supported.		

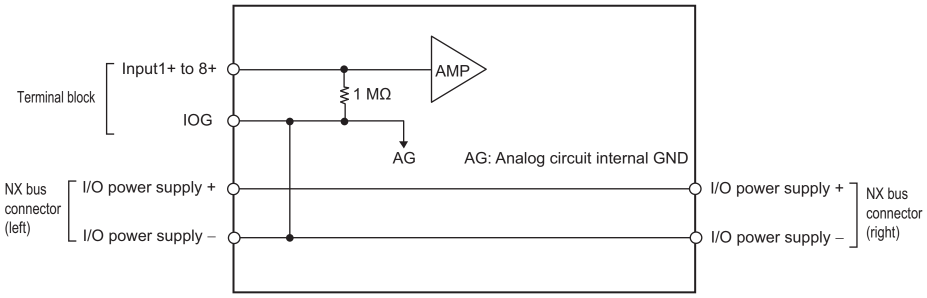
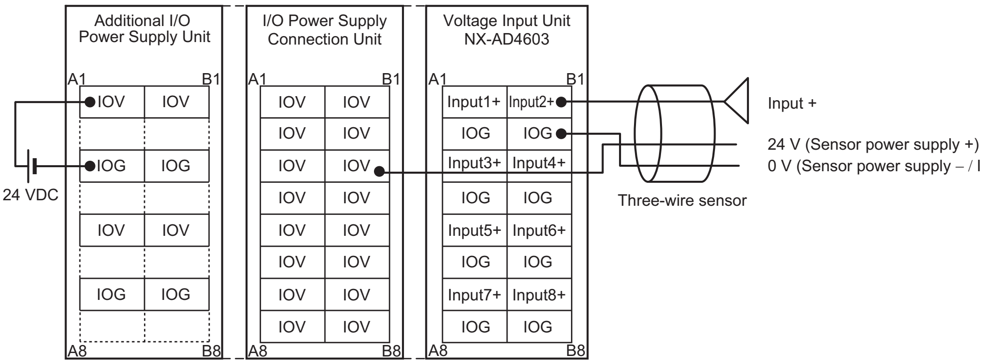
Analog Input Unit (voltage input type) 4 points NX-AD3604

Unit name	Analog Input Unit (voltage input type)	**Model**	NX-AD3604
Capacity	4 points	**External connection terminals**	Screwless clamping terminal block (12 terminals)
I/O refreshing method	Free-Run refreshing		
Indicator	TS indicator  	**Input method**	Differential Input
		Input range	-10 to +10 V
		Input conversion range	-5 to 105% (full scale)
		Absolute maximum rating	±15 V
		Input impedance	1 MΩ min.
		Resolution	1/8000 (full scale)
		Overall accuracy **25°C**	±0.2% (full scale)
		Overall accuracy **0 to 55°C**	±0.4% (full scale)
		Conversion time	250 µs/point
Dimensions	12 (W) x 100 (H) x 71 (D)	**Isolation method**	Between the input and the NX bus: Power = Transformer, Signal = Digital isolator (no isolation between inputs)
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	No supply	**Current capacity of I/O power supply terminal**	Without I/O power supply terminals
NX Unit power consumption	1.10 W max.	**I/O current consumption**	No consumption
Weight	70 g max.		
Circuit layout	 Input1+ to 4+ Terminal block Input1– to 4– AG AMP 510 KΩ 510 KΩ AG AG: Analog circuit internal GND NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right)		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 Voltage Input Unit NX-AD3604 A1 B1 Input1+ Input2+ Input1– Input2– Input3+ Input4+ Input3– Input4– AG AG AG AG A8 B8 Input + Input – AG terminal is connected to 0 V of analog circuit inside the Unit. It is not necessary to wire AG terminal normally.		
Input disconnection detection	Not supported.		

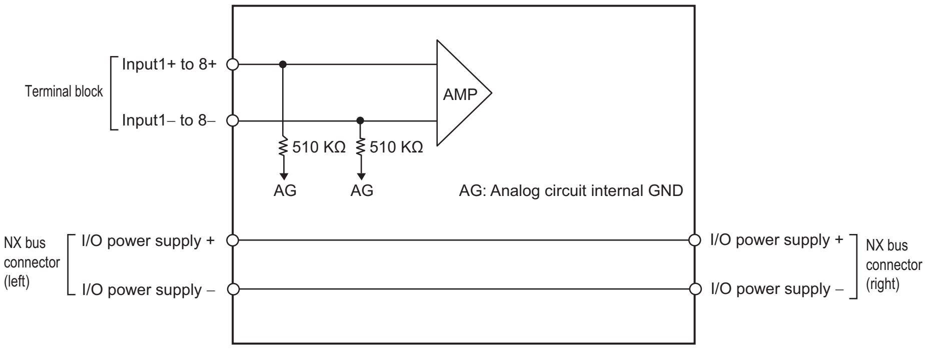
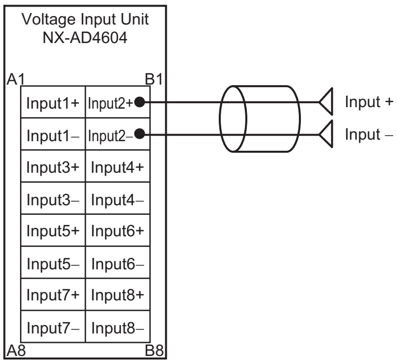
Analog Input Unit (voltage input type) 4 points NX-AD3608

Unit name	Analog Input Unit (voltage input type)	**Model**	NX-AD3608
Capacity	4 points	**External connection terminals**	Screwless clamping terminal block (12 terminals)
I/O refreshing method	Selectable Synchronous I/O refreshing or Free-Run refreshing		
Indicator	TS indicator 	**Input method**	Differential Input
		Input range	-10 to +10 V
		Input conversion range	-5 to 105% (full scale)
		Absolute maximum rating	±15 V
		Input impedance	1 MΩ min.
		Resolution	1/30000 (full scale)
		Overall accuracy **25°C**	±0.1% (full scale)
		0 to 55°C	±0.2% (full scale)
		Conversion time	10 µs/point
Dimensions	12 (W) x 100 (H) x 71 (D)	**Isolation method**	Between the input and the NX bus: Power = Transformer, Signal = Digital isolator (no isolation between inputs)
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	No supply	**Current capacity of I/O power supply terminal**	Without I/O power supply terminals
NX Unit power consumption	1.10 W max.	**I/O current consumption**	No consumption
Weight	70 g max.		
Circuit layout	 Terminal block Input1+ to 4+ Input1– to 4– AG AMP 510 KΩ 510 KΩ AG AG: Analog circuit internal GND NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right)		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 Voltage Input Unit NX-AD3608 A1 B1 Input1+ Input2+ Input1– Input2– Input3+ Input4+ Input3– Input4– AG AG AG AG A8 B8 Input + Input – AG terminal is connected to 0 V of analog circuit inside the Unit. It is not necessary to wire AG terminal normally.		
Input disconnection detection	Not supported.		

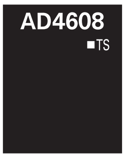
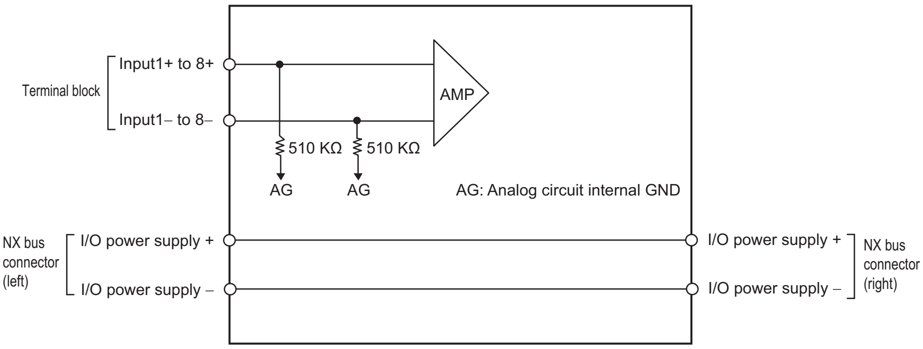
Analog Input Unit (voltage input type) 8 points NX-AD4603

Unit name	Analog Input Unit (voltage input type)	**Model**	NX-AD4603
Capacity	8 points	**External connection terminals**	Screwless clamping terminal block (16 terminals)
I/O refreshing method	Free-Run refreshing		
Indicator	TS indicator	**Input method**	Single-ended input
		Input range	-10 to +10 V
		Input conversion range	-5 to 105% (full scale)
		Absolute maximum rating	±15 V
		Input impedance	1 MΩ min.
		Resolution	1/8000 (full scale)
		Overall accuracy **25°C**	±0.2% (full scale)
		0 to 55°C	±0.4% (full scale)
		Conversion time	250 µs/point
Dimensions	12 (W) x 100 (H) x 71 (D)	**Isolation method**	Between the input and the NX bus: Power = Transformer, Signal = Digital isolator (no isolation between inputs)
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	Supply from the NX bus	**Current capacity of I/O power supply terminal**	IOG: 0.1 A/terminal max.
NX Unit power consumption	1.15 W max.	**I/O current consumption**	No consumption
Weight	70 g max.		
Circuit layout	 Terminal block Input1+ to 8+ IOG 1 MΩ AMP AG AG: Analog circuit internal GND NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right)		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 Additional I/O Power Supply Unit I/O Power Supply Connection Unit Voltage Input Unit NX-AD4603 A1 B1 A8 B8 IOV IOG 24 VDC Input1+ Input2+ Input3+ Input4+ Input5+ Input6+ Input7+ Input8+ Input + 24 V (Sensor power supply +) 0 V (Sensor power supply – / I Three-wire sensor		
Input disconnection detection	Not supported.		

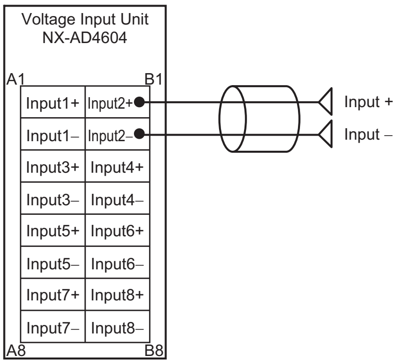
Analog Input Unit (voltage input type) 8 points NX-AD4604

Unit name	Analog Input Unit (voltage input type)	**Model**	NX-AD4604
Capacity	8 points	**External connection terminals**	Screwless clamping terminal block (16 terminals)
I/O refreshing method	Free-Run refreshing		
Indicator	TS indicator 	**Input method**	Differential Input
		Input range	-10 to +10 V
		Input conversion range	-5 to 105% (full scale)
		Absolute maximum rating	±15 V
		Input impedance	1 MΩ min.
		Resolution	1/8000 (full scale)
		Overall accuracy **25°C**	±0.2% (full scale)
		0 to 55°C	±0.4% (full scale)
		Conversion time	250 µs/point
Dimensions	12 (W) x 100 (H) x 71 (D)	**Isolation method**	Between the input and the NX bus: Power = Transformer, Signal = Digital isolator (no isolation between inputs)
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	No supply	**Current capacity of I/O power supply terminal**	Without I/O power supply terminals
NX Unit power consumption	1.15 W max.	**I/O current consumption**	No consumption
Weight	70 g max.		
Circuit layout	 Input1+ to 8+ Terminal block Input1– to 8– AMP 510 KΩ 510 KΩ AG AG AG: Analog circuit internal GND NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right)		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 Voltage Input Unit NX-AD4604 A1 B1 Input1+ Input2+ Input1– Input2– Input3+ Input4+ Input3– Input4– Input5+ Input6+ Input5– Input6– Input7+ Input8+ Input7– Input8– A8 B8 Input + Input –		
Input disconnection detection	Not supported.		

Analog Input Unit (voltage input type) 8 points NX-AD4608

<table>
<tr><td>Unit name</td><td>Analog Input Unit (voltage input type)</td><td colspan="2">Model</td><td>NX-AD4608</td></tr>
<tr><td>Capacity</td><td>8 points</td><td colspan="2">External connection terminals</td><td>Screwless clamping terminal block (16 terminals)</td></tr>
<tr><td>I/O refreshing method</td><td colspan="4">Selectable Synchronous I/O refreshing or Free-Run refreshing</td></tr>
<tr><td rowspan="9">Indicator</td><td rowspan="9">TS indicator
 </td><td colspan="2">Input method</td><td>Differential Input</td></tr>
<tr><td colspan="2">Input range</td><td>-10 to +10 V</td></tr>
<tr><td colspan="2">Input conversion range</td><td>-5 to 105% (full scale)</td></tr>
<tr><td colspan="2">Absolute maximum rating</td><td>±15 V</td></tr>
<tr><td colspan="2">Input impedance</td><td>1 MΩ min.</td></tr>
<tr><td colspan="2">Resolution</td><td>1/30000 (full scale)</td></tr>
<tr><td rowspan="2">Overall accuracy</td><td>25°C</td><td>±0.1% (full scale)</td></tr>
<tr><td>0 to 55°C</td><td>±0.2% (full scale)</td></tr>
<tr><td colspan="2">Conversion time</td><td>10 µs/point</td></tr>
<tr><td>Dimensions</td><td>12 (W) x 100 (H) x 71 (D)</td><td colspan="2">Isolation method</td><td>Between the input and the NX bus: Power = Transformer, Signal = Digital isolator (no isolation between inputs)</td></tr>
<tr><td>Insulation resistance</td><td>20 MΩ min. between isolated circuits (at 100 VDC)</td><td colspan="2">Dielectric strength</td><td>510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.</td></tr>
<tr><td>I/O power supply method</td><td>No supply</td><td colspan="2">Current capacity of I/O power supply terminal</td><td>Without I/O power supply terminals</td></tr>
<tr><td>NX Unit power consumption</td><td>1.15 W max.</td><td colspan="2">I/O current consumption</td><td>No consumption</td></tr>
<tr><td>Weight</td><td colspan="4">70 g max.</td></tr>
<tr><td>Circuit layout</td><td colspan="4">

Terminal block
Input1+ to 8+
Input1– to 8–
AMP
510 KΩ
510 KΩ
AG
AG
AG: Analog circuit internal GND
NX bus connector (left)
I/O power supply +
I/O power supply –
I/O power supply +
I/O power supply –
NX bus connector (right)

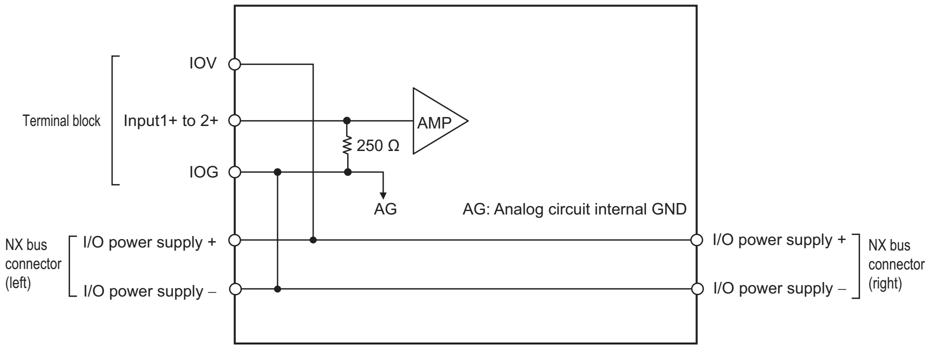
</td></tr>
<tr><td>Installation orientation and restrictions</td><td colspan="4">Installation orientation: Possible in 6 orientations.
Restrictions: No restrictions</td></tr>
<tr><td>Terminal connection diagram</td><td colspan="4">

Voltage Input Unit
NX-AD4604
A1
B1
Input1+
Input2+
Input1–
Input2–
Input3+
Input4+
Input3–
Input4–
Input5+
Input6+
Input5–
Input6–
Input7+
Input8+
Input7–
Input8–
A8
B8
Input +
Input –

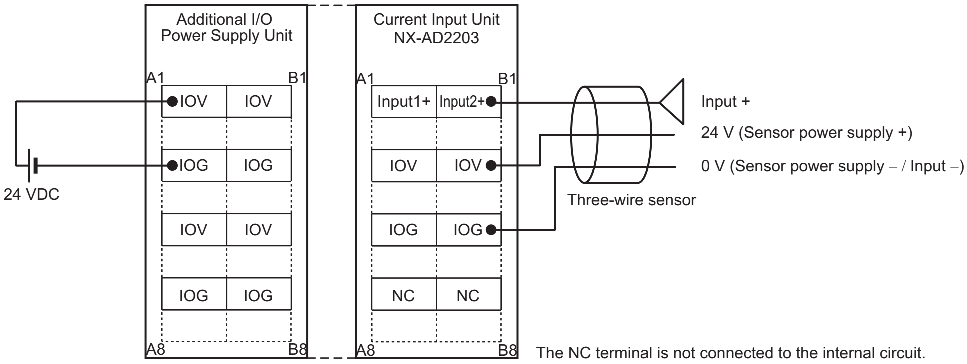
</td></tr>
<tr><td>Input disconnection detection</td><td colspan="4">Not supported.</td></tr>
</table>

Analog Input Unit (current input type) 2 points NX-AD2203

<table>
<tr><td>Unit name</td><td>Analog Input Unit (current input type)</td><td colspan="2">Model</td><td>NX-AD2203</td></tr>
<tr><td>Capacity</td><td>2 points</td><td colspan="2">External connection terminals</td><td>Screwless clamping terminal block (8 terminals)</td></tr>
<tr><td>I/O refreshing method</td><td colspan="4">Free-Run refreshing</td></tr>
<tr><td rowspan="9">Indicator</td><td rowspan="9">TS indicator

 </td><td colspan="2">Input method</td><td>Single-ended input</td></tr>
<tr><td colspan="2">Input range</td><td>4 to 20 mA</td></tr>
<tr><td colspan="2">Input conversion range</td><td>-5 to 105% (full scale)</td></tr>
<tr><td colspan="2">Absolute maximum rating</td><td>±30 mA</td></tr>
<tr><td colspan="2">Input impedance</td><td>250 Ω min.</td></tr>
<tr><td colspan="2">Resolution</td><td>1/8000 (full scale)</td></tr>
<tr><td rowspan="2">Overall accuracy</td><td>25°C</td><td>±0.2% (full scale)</td></tr>
<tr><td>0 to 55°C</td><td>±0.4% (full scale)</td></tr>
<tr><td colspan="2">Conversion time</td><td>250 µs/point</td></tr>
<tr><td>Dimensions</td><td>12 (W) x 100 (H) x 71 (D)</td><td colspan="2">Isolation method</td><td>Between the input and the NX bus: Power = Transformer, Signal = Digital isolator (no isolation between inputs)</td></tr>
<tr><td>Insulation resistance</td><td>20 MΩ min. between isolated circuits (at 100 VDC)</td><td colspan="2">Dielectric strength</td><td>510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.</td></tr>
<tr><td>I/O power supply method</td><td>Supply from the NX bus</td><td colspan="2">Current capacity of I/O power supply terminal</td><td>IOV: 0.1 A/terminal max.,
IOG: 0.1 A/terminal max.</td></tr>
<tr><td>NX Unit power consumption</td><td>0.90 W max.</td><td colspan="2">I/O current consumption</td><td>No consumption</td></tr>
<tr><td>Weight</td><td colspan="4">70 g max.</td></tr>
<tr><td>Circuit layout</td><td colspan="4">

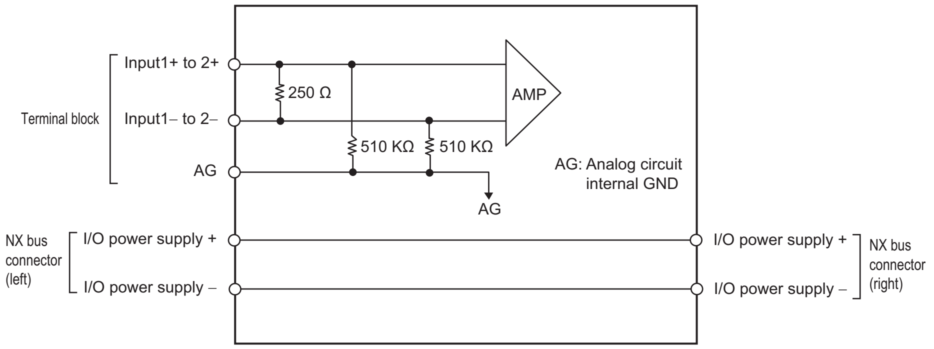
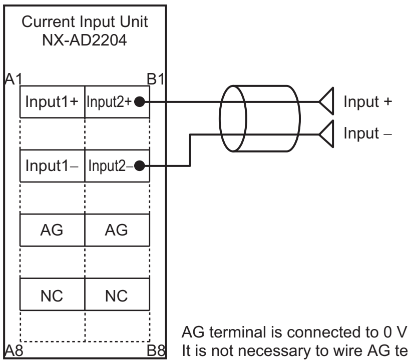
IOV
Terminal block
Input1+ to 2+
IOG
AMP
250 Ω
AG
AG: Analog circuit internal GND
NX bus connector (left)
I/O power supply +
I/O power supply –
I/O power supply +
I/O power supply –
NX bus connector (right)

</td></tr>
<tr><td>Installation orientation and restrictions</td><td colspan="4">Installation orientation: Possible in 6 orientations.
Restrictions: No restrictions</td></tr>
<tr><td>Terminal connection diagram</td><td colspan="4">

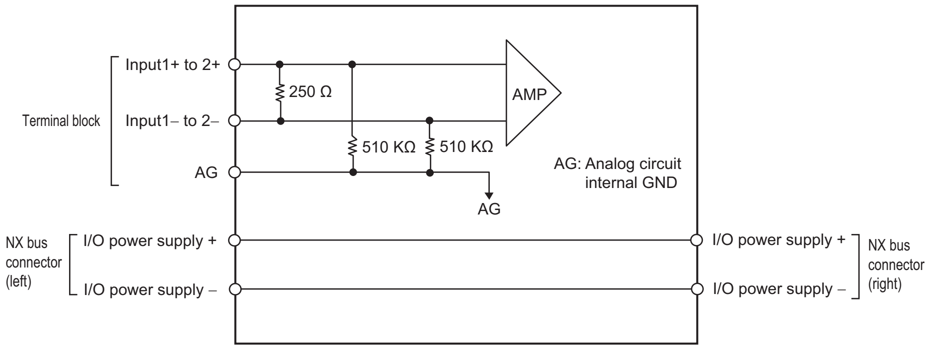
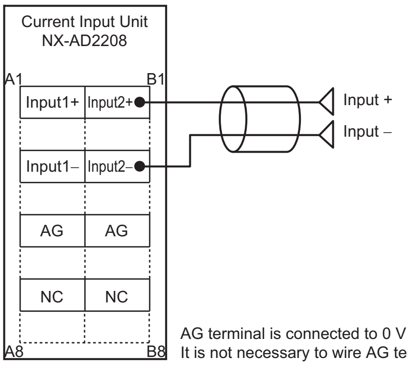
Additional I/O Power Supply Unit
A1
B1
IOV
IOV
IOG
IOG
IOV
IOV
IOG
IOG
A8
B8
24 VDC
Current Input Unit NX-AD2203
A1
B1
Input1+
Input2+
IOV
IOV
IOG
IOG
NC
NC
A8
B8
Input +
24 V (Sensor power supply +)
0 V (Sensor power supply – / Input –)
Three-wire sensor

The NC terminal is not connected to the internal circuit.</td></tr>
<tr><td>Input disconnection detection</td><td colspan="4">Supported.</td></tr>
</table>

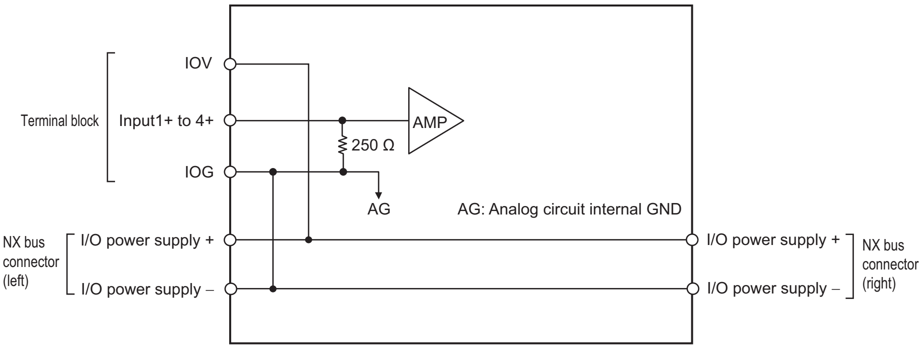
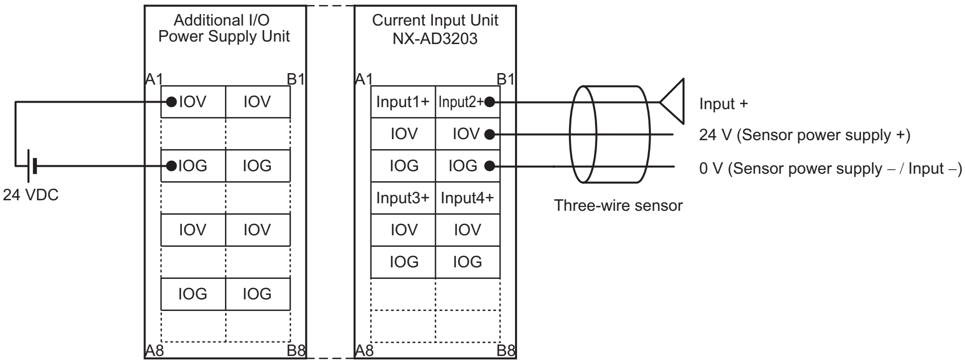
Analog Input Unit (current input type) 2 points NX-AD2204

Unit name	Analog Input Unit (current input type)	**Model**	NX-AD2204
Capacity	2 points	**External connection terminals**	Screwless clamping terminal block (8 terminals)
I/O refreshing method	Free-Run refreshing		
Indicator	TS indicator 	**Input method**	Differential Input
		Input range	4 to 20 mA
		Input conversion range	-5 to 105% (full scale)
		Absolute maximum rating	±30 mA
		Input impedance	250 Ω min.
		Resolution	1/8000 (full scale)
		Overall accuracy **25°C**	±0.2% (full scale)
		0 to 55°C	±0.4% (full scale)
		Conversion time	250 µs/point
Dimensions	12 (W) x 100 (H) x 71 (D)	**Isolation method**	Between the input and the NX bus: Power = Transformer, Signal = Digital isolator (no isolation between inputs)
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	No supply	**Current capacity of I/O power supply terminal**	Without I/O power supply terminals
NX Unit power consumption	0.90 W max.	**I/O current consumption**	No consumption
Weight	70 g max.		
Circuit layout	 Input1+ to 2+ Terminal block Input1– to 2– AG 250 Ω 510 KΩ 510 KΩ AMP AG: Analog circuit internal GND AG NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right)		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 Current Input Unit NX-AD2204 A1 B1 Input1+ Input2+ Input1– Input2– AG AG NC NC A8 B8 Input + Input – AG terminal is connected to 0 V of analog circuit inside the Unit. It is not necessary to wire AG terminal normally.		
Input disconnection detection	Supported.		

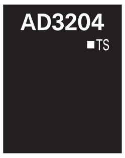
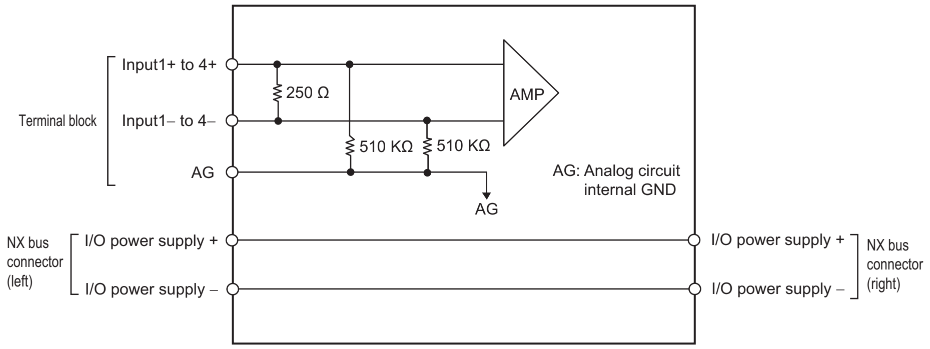
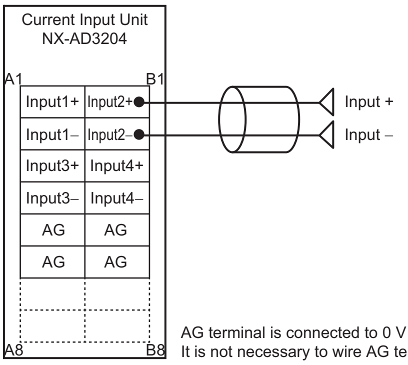
Analog Input Unit (current input type) 2 points NX-AD2208

Unit name	Analog Input Unit (current input type)	**Model**		NX-AD2208
Capacity	2 points	**External connection terminals**		Screwless clamping terminal block (8 terminals)
I/O refreshing method	Selectable Synchronous I/O refreshing or Free-Run refreshing			
Indicator	TS indicator 	**Input method**		Differential Input
		Input range		4 to 20 mA
		Input conversion range		-5 to 105% (full scale)
		Absolute maximum rating		±30 mA
		Input impedance		250 Ω
		Resolution		1/30000 (full scale)
		Overall accuracy	**25°C**	±0.1% (full scale)
			0 to 55°C	±0.2% (full scale)
		Conversion time		10 µs/point
Dimensions	12 (W) x 100 (H) x 71 (D)	**Isolation method**		Between the input and the NX bus: Power = Transformer, Signal = Digital isolator (no isolation between inputs)
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**		510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	No supply	**Current capacity of I/O power supply terminal**		Without I/O power supply terminals
NX Unit power consumption	0.90 W max.	**I/O current consumption**		No consumption
Weight	70 g max.			
Circuit layout	 Terminal block Input1+ to 2+ Input1– to 2– AG 250 Ω 510 KΩ 510 KΩ AMP AG AG: Analog circuit internal GND NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right)			
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions			
Terminal connection diagram	 Current Input Unit NX-AD2208 A1 B1 Input1+ Input2+ Input1– Input2– AG AG NC NC A8 B8 Input + Input –AG terminal is connected to 0 V of analog circuit inside the Unit. It is not necessary to wire AG terminal normally.			
Input disconnection detection	Supported.			

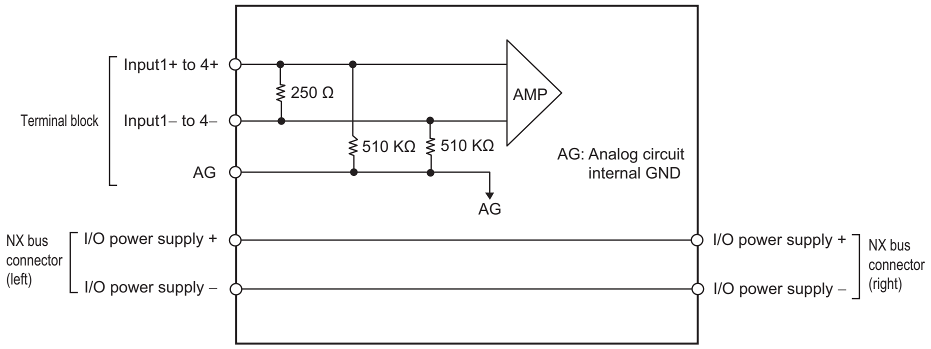
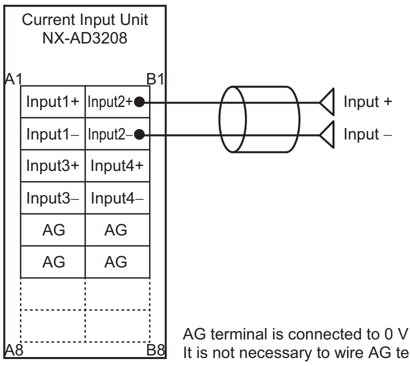
Analog Input Unit (current input type) 4 points NX-AD3203

Unit name	Analog Input Unit (current input type)	**Model**	NX-AD3203
Capacity	4 points	**External connection terminals**	Screwless clamping terminal block (12 terminals)
I/O refreshing method	Free-Run refreshing		
Indicator	TS indicator 	**Input method**	Single-ended input
		Input range	4 to 20 mA
		Input conversion range	-5 to 105% (full scale)
		Absolute maximum rating	±30 mA
		Input impedance	250 Ω min.
		Resolution	1/8000 (full scale)
		Overall accuracy **25°C**	±0.2% (full scale)
		0 to 55°C	±0.4% (full scale)
		Conversion time	250 μs/point
Dimensions	12 (W) x 100 (H) x 71 (D)	**Isolation method**	Between the input and the NX bus: Power = Transformer, Signal = Digital isolator (no isolation between inputs)
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	Supply from the NX bus	**Current capacity of I/O power supply terminal**	IOV: 0.1 A/terminal max., IOG: 0.1 A/terminal max.
NX Unit power consumption	0.90 W max.	**I/O current consumption**	No consumption
Weight	70 g max.		
Circuit layout	 IOV Terminal block Input1+ to 4+ IOG AMP 250 Ω AG AG: Analog circuit internal GND NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right)		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 Additional I/O Power Supply Unit A1 B1 IOV IOV IOG IOG IOV IOV IOG IOG A8 B8 24 VDC Current Input Unit NX-AD3203 A1 B1 Input1+ Input2+ IOV IOV IOG IOG Input3+ Input4+ IOV IOV IOG IOG A8 B8 Input + 24 V (Sensor power supply +) 0 V (Sensor power supply – / Input –) Three-wire sensor		
Input disconnection detection	Supported.		

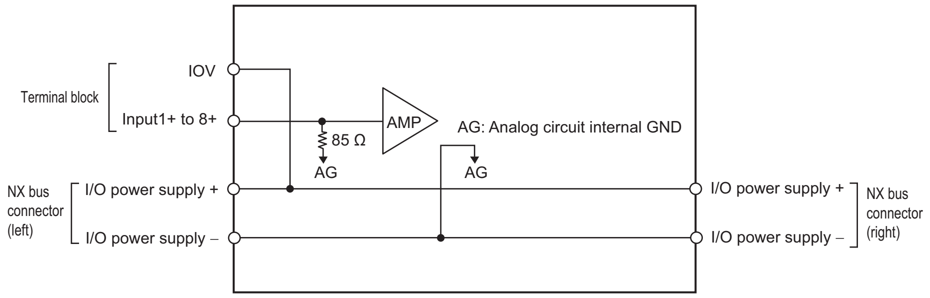
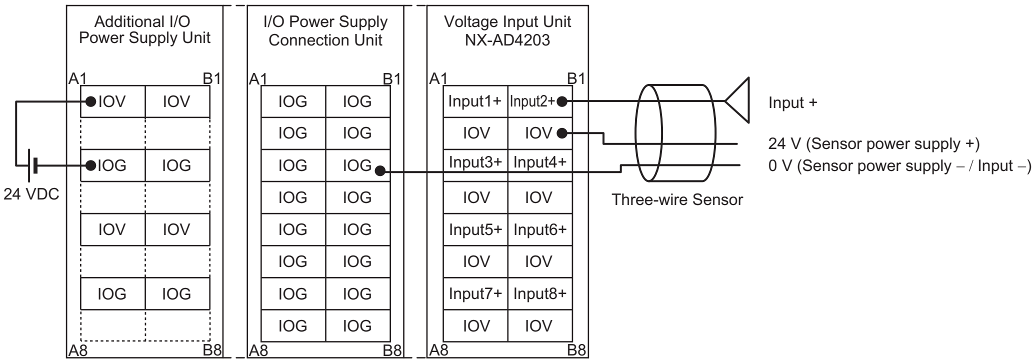
Analog Input Unit (current input type) 4 points NX-AD3204

Unit name	Analog Input Unit (current input type)	**Model**	NX-AD3204
Capacity	4 points	**External connection terminals**	Screwless clamping terminal block (12 terminals)
I/O refreshing method	Free-Run refreshing		
Indicator	TS indicator 	**Input method**	Differential Input
		Input range	4 to 20 mA
		Input conversion range	-5 to 105% (full scale)
		Absolute maximum rating	±30 mA
		Input impedance	250 Ω min.
		Resolution	1/8000 (full scale)
		Overall accuracy **25°C**	±0.2% (full scale)
		Overall accuracy **0 to 55°C**	±0.4% (full scale)
		Conversion time	250 µs/point
Dimensions	12 (W) x 100 (H) x 71 (D)	**Isolation method**	Between the input and the NX bus: Power = Transformer, Signal = Digital isolator (no isolation between inputs)
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	No supply	**Current capacity of I/O power supply terminal**	Without I/O power supply terminals
NX Unit power consumption	0.90 W max.	**I/O current consumption**	No consumption
Weight	70 g max.		
Circuit layout	 Terminal block Input1+ to 4+ Input1– to 4– AG 250 Ω 510 KΩ 510 KΩ AMP AG: Analog circuit internal GND AG NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right)		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 Current Input Unit NX-AD3204 A1 B1 Input1+ Input2+ Input1– Input2– Input3+ Input4+ Input3– Input4– AG AG AG AG A8 B8 Input + Input – AG terminal is connected to 0 V of analog circuit inside the Unit. It is not necessary to wire AG terminal normally.		
Input disconnection detection	Supported.		

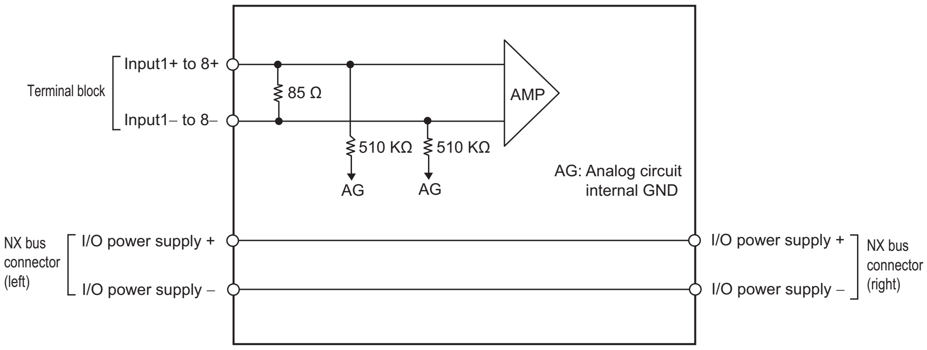
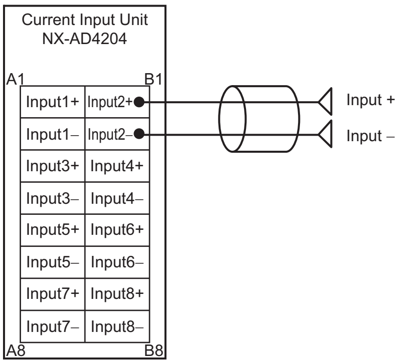
Analog Input Unit (current input type) 4 points NX-AD3208

Unit name	Analog Input Unit (current input type)	**Model**	NX-AD3208
Capacity	4 points	**External connection terminals**	Screwless clamping terminal block (12 terminals)
I/O refreshing method	Selectable Synchronous I/O refreshing or Free-Run refreshing		
Indicator	TS indicator	**Input method**	Differential Input
		Input range	4 to 20 mA
		Input conversion range	-5 to 105% (full scale)
		Absolute maximum rating	±30 mA
		Input impedance	250 Ω min.
		Resolution	1/30000 (full scale)
		Overall accuracy **25°C**	±0.1% (full scale)
		0 to 55°C	±0.2% (full scale)
		Conversion time	10 µs/point
Dimensions	12 (W) x 100 (H) x 71 (D)	**Isolation method**	Between the input and the NX bus: Power = Transformer, Signal = Digital isolator (no isolation between inputs)
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	No supply	**Current capacity of I/O power supply terminal**	Without I/O power supply terminals
NX Unit power consumption	0.95 W max.	**I/O current consumption**	No consumption
Weight	70 g max.		
Circuit layout	 Terminal block Input1+ to 4+ Input1– to 4– AG 250 Ω 510 KΩ 510 KΩ AMP AG: Analog circuit internal GND AG NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right)		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 Current Input Unit NX-AD3208 A1 B1 Input1+ Input2+ Input1– Input2– Input3+ Input4+ Input3– Input4– AG AG AG AG A8 B8 Input + Input – AG terminal is connected to 0 V of analog circuit inside the Unit. It is not necessary to wire AG terminal normally.		
Input disconnection detection	Supported.		

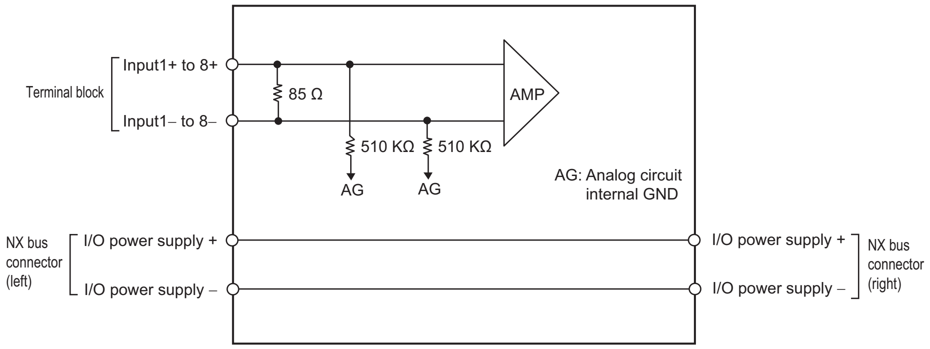
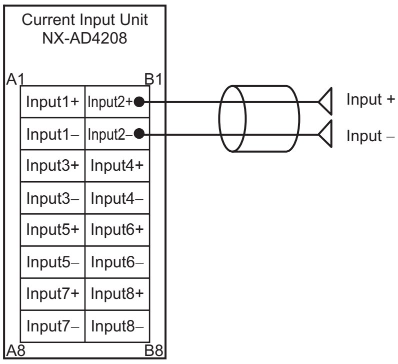
Analog Input Unit (current input type) 8 points NX-AD4203

Unit name	Analog Input Unit (current input type)	**Model**	NX-AD4203
Capacity	8 points	**External connection terminals**	Screwless clamping terminal block (16 terminals)
I/O refreshing method	Free-Run refreshing		
Indicator	TS indicator 	**Input method**	Single-ended input
		Input range	4 to 20 mA
		Input conversion range	-5 to 105% (full scale)
		Absolute maximum rating	±30 mA
		Input impedance	85 Ω
		Resolution	1/8000 (full scale)
		Overall accuracy **25°C**	±0.2% (full scale)
		Overall accuracy **0 to 55°C**	±0.4% (full scale)
		Conversion time	250 µs/point
Dimensions	12 (W) x 100 (H) x 71 (D)	**Isolation method**	Between the input and the NX bus: Power = Transformer, Signal = Digital isolator (no isolation between inputs)
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	Supply from the NX bus	**Current capacity of I/O power supply terminal**	IOV: 0.1 A/terminal max.
NX Unit power consumption	1.05 W max.	**I/O current consumption**	No consumption
Weight	70 g max.		
Circuit layout	 Terminal block IOV Input1+ to 8+ 85 Ω AG AMP AG: Analog circuit internal GND AG NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right)		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 Additional I/O Power Supply Unit A1 B1 IOV IOV IOG IOG IOV IOV IOG IOG A8 B8 24 VDC I/O Power Supply Connection Unit A1 B1 IOG IOG A8 B8 Voltage Input Unit NX-AD4203 A1 B1 Input1+ Input2+ IOV IOV Input3+ Input4+ IOV IOV Input5+ Input6+ IOV IOV Input7+ Input8+ IOV IOV A8 B8 Input + 24 V (Sensor power supply +) 0 V (Sensor power supply – / Input –) Three-wire Sensor		
Input disconnection detection	Supported.		

Analog Input Unit (current input type) 8 points NX-AD4204

Unit name	Analog Input Unit (current input type)	**Model**	NX-AD4204
Capacity	8 points	**External connection terminals**	Screwless clamping terminal block (16 terminals)
I/O refreshing method	Free-Run refreshing		
Indicator	TS indicator 	**Input method**	Differential Input
		Input range	4 to 20 mA
		Input conversion range	-5 to 105% (full scale)
		Absolute maximum rating	±30 mA
		Input impedance	85 Ω
		Resolution	1/8000 (full scale)
		Overall accuracy **25°C**	±0.2% (full scale)
		0 to 55°C	±0.4% (full scale)
		Conversion time	250 µs/point
Dimensions	12 (W) x 100 (H) x 71 (D)	**Isolation method**	Between the input and the NX bus: Power = Transformer, Signal = Digital isolator (no isolation between inputs)
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	No supply	**Current capacity of I/O power supply terminal**	Without I/O power supply terminals
NX Unit power consumption	1.05 W max.	**I/O current consumption**	No consumption
Weight	70 g max.		
Circuit layout	 Terminal block Input1+ to 8+ Input1– to 8– 85 Ω AMP 510 KΩ 510 KΩ AG AG AG: Analog circuit internal GND NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right)		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 Current Input Unit NX-AD4204 A1 B1 Input1+ Input2+ Input1– Input2– Input3+ Input4+ Input3– Input4– Input5+ Input6+ Input5– Input6– Input7+ Input8+ Input7– Input8– A8 B8 Input + Input –		
Input disconnection detection	Supported.		

Analog Input Unit (current input type) 8 points NX-AD4208

Unit name	Analog Input Unit (current input type)	**Model**	NX-AD4208
Capacity	8 points	**External connection terminals**	Screwless clamping terminal block (16 terminals)
I/O refreshing method	Selectable Synchronous I/O refreshing or Free-Run refreshing		
Indicator	TS indicator	**Input method**	Differential Input
		Input range	4 to 20 mA
		Input conversion range	-5 to 105% (full scale)
		Absolute maximum rating	±30 mA
		Input impedance	85 Ω
		Resolution	1/30000 (full scale)
		Overall accuracy 25°C	±0.1% (full scale)
		Overall accuracy 0 to 55°C	±0.2% (full scale)
		Conversion time	10 µs/point
Dimensions	12 (W) x 100 (H) x 71 (D)	**Isolation method**	Between the input and the NX bus: Power = Transformer, Signal = Digital isolator (no isolation between inputs)
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	No supply	**Current capacity of I/O power supply terminal**	Without I/O power supply terminals
NX Unit power consumption	1.10 W max.	**I/O current consumption**	No consumption
Weight	70 g max.		
Circuit layout	 Input1+ to 8+ Terminal block Input1– to 8– 85 Ω AMP 510 KΩ 510 KΩ AG AG AG: Analog circuit internal GND NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right)		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 Current Input Unit NX-AD4208 A1 B1 Input1+ Input2+ Input1– Input2– Input3+ Input4+ Input3– Input4– Input5+ Input6+ Input5– Input6– Input7+ Input8+ Input7– Input8– A8 B8 Input + Input –		
Input disconnection detection	Supported.		

Version Information

NX Unit		Corresponding unit versions/versions		
Model	**Unit Version**	**EtherCAT Coupler Units NX-ECC20□ ***	**NJ/NX-series CPU Units NJ501-□□□□/NJ301-□□□□ NJ101-□□□□/NX701-□□□□**	**Sysmac Studio**
NX-AD□□□□	Ver.1.0	Version 1.0 or later	Version 1.05 or later	Version 1.06 or higher

* For the NX-ECC202, there is no unit version of 1.1 or earlier.

NX-series Analog Output Unit

NX-DA

Analog Outputs to meet all machine control needs; from general-purpose outputs to high-speed synchronous, high-resolution control outputs

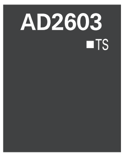
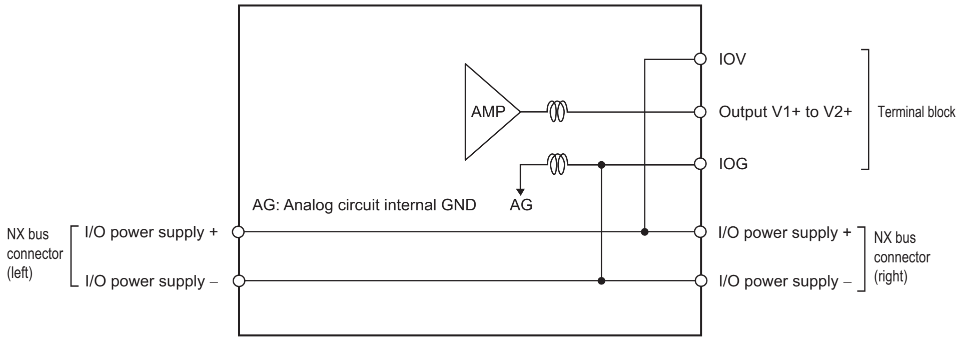
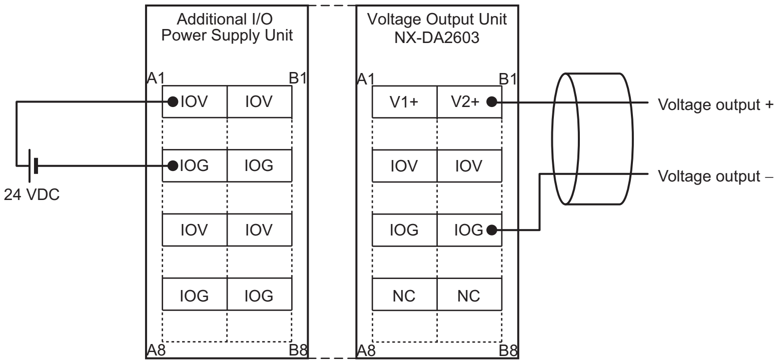
- Analog Output Units for the NX-series modular I/O system.
- Connect to other NX-series I/O Units and EtherCAT Coupler units using the high-speed NX-bus.
- Separate modules for voltage- and current outputs.

Features

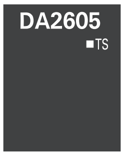
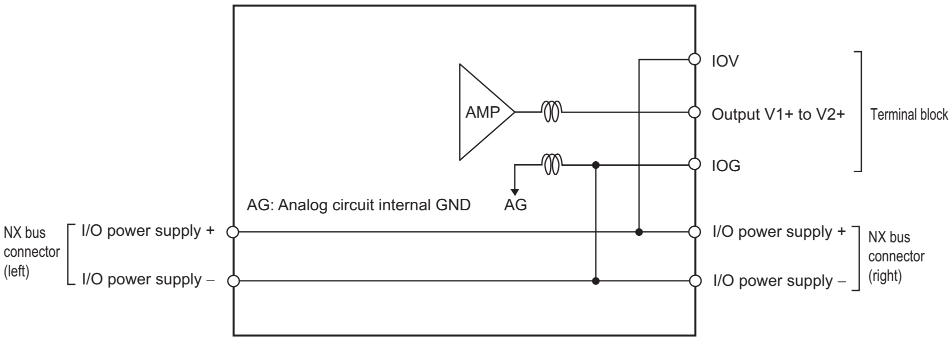
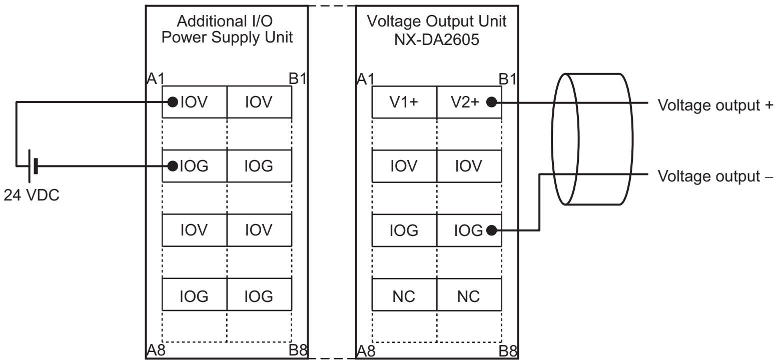
- Up to four analog outputs per unit.
- Free-run refreshing or synchronous I/O refreshing can be selected using the NX-series EtherCAT Coupler.
- Output update cycles of 10 µs per channel, and resolution of 1/30000, ideal for high-speed, high-precision control.
- The screwless terminal block is detachable for easy commissioning and maintenance.
- Screwless push-in terminal block significantly reduces wiring work.
- All models are just 12 mm wide, saving space in your cabinet.

Analog Output Unit Specifications

Analog Output Unit (voltage output type) 2points NX-DA2603

Unit name	Analog Output Unit (voltage output type)	**Model**	NX-DA2603
Capacity	2 points	**External connection terminals**	Screwless clamping terminal block (8 terminals)
I/O refreshing method	Free-Run refreshing		
Indicator	TS indicator  	**Output range**	-10 to +10 V
		Output conversion range	-5 to 105% (full scale)
		Allowable load resistance	5 kΩ min.
		Output impedance	0.5 Ω max.
		Resolution	1/8000 (full scale)
		Overall accuracy **25°C**	±0.3% (full scale)
		0 to 55°C	±0.5% (full scale)
		Conversion time	250 µs/point
Dimensions	12 (W) x 100 (H) x 71 (D)	**Isolation method**	Between the input and the NX bus: Power = Transformer, Signal = Digital isolator (no isolation between inputs)
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	Supply from the NX bus	**Current capacity of I/O power supply terminal**	IOV: 0.1 A/terminal max., IOG: 0.1 A/terminal max.
NX Unit power consumption	1.10 W max.	**I/O current consumption**	No consumption
Weight	70 g max.		
Circuit layout	 IOV AMP Output V1+ to V2+ Terminal block IOG AG: Analog circuit internal GND AG NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right)		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 Additional I/O Power Supply Unit A1 B1 IOV IOV IOG IOG IOV IOV IOG IOG A8 B8 24 VDC Voltage Output Unit NX-DA2603 A1 B1 V1+ V2+ IOV IOV IOG IOG NC NC A8 B8 Voltage output + Voltage output –		

Analog Output Unit (voltage output type) 2points NX-DA2605

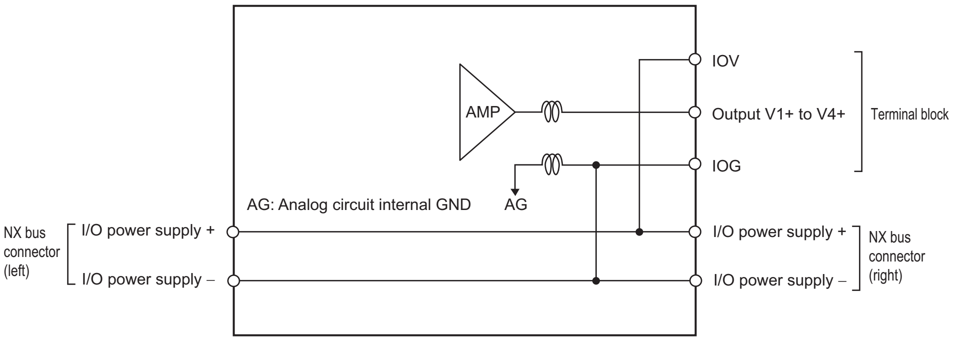
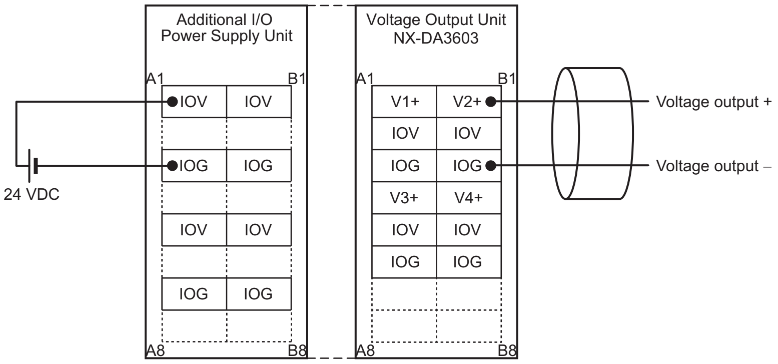
Unit name	Analog Output Unit (voltage output type)	**Model**	NX-DA2605
Capacity	2 points	**External connection terminals**	Screwless clamping terminal block (8 terminals)
I/O refreshing method	Selectable Synchronous I/O refreshing or Free-Run refreshing		
Indicator	TS indicator 	**Output range**	-10 to +10 V
		Output conversion range	-5 to 105% (full scale)
		Allowable load resistance	5 kΩ min.
		Output impedance	0.5 Ω max.
		Resolution	1/30000 (full scale)
		Overall accuracy **25°C**	±0.1% (full scale)
		0 to 55°C	±0.3% (full scale)
		Conversion time	10 μs/point
Dimensions	12 (W) x 100 (H) x 71 (D)	**Isolation method**	Between the input and the NX bus: Power = Transformer, Signal = Digital isolator (no isolation between inputs)
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	Supply from the NX bus	**Current capacity of I/O power supply terminal**	IOV: 0.1 A/terminal max., IOG: 0.1 A/terminal max.
NX Unit power consumption	1.10 W max.	**I/O current consumption**	No consumption
Weight	70 g max.		
Circuit layout			
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram			

DA2605
■TS

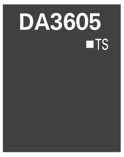
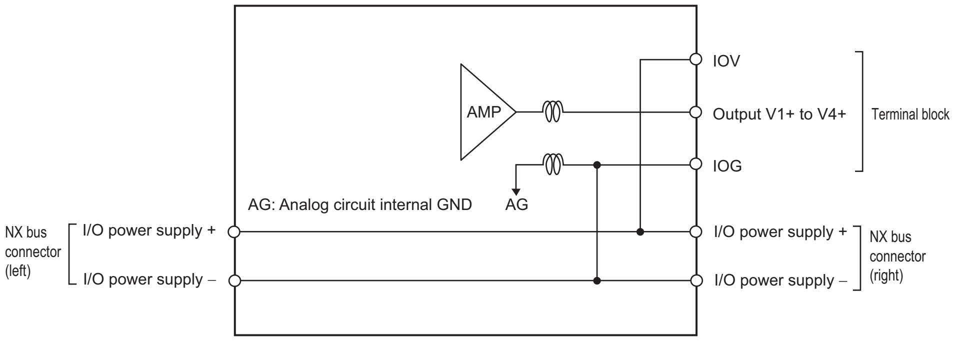
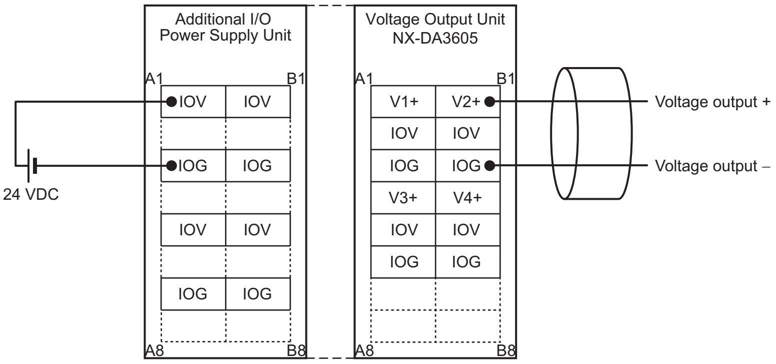
IOV
AMP
Output V1+ to V2+
Terminal block
IOG
AG: Analog circuit internal GND
AG
NX bus connector (left)
I/O power supply +
I/O power supply –
I/O power supply +
I/O power supply –
NX bus connector (right)

Additional I/O Power Supply Unit
A1
B1
IOV
IOV
IOG
IOG
IOV
IOV
IOG
IOG
A8
B8
24 VDC
Voltage Output Unit NX-DA2605
A1
B1
V1+
V2+
IOV
IOV
IOG
IOG
NC
NC
A8
B8
Voltage output +
Voltage output –

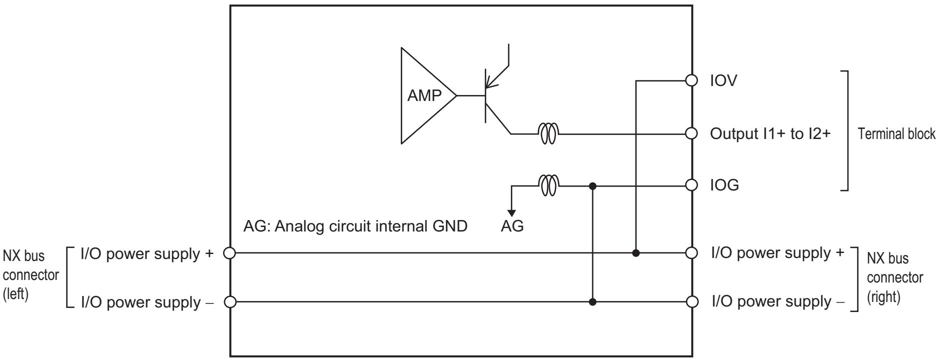
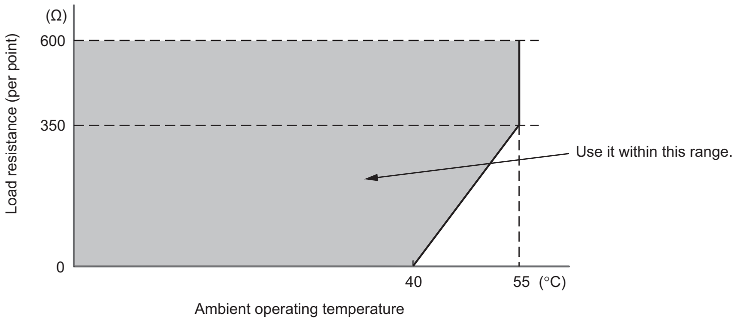
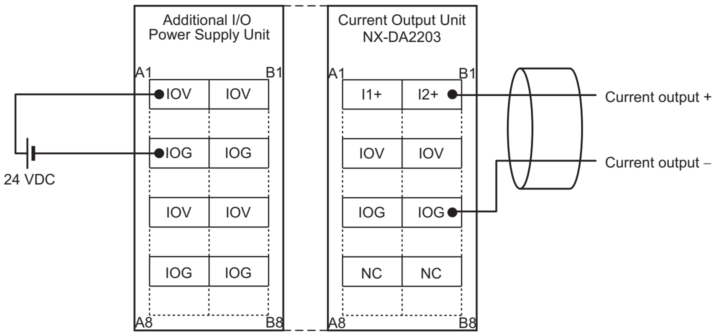
Analog Output Unit (voltage output type) 4points NX-DA3603

Unit name	Analog Output Unit (voltage output type)	**Model**	NX-DA3603
Capacity	4 points	**External connection terminals**	Screwless clamping terminal block (12 terminals)
I/O refreshing method	Free-Run refreshing		
Indicator	TS indicator 	**Output range**	-10 to +10 V
		Output conversion range	-5 to 105% (full scale)
		Allowable load resistance	5 kΩ min.
		Output impedance	0.5 Ω max.
		Resolution	1/8000 (full scale)
		Overall accuracy **25°C**	±0.3% (full scale)
		0 to 55°C	±0.5% (full scale)
		Conversion time	250 µs/point
Dimensions	12 (W) x 100 (H) x 71 (D)	**Isolation method**	Between the input and the NX bus: Power = Transformer, Signal = Digital isolator (no isolation between inputs)
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	Supply from the NX bus	**Current capacity of I/O power supply terminal**	IOV: 0.1 A/terminal max., IOG: 0.1 A/terminal max.
NX Unit power consumption	1.25 W max.	**I/O current consumption**	No consumption
Weight	70 g max.		
Circuit layout	 IOV AMP Output V1+ to V4+ Terminal block IOG AG: Analog circuit internal GND AG NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right)		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 Additional I/O Power Supply Unit A1 B1 IOV IOV IOG IOG IOV IOV IOG IOG A8 B8 24 VDC Voltage Output Unit NX-DA3603 A1 B1 V1+ V2+ IOV IOV IOG IOG V3+ V4+ IOV IOV IOG IOG A8 B8 Voltage output + Voltage output –		

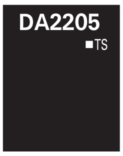
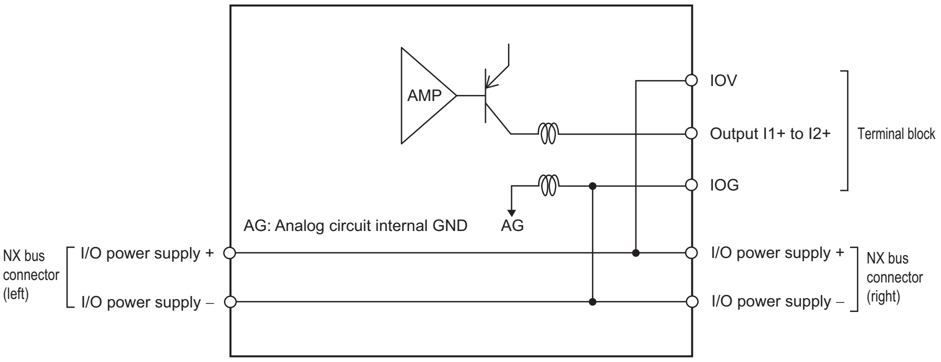
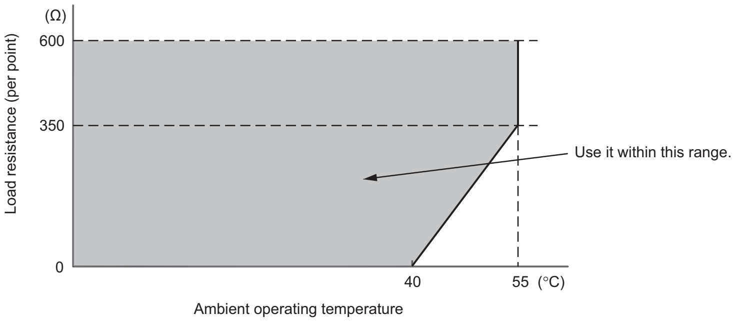
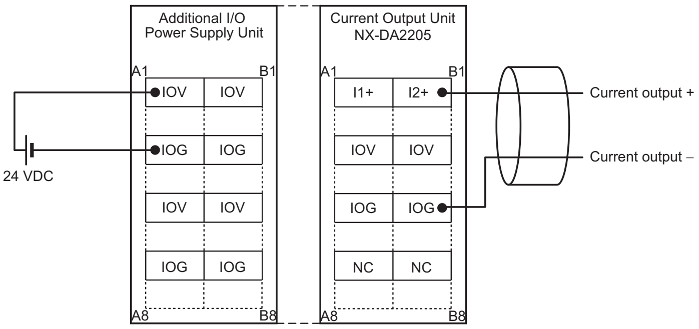
Analog Output Unit (voltage output type) 4points NX-DA3605

Unit name	Analog Output Unit (voltage output type)	**Model**	NX-DA3605
Capacity	4 points	**External connection terminals**	Screwless clamping terminal block (12 terminals)
I/O refreshing method	Selectable Synchronous I/O refreshing or Free-Run refreshing		
Indicator	TS indicator 	**Output range**	-10 to +10 V
		Output conversion range	-5 to 105% (full scale)
		Allowable load resistance	5 kΩ min.
		Output impedance	0.5 Ω max.
		Resolution	1/30000 (full scale)
		Overall accuracy 25°C	±0.1% (full scale)
		Overall accuracy 0 to 55°C	±0.3% (full scale)
		Conversion time	10 µs/point
Dimensions	12 (W) x 100 (H) x 71 (D)	**Isolation method**	Between the input and the NX bus: Power = Transformer, Signal = Digital isolator (no isolation between inputs)
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	Supply from the NX bus	**Current capacity of I/O power supply terminal**	IOV: 0.1 A/terminal max., IOG: 0.1 A/terminal max.
NX Unit power consumption	1.25 W max.	**I/O current consumption**	No consumption
Weight	70 g max.		
Circuit layout	 IOV AMP Output V1+ to V4+ Terminal block IOG AG: Analog circuit internal GND AG NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right)		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 Additional I/O Power Supply Unit A1 B1 IOV IOV IOG IOG IOV IOV IOG IOG A8 B8 24 VDC Voltage Output Unit NX-DA3605 A1 B1 V1+ V2+ IOV IOV IOG IOG V3+ V4+ IOV IOV IOG IOG A8 B8 Voltage output + Voltage output –		

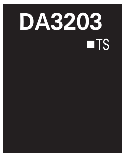
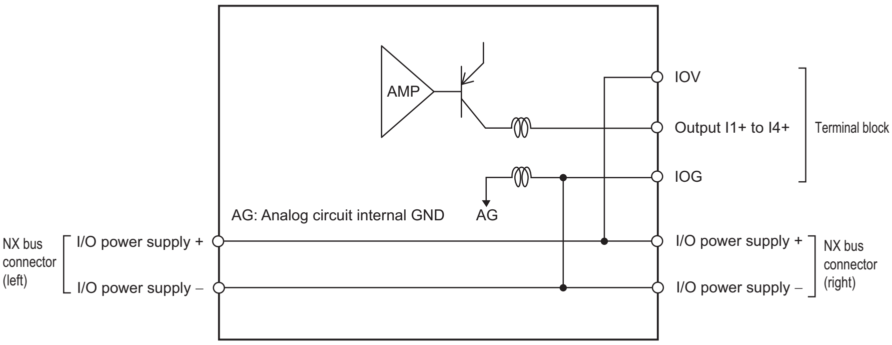
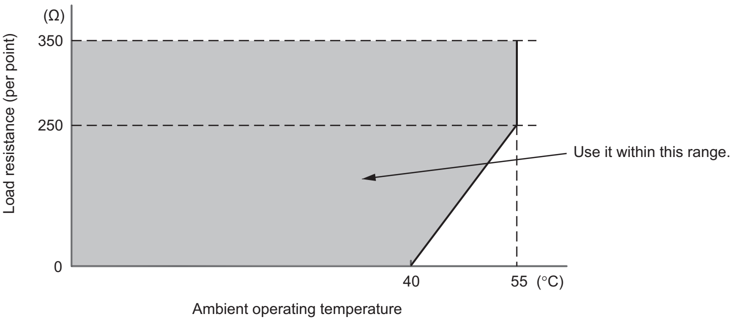
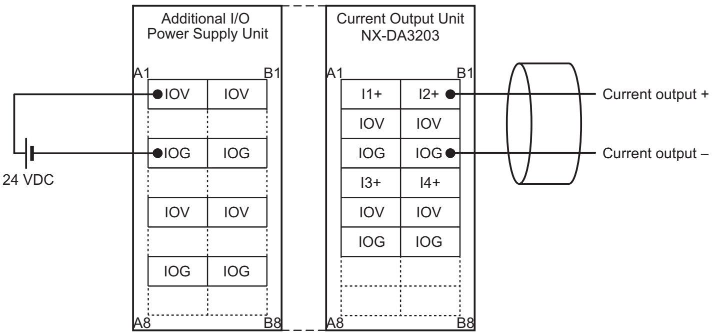
Analog Output Unit (current output type) 2points NX-DA2203

Unit name	Analog Output Unit (current output type)	**Model**	NX-DA2203
Capacity	2 points	**External connection terminals**	Screwless clamping terminal block (8 terminals)
I/O refreshing method	Free-Run refreshing		
Indicator	TS indicator 	**Output range**	4 to 20 mA
		Output conversion range	-5 to 105% (full scale)
		Allowable load resistance	600 Ω min.
		Resolution	1/8000 (full scale)
		Overall accuracy **25°C**	±0.3% (full scale)
		Overall accuracy **0 to 55°C**	±0.6% (full scale)
		Conversion time	250 μs/point
Dimensions	12 (W) x 100 (H) x 71 (D)	**Isolation method**	Between the input and the NX bus: Power = Transformer, Signal = Digital isolator (no isolation between inputs)
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	Supply from the NX bus	**Current capacity of I/O power supply terminal**	IOV: 0.1 A/terminal max., IOG: 0.1 A/terminal max.
NX Unit power consumption	1.75 W max.	**I/O current consumption**	No consumption
Weight	70 g max.		
Circuit layout	 AMP IOV Output I1+ to I2+ Terminal block IOG AG: Analog circuit internal GND AG NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right)		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: For upright installation: No restrictions For any installation other than upright: Restricted as shown in the graph below.  		
Terminal connection diagram	 Additional I/O Power Supply Unit A1 B1 IOV IOV IOG IOG IOV IOV IOG IOG A8 B8 24 VDC Current Output Unit NX-DA2203 A1 B1 I1+ I2+ IOV IOV IOG IOG NC NC A8 B8 Current output + Current output –		

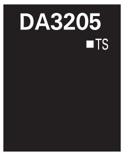
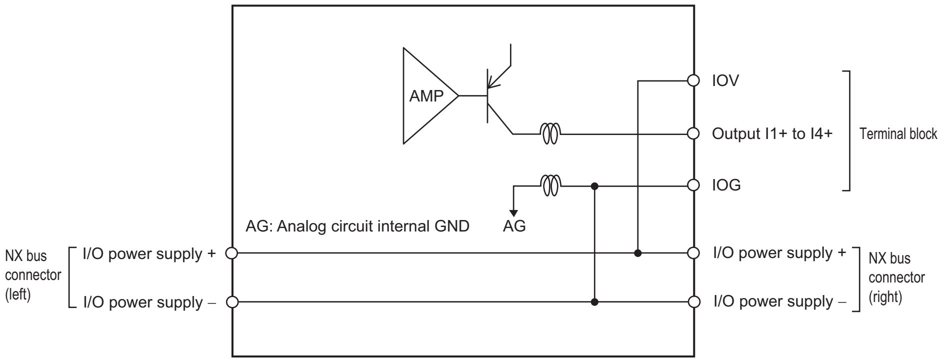
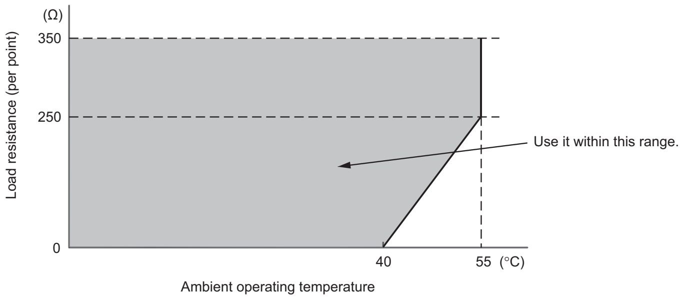
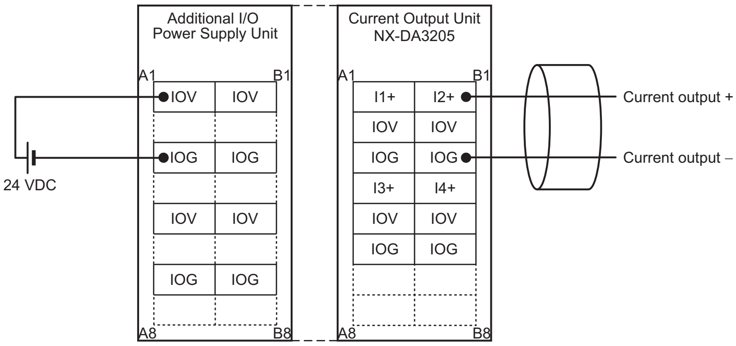
Analog Output Unit (current output type) 2points NX-DA2205

Unit name	Analog Output Unit (current output type)	**Model**	NX-DA2205
Capacity	2 points	**External connection terminals**	Screwless clamping terminal block (8 terminals)
I/O refreshing method	Selectable Synchronous I/O refreshing or Free-Run refreshing		
Indicator	TS indicator 	**Output range**	4 to 20 mA
		Output conversion range	-5 to 105% (full scale)
		Allowable load resistance	600 Ω min.
		Resolution	1/30000 (full scale)
		Overall accuracy **25°C**	±0.1% (full scale)
		0 to 55°C	±0.3% (full scale)
		Conversion time	10 μs/point
Dimensions	12 (W) x 100 (H) x 71 (D)	**Isolation method**	Between the input and the NX bus: Power = Transformer, Signal = Digital isolator (no isolation between inputs)
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	Supply from the NX bus	**Current capacity of I/O power supply terminal**	IOV: 0.1 A/terminal max., IOG: 0.1 A/terminal max.
NX Unit power consumption	1.75 W max.	**I/O current consumption**	No consumption
Weight	70 g max.		
Circuit layout	 AMP IOV Output I1+ to I2+ IOG Terminal block AG: Analog circuit internal GND AG NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right)		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: For upright installation: No restrictions For any installation other than upright: Restricted as shown in the graph below. 		
Terminal connection diagram	 Additional I/O Power Supply Unit A1 B1 IOV IOV IOG IOG IOV IOV IOG IOG A8 B8 24 VDC Current Output Unit NX-DA2205 A1 B1 I1+ I2+ IOV IOV IOG IOG NC NC A8 B8 Current output + Current output –		

Analog Output Unit (current output type) 4points NX-DA3203

Unit name	Analog Output Unit (current output type)	**Model**	NX-DA3203
Capacity	4 points	**External connection terminals**	Screwless clamping terminal block (12 terminals)
I/O refreshing method	Free-Run refreshing		
Indicator	TS indicator 	**Output range**	4 to 20 mA
		Output conversion range	-5 to 105% (full scale)
		Allowable load resistance	350 Ω min.
		Resolution	1/8000 (full scale)
		Overall accuracy **25°C**	±0.3% (full scale)
		Overall accuracy **0 to 55°C**	±0.6% (full scale)
		Conversion time	250 µs/point
Dimensions	12 (W) x 100 (H) x 71 (D)	**Isolation method**	Between the input and the NX bus: Power = Transformer, Signal = Digital isolator (no isolation between inputs)
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	Supply from the NX bus	**Current capacity of I/O power supply terminal**	IOV: 0.1 A/terminal max., IOG: 0.1 A/terminal max.
NX Unit power consumption	1.80 W max.	**I/O current consumption**	No consumption
Weight	70 g max.		
Circuit layout	 AMP IOV Output I1+ to I4+ Terminal block IOG AG: Analog circuit internal GND AG NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right)		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: For upright installation: No restrictions For any installation other than upright: Restricted as shown in the graph below. 		
Terminal connection diagram	 Additional I/O Power Supply Unit A1 B1 IOV IOV IOG IOG IOV IOV IOG IOG A8 B8 24 VDC Current Output Unit NX-DA3203 A1 B1 I1+ I2+ IOV IOV IOG IOG I3+ I4+ IOV IOV IOG IOG A8 B8 Current output + Current output –		

Analog Output Unit (current output type) 4points NX-DA3205

Unit name	Analog Output Unit (current output type)	**Model**	NX-DA3205
Capacity	4 points	**External connection terminals**	Screwless clamping terminal block (12 terminals)
I/O refreshing method	Selectable Synchronous I/O refreshing or Free-Run refreshing		
Indicator	TS indicator 	**Output range**	4 to 20 mA
		Output conversion range	-5 to 105% (full scale)
		Allowable load resistance	350 Ω min.
		Resolution	1/30000 (full scale)
		Overall accuracy **25°C**	±0.1% (full scale)
		0 to 55°C	±0.3% (full scale)
		Conversion time	10 µs/point
Dimensions	12 (W) x 100 (H) x 71 (D)	**Isolation method**	Between the input and the NX bus: Power = Transformer, Signal = Digital isolator (no isolation between inputs)
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	Supply from the NX bus	**Current capacity of I/O power supply terminal**	IOV: 0.1 A/terminal max., IOG: 0.1 A/terminal max.
NX Unit power consumption	1.80 W max.	**I/O current consumption**	No consumption
Weight	70 g max.		
Circuit layout	 AMP IOV Output I1+ to I4+ IOG Terminal block AG: Analog circuit internal GND AG NX bus connector (left) I/O power supply + I/O power supply – I/O power supply + I/O power supply – NX bus connector (right)		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: For upright installation: No restrictions For any installation other than upright: Restricted as shown in the graph below. 		
Terminal connection diagram	 Additional I/O Power Supply Unit Current Output Unit NX-DA3205 A1 B1 IOV IOG I1+ I2+ I3+ I4+ 24 VDC Current output + Current output – A8 B8		

Version Information

NX Unit		Corresponding unit versions/versions		
Model	**Unit Version**	**EtherCAT Coupler Units** **NX-ECC20□ ***	**NJ/NX-series CPU Units** **NJ501-□□□□** **NJ301-□□□□** **NJ101-□□□□** **NX701-□□□□**	**Sysmac Studio**
NX-DA□□□□	Ver.1.0	Version 1.0 or later	Version 1.05 or later	Version 1.06 or higher

* For the NX-ECC202, there is no unit version of 1.1 or earlier.

NX-series Temperature Input Unit

NX-TS

Temperature Input Units for Standard and High-speed, High-precision Temperature measurement and control

- Temperature Input Units for the NX-series modular I/O system.
- Connect to other NX-series I/O Units and EtherCAT Coupler units using the high-speed NX-bus.
- Thermocouple and platinum resistance thermometer input models are available.

NX-TS2101

NX-TS3101

NX-TS2201

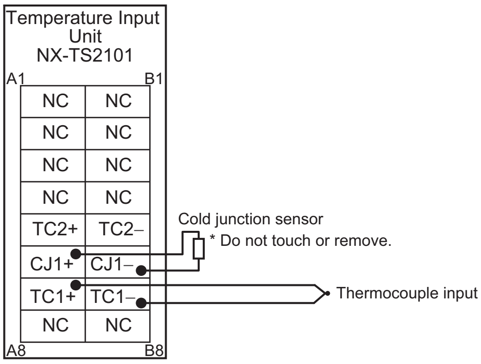
NX-TS3201

Features

- Input up to four temperature sensor signals with one Unit.
- Three sampling speeds, 250 ms, 60 ms, and 10 ms, are available to cover a wide range from general-purpose application to high-speed, high-precision control.
- Moving average, input sensor disconnection detection function, cold junction compensation enable/disable selection function, and input compensation.
- The screwless terminal block is detachable for easy commissioning and maintenance.
- Screwless push-in terminal block significantly reduces wiring work.

Temperature Input Unit Specifications

Temperature Input Unit (Thermocouple Input type) 2 points NX-TS2101

Unit name	Temperature Input Unit (thermocouple input type)	**Model**	NX-TS2101
Number of points	2 points	**External connection terminals**	Screwless clamping terminal block (16 terminals)
I/O refreshing method	Free-Run refreshing		
Indicators	TS indicator	**Temperature sensor**	K, J, T, E, L, U, N, R, S, B, WRe5-26, PLII
		Input conversion range	±20°C of the input range
		Absolute maximum rating	±130 mV
		Input impedance	20 kΩ min.
		Resolution	0.1°C max. *1
		Reference accuracy	*2
		Temperature coefficient	*2
		Cold junction compensation error	±1.2°C *3 *4
		Input disconnection detection current	Approx. 0.1 μA
Warm-up period	30 minutes	**Conversion time**	250 ms/Unit
Dimensions	12 (W) x 100 (H) x 71 (D)	**Isolation method**	Between the input and the NX bus: Power = Transformer, Signal = Photocoupler Between inputs: Power = Transformer, Signal = Photocoupler
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	No supply	**Current capacity of I/O power supply terminal**	Without I/O power supply terminals
NX Unit power consumption	0.90 W max.	**Current consumption from I/O power supply**	No consumption
Weight	70 g max.		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: The cold junction compensation error is restricted according to the installation orientation and the power consumption of adjacent Units. Refer to *Cold Junction Compensation Error Specifications for Units That Take a Thermocouple Input Type*.		
Terminal connection diagram	 Temperature Input Unit NX-TS2101 A1 B1 NC NC NC NC NC NC NC NC TC2+ TC2– CJ1+ CJ1– TC1+ TC1– NC NC A8 B8 Cold junction sensor * Do not touch or remove. Thermocouple input		

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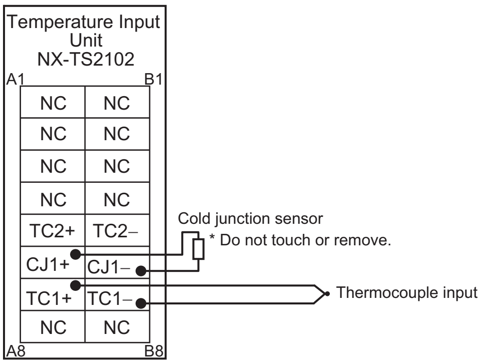
*1. The resolution is 0.2°C max. when the input type is R, S, or W.

*2. Refer to *Reference Accuracy and Temperature Coefficient According to the Input Type and Measurement Temperature*.

*3. The overall accuracy is guaranteed for a set consisting of a cold junction sensor that is mounted on the terminal block and a Temperature Input Unit. Be sure to use the terminal block and the Temperature Input Unit together. A calibration control number is both displayed on the terminal block and the Unit. Make sure to return the terminal block (including a cold junction sensor mounted) and the Unit together for repair.

*4. Refer to *Cold Junction Compensation Error Specifications for Units That Take a Thermocouple Input Type* for the specifications for each set of operating conditions.

Temperature Input Unit (Thermocouple Input type) 2 points NX-TS2102

Unit name	Temperature Input Unit (thermocouple input type)	**Model**	NX-TS2102
Number of points	2 points	**External connection terminals**	Screwless clamping terminal block (16 terminals)
I/O refreshing method	Free-Run refreshing		
Indicators	TS indicator	**Temperature sensor**	K, J, T, E, L, U, N, R, S, WRe5-26, PLII
		Input conversion range	±20°C of the input range
		Absolute maximum rating	±130 mV
		Input impedance	20 kΩ min.
		Resolution	0.01°C max.
		Reference accuracy	*1
		Temperature coefficient	*1
		Cold junction compensation error	±1.2°C *2 *3
		Input disconnection detection current	Approx. 0.1 µA
Warm-up period	45 minutes	**Conversion time**	10 ms/Unit
Dimensions	12 (W) x 100 (H) x 71 (D)	**Isolation method**	Between the input and the NX bus: Power = Transformer, Signal = Digital isolator Between inputs: Power = Transformer, Signal = Digital isolator
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	No supply	**Current capacity of I/O power supply terminal**	Without I/O power supply terminals
NX Unit power consumption	0.80 W max.	**Current consumption from I/O power supply**	No consumption
Weight	70 g max.		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: The cold junction compensation error is restricted according to the installation orientation and the power consumption of adjacent Units. Refer to *Cold Junction Compensation Error Specifications for Units That Take a Thermocouple Input Type*.		
Terminal connection diagram	 Temperature Input Unit NX-TS2102 A1 B1 NC NC NC NC NC NC NC NC TC2+ TC2– CJ1+ CJ1– TC1+ TC1– NC NC A8 B8 Cold junction sensor * Do not touch or remove. Thermocouple input		

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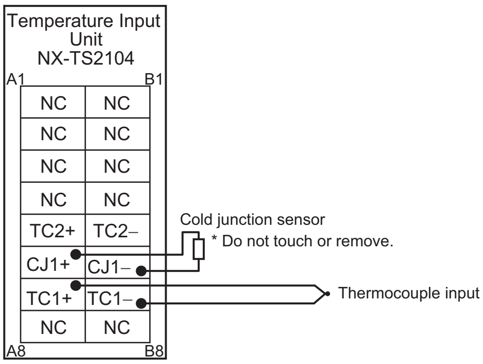
*1. Refer to *Reference Accuracy and Temperature Coefficient According to the Input Type and Measurement Temperature*.

*2. The overall accuracy is guaranteed for a set consisting of a cold junction sensor that is mounted on the terminal block and a Temperature Input Unit. Be sure to use the terminal block and the Temperature Input Unit together. A calibration control number is both displayed on the terminal block and the Unit. Make sure to return the terminal block (including a cold junction sensor mounted) and the Unit together for repair.

*3. Refer to *Cold Junction Compensation Error Specifications for Units That Take a Thermocouple Input Type* for the specifications for each set of operating conditions.

Temperature Input Unit (Thermocouple Input type) 2 points NX-TS2104

Unit name	Temperature Input Unit (thermocouple input type)	**Model**	NX-TS2104
Number of points	2 points	**External connection terminals**	Screwless clamping terminal block (16 terminals)
I/O refreshing method	Free-Run refreshing		
Indicators	TS indicator	**Temperature sensor**	K, J, T, E, L, U, N, R, S, WRe5-26, PLII
		Input conversion range	±20°C of the input range
		Absolute maximum rating	±130 mV
		Input impedance	20 kΩ min.
		Resolution	0.001°C max.
		Reference accuracy	*1
		Temperature coefficient	*1
		Cold junction compensation error	±1.2°C *2 *3
		Input disconnection detection current	Approx. 0.1 μA
Warm-up period	45 minutes	**Conversion time**	60 ms/Unit
Dimensions	12 (W) x 100 (H) x 71 (D)	**Isolation method**	Between the input and the NX bus: Power = Transformer, Signal = Digital isolator Between inputs: Power = Transformer, Signal = Digital isolator
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	No supply	**Current capacity of I/O power supply terminal**	Without I/O power supply terminals
NX Unit power consumption	0.80 W max.	**Current consumption from I/O power supply**	No consumption
Weight	70 g max.		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: The cold junction compensation error is restricted according to the installation orientation and the power consumption of adjacent Units. Refer to *Cold Junction Compensation Error Specifications for Units That Take a Thermocouple Input Type.*		
Terminal connection diagram	 Temperature Input Unit NX-TS2104 A1 B1 NC NC NC NC NC NC NC NC TC2+ TC2– CJ1+ CJ1– TC1+ TC1– NC NC A8 B8 Cold junction sensor * Do not touch or remove. Thermocouple input		

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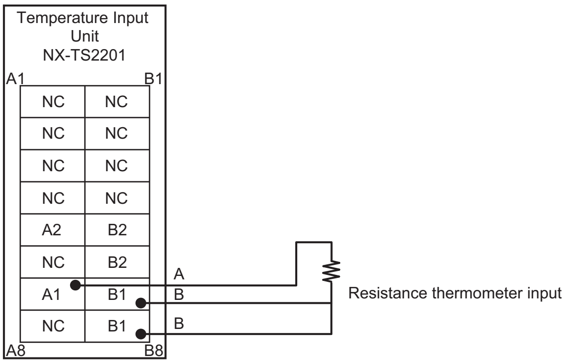
*1. Refer to *Reference Accuracy and Temperature Coefficient According to the Input Type and Measurement Temperature.*

*2. The overall accuracy is guaranteed for a set consisting of a cold junction sensor that is mounted on the terminal block and a Temperature Input Unit. Be sure to use the terminal block and the Temperature Input Unit together. A calibration control number is both displayed on the terminal block and the Unit. Make sure to return the terminal block (including a cold junction sensor mounted) and the Unit together for repair.

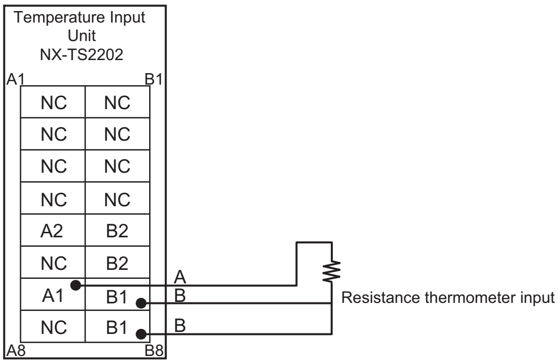
*3. Refer to *Cold Junction Compensation Error Specifications for Units That Take a Thermocouple Input Type* for the specifications for each set of operating conditions.

Temperature Input Unit (Resistance Thermometer Input type) 2 points NX-TS2201

Unit name	Temperature Input Unit (resistance thermometer input type)	**Model**	NX-TS2201
Capacity	2 points	**External connection terminals**	Screwless clamping terminal block (16 terminals)
I/O refreshing method	Free-Run refreshing		
Indicator	TS indicator 	**Temperature sensor**	Pt100 (three-wire)/Pt1000 (three-wire)
		Input conversion range	±20°C of the input range
		Input detection current	Approx. 0.25 mA
		Resolution	0.1°C max.
		Reference accuracy	*
		Temperature coefficient	*
		Effect of conductor resistance	0.06°C/Ω max. (also 20 Ω max.)
Warm-up period	10 minutes	**Conversion time**	250 ms/Unit
Dimensions	12 (W) x 100 (H) x 71 (D)	**Isolation method**	Between the input and the NX bus: Power = Transformer, Signal = Photocoupler Between inputs: Power = Transformer, Signal = Photocoupler
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	No supply	**Current capacity of I/O power supply terminal**	Without I/O power supply terminals
NX Unit power consumption	0.90 W max.	**Current consumption from I/O power supply**	No consumption
Weight	70 g max.		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 Temperature Input Unit NX-TS2201 A1 B1 NC NC NC NC NC NC NC NC A2 B2 NC B2 A1 B1 NC B1 A8 B8 A B B Resistance thermometer input		

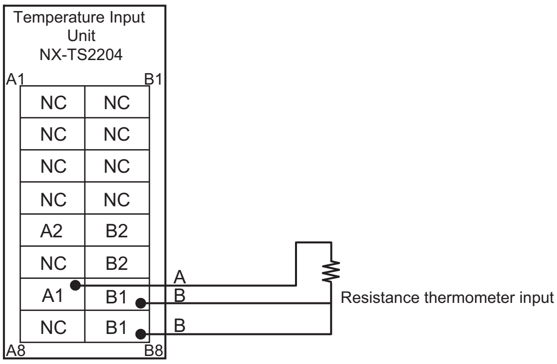
* Refer to Reference accuracy and temperature coefficient according to the input type and measurement temperature.

Temperature Input Unit (Resistance Thermometer Input type) 2 points NX-TS2202

Unit name	Temperature Input Unit (resistance thermometer input type)	**Model**	NX-TS2202
Capacity	2 points	**External connection terminals**	Screwless clamping terminal block (16 terminals)
I/O refreshing method	Free-Run refreshing		
Indicator	TS indicator 	**Temperature sensor**	Pt100 (three-wire)
		Input conversion range	±20°C of the input range
		Input detection current	Approx. 0.25 mA
		Resolution	0.01°C max.
		Reference accuracy	*
		Temperature coefficient	*
		Effect of conductor resistance	0.06°C/Ω max. (also 20 Ω max.)
Warm-up period	30 minutes	**Conversion time**	10 ms/Unit
Dimensions	12 (W) x 100 (H) x 71 (D)	**Isolation method**	Between the input and the NX bus: Power = Transformer, Signal = Digital isolator Between inputs: Power = Transformer, Signal = Digital isolator
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	No supply	**Current capacity of I/O power supply terminal**	Without I/O power supply terminals
NX Unit power consumption	0.75 W max.	**Current consumption from I/O power supply**	No consumption
Weight	70 g max.		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram			

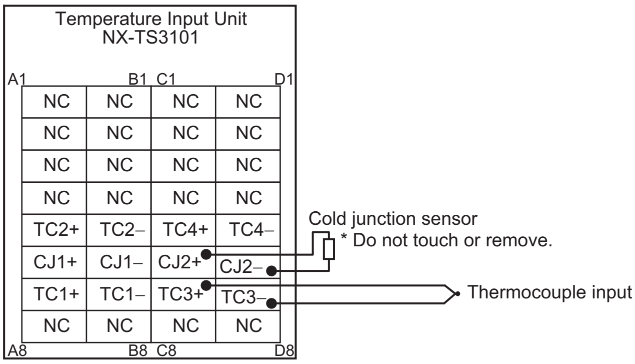
* Refer to Reference accuracy and temperature coefficient according to the input type and measurement temperature.

Temperature Input Unit (Resistance Thermometer Input type) 2 points NX-TS2204

Unit name	Temperature Input Unit (resistance thermometer input type)	**Model**	NX-TS2204
Capacity	2 points	**External connection terminals**	Screwless clamping terminal block (16 terminals)
I/O refreshing method	Free-Run refreshing		
Indicator	TS indicator	**Temperature sensor**	Pt100 (three-wire)/Pt1000 (three-wire)
		Input conversion range	±20°C of the input range
		Input detection current	Approx. 0.25 mA
		Resolution	0.001°C max.
		Reference accuracy	*
		Temperature coefficient	*
		Effect of conductor resistance	0.06°C/Ω max. (also 20 Ω max.)
Warm-up period	30 minutes	**Conversion time**	60 ms/Unit
Dimensions	12 (W) x 100 (H) x 71 (D)	**Isolation method**	Between the input and the NX bus: Power = Transformer, Signal = Digital isolator Between inputs: Power = Transformer, Signal = Digital isolator
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	No supply	**Current capacity of I/O power supply terminal**	Without I/O power supply terminals
NX Unit power consumption	0.75 W max.	**Current consumption from I/O power supply**	No consumption
Weight	70 g max.		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 Temperature Input Unit NX-TS2204 A1 B1 NC NC NC NC NC NC NC NC A2 B2 NC B2 A1 B1 NC B1 A8 B8 A B B Resistance thermometer input		

* Refer to Reference accuracy and temperature coefficient according to the input type and measurement temperature.

Temperature Input Unit (Thermocouple Input type) 4 points NX-TS3101

Unit name	Temperature Input Unit (thermocouple input type)	**Model**	NX-TS3101
Number of points	4 points	**External connection terminals**	Screwless clamping terminal block (16 terminals x 2)
I/O refreshing method	Free-Run refreshing		
Indicators	TS indicator	**Temperature sensor**	K, J, T, E, L, U, N, R, S, B, WRe5-26, PLII
		Input conversion range	±20°C of the input range
		Absolute maximum rating	±130 mV
		Input impedance	20 kΩ min.
		Resolution	0.1°C max. *1
		Reference accuracy	*2
		Temperature coefficient	*2
		Cold junction compensation error	±1.2°C *3 *4
		Input disconnection detection current	Approx. 0.1µA
Warm-up period	30 minutes	**Conversion time**	250 ms/Unit
Dimensions	24 (W) x 100 (H) x 71 (D)	**Isolation method**	Between the input and the NX bus: Power = Transformer, Signal = Photocoupler Between inputs: Power = Transformer, Signal = Photocoupler
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	No supply	**Current capacity of I/O power supply terminal**	Without I/O power supply terminals
NX Unit power consumption	1.30 W max.	**Current consumption from I/O power supply**	No consumption
Weight	140 g max.		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: The cold junction compensation error is restricted according to the installation orientation and the power consumption of adjacent Units. Refer to *Cold Junction Compensation Error Specifications for Units That Take a Thermocouple Input Type.*		
Terminal connection diagram	 Temperature Input Unit NX-TS3101 A1 B1 C1 D1 NC NC NC NC NC NC NC NC NC NC NC NC NC NC NC NC TC2+ TC2− TC4+ TC4− CJ1+ CJ1− CJ2+ CJ2− TC1+ TC1− TC3+ TC3− NC NC NC NC A8 B8 C8 D8 Cold junction sensor * Do not touch or remove. Thermocouple input		

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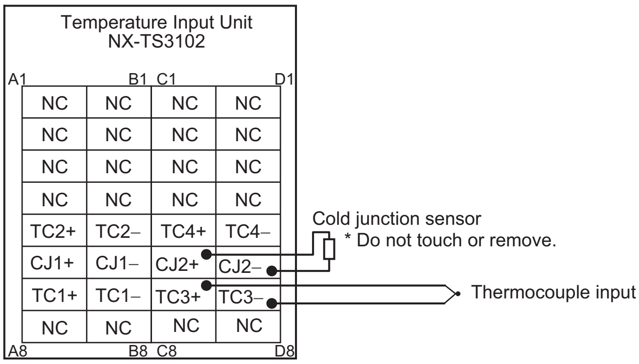
*1. The resolution is 0.2°C max. when the input type is R, S, or W.

*2. Refer to *Reference Accuracy and Temperature Coefficient According to the Input Type and Measurement Temperature.*

*3. The overall accuracy is guaranteed for a set consisting of a cold junction sensor that is mounted on the terminal block and a Temperature Input Unit. Be sure to use the terminal block and the Temperature Input Unit together. A calibration control number is both displayed on the terminal block and the Unit. Make sure to return the terminal block (including a cold junction sensor mounted) and the Unit together for repair.

*4. Refer to *Cold Junction Compensation Error Specifications for Units That Take a Thermocouple Input Type* for the specifications for each set of operating conditions.

Temperature Input Unit (Thermocouple Input type) 4 points NX-TS3102

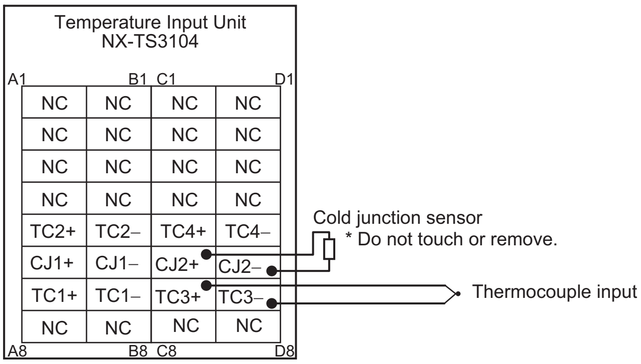
Unit name	Temperature Input Unit (thermocouple input type)	**Model**	NX-TS3102
Number of points	4 points	**External connection terminals**	Screwless clamping terminal block (16 terminals x 2)
I/O refreshing method	Free-Run refreshing		
Indicators	TS indicator 	**Temperature sensor**	K, J, T, E, L, U, N, R, S, WRe5-26, PLII
		Input conversion range	±20°C of the input range
		Absolute maximum rating	±130 mV
		Input impedance	20 kΩ min.
		Resolution	0.01°C max.
		Reference accuracy	*1
		Temperature coefficient	*1
		Cold junction compensation error	±1.2°C *2 *3
		Input disconnection detection current	Approx. 0.1 µA
Warm-up period	45 minutes	**Conversion time**	10 ms/Unit
Dimensions	24 (W) x 100 (H) x 71 (D)	**Isolation method**	Between the input and the NX bus: Power = Transformer, Signal = Digital isolator Between inputs: Power = Transformer, Signal = Digital isolator
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	No supply	**Current capacity of I/O power supply terminal**	Without I/O power supply terminals
NX Unit power consumption	1.10 W max.	**Current consumption from I/O power supply**	No consumption
Weight	140 g max.		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: The cold junction compensation error is restricted according to the installation orientation and the power consumption of adjacent Units. Refer to *Cold Junction Compensation Error Specifications for Units That Take a Thermocouple Input Type*.		
Terminal connection diagram	 Temperature Input Unit NX-TS3102 A1 B1 C1 D1 NC NC NC NC NC NC NC NC NC NC NC NC NC NC NC NC TC2+ TC2− TC4+ TC4− CJ1+ CJ1− CJ2+ CJ2− TC1+ TC1− TC3+ TC3− NC NC NC NC A8 B8 C8 D8 Cold junction sensor * Do not touch or remove. Thermocouple input		

*1. Refer to *Reference Accuracy and Temperature Coefficient According to the Input Type and Measurement Temperature*.

*2. The overall accuracy is guaranteed for a set consisting of a cold junction sensor that is mounted on the terminal block and a Temperature Input Unit. Be sure to use the terminal block and the Temperature Input Unit together. A calibration control number is both displayed on the terminal block and the Unit. Make sure to return the terminal block (including a cold junction sensor mounted) and the Unit together for repair.

*3. Refer to *Cold Junction Compensation Error Specifications for Units That Take a Thermocouple Input Type* for the specifications for each set of operating conditions.

Temperature Input Unit (Thermocouple Input type) 4 points NX-TS3104

Unit name	Temperature Input Unit (thermocouple input type)	**Model**	NX-TS3104
Number of points	4 points	**External connection terminals**	Screwless clamping terminal block (16 terminals x 2)
I/O refreshing method	Free-Run refreshing		
Indicators	TS indicator	**Temperature sensor**	K, J, T, E, L, U, N, R, S, WRe5-26, PLII
		Input conversion range	±20°C of the input range
		Absolute maximum rating	±130 mV
		Input impedance	20 kΩ min.
		Resolution	0.001°C max.
		Reference accuracy	*1
		Temperature coefficient	*1
		Cold junction compensation error	±1.2°C *2 *3
		Input disconnection detection current	Approx. 0.1 µA
Warm-up period	45 minutes	**Conversion time**	60 ms/Unit
Dimensions	24 (W) x 100 (H) x 71 (D)	**Isolation method**	Between the input and the NX bus: Power = Transformer, Signal = Digital isolator Between inputs: Power = Transformer, Signal = Digital isolator
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	No supply	**Current capacity of I/O power supply terminal**	Without I/O power supply terminals
NX Unit power consumption	1.10 W max.	**Current consumption from I/O power supply**	No consumption
Weight	140 g max.		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: The cold junction compensation error is restricted according to the installation orientation and the power consumption of adjacent Units. Refer to *Cold Junction Compensation Error Specifications for Units That Take a Thermocouple Input Type*.		
Terminal connection diagram	 Temperature Input Unit NX-TS3104 A1 B1 C1 D1 NC NC NC NC NC NC NC NC NC NC NC NC NC NC NC NC TC2+ TC2– TC4+ TC4– CJ1+ CJ1– CJ2+ CJ2– TC1+ TC1– TC3+ TC3– NC NC NC NC A8 B8 C8 D8 Cold junction sensor * Do not touch or remove. Thermocouple input		

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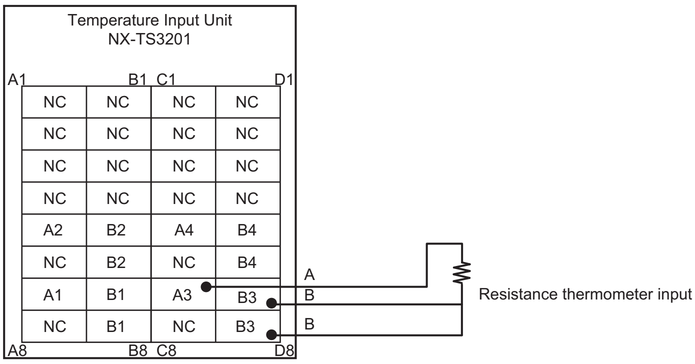
*1. Refer to *Reference Accuracy and Temperature Coefficient According to the Input Type and Measurement Temperature*.

*2. The overall accuracy is guaranteed for a set consisting of a cold junction sensor that is mounted on the terminal block and a Temperature Input Unit. Be sure to use the terminal block and the Temperature Input Unit together. A calibration control number is both displayed on the terminal block and the Unit. Make sure to return the terminal block (including a cold junction sensor mounted) and the Unit together for repair.

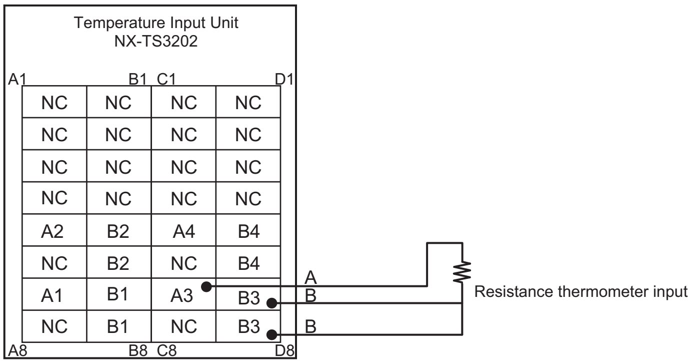
*3. Refer to *Cold Junction Compensation Error Specifications for Units That Take a Thermocouple Input Type* for the specifications for each set of operating conditions.

Temperature Input Unit (Resistance Thermometer Input type) 4 points NX-TS3201

Unit name	Temperature Input Unit (resistance thermometer input type)	**Model**	NX-TS3201
Capacity	4 points	**External connection terminals**	Screwless clamping terminal block (16 Terminals x 2)
I/O refreshing method	Free-Run refreshing		
Indicator	TS indicator 	**Temperature sensor**	Pt100 (three-wire)/Pt1000 (three-wire)
		Input conversion range	±20°C of the input range
		Input detection current	Approx. 0.25 mA
		Resolution	0.1°C max.
		Reference accuracy	*
		Temperature coefficient	*
		Effect of conductor resistance	0.06°C/Ω max. (also 20 Ω max.)
Warm-up period	10 minutes	**Conversion time**	250 ms/Unit
Dimensions	24 (W) x 100 (H) x 71 (D)	**Isolation method**	Between the input and the NX bus: Power = Transformer, Signal = Photocoupler Between inputs: Power = Transformer, Signal = Photocoupler
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	No supply	**Current capacity of I/O power supply terminal**	Without I/O power supply terminals
NX Unit power consumption	1.30 W max.	**Current consumption from I/O power supply**	No consumption
Weight	140 g max.		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 Temperature Input Unit NX-TS3201 A1 B1 C1 D1 NC NC NC NC NC NC NC NC NC NC NC NC NC NC NC NC A2 B2 A4 B4 NC B2 NC B4 A1 B1 A3 B3 NC B1 NC B3 A8 B8 C8 D8 A B B Resistance thermometer input		

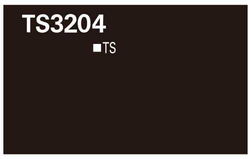
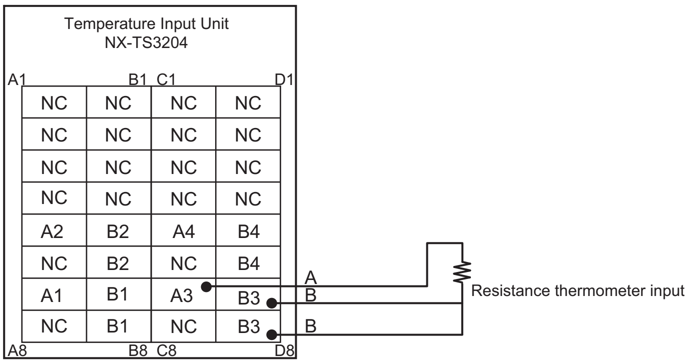
* Refer to Reference accuracy and temperature coefficient according to the input type and measurement temperature.

Temperature Input Unit (Resistance Thermometer Input type) 4 points NX-TS3202

Unit name	Temperature Input Unit (resistance thermometer input type)	**Model**	NX-TS3202
Capacity	4 points	**External connection terminals**	Screwless clamping terminal block (16 terminals x 2)
I/O refreshing method	Free-Run refreshing		
Indicator	TS indicator	**Temperature sensor**	Pt100 (three-wire)
		Input conversion range	±20°C of the input range
		Input detection current	Approx. 0.25 mA
		Resolution	0.01°C max.
		Reference accuracy	*
		Temperature coefficient	*
		Effect of conductor resistance	0.06°C/Ω max. (also 20 Ω max.)
Warm-up period	30 minutes	**Conversion time**	10 ms/Unit
Dimensions	24 (W) x 100 (H) x 71 (D)	**Isolation method**	Between the input and the NX bus: Power = Transformer, Signal = Digital isolator Between inputs: Power = Transformer, Signal = Digital isolator
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	No supply	**Current capacity of I/O power supply terminal**	Without I/O power supply terminals
NX Unit power consumption	1.05 W max.	**Current consumption from I/O power supply**	No consumption
Weight	130 g max.		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 Temperature Input Unit NX-TS3202 A1 B1 C1 D1 NC NC NC NC NC NC NC NC NC NC NC NC NC NC NC NC A2 B2 A4 B4 NC B2 NC B4 A1 B1 A3 B3 NC B1 NC B3 A8 B8 C8 D8 A B B Resistance thermometer input		

* Refer to Reference accuracy and temperature coefficient according to the input type and measurement temperature.

Temperature Input Unit (Resistance Thermometer Input type) 4 points NX-TS3204

Unit name	Temperature Input Unit (resistance thermometer input type)	**Model**	NX-TS3204
Capacity	4 points	**External connection terminals**	Screwless clamping terminal block (16 terminals x 2)
I/O refreshing method	Free-Run refreshing		
Indicator	TS indicator  	**Temperature sensor**	Pt100 (three-wire)/Pt1000 (three-wire)
		Input conversion range	±20°C of the input range
		Input detection current	Approx. 0.25 mA
		Resolution	0.001°C max.
		Reference accuracy	*
		Temperature coefficient	*
		Effect of conductor resistance	0.06°C/Ω max. (also 20 Ω max.)
Warm-up period	30 minutes	**Conversion time**	60 ms/Unit
Dimensions	24 (W) x 100 (H) x 71 (D)	**Isolation method**	Between the input and the NX bus: Power = Transformer, Signal = Digital isolator Between inputs: Power = Transformer, Signal = Digital isolator
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	No supply	**Current capacity of I/O power supply terminal**	Without I/O power supply terminals
NX Unit power consumption	1.05 W max.	**Current consumption from I/O power supply**	No consumption
Weight	130 g max.		
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions		
Terminal connection diagram	 Temperature Input Unit NX-TS3204 A1 B1 C1 D1 NC NC NC NC NC NC NC NC NC NC NC NC NC NC NC NC A2 B2 A4 B4 NC B2 NC B4 A1 B1 A3 B3 NC B1 NC B3 A8 B8 C8 D8 A B B Resistance thermometer input		

* Refer to Reference accuracy and temperature coefficient according to the input type and measurement temperature.

• Reference accuracy and temperature coefficient according to the input type and measurement temperature *1

For NX-TS□□02/TS□□04

Conversion time	Input type		Measurement temperature (°C)	Reference accuracy °C (%) *3	Temperature coefficient °C/°C *4 (ppm/°C *5)
	Input type *2	Temperature range (°C)			
10/60ms	K	-200 to 1300	Same as the left	±0.75 (±0.05%)	±0.08 (±50 ppm/°C)
	K	-20 to 600 (High Resolution)	Same as the left	±0.30 (±0.05%)	±0.03 (±48 ppm/°C)
	J	-200 to 1200	-200 to 0	±0.70 (±0.05%)	±0.13 (±96 ppm/°C)
			0 to 1200		±0.06 (±42 ppm/°C)
	J	-20 to 600 (High Resolution)	Same as the left	±0.30 (±0.05%)	±0.04 (±72 ppm/°C)
	T	-200 to 400	-200 to -180	±1.30 (±0.22%)	±0.05 (±75 ppm/°C)
			-180 to 0	±0.70 (±0.12%)	
			0 to 400	±0.33 (±0.055%)	
	E	-200 to 1000	-200 to 0	±0.60 (±0.05%)	±0.12 (±100 ppm/°C)
			0 to 1000		±0.06 (±50 ppm/°C)
	L	-200 to 900	Same as the left	±0.50 (±0.05%)	±0.04 (±40 ppm/°C)
	U	-200 to 600	-200 to -100	±0.70 (±0.09%)	±0.06 (±75 ppm/°C)
			-100 to 0	±0.50 (±0.07%)	
			0 to 600	±0.40 (±0.05%)	
	N	-200 to 1300	-200 to -150	±1.60 (±0.11%)	±0.11 (±70 ppm/°C)
			-150 to -100	±0.75 (±0.05%)	
			-100 to 1300		±0.08 (±50 ppm/°C)
	R	-50 to 1700	-50 to 0	±3.20 (±0.19%)	±0.13 (±77 ppm/°C)
			0 to 100	±2.50 (±0.15%)	±0.11 (±60 ppm/°C)
			100 to 1700	±1.75 (±0.10%)	
	S	-50 to 1700	-50 to 0	±3.20 (±0.19%)	±0.13 (±77 ppm/°C)
			0 to 100	±2.50 (±0.15%)	±0.11 (±60 ppm/°C)
			100 to 1700	±1.75 (±0.10%)	
	WRe5-26	0 to 2300	0 to 1500	±1.15 (±0.05%)	±0.13 (±58 ppm/°C)
			1500 to 2200		±0.21 (±91 ppm/°C)
			2200 to 2300	±1.40 (±0.07%)	
	PL II	0 to 1300	Same as the left	±0.65 (±0.05%)	±0.07 (±57 ppm/°C)
	Pt100	-200 to 850	-200 to -50	±0.50 (±0.05%)	±0.08 (±78 ppm/°C)
			-50 to 150	±0.21 (±0.02%)	±0.03 (±29 ppm/°C)
			150 to 850	±0.50 (±0.05%)	±0.08 (±78 ppm/°C)
	Pt1000	-200 to 850	Same as the left	±0.50 (±0.05%)	±0.09 (±85 ppm/°C)

For NX-TS□□01

Conversion time	Input type		Measurement temperature (°C)	Reference accuracy °C (%) *3	Temperature coefficient °C/°C *4 (ppm/°C *5)
	Input type	Temperature range (°C)			
250 ms	K	-200 to 1300	-200 to -100	±1.5 (±0.1%)	±0.15 (±100 ppm/°C)
			-100 to 400		±0.30 (±200 ppm/°C)
			400 to 1300		±0.38 (±250 ppm/°C)
	J	-200 to 1200	-200 to 400	±1.4 (±0.1%)	±0.14 (±100 ppm/°C)
			400 to 900	±1.2 (±0.09%)	±0.28 (±200 ppm/°C)
			900 to 1200		±0.35 (±250 ppm/°C)
	T	-200 to 400	-200 to -100	±1.2 (±0.2%)	±0.30 (±500 ppm/°C)
			-100 to 400		±0.12 (±200 ppm/°C)
	E	-200 to 1000	-200 to 400	±1.2 (±0.1%)	±0.12 (±100 ppm/°C)
			400 to 700	±2.0 (±0.17%)	±0.24 (±200 ppm/°C)
			700 to 1000		±0.30 (±250 ppm/°C)
	L	-200 to 900	-200 to 300	±1.1 (±0.1%)	±0.11 (±100 ppm/°C)
			300 to 700	±2.2 (±0.2%)	±0.22 (±200 ppm/°C)
			700 to 900		±0.28 (±250 ppm/°C)
	U	-200 to 600	-200 to 400	±1.2 (±0.15%)	±0.12 (±150 ppm/°C)
			400 to 600	±1.0 (±0.13%)	
	N	-200 to 1300	-200 to 400	±1.5 (±0.1%)	±0.30 (±200 ppm/°C)
			400 to 1000		
			1000 to 1300		±0.38 (±250 ppm/°C)
	R	-50 to 1700	-50 to 500	±1.75 (±0.1%)	±0.44 (±250 ppm/°C)
			500 to 1200	±2.5 (±0.15%)	
			1200 to 1700		
	S	-50 to 1700	-50 to 600	±1.75 (±0.1%)	±0.44 (±250 ppm/°C)
			600 to 1100	±2.5 (±0.15%)	
			1100 to 1700		
	B	0 to 1800	0.0 to 400.0	Reference accuracy does not apply	Reference accuracy does not apply
			400 to 1200	±3.6 (±0.2%)	±0.45 (±250 ppm/°C)
			1200 to 1800	±5.0 (±0.28%)	±0.54 (±300 ppm/°C)
	WRe5-26	0 to 2300	0 to 300	±1.15 (±0.05%)	±0.46 (±200 ppm/°C)
			300 to 800	±2.3 (±0.1%)	
			800 to 1500	±3.0 (±0.13%)	
			1500 to 2300		±0.691 (±300 ppm/°C)
	PLII	0 to 1300	0 to 400	±1.3 (±0.1%)	±0.23 (±200 ppm/°C)
			400 to 800	±2.0 (±0.15%)	±0.39 (±300 ppm/°C)
			800 to 1300		±0.65 (±500 ppm/°C)
	Pt100	-200 to 850	-200 to 300	±1.0 (±0.1%)	±0.1 (±100 ppm/°C)
			300 to 700	±2.0 (±0.2%)	±0.2 (±200 ppm/°C)
			700 to 850	±2.5 (±0.25%)	±0.25 (±250 ppm/°C)
	Pt1000	-200 to 850	-200 to 300	±1.0 (±0.1%)	±0.1 (±100 ppm/°C)
			300 to 700	±2.0 (±0.2%)	±0.2 (±200 ppm/°C)
			700 to 850	±2.5 (±0.25%)	±0.25 (±250 ppm/°C)

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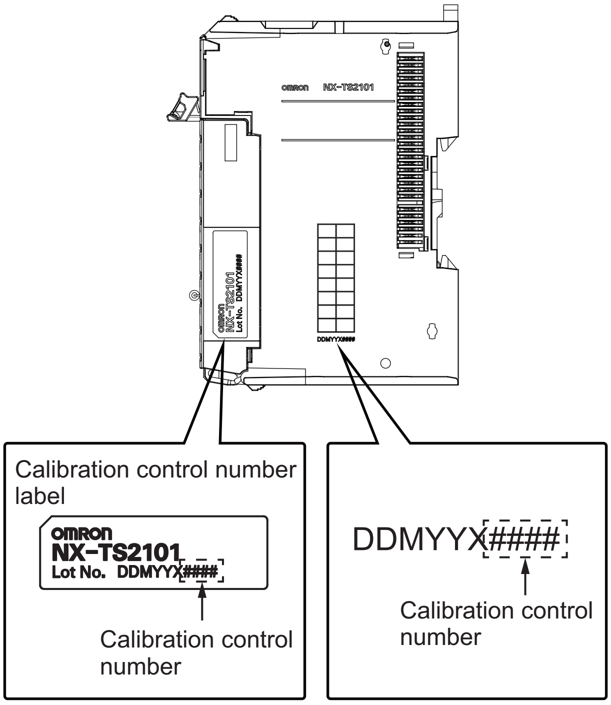
*1. To convert the temperature unit from Celsius to Fahrenheit, use the following equation.
Fahrenheit temperature (°F) = Celsius temperature (°C) x 1.8 + 32

*2. If there is more than one input range for the same input type, the one with narrower input range has higher resolution.

*3. For a thermocouple input type Temperature Input Unit, the overall accuracy is guaranteed for a set consisting of a cold junction sensor that is mounted on the terminal block and a Temperature Input Unit. Be sure to use the terminal block and Temperature Input Unit with the same calibration control number together. For the 24 mm wide model, also be sure the left and right terminal blocks are correctly attached.


omron NX-TS2101
omron NX-TS2101 Lot No. DDMYYX####
DDMYYX####
Calibration control number label
omron
NX-TS2101
Lot No. DDMYYX####
Calibration control number
DDMYYX####
Calibration control number

*4. An error for a measured value when the ambient temperature changes by 1°C.
The following formula is used to calculate the error of the measured value.
Overall accuracy = Reference accuracy + Temperature characteristic x Change in the ambient temperature + Cold junction compensation error
(Calculation example)
Conditions

Item	Description
Ambient temperature	30°C
Measured value	100°C
NX Unit	NX-TS2101
Thermocouple	K thermocouple

The characteristic values are formulated from the data sheet or reference accuracy and temperature coefficient table under the above conditions

Item	Description
Reference accuracy	-100 to 400°C: ±1.5°C
Temperature coefficient	-100 to 400°C: ±0.30°C/°C
Change in the ambient temperature	25°C -> 30°C 5 deg
Cold junction compensation error	±1.2°C

Therefore,
Overall accuracy = Reference accuracy + Temperature characteristic x Change in the ambient temperature + Cold junction compensation error
= ±1.5°C + (±0.30°C/°C) x 5 deg + ±1.2°C
= ±4.2°C

*5. The ppm value is for the full scale of temperature range.

• Cold Junction Compensation Error Specifications for Units That Take a Thermocouple Input Type

The cold junction compensation error for Units that take a thermocouple input type is restricted as follows according to the installation orientation and the power consumption of adjacent Units*.

(a) For upright installation, when the power consumption is 1.5 W or less for both the left and right adjacent Units

The cold junction compensation error is ±1.2°C.
However, there are exceptions depending on the input type and temperature. Those conditions and the cold junction compensation error are as in the table below.

Input type and temperature range	Cold junction compensation error
T below -90°C	±3.0°C
J, E, K and N below -100°C	
U, L and PLII	
R and S below 200°C	
B below 400°C	Not guaranteed
W	±3.0°C

(b) When the power consumption of either the left or the right adjacent Unit is more than 1.5 W but less than 3.9 W. Or for any installation other than upright, when the power consumption of both the left and right adjacent Units is less than 3.9 W

The cold junction compensation error is ±4.0°C.
However, there are exceptions depending on the input type and temperature. Those conditions and the cold junction compensation error are as in the table below.

Input type and temperature range	Cold junction compensation error
T below -90°C	±7.0°C
J, E, K and N below -100°C	
U, L and PLII	
R and S below 200°C	
B below 400°C	Not guaranteed
W	±9.0°C

(c) When the power consumption exceeds 3.9 W for either the left or right adjacent Unit

Do not use the above condition (c) because the cold junction compensation error is not guaranteed in this condition.

* The power consumption of adjacent Units is the total of the following values.
The power consumption of the NX Unit power supply and I/O power supply for the NX Units adjacent to the Temperature Input Unit. If the adjacent Unit is an Input Unit, it is the total power consumption according to the input current.

Version Information

NX Units		Corresponding unit versions/versions		
Model	**Unit Version**	**EtherCAT Coupler Units NX-ECC20□ ***	**NJ/NX-series CPU Units** **NJ501-□□□□** **NJ301-□□□□** **NJ101-□□□□** **NX701-□□□□**	**Sysmac Studio**
NX-TS2101	Ver.1.0	Ver.1.0 or later	Ver.1.05 or later	Ver.1.06 or higher
	Ver.1.1			Ver.1.08 or higher
NX-TS2102	Ver.1.1			Ver.1.08 or higher
NX-TS2104	Ver.1.1			Ver.1.08 or higher
NX-TS2201	Ver.1.0			Ver.1.06 or higher
	Ver.1.1			Ver.1.08 or higher
NX-TS2202	Ver.1.1			Ver.1.08 or higher
NX-TS2204	Ver.1.1			Ver.1.08 or higher
NX-TS3101	Ver.1.0			Ver.1.06 or higher
	Ver.1.1			Ver.1.08 or higher
NX-TS3102	Ver.1.1			Ver.1.08 or higher
NX-TS3104	Ver.1.1			Ver.1.08 or higher
NX-TS3201	Ver.1.0			Ver.1.06 or higher
	Ver.1.1			Ver.1.08 or higher
NX-TS3202	Ver.1.1			Ver.1.08 or higher
NX-TS3204	Ver.1.1			Ver.1.08 or higher

* For the NX-ECC202, there is no unit version of 1.1 or earlier.

NX-series Incremental Encoder Input Unit

NX-EC0□□□

Read position information from incremental encoders, synchronised with the control cycle and EtherCAT Distributed Clock.

- Process encoder input data using the MC Function Modules of the NJ/NX-series Machine Automation Controller.
- The time when the encoder input value is changed can be read. This enables high-precision timing control in combination with time-stamp outputs.*

* Available soon

Features

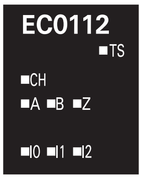
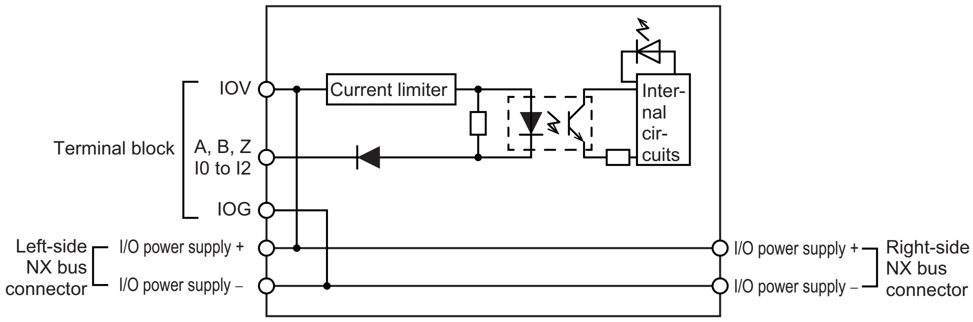
- Open collector output type and line driver output type Incremental Encoders can be connected.
- High-speed remote I/O control with communications cycle as fast as 125 µs *1
- Free-Run refreshing or Synchronous I/O refreshing, Task Period Prioritized refreshing *2, can be selected for refreshing with the NX-series EtherCAT Coupler.
- When the MC Function Modules of the NJ/NX-series Machine Automation Controller are used, the encoder input can be used for motion control instructions as an “axis”.
- Latch function (1 internal signal and 2 input signals from external devices)
- Pulse Period Measurement
- 32 bit counters (80000000 to 7FFFFFFF HEX)
- Maximum counting rate: 4 MHz (Line receiver: 4 MHz, Open collector: 500 kHz)
- Input edge time stamps
- The maximum and minimum counter values can be set.

*1 When using the NX-EC01□□ together with the NX701-□□□□ and NX-ECC203.
*2 Task Period Prioritized refreshing is available when the NX-ECC203 is used together.

Specification

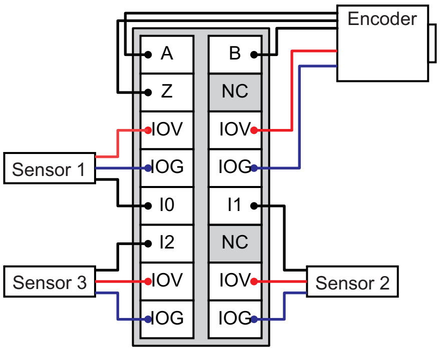
● Incremental Encoder Input Units

NX-EC0112

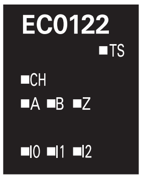
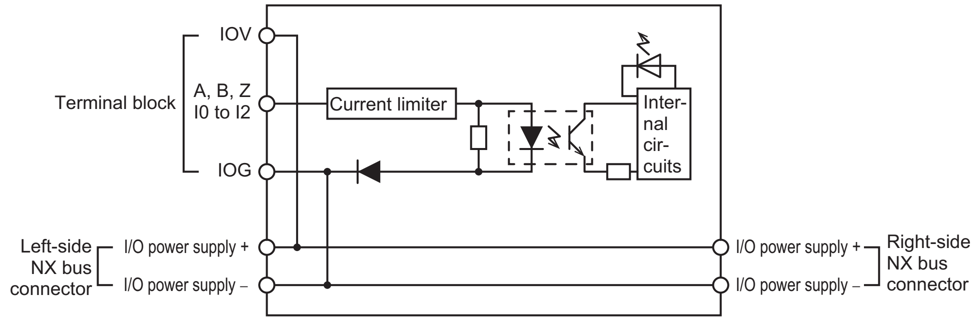
Unit name	Incremental Encoder Input Units	**Model**	NX-EC0112
Number of channels	1 channel	**Type of external connections**	Screwless clamping terminal block (16 terminals)
I/O refreshing method	Free-Run refreshing or synchronous I/O refreshing, Task Period Prioritized refreshing *		
Indicators	 	**Input signals**	Counter: Phases A, B, and Z External Inputs: 3
Input form	Voltage input (24 V)		
Counting unit	Pulses		
Pulse input method	Phase differential pulse (multiplication x2/4), pulse + direction inputs, or up and down pulse inputs		
Counter range	−2,147,483,648 to 2,147,483,647 pulses		
Counter functions			
Counter type	Ring counter or linear counter		
Counter controls	Gate control, counter reset, and counter preset		
Latch function	Two external input latches and one internal latch		
Measurements	Pulse rate measurement and pulse period measurement		
Voltage input specifications			
Input voltage	20.4 to 28.8 VDC (24 VDC +20%/−15%)	**ON voltage**	19.6 VDC min./3 mA min.
Input current	4.2 mA typical (24 VDC)	**OFF voltage**	4.0 VDC max./1 mA max.
Maximum response frequency	Phases A and B: Single-phase 500 kHz (phase differential pulse input x4: 125 kHz), Phase Z: 125 kHz		
Internal I/O common processing	NPN		
External input specifications			
Input voltage	20.4 to 28.8 VDC (24 VDC +20%, −15%)	**ON voltage/ON current**	15 VDC min./3 mA min.
Input current	4.6 mA typical (24 VDC)	**OFF voltage/OFF current**	4.0 VDC max./1 mA max.
ON/OFF response time	1 µs max./2 µs max.		
Internal I/O common processing	NPN		
Dimensions	12 × 100 × 71 mm (W×H×D)	**Isolation method**	Photocoupler isolation
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute with leakage current of 5 mA max.
I/O power supply method	Supplied from the NX bus. 20.4 to 28.8 VDC (24 VDC +20%, −15%)	**Current capacity of I/O power supply terminals**	IOV: 0.3 A max. per terminal for encoder supply section and 0.1 A max. per terminal for other sections IOG: 0.3 A max. per terminal for encoder supply section and 0.1 A max. per terminal for other sections
NX Unit power consumption	0.85 W max.	**Current consumption from I/O power supply**	None
Weight	70 g max.		
Circuit layout	Encoder Input and External Inputs  IOV Current limiter Inter-nal cir-cuits Terminal block A, B, Z I0 to I2 IOG Left-side NX bus connector I/O power supply + I/O power supply − I/O power supply + I/O power supply − Right-side NX bus connector		
Installation orientation and restrictions	Installation orientation: 6 possible orientations Restrictions: There are no restrictions.		

* The I/O refreshing method is automatically set according to the connected Communications Coupler Unit and CPU Unit.

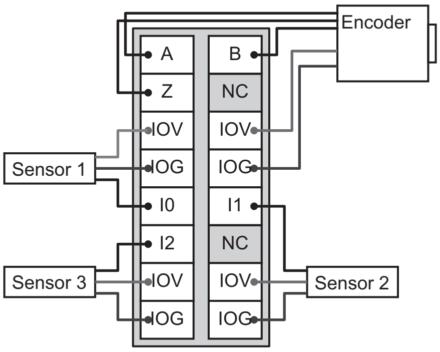
System Configuration
Controllers
Softwares
Programmable Terminals
Features
Incremental Encoder Input Unit Specifications
EtherCAT Slave Terminals
Version Information
Safety
Mortion/Drives
Inverters
Sensors
Remote I/O Terminals
Ordering Information

Terminal connection diagram	 Encoder A B Z NC IOV IOV Sensor 1 IOG IOG I0 I1 I2 NC Sensor 3 IOV IOV Sensor 2 IOG IOG		
Failure detection	None	**Protection**	None

NX-EC0122

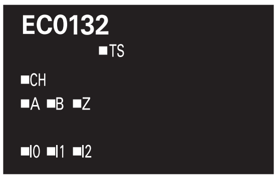
Unit name	Incremental Encoder Input Units	**Model**	NX-EC0122
Number of channels	1 channel	**Type of external connections**	Screwless push-in terminal block (16 terminals)
I/O refreshing method	Free-Run refreshing or synchronous I/O refreshing, Task Period Prioritized refreshing *		
Indicators		**Input signals**	Counter: Phases A, B, and Z External Inputs: 3
Input form	Voltage input (24 V)		
Counting unit	Pulses		
Pulse input method	Phase difference pulse (multiplication x2/4), pulse + direction inputs, or up and down pulse inputs		
Counter range	–2,147,483,648 to 2,147,483,647 pulses		
Counter functions			
Counter type	Ring counter or linear counter		
Counter controls	Gate control, counter reset, and counter preset		
Latch function	Two external input latches and one internal latch		
Measurements	Pulse rate measurement and pulse period measurement		
Voltage input specifications			
Input voltage	20.4 to 28.8 VDC (24 VDC +20%/–15%)	**ON voltage**	19.6 VDC min./3 mA min.
Input current	4.2 mA typical (24 VDC)	**OFF voltage**	4.0 VDC max./1 mA max.
Maximum response frequency	Phases A and B: Single-phase 500 kHz (phase difference pulse input x4: 125 kHz), Phase Z: 125 kHz		
Internal I/O common processing	PNP		
External input specifications			
Input voltage	20.4 to 28.8 VDC (24 VDC +20%/–15%)	**ON voltage/ON current**	15 VDC min./3 mA min.
Input current	4.6 mA typical (24 VDC)	**OFF voltage/OFF current**	4.0 VDC max./1 mA max.
ON/OFF response time	1 µs max./2 µs max.		
Internal I/O common processing	PNP		
Dimensions	12 × 100 × 71 mm (W×H×D)	**Isolation method**	Photocoupler isolation
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute with leakage current of 5 mA max.
I/O power supply source	Supplied from the NX bus. 20.4 to 28.8 VDC (24 VDC +20%/–15%)	**Current capacity of I/O power supply terminals**	IOV: 0.3 A max. per terminal for encoder supply section and 0.1 A max. per terminal for other sections IOG: 0.3 A max. per terminal for encoder supply section and 0.1 A max. per terminal for other sections
NX Unit power consumption	0.95 W max.	**Current consumption from I/O power supply**	None
Weight	70 g max.		
Circuit layout	Encoder Input and External Inputs  IOV Terminal block A, B, Z I0 to I2 IOG Current limiter Inter-nal cir-cuits Left-side NX bus connector I/O power supply + I/O power supply – I/O power supply + I/O power supply – Right-side NX bus connector		
Installation orientation and restrictions	Installation orientation: 6 possible orientations Restrictions: There are no restrictions.		

* The I/O refreshing method is automatically set according to the connected Communications Coupler Unit and CPU Unit.

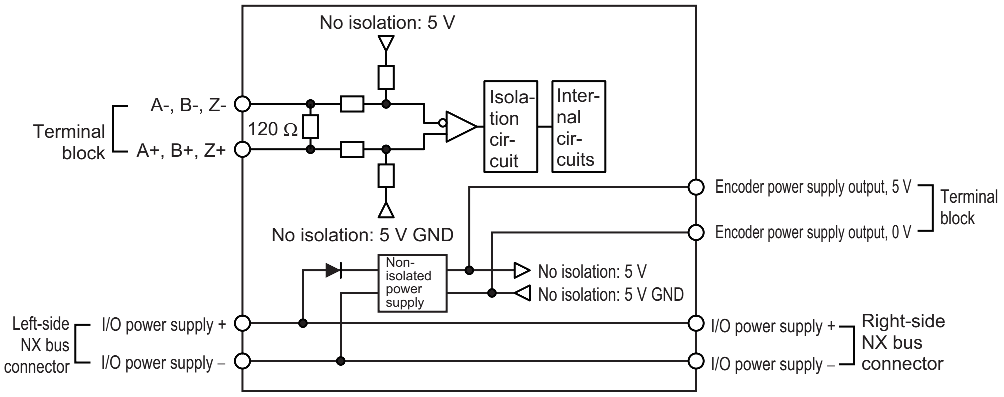
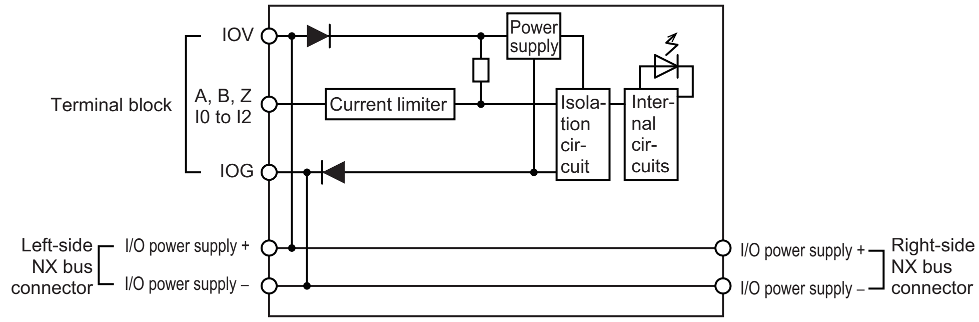
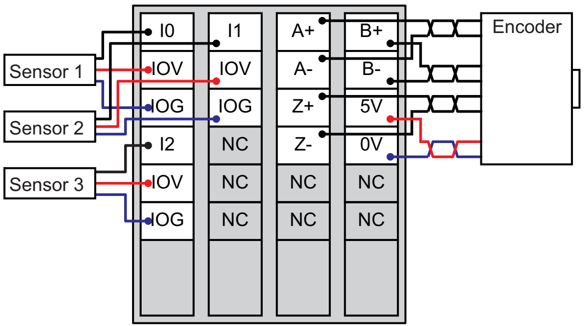
Terminal connection diagram			
Failure detection	None	**Protection**	None

Encoder
A
B
Z
NC
IOV
IOV
Sensor 1
IOG
IOG
I0
I1
I2
NC
Sensor 3
IOV
IOV
Sensor 2
IOG
IOG

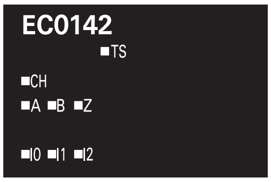
NX-EC0132

Unit name	Incremental Encoder Input Units	**Model**	NX-EC0132
Number of channels	1 channel	**Type of external connections**	Screwless clamping terminal block (12 terminals × 2)
I/O refreshing method	Free-Run refreshing or synchronous I/O refreshing, Task Period Prioritized refreshing *		
Indicators		**Input signals**	Counter: Phases A, B, and Z External Inputs: 3
Input form	Line receiver input		
Counting unit	Pulses		
Pulse input method	Phase differential pulse (multiplication x2/4), pulse + direction inputs, or up and down pulse inputs		
Counter range	–2,147,483,648 to 2,147,483,647 pulses		
Counter functions			
Counter type	Ring counter or linear counter		
Counter controls	Gate control, counter reset, and counter preset		
Latch function	Two external input latches and one internal latch		
Measurements	Pulse rate measurement and pulse period measurement		
Line driver specifications			
Input voltage	EIA standard RS-422-A line driver levels	**High level input voltage**	V_{IT+}: 0.1 V min.
Input impedance	120 Ω ± 5%	**Low level input voltage**	V_{IT-}: –0.1 V min.
Hysteresis voltage	Vhys (V_{IT+} – V_{IT-}): 60 mV		
Maximum response frequency	Phases A and B: Single-phase 4 MHz (phase differential pulse input x4: 1 MHz), Phase Z: 1 MHz		
5-V power supply for encoder	Output voltage: 5 VDC ±5% Output current: 500 mA max.		
External input specifications			
Input voltage	20.4 to 28.8 VDC (24 VDC +20%, –15%)	**ON voltage/ON current**	15 VDC min./3 mA min.
Input current	3.5 mA typical (24 VDC)	**OFF voltage/OFF current**	5.0 VDC max./1 mA max.
ON/OFF response time	1 µs max./1 µs max.		
Internal I/O common processing	NPN		
Dimensions	12 × 100 × 71 mm (W×H×D)	**Isolation method**	Digital isolator
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute with leakage current of 5 mA max.
I/O power supply method	Supplied from the NX bus. 20.4 to 28.8 VDC (24 VDC +20%, –15%)	**Current capacity of I/O power supply terminals**	IOV: 0.1 A max. per terminal IOG: 0.1 A max. per terminal
NX Unit power consumption	0.95 W max.	**Current consumption from I/O power supply**	Unit current consumption: 30 mA max. Consumption from encoder 5-V power supply: Encoder current consumption *0.28 mA
Weight	130 g max.		

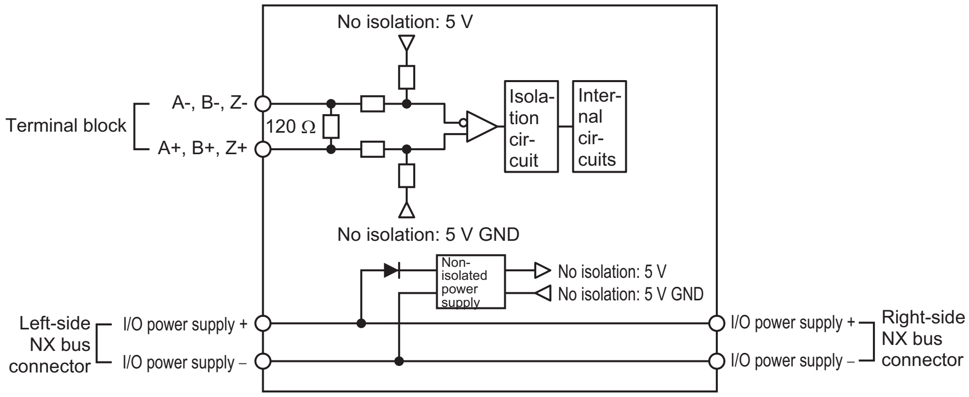
* The I/O refreshing method is automatically set according to the connected Communications Coupler Unit and CPU Unit.

Circuit layout	Encoder Input  No isolation: 5 V Terminal block A-, B-, Z- A+, B+, Z+ 120 Ω Isola-tion cir-cuit Inter-nal cir-cuits No isolation: 5 V GND Non-isolated power supply Encoder power supply output, 5 V Encoder power supply output, 0 V Terminal block No isolation: 5 V No isolation: 5 V GND Left-side NX bus connector I/O power supply + I/O power supply – I/O power supply + I/O power supply – Right-side NX bus connector External Inputs  IOV Terminal block A, B, Z I0 to I2 IOG Current limiter Power supply Isola-tion cir-cuit Inter-nal cir-cuits Left-side NX bus connector I/O power supply + I/O power supply – I/O power supply + I/O power supply – Right-side NX bus connector		
Installation orientation and restrictions	Installation orientation: 6 possible orientations Restrictions: There are no restrictions.		
Terminal connection diagram	 Sensor 1 Sensor 2 Sensor 3 I0 IOV IOG I2 IOV IOG I1 IOV IOG NC NC NC A+ A- Z+ Z- NC NC B+ B- 5V 0V NC NC Encoder		
Failure detection	None	**Protection**	None

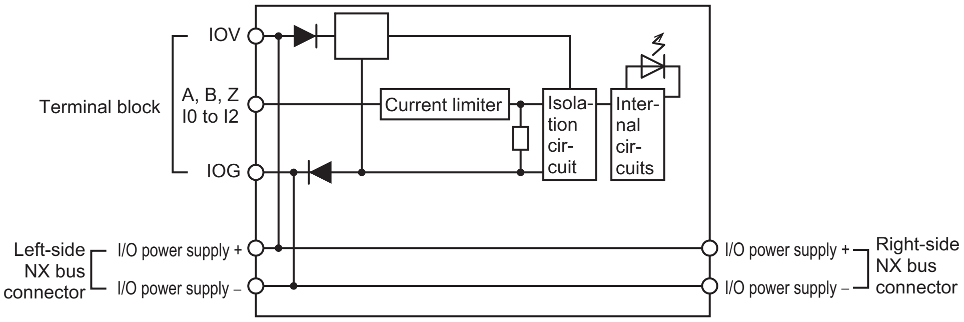
NX-EC0142

Unit name	Incremental Encoder Input Units	**Model**	NX-EC0142
Number of channels	1 channel	**Type of external connections**	Screwless push-in terminal block (12 terminals × 2)
I/O refreshing method	Free-Run refreshing or synchronous I/O refreshing, Task Period Prioritized refreshing *		
Indicators		**Input signals**	Counter: Phases A, B, and Z External Inputs: 3
Input form	Line receiver input		
Counting unit	Pulses		
Pulse input method	Phase difference pulse (multiplication x2/4), pulse + direction inputs, or up and down pulse inputs		
Counter range	–2,147,483,648 to 2,147,483,647 pulses		
Counter functions			
Counter type	Ring counter or linear counter		
Counter controls	Gate control, counter reset, and counter preset		
Latch function	Two external input latches and one internal latch		
Measurements	Pulse rate measurement and pulse period measurement		
Line driver specifications			
Input voltage	EIA standard RS-422-A line driver levels	**High level input voltage**	V_{IT+}: 0.1 V min.
Input impedance	120 Ω ± 5%	**Low level input voltage**	V_{IT-}: –0.1 V min.
Hysteresis voltage	Vhys (V_{IT+} – V_{IT-}): 60 Mv		
Maximum response frequency	Phases A and B: Single-phase 4 MHz (phase difference pulse input x4: 1 MHz), Phase Z: 1 MHz		
5-V power supply for encoder	Output voltage: 5 VDC Output current: 500 mA max.		
External input specifications			
Input voltage	20.4 to 28.8 VDC (24 VDC +20%/.15%)	**ON voltage/ON current**	15 VDC min./3 mA min.
Input current	3.5 mA typical (24 VDC)	**OFF voltage/OFF current**	4.0 VDC max./1 mA max.
ON/OFF response time	1 µs max./2 µs max.		
Internal I/O common processing	PNP		
Dimensions	12 × 100 × 71 mm (W×H×D)	**Isolation method**	Photocoupler isolation
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute with leakage current of 5 mA max.
I/O power supply source	Supplied from the NX bus. 20.4 to 28.8 VDC (24 VDC +20%/–15%)	**Current capacity of I/O power supply terminals**	IOV: 0.1 A max. per terminal IOG: 0.1 A max. per terminal
NX Unit power consumption	1.05W max.	**Current consumption from I/O power supply**	Unit current consumption: 30 mA max. Consumption from encoder 5-V power supply: Encoder current consumption *0.28 mA
Weight	130 g max.		

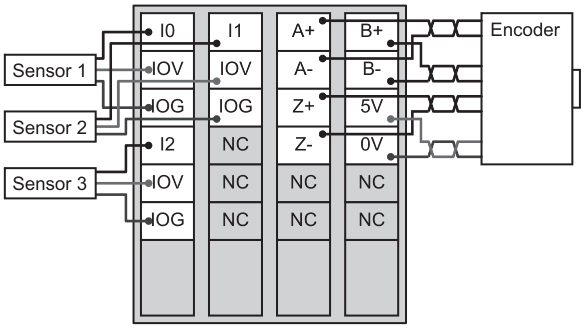
* The I/O refreshing method is automatically set according to the connected Communications Coupler Unit and CPU Unit.

<table>
<tr><td>Circuit layout</td><td colspan="3">Encoder Input


No isolation: 5 V
Terminal block
A-, B-, Z-
A+, B+, Z+
120 Ω
Isolation circuit
Internal circuits
No isolation: 5 V GND
Non-isolated power supply
No isolation: 5 V
No isolation: 5 V GND
Left-side NX bus connector
I/O power supply +
I/O power supply –
I/O power supply +
I/O power supply –
Right-side NX bus connector

External Inputs


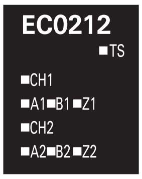
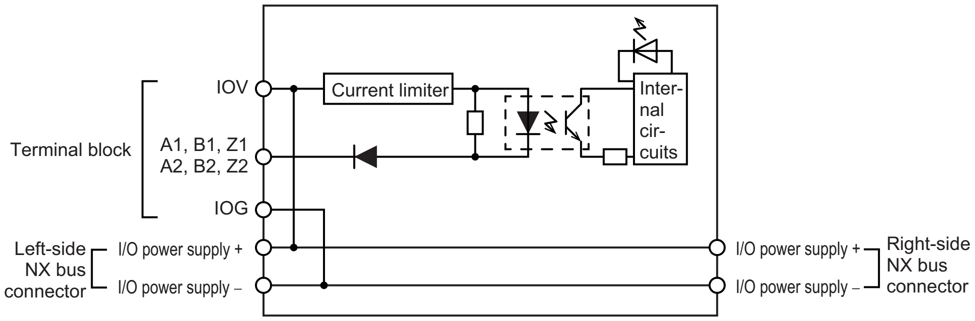
IOV
Terminal block
A, B, Z
I0 to I2
IOG
Current limiter
Isolation circuit
Internal circuits
Left-side NX bus connector
I/O power supply +
I/O power supply –
I/O power supply +
I/O power supply –
Right-side NX bus connector

</td></tr>
<tr><td>Installation orientation and restrictions</td><td colspan="3">Installation orientation: 6 possible orientations
Restrictions: There are no restrictions.</td></tr>
<tr><td>Terminal connection diagram</td><td colspan="3">

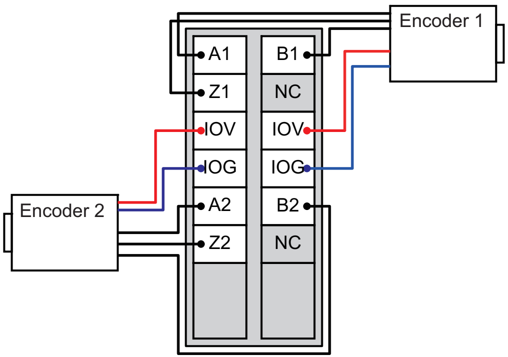
I0
I1
A+
B+
Encoder
Sensor 1
IOV
IOV
A-
B-
Sensor 2
IOG
IOG
Z+
5V
I2
NC
Z-
0V
Sensor 3
IOV
NC
NC
NC
IOG
NC
NC
NC

</td></tr>
<tr><td>Failure detection</td><td>None</td><td>Protection</td><td>None</td></tr>
</table>

NX-EC0212

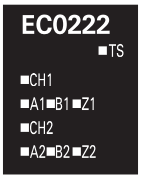
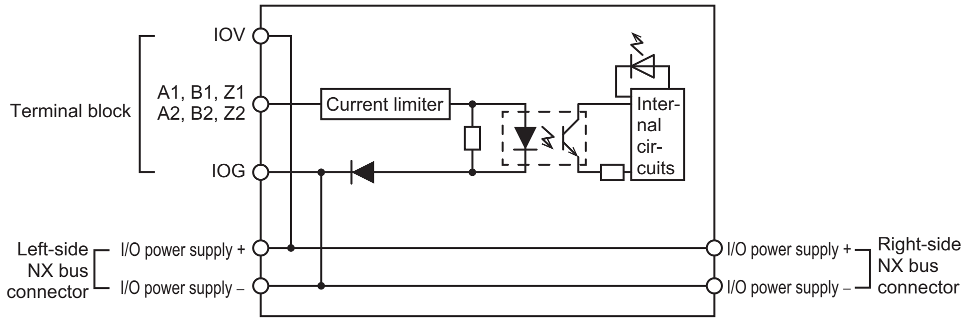
Unit name	Incremental Encoder Input Units	**Model**	NX-EC0212
Number of channels	2 channels	**Type of external connections**	Screwless clamping terminal block (12 terminals)
I/O refreshing method	Free-Run refreshing or synchronous I/O refreshing, Task Period Prioritized refreshing *		
Indicators		**Input signals**	Counter: Phases A, B, and Z External Inputs: None
Input form	Voltage input (24 V)		
Counting unit	Pulses		
Pulse input method	Phase differential pulse (multiplication x2/4), pulse + direction inputs, or up and down pulse inputs		
Counter range	–2,147,483,648 to 2,147,483,647 pulses		
Counter functions			
Counter type	Ring counter or linear counter		
Counter controls	Gate control, counter reset, and counter preset		
Latch function	Two external input latches and one internal latch		
Measurements	Pulse rate measurement and pulse period measurement		
Voltage input specifications			
Input voltage	20.4 to 28.8 VDC (24 VDC +20%, –15%)	**ON voltage**	19.6 VDC min./3 mA min.
Input current	4.2 mA typical (24 VDC)	**OFF voltage**	4.0 VDC max./1 mA max.
Maximum response frequency	Phases A and B: Single-phase 500 kHz (phase differential pulse input x4: 125 kHz), Phase Z: 125 kHz		
Internal I/O common processing	NPN		
External input specifications			
Input voltage	---	**ON voltage/ON current**	---
Input current	---	**OFF voltage/OFF current**	---
ON/OFF response time	---		
Internal I/O common processing	---		
Dimensions	12 × 100 × 71 mm (W×H×D)	**Isolation method**	Photocoupler isolation
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute with leakage current of 5 mA max.
I/O power supply method	Supplied from the NX bus. 20.4 to 28.8 VDC (24 VDC +20%, –15%)	**Current capacity of I/O power supply terminals**	IOV: 0.3 A max. per terminal IOG: 0.3 A max. per terminal
NX Unit power consumption	0.85 W max.	**Current consumption from I/O power supply**	None
Weight	70 g max.		
Circuit layout	Encoder Input  IOV Current limiter Inter-nal cir-cuits Terminal block A1, B1, Z1 A2, B2, Z2 IOG Left-side NX bus connector I/O power supply + I/O power supply – I/O power supply + I/O power supply – Right-side NX bus connector		
Installation orientation and restrictions	Installation orientation: 6 possible orientations Restrictions: There are no restrictions.		

* The I/O refreshing method is automatically set according to the connected Communications Coupler Unit and CPU Unit.

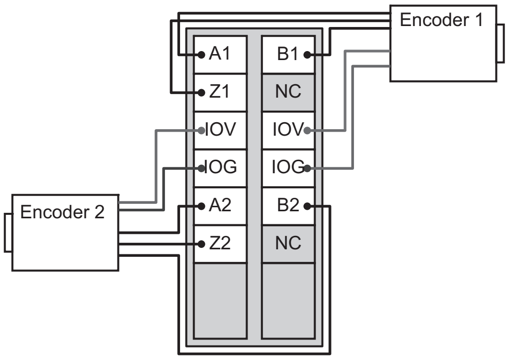
<table>
<tr><td>Terminal connection diagram</td><td colspan="3">
Encoder 1
Encoder 2
A1
B1
Z1
NC
IOV
IOV
IOG
IOG
A2
B2
Z2
NC

</td></tr>
<tr><td>Failure detection</td><td>None</td><td>Protection</td><td>None</td></tr>
</table>

NX-EC0222

Unit name	Incremental Encoder Input Units	**Model**	NX-EC0222
Number of channels	2 channels	**Type of external connections**	Screwless push-in terminal block (12 terminals)
I/O refreshing method	Free-Run refreshing or synchronous I/O refreshing, Task Period Prioritized refreshing *		
Indicators		**Input signals**	Counter: Phases A, B, and Z External Inputs: None
Input form	Voltage input (24 V)		
Counting unit	Pulses		
Pulse input method	Phase difference pulse (multiplication x2/4), pulse + direction inputs, or up and down pulse inputs		
Counter range	–2,147,483,648 to 2,147,483,647 pulses		
Counter functions			
Counter type	Ring counter or linear counter		
Counter controls	Gate control, counter reset, and counter preset		
Latch function	Two external input latches and one internal latch		
Measurements	Pulse rate measurement and pulse period measurement		
Voltage input specifications			
Input voltage	20.4 to 28.8 VDC (24 VDC +20%/–15%)	**ON voltage**	19.6 VDC min./3 mA min.
Input current	4.2 mA typical (24 VDC)	**OFF voltage**	4.0 VDC max./1 mA max.
Maximum response frequency	Phases A and B: Single-phase 500 kHz (phase difference pulse input x4: 125 kHz), Phase Z: 125 kHz		
Internal I/O common processing	PNP		
External input specifications			
Input voltage	---	**ON voltage/ON current**	---
Input current	---	**OFF voltage/OFF current**	---
ON/OFF response time	---		
Internal I/O common processing	---		
Dimensions	12 × 100 × 71 mm (W×H×D)	**Isolation method**	Photocoupler isolation
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute with leakage current of 5 mA max.
I/O power supply source	Supplied from the NX bus. 20.4 to 28.8 VDC (24 VDC +20%/–15%)	**Current capacity of I/O power supply terminals**	IOV: 0.3 A max. per terminal IOG: 0.3 A max. per terminal
NX Unit power consumption	0.95 W max.	**Current consumption from I/O power supply**	None
Weight	70 g max.		
Circuit layout	Encoder Input  IOV Terminal block A1, B1, Z1 A2, B2, Z2 IOG Current limiter Inter-nal cir-cuits Left-side NX bus connector I/O power supply + I/O power supply – I/O power supply + I/O power supply – Right-side NX bus connector		
Installation orientation and restrictions	Installation orientation: 6 possible orientations Restrictions: There are no restrictions.		

* The I/O refreshing method is automatically set according to the connected Communications Coupler Unit and CPU Unit.

Terminal connection diagram	 Encoder 1 A1 B1 Z1 NC IOV IOV IOG IOG Encoder 2 A2 B2 Z2 NC		
Failure detection	None	**Protection**	None

Version Information

NX Units		Corresponding unit versions/versions		
Model	**Unit Version**	**EtherCAT Coupler Units** **NX-ECC20□** [*1]	**NJ/NX-series CPU Units** **NJ501-□□□□** **NJ301-□□□□** **NJ101-□□□□** **NX701-□□□□**	**Sysmac Studio**
NX-EC0112	Ver.1.1	Ver.1.1 [*2]	Ver.1.06 [*2]	Ver.1.10
	Ver.1.2			Ver.1.12
NX-EC0122	Ver.1.0			Ver.1.07
	Ver.1.1			Ver.1.08
	Ver.1.2			Ver.1.12
NX-EC0132	Ver.1.1			Ver.1.10
	Ver.1.2			Ver.1.12
NX-EC0142	Ver.1.0			Ver.1.07
	Ver.1.1			Ver.1.08
	Ver.1.2			Ver.1.12
NX-EC0212	Ver.1.1	Ver.1.1 [*2]	Ver.1.06 [*2]	Ver.1.10
	Ver.1.2			Ver.1.12
NX-EC0222	Ver.1.0			Ver.1.07
	Ver.1.1			Ver.1.08
	Ver.1.2			Ver.1.12

*1. Some Units do not have all of the versions given in the above table. If a Unit does not have the specified version, support is provided by the oldest available version after the specified version. Refer to the user's manuals for the specific Units for the relation between models and versions.

*2. You can use the following versions if time stamp refreshing is not used.
EtherCAT Coupler Unit: Version 1.0
NJ-series CPU Unit: Version 1.05

NX-series SSI Input Unit

NX-ECS□□□

Read position information from encoders with Synchronous Serial Interface (SSI).

- Process SSI encoder input data using the MC Function Modules of the NJ/NX-series Machine Automation Controller.
- Encoder data can be synchronised with the control cycle and EtherCAT Distributed Clock.

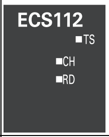
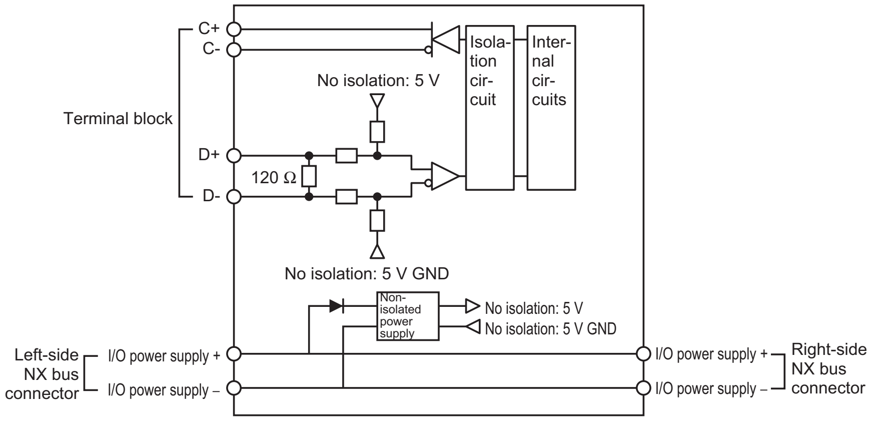
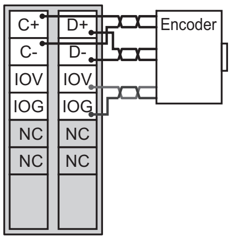
Features

- SSI clock frequency is supported up to 2 MHz.
- High-speed remote I/O control with communications cycle as fast as 125 μs [*1]
- Free-run refreshing or Synchronous I/O refreshing, Task Period Prioritized refreshing [*2], can be selected for refreshing with the NX-series EtherCAT Coupler.
- When the MC Function Modules of the NJ/NX-series Machine Automation Controller are used, the encoder input can be used for motion control instructions as an “axis”.
- Choice of SSI Coding Methods (No conversion, binary code, or gray code)
- Input edge time stamps
- Multi turn and single turn SSI encoders are supported.
- Data Refresh Status (Data refreshing can be checked on the host controller.)
- Maximum connecting SSI cable length:400m

*1 When using the NX-EC01□□ together with the NX701-□□□□ and NX-ECC203.
*2 Task Period Prioritized refreshing is available when the NX-ECC203 is used together.

Specification

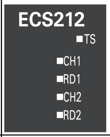
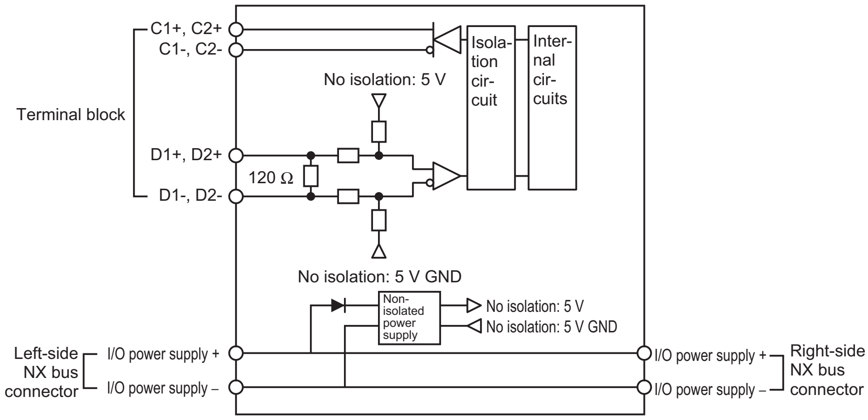
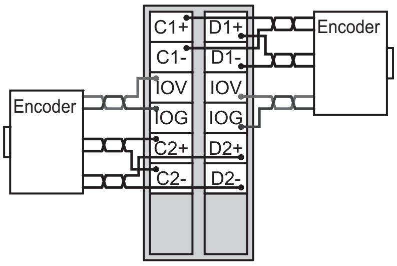
SSI Input Units 1 channel NX-ECS112

Unit name	SSI Input Units	**Model**	NX-ECS112
Number of channels	1 channel	**Type of external connections**	Screwless push-in terminal block (12 terminals)
I/O refreshing method	Free-Run refreshing or synchronous I/O refreshing, Task Period Prioritized refreshing [*1]		
Indicators	 ECS112 TS CH RD	**Input signals**	External inputs: 2 Data input (D+,D–) External outputs: 2 Clock output (C+, C–)
I/O interface	Synchronized serial interface (SSI)		
Clock output	EIA standard RS-422-A line driver levels		
Data input	EIA standard RS-422-A line receiver levels		
Maximum data length	32 bits (The single-turn, multi-turn, and status data length can be set.)		
Coding method	No conversion, binary code, or gray code		
Baud Rate	100 kHz, 200 kHz, 300 kHz, 400 kHz, 500 kHz, 1.0 MHz, 1.5 MHz, or 2.0 MHz		
Dimensions	12 × 100 × 71 mm (W×H×D)	**Isolation method**	Digital isolator
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute with leakage current of 5 mA max.
I/O power supply source	Supplied from the NX bus. 20.4 to 28.8 VDC (24 VDC +20%/–15%)	**Current capacity of I/O power supply terminals**	IOV: 0.3 A max. per terminal IOG: 0.3 A max. per terminal
NX Unit power consumption	0.85 W	**Current consumption from I/O power supply**	20 mA
Maximum transmission distance [*2]	**Baud Rate**	**Maximum transmission distance**	
	100 kHz	400 m	
	200 kHz	190 m	
	300 kHz	120 m	
	400 kHz	80 m	
	500 kHz	60 m	
	1.0 MHz	25 m	
	1.5 MHz	10 m	
	2.0 MHz	5 m	
Weight	65 g		
Circuit layout	SSI Clock Output and Data Input  C+ C- Terminal block No isolation: 5 V Isolation circuit Internal circuits D+ 120 Ω D- No isolation: 5 V GND Non-isolated power supply No isolation: 5 V No isolation: 5 V GND Left-side NX bus connector I/O power supply + I/O power supply – I/O power supply + I/O power supply – Right-side NX bus connector		
Installation orientation and restrictions	Installation orientation: 6 possible orientations Restrictions: There are no restrictions.		
Terminal connection diagram	 C+ D+ C- D- IOV IOV IOG IOG NC NC NC NC Encoder		
Failure detection	None	**Protection**	None

*1. The I/O refreshing method is automatically set according to the connected Communications Coupler Unit and CPU Unit.

*2. The maximum transmission distance for an SSI Input Unit depends on the baud rate due to the delay that can result from the responsiveness of the connected encoder and cable impedance. The maximum transmission distance is only a guideline. Review the specifications for the cables and encoders in the system and evaluate the operation of the equipment before use.

SSI Input Units 2 channel NX-ECS212

Unit name	SSI Input Units	**Model**	NX-ECS212
Number of channels	2 channels	**Type of external connections**	Screwless push-in terminal block (12 terminals)
I/O refreshing method	Free-Run refreshing or synchronous I/O refreshing, Task Period Prioritized refreshing *1		
Indicators	 ECS212 TS CH1 RD1 CH2 RD2	**Input signals**	External inputs: 2 Data input (D+, D–) External outputs: 2 Clock output (C+, C–)
I/O interface	Synchronized serial interface (SSI)		
Clock output	EIA standard RS-422-A line driver levels		
Data input	EIA standard RS-422-A line receiver levels		
Maximum data length	32 bits (The single-turn, multi-turn, and status data length can be set.)		
Coding method	No conversion, binary code, or gray code		
Baud Rate	100 kHz, 200 kHz, 300 kHz, 400 kHz, 500 kHz, 1.0 MHz, 1.5 MHz, or 2.0 MHz		
Dimensions	12 × 100 × 71 mm (W×H×D)	**Isolation method**	Digital isolator
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute with leakage current of 5 mA max.
I/O power supply source	Supplied from the NX bus. 20.4 to 28.8 VDC (24 VDC +20%/–15%)	**Current capacity of I/O power supply terminals**	IOV: 0.3 A max. per terminal IOG: 0.3 A max. per terminal
NX Unit power consumption	0.9 W	**Current consumption from I/O power supply**	30 mA
Maximum transmission distance *2	**Baud Rate**	**Maximum transmission distance**	
	100 kHz	400 m	
	200 kHz	190 m	
	300 kHz	120 m	
	400 kHz	80 m	
	500 kHz	60 m	
	1.0 MHz	25 m	
	1.5 MHz	10 m	
	2.0 MHz	5 m	
Weight	65 g		
Circuit layout	SSI Clock Output and Data Input  C1+, C2+ C1-, C2- Terminal block D1+, D2+ D1-, D2- 120 Ω No isolation: 5 V No isolation: 5 V GND Isolation circuit Internal circuits Non-isolated power supply No isolation: 5 V No isolation: 5 V GND Left-side NX bus connector I/O power supply + I/O power supply – I/O power supply + I/O power supply – Right-side NX bus connector		
Installation orientation and restrictions	Installation orientation: 6 possible orientations Restrictions: There are no restrictions.		
Terminal connection diagram	 Encoder Encoder C1+ C1- IOV IOG C2+ C2- D1+ D1- IOV IOG D2+ D2-		
Failure detection	None	**Protection**	None

*1. The I/O refreshing method is automatically set according to the connected Communications Coupler Unit and CPU Unit.

*2. The maximum transmission distance for an SSI Input Unit depends on the baud rate due to the delay that can result from the responsiveness of the connected encoder and cable impedance. The maximum transmission distance is only a guideline. Review the specifications for the cables and encoders in the system and evaluate the operation of the equipment before use.

Version Information

NX Units		Corresponding unit versions/versions		
Model	**Unit Version**	**EtherCAT Coupler Units** **NX-ECC20□ ***	**NJ/NX-series CPU Units** **NJ501-□□□□** **NJ301-□□□□** **NJ101-□□□□** **NX701-□□□□**	**Sysmac Studio**
NX-ECS112	Ver.1.0	Ver.1.1*	Ver.1.06*	Ver.1.07
	Ver.1.1			Ver.1.08
	Ver.1.2			Ver.1.12
NX-ECS212	Ver.1.0			Ver.1.07
	Ver.1.1			Ver.1.08
	Ver.1.2			Ver.1.12

* For the NX-ECC202, there is no unit version of 1.1 or earlier.

NX-series Pulse Output Unit

NX-PG0□□□

Positioning with Pulse Input Type Motor Drivers Such As Stepper Motor Drive

- The MC Function Modules of the NJ/NX-series Machine Automation Controller enable pulse outputs for motor control.
- The same motion control instructions as those for Servomotor control allow you to program single-axis PTP control and interpolation.

Features

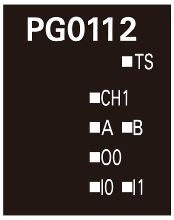
- When the motion control instructions of the MC Function Modules of the NJ/NX-series Machine Automation Controller are used, number of usable units is the same as the maximum number of axes controlled by the NJ/NX-series Controller.
- High-speed remote I/O control with communications cycle as fast as 125 μs [*1]
- Synchronous I/O refreshing or Task Period Prioritized refreshing [*2], with the EtherCAT Coupler Unit.
- Latch function (2 external latch inputs)
- Maximum pulse output speed: 500 kpps

*1 When using the NX-EC01□□ together with the NX701-□□□□ and NX-ECC203.
*2 Task Period Prioritized refreshing is available when the NX-ECC203 is used together.

Specification

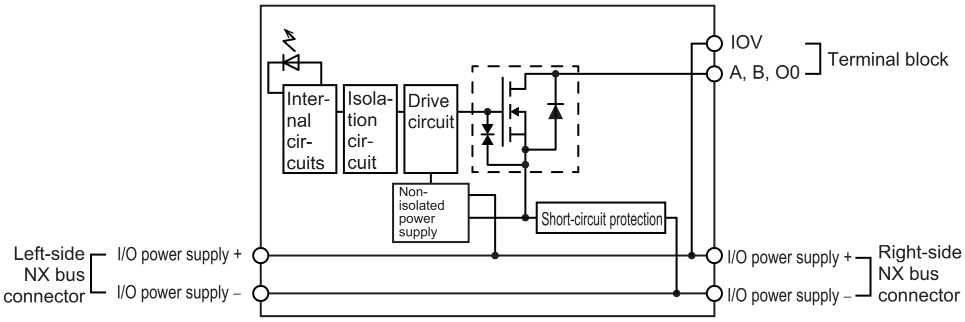
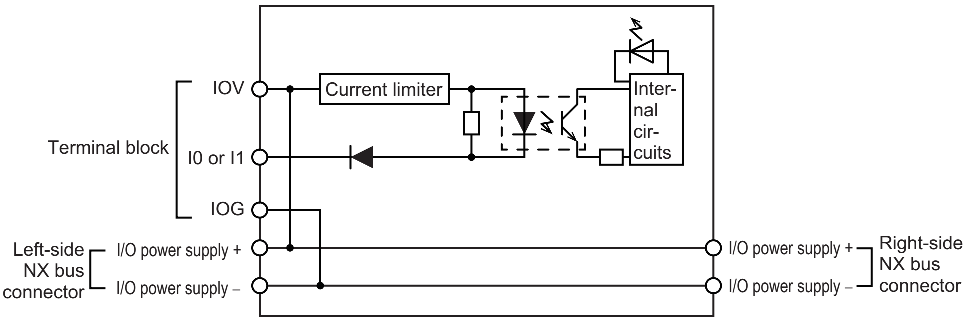
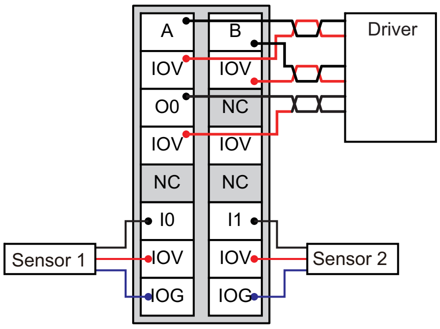
● Pulse Output Units

NX-PG0112

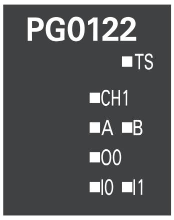
Unit name	Pulse Output Units	**Model**	NX-PG0112
Number of axes	1	**Type of external connections**	Screwless clamping terminal block (16 terminals)
I/O refreshing method	Synchronous I/O refreshing, Task Period Prioritized refreshing *1		
Indicators		**I/O signals**	Inputs: 2, External inputs Outputs: 3, The outputs are the forward direction pulse output, reverse direction pulse output, and external output (one of each output).
Control method	Open-loop control through pulse string output		
Controlled drive	Servo drive with a pulse string input or a stepper motor drive		
Pulse output form	Open collector output		
Unit of control	Pulses		
Maximum pulse output speed	500 kpps		
Pulse output method	Forward/reverse direction outputs or Pulse + direction outputs		
Position control range	−2,147,483,648 to 2,147,483,647 pulses		
Velocity control range	1 to 500,000 pps		
Positioning *2			
Single-axis position control	Absolute positioning, relative positioning, and interrupt feeding		
Single-axis velocity control	Velocity control (velocity feeding in Position Control Mode)		
Single-axis synchronized control	Cam operation and gear operation		
Single-axis manual operation	Jogging		
Auxiliary function for single-axis control	Homing, stopping, and override changes		
External input specifications			
Input voltage	20.4 to 28.8 VDC (24 VDC +20%/−15%)	**ON voltage/ON current**	15 VDC min./3 mA min.
Input current	4.6 mA typical (24 VDC)	**OFF voltage/OFF current**	4.0 VDC max./1 mA max.
ON/OFF response time	1 µs max./2 µs max.		
Internal I/O common processing	NPN		
Pulse output and external output specifications			
Rated voltage	24 VDC		
Load voltage range	15 to 28.8 VDC	**Residual voltage**	1.0 V max.
Maximum load current	30 mA	**Leakage current**	0.1 mA max.
ON/OFF response time	Pulse output: Refer to “*NX-series Position Interface Units User’s Manual* (W524-E1)”. External output: 5 µs max./5 µs max.		
Internal I/O common processing	NPN		
Dimensions	12 × 100 × 71 mm (W×H×D)	**Isolation method**	External inputs: Photocoupler isolation External outputs: Digital isolator
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute with leakage current of 5 mA max.
I/O power supply method	Supplied from the NX bus. 20.4 to 28.8 VDC (24 VDC +20%, −15%)	**Current capacity of I/O power supply terminals**	IOV: 0.1 A max. per terminal IOG: 0.1 A max. per terminal
NX Unit power consumption	0.80 W max.	**Current consumption from I/O power supply**	20 mA max.
Weight	70 g max.	**Cable length**	3 m max.

*1. The I/O refreshing method is automatically set according to the connected Communications Coupler Unit and CPU Unit.

*2. These functions are supported when you also use the MC Function Module in the NJ-series CPU Unit.
Refer to the NJ-series CPU Unit Motion Control User's Manual (Cat. No. W507) for details.
A Pulse Output Unit only outputs pulses during the control period based on commands received at a fixed period.
Target position calculations (distribution calculations) for acceleration/deceleration control or for each control period must be performed on the Controller that is connected as the host.

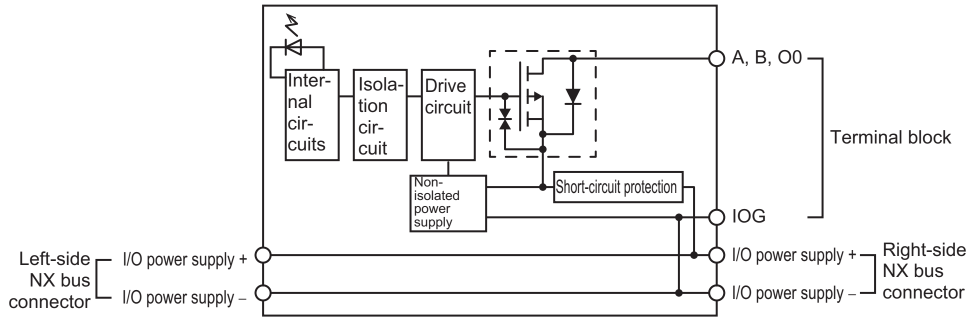
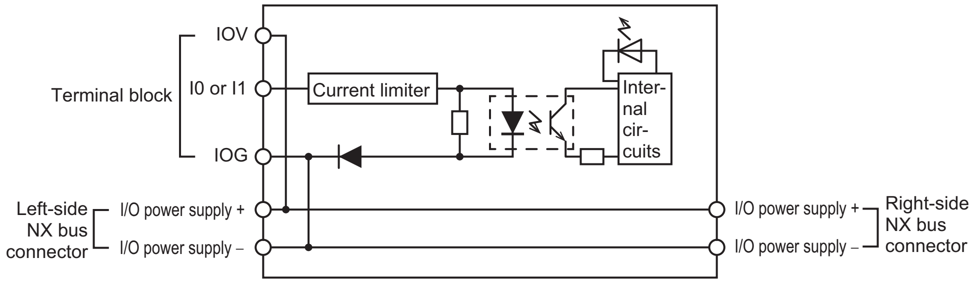
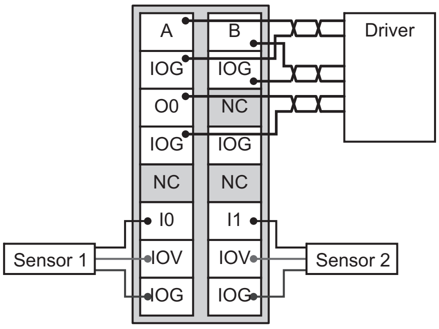
Circuit layout	Pulse Output and External Output  Inter-nal cir-cuits Isola-tion cir-cuit Drive circuit Non-isolated power supply Short-circuit protection IOV A, B, O0 Terminal block Left-side NX bus connector I/O power supply + I/O power supply – I/O power supply + I/O power supply – Right-side NX bus connector External Inputs  IOV Current limiter Inter-nal cir-cuits Terminal block I0 or I1 IOG Left-side NX bus connector I/O power supply + I/O power supply – I/O power supply + I/O power supply – Right-side NX bus connector		
Installation orientation and restrictions	Installation orientation: 6 possible orientations Restrictions: There are no restrictions.		
Terminal connection diagram	 A B IOV IOV O0 NC IOV IOV NC NC I0 I1 IOV IOV IOG IOG Driver Sensor 1 Sensor 2		
Failure detection	None	**Protection**	None

NX-PG0122

Unit name	Pulse Output Units	**Model**	NX-PG0122
Number of axes	1	**Type of external connections**	Screwless push-in terminal block (16 terminals)
I/O refreshing method	Synchronous I/O refreshing, Task Period Prioritized refreshing *1		
Indicators		**I/O signals**	External inputs: 2 These are general-purpose inputs. External outputs: 3 These are the forward direction pulse output, reverse direction pulse output, and a general-purpose output.
Control method	Open-loop control through pulse string output		
Controlled drive	Servo drive with a pulse train input or a stepper motor drive		
Pulse output form	Open collector output		
Control unit	Pulses		
Maximum pulse output speed	500 kpps		
Pulse output method	Forward/reverse direction pulse outputs or pulse + direction outputs		
Position control range	–2,147,483,648 to 2,147,483,647 pulses		
Velocity control range	1 to 500,000 pps		
Positioning *2			
Single-axis position control	Absolute positioning, relative positioning, and interrupt feeding		
Single-axis velocity control	Velocity control (velocity feeding in Position Control Mode)		
Single-axis synchronized control	Cam operation and gear operation		
Single-axis manual operation	Jogging		
Auxiliary function for single-axis control	Homing, stopping, and override changes		
External input specifications			
Input voltage	20.4 to 28.8 VDC (24 VDC +20%/–15%)	**ON voltage/ON current**	15 VDC min./3 mA min.
Input current	4.6 mA typical (24 VDC)	**OFF voltage/OFF current**	4.0 VDC max./1 mA max.
ON/OFF response time	1 µs max./2 µs max.		
Internal I/O common processing	PNP		
External output specifications			
Rated voltage	24 VDC		
Load voltage range	15 to 28.8 VDC	**Residual voltage**	1.0 V max.
Maximum load current	30 mA	**Leakage current**	0.1 mA max.
ON/OFF response time	Pulse output: Refer to "*NX-series Position Interface Units User's Manual* (W524-E1)". 5 µs max./5 µs max.		
Internal I/O common processing	PNP		
Dimensions	12 × 100 × 71 mm (W×H×D)	**Isolation method**	External inputs: Photocoupler isolation External outputs: Digital isolator
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	**Dielectric strength**	510 VAC between isolated circuits for 1 minute with leakage current of 5 mA max.
I/O power supply source	Supplied from the NX bus. 20.4 to 28.8 VDC (24 VDC +20%/–15%)	**Current capacity of I/O power supply terminals**	IOV: 0.1 A max. per terminal IOG: 0.1 A max. per terminal
NX Unit power consumption	0.90 W max.	**Current consumption from I/O power supply**	20 mA max.
Weight	70 g max.	**Cable length**	3 m max.

*1. The I/O refreshing method is automatically set according to the connected Communications Coupler Unit and CPU Unit.

*2. These functions are supported when you also use the MC Function Module in the NJ-series CPU Unit.
Refer to the NJ-series CPU Unit Motion Control User's Manual (Cat. No. W507) for details.
A Pulse Output Unit only outputs pulses during the control period based on commands received at a fixed period.
Target position calculations (distribution calculations) for acceleration/deceleration control or for each control period must be performed on the Controller that is connected as the host

Circuit layout	Pulse Output and External Output  Internal circuits Isolation circuit Drive circuit Non-isolated power supply Short-circuit protection A, B, O0 Terminal block IOG Left-side NX bus connector I/O power supply + I/O power supply – I/O power supply + I/O power supply – Right-side NX bus connector External Inputs  IOV I0 or I1 IOG Terminal block Current limiter Internal circuits Left-side NX bus connector I/O power supply + I/O power supply – I/O power supply + I/O power supply – Right-side NX bus connector		
Installation orientation and restrictions	Installation orientation: 6 possible orientations Restrictions: There are no restrictions.		
Terminal connection diagram	 A B IOG IOG O0 NC IOG IOG NC NC I0 I1 IOV IOV IOG IOG Driver Sensor 1 Sensor 2		
Failure detection	None	**Protection**	None

Version Information

NX Units		Corresponding unit versions/versions		
Model	**Unit Version**	**EtherCAT Coupler Units** **NX-ECC20□ ***	**NJ/NX-series CPU Units** **NJ501-□□□□** **NJ301-□□□□** **NJ101-□□□□** **NX701-□□□□**	**Sysmac Studio**
NX-PG0112	Ver.1.1	Ver.1.0	Ver.1.05	Ver.1.10
	Ver.1.2			Ver.1.12
NX-PG0122	Ver.1.0			Ver.1.06
	Ver.1.1			Ver.1.08
	Ver.1.2			Ver.1.12

* For the NX-ECC202, there is no unit version of 1.1 or earlier.

NX-series System Unit

NX-PD/PF/PC/TBX

Power Supply Unit, Power Connection Unit, and FG Terminal Expansion Unit for NX-series

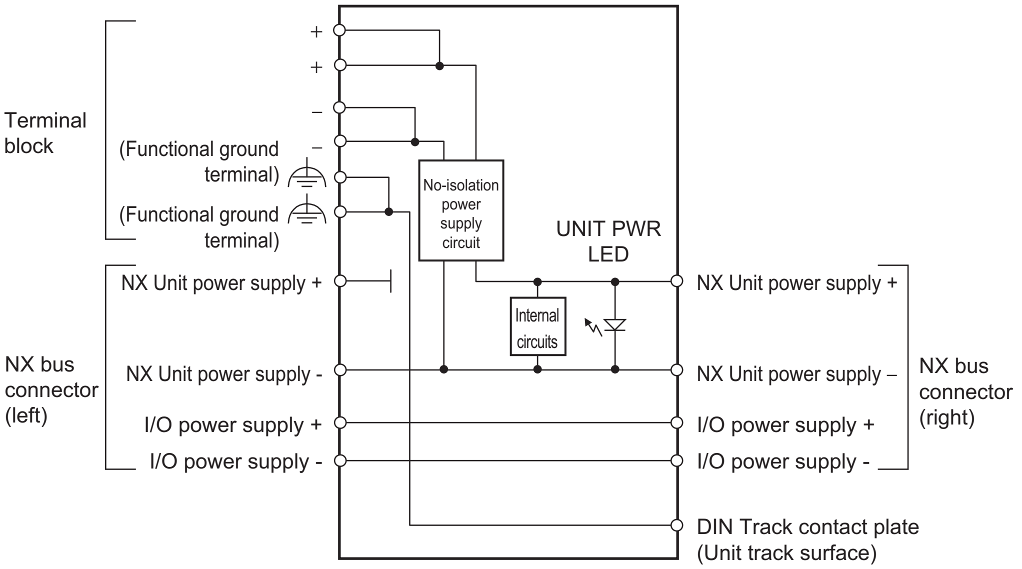
- Provide stabilised power to the internal circuits of NX I/O Units.
- Feed additional power to I/O circuits of NX I/O Units.
- Provide extra terminals for sensor/actuator power and termination of shielded cabling.

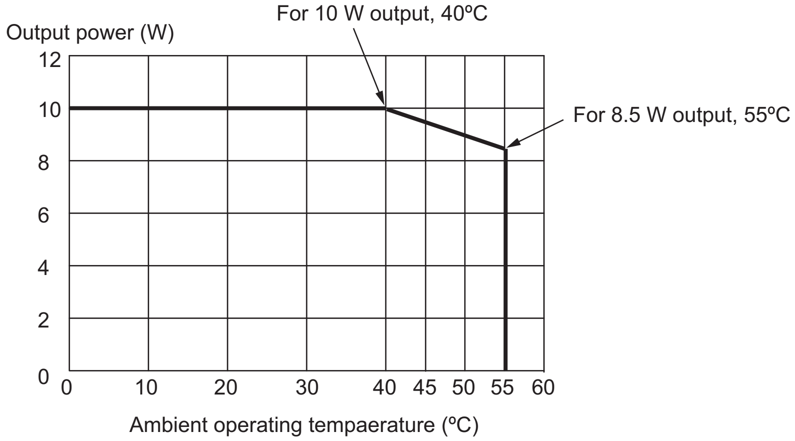
Features

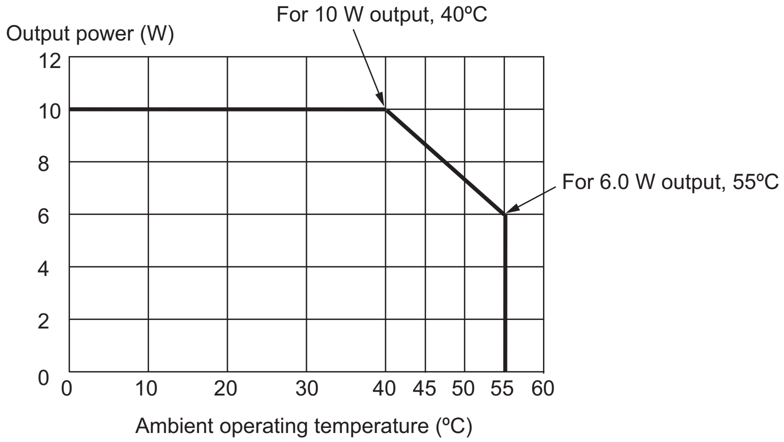
- Units to feed in additional Unit power and I/O power to an NX-series remote I/O terminal.
- Screwless clamp terminal block significantly reduces wiring work.
- Space-saving 12 mm wide units.
- The NX Unit Power Supply Unit allows expansion of the I/O configuration beyond the maximum power supply capacity of the EtherCAT Coupler
- The I/O Power Supply Unit is used when the total allowed I/O current per feed terminal is exceeded, or to split I/O power into groups.
- The I/O Power Connection Unit can be used as an additional power supply terminal for connected sensors and actuators.
- The FG Terminal Expansion Unit can be used as ground terminal for wire shields.
- The screwless terminal block is detachable for easy commissioning and maintenance.

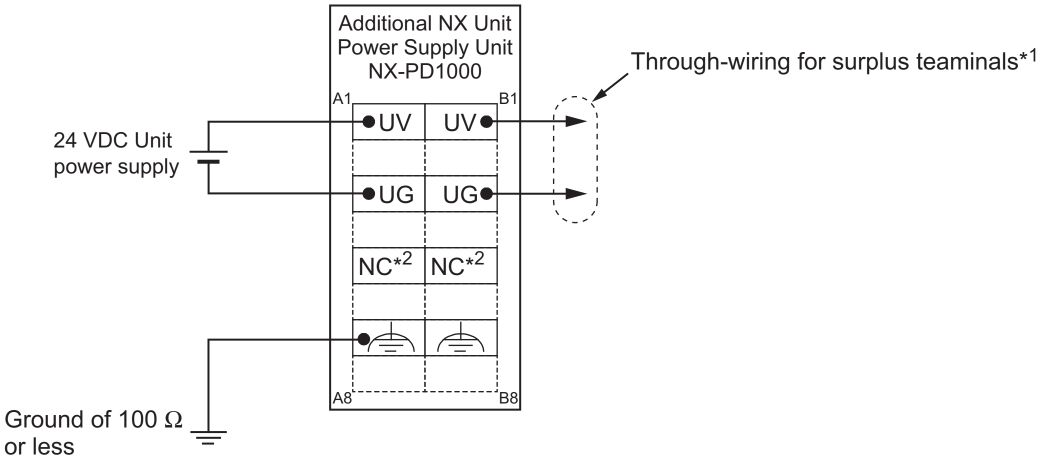
Specification

Additional NX Unit Power Supply Unit NX-PD1000

Unit name	Additional NX Unit Power Supply Unit
Model	NX-PD1000
External connection terminals	Screwless push-in terminal block (8 terminals)
Power supply voltage	24 VDC (20.4 to 28.8 VDC)
NX Bus power supply capacity	10 W max. (Refer to Installation orientation and restrictions for details.)
NX Unit power supply efficiency	70%
Unwired terminal current capacity	4 A max. (Including the current of through-wiring)
Dimensions	12 (W) × 100 (H) × 71 (D)
Isolation method	No-isolation
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)
Dielectric strength	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
NX Unit power consumption	0.45 W max.
I/O current consumption	No consumption
Weight	65 g max.
Circuit layout	 + + − − Terminal block (Functional ground terminal) (Functional ground terminal) No-isolation power supply circuit UNIT PWR LED Internal circuits NX Unit power supply + NX bus connector (left) NX Unit power supply - I/O power supply + I/O power supply - NX Unit power supply + NX Unit power supply – I/O power supply + I/O power supply - NX bus connector (right) DIN Track contact plate (Unit track surface)

<table>
<tr><td>Installation orientation and restrictions</td><td>
Installation orientation: Possible in 6 orientations.
Restrictions:
• For upright installation


• For any installation other than upright


</td></tr>
<tr><td>Terminal connection diagram</td><td>

Additional NX Unit
Power Supply Unit
NX-PD1000
Through-wiring for surplus teaminals*1
A1
B1
UV
UV
24 VDC Unit
power supply
UG
UG
NC*2
NC*2
A8
B8
Ground of 100 Ω
or less
</td></tr>
</table>

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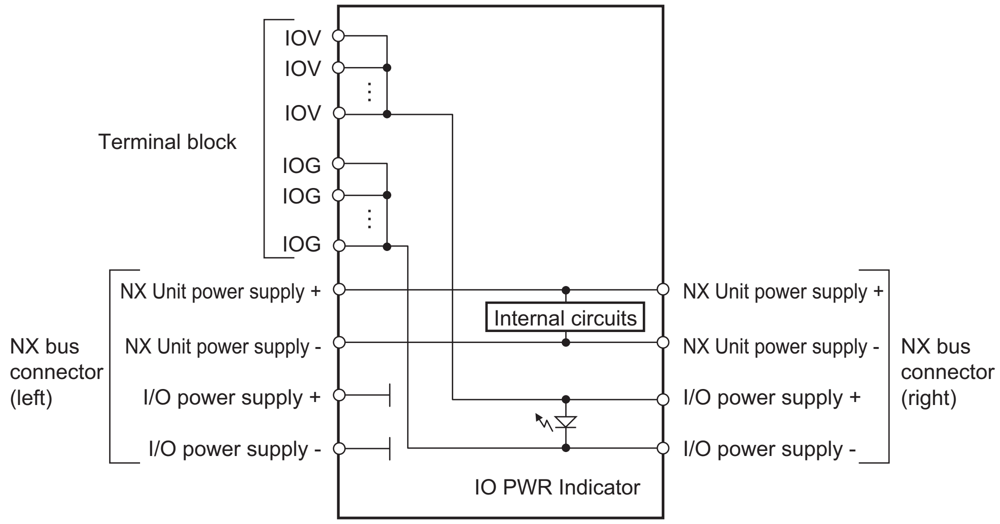
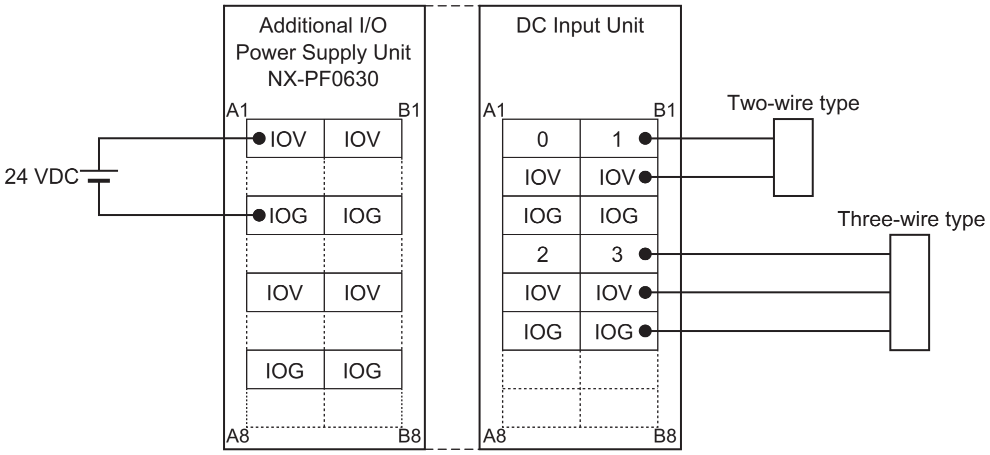
*1. You can use the unwired terminals of the Unit power supply terminals (UV/UG) for through-wiring of the Additional NX Unit Power Supply Unit or the Unit power supply terminals on the EtherCAT Coupler Unit.

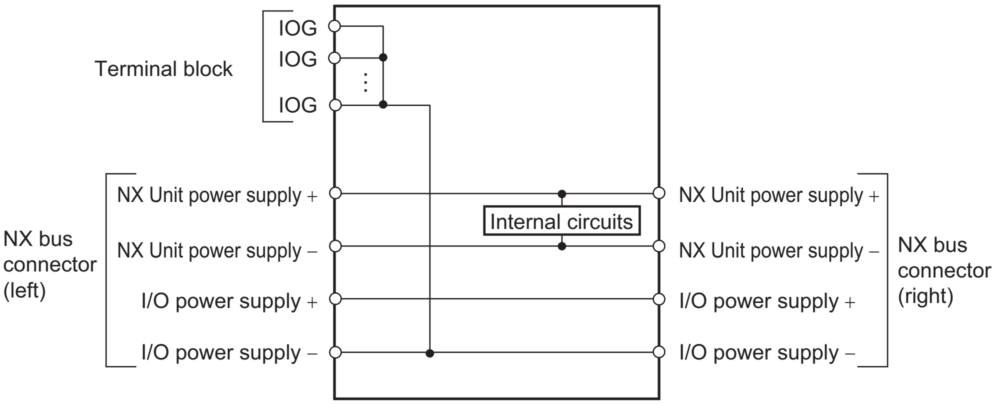
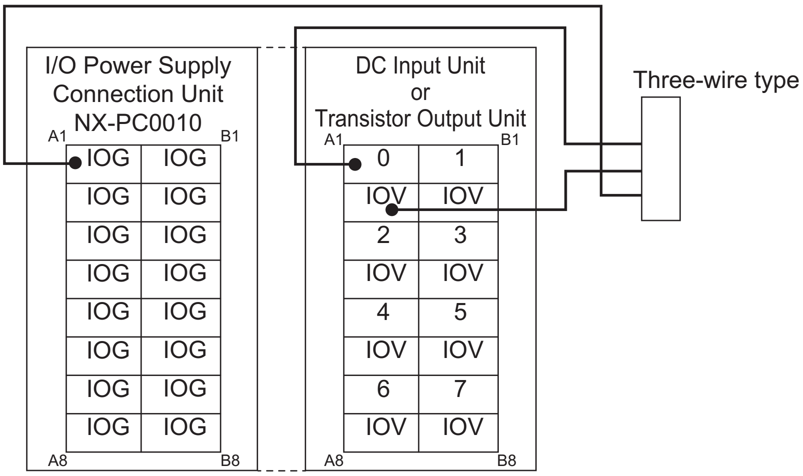
*2. The NC terminal is not connected to the internal circuit.

Additional I/O Power Supply Units NX-PF0□30

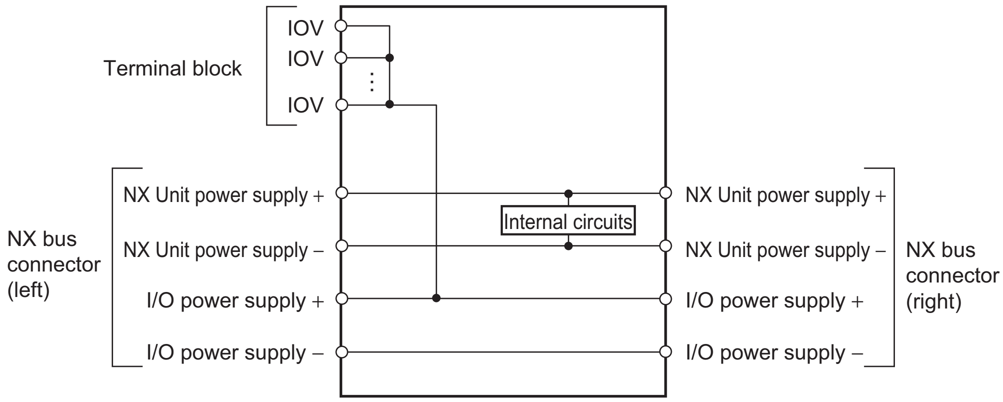
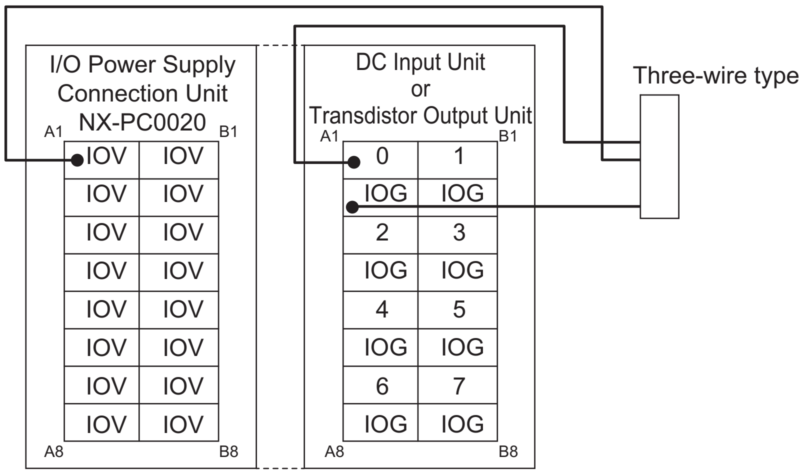
Unit name	Additional I/O Power Supply Unit	
Model	NX-PF0630	NX-PF0730
External connection terminals	Screwless push-in terminal block (8 terminals)	
Power supply voltage	5 to 24 VDC (4.5 to 28.8 VDC)*	
I/O power supply maximum current	4 A	10 A
Current capacity of I/O power supply terminal	4 A max.	10 A max.
Dimensions	12 (W) × 100 (H) × 71 (D)	
Isolation method	No-isolation	
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	
Dielectric strength	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.	
NX Unit power consumption	0.45 W max.	
I/O current consumption	10 mA max.	
Weight	65 g max.	
Circuit layout	 IOV IOV IOV Terminal block IOG IOG IOG NX Unit power supply + NX bus connector (left) NX Unit power supply - I/O power supply + I/O power supply - Internal circuits IO PWR Indicator NX Unit power supply + NX Unit power supply - I/O power supply + I/O power supply - NX bus connector (right)	
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions	
Terminal connection diagram	 Additional I/O Power Supply Unit NX-PF0630 A1 B1 IOV IOV 24 VDC IOG IOG IOV IOV IOG IOG A8 B8 DC Input Unit A1 B1 0 1 IOV IOV IOG IOG 2 3 IOV IOV IOG IOG A8 B8 Two-wire type Three-wire type	
Overload/low voltage detection	Not supported	
Protective function	Not supported.	

* Use an output voltage that is appropriate for the I/O circuits of the NX Units and the connected external devices.

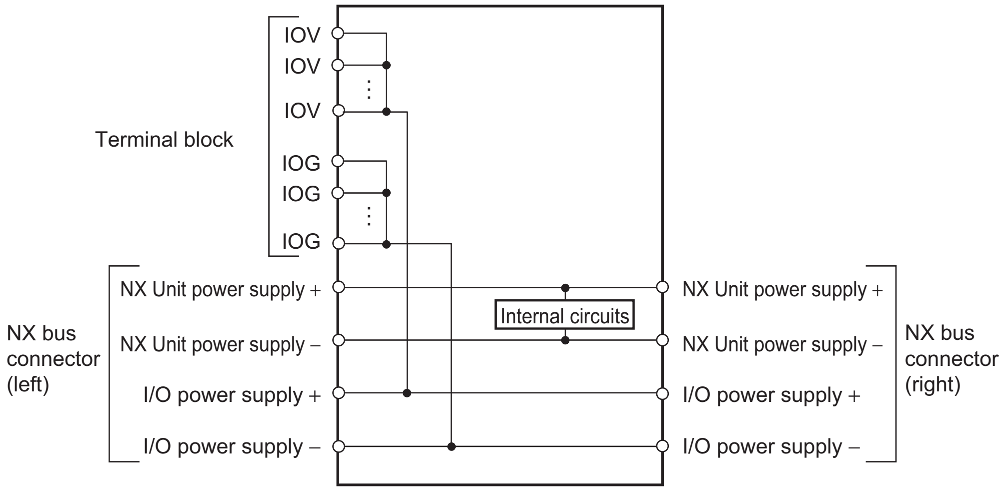
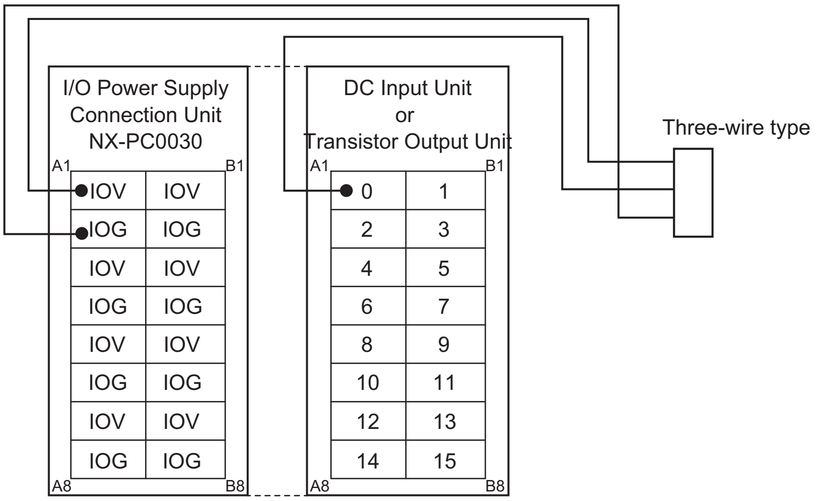
I/O Power Supply Connection Unit IOG terminal type NX-PC0010

Unit name	I/O Power Supply Connection Unit
Model	NX-PC0010
External connection terminals	Screwless push-in termnal block (16 terminals)
Number of I/O power supply terminals	IOG: 16 terminals
Current capacity of I/O power supply terminal	4 A/terminal max.
Dimensions	12 (W) × 100 (H) × 71 (D)
Isolation method	No-isolation
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)
Dielectric strength	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
NX Unit power consumption	0.45 W max.
I/O current consumption	No consumption
Weight	65 g max.
Circuit layout	 Terminal block IOG IOG IOG NX bus connector (left) NX Unit power supply + NX Unit power supply – I/O power supply + I/O power supply – Internal circuits NX Unit power supply + NX Unit power supply – I/O power supply + I/O power supply – NX bus connector (right)
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions
Terminal connection diagram	 I/O Power Supply Connection Unit NX-PC0010 A1 B1 IOG A8 B8 DC Input Unit or Transistor Output Unit 0 1 IOV 2 3 4 5 6 7 Three-wire type

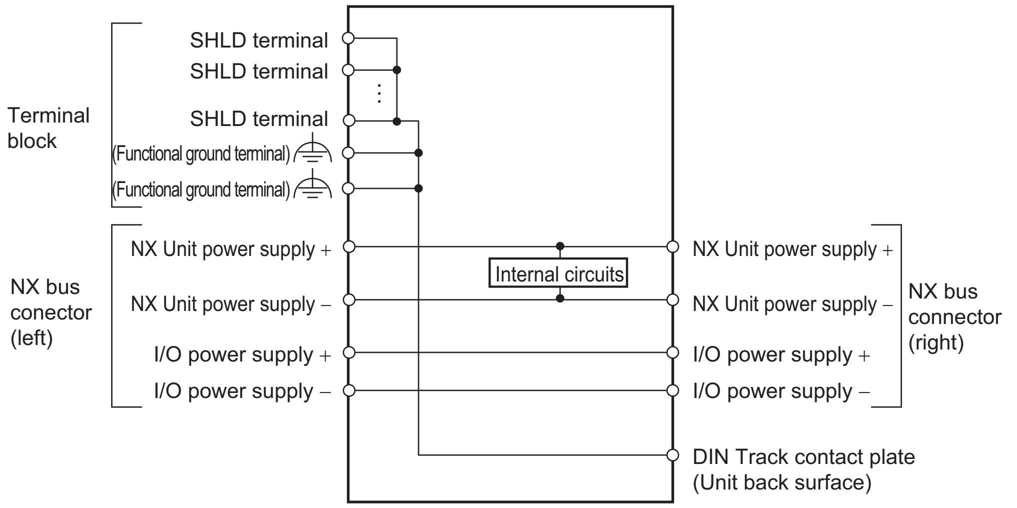
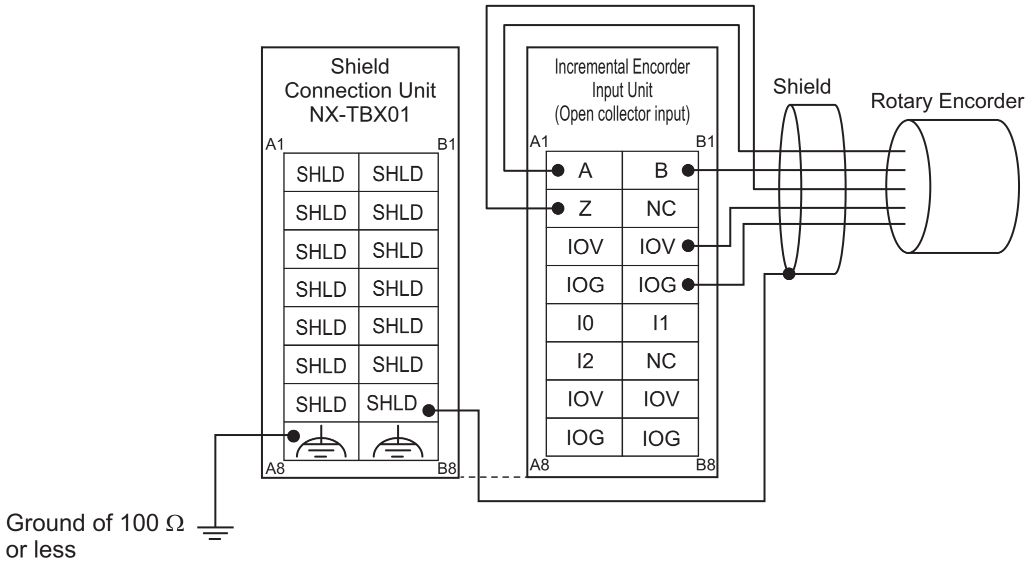
I/O Power Supply Connection Unit IOV terminal type NX-PC0020

Unit name	I/O Power Supply Connection Unit
Model	NX-PC0020
External connection terminals	Screwless push-in terminal block (16 terminals)
Number of I/O power supply terminals	IOV: 16 terminals
Current capacity of I/O power supply terminal	4 A/terminal max.
Dimensions	12 (W) × 100 (H) × 71 (D)
Isolation method	No-isolation
Isolation resistance	20 MΩ min. between isolated circuits (at 100 VDC)
Dielectric strength	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
NX Unit power consumption	0.45 W max.
I/O current consumption	No consumption
Weight	65 g max.
Circuit layout	 IOV IOV IOV Terminal block NX bus connector (left) NX Unit power supply + NX Unit power supply – I/O power supply + I/O power supply – Internal circuits NX Unit power supply + NX Unit power supply – I/O power supply + I/O power supply – NX bus connector (right)
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions
Terminal connection diagram	 I/O Power Supply Connection Unit NX-PC0020 A1 B1 IOV A8 B8 DC Input Unit or Transdistor Output Unit 0 1 IOG 2 3 4 5 6 7 Three-wire type

I/O Power Supply Connection Unit IOV/IOG terminal type NX-PC0030

Unit name	I/O Power Supply Connection Unit
Model	NX-PC0030
External connection terminals	Screwless push-in terminal block (16 terminals)
Number of I/O power supply terminals	IOV: 8 terminals IOG: 8 terminals
Current capacity of I/O power supply terminal	4 A/terminal max.
DImensions	12 (W) × 100 (H) × 71 (D)
Isolation method	No-isolation
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)
Dielectric strength	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
NX Unit power consumption	0.45 W max.
I/O current consumption	No consumption
Weight	65 g max.
Circuit layout	 IOV IOV IOV Terminal block IOG IOG IOG NX Unit power supply + NX Unit power supply − I/O power supply + I/O power supply − NX bus connector (left) Internal circuits NX Unit power supply + NX Unit power supply − I/O power supply + I/O power supply − NX bus connector (right)
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions
Terminal connection diagram	 I/O Power Supply Connection Unit NX-PC0030 A1 B1 IOV IOV IOG IOG IOV IOV IOG IOG IOV IOV IOG IOG IOV IOV IOG IOG A8 B8 DC Input Unit or Transistor Output Unit A1 B1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 A8 B8 Three-wire type

Shield Connection Unit NX-TBX01

Unit name	Shield Connection Unit
Model	NX-TBX01
External connection terminals	Screwless push-in terminal block (16 terminals)
Number of shield terminals	14 terminals (The following two terminals are functional ground terminals.)
Dimensions	12 (W) × 100 (H) × 71 (D)
Isolation method	Isolation between the SHLD functional ground terminal, and internal circuit: No-isolation
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)
Dielectric strength	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
NX Unit power consumption	0.45 W max.
I/O current consumption	No consumption
Weight	65 g max.
Circuit layout	
Installation orientation and restrictions	Installation orientation: Possible in 6 orientations. Restrictions: No restrictions
Terminal connection diagram	

Terminal block
SHLD terminal
SHLD terminal
SHLD terminal
(Functional ground terminal)
(Functional ground terminal)
NX bus conector (left)
NX Unit power supply +
NX Unit power supply −
I/O power supply +
I/O power supply −
Internal circuits
NX Unit power supply +
NX Unit power supply −
I/O power supply +
I/O power supply −
NX bus connector (right)
DIN Track contact plate (Unit back surface)

Shield Connection Unit NX-TBX01
A1
B1
SHLD
A8
B8
Incremental Encorder Input Unit (Open collector input)
A
B
Z
NC
IOV
IOG
I0
I1
I2
Shield
Rotary Encorder
Ground of 100 Ω or less

Version Information

NX Units		Corresponding unit versions/versions		
Model	**Unit Version**	**EtherCAT Coupler Units** **NX-ECC20□***	**NJ/NX-series CPU Units** **NJ501-□□□□** **NJ301-□□□□** **NJ101-□□□□** **NX701-□□□□**	**Sysmac Studio**
NX-PD1000	Ver.1.0	Ver.1.0 or later	Ver.1.05 or later	Ver.1.06 or higher
NX-PF0630				
NX-PF0730				Ver.1.08 or higher
NX-PC0020				Ver.1.06 or higher
NX-PC0010				
NX-PC0030				
NX-TBX01				

* For the NX-ECC202, there is no unit version of 1.1 or earlier.

NX-series Safety Control Units

NX-SL/SI/SO

Integration of Safety into Machine Automation Enables Simple, Flexible System Configuration.

- EN ISO13849-1 (PLe/Safety Category4), IEC 61508 (SIL3) certified.
- One connection using Safety over EtherCAT (FSoE) * protocol enables flexible configuration by mixing the Safety Units with standard NX I/O.
- Hardware and safety circuits can be configured using the Sysmac Studio (Ver. 1.07)

* Safety over EtherCAT (FSoE): The open protocol Safety over EtherCAT (abbreviated with FSoE "FailSafe over EtherCAT") defines a safety related communication layer for EtherCAT. Safety over EtherCAT meets the requirements of IEC 61508 SIL 3 and enables the transfer of safe and standard information on the same communication system without limitations with regard to transfer speed and cycle time.

Features

- Integrated safety into machine automation possible by connecting with the NX-series EtherCAT Coupler.
- The Safety CPU Unit controls up to 128 Safety I/O Units.
- 4 or 8 points per Safety Input Unit. The 4-point Safety Input Unit can be directly connected with OMRON Non-contact Switches and Singlebeam Sensors.
- 2 or 4 points per Safety Output Unit. The 2-point Safety Output Unit is characterized by large output breaking current of 2.0 A.
- The Safety Units can be freely allocated in any combination with standard NX I/O.
- Compliant with IEC61131-3
- Safety programs can be standardized and reused efficiently by using POUs for design and operation.

Specifications

Regulations and Standards

Certification body	Standards
TÜV Rheinland *	• EN ISO 13849-1: 2008 + AC: 2009 • EN ISO 13849-2: 2012 • IEC 61508 parts 1-7: 2010 • EN 62061: 2005 • EN 61131-2: 2007 • EN ISO 13850: 2008 • EN 60204-1: 2006 + A1: 2009 + AC: 2010 • EN 61000-6-2: 2005 • EN 61000-6-4: 2007 • NFPA 79: 2012 • ANSI RIA 15.06-1999 • ANSI B11.19-2010 • UL1998 • IEC 61326-3-1: 2008
UL	cULus: Listed (UL508) and ANSI/ISA 12.12.01

* Certification was received for applications in which OMRON FSoE devices are connected to each other.

The NX-series Safety Control Units allow you to build a safety control system that meets the following standards.

- Requirements for SIL 3 (Safety Integrity Level 3) in IEC 61508, EN 62061, Safety Standard for Safety Instrumented Systems (Functional Safety of Electrical/Electronic/Programmable Electronic Safety-related Systems)
- Requirements for PLe (Performance Level e) and for safety category 4 in EN ISO13849-1

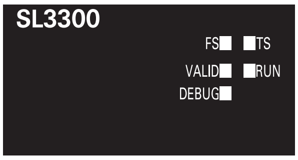
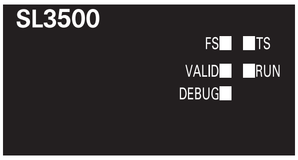
The NX-series Safety Control Units are also registered for C-Tick and KC compliance.

General Specification

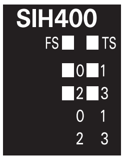
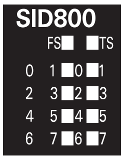
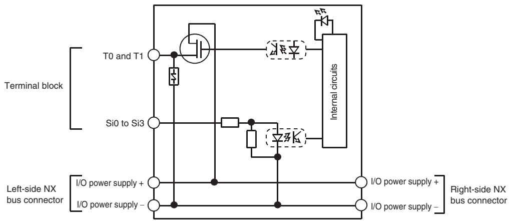
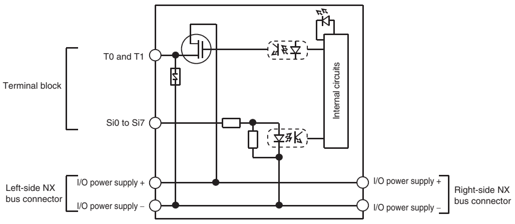
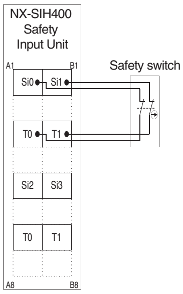
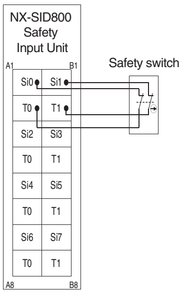
Item		Specification
Enclosure		Mounted in a panel (open)
Grounding method		Ground to 100 Ω or less.
Operating environment	Ambient operating temperature	0 to 55°C (The upper limit of the ambient operating temperature is restricted by the installation orientation.)
	Ambient operating humidity	10% to 95% (with no condensation or icing)
	Atmosphere	Must be free from corrosive gases.
	Ambient storage temperature	–25 to 70°C (with no condensation or icing)
	Altitude	2,000 m max.
	Pollution degree	2 or less: Conforms to JIS B3502 and IEC 61131-2.
	Noise immunity	Conforms to IEC 61131-2. 2 kV on power supply line (Conforms to IEC 61000-4-4.)
	Insulation class	Class III (SELV)
	Overvoltage category	Category II: Conforms to JIS B3502 and IEC 61131-2.
	EMC immunity level	Zone B
	Vibration resistance	Conforms to IEC 60068-2-6. 5 to 8.4 Hz with 3.5-mm amplitude, 8.4 to 150 Hz, acceleration of 9.8 m/s^2, 100 minutes each in X, Y, and Z directions (10 sweeps of 10 min each = 100 min total)
	Shock resistance	Conforms to IEC 60068-2-27. 147 m/s^2, 3 times each in X, Y, and Z directions
	Insulation resistance	20 MΩ between isolated circuits (at 100 VDC)
	Dielectric strength	510 VAC for 1 min between isolated circuits, leakage current: 5 mA max.
Installation method		DIN Track (IEC 60715 TH35-7.5/TH35-15)
Applicable standards		IEC 61508: 2010 SIL 3, EN 62061: 2005 SIL CL3 EN ISO 13849-1, 13849-2: 2008 PL e/Safety Category 4 UL 1998 cULus: Listed UL508, ANSI/ISA 12.12.01 EN 61131-2, C-Tick, KC: KC Registration, NK, LR

Specifications of Individual Units

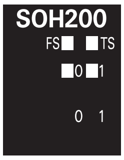
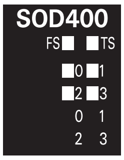
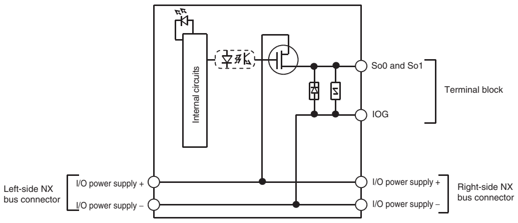
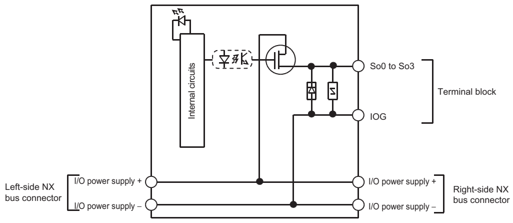
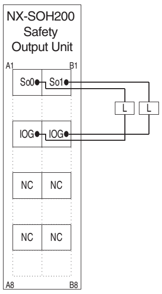
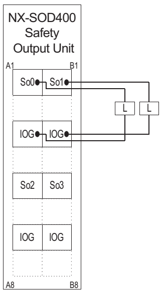
Safety CPU Unit NX-SL3300

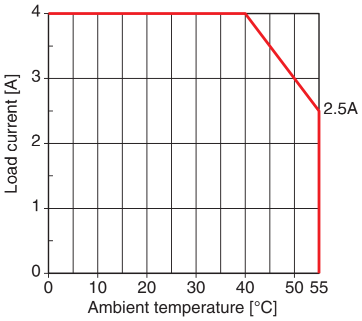
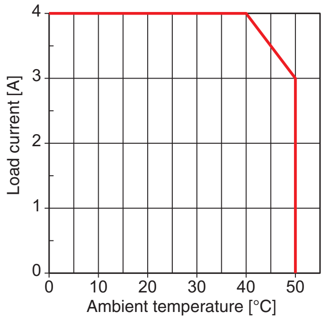
Unit name	Safety CPU Unit	
Model	NX-SL3300	NX-SL3500
Maximum number of safety I/O points	256 points	1024 points
Program capacity	512 KB	2048 KB
Number of safety master connections	32	128
I/O refreshing method	Free-Run refreshing	Free-Run refreshing
External connection terminals	None	None
Indicators	FS indicator, VALID indicator, DEBUG indicator, TS indicator, and RUN indicator 	FS indicator, VALID indicator, DEBUG indicator, TS indicator, and RUN indicator 
Dimensions	30 × 100 × 71 mm (W × H × D)	
I/O power supply method	Not supplied.	
Current capacity of I/O power supply terminals	No I/O power supply terminals	
NX Unit power consumption	0.90 W max.	
Current consumption from I/O power supply	No consumption	
Weight	75 g max.	
Installation orientation and restrictions	Installation orientation: 6 possible orientations Restrictions: None	

Safety Input Units NX-SIH400/SID800

Unit name	Safety Input Unit	
Model	NX-SIH400	NX-SID800
Number of safety input points	4 points	8 points
Number of test output points	2 points	2 points
Internal I/O common	PNP (sinking inputs)	
Rated input voltage	24 VDC (20.4 to 28.8 VDC)	
OMRON special safety input devices	Can be connected.	Cannot be connected.
Number of safety slave connections	1	
I/O refreshing method	Free-Run refreshing	
External connection terminals	Screwless clamping terminal block (8 terminals)	Screwless clamping terminal block (16 terminals)
Indicators	TS indicator, FS indicator, input indicators (yellow), and input error indicators (red)  SIH400 FS TS 0 1 2 3 0 1 2 3	TS indicator, FS indicator, input indicators (yellow), and input error indicators (red)  SID800 FS TS 0 1 0 1 2 3 2 3 4 5 4 5 6 7 6 7
Safety input current	4.5 mA typical	3.0 mA typical
Safety input ON voltage	11 VDC min.	15 VDC min.
Safety input OFF voltage/OFF current	5 VDC max., 1 mA max.	
Test output type	Sourcing outputs (PNP)	
Test output load current	25 mA max.	50 mA max.
Test output residual voltage	1.2 V max. (Between IOV and all output terminals)	
Test output leakage current	0.1 mA max.	
Dimensions	12 × 100 × 71 mm (W × H × D)	
Isolation method	Photocoupler isolation	
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	
Dielectric strength	510 VAC for 1 min between isolated circuits, leakage current: 5 mA max.	
I/O power supply method	Power supplied from the NX bus	
Current capacity of I/O power supply terminals	No applicable terminals.	
NX Unit power consumption	0.70 W max.	0.75 W max.
Current consumption from I/O power supply	20 mA max.	
Weight	70 g max.	
Circuit layout	 Terminal block T0 and T1 Si0 to Si3 Internal circuits Left-side NX bus connector I/O power supply + I/O power supply – I/O power supply + I/O power supply – Right-side NX bus connector	 Terminal block T0 and T1 Si0 to Si7 Internal circuits Left-side NX bus connector I/O power supply + I/O power supply – I/O power supply + I/O power supply – Right-side NX bus connector
Terminal connection diagram	Si0 to Si3: Safety input terminals T0 and T1: Test output terminals  NX-SIH400 Safety Input Unit A1 B1 Safety switch Si0 Si1 T0 T1 Si2 Si3 T0 T1 A8 B8 Refer to User's manual (Z930-E1) for details.	Si0 to Si7: Safety input terminals T0 and T1: Test output terminals  NX-SID800 Safety Input Unit A1 B1 Safety switch Si0 Si1 T0 T1 Si2 Si3 T0 T1 Si4 Si5 T0 T1 Si6 Si7 T0 T1 A8 B8 Refer to User's manual (Z930-E1) for details.
Installation orientation and restrictions	Installation orientation: 6 possible orientations. Restrictions: Maximum ambient temperature is 50°C for any orientation other than upright installation.	
Protective functions	Overvoltage protection circuit and short detection (test outputs)	

Safety Output Units NX-SOH200/SOD400

Unit name	Safety Output Unit	
Model	NX- SOH200	NX-SOD400
Number of safety output points	2 points	4 points
Internal I/O common	PNP (sourcing outputs)	
Maximum load current	2.0 A/point 4.0 A/Unit at 40°C 2.5 A/Unit at 55°C The maximum load current depends on the installation orientation and ambient temperature	0.5 A/point and 2.0 A/Unit
Rated voltage	24 VDC (20.4 to 28.8 VDC)	
Number of safety slave connections	1	
I/O refreshing method	Free-Run refreshing	
External connection terminals	Screwless clamping terminal block (8 terminals)	
Indicators	TS indicator, FS indicator, output indicators (yellow), and output error indicators (red)  SOH200 FS TS 0 1 0 1	TS indicator, FS indicator, output indicators (yellow), and output error indicators (red)  SOD400 FS TS 0 1 2 3 0 1 2 3
Safety output ON residual voltage	1.2 V max. (Between IOV and all output terminals)	
Safety output OFF residual voltage	2 V max. (Between IOG and all output terminals)	
Safety output leakage current	0.1 mA max.	
Dimensions	12 × 100 × 71 mm (W × H × D)	
Isolation method	Photocoupler isolation	
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	
Dielectric strength	510 VAC for 1 min between isolated circuits, leakage current: 5 mA max.	
I/O power supply method	Power supplied from the NX bus	
Current capacity of I/O power supply terminals	IOG: 2 A max./terminal	IOG (A3 and B3): 2 A max./terminal IOG (A7 and B7): 0.5 A max./terminal
NX Unit power consumption	0.70 W max.	0.75 W max.
Current consumption from I/O power supply	40 mA max.	60 mA max.
Weight	65 g max.	
Circuit layout	 Internal circuits So0 and So1 Terminal block IOG Left-side NX bus connector I/O power supply + I/O power supply − I/O power supply + I/O power supply − Right-side NX bus connector	 Internal circuits So0 to So3 Terminal block IOG Left-side NX bus connector I/O power supply + I/O power supply − I/O power supply + I/O power supply − Right-side NX bus connector
Terminal connection diagram	So0 and So1: Safety output terminals IOG: I/O power supply 0 V  NX-SOH200 Safety Output Unit A1 B1 So0 So1 L L IOG IOG NC NC NC NC A8 B8 Refer to User's manual (Z930-E1) for details.	So0 to So3: Safety output terminals IOG: I/O power supply 0 V  NX-SOD400 Safety Output Unit A1 B1 So0 So1 L L IOG IOG So2 So3 IOG IOG A8 B8 Refer to User's manual (Z930-E1) for details.

<table>
<tr><th>Unit name</th><th colspan="2">Safety Output Unit</th></tr>
<tr><td>Model</td><td>NX- SOH200</td><td>NX-SOD400</td></tr>
<tr><td>Installation orientation and restrictions</td><td>Installation orientation: 6 possible orientations
Restrictions: For upright installation, the ambient temperature is restricted as shown below depending on the total Unit load current.

For all installation orientations other than upright installation, the ambient temperature is restricted as shown below according to the total Unit load current.
 </td><td>Installation orientation: 6 possible orientations
Restrictions: None</td></tr>
<tr><td>Protective functions</td><td colspan="2">Overvoltage protection circuit and short detection</td></tr>
</table>

Version Information

The combinations that can be used of the unit versions of the Safety Control Units, NJ/NX-series CPU Units, and NX-series EtherCAT Coupler Unit, and the version of the Sysmac Studio

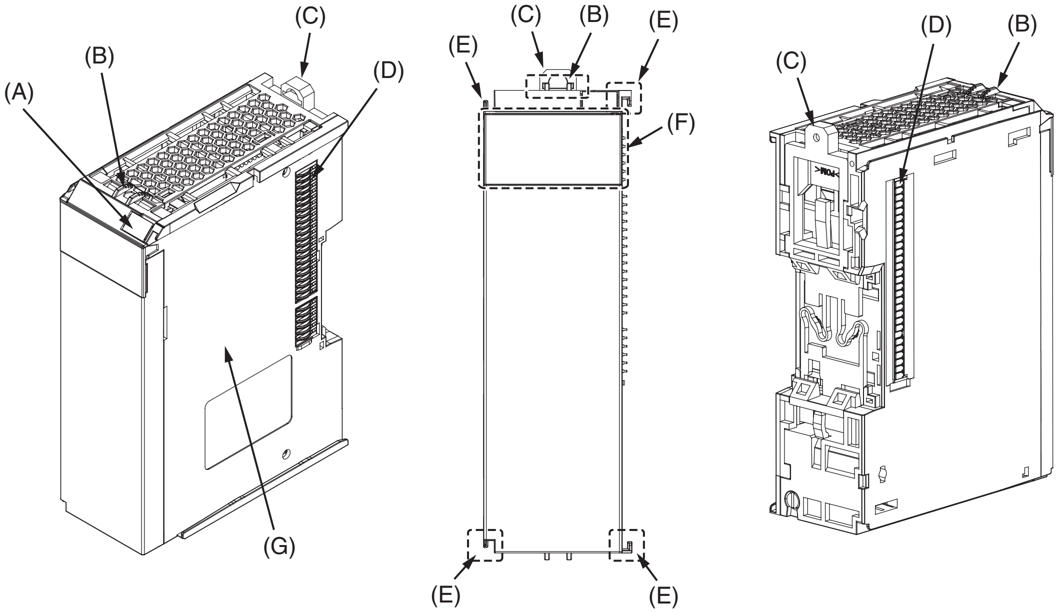
NX Unit		Corresponding version		
Model number	**Unit version**	**EtherCAT Coupler Unit NX-ECC20□ ✻**	**NJ/NX-series CPU Units** **NJ501-□□□□** **NJ301-□□□□** **NJ101-□□□□** **NX701-□□□□**	**Sysmac Studio**
NX-SL3300	1.0	1.1 or later ✻	1.06 or later	1.07 or later
	1.1			1.10 or later
NX-SL3500	1.0	1.2 or later ✻	1.07 or later	1.08 or later
	1.1			1.10 or later
NX-SIH400	1.0	1.1 or later ✻	1.06 or later	1.07 or later
	1.1			1.10 or later
NX-SID800	1.0			1.07 or later
NX-SOH200				
NX-SOD400				

✻ Some models do not have all of the versions given in the above table.
For those models, the oldest version applies. Refer to the user's manuals for the specific Units for the relation between models and versions.

Components and Functions

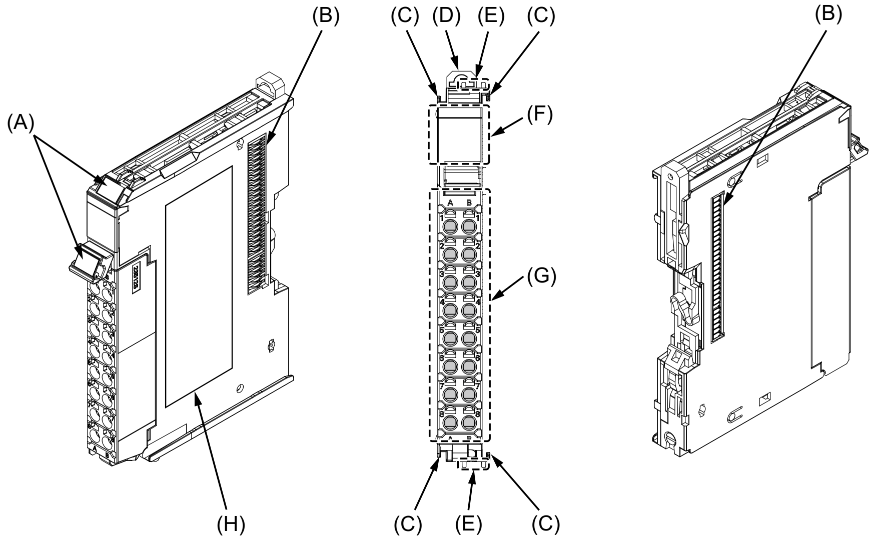
Safety CPU Unit

NX-SL3300/SL3500



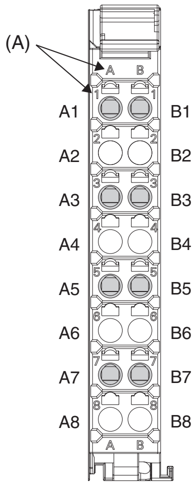
Letter	Item	Specification
A	Marker attachment locations	The locations where markers are attached. The markers made by OMRON are installed for the factory setting. Commercially available markers can also be installed. For details, refer to User's Manual (Z930-E1).
B	Protrusions for removing the Unit	The protrusions to hold when removing the Unit.
C	DIN Track mounting hooks	These hooks are used to mount the NX Unit to a DIN Track.
D	NX bus connector	This is the NX-series bus connector. It is used to connect an NX-series Safety I/O Unit or other NX Unit.
E	Unit hookup guides	These guides are used to connect two Units.
F	Indicators	The indicators show the current operating status of the NX Unit or signal I/O status. Refer to User's Manual (Z930-E1).
G	Unit specifications	The specifications of the NX Unit are given here.

Safety Input Unit NX-SIH400/SID800
Safety Output Unit NX-SOH200/SOD400

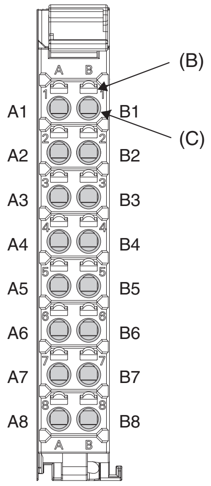


Letter	Item	Specification
A	Marker attachment locations	The locations where markers are attached. The markers made by OMRON are installed for the factory setting. Commercially available markers can also be installed. For details, refer to User's Manual (Z930-E1).
B	NX bus connector	This is the NX-series bus connector. Connect this connector to another Unit, such as the NX-series Safety CPU Unit or a Safety I/O Unit.
C	Unit hookup guides	These guides are used to connect two Units.
D	DIN Track mounting hooks	These hooks are used to mount the NX Unit to a DIN Track.
E	Protrusions for removing the Unit	The protrusions to hold when removing the Unit.
F	Indicators	The indicators show the current operating status of the NX Unit or signal I/O status. Refer to User's Manual (Z930-E1).
G	Terminal block	The terminal block is used to connect to external devices. It connects the safety outputs. The number of terminals depends on the NX Unit.
H	Unit specifications	The specifications of the NX Unit are given here.

Terminal Blocks



8-terminal type



16-terminal type

Letter	Item	Specification
(A)	Terminal number indications	The terminal numbers are given by column letters A and B, and row numbers 1 to 8. The combination of the column and row gives the terminal numbers from A1 to A8 and B1 to B8. The terminal number indicators are the same regardless of the number of terminals on the terminal block, as shown above.
(B)	Release holes	Insert a flat-blade screwdriver into these holes to connect and remove the wires.
(C)	Terminal holes	The wires are inserted into these holes.

Applicable Terminal Blocks for Each Unit Model

Unit model number	Terminal Blocks				
	Model	No. of terminals	Terminal number indications	Ground terminal mark	Terminal current capacity
NX-SIH400	NX-TBA082	8	A/B	None	10A
NX-SID800	NX-TBA162	16	A/B	None	10A
NX-SOH200	NX-TBA082	8	A/B	None	10A
NX-SOD400	NX-TBA082	8	A/B	None	10A

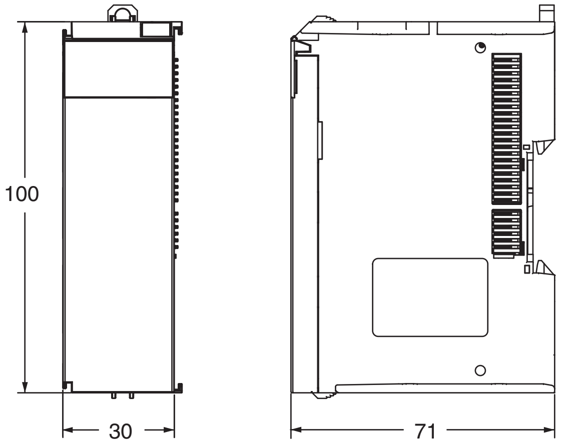
Applicable Wires

Refer to the page of The Applicable Wires of the EtherCAT Slave Terminals NX Series.

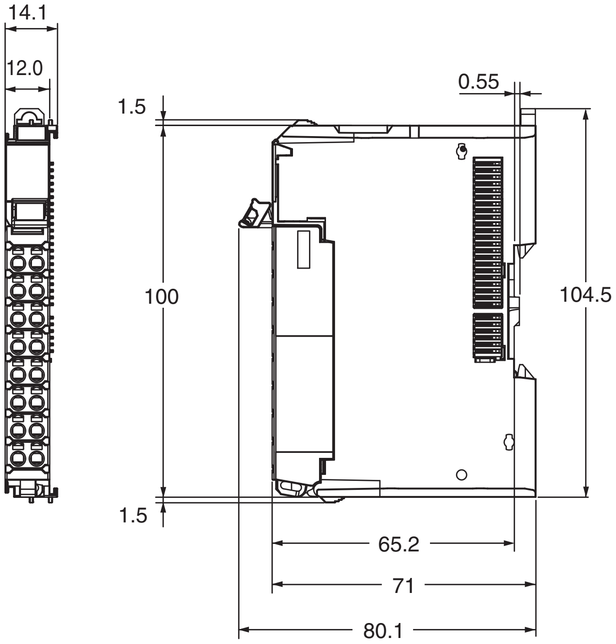
Dimensions

(Unit/mm)

Safety CPU Unit NX-SL3300



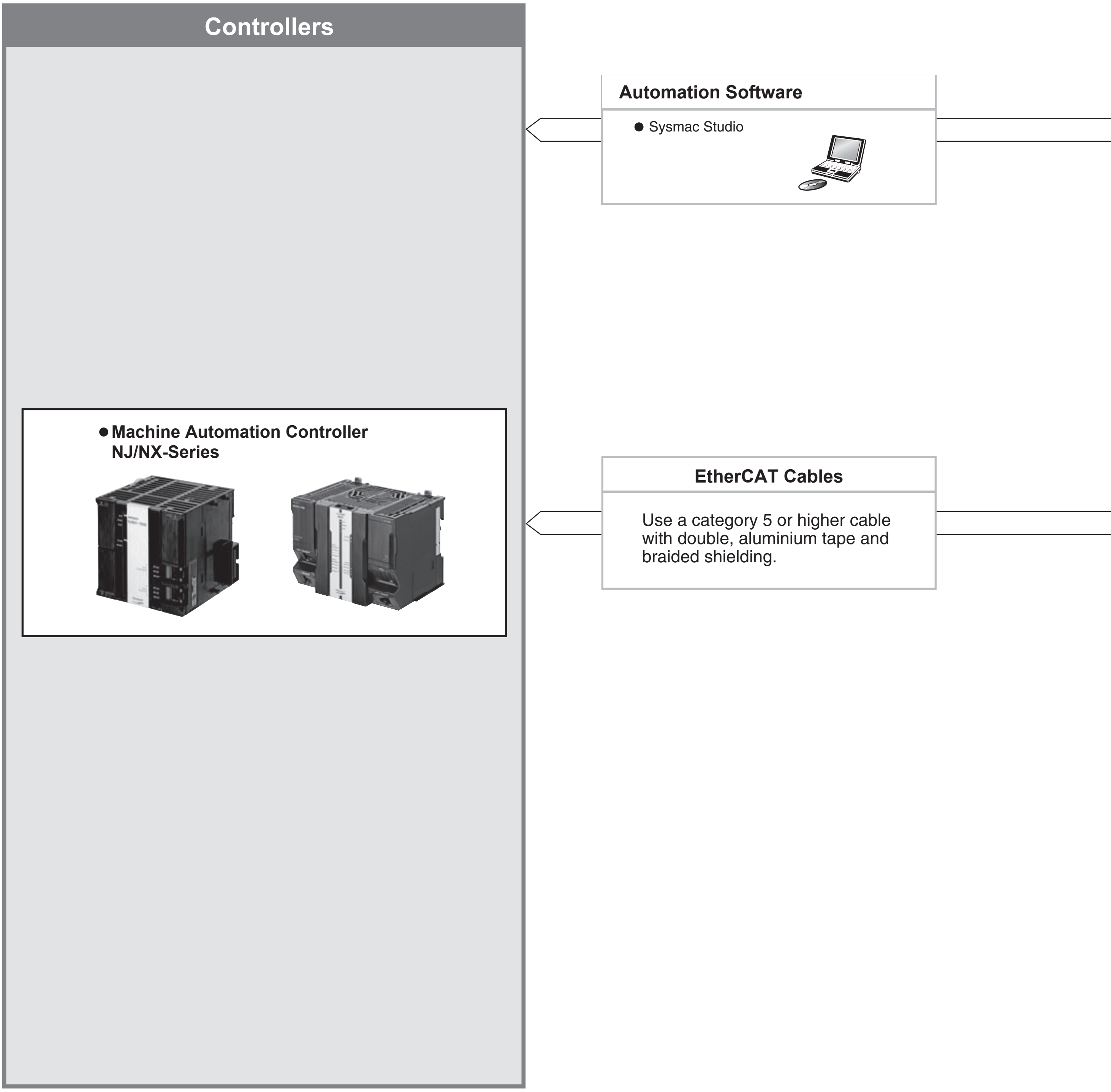
Safety Input Units NX-SIH400/SID800
Safety Output Units NX-SOH200/SOD400



AC Servomotors/Linear Motors/Drives

G5-Series EtherCAT communications Type

System Configuration


Controllers
Automation Software
● Sysmac Studio
● Machine Automation Controller
NJ/NX-Series
EtherCAT Cables

Use a category 5 or higher cable with double, aluminium tape and braided shielding.

USB Communications

EtherCAT Communications

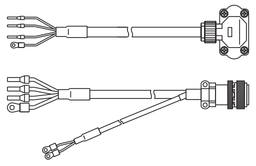
Servo Drive

- **G5-Series Drives with Built-in EtherCAT Communications R88D-KN□□-ECT**

I/O signals

Power Cables

- **Non-Flexible Cables**
  - **Without Brake R88A-CA□□□□□S**
  - **With Brake R88A-CA□□□□□B**
- **Flexible Cables**
  - **Without Brake R88A-CA□□□□□SR**
  - **With Brake R88A-CA□□□□□BR**



Brake Cables (50 to 750 W max.)

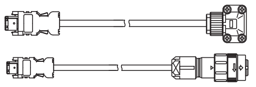
- **Non-Flexible Cables R88A-CAKA□□□B**
- **Flexible Cables R88A-CAKA□□□BR**

Motor power signals

Feedback Signals

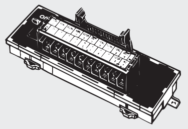
Encoder Cables

- **Non-Flexible Cables**
  - **For 750W or less R88A-CRK□□□□C**
  - **For 1.0kW or more R88A-CRKC□□□N**
- **Flexible Cables**
  - **For 750W or less R88A-CRK□□□□CR**
  - **For 1.0kW or more R88A-CRKC□□□NR**

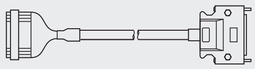


Connector-Terminal Block Conversion Units and Cable

- **Connector-Terminal Block Conversion Unit XW2□-20G□**



- **Cable XW2Z-□□□J-B34**



AC Servomotors

- **G5-Series motor R88M-K**

3000r/min
2000r/min
1500r/min
1000r/min

INC ABS INC

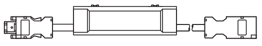
External scale

Peripheral Devices

- Reactors 3G3AX-DL 3G3AX-AL
- External Regeneration Resistors R88A-RR

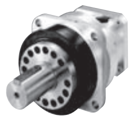
Absolute Encoder Battery Cable

R88A-CRGD0R3C (-BS)
(One Battery is included with model numbers ending in"BS")



Note: Not required if a battery is connected to the control connector (CN1).

Decelerators



INC **Incremental output:** When the controller power supply is turned ON, operation is always started from the origin.

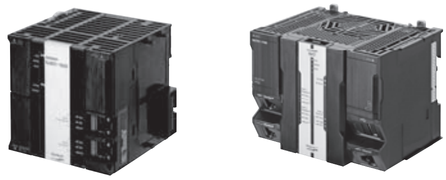
ABS INC **Absolute/Incremental output:** The Servomotor can be switched between an absolute output and an Incremental output. When an absolute output is selected and the Controller power supply is turned ON, the Controller reads the Servo absolute position data to restore the absolute position.

Linear Motor/Drives

G5-Series EtherCAT communications Linear Motor Type

System Configuration

Controllers



Machine Automation Controller
NJ/NX Series

Automation Software

- Sysmac Studio

EtherCAT Cables

Use a category 5 or higher cable with double, aluminium tape and braided shielding.

Servo Drive

EtherCAT Communications

- **G5 Series**
  Drives with Built-in
  EtherCAT Communications
  Linear Motor type
  R88D-KN□□-ECT-L

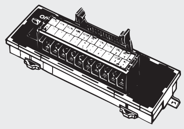
Peripheral Devices

- Reactors
  3G3AX-DL
  3G3AX-AL
- External Regeneration
  Resistors
  R88A-RR

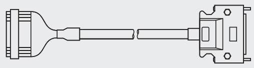
I/O signals

Connector-Terminal Block Conversion Units and Cable

- **Connector-Terminal Block Conversion Unit**
  XW2□-20G□



- **Cable**
  XW2Z-□□□J-B34



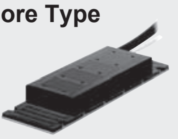
Motor power signals

Power Cables

- **Power Cable**
  Supplied by the user.

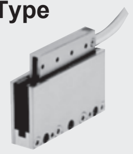
Linear Moter

- **Iron-core Type**



Motor Coil Unit : R88L-EC-FW-□
Magnet Trac : R88L-EC-FM-□

- **Ironless Type**

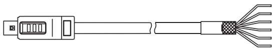


Motor Coil Unit : R88L-EC-GW-□
Magnet Trac : R88L-EC-GM-□

Feedback Signals

External encoder Cables

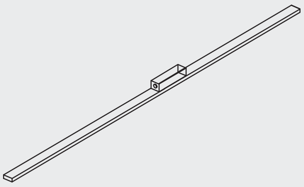
- **Serial Communications Cable**
  R88A-CRKE010SR



- **90° Phase Difference Input Cable**
  Supplied by the user

External encoder

- **Commercial Product**
  Supplied by the user.



G5-Series AC Servo Drives with Built-in EtherCAT Communications

R88D-KN□-ECT

G5-series provides both high-speed and highly-accurate control and safety

- High-accuracy positioning with fully-closed control.
- Servo Drives for 400VAC widens applicable systems and environment, including large-scale equipment and overseas facilities.
- Safe design and Safe Torque Off (STO) function (application pending)
- Vibration can be suppressed in acceleration/deceleration even in low rigidity mechanical systems.

General Specifications

Item			Specifications
Ambient operating temperature and operating humidity			0 to 55°C, 90%RH max. (with no condensation)
Storage ambient temperature and humidity			–20 to 65°C, 90%RH max. (with no condensation)
Operating and storage atmosphere			No corrosive gases
Vibration resistance			10 to 60 Hz and at an acceleration of 5.88 m/s^2 or less (Not to be run continuously at a resonance point)
Insulation resistance			Between power supply terminals/power terminals and FG terminal: 0.5 MΩ min. (at 500 VDC)
Dielectric strength			Between power supply/power line terminals and FG terminal: 1,500 VAC for 1 min at 50/60 Hz
Protective structure			Built into panel
International standard	**EC Directives**	**EMC Directive**	EN 55011, EN 61000-6-2, IEC 61800-3
		Low Voltage Directive	EN 61800-5-1
		Machinery Directives	EN954-1 (Category 3), EN ISO 13849-1: 2008 (Category 3) (PLc,d), ISO 13849-1: 2006 (Category 3) (PLc,d), EN61508 (SIL2), EN62061 (SIL2), EN61800-5-2 (STO), IEC61326-3-1 (SIL2)
	UL standards		UL 508C
	CSA standards		CSA22.2 No. 14
	Korean Radio Regulations (KC)		Certified

Note: 1. The above items reflect individual evaluation testing. The results may differ under compound conditions.

2. Always disconnect all connections to the Servo Drive before you perform insulation resistance tests on it. If you perform an insulation resistance test while the Servo Drive is connected, the Servo Drive may be damaged.
Never perform dielectric strength tests on the Servo Drive. Failure to follow this precaution may result in damaging internal elements.

3. Some Servo Drive parts will require maintenance. For details, refer to G5 Series USER'S MANUAL (Cat.No. I576)

Performance Specifications

● Servo Drives with 100 VAC Input Power

for Single-phase input type

Item			R88D-KNA5L-ECT	R88D-KN01L-ECT	R88D-KN02L-ECT	R88D-KN04L-ECT
Continuous output current (rms)			1.2A	1.7A	2.5A	4.6A
Input power supply	Main circuit	Power supply capacity	0.4KVA	0.4KVA	0.5KVA	0.9KVA
		Power supply voltage	Single-phase 100 to 120 VAC (85 to 132 V) 50/60 Hz			
		Rated current	1.7A	2.6A	4.3A	7.6A
		Heat value*1	11W	16.6W	21W	25W
	Control circuit	Power supply voltage	Single-phase 100 to 120 VAC (85 to 132 V) 50/60 Hz			
		Heat value*1	4W	4W	4W	4W
Weight			Approx. 0.8kg	Approx. 0.8kg	Approx. 1.0kg	Approx. 1.6kg
Maximum applicable motor capacity			50W	100W	200W	400 W
Applicable Servomotor	3,000 r/min Servomotors	INC	R88M-K05030H	R88M-K10030L	R88M-K20030L	R88M-K40030L
		ABS	R88M-K05030T	R88M-K10030S	R88M-K20030S	R88M-K40030S
	2,000 r/min Servomotors	ABS	-	-	-	-
	1,000 r/min Servomotors	ABS	-	-	-	-

*1 The heat value is given for rated operation.

● Servo Drives with 200 VAC Input Power

for Single-phase/Three-phase input type

Item			R88D-KN01H-ECT	R88D-KN02H-ECT	R88D-KN04H-ECT	R88D-KN08H-ECT	R88D-KN10H-ECT	R88D-KN15H-ECT
Continuous output current (rms)			1.2A	1.6A	2.6A	4.1A	5.9A	9.4A
Input power supply	Main circuit	Power supply capacity	0.5KVA	0.5KVA *1	0.9KVA	1.3KVA	1.8KVA	2.3KVA
		Power supply voltage	Single-phase or 3-phase 200 to 240 VAC (170 to 264 V) 50/60 Hz					
		Rated current	1.6/0.9A *1	2.4/1.3A *1	4.1/2.4A *1	6.6/3.6A *1	9.1/5.2A *1	14.2/8.1A *1
		Heat value*2	14.3/13.7W*1	23/19W *1	33/24W *1	30/35.5W *1	57/49W *1	104/93W*1
	Control circuit	Power supply voltage	Single-phase 200 to 240 VAC (170 to 264 V) 50/60 Hz					
		Heat value*2	4W	4W	4W	4W	7W	7W
Weight			Approx. 0.8kg	Approx. 0.8kg	Approx. 1.0kg	Approx. 1.6kg	Approx. 1.8kg	Approx. 1.8kg
Maximum applicable motor capacity			100W	200W	400W	750W	1kW	1.5kW
Applicable Servomotor	3,000 r/min Servomotors	INC	R88M-K05030H R88M-K10030H	R88M-K20030H	R88M-K40030H	R88M-K75030H	-	R88M-K1K030H R88M-K1K530H
		ABS	R88M-K05030T R88M-K10030T	R88M-K20030T	R88M-K40030T	R88M-K75030T	-	R88M-K1K030T R88M-K1K530T
	2,000 r/min Servomotors	INC	-	-	-	-	R88M-K1K020H	R88M-K1K520H
		ABS	-	-	-	-	R88M-K1K020T	R88M-K1K520T
	1,000 r/min Servomotors	INC	-	-	-	-	-	R88M-K90010H
		ABS	-	-	-	-	-	R88M-K90010T

*1 The first value is for single-phase input power and the second value is for 3-phase input power.
*2 The heat value is given for rated operation.

● Servo Drives with 200 VAC Input Power

for Three-phase input type

Item			R88D-KN20H-ECT	R88D-KN30H-ECT	R88D-KN50H-ECT	R88D-KN75H-ECT	R88D-KN150H-ECT
Continuous output current (rms)			13.4A	18.7A	33.0A	44.0A	66.1A
Input power supply	**Main circuit**	**Power supply capacity**	3.3KVA	4.5KVA	7.5KVA	11.0KVA	22.0KVA
		Power supply voltage	3-phase 200 to 230 VAC (170 to 253 V) 50/60 Hz			3-phase 200 to 230VAC (170 to 253V) 50/60Hz 280 to 325VDC (238 to 357V)	
		Rated current	11.8A	15.1A	21.6A	32.0A	58.0A
		Heat value *1	139W	108W	328W	381W	720W
	Control circuit	**Power supply voltage**	Single-phase 200 to 230 VAC (170 to 253 V) 50/60 Hz			Single-phase 200 to 230VAC (170 to 253V) 50/60Hz 280 to 25VDC (238 to 357V)	
		Heat value *1	10W	13W	13W	15W	17W
Weight			Approx. 2.7kg	Approx. 4.8kg	Approx. 4.8kg	Approx. 13.5kg	Approx. 21.0kg
Maximum applicable motor capacity			2kW	3kW	5kW	7.5kW	15kW
Applicable Servomotor	**3,000 r/min Servomotors**	**INC**	R88M-K2K030H	R88M-K3K030H	R88M-K4K030H R88M-K5K030H	–	–
		ABS	R88M-K2K030T	R88M-K3K030T	R88M-K4K030T R88M-K5K030T	–	–
	2,000 r/min 1,500 r/min Servomotors	**INC**	R88M-K2K020H	R88M-K3K020H	R88M-K4K020H R88M-K5K020H	–	–
		ABS	R88M-K2K020T	R88M-K3K020T	R88M-K4K020T R88M-K5K020T	R88M-K7K515T	R88M-K11K015T R88M-K15K015T
	1,000 r/min Servomotors	**INC**	–	R88M-K2K010H	R88M-K3K010H	–	–
		ABS	–	R88M-K2K010T	R88M-K3K010T R88M-K4K510T	R88M-K6K010T	–

*1 The heat value is given for rated operation.

● Servo Drives with 400 VAC Input Power

for Three-phase input type

Item			R88D-KN06F-ECT	R88D-KN10F-ECT	R88D-KN15F-ECT	R88D-KN20F-ECT	R88D-KN30F-ECT	R88D-KN50F-ECT	R88D-KN75F-ECT	R88D-KN150F-ECT
Continuous output current (rms)			1.5A	2.9A	4.7A	6.7A	9.4A	16.5A	22.0A	33.1A
Input power supply	**Main circuit**	**Power supply capacity**	1.2KVA	1.8KVA	2.3KVA	3.8KVA	4.5KVA	6.0KVA	11.0KVA	22.0KVA
		Power supply voltage	Three-phase 380 to 480 VAC (323 to 528 V) 50/60 Hz							
		Rated current	2.1A	2.8A	4.7A	5.9A	7.6A	12.1A	16.0A	29.0A
		Heat value*1	32.2W	48W	49W	65W	108W	200W	300W	590W
	Control circuit	**Power supply voltage**	24 VDC (20.4 to 27.6 V)							
		Heat value*1	7W	7W	7W	10W	13W	13W	15W	22W
Weight			Approx. 1.9kg	Approx. 1.9kg	Approx. 1.9kg	Approx. 2.7kg	Approx. 4.7kg	Approx. 4.7kg	Approx. 13.5kg	Approx. 21.0kg
Maximum applicable motor capacity			600W	1kW	1.5kW	2kW	3kW	5kW	7.5kW	15kW
Applicable Servomotor	**3,000 r/min Servomotors**	**INC**	–	R88M-K75030F	R88M-K1K030F R88M-K1K530F	R88M-K2K030F	R88M-K3K030F	R88M-K4K030F R88M-K5K030F	–	–
		ABS	–	R88M-K75030C	R88M-K1K030C R88M-K1K530C	R88M-K2K030C	R88M-K3K030C	R88M-K4K030C R88M-K5K030C	–	–
	2,000 r/min Servomotors	**INC**	R88M-K40020F R88M-K60020F	R88M-K1K020F	R88M-K1K520F	R88M-K2K020F	R88M-K3K020F	R88M-K4K020F R88M-K5K020F	–	–
		ABS	R88M-K40020C R88M-K60020C	R88M-K1K020C	R88M-K1K520C	R88M-K2K020C	R88M-K3K020C	R88M-K4K020C R88M-K5K020C	R88M-K7K515C	R88M-K11K015C R88M-K15K015C
	1,000 r/min Servomotors	**INC**	–	–	R88M-K90010F	–	R88M-K2K010F	R88M-K3K010F	–	–
			–	–	R88M-K90010C	–	R88M-K2K010C	R88M-K3K010C R88M-K4K510C	R88M-K6K010C	–

*1 The heat value is given for rated operation.

EtherCAT Communications Specifications

Item	Specification
Communications standard	IEC 61158 Type 12, IEC 61800-7 CiA 402 Drive Profile
Physical layer	100BASE-TX (IEEE802.3)
Connectors	RJ45 × 2 (shielded) ECAT IN: EtherCAT input ECAT OUT: EtherCAT output
Communications media	Category 5 or higher (cable with double, aluminum tape and braided shielding) is recommended.
Communications distance	Distance between nodes: 100 m max.
Process data	Fixed PDO mapping
Mailbox (CoE)	Emergency messages, SDO requests, SDO responses, and SDO information
Distributed clock	Synchronization in DC mode. DC cycle: 250 µs, 500 µs, 1 ms, 2 ms, 4 ms
LED indicators	L/A IN (Link/Activity IN) × 1 L/A OUT (Link/Activity OUT) × 1 RUN × 1 ERR × 1
CiA402 Drive Profile	• Cyclic synchronous position mode • Cyclic synchronous velocity mode • Cyclic synchronous torque mode • Profile position mode • Homing mode • Touch probe function (Latch function) • Torque limit function

Version Information

Unit Versions

Unit	Model	Unit version		
		Unit version 1.0	Unit version 2.0	Unit version 2.1
AC Servo Drives G5-Series built-in EtherCAT Communications	**R88D-KN□-ECT-R**	Supported		
	R88D-KN□-ECT		Supported	Supported
Compatible Sysmac Studio version (To connect the NJ Controller)		Version 1.00 or higher *1	Version1.00 or higher *2	Version1.00 or higher
Compatible Sysmac Studio version (To connect the NX Controller)		Ver.1.13 *1	Ver.1.13 *2	Ver.1.13

*1 The function that was enhanced by the upgrade for Unit version2.0 can not be used. For detail, refer to "Function Support by Unit Version".
*2 The function that was enhanced by the upgrade for Unit version2.1 can not be used. For detail, refer to "Function Support by Unit Version".

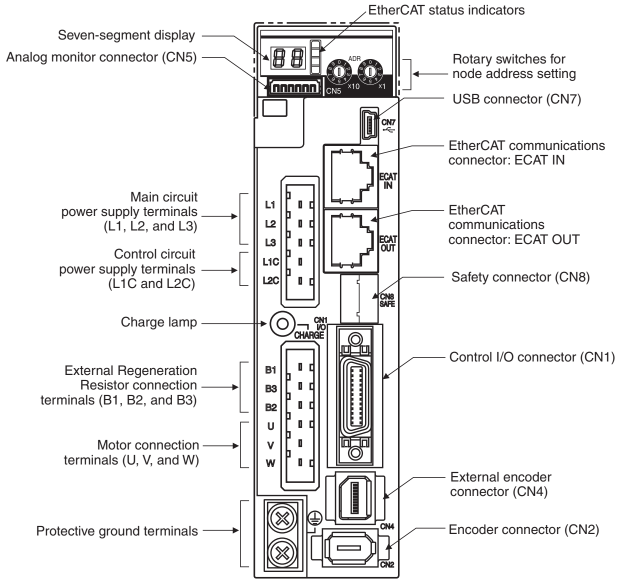
Function Support by Unit Version

Unit		AC Servo Drives G5-Series built-in EtherCAT Communications		
Model		R88D-KN□-ECT-R	R88D-KN□-ECT	
Item / Unit version		Unit version 1.0	Unit version 2.0	Unit version 2.1
Sysmac Products Features	**Sysmac Error Status**	No supported		Supported
	Saving the Node Address Setting	No supported		Supported
	Serial Number Display *1	No supported		Supported
	ESI Specification (Version 1.0)	No supported		Supported
	SII Data Check	No supported		Supported
Fixed PDO mapping		No supported	Supported	
Variable PDO mapping (1600 hex, 1A00 hex)		No supported		Supported
Available operation modes	**csp: Cyclic synchronous position mode**	Supported		
	csv: Cyclic synchronous velocity mode	No supported	Supported	
	cst: Cyclic synchronous torque mode	No supported	Supported	
	pp: Profile position mode	No supported		Supported
	hm: Homing mode	No supported	Supported	
FIR filter function		No supported	Supported *2 (Available when the communications cycle is 1 ms or above)	
Error detection function	**Excessive Speed Deviation Error**	No supported	Supported	
	Interruptions Error	No supported	Supported	
Electronic gear function		Supported	No supported (only to 1:1)	Supported
Fully-closed Control *3		Supported	Available when the communications cycle is 500•s or above in csp and 1 ms or above in hm.	Available when the communications cycle is 1 ms or above at an electronic gear ratio of 1:1 and 2 ms or above at a gear ratio other than 1:1. *4

Unit	AC Servo Drives G5-Series built-in EtherCAT Communications		
Model	**R88D-KN□-ECT-R**	**R88D-KN□-ECT**	
Item / **Unit version**	**Unit version 1.0**	**Unit version 2.0**	**Unit version 2.1**
Torque limit objects	PDO mapping to 60E0/60E1 hex is not possible.	PDO mapping to 60E0/60E1 hex is possible.*5	
Positioning Completion Range	No supported		Supported
Reference Position for CSP (4020 hex)	No supported		Supported
Data Setting Warning Detection Setting (3781)	No supported		Supported
Version indication on the unit label	No supported	Supported	

*1 The function to show the serial number controlled by OMRON in 1018h-04 hex.
*2 Setting the communications cycle to 500 µs or less does not enable the FIR filter function, although doing so does not cause any error.
*3 If Fully-closed Control is not available, a Function Setting Error (Error No. 93.4) will occur.
*4 This is applicable only when the total size of the objects mapped to RxPDO is 12 bytes or less. For details, refer to the USER'S MANUAL.
*5 There are objects added (3013 hex/3522 hex) to or renamed (3525 hex/3526 hex) from unit version 1.0.
For details of these objects, refer to Torque Limit Selection (3521 hex) in Extended Objects of each manual.

Components and Functions

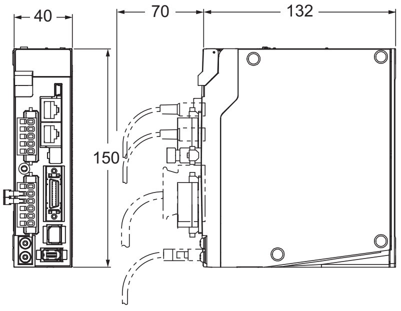

EtherCAT status indicators
Seven-segment display
Analog monitor connector (CN5)
Rotary switches for node address setting
USB connector (CN7)
EtherCAT communications connector: ECAT IN
Main circuit power supply terminals (L1, L2, and L3)
Control circuit power supply terminals (L1C and L2C)
EtherCAT communications connector: ECAT OUT
Safety connector (CN8)
Charge lamp
Control I/O connector (CN1)
External Regeneration Resistor connection terminals (B1, B2, and B3)
Motor connection terminals (U, V, and W)
External encoder connector (CN4)
Protective ground terminals
Encoder connector (CN2)
ADR
x10
x1
CN5
CN7
ECAT IN
ECAT OUT
CN8 SAFE
CN1 I/O
CHARGE
L1
L2
L3
L1C
L2C
B1
B3
B2
U
V
W
CN4
CN2

Name	Function
Display	A 2-digit 7-segment display shows the node address, error codes, and other Servo Drive status.
Charge Lamp	Lights when the main circuit power supply is turned ON.
EtherCAT Status Indicators	These indicators show the status of EtherCAT communications. For details, refer to G5 Series USER'S MANUAL (Cat.No. I576).
Control I/O Connector (CN1)	Used for command input signals and I/O signals.
Encoder Connector (CN2)	Connector for the encoder installed in the Servomotor.
External Encoder Connector (CN4)	Connector for an encoder signal used during fully-closed control.
EtherCAT Communications Connectors (ECAT IN and ECAT OUT)	These connectors are for EtherCAT communications.
Analog Monitor Connector (CN5)	You can use a special cable to monitor values, such as the motor rotation speed, torque command value, etc.
USB Connector (CN7)	Communications connector for the computer.
Safety Connector (CN8)	Connector for safety devices. If no safety devices are used, keep the factory-set safety bypass connector installed.

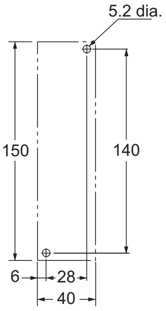
Dimensions

<Wall Mounting>

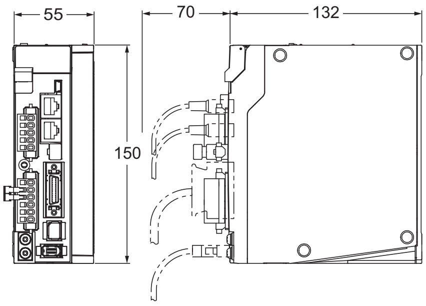
Single-phase 100 VAC R88D-KNA5L-ECT/-KN01L-ECT (50 to 100 W)
R88D-KN01L-ECT-L (100W)
Single-phase/Three-phase 200 VAC R88D-KN01H-ECT/-KN02H-ECT (100 to 200W)
R88D-KN01H-ECT-L/-KN02H-ECT-L (100 to 200W)



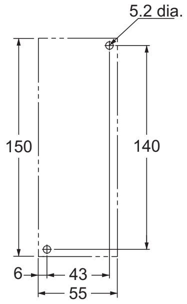
Mounting dimensions



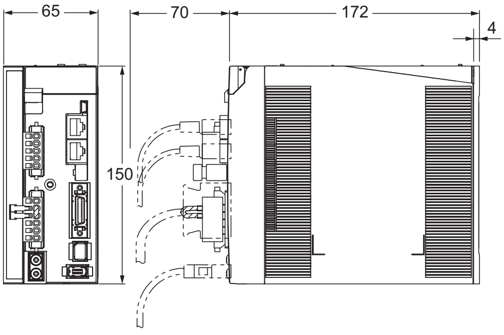
Single-phase 100 VAC R88D-KN02L-ECT (200W)
R88D-KN02L-ECT-L (200W)
Single-phase/Three-phase 200 VAC R88D-KN04H-ECT (400W)
R88D-KN04H-ECT-L (400W)



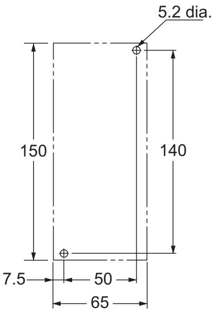
Mounting dimensions



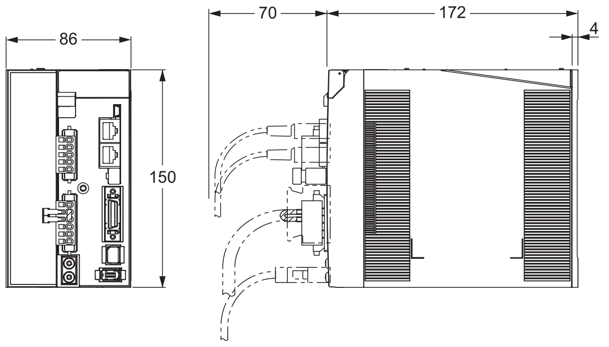
Single-phase 100 VAC R88D-KN04L-ECT (400W)
R88D-KN04L-ECT-L (400W)
Single-phase/Three-phase 200 VAC R88D-KN08H-ECT (750W)
R88D-KN08H-ECT-L (750W)



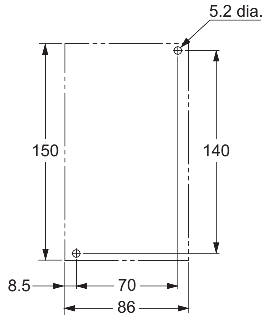
Mounting dimensions



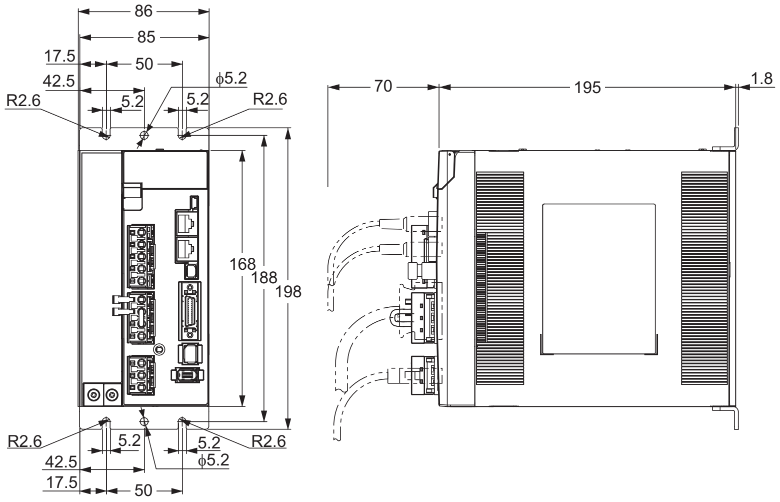
Single-phase/Three-phase 200 VAC R88D-KN10H-ECT/-KN15H-ECT (900W to 1.5kW) R88D-KN10H-ECT-L/-KN15H-ECT-L (1 to 1.5kW)


86
150
70
172
4

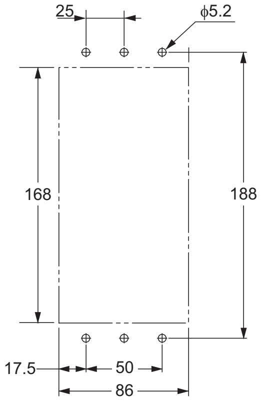
Mounting dimensions


5.2 dia.
150
140
8.5
70
86

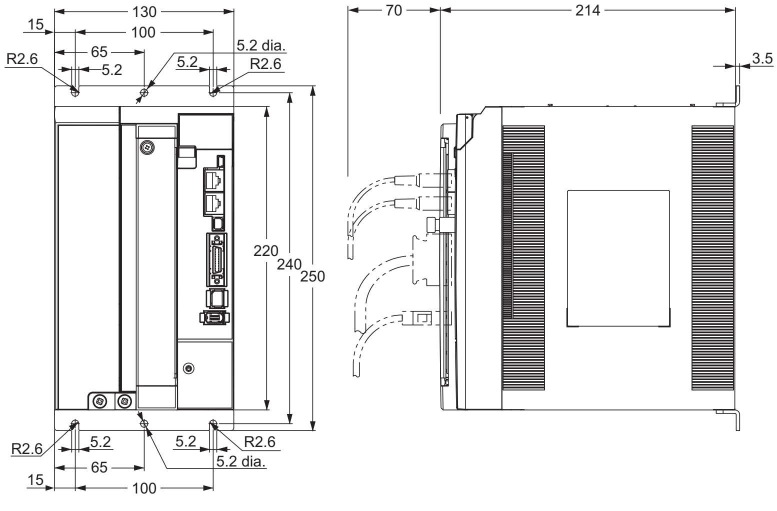
Three-phase 200 VAC R88D-KN20H-ECT (2kW)


86
85
17.5
50
42.5
ϕ5.2
R2.6
5.2
5.2
R2.6
168
188
198
R2.6
5.2
5.2
R2.6
42.5
ϕ5.2
17.5
50
70
195
1.8

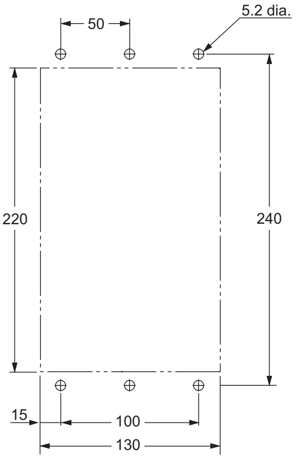
Mounting dimensions


25
ϕ5.2
168
188
17.5
50
86

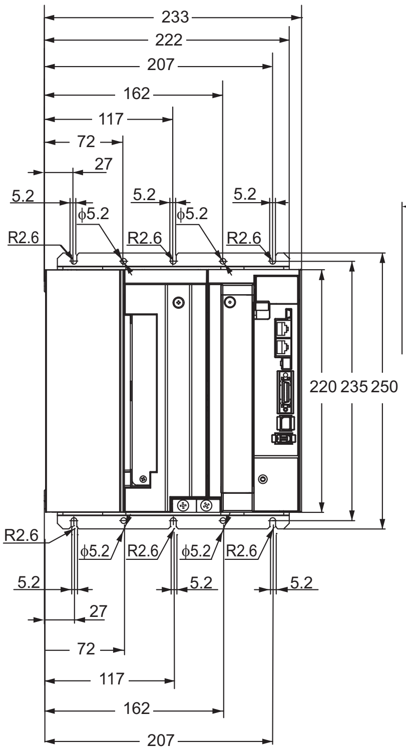
Three-phase 200 VAC R88D-KN30H-ECT/-KN50H-ECT (3 to 5kW)

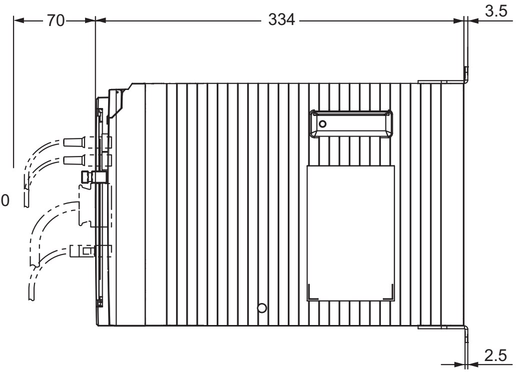

130
15
100
5.2 dia.
R2.6
65
5.2
5.2
R2.6
220
240
250
R2.6
5.2
5.2
R2.6
65
5.2 dia.
15
100
70
214
3.5

Mounting dimensions

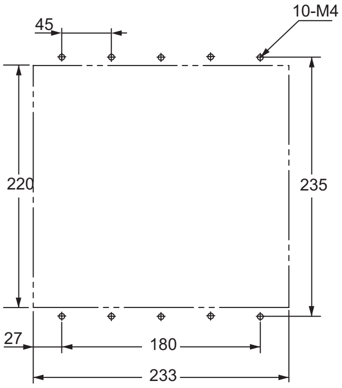

50
5.2 dia.
220
240
15
100
130

Three-phase 200 VAC R88D-KN75H-ECT (7.5kW)

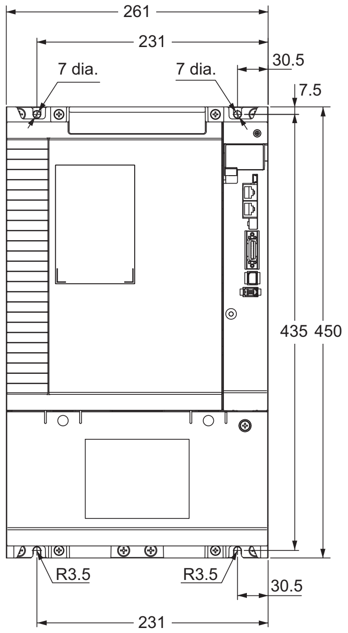

233
222
207
162
117
72
27
5.2
ϕ5.2
5.2
ϕ5.2
5.2
R2.6
R2.6
R2.6
220 235 250
R2.6
ϕ5.2
R2.6
ϕ5.2
R2.6
5.2
5.2
5.2
27
72
117
162
207

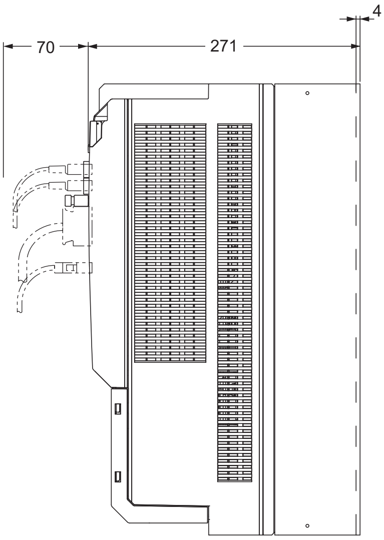


Mounting dimensions

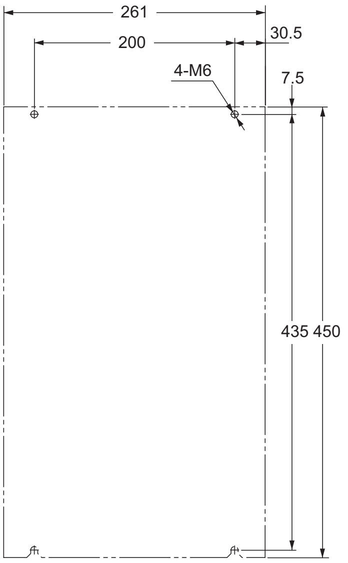

45
10-M4
220
235
27
180
233

Three-phase 200 VAC R88D-KN150H-ECT (15kW)

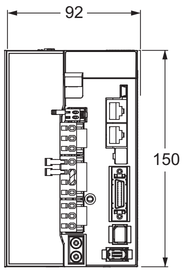

261
231
7 dia.
7 dia.
30.5
7.5
435 450
R3.5
R3.5
30.5
231

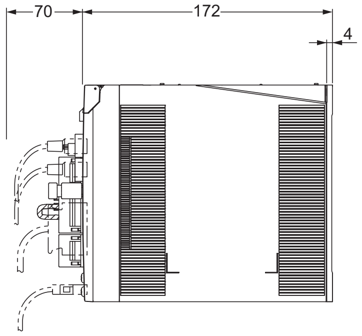


Mounting dimensions


261
200
30.5
4-M6
7.5
435 450

Three-phase 400 VAC R88D-KN06F-ECT/-KN10F-ECT (600W to 1.0kW)
R88D-KN06F-ECT-L/-KN10F-ECT-L (600W to 1.0kW)
Three-phase 400 VAC R88D-KN15F-ECT (1.5kW)
R88D-KN15F-ECT-L (1.5kW)





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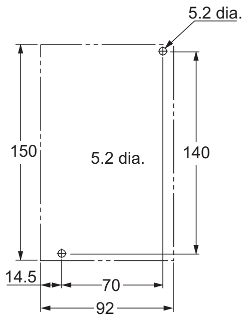
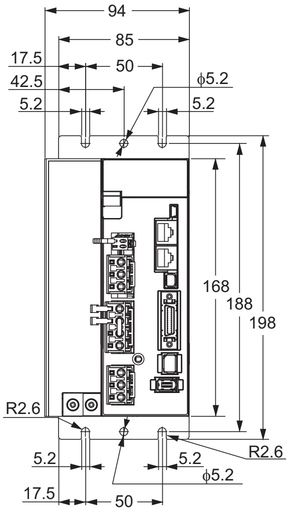
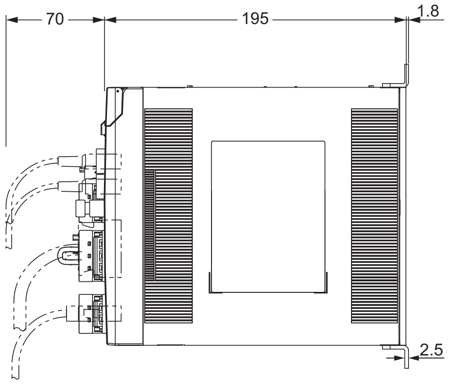
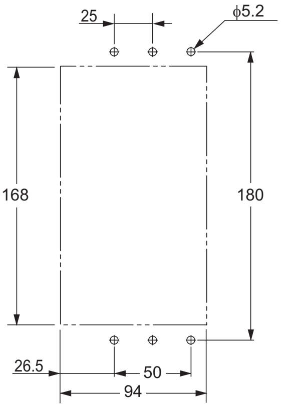

5.2 dia.
150
5.2 dia.
140
14.5
70
92

Three-phase 400 VAC R88D-KN20F-ECT (2kW)
R88D-KN20F-ECT-L (2kW)

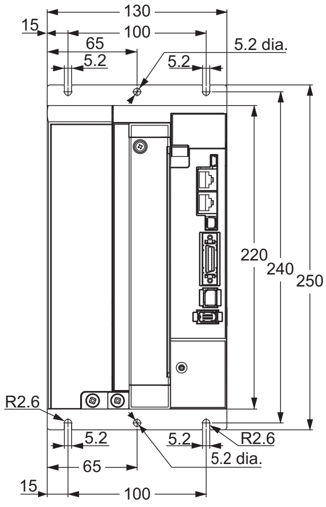

94
85
17.5
50
42.5
ϕ5.2
5.2
5.2
168
188
198
R2.6
5.2
5.2
R2.6
ϕ5.2
17.5
50

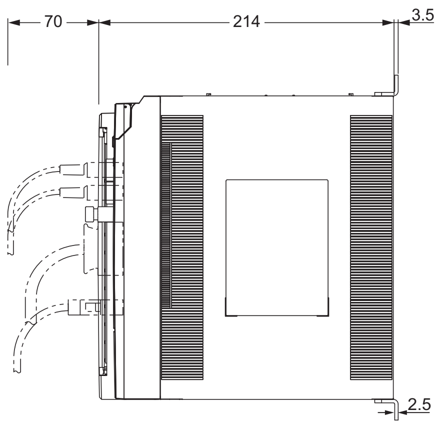


Mounting dimensions

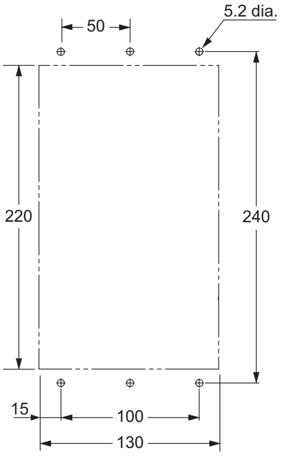

25
ϕ5.2
168
180
26.5
50
94

Three-phase 400 VAC R88D-KN30F-ECT/-KN50F-ECT (3 to 5kW)
R88D-KN30F-ECT-L (3kW)

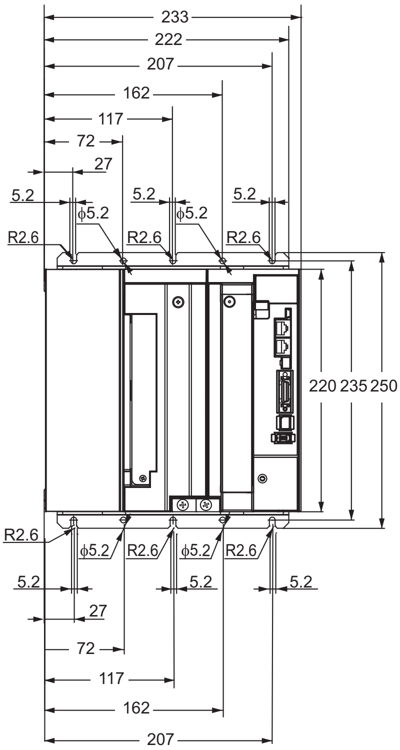

130
15
100
65
5.2 dia.
5.2
5.2
220
240
250
R2.6
5.2
5.2
R2.6
5.2 dia.
65
15
100

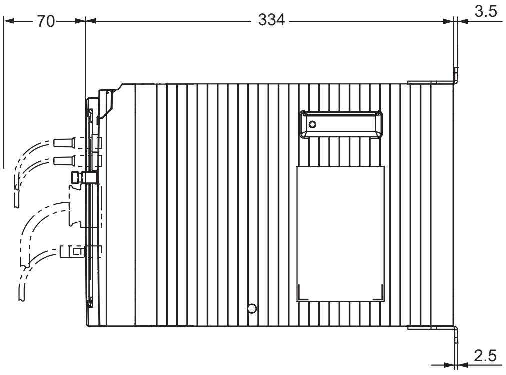


Mounting dimensions

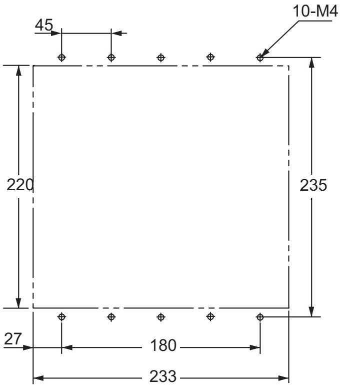

50
5.2 dia.
220
240
15
100
130

Three-phase 400 VAC R88D-KN75F-ECT (7.5kW)

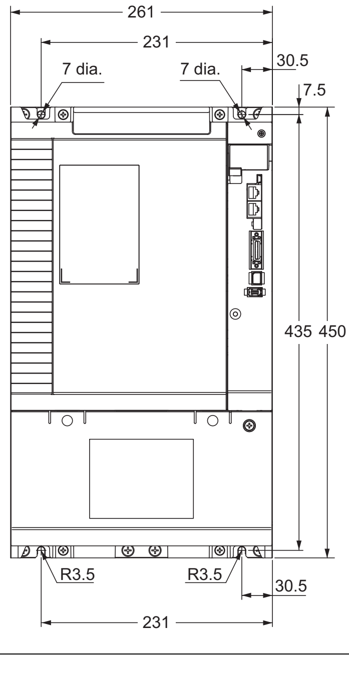

233
222
207
162
117
72
27
5.2
ϕ5.2
5.2
ϕ5.2
5.2
R2.6
R2.6
R2.6
220 235 250
R2.6
ϕ5.2
R2.6
ϕ5.2
R2.6
5.2
5.2
5.2
27
72
117
162
207

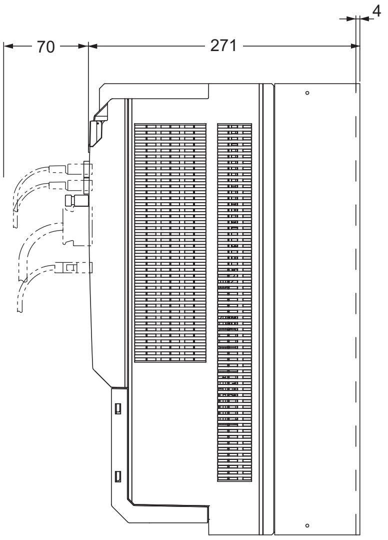


Mounting dimensions

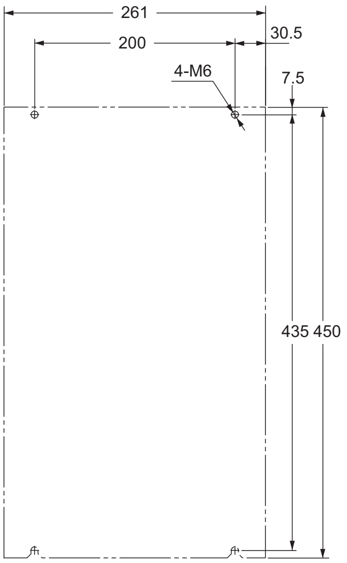

45
10-M4
220
235
27
180
233

Three-phase 400 VAC R88D-KN150F-ECT (15kW)


261
231
7 dia.
7 dia.
30.5
7.5
435 450
R3.5
R3.5
30.5
231



Mounting dimensions


261
200
30.5
4-M6
7.5
435 450

G5-series AC Servo Drives with Built-in EtherCAT Communications Linear Motor Type

R88D-KN☐-ECT-L

Linear Motor for Higher-speed and Higher-precision

- Inherited functions and performance of G5series and EtherCAT communications achieve high-speed and high-precision positioning.
- Same Iron-core motor type for 200V AC and 400V AC.
- Quick setup by automatic setup function

General Specifications

Item		Specifications
Ambient operating temperature and humidity		0 to 55°C, 20% to 85% max. (with no condensation)
Storage ambient temperature and humidity		–20 to 65°C, 20% to 85% max. (with no condensation)
Operating and storage atmosphere		No corrosive gases
Vibration resistance		10 to 60 Hz and at an acceleration of 5.88 m/s^2 or less (Not to be run continuously at the resonance point)
Insulation resistance		Between power supply terminals/power terminals and FG terminal: 0.5 MΩ min. (at 500 VDC)
Dielectric strength		Between power supply/power terminals and FG terminal: 1,500 VAC for 1 min at 50/60 Hz
Protective structure		Built into panel
EC Directives*	**EMC Directive**	EN 55011, EN 61000-6-2, EN 61800-3
	Low Voltage Directive	EN 61800-5-1
	Machinery Directives	EN954-1(Cat.3), EN ISO13849-1 (Cat.3)(PLc, d), ISO13849-1(Cat.3)(PLc, d),EN61508(SIL2), EN62061(SIL2), EN61800-5-2 (STO), IEC61326-3-1 (SIL 2)
UL standards		UL 508C
CSA standards		CSA22.2 No.14
Korean Radio Regulations (KC)		Certified

* The certification from third party is issued in combination with the revolution type motor. The conformance as the whole system should be checked by machine builder.

Note: 1. The above items reflect individual evaluation testing. The results may differ under compound conditions.

Note: 2. Always disconnect all connections to the Servo Drive before you perform insulation resistance tests on it. If you perform an insulation resistance test while the Servo Drive is connected, the Servo Drive may be damaged. Never perform dielectric strength tests on the Servo Drive. Failure to follow this precaution may result in damaging internal elements.

Note: 3. Some Servo Drive parts will require maintenance. For details, refer to the G5 series USER'S MANUAL (Cat.No.I577). Confirm the Manual No. that is listed in Related Manuals.

Note: 4. Vibration, unstable movement, or accoustic noise may occur by an exogenous noise. In such case, please reduce incoming noise as referred in G5 series user's manuals.

Performance Specifications

● Servo Drives with 100 VAC Input Power

for Single-phase input types

Item			R88D-KN01L-ECT-L	R88D-KN02L-ECT-L	R88D-KN04L-ECT-L
Input power supply	Main circuit	Power supply capacity	0.4 KVA	0.5 KVA	0.9 KVA
		Power supply voltage	Single-phase 100 to 120 VAC (85 to 132 VAC) 50/60 Hz		
		Rated current	2.6 A	4.3 A	7.6 A
		Heat value[*1]	16.6 W	21 W	25 W
	Control circuit	Power supply voltage	Single-phase 100 to 120 VAC (85 to 132 VAC) 50/60 Hz		
		Heat value[*1]	4 W	4 W	4 W
Mass			Approx. 0.8 kg	Approx. 1.0 kg	Approx. 1.6 kg
Maximum motor capacity	Motor Rated Rms Current		1.7 Arms	2.5 Arms	4.6 Arms
	Maximum current of motor		5.1 Arms	7.5 Arms	13.8 Arms

*1. The heat value is given for rated operation.

● Servo Drives with 200 VAC Input Power

for Single-phase/Three-phase input type

Item			R88D-KN01H-ECT-L	R88D-KN02H-ECT-L	R88D-KN04H-ECT-L	R88D-KN08H-ECT-L	R88D-KN10H-ECT-L	R88D-KN15H-ECT-L
Input power supply	Main circuit	Power supply capacity	0.5 KVA	0.5 KVA	0.9 KVA	1.3 KVA	1.8 KVA	2.3 KVA
		Power supply voltage	Single-phase or 3-phase 200 to 240 VAC (170 to 264 VAC) 50/60 Hz					
		Rated current	1.6/0.9 A[*1]	2.4/1.3 A[*1]	4.1/2.4 A[*1]	6.6/3.6 A[*1]	9.1/5.2 A[*1]	14.2/8.1 A[*1]
		Heat value[*2]	14.3/13.7 W[*1]	23/19 W[*1]	33/24 W[*1]	30/35.5 W[*1]	57/49 W[*1]	104/93 W[*1]
	Control circuit	Power supply voltage	Single-phase 200 to 240 VAC (170 to 264 VAC) 50/60 Hz					
		Heat value[*2]	4 W	4 W	4 W	4 W	7 W	7 W
Mass			Approx. 0.8 kg	Approx. 0.8 kg	Approx. 1.0 kg	Approx. 1.6 kg	Approx. 1.8 kg	Approx. 1.8 kg
Maximum motor capacity	Rated effective current of motor		1.2 Arms	1.6 Arms	2.6 Arms	4.1 Arms	5.9 Arms	9.4 Arms
	Maximum current of motor		3.6 Arms	4.8 Arms	7.8 Arms	12.3 Arms	16.9 Arms	28.2 Arms

*1. The first value is for single-phase input power and the second value is for 3-phase input power.
*2. The heat value is given for rated operation.

● Servo Drives with 400 VAC Input Power

for Three-phase input type

Item			R88D-KN06F-ECT-L	R88D-KN10F-ECT-L	R88D-KN15F-ECT-L	R88D-KN20F-ECT-L	R88D-KN30F-ECT-L
Input power supply	Main circuit	Power supply capacity	1.2 KVA	1.8 KVA	2.3 KVA	3.8 KVA	4.5 KVA
		Power supply voltage	3-phase 380 to 480 VAC (323 to 528 VAC) 50/60 Hz				
		Rated current	2.1 A	2.8 A	3.9 A	5.9 A	7.6 A
		Heat value[*1]	32.2 W	48 W	49 W	65 W	108 W
	Control circuit	Power supply voltage	24 VDC (20.4 to 27.6 VAC)				
		Heat value[*1]	7 W	7 W	7W	10 W	13 W
Mass			Approx. 1.9 kg	Approx. 1.9 kg	Approx. 1.9 kg	Approx. 2.7 kg	Approx. 4.7 kg
Maximum motor capacity	Rated effective current of motor		1.5 Arms	2.9 Arms	4.7 Arms	6.7 Arms	9.4 Arms
	Maximum current of motor		4.5 Arms	8.7 Arms	14.1 Arms	19.7 Arms	28.2 Arms

*1. The heat value is given for rated operation.

EtherCAT Communications Specifications

Item	Specification
Communications standard	IEC 61158 Type 12, IEC 61800-7 CiA 402 Drive Profile
Physical layer	100BASE-TX (IEEE802.3)
Connectors	RJ45 × 2 (shielded) ECAT IN: EtherCAT input ECAT OUT: EtherCAT output
Communications media	Ethernet Category 5 (100BASE-TX) or higher (twisted-pair cable with double, aluminum tape and braided shielding) is recommended.
Communications distance	Distance between nodes: 100 m max.
Process data	Fixed PDO mapping
Mailbox (CoE)	Emergency messages, SDO requests, SDO responses, and SDO information
Distributed clock (DC)	Synchronization in DC mode. DC cycle: 250 µs, 500 µs, 1 ms, 2 ms, 4 ms
LED indicators	L/A IN (Link/Activity IN) × 1 L/A OUT (Link/Activity OUT) × 1 RUN × 1 ERR × 1
CiA402 Drive Profile	• Cyclic synchronous position mode • Cyclic synchronous velocity mode • Cyclic synchronous torque mode • Profile position mode • Homing mode • Touch probe function (Latch function) • Torque limit function

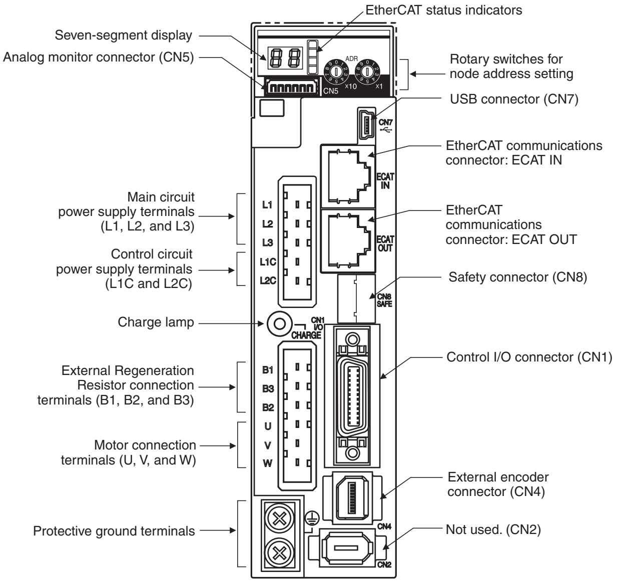
Version Information

Unit Versions

● AC Servo Drives with built-in EtherCAT communications Linear motor type and Software

Unit	Model	Unit version
		Unit version 1.1
AC Servo Drives G5-Series built-in EtherCAT Communications Linear Motor Type	**R88D-KN□□□-ECT-L**	Supported
Compatible Sysmac Studio version (To connect the NJ Controller)		Version 1.04 or higher
Compatible Sysmac Studio version (To connect the NX Controller)		Ver.1.13

Components and Functions


EtherCAT status indicators
Seven-segment display
Analog monitor connector (CN5)
Rotary switches for node address setting
USB connector (CN7)
EtherCAT communications connector: ECAT IN
Main circuit power supply terminals (L1, L2, and L3)
EtherCAT communications connector: ECAT OUT
Control circuit power supply terminals (L1C and L2C)
Safety connector (CN8)
Charge lamp
Control I/O connector (CN1)
External Regeneration Resistor connection terminals (B1, B2, and B3)
Motor connection terminals (U, V, and W)
External encoder connector (CN4)
Protective ground terminals
Not used. (CN2)
ADR
x10
x1
CN5
CN7
ECAT IN
ECAT OUT
CN8 SAFE
CN1 I/O
CHARGE
CN4
CN2
L1
L2
L3
L1C
L2C
B1
B3
B2
U
V
W

Display

A 2-digit 7-segment display shows the node address, error codes, and other Servo Drive status.

Charge Lamp

Lights when the main circuit power supply is turned ON.

EtherCAT Status Indicators

These indicators show the status of EtherCAT communications.
For details, refer to the G5 series USER'S MANUAL (Cat.No.I576).

Control I/O Connector (CN1)

Used for command input signals and I/O signals.

External Encoder Connector (CN4)*

Connector for an encoder signal used during fully-closed control.

EtherCAT Communications Connectors (ECAT IN and ECAT OUT)

These connectors are for EtherCAT communications.

Analog Monitor Connector (CN5)

You can use a special cable to monitor values, such as the motor rotation speed, torque command value, etc.

USB Connector (CN7)

Communications connector for the computer.

Safety Connector (CN8)

Connector for safety devices.
If no safety devices are used, keep the factory-set safety bypass connector installed.

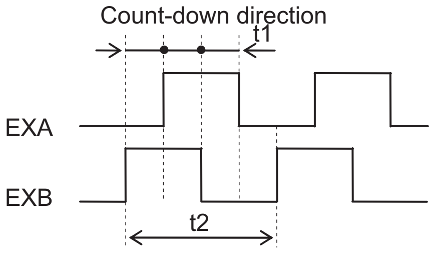
✻External Encoder

Contact the encoder manufacturer to find out the detailed specifications such as operating environment before use.

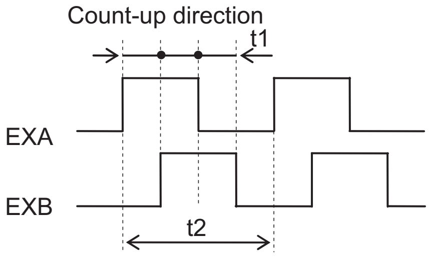
External encoder type	Maker	Example of External encoder	Supported speed✻1	Resolution ✻4 [µm]	Maximum speed ✻4 [m/s]
90° phase difference output type✻2✻3	–	90º phase difference output type	0 to 4 Mpps (Multiplication × 4)	–	–
Serial communications type (Incremental type)✻3	Magnescale Co., Ltd	SR75	0 to 400 Mpps	0.01 to 1	3.3
		SR85		0.01 to 1	3.3
		SL700+PL101RP/RHP		0.1	10
		SL710+PL101RP/RHP		0.1	10
Serial communications type (Absolute type)✻3	Mitutoyo Corporation	AT573A	0 to 400 Mpps	0.05	2.5
		ST778A(L)		0.1	5
	Magnescale Co., Ltd	SR77		0.01 to 1	3.3
		SR87		0.01 to 1	3.3
	Renishaw Co.	RESOLUTE		0.001	0.4
				0.05	20
				0.1	40
	FAGOR AUTOMATION	SAP/SVAP/GAP		0.05	2.5
		LAP		0.1	2

✻1. The supported speed is the internal feedback pulse speed [external encoder pulse/s] of the external encoder that can be processed by the Servo Drive.
Check the instruction manual of the external encoder for the speed range supported by your external encoder.

✻2. These are the directions that the Drive counts a 90° phase difference output.



EXB is 90° ahead of EXA.
t1 > 0.25 µs
t2 > 1.0 µs



EXB is 90° behind EXA.
t1 > 0.25 µs
t2 > 1.0 µs

✻3. For the external encoder connection direction, set the direction so that count-up occurs when the motor shaft is rotating counterclockwise, and count-down occurs when the motor shaft is rotating clockwise. If the connection direction cannot be selected due to installation conditions or any other reason, the count direction can be reversed using External Feedback Pulse Direction Switching (3326 hex).

✻4. The resolution and maximum speed are the values for the G5-series Servo Drive. The resolution and maximum speed may be different from the specifications of the feedback encoder due to restriction on the maximum pulse frequency of the Servo Drive.

Dimensions

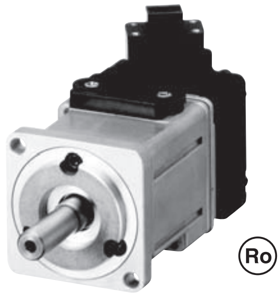
Refer to the page of Dimensions of the built-in EtherCAT communication type.

G5-Series AC Servomotors

R88M-K INC ABS/INC

Servo family for accurate motion control. Power range extended up to 15kW

- Maximum rotation speed : 6,000 r/min
- Featuring a 20-bit high-resolution incremental encoder
- Servomotors Conform to IP67
- 60% cogging torque reduction



General Specifications

Item			3,000-r/min motors		1,000-r/min motors 1,500-r/min motors 2,000-r/min motors
			50 to 750W	1 to 5kW	900W to 15kW
Ambient operating temperature and operating humidity			0 to 40°C 20 to 85% RH (with no condensation)		
Storage ambient temperature and humidity			–20 to +65°C, 20% to 85% RH (with no condensation) Guaranteed maximum temperature: 72 hours at 80°C		
Operating and storage atmosphere			No corrosive gases		
Vibration resistance *1			Acceleration of 49 m/s^2 24.5 m/s^2 max. in X, Y, and Z directions when the motor is stopped		
Impact resistance			Acceleration of 98 m/s^2 max. 3 times each in X, Y, and Z directions		
Insulation resistance			Between power terminal and FG terminal: 20 MΩ min. (at 500 VDC Megger)		
Dielectric strength			1,500 VAC between power terminal and FG terminal (sensed current 10 mA) for 1 min (voltage 100 V, 200 V) 1,800 VAC between power terminal and FG terminal (sensed current 10 mA) for 1 min (voltage 400 V) 1,000 VAC between brake terminal and FG terminal (sensed current 10 mA) for 1 min		
Insulation class			Type B	Type F	
Protective structure			IP67 (except for through-shaft parts and motor and encoder connector pins)		
Interna-tional standard	**EC directive**	**Low voltage directive**	EN60034-1/-5		
	UL standards		UL1004-1		UL1004-1,UL1004-6 *2
	CSA standards		CSA 22.2 No.100		

*1 The amplitude may be amplified by machine resonance. Do not exceed 80% of the specified value for extended periods of time.
*2 UL 1004-6 applies only to 1,500-r/min Servomotors of 7.5 to 15 kW and 1,000-r/min Servomotors of 4.5 to 6 kW.

Note:
1. Do not use the cable when it is laying in oil or water.
2. Do not expose the cable outlet or connections to stress due to bending or the weight of the cable itself.
3. Always disconnect all connections to the Servo Motor before you perform insulation resistance tests on it. If you perform an insulation resistance test while the Servo Motor is connected, the Servo Motor may be damaged.
   Never perform dielectric strength tests on the Servo Motor . Failure to follow this precaution may result in damaging internal elements.
4. To conform EMC directive, the tips on wiring and installation written in the G5 series user's manual must be followed.Confirm the Manual No. that is listed in Related Manuals.

Performance Specifications

<Cylinder type>

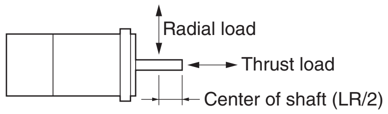
• 3,000 r/min Servomotors (100 VAC Input Power)

Item		Model (R88M-) Unit	K05030H	K10030L	K20030L	K40030L
			K05030T	K10030S	K20030S	K40030S
Rated output *1		W	50	100	200	400
Rated torque *1		N • m	0.16	0.32	0.64	1.3
Rated rotation speed		r/min	3,000			
Momentary maximum rotation speed		r/min	6,000			
Momentary maximum torque*1		N • m	0.48	0.95	1.91	3.8
Rated current *1		A (rms)	1.1	1.6	2.5	4.6
Momentary maximum current*1		A (0-p)	4.7	6.9	10.6	19.5
Rotor inertia	Without brake	kg • m^2	0.025×10^{-4}	0.051×10^{-4}	0.14×10^{-4}	0.26×10^{-4}
	With brake	kg • m^2	0.027×10^{-4}	0.054×10^{-4}	0.16×10^{-4}	0.28×10^{-4}
Applicable load inertia		–	30 times the rotor inertia max. *2			
Torque constant *1		N • m/A	0.11±10%	0.14±10%	0.20±10%	0.21±10%
Power rate *1	Without brake	kW/s	10.1	19.8	28.9	62.4
	With brake	kW/s	9.4	18.7	25.3	37.8
Mechanical time constant	Without brake	ms	1.43	1.03	0.61	0.48
	With brake	ms	1.54	1.09	0.70	0.52
Electrical time constant		ms	0.82	0.91	3.0	3.4
Allowable radial load *3		N	68	68	245	245
Allowable thrust load *3		N	58	58	98	98
Weight	Without brake	kg	Approx. 0.31	Approx. 0.45	Approx. 0.78	Approx. 1.2
	With brake	kg	Approx. 0.51	Approx. 0.65	Approx. 1.2	Approx. 1.6
Radiator plate dimensions (material)			100×80×t10 (Al)		130×120×t12 (Al)	
Applicable drivers (R88D-)			KNA5L-ECT	KN01L-ECT	KN02L-ECT	KN04L-ECT
Brake specifications	Brake inertia	kg • m^2	2×10^{-7}	2×10^{-7}	1.8×10^{-6}	1.8×10^{-6}
	Excitation voltage *4	V	24 VDC±10%			
	Power consumption (at 20°C)	W	7	7	9	9
	Current consumption (at 20°C)	A	0.3	0.3	0.36	0.36
	Static friction torque	N • m	0.29 min.	0.29 min.	1.27 min.	1.27 min.
	Attraction time *5	ms	35 max.	35 max.	50 max.	50 max.
	Release time *5	ms	20 max.	20 max.	15 max.	20 max.
	Backlash		±1°			
	Allowable work per braking	J	39.2	39.2	137	137
	Allowable total work	J	4.9×10^3	4.9×10^3	44.1×10^3	44.1×10^3
	Allowable angular acceleration	rad/s^2	30,000 max. (Speed of 2,800 r/min or more must not be changed in less than 10 ms)			
	Brake limit	–	10 million times min.			
	Rating	–	Continuous			
	Insulation class	–	Type F			

*1 These are the values when the motor is combined with a driver at normal temperature (20°C, 65%). The momentary maximum torque indicates the standard value.

*2 Applicable load inertia.
- The operable load inertia ratio (load inertia/rotor inertia) depends on the mechanical configuration and its rigidity. For a machine with high rigidity, operation is possible even with high load inertia. Select an appropriate motor and confirm that operation is possible.
- If the dynamic brake is activated frequently with high load inertia, the Dynamic Brake Resistor may burn. Do not repeatedly turn the servo ON/OFF while the dynamic brake is enabled.
- The dynamic brake is designed only for emergency stops. Design the system so that the Servomotor remains stopped for at least 3 minutes after applying the dynamic brake. Otherwise the dynamic brake circuits may fail.

*3 The allowable radial and thrust loads are the values determined for a limit of 20,000 hours at normal operating temperatures. The allowable radial loads are applied as shown in the following diagram.



*4 This is a non-excitation brake. (It is released when excitation voltage is applied.)

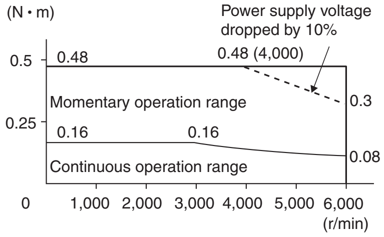
*5 The operation time is the value (reference value) measured with a surge suppressor (CR50500 by Okaya Electric Industries Co., Ltd.).

Torque and Rotation Speed Characteristics

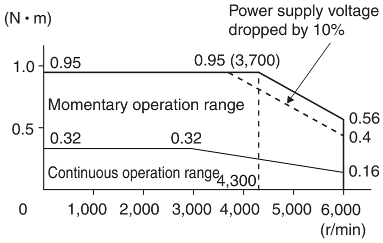
• 3,000 r/min Servomotors (100 VAC Input Power)

The following graphs show the characteristics with a 3-m standard cable and a 100 VAC input.

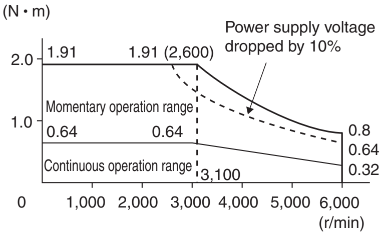
- R88M-K05030H/T (50W)



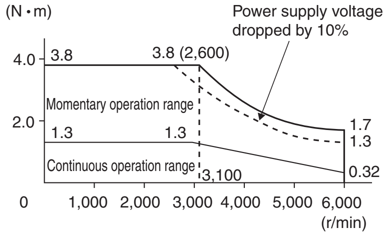
- R88M-K10030L/S (100W)



- R88M-K20030L/S (200W)



- R88M-K40030L/S (400W)



Note: 1. The continuous operation range is the range in which continuous operation is possible. Continuous operation at the maximum speed is also possible. However,doing so will reduce the output torque.

2. If the motor power cable exceeds 20 m, the voltage drop will increase and the momentary operation range will become narrower.

Performance Specifications

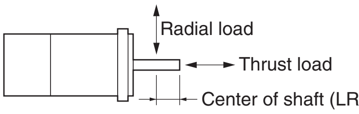
• 3,000 r/min Servomotors (200 VAC Input Power)

Model (R88M-)			K05030H	K10030H	K20030H	K40030H	K75030H	K1K030H	K1K530H	K2K030H	K3K030H	K4K030H	K5K030H
Item		Unit	K05030T	K10030T	K20030T	K40030T	K75030T	K1K030T	K1K530T	K2K030T	K3K030T	K4K030T	K5K030T
Rated output *1		W	50	100	200	400	750	1000	1500	2000	3000	4000	5000
Rated torque *1		N • m	0.16	0.32	0.64	1.3	2.4	3.18	4.77	6.37	9.55	12.7	15.9
Rated rotation speed		r/min	3,000										
Momentary maximum rotation speed]		r/min	6,000					5,000				4,500	
Momentary maximum torque *1		N • m	0.48	0.95	1.91	3.8	7.1	9.55	14.3	19.1	28.6	38.2	47.7
Rated current *1		A (rms)	1.1	1.1	1.5	2.4	4.1	6.6	8.2	11.3	18.1	19.6	24.0
Momentary maximum current *1		A (0-p)	4.7	4.7	6.5	10.2		28	35	48	77	83	102
Rotor inertia	Without brake	kg • m²	0.025×10^{-4}	0.051×10^{-4}	0.14×10^{-4}	0.26×10^{-4}	0.87×10^{-4}	2.03×10^{-4}	2.84×10^{-4}	3.68×10^{-4}	6.50×10^{-4}	12.9×10^{-4}	17.4×10^{-4}
	With brake	kg • m²	0.027×10^{-4}	0.054×10^{-4}	0.16×10^{-4}	0.28×10^{-4}	0.97×10^{-4}	2.35×10^{-4}	3.17×10^{-4}	4.01×10^{-4}	6.85×10^{-4}	14.2×10^{-4}	18.6×10^{-4}
Applicable load inertia		–	30 times the rotor inertia max. *2				20 times the rotor inertia max. *2	15 times the rotor inertia max. *2		15 times the rotor inertia max. *2			
Torque constant *1		N • m/A	0.11±10%	0.21±10%	0.32±10%	0.40±10%	0.45±10%	0.37	0.45	0.44	0.41	0.49	0.49
Power rate *1	Without brake	kW/s	10.1	19.8	28.9	62.3	65.4	49.8	80.1	110	140	126	146
	With brake	kW/s	9.4	18.7	25.3	57.8	58.7	43.0	71.8	101	116	114	136
Mechanical time constant	Without brake	ms	1.43	1.07	0.58	0.43	0.37	0.61	0.49	0.44	0.41	0.51	0.50
	With brake	ms	1.54	1.13	0.66	0.46	0.42	0.71	0.55	0.48	0.49	0.56	0.54
Electrical time constant		ms	0.82	0.90	3.2	3.4	5.3	5.8	6.3	6.7	11	12	13
Allowable radial load *3		N	68	68	245	245	392	490	490	490	490	784	784
Allowable thrust load *3		N	58	58	98	98	147	196	196	196	196	343	343
Weight	Without brake	kg	Approx. 0.31	Approx. 0.46	Approx. 0.79	Approx. 1.2	Approx. 2.3	Approx. 3.5	Approx. 4.4	Approx. 5.3	Approx. 8.3	Approx. 11.0	Approx. 14.0
	With brake	kg	Approx. 0.51	Approx. 0.66	Approx. 1.2	Approx. 1.6	Approx. 3.1	Approx. 4.5	Approx. 5.4	Approx. 6.3	Approx. 9.4	Approx. 12.6	Approx. 16.0
Radiator plate dimensions (material)			100×80×t10 (Al)		130×120×t12 (Al)		170×160 ×t12 (Al)	320×300×t20 (Al)		380×350×t30 (Al)			
Applicable drives (R88D-)			KN01H-ECT	KN01H-ECT	KN02H-ECT	KN04H-ECT	KN08H-ECT	KN15H-ECT	KN15H-ECT	KN20H-ECT	KN30H-ECT	KN50H-ECT	KN50H-ECT
Brake specifications	Brake inertia	kg • m²	2×10^{-7}	2×10^{-7}	1.8×10^{-6}	1.8×10^{-6}	0.75×10^{-5}	0.33×10^{-4}	0.33×10^{-4}	0.33×10^{-4}	0.33×10^{-4}	1.35×10^{-4}	1.35×10^{-4}
	Excitation voltage *4	V	24 VDC±10%										
	Power consumption (at 20°C)	W	7	7	9	9	17	19	19	19	19	22	22
	Current consumption (at 20°C)	A	0.3	0.3	0.36	0.36	0.70±10%	0.81±10%	0.81±10±	0.81±10%	0.81±10%	0.90±10%	0.90±10%
	Static friction torque	N • m	0.29 min.	0.29 min.	1.27 min.	1.27 min.	2.5 min.	7.8 min.	7.8 min.	7.8 min.	11.8 min.	16.1 min.	16.1 min.
	Attraction time *5	ms	35 max.	35 max.	50 max.	50 max.	50 max.	50 max.	50 max.	50 max.	80 max.	110 max.	110 max.
	Release time *5	ms	20 max.	20 max.	15 max.	15 max.	15 max. *6	15 max. *6	15 max. *6	15 max. *6	15 max. *6	50 max. *7	50 max. *7
	Backlash		±1°										
	Allowable work per braking	J	39.2	39.2	137	137	392	392	392	392	392	1470	1470
	Allowable total work	J	4.9×10^{3}	4.9×10^{3}	44.1×10^{3}	44.1×10^{3}	4.9×10^{5}	4.9×10^{5}	4.9×10^{5}	4.9×10^{6}	4.9×10^{6}	2.2×10^{6}	2.2×10^{6}
	Allowable angular acceleration	rad/s²	30,000 max. (Speed of 2,800 r/min or more must not be changed in less than 10 ms)				10,000						
	Brake limit	–	10 million times min.										
	Rating	–	Continuous										
	Insulation class	–	Type F										

*1 These are the values when the motor is combined with a driver at normal temperature (20°C, 65%). The momentary maximum torque indicates the standard value.

*2 Applicable load inertia.
- The operable load inertia ratio (load inertia/rotor inertia) depends on the mechanical configuration and its rigidity. For a machine with high rigidity, operation is possible even with high load inertia. Select an appropriate motor and confirm that operation is possible.
- If the dynamic brake is activated frequently with high load inertia, the Dynamic Brake Resistor may burn. Do not repeatedly turn the servo ON/OFF while the dynamic brake is enabled.
- The dynamic brake is designed only for emergency stops. Design the system so that the Servomotor remains stopped for at least 3 minutes after applying the dynamic brake. Otherwise the dynamic brake circuits may fail.

*3 The allowable radial and thrust loads are the values determined for a limit of 20,000 hours at normal operating temperatures. The allowable radial loads are applied as shown in the following diagram.



*4 This is a non-excitation brake. (It is released when excitation voltage is applied.)

*5 The operation time is the value (reference value) measured with a surge suppressor (CR50500 by Okaya Electric Industries Co., Ltd.).

*6 Direct current switching with a varistor (Z15D151 by Ishizuka Electronics Co.).

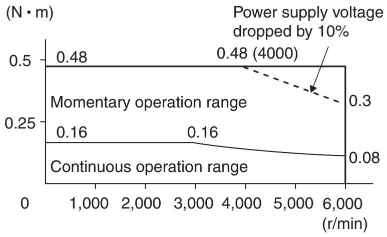
*7 Direct current switching with a varistor (TNR9G820K by Nippon Chemi-Con Corporation).

Torque and Rotation Speed Characteristics

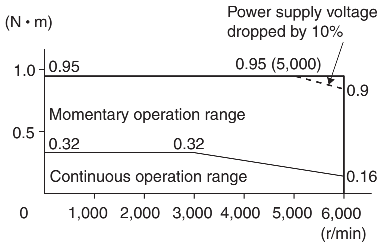
• 3,000 r/min Servomotors (200 VAC Input Power)

The following graphs show the characteristics with a 3 m standard cable and a 200 VAC input.

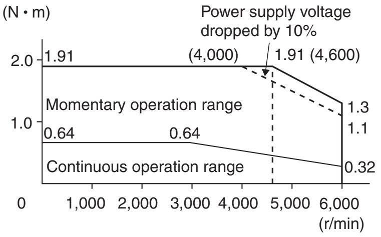
- R88M-K05030H/T (50W)



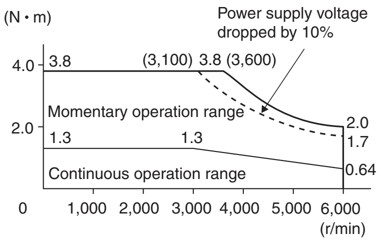
- R88M-K10030H/T (100W)



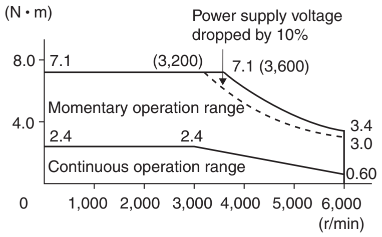
- R88M-K20030H/T (200W)



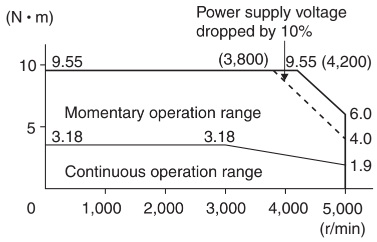
- R88M-K40030H/T (400W)



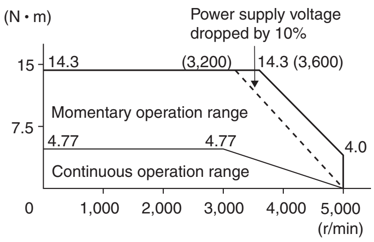
- R88M-K75030H/T (750W)



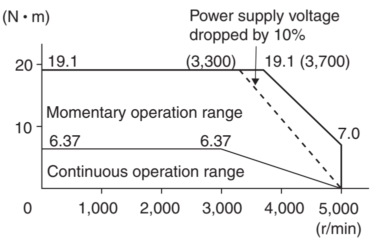
- R88M-K1K030H/T (1kW)



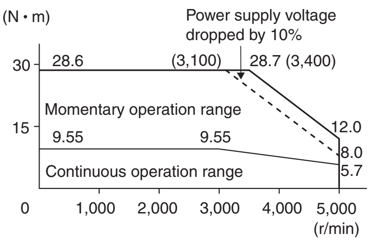
- R88M-K1K530H/T (1.5kW)



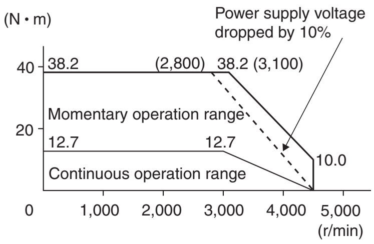
- R88M-K2K030H/T (2kW)



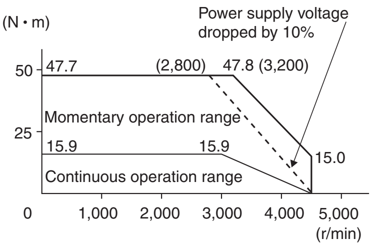
- R88M-K3K030H/T (3kW)



- R88M-K4K030H/T (4kW)



- R88M-K5K030H/T (5kW)



Note: 1. The continuous operation range is the range in which continuous operation is possible. Continuous operation at the maximum speed is also possible. However,doing so will reduce the output torque.

2. If the motor power cable exceeds 20 m, the voltage drop will increase and the momentary operation range will become narrower.

Performance Specifications

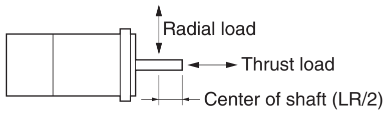
• 3,000 r/min Servomotors (400 VAC Input Power)

		Model (R88M-)	K75030F	K1K030F	K1K530F	K2K030F	K3K030F	K4K030F	K5K030F
Item		**Unit**	**K75030C**	**K1K030C**	**K1K530C**	**K2K030C**	**K3K030C**	**K4K030C**	**K5K030C**
Rated output *1		**W**	750	1,000	1,500	2,000	3,000	4,000	5,000
Rated torque *1		**N • m**	2.39	3.18	4.77	6.37	9.55	12.7	15.9
Rated rotation speed		**r/min**	3,000						
Momentary maximum rotation speed		**r/min**	5,000					4,500	
Momentary maximum torque*1		**N • m**	7.16	9.55	14.3	19.1	28.6	38.2	47.7
Rated current *1		**A (rms)**	2.4	3.3	4.2	5.7	9.2	9.9	12.0
Momentary maximum current *1		**A (0-p)**	10	14	18	24	39	42	51
Rotor inertia	**Without brake**	**kg • m²**	1.61×10^{-4}	2.03×10^{-4}	2.84×10^{-4}	3.68×10^{-4}	6.50×10^{-4}	12.9×10^{-4}	17.4×10^{-4}
	With brake	**kg • m²**	1.93×10^{-4}	2.35×10^{-4}	3.17×10^{-4}	4.01×10^{-4}	7.85×10^{-4}	14.2×10^{-4}	18.6×10^{-4}
Applicable load inertia		–	20 times the rotor inertia max. *2	15 times the rotor inertia max. *2					
Torque constant *1		**N • m/A**	0.78	0.75	0.89	0.87	0.81	0.98	0.98
Power rate *1	**Without brake**	**kW/s**	35.5	49.8	80.1	110	140	126	146
	With brake	**kW/s**	29.6	43	71.8	101	116	114	136
Mechanical time constant	**Without brake**	**ms**	0.67	0.60	0.49	0.45	0.40	0.51	0.50
	With brake	**ms**	0.8	0.70	0.55	0.49	0.49	0.56	0.54
Electrical time constant		**ms**	5.9	5.8	6.5	6.6	12	13	13
Allowable radial load *3		**N**	490	490	490	490	490	784	784
Allowable thrust load *3		**N**	196	196	196	196	196	343	343
Weight	**Without brake**	**kg**	Approx. 3.1	Approx. 3.5	Approx. 4.4	Approx. 5.3	Approx. 8.3	Approx. 11.0	Approx. 14.0
	With brake	**kg**	Approx. 4.1	Approx. 4.5	Approx. 5.4	Approx. 6.3	Approx. 9.4	Approx. 12.6	Approx. 16.0
Radiator plate dimensions (material)			320×300×t20 (Al)				380×350×t30 (Al)		
Applicable drives (R88D-)			KN10F-ECT	KN15F-ECT	KN15F-ECT	KN20F-ECT	KN30F-ECT	KN50F-ECT	KN50F-ECT
Brake specifications	**Brake inertia**	**kg • m²**	0.33×10^{-4}	0.33×10^{-4}	0.33×10^{-4}	0.33×10^{-4}	0.33×10^{-4}	0.33×10^{-4}	1.35×10^{-4}
	Excitation voltage *4	**V**	24 VDC±10%						
	Power consumption (at 20°C)	**W**	17	19	19	19	19	22	22
	Current consumption (at 20°C)	**A**	0.70±10%	0.81±10%	0.81±10%	0.81±10%	0.81±10%	0.90±10%	0.90±10%
	Static friction torque	**N • m**	2.5 min.	7.8 min.	7.8 min.	7.8 min.	11.8 min.	16.1 min.	16.1 min.
	Attraction time *5	**ms**	50 max.	50 max.	50 max.	50 max.	80 max.	110 max.	110 max.
	Release time *5	**ms**	15 max. *6	15 max. *6	15 max. *6	15 max. *6	15 max. *6	50 max. *7	50 max. *7
	Backlash		±1°						
	Allowable work per braking	**J**	392	392	392	392	392	1470	1470
	Allowable total work	**J**	4.9×10^{5}	4.9×10^{5}	4.9×10^{5}	4.9×10^{5}	4.9×10^{5}	2.2×10^{6}	2.2×10^{6}
	Allowable angular acceleration	**rad/s²**	10,000						
	Brake limit	–	10 million times min.						
	Rating	–	Continuous						
	Insulation class	–	Type F						

*1 These are the values when the motor is combined with a driver at normal temperature (20°C, 65%). The momentary maximum torque indicates the standard value.

*2 Applicable load inertia.
- The operable load inertia ratio (load inertia/rotor inertia) depends on the mechanical configuration and its rigidity. For a machine with high rigidity, operation is possible even with high load inertia. Select an appropriate motor and confirm that operation is possible.
- If the dynamic brake is activated frequently with high load inertia, the Dynamic Brake Resistor may burn. Do not repeatedly turn the servo ON/OFF while the dynamic brake is enabled.
- The dynamic brake is designed only for emergency stops. Design the system so that the Servomotor remains stopped for at least 3 minutes after applying the dynamic brake. Otherwise the dynamic brake circuits may fail.

*3 The allowable radial and thrust loads are the values determined for a limit of 20,000 hours at normal operating temperatures. The allowable radial loads are applied as shown in the following diagram.



*4 This is a non-excitation brake. (It is released when excitation voltage is applied.)

*5 The operation time is the value (reference value) measured with a surge suppressor (CR50500 by Okaya Electric Industries Co., Ltd.).

*6 Direct current switching with a varistor (Z15D151 by Ishizuka Electronics Co.).

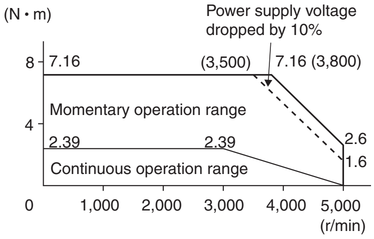
*7 Direct current switching with a varistor (TNR9G820K by Nippon Chemi-Con Corporation).

Torque and Rotation Speed Characteristics

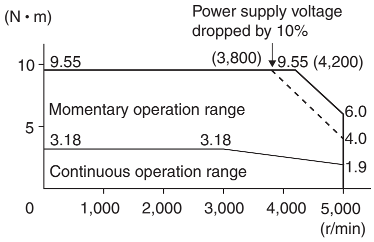
• 3,000 r/min Servomotors (400 VAC Input Power)

The following graphs show the characteristics with a 3 m standard cable and a 400 VAC input.

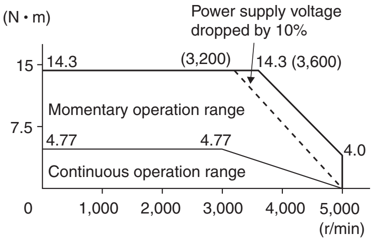
- R88M-K75030F/C (750W)



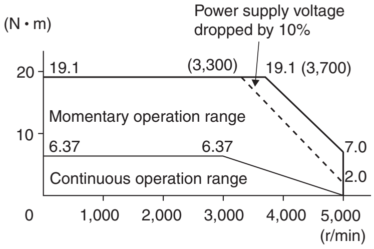
- R88M-K1K030F/C (1kW)



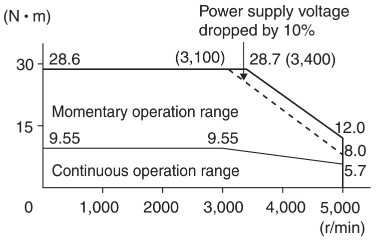
- R88M-K1K530F/C (1.5kW)



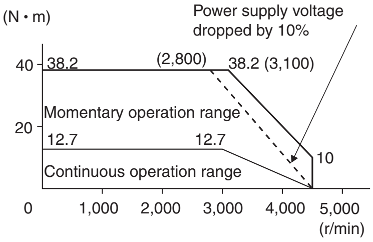
- R88M-K2K030F/C (2kW)



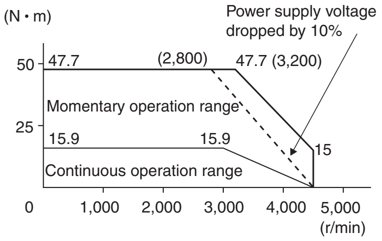
- R88M-K3K030F/C (3kW)



- R88M-K4K030F/C (4kW)



- R88M-K5K030F/C (5kW)



Note: 1. The continuous operation range is the range in which continuous operation is possible. Continuous operation at the maximum speed is also possible. However,doing so will reduce the output torque.

2. If the motor power cable exceeds 20 m, the voltage drop will increase and the momentary operation range will become narrower.

Performance Specifications

• 1,500r/min, 2,000 r/min Servomotors (200 VAC Input Power)

Item		Model (R88M-) Unit	K1K020H K1K020T	K1K520H K1K520T	K2K020H K2K020T	K3K020H K3K020T	K4K020H K4K020T	K5K020H K5K020T	– K7K515T	– K11K015T	– K15K015T
Rated output *1		W	1,000	1,500	2,000	3,000	4,000	5,000	7,500	11,000	15,000
Rated torque *1		N • m	4.77	7.16	9.55	14.3	19.1	23.9	47.8	70.0	95.0
Rated rotation speed		r/min	2,000						1,500		
Momentary maximum rotation speed		r/min	3,000							2,000	
Momentary maximum torque *1		N • m	14.3	21.5	28.6	43.0	57.3	71.6	119.0	175.0	224.0
Rated current *1		A (rms)	5.7	9.4	11.5	17.4	21.0	25.9	44.0	54.2	66.1
Momentary maximum current *1		A (0-p)	24	40	49	74	89	110	165	203	236
Rotor inertia	Without brake	kg • m²	4.60×10^{-4}	6.70×10^{-4}	8.72×10^{-4}	12.9×10^{-4}	37.6×10^{-4}	48.0×10^{-4}	101×10^{-4}	212×10^{-4}	302×10^{-4}
	With brake	kg • m²	5.90×10^{-4}	7.99×10^{-4}	10.0×10^{-4}	14.2×10^{-4}	38.6×10^{-4}	48.8×10^{-4}	107×10^{-4}	220×10^{-4}	311×10^{-4}
Applicable load inertia		–	10 times the rotor inertia max. *2								
Torque constant *1		N • m/A	0.63	0.58	0.64	0.59	0.70	0.70	0.77	0.92	1.05
Power rate *1	Without brake	kW/s	49.5	76.5	105	159	97.1	119	226	231	302
	With brake	kW/s	38.6	64.2	91.2	144	94.5	117	213	223	293
Mechanical time constant	Without brake	ms	0.80	0.66	0.66	0.57	0.65	0.63	0.58	0.80	0.71
	With brake	ms	1.02	0.80	0.76	0.63	0.66	0.64	0.61	0.83	0.74
Electrical time constant		ms	9.4	10	10	12	20	19	21	31	32
Allowable radial load *3		N	490	490	490	784	784	784	1,176	2,254	2,254
Allowable thrust load *3		N	196	196	196	343	343	343	490	686	686
Weight	Without brake	kg	Approx. 5.2	Approx. 6.7	Approx. 8.0	Approx. 11.0	Approx. 15.5	Approx. 18.6	Approx. 36.4	Approx. 52.7	Approx. 70.2
	With brake	kg	Approx. 6.7	Approx. 8.2	Approx. 9.5	Approx. 12.6	Approx. 18.7	Approx. 21.8	Approx. 40.4	Approx. 58.9	Approx. 76.3
Radiator plate dimensions (material)			275×260×t15 (Al)			380×350×t 30 (Al)	470×440×t30 (Al)		550×520×t 30 (Al)	670×630×t35 (Al)	
Applicable drives (R88D-)			KN10H-ECT	KN15H-ECT	KN20H-ECT	KN30H-ECT	KN50H-ECT	KN50H-ECT	KN75H-ECT	KN150H-ECT	KN150H-ECT
Brake specifications	Brake inertia	kg • m²	1.35×10^{-4}	1.35×10^{-4}	1.35×10^{-4}	1.35×10^{-4}	4.7×10^{-4}	4.7×10^{-4}	4.7×10^{-4}	7.1×10^{-4}	7.1×10^{-4}
	Excitation voltage *4	V	24 VDC±10%								
	Power consumption (at 20°C)	W	14	19	19	22	31	31	34	26	26
	Current consumption (at 20°C)	A	0.59±10%	0.79±10%	0.79±10%	0.90±10%	1.3±10%	1.3±10%	1.4±10%	1.08±10%	1.08±10%
	Static friction torque	N • m	4.9 min.	13.7 min.	13.7 min.	16.2 min.	24.5 min.	24.5 min.	58.8 min.	100 min.	100 min.
	Attraction time *5	ms	80 max.	100 max.	100 max.	110 max.	80 max.	80 max.	150 max.	300 max.	300 max.
	Release time *5	ms	70 max. *6	50 max. *6	50 max. *6	50 max. *6	25 max. *7	25 max. *7	50 max.	140 max.	140 max.
	Backlash		±1°								
	Allowable work per braking	J	588	1,176	1,176	1,470	1,372	1,372	1,372	2,000	2,000
	Allowable total work	J	7.8×10^{5}	1.5×10^{6}	1.5×10^{6}	2.2×10^{6}	2.9×10^{6}	2.9×10^{6}	2.9×10^{6}	4.0×10^{6}	4.0×10^{6}
	Allowable angular acceleration	rad/s²	10,000						5,000	3,000	
	Brake limit	–	10 million times min.								
	Rating	–	Continuous								
	Insulation class	–	Type F								

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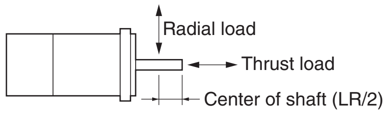
*1 These are the values when the motor is combined with a driver at normal temperature (20°C, 65%). The momentary maximum torque indicates the standard value.

*2 Applicable load inertia.
- The operable load inertia ratio (load inertia/rotor inertia) depends on the mechanical configuration and its rigidity. For a machine with high rigidity, operation is possible even with high load inertia. Select an appropriate motor and confirm that operation is possible.
- If the dynamic brake is activated frequently with high load inertia, the Dynamic Brake Resistor may burn. Do not repeatedly turn the servo ON/OFF while the dynamic brake is enabled.
- The dynamic brake is designed only for emergency stops. Design the system so that the Servomotor remains stopped for at least 3 minutes after applying the dynamic brake. Otherwise the dynamic brake circuits may fail.

*3 The allowable radial and thrust loads are the values determined for a limit of 20,000 hours at normal operating temperatures. The allowable radial loads are applied as shown in the following diagram.



*4 This is a non-excitation brake. (It is released when excitation voltage is applied.)

*5 The operation time is the value (reference value) measured with a surge suppressor (CR50500 by Okaya Electric Industries Co., Ltd.).

*6 Direct current switching with a varistor (Z15D151 by Ishizuka Electronics Co.).

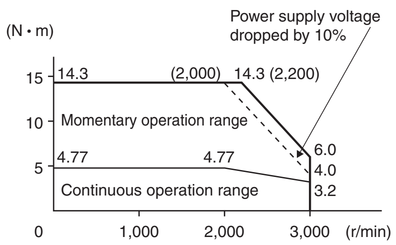
*7 Direct current switching with a varistor (TNR9G820K by Nippon Chemi-Con Corporation).

Torque and Rotation Speed Characteristics

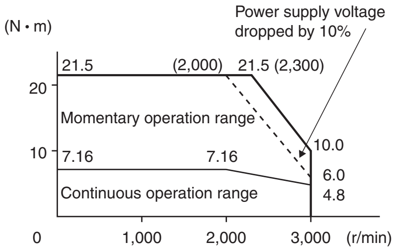
• 1,500r/min, 2,000 r/min Servomotors (200 VAC Input Power)

The following graphs show the characteristics with a 3 m standard cable and a 200 VAC input.

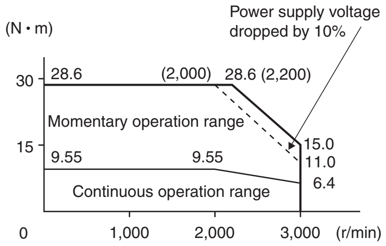
- R88M-K1K020H/T (1kW)



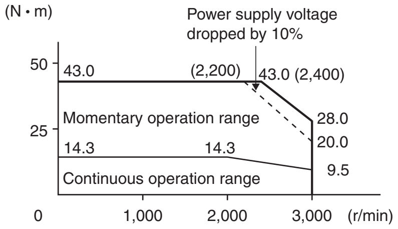
- R88M-K1K520H/T (1.5kW)



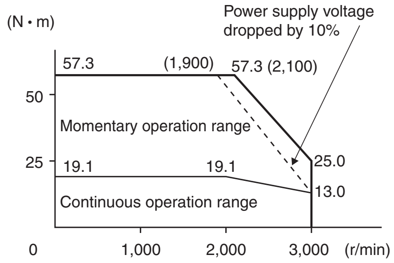
- R88M-K2K020H/T (2kW)



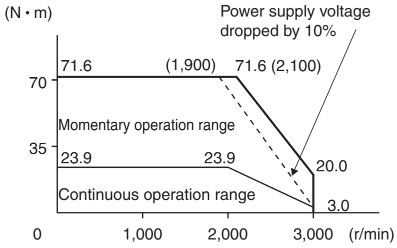
- R88M-K3K020H/T (3kW)



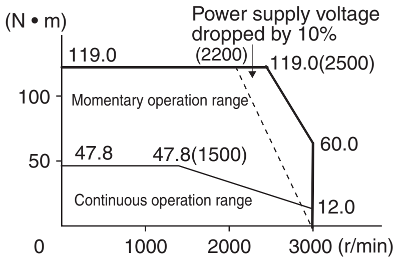
- R88M-K4K020H/T (4kW)



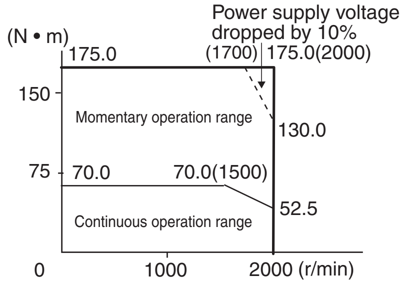
- R88M-K5K020H/T (5kW)



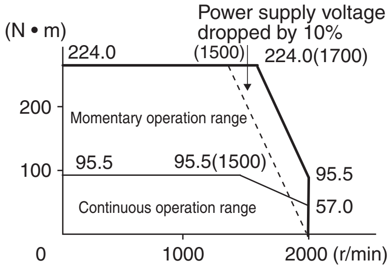
- R88M-K7K515T (7.5kW)



- R88M-K11K015T (11kW)



- R88M-K15K015T (15kW)



Note: 1. The continuous operation range is the range in which continuous operation is possible. Continuous operation at the maximum speed is also possible. However,doing so will reduce the output torque.

2. If the motor power cable exceeds 20 m, the voltage drop will increase and the momentary operation range will become narrower.

Performance Specifications

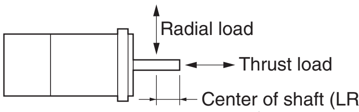
- **1,500r/min, 2,000 r/min Servomotors (400 VAC Input Power)**

Model (R88M-)			K40020F	K60020F	K1K020F	K1K520F	K2K020F	K3K020F	K4K020F	K5K020F	–	–	–
Item		Unit	K40020C	K60020C	K1K020C	K1K520C	K2K020C	K3K020C	K4K020C	K5K020C	K7K515C	K11K015C	K15K015C
Rated output *1		W	400	600	1,000	1,500	2,000	3,000	4,000	5,000	7,500	11,000	15,000
Rated torque *1		N • m	1.91	2.86	4.77	7.16	9.55	14.3	19.1	23.9	47.8	70.0	95.9
Rated rotation speed		r/min	2,000								1,500		
Momentary maximum rotation speed		r/min	3,000									2,000	
Momentary maximum torque *1		N • m	5.73	8.59	14.3	21.5	28.7	43.0	57.3	71.6	119.0	175.0	224.0
Rated current *1		A (rms)	1.2	1.5	2.8	4.7	5.9	8.7	10.6	13.0	22.0	27.1	33.1
Momentary maximum current *1		A (0-p)	4.9	6.5	12	20	25	37	45	55	83	101	118
Rotor inertia	Without brake	kg • m^{2}	1.61×10^{-4}	2.03×10^{-4}	4.60×10^{-4}	6.70×10^{-4}	8.72×10^{-4}	12.9×10^{-4}	37.6×10^{-4}	48.0×10^{-4}	101×10^{-4}	212×10^{-4}	302×10^{-4}
	With brake	kg • m^{2}	1.90×10^{-4}	2.35×10^{-4}	5.90×10^{-4}	7.99×10^{-4}	10.0×10^{-4}	14.2×10^{-4}	38.6×10^{-4}	48.8×10^{-4}	107×10^{-4}	220×10^{-4}	311×10^{-4}
Applicable load inertia		–	10 times the rotor inertia max. *2										
Torque constant *1		N • m/A	1.27	1.38	1.27	1.16	1.27	1.18	1.40	1.46	1.54	1.84	2.10
Power rate *1	Without brake	kW/s	22.7	40.3	49.5	76.5	105	159	97.1	119	226	231	302
	With brake	kW/s	19.2	34.8	38.6	64.2	91.2	144	94.5	117	213	223	293
Mechanical time constant	Without brake	ms	0.70	0.62	0.79	0.66	0.68	0.56	0.60	0.60	0.58	0.80	0.71
	With brake	ms	0.83	0.72	1.01	0.79	0.78	0.61	0.61	0.61	0.61	0.83	0.74
Electrical time constant		ms	5.7	5.9	10	10	10	12	21	19	21	31	32
Allowable radial load *3		N	490	490	490	490	490	784	784	784	1,176	2,254	2,254
Allowable thrust load *3		N	196	196	196	196	196	343	343	343	490	686	686
Weight	Without brake	kg	Approx. 3.1	Approx. 3.5	Approx. 5.2	Approx. 6.7	Approx. 8.0	Approx. 11.0	Approx. 15.5	Approx. 18.6	Approx. 36.4	Approx. 52.7	Approx. 70.2
	With brake	kg	Approx. 4.1	Approx. 4.5	Approx. 6.7	Approx. 8.2	Approx. 9.5	Approx. 12.6	Approx. 18.7	Approx. 21.8	Approx. 40.4	Approx. 58.9	Approx. 76.3
Radiator plate dimensions (material)			320×300×t20 (Al)		275×260×t15 (Al)			380×350 ×t30 (Al)	470×440×t30 (Al)		550×520 ×t30 (Al)	670×630×t35 (Al)	
Applicable drives (R88D-)			KN06F-ECT	KN06F-ECT	KN10F-ECT	KN15F-ECT	KN20F-ECT	KN30F-ECT	KN50F-ECT	KN50F-ECT	KN75F-ECT	KN150F-ECT	KN150F-ECT
Brake specifications	Brake inertia	kg • m^{2}	1.35×10^{-4}	1.35×10^{-4}	1.35×10^{-4}	1.35×10^{-4}	1.35×10^{-4}	1.35×10^{-4}	4.7×10^{-4}	4.7×10^{-4}	4.7×10^{-4}	7.1×10^{-4}	7.1×10^{-4}
	Excitation voltage *4	V	24 VDC±10%										
	Power consumption (at 20°C)	W	17	17	14	19	19	22	31	31	34	26	26
	Current consumption (at 20°C)	A	0.70±10%	0.70±10%	0.59±10%	0.79±10%	0.79±10%	0.90±10%	1.3±10%	1.3±10%	1.4±10%	1.08±10%	1.08±10%
	Static friction torque	N • m	2.5 min.	2.5 min.	4.9 min.	13.7 min.	13.7 min.	16.2 min.	24.5 min.	24.5 min.	58.8 min.	100 min.	100 min.
	Attraction time *5	ms	50 max.	50 max.	80 max.	100 max.	100 max.	110 max.	80 max.	80 max.	150 max.	300 max.	300 max.
	Release time *5	ms	15 max. *7	15 max. *7	70 max. *6	50 max. *6	50 max. *6	50 max. *6	25 max. *7	25 max. *7	50 max.	140 max.	140 max.
	Backlash		±1°										
	Allowable work per braking	J	392	392	588	1,176	1,176	1,470	1,372	1,372	1,372	2,000	2,000
	Allowable total work	J	4.9×10^{5}	4.9×10^{5}	7.8×10^{5}	1.5×10^{6}	1.5×10^{6}	2.2×10^{6}	2.9×10^{6}	2.9×10^{6}	2.9×10^{6}	4.0×10^{6}	4.0×10^{6}
	Allowable angular acceleration	rad/s^{2}	10,000								5,000	3,000	
	Brake limit	–	10 million times min.										
	Rating	–	Continuous										
	Insulation class	–	Type F										

*1 These are the values when the motor is combined with a driver at normal temperature (20°C, 65%). The momentary maximum torque indicates the standard value.

*2 Applicable load inertia.
- The operable load inertia ratio (load inertia/rotor inertia) depends on the mechanical configuration and its rigidity. For a machine with high rigidity, operation is possible even with high load inertia. Select an appropriate motor and confirm that operation is possible.
- If the dynamic brake is activated frequently with high load inertia, the Dynamic Brake Resistor may burn. Do not repeatedly turn the servo ON/OFF while the dynamic brake is enabled.
- The dynamic brake is designed only for emergency stops. Design the system so that the Servomotor remains stopped for at least 3 minutes after applying the dynamic brake. Otherwise the dynamic brake circuits may fail.

*3 The allowable radial and thrust loads are the values determined for a limit of 20,000 hours at normal operating temperatures. The allowable radial loads are applied as shown in the following diagram.



*4 This is a non-excitation brake. (It is released when excitation voltage is applied.)

*5 The operation time is the value (reference value) measured with a surge suppressor (CR50500 by Okaya Electric Industries Co., Ltd.).

*6 Direct current switching with a varistor (Z15D151 by Ishizuka Electronics Co.).

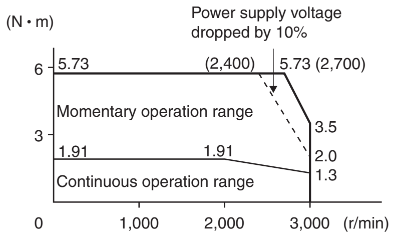
*7 Direct current switching with a varistor (TNR9G820K by Nippon Chemi-Con Corporation).

Torque and Rotation Speed Characteristics

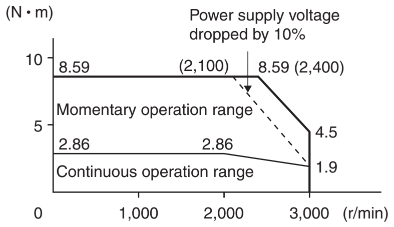
• 1,500r/min, 2,000 r/min Servomotors (400 VAC Input Power)

The following graphs show the characteristics with a 3 m standard cable and a 400 VAC input.

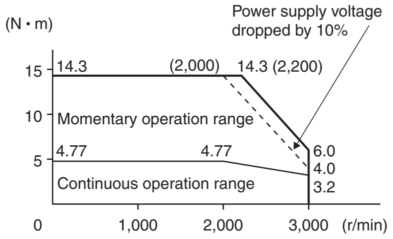
- R88M-K40020F/C (400W)



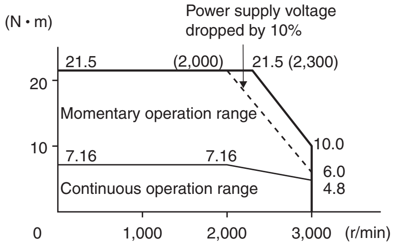
- R88M-K60020F/C (600W)



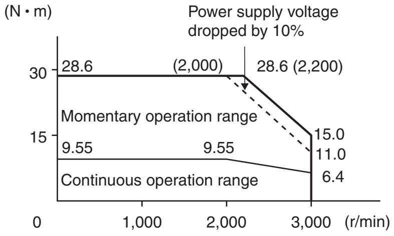
- R88M-K1K020F/C (1kW)



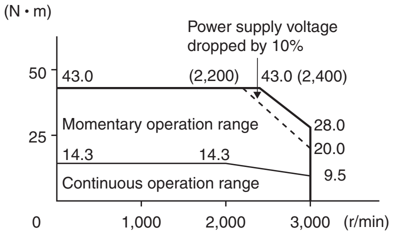
- R88M-K1K520F/C (1.5kW)



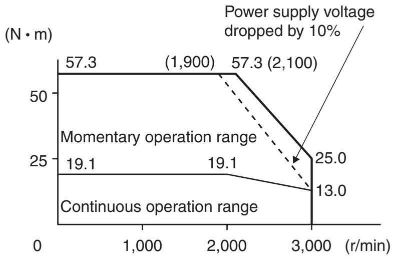
- R88M-K2K020F/C (2kW)



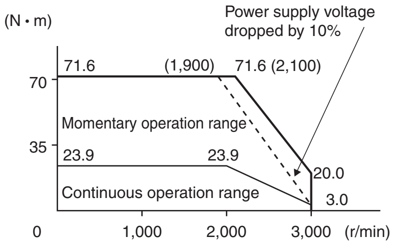
- R88M-K3K020F/C (3kW)



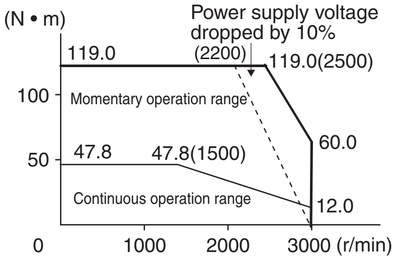
- R88M-K4K020F/C (4kW)



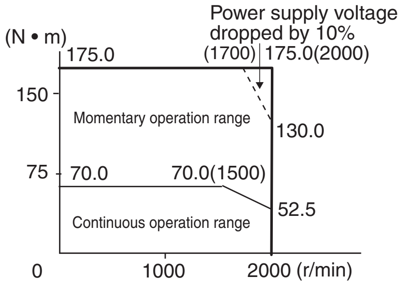
- R88M-K5K020F/C (5kW)



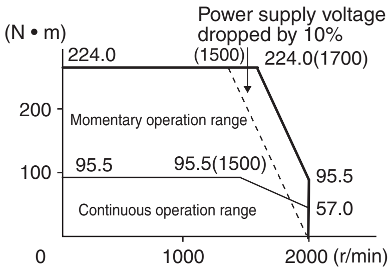
- R88M-K7K515C (7.5kW)



- R88M-K11K015C (11kW)



- R88M-K15K015C (15kW)



Note: 1. The continuous operation range is the range in which continuous operation is possible. Continuous operation at the maximum speed is also possible. However,doing so will reduce the output torque.

2. If the motor power cable exceeds 20 m, the voltage drop will increase and the momentary operation range will become narrower.

Performance Specifications

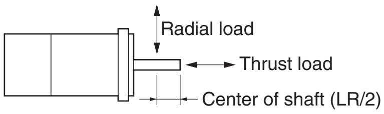
• 1,000 r/min Servomotors (200/400 VAC Input Power)

			200 VAC					400 VAC				
		Model (R88M-)	K90010H	K2K010H	K3K010H	–	–	K90010F	K2K010F	K3K010F	–	–
Item		Unit	K90010T	K2K010T	K3K010T	K4K510T	K6K010T	K90010C	K2K010C	K3K010C	K4K510C	K6K010C
Rated output *1		W	900	2,000	3,000	4,500	6,000	900	2,000	3,000	4,500	6,000
Rated torque *1		N • m	8.59	19.1	28.7	43.0	57.0	8.59	19.1	28.7	43.0	57.3
Rated rotation speed		r/min	1,000									
Momentary maximum rotation speed		r/min	2,000									
Momentary maximum torque *1		N • m	19.3	47.7	71.7	107.0	143.0	19.3	47.7	71.7	107.0	143.0
Rated current *1		A (rms)	7.6	17.0	22.6	29.7	38.8	3.8	8.5	11.3	14.8	19.4
Momentary maximum current *1		A (0-p)	24	60	80	110	149	12	30	40	55	74
Rotor inertia	Without brake	kW/s	6.70×10^{-4}	30.3×10^{-4}	48.4×10^{-4}	79.1×10^{-4}	101×10^{-4}	6.70×10^{-4}	30.3×10^{-4}	48.4×10^{-4}	79.1×10^{-4}	101×10^{-4}
	With brake	kW/s	7.99×10^{-4}	31.4×10^{-4}	49.2×10^{-4}	84.4×10^{-4}	107×10^{-4}	7.99×10^{-4}	31.4×10^{-4}	49.2×10^{-4}	84.4×10^{-4}	107×10^{-4}
Applicable load inertia		–	10 times the rotor inertia max. *2									
Torque constant *1		N • m/A	0.86	0.88	0.96	1.02	1.04	1.72	1.76	1.92	2.05	2.08
Power rate *1	Without brake	kW/s	110	120	170	233	325	110	120	170	233	325
	With brake	kW/s	92.4	116	167	219	307	92.4	116	167	219	307
Mechanical time constant	Without brake	ms	0.66	0.75	0.63	0.55	0.54	0.66	0.76	0.61	0.55	0.54
	With brake	ms	0.78	0.78	0.64	0.63	0.57	0.79	0.78	0.62	0.63	0.57
Electrical time constant		ms	11	18	21	20	23	11	18	22	20	23
Allowable radial load *3		N	686	1176	1470	1470	1764	686	1176	1470	1470	1764
Allowable thrust load *3		N	196	490	490	490	588	196	490	490	490	588
Weight	Without brake	kg	Approx. 6.7	Approx. 14.0	Approx. 20.0	Approx. 29.4	Approx. 36.4	Approx. 6.7	Approx. 14.0	Approx. 20.0	Approx. 29.4	Approx. 36.4
	With brake	kg	Approx. 8.2	Approx. 17.5	Approx. 23.5	Approx. 33.3	Approx. 40.4	Approx. 8.2	Approx. 17.5	Approx. 23.5	Approx. 33.3	Approx. 40.4
Radiator plate dimensions (material)			270×260×t15 (Al)			470×440×t30 (Al)	550×520×t30 (Al)	270×260×t15 (Al)	470×440×t30 (Al)			550×520×t30 (Al)
Applicable drives (R88D-)			KN15H-ECT	KN30HF-ECT	KN50H-ECT	KN50H-ECT	KN75H-ECT	KN15F-ECT	KN30F-ECT	KN50F-ECT	KN50F-ECT	KN75F-ECT
Brake specifications	Brake inertia	kg • m^2	1.35×10^{-4}	4.7×10^{-4}	4.7×10^{-4}	4.7×10^{-4}	4.7×10^{-4}	1.35×10^{-4}	4.7×10^{-4}	4.7×10^{-4}	4.7×10^{-4}	4.7×10^{-4}
	Excitation voltage *4	V	24 VDC±10%									
	Power consumption (at 20°C)	W	19	31	34	34	34	19	31	34	34	34
	Current consumption (at 20°C)	A	0.79±10%	1.3±10%	1.4±10%	1.4±10%	1.4±10%	0.79±10%	1.3±10%	1.4±10%	1.4±10%	1.4±10%
	Static friction torque	N • m	13.7 min.	24.5 min.	58.8 min.	58.8 min.	58.8 min.	13.7 min.	24.5 min.	58.8 min.	58.8 min.	58.8 min.
	Attraction time *5	ms	100 max.	80 max.	150 max.	150 max.	150 max.	100 max.	80 max.	150 max.	150 max.	150 max.
	Release time *5	ms	50 max. *6	25 max. *7	50 max. *7	50 max.	50 max.	50 max. *6	25 max. *7	50 max. *7	50 max.	50 max.
	Backlash		±1°									
	Allowable work per braking	J	1,176	1,372	1,372	1,372	1,372	1,176	1,372	1,372	1,372	1,372
	Allowable total work	J	1.5×10^{6}	2.9×10^{6}	2.9×10^{6}	2.9×10^{6}	2.9×10^{6}	1.5×10^{6}	2.9×10^{6}	2.9×10^{6}	2.9×10^{6}	2.9×10^{6}
	Allowable angular acceleration	rad/s^2	10,000			5,000		10,000			5,000	
	Brake limit	–	10 million times min.									
	Rating	–	Continuous									
	Insulation class	–	Type F									

[1] These are the values when the motor is combined with a driver at normal temperature (20°C, 65%). The momentary maximum torque indicates the standard value.

[2] Applicable load inertia.
- The operable load inertia ratio (load inertia/rotor inertia) depends on the mechanical configuration and its rigidity. For a machine with high rigidity, operation is possible even with high load inertia. Select an appropriate motor and confirm that operation is possible.
- If the dynamic brake is activated frequently with high load inertia, the Dynamic Brake Resistor may burn. Do not repeatedly turn the servo ON/OFF while the dynamic brake is enabled.
- The dynamic brake is designed only for emergency stops. Design the system so that the Servomotor remains stopped for at least 3 minutes after applying the dynamic brake. Otherwise the dynamic brake circuits may fail.

[3] The allowable radial and thrust loads are the values determined for a limit of 20,000 hours at normal operating temperatures. The allowable radial loads are applied as shown in the following diagram.



[4] This is a non-excitation brake. (It is released when excitation voltage is applied.)

[5] The operation time is the value (reference value) measured with a surge suppressor (CR50500 by Okaya Electric Industries Co., Ltd.).

[6] Direct current switching with a varistor (Z15D151 by Ishizuka Electronics Co.).

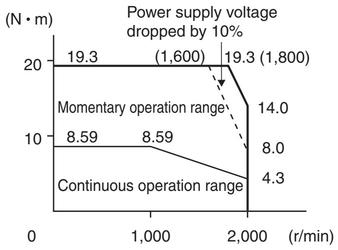
[7] Direct current switching with a varistor (TNR9G820K by Nippon Chemi-Con Corporation).

Torque and Rotation Speed Characteristics

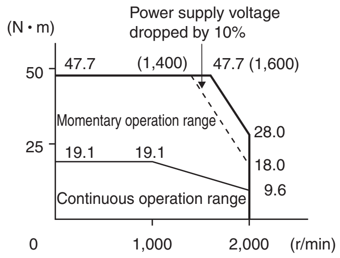
• 1,000 r/min Servomotors (200/400 VAC Input Power)

The following graphs show the characteristics with a 3 m standard cable and a 200 VAC input.

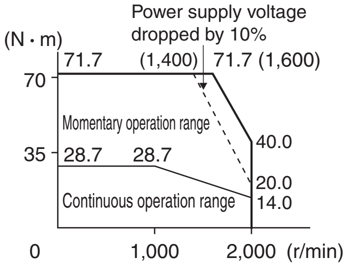
- R88M-K90010H/T/F/C (900W)



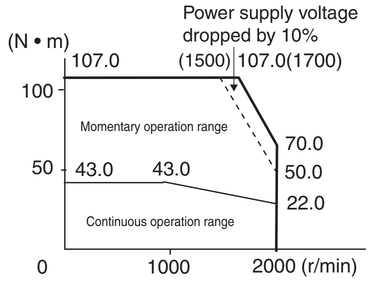
- R88M-K2K010H/T/F/C (2kW)



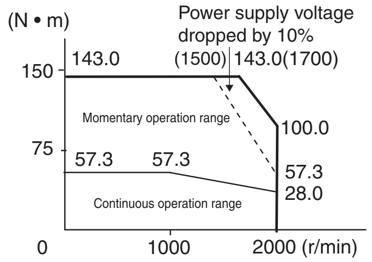
- R88M-K3K010H/T/F/C (3kW)



- R88M-K4K510T/C (4.5kW)



- R88M-K6K010T/C (6kW)



Note: 1. The continuous operation range is the range in which continuous operation is possible. Continuous operation at the maximum speed is also possible. However,doing so will reduce the output torque.

2. If the motor power cable exceeds 20 m, the voltage drop will increase and the momentary operation range will become narrower.

Encoder Specifications

Incremental Encoders

Item	Specifications
Encoder system	Optical encoder
	20 bits
No. of output pulses	Phases A and B: 262,144 pulses/rotation Phase Z: 1 pulse/rotation
Power supply voltage	5 VDC±5%
Power supply current	180 mA (max.)
Output signals	+S, –S
Output interface	RS-485 compliance

Absolute Encoders

Item	Specifications
Encoder system	Optical encoder
	17 bits
No. of output pulses	Phases A and B: 32,768 pulses/rotation Phase Z: 1 pulse/rotation
Maximum rotations	–32,768 to +32,767 rotations
Power supply voltage	5 VDC±5%
Power supply current	110 mA (max.)
Applicable battery voltage	3.6 VDC
Current consumption of battery	265 μA for a maximum of 5 s right after power interruption 100 μA for operation during power interruption 3.6 μA when power is supplied to Servo Drive
Output signals	+S, –S
Output interface	RS-485 compliance

Note: Multi-rotation Data Backup

- The multi-rotation data will be lost if the battery cable connector is disconnected at the motor when connecting the battery cable for the absolute encoder and battery.
- The multi-rotation data will be lost if CN2 is disconnected when connecting the battery to CN1.

Dimensions

<Cylinder type>

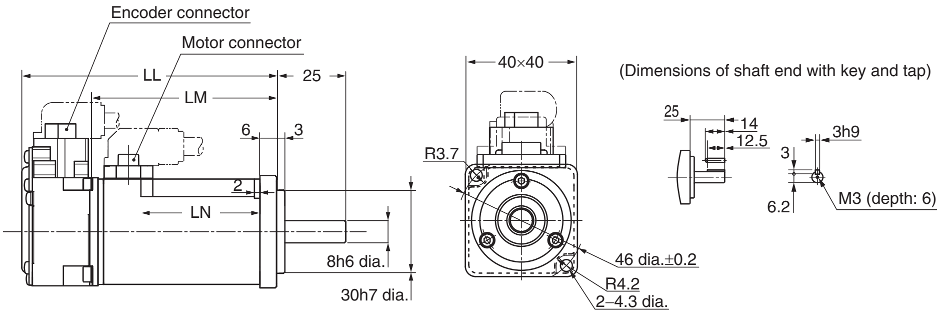
• 3,000 r/min Servomotors (100/200 VAC)

50W/100W

• Without brake

- R88M-K05030H (-S2)/-K10030□ (-S2) **INC**
- R88M-K05030T (-S2)/-K10030□ (-S2) **ABS**

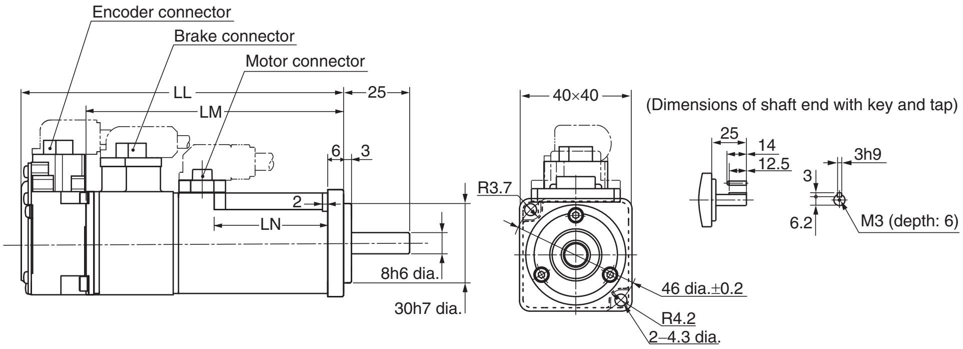
Model	Dimensions (mm)		
	LL	LM	LN
R88M-K05030□	72	48	23
R88M-K10030□	92	68	43


Encoder connector
Motor connector
LL
25
LM
6
3
2
LN
8h6 dia.
30h7 dia.
40×40
R3.7
46 dia.±0.2
R4.2
2–4.3 dia.
(Dimensions of shaft end with key and tap)
25
14
12.5
3h9
3
6.2
M3 (depth: 6)

• With brake

- R88M-K05030H-B (S2)/-K10030□-B (S2) **INC**
- R88M-K05030T-B (S2)/-K10030□-B (S2) **ABS**

Model	Dimensions (mm)		
	LL	LM	LN
R88M-K05030□-B□	102	78	23
R88M-K10030□-B□	122	98	43

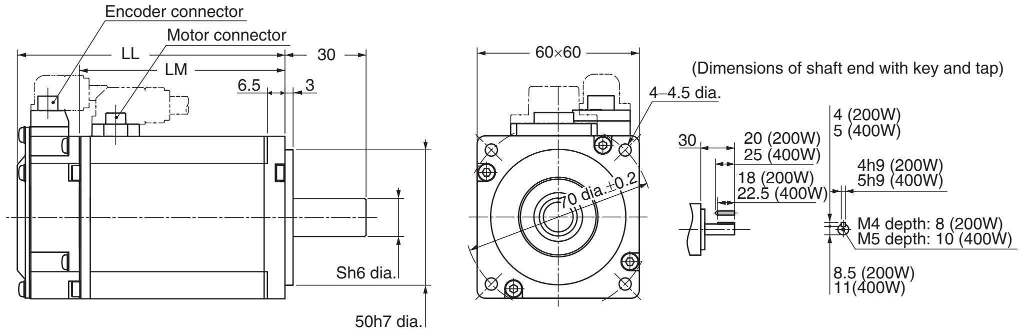

Encoder connector
Brake connector
Motor connector
LL
25
LM
6
3
2
LN
8h6 dia.
30h7 dia.
40×40
R3.7
46 dia.±0.2
R4.2
2–4.3 dia.
(Dimensions of shaft end with key and tap)
25
14
12.5
3h9
3
6.2
M3 (depth: 6)

200W/400W

• Without brake

- R88M-K20030□ (-S2)/-K40030□ (-S2) **INC**
- R88M-K20030□ (-S2)/-K40030□ (-S2) **ABS**

Model	Dimensions (mm)		
	LL	LM	LN
R88M-K20030□	79.5	56.5	11
R88M-K40030□	99	76	14

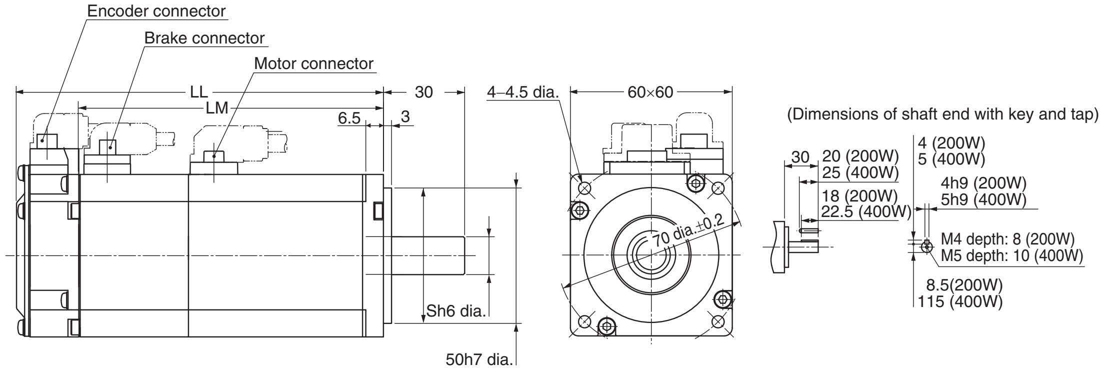

Encoder connector
Motor connector
LL
30
LM
6.5
3
Sh6 dia.
50h7 dia.
60×60
4–4.5 dia.
70 dia.±0.2
(Dimensions of shaft end with key and tap)
30
20 (200W)
25 (400W)
18 (200W)
22.5 (400W)
4 (200W)
5 (400W)
4h9 (200W)
5h9 (400W)
M4 depth: 8 (200W)
M5 depth: 10 (400W)
8.5 (200W)
11(400W)

Note: The standard models have a straight shaft. A model with a key and tap is indicated by adding “S2” to the end of the model number.
Models with an oil seal are indicated with O at the end of the model number. The motor dimensions do not change.

• With brake

- R88M-K20030□-B (S2)/-K40030□-B (S2) **INC**
- R88M-K20030□-B (S2)/-K40030□-B (S2) **ABS**

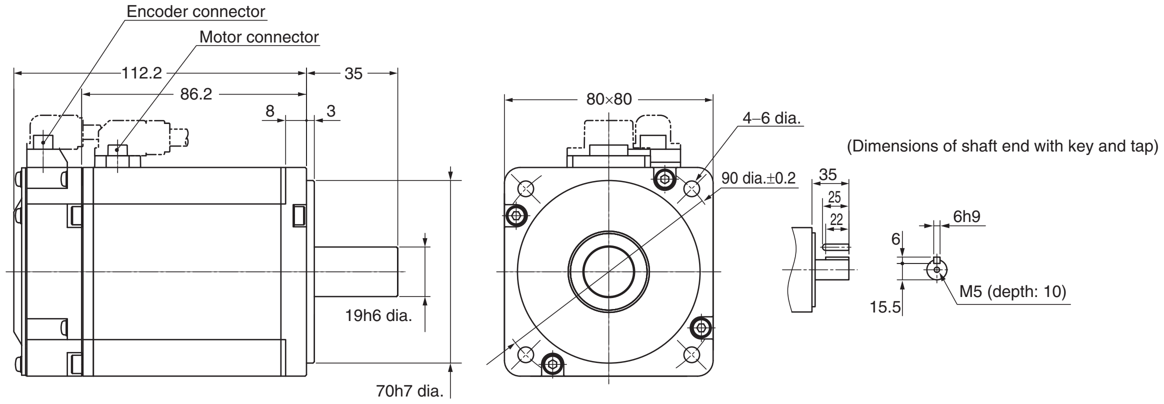
Model	Dimensions (mm)		
	LL	LM	S
R88M-K20030□-B□	116	93	11
R88M-K40030□-B□	135.5	112.5	14


Encoder connector
Brake connector
Motor connector
LL
LM
30
6.5
3
4–4.5 dia.
60×60
70 dia.±0.2
Sh6 dia.
50h7 dia.
(Dimensions of shaft end with key and tap)
30
20 (200W)
25 (400W)
18 (200W)
22.5 (400W)
4 (200W)
5 (400W)
4h9 (200W)
5h9 (400W)
M4 depth: 8 (200W)
M5 depth: 10 (400W)
8.5(200W)
115 (400W)

750W

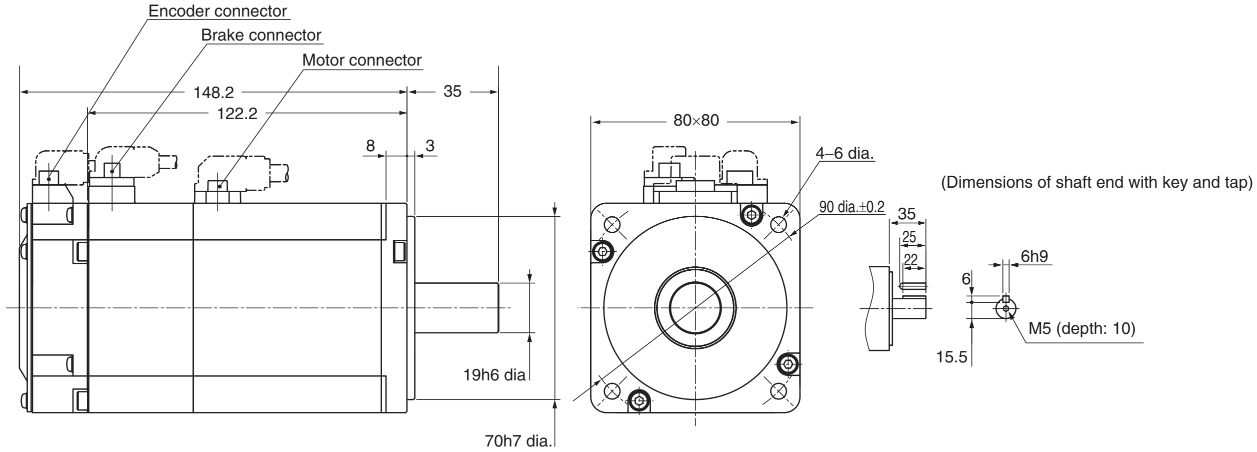
• Without brake

- R88M-K75030H (-S2) **INC**
- R88M-K75030T (-S2) **ABS**


Encoder connector
Motor connector
112.2
35
86.2
8
3
80×80
4–6 dia.
90 dia.±0.2
19h6 dia.
70h7 dia.
(Dimensions of shaft end with key and tap)
35
25
22
6h9
6
M5 (depth: 10)
15.5

With brake

- R88M-K75030H-B (S2) **INC**
- R88M-K75030T-B (S2) **ABS**


Encoder connector
Brake connector
Motor connector
148.2
35
122.2
8
3
80×80
4–6 dia.
90 dia.±0.2
19h6 dia
70h7 dia.
(Dimensions of shaft end with key and tap)
35
25
22
6h9
6
M5 (depth: 10)
15.5

Note: The standard models have a straight shaft. A model with a key and tap is indicated by adding “S2” to the end of the model number. Models with an oil seal are indicated with O at the end of the model number. The motor dimensions do not change.

1kW/1.5kW/2kW

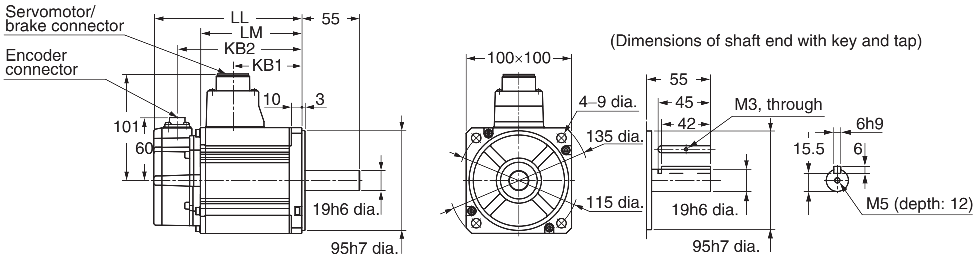
• Without brake

- R88M-K1K030H (-S2)/-K1K530H (-S2)/-K2K030H (-S2) **INC**
- R88M-K1K030T (-S2)/-K1K530T (-S2)/-K2K030T (-S2) **ABS**

• With brake

- R88M-K1K030H-B (S2)/-K1K530H-B (S2)/-K2K030H-B (S2) **INC**
- R88M-K1K030T-B (S2)/-K1K530T-B (S2)/-K2K030T-B (S2) **ABS**

Model	Dimensions (mm)			
	LL	LM	KB1	KB2
R88M-K1K030□	141	97	66	119
R88M-K1K530□	159.5	115.5	84.5	137.5
R88M-K2K030□	178.5	134.5	103.5	156.5
R88M-K1K030□-B□	168	124	66	146
R88M-K1K530□-B□	186.5	142.5	84.5	164.5
R88M-K2K030□-B□	205.5	161.5	103.5	183.5


Servomotor/ brake connector
Encoder connector
LL
LM
KB2
KB1
55
10
3
101
60
19h6 dia.
95h7 dia.
100×100
4–9 dia.
135 dia.
115 dia.
(Dimensions of shaft end with key and tap)
55
45
42
M3, through
6h9
15.5
6
19h6 dia.
95h7 dia.
M5 (depth: 12)

3kW

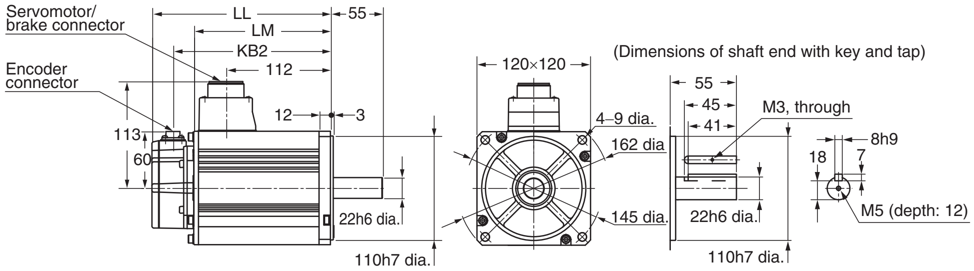
• Without brake

- R88M-K3K030H (-S2) **INC**
- R88M-K3K030T (-S2) **ABS**

• With brake

- R88M-K3K030H-B (S2) **INC**
- R88M-K3K030T-B (S2) **ABS**

Model	Dimensions (mm)		
	LL	LM	KB2
R88M-K3K030□	190	146	168
R88M-K3K030□-B□	215	171	193


Servomotor/ brake connector
Encoder connector
LL
LM
KB2
112
55
12
3
113
60
22h6 dia.
110h7 dia.
120×120
4–9 dia.
162 dia
145 dia.
(Dimensions of shaft end with key and tap)
55
45
41
M3, through
8h9
18
7
22h6 dia.
110h7 dia.
M5 (depth: 12)

Note: The standard models have a straight shaft. A model with a key and tap is indicated by adding “S2” to the end of the model number.
Models with an oil seal are indicated with O at the end of the model number. The motor dimensions do not change.

4kW/5kW

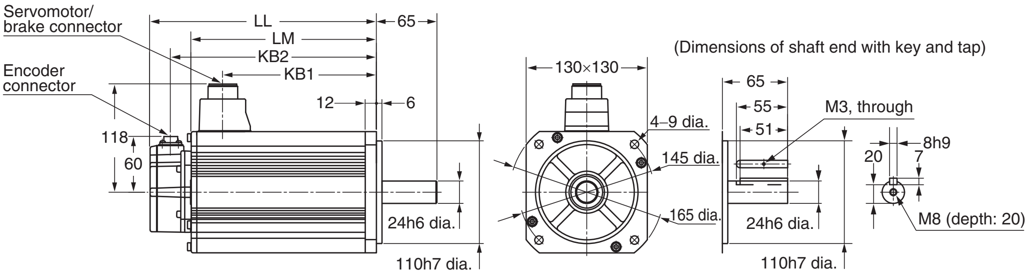
• Without brake

- R88M-K4K030H (-S2)/-K5K030H (-S2) **INC**
- R88M-K4K030T (-S2)/-K5K030T (-S2) **ABS**

• With brake

- R88M-K4K030H-B (S2)/-K5K030H-B (S2) **INC**
- R88M-K4K030T-B (S2)/-K5K030T-B (S2) **ABS**

Model	Dimensions (mm)			
	LL	LM	KB1	KB2
R88M-K4K030□	208	164	127	186
R88M-K5K030□	243	199	162	221
R88M-K4K030□-B□	236	192	127	214
R88M-K5K030□-B□	271	227	162	249


Servomotor/ brake connector
Encoder connector
LL
LM
KB2
KB1
65
12
6
118
60
24h6 dia.
110h7 dia.
130×130
4–9 dia.
145 dia.
165 dia.
(Dimensions of shaft end with key and tap)
65
55
51
M3, through
8h9
20
7
24h6 dia.
110h7 dia.
M8 (depth: 20)

Note: The standard models have a straight shaft. A model with a key and tap is indicated by adding “S2” to the end of the model number.
Models with an oil seal are indicated with O at the end of the model number. The motor dimensions do not change.

• 3,000 r/min Servomotors (400 VAC)

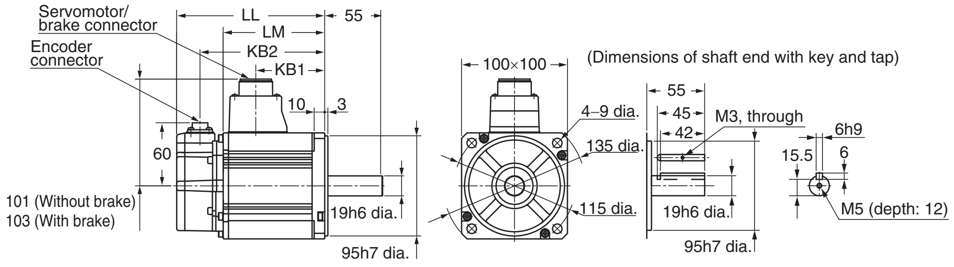
750W/1kW/1.5kW/2kW

• Without brake

- R88M-K75030F (-S2)/-K1K030F (-S2)/-K1K530F (-S2)/-K2K030F (-S2) **INC**
- R88M-K75030C (-S2)/-K1K030C (-S2)/-K1K530C (-S2)/-K2K030C (-S2) **ABS**

• With brake

- R88M-K75030F-B (S2)/-K1K030F-B (S2)/-K1K530F-B (S2)/-K2K030F-B (S2) **INC**
- R88M-K75030C-B (S2)/-K1K030C-B (S2)/-K1K530C-B (S2)/-K2K030C-B (S2) **ABS**


Servomotor/
brake connector
Encoder
connector
LL
55
LM
KB2
KB1
10
3
60
101 (Without brake)
103 (With brake)
19h6 dia.
95h7 dia.
100×100
(Dimensions of shaft end with key and tap)
4–9 dia.
135 dia.
115 dia.
55
45
42
M3, through
6h9
15.5
6
19h6 dia.
95h7 dia.
M5 (depth: 12)

Model	Dimensions (mm)			
	LL	LM	KB1	KB2
R88M-K75030□	131.5	87.5	56.5	109.5
R88M-K1K030□	141	97	66	119
R88M-K1K530□	159.5	115.5	84.5	137.5
R88M-K2K030□	178.5	134.5	103.5	156.5
R88M-K75030□-B□	158.5	114.5	53.5	136.5
R88M-K1K030□-B□	168	124	63	146
R88M-K1K530□-B□	186.5	142.5	81.5	164.5
R88M-K2K030□-B□	205.5	161.5	100.5	183.5

3kW

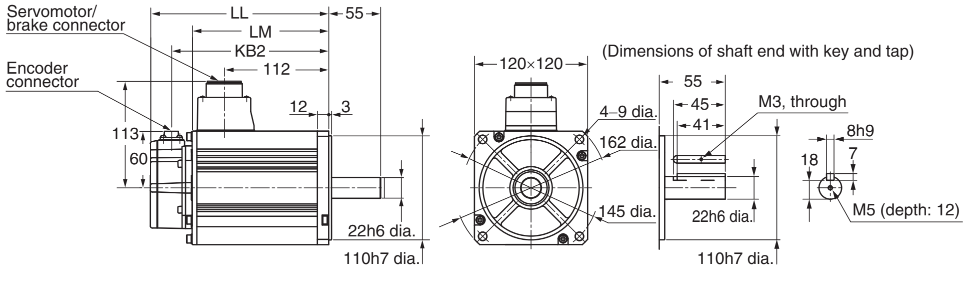
• Without brake

- R88M-K3K030F (-S2) **INC**
- R88M-K3K030C (-S2) **ABS**

• With brake

- R88M-K3K030F-B (S2) **INC**
- R88M-K3K030C-B (S2) **ABS**

Model	Dimensions (mm)		
	LL	LM	KB2
R88M-K3K030□	190	146	168
R88M-K3K030□-B□	215	171	193


Servomotor/
brake connector
Encoder
connector
LL
55
LM
KB2
112
12
3
113
60
22h6 dia.
110h7 dia.
120×120
(Dimensions of shaft end with key and tap)
4–9 dia.
162 dia.
145 dia.
55
45
41
M3, through
8h9
18
7
22h6 dia.
110h7 dia.
M5 (depth: 12)

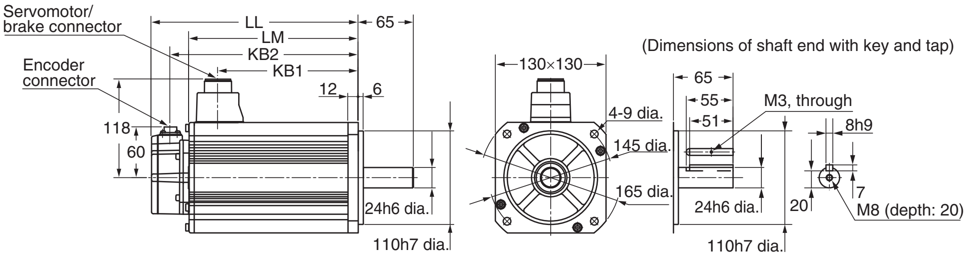
Note: The standard models have a straight shaft. A model with a key and tap is indicated by adding "S2" to the end of the model number.
Models with an oil seal are indicated with O at the end of the model number. The motor dimensions do not change.

4kW/5kW

- **Without brake**
  - R88M-K4K030F (-S2)/-K5K030F (-S2) **INC**
  - R88M-K4K030C (-S2)/-K5K030C (-S2) **ABS**

- **With brake**
  - R88M-K4K030F-B (S2)/-K5K030F-B (S2) **INC**
  - R88M-K4K030C-B (S2)/-K5K030C-B (S2) **ABS**

Model	Dimensions (mm)			
	LL	LM	KB1	KB2
R88M-K4K030□	208	164	127	186
R88M-K5K030□	243	199	162	221
R88M-K4K030□-B□	233	189	127	211
R88M-K5K030□-B□	268	224	162	246


Servomotor/
brake connector
Encoder
connector
LL
LM
KB2
KB1
65
12
6
118
60
24h6 dia.
110h7 dia.
130×130
4-9 dia.
145 dia.
165 dia.
(Dimensions of shaft end with key and tap)
65
55
51
M3, through
8h9
24h6 dia.
20
7
M8 (depth: 20)
110h7 dia.

Note: The standard models have a straight shaft. A model with a key and tap is indicated by adding “S2” to the end of the model number.
Models with an oil seal are indicated with O at the end of the model number. The motor dimensions do not change.

• 1,500r/min, 2,000 r/min Servomotors (200 VAC)

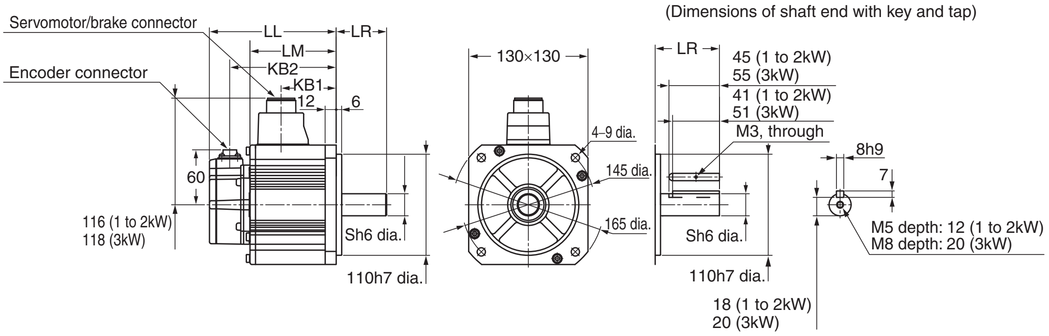
1kW/1.5kW/2kW/3kW

• Without brake

- R88M-K1K020H (-S2)/-K1K520H (-S2)/-K2K020H (-S2)/-K3K020H (-S2) **INC**
- R88M-K1K020T (-S2)/-K1K520T (-S2)/-K2K020T (-S2)/-K3K020T (-S2) **ABS**

• With brake

- R88M-K1K020H-B (S2)/-K1K520H-B (S2)/-K2K020H-B (S2)/-K3K020H-B (S2) **INC**
- R88M-K1K020T-B (S2)/-K1K520T-B (S2)/-K2K020T-B (S2)/-K3K020T-B (S2) **ABS**


(Dimensions of shaft end with key and tap)
Servomotor/brake connector
Encoder connector
LL
LR
LM
KB2
KB1
12
6
60
116 (1 to 2kW)
118 (3kW)
Sh6 dia.
110h7 dia.
130×130
4–9 dia.
145 dia.
165 dia.
LR
45 (1 to 2kW)
55 (3kW)
41 (1 to 2kW)
51 (3kW)
M3, through
8h9
7
Sh6 dia.
110h7 dia.
M5 depth: 12 (1 to 2kW)
M8 depth: 20 (3kW)
18 (1 to 2kW)
20 (3kW)

Model	Dimensions (mm)					
	LL	LR	LM	S	KB1	KB2
R88M-K1K020□	138	55	94	22	60	116
R88M-K1K520□	155.5	55	111.5	22	77.5	133.5
R88M-K2K020□	173	55	129	22	95	151
R88M-K3K020□	208	65	164	24	127	186
R88M-K1K020□-B□	166	55	122	22	60	144
R88M-K1K520□-B□	183.5	55	139.5	22	77.5	161.5
R88M-K2K020□-B□	201	55	157	22	95	179
R88M-K3K020□-B□	236	65	192	24	127	214

4kW/5kW

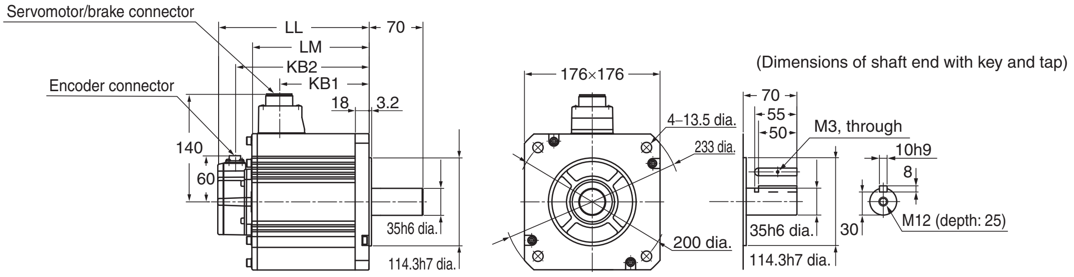
• Without brake

- R88M-K4K020H (-S2)/-K5K020H (-S2) **INC**
- R88M-K4K020T (-S2)/-K5K020T (-S2) **ABS**

• With brake

- R88M-K4K020H-B (S2)/-K5K020H-B (S2) **INC**
- R88M-K4K020T-B (S2)/-K5K020T-B (S2) **ABS**

Model	Dimensions (mm)			
	LL	LM	KB1	KB2
R88M-K4K020□	177	133	96	155
R88M-K5K020□	196	152	115	174
R88M-K4K020□-B□	202	158	96	180
R88M-K5K020□-B□	221	177	115	199


Servomotor/brake connector
Encoder connector
LL
70
LM
KB2
KB1
18
3.2
140
60
35h6 dia.
114.3h7 dia.
176×176
4–13.5 dia.
233 dia.
200 dia.
(Dimensions of shaft end with key and tap)
70
55
50
M3, through
10h9
8
35h6 dia.
30
114.3h7 dia.
M12 (depth: 25)

Note: The standard models have a straight shaft. A model with a key and tap is indicated by adding “S2” to the end of the model number. Models with an oil seal are indicated with O at the end of the model number. The motor dimensions do not change.

7.5kW

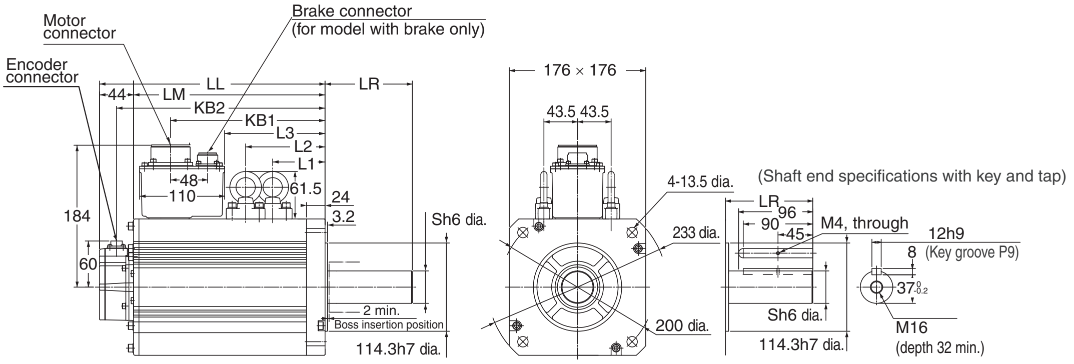
• Without brake

- R88M-K7K515T (-S2) **ABS**

• With brake

- R88M-K7K515T-B (S2) **ABS**

Model	Dimensions (mm)								
	LL	LR	LM	S	KB1	KB2	L1	L2	L3
R88M-K7K515T☐	312	113	268	42	219	290	117.5	117.5	149
R88M-K7K515T-B☐	337	113	293	42	253	315	117.5	152.5	183


Motor connector
Brake connector (for model with brake only)
Encoder connector
LL
LR
44
LM
KB2
KB1
L3
L2
L1
48
110
61.5
24
3.2
184
60
Sh6 dia.
2 min.
Boss insertion position
114.3h7 dia.
176 × 176
43.5 43.5
4-13.5 dia.
233 dia.
200 dia.
(Shaft end specifications with key and tap)
LR
96
90
45
M4, through
12h9
8 (Key groove P9)
37$^{0}_{-0.2}$
Sh6 dia.
114.3h7 dia.
M16
(depth 32 min.)

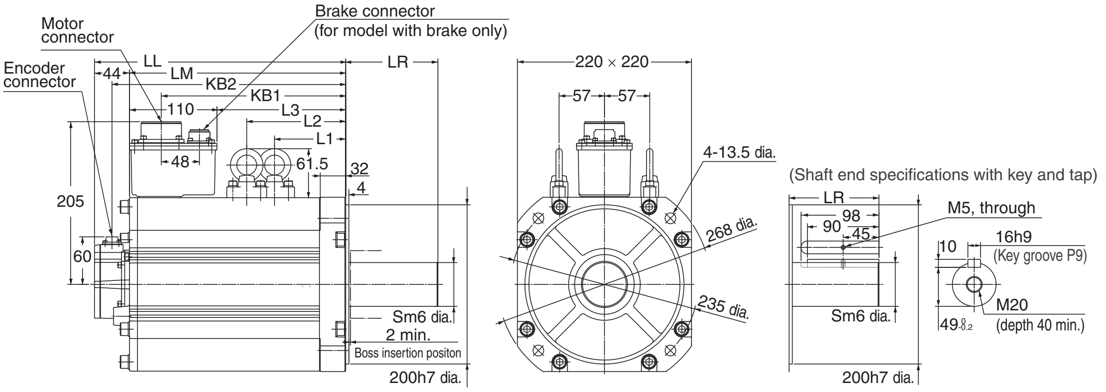
11kW/15kW

• Without brake

- R88M-K11K015T (-S2)/-K15K015T (-S2) **ABS**

• With brake

- R88M-K11K015T-B (S2)/R88M-K15K015T-B (S2) **ABS**


Motor connector
Brake connector (for model with brake only)
Encoder connector
44
LL
LM
KB2
KB1
LR
110
L3
L2
L1
48
61.5
32
4
205
60
Sm6 dia.
2 min.
Boss insertion positon
200h7 dia.
220 × 220
57
57
4-13.5 dia.
268 dia.
235 dia.
(Shaft end specifications with key and tap)
LR
98
90
45
M5, through
16h9
10
(Key groove P9)
Sm6 dia.
M20
49$^{0}_{-0.2}$
(depth 40 min.)
200h7 dia.

Model	Dimensions (mm)								
	LL	LR	LM	S	KB1	KB2	L1	L2	L3
R88M-K11K015T☐	316	116	272	55	232	294	124.5	124.5	162
R88M-K15K015T☐	384	116	340	55	300	362	158.5	158.5	230
R88M-K11K015T-B☐	364	116	320	55	266	342	124.5	159.5	196
R88M-K15K015T-B☐	432	116	388	55	334	410	158.5	193.5	264

Note: The standard models have a straight shaft. A model with a key and tap is indicated by adding “S2” to the end of the model number. Models with an oil seal are indicated with O at the end of the model number. The motor dimensions do not change.

• 1,500 r/min, 2,000 r/min Servomotors (400 VAC)

400W/600W

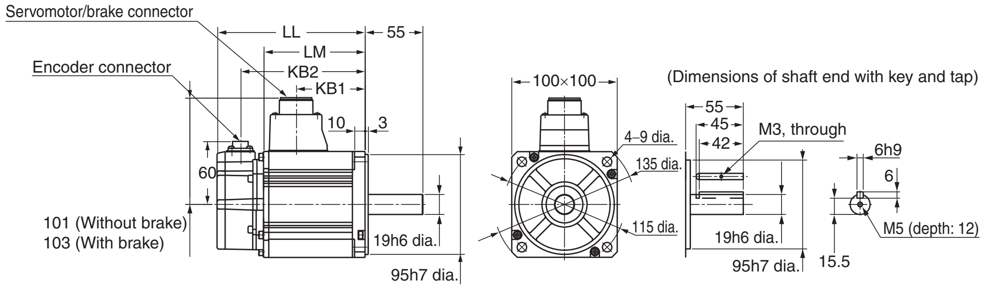
• Without brake

- R88M-K40020F (-S2)/-K60020F (-S2) **INC**
- R88M-K40020C (-S2)/-K60020C (-S2) **ABS**

• With brake

- R88M-K40020F-B (S2)/-K60020F-B (S2) **INC**
- R88M-K40020C-B (S2)/-K60020C-B (S2) **ABS**

Model	Dimensions (mm)			
	LL	LM	KB1	KB2
R88M-K40020☐	131.5	87.5	56.5	109.5
R88M-K60020☐	141	97	66	119
R88M-K40020☐-B☐	158.5	114.5	53.5	136.5
R88M-K60020☐-B☐	168	124	63	146


Servomotor/brake connector
Encoder connector
LL
55
LM
KB2
KB1
10
3
60
101 (Without brake)
103 (With brake)
19h6 dia.
95h7 dia.
100×100
4–9 dia.
135 dia.
115 dia.
(Dimensions of shaft end with key and tap)
55
45
42
M3, through
19h6 dia.
95h7 dia.
15.5
6h9
6
M5 (depth: 12)

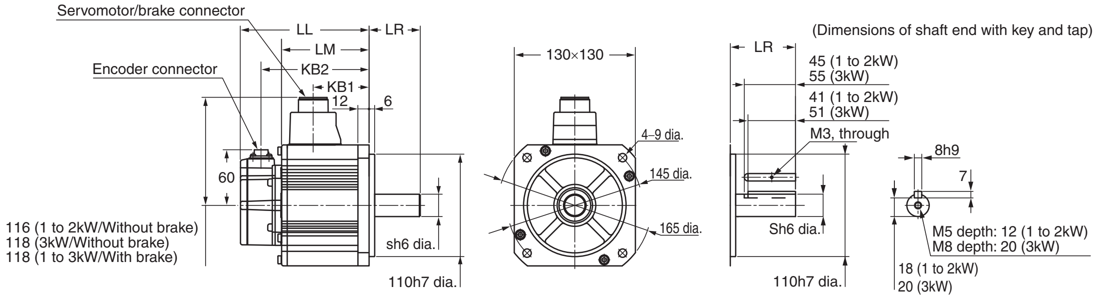
1kW/1.5kW/2kW/3kW

• Without brake

- R88M-K1K020F (-S2)/-K1K520F (-S2)/-K2K020F (-S2)/-K3K020F (-S2) **INC**
- R88M-K1K020C (-S2)/-K1K520C (-S2)/-K2K020C (-S2)/-K3K020C (-S2) **ABS**

• With brake

- R88M-K1K020F-B (S2)/-K1K520F-B (S2)/-K2K020F-B (S2)/-K3K020F-B (S2) **INC**
- R88M-K1K020C-B (S2)/-K1K520C-B (S2)/-K2K020C-B (S2)/-K3K020C-B (S2) **ABS**


Servomotor/brake connector
Encoder connector
LL
LR
LM
KB2
KB1
12
6
60
116 (1 to 2kW/Without brake)
118 (3kW/Without brake)
118 (1 to 3kW/With brake)
sh6 dia.
110h7 dia.
130×130
4–9 dia.
145 dia.
165 dia.
LR
(Dimensions of shaft end with key and tap)
45 (1 to 2kW)
55 (3kW)
41 (1 to 2kW)
51 (3kW)
M3, through
Sh6 dia.
110h7 dia.
8h9
7
M5 depth: 12 (1 to 2kW)
M8 depth: 20 (3kW)
18 (1 to 2kW)
20 (3kW)

Model	Dimensions (mm)					
	LL	LR	LM	S	KB1	KB2
R88M-K1K020☐	138	55	94	22	60	116
R88M-K1K520☐	155.5	55	111.5	22	77.5	133.5
R88M-K2K020☐	173	55	129	22	95	151
R88M-K3K020☐	208	65	164	24	127	186
R88M-K1K020☐-B☐	163	55	119	22	57	141
R88M-K1K520☐-B☐	180.5	55	136.5	22	74.5	158.5
R88M-K2K020☐-B☐	198	55	154	22	92	176
R88M-K3K020☐-B☐	233	65	189	24	127	211

Note: The standard models have a straight shaft. A model with a key and tap is indicated by adding “S2” to the end of the model number. Models with an oil seal are indicated with O at the end of the model number. The motor dimensions do not change.

4kW/5kW

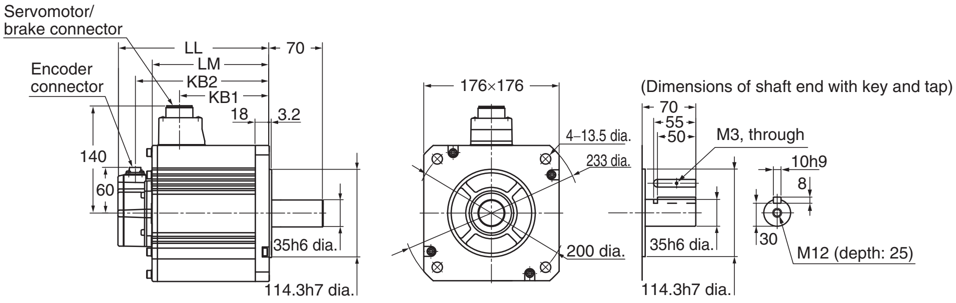
• Without brake

- R88M-K4K020F (-S2)/-K5K020F (-S2) **INC**
- R88M-K4K020C (-S2)/-K5K020C (-S2) **ABS**

• With brake

- R88M-K4K020F-B (S2)/-K5K020F-B (S2) **INC**
- R88M-K4K020C-B (S2)/-K5K020C-B (S2) **ABS**

Model	Dimensions (mm)			
	LL	LM	KB1	KB2
R88M-K4K020☐	177	133	96	155
R88M-K5K020☐	196	152	115	174
R88M-K4K020☐-B☐	202	158	96	180
R88M-K5K020☐-B☐	221	177	115	199


Servomotor/
brake connector
Encoder
connector
LL
70
LM
KB2
KB1
18
3.2
140
60
35h6 dia.
114.3h7 dia.
176×176
4–13.5 dia.
233 dia.
200 dia.
(Dimensions of shaft end with key and tap)
70
55
50
M3, through
10h9
8
30
M12 (depth: 25)
35h6 dia.
114.3h7 dia.

7.5kW

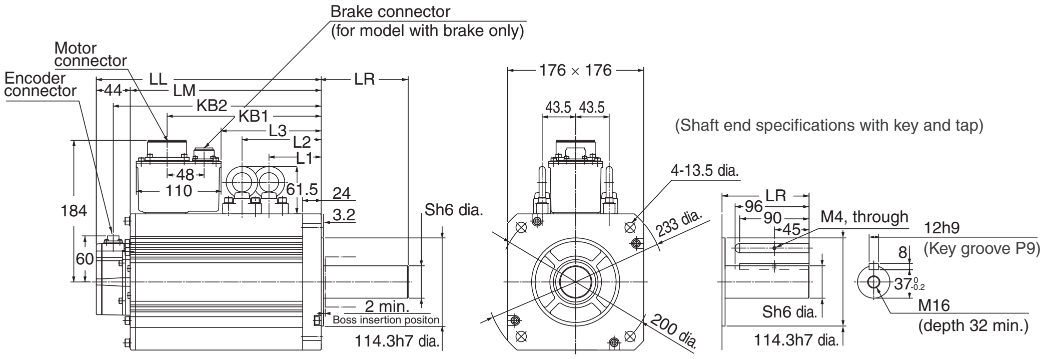
• Without brake

- R88M-K7K515C (-S2) **ABS**

• With brake

- R88M-K7K515C-B (S2) **ABS**

Model	Dimensions (mm)								
	LL	LR	LM	S	KB1	KB2	L1	L2	L3
R88M-K7K515C☐	312	133	268	42	219	290	117.5	117.5	149
R88M-K7K515C-B☐	337	113	293	42	253	315	117.5	152.5	183


Brake connector
(for model with brake only)
Motor
connector
Encoder
connector
44
LL
LM
LR
KB2
KB1
L3
L2
L1
48
110
61.5
24
3.2
184
60
Sh6 dia.
2 min.
Boss insertion positon
114.3h7 dia.
176 × 176
43.5
43.5
4-13.5 dia.
233 dia.
200 dia.
(Shaft end specifications with key and tap)
LR
96
90
45
M4, through
12h9
(Key groove P9)
8
$37^{0}_{-0.2}$
M16
(depth 32 min.)
Sh6 dia.
114.3h7 dia.

Note: The standard models have a straight shaft. A model with a key and tap is indicated by adding “S2” to the end of the model number. Models with an oil seal are indicated with O at the end of the model number. The motor dimensions do not change.

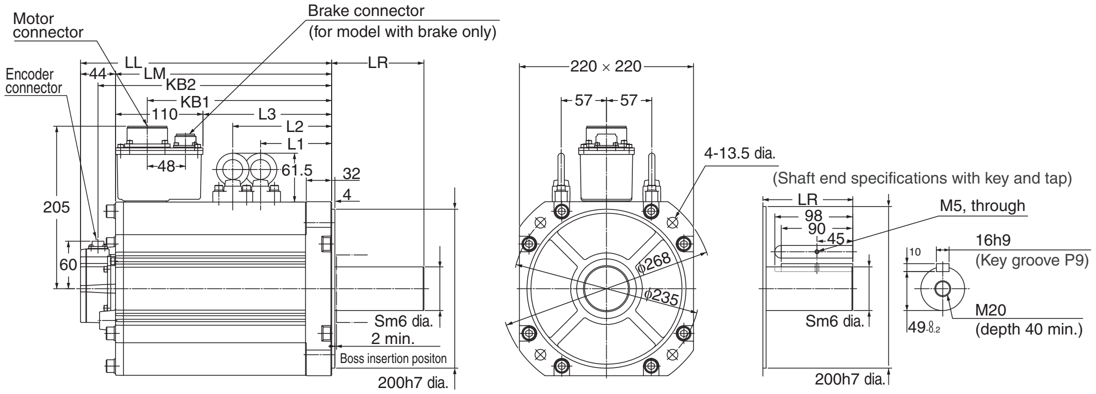
11kW/15kW

• Without brake

- R88M-K11K015C (-S2)/-K15K015C (-S2) **ABS**

• With brake

- R88M-K11K015C-B (S2)/R88M-K15K015C-B (S2) **ABS**


Motor connector
Brake connector (for model with brake only)
Encoder connector
LL
44
LM
KB2
KB1
110
L3
L2
L1
48
61.5
32
4
205
60
LR
Sm6 dia.
2 min.
Boss insertion positon
200h7 dia.
220 × 220
57
57
4-13.5 dia.
φ268
φ235
(Shaft end specifications with key and tap)
LR
98
90
45
M5, through
16h9
(Key groove P9)
10
M20
(depth 40 min.)
Sm6 dia.
49 0 -0.2
200h7 dia.

Model	Dimensions (mm)								
	LL	LR	LM	S	KB1	KB2	L1	L2	L3
R88M-K11K015C☐	316	116	272	55	232	294	124.5	124.5	162
R88M-K15K015C☐	384	116	340	55	300	362	158.5	158.5	230
R88M-K11K015C-B☐	364	116	320	55	266	342	124.5	159.5	196
R88M-K15K015C-B☐	432	116	388	55	334	410	158.5	193.5	264

Note: The standard models have a straight shaft. A model with a key and tap is indicated by adding “S2” to the end of the model number. Models with an oil seal are indicated with O at the end of the model number. The motor dimensions do not change.

• 1,000 r/min Servomotors (200 VAC)

900W

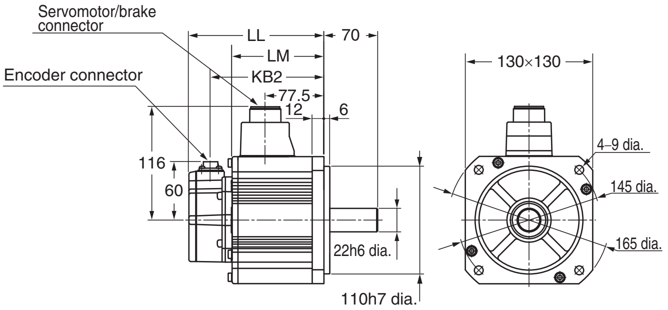
• Without brake

- R88M-K90010H (-S2) INC
- R88M-K90010T (-S2) ABS

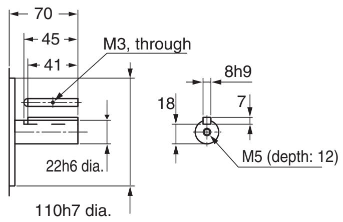
• With brake

- R88M-K90010H-B (S2) INC
- R88M-K90010T-B (S2) ABS

Model	Dimensions (mm)		
	LL	LM	KB2
R88M-K90010□	155.5	111.5	133.5
R88M-K90010□-B□	183.5	139.5	161.5


Servomotor/brake connector
Encoder connector
LL
LM
KB2
77.5
12
6
70
116
60
22h6 dia.
110h7 dia.
130×130
4–9 dia.
145 dia.
165 dia.

(Dimensions of shaft end with key and tap)


70
45
41
M3, through
8h9
18
7
M5 (depth: 12)
22h6 dia.
110h7 dia.

2kW/3kW

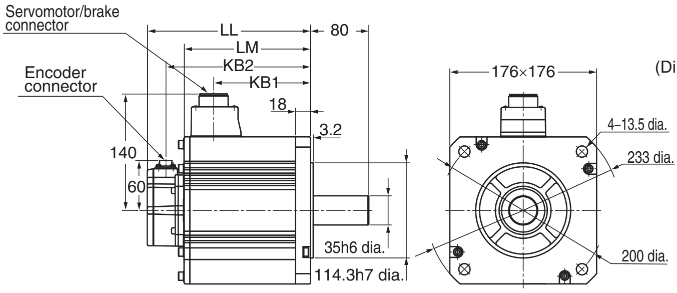
• Without brake

- R88M-K2K010H (-S2)/-K3K010H (-S2) INC
- R88M-K2K010T (-S2)/-K3K010T (-S2) ABS

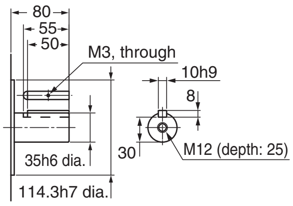
• With brake

- R88M-K2K010H-B (S2)/-K3K010H-B (S2) INC
- R88M-K2K010T-B (S2)/-K3K010T-B (S2) ABS

Model	Dimensions (mm)			
	LL	LM	KB1	KB2
R88M-K2K010□	163.5	119.5	82.5	141.5
R88M-K3K010□	209.5	165.5	128.5	187.5
R88M-K2K010□-B□	192.5	148.5	82.5	170.5
R88M-K3K010□-B□	238.5	194.5	128.5	216.5


Servomotor/brake connector
Encoder connector
LL
LM
KB2
KB1
18
3.2
80
140
60
35h6 dia.
114.3h7 dia.
176×176
4–13.5 dia.
233 dia.
200 dia.

(Dimensions of shaft end with key and tap)


80
55
50
M3, through
10h9
8
30
M12 (depth: 25)
35h6 dia.
114.3h7 dia.

4.5kW

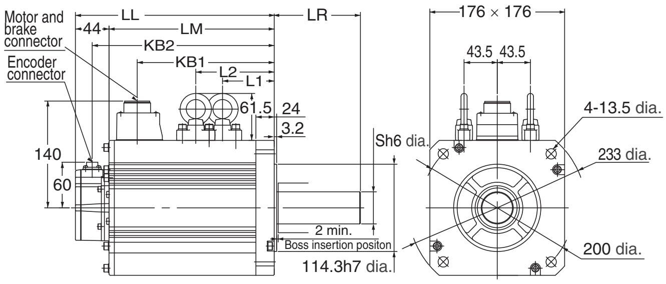
• Without brake

- R88M-K4K510T (-S2) ABS

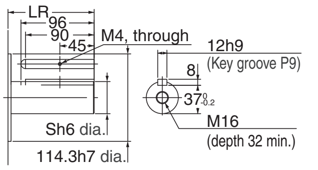
• With brake

- R88M-K4K510T-B (S2) ABS

Model	Dimensions (mm)							
	LL	LR	LM	S	KB1	KB2	L1	L2
R88M-K4K510T□	266	113	222	42	185	244	98	98
R88M-K4K510T-B□	291	113	247	42	185	269	98	133


Motor and brake connector
Encoder connector
LL
LR
44
LM
KB2
KB1
L2
L1
61.5
24
3.2
140
60
Sh6 dia.
2 min.
Boss insertion positon
114.3h7 dia.
176 × 176
43.5
43.5
4-13.5 dia.
233 dia.
200 dia.

(Shaft end specifications with key and tap)


LR
96
90
45
M4, through
12h9
(Key groove P9)
8
$37^{0}_{-0.2}$
M16
(depth 32 min.)
Sh6 dia.
114.3h7 dia.

Note: The standard models have a straight shaft. A model with a key and tap is indicated by adding “S2” to the end of the model number.
Models with an oil seal are indicated with O at the end of the model number. The motor dimensions do not change.

6kW

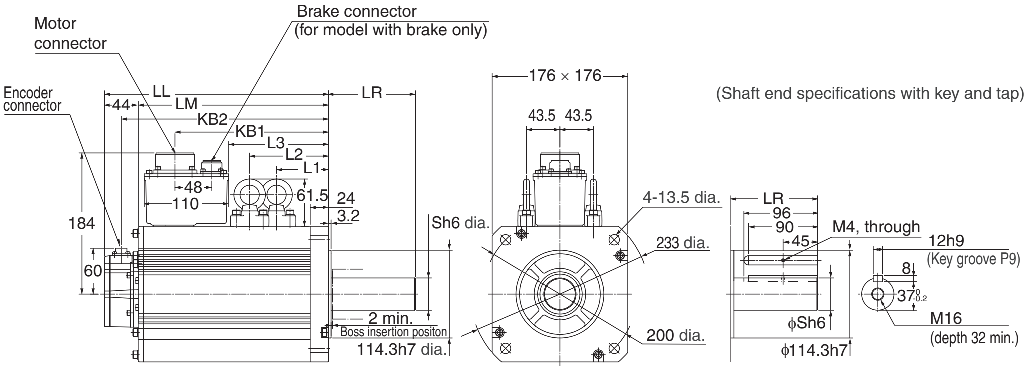
• Without brake

- R88M-K6K010T (-S2) **ABS**

• With brake

- R88M-K6K010T-B (S2) **ABS**

Model	Dimensions (mm)								
	LL	LR	LM	S	KB1	KB2	L1	L2	L3
R88M-K6K010T☐	312	113	268	42	219	290	117.5	117.5	149
R88M-K6K010T-B☐	337	113	293	42	253	315	117.5	152.5	183


Motor connector
Brake connector (for model with brake only)
Encoder connector
LL
LR
44
LM
KB2
KB1
L3
L2
L1
48
110
61.5
24
3.2
184
60
Sh6 dia.
2 min.
Boss insertion positon
114.3h7 dia.
176 × 176
43.5
43.5
4-13.5 dia.
233 dia.
200 dia.
(Shaft end specifications with key and tap)
LR
96
90
45
M4, through
12h9
(Key groove P9)
8
37 0 -0.2
M16
(depth 32 min.)
φSh6
φ114.3h7

Note: The standard models have a straight shaft. A model with a key and tap is indicated by adding “S2” to the end of the model number. Models with an oil seal are indicated with O at the end of the model number. The motor dimensions do not change.

• 1,000 r/min Servomotors (400 VAC)

900W

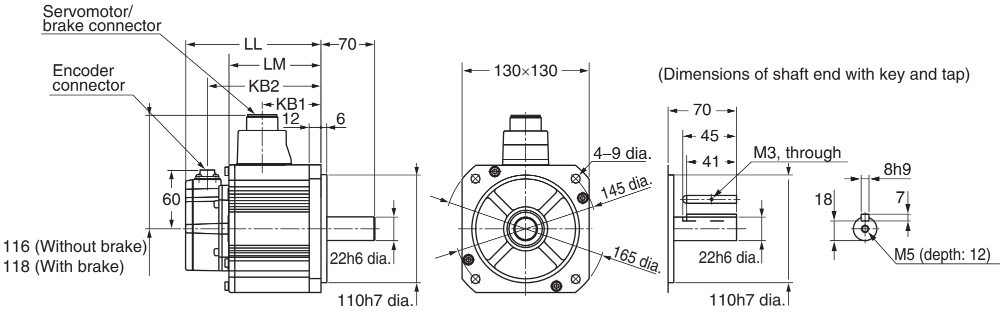
• Without brake

- R88M-K90010F (-S2) **INC**
- R88M-K90010C (-S2) **ABS**

• With brake

- R88M-K90010F-B (S2) **INC**
- R88M-K90010C-B (S2) **ABS**

Model	Dimensions (mm)			
	LL	LM	KB1	KB2
R88M-K90010□	155.5	111.5	77.5	133.5
R88M-K90010□-B□	180.5	136.5	74.5	158.5


Servomotor/ brake connector
Encoder connector
LL
70
LM
KB2
KB1
12
6
60
116 (Without brake)
118 (With brake)
22h6 dia.
110h7 dia.
130×130
4–9 dia.
145 dia.
165 dia.
(Dimensions of shaft end with key and tap)
70
45
41
M3, through
8h9
18
7
22h6 dia.
M5 (depth: 12)
110h7 dia.

2kW/3kW

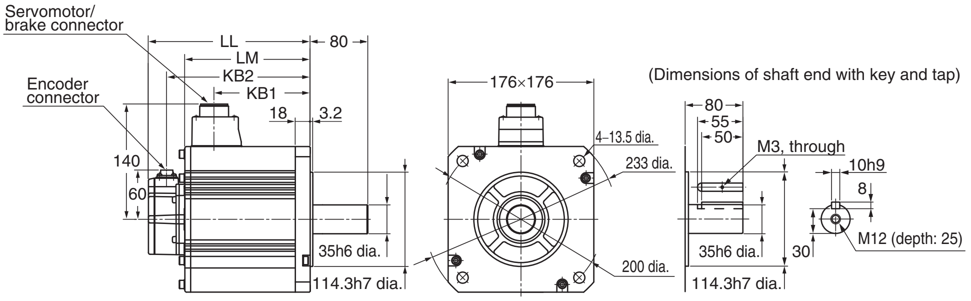
• Without brake

- R88M-K2K010F (-S2)/-K3K010F (-S2) **INC**
- R88M-K2K010C (-S2)/-K3K010C (-S2) **ABS**

• With brake

- R88M-K2K010F-B (S2)/-K3K010F-B (S2) **INC**
- R88M-K2K010C-B (S2)/-K3K010C-B (S2) **ABS**

Model	Dimensions (mm)			
	LL	LM	KB1	KB2
R88M-K2K010□	163.5	119.5	82.5	141.5
R88M-K3K010□	209.5	165.5	128.5	187.5
R88M-K2K010□-B□	188.5	144.5	82.5	166.5
R88M-K3K010□-B□	234.5	190.5	128.5	212.5


Servomotor/ brake connector
Encoder connector
LL
80
LM
KB2
KB1
18
3.2
140
60
35h6 dia.
114.3h7 dia.
176×176
4–13.5 dia.
233 dia.
200 dia.
(Dimensions of shaft end with key and tap)
80
55
50
M3, through
10h9
8
35h6 dia.
30
M12 (depth: 25)
114.3h7 dia.

4.5kW

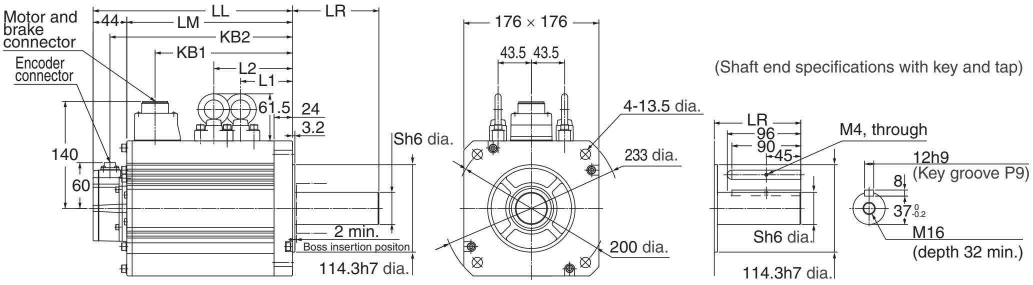
• Without brake

- R88M-K4K510C (-S2) **ABS**

• With brake

- R88M-K4K510C-B (S2) **ABS**

Model	Dimensions (mm)							
	LL	LR	LM	S	KB1	KB2	L1	L2
R88M-K4K510T□	266	113	222	42	185	244	98	98
R88M-K4K510T-B□	291	113	247	42	185	269	98	133


Motor and brake connector
Encoder connector
44
LL
LR
LM
KB2
KB1
L2
L1
61.5
24
3.2
140
60
Sh6 dia.
2 min.
Boss insertion positon
114.3h7 dia.
176 × 176
43.5
43.5
4-13.5 dia.
233 dia.
200 dia.
(Shaft end specifications with key and tap)
LR
96
90
45
M4, through
12h9
(Key groove P9)
8
37 0 -0.2
M16
(depth 32 min.)
Sh6 dia.
114.3h7 dia.

Note: The standard models have a straight shaft. A model with a key and tap is indicated by adding “S2” to the end of the model number. Models with an oil seal are indicated with O at the end of the model number. The motor dimensions do not change.

6kW

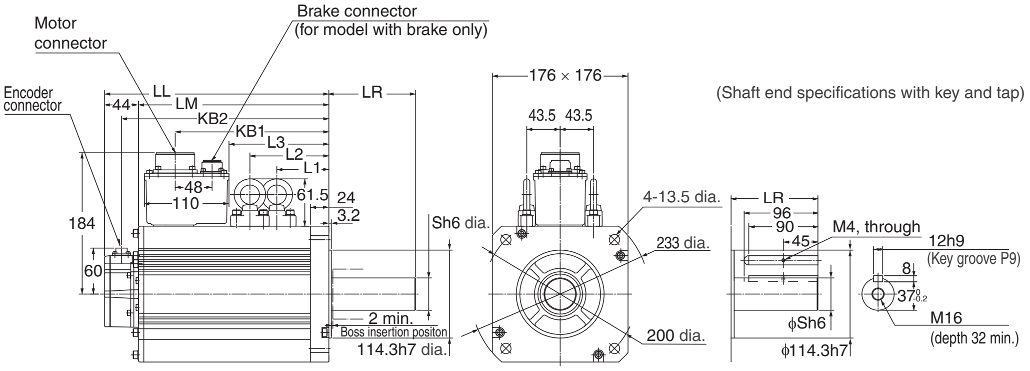
• Without brake

- R88M-K6K010C (-S2) **ABS**

• With brake

- R88M-K6K010C-B (S2) **ABS**

Model	Dimensions (mm)								
	LL	LR	LM	S	KB1	KB2	L1	L2	L3
R88M-K6K010C□	312	113	268	42	219	290	117.5	117.5	149
R88M-K6K010C-B□	337	113	293	42	253	315	117.5	152.5	183


Motor connector
Brake connector (for model with brake only)
Encoder connector
LL
LR
44
LM
KB2
KB1
L3
L2
L1
48
110
61.5
24
3.2
184
60
Sh6 dia.
2 min.
Boss insertion positon
114.3h7 dia.
176 × 176
43.5
43.5
4-13.5 dia.
233 dia.
200 dia.
(Shaft end specifications with key and tap)
LR
96
90
45
M4, through
12h9
(Key groove P9)
8
$37^{0}_{-0.2}$
M16
(depth 32 min.)
ϕSh6
ϕ114.3h7

Note: The standard models have a straight shaft. A model with a key and tap is indicated by adding “S2” to the end of the model number. Models with an oil seal are indicated with O at the end of the model number. The motor dimensions do not change.

G5-series Linear Motor

R88L-EC-□

Linear Motor for Higher-speed and Higher-precision

- Lineup of compact and high-thrust iron-core motor type and cogging-free ironless motor type with excellent speed stability.
- Same Iron-core motor type for 200V AC and 400V AC.

General Specifications

● Iron-core Linear Motors

<table>
<tr><th colspan="3">Item</th><th>Description</th></tr>
<tr><td colspan="3">Operating ambient temperature humidity</td><td>0 to 40°C, 20% to 80%
(with no condensation)</td></tr>
<tr><td colspan="3">Storage ambient temperature and humidity</td><td>–20 to +65°C, 85% max.
(with no condensation)</td></tr>
<tr><td colspan="3">Operating and storage atmosphere</td><td>No corrosive gases</td></tr>
<tr><td colspan="3">Vibration resistance*</td><td>Acceleration of 49 m/s^2 max. in X, Y, and Z directions</td></tr>
<tr><td colspan="3">Impact resistance</td><td>Acceleration of 98 m/s^{2}max. 3 times each in X, Y, and Z directions</td></tr>
<tr><td colspan="3">Insulation resistance</td><td>Between power terminal and FG terminal: 10 MΩ min. (at 500 VDC)</td></tr>
<tr><td colspan="3">Dielectric strength</td><td>Between power terminal and FG terminal: 2,750 VDC for 1 s
Between power terminal and sensor: 2,750 VDC for 1 s</td></tr>
<tr><td colspan="3">Protective structure</td><td>IP00</td></tr>
<tr><td colspan="3">Maximum coil temperature (Motor Coil Unit)</td><td>130°C</td></tr>
<tr><td colspan="3">Maximum magnet temperature (Magnet Track)</td><td>70°C</td></tr>
<tr><td colspan="3">Insulation class</td><td>Class B</td></tr>
<tr><td colspan="3">Cooling method</td><td>Self-cooling</td></tr>
<tr><td>International standard</td><td>EC directive</td><td>Low voltage directive</td><td>EN60034-1</td></tr>
</table>

● Ironless Linear Motors

<table>
<tr><th colspan="3">Item</th><th>Description</th></tr>
<tr><td colspan="3">Operating ambient temperature humidity</td><td>0 to 40°C, 20% to 80%
(with no condensation)</td></tr>
<tr><td colspan="3">Storage ambient temperature and humidity</td><td>–20 to +65°C, 85% max.
(with no condensation)</td></tr>
<tr><td colspan="3">Operating and storage atmosphere</td><td>No corrosive gases</td></tr>
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<tr><td colspan="3">Impact resistance</td><td>Acceleration of 98 m/s^2 max. 3 times each in X, Y, and Z directions</td></tr>
<tr><td colspan="3">Insulation resistance</td><td>Between power terminal and FG terminal: 10 MΩ min. (at 500 VDC)</td></tr>
<tr><td colspan="3">Dielectric strength</td><td>Between power terminal and FG terminal: 2,250 VDC for 1 s
Between power terminal and sensor: 2,250 VDC for 1 s</td></tr>
<tr><td colspan="3">Protective structure</td><td>IP00</td></tr>
<tr><td colspan="3">Maximum coil temperature (Motor Coil Unit)</td><td>110°C</td></tr>
<tr><td colspan="3">Maximum magnet temperature (Magnet Track)</td><td>70°C</td></tr>
<tr><td colspan="3">Insulation class</td><td>Class B</td></tr>
<tr><td colspan="3">Cooling method</td><td>Self-cooling</td></tr>
<tr><td>International standard</td><td>EC directive</td><td>Low voltage directive</td><td>EN60034-1</td></tr>
</table>

* The amplitude may be increased by machine resonance. As a guideline, do not exceed 80% of the specified value.

Characteristics/Speed - Force Characteristics

●Iron-core Linear Motors

Item	Unit	R88L-EC-						
		FW-0303-ANPC	FW-0306-ANPC	FW-0606-ANPC	FW-0609-ANPC	FW-0612-ANPC	FW-1112-ANPC	FW-1115-ANPC
Maximum speed (100VAC)	**m/s**	2.5	2.5	2	-	-	-	-
Maximum speed (200VAC)	**m/s**	5	5	4	4	4	2	2
Maximum speed (400VAC)	**m/s**	10	10	8	8	8	4	4
Continuous force[*1]	**N**	48	96	160	240	320	608	760
Momentary maximum force[*2]	**N**	105	210	400	600	800	1,600	2,000
Continuous current[*2]	**Arms**	1.24	2.4	3.4	5.2	6.9	6.5	8.2
Momentary maximum current[*1]	**Arms**	3.1	6.1	10	15	20	20	25
Motor force constant	**N/Arms**	39.7	39.7	46.5	46.5	46.5	93.0	93.0
Back electromotive force	**V·s/m**	13.2	13.2	15.5	15.5	15.5	31	31
Motor constant	**N/√W**	9.75	13.78	19.49	23.87	27.57	41.47	46.37
Phase resistance	Ω	5.34	2.68	1.83	1.23	0.92	1.6	1.29
Phase inductance	**mH**	34.7	17.4	13.7	9.2	6.9	12.8	10.3
Electrical time constant	**ms**	6.5	6.5	7.5	7.5	7.5	8	8
Maximum continuous power consumption	**W**	32	63	88	131	175	279	349
Thermal resistance	**K/W**	2.20	1.10	0.78	0.52	0.39	0.23	0.18
Thermal time constant	**s**	110	110	124	124	124	126	126
Magnetic attractive force	**N**	300	500	1,020	1,420	1,820	3,640	4,440
Magnetic pole pitch	**mm**	24	24	24	24	24	24	24
Mass (except cables)	**kg**	0.48	0.78	1.31	1.84	2.37	4.45	5.45
Cooling plate dimensions	**mm**	238×220×10	238×220×10	250×287×12	250×287×12	250×287×12	371×330×14	371×330×14
Application Servo Drives (R88D-☐-ECT-L)		KN01L/KN02H/KN06F	KN02L/KN04H/KN10F	KN04L/KN08H/KN15F	KN10H/KN20F	KN15H/KN30F	KN15H/KN30F	KN15H/KN30F
Magnet Trac (R88L-EC-)		FM-03096-A/FM-03144-A/FM-03384-A		FM-06192-A/FM-06288-A			FM-11192-A/FM-11288-A	
Magnet Trac Unit Length	**mm**	96/144/384		192/288			192/288	

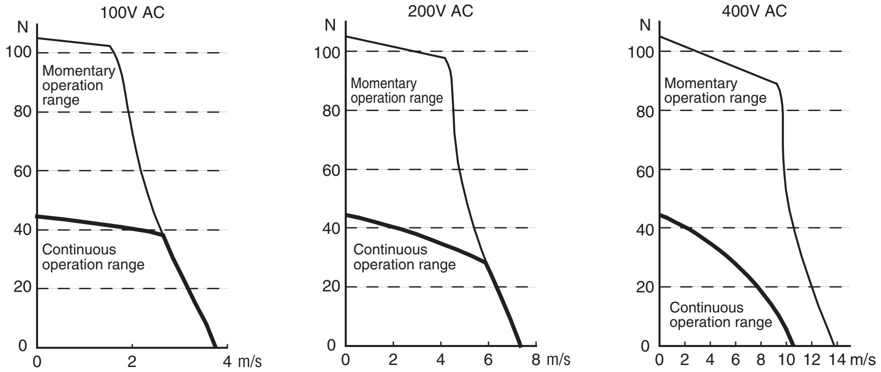
*1. This shows a value measured when the Motor Coil Unit is at 100°C and the Magnet Trac is at 25°C. The coil unit is mounted in the center of an aluminum moving table (heat sink) which has its size larger than indicated in table as cooling condition.

*2. The Motor Coil Unit is subjected to a temperature rise of 6 K/s.

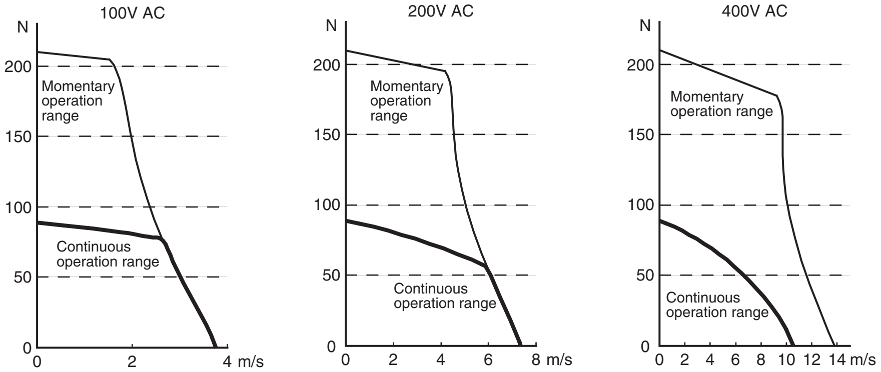
Speed - Force Characteristics

The following graphs show the performance when the coil temperature of the Motor Coil Unit is 100°C.
The maximum operation speed is limited by considering the guide mechanism, encoder, and other aspects. If it is 5 m/s or higher, please consult with your OMRON representative.

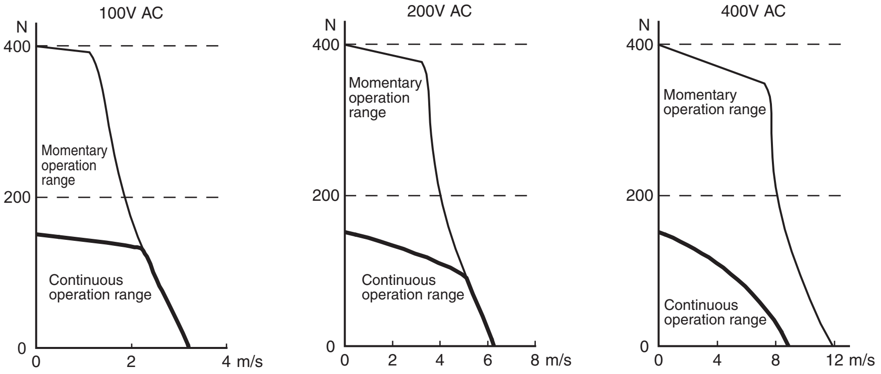
R88L-EC-FW-0303



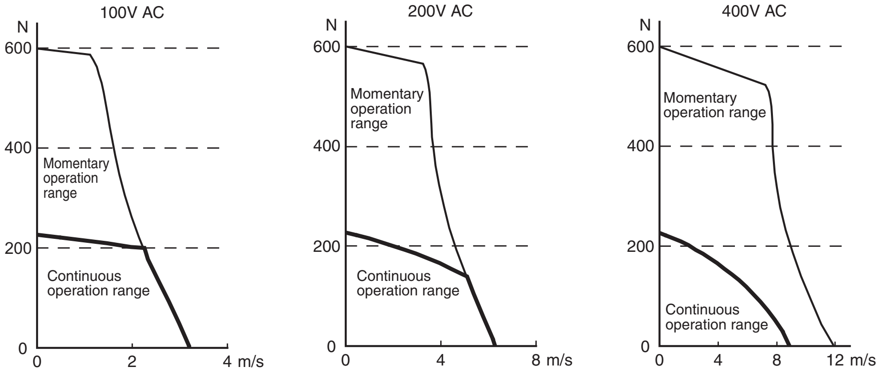
R88L-EC-FW-0306



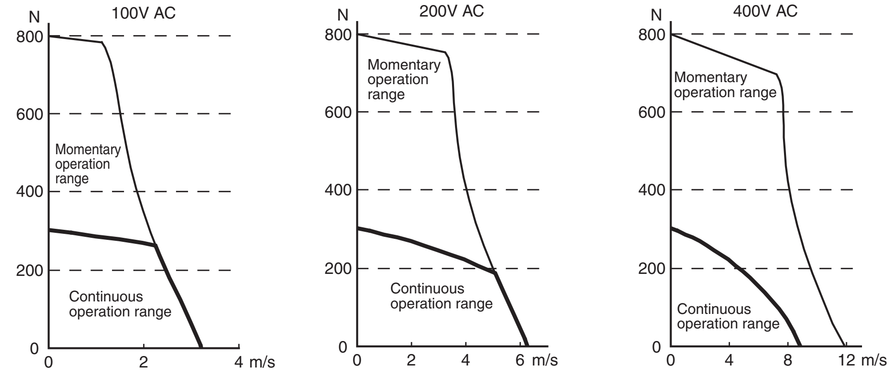
R88L-EC-FW-0606



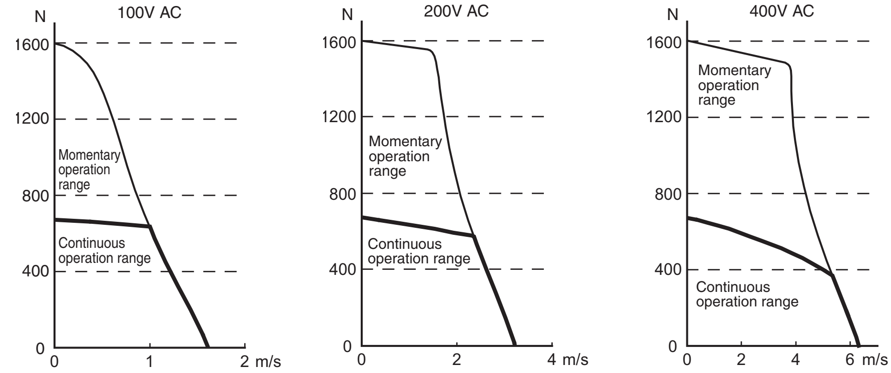
R88L-EC-FW-0609



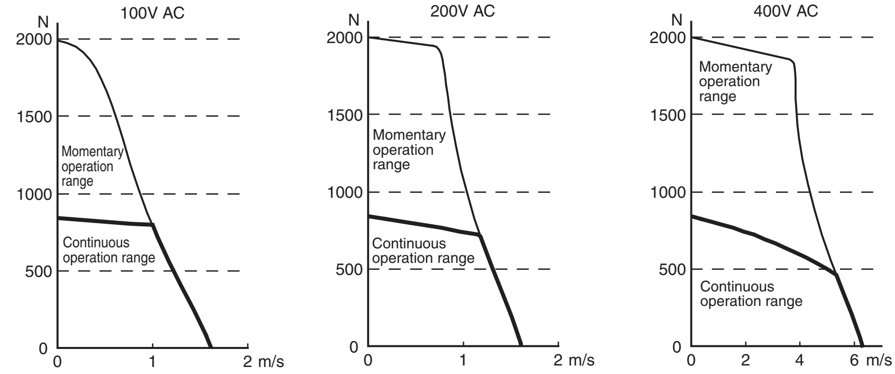
R88L-EC-FW-0612



R88L-EC-FW-1112



R88L-EC-FW-1115



●Ironless Linear Motors

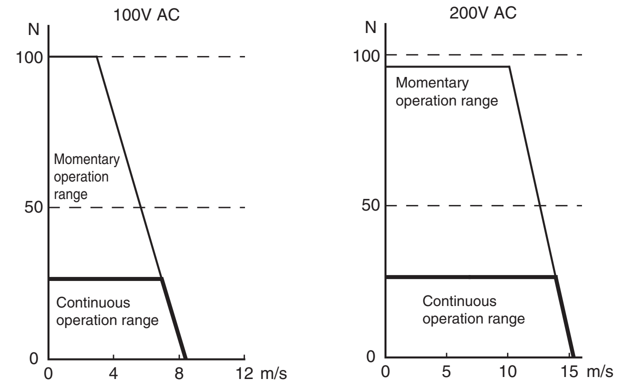
Item	Unit	R88L-EC-									
		GW-0303-ANPS		GW-0306-ANPS	GW-0309-ANPS	GW-0503-ANPS	GW-0506-ANPS	GW-0509-ANPS	GW-0703-ANPS	GW-0706-ANPS	GW-0709-ANPS
Maximum speed (100VAC)	**m/s**	8	-	8	-	2.2	2.2	2.2	1.2	1.2	-
Maximum speed (200VAC)	**m/s**	-	16	16	16	4.4	4.4	4.4	2.4	2.4	2.4
Continuous force*1	**N**	26.5		53	80	58	117	175	117	232	348
Momentary maximum force*2	**N**	100	96	200	300	240	480	720	552	1110	1730
Continuous current*2	**Arms**	1.33		2.66	4.0	0.87	1.76	2.60	0.94	1.87	2.81
Momentary maximum current*1	**Arms**	5.0	4.8	10.0	15.0	3.50	7.1	10.6	4.5	9.0	14
Motor force constant	**N/Arms**	19.9		19.9	19.9	68.0	68.0	68.0	124.0	124.0	124.0
Back electromotive force	**V·s/m**	6.6		6.6	6.6	22.7	22.7	22.7	41.3	41.3	41.3
Motor constant	**N/√W**	4.90		6.93	8.43	9.85	13.96	17.03	17.97	25.44	31.14
Phase resistance	**Ω**	5.5		2.8	1.8	15.9	8.0	5.3	15.8	7.9	5.3
Phase inductance	**mH**	1.8		0.9	0.6	13	6.5	4.2	28.0	14.0	9.0
Electrical time constant	**ms**	0.35		0.35	0.35	0.8	0.8	0.8	1.8	1.8	1.8
Maximum continuous power consumption	**W**	47		95	142	67	134	200	82	165	247
Thermal resistance	**K/W**	2.1		1.06	0.71	1.70	0.85	0.65	1.56	1.04	0.52
Thermal time constant	**s**	36		36	36	72	72	72	96	96	96
Magnetic attractive force	**N**	0		0	0	0	0	0	0	0	0
Magnetic pole pitch	**mm**	30		30	30	42	42	42	57	57	57
Mass (except cables)	**kg**	0.084		0.162	0.24	0.25	0.47	0.69	0.55	0.95	1.35
Application Servo Drives (R88D-☐-ECT-L)		KN01L	KN02H	KN04L/ KN08H	KN10H	KN01L/ KN01H	KN02L/ KN04H	KN04L/ KN08H	KN02L/ KN04H	KN04L/ KN08H	KN10H
Magnet Trac (R88L-EC-)		GM-03090-A/GM-03120-A/GM-03390-A				GM-05126-A/GM-05168-A/GM-05210-A/GM-05546-A			GM-07114-A/GM-07171-A/GM-07456-A		
Magnet Trac Unit Length	**mm**	90/120/390				126/168/210/546			114/171/456		

✻1. This shows a value measured when the Motor Coil Unit is at 100°C and the Magnet Trac is at 25°C.
✻2. The Motor Coil Unit is subjected to a temperature rise of 40 K/s.

Speed - Force Characteristics

The maximum operation speed is limited by considering the guide mechanism, encoder, and other aspects. If it is 5 m/s or higher, please consult with your OMRON representative.

R88L-EC-GW-0303



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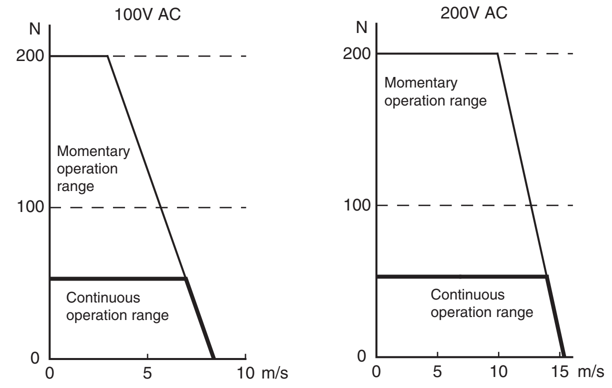
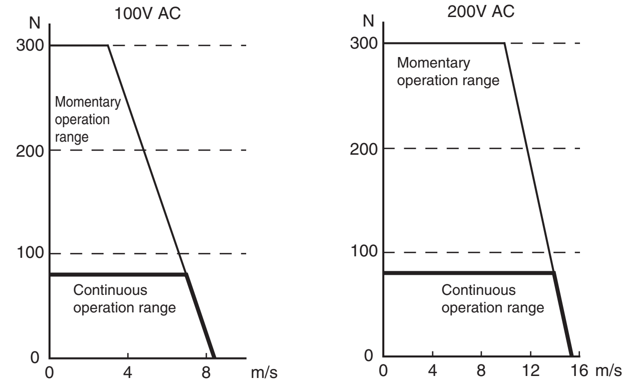
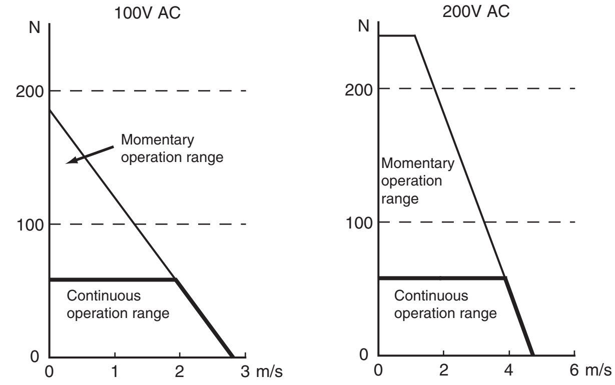


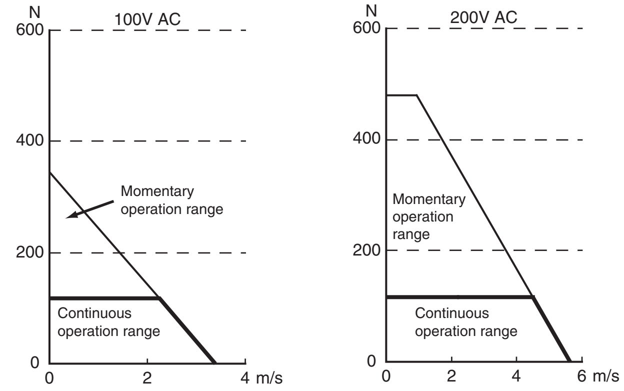
R88L-EC-GW-0309



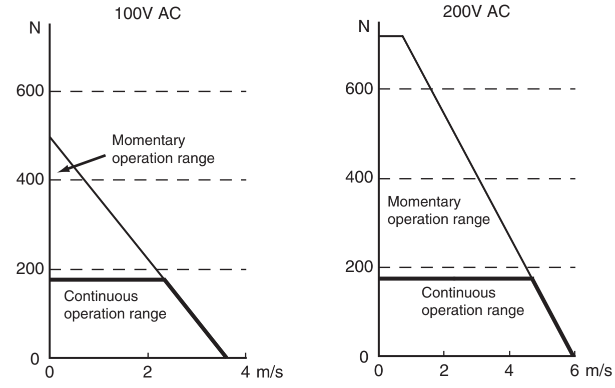
R88L-EC-GW-0503



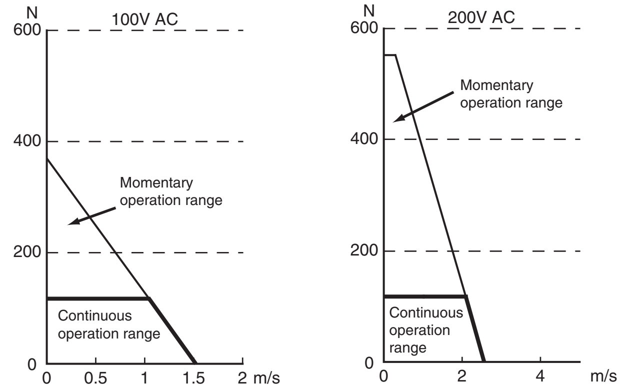
R88L-EC-GW-0506



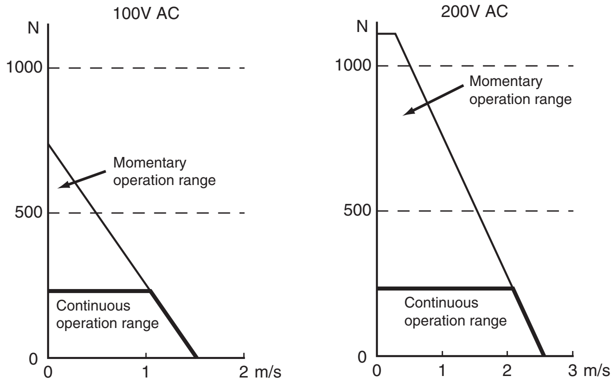
R88L-EC-GW-0509



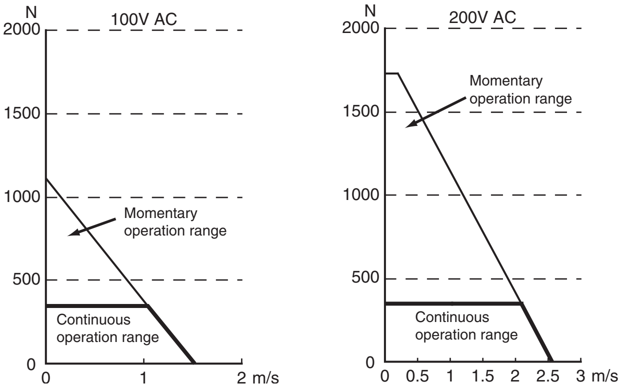
R88L-EC-GW-0703



R88L-EC-GW-0706



R88L-EC-GW-0709

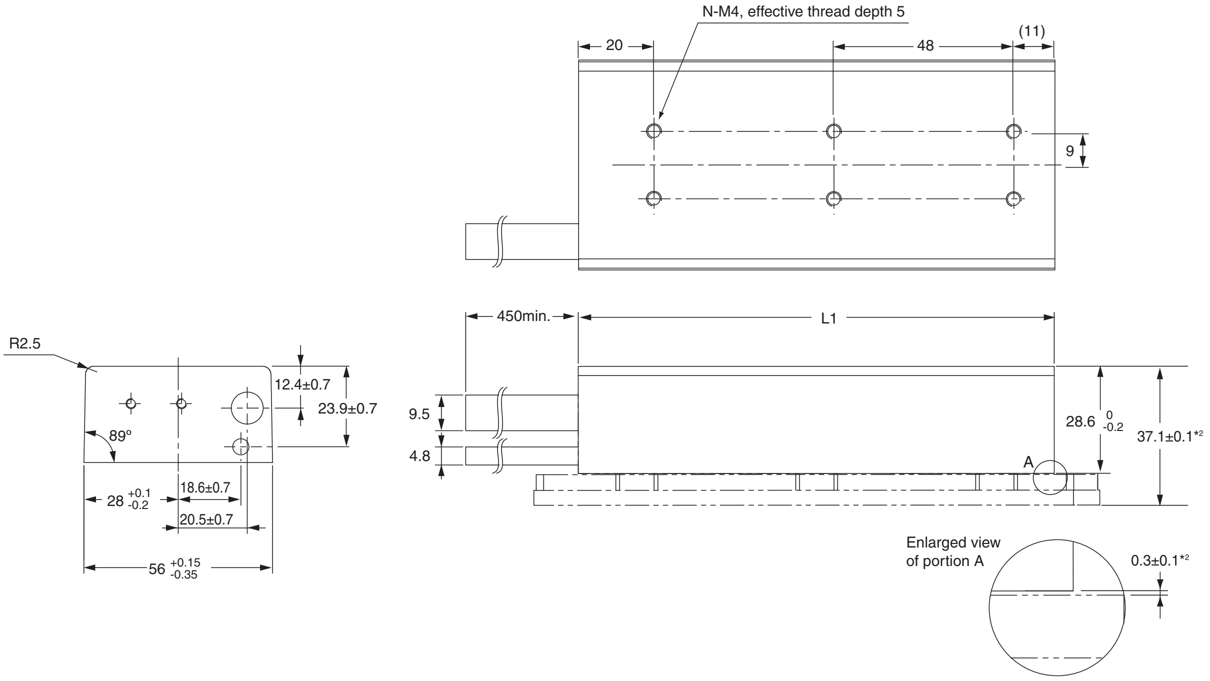


Dimensions

● Iron-core Linear Motors R88L-EC-FW-0303/-0306

• Motor Coil Unit

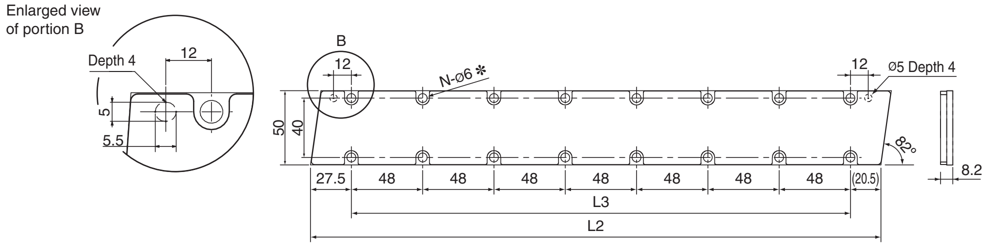
Model	L1 [mm]	Number of holes [N]	Mass [kg]*1
R88L-EC-FW-0303	79 +0.15/–0.35	4	0.72
R88L-EC-FW-0306	127 +0.15/–0.35	6	1.03


N-M4, effective thread depth 5
20
48
(11)
9
450min.
L1
R2.5
12.4±0.7
23.9±0.7
89°
28 +0.1 -0.2
18.6±0.7
20.5±0.7
56 +0.15 -0.35
9.5
4.8
28.6 0 -0.2
37.1±0.1*2
A
Enlarged view of portion A
0.3±0.1*2

*1 The weight of 450-mm cables are included.
*2 These values indicate mounting dimensions.

• Magnet Trac

Model	L2 [mm]	L3 [mm]	Number of holes [N]	Mass [kg]
R88L-EC-FM-03096-A	96	48	4	Approx. 0.22
R88L-EC-FM-03144-A	144	96	6	Approx. 0.32
R88L-EC-FM-03384-A	384	336	16	Approx. 0.85

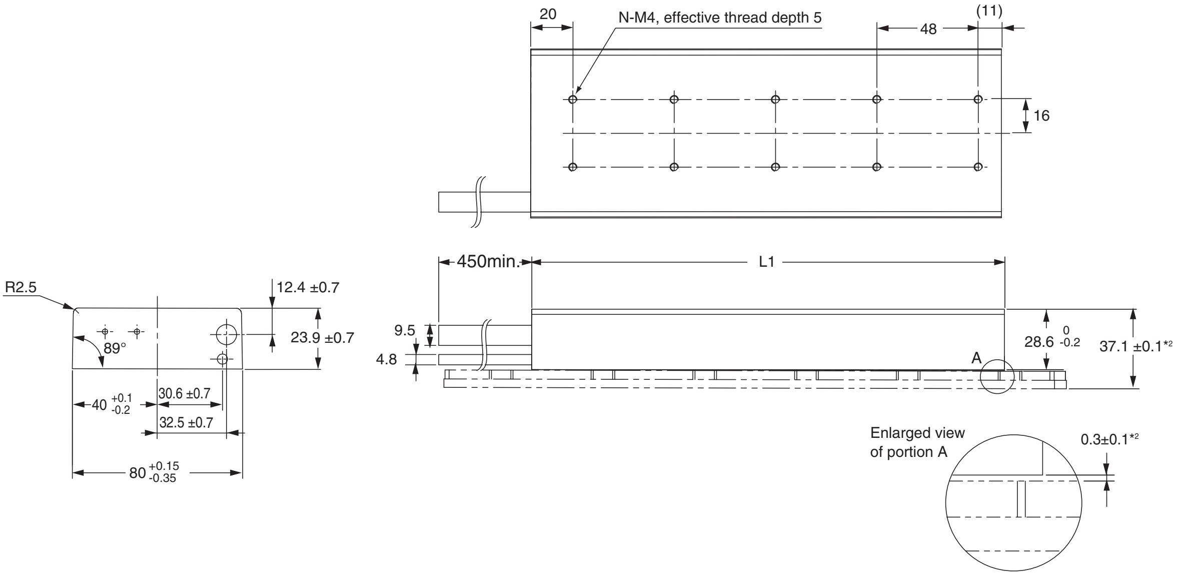

Enlarged view of portion B
Depth 4
12
5
5.5
B
12
N-Ø6 *
12
Ø5 Depth 4
50
40
82°
8.2
27.5
48
48
48
48
48
48
48
(20.5)
L3
L2

* Use M5 low head allen head bolts.

R88L-EC-FW-0606/-0609/-0612

• Motor Coil Unit

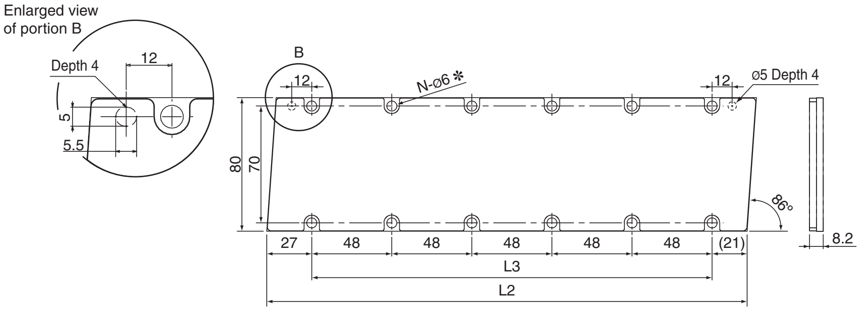
Model	L1 [mm]	Number of holes [N]	Mass [kg]*1
R88L-EC-FW-0606	127 +0.15/–0.35	6	1.59
R88L-EC-FW-0609	175 +0.15/–0.35	8	2.15
R88L-EC-FW-0612	223 +0.15/–0.35	10	2.7


20
N-M4, effective thread depth 5
48
(11)
16
450min.
L1
R2.5
12.4 ±0.7
89°
23.9 ±0.7
40 +0.1 -0.2
30.6 ±0.7
32.5 ±0.7
80 +0.15 -0.35
9.5
4.8
28.6 0 -0.2
37.1 ±0.1*2
A
Enlarged view of portion A
0.3±0.1*2

*1 The weight of 450-mm cables are included.
*2 These values indicate mounting dimensions.

• Magnet Trac

Model	L2 [mm]	L3 [mm]	Number of holes [N]	Mass [kg]
R88L-EC-FM-06192-A	192	144	8	Approx. 0.77
R88L-EC-FM-06288-A	288	240	12	Approx. 1.15

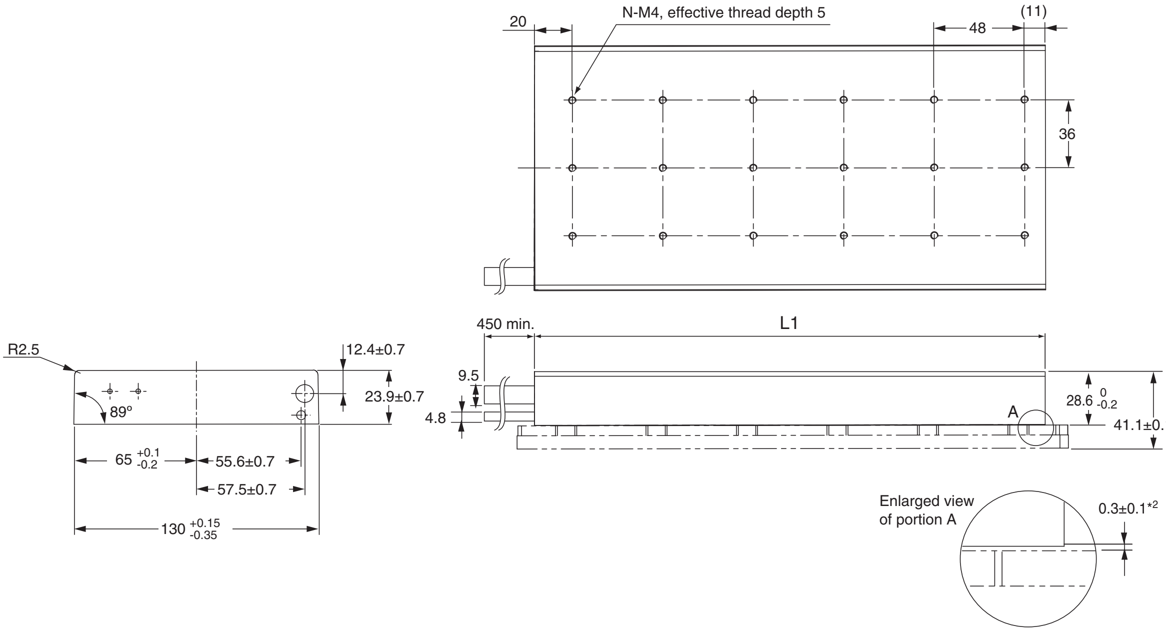

Enlarged view of portion B
Depth 4
12
5
5.5
B
12
N-ø6 *
12
ø5 Depth 4
80
70
86°
27
48
48
48
48
48
(21)
L3
L2
8.2

* Use M5 low head allen head bolts.

R88L-EC-FW-1112/-1115

• Motor Coil Unit

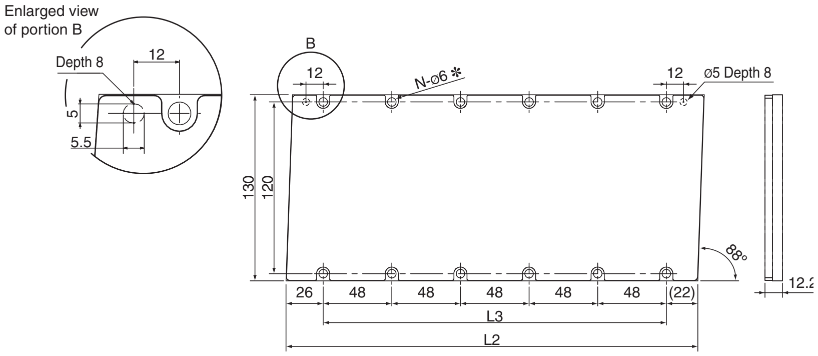
Model	L1 [mm]	Number of holes [N]	Mass [kg]*1
R88L-EC-FW-1112	223 +0.15/–0.35	15	4.89
R88L-EC-FW-1115	271 +0.15/–0.35	18	5.94


20
N-M4, effective thread depth 5
(11)
48
36
450 min.
L1
R2.5
12.4±0.7
23.9±0.7
89°
65 +0.1 -0.2
55.6±0.7
57.5±0.7
130 +0.15 -0.35
9.5
4.8
A
28.6 0 -0.2
41.1±0.1*2
Enlarged view of portion A
0.3±0.1*2

*1 The weight of 450-mm cables are included.
*2 These values indicate mounting dimensions.

• Magnet Trac

Model	L2 [mm]	L3 [mm]	Number of holes [N]	Mass [kg]
R88L-EC-FM-11192-A	192	144	8	Approx. 2.12
R88L-EC-FM-11288-A	288	240	12	Approx. 3.18


Enlarged view of portion B
Depth 8
12
5
5.5
B
12
N-ø6 ✻
12
ø5 Depth 8
130
120
88°
12.2
26
48
48
48
48
48
(22)
L3
L2

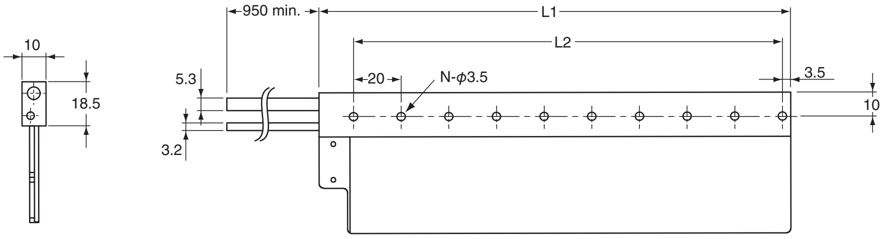
* Use M5 low head allen head bolts.

●Ironless Linear Motors

R88L-EC-GW-0303/-0306/-0309

• Motor Coil Unit

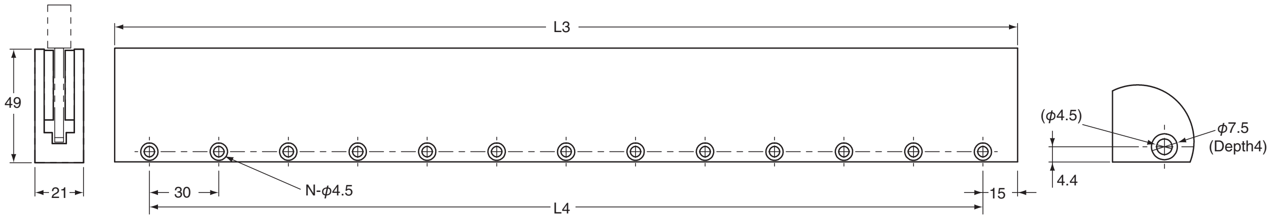
Model	L1 [mm]	L2 [mm]	Number of holes [N]	Mass [kg]*
R88L-EC-GW-0303	78	60	4	0.2
R88L-EC-GW-0306	138	120	7	0.28
R88L-EC-GW-0309	198	180	10	0.36


10
18.5
950 min.
L1
L2
5.3
3.2
20
N-φ3.5
3.5
10

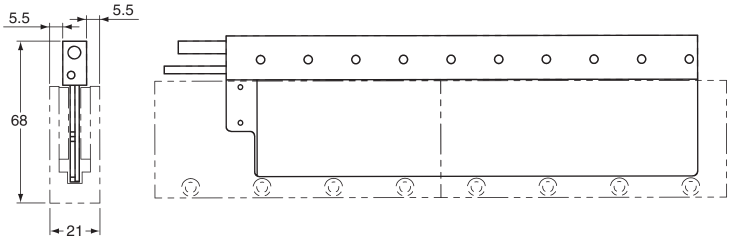
* The weight of 950 mm cables are included.

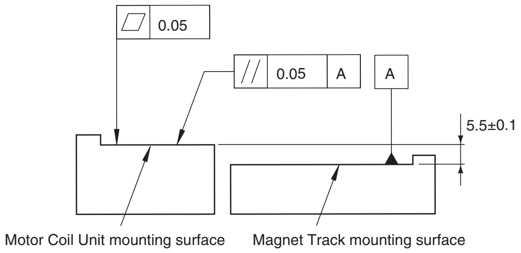
• Magnet Trac

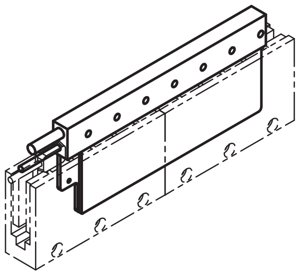
Model	L3 [mm]	L4 [mm]	Number of holes [N]	Mass [kg]
R88L-EC-GM-03090-A	90	60	3	Approx. 0.46
R88L-EC-GM-03120-A	120	90	4	Approx. 0.61
R88L-EC-GM-03390-A	390	360	13	Approx. 1.97


49
21
L3
30
N-φ4.5
15
L4
(φ4.5)
φ7.5
(Depth4)
4.4

• Combination diagram



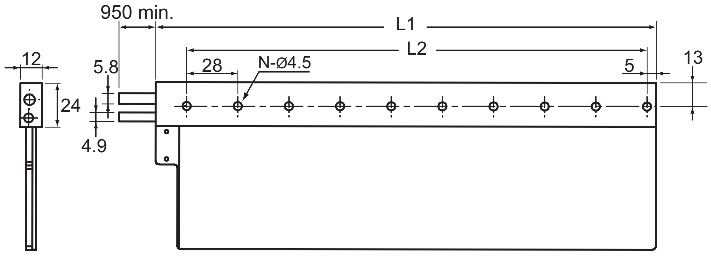

0.05
0.05
A
A
5.5±0.1
Motor Coil Unit mounting surface
Magnet Track mounting surface



R88L-EC-GW-0503/-0506/-0509

• Motor Coil Unit

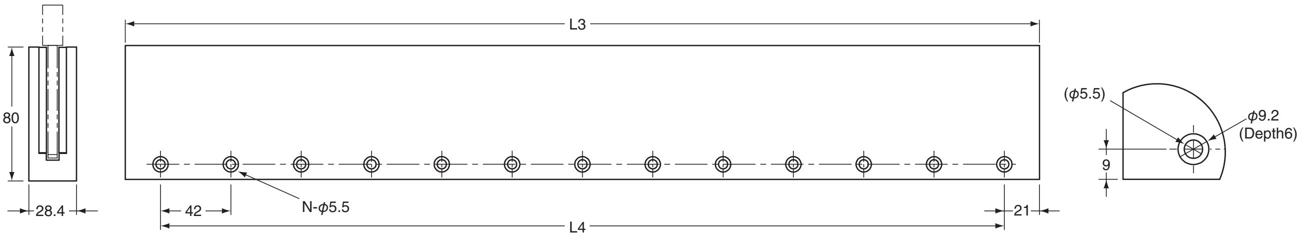
Model	L1 [mm]	L2 [mm]	Number of holes [N]	Mass [kg]*
R88L-EC-GW-0503	106	84	4	0.48
R88L-EC-GW-0506	190	168	7	0.71
R88L-EC-GW-0509	274	252	10	0.94


950 min.
L1
L2
12
5.8
28
N-Ø4.5
5
13
24
4.9

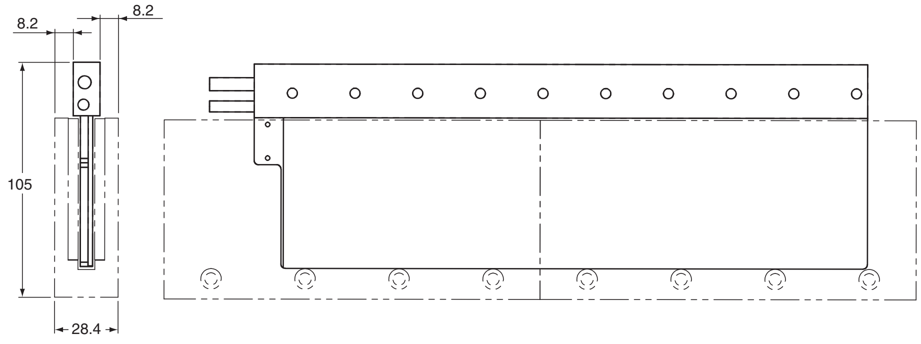
* The weight of 950 mm cables are included.

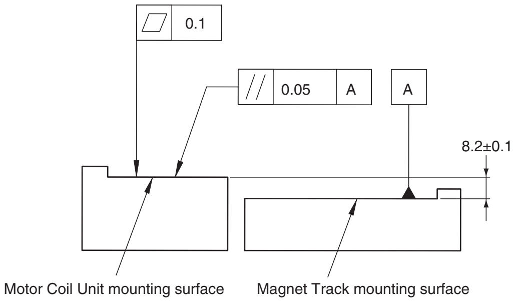
• Magnet Trac

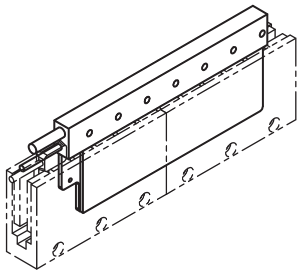
Model	L3 [mm]	L4 [mm]	Number of holes [N]	Mass [kg]
R88L-EC-GM-05126-A	126	84	3	Approx. 1.49
R88L-EC-GM-05168-A	168	126	4	Approx. 1.98
R88L-EC-GM-05210-A	210	168	5	Approx. 2.47
R88L-EC-GM-05546-A	546	504	13	Approx. 6.43


L3
80
28.4
42
N-ϕ5.5
21
L4
(ϕ5.5)
ϕ9.2
(Depth6)
9

• Combination diagram


8.2
8.2
105
28.4

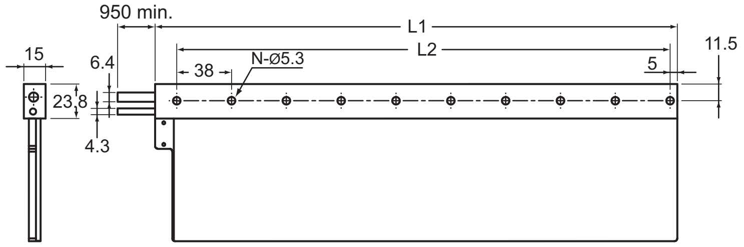

0.1
0.05
A
A
8.2±0.1
Motor Coil Unit mounting surface
Magnet Track mounting surface



R88L-EC-GW-0703/-0706/-0709

• Motor Coil Unit

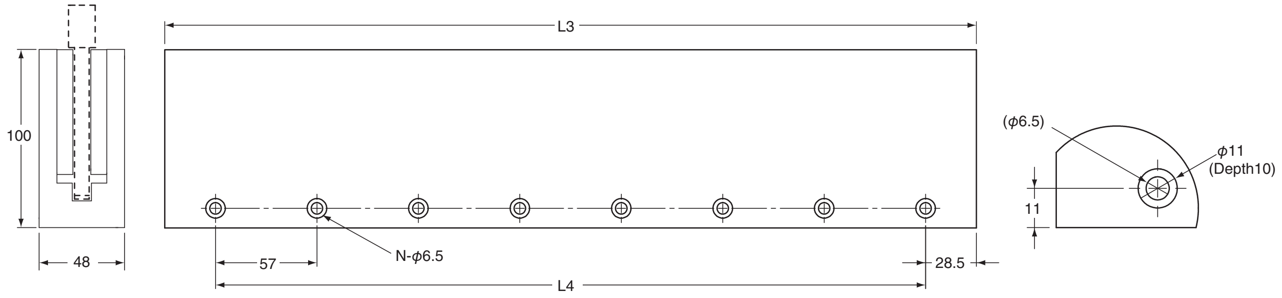
Model	L1 [mm]	L2 [mm]	Number of holes [N]	Mass [kg]*
R88L-EC-GW-0703	134	114	4	0.9
R88L-EC-GW-0706	248	228	7	1.32
R88L-EC-GW-0709	362	342	10	1.74


950 min.
L1
L2
11.5
15
6.4
38
N-Ø5.3
5
23.8
4.3

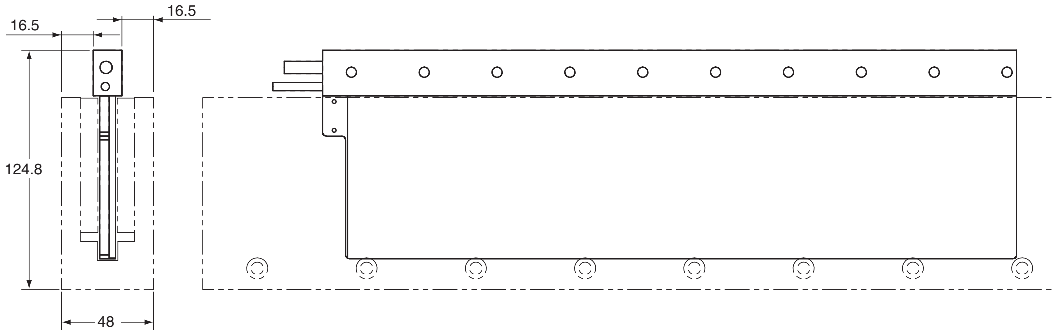
* The weight of 950 mm cables are included.

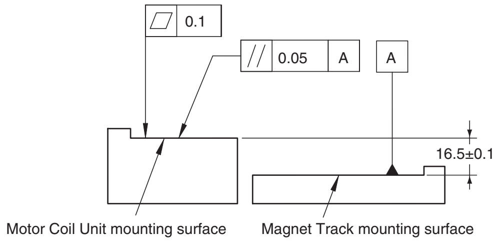
• Magnet Trac

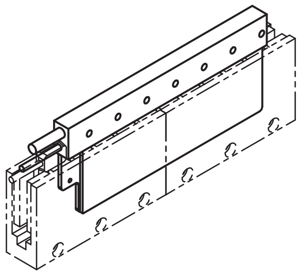
Model	L3 [mm]	L4 [mm]	Number of holes [N]	Mass [kg]
R88L-EC-GM-07114-A	114	57	2	Approx. 2.88
R88L-EC-GM-07171-A	171	114	3	Approx. 4.31
R88L-EC-GM-07456-A	456	399	8	Approx. 11.5


L3
100
48
57
N-ϕ6.5
28.5
L4
(ϕ6.5)
ϕ11
(Depth10)
11

• Combination diagram


16.5
16.5
124.8
48


0.1
// 0.05 A
A
16.5±0.1
Motor Coil Unit mounting surface
Magnet Track mounting surface



Combination table

Servo Drive and Servomotor Combinations (3,000 r/min, 2,000 r/min, 1,500r/min, 1,000 r/min)

<Cylinder Type>
3,000-r/min servomotors

Power Supply Voltage	Servo Drive Model Numbers	Servomotor Model Numbers		
	EtherCAT	Output	With incremental encoder	With absolute encoder
Single-phase 100 to 115 VAC	R88D-KNA5L-ECT	50 W	R88M-K05030H-□	R88M-K05030T-□
	R88D-KN01L-ECT	100 W	R88M-K10030L-□	R88M-K10030S-□
	R88D-KN02L-ECT	200 W	R88M-K20030L-□	R88M-K20030S-□
	R88D-KN04L-ECT	400 W	R88M-K40030L-□	R88M-K40030S-□
Single-phase/ three-phase 200 to 240 VAC	R88D-KN01H-ECT *	50 W	R88M-K05030H-□ *	R88M-K05030T-□ *
	R88D-KN01H-ECT	100 W	R88M-K10030H-□	R88M-K10030T-□
	R88D-KN02H-ECT	200 W	R88M-K20030H-□	R88M-K20030T-□
	R88D-KN04H-ECT	400 W	R88M-K40030H-□	R88M-K40030T-□
	R88D-KN08H-ECT	750 W	R88M-K75030H-□	R88M-K75030T-□
	R88D-KN15H-ECT *	1 kW	R88M-K1K030H-□ *	R88M-K1K030T-□ *
	R88D-KN15H-ECT	1.5 kW	R88M-K1K530H-□	R88M-K1K530T-□
Three-phase 200 to 240 VAC	R88D-KN20H-ECT	2 kW	R88M-K2K030H-□	R88M-K2K030T-□
	R88D-KN30H-ECT	3 kW	R88M-K3K030H-□	R88M-K3K030T-□
	R88D-KN50H-ECT *	4 kW	R88M-K4K030H-□ *	R88M-K4K030T-□ *
	R88D-KN50H-ECT	5 kW	R88M-K5K030H-□	R88M-K5K030T-□
Three-phase 400 to 480 VAC	R88D-KN10F-ECT *	750 W	R88M-K75030F-□ *	R88M-K75030C-□ *
	R88D-KN15F-ECT *	1 kW	R88M-K1K030F-□ *	R88M-K1K030C-□ *
	R88D-KN15F-ECT	1.5 kW	R88M-K1K530F-□	R88M-K1K530C-□
	R88D-KN20F-ECT	2 kW	R88M-K2K030F-□	R88M-K2K030C-□
	R88D-KN30F-ECT	3 kW	R88M-K3K030F-□	R88M-K3K030C-□
	R88D-KN50F-ECT *	4 kW	R88M-K4K030F-□ *	R88M-K4K030C-□ *
	R88D-KN50F-ECT	5 kW	R88M-K5K030F-□	R88M-K5K030C-□

1,500r/min, 2,000-r/min servomotors

Power Supply Voltage	Servo Drive Model Numbers	Servomotor Model Numbers		
	EtherCAT	Output	With incremental encoder	With absolute encoder
Single-phase/ three-phase 200 to 240 VAC	R88D-KN10H-ECT	1 kW	R88M-K1K020H-□	R88M-K1K020T-□
	R88D-KN15H-ECT	1.5 kW	R88M-K1K520H-□	R88M-K1K520T-□
Three-phase 200 to 240 VAC	R88D-KN20H-ECT	2 kW	R88M-K2K020H-□	R88M-K2K020T-□
	R88D-KN30H-ECT	3 kW	R88M-K3K020H-□	R88M-K3K020T-□
	R88D-KN50H-ECT *	4 kW	R88M-K4K020H-□ *	R88M-K4K020T-□ *
	R88D-KN50H-ECT	5 kW	R88M-K5K020H-□	R88M-K5K020T-□
	R88D-KN75H-ECT	7.5 kW	–	R88M-K7K515T-□
	R88D-KN150H-ECT *	11 kW	–	R88M-K11K015T-□ *
	R88D-KN150H-ECT	15 kW	–	R88M-K15K015T-□
Three-phase 400 to 480 VAC	R88D-KN06F-ECT *	400 W	R88M-K40020F-□ *	R88M-K40020C-□ *
	R88D-KN06F-ECT	600 W	R88M-K60020F-□	R88M-K60020C-□
	R88D-KN10F-ECT	1 kW	R88M-K1K020F-□	R88M-K1K020C-□
	R88D-KN15F-ECT	1.5 kW	R88M-K1K520F-□	R88M-K1K520C-□
	R88D-KN20F-ECT	2 kW	R88M-K2K020F-□	R88M-K2K020C-□
	R88D-KN30F-ECT	3 kW	R88M-K3K020F-□	R88M-K3K020C-□
	R88D-KN50F-ECT *	4 kW	R88M-K4K020F-□ *	R88M-K4K020C-□ *
	R88D-KN50F-ECT	5 kW	R88M-K5K020F-□	R88M-K5K020C-□
	R88D-KN75F-ECT	7.5 kW	–	RR88M-K7K515C-□
	R88D-KN150F-ECT *	11 kW	–	R88M-K11K015C-□ *
	R88D-KN150F-ECT	15 kW	–	R88M-K15K015C-□

* Please note the capacity of Servo Drive and Servomotor are not same in this combination.

1,000-r/min servomotors

Power Supply Voltage	Servo Drive Model Numbers	Servomotor Model Numbers		
	EtherCAT	Output	With incremental encoder	With absolute encoder
Single-phase/	R88D-KN15H-ECT *	900 W	R88M-K90010H-□ *	R88M-K90010T-□ *
Three-phase 200 to 240 VAC	R88D-KN30H-ECT *	2 kW	R88M-K2K010H-□ *	R88M-K2K010T-□ *
	R88D-KN50H-ECT *	3 kW	R88M-K3K010H-□ *	R88M-K3K010T-□ *
	R88D-KN50H-ECT *	4.5 kW	–	R88M-K4K510T-□ *
	R88D-KN75H-ECT *	6 kW	–	R88M-K6K010T-□ *
Three-phase 400 to 480 VAC	R88D-KN15F-ECT *	900 W	R88M-K90010F-□ *	R88M-K90010C-□ *
	R88D-KN30F-ECT *	2 kW	R88M-K2K010F-□ *	R88M-K2K010C-□ *
	R88D-KN50F-ECT *	3 kW	R88M-K3K010F-□ *	R88M-K3K010C-□ *
	R88D-KN50F-ECT *	4.5 kW	–	R88M-K4K510C-□ *
	R88D-KN75F-ECT *	6 kW	–	R88M-K6K010C-□ *

* Please note the capacity of Servo Drive and Servomotor are not same in this combination.

Servomotor and Decelerator Combinations (3,000 r/min, 2,000 r/min, 1,000 r/min)

<Cylinder Type>

3,000-r/min servomotors

Motor model	1/5	1/11 (1/9 for flange size No.11)	1/21	1/33	1/45
R88M-K05030□	R88G-HPG11B05100B□ (Also used with R88M-K10030□)	R88G-HPG11B09050B□ (Gear ratio 1/9)	R88G-HPG14A21100B□ (Also used with R88M-K10030□)	R88G-HPG14A33050B□	R88G-HPG14A45050B□
R88M-K10030□	R88G-HPG11B05100B□	R88G-HPG14A11100B□	R88G-HPG14A21100B□	R88G-HPG20A33100B□	R88G-HPG20A45100B□
R88M-K20030□	R88G-HPG14A05200B□	R88G-HPG14A11200B□	R88G-HPG20A21200B□	R88G-HPG20A33200B□	R88G-HPG20A45200B□
R88M-K40030□	R88G-HPG14A05400B□	R88G-HPG20A11400B□	R88G-HPG20A21400B□	R88G-HPG32A33400B□	R88G-HPG32A45400B□
R88M-K75030H/T (200 V)	R88G-HPG20A05750B□	R88G-HPG20A11750B□	R88G-HPG32A21750B□	R88G-HPG32A33750B□	R88G-HPG32A45750B□
R88M-K75030F/C (400 V)	R88G-HPG32A052K0B□ (Also used with R88M-K2K030□)	R88G-HPG32A112K0B□ (Also used with R88M-K2K030□)	R88G-HPG32A211K5B□ (Also used with R88M-K1K5030□)	R88G-HPG32A33600SB□ (Also used with R88M-K60020□)	R88G-HPG50A451K5B□ (Also used with R88M-K1K530□)
R88M-K1K030□	R88G-HPG32A052K0B□ (Also used with R88M-K2K030□)	R88G-HPG32A112K0B□ (Also used with R88M-K2K030□)	R88G-HPG32A211K5B□ (Also used with R88M-K1K5030□)	R88G-HPG50A332K0B□ (Also used with R88M-K2K030□)	R88G-HPG50A451K5B□ (Also used with R88M-K1K530□)
R88M-K1K530□	R88G-HPG32A052K0B□ (Also used with R88M-K2K030□)	R88G-HPG32A112K0B□ (Also used with R88M-K2K030□)	R88G-HPG32A211K5B□	R88G-HPG50A332K0B□ (Also used with R88M-K2K030□)	R88G-HPG50A451K5B□
R88M-K2K030□	R88G-HPG32A052K0B□	R88G-HPG32A112K0B□	R88G-HPG50A212K0B□	R88G-HPG50A332K0B□	–
R88M-K3K030□	R88G-HPG32A053K0B□	R88G-HPG50A113K0B□	R88G-HPG50A213K0B□	–	–
R88M-K4K030□	R88G-HPG32A054K0B□	R88G-HPG50A115K0B□ (Also used with R88M-K5K030□)	–	–	–
R88M-K5K030□	R88G-HPG50A055K0B□	R88G-HPG50A115K0B□	–	–	–

2,000-r/min servomotors

Motor model	1/5	1/11	1/21 (1/20 for flange size No.65)	1/33 (1/25 for flange size No.65)	1/45
R88M-K40020□ (Only 400 V)	R88G-HPG32A052K0B□ (Also used with R88M-K2K030□)	R88G-HPG32A112K0B□ (Also used with R88M-K2K030□)	R88G-HPG32A211K5B□ (Also used with R88M-K1K5030□)	R88G-HPG32A33600SB□ (Also used with R88M-K60020□)	R88G-HPG32A45400SB□
R88M-K60020□ (Only 400 V)	R88G-HPG32A052K0B□ (Also used with R88M-K2K030□)	R88G-HPG32A112K0B□ (Also used with R88M-K2K030□)	R88G-HPG32A211K5B□ (Also used with R88M-K1K5030□)	R88G-HPG32A33600SB□	R88G-HPG50A451K5B□ (R88M-K1K530□)
R88M-K1K020□	R88G-HPG32A053K0B□ (Also used with R88M-K3K030□)	R88G-HPG32A112K0SB□ (Also used with R88M-K2K020□)	R88G-HPG32A211K0SB□	R88G-HPG50A332K0SB□ (Also used with R88M-K2K020□)	R88G-HPG50A451K0SB□
R88M-K1K520□	R88G-HPG32A053K0B□ (Also used with R88M-K3K030□)	R88G-HPG32A112K0SB□ (Also used with R88M-K2K020□)	R88G-HPG50A213K0B□ (Also used with R88M-K3K030□)	R88G-HPG50A332K0SB□ (Also used with R88M-K2K020□)	–
R88M-K2K020□	R88G-HPG32A053K0B□ (Also used with R88M-K3K030□)	R88G-HPG32A112K0SB□	R88G-HPG50A213K0B□ (Also used with R88M-K3K030□)	R88G-HPG50A332K0SB□	–
R88M-K3K020□	R88G-HPG32A054K0B□ (Also used with R88M-K4K030□)	R88G-HPG50A115K0B□ (Also used with R88M-K5K030□)	R88G-HPG50A213K0SB□	R88G-HPG65A253K0SB□	–
R88M-K4K020□	R88G-HPG50A055K0SB□ (Also used with R88M-K5K020□)	R88G-HPG50A115K0SB□ (Also used with R88M-K3K030□)	R88G-HPG65A205K0SB□ (Also used with R88M-K3K030□)	R88G-HPG65A255K0SB□ (Also used with R88M-K5K020□)	–
R88M-K5K020□	R88G-HPG50A055K0SB□	R88G-HPG50A115K0SB□	R88G-HPG65A205K0SB□	R88G-HPG65A255K0SB□	–

1,000-r/min servomotors

Motor model	1/5	1/11	1/21 (1/20 for flange size No.65)	1/33 (1/25 for flange size No.65)
R88M-K90010□	R88G-HPG32A05900TB□ (Also used with R88M-K5K020□)	R88G-HPG32A11900TB□ (Also used with R88M-K2K020□)	R88G-HPG50A21900TB□ (Also used with R88M-K3K030□)	R88G-HPG50A33900TB□ (Also used with R88M-K2K020□)
R88M-K2K010□	R88G-HPG32A052K0TB□	R88G-HPG50A112K0TB□	R88G-HPG50A212K0TB□ (Also used with R88M-K5K020□)	R88G-HPG65A255K0SB□ (Also used with R88M-K5K020□)
R88M-K3K010□	R88G-HPG50A055K0SB□ (Also used with R88M-K5K020□)	R88G-HPG50A115K0SB□ (Also used with R88M-K5K020□)	R88G-HPG65A205K0SB□ (Also used with R88M-K5K020□)	R88G-HPG65A255K0SB□ (Also used with R88M-K5K020□)

Linear Motor and AC Servo Drive Linear Motor Type Combinations

●Iron-core Linear Motor type

Linear Motor Model Numbers	Power Supply Voltage (V)	Servo Drive Model Numbers	Maximum speed (m/s)
R88L-EC-FW-0303-ANPC	100	R88D-KN01L-ECT-L	2.5
	200	R88D-KN02H-ECT-L	5
	400	R88D-KN06F-ECT-L	10
R88L-EC-FW-0306-ANPC	100	R88D-KN02L-ECT-L	2.5
	200	R88D-KN04H-ECT-L	5
	400	R88D-KN10F-ECT-L	10
R88L-EC-FW-0606-ANPC	100	R88D-KN04L-ECT-L	2
	200	R88D-KN08H-ECT-L	4
	400	R88D-KN15F-ECT-L	8
R88L-EC-FW-0609-ANPC	200	R88D-KN10H-ECT-L	4
	400	R88D-KN20F-ECT-L	8
R88L-EC-FW-0612-ANPC	200	R88D-KN15H-ECT-L	4
	400	R88D-KN30F-ECT-L	8
R88L-EC-FW-1112-ANPC	200	R88D-KN15H-ECT-L	2
	400	R88D-KN30F-ECT-L	4
R88L-EC-FW-1115-ANPC	200	R88D-KN15H-ECT-L	2
	400	R88D-KN30F-ECT-L	4

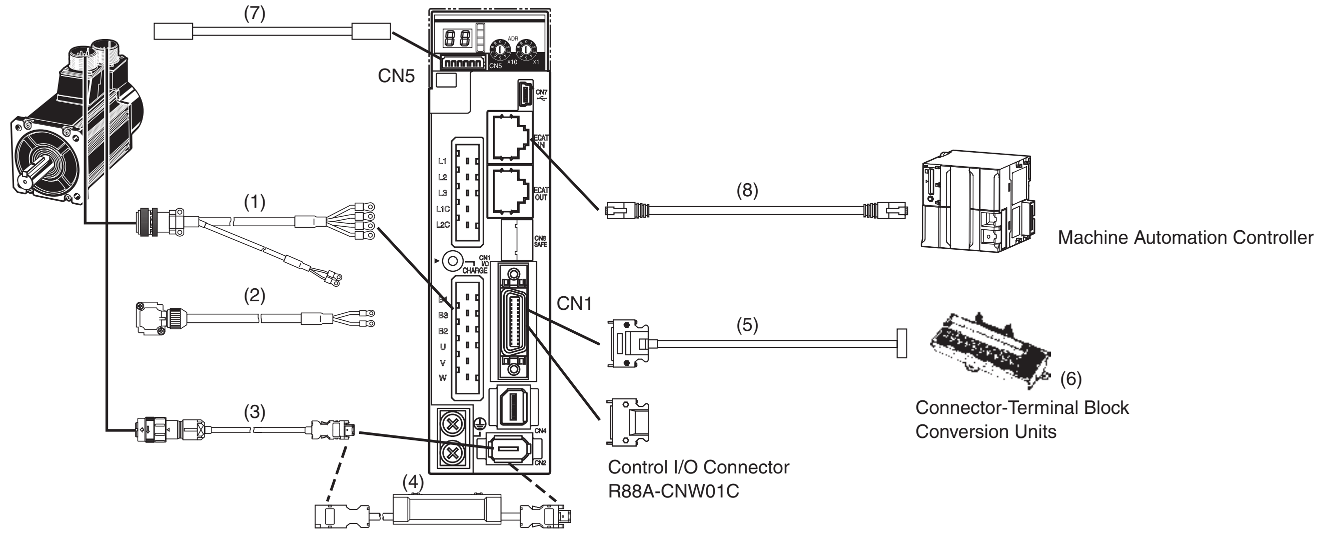
●Ironless Linear Motor type

Linear Motor Model Numbers	Power Supply Voltage (V)	Servo Drive Model Numbers	Maximum speed (m/s)
R88L-EC-GW-0303-ANPS	100	R88D-KN01L-ECT-L	8
	200	R88D-KN02H-ECT-L	16
R88L-EC-GW-0306-ANPS	100	R88D-KN04L-ECT-L	8
	200	R88D-KN08H-ECT-L	16
R88L-EC-GW-0309-ANPS	200	R88D-KN10H-ECT-L	16
R88L-EC-GW-0503-ANPS	100	R88D-KN01L-ECT-L	2.2
	200	R88D-KN01H-ECT-L	4.4
R88L-EC-GW-0506-ANPS	100	R88D-KN02L-ECT-L	2.2
	200	R88D-KN04H-ECT-L	4.4
R88L-EC-GW-0509-ANPS	100	R88D-KN04L-ECT-L	2.2
	200	R88D-KN08H-ECT-L	4.4
R88L-EC-GW-0703-ANPS	100	R88D-KN02L-ECT-L	1.2
	200	R88D-KN04H-ECT-L	2.4
R88L-EC-GW-0706-ANPS	100	R88D-KN04L-ECT-L	1.2
	200	R88D-KN08H-ECT-L	2.4
R88L-EC-GW-0709-ANPS	200	R88D-KN10H-ECT-L	2.4

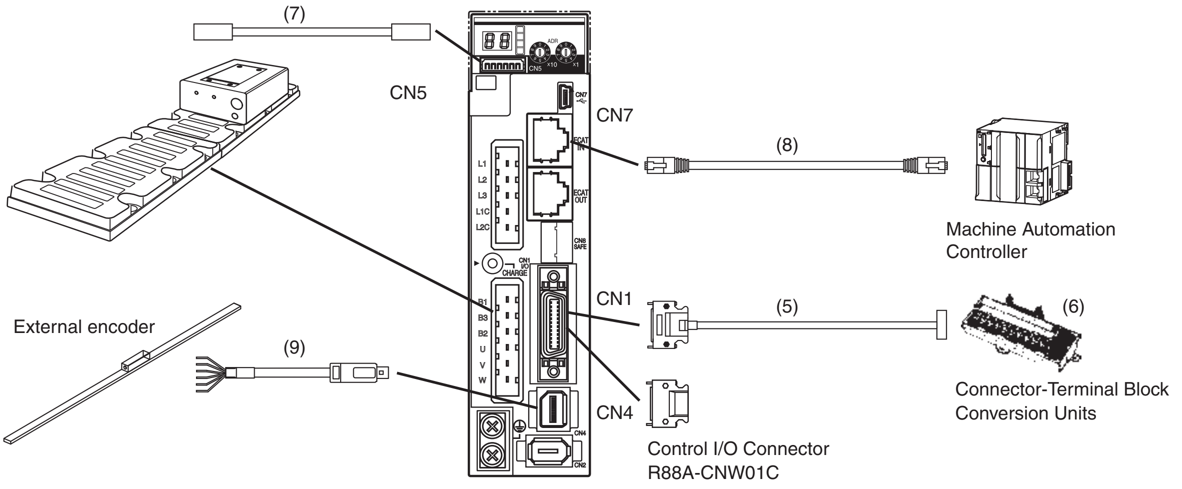
Note: The maximum operation speed is limited by considering the guide mechanism, encoder, and other aspects. If it is 5 m/s or higher, please consult with your OMRON representative.

Cable Combinations

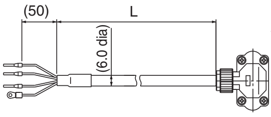
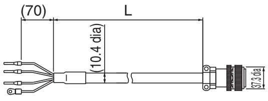
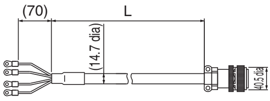
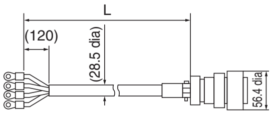
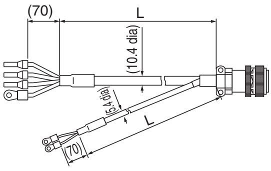
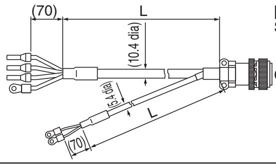
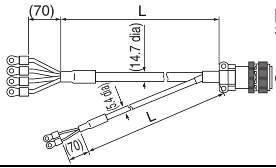
● EtherCAT Communications


(7)
CN5
(1)
(2)
(3)
(4)
(8)
Machine Automation Controller
CN1
(5)
(6)
Connector-Terminal Block Conversion Units
Control I/O Connector R88A-CNW01C

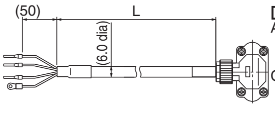
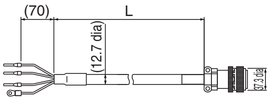
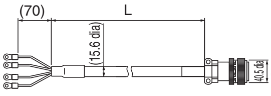
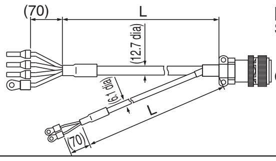
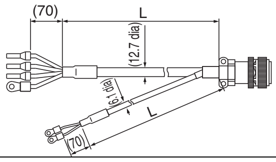
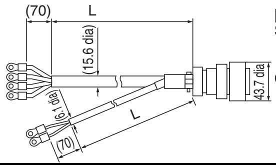
● EtherCAT Communications Linear Motor Type


(7)
CN5
CN7
(8)
Machine Automation Controller
External encoder
(9)
CN1
(5)
(6)
Connector-Terminal Block Conversion Units
CN4
Control I/O Connector R88A-CNW01C

Servomotor Power Cables (For CNB)

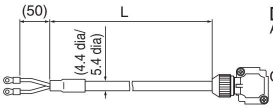
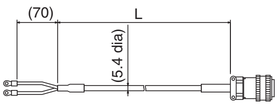
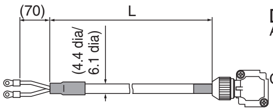
Symbol			Name	Connected to	Model	Description
(1)	Standard Cables	Without Brakes	Standard Servomotor Power Cables for Servomotors without Brakes	[100 V] [200 V] Cylindrical Servomotors, 3,000 r/min, 50 to 750 W	R88A-CAKA□□□S The empty boxes in the model number are for the cable length. The cable can be 3, 5, 10, 15, 20, 30, 40, or 50 m long.	 **[Servomotor Connector]** Angle plug: JN8FT04SJ1 (Japan Aviation Electronics Industry, Ltd.) Contact pins: ST-TMH-S-C1B-3500-A534G (Japan Aviation Electronics Industry, Ltd.)
				[200 V] Cylindrical Servomotors, 3,000 r/min, 1 to 2 kW Cylindrical Servomotors, 2,000 r/min, 1 to 2 kW Cylindrical Servomotors, 1,000 r/min, 900 W	R88A-CAGB□□□S The empty boxes in the model number are for the cable length. The cable can be 3, 5, 10, 15, 20, 30, 40, or 50 m long.	 **[Servomotor Connector]** Straight plug: N/MS3106B20-4S (Japan Aviation Electronics Industry, Ltd.) Cable clamp: N/MS3057-12A (Japan Aviation Electronics Industry, Ltd.)
				[400 V] Cylindrical Servomotors, 3,000 r/min, 750 W to 2 kW Cylindrical Servomotors, 2,000 r/min, 400 W to 2 kW Cylindrical Servomotors, 1,000 r/min, 900 W		
				[200 V] [400 V] Cylindrical Servomotors, 3,000 r/min, 3 to 5 kW Cylindrical Servomotors, 2,000 r/min, 3 to 5 kW Cylindrical Servomotors, 1,000 r/min, 2 to 4.5 kW	R88A-CAGD□□□S The empty boxes in the model number are for the cable length. The cable can be 3, 5, 10, 15, 20, 30, 40, or 50 m long.	 **[Servomotor Connector]** Straight plug: N/MS3106B22-22S (Japan Aviation Electronics Industry, Ltd.) Cable clamp: N/MS3057-12A (Japan Aviation Electronics Industry, Ltd.)
				[200 V] [400 V] Cylindrical Servomotors, 1,500 r/min, 7.5 kW Cylindrical Servomotors, 1,000 r/min, 6 kW	R88A-CAGE□□□S The empty boxes in the model number are for the cable length. The cable can be 3, 5, 10, 15, 20, 30, 40, or 50 m long.	 **[Servomotor Connector]** Straight plug: N/MS3106B32-17S (Japan Aviation Electronics Industry, Ltd.) Cable clamp: N/MS3057-20A (Japan Aviation Electronics Industry, Ltd.)
		With Brakes	Standard Servomotor Power Cables for Servomotors with Brakes	**Note:** Different connectors are used for the motor power and the brake on 100-V and 200-V, 3,000-r/min Servomotors of 50 to 750 W and Servomotors of 6 to 15 kW. When using a Servomotor with a brake, two cables are required: a Power Cable without Brake and a Brake Cable.		
				[200 V] Cylindrical Servomotors, 3,000 r/min, 1 to 2 kW Cylindrical Servomotors, 2,000 r/min, 1 to 2 kW Cylindrical Servomotors, 1,000 r/min, 900 W	R88A-CAGB□□□B The empty boxes in the model number are for the cable length. The cable can be 3, 5, 10, 15, 20, 30, 40, or 50 m long.	 **[Servomotor Connector]** Straight plug: N/MS3106B20-18S (Japan Aviation Electronics Industry, Ltd.) Cable clamp: N/MS3057-12A (Japan Aviation Electronics Industry, Ltd.)
				[400 V] Cylindrical Servomotors, 3,000 r/min, 1 to 2 kW Cylindrical Servomotors, 2,000 r/min, 400 W to 2 kW Cylindrical Servomotors, 1,000 r/min, 900 W	R88A-CAKF□□□B The empty boxes in the model number are for the cable length. The cable can be 3, 5, 10, 15, 20, 30, 40, or 50 m long.	 **[Servomotor Connector]** Straight plug: N/MS3106B24-11S (Japan Aviation Electronics Industry, Ltd.) Cable clamp: N/MS3057-16A (Japan Aviation Electronics Industry, Ltd.)
				[200 V] [400 V] Cylindrical Servomotors, 3,000 r/min, 3 to 5 kW Cylindrical Servomotors, 2,000 r/min, 3 to 5 kW Cylindrical Servomotors, 1,000 r/min, 2 to 3 kW	R88A-CAGD□□□B The empty boxes in the model number are for the cable length. The cable can be 3, 5, 10, 15, 20, 30, 40, or 50 m long.	 **[Servomotor Connector]** Straight plug: N/MS3106B24-11S (Japan Aviation Electronics Industry, Ltd.) Cable clamp: N/MS3057-16A (Japan Aviation Electronics Industry, Ltd.)

Note: Insert the cable length into the boxes in the model number of cables. (3 m: 003, 5 m: 005, 10 m: 010)

Symbol			Name	Connected to	Model	Description
(1)	Robot Cables	Without Brakes	Robot Servomotor Power Cables for Servomotors without Brakes	[100 V] [200 V] Cylindrical Servomotors, 3,000 r/min, 50 to 750 W	R88A-CAKA□□□SR The empty boxes in the model number are for the cable length. The cable can be 3, 5, 10, 15, 20, 30, 40, or 50 m long.	 **[Servomotor Connector]** Angle plug: JN8FT04SJ1 (Japan Aviation Electronics Industry, Ltd.) Connector pins: ST-TMH-S-C1B-3500-A534G (Japan Aviation Electronics Industry, Ltd.)
				[200 V] Cylindrical Servomotors, 3,000 r/min, 1 to 2 kW Cylindrical Servomotors, 2,000 r/min, 1 to 2 kW Cylindrical Servomotors, 1,000 r/min, 900 W	R88A-CAGB□□□SR The empty boxes in the model number are for the cable length. The cable can be 3, 5, 10, 15, 20, 30, 40, or 50 m long.	 **[Servomotor Connector]** Straight plug: N/MS3106B20-4S (Japan Aviation Electronics Industry, Ltd.) Cable clamp: N/MS3057-12A (Japan Aviation Electronics Industry, Ltd.)
				[400 V] Cylindrical Servomotors, 3,000 r/min, 750 W to 2 kW Cylindrical Servomotors, 2,000 r/min, 400 W to 2 kW Cylindrical Servomotors, 1,000 r/min, 900 W		
				[200 V] [400 V] Cylindrical Servomotors, 3,000 r/min, 3 to 5 kW Cylindrical Servomotors, 2,000 r/min, 3 to 5 kW Cylindrical Servomotors, 1,000 r/min, 2 to 4.5 kW	R88A-CAGD□□□SR The empty boxes in the model number are for the cable length. The cable can be 3, 5, 10, 15, 20, 30, 40, or 50 m long.	 **[Servomotor Connector]** Straight plug: N/MS3106B22-22S (Japan Aviation Electronics Industry, Ltd.) Cable clamp: N/MS3057-12A (Japan Aviation Electronics Industry, Ltd.)
		With Brakes	Robot Servomotor Power Cables for Servomotors with Brakes	**Note:** Different connectors are used for the motor power and the brake on 100-V and 200-V, 3,000-r/min Servomotors of 50 to 750 W and Servomotors of 6 to 15 kW. When using a Servomotor with a brake, two cables are required: a Power Cable without Brake and a Brake Cable.		
				[200 V] Cylindrical Servomotors, 3,000 r/min, 1 to 2 kW Cylindrical Servomotors, 2,000 r/min, 1 to 2 kW Cylindrical Servomotors, 1,000 r/min, 900 W	R88A-CAGB□□□BR The empty boxes in the model number are for the cable length. The cable can be 3, 5, 10, 15, 20, 30, 40, or 50 m long.	 **[Servomotor Connector]** Straight plug: N/MS3106B20-18S (Japan Aviation Electronics Industry, Ltd.) Cable clamp: N/MS3057-12A (Japan Aviation Electronics Industry, Ltd.)
				[400 V] Cylindrical Servomotors, 3,000 r/min, 1 to 2 kW Cylindrical Servomotors, 2,000 r/min, 400 W to 2 kW Cylindrical Servomotors, 1,000 r/min, 900 W	R88A-CAKF□□□BR The empty boxes in the model number are for the cable length. The cable can be 3, 5, 10, 15, 20, 30, 40, or 50 m long.	 **[Servomotor Connector]** Straight plug: N/MS3106B24-11S (Japan Aviation Electronics Industry, Ltd.) Cable clamp: N/MS3057-16A (Japan Aviation Electronics Industry, Ltd.)
				[200 V] [400 V] Cylindrical Servomotors, 3,000 r/min, 3 to 5 kW Cylindrical Servomotors, 2,000 r/min, 3 to 5 kW Cylindrical Servomotors, 1,000 r/min, 2 to 3 kW	R88A-CAGD□□□BR The empty boxes in the model number are for the cable length. The cable can be 3, 5, 10, 15, 20, 30, 40, or 50 m long.	 (70) L (15.6 dia) 43.7 dia (6.1 dia) L (70) **[Servomotor Connector]** Straight plug: N/MS3106B24-11S (Japan Aviation Electronics Industry, Ltd.) Cable clamp: N/MS3057-16A (Japan Aviation Electronics Industry, Ltd.)

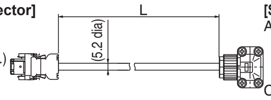
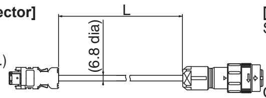
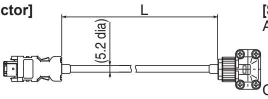
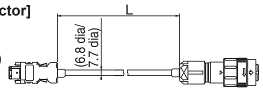
Note: Insert the cable length into the boxes in the model number of cables. (3 m: 003, 5 m: 005, 10 m: 010)

Brake Cables

Symbol		Name	Connected to	Model	Description
(2)	Standard Cables	Brake Cables (Standard Cables)	[100 V] [200 V] Cylindrical Servomotors, 3,000 r/min, 50 to 750 W	R88A-CAKA□□□B The empty boxes in the model number are for the cable length. The cable can be 3, 5, 10, 15, 20, 30, 40, or 50 m long. (3 to 20 m: 4.4 dia 30 to 50 m: 5.4 dia)	 **[Servomotor Connector]** Angle plug: JN4FT02SJ1-R (Japan Aviation Electronics Industry, Ltd.) Connector pins: ST-TMH-S-C1B-3500-(A534G) (Japan Aviation Electronics Industry, Ltd.)
			[200 V] [400 V] Cylindrical Servomotors, 1,500 r/min, 7.5 to 15 kW 1,000 r/min, 6 kW	R88A-CAGE□□□B The empty boxes in the model number are for the cable length. The cable can be 3, 5, 10, 15, 20, 30, 40, or 50 m long. (5.4 dia)	 **[Servomotor Connector]** Angle plug: N/MS3106B14S-2S (Japan Aviation Electronics Industry, Ltd.) Connector pins: N/MS3057-6A (Japan Aviation Electronics Industry, Ltd.)
	Robot Cables	Brake Cables (Robot Cables)	[100 V] [200 V] Cylindrical Servomotors, 3,000 r/min, 50 to 750 W	R88A-CAKA□□□BR The empty boxes in the model number are for the cable length. The cable can be 3, 5, 10, 15, 20, 30, 40, or 50 m long. (3 to 20 m: 4.4 dia 30 to 50 m: 6.1 dia)	 **[Servomotor Connector]** Angle plug: JN4FT02SJ1-R (Japan Aviation Electronics Industry, Ltd.) Connector pins: ST-TMH-S-C1B-3500-(A534G) (Japan Aviation Electronics Industry, Ltd.)

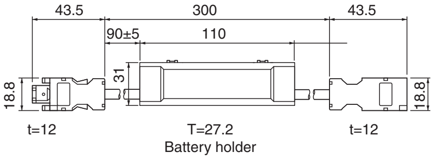
Note: Insert the cable length into the boxes in the model number of cables. (3 m: 003, 5 m: 005, 10 m: 010)

Encoder Cables (for CN2)

Symbol		Name	Connected to	Model	Description
(3)	Standard Cables	Standard Encoder Cables with Connectors	Cylindrical Servomotors, 3,000 r/min, 50 to 750 W (Absolute encoder/ Incremental encoder)	R88A-CRKA□□□C The empty boxes in the model number are for the cable length. The cable can be 3, 5, 10, 15, 20, 30, 40, or 50 m long. (3 to 20 m: 5.2 dia 30 to 50 m: 6.8 dia)	**[Servo Drive Connector]** Connector: 55100-0670 (Molex Japan Co., Ltd.)  **[Servomotor Connector]** Angle clamp: JN6FR07SM1 (Japan Aviation Electronics Industry, Ltd.) Connector pins: LY10-C1-A1-10000 (Japan Aviation Electronics Industry, Ltd.)
			Cylindrical Servomotors, 3,000 r/min, For 1 kW (200 V) For 750 W (400 V) Cylindrical Servomotors, 2,000 r/min, Cylindrical Servomotors, 1,000 r/min, (Absolute encoder/ Incremental encoder)	R88A-CRKC□□□N The empty boxes in the model number are for the cable length. The cable can be 3, 5, 10, 15, 20, 30, 40, or 50 m long.	**[Servo Drive Connector]** Connector: 55100-0670 (Molex Japan Co., Ltd.)  **[Servomotor Connector]** Straight plug: JN2DS10SL2-R (Japan Aviation Electronics Industry, Ltd.) Contact: JN1-22-22S-10000 (Japan Aviation Electronics Industry, Ltd.)
	Robot Cables	Robot Encoder Cables with Connectors	Cylindrical Servomotors, 3,000 r/min, 50 to 750 W (Absolute encoder/ Incremental encoder)	R88A-CRKA□□□CR The empty boxes in the model number are for the cable length. The cable can be 3, 5, 10, 15, 20, 30, 40, or 50 m long. (3 to 20 m: 5.2 dia 30 to 50 m: 6.8 dia)	**[Servo Drive Connector]** Connector: 55100-0670 (Molex Japan Co., Ltd.)  **[Servomotor Connector]** Angle clamp: JN6FR07SM1 (Japan Aviation Electronics Industry, Ltd.) Connector pins: LY10-C1-A1-10000 (Japan Aviation Electronics Industry, Ltd.)
			Cylindrical Servomotors, 3,000 r/min, For 1 kW (200 V) For 750 W (400 V) Cylindrical Servomotors, 2,000 r/min, Cylindrical Servomotors, 1,000 r/min, (Absolute encoder/ Incremental encoder)	R88A-CRKC□□□NR The empty boxes in the model number are for the cable length. The cable can be 3, 5, 10, 15, 20, 30, 40, or 50 m long. (3 to 20 m: 6.8 dia 30 to 50 m: 7.7 dia)	**[Servo Drive Connector]** Connector: 55100-0670 (Molex Japan Co., Ltd.)  **[Servomotor Connector]** Straight plug: JN2DS10SL2-R (Japan Aviation Electronics Industry, Ltd.) Contact: JN1-22-22S-10000 (Japan Aviation Electronics Industry, Ltd.)

Note: Insert the cable length into the boxes in the model number of cables. (3 m: 003, 5 m: 005, 10 m: 010)

Absolute Encoder Backup Battery and Absolute Encoder Battery Cable

Symbol	Name	Specifications		Model	Description
(4)	Absolute Encoder Battery Cable	Battery not included	0.3 m	R88A-CRGD0R3C	 43.5 300 43.5 90±5 110 18.8 31 18.8 t=12 T=27.2 Battery holder t=12
		One R88A-BAT01G Battery included.	0.3 m	R88A-CRGD0R3C-BS	
	Absolute Encoder Backup Battery	–		R88A-BAT01G	–

Control Cables (for CN1)

Symbol	Name		Connected to		Model
(5)	For Connector Terminal Block	Connector Terminal Block Cables	Cable for EtherCAT Communications		XW2Z-□□□J-B34 The empty boxes in the model number are for the cable length. The cable can be 1, or 2 m long.
(6)		Connector-Terminal Block Conversion Units	Cable for EtherCAT Communications	Slotted screw (rise up) M3	XW2R-E20GD-T
				Phillips screw M3	XW2R-J20GD-T
				Push-in spring	XW2R-P20GD-T

Note: Insert the cable length into the boxes in the model number of cables. (3 m: 003, 5 m: 005, 10 m: 010)

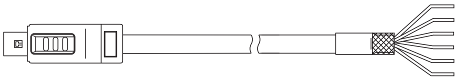
Monitor Connector (for CN5)

Symbol	Name	Lengths	Model
(7)	Analog Monitor Cable	1 m	R88A-CMK001S

EtherCAT Communication Cable

Symbol	Name	Description
(8)	Ethernet Cable	EtherCAT Communication Cables • Use a category 5 or higher cable with double, aluminum tape and braided shielding. Connector (Modular Plug) Specifications • Use a category 5 or higher, shielded connector.

External encoder Cables

Symbol	Name	Length (L)	Model	Description
(9)	Serial Communications Cable	10m	R88A-CRKE010SR	CN4 with Connectors 

Connectors

Connectors	Name	Model
CN1	Control I/O Connector (EtherCAT Communications)	R88A-CNW01C
CN2	Encoder Connector	R88A-CNW01R
CN4	External scale connector	R88A-CNK41L
CN8	Safety connector	R88A-CNK81S

Servomotor Connector

Connectors	Name	Connected to	Model
–	Motor connector for encoder cable	3,000 r/min, 50 to 750 W	R88A-CNK02R
		3,000 r/min, 1 to 5 kW (200 V)/750 W to 5 kW (400 V) 2,000 r/min, 1,000 r/min	R88A-CNK04R
–	Power cable connector	750 W max. (100 V/200 V)	R88A-CNK11A
–	Brake cable connector	750 W max. (100 V/200 V)	R88A-CNK11B

Multi-function Compact Inverter

MX2-Series V1 type

Born to drive machines

- Positioning functionality.
- Fieldbus communications with optional unit EtherCAT, CompoNet and DeviceNet
- Drive Programming.
- Current vector Control.
- High Starting torque: 200% at 0.5 Hz.
- Safety function* EN ISO 13849-1:2008 (Cat.3/PLd) IEC 60204-1 Stop Category 0
- Speed range up to 580 Hz.

* When optional DeviceNet communication unit or CompoNet communication unit is mounted onto the MX2, the inverter will not conform to the safety standards.

Performance Specifications

Inverter 3G3MX2

3-phase 200 V Class

Function name			3-phase 200 V										
Model name (3G3MX2-)			A2001-V1	A2002-V1	A2004-V1	A2007-V1	A2015-V1	A2022-V1	A2037-V1	A2055-V1	A2075-V1	A2110-V1	A2150-V1
Applicable motor capacity	**kW**	**CT**	0.1	0.2	0.4	0.75	1.5	2.2	3.7	5.5	7.5	11	15
		VT	0.2	0.4	0.75	1.1	2.2	3.0	5.5	7.5	11	15	18.5
	HP	**CT**	1/8	1/4	1/2	1	2	3	5	7 1/2	10	15	20
		VT	1/4	1/2	1	1 1/2	3	4	7 1/2	10	15	20	25
Rated output capacity [kVA]	**200 V**	**CT**	0.2	0.5	1.0	1.7	2.7	3.8	6.0	8.6	11.4	16.2	20.7
		VT	0.4	0.6	1.2	2.0	3.3	4.1	6.7	10.3	13.8	19.3	23.9
	240 V	**CT**	0.3	0.6	1.2	2.0	3.3	4.5	7.2	10.3	13.7	19.5	24.9
		VT	0.4	0.7	1.4	2.4	3.9	4.9	8.1	12.4	16.6	23.2	28.6
Rated input voltage			3-phase 200 V - 15% to 240 V + 10%, 50/60 Hz ± 5%										
Rated input current [A]		**CT**	1.0	1.6	3.3	6.0	9.0	12.7	20.5	30.8	39.6	57.1	62.6
		VT	1.2	1.9	3.9	7.2	10.8	13.9	23.0	37.0	48.0	68.0	72.0
Rated output voltage			3-phase 200 to 240 V (The output cannot exceed the incoming voltage).										
Rated output current [A]		**CT**	1.0	1.6	3.0	5.0	8.0	11.0	17.5	25.0	33.0	47.0	60.0
		VT	1.2	1.9	3.5	6.0	9.6	12.0	19.6	30.0	40.0	56.0	69.0
Short-time deceleration braking torque (%) (Discharge Resistor not connected)			50	50	50	50	50	20	20	20	20	10	10
Braking Resistor circuit *	**Regenerative braking**		Built-in Braking Resistor circuit (separate Discharge Resistor)										
	Min. connectable resistance [Ω]		100	100	100	50	50	35	35	20	17	17	10
Weight [kg]			1.0	1.0	1.1	1.2	1.6	1.8	2.0	3.3	3.4	5.1	7.4
Dimensions (width × height) [mm]			68 × 128				108 × 128		140 × 128	140 × 260		180 × 296	220 × 350
Dimensions (depth) [mm]			109		122.5	145.5	170.5		170.5	155		175	

* The BRD usage is 10%.

3-phase 400 V Class

Function name			3-phase 400 V									
Model name (3G3MX2-)			A4004-V1	A4007-V1	A4015-V1	A4022-V1	A4030-V1	A4040-V1	A4055-V1	A4075-V1	A4110-V1	A4150-V1
Applicable motor capacity	**kW**	**CT**	0.4	0.75	1.5	2.2	3.0	4.0	5.5	7.5	11	15
		VT	0.75	1.5	2.2	3.0	4.0	5.5	7.5	11	15	18.5
	HP	**CT**	1/2	1	2	3	4	5	7 1/2	10	15	20
		VT	1	2	3	4	5	7 1/2	10	15	20	25
Rated output capacity [kVA]	**380 V**	**CT**	1.1	2.2	3.1	3.6	4.7	6.0	9.7	11.8	15.7	20.4
		VT	1.3	2.6	3.5	4.5	5.7	7.3	11.5	15.1	20.4	25.0
	480 V	**CT**	1.4	2.8	3.9	4.5	5.9	7.6	12.3	14.9	19.9	25.7
		VT	1.7	3.4	4.4	5.7	7.3	9.2	14.5	19.1	25.7	31.5
Rated input voltage			3-phase 380 V - 15% to 480 V + 10%, 50/60 Hz ± 5%									
Rated input current [A]		**CT**	1.8	3.6	5.2	6.5	7.7	11.0	16.9	18.8	29.4	35.9
		VT	2.1	4.3	5.9	8.1	9.4	13.3	20.0	24.0	38.0	44.0
Rated output voltage			3-phase 380 to 480 V (The output cannot exceed the incoming voltage).									
Rated output current [A]		**CT**	1.8	3.4	4.8	5.5	7.2	9.2	14.8	18.0	24.0	31.0
		VT	2.1	4.1	5.4	6.9	8.8	11.1	17.5	23.0	31.0	38.0
Short-time deceleration braking torque (%) (Discharge Resistor not connected)			50	50	50	20	20	20	20	20	10	10
Braking Resistor circuit *	**Regenerative braking**		Built-in Braking Resistor circuit (separate Discharge Resistor)									
	Min. connectable resistance [Ω]		180	180	180	100	100	100	70	70	70	35
Weight [kg]			1.5	1.6	1.8	1.9	1.9	2.1	3.5	3.5	4.7	5.2
Dimensions (width × height) [mm]			108 × 128					140 × 128	140 × 260		180 × 296	
Dimensions (depth) [mm]			143.5	170.5				170.5	155		175	

* The BRD usage is 10%.

1-phase 200 V Class

Function name			1-phase 200 V					
Model name (3G3MX2-)			AB001-V1	AB002-V1	AB004-V1	AB007-V1	AB015-V1	AB022-V1
Applicable motor capacity	**kW**	**CT**	0.1	0.2	0.4	0.75	1.5	2.2
		VT	0.2	0.4	0.55	1.1	2.2	3.0
	HP	**CT**	1/8	1/4	1/2	1	2	3
		VT	1/4	1/2	3/4	1 1/2	3	4
Rated output capacity [kVA]	**200 V**	**CT**	0.2	0.5	1.0	1.7	2.7	3.8
		VT	0.4	0.6	1.2	2.0	3.3	4.1
	240 V	**CT**	0.3	0.6	1.2	2.0	3.3	4.5
		VT	0.4	0.7	1.4	2.4	3.9	4.9
Rated input voltage			1-phase 200 V - 15% to 240 V + 10%, 50/60 Hz ± 5%					
Rated input current [A]		**CT**	1.3	3.0	6.3	11.5	16.8	22.0
		VT	2.0	3.6	7.3	13.8	20.2	24.0
Rated output voltage			3-phase 200 to 240 V (The output cannot exceed the incoming voltage).					
Rated output current [A]		**CT**	1.0	1.6	3.0	5.0	8.0	11.0
		VT	1.2	1.9	3.5	6.0	9.6	12.0
Short-time deceleration braking torque (%) (Discharge Resistor not connected)			50	50	50	50	50	20
Braking Resistor circuit *	**Regenerative braking**		Built-in Braking Resistor circuit (separate Discharge Resistor)					
	Min. connectable resistance [Ω]		100	100	100	50	50	35
Weight [kg]			1.0	1.0	1.1	1.4	1.8	1.8
Dimensions (width × height) [mm]			68 × 128			108 × 128		
Dimensions (depth) [mm]			109		122.5	170.5		

* The BRD usage is 10%.

MX2-Series EtherCAT Communication Unit 3G3AX-MX2-ECT

This is the communication unit to connect the Multi-function Compact Inverter MX2 to EtherCAT network.
This communication unit passed the conformance test of EtherCAT.

Common Specifications

Item		Specifications
Model		3G3AX-MX2-ECT
Power supply		Supplied from the inverter
Protective structure		Open type (IP20)
Ambient Operating Temperature		–10 to +50°C
Ambient Storage Temperature		–20 to +65°C
Ambient Operating Humidity		20% to 90% RH (with no condensation)
Vibration Resistance		5.9 m/s^2 (0.6 G), 10 to 55 Hz
Application environment		At a maximum altitude of 1,000 m; indoors (without corrosive gases or dust)
Weight		100 g max.
International standard	UL/cUL	UL508C
	EC directive	EMC Directive :EN61800-3:2004 Low Voltage Directive :EN61800-5-1:2003

EtherCAT Communications Specifications

Item	Specifications
Communications standard	IEC 61158 Type12, IEC 61800-7 CiA 402 drive profile
Physical layer	100BASE-TX (IEEE802.3)
Connector	RJ45 × 2 (shielded type) ECAT IN : EtherCAT input ECAT OUT : EtherCAT output
Communications media	Category 5 or higher (cable with double, aluminum tape and braided shielding) is recommended.
Communications distance	Distance between nodes: 100 m max.
Process data	Fixed PDO mapping PDO mapping
Mailbox (CoE)	Emergency messages, SDO requests, SDO responses, and SDO information
Distributed clock	FreeRun mode (asynchronous)
LED display	L/A IN (Link/Activity IN) × 1 L/A OUT (Link/Activity OUT) × 1 RUN × 1 ERR × 1
CiA402 drive profile	Velocity mode

Function Specifications

Function name		Specifications
Enclosure ratings *1		Open type (IP20)
Control	**Control method**	Phase-to-phase sinusoidal modulation PWM
	Output frequency range *2	0.10 to 400 Hz (or 580 Hz in the high-frequency mode; restrictions apply)
	Frequency precision *3	Digital command: ±0.01% of the max. frequency, Analog command: ±0.2% of the max. frequency (25±10°C)
	Frequency setting resolution	Digital setting: 0.01 Hz, Analog setting: One-thousandth of the maximum frequency
	Voltage/Frequency characteristics	V/f characteristics (constant/reduced torque) Sensorless vector control, V/f control with speed feedback
	Overload current rating	Heavy load rating (CT): 150%/60 s Light load rating (VT): 120%/60 s
	Instantaneous overcurrent protection	200% of the value of heavy load rating (CT)
	Acceleration/Deceleration time	0.01 to 3600 s (linear/curve selection), acceleration/deceleration 2 setting available
	Carrier frequency adjustment range	2 to 15 kHz (with derating)
	Starting torque	200%/0.5 Hz (sensorless vector control)
	External DC injection braking	Starts at a frequency lower than that in deceleration via the STOP command, at a value set lower than that during operation, or via an external input. (Level and time settable).
Protective functions		Overcurrent, overvoltage, undervoltage, electronic thermal, temperature error, ground fault overcurrent at power-on status, rush current prevention circuit, overload limit, incoming overvoltage, external trip, memory error, CPU error, USP error, communication error, overvoltage suppression during deceleration, protection upon momentary power outage, emergency cutoff, etc.
Input signal	**Frequency settings**	Digital Operator External analog input signal: 0 to 10 VDC/4 to 20 mA, Modbus communication (Modbus-RTU)
	RUN/STOP command	Digital Operator External digital input signal (3-wire input supported), Modbus communication (Modbus-RTU)
	Multi-function input	7 points (Selectable from 59 functions)
	Analog input	2 points (Voltage FV terminal: 10 bits/0 to 10 V, Current FI terminal: 10 bits/4 to 20 mA)
	Pulse input	1 point (RP terminal: 32 kHz max., 5 to 24 VDC)
Output signal	**Multi-function output**	2 points (P1/EDM, P2; selectable from 43 functions)
	Relay output	1 point (1c contact: MC, MA, MB; selectable from 43 functions)
	Analog output (Frequency monitor)	1 point (AM terminal: Voltage 10 bits/0 to 10 V) (Frequency, current selectable)
	Pulse output	1 point (MP terminal: 32 kHz max., 0 to 10 V)
Communications	**RS-422**	RJ45 connector (for Digital Operator)
	RS-485	Control circuit terminal block, Modbus communication (Modbus-RTU)
	USB	USB1.1, mini-B connector
Drive Programming *4		Calculate, Logic, Control I/O and so on
Other functions		AVR function, V/f characteristics switching, upper/lower limit, 16-step speeds, starting frequency adjustment, jogging operation, carrier frequency adjustment, PID control, frequency jump, analog gain/bias adjustment, S shape acceleration/deceleration, electronic thermal characteristics, level adjustment, restart function, torque boost function, fault monitor, soft lock function, frequency conversion display, USP function, motor 2 control function, UP/DWN, overcurrent control function, etc.
Operating environment	**Ambient operating temperature**	-10 to 50°C (However, derating is required).
	Ambient storage temperature	-20°C to 65°C
	Ambient operating humidity	20% to 90% RH (with no condensation)
	Vibration resistance	5.9 m/s^2 (0.6G), 10 to 55 Hz
	Application environment	At a maximum altitude of 1,000 m; indoors (without corrosive gases or dust)
Options	**EtherCAT Communication Unit**	3G3AX-MX2-ECT
	CompoNet Communication Unit	3G3AX-MX2-CRT-E
	DeviceNet Communication Unit	3G3AX-MX2-DRT-E
	I/O Unit	3G3AX-MX2-EI015-E

*1 Protection method complies with JEM 1030.
*2 To operate the motor at over 50/60 Hz, contact the motor manufacturer to find out the maximum allowable speed of revolution.
*3 For the stable control of the motor, the output frequency may exceed the maximum frequency set in A004 (A204) by 2 Hz max.
*4 Refer to the Drive Programming USER'S MANUAL (No. I580).

Function name			Specifications
Other option			DC reactor, AC reactor, radio noise filter, input noise filter, output noise filter, regenerative braking unit, Braking Resistor, EMC noise filter, etc.
International standard	**EC directive**	**EMC directive**	EN61800-3: 2004
		Low voltage directive	EN61800-5-1: 2007
		Machinery directives	IEC 60204-1 Stop Category 0, EN IEC 61800-5-2 (STO), EN ISO 13849-1: 2008 (PLd)
	UL/cUL		UL508C

Note: **1.** The applicable motor is a 3-phase standard motor. For using any other type, be sure that the rated current does not exceed that of the Inverter.
2. Output voltage decreases according to the level of the power supply voltage.
3. The braking torque at the time of capacitor feedback is an average deceleration torque at the shortest deceleration (when it stops from 50 Hz). It is not a continuous regeneration torque. Also, the average deceleration torque varies depending on the motor loss. The value is reduced in operation over 50 Hz.

Version Information

Unit Versions

Unit	Model	Unit version	
		Ver.1.0	Ver1.1
EtherCAT Communication Unit for MX2-Series	3G3AX-MX2-ECT	Supported	Supported
Compatible Sysmac Studio version (To connect the NJ Controller)		Version1.05 or higher*	Version1.05 or higher
Compatible Sysmac Studio version (To connect the NX Controller)		Version1.13 or higher*	Version1.13 or higher*

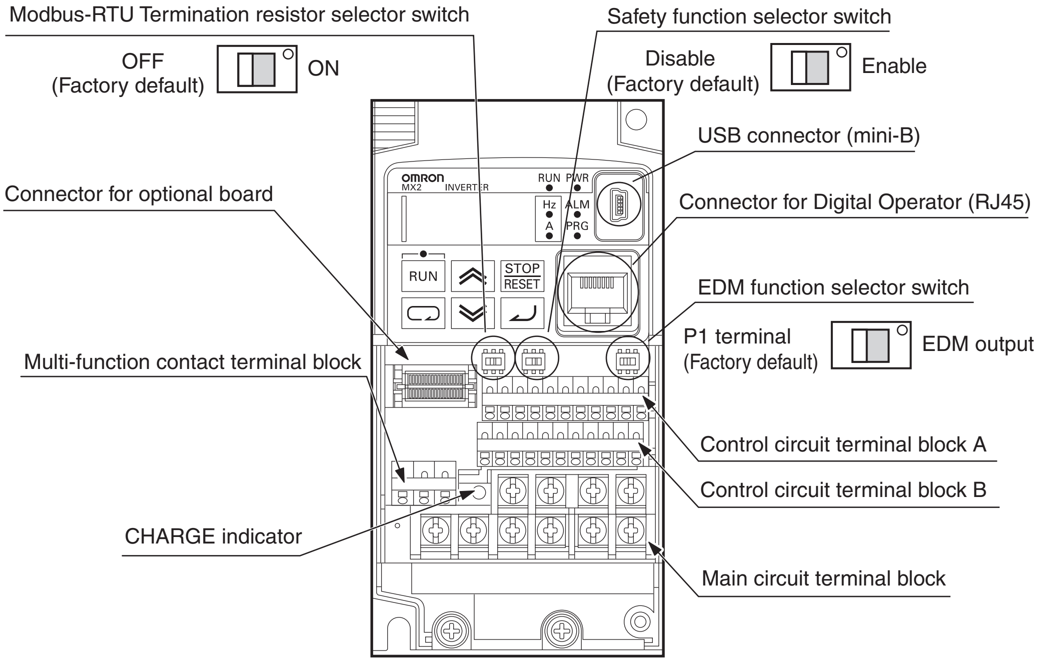
* The function that was enhanced by the upgrade for Unit version1.1 can not be used. For detail, refer to "Function Support by Unit Version".

Function Support by Unit Version

Unit Model Unit version / Item	Unit version 1.0	Unit version 1.1
Store-function of back-up number of parameters	Not supported	Supported
Initializing function as parameters.	Not supported	Supported

Components and Functions

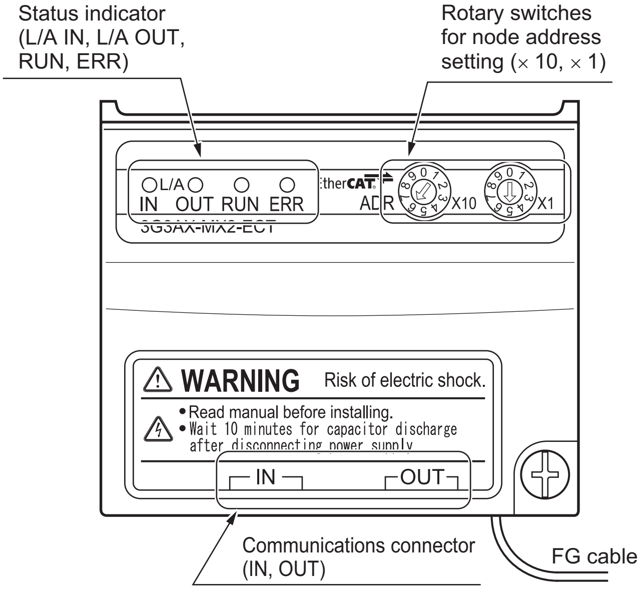
Inverter 3G3MX2


Modbus-RTU Termination resistor selector switch
OFF (Factory default)
ON
Safety function selector switch
Disable (Factory default)
Enable
USB connector (mini-B)
Connector for optional board
Connector for Digital Operator (RJ45)
EDM function selector switch
P1 terminal (Factory default)
EDM output
Multi-function contact terminal block
Control circuit terminal block A
Control circuit terminal block B
CHARGE indicator
Main circuit terminal block
omron
MX2 INVERTER
RUN PWR
Hz ALM
A PRG
RUN
STOP RESET

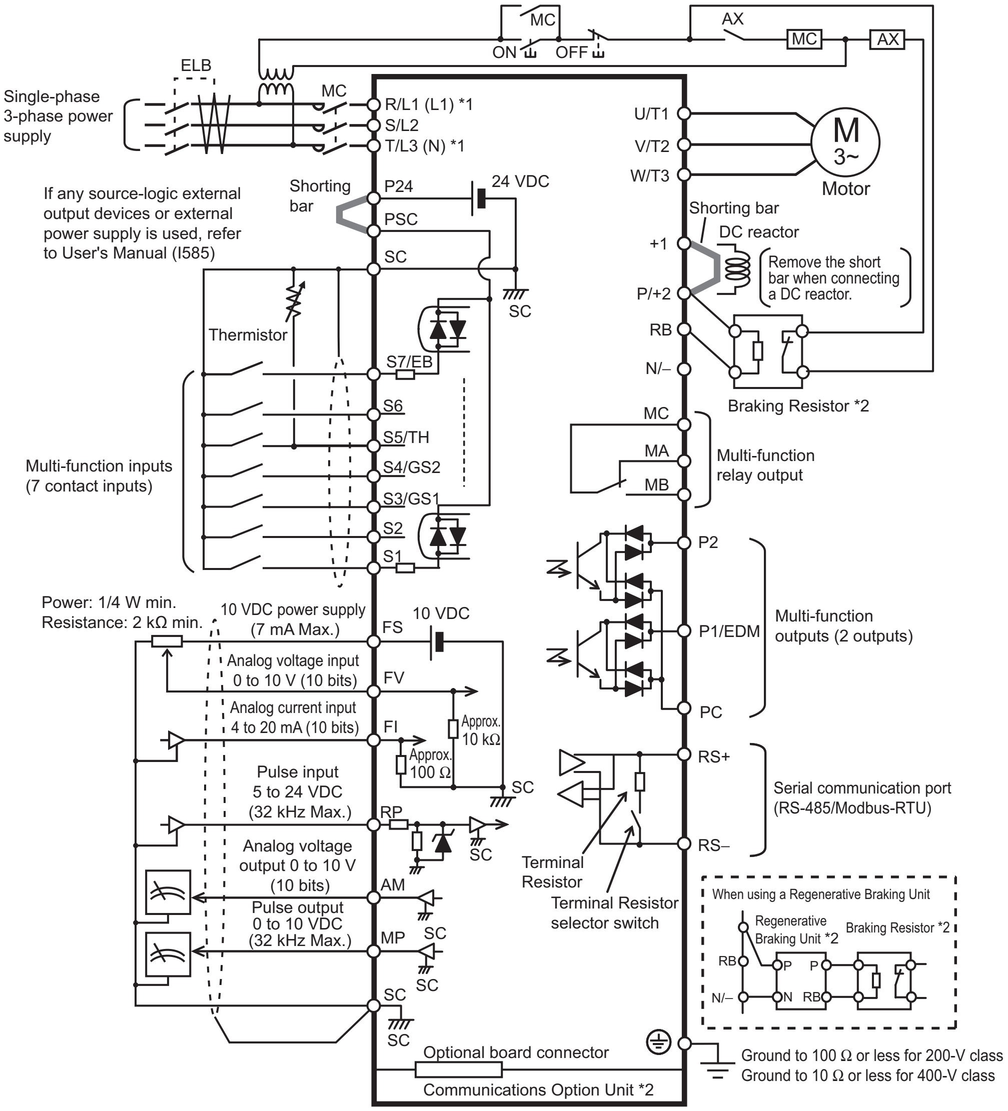
Name	Function
Modbus-RTU Termination resistor selector switch	Use this Terminal Resistor selector switch for RS-485 terminals on the control circuit terminal block. When this switch is turned ON, the internal 200 Ω Resistor is connected.
Safety function selector switch	Turn this switch ON when using the safety function. Turn OFF the power before turning this switch ON/OFF. For details, refer to USER'S MANUAL (Cat.No.I585).
EDM function selector switch	Turn this switch ON when using the EDM output of the safety function. Turn OFF the power before turning this switch ON/OFF.For details, refer to USER'S MANUAL (Cat.No.I585).
USB connector	Use this mini-B USB connector to connect a PC. Even when the Inverter is being operated by a PC, etc., via USB connection, it can still be operated using the Digital Operator.
Connector for Digital Operator	Use this connector to connect the Digital Operator.
Connector for optional board	Use this connector to mount the optional board. (Communications Units and other options can be connected.)
Control circuit terminal blocks A and B	These terminal blocks are used to connect various digital/analog input and output signals for inverter control, etc.
Multi-function contact terminal block	Use this SPDT contact terminal block for relay outputs.
Main circuit terminal block	Use this terminal block to connect an output to the motor and Braking Resistor, etc. Also, use this terminal block to connect the inverter to the main power supply.
CHARGE indicator (Charge indicator LED)	This LED indicator is lit if the DC voltage of the main circuit (between terminals P/+2 and N/-) remains approx. 45 V or above after the power has been cut off. Before wiring, etc. confirm that the Charge LED indicator is turned OFF.

Note: This illustration shows the terminal block with the front cover removed.

EtherCAT Communication Unit 3G3AX-MX2-ECT


Status indicator (L/A IN, L/A OUT, RUN, ERR)
Rotary switches for node address setting (× 10, × 1)
L/A IN
L/A OUT
RUN
ERR
3G3AX-MX2-ECT
EtherCAT
ADR
X10
X1
WARNING Risk of electric shock.
• Read manual before installing.
• Wait 10 minutes for capacitor discharge after disconnecting power supply.
IN
OUT
Communications connector (IN, OUT)
FG cable

Connection Diagram

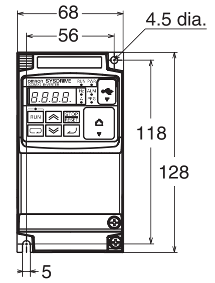

MC
AX
MC
AX
ON
OFF
ELB
Single-phase
3-phase power
supply
MC
R/L1 (L1) *1
S/L2
T/L3 (N) *1
U/T1
V/T2
W/T3
M
3~
Motor
If any source-logic external output devices or external power supply is used, refer to User's Manual (I585)
Shorting bar
P24
24 VDC
PSC
SC
SC
Shorting bar
+1
DC reactor
Remove the short bar when connecting a DC reactor.
P/+2
RB
N/–
Braking Resistor *2
Thermistor
S7/EB
S6
S5/TH
S4/GS2
S3/GS1
S2
S1
Multi-function inputs
(7 contact inputs)
MC
MA
MB
Multi-function
relay output
P2
P1/EDM
PC
Multi-function
outputs (2 outputs)
Power: 1/4 W min.
Resistance: 2 kΩ min.
10 VDC power supply
(7 mA Max.)
FS
10 VDC
Analog voltage input
0 to 10 V (10 bits)
FV
Analog current input
4 to 20 mA (10 bits)
FI
Approx.
10 kΩ
Approx.
100 Ω
SC
Pulse input
5 to 24 VDC
(32 kHz Max.)
RP
SC
Analog voltage
output 0 to 10 V
(10 bits)
AM
Pulse output
0 to 10 VDC
(32 kHz Max.)
MP
SC
SC
SC
SC
RS+
RS–
Serial communication port
(RS-485/Modbus-RTU)
Terminal
Resistor
Terminal Resistor
selector switch
When using a Regenerative Braking Unit
Regenerative
Braking Unit *2
Braking Resistor *2
RB
P
P
N/–
N
RB
Optional board connector
Communications Option Unit *2
Ground to 100 Ω or less for 200-V class
Ground to 10 Ω or less for 400-V class

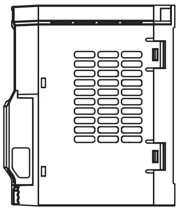
*1 Connect to terminals L1 and N on a single-phase, 200-V Inverter (3G3MX2-AB□□□-V1).
*2 Optional.

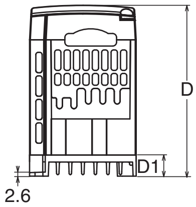
Dimensions

(Unit: mm)

3G3MX2-AB001-V1
3G3MX2-AB002-V1
3G3MX2-AB004-V1
3G3MX2-A2001-V1
3G3MX2-A2002-V1
3G3MX2-A2004-V1
3G3MX2-A2007-V1

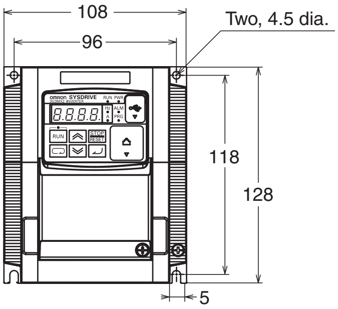


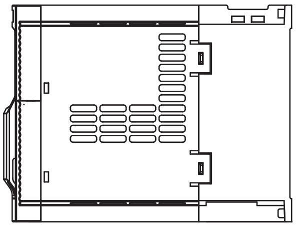


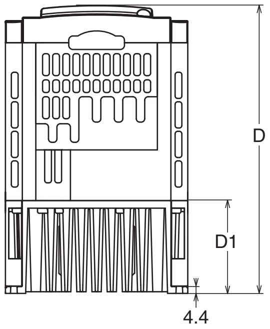


Power supply	Model	W [mm]	H [mm]	D [mm]	D1 [mm]
1-phase 200 V	3G3MX2-AB001-V1 3G3MX2-AB002-V1	68	128	109	13.5
	3G3MX2-AB004-V1			122.5	27
3-phase 200 V	3G3MX2-A2001-V1 3G3MX2-A2002-V1			109	13.5
	3G3MX2-A2004-V1			122.5	27
	3G3MX2-A2007-V1			145.5	50

3G3MX2-AB007-V1
3G3MX2-AB015-V1
3G3MX2-AB022-V1
3G3MX2-A2015-V1
3G3MX2-A2022-V1
3G3MX2-A4004-V1
3G3MX2-A4007-V1
3G3MX2-A4015-V1
3G3MX2-A4022-V1
3G3MX2-A4030-V1

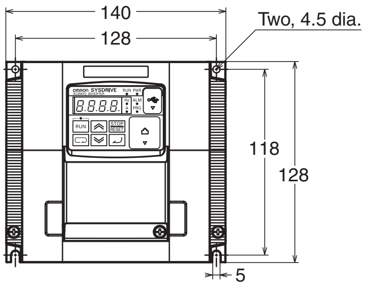


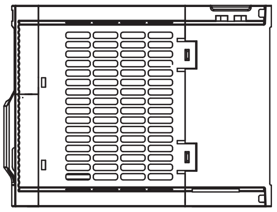


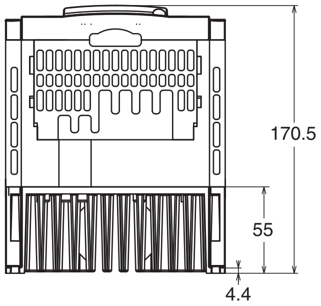


Power supply	Model	W [mm]	H [mm]	D [mm]	D1 [mm]
1-phase 200 V	3G3MX2-AB007-V1 3G3MX2-AB015-V1 3G3MX2-AB022-V1	108	128	170.5	55
3-phase 200 V	3G3MX2-A2015-V1 3G3MX2-A2022-V1				
3-phase 400 V	3G3MX2-A4004-V1			143.5	28
	3G3MX2-A4007-V1 3G3MX2-A4015-V1 3G3MX2-A4022-V1 3G3MX2-A4030-V1			170.5	55

3G3MX2-A2037-V1
3G3MX2-A4040-V1



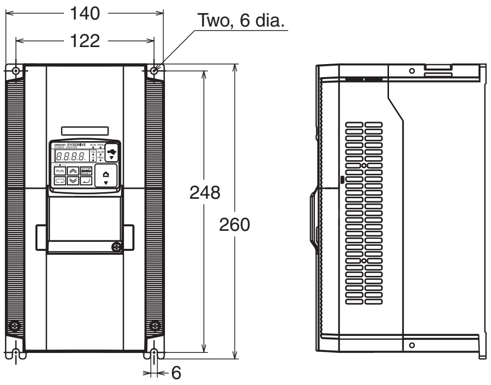


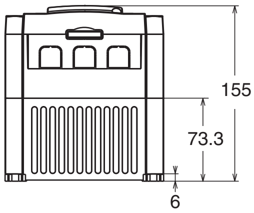


Power supply	Model	W [mm]	H [mm]	D [mm]	D1 [mm]
3-phase 200 V	3G3MX2-A2037-V1	140	128	170.5	55
3-phase 400 V	3G3MX2-A4040-V1				

System Configuration
Controllers
Softwares
Programmable Terminals
EtherCAT Slave Terminals
Safety
Mortion/Drives
Inverters
Sensors
Remote I/O Terminals
Ordering Information
Performance Specifications
Function Specifications
Version Information
Components and Functions
Connection Diagram
Dimensions
Related Options

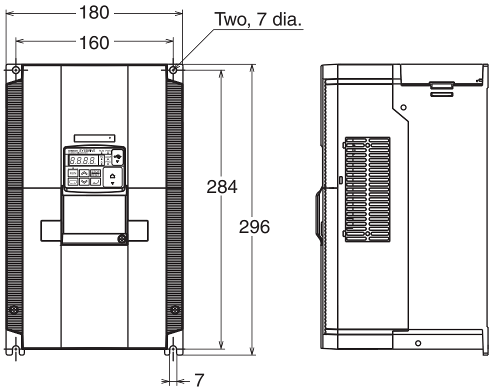
3G3MX2-A2055-V1
3G3MX2-A2075-V1
3G3MX2-A4055-V1
3G3MX2-A4075-V1

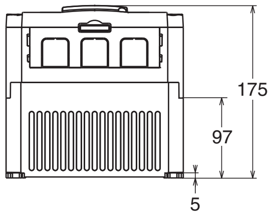

140
122
Two, 6 dia.
248
260
6



Power supply	Model	W [mm]	H [mm]	D [mm]	D1 [mm]
3-phase 200 V	3G3MX2-A2055-V1 3G3MX2-A2075-V1	140	260	155	73.3
3-phase 400 V	3G3MX2-A4055-V1 3G3MX2-A4075-V1				

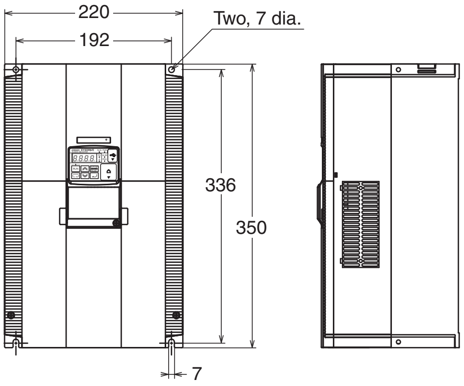
3G3MX2-A2110-V1
3G3MX2-A4110-V1
3G3MX2-A4150-V1

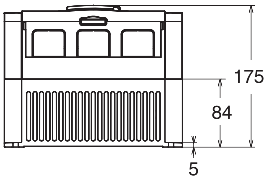

180
160
Two, 7 dia.
284
296
7



Power supply	Model	W [mm]	H [mm]	D [mm]	D1 [mm]
3-phase 200 V	3G3MX2-A2110-V1	180	296	175	97
3-phase 400 V	3G3MX2-A4110-V1 3G3MX2-A4150-V1				

3G3MX2-A2150-V1

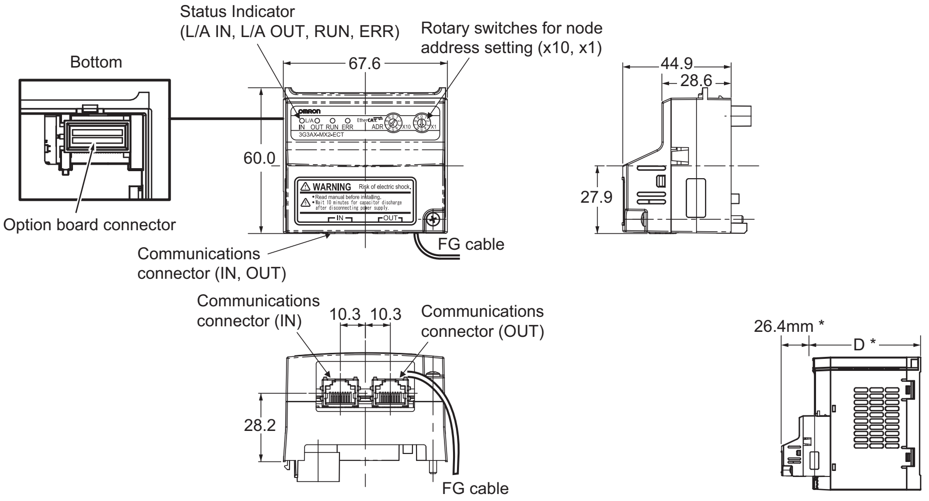

220
192
Two, 7 dia.
336
350
7



Power supply	Model	W [mm]	H [mm]	D [mm]	D1 [mm]
3-phase 200 V	3G3MX2-A2150-V1	220	350	175	84

EtherCAT Communication Unit

3G3AX-MX2-ECT


Status Indicator
(L/A IN, L/A OUT, RUN, ERR)
Rotary switches for node address setting (x10, x1)
Bottom
67.6
44.9
28.6
60.0
27.9
WARNING
Option board connector
Communications connector (IN, OUT)
FG cable
IN
OUT
Communications connector (IN)
10.3
10.3
Communications connector (OUT)
28.2
FG cable
26.4mm *
D *

* After the EtherCAT Communication Unit is installed, dimension D of the inverter increases by 26.4 mm.
(Dimension D of the inverter varies depending on the capacity. Refer to the MX2-series V1 type USER'S MANUAL (Cat.No.I585))

Related Options

Refer to Ordering Information of MX2-Series V1 type Inverters for the related Options.

High-function General-purpose Inverters

RX Series V1 Type

Versatile for a Wide Range of Applications

- Double rating VT 120%/1 min and CT 150% /1 min.
- Drive Programming
- LCD 5 line Digital Operator (Optional)
- Fieldbus communications with optional unit EtherCAT
- Built-in radio noise filter/EMC filter (Selectable)

Performance Specifications

Inverter 3G3RX-V1

3-phase 200-V Class

CT: Heavy load rating VT: Light load rating

Item	Model name (3G3RX-)		3-phase 200-V class														
			A2004-V1	**A2007-V1**	**A2015-V1**	**A2022-V1**	**A2037-V1**	**A2055-V1**	**A2075-V1**	**A2110-V1**	**A2150-V1**	**A2185-V1**	**A2220-V1**	**A2300-V1**	**A2370-V1**	**A2450-V1**	**A2550-V1**
Maximum applicable motor capacity (kW)		**CT**	0.4	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55
		VT	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75
Rated output capacity (kVA)	**200V**	**CT**	1.0	1.7	2.5	3.6	5.7	8.3	11.0	15.9	22.1	26.3	32.9	41.9	50.2	63.0	76.2
		VT	1.2	2.1	3.2	4.1	6.7	10.3	15.2	20.0	25.2	29.4	39.1	48.4	58.5	72.7	93.5
	240V	**CT**	1.2	2.0	3.1	4.3	6.8	9.9	13.3	19.1	26.6	31.5	39.4	50.2	60.2	75.6	91.4
		VT	1.5	2.6	3.9	4.9	8.1	12.4	18.2	24.1	30.3	35.5	46.9	58.1	70.2	87.2	112.2
Rated input voltage			3-phase 200 V -15% to 240 V +10%, 50/60 Hz ±5%														
Rated input current (A)		**CT**	3.3	5.5	8.3	12	18	26	35	51	70	84	105	133	160	200	242
		VT	3.9	7.2	10.8	13.9	23	37	48	64	80	94	120	150	186	240	280
Rated output voltage			3-phase 200 to 240 V (Cannot exceed that of incoming voltage)														
Rated output current (A)		**CT**	3.0	5.0	7.5	10.5	16.5	24	32	46	64	76	95	121	145	182	220
		VT	3.7	6.3	9.4	12	19.6	30	44	58	73	85	113	140	169	210	270
EMC Noise Filter			Built-in (EMC Directive EN61800-3 Category C3)														
Weight (kg)			3.5	3.5	3.5	3.5	3.5	6	6	6	14	14	14	22	30	30	43
Braking Resistor circuit	**Regenerative braking**		Built-in Braking Resistor circuit (separate Discharge Resistor)											Separate Regenerative Braking Unit			
	Min. connectable resistance (Ω)		50	50	35	35	35	16	10	10	7.5	7.5	5	---			
Maximum leakage current (mA)	**EMC filter enabled**		2.5					48			23						
	EMC filter disabled		0.1														

3-phase 400-V Class

CT: Heavy load rating VT: Light load rating

Item	Model name (3G3RX-)		3-phase 400-V class										
			A4004-V1	**A4007-V1**	**A4015-V1**	**A4022-V1**	**A4037-V1**	**A4055-V1**	**A4075-V1**	**A4110-V1**	**A4150-V1**	**A4185-V1**	**A4220-V1**
Maximum applicable motor capacity (kW)		**CT**	0.4	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22
		VT	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30
Rated output capacity (kVA)	**400V**	**CT**	1.0	1.7	2.6	3.6	6.2	9.6	13.1	17.3	22.1	26.3	33.2
		VT	1.3	2.1	3.3	4.6	7.6	11.0	15.2	20.0	25.6	29.7	39.4
	480V	**CT**	1.2	2.0	3.1	4.4	7.4	11.6	15.7	20.7	26.6	31.5	39.9
		VT	1.5	2.5	3.9	5.5	9.2	13.3	18.2	24.1	30.7	35.7	47.3
Rated input voltage			3-phase 380 V -15% to 480 V +10%, 50/60 Hz ±5%										
Rated input current (A)		**CT**	1.8	2.8	4.2	5.8	9.8	15	21	28	35	42	53
		VT	2.1	4.3	5.9	8.1	13.3	20	24	32	41	47	63
Rated output voltage			3-phase 380 to 480 V (Cannot exceed that of incoming voltage)										
Rated output current (A)		**CT**	1.5	2.5	3.8	5.3	9.0	14	19	25	32	38	48
		VT	1.9	3.1	4.8	6.7	11.1	16	22	29	37	43	57
EMC Noise Filter			Built-in (EMC Directive EN61800-3 Category C3)										
Weight (kg)			3.5	3.5	3.5	3.5	3.5	6	6	6	14	14	14
Braking Resistor circuit	**Regenerative braking**		Built-in Braking Resistor circuit (separate Discharge Resistor)										
	Min. connectable resistance (Ω)		100	100	100	100	70	70	35	35	24	24	20
Maximum leakage current (mA)	**EMC filter enabled**		5					95			56		
	EMC filter disabled		0.2										

Item	Model name (3G3RX-)		3-phase 400-V class							
			A4300-V1	**A4370-V1**	**A4450-V1**	**A4550-V1**	**B4750-V1**	**B4900-V1**	**B411K-V1**	**B413K-V1**
Applicable motor capacity (kW)		**CT**	30	37	45	55	75	90	110	132
		VT	37	45	55	75	90	110	132	160
Rated output capacity (kVA)	**400V**	**CT**	40.1	51.9	63.0	77.5	103.2	121.9	150.3	180.1
		VT	48.4	58.8	72.7	93.5	110.8	135	159.3	200.9
	480V	**CT**	48.2	62.3	75.6	93.1	123.8	146.3	180.4	216.1
		VT	58.1	70.6	87.2	112.2	133	162.1	191.2	241.1
Rated input voltage			3-phase 380 V -15% to 480 V +10%, 50/60 Hz ±5%							
Rated input current (A)		**CT**	64	83	100	121	164	194	239	286
		VT	77	94	116	149	176	199	253	300
Rated output voltage			3-phase 380 to 480 V (according to the input voltage)							
Rated output current (A)		**CT**	58	75	91	112	149	176	217	260
		VT	70	85	105	135	160	195	230	290
EMC Noise Filter			Built-in (EMC Directive EN61800-3 Category C3)							
Weight (kg)			22	30	30	30	55	55	70	70
Braking Resistor circuit	**Regenerative braking**		Separate Regenerative Braking Unit							
	Min. connectable resistance (Ω)		---							
Maximum leakage current (mA)	**EMC filter enabled**		56				0.2 (No enabled/disabled setting available)			
	EMC filter disabled		0.2							

Function Specifications

Inverter 3G3RX-V1

Function name			Specifications	
Enclosure ratings			IP20 (0.4 to 55 kW) IP00 (75 to 132 kW)	
Control method			Phase-to-phase sinusoidal modulation PWM	
Output frequency range			0.1 to 400 Hz	
Frequency precision			Digital command: ±0.01% of the maximum frequency, Analog command: ±0.2% of the maximum frequency (25±10°C)	
Frequency resolution			Digital setting: 0.01 Hz Analog setting: maximum frequency/4000 (Terminal FV: 12 bits/0 to +10 V), (Terminal FE: 12 bits/-10 to 10 V), (Terminal FI: 12 bits/0 to 20 mA)	
Voltage/Frequency characteristics			Heavy load rating (CT): V/f characteristics (constant torque, reduced torque, free V/f setting), sensorless vector control, 0-Hz sensorless vector control, sensor vector control Light load rating (VT) : V/f characteristics (constant torque, reduced torque, free V/f setting), sensorless vector control	
Overload current rating			Heavy load rating (CT): 150%/60 s, 200%/3 s (180%/3 s for 75 kW or more) Light load rating (VT): 120%/60 s, 150%/5 s	
Instantaneous overcurrent protection			200% of the value of heavy load rating (CT)	
Acceleration/Deceleration time			0.01 to 3600 s (linear/curve selection)	
Speed fluctuation			Heavy load rating (CT): ±0.5% *1, *2 Light load rating (VT): ±0.5% *1	
Carrier frequency adjustment range			(For 0.4 to 55kW) Heavy load rating (CT): 0.5 to15 kHz Light load rating (VT): 0.5 to12 kHz	(For 75 to 132kW) Heavy load rating (CT): 0.5 to 10 kHz Light load rating (VT): 0.5 to 8 kHz
Starting torque	**Sensor less vector control**		(For 0.4 to 55kW) Heavy load rating (CT): 200%/0.3 Hz *1 Light load rating (VT): 150%/0.5 Hz *1	(For 75 to 132kW) Heavy load rating (CT): 180%/0.3 Hz *1 Light load rating (VT): 120%/0.5 Hz *1
	0-Hz sensorless vector control		(For 0.4 to 55kW) Heavy load rating (CT): 150%/Torque at 0 Hz *3 Light load rating (VT): No function available	(For 75 to132kW) Heavy load rating (CT): 130%/Torque at 0 Hz *3 Light load rating (VT): No function available
External DC injection braking			Operates when the starting frequency is lower than that in deceleration via the STOP command, when the frequency reference is lower than the operation frequency, or via an external input (braking power, time, and frequency are variable)	
Protective functions			Overcurrent protection, Overvoltage protection, Undervoltage protection, Electronic thermal protection, Temperature error protection, Momentary power interruption/Power interruption protection, Input phase loss protection, Braking resistor overload protection, Ground-fault current detection at power-on, USP error, External trip, Emergency shutoff trip, CT error, Communication error, Option error, etc.	
Input signal	**Frequency settings**	**Standard Digital Operator**	Setting via ▲ ▼ keys	
		External signal *4	0 to 10 VDC, -10 to 10 VDC (Input impedance: 10 kΩ), 4 to 20 mA (Input impedance: 100 Ω)	
		External port	Setting through RS-485 communications	
	Forward or Reverse operation/Stop	**Standard Digital Operator**	RUN/STOP (Forward/reverse switched via parameter settings)	
		External signal	Forward/Stop (Reverse/Stop available at the time of multi-functional input terminal allocation), 3-wire input available (at the time of control circuit terminal block allocation)	
		External port	Setting through RS-485 communications	
	Multi-function input *5		8 terminals, NO/NC switchable, sink/source logic switchable Heavy load (CT): 8 functions can be selected from among 72 Light load (VT): 8 functions can be selected from among 57	
	Thermistor input terminal		1 terminal (Positive/Negative temperature coefficient of resistance element switchable)	
Output signal	**Multi-function output *5**		5 open collector output terminals: NO/NC switchable, sink/source logic switchable 1 relay (SPDT contact) output terminal: NO/NC switchable Heavy load (CT): 6 functions can be selected from among 55 Light load (VT): 6 functions can be selected from among 51	
	Multi-function monitor output terminal		Analog voltage output (0 to 10 V) *6 , Analog current output (0 to 20 mA) *6 , Pulse train output (maximum frequency 3.6 kHz)	
Display monitor			Output frequency, Output current, Output torque, Frequency conversion value, Trip record, I/O terminal status, Electric power, etc.	
Other functions			• Heavy load rating (CT) V/f free setting (7), Upper/lower frequency limit, Frequency jump, Curve acceleration/deceleration, Manual torque boost level/break, Energy-saving operation, Analog meter adjustment, Starting frequency, Carrier frequency adjustment, Electronic thermal function (free setting available), External start/end (frequency/rate), Analog input selection, Trip retry, Restart during momentary power interruption, Various signal outputs, Reduced voltage startup, Overload limit, Initialization value setting, Automatic deceleration at power-off, AVR function, Automatic acceleration/deceleration, Auto tuning (Online/Offline) • Light load rating (VT) V/f free setting (7), Upper/lower frequency limit, Frequency jump, Curve acceleration/deceleration, Manual torque boost level/break, Energy-saving operation, Analog meter adjustment, Starting frequency, Carrier frequency adjustment, Electronic thermal function (free setting available), External start/end (frequency/rate), Analog input selection, Trip retry, Restart during momentary power interruption, Various signal outputs, Reduced voltage startup, Overload limit, Initialization value setting, Automatic deceleration at power-off, AVR function, Auto tuning (Online/Offline)	

*1 Applicable in the sensorless vector control

*2 Applicable in the 0-Hz sensorless vector control

*3 Applicable in the 0 Hz sensorless vector control when using a motor one size smaller in capacity than the inverter

*4 The maximum frequency is set to 9.8 V for a voltage input of 0 to 10 VDC and to 19.8 mA for an current input of 4 to 20 mA, respectively. If this causes any inconvenience, change the default datas.

*5 In the VT mode, the available functions are limited compared with the CT mode. The default setting and setting range of some functions also differ.

*6 The analog voltage and current values for the multi-function monitor output terminals show values that can only be used as a guide for analog meter connection. The maximum output value may differ slightly from 10 V or 20 mA due to the variability of the analog output circuit. If this causes any inconvenience, refer to the RX series V1 type User's Manual. (Man.No.I578) to adjust the default settings.

Function name			Specifications
Operating environment	**Ambient operating temperature**		Heavy load rating (CT): –10 to 50°C Light load rating (VT): –10 to 40°C
	Ambient storage temperature		–20 to 65°C
	Ambient operating humidity		20% to 90% (with no condensation)
	Vibration resistance *7		5.9m/s^2 (0.6G), 10 to 55Hz / 0.4 to 22kW 2.94m/s^2 (0.3G), 10 to 55Hz / 30 to 132kW
	Application environment		At a maximum altitude of 1,000 m (without corrosive gases or dust) *8
Options	**PG Board**		Sensor vector control 3G3AX-PG01
	EtherCAT Communication Unit		3G3AX-RX-ECT
	CompoNet^{TM} Communication Unit		3G3AX-RX-CRT-E
	DeviceNet^{TM} Communication Unit		3G3AX-RX-DRT-E
Other options			Braking Resistor, AC reactor, DC reactor, Digital Operator, Digital Operator cables, Noise filter, Regenerative braking unit, etc.
International standard	**EC Directive**	**EMC Directive**	EN61800-3: 2004
		Low Voltage Directive	EN61800-5-1: 2003
	UL/cUL		UL508C

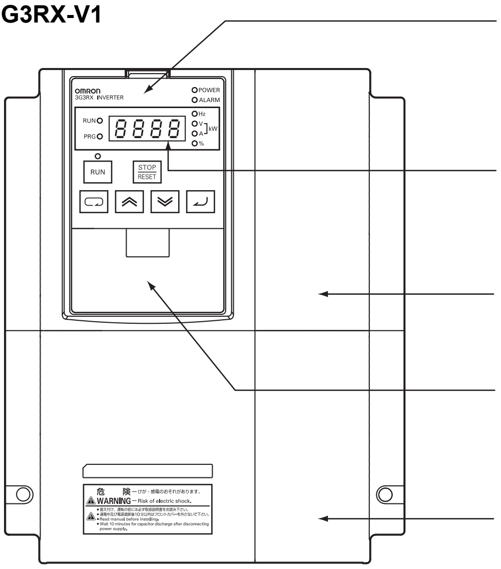
*7 Complies with the test method specified in JIS C60068-2-6: 2010 (IEC 60068-2-6: 2007).

*8 If the altitude is higher than 1,000 m, reduce the amount of heat generation because air density decreases by 1% with the increasing altitude by 100 m. For switching devices such as IGBTs, the amount of heat generation is proportional to the current flowing in the device and the applied voltage. Therefore, reduce the value of the rated current by 1% with the increasing altitude by 100 m to use a standard inverter. However, this is applicable to an altitude of 2,500 m or lower.

Components and Functions

Note: Example of the 3G3RX-A2055-V1/A2075-V1/A2110-V1/A4055-V1/A4075-V1/A4110-V1

Inverter 3G3RX-V1



Digital Operator
Use this to set parameters, view various monitor data, run/stop the inverter, etc.

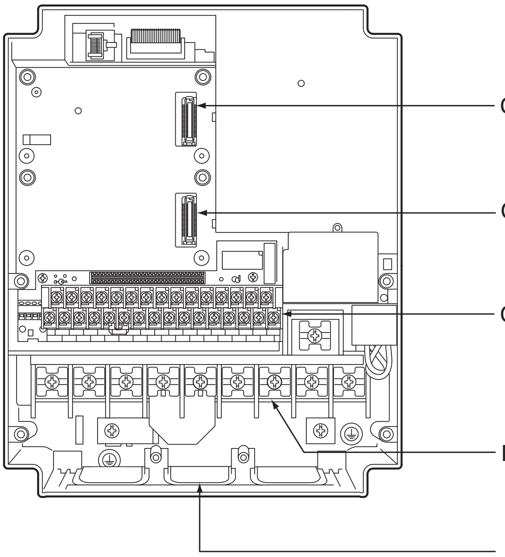
Data Display
This displays the frequency reference value, output frequency, parameter set value, or other relevant data.

Front Cover
Remove this to mount option boards.

Spacer Cover
Remove this to mount optional units or 5-line LCD Digital Operator.

Terminal block Cover
Remove this cover when wiring the terminal block.

Open the terminal block cover to wire the main circuit terminal block and the control circuit terminal block. Moreover, you can open the front cover to mount option boards.



Connector for mounting option board 1
Use this connector to mount the optional board.

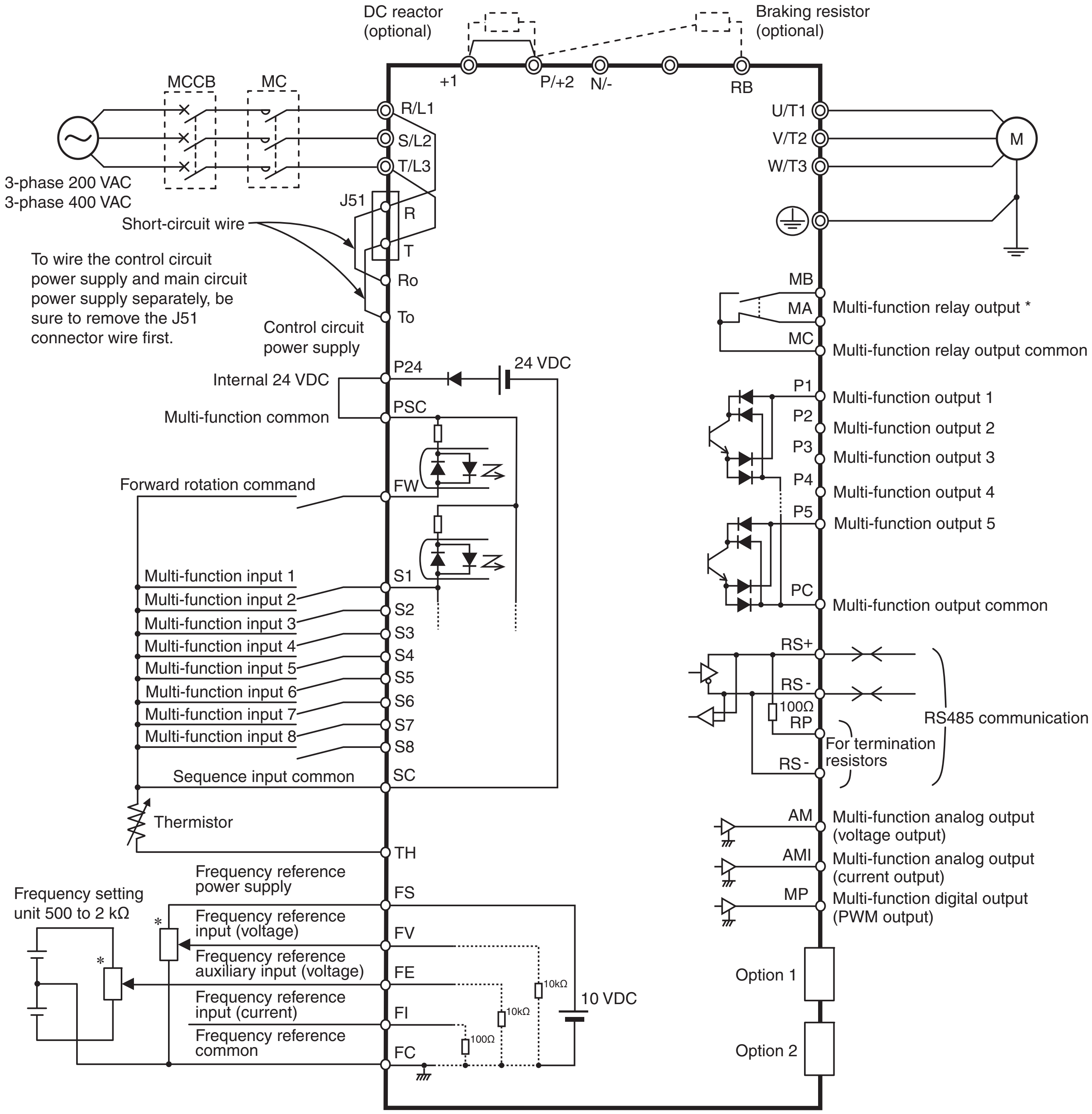
Connector for mounting option board 2
Use this connector to mount the optional board or communications units.

Control circuit terminal blocks
Use this to connect various digital/analog I/O signals for inverter control.

Main circuit terminal block
Use this to connect the inverter main power supply, motor, braking resistor, and other devices.

Backing plate
Cut off the cutout portions of this plate to connect power supply lines, signal lines, etc.

Connection Diagram


DC reactor
(optional)
Braking resistor
(optional)
+1
P/+2
N/-
RB
MCCB
MC
R/L1
S/L2
T/L3
U/T1
V/T2
W/T3
M
3-phase 200 VAC
3-phase 400 VAC
J51
R
T
Short-circuit wire
To wire the control circuit power supply and main circuit power supply separately, be sure to remove the J51 connector wire first.
Ro
To
Control circuit power supply
MB
MA
MC
Multi-function relay output *
Multi-function relay output common
P24
24 VDC
Internal 24 VDC
PSC
Multi-function common
P1
P2
P3
P4
P5
Multi-function output 1
Multi-function output 2
Multi-function output 3
Multi-function output 4
Multi-function output 5
Forward rotation command
FW
Multi-function input 1
Multi-function input 2
Multi-function input 3
Multi-function input 4
Multi-function input 5
Multi-function input 6
Multi-function input 7
Multi-function input 8
S1
S2
S3
S4
S5
S6
S7
S8
PC
Multi-function output common
RS+
RS-
100Ω
RP
RS-
RS485 communication
For termination resistors
Sequence input common
SC
Thermistor
TH
AM
Multi-function analog output (voltage output)
AMI
Multi-function analog output (current output)
MP
Multi-function digital output (PWM output)
Frequency setting unit 500 to 2 kΩ
Frequency reference power supply
FS
Frequency reference input (voltage)
FV
Frequency reference auxiliary input (voltage)
FE
Frequency reference input (current)
FI
Frequency reference common
FC
*
*
10kΩ
10kΩ
100Ω
10 VDC
Option 1
Option 2

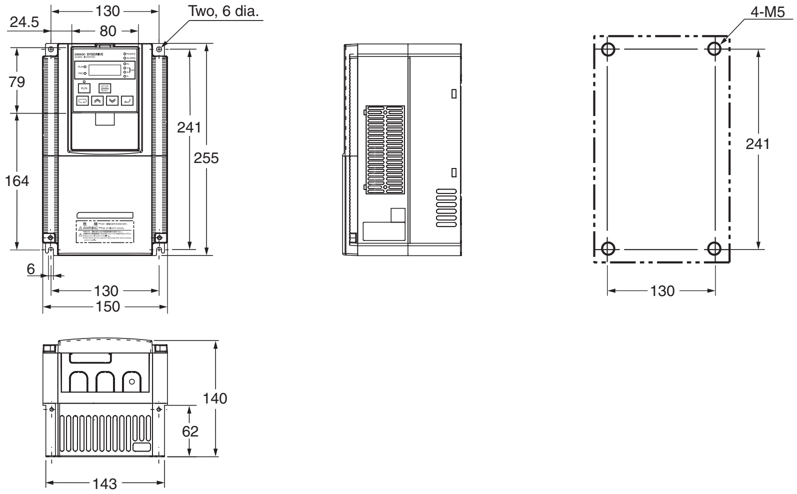
* Variable volume adjuster (2 kΩ 1/4 W or larger recommended)

Dimensions

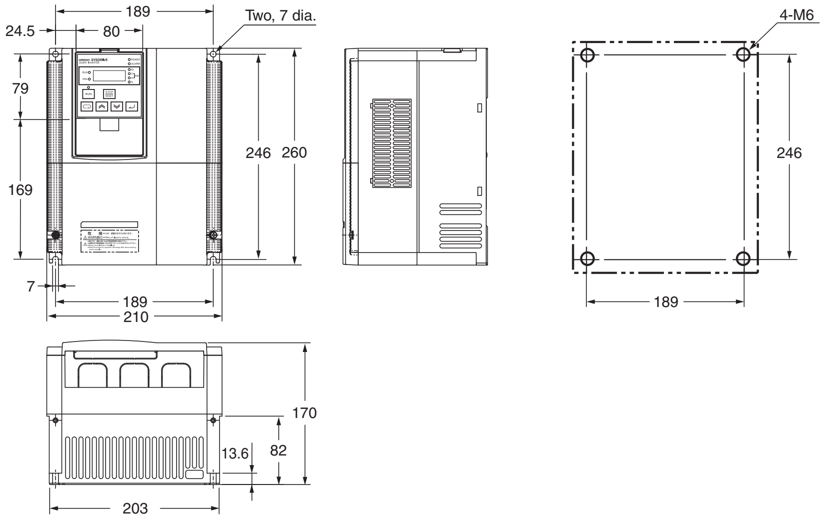
(Unit: mm)

Inverter 3G3RX-V1

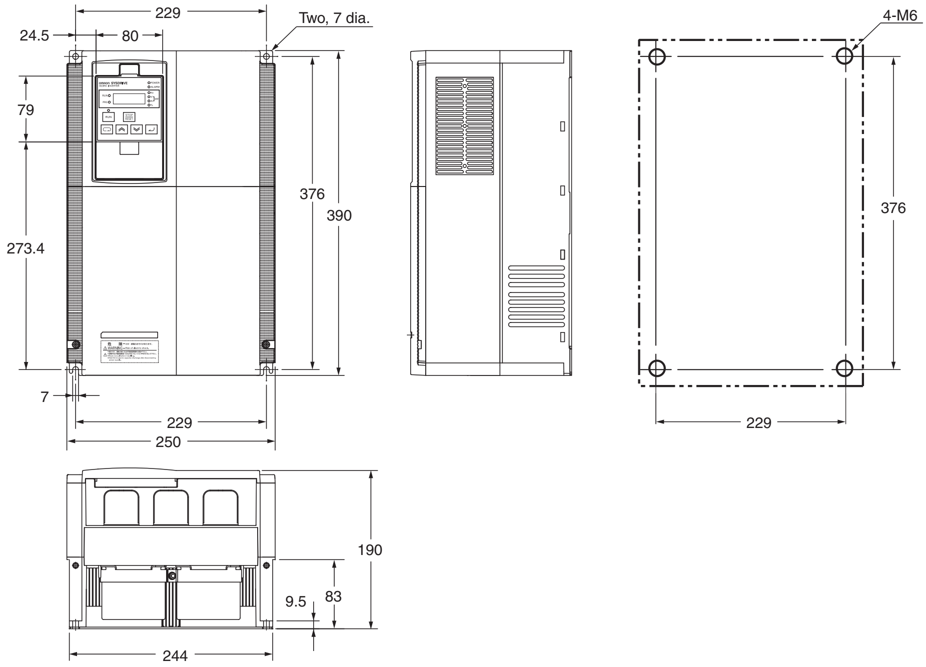
3G3RX-A2004-V1
3G3RX-A2007-V1
3G3RX-A2015-V1
3G3RX-A2022-V1
3G3RX-A2037-V1
3G3RX-A4004-V1
3G3RX-A4007-V1
3G3RX-A4015-V1
3G3RX-A4022-V1
3G3RX-A4037-V1


130
24.5
80
Two, 6 dia.
79
164
241
255
6
130
150
4-M5
241
130
140
62
143

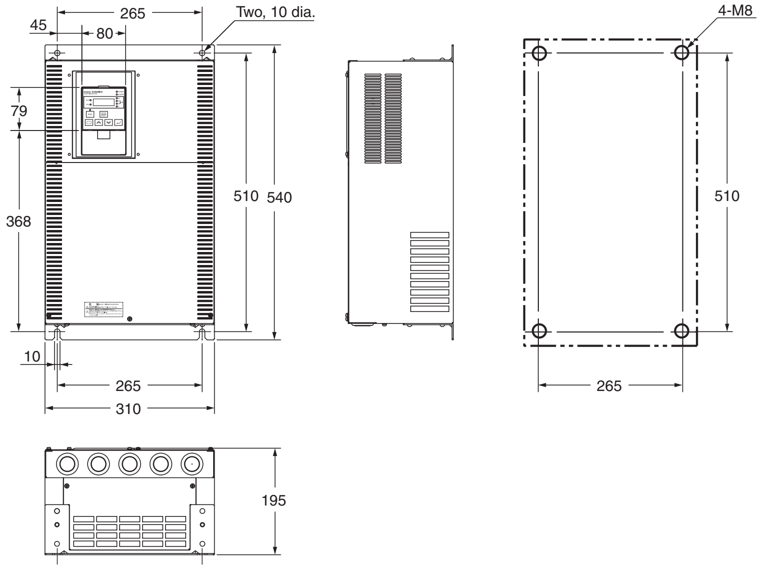
3G3RX-A2055-V1
3G3RX-A2075-V1
3G3RX-A2110-V1
3G3RX-A4055-V1
3G3RX-A4075-V1
3G3RX-A4110-V1


189
24.5
80
Two, 7 dia.
79
169
246
260
7
189
210
4-M6
246
189
170
13.6
82
203

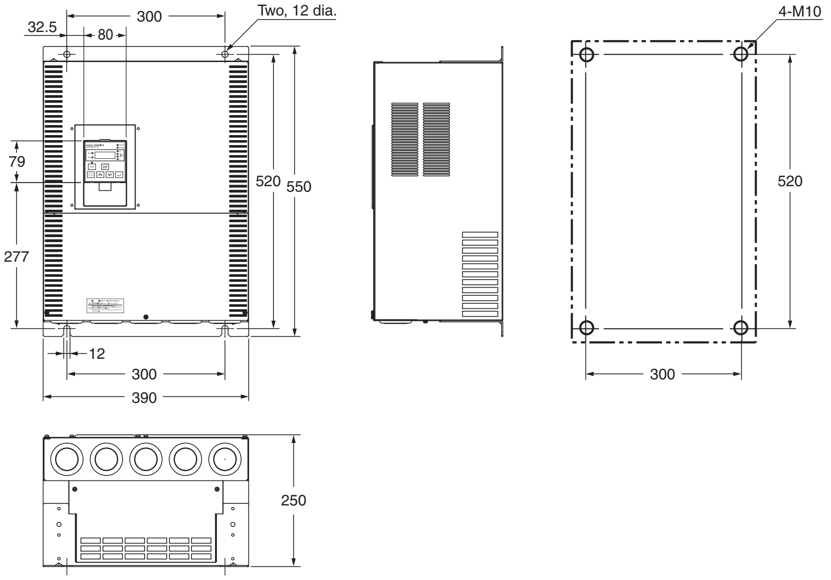
3G3RX-A2150-V1
3G3RX-A2185-V1
3G3RX-A2220-V1
3G3RX-A4150-V1
3G3RX-A4185-V1
3G3RX-A4220-V1


229
24.5
80
Two, 7 dia.
79
273.4
376
390
7
229
250
4-M6
376
229
190
9.5
83
244

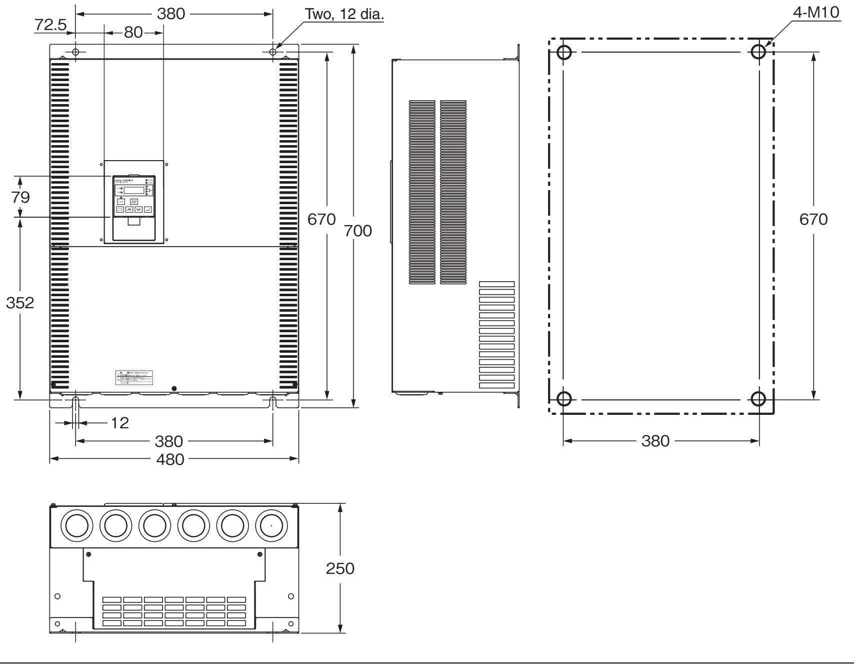
3G3RX-A2300-V1
3G3RX-A4300-V1


265
45
80
Two, 10 dia.
79
368
510
540
10
265
310
4-M8
510
265
195

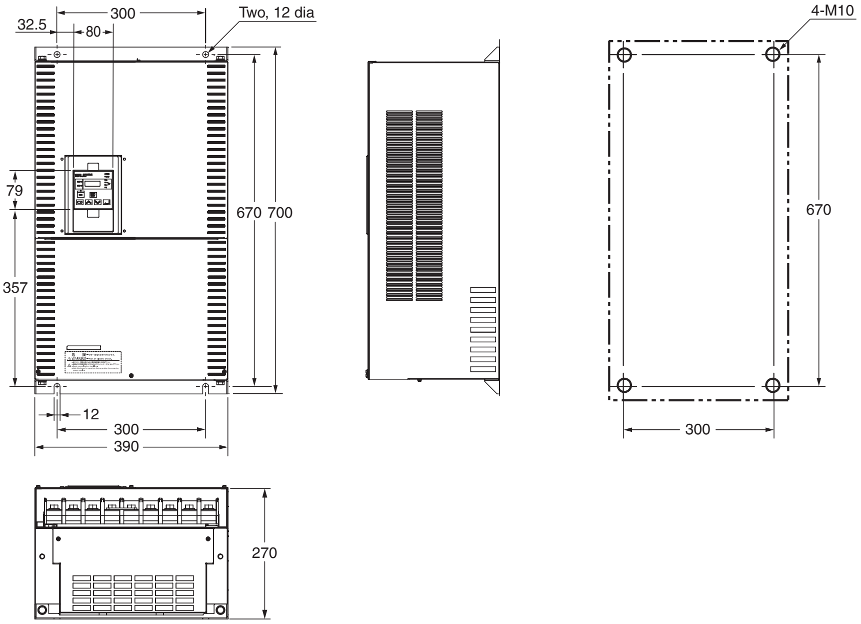
3G3RX-A2370-V1
3G3RX-A2450-V1
3G3RX-A4370-V1
3G3RX-A4450-V1
3G3RX-A4550-V1


300
32.5
80
Two, 12 dia.
79
277
520
550
12
300
390
4-M10
520
300
250

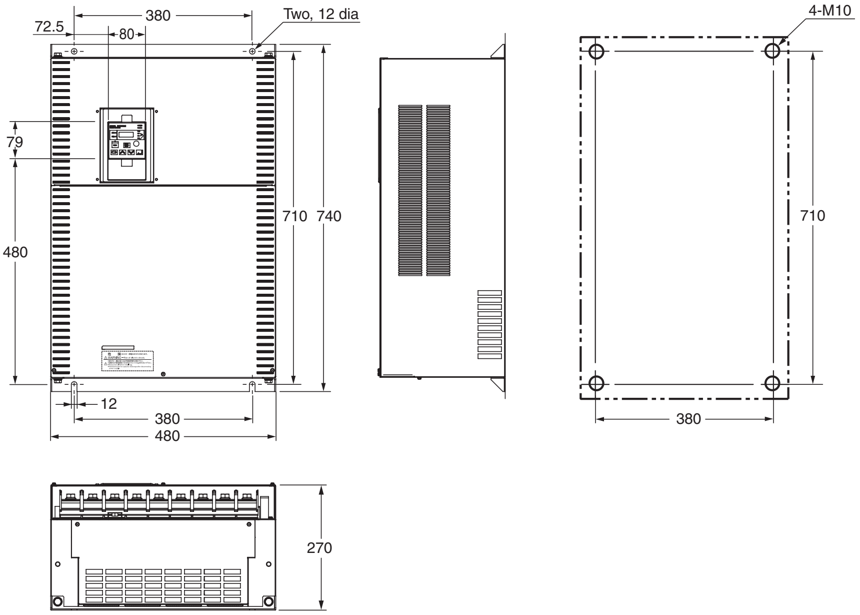
3G3RX-A2550-V1


380
72.5
80
Two, 12 dia.
79
352
670
700
12
380
480
4-M10
670
380
250

3G3RX-B4750-V1
3G3RX-B4900-V1


300
32.5
80
Two, 12 dia
79
357
670
700
12
300
390
4-M10
670
300
270

3G3RX-B411K-V1
3G3RX-B413K-V1


380
72.5
80
Two, 12 dia
79
480
710
740
12
380
480
4-M10
710
380
270

Communication Unit

RX-Series V1 type EtherCAT Communication Unit 3G3AX-RX-ECT

This is the communication unit to connect the High-function General-purpose Inverters RX-series V1 type to EtherCAT network.
This communication unit passed the conformance test of EtherCAT.

Note: 1. It is not possible to use a EtherCAT Communication Unit 3G3AX-RX-ECT with a RX-series (Model without "-V1").
2. Sysmac Studio can be used when using with NJ/NX-series Controller.
To connect the NJ Controller, Sysmac Studio version 1.03 or higher is required.
To connect the NX Controller, Sysmac Studio version 1.13 or higher is required.

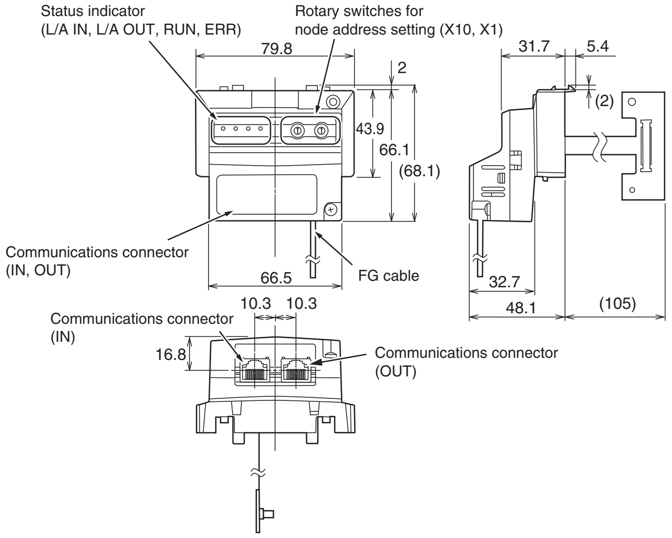
Common Specifications

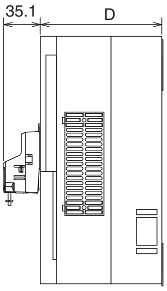
Item		Specifications
Power supply		Supplied from the inverter
Protective structure		Open type (IP20)
Ambient operating temperature		–10 to 50°C
Ambient storage temperature		–20 to 65°C
Ambient operating humidity		20% to 90% RH (with no condensation)
Vibration resistance		5.9 m/s^2 (0.6 G), 10 to 55 Hz
Application environment		At a maximum altitude of 1,000 m (without corrosive gases or dust)
Weight		100 g max. (Shipping weight: approx. 200 g)
International standard	UL/cUL	UL508C
	EC Directives	EMC Directive : EN61800-3 Low Voltage Directive : EN61800-5-1

EtherCAT Communications Specifications

Item	Specifications
Communications standard	IEC 61158 Type12, IEC 61800-7 CiA 402 drive profile
Physical layer	100BASE-TX (IEEE802.3)
Connector	RJ45 x 2 (shielded type) ECAT IN : EtherCAT input ECAT OUT : EtherCAT output
Communications media	Category 5 or higher (cable with double, aluminum tape and braided shielding) is recommended.
Communications distance	Distance between nodes: 100 m max.
Process data	Fixed PDO mapping PDO mapping
Mailbox (CoE)	Emergency messages, SDO requests, SDO responses, and SDO information
Distributed clock	FreeRun mode (asynchronous)
LED display	L/A IN (Link/Activity IN) x 1 L/A OUT (Link/Activity OUT) x 1 RUN x 1 ERR x 1
CiA402 drive profile	Velocity mode

Dimensions (mm)





Note: After the EtherCAT Communication Unit is installed, dimension D of the inverter increases by 35.1 mm.
(Dimension D of the inverter varies depending on the capacity. Refer to the RX-series V1 type USER'S MANUAL (Cat.No.I578))

Related Options

Refer to Ordering Information of RX-Series V1 type Inverters for the related Options.

System Configuration
Controllers
Softwares
System Configuration
Programmable Terminals
Ratings and Specifications
EtherCAT Slave Terminals
Cameras / Cables Connection Table
EtherCAT Communications Specifications
Safety
Version Information
Mortion/Drives
Components and Functions
Processing Items
Inverters
Dimensions
Sensors
Optical Chart
Remote I/O Terminals
Ordering Information

Vision System

FH-Series

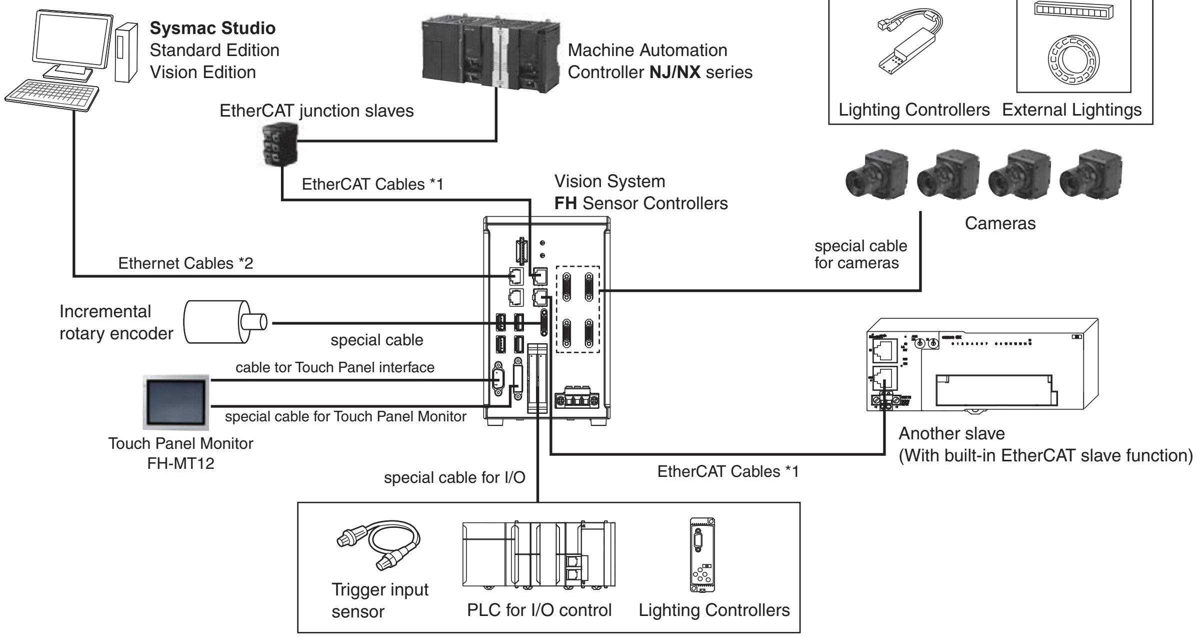
Easier to Embed in Machine, Shorter Machine cycle Times

- Calculations are easy to set for the results from four parallel tasks.
- Synchronous control of devices connected via EtherCAT is possible.
- The new Shape Search III processing item enables fast, precise, and stable measurements.
- Microsoft® .NET is supported to share machine interface with PC.
- User interface customization is supported.

System configuration

EtherCAT connections for FH series

Example of the FH Sensor Controllers (4-camera type)


Sysmac Studio
Standard Edition
Vision Edition
Machine Automation Controller **NJ/NX** series
EtherCAT junction slaves
Lighting Controllers
External Lightings
EtherCAT Cables *1
Vision System
FH Sensor Controllers
Cameras
Ethernet Cables *2
special cable for cameras
Incremental rotary encoder
special cable
cable tor Touch Panel interface
special cable for Touch Panel Monitor
Touch Panel Monitor
FH-MT12
Another slave
(With built-in EtherCAT slave function)
special cable for I/O
EtherCAT Cables *1
Trigger input sensor
PLC for I/O control
Lighting Controllers

*1. To use STP (shielded twisted-pair) cable of category 5 or higher with double shielding (braiding and aluminum foil tape) for EtherCAT and RJ45 connector.
*2. To use STP (shielded twisted-pair) cable of category 5 or higher for Ethernet and RJ45 connector.

Ratings and Specifications (Sensor Controllers)

FH Sensor Controllers

Type				**High-speed Controllers (4 core)**			**Standard Controllers (2 core)**		
Model				**FH-3050**	**FH-3050-10**	**FH-3050-20**	**FH-1050**	**FH-1050-10**	**FH-1050-20**
Main functions	**No. of Cameras**			2	4	8	2	4	8
	Connected Camera			Can be connected to all cameras. (FZ-S series/FH-S series)		Can be connected to all cameras. (FZ-S series/ FH-S series) (Can be connected to up to four 12 million-pixel cameras or up to eight cameras other than 12 million-pixel cameras.)	Can be connected to all cameras. (FZ-S series/FH-S series)		Can be connected to all cameras. (FZ-S series/ FH-S series) (Can be connected to up to four 12 million-pixel cameras or up to eight cameras other than 12 million-pixel cameras.)
	Number of multi-input			Please refer to the chart below.					
	Number of logged images			Please refer to the chart below.					
	No. of scenes			128					
	Operation			Mouse or similar device					
	Settings			Create series of processing steps by editing the flowchart (Help messages provided).					
	Language			Japanese, English, Chinese(simplified), Chinese(Traditional), Korean, German, French, Italian, Spanish					
External interface	**Serial communications**			RS-232C: 1 CH					
	EtherNet communications			No-protocol (TCP/UDP) 1000BASE-T					
				1 port	2 port	2 port	1 port	2port	2port
	EtherNet/IP communications			Ethernet port baud rate: 1 Gbps (1000 BASE-T)					
	EtherCAT communications			EtherCAT protocol (100BASE-TX)					
	Parallel I/O			Either an NPN or PNP output is supported (switchable). (In the 2-line random trigger mode) 17 inputs (STEP0/ENCTRIG_Z0, STEP1/ENCTRIG_Z1, ENCTRIG_A0 to 1, ENCTRIG_B0 to 1, DSA0 to 1, DI0 to 7, DI_LINE0) 37 outputs (RUN0 to 1, READY0 to 1, BUSY0 to 1, OR0 to 1, ERROR0 to 1, GATE0 to 1, STGOUT0/SHTOUT0, STGOUT1/SHTOUT1, STGOUT2 to 7, DO0 to 15, ACK) (In the 5-line to 8-line random trigger mode) 19 inputs, STEP0 to 7, DI_LINE0 to 2, DI0 to 7) 34 outputs (READY0 to 7, BUSY0 to 7, OR0 to 7, ACK, ERROR, STGOUT/SHTOUT0 to 7)					
	Encoder interface			RS422-A line driver level. Phase A/B: single-phase 4MHz (multiplying phase difference of 1MHz by 4 times), Phase Z: 1MHz					
	Monitor interface			DVI-I (Single Link) output IF × 1ch					
	USB interface			4 channels (supports USB 1.1 and 2.0)					
	SD card interface			SDHC card of Class4 or higher rating is recommended.					
Ratings	**Power supply voltage**			20.4 to 26.4 VDC					
	Current consumption (at 24.0 VDC) *	**When connected to a intelligent compact camera**	**Connected to 2 cameras**	5.0 A max.	5.4 A max.	6.4 A max.	4.7 A max.	5.0 A max.	5.9 A max.
			Connected to 4 cameras	---	7.0 A max.	8.1 A max.	---	6.5 A max.	7.5 A max.
			Connected to 8 cameras	---	---	11.5 A max.	---	---	10.9 A max.
		When connected to a 300,000-pixel camera, 2 million-pixel camera, 4 million-pixel camera, 5 million-pixel camera or 12 million-pixel camera	**Connected to 2 cameras**	4.1 A max.	4.2 A max.	5.2 A max.	3.6 A max.	3.7 A max.	4.5 A max.
			Connected to 4 cameras	---	4.8 A max.	5.6 A max.	---	4.3 A max.	5.0 A max.
			Connected to 8 cameras	---	---	6.8 A max.	---	---	6.2 A max.
	Insulation resistance			Between DC power supply and controller FG: 20 MΩ or higher (rated voltage 250 V)					
Operation Environment	**Noise Immunity**	**Fast transient burst**	**DC Power Supply**	Direct infusion: 2 KV Pulse rising: 5 ns Pulse width: 50 ns Burst continuation time: 15 ms/0.75 ms Period: 300 ms Application time: 1 min					
			I/O line	Cramp: 1 KV Pulse rising: 5 ns Pulse width: 50 ns Burst continuation time: 15 ms/0.75 ms Period: 300 ms Application time: 1 min					
	Ambient temperature range			Operating: 0 to 50 °C Storage: -20 to 65 °C (with no icing or condensation)					
	Ambient humidity range			Operating and storage: 35% to 85% (with no condensation)					
	Ambient atmosphere			No corrosive gases					
	Grounding			Type D grounding (100Ω or less grounding resistance) Conventional type 3 grounding					
	Degree of protection			IEC60529 IP20					

Type		High-speed Controllers (4 core)			Standard Controllers (2 core)		
Model		**FH-3050**	**FH-3050-10**	**FH-3050-20**	**FH-1050**	**FH-1050-10**	**FH-1050-20**
Dimensions	**Dimensions**	190 × 115 × 182.5 mm					
	Weight	Approx. 3.2 kg	Approx. 3.4 kg	Approx. 3.4 kg	Approx. 3.2 kg	Approx. 3.4 kg	Approx. 3.4 kg
	Case materials	Cover: zinc-plated steel plate, side plate: aluminum (A6063)					
Accessories		Controller (1) / user manual (one Japanese and one English versions) / Instruction Installation Manual (1) / Power supply terminal block connector (1) / Ferrite core (2, FH-3050 and FH-1050), 4 (FH-3050-10 and FH-1050-10), and 8 (FH-3050-20 and FH-1050-20)					

* The current consumption when the maximum number of cameras supported by each controller are connected. If a lighting controller model is connected to a lamp, the current consumption is as high as when an intelligent compact CMOS camera is connected.

Number of logged images/Max. Number of Loading Images during Multi-input

Cameras	Color/ Monochrome	Model	Number of logged images								Max. Number of Loading Images during Multi-input *2
			Connected to 1 camera	Connected to 2 camera	Connected to 3 camera	Connected to 4 camera	Connected to 5 camera	Connected to 6 camera	Connected to 7 camera	Connected to 8 camera	
Intelligent Compact CMOS Cameras *1	**Color**	**FZ-SQ010F/ -SQ050F/ -SQ100F/ -SQ100N**	232	116	77	58	46	38	33	29	256
300,000 pixels CCD Cameras	**Monochrome**	**FZ-S/-SF/ -SH/-SP**	272	136	90	68	54	45	38	34	
	Color	**FZ-SC/ -SFC/-SHC/ -SPC**	270	135	90	67	54	45	38	33	
300,000 pixels CMOS Cameras	**Monochrome**	**FH-SM**	272	136	90	68	54	45	38	34	256
	Color	**FH-SC**	270	135	90	67	54	45	38	33	
2 million pixels CMOS Cameras	**Color/ Monochrome**	**FH-SC02/ -SM02**	37	18	12	9	7	6	5	4	51
2 million pixels CCD Cameras	**Color/ Monochrome**	**FZ-SC2M/ -S2M**	43	21	14	10	8	7	6	5	64
4 million pixels CMOS Cameras	**Color/ Monochrome**	**FH-SC04/ -SM04**	20	10	6	5	4	3	2	2	32
5 million pixels CCD Cameras	**Color/ Monochrome**	**FZ-SC5M2/ -S5M2**	16	8	5	4	3	2	2	2	25
12 million pixels CMOS Cameras	**Color/ Monochrome**	**FH-SC12/ -SM12**	6	3	2	2	---	---	---	---	10

*1 The multi-input function cannot be used when the built-in lighting of an intelligent compact camera is used.

*2 When using two camera cables for connection, the maximum number of loaded images during multi-input is twice the number given in the table. Refer to the Vision System FH/FZ5 Series User's Manual (Cat. No. Z340) for details.

Ratings and Specifications (Cameras)

High-speed CMOS cameras

Model	FH-SM	FH-SC	FH-SM02	FH-SC02	FH-SM04	FH-SC04	FH-SM12	FH-SC12
Image elements	CMOS image elements (1/3-inch equivalent)		CMOS image elements (2/3-inch equivalent)		CMOS image elements (1-inch equivalent)		CMOS image elements (1.76-inch equivalent)	
Color/Monochrome	Monochrome	Color	Monochrome	Color	Monochrome	Color	Monochrome	Color
Effective pixels	640 (H) × 480 (V)		2040 (H) × 1088 (V)		2040 (H) × 2048 (V)		4084 (H) × 3072 (V)	
Imaging area H x V (opposing corner)	4.8 × 3.6 (6.0mm)		11.26 × 5.98 (12.76mm)		11.26 × 11.26 (15.93mm)		22.5 × 16.9 (28.14 mm)	
Pixel size	7.4 (µm) × 7.4 (µm)		5.5 (µm) × 5.5 (µm)		5.5 (µm) × 5.5 (µm)		5.5 (µm) × 5.5 (µm)	
Shutter function	Electronic shutter; Shutter speeds can be set from 20 µs to 100 ms.		Electronic shutter; Shutter speeds can be set from 25 µs to 100 ms.				Electronic shutter; Shutter speeds can be set from 60 µs to 100 ms.	
Partial function	1 to 480 lines	2 to 480 lines	1 to 1088 lines	2 to 1088 lines	1 to 2048 lines	2 to 2048 lines	4 to 3072 lines (4-line increments)	
Frame rate (image read time)	308 fps (3.3 ms)		219 fps (4.6 ms)*		118 fps (8.5 ms)*		38.9 fps (25.7 ms)*	
Lens mounting	C mount						M42 mount	
Field of vision, installation distance	Selecting a lens according to the field of vision and installation distance							
Ambient temperature range	Operating: 0 to 40 °C, Storage: -25 to 65 °C (with no icing or condensation)							
Ambient humidity range	Operating and storage: 35% to 85% (with no condensation)							
Weight	Approx.105 g		Approx.110 g				Approx.320 g	
Accessories	Instruction manual							

* Frame rate in high speed mode when the camera is connected using two camera cables.

Digital CCD Cameras

Model	FZ-S	FZ-SC	FZ-S2M	FZ-SC2M	FZ-S5M2	FZ-SC5M2
Image elements	Interline transfer reading all pixels, CCD image elements (1/3-inch equivalent)		Interline transfer reading all pixels, CCD image elements (1/1.8-inch equivalent)		Interline transfer reading all pixels, CCD image elements (2/3-inch equivalent)	
Color/Monochrome	Monochrome	Color	Monochrome	Color	Monochrome	Color
Effective pixels	640 (H) × 480 (V)		1600 (H) × 1200 (V)		2448 (H) × 2044 (V)	
Imaging area H x V (opposing corner)	4.8 × 3.6 (6.0mm)		7.1 × 5.4 (8.9mm)		8.4 × 7.1 (11mm)	
Pixel size	7.4 (µm) × 7.4 (µm)		4.4 (µm) × 4.4 (µm)		3.45 (µm) × 3.45 (µm)	
Shutter function	Electronic shutter; select shutter speeds from 20 µs to 100 ms					
Partial function	12 to 480 lines		12 to 1200 lines		12 to 2044 lines	
Frame rate (image read time)	80 fps (12.5 ms)		30 fps (33.3 ms)		16 fps (62.5 ms)	
Lens mounting	C mount					
Field of vision, installation distance	Selecting a lens according to the field of vision and installation distance					
Ambient temperature range	Operating: 0 to 50 °C Storage: -25 to 65 °C (with no icing or condensation)		Operating: 0 to 40 °C Storage: -25 to 65 °C (with no icing or condensation)			
Ambient humidity range	Operating and storage: 35% to 85% (with no condensation)					
Weight	Approx. 55 g		Approx. 76 g		Approx.140 g	
Accessories	Instruction manual					

Small CCD Digital Cameras

Model	FZ-SF	FZ-SFC	FZ-SP	FZ-SPC
Image elements	Interline transfer reading all pixels, CCD image elements (1/3-inch equivalent)			
Color/Monochrome	Monochrome	Color	Monochrome	Color
Imaging area H x V (opposing corner)	4.8 × 3.6 (6.0mm)			
Effective pixels	640 (H) × 480 (V)			
Imaging area H x V (opposing corner)	4.8 × 3.6 (6.0mm)			
Pixel size	7.4 (µm) × 7.4 (µm)			
Shutter function	Electronic shutter; select shutter speeds from 20 µm to 100 ms			
Partial function	12 to 480 lines			
Frame rate (image read time)	80 fps (12.5ms)			
Lens mounting	Special mount (M10.5 P0.5)			
Field of vision, installation distance	Selecting a lens according to the field of vision and installation distance			
Ambient temperature range	Operating: 0 to 50 °C (camera amp) 0 to 45 °C (camera head) Storage: -25 to 65 °C (with no icing or condensation)			
Ambient humidity range	Operating and storage: 35% to 85% (with no condensation)			
Weight	Approx. 150 g			
Accessories	Instruction manual, installation bracket,Four mounting brackets (M2)		Instruction manual	

High-speed CCD Cameras

Model	FZ-SH	FZ-SHC
Image elements	Interline transfer reading all pixels, CCD image elements (1/3-inch equivalent)	
Color/Monochrome	Monochrome	Color
Effective pixels	640 (H) × 480 (V)	
Imaging area H x V (opposing corner)	4.8 × 3.6 (6.0mm)	
Pixel size	7.4 (µm) × 7.4 (µm)	
Shutter function	Electronic shutter; select shutter speeds from 1/10 to 1/50,000 s	
Partial function	12 to 480 lines	
Frame rate (image read time)	204 fps (4.9ms)	
Field of vision, installation distance	Selecting a lens according to the field of vision and installation distance	
Ambient temperature range	Operating: 0 to 40 °C Storage: -25 to 65 °C (with no icing or condensation)	
Ambient humidity range	Operating and storage: 35% to 85% (with no condensation)	
Weight	Approx. 105 g	
Accessories	Instruction manual	

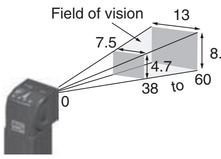
Intelligent Compact CMOS Cameras

Model	FZ-SQ010F	FZ-SQ050F	FZ-SQ100F	FZ-SQ100N
Image elements	CMOS image elements (1/3-inch equivalent)			
Color/Monochrome	Color			
Effective pixels	752 (H) × 480 (V)			
Imaging area H x V (opposing corner)	4.51 × 2.88 (5.35mm)			
Pixel size	6.0 (µm) × 6.0 (µm)			
Shutter function	1/250 to 1/32,258			
Partial function	8 to 480 lines			
Frame rate (image read time)	60 fps			
Field of vision	7.5 × 4.7 to 13 × 8.2 mm	13 × 8.2 to 53 × 33 mm	53 × 33 to 240 × 153 mm	29 × 18 to 300 × 191 mm
Installation distance	38 to 60 mm	56 to 215 mm	220 to 970 mm	32 to 380 mm
LED class *	Risk Group2			
Ambient temperature range	Operating: 0 to 50 °C Storage: -25 to 65 °C			
Ambient humidity range	Operating and storage: 35% to 85% (with no condensation)			
Weight	Approx. 150 g		Approx. 140 g	
Accessories	Mounting bracket (FQ-XL), polarizing filter attachment (FQ-XF1), instruction manual and warning label			

* Applicable standards: IEC62471-2

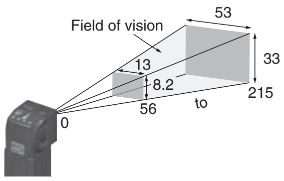
• Narrow View

FZ-SQ010F



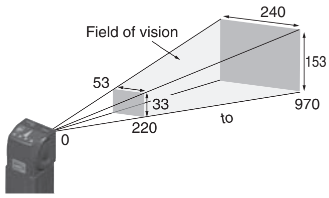
• Standard

FZ-SQ050F



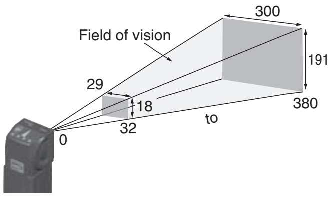
• Wide View (Long-distance)

FZ-SQ100F



• Wide View (Short-distance)

FZ-SQ100N



Ratings and Specifications (LCD Monitor, Cable)

Camera Cables

Model	FZ-VS3 (2 m)	FZ-VSB3 (2 m)	FZ-VSL3 (2 m)	FZ-VSLB3 (2 m)
Shock resistiveness (durability)	10 to 150 Hz single amplitude 0.15 mm 3 directions, 8 strokes, 4 times			
Ambient temperature range	Operation and storage: 0 to 65 °C (with no icing or condensation)			
Ambient humidity range	Operation and storage: 40 to 70%RH (with no condensation)			
Ambient atmosphere	No corrosive gases			
Material	Cable sheath, connector: PVC			
Minimum bending radius	69mm	69mm	69mm	69mm
Weight	Approx. 170 g	Approx. 180 g	Approx. 170 g	Approx. 180 g

Cable Extension Unit

Model	FZ-VSJ
Power supply voltage *1	11.5 to 13.5 VDC
Current consumption *2	1.5 A max.
Ambient temperature range	Operating: 0 to 50 °C; Storage: -25 to 65 °C (with no icing or condensation)
Ambient humidity range	Operating and storage: 35 to 85% (with no condensation)
Weight	Approx. 240 g
Accessories	Instruction Sheet and 4 mounting screws

*1 A 12-VDC power supply must be provided to the Cable Extension Unit when connecting the Intelligent Compact Camera, or the Lighting Controller.

*2 The current consumption shows when connecting the Cable Extension Unit to an external power supply.

Long-distance Camera Cables

Model	FZ-VS4 (15 m)	FZ-VSL4 (15 m)
Shock resistiveness (durability)	10 to 150 Hz single amplitude 0.15 mm 3 directions, 8 strokes, 4 times	
Ambient temperature range	Operation and storage: 0 to 65 °C (with no icing or condensation)	
Ambient humidity range	Operation and storage: 40 to 70%RH (with no condensation)	
Ambient atmosphere	No corrosive gases	
Material	Cable sheath, connector: PVC	
Minimum bending radius	78 mm	
Weight	Approx. 1400 g	

Encoder Cable

Model	FH-VR
Vibration resistiveness	10 to 150 Hz single amplitude 0.1 mm 3 directions, 8 strokes, 10 times
Ambient temperature range	Operation: 0 to 50 °C; Storage: -10 to 60 °C (with no icing or condensation)
Ambient humidity range	Operation and storage: 35 to 85%RH (with no condensation)
Ambient atmosphere	No corrosive gases
Material	Cable Jacket: Heat, oil and flame resistant PVC Connector: polycarbonate resin
Minimum bending radius	65 mm
Weight	Approx. 104 g

Touch Panel Monitor

Model		FH-MT12
Major Function	**Display area**	12.1 inch
	Resolution	1024 (V) × 768 (H)
	Number of color	16,700,000 colors (8 bit/color)
	Brightness	500cd/m ^{2} (Typ)
	Contrast Ratio	600:1 (Typ)
	Viewing angle	Left and right: each 80°, upward: 80°, downward: 60°
	Backlight Unit	LED, edge-light
	Backlight lifetime	About 100,000hour
	Touch panel	4wire resistive touch screen
External interface	**Video input**	analog RGB
	Touch panel signal	USB
		RS-232C
Ratings	**Power supply voltage**	24 VDC (21.6 to 26.4 VDC)
	Current consumption	0.5 A
	Insulation resistance	Between DC power supply and Touch Panel Monitor FG: 20 MΩ or higher (rated voltage 250 V)
Operating environment	**Ambient temperature range**	Operating: 0 to 50°C, Storage: -20 to +65°C (with no icing or condensation)
	Ambient humidity range	Operating and Storage: 20 to 85 %RH (with no icing or condensation)
	Ambient environment	No corrosive gas
	Vibration resistance	10 to 150 Hz, one-side amplitude 0.1 mm (Max. acceleration 15 m/s^2) 10 times for 8 minutes for each three direction
	Degree of protection	Panel mounting: IP65 on the front
Operation		Touch pen
Structure	**Mounting**	Panel mounting, VESA mounting
	Weight	Approx.2.6 kg
	Material	Front panel: PC/PBT, Front Sheet: PET, Rear case: SUS

Note: FH Series Sensor Controllers version 5.32 or higher is required.

Touch Panel Monitor Cables

Model	FH-VMDA (2 m)	FH-VUAB (2 m)	XW2Z-200PP-1 (2 m)
Cable type	DVI-Analog Conversion Cable	USB Cable	RS-232C Cable
Vibration resistance	10 to 150 Hz, one-side amplitude 0.1 mm, 10 times for 8 minutes for each three direction		
Ambient Temperature	Operating Condition: 0 to 50°C, Storage Condition: -10 to 60°C (with no icing or condensation)		
Ambient Humidity	Operating Condition: 35 to 85%RH, Storage Condition: 35 to 85%RH (with no icing or condensation)		
Ambient environment	No corrosive gases		
Material	Cable outer sheath, Connector: PVC		Cable outer sheath: PVC, Connector: ABS/Ni Plating
Minimum bend radius	36 mm	25 mm	59 mm
Weight	Approx.220 g	Approx.75 g	Approx.162 g

LCD Monitor

Model	**FZ-M08**
Size	8.4 inches
Type	Liquid crystal color TFT
Resolution	1,024 × 768 dots
Input signal	Analog RGB video input, 1 channel
Power supply voltage	21.6 to 26.4 VDC
Current consumption	Approx. 0.7 A max.
Ambient temperature range	Operating: 0 to 50 °C; Storage: -25 to 65 °C (with no icing or condensation)
Ambient humidity range	Operating and storage: 35 to 85% (with no condensation)
Weight	Approx. 1.2 kg
Accessories	Instruction Sheet and 4 mounting brackets

LED Monitor Cable

Model	**FZ-VM**
Vibration resistiveness	10 to 150 Hz single amplitude 0.15 mm 3 directions, 8 strokes, 4 times
Ambient temperature range	Operation: 0 to 50 °C; Storage: -20 to 65 °C (with no icing or condensation)
Ambient humidity range	Operation and storage: 35 to 85%RH (with no condensation)
Ambient atmosphere	No corrosive gases
Material	Cable sheath: heat-resistant PVC Connector: PVC
Minimum bending radius	75 mm
Weight	Approx. 170 g

Note: When you connect a LCD Monitor FZ-M08 to FH sensor controller, please use it in combination with a DVI-I -RGB Conversion Connector FH-VMRGB.

EtherCAT Communications Specifications

Item		**Specifications**
Communications standard		IEC61158 Type 12
Physical layer		100 BASE-TX (IEEE802.3)
Modulation		Base band
Baud rate		100 Mbps
Topology		Depends on the specifications of the EtherCAT master.
Transmission Media		Twisted-pair cable of category 5 or higher (double-shielded straight cable with aluminum tape and braiding)
Transmission Distance		Distance between nodes: 100 m or less
Node address setting		00 to 9
External connection terminals		RJ45 × 2 (shielded) IN: EtherCAT input data, OUT: EtherCAT output data
Send/receive PDO data sizes	**Input**	56 to 280 bytes/line (including input data, status, and unused areas) Up to 8 lines can be set. *
	Output	28 bytes/line (including output data and unused areas) Up to 8 lines can be set. *
Mailbox data size	**Input**	512 bytes
	Output	512 bytes
Mailbox		Emergency messages, SDO requests, and SDO information
Refreshing methods		I/O-synchronized refreshing (DC)

* This depends on the upper limit of the master.

Version Information

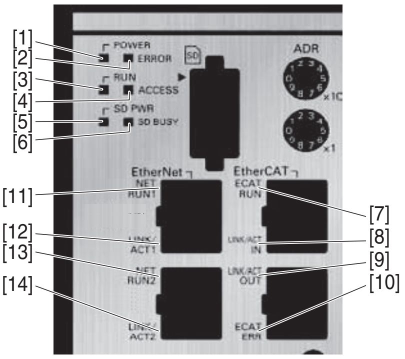
FH Series and Programming Devices

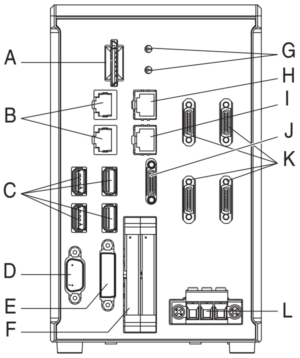
Use the latest version of Sysmac Studio Standard Edition/Vision Edition.

FH Series	**Version of FH Series**	**Corresponding version of Sysmac Studio Standard Edition/Vision Edition**
FH-3050 (-□) **FH-1050 (-□)**	Version 5.30	Supported by version 1.10.80 or higher.
	Version 5.20	Supported by version 1.10 or higher.
	Version 5.10	Supported by version 1.07.43 or higher.
	Version 5.00	Supported by version 1.07 or higher. Not supported by version 1.06 or lower.

Components and Functions

Example of the FH Sensor Controllers BOX type (4-camera type)





	Name	Description
[1]	POWER LED	Lit while power is ON.
[2]	ERROR LED	Lit when an error has occurred.
[3]	RUN LED	Lit while the controller is in Measurement Mode.
[4]	ACCESS LED	Lit while the memory is accessed.
[5]	SD POWER LED	Lit while power is supplied to the SD card and the card is usable.
[6]	SD BUSY LED	Blinks while the SD memory card is accessed.
[7]	EtherCAT RUN LED	Lit while EtherCAT communications are usable.
[8]	EtherCAT LINK/ACT IN LED	Lit when connected with an EtherCAT device, and blinks while performing communications.
[9]	EtherCAT LINK/ACT OUT LED	Lit when connected with an EtherCAT device, and blinks while performing communications.
[10]	EtherCAT ERR LED	Lit when EtherCAT communications have become abnormal.
[11]	EtherNet NET RUN1 LED	Lit while EtherNet communications are usable.
[12]	EtherNet NET LINK/ACK1 LED	Lit when connected with an EtherNet device, and blinks while performing communications.
[13]	EtherNet NET RUN2 LED	Lit when EtherNet communications are usable.
[14]	EtherNet NET LINK/ACK2 LED	Lit when connected with an EtherNet device, and blinks while performing communications.

	Name	Description
A	SD memory card installation connector	Install the SD memory card. Do not plug or unplug the SD card during measurement operation. Otherwise measurement time may be affected or data may be destroyed.
B	EtherNet connector	Connect an EtherNet device.
C	USB connector	Connect a USB device. Do not plug or unplug it during measurement operation. Otherwise measurement time may be affected or data may be destroyed.
D	RS-232C connector	Connect an external device such as a programmable controller.
E	DVI-I connector	Connect a monitor.
F	I/O connector (control lines, data lines)	Connect the controller to external devices such as a sync sensor and PLC.
G	EtherCAT address setup volume	Used to set a node address (00 to 99) as an EtherCAT communication device.
H	EtherCAT communication connector (IN)	Connect the opposed EtherCAT device.
I	EtherCAT communication connector (OUT)	Connect the opposed EtherCAT device.
J	Encoder connector	Connect an encoder.
K	Camera connector	Connect cameras.
L	Power supply terminal connector	Connect a DC power supply. Wire the controller independently on other devices. Wire the ground line. Be sure to ground the controller alone. Perform wiring using the attached power supply connector.

Processing Items

Group	Icon	Processing Item	
Measurement		Search	Used to identify the shapes and calculate the position of measurement objects.
		Flexible Search	Recognizing the shapes of workpieces with variation and detecting their positions.
		Sensitive Search	Search a small difference by dividing the search model in detail, and calculating the correlation.
		ECM Search	Used to search the similar part of model form input image. Detect the evaluation value and position.
		EC Circle Search	Extract circles using "round " shape information and get position, radius and quantity in high preciseness.
		Shape Search Ⅱ	Used to search the similar part of model from input image regardless of environmental changes. Detect the evaluation value and position.
		Shape Search Ⅲ	Robust detection of positions is possible at high-speed and with high precision incorporating environmental fluctuations, such as differences in individual shapes of the workpieces, pose fluctuations, noise superimposition and shielding.
		EC Corner	This processing item measures a corner position (corner) of a workpiece.
		Ec Cross	The center position of a crosshair shape is measured using the lines created by the edge information on each side of the crosshair.
		Classification	Used when various kinds of products on the assembly line need to be sorted and identified.
		Edge Position	Measure position of measurement objects according to the color change in measurement area.
		Edge Pitch	Detect edges by color change in measurement area. Used for calculating number of pins of IC and connectors.
		Scan Edge Position	Measure peak/bottom edge position of workpieces according to the color change in separated measurement area.
		Scan Edge Width	Measure max/min/average width of workpieces according to the color change in separated measurement area.
		Circular Scan Edge Position	Measure center axis, diameter and radius of circular workpieces.
		Circular Scan Edge Width	Measure center axis, width and thickness of ring workpieces.
		Intersection	Calculate approximate lines from the edge information on two sides of a square workpiece to measure the angle formed at the intersection of the two lines.
		Color Data	Used for detecting presence and mixed varieties of products by using color average and deviation.
		Gravity and Area	Used to measure area, center of gravity of workpices by extracting the color to be measured.
		Labeling	Used to measure number, area and gravity of workpieces by extracting registered color.
		Label Data	Selecting one region of extracted Labeling, and get that measurement. Area and Gravity position can be got and judged.
		Defect	Used for appearance measurement of plain-color measurement objects such as defects, stains and burrs.
		Precise Defect	Check the defect on the object. Parameters for extraction defect can be set precisely.
		Fine Matching	Difference can be detected by overlapping and comparing (matching) registered fine images with input images.
	AB	Character Inspect	Recognize character according correlation search with model image registered in [Model Dictionary].
	Date 08-02-1	Date Verification	Reading character string is verified with internal date.
	A	Model Dictionary	Register character pattern as dictionary. The pattern is used in [Character Inspection].
		2DCode *2	Recognize 2D code and display where the code quality is poor.
		Barcode *1	Recognize barcode, verify and output decoded characters.
	OCR	OCR	Recognize and read characters in images as character information.
	OCR	OCR User Dictionary	Register dictionary data to use for OCR.
		Circle Angle	Used for calculating angle of inclination of circular measurement objects.
		Glue Bead Inspection	You can inspect coating of a specified color for gaps or runoffs along the coating path.
Input Image		Camera Image Input	To input images from cameras. And set up the conditions to input images from cameras. (For FZ5 Sensor Controllers only)
		Camera Image Input FH	To input images from cameras. And set up the conditions to input images from cameras. (For FH Sensor Controllers only)
		Camera Image Input HDR	Create high-dynamic range images by acquiring several images with different conditions.
		Camera Image Input HDRLite	HDR function for FZ-SQ□ Intelligent Compact Cameras.
		Camera Switch	To switch the cameras used for measurement. Not input images from cameras again.
		Measurement Image Switching	To switch the images used for measurement. Not input images from camera again.

Group	Icon	Processing Item	
Compensate image		Position Compensation	Used when positions are differed. Correct measurement is performed by correcting position of input images.
		Filtering	Used for processing images input from cameras in order to make them easier to be measured.
		Backgrond Suppression	To enhance contrast of images by extracting color in specified brightness.
		Brightness Correct Filter	Track brightness change of entire screen and remove gradual brightness change such as uneven brightness.
		Color Gray Filter	Color image is converted into monochrome images to emphasize specific color.
		Extract Color Filter	Convert color image to color extracted image or binary image.
		Anti Color Shading	To remove the irregular color/pattern by uniformizing max.2 specified colors.
		Stripes Removal Filter Ⅱ	Remove the background pattern of vertical, horizontal and diagonal stripes.
	ABC	Polar Transformation	Rectify the image by polar transformation. Useful for OCR or pattern inspection printed on circle.
		Trapezoidal Correction	Rectify the trapezoidal deformed image.
		Machine Simulator	How the alignment marks would move on the image when each stage or robot axis is controlled can be checked.
		Image Subtraction	The registered model image and measurement image are compared and only the different pixels are extracted and converted to an image.
		Advanced filter	Process the images acquired from cameras in order to make them easier to measure. This processing item consolidates existing image conversion filtering into one processing item and adds extra functions.
		Panorama	Combine multiple image to create one big image.
Support measurement		Unit Macro	Advanced arithmetic processing can be easily incorporated into workflow as Unit Macro processing items.
		Unit Calculation Macro	This function is convenient when the user wants to calculate a value using an original calculation formula or change the set value or system data of a processing item.
	ABC	Calculation	Used when using the judge results and measured values of ProcItem which are registered in processing units.
		Line Regression	Used for calculating regression line from plural measurement coodinate.
		Circle Regression	Used for calculating regression circle from plural measurement coordinate.
	P	Precise Calibration	Used for calibration corresponding to trapezoidal distortion and lens distortion.
	User	User Data	Used for setting of the data that can be used as common constants and variables in scene group data.
		Set Unit Data	Used to change the ProcItem data (setting parameters,etc.) that has been set up in a scene.
		Get Unit Data	Used to get one data (measured results, setting parameters,etc.) of ProcItem that has been set up in a scene.
		Set Unit Figure	Used for re-setting the figure data (model, measurement area) registered in an unit.
		Get Unit Figure	Used for get the figure data (model, measurement area) registered in an unit.
		Trend Monitor	Used for displaying the information about results on the monitor, facilitating to avoid NG and analyze causes.
		Image Logging	Used for saving the measurement images to the memory and USB memory.
		Image Conversion Logging	Used for saving the measurement images in JPEG and BMP format.
		Data Logging	Used for saving the measurement data to the memory and USB memory.
		Elapsed Time	Used for calculating the elapsed time since the measurement trigger input.
		Wait	Processing is stopped only at the set time. The standby time is set by the unit of [ms].
		Focus	Focus setting is supported.
		Iris	Focus and aperture setting is supported.
		Parallelize	A part of the measurement flow is divided into two or more tasks and processed in parallel to shorten the measurement time. This processing item is placed at the top of processing to be performed in parallel.
		Parallelize Task	A part of the measurement flow is divided into two or more tasks and processed in parallel to shorten the measurement time. This processing item is placed immediately before processing to be performed in parallel between Parallelize and Parallelize End.
		Statistics	Used when you need to calculate an average of multiple measurement results.

Group	Icon	Processing Item	
Support measurement		Referrence Calib Data	Calibration data and distortion compensation data held under other processing items can be referenced.
		Position Data Calculation	The specified position angle is calculated from the measured positions.
		Stage Data	Sets and stores data related to stages.
		Robot Data	Sets and stores data related to robots.
		Vision Master Calibration	This processing item automatically calculates the entire axis movement amount of the control equipment necessary for calibration.
		PLC Mastoer Calibration	Calibration data is created using a communication command from PLC.
		Convert Position Data	The position angle after the specified axis movement is calculated.
		Movement Single Position	The axis movement that is required to match the measured position angle to the reference position angle is calculated.
		Movement Multi Points	The axis movements that are required to match the measured position angles to the corresponding reference position angles are calculated.
		Detection Point	Obtains position/angle information by referring to the coordinate values measured with the Measurement Processing Unit.
		Camera Calibration	By setting the camera calibration, the measurement result can be converted and output as actual dimensions.
		Data Save	The set data can be saved in the controller main unit or as scene data. The data is held even after the FH/FZ power is turned off.

Group	Icon	Processing Item	
Branch		Conditional Branch	Used where more than two kinds of products on the production line need to detected separately.
		End	This ProcItem must be set up as the last processing unit of a branch.
		DI Branch	Same as ProcItem "Branch". But you can change the targets of conditional branching via external inputs.
		Control Flow Normal	Set the measurement flow processing into the wait state in which the specific no-protocol command can be executed.
		Control Flow PLC Link	Set the measurement flow processing into the wait state in which the specific PLC Link command can be executed.
		Control Flow Parallel	Set the measurement flow processing into the wait state in which the specific parallel command can be executed.
		Control Flow Fieldbus	Set the measurement flow processing into the wait state in which the specific Fieldbus command can be executed.
	SWITCH	Selective Branch	Easily branch to multiple destinations.
Output result		Data Output	Used when you need to output data to the external devices such as PLC or PC via serial ports.
		Parallel Data Output	Used when you need to output data to the external devices such as PLC or PC via parallel ports.
		Parallel Judgement Output	Used when you need to output judgement results to the external devices such as PLC or PC via parallel ports.
		Fieldbus Data Output	Outputs data to an external device, such as a Programmable Controller, through a fieldbus interface.
Display result	OK	Result Display	Used for displaying the texts or the figures in the camera image.
		Display Image File	Display selected image file.
	NG	Display Last NG Image	Display the last NG images.

*1 Bar Codes that can be read : JAN/EAN/UPC (including add-on codes), Code 39, Codabar (NW-7), ITF (Interleaved 2 of 5), Code 93, Code 128, GS1-128, GS1 DataBar (RSS-14 / RSS Limited / RSS Expanded), Pharmacode

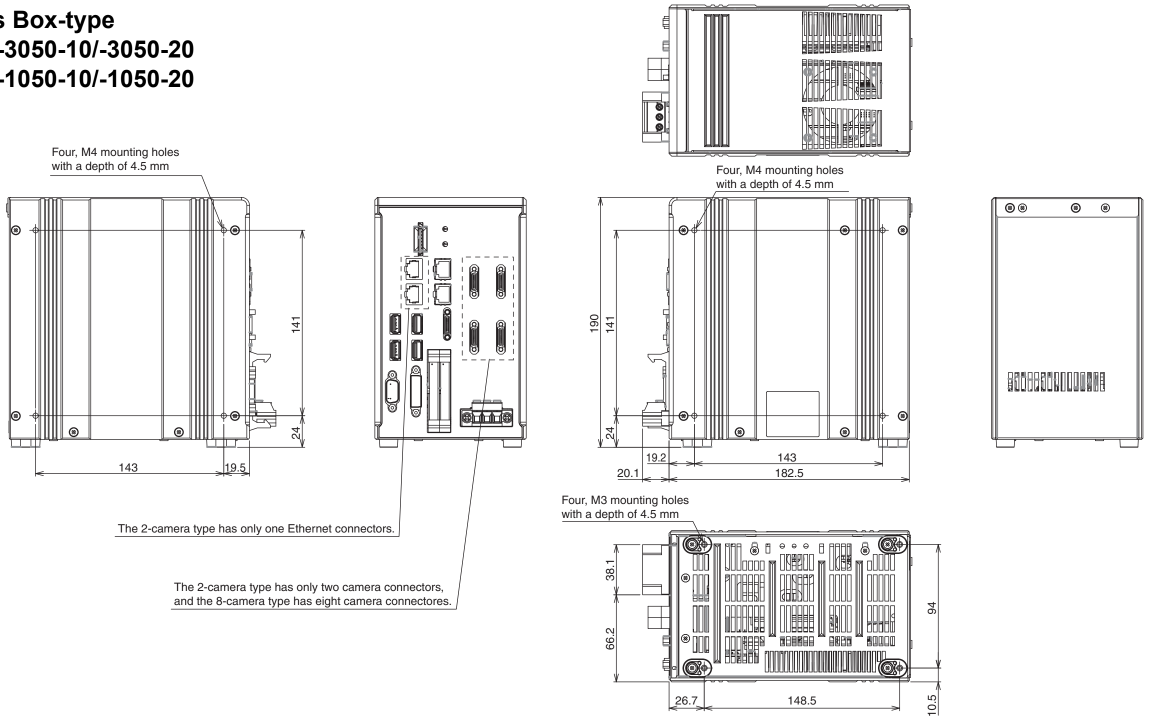
*2 2D Codes that can be read : Data Matrix (ECC200), QR Code

Dimensions

(Unit: mm)

Series Sensor Controllers

FH-series Box-type
FH-3050/-3050-10/-3050-20
FH-1050/-1050-10/-1050-20

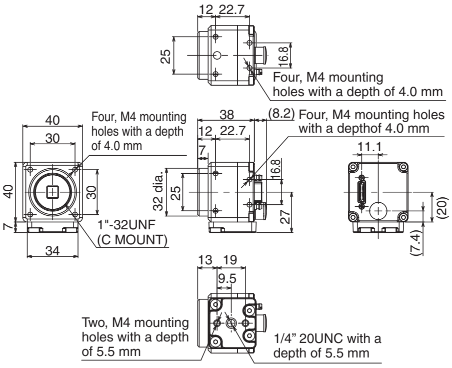

Four, M4 mounting holes with a depth of 4.5 mm
141
24
143
19.5
The 2-camera type has only one Ethernet connectors.
The 2-camera type has only two camera connectors, and the 8-camera type has eight camera connectores.
Four, M4 mounting holes with a depth of 4.5 mm
190
141
24
19.2
143
20.1
182.5
Four, M3 mounting holes with a depth of 4.5 mm
38.1
66.2
94
26.7
148.5
10.5

Cameras

High-speed CMOS Camera

300,000-pixel camera

FH-SC
FH-SM

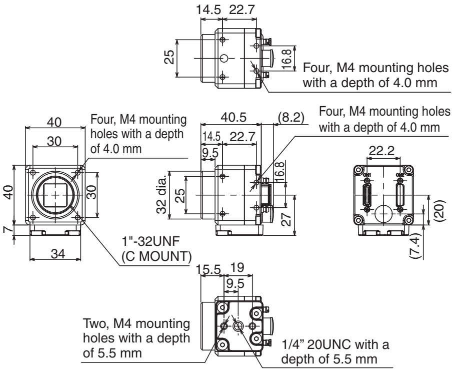

12 22.7
25
16.8
Four, M4 mounting holes with a depth of 4.0 mm
40
30
Four, M4 mounting holes with a depth of 4.0 mm
38
(8.2) Four, M4 mounting holes with a depthof 4.0 mm
12 22.7
7
16.8
11.1
40
30
32 dia.
25
27
(20)
7
1"-32UNF (C MOUNT)
34
(7.4)
13 19
9.5
Two, M4 mounting holes with a depth of 5.5 mm
1/4" 20UNC with a depth of 5.5 mm

2 million-pixel camera

FH-SC02
FH-SM02

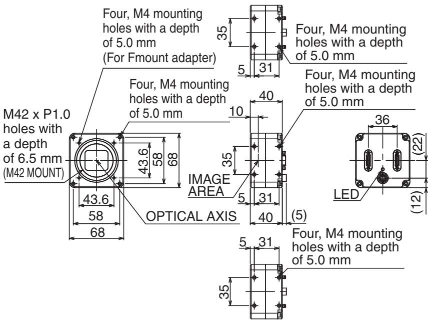
4 million-pixel camera

FH-SC04
FH-SM04


14.5 22.7
25
16.8
Four, M4 mounting holes with a depth of 4.0 mm
40
30
Four, M4 mounting holes with a depth of 4.0 mm
40.5
(8.2)
Four, M4 mounting holes with a depth of 4.0 mm
14.5 22.7
9.5
16.8
22.2
40
30
32 dia.
25
27
(20)
7
1"-32UNF (C MOUNT)
34
(7.4)
15.5 19
9.5
Two, M4 mounting holes with a depth of 5.5 mm
1/4" 20UNC with a depth of 5.5 mm

12 million-pixel camera

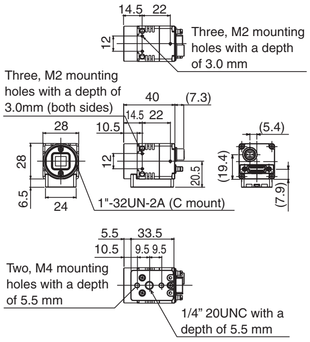
FH-SC12
FH-SM12


Four, M4 mounting holes with a depth of 5.0 mm (For Fmount adapter)
35
5 31
Four, M4 mounting holes with a depth of 5.0 mm
Four, M4 mounting holes with a depth of 5.0 mm
40
10
Four, M4 mounting holes with a depth of 5.0 mm
36
M42 x P1.0 holes with a depth of 6.5 mm (M42 MOUNT)
43.6
58
68
35
(22)
IMAGE AREA
5 31
LED
(12)
43.6
58
68
OPTICAL AXIS
40
(5)
5 31
Four, M4 mounting holes with a depth of 5.0 mm
35

Digital CCD Cameras

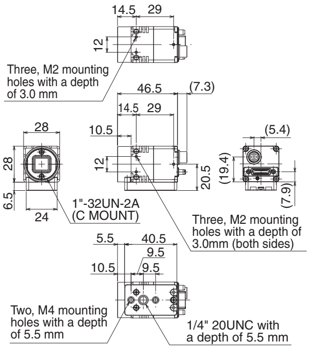
300,000-pixel camera

FZ-S
FZ-SC


14.5 22
12
Three, M2 mounting holes with a depth of 3.0 mm
Three, M2 mounting holes with a depth of 3.0mm (both sides)
40
(7.3)
14.5 22
28
10.5
(5.4)
28
12
20.5
(19.4)
6.5
24
1"-32UN-2A (C mount)
(7.9)
5.5 33.5
10.5 9.5 9.5
Two, M4 mounting holes with a depth of 5.5 mm
1/4" 20UNC with a depth of 5.5 mm

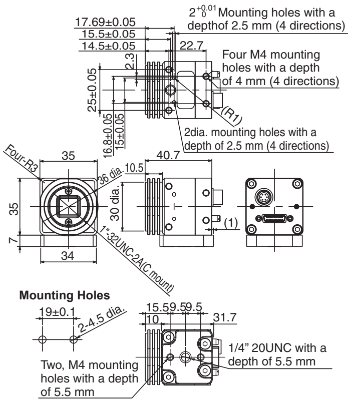
2 million-pixel camera

FZ-S2M
FZ-SC2M


14.5 29
12
Three, M2 mounting holes with a depth of 3.0 mm
46.5
(7.3)
14.5 29
28
10.5
(5.4)
28
12
20.5
(19.4)
6.5
24
1"-32UN-2A (C MOUNT)
Three, M2 mounting holes with a depth of 3.0mm (both sides)
(7.9)
5.5 40.5
9.5
10.5 9.5
Two, M4 mounting holes with a depth of 5.5 mm
1/4" 20UNC with a depth of 5.5 mm

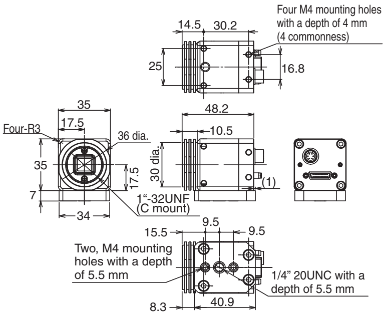
5 million-pixel camera

FZ-S5M2
FZ-SC5M2


2 +0.01 0 Mounting holes with a depthof 2.5 mm (4 directions)
17.69±0.05
15.5±0.05
14.5±0.05
22.7
2.3
Four M4 mounting holes with a depth of 4 mm (4 directions)
25±0.05
(R1)
16.8±0.05
15±0.05
2dia. mounting holes with a depth of 2.5 mm (4 directions)
Four-R3
35
40.7
36 dia.
10.5
35
30 dia.
(1)
7
34
1"-32UNC-2A(C mount)
Mounting Holes
19±0.1
2-4.5 dia.
15.5 9.5 9.5
10
31.7
1/4" 20UNC with a depth of 5.5 mm
Two, M4 mounting holes with a depth of 5.5 mm

High-speed CCD Camera

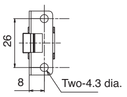
FZ-SH
FZ-SHC

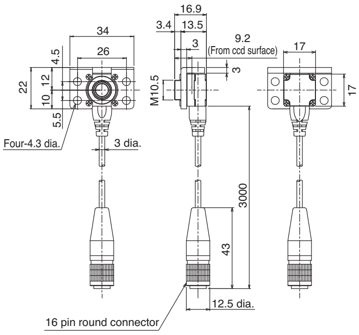

Four M4 mounting holes with a depth of 4 mm (4 commonness)
14.5 30.2
25
16.8
35
48.2
17.5
10.5
Four-R3
36 dia.
35
30 dia.
17.5
(1)
7
1"-32UNF (C mount)
34
15.5
9.5
9.5
Two, M4 mounting holes with a depth of 5.5 mm
1/4" 20UNC with a depth of 5.5 mm
8.3
40.9

Small digital CCD cameras

Camera head

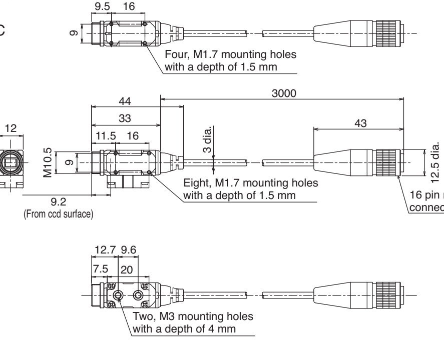
Flat camera
FZ-SF
FZ-SFC


26
8
Two-4.3 dia.


16.9
3.4 13.5
34
3
9.2 (From ccd surface)
17
26
4.5
3
22
10 12
M10.5
17
5.5
Four-4.3 dia.
3 dia.
3000
43
16 pin round connector
12.5 dia.

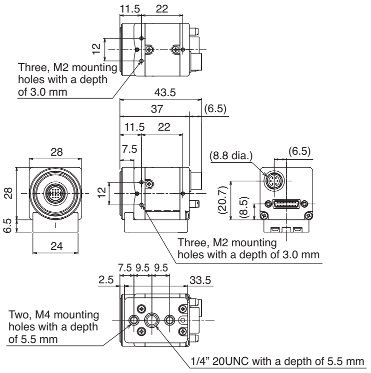
Pen-shaped camera

FZ-SP
FZ-SPC


9.5 16
9
Four, M1.7 mounting holes with a depth of 1.5 mm
44
3000
33
43
12
11.5 16
3 dia.
12.5 dia.
M10.5
9
12
6
Eight, M1.7 mounting holes with a depth of 1.5 mm
16 pin round connector
9.2 (From ccd surface)
12.7 9.6
7.5 20
Two, M3 mounting holes with a depth of 4 mm

Camera amplifier

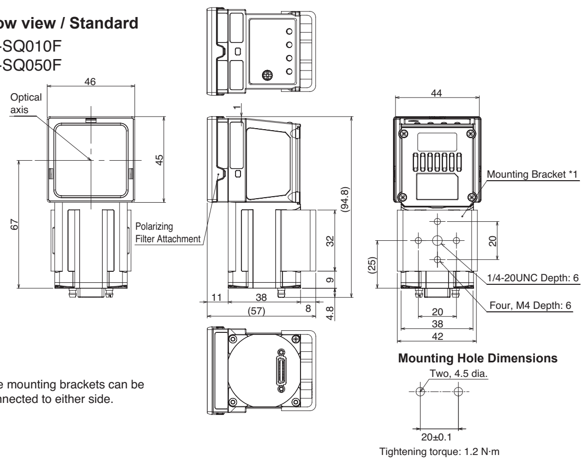
Can be used for both flat cameras and pen-shaped cameras


11.5 22
12
Three, M2 mounting holes with a depth of 3.0 mm
43.5
37
(6.5)
11.5 22
28
7.5
(8.8 dia.)
(6.5)
28
12
(20.7)
(8.5)
6.5
24
Three, M2 mounting holes with a depth of 3.0 mm
7.5 9.5 9.5
2.5
33.5
Two, M4 mounting holes with a depth of 5.5 mm
1/4" 20UNC with a depth of 5.5 mm

Intelligent Compact CMOS Cameras

Narrow view / Standard

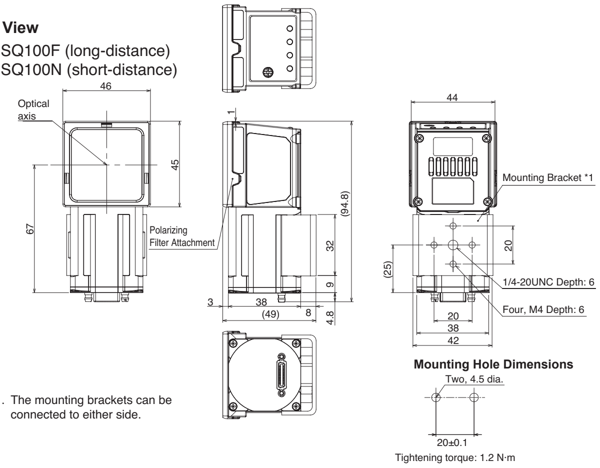
FZ-SQ010F
FZ-SQ050F


46
Optical axis
45
67
Polarizing Filter Attachment
11
38
(57)
8
4.8
9
32
(94.8)
44
Mounting Bracket *1
20
(25)
1/4-20UNC Depth: 6
Four, M4 Depth: 6
20
38
42
Mounting Hole Dimensions
Two, 4.5 dia.
20±0.1
Tightening torque: 1.2 N·m

*1. The mounting brackets can be connected to either side.

Wide View

FZ-SQ100F (long-distance)
FZ-SQ100N (short-distance)


46
Optical axis
1
45
67
Polarizing Filter Attachment
3
38
(49)
8
4.8
9
32
(94.8)
44
Mounting Bracket *1
20
(25)
1/4-20UNC Depth: 6
Four, M4 Depth: 6
20
38
42
Mounting Hole Dimensions
Two, 4.5 dia.
20±0.1
Tightening torque: 1.2 N·m

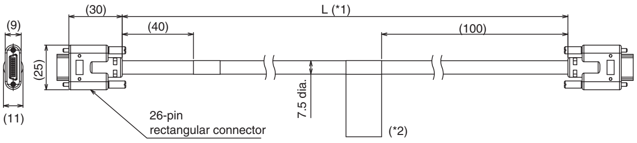
*1. The mounting brackets can be connected to either side.

Cables

Camera Cable

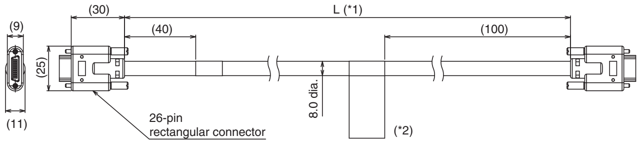
Camera Cable

FZ-VS3


(30)
L (*1)
(9)
(40)
(100)
(25)
(11)
26-pin rectangular connector
7.5 dia.
(*2)

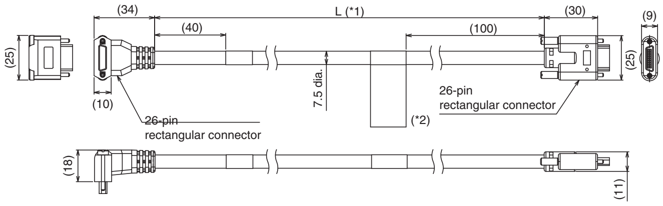
Bend resistant Camera Cable

FZ-VSB3


(30)
L (*1)
(9)
(40)
(100)
(25)
(11)
26-pin rectangular connector
8.0 dia.
(*2)

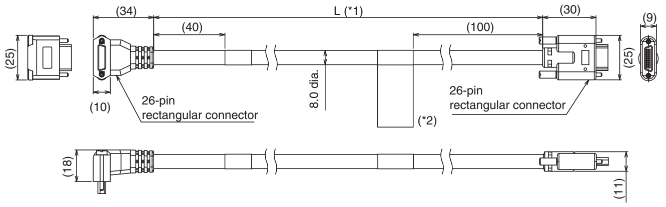
Right-angle Camera Cable

FZ-VSL3


(34)
L (*1)
(30)
(9)
(40)
(100)
(25)
(25)
(10)
26-pin rectangular connector
7.5 dia.
26-pin rectangular connector
(*2)
(18)
(11)

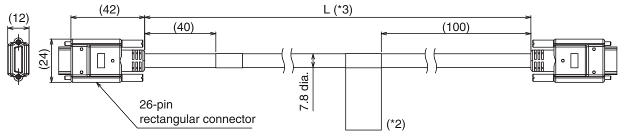
Bend resistant Right-angle Camera Cable

FZ-VSLB3


(34)
L (*1)
(30)
(9)
(40)
(100)
(25)
(25)
(10)
26-pin rectangular connector
8.0 dia.
26-pin rectangular connector
(*2)
(18)
(11)

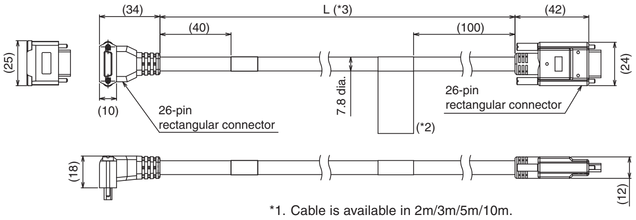
Long-distance Camera Cable

FZ-VS4


(12)
(42)
L (*3)
(40)
(100)
(24)
26-pin rectangular connector
7.8 dia.
(*2)

Long-distance Right-angle Camera Cable

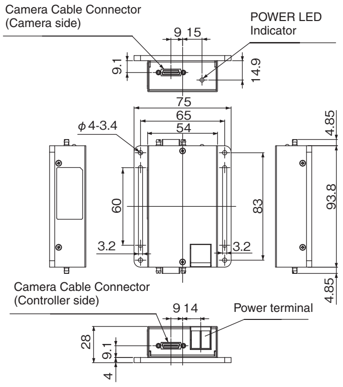
FZ-VSL4


(34)
L (*3)
(42)
(40)
(100)
(25)
(24)
(10)
26-pin rectangular connector
7.8 dia.
26-pin rectangular connector
(*2)
(18)
(12)

*1. Cable is available in 2m/3m/5m/10m.
*2. Each camera cables has polarity.
Please ensure that the name plate side of the cable is connected to the controller.
*3. Cable is available in 15m.

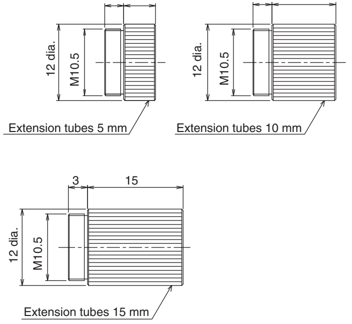
Camera Cable Extension Unit

FZ-VSJ


Camera Cable Connector (Camera side)
POWER LED Indicator
9 15
9.1
14.9
75
65
54
ϕ4-3.4
4.85
60
83
93.8
3.2
3.2
4.85
Camera Cable Connector (Controller side)
9 14
Power terminal
28
9.1
4

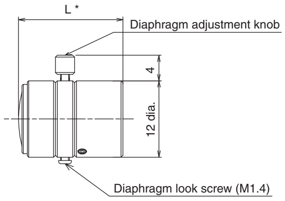
Extension Tubes for Small Camera

FZ-LESR


3
5
12 dia.
M10.5
Extension tubes 5 mm
3
10
12 dia.
M10.5
Extension tubes 10 mm
3
15
12 dia.
M10.5
Extension tubes 15 mm

Lens for Small Camera

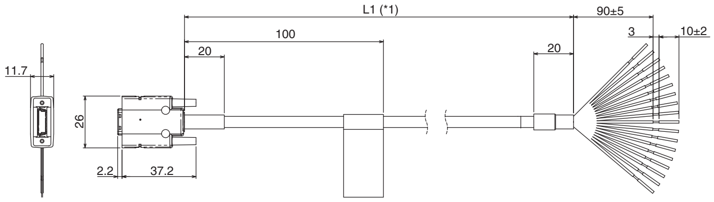
FZ-LES Series


L *
Diaphragm adjustment knob
4
12 dia.
Diaphragm look screw (M1.4)

* Overall length is available in 16.4mm/19.7mm/23.1mm/25.5mm.

Encoder Cable

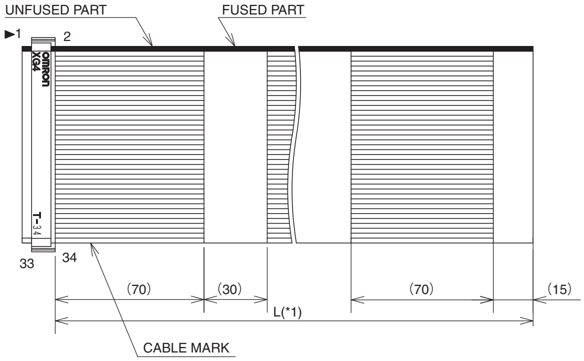
FH-VR


L1 (*1)
90±5
100
3
10±2
20
20
11.7
26
2.2
37.2

*1. Cable is available in 1.5 m.

Parallel I/O Cable

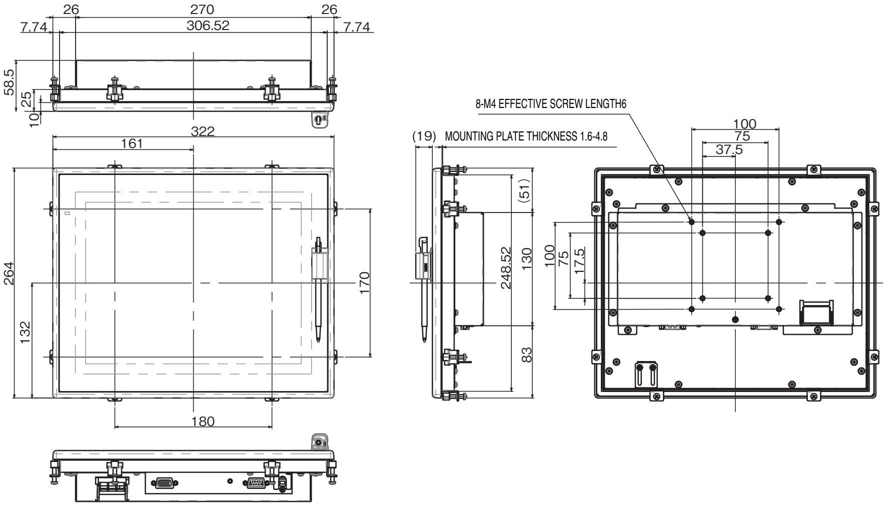
XW2Z-S013-□


UNFUSED PART
FUSED PART
▶1
2
OMRON XG4
T-34
33
34
(70)
(30)
(70)
(15)
L(*1)
CABLE MARK

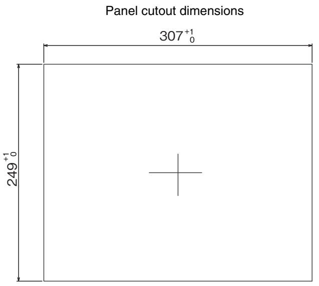
*1. Cable is available in 2m/5m.

Touch Panel Monitor

FH-MT12


26
270
26
7.74
306.52
7.74
58.5
25
10
322
161
264
132
170
180
8-M4 EFFECTIVE SCREW LENGTH6
(19)
MOUNTING PLATE THICKNESS 1.6-4.8
(51)
248.52
130
83
100
75
37.5
100
75
17.5

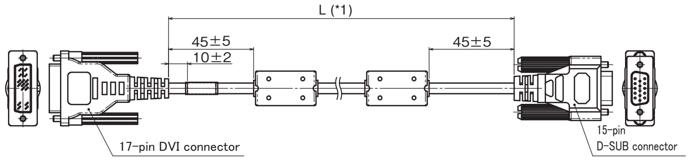
Panel cutout dimensions


Panel cutout dimensions
307^{+1}_{0}
249^{+1}_{0}

Note:1. Panel thickness : 1.6 to 4.8 mm
2. No burr allowed

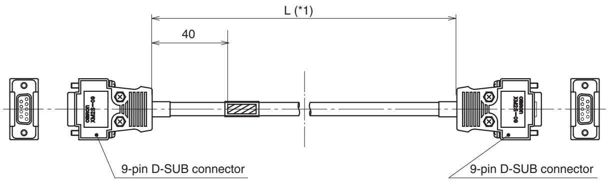
DVI-Analog Conversion Cable for Touch Panel Monitor

FH-VMDA


L (*1)
45±5
10±2
45±5
17-pin DVI connector
15-pin
D-SUB connector

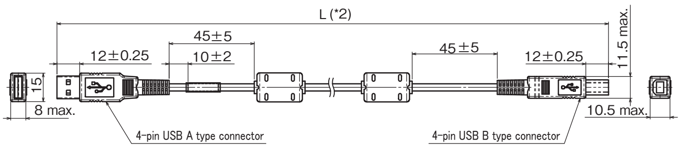
RS-232C Cable for Touch Panel Monitor

XW2Z-□□□PP-1


L (*1)
40
9-pin D-SUB connector
9-pin D-SUB connector

USB Cable for Touch Panel Monitor

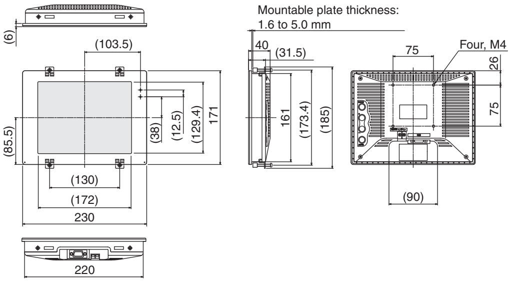
FH-VUAB


L (*2)
45±5
12±0.25
10±2
45±5
12±0.25
11.5 max.
15
8 max.
10.5 max.
4-pin USB A type connector
4-pin USB B type connector

*1. Cable is available in 2m/5m/10m.
*2. Cable is available in 2m/5m.

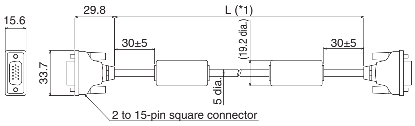
LCD Monitor

FZ-M08


(6)
(103.5)
(38)
(12.5)
(129.4)
171
(85.5)
(130)
(172)
230
220
Mountable plate thickness:
1.6 to 5.0 mm
40
(31.5)
161
(173.4)
(185)
75
Four, M4
26
75
(90)

LED Monitor Cable

FZ-VM

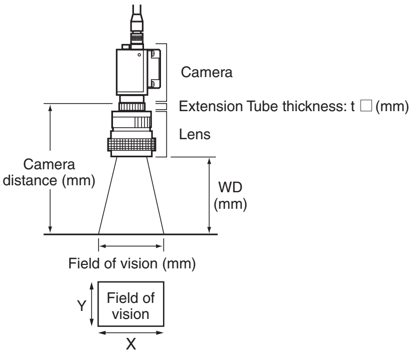

15.6
33.7
29.8
L (*1)
30±5
(19.2 dia.)
30±5
5 dia.
2 to 15-pin square connector

*1. cable is available in 2m/5m.

Optical Chart

Meaning of Optical Chart

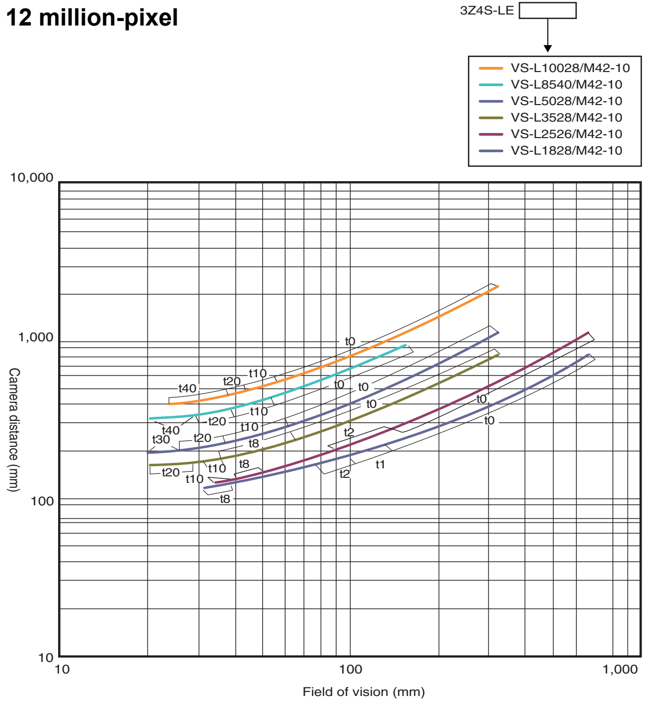
The X axis of the optical chart shows the field of vision (mm) (*1), and the Y axis of the optical chart shows the camera installation distance (mm) (*2).


Camera
Extension Tube thickness: t □ (mm)
Lens
Camera distance (mm)
WD (mm)
Field of vision (mm)
Y
Field of vision
X

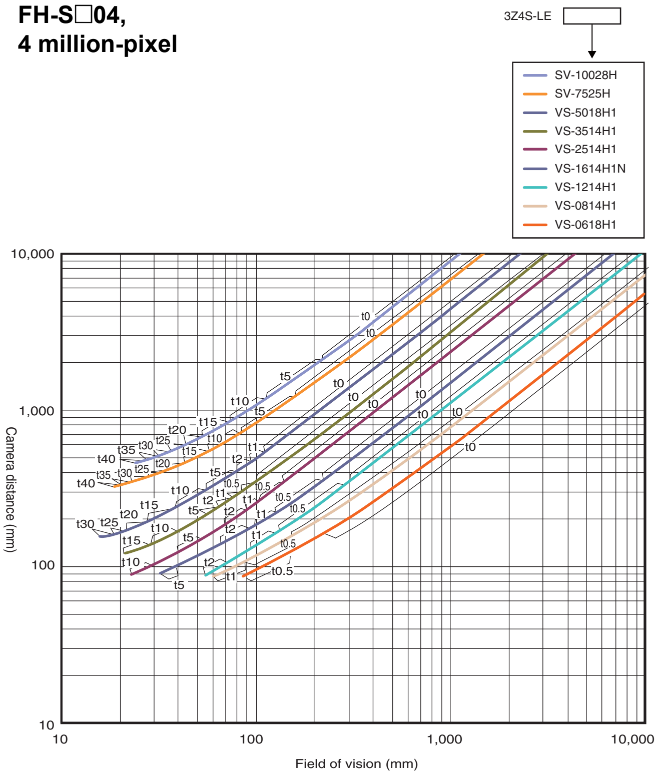
*1. The lengths of the fields of vision given in the optical charts are the lengths of the Y axis.

*2. The vertical axis represents WD for small cameras.

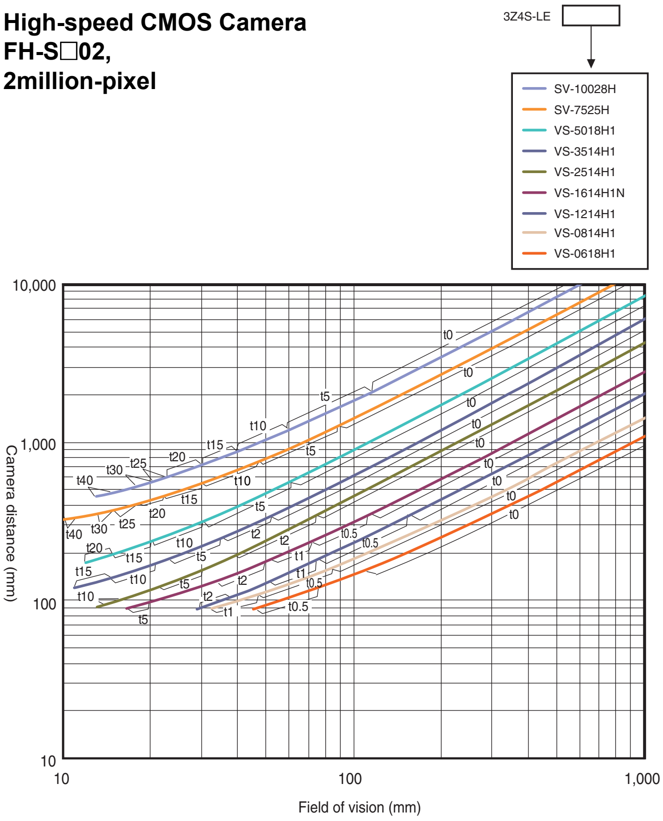
High-speed CMOS Camera FH-S□12, 12 million-pixel



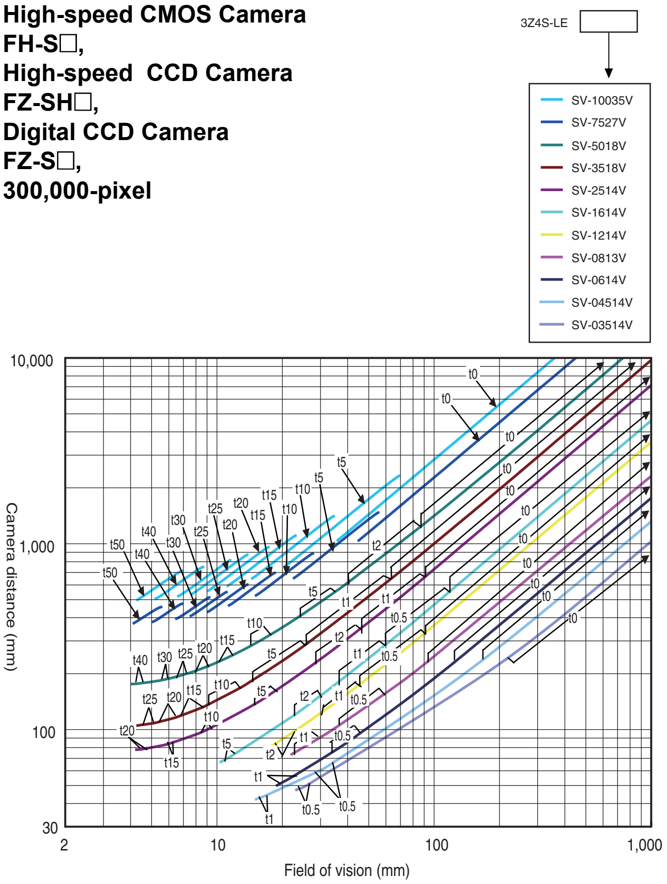
High-speed CMOS Camera FH-S□04, 4 million-pixel



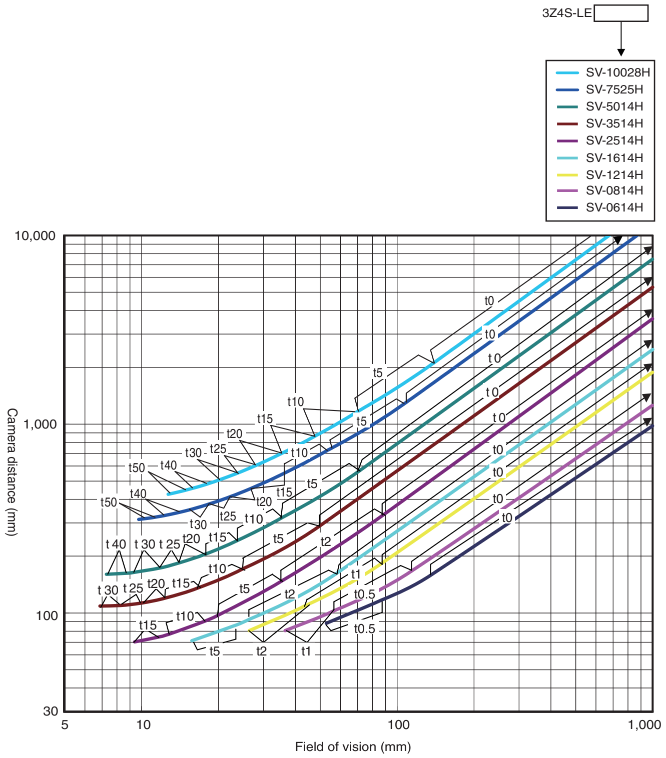
High-speed CMOS Camera FH-S□02, 2million-pixel



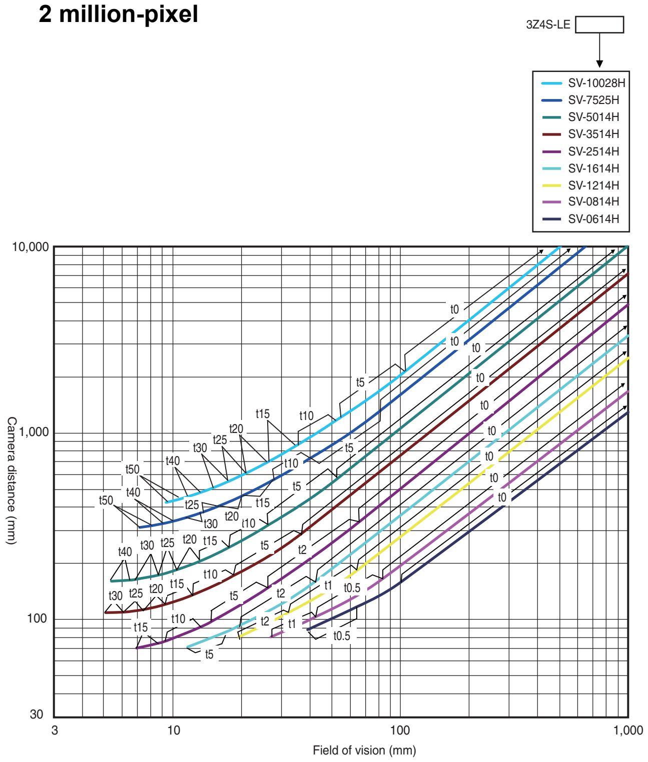
High-speed CMOS Camera FH-S□, High-speed CCD Camera FZ-SH□, Digital CCD Camera FZ-S□, 300,000-pixel



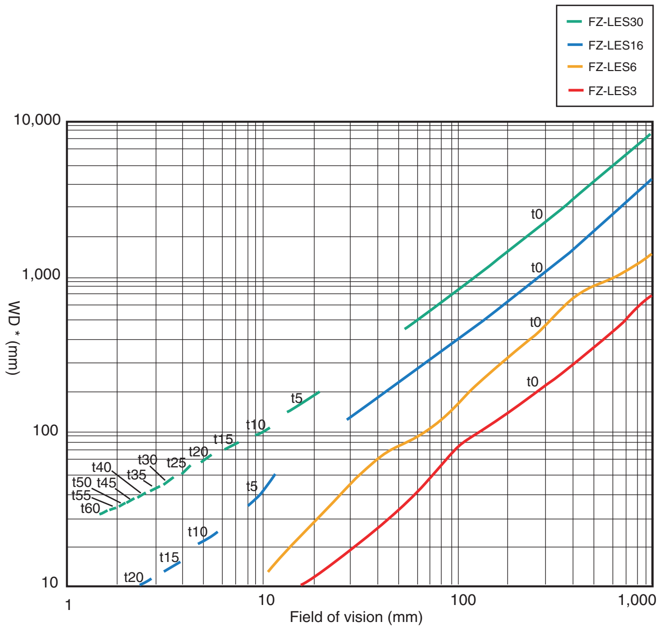
Digital CCD Camera FZ-S□5M2, 5 million-pixel



Digital CCD Camera FZ-S□2M, 2 million-pixel

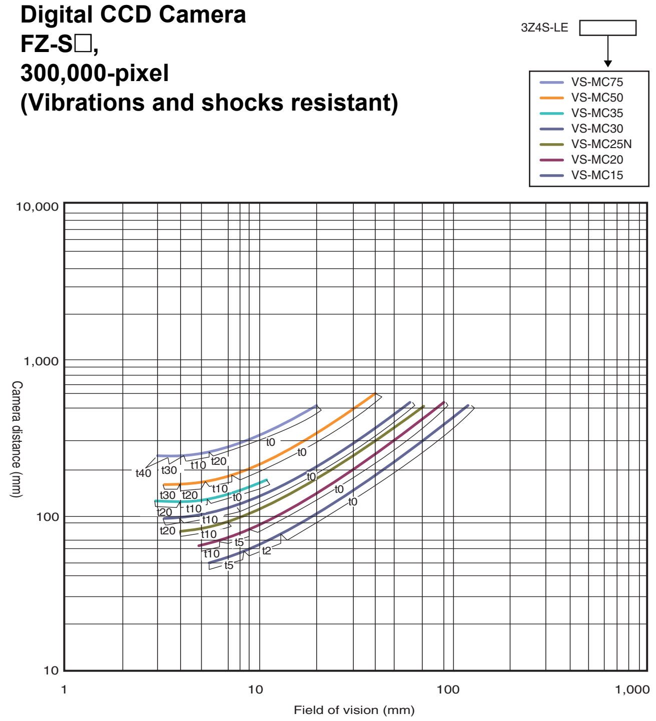


Small Digital CCD Cameras FZ-SF□, FZ-SP□, 300,000-pixel

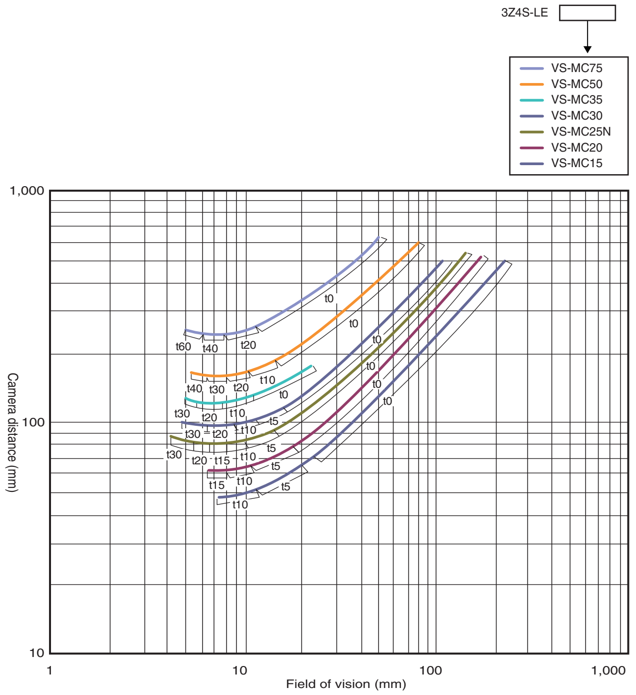


* The vertical axis represents WD, not installation distance.

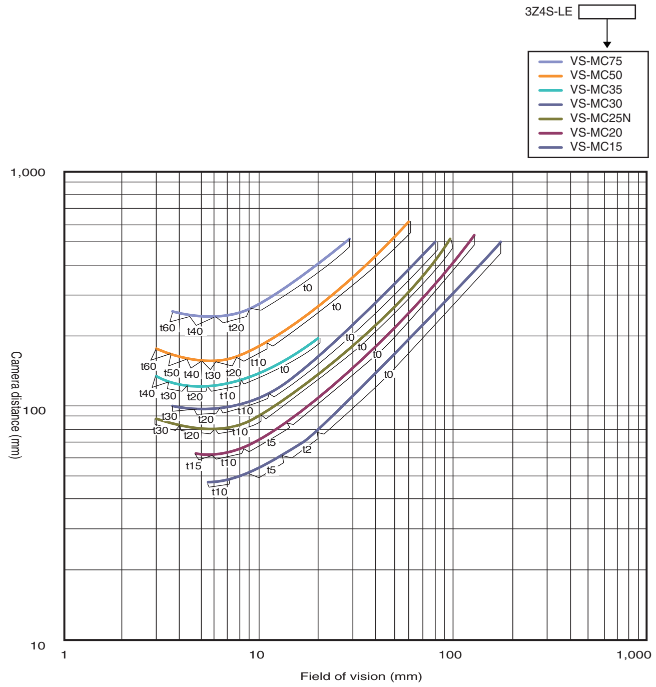
High-speed CMOS Camera
FH-S□,
High-speed CCD Camera
FZ-SH□,
Digital CCD Camera
FZ-S□,
300,000-pixel
(Vibrations and shocks resistant)



Digital CCD Camera
FZ-S□5M2,
5 million-pixel
(Vibrations and shocks resistant)



Digital CCD Camera
FZ-S□2M,
2 million-pixel
(Vibrations and shocks resistant)



MEMO

Smart Camera
FQ-M-Series

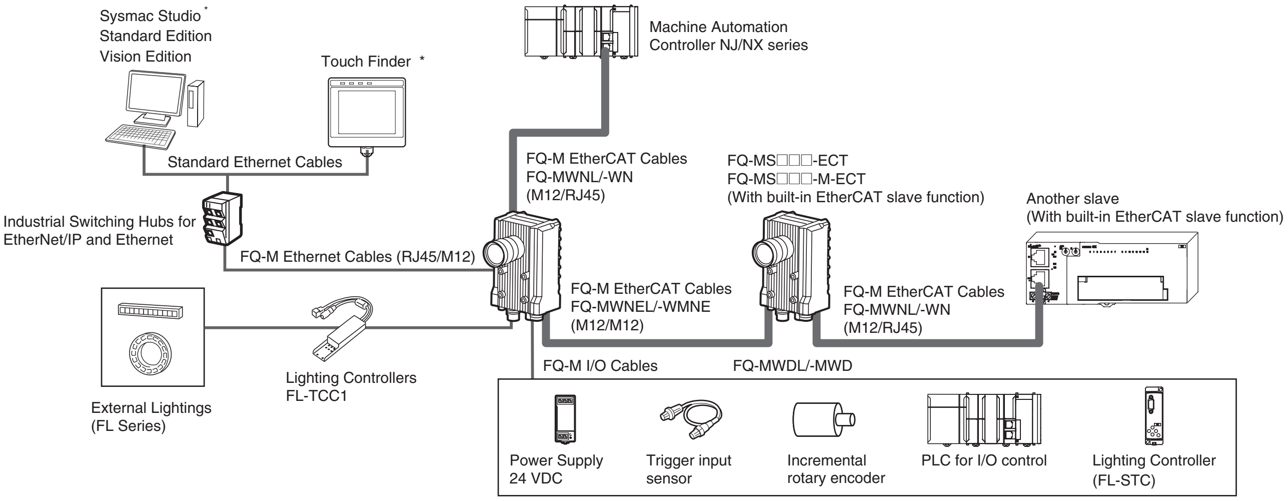
Designed for motion tracking

- Connectivity with EtherCAT/Ethernet
- Up to 5000 pieces per minute with 360 degree rotation*
- Vision sensor with encoder input for tracking function
- Calibration function of the complete system
- Flexible data output depending on the output devices

* The processing speed depends on setting conditions.

System configuration

EtherCAT connections


Sysmac Studio *
Standard Edition
Vision Edition
Touch Finder *
Machine Automation Controller NJ/NX series
Standard Ethernet Cables
FQ-M EtherCAT Cables
FQ-MWNL/-WN
(M12/RJ45)
FQ-MS□□□-ECT
FQ-MS□□□-M-ECT
(With built-in EtherCAT slave function)
Another slave
(With built-in EtherCAT slave function)
Industrial Switching Hubs for EtherNet/IP and Ethernet
FQ-M Ethernet Cables (RJ45/M12)
FQ-M EtherCAT Cables
FQ-MWNEL/-WMNE
(M12/M12)
FQ-M EtherCAT Cables
FQ-MWNL/-WN
(M12/RJ45)
Lighting Controllers
FL-TCC1
External Lightings
(FL Series)
FQ-M I/O Cables
FQ-MWDL/-MWD
Power Supply
24 VDC
Trigger input
sensor
Incremental
rotary encoder
PLC for I/O control
Lighting Controller
(FL-STC)

* Sysmac Studio and Touch Finder can not be used together. When both are connected, Sysmac Studio will have a priority. When you make Machine Automation Controller NJ/NX-series settings with the Sysmac Studio Standard Edition, connect a computer and the NJ/NX via a USB connection or an Ethernet network.

Note: 1. EtherCAT and Ethernet (PLC Link) can not be used simultaneously.

2. It is not possible to configure and adjust the FQ-M via an NJ/NX-series controller, when they are connected via an EtherCAT network. For configuration and adjustment of FQ-M, connect the FQ-M and a computer or a Touch Finder via an Ethernet network.

Specifications

Sensors

Item		Type EtherCAT communication function provided	
		Color	**Monochrome**
Model	**NPN**	FQ-MS120-ECT	FQ-MS120-M-ECT
	PNP	FQ-MS125-ECT	FQ-MS125-M-ECT
Field of vision, Installation distance		Selecting a lens according to the field of vision and installation distance. Refer to the *“Optical Chart”* page.	
Main functions	**Inspection items**	Shape search, Search, Labeling, Edge position	
	Number of simultaneous inspections	32	
	Number of registered scenes	32 *1	
Image input	**Image processing method**	Real color	Monochrome
	Image elements	1/3-inch color CMOS	1/3-inch monochrome CMOS
	Image filter	High dynamic range (HDR) and white balance	High dynamic range (HDR)
	Shutter	Electronic shutter; select shutter speeds from 1/10 to 1/30000 (sec)	
	Processing resolution	752 (H) × 480 (V)	
	Pixel size	6.0 (µm) × 6.0 (µm)	
	Frame rate (image read time)	60fps (16.7ms)	
External Lightings	**Connecting method**	Connection via a strobe light controller	
	Connectable lighting	FL series	
Data logging	**Measurement data**	In Sensor: Max. 32000 items *2	
	Images	In Sensor: 20 images *2	
Measurement trigger		I/O trigger, Encoder trigger, Communications trigger (Ethernet No-protocol, PLC Link, or EtherCAT)	
I/O specifications	**Input signals**	9 signals • Single measurement input (TRIG) • Error clear input (IN0) • Encoder counter reset input (IN1) • Encoder input (A±, B±, Z±) *4	
	Output signals	5 signals *3 • OUT0 Overall judgement output (OR) • OUT1 Control output (BUSY) • OUT2 Error output (ERROR) • OUT3 (Shutter output: SHTOUT) • OUT4 (Strobe trigger output: STGOUT)	
	Ethernet specifications	100BASE-TX/10BASE-TX	
	EtherCAT specifications	Dedicated protocol for EtherCAT 100BASE-TX	
	Connection method	Special connector cables • Power supply and I/O: 1 special connector I/O cable • Touch Finder, Computer and Ethernet: 1 Ethernet cable • EtherCAT: 2 EtherCAT cable	
LED display		• OR: Judgment result indicator • ERR: Error indicator • BUSY: BUSY indicator • ETN: Ethernet communications indicator	
	EtherCAT display	• L/A IN (Link/Activity IN) × 1 • L/A OUT (Link/Activity OUT) × 1 • RUN × 1 • ERR × 1	
Ratings	**Power supply voltage**	21.6 to 26.4 VDC (including ripple)	
	Insulation resistance	Between all lead wires and case: 0.5 MΩ (at 250 V)	
	Current consumption	450mA max. (When the FL-series Strobe controller and lighting are used.) 250mA max. (When external lighting is not used.)	
Environmental immunity	**Ambient temperature range**	Operating: 0 to 50 °C, Storage: -20 to 65 °C (with no icing or condensation)	
	Ambient humidity range	Operating and storage: 35% to 85% (with no condensation)	
	Ambient atmosphere	No corrosive gas	
	Vibration resistance (destruction)	10 to 150 Hz, single amplitude: 0.35 mm, X/Y/Z directions, 8 min each, 10 times	
	Shock resistance (destruction)	150 m/s^2 3 times each in 6 direction (up, down, right, left, forward, and backward)	
	Degree of protection	IEC60529 IP40	
Materials		Case: alminium die casting, Rear cover: alminium plate	
Weight		Approx. 480 g (Sensor only)	
Accessories		Instruction Manual	

*1 The maximum number of registerable scenes depends on settings due to restrictions on memory.
*2 If a Touch Finder is used, results can be saved up to the capacity of an SD card.
*3 The five output signals can be allocated for the judgements of individual inspection items.

*4 Encoder input specifications

Pulse input Specifications (When an open collector type encoder is used.)

Item		Specification		
Input voltage		24 VDC ±10%	12 VDC ±10%	5 VDC ±5%
Input current		4.8 mA (at 24 VDC, typical value)	2.4 mA (at 12 VDC, typical value)	1.0 mA (at 5 VDC, typical value)
NPN	**ON voltage *1**	4.8 V max.	2.4 V max.	1.0 V max.
	OFF voltage *2	19.2 V min.	9.6 V min.	4.0 V min.
PNP	**ON voltage *1**	19.2 V min.	9.6 V min.	4.0 V min.
	OFF voltage *2	4.8 V max.	2.4 V max.	1.0 V max.
Maximum response frequency *3		50 kHz (I/O cable: when the FQ-MWD005 or FQ-MWDL005 cables is used.) 20 kHz (I/O cable: when the FQ-MWD010 or FQ-MWDL010 cables is used.)		
Input impedance		5.1 kΩ		

*1 ON voltage: Voltage to change from OFF to ON state. The ON voltage is the difference of voltages between the GND terminal of the encoder power terminals and each input terminal.

*2 OFF voltage: Voltage to change from ON to OFF state. The ON voltage is the difference of voltages between the GND terminal of the encoder power terminals and each input terminal.

*3 Select maximum response frequency depending on length of the encoder cable and response frequency of the encoder.

Pulse input Specifications (When a line-driver output type encoder is used.)

Item	Specification
Input voltage	EIA standard RS-422-A line driver level
Input impedance *1	120 Ω ±5%
Differential input voltage	0.2 V min.
Hysteresis voltage	50 mV
Maximum response frequency *2	200 kHz (I/O cable: when the FQ-MWD005, FQ-MWDL005, FQ-MWD010, or FQ-MWDL010 cables is used.)

*1 When terminating resistance function is used.

*2 Select maximum response frequency depending on length of the encoder cable and response frequency of the encoder.

Touch Finder

Item		Type	Model with DC power supply	Model with AC/DC/battery power supply
		Model	FQ-MD30	FQ-MD31
Number of connectable Sensors			2 max.	
Main functions	**Types of measurement displays**		Last result display, Last NG display, trend monitor, histograms	
	Types of display images		Through, frozen, zoom-in, and zoom-out images	
	Data logging		Measurement results, measured images	
	Menu language		English, Japanese	
Indications	**LCD**	**Display device**	3.5-inch TFT color LCD	
		Pixels	320 × 240	
		Display colors	16,777,216	
	Backlight	**Life expectancy *1**	50,000 hours at 25 °C	
		Brightness adjustment	Provided	
		Screen saver	Provided	
	Indicators	**Power indicator (color: green)**	POWER	
		Error indicator (color: red)	ERROR	
		SD card access indicator (color: yellow)	SD ACCESS	
		Charge indicator (color: orange)	---	CHARGE
Operation interface	**Touch screen**	**Method**	Resistance film	
		Life expectancy *2	1,000,000 operations	
External interface	**Ethernet**		100 BASE-TX/10 BASE-T	
	SD card		Omron SD card (Model: HMC-SD291/491) or a SDHC card of Class4 or higher rating is recommended.	
Ratings	**Power supply voltage**	**DC power connection**	20.4 to 26.4 VDC (including ripple)	
		AC adapter connection	---	100 to 240 VAC, 50/60 Hz
		Battery connection	---	FQ-BAT1 Battery (1 cell, 3.7 V)
	Continuous operation on Battery *3		---	1.5 h
	Current consumption		DC power connection: 0.2 A	
	Insulation resistance		Between all lead wires and case: 0.5 MΩ (at 250 V)	
Environmental immunity	**Ambient temperature range**		Operating: 0 to 50 °C Storage: -25 to 65 °C (with no icing or condensation)	Operating: 0 to 50 °C when mounted to DIN Track or panel 0 to 40 °C when operated on a Battery Storage: -25 to 65 °C (with no icing or condensation)
	Ambient humidity range		Operating and storage: 35% to 85% (with no condensation)	

Item		Type	Model with DC power supply	Model with AC/DC/battery power supply
		Model	FQ-MD30	FQ-MD31
Environmental immunity	**Ambient atmosphere**		No corrosive gas	
	Vibration resistance (destruction)		10 to 150 Hz, single amplitude: 0.35 mm, X/Y/Z directions 8 min each, 10 times	
	Shock resistance (destruction)		150 m/s^2 3 times each in 6 direction (up, down, right, left, forward, and backward)	
	Degree of protection		IEC 60529 IP20	
Dimensions			95 × 85 × 33 mm	
Materials			Case: ABS	
Weight			Approx. 270 g (without Battery and hand strap)	
Accessories			Touch Pen (FQ-XT), Instruction Manual	

*1 This is a guideline for the time required for the brightness to diminish to half the initial brightness at room temperature and humidity. No guarantee is implied. The life of the backlight is greatly affected by the ambient temperature and humidity. It will be shorter at lower or higher temperatures.
*2 This value is only a guideline. No guarantee is implied. The value will be affected by operating conditions.
*3 This value is only a guideline. No guarantee is implied. The value will be affected by the operating environment and operating conditions.

Battery Specifications

Item Model	FQ-BAT1
Battery type	Secondary lithium ion battery
Nominal capacity	1800 mAh
Rated voltage	3.7 V
Dimensions	35.3 × 53.1 × 11.4 mm
Ambient temperature range	Operating: 0 to 40 °C Storage: -25 to 65 °C (with no icing or condensation)
Ambient humidity range	Operating and storage: 35% to 85% (with no condensation)
Charging method	Charged in Touch Finder (FQ-MD31). AC adapter (FQ-AC□) is required.
Charging time *1	2.0 h
Battery backup life *2	300 charging cycles
Weight	50 g max.

*1 This value is only a guideline. No guarantee is implied. The value will be affected by operating conditions.
*2 This is a guideline for the time required for the capacity of the Battery to be reduced to 60% of the initial capacity. No guarantee is implied.The value will be affected by the operating environment and operating conditions.

EtherCAT Communications Specifications

Item	Specifications
Communications standard	IEC 61158 Type12
Physical layer	100BASE-TX (IEEE802.3)
Connector	M12 × 2 E-CAT IN : EtherCAT (IN) E-CAT OUT : EtherCAT (OUT)
Communications media	Use the cables for FQ-MWN□□, or FQ-WN□□ series.
Communications distance	Use the communication cable within the length of FQ-MWN□□ or FQ-WN□□ series cables.
Process data	Variable PDO Mapping
Mailbox (CoE)	Emergency messages, SDO requests, SDO responses, and SDO information
Distributed clock	Synchronization with DC mode 1
LED display	L/A IN (Link/Activity IN) × 1 L/A OUT (Link/Activity OUT) × 1 RUN × 1 ERR × 1

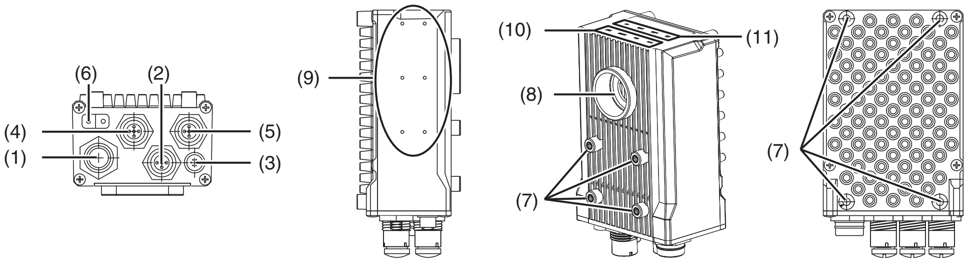
Version Information

FQ-M Series and Programming Devices

FQ-M Series	Required Programming Device	
	Sysmac Studio Standard Edition/Vision Edition	
	Ver.1.00	Ver.1.01 or higher
FQ-MS□□□(-M)-ECT	Not supported	Supported

Components and Functions

Sensor

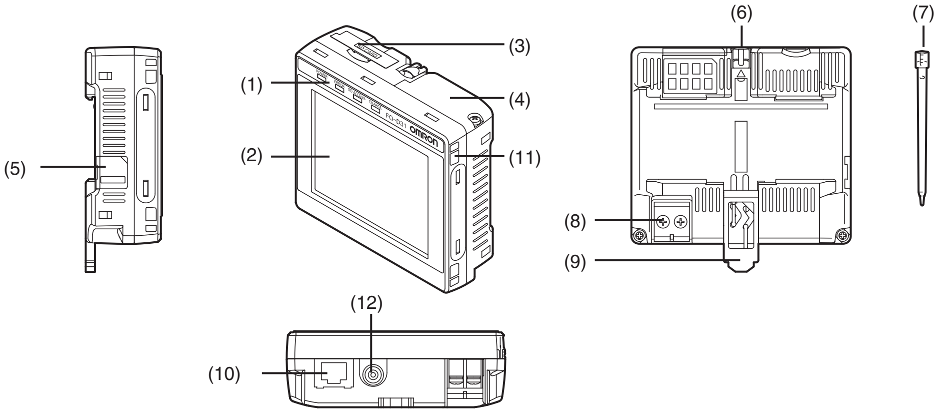


No.	Name	Description
(1)	**I/O Cable connector**	An I/O Cable is used to connect the Sensor to the power supply and external I/O.
(2)	**Ethernet connector**	An Ethernet cable is used to connect the Sensor to external devices such as PLCs, the Touch Finder, or computers.
(3)	**Lighting connector**	Connect an external lighting (strobe controller).
(4)	**EtherCAT connector (IN)***	Connect an EtherCAT compatible device.
(5)	**EtherCAT connector (OUT)***	Connect an EtherCAT compatible device.
(6)	**Node address switch ***	Set the node address for EtherCAT communications.
(7)	**Installation holes**	Holes to install and secure the camera.
(8)	**C-mount lens connection part**	Install the C-mount lens in this part. Determine the field of view depending on the measurement target and select a suitable CCTV lens (C-mounting lens).

No.	Name		Description
(9)	**Strobe controller connection holes**		Install the strobe controller in this part. FL-TCC1 can be mounted.
(10)	**Measure-ment process Operation indicators**	**OR**	Lit in orange while OR signal is ON.
		ETN	Lit in orange while in Ethernet communications.
		ERROR	Lit in red when an error occurs.
		BUSY	Lit in green while the sensor is processing.
(11)	**EtherCAT Operation indicators**	**L/A IN**	Lit in green when Link with EtherCAT device is established and flickers in green when communicating (data IN).
		L/A OUT	Lit in green when Link with EtherCAT device is established and flickers in green when communicating (data OUT).
		ECAT RUN	Lit in green when EtherCAT communication is available.
		ECAT ERROR	Lit in red when an EtherCAT communications error occurs.

* FQ-MS□□□-ECT and FQ-MS□□□-M-ECT only.

Touch Finder



No.	Name		Description
(1)	**Operation indicators**	**POWER**	Lights green when the Touch Finder is turned ON.
		ERROR	Lights red when an error occurs.
		SD ACCESS	Lights yellow when an SD card is inserted. Flashes yellow when the SD card is being accessed.
		CHARGE *	Lights orange when the Battery is charging.
(2)	**LCD/touch panel**		Displays the setting menu, measurement results, and images input by the camera.
(3)	**SD card slot**		An SD card can be inserted.
(4)	**Battery cover ***		The Battery is inserted behind this cover. Remove the cover when mounting or removing the Battery.
(5)	**Power supply switch**		The Battery is inserted behind this cover. Remove the cover when mounting or removing the Battery.

No.	Name	Description
(6)	**Touch pen holder**	The touch pen can be stored here when it is not being used.
(7)	**Touch pen**	Used to operate the touch panel.
(8)	**DC power supply connector**	Used to connect a DC power supply.
(9)	**Slider**	Used to mount the Touch Finder to a DIN Track.
(10)	**Ethernet port**	Used when connecting the Touch Finder to the Sensor with an Ethernet cable. Insert the connector until it locks in place.
(11)	**Strap holder**	This is a holder for attaching the strap.
(12)	**AC power supply connector ***	Used to connect the AC adapter.

* Applicable to the FQ-MD31 only.

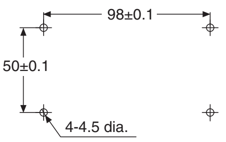
Dimensions

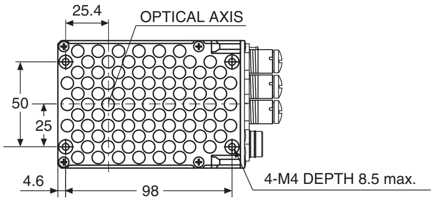
(Unit: mm)

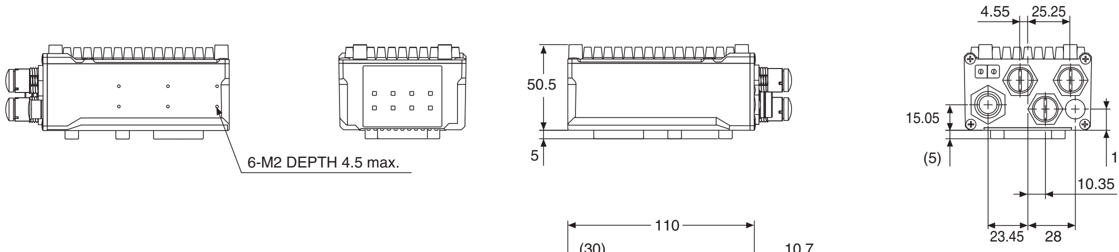
Sensor

FQ-MS120-ECT/MS120-M-ECT
FQ-MS125-ECT/MS125-M-ECT

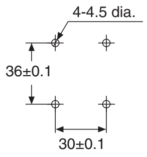
MOUNTING SCREW HOLES (1)

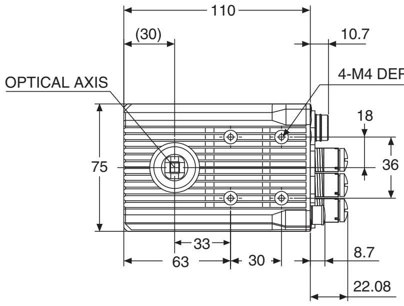

98±0.1
50±0.1
4-4.5 dia.


25.4
OPTICAL AXIS
50
25
4.6
98
4-M4 DEPTH 8.5 max.


6-M2 DEPTH 4.5 max.
50.5
5
4.55
25.25
15.05
(5)
12.5
10.35
23.45
28

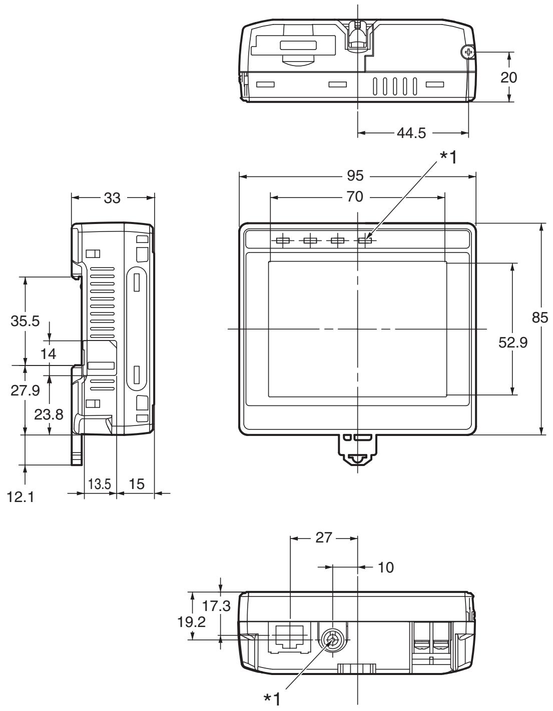
MOUNTING SCREW HOLES (2)


4-4.5 dia.
36±0.1
30±0.1

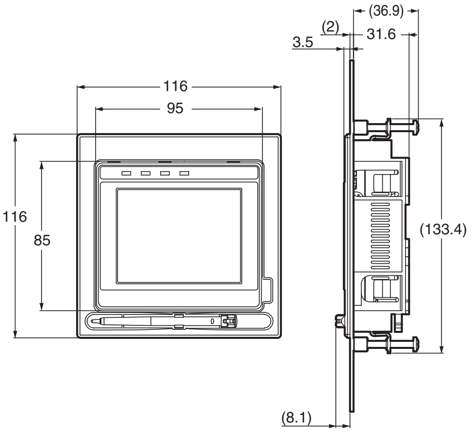

110
(30)
10.7
OPTICAL AXIS
4-M4 DEPTH 7 max.
18
75
36
33
63
30
8.7
22.08

Touch Finder

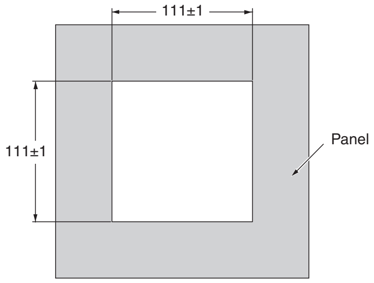
FQ-MD30/MD31


20
44.5
*1
95
70
33
85
52.9
35.5
14
27.9
23.8
12.1
13.5
15
27
10
17.3
19.2
*1

Panel Mounting Adapter *2


(36.9)
(2)
3.5
31.6
116
95
116
85
(133.4)
(8.1)

Panel Cutout Dimensions

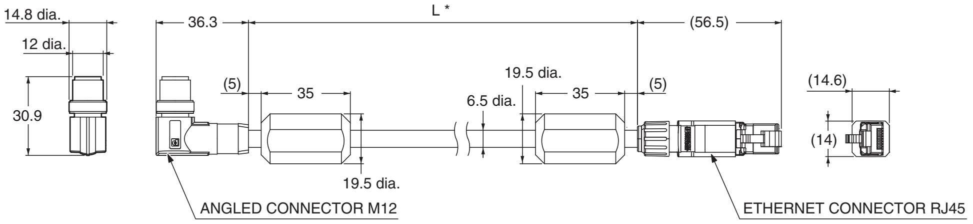

111±1
111±1
Panel

*1 Provided with FQ-MD31 only.
*2 The dimension of the panel mounting adapter does not include that of a FQ-MD□□.

Cables

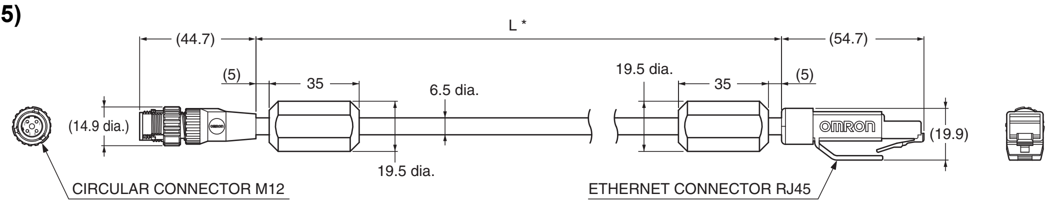
● For EtherCAT and Ethernet cable

Angle:M12/ Straight:RJ45
FQ-MWNL005/010


14.8 dia.
12 dia.
30.9
36.3
L *
(56.5)
(5)
35
19.5 dia.
6.5 dia.
35
(5)
(14.6)
(14)
19.5 dia.
ANGLED CONNECTOR M12
ETHERNET CONNECTOR RJ45

* Cable is available in 5 m/10 m.

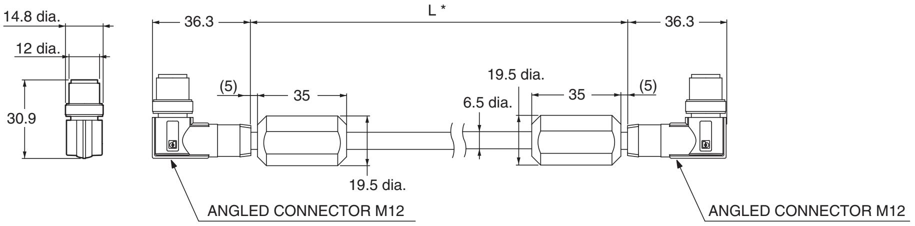
Straight type (M12/RJ45)
FQ-WN005/010


(44.7)
L *
(54.7)
(5)
35
6.5 dia.
19.5 dia.
35
(5)
(14.9 dia.)
(19.9)
19.5 dia.
CIRCULAR CONNECTOR M12
ETHERNET CONNECTOR RJ45

* Cable is available in 5 m/10 m.

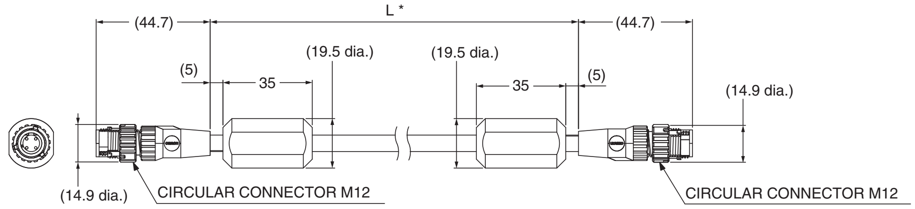
● For EtherCAT cable

Angle type (M12/M12)
FQ-MWNEL005/010


14.8 dia.
12 dia.
30.9
36.3
L *
36.3
(5)
35
19.5 dia.
6.5 dia.
35
(5)
19.5 dia.
ANGLED CONNECTOR M12
ANGLED CONNECTOR M12

* Cable is available in 5 m/10 m.

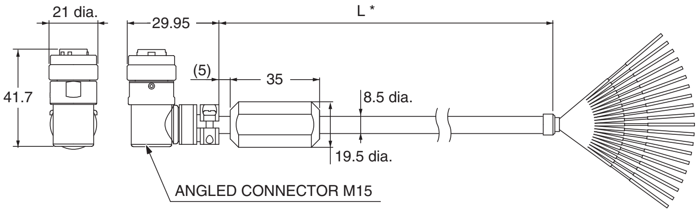
Straight type (M12/M12)
FQ-MWNE005/010


(44.7)
L *
(44.7)
(19.5 dia.)
(19.5 dia.)
(5)
35
35
(5)
(14.9 dia.)
(14.9 dia.)
CIRCULAR CONNECTOR M12
CIRCULAR CONNECTOR M12

* Cable is available in 5 m/10 m.

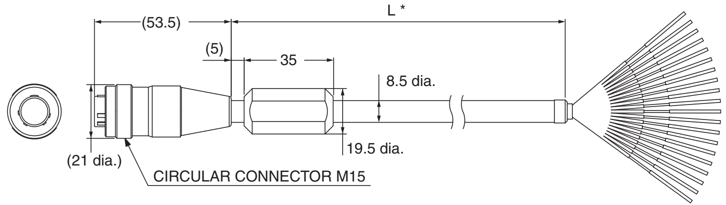
● I/O Cables

Angle type
FQ-MWDL005/010


21 dia.
29.95
L *
41.7
(5)
35
8.5 dia.
19.5 dia.
ANGLED CONNECTOR M15

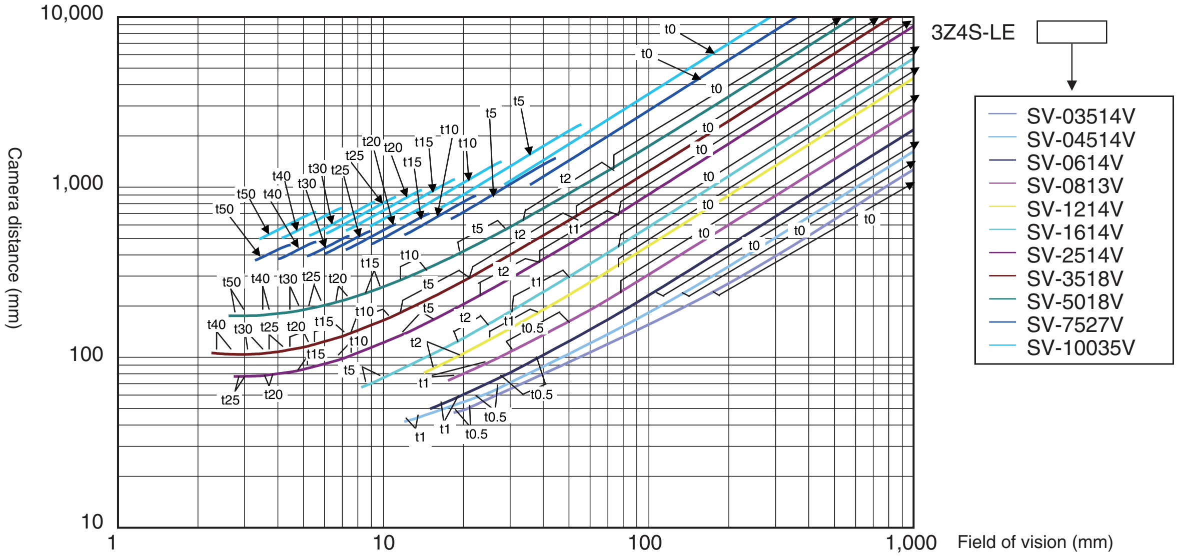
* Cable is available in 5 m/10 m.

Straight type
FQ-MWD005/010


(53.5)
L *
(5)
35
8.5 dia.
19.5 dia.
(21 dia.)
CIRCULAR CONNECTOR M15

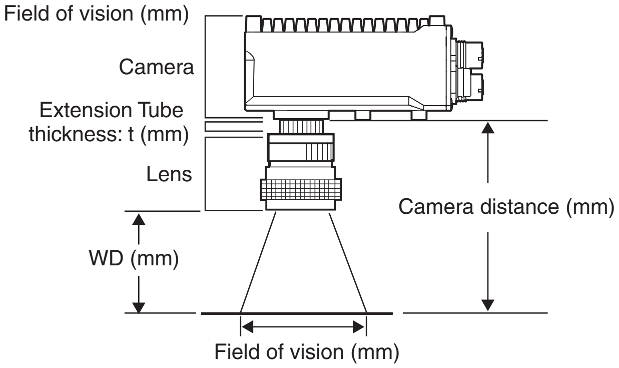
* Cable is available in 5 m/10 m.

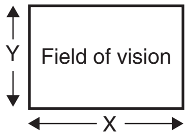
Optical Chart



Meaning of Optical Chart

The X axis of the optical chart shows the field of vision (mm) *1,
and the Y axis of the optical chart shows the camera installation distance (mm).*2


Field of vision (mm)
Camera
Extension Tube thickness: t (mm)
Lens
WD (mm)
Camera distance (mm)
Field of vision (mm)


Y
Field of vision
X

*1. The lengths of the fields of vision given in the optical charts are the lengths of the Y axis.
*2. The vertical axis represents WD for small cameras.

Displacement Sensor

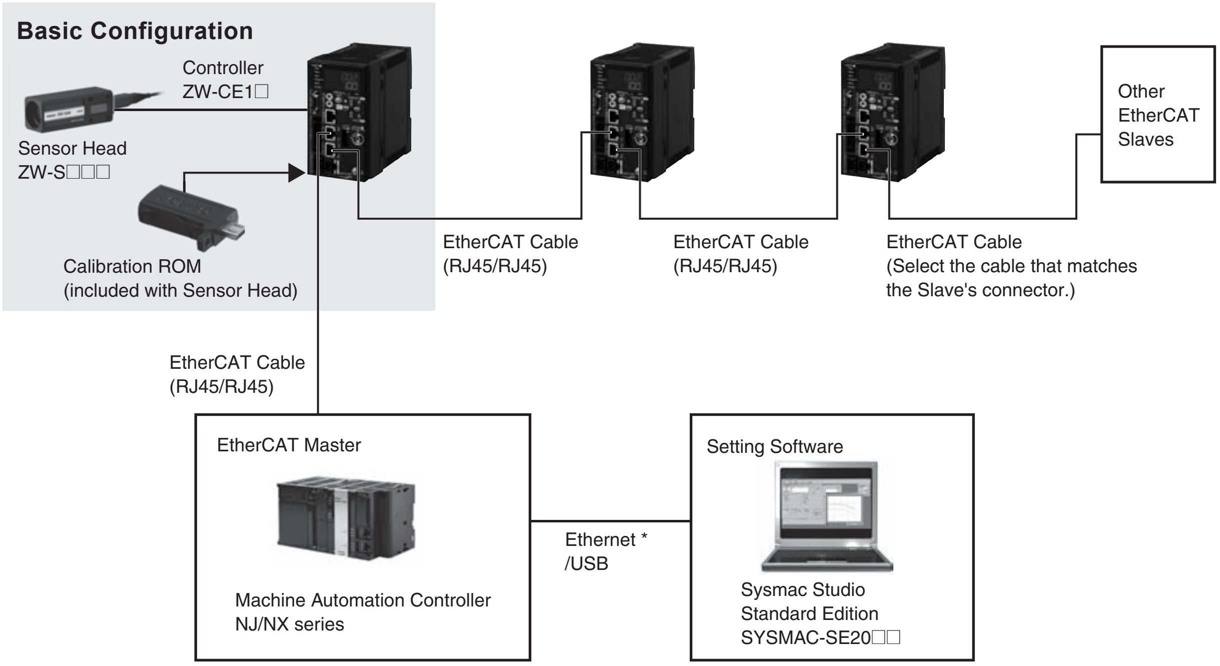
ZW-Series

Non-contact measurement of height and position with high precision. Uses the new "White Light Confocal Principle".

- Ultra-compact and ultra-light sensor head
- Stable measurement of any material and superior angle characteristics
- Sensor head with excellent environmental resistance, no noise, and zero heat generation

System configuration

EtherCAT connections


Basic Configuration
Controller
ZW-CE1□
Sensor Head
ZW-S□□□
Calibration ROM
(included with Sensor Head)
EtherCAT Cable
(RJ45/RJ45)
EtherCAT Cable
(RJ45/RJ45)
EtherCAT Cable
(Select the cable that matches the Slave's connector.)
Other
EtherCAT
Slaves
EtherCAT Cable
(RJ45/RJ45)
EtherCAT Master
Machine Automation Controller
NJ/NX series
Ethernet *
/USB
Setting Software
Sysmac Studio
Standard Edition
SYSMAC-SE20□□

* Prepare commercially available Ethernet cable satisfying the following requirements:
- Category 5e or more, 30 m or less
- RJ45 connector (8-pin modular jack)
- For direct connection: Select cross cable.
- For connection through an industrial switching hub: Select straight cable.

Specifications

Sensor Head

Item		ZW-S07	ZW-S20	ZW-S30	ZW-S40	ZW-SR07	ZW-SR20	ZW-SR40
Measuring center distance		7mm	20 mm	30mm	40 mm	7 mm	20 mm	40 mm
Measuring range		±0.3mm	±1 mm	±3mm	±6 mm	±0.3 mm	±1 mm	±6 mm
Static resolution *1		0.25 µm	0.25 µm	0.25 µm	0.25 µm	0.25 µm	0.25 µm	0.25 µm
Linearity *2		±0.8 µm	±1.2 µm	±4.5 µm	±7.0 µm	±1.1 µm	±1.6 µm	±9.3 µm
Spot diameter *3	**Near**	20 µm dia.	45 µm dia.	70 µm dia.	90 µm dia.	20 µm dia.	45 µm dia.	90 µm dia.
	Center	18 µm dia.	40 µm dia.	60 µm dia.	80 µm dia	18 µm dia.	40 µm dia.	80 µm dia
	Far	20 µm dia.	45 µm dia.	70 µm dia.	90 µm dia	20 µm dia.	45 µm dia.	90 µm dia
Measuring cycle		500 µs to 10 ms						
Operating ambient illumination		Illumination on object surface 10,000 lx or less: incandescent light						
Ambient temperature range		Operating: 0 to 50°C, Storage: –15 to 60°C (with no icing or condensation)						
Ambient humidity range		Operating and storage: 35% to 85% (with no condensation)						
Degree of protection		IP40 (IEC60529)						
Vibration resistance (destructive)		10 to 150 Hz, 0.35 mm single amplitude, 80 min each in X, Y, and Z directions						
Shock resistance (destructive)		150 m/s² 3 times each in six directions (up/down, left/right, forward/backward)						
Temperature characteristic *4		0.6 µm/ °C (0.45 µm/ °C)	1.5 µm/ °C (1.0 µm/ °C)	2.8 µm/ °C (2.0 µm/ °C)	4.8 µm/ °C (3.8 µm/ °C)	0.6 µm/ °C (0.45 µm/ °C)	1.5 µm/ °C (1.0 µm/ °C)	4.8 µm/ °C (3.8 µm/ °C)
Materials		Case: aluminum die-cast Fiber cable sheat: PVC Calibration ROM: PC						
Fiber cable length		0.3 m, 2 m (Flex-resistant cable)						
Fiber cable minimum bending radius		20 mm						
Insulation resistance (Calibration ROM)		Between case and all terminals: 20 MΩ (by 250 V megger)						
Dielectric strength (Calibration ROM)		Between case and all terminals: 1,000 VAC, 50/60 Hz, 1 min						
Weight		Approx. 105 g (Chassis, fiber cable total)						
Accessories included with sensor head		Instruction sheet, Fixing screw (M2) for Calibration ROM, Precautions for correct use						

*1. Capacity value when Omron standard mirror surface target is measured at the measurement center distance as the average of 4,096 times.

*2. Material setting for the Omron standard mirror surface target: Error from an ideal straight line when measuring on mirror surface.
The reference values for linearity when targets to measure other than the above are as in the table below.

Item	ZW-S07	ZW-S20	ZW-S30	ZW-S40	ZW-SR07	ZW-SR20	ZW-SR40
Grass	±1.0 µm	±1.2 µm	±4.5 µm	±7.0 µm	±1.1 µm	±1.6 µm	±9.3 µm
SUS BA	±1.2 µm	±1.4 µm	±5.5 µm	±8.5 µm	±1.2 µm	±1.8 µm	±9.3 µm
White ceramic	±1.6 µm	±1.7 µm	±6.4 µm	±9.5 µm	±1.6 µm	±1.9 µm	±11.0 µm

*3. Capacity value defined by $1/e^2$ (13.5%) of the center optical intensity in the measured area.

*4. Temperature characteristic at the measurement center distance when fastened with an aluminum jig between the Sensor Head and the target and the Sensor Head and the controller are set in the same temperature environment.
Figures in parentheses are converted value obtained by subtracting the effect of expansion or contraction of the aluminum jig itself.

Controller

Item			ZW-CE10T	ZW-CE15T
Input/Output type			NPN	PNP
Number of connected Sensor Heads			1 per Controller	
Sensor Head compatibility			Available	
Light source for measurement			White LED	
Segment display	**Main display**		11-segment red display, 6 digits	
	Sub-display		11-segment green display, 6 digits	
LED display	**Status indicators**		HIGH (orange), PASS (green), LOW (orange), STABILITY (green), ZERO (green), ENABLE (green), THRESHOLD-H (orange), THRESHOLD-L (orange), RUN (green)	
	EtherCAT indicators		L/A IN(Link Activity IN)(green), L/O OUT(Link Activity OUT)(green), ECAT RUN(green), ECAT ERR(red)	
External interface	**Ethernet**		100BASE-TX, 10BASE-T, No-protocol Communications (TCP/UDP), EtherNet/IP™	
	EtherCAT		EtherCAT-specific protocol 100BASE-TX	
	RS-232C		115,200 bps max.	
	Analog output terminal block	**Analog voltage output (OUT1V)**	-10 V to +10 V, output impedance: 100 Ω	
		Analog current output (OUT1A)	4 mA to 20 mA, maximum load resistance: 300Ω	

Item				ZW-CE10T	ZW-CE15T
External interface	**32-pole extension connector**	**Judgment output (HIGH1/PASS1/LOW1)**		Transistor output system Output voltage: 21.6 to 30 VDC Load current: 50 mA or less Residual voltage when turning ON: 1.2 V or less Leakage voltage when turning OFF: 0.1 mA or les	
		BUSY output (BUSY1)			
		ALARM output (ALARM1)			
		ENABLE output (ENABLE)			
		LED OFF input (LED OFF1)		DC input system Input voltage: 24 VDC ·10% (21.6 to 26.4 VDC) Input current: 7 mA Typ. (24 VDC) Voltage/Current when turning ON: 19 V/3 mA or more Voltage/Current when turning OFF:5 V/1 mA or less	
		ZERO RESET input (ZERO)			
		TIMING output (TIMING1)			
		RESET output (RESET1)			
		Bank	**Selected bank output (BANK_OUT 1 to 3)**	Transistor output system Output voltage: 21.6 to 30 VDC Load current: 50 mA or less Residual voltage when turning ON: 1.2 V or less Leakage voltage when turning OFF: 0.1 mA or less	
			Selected bank input (BANK_SEL 1 to 3)	DC input system Input voltage: 21.6 to 26 VDC Input current: 7 mA Typ. (24 VDC) Voltage/Current when turning ON: 19 V/3 mA or more Voltage/Current when turning OFF:5 V/1 mA or less	
Main functions	**Exposure time**			Auto/Manual	
	Measuring cycle			500 µs to 10 ms	
	Material setting			Standard/Mirror/Diffusion surfaces	
	Measurement Item			Height/Thickness/Calculation	
	Filtering			Median/Average/Differentiation/High pass/Low pass/Band pass	
	Outputs			Scaling/Different holds/Zero reset/Logging for a measured value	
	Display			Measured value/Threshold value/Analog output voltage or current value/Judgment result/ Resolution/Exposure time	
	Number of configurable banks			Max. 8 banks	
	Task process			Multi-task (up to 4 tasks per bank)	
	System			Save/Initialization/Display measurement information/Communication settings/Sensor Head calibration/Key-lock/Trigger-key input	
Ratings	**Power supply voltage**			21.6 to 26.4 VDC (including ripple)	
	Current consumption			600 mA max.	
	Insulation resistance			Across all lead wires and controller case: 20 MΩ(by 250 V megger)	
	Dialectic strength			Across all lead wires and controller case: 1,000 VAC, 50/60 Hz, 1 min.	
Environmental	**Degree of protection**			IP20(IEC60529)	
	Vibration resistance (destructive)			10 to 55 Hz, 0.35-mm single amplitude, 50 min each in X, Y, and Z directions	
	Shock resistance (destructive)			150 m/s^2, 3 times each in six directions (up/down, left/right, forward/backward)	
	Ambient temperature			Operating: 0 to 40°C Storage:-15 to 60°C (with no icing or condensation)	
	Ambient humidity			Operating and storage: 35% to 85% (with no condensation)	
Grounding				D-type grounding (Grounding resistance of 100 Ω or less) Note: For conventional Class D grounding	
Materials				Case: PC	
Weight				Approx. 750 g (main unit only), Approx. 150 g (Parallel Cable)	
Accessories included with controller				Instruction sheet,Member registration sheet, Parallel cable ZW-XCP2E	

Note: Controllers with binary outputs are also available (ZW-C10T/-C15T). Please contact your OMRON sales representative for details.

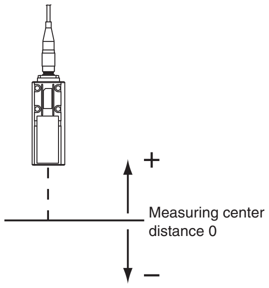
ZW Series EtherCAT Communications Specifications

Item	Specification
Communications standard	IEC61158 Type12
Physical layer	100BASE-TX(IEEE802.3)
Connectors	RJ45 × 2 ECAT IN: EtherCAT input ECAT OUT: EtherCAT output
Communications media	Category 5 or higher (cable with double, aluminum tape and braided shielding) is recommended.
Communications distance	Distance between nodes: 100 m max.
Process data	Variable PDO mapping
Mailbox (CoE)	Emergency messages, SDO requests, SDO responses, and SDO information
Distributed clock	Synchronization in DC mode.
LED display	L/A IN (Link/Activity IN) × 1, AL/A OUT (Link/Activity OUT) × 1, AECAT RUN × 1, AECAT ERR × 1

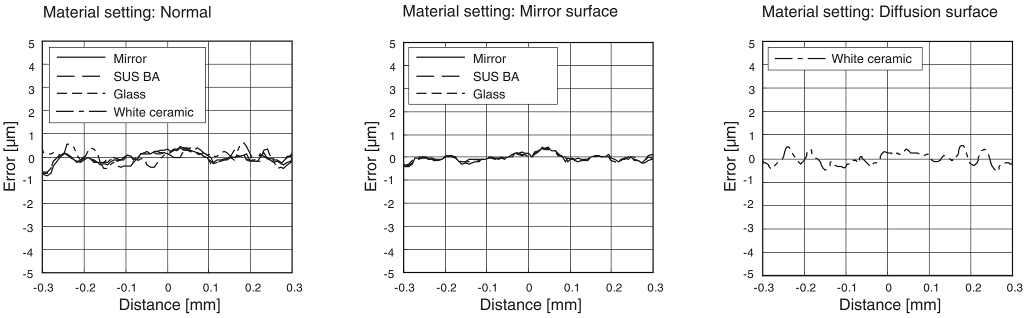
Characteristic data (typical examples)

Linearity Characteristic by Materials

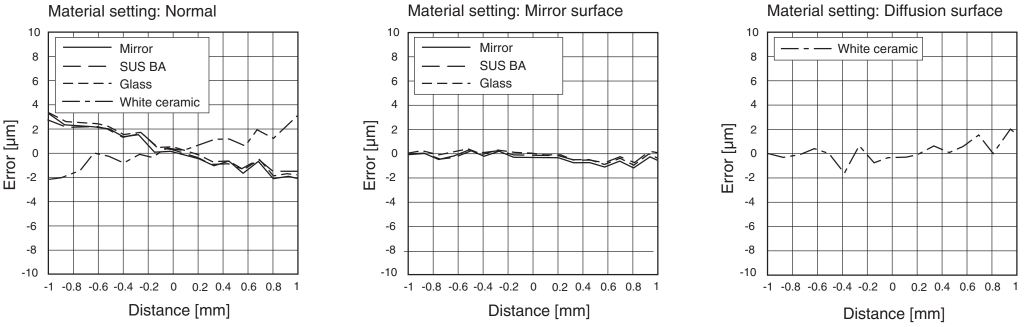
Straight type


+
Measuring center
distance 0
–

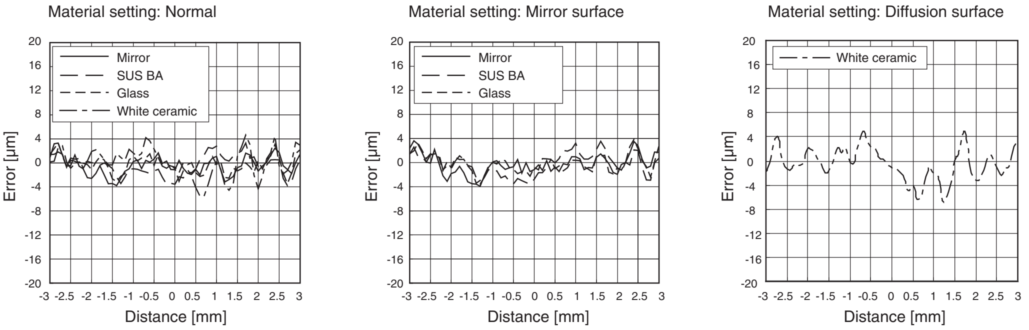
ZW-S07



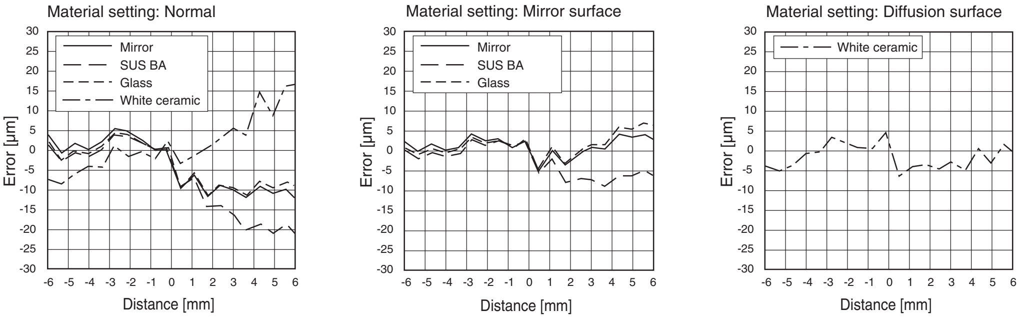
ZW-S20



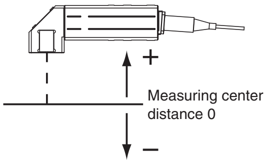
ZW-S30



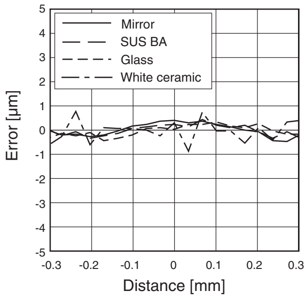
ZW-S40

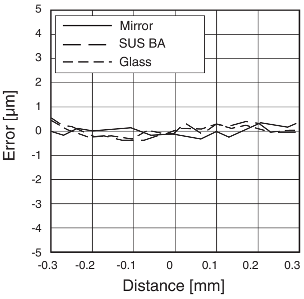


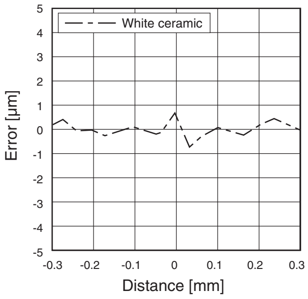
Right-angle type



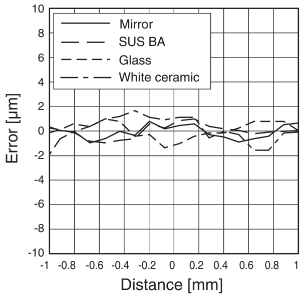
ZW-SR07

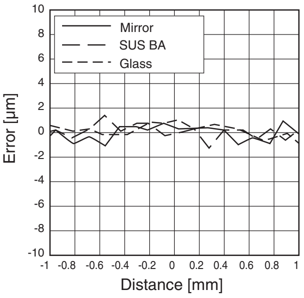

Material setting: Normal

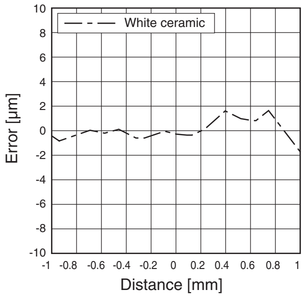

Material setting: Mirror surface


Material setting: Diffusion surface

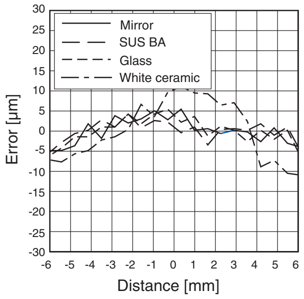
ZW-SR20

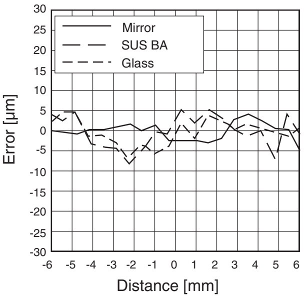

Material setting: Normal

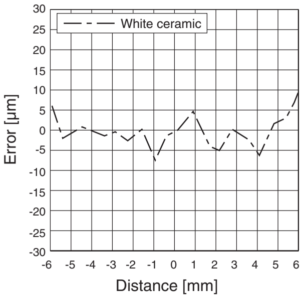

Material setting: Mirror surface


Material setting: Diffusion surface

ZW-SR40

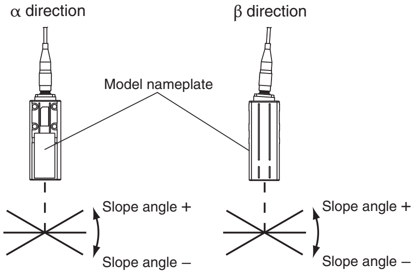

Material setting: Normal


Material setting: Mirror surface


Material setting: Diffusion surface

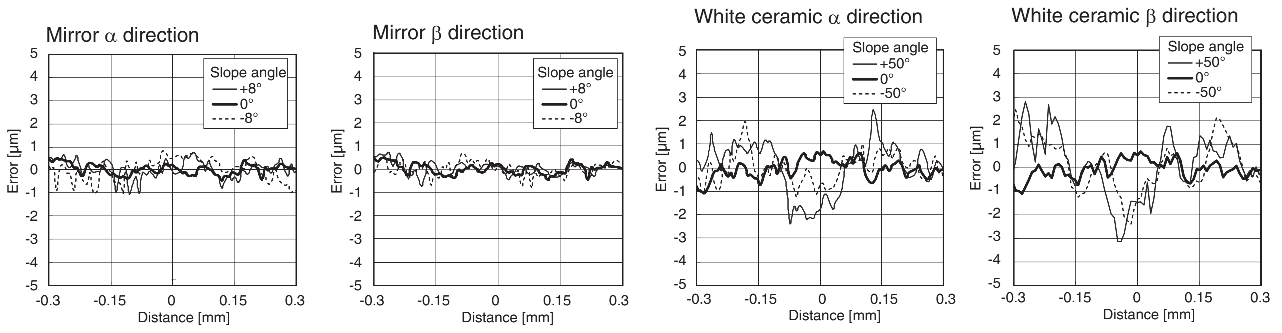
●Angle Characteristic *

Straight type

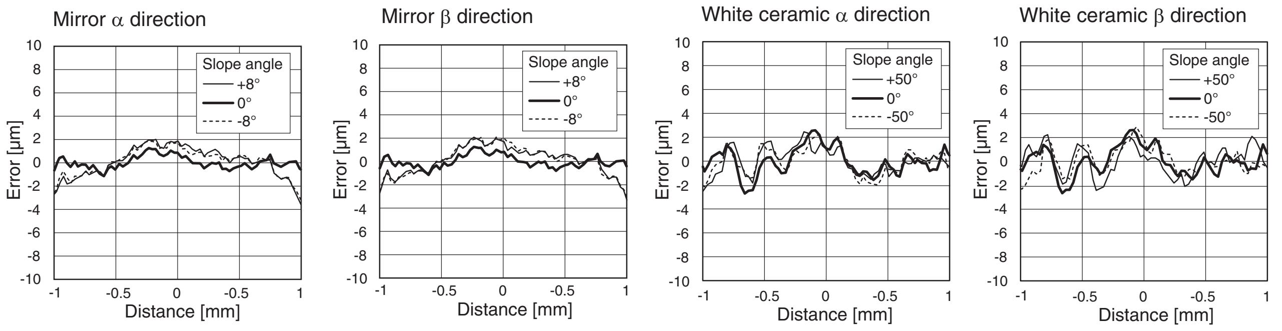

α direction
β direction
Model nameplate
Slope angle +
Slope angle –
Slope angle +
Slope angle –

*The above show the results after executing scaling.

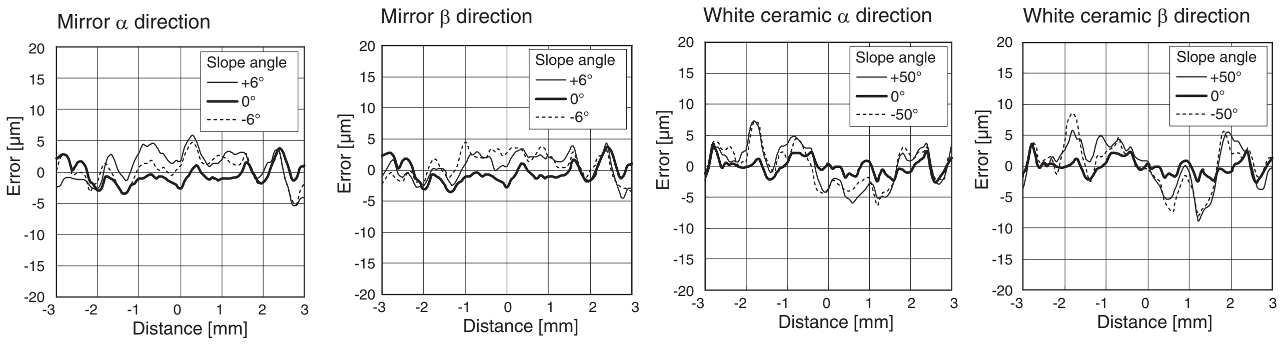
ZW-S07



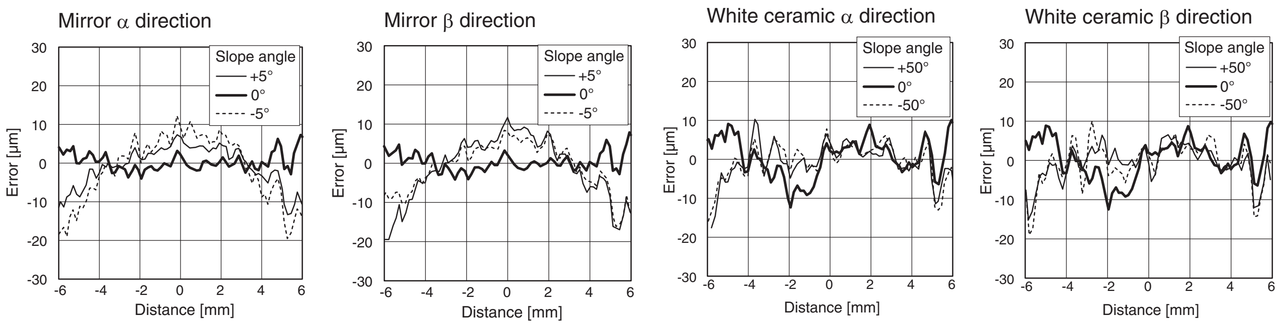
ZW-S20



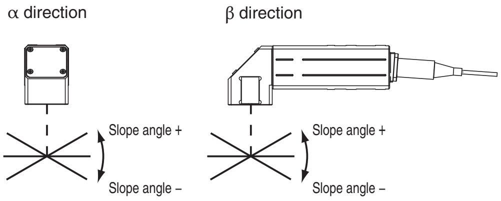
ZW-S30



ZW-S40



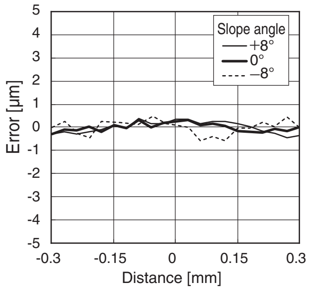
Right-angle type



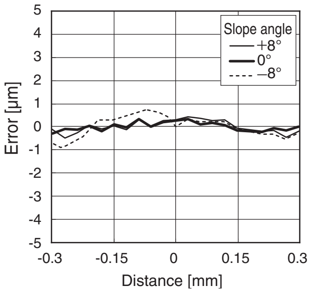
✻ The above show the results after executing scaling.

ZW-SR07

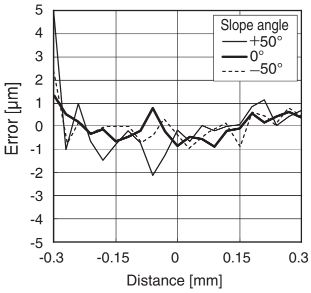
Mirror α direction



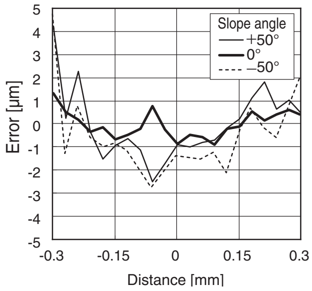
Mirror β direction



White ceramic α direction

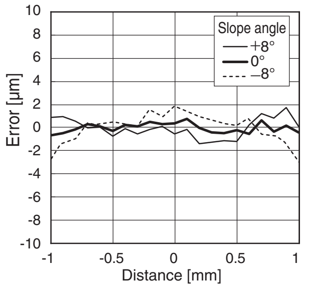


White ceramic β direction

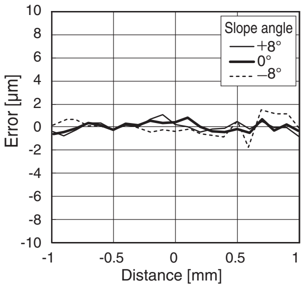


ZW-SR20

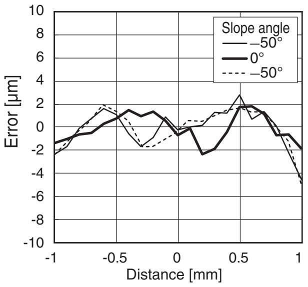
Mirror α direction



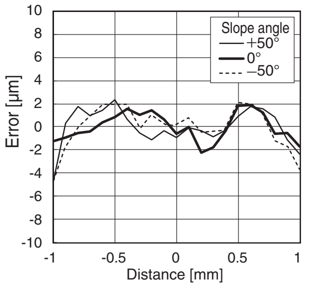
Mirror β direction



White ceramic α direction

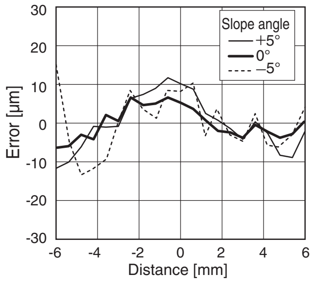


White ceramic β direction

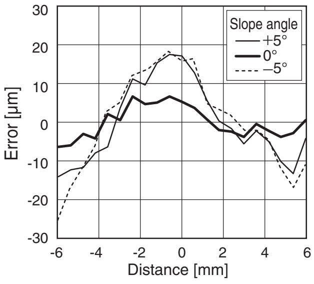


ZW-SR40

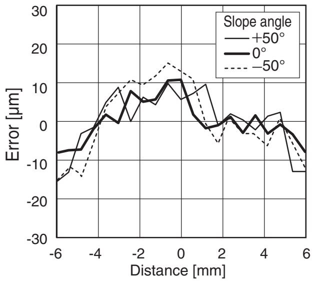
Mirror α direction



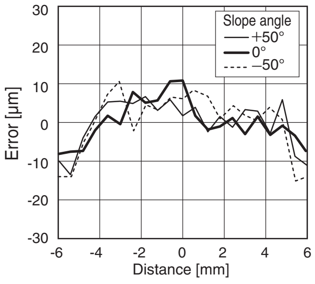
Mirror β direction



White ceramic α direction



White ceramic β direction



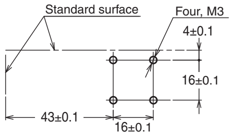
Dimensions

(Unit: mm)

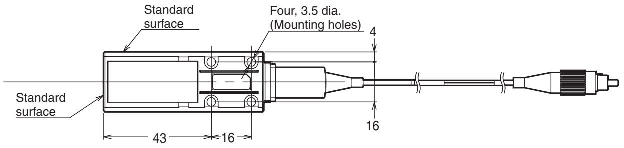
Sensor Head

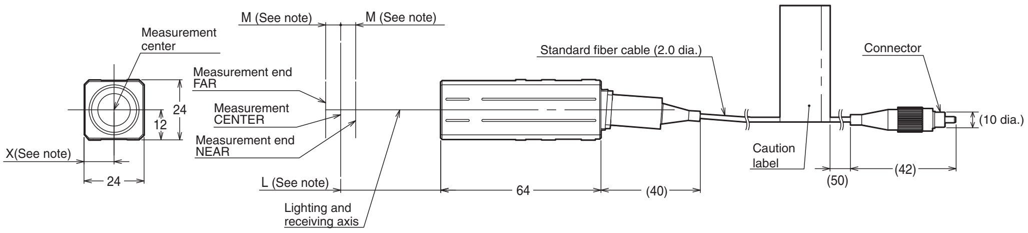
Straight type

ZW-S07/-S20/-S30/-S40


Standard surface
Four, M3
4±0.1
16±0.1
43±0.1
16±0.1

Mounting hole dimensions


Standard surface
Four, 3.5 dia. (Mounting holes)
4
Standard surface
43
16
16

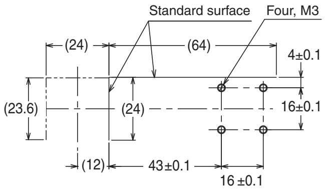

Measurement center
M (See note)
M (See note)
Measurement end FAR
Measurement CENTER
Measurement end NEAR
24
12
X(See note)
24
L (See note)
Lighting and receiving axis
Standard fiber cable (2.0 dia.)
Connector
(10 dia.)
Caution label
64
(40)
(50)
(42)

Note:

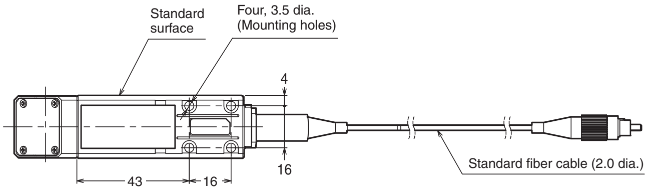
Model	L	M	X
ZW-S07	7	0.3	12
ZW-S20	20	1	11.8
ZW-S30	30	3	11.7
ZW-S40	40	6	11.7

Right-angle type

ZW-SR07/-SR20/-SR40

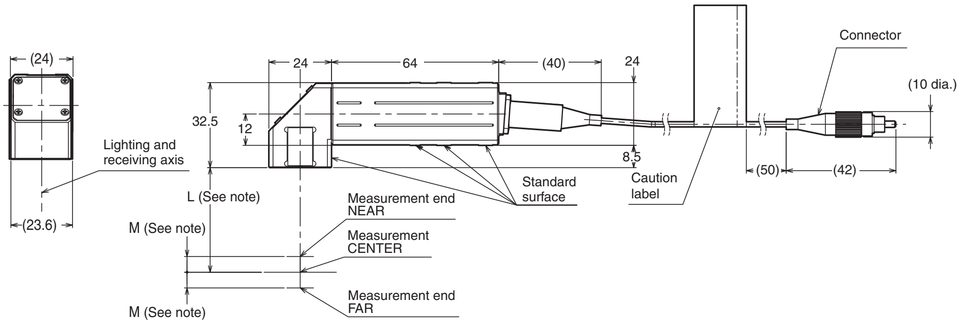

Standard surface
Four, M3
(24)
(64)
4±0.1
(23.6)
(24)
16±0.1
(12)
43±0.1
16 ±0.1

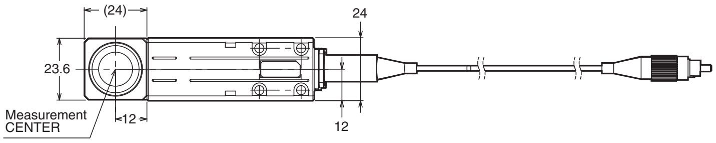
Mounting hole dimensions


Standard surface
Four, 3.5 dia. (Mounting holes)
4
43
16
16
Standard fiber cable (2.0 dia.)

Note:

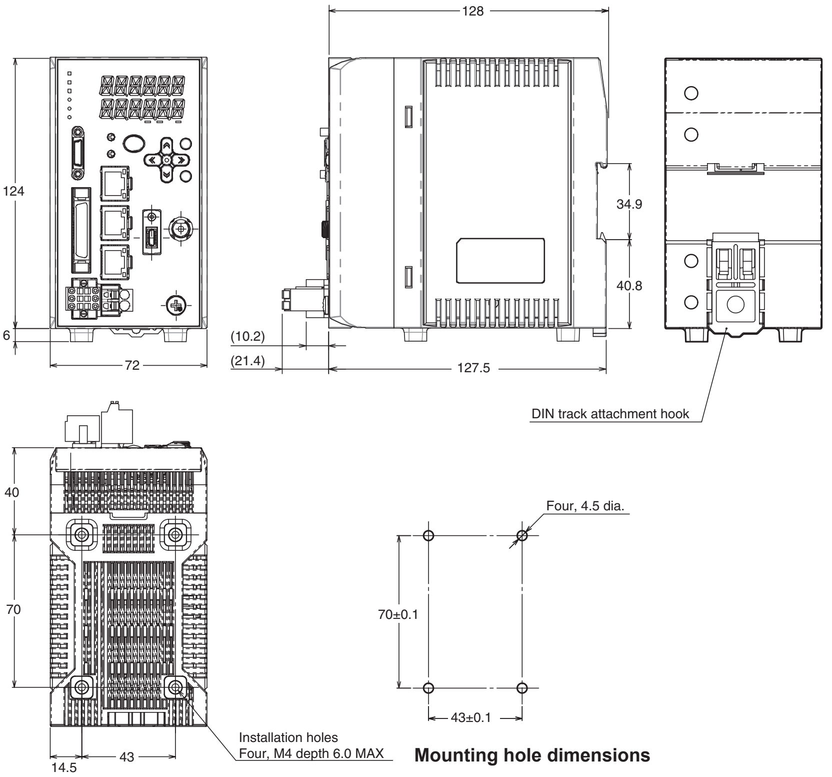
Model	L	M
ZW-SR07	7	0.3
ZW-SR20	20	1
ZW-SR40	40	6


(24)
24
64
(40)
24
Connector
(10 dia.)
32.5
12
Lighting and receiving axis
8.5
(50)
(42)
Standard surface
Caution label
L (See note)
Measurement end NEAR
(23.6)
M (See note)
Measurement CENTER
Measurement end FAR
M (See note)


(24)
24
23.6
Measurement CENTER
12
12

Controller

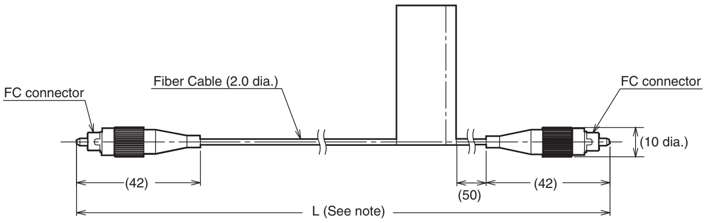
ZW-CE10T/-CE15T


128
124
6
72
(10.2)
(21.4)
127.5
34.9
40.8
DIN track attachment hook
40
70
14.5
43
Installation holes
Four, M4 depth 6.0 MAX
Four, 4.5 dia.
70±0.1
43±0.1

Mounting hole dimensions

Extension Fiber Cable

ZW-XF02R/-XF05R/-XF10R/-XF20R/-XF30R


FC connector
Fiber Cable (2.0 dia.)
FC connector
(10 dia.)
(42)
(50)
(42)
L (See note)

Note: The following table lists cable lengths per models.

Model	Cable length	L
ZW-XF02R	2 m	2,000±20
ZW-XF05R	5 m	5,000±50
ZW-XF10R	10 m	10,000±100
ZW-XF20R	20 m	20,000±200
ZW-XF30R	30 m	30,000±300

MEMO

Fiber Sensor/Laser Photoelectric Sensors/Contact Sensor

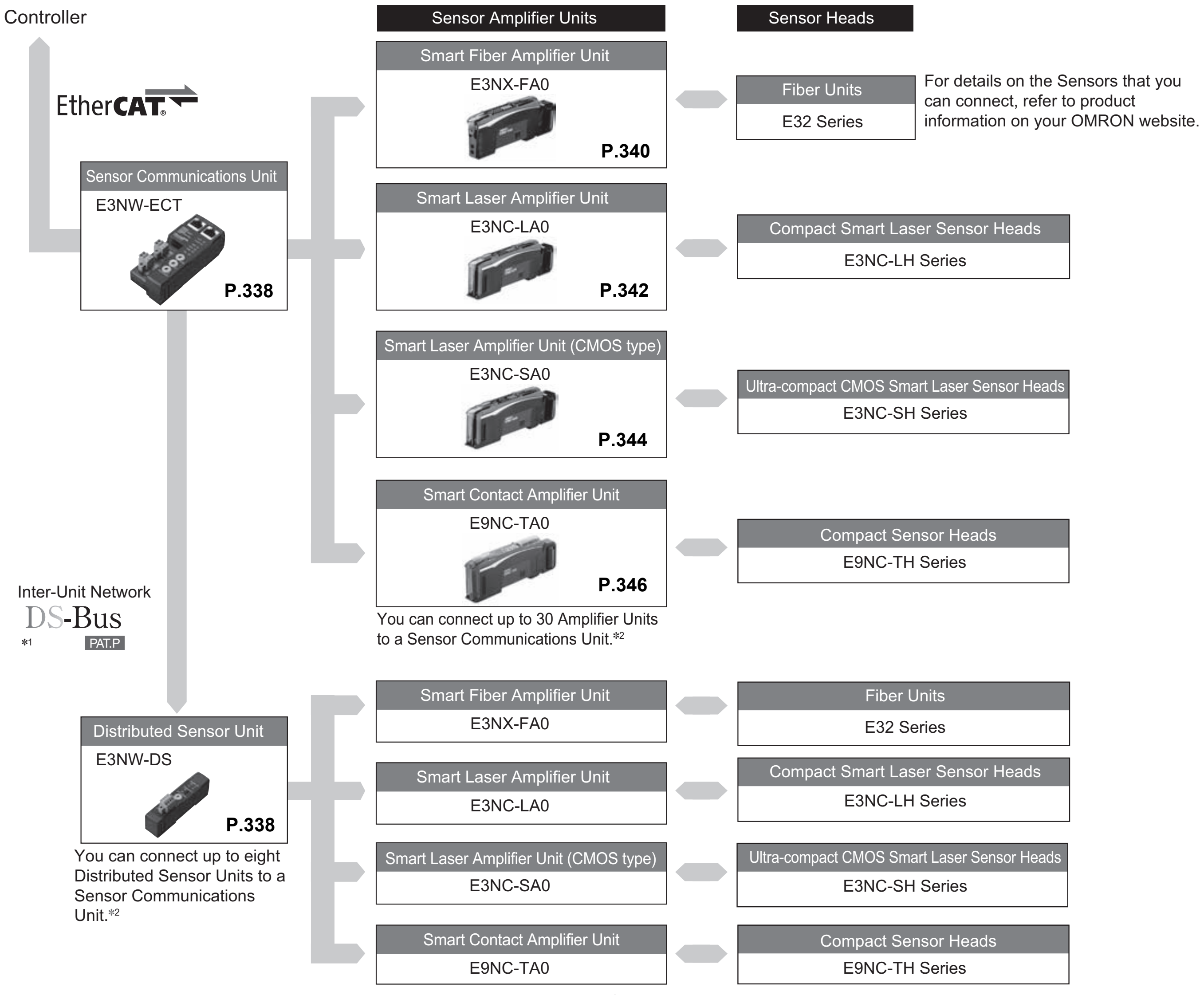
E3NX-FA/E3NC-L/E3NC-S/E9NC-T For Sensor Communications Unit N-Smart

Connect Fiber Sensors, Laser Sensors and Contact Sensors to EtherCAT at Low Initial Cost.

- Consists of Sensor communications unit with master function + Distributed Sensor Unit with slave function
- Communication between units is by OMRON's unique DS-Bus
- Also supports feedback control with the fastest communication speed in the industry*
- Sensor functions such as present value monitoring, setting changes, and batch tuning are controlled by EtherCAT

* As of February 2013, based on OMRON research

System Configuration


Controller
Sensor Amplifier Units
Sensor Heads
EtherCAT
Sensor Communications Unit
E3NW-ECT
P.338
Smart Fiber Amplifier Unit
E3NX-FA0
P.340
Fiber Units
E32 Series
Smart Laser Amplifier Unit
E3NC-LA0
P.342
Compact Smart Laser Sensor Heads
E3NC-LH Series
Smart Laser Amplifier Unit (CMOS type)
E3NC-SA0
P.344
Ultra-compact CMOS Smart Laser Sensor Heads
E3NC-SH Series
Smart Contact Amplifier Unit
E9NC-TA0
P.346
Compact Sensor Heads
E9NC-TH Series
Inter-Unit Network
DS-Bus
*1
PAT.P
Distributed Sensor Unit
E3NW-DS
P.338
Smart Fiber Amplifier Unit
E3NX-FA0
Fiber Units
E32 Series
Smart Laser Amplifier Unit
E3NC-LA0
Compact Smart Laser Sensor Heads
E3NC-LH Series
Smart Laser Amplifier Unit (CMOS type)
E3NC-SA0
Ultra-compact CMOS Smart Laser Sensor Heads
E3NC-SH Series
Smart Contact Amplifier Unit
E9NC-TA0
Compact Sensor Heads
E9NC-TH Series

For details on the Sensors that you can connect, refer to product information on your OMRON website.

You can connect up to 30 Amplifier Units to a Sensor Communications Unit.[*2]

You can connect up to eight Distributed Sensor Units to a Sensor Communications Unit.[*2]

You can connect up to 10 Amplifier Units to a Distributed Sensor Unit.[*2]

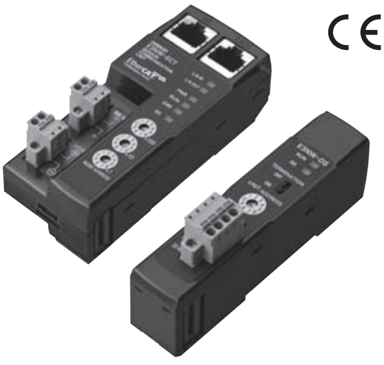
[*1] The DS-Bus is an OMRON inter-Unit network communications protocol that connects the E3NW-ECT Sensor Communications Unit and E3NW-DS Distributed Sensor Units.

[*2] You can connect up to 30 Sensors total to the Sensor Communications Unit and Distributed Sensor Units.

Sensor Communications Unit

E3NW

The Next-generation Sensor Networking Units That Revolutionizes the Workplace from Introduction and Startup though Operation



For the most recent information on models that have been certified for safety standards, refer to your OMRON website.

- Low initial cost achieved by distributed placement with the Sensor Communications Unit and Distributed Sensor Units (patent pending).
- Programless transmission of ON/OFF signals and detected quantities to host PLC (PDO communications).
- Reading and writing threshold values and function settings, tuning, and other operations are possible (SDO communications).
- Wire saving: simply connect the communications cable and power cable, and slide the Amplifier Units from the side.
- Up to 30 Sensor Amplifier Units can be connected. (total number of Sensor Amplifier Units: 30, number of Sensor Amplifier Units for one Sensor Communications Unit: 30, number of Sensor Amplifier Units for one Distributed Sensor Unit: 10)

General Spesifications

Type	Sensor Communications Unit	Distributed Sensor Unit
Item Model	**E3NW-ECT**	**E3NW-DS**
Connectable Sensor Amplifier Units	N-Smart Smart Fiber Amplifier Unit: E3NX-FA0 Smart Laser Amplifier Unit: E3NC-LA0 Smart Laser Amplifier Unit (CMOS type): E3NC-SA0 Smart Contact Amplifier Unit: E9NC-TA0*1	
Power supply voltage	24 VDC (20.4 to 26.4 V)	
Power and current consumption	2.4 W max. (Not including the power supplied to Sensors.), 100 mA max. (Not including the current supplied to Sensors.)	2 W max. (Not including the power supplied to Sensors.), 80 mA max. (Not including the current supplied to Sensors.)
Indicators	L/A IN indicator (green), L/A OUT indicator (green), PWR indicator (green), RUN indicator (green), ERROR indicator (red), and SS (Sensor Status) indicator (green/red)	RUN indicator (green) and SS (Sensor Status) indicator (green/red)
Vibration resistance (destruction)	10 to 60 Hz with a 0.7-mm double amplitude, 50 m/s^2 at 60 to 150 Hz, for 1.5 hours each in X, Y, and Z directions	
Shock resistance (destruction)	150 m/s^2 for 3 times each in X, Y, and Z directions	
Ambient temperature range	Operating: 0 to 55°C;*2 Storage: –30 to 70°C (with no icing or condensation)	
Ambient humidity range	Operating and storage: 25% to 85% (with no condensation)	
Maximum connectable Sensors	30*3	10
Maximum connectable Distributed Sensor Units	8	–
Insulation resistance	20 MΩ min. (at 500 VDC)	
Dielectric strength	500 VAC at 50/60 Hz for 1 minute	
Mounting method	35-mm DIN track-mounting	
Weight (packed state/Unit only)	Approx. 185 g/approx. 95 g	Approx. 160 g/approx. 40 g
Materials	Polycarbonate	
Accessories	Power supply connector, communications connector for E3NW-DS connection, DIN Track End Plates (2 pieces), and Instruction manual	Power supply/communications connector, DIN Track End Plates (2 pieces), ferrite cores (2 pieces), and Instruction manual

*1 The E9NC-TA0 is supported for firmware version 1.03 or higher (Sensor Communications Units manufactured in July 2014 or later).
*2 Temperature Limitations Based on Number of Connected Amplifier Units:
Groups of 1 or 2 Amplifier Units: 0 to 55°C, Groups of 3 to 10 Amplifier Units: 0 to 50°C, Groups of 11 to 16 Amplifier Units: 0 to 45°C, Groups of 17 to 30 Amplifier Units: 0 to 40°C
*3 You can connect up to 30 Sensors total to the Sensor Communications Unit and Distributed Sensor Units.

Version Information

Sensor Communications Unit and Sysmac Studio

Sensor Communications Unit	Sysmac Studio version	
	Ver.1.04 or lower	Ver.1.05 or higher
E3NW-ECT	Not supported.	supported.

Communications Spesifications

Item	Specifications
Communications protocol	Dedicated protocol for EtherCAT
Modulation	Baseband method
Baud rate	100 Mbps
Physical layer	100BASE-TX (IEEE 802.3u)
Topology	Daisy chain
Communications media	STP category 5 or higher
Communications distance	Distance between nodes: 100 m max.
Noise immunity	Conforms to IEC 61000-4-4, 1 kV or higher
Node address setting method	Set with decimal rotary switch or software *1
Node address range	000 to 192 *2

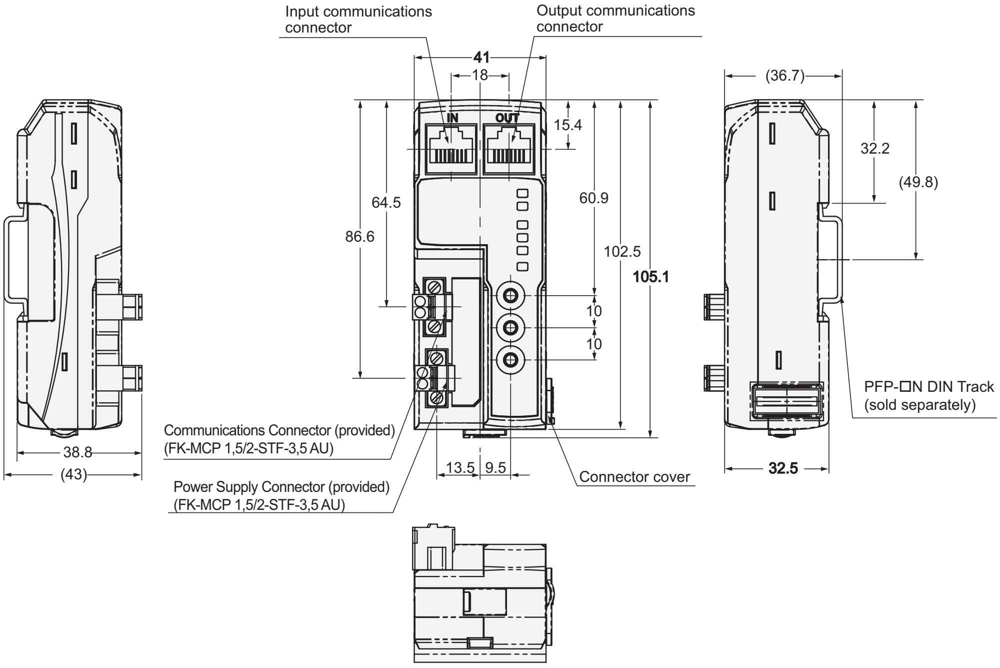
*1 The software setting is used when the node address setting switches are set to 0.

*2 The range depends on the EtherCAT master that is used. Refer to the *E3NW-ECT EtherCAT Digital Sensor Communications Unit Operation Manual* (E429) for details.

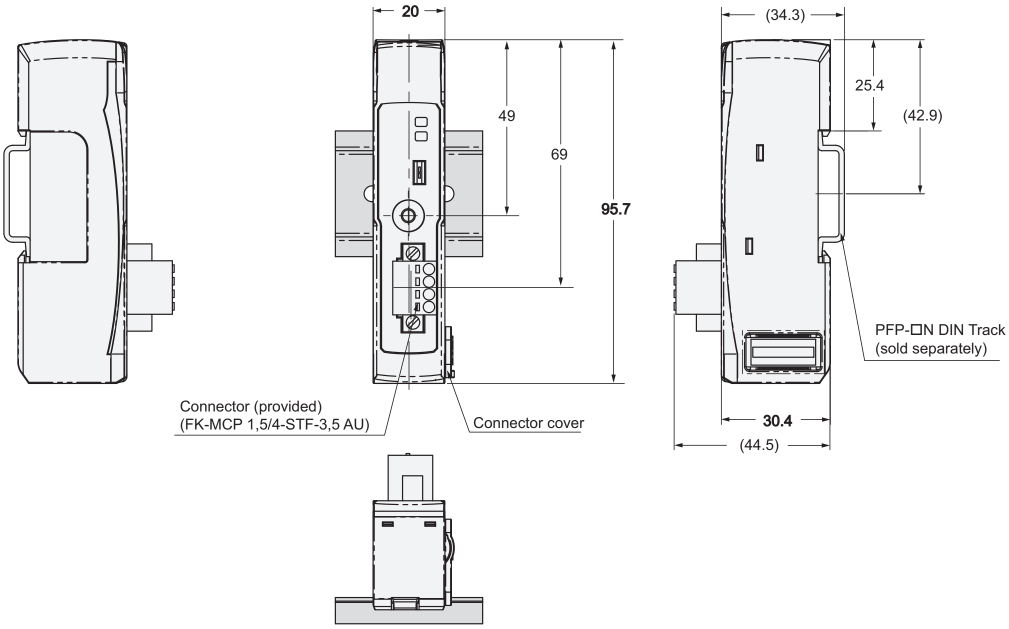
Dimensions

(Unit: mm)
Tolerance class IT16 applies to dimensions in this data sheet unless otherwise specified.

Sensor Communications Unit
E3NW-ECT


Input communications connector
Output communications connector
41
18
IN
OUT
15.4
64.5
60.9
86.6
102.5
105.1
10
10
(36.7)
32.2
(49.8)
PFP-☐N DIN Track (sold separately)
Communications Connector (provided) (FK-MCP 1,5/2-STF-3,5 AU)
38.8
(43)
13.5
9.5
Connector cover
32.5
Power Supply Connector (provided) (FK-MCP 1,5/2-STF-3,5 AU)

Distributed Sensor Unit
E3NW-DS


20
(34.3)
25.4
49
(42.9)
69
95.7
PFP-☐N DIN Track (sold separately)
Connector (provided) (FK-MCP 1,5/4-STF-3,5 AU)
Connector cover
30.4
(44.5)

Smart Fiber Amplifier Unit

E3NX-FA0

The Advanced Fiber Sensor That Handles On-site Needs

- Improved basic performance with 1.5 times the sensing distance and approx. 1/10th the minimum sensing object.*
- Ultra-easy setup with Smart Tuning with a light intensity adjustment range expanded 20 times to 40,000:1. Optimum stable detection achieved with light level adjustment even for saturated incident light.
- White on black display characters for high visibility.
- Solution Viewer that shows the passing time and difference in incident levels and Change Finder that shows even high-speed workpieces to achieve reliable detection.

* Compared to the E3X-HD.

For details on the Fiber Units that you can connect, refer to product information on your OMRON website.

For the most recent information on models that have been certified for safety standards, refer to your OMRON website.

General Specifications

Item		Specifications
Model		E3NX-FA0
Connecting method		Connector for Sensor Communications Unit
Light source (wavelength)		Red, 4-element LED (625 nm)
Power supply voltage		Supplied from the connector through the Sensor Communications Unit
Power consumption *1		At Power Supply Voltage of 24 VDC Normal mode: 960 mW max. (Current consumption: 40 mA max.), Eco ON: 720 mW max. (Current consumption: 30 mA max.) Eco LO: 840 mW max. (Current consumption: 35 mA max.)
Protection circuits		Power supply reverse polarity protection and output short-circuit protection
Response time	**Super-high-speed mode (SHS) *2**	Operate or reset: 32 µs
	High-speed mode (HS)	Operate or reset: 250 µs
	Standard mode (Stnd)	Operate or reset: 1 ms
	Giga-power mode (GIGA)	Operate or reset: 16 ms
Maximum connectable Units		30
No. of Units for mutual interference prevention	**Super-high-speed mode (SHS) *2**	0
	High-speed mode (HS)	10
	Standard mode (Stnd)	10
	Giga-power mode (GIGA)	10
Auto power control (APC)		Always enabled.
Other functions	**Dynamic power control (DPC)**	Provided
	Receiver side Timer	Select from timer disabled, OFF-delay, ON-delay, one-shot, or ON-delay + OFF-delay timer: 1 to 9,999 ms
	Zero reset	Negative values can be displayed. (Threshold value is shifted.)
	Resetting settings *3	Select from initial reset (factory defaults) or user reset (saved settings).
	Eco mode	Select from OFF (digital display lit), ECO ON (digital display not lit), and ECO LO (digital display dimmed).
	Bank switching	Select from banks 1 to 4.
	Power tuning	Select from ON or OFF.
	Output 1	Select from normal detection mode or area detection mode.
	Output 2	Select from normal detection mode, alarm output mode, or error output mode.
	Hysteresis width	Select from standard setting or user setting. For a user setting, the hysteresis width can be set from 0 to 9,999.
Ambient illumination (Receiver side)		Incandescent lamp: 20,000 lx max., Sunlight: 30,000 lx max.

Item		Specifications
Ambient temperature range *4		Operating: Groups of 1 or 2 Amplifier Units: 0 to 55°C, Groups of 3 to 10 Amplifier Units:0 to 50°C, Groups of 11 to 16 Amplifier Units:0 to 45°C, Groups of 17 to 30 Amplifier Units:0 to 40°C Storage: –30 to 70°C (with no icing or condensation)
Ambient humidity range		Operating and storage: 35% to 85% (with no condensation)
Altitude		2,000 m max.
Installation environment		Pollution degree 3 (as per IEC 60947-1)
Insulation resistance		20 MΩ min. (at 500 VDC)
Dielectric strength		1,000 VAC at 50/60 Hz for 1 minute
Vibration resistance (destruction)		10 to 55 Hz with a 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions
Shock resistance (destruction)		150 m/s^2 for 3 times each in X, Y, and Z directions
Weight (packed state/Sensor only)		Approx. 65 g/approx. 25 g
Materials	**Case**	Polycarbonate (PC)
	Cover	Polycarbonate (PC)
Accessories		Instruction Manual

*1 At Power Supply Voltage of 10 to 30 VDC.
Normal mode: 1,080 mW max. (Current consumption: 36 mA max. at 30 VDC, 108 mA max. at 10 VDC)
Eco ON: 880 mW max. (Current consumption: 28 mA max. at 30 VDC, 88 mA max. at 10 VDC)
Eco LO: 980 mW max. (Current consumption: 32 mA max. at 30 VDC, 98 mA max. at 10 VDC)

*2 The mutual interference prevention function is disabled if the detection mode is set to super-high-speed mode.

*3 The bank is not reset by the user reset function or saved by the user save function.

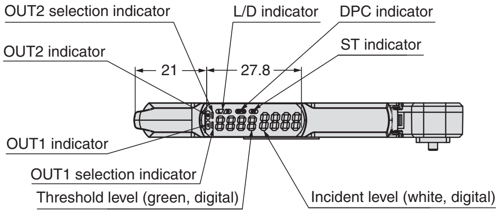
*4 When the number of connected units is 11 or more, the ambient temperature is less than 50°C.

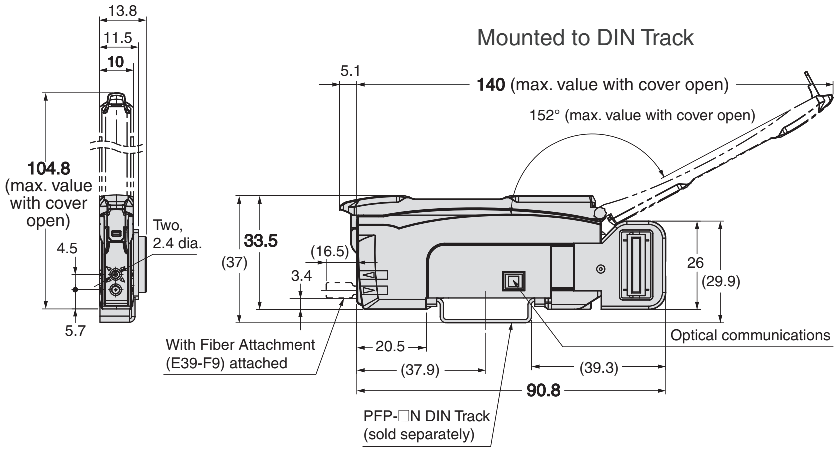
Dimensions

(Unit: mm)
Tolerance class IT16 applies to dimensions in this data sheet unless otherwise specified.

Amplifier Unit with Connector for Sensor Communications Unit

E3NX-FA0


OUT2 selection indicator
L/D indicator
DPC indicator
ST indicator
OUT2 indicator
21
27.8
OUT1 indicator
OUT1 selection indicator
Threshold level (green, digital)
Incident level (white, digital)


13.8
11.5
10
104.8 (max. value with cover open)
4.5
5.7
Two, 2.4 dia.
Mounted to DIN Track
5.1
140 (max. value with cover open)
152° (max. value with cover open)
33.5
(37)
(16.5)
3.4
26
(29.9)
Optical communications
With Fiber Attachment (E39-F9) attached
20.5
(37.9)
(39.3)
90.8
PFP-□N DIN Track (sold separately)

Smart Laser Amplifier Unit

E3NC-LA0

Stable Detection at the Laser Sensor Head United with Application

- Select from three Sensor Heads to match the application from short distance to long distance.
- Product variations with Coaxial Retro-reflective, variable spot and pinpoint spot for stable detection of your workpieces.
- Robot cable for reliable application in adverse environments. Laser Class 1 for safe application.
- White on black display characters for high visibility.
- Smart Tuning to achieve stable detection with easy setup.

omron
E3NC-LA0

For details on the Sensor Heads that you can connect, refer to product information on your OMRON website.

For the most recent information on models that have been certified for safety standards, refer to your OMRON website.

General Specifications

Item		Specifications
Model		E3NC-LA0
Connecting method		Connector for Sensor Communications Unit
Power supply voltage		Supplied from the connector through the Sensor Communications Unit
Power consumption *1		At Power Supply Voltage of 24 VDC Normal mode: 1,560mW max. (Current consumption: 65mA max.) Eco ON: 1,320 mW max. (Current consumption: 55mA max.) Eco LO: 1,440 mW max. (Current consumption: 60mA max.)
Indicators		7-segment displays (Sub digital display: green, Main digital display: white) Display direction: Switchable between normal and reversed. OUT indicator (orange), L/D indicator (orange), ST indicator (blue), DPC indicator (green), and OUT selection indicator (orange)
Protection circuits		Power supply reverse polarity protection and output short-circuit protection
Response time	**Super-high-speed mode (SHS)** *2	Operate or reset: 80 μs
	High-speed mode (HS)	Operate or reset: 250 μs
	Standard mode (Stnd)	Operate or reset: 1 ms
	Giga-power mode (GIGA)	Operate or reset: 16 ms
Sensitivity adjustment		Smart Tuning (2-point tuning, full auto tuning, position tuning, maximum sensitivity tuning, power tuning, or percentage tuning (–99% to +99%)), or manual adjustment.
Maximum connectable Units		30
No. of Units for mutual interference prevention	**Super-high-speed mode (SHS)** *2	0
	High-speed mode (HS)	2
	Standard mode (Stnd)	2
	Giga-power mode (GIGA)	4
Other Functions	**Dynamic power control (DPC)**	Provided
	Timer	Select from timer disabled, OFF-delay, ON-delay, one-shot, or ON-delay + OFF-delay timer: 1 to 9,999 ms
	Zero reset	Negative values can be displayed. (Threshold value is shifted.)
	Resetting settings *3	Select from initial reset (factory defaults) or user reset (saved settings).
	Eco mode	Select from OFF (digital display lit), ECO ON (digital display not lit), and ECO LO (digital display dimmed).
	Bank switching	Select from banks 1 to 4.
	Power tuning	Select from ON or OFF.
	Output 1	Select from Normal Detection Mode or Area Detection Mode.
	Output 2	Select from normal detection mode, alarm output mode, or error output mode.
	Hysteresis width	Select from standard setting or user setting.

Item		Specifications
Ambient temperature range *4		Operating: Groups of 1 or 2 Amplifier Units: 0 to 55°C, Groups of 3 to 10 Amplifier Units: 0 to 50°C, Groups of 11 to 16 Amplifier Units: 0 to 45°C, Groups of 17 to 30 Amplifier Units: 0 to 40°C Storage: –30 to 70°C (with no icing or condensation)
Ambient humidity range		Operating and storage: 35% to 85% (with no condensation)
Altitude		2,000 m max.
Installation environment		Pollution degree 3 (as per IEC 60947-1)
Insulation resistance		20 MΩ (at 500 VDC)
Dielectric strength		1,000 VAC at 50/60 Hz for 1 minute
Vibration resistance (destruction)		10 to 55 Hz with a 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions
Shock resistance (destruction)		150m/s^2 for 3 times each in X, Y, and Z directions
Weight (packed state/Amplifier Unit only)		Approx. 65 g/approx. 25 g
Materials	**Case**	Polycarbonate (PC)
	Cover	Polycarbonate (PC)
Accessories		Instruction Manual

*1 At Power Supply Voltage of 10 to 30 VDC.
Normal mode: 1,650 mW max. (Current consumption: 55 mA max. at 30 VDC, 115 mA max. at 10 VDC)
Eco ON: 1,410 mW max. (Current consumption: 47 mA max. at 30 VDC, 95 mA max. at 10 VDC)
Eco LO: 1,530 mW max. (Current consumption: 51 mA max. at 30 VDC, 105 mA max. at 10 VDC)

*2 The mutual interference prevention function is disabled if the detection mode is set to super-high-speed mode.

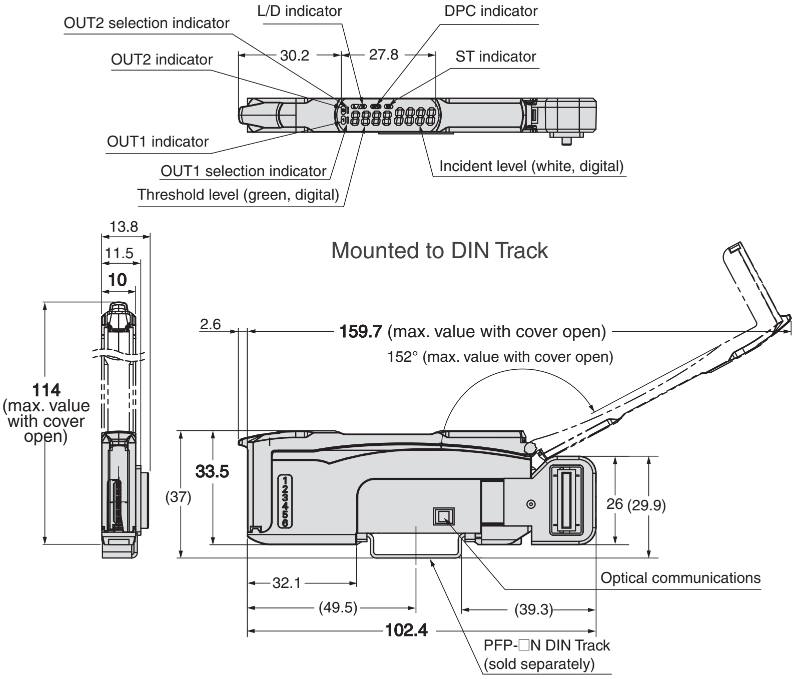
*3 The bank is not reset by the user reset function or saved by the user save function.

*4 When the number of connected units is 11 or more, the ambient temperature is less than 50°C.

Dimensions

(Unit: mm)
Tolerance class IT16 applies to dimensions in this data sheet unless otherwise specified.

Amplifier Unit with Connector for Sensor Communications Unit
E3NC-LA0


OUT2 selection indicator
L/D indicator
DPC indicator
OUT2 indicator
30.2
27.8
ST indicator
OUT1 indicator
OUT1 selection indicator
Threshold level (green, digital)
Incident level (white, digital)
13.8
11.5
10
Mounted to DIN Track
2.6
159.7 (max. value with cover open)
152° (max. value with cover open)
114
(max. value
with cover
open)
33.5
(37)
26 (29.9)
Optical communications
32.1
(49.5)
(39.3)
102.4
PFP-□N DIN Track
(sold separately)

Smart Laser Amplifier Unit (CMOS type)

E3NC-SA0

A Ultra-compact CMOS Laser Sensor for Stable Detection without the Influence of Workpiece Color, Material, or Surface Conditions

For the most recent information on models that have been certified for safety standards, refer to your OMRON website.

- Dynamic range of 500,000 times for stable detection without influence from changes in workpieces.
- The industry's smallest CMOS laser head* for installation into small spaces.
- Distance discrimination enables stable detection of level differences as small as 1.5 mm.
- Robot cable for reliable application in adverse environments and IP67 protection.
- White on black display characters for high visibility.
- Smart Tuning to achieve stable detection with easy setup.

* Based on February 2013 OMRON investigation.

For details on the Sensor Heads that you can connect, refer to product information on your OMRON website.

General Specifications

Item		Specifications
Model		E3NC-SA0
Connecting method		Connector for Sensor Communications Unit
Power supply voltage		Supplied from the connector through the Sensor Communications Unit
Power consumption *1		At Power Supply Voltage of 24 VDC Normal mode: 1,920 mW max. (Current consumption: 80 mA max.) Eco ON: 1,680 mW max. (Current consumption: 70 mA max.) Eco LO: 1,800 mW max. (Current consumption: 75 mA max.)
Indicators		7-segment displays (Sub digital display: green, Main digital display: white) Display direction: Switchable between normal and reversed. OUT indicator (orange), L/D indicator (orange), ST indicator (blue), ZERO indicator (green), and OUT selection indicator (orange)
Protection circuits		Power supply reverse polarity protection and output short-circuit protection
Response time	**Super-high-speed mode (SHS)** *2	Operate or reset: 1.5 ms
	High-speed mode (HS)	Operate or reset: 5 ms
	Standard mode (Stnd)	Operate or reset: 10 ms
	Giga-power mode (GIGA)	Operate or reset: 50 ms
Sensitivity adjustment		Smart Tuning (2-point tuning, full auto tuning, 1-point tuning, tuning without workpiece, 2-point area tuning, 1-point area tuning, or area tuning without workpiece), or manual adjustment
Maximum connectable Units		30
No. of Units for mutual interference prevention	**Super-high-speed mode (SHS)** *2	0
	High-speed mode (HS)	2
	Standard mode (Stnd)	2
	Giga-power mode (GIGA)	2
Other Functions	**Timer**	Select from timer disabled, OFF-delay, ON-delay, one-shot, or ON-delay + OFF-delay timer: 1 to 9,999 ms
	Zero reset	Negative values can be displayed. (Threshold value is shifted.)
	Resetting settings *3	Select from initial reset (factory defaults) or user reset (saved settings).
	Eco mode	Select from OFF (digital display lit), ECO ON (digital display not lit), and ECO LO (digital display dimmed).
	Bank switching	Select from banks 1 to 4.
	Output 1	Select from Normal detection mode, Area detection mode, or hold mode.
	Output 2	Select from Normal detection mode or Error output mode.
	Keep function *4	Select from ON or OFF.
	Background suppression *5	Select from ON or OFF.
	Hysteresis width	Select from standard setting or user setting.

Item		Specifications
Ambient temperature range *6		Operating: Groups of 1 or 2 Amplifier Units: 0 to 55°C, Groups of 3 to 10 Amplifier Units: 0 to 50°C, Groups of 11 to 16 Amplifier Units: 0 to 45°C, Groups of 17 to 30 Amplifier Units: 0 to 40°C Storage: –30 to 70°C (with no icing or condensation)
Ambient humidity range		Operating and storage: 35% to 85% (with no condensation)
Altitude		2,000 m max.
Installation environment		Pollution degree 3 (as per IEC 60947-1)
Insulation resistance		20 MΩ (at 500 VDC)
Dielectric strength		1,000 VAC at 50/60 Hz for 1 minute
Vibration resistance (destruction)		10 to 55 Hz with a 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions
Shock resistance (destruction)		150 m/s^2 for 3 times each in X, Y, and Z directions
Weight (packed state/Amplifier Unit only)		Approx. 65 g/approx. 25 g
Materials	**Case**	Polycarbonate (PC)
	Cover	Polycarbonate (PC)
Accessories		Instruction Manual

*1 At Power Supply Voltage of 10 to 30 VDC.
Normal mode: 2.250 mW max. (Current consumption: 75 mA max. at 30 VDC, 145 mA max. at 10 VDC)
Eco ON: 2,010 mW max. (Current consumption: 67 mA max. at 30 VDC, 125 mA max. at 10 VDC)
Eco LO: 2,130 mW max. (Current consumption: 71 mA max. at 30 VDC, 135 mA max. at 10 VDC)
*2 The mutual interference prevention function is disabled if the detection mode is set to super-high-speed mode.
*3 The bank is not reset by the user reset function or saved by the user save function.
*4 The output for a measurement error is set. ON: The value of the output from before the measurement error is retained. OFF: The output is turned OFF when a measurement error occurs.
*5 Only the sensing object is detected when tuning.
*6 When the number of connected units is 11 or more, the ambient temperature is less than 50°C.

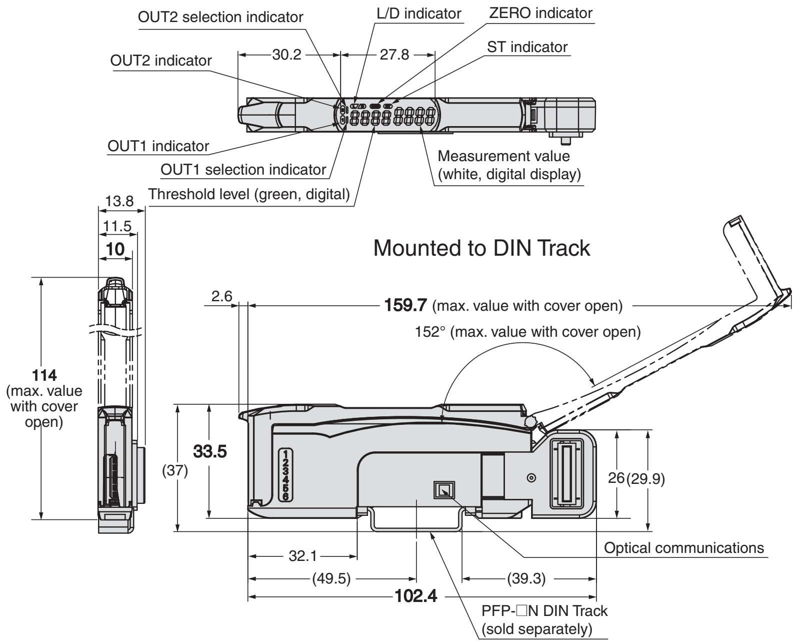
Dimensions

(Unit: mm)
Tolerance class IT16 applies to dimensions in this data sheet unless otherwise specified.

Amplifier Unit with Connector for Sensor Communications Unit

E3NC-SA0

omron
E3NC-SA0


OUT2 selection indicator
L/D indicator
ZERO indicator
OUT2 indicator
30.2
27.8
ST indicator
OUT1 indicator
OUT1 selection indicator
Measurement value (white, digital display)
Threshold level (green, digital)
13.8
11.5
10
Mounted to DIN Track
114 (max. value with cover open)
2.6
159.7 (max. value with cover open)
152° (max. value with cover open)
33.5
(37)
26
(29.9)
Optical communications
32.1
(49.5)
(39.3)
102.4
PFP-□N DIN Track (sold separately)

Smart Contact Amplifier Unit

E9NC-TA0

Advanced, Durable, Space-saving Contact Sensors.

- OMRON's unique ball spline mechanism for resistance to vibration and shock.
- Employs a robot cable that withstands bending.*
- Slim, short Sensor Heads and slim Amplifier Units to save you space.
- A flanged type that does not require mounting brackets and is easy to replace.
- Transmits high-precision data with a resolution of 0.1 mm across a network.

* Robot cable specifications apply to the Sensor Head cable and the Connection Cable between the Preamplifier and the Amplifier Unit.

For the most recent information on models that have been certified for safety standards, refer to your OMRON website.

General Specifications

Item		Specifications
Model		E9NC-TA0
Connecting method		Connector for Sensor Communications Unit
Power supply voltage		Supplied from the connector through the Sensor Communications Unit
Display resolution		0.1 μm min.
Power consumption *1		At Power Supply Voltage of 24 VDC Normal mode: 2,040 mW max. (Current consumption: 85 mA max.) Eco ON: 1,800 mW max. (Current consumption: 75 mA max.) Eco LO: 1,920 mW max. (Current consumption: 80 mA max.)
Indicators		7-segment displays (white) GO indicator (orange), HIGH/LOW indicator (orange), NO/NC indicator (orange), PRST indicator (green), ST indicator (blue)
Protection circuits		Power supply reverse polarity protection and output short-circuit protection
Response time	**Super-high-speed mode (SHS)**	Operate or reset: 3 ms
	High-speed mode (HS)	Operate or reset: 10 ms
	Standard mode (Stnd)	Operate or reset: 100 ms
	Giga mode (GIGA)	Operate or reset: 1,000 ms
Threshold setting		Smart Tuning (2-point area tuning, tolerance tuning, 2-point tuning, 1-point tuning), or manual adjustment
No. of banks		4
Functions	**Output mode selection**	Normal output, hybrid output (Output is performed according to the combination of the two bits used to specify HIGH, GO, LOW, and error.)
	Preset	Negative values can be displayed.
	Resetting settings *2	Select from initial reset (factory defaults) or user reset (saved settings).
	Eco mode *3	Select from OFF (digital display lit), ECO ON (digital display not lit), and ECO LO (digital display dimmed).
	Bank switching	Select from banks 1 to 4.
	Origin point use setting	Select whether using the Sensor Head origin point or setting the point at power ON as origin.
	Direction	Switchable
	Output	Select from Normal sensing mode or Area sensing mode.
	Display digits	Settable in units ranging from 0.0001 mm to 1 mm.
Maximum connectable Units		With E3NW-ECT: 30 units *4 With E3NW-CCL: 16 units
Ambient temperature range		Operating: Groups of 1 or 2 Amplifier Units: 0 to 55°C, Groups of 3 to 10 Amplifier Units: 0 to 50°C, Groups of 11 to 16 Amplifier Units: 0 to 45°C, Groups of 17 to 30 Amplifier Units: 0 to 40°C Storage: −30 to 70°C (with no icing or condensation)
Ambient humidity range		Operating and storage: 35% to 85% (with no condensation)
Insulation resistance		20 MΩ (at 500 VDC)
Dielectric strength		1,000 VAC at 50/60 Hz for 1 minute
Vibration resistance (destruction)		10 to 55 Hz with a 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions
Shock resistance (destruction)		150 m/s^2 for 3 times each in X, Y, and Z directions
Weight (packed state/Amplifier Unit only)		Approx. 65 g/approx. 25 g
Materials	**Case**	Polycarbonate (PC)
	Cover	Polycarbonate (PC)
Accessories		Instruction Manual

*1 At Power Supply Voltage of 10 to 30 VDC.
Normal mode: 2,250 mW max. (Current consumption: 75 mA max. at 30 VDC, 155 mA max. at 10 VDC)
Eco ON: 2,010 mW max. (Current consumption: 67 mA max. at 30 VDC, 135 mA max. at 10 VDC)
Eco LO: 2,130 mW max. (Current consumption: 71 mA max. at 30 VDC, 145 mA max. at 10 VDC)

*2. The bank is not reset by the user reset function or saved by the user save function.

*3. ECO LO is supported for Amplifier Units manufactured in August 2014 or later.

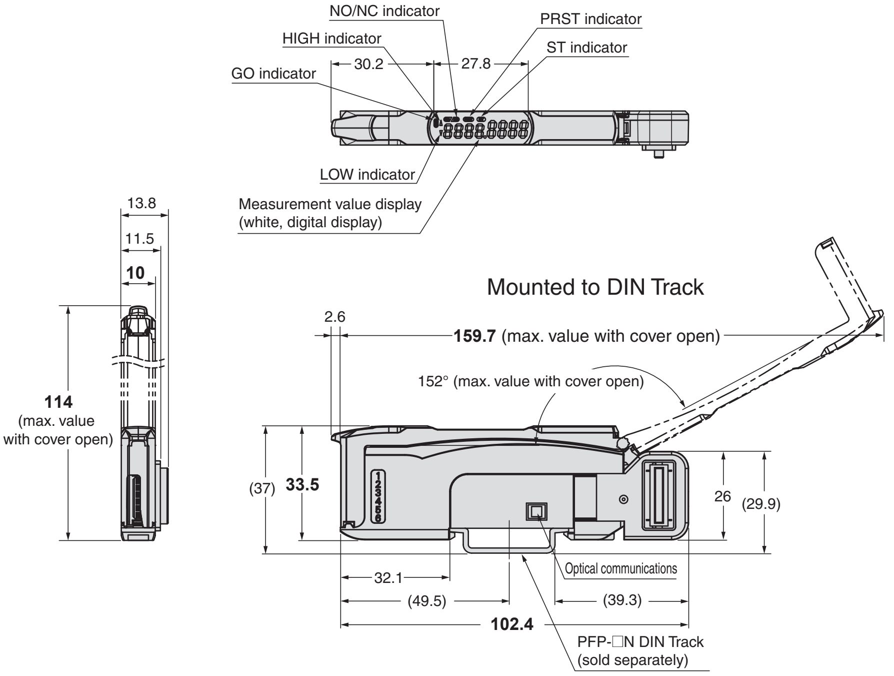
*4. When the Sensors are connected to an OMRON NJ/NX-series Controller.

Dimensions

(Unit: mm)
Tolerance class IT16 applies to dimensions in this data sheet unless otherwise specified.

Model with Communications

E9NC-TA0


NO/NC indicator
PRST indicator
HIGH indicator
ST indicator
30.2
27.8
GO indicator
LOW indicator
Measurement value display (white, digital display)
13.8
11.5
10
114 (max. value with cover open)
Mounted to DIN Track
2.6
159.7 (max. value with cover open)
152° (max. value with cover open)
(37)
33.5
26
(29.9)
Optical communications
32.1
(49.5)
(39.3)
102.4
PFP-☐N DIN Track (sold separately)

System Configuration
Controllers
Softwares
Programmable Terminals
General Specifications
Dimensions
EtherCAT Slave Terminals
Safety
Mortion/Drives
Inverters
Sensors
Remote I/O Terminals
Ordering Information

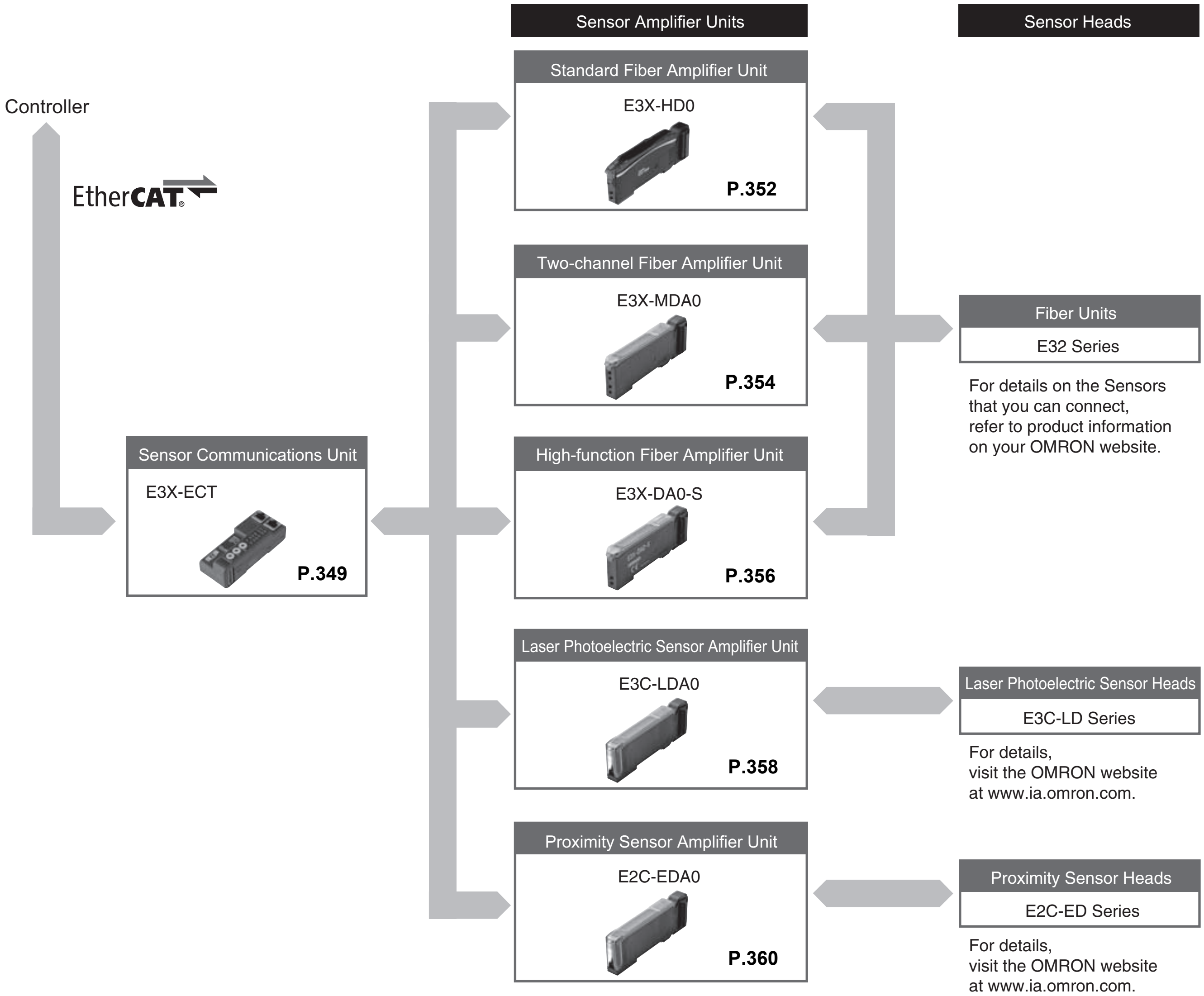
Fiber Sensors/Laser Photoelectric Sensor/Proximity Sensor

E3X/E3C-LDA/E2C-EDA Communication unit connection series

Easily connect fiber sensors, laser photoelectric sensors, and proximity sensors to EtherCAT

- Ultra high-speed communication of sensor output
- Sensor functions such as reading present values, changing settings and tuning are controlled by EtherCAT
- Up to 30 amplifiers can be connected

System Configuration


Sensor Amplifier Units
Sensor Heads
Controller
EtherCAT
Sensor Communications Unit
E3X-ECT
P.349
Standard Fiber Amplifier Unit
E3X-HD0
P.352
Two-channel Fiber Amplifier Unit
E3X-MDA0
P.354
High-function Fiber Amplifier Unit
E3X-DA0-S
P.356
Laser Photoelectric Sensor Amplifier Unit
E3C-LDA0
P.358
Proximity Sensor Amplifier Unit
E2C-EDA0
P.360
Fiber Units
E32 Series
Laser Photoelectric Sensor Heads
E3C-LD Series
Proximity Sensor Heads
E2C-ED Series

For details on the Sensors that you can connect, refer to product information on your OMRON website.

For details, visit the OMRON website at www.ia.omron.com.

For details, visit the OMRON website at www.ia.omron.com.

Sensor Communications Unit

E3X-ECT

EtherCAT sensor communication unit makes it easy to manage sensor settings

- Programless transmission of ON/OFF signals and detected quantities to host PLC (PDO communications).
- Reading and writing threshold values and function settings, teaching, and other operations are possible (SDO communications).
- Wire saving: simply connect the communications cable and power cable, and slide the Amplifier Units from the side.
- Up to 30 Sensor Amplifier Units can be connected.

For the most recent information on models that have been certified for safety standards, refer to your OMRON website.

Connectable sensors

Type	Model	Features
Fiber Amplifier Unit	**E3X-HD0**	Standard Fiber Amplifier Unit with easy operation and settings
	E3X-MDA0	Two-channel Fiber Amplifier Unit allows connection of two bundles of fibers
	E3X-DA0-S	High-functionality Fiber Amplifier Unit enables two threshold value settings
Laser Photoelectric Sensor Amplifier Unit	**E3C-LDA0**	Laser Amplifier Unit enables connection of 3 types of laser beam sensors.
Proximity Sensor Amplifier Unit	**E2C-EDA0**	Proximity Amplifier Unit enables easy configuration of high-precision sensitivity settings

General Specifications

Item	Specifications
Power supply voltage	20.4 to 26.4 VDC
Power consumption	2.4 W max. (Not include sensors current) 100 mA max. at 24 VDC (Not include sensors current)
Indicators	L/A IN (yellow), L/A OUT (yellow), PWR (green) RUN (green), ERROR (red), SS (Sensor Status) (green/red)
Vibration resistance	10 to 150 Hz with double-amplitude of 0.7 mm or 50 m/s^2 for 80 minutes each in X, Y and Z directions
Shock resistance	150 m/s^2, for 3 times each in 3 directions
Dielectric strength	500 VAC at 50/60 Hz for 1 minute
Insulation resistance	20MΩ min.
Ambient operating temperature	0 to +55 °C
Ambient operating temperature	25 to 85 % (with no condensation)
Storage temperature	–30 to +70 °C (with no icing or condensation)
Storage humidity	25 to 85 % (with no condensation)
Installation	Mounted on 35-mm DIN Track
Accessories	Power supply connector, DIN Track End Plates (2 pieces), and Instruction Manual
Weight (packed state/Amplifier only)	Approx. 220g/Approx. 95g

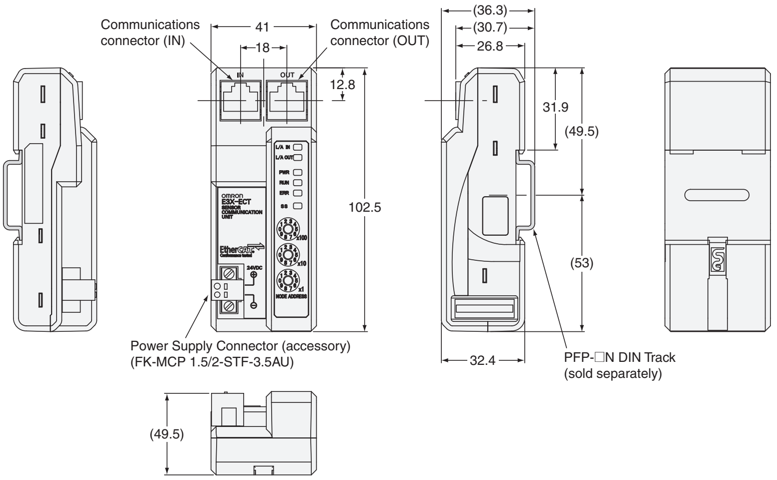
EtherCAT Communications Specifications

Item	Specification
Communication protocol	Dedicated protocol for EtherCAT
Modulation	Baseband method
Baud rate	100 Mbps
Physical layer	100BASE-TX (IEEE802.3)
Connectors	RJ45 shielded connector × 2 CN IN: EtherCAT input CN OUT: EtherCAT output
Topology	Daisy chain
Communications media	Category 5 or higher (cable with double, aluminum tape and braided shielding is recommended.)
Communications distance	Distance between nodes (slaves): 100 m max.
Noise resistance	Conforms to IEC 61000-4-4, 1 kV or higher
Node address setting method	Set with decimal rotary switch or Sysmac Studio
Node address range	1 to 999: Set with rotary switch 1 to 65535: Set with Sysmac Studio
LED display	PWR × 1 L/A IN (Link/Activity IN) × 1 L/A OUT (Link/Activity OUT) × 1 RUN × 1 ERR × 1
Process data	Variable PDO Mapping
PDO size/node	36 byte max.
Mailbox	Emergency messages, SDO requests, SDO responses, and SDO information
SYNCHRONIZATION mode	Free Run mode or DC mode 1

Dimensions

(Unit: mm)

E3X-ECT


Communications connector (IN)
41
18
Communications connector (OUT)
IN
OUT
12.8
102.5
(36.3)
(30.7)
26.8
31.9
(49.5)
(53)
Power Supply Connector (accessory)
(FK-MCP 1.5/2-STF-3.5AU)
32.4
PFP-□N DIN Track
(sold separately)
(49.5)

Version Information

Sensor Communications Unit and Sysmac Studio

Sensor Communications Unit	Sysmac Studio version	
	Ver.1.01 or lower	Ver.1.02 or higher
E3X-ECT	Not supported.	supported.

Standard Fiber Amplifier Unit

E3X-HD0

High Functionality Fiber Amplifier Long-term Stable Detection with Your Finger Tip

- Smart Tuning allows of the optimum settings easily.
- High functionality, and easy operation through ultimate usability.
- Long-team stable detection.
- Smart Power Control enables the compensation of the incident level and light intensity automatically by detecting dirt,vibration and LED aged deterioration.
- Lighting element GIGA RAY II provides ample detection capability in a wide range of applications

E3X-HD
omron
E3X-HD0

For details on the Fiber Units that you can connect,
refer to product information on your OMRON website.

For the most recent information on models that have been certified for safety standards, refer to your OMRON website.

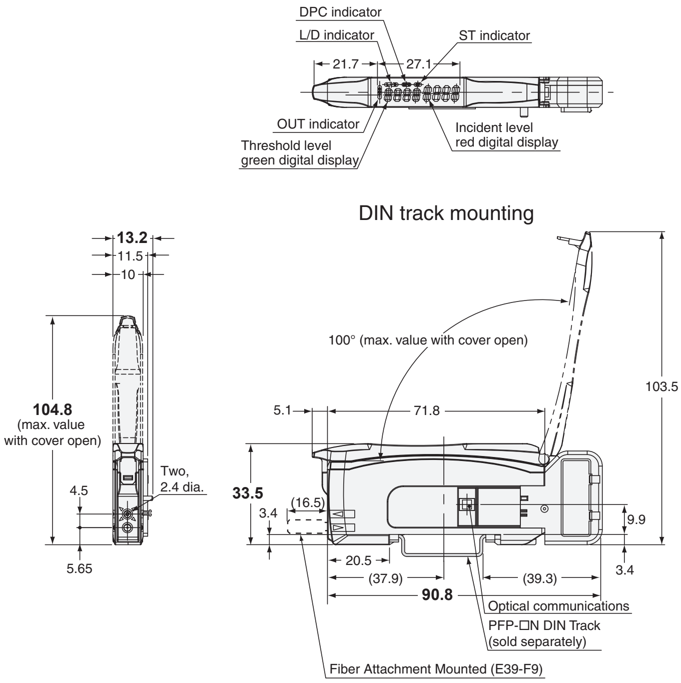
General Specifications

Item		Specifications
Model		E3X-HD0
Connection method		Connector for Sensor Communications Unit
Light source (wavelength)		Red, 4-element LED (625 nm)
Power supply voltage		Supplied from the connector through the Sensor Communications Unit
Power consumption		Normal Mode: 720 mW max. (Current consumption: 30 mA max. at 24 VDC, 60 mA max. at 12 DVC) Eco ON: 530 mW max. (Current consumption: 22 mA max. at 24 VDC, 44 mA max. at 12 VDC)
Protection circuits		Power supply reverse polarity protection and output short-circuit protection
Response time	**High-speed mode (HS)**	Operate or reset: 250 µs (default setting)
	Standard mode (Stnd)	Operate or reset: 1 ms
	Giga-power mode (GIGA)	Operate or reset: 16 ms
Maximum connectable Units		with E3X-ECT: 30 units (Number of connectable amplifiers)
No. of Units for mutual interference prevention		Possible for up to 10 units (optical communications sync)
Auto power control (APC)		Always ON
Other functions		Power tuning, differential detection, DPC, timer (OFF-delay, ON-delay, or one-shot), zero reset, resetting settings, and Eco Mode
Ambient Illumination (Receiver side)		Incandescent lamp: 20,000 lux max., Sunlight: 30,000 lux max.
Ambient temperature range		Operating: Groups of 1 to 2 Amplifiers: 0 to 55 °C Groups of 3 to 10 Amplifiers: 0 to 50 °C Groups of 11 to 16 Amplifiers: 0 to 45 °C Groups of 17 to 30 Amplifiers: 0 to 40 °C Storage: -30 to 70 °C (with no icing or condensation)
Ambient humidity range		Operating and storage: 35% to 85% (with no condensation)
Insulation resistance		20 MΩ min. (at 500 VDC)
Dielectric strength		1,000 VAC at 50/60 Hz for 1 minute
Vibration resistance		Destruction: 10 to 150 Hz with a 0.7-mm double amplitude for 80 minutes each in X, Y and Z directions
Shock resistance		Destruction: 150 m/s^2, for 3 times each in X, Y, and Z directions
Degree of protection		IEC 60529 IP50 (with Protective Cover attached)
Weight (packed state/Amplifier only)		Approx. 65 g/Approx. 25 g
Materials	**Case**	Heat-resistant ABS (Connector: PBT)
	Cover	Polycarbonate (PC)
Accessories		Instruction Manual

Dimensions

(Unit: mm)

E3X-HD0


DPC indicator
L/D indicator
ST indicator
21.7
27.1
OUT indicator
Threshold level green digital display
Incident level red digital display
DIN track mounting
13.2
11.5
10
104.8 (max. value with cover open)
Two, 2.4 dia.
4.5
5.65
100° (max. value with cover open)
103.5
5.1
71.8
33.5
3.4
(16.5)
9.9
3.4
20.5
(37.9)
(39.3)
90.8
Optical communications
PFP-☐N DIN Track (sold separately)
Fiber Attachment Mounted (E39-F9)

Two-channel Fiber Amplifier Unit

E3X-MDA0

Two-channel fiber amplifier on one unit

CE

- Features a Power Tuning function that optimizes light reception at the press of a button.
- Combines newly developed 4-element LEDs with an APC circuit to ensure stable, long-term LED performance.
- 2-channel models achieve the thinnest profile in the industry, at only 5 mm per channel. (According to July 2012)
- 2-channel models also offer AND/OR control output.

For details on the Fiber Units that you can connect,
refer to product information on your OMRON website.

For the most recent information on models that have been certified for safety standards, refer to your OMRON website.

General Spesifications

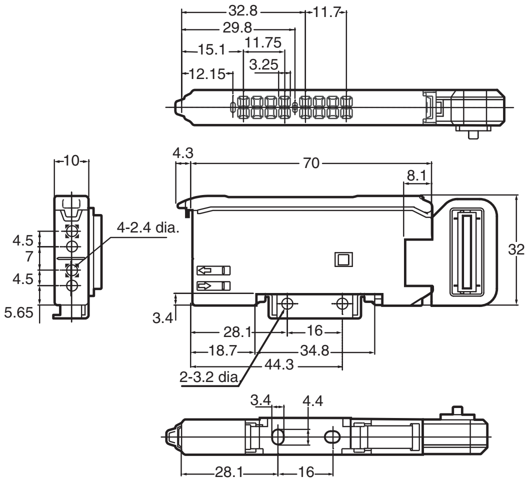
Item		Specifications
Model		E3X-MDA0
Connection method		Connector for Sensor Communications Unit
Light source (wavelength)		Red LED (635 nm)
Power supply voltage		Supplied from the connector through the Sensor Communications Unit
Power consumption		1,080 mW max. (current consumption: 45 mA max. at power supply voltage of 24 VDC)
Protection circuits		Power supply reverse polarity protection and output short-circuit protection
Response time	**High-speed mode**	Operate or reset: 450 μs
	Standard mode	Operate or reset: 1 ms
	High-resolution mode	Operate or reset: 4 ms
Maximum connectable Units		with E3X-ECT: 30 units (Number of connectable amplifiers)
No. of Units for mutual interference prevention		Possible for up to 9 Units (18 channels) *
Auto power control (APC)		Always ON
Other functions		Power tuning, timer (OFF-delay, ON-delay, or one-shot), zero reset, resetting settings, Eco Mode and output setting (channel 2 output, AND, OR, leading edge sync, falling edge sync, or differential output)
Ambient Illumination (Receiver side)		Incandescent lamp: 10,000 lux max., Sunlight: 20,000 lux max.
Ambient temperature range		Operating: Groups of 1 to 2 Amplifiers: 0 to 55 °C Groups of 3 to 10 Amplifiers: 0 to 50 °C Groups of 11 to 16 Amplifiers: 0 to 45 °C Groups of 17 to 30 Amplifiers: 0 to 40 °C Storage: -30 to 70 °C (with no icing or condensation)
Ambient humidity range		Operating and storage: 35% to 85% (with no condensation)
Insulation resistance		20 MΩ min. (at 500 VDC)
Dielectric strength		1,000 VAC at 50/60 Hz for 1 minute
Vibration resistance		Destruction: 10 to 150 Hz with a 0.7-mm double amplitude for 80 minutes each in X, Y and Z directions
Shock resistance		Destruction: 150 m/s^2, for 3 times each in X, Y, and Z directions
Degree of protection		IEC 60529 IP50 (with Protective Cover attached)
Weight (packed state)		Approx. 55 g
Materials	**Case**	Polybutylene terephthalate (PBT)
	Cover	Polycarbonate (PC)
Accessories		Instruction Manual

* Mutual interference prevention can be used for up to 5 Units (10 channels) if power tuning is enabled.

Dimensions

(Unit: mm)

E3X-MDA0


32.8
11.7
29.8
15.1
11.75
3.25
12.15
10
4.3
70
8.1
4-2.4 dia.
4.5
7
4.5
5.65
32
3.4
28.1
16
18.7
34.8
44.3
2-3.2 dia
3.4
4.4
28.1
16

High-functionally Fiber Amplifier Unit

E3X-DA0-S

High-functionally Fiber Amplifier Unit for Realizing Stable Detection

CE

- "GIGA RAY" Giga Power Lighting Element to create a wide variety of value.
- Power turning to easily set the optimum light level.
- Active Thereshold Control (ATC) reduces incorrect operation due to dust, oil, or other influences.
- Automatic Power Control (APC) is always enabled to stabilize emitter power with high accuracy.

For details on the Fiber Units that you can connect,
refer to product information on your OMRON website.

E3X-DA0-S
omron

For the most recent information on models that have been certified for safety standards, refer to your OMRON website.

General Specifications

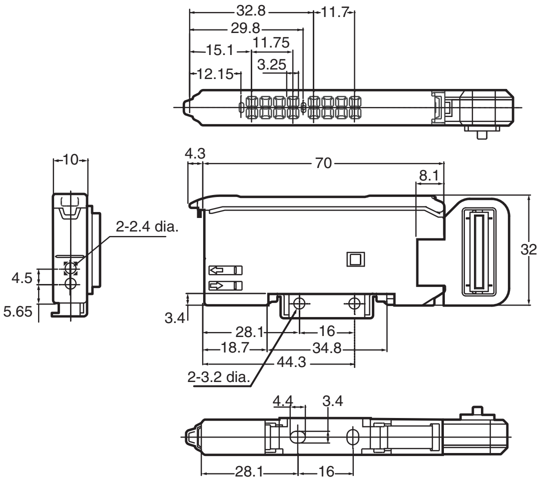
Item		Specifications
Model		E3X-DA0-S
Connection method		Connector for Sensor Communications Unit
Light source (wavelength)		Red, 4-element LED (625 nm)
Power supply voltage		Supplied from the connector through the Sensor Communications Unit
Power consumption		Normal mode: 960 mW max. (Current consumption: 40 mA max. at 24 VDC, 80 mA max. at 12 VDC) Power saving ECO1: 720 mW max. (Current consumption: 30 mA max. at 24 VDC, 60 mA max. at 12 VDC) Power saving ECO2: 600 mW max. (Current consumption: 25 mA max. at 24 VDC, 50 mA max. at 12 VDC)
Protection circuits		Power supply reverse polarity protection, output short-circuit protection and output reverse polarity protection
Response time	**High-speed mode**	Operate or reset: 250 µs
	Standard mode	Operate or reset: 1 ms
	High-resolution mode	Operate or reset: 4 ms
	Tough mode	Operate or reset: 16 ms
Maximum connectable Units		with E3X-ECT: 30 units (Number of connectable amplifiers)
No. of Units for mutual interference prevention		Possible for up to 10 units
Auto power control (APC)		Always ON
Other functions		Power tuning, differential detection, timer (OFF-delay, ON-delay, One-shot, or ON-delay + OFF-delay timer), zero reset, resetting settings, Eco Mode and output setting (output for each channel, area output, or self-diagnosis)
Ambient Illumination (Receiver side)		Incandescent lamp: 10,000 lux max., Sunlight: 20,000 lux max.
Ambient temperature range		Operating: Groups of 1 to 2 Amplifiers: 0 to 55 °C Groups of 3 to 10 Amplifiers: 0 to 50 °C Groups of 11 to 16 Amplifiers: 0 to 45 °C Groups of 17 to 30 Amplifiers: 0 to 40 °C Storage: -30 to 70 °C (with no icing or condensation)
Ambient humidity range		Operating and storage: 35% to 85% (with no condensation)
Insulation resistance		20 MΩ min. (at 500 VDC)
Dielectric strength		1,000 VAC at 50/60 Hz for 1 minute
Vibration resistance		Destruction: 10 to 150 Hz with a 0.7-mm double amplitude for 80 minutes each in X, Y and Z directions
Shock resistance		Destruction: 150 m/s^2, for 3 times each in X, Y, and Z directions
Degree of protection		IEC 60529 IP50 (with Protective Cover attached)
Weight (packed state)		Approx. 55 g
Materials	**Case**	Polybutylene terephthalate (PBT)
	Cover	Polycarbonate (PC)
Accessories		Instruction Manual

* The rated sensing distance is approximately 1/2 and the incident level is approximately 1/3 of the normal levels when ECO mode is enabled.

Dimensions

(Unit: mm)

E3X-DA0-S


32.8
11.7
29.8
15.1
11.75
3.25
12.15
10
4.3
70
8.1
2-2.4 dia.
32
4.5
5.65
3.4
28.1
16
18.7
34.8
44.3
2-3.2 dia.
4.4
3.4
28.1
16

Laser Photoelectric Sensor Amplifier Unit
E3C-LDA0

Three beams are selectable to match the work: spot, line, and area

- Long-distance detection (diffuse reflection type: 1 m, retroreflective type: 7 m)
- Spot, line, and area types enable selection of the beam shape to match the application
- Adjustable spot diameter
- Adjustable optical axis

For details on the Sensor Heads that you can connect, refer to product information on your OMRON website.

For the most recent information on models that have been certified for safety standards, refer to your OMRON website.

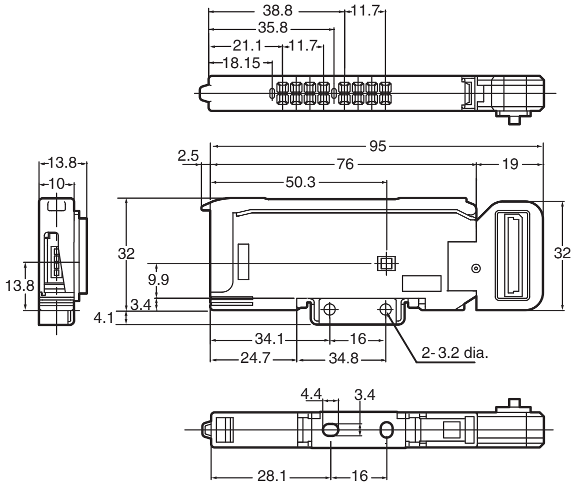
General Specifications

Item		Specifications
Model		E3C-LDA0
Connection method		Connector for Sensor Communications Unit
Power supply voltage		Supplied from the connector through the Sensor Communications Unit
Power consumption		1,080 mW max. (current consumption: 45 mA max. at power supply voltage of 24 VDC)
Protection circuits		Power supply reverse polarity protection and output short-circuit protection
Response time	**High-speed mode**	Operate or reset: 250 μs
	Standard mode	Operate or reset: 1 ms
	High-resolution mode	Operate or reset: 4 ms
Maximum connectable Units		with E3X-ECT: 30 units (Number of connectable amplifiers)
No. of Units for mutual interference prevention		Possible for up to 10 units
Auto power control (APC)		Always ON
Other functions		Differential detection, timer (OFF-delay, ON-delay, or one-shot), zero reset, resetting settings, counter and output setting (channel 2 output, area output, or self-diagnosis.)
Ambient temperature range		Operating: Groups of 1 to 2 Amplifiers: 0 to 55 °C Groups of 3 to 10 Amplifiers: 0 to 50 °C Groups of 11 to 16 Amplifiers: 0 to 45 °C Groups of 17 to 30 Amplifiers: 0 to 40 °C Storage: -30 to 70 °C (with no icing or condensation)
Ambient humidity range		Operating and storage: 35% to 85% (with no condensation)
Insulation resistance		20 MΩ min. (at 500 VDC)
Dielectric strength		1,000 VAC at 50/60 Hz for 1 minute
Vibration resistance		Destruction: 10 to 150 Hz with a 0.7-mm double amplitude for 80 minutes each in X, Y and Z directions
Shock resistance		Destruction: 150 m/s^2, for 3 times each in X, Y, and Z directions
Degree of protection		IEC 60529 IP50 (with Protective Cover attached)
Weight (packed state)		Approx. 55 g
Materials	**Case**	Polybutylene terephthalate (PBT)
	Cover	Polycabonate (PC)
Accessories		Instruction Manual

Dimensions

(Unit: mm)

E3C-LDA0


38.8
11.7
35.8
21.1
11.7
18.15
95
2.5
76
19
50.3
13.8
10
32
32
9.9
13.8
3.4
4.1
34.1
16
24.7
34.8
2- 3.2 dia.
4.4
3.4
28.1
16

Proximity Sensor Amplifier Unit

E2C-EDA0

Proximity Sensor with Separate Amplifier Enables Easily Making High-precision Sensitivity Settings

- Wide variety of Sensor Heads to select according to the application. The Sensor Heads use flexible cable.
- High resistance to changes in ambient temperature. Temperature characteristics of 0.08%/°C (for 5.4-dia. models).
- Make simple and reliable detection settings with micronlevel precision using the teaching function.
- Check the sensing excess gain level on the digital display.
- Support for high-precision positioning and screening with fine positioning to maximize variations.

For details on the Sensor Heads that you can connect, refer to product information on your OMRON website.

For the most recent information on models that have been certified for safety standards, refer to your OMRON website.

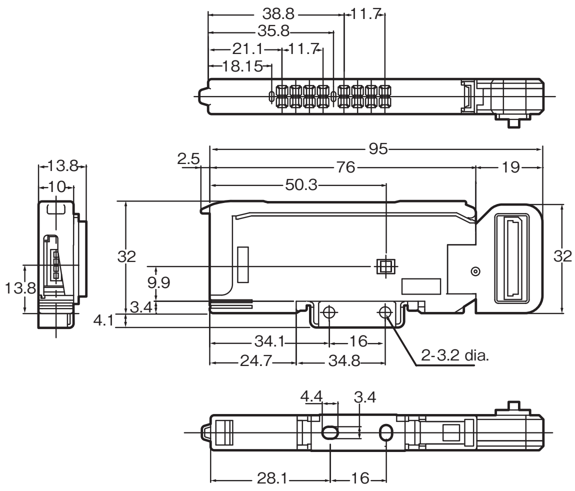
General Specifications

Item		Specifications
Model		E2C-EDA0
Connection method		Connector for Sensor Communications Unit
Power supply voltage		Supplied from the connector through the Sensor Communications Unit
Power consumption		1,080 mW max. (current consumption: 45 mA max. at power supply voltage of 24 VDC)
Protection circuits		Power supply reverse polarity protection and output short-circuit protection
Response time	**High-speed mode**	Operate or reset: 300 µs
	Standard mode	Operate or reset: 1 ms
	High-resolution mode	Operate or reset: 4 ms
Maximum connectable Units		with E3X-ECT: 30 units (Number of connectable amplifiers)
No. of Units for mutual interference prevention		Possible for up to 5 units
Other functions		Differential detection,timer (OFF-delay, ON-delay, or one-shot), zero reset, resetting settings, Hysteresis settings and output setting (channel 2 output, area output, self-diagnosis, or open circuit detection.)
Ambient temperature range		Operating: When connecting 1 to 2 Units: 0 to 55 °C When connecting 3 to 5 Units: 0 to 50 °C When connecting 6 to 16 Units: 0 to 45 °C When connecting 17 to 30 Units: 0 to 40 °C When used in combination with an E2C-EDR6-F When connecting 3 to 4 Units: 0 to 50 °C When connecting 5 to 8 Units: 0 to 45 °C When connecting 9 to 16 Units: 0 to 40 °C When connecting 17 to 30 Units: 0 to 35 °C Storage: -30 to 70 °C (with no icing)
Ambient humidity range		Operating and storage: 35% to 85% (with no condensation)
Insulation resistance		20 MΩ min. (at 500 VDC)
Dielectric strength		1,000 VAC at 50/60 Hz for 1 minute
Vibration resistance		Destruction: 10 to 150 Hz with a 0.7-mm double amplitude for 80 minutes each in X, Y and Z directions
Shock resistance		Destruction: 150 m/s^2, for 3 times each in X, Y, and Z directions
Degree of protection		IEC 60529 IP50 (with Protective Cover attached)
Weight (packed state)		Approx. 55 g
Materials	**Case**	Polybutylene terephthalate (PBT)
	Cover	Polycabonate (PC)
Accessories		Instruction Manual

Dimensions

(Unit: mm)

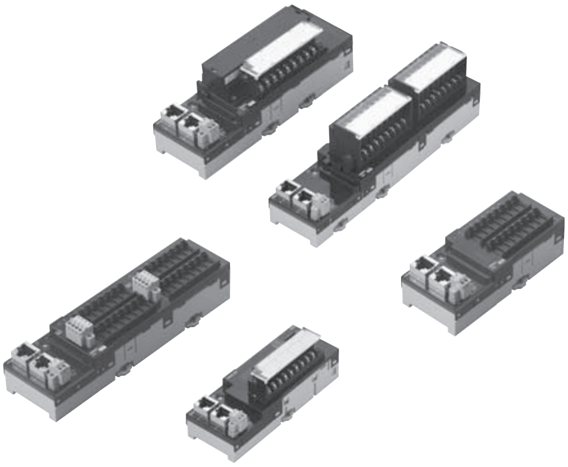
E2C-EDA0


38.8
11.7
35.8
21.1
11.7
18.15
13.8
10
13.8
2.5
95
76
19
50.3
32
9.9
3.4
4.1
32
34.1
16
24.7
34.8
2-3.2 dia.
4.4
3.4
28.1
16

EtherCAT Remote I/O Terminals

GX-Series

Realizes high-speed communication to match a variety of applications



• Digital I/O Terminals

Inputs/Outputs the digital ON/OFF signals.

• Analog I/O Terminals

Inputs/Outputs the analog signal of 0-5V or 4-20mA, etc., and executes A/D or D/A conversion.

• Encoder Input Terminal

Performs conversion for pulse input signals from an encoder.

• Expansion Units

Attached to the Digital I/O Unit to expands the I/O points.
Can be attached to a two-tier terminal block type with 16 inputs, 16 outputs, and 16 relay outputs.

General Specifications

It is common specifications of EtherCAT Remote I/O Terminal GX-Series. Refer to the pages of specifications for individual I/O terminals for details.

Item	Specification
Unit power supply voltage	20.4 to 26.4 VDC (24 VDC –15% to +10%)
I/O power supply voltage	20.4 to 26.4 VDC (24 VDC –15% to +10%)
Noise resistance	Conforms to IEC 61000-4-4, 2 kV (power line)
Vibration resistance	Malfunction 10 to 60 Hz with amplitude of 0.7 mm, 60 to 150Hz and 50 m/s^2 in X, Y, and Z directions for 80 minutes <Relay Output Unit GX-OC1601 only> 10 to 55 Hz with double-amplitude of 0.7 mm
Impact resistance	150 m/s^2 with amplitude of 0.7 mm <Relay Output Unit GX-OC1601 only> 100 m/s^2 (3 times each in 6 directions on 3 axes)
Dielectric strength	600 VAC (between isolated circuits)
Isolation resistance	20 MΩ or more (between isolated circuits)
Ambient operating temperature	–10 to 55 °C
Operating humidity	25% to 85% (with no condensation)
Operating atmosphere	No corrosive gases
Storage temperature	–25 to 65 °C
Storage humidity	25% to 85% (with no condensation)
Terminal block screws tightening torque *	M3 wiring screws: 0.5 N•m M3 terminal block mounting screws: 0.5 N•m
Mounting method	35-mm DIN track mounting

* Applicable only to 2-tier terminal block and 3-tier terminal block type slaves.

EtherCAT Communications Specifications

Communications Specifications of GX-Series EtherCAT Remote I/O Terminal

Item	Specification
Communication protocol	Dedicated protocol for EtherCAT
Modulation	Base band
Baud rate	100 Mbps
Physical layer	100BASE-TX (IEEE802.3)
Connectors	RJ45 shielded connector × 2 CN IN: EtherCAT input CN OUT: EtherCAT output
Communications media	Category 5 or higher (cable with double, aluminum tape and braided shielding is recommended.)
Communications distance	Distance between nodes (slaves): 100 m max.
Noise resistance	Conforms to IEC 61000-4-4, 1 kV or higher
Node address setting method	Set with decimal rotary switch or Sysmac Studio
Node address range	1 to 99: Set with rotary switch 1 to 65535: Set with Sysmac Studio
LED display	PWR × 1 L/A IN (Link/Activity IN) × 1 L/A OUT (Link/Activity OUT) × 1 RUN × 1 ERR × 1
Process data	Fixed PDO mapping
PDO size/node	2 bit to 256 byte
Mailbox	Emergency messages, SDO requests, SDO responses, and SDO information
SYNCHRONIZATION mode	Digital I/O Slave Unit and Analog I/O Slave Unit: Free Run mode (asynchronous) Encoder Input Slave Unit: DC mode 1

Version Information

Unit Versions

Units	Models	Unit Version	
		Unit version 1.0	**Unit version 1.1**
GX-Series EtherCAT Slave Units	GX-□□□□□□	Supported	Supported
Compatible Sysmac Studio version (To connect the NJ Controller)		Version1.05 or higher *	Version 1.05 or higher
Compatible Sysmac Studio version (To connect the NX Controller)		Version1.13 or higher *	Version1.13 or higher

* The function that was enhanced by the upgrade for Unit version1.1 can not be used. For detail, refer to "Function Support by Unit Version".

Function Support by Unit Version

The following tables show the relationship between unit versions and CX-Programmer versions.

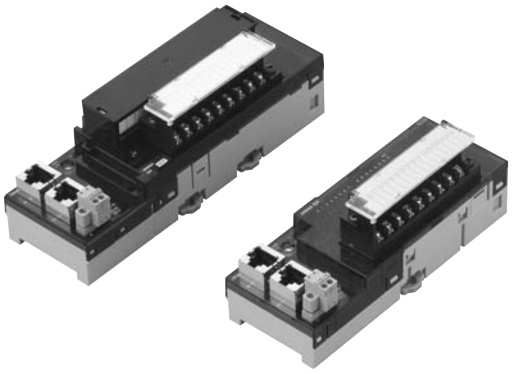
Unit Versions and Programming Devices

Unit	GX-Series EtherCAT Slave Units	
Model	**GX-□□□□□□**	
Unit version **Item**	**Unit version 1.0**	**Unit version 1.1**
Sysmac error status	No Supported	Supported
Save the node address setting	No Supported	Supported
Serial Number Display	No Supported	Supported
ESI standard (1.0)	Supported	Supported
SII data check	No Supported	Supported

Digital I/O Terminal 2-tier Terminal Block Type

GX-□D16□1/OC1601

High-speed digital I/O terminal with the screw type terminal block for EtherCAT communications



- Detachable screw terminal block facilitates the maintenance.
- The expansion unit can be connected.
  (One expansion unit per one I/O terminal unit.)
  Input/output point can be flexibly increased depending on the system.
- Input response time can be switched for high-speed processing.
- Selectable node address setting methods: setting with rotary switch and with tool software.
  When setting the nodes with rotary switch, setting is easy and node identification becomes possible for maintenance.

Expansion Units

One Expansion Unit can be combined with one Digital I/O Terminal (GX-ID16□1/OD16□1/OC1601). The following Expansion Units are available. They can be combined in various ways for flexible I/O capacity expansion.

Model	I/O points	Input capacity	Output capacity
XWT-ID08	8 DC inputs (NPN)	8	0
XWT-ID08-1	8 DC inputs (PNP)	8	0
XWT-OD08	8 transistor outputs (NPN)	0	8
XWT-OD08-1	8 transistor outputs (PNP)	0	8
XWT-ID16	16 DC inputs (NPN)	16	0
XWT-ID16-1	16 DC inputs (PNP)	16	0
XWT-OD16	16 transistor outputs (NPN)	0	16
XWT-OD16-1	16 transistor outputs (PNP)	0	16

General Specifications

For Common Specifications of I/O terminals, refer to page 362.

Input Section Specifications

16-point Input Terminals

Item	Specification	
	GX-ID1611	GX-ID1621
Input capacity	16 points	
Internal I/O common	NPN	PNP
ON voltage	15 VDC min. (between each input terminal and the V terminal)	15 VDC min. (between each input terminal and the G terminal)
OFF voltage	5 VDC max. (between each input terminal and the V terminal)	5 VDC max. (between each input terminal and the G terminal)
OFF current	1.0 mA max.	
Input current	6.0 mA max./input (at 24-VDC) 3.0 mA max./input (at 17-VDC)	
ON delay	0.1 ms max.	
OFF delay	0.2 ms max.	
Input filter value	Without filter, 0.5 ms, 1 ms, 2 ms, 4 ms, 8 ms, 16 ms, 32 ms (Default setting: 1 ms)	
Number of circuits per common	16 inputs/common	
Input indicators	LED display (yellow)	
Isolation method	Photocoupler isolation	
I/O power supply method	Supply by I/O power supply	
Unit power supply current consumption	90 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
I/O power supply current consumption	5 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
Weight	180 g max.	
Expansion functions	Enabled	
Short-circuit protection function	No	

Note: For the I/O power supply current value to V and G terminals, refer to GX Series Operation Manual (Cat. No. W488).

Output Section Specifications

16-point Output Terminals

Item	Specification	
	GX-OD1611	GX-OD1621
Output capacity	16 points	
Rated current (ON current)	0.5 A/output, 4.0 A/common	
Internal I/O common	NPN	PNP
Residual voltage	1.2 V max. (0.5 ADC, between each output terminal and the G terminal)	1.2 V max. (0.5 ADC, between each output terminal and the V terminal)
Leakage current	0.1 mA max.	
ON delay	0.5 ms max.	
OFF delay	1.5 ms max.	
Number of circuits per common	16 points/common	
Output indicators	LED display (yellow)	
Isolation method	Photocoupler isolation	
I/O power supply method	Supply by I/O power supply	
Unit power supply current consumption	90 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
I/O power supply current consumption	5 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
Weight	180 g max.	
Expansion functions	Enabled	
Output handling for communications errors	Select either hold or clear	
Short-circuit protection function	No	

Note: For the I/O power supply current value to V and G terminals, refer to GX Series Operation Manual (Cat. No. W488).

Relay 16-point Output Terminals

Item	Specification
	GX-OC1601
Output capacity	16 points
Mounted relays	NY-5W-K-IE (Fujitsu Component) *
Rated load	Resistance load 250 VAC 2 A/output, common 8 A 30 VDC 2 A/output, common 8 A
Rated ON current	3 A/output
Maximum contact voltage	250 VAC, 125 VDC
Maximum contact current	3 A/output
Maximum switching capacity	750 VAAC, 90 WDC
Minimum applicable load (reference value)	5 VDC 1mA
Mechanical service life	20,000,000 operations min.
Electrical service life	100,000 operations min.
Number of circuits per common	16 points/common
Output indicators	LED display (yellow)
Isolation method	Relay isolation
I/O power supply method	The relay drive power is supplied from the unit power supply.
Unit power supply current consumption	210 mA max. (for 20.4 to 26.4-VDC power supply voltage)
Weight	290 g max.
Expansion functions	Enabled
Output handling for communications errors	Select either hold or clear
Short-circuit protection function	No

* For the specification of individual relay, refer to the data sheet of published by manufacturers.

Precautions for Correct Use

- With a current of between 2 and 3 A (8 to 10 A per common), either ensure that the number of points per common that simultaneously turn ON does not exceed 4 or ensure that the ambient temperature does not exceed 45 °C. Also, there are no restrictions if the current does not exceed 2 A (8 A per common).
- The rated current is the value for assuring normal operation, and not for assuring durability of the relays. The relay service life depends greatly on factors such as the operating temperature, the type of load, and switching conditions. The actual equipment must be checked under actual operating conditions.

Input and Output Section Specifications

8-point Input and 8-point output Terminals

General Specifications

Item	Specification	
	GX-MD1611	GX-MD1621
Internal I/O common	NPN	PNP
I/O indicators	LED display (yellow)	
Unit power supply current consumption	80 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
Weight	190 g max.	
Expansion functions	No	
Short-circuit protection function	No	

Input Section

Item	Specification	
	GX-MD1611	GX-MD1621
Input capacity	8 points	
ON voltage	15 VDC min. (between each input terminal and the V terminal)	15 VDC min. (between each input terminal and the G terminal)
OFF voltage	5 VDC max. (between each input terminal and the V terminal)	5 VDC max. (between each input terminal and the G terminal)
OFF current	1.0 mA max.	
Input current	6.0 mA max./input (at 24-VDC) 3.0 mA max./input (at 17-VDC)	
ON delay	0.1 ms max.	
OFF delay	0.2 ms max.	
Input filter value	Without filter, 0.5 ms, 1 ms, 2 ms, 4 ms, 8 ms, 16 ms, 32 ms (Default setting: 1 ms)	
Number of circuits per common	8 points/common	
Isolation method	Photocoupler isolation	
I/O power supply method	Supply by I/O power supply	
I/O power supply current consumption	5 mA max. (for 20.4 to 26.4-VDC power supply voltage)	

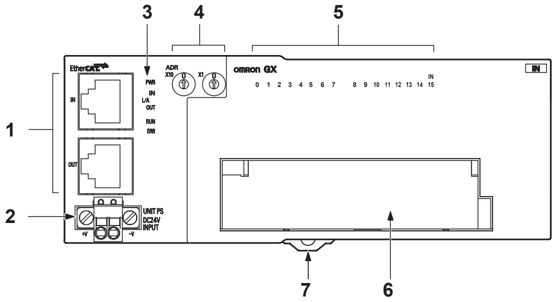
Output Section

Item	Specification	
	GX-MD1611	GX-MD1621
Output capacity	8 points	
Rated output current	0.5 A/output, 2.0 A/common	
Residual voltage	1.2 V max. (0.5 ADC, between each output terminal and the G terminal)	1.2 V max. (0.5 ADC, between each output terminal and the V terminal)
Leakage current	0.1 mA max.	
ON delay	0.5 ms max.	
OFF delay	1.5 ms max.	
Number of circuits per common	8 points/common	
Isolation method	Photocoupler isolation	
I/O power supply method	Supply by I/O power supply	
I/O power supply current consumption	5 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
Output handling for communications errors	Select either hold or clear	

Note: For the I/O power supply current value to V and G terminals, refer to GX Series Operation Manual (Cat. No. W488).

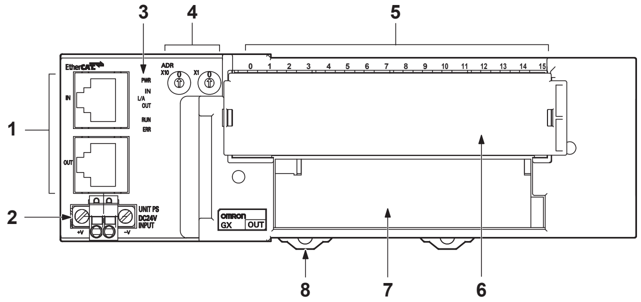
Components and Functions

16 Inputs Terminal GX-ID1611/ID1621
16 Outputs Terminal GX-OD1611/OD1621



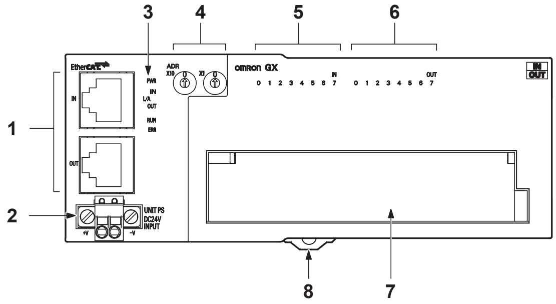
No.	Name	Function
1	Communica-tions connector	(CN IN) Connects the communications cable which comes from the Master Unit side. (CN OUT) Connects the communications cable of the next I/O terminal.
2	Unit Power Supply Connector	Connect the unit power supply (24 VDC).
3	Status indicator	It indicates the communication state and the operation state of I/O terminals.
4	Node address Switch	It sets node addresses of terminals (decimal). Setting range is 00 to 99.
5	Input terminal: Input indicator (0 to 15) Output terminal: Output indicator (0 to 15)	Indicates the state of input/output contact (ON/OFF). Input terminal: Not lit: Contact OFF (input OFF state) Lit in yellow: Contact ON (input ON state) Output terminal: Not lit: Contact OFF (output OFF state) Lit in yellow: Contact ON (output ON state)
6	Terminal Block	Connects external devices and the I/O power supply. V, G: I/O power supply terminals 0 to 15: Input terminals
7	DIN track mounting hook	Fixes a slave to a DIN track.

Relay 16-point Output Terminals GX-OC1601



No.	Name	Function
1	Communica-tions connector	(CN IN) Connects the communications cable which comes from the Master Unit side. (CN OUT) Connects the communications cable of the next I/O terminal.
2	Unit Power Supply Connector	Connect the unit power supply (24 VDC).
3	Status indicator	It indicates the communication state and the operation state of I/O terminals.
4	Node address Switch	It sets node addresses of terminals (decimal). Setting range is 00 to 99.
5	Output indicator (0 to 15)	Indicates the state of output contact (ON/OFF). Not lit: Contact OFF (input OFF state) Lit in yellow: Contact ON (input ON state)
6	Output Relay	Turn ON/OFF the contacts.
7	Terminal Block	Connects external devices and the I/O power supply. COM0, COM1: Common terminals 0 to 15: Output terminals
8	DIN track mounting hook	Fixes a slave to a DIN track.

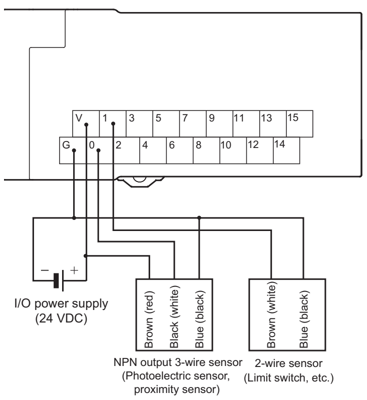
8 Inputs Terminal / 8 Outputs Terminal GX-MD1611/MD1621



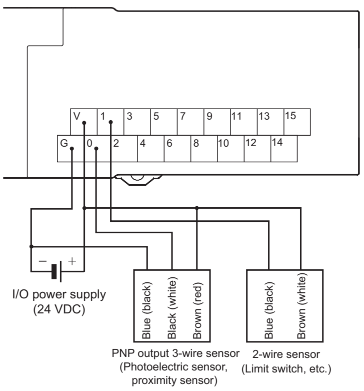
No.	Name	Function
1	Communica-tions connector	(CN IN) Connects the communications cable which comes from the Master Unit side. (CN OUT) Connects the communications cable of the next I/O terminal.
2	Unit Power Supply Connector	Connect the unit power supply (24 VDC).
3	Status indicator	It indicates the communication state and the operation state of I/O terminals.
4	Node address Switch	It sets node addresses of terminals (decimal). Setting range is 00 to 99.
5	Input indicator (0 to 7)	Indicates the state of input contact (ON/OFF). Not lit: Contact OFF (input OFF state) Lit in yellow: Contact ON (input ON state)
6	Output indicator (0 to 7)	Indicates the state of output contact (ON/OFF). Not lit: Contact OFF (output OFF state) Lit in yellow: Contact ON (output ON state)
7	Terminal Block	Connects external devices and the I/O power supply. <Left side> V1, G1: Input I/O terminals 0 to 7: Input terminals <Right side> V2, G2: Output I/O terminals 0 to 7: Output terminals
8	DIN track mounting hook	Fixes a slave to a DIN track.

Wiring

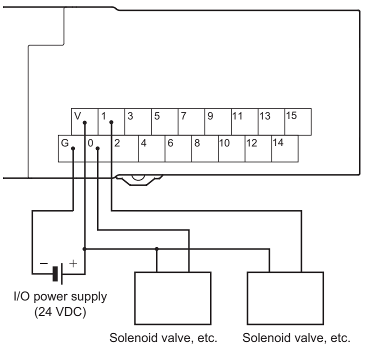
GX-ID1611 (NPN)


V 1 3 5 7 9 11 13 15
G 0 2 4 6 8 10 12 14
− +
I/O power supply
(24 VDC)
Brown (red)
Black (white)
Blue (black)
Brown (white)
Blue (black)
NPN output 3-wire sensor
(Photoelectric sensor,
proximity sensor)
2-wire sensor
(Limit switch, etc.)

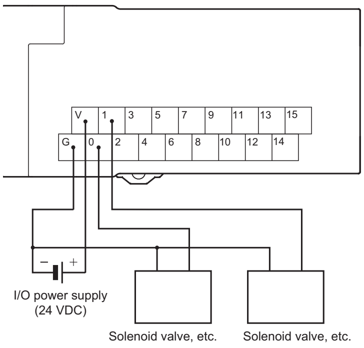
GX-ID1621 (PNP)


V 1 3 5 7 9 11 13 15
G 0 2 4 6 8 10 12 14
− +
I/O power supply
(24 VDC)
Blue (black)
Black (white)
Brown (red)
Blue (black)
Brown (white)
PNP output 3-wire sensor
(Photoelectric sensor,
proximity sensor)
2-wire sensor
(Limit switch, etc.)

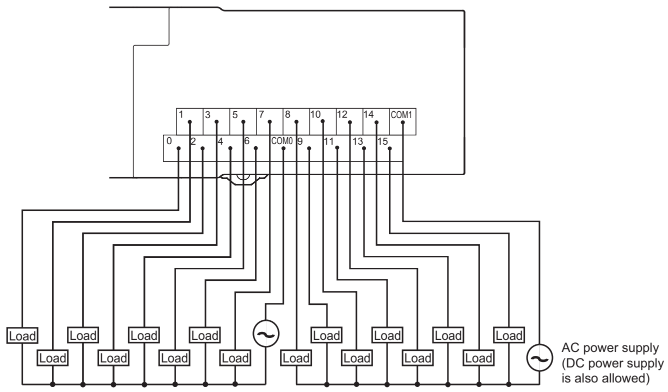
GX-OD1611 (NPN)


V 1 3 5 7 9 11 13 15
G 0 2 4 6 8 10 12 14
− +
I/O power supply
(24 VDC)
Solenoid valve, etc.
Solenoid valve, etc.

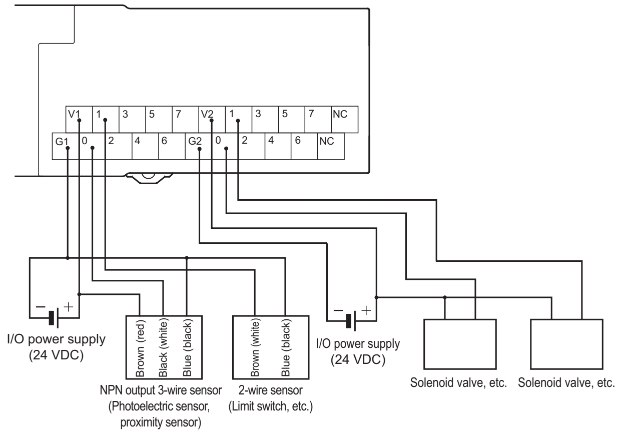
GX-OD1621 (PNP)


V 1 3 5 7 9 11 13 15
G 0 2 4 6 8 10 12 14
− +
I/O power supply
(24 VDC)
Solenoid valve, etc.
Solenoid valve, etc.

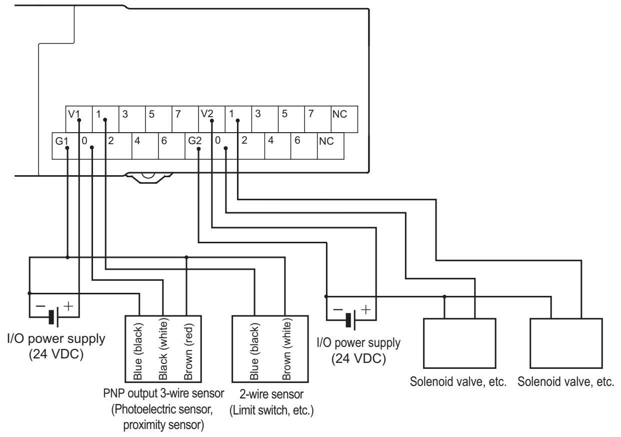
GX-OC1601


1 3 5 7 8 10 12 14 COM1
0 2 4 6 COM0 9 11 13 15
Load
~
AC power supply
(DC power supply
is also allowed)

GX-MD1611 (NPN)


V1 1 3 5 7 V2 1 3 5 7 NC
G1 0 2 4 6 G2 0 2 4 6 NC
− +
I/O power supply
(24 VDC)
Brown (red)
Black (white)
Blue (black)
Brown (white)
Blue (black)
NPN output 3-wire sensor
(Photoelectric sensor,
proximity sensor)
2-wire sensor
(Limit switch, etc.)
− +
I/O power supply
(24 VDC)
Solenoid valve, etc.
Solenoid valve, etc.

GX-MD1621 (PNP)

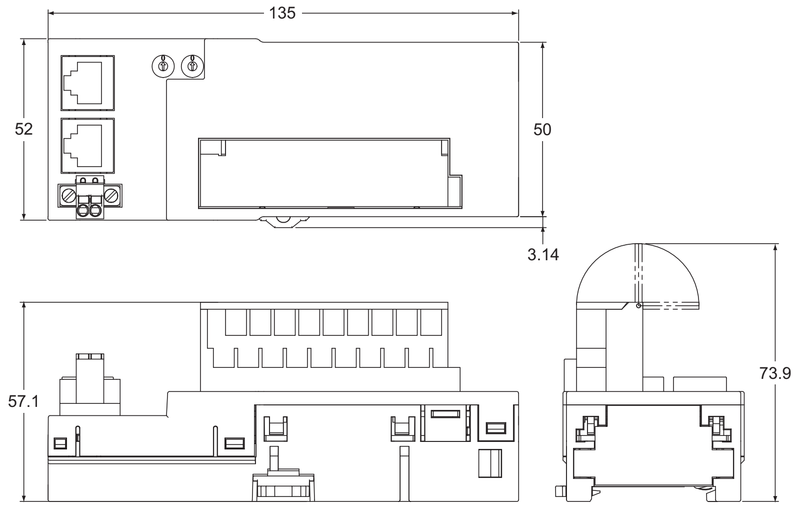

V1 1 3 5 7 V2 1 3 5 7 NC
G1 0 2 4 6 G2 0 2 4 6 NC
− +
I/O power supply
(24 VDC)
Blue (black)
Black (white)
Brown (red)
Blue (black)
Brown (white)
PNP output 3-wire sensor
(Photoelectric sensor,
proximity sensor)
2-wire sensor
(Limit switch, etc.)
− +
I/O power supply
(24 VDC)
Solenoid valve, etc.
Solenoid valve, etc.

Note: Wire colors have been changed according to revisions in the JIS standards for photoelectric and proximity sensors. The colors in parentheses are the wire colors prior to the revisions.

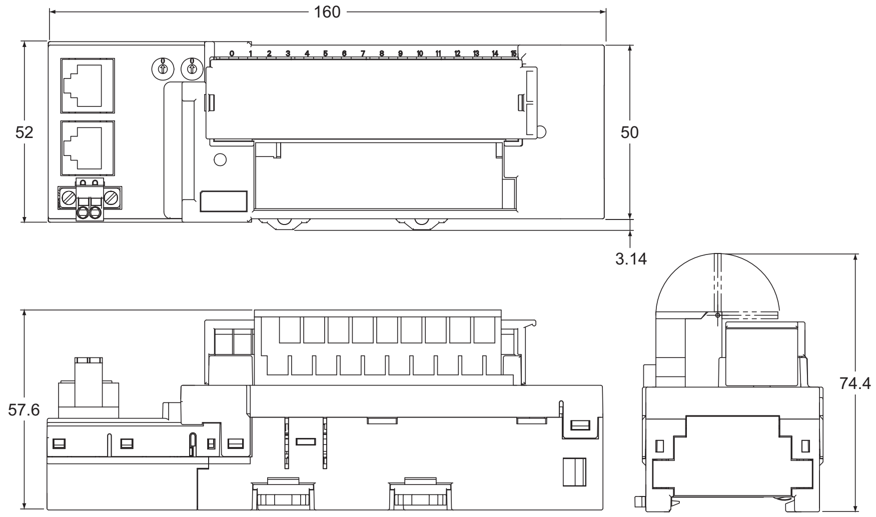
Dimensions

(Unit: mm)

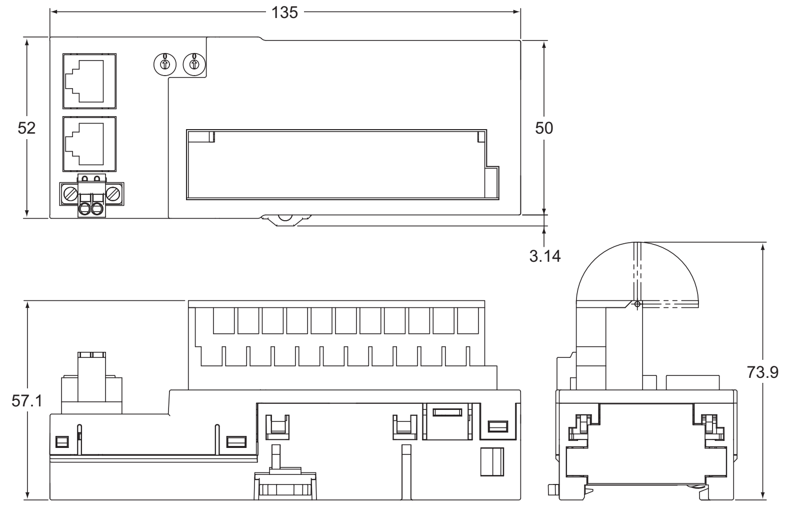
GX-ID1611/ID1621
GX-OD1611/OD1621


135
52
50
3.14
57.1
73.9

GX-OC1601

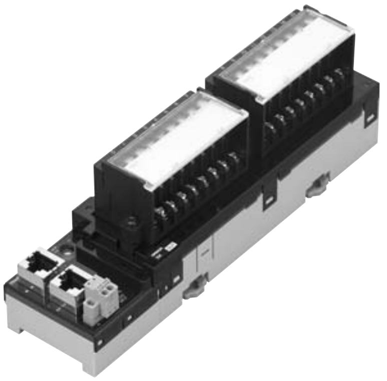

160
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
52
50
3.14
57.6
74.4

GX-MD1611/MD1621


135
52
50
3.14
57.1
73.9

Digital I/O Terminal 3-tier Terminal Block Type
GX-ID16□2/OD16□2/MD16□2

A common terminal is provided for each contact. It eliminate the needs for relay terminal blocks



- It is unnecessary to share the common terminal among multiple contacts.
  Easy-to-find wiring locations.
- Detachable screw terminal block facilitates the maintenance.
- Input response time can be switched for high-speed processing.
- Selectable node address setting methods: setting with rotary switch and with tool software.
  When setting the nodes with rotary switch, setting is easy and node identification becomes possible for maintenance.

General Specifications

For Common Specifications of I/O terminals, refer to page 362.

Input Section Specifications

16-point Input Terminals

Item	Specification	
	GX-ID1612	GX-ID1622
Input capacity	16 points	
Internal I/O common	NPN	PNP
ON voltage	15 VDC min. (between each input terminal and the V terminal)	15 VDC min. (between each input terminal and the G terminal)
OFF voltage	5 VDC max. (between each input terminal and the V terminal)	5 VDC max. (between each input terminal and the G terminal)
OFF current	1.0 mA max.	
Input current	6.0 mA max./input (at 24-VDC) 3.0 mA max./input (at 17-VDC)	
ON delay	0.1 ms max.	
OFF delay	0.2 ms max.	
Input filter value	Without filter, 0.5 ms, 1 ms, 2 ms, 4 ms, 8 ms, 16 ms, 32 ms (Default setting: 1 ms)	
Number of circuits per common	8 points/common	
Input indicators	LED display (yellow)	
Isolation method	Photocoupler isolation	
I/O power supply method	Supply by I/O power supply	
Input device supply current	100 mA/point	
Unit power supply current consumption	90 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
I/O power supply current consumption	5 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
Weight	370 g max.	
Expansion functions	No	
Short-circuit protection function	No	

Note: For the I/O power supply current value to V and G terminals, refer to GX Series Operation Manual (Cat. No. W488).

Output Section Specifications

16-point Output Terminals

Item	Specification	
	GX-OD1612	GX-OD1622
Output capacity	16 points	
Rated current (ON current)	0.5 A/output, 4.0 A/common	
Internal I/O common	NPN	PNP
Residual voltage	1.2 V max. (0.5 ADC, between each output terminal and the G terminal)	1.2 V max. (0.5 ADC, between each output terminal and the V terminal)
Leakage current	0.1 mA max.	
ON delay	0.5 ms max.	
OFF delay	1.5 ms max.	
Number of circuits per common	8 points/common	
Output indicators	LED display (yellow)	
Isolation method	Photocoupler isolation	
I/O power supply method	Supply by I/O power supply	
Output device supply current	100 mA/point	
Unit power supply current consumption	90 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
I/O power supply current consumption	5 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
Weight	370 g max.	
Expansion functions	No	
Output handling for communications errors	Select either hold or clear	
Short-circuit protection function	No	

Note: For the I/O power supply current value to V and G terminals, refer to GX Series Operation Manual (Cat. No. W488).

Input and Output Section Specifications

8-point Input and 8-point output Terminals

General Specifications

Item	Specification	
	GX-MD1612	GX-MD1622
Internal I/O common	NPN	PNP
I/O indicators	LED display (yellow)	
Unit power supply current consumption	90 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
Weight	370 g max.	
Expansion functions	No	
Short-circuit protection function	No	

Input Section

Item	Specification	
	GX-MD1612	GX-MD1622
Input capacity	8 points	
ON voltage	15 VDC min. (between each input terminal and the V terminal)	15 VDC min. (between each input terminal and the G terminal)
OFF voltage	5 VDC max. (between each input terminal and the V terminal)	5 VDC max. (between each input terminal and the G terminal)
OFF current	1.0 mA max./input	
Input current	6.0 mA max./input (at 24-VDC) 3.0 mA max./input (at 17-VDC)	
ON delay	0.1 ms max.	
OFF delay	0.2 ms max.	
Input filter value	Without filter, 0.5 ms, 1 ms, 2 ms, 4 ms, 8 ms, 16 ms, 32 ms (Default setting: 1 ms)	
Number of circuits per common	8 points/common	
Isolation method	Photocoupler isolation	
I/O power supply method	Supply by I/O power supply	
Input device supply current	100 mA/point	
I/O power supply current consumption	5 mA max. (for 20.4 to 26.4-VDC power supply voltage)	

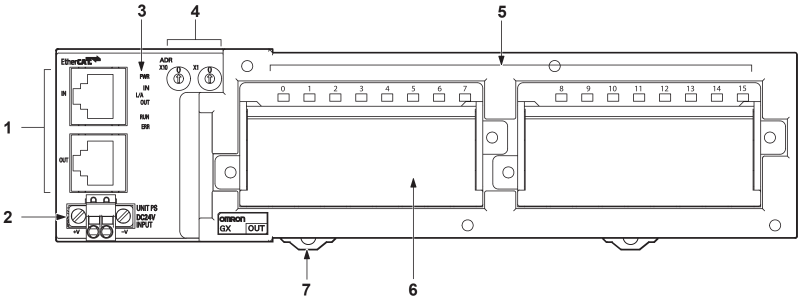
Output Section

Item	Specification	
	GX-MD1612	GX-MD1622
Output capacity	8 points	
Rated output current	0.5 A/output, 2.0 A/common	
Residual voltage	1.2 V max. (0.5 ADC, between each output terminal and the G terminal)	1.2 V max. (0.5 ADC, between each output terminal and the V terminal)
Leakage current	0.1 mA max.	
ON delay	0.5 ms max.	
OFF delay	1.5 ms max.	
Number of circuits per common	8 points/common	
Isolation method	Photocoupler isolation	
I/O power supply method	Supply by I/O power supply	
Output device supply current	100 mA/point	
I/O power supply current consumption	5 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
Output handling for communications errors	Select either hold or clear	

Note: For the I/O power supply current value to V and G terminals, refer to GX-Series Operation Manual (Cat. No. W488).

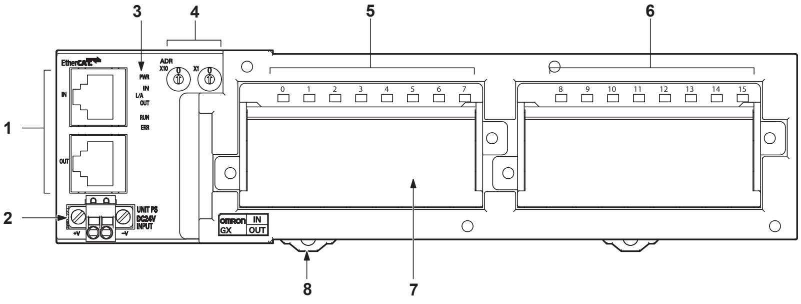
Components and Functions

16 Inputs Terminal GX-ID1612/ID1622
16 Outputs Terminal GX-OD1612/OD1622



No.	Name	Function
1	Communications connector	(CN IN) Connects the communications cable which comes from the Master Unit side. (CN OUT) Connects the communications cable of the next I/O terminal.
2	Unit Power Supply Connector	Connect the unit power supply (24 VDC).
3	Status indicator	It indicates the communication state and the operation state of I/O terminals.
4	Node address Switch	It sets node addresses of terminals (decimal). Setting range is 00 to 99.
5	Input terminal: Input indicator (0 to 15) Output terminal: Output indicator (0 to 15)	Indicates the state of input/output contact (ON/OFF). Input terminal: Not lit: Contact OFF (input OFF state) Lit in yellow: Contact ON (input ON state) Output terminal: Not lit: Contact OFF (output OFF state) Lit in yellow: Contact ON (output ON state)
6	Terminal Block	Connects external devices and the I/O power supply. <Left side> V1, G1: I/O power supply terminals 0 to 7: Input terminals (Output terminals) <Right side> V2, G2: I/O power supply terminals 8 to 15: Input terminals (Output terminals)
7	DIN track mounting hook	Fixes a slave to a DIN track.

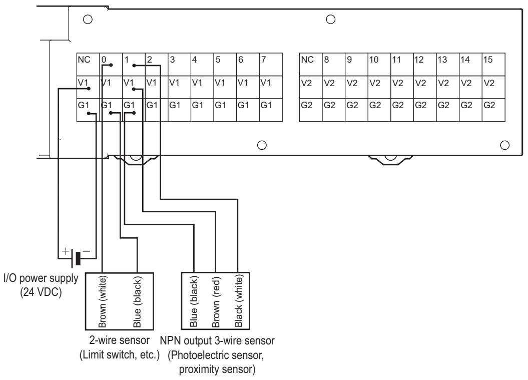
8 Inputs Terminal / 8 Outputs Terminal GX-MD1612/MD1622



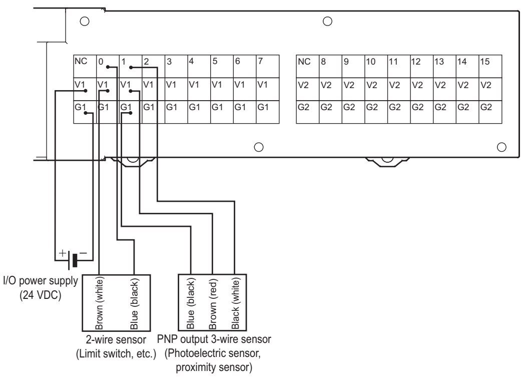
No.	Name	Function
1	Communications connector	(CN IN) Connects the communications cable which comes from the Master Unit side. (CN OUT) Connects the communications cable of the next I/O terminal.
2	Unit Power Supply Connector	Connect the unit power supply (24 VDC).
3	Status indicator	It indicates the communication state and the operation state of I/O terminals.
4	Node address Switch	It sets node addresses of terminals (decimal). Setting range is 00 to 99.
5	Input indicator (0 to 7)	Indicates the state of input contact (ON/OFF). Not lit: Contact OFF (input OFF state) Lit in yellow: Contact ON (input ON state)
6	Output indicator (0 to 7)	Indicates the state of output contact (ON/OFF). Not lit: Contact OFF (output OFF state) Lit in yellow: Contact ON (output ON state)
7	Terminal Block	Connects external devices and the I/O power supply. <Left side> V1, G1: Input I/O puwer supply terminals 0 to 7: Input terminals <Right side> V2, G2: Output I/O power supply terminals 0 to 7: Output terminals
8	DIN track mounting hook	Fixes a slave to a DIN track.

Wiring

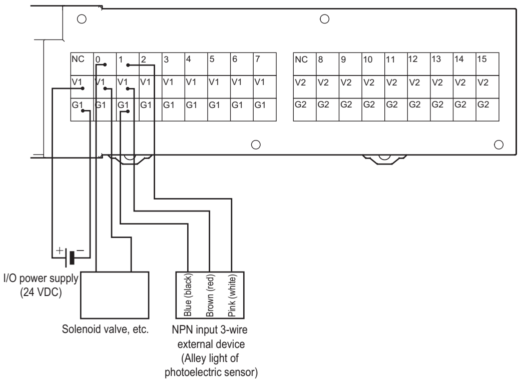
GX-ID1612 (NPN)


NC 0 1 2 3 4 5 6 7
V1 V1 V1 V1 V1 V1 V1 V1 V1
G1 G1 G1 G1 G1 G1 G1 G1 G1
NC 8 9 10 11 12 13 14 15
V2 V2 V2 V2 V2 V2 V2 V2 V2
G2 G2 G2 G2 G2 G2 G2 G2 G2
I/O power supply (24 VDC)
Brown (white)
Blue (black)
Blue (black)
Brown (red)
Black (white)
2-wire sensor (Limit switch, etc.)
NPN output 3-wire sensor (Photoelectric sensor, proximity sensor)

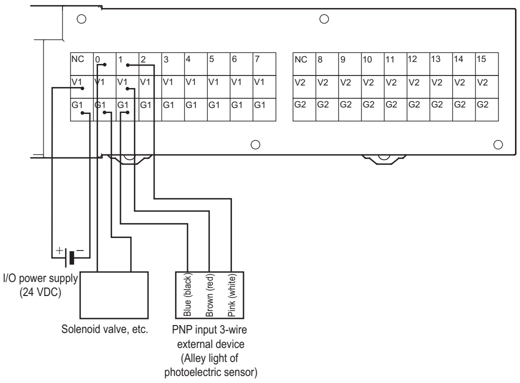
GX-ID1622 (PNP)


NC 0 1 2 3 4 5 6 7
V1 V1 V1 V1 V1 V1 V1 V1 V1
G1 G1 G1 G1 G1 G1 G1 G1 G1
NC 8 9 10 11 12 13 14 15
V2 V2 V2 V2 V2 V2 V2 V2 V2
G2 G2 G2 G2 G2 G2 G2 G2 G2
I/O power supply (24 VDC)
Brown (white)
Blue (black)
Blue (black)
Brown (red)
Black (white)
2-wire sensor (Limit switch, etc.)
PNP output 3-wire sensor (Photoelectric sensor, proximity sensor)

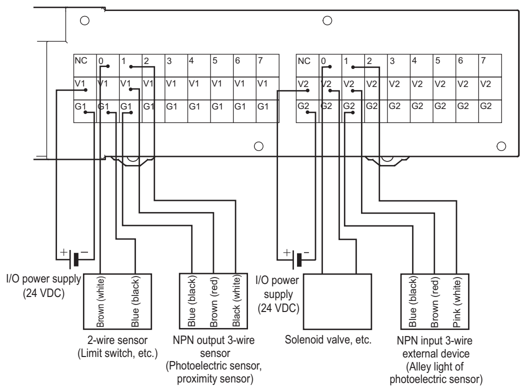
GX-OD1612 (NPN)


NC 0 1 2 3 4 5 6 7
V1 V1 V1 V1 V1 V1 V1 V1 V1
G1 G1 G1 G1 G1 G1 G1 G1 G1
NC 8 9 10 11 12 13 14 15
V2 V2 V2 V2 V2 V2 V2 V2 V2
G2 G2 G2 G2 G2 G2 G2 G2 G2
I/O power supply (24 VDC)
Blue (black)
Brown (red)
Pink (white)
Solenoid valve, etc.
NPN input 3-wire external device (Alley light of photoelectric sensor)

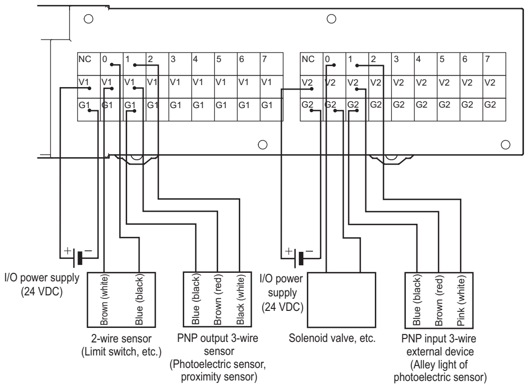
GX-OD1622 (PNP)


NC 0 1 2 3 4 5 6 7
V1 V1 V1 V1 V1 V1 V1 V1 V1
G1 G1 G1 G1 G1 G1 G1 G1 G1
NC 8 9 10 11 12 13 14 15
V2 V2 V2 V2 V2 V2 V2 V2 V2
G2 G2 G2 G2 G2 G2 G2 G2 G2
I/O power supply (24 VDC)
Blue (black)
Brown (red)
Pink (white)
Solenoid valve, etc.
PNP input 3-wire external device (Alley light of photoelectric sensor)

GX-MD1612 (NPN)


NC 0 1 2 3 4 5 6 7
V1 V1 V1 V1 V1 V1 V1 V1 V1
G1 G1 G1 G1 G1 G1 G1 G1 G1
NC 0 1 2 3 4 5 6 7
V2 V2 V2 V2 V2 V2 V2 V2 V2
G2 G2 G2 G2 G2 G2 G2 G2 G2
I/O power supply (24 VDC)
Brown (white)
Blue (black)
Blue (black)
Brown (red)
Black (white)
I/O power supply (24 VDC)
Blue (black)
Brown (red)
Pink (white)
2-wire sensor (Limit switch, etc.)
NPN output 3-wire sensor (Photoelectric sensor, proximity sensor)
Solenoid valve, etc.
NPN input 3-wire external device (Alley light of photoelectric sensor)

GX-MD1622 (PNP)

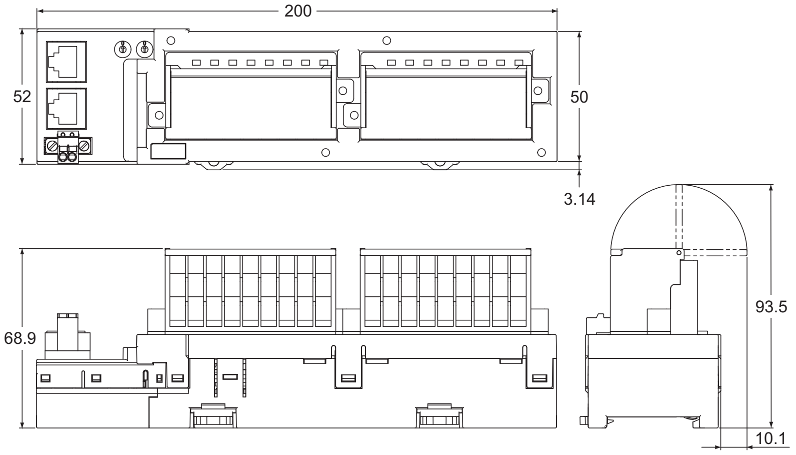

NC 0 1 2 3 4 5 6 7
V1 V1 V1 V1 V1 V1 V1 V1 V1
G1 G1 G1 G1 G1 G1 G1 G1 G1
NC 0 1 2 3 4 5 6 7
V2 V2 V2 V2 V2 V2 V2 V2 V2
G2 G2 G2 G2 G2 G2 G2 G2 G2
I/O power supply (24 VDC)
Brown (white)
Blue (black)
Blue (black)
Brown (red)
Black (white)
I/O power supply (24 VDC)
Blue (black)
Brown (red)
Pink (white)
2-wire sensor (Limit switch, etc.)
PNP output 3-wire sensor (Photoelectric sensor, proximity sensor)
Solenoid valve, etc.
PNP input 3-wire external device (Alley light of photoelectric sensor)

Note: Wire colors have been changed according to revisions in the JIS standards for photoelectric and proximity sensors.
The colors in parentheses are the wire colors prior to the revisions.

Dimensions

(Unit: mm)

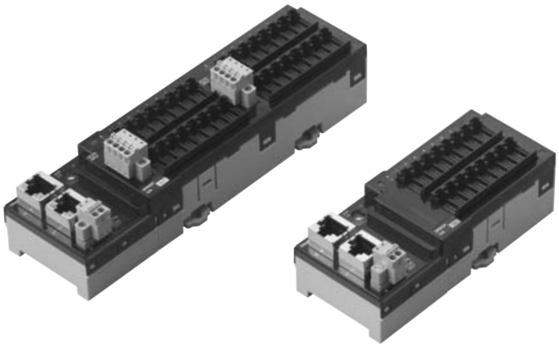
GX-ID1612/ID1622
GX-OD1612/OD1622
GX-MD1612/MD1622


200
52
50
3.14
68.9
93.5
10.1

Digital I/O Terminal e-CON Connector Type

GX-□D16□8/□D32□8

Easy wiring using industry standard e-CON connectors. Special wiring tool is not necessary



- Digital I/O terminal with industry standard e-CON connectors.
- A common terminal is provided for each connector.
  The I/O terminal and the sensors can be connected directly.
- Input response time can be switched for high-speed processing.
- Selectable node address setting methods: setting with rotary switch and with tool software.
  When setting the nodes with rotary switch, setting is easy and node identification becomes possible for maintenance.

General Specifications

For Common Specifications of I/O terminals, refer to page 362.

Input Section Specifications

16-point Input Terminals

Item	Specification	
	GX-ID1618	GX-ID1628
Input capacity	16 points	
Internal I/O common	NPN	PNP
ON voltage	15 VDC min. (between each input terminal and the V terminal)	15 VDC min. (between each input terminal and the G terminal)
OFF voltage	5 VDC max. (between each input terminal and the V terminal)	5 VDC max. (between each input terminal and the G terminal)
OFF current	1.0 mA max.	
Input current	6.0 mA max./input (at 24-VDC) 3.0 mA max./input (at 17-VDC)	
ON delay	0.1 ms max.	
OFF delay	0.2 ms max.	
Input filter value	Without filter, 0.5 ms, 1 ms, 2 ms, 4 ms, 8 ms, 16 ms, 32 ms (Default setting: 1 ms)	
Number of circuits per common	16 points/common	
Input indicators	LED display (yellow)	
Isolation method	No isolation	
I/O power supply method	Supplied from unit power supply	
Input device supply current	50 mA/point	
Unit power supply current consumption	150 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
Weight	140 g max.	
Expansion functions	No	
Short-circuit protection function	Available (Operates at 50 mA/point min.)	

Note: For the I/O power supply current value to V and G terminals, refer to GX Series Operation Manual (Cat. No. W488).

32-point Input Terminals

Item	Specification	
	GX-ID3218	GX-ID3228
Input capacity	32 points	
Internal I/O common	NPN	PNP
ON voltage	15 VDC min. (between each input terminal and the V terminal)	15 VDC min. (between each input terminal and the G terminal)
OFF voltage	5 VDC max. (between each input terminal and the V terminal)	5 VDC max. (between each input terminal and the G terminal)
OFF current	1.0 mA max.	
Input current	6.0 mA max./input (at 24-VDC) 3.0 mA max./input (at 17-VDC)	
ON delay	0.1 ms max.	
OFF delay	0.2 ms max.	
Input filter value	Without filter, 0.5 ms, 1 ms, 2 ms, 4 ms, 8 ms, 16 ms, 32 ms (Default setting: 1 ms)	
Number of circuits per common	32 points/common	
Input indicators	LED display (yellow)	
Isolation method	No isolation	
I/O power supply method	Supplied from unit power supply	
Input device supply current	50 mA/point	
Unit power supply current consumption	230 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
Weight	220 g max.	
Expansion functions	No	
Short-circuit protection function	Available (Operates at 50 mA/point min.)	

Note: For the I/O power supply current value to V and G terminals, refer to GX Series Operation Manual (Cat. No. W488).

Output Section Specifications

16-point Output Terminals

Item	Specification	
	GX-OD1618	GX-OD1628
Output capacity	16 points	
Rated current (ON current)	0.5 A/output, 4.0 A/common	
Internal I/O common	NPN	PNP
Residual voltage	1.2 V max. (0.5 ADC, between each output terminal and the G terminal)	1.2 V max. (0.5 ADC, between each output terminal and the V terminal)
Leakage current	0.1 mA max.	
ON delay	0.5 ms max.	
OFF delay	1.5 ms max.	
Number of circuits per common	16 points/common	
Output indicators	LED display (yellow)	
Isolation method	Photocoupler isolation	
I/O power supply method	Supply by I/O power supply	
Output device supply current	100 mA/point	
Unit power supply current consumption	80 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
Weight	130 g max.	
Expansion functions	No	
Output handling for communications errors	Select either hold or clear	
Short-circuit protection function	No	

Note: For the I/O power supply current value to V and G terminals, refer to GX Series Operation Manual (Cat. No. W488).

32-point Output Terminals

Item	Specification	
	GX-OD3218	GX-OD3228
Output capacity	32 points	
Rated current (ON current)	0.5 A/output, 4.0 A/common	
Internal I/O common	NPN	PNP
Residual voltage	1.2 V max. (0.5 ADC, between each output terminal and the G terminal)	1.2 V max. (0.5 ADC, between each output terminal and the V terminal)
Leakage current	0.1 mA max.	
ON delay	0.5 ms max.	
OFF delay	1.5 ms max.	
Number of circuits per common	16 points/common	
Output indicators	LED display (yellow)	
Isolation method	Photocoupler isolation	
I/O power supply method	Supply by I/O power supply	
Output device supply current	100 mA/point	
Unit power supply current consumption	100 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
Weight	210 g max.	
Expansion functions	No	
Output handling for communications errors	Select either hold or clear	
Short-circuit protection function	No	

Note: For the I/O power supply current value to V and G terminals, refer to GX Series Operation Manual (Cat. No. W488).

Input and Output Section Specifications

8-point Input and 8-point output Terminals

General Specifications

Item	Specification	
	GX-MD1618	GX-MD1628
Internal I/O common	NPN	PNP
I/O indicators	LED display (yellow)	
Unit power supply current consumption	120 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
Weight	140 g max.	
Expansion functions	No	
Short-circuit protection function	Available at input section only (Operates at 50 mA/point min.)	

Input Section

Item	Specification	
	GX-MD1618	GX-MD1628
Input capacity	8 points	
ON voltage	15 VDC min. (between each input terminal and the V terminal)	15 VDC min. (between each input terminal and the G terminal)
OFF voltage	5 VDC max. (between each input terminal and the V terminal)	5 VDC max. (between each input terminal and the G terminal)
OFF current	1.0 mA max.	
Input current	6.0 mA max./input (at 24-VDC) 3.0 mA max./input (at 17-VDC)	
ON delay	0.1 ms max.	
OFF delay	0.2 ms max.	
Input filter value	Without filter, 0.5 ms, 1 ms, 2 ms, 4 ms, 8 ms, 16 ms, 32 ms (Default setting: 1 ms)	
Number of circuits per common	8 points/common	
Isolation method	No-isolation	
I/O power supply method	Supplied from unit power supply	
Input device supply current	50 mA/point	
I/O power supply current consumption	5 mA max. (for 20.4 to 26.4-VDC power supply voltage)	

Output Section

Item	Specification	
	GX-MD1618	GX-MD1628
Output capacity	8 points	
Rated output current	0.5 A/output, 2.0 A/common	
Residual voltage	1.2 V max. (0.5 ADC, between each output terminal and the G terminal)	1.2 V max. (0.5 ADC, between each output terminal and the V terminal)
Leakage current	0.1 mA max.	
ON delay	0.5 ms max.	
OFF delay	1.5 ms max.	
Number of circuits per common	8 points/common	
Isolation method	Photocoupler isolation	
I/O power supply method	Supply by I/O power supply	
Output device supply current	100 mA/point	
I/O power supply current consumption	5 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
Output handling for communications errors	Select either hold or clear	

Note: For the I/O power supply current value to V and G terminals, refer to GX Series Operation Manual (Cat. No. W488).

16-point Input and 16-point output Terminals

General Specifications

Item	Specification	
	GX-MD3218	GX-MD3228
Internal I/O common	NPN	PNP
I/O indicators	LED display (yellow)	
Unit power supply current consumption	140 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
Weight	220 g max.	
Expansion functions	No	
Short-circuit protection function	Available at input section only (Operates at 50 mA/point min.)	

Input Section

Item	Specification	
	GX-MD3218	GX-MD3228
Input capacity	16 points	
ON voltage	15 VDC min. (between each input terminal and the V terminal)	15 VDC min. (between each input terminal and the G terminal)
OFF voltage	5 VDC max. (between each input terminal and the V terminal)	5 VDC max. (between each input terminal and the G terminal)
OFF current	1.0 mA max.	
Input current	6.0 mA max./input (at 24-VDC) 3.0 mA max./input (at 17-VDC)	
ON delay	0.1 ms max.	
OFF delay	0.2 ms max.	
Input filter value	Without filter, 0.5 ms, 1 ms, 2 ms, 4 ms, 8 ms, 16 ms, 32 ms (Default setting: 1 ms)	
Number of circuits per common	16 points/common	
Isolation method	No-isolation	
I/O power supply method	Supplied from unit power supply	
Input device supply current	50 mA/point	
I/O power supply current consumption	5 mA max. (for 20.4 to 26.4-VDC power supply voltage)	

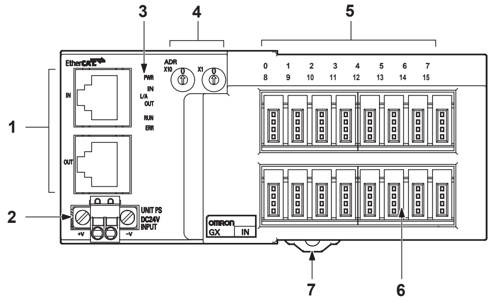
Output Section

Item	Specification	
	GX-MD3218	GX-MD3228
Output capacity	16 points	
Rated output current	0.5 A/output, 2.0 A/common	
Residual voltage	1.2 V max. (0.5 ADC, between each output terminal and the G terminal)	1.2 V max. (0.5 ADC, between each output terminal and the V terminal)
Leakage current	0.1 mA max.	
ON delay	0.5 ms max.	
OFF delay	1.5 ms max.	
Number of circuits per common	16 points/common	
Isolation method	Photocoupler isolation	
I/O power supply method	Supply by I/O power supply	
Output device supply current	100 mA/point	
I/O power supply current consumption	5 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
Output handling for communications errors	Select either hold or clear	

Note: For the I/O power supply current value to V and G terminals, refer to GX Series Operation Manual (Cat. No. W488).

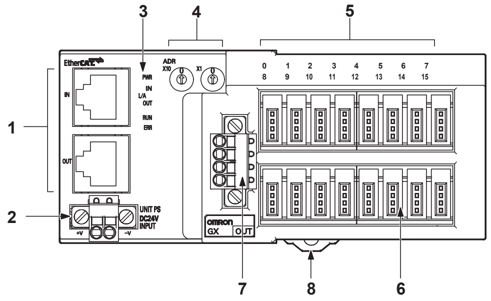
Components and Functions

16 Inputs Terminal GX-ID1618/ID1628


3
4
5
1
2
7
6
EtherCAT
IN
OUT
ADR
X10
X1
PWR
L/A
RUN
ERR
UNIT PS
DC24V
INPUT
+V
−V
omron
GX
IN
0 1 2 3 4 5 6 7
8 9 10 11 12 13 14 15

No.	Name	Function
1	Communications connector	(CN IN) Connects the communications cable which comes from the Master Unit side. (CN OUT) Connects the communications cable of the next I/O terminal.
2	Unit Power Supply Connector	Connect the unit power supply (24 VDC).
3	Status indicator	It indicates the communication state and the operation state of I/O terminals.
4	Node address Switch	It sets node addresses of terminals (decimal). Setting range is 00 to 99.
5	Input indicator (0 to 15)	Indicates the state of input contact (ON/OFF). Not lit: Contact OFF (input OFF state) Lit in yellow: Contact ON (input ON state)
6	I/O connector (0 to 15)	Connects an external device.
7	DIN track mounting hook	Fixes a slave to a DIN track.

16 Outputs Terminal GX-OD1618/OD1628


3
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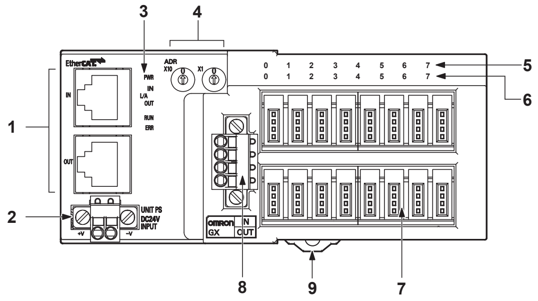
5
1
2
7
8
6
EtherCAT
IN
OUT
ADR
X10
X1
PWR
L/A
RUN
ERR
UNIT PS
DC24V
INPUT
+V
−V
omron
GX
OUT
0 1 2 3 4 5 6 7
8 9 10 11 12 13 14 15

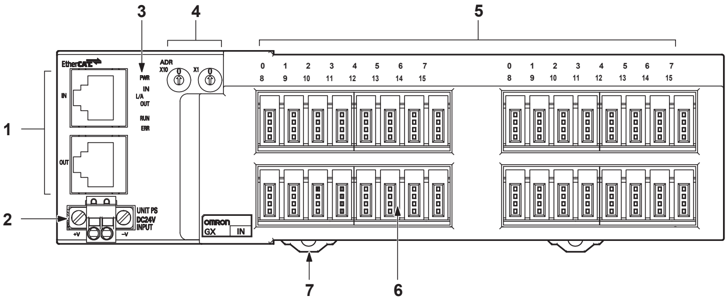
No.	Name	Function
1	Communications connector	(CN IN) Connects the communications cable which comes from the Master Unit side. (CN OUT) Connects the communications cable of the next I/O terminal.
2	Unit Power Supply Connector	Connect the unit power supply (24 VDC).
3	Status indicator	It indicates the communication state and the operation state of I/O terminals.
4	Node address Switch	It sets node addresses of terminals (decimal). Setting range is 00 to 99.
5	Output indicator (0 to 15)	Indicates the state of output contact (ON/OFF). Not lit: Contact OFF (output OFF state) Lit in yellow: Contact ON (output ON state)
6	I/O connector (0 to 15)	Connects an external device.
7	I/O power supply connector	Supplies the I/O power.
8	DIN track mounting hook	Fixes a slave to a DIN track.

8 Inputs/8 Outputs Terminal GX-MD1618/MD1628


3
4
5
6
1
2
8
9
7
EtherCAT
IN
OUT
ADR
X10
X1
PWR
L/A
RUN
ERR
UNIT PS
DC24V
INPUT
+V
−V
omron
GX
IN
OUT
0 1 2 3 4 5 6 7
0 1 2 3 4 5 6 7

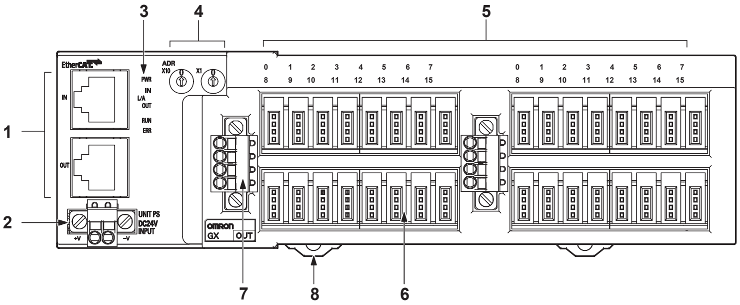
No.	Name	Function
1	Communications connector	(CN IN) Connects the communications cable which comes from the Master Unit side. (CN OUT) Connects the communications cable of the next I/O terminal.
2	Unit Power Supply Connector	Connect the unit power supply (24 VDC).
3	Status indicator	It indicates the communication state and the operation state of I/O terminals.
4	Node address Switch	It sets node addresses of terminals (decimal). Setting range is 00 to 99.
5	Input indicator (0 to 7)	Indicates the state of input contact (ON/OFF). Not lit: Contact OFF (input OFF state) Lit in yellow: Contact ON (input ON state)
6	Output indicator (0 to 7)	Indicates the state of output contact (ON/OFF). Not lit: Contact OFF (output OFF state) Lit in yellow: Contact ON (output ON state)
7	I/O connector (0 to 15)	Connects an external device. <Top side> For input device <Bottom side> For output device
8	I/O power supply connector	Supplies the I/O power. (For output device)
9	DIN track mounting hook	Fixes a slave to a DIN track.

32 Inputs Terminal GX-ID3218/ID3228


3
4
5
1
2
7
6
EtherCAT
ADR X10
X1
PWR
L/A IN
L/A OUT
RUN
ERR
IN
OUT
UNIT PS DC24V INPUT
+V
−V
omron GX IN
0 1 2 3 4 5 6 7
8 9 10 11 12 13 14 15

No.	Name	Function
1	Communications connector	(CN IN) Connects the communications cable which comes from the Master Unit side. (CN OUT) Connects the communications cable of the next I/O terminal.
2	Unit Power Supply Connector	Connect the unit power supply (24 VDC).
3	Status indicator	It indicates the communication state and the operation state of I/O terminals.
4	Node address Switch	It sets node addresses of terminals (decimal). Setting range is 00 to 99.
5	Input indicator (IN1 0 to 15, IN2 0 to 15)	Indicates the state of input contact (ON/OFF). Input terminal: Not lit: Contact OFF (input OFF state) Lit in yellow: Contact ON (input ON state)
6	I/O connector (0 to 15× 2)	Connects an external device.
7	DIN track mounting hook	Fixes a slave to a DIN track.

32 Outputs Terminal GX-OD3218/OD3228


3
4
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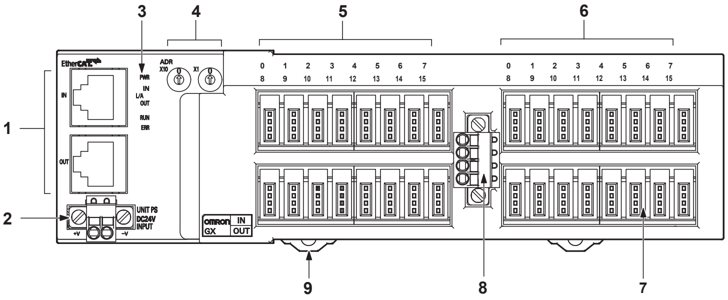
1
2
7
8
6
EtherCAT
ADR X10
X1
PWR
L/A IN
L/A OUT
RUN
ERR
IN
OUT
UNIT PS DC24V INPUT
+V
−V
omron GX OUT
0 1 2 3 4 5 6 7
8 9 10 11 12 13 14 15

No.	Name	Function
1	Communications connector	(CN IN) Connects the communications cable which comes from the Master Unit side. (CN OUT) Connects the communications cable of the next I/O terminal.
2	Unit Power Supply Connector	Connect the unit power supply (24 VDC).
3	Status indicator	It indicates the communication state and the operation state of I/O terminals.
4	Node address Switch	It sets node addresses of terminals (decimal). Setting range is 00 to 99.
5	Output indicator (OUT1 0 to 15, OUT2 0 to 15)	Indicates the state of output contact (ON/OFF). Not lit: Contact OFF (output OFF state) Lit in yellow: Contact ON (output ON state)
6	I/O connector (0 to 15 × 2)	Connects an external device.
7	I/O power supply connector	Supplies the I/O power.
8	DIN track mounting hook	Fixes a slave to a DIN track.

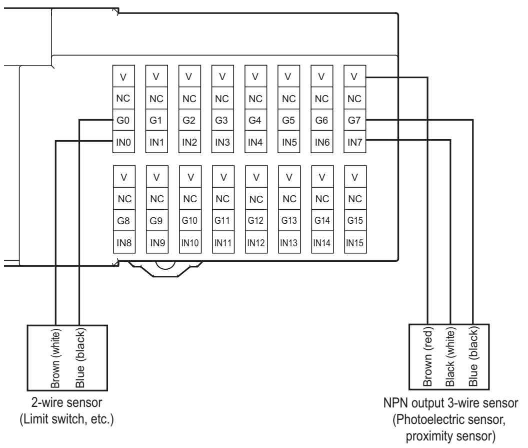
16 Inputs/16 Outputs Terminal GX-MD3218/MD3228


3
4
5
6
1
2
9
8
7
EtherCAT
ADR X10
X1
PWR
L/A IN
L/A OUT
RUN
ERR
IN
OUT
UNIT PS DC24V INPUT
+V
−V
omron GX IN OUT
0 1 2 3 4 5 6 7
8 9 10 11 12 13 14 15

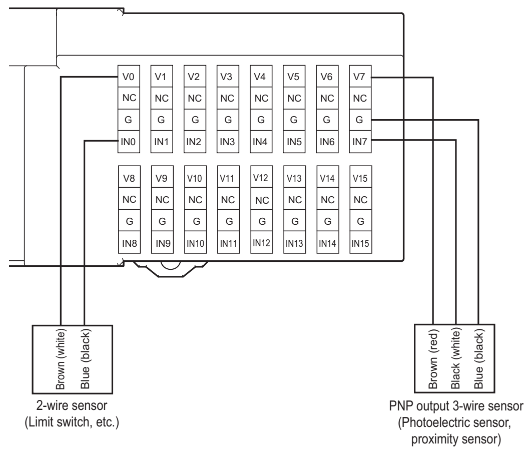
No.	Name	Function
1	Communications connector	(CN IN) Connects the communications cable which comes from the Master Unit side. (CN OUT) Connects the communications cable of the next I/O terminal.
2	Unit Power Supply Connector	Connect the unit power supply (24 VDC).
3	Status indicator	It indicates the communication state and the operation state of I/O terminals.
4	Node address Switch	It sets node addresses of terminals (decimal). Setting range is 00 to 99.
5	Input indicator (0 to 15)	Indicates the state of input contact (ON/OFF). Not lit: Contact OFF (input OFF state) Lit in yellow: Contact ON (input ON state)
6	Output indicator (0 to 15)	Indicates the state of output contact (ON/OFF). Not lit: Contact OFF (output OFF state) Lit in yellow: Contact ON (output ON state)
7	I/O connector (0 to 15 × 2)	Connects an external device. <Top side> For input device <Bottom side> For output device
8	I/O power supply connector	Supplies the I/O power. (For output device)
9	DIN track mounting hook	Fixes a slave to a DIN track.

Wiring

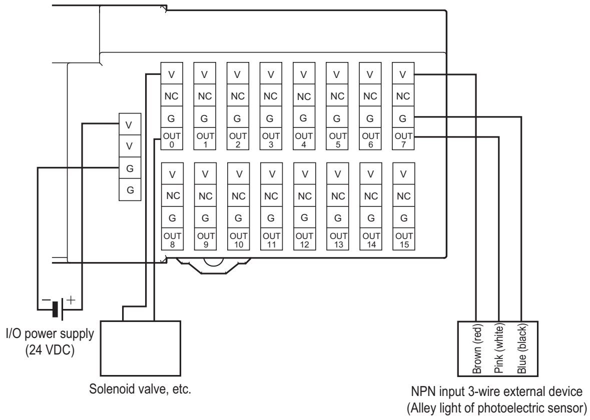
GX-ID1618 (NPN)


V
NC
G0
IN0
IN7
G8
IN8
IN15
Brown (white)
Blue (black)
2-wire sensor
(Limit switch, etc.)
Brown (red)
Black (white)
Blue (black)
NPN output 3-wire sensor
(Photoelectric sensor,
proximity sensor)

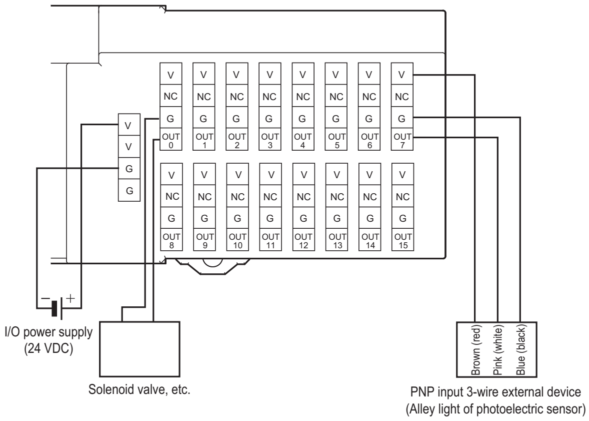
GX-ID1628 (PNP)


V0
NC
G
IN0
V15
IN15
Brown (white)
Blue (black)
2-wire sensor
(Limit switch, etc.)
Brown (red)
Black (white)
Blue (black)
PNP output 3-wire sensor
(Photoelectric sensor,
proximity sensor)

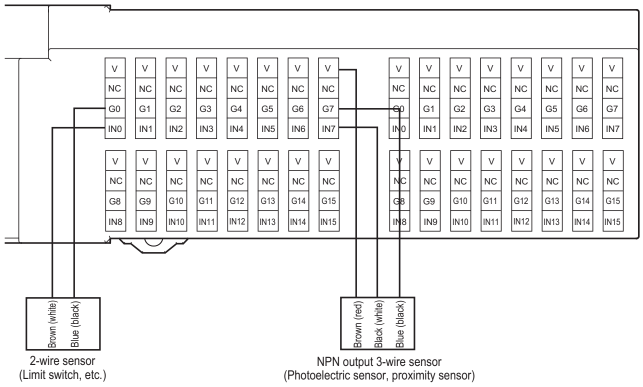
GX-OD1618 (NPN)


V
NC
G
OUT 0
OUT 15
I/O power supply
(24 VDC)
Solenoid valve, etc.
Brown (red)
Pink (white)
Blue (black)
NPN input 3-wire external device
(Alley light of photoelectric sensor)

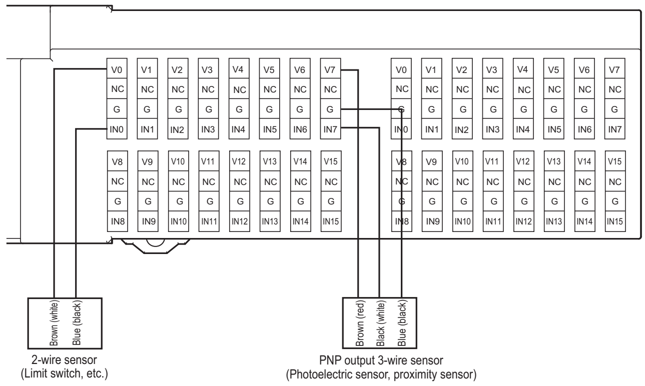
GX-OD1628 (PNP)


V
NC
G
OUT 0
OUT 15
I/O power supply
(24 VDC)
Solenoid valve, etc.
Brown (red)
Pink (white)
Blue (black)
PNP input 3-wire external device
(Alley light of photoelectric sensor)

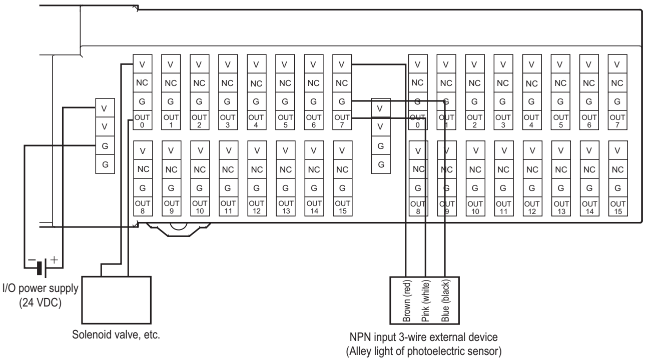
GX-ID3218 (NPN)


V
NC
G0
IN0
G15
IN15
Brown (white)
Blue (black)
2-wire sensor
(Limit switch, etc.)
Brown (red)
Black (white)
Blue (black)
NPN output 3-wire sensor
(Photoelectric sensor, proximity sensor)

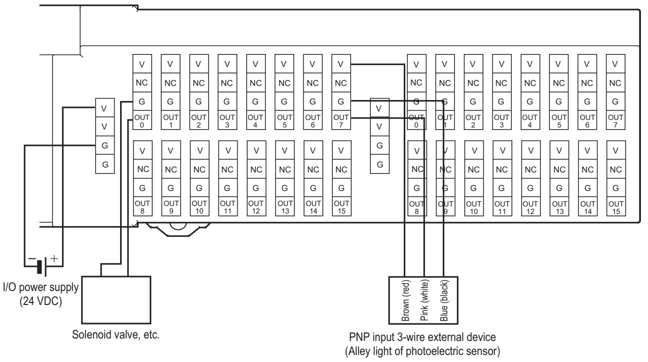
GX-ID3228 (PNP)


V0
NC
G
IN0
V15
IN15
Brown (white)
Blue (black)
2-wire sensor
(Limit switch, etc.)
Brown (red)
Black (white)
Blue (black)
PNP output 3-wire sensor
(Photoelectric sensor, proximity sensor)

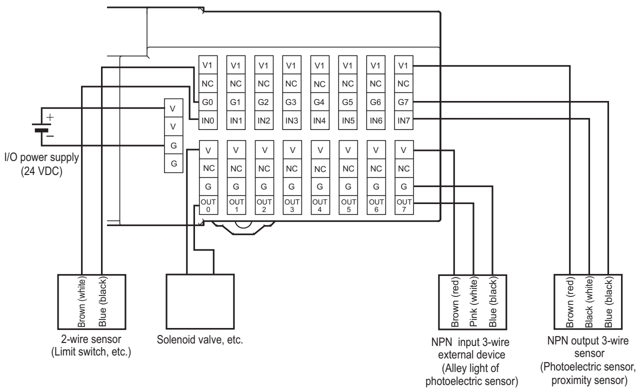
GX-OD3218 (NPN)


V
NC
G
OUT 0
OUT 15
I/O power supply
(24 VDC)
Solenoid valve, etc.
Brown (red)
Pink (white)
Blue (black)
NPN input 3-wire external device
(Alley light of photoelectric sensor)

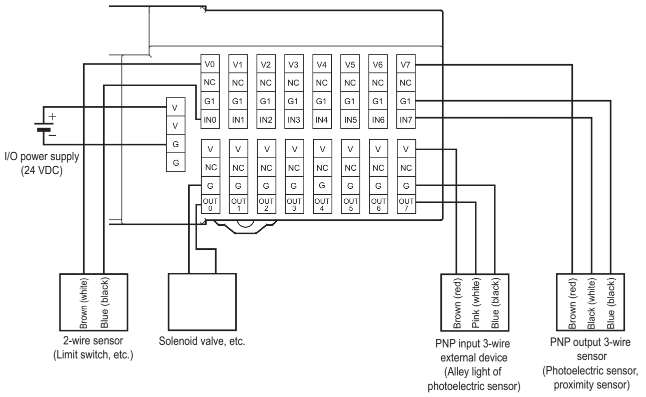
GX-OD3228 (PNP)


V
NC
G
OUT 0
OUT 15
I/O power supply
(24 VDC)
Solenoid valve, etc.
Brown (red)
Pink (white)
Blue (black)
PNP input 3-wire external device
(Alley light of photoelectric sensor)

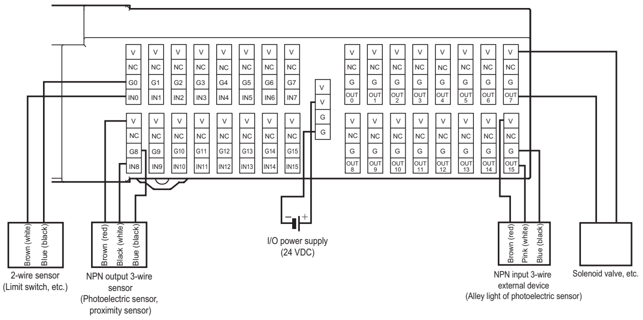
GX-MD1618 (NPN)


V1 V1 V1 V1 V1 V1 V1 V1
NC NC NC NC NC NC NC NC
G0 G1 G2 G3 G4 G5 G6 G7
IN0 IN1 IN2 IN3 IN4 IN5 IN6 IN7
V V G G
V V V V V V V V
NC NC NC NC NC NC NC NC
G G G G G G G G
OUT 0 OUT 1 OUT 2 OUT 3 OUT 4 OUT 5 OUT 6 OUT 7
+
−
I/O power supply (24 VDC)
Brown (white)
Blue (black)
2-wire sensor (Limit switch, etc.)
Solenoid valve, etc.
Brown (red)
Pink (white)
Blue (black)
NPN input 3-wire external device (Alley light of photoelectric sensor)
Brown (red)
Black (white)
Blue (black)
NPN output 3-wire sensor (Photoelectric sensor, proximity sensor)

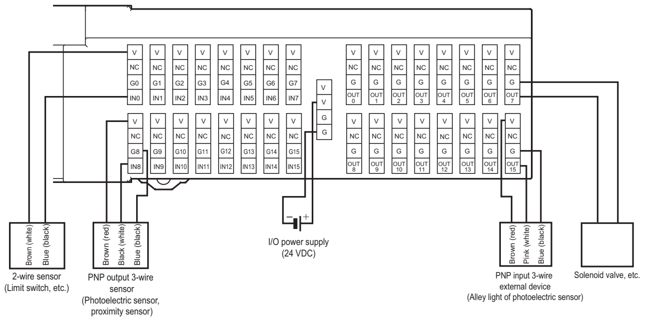
GX-MD1628 (PNP)


V0 V1 V2 V3 V4 V5 V6 V7
NC NC NC NC NC NC NC NC
G1 G1 G1 G1 G1 G1 G1 G1
IN0 IN1 IN2 IN3 IN4 IN5 IN6 IN7
V V G G
V V V V V V V V
NC NC NC NC NC NC NC NC
G G G G G G G G
OUT 0 OUT 1 OUT 2 OUT 3 OUT 4 OUT 5 OUT 6 OUT 7
+
−
I/O power supply (24 VDC)
Brown (white)
Blue (black)
2-wire sensor (Limit switch, etc.)
Solenoid valve, etc.
Brown (red)
Pink (white)
Blue (black)
PNP input 3-wire external device (Alley light of photoelectric sensor)
Brown (red)
Black (white)
Blue (black)
PNP output 3-wire sensor (Photoelectric sensor, proximity sensor)

GX-MD3218 (NPN)


V NC G0 IN0 … V NC G7 IN7
V NC G8 IN8 … V NC G15 IN15
V V G G
V NC G OUT 0 … OUT 7
V NC G OUT 8 … OUT 15
I/O power supply (24 VDC)
Brown (white)
Blue (black)
2-wire sensor (Limit switch, etc.)
Brown (red)
Black (white)
Blue (black)
NPN output 3-wire sensor (Photoelectric sensor, proximity sensor)
Brown (red)
Pink (white)
Blue (black)
NPN input 3-wire external device (Alley light of photoelectric sensor)
Solenoid valve, etc.

GX-MD3228 (PNP)

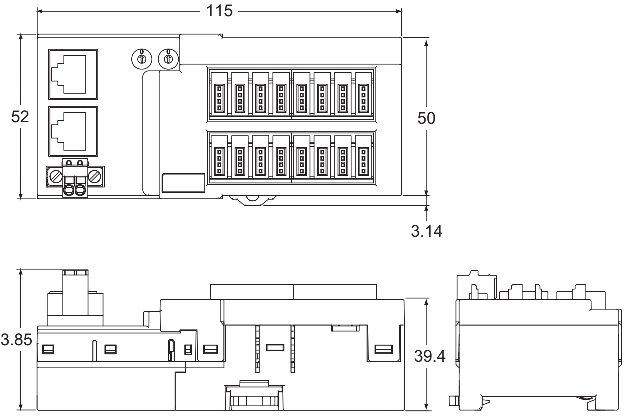

V NC G0 IN0 … V NC G7 IN7
V NC G8 IN8 … V NC G15 IN15
V V G G
V NC G OUT 0 … OUT 7
V NC G OUT 8 … OUT 15
I/O power supply (24 VDC)
Brown (white)
Blue (black)
2-wire sensor (Limit switch, etc.)
Brown (red)
Black (white)
Blue (black)
PNP output 3-wire sensor (Photoelectric sensor, proximity sensor)
Brown (red)
Pink (white)
Blue (black)
PNP input 3-wire external device (Alley light of photoelectric sensor)
Solenoid valve, etc.

Note: Wire colors have been changed according to revisions in the JIS standards for photoelectric and proximity sensors. The colors in parentheses are the wire colors prior to the revisions.

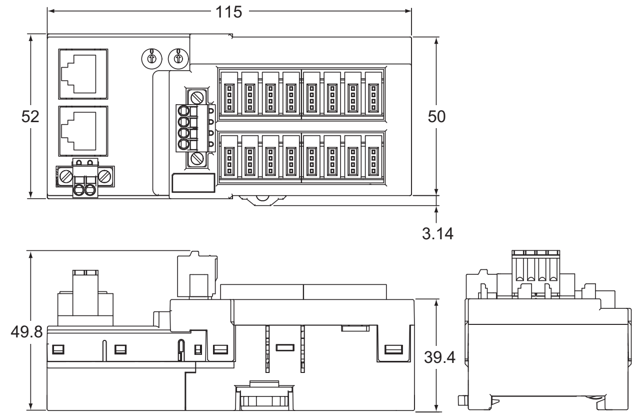
Dimensions

(Unit: mm)

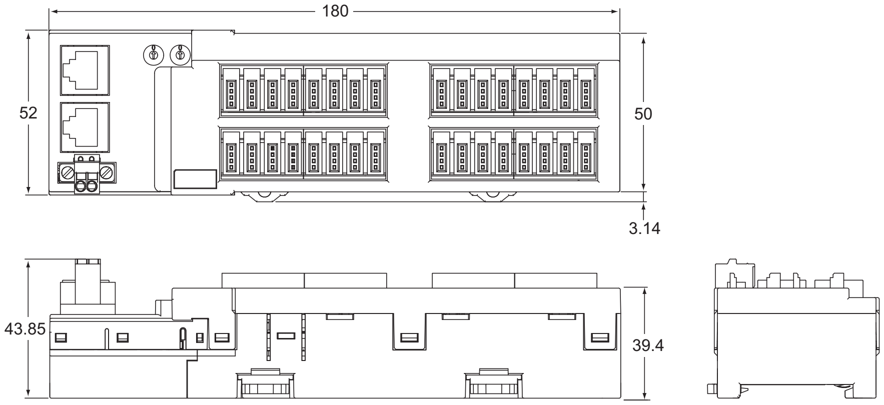
GX-ID1618/ID1628


115
52
50
3.14
43.85
39.4

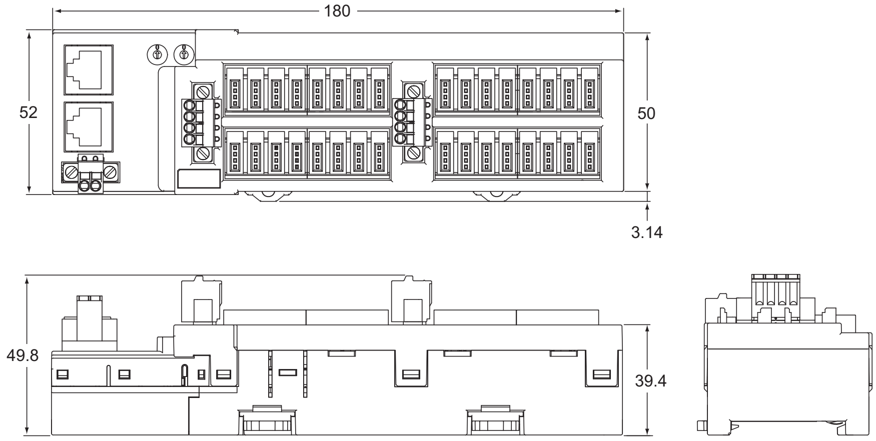
GX-OD1618/OD1628
GX-MD1618/MD1628


115
52
50
3.14
49.8
39.4

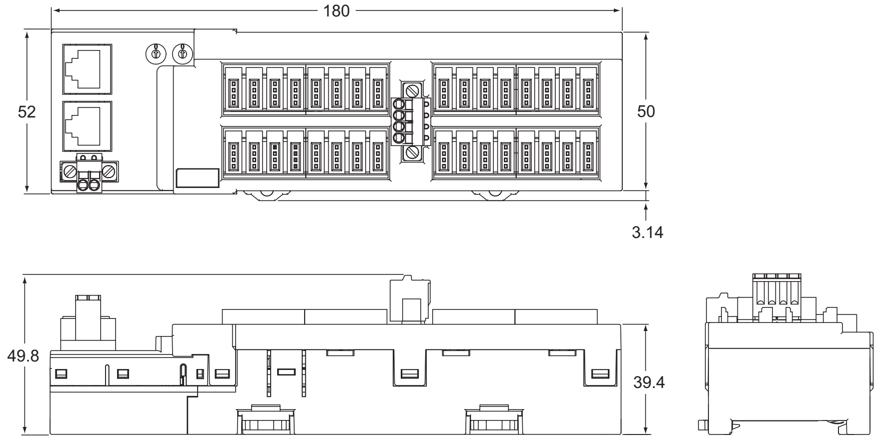
GX-ID3218/ID3228


180
52
50
3.14
43.85
39.4

GX-OD3218/OD3228


180
52
50
3.14
49.8
39.4

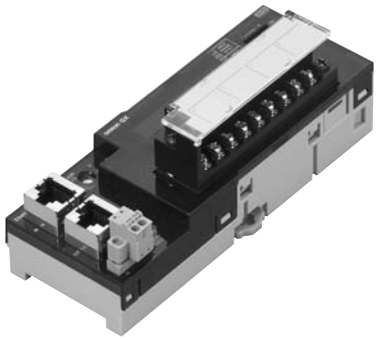
GX-MD3218/MD3228


180
52
50
3.14
49.8
39.4

Analog I/O Terminal 2-tier Terminal Block Type

GX-AD0471/DA0271

Analog I/O terminal with screw terminal block for EtherCAT communicaitons



- The input/output range can be easily changed by the setting with the switch.
- Detachable screw terminal block facilitates the maintenance.
- Moving average calculation function.
  Settings within the range of 100µs-64ms. (For input only.)
- Disconnection detection function.
  (For input only and for usage with 1-5V or 4-20mA ranges.)
- Selectable node address setting methods: setting with rotary switch and with tool software.
  When setting the nodes with rotary switch, setting is easy and node identification becomes possible for maintenance.

General Specifications

For Common Specifications of I/O terminals, refer to page 362.

Input Section Specifications

4-point Input Terminals

Item		Specification	
		Voltage input	Current input
Input capacity		4 points (possible to set number of enabled channels)	
Input range		0 to 5V 1 to 5V 0 to 10V –10 to +10V	4 to 20mA
Input range setting method		Input range switch: Common to input CH1/CH2, common to input CH3/CH4 SDO communication: Possible to set input CH1 to CH4 individually	
Maximum signal input		± 15 V	± 30 mA
Input impedance		1 MΩ min.	Approx. 250 Ω
Resolution		1/8000 (full scale)	
Overall accuracy	**25 °C**	± 0.3% FS	± 0.4% FS
	–10 to +55 °C	± 0.6% FS	± 0.8% FS
Analog conversion cycle		500 µs/input When 4 points are used: 2 ms max.	
A/D converted data		Other than ± 10 V: 0000 to 1F40 Hex full scale (0 to 8000) ± 10 V: F060 to 0FA0 Hex full scale (–4000 to +4000) A/D conversion range: ± 5% FS of the above data ranges.	
Isolation method		Photocoupler isolation (between input and communications lines) No isolation between input signals	
Unit power supply current consumption		120 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
Weight		180 g max.	
Accessories		Four short-circuit metal fixtures (for current input) *	

* Short-circuit metal fixtures are used for current input only, but store in a safe place when using for voltage inputs as well.

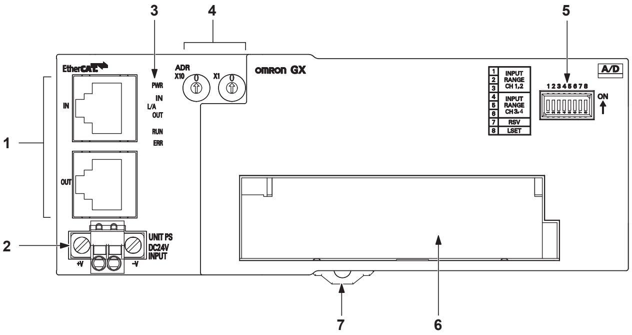
Output Section Specifications

2-point Output Terminals

Item		Specification	
		Voltage output	Current output
Output capacity		2 points (possible to set number of enabled channels)	
Output range		0 to 5V 1 to 5V 0 to 10V –10 to +10V	4 to 20mA
Output range setting method		Output range switch, SDO communications: Possible to set outputs CH1 and CH2 separately.	
External output allowable load resistance		5 kΩ min.	600 Ω max.
Resolution		1/8000 (full scale)	
Overall accuracy	**25 °C**	± 0.4% FS	
	–10 to +55 °C	± 0.8%FS	
Analog conversion cycle		500 µs/input When 2 points are used: 1 ms max.	
D/A converted data		Other than ± 10 V: 0000 to 1F40 Hex full scale (0 to 8000) ± 10 V: F060 to 0FA0 Hex full scale (–4000 to +4000) D/A conversion range: ± 5% FS of the above data ranges	
Isolation method		Photocoupler isolation (between output and communications lines) No isolation between output signals	
Unit power supply current consumption		150 mA max. (for 20.4 to 26.4-VDC power supply voltage)	
Weight		190 g max.	

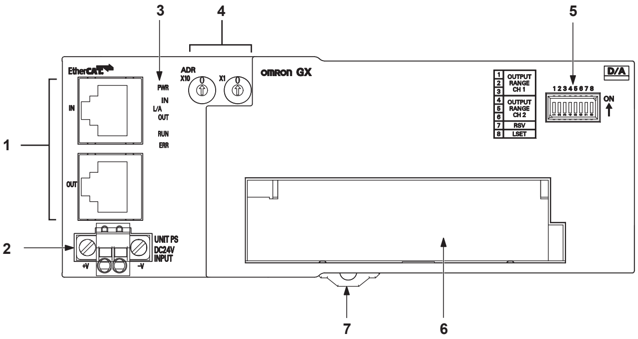
Components and functions

4-points Analog Inputs Terminal GX-AD0471


3
4
5
1
2
7
6
EtherCAT
PWR
IN
L/A
OUT
RUN
ERR
ADR
X10
X1
omron GX
IN
OUT
UNIT PS
DC24V
INPUT
+V
−V
1
2
3
INPUT RANGE CH 1,2
4
5
6
INPUT RANGE CH 3,4
7
RSV
8
LSET
1 2 3 4 5 6 7 8
ON
A/D

No.	Name	Function
1	Communications connector	(CN IN) Connects the communications cable which comes from the Master Unit side. (CN OUT) Connects the communications cable of the next I/O terminal.
2	Unit Power Supply Connector	Connect the unit power supply (24 VDC).
3	Status indicator	It indicates the communication state and the operation state of I/O terminals.
4	Node address Switch	It sets node addresses of terminals (decimal). Setting range is 00 to 99.
5	Input range switch	DIP switch for setting input range.
6	Terminal Block	Terminal block for analog input signals V1 to V4: Voltage input terminals I1 to I4: Current input terminals AG: Analog GND NC: Not used
7	DIN track mounting hook	Fixes a slave to a DIN track.

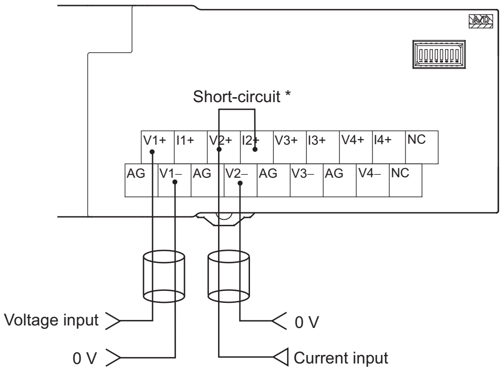
2-points Analog Inputs Terminal GX-DA0271


3
4
5
1
2
7
6
EtherCAT
PWR
IN
L/A
OUT
RUN
ERR
ADR
X10
X1
omron GX
IN
OUT
UNIT PS
DC24V
INPUT
+V
−V
1
2
3
OUTPUT RANGE CH 1
4
5
6
OUTPUT RANGE CH 2
7
RSV
8
LSET
1 2 3 4 5 6 7 8
ON
D/A

No.	Name	Function
1	Communications connector	(CN IN) Connects the communications cable which comes from the Master Unit side. (CN OUT) Connects the communications cable of the next I/O terminal.
2	Unit Power Supply Connector	Connect the unit power supply (24 VDC).
3	Status indicator	It indicates the communication state and the operation state of I/O terminals.
4	Node address Switch	It sets node addresses of terminals (decimal). Setting range is 00 to 99.
5	Output range switch	DIP switch for setting output range.
6	Terminal Block	Terminal block for analog output signals V1+, V2+: Voltage output positive terminals I1+, I2+: Current output positive terminals 1–, 2–: Voltage/current output negative terminals NC: Not used
7	DIN track mounting hook	Fixes a slave to a DIN track.

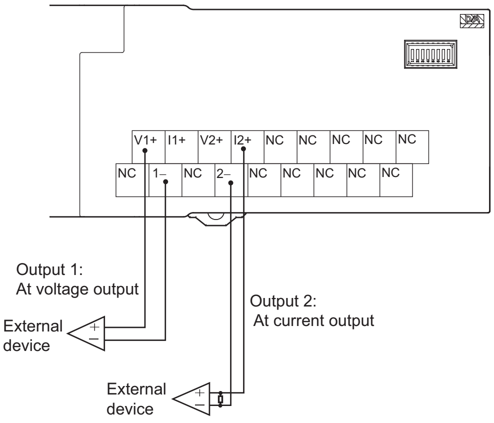
Wiring

GX-AD0471


Short-circuit *
V1+
I1+
V2+
I2+
V3+
I3+
V4+
I4+
NC
AG
V1−
AG
V2−
AG
V3−
AG
V4−
NC
Voltage input
0 V
0 V
Current input

* Short-circuit the “V positive” terminal and “I positive” terminal at current input.
Use the attached short-circuit metal fixture to short-circuit terminals.

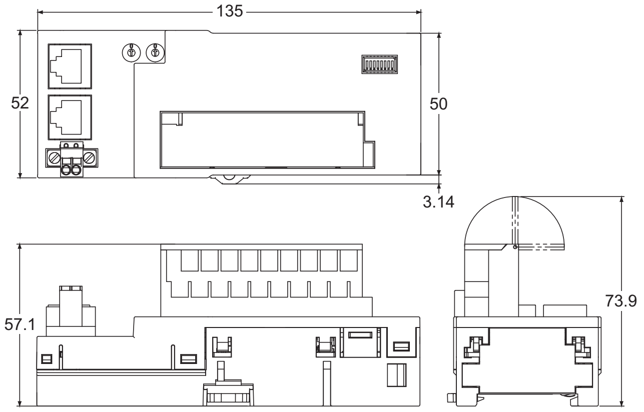
GX-DA0271


V1+
I1+
V2+
I2+
NC
NC
NC
NC
NC
NC
1−
NC
2−
NC
NC
NC
NC
NC
Output 1:
At voltage output
External device
Output 2:
At current output
External device

Dimensions

(Unit: mm)

GX-AD0471
GX-DA0271

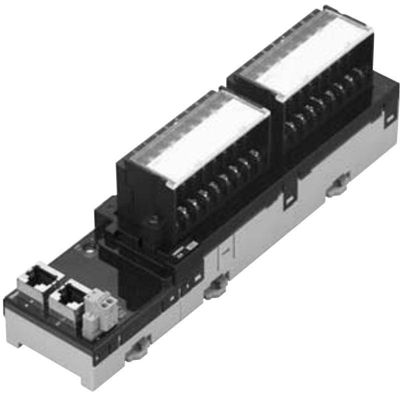

135
52
50
3.14
57.1
73.9

Encoder Input Terminal 3-tier Terminal Block Type

GX-EC0211/EC0241

EtherCAT-compatible encoder input terminal which enables high-speed and accurate control

- Two counter function available. Pulse count within 32 bit range.
- Maximum input pulse frequency of 4MHz (Line driver input after quadrature). High-speed network EtherCAT enables high-speed and accurate control.
- Selectable two input types: Open collector input and line driver input.
- Built-in two external latch inputs and one reset input .
- Selectable node address settings: setting with rotary switches and setting on tool software.
- Detachable screw terminal will facilitate the maintenance work.



General Specifications

For Common Specifications of I/O terminals, refer to page 362.

Open collector inputs Type

Terminal specifications

Item	Specification
Counter point	2 points
Input signal	Counter phase A Counter phase B Counter phase Z Latch input (A/B) Counter reset input
Counter enabled status display	LED display (green)
Input indicators	LED display (yellow)
Unit power supply current consumption	130 mA max. (for 20.4 to 26.4 VDC power supply voltage)
Weight	390 g max.

Pulse input specifications

Item	Specification			
	Counter phase A/B		Counter phase Z	
Input voltage	20.4 to 26.4 VDC (24 VDC −15 to +10%)	4.5 to 5.5 VDC (5 VDC ±5%)	20.4 to 26.4 VDC (24 VDC −15 to +10%)	4.5 to 5.5 VDC (5 VDC ±5%)
Input current	8.4 mA (at 24 VDC)	8.6 mA (at 5 VDC)	8.4 mA (at 24 VDC)	8.6 mA (at 5 VDC)
ON voltage	19.6 V min.	4.5 V min.	18.6 V min.	4.5 V min.
OFF voltage	4 V max.	1.5 V max.	4 V max.	1.5 V max.
Input restriction resistance	2.7 kΩ	430 Ω	2.7 kΩ	430 Ω
Maximum response frequency	Single phase 500 kHz (phase difference Multiplication × 4, 125 kHz)		125 kHz	
Filter switching	NA		NA	

Latch/reset input specifications

Item	Specification	
	Latch input (A/B)	Reset input
Internal I/O common	NPN	
Input voltage	20.4 to 26.4 VDC (24 VDC −15 to +10%)	20.4 to 26.4 VDC (24 VDC −15 to +10%)
Input impedance	4.0 kΩ	3.3 kΩ
Input current	5.5 mA (at 24 VDC)	7 mA (at 24 VDC)
ON voltage/ON current	17.4 VDC min./3 mA min.	14.4 VDC min./3 mA min.
OFF voltage/OFF current	5 VDC max./1 mA max.	5 VDC max./1 mA max.
ON response time	3 μs max.	15 μs max.
OFF response time	3 μs max.	90 μs max.

Note: For the pulse input timing specifications, refer to USER’S MANUAL (Cat. No. W488).

Line Driver inputs Type

Terminal specifications

Item	Specification
Counter point	2 points
Input signal	Counter phase A Counter phase B Counter phase Z Latch input (A/B) Counter reset input
Counter enabled status display	LED display (green)
Input indicators	LED display (yellow)
Unit power supply current consumption	100 mA max. (for 20.4 to 26.4 VDC power supply voltage)
Weight	390 g max.

Pulse input specifications

Item	Specification	
	Counter phase A/B	Counter phase Z
Input voltage	EIA standard RS-422-A line driver level	
Input impedance	120 Ω ±5%	
gH level input voltage	0.1 V	
gL level input voltage	–0.1 V	
Hysteresis voltage	60 mV	
Maximum response frequency	Single phase 4 MHz (phase difference Multiplication ×4, 1 MHz)	1 MHz
Filter switching	NA	

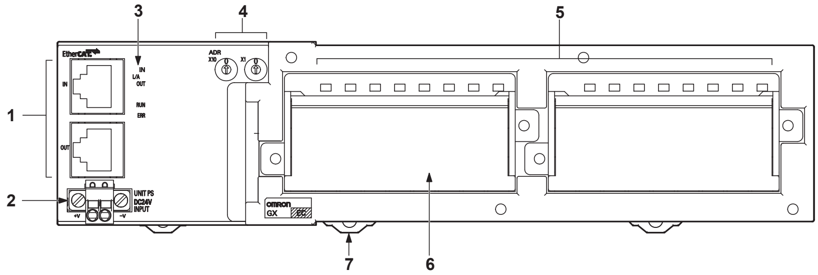
Latch/reset input specifications

Item	Specification	
	Latch input (A/B)	Reset input
Internal I/O common	PNP	
Input voltage	20.4 to 26.4 VDC (24 VDC –15 to +10%)	20.4 to 26.4 VDC (24 VDC –15 to +10%)
Input impedance	4.0 kΩ	3.3 kΩ
Input current	5.5 mA (at 24 VDC)	7 mA (at 24 VDC)
ON voltage/ON current	17.4 VDC min./3 mA min.	14.4 VDC min./3 mA min.
OFF voltage/OFF current	5 VDC max./1 mA max.	5 VDC max./1 mA max.
ON response time	3 μs max.	15 μs max.
OFF response time	3 μs max.	90 μs max.

Note: For the pulse input timing specifications, refer to USER'S MANUAL (Cat. No. W488).

Components and functions

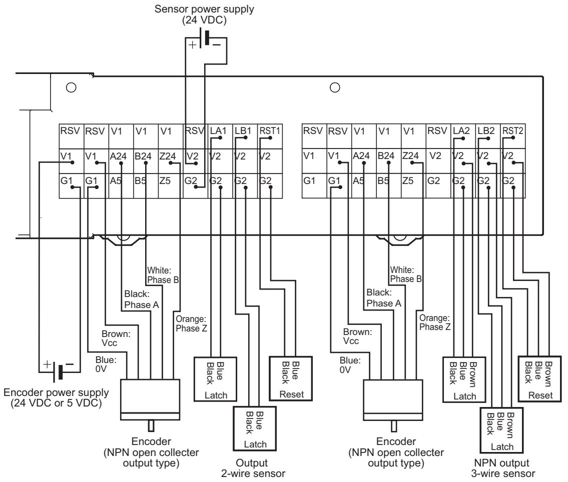
Open collector inputs Type GX-EC0211
Line driver inputs Type GX-EC0241

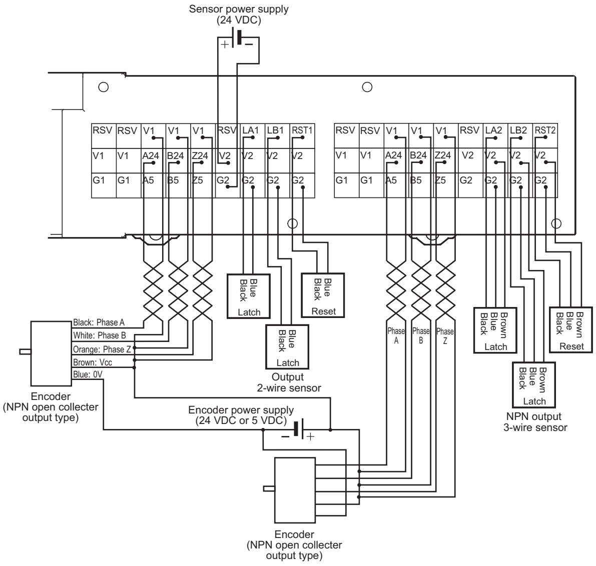


No.	Name	Function
1	Communications Connectors	(CN IN) Connects the communications cable which comes from the Master Unit side. (CN OUT) Connects the communications cable of the next I/O terminal.
2	Unit Power Supply Connector	Connect the unit power supply (24 VDC).
3	Status Indicators	It indicates the communication state and the operation state of I/O terminals.
4	Node address Switches	It sets node addresses of terminals (decimal). Setting range is 00 to 99.
5	Inputs Indicators	The indicators show the status of the inputs of each channel. For details, refer to GX Series Operation Manual (Cat.No.W488).
6	Terminal Block	Connects external devices and the I/O power supply. For details, refer to GX Series Operation Manual (Cat.No.W488).
7	DIN track mounting hook	Fixes Slave Unit to a DIN track.

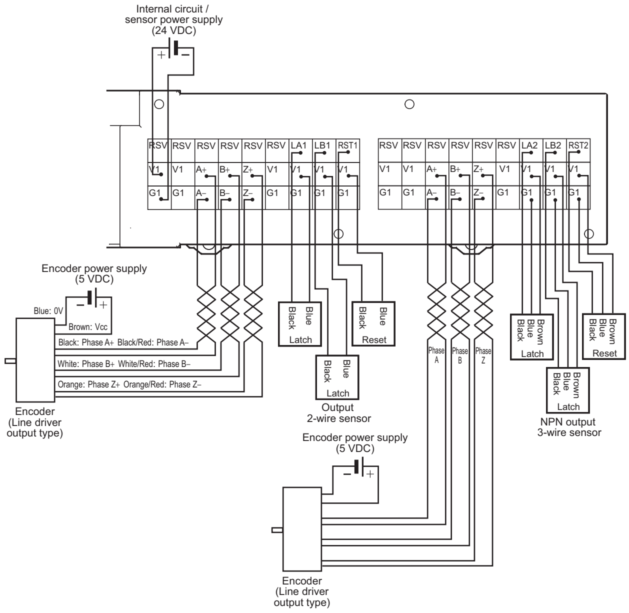
Wiring

Open collector inputs Type GX-EC0211


Sensor power supply (24 VDC)
RSV RSV V1 V1 V1 RSV LA1 LB1 RST1
V1 V1 A24 B24 Z24 V2 V2 V2
G1 G1 A5 B5 Z5 G2 G2 G2 G2
RSV RSV V1 V1 V1 RSV LA2 LB2 RST2
V1 V1 A24 B24 Z24 V2 V2 V2 V2
G1 G1 A5 B5 Z5 G2 G2 G2 G2
White: Phase B
Black: Phase A
Orange: Phase Z
Brown: Vcc
Blue: 0V
Encoder power supply (24 VDC or 5 VDC)
Encoder (NPN open collecter output type)
Blue
Black
Latch
Reset
Output 2-wire sensor
Brown
Blue
Black
Latch
Reset
NPN output 3-wire sensor


Sensor power supply (24 VDC)
RSV RSV V1 V1 V1 RSV LA1 LB1 RST1
V1 V1 A24 B24 Z24 V2 V2 V2 V2
G1 G1 A5 B5 Z5 G2 G2 G2 G2
RSV RSV V1 V1 V1 RSV LA2 LB2 RST2
V1 V1 A24 B24 Z24 V2 V2 V2 V2
G1 G1 A5 B5 Z5 G2 G2 G2 G2
Black: Phase A
White: Phase B
Orange: Phase Z
Brown: Vcc
Blue: 0V
Encoder (NPN open collecter output type)
Blue
Black
Latch
Reset
Output 2-wire sensor
Encoder power supply (24 VDC or 5 VDC)
Phase A
Phase B
Phase Z
Brown
Blue
Black
Latch
Reset
NPN output 3-wire sensor
Encoder (NPN open collecter output type)

Line driver inputs Type GX-EC0241

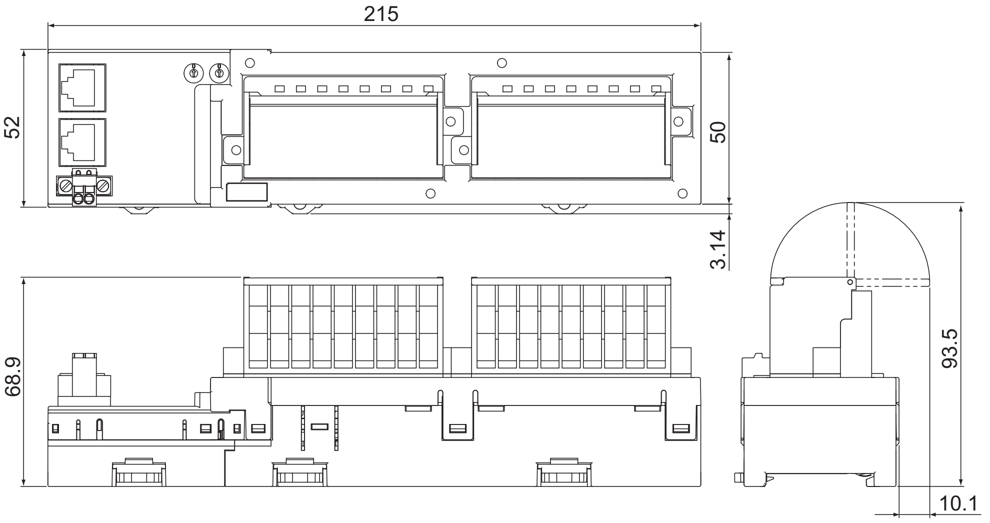

Internal circuit / sensor power supply (24 VDC)
RSV RSV RSV RSV RSV RSV LA1 LB1 RST1
V1 V1 A+ B+ Z+ V1 V1 V1 V1
G1 G1 A– B– Z– G1 G1 G1 G1
RSV RSV RSV RSV RSV RSV LA2 LB2 RST2
V1 V1 A+ B+ Z+ V1 V1 V1 V1
G1 G1 A– B– Z– G1 G1 G1 G1
Encoder power supply (5 VDC)
Blue: 0V
Brown: Vcc
Black: Phase A+ Black/Red: Phase A–
White: Phase B+ White/Red: Phase B–
Orange: Phase Z+ Orange/Red: Phase Z–
Encoder (Line driver output type)
Blue
Black
Latch
Reset
Output 2-wire sensor
Encoder power supply (5 VDC)
Encoder (Line driver output type)
Phase A
Phase B
Phase Z
Brown
Blue
Black
Latch
Reset
NPN output 3-wire sensor

Note: Wire to V1, G1, V2, and G2 as shown in the wiring diagram.

Dimensions

(Unit: mm)

GX-EC0211/EC0241

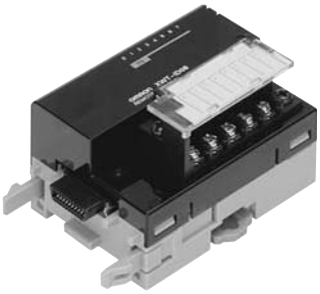

215
52
50
3.14
68.9
93.5
10.1

Expansion Units

XWT-□D08(-1)/□D16(-16)

Expansion I/O Units make expansion easy!

- Flexible expansion with many different combinations.
- Removable I/O terminal block enables faster startup time and improved maintainability.
- Common expansion unit with DeviceNet (DRT2-Series) and CompoNet (CRT1-Series).



General Specifications

For Common Specifications of I/O terminals, refer to page 362.

Input Section Specifications

8-point Input Expansion Units

Item	Specification	
	XWT-ID08	XWT-ID08-1
Internal I/O common	NPN	PNP
I/O capacity	8 inputs	
ON voltage	15 VDC min. (between each input terminal and the V terminal)	15 VDC min. (between each input terminal and the G terminal)
OFF voltage	5 VDC max. (between each input terminal and the V terminal)	5 VDC max. (between each input terminal and the G terminal)
OFF current	1.0 mA max.	
Input current	At 24 VDC: 6.0 mA max./input At 17 VDC: 3.0 mA max./input	
ON delay	1.5 ms max.	
OFF delay	1.5 ms max.	
Number of circuits per common	8 inputs/common	
Communications power supply current consumption	5 mA	
Weight	80 g max.	

16-point Input Expansion Units

Item	Specification	
	XWT-ID16	XWT-ID16-1
Internal I/O common	NPN	PNP
I/O capacity	16 inputs	
ON voltage	15 VDC min. (between each input terminal and the V terminal)	15 VDC min. (between each input terminal and the G terminal)
OFF voltage	5 VDC max. (between each input terminal and the V terminal)	5 VDC max. (between each input terminal and the G terminal)
OFF current	1.0 mA max.	
Input current	At 24 VDC: 6.0 mA max./input At 17 VDC: 3.0 mA max./input	
ON delay	1.5 ms max.	
OFF delay	1.5 ms max.	
Number of circuits per common	16 inputs/common	
Communications power supply current consumption	10 mA	
Weight	120 g max.	

Output Section Specifications

8-point Input Expansion Units

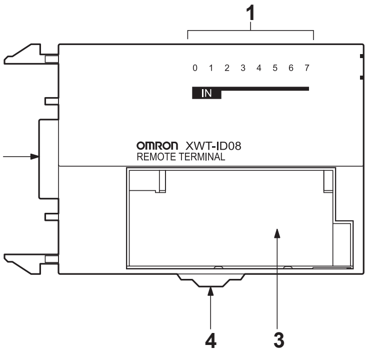
Item	Specification	
	XWT-OD08	XWT-OD08-1
Internal I/O common	NPN	PNP
I/O capacity	8 outputs	
Rated output current	0.5 A/output, 2.0 A/common	
Residual voltage	1.2 V max. (0.5 A DC, between each output terminal and the G terminal)	1.2 V max. (0.5 A DC, between each output terminal and the V terminal)
Leakage current	0.1 mA max.	
ON delay	0.5 ms max.	
OFF delay	1.5 ms max.	
Number of circuits per common	8 outputs/common	
Communications power supply current consumption	5 mA	
Weight	80 g max.	

16-point Input Expansion Units

Item	Specification	
	XWT-OD16	XWT-OD16-1
Internal I/O common	NPN	PNP
I/O capacity	16 outputs	
Rated output current	0.5 A/output, 4.0 A/common	
Residual voltage	1.2 V max. (0.5 A DC, between each output terminal and the G terminal)	1.2 V max. (0.5 A DC, between each output terminal and the V terminal)
Leakage current	0.1 mA max.	
ON delay	0.5 ms max.	
OFF delay	1.5 ms max.	
Number of circuits per common	16 outputs/common	
Communications power supply current consumption	10 mA	
Weight	120 g max.	

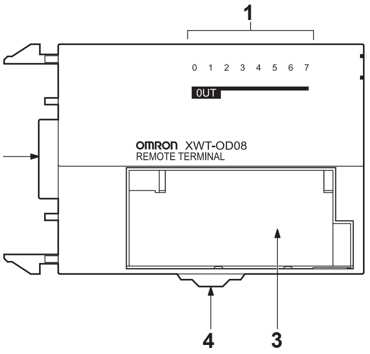
Components and functions

XWT-ID08/ID08-1


1
0 1 2 3 4 5 6 7
IN
omron XWT-ID08
REMOTE TERMINAL
2
4
3

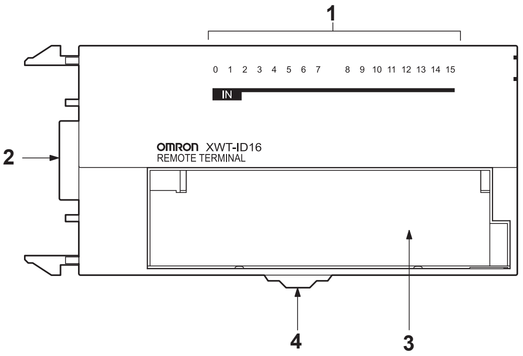
No.	Name	Function
1	Input indicator (0 to 7)	Indicates the state of input contact (ON/OFF). Not lit: Contact OFF (input OFF state) Lit in yellow: Contact ON (input ON state)
2	Terminal connector	Connects the connector on the right side of the slave.
3	Terminal block	Connects external devices and the I/O power supply. V, G: I/O power supply terminals 0 to 7: Input terminals
4	DIN track mounting hook	Fixes a slave to a DIN track.

XWT-OD08/OD08-1


1
0 1 2 3 4 5 6 7
OUT
omron XWT-OD08
REMOTE TERMINAL
2
4
3

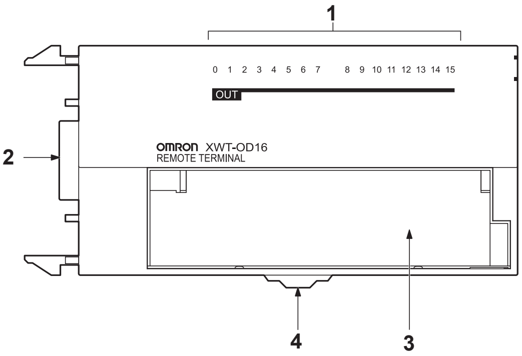
No.	Name	Function
1	Output indicator (0 to 7)	Indicates the state of output contact (ON/OFF). Not lit: Contact OFF (output OFF state) Lit in yellow: Contact ON (output ON state)
2	Terminal connector	Connects the connector on the right side of the slave.
3	Terminal block	Connects external devices and the I/O power supply. V, G: I/O power supply terminals 0 to 7: Output terminals
4	DIN track mounting hook	Fixes a slave to a DIN track.

XWT-ID16/ID16-1


1
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
IN
omron XWT-ID16
REMOTE TERMINAL
2
4
3

No.	Name	Function
1	Input indicator (0 to 15)	Indicates the state of input contact (ON/OFF). Not lit: Contact OFF (input OFF state) Lit in yellow: Contact ON (input ON state)
2	Terminal connector	Connects the connector on the right side of the slave.
3	Terminal block	Connects external devices and the I/O power supply. V, G: I/O power supply terminals 0 to 15: Input terminals
4	DIN track mounting hook	Fixes a slave to a DIN track.

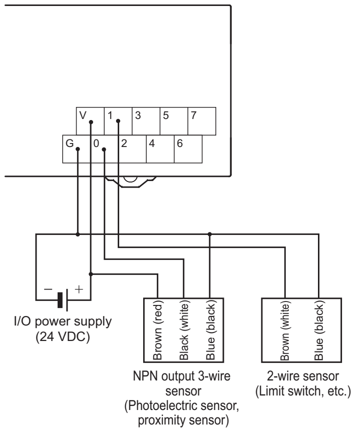
XWT-OD16/OD16-1


1
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
OUT
omron XWT-OD16
REMOTE TERMINAL
2
4
3

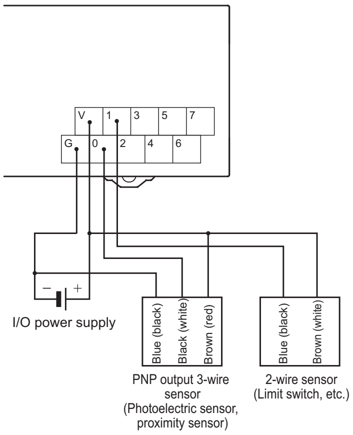
No.	Name	Function
1	Output indicator (0 to 15)	Indicates the state of output contact (ON/OFF). Not lit: Contact OFF (output OFF state) Lit in yellow: Contact ON (output ON state)
2	Terminal connector	Connects the connector on the right side of the slave.
3	Terminal block	Connects external devices and the I/O power supply. V, G: I/O power supply terminals 0 to 15: Output terminals
4	DIN track mounting hook	Fixes a slave to a DIN track.

Wiring

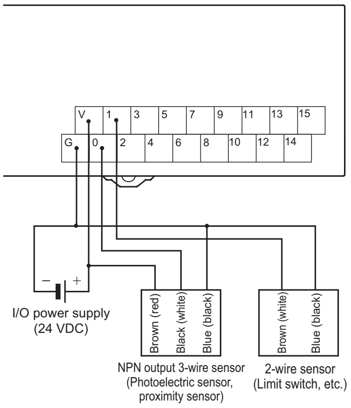
XWT-ID08 (NPN)


V
1
3
5
7
G
0
2
4
6
I/O power supply
(24 VDC)
Brown (red)
Black (white)
Blue (black)
NPN output 3-wire sensor
(Photoelectric sensor, proximity sensor)
Brown (white)
Blue (black)
2-wire sensor
(Limit switch, etc.)

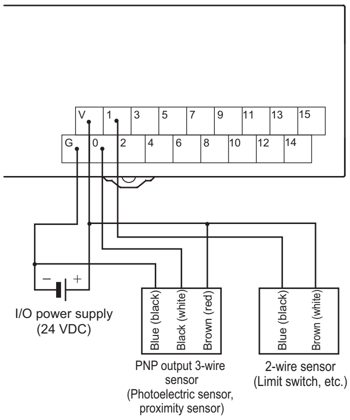
XWT-ID08-1 (PNP)


V
1
3
5
7
G
0
2
4
6
I/O power supply
Blue (black)
Black (white)
Brown (red)
PNP output 3-wire sensor
(Photoelectric sensor, proximity sensor)
Blue (black)
Brown (white)
2-wire sensor
(Limit switch, etc.)

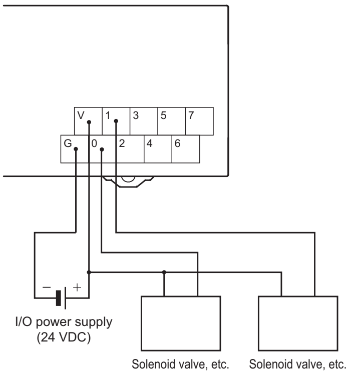
XWT-ID16 (NPN)


V
1
3
5
7
9
11
13
15
G
0
2
4
6
8
10
12
14
I/O power supply
(24 VDC)
Brown (red)
Black (white)
Blue (black)
NPN output 3-wire sensor
(Photoelectric sensor, proximity sensor)
Brown (white)
Blue (black)
2-wire sensor
(Limit switch, etc.)

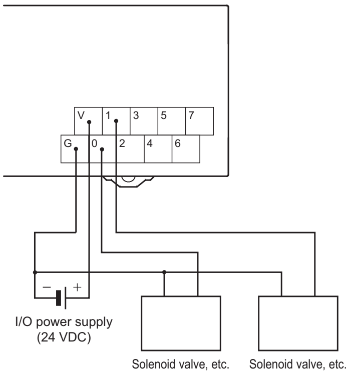
XWT-ID16-1 (PNP)


V
1
3
5
7
9
11
13
15
G
0
2
4
6
8
10
12
14
I/O power supply
(24 VDC)
Blue (black)
Black (white)
Brown (red)
PNP output 3-wire sensor
(Photoelectric sensor, proximity sensor)
Blue (black)
Brown (white)
2-wire sensor
(Limit switch, etc.)

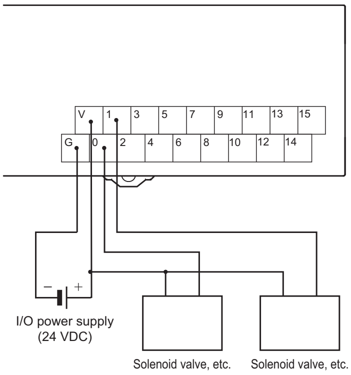
XWT-OD08 (NPN)


V
1
3
5
7
G
0
2
4
6
I/O power supply
(24 VDC)
Solenoid valve, etc.
Solenoid valve, etc.

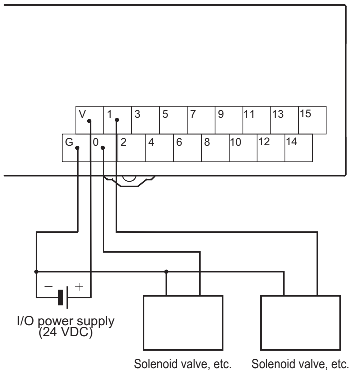
XWT-OD08-1 (PNP)


V
1
3
5
7
G
0
2
4
6
I/O power supply
(24 VDC)
Solenoid valve, etc.
Solenoid valve, etc.

XWT-OD16 (NPN)


V
1
3
5
7
9
11
13
15
G
0
2
4
6
8
10
12
14
I/O power supply
(24 VDC)
Solenoid valve, etc.
Solenoid valve, etc.

XWT-OD016-1 (PNP)

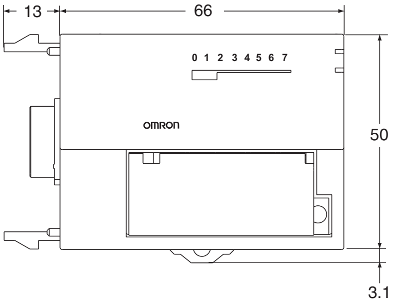

V
1
3
5
7
9
11
13
15
G
0
2
4
6
8
10
12
14
I/O power supply
(24 VDC)
Solenoid valve, etc.
Solenoid valve, etc.

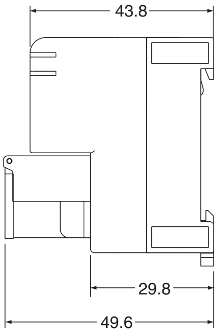
Note: Wire colors have been changed according to revisions in the JIS standards for photoelectric and proximity sensors.
The colors in parentheses are the wire colors prior to the revisions.

Dimensions

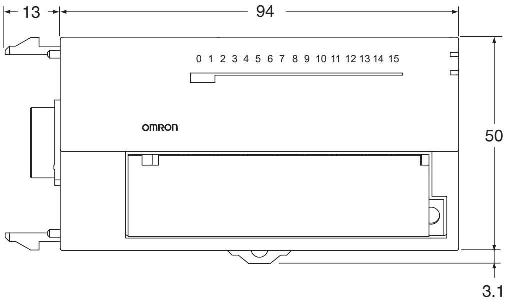
(Unit: mm)

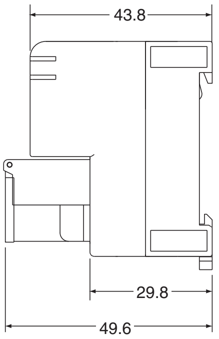
XWT-ID08/ID08-1
XWT-OD08/OD08-1


13
66
0 1 2 3 4 5 6 7
OMRON
50
3.1



XWT-ID16/ID16-1
XWT-OD16/OD16-1


13
94
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
OMRON
50
3.1



MEMO

Ordering Information

Ordering Information

Machine Automation Controller NJ/NX-Series 398
Automation Software Sysmac Studio 414
FA Communications Software CX-Compolet / SYSMAC Gateway 415
Programmable Terminals NA-Series........ 416
EtherCAT, EtherNet/IP Slave Terminals NX Series 418
Safety Control Units NX Series 428
AC Servomotor/Linear Motor/Drives G5-Series 430
Multi-function Compact Inverter MX2-Series V1 type 448
High-function General-purpose Inverter RX-Series V1 type 454
Vision System FH-Series 458
Smart Camera FQ-M-Series 464
Displacement Sensor ZW-Series 466
Fiber Sensor/Laser Photoelectric Sensors/Contact Sensor N-Smart (Sensor Communications Unit connection series.) 467
Fiber Sensors/Laser Photoelectric Sensor/Proximity Sensor (Sensor Communications Unit Connection series.) 467
EtherCAT Remote I/O Terminal GX-Series 468

Related Manuals

International Standards

- The standards are abbreviated as follows: U: UL, U1: UL (Class I Division 2 Products for Hazardous Locations), C: CSA, UC: cULus, UC1: cULus (Class I Division 2 Products for Hazardous Locations), CU: cUL, N: NK, KC: KC Registration, L: Lloyd, and CE: EC Directives.
- Contact your OMRON representative for further details and applicable conditions for these standards.

● EC Directives

The EC Directives applicable to PLCs include the EMC Directives and the Low Voltage Directive. OMRON complies with these directives as described below.

● EMC Directives
Applicable Standards
EMI: EN61000-6-4, EN61131-2
EMS: EN61000-6-2, EN61131-2
PLCs are electrical devices that are incorporated in machines and manufacturing installations. OMRON PLCs conform to the related EMC standards so that the devices and machines into which they are built can more easily conform to EMC standards. The actual PLCs have been checked for conformity to EMC standards. Whether these standards are satisfied for the actual system, however, must be checked by the customer.
EMC-related performance will vary depending on the configuration, wiring, and other conditions of the equipment or control panel in which the PLC is installed. The customer must, therefore, perform final checks to confirm that the overall machine or device conforms to EMC standards.

● Low Voltage Directive
Applicable Standard:EN61131-2
VDC must satisfy the appropriate safety requirements. With PLCs, this applies to Power Supply Units and I/O Units that operate in these voltage ranges.
These Units have been designed to conform to EN61131-2, which is the applicable standard for PLCs.

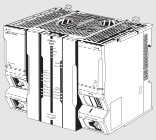
● Conformance to EC Directives
The NJ/NX-series I/O Units conform to the Common Emission Standards (EN 61131-2) of the EMC Directives. However, noise generated by relay output switching may not satisfy these Standards when the Unit is incorporated in to a system.
In such a case, appropriate countermeasures must be provided externally to the Output Unit, such as connecting a contact protection circuit. Countermeasures taken to satisfy the standards vary depending on the devices on the load side, wiring, configuration of machines, etc.

Ordering Information

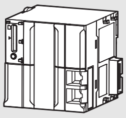
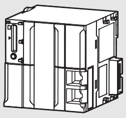
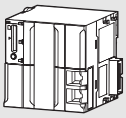
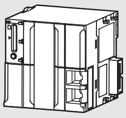
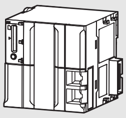
Basic Configuration Units

CPU Rack

NX701 CPU Units

Product Name	Specifications			Current (Power) consumption	Model	Standards
	Program capacity	Memory capacity for variables	Number of motion axes			
NX701 CPU Units 	80 MB	4 MB: Retained during power interruption 256 MB: Not retained during power interruption	256	40 W (including SD Memory Card and End Cover)	NX701-1700	UC1, RCM, CE, KC
			128		NX701-1600	

NJ-seires CPU Units

Product name	Specifications							Current consumption (A)		Model	Standards
	I/O capacity / maximum umber of configuration Units (Expansion Racks)	Program capacity	Memory capacity for variables	Number of motion axes	Database Connection function	SECS/GEM Communication function	Number of controlled robots	5 VDC	24 VDC		
NJ501 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	No	No	---	1.90	---	NJ501-1500	UC1, N, L, CE, KC
				32						NJ501-1400	
				16						NJ501-1300	
NJ501 Database Connection CPU Units 				64	Yes					NJ501-1520	
				32						NJ501-1420	
				16						NJ501-1320	
NJ501 SECS/GEM CPU Unit 				16	No	Yes				NJ501-1340	
NJ501 NJ Robotics CPU Units 				64		No	8 max.*			NJ501-4500	
				32						NJ501-4400	
				16						NJ501-4300	
				16			1			NJ501-4310	
NJ301 CPU Units 		5 MB	0.5 MB: Retained during power interruption 2 MB: Not retained during power interruption	8			---			NJ301-1200	
				4						NJ501-1100	
NJ101 CPU Units		3 MB		2						NJ101-1000	
				0						NJ101-9000	

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

Accessories

The following accessories come with the CPU Unit.

Item	Specification	
	NX-series	NJ-series
Battery	CJ1W-BAT01	
End Cover	NX-END01 (must be attached to the right end of the CPU Rack)	CJ1W-TER01 (must be attached to the right end of the CPU Rack)
End Plate	---	PFP-M (2 required)
Fan Unit	NX-FAN01	---
SD Memory Card * (Flash Memory 2 GB)	---	HMC-SD291

* NJ501-1□20 or NJ501-1340 only.

SECS/GEM Configurator

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	Standards
		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 SECS/GEM Configurator runs on the following OS. Windows XP (Service Pack3 or higher, 32-bit edition), Windows Vista (32-bit edition), or Windows 7 (32-bit or 64-bit edition) The software is included in the Sysmac Studio Standard Edition DVD.	1 license	---	WS02-GCTL1	---

■ Power Supply Units

One Power Supply Unit is required for each Rack.

NX-series

Product Name	Power supply voltage	Output capacity	Options			Model	Standards
		Total power consumption	24-VDC service power supply	RUN output	Maintenance forecast monitor		
AC Power Supply Unit	100 to 240 VAC	90 W	No	Yes	No	NX-PA9001	UC1, CE, RCM, KC
DC Power Supply Unit	24 VDC	70 W				NX-PD7001	

NJ-series

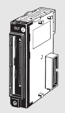
Product name	Power supply voltage	Output current		Output capacity	Options			Model	Standards
		5-VDC output capacity	24-VDC output capacity	Total power consump-tion	24-VDC service power supply	RUN output	Maintenance forecast monitor		
AC Power Supply Unit	100 to 240 VAC	6.0 A	1.0 A	30 W	No	Yes	No	NJ-PA3001	UC1, N, L, CE
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 *

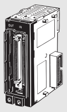
* Supported only by the NJ-series CPU Units.
Select the I/O Control Unit, I/O Interface Unit, Expansion Connecting Cable, and CJ-Series Power Supply Unit.

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

Product name	Specifications	Current consumption (A)		Model	Standards
		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	UC1, N, L, CE

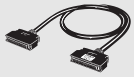
Note: Mounting the I/O Control Unit in any other location may cause faulty operation.

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

Product Name	Specifications	Current consumption (A)		Model	Standards
		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	UC1, N, L, CE

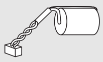
Note: Mounting the I/O Interface Unit in any other location may cause faulty operation.

■ I/O Connecting Cables

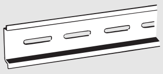
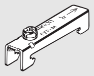
Product name	Specifications		Model	Standards
I/O Connecting Cable 	• Connects an I/O Control Unit on NJ-Series CPU Rack to an I/O Interface Unit on a NJ-Series Expansion Rack. or • Connects an I/O Interface Unit on NJ-Series Expansion Rack to an I/O Interface Unit on another NJ-Series Expansion Rack.	Cable length: 0.3 m	CS1W-CN313	N, L, CE
		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	

Optional Products and Maintenance Products

Product name	Specifications	Model	Standards
Memory Cards	SD memory card, 2GB	HMC-SD291	N, L, CE
	SD memory card, 4GB	HMC-SD491	CE

Product name	Specifications		Model	Standards
Battery Set 	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.** For NX701, the battery service life is 2.5 years at 25°C. For NJ-series, 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	---
End Cover	Mounted to the right-hand side of NX-Series CPU Racks.	One End Cover is provided as a standard accessory with each CPU Unit and I/O Interface Unit.	NX-END01	UC1, RCM, CE, KC
	Mounted to the right-hand side of NJ-Series CPU Racks or Expansion Racks.		CJ1W-TER01	UC1, N, L, CE

DIN Track Accessories

Product name	Specifications	Model	Standards
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	

Connecting Cable

■ Peripheral (USB) Port

Use commercially available USB cable.

Specifications: USB 1.1 or 2.0 cable (A connector - B connector), 5.0 m max.

■ Recommended EtherCAT and EtherNet/IP Communications Cables

Use Straight STP (shielded twisted-pair) cable of category 5 or higher with double shielding (braiding and aluminum foil tape) for EtherCAT.
For EtherCAT, use a shielded twisted-pair cable (double shielding with aluminum tape and braiding) of Ethernet category 5 (100BASE-TX) or higher, and use straight wiring.
For EtherNet/IP, required specification for the communications cables varies depending on the baud rate.
For 100BASE-TX/10BASE-T, use an STP (shielded twisted-pair) cable of Ethernet category 5 or higher. You can use either a straight or cross cable.
For 1000BASE-T, use an STP (double shielding with aluminum tape and braiding) cable of Ethernet category 5e or higher. You can use either a straight or cross cable.
In the table, materials indicated available for EtherNet/IP 100BASE-TX are available for both of 100BASE-TX and 10BASE-T.

Cabel with Connectors

Item			Recommended manufacturer	Cable length (m)*1	Model
Products for EtherCAT	Wire Gauge and Number of Pairs: AWG27, 4-pair Cable Cable Sheath material: LSZH *2 Cable color: Yellow *3	Standard type Cable with Connectors on Both Ends (RJ45/RJ45) 	OMRON	0.3	XS6W-6LSZH8SS30CM-Y
				0.5	XS6W-6LSZH8SS50CM-Y
				1	XS6W-6LSZH8SS100CM-Y
				2	XS6W-6LSZH8SS200CM-Y
				3	XS6W-6LSZH8SS300CM-Y
				5	XS6W-6LSZH8SS500CM-Y
	Wire Gauge and Number of Pairs: AWG22, 2-pair Cable	Rugged type Cable with Connectors on Both Ends (RJ45/RJ45) 	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
		Rugged type Cable with Connectors on Both Ends (M12/RJ45) 	OMRON	0.3	XS5W-T421-AMC-K
				0.5	XS5W-T421-BMC-K
				1	XS5W-T421-CMC-K
				2	XS5W-T421-DMC-K
				5	XS5W-T421-GMC-K
				10	XS5W-T421-JMC-K
		Rugged type Cable with Connectors on Both Ends (M12 L/RJ45) 	OMRON	0.3	XS5W-T422-AMC-K
				0.5	XS5W-T422-BMC-K
				1	XS5W-T422-CMC-K
				2	XS5W-T422-DMC-K
				5	XS5W-T422-GMC-K
				10	XS5W-T422-JMC-K

*1. Standard type cables length 0.2, 0.3, 0.5, 1, 1.5, 2, 3, 5, 7.5, 10, 15 and 20m are available.
Rugged type cables length 0.3, 0.5, 1, 2, 3, 5, 10 and 15m are available.
*2. The lineup features Low Smoke Zero Halogen cables for in-cabinet use and PUR cables for out-of-cabinet use.
*3. Cables colors are available in blue, yellow, or Green
Note: For details, refer to Cat.No.G019.

Cables / Connectors

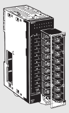
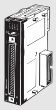
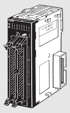
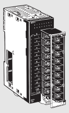
Item			Recommended manufacturer	Model
Products for EtherCAT or EtherNet/IP (1000BASE-T/100BASE-TX)	Wire Gauge and Number of Pairs: AWG24, 4-pair Cable	Cables	Hitachi Metals, Ltd.	NETSTAR-C5E SAB 0.5 × 4P *1
			Kuramo Electric Co.	KETH-SB *1
			SWCC Showa Cable Systems Co.	FAE-5004 *1
		RJ45 Connectors	Panduit Corporation	MPS588-C *1
Products for EtherCAT or EtherNet/IP (100BASE-TX)	Wire Gauge and Number of Pairs: AWG22, 2-pair Cable	Cables	Kuramo Electric Co.	KETH-PSB-OMR *2
			Nihon Electric Wire&Cable Co.,Ltd.	PNET/B *2
		RJ45 Assembly Connector 	OMRON	XS6G-T421-1 *2
Products for EtherNet/IP (100BASE-TX)	Wire Gauge and Number of Pairs: 0.5 mm, 4-pair Cable	Cables	Fujikura Ltd.	F-LINK-E 0.5mm × 4P *3
		RJ45 Connectors	Panduit Corporation	MPS588 *3

*1. We recommend you to use above cable for EtherCAT and EtherNet/IP, and RJ45 Connector together.
*2. We recommend you to use above cable for EtherCAT and EtherNet/IP, and RJ45 Assembly Connector together.
*3. We recommend you to use above cable For EtherNet/IP and RJ45 Connectors together.

Basic I/O Units *

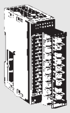
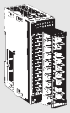
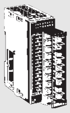
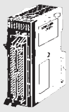
* Supported only by the NJ-series CPU Units.

■ Input Units

Unit classification	Product name	Specifications				Number of bits allocated	Response time *1		Current consumption (A)		Model	Standards
		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	UC1, N, L, CE
		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 High-speed type	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 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 High-speed type	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 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 400), or use an OMRON XW2R Connector-Terminal Block Conversion Unit (detail informations: XW2R series Connector-terminal block conversion unit Catalog (Catalog number: G077)) or a G7□ I/O Relay Terminal .

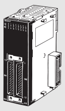
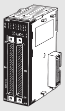
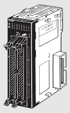
■ Output Units

Unit classification	Product name	Specifications					Number of bits allocated	Current consumption (A)		Model	Standards
		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	UC1, N, L, CE
		–	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	
	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 *1	
		Sinking	16 outputs High-speed type	24 VDC, 0.5 A	16 points, 1 common	Removable terminal block	16	0.15	–	CJ1W-OD213 *1	
		Sinking	32 outputs	12 to 24 VDC, 0.5 A	16 points, 1 common	Fujitsu connector	32	0.14	–	CJ1W-OD231 *2	
		Sinking	32 outputs	12 to 24 VDC, 0.5 A	16 points, 1 common	MIL connector	32	0.14	–	CJ1W-OD233 *1, *2	
		Sinking	32 outputs High-speed type	24 VDC, 0.5 A	16 points, 1 common	MIL connector	32	0.22	–	CJ1W-OD234 *1, *2	
		Sinking	64 outputs	12 to 24 VDC, 0.3 A	16 points, 1 common	Fujitsu connector	64	0.17	–	CJ1W-OD261 *2	
		Sinking	64 outputs	12 to 24 VDC, 0.3 A	16 points, 1 common	MIL connector	64	0.17	–	CJ1W-OD263 *2	
		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 *2	
		Sourcing	64 outputs	12 to 24 VDC, 0.3 A	16 points, 1 common	MIL connector	64	0.17	–	CJ1W-OD262 *2	

*1 The ON/OFF response time for the CJ1W-OD213/CJ1W-OD234 is shorter than for the CJ1W-OD211/CJ1WOD233, 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

*2 Connectors are not provided with these connector models. Either purchase one of the following 40-pin Connectors, or use an OMRON XW2R Connector-Terminal Block Conversion Unit (detail informations: XW2R series Connector-terminal block conversion unit Catalog (Catalog number: G077)) or a G7☐ I/O Relay Terminal.

■ I/O Units

Unit classification	Product name	Specifications					Number of bits allocated	Current consumption (A)		Model	Standards
		Output type	I/O points	Input voltage, Input current Maximum switching capacity	Commons	External connection		5 V	24 V		
CJ1 Basic I/O Units	**DC Input/ Transistor Output Units**  	Sinking	16 inputs	24 VDC, 7 mA	16 points, 1 common	Fujitsu connector	32	0.13	---	CJ1W-MD231 *2	UC1, N, CE
			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	UC1, N, CE
			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 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	UC1, N, L, CE
			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	UC1, N, CE
			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 XW2R Connector-Terminal Block Conversion Unit (detail information: XW2R series Connector-terminal block conversion unit Catalog (Catalog number: G077)) 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 XW2R Connector-Terminal Block Conversion Unit (detail informations: XW2R series Connector-terminal block conversion unit Catalog (Catalog number: G077)) or a G7□ I/O Relay Terminal.

● Applicable Connectors

Fujitsu 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	Standards
40-pin Connectors	Soldered	FCN-361J040-AU Connector FCN-360C040-J2 Connector Cover	Fujitsu 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	FCN-363J040 Housing FCN-363J-AU Contactor FCN-360C040-J2 Connector Cover		C500-CE405	
	Pressure welded	FCN-367J040-AU/F		C500-CE403	
24-pin Connectors	Soldered	FCN-361J024-AU Connector FCN-360C024-J2 Connector Cover	Fujitsu Connectors: CJ1W-MD231 (16 inputs, 16 outputs): 2 per Unit	C500-CE241	
	Crimped	FCN-363J024 Housing FCN-363J-AU Contactor FCN-360C024-J2 Connector Cover		C500-CE242	
	Pressure welded	FCN-367J024-AU/F		C500-CE243	

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

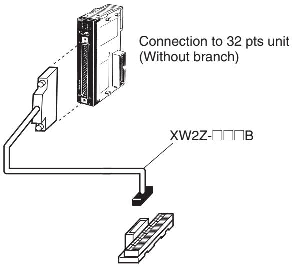
Name	Connection	Remarks	Applicable Units	Model	Standards
40-pin Connectors	Pressure welded	FRC5-AO40-3TOS	MIL Connectors: CJ1W-ID232/233 (32 inputs): 1 per Unit CJ1W-OD232/233/234 (32 outputs):1 per Unit CJ1W-ID262 (64 inputs): 2 per Unit CJ1W-OD262/263 (64 outputs): 2 per Unit CJ1W-MD263/563 (32 inputs,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

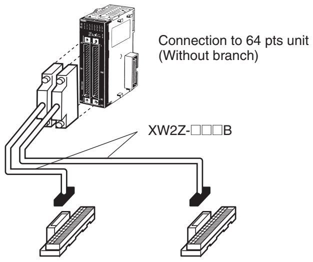
Example: With OMRON Connector-terminal block conversion unit

Only main products are shown here.
More detail informations are shown in XW2R series Connector-terminal block conversion unit Catalog (Web Catalog number: G077)

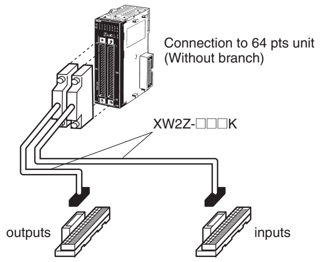
32-point Input Unit or Output Unit
CJ1W-ID231 32-point



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 Phillips screw	XW2R-J34GD-□□
Models with Slotted screw (rise up)	XW2R-E34GD-□□
Models with Push-in spring	XW2R-P34GD-□□

Combination table

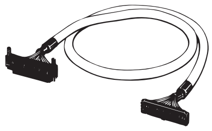
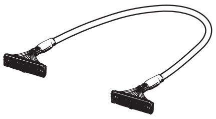
PLC Type	I/O	I/O Points	I/O unit model	Connecting cables
C1	Input	32	CJ1W-ID231	XW2Z-□□□B 32-point Unit: 1 Cable 64-point Unit: 2 Cables
		64	CJ1W-ID261	
	Input/Output	32	CJ1W-MD261 (inputs)	
C2	Input	32	CJ1W-ID232	XW2Z-□□□K 32-point Unit: 1 Cable 64-point Unit: 2 Cables
			CJ1W-ID233	
		64	CJ1W-ID262	
	Input/Output	32	CJ1W-MD263 (inputs)	
			CJ1W-MD563 (inputs)	
C3	Output	32	CJ1W-OD231	XW2Z-□□□B 32-point Unit: 1 Cable 64-point Unit: 2 Cables
		64	CJ1W-OD261	
	Input/Output	32	CJ1W-MD261 (outputs)	
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.

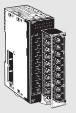
Connector-terminal block conversion unit

Product name	Wiring method	I/O Points (number of poles)	Model
Connector terminal block conversion unit	Models with Phillips screw 	32 (34)	XW2R-J34GD-C1
		32 (34)	XW2R-J34GD-C2
		32 (34)	XW2R-J34GD-C3
		32 (34)	XW2R-J34GD-C4
	Models with Slotted screw (rise up) 	32 (34)	XW2R-E34GD-C1
		32 (34)	XW2R-E34GD-C2
		32 (34)	XW2R-E34GD-C3
		32 (34)	XW2R-E34GD-C4
	Models with Push-in spring 	32 (34)	XW2R-P34GD-C1
		32 (34)	XW2R-P34GD-C2
		32 (34)	XW2R-P34GD-C3
		32 (34)	XW2R-P34GD-C4

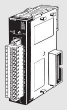
Connecting cables

Product name	Appearance	Connectors	Model	Cable length (m)
For I/O Unit Connecting Cable	XW2Z-□□□B 	One 40-pin MIL Connector to One 40-pin Connector Made by Fujitsu Component, Ltd.	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	Standards
		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	UC1, N, L, CE

■ B7A Interface Units

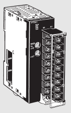
Unit classification	Product name	Specifications		Number of bits allocated	Current consumption (A)		Model	Standards
		I/O points	External connection		5 V	24 V		
CJ1 Basic I/O Units	**B7A Interface Units** 	64 inputs	Removable terminal block	64	0.07	---	CJ1W-B7A14	UC1, CE
		64 outputs			0.07	---	CJ1W-B7A04	
		32 inputs/outputs			0.07	---	CJ1W-B7A22	

Special I/O Units and CPU Bus Units *

* Supported only by the NJ-series CPU Units.

■ Process I/O Units

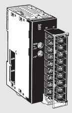
● Isolated-type Units with Universal Inputs

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	Standards
									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	UC1, CE
		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	UC1, L, CE

*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.

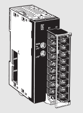
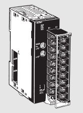
● Isolated-type DC Input Units

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	Standards
								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	UC1, CE

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

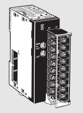
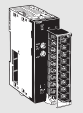
■ Analog I/O Units

● 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	Standards
										5 V	24 V		
CJ1 Special I/O Units	**Analog Input Units** High-speed type 	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	UC1, CE
	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	UC1, N, L, CE
		4 inputs								0.42	---	CJ1W-AD041-V1	

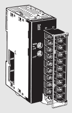
*1 The direct conversion function using the AIDC instruction cannot be used.
*2 The resolution and conversion speed cannot be set independently. If the resolution is set to 1/4,000, then the conversion speed will be 1 ms/point.
*3 At 23 ±2°C

● 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	Standards
											5 V	24 V		
CJ1 Special I/O Units	**Analog Output Units** High-speed type 	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	UC1, CE
	Analog Output Units 	8 outputs		1 to 5 V, 0 5 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	0.14 *2	CJ1W-DA08V	UC1, N, L, CE
		8 outputs		4 to 20 mA					24 VDC $^{+10\%}_{-15\%}$, 170 mA max.		0.14	0.17 *2	CJ1W-DA08C	UC1, N, CE
		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.	Voltage output: ±0.3% of F.S. Current output: ±0.5% of F.S.		24 VDC $^{+10\%}_{-15\%}$, 200 mA max.		0.12	0.2 *2	CJ1W-DA041	UC1, N, L, CE
		2 outputs							24 VDC $^{+10\%}_{-15\%}$, 140 mA max.		0.12	0.14 *2	CJ1W-DA021	

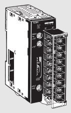
*1 The direct conversion function using the AODC instruction cannot be used.
*2 This is for an external power supply, and not for internal current consumption

● Analog I/O Units

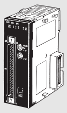
Unit classification	Product name	No. of points	Signal range selection	Signal range	Resolution (See note.)	Conversion speed (See note.)	Accuracy (at ambient temperature of 25°C)	External connection	No. of unit numbers allocated	Current consumption (A)		Model	Standards
										5 V	24 V		
CJ1 Special I/O Units	**Analog 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	UC1, N, L, CE
		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	Standards
		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	UC1, N, L, CE
				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	

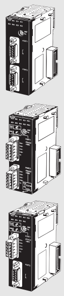
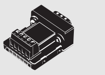
■ High-speed Counter Unit

Unit classification	Product name	Specifications			No. of unit numbers allocated	Current consumption (A)		Model	Standards
		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	UC1, N, L, CE
			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	Standards
		Communications Interface	Communications functions		5 V	24 V		
CJ1 CPU Bus Units	**Serial Communications Units** High-speed type 	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	UC1, N, L, CE
		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	

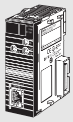
Note: Simple Backup Function and Interrupt notification function cannot be used.

*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	Standards
		Communications cable	Communications functions	Max. Units mountable per CPU Unit		5 V	24 V		
CJ1 CPU Bus Unit	**EtherNet/IP Unit** 	STP (shielded twisted-pair) cable of category 5, 5e, or higher	Tag data link message service	4	1	0.41	---	CJ1W-EIP21 *	UC1, N, L, CE

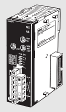
* Supported only by the EtherNet/IP Units with unit version 2.1 or later , CPU Units with unit version 1.01 or later and the Sysmac Studio version 1.02 or higher.

■ EtherCAT Slave Unit

Unit classification	Product name	Specifications	Communications type	No. of unit numbers allocated	Current consumption (A)		Model	Standards
					5 V	24 V		
CJ1 CPU Bus Units	**EtherCAT Slave Unit** 	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 *	UC1, CE, KC

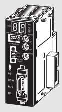
* When using with the Machine Automation Controller NJ /NXSeries, use CPU Units with unit version 1.10 or later and the Sysmac Studio version 1.13 or higher.

■ DeviceNet Unit

Unit classification	Product name	Specifications	Communications type	No. of unit numbers allocated	Current consumption (A)		Model	Standards
					5 V	24 V		
CJ1 CPU Bus Units	**DeviceNet Unit** 	Functions as master and/or slave; allows control of 32,000 points max. per master.	• 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	UC1, N, L, CE

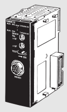
Note: 1. Simple backup function cannot be used.
2. DeviceNet configurator cannot be used. Use CX-Integrator.

■ CompoNet Master Unit

Unit classification	Product name	Specifications		No. of unit numbers allocated	Current consumption (A)		Model	Standards
		Communications functions	No. of I/O points per Master Unit		5 V	24 V		
CJ1 Special I/O Units	**CompoNet Master Unit** 	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 *	U, U1, N, L, CE

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	Standards
		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	UC, CE
			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	Standards
EtherCAT junction slaves		3	20.4 to 28.8 VDC (24 VDC -15 to +20%)	0.08	GX-JC03	CE, UC1
		6		0.17	GX-JC06	

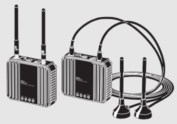
Note: 1. Please do not connect EtherCAT junction slaves with OMRON position control unit, Model CJ1W-NC□81/□82.
2. EtherCAT junction slaves cannot be used for EtherNet/IP and Ethernet.

■ Industrial Switching Hubs for EtherNet/IP and Ethernet

Product name		Specifications			Accessories	Current consumption (A)	Model	Standards
		Functions	No. of ports	Failure detection				
Industrial Switching Hubs		Quality of Service (QoS): EtherNet/IP control data priority Failure detection: Broadcast storm and LSI error detection 10/100BASE-TX, Auto-Negotiation	3	No	• Power supply connector	0.22	W4S1-03B	UC, CE
			5	No			W4S1-05B	
			5	Yes	• Power supply connector • Connector for informing error		W4S1-05C	CE

Note: Industrial switching hubs cannot be used for EtherCAT.

■ WE70 FA WIRELESS LAN UNITS

Product name	Applicable region	Type	Model	Standards
WE70 FA WIRELESS LAN UNITS 	Japan	Access Point (Master)	WE70-AP	---
		Client (Slave)	WE70-CL	
	Europe	Access Point (Master)	WE70-AP-EU	CE
		Client (Slave)	WE70-CL-EU	
	U.S	Access Point (Master)	WE70-AP-US	UC
		Client (Slave)	WE70-CL-US	
	Canada	Access Point (Master)	WE70-AP-CA	
		Client (Slave)	WE70-CL-CA	
	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. For example, using the WE70-AP-US outside of the United States is illegal in terms of the usage of electromagnetic waves. Refer to the WE70 Catalog (Cat. No. N154).

Automation Software Sysmac Studio

Ordering Information

Automation Software

Please purchase a DVD and licenses the first time you purchase the Sysmac Studio. DVDs and licenses are available individually.
The license does not include the DVD.

Product	Specifications			Model	Standards
		Number of licenses	Media		
Sysmac Studio Standard Edition Ver.1.□□	The Sysmac Studio is the software that provides an integrated environment for setting, programming, debugging and maintenance of machine automation controllers including the NJ/NX Series, EtherCAT Slave, and the HMI. Sysmac Studio runs on the following OS. Windows XP (Service Pack 3 or higher, 32-bit version) / Windows Vista (32-bit version) / Windows 7 (32-bit/64-bit version) / Windows 8 (32-bit/64-bit version) / Windows 8.1(32-bit/64-bit version)	– (Media only)	DVD *1	**SYSMAC-SE200D**	–
		1 license	–	**SYSMAC-SE201L**	–
		3 licenses	–	**SYSMAC-SE203L**	–
		10 licenses	–	**SYSMAC-SE210L**	–
		30 licenses	–	**SYSMAC-SE230L**	–
		50 licenses	–	**SYSMAC-SE250L**	–
Sysmac Studio Vision Edition Ver.1.□□ *2 *3	Sysmac Studio Vision Edition is a limited license that provides selected functions required for FQ-M-series and FH-series Vision Sensor settings.	1 license	–	**SYSMAC-VE001L**	–
Sysmac Studio Measurement Sensor Edition Ver.1.□□ *3 *4	Sysmac Studio Measurement Sensor Edition is a limited license that provides selected functions required for ZW-series Displacement Sensor settings.	1 license	–	**SYSMAC-ME001L**	–
		3 licenses	–	**SYSMAC-ME003L**	–
Sysmac Studio NX-I/O Edition Ver.1.□□ *3 *5	Sysmac Studio NX-I/O Edition is a limited license that provides selected functions required for EtherNet/IP Coupler settings.	1 license	–	**SYSMAC-NE001L**	–

Note: Site licenses are available for users who will run Sysmac Studio on multiple computers. Ask your OMRON sales representative for details.
*1. The same media is used for both the Standard Edition and the Vision Edition.
*2. With the Vision Edition, you can use only the setup functions for FQ-M-series and FH-series Vision Sensors.
*3. This product is a license only. You need the Sysmac Studio Standard Edition DVD media to install it.
*4. With the Measurement Sensor Edition, you can use only the setup functions for ZW-series Displacement Sensors.
*5. With the NX-I/O Edition, you can use only the setup functions for EtherNet/IP Coupler.

Components

DVD (SYSMAC-SE200D)

Components	Details
Introduction	An introduction about components, installation/uninstallation, user registration and auto update of the Sysmac Studio is provided.
Setup disk (DVD-ROM)	1

License (SYSMAC-SE2□□L/VE0□□L/ME0□□L)

Components	Details
License agreement	The license agreement gives the usage conditions and warranty for the Sysmac Studio.
License card	A model number, version, license number, and number of licenses are described.
User registration card	Two cards are contained. One is for users in Japan and the other is for users in other countries.

Included Support Software

DVD media of Sysmac Studio includes the following support software.

Included Support Software		Outline
CX-Designer	**Ver.3.□**	The CX-Designer is used to create screens for NS-series PTs. *1
CX-Integrator	**Ver.2.□**	The CX-Integrator is used to set up FA networks.
CX-Protocol	**Ver.1.□**	The CX-Protocol is used for protocol macros for Serial Communications Units.
Network Configurator	**Ver.3.□**	The Network Configurator is used for tag data links on the built-in EtherNet/IP port.
SECS/GEM Configurator *2	**Ver.1.□**	The SECS/GEM Configurator is used for SECS/GEM settings.

*1. Please use the Sysmac Studio to create the project of the NA Series.
*2. Please purchase the required number of SECS/GEM Configurator licenses.

Ordering Information

CX-Compolet

Product name	Specification	Model	Standards
CX-Compolet*	Software components that can make it easy to create programs for communications between a computer and controllers. This packaged product bundles CX-Compolet and SYSMAC Gateway with 1 license each. Supported execution environment: .NET Framework (1.1, 2.0, 3.0, 3.5, 4.0 or 4.5.1) Development environment: Visual Studio 2005/2008/2010/2012/2013 Development languages: Visual Basic, C# Supported communications: Equal to SYSMAC Gateway.	**WS02-CPLC1**	–
	3 additional licenses (This product provides only additional licenses. The software must be purchased in advance.)	**WS02-CPLC1-L3**	
	5 additional licenses (This product provides only additional licenses. The software must be purchased in advance.)	**WS02-CPLC1-L5**	
	10 additional licenses (This product provides only additional licenses. The software must be purchased in advance.)	**WS02-CPLC1-L10**	
	Software components only. This package includes CX-Compolet with 1 license. SYSMAC Gateway is not included.	**WS02-CPLC2**	

Note: Supported only by the CPU Units with unit version 1.01 or later and the CX-Compolet version 1.31 or higher.
* One license is required per computer.

SYSMAC Gateway (Communications Middleware)

Product name	Specification	Model	Standards
SYSMAC Gateway*	Communications middleware for personal computers running Windows. Supports CIP communications and tag data links (EtherNet/IP) in addition to FinsGateway functions. This package includes SYSMAC Gateway with 1 licence. (Fins Gateway is also included.) Supported communications: RS-232C, USB, Controller Link, SYSMAC LINK, Ethernet, EtherNet/IP	**WS02-SGWC1**	–
	10 additional licenses (This product provides only additional licenses.)	**WS02-SGWC1-L**	

Note: Supported only by the CPU Units with unit version 1.01 or later and the SYSMAC Gateway version 1.31 or higher.
* One license is required per computer.

System Requirements (CX-Compolet / SYSMAC Gateway)

Item	Requirement					
Operating system (OS) Japanese or English system	Microsoft Windows Server 2003 (32bit)	Microsoft Windows Vista (32bit)	Microsoft Windows 7 (32bit/64bit *)	Microsoft Windows Server 2008 (32bit/64bit *) or Microsoft Windows Server 2008 R2 (64bit *)	Microsoft Windows Server 2012 (64bit*) or Microsoft Windows Server 2012 R2 (64bit*)	Microsoft Windows 8 (32bit/64bit*) or Microsoft Windows 8.1 (32bit/64bit*)
Personal compute	Windows computers with Intel x86 processor		Windows computers with Intel 32bit (x86) processor or 64bit (x64) -based processor			
Hard disk	At least 400 MB of available space					

Note: 1. USB Port on the PC can not be shared between SYSMAC Gateway and CX-One in Windows Vista or higher.
2. System requirements for Windows computers are the same as those recommended by Microsoft.
* This software runs on WOW64 (Windows-On-Windows 64). Customer application must be run as 32bit process.

Correspondence between Controller Models and Connected Networks

Yes : Supported, No : Not Supported

Personal Computer Side / Controller Model	RS-232C				USB	Ethernet (LAN)		Controller Link
	SYSWAY (Host Link C Mode)	SYSWAY-CV (Host Link FINS)	CompoWay/F (master at personal computer)	Peripheral Bus	FINS	Ethernet (FINS)	EtherNet/IP	FINS
NJ5 (unit version 1.01 or later)*1	No	No	No	No	No	No	Yes*2	No
NJ3 (unit version 1.01 or later)*1	No	No	No	No	No	No	Yes*2	No

✻1. To connect the NJ Controller, CX-Compolet / SYSMAC Gateway version 1.31 or higher is required.
✻2. Tag data links between SYSMAC Gateway and the NJ-series CPU Unit can be created within the CJ-series specifications for variable with basic data type, array variable, and structure variable. SYSMAC Gateway memory allocation of structure variable is the same as the CJ-series.

Ordering Information

New models NA5-□U□□□□ are released in April 2015.
New models NA5-□U□□□□ and existing models NA5-□W□□□□ have the same specifications and performance characteristics of hardware and software except for certified safety standards.
For certified safety specifications, refer to International standards in the *General Specifications* on page 49.

NA5-□U

Product name	Specifications	Model
NA5-15U	15.4 inch wide screen, TFT LCD, 16,770,000 colors (24 bit full color), 1280 × 800 dots, Frame color : Silver	**NA5-15U101S**
	15.4 inch wide screen, TFT LCD, 16,770,000 colors (24 bit full color), 1280 × 800 dots, Frame color : Black	**NA5-15U101B**
NA5-12U	12.1 inch wide screen, TFT LCD, 16,770,000 colors (24 bit full color), 1280 × 800 dots, Frame color : Silver	**NA5-12U101S**
	12.1 inch wide screen, TFT LCD, 16,770,000 colors (24 bit full color), 1280 × 800 dots, Frame color : Black	**NA5-12U101B**
NA5-9U	9 inch wide screen, TFT LCD, 16,770,000 colors (24 bit full color), 800 × 480 dots, Frame color : Silver	**NA5-9U001S**
	9 inch wide screen, TFT LCD, 16,770,000 colors (24 bit full color), 800 × 480 dots, Frame color : Black	**NA5-9U001B**
NA5-7U	7 inch wide screen, TFT LCD, 16,770,000 colors (24 bit full color), 800 × 480 dots, Frame color : Silver	**NA5-7U001S**
	7 inch wide screen, TFT LCD, 16,770,000 colors (24 bit full color), 800 × 480 dots, Frame color : Black	**NA5-7U001B**

NA5-□W

Product name	Specifications	Model
NA5-15W	15.4 inch wide screen, TFT LCD, 16,770,000 colors (24 bit full color), 1280 × 800 dots, Frame color : Silver	**NA5-15W101S**
	15.4 inch wide screen, TFT LCD, 16,770,000 colors (24 bit full color), 1280 × 800 dots, Frame color : Black	**NA5-15W101B**
NA5-12W	12.1 inch wide screen, TFT LCD, 16,770,000 colors (24 bit full color), 1280 × 800 dots, Frame color : Silver	**NA5-12W101S**
	12.1 inch wide screen, TFT LCD, 16,770,000 colors (24 bit full color), 1280 × 800 dots, Frame color : Black	**NA5-12W101B**
NA5-9W	9 inch wide screen, TFT LCD, 16,770,000 colors (24 bit full color), 800 × 480 dots, Frame color : Silver	**NA5-9W001S**
	9 inch wide screen, TFT LCD, 16,770,000 colors (24 bit full color), 800 × 480 dots, Frame color : Black	**NA5-9W001B**
NA5-7W	7 inch wide screen, TFT LCD, 16,770,000 colors (24 bit full color), 800 × 480 dots, Frame color : Silver	**NA5-7W001S**
	7 inch wide screen, TFT LCD, 16,770,000 colors (24 bit full color), 800 × 480 dots, Frame color : Black	**NA5-7W001B**

Options

Product name	Specifications	Model
SD memory card	2 GB	**HMC-SD291**
	4 GB	**HMC-SD491**
USB Memory	2 GB	**FZ-MEM2G**
	8 GB	**FZ-MEM8G**
Replacement Battery	Battery life: 5 years (at 25°C). This Battery is provided as an accessory.	**CJ1W-BAT01**
Anti-reflection Sheets	For the NA5-15W. Attach a Sheet to the screen to protect against diffused reflections and dirt. The entire Sheet is colorless and transparent. Five Sheets are provided in one set.	**NA-15WKBA04**
	For the NA5-12W. Attach a Sheet to the screen to protect against diffused reflections and dirt. The entire Sheet is colorless and transparent. Five Sheets are provided in one set.	**NA-12WKBA04**
	For the NA5-9W. Attach a Sheet to the screen to protect against diffused reflections and dirt. The entire Sheet is colorless and transparent. Five Sheets are provided in one set.	**NA-9WKBA04**
	For the NA5-7W. Attach a Sheet to the screen to protect against diffused reflections and dirt. The entire Sheet is colorless and transparent. Five Sheets are provided in one set.	**NA-7WKBA04**

USB Cable

Product name	Specifications
USB Cable	Use commercially available USB cable. Specifications: USB 2.0 cable (A connector - B connector), 5.0 m max.

Recommended Network Devices

Industrial Switching Hubs

Product name	Specifications					Model
	Functions	No. of ports	Failure detection	Accessories	Current consumption (A)	
Industrial Switching Hubs	Quality of Service (QoS): EtherNet/IP control data priority Failure detection: Broadcast storm and LSI error detection 10/100BASE-TX, Auto-Negotiation	3	No	Power supply connector	0.22	W4S1-03B
		5	No	• Power supply connector • Connector for informing error		W4S1-05B
		5	Yes			W4S1-05C

Recommended Ethernet Communications Cables

Use STP (shielded twisted-pair) cable of category 5 or higher

Product name		Recommended manufacturer	Model
Wire Gauge and Number of Pairs: AWG24, 4-pair Cable	Cables	Hitachi Metals, Ltd	NETSTAR-C5E SAB 0.5 × 4P
		Kuramo Electric Co.	KETH-SB
		SWCC Showa Cable Systems Co.	FAE-5004
	RJ45 Connectors	Panduit Corporation	MPS588
Wire Gauge and Number of Pairs: 0.5 mm, 4-pair Cable	Cables	Fujikura Ltd.	F-LINK-E 0.5mm × 4P
	RJ45 Connectors	Panduit Corporation	MPS588

Note: We recommend you to use above cable and RJ45 Connectors together.

Ordering Information

EtherCAT Coupler Unit

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

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

EtherNet/IP Coupler Unit

Unit type	Product Name	Current consumption	Maximum I/O power supply current	Model	Standards
NX Series EtherNet/IP Coupler Unit	EtherNet/IP Coupler Unit	1.50 W or lower	10 A	**NX-EIC202**	UC1, CE, KC

The following accessory comes with the Network Coupler Unit.

Item	Specification
End Cover	NX-END01 (1 pcs)

Digital Input Unit (Screwless Clamping Terminal Block, 12 mm Width)

Unit type	Product Name	Specification					Model	Standards
		Number of points	Internal I/O common	Rated input voltage	I/O refreshing method	ON/OFF response time		
NX Series Digital Input Units	DC Input Units	4 points	NPN	12 to 24 VDC	Switching Synchronous I/O refreshing and Free-Run refreshing	20 µs max./400 µs max.	**NX-ID3317**	UC1, N, L, CE, KC
				24 VDC		100 ns max./100 ns max.	**NX-ID3343**	
					Input refreshing with input changed time only*		**NX-ID3344**	
			PNP	12 to 24 VDC	Switching Synchronous I/O refreshing and Free-Run refreshing	20 µs max./400 µs max.	**NX-ID3417**	
				24 VDC	Input refreshing with input changed time only*	100 ns max./100 ns max.	**NX-ID3443**	
							NX-ID3444	
		8 points	NPN		Switching Synchronous I/O refreshing and Free-Run refreshing	20 µs max./400 µs max.	**NX-ID4342**	
			PNP				**NX-ID4442**	
			NPN				**NX-ID5342**	
		16 points	PNP				**NX-ID5442**	

* To use input refreshing with input changed time, NJ CPU Unit with unit version 1.06 or later, EtherCAT Coupler Unit with unit version 1.1 or later, and Sysmac Studio version 1.07 or higher are required.

DC Input Units (M3 Screw Terminal Block, 30 mm Width)

Unit type	Product Name	Specification					Model	Standards
		Number of points	Internal I/O common	Rated input voltage	I/O refreshing method	ON/OFF response time		
NX Series Digital Input Units	DC Input Units 	16 points	For both NPN/PNP	24 VDC	Switching Synchronous I/O refreshing and Free-Run refreshing	20 µs max./ 400 µs max.	**NX-ID5142-1**	UC1, CE, KC

DC Input Units (MIL Connector, 30 mm Width)

Unit type	Product Name	Specification					Model	Standards
		Number of points	Internal I/O common	Rated input voltage	I/O refreshing method	ON/OFF response time		
NX Series Digital Input Units	DC Input Units 	16 points	For both NPN/PNP	24 VDC	Switching Synchronous I/O refreshing and Free-Run refreshing	20 µs max./ 400 µs max.	**NX-ID5142-5**	UC1, CE, KC
		32 points					**NX-ID6142-5**	

DC Input Units (Fujitsu Connector, 30 mm Width)

Unit type	Product Name	Specification					Model	Standards
		Number of points	Internal I/O common	Rated input voltage	I/O refreshing method	ON/OFF response time		
NX Series Digital Input Units	DC Input Units 	32 points	For both NPN/PNP	24 VDC	Switching Synchronous I/O refreshing and Free-Run refreshing	20 µs max./ 400 µs max.	**NX-ID6142-6**	UC1, CE, KC

Analog Input Unit (Screwless Clamping Terminal Block, 12 mm Width)

Unit type	Product Name	Specification				Model	Standards
		Number of points	Rated input voltage	I/O refreshing method	ON/OFF response time		
NX Series Analog Input Units	AC Input Units 	4 points	200 to 240 VAC, 50/60 Hz (170 to 264 VAC, ±3 Hz)	Free-Run refreshing	10 ms max./40 ms max.	**NX-IA3317**	UC1, N, CE, KC

Transistor Output Unit (Screwless Clamping Terminal Block, 12 mm Width)

Unit type	Product Name	Specification						Model	Standards
		Number of points	Internal I/O common	Maximum value of load current	Rated voltage	I/O refreshing method	ON/OFF response time		
NX Series Digital output Units	Transistor Output Unit	2 points	NPN	0.5 A/point, 1 A/Unit	24 VDC	Output refreshing with specified time stamp only*	300 ns max./ 300 ns max.	**NX-OD2154**	UC1, N, L, CE, KC
			PNP					**NX-OD2258**	
		4 points	NPN	0.5 A/point, 2 A/Unit	12 to 24 VDC	Switching Synchronous I/O refreshing and Free-Run refreshing	0.1 ms max./ 0.8 ms max.	**NX-OD3121**	
					24 VDC		300 ns max./ 300 ns max.	**NX-OD3153**	
			PNP				0.5 ms max./ 1.0 ms max.	**NX-OD3256**	
							300 ns max./ 300 ns max.	**NX-OD3257**	
				2A/point, 8A/NXUnit			0.5ms max./ 1.0ms max.	**NX-OD3268**	UC1, CE, KC
		8 points	NPN	0.5 A/point, 4 A/Unit	12 to 24 VDC		0.1 ms max./ 0.8 ms max.	**NX-OD4121**	UC1, N, L, CE, KC
			PNP		24 VDC		0.5 ms max./ 1.0 ms max.	**NX-OD4256**	
		16 points	NPN		12 to 24 VDC		0.1 ms max./ 0.8 ms max.	**NX-OD5121**	
			PNP		24 VDC		0.5 ms max./ 1.0 ms max.	**NX-OD5256**	

* To use output refreshing with specified time stamp, NJ CPU Unit with unit version 1.06 or later, EtherCAT Coupler Unit with unit version 1.1 or later, and Sysmac Studio version 1.07 or higher are required.

Transistor Output Units (M3 Screw Terminal Block, 30 mm Width)

Unit type	Product Name	Specification						Model	Standards
		Number of points	Internal I/O common	Maximum value of load current	Rated voltage	I/O refreshing method	ON/OFF response time		
NX Series Digital output Units	Transistor Output Unit	16 points	NPN	0.5 A/point, 5 A/Unit	12 to 24 VDC	Switching Synchronous I/O refreshing and Free-Run refreshing	0.1 ms max./ 0.8 ms max.	**NX-OD5121-1**	UC1, CE, KC
			PNP		24 VDC		0.5 ms max./ 1.0 ms max.	**NX-OD5256-1**	

Transistor Output Units (MIL Connector, 30 mm Width)

Unit type	Product Name	Specification						Model	Standards
		Number of points	Internal I/O common	Maximum value of load current	Rated voltage	I/O refreshing method	ON/OFF response time		
NX Series Digital output Units	Transistor Output Unit	16 points	NPN	0.5 A/point, 2 A/Unit	12 to 24 VDC	Switching Synchronous I/O refreshing and Free-Run refreshing	0.1 ms max./ 0.8 ms max.	**NX-OD5121-5**	UC1, CE, KC
			PNP		24 VDC		0.5 ms max./ 1.0 ms max.	**NX-OD5256-5**	
		32 points	NPN	0.5 A/point, 2 A/common, 4 A/Unit	12 to 24 VDC		0.1 ms max./ 0.8 ms max.	**NX-OD6121-5**	
			PNP		24 VDC		0.5 ms max./ 1.0 ms max.	**NX-OD6256-5**	

Transistor Output Units (Fujitsu Connector, 30 mm Width)

Unit type	Product Name	Specification						Model	Standards
		Number of points	Internal I/O common	Maximum value of load current	Rated voltage	I/O refreshing method	ON/OFF response time		
NX Series Digital output Units	Transistor Output Unit	32 points	NPN	0.5 A/point, 2 A/common, 4 A/Unit	12 to 24 VDC	Switching Synchronous I/O refreshing and Free-Run refreshing	0.1 ms max./ 0.8 ms max.	**NX-OD6121-6**	UC1, CE, KC

Relay Output Unit (Screwless Clamping Terminal Block, 12 mm Width)

Unit type	Product Name	Specification					Model	Standards
		Capacity	Relay type	Maximum switching capacity	I/O refreshing method	ON/OFF response time		
NX Series Digital output Units	Relay Output Unit	2 points	N.O.	AC250V/2A (cosϕ=1) AC250V/2A (cosϕ=0.4) DC24V/2A 4A/NX Unit	Free-Run refreshing	15ms max./ 15ms max.	**NX-OC2633**	UC1, N, L, CE, KC
			NO+NC				**NX-OC2733**	UC1, N, CE,KC

Digital Mixed I/O Unit

● DC Input/Transistor Output Units (MIL Connector, 30 mm Width)

Unit type	Product Name	Specification						Model	Standards
		Number of points	Internal I/O common	Maximum value of load current	Rated voltage	I/O refreshing method	ON/OFF response time		
NX Series Digital Mixed I/O Units	DC Input/ Transistor Output Units	Outputs: 16 points Inputs: 16 points	Outputs: NPN Inputs: For both NPN/PNP	0.5 A/point, 2 A/Unit	Outputs: 12 to 24 VDC Inputs: 24 VDC	Switching Synchronous I/O refreshing and Free-Run refreshing	Outputs: 0.1 ms max./ 0.8 ms max. Inputs: 20 µs max./ 400 µs max.	**NX-MD6121-5**	UC1, CE, KC
			Outputs: PNP Inputs: For both NPN/PNP		Outputs: 24 VDC Inputs: 24 VDC		Outputs: 0.5 ms max./ 1.0 ms max. Inputs: 20 µs max./ 400 µs max.	**NX-MD6256-5**	

● DC Input/Transistor Output Units (Fujitsu Connector, 30 mm Width)

Unit type	Product Name	Specification						Model	Standards
		Number of points	Internal I/O common	Maximum value of load current	Rated voltage	I/O refreshing method	ON/OFF response time		
NX Series Digital Output Units	Transistor Output Units	Outputs: 16 points Inputs: 16 points	Outputs: NPN Inputs: For both NPN/PNP	0.5 A/point, 2 A/Unit	Outputs: 12 to 24 VDC Inputs: 24 VDC	Switching Synchronous I/O refreshing and Free-Run refreshing	Outputs: 0.1 ms max./ 0.8 ms max. Inputs: 20 µs max./ 400 µs max.	**NX-MD6121-6**	UC1, CE, KC

Analog Input Unit

Unit type	Product Name	Specification									NX Unit power consumption	Model	Standards
		Capacity	Input range	Resolution	Conversion value, decimal number (0 to 100%)	Over all accuracy (25°C)	Input method	Conversion time	Input impedance	I/O refreshing method			
NX Series Analog Input Unit	**Voltage Input Unit**	2 points	-10 to +10V	1/8000	-4000 to 4000	±0.2% (full scale)	Single-ended input	250 µs/point	1MΩ min.	Free-Run refreshing	1.05W max.	**NX-AD2603**	UC1, N, L, CE, KC
							Differential Input				1.05W max.	**NX-AD2604**	
				1/30000	-15000 to 15000	±0.1% (full scale)	Differential Input	10 µs/point		Selectable Synchronous I/O refreshing or Free-Run refreshing	1.05W max.	**NX-AD2608**	
		4 points		1/8000	-4000 to 4000	±0.2% (full scale)	Single-ended input	250 µs/point		Free-Run refreshing	1.10W max.	**NX-AD3603**	
							Differential Input				1.10W max.	**NX-AD3604**	
				1/30000	-15000 to 15000	±0.1% (full scale)	Differential Input	10 µs/point		Selectable Synchronous I/O refreshing or Free-Run refreshing	1.10W max.	**NX-AD3608**	
		8 points		1/8000	-4000 to 4000	±0.2% (full scale)	Single-ended input	250 µs/point		Free-Run refreshing	1.15W max.	**NX-AD4603**	
							Differential Input				1.15W max.	**NX-AD4604**	
				1/30000	-15000 to 15000	±0.1% (full scale)	Differential Input	10 µs/point		Selectable Synchronous I/O refreshing or Free-Run refreshing	1.15W max.	**NX-AD4608**	
	Current Input Unit	2 points	4 to 20mA	1/8000	0 to 8000	±0.2% (full scale)	Single-ended input	250 µs/point	250Ω	Free-Run refreshing	0.90W max.	**NX-AD2203**	
							Differential Input				0.90W max.	**NX-AD2204**	
				1/30000	0 to 30000	±0.1% (full scale)	Differential Input	10 µs/point		Selectable Synchronous I/O refreshing or Free-Run refreshing	0.90W max.	**NX-AD2208**	
		4 points		1/8000	0 to 8000	±0.2% (full scale)	Single-ended input	250 µs/point		Free-Run refreshing	0.90W max.	**NX-AD3203**	
							Differential Input				0.90W max.	**NX-AD3204**	
				1/30000	0 to 30000	±0.1% (full scale)	Differential Input	10 µs/point		Selectable Synchronous I/O refreshing or Free-Run refreshing	0.95W max.	**NX-AD3208**	
		8 points		1/8000	0 to 8000	±0.2% (full scale)	Single-ended input	250 µs/point	85Ω	Free-Run refreshing	1.05W max.	**NX-AD4203**	
							Differential Input				1.05W max.	**NX-AD4204**	
				1/30000	0 to 30000	±0.1% (full scale)	Differential Input	10 µs/point		Selectable Synchronous I/O refreshing or Free-Run refreshing	1.10W max.	**NX-AD4208**	

Analog Output Unit

Unit type	Product Name	Specification							NX Unit power consumption	Model	Standards
		Capacity	Input range	Resolution	Output setting value, decimal number (0 to 100%)	Over all accuracy (25°C)	Conversion time	I/O refreshing method			
NX Series Analog Output Unit	**Voltage Output Unit**	2 points	-10 to +10V	1/8000	-4000 to 4000	±0.3% (full scale)	250 µs/point	Free-Run refreshing	1.10W max.	**NX-DA2603**	UC1,N, L, CE,KC
				1/30000	-15000 to 15000	±0.1% (full scale)	10 µs/point	Selectable Synchronous I/O refreshing or Free-Run refreshing	1.10W max.	**NX-DA2605**	
		4 points		1/8000	-4000 to 4000	±0.3% (full scale)	250 µs/point	Free-Run refreshing	1.25W max.	**NX-DA3603**	
				1/30000	-15000 to 15000	±0.1% (full scale)	10 µs/point	Selectable Synchronous I/O refreshing or Free-Run refreshing	1.25W max.	**NX-DA3605**	
	Current Output Unit	2 points	4 to 20mA	1/8000	0 to 8000	±0.3% (full scale)	250 µs/point	Free-Run refreshing	1.75W max.	**NX-DA2203**	
				1/30000	0 to 30000	±0.1% (full scale)	10 µs/point	Selectable Synchronous I/O refreshing or Free-Run refreshing	1.75W max.	**NX-DA2205**	
		4 points		1/8000	0 to 8000	±0.3% (full scale)	250 µs/point	Free-Run refreshing	1.80W max.	**NX-DA3203**	
				1/30000	0 to 30000	±0.1% (full scale)	10 µs/point	Selectable Synchronous I/O refreshing or Free-Run refreshing	1.80W max.	**NX-DA3205**	

Temperature Input Unit

Unit type	Product Name	Specification							NX Unit power consumption	Model	Standards
		Capacity	Input type	Resolution (25°C)	Over all accuracy (25°C)	Conversion time	I/O refreshing method	Terminals			
NX Series Temperature Input Unit	**Thermocouple Input type**	2 points	Thermocouple	0.1°C max. *1	Refer to Reference accuracy and temperature coefficient according to the input type and measurement temperature	250 ms/ Unit	Free-Run refreshing	16 Terminals	0.90W max.	**NX-TS2101**	UC1, N, L, CE, KC
		4 points						16 Terminals x 2	1.30W max.	**NX-TS3101**	
		2 points		0.01°C max.		10 ms/Unit		16 Terminals	0.80W max.	**NX-TS2102**	
		4 points						16 Terminals x 2	1.10W max.	**NX-TS3102**	
		2 points		0.001°C max.		60 ms/Unit		16 Terminals	0.80W max.	**NX-TS2104**	
		4 points						16 Terminals x 2	1.10W max.	**NX-TS3104**	
	Resistance Thermometer Input type	2 points	Resistance Thermometer (Pt100/ Pt1000, three-wire) *2	0.1°C max.		250 ms/ Unit		16 Terminals	0.90W max.	**NX-TS2201**	
		4 points						16 Terminals x 2	1.30W max.	**NX-TS3201**	
		2 points		0.01°C max.		10 ms/Unit		16 Terminals	0.75W max.	**NX-TS2202**	
		4 points						16 Terminals x 2	1.05W max.	**NX-TS3202**	
		2 points		0.001°C max.		60 ms/Unit		16 Terminals	0.75W max.	**NX-TS2204**	
		4 points						16 Terminals x 2	1.05W max.	**NX-TS3204**	

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

Incremental Encoder Input Unit

Unit type	Product Name	Specification						Model	Standards
		Number of channels	External inputs	Maximum response frequency	I/O refreshing method	Number of I/O entry mappings	Remarks		
NX Series Position Interface Unit	Incremental Encoder Input Units	1 (NPN)	3 (NPN)	500 kHz	• Free-Run refreshing • Synchronous I/O refreshing	1/1	24-V voltage input	**NX-EC0112**	UC1, CE, KC
		1 (PNP)	3 (PNP)					**NX-EC0122**	UC1, N, L, CE, KC
		1	3 (NPN)	4 MHz			Line receiver input	**NX-EC0132**	UC1, CE, KC
			3 (PNP)					**NX-EC0142**	UC1, N, L, CE, KC
		2 (NPN)	None	500 kHz		2/2	24-V voltage input	**NX-EC0212**	UC1, CE, KC
		2 (PNP)						**NX-EC0222**	UC1, N, L, CE, KC

SSI Input Unit

Unit type	Product Name	Specification					Model	Standards
		Number of channels	Input/Output form	Maximum data length	Encoder power supply	Type of external connections		
NX Series Position Interface Unit	**SSI Input Units**	1	EIA standard RS-422-A	32 bits	DC24V, 0.3A/CH	Screwless push-in terminal block (12 terminals)	**NX-ECS112**	UC1, N, L, CE, KC
		2	EIA standard RS-422-A	32 bits	DC24V, 0.3A/CH	Screwless push-in terminal block (12 terminals)	**NX-ECS212**	UC1, N, L, CE, KC

Pulse Output Unit

Unit type	Product Name	Specification						Model	Standards
		Number of channels	External inputs	External outputs	Maximum pulse output speed	I/O refreshing method	Number of I/O entry mappings		
NX Series Position Interface Unit	Pulse Output Units	1 (NPN)	2 (NPN)	1 (NPN)	500 kpps	Synchronous I/O refreshing	1/1	**NX-PG0112**	UC1, CE, KC
		1 (PNP)	2 (PNP)	1 (PNP)				**NX-PG0122**	UC1, N, L, CE, KC

System Unit

● Additional NX Unit Power Supply Unit

Unit type	Product Name	Power supply voltage	NX Bus power supply capacity	NX Unit power consumption	Model	Standards
NX Series System Unit	**Additional NX Unit Power Supply Unit**	24 VDC (20.4 to 28.8 VDC)	10 W max.	0.45 W max.	**NX-PD1000**	UC1, N, L, CE, KC

● Additional I/O Power Supply Unit

Unit type	Product Name	Power supply voltage	I/O power feed maximum current	NX Unit power consumption	Model	Standards
NX Series System Unit	**Additional I/O Power Supply Unit**	5 to 24 VDC (4.5 to 28.8 VDC)	4 A	0.45 W max.	**NX-PF0630**	UC1, N, L, CE, KC
			10 A		**NX-PF0730**	

● I/O Power Supply Connection Unit

Unit type	Product Name	Number of I/O power terminals	Current capacity of I/O power terminal	NX Unit power consumption	Model	Standards
NX Series System Unit	**I/O Power Supply Connection Unit**	IOG: 16 terminals	4 A/terminal max.	0.45 W max.	**NX-PC0010**	UC1, N, L, CE, KC
		IOV: 16 terminals	4 A/terminal max.	0.45 W max.	**NX-PC0020**	UC1, N, L, CE, KC
		IOV:8 terminals IOG:8 terminals	4 A/terminal max.	0.45 W max.	**NX-PC0030**	UC1, N, L, CE, KC

● Shield Connection Unit

Unit type	Product Name	Number of shield terminals	NX Unit power consumption	Model	Standards
NX Series System Unit	**Shield Connection Unit**	14 terminals (The following two terminals are functional ground terminals.)	0.45 W max.	**NX-TBX01**	UC1, N, L, CE, KC

Optional Products and Maintenance Products

Product Name	Specification	Model	Standards
Unit/Terminal Block Coding Pins	For 10 Units (Terminal Block: 30 pins, Unit: 30 pins)	**NX-AUX02**	---
End Cover	One End Cover is provided as a standard accessory with EtherCAT Coupler Unit.	**NX-END01**	---
DIN Track Insulation Spacers	A Spacer to insulate the control panel from the DIN Track. To insulate the EtherCAT Slave Terminal from the control panel, use Din Track Insulation Spacers.	**NX-AUX01**	---

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

Ordering Information

Safety CPU Unit

Unit type	Appearance	Specifications					Model
		Maximum number of safety I/O points	**Program capacity**	**Number of safety master connections**	**I/O refreshing method**	**Unit version**	
Safety CPU Unit		256 points	512KB	32	Free-Run refreshing	Ver.1.1	**NX-SL3300**
		1024 points	2048KB	128	Free-Run refreshing	Ver.1.1	**NX-SL3500**

Safety Input Units

Unit type	Appearance	Specifications								Model
		Number of safety input points	**Number of test output points**	**Internal I/O common**	**Rated input voltage**	**OMRON special safety input devices**	**Number of safety slave connections**	**I/O refreshing method**	**Unit version**	
Safety Input Units		4 points	2 points	Sinking inputs (PNP)	24 VDC	Can be connected. ✻	1	Free-Run refreshing	Ver.1.1	NX-SIH400
		8 points	2 points	Sinking inputs (PNP)	24 VDC	Cannot be connected.	1	Free-Run refreshing	Ver.1.0	NX-SID800

✻ The following OMRON special safety input devices can be connected directly without a special controller.
For detail of connectable OMRON special safety input devices,refer to NX-series Safety Control Units User's Manual(No.Z930-E1).

Type	Model and corresponding PL and safety category
OMRON Single-beam Safety Sensors	E3ZS and E3FS
OMRON Non-contact Door Switches	D40Z D40A
OMRON Safety Mats	UM
OMRON Safety Edges	SGE (4-wire connection)

Safety Output Units

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

Option

Product Name	Specification	Model
Unit/Terminal Block Coding Pins	For 10 Units (Terminal Block: 30 pins, Unit: 30 pins)	**NX-AUX02**

Product name	Specification				Model
	No. of terminals	Terminal number indications	Ground terminal mark	Terminal current capacity	
Terminal Block	8	A/B	None	10A	**NX-TBA082**
	16	A/B	None	10A	**NX-TBA162**

Interpreting Model Numbers

AC Servo Drive Rotary Motor Type Model Numbers

R88D-K N 01 H -ECT

(1) (2) (3) (4) (5)

No	Item	Symbol	Specifications
(1)	G5-Series Servo Drive		
(2)	Drive Type	N	Communication type
(3)	Maximum Applicable Servomotor Capacity	A5	50 W
		01	100 W
		02	200 W
		04	400 W
		06	600 W
		08	750 W
		10	1 kW
		15	1.5 kW
		20	2 kW
		30	3 kW
		40	4 kW
		50	5 kW
		75	7.5 kW
		150	15 kW
(4)	Power Supply Voltage	L	100 VAC
		H	200 VAC
		F	400 VAC
(5)	Network type	-ECT	EtherCAT Communications

AC Servo Drive Linear Motor Type Model Numbers

R88D-K N 01 H -ECT -L

(1) (2) (3) (4) (5) (6)

No	Item	Symbol	Specifications
(1)	G5-series Servo Drive		
(2)	Drive Type	N	Communication type
(3)	Maximum Applicable Linear Motor Capacity	01	100 W
		02	200 W
		04	400 W
		06	600 W
		08	750 W
		10	1 kW
		15	1.5 kW
		20	2 kW
		30	3 kW
(4)	Power Supply Voltage	L	100 VAC
		H	200 VAC
		F	400 VAC
(5)	Network type	-ECT	EtherCAT Communications
(6)	Motor type	-L	Linear Motor

Servomotor Model Numbers

R88M-K □ 750 30 H -BO S2

(1) (2) (3) (4) (5) (6)

No	Item	Symbol	Specifications
(1)	G5-Series Servomotor		
(2)	Motor Type	Blank	Cylinder type
(3)	Servomotor Capacity	050	50 W
		100	100 W
		200	200 W
		400	400 W
		600	600 W
		750	750 W
		900	900 W
		1K0	1 kW
		1K5	1.5 kW
		2K0	2 kW
		3K0	3 kW
		4K0	4 kW
		4K5	4.5 kW
		5K0	5 kW
		6K0	6 kW
		7K5	7.5 kW
		11K0	11 kW
		15K0	15 kW
(4)	Rated Rotation Speed	10	1,000 r/min
		15	1,500 r/min
		20	2,000 r/min
		30	3,000 r/min
(5)	Applied Voltage	F	400 VAC (with incremental encoder specifications) **INC**
		H	200 VAC (with incremental encoder specifications) **INC**
		L	100 VAC (with incremental encoder specifications) **INC**
		C	400 VAC (with absolute encoder specifications) **ABS/INC**
		T	200VAC (with absolute encoder specifications) **ABS/INC**
		S	100 VAC (with absolute encoder specifications) **ABS/INC**
(6)	Option	Blank	Straight shaft
		B	With brake
		O	With oil seal
		S2	With key and tap

Note: **INC** incremental encoder: 20bit
ABS/INC incremental encoder: 17bit, absolute encoder: 17bit

Linear Motor

● Iron-core linear motor

Motor Coil Unit

R88L-EC	-FW	-03	03	-A	NP	C
(1)	(2)	(3)	(4)	(5)	(6)	(7)

No	Item	Symbol	Specifications
(1)	G5-series Linear Motor		
(2)	Part Type	FW	Iron-core type Motor Coil Unit
(3)	Effective Magnet Width	03	30mm
		06	60mm
		11	110mm
(4)	Coil Model	03	3-coil
		06	6-coil
		09	9-coil
		12	12-coil
		15	15-coil
(5)	Version	A	Ver.A
(6)	Connector	NP	Not Provided
(7)	Type	C	Compact type

Magnet Trac

R88L-EC	-FM	-03	096	-A
(1)	(2)	(3)	(4)	(5)

No	Item	Symbol	Specifications
(1)	G5-series Linear Motor		
(2)	Part Type	FM	Iron-core type Magnet Trac
(3)	Effective Magnet Width	03	30mm
		06	60mm
		11	110mm
(4)	Magnet Trac Unit Length	096	96mm
		144	144mm
		192	192mm
		288	288mm
		384	384mm
(5)	Version	A	Ver.A

● Ironless linear motor

Motor Coil Unit

R88L-EC	-GW	-03	03	-A	NP	S
(1)	(2)	(3)	(4)	(5)	(6)	(7)

No	Item	Symbol	Specifications
(1)	G5-series Linear Motor		
(2)	Part Type	GW	Ironless type Motor Coil Unit
(3)	Effective Magnet Width	03	30mm
		05	50mm
		07	70mm
(4)	Coil Model	03	3-coil
		06	6-coil
		09	9-coil
(5)	Version	A	Ver.A
(6)	Connector	NP	Not Provided
(7)	Type	S	Standard type

Magnet Trac

R88L-EC	-GM	-03	090	-A
(1)	②	③	④	⑤

No	Item	Symbol	Specifications
(1)	G5-series Linear Motor		
(2)	Part Type	GM	Ironless type Magnet Trac
(3)	Effective Magnet Width	03	30mm
		05	50mm
		07	70mm
(4)	Magnet Trac Unit Length	090	90mm
		114	114mm
		120	120mm
		126	126mm
		168	168mm
		171	171mm
		210	210mm
		390	390mm
		456	456mm
		546	546mm
(5)	Version	A	Ver.A

Understanding Decelerator Model Numbers (Backlash = 3' Max./Backlash = 15' Max.)

Backlash = 3' Max.

R88G-HPG 14A 05 100 S B J
(1) (2) (3) (4) (5) (6) (7)

No	Item	Symbol	Specifications
(1)	Decelerator for G□-Series Servomotors Backlash = 3' Max.		
(2)	Flange Size Number	11B	□40
		14A	□60
		20A	□90
		32A	□120
		50A	□170
		65A	□230
(3)	Gear Ratio	05	1/5
		09	1/9 (only frame number 11B)
		11	1/11 (except frame number 65A)
		12	1/12 (only frame number 65A)
		20	1/20 (only frame number 65A)
		21	1/21 (except frame number 65A)
		25	1/25 (only frame number 65A)
		33	1/33
		45	1/45
(4)	Applicable Servomotor Capacity	050	50 W
		100	100 W
		200	200 W
		400	400 W
		750	750 W
		900	900 W
		1K0	1 kW
		1K5	1.5 kW
		2K0	2 kW
		3K0	3 kW
		4K0	4 kW
		4K5	4.5 kW
		5K0	5 kW
(5)	Motor Type	Blank	3,000-r/min cylindrical servomotors
		S	2,000-r/min cylindrical servomotors
		T	1,000-r/min cylindrical servomotors
(6)	Backlash	B	Backlash = 3' Max
(7)	Option	Blank	Straight shaft
		J	With key and tap

Backlash = 15' Max.

R88G-VRSF 09 B 100 C J
(1) (2) (3) (4) (5) (6) (7)

No	Item	Symbol	Specifications
(1)	Decelerator for G□-Series Servomotors Backlash = 15' Max.		
(2)	Gear Ratio	05	1/5
		09	1/9
		15	1/15
		25	1/25
(3)	Flange Size Number	B	□52
		C	□78
		D	□98
(4)	Applicable Servomotor Capacity	050	50 W
		100	100 W
		200	200 W
		400	400 W
		750	750 W
(5)	Motor Type	Blank	3,000-r/min cylindrical servomotors
(6)	Backlash	C	Backlash = 15' Max
(7)	Option	J	With key (without tap)

Table of Servomotor Variations

R88M-K□□□□□□□-□□□□

(3) (4) (5) (6) (7) (8) (9)

(3)	(4)	(5)		(6)						(7)		(8)		(9)	
Type	**Applicable Servomotor Capacity**	**Rotation speed**	**Model**	**Applied Voltage**						**With brake / Without brake**		**Models with oil seals**		**Shaft type**	
				INC	**INC**	**INC**	**ABS**	**ABS**	**ABS**						
				400	**200**	**100**	**400**	**200**	**100**	–	**B**				
				F	**H**	**L**	**C**	**T**	**S**	**Blank**	**With brake**	**Blank**	**O**	**Blank**	**S2**
Cylinder	50 W	3,000 r/min	R88M-K05030 *1		√			√		√	√	√	√	√	√
	100 W		R88M-K10030		√	√		√	√	√	√	√	√	√	√
	200 W		R88M-K20030		√	√		√	√	√	√	√	√	√	√
	400 W		R88M-K40030		√	√		√	√	√	√	√	√	√	√
	750 W		R88M-K75030	√	√		√	√		√	√	√	√	√	√
	1 kW		R88M-K1K030	√	√		√	√		√	√	√	√	√	√
	1.5 kW		R88M-K1K530	√	√		√	√		√	√	√	√	√	√
	2 kW		R88M-K2K030	√	√		√	√		√	√	√	√	√	√
	3 kW		R88M-K3K030	√	√		√	√		√	√	√	√	√	√
	4 kW		R88M-K4K030	√	√		√	√		√	√	√	√	√	√
	5 kW		R88M-K5K030	√	√		√	√		√	√	√	√	√	√
	400 W	2,000 r/min	R88M-K40020	√			√			√	√	√	√	√	√
	600 W		R88M-K60020	√			√			√	√	√	√	√	√
	1 kW		R88M-K1K020	√	√		√	√		√	√	√	√	√	√
	1.5 kW		R88M-K1K520	√	√		√	√		√	√	√	√	√	√
	2 kW		R88M-K2K020	√	√		√	√		√	√	√	√	√	√
	3 kW		R88M-K3K020	√	√		√	√		√	√	√	√	√	√
	4 kW		R88M-K4K020	√	√		√	√		√	√	√	√	√	√
	5 kW		R88M-K5K020	√	√		√	√		√	√	√	√	√	√
	7.5 kW		R88M-K7K515 *2				√	√		√	√	√	√	√	√
	11 kW		R88M-K11K015 *2				√	√		√	√	√	√	√	√
	15 kW		R88M-K15K015 *2				√	√		√	√	√	√	√	√
	900 W	1,000 r/min	R88M-K90010	√	√		√	√		√	√	√	√	√	√
	2 kW		R88M-K2K010	√	√		√	√		√	√	√	√	√	√
	3 kW		R88M-K3K010	√	√		√	√		√	√	√	√	√	√
	4.5 kW		R88M-K4K510				√	√		√	√	√	√	√	√
	6 kW		R88M-K6K010				√	√		√	√	√	√	√	√
Blank: Cylinder type	example 030: 30 W 100: 100 W 1K0: 1 kW	10: 1,000 r/min 20: 2,000 r/min 30: 3,000 r/min		F: 400 VAC (with incremental encoder) INC H: 200 VAC (with incremental encoder) INC L: 100 VAC (with incremental encoder) INC C: 400 VAC (with absolute encoder) ABS/INC T: 200 VAC (with absolute encoder) ABS/INC S: 100 VAC (with absolute encoder) ABS/INC						Blank: Without brake B: 24 VDC With brake		Blank: Without oil seals O: With oil seals		Blank: Straight shaft S2: With key and tap	

*1 R88M-K05030H-□, R88M-K05030T-□, can be used for Power Supply Voltage of 100/200VAC.
*2 The rated speed is 1,500 r/min.

Ordering Information

AC Servo Drives

EtherCAT Communications

Specifications		Model
Power Model Supply Voltage	Applicable Servomotor Capacity	
Single-phase 100 VAC	50 W	R88D-KNA5L-ECT
	100 W	R88D-KN01L-ECT
	200 W	R88D-KN02L-ECT
	400 W	R88D-KN04L-ECT
Single-phase/three-phase 200 VAC	100 W	R88D-KN01H-ECT
	200 W	R88D-KN02H-ECT
	400 W	R88D-KN04H-ECT
	750 W	R88D-KN08H-ECT
	1 kW	R88D-KN10H-ECT
	1.5 kW	R88D-KN15H-ECT
Three-phase 200 VAC	2 kW	R88D-KN20H-ECT
	3 kW	R88D-KN30H-ECT
	5 kW	R88D-KN50H-ECT
	7.5 kW	R88D-KN75H-ECT
	15 kW	R88D-KN150H-ECT
Three-phase 400 VAC	600 W	R88D-KN06F-ECT
	1 kW	R88D-KN10F-ECT
	1.5 kW	R88D-KN15F-ECT
	2 kW	R88D-KN20F-ECT
	3 kW	R88D-KN30F-ECT
	5 kW	R88D-KN50F-ECT
	7.5 kW	R88D-KN75F-ECT
	15 kW	R88D-KN150F-ECT

Note: When connecting a Servo Drive to the NJ-Series Machine Automation Controller, it is recommended that you use the Servo Drive with Built-in EtherCAT Communications, R88D-KN□□□-ECT, with unit version 2.1 or later.

Linear Motor with built-in EtherCAT communications

Specifications		Model
Power Supply Voltage	Applicable Servomotor Capacity	
Single-phase 100 VAC	100 W	R88D-KN01L-ECT-L
	200 W	R88D-KN02L-ECT-L
	400 W	R88D-KN04L-ECT-L
Single-phase/three-phase 200 VAC	100 W	R88D-KN01H-ECT-L
	200 W	R88D-KN02H-ECT-L
	400 W	R88D-KN04H-ECT-L
	750 W	R88D-KN08H-ECT-L
	1 kW	R88D-KN10H-ECT-L
	1.5 kW	R88D-KN15H-ECT-L
Three-phase 400 VAC	600 W	R88D-KN06F-ECT-L
	1 kW	R88D-KN10F-ECT-L
	1.5 kW	R88D-KN15F-ECT-L
	2 kW	R88D-KN20F-ECT-L
	3 kW	R88D-KN30F-ECT-L

Servomotors

<Cylinder Type>
3,000-r/min servomotors

Rotation speed	Encoder	Option
3,000 r/min	**INC**	Without key
	ABS/INC	**With key**

Specifications			Model
			With incremental encoder
			Straight shaft with key and tap
	Voltage	Rated output	Without oil seals
Without brake	100 V	50 W	R88M-K05030H-S2
		100 W	R88M-K10030L-S2
		200 W	R88M-K20030L-S2
		400 W	R88M-K40030L-S2
	200 V	50 W	R88M-K05030H-S2
		100 W	R88M-K10030H-S2
		200 W	R88M-K20030H-S2
		400 W	R88M-K40030H-S2
		750 W	R88M-K75030H-S2
		1 kW	R88M-K1K030H-S2
		1.5 kW	R88M-K1K530H-S2
		2 kW	R88M-K2K030H-S2
		3 kW	R88M-K3K030H-S2
		4 kW	R88M-K4K030H-S2
		5 kW	R88M-K5K030H-S2
	400 V	750 W	R88M-K75030F-S2
		1 kW	R88M-K1K030F-S2
		1.5 kW	R88M-K1K530F-S2
		2 kW	R88M-K2K030F-S2
		3 kW	R88M-K3K030F-S2
		4 kW	R88M-K4K030F-S2
		5 kW	R88M-K5K030F-S2
With brake	100 V	50 W	R88M-K05030H-BS2
		100 W	R88M-K10030L-BS2
		200 W	R88M-K20030L-BS2
		400 W	R88M-K40030L-BS2
	200 V	50 W	R88M-K05030H-BS2
		100 W	R88M-K10030H-BS2
		200 W	R88M-K20030H-BS2
		400 W	R88M-K40030H-BS2
		750 W	R88M-K75030H-BS2
		1 kW	R88M-K1K030H-BS2
		1.5 kW	R88M-K1K530H-BS2
		2 kW	R88M-K2K030H-BS2
		3 kW	R88M-K3K030H-BS2
		4 kW	R88M-K4K030H-BS2
		5 kW	R88M-K5K030H-BS2
	400 V	750 W	R88M-K75030F-BS2
		1 kW	R88M-K1K030F-BS2
		1.5 kW	R88M-K1K530F-BS2
		2 kW	R88M-K2K030F-BS2
		3 kW	R88M-K3K030F-BS2
		4 kW	R88M-K4K030F-BS2
		5 kW	R88M-K5K030F-BS2

Note: Models with oil seals are also available.

Rotation speed	Encoder	Option
3,000 r/min	**INC**	**Without key**
	ABS/INC	With key

Specifications			Model
			With incremental encoder
			Straight shaft without key
	Voltage	Rated output	Without oil seals
Without brake	100 V	50 W	R88M-K05030H
		100 W	R88M-K10030L
		200 W	R88M-K20030L
		400 W	R88M-K40030L
	200 V	50 W	R88M-K05030H
		100 W	R88M-K10030H
		200 W	R88M-K20030H
		400 W	R88M-K40030H
		750 W	R88M-K75030H
		1 kW	R88M-K1K030H
		1.5 kW	R88M-K1K530H
		2 kW	R88M-K2K030H
		3 kW	R88M-K3K030H
		4 kW	R88M-K4K030H
		5 kW	R88M-K5K030H
	400 V	750 W	R88M-K75030F
		1 kW	R88M-K1K030F
		1.5 kW	R88M-K1K530F
		2 kW	R88M-K2K030F
		3 kW	R88M-K3K030F
		4 kW	R88M-K4K030F
		5 kW	R88M-K5K030F
With brake	100 V	50 W	R88M-K05030H-B
		100 W	R88M-K10030L-B
		200 W	R88M-K20030L-B
		400 W	R88M-K40030L-B
	200 V	50 W	R88M-K05030H-B
		100 W	R88M-K10030H-B
		200 W	R88M-K20030H-B
		400 W	R88M-K40030H-B
		750 W	R88M-K75030H-B
		1 kW	R88M-K1K030H-B
		1.5 kW	R88M-K1K530H-B
		2 kW	R88M-K2K030H-B
		3 kW	R88M-K3K030H-B
		4 kW	R88M-K4K030H-B
		5 kW	R88M-K5K030H-B
	400 V	750 W	R88M-K75030F-B
		1 kW	R88M-K1K030F-B
		1.5 kW	R88M-K1K530F-B
		2 kW	R88M-K2K030F-B
		3 kW	R88M-K3K030F-B
		4 kW	R88M-K4K030F-B
		5 kW	R88M-K5K030F-B

Note: Models with oil seals are also available.

Rotation speed	Encoder	Option
3,000 r/min	INC	Without key
	ABS/INC	With key

Specifications			Model
			With absolute encoder
			Straight shaft withkey and tap
	Voltage	Rated output	Without oil seals
Without brake	100 V	50 W	R88M-K05030T-S2
		100 W	R88M-K10030S-S2
		200 W	R88M-K20030S-S2
		400 W	R88M-K40030S-S2
	200 V	50 W	R88M-K05030T-S2
		100 W	R88M-K10030T-S2
		200 W	R88M-K20030T-S2
		400 W	R88M-K40030T-S2
		750 W	R88M-K75030T-S2
		1 kW	R88M-K1K030T-S2
		1.5 kW	R88M-K1K530T-S2
		2 kW	R88M-K2K030T-S2
		3 kW	R88M-K3K030T-S2
		4 kW	R88M-K4K030T-S2
		5 kW	R88M-K5K030T-S2
	400 V	750 W	R88M-K75030C-S2
		1 kW	R88M-K1K030C-S2
		1.5 kW	R88M-K1K530C-S2
		2 kW	R88M-K2K030C-S2
		3 kW	R88M-K3K030C-S2
		4 kW	R88M-K4K030C-S2
		5 kW	R88M-K5K030C-S2
With brake	100 V	50 W	R88M-K05030T-BS2
		100 W	R88M-K10030S-BS2
		200 W	R88M-K20030S-BS2
		400 W	R88M-K40030S-BS2
	200 V	50 W	R88M-K05030T-BS2
		100 W	R88M-K10030T-BS2
		200 W	R88M-K20030T-BS2
		400 W	R88M-K40030T-BS2
		750 W	R88M-K75030T-BS2
		1 kW	R88M-K1K030T-BS2
		1.5 kW	R88M-K1K530T-BS2
		2 kW	R88M-K2K030T-BS2
		3 kW	R88M-K3K030T-BS2
		4 kW	R88M-K4K030T-BS2
		5 kW	R88M-K5K030T-BS2
	400 V	750 W	R88M-K75030C-BS2
		1 kW	R88M-K1K030C-BS2
		1.5 kW	R88M-K1K530C-BS2
		2 kW	R88M-K2K030C-BS2
		3 kW	R88M-K3K030C-BS2
		4 kW	R88M-K4K030C-BS2
		5 kW	R88M-K5K030C-BS2

Note: Models with oil seals are also available.

Rotation speed	Encoder	Option
3,000 r/min	INC	Without key
	ABS/INC	With key

Specifications			Model
			With absolute encoder
			Straight shaft without key
	Voltage	Rated output	Without oil seals
Without brake	100 V	50 W	R88M-K05030T
		100 W	R88M-K10030S
		200 W	R88M-K20030S
		400 W	R88M-K40030S
	200 V	50 W	R88M-K05030T
		100 W	R88M-K10030T
		200 W	R88M-K20030T
		400 W	R88M-K40030T
		750 W	R88M-K75030T
		1 kW	R88M-K1K030T
		1.5 kW	R88M-K1K530T
		2 kW	R88M-K2K030T
		3 kW	R88M-K3K030T
		4 kW	R88M-K4K030T
		5 kW	R88M-K5K030T
	400 V	750 W	R88M-K75030C
		1 kW	R88M-K1K030C
		1.5 kW	R88M-K1K530C
		2 kW	R88M-K2K030C
		3 kW	R88M-K3K030C
		4 kW	R88M-K4K030C
		5 kW	R88M-K5K030C
With brake	100 V	50 W	R88M-K05030T-B
		100 W	R88M-K10030S-B
		200 W	R88M-K20030S-B
		400 W	R88M-K40030S-B
	200 V	50 W	R88M-K05030T-B
		100 W	R88M-K10030T-B
		200 W	R88M-K20030T-B
		400 W	R88M-K40030T-B
		750 W	R88M-K75030T-B
		1 kW	R88M-K1K030T-B
		1.5 kW	R88M-K1K530T-B
		2 kW	R88M-K2K030T-B
		3 kW	R88M-K3K030T-B
		4 kW	R88M-K4K030T-B
		5 kW	R88M-K5K030T-B
	400 V	750 W	R88M-K75030C-B
		1 kW	R88M-K1K030C-B
		1.5 kW	R88M-K1K530C-B
		2 kW	R88M-K2K030C-B
		3 kW	R88M-K3K030C-B
		4 kW	R88M-K4K030C-B
		5 kW	R88M-K5K030C-B

Note: Models with oil seals are also available.

2,000-r/min servomotors

Rotation speed	Encoder	Option
2,000 r/min	**INC**	Without key
	ABS/INC	**With key**

Specifications			Model
			With incremental encoder
			Straight shaft with key and tap
	Voltage	Rated output	Without oil seals
Without brake	200 V	1 kW	R88M-K1K020H-S2
		1.5 kW	R88M-K1K520H-S2
		2 kW	R88M-K2K020H-S2
		3 kW	R88M-K3K020H-S2
		4 kW	R88M-K4K020H-S2
		5 kW	R88M-K5K020H-S2
	400 V	400 W	R88M-K40020F-S2
		600 W	R88M-K60020F-S2
		1 kW	R88M-K1K020F-S2
		1.5 kW	R88M-K1K520F-S2
		2 kW	R88M-K2K020F-S2
		3 kW	R88M-K3K020F-S2
		4 kW	R88M-K4K020F-S2
		5 kW	R88M-K5K020F-S2
With brake	200 V	1 kW	R88M-K1K020H-BS2
		1.5 kW	R88M-K1K520H-BS2
		2 kW	R88M-K2K020H-BS2
		3 kW	R88M-K3K020H-BS2
		4 kW	R88M-K4K020H-BS2
		5 kW	R88M-K5K020H-BS2
	400 V	400 W	R88M-K40020F-BS2
		600 W	R88M-K60020F-BS2
		1 kW	R88M-K1K020F-BS2
		1.5 kW	R88M-K1K520F-BS2
		2 kW	R88M-K2K020F-BS2
		3 kW	R88M-K3K020F-BS2
		4 kW	R88M-K4K020F-BS2
		5 kW	R88M-K5K020F-BS2

Note: Models with oil seals are also available.

Rotation speed	Encoder	Option
2,000 r/min	**INC**	**Without key**
	ABS/INC	With key

Specifications			Model
			With incremental encoder
			Straight shaft without key
	Voltage	Rated output	Without oil seals
Without brake	200 V	1 kW	R88M-K1K020H
		1.5 kW	R88M-K1K520H
		2 kW	R88M-K2K020H
		3 kW	R88M-K3K020H
		4 kW	R88M-K4K020H
		5 kW	R88M-K5K020H
	400 V	400 W	R88M-K40020F
		600 W	R88M-K60020F
		1 kW	R88M-K1K020F
		1.5 kW	R88M-K1K520F
		2 kW	R88M-K2K020F
		3 kW	R88M-K3K020F
		4 kW	R88M-K4K020F
		5 kW	R88M-K5K020F
With brake	200 V	1 kW	R88M-K1K020H-B
		1.5 kW	R88M-K1K520H-B
		2 kW	R88M-K2K020H-B
		3 kW	R88M-K3K020H-B
		4 kW	R88M-K4K020H-B
		5 kW	R88M-K5K020H-B
	400 V	400 W	R88M-K40020F-B
		600 W	R88M-K60020F-B
		1 kW	R88M-K1K020F-B
		1.5 kW	R88M-K1K520F-B
		2 kW	R88M-K2K020F-B
		3 kW	R88M-K3K020F-B
		4 kW	R88M-K4K020F-B
		5 kW	R88M-K5K020F-B

Note: Models with oil seals are also available.

Rotation speed	Encoder	Option
2,000 r/min	INC	Without key
	ABS/INC	With key

Specifications			Model
			With absolute encoder
			Straight shaft with key and tap
	Voltage	Rated output	Without oil seals
Without brake	200 V	1 kW	R88M-K1K020T-S2
		1.5 kW	R88M-K1K520T-S2
		2 kW	R88M-K2K020T-S2
		3 kW	R88M-K3K020T-S2
		4 kW	R88M-K4K020T-S2
		5 kW	R88M-K5K020T-S2
		7.5 kW	R88M-K7K515T-S2 *
		11 kW	R88M-K11K015T-S2 *
		15 kW	R88M-K15K015T-S2 *
	400 V	400 W	R88M-K40020C-S2
		600 W	R88M-K60020C-S2
		1 kW	R88M-K1K020C-S2
		1.5 kW	R88M-K1K520C-S2
		2 kW	R88M-K2K020C-S2
		3 kW	R88M-K3K020C-S2
		4 kW	R88M-K4K020C-S2
		5 kW	R88M-K5K020C-S2
		7.5 kW	R88M-K7K515C -S2 *
		11 kW	R88M-K11K015C-S2 *
		15 kW	R88M-K15K015C-S2 *
With brake	200 V	1 kW	R88M-K1K020T-BS2
		1.5 kW	R88M-K1K520T-BS2
		2 kW	R88M-K2K020T-BS2
		3 kW	R88M-K3K020T-BS2
		4 kW	R88M-K4K020T-BS2
		5 kW	R88M-K5K020T-BS2
		7.5 kW	R88M-K7K515T-BS2 *
		11 kW	R88M-K11K015T-BS2 *
		15 kW	R88M-K15K015T-BS2 *
	400 V	400 W	R88M-K40020C-BS2
		600 W	R88M-K60020C-BS2
		1 kW	R88M-K1K020C-BS2
		1.5 kW	R88M-K1K520C-BS2
		2 kW	R88M-K2K020C-BS2
		3 kW	R88M-K3K020C-BS2
		4 kW	R88M-K4K020C-BS2
		5 kW	R88M-K5K020C-BS2
		7.5 kW	R88M-K7K515C-BS2 *
		11 kW	R88M-K11K015C-BS2 *
		15 kW	R88M-K15K015C-BS2 *

Note: Models with oil seals are also available.
* The rated speed is 1,500 r/min.

Rotation speed	Encoder	Option
2,000 r/min	INC	Without key
	ABS/INC	With key

Specifications			Model
			With absolute encoder
			Straight shaft without key
	Voltage	Rated output	Without oil seals
Without brake	200 V	1 kW	R88M-K1K020T
		1.5 kW	R88M-K1K520T
		2 kW	R88M-K2K020T
		3 kW	R88M-K3K020T
		4 kW	R88M-K4K020T
		5 kW	R88M-K5K020T
		7.5 kW	R88M-K7K515T *
		11 kW	R88M-K11K015T *
		15 kW	R88M-K15K015T *
	400 V	400 W	R88M-K40020C
		600 W	R88M-K60020C
		1 kW	R88M-K1K020C
		1.5 kW	R88M-K1K520C
		2 kW	R88M-K2K020C
		3 kW	R88M-K3K020C
		4 kW	R88M-K4K020C
		5 kW	R88M-K5K020C
		7.5 kW	R88M-K7K515C *
		11 kW	R88M-K11K015C *
		15 kW	R88M-K15K015C *
With brake	200 V	1 kW	R88M-K1K020T-B
		1.5 kW	R88M-K1K520T-B
		2 kW	R88M-K2K020T-B
		3 kW	R88M-K3K020T-B
		4 kW	R88M-K4K020T-B
		5 kW	R88M-K5K020T-B
		7.5 kW	R88M-K7K515T-B *
		11 kW	R88M-K11K015T-B *
		15 kW	R88M-K15K015T-B *
	400 V	400 W	R88M-K40020C-B
		600 W	R88M-K60020C-B
		1 kW	R88M-K1K020C-B
		1.5 kW	R88M-K1K520C-B
		2 kW	R88M-K2K020C-B
		3 kW	R88M-K3K020C-B
		4 kW	R88M-K4K020C-B
		5 kW	R88M-K5K020C-B
		7.5 kW	R88M-K7K515C-B *
		11 kW	R88M-K11K015C-B *
		15 kW	R88M-K15K015C-B *

Note: Models with oil seals are also available.
* The rated speed is 1,500 r/min.

1,000-r/min servomotors

Rotation speed	Encoder	Option
1,000 r/min	INC	Without key
	ABS/INC	With key

Specifications			Model
			With incremental encoder
			Straight shaft with key and tap
	Voltage	Rated output	Without oil seals
Without brake	200 V	900 W	R88M-K90010H-S2
		2 kW	R88M-K2K010H-S2
		3 kW	R88M-K3K010H-S2
	400 V	900 W	R88M-K90010F-S2
		2 kW	R88M-K2K010F-S2
		3 kW	R88M-K3K010F-S2
With brake	200 V	900 W	R88M-K90010H-BS2
		2 kW	R88M-K2K010H-BS2
		3 kW	R88M-K3K010H-BS2
	400 V	900 W	R88M-K90010F-BS2
		2 kW	R88M-K2K010F-BS2
		3 kW	R88M-K3K010F-BS2

Note: Models with oil seals are also available.

Rotation speed	Encoder	Option
1,000 r/min	INC	Without key
	ABS/INC	With key

Specifications			Model
			With incremental encoder
			Straight shaft without key
	Voltage	Rated output	Without oil seals
Without brake	200 V	900 W	R88M-K90010H
		2 kW	R88M-K2K010H
		3 kW	R88M-K3K010H
	400 V	900 W	R88M-K90010F
		2 kW	R88M-K2K010F
		3 kW	R88M-K3K010F
With brake	200 V	900 W	R88M-K90010H-B
		2 kW	R88M-K2K010H-B
		3 kW	R88M-K3K010H-B
	400 V	900 W	R88M-K90010F-B
		2 kW	R88M-K2K010F-B
		3 kW	R88M-K3K010F-B

Note: Models with oil seals are also available.

Rotation speed	Encoder	Option
1,000 r/min	INC	Without key
	ABS/INC	With key

Specifications			Model
			With absolute encoder
			Straight shaft with key and tap
	Voltage	Rated output	Without oil seals
Without brake	200 V	900 W	R88M-K90010T-S2
		2 kW	R88M-K2K010T-S2
		3 kW	R88M-K3K010T-S2
		4.5 kW	R88M-K4K510T-S2
		6 kW	R88M-K6K010T-S2
	400 V	900 W	R88M-K90010C-S2
		2 kW	R88M-K2K010C-S2
		3 kW	R88M-K3K010C-S2
		4.5 kW	R88M-K4K510C-S2
		6 kW	R88M-K6K010C-S2
With brake	200 V	900 W	R88M-K90010T-BS2
		2 kW	R88M-K2K010T-BS2
		3 kW	R88M-K3K010T-BS2
		4.5 kW	R88M-K4K510T-BS2
		6 kW	R88M-K6K010T-BS2
	400 V	900 W	R88M-K90010C-BS2
		2 kW	R88M-K2K010C-BS2
		3 kW	R88M-K3K010C-BS2
		4.5 kW	R88M-K4K510C-BS2
		6 kW	R88M-K6K010C-BS2

Note: Models with oil seals are also available.

Rotation speed	Encoder	Option
1,000 r/min	INC	Without key
	ABS/INC	With key

Specifications			Model
			With absolute encoder
			Straight shaft without key
	Voltage	Rated output	Without oil seals
Without brake	200 V	900 W	R88M-K90010T
		2 kW	R88M-K2K010T
		3 kW	R88M-K3K010T
		4.5 kW	R88M-K4K510T
		6 kW	R88M-K6K010T
	400 V	900 W	R88M-K90010C
		2 kW	R88M-K2K010C
		3 kW	R88M-K3K010C
		4.5 kW	R88M-K4K510C
		6 kW	R88M-K6K010C
With brake	200 V	900 W	R88M-K90010T-B
		2 kW	R88M-K2K010T-B
		3 kW	R88M-K3K010T-B
		4.5 kW	R88M-K4K510T-B
		6 kW	R88M-K6K010T-B
	400 V	900 W	R88M-K90010C-B
		2 kW	R88M-K2K010C-B
		3 kW	R88M-K3K010C-B
		4.5 kW	R88M-K4K510C-B
		6 kW	R88M-K6K010C-B

Note: Models with oil seals are also available.

Linear Motors

<Iron-core motor type>

Motor Coil Unit

Motor Coil Unit model	Continuous force [N]	Momentary maximum force [N]
R88L-EC-FW-0303-ANPC	48	105
R88L-EC-FW-0306-ANPC	96	210
R88L-EC-FW-0606-ANPC	160	400
R88L-EC-FW-0609-ANPC	240	600
R88L-EC-FW-0612-ANPC	320	800
R88L-EC-FW-1112-ANPC	608	1600
R88L-EC-FW-1115-ANPC	760	2000

Magnet Trac

Magnet Trac model	Magnet Trac Unit Length (mm)
R88L-EC-FM-03096-A	96
R88L-EC-FM-03144-A	144
R88L-EC-FM-03384-A	384
R88L-EC-FM-06192-A	192
R88L-EC-FM-06288-A	288
R88L-EC-FM-11192-A	192
R88L-EC-FM-11288-A	288

<Ironless motor type>

Motor Coil Unit

Motor Coil Unit model	Continuous force [N]	Momentary maximum force [N]
R88L-EC-GW-0303-ANPS	26.5	96
R88L-EC-GW-0306-ANPS	53	200
R88L-EC-GW-0309-ANPS	80	300
R88L-EC-GW-0503-ANPS	58	240
R88L-EC-GW-0506-ANPS	117	480
R88L-EC-GW-0509-ANPS	175	720
R88L-EC-GW-0703-ANPS	117	552
R88L-EC-GW-0706-ANPS	232	1110
R88L-EC-GW-0709-ANPS	348	1730

Magnet Trac

Magnet Trac model	Magnet Trac Unit Length (mm)
R88L-EC-GM-03090-A	90
R88L-EC-GM-03120-A	120
R88L-EC-GM-03390-A	390
R88L-EC-GM-05126-A	126
R88L-EC-GM-05168-A	168
R88L-EC-GM-05210-A	210
R88L-EC-GM-05546-A	546
R88L-EC-GM-07114-A	114
R88L-EC-GM-07171-A	171
R88L-EC-GM-07456-A	456

Combination table

Motor Coil Unit and Magnet Trac Combinations

Iron-core motor type

Motor Coil Unit model	Magnet Trac model
R88L-EC-FW-0303-ANPC R88L-EC-FW-0306-ANPC	R88L-EC-FM-03096-A R88L-EC-FM-03144-A R88L-EC-FM-03384-A
R88L-EC-FW-0606-ANPC R88L-EC-FW-0609-ANPC R88L-EC-FW-0612-ANPC	R88L-EC-FM-06192-A R88L-EC-FM-06288-A
R88L-EC-FW-1112-ANPC R88L-EC-FW-1115-ANPC	R88L-EC-FM-11192-A R88L-EC-FM-11288-A

Ironless motor type

Motor Coil Unit model	Magnet Trac model
R88L-EC-GW-0303-ANPS R88L-EC-GW-0306-ANPS R88L-EC-GW-0309-ANPS	R88L-EC-GM-03090-A R88L-EC-GM-03120-A R88L-EC-GM-03390-A
R88L-EC-GW-0503-ANPS R88L-EC-GW-0506-ANPS R88L-EC-GW-0509-ANPS	R88L-EC-GM-05126-A R88L-EC-GM-05168-A R88L-EC-GM-05210-A R88L-EC-GM-05546-A
R88L-EC-GW-0703-ANPS R88L-EC-GW-0706-ANPS R88L-EC-GW-0709-ANPS	R88L-EC-GM-07114-A R88L-EC-GM-07171-A R88L-EC-GM-07456-A

Deceleraters (Backlash = 3' Max./Backlash = 15' Max.)

Backlash = 3' Max

<Cylinder Type>

3,000-r/min servomotors

Straight shaft without key

Motor capacity	Gear Ratio	Model (Straight shaft)
50 W	1/5	R88G-HPG11B05100B
	1/9	R88G-HPG11B09050B
	1/21	R88G-HPG14A21100B
	1/33	R88G-HPG14A33050B
	1/45	R88G-HPG14A45050B
100 W	1/5	R88G-HPG11B05100B
	1/11	R88G-HPG14A11100B
	1/21	R88G-HPG14A21100B
	1/33	R88G-HPG20A33100B
	1/45	R88G-HPG20A45100B
200 W	1/5	R88G-HPG14A05200B
	1/11	R88G-HPG14A11200B
	1/21	R88G-HPG20A21200B
	1/33	R88G-HPG20A33200B
	1/45	R88G-HPG20A45200B
400 W	1/5	R88G-HPG14A05400B
	1/11	R88G-HPG20A11400B
	1/21	R88G-HPG20A21400B
	1/33	R88G-HPG32A33400B
	1/45	R88G-HPG32A45400B
750 W (200 V)	1/5	R88G-HPG20A05750B
	1/11	R88G-HPG20A11750B
	1/21	R88G-HPG32A21750B
	1/33	R88G-HPG32A33750B
	1/45	R88G-HPG32A45750B
750W (400 V)	1/5	R88G-HPG32A052K0B
	1/11	R88G-HPG32A112K0B
	1/21	R88G-HPG32A211K5B
	1/33	R88G-HPG32A33600SB
	1/45	R88G-HPG50A451K5B
1kW	1/5	R88G-HPG32A052K0B
	1/11	R88G-HPG32A112K0B
	1/21	R88G-HPG32A211K5B
	1/33	R88G-HPG50A332K0B
	1/45	R88G-HPG50A451K5B
1.5kW	1/5	R88G-HPG32A052K0B
	1/11	R88G-HPG32A112K0B
	1/21	R88G-HPG32A211K5B
	1/33	R88G-HPG50A332K0B
	1/45	R88G-HPG50A451K5B
2kW	1/5	R88G-HPG32A052K0B
	1/11	R88G-HPG32A112K0B
	1/21	R88G-HPG50A212K0B
	1/33	R88G-HPG50A332K0B
3kW	1/5	R88G-HPG32A053K0B
	1/11	R88G-HPG50A113K0B
	1/21	R88G-HPG50A213K0B
4kW	1/5	R88G-HPG32A054K0B
	1/11	R88G-HPG50A115K0B
5kW	1/5	R88G-HPG50A055K0B
	1/11	R88G-HPG50A115K0B

Note: 1. The standard models have a straight shaft.
2. To order a Servomotor with a straight shaft with key, add “J” to the end of the model number, in the place indicated by the box.

2,000-r/min servomotors

Straight shaft without key

Motor capacity	Gear Ratio	Model (Straight shaft)
400 W	1/5	R88G-HPG32A052K0B
	1/11	R88G-HPG32A112K0B
	1/21	R88G-HPG32A211K5B
	1/33	R88G-HPG32A33600SB
	1/45	R88G-HPG32A45400SB
600 W	1/5	R88G-HPG32A052K0B
	1/11	R88G-HPG32A112K0B
	1/21	R88G-HPG32A211K5B
	1/33	R88G-HPG32A33600SB
	1/45	R88G-HPG50A451K5B
1 kW	1/5	R88G-HPG32A053K0B
	1/11	R88G-HPG32A112K0SB
	1/21	R88G-HPG32A211K0SB
	1/33	R88G-HPG50A332K0SB
	1/45	R88G-HPG50A451K0SB
1.5 kW	1/5	R88G-HPG32A053K0B
	1/11	R88G-HPG32A112K0SB
	1/21	R88G-HPG50A213K0B
	1/33	R88G-HPG50A332K0SB
2 kW	1/5	R88G-HPG32A053K0B
	1/11	R88G-HPG32A112K0SB
	1/21	R88G-HPG50A213K0B
	1/33	R88G-HPG50A332K0SB
3 kW	1/5	R88G-HPG32A054K0B
	1/11	R88G-HPG50A115K0B
	1/21	R88G-HPG50A213K0SB
	1/25	R88G-HPG65A253K0SB
4 kW	1/5	R88G-HPG50A055K0SB
	1/11	R88G-HPG50A115K0SB
	1/20	R88G-HPG65A205K0SB
	1/25	R88G-HPG65A255K0SB
5 kW	1/5	R88G-HPG50A055K0SB
	1/11	R88G-HPG50A115K0SB
	1/20	R88G-HPG65A205K0SB
	1/25	R88G-HPG65A255K0SB

Note: 1. The standard models have a straight shaft.
2. To order a Servomotor with a straight shaft with key, add “J” to the end of the model number, in the place indicated by the box.

1,000-r/min servomotors

Straight shaft without key

Motor capacity	Gear Ratio	Model (Straight shaft)
900 W	1/5	R88G-HPG32A05900TB
	1/11	R88G-HPG32A11900TB
	1/21	R88G-HPG50A21900TB
	1/33	R88G-HPG50A33900TB
2 kW	1/5	R88G-HPG32A052K0TB
	1/11	R88G-HPG50A112K0TB
	1/21	R88G-HPG50A212K0TB
	1/25	R88G-HPG65A255K0SB
3 kW	1/5	R88G-HPG50A055K0SB
	1/11	R88G-HPG50A115K0SB
	1/20	R88G-HPG65A205K0SB
	1/25	R88G-HPG65A255K0SB

Note: 1. The standard models have a straight shaft.
2. To order a Servomotor with a straight shaft with key, add "J" to the end of the model number, in the place indicated by the box.

Backlash = 15' Max

<Cylinder Type>

3,000-r/min servomotors

Straight shaft with key

Motor capacity	Gear Ratio	Model (Straight shaft)
50 W	1/5	R88G-VRSF05B100CJ
	1/9	R88G-VRSF09B100CJ
	1/15	R88G-VRSF15B100CJ
	1/25	R88G-VRSF25B100CJ
100 W	1/5	R88G-VRSF05B100CJ
	1/9	R88G-VRSF09B100CJ
	1/15	R88G-VRSF15B100CJ
	1/25	R88G-VRSF25B100CJ
200 W	1/5	R88G-VRSF05B200CJ
	1/9	R88G-VRSF09C200CJ
	1/15	R88G-VRSF15C200CJ
	1/25	R88G-VRSF25C200CJ
400 W	1/5	R88G-VRSF05C400CJ
	1/9	R88G-VRSF09C400CJ
	1/15	R88G-VRSF15C400CJ
	1/25	R88G-VRSF25C400CJ
750 W	1/5	R88G-VRSF05C750CJ
	1/9	R88G-VRSF09D750CJ
	1/15	R88G-VRSF15D750CJ
	1/25	R88G-VRSF25D750CJ

Accessories and Cables

■ Connection Cables (Motor Power Cables, Brake Cables, Encoder Cables)

<Non-flexible Cable>

Motor Power Cables

Specifications		Without brake	With brake
		Model	Model
[100 V/200 V] 3,000-r/min Servomotors of 50 to 750 W	**3 m**	R88A-CAKA003S	(See note1.)
	5 m	R88A-CAKA005S	
	10 m	R88A-CAKA010S	
	15m	R88A-CAKA015S	
	20 m	R88A-CAKA020S	
	30 m	R88A-CAKA030S	
	40 m	R88A-CAKA040S	
	50 m	R88A-CAKA050S	
[200 V] 3,000-r/min Servomotors of 1 to 2 kW 2,000-r/min Servomotors of 1 to 2 kW 1,000-r/min Servomotors of 900 W	**3 m**	R88A-CAGB003S	R88A-CAGB003B
	5 m	R88A-CAGB005S	R88A-CAGB005B
	10 m	R88A-CAGB010S	R88A-CAGB010B
	15 m	R88A-CAGB015S	R88A-CAGB015B
	20 m	R88A-CAGB020S	R88A-CAGB020B
	30 m	R88A-CAGB030S	R88A-CAGB030B
	40 m	R88A-CAGB040S	R88A-CAGB040B
	50 m	R88A-CAGB050S	R88A-CAGB050B
[400 V] 3,000-r/min Servomotors of 750 W to 2 kW 2,000-r/min Servomotors of 400 W to 2 kW 1,000-r/min Servomotors of 900 W	**3 m**	R88A-CAGB003S	R88A-CAKF003B
	5 m	R88A-CAGB005S	R88A-CAKF005B
	10 m	R88A-CAGB010S	R88A-CAKF010B
	15 m	R88A-CAGB015S	R88A-CAKF015B
	20 m	R88A-CAGB020S	R88A-CAKF020B
	30 m	R88A-CAGB030S	R88A-CAKF030B
	40 m	R88A-CAGB040S	R88A-CAKF040B
	50 m	R88A-CAGB050S	R88A-CAKF050B
[200 V] [400 V] 3,000-r/min Servomotors of 3 to 5 kW 2,000-r/min Servomotors of 3 to 5 kW 1,000-r/min Servomotors of 2 to 4.5 kW	**3 m**	R88A-CAGD003S	R88A-CAGD003B
	5 m	R88A-CAGD005S	R88A-CAGD005B
	10 m	R88A-CAGD010S	R88A-CAGD010B
	15 m	R88A-CAGD015S	R88A-CAGD015B
	20 m	R88A-CAGD020S	R88A-CAGD020B
	30 m	R88A-CAGD030S	R88A-CAGD030B
	40 m	R88A-CAGD040S	R88A-CAGD040B
	50 m	R88A-CAGD050S	R88A-CAGD050B
[200 V] [400 V] 1,500-r/min Servomotors of 7.5 kW 1,000-r/min Servomotors of 6 kW	**3 m**	R88A-CAGE003S	
	5 m	R88A-CAGE005S	
	10 m	R88A-CAGE010S	
	15 m	R88A-CAGE015S	
	20 m	R88A-CAGE020S	
	30 m	R88A-CAGE030S	
	40 m	R88A-CAGE040S	
	50 m	R88A-CAGE050S	

Note: 1. Different connectors are used for the motor power and the brake on 100-V and 200-V, 3,000-r/min Servomotors of 50 to 750 W and Servomotors of 6 to 15 kW. When using a Servomotor with a brake, two cables are required: a Power Cable without Brake and a Brake Cable.

2. For non-flexible power cables for Servomotors of 11 or 15 kW, refer to G5 series USER'S MANUAL (Cat.No. I576) and make your own cable.

Brake Cable

Specifications		Standard Cables
		Model
[100 V][200 V] 3,000-r/min Servomotors of 50 to 750 W	3 m	R88A-CAKA003B
	5 m	R88A-CAKA005B
	10 m	R88A-CAKA010B
	15 m	R88A-CAKA015B
	20 m	R88A-CAKA020B
	30 m	R88A-CAKA030B
	40 m	R88A-CAKA040B
	50 m	R88A-CAKA050B
[200 V][400 V] 1,500-r/min and 2,000-r/min Servomotors of 7.5 to 15 kW 1,000-r/min Servomotors of 6 kW	3 m	R88A-CAGE003B
	5 m	R88A-CAGE005B
	10 m	R88A-CAGE010B
	15 m	R88A-CAGE015B
	20 m	R88A-CAGE020B
	30 m	R88A-CAGE030B
	40 m	R88A-CAGE040B
	50 m	R88A-CAGE050B

Encoder Cable

Specifications		Standard Cables
		Model
[100 V/200 V] 3,000-r/min Servomotors of 50 to 750 W (for both absolute encoders and incremental encoders)	3 m	R88A-CRKA003C
	5 m	R88A-CRKA005C
	10 m	R88A-CRKA010C
	15 m	R88A-CRKA015C
	20 m	R88A-CRKA020C
	30 m	R88A-CRKA030C
	40 m	R88A-CRKA040C
	50 m	R88A-CRKA050C
[100 V and 200 V] 3,000-r/min Servomotors of 1.0 kW or more 2,000-r/min Servomotors 1,500-r/min Servomotors 1,000-r/min Servomotors [400 V] 3,000-r/min Servomotors 2,000-r/min Servomotors 1,500-r/min Servomotors 1,000-r/min Servomotors	3 m	R88A-CRKC003N
	5 m	R88A-CRKC005N
	10 m	R88A-CRKC010N
	15 m	R88A-CRKC015N
	20 m	R88A-CRKC020N
	30 m	R88A-CRKC030N
	40 m	R88A-CRKC040N
	50 m	R88A-CRKC050N

<Flexible Cables>

Motor Power Cables

Specifications		Without brake	With brake
		Model	Model
[100 V/200 V] **3,000-r/min Servomotors of 50 to 750 W**	**3 m**	R88A-CAKA003SR	(See note1.)
	5 m	R88A-CAKA005SR	
	10 m	R88A-CAKA010SR	
	15 m	R88A-CAKA015SR	
	20 m	R88A-CAKA020SR	
	30 m	R88A-CAKA030SR	
	40 m	R88A-CAKA040SR	
	50 m	R88A-CAKA050SR	
[200 V] **3,000-r/min Servomotors of 1 to 2 kW** **2,000-r/min Servomotors of 1 to 2 kW** **1,000-r/min Servomotors of 900 W**	**3 m**	R88A-CAGB003SR	R88A-CAGB003BR
	5 m	R88A-CAGB005SR	R88A-CAGB005BR
	10 m	R88A-CAGB010SR	R88A-CAGB010BR
	15 m	R88A-CAGB015SR	R88A-CAGB015BR
	20 m	R88A-CAGB020SR	R88A-CAGB020BR
	30 m	R88A-CAGB030SR	R88A-CAGB030BR
	40 m	R88A-CAGB040SR	R88A-CAGB040BR
	50 m	R88A-CAGB050SR	R88A-CAGB050BR
[400 V] **3,000-r/min Servomotors of 750 W to 2 kW** **2,000-r/min Servomotors of 400 W to 2 kW** **1,000-r/min Servomotors of 900 W**	**3 m**	R88A-CAGB003SR	R88A-CAKF003BR
	5 m	R88A-CAGB005SR	R88A-CAKF005BR
	10 m	R88A-CAGB010SR	R88A-CAKF010BR
	15 m	R88A-CAGB015SR	R88A-CAKF015BR
	20 m	R88A-CAGB020SR	R88A-CAKF020BR
	30 m	R88A-CAGB030SR	R88A-CAKF030BR
	40 m	R88A-CAGB040SR	R88A-CAKF040BR
	50 m	R88A-CAGB050SR	R88A-CAKF050BR
[200 V] [400 V] **3,000-r/min Servomotors of 3 to 5 kW** **2,000-r/min Servomotors of 3 to 5 kW** **1,000-r/min Servomotors of 2 to 4.5 kW**	**3 m**	R88A-CAGD003SR	R88A-CAGD003BR
	5 m	R88A-CAGD005SR	R88A-CAGD005BR
	10 m	R88A-CAGD010SR	R88A-CAGD010BR
	15 m	R88A-CAGD015SR	R88A-CAGD015BR
	20 m	R88A-CAGD020SR	R88A-CAGD020BR
	30 m	R88A-CAGD030SR	R88A-CAGD030BR
	40 m	R88A-CAGD040SR	R88A-CAGD040BR
	50 m	R88A-CAGD050SR	R88A-CAGD050BR

Note: 1. Different connectors are used for the motor power and the brake on 100-V and 200-V, 3,000-r/min Servomotors of 50 to 750 W and Servomotors of 6 to 15 kW. When using a Servomotor with a brake, two cables are required: a Power Cable without Brake and a Brake Cable.

2. For flexible power cables for Servomotors of 11 or 15 kW, refer to G5 series USER'S MANUAL (Cat.No. I576) and make your own cable. For flexible motor power cables for Servomotors of 6 to 7.5kW, make your own cable by referring to the wirings of non-flexible motor power cables in the G5 series USER'S MANUAL (Cat.No.I576).

Brake Cable

Specifications		Robot Cables
		Model
[100 V] [200 V] **3,000-r/min Servomotors of 50 to 750 W**	**3 m**	R88A-CAKA003BR
	5 m	R88A-CAKA005BR
	10 m	R88A-CAKA010BR
	15 m	R88A-CAKA015BR
	20 m	R88A-CAKA020BR
	30 m	R88A-CAKA030BR
	40 m	R88A-CAKA040BR
	50 m	R88A-CAKA050BR

Note: For flexible brake cables for Servomotors of 6 to 15 kW, refer to G5 series USER'S MANUAL (Cat.No. I576) and make your own brake cable.

Encoder Cable

Specifications		Robot Cables
		Model
[100 V/200 V] **3,000-r/min Servomotors of 50 to 750 W (for both absolute encoders and incremental encoders)**	**3 m**	R88A-CRKA003CR
	5 m	R88A-CRKA005CR
	10 m	R88A-CRKA010CR
	15 m	R88A-CRKA015CR
	20 m	R88A-CRKA020CR
	30 m	R88A-CRKA030CR
	40 m	R88A-CRKA040CR
	50 m	R88A-CRKA050CR
[100 V and 200 V] **3,000-r/min Servomotors of 1.0 kW or more** **2,000-r/min Servomotors** **1,500-r/min Servomotors** **1,000-r/min Servomotors** **[400 V]** **3,000-r/min Servomotors** **2,000-r/min Servomotors** **1,500-r/min Servomotors** **1,000-r/min Servomotors**	**3 m**	R88A-CRKC003NR
	5 m	R88A-CRKC005NR
	10 m	R88A-CRKC010NR
	15 m	R88A-CRKC015NR
	20 m	R88A-CRKC020NR
	30 m	R88A-CRKC030NR
	40 m	R88A-CRKC040NR
	50 m	R88A-CRKC050NR

Cable/Connector

Absolute Encoder Battery Cable

Name	Length	Model
Absolute Encoder Battery Cable (Battery not included)	0.3 m	**R88A-CRGD0R3C**
Absolute Encoder Battery Cable (One R88A-BAT01G Battery included)	0.3 m	**R88A-CRGD0R3C-BS**

Absolute Encoder Backup Battery

Specifications	Model
2,000 mA • h 3.6 V	**R88A-BAT01G**

Analog Monitor Cable

Name	Length	Model
Analog Monitor Cable	1 m	**R88A-CMK001S**

Servo Drive Connectors (common)

Name	Connects to	Model
Encoder Connector	CN2	**R88A-CNW01R**
External Scale Connector	CN4	**R88A-CNK41L**
Safety Connector	CN8	**R88A-CNK81S**

Servo Drive Connectors (EtherCAT Communications/ EtherCAT Communications Linear motor)

Name	Connects to	Model
Control I/O Connector	CN1	**R88A-CNW01C**

Servomotor Connector

Name		Model
	Applicable Servomotor Capacity	
Servomotor Connector for Encoder Cable	[100 V/200 V] 3,000 r/min (50 to 750 W)	**R88A-CNK02R**
	[100 V/200 V] 3,000 r/min (1 to 5 kW) 2,000r/min,1,000r/min [400 V] 3,000 r/min, 2,000 r/min, 1,000 r/min	**R88A-CNK04R**
Power Cable Connector	(750 W max.)	**R88A-CNK11A**
Brake Cable Connector	(750 W max.)	**R88A-CNK11B**

External Encoder Cable

Name	Lengths	Model
Serial Communications Cable	10 m	**R88A-CRKE010SR**

Control Cables

Control Cables (for Connector Terminal Block/CN1)

Name	Specifications			Model
Connector Terminal Block Cables	EtherCAT Communications		Length 1.0 m	**XW2Z-100J-B34**
			Length 2.0 m	**XW2Z-200J-B34**
Connector Terminal Block Conversion Unit	EtherCAT Communications	Conversion Unit for General-purpose Controllers (M3 screws)	Through type	**XW2B-20G4**
		Conversion Unit for General-purpose Controllers (M3.5 screws)	Through type	**XW2B-20G5**
		Conversion Unit for General-purpose Controllers (M3 screws)	Slim type	**XW2D-20G6**

EtherCAT Communications Cables

Refer to Connecting cable with NJ-series Controller for the recommended cables.

Peripheral Devices (External Regeneration Resistors, Reactors, Mounting Brackets)

External Regeneration Resistors

Specifications	Model
80 W 50 Ω	**R88A-RR08050S**
80 W 100 Ω	**R88A-RR080100S**
220 W 47 Ω	**R88A-RR22047S1**
500 W 20 Ω	**R88A-RR50020S**

Reactors

Specifications		Model
EtherCAT Communications	Linear Motor with built-in EtherCAT communications	
R88D-KNA5L-ECT/-KN01H-ECT (For single-phase input)	R88D-KN01H-ECT-L (For single-phase input)	**3G3AX-DL2002**
R88D-KN01L-ECT/-KN02H-ECT (For single-phase input)	R88D-KN01L-ECT-L/-KN02H-ECT-L (For single-phase input)	**3G3AX-DL2004**
R88D-KN02L-ECT/-KN04H-ECT (For single-phase input)	R88D-KN02L-ECT-L/-KN04H-ECT-L (For single-phase input)	**3G3AX-DL2007**
R88D-KN04L-ECT/-KN08H-ECT/-KN10H-ECT (For single-phase input)	R88D-KN04L-ECT-L/-KN08H-ECT-L/ -KN10H-ECT-L (For single-phase input)	**3G3AX-DL2015**
R88D-KN15H-ECT (For single-phase input)	R88D-KN15H-ECT-L (For single-phase input)	**3G3AX-DL2022**
R88D-KN01H-ECT/-KN02H-ECT/-KN04H-ECT/ -KN08H-ECT/-KN10H-ECT/-KN15H-ECT (For three-phase input)	R88D-KN01H-ECT-L/-KN02H-ECT-L/ -KN04H-ECT-L/-KN08H-ECT-L/ -KN10H-ECT-L/-KN15H-ECT-L (For three-phase input)	**3G3AX-AL2025**
R88D-KN20H-ECT/-KN30H-ECT	–	**3G3AX-AL2055**
R88D-KN50H-ECT	–	**3G3AX-AL2110**
R88D-KN75H-ECT/-KN150H-ECT	–	**3G3AX-AL2220**
R88D-KN06F-ECT/-KN10F-ECT/-KN15F-ECT	R88D-KN06F-ECT-L/-KN10F-ECT-L/-KN15F-ECT-L	**3G3AX-AL4025**
R88D-KN20F-ECT/-KN30F-ECT	R88D-KN20F-ECT-L/-KN30F-ECT-L	**3G3AX-AL4055**
R88D-KN50F-ECT	–	**3G3AX-AL4110**
R88D-KT75H-ECT/-KT150F-ECT	–	**3G3AX-AL4220**

Mounting Brackets (L Brackets for Rack Mounting)

Specifications	Model
EtherCAT Communications	
R88D-KNA5L-ECT/-KN01L-ECT/-KN01H-ECT/ -KN02H-ECT	**R88A-TK01K**
R88D-KN02L-ECT/-KN04H-ECT	**R88A-TK02K**
R88D-KN04L-ECT/-KN08H-ECT	**R88A-TK03K**
R88D-KN10H-ECT/-KN15H-ECT/-KN06F-ECT/ -KN10F-ECT/-KN15F-ECT	**R88A-TK04K**

Multi-function Compact Inverter MX2-Series V1 type

Interpreting Model Numbers

3G3MX2-A□□□□-V1
1 2 3
MX2 Series V1 type

1) Voltage class

B	1-phase 200 VAC (200-V class)
2	3-phase 200 VAC (200-V class)
4	3-phase 400 VAC (400-V class)

2) Max. applicable motor capacity (CT)

001	0.1 kW
002	0.2 kW
004	0.4 kW
007	0.75 kW
015	1.5 kW
022	2.2 kW
030	3.0 kW
037	3.7 kW
040	4.0 kW
055	5.5 kW
075	7.5 kW
110	11 kW
150	15 kW

3) Area

-V	Japan and areas other than China and Europe
-ZV1	China
-E	Europe

Ordering Information

3G3MX2 Inverter Models

Rated voltage	Enclosure ratings	Max. applicable motor capacity		Model
		CT: Heavy load	VT: Light load	
3-phase 200 VAC	IP20	0.1kW	0.2 kW	**3G3MX2-A2001-V1**
		0.2 kW	0.4 kW	**3G3MX2-A2002-V1**
		0.4 kW	0.75 kW	**3G3MX2-A2004-V1**
		0.75 kW	1.1 kW	**3G3MX2-A2007-V1**
		1.5 kW	2.2 kW	**3G3MX2-A2015-V1**
		2.2 kW	3.0 kW	**3G3MX2-A2022-V1**
		3.7 kW	5.5 kW	**3G3MX2-A2037-V1**
		5.5 kW	7.5 kW	**3G3MX2-A2055-V1**
		7.5 kW	11 kW	**3G3MX2-A2075-V1**
		11 kW	15 kW	**3G3MX2-A2110-V1**
		15 kW	18.5 kW	**3G3MX2-A2150-V1**
3-phase 400 VAC	IP20	0.4 kW	0.75 kW	**3G3MX2-A4004-V1**
		0.75 kW	1.5 kW	**3G3MX2-A4007-V1**
		1.5 kW	2.2 kW	**3G3MX2-A4015-V1**
		2.2 kW	3.0 kW	**3G3MX2-A4022-V1**
		3.0 kW	4.0 kW	**3G3MX2-A4030-V1**
		4.0 kW	5.5 kW	**3G3MX2-A4040-V1**
		5.5 kW	7.5 kW	**3G3MX2-A4055-V1**
		7.5 kW	11 kW	**3G3MX2-A4075-V1**
		11 kW	15 kW	**3G3MX2-A4110-V1**
		15 kW	18.5 kW	**3G3MX2-A4150-V1**
1-phase 200 VAC	IP20	0.1 kW	0.2 kW	**3G3MX2-AB001-V1**
		0.2 kW	0.4 kW	**3G3MX2-AB002-V1**
		0.4 kW	0.55 kW	**3G3MX2-AB004-V1**
		0.75 kW	1.1 kW	**3G3MX2-AB007-V1**
		1.5 kW	2.2 kW	**3G3MX2-AB015-V1**
		2.2 kW	3.0 kW	**3G3MX2-AB022-V1**

Communication Unit

Name	Model
EtherCAT Communication Unit	**3G3AX-MX2-ECT**

Related Options

Name	Specifications		Model
Regenerative Braking Units	3-phase 200 VAC	General purpose with Braking resistor	**3G3AX-RBU21**
		High Regeneration purpose with Braking resistor	**3G3AX-RBU22**
	3-phase 400 VAC	General purpose with Braking resistor	**3G3AX-RBU41**
Braking Resistor	Compact type	Resistor 120 W, 180 Ω	**3G3AX-RBA1201**
		Resistor 120 W, 100 Ω	**3G3AX-RBA1202**
		Resistor 120 W, 5 Ω	**3G3AX-RBA1203**
		Resistor 120 W, 35 Ω	**3G3AX-RBA1204**
	Standard type	Resistor 200 W, 180 Ω	**3G3AX-RBB2001**
		Resistor 200 W, 100 Ω	**3G3AX-RBB2002**
		Resistor 300 W, 50 Ω	**3G3AX-RBB3001**
		Resistor 400 W, 35 Ω	**3G3AX-RBB4001**
	Medium capacity type	Resistor 400 W, 50 Ω	**3G3AX-RBC4001**
		Resistor 600 W, 35 Ω	**3G3AX-RBC6001**
		Resistor 1200 W, 17 Ω	**3G3AX-RBC12001**

Name	Specifications of Inverter			Model
	Voltage class	CT: Heavy load	VT: Light load	
DC Reactor	3-phase 200 VAC	0.1 kW	0.2 kW	**3G3AX-DL2002**
		0.2 kW	0.4 kW	**3G3AX-DL2004**
		0.4 kW	0.75 kW	**3G3AX-DL2007**
		0.75 kW	1.1 kW	**3G3AX-DL2015**
		1.5 kW	2.2 kW	**3G3AX-DL2022**
		2.2 kW	3.0 kW	**3G3AX-DL2037**
		3.7 kW	5.5 kW	**3G3AX-DL2055**
		5.5 kW	7.5 kW	**3G3AX-DL2075**
		7.5 kW	11 kW	**3G3AX-DL2110**
		11 kW	15 kW	**3G3AX-DL2150**
		15 kW	18.5 kW	**3G3AX-DL2220**
	1-phase 200 VAC	0.1 kW	0.2 kW	**3G3AX-DL2002**
		0.2 kW	0.4 kW	**3G3AX-DL2004**
		0.4 kW	0.55 kW	**3G3AX-DL2007**
		0.75 kW	1.1 kW	**3G3AX-DL2015**
		1.5 kW	2.2 kW	**3G3AX-DL2022**
		2.2 kW	3.0 kW	**3G3AX-DL2037**
	3-phase 400 VAC	0.4 kW	0.75 kW	**3G3AX-DL4007**
		0.75 kW	1.5 kW	**3G3AX-DL4015 ***
		1.5 kW	2.2 kW	**3G3AX-DL4022**
		2.2 kW	3.0 kW	**3G3AX-DL4037**
		3.0 kW	4.0 kW	
		4.0 kW	5.5 kW	**3G3AX-DL4055**
		5.5 kW	7.5 kW	**3G3AX-DL4075 ***
		7.5 kW	11 kW	**3G3AX-DL4110 ***
		11 kW	15 kW	**3G3AX-DL4150**
		15 kW	18.5 kW	**3G3AX-DL4220**

* Only the CT rating is supported.

Note: When using the Inverter for light load rating, select the model with one size larger capacity (rated current).

Name	Specifications of Inverter			Model
	Voltage class	CT: Heavy load	VT: Light load	
Radio Noise Filter	3-phase 200 VAC	0.1 kW	0.2 kW	**3G3AX-ZCL2**
		0.2 kW	0.4 kW	
		0.4 kW	0.75 kW	
		0.75 kW	1.1 kW	
		1.5 kW	2.2 kW	
		2.2 kW	3.0 kW	
		3.7 kW	5.5 kW	**3G3AX-ZCL1 (3G3AX-ZCL2)**
		5.5 kW	7.5 kW	
		7.5 kW	11 kW	**3G3AX-ZCL1**
		11 kW	15 kW	
		15 kW	18.5 kW	
	1-phase 200 VAC	0.1 kW	0.2 kW	**3G3AX-ZCL2**
		0.2 kW	0.4 kW	
		0.4 kW	0.55 kW	
		0.75 kW	1.1 kW	
		1.5 kW	2.2 kW	
		2.2 kW	3.0 kW	
	3-phase 400 VAC	0.4 kW	0.75 kW	**3G3AX-ZCL2 (3G3AX-ZCL1)**
		0.75 kW	1.5 kW	
		1.5 kW	2.2 kW	
		2.2 kW	3.0 kW	
		3.0 kW	4.0 kW	
		4.0 kW	5.5 kW	
		5.5 kW	7.5 kW	
		7.5 kW	11 kW	**3G3AX-ZCL1**
		11 kW	15 kW	
		15 kW	18.5 kW	
Input Noise Filter	3-phase 200 VAC	0.1 kW	0.2 kW	**3G3AX-NFI21**
		0.2 kW	0.4 kW	
		0.4 kW	0.75 kW	
		0.75 kW	1.1 kW	**3G3AX-NFI22**
		1.5 kW	2.2 kW	**3G3AX-NFI23**
		2.2 kW	3.0 kW	
		3.7 kW	5.5 kW	**3G3AX-NFI24**
		5.5 kW	7.5 kW	**3G3AX-NFI25**
		7.5 kW	11 kW	**3G3AX-NFI26**
		11 kW	15 kW	**3G3AX-NFI27**
		15 kW	18.5 kW	**3G3AX-NFI28**
	1-phase 200 VAC	0.1 kW	0.2 kW	**3G3AX-NFI21**
		0.2 kW	0.4 kW	
		0.4 kW	0.55 kW	**3G3AX-NFI22**
		0.75 kW	1.1 kW	**3G3AX-NFI23**
		1.5 kW	2.2 kW	**3G3AX-NFI23 ***
		2.2 kW	3.0 kW	**3G3AX-NFI24**
	3-phase 400 VAC	0.4 kW	0.75 kW	**3G3AX-NFI41**
		0.75 kW	1.5 kW	
		1.5 kW	2.2 kW	
		2.2 kW	3.0 kW	**3G3AX-NFI42**
		3.0 kW	4.0 kW	
		4.0 kW	5.5 kW	**3G3AX-NFI43**
		5.5 kW	7.5 kW	
		7.5 kW	11 kW	**3G3AX-NFI44**
		11 kW	15 kW	**3G3AX-NFI45**
		15 kW	18.5 kW	**3G3AX-NFI46**

* Only the CT rating is supported.

Name	Specifications of Inverter			Model
	Voltage class	CT: Heavy load	VT: Light load	
EMC-compatible Noise Filter	3-phase 200 VAC	0.1 kW	0.2 kW	**Schaffner product will be supported in future.**
		0.2 kW	0.4 kW	
		0.4 kW	0.75 kW	
		0.75 kW	1.1 kW	
		1.5 kW	2.2 kW	
		2.2 kW	3.0 kW	
		3.7 kW	5.5 kW	
		5.5 kW	7.5 kW	
		7.5 kW	11 kW	
		11 kW	15 kW	
		15 kW	18.5 kW	
	1-phase 200 VAC	0.1 kW	0.2 kW	
		0.2 kW	0.4 kW	
		0.4 kW	0.55 kW	
		0.75 kW	1.1 kW	
		1.5 kW	2.2 kW	
		2.2 kW	3.0 kW	
	3-phase 400 VAC	0.4 kW	0.75 kW	
		0.75 kW	1.5 kW	
		1.5 kW	2.2 kW	
		2.2 kW	3.0 kW	
		3.0 kW	4.0 kW	
		4.0 kW	5.5 kW	
		5.5 kW	7.5 kW	
		7.5 kW	11 kW	
		11 kW	15 kW	
		15 kW	18.5 kW	
Output Noise Filter	3-phase 200 VAC	0.1 kW	0.2 kW	**3G3AX-NFO01**
		0.2 kW	0.4 kW	
		0.4 kW	0.75 kW	
		0.75 kW	1.1 kW	**3G3AX-NFO02**
		1.5 kW	2.2 kW	
		2.2 kW	3.0 kW	**3G3AX-NFO03**
		3.7 kW	5.5 kW	
		5.5 kW	7.5 kW	**3G3AX-NFO04**
		7.5 kW	11 kW	
		11 kW	15 kW	**3G3AX-NFO05**
		15 kW	18.5 kW	**3G3AX-NFO06**
	1-phase 200 VAC	0.1 kW	0.2 kW	**3G3AX-NFO01**
		0.2 kW	0.4 kW	
		0.4 kW	0.55 kW	**3G3AX-NFO02**
		0.75 kW	1.1 kW	
		1.5 kW	2.2 kW	**3G3AX-NFO03**
		2.2 kW	3.0 kW	
	3-phase 400 VAC	0.4 kW	0.75 kW	**3G3AX-NFO01**
		0.75 kW	1.5 kW	
		1.5 kW	2.2 kW	**3G3AX-NFO02**
		2.2 kW	3.0 kW	
		3.0 kW	4.0 kW	
		4.0 kW	5.5 kW	**3G3AX-NFO03**
		5.5 kW	7.5 kW	
		7.5 kW	11 kW	
		11 kW	15 kW	**3G3AX-NFO04**
		15 kW	18.5 kW	

Name	**Specifications of Inverter**			**Model**
	Voltage class	**CT: Heavy load**	**VT: Light load**	
AC Reactor	3-phase 200 VAC	0.1 kW	0.2 kW	**3G3AX-AL2025**
		0.2 kW	0.4 kW	
		0.4 kW	0.75 kW	
		0.75 kW	1.1 kW	
		1.5 kW	2.2 kW	**3G3AX-AL2055**
		2.2 kW	3.0 kW	
		3.7 kW	5.5 kW	**3G3AX-AL2110**
		5.5 kW	7.5 kW	**3G3AX-AL2110 ***
		7.5 kW	11 kW	**3G3AX-AL2220**
		11 kW	15 kW	**3G3AX-AL2220 ***
		15 kW	18.5 kW	**3G3AX-AL2330**
	1-phase 200 VAC	0.1 kW	0.2 kW	**3G3AX-AL2025**
		0.2 kW	0.4 kW	
		0.4 kW	0.55 kW	
		0.75 kW	1.1 kW	
		1.5 kW	2.2 kW	**3G3AX-AL2055 ***
		2.2 kW	3.0 kW	**3G3AX-AL2110**
	3-phase 400 VAC	0.4 kW	0.75 kW	**3G3AX-AL4025**
		0.75 kW	1.5 kW	
		1.5 kW	2.2 kW	**3G3AX-AL4055**
		2.2 kW	3.0 kW	
		3.0 kW	4.0 kW	
		4.0 kW	5.5 kW	**3G3AX-AL4110**
		5.5 kW	7.5 kW	**3G3AX-AL4110 ***
		7.5 kW	11 kW	**3G3AX-AL4220**
		11 kW	15 kW	**3G3AX-AL4220 ***
		15 kW	18.5 kW	**3G3AX-AL4330**

Note: When using the Inverter for light load rating, select the model with one size larger capacity (rated current).
* Only the CT rating is supported.

Name	**Cable length(m)**	**Model**
Digital Operator	---	**3G3AX-OP01**
Connection cable	1m	**3G3AX-OPCN1**
	3m	**3G3AX-OPCN3**

EtherCAT Communications Cables

Refer to Connecting cable with NJ-series Controller for the recommended cables.

MEMO

High-function General-purpose Inverter RX-Series V1 type

Interpreting Model Numbers

3G3RX-□□□□□-V1

1 2 3

RX series V1 type

1) Enclosure rating

A	Panel-mounting (IP20 min.) or closed wall-mounting models
B	Panel-mounting (IP00 min.)

2) Voltage class

2	3-phase 200 V AC (200-V class)
4	3-phase 400 V AC (400-V class)

3) Maximum Applicable Motor Capacity (CT:Heavy load)

004	0.4 kW	075	7.5 kW	370	37 kW
007	0.75 kW	110	11 kW	450	45 kW
015	1.5 kW	150	15 kW	550	55 kW
022	2.2 kW	185	18.5 kW	750	75 kW
037	3.7 kW	220	22 kW	900	90 kW
055	5.5 kW	300	30 kW	11k	110 kW
				13k	132 kW

Ordering Information

RX series V1 type Inverter Models

Rated voltage	Enclosure ratings	Max. applicable motor capacity		Model
		CT: Heavy load	VT: Light load	
3-phase 200 VAC	IP20	0.4 kW	0.75 kW	**3G3RX-A2004-V1**
		0.75 kW	1.5 kW	**3G3RX-A2007-V1**
		1.5 kW	2.2 kW	**3G3RX-A2015-V1**
		2.2 kW	3.7 kW	**3G3RX-A2022-V1**
		3.7 kW	5.5 kW	**3G3RX-A2037-V1**
		5.5 kW	7.5 kW	**3G3RX-A2055-V1**
		7.5 kW	11 kW	**3G3RX-A2075-V1**
		11 kW	15 kW	**3G3RX-A2110-V1**
		15 kW	18.5 kW	**3G3RX-A2150-V1**
		18.5 kW	22 kW	**3G3RX-A2185-V1**
		22 kW	30 kW	**3G3RX-A2220-V1**
		30 kW	37 kW	**3G3RX-A2300-V1**
		37 kW	45 kW	**3G3RX-A2370-V1**
		45 kW	55 kW	**3G3RX-A2450-V1**
		55 kW	75 kW	**3G3RX-A2550-V1**
3-phase 400 VAC		0.4 kW	0.75 kW	**3G3RX-A4004-V1**
		0.75 kW	1.5 kW	**3G3RX-A4007-V1**
		1.5 kW	2.2 kW	**3G3RX-A4015-V1**
		2.2 kW	3.7 kW	**3G3RX-A4022-V1**
		3.7 kW	5.5 kW	**3G3RX-A4037-V1**
		5.5 kW	7.5 kW	**3G3RX-A4055-V1**
		7.5 kW	11 kW	**3G3RX-A4075-V1**
		11 kW	15 kW	**3G3RX-A4110-V1**
		15 kW	18.5 kW	**3G3RX-A4150-V1**
		18.5 kW	22 kW	**3G3RX-A4185-V1**
		22 kW	30 kW	**3G3RX-A4220-V1**
		30 kW	37 kW	**3G3RX-A4300-V1**
		37 kW	45 kW	**3G3RX-A4370-V1**
		45 kW	55 kW	**3G3RX-A4450-V1**
		55 kW	75 kW	**3G3RX-A4550-V1**
	IP00	75 kW	90 kW	**3G3RX-B4750-V1**
		90 kW	110 kW	**3G3RX-B4900-V1**
		110 kW	132 kW	**3G3RX-B411K-V1**
		132 kW	160 kW	**3G3RX-B413K-V1**

Communication Unit

Name	Model
EtherCAT Communication Unit	**3G3AX-RX-ECT**

Related Options

Name	Specifications		Model
Regenerative Braking Units	3-phase 200 VAC	General purpose with Braking resistor	**3G3AX-RBU21**
		High Regeneration purpose with Braking resistor	**3G3AX-RBU22**
		General purpose for 30 kW *	**3G3AX-RBU23**
		General purpose for 55 kW *	**3G3AX-RBU24**
	3-phase 400 VAC	General purpose with Braking resistor	**3G3AX-RBU41**
		General purpose for 30 kW *	**3G3AX-RBU42**
		General purpose for 55 kW *	**3G3AX-RBU43**
Braking Resistor	Compact type	Resistor 120 W, 180 Ω	**3G3AX-RBA1201**
		Resistor 120 W, 100 Ω	**3G3AX-RBA1202**
		Resistor 120 W, 50 Ω	**3G3AX-RBA1203**
		Resistor 120 W, 35 Ω	**3G3AX-RBA1204**
	Standard type	Resistor 200 W, 180 Ω	**3G3AX-RBB2001**
		Resistor 200 W, 100 Ω	**3G3AX-RBB2002**
		Resistor 300 W, 50 Ω	**3G3AX-RBB3001**
		Resistor 400 W, 35 Ω	**3G3AX-RBB4001**
	Medium capacity type	Resistor 400 W, 50 Ω	**3G3AX-RBC4001**
		Resistor 600 W, 35 Ω	**3G3AX-RBC6001**
		Resistor 1200 W, 17 Ω	**3G3AX-RBC12001**

* The braking resistor is optionally required.

Name	Model
Radio Noise Filter	**3G3AX-ZCL2**
	3G3AX-ZCL1

Name	Specifications of Inverter			Model
	Voltage class	CT: Heavy load (kW)	VT: Light load (kW)	
Input Noise Filter	3-phase 200 VAC	0.4 to 0.75	0.75	**3G3AX-NFI21**
		1.5	1.5	**3G3AX-NFI22**
		2.2, 3.7	2.2, 3.7	**3G3AX-NFI23**
		5.5	5.5	**3G3AX-NFI24**
		7.5	7.5	**3G3AX-NFI25**
		11	11	**3G3AX-NFI26**
		15	15	**3G3AX-NFI27**
		18.5	18.5	**3G3AX-NFI28**
		22, 30	22, 30	**3G3AX-NFI29**
		37	37	**3G3AX-NFI2A**
		45	45	**3G3AX-NFI2B**
		55	55	**3G3AX-NFI2C**
	3-phase 400 VAC	0.4 to 2.2	0.75 to 2.2	**3G3AX-NFI41**
		3.7	3.7	**3G3AX-NFI42**
		5.5, 7.5	5.5, 7.5	**3G3AX-NFI43**
		11	11	**3G3AX-NFI44**
		15	15	**3G3AX-NFI45**
		18.5	18.5	**3G3AX-NFI46**
		22	22	**3G3AX-NFI47**
		30	30	**3G3AX-NFI48**
		37	37	**3G3AX-NFI49**
		45, 55	45, 55	**3G3AX-NFI4A**

Name	Specifications of Inverter			Model
	Voltage class	CT: Heavy load (kW)	VT: Light load (kW)	
EMC Noise Filter *	3-phase 200 VAC	0.4 to 7.5	0.75	**3G3AX-EFI41**
		1.5	1.5	**3G3AX-EFI42**
		2.2, 3.7	2.2, 3.7	**3G3AX-EFI43**
		5.5	5.5	**3G3AX-EFI44**
		7.5	7.5	**3G3AX-EFI45**
		11	11	**3G3AX-EFI47**
		15	15	**3G3AX-EFI48**
		18.5	18.5	**3G3AX-EFI49**
		22, 30	22, 30	**3G3AX-EFI4A**
		37	37	**3G3AX-EFI4B**
	3-phase 400 VAC	0.4 to 22	0.75 to 2.2	**3G3AX-EFI41**
		3.7	3.7	**3G3AX-EFI42**
		5.5, 7.5	5.5, 7.5	**3G3AX-EFI43**
		11	11	**3G3AX-EFI44**
		15	15	**3G3AX-EFI45**
		18.5	18.5	**3G3AX-EFI46**
		22	22	**3G3AX-EFI47**
		30	30	**3G3AX-EFI48**
		37	37	**3G3AX-EFI49**
		45, 55	45, 55	**3G3AX-EFI4A**
		75, 90	75, 90	**3G3AX-EFI4B**
Output Noise Filter	3-phase 200 VAC/ 3-phase 400 VAC	Applicable motor 200 V class: 0.4 to 0.75 400 V class: 0.4 to 2.2	Applicable motor 200 V class: 0.75 400 V class: 0.75 to 2.2	**3G3AX-NFO01**
		Applicable motor 200 V class: 1.5, 2.2 400 V class: 3.7	Applicable motor 200 V class: 1.5, 2.2 400 V class: 3.7	**3G3AX-NFO02**
		Applicable motor 200 V class: 3.7, 5.5 400 V class: 5.5 to 11	Applicable motor 200 V class: 3.7, 5.5 400 V class: 5.5 to 11	**3G3AX-NFO03**
		Applicable motor 200 V class: 7.5, 11 400 V class: 15 to 22	Applicable motor 200 V class: 7.5, 11 400 V class: 15 to 22	**3G3AX-NFO04**
		Applicable motor 200 V class: 15 400 V class: 30, 37	Applicable motor 200 V class: 15 400 V class: 30, 37	**3G3AX-NFO05**
		Applicable motor 200 V class: 18.5, 22 400 V class: 45	Applicable motor 200 V class: 18.5, 22 400 V class: 45	**3G3AX-NFO06**
		Applicable motor 200 V class: 30, 37 400 V class: 55, 75	Applicable motor 200 V class: 30, 37 400 V class: 55, 75	**3G3AX-NFO07**

* Although an EMC Noise Filter is built into the RX, it may be necessary to provide another EMC Noise Filter when the cable between the Motor and the Inverter is long.

Name	Specifications of Inverter			Model
	Voltage class	CT: Heavy load (kW)	VT: Light load (kW)	
DC Reactor	3-phase 200 VAC	0.4	---	**3G3AX-DL2004**
		0.75	0.75	**3G3AX-DL2007**
		1.5	1.5	**3G3AX-DL2015**
		2.2	2.2	**3G3AX-DL2022**
		3.7	3.7	**3G3AX-DL2037**
		5.5	5.5	**3G3AX-DL2055**
		7.5	7.5	**3G3AX-DL2075**
		11	11	**3G3AX-DL2110**
		15	15	**3G3AX-DL2150**
		18.5, 22	18.5, 22	**3G3AX-DL2220**
		30	30	**3G3AX-DL2300**
		37	37	**3G3AX-DL2370**
		45	45	**3G3AX-DL2450**
		55	55	**3G3AX-DL2550**
	3-phase 400 VAC	0.4	---	**3G3AX-DL4004**
		0.75	0.75	**3G3AX-DL4007**
		1.5	1.5	**3G3AX-DL4015**
		2.2	2.2	**3G3AX-DL4022**
		3.7	3.7	**3G3AX-DL4037**
		5.5	5.5	**3G3AX-DL4055**
		7.5	7.5	**3G3AX-DL4075**
		11	11	**3G3AX-DL4110**
		15	15	**3G3AX-DL4150**
		18.5, 22	18.5, 22	**3G3AX-DL4220**
		30	30	**3G3AX-DL4300**
		37	37	**3G3AX-DL4370**
		45	45	**3G3AX-DL4450**
		55	55	**3G3AX-DL4550**
AC Reactor	3-phase 200 VAC	0.4 to 1.5	0.75 to 1.5	**3G3AX-AL2025**
		2,2, 3.7	2.2, 3.7	**3G3AX-AL2055**
		5.5, 7.5	5.5, 7.5	**3G3AX-AL2110**
		11, 15	11, 15	**3G3AX-AL2220**
		18.5, 22	18.5, 22	**3G3AX-AL2330**
		30, 37	30, 37	**3G3AX-AL2500**
		45, 55	45, 55	**3G3AX-AL2750**
	3-phase 400 VAC	0.4 to 1.5	0.75 to 1.5	**3G3AX-AL4025**
		2.2, 3.7	2.2, 3.7	**3G3AX-AL4055**
		5.5, 7.5	5.5, 7.5	**3G3AX-AL4110**
		11, 15	11, 15	**3G3AX-AL4220**
		18.5, 22	18.5, 22	**3G3AX-AL4330**
		30, 37	30, 37	**3G3AX-AL4500**
		45, 55	45, 55	**3G3AX-AL4750**

Name	Specifications	Model
PG Board	For Position or Frequency Control	**3G3AX-PG01**
Digital Operator	---	**3G3AX-OP01**
	---	**3G3AX-OP05 (available soon)**
Digital Operator Connecting Cable	Cable Length 1 m	**3G3AX-OPCN1**
	Cable Length 3 m	**3G3AX-OPCN3**

EtherCAT Communications Cables

Refer to Connecting cable with NJ-series Controller for the recommended cables.

Ordering Information

FH Series Sensor Controllers

Item		CPU	No. of cameras	Output	Model
	Box-type controllers	High-speed Controllers (4 core)	2	NPN/PNP	**FH-3050**
			4	NPN/PNP	**FH-3050-10**
			8	NPN/PNP	**FH-3050-20**
		Standard Controllers (2 core)	2	NPN/PNP	**FH-1050**
			4	NPN/PNP	**FH-1050-10**
			8	NPN/PNP	**FH-1050-20**

Cameras

Item		Descriptions	Color / Monochrome	Image read time	Model
	High-speed CMOS Cameras (Lens required) For FH Sensor Controllers only	12 million pixels (Up to four cameras can be connected to one Controller. Up to eight cameras other than 12 million-pixel cameras can be connected to a FH-3050-20 or a FH-1050-20.)	Color	25.7 ms *	**FH-SC12**
			Monochrome		**FH-SM12**
	High-speed CMOS Cameras (Lens required) For FH Sensor Controllers only	4 million pixels	Color	8.5 ms *	**FH-SC04**
			Monochrome		**FH-SM04**
		2 million pixels	Color	4.6 ms *	**FH-SC02**
			Monochrome		**FH-SM02**
		300,000 pixels	Color	3.3 ms	**FH-SC**
			Monochrome		**FH-SM**
	Digital CCD Cameras (Lens required)	5 million pixels	Color	62.5 ms	**FZ-SC5M2**
			Monochrome		**FZ-S5M2**
		2 million pixels	Color	33.3 ms	**FZ-SC2M**
			Monochrome		**FZ-S2M**
		300,000 pixels	Color	12.5 ms	**FZ-SC**
			Monochrome		**FZ-S**
	High-speed CCD Cameras (Lens required)	300,000 pixels	Color	4.9 ms	**FZ-SHC**
			Monochrome		**FZ-SH**
	Small Digital CCD Cameras (Lenses for small camera required)	300,000-pixel flat type	Color	12.5 ms	**FZ-SFC**
			Monochrome		**FZ-SF**
		300,000-pixel pen type	Color	12.5 ms	**FZ-SPC**
			Monochrome		**FZ-SP**
	Intelligent Compact CMOS Cameras (Camera + Manual Focus Lens + High power Lighting)	Narrow view	Color	16.7 ms	**FZ-SQ010F**
		Standard view	Color		**FZ-SQ050F**
		Wide View (long-distance)	Color		**FZ-SQ100F**
		Wide View (short-distance)	Color		**FZ-SQ100N**

* Frame rate in high speed mode when the camera is connected using two camera cables. For other conditions, please refer to the chart below.

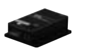
Model			FH-SM02	FH-SC02	FH-SM04	FH-SC04	FH-SM12	FH-SC12
Image Acquisition Time	**2 Cables *1**	**High Speed Mode *2**	4.6ms		8.5ms		25.7ms	
		Standard Mode	9.7ms		17.9ms		51.3ms	
	1 Cables	**High Speed Mode *2**	9.2ms		17.0ms		51.3ms	
		Standard Mode	19.3ms		35.8ms		102.0ms	

*1 Two Camera ports of the controller are used per one camera.

*2 Up to 5 m Camera Cable lengh.

Cmera Cables

Item	Descriptions	Model
	Camera Cable Cable length: 2 m, 3 m, 5m, or 10 m *2	**FZ-VS3**
	Bend resistant Camera Cable Cable length: 2 m, 3 m, 5m, or 10 m *2	**FZ-VSB3**
	Right-angle Camera Cable *1 Cable length: 2 m, 3 m, 5m, or 10 m *2	**FZ-VSL3**
	Bend resistant Right-angle Camera Cable *1 Cable length: 2 m, 3 m, 5 m, or 10 m *2	**FZ-VSLB3**

Item	Descriptions	Model
	Long-distance Camera Cable Cable length: 15 m *2	**FZ-VS4**
	Long-distance Right-angle Camera Cable *1 Cable length: 15 m *2	**FZ-VSL4**
	Cable Extension Unit Up to two Extension Units and three Cables can be connected. (Maximum cable length: 45 m *2)	**FZ-VSJ**

*1 This Cable has an L-shaped connector on the Camera end.

*2 The maximum cable length depends on the Camera being connected, and the model and length of the Cable being used. For further information,please refer to the "Cameras / Cables Connection Table" and "Maximum Extension Length Using Cable Extension Units FZ-VSJ table".
When a high-speed CMOS camera FH-S☐02/-S☐04/-S☐12 is used in the high speed mode of transmission speed, two camera cables are required.

Cameras / Cables Connection Table

Type of camera	Model	Cable length	High-speed CMOS cameras *						
			300,000-pixel	2 million-pixel		4 million-pixel		12 million-pixel	
			FH-SM/SC	FH-SM02/SC02		FH-SM04/SC04		FH-SM12/SC12	
			—	High speed mode of transmission speed select	Standard mode of transmission speed select	High speed mode of transmission speed select	Standard mode of transmission speed select	High speed mode of transmission speed select	Standard mode of transmission speed select
Camera Cables Right-angle camera cables	FZ-VS3 FZ-VSL3	2 m	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		3 m	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		5 m	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		10 m	Yes	No	Yes	No	Yes	No	Yes
Bend resistant camera cables Bend resistant	FZ-VSB3 FZ-VSLB3	2 m	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		3 m	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		5 m	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		10 m	Yes	No	Yes	No	Yes	No	Yes
Long-distance camera cable Long-distance right-angle	FZ-VS4 FZ-VSL4	15 m	Yes	No	Yes	No	Yes	No	Yes

Type of camera	Model	Cable length	Digital CCD cameras			Small digital CCD cameras Pen type / flat type	High-speed CCD cameras	Intelligent compact CMOS cameras
			300,000-pixel	2 million-pixel	5 million-pixel			
			FZ-S/SC	FZ-S2M/SC2M	FZ-S5M2/SC5M2	FZ-SF/SFC FZ-SP/SPC	FZ-SH/SHC	FZ-SQ□
Camera Cables Right-angle camera cables	FZ-VS3 FZ-VSL3	2 m	Yes	Yes	Yes	Yes	Yes	Yes
		3 m	Yes	Yes	Yes	Yes	Yes	Yes
		5 m	Yes	Yes	Yes	Yes	Yes	Yes
		10 m	Yes	Yes	No	Yes	Yes	Yes
Bend resistant camera cables Bend resistant Right-angle	FZ-VSB3 FZ-VSLB3	2 m	Yes	Yes	Yes	Yes	Yes	Yes
		3 m	Yes	Yes	Yes	Yes	Yes	Yes
		5 m	Yes	Yes	Yes	Yes	Yes	Yes
		10 m	Yes	Yes	No	Yes	Yes	Yes
Long-distance camera cable Long-distance right-angle camera cable	FZ-VS4 FZ-VSL4	15 m	Yes	Yes	No	Yes	Yes	Yes

Maximum Extension Length Using Cable Extension Units FZ-VSJ

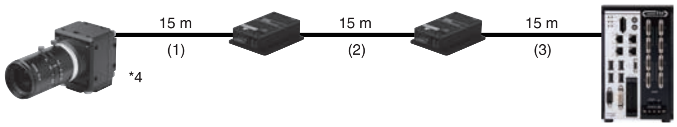
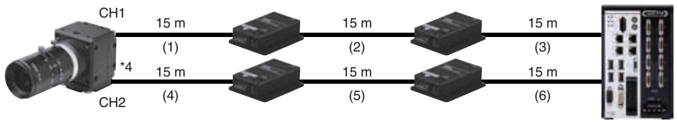
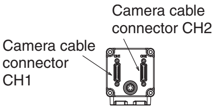
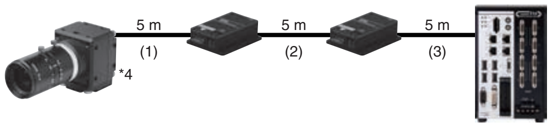
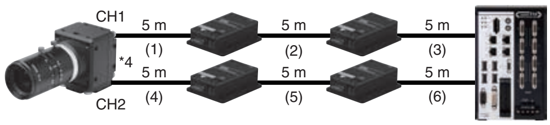
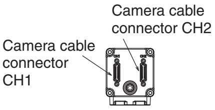
Item	Model	Transmission speed (*1)	No. of CH used for connection (*2)	Maximum cable length using 1 Camera Cable (*1)	Max. number of connectable Extension Units	Using Cable Extension Units FZ-VSJ	
						Max. cable length	Connection configuration
High-speed CMOS Cameras	FH-SM/SC	---	---	15 m (Using FZ-VS4/VSL4)	2	45 m	[Configuration 1] Camera cable: 15 m × 3 Extension Unit: 2
	FH-SM02/SC02 FH-SM04/SC04 FH-SM12/SC12	Standard	1	15 m (Using FZ-VS4/VSL4)	2	45 m	[Configuration 1] Camera cable: 15 m × 3 Extension Unit: 2
			2	15 m (Using FZ-VS4/VSL4)	4 (*3)	45 m	[Configuration 2] Camera cable: 15 m × 6 Extension Unit: 4
		High speed	1	5 m (Using FZ-VS□/VSL□)	2	15 m	[Configuration 3] Camera cable: 5 m × 3 Extension Unit: 2
			2	5 m (Using FZ-VS□/VSL□)	4 (*3)	15 m	[Configuration 4] Camera cable: 5 m × 6 Extension Unit: 4
Digital CCD Cameras	FZ-S/SC FZ-S2M/SC2M	---	---	15 m (Using FZ-VS4/VSL4)	2	45 m	[Configuration 1] Camera cable: 15 m × 3 Extension Unit: 2
	FZ-S5M2/SC5M2	---	---	5 m (Using FZ-VS□/VSL□)	2	15 m	[Configuration 3] Camera cable: 5 m × 3 Extension Unit: 2
Small Digital CCD Cameras	FZ-SF/SFC FZ-SP/SPC	---	---	15 m (Using FZ-VS4/VSL4)	2	45 m	[Configuration 1] Camera cable: 15 m × 3 Extension Unit: 2
High-speed CCD Cameras	FZ-SH/SHC	---	---	15 m (Using FZ-VS4/VSL4)	2	45 m	[Configuration 1] Camera cable: 15 m × 3 Extension Unit: 2
Intelligent Compact	FZ-SQ□	---	---	15 m (Using FZ-VS4/VSL4)	2	45 m	[Configuration 1] Camera cable: 15 m × 3 Extension Unit: 2

*1 The FH-S□□□ enables switching between standard and high speed modes. In high speed mode, images can be transferred approximately two times faster than in standard mode, but the connectable cable length will be shorter.

*2 The FH-S□□□ has two channels to connect Camera Cables. Connection to two channels makes image transfer two times faster than connection to one channel: high speed mode using two channels can transfer approximately four times as many images as standard mode using one channel.

*3 Each channel can be used to connect up to two Cable Extension Units: up to four extension units, two channels x two units, can be connected by using two channels.

Connection Configuration

	Connection configuration using the maximum length of Camera Cables	Remarks
Configuration 1		
Configuration 2	 CH1 15 m (1) 15 m (2) 15 m (3) *4 15 m (4) 15 m (5) 15 m (6) CH2	
Configuration 3		
Configuration 4	 CH1 5 m (1) 5 m (2) 5 m (3) *4 5 m (4) 5 m (5) 5 m (6) CH2	

*4 Select the Camera Cables between the Controller and Extension Unit, between the Extension Units, and between the Extension Unit and Camera according to the connected Camera.
Different types or lengths of Camera Cables can be used for (1), (2), and (3) as well as for (4), (5), and (6). However, the type and length of Camera Cable (1) must be the same as those of Camera Cable (4), (2) must be the same as (5), and (3) must be the same as (6).

Touch Panel Monitor

Item	Descriptions	Model
	Touch Panel Monitor 12.1 inches For FH Sensor Controllers *	**FH-MT12**

* FH Series Sensor Controllers version 5.32 or higher is required.

Touch Panel Monitor Cables

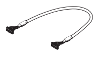
Item	Descriptions	Model
	DVI-Analog Conversion Cable for Touch Panel Monitor Cable length: 2 m, 5 m or 10 m	**FH-VMDA**
	RS-232C Cable for Touch Panel Monitor Cable length: 2 m, 5 m or 10 m	**XW2Z-□□□PP-1***
	USB Cable for Touch Panel Monitor Cable length: 2 m or 5 m	**FH-VUAB**

* Insert the cables length into □□□ in the model number as follows.
2 m = 200, 5 m = 500, 10 m = 010.

A video signal cable and an operation signal cable are required to connect the Touch Panel Monitor.

Signal	Cable	2 m	5 m	10 m
Video signal	DVI-Analog Conversion Cable	Yes	Yes	Yes
Touch panel operation signal	USB Cable	Yes	Yes	No
	RS-232C Cable	Yes	Yes	Yes

Parallel I/O Cables/Encoder Cable

Item	Descriptions	Model
	Parallel I/O Cable *1 Cable length: 2 m or 5 m	**XW2Z-S013-□** *2
	Parallel I/O Cable for Connector-terminal Conversion Unit *1 Cable length: 0.5 m, 1 m, 1.5 m, 2 m, 3 m, 5 m Connector-Terminal Block Conversion Units can be connected (Terminal Blocks Recommended Products: OMRON XW2R-□34G-T)	**XW2Z-□□□EE** *3
	Connector-Terminal Block Conversion Units, General-purpose devices	**XW2R-□34G-T** *4
	Encoder Cable for line-driver Cable length: 1.5 m	**FH-VR**

*1 2 Cables are required for all I/O signals.
*2 Insert the cables length into □ in the model number as follows. 2 m = 2, 5 m = 5
*3 Insert the cables length into □□□ in the model number as follows. 0.5 m = 050, 1 m = 100, 1.5 m = 150, 2 m = 200, 3 m = 300, 5 m = 500
*4 Insert the wiring method into □ in the model number as follows. Phillips screw = J, Slotted screw (rise up) = E, Push-in spring = P
Refer to the XW2R Series catalog (Cat. No. G077) for details.

EtherCAT Communications Cables

Refer to Connecting cable with NJ-series Controller for the recommended cables.

Development Environment

Please purchase a CD-ROM and licenses the first time you purchase the Application Producer. CD-ROMs and licenses are available individually. The license does not include the CD-ROM.

Product	Specifications	Number of Model Standards licenses	Media	Model
Application Producer	Software components that provide a development environment to further customize the standard controller features of the FH Series. System requirements: • CPU: Intel Pentium Processor (SSE2 or higher) • OS: Windows 7 Professional (32/64bit) or Enterprise(32/64bit) or Ultimate (32/64bit), Windows 8 Pro(32/64bit) or Enterprise(32/64bit), Windows 8.1 Pro(32/64bit) or Enterprise(32/64bit) • .NET Framework: .NET Framework 3.5 or higher • Memory: At least 2 GB RAM Available disk space: At least 2 GB • Browser: Microsoft® Internet Explorer 6.0 or later • Display: XGA (1024 × 768), True Color (32-bit) or higher • Optical drive: CD/DVD drive The following software is required to customize the software: Microsoft® Visual Studio® 2010 Professional or Microsoft® Visual Studio® 2008 Professional or Microsoft® Visual Studio® 2012 Professional	– (Media only)	CD-ROM	**FH-AP1**
		1 license	–	**FH-AP1L**

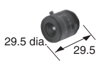
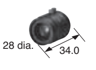
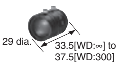
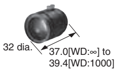
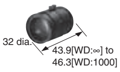
Accessories

Item	Descriptions				Model
	LCD Monitor 8.4 inches For Box-type Controllers*1				**FZ-M08**
	LED Monitor Cable Cable length: 2 m or 5 m (When you connect a LCD Monitor FZ-M08 to FH sensor controller, please use it in combination with a DVI-I -RGB Conversion Connector FH-VMRGB.)				**FZ-VM**
	DVI-I -RGB Conversion Connector				**FH-VMRGB**
	USB Memory		2 GB		**FZ-MEM2G**
			8 GB		**FZ-MEM8G**
	SD Card		2 GB		**HMC-SD291**
			4 GB		**HMC-SD491**
	Display/USB Switcher				**FZ-DU**
–	Mouse Recommended Products Driverless wired mouse (A mouse that requires the mouse driver to be installed is not supported.)				---
	EtherCAT junction slaves	3 port	Power supply voltage: 20.4 to 28.8 VDC (24 VDC -15 to 20%)	Current consumption: 0.08 A	**GX-JC03**
		6 port		Current consumption: 0.17 A	**GX-JC06**
	Industrial Switching Hubs for EtherNet/IP and Ethernet	3 port	Failure detection: None	Current consumption 0.22 A	**W4S1-03B**
		5 port	Failure detection: None		**W4S1-05B**
		5 port	Failure detection: Supported		**W4S1-05C**
–	Calibration Plate				**FZD-CAL**
–	External Lighting			–	**FLV Series *2**
					FL Series *2
	Lighting Controller (Required to control external lighting from a Controller)		For FLV-Series	Camera Mount Lighting Controller	**FLV-TCC Series *2**
				Analog Lighting Controller	**FLV-ATC Series *2**
			For FL-Series	Camera Mount Lighting Controller	**FL-TCC Series *2**
	For Intelligent Compact Camera			Mounting Bracket	**FQ-XL**
				Mounting Brackets	**FQ-XL2**
				Polarizing Filter Attachment	**FQ-XF1**
–	Mounting Bracket for FZ-S□				**FZ-S-XLC**
	Mounting Bracket for FZ-S□2M				**FZ-S2M-XLC**
	Mounting Bracket for FZ-SH□				**FZ-SH-XLC**
	Mounting Bracket for FH-S□, FZ-S□5M2				**FH-SM-XLC**
	Mounting Bracket for FH-S□12				**FH-SM12-XLC**

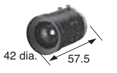
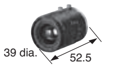
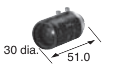
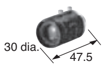
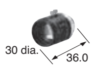
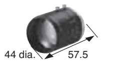
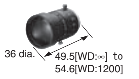
*1 It can be used in FH series.
*2 Refer to the Vision Accessory Catalog (Cat. No. Q198) for details.

Lenses

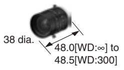
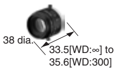
C-mount Lens for 1/3-inch image sensor (Recommend: FZ-S□/FZ-SH□/FH-S□)

Model	3Z4S-LE SV-03514V	3Z4S-LE SV-04514V	3Z4S-LE SV-0614V	3Z4S-LE SV-0813V	3Z4S-LE SV-1214V	3Z4S-LE SV-1614V	3Z4S-LE SV-2514V	3Z4S-LE SV-3518V	3Z4S-LE SV-5018V	3Z4S-LE SV-7527V	3Z4S-LE SV-10035V
Appearance/ Dimensions (mm)								 29 dia. 33.5[WD:∞] to 37.5[WD:300]	 32 dia. 37.0[WD:∞] to 39.4[WD:1000]	32 dia. 42.0[WD:∞] to 44.4[WD:1000]	 32 dia. 43.9[WD:∞] to 46.3[WD:1000]
Focal length	3.5 mm	4.5 mm	6 mm	8 mm	12 mm	16 mm	25 mm	35 mm	50 mm	75 mm	100 mm
Aperture (F No.)	1.4 to Close	1.4 to Close	1.4 to Close	1.3 to Close	1.4 to Close	1.4 to Close	1.4 to Close	1.8 to Close	1.8 to Close	2.7 to Close	3.5 to Close
Filter size	---	---	M27.0 P0.5	M25.5 P0.5	M27.0 P0.5	M27.0 P0.5	M27.0 P0.5	M27.0 P0.5	M30.5 P0.5	M30.5 P0.5	M30.5 P0.5
Maximum sensor size	1/3 inch	1/3 inch	1/3 inch	1/3 inch	1/3 inch	1/3 inch	1/3 inch	1/3 inch	1/3 inch	1/3 inch	1/3 inch
Mount	C mount										

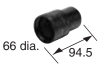
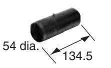
C-mount Lens for 2/3-inch image sensor (Recommend: FZ-S□2M/FZ-S□5M2)
(3Z4S-LE SV-7525H and 3Z4S-LE SV-10028H can also be used for FH-S□02/FH-S□04)

Model	3Z4S-LE SV-0614H	3Z4S-LE SV-0814H	3Z4S-LE SV-1214H	3Z4S-LE SV-1614H	3Z4S-LE SV-2514H	3Z4S-LE SV-3514H	3Z4S-LE SV-5014H	3Z4S-LE SV-7525H	3Z4S-LE SV-10028H
Appearance/ Dimensions (mm)								 36 dia. 49.5[WD:∞] to 54.6[WD:1200]	39 dia. 66.5[WD:∞] to 71.6[WD:2000]
Focal length	6 mm	8 mm	12 mm	16 mm	25 mm	35 mm	50 mm	75 mm	100 mm
Aperture (F No.)	1.4 to 16	1.4 to 16	1.4 to 16	1.4 to 16	1.4 to 16	1.4 to 16	1.4 to 16	2.5 to Close	2.8 to Close
Filter size	M40.5 P0.5	M35.5 P0.5	M27.0 P0.5	M27.0 P0.5	M27.0 P0.5	M35.5 P0.5	M40.5 P0.5	M34.0 P0.5	M37.5 P0.5
Maximum sensor size	2/3 inch	2/3 inch	2/3 inch	2/3 inch	2/3 inch	2/3 inch	2/3 inch	1 inch	1 inch
Mount	C mount								

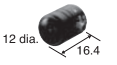
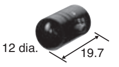
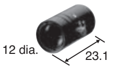
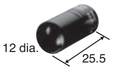
C-mount Lens for 1-inch image sensor (Recommend: FH-S□02/FH-S□04)
(3Z4S-LE SV-7525H with focal length of 75 mm and 3Z4S-LE SV-10028H with focal length of 100 mm are also available.)

Model	3Z4S-LE VS-0618H1	3Z4S-LE VS-0814H1	3Z4S-LE VS-1214H1	3Z4S-LE VS-1614H1N	3Z4S-LE VS-2514H1	3Z4S-LE VS-3514H1	3Z4S-LE VS-5018H1
Appearance/ Dimensions (mm)			 38 dia. 48.0[WD:∞] to 48.5[WD:300]	38 dia. 45.0[WD:∞] to 45.9[WD:300]	 38 dia. 33.5[WD:∞] to 35.6[WD:300]	38 dia. 35.0[WD:∞] to 39.1[WD:300]	44 dia. 44.5[WD:∞] to 49.5[WD:500]
Focal length	6 mm	8mm	12 mm	16 mm	25 mm	35 mm	50 mm
Aperture (F No.)	1.8 to 16	1.4 to 16	1.4 to 16	1.4 to 16	1.4 to 16	1.4 to 16	1.8 to 16
Filter size	Can not be used with a filter	M55.0 P0.75	M35.5 P0.5	M30.5 P0.5	M30.5 P0.5	M30.5 P0.5	M40.5 P0.5
Maximum sensor size	1 inch	1 inch	1 inch	1 inch	1 inch	1 inch	1 inch
Mount	C mount						

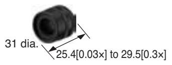
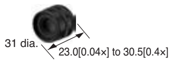
M42-mount Lens for large image sensor (Recommend: FH-S□12)

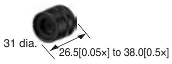
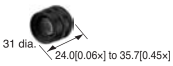
Model	3Z4S-LE VS-L1828/M42-10	3Z4S-LE VS-L2526/M42-10	3Z4S-LE VS-L3528/M42-10	3Z4S-LE VS-L5028/M42-10	3Z4S-LE VS-L8540/M42-10	3Z4S-LE VS-L10028/M42-10
Appearance/ Dimensions (mm)					55.5 dia. 129.5	
Focal length	18 mm	25 mm	35 mm	50 mm	85 mm	100 mm
Aperture (F No.)	2.8 to 16	2.6 to 16	2.8 to 16	2.8 to 16	4.0 to 16	2.8 to 16
Filter size	M55.0 P0.75	M55.0 P0.75	M62.0 P0.75	M62.0 P0.75	M52.0 P0.75	M52.0 P0.75
Maximum sensor size	1.8 inch					
Mount	M42 mount					

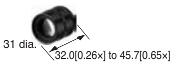
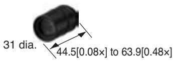
Lenses for small camera

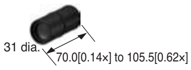
Model	FZ-LES3	FZ-LES6	FZ-LES16	FZ-LES30
Appearance/ Dimensions (mm)				
Focal length	3 mm	6 mm	16 mm	30 mm
Aperture (F No.)	2.0 to 16	2.0 to 16	3.4 to 16	3.4 to 16

Vibrations and shocks resistant C-mount Lens for 2/3-inch image sensor (Recommend: FZ-S□/FZ-S□2M/FZ-S□5M2/FZ-SH□/FH-S□) (Vibrations and Shocks Resistant Lenses for 1-inch image sensors and for large image sensors are also available. Ask your OMRON representative for details.)

Model	3Z4S-LE VS-MC15-□□□□□ *1									3Z4S-LE VS-MC20-□□□□□ *1								
Appearance/ Dimensions (mm)																		
Focal length	15 mm									20 mm								
Filter size	M27.0 P0.5									M27.0 P0.5								
Optical magnification	0.03 ×			0.2 ×			0.3 ×			0.04 ×			0.25 ×			0.4 ×		
Aperture (fixed F No.) *2	2	5.6	8	2	5.6	8	2	5.6	8	2	5.6	8	2	5.6	8	2	5.6	8
Depth of field (mm) *3	183.1	512.7	732.4	4.8	13.4	19.2	2.3	6.5	9.2	110.8	291.2	416.0	3.4	9.0	12.8	1.5	3.9	5.6
Maximum sensor size	2/3 inch																	
Mount	C mount																	

Model	3Z4S-LE VS-MC25N-□□□□□ *1									3Z4S-LE VS-MC30□□□□□ *1								
Appearance/ Dimensions (mm)																		
Focal length	25 mm									30 mm								
Filter size	M27.0 P0.5									M27.0 P0.5								
Optical magnification	0.05 ×			0.25 ×			0.5 ×			0.06 ×			0.15 ×			0.45 ×		
Aperture (fixed F No.) *2	2	5.6	8	2	5.6	8	2	5.6	8	2	5.6	8	2	5.6	8	2	5.6	8
Depth of field (mm) *3	67.2	188.2	268.8	3.2	9.0	12.8	1.0	2.7	3.8	47.1	131.9	188.4	8.2	22.9	32.7	1.1	3.2	4.6
Maximum sensor size	2/3 inch																	
Mount	C mount																	

Model	3Z4S-LE VS-MC35-□□□□□ *1									3Z4S-LE VS-MC50-□□□□□ *1								
Appearance/ Dimensions (mm)																		
Focal length	35 mm									50 mm								
Filter size	M27.0 P0.5									M27.0 P0.5								
Optical magnification	0.26 ×			0.3 ×			0.65 ×			0.08 ×			0.2 ×			0.48 ×		
Aperture (fixed F No.) *2	2	5.6	8	2	5.6	8	2	5.6	8	2	5.6	8	2	5.6	8	2	5.6	8
Depth of field (mm) *3	2.8	8.4	11.9	2.2	6.5	9.2	0.6	1.7	2.5	33.8	75.6	108.0	6.0	13.4	19.2	1.3	2.9	4.1
Maximum sensor size	2/3 inch																	
Mount	C mount																	

Model	3Z4S-LE VS-MC75-□□□□□ *1								
Appearance/ Dimensions (mm)									
Focal length	75 mm								
Filter size	M27.0 P0.5								
Optical magnification	0.14 ×			0.2 ×			0.62 ×		
Aperture (fixed F No.) *2	3.8	5.6	8	3.8	5.6	8	3.8	5.6	8
Depth of field (mm) *3	17.7	26.1	37.2	9.1	13.4	19.2	1.3	1.9	2.7
Maximum sensor size	2/3 inch								
Mount	C mount								

*1 Insert the iris range into □□□□□ in the model number as follows.
F=1.9 to 3.8: blank
F=5.6: FN056
F=8: FN080
*2 F-number can be selected from maximum aperture, 5.6, and 8.0.
*3 When circle of least confusion is 40 µm.

Extension Tubes

Lenses	For M42 mount Lenses *	For C mount Lenses *	For Small Digital CCD Cameras
Model	**3Z4S-LE VS-EXR/M42**	**3Z4S-LE SV-EXR**	**FZ-LESR**
Contents	Set of 5 tubes (20 mm, 10 mm, 8 mm, 2 mm, and 1 mm) Maximum outer diameter: 47.5 mm dia.	Set of 7 tubes (40 mm, 20 mm,10 mm, 5 mm, 2.0 mm, 1.0 mm, and 0.5 mm) Maximum outer diameter: 30 mm dia.	Set of 3 tubes (15 mm,10 mm, 5 mm) Maximum outer diameter: 12 mm dia.

* Do not use the 0.5-mm, 1.0-mm, and 2.0-mm Extension Tubes attached to each other. Since these Extension Tubes are placed over the threaded section of the Lens or other Extension Tube, the connection may loosen when more than one 0.5-mm, 1.0-mm or 2.0-mm Extension Tube are used together.
Reinforcement is required to protect against vibration when Extension Tubes exceeding 30 mm are used.
When using the Extension Tube, check it on the actual device before using it.

Smart Camera FQ-M-Series

Ordering Information

Sensors

Appearance	Type			Model
	Color	NPN	EtherCAT communication function provided	**FQ-MS120-ECT**
		PNP		**FQ-MS125-ECT**
	Monochrome	NPN		**FQ-MS120-M-ECT**
		PNP		**FQ-MS125-M-ECT**

Touch Finder

Appearance	Type	Model
	DC power supply	**FQ-MD30**
	AC/DC/battery *	**FQ-MD31**

* AC Adapter and Battery are sold separately.

Bend resistant Cables for FQ-M Series

Cable Type	Appearance	Type	Cable length	Model
EtherCAT and Ethernet cable (M12/RJ45)		Angle: M12/ Straight: RJ45	5m	**FQ-MWNL005**
			10m	**FQ-MWNL010**
		Straight type	5m	**FQ-WN005**
			10m	**FQ-WN010**
			20m	**FQ-WN020**
EtherCAT cable (M12/M12)		Angle type	5m	**FQ-MWNEL005**
			10m	**FQ-MWNEL010**
		Straight type	5m	**FQ-MWNE005**
			10m	**FQ-MWNE010**
I/O Cables		Angle type	5m	**FQ-MWDL005**
			10m	**FQ-MWDL010**
		Straight type	5m	**FQ-MWD005**
			10m	**FQ-MWD010**

Accessories

Appearance	Type		Model
	For Touch Finder	Panel Mounting Adapter	**FQ-XPM**
		AC Adapter (for models for DC/AC/Battery)	**FQ-AC□ *1**
		Battery (for models for DC/AC/Battery)	**FQ-BAT1 *2**
		Touch Pen (enclosed with Touch Finder)	**FQ-XT**
		Strap	**FQ-XH**
		SD Card (2 GB)	**HMC-SD291**
		SD Card (4GB)	**HMC-SD491**

*1 AC Adapters for Touch Finder with DC/AC/Battery Power Supply. Select the model for the country in which the Touch Finder will be used.

Plug type	Voltage	Certified standards	Model
A	125 V max.	PSE	**FQ-AC1**
		UL/CSA	**FQ-AC2**
	250 V max.	CCC mark	**FQ-AC3**
C	250 V max.	---	**FQ-AC4**
BF	250 V max.	---	**FQ-AC5**
O	250 V max.	---	**FQ-AC6**

*2 This product uses a lithium-ion secondary battery. Before exporting, check the laws and regulations of the destination country.

Cameras peripheral devices

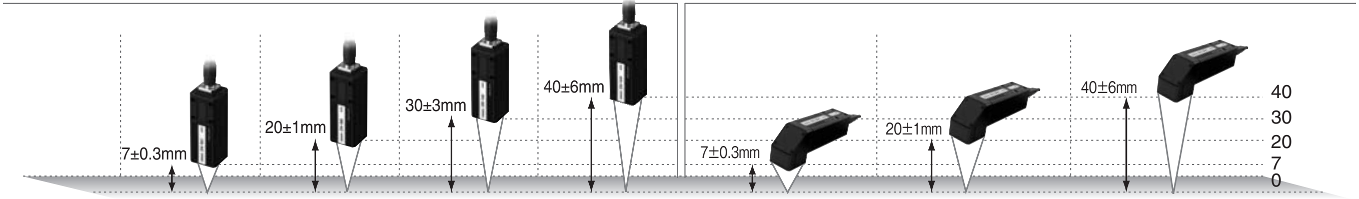
Type	Model	Remarks
CCTV Lenses	3Z4S-LE Series	**Refer to Vision Accessory Catalog(Q198)**
External Lightings	FLV Series	
	FL Series	

Ordering Information

Sensor Head

● Sensor Head

Straight type **Right-angle type**



Measuring range	7±0.3mm	20±1mm	30±3mm	40±6mm	7±0.3mm	20±1mm	40±6mm
Spot diameter	18μm dia.	40μm dia.	60μm dia.	80μm dia.	18μm dia.	40μm dia.	80μm dia.
Static resolution	0.25μm	0.25μm	0.25μm	0.25μm	0.25μm	0.25μm	0.25μm
Model	**ZW-S07 2M**	**ZW-S20 2M**	**ZW-S30 2M**	**ZW-S40 2M**	**ZW-SR07 2M**	**ZW-SR20 2M**	**ZW-SR40 2M**
	ZW-S07 0.3M	**ZW-S20 0.3M**	**ZW-S30 0.3M**	**ZW-S40 0.3M**	**ZW-SR07 0.3M**	**ZW-SR20 0.3M**	**ZW-SR40 0.3M**

Note: When ordering, specify the cable length (0.3 m, 2.0 m).

Controller with EtherCAT

Appearance	Power supply	Output type	Model
	DC24V	NPN	**ZW-CE10T**
		PNP	**ZW-CE15T**

Cable

Appearance	Item	Cable length	Model
	Sensor Head - Controller Extension Fiber Cable (flexible cable) (Fiber Adapter ZW-XFC provided)	2m	**ZW-XF02R**
		5m	**ZW-XF05R**
		10m	**ZW-XF10R**
		20m	**ZW-XF20R**
		30m	**ZW-XF30R**
	Fiber Adapter (between Sensor Head pre-wired cable and Extension Fiber Cable)	—	**ZW-XFC**
	Parallel cable for ZW-CE1□T 32-pole (included with Controller ZW-CE1□T)	2m	**ZW-XCP2E**
	RS-232C Cable for personal computer	2m	**ZW-XRS2**
	RS-232C Cable for PLC/programmable terminal	2m	**ZW-XPT2**

Accessories

Item	Model
Fiber Connector Cleaner	**ZW-XCL**

Note: Place orders in units of boxes (containing 10 units).

Ordering Information

Sensor Communication Unit

Product name	Power Supply Voltage	Power Supply	Model
EtherCAT Communications Unit	DC24V	Supplied from terminal block connector	**E3NW-ECT**

Distributed Sensor Unit

Product name	Power Supply Voltage	Power Supply	Model
Distributed Sensor Unit	DC24V	Supplied from terminal block connector through the sensor communication unit	**E3NW-DS**

Note: Please read and understand the important precautions and reminders described on the manuals (E429) of E3NW-ECT, before attempting tostart operation.

Connectable Sensors (Amplifier Units)

Product name	Connection Method	Power Supply	Model
Smart Fiber Amplifier Unit	Connect to a sensor communication unit, distributed unit and amplifier units by connectors	Supplied from the connector through the sensor communication unit and distributed unit	**E3NX-FA0**
Smart Laser Amplifier Unit			**E3NC-LA0**
Smart Laser Amplifier Unit (CMOS type)			**E3NC-SA0**
Smart Contact Amplifier Unit			**E9NC-TA0**

Note: Please read and understand the important precautions and reminders described on the instruction sheet bundled to the product, before attempting to start operation.

EtherCAT Communications Cables

Refer to Connecting cable with NJ-series Controller for the recommended cables.

Fiber Sensors/Laser Photoelectric Sensor/Proximity Sensor
E3X/E3C-LDA/E2C-EDA
(Sensor Communications Unit connection series)

Ordering Information

Sensor Communications Unit

Product name	Power Supply Voltage	Power Supply	Model
EtherCAT Communications Unit	DC24V	Supplied from terminal block connector	**E3X-ECT**

Note: Please read and understand the important precautions and reminders described on the manuals (E413) of E3X-ECT, before attempting to start operation.

Connectable Sensors (Amplifier Units)

Product name	Connection Method	Power Supply	Model
Standard Fiber Amplifier Unit	Connect to a sensor communication unit and amplifier units by connectors	Supplied from the connector through the sensor communication unit	**E3X-HD0**
Two-channel Fiber Amplifier Unit			**E3X-MDA0**
High-functionally Fiber Amplifier Unit			**E3X-DA0-S**
Laser Photoelectric Sensor Amplifier Unit			**E3C-LDA0**
Proximity Sensor Amplifier Unit			**E2C-EDA0**

Note: Please read and understand the important precautions and reminders described on the instruction sheet bundled to the product, before attempting to start operation.

EtherCAT Communications Cables

Refer to Connecting cable with NJ-series Controller for the recommended cables.

EtherCAT Remote I/O Terminal GX-Series

Interpreting Model Numbers

GX-□□ □□ □ □ □

1 2 3 4 5

1) Type

Code	Specifications
ID	DC Input
OD	DC Output
MD	DC Input/Output
OC	Relay Output
AD	Analog Input
DA	Analog Output
EC	Encoder Input

2) Number of I/O point

Code	Specifications
02	2 points (2CH)
04	4 points (4CH)
16	16 points
32	32 points

3) Input/Output type

Code	Digital Input/ Digital Output type	Analog Input/ Analog Output type	Encoder Input Type
1	NPN/Sinking	–	Open collector input, NPN
2	PNP/Sourcing	–	–
4	–	–	Line driver input, PNP
7	–	Multi 1 (Current/Voltage)	–

4) Connecting

Code	Specifications
1	Screw (Common) (2-tier Terminal Block)
2	Screw (Divided common) (3-tier Terminal Block)
8	e-CON

5) Figure/Function

Code	Digital Input/ Digital Output type	Analog Input/ Analog Output type	Encoder Input Type
None	Horizontal type	Standard type	–

Ordering Information

Digital I/O Terminal

Terminal Block Type

Name	Specifications			Model	Standards
2-tier terminal blocks	Inputs	16 inputs	NPN	**GX-ID1611**	UC1, N, L, CE
			PNP	**GX-ID1621**	
	Outputs	16 outputs	NPN	**GX-OD1611**	
			PNP	**GX-OD1621**	
	Outputs	16 outputs	Relay	**GX-OC1601**	
	Inputs/Outputs	8 inputs/8 outputs	NPN	**GX-MD1611**	
			PNP	**GX-MD1621**	
3-tier terminal blocks	Inputs	16 inputs	NPN	**GX-ID1612**	
			PNP	**GX-ID1622**	
	Outputs	16 outputs	NPN	**GX-OD1612**	
			PNP	**GX-OD1622**	
	Inputs/Outputs	8 inputs/8 outputs	NPN	**GX-MD1612**	
			PNP	**GX-MD1622**	

e-CON Connector Type

Name	Specifications			Model	Standards
e-CON Connector Type	Inputs	16 inputs	NPN	**GX-ID1618**	UC1, N, L, CE
			PNP	**GX-ID1628**	
	Outputs	16 outputs	NPN	**GX-OD1618**	
			PNP	**GX-OD1628**	
	Inputs/Outputs	8 inputs/8 outputs	NPN	**GX-MD1618**	
			PNP	**GX-MD1628**	
	Inputs	32 inputs	NPN	**GX-ID3218**	
			PNP	**GX-ID3228**	
	Outputs	32 outputs	NPN	**GX-OD3218**	
			PNP	**GX-OD3228**	
	Inputs/Outputs	16 inputs/16 outputs	NPN	**GX-MD3218**	
			PNP	**GX-MD3228**	

Analog I/O Terminal

2-tier Terminal Block Type

Name	Specifications		Model	Standards
2-tier terminal block type	Analog inputs	4 inputs	**GX-AD0471**	UC1, N, L, CE
	Analog outputs	2 outputs	**GX-DA0271**	

Encoder Input Terminal

3-tier Terminal Block Type

Name	Specifications		Model	Standards
3-tier Terminal Block Type	Open collector inputs	2 inputs	**GX-EC0211**	UC1, N, L, CE
	Line driver inputs	2 inputs	**GX-EC0241**	

Expansion Units

Name	Specifications				Model	Standards
Expansion Units	Inputs	8 inputs	NPN	One Expansion Unit can be mounted to one GX-ID16□1/OD16□1/ OC1601 Digital I/O Terminal.	**XWT-ID08**	UC1, N, CE
			PNP		**XWT-ID08-1**	
	Outputs	8 outputs	NPN		**XWT-OD08**	
			PNP		**XWT-OD08-1**	
	Inputs	16 inputs	NPN		**XWT-ID16**	
			PNP		**XWT-ID16-1**	
	Outputs	16 outputs	NPN		**XWT-OD16**	
			PNP		**XWT-OD16-1**	

EtherCAT Communications Cables

Refer to Connecting cable with NJ-series Controller for the recommended cables.

Related Manuals

NJ-Series

Cat. No.	Model number	Manual
W513	NJ501/NJ301-□□□□	NJ-Series Startup Guide (CPU Unit)
W514	NJ501/NJ301-□□□□	NJ-Series Startup Guide (Motion Control)
W500	NJ501/NJ301-□□□□	NJ-series CPU Unit Hardware User's Manual
W501	NJ501/NJ301-□□□□	NJ-series CPU Unit Software User's Manual
W507	NJ501/NJ301-□□□□	NJ-series CPU Unit Motion Control User's Manual
W527	NJ501-1□20	NJ-series Database Connection CPU Units User's Manual
W528	NJ501-1340	NJ-series NJ501-1340 SECS/GEM CPU Units User's Manual
W505	NJ501/NJ301-□□□□	NJ-series CPU Unit Built-in EtherCAT Port User's Manual
W506	NJ501/NJ301-□□□□	NJ-series CPU Unit Built-in EtherNet/IP Port User's Manual
W502	NJ501/NJ301-□□□□	NJ-series Instructions Reference Manual
W508	NJ501/NJ301-□□□□	NJ-series Motion Control Instructions Reference Manual
W503	NJ501/NJ301-□□□□	NJ-series Troubleshooting Manual
W490	CJ1W-AD0□□-□□/-DA0□□□/-MAD42	CJ-series Analog I/O Units Operation Manual for NJ-series CPU Unit
W498	CJ1W-PDC15/-AD04U/-PH41U	CJ-series Analog I/O Units Operation Manual for NJ-series CPU Unit
W491	CJ1W-TC003/-TC004/-TC103/-TC104	CJ-series Temperature Control Units Operation Manual for NJ-series CPU Unit
Z317	CJ1W-V680C11/-V680C12	CJ-series ID Sensor Units Operation Manual for NJ-series CPU Unit
W492	CJ1W-CT021	CJ-series High-speed Counter Units Operation Manual for NJ-series CPU Unit
W494	CJ1W-SCU□	CJ-series Serial Communication Units Operation Manual for NJ-series CPU Unit
W495	CJ1W-EIP21	CJ-series EtherNet/IP Units Operation Manual for NJ-series CPU Unit
W497	CJ1W-DRM21	CJ-series DeviceNet Units Operation Manual for NJ-series CPU Unit
W493	CJ1W-CRM21	CJ-series CompoNet Master Units Operation Manual for NJ-series CPU Unit
W541	CJ1W-ECT21	CJ-ECAT Slave Unit User's Manual for CJ-series CPU Unit
W542	CJ1W-ECT21	CJ-ECAT Slave Unit User's Manual for NJ-series CPU Unit

Sysmac Studio

Cat. No.	Model number	Manual
W504	SYSMAC-SE2□□□	Sysmac Studio version 1 OPERATION MANUAL
V099	---	CX-Designer Ver.3.□ User's Manual
W464		CS/CJ/CP/NSJ Series CXIntegrator Ver.2.□ OPERATION MANUAL
W344		CX-Protocol OPERATION MANUAL
V117	NA5-15 NA5-12 NA5-9 NA5-7	NA-series Programmable Terminal Hardware UserÅfs Manual
V118	NA5-15 NA5-12 NA5-9 NA5-7	NA-series Programmable Terminal Software User's Manual
V119	NA5-15 NA5-12 NA5-9 NA5-7	NA-series Programmable Terminal Device Connection UserÅfs Manual
V120	NA5-15 NA5-12 NA5-9 NA5-7	NA-series Programmable Terminal Startup Guide

Programmable Terminals NA-Series

Cat. No.	Model number	Manual
V117	NA5-15 NA5-12 NA5-9 NA5-7	NA-series Programmable Terminal Hardware User's Manual
V118	NA5-15 NA5-12 NA5-9 NA5-7	NA-series Programmable Terminal Software User's Manual
V119	NA5-15 NA5-12 NA5-9 NA5-7	NA-series Programmable Terminal Device Connection User's Manual
V120	NA5-15 NA5-12 NA5-9 NA5-7	NA-series Programmable Terminal Startup Guide

EtherCAT Slave Terminals NX-series

Cat. No.	Model number	Manual
W519	NX-ECC201 NX-ECC202	NX-series EtherCAT Coupler Units User’s Manual
W521	NX-ID□□□□ NX-IA□□□□ NX-OD□□□□ NX-OC□□□□ NX-MD□□□□	NX-series Digital I/O Units User’s Manual
W522	NX-AD□□□□ NX-DA□□□□ NX-TS□□□□ NX-IA□□□□	NX-series Analog I/O Units User’s Manual
W524	NX-EC0□□□ NX-ECS□□□ NX-PG0□□□	NX-series Position Interface Units User’s Manual
W523	NX-PD1□□□ NX-PF0□□□ NX-PC0□□□ NX-TBX01	NX-series System Units User’s Manual
W525	NX-□□□□□□	NX-series Data Reference Manual

Safety Control Unit NX-series

Cat. No.	Model number	Manual
Z930	NX-SL□□□□ NX-SI□□□□ NX-SO□□□□	NX-series Safety Control Unit User's Manual
Z931	NX-SL□□□□	NX-series Safety Control Unit Instructions Reference Manual

G5-Series

Cat. No.	Model number	Manual
I576	R88D-KN□-ECT/R88M-K	G5-SERIES EtherCAT Communications AC SERVOMOTOR AND SERVO DRIVE USER'S MANUAL
I577	R88D-KN□-ECT-L/R88L-EC	G5-SERIES EtherCAT Communications Linear Motor Type LINEARMOTOR AND DRIVE USER'S MANUAL

MX2-Series V1 type/RX-Series V1 type

Cat. No.	Model number	Manual
I585	3G3MX2-□□□□□-V1	Multi-function Compact Inverter MX2-series V1 type USER'S MANUAL
I578	3G3RX-□□□□□-V1	High-function General-purpose Inverter RX-Series V1 type USER'S MANUAL
I574	3G3AX-MX2-ECT/3G3AX-RX-ECT	MX2-series V1 type/RX-series V1 type EtherCAT Communication Unit USER'S MANUAL

FH-Series

Cat. No.	Model number	Manual
Z340	FH/FZ5	Vision System FH/FZ5 Series User's Manual
Z341	FH/FZ5	Vision System FH/FZ5 Series Processinng Item Function Reference Manual
Z342	FH/FZ5	Vision System FH/FZ5 Series User's Manual for Communications Settings
Z343	FH	Vision System FH Series Operation Manual for Sysmac Studio

FQ-M-Series

Cat. No.	Model number	Manual
Z314	FQ-MS□□□(-M) FQ-MS□□□(-M)-ECT	Specialized Vision Sensor for Positioning FQ-M-Series User's Manual

ZW-Series

Cat. No.	Model number	Manual
Z332	ZW-CE1□T	Displacement Measurement Sensor ZW-CE1□T-Series User's Manual

Fiber/Laser Photoelectric/Contact Sensors N-Smart

Cat. No.	Model number	Manual
E429	E3NW-ECT	EtherCAT Sensor Communications Unit Operation Manual

Fibers/Laser Photoelectric/Proximity Sensor

Cat. No.	Model number	Manual
E413	E3X-ECT	EtherCAT Sensor Communications Unit Operation Manual

GX-Series

Cat. No.	Model number	Manual
W488	GX-□□□□□□□	GX-Series EtherCAT Slave USER'S MANUAL

MEMO

Terms and Conditions of Sale

1. Offer; Acceptance. These terms and conditions (these "Terms") are deemed part of all quotes, agreements, purchase orders, acknowledgments, price lists, catalogs, manuals, brochures and other documents, whether electronic or in writing, relating to the sale of products or services (collectively, the "Products") by Omron Electronics LLC and its subsidiary companies ("Omron"). Omron objects to any terms or conditions proposed in Buyer's purchase order or other documents which are inconsistent with, or in addition to, these Terms.
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